Buena Vista Landfill Redevelopment Project
Draft Environmental Impact Report
Appendices G-T

State Clearinghouse #2024020617

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Appendix G1.1. Special-Status Plants with Potential to Occur

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APPENDIX G1.1 STATUS, DISTRIBUTION AND HABITAT OF SPECIAL-STATUS PLANTS WITH POTENTIAL TO OCCUR IN THE VICINITY OF THE PROPOSED BUENA VISTA LANDFILL REDEVELOPMENT PROJECT AREA AND ALTERNATIVE 3 PROJECT AREA.

***Scientific Name*[1] Common Name**	**USFWS Listing[2]**	**State Status[3]**	**CNPS Status[4]**	**Habitat Type[5]**	**Distribution by County[6]**	**Blooming Period[7]**	**Potential for Occurrence**	
							Proposed Project	**Alternative 3**
Amsinckia lunaris bent-flowered fiddleneck	None	None	List 1B.2	Cismontane woodland, valley and foothill grassland, coastal bluff scrub. 10-1640 ft.	ALA, COL, CCA, LAK, MRN, NAP, SFO, SMT, SCL, SCR, SON, SUT, YOL	March-June	**LOW** Some potential for occurrence in the coast live oak woodland and disturbed non-native grasslands of the portion of the Study Area bordering the Ellicott Slough NWR. However, this species is not documented to occur in southern Santa Cruz County and was not observed during May and July 2022 or June and July 2025 focused rare plant surveys. Nearest known extant occurrence documented in Scott's Valley, approximately 14 miles northwest of the Study Area (CNDDB 2026a,b; Calflora 2026a).	**LOW** The Study Area for Alternative 3 provides some potential for occurrence in the openings of coast live oak woodland and formerly grazed grassland on the upper terrace west of the proposed Project area. However, this species was not observed during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest documented extant occurrence of this species.
Calandrinia breweri Brewer's calandrinia	None	None	List 4.2	Chaparral, coastal scrub; sandy or loamy, disturbed sites and burns. 35-4005 ft.	CCA, ELD, LAX, MRN, MPA, MNT, NAP, ORA, RIV, SDG, SLO, SMT, SBA, SCL, SCR, SON, VEN, Baja California	(January) March-June	**LOW** Although the Study Area supports disturbed loamy soils, suitable chaparral and coastal scrub habitat is limited and lacks suitable microsite edaphic conditions for the species (i.e., openings, indurate sand). This species was not observed during May and July 2022 or June and July 2025 focused rare plant surveys. Nearest known extant occurrences are documented at Elkhorn Slough Reserve, approximately 8 miles southeast of the Study Area (Calflora 2026b) and Quail Hollow Ranch County Park, 18 miles northwest of the Study Area (Calflora 2026c).	**LOW** This species is known from disturbed sites, but typically occurs in maritime chaparral in sandy soils which is not present within the Alternative 3 Study Area. This species was not observed within the Study Area for Alternative 3 during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest documented extant occurrence of this species.

Appendix G1.1 Special-Status Plants with Potential to Occur

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Carex comosa bristly sedge	None	None	List 2B.1	Marshes and swamps, lake margins, coastal prairie, mesic depressions in valley and foothill grassland. 0-2050 ft.	CCA, FRE, LAK, MEN, SAC, SBD*, SFO*, SJQ, SMT, SCR, SHA, SON, Idaho, Oregon, Washington, other states	May-September	**LOW** Wetlands within the Project Study Area were not observed to support hydrophytic (i.e., wetland) *Carex* species. Moreover, this species is likely extirpated from Santa Cruz County. Bristly sedge was not observed during May and July 2022 or June and July 2025 focused rare plant surveys. Nearest known extant occurrence was documented in Nisene Marks State Park, approximately 8.6 miles northwest of the Study Area (Calflora 2026d).	**LOW** The seasonal wetlands and freshwater marsh within the Alternative 3 Study Area were not observed to support hydrophytic *Carex* species. This species was not observed during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest documented extant occurrence of this species.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	None	None	List 1B.1	Valley and foothill grassland; alkaline soils. 0-755 ft.	ALA, CCA, MNT, SLO, SMT, SCL, SCR*, SOL*	(April)May-October (November)	**LOW** Congdon's tarplant is known to occur in disturbed non-native grassland and ruderal habitats; however, alkaline soils were not observed directly within the Study Area. This species was not observed during May and July 2022 or June and July 2025 focused rare plant surveys. The nearest extant occurrences are documented at Ellicott Slough Wildlife Refuge, 0.4 miles northeast of the Study Area (CNDDB 2026a,b; Calflora 2026e) and Kelly Lake, approximately 4 miles east of the Study Area (Calflora 2026f).	**LOW** Alkaline soils known to support this species are not present within the Study Area for Alternative 3. This species was not observed during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest extant occurrences of this species.

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Chorizanthe pungens var. *pungens* Monterey spineflower	Threatened	None	List 1B.2	Maritime chaparral, cismontane woodland coastal dunes, coastal scrub, valley and foothill grassland; sandy soils. 10-1475 ft.	MNT, SCR, SLO*	April-June (July-August)	**NONE** Sandy, well drained soils known to support this species are not present within the Study Area. This species was not observed during May and July 2022 or June 2025 focused rare plant surveys. The nearest extant occurrences are documented near Rancho Road, Watsonville, approximately 1.5 miles northwest of the Study Area (Calflora 2026g), and Pajaro Dunes, approximately 2.8 miles south of the Study Area (CNDDB 2026a,b; Calflora 2026h).	**NONE** Sandy, well drained soils known to support this species are not present within the Alternative 3 Study Area. This species was not observed during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest extant occurrences of this species.

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Chorizanthe robusta var. *robusta* robust spineflower	Endangered	None	List 1B.1	Coastal dunes, coastal scrub, openings in cismontane woodland, coastal prairie; sandy or gravelly (often alluvial) soil. 10-985 ft.	ALA*, SCL*, SCR, SFO, SMT*	April-September	**MODERATE** Suitable openings with gravelly, alluvial soils present within limited portions of the Gallighan Slough drainage bisecting the Study Area. This species was not observed during May and July 2022 or June and July 2025 focused rare plant surveys. The nearest extant occurrence is 0.5 miles south of the Study Area in an opening with sandy alluvial soil immediately adjacent to Harkins Slough near the confluence with Gallighan Slough (CNDDB 2026a,b; SJSU Herbarium 2025). This occurrence was confirmed extant by ESW in June 2025. Additional occurrence locations for robust spineflower include Whiskey Hill Road, Watsonville, approximately 1 mile northwest of the Study Area (Calflora 2026i), Ellicott Slough National Wildlife Refuge, approximately 1.3 miles northwest of the Study Area (CNDDB 2026a,b), Manresa State Beach, approximately 2.2 miles west of the Study Area (Brinegar 2004), and Sunset State Beach, approximately 2.3 miles southwest of the Study Area (Calflora 2026j).	**MODERATE** There are no locations with sandy or gravelly alluvium or similar substrates that support this species. Robust spineflower was not observed during 2018, 2025, and 2026 focused rare plant surveys. A nearby reference population adjacent to Harkins Slough near the confluence with Gallighan Slough was visited prior to conducting 2026 floristic surveys of the Alternative 3 Study Area to confirm blooming phenology. See Proposed Project for nearest extant occurrences of this species.

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Elymus californicus California bottle-brush grass	None	None	List 4.3	Broadleaved upland forest, cismontane woodland, North Coast coniferous forest, riparian woodland. 50-1540 ft.	MRN, SDG, SCR, SMT, SON	May-August (November)	**LOW** Limited potential for occurrence within Coast live oak (broadleaved upland) forest habitat within the Study Area, particularly on the slope above the Ellicott Slough NWR (Harkins Slough). This species was not observed during July 2022 or July 2025 focused rare plant surveys. Common blue wildrye (*Elymus glaucus*) was observed in the oak woodland and surrounding ecotones. The nearest extant occurrence is documented at Mangles Gulch, Aptos, approximately 6.75 miles northwest of the Study Area (Calflora 2026k).	**LOW** Potential to occur in coast live oak forest within the Study Area east of the proposed Alternative 3 combined facilities Project area. This species was not observed within the Study Area for Alternative 3 during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest extant occurrence of this species.
Gilia tenuiflora ssp. *Arenaria* Monterey gilia	Endangered	Threatened	List 1B.2	Maritime chaparral, cismontane woodland, maritime chaparral, coastal dunes, coastal scrub, valley and foothill grassland; sandy openings. 0-150 ft.	MNT, SCR	April-June	**NONE** Suitable openings in maritime chaparral or sandy (aeolian) dunes are not present within the Study Area. This species was not observed during May 2022 or June 2025 focused rare plant surveys. The nearest extant occurrence is documented at Sunset Beach State Park in coastal dune mat/scrub, approximately 2.85 miles southwest of the Study Area (CNDDB 2026a,b; Calflora 2026l).	**NONE** Suitable openings in maritime chaparral or sandy (aeolian) dunes are not present within the Study Area for Alternative 3. This species was not observed during 2018, 2025, and 2026 focused rare plant surveys of the Alternative 3 Study Area. This species is not expected within the Study Area, and additional focused surveys are not recommended. See Proposed Project for nearest extant occurrence of this species.

Appendix G1.1 Special-Status Plants with Potential to Occur

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Holocarpha macradenia Santa Cruz tarplant	Threatened	Endangered	List 1B.1	Coastal prairie, valley and foothill grassland, coastal scrub, often in clay or sandy soils. 35-720 ft.	ALA*, CCA*, MNT, MRN*, SCR	June-October	**LOW** Found in poor quality annual grassland and coastal prairie habitat less than one linear mile northeast of the Study Area. However, this species has never been observed from this location and typically requires continuous ongoing disturbance (e.g. grazing, mowing) for viability. Not expected to occur on site and not observed during the May and July 2022 and June and July 2025 focused rare plant surveys, or subsequent site visits during the blooming period. The nearest extant occurrences include the east side of Harkins Slough, approximately 0.65 miles southeast of the Study Area (CNDDB 2026a,b), near Larkin Valley Road, approximately 1.2 miles northeast of the Study Area (Calflora 2026m), Watsonville Municipal Airport, approximately 1.65 miles northeast of the Study Area (Calflora 2026n), and on a hill overlooking Struve Slough, approximately 1.5 miles southeast of the Study Area (Calflora 2026o).	**MODERATE** Potential for occurrence in formerly grazed mesic coastal prairie habitat located within the Study Area on the upper terrace west of the Alternative 3 Project area. Santa Cruz tarplant was not observed within the Study Area for Alternative 3 during 2018, 2025, and 2026 focused rare plant surveys. Nearby reference populations in Watsonville were visited prior to conducting floristic surveys of the Alternative 3 Study Area for Santa Cruz tarplant. See Proposed Project for nearest extant occurrences of this species.

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Hosackia gracilis harlequin lotus	None	None	List 4.2	Moist to wet places, broadleaved upland forest, coastal scrub, coastal bluff scrub, closed-cone coniferous forest, cismontane woodland, coastal prairie, meadows and seeps, marshes, north coast coniferous forest, valley and foothill grassland. 0-2295 ft.	DNT, HUM, MRN, MEN, MNT, SFO, SLO, SMT, SCL, SCR, SON, Oregon, Washington	March-July	**LOW** Potential for occurrence along margins of freshwater marsh wetland and seasonal wetland (swale) habitat within the Study Area. This species is most commonly found in mesic coastal prairie grassland and other wet meadows. Harlequin lotus was not observed during May and July 2022 or June and July 2025 focused rare plant surveys. The nearest extant occurrence is documented at Long Valley in the Elkhorn Slough Reserve approximately 5.5 miles southeast of the Study Area (Calflora 2026p).	**LOW** Potential for occurrence in mesic coastal prairie depressions and along margins of freshwater marsh wetland within the Alternative 3 Study Area. However, Harlequin lotus was not observed during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest extant occurrence of this species.
Iris longipetala coast iris	None	None	List 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps. 0-1970 ft.	ALA, CCA, ELD, GLE, HUM, MRN, MEN, MER, MNT, SFO, SMT, SCL, SCR, SOL, SON, VEN	March-May (June)	**NONE** No suitable habitat present within the Project Study Area. See Alternative 3 for nearest extant occurrences of this species.	**LOW** Potential for occurrence in patchy coastal prairie and seasonal wetland seep within the Alternative 3 Study Area. This species was not observed during 2018 and 2026 focused rare plant surveys. Only two documented occurrences of this species are known from Santa Cruz County, in Scotts Valley and Ben Lomond, located approximately 14.5 miles and 26 miles northwest of the Study Area, respectively (Calflora 2026q; Calflora 2026r).

Appendix G1.1 Special-Status Plants with Potential to Occur

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Perideridia gairdneri ssp. *gairdneri* Gairdner's yampah	None	None	List 4.2	Moist sites in coastal prairie, broadleaved upland forest, chaparral, valley and foothill grassland, vernal pools. 0-2000 ft.	DNT, KRN, MRN, MEN, MNT, NAP, SLO, SMT (?), SCL, SCR, SCZ, SOL, SON	June-October	**LOW** Suitable annual grassland and seasonal wetland (swale) habitat located within the Study Area. However, this species was not observed during July 2022 or June and July 2025 focused rare plant surveys. The nearest extant occurrence is documented near Soquel along Rodeo Gulch, approximately 10.5 miles northwest of the Study Area (Calflora 2026s).	**LOW** Mesic coastal prairie grassland on the upper terrace west of the Alternative 3 combined facilities Project Area has potential to support Gairdner's yampah This species was not observed within the Study Area for Alternative 3 during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest documented extant occurrence of this species.
Plagiobothrys chorisianus var. *chorisianus* Choris' popcorn-flower	None	None	List 1B.2	Moist places in chaparral, coastal prairie, coastal scrub. 10-525 ft.	ALA(?), MNT, SCL, SCR, SFO, SMT	March-June	**NONE** No suitable habitat present within the Project Study Area. See Alternative 3 for nearest extant occurrence of this species.	**MODERATE** Suitable mesic coastal prairie (depressions) and seasonal wetland habitat present within the Study Area for Alternative 3. This species was not observed during 2018 and 2026 surveys of the Alternative 3 Study Area. The nearest extant occurrence is documented at the Watsonville Municipal Airport, approximately 1.6 miles northeast of the Study Area (CNDDBa,b; Taylor 1994).
Plagiobothrys chorisianus var. *hickmanii* Hickman's popcorn-flower	None	None	List 4.2	Moist places in closed – cone coniferous forest, chaparral, coastal scrub, marshes and swamps, vernal pools. 50-1280 ft.	MNT, SCL, SCR, SLO, SMT (?)	April-June	**NONE** No suitable habitat present within the Project Study Area. See Alternative 3 for nearest extant occurrence of this species.	**LOW** Suitable seasonal wetland seep habitat located within western portion of the Alternative 3 Study Area beyond the limits of the combined facilities Project area. This species was not observed during 2018 and 2026 focused rare plant surveys of the Alternative 3 Study Area. The nearest extant occurrence is documented at the Glenwood Preserve in Scotts Valley approximately 14.5 miles northwest of the Study Area (Calflora 2026u).

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Plagiobothrys diffusus San Francisco popcornflower	None	Endangered	List 1B.1	Coastal prairie, valley and foothill grassland. 195-1180 ft.	ALA, SBT, SCR, SFO*, SMT	March-June	**NONE** No suitable habitat present within the Proposed Project Study Area. See Alternative 3 for nearest extant occurrence of this species.	**MODERATE** Potential for occurrence in remnant mesic coastal prairie within the Study Area for Alternative 3. However, the degraded nature of most grassland habitat within the Study Area is not likely to support this species. San Francisco popcornflower was not observed during 2018 and 2026 focused rare plant surveys. The nearest extant occurrence is documented at the Watsonville Municipal Airport, approximately 1.6 miles northeast of the Study Area (CNDDBa,b; Calflora 2026v)
Sanicula hoffmannii Hoffmann's sanicle	None	None	List 4.3	Broadleaved upland forest, mixed evergreen forest, chaparral, coastal scrub; serpentinite or clay. 100-985 ft.	MNT, SBA, SCR, SLO, SMT	March-May	**NONE** No suitable habitat present within the Project Study Area. See Alternative 3 for nearest extant occurrence of this species.	**LOW** The oak woodland habitat lacks serpentine or clay substrates known to support this species. This species was not observed during 2018 and 2026 focused rare plant surveys of the Alternative 3 Study Area. The nearest extant occurrence is documented at Sunset Beach State Park, approximately 2.9 miles southwest of the Study Area (Calflora 2026w).
Sidalcea malachroides maple-leaved checkerbloom	None	None	List 4.2	Broadleaved upland forest, coastal prairie, coastal scrub, valley and foothill grassland; sandy areas 0-2395 ft.	DNT, HUM, MEN, MNT, SCL, SCR, SON, (OR)	(March) April-August	**LOW** Some potential for occurrence in coast live oak woodland habitat, but this species usually occurs in sandy soils which are not found in broadleaved upland forests of the Study Area. This species was not observed during July 2022 or June and July 2025 focused rare plant surveys. The nearest occurrence is documented near Trout Gulch Road, Aptos, approximately 7 miles northwest of the Study Area (Calflora 2026x).	**LOW** The coastal prairie and coast live oak woodland of the Alternative 3 Study Area lacks sandy, well drained soils. This species was not observed within the Study Area for Alternative 3 during 2018, 2025, and 2026 focused rare plant surveys. See Proposed Project for nearest extant occurrence of this species.

Appendix G1.1 Special-Status Plants with Potential to Occur

Scientific Name[1] Common Name	USFWS Listing[2]	State Status[3]	CNPS Status[4]	Habitat Type[5]	Distribution by County[6]	Blooming Period[7]	Potential for Occurrence	
							Proposed Project	Alternative 3
Trifolium buckwestiorum Santa Cruz clover	None	None	List 1B.1	Coastal prairie; often along margins of broadleaved upland forest, cismontane woodland. 115-2000 ft.	MEN, MNT, SCL, SCR, SMT, SON	April-October	**NONE** No suitable habitat present within the Project Study Area. See Alternative 3 for nearest documented extant occurrence of this species.	**LOW** Suitable coastal prairie habitat is present within the Study Area but ecotones/ margins of this habitat type are limited to non-native (eucalyptus) forest, ruderal, and disturbed areas which do not typically support Santa Cruz clover. This species was not observed during 2018 and 2026 focused rare plant surveys. The nearest extant occurrence in similar coastal prairie habitat is documented approximately 9 miles north of the Study Area (CNDDB 2026a,b; Calflora 2026y).

* Presumed extinct in these counties or states

[1] Nomenclature follows Baldwin et al (2012) Hickman (1993); Tibor (2001); California Native Plant Society (2026).
[2] U.S. Fish and Wildlife Service (2026).
[3] Section 1904, California Fish and Game Code (CFGC 2025).
[4] Tibor (2001); California Native Plant Society (2018).
CNPS Lists:
- List 1A: Presumed extinct in California.
- List 1B: Rare, Threatened, or Endangered in California and elsewhere.
- List 2: Rare, Threatened, or Endangered in California, more common elsewhere.
- List 3: Plants about which more information is needed.
- List 4: Plants of limited distribution: a watch list.

Threat Code extensions:
1: Seriously endangered in California.
2: Fairly endangered in California.
3 Not very endangered in California.

[5] Thomas (1960); Munz and Keck (1973); Hickman (1993); Baldwin et al (2012); Tibor (2001); California Native Plant Society (2026); and unpublished information.
[6] Tibor (2001); California Native Plant Society (2026); and unpublished information; counties abbreviated by a three-letter code (below); occurrence in other states as indicated.
[7] Munz and Keck (1973); Tibor (2001); California Native Plant Society (2026).

Appendix G1.1 Special-Status Plants with Potential to Occur

NOTES:

ALA: Alameda
AMA: Amador
BUT: Butte
CCA: Contra Costa
COL: Colusa
DNT: Del Norte
FRE: Fresno
GLE: Glenn
HUM: Humboldt
KRN: Kern
LAK: Lake
LAX: Los Angeles
MAD: Madera
MEN: Mendocino
MER: Merced
MNT: Monterey
MOD: Modoc
MPA: Mariposa
MRN: Marin
NAP: Napa
NEV: Nevada
ORA: Orange
PLA: Placer
PLU: Plumas
RIV: Riverside
SAC: Sacramento
SBA: Santa Barbara
SBD: San Bernardino
SBT: San Benito
SCL: Santa Clara
SCR: Santa Cruz
SCZ: Santa Cruz Island (SBA Co.)
SDG: San Diego
SFO: San Francisco
SHA: Shasta
SIE: Sierra
SIS: Siskiyou
SJQ: San Joaquin
SLO: San Luis Obispo
SMT: San Mateo
SOL: Solano
SON: Sonoma
SRO: Santa Rosa Island (SBA Co.)
STA: Stanislaus
SUT: Sutter
TEH: Tehama
TRI: Trinity
TUL: Tulare
TUO: Tuolumne
VEN: Ventura
YOL: Yolo
YUB: Yub

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Appendix G1.2. Plant Species Narratives

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Santa Cruz Tarplant (Holocarpha macradenia)

Santa Cruz tarplant (*Holocarpha macradenia*) is listed as a Federal Threatened (FT), State Endangered (SE), and CNPS California Rare Plant Rank (CRPR) 1B.1 rare plant species with extant populations occurring on flat to gently sloping marine terraces. Santa Cruz tarplant is an herbaceous annual in the Asteraceae (composite) family with a blooming period from June to October. Flowering individuals are usually most recognizable from June through early August when individuals are mature with multiple branching flowerheads and competing annual grasses and forbs have senesced. This species is known to occur primarily in Santa Cruz County and northern Monterey County with several disjunct occurrences in western Contra Costa County. In 2002, USFWS designated 2,902 acres of Critical Habitat for the species with emphasis on coastal terrace prairie with suitable soil types including Watsonville, Tierra, Elkhorn, Santa Inez, and Pinto Series. Commonly associated native plants include purple needlegrass (Stipa pulchra), California oatgrass (Danthonia californica), tarweeds (*Hemizonia spp., Centromadia spp.*), rushes (*Juncus spp.*), golden brodiaea (*Tritilea ixioides*), and blue-eyed grass (*Sisyrinchium bellum*). In general, Santa Cruz tarplant requires regular disturbance or compacted soils with reduced competition from annual, invasive grasses for germination and persistence in the landscape. Grazing, mowing, and/or burning are effective methods for maintaining or restoring Santa Cruz tarplant populations.

The nearest extant population of Santa Cruz tarplant is located at 521 Harkins Slough Road (High Ground Organics) in approximately 40-acres of open grassland placed in a conservation easement by the previous property owner (Open Space Alliance) in 2000. Population estimates vary annually and active management including grazing, seeding, and outplanting, was undertaken by Watsonville Wetlands Watch from 2006 through 2010, with additional management undertaken intermittently through the present. The largest annual population at this occurrence was observed in 2009, totaling 205 individuals. Santa Cruz tarplant was not observed at this location from 1993 until 2005 when 108 individuals were observed growing in a small patch in thin, clay soils on the edge of a grassland restoration project area. It is presumed the seedbank of longer-lived ray flower achenes remain dormant for 15 years or more until conditions are optimal for germination.

The Buena Vista Landfill Study Area is not situated within USFWS designated Critical Habitat for the Santa Cruz Tarplant, and no suitable habitat is present within the Project Area. Despite focused rare plant surveys of the property by EcoSystems West in May 2022, June and July 2025, and March and June 2026, along with multiple visits to reference sites, Santa Cruz tarplant was not observed within the Project areas or the surrounding Study Area.

Robust spineflower (Chorizanthe robusta var. robusta)

Robust spineflower is a Federal Threatened, State Endangered, and CRPR 1B.1 annual herb in the *Polygonaceae* (buckwheat) family with a geographic range limited almost entirely to central and southern Santa Cruz County. This species' growth habit is typically erect, although the occurrence at Sunset State Beach in aeolian hind dunes supports prostrate, spreading plants. Individual robust spineflower plants are typically less than 2.5 dm tall with hairy, oblanceolate leaves forming a distinctive basal rosette typical of the *Chorizanthe* genus. Leaf blades are 1.5-5 cm long and 0.3-1 cm wide; and flowers are oriented in a dense, cymose inflorescence. Flowers are subtended by two bracts and have a fused 2.5-4 mm involucral tube (sepals) with white margins and diagnostic hooked 0.7-1.3 mm awns. The perianth (petals) is often two-colored with a white tube and white to rose, jagged lobes. This species is limited entirely to sandy or gravelly aeolian or alluvial derived soils in inland or coastal marine deposits and outcrops. Robust spineflower generally occurs in openings in

chaparral, coastal scrub, and dune scrub habitats, or in sandy herb-dominated annual grasslands and meadows. This species is not documented to occur in the clayey soils typical of the majority of the Study Area; however, alluvial sediments deposits along the unnamed drainages and tributaries to Gallighan slough may support robust spineflower populations.

The nearest CNDDB documented occurrence of robust spineflower to Study Area was originally mapped at Land Trust of Santa Cruz County Watsonville Slough Farms property and assigned an approximate location by the California Consortium of Herbaria (CCH) based on a written description by the identifying botanist, Sandra Baron (pers comm January 2025). The written description by Ms. Baron identified the 2007 occurrence as located "near Harkins Slough at the edge of private property." To approximate this record, the CCH applied the latitudinal and longitudinal coordinates as (36.89674, -121.80066) (NAD83) which centers the occurrence near the Little Bee Barn at Watsonville Slough Farms. This area has not only been developed for many decades, it supports clayey Watsonville loam soils and lacks the sandy substrates and other habitat requirements for this species. On January 23, 2025, Ms. Baron confirmed in conversations with EcoSystems West that this occurrence was located directly across Harkins Slough west of the WSF Study Area boundary on a sand/gravel bar near the eastern terminus of Harkins Slough Road. Ms. Baron subsequently reported the recorded CNDDB occurrence location as an error to the CCH. In early June 2025, EcoSystems West confirmed the location of this occurrence in a sandy opening approximately 0.4 miles south of the Study Area (36.906317, -121.807256) immediately adjacent to the confluence of Harkins Slough and Gallighan Slough. Less than 50 individual plants were observed, but plants were readily identifiable at the time of the site visit with multiple erect, branching stems and distinctive white flowers.

Robust spineflower was not identified during multiple focused surveys of the Project areas or the surrounding Study Area, although EcoSystems West confirmed the species at reference sites visited during the same survey period. Suitable dry openings in sandy or gravelly soils, including areas with alluvial deposits, were not observed during focused rare plant surveys in May 2022, June and July 2025, and March and June 2026. As no suitable habitat occurs within the Project Area, and multiple rare plant surveys found no robust spineflower within the Project areas and surrounding Study Area, no additional surveys are recommended.

Appendix G1.3. Observed Plant Lists

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APPENDIX G1.3a. LIST OF VASCULAR PLANTS ENCOUNTERED DURING FLORISTIC SURVEYS OF THE BUENA VISTA LANDFILL REDEVELOPMENT STUDY AREA.

Scientific Name	Common Name	Status	Life History	Wetland Indicator
ANACARDIACEAE				
Toxicodendron diversilobum	Poison oak	native	Vine, Shrub	FACU
APIACEAE				
Berula erecta	Cut leaved water parsnip	native	Perennial herb	OBL
Conium maculatum	Poison hemlock	invasive non-native	Perennial herb	FACW
Foeniculum vulgare	Fennel	• invasive non-native	Perennial herb	NL/UPL
Oenanthe sarmentosa	Water parsley	native	Perennial herb	OBL
ARACEAE				
Lemna minor	Smaller duckweed	native	Perennial herb	OBL
ASTERACEAE				
Achillea millefolium	Yarrow	native	Perennial herb	FACU
Anthemis cotula	Dog fennel	non-native	Annual herb	FACU
Artemisia californica	Coastal sage brush	native	Shrub	NL/UPL
Baccharis glutinosa	Salt Marsh baccharis	native	Perennial herb	FACW
Baccharis pilularis	Coyote brush	native	Shrub	NL/UPL
Calendula arvensis	Field marigold	non-native	Annual herb	NL/UPL
Carduus pycnocephalus	Italian thistle	non-native	Annual herb	NL/UPL
Cirsium vulgare	Bullthistle	• invasive non-native	Perennial herb	FACU
Erigeron canadensis	Canada horseweed	native	Annual herb	FACU
Euthamia occidentalis	Western goldenrod	native	Perennial herb	FACW
Helminthotheca echioides	Bristly ox-tongue	• invasive non-native	Annual, Perennial herb	FAC
Hypochaeris glabra	Smooth cats ear	• invasive non-native	Annual herb	NL/UPL
Hypochaeris radicata	Hairy cats ear	• invasive non-native	Perennial herb	FACU
Lactuca serriola	Prickly lettuce	non-native	Annual herb	FACU
Leucanthemum maximum	Shasta daisy	non-native	Annual, Perennial herb	NL/UPL
Madia sativa	Coastal tarweed	native	Annual herb	NL/UPL
Pseudognaphalium californicum	Ladies' tobacco	native	Annual, Perennial herb	NL/UPL
Pseudognaphalium luteoalbum	Jersey cudweed	non-native	Annual herb	FAC
Sonchus asper ssp. asper	Sow thistle	non-native	Annual herb	FAC
Sonchus oleraceus	Sow thistle	non-native	Annual herb	UPL
Symphyotrichum chilense	Pacific aster	native	Perennial herb	FAC
BRASSICACEAE				
Brassica nigra	Black mustard	• invasive non-native	Annual herb	NL/UPL
Hirschfeldia incana	Mustard	• invasive non-native	Perennial herb	NL/UPL

Scientific Name	Common Name	Status	Life History	Wetland Indicator
Nasturtium officinale	Watercress	native	Perennial herb (aquatic)	OBL
Raphanus sativus	Jointed charlock	• invasive non-native	Annual, Biennial herb	NL/UPL
CAPRIFOLIACEAE				
Lonicera involucrata var. *ledebourii*	Coast twinberry	native	Shrub	FAC
CARYOPHYLLACEAE				
Spergularia rubra	Purple sand spurry	non-native	Annual, Perennial herb	FAC
CHENOPODIACEAE				
Atriplex prostrata	Fat-hen	non-native	Annual herb	FACW
CONVOLVULACEAE				
Convolvulus arvensis	Field bindweed	non-native	Perennial herb, Vine	NL/UPL
CORNACEAE				
Cornus sericea ssp. *sericea*	Red osier dogwood	native	Shrub	FACW
CUCURBITACEAE				
Marah fabacea	California man-root	native	Perennial herb, Vine	NL/UPL
CUPRESSACEAE				
Hesperocyparis macrocarpa	Monterey cypress	native	Tree	NL/UPL
Sequoia sempervirens	Coast redwood	native	Tree	NL/UPL
CYPERACEAE				
Carex globosa	Round fruit sedge	native	Perennial grasslike herb	NL/UPL
Cyperus eragrostis	Tall cyperus	native	Perennial grasslike herb	FACW
Scirpus microcarpus	Small fruited bulrush	native	Perennial grasslike herb	OBL
DENNSTAEDTIACEAE				
Pteridium aquilinum var. pubescens	Western bracken fern	native	Fern	FACU
DIPSACACEAE				
Dipsacus sativus	Indian teasel	• invasive non-native	Annual, Biennial herb	NL/UPL
DRYOPTERIDACEAE				
Polystichum munitum	Western sword fern	native	Fern	NL/UPL
EQUISETACEAE				
Equisetum telmateia ssp. *braunii*	Giant horsetail	native	Fern	FACW
ERICACEAE				
Arbutus unedo	Strawberry tree	non-native	Tree	NL/UPL
FABACEAE				
Acmispon americanus var. americanus	Spanish lotus	native	Annual herb	UPL
Genista monspessulana	French broom	• invasive non-native	Shrub	NL/UPL
Lotus corniculatus	Bird's foot trefoil	non-native	Perennial herb	FAC

Scientific Name	Common Name	Status	Life History	Wetland Indicator
Medicago polymorpha	California burclover	• invasive non-native	Annual herb	FACU
Melilotus albus	White sweetclover	non-native	Annual, Biennial herb	NL/UPL
Robinia pseudoacacia	Black locust	• invasive non-native	Tree	FACU
Trifolium angustifolium	Narrow leaved clover	non-native	Annual herb	NL/UPL
Trifolium incarnatum	Crimson clover	non-native	Annual herb	NL/UPL
Trifolium repens	White clover	non-native	Perennial herb	FACU
Vicia sativa ssp. *sativa*	Common vetch	non-native	Annual herb, Vine	FACU
Vicia villosa ssp. *varia*	Smooth vetch	non-native	Annual herb, Vine	NL/UPL
FAGACEAE				
Quercus agrifolia	Coast live oak	native	Tree	NL/UPL
GERANIACEAE				
Erodium botrys	Big heron bill	non-native	Annual herb	FACU
GROSSULARIACEAE				
Ribes divaricatum var. *pubiflorum*	Spreading gooseberry	native	Shrub	FAC
HAMAMELIDACEAE				
Liquidambar styraciflua	Sweetgum	non-native	Tree	FAC
JUGLANDACEAE				
Juglans hindsii	Northern california black walnut	native	Tree	FAC
JUNCACEAE				
Juncus effusus ssp. *pacificus*	Pacific rush	native	Perennial grasslike herb	FACW
Juncus patens	Rush	native	Perennial grasslike herb	FACW
Juncus xiphioides	Iris leaved rush	native	Perennial grasslike herb	OBL
LAMIACEAE				
Mentha pulegium	Pennyroyal	• invasive non-native	Perennial herb	OBL
MONTIACEAE				
Claytonia perfoliata ssp. *perfoliata*	Claytonia	native	Annual herb	FAC
MYRSINACEAE				
Lysimachia arvensis	Scarlet pimpernel	non-native	Annual herb	FAC
MYRTACEAE				
Callistemon citrinus	Crimson bottlebrush	non-native	Tree, Shrub	NL/UPL
Eucalyptus globulus	Blue gum	• invasive non-native	Tree	NL/UPL
Eucalyptus sideroxylon	Red iron bark	non-native	Tree	NL/UPL
ONAGRACEAE				
Epilobium brachycarpum	Willow herb	native	Annual herb	FAC
Epilobium ciliatum ssp. *watsonii*	Willow herb	native	Perennial herb	FACW

Scientific Name	Common Name	Status	Life History	Wetland Indicator
Oenothera elata ssp. *hookeri*	Evening primrose	native	Perennial herb	FACW
ORCHIDACEAE				
Epipactis helleborine	Helleborine	non-native	Perennial herb	FACU
PAPAVERACEAE				
Eschscholzia californica	California poppy	native	Annual, Perennial herb	FAC
PINACEAE				
Pinus radiata	Monterey pine	native	Tree	NL/UPL
PLANTAGINACEAE				
Plantago coronopus	Cut leaf plantain	non-native	Annual herb	FAC
Plantago lanceolata	Ribwort	• invasive non-native	Perennial herb	FAC
Veronica americana	American brooklime	native	Perennial herb	OBL
POACEAE				
Avena barbata	Slim oat	• invasive non-native	Annual grass	NL/UPL
Briza maxima	Rattlesnake grass	• invasive non-native	Annual grass	NL/UPL
Bromus catharticus var. *catharticus*	Rescue grass	non-native	Annual, Perennial grass	NL/UPL
Bromus diandrus	Ripgut brome	• invasive non-native	Annual grass	NL/UPL
Bromus hordeaceus	Soft chess	• invasive non-native	Annual grass	FACU
Bromus sitchensis var. *carinatus*	California brome	native	Perennial grass	NL/UPL
Cortaderia jubata	Andean pampas grass	• invasive non-native	Perennial grass	NL/UPL
Cynodon dactylon	Bermuda grass	• invasive non-native	Perennial grass	FACU
Danthonia californica	California oatgrass	native	Perennial grass	FAC
Ehrharta erecta	Upright veldt grass	• invasive non-native	Perennial grass	NL/UPL
Elymus triticoides	Beardless wild rye	native	Perennial grass	FAC
Festuca bromoides	Brome fescue	non-native	Annual grass	FACU
Festuca myuros	Rattail sixweeks grass	• invasive non-native	Annual grass	FACU
Festuca perennis	Italian rye grass	• invasive non-native	Annual, Perennial grass	FAC
Holcus lanatus	Common velvetgrass	• invasive non-native	Perennial grass	FAC
Hordeum marinum ssp. *gussoneanum*	Barley	non-native	Annual grass	FAC
Hordeum murinum ssp. *leporinum*	Farmer's foxtail	non-native	Annual grass	FACU
Melica californica	California melic	native	Perennial grass	NL/UPL
Phalaris aquatica	Harding grass	• invasive non-native	Perennial grass	FACU
Polypogon monspeliensis	Annual beard grass	• invasive non-native	Annual grass	FACW
Stipa pulchra	Purple needle grass	native	Perennial grass	NL/UPL

Scientific Name	Common Name	Status	Life History	Wetland Indicator
POLYGONACEAE				
Persicaria punctata	Dotted smartweed	native	Perennial herb	OBL
Rumex acetosella	Sheep sorrel	• invasive non-native	Perennial herb	FAC
Rumex conglomeratus	Green dock	non-native	Perennial herb	FACW
Rumex crispus	Curly dock	• invasive non-native	Perennial herb	FAC
Rumex pulcher	Fiddleleaf dock	non-native	Perennial herb	FAC
RHAMNACEAE				
Frangula californica ssp. *californica*	California coffeeberry	native	Shrub	NL/UPL
ROSACEAE				
Potentilla anserina ssp. *anserina*	Silver weed cinquefoil	native	Perennial herb	OBL
Rubus armeniacus	Himalayan blackberry	• invasive non-native	Shrub	FAC
Rubus ursinus	California blackberry	native	Vine, Shrub	FAC
RUBIACEAE				
Galium aparine	Cleavers	native	Annual herb	FACU
SALICACEAE				
Populus trichocarpa	Black cottonwood	native	Tree	NL/UPL
Salix lasiandra var. *lasiandra*	Pacific willow	native	Tree	FACW
Salix lasiolepis	Arroyo willow	native	Tree, Shrub	FACW
SAPINDACEAE				
Acer negundo	Boxelder	native	Tree	FACW
Aesculus californica	Buckeye	native	Tree	NL/UPL
SOLANACEAE				
Solanum nigrum	Black nightshade	non-native	Annual herb	NL/UPL
TYPHACEAE				
Typha angustifolia	Narrow leaf cattail	non-native	Perennial herb (aquatic)	OBL
Typha latifolia	Broadleaf cattail	native	Perennial herb (aquatic)	OBL
URTICACEAE				
Urtica dioica ssp. *dioica*	Stinging nettle	non-native	Perennial herb	FAC
VIBURNACEAE				
Sambucus mexicana	Blue elderberry	native	Tree, Shrub	FACU

APPENDIX G1.3b. LIST OF VASCULAR PLANTS ENCOUNTERED DURING SUPPLEMENTAL FLORISTIC SURVEYS OF THE ALTERNATIVE 3 COMBINED FACILITIES STUDY AREA.

Scientific Name	Common Name	Status	Life History	Wetland Indicator
AGAVACEAE				
Chlorogalum pomeridianum	Common soaproot	native	Perennial herb	NL/UPL
ANACARDIACEAE				
Toxicodendron diversilobum	Poison oak	native	Vine, Shrub	FACU
APIACEAE				
Conium maculatum	Poison hemlock	• invasive non-native	Perennial herb	FACW
Oenanthe sarmentosa	Water parsley	native	Perennial herb	OBL
Sanicula crassicaulis	Pacific sanicle	native	Perennial herb	NL/UPL
ARALIACEAE				
Hedera canariensis	Canary ivy	• invasive non-native	Vine	NL/UPL
Hedera helix	English ivy	• invasive non-native	Vine, Shrub	FACU
ASTERACEAE				
Ageratina adenophora	Thoroughwort	• invasive non-native	Perennial herb	FACU
Artemisia californica	Coastal sage brush	native	Shrub	NL/UPL
Artemisia douglasiana	California mugwort	native	Perennial herb	FAC
Baccharis pilularis	Coyote brush	native	Shrub	NL/UPL
Calendula arvensis	Field marigold	non-native	Annual herb	NL/UPL
Carduus pycnocephalus	Italian thistle	non-native	Annual herb	NL/UPL
Cirsium vulgare	Bullthistle	• invasive non-native	Perennial herb	FACU
Crepis vesicaria ssp. *taraxacifolia*	Weedy hawksbeard	non-native	Annual, Perennial herb	NL/UPL
Erigeron bonariensis	Flax-leaved horseweed	non-native	Annual herb	FACU
Erigeron canadensis	Canada horseweed	native	Annual herb	FACU
Helminthotheca echioides	Bristly ox-tongue	• invasive non-native	Annual, Perennial herb	FAC
Hypochaeris glabra	Smooth cats ear	• invasive non-native	Annual herb	NL/UPL
Hypochaeris radicata	Hairy cats ear	• invasive non-native	Perennial herb	FACU
Lactuca serriola	Prickly lettuce	non-native	Annual herb	FACU
Matricaria discoidea	Pineapple weed	native	Annual herb	FACU
Pseudognaphalium luteoalbum	Jersey cudweed	non-native	Annual herb	FAC
Senecio vulgaris	Common groundsel	non-native	Annual herb	FACU
Silybum marianum	Milk thistle	• invasive non-native	Annual, Perennial herb	NL/UPL
Sonchus asper	Spiny sowthistle	non-native	Annual herb	FAC
Sonchus oleraceus	Sow thistle	non-native	Annual herb	UPL
Symphyotrichum chilense	Pacific aster	native	Perennial herb	FAC
Tragopogon porrifolius	Salsify	non-native	Perennial herb	NL/UPL
Xanthium orientale	Common cocklebur	Native	Annual herb	FAC
BORAGINACEAE				

Scientific Name	Common Name	Status	Life History	Wetland Indicator
Borago officinalis	Common borage	non-native	Annual herb	NL/UPL
Myosotis latifolia	forget me not	• invasive non-native	Perennial herb	NL/UPL
BRASSICACEAE				
Brassica nigra	Black mustard	• invasive non-native	Annual herb	NL/UPL
Brassica rapa	Common mustard	• invasive non-native	Annual herb	FACU
Capsella bursa-pastoris	Shepherd's purse	non-native	Annual herb	FACU
Cardamine oligosperma	Idaho bittercress	native	Annual, Perennial herb	FAC
Hirschfeldia incana	Mustard	• invasive non-native	Perennial herb	NL/UPL
Nasturtium officinale	Watercress	native	Perennial herb (aquatic)	OBL
Raphanus raphanistrum	Jointed charlock	non-native	Annual, Perennial herb	NL/UPL
CACTACEAE				
Opuntia ficus-indica	Tuna	non-native	Shrub (stem succulent)	NL/UPL
CARYOPHYLLACEAE				
Stellaria media	Chickweed	non-native	Annual herb	FACU
CHENOPODIACEAE				
Chenopodium album	Lamb's quarters	non-native	Annual herb	FACU
Chenopodium murale	Nettle leaf goosefoot	non-native	Annual herb	FACU
CONVOLVULACEAE				
Convolvulus arvensis	Field bindweed	non-native	Perennial herb, Vine	NL/UPL
CORNACEAE				
Cornus sericea ssp. *occidentalis*	Western dogwood	native	Shrub	FACW
CRASSULACEAE				
Crassula connata	Sand pygmy weed	native	Annual herb	FAC
CUCURBITACEAE				
Marah fabacea	California man-root	native	Perennial herb, Vine	NL/UPL
CUPRESSACEAE				
Hesperocyparis macrocarpa	Monterey cypress	native	Tree	NL/UPL
Sequoia sempervirens	Coast redwood	native	Tree	NL/UPL
CYPERACEAE				
Carex densa	Sedge	native	Perennial grasslike herb	OBL
Carex tumulicola	Split awn sedge	native	Perennial grasslike herb	FACU
Cyperus eragrostis	Tall cyperus	native	Perennial grasslike herb	FACW
Schoenoplectus californicus	California bulrush	native	Perennial grasslike herb	OBL
Scirpus microcarpus	Small fruited bulrush	native	Perennial grasslike herb	OBL

Scientific Name	Common Name	Status	Life History	Wetland Indicator
DENNSTAEDTIACEAE				
Pteridium aquilinum	Western brackenfern	native	Fern	FACU
DIPSACACEAE				
Dipsacus fullonum	Wild teasel	• invasive non-native	Perennial herb	FAC
Dipsacus sativus	Indian teasel	• invasive non-native	Annual, Biennial herb	NL/UPL
DRYOPTERIDACEAE				
Dryopteris arguta	Wood fern	native	Fern	NL/UPL
EQUISETACEAE				
Equisetum telmateia	Giant horsetail	native	Fern	FACW
FABACEAE				
Genista monspessulana	French broom	• invasive non-native	Shrub	NL/UPL
Lotus corniculatus	Bird's foot trefoil	non-native	Perennial herb	FAC
Medicago polymorpha	California burclover	• invasive non-native	Annual herb	FACU
Melilotus albus	White sweetclover	non-native	Annual, Biennial herb	NL/UPL
Trifolium angustifolium	Narrow leaved clover	non-native	Annual herb	NL/UPL
Trifolium dubium	Shamrock	non-native	Annual herb	NL/UPL
Trifolium hirtum	Rose clover	• invasive non-native	Annual herb	NL/UPL
Trifolium subterraneum	Subterranean clover	non-native	Annual herb	NL/UPL
Vicia sativa ssp. *sativa*	Common vetch	non-native	Annual herb, Vine	FACU
Vicia villosa ssp. *varia*	Smooth vetch	non-native	Annual herb, Vine	NL/UPL
FAGACEAE				
Quercus agrifolia var. *agrifolia*	Coast live oak	native	Tree	NL/UPL
GERANIACEAE				
Erodium botrys	Big heron bill	non-native	Annual herb	FACU
Erodium moschatum	Whitestem filaree	non-native	Annual herb	NL/UPL
Geranium dissectum	Wild geranium	• invasive non-native	Annual herb	NL/UPL
IRIDACEAE				
Iris douglasiana	Douglas iris	native	Perennial herb	NL/UPL
Sisyrinchium bellum	Blue eyed grass	native	Perennial herb	FACW
JUNCACEAE				
Juncus effusus	Common bog rush	native	Perennial grasslike herb	FACW
Juncus occidentalis	Slender juncus	native	Perennial grasslike herb	FACW
Juncus patens	Rush	native	Perennial grasslike herb	FACW
Luzula comosa	Hairy wood rush	native	Perennial grasslike herb	FAC
LAMIACEAE				
Clinopodium douglasii	Yerba Buena	native	Perennial herb	FACU
Mentha pulegium	Pennyroyal	• invasive non-native	Perennial herb	OBL

Scientific Name	Common Name	Status	Life History	Wetland Indicator
Stachys bullata	Southern hedge nettle	native	Perennial herb	NL/UPL
LINACEAE				
Linum bienne	Flax	non-native	Annual herb	NL/UPL
LYTHRACEAE				
Lythrum hyssopifolia	Hyssop loosestrife	• invasive non-native	Annual, Perennial herb	OBL
MALVACEAE				
Malva parviflora	Cheeseweed	non-native	Annual herb	NL/UPL
MONTIACEAE				
Claytonia perfoliata ssp. *perfoliata*	Claytonia	native	Annual herb	FAC
MYRSINACEAE				
Lysimachia arvensis	Scarlet pimpernel	non-native	Annual herb	FAC
MYRTACEAE				
Eucalyptus globulus	Blue gum	• invasive non-native	Tree	NL/UPL
Eucalyptus sideroxylon	Red iron bark	non-native	Tree	NL/UPL
ONAGRACEAE				
Camissoniopsis micrantha	Spencer primrose	native	Annual herb	NL/UPL
Epilobium brachycarpum	Willow herb	native	Annual herb	FAC
Epilobium ciliatum ssp. *watsonii*	Willow herb	native	Perennial herb	FACW
Taraxia ovata	Sun cup	native	Perennial herb	NL/UPL
OXALIDACEAE				
Oxalis pes-caprae	Bermuda buttercup	• invasive non-native	Perennial herb	NL/UPL
PLANTAGINACEAE				
Kickxia elatine	Sharp point fluellin	non-native	Perennial herb	UPL
Plantago coronopus	Cut leaf plantain	non-native	Annual herb	FAC
Plantago lanceolata	Ribwort	• invasive non-native	Perennial herb	FAC
POACEAE				
Agrostis stolonifera	Redtop	• invasive non-native	Perennial grass	FACW
Aira caryophyllea	Silvery hairgrass	non-native	Annual grass	FACU
Avena barbata	Slim oat	• invasive non-native	Annual grass	NL/UPL
Briza maxima	Rattlesnake grass	• invasive non-native	Annual grass	NL/UPL
Briza minor	Little rattlesnake grass	non-native	Annual grass	FAC
Bromus catharticus var. *catharticus*	Rescue grass	non-native	Annual, Perennial grass	NL/UPL
Bromus diandrus	Ripgut brome	• invasive non-native	Annual grass	NL/UPL
Bromus hordeaceus	Soft chess	• invasive non-native	Annual grass	FACU
Bromus laevipes	Narrow flowered brome	native	Perennial grass	NL/UPL
Bromus sitchensis var. *carinatus*	California brome	native	Perennial grass	NL/UPL
Cortaderia jubata	Andean pampas grass	• invasive non-native	Perennial grass	FACU

Scientific Name	Common Name	Status	Life History	Wetland Indicator
Cynodon dactylon	Bermuda grass	• invasive non-native	Perennial grass	FACU
Dactylis glomerata	Orchardgrass	• invasive non-native	Perennial grass	FACU
Danthonia californica	California oatgrass	native	Perennial grass	FAC
Echinochloa crus-galli	Barnyard grass	non-native	Annual grass	FACW
Ehrharta erecta	Upright veldt grass	• invasive non-native	Perennial grass	NL/UPL
Festuca arundinacea	Reed fescue	• invasive non-native	Perennial grass	FACU
Festuca bromoides	Brome fescue	non-native	Annual grass	FACU
Festuca myuros	Rattail sixweeks grass	• invasive non-native	Annual grass	FACU
Festuca perennis	Italian rye grass	• invasive non-native	Annual, Perennial grass	FACU
Gastridium phleoides	Nit grass	non-native	Annual grass	FACU
Holcus lanatus	Common velvetgrass	• invasive non-native	Perennial grass	FAC
Hordeum marinum ssp. *gussoneanum*	Barley	non-native	Annual grass	FAC
Hordeum murinum ssp. *leporinum*	Farmer's foxtail	non-native	Annual grass	FACU
Melica torreyana	Torrey's melica	native	Perennial grass	NL/UPL
Phalaris aquatica	Harding grass	• invasive non-native	Perennial grass	FACU
Polypogon monspeliensis	Annual beard grass	• invasive non-native	Annual grass	FACW
Stipa miliacea var. *miliacea*	Smilo grass	• invasive non-native	Perennial grass	NL/UPL
Stipa pulchra	Purple needle grass	native	Perennial grass	NL/UPL
POLYGONACEAE				
Persicaria amphibia	Water smartweed	native	Perennial herb (aquatic)	OBL
Persicaria punctata	Dotted smartweed	native	Perennial herb	OBL
Rumex acetosella	Sheep sorrel	• invasive non-native	Perennial herb	FAC
Rumex conglomeratus	Green dock	non-native	Perennial herb	FACW
Rumex crispus	Curly dock	• invasive non-native	Perennial herb	FAC
Rumex pulcher	Fiddleleaf dock	non-native	Perennial herb	FAC
RHAMNACEAE				
Frangula californica	California coffeeberry	native	Shrub	NL/UPL
ROSACEAE				
Cotoneaster pannosus	Woolly cotoneaster	• invasive non-native	Shrub	NL/UPL
Sanguisorba minor	Garden burnet	non-native	Perennial herb	FACU
Rosa californica	California wild rose	native	Shrub	FAC
Rubus armeniacus	Himalayan blackberry	• invasive non-native	Shrub	FAC
Rubus ursinus	California blackberry	native	Vine, Shrub	FAC
RUBIACEAE				
Galium aparine	Cleavers	native	Annual herb	FACU
SALICACEAE				
Populus trichocarpa	Black cottonwood	native	Tree	FAC

Scientific Name	Common Name	Status	Life History	Wetland Indicator
Salix laevigata	Polished willow	native	Tree	FACW
Salix lasiandra var. *lasiandra*	Pacific willow	native	Tree	FACW
Salix lasiolepis	Arroyo willow	native	Tree, Shrub	FACW
SAPINDACEAE				
Acer macrophyllum	Bigleaf maple	native	Tree	FAC
SCROPHULARIACEAE				
Scrophularia californica	California bee plant	native	Perennial herb	FAC
SOLANACEAE				
Datura stramonium	Jimson weed	non-native	Annual herb	NL/UPL
Physalis philadelphica	Tomatillo	non-native	Annual herb	UPL
Solanum nigrum	Black nightshade	non-native	Annual herb	FACU
THEMIDACEAE				
Brodiaea elegans ssp. *elegans*	Harvest brodiaea	native	Perennial herb	FACU
TYPHACEAE				
Typha angustifolia	Narrow leaf cattail	non-native	Perennial herb (aquatic)	OBL
Typha latifolia	Broadleaf cattail	native	Perennial herb (aquatic)	OBL
URTICACEAE				
Urtica dioica ssp. *dioica*	Stinging nettle	native	Perennial herb	FAC
Urtica urens	Annual stinging nettle	non-native	Annual herb	NL/UPL
VIBURNACEAE				
Sambucus mexicana	Elderberry	native	Tree, Shrub	FACU

Appendix G2.1. Sensitive Wildlife Species with Potential to Occur

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APPENDIX G2.1 CONSERVATION STATUS, HABITAT REQUIREMENTS, AND POTENTIAL TO OCCUR FOR SENSITIVE WILDLIFE SPECIES IN THE VICINITY OF THE PROPOSED BUENA VISTA LANDFILL REDEVELOPMENT PROJECT AREA AND THE ALTERNATIVE 3 PROJECT AREA.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
INVERTEBRATES						
Crotch's Bumble Bee *Bombus crotchii*	-	SCE	S2	Open grassland and scrubland with requisite underground nesting habitat, such as small mammal burrows, underneath soft disturbed soil or leaf litter (Goulson 2010, Williams et al. 2014).	**Possible** The non-native grassland, ruderal grassland, and coastal scrub habitats within the Study Area provide suitable potential habitat for this species although nesting habitat (small mammal burrows or thatch), nectar, and pollen sources are limited, especially in ruderal grassland areas where soil depth is shallow on top of the capped landfill, thereby limiting thatch and blooming plant species. The current occupied range within Santa Cruz County is understudied but one recent record exists from Pleasure Point (2025), approximately 9 miles to the northwest (Xerces Society et al. 2026, CNDDB 2026b,c). Additional historical records include south county occurrences at the Watsonville Airport (1994), 1.5 miles northeast of the Study Area and Sunset State Beach (1995), 2 miles southwest of the Study Area (CNDDB 2026b,c).	**Possible** The Study Area for Alternative 3 provides potential suitable native and non-native grassland habitat and ruderal habitats. See Proposed Project for nearest documented occurrences of this species.
Monarch Butterfly *Danaus plexippus* (winter roost sites)	PT	-	S2S3	Eucalyptus, Monterey pine, or Monterey cypress tree groves. Abiotic and biotic factors including southeast aspect, wind protection and proximity to nectaries determine habitat suitability (Griffiths and Villablanca 2015, Dayton and Bell 1992).	**Not Expected** Individual monarchs were observed within the Study Area during November 2022 and 2025 site visits. However, the grove of eucalyptus in the southeast corner of the Study Area does not provide potential autumnal or winter roost habitat. The grove is located over 2 miles from the ocean (greater than the typical distance of within 1.5 miles). Additionally, the approximately 2-acre grove is a monospecific stand of eucalyptus trees of the same age that, because of how densely planted they are, have grown tall and thin, lack many mid-tier branches, and restrict sunlight penetration into the center of the stand. These characteristics limit use of the grove by roosting monarchs. The grove lacks nectar plants such as English ivy. Nearby grassland and coyote brush scrub support some nectary vegetation. Individual monarchs have also been observed in the eucalyptus groves along the rail line, approximately 300 feet and 1000 feet south/southeast of the Study Area. The nearest known winter roost site is Manresa State Beach 2.2 miles west (Xerces Society 2026).	**Not Expected** Individual monarchs were observed during November 2022 and 2025 site visits, flying within the Study Area; however, no autumnal or winter roosting butterflies were observed within the eucalyptus stands in or near the Study Area. The stand of eucalyptus trees located in the northwest corner of the Study Area provides marginal potential autumnal or winter roost habitat. The grove is located over 2.0 miles from the ocean (greater than the typical distance of within 1.5 miles). The trees within the stand provide roosting substrate with a number of lateral branches and a southern aspect. Nearby grassland and coyote brush scrub support some nectary vegetation. See Proposed Project for nearest documented winter roost site.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
AMPHIBIANS AND REPTILES						
California Red-legged Frog *Rana draytonii*	FT	SSC	S2S3	Requires the presence of surface water until mid to late summer for reproduction; occupies ephemeral and/or perennial water with standing or slow-moving flows. Upland habitat includes leaf litter, dense grassland, small mammal burrows, irrigated agricultural fields, and greenhouses. Adults are known to travel up to 2 miles overland between aquatic sites (USFWS 2002, Fellers and Kleeman 2007, USFWS 2010). There is Final Critical Habitat for this species (USFWS 2010).	**Possible** An individual CRLF was observed in the Gallighan Slough drainage within the Study Area during 2023 surveys and a road-killed individual CRLF was observed in 2014 on Buena Vista Drive immediately southwest of the landfill entrance (Westphal 2018). The drainages and wetlands of the Study Area provide non-breeding aquatic and/or marginal potential breeding aquatic habitat and the oak woodland, grassland, scrub, and riparian habitats provide potential refuge, movement, and/or dispersal habitat. The nearest known breeding location is a pond off of Whisky Hill Road (0.6 miles west) (Biosearch 2025). Additional breeding sites are located in Prospect Pond (0.9 miles northwest), Green's Pond (1.1 miles northwest) (Biosearch 2025), lower Harkins Slough/Watsonville Slough 1 mile south (2017) (CNDDB 2026b,c), and, historically, in Struve Slough <1 mile east (2001) (CNDDB 2026b,c). Six road killed CRLF were identified nearby along Buena Vista Drive and San Andreas Rd (Westphal 2018). Other ponds, ditches, and swales on private property within 1.0 mile of the Study Area provide potential aquatic habitat and/or hydration points. The property is within designated Critical Habitat for this species. Busy roads, agricultural operations, and Landfill operations are barriers to movement.	**Possible** See Proposed Project.
California Tiger Salamander *Ambystoma californiense*	FT	SE	-	Seasonal pools, stock ponds and detention basins, and ditches with nearby upland grasslands, open woodlands, and coastal scrub with small mammal burrows within Central California (Wang, et al. 2009; Biosearch 2026). Perennial ponds that are free of introduced aquatic predators, especially predatory fishes, also provide habitat (Alvarez 2004). May migrate up to 1.37 mile to reach breeding ponds (USFWS 2003, Orloff 2011; Searcy and Shaffer 2011).	**Not Expected** Marginal upland habitat is present on the capped landfill, and in coast live oak woodland, non-native grassland, ruderal, and willow riparian habitat within the Study Area. Management of rodents on the property reduces the number of burrows available. A cluster of four breeding ponds are present within 0.9 and 1.2 miles to the northwest: Prospect Pond (0.9 miles), Buena Vista Pond (1.0 mile), Green's Pond (1.1 miles), and Ellicott Pond (1.2 miles) (Biosearch 2026, CNDDB 2026b,c). Intervening agricultural fields and roads (non-habitat), fragmentation of existing habitat, and maximum migration distance from known breeding ponds to the Project site likely preclude presence within the Study Area.	**Not Expected** See Proposed Project. In addition, native and non-native grassland on the upper western terrace provides potential upland habitat.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
Foothill Yellow-legged Frog *Rana boylii*	FT	SE	S2	Suitable stream reaches typically contain a wide and shallow channel morphology, an intermittent canopy, and rocky substrate that is cobble-sized or larger. These features provide habitat for breeding, feeding, and reproduction and in some cases general aquatic or overwintering habitat for the foothill yellow-legged frog (USFWS 2025).	**Not Expected** The Project area does not provide suitable habitat for this species. Waterbodies lack rocky substrate, are inundated with agricultural sediments, and are largely intermittent. The nearest known occurrence of FYLF to the Project Area is from 1970 and approximately 1.3 miles to the northwest (CNDDB 2026b,c). There have been no other corroborating records made nearby in the last 55 years. Other than this record, all other documented sightings of this species in Santa Cruz County occur in the creek systems running through the Santa Cruz Mountains, with the nearest in Soquel Creek approximately 10 miles to the northwest.	**Not Expected** See Proposed Project.
Northwestern Pond Turtle (NWPT) *Actinemys marmorata*	PT	SSC	S3	Found in ponds, marshes, rivers, streams, and irrigation ditches containing aquatic vegetation; usually seen sunning on logs, banks, or rocks. Moves up to 3-4 miles within a creek system, especially during "walk-abouts" before a female lays eggs; nests up to several hundred feet from aquatic habitat, in woodlands, grasslands, or open forest (Holland and Bury 1998).	**Possible** Within the Study Area, the Gallighan Slough drainage provides marginal aquatic, movement, and dispersal habitat for the turtle. The culvert under the road between the Landfill and the Old Landfill likely precludes upstream movement much of the year. Non-native grassland provides marginal potential nesting habitat but higher quality nesting habitat is available closer to aquatic features. During surveys, 1-2 individual NWPTs were observed in the wastewater treatment ponds for the Buena Vista Migrant Center <0.1 miles southwest of the Study Area and 7 adults were observed in the Gallighan Slough approximately 0.1 miles south of the Study Area (KEC 2024).	**Possible** See Proposed Project.
Santa Cruz Black Salamander *Aneides niger*	-	SSC	S3	Mixed deciduous woodland, coniferous forests, and coastal grasslands. Found under rocks near streams, in talus, under damp logs, and other objects. In Santa Cruz, found near water under rocks near streams, seeps, and springs (Stebbins and McGinnis 2012, CDFW CWHR 2014 and 2016, Nafis 2018).	**Not Expected** Known from Green Valley Road (CNDDB 2026b,c) 5.5 miles to the northeast in the foothills above Watsonville and more frequently in the Santa Cruz Mountains. The Study Area does not contain suitable moist woodland or forest habitat.	**Not Expected** See Proposed Project.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
Santa Cruz Long-toed Salamander *Ambystoma macrodactylum croceum*	FE	SE/FP	-	Shallow ponds with emergent and submerged vegetation for cover during the aquatic phase of their life. In terrestrial phase, densely vegetated habitats such as coast live oak woodland, willow riparian, mixed evergreen forest, and coastal scrub with abundant burrows or other moist refugia such as fallen logs and along the root systems of plants (Biosearch 2026, Ruth 1988, USFWS 1999 and 2009). Ouliers may travel more than 1 mile between upland habitats and breeding ponds (Ruth 1988).	**Not Expected** Marginal upland habitat is present within the Study Area, including coast live oak woodland and willow riparian (Gallighan Slough), and the capped landfill provides movement and dispersal habitat for this species. Six known breeding sites have been identified in the Ellicott-Buena Vista subpopulation, between 0.9 and 1.4 miles to the west and northwest of the Study Area on the Ellicott Slough National Wildlife Refuge: Delaney Pond (0.9 miles), Prospect Pond (0.9 miles), Buena Vista Pond (1.0 mile), Green's Pond (1.1 miles), Ellicott Pond (1.2 miles), and Buena Vista Pond 2 (1.4 miles). However, habitat between the Study Area and known breeding sites is highly fragmented by intensive agricultural operations and roads, and the approximate 1-mile migration distance, likely precludes presence within the Study Area. Four additional known breeding ponds are located in the Larkin Valley-Freedom subpopulation; however, they are all over 2.5 miles away and State Route 1 acts as a barrier for movement (Biosearch 2026, CNDDB 2026b,c). Additionally, Whisky Hill Pond, 0.6 miles west, provides potential breeding habitat (Biosearch 2025).	**Not Expected** See Proposed Project.
BIRDS						
Allen's Hummingbird *Selasphorus sasin* (nesting)	BCC	-	-	Breeds exclusively in the narrow coastal fog belt primarily within coastal scrub and riparian. Shows preference for nesting in densely vegetated areas with at least some tree cover, typically near water sources (Grinnell and Miller 1944, Clark et al. 2020).	**Present** Observed during 2024 surveys. Flowering plants in and around the Study Area provide foraging habitat. Trees and shrubs, especially those adjacent to Harkins Slough and creeks/drainages, provide potential nesting habitat.	**Present** See Proposed Project.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
Bald Eagle *Haliaeetus leucocephalus* (nesting and foraging)	-	SE/FP	G5S3	Typically breeds in forested areas adjacent to large bodies of water. Nests in trees in mature and old-growth forest with some habitat edge, relatively close (usually <2 km) to water with suitable foraging opportunities (diversity, abundance, and vulnerability of prey base). For perching, prefers tall, mature coniferous or deciduous trees with a wide view of the surroundings (Buehler 2022).	**Present** Single pair known to nest on Harkins Slough and Gallighan Slough (Byrne 2016, Schmaltz 2017, eBird 2026) and observed there during 2024 surveys. Although nearby, the bald eagle is likely to prefer hunting over the sloughs than the grasslands within the Study Area and larger trees outside of the Study Area provide higher quality nesting habitat.	**Present** See Proposed Project.
Bullock's Oriole *Icterus bullockii* (nesting)	BCC	-	-	Breeds in riparian corridors, open woodlands, oak woodlands, and other wooded habitats with mature deciduous trees. Forages primarily on insects within the tree canopy and along woodland edges (Flood et al. 2020).	**Possible** Suitable breeding habitat is present within the riparian corridors and other wooded areas containing mature willows, cottonwoods, oaks, sycamores, eucalyptus, and other large trees that provide nesting and foraging habitat. Bullock's orioles have been observed at Harkins Slough (2026).	**Possible** See Proposed Project.
California Gull *Larus californicus* (nesting)	BCC	-	-	Nests in colonies on inland islands or stretches of land isolated from terrestrial predators by intermittent water or some other physical barrier. Foraging during the breeding season may occur in nearly any habitat type with available food sources. Habitat use is expanded into marine systems during winter season (Jones 1986, Baird 1976, Winkler 2020).	**Possible** Common and abundant foraging within Landfill boundary and nearby at Harkins Slough (eBird 2026). Nesting uncommon in the County but rooftops within the Study Area may provide suitable substrate.	**Possible** Although nesting is uncommon in the County, greenhouse rooftops within the Study Area for Alternative 3 may provide suitable substrate. See Proposed Project for additional information.
California Thrasher *Toxostoma redivivum* (nesting)	BCC	-	-	Inhabits chapparal and, to a lesser extent, sagebrush. May also be found in chapparal adjacent riparian and oak woodland. Nest often hidden within dense shrub (Grinnell 1917, Linsdale 1947, Cody 2020).	**Present** Observed (2022) in the vicinity along the Santa Cruz Branch Rail Line (SCBRL) southwest of the Old Landfill. Scrub and chapparal adjacent to the Landfill provide foraging and nesting habitat.	**Present** The Study Area for Alternative 3 provides potential suitable breeding habitat within the coyote brush scrub located on the eastern side of the Study Area. See Proposed Project.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
Golden Eagle *Aquila chrysaetos*	-	FP	S3	In central California, this species typically hunts over grasslands with high topographic relief (rolling hills and mountains), building nests in cliffs or trees, often in oak woodland or oak savanna with a wide view of the surrounding area, updrafts for flight, and proximity to small to medium sized mammal hunting grounds (Katzner et al. 2020).	**Not Expected** Recent records (2018-2025) document this species near the Study Area along Harkins Sough with one recent (2024) sighting along Gallighan Slough. One pair was observed in 2018 during breeding season flying over Harkins Slough (eBird 2026). The Study Area provides marginal hunting habitat due to the disturbed and fragmented quality of non-native grassland habitat and active landfill operations. While the taller trees within or adjacent to the Study Area provide suitable nesting habitat, this species exhibits strong site fidelity and is not known to nest in this area.	**Not Expected** See Proposed Project.
Grasshopper Sparrow *Ammodramus savannarum* (nesting)	-	SSC	S3	Associated with short to medium-height grasslands with little or no shrub cover and patchy bare ground. May be found in pastures and agricultural fields. Feeds on insects and seeds. Nest on ground in grassland habitats between April and May (Vickery 1996). For breeding prefers large grasslands of at least 30-100 acres.	**Possible** Recent (2022) occurrence record from the landfill; however, records in the immediate area are rare. Only four possible breeding season records from the lower Watsonville area, whereas, records from the Watsonville foothills are more numerous (eBird 2026). Grassland on site and nearby agricultural fields provide potential habitat.	**Possible** The Study Area for Alternative 3 provides potential suitable breeding habitat in the native and non-native grassland habitat on the upper terrace. See Proposed Project for nearest recent records of this species.
Lawrence's Goldfinch *Spinus lawrencei* (nesting)	BCC	-	S3S4	Typically occupies arid and open woodlands within the near vicinity of three habitat components: chaparral or other brushy areas; tall annual weed fields; and water source such as stream, small lake, or farm pond (Watt et al. 2020).	**Possible** Individual observed during 2018 surveys. Also known from Harkins Slough and Struve Slough (eBird 2026). Nesting on central coast is uncommon.	**Possible** See Proposed Project.
Loggerhead Shrike *Lanius ludovicianus* (nesting)	BCC	SSC	-	Grassland, agricultural fields, and shrub habitats with small reptiles and insects. Nests in dense trees or shrubs adjacent to open areas. Known to impale prey items on barbed wire fences (Yosef 2020).	**Not Expected** Records from Harkins Slough, Struve Slough, and other nearby locations, including an old (1987) record from Buena Vista Landfill (eBird 2026), but this species is rare in the County. Grasslands within the Study Area provide potential foraging habitat. No recent breeding records in Santa Cruz County, likely extirpated as a breeder.	**Not Expected** See Proposed Project.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
Northern Harrier *Circus cyaneus* (nesting)	-	SSC	S3	Ground nester; grasslands, sloughs, wet meadows, savanna, prairies and marshes (Smith et al. 2020).	**Not Expected** Recent records document this species along Harkins Slough (2023) and at Watsonville Slough Farm (2018-2025) mostly outside of breeding season (eBird 2026) and the non-native grassland of the Study Area is likely too disturbed and fragmented to be preferred as nest habitat by this species.	**Not Expected** The non-native grassland habitat within the Study Area for Alternative 3 is likely too fragmented to be preferred as nesting habitat by this species. See Proposed Project for nearest recent records of this species.
Nuttall's Woodpecker *Picoides nuttallii* (nesting)	BCC	-	-	Occurs primarily in oak and riparian woodland. May also be found foraging in woodland adjacent chaparral. Excavates nest cavities in soft or dead wood (Short 1971).	**Present** Observed during 2024 surveys. Woodlands surrounding the Study Area provide foraging and nesting habitat. This species is likely to be found in and around the Landfill and is regularly observed in the adjacent areas (eBird 2026).	**Present** The coast live oak woodland within the Study Area for Alternative 3 provides foraging and nesting habitat. See Proposed Project for additional information.
Oak Titmouse *Baeolophus inornatus* (nesting)	BCC	-	-	Nests in natural cavities, old woodpecker holes, artificial nest boxes from mid-March through April. Inhabits oak woodlands along the Pacific Slope. Requires elevated perches for foraging and eating (Cicero et al. 2020).	**Present** Observed during 2018 and 2024 surveys. Also known from the forested habitats around Harkins Slough and Gallighan Slough (eBird 2026).	**Present** The coast live oak woodland within the Study Area for Alternative 3 provides foraging and nesting habitat. This species was observed during 2025 surveys. See Proposed Project for additional information.
Olive-sided Flycatcher *Contopus cooperi* (nesting)	BCC	SSC	-	Inhabits woodland and forest habitats. Nests in tall trees, generally near the edges and openings to meadows, grasslands, wetlands, and ponds (Altman and Sallabanks 2020).	**Possible** Rare records from the immediate area are limited to a sighting along the SCBRL southwest of the Old Landfill (2014), near the corner of San Andreas Road and Buena Vista Drive (2017), and from Rancho Road (2018). Additional recent breeding season records are from Larkin Valley, La Selva Beach, and Sunset Beach (eBird 2026). Suitable habitat is present in forested areas around the margins of the Study Area but nesting within the Project Area is unlikely.	**Possible** See Proposed Project.
Tricolored Blackbird *Agelaius tricolor* (nesting colony)	BCC	ST	S1S2	Colonial breeders. Breeding sites require nearby water, suitable nesting substrate, and open-range foraging habitat of natural grassland, shrubland, or agricultural cropland (Meese and Beedy 2015, Beedy et al. 2023).	**Not Expected** Known foraging records from Harkins Slough, Hanson's Slough, Struve Slough (eBird 2025, CNDDB 2026b,c) and numerous other locations in the immediate vicinity. Study Area provides foraging habitat but no nesting habitat. Confirmed breeding in Santa Cruz County is limited to one small colony on the north coast (eBird 2025).	**Not Expected** See Proposed Project.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
Western Burrowing Owl *Athene cunicularia* (nesting and some wintering sites)	BCC	SSC	S3	Found in open areas with low-growing vegetation including annual and perennial grasslands, deserts, open scrub habitats, and agricultural fields with suitable burrows. Burrows of fossorial mammals are an essential component of their nesting and wintering habitat, but they may also use artificial structures such as culverts, openings in asphalt pavement, woody debris/rock piles, and crevices in stacks of straw bales (Poulin et al. 2020).	**Possible** Recent winter or migrant sightings of individuals are from Watsonville Slough Farm (2025) the confluence of Watsonville Slough and Struve Slough along the SCBRL (2021 and 2024), and the Pajaro Valley High School open space (2018-2019) (eBird 2026). No nesting records in the Santa Cruz County since 1987 and nesting is considered to be extirpated (Center for Biological Diversity (CBD) et al. 2003; Townsend and Lenihan 2007; Trulio 2018a,b). Non-native grassland within the Study Area provides marginal potential wintering or migrant habitat due to the limited number of small mammal burrows.	**Possible** The Study Area for Alternative 3 provides potential suitable breeding habitat in the native and non-native grassland habitat on the upper terrace and in squirrel burrows throughout the property. See Proposed Project for nearest recent records of this species.
Western Gull *Larus occidentalis* (nesting)	BCC	-	-	Range confined to the North American coastline. Breeds primarily on offshore islands in the Pacific with the Southeast Farallon Island estimated to contain at least 30% of the world's breeding population. Will also nest on ground or cliffs along coastline or on human structures such as piers, buildings, and boats (Penniman et al. 1990, Pierotti et al. 2024).	**Possible** Common and abundant foraging within Landfill boundary and nearby at Harkins Slough (eBird 2026). Rooftops within the Study Area may provide suitable nesting substrate.	**Possible** See Proposed Project.
Western Screech-Owl *Megascops kennicottii* (nesting)	BCC	-	-	Common and widely distributed throughout a diverse range of habitats, especially those dominated by deciduous trees and riparian habitat. Nests in tree cavities (Feusier 1989, Noble 1990, Lehman 1994).	**Not Expected** Common in the Santa Cruz mountains but not expected in the more urban areas of Watsonville (eBird 2026).	**Not Expected** See Proposed Project.
White-tailed Kite *Elanus leucurus* (nesting and foraging)	-	FP	S3S4	Nests in trees on the margins of open areas including grasslands and sloughs containing a high abundance of small mammals and lizards (Dunk 2020).	**Possible** Numerous recent sightings from Harkins Slough (2018-2025) and two from Gallighan Slough (2021 and 2025) including juveniles (eBird 2026). Tree stands within and adjacent to the Study Area provide potential nesting habitat. Grasslands with small mammals provide foraging habitat.	**Possible** See Proposed Project.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
Wrentit *Chamaea fasciata* (nesting)	BCC	-	-	Prefers native scrub and chapparal habitats but will nest in a variety of habitats if a dense understory is present. Non-migratory: pairs often remain on breeding territory year-round (Geupel 2023, Grinnell and Miller 1944, Garrett and Dunn 1981).	**Present** Recent sightings in the immediate vicinity (eBird 2026). Observed during 2022 and 2024 surveys. Scrub and chapparal adjacent to the Landfill provide foraging and nesting habitat.	**Present** See Proposed Project. This species was observed during 2025 surveys.
Yellow Warbler *Setophaga petechia* (nesting)	-	SSC	S3	Breeds in willow dominated riparian and wet deciduous thickets. May nest in disturbed and edge habitats including orchards and parks. Nest is an open cup often placed in small trees such as willow, dogwood, alder, and cottonwood (Campbell et al. 2001, Lowther et al. 2025, Dunn and Garrett 1997).	**Possible** Recent (2022) records in the immediate vicinity along the Santa Cruz Branch Rail Line southwest of the Old Landfill (KEC 2022, eBird 2026). Tree stands and riparian vegetation within the Study Area provide suitable foraging and potential nesting habitat. Known to nest in riparian areas nearby along Harkins Slough (eBird 2026).	**Possible** See Proposed Project.
nesting birds	-	CFGC	-	Variable.	**Present** Tree stands, grasslands, and scattered coyote bush provide nesting habitat for birds, including raptors and owls. Breeding activity was observed during 2018, 2024, and 2025 (reconnaissance) surveys for the following common avian species: Anna's Hummingbird, Black Phoebe, Bushtit, Hooded Oriole, Killdeer, Lesser Goldfinch, Orange-crowned Warbler, Wilson's Warbler, Purple Finch, House Finch, and Red-tailed Hawk.	**Present** Reconnaissance surveys detected used Cliff Swallow and Barn Swallow/Black Phoebe nests on structures within the Study Area. A Red-tailed Hawk nest was observed in the eucalyptus stand running parallel to Harkins Slough Road and juvenile hawks have been observed during multiple years. See Proposed Project for other nesting species observed nearby.
MAMMALS						
Long-legged Myotis *Myotis volans*	-	-	HP	Roosts primarily in large hollow tree snags or live trees with exfoliating bark; also uses rock crevices, mines, and buildings (Warner and Czaplewski 1984).	**Possible** Potential roost sites available in trees with exfoliating bark, primarily adjacent to the Harkins Slough Road realignment footprint, within the Wildlife Refuge. May forage over site or occur as migrant.	**Possible** The coast live oak woodland and buildings within the Study Area for Alternative 3 provide foraging and nesting habitat. See Proposed Project for additional information.
Western Red Bat *Lasiurus blossevillii*	-	SSC	HP	Roosts in foliage, primarily in riparian and woodland habitats (WBWG 2025, Harvey et al.1999, Pierson et al. 1997).	**Possible** Potential roosting habitat occurs in the riparian woodland and oak woodland habitats. May forage over site or occur as seasonal migrant and roost within riparian habitat.	**Possible** See Proposed Project.

Common Name *Scientific Name*	Status			Habitat Requirements	Potential Occurrence	
	Federal	State	Other		Buena Vista Landfill (Proposed Project)	Alternative 3
common roosting bat species	-	CFGC	-	Variable.	**Present** Common roosting bat species were observed during July 2024 surveys. Tree stands, buildings, and culverts provide potential roosting habitat, including foliage roosting bats.	**Present** See Proposed Project.
San Francisco Dusky-footed Woodrat *Neotoma fuscipes annectens*	-	-	S2S3	Associated with riparian, oak woodland and redwood forest habitats and edge habitats. Builds houses from sticks and leaves under or in buildings and trees, in hollow trees, or in tree canopy (Sakai and Noon 1993).	**Present** During 2018, 2023, 2024, and 2025 surveys, woodrat houses were observed within oak woodland, eucalyptus forest, and riparian vegetation habitat types, especially those on the margins with grassland habitat, where edge habitats or ecotones exist.	**Present** Active nest houses were observed within the Study Area for Alternative 3 during 2018, 2023, 2024, 2025, and 2026 surveys. See Proposed Project for additional information.
American Badger *Taxidea taxus*	-	SSC	-	Occurs in open, uncultivated grasslands and meadows, and open stages of shrub and forest habitats with dry with friable soils. Forages on burrowing rodents, insects, and ground nesting birds (CDFW CWHR 2008, Quinn 2015).	**Not Expected** Potential habitat in the vicinity is fragmented by agriculture, roads, and other development and is not likely to be preferred by this reclusive species. Historic record from 1909 in the vicinity (west) of the Study Area (CNDDB 2026b,c).	**Not Expected** See Proposed Project.

NOTES:

Federal Status

FE = Endangered: Any species, which is in danger of extinction throughout all, or a significant portion of its range (USFWS 2026a).

FT = Threatened: Any species, which is likely to become an endangered species within the foreseeable future throughout all, or a significant portion of its range (USFWS 2026a).

PT= Proposed Threatened: Proposed for listing as threatened under the ESA (USFWS 2026b).

BCC = Species of migratory nongame birds that are considered to be of concern in the United States because of (1) documented or apparent population declines, (2) small or restricted populations, (3) dependence on restricted or vulnerable habitats (USFWS 2021).

State Status

SE = Endangered: A native species or subspecies of animal which is in serious danger of becoming extinct throughout all, or a significant portion of its range, due to loss of habitat, change in habitat, over exploitation, predation, competition and/or disease (CDFW 2026a).

ST = Threatened: A native species or subspecies of bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Fish & G. Code, §2067

SCE = Candidate Endangered: A species that is being considered for listing and is temporarily afforded the same protections as listed species.

SSC = CDFW Species of Special Concern: Designated due to declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction (CDFW 2026b, CNDDB 2026a).

FP = Fully Protected[1]: State's initial protection for animals that were rare or faced possible extinction. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock (CDFW 2026c).

CFGC = California Fish and Game Code (2026):
3503 - Protects active nests and eggs of birds from take, possession, or needless destruction
3503.5. - Protects birds of prey (Orders Falconiformes and Strigiformes)
Section 86; 2000; 2014; 3007; 4150, and Title 14 CCR - Protects non-listed bat species and their roosting habitat, including individual roosts and maternity colonies.

[1] More information on Fully Protected species and the take provisions can be found in the Fish and Game Code, (birds at §3511, mammals at §4700, reptiles and amphibians at §5050, and fish at §5515). Additional information on Fully Protected fish can be found in the California Code of Regulations, Title 14, Division 1, Subdivision 1, Chapter 2, Article 4, §5.93.

Other

NatureServe Ranking[2]: S1 = Critically Imperiled—Critically imperiled in the state because of extreme rarity (often 5 or fewer populations) or because of factor(s) such as very steep declines making it especially vulnerable to extirpation from the state.
S2 = Imperiled—Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3 = Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
S4 = Apparently Secure – At a fairly low risk of extirpation in the state due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

HP = Considered "High Priority" on the Western Bat Working Group's (WBWG) Western Bat Species Regional Priority Matrix

[2] Originally developed by The Nature Conservancy and now maintained and recently revised by NatureServe. Includes a **Global rank** (G-rank), over the taxon's entire distribution, and a **State rank** (S-rank), over its state distribution. For subspecies and varieties, there is also a "T" rank describing the global rank for the infraspecific taxon. Criteria are used to assign element ranks, from G1 to G5 for the Global rank and from S1 to S5 for the State rank, taking into account rarity, threats, and trends (CNDDB 2026a).

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Appendix G2.2. Sensitive Wildlife Species Narratives

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SENSITIVE WILDLIFE SPECIES NARRATIVES

CROTCH'S BUMBLE BEE

The Crotch's Bumble Bee (*Bombus crotchii*) is a candidate species for listing as Endangered under California Endangered Species Act (CESA) (CDFW 2026a). While awaiting listing under CESA by California Department of Fish and Wildlife (CDFW), candidate species are given full CESA protection. This species inhabits open grassland and scrubland habitat that contain requisite underground nesting habitat, such as small mammal burrows, soft disturbed soil, or leaf litter (Goulson 2010, Williams et al. 2014). This species may also inhabit semi-natural habitats surrounded by highly modified landscapes, such as parks and gardens. The active period for a colony is when detection probability is highest for this species and occurs annually between April and August (CDFW 2023), but queens may emerge from hibernation as early as February.

MONARCH BUTTERFLY

The life history of the monarch butterfly (*Danaus Plexippus)* can be divided into two temporally defined periods: a spring/summer reproductive period and a fall/winter non-reproductive (wintering) period. During the spring and summer, monarchs exploit the widely distributed North American milkweed flora (*Asclepias* spp.) as food for their larvae. In the fall, the adult butterflies that are produced during the latter part of summer migrate to wintering habitats in coastal California or central Mexico to spend the winter months. Monarchs spend from 1 to 9 months as adults, depending on when they become reproductive. If they become reproductive immediately, they live 1-2 months as adults. Monarch adults that emerge from August through October typically migrate and overwinter before becoming reproductive the following spring. These monarchs live approximately 8-9 months as adults.

Monarchs arrive at overwintering sites in September and the first half of October to form fall aggregations. By mid-November they form more stable aggregations, which persist through January or February (Pelton et al. 2016). The monarch butterfly utilizes eucalyptus, Monterey pine, or Monterey cypress tree groves for winter roost sites, typically within 1.5 miles (2.4 kilometers) of the Pacific Ocean. Monarchs form aggregations on the underside of peripheral branches. The suitability of the stand is determined by both abiotic and biotic factors including:

- periodic exposure to (dappled) sunlight (often southeast aspect);
- cool shady roost areas for periods of warm weather;
- primary and secondary wind protection;
- proximity to nectaries (fall or winter blooming flowers);
- humidity; and
- water sources.

Monarchs typically emerge from a state of nocturnal torpor and begin to fly at temperatures around 55° F. Below this temperature, monarchs are unable to fly and are often killed or injured if dislodged from their roosts. Winter roost sites are sufficiently heterogeneous to permit shifts of roost location in accord with prevailing weather conditions and seasonal variation in insulation. The roost site consists of the trees upon which the butterflies cluster, as well as the surrounding trees that provide wind protection. In addition, overwintering habitat includes nectar plants and water sources surrounding the roost site, since monarchs may fly some distance to obtain these resources (Pelton et al. 2016, Griffiths and Villablanca 2015).

California Red-Legged Frog

The California Red-legged Frog (CRLF; *Rana draytonii*) is listed as threatened under the federal Endangered Species Act. The CRLF is also designated as a Species of Special Concern by the California Department of Fish and Wildlife (CDFW). The CRLF requires still or slow-moving water for egg deposition and larval development (USFWS 2010). Aquatic breeding habitats include natural and manmade ponds, marshes, sloughs, slow-moving streams, backwater portions of rivers and portions of some reservoirs where predatory fish have limited access (USFWS 1996; Alvarez et al. 2024). The CRLF also requires aquatic non-breeding habitat (Bulger et al. 2003; Fellers and Kleeman 2007; USFWS 2010). Non-breeding habitats are primarily along permanent and seasonal streams but may also include well-vegetated areas that remain cool through the summer including seeps, springs, canals and other moist or wet locations with similar characteristics, both natural and manmade.

Movements of post-metamorphic juveniles generally occur with the first rains of the weather-year, in response to receding water, or following the breeding season (Fellers and Kleeman 2007; Allaback et al. 2010). Use of upland habitats by CRLF varies over the course of the year, although they generally remain close to aquatic habitats during the dry season (Bulger et al. 2003; Tatarian 2008; Keung, 2015; Halstead and Kleeman 2017). Beginning with the first rains of the fall, CRLF may engage in longer movements and remain away from water for weeks at a time, although most non-migrating adults are found within approximately 300 feet of aquatic habitats (Bulger et al. 2003; USFWS 2010; Keung, 2015; Halstead and Kleeman 2017). During the late fall and winter, CRLF adults migrate to breeding ponds. A radio-telemetry study in Santa Cruz County determined that migrating individuals generally engage in straight-line movements often irrespective of riparian corridors, and that they may move up to two miles between non-breeding and breeding sites (Bulger et al. 2003). The distances moved by dispersing CRLF is highly dependent on local conditions and spatial distribution of aquatic and nonbreeding habitats (USFWS 2010).

Northwestern Pond Turtle

The Northwestern Pond Turtle (NWPT; *Actinemys marmorata*) (formerly Western Pond Turtle) is proposed for listing under the federal Endangered Species Act as threatened and is a California SSC (USFWS 2023a,b). The range of the Northwestern Pond Turtle includes populations from the San Joaquin Valley north, all populations in California north of the middle of Monterey Bay, the Coastal and Cascade Ranges of Oregon and Washington State, and an outlying population in Nevada (Shaffer and Scott 2022, pp. 5, 13). It primarily inhabits permanent water sources including ponds, streams and rivers. Although it is primarily an aquatic species, it can move across land in response to fluctuating water level, an apparent adaptation to the variable rainfall and unpredictable flows that occur in many coastal California drainage basins (Rathbun, et al. 1992). The species favors sites with deep pools and with an abundance of basking sites, such as partially submerged logs or rocks, matted emergent vegetation, floating aquatic vegetation or exposed shorelines. Females travel from aquatic sites into open, grassy areas to lay eggs in a shallow nest (Holland 1992; Rathbun et al. 1992, 2002). Although nests have been reported up to 1,300 feet from water bodies (Jennings and Hayes 1994), Rathbun et al. (2002) found the average distance to water was 92 feet (range 31–260 feet).

The Western Pond Turtle was traditionally split into two subspecies, distinguished in part by the presence (*marmorata*) or absence (*pallida*) of inguinal scutes. Genetic research was used to determine that the two taxa should be recognized as separate species (Spinks, et al. 2014). The boundary between Southwestern Pond Turtle (*Actinemys pallida*) and Northwestern Pond Turtle has been revised over time. The specimens examined by Spinks et al. (2014) in the coast ranges south

of San Francisco Bay were *pallida*. Thompson et al. (2016), Shaffer et al. (2019) and Hansen and Shedd (2025) adopted that range. However, based on additional genetic work, USFWS revised the species boundary between the two species southwards to the middle of the Monterey Bay coastline, meaning the project area is within the range of *marmorata*.

Allen's Hummingbird

The Allen's Hummingbird (*Selasphorus sasin*) is listed by the US Fish and Wildlife Service (USFWS) as a Bird of Conservation Concern (BCC) (2021). It migrates from Mexico to arrive in coastal California late winter/early spring. This species breeds from southwest Oregon to southern California, including on some of the Channel Islands. The breeding period is from February 1 to mid-July, with most breeding occurring March-June. In anticipation of the arrival of the females, males squabble to defend food sources and territory in shrub, chaparral, riparian woodland, mixed evergreen, and eucalyptus groves in the fog belt. Females typically select thicker riparian understory vegetation for nesting. Females build the nest from downy material bonded with spider webs and decorated with moss and lichen. The female provides all the care at the nest. The Allen's Hummingbird feeds on floral nectar and small insects.

Bald Eagle

The Bald Eagle (*Haliaeetus leucocephalus*) is listed as endangered under CESA and is designated a Fully Protected species by CDFW (2026c). This large bird of prey can be found throughout most of California at lakes, reservoirs, rivers, rangelands, and coastal wetlands. They are opportunistic foragers preying upon a variety of small animals, with a preference for fish over other types of prey. The species often scavenges, pirating food from other species. Breeding pairs remain together for life, or until the death of one individual at which time the surviving bird may seek a new mate. They build large stick nests, frequently located in the upper canopy of the tallest trees in the area. Breeding adults will often reuse previous nests, repairing and expanding previous nests each year and the pair's territory typically includes several nests. One to three eggs are laid in the winter or early spring, and chicks fledge when they are about 11 or 12 weeks old.

California Gull

The California Gull (*Larus californicus*) is listed as a BCC by the USFWS (2021). The California Gull can be found foraging throughout a large variety of habitat types across its range but almost exclusively nests in colonies on islands on bodies of water or other similarly situated substrate that provides refuge from terrestrial predators (Winkler 2020). In addition to natural substrates, rooftops also provide suitable nesting habitat for this species.

California Thrasher

The California Thrasher (*Toxostoma redivivum)* is listed by USFWS as a BCC. The California Thrasher primarily inhabits scrub/chapparal and sagebrush habitat types but may also be found within scrub adjacent riparian and oak woodland. Nests are most often placed well hidden within dense scrub. The nesting season typically occurs from February through July but nesting has been documented starting as early as November.

Golden Eagle

The Golden Eagle (*Aquila chrysaetos*) is a CDFW Fully Protected species (CDFW 2026c). In central California, the Golden Eagle typically hunts over grasslands with high topographic relief (rolling hills

and mountains) building nests in cliffs or trees, often in oak woodland or oak savanna with a wide view of the surrounding area, updrafts for flight, and proximity to small to medium sized mammal hunting grounds (Katzner et al. 2020).

Grasshopper Sparrow

The Grasshopper Sparrow (*Ammodramus savannarum)* is a California SSC. The California breeding range for this species is a very narrow band along the coast. The Grasshopper Sparrow is associated with short to medium-height grasslands, often with patchy bare ground, and may be found in pastures and agricultural fields. In the west, this species may utilize lusher grasslands with shrub cover. The Grasshopper Sparrow nests on the ground in grassland habitats between April and June. Forages on insects and seeds (Vickery 1996).

Lawrence's Goldfinch

The Lawrence's Goldfinch (*Spinus lawrencei)* is listed as a BCC by the USFWS (2021). It typically occupies arid and open woodlands in the vicinity of three habitat components: chaparral or other brushy areas; tall annual weed fields; and water source such as stream, small lake, or farm pond. It prefers native plant seeds as a food source, and breeding sites are typically close to water. On the Central Coast, the Lawrence's Goldfinch tends to nest in oaks of moderate to small diameter with some lichen; however, this species may use riparian woodland, chaparral, or coastal scrub (Watt et al. 2020; Rosenberg et al. 1991).

Nuttall's Woodpecker

The Nuttall's Woodpecker (*Dryobates nuttallii*) is listed by USFWS as a BCC. It occurs primarily in California's oak woodlands but may also be observed in riparian woodlands, forested suburban areas, and, rarely, in conifer forests. Its distribution stretches from northernmost California to northern Baja California. The Nuttall's Woodpecker forages in the crevices of trees, primarily gleaning insects. Breeding occurs between April and July. Nest sites are cavities in soft wood, with the male typically excavating the cavity prior to egg laying and the both the male and female refining the cavity during egg-laying (Lowther and Pattern 2020).

Oak Titmouse

The Oak Titmouse (*Baeolophus inornatus*) is listed by USFWS as a BCC. It is a common year-round resident of warm, dry woodlands, restricted almost entirely to California, but ranges from southwest Oregon to northwest Baja California. The Oak Titmouse occupies predominantly oak or mixed oak-pine forests but has also adapted to other similar habitats such as open pine forests in central California. It has a varied diet that is composed of plant parts including seeds and berries, as well as invertebrates. The Oak Titmouse pair bonds during their first breeding season, and the pair mates for life. The breeding pair builds a nest of grass, moss, mud, hair, feathers, and fur in a woodpecker hole, natural cavity, or nest box and may partially excavate their own cavities. In central California, breeding activity typically occurs between late February and the end of June; late nest-building (June) indicates a replacement nest or a second clutch (Cicero et al. 2020).

Olive-sided Flycatcher

The Olive-sided Flycatcher (*Contopus cooperi*) is a USFWS BCC and a California SSC. It breeds in woodlands and forests, at edges and openings, such as meadows, grasslands, wetlands and ponds, near open water from Alaska through Canada into California. It builds a cup nest of twigs, rootlets,

and lichens, placed near the tip of a horizontal branch. Tall, prominent trees and snags are used for perching, singing and foraging.

Western Burrowing Owl

The western burrowing owl (*Athene cunicularia hypugaea*) is a USFWS (2021) Bird of Conservation Concern and a CDFW Species of Special Concern (CDFW 2025b, Shuford and Gardali 2008), with breeding sites protected as well as some wintering sites (CNDDB 2026). The burrowing owl is found in open areas with sparse, low-growing vegetation (<6 inches around burrows) including annual and perennial grasslands, deserts, open scrub habitats, and agricultural fields with suitable burrows. Burrows of fossorial mammals are an essential component of their nesting and wintering habitat, but they may also use artificial structures such as culverts, openings in asphalt pavement, woody debris/rock piles, and crevices in stacks of straw bales (Poulin et al. 2020). The presence of fossorial mammals, typically ground squirrels, is a good predictor for re-occupancy of habitat, typically in areas that are adjacent to current breeding habitat (Center for Biological Diversity et al. 2003; Shuford and Gardali 2008).

Western Gull

The Western Gull (*Larus occidentalis*) is listed as a BCC by the USFWS (2021). The Western Gull can be found foraging throughout a large variety of habitat types across its narrow range along the Pacific coast of the United States and Baja California. Nests are built on offshore islands, rocky islets, and sea cliffs as well as human structures such as abandoned piers, channel markers, dikes separating ponds and rooftops near oceans/bays (Pierotti et al. 2024). Despite this narrow range, it is the most abundant species of gull in Santa Cruz County and is commonly observed foraging on refuse at landfills.

White-tailed Kite

The White-tailed Kite (*Elanus leucurus*) is a CDFW Fully Protected species (CDFW 2026c). It inhabits agricultural fields, open grasslands, savannah-like habitats, and riparian and oak woodlands in a relatively narrow band on the west coast of the U.S. and Canada and over large parts of Mexico. An abundance of small prey is a requisite habitat feature. The White-tailed Kite feeds on rodents, lizards, birds, and insects. Nests sites are variable, and may be located in herbaceous open stages of most habitats from large scrub to trees. The kite makes a stick nest near the top of its nest site, camouflaged from below but open on top. Some nest site fidelity has been observed. Kites may nest semi-colonially. Breeding season occurs from late February to early August. Occasionally kites will double brood in a single season (Dunk 2020, Laursen, Pers. Comm 2018).

Wrentit

The Wrentit (*Chamaea fasciata)* is listed by USFWS as a BCC (2021). It occurs along the west coast (west of the Cascades and the Sierra Nevada) from the Columbia River to Baja California. The Wrentit is abundant in shrublands, especially coastal scrub and chaparral; and a variety of other habitats with adequate understory cover such as timber and riparian forests, oak woodland, and urban and suburban areas. Wrentits typically mate for life and both the male and the female defend their territory year-round. Breeding occurs from mid-March to early August. Nest sites are often in dense scrub such as California sage, California blackberry, poison oak or coffeeberry, but may also be situated in trees. Nests are constructed of strips of bark, twigs, cobwebs, and are lined with grasses, and other softer materials and decorated with lichen along with materials gleaned from humans. The Wrentit eats insects, spiders, fruit, and seeds (Geupel and Ballard 2023).

Yellow Warbler

The Yellow Warbler (*Setophaga petechia)* is a California SSC (CDFW 2026b, Shuford and Gardali 2008). The Yellow Warbler forages in dense riparian understory and nests in riparian woodland and shrub with an open canopy along streams or other watercourses. Nesting typically occurs between May and August (Lowther et al. 2025).

Long-legged Myotis

The Long-legged Myotis (*Myotis volans*) is considered a High Priority species by the Western Bat Working Group (WBWG). It roosts primarily in large hollow tree snags, or live trees with exfoliating bark; but also uses rock crevices, mines, and buildings. This species is most common in woodland and forest habitats but also occupies chaparral and coastal scrub. The Long-legged Myotis forages in and around the forest canopy, over water and open habitats and is associated with short-lived patches of high insect density. The Long-legged Myotis forms maternity colonies with young born in June and July and volant 3-6 weeks later. The Long-legged Myotis is most active 3-4 hours after sunset. This species probably makes short migrations to winter hibernacula (Warner and Czaplewski 1984).

Western Red Bat

The Western Red Bat (*Lasiurus blossevillii*) is a California SSC and is considered a High Priority species by WBWG. It roosts in foliage, primarily in riparian and wooded habitats, along streams and in edge habitats or habitat mosaics that provide open areas for foraging. The Western Red Bat prefers roost sites that are protected from above and open below and located above dark ground cover (Harvey et al. 1999, Pierson et al. 1997). Young are born between late May and July and volant 3-6 weeks later. The Western Red Bat begins foraging 1 - 2 hours after sunset and again several hours before sunrise, corresponding to periods of insect activity. This species may migrate a short distance between summer and winter ranges (WBWG 2017).

San Francisco Dusky-footed Woodrat

The San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) is listed as S2/S3 by NatureServe and is considered under CEQA (CNDDB 2026). In 2026, the San Francisco Dusky-footed Woodrat was removed from the list of CDFW SSC. The woodrat is associated with riparian, oak woodland, redwood forest, and chaparral or other scrub habitats. The woodrat builds houses on the ground or in trees, utilizing understory, woody debris, human debris, structures or buildings. Houses range in size from 3 to 8 feet across at the base, up to 6 feet tall, and up to approximately 30 feet above the ground in tree canopies. The woodrat tends to live in colonies of 3 to 15 or more houses, with the inhabitants often representing multiple generations. Houses have food caches, latrines, and often *Peromyscus* sp. nests and/or amphibians within. The woodrat is mostly nocturnal, leaving its house to forage on different parts of the same woody plant seasonally including leaves, bark, seeds and fruit of coast live oak, coffeeberry, poison oak, elderberry, but also grasses, flowers, and fungi. The woodrat breeds from December to September with a peak in mid-spring (Sakai and Noon 1993).

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Appendix G2.3. Santa Cruz Long-Toed Salamander and California Tiger Salamander Site Assessment

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SANTA CRUZ LONG-TOED SALAMANDER AND CALIFORNIA TIGER SALAMANDER SITE ASSESSMENT, BUENA VISTA LANDFILL REDEVELOPMENT PROJECT, SANTA CRUZ COUNTY, CA

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SANTA CRUZ LONG-TOED SALAMANDER AND CALIFORNIA TIGER SALAMANDER SITE ASSESSMENT, BUENA VISTA LANDFILL REDEVELOPMENT PROJECT, SANTA CRUZ COUNTY, CA

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SANTA CRUZ LONG-TOED SALAMANDER AND CALIFORNIA TIGER SALAMANDER SITE ASSESSMENT, BUENA VISTA LANDFILL REDEVELOPMENT PROJECT, SANTA CRUZ COUNTY, CA

INTRODUCTION

The County of Santa Cruz (County) proposes to redevelop the Buena Vista Landfill to a transfer station after it reaches capacity in the next 10-15 years. The site is located west of Watsonville in Santa Cruz County, California. The Buena Vista Landfill Redevelopment Project (Project) will involve developing two new waste transfer stations, improving the existing organics diversion process and implementing the landfill closure and revegetation plan once site capacity is reached. This assessment updates a previous version dated 1 August 2025 and includes an additional design option focused on the Miyashita property situated immediately northeast of the landfill.

The Project is within the range of the Santa Cruz long-toed salamander (SCLTS; *Ambystoma macrodactylum croceum*), which is listed as endangered under both the federal Endangered Species Act (ESA) and California Endangered Species Act (CESA) and designated as a Fully Protected Species under the Fish and Game Code of California. The Project is also within the range of the California tiger salamander (CTS; *Ambystoma californiense*), which is listed as threatened under both the ESA and CESA. Either or both species may be negatively affected if they inhabit the property or pass through it during migration and/or dispersal. This assessment follows guidelines prepared by the United States Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) (USFWS and CDFW 2012).

Project Site and Description

The Project covers approximately 130 acres and is bordered by Buena Vista Road on the west, Harkins Slough Road on the north and east, and Rountree Lane on the south in unincorporated Santa Cruz County, California (Figure 1). The entrance to the landfill is located at 1231 Buena Vista Drive. The site ranges in elevation from approximately 15 feet above sea level in the southern part of the site to approximately 180 feet at the cap of the landfill.

The primary components of the project are shown in Figure 2. One new transfer station would be situated in the northeast corner of the site along Harkins Slough Road, while the other would be situated at the end of Rountree Lane in the southern part of the site. Two options for an organics diversion facility (ODF) have been proposed. The ODF will be situated either in the northern part of the site (Option 1) or on top of the old landfill in the southern part of the site (Option 2).

The County is also considering consolidating all new facilities adjacent to the landfill to the northeast (Miyashita property). This option is referred to as Alternative 3 (Figure 3).

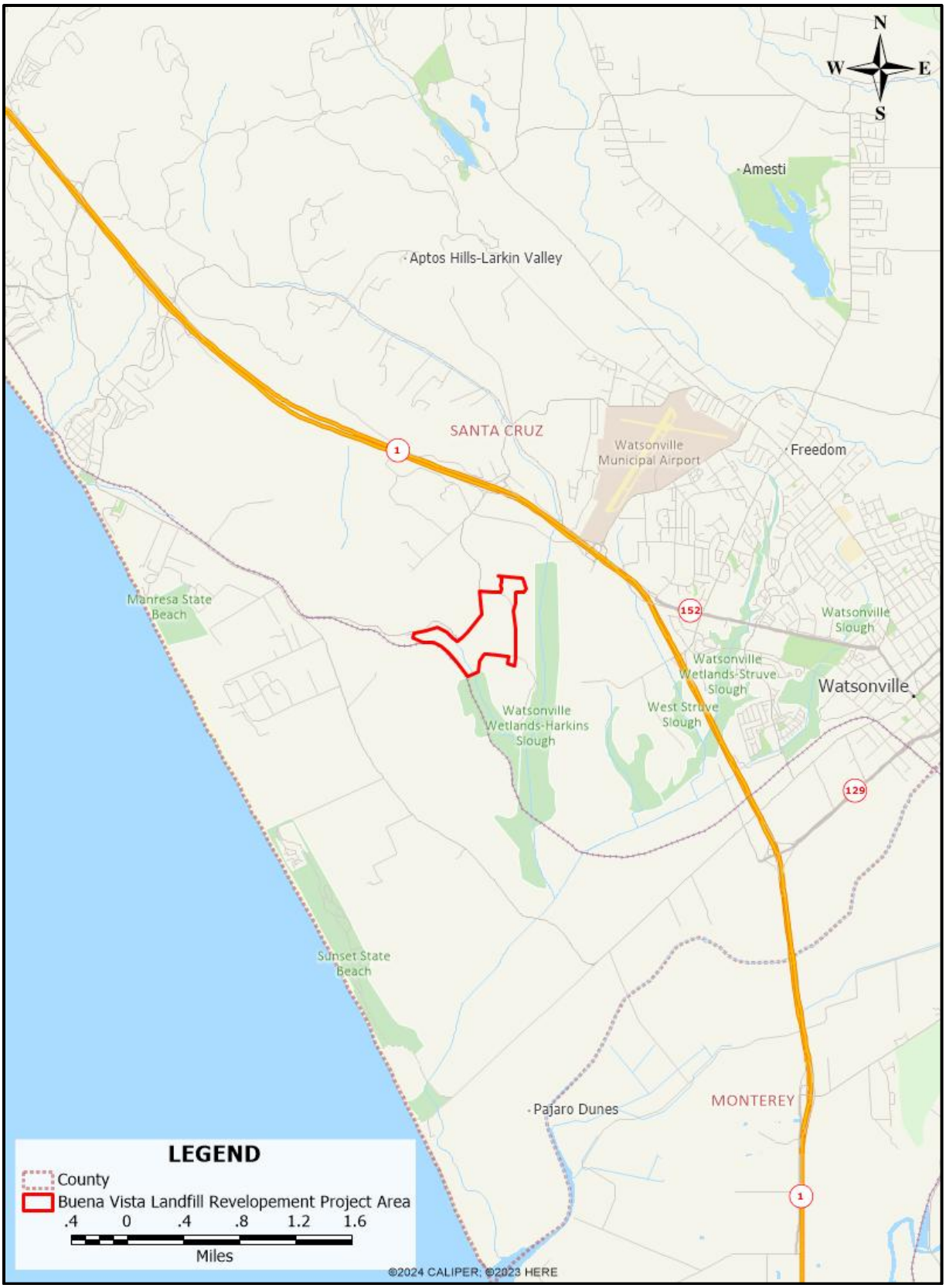

Figure 1. Buena Vista Landfill Redevelopment Project Vicinity Map.

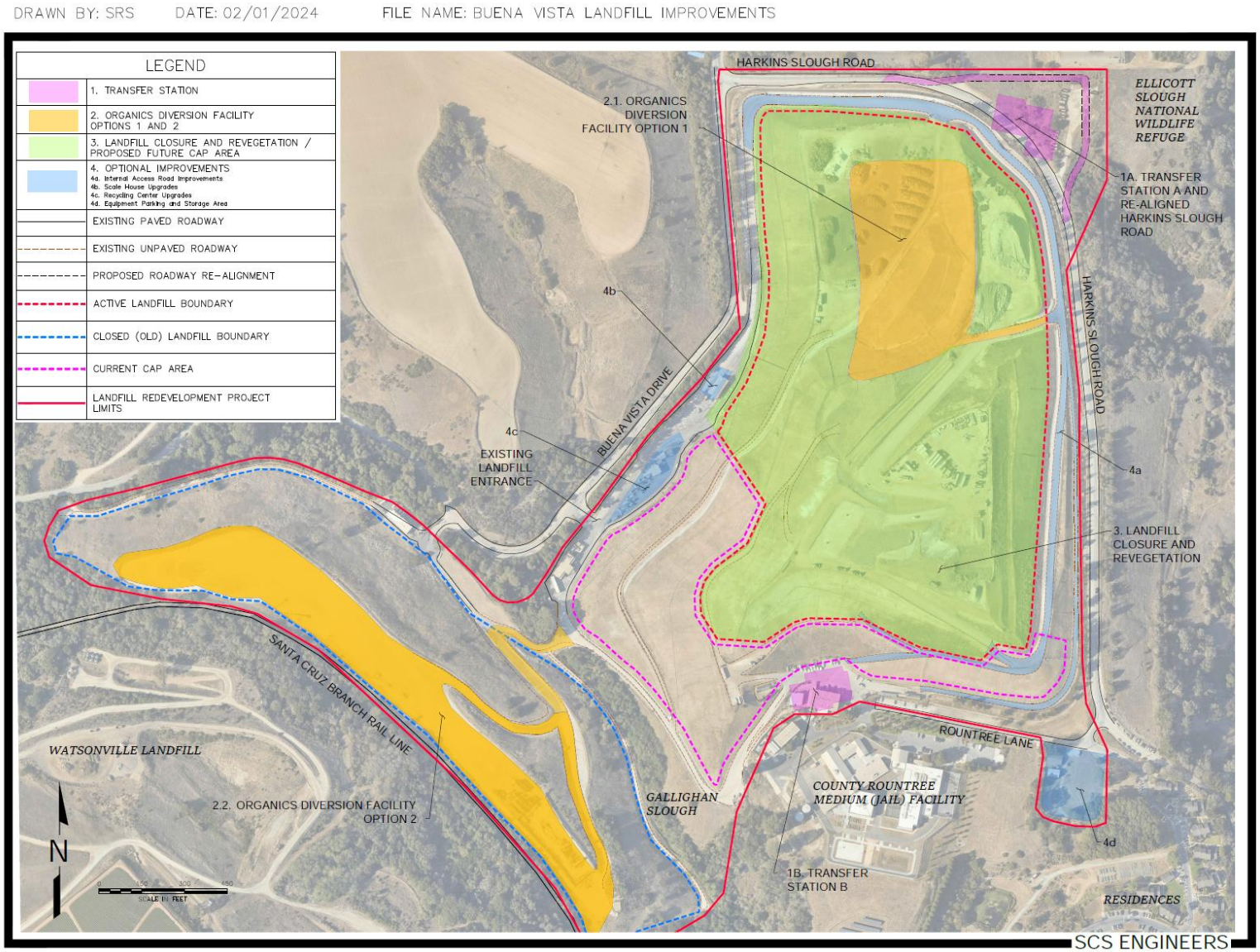

Figure 2. Buena Vista Landfill Redevelopment Project Overview of Options 1 and 2.

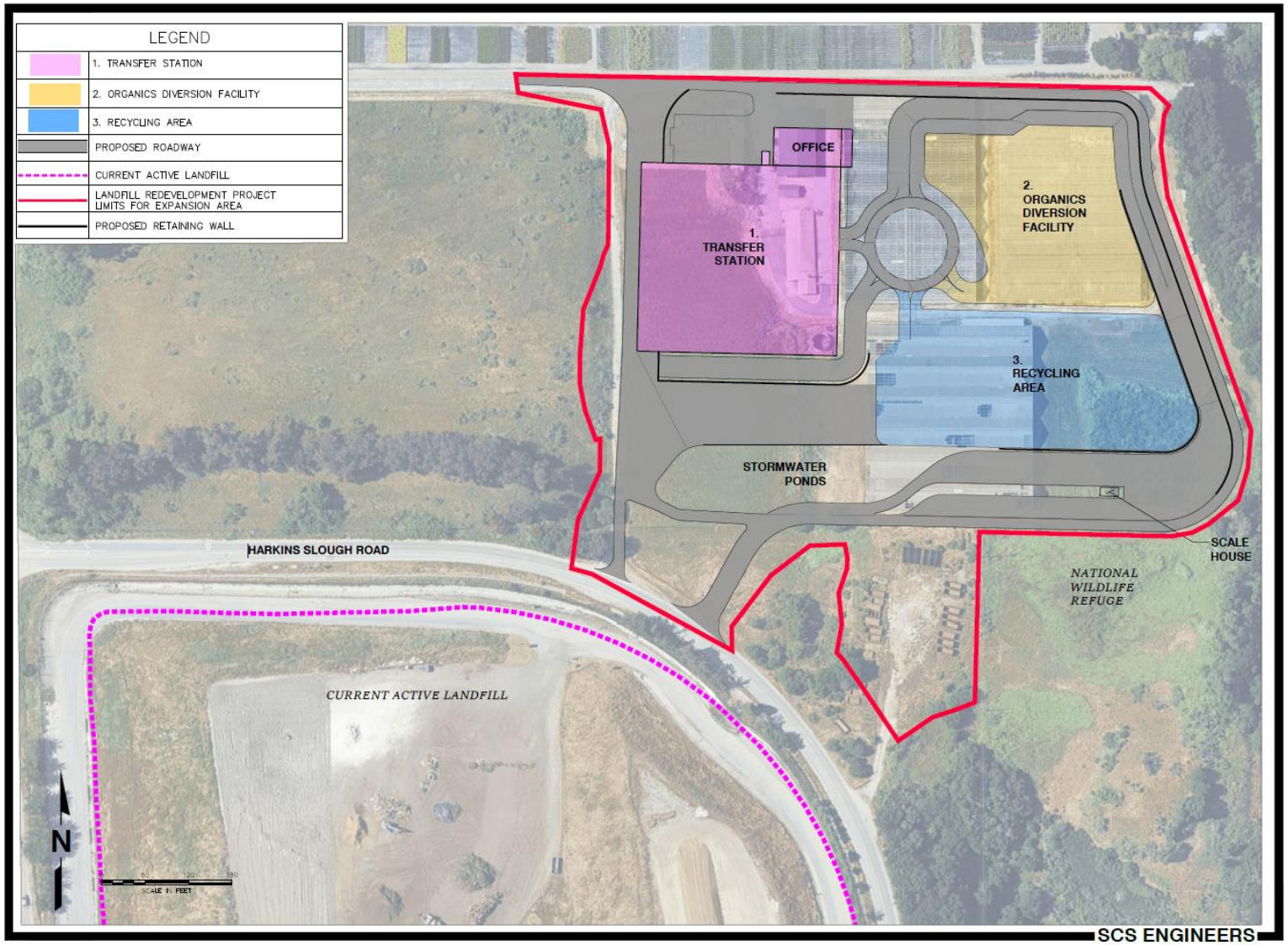

Figure 3. Buena Vista Landfill Redevelopment Project Overview - Alternative 3.

Santa Cruz Long-toed Salamander – Description, Ecology and Status

The SCLTS is a small salamander measuring 1.6 to 3.5 inches in snout-vent length (Stebbins and McGinnis 2012, 2018; Hansen and Shedd 2025). Adults and post-metamorphic juveniles are black with an irregular pattern of yellow-orange spots along the dorsum that may merge into stripes. Ventral coloration is dark gray to black, while the sides have a fine white speckling. Females and males are of similar body length, while males possess a significantly longer, broader tail. In their aquatic life stage, larval SCLTS are typically olive gray or brownish gray dorsally with bushy, external gills and a prominent dorsal fin that extends forward to the forelimbs.

The SCLTS is one of five subspecies of the long-toed salamander (*Ambystoma macrodactylum*) distributed throughout northeastern California and north into British Columbia (Petranka 1998; Stebbins 2003). The subspecies *croceum* occupies a very small range that is limited to southern Santa Cruz and extreme northern Monterey Counties in the vicinity of the coast. It is isolated from other subspecies by more than 150 miles, and recent genetic analysis indicates full species status is warranted (Savage, pers. comm.). In addition, analysis within the extant range reveals distinct genetic metapopulations that are isolated from one another, presumably by fragmentation of native habitats (Savage, pers. comm.). Given its extremely small range, barriers to genetic flow between breeding populations and ongoing habitat fragmentation, the SCLTS is considered vulnerable to extinction (USFWS 1999, 2009).

The SCLTS breeds in seasonal, semi-permanent ponds and some perennial ponds and sloughs. Single eggs are deposited on submergent vegetation and woody debris. Larvae require approximately 90 to 150 days to reach transformation (Ruth 1988). Larvae feed on a wide variety of aquatic organisms, including invertebrates and tree frog tadpoles (Anderson 1968). The growth rate and timing of metamorphosis vary with water temperature, food levels, larval densities and hydro-period (Petranka 1998). After metamorphosis, juveniles settle in nearby upland areas with relatively greater canopy cover and soil moisture (Stemle et al. 2025). Juveniles settle within several hundred feet of the pond under debris or underground until late summer, fall or winter rains incite further outward-bound dispersal (USFWS 1999). Post-metamorphic juvenile dispersal may continue throughout the rainy season (Biosearch 2020). Breeding sites generally lack exotic predators such as non-native fish, which prey on adults, eggs and larval salamanders. The few perennial ponds that support both SCLTS and invasive aquatic species, including American bullfrogs (*Lithobates catesbeianus*), have sufficient submergent and emergent vegetative cover to provide eggs and larvae with protection from predators.

SCLTS inhabit densely vegetated uplands including coast live oak woodland, willow riparian, mixed evergreen forest and coastal scrub. They remain underground in small mammal burrows and other moist refugia such as fallen logs and along the root systems of plants (Ruth and Tollestrup 1973; Ruth 1988). While SCLTS are rarely found in their refugia, small mammals that co-occur with SCLTS include broad-handed mole (*Scapanus latimanus*), shrew-mole (*Neurotrichus gibbsii*), Botta's pocket gopher (*Thomomys bottae*) and California vole (*Microtus californicus*). The burrow entrances and tunnel systems that

SCLTS utilize are often not visible, since they are typically under layers of leaf duff and woody debris in forest and scrub habitats. Adult SCLTS remain below ground during the dry season and emerge during rainy nights in the fall and winter to migrate to breeding ponds. Recapture data indicates that individuals return to the same upland areas after breeding (Ruth 1989; Biosearch 2002, 2015a). Terrestrial individuals feed primarily on sow bugs, earthworms and other invertebrates (Anderson 1968). Although grassland does not provide over-summering habitat for adults, they will readily cross grassland and use grassland cover-sites as needed for days or weeks during breeding migrations interrupted by episodic rain events (Ruth 1989; Biosearch 2002, 2013, 2015b).

The distance SCLTS move between upland and breeding habitats is not well understood, and few studies have been conducted specifically to determine migration and dispersal distances. SCLTS have been documented travelling more than one mile between upland habitats and their breeding ponds (Ruth 1988), and USFWS may assume presence of SCLTS if a known breeding pond lies within 1.2 miles (2 km) of appropriate upland and no significant barriers to movement exist (USFWS and CDFW 2012). A recent analysis of trapping data from Seascape Uplands indicates that 99% of SCLTS activity occurred within 1,119 m (0.70 miles) of the breeding pond (Stemle et al. 2024).

The SCLTS was designated as Endangered under the federal Endangered Species Act in 1967, and under the California Endangered Species Act in 1971. The subspecies is designated as a Fully Protected Species under the Fish and Game Code of California.

California Tiger Salamander – Description, Ecology and Status

The CTS is a large (3 – 6.5 inches, snout-vent length), stocky salamander that is black to dark brown with striking white, cream-colored or pale-yellow spots (Stebbins 2003; Stebbins and McGinnis 2012). Adults spend most of their lives underground, typically in burrows of Botta's pocket gophers (*Thomomys bottae*), California ground squirrels (*Otospermophilus beecheyi*) and other mammals (USFWS 2003). Although it primarily inhabits grassland and oak savanna in the valleys and low hills throughout its range in central and coastal California, it also uses coastal scrub in Monterey, Santa Cruz and Santa Barbara Counties (Wang, et al. 2009; pers. obs.).

During fall and winter rains from approximately September-April, adults emerge from underground retreats to breed (Loredo and Van Vuren 1996; Stebbins 2003). Although California tiger salamanders have been found 2,200 m (1.37 miles) from breeding sites, an estimated 95% of the adult population associated with a specific breeding location resides within 1,867 m (1.16 miles) (Orloff 2011; Searcy and Shaffer 2011). Adults may spend many days, weeks or months migrating during episodic rain events, and they will return to the same upland areas after breeding (Orloff 2011; Searcy and Shaffer 2011; Allaback et al. 2017; Allaback and Laabs, unpublished data). In years of below average rainfall, or when the timing of rain is suboptimal, females may not successfully reproduce (Trenham, et al. 2000).

Males typically spend 6-8 weeks at breeding ponds, while females usually spend only 1-2 weeks (Loredo and Van Vuren 1996). Vernal pools and semi-permanent ponds provide quiet waters ideal for egg-laying. Perennial ponds that are free of introduced aquatic predators, especially predatory fishes, also provide habitat (Alvarez 2004). After hatching in two to three weeks, larvae are 10-15 mm (0.4-0.6 inches, total length). Hatchlings primarily forage on zooplankton, while larger larvae feed mostly on frog tadpoles and invertebrates (Anderson 1968). Larval cannibalism also occurs (pers. obs.). The number of larvae that reach metamorphosis is highly variable due to a variety of ecological factors including the timing and amount of rainfall during the previous winter (Loredo and Van Vuren 1996; Trenham, et al. 2000). Larvae will desiccate and die if ponds dry before metamorphosis is complete (Feaver 1971).

Metamorphosis typically occurs from May - July when late-stage larvae reach approximately 100-125 mm (3.9-4.9 inches, total length). During metamorphosis the gills recede, legs become robust, eyes become well-developed and the adult spot pattern emerges. Length and weight may vary just prior to transformation, because larvae can either accelerate development rapidly as ponds dry or delay development to take advantage of a longer hydro-period. Overwintering larvae have also been documented (Alvarez 2004). Immediately following transformation, post-metamorphic juvenile salamanders appear to seek the closest cover they encounter, including temporary cover such as cracks in the earth, debris or deeper refugia including gopher and ground squirrel holes (Loredo, et al. 1996; Searcy and Shaffer 2011). Juveniles that survive the arid summer may disperse farther from the breeding sites during summer and fall rains and do not return to the ponds or colonize new ones until they are sexually active (Stebbins 2003). Although individuals may become reproductive in 2-3 years, they typically do not breed until they are 4-5 years old and rarely live longer than 10 years in the wild (Trenham, et al. 2000).

California tiger salamanders in the project area are part of the Central California Distinct Population Segment (DPS), which includes southern Santa Cruz County, Monterey County, northern San Luis Obispo County and portions of western San Benito, Fresno and Kern Counties (USFWS 2003). California tiger salamanders within this population are allied with one another genetically and are discreet from other populations (Shaffer, et al. 1993). In 2004, the Central California DPS was listed as Threatened by the USFWS throughout its range (USFWS 2004). On 19 August 2010 CDFW listed the species as Threatened (CDFW 2013).

METHODS

This site assessment followed current resource agency guidelines for SCLTS (USFWS and CDFW 2012) and CTS (USFWS and CDFG 2003). Three primary elements were evaluated to determine the likelihood of SCLTS and CTS presence:

(1) A determination of whether the Project site is within the range of each species;

(2) A review of known records (i.e., breeding ponds and occurrences) for SCLTS and CTS within 3.1 miles (5 kilometers) of the Project;

(3) An assessment of the habitats on the project site and within 1.2 miles (2 kilometers) of the Project site.

Records and Literature Review

Relevant literature and databases were searched for information regarding both species in proximity to the Project. The California Natural Diversity Database (CNDDB), which is maintained by CDFW, was searched for all occurrences of both species (CDFW 2026). The collection catalogs for the Museum of Vertebrate Zoology and California Academy of Sciences were queried for regional records. All SCLTS and CTS records within 3.1 miles of the project site were identified and mapped. Previous field investigations and assessments in the vicinity of the Project were reviewed (Biosearch 2009, 2015a, 2015b, 2016a, 2016b, 2020, 2025; Bland 2010; USFWS 2010; Resource Conservation District 2013). Other experienced biologists were consulted, as necessary. Aerial photographs (Google Earth) were used to identify upland habitats within 1.2 miles and field-checked from public roads.

Field Assessment

On 30 July 2025 and 29 June 2026, wildlife biologists David Laabs and Mark Allaback visited the Project site and Alternative 3. Photos of existing conditions were taken. Wildlife habitats on the site were characterized. To determine whether the site provided potential habitat for SCLTS and CTS, the following characteristics of the project area were described:

- Vegetation coverage and understory composition
- Habitat connectivity between the project area and known/potential breeding sites
- Distance to the nearest known or potential breeding site or confirmed upland record
- Site conditions that would prevent or reduce the potential for the presence of SCLTS and CTS

RESULTS

Project Site in Relation to Range of Santa Cruz Long-toed Salamander

The Project is within the current range of the SCLTS (USFWS 1999, 2009). SCLTS in this area are part of the Ellicott-Buena Vista subpopulation, one of six clusters of breeding sites described for the species (USFWS 1999, 2009).

Santa Cruz Long-toed Salamander Records Within 3.1 Miles (5 km)

The Project is situated within 3.1 miles of 11 known SCLTS breeding ponds (Table 1; Figure 4). Six known SCLTS breeding sites have been identified in the Ellicott-Buena Vista subpopulation - Ellicott Pond, Buena Vista Pond, Green's Pond, Prospect Pond, Delaney Pond and Buena Vista Pond 2. These ponds are all situated between 0.9 and 1.4 miles to the west and northwest of the project site on the Ellicott Sough National Wildlife Refuge. Buena Vista Pond, situated 1.0 mile from the project site, historically supported a sizeable SCLTS population, but has not held water well for several years (Kodama, pers. comm.; Allaback, pers. obs.). Ellicott Pond, located 1.5 miles west, is a highly productive SCLTS breeding pond. A mark-recapture study in 2014-15 estimated that 5,680 breeding adults were present (Biosearch 2015a). Buena Vista Pond 2, located 1.4 miles northwest, was constructed in 2021. It was successfully colonized by SCLTS in 2022, based on the results of pitfall trapping studies and eDNA testing (Ralston, pers. comm.; Biosearch 2024). SCLTS larvae have been detected at the pond in every subsequent year (Kasteen, pers.comm.).

Table 1. Known Santa Cruz long-toed salamander breeding ponds within 3.1 miles (5 km) of the proposed Buena Vista Landfill Redevelopment Project.

Subpopulation/Pond Name	UTM E (NAD83 Zone 10)	UTM N (NAD83 Zone 10)	Distance from Project Site
Ellicott-Buena Vista			
Delaney Pond	603935	4087036	0.9
Prospect Pond	603637	4086775	0.9
Buena Vista Pond	604504	4087738	1.0
Green's Pond	603720	4087439	1.1
Ellicott Pond	603310	4087035	1.2
Buena Vista Pond 2	604137	4088380	1.4
Valencia-Seascape			
Weelili Onyenmak Pond	602017	4089919	2.9
Calabasas (Larkin Valley & Freedom)			
Winterwind Way Pond	604120	4090525	2.6
Olive's Pond	603215	4090384	2.8
Suess Pond	602803	4090606	3.0
Calabasas Pond	602735	4090700	3.1

The four ponds in the Larkin Valley-Freedom subpopulation (Winterwind Way Pond, Olive's Pond, Suess Pond and Calabasas Pond) that are within 3.1 miles are unlikely to

influence the presence of the species at the project site, given their distance. Moreover, State Route 1, which separates the site from the Larkin Valley breeding ponds, is a barrier to migrating SCLTS.

SCLTS were confirmed in 2024 at a pond at Weelili Onyenmak, owned and managed by the Land trust of Santa Cruz County (Biosearch 2025). This pond is situated 2.9 miles to the north and is associated with the Valencia-Seascape subpopulation. Following removal of non-native predatory fish, breeding by SCLTS was confirmed in 2026 (Allaback, pers. obs.).

Two ponds in the area that were known to support the species in the past (Anderson's Pond and Rancho Pond) no longer exist (USFWS 2025). A pond known to support California red-legged frog breeding, situated 0.3 miles northwest, provides suitable breeding habitat for SCLTS.

Project in Relation to Range of California Tiger Salamander

The project site is within the range of the CTS (Stebbins 2003; CDFW 2015). CTS are currently known from Ellicott Slough NWR and are present at four of the six SCLTS breeding ponds described above. Although considered part of the Central California DPS, the population in southwest Santa Cruz County is completely isolated from other CTS populations.

California Tiger Salamander Records Within 3.1 Mile (5 km)

CTS are known from four breeding sites, all of which also support breeding by SCLTS (Figure 5; Table 2). The nearest breeding site is Buena Vista Pond, situated 0.9 miles to the northwest (CDFW 2018). The species is also known to breed in Green's Pond, Prospect Pond and Ellicott Pond, located between 1.0 and 1.2 miles northwest of the site. Buena Vista Pond supports a relatively small number of CTS – an estimate of 57 breeding adults was made in 2014-15 (Biosearch 2009, 2015b, 2016a). Ellicott Slough NWR supports a robust population, with more than 350 individuals captured in 2014-15 (Biosearch 2015a).

Table 2. California tiger salamander breeding records from within 3.1 miles (5 km) of the Buena Vista Landfill Redevelopment Project.

Site Name	UTM E (NAD83 Zone 10)	UTM N (NAD83 Zone 10)	Distance from Project Site
Prospect Pond	603637	4086775	0.9
Buena Vista Pond	604504	4087738	1.0
Green's Pond	603720	4087439	1.1
Ellicott Pond	603310	4087035	1.2

Habitats on Project Site

The Redevelopment Project would largely take place within the boundaries of the existing landfill, and as such, most project components are situated on previously disturbed areas (Figure 6). A few components, including Transfer Station A and one of the optional improvements (4d – equipment and storage area) support remnants of native habitats.

Transfer Station A will be situated in the northeast corner of the site along Harkins Slough Road, which will also be re-routed to facilitate the new station. The site currently supports a patchwork of coast live-oak woodland and non-native grassland (Figure 7). Burrowing mammals including Botta's pocket gopher are present. This area provides marginal upland habitat for SCLTS and CTS.

Transfer Station B will be situated in the south-central part of the suite in an area that is already developed (Figure 8). An existing maintenance shop and office building will be demolished and replaced with a transfer station. This area lacks suitable habitat for SCLTS or CTS.

Option 1 for the ODF is situated within the active landfill area in the northern part of the site (Figure 9). Option 2 is situated on top of the old landfill in the southwestern part of the site. Both facilities are in areas that lack suitable habitat for SCLTS or CTS.

Optional improvements proposed include internal access road improvements, scale house upgrades, recycling center upgrades and equipment parking and storage areas. With the exception of the parking and storage area, these components are all within operational areas of the site and do not provide suitable habitat for SCLTS or CTS. The equipment parking and storage area (Optional Improvement 4d) is situated in an area that has been disturbed in the past and supports ruderal habitat as well as a small amount of willow riparian habitat Figure 10). The area provides marginal upland habitat for SCLTS and CTS.

Portions of the landfill which have been capped are currently kept largely free of vegetation and burrowing mammals (Figure 11). The revegetation plan for the remainder of the landfill is being developed. In general, the capped landfill provides marginal habitat for CTS and migratory habitat for SCLTS.

A channelized portion of Gallighan Slough flows through the project area (Figure 12). Although none of the project components directly affect the slough, it provides suitable upland and dispersal habitat for the SCLTS, and negative impacts to this resource should be avoided.

Alternative 3, a more recent option proposed by the County, would involve constructing all future facilities in one locale, the Miyashita property, rather than at three separate locales. Alternative 3 covers approximately 13 acres. Approximately 2.5 acres along the western edge of the site was farmed briefly in the past but has been fallow for some time (Figure 13). Much of the site supports greenhouses and processing buildings that are not currently in use (Figure 14). The proposed entrance from Buena Vista Road supports an

area of ruderal grassland (Figure 15). A small area covering approximately 0.7 acres in the southeast corner of the site supports a dense stand of coastal scrub habitat (Figure 16). The area between the buildings is mowed annually. A small number of active California ground squirrel burrows were present surrounding the greenhouses, although poison bait stations were also observed. The area provides marginal upland habitat for CTS.

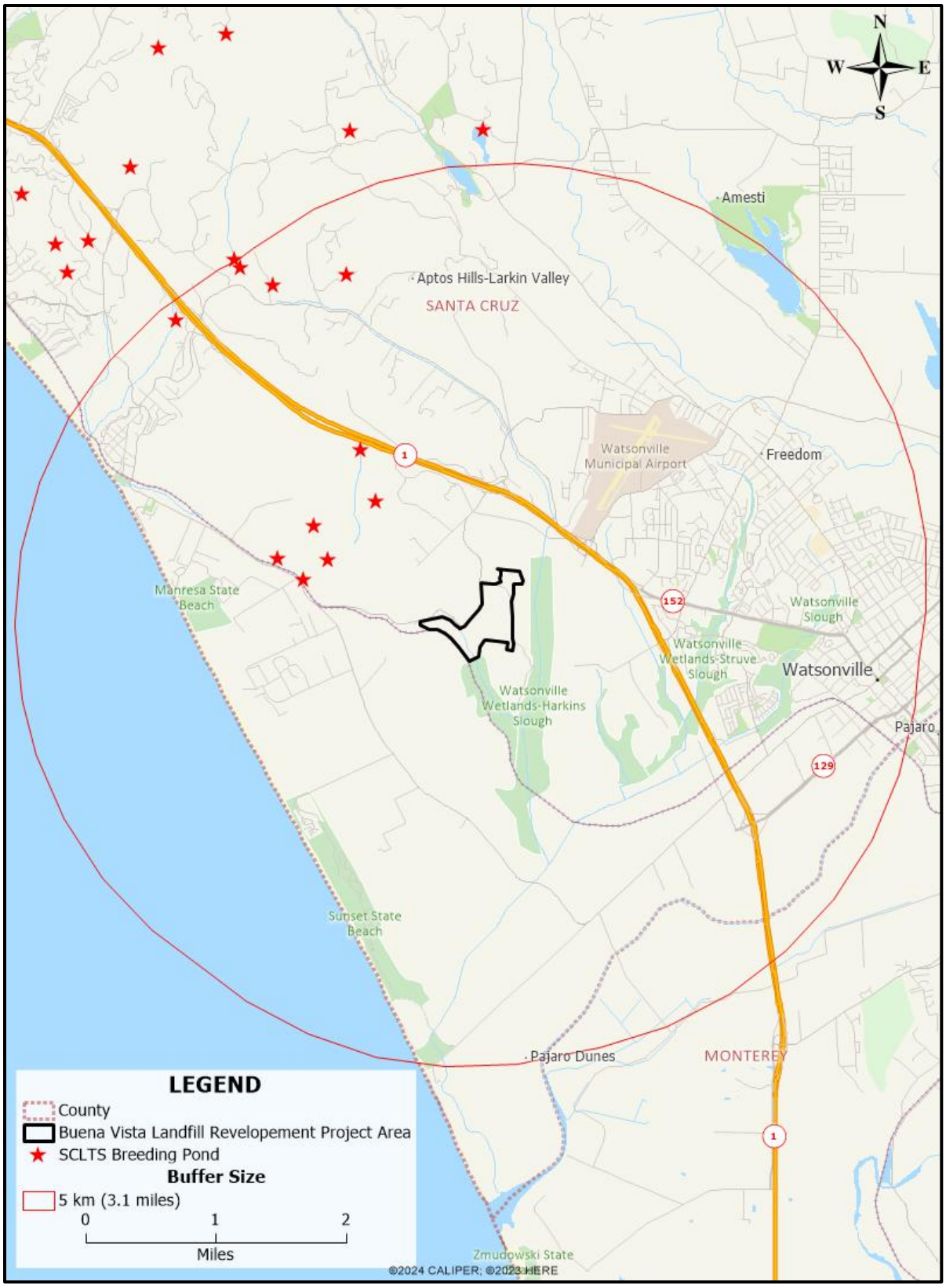

Figure 4. Santa Cruz long-toed salamander breeding ponds within 5 km (3.1 miles) of the Buena Vista Landfill Redevelopment Project.

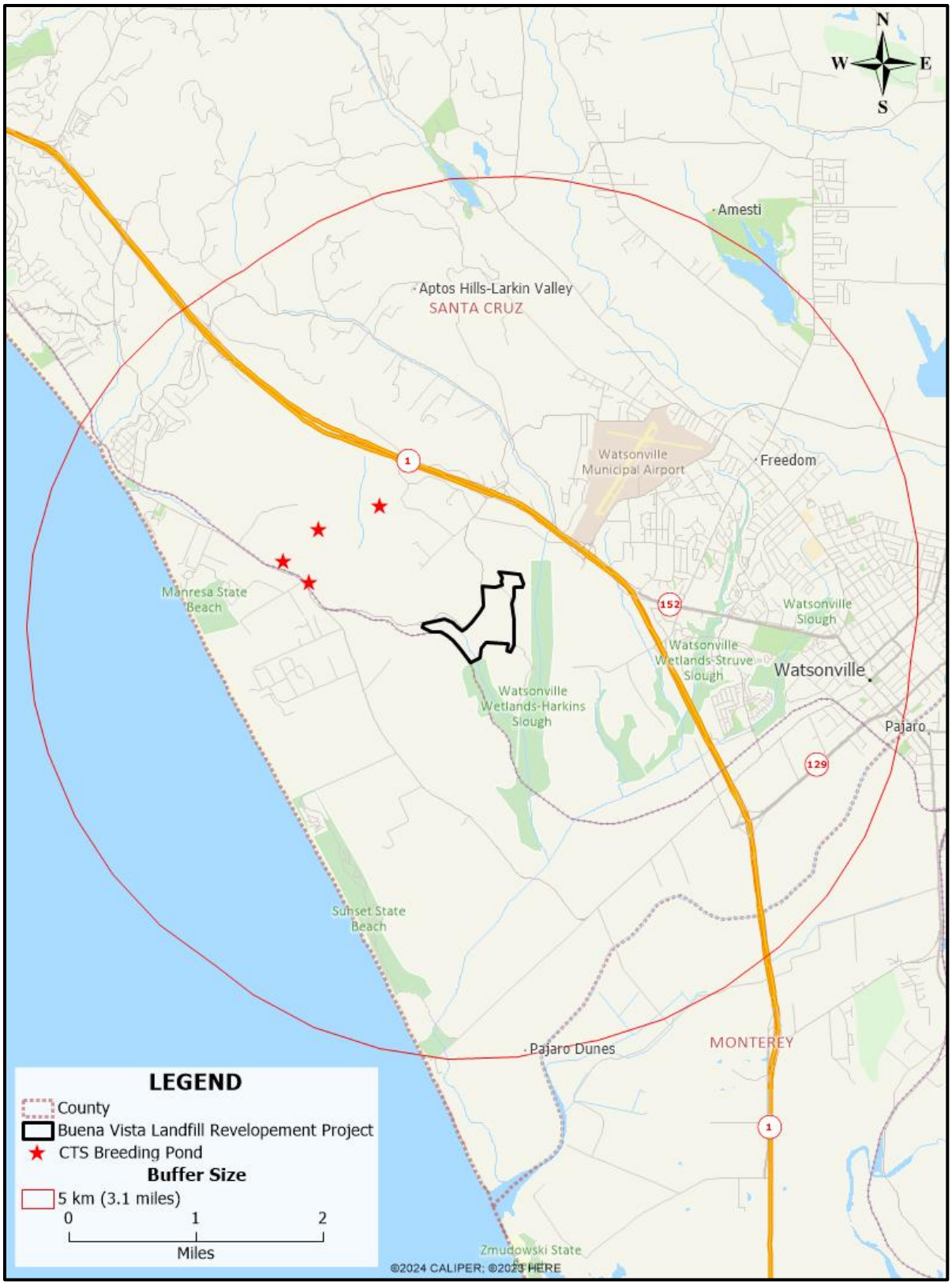

Figure 5. California tiger salamander breeding ponds within 5 km (3.1 miles) of the Buena Vista Landfill Redevelopment Project.

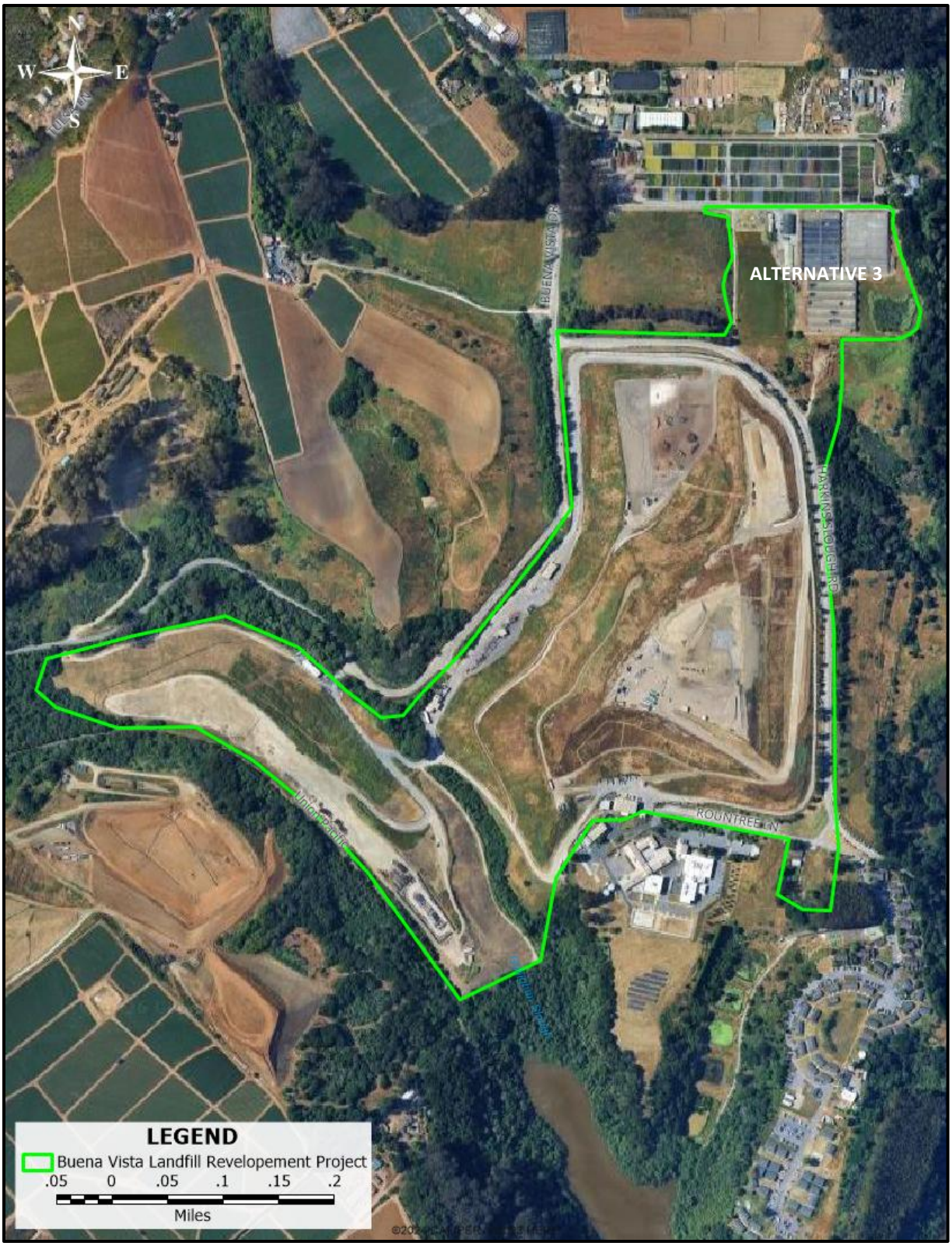

Figure 6. Aerial image of Buena Vista Landfill Redevelopment Project.

Figure 7. Oak woodland and grassland at Transfer Station A aite.

Figure 8. Developed area at Transfer Station B site.

Figure 9. Organics Diversion Facility Option 1 site.

Figure 10. Ruderal habitat at parking and storage area site.

Figure 11. Capped portion of landfill.

Figure 12. Willow riparian habitat along Gallighan Slough.

Figure 13. Fallow field on west side of Miyashita property (Alternative 3).

Figure 14. Greenhouses at Miyashita property (Alternative 3).

Figure 15. Proposed transfer station entry route to Miyashita property (Alternative 3).

Figure 16. Coastal scrub and non-native grassland, Miyashita property (Alternative 3).

Habitats Within 1.2 Miles of the Project Boundaries

Much of the area immediately surrounding the project site is in commercial agricultural production (Figure 17). The Rountree Medium Facility Prison borders the site to the south. Riparian and oak woodland habitats persist along Gallighan Slough and Watsonville Slough to the south and west. Harkins Slough, which is part of the Ellicott Slough NWR, borders the site to the east. The area supports freshwater wetland, coastal grassland live-oak woodland and coastal scrub. The slough is occupied by a variety of fish species and is not considered habitat for either SCLTS or CTS. State Route 1 passes within 0.6 miles north of the project site. The freeway is a significant barrier to migratory movements and is considered to be a complete barrier to gene flow for both SCLTS and CTS. Native habitats including coast live-oak woodland, coastal scrub, willow riparian, grassland and *Eucalyptus* groves, are preserved at the Ellicott Slough NWR, approximately 0.8 miles to the northwest.

In addition to the aquatic habitats occupied by SCLTS and CTS discussed previously, there are numerous seasonal and permanent ponds within 1.2 miles of the site (Figure 12). Most of these ponds are regularly manipulated and maintained agricultural ponds, which are not expected to support breeding by either species. A series of wastewater treatment ponds is present to the south of the project site. A pond known to support California red-legged frog breeding (Kittleson pers. comm.), situated 0.3 miles northwest, also provides suitable breeding habitat for SCLTS.

All known SCLTS breeding ponds in the region are located nearly a mile or more to the northwest of the project site (Figure 12). Wildlife habitats between the Project and these ponds are highly fragmented by intensive agricultural operations. Very little intervening intact oak woodland is present for SCLTS, although partially fragmented upland habitat connectivity for SCLTS exists between Prospect Pond and the southeastern portion of the project site along the upper reaches of Gallighan Slough.

All known CTS breeding ponds in the region are located nearly a mile or more to the northwest of the project site (Figure 12). Wildlife habitats between the Project and these ponds are highly fragmented by intensive agricultural operations. Very little suitable upland habitat is available in the area, and the patches of open grassland are small and may be compromised by adjacent agriculture operations that often include burrowing mammal eradication.

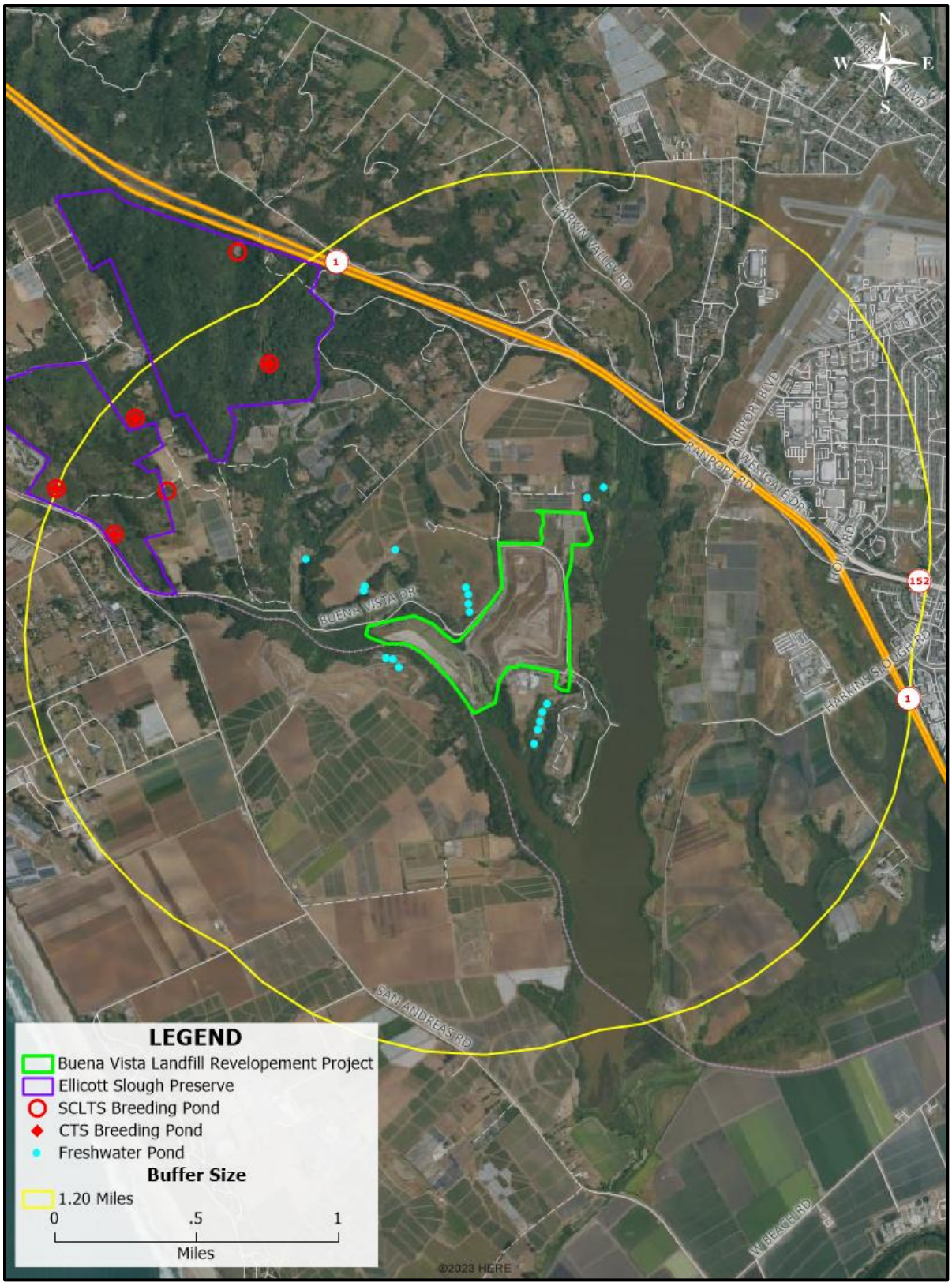

Figure 17. Aerial image of area within 1.2 miles of Buena Vista Landfill Redevelopment Project.

DISCUSSION AND RECOMMENDATIONS

The County of Santa Cruz plans to transition the Buena Vista Landfill to the Buena Vista Transfer Station following the anticipated closure of the landfill in 10 to 15 years. Since the property is within the range of SCLTS and CTS, this assessment was prepared to determine the presence of aquatic or upland habitats and evaluate the probability that either species could occupy the project site. The following discussion assumes that there are no other, as yet unidentified SCLTS or CTS breeding ponds in proximity to the project site.

The project site is within the range of the SCLTS. There is no breeding habitat for the species on the project site. The site is mostly developed or ruderal and generally does not provide suitable upland habitat for SCLTS, with the exception of willow riparian habitat along Gallighan Slough, a small patch of coast live-oak woodland northeast of Harkins Slough Road, and a small patch of coastal scrub in the southeast corner of Alternative 3. The nearest known breeding sites are Prospect Pond and Delaney Pond, located 0.9 miles northwest on the Ellicott Slough National Wildlife Refuge, which is near the greatest distance that the species is known to migrate. Given that there is relatively good habitat connectivity in the intervening area, Gallighan Slough should be considered potential upland habitat for SCLTS. Native habitats in the area between the project site and Buena Vista Pond are largely converted to agricultural uses. Row crops are considered to be non-habitat and at least a partial barrier to migration. Given the lack of suitable upland habitat on the project site, distance to the nearest breeding sites (greater than one mile) and the amount of intervening non-habitat, it is unlikely that the SCLTS occupies or migrates through the Alternative 3 site.

The project site is within the range of CTS. There is no breeding habitat for the species onsite, and the nearby ponds associated with agricultural and other commercial activities do not appear appropriate based on a review of aerial photographs (Google Earth). Upland habitats for the species are very limited on the site. The small grassland area on the west side of Alternative 3 was disked in the past and does not support California ground squirrels. Only marginal patches of upland habitat are present along the east side of Alternative 3. The capped portion of the landfill may ultimately provide upland habitat for CTS, although ongoing control of California ground squirrels decreases the habitat quality of the area. The nearest known breeding pond is Prospect Pond, 0.9 miles to the northwest on the Ellicott Slough National Wildlife Refuge which is near the greatest distance that the species is known to migrate. Native habitats in the area between the project site and the known CTS breeding sites are largely converted to agricultural uses. Row crops are considered non-habitat and at least a partial barrier to migration. Given the distance to the nearest breeding sites, lack of upland habitat and the amount of intervening non-habitat, it is unlikely that the CTS currently inhabits or migrates through the project site.

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Appendix G2.4. Wildlife Species Observed

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APPENDIX G2.4A MAMMAL AND AMPHIBIAN/REPTILE SPECIES OBSERVED WITHIN THE BUENA VISTA LANDFILL REDEVELOPMENT AND ALTERNATIVE 3 COMBINED FACILITIES SITE.

Common Name	Scientific Name
MAMMALS	
Bat sp.	NA
California Ground Squirrel (burrows)	*Otospermophilus beecheyi*
AMPHIBIANS/REPTILES	
American Bullfrog	*Lithobates catesbeianus*
Arboreal Salamander	*Aneides lugubris*
Coast Range Fence Lizard	*Sceloporus occidentalis bocourtii*
Sierran Chorus Frog	*Pseudacris* sierra
Slender Salamander sp.	*Batrachoseps*

APPENDIX G2.4B BIRD SPECIES OBSERVED WITHIN THE BUENA VISTA LANDFILL REDEVELOPMENT AND ALTERNATIVE 3 STUDY AREAS BY HABITAT TYPE AND POTENTIAL USE.

Common Name *Scientific Name*	Conservation Status	Habitat Type									
		Coastal Scrub	Native/ Non-native Grassland	Coast Live Oak Woodland	Willow Forest (Non-Riparian)	Non-native Forest	Riparian Forest and Scrub	Riverine	Wetland	Ruderal	Developed
Allen's Hummingbird *Selasphorus sasin*	BCC	F/N	F	F	F/N	F/N	F/N		F	F	
American Barn Owl *Tyto furcata*		F	F	N			N			F	F/N
American Crow *Corvus brachyrhynchos*		F	F	F/N	F	F/N	F/N	F	F	F	F
American Goldfinch *Spinus tristis*		F/N	F	F/N	F	F/N	F			F	
American Robin *Turdus migratorius*			F	F/N	F	F/N	F/N			F	F
Anna's Hummingbird *Calypte anna*		F/N	F	F/N	F/N	F/N	F/N		F	F	F/N
Bald Eagle *Haliaeetus leucocephalus*	SE, FP		F	F				F	F		
Barn Swallow *Hirundo rustica*		F	F	F	F	F	F	F	F	F	F/N
Bewick's Wren *Thryomanes bewickii*		F		F/N	F	F/N	F/N			F	F/N
Black Phoebe *Sayornis nigricans*		F	F	F	F	F	F		F	F	F/N
Black-headed Grosbeak *Pheucticus melanocephalus*				F/N	F	F	F/N				
Brewer's Blackbird *Euphagus cyanocephalus*		F	F	F/N			F			F/N	F
Brown-headed Cowbird* *Molothrus ater*		F/N	F/N	F/N	F/N	F/N	F/N			F	F
Bushtit *Psaltriparus minimus*		F/N		F/N	F/N	F/N	F/N		F		
California Gull *Larus californicus*	BCC										F/N
California Quail *Callipepla californica*		F/N	F/N	F/N							

Common Name *Scientific Name*	Conservation Status	Habitat Type									
		Coastal Scrub	Native/ Non-native Grassland	Coast Live Oak Woodland	Willow Forest (Non-Riparian)	Non-native Forest	Riparian Forest and Scrub	Riverine	Wetland	Ruderal	Developed
California Scrub-Jay *Aphelocoma californica*		F	F	F/N		F/N	F/N			F	F
California Thrasher *Toxostoma redivivum*	BCC	F/N		F/N			F				
California Towhee *Melozone crissalis*		F/N	F	F/N	F	F/N	F			F	F
Chestnut-backed Chickadee *Poecile rufenscens*				F/N	F	F/N	F/N			F	F/N
Cliff Swallow *Petrochelidon pyrrhonota*		F	F	F	F	F	F	F	F	F	F/N
Common Raven *Corvus corax*		F	F	F/N		F/N				F	F
Common Yellowthroat *Geothlypis trichas*							F/N		F/N		
Cooper's Hawk *Astur cooperii*				F/N	F/N	F/N	F/N				F
Dark-eyed Junco *Junco hyemalis*			F/N	F/N	F/N	F/N	F/N			F/N	F/N
Downy Woodpecker *Dryobates pubescens*		F		F/N	F/N	F/N	F/N				
Eurasian Collared-Dove* *Streptopelia decaocto*		F	F	F/N		F/N				F	F/N
European Starling* *Sturnus vulgaris*			F	F/N		F/N	F/N			F	F/N
Grasshopper Sparrow *Ammodramus savannarum*	SSC	F	F/N								
Great Blue Heron *Ardea herodias*		F	F			N					
Great Horned Owl *Bubo virginianus*		F	F	F/N	F/N	F/N	F/N			F	F
Hairy Woodpecker *Leuconotopicus villosus*		F		F/N	F/N	F/N	F/N				
Hooded Oriole *Icterus cucullatus*				F	F	F/N	F/N				

Common Name *Scientific Name*	Conservation Status	Habitat Type									
		Coastal Scrub	Native/ Non-native Grassland	Coast Live Oak Woodland	Willow Forest (Non-Riparian)	Non-native Forest	Riparian Forest and Scrub	Riverine	Wetland	Ruderal	Developed
House Finch *Haemorhous mexicanus*			F	F/N	F/N	F/N	F/N			F	F/N
Hutton's Vireo *Vireo huttoni*				F/N		F	F/N				
Killdeer *Charadrius vociferus*			F/N							F/N	F/N
Lawrence's goldfinch *Spinus lawrencei*	BCC	F/N	F	F/N						F	
Lesser Goldfinch *Spinus psaltria*		F	F	F/N	F/N	F/N	F/N			F	F
Mallard *Anas platyrhynchos*			N				F/N		F		
Mourning Dove *Zenaida macroura*		F	F	F/N	F/N	F/N	F/N			F/N	F/N
Northern Rough-winged Swallow *Stelgidopteryx serripennis*		F	F	F	F	F	F	F	F	F	F/N
Nuttall's Woodpecker *Dryobates nuttallii*	BCC			F/N	F/N	F/N	F/N				
Oak Titmouse *Baeolophus inornatus*	BCC			F/N	F/N	F/N	F/N				
Olive-sided Flycatcher *Contopus cooperi*	BCC, SSC			F		F	F				
Orange-crowned Warbler *Vermivora celata*		F		F/N	F/N	F/N	F/N				
Osprey *Pandion haliaet*						N					N
Purple Finch *Haemorhous purpureus*				F	F		F				
Red-tailed Hawk *Buteo jamaicensis*		F	F	F/N	N	N	N			F	F
Red-winged Blackbird *Agelaius phoeniceus*			F				F		F/N	F	
Rock Pigeon* *Columba livia*		F	F							F	F/N

Common Name *Scientific Name*	Conservation Status	Habitat Type									
		Coastal Scrub	Native/ Non-native Grassland	Coast Live Oak Woodland	Willow Forest (Non-Riparian)	Non-native Forest	Riparian Forest and Scrub	Riverine	Wetland	Ruderal	Developed
Song Sparrow *Melospiza melodia*		F	F/N		F/N	F/N	F/N		F/N		
Spotted Towhee *Pipilo maculatus*				F/N	F/N	F/N	F/N				
Swainson's Thrush *Catharus ustulatus*					F	F	F/N				
Turkey Vulture *Cathartes aura*		F	F	F						F	F
Violet-green Swallow *Tachycineta thalassina*		F	F	F/N	F/N	F	F/N	F	F	F	F
Western Flycatcher *Empidonax difficilis*				F/N	F/N	F/N	F/N				
Western Gull *Larus occidentalis*	BCC										F/N
White-tailed Kite *Elanus leucurus*	FP	F	F	F/N		N	N			F	
Wilson's Warbler *Cardellina pusilla*				F	F/N	F/N	F/N		F		
Wrentit *Chamaea fasciata*	BCC	F/N		F/N			F				
Yellow Warbler *Setophaga petechia*	SSC						F/N		F		

NOTES:

* Non-Native Species
F = Foraging Potential
N = Nesting Potential

Federal Status

BCC = Species of migratory nongame birds that are considered to be of concern in the United States because of (1) documented or apparent population declines, (2) small or restricted populations, (3) dependence on restricted or vulnerable habitats.

State Status

SE = Endangered: A native species or subspecies of animal which is in serious danger of becoming extinct throughout all, or a significant portion of its range, due to loss of habitat, change in habitat, over exploitation, predation, competition and/or disease.

SSC = CDFW Species of Special Concern: Designated because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

FP = Fully Protected[3]: State's initial protection for animals that were rare or faced possible extinction. Fully Protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

[3] More information on Fully Protected species and the take provisions can be found in the Fish and Game Code, (birds at §3511), Protected birds of prey (Orders Falcinoformes and Strigiformes) under California Fish and Game Code 3503.5.

Appendix G3.1. U.S. Fish and Wildlife Service Official Species List

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish And Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003-7726
Phone: (805) 644-1766 Fax: (805) 644-3958
Email Address: FW8VenturaSection7@FWS.Gov
https://www.fws.gov/Ventura

In Reply Refer To: 09/29/2026 19:21:54 UTC
Project Code: 2025-0141077
Project Name: Buena Vista Landfill Redevelopment Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed list identifies species listed as threatened and endangered, species proposed for listing as threatened or endangered, designated and proposed critical habitat, and species that are candidates for listing that may occur within the boundary of the area you have indicated using the U.S. Fish and Wildlife Service's (Service) Information Planning and Conservation System (IPaC). The species list fulfills the requirements under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the species list should be verified after 90 days. We recommend that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists following the same process you used to receive the enclosed list. Please include the Consultation Tracking Number in the header of this letter with any correspondence about the species list.

Due to staff shortages and excessive workload, we are unable to provide an official list more specific to your area. Numerous other sources of information are available for you to narrow the list to the habitats and conditions of the site in which you are interested. For example, we recommend conducting a biological site assessment or surveys for plants and animals that could help refine the list.

If a Federal agency is involved in the project, that agency has the responsibility to review its proposed activities and determine whether any listed species may be affected. If the project is a major construction project*, the Federal agency has the responsibility to prepare a biological assessment to make a determination of the effects of the action on the listed species or critical habitat. If the Federal agency determines that a listed species or critical habitat is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve

conflicts with respect to threatened or endangered species or their critical habitat prior to a written request for formal consultation. During this review process, the Federal agency may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. These recommendations are advisory because the jeopardy prohibition of section 7(a)(2) of the Act does not apply until the species is listed or the proposed critical habitat is designated. The conference process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

When a proposed species or proposed critical habitat may be affected by an action, the lead Federal agency may elect to enter into formal conference with the Service even if the action is not likely to jeopardize or result in the destruction or adverse modification of proposed critical habitat. If the proposed species is listed or the proposed critical habitat is designated after completion of the conference, the Federal agency may ask the Service, in writing, to confirm the conference as a formal consultation. If the Service reviews the proposed action and finds that no significant changes in the action as planned or in the information used during the conference have occurred, the Service will confirm the conference as a formal consultation on the project and no further section 7 consultation will be necessary. Use of the formal conference process in this manner can prevent delays in the event the proposed species is listed or the proposed critical habitat is designated during project development or implementation.

Candidate species are those species presently under review by the Service for consideration for Federal listing. Candidate species should be considered in the planning process because they may become listed or proposed for listing prior to project completion. Preparation of a biological assessment, as described in section 7(c) of the Act, is not required for candidate species. If early evaluation of your project indicates that it is likely to affect a candidate species, you may wish to request technical assistance from this office.

Only listed species receive protection under the Act. However, sensitive species should be considered in the planning process in the event they become listed or proposed for listing prior to project completion. We recommend that you review information in the California Department of Fish and Wildlife's Natural Diversity Data Base. You can contact the California Department of Fish and Wildlife at (916) 324-3812 for information on other sensitive species that may occur in this area.

[*A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

Attachment(s):

- Official Species List
- Bald & Golden Eagles
- Migratory Birds

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Ventura Fish And Wildlife Office
2493 Portola Road, Suite B
Ventura, CA 93003-7726
(805) 644-1766

PROJECT SUMMARY

Project Code: 2025-0141077
Project Name: Buena Vista Landfill Redevelopment Project
Project Type: Landfill - Solid Waste
Project Description: The County of Santa Cruz proposes to transition the existing active landfill through a closure process while constructing transfer stations to receive and transport refuse, recycling, and organics.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@36.916616149999996,-121.81082455247696,14z

Counties: Santa Cruz County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 18 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
San Joaquin kit fox *Vulpes macrotis mutica*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/2873
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf

BIRDS

NAME	STATUS
California condor *Gymnogyps californianus*	Endangered

Population: Wherever found, except where listed as an experimental population
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8193
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf

California least tern *Sternula antillarum browni* — Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/8104
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf

Least Bell's vireo *Vireo bellii pusillus* — Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/5945
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf

western snowy plover *Charadrius nivosus nivosus* — Threatened

Population: Pacific Coast population DPS-U.S.A. (CA, OR, WA), Mexico (within 50 miles of Pacific coast)
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8035
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf

Yellow-billed Cuckoo *Coccyzus americanus* — Threatened

Population: Western U.S. DPS
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/3911
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf

REPTILES

NAME	STATUS
Northwestern Pond Turtle *Actinemys marmorata*	Proposed Threatened
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1111 General project design guidelines: https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf	
San Francisco garter snake *Thamnophis sirtalis tetrataenia*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5956 General project design guidelines: https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf	

AMPHIBIANS

NAME	STATUS
California red-legged frog *Rana draytonii*	Threatened
There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 General project design guidelines: https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf	
California tiger Salamander *Ambystoma californiense*	Threatened
Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076 General project design guidelines: https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf	
Foothill yellow-legged frog *Rana boylii*	Threatened
Population: Central Coast Distinct Population Segment (Central Coast DPS) There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5133 General project design guidelines: https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf	
Santa Cruz long-toed salamander *Ambystoma macrodactylum croceum*	Endangered
There is **proposed** critical habitat for this species. Species profile: https://ecos.fws.gov/ecp/species/7405	

FISHES

NAME	STATUS
tidewater goby *Eucyclogobius newberryi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/57 General project design guidelines: https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf	Endangered

INSECTS

NAME	STATUS
Monarch butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743 General project design guidelines: https://ipac.ecosphere.fws.gov/project/YA2TKJYQ4RE2XO7X5NQN4QWUTU/documents/generated/11304.pdf	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Monterey gilia *Gilia tenuiflora ssp. arenaria* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/856	Endangered
Monterey spineflower *Chorizanthe pungens var. pungens* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/396	Threatened
Robust spineflower *Chorizanthe robusta var. robusta* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9287	Endangered
Santa Cruz tarplant *Holocarpha macradenia* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6832	Threatened

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
California red-legged frog *Rana draytonii* https://ecos.fws.gov/ecp/species/2891#crithab	Final

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

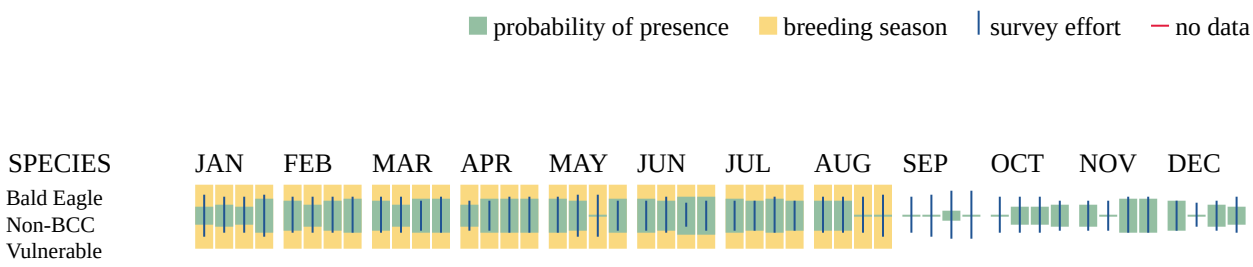
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

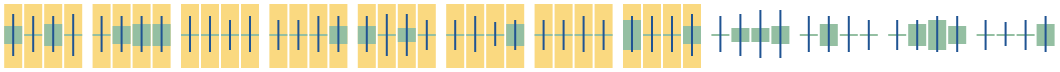
Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Golden Eagle
Non-BCC
Vulnerable



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Allen's Hummingbird *Selasphorus sasin* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31

NAME	BREEDING SEASON
Belding's Savannah Sparrow *Passerculus sandwichensis beldingi* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Black Skimmer *Rynchops niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Black Swift *Cypseloides niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
Black Tern *Chlidonias niger surinamenisis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black Turnstone *Arenaria melanocephala* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10557	Breeds elsewhere
Brandt's Cormorant *Urile penicillatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11903	Breeds Apr 15 to Sep 15
Bullock's Oriole *Icterus bullockii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9458	Breeds Mar 21 to Jul 25
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10955	Breeds Mar 1 to Jul 31
California Thrasher *Toxostoma redivivum* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9436	Breeds Jan 1 to Jul 31
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10575	Breeds Jun 1 to Aug 31

NAME	BREEDING SEASON
Common Yellowthroat *Geothlypis trichas sinuosa* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Elegant Tern *Thalasseus elegans* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8561	Breeds Apr 5 to Aug 5
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Heermann's Gull *Larus heermanni* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11955	Breeds Mar 15 to Aug 31
Lawrence's Goldfinch *Spinus lawrencei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Northern Harrier *Circus hudsonius* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8350	Breeds Apr 1 to Sep 15
Nuttall's Woodpecker *Dryobates nuttallii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse *Baeolophus inornatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31

NAME	BREEDING SEASON
Red Knot *Calidris canutus roselaari* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8880	Breeds elsewhere
Santa Barbara Song Sparrow *Melospiza melodia graminea* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/5513	Breeds Mar 1 to Sep 5
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Tricolored Blackbird *Agelaius tricolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Western Grebe *Aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Western Gull *Larus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11969	Breeds Apr 21 to Aug 25
Western Screech-Owl *Megascops kennicottii cardonensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11923	Breeds Mar 1 to Jun 30
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds elsewhere
Wrentit *Chamaea fasciata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10668	Breeds Mar 15 to Aug 10

PROBABILITY OF PRESENCE SUMMARY

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Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

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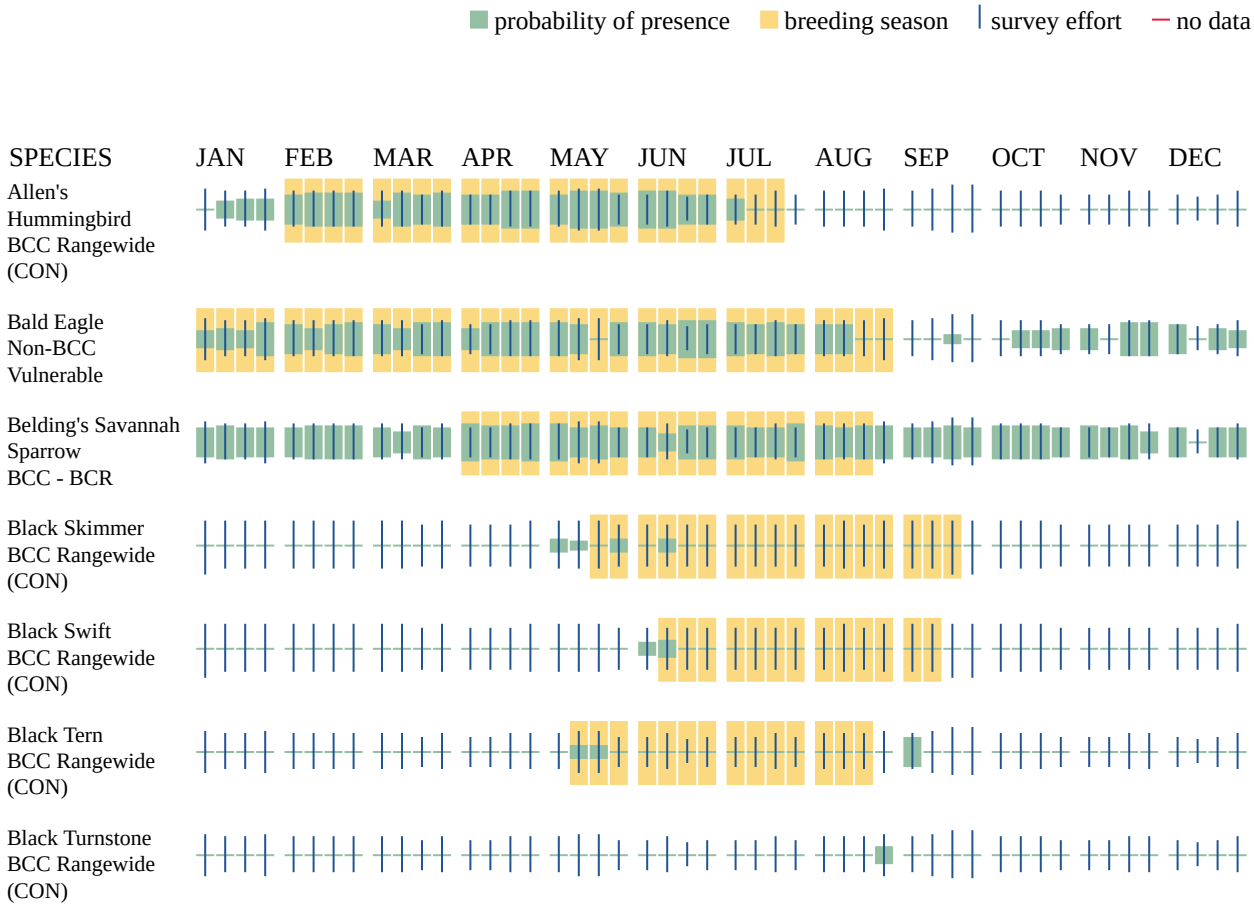
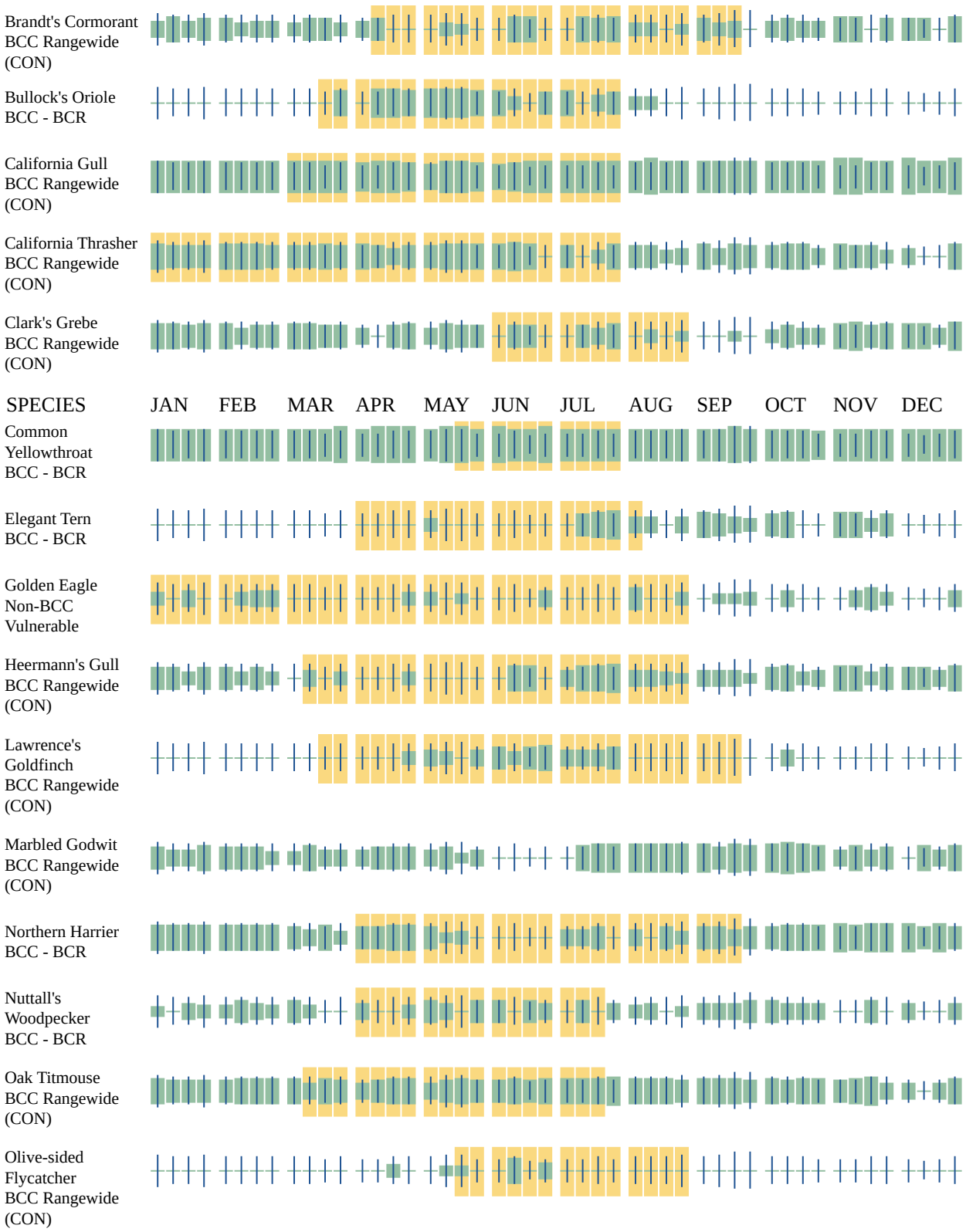
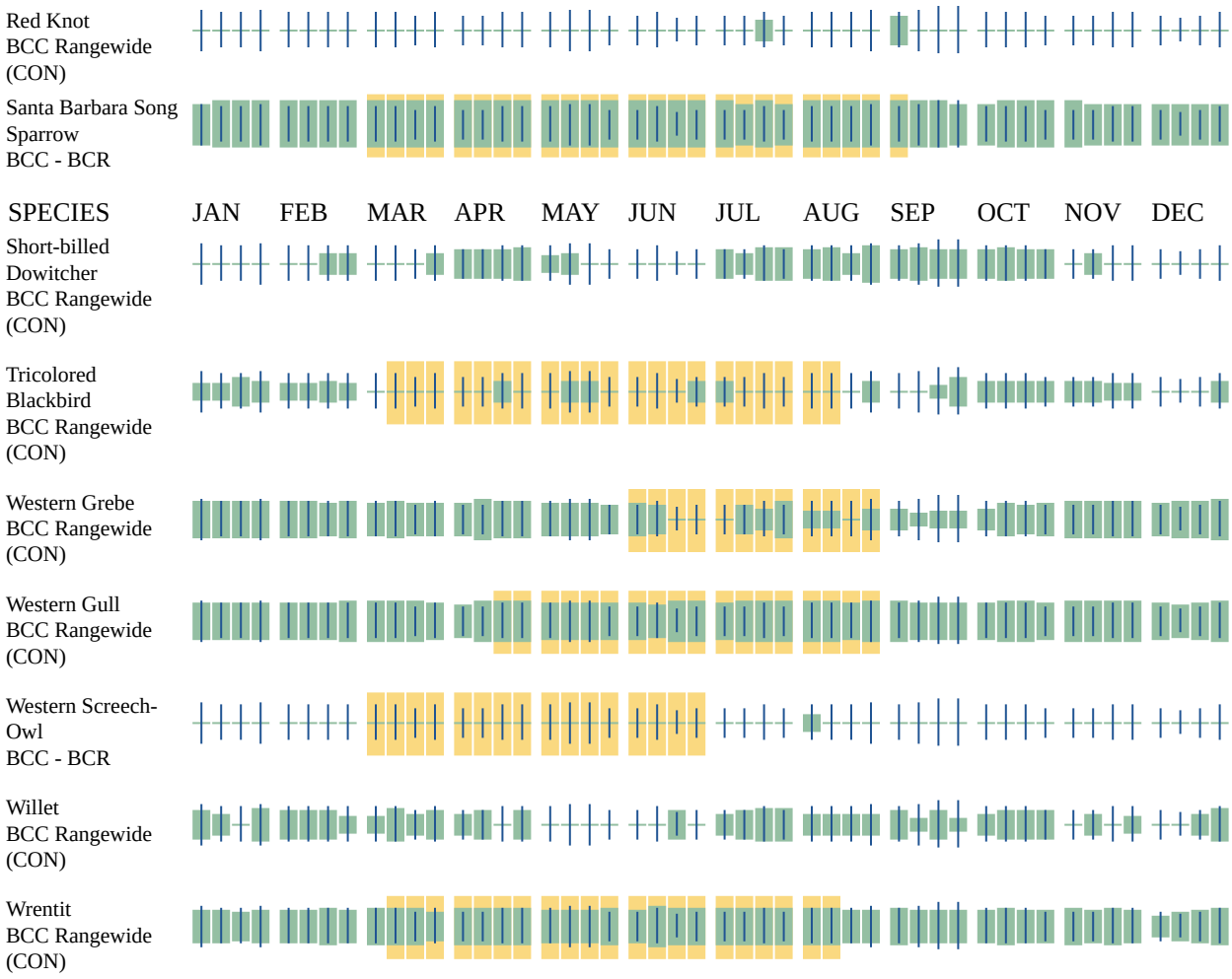



Brandt's Cormorant BCC Rangewide (CON)
Bullock's Oriole BCC - BCR
California Gull BCC Rangewide (CON)
California Thrasher BCC Rangewide (CON)
Clark's Grebe BCC Rangewide (CON)
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Common Yellowthroat BCC - BCR
Elegant Tern BCC - BCR
Golden Eagle Non-BCC Vulnerable
Heermann's Gull BCC Rangewide (CON)
Lawrence's Goldfinch BCC Rangewide (CON)
Marbled Godwit BCC Rangewide (CON)
Northern Harrier BCC - BCR
Nuttall's Woodpecker BCC - BCR
Oak Titmouse BCC Rangewide (CON)
Olive-sided Flycatcher BCC Rangewide (CON)



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- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

IPAC USER CONTACT INFORMATION

Agency: County of Santa Cruz
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LEAD AGENCY CONTACT INFORMATION

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Appendix G3.2. Wildlife Species Excluded from Consideration

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WILDLIFE SPECIES EXCLUDED FROM CONSIDERATION

An Official Species List was generated on September 29, 2026, using the U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) system for the Buena Vista Landfill Redevelopment Project (Project) (**Appendix G3.1**). EcoSystems West Consulting Group evaluated all federally listed species identified on this list for potential to occur within the Biological Study Area (Study Area).

Based on information from the sources found above in Section 3.0 Methods, target lists were developed for special-status plants (**Appendix G1.1**) and wildlife species (**Appendix G2.1**) with potential to occur in the vicinity of the Study Area. Our desktop assessment followed protocols and survey guidelines identified in CDFW (2021), USFWS (2026) and other standard survey protocols. We reviewed distribution information for sensitive species to determine which species would have the potential to occur in or near the Study Area based on present day range, locations of known occurrences and distance from the Study Area, dispersal distances (for wildlife), and intervening barriers to movement. This information was supplemented by field visits where we investigated soils, vegetation and habitat types, and suitability of available habitat. Based on all of these factors and our professional knowledge of the region and local sensitive species, we determined which species have potential to occur and which species could be eliminated from consideration (**Appendix G1.1** and **G2.1**).

The following federally-listed species included on the IPaC List were eliminated from consideration based on lack of suitable habitat in or near the Study Area; present day range; dispersal distances, distance from known occurrence locations (CNDDB 2026a,b), and barriers to movement; and professional knowledge of the region and local sensitive species:

- San Joaquin Kit Fox (*Vulpes macrotis mutica*): The Project Area is located well outside the current range of this species. The nearest known occurrence is approximately 19 miles east in Hollister (San Benito County).
- California Condor (*Gymnogyps californianus*): The Project Area is located well outside the current range of this species, and no canyons or remote gorge/mountain habitat required to support foraging and nesting California condors is available in or near the Study Area. The nearest managed population occurs 40 miles south in Big Sur and 45 miles southeast in Pinnacles National Park. (NPS 2023).
- California Least Tern (*Sternula antillarum browni*): Observations for individuals of this species are rare in Santa Cruz County, with only historical colonies on the Pajaro River. Closest current colonies are from southernmost San Francisco Bay approximately 36 miles north of the Project Area (eBird 2026).
- Least Bell's Vireo (*Vireo bellii pusillus*): Rare northernmost nesting pairs are from Gilroy in Santa Clara County from 1997, San Felipe Lake in San Benito County from 2025, and the Merced National Wildlife Refuge in Stanislaus County from 2010. Only rare observations of individuals on the Pajaro River (1996) (eBird 2026).
- Marbled Murrelet (*Brachyramphus marmoratus*): The Project Area lacks the mature coniferous forest this species utilizes for breeding. The closest known occurrences of breeding are from the North Coast old growth forests of Santa Cruz County.

- Western Snowy Plover (*Charadrius nivosus nivosus*): This shorebird is found in coastal beaches and open sandy coastal areas, sparsely vegetated dunes, salt pans at lagoons and salt-evaporation ponds, estuaries, levees, and some sand/cobble river bars up to 7 miles from the beach (Page et al. 2023). The Project Area lacks suitable nesting habitat. Nearest occurrence is at Sunset State Beach and Pajaro Dunes Beach, approximately 2 miles southwest of the Project Area (eBird 2026). Winter sightings are from the open space at Twin Lakes State Beach, Corcoran Lagoon, Capitola Beach, and New Brighton Beach (eBird 2026).
- Yellow-billed Cuckoo (*Coccyzus americanus*): The western subspecies has disappeared from most of the western U.S. and now occurs as an extremely rare breeder in California. All extremely rare sightings (6) in the region describe only one bird and include two historical sightings (1979 and 1996), one observation of a dead bird, three summer sightings spread between 2009-2016 (eBird 2026). Nearest breeding sites are approximately 200 miles southeast in the Kern River Preserve, and very rare possible nests along the Sacramento River approximately 150 miles north (eBird 2026). Not within designated critical habitat for the species (USFWS 2021).
- San Francisco Garter Snake (*Thamnophis sirtalis tetrataenia*): The Project Area is located well outside the current range of this species. Closest known occurrence is 32 miles northwest, near Ano Nuevo State Park.
- Tidewater goby (*Eucyclogobius newberryi*): This species is found in coastal lagoons and creeks; found up to 3 miles upstream in slow moving water (USFWS 2005). Although the Pajaro River is within the known range of the species, no brackish lagoon habitat or suitable slow-moving backwater features occur within or adjacent to the Project Area. The closest occurrence is reported one mile to the south, in the Pajaro River up to 2.8 miles upstream from the river mouth.

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Appendix G4. Native Shallow-Rooted Shrubs, Perennial Herbs, and Vines Proposed for the Landfill Cap

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APPENDIX G4 NATIVE SHALLOW-ROOTED SHRUBS, PERENNIAL HERBS, AND VINES PROPOSED THE FOR THE LANDFILL CAP

UPLAND SPECIES

Baldhip rose (*Rosa gymnocarpa*)
Black sage (*Salvia mellifera*)
Blue elderberry (*Sambucus Mexicana*)
Blueblossum (*Ceanothus thyrsiflorus*)
Brittle leaf manzanita (*Arctostaphylos crustacea*)
California buckwheat (*Eriogonum fasciculatum*)
California fuchsia (*Epilobium canum*)
California poppy (*Escholzia californica*)
California sagebrush (*Artemisia californica*)
Chamise (*Adenostoma fasciculatus*)
Chaparral currant (*Ribes malvaceum*)
Coast silk tassel (*Garrya elliptica*)
Coffeeberry (*Frangula californica*)
Columbine (*Aquilegia Formosa*)
Creeping snowberry (*Symphoricarpos mollis*)
Flannel bush (*Fremontodendron californicum*)
Fuchsia flowered gooseberry (*Ribes speciosum*)
Giant vetch (*Vicia gigantea*)
Gooseberry (*Ribes mensiesii*)
Lemonade berry (*Rhus integrifolia*)
Lupine (*Lupinus bicolor*)
Naked buckwheat (*Eriogonum nudum*)
Osoberry (*Oemleria cerasiformis*)
Paintbrush (*Castilleja affinis*)
Pink honeysuckle (*Lonicera hispidula*)
Pitcher sage (*Lepechinia calycina*)
Sticky-monkey flower (*Diplacus aurantiacus*)
Toyon (*Heteromeles arbutifolia*)
Wartleaf ceanothus (*Ceanothus papillosus*)
Wooly leaf manzanita (*Arctostaphylos tomentosa*)
Yarrow (*Achillea millefolium*)

RIPARIAN BUFFER SPECIES

California aster (*Symphyotrichum chilense*)
California blackberry (*Rubus ursinus*)
California wild rose (*Rosa californica*)
Cardinal monkey flower (*Erythranthe cardinalis*)
Coast twinberry (*Lonicera involucrate*)
Spreading gooseberry (*Ribes divaricatum*)
Western goldenrod (*Euthamia occidentalis*)
Western verbena (*Verbena lasiostachys*)

Appendix G5. Arborist Report

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James P. Allen & Associates

Dedicated to the Preservation of Trees

Buena Vista Landfill Rehabilitation Project

Tree Resource Analysis/ Construction Impact Assessment/ Tree Protection Plan

Prepared for
The County of Santa Cruz
Community Development
&
Infrastructure Department

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Required Procedures……Pages 16 through 19

Tree Preservation Specifications…..……...Page 20

ATTACHMENTS

- Tree Resource Inventory
- Tree Location Map Files
    - Tree Resource Analysis/Construction Impact Assessment
    - Tree Resource Analysis/Tree Protection Plan

ASSIGNMENT/SCOPE OF SERVICES

The Capitol Projects Division of the County of Santa Cruz Community Development and Infrastructure Department is in process of redeveloping the Buena Vista Landfill. The proposed areas to be developed are populated with both native and non-native species that may be affected by necessary construction. Many of these trees meet "Significant" criteria as defined by Santa Cruz County Significant Tree Protection section 16.34. In order to create a design that ensures tree health/stability, minimizes tree removal and protects tree resources on this site during construction the following tasks have been completed as requested by Nicole Steele, Project Manager.

- Locate and inventory all trees growing within Sensitive Habitats and trees greater than 6 diameter inches within known impact areas and adjacent to project boundaries
  - Proposed Transfer Station "A"
    Proposed Fuel/Storage Area
- Attach numerical tags to each tree and document locations
- Identify each tree as to genus and species
- Measure trunk diameter at a point 4.5 feet above grade
- Identify trees that meet "Significant" criteria as defined by Santa Cruz County Significant Tree Protection section 16.34, if any
- Review 6 different design options to determine the least impactful
- Assess conditions of trees growing within 20' of grading limits
  - Rate health, structure and preservation suitability as "good", "fair" or "poor"
  - Define Critical Root Zones
- Describe unique conditions of each tree, if any
- Identify trees with active disease organisms or structural weakness that present risk to the redefined use of the site
- Provide recommendations for remedial treatments, maintenance and pre-construction treatments to improve tree condition and decrease risk in preparation for construction
- Create tree preservation specifications including a protection fencing plan
- Define and document a Mitigation Maintenance and Monitoring Program
- Provide all findings in the form of a Tree Resource Analysis/Construction Impact Assessment Report accompanied by an inventory, Tree Location Map/Preservation Plan for submittal to Santa Cruz County Environmental Planning Department

There may be high risk trees in this and other areas of the project that threaten the safe use of the proposed BVLRP. A risk assessment was not conducted as a component of this assignment.

The findings presented in this arborist report are intended for the sole use of Santa Cruz County Community Development & Infrastructure Department in evaluating the proposed Buena Vista Landfill Redevelopment Project. The findings presented by James P. Allen and Associates, Consulting Arborists in this report are for information purposes only; they are not intended to represent the interpretation of any State, Federal or County law or ordinance pertaining to permitting actions within sensitive habitat or endangered species. The interpretation of such laws and/or ordinances is the responsibility of the applicable governing body.

SUMMARY

Plans for the Buena Vista Landfill Redevelopment Project have been reviewed and the known impacts resulting from the proposed construction as defined at this time have been evaluated. During the course of project design, six (6) alternatives with various retaining wall and cut/fill options were presented for my review. The least impactful option to tree resources; no retaining wall with a 2:1 slope was chosen to reduce necessary tree removal and diminish tree root damage at the proposed Transfer Station "A" location.

Three hundred ninety-five (395) trees and tree groups growing within and adjacent to the development area have been inspected and inventoried.

The construction of this project requires the removal of one hundred fifty-one trees (151) trees due to project related impacts and High-Risk conditions. Four (4) of these Trees #129, 164, 165 and 166 are proposed for removal that stand in the proposed Fuel/Storage Area should be removed due to their condition. These trees have a high failure propensity with severe consequences if they were to fall and strike a building or personnel.

One hundred twenty-eight (128) of the trees proposed for removal meet Significant" criteria as defined by Santa Cruz County Significant Tree Protection Section 16.34. All trees and tree groups apart from those surrounding the current landfill extents are within Oak/Riparian Woodland Sensitive Habitats and have been defined as meeting "Significant" criteria.

Tree Removal Summary Table
Buena Vista Landfill Redevelopment Project
February 12, 2025

Project Area	Total Trees Inventoried	Significant Trees/Tree Groups Inventoried	"Significant" Trees to be Removed (Construction Impacts)	Non "Significant" Trees to be Removed (Construction Impacts)	"Significant" Trees to be Removed (High Risk Condition Issues)	Trees to be Preserved and Protected
Fuel/Storage Area	71	71	15	0	4	52
TSA	324	249	109	23	0	192
Totals	395	320	124	23	4	244
Total Trees to be Removed					151	
Total "Significant" Trees to be Removed					128	

Tree Group #88, clumps of "significant" willow sprouts growing within Riparian Woodland, a Sensitive Habitat on the North side of Harkins Slough Road may need to be pruned to accommodate the proposed road width expansion and drainage improvements.

Mitigation strategies, including replacement planting or habitat restoration, will be determined by others.

The implementation of the Required Procedures as defined within this document as well as adherence to Tree Preservation Specifications, are required to safeguard trees proposed for retention.

OBSERVATIONS

Project/Site Description

The Buena Vista Landfill Redevelopment Project (BVLR) includes: 1) Developing two new waste transfer stations at the existing landfill site to implement transfer station operations for waste handling and transport; 2) Developing an organics diversion facility to support organics waste processing and diversion; and 3) Implementing the landfill closure plan once site capacity is reached.

The design and development of Transfer Station "A" (TSA) and conceptual Fuel/Storage Area are the Project's priorities and subject of this study to determine tree related impacts.

Transfer Station "A" is proposed at the Northeast corner of the current Buena Vista Landfill (BVL) parcel. This site is bordered by Harkins Slough Road and the operational BVL to the South, abandoned greenhouses to the North, a National Wildlife Refuge and Harkins Slough to the East. This mostly level area is currently used as an equipment storage area. It slopes gently to the West toward a drainage ditch/un-named tributary identified as Riparian Woodland, a Sensitive Habitat and more dramatically to the Southwest where interfaces with Sensitive Oak Woodland Habitat and Harkins Slough.

The proposed Fuel/Storage Area is the former site of Hope Services and lies to the South of Rountree Lane. It is bound on the East by Terra Alta Drive, to the West by a vacant parcel and the Santa Cruz County (SCCo) Sheriff's Correctional Facility. This relatively level parcel slopes to the South in the back of the lot where it interfaces with SCCo facilities.

Tree Descriptions

The proposed TSA areas is populated with coast live oak *(Quercus agrifolia)* trees that compose an oak woodland, a Sensitive Habitat.

The Southeastern section has been densely planted. Individual trees are suppressed with minimal space for proper structural development.

Each of the coast live oak trees assessed is in fair to poor condition and meets "Significant" criteria.

OBSERVATIONS

Tree Descriptions, continued

Coast live oak trees in the central section of the proposed TSA were planted with more space between plantings, but still too closely together to allow normal canopy width.

Future plantings should allow space for proper development to avoid overcrowding and diminished resource functionality and aesthetics.

Trees #233, depicted below and 234 are Significant coast live oak trees that grow on the neighboring property to the North. These trees will be subjected to significant root loss because of necessary grading. Tree removal will be necessary.

OBSERVATIONS

Tree Descriptions, continued

The southern section of the proposed TSA abuts the current BVL use area which is lined with 81 trees of the following species:

- coast live oak *(Quercus agrifolia)*
- coast redwood *(Sequoia sempervirens)*
- Monterey cypress (*Hesperocyparis macrocarpa)*
- Red iron bark eucalyptus (*Eucalyptus sideroxylon)*

Each of these trees surrounding the BVL is in poor condition due to inappropriate species selection at planting and lack of proper care. During our inspection a County crew was in process of removing lower branches from all of the trees, including those required to be removed to accommodate the construction of this project. This unnecessary pruning further reduces the intended function of visual screening, noise attenuation and dust control in addition to increasing the potential for upper branch breakage and whole tree failure.

The area where these trees stand has not been identified as a Sensitive Habitat. Therefore, trees greater than 20 diameter inches meet "Significant" as defined in Santa Cruz County Code Section 16.34.030

- *any group consisting of 10 or more trees on one parcel, each greater than 20 inches d.b.h. (approximately five feet in circumference).*

Two of the 25 trees required to be removed in this area due to construction related impacts meet "Significant" criteria.

OBSERVATIONS

Tree Descriptions, continued

Groups of willows (*Salix)* sp. line the Northern section of Harkins Slough Road, the primary entry point to the proposed TSA. They are within or near a drainage ditch/un-named tributary identified as Riparian Woodland, a Sensitive Habitat.

It appears that Individual tree in these areas have recently been pruned for vertical and horizontal road clearance.

If additional clearance is necessary for road widening and drainage improvements areas will need to be identified and pruned by qualified arborists adhering to the most recent version of recognized professional standards.

OBSERVATIONS

Tree Descriptions, continued

Tree resources within and adjacent to the proposed Fuel/Storage area are comprised of:

- blue gum eucalyptus (*Eucalyptus globulus)*
- Monterey pine (*Pinus radiata)*
- coast live oak (*Quercus agrifolia)*
- Liquidambar (*Liquidambar styraciflua)*
- Magnolia (*Magnolia)* sp.

A dense group of blue gum eucalyptus (*Eucalyptus globulus)* stands on the Southeastern section of this site.

Tree canopies extending to the North over the proposed use area will need to be pruned periodically to diminish branch failure potential.

The area is heavily vegetated with poison oak along with a few native and non-native groundcover plants. Long strips of highly flammable eucalyptus bark have shed from the eucalyptus and accumulated in this area. See inset photo. These accumulations obscured visual assessment of the buttress roots and create highly flammable conditions.

There is visible evidence of the leaf edge margins being chewed by the Australian tortoise beetle or small eucalyptus tortoise beetle, (*Trachymela sloanei)*.

There is no evidence of soil fractures, voids, or erosion. However, there is evidence of past tree failure.

A risk assessment was not conducted as a component of this assignment. There may be high risk trees in this and other areas of the project that threatens the safe use of the proposed BVLRP.

Tree Risk was not evaluated nor will be reported on within this assignment.

OBSERVATIONS

Tree Descriptions, continued

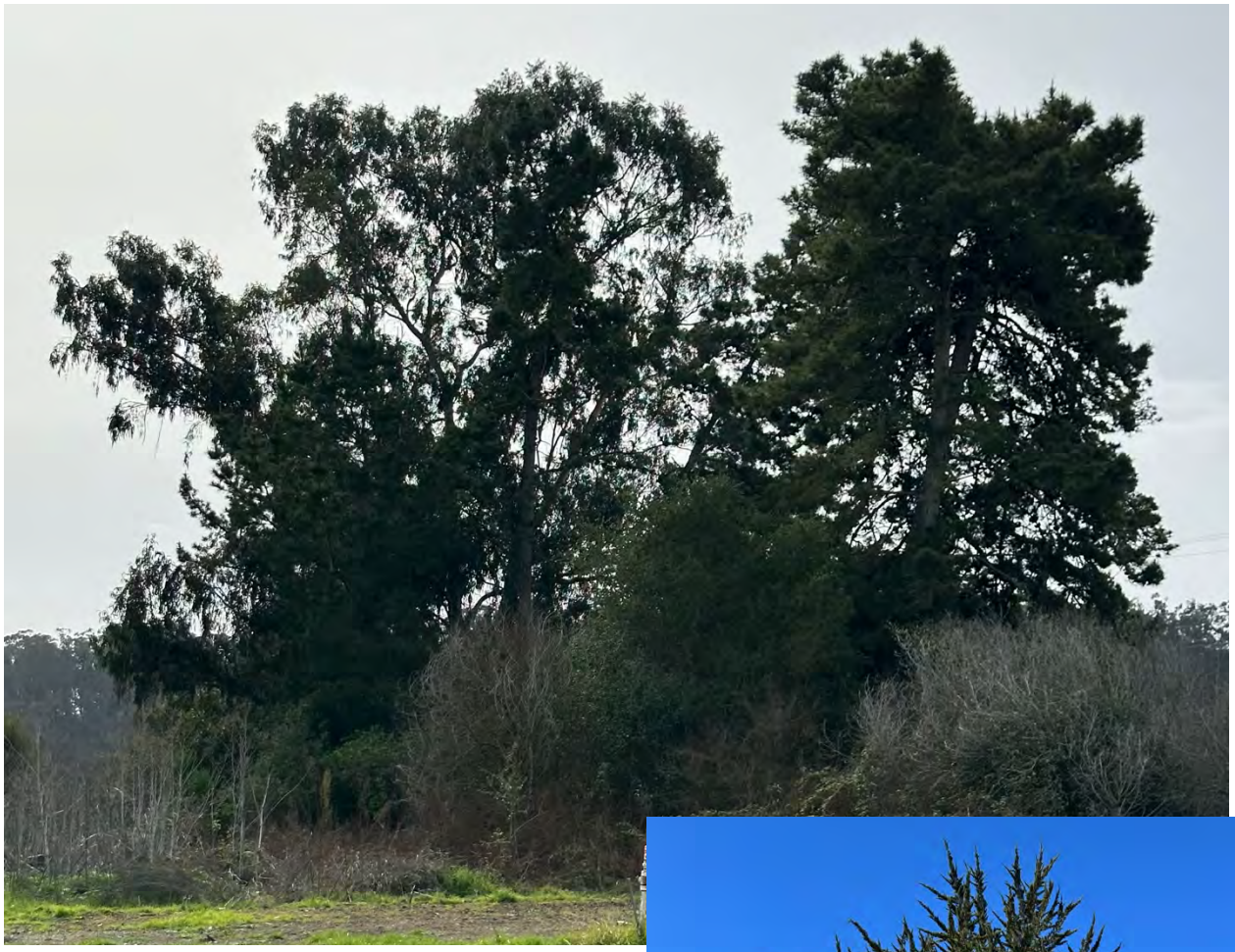
Trees #164, 165 and 166 are High Risk trees growing on the Northwest corner of this dense group of blue gum eucalyptus. There have been numerous large diameter, broken branches and trunks that have broken and fallen, depicted by the yellow arrow. These trees threaten the safe use of the proposed facility and are recommended to be removed due to their condition.

This area has been defined as a Sensitive Habitat. Each tree growing in the proposed Fuel/Storage Area has a “Significant” tree designation

OBSERVATIONS

Tree Descriptions, continued

Trees growing along the Western boundary of the proposed Fuel/Storage Area span the property boundary. The proposed grading limits allow enough distance from Critical Root Zones for these trees to be preserved and protected during construction. One Monterey pine Tree #129 is recommended for removal due to High Failure Potential and lean towards the Facility.



Tree #119, a mature Monterey cypress is within grading limits and required to be removed due to construction impacts.

The Southern section of the proposed Fuel/Storage area is populated with Significant coast live oak trees. There is no grading proposed or known impacts to this area.

OBSERVATIONS
Tree Descriptions, continued

Trees #156, 157, 158 and 159, depicted below are Significant coast redwood trees with good suitability for preservation.

Critical Root Zone (CRZ) extents range from 18 to 22 feet. Grading within the CRZ should be avoided.

Tree #158 has a codominant trunk at the height of approximately 40 feet above grade. This weak attachment is prone to failure and requires a Simple Direct Cable system to be installed.

Trees #174 through 176 and 243 through 248 were planted as street trees.

These liquidambar and magnolia trees are within proposed grading limits and are required to be removed.

TREE INVENTORY METHODOLOGY

The attached inventory lists information on 395 trees/tree groups growing within and directly adjacent to project extents

Each tree/tree group was assessed visually assessed from the root crown through the foliar canopy extents. Round numbered metal tags were affixed to each tree trunk. Tree locations are documented on the attached *Tree Location Map*.

The tree inventory lists species, trunk diameter, tree health, and structure ratings, level of impacts and description, observations, required procedures and whether the tree meets Significant criteria for individual trees/tree groups to be preserved that stand within 20 feet of proposed grading limits.

For trees within known impact zones the data collected was limited to tree species, diameter, level of impacts and description required procedures and whether the tree met "Significant" status. Tree locations have been documented on the attached *Tree Location Map* file.

Diameter: is the width of the trunk measured at 4.5 feet above natural grade (ground level). For trees that were unable to be measured at 2 feet above natural grade, measurement heights are provided.

Tree health and structure are separate issues that are related since both are revealed by tree anatomy. A tree's vascular system is confined in a thin layer of tissue between the bark and wood layers. This thin layer is responsible for transport of nutrients and water between the root system and the foliar canopy. When this tissue layer is functioning properly, a tree has the ability to produce foliage (leaves). As long as the tree maintains a connected vascular system, it may appear to be in good health.

When conditions conducive to decay are present, fungi, bacteria or poor compartmentalization, wood strength is degraded. As decay advances, the tree's ability to continue standing is compromised. Thus, a tree can appear to be in good health, but have poor structure.

Tree Health: This rating is determined visually. Annual growth rates, leaf size and coloration are examined. Indications of insect activity, decay and dieback percentages are also used to define health ratings.

Trees in **"good"** health are full canopied, with dark green leaf coloration. Areas of foliar dieback or discoloration are less than 10% of the canopy. Dead material in the tree is limited to small twigs and branches less than one inch in diameter. There is no evidence of insects, disease or decay.

Trees with a **"fair"** health rating have from 10% to 30% foliar dieback, with faded coloration, dead wood larger than one inch, and/or visible insect activity, disease or decay.

Trees rated as having **"poor"** health have greater than 30% foliar dieback, dead wood greater than two inches, severe decay, disease or insect activity.

Tree Structure: This rating is determined by visually assessing the roots, root crown (where the trunk meets the ground), supporting trunk, and branch structure. The presence of decay can affect both health and structural ratings.

TREE INVENTORY METHODOLOGY, continued

Trees that receive a **"good"** structural rating are well rooted, with visible taper in the lower trunk, leading to buttress root development. These qualities indicate that the tree is solidly rooted in the growing site. No structural defects such as codominant stems (two stems of equal size that emerge from the same point), poorly attached branches, cavities, or decay are present.

Trees that receive a **"fair"** structural rating may have defects such as poor taper in the trunk, inadequate root development or growing site limitations. They may have multiple trunks, included bark (where bark turns inward at an attachment point), or suppressed canopies. Decay or previous limb loss (less than 2 inches in diameter) may be present in these trees. Trees with fair structure may be improved through proper maintenance procedures.

Poorly structured trees display serious defects that may lead to limb, trunk or whole tree failure due to uprooting. Trees in this condition may have had root loss or severe decay that has weakened their support structure. Trees in this condition can present a risk to people and structures. Maintenance procedures may reduce but not eliminate these defects.

Note* Tree health and structure are separate issues that are related since both are revealed by tree anatomy. A tree's vascular system is confined in a thin layer of tissue between the bark and wood layers. This thin layer is responsible for transport of nutrients and water between the root system and the foliar canopy. When this tissue layer is functioning properly a tree has the ability to produce foliage (leaves). As long as the tree maintains a connected vascular system it may appear to be in good health.

When conditions conducive to decay are present, fungi, bacteria or poor compartmentalization, wood strength is degraded. As decay advances, the tree's ability to continue standing is compromised. Thus, a tree can appear to be in good health but have poor structure.

LEVEL/Description of Construction Impacts

This section describes what procedures are proposed near the individual tree. The influences the proposed construction activities will have on the tree are classified as **None Known, Low, Moderate** or **High.** These classifications are defined as follows:

NONE, the tree is not near the impact area of the proposed construction.

LOW, adverse effects from the proposed construction activities are minimal.

MODERATE, this level of impacts will result in loss in tree vigor and/or stability. Recommended procedures must be implemented to decrease these impacts.

HIGH, requiring tree removal or the understanding that premature tree mortality can be anticipated. Mitigation is required for "Protected" and "Landmark" trees subject to this level of impacts.

Site inspections and review of the plans as presented identified construction impacts to individual tree/tree groups. The construction of this project as presented requires the following procedures:

- **Vertical clearance** is needed where branches of trees encroach upon work areas and equipment access. Branches may need to be pruned to gain required clearance.

TREE INVENTORY METHODOLOGY

LEVEL/Description of Construction Impacts, continued

- **Grading for site stabilization, road width expansion or re-alignment, drainage, and utility line construction.** These procedures require alteration of natural grade in the form of cut and/or fill (described below) at the defined "Limits of Grading". Roots shattered during this process provide openings for opportunistic decay causing organisms degrading tree support systems and vigor.

- **Alteration of natural grade**
  - Cuts, lowering of natural grade, require the removal of soil until the desired elevation is reached. A cut within the trees Critical Root Zone can remove non-woody and woody roots. Non-woody (absorbing) roots are responsible for transporting moisture and nutrients necessary for maintaining tree health. More significant cuts remove woody roots that provide structural support, compromising the tree's ability to stand upright.

  - Fill, increasing natural grade, often requires an initial cut to "knit in" and stabilize the material. This material is applied in layers and compacted in the process. Compaction breaks down soil structure by removing air and adding moisture. Anaerobic conditions may develop, promoting decay. Absorbing roots can suffocate from lack of oxygen. Structural roots may be compromised because of the decay.

Significant Tree Criteria

This project is situated beyond the Urban Services Line and within the Coastal Zone. Significant tree designations were assigned per criteria defined in Santa Cruz County Code Section 16.34.030, copied below:

"Significant tree," for the purposes of this chapter, shall include any tree, sprout clump, or group of trees, as follows:

(A) Within the urban services line or rural services line, any tree which is equal to or greater than 20 inches d.b.h. (approximately five feet in circumference); any sprout clump of five or more stems each of which is greater than 12 inches d.b.h. (approximately three feet in circumference); or any group consisting of five or more trees on one parcel, each of which is greater than 12 inches d.b.h. (approximately three feet in circumference).

(B) Outside the urban services line or rural services line, where visible from a scenic road, any beach, or within a designated scenic resource area, any tree which is equal to or greater than 40 inches d.b.h. (approximately 10 feet in circumference); any sprout clump of five or more stems, each of which is greater than 20 inches d.b.h. (approximately five feet in circumference); or, any group consisting of 10 or more trees on one parcel, each greater than 20 inches d.b.h. (approximately five feet in circumference).

(C) Any tree located in a sensitive habitat as defined in Chapter 16.32 SCCC. Also see SCCC 16.34.090(C), exemption of projects with other permits.

Significant Tree Criteria, continued

"Significant tree removal permit" means a permit issued pursuant to the provisions of this chapter.

"Sprout clump" means individual stems arising from one root collar and sharing a common root system. [Ord. 5182 § 14, 2014; Ord. 4346 §§ 73, 74, 1994; Ord. 3443 § 1, 1983; Ord. 3341 § 1, 1982].

Several impacted sections of the Project are within which are within oak woodland and riparian forest defined as Sensitive Habitats. The area proposed for Transfer Station A is primarily within and Oak Woodland so each tree within this area is defined as a Significant Tree.

As further defined by Erin McGinty of Eco Systems West and supported by Matt Johnson, Principal Planner for Santa Cruz County Environmental Planning the following analysis and distinction of trees that meet "Significant" criteria within this project is agreed upon as follows:

"1) Trees that will be removed within the Hope Services area (south of Rountree Lane) are within sensitive habitat and therefore Significant Trees.

2) Trees that will be removed on the landfill side of Harkins Slough Road north of Rountree Lane do not constitute Critical Habitat (and are, therefore **not defined as Significant trees)** for the following reasons:

Per the USFWS Critical Habitat Fact Sheet (attached), not all areas within mapped Critical Habitat boundaries are considered Critical Habitat. "Our rules typically exclude developed areas such as buildings, roads, airports, parking lots, piers, and similar facilities."

Per the Revised Designation of Critical Habitat for California Red-Legged Frog (2010); Final Rule, "(4) Dispersal Habitat. Accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mi (1.6 km) of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs over 50 ac (20 ha) in size, *or other areas that do not contain those features identified in PCE 1, 2, or 3 [Aquatic Breeding, Aquatic Non-Breeding, and Upland Habitat Primary Constituent Elements] as essential to the conservation of the species*" (pp 12836)."

REQUIRED PROCEDURES

Tree Removal due to Construction Impacts

One hundred twenty-eight (128) "Significant" criteria trees are required to be removed to construct the project as proposed. Trees proposed for removal are within or directly adjacent to disturbance limits. Trees to be removed are identified on the attached spreadsheet, summarized in the table below and listed as follows:

- **"Significant" Trees to Be Removed due to Construction Impacts (124)**
  - **TSA Area (109)**
    - **14 through 26, 34 through 43, 45 through 86, 84, 85, 86, 89, 100, 233, 234, 242 through 251, 330, 335 through 340, 365 through 394**
  - **Fuel/Storage Area (15)**
    - **169 through 176, 242 through 248**

- **Non "Significant" Trees to Be Removed due to Construction Impacts (23)**
  - **TSA Area (23)**
    - **90 through 99, 101 through 113**

- **Tree Removal due to Condition**
  - **Four trees are recommended for removal in the Fuel/Storage Aera due to High Failure Potential**
    - **Trees # 129. 164, 165 and 166**

Tree Removal Summary Table Buena Vista Landfill Redevelopment Project February 12, 2025						
Project Area	**Total Trees Inventoried**	**Significant Trees/Tree Groups Inventoried**	**"Significant" Trees to be Removed (Construction Impacts)**	**Non "Significant" Trees to be Removed (Construction Impacts)**	**"Significant" Trees to be Removed (High Risk Condition Issues)**	**Trees to be Preserved and Protected**
Fuel/Storage Area	**71**	**71**	**15**	**0**	**4**	**52**
TSA	**324**	**249**	**109**	**23**	**0**	**192**
Totals	**395**	**320**	**124**	**23**	**4**	**244**
Total Trees to be Removed					**151**	
Total "Significant" Trees to be Removed					**128**	

Tree/Tree Group locations are documented on the attached *Tree Resource Analysis/Tree Location* map file.

REQUIRED PROCEDURES, continued

Cabling

Tree #158, has a weak attachment point at the height of approximately 40 feet above grade. The installation of a cable system between weakly attached secondary trunks will provide additional support cable using the following or similar hardware:

- ¾ inch "eye" through bolts or all thread with Amon nuts
- 5/16 inch EHS cable
- Preformed grips with thimbles

Tree Pruning

- **Tree Group #88**, clumps of "significant" willow sprouts growing within Riparian Woodland, a Sensitive Habitat on the North side of Harkins Slough Road may need to be pruned to accommodate the proposed road width expansion.
-
- **Risk Reduction Pruning** to remove dead branches has been recommended to eliminate the potential of them falling, damaging vehicles or causing personal injury should have dead branches greater than one-diameter inch pruned/removed
- **Clearance Pruning** may be necessary to allow vertical and horizontal clearance for construction activities. If clearance pruning deemed necessary, the following process should be adhered to:
    - Individual trees requiring clearance pruning will be identified the contractor 45 days prior to project initiation
    - The Project Arborist will be notified of the location and clearance requirements 30 days prior to project initiation
    - The Project Arborist will create clearance pruning specifications
    - The Project Arborist will direct and oversee the proper clearance pruning to be performed by qualified arborists adhering to the most current versions of the A-300 Standards
        - Tree Pruning should not be performed by unqualified personnel

Tree Root Pruning

Tree roots encountered during required excavation within Critical Root Zones

- Roots should be located using non-invasive procedures when possible Exploration can be done either by hand, using small tools, or an **AirSpade©**. This tool uses compressed air to displace soil without damage to roots.
- A small excavator may begin the exploration at the furthest distance from the tree trunk
- The boom of the excavator will be in line with the tree trunk beginning in a "spoke in wheel" pattern with the tree trunk in the position of a wheel's hub
- Excavation will begin by scraping the top 6 to 10-inches of the soil surface at one to two foot "strokes beginning at the furthest point away from the tree
- Hand Excavation, without the use of motorized equipment may be necessary of root populations are high, of large diameter and dense

REQUIRED PROCEDURES, continued
Tree Root Pruning

- Once exposed, the roots can be examined by the Project Arborist, and determinations can be made regarding the feasibility of root removal or root severance. If roots need to be pruned the following procedures shall be used:
  - **Root pruning** is to be performed by skilled labor. Roots are to be pruned cleanly. Bark should adhere to the wood without tearing. Wood fibers should remain intact without shattering. The following tools should be used:
    - Hand-pruners/Loppers
    - Handsaw
    - Reciprocating saw
    - Chainsaw

When completed, the pruned portions should be covered with burlap or similar material and kept moist.

Tree Maintenance Contractors qualifications:
A qualified, state licensed and fully insured Certified Arborist should be contracted to perform the above-described work in compliance with the most current versions of the following industry standards:

- American National Standards Institute, *A300 for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance-Standard Practices*.
  - (Part 1)-2017 Pruning
  - (Part 5)- 2012 Management of Trees on Construction Sites
  - (Part 8)-2013 Root Management

- American National Standards Institute *Z133.1-1994 for Tree Care Operations- Pruning, Trimming, Repairing, Maintaining, and Removing Trees and Cutting Brush-Safety Requirements*
- International Society of Arboriculture: *Best Management Practices*
  - All Applicable Sections

Tree Preservation Specifications included in this report outline specifics for tree protection structures and other procedures that will provide the best opportunity for their long-term survivability.

Tree Preservation Structures shall be constructed of the following materials as field specified by the Project Arborist.

- Chain link, 72 inches in height secured to metal stakes driven at least 18 inches into the soil.
- Temporary orange snow fencing attached to "T" posts driven into the ground
- Silt fencing
- Wattle
- Rice straw bales

Tree Preservation Structure locations will be determined in the field by the Project Arborist.

REQUIRED PROCEDURES, continued

Inspections To ensure the successful implementation of the recommended procedures Site Inspections are recommended by the Project Arborist. Site inspections will take place at the following intervals throughout the course of the project:

- Following on-site placement of grade stakes
- During placement of tree protection structures
- After Tree Preservation fencing locations have been staked.
- Following Tree Protection fencing installation and prior to the commencement of grading.
- As necessary during construction/excavation activities to ensure compliance with all conditions of project approval.

Site monitoring forms will be submitted to the Santa Cruz County Environmental Planning Department upon their request.

MITIGATION MAINTENANCE AND MONITORING PROGRAM (MM&MP)

Mitigation strategies, including replacement planting or habitat restoration, will be determined by others.

Please contact me at 831-426-6603 with questions regarding the tree resources on this project.

Respectfully submitted,

James P. Allen

James P. Allen
American Society of Consulting Arborists, Registered Consulting Arborist #390
Society of American Foresters, Certified Urban Forester #120
International Society of Arboriculture, Board Certified Master Arborist #625B
International Society of Arboriculture, Qualified Tree Risk Assessor
Certified Line Clearance Tree Trimmer
California State Contractors License C-61/D-49 #608703

Tree Preservation Specifications
Buena Vista Landfill Redevelopment Project

These guidelines should be printed on all pages of the development plans. Contractors and sub-contractors should be aware of tree protection guidelines and restrictions. Contracts should incorporate tree protection language that includes "damage to trees will be appraised using the Guide to Plant Appraisal 10th Edition and result in mitigation costs and monetary fines assessed".

Preconstruction meeting with the Project Arborist: A meeting with the Project Arborist, Project Manager and all contractors involved with the project shall take place prior to project initiation. All tree preservation specifications will be reviewed and discussed.

Field decisions: The Project Arborist and Contractor will work together to determine the most effective construction methods required to preserve and protect trees.

Tree Preservation Zone (TPZ) establishment: TPZ's shall be established as indicated on the attached map. The TPZ's shall be delineated by one or more of the following Tree Protection structures:

- Temporary orange snow fencing attached to "T" posts driven into the ground
- Chain link, 72 inches in height secured to metal stakes driven at least 18 inches into the soil.
- Silt fencing
- Wattle
- Rice straw bales

Tree protection structures will be installed prior to the onset of grading under the supervision of the Project Arborist and shall not be moved.

Restrictions within the Tree Preservation Zone (TPZ): No storage of construction materials, debris or excess soil will be allowed within the TPZ. Parking of vehicles or construction equipment in this area is prohibited. Solvents, liquids or phytotoxic materials of any type shall never be stored or disposed of within the any TPZ and shall only be disposed of as prescribed by law.

Grade Alterations: Maintain the natural grade. If tree roots are encountered during the construction process, the Project Arborist will be notified immediately. Exposed roots will be immediately covered with moistened burlap (or similar material) until the Project Arborist decides as to required mitigation methods and extent of damage.

Trenching requirements: Any areas of where trenching is proposed will be evaluated with the Project Arborist and the Contractor prior to excavation or construction.

Tree canopy alterations: Unauthorized pruning of any tree on this site will not be allowed. Tree canopy alterations will be performed to the specifications established by the Project Arborist.

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BUENA VISTA LANDFILL REDEVELOPMENT PROJECT
CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
1	coast live oak *Quercus agrifolia*	14.7 @ 6" Above Grade	Fair	Poor	Fair	10	**LOW/ Proximity to Existing Road Rehab**	• **Poor trunk/stem attachments Small diameter dead branches Mechanical wound on Northwest side of trunk** • **Preserve and Protect** • **Yes** • **Yes**
2	coast live oak *Quercus agrifolia*	16 @ 6" Above Grade	Fair	Poor	Fair	12	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees Poor trunk/stem attachments** • **Preserve and Protect** • **Yes** • **Yes**
3	coast live oak *Quercus agrifolia*	11.3	Fair	Poor	Fair	10	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees Asymetrical canopy Small diameter dead branches** • **Preserve and Protect** • **Yes** • **Yes**
4	coast live oak *Quercus agrifolia*	Triple Trunk 6.5 & 7 & 8.1 @ 18" Above Grade	Fair	Poor	Fair	12	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees Poor trunk/stem attachments Nest in canopy** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
5	coast live oak *Quercus agrifolia*	19.4 @ 6" Above Grade	Fair	Poor	Fair	14	**LOW/ Proximity to Existing Road Rehab**	**Within dense stand of small, suppressed trees Poor trunk/stem attachments Small diameter dead branches • Preserve and Protect • Yes • Yes**
6	coast live oak *Quercus agrifolia*	10.4 @ 24 " Above Grade	Fair	Poor	Fair	8	**LOW/ Proximity to Existing Road Rehab**	**Within dense stand of small, suppressed trees Poor trunk/stem attachments Low Live Crown Ratio Decayed pruning wounds Small diameter dead branches • Preserve and Protect • Yes • Yes**
7	coast live oak *Quercus agrifolia*	8.2	Fair	Poor	Fair	10	**LOW/ Proximity to Existing Road Rehab**	**Within dense stand of small, suppressed trees Bowed trunk Low Live Crown Ratio • Preserve and Protect • Yes • Yes**
8	coast live oak *Quercus agrifolia*	Double Trunk 8.4 & 10.2	Fair	Fair	Fair	12	**LOW/ Proximity to Existing Road Rehab**	**Within dense stand of small, suppressed trees Poor trunk/stem attachments Small diameter dead branches • Preserve and Protect • Yes • Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
9	coast live oak *Quercus agrifolia*	6.4 @ 36" Above Grade	Fair	Poor	Fair	8	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees** **Poor trunk/stem attachments** **Suppressed tree** • **Preserve and Protect** • **Yes** • **Yes**
10	coast live oak *Quercus agrifolia*	5.4	Fair	Poor	Fair	8	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees** **Poor trunk/stem attachments** **Suppressed tree** • **Preserve and Protect** • **Yes** • **Yes**
11	coast live oak *Quercus agrifolia*	6.8	Fair	Poor	Fair	8	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees** **Poor trunk/stem attachments** **Suppressed tree** • **Preserve and Protect** • **Yes** • **Yes**
12	coast live oak *Quercus agrifolia*	7.3	Fair	Fair	Fair	8	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees** **Decayed pruning wounds** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
13	coast live oak *Quercus agrifolia*	6.9	Fair	Poor	Fair	10	**LOW/ Proximity to Existing Road Rehab**	• **Within dense stand of small, suppressed trees** **Suppressed tree** • **Preserve and Protect** • **Yes** • **Yes**
14	coast live oak *Quercus agrifolia*	8.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
15	coast live oak *Quercus agrifolia*	Double Trunk 9.5 & 6.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
16	coast live oak *Quercus agrifolia*	8	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
17	coast live oak *Quercus agrifolia*	12.2 @ 36" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
18	coast live oak *Quercus agrifolia*	10.8	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
19	coast live oak *Quercus agrifolia*	6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
20	coast live oak *Quercus agrifolia*	12.5 @ 12" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
21	coast live oak *Quercus agrifolia*	8.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
22	coast live oak *Quercus agrifolia*	10.7 @ 24" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
23	coast live oak *Quercus agrifolia*	Double Trunk 7.1 & 6.9 @ 36" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
24	coast live oak *Quercus agrifolia*	14.1 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
25	coast live oak *Quercus agrifolia*	10.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
26	coast live oak *Quercus agrifolia*	Double Trunk 8.2 & 14.6	N/A	N/A	N/A	N/A	**HIGH/ Proximity to Proposed Grading Limits**	• **Grows at Northen canopy edge downslope of proposed fill treatment** • **Remove due to Construction Impacts** • **Yes** • **Yes**
27	coast live oak *Quercus agrifolia*	15.1 @ 12" Above Grade	Fair	Poor	Poor	16	**LOW/ Proximity to Grading Limits**	• **Grows at Northen canopy edge downslope of fill treatment** **Poor trunk/stem attachments** **Suppressed to the Southeast** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
28	coast live oak *Quercus agrifolia*	Triple Trunk 8.4 & 9.2 & 10.2	Fair	Poor	Fair	18	**LOW/ Proximity to Grading Limits**	• Grows at Northen canopy edge downslope of fill treatment Poor trunk/stem attachments • Preserve and Protect • Yes • Yes
29	coast live oak *Quercus agrifolia*	6	Poor`	Poor	Poor	8	**LOW/ Proximity to Grading Limits**	• Grows at Northen canopy edge downslope of fill treatment Tall, supppressed tree • Preserve and Protect • Yes • Yes
30	coast live oak *Quercus agrifolia*	10.1	Fair	Poor	Poor	12	**LOW/ Proximity to Grading Limits**	• Grows at Northen canopy edge downslope of fill treatment Leans dramatically to the Northwest Dead branches Unstable • Preserve and Protect • Yes • Yes
31	coast live oak *Quercus agrifolia*	8.1	Fair	Poor	Poor	10	**LOW/ Proximity to Grading Limits**	• Grows at Northen canopy edge downslope of fill treatment Leans to the Northwest Dead branches • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
32	coast live oak *Quercus agrifolia*	Double Trunk 12.7 & 16.1	Fair	Poor	Poor	16	**LOW/ Proximity to Grading Limits**	• Grows at Northen canopy edge downslope of fill treatment Poor trunk/stem attachments Suppressed to the South Dead branches • Preserve and Protect • Yes • Yes
33	coast live oak *Quercus agrifolia*	8.2 @ 36" Above Grade	Fair	Fair	Good	12	**LOW/ Proximity to Grading Limits**	• Grows at Northen canopy edge downslope of fill treatment Small diameter dead branches Suppressed by ivy growth Suppressed to the Southeast • Preserve and Protect • Yes • Yes
34	coast live oak *Quercus agrifolia*	13.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Proposed Road Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
35	coast live oak *Quercus agrifolia*	Double Trunk 9.6 & 8.6 @ 36" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes

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CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
36	coast live oak *Quercus agrifolia*	13.2 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• **Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
37	coast live oak *Quercus agrifolia*	5.9	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• **Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
38	coast live oak *Quercus agrifolia*	9.3	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• **Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
39	coast live oak *Quercus agrifolia*	6.8	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• **Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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BUENA VISTA LANDFILL REDEVELOPMENT PROJECT
CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
40	coast live oak *Quercus agrifolia*	Double Trunk 5.2 & 5	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
41	coast live oak *Quercus agrifolia*	5.1	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
42	coast live oak *Quercus agrifolia*	5.3	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
43	coast live oak *Quercus agrifolia*	26 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Retaining Wall Construction Zone**	• Within Proposed Retaining Wall Construction Zone Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
44	coast live oak *Quercus agrifolia*	10.3 @ 24" Above Grade	Fair	Fair	Fair	14	**MODERATE/ Proximity to Retaining Wall Construction Zone**	• Grows East of proposed retaining wall • Preserve and Protect • Yes • Yes

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CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
45	coast live oak *Quercus agrifolia*	5.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
46	coast live oak *Quercus agrifolia*	18.7 @ 36" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
47	coast live oak *Quercus agrifolia*	7.3	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
48	coast live oak *Quercus agrifolia*	13.8	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
49	coast live oak *Quercus agrifolia*	9.3 @ 12" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
50	coast live oak *Quercus agrifolia*	14.8 @ 24" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
51	coast live oak *Quercus agrifolia*	7.8	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
52	coast live oak *Quercus agrifolia*	13.1 @ 18" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
53	coast live oak *Quercus agrifolia*	6.5 @ 24" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
54	coast live oak *Quercus agrifolia*	13.4 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
55	coast live oak *Quercus agrifolia*	12.1 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
56	coast live oak *Quercus agrifolia*	6.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
57	coast live oak *Quercus agrifolia*	11.8 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
58	coast live oak *Quercus agrifolia*	5.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
59	coast live oak *Quercus agrifolia*	8.3	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
60	coast live oak *Quercus agrifolia*	19.4 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
61	coast live oak *Quercus agrifolia*	12.9	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
62	coast live oak *Quercus agrifolia*	6.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
63	coast live oak *Quercus agrifolia*	5.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
64	coast live oak *Quercus agrifolia*	9.5 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
65	coast live oak *Quercus agrifolia*	14.1 @ 6" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
66	coast live oak *Quercus agrifolia*	6 in	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
67	coast live oak *Quercus agrifolia*	Double Trunk 6 & 7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
68	coast live oak *Quercus agrifolia*	11	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
69	coast live oak *Quercus agrifolia*	13.6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
70	coast live oak *Quercus agrifolia*	14.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
71	coast live oak *Quercus agrifolia*	14.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
72	coast live oak *Quercus agrifolia*	19	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
73	coast live oak *Quercus agrifolia*	Double Trunk 6.4 & 7.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
74	coast live oak *Quercus agrifolia*	7.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
75	coast live oak *Quercus agrifolia*	6.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
76	coast live oak *Quercus agrifolia*	15.7 @ 18" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
77	iron bark eucalyptus Eucalyptus sideroxylonyi	Double Trunk 19 & 14.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes**
78	iron bark eucalyptus Eucalyptus sideroxylonyi	15.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes**
79	iron bark eucalyptus Eucalyptus sideroxylonyi	34.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
80	iron bark eucalyptus Eucalyptus sideroxylonyi	24.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
81	coast live oak *Quercus agrifolia*	13.6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
82	iron bark eucalyptus Eucalyptus sideroxylonyi	8.9 @ 36" Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
83	coast live oak *Quercus agrifolia*	11.2 @ 6" Above Grade	Fair	Fair	Fair	14	**NONE KNOWN**	• **Grows on neighboring property** • **Preserve and Protect** • **Yes** • **Yes**
84	iron bark eucalyptus *Eucalyptus sideroxylon*	7.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
85	iron bark eucalyptus Eucalyptus sideroxylonyi	Double Trunk 5.5 & 6.8	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
86	iron bark eucalyptus Eucalyptus sideroxylonyi	28 @ Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No**
87	iron bark eucalyptus Eucalyptus sideroxylonyi	34 @ Grade	Fair	Poor	Fair	18	**NONE KNOWN**	• **Grows on neighboring property** • **Preserve and Protect** • **Yes** • **Yes**
88	willow Salix sp.	Several small groups of trees between the power pole and San Andreas Road	Fair	Poor	Fair	12	**MODERATE/ Proximity to Road**	• **Clumps of willows growing along drainage swale on North side of Harkins Slough Road** • **Preserve and Protect** **Clearance Pruning Required** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
89	Monterey cypress Hesperocyparis macrocarpa	Double Trunk 13.3 & 11.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **Yes**
90	Monterey cypress Hesperocyparis macrocarpa	18	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**
91	Monterey cypress Hesperocyparis macrocarpa	9.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**
92	Monterey pine Pinus radiata	8.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**
93	Monterey cypress Hesperocyparis macrocarpa	10.8	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
94	Monterey cypress Hesperocyparis macrocarpa	8.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**
95	Iron bark eucalyptus Eucalyptus sideroxylonyi	23.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **Yes**
96	Iron bark eucalyptus Eucalyptus sideroxylonyi	13.8	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **Yes**
97	Monterey pine Pinus radiata	5.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**
98	Iron bark eucalyptus Eucalyptus sideroxylonyi	Double Trunk 4.5 & 3.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
99	Monterey cypress Hesperocyparis macrocarpa	11.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**
100	coast redwood Sequoia sempervirens	50.6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **Yes**
101	coast live oak *Quercus agrifolia*	13.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **Yes**
102	coast redwood Sequoia sempervirens	8.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**
103	coast live oak *Quercus agrifolia*	16.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **No** • **No**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
104	coast redwood Sequoia sempervirens	7.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
105	coast redwood Sequoia sempervirens	8.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
106	coast redwood Sequoia sempervirens	9	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
107	coast redwood Sequoia sempervirens	9.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
108	coast redwood Sequoia sempervirens	9.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
109	coast redwood Sequoia sempervirens	4.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
110	coast redwood Sequoia sempervirens	11.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
111	coast redwood Sequoia sempervirens	7.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
112	coast redwood Sequoia sempervirens	10.9	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No
113	Monterey cypress Hesperocyparis macrocarpa	15.3	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • No • No

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CONSTRUCTION IMPACT ASSESSMENT

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
114	Monterey cypress Hesperocyparis macrocarpa	18.1	N/A	N/A	N/A	N/A	**NONE KNOWN**	• **Within a line of trees at perimeter of landfill** **Small diameter dead branches** **Tree Condition Not Assessed** • **Preserve and Protect** • **No** • **No**
115	Monterey cypress Hesperocyparis macrocarpa	15.5	N/A	N/A	N/A	N/A	**NONE KNOWN**	• **Within a line of trees at perimeter of landfill** **Small diameter dead branches** **Tree Condition Not Assessed** • **Preserve and Protect** • **No** • **No**
116	Monterey cypress Hesperocyparis macrocarpa	Double Trunk 11 & 12.8	N/A	N/A	N/A	N/A	**NONE KNOWN**	• **Within a line of trees at perimeter of landfill** **Small diameter dead branches** **Tree Condition Not Assessed** • **Preserve and Protect** • **No** • **No**
117	Monterey cypress Hesperocyparis macrocarpa	28.6 @ 36" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• **Within a line of trees at perimeter of landfill** **Small diameter dead branches** **Tree Condition Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
118	Monterey cypress Hesperocyparis macrocarpa	14.6	N/A	N/A	N/A	N/A	**NONE KNOWN**	• **Within a line of trees at perimeter of landfill** **Small diameter dead branches** **Tree Condition Not Assessed** • **Preserve and Protect** • **No** • **No**
119	Monterey cypress Hesperocyparis macrocarpa	42.1	Fair	Poor	Fair	24	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Poor trunk/stem attachments** • **Remove due to Construction Impacts** • **Yes** • **Yes**
120	coast live oak *Quercus agrifolia*	15.2 @ 36" Above Grade	Poor	Poor	Poor	8	**LOW/ 25' from Grading Limits**	• **Group surrounding proposed Fuel/Strorage Area** **Stands on neighboring property** **Previoously topped** **Profuse sprout growth** • **Preserve and Protect** • **Yes** • **Yes**
121	coffeberry Rhamanus sp.	Group of Several Multi- Stemmed	Fair	Fair	Fair	10	**LOW/ 18' from Grading Limits**	• **Group surrounding proposed Fuel/Strorage Area** **Dense shrub growth** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
122	Monterey pine Pinus radiata	19.5	Poor	Poor	Poor	18	**LOW/ 35' from Grading Limits**	• Group surrounding proposed Fuel/Strorage Area Thinning canopy Evidence of Red Turpentine beetle • Preserve and Protect • Yes • Yes
123	coast live oak *Quercus agrifolia*	10.3	Fair	Fair	Good	12	**LOW/ 22' from Grading Limits**	• Group surrounding proposed Fuel/Strorage Area Small diameter dead branches Suppressed to the West • Preserve and Protect • Yes • Yes
124	Monterey pine Pinus radiata	26.1	Fair	Poor	Fair	22	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Leans to the Weest Large diameter dead and broken branches • Preserve and Protect • Yes • Yes
125	Monterey pine Pinus radiata	13.9	Fair	Poor	Fair	16	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Grows on neighboring property Swoops to the North • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
126	Monterey pine Pinus radiata	Double Trunk 17.5 & 14.9	Fair	Poor	Fair	18	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Grows on neighboring property • Preserve and Protect • Yes • Yes
127	Monterey pine Pinus radiata	16	Fair	Poor	Poor	18	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Grows on property boundary • Preserve and Protect • Yes • Yes
128A	coast live oak *Quercus agrifolia*	8	Fair	Poor	Fair	10	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Poor trunk/stem attachments • Preserve and Protect • Yes • Yes
128	Monterey pine Pinus radiata	11	Fair	Fair	Fair	12	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Young treee leaning to the Northeast Suppressed to the West • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
129	blue gum eucalyptus Eucaylptus globulus	9.6	Fair	Poor	Poor	12	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area Smaller suppressed tree** • **Remove due to Condition** • **Yes** • **Yes**
130	blue gum eucalyptus Eucaylptus globulus	72.4 @ Grade	Fair	Poor	Fair	32	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area Large, mature tree Poor trunk/stem attachments** • **Preserve and Protect** • **Yes** • **Yes**
131	Monterey pine Pinus radiata	14.2	Fair	Poor	Fair	16	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area Stands on Property Boundary Suppressed young tree Exudation in lower trunk** • **Preserve and Protect** • **Yes** • **Yes**
132	Monterey pine Pinus radiata	10.6	Dead	Dead	Dead	N/A	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area Dead Monterey pine stub** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
133	Monterey pine Pinus radiata	11.4	Dead	Dead	Dead	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Dead Monterey pine stub • Preserve and Protect • Yes • Yes
134	Monterey pine Pinus radiata	22.7	Fair	Fair	Fair	18	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Leans to the Southwest • Preserve and Protect • Yes • Yes
135	coast live oak *Quercus agrifolia*	17.6	Fair	Fair	Fair	12	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Stands on Property Boundary • Preserve and Protect • Yes • Yes
136	coast live oak *Quercus agrifolia*	17.3 @ Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Imapct Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
137	coast live oak *Quercus agrifolia*	Double Trunk 8.7 & 12.5	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
138	coast live oak *Quercus agrifolia*	13.9 @ 6" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
139	Monterey pine Pinus radiata	15.7	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
140	Monterey pine Pinus radiata	10.8	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
141	Monterey pine Pinus radiata	13.8	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
142	Monterey pine Pinus radiata	15.1	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
143	coast live oak *Quercus agrifolia*	15.6 @ 24" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
144	Monterey pine Pinus radiata	15.1	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
145	Monterey pine Pinus radiata	27.4	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
146	coast live oak *Quercus agrifolia*	16.9 @ 6" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
147	coast live oak *Quercus agrifolia*	15.1 @ 6" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
148	coast live oak *Quercus agrifolia*	Double Trunk 12.2 & 14 @ 18" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
149	coast live oak *Quercus agrifolia*	16.1	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
150	coast live oak *Quercus agrifolia*	8.2	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
151	coast live oak *Quercus agrifolia*	15.6	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
152	coast live oak *Quercus agrifolia*	8 @ 36" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
153	coast live oak *Quercus agrifolia*	9	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
154	coast live oak *Quercus agrifolia*	9.6	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
155	coast live oak *Quercus agrifolia*	6	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Beyond Impact Area Tree Condition Not Assessed • Preserve and Protect • Yes • Yes
156	coast redwood Sequoia sempervirens	28.5	Good	Good	Good	22	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Excellent preservation suitability • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
157	coast redwood Sequoia sempervirens	20.3	Good	Good	Good	18	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Excellent preservation suitability • Preserve and Protect • Yes • Yes
158	coast redwood Sequoia sempervirens	26.4	Good	Poor	Good	22	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Excellent preservation suitability Poor trunk/stem attachments • Preserve and Protect Simple Direct Cable Installation • Yes • Yes
159	coast redwood Sequoia sempervirens	Double Trunk 11.3 & 15.2	Good	Good	Good	18	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Excellent preservation suitability • Preserve and Protect • Yes • Yes
160	blue gum eucalyptus Eucaylptus globulus	Quadruple Trunk 9.2 & 13.4 & 8 & 4.3	Fair	Poor	Fair	15	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area Western edge of dense grove • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
161	blue gum eucalyptus Eucaylptus globulus	12.3	Fair	Poor	Fair	15	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area Western edge of dense grove** • **Preserve and Protect** • **Yes** • **Yes**
162	blue gum eucalyptus Eucaylptus globulus	Quadruple Trunk 7.3 & 2.7 & 3.6 & 3	Fair	Poor	Fair	15	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area Western edge of dense grove** • **Preserve and Protect** • **Yes** • **Yes**
163	blue gum eucalyptus Eucaylptus globulus	Six Trunks 3 & 5.4 & 10.2 & 4.1 & 1 & 1.5	Fair	Poor	Fair	15	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area Western edge of dense grove** • **Preserve and Protect** • **Yes** • **Yes**
164	blue gum eucalyptus Eucaylptus globulus	Quadruple Trunk 19.1 & 5.7 & 3.2 & 9.5	Fair	Poor	Poor	15	**NONE KNOWN**	• **Group surrounding proposed Fuel/Strorage Area High Failure Potential** • **Remove due to Condition** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
165	blue gum eucalyptus Eucaylptus globulus	Double Trunk 13.2 & 6	Fair	Poor	Poor	15	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area High Failure Potential • Remove due to Condition • Yes • Yes
166	blue gum eucalyptus Eucaylptus globulus	Double Trunk 22.4 & 13.5	Fair	Poor	Poor	15	**NONE KNOWN**	• Group surrounding proposed Fuel/Strorage Area High Failure Potential • Remove due to Condition • Yes • Yes
167	blue gum eucalyptus Eucaylptus globulus	Five Trunks 16.2 & 8.5 & 9.2 & 9.1 & 12.1						• Northern surrounding proposed Fuel/Strorage Area • Preserve and Protect • Yes • Yes
168	blue gum eucalyptus Eucaylptus globulus	9.2	Fair	Poor	Poor	15	**HIGH/ Within Proposed Grading Limits**	• Group of 6, High Risk eucalyptus in central section of the proposed Fuel/Strorage Area High Failure Potential • Remove due to Construction Impacts • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
169	blue gum eucalyptus Eucaylptus globulus	21.4	Fair	Poor	Poor	15	**HIGH/ Within Proposed Grading Limits**	• **Group of 6, High Risk eucalyptus in central section of the proposed Fuel/Strorage Area High Failure Potential** • **Remove due to Construction Impacts** • **Yes** • **Yes**
170	blue gum eucalyptus Eucaylptus globulus	9.5	Fair	Poor	Poor	15	**HIGH/ Within Proposed Grading Limits**	• **Group of 6, High Risk eucalyptus in central section of the proposed Fuel/Strorage Area High Failure Potential** • **Remove due to Construction Impacts** • **Yes** • **Yes**
171	blue gum eucalyptus Eucaylptus globulus	13	Fair	Poor	Poor	15	**HIGH/ Within Proposed Grading Limits**	• **Group of 6, High Risk eucalyptus in central section of the proposed Fuel/Strorage Area High Failure Potential** • **Remove due to Construction Impacts** • **Yes** • **Yes**
172	blue gum eucalyptus Eucaylptus globulus	21.4	Fair	Poor	Poor	15	**HIGH/ Within Proposed Grading Limits**	• **Group of 6, High Risk eucalyptus in central section of the proposed Fuel/Strorage Area High Failure Potential** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
173	blue gum eucalyptus Eucaylptus globulus	73.8 @ Grade	Fair	Poor	Poor	15	**HIGH/ Within Proposed Grading Limits**	• Group of 6, High Risk eucalyptus in central section of the proposed Fuel/Strorage Area High Failure Potential • Remove due to Construction Impacts • Yes • Yes
174	liquid amber	15	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
175	magonlia	7.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
176	magonlia	9.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
177	buckeye	6.5	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Line of small buckeye trees to the Norh of Maintenance Yard parking area No Known Impacts Tree Condition Was Not Assessed • Preserve and Protect • No • No
178	buckeye	5	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Line of buckeye trees to the Norh of Maintenance Yard parking area No Known Impaacts Tree Condition Was Not Assessed • Preserve and Protect • No • No
179	buckeye	8.4 @ 36" Above Grade	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Line of buckeye trees to the Norh of Maintenance Yard parking area No Known Impaacts Tree Condition Was Not Assessed • Preserve and Protect • No • No
180	buckeye	4.5	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Line of buckeye trees to the Norh of Maintenance Yard parking area No Known Impaacts Tree Condition Was Not Assessed • Preserve and Protect • No • No

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Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
181	buckeye	5.6	N/A	N/A	N/A	N/A	**NONE KNOWN**	• Line of buckeye trees to the Norh of Maintenance Yard parking area No Known Impaacts Tree Condition Was Not Assessed • Preserve and Protect • No • No
182	coast redwood Sequoia sempervirens	15.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
183	coast redwood Sequoia sempervirens	13.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
184	coast live oak Quercus agrifolia	14.1 @ 24" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No

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Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
185	coast live oak Quercus agrifolia	12.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
186	coast redwood Sequoia sempervirens	6.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
187	Monterey cypress Hesperocyparis macrocarpa	19.4 @ 18" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
188	Monterey cypress Hesperocyparis macrocarpa	12.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
189	Monterey cypress Hesperocyparis macrocarpa	12 @ 24" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
190	Monterey cypress Hesperocyparis macrocarpa	15.5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
191	Monterey cypress Hesperocyparis macrocarpa	17.8 @ Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
192	Monterey cypress Hesperocyparis macrocarpa	19.8 @ Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
193	coast live oak Quercus agrifolia	9.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
194	Monterey cypress Hesperocyparis macrocarpa	13	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
195	Monterey cypress Hesperocyparis macrocarpa	19.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
196	Monterey cypress Hesperocyparis macrocarpa	19.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
197	Monterey cypress Hesperocyparis macrocarpa	13.6 @ 12" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
198	Monterey cypress Hesperocyparis macrocarpa	19.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **Yes**
199	Monterey cypress Hesperocyparis macrocarpa	23.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
200	Monterey cypress Hesperocyparis macrocarpa	19.6 @ 24" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
201	Monterey cypress Hesperocyparis macrocarpa	32 @ 18" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
202	Monterey cypress Hesperocyparis macrocarpa	32.2 @ 24" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
203	Monterey cypress Hesperocyparis macrocarpa	18.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
204	Monterey cypress Hesperocyparis macrocarpa	19.6 @ 36" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
205	Monterey cypress Hesperocyparis macrocarpa	28 @ 24" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
206	Monterey cypress Hesperocyparis macrocarpa	22.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
207	Monterey cypress Hesperocyparis macrocarpa	28.2 @ 24" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
208	coast redwood Sequoia sempervirens	16	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
209	coast redwood Sequoia sempervirens	9.5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
210	coast redwood Sequoia sempervirens	13.3	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
211	coast redwood Sequoia sempervirens	9.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
212	coast redwood Sequoia sempervirens	9.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
213	coast redwood Sequoia sempervirens	10.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
214	coast redwood Sequoia sempervirens	9	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
215	coast redwood Sequoia sempervirens	12	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
216	coast redwood Sequoia sempervirens	11.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
217	coast redwood Sequoia sempervirens	10.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
218	coast redwood Sequoia sempervirens	9.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
219	coast redwood Sequoia sempervirens	9.9	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
220	coast redwood Sequoia sempervirens	9.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
221	coast redwood Sequoia sempervirens	11	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
222	coast redwood Sequoia sempervirens	15.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
223	coast redwood Sequoia sempervirens	19.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
224	coast redwood Sequoia sempervirens	12.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
225	coast live oak Quercus agrifolia	13.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
226	coast live oak Quercus agrifolia	15.6 @ 36" Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
227	Monterey cypress Hesperocyparis macrocarpa	14.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**
228	Monterey cypress Hesperocyparis macrocarpa	17.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within a line of trees at perimeter of landfill** **Tree Condition Was Not Assessed** • **Preserve and Protect** • **No** • **No**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
229	coast redwood Sequoia sempervirens	13.9	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
230	coast redwood Sequoia sempervirens	9.5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
231	coast redwood Sequoia sempervirens	13.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No
232	coast redwood Sequoia sempervirens	10.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within a line of trees at perimeter of landfill Tree Condition Was Not Assessed • Preserve and Protect • No • No

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
233	coast live oak Quercus agrifolia	18.4 @ 48" Above Grade	Fair	Poor	Good	18	**HIGH/ Excavation Within Critical Root Zone**	• Grows on neighboring property to the North of proposed Transfer Station A Divides into two, poorly attached stems at 30" above grade Poor trunk/stem attachents throughout tree structure Decayed wound site from large branch removal on Northeast side of trunk • Remove due to Construction Impacts • Yes • Yes
234	coast live oak Quercus agrifolia	17.1 @ 48" Above Grade	Fair	Poor	Good	18	**HIGH/ Excavation Within Critical Root Zone**	• Grows on neighboring property to the North of proposed Transfer Station A Poor trunk/stem attachents • Remove due to Construction Impacts • Yes • Yes
235	blue gum eucalyptus Eucaylptus globulus	Double Trunk 11.1 & 8.6	Fair	Poor	Fair	16	**MODERATE/ Excavation Within Canopy Extents**	• Northern edge of dense grove of eucalyptus Larger trunk leans dramatically to the North toward proposed Fueling Facility Poor trunk/stem attachments • Preserve and Protect Special Treatment Area Canopy and Root Pruning Required • Yes • Yes

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
236	blue gum eucalyptus Eucaylptus globulus	Eight trunks 8, 15.2, 4.2, 4.8, 5.3, 6.4, 5.2, and 1.5	Fair	Fair	Fair	16	**MODERATE/ Excavation Within Canopy Extents**	• Northern edge of dense grove of eucalyptus Larger trunk leans dramatically to the North toward proposed Fueling Facility Poor trunk/stem attachments • Preserve and Protect Special Treatment Area Canopy and Root Pruning Required • Yes • Yes
237	blue gum eucalyptus Eucaylptus globulus	11.3	Fair	Poor	Fair	16	**MODERATE/ Excavation Within Canopy Extents**	• Northern edge of dense grove of eucalyptus Larger trunk leans dramatically to the North toward proposed Fueling Facility Poor trunk/stem attachments • Preserve and Protect Special Treatment Area Canopy and Root Pruning Required • Yes • Yes
238	blue gum eucalyptus Eucaylptus globulus	Double trunk line 14.2 and 8.4	Poor	Poor	Poor	16	**MODERATE/ Excavation Within Canopy Extents**	• Northern edge of dense grove of eucalyptus Larger trunk leans dramatically to the North toward proposed Fueling Facility Poor trunk/stem attachments • Preserve and Protect Special Treatment Area Canopy and Root Pruning Required • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
239	blue gum eucalyptus Eucaylptus globulus	Five Trunks 13.2, 14.1, 14.4, 13.8, and 7.8	Fair	Fair	Fair	16	**MODERATE/ Excavation Within Canopy Extents**	• Northern edge of dense grove of eucalyptus Larger trunk leans dramatically to the North toward proposed Fueling Facility Poor trunk/stem attachments • Preserve and Protect Special Treatment Area Canopy and Root Pruning Required • Yes • Yes
240	blue gum eucalyptus Eucaylptus globulus	Four Trunks 6.8, and 15.7, 15.8 and 6.6	Fair	Fair	Fair	16	**MODERATE/ Excavation Within Canopy Extents**	• Northern edge of dense grove of eucalyptus Larger trunk leans dramatically to the North toward proposed Fueling Facility Poor trunk/stem attachments • Preserve and Protect Special Treatment Area Canopy and Root Pruning Required • Yes
241	blue gum eucalyptus Eucaylptus globulus	Five Trunks 8.5, 8.4, 12.5, 13.8, & 6.2	Fair	Poor	Poor	16	**MODERATE/ Excavation Within Canopy Extents**	• Northern edge of dense grove of eucalyptus Larger trunk leans dramatically to the North toward proposed Fueling Facility Poor trunk/stem attachments • Preserve and Protect Special Treatment Area Canopy and Root Pruning Required • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
242	Coast Live Oak	12.7	Fair	Good	Good	12	**HIGH/ Within Proposed Grading Limits**	• Stands on adjacent property. Good form and structure. Excellent preservation suitability with 12 foot exclusion zone. Canopy extends approximately 12 feet towards the development area Small diameter dead branches • Remove due to Construction Impacts • Yes • Yes
243	Magnolia	6.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes
244	Magnolia	Triple Trunk 5.6, 6 & 4.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed • Remove due to Construction Impacts • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
245	Magnolia	Double Trunk 6 & 9	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
246	Magnolia	Double Trunk 9.7 and 7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
247	magnolia	10.3	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Line of street trees to the North of proposed Fuel/Strorage Area Within Known Impact Area Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
248	coast live oak *Quercus agrifolia*	4.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area, Transfer Station A Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
249	coast live oak *Quercus agrifolia*	3.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area, Transfer Station A** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
250	coast live oak *Quercus agrifolia*	4.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area, Transfer Station A** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
251	coast live oak *Quercus agrifolia*	3.6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area, Transfer Station A** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
252	coast live oak *Quercus agrifolia*	3	Fair	Poor	Fair	4	**LOW/ Proximity to Grading Limits**	• **Within dense stand of small, suppressed trees** **Poor trunk/stem attachments** **Small diameter dead branches** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
253	coast live oak *Quercus agrifolia*	4.6	Fair	Poor	Fair	4	**LOW/ Proximity to Grading Limits**	• **Within dense stand of small, suppressed trees** **Poor trunk/stem attachments** **Small diameter dead branches** • **Preserve and Protect** • **Yes** • **Yes**
254	coast live oak *Quercus agrifolia*	5.3	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
255	coast live oak *Quercus agrifolia*	**2.5**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
256	coast live oak *Quercus agrifolia*	**4.6**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
257	coast live oak *Quercus agrifolia*	**1.3**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
258	coast live oak *Quercus agrifolia*	**2.7**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
259	coast live oak *Quercus agrifolia*	**1.4**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
260	coast live oak *Quercus agrifolia*	**3**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
261	coast live oak *Quercus agrifolia*	**2.4**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
262	coast live oak *Quercus agrifolia*	**3.2**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
263	coast live oak *Quercus agrifolia*	**2.2**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
264	coast live oak *Quercus agrifolia*	**3.5**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
265	coast live oak *Quercus agrifolia*	**4.3**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
266	coast live oak *Quercus agrifolia*	**5.1**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
267	coast live oak *Quercus agrifolia*	**4.6**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
268	coast live oak *Quercus agrifolia*	**1.7**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
269	coast live oak *Quercus agrifolia*	**1.5**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
270	coast live oak *Quercus agrifolia*	**4.1**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
271	coast live oak *Quercus agrifolia*	**1.1**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
272	coast live oak *Quercus agrifolia*	**5.3**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
273	coast live oak *Quercus agrifolia*	**4.7**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
274	coast live oak *Quercus agrifolia*	**2**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
275	coast live oak *Quercus agrifolia*	**0.75**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
276	coast live oak *Quercus agrifolia*	**1.2**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
277	coast live oak *Quercus agrifolia*	**3.5**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
278	coast live oak *Quercus agrifolia*	**3.7**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
279	coast live oak *Quercus agrifolia*	**2.6**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
280	coast live oak *Quercus agrifolia*	1.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
281	coast live oak *Quercus agrifolia*	**3.7**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
282	coast live oak *Quercus agrifolia*	**9.4 @ Grade**	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
283	coast live oak *Quercus agrifolia*	4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
284	coast live oak *Quercus agrifolia*	11	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
285	coast live oak *Quercus agrifolia*	1.5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
286	coast live oak *Quercus agrifolia*	Double Trunk 7.5 & 6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
287	coast live oak *Quercus agrifolia*	Double Trunk 4.7 & 8.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
288	coast live oak *Quercus agrifolia*	4.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
289	coast live oak *Quercus agrifolia*	4.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
290	coast live oak *Quercus agrifolia*	18.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
291	coast live oak *Quercus agrifolia*	5.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
292	coast live oak *Quercus agrifolia*	9.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
293	coast live oak *Quercus agrifolia*	9.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
294	coast live oak *Quercus agrifolia*	Double Trunk 10.1 & 10	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
295	coast live oak *Quercus agrifolia*	8.5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
296	coast live oak *Quercus agrifolia*	Nine Trunks 7.6, 2.7, 5.1, 5.3, 3.1, 2.6, 3.5, 1.7, 1.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
297	coast live oak *Quercus agrifolia*	8.5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
298	coast live oak *Quercus agrifolia*	9.5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
299	coast live oak *Quercus agrifolia*	9.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
300	coast live oak *Quercus agrifolia*	13.8	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
301	coast live oak *Quercus agrifolia*	11.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
302	coast live oak *Quercus agrifolia*	6.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
303	coast live oak *Quercus agrifolia*	8.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
304	coast live oak *Quercus agrifolia*	11.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
305	coast live oak *Quercus agrifolia*	3.8	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
306	coast live oak *Quercus agrifolia*	Four Trunks 3.4, 7.8, 13.6, 16.3	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
307	coast live oak *Quercus agrifolia*	4.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes**
308	coast live oak *Quercus agrifolia*	4.3	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
309	coast live oak *Quercus agrifolia*	8.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
310	coast live oak *Quercus agrifolia*	7.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes**
311	coast live oak *Quercus agrifolia*	11	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
312	coast live oak *Quercus agrifolia*	2.8	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
313	coast live oak *Quercus agrifolia*	6.9	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
314	coast live oak *Quercus agrifolia*	5	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
315	coast live oak *Quercus agrifolia*	16.8	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
316	coast live oak *Quercus agrifolia*	2.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
317	coast live oak *Quercus agrifolia*	6.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
318	coast live oak *Quercus agrifolia*	3.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
319	coast live oak *Quercus agrifolia*	6.1	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
320	coast live oak *Quercus agrifolia*	3.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes
321	coast live oak *Quercus agrifolia*	3.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• Within dense stand of small, suppressed trees Condition Not Assessed • Preserve and Protect • Yes • Yes

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
322	coast live oak *Quercus agrifolia*	Double Trunk 6.9 & 11	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
323	coast live oak *Quercus agrifolia*	Double Trunk 10.1 & 12.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
324	coast live oak *Quercus agrifolia*	8.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
325	coast live oak *Quercus agrifolia*	Double Trunk 19.4 & 18.3	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
326	coast live oak *Quercus agrifolia*	12.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
327	coast live oak *Quercus agrifolia*	12.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
328	coast live oak *Quercus agrifolia*	8.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
329	coast live oak *Quercus agrifolia*	Double Trunk 14.2 & 8.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of small, suppressed trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
330	coast live oak *Quercus agrifolia*	8.5	Fair	Fair	Fair	10	**None Known**	• **Dead branches** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
331	coast live oak *Quercus agrifolia*	8.6	Fair	Fair	Fair	10	**None Known**	• **Dead branches** • **Preserve and Protect** • **Yes** • **Yes**
332	coast live oak *Quercus agrifolia*	9.1	Fair	Fair	Fair	10	**None Known**	• **Large diameter dead branches** • **Preserve and Protect** • **Yes** • **Yes**
333	coast live oak *Quercus agrifolia*	12.7 @ 24 Above Grade	Fair	Fair	Fair	10	**None Known**	• **Large diameter dead branches** • **Preserve and Protect** • **Yes** • **Yes**
334	coast live oak *Quercus agrifolia*	12.7	Fair	Fair	Fair	10	**None Known**	• **Dead branches** • **Preserve and Protect** • **Yes** • **Yes**
335	coast live oak *Quercus agrifolia*	8.1	N/A	N/A	N/A	N/A	**HIGH/ Proximity to Proposed Grading Limits**	• **Within Known Impact Area Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
336	coast live oak *Quercus agrifolia*	9.4 @ 18 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Proximity to Proposed Grading Limits**	• **Within Known Impact Area Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
337	coast live oak *Quercus agrifolia*	1.7 @ 24 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
338	coast live oak *Quercus agrifolia*	2.6 @ 36 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
339	coast live oak *Quercus agrifolia*	1.6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
340	coast live oak *Quercus agrifolia*	2.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
341	coast live oak *Quercus agrifolia*	Double Trunk 4.1 & 3.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees** **Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
342	coast live oak *Quercus agrifolia*	5.2 @ 24 Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
343	coast live oak *Quercus agrifolia*	7.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
344	coast live oak *Quercus agrifolia*	8.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
345	coast live oak *Quercus agrifolia*	9.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
346	coast live oak *Quercus agrifolia*	10.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
347	coast live oak *Quercus agrifolia*	Double Trunk 9.8 & 8.9	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
348	coast live oak *Quercus agrifolia*	11.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
349	coast live oak *Quercus agrifolia*	Triple Trunk 24.2, 13.6, 15.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
350	coast live oak *Quercus agrifolia*	17.9	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
351	coast live oak *Quercus agrifolia*	19.6 @ 24 Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
352	coast live oak *Quercus agrifolia*	31.4 @ 24 Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
353	coast live oak *Quercus agrifolia*	7.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
354	coast live oak *Quercus agrifolia*	3.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
355	coast live oak *Quercus agrifolia*	4.2 @ 24 Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
356	coast live oak *Quercus agrifolia*	2.2	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
357	coast live oak *Quercus agrifolia*	2.6	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
358	coast live oak *Quercus agrifolia*	4.3	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
359	coast live oak *Quercus agrifolia*	2.8	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
360	coast live oak *Quercus agrifolia*	4.8 @ 24 Above Grade	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
361	coast live oak *Quercus agrifolia*	4.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
362	coast live oak *Quercus agrifolia*	2.7	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
363	coast live oak *Quercus agrifolia*	3.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
364	coast live oak *Quercus agrifolia*	Double Trunk 2.3 & 1.4	N/A	N/A	N/A	N/A	**NONE/ Beyond Known Impact Areas**	• **Within dense stand of smaller trees Condition Not Assessed** • **Preserve and Protect** • **Yes** • **Yes**
365	coast live oak *Quercus agrifolia*	3.6 @ 24 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
366	coast live oak *Quercus agrifolia*	1.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
367	coast live oak *Quercus agrifolia*	0.75	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
368	coast live oak *Quercus agrifolia*	4.2 @ 24 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
369	coast live oak *Quercus agrifolia*	20.2 @ Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
370	coast live oak *Quercus agrifolia*	10.8 @ Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
371	coast live oak *Quercus agrifolia*	9.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
372	coast live oak *Quercus agrifolia*	8.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
373	coast live oak *Quercus agrifolia*	11.4 @ Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
374	coast live oak *Quercus agrifolia*	6.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
375	coast live oak *Quercus agrifolia*	11.6 @ 24 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
376	coast live oak *Quercus agrifolia*	12.1 @ Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

James P. Allen & Associates

BUENA VISTA LANDFILL REDEVELOPMENT PROJECT
CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
377	coast live oak *Quercus agrifolia*	2.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
378	coast live oak *Quercus agrifolia*	4.6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
379	coast live oak *Quercus agrifolia*	4.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
380	coast live oak *Quercus agrifolia*	3	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
381	coast live oak *Quercus agrifolia*	3.7	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

James P. Allen & Associates

BUENA VISTA LANDFILL REDEVELOPMENT PROJECT
CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
382	coast live oak *Quercus agrifolia*	Double Trunk 2.1 & 2.9	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
383	coast live oak *Quercus agrifolia*	4.5	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
384	coast live oak *Quercus agrifolia*	3.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
385	coast live oak *Quercus agrifolia*	2.6	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
386	coast live oak *Quercus agrifolia*	0.75	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

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BUENA VISTA LANDFILL REDEVELOPMENT PROJECT
CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
387	coast live oak *Quercus agrifolia*	1.2	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
388	coast live oak *Quercus agrifolia*	2.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
389	coast live oak *Quercus agrifolia*	2.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
390	coast live oak *Quercus agrifolia*	2.4	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
391	coast live oak *Quercus agrifolia*	0.75	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**

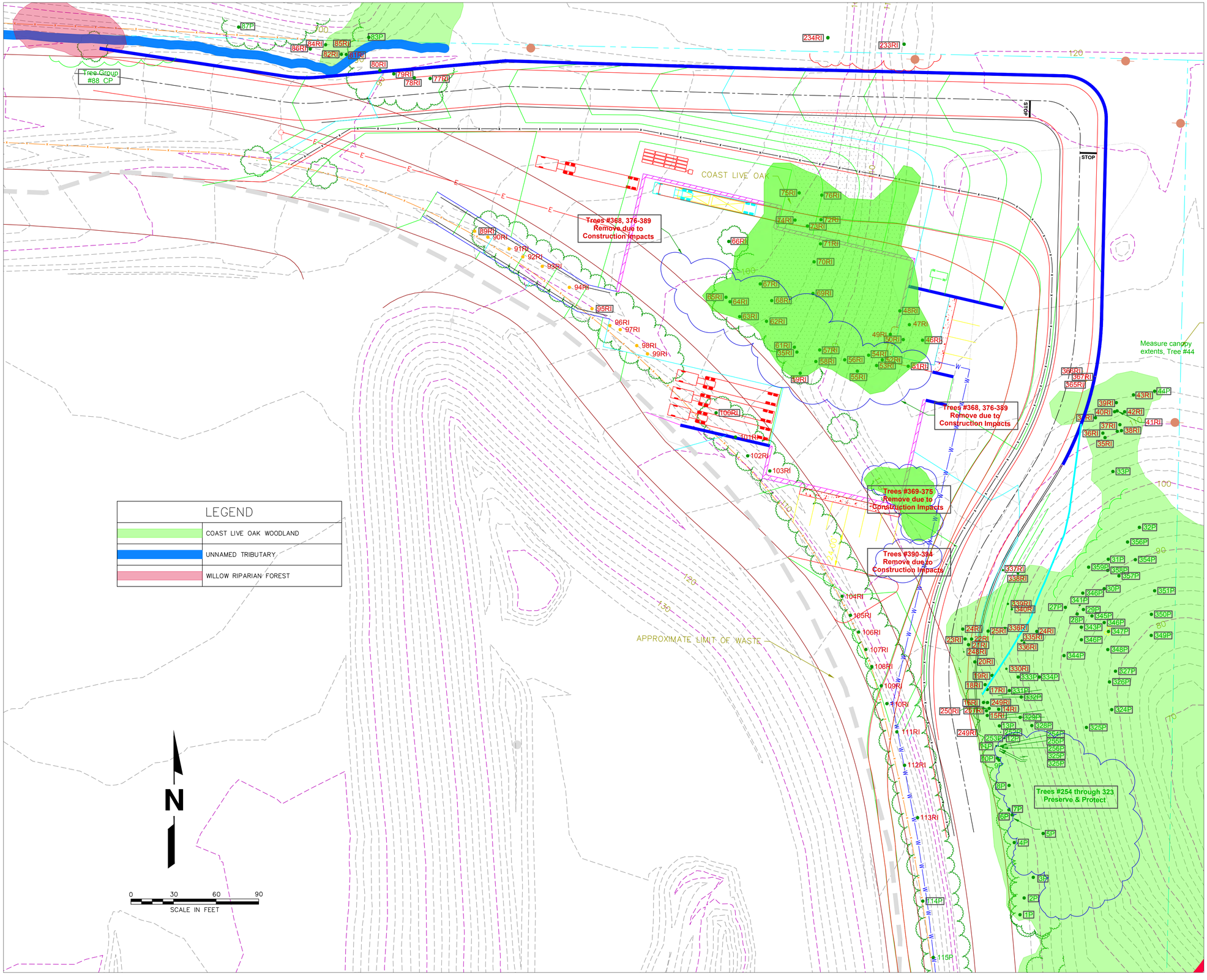
James P. Allen & Associates

BUENA VISTA LANDFILL REDEVELOPMENT PROJECT
CONSTRUCTION IMPACT ASSESSMENT

Dedicated to the Preservation of Trees

TREE RESOURCE INVENTORY

TREE/ TREE GROUP #	SPECIES	DIAMETER @ 4.5ft ABOVE NATURAL GRADE (INCHES)	HEALTH	STRUCTURE	PRESERVATION SUITABILITY	CRITICAL ROOT ZONE (CRZ) Radial Footage Preserved Trees Only	CONSTRUCTION IMPACTS LEVEL/ Description	• OBSERVATIONS • REQUIRED PROCEDURES • GROWS WITHIN SENSITIVE HABITAT Yes/No • MEETS "SIGNIFICANT" CRITERIA Yes/No
392	coast live oak *Quercus agrifolia*	1.1	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
393	coast live oak *Quercus agrifolia*	2.4 @ 18 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**
394	coast live oak *Quercus agrifolia*	6.2 @ 12 Above Grade	N/A	N/A	N/A	N/A	**HIGH/ Within Proposed Grading Limits**	• **Within Known Impact Area** **Tree Condition Was Not Assessed** • **Remove due to Construction Impacts** • **Yes** • **Yes**



Map Key / Legend

- Surveyed Tree Trunk Location
- Field Located Tree Trunk, Approximate
- 1 — Assigned Tree Number
- 20 — Tree Meets "Significant" Criteria
- 1 P — Preserve and Protect
- 8 RI — Remove due to Construction Impacts
- 8 RC — Remove due to Condition:
  - High-Risk
- 88_CP — Clearance Pruning Required
  - Tree Group #88
- Canopy Extents
- Indicates Group of Small Trees

Santa Cruz County General Services Department

Buena Vista Landfill Redevelopment Project

Tree Resource Analysis Construction Impact Assessment

Location Map

Proposed Transfer Station "A"

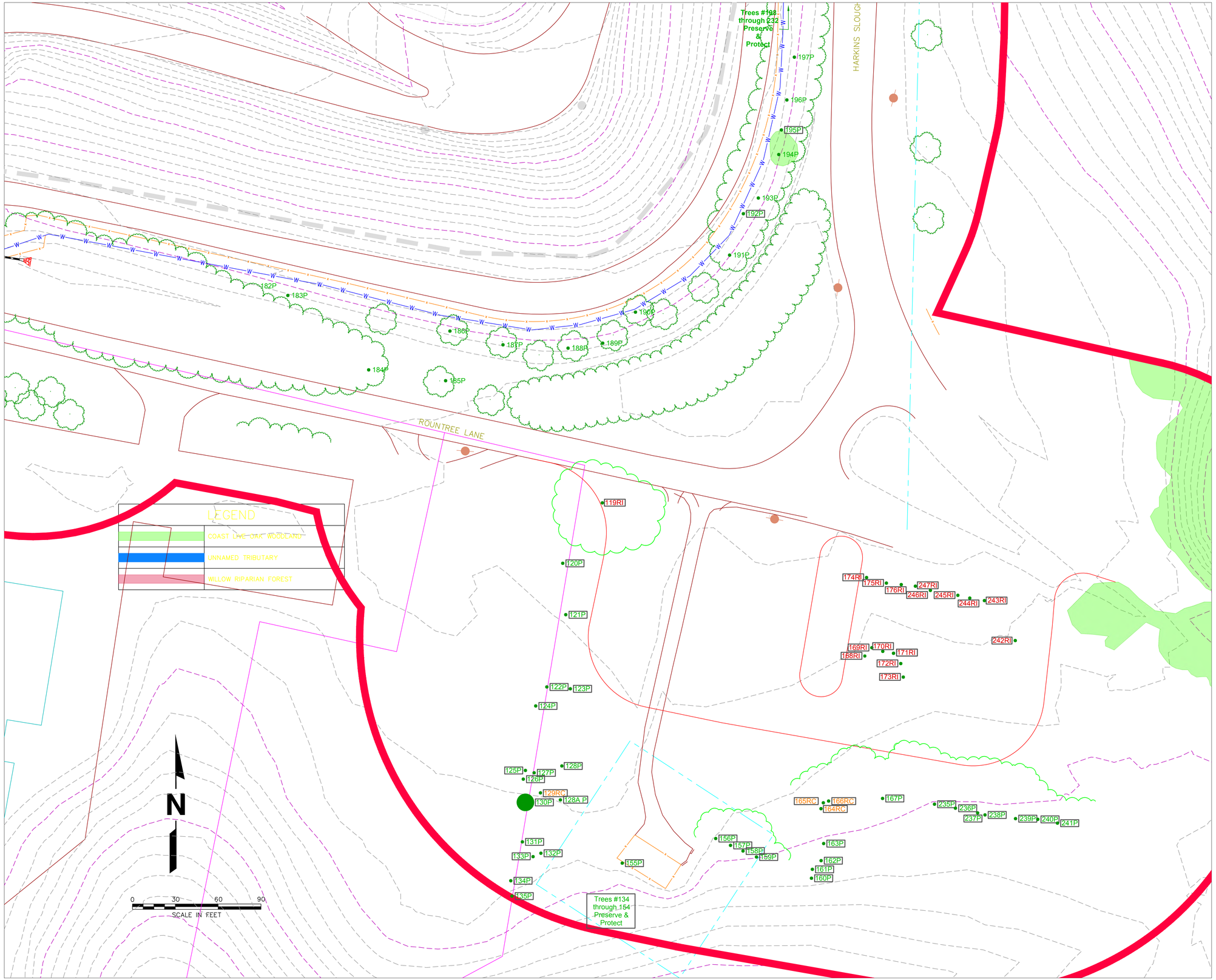
At 30 Scale

Santa Cruz County General Services
Buena Vista Redevelopment Project

Tree Location Map

James P. Allen & Associates
119 Surfside Avenue, Santa Cruz Ca 95060
office 831.426.6603
email jpallen@consultingarborists.com

Date: 2/12/25
Revision: XX/XX/XX
Revision: XX/XX/XX



Map Key / Legend

- Surveyed Tree Trunk Location
- Field Located Tree Trunk, Approximate
- 1 — Assigned Tree Number
- 20 — Tree Meets "Significant" Criteria
- 1 P — Preserve and Protect
- 8 RI — Remove due to Construction Impacts
- 8 RC — Remove due to Condition:
  - High-Risk
- Canopy Extents

Santa Cruz County
General Services Department

Buena Vista Landfill Redevelopment Project

Tree Resource Analysis
Construction Impact Assessment

Location Map

Proposed Fuel/Storage Yard
At 30 Scale

Santa Cruz County General Services
Buena Vista Redevelopment Project

Tree Location Map

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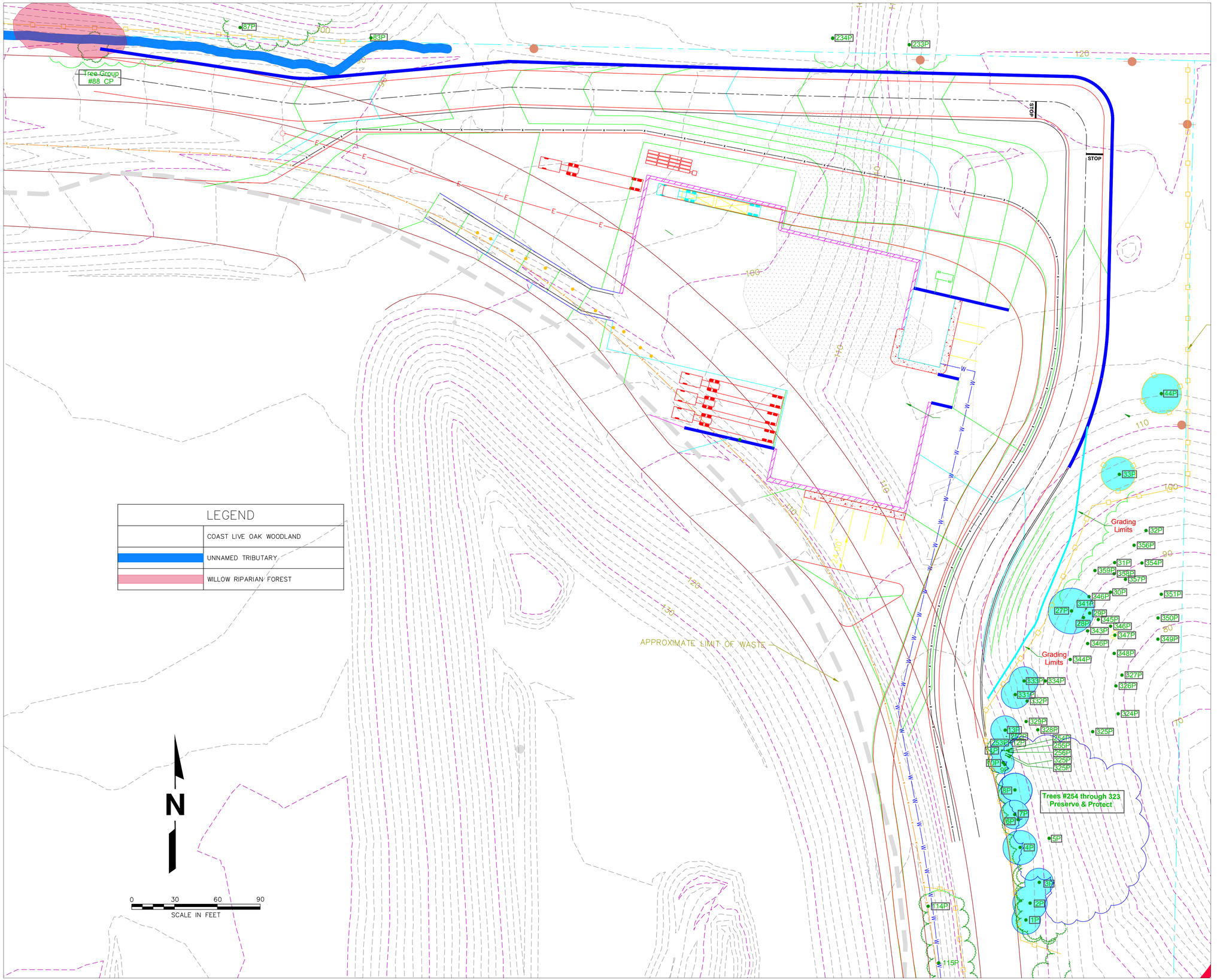
email jpallen@consultingarborists.com

Date: 2/12/25
Revision: XX/XX/XX
Revision: XX/XX/XX



Map Key / Legend

- **Surveyed Tree Trunk Location**
- **Field Located Tree Trunk, Approximate**
- **1** Assigned Tree Number
- **20** Tree Meets "Significant" Criteria
- **1 P** Preserve and Protect
- **88_CP** Clearance Pruning Required
  - Tree Group #88
- Canopy Extents
- Indicates Group of Small Trees
- **Tree Preservation Structures,** shall be constructed of the following materials as field specified by the Project Arborist.
  - Chain link, 72 inches in height secured to metal stakes driven at least 18 inches into the soil.
  - Temporary orange snow fencing attached to "T" posts driven into the ground
  - Silt fencing
  - Wattle
  - Rice straw bales

Santa Cruz County General Services Department

Buena Vista Landfill Redevelopment Project

Tree Resource Analysis/ Tree Protection Plan

Location Map

Proposed Transfer Station "A"

At 30 Scale

Santa Cruz County General Services
Buena Vista Redevelopment Project

Tree Location Map

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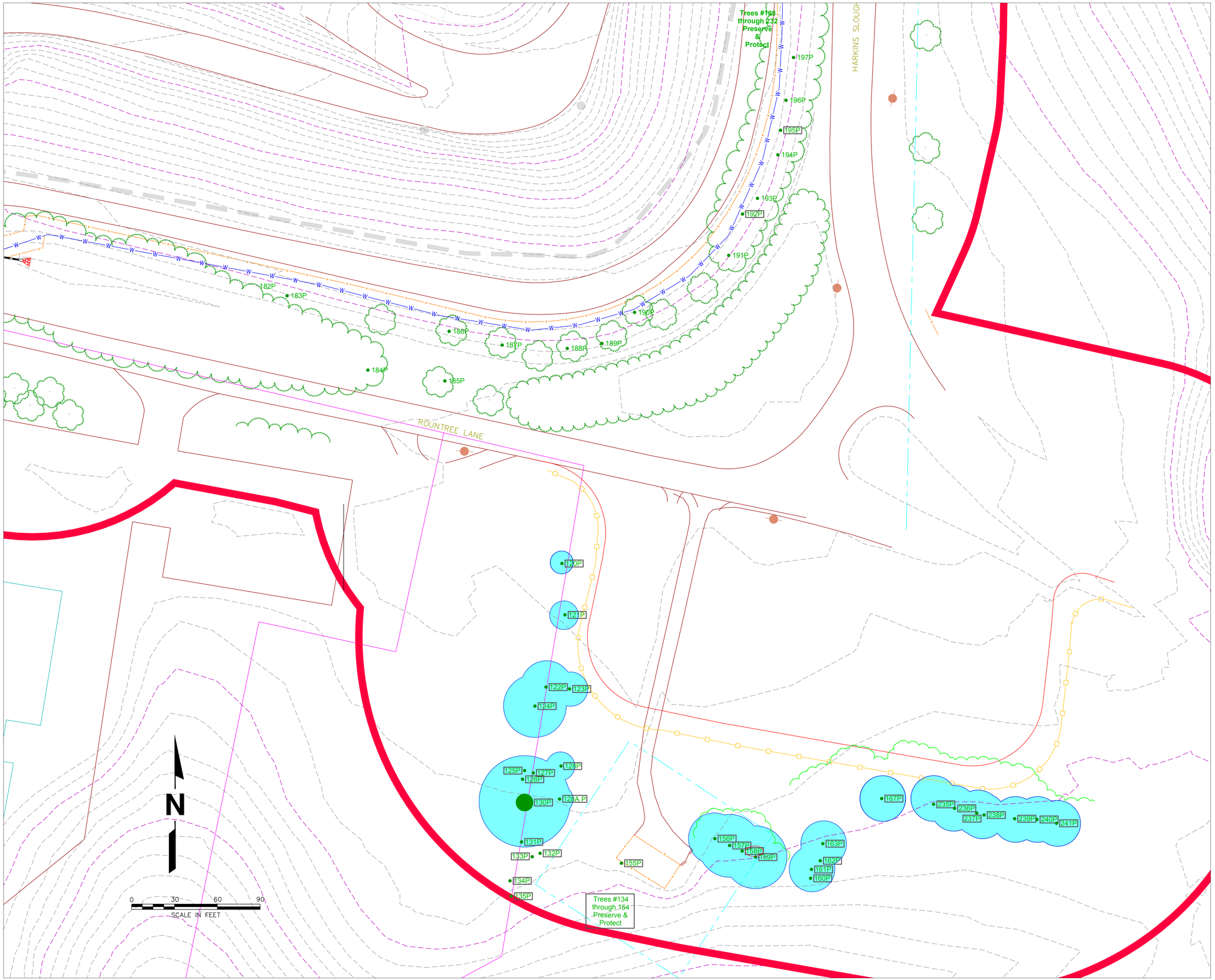
Date: 2/12/25
Revision: XX/XX/XX
Revision: XX/XX/XX



Map Key / Legend

- **Surveyed Tree Trunk Location**
- **Field Located Tree Trunk, Approximate**
- **1** **Assigned Tree Number**
- **20** **Tree Meets "Significant" Criteria**
- **1 P** **Preserve and Protect**
- **Critical Root Zone**
  Tree Preservation Zone
- **158 P** **Simple Direct Cable Installation, Tree #158**
- **Tree Preservation Structures,** shall be constructed of the following materials as field specified by the Project Arborist.
  - Chain link, 72 inches in height secured to metal stakes driven at least 18 inches into the soil.
  - Temporary orange snow fencing attached to "T" posts driven into the ground
  - Silt fencing
  - Wattle
  - Rice straw bales

Santa Cruz County
General Services Department

Buena Vista Landfill Redevelopment Project

Tree Resource Analysis/ Tree Protection Plan

Location Map

Proposed Fuel/Storage Yard

At 30 Scale

Santa Cruz County General Services
Buena Vista Redevelopment Project

Tree Location Map

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email jpallen@consultingarborists.com

Date: 2/12/25
Revision: XX/XX/XX
Revision: XX/XX/XX

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Appendix H1. Field Investigation, Laboratory Testing, and Subsurface Conditions County Property Northeast of Buena Vista Landfill Memo

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Geosyntec consultants

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Oakland, California 94607
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www.geosyntec.com

Memorandum

Date:	4 June 2020
To:	Kasey Kolassa, County of Santa Cruz
Copies to:	Sangeeta Lewis; File WG2562
From:	Fabrizio Settepani, P.E., G.E.
Subject:	Field Investigation, Laboratory Testing, and Subsurface Conditions County Property Northeast of Buena Vista Landfill (Watsonville, CA) Geosyntec Project Number: WG2562

1. GENERAL

This memorandum summarizes the geotechnical drilling, soil sampling, and testing performed by Geosyntec Consultants, Inc. (Geosyntec) for the property owned by the County of Santa Cruz near Watsonville, California and located northeast (NE) of the Buena Vista Drive Landfill (Landfill) across Harkins Slough Road.

The fieldwork activities included performing geotechnical drilling and collecting soil samples at six borings GT18-01 through GT18-06. Figure 1 presents the final borehole locations. The field work was performed between 12 November and 15 November 2018.

The memorandum also includes borings from a previous field investigation, describes the laboratory testing program, and summarizes the subsurface conditions in the area.

2. PRE-DRILLING ACTIVITIES

Before drilling, Geosyntec visited the site on 5 November 2018 to mark the boring locations and met California Utility Locators, a private utility locator from Scotts Valley, California. The utility locator cleared the boring locations and the surrounding area of electrical and metal utilities. Geosyntec also called Underground Service Alert (USA) after marking the locations with white paint and received ticket number X830900918-00X.

USA informed the following parties of Geosyntec's planned work:

- CTYWAT = CITY OF WATSONVILLE
- PACBEL = PACIFIC BELL
- PGESAL = PGE DISTRIBUTION SALINAS

Geosyntec called the County of Santa Cruz and was informed that a drilling permit was not required for a geotechnical field investigation.

Geosyntec also reviewed existing borings in the area of the proposed sediment basin. Attachment 1 includes the existing boring log in the area of the proposed sediment basin.

Geosyntec contracted with Pitcher Services LLC (California C57 Contractor No.1044895) of East Palo Alto, California to perform the geotechnical drilling. As will be described below, Pitcher performed the energy measurement of the sampling setup at boring GT18-03.

3. DRILLING AND SAMPLING ACTIVITIES

Geosyntec was onsite full time during the field activities to provide oversight and to document the drilling and sampling activities.

Pitcher used a Failing 1500 (PD59) truck-mounted drill rig to perform the drilling. The drill rig was equipped with an automatic slide hammer with 30-inch drop for collection of split-spoon samples. The drilling program included both mud rotary and solid stem auger drilling as described below.

Solid stem augers were used in the top 5 feet to allow the setting of a casing that would in turn allow the use of mud rotary drilling techniques. Samples were collected at minimum 5 feet intervals.

The depth of exploration varied between 51.5 feet and 82 feet below the existing ground surface at the time of drilling. The mud rotary drilling technique did not allow for open borehole groundwater level measurement. The moisture content description indicated on the borehole logs was based on visual observation of soil sample moisture conditions; therefore, the depths are approximate and do not represent stabilized groundwater conditions. Groundwater was not encountered to the maximum depth explored in any of the six borings.

Soil sampling was performed using: (1) standard penetration test (SPT), split-spoon sampler (1-3/8 inch inside diameter [ID], 2 inch outside diameter [OD]) without liners to measure blow counts in general accordance with ASTM D1586, (2) modified California split spoon with liners (2.5 inch ID, 3 inch OD) to measure blow counts, and (3) thin-wall Shelby tube sampler (3-feet long by 3-inch diameter).

Soils collected using the samplers were retained in individual Ziplock plastic bags. A 140-pound hammer was used for driving samples with the SPT samplers, and a 300-pound hammer was used for the modified California sampler. Soil samples collected during drilling were logged for lithologic characterization consistent with the Unified Soil Classification System (USCS) in general accordance with ASTM D2487/2488, and were retained for potential laboratory testing.

The boring logs include soil classifications based on laboratory testing results of samples selected by Geosyntec. Attachment 2 includes the 2018 boring logs.

Pitcher performed energy calibration measurements of the drill rig hammer system during the drilling and sampling at boring GT18-03 on 13 November 2018. Calibration measurements were obtained during sampling using both the SPT and California modified samplers. Pitcher prepared a report detailing the methods and results of the energy measurements; Attachment 3 includes the energy report.

As the drilling progressed, the drill cuttings and drilling mud were pumped into 55-gallon drums, and the drums were sealed once full. After the field investigation concluded, workers from the County of Santa Cruz transported the filled drums to the Buena Vista Landfill for disposal.

After drilling had been performed at each location, the driller backfilled each boring to the ground surface with cement bentonite grout. The boring locations were staked, labeled, and flagged for surveying.

4. POST-DRILLING ACTIVITIES

A County survey crew surveyed the completed boring locations based on the site's local coordinate system. The information is tabulated below:

BORING	NORTHING	EASTING	ELEVATION	DEPTH (ft-bgs)
GT18-01	11,926.38	10,950.23	115.3 feet	51.5 feet
GT18-02	12,115.01	11,028.95	120.0 feet	51.5 feet
GT18-03	11,987.99	10,890.42	118.7 feet	82.0 feet
GT18-04	12,117.50	10,766.48	98.0 feet	52.0 feet
GT18-05	12,043.20	10,736.99	99.6 feet	53.5 feet
GT18-06	12,114.08	10,898.48	120.1 feet	51.5 feet

All retained soil samples (i.e., Shelby tubes, brass rings, plastic bags, and bulk bucket samples) collected during drilling were packaged and transported to Geosyntec's office in Oakland, California.

5. LABORATORY TESTING

After the field investigation, Geosyntec inspected the soil samples and selected samples for laboratory testing. Laboratory testing was performed for Geosyntec by Cooper Testing Laboratory of Palo Alto, California. The following tests were performed:

LABORATORY TEST	ASTM DESIGNATION	PURPOSE
Moisture Content/Dry Density	D2937	Subsurface characterization, slope stability analyses.
Grain size	D422	Subsurface characterization, liquefaction analyses.
Atterberg limits	D4318	Subsurface characterization, liquefaction analyses, consolidation settlement.
Consolidation	D2435	Consolidation settlement. Test was performed in case property will be used for alternative use in the future.
Unconsolidated Undrained (UU) Triaxial test	D2850	Strength of natural (subsurface), slope stability analyses and future use of property.

Table 1 lists the test results. Attachment 4 includes the soil test data sheets. The laboratory test results indicate that:

- The tested coarse-grained soils samples are sands with gravel that classified as GP, GM, SP, SM, and SC in accordance with the USCS and had fines contents between 15.3 percent and 39.4 percent. The gravel contents in the sands ranged between 0 percent and 38.3 percent.
- The fine-grained soils are primarily medium to high plasticity clays with USCS classification CL and CH, the liquid limits (LL) range between 33 and 74 and the plasticity indices (PI) range between 16 and 43. The dry unit weights range between 80.1 and 103.4 pounds per cubic foot (pcf). The natural moisture contents ranged between 21 percent and 37.7 percent.
- The relatively undisturbed samples of fine-grained soils tested for unconsolidated-undrained strength at natural moisture contents had strengths between 1,270 psf and 2,355 psf at strains of 5 percent.

- Two of the relatively undisturbed samples tested at natural moisture contents were also backpressure saturated and tested for unconsolidated-undrained strength had strengths of 1,018 psf and 1,414 psf at strains of 5 percent versus 2,355 psf and 1,685 psf, respectively at natural moisture contents.

6. SUBSURFACE CONDITIONS

6.1 Area Geology

EMCON[1] states that the area is underlain by at least 1,000 feet of a heterogeneous mixture of interbedded gravel, sand, silt, and clay. Surficial stream and terrace deposits overlie approximately 500 feet of fine sands of the Aromas formation. The Aromas formation in turn overlies the Purisima formation which is approximately 500 feet thick and composed of semiconsolidated sand, silt, clay, and shale.

The area is in coastal Santa Cruz County which has step-like marine terraces of Pleistocene age that consist of weakly consolidated to semiconsolidated heterogeneous deposits of moderately to poorly sorted silt, silty clay, sand, and gravel[2]. Geosyntec[3] summarized that it is a naturally occurring valley within an uplifted marine terrace. It lies within a broad band of gently rolling hills of the Monterey Bay coastal plain. This gentle terrain has been incised by numerous small streams draining southward to the Pajaro River, including Harkins Slough to the east and Gallighan Slough to the southwest.

The Aromas Sand formation is the primary water-bearing unit and consists of aeolian (wind blown) and fluvial sand, silt, clay and gravel. Underlying the Aromas Sand formation is the Tertiary Purisima formation, which is too deep to be relevant to site hydrogeologic conditions. Groundwater beneath the site occurs in the Aromas Sand formation but also occurs in the overlying aeolian and terrace deposits. Perched groundwater zones occur in the aeolian and terrace deposits where the percolation of rainfall and irrigation is inhibited by low permeability horizons in near-surface deposits.

---

[1] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978

[2] See United States Geological Survey (USGS) Open File Report 97-489; Geologic Map of Santa Cruz County, California.

[3] *Preliminary Closure and Postclosure Maintenance Plan; Buena Vista Drive Sanitary Landfill; Santa Cruz County, California*; prepared by Geosyntec Consultants, Inc.; Project WG1019 and WG1394; July 2008, Amended May 2011, December 2011, May 2016.

Groundwater flow conditions are influenced regionally by agricultural and municipal pumping wells. Based on information for the Landfill, the direction of groundwater flow is southeast and water levels range between –5 feet and +5 feet MSL.

6.2 Subsurface Conditions in NE Corner Area

The area is relatively flat (upper portion of the site) and slopes toward the southeast and toward the west. Two of the borings (GT18-04 and GT18-05) are at the toe of the slope toward the west; the other four borings are on the flat portion of the site (GT18-01, GT18-02, GT18-03, and GT18-06).

Geosyntec reviewed the predevelopment topography from 1984 in the area and estimates that the upper 10 feet to 15 feet in GT18-04 and GT18-05 consists of fill that was placed as part of constructing the realignment of Harkins Slough Road[4]. The fill is primarily silty clay.

Borings GT18-01, GT18-02, GT18-03, and GT18-06 show that the top 15 feet to 25 feet consist of clays and clayey sands; with depth the soils become silty and gravelly sands.

Based on the blowcounts measured during the field investigation, the sands are medium dense to very dense and the clays are stiff to hard.

Groundwater was not encountered during the field investigation. Based on visual cues during drilling, groundwater is deep and below the depth of exploration. The soils were dry to moist and this assumption was used to correct field blowcount (i.e., no water table was assumed to correct the field blowcounts).

The nearest groundwater monitoring well to the area is MW-13 located on the Landfill side and across Harkins Slough Road about 200 feet south of the area. The groundwater elevations since well construction in 2007 vary between -5.21 feet and 4.81 feet[5]. Based on this information, the groundwater (i.e., the water table) is at least 90 feet below the 2017 topography (GT18-04 and GT18-05) and deeper at the other boring locations.

ATTACHMENTS

Figure 1 – 2018 Field Investigation Locations

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[4] *Geotechnical Investigation: Harkins Slough Road Relocation Sanitary Landfill Expansion Buena Vista Drive, Santa Cruz County, California*; prepared for Santa Cruz County Department of Public Works; prepared by EMCON Associates; project 307-01.13; July 1985.

[5] See Table 1 in *2019 Winter, Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561; 5 August 2019.

Table 1 – Summary of Laboratory Test Results

Attachment 1 – Previous Boring Logs

Attachment 2 – Geosyntec Boring Logs

Attachment 3 – Energy Measurement Report

Attachment 4 – Laboratory Test Results

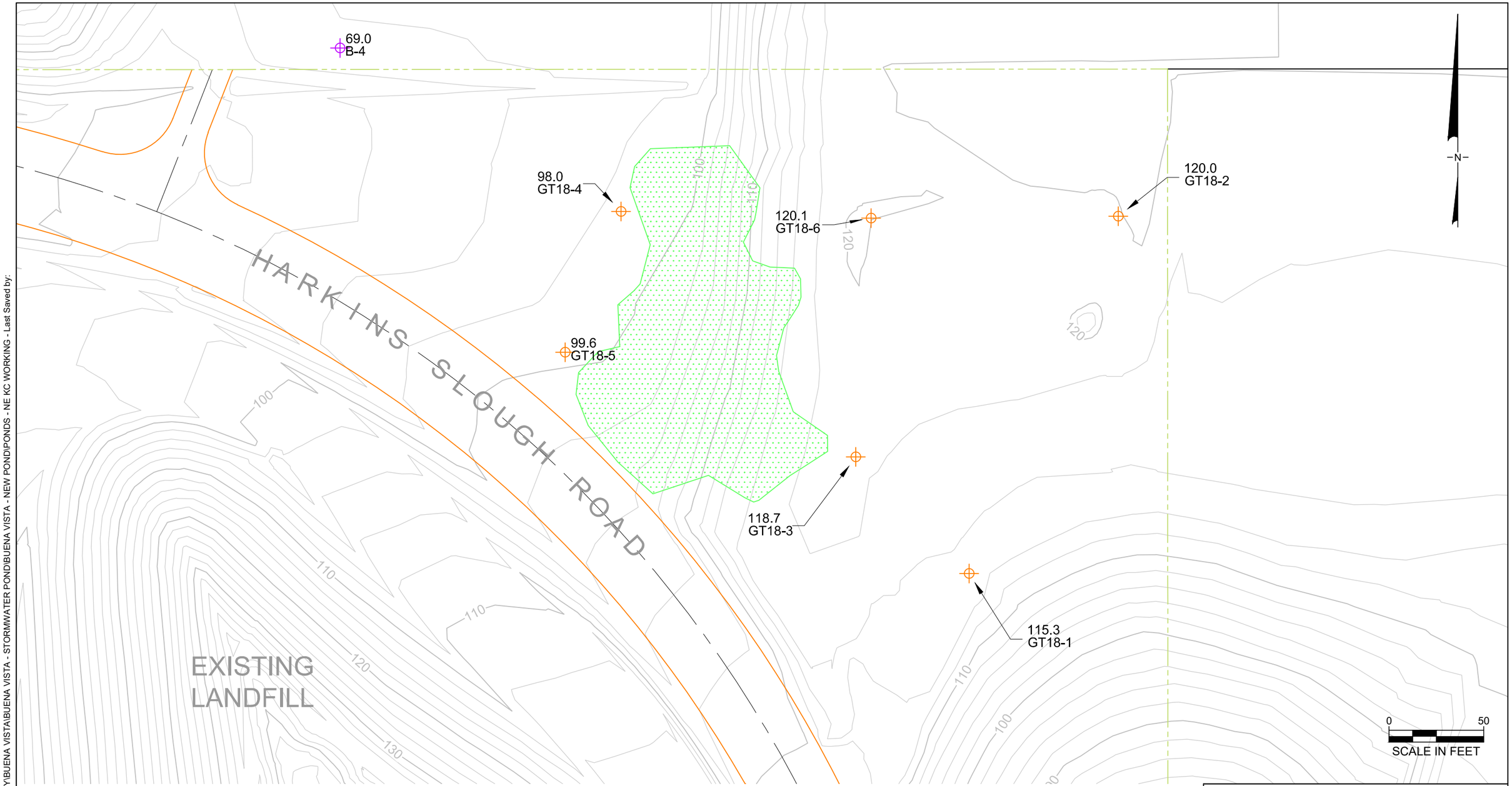
* * * * *

Table 1
Summary of Laboratory Test Results
Northeast Property
Buena Vista Landfill
Watsonville, California

Boring	Sample Location					Dry Unit Weight	Natural Moisture Content	Wet Unit Weight	Void Ratio G_s=2.65	Estimated Initial Degree of Saturation G_s=2.65	USCS	Soil Description	LL	PL	PI	Gravel Content	Sand Content	Fines Content	S_u at 5% strain	Confining Pressure	Test Conditions
	Sample ID	From (ft-BGS)	To (ft-BGS)	Midpoint Depth (ft-BGS)	Midpoint Elevation (ft-MSL)	(pcf)	(%)	(pcf)		(%)			(%)	(%)	(%)	(%)	(%)	(%)	(psf)	(psi)	
GT18-01	01-04B	18.5	19.0	18.8	96.6						SM	Yellowish Brown Silty SAND w/ Gravel				28.2	56.1	15.7			
GT18-01	01-06B	30.5	31.0	30.8	84.6						SM	Yellowish Brown Silty SAND w/ Gravel				38.3	42.6	19.1			
GT18-02	02-09B	45.5	46.0	45.8	74.3						ML	Olive Brown SILT w/ Sand				0.1	21.7	78.2			
GT18-03	03-03B	12.5	13.0	12.8	105.9						CL	Yellowish Brown Sandy CLAY				0.0	30.7	69.3			
GT18-03	03-05B	20.5	21.0	20.8	97.9						SC	Dark Brown Clayey SAND w/ Gravel changes to Olive Brown				20.9	59.8	19.3			
GT18-03	03-06C	26.0	26.5	26.3	92.4						CL	Olive Sandy CLAY changes to Yellowish Brown				8.0	40.8	51.2			
GT18-03	03-09	40.0	41.5	40.8	77.9						CH	Olive Gray Fat CLAY	64	28	36	0.0	0.6	99.4			
GT18-04	04-03	15.0	17.5	16.3	81.7	100.6	24.0	124.7	0.64	99%	CH	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand	52	18	34				1270	8.0	Natural MC
GT18-04	04-04	20.0	22.5	21.3	76.7	80.1	37.7	110.3	1.06	94%	CH	Olive Brown Fat CLAY	74	31	43				2355	10.0	Natural MC
						83.5	37.4	114.7	0.98	101%									1018	10.0	Backpressure Saturated
GT18-05	05-02	10.0	12.5	11.3	88.4	103.4	21.0	125.1	0.60	93%	CL	Olive Brown Mottled Gray Sandy Lean CLAY	33	17	16				1685	6.0	Natural MC
						99.5	23.4	122.8	0.66	94%									1414	6.0	Backpressure Saturated
GT18-05	05-03	15.0	17.5	16.3	83.4	95.3	26.4	120.5	0.74	95%	CL	Olive Brown Lean CLAY w/ Sand	48	20	28				1710	8.0	Natural MC
GT18-05	05-05	25.0	26.5	25.8	73.9						CH	Olive Brown Fat CLAY	71	28	43	0.1	0.7	99.2			
GT18-06	06-01B	6.0	6.5	6.3	113.8						SC	Yellowish Brown Clayey SAND				0.9	63.1	36.0			
GT18-06	06-03	15.0	16.5	15.8	104.3						SC	Yellowish Brown Clayey SAND				0.0	60.6	39.4			
GT18-06	06-06B	31.0	31.5	31.3	88.8						SC	Dark Brown Clayey SAND				10.9	73.8	15.3			

Abbreviations:
BGS: below the ground surface at the time of drilling
ft: feet
LL: Liquid Limit (Atterberg Limits)
MSL: Mean Sea Level
pcf: Pounds per cubic foot
PI: Plasticity Index (PI = LL - PL)
PL: Plastic Limit (Atterberg Limits)
psf: Pounds per square foot
psi: Pounds per square inch
USCS: Unified Soil Classification System

Symbols:
G_s: Specific gravity
S_u: Undrained shear strength



LEGEND

- 100 — EXISTING GROUND CONTOUR (10 FT)
- EXISTING GROUND CONTOUR (2 FT)
- PROPERTY LINE
- RIGHT OF WAY
- COAST LIVE OAK WOODLAND
- 2018 BORING LOCATION
- 1985 BORING LOCATION (EMCON)

NOTES:

1. TOPOGRAPHIC DATA FROM 17 AUGUST 2017 AERIAL PHOTOGRAPHY BY TETRA TECH GEOMATIC TECHNOLOGIES OF LAFAYETTE, CALIFORNIA AND AMERICAN AERIAL SURVEYS, INC. OF IONE, CALIFORNIA.
2. BORING ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL AT THE TIME OF DRILLING.

2018 FIELD INVESTIGATION LOCATIONS
BUENA VISTA DRIVE LANDFILL
SANTA CRUZ COUNTY

Geosyntec consultants

PROJECT NO: WG2562 | FEBRUARY 2020

FIGURE 1

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\BUENA VISTA - STORMWATER POND\BUENA VISTA - NEW PONDS - NE KC WORKING - Last Saved by: ABekar on 3/26/20

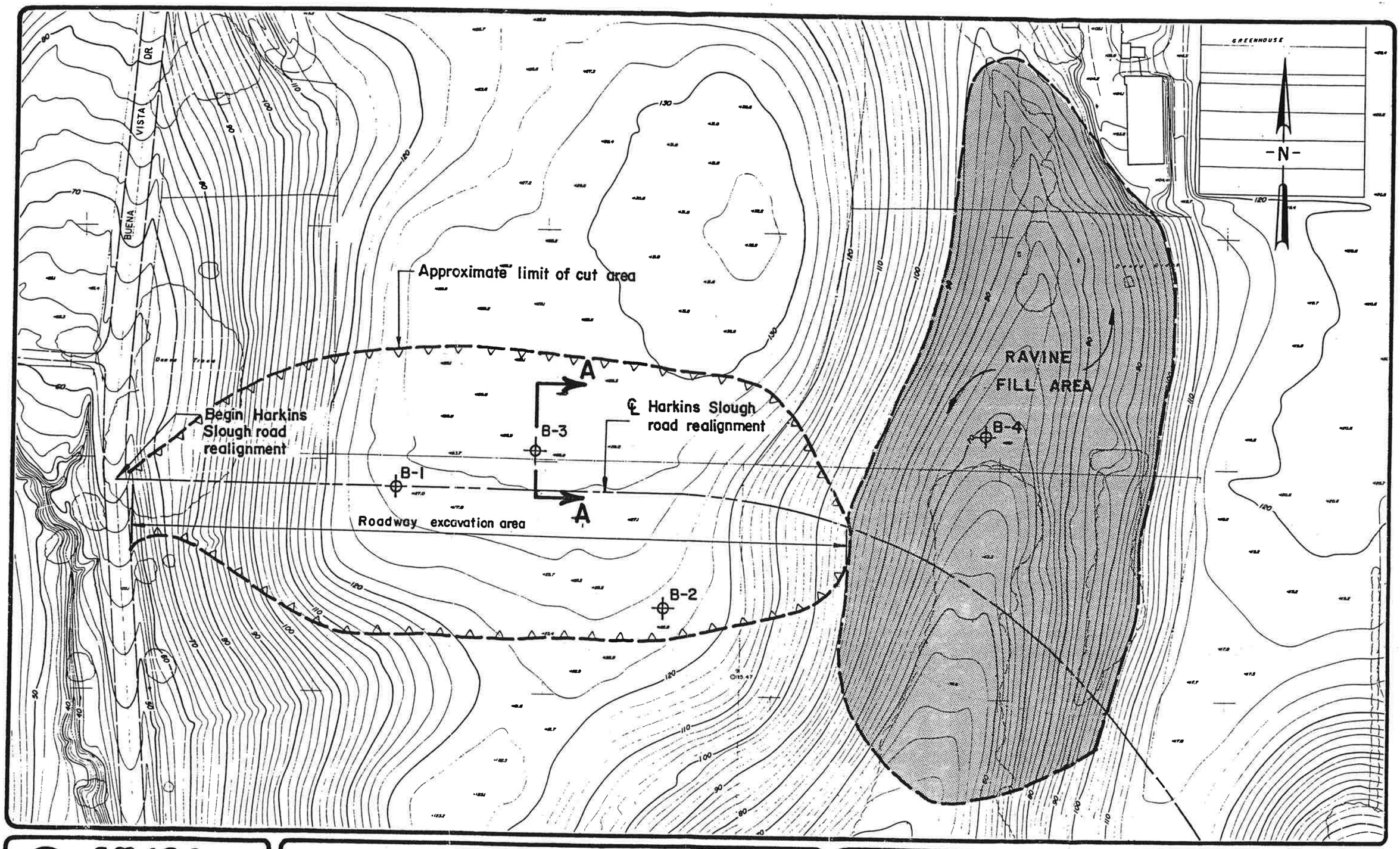
ATTACHMENT 1
PREVIOUS BORING LOGS

GEOTECHNICAL INVESTIGATION
HARKINS SLOUGH ROAD RELOCATION
SANITARY LANDFILL EXPANSION
BUENA VISTA DRIVE
SANTA CRUZ COUNTY, CALIFORNIA

Prepared for
SANTA CRUZ COUNTY DEPARTMENT OF PUBLIC WORKS
July 1985

EMCON Associates
90 Archer Street
San Jose, California 95112

Project 307-01.13



EMCON Associates
San Jose, California

SCALE IS OFF - SHOULD BE 1" = 100'

Scale 0 200 400 600 800 Feet

COUNTY OF SANTA CRUZ
HARKINS SLOUGH ROAD RELOCATION PROJECT
AT BUENA VISTA LANDFILL EXPANSION
SANTA CRUZ COUNTY, CALIFORNIA

BORING LOCATION MAP

FIGURE 1

PROJECT NO. 307-01.13

Appendix A

FIELD INVESTIGATION

The subsurface soil and ground-water conditions beneath the investigation area were explored by drilling four borings between the dates of March 22 to April 10, 1985. These borings were drilled with a truck-mounted hollow-stem auger and were logged by our geologist, who also obtained undisturbed and disturbed soil samples.

Soil samples were obtained by driving a 2-1/2-inch-diameter Modified California sampler or 2-inch split-spoon sampler into the soil at selected depths using a 140-pound hammer and a drop of 30 inches. Representative bulk samples of auger cuttings were taken from the borings for visual classification and laboratory testing.

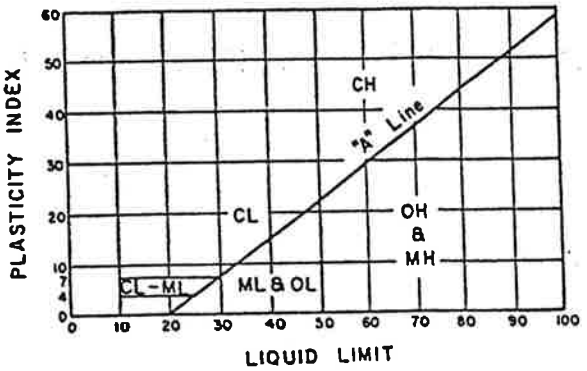
Logs of the soils and other subsurface conditions encountered by the borings in the study area are presented on Plates A-1 through A-4. The classification system used to describe the logs is presented on Plate A-5, Method of Classification.

MAJOR DIVISIONS		SYMBOLS	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 1/2 of soil > no. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > no. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction < no. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (More than 1/2 of soil < no. 200 sieve size)	SILTS & CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

CLASSIFICATION CHART
(Unified Soil Classification System)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

GRAIN SIZE CHART



PLASTICITY CHART

METHOD OF SOIL CLASSIFICATION

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13
PROJECT NAME Buena Vista Landfill
BY WMC DATE 3/22 & 3/25/85

BORING NO. B-1
PAGE 1 OF 2
SURFACE ELEV. 127'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0		CL-CH	SILTY CLAY, dark brown (10YR 3/3), 10% fine quartz grains, roots and organic debris, soft, moist.
		50/10"		5			SANDY CLAY, yellow-brown (10YR 5/6), 40% sand, very fine to fine grained, <5% mica quartz and rock fragments, hard, damp.
		27		10			decreasing sand.
		20		15			10% carbonaceous material, silty, moderately plastic, stiff, damp.
	4.0	45		20			interbedded clayey sand lenses, firm, moist
	4.5+	44		25			olive gray (5Y 6/2), with brown (10YR 5/6) mottling, 15% organics, sandy, hard, damp. increased plasticity.
		56		30		SP	Iron (orange) and manganese (black) staining, thin interbedded sand lenses.
	3.75	50		35		CL	SAND, yellow-brown (10YR 5/6), very fine to fine grained, poorly graded, predominantly quartz with <5% mica, very dense, damp.
				40		SP	CLAY, olive (5Y 5/3), iron staining along striations, stiff, damp.

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-1a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-1

PROJECT NAME Buena Vista Landfill — PAGE 2 OF 2

BY WMC DATE 3/22/85 & 3/25/85 — SURFACE ELEV. 127'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		54		40		SP	SAND, yellow-brown (10YR 6/6), very fine grained, poorly graded, few clayey lenses, very dense, damp.
		51		45		CL	CLAY, light yellow brown (2.5Y 6/4), iron staining, sand filled animal burrows, hard, damp. sandy, fine to medium grained.
		50		50		SM-SP	SAND, yellow-brown (10YR 5/8), medium to coarse grained, 5% rounded pebbles ½" in diameter, 30% fines.
		52		55			brownish-gray (2.5YR 6/2), medium grained, very dense, damp.
		51		60			gravelly interbedded clay lenses, light olive (5Y 6/3), sand filled burrows with iron stained contacts.
		66		65			dark yellow-brown (10YR 4/6), fine to medium grained, no clay fines.
		72	▽	70			olive gray (5Y 3/2), alternating silt to coarse grained sand in a fining upward sequence (1" to 2") intervals, wet.
						CL	CLAY, dark gray (2.5Y 4/0), iron staining, stiff, damp.
	2.8			75			TERMINATED BORING AT 76 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-1b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-2

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 3/25/85 — SURFACE ELEV. 123'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0	CL		CLAY, dark brown (10YR 3/2), silty, damp.
							increasing sand.
		44		5			yellow-brown (10YR 5/4), 30 to 40% very fine to fine quartz and plagioclase grains weathered to white clay, hard, damp.
				10			no sand, slightly silty, damp.
		30		15	SC		CLAYEY SAND, yellow-brown (10YR 5/4), 40% clay fines, 1% plant debris, medium dense, damp.
	3.4	24		20	CH		CLAY, olive gray (5Y 5/2), extensive iron staining along rootholes, <5% sandy, very stiff, damp.
				25	SC		CLAYEY SAND, yellow-brown (10YR 5/6), very fine to fine grained, poorly graded, interbedded clay (extensively oxidized), very dense, damp.
		56		30			
	2.75			35	CH		CLAY, olive - gray (5Y 5/2), minor iron staining, slightly silty, very stiff, damp.
					SC		CLAYEY SAND, brown (10YR 4/3), very fine to fine grained, poorly graded, very dense, damp.
				40			

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-2a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 BORING NO. B-2

PROJECT NAME Buena Vista Landfill PAGE 2 OF 2

BY WMC DATE 3/25/85 SURFACE ELEV. 123'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		57/8"		40		SC	CLAYEY SAND, (continued)
							decrease in clay content.
				45		SP	SAND, yellow-brown (10YR 5/6), very fine grained, poorly graded, very dense, damp.
				50			BORING TERMINATED AT 51 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-2b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-3

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 129'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						CL	SANDY CLAY, yellow-brown (10YR 5/4), soft, moist.
		62		5		SC	CLAYEY SAND, dark yellow-brown (10YR 4/4), finely laminated, quartz and altered plagioclase grains, very dense, damp.
		40		10			interbedded clay lenses with carbonaceous material, damp.
		28		15		CH	CLAY, olive gray (5Y 4/2), minor gray (5Y 6/1) mottling, slightly sandy, altered plagioclase grains, 1% rock fragments, very stiff, damp.
	2.60	31		20			olive gray (5Y 5/2), orange mottling, very stiff.
				25			
							increasing sandy interbedding.
	4.0	42		30			olive (5Y 5/3).
		68		35		SP	SAND, yellow-brown (10YR 5/6), fine grained, poorly graded, <10% clay fines, very dense, damp.
							interbedded clay lenses, very stiff.
				40			

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-3a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-3

PROJECT NAME Buena Vista Landfill — PAGE 2 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 129.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40			SAND (continued)
				45			
	4.0/4.5	35		50		CL	CLAY, light olive brown (2.5Y 5/4), thin silty laminations, iron staining along thin fractures, very stiff, damp.
				55		SP	SAND, yellow-brown (10YR 5/4), fine-medium grained, interbedded clay lenses, damp.
		50/5"		60			dark yellow-brown (10YR 3/4), medium-coarse grained, poorly graded, very dense.
							BORING TERMINATED AT 60 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-3b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307.01.13 — BORING NO. B-4

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 69.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						CH-CL	SANDY CLAY, very dark gray (10YR 3/1), soft, moist.
	1.3	19		5			CLAY, yellow-brown (10YR 5/4), moderately plastic, firm, damp.
	3.0	30		10			very dark gray-brown (10YR 3/2), silty, 5% carbonaceous material.
	2.1	21		15			interbedded sand lenses, very fine grained, predominantly quartz with 10% mica, orange mottling, stiff, clay.
	1.25	20		20			dark gray-brown (10YR 4/2), sandy, decreased plasticity.
	3.5	27		25			yellow-brown (10YR 5/4), 10-15% carbonaceous matter and rootholes.
							increasing sand, very fine grained.
		65		30		SC	CLAYEY SAND, gray-brown (2.5Y 5/2), very fine grained, 20 to 30% clay fines, thin orange laminations, very dense, damp.
		50/4"	▽	35			interbedded poorly graded sand lenses, fine grained, 5% rounded pebbles.
		50/6"		40		GP	SANDY GRAVEL

REMARKS

Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-4a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13
PROJECT NAME Buena Vista Landfill
BY WMC DATE 4/10/85

BORING NO. B-4
PAGE 2 OF 2
SURFACE ELEV. 69.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40		GP	SANDY GRAVEL, dark brown (7.5YR 4/4), 40% medium to coarse sand, 60% fine gravel, very dense, wet.
		50/4"		45			increasing gravel size.
							REFUSAL AT 45 FEET

REMARKS

EMCON ASSOCIATES

PLATE A-4b

ATTACHMENT 2
GEOSYNTEC BORING LOGS

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

PROJECT Northeast Sediment Basin
PROJECT LOCATION Buena Vista Landfill
PROJECT NUMBER WG2562/02

KEY SHEET - CLASSIFICATIONS AND SYMBOLS

GS FORM: 01-KEY/SYMBOLS

EMPIRICAL CORRELATIONS WITH STANDARD PENETRATION RESISTANCE N VALUES *

	N VALUE * (BLOWS/FT)	CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TONS/SQ FT)
FINE GRAINED SOILS	0 - 2	VERY SOFT	<0.25
	3 - 4	SOFT	0.25 - 0.50
	5 - 8	FIRM	0.50 - 1.00
	9 - 15	STIFF	1.00 - 2.00
	16 - 30	VERY STIFF	2.00 - 4.00
	31 - 50	HARD	>4.00
	>50	VERY HARD	

	N VALUE * (BLOWS/FT)	RELATIVE DENSITY
COARSE GRAINED SOILS	0 - 4	VERY LOOSE
	5 - 10	LOOSE
	11 - 30	MEDIUM DENSE
	31 - 50	DENSE
	>50	VERY DENSE

* ASTM D 1586; NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 IN. O.D., 1.4 IN. I.D. SAMPLER ONE FOOT.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

MAJOR DIVISIONS			SYMBOLS	DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL COARSER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO.4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO.4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL FINER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

NOTE: DUAL SYMBOLS USED FOR BORDERLINE CLASSIFICATIONS

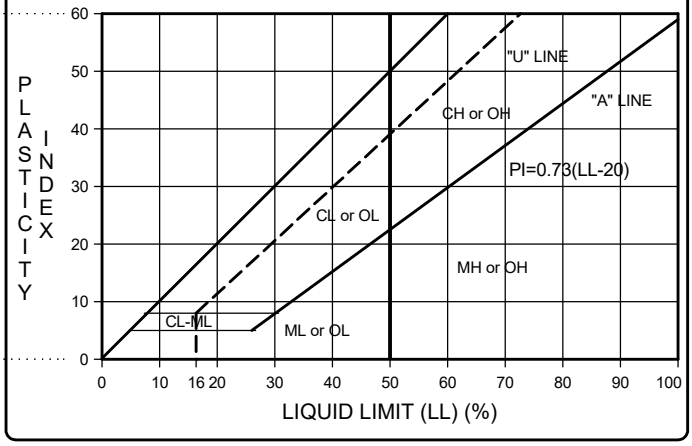
PARTICLE SIZE IDENTIFICATION

USCS (SOILS ONLY) *		SEDIMENTARY (ROCK ONLY)	
BOULDER	>300 mm	BOULDER	>256 mm
COBBLE	75 - 300 mm	COBBLE	64 - 256 mm
GRAVEL: COARSE	20 - 75 mm	PEBBLE	4 - 64 mm
GRAVEL: FINE	4.75 - 20 mm	GRANULE	2 - 4 mm
		SAND: V. COARSE	1 - 2 mm
SAND: COARSE	2 - 4.75 mm	SAND: COARSE	0.5 - 1 mm
SAND: MEDIUM	0.42 - 2 mm	SAND: MEDIUM	0.25 - 0.5 mm
SAND: FINE	0.074 - 0.42 mm	SAND: FINE	0.125 - 0.25 mm
		SAND: V. FINE	0.063 - 0.125 mm
SILT/CLAY	<0.074 mm	SILT	0.004 - 0.063 mm
		CLAY	<0.004 mm

* WELL GRADED - HAVING WIDE RANGE OF GRAIN SIZES AND APPRECIABLE AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES
* POORLY GRADED - PREDOMINANTLY ONE GRAIN SIZE, OR HAVING A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING

PERCENTAGE OF PARTICLE TYPE IN DECREASING ORDER OF PARTICLE SIZE (GRAVEL,SAND,FINES)

PLASTICITY CHART



OTHER MATERIAL SYMBOLS

- Conglomerate/ Agglomerate
- Sandstone
- Silty Sandstone
- Clayey Sandstone
- Sandy Siltstone
- Siltstone
- Claystone
- Clayey Siltstone/ Silty Claystone
- Sandy Claystone
- Granitic/Intrusive
- Volcanic/Extrusive
- Metamorphic
- Limestone
- Dolomite
- Glacial Till
- Landslide Debris
- Marker Bed
- Artificial Fill
- Refuse
- Concrete/Asphalt

WELL SYMBOLS

- CONCRETE
- GROUT
- BENTONITE SEAL
- TRANSITION SAND
- SAND/GRAVEL PACK
- NATIVE/SLUFF
- CENTRALIZER

SAMPLE TYPE AND OTHER SYMBOLS

- BULK SAMPLE
- STANDARD PENETRATION TEST
- MODIFIED CALIFORNIA SAMPLE
- PITCHER BARREL
- SHELBY TUBE
- CORE SAMPLE

- Water Level at Time Drilling, or as Shown
- Static Water Level
- Pump Inlet
- Loss of Drilling Fluid
- MSL: Mean Sea Level
- AGS: Above Ground Surface
- BGS: Below Ground Surface
- BTOC: Below Top of Casing
- HSA: Hollow Stem Auger

01-KEY/SYMBOLS BVLF NE SB BORING LOGS 02.18.20.GPJ GEOSNTEC.GDT 2/18/20

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-01 **SHEET** 1 OF 2
START DATE 11/12/2018 8:10:00 AM **ELEVATION DATA**
FINISH DATE 11/12/2018 1:45:00 PM **GROUND SURFACE** 115.3 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	115	Silty SAND (SM): brown, dry to lightly damp, [0,80,20], no plasticity, loose, roots and debris encountered																
	114																	
	113																	
	112									Glass or plastic encountered.								
	111																	
5	110	Sandy Lean CLAY (CL): tan with rust-colored mottling, dry, [0,30,70], low plasticity, very stiff		01-01		8 11 17	28											
	109																	
	108																	
	107																	
	106																	
10	105							27										
	104			01-02														
	103	Color transitioned to yellowish brown																
	102																	
	101	Silty SAND (SM): yellowish brown, damp to wet, [0,70,30], no plasticity, medium dense						50										
15	100			01-03														
	99																	
	98																	
	97	Silty SAND with Gravel (SM): yellowish brown, damp to wet, no plasticity, medium dense				18 15 8	23											
	96			01-04									28.2	56.1	15.7			
20	95																	
	94																	
	93																	
	92																	
	91			01-05		10 14 17	31											
25	90									Gravel >1" observed in cuttings.								
	89																	
	88																	
	87																	
	86																	
30																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11926.38
EASTING: 10950.23
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-01 **SHEET** 2 OF 2
START DATE 11/12/2018 8:10:00 AM **ELEVATION DATA**
FINISH DATE 11/12/2018 1:45:00 PM **GROUND SURFACE** 115.3 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	85	Silty SAND w/ Gravel (SM): yellowish brown, dry to damp, no plasticity, dense.		01-06		13 16 18	34						38.3	42.6	19.1			
5	80	Silty SAND w/ Gravel (SM): olive to gray, damp to moist, [0,80,20], low plasticity.		01-07				73										
10	75	Poorly-graded SAND (SP): brown, dry to damp, [0,90,10], no plasticity.		01-08		7 13 17	30	67										
15	70	Transitioned from rust-colored mottling to gray sand.		01-09		11 16 31	47	83										
20	65	Poorly-graded SAND (SP): gray and brown with rust mottling, moist, [10,80,10], no plasticity, very dense.		01-10		21 42 50/5"		78										
25	60																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11926.38
EASTING: 10950.23
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-02 **SHEET** 1 OF 2
START DATE 11/12/2018 3:00:00 PM **ELEVATION DATA**
FINISH DATE 11/13/2018 7:00:00 AM **GROUND SURFACE** 120 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	119	Silty Lean CLAY with Gravel (CL): brown, dry, [10,20,70], low plasticity, soft, gravel pieces less than 1" in size								~2" aggregate base at surface									
	118																		
	117																		
	116																		
5	115	Clayey SAND (SC): brown with rust-colored mottling, moist, [0,80,20], low plast, dense		02-01		10 17 25	42	33											
	114																		
	113																		
	112																		
	111																		
10	110	Clayey SAND with Gravel (SC): brown to black with rust-colored mottling, moist, [20,60,20], dense		02-02		9 14 20	34	56											
	109																		
	108																		
	107																		
	106																		
15	105	Less gravel, [10,70,20], dense		02-03		11 15 18	33	67											
	104																		
	103																		
	102																		
	101																		
20	100	More gravel, [20,60,20], medium dense		02-04		7 9 15	24	56											
	99																		
	98																		
	97																		
	96																		
25	95	Less gravel, [10,80,10], medium dense		02-05		11 12 16	28	67											
	94																		
	93																		
	92																		
	91																		
30	90																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12115.01
EASTING: 11028.95
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-02 **SHEET** 2 OF 2
START DATE 11/12/2018 3:00:00 PM **ELEVATION DATA**
FINISH DATE 11/13/2018 7:00:00 AM **GROUND SURFACE** 120 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	89	Silty SAND (SM-SP): olive brown, damp, [0,90,10], no plasticity, medium dense, no gravel.	02-06		4 7 10	17	61										
	88																
	87																
	86																
35	85	Fines increase to 20%															
	84		02-07		12 10 15	25	89										
	83																
	82																
	81																
40	80	SILT with Sand (ML): olive brown, damp, no to low plasticity, medium dense					70										
	79																
	78		02-08														
	77																
	76																
45	75								Observed gravel in cuttings								
	74		02-09		7 8 15	23	83					0.1	21.7	78.2			
	73																
	72																
	71																
50	70	Silty SAND (SM): olive brown, dry to damp, [0,85,15], nonplastic fines, fine sand															
	69		02-10		12 19 32	51	83										
	68																
	67																
	66																
55	65																
	64																
	63																
	62																
	61																
60	60																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12115.01
EASTING: 11028.95
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 1 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	118	Sandy Lean CLAY (CL): yellowish brown, dry, [0,20,80], low to medium plasticity, soft, observed organic roots in upper 2"															
5	113	Sandy Lean CLAY (CL): yellowish brown, dry to moist, [5,20,75], low plasticity, very stiff, gravel observed (<1/2")		03-01		17 50/6"		33	08:45								
10	108	Sandy Lean CLAY (CL): yellowish brown, damp, low plasticity, very stiff, no gravel observed		03-02				58	10:15								
	106			03-03		6 8 13	21		10:30			0	30.7	69.3			
15	103	Sandy Lean Clay (CL): yellowish brown with rust-colored mottling, damp, [0,40,60], low plasticity, stiff		03-04				83	11:00								
20	98	Clayey SAND with Gravel (SC): dark brown changes to olive brown, moist, low plasticity, very stiff, observed gravel less than 1/4"		03-05		5 8 11	19	61	11:20			20.9	59.8	19.3			
25	93			03-06		9 6 6	12	83	11:45								
	92	Sandy Lean CLAY (CL): olive changes to yellowish brown, moist, low plasticity, stiff										8	40.8	51.2			
	90	Gravelly SAND (SP): brown, moist, [40,50,10], rounded to subrounded gravel		03-07				67	12:00								
30	89																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

03-GEOTECH2-SCC BVLF NE SB BORING LOGS 02.19.20.GPJ GEOSNTEC.GDT 2/19/20

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 2 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
35	83	SILT (ML): olive gray, moist, [0,20,80], no plasticity, dense, no observed gravel		03-08				90	12:45								
40	78	Fat CLAY (CH): olive gray, high plasticity, hard		03-09		13 13 20	33	83	13:30			0	0.6	99.4	64	28	36
45	73	SILT (ML): olive gray, moist, [0,20,80], no plasticity, very dense, no gravel observed		03-10		14 48 50/4"		44	14:00								
50	68	Silty SAND (SM): brown and tan, damp, [0,80,20], no plasticity, very dense, no gravel observed, medium sand.		03-11		28 50/5"		83	14:20								
55	63	Silty SAND with Gravel (SM): brown and dark brown, damp, [10,70,20], no plasticity, very dense, observed <1/4" gravel		03-12		12 35 50/5.5"		83	15:00								
60	59																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 3 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	58	Gravelly SAND (SP): brown and tan, damp, [30,70,0], no plasticity, medium dense, no observed fines		03-13		9 9 10	19	33	15:30									
	57																	
	56																	
	55																	
	54																	
65	53	Sandy GRAVEL (GP): dark brown, [60,30,10], no plasticity, very dense, gravel approximately 1/4-3/4"		03-14		42 50/6"		67	16:00									
	52																	
	51																	
	50																	
	49																	
70	48	Gravelly SAND (SP): brown to dark brown, damp, [30,70,0], no plasticity, very dense		03-15		7 22 46	68	83	16:20									
	47																	
	46																	
	45																	
	44																	
75	43	Silty SAND (SM): olive with rust-color mottling, damp[0,70,30], cemented, dense		03-16		25 25 24	49	67	16:45									
	42																	
	41																	
	40																	
	39																	
80	38	Silty SAND (SM): olive with rust-color mottling, damp, [0,70,30], cemented, very dense		03-17		14 33 50/4"		33	17:30									
	37																	
	36																	
	35																	
	34																	
85	33																	
	32																	
	31																	
	30																	
	29																	
90																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-04 **SHEET** 1 OF 2
START DATE 11/14/2018 7:45:00 AM **ELEVATION DATA**
FINISH DATE 11/14/2018 1:00:00 PM **GROUND SURFACE** 98 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 52 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	97	Silty Lean CLAY (CL): dark brown, dry, [0,20,80], low plasticity, soft, roots observed in upper 1" [FILL]																
5	93	Silty Lean CLAY (CL): olive gray and tan with rust-color mottling, moist, [0,20,80], low plasticity, stiff [FILL]		04-01		7 12 16	28	44	08:45									
10	88	SILT to Silty SAND (ML/SM): olive brown, [0,50,50], damp, low plasticity		04-02				87	09:00									
15	83	Fat CLAY with Sand (CH): greenish gray mottled dark gray, [0,10,90], high plasticity		04-03				87	09:30	15': consolidation test performed. Su=1270 psf, 5% strain, 8 psi confinement, natural water content. Observed gravel in cuttings.	124.7	24				52	18	34
20	78	Fat CLAY (CH): olive brown with rust-color mottling, [0,10,90], high plasticity, stiff		04-04				87	10:00	20': consolidation test performed. Su=2355 psf, 5% strain, 10 psi confinement, natural water content. Su=1018 psf, 5% strain, 10 psi confinement, backpressure saturation.	114.7	37.4				74	31	43
25	73			04-05				83	10:30									
30	68	Silty SAND (SM): brown and tan, [0,80,20], no plasticity, very dense, fine sand		04-06		17 35 50/5"		33	10:45									

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12117.5
EASTING: 10766.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-04 **SHEET** 2 OF 2
START DATE 11/14/2018 7:45:00 AM **ELEVATION DATA**
FINISH DATE 11/14/2018 1:00:00 PM **GROUND SURFACE** 98 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 52 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	67									Drill rig chattering.								
	66																	
	65																	
	64																	
35	63	Silty SAND with Gravel (SM): brown and black, damp, [20,60,20], no plasticity, very dense, cemented		04-07		23 33 50/5"		78	11:15									
	62																	
	61									Drill rig chattering from 37' to 40'.								
	60																	
	59																	
40	58	Silty SAND with Gravel (SM): brown and black, damp, [10,60,30], dense, finer sand and less gravel		04-08		9 16 26	42	78	11:30									
	57																	
	56																	
	55																	
	54																	
45	53																	
	52	Silty CLAY (CL): olive gray, moist, [0,10,90], low plasticity, very stiff		04-09		22 21 16	37	72	12:00									
	51																	
	50																	
	49																	
50	48	Silty SAND (SM): olive brown, damp, [0,70,30], no plasticity, dense, fine sand		04-10				67	12:15									
	47			04-11		14 18 18	36	78	12:30									
	46																	
	45																	
	44																	
55	43																	
	42																	
	41																	
	40																	
	39																	
60	38																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12117.5
EASTING: 10766.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-05 **SHEET** 1 OF 2
START DATE 11/14/2018 2:00:00 PM **ELEVATION DATA**
FINISH DATE 11/15/2018 10:00:00 AM **GROUND SURFACE** 99.6 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 53.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	99	Silty Lean CLAY (CL): light brown to brown, dry, [0,20,80], low plasticity, loose, observed roots in top 2". Increasing moisture and sand content with depth. [FILL]																	
	98																		
	97																		
	96																		
5	95																		
	94	Silty SAND (SM): olive brown, dry, [0,70,30], no plasticity, medium dense, fine sand [FILL]		05-01		4 7 9	16	44	15:00										
	93																		
	92																		
	91																		
	90																		
10	89	Sandy Lean CLAY (CL): olive brown mottled gray, moist, moist, [0,30,70], low plasticity [FILL]						87	15:15	10': Su=1685 psf, 5% strain, 6 psi confine, natural water content. Su=1414 psf, 5% strain, 6 psi confine, backpressure saturation.									
	88			05-02							122.8	23.4				33	17	16	
	87																		
	86																		
	85																		
15	84	Sandy Lean CLAY (CL): olive brown, moist, [0,10,90], low plasticity						87	15:30	15': Su=1710 psf, 5% strain, 8 psi confine, natural water content.									
	83			05-03							120.5	26.4				48	20	28	
	82																		
	81																		
	80																		
20	79	Sandy Lean CLAY (CL): olive brown, moist, [0,20,80], low to medium plasticity, soft to stiff in zones						87	15:50	Vary zones of stiffness from 20-22.5', rounded gravel between 1/8" and 1/4" observed.									
	78			05-04															
	77																		
	76																		
	75																		
25	74	Fat CLAY (CH): olive brown, [0,70,30], high plasticity, very stiff				5 10 10	20	50	16:15				0.1	0.7	99.2	71	28	43	
	73			05-05															
	72																		
	71							100	06:45										
	70	Silty SAND (SM): tan to light brown with rust-color mottling, moist, [0,70,30], nonplastic		05-06															
30																			

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12043.2
EASTING: 10736.99
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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Oakland, CA 94607
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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-05 **SHEET** 2 OF 2
START DATE 11/14/2018 2:00:00 PM **ELEVATION DATA**
FINISH DATE 11/15/2018 10:00:00 AM **GROUND SURFACE** 99.6 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 53.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
35	69																		
	68	Silty SAND (SM): tan to light brown, dry to damp, [0,80,20], very dense, nonplastic		05-07		21 48 50/5"		33	07:45										
	67																		
	66																		
	65																		
35	64																		
	63																		
	62	More sand, [0,90,10]		05-08		14 23 30	53	78	08:15										
	61																		
40	60																		
	59																		
	58																		
	57	Silty SAND with Gravel (SM): tan and brown, damp, [10,80,10], dense, nonplastic, rounded rocks ~1", angular gravel		05-09		18 33 36	69	78	08:35										
	56																		
	55																		
45	54																		
	53																		
	52	Dense, more gravel		05-10		22 15 36	51	72	09:00										
	51																		
50	50																		
	49																		
	48																		
	47			05-11		15 21 22	43	67	09:20										
	46	Clayey SAND with Gravel (SC): grayish brown, damp, [10,50,40], low plasticity fines, dense, cemented																	
55	45																		
	44																		
	43																		
	42																		
	41																		
60	40																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12043.2
EASTING: 10736.99
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

03-GEOTECH2-SCC BVLF NE SB BORING LOGS 02.19.20.GPJ GEOSNTEC.GDT 2/19/20

Geosyntec consultants
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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-06 **SHEET** 1 OF 2
START DATE 11/15/2018 11:15:00 AM **ELEVATION DATA**
FINISH DATE 11/15/2018 4:35:00 PM **GROUND SURFACE** 120.1 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	120	Clayey SAND (SC): yellowish brown, dry, [0,70,30], low plasticity, fine sand								2" aggregate base on surface. Top surface smoothed by loader to provide access for drill rig.								
5	115	Clayey SAND (SC): yellowish brown, low plasticity, medium dense		06-01		4 6 9	15	44	12:00				0.9	63.1	36			
10	110	Clayey SAND (SC): yellowish brown, moist, [0,70,30], medium dense		06-02		4 9 9	18	50	12:20									
15	105			06-03		5 9 7	16		12:35				0	60.6	39.4			
20	100	Silty SAND (SM): light brown to brown, moist, [0,85,15], nonplastic		06-04				0	12:50									
25	95	Silty SAND with Gravel (SM): light brown to brown, [10,60,30], nonplastic, medium dense, observed gravel <1/4"		06-05		9 10 10	20	67	13:15	Drill rig chattering								
30	90																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12114.08
EASTING: 10898.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-06 **SHEET** 2 OF 2
START DATE 11/15/2018 11:15:00 AM **ELEVATION DATA**
FINISH DATE 11/15/2018 4:35:00 PM **GROUND SURFACE** 120.1 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	89	Clayey SAND (SC): dark brown, medium dense		06-06		7 8 10	18		13:45			10.9	73.8	15.3			
5	88																
10	87																
15	86																
20	85							47	14:15								
25	84			06-07													
30	83																
35	82																
40	81	SILT (ML): grayish brown with rust-color mottling, moist, [0,10,90], low plasticity, medium stiff		06-08		5 8 8	16	100	14:40								
45	80																
50	79			06-09				40	14:55								
55	78																
60	77																
65	76																
70	75																
75	74																
80	73																
85	72																
90	71																
95	70	Silty SAND (SM): brown and tan, dry to damp, [0,80,20], nonplastic, very dense		06-10		17 33 48	81		15:30								
100	69																
105	68																
110	67																
115	66																
120	65																
125	64																
130	63																
135	62																
140	61																
145	60																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12114.08
EASTING: 10898.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

ATTACHMENT 3
ENERGY MEASUREMENTS

November 15, 2018

Geosyntec Consultants
Attn: Fabrizio Settepani

Re: Standard Penetration Energy Measurements
Automatic Hammer on Mud Rotary Drill Rig, PD-59
Buena Vista Landfill Northeast Sediment Basin Project Area, Boring GT18-03

Dear Mr.Settepani,

This report offers results of energy measurements and related calculations made on November 13, 2018 during Standard Penetration Testing (SPT) and sampling on Pitcher Drilling's mud rotary drill rig. Dynamic tests were performed on an instrumented section of NWJ drill rod attached to the sampler rod string. All dynamic measurements were obtained and recorded using a SPT Analyzer®.

Average Energy for 140lb hammer: 81%
Average Energy for 300lb hammer: 87%

Depth (bgs-ft)	Sampler	Hammer Weight (lb)	Avg ETR (%)
5	SPT	140	75.8
12	Mod Cal	300	85.9
20	Mod Cal	300	88.1
25	Mod Cal	300	85.1
40	SPT	140	84.3
45	SPT	140	81.5
50	Mod Cal	300	86.5
55	Mod Cal	300	86.7
60.5	Mod Cal	300	87.6
65	Mod Cal	300	86.8
70	Mod Cal	300	86.2
75	SPT	140	82.8
80.5	SPT	140	80.3

Note: If the SPT Analyzer did not measure all blows for a sample depth, the reported blow count and therefore calculated N60 value in the following tables will be incorrect. Often blows are excluded from calculations if the sensors are loose or have drifted from the baseline. Field records of actual blow count values should be used in place of the blow counts shown in the following tables.

Equipment:

SPT energy measurements were made on SPT and Modified California samplers driven by the hammer/anvil system on the Pitcher Drilling drill rig on November 13, 2018. The rig was tested on the Buena Vista Landfill Project area. In total, 13 energy measurements were collected corresponding to 13 different samples at increasing depth.

Gregg used a SPT Analyzer (SPTA) to acquire and process measurements of force and velocity with every impact of the automatic hammer on the sample rods. Gregg follows the procedure outlined in ASTM D4633. Two strain gauges mounted on a two foot section of NWJ rod measured force, while two piezoresistive accelerometers bolted on the same rod measured acceleration. The gauges were mounted approximately 6" from the top of the rod.
Analog signals from the gauges and accelerometers were collected, digitized, displayed in real-time, and stored by the SPTA. Selected output from the SPTA for each recorded impact of the hammer included:

- Maximum force in the rod (FMX)
- Maximum velocity in the rod (VMX)
- Maximum calculated transferred energy (EFV)
- Blows per minute (BPM)
- Energy transferred to the rods (ETR)

Data and Calculations:

The purpose of testing was to measure the energy transferred from the hammer to the drill rod and to calculate the energy efficiency of the hammer. The SPTA measurements of force and velocity were reviewed after field testing and analyzed to calculate the transferred energy (EFV).

The maximum energy transferred past the gauge location, EFV, is computed by the SPTA using force (F) and velocity (V) records as follows:

$$EMX = \int_a^b F(t)\, V(t)\, dt$$

The time "a" corresponds to the start of the record when the energy transfer begins and "b" is the time at which energy transferred to the rod reaches a maximum value. The energy transferred is defined as ETR, and is usually used to define the efficiency of the hammer/anvil system.

Results:

Tables for each sample depth summarize the average calculated energies for each sample tested as well as the details for each sample. It is shown that the overall average (ETR) energy for this system is 81% for the 140lb hammer and 87% for the 300lb hammer. The Summary of SPT Test Results table at the end provides a summary of all the samples tested at each sampling depth. The plots and tables present selected measured and calculated results as a function of blow number. The results include:

- the blow number
- BC (blow count in feet) *NOTE: This is calculated by dividing the number of blows for each 6" of penetration by the 6" depth interval and is therefore only approximate. If some blows were deleted due to erroneous or poor data, the penetration depths are not correct.
- FMX (maximum rod force)
- VMX (maximum rod velocity)
- BPM (blows per minute)
- EFV (energy using the Force Velocity method in ft-lbs)
- ETR (energy transferred as a percentage of maximum)

At the end of each table is a statistical evaluation of the results for each variable including the average, standard deviation, maximum, minimum and what blow number these maximums and minimums occurred.

If you have any questions or comments on this report, please do not hesitate to call our office at (562) 427-6899.

Sincerely,

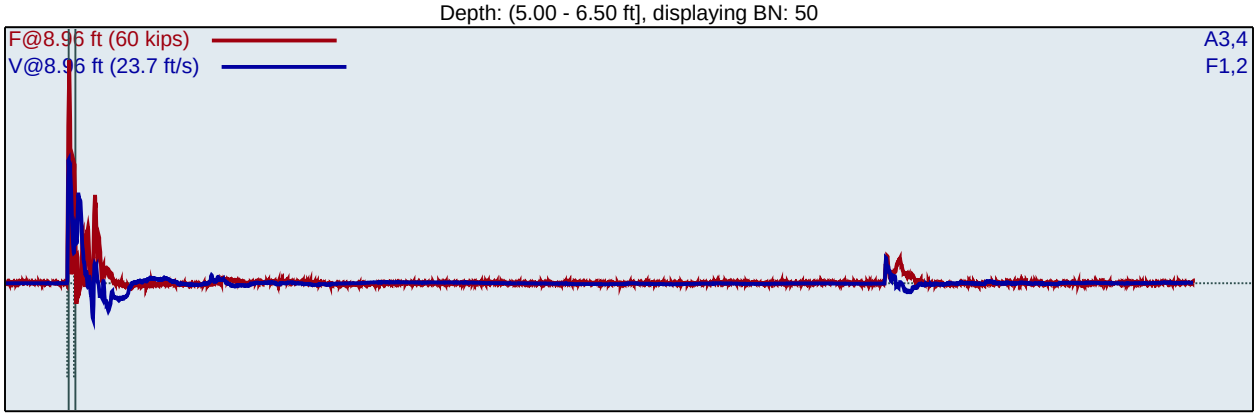
Kelly Cabal

Kelly Cabal
Data Management & Communications
Gregg Drilling, LLC

Appendix A

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 8.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (5.00 - 6.50 ft], displaying BN: 50



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 348 mv/6.4v/5000g (1) VF1
A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
1	2	42	13.4	1.9	303	86.6
2	2	50	13.1	1.9	288	82.2
3	50	50	12.2	37.3	254	72.7
4	50	50	11.8	37.8	257	73.4
5	50	51	11.5	37.6	264	75.5
6	50	52	11.4	37.8	268	76.6
7	50	52	11.1	37.7	271	77.3
8	50	51	11.2	37.8	263	75.1
9	50	52	11.4	37.9	271	77.5
10	50	51	10.8	37.8	251	71.8
11	50	51	11.4	37.9	262	74.9
12	50	53	11.6	37.8	269	76.8
13	50	52	11.4	37.8	267	76.2
14	50	52	11.0	37.8	261	74.6
15	50	51	11.0	37.8	259	73.9
16	50	52	11.2	37.8	267	76.2
17	50	52	11.6	37.7	269	76.9
18	50	51	11.2	37.9	265	75.7
19	50	52	11.4	37.8	267	76.2
20	50	50	11.0	37.9	256	73.0
21	50	52	11.5	38.0	264	75.4
22	50	52	11.3	37.9	261	74.6
23	50	52	11.5	37.8	264	75.4
24	50	52	11.4	37.9	267	76.1
25	50	52	11.4	37.8	271	77.5
26	50	52	11.3	37.9	262	75.0
27	50	52	11.3	37.9	264	75.6
28	50	52	11.4	37.8	264	75.5
29	50	52	11.3	37.9	260	74.3

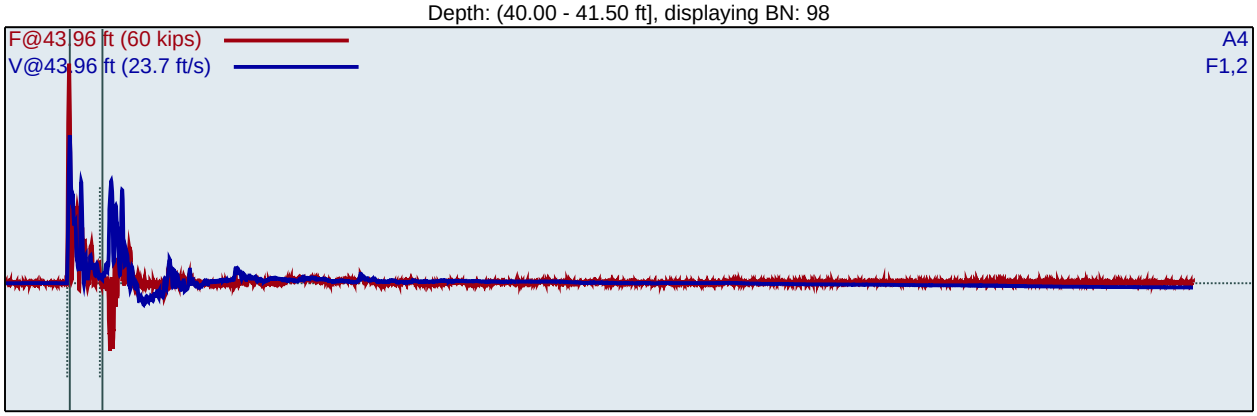
30	50	52	11.4	37.8	265	75.7
31	50	52	11.5	37.9	266	76.0
32	50	52	11.4	37.8	266	76.1
33	50	52	11.3	38.0	266	76.1
34	50	52	11.4	38.0	267	76.4
35	50	52	11.5	37.8	265	75.8
36	50	51	11.1	37.9	262	74.7
37	50	51	11.2	37.9	264	75.4
38	50	52	11.4	37.9	269	77.0
39	50	51	11.3	37.9	268	76.6
40	50	52	11.1	38.0	262	75.0
41	50	52	11.3	37.9	265	75.8
42	50	52	11.4	38.1	263	75.2
43	50	51	10.9	37.8	259	74.1
44	50	52	11.3	38.0	262	74.9
45	50	52	11.4	37.8	261	74.6
46	50	52	11.1	37.9	263	75.1
47	50	52	11.2	38.0	263	75.1
48	50	51	11.2	37.8	263	75.2
49	50	52	11.3	38.0	264	75.4
50	50	52	11.4	38.0	266	76.1
51	50	53	11.5	37.9	271	77.4
52	50	53	11.6	38.0	269	76.8
	Average	52	11.3	37.8	264	75.5
	Std Dev	1	0.2	0.1	4	1.2
	Maximum	53	12.2	38.1	271	77.5
	Minimum	50	10.8	37.3	251	71.8

N-value: 50

Sample Interval Time: 110.70 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 43.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (40.00 - 41.50 ft], displaying BN: 98



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
55	13	51	12.2	38.5	294	84.0
56	13	52	12.8	38.2	299	85.5
57	13	52	12.4	38.1	299	85.6
58	13	51	11.8	38.0	296	84.7
59	13	53	12.0	38.1	296	84.6
60	13	52	12.1	38.0	295	84.4
61	13	52	12.2	38.0	298	85.0
62	13	52	12.0	38.1	299	85.5
63	13	52	12.9	38.1	297	84.9
64	13	52	12.5	38.1	299	85.6
65	13	52	12.8	38.2	301	86.1
66	13	51	13.4	38.1	300	85.7
67	13	52	12.5	38.2	295	84.3
68	13	52	12.2	38.1	294	84.1
69	13	52	12.6	38.3	299	85.6
70	13	53	13.4	38.1	299	85.3
71	13	52	13.6	38.3	297	84.8
72	13	52	12.6	38.2	299	85.5
73	13	53	13.1	38.2	300	85.8
74	13	53	13.8	38.2	301	85.9
75	13	52	13.6	38.1	304	87.0
76	13	52	13.3	38.2	303	86.4
77	13	52	13.2	38.4	302	86.2
78	13	52	12.6	38.2	299	85.4
79	13	52	12.6	38.3	301	86.0
80	13	52	13.4	38.4	297	84.7
81	20	53	12.9	38.1	293	83.7
82	20	52	12.9	38.3	295	84.2
83	20	52	12.8	38.3	294	83.9
84	20	52	12.7	38.2	288	82.3
85	20	52	12.2	38.3	287	81.9
86	20	53	12.6	38.2	294	83.9

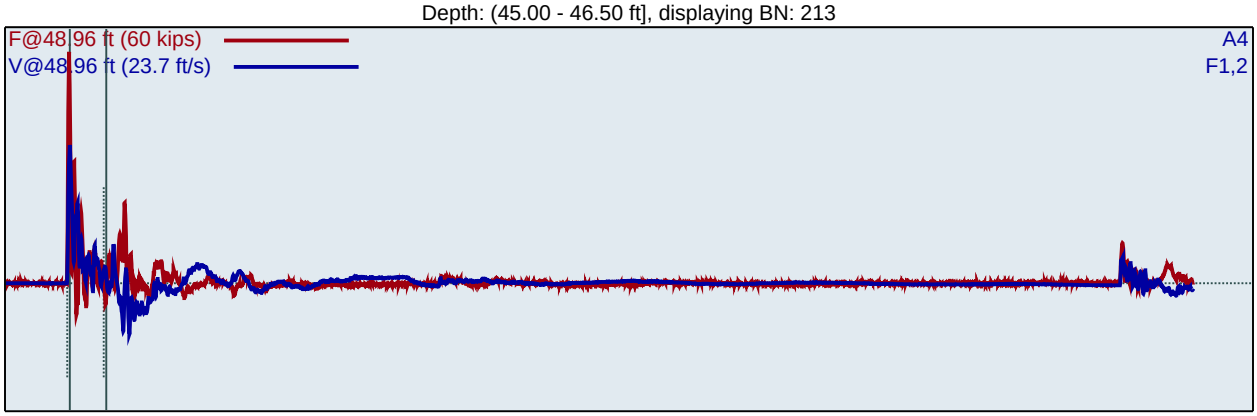
87	20	53	13.0	38.3	293	83.6
88	20	52	12.9	38.2	292	83.3
89	20	52	12.6	38.2	286	81.8
90	20	51	11.8	38.2	284	81.2
91	20	51	13.1	38.1	296	84.5
92	20	53	13.5	38.4	296	84.5
93	20	53	13.4	38.4	292	83.3
94	20	52	12.9	38.2	291	83.2
95	20	52	13.1	38.3	293	83.8
96	20	52	13.5	38.2	292	83.4
97	20	52	13.9	38.4	292	83.4
98	20	51	13.7	38.3	299	85.3
99	20	52	13.8	38.3	300	85.6
100	20	52	13.5	38.4	287	82.1
	Average	52	13.1	38.3	295	84.3
	Std Dev	1	0.5	0.1	5	1.4
	Maximum	53	13.9	38.4	304	87.0
	Minimum	51	11.8	38.1	284	81.2

N-value: 33

Sample Interval Time: 70.75 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 48.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (45.00 - 46.50 ft], displaying BN: 213



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
104	14	54	12.1	37.6	286	81.6
105	14	54	12.1	37.7	289	82.6
106	14	54	12.0	37.8	284	81.2
107	14	54	12.1	37.6	286	81.8
108	14	53	11.8	37.5	284	81.2
109	14	53	12.1	37.5	285	81.6
110	14	53	11.7	37.8	280	80.0
111	14	53	12.0	37.7	279	79.8
112	14	53	11.9	37.8	290	82.9
113	14	54	12.1	37.8	288	82.3
114	14	54	12.3	38.0	281	80.2
115	14	53	11.8	37.8	283	80.8
116	14	54	12.3	37.5	281	80.3
117	14	53	12.5	37.4	286	81.8
118	48	54	12.8	37.6	279	79.8
119	48	54	12.1	37.7	280	80.1
120	48	53	11.8	37.5	280	80.1
121	48	54	12.1	37.4	281	80.2
122	48	53	12.1	37.7	290	82.8
123	48	53	12.3	37.5	284	81.0
124	48	53	12.4	37.5	279	79.7
125	48	52	12.7	37.5	281	80.2
126	48	53	12.5	37.6	286	81.7
127	48	53	12.8	37.6	280	80.0
128	48	53	12.9	37.5	286	81.8
129	48	53	12.8	37.5	288	82.2
130	48	53	13.1	37.6	293	83.7
131	48	53	13.0	37.7	288	82.4
132	48	53	12.7	37.5	288	82.3
133	48	52	12.9	37.5	292	83.5
134	48	53	12.7	37.4	286	81.8
135	48	54	12.6	37.5	288	82.4

136	48	54	12.2	37.6	278	79.4
137	48	54	12.3	37.7	281	80.4
138	48	54	12.5	37.7	278	79.4
139	48	54	12.6	37.5	282	80.6
140	48	54	12.3	37.4	288	82.3
141	48	54	12.5	37.7	273	78.1
142	48	54	12.2	37.6	286	81.8
143	48	54	12.2	37.7	285	81.4
144	48	54	12.4	37.6	283	81.0
145	48	53	12.8	37.7	286	81.7
146	48	54	12.2	37.9	282	80.6
147	48	54	12.1	37.6	281	80.2
148	48	54	12.3	37.8	288	82.4
149	48	55	12.5	37.7	289	82.7
150	48	54	12.4	37.9	283	80.9
151	48	55	13.0	37.8	289	82.5
152	48	55	12.6	37.9	287	82.1
153	48	55	12.5	37.9	289	82.6
154	48	55	12.7	37.7	293	83.7
155	48	54	12.4	37.7	286	81.8
156	48	53	12.2	37.9	283	80.8
157	48	54	12.3	37.8	279	79.7
158	48	54	12.2	38.0	281	80.4
159	48	53	11.9	37.8	271	77.6
160	48	53	12.2	37.7	282	80.5
161	48	54	12.6	37.7	282	80.5
162	48	54	12.7	37.8	283	80.8
163	48	55	12.6	37.7	284	81.2
164	48	54	12.5	37.7	282	80.4
165	48	53	12.4	37.7	289	82.6
166	50	55	12.3	37.6	283	80.9
167	50	54	12.6	37.5	284	81.1
168	50	54	12.5	37.2	280	80.1
169	50	54	12.6	37.6	287	81.9
170	50	55	12.4	37.9	285	81.5
171	50	54	12.2	37.8	283	81.0
172	50	54	12.2	37.8	283	81.0
173	50	54	12.3	37.9	274	78.4
174	50	54	12.1	37.9	280	79.9
175	50	54	12.3	37.7	282	80.5
176	50	54	12.1	37.7	287	82.0
177	50	54	12.1	37.7	285	81.3
178	50	54	12.4	37.7	295	84.2
179	50	54	12.1	37.7	284	81.0
180	50	54	12.2	37.8	282	80.6
181	50	54	12.4	37.9	285	81.5
182	50	55	12.7	37.8	291	83.0
183	50	54	12.6	37.9	288	82.3
184	50	54	12.7	37.7	290	82.9
185	50	55	12.5	37.7	287	82.0
186	50	54	12.7	37.9	296	84.5
187	50	54	12.4	37.9	283	81.0
188	50	55	12.5	37.7	289	82.6
189	50	55	12.4	37.9	289	82.7
190	50	54	12.2	38.0	285	81.3
191	50	55	12.4	37.8	286	81.7
192	50	54	12.6	37.8	305	87.1
193	50	55	12.4	37.8	287	82.0
194	50	55	12.4	37.8	286	81.7
195	50	55	12.5	37.8	289	82.4
196	50	55	12.4	38.0	294	84.0

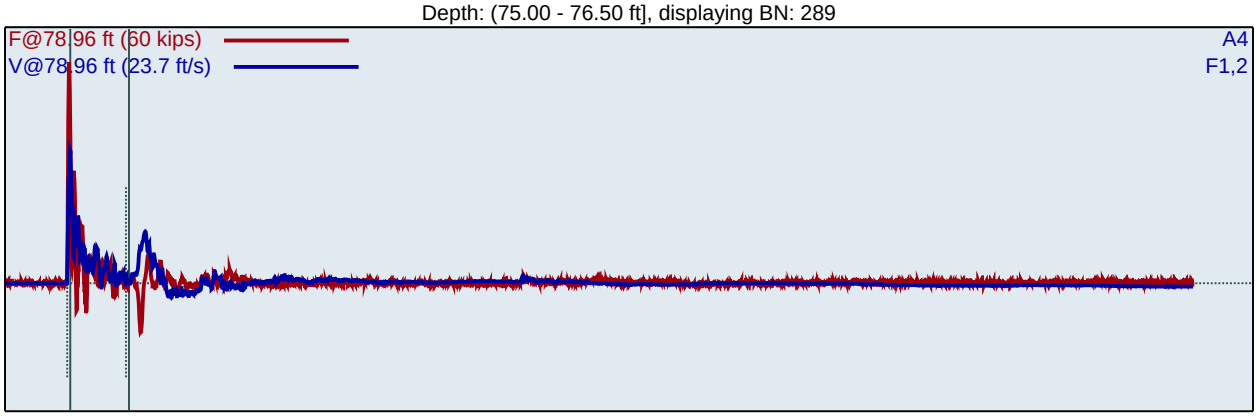
197	50	56	12.0	38.0	286	81.8
198	50	54	12.1	37.8	281	80.4
199	50	54	12.4	37.6	285	81.5
200	50	54	12.6	37.8	287	82.1
201	50	55	12.7	37.8	288	82.2
202	50	55	12.6	37.9	289	82.6
203	50	54	12.6	37.9	286	81.6
204	50	54	12.3	37.9	282	80.5
205	50	54	12.4	38.0	285	81.3
206	50	54	12.6	38.0	286	81.7
207	50	55	12.5	37.9	288	82.2
208	50	53	12.5	38.1	287	82.1
209	50	54	12.5	37.9	286	81.6
210	50	53	12.5	37.8	290	82.9
211	50	54	12.9	37.8	290	82.7
212	50	55	12.9	37.9	279	79.8
213	50	54	12.8	38.1	287	81.9
214	50	55	12.8	37.8	285	81.4
215	50	55	12.7	37.8	285	81.6
	Average	54	12.5	37.7	285	81.5
	Std Dev	1	0.3	0.2	5	1.4
	Maximum	56	13.1	38.1	305	87.1
	Minimum	52	11.8	37.2	271	77.6

N-value: 98

Sample Interval Time: 176.61 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 78.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (75.00 - 76.50 ft], displaying BN: 289



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
218	25	52	11.9	37.8	290	82.8
219	25	49	12.2	37.9	286	81.8
220	25	54	11.3	37.7	293	83.8
221	25	53	11.6	37.8	293	83.6
222	25	53	11.7	37.8	294	83.9
223	25	53	12.1	37.8	293	83.6
224	25	54	11.6	37.8	294	84.0
225	25	54	11.6	37.8	292	83.5
226	25	53	11.8	37.7	295	84.2
227	25	54	11.6	37.7	291	83.2
228	25	53	11.7	37.7	294	84.0
229	25	54	11.5	37.8	289	82.6
230	25	53	11.4	37.8	289	82.7
231	25	54	11.5	37.6	289	82.7
232	25	53	11.5	37.7	295	84.3
233	25	54	11.4	37.7	287	82.0
234	25	53	11.9	37.7	293	83.6
235	25	53	11.9	37.8	294	84.1
236	25	54	11.6	37.7	292	83.3
237	25	54	11.4	37.7	292	83.4
238	25	54	11.5	37.8	287	82.1
239	25	53	11.5	37.9	292	83.6
240	25	54	11.6	37.7	291	83.3
241	25	54	11.1	37.7	290	82.8
242	25	53	11.7	37.6	285	81.4
243	25	54	11.4	37.8	292	83.4
244	25	53	11.1	37.6	286	81.8
245	25	53	11.3	37.5	290	83.0
246	25	53	11.6	37.6	294	84.1
247	25	54	11.1	37.6	290	82.8
248	25	53	11.3	37.5	289	82.5
249	25	53	11.8	37.7	298	85.1

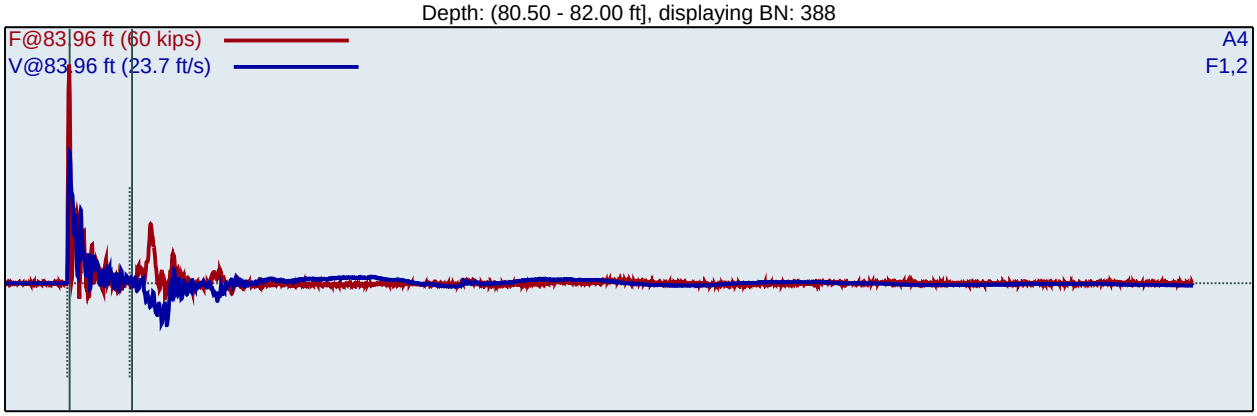
250	25	53	11.2	37.7	289	82.5
251	25	53	11.2	37.7	289	82.6
252	25	53	11.1	37.5	288	82.3
253	25	53	10.9	37.7	286	81.8
254	25	53	11.3	37.8	288	82.2
255	25	53	11.0	37.6	284	81.3
256	25	54	11.1	37.7	288	82.4
257	25	53	11.1	37.6	288	82.2
258	25	53	11.1	37.7	290	82.8
259	25	54	11.2	37.7	294	83.9
260	25	53	10.9	37.6	285	81.4
261	25	53	11.5	37.6	295	84.3
262	25	53	11.2	37.7	290	82.9
263	25	54	11.3	37.6	292	83.6
264	25	50	12.2	37.7	286	81.7
265	25	53	11.3	37.6	286	81.7
266	25	53	11.8	37.5	293	83.7
267	25	53	11.7	37.5	288	82.2
268	24	54	11.3	37.5	289	82.6
269	24	54	11.2	37.5	284	81.1
270	24	50	12.3	37.8	282	80.6
271	24	54	10.9	37.5	288	82.3
272	24	53	11.7	37.6	292	83.5
273	24	54	11.1	37.6	291	83.0
274	24	54	11.6	37.7	296	84.5
275	24	53	11.0	37.5	291	83.2
276	24	51	12.4	37.7	290	82.7
277	24	54	11.7	37.4	299	85.4
278	24	51	12.1	37.7	287	82.0
279	24	54	11.4	37.6	294	83.9
280	24	54	11.3	37.7	290	82.8
281	24	51	12.4	37.6	290	82.9
282	24	54	11.4	37.6	292	83.4
283	24	52	12.3	37.8	292	83.5
284	24	52	12.4	37.6	295	84.4
285	24	54	11.3	37.6	292	83.6
286	24	51	12.2	37.8	288	82.4
287	24	50	12.5	37.5	288	82.3
288	24	54	11.6	37.6	291	83.2
289	24	52	12.3	37.7	290	82.9
290	24	54	11.5	37.6	286	81.8
291	24	54	11.4	37.6	285	81.6
	Average	53	11.5	37.6	290	82.8
	Std Dev	1	0.5	0.1	4	1.0
	Maximum	54	12.5	37.8	299	85.4
	Minimum	50	10.9	37.4	282	80.6

N-value: 49

Sample Interval Time: 116.30 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 83.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (80.50 - 82.00 ft], displaying BN: 388



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
294	14	51	11.5	36.8	283	80.9
295	14	50	11.4	36.9	279	79.7
296	14	50	11.1	37.1	282	80.6
297	14	50	11.6	37.1	276	78.8
298	14	50	11.5	36.9	280	80.1
299	14	50	11.6	37.2	285	81.5
300	14	50	11.9	37.2	284	81.2
301	14	49	11.4	37.2	271	77.6
302	14	50	11.6	36.9	280	80.1
303	14	50	11.6	37.2	277	79.2
304	14	49	11.4	37.0	276	78.9
305	14	50	11.6	37.3	279	79.7
306	14	50	12.0	37.2	290	83.0
307	14	50	11.5	37.2	272	77.6
308	33	51	12.2	37.2	288	82.2
309	33	51	12.0	37.4	284	81.1
310	33	48	11.4	37.3	275	78.7
311	33	50	11.9	37.3	284	81.0
312	33	49	11.5	37.2	272	77.6
313	33	50	11.7	37.3	274	78.2
314	33	50	11.7	37.3	276	79.0
315	33	50	12.0	37.4	278	79.5
316	33	51	11.8	37.1	283	80.9
317	33	51	11.8	37.4	281	80.2
318	33	48	11.2	37.3	271	77.5
319	33	51	12.0	37.3	284	81.1
320	33	50	11.7	37.4	281	80.3
321	33	51	11.8	37.3	282	80.6
322	33	50	11.7	37.3	279	79.7
323	33	51	11.5	37.3	285	81.3
324	33	49	11.3	37.3	273	78.1
325	33	51	11.7	37.2	280	79.9

326	33	52	12.4	37.4	286	81.8
327	33	51	12.0	37.2	282	80.5
328	33	51	11.8	37.3	280	80.0
329	33	51	12.2	37.2	283	80.9
330	33	51	12.2	37.4	282	80.6
331	33	52	12.4	37.4	282	80.6
332	33	51	11.7	37.4	277	79.0
333	33	50	11.7	37.4	275	78.4
334	33	51	12.0	37.4	281	80.2
335	33	51	11.9	37.3	281	80.4
336	33	51	12.0	37.3	281	80.3
337	33	51	11.9	37.3	282	80.7
338	33	51	12.1	37.3	281	80.4
339	33	51	11.9	37.3	282	80.7
340	33	51	11.9	37.2	285	81.4
341	50	51	11.9	37.4	280	80.1
342	50	51	11.9	37.4	282	80.6
343	50	51	12.3	37.4	284	81.3
344	50	51	12.0	37.5	282	80.5
345	50	51	11.9	37.3	280	79.9
346	50	50	11.7	37.4	278	79.6
347	50	51	12.6	37.4	287	82.0
348	50	51	12.5	37.3	281	80.2
349	50	51	12.0	37.4	282	80.4
350	50	51	12.1	37.4	284	81.1
351	50	51	11.8	37.5	277	79.2
352	50	51	12.0	37.5	284	81.2
353	50	51	11.9	37.5	281	80.3
354	50	50	11.7	37.3	276	78.9
355	50	51	12.2	37.5	285	81.4
356	50	51	11.8	37.4	277	79.1
357	50	51	12.0	37.5	280	79.9
358	50	51	12.0	37.4	281	80.3
359	50	51	12.1	37.4	282	80.7
360	50	51	12.4	37.4	284	81.2
361	50	52	12.3	37.4	285	81.4
362	50	51	12.1	37.4	280	80.1
363	50	52	12.2	37.4	280	80.0
364	50	51	11.9	37.4	282	80.6
365	50	49	11.7	37.5	279	79.6
366	50	50	12.1	37.4	282	80.4
367	50	51	12.0	37.4	280	80.0
368	50	49	11.8	37.4	277	79.1
369	50	51	12.2	37.3	281	80.3
370	50	51	12.3	37.3	283	80.7
371	50	51	12.3	37.5	284	81.0
372	50	51	12.3	37.5	283	80.9
373	50	51	12.1	37.4	284	81.1
374	50	50	12.1	37.6	280	80.1
375	50	51	12.0	37.4	280	80.0
376	50	51	12.6	37.4	286	81.8
377	50	49	11.5	37.4	276	78.7
378	50	50	11.8	37.5	276	78.9
379	50	51	12.0	37.3	281	80.4
380	50	51	12.7	37.5	288	82.2
381	50	50	11.9	37.3	278	79.4
382	50	51	12.3	37.5	284	81.1
383	50	51	12.1	37.5	284	81.2
384	50	51	12.2	37.4	282	80.7
385	50	51	12.1	37.6	285	81.6
386	50	51	12.1	37.4	282	80.5

387	50	52	12.3	37.6	282	80.7
388	50	51	12.1	37.5	283	81.0
389	50	52	12.2	37.4	288	82.3
390	50	51	11.9	37.4	280	79.9
	Average	51	12.0	37.4	281	80.3
	Std Dev	1	0.3	0.1	3	1.0
	Maximum	52	12.7	37.6	288	82.3
	Minimum	48	11.2	37.1	271	77.5

N-value: 83

Sample Interval Time: 154.24 seconds.

Summary of SPT Test Results

Project: PD59, Test Date: 11/13/18

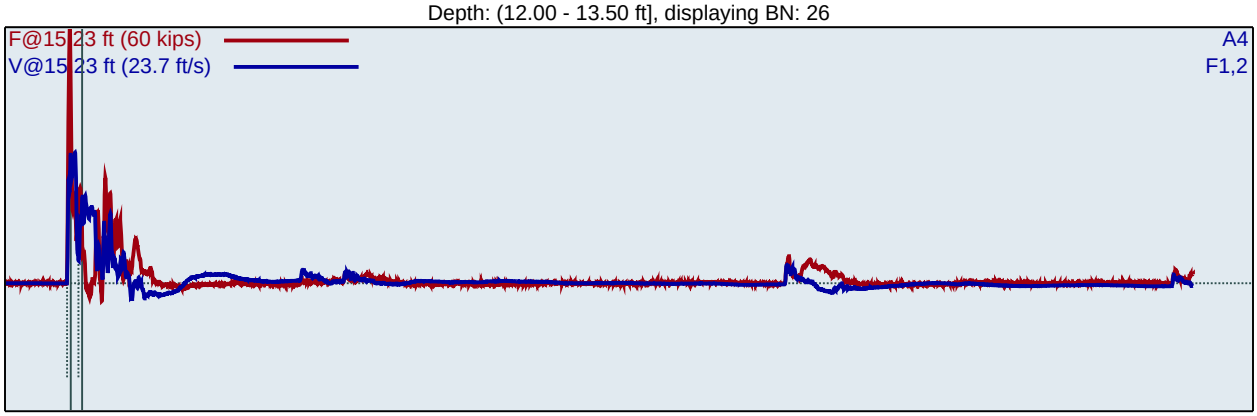
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
8.96	**2-50-0**	**50**	**67**	52	11.3	37.8	264	75.5
43.96	**13-13-20**	**33**	**44**	52	13.1	38.3	295	84.3
48.96	**14-48-50**	**98**	**131**	54	12.5	37.7	285	81.5
78.96	**25-25-24**	**49**	**65**	53	11.5	37.6	290	82.8
83.96	**14-33-50**	**83**	**111**	51	12.0	37.4	281	80.3
		Overall Average Values:		52	12.1	37.7	283	80.7
		Standard Deviation:		2	0.6	0.3	10	2.8
		Overall Maximum Value:		56	13.9	38.4	305	87.1
		Overall Minimum Value:		48	10.8	37.1	251	71.8

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 15.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (12.00 - 13.50 ft], displaying BN: 26



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
2	6	61	13.0	2.6	624	83.2
3	6	61	12.6	33.6	632	84.3
4	6	61	12.1	34.2	646	86.2
5	6	61	12.1	34.7	643	85.7
6	6	61	11.9	34.7	645	86.0
7	6	61	11.9	34.8	648	86.4
8	8	61	11.9	34.8	647	86.3
9	8	61	11.9	35.0	650	86.7
10	8	61	11.9	35.0	648	86.4
11	8	61	12.2	35.1	631	84.2
12	8	61	12.2	35.2	630	84.0
13	8	61	11.8	35.1	640	85.3
14	8	61	11.8	35.3	640	85.3
15	8	61	11.7	35.3	644	85.8
16	13	61	11.8	35.4	613	81.8
17	13	62	12.1	35.4	647	86.2
18	13	61	12.1	35.5	647	86.2
19	13	61	11.9	35.5	640	85.3
20	13	61	11.7	35.4	633	84.4
21	13	62	11.9	35.5	647	86.2
22	13	61	11.9	35.4	649	86.5
23	13	62	11.9	35.5	648	86.4
24	13	62	11.9	35.4	648	86.4
25	13	61	11.9	35.4	669	89.2
26	13	61	12.1	35.3	652	87.0
27	13	61	11.9	35.4	654	87.2
28	13	62	11.9	35.3	650	86.7

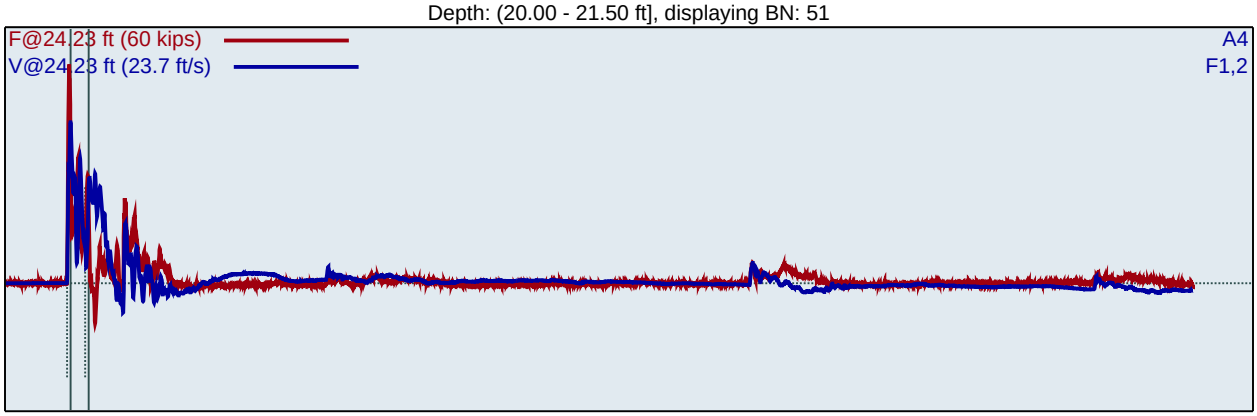
Average	61	11.9	35.3	644	85.9
Std Dev	0	0.1	0.2	11	1.4
Maximum	62	12.2	35.5	669	89.2
Minimum	61	11.7	34.8	613	81.8

N-value: 21

Sample Interval Time: 44.48 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 24.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (20.00 - 21.50 ft], displaying BN: 51



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

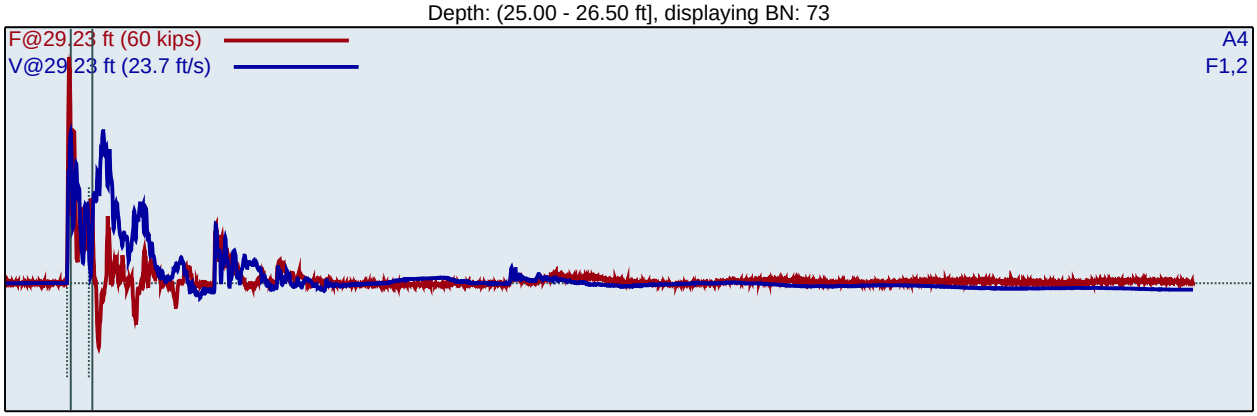
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
30	5	51	14.3	1.9	646	86.2
31	5	51	14.5	34.4	653	87.0
32	5	51	14.7	34.9	659	87.9
33	5	50	14.7	35.1	653	87.0
34	5	51	14.7	35.1	650	86.7
35	8	51	14.5	35.1	661	88.2
36	8	51	14.6	35.2	665	88.6
37	8	52	14.5	35.3	659	87.9
38	8	51	14.6	35.3	668	89.1
39	8	51	14.7	35.4	664	88.6
40	8	52	14.4	35.4	667	88.9
41	8	51	14.6	35.5	656	87.5
42	8	52	14.4	35.5	661	88.1
43	11	51	14.8	35.5	656	87.4
44	11	52	14.6	35.6	668	89.1
45	11	51	14.7	35.6	658	87.7
46	11	52	14.6	35.6	668	89.0
47	11	52	14.7	35.6	664	88.5
48	11	52	14.8	8.6	660	88.0
49	11	51	14.9	35.5	659	87.9
50	11	52	14.8	35.5	658	87.7
51	11	51	14.9	35.4	661	88.1
52	11	51	14.8	35.5	653	87.0
53	11	51	14.7	35.5	656	87.5
	Average	51	14.7	34.0	661	88.1
	Std Dev	0	0.1	6.0	5	0.6
	Maximum	52	14.9	35.6	668	89.1
	Minimum	51	14.4	8.6	653	87.0

N-value: 19

Sample Interval Time: 44.26 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 29.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (25.00 - 26.50 ft], displaying BN: 73



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

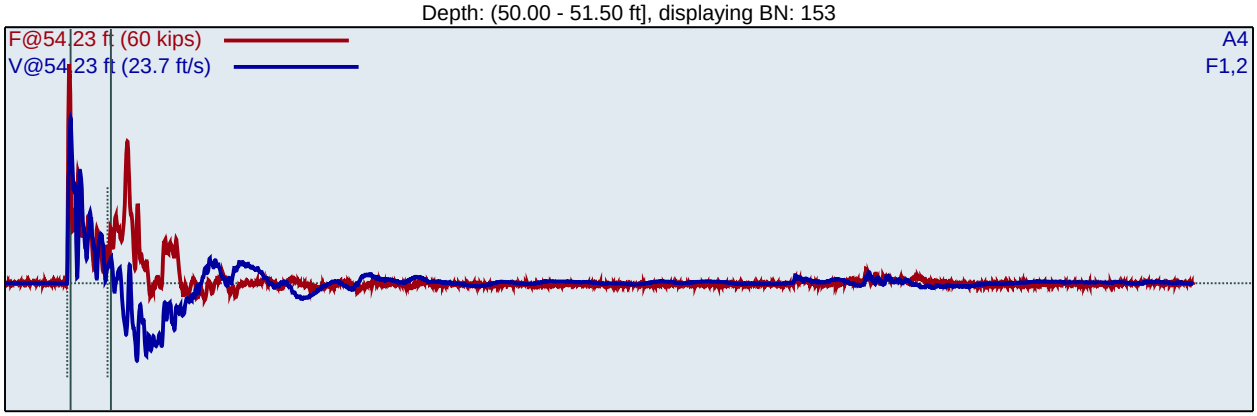
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
55	9	53	13.7	2.9	644	85.8
56	9	53	13.6	35.2	638	85.1
57	9	53	13.7	35.4	638	85.0
58	9	53	13.6	35.3	640	85.4
59	9	53	13.6	35.4	636	84.8
60	9	53	13.6	35.5	641	85.5
61	9	53	13.5	35.4	643	85.7
62	9	53	13.5	35.5	637	85.0
63	9	53	13.5	35.5	637	84.9
64	6	53	13.5	35.6	647	86.3
65	6	53	13.5	35.5	641	85.4
66	6	53	13.4	35.5	638	85.1
67	6	53	14.1	35.5	626	83.5
68	6	53	14.0	35.6	632	84.2
69	6	53	14.0	35.5	632	84.3
70	6	53	14.1	35.6	632	84.2
71	6	53	14.0	35.6	636	84.7
72	6	53	14.4	35.6	645	86.0
73	6	53	14.1	35.6	650	86.6
74	6	53	14.1	35.7	640	85.3
75	6	53	13.9	35.8	640	85.4
	Average	53	13.9	35.6	638	85.1
	Std Dev	0	0.3	0.1	7	0.9
	Maximum	53	14.4	35.8	650	86.6
	Minimum	53	13.4	35.5	626	83.5

N-value: 12

Sample Interval Time: 33.85 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 54.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (50.00 - 51.50 ft], displaying BN: 153



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
78	28	51	15.5	34.9	643	85.7
79	28	52	15.5	34.6	634	84.5
80	28	51	15.2	35.0	631	84.1
81	28	51	15.2	34.7	643	85.8
82	28	51	15.3	34.8	646	86.1
83	28	51	15.4	34.9	642	85.6
84	28	51	15.2	34.9	639	85.3
85	28	51	15.2	34.9	640	85.3
86	28	51	15.3	34.9	643	85.7
87	28	51	15.2	35.0	649	86.5
88	28	52	15.1	35.0	637	85.0
89	28	51	15.2	35.0	644	85.8
90	28	52	15.2	35.0	645	86.0
91	28	51	15.2	34.9	636	84.9
92	28	51	15.2	34.9	647	86.2
93	28	52	15.0	35.0	644	85.8
94	28	51	15.2	35.0	646	86.1
95	28	51	15.0	35.1	641	85.4
96	28	51	15.1	34.9	645	85.9
97	28	51	15.1	35.0	641	85.5
98	28	51	15.1	35.0	645	86.1
99	28	51	15.3	34.9	653	87.1
100	28	51	15.3	35.2	655	87.3
101	28	51	15.0	35.2	650	86.7
102	28	51	15.1	35.2	649	86.6
103	28	51	15.1	35.3	653	87.1
104	28	51	15.1	34.9	645	86.0
105	28	51	15.0	35.0	647	86.3
106	50	51	15.1	35.2	644	85.8
107	50	51	15.2	35.1	649	86.5
108	50	51	15.1	35.0	641	85.5
109	50	51	15.2	35.0	638	85.1

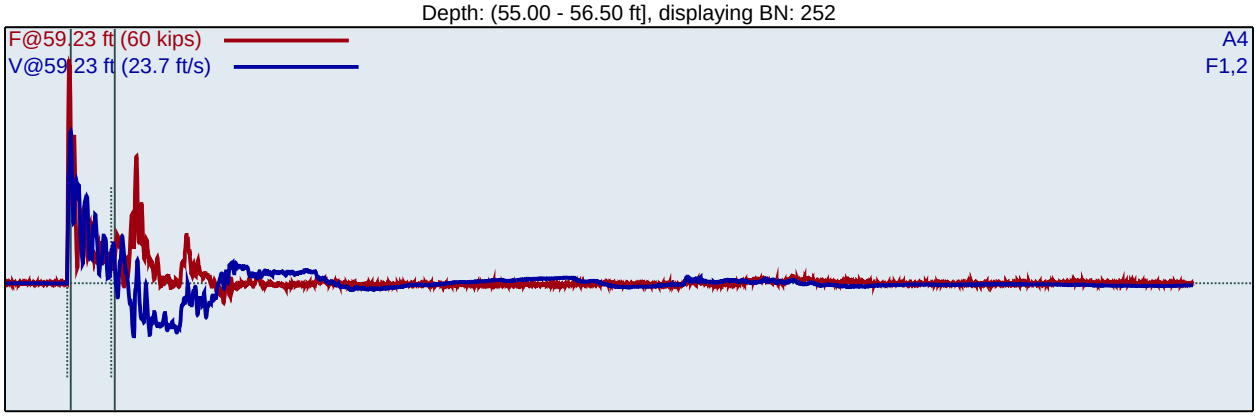
110	50	51	15.2	35.1	645	85.9
111	50	51	15.1	34.9	641	85.5
112	50	51	15.2	34.9	647	86.2
113	50	51	15.3	35.2	652	86.9
114	50	51	15.1	35.0	645	86.0
115	50	51	15.2	34.9	649	86.5
116	50	51	15.2	35.4	644	85.9
117	50	51	15.2	35.2	638	85.1
118	50	51	15.3	35.0	660	88.0
119	50	51	15.2	35.4	649	86.5
120	50	51	15.2	35.3	645	86.0
121	50	51	15.2	35.2	643	85.8
122	50	51	15.2	35.2	644	85.8
123	50	51	15.2	35.4	649	86.6
124	50	51	15.3	35.1	654	87.2
125	50	51	15.2	35.0	655	87.4
126	50	51	15.3	35.2	650	86.7
127	50	51	15.2	35.2	646	86.2
128	50	51	15.3	35.0	651	86.8
129	50	51	15.2	35.0	650	86.6
130	50	51	15.3	35.1	654	87.2
131	50	50	15.4	34.7	658	87.8
132	50	51	15.2	35.0	652	86.9
133	50	51	15.2	34.9	652	87.0
134	50	51	15.3	34.9	645	86.0
135	50	51	15.2	35.0	653	87.1
136	50	51	15.3	35.2	667	88.9
137	50	51	15.4	35.0	661	88.2
138	50	51	15.6	34.9	659	87.8
139	50	52	15.3	35.1	652	87.0
140	50	51	15.5	35.3	651	86.8
141	50	51	15.2	35.0	651	86.8
142	50	51	15.4	34.9	665	88.6
143	50	51	15.5	35.3	660	88.0
144	50	51	15.5	34.9	649	86.5
145	50	51	15.5	35.3	664	88.5
146	50	51	15.3	35.3	654	87.2
147	50	51	15.3	35.0	661	88.2
148	50	52	15.5	35.1	660	88.0
149	50	51	15.2	35.5	652	86.9
150	50	51	15.2	35.1	650	86.7
151	50	51	15.3	35.4	638	85.0
152	50	51	15.2	35.1	651	86.8
153	50	51	15.3	35.4	652	87.0
154	50	51	15.4	35.0	666	88.9
155	50	51	15.3	35.3	657	87.6
	Average	51	15.3	35.1	651	86.8
	Std Dev	0	0.1	0.2	7	1.0
	Maximum	52	15.6	35.5	667	88.9
	Minimum	50	15.1	34.7	638	85.0

N-value: 50

Sample Interval Time: 131.85 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 59.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (55.00 - 56.50 ft], displaying BN: 252



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
158	12	53	14.4	35.6	652	87.0
159	12	53	14.3	35.7	649	86.6
160	12	53	14.3	35.8	651	86.8
161	12	53	14.3	35.6	659	87.9
162	12	53	14.3	35.6	653	87.1
163	12	52	14.3	35.7	648	86.4
164	12	52	14.4	35.6	655	87.3
165	12	52	14.2	35.5	650	86.7
166	12	52	14.4	35.6	656	87.4
167	12	53	14.2	35.5	649	86.5
168	12	52	14.1	35.8	648	86.4
169	12	52	14.3	35.6	651	86.9
170	35	53	14.3	35.7	653	87.1
171	35	53	14.1	35.8	652	87.0
172	35	53	14.0	35.8	650	86.7
173	35	53	14.1	35.6	655	87.3
174	35	53	14.2	35.7	656	87.5
175	35	52	14.2	35.6	642	85.6
176	35	52	14.4	35.7	643	85.7
177	35	52	14.2	35.7	638	85.0
178	35	52	14.3	35.8	640	85.3
179	35	53	14.1	35.6	655	87.4
180	35	53	14.0	35.8	649	86.6
181	35	53	14.1	35.7	649	86.5
182	35	53	14.2	35.8	645	85.9
183	35	53	14.0	35.8	654	87.1
184	35	53	14.1	35.5	657	87.6
185	35	53	14.2	35.7	645	86.0
186	35	53	14.3	35.7	640	85.3
187	35	53	14.2	35.6	640	85.4
188	35	53	14.1	35.7	645	86.0
189	35	53	14.2	35.7	645	85.9

190	35	52	14.2	35.8	650	86.7
191	35	52	14.2	35.6	652	86.9
192	35	52	14.2	35.6	647	86.2
193	35	52	14.3	35.7	650	86.7
194	35	52	14.5	35.7	659	87.8
195	35	52	14.4	35.8	647	86.2
196	35	52	14.5	35.7	652	86.9
197	35	52	14.6	35.9	647	86.3
198	35	53	14.4	35.7	644	85.8
199	35	53	14.3	35.8	648	86.4
200	35	53	14.4	35.6	652	86.9
201	35	53	14.2	35.6	647	86.2
202	35	53	14.3	35.7	645	86.1
203	35	53	14.3	35.8	650	86.7
204	35	53	14.3	35.7	648	86.4
205	50	53	14.2	36.0	655	87.3
206	50	53	14.2	35.9	652	86.9
207	50	53	14.1	35.9	654	87.1
208	50	53	14.2	35.9	653	87.1
209	50	53	14.1	35.9	649	86.6
210	50	54	14.3	35.7	656	87.5
211	50	53	14.3	35.7	658	87.8
212	50	53	14.3	35.7	661	88.2
213	50	53	14.3	35.8	654	87.2
214	50	53	14.6	35.7	653	87.1
215	50	52	14.3	35.7	646	86.1
216	50	53	14.7	35.7	648	86.4
217	50	53	14.7	35.7	653	87.1
218	50	53	14.4	35.8	663	88.4
219	50	53	14.1	35.7	657	87.6
220	50	52	14.2	35.7	649	86.6
221	50	53	13.9	35.8	658	87.8
222	50	54	14.0	35.8	656	87.5
223	50	54	14.1	35.7	666	88.8
224	50	54	14.2	35.9	663	88.4
225	50	53	14.5	35.8	649	86.5
226	50	53	14.4	35.8	662	88.3
227	50	53	14.2	35.8	653	87.0
228	50	53	14.7	35.6	653	87.0
229	50	53	14.2	35.8	644	85.8
230	50	52	14.6	35.7	652	86.9
231	50	52	14.5	35.8	640	85.4
232	50	53	14.6	35.7	653	87.1
233	50	52	14.4	35.8	645	86.1
234	50	53	14.4	35.8	637	85.0
235	50	53	14.5	35.8	648	86.4
236	50	53	14.3	35.8	640	85.3
237	50	53	14.2	36.1	643	85.8
238	50	53	14.3	35.6	655	87.3
239	50	53	14.2	35.8	652	86.9
240	50	53	14.0	35.7	647	86.3
241	50	53	14.0	35.7	653	87.1
242	50	52	14.0	35.9	654	87.3
243	50	53	14.1	35.9	645	86.0
244	50	53	13.9	35.9	649	86.5
245	50	52	13.8	35.7	656	87.4
246	50	53	13.9	36.0	652	87.0
247	50	53	14.0	35.9	653	87.0
248	50	53	13.8	35.9	653	87.1
249	50	53	13.9	35.7	649	86.5
250	50	53	14.0	35.8	649	86.6

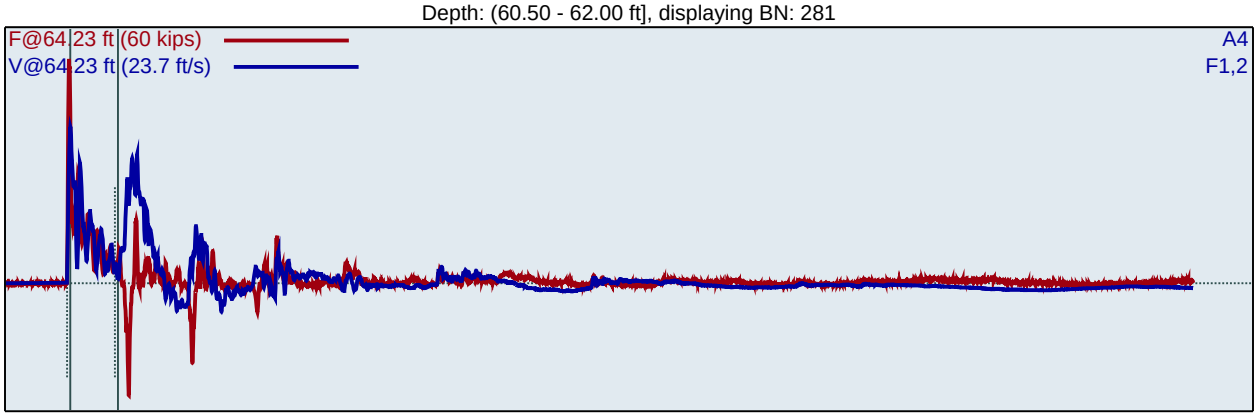
251	50	53	14.2	35.7	651	86.8
252	50	52	14.0	35.7	646	86.1
253	50	53	14.0	35.7	646	86.1
254	50	52	14.1	35.8	652	86.9
	Average	53	14.2	35.7	650	86.7
	Std Dev	0	0.2	0.1	6	0.8
	Maximum	54	14.7	36.1	666	88.8
	Minimum	52	13.8	35.5	637	85.0

N-value: 85

Sample Interval Time: 161.20 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 64.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (60.50 - 62.00 ft], displaying BN: 281



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
256	9	52	14.4	1.9	639	85.3
257	9	52	14.5	35.2	634	84.6
258	9	52	14.5	35.3	671	89.4
259	9	53	14.5	35.1	669	89.2
260	9	53	14.6	35.5	667	88.9
261	9	53	14.6	35.4	665	88.7
262	9	53	14.5	35.5	664	88.5
263	9	53	14.5	35.5	670	89.3
264	9	53	14.5	35.6	668	89.0
265	9	53	14.7	35.5	670	89.3
266	9	53	14.8	35.6	645	86.0
267	9	53	14.7	35.5	672	89.6
268	9	53	14.5	35.6	669	89.2
269	9	53	14.7	35.5	667	88.9
270	9	53	14.6	35.6	662	88.3
271	9	53	14.6	35.6	670	89.3
272	9	53	14.8	35.6	668	89.1
273	9	53	14.5	35.6	661	88.1
274	10	53	14.6	35.6	644	85.8
275	10	53	14.5	35.5	663	88.5
276	10	53	14.4	35.5	651	86.7
277	10	53	14.6	35.5	638	85.0
278	10	53	14.6	35.6	648	86.4
279	10	52	14.5	35.6	634	84.5
280	10	53	14.5	35.7	636	84.8
281	10	53	14.5	35.6	661	88.1
282	10	53	14.4	35.6	665	88.7
283	10	53	14.2	35.8	660	88.0

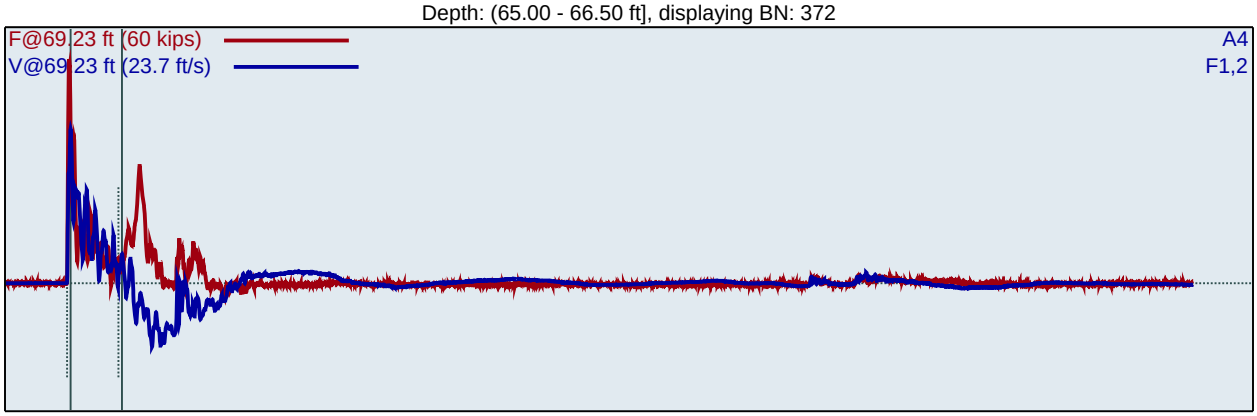
Average	53	14.6	35.6	657	87.6
Std Dev	0	0.1	0.1	12	1.6
Maximum	53	14.8	35.8	672	89.6
Minimum	52	14.2	35.5	634	84.5

N-value: 19

Sample Interval Time: 45.52 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 69.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (65.00 - 66.50 ft], displaying BN: 372



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
284	41	53	14.2	1.9	646	86.2
285	41	53	14.2	2.2	642	85.6
286	41	52	14.2	35.2	648	86.4
287	41	52	14.1	35.3	647	86.3
288	41	53	14.0	35.4	648	86.4
289	41	53	14.0	35.2	651	86.7
290	41	53	14.1	35.3	646	86.1
291	41	53	14.1	35.1	654	87.2
292	41	53	14.0	35.4	653	87.1
293	41	53	14.1	35.4	655	87.3
294	41	52	14.2	35.4	661	88.2
295	41	52	14.2	35.5	658	87.7
296	41	52	14.1	35.4	653	87.1
297	41	52	14.3	35.4	656	87.4
298	41	52	14.3	35.4	653	87.0
299	41	52	14.2	35.4	658	87.7
300	41	52	14.3	35.4	655	87.4
301	41	52	14.2	35.5	647	86.3
302	41	52	14.5	35.4	636	84.8
303	41	52	14.4	35.4	638	85.1
304	41	52	14.0	35.3	638	85.0
305	41	52	13.9	35.4	645	86.0
306	41	52	13.9	35.4	643	85.8
307	41	52	14.2	35.5	640	85.3
308	41	52	14.5	35.3	642	85.6
309	41	52	14.4	35.3	646	86.1
310	41	52	14.4	35.5	642	85.6
311	41	52	14.5	35.4	645	86.0
312	41	52	14.4	35.5	644	85.8
313	41	52	14.4	35.5	645	86.0
314	41	52	14.4	35.5	644	85.9
315	41	52	14.3	35.5	646	86.2

316	41	52	14.2	35.4	642	85.6
317	41	52	14.4	35.3	646	86.1
318	41	51	14.3	35.5	642	85.6
319	41	52	14.3	35.7	658	87.7
320	41	52	14.3	35.4	643	85.8
321	41	51	14.6	35.6	649	86.6
322	41	52	14.4	35.6	641	85.5
323	41	52	14.4	35.5	638	85.1
324	41	52	14.4	35.5	641	85.5
325	50	52	14.4	35.5	643	85.8
326	50	52	14.3	35.7	649	86.6
327	50	52	14.3	35.8	646	86.1
328	50	52	14.3	35.5	641	85.5
329	50	52	14.3	35.6	639	85.1
330	50	52	14.5	35.6	648	86.4
331	50	52	14.3	35.5	641	85.5
332	50	52	14.2	35.8	641	85.4
333	50	52	14.3	35.7	647	86.2
334	50	52	14.3	35.7	640	85.4
335	50	52	14.3	35.7	649	86.5
336	50	52	14.3	35.7	643	85.8
337	50	52	14.3	35.7	645	86.0
338	50	52	14.3	35.6	646	86.2
339	50	52	14.4	35.6	645	86.0
340	50	52	14.3	35.7	645	86.1
341	50	52	14.3	35.6	654	87.3
342	50	52	14.3	35.7	653	87.1
343	50	52	14.2	35.8	647	86.3
344	50	52	14.2	35.7	647	86.3
345	50	52	14.3	35.5	648	86.4
346	50	52	14.2	35.7	648	86.4
347	50	52	14.3	35.5	649	86.5
348	50	52	14.2	35.5	666	88.7
349	50	52	14.1	35.4	655	87.3
350	50	52	14.2	35.5	662	88.3
351	50	52	14.6	35.4	653	87.1
352	50	52	14.5	35.5	647	86.3
353	50	52	14.5	35.3	651	86.8
354	50	52	14.5	35.4	654	87.2
355	50	52	14.3	35.5	652	86.9
356	50	52	14.4	35.6	651	86.8
357	50	52	14.4	35.6	652	87.0
358	50	52	14.4	35.4	650	86.7
359	50	52	14.4	35.7	650	86.7
360	50	52	14.3	35.3	655	87.3
361	50	53	14.1	35.6	661	88.1
362	50	52	14.2	35.7	649	86.5
363	50	53	14.2	35.7	654	87.2
364	50	53	13.9	35.7	661	88.2
365	50	53	14.3	35.4	659	87.8
366	50	53	14.4	35.7	656	87.5
367	50	53	14.2	35.5	652	87.0
368	50	52	14.4	36.1	658	87.7
369	50	52	14.3	35.9	655	87.4
370	50	52	14.4	36.1	654	87.2
371	50	52	14.5	36.2	653	87.1
372	50	52	14.3	36.3	657	87.7
373	50	52	14.6	36.3	658	87.8
374	50	52	14.5	36.1	659	87.8

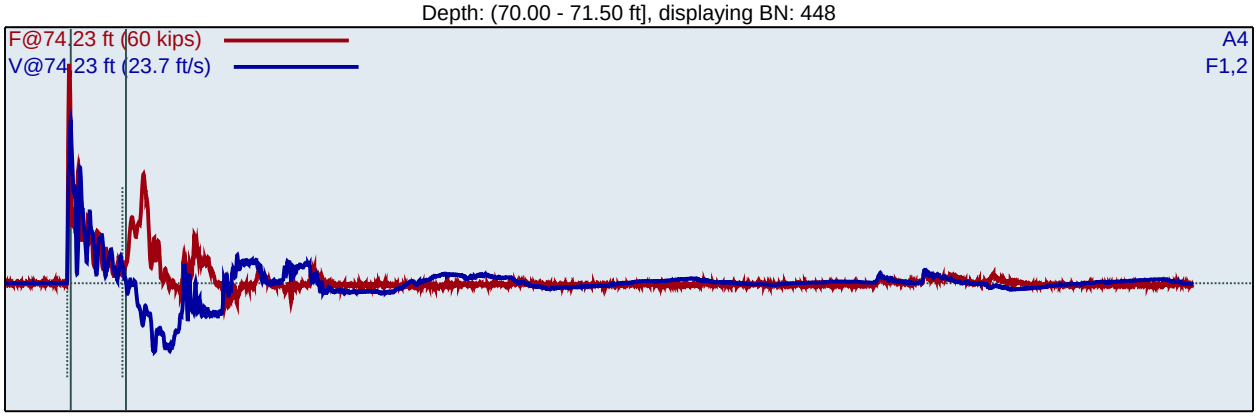
Average	52	14.3	35.7	651	86.8
Std Dev	0	0.1	0.2	6	0.8
Maximum	53	14.6	36.3	666	88.7
Minimum	52	13.9	35.3	639	85.1

N-value: 50

Sample Interval Time: 177.25 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 74.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (70.00 - 71.50 ft], displaying BN: 448



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
376	7	51	14.7	2.1	621	82.8
377	7	51	14.7	34.1	631	84.1
378	7	52	14.8	34.3	636	84.8
379	7	52	14.7	34.4	649	86.5
380	7	51	14.8	34.4	647	86.3
381	7	51	14.5	34.6	644	85.9
382	7	52	14.7	34.7	655	87.3
383	22	52	14.8	34.7	630	84.0
384	22	52	14.6	34.8	621	82.8
385	22	52	14.8	34.8	634	84.5
386	22	52	14.7	34.9	628	83.8
387	22	52	14.7	34.7	638	85.1
388	22	51	14.7	35.0	612	81.6
389	22	51	15.0	34.8	650	86.7
390	22	51	14.7	34.9	649	86.5
391	22	52	14.8	35.0	645	86.0
392	22	52	14.9	35.0	659	87.9
393	22	52	14.8	34.9	646	86.1
394	22	52	14.9	35.0	654	87.1
395	22	51	15.0	35.0	652	87.0
396	22	52	14.9	34.9	648	86.4
397	22	52	14.9	34.9	650	86.6
398	22	51	14.9	35.2	653	87.0
399	22	51	15.0	35.0	655	87.4
400	22	51	15.1	35.0	655	87.3
401	22	51	15.0	35.0	657	87.6
402	22	51	15.1	35.0	661	88.2
403	22	51	15.2	34.9	653	87.1
404	22	51	15.2	35.2	652	86.9
405	46	51	14.8	34.9	645	86.0
406	46	51	14.9	34.9	637	84.9
407	46	51	14.8	34.8	653	87.1

408	46	51	15.0	34.7	657	87.6
409	46	51	14.5	34.7	639	85.2
410	46	51	15.1	34.7	645	86.0
411	46	51	14.9	34.8	649	86.6
412	46	51	14.7	34.7	652	86.9
413	46	52	14.6	34.6	646	86.1
414	46	51	14.6	34.7	644	85.9
415	46	51	14.7	34.8	645	85.9
416	46	51	14.8	34.8	654	87.3
417	46	51	14.7	34.9	646	86.1
418	46	51	14.8	34.8	648	86.4
419	46	51	14.7	34.7	649	86.5
420	46	52	14.8	35.0	642	85.6
421	46	51	14.9	35.0	657	87.6
422	46	51	14.8	35.2	654	87.2
423	46	51	15.0	35.1	654	87.2
424	46	52	14.8	35.4	650	86.7
425	46	51	15.0	35.2	660	87.9
426	46	52	14.8	35.7	649	86.5
427	46	51	15.0	35.2	643	85.7
428	46	51	14.9	35.3	646	86.2
429	46	51	15.0	35.8	648	86.4
430	46	51	15.2	35.1	649	86.6
431	46	51	15.0	35.6	640	85.3
432	46	52	15.0	35.7	650	86.6
433	46	51	15.0	35.3	647	86.3
434	46	51	15.1	35.7	644	85.9
435	46	52	14.9	35.8	651	86.9
436	46	51	15.2	35.8	646	86.1
437	46	52	14.7	35.6	639	85.2
438	46	52	14.9	35.7	646	86.2
439	46	51	15.1	35.4	649	86.5
440	46	51	14.8	35.5	640	85.3
441	46	51	15.1	35.4	657	87.5
442	46	52	14.8	35.4	643	85.7
443	46	52	14.9	35.3	638	85.0
444	46	52	15.1	35.3	645	86.1
445	46	52	14.9	35.3	652	87.0
446	46	52	15.0	34.7	646	86.2
447	46	51	15.0	34.8	637	84.9
448	46	51	15.1	34.8	642	85.6
449	46	51	14.9	35.0	643	85.7
450	46	52	14.9	34.7	643	85.8
	Average	51	14.9	35.1	647	86.2
	Std Dev	0	0.2	0.3	9	1.1
	Maximum	52	15.2	35.8	661	88.2
	Minimum	51	14.5	34.6	612	81.6

N-value: 68

Sample Interval Time: 126.81 seconds.

Summary of SPT Test Results

Project: PD59, Test Date: 11/13/18

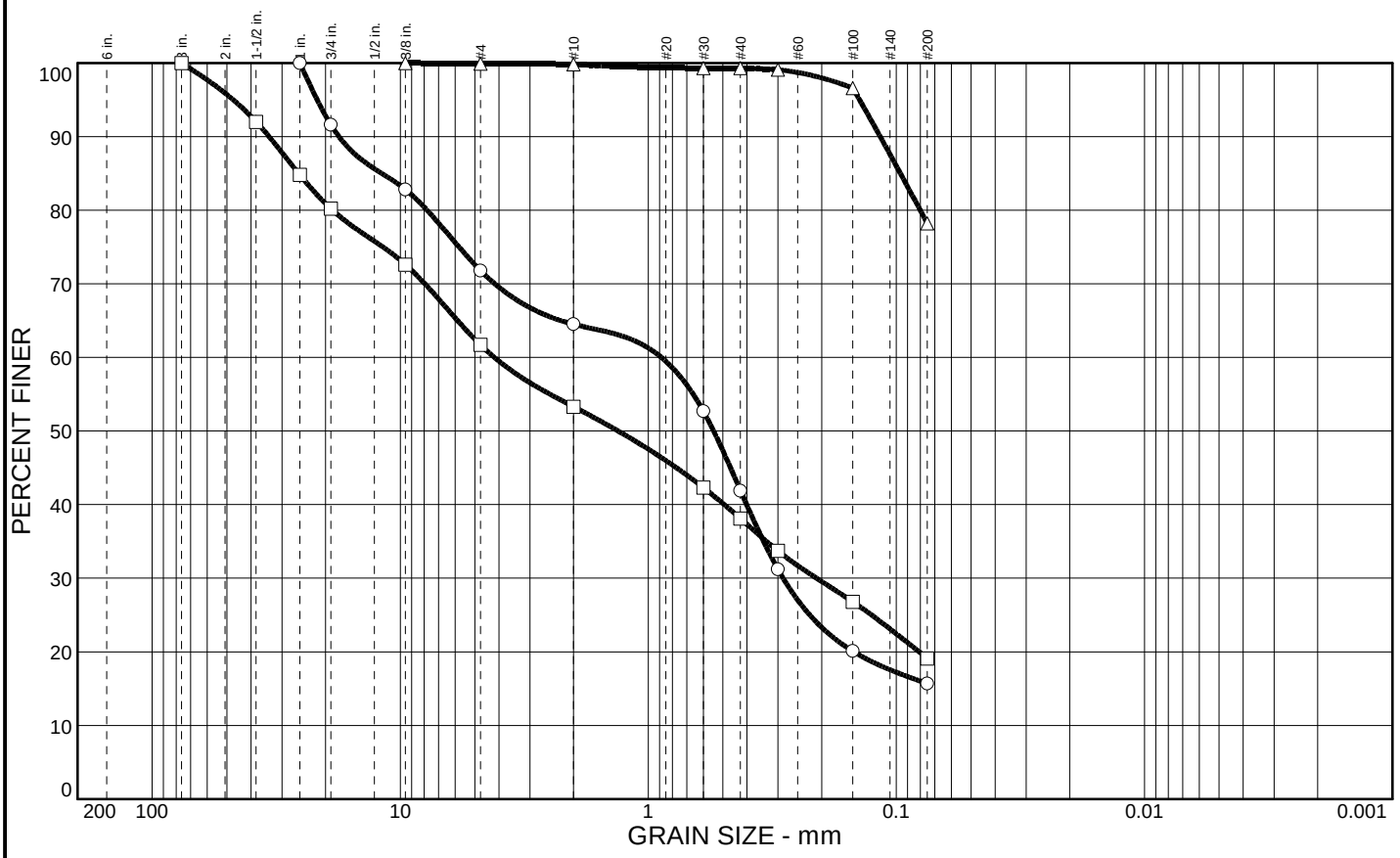
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
15.23	**6-8-13**	**21**	**30**	61	11.9	35.3	644	85.9
24.23	**5-8-11**	**19**	**27**	51	14.7	34.0	661	88.1
29.23	**9-6-6**	**12**	**17**	53	13.9	35.6	638	85.1
54.23	**28-50-0**	**50**	**72**	51	15.3	35.1	651	86.8
59.23	**12-35-50**	**85**	**122**	53	14.2	35.7	650	86.7
64.23	**9-9-10**	**19**	**27**	53	14.6	35.6	657	87.6
69.23	**41-50-0**	**50**	**72**	52	14.3	35.7	651	86.8
74.23	**7-22-46**	**68**	**98**	51	14.9	35.1	647	86.2
		Overall Average Values:		53	14.4	35.4	650	86.7
		Standard Deviation:		2	0.8	1.5	9	1.2
		Overall Maximum Value:		62	15.6	36.3	672	89.6
		Overall Minimum Value:		50	11.7	8.6	612	81.6

ATTACHMENT 4
LABORATORY TEST RESULTS

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		28.2	56.1	15.7					
□		38.3	42.6	19.1					
△		0.1	21.7	78.2					

SIEVE inches size	PERCENT FINER ○	□	△
3"		100.0	
1.5"		92.0	
1"	100.0	84.8	
3/4"	91.6	80.2	
3/8"	82.8	72.6	100.0
GRAIN SIZE			
D_{60}	0.886	4.18	
D_{30}	0.286	0.210	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	71.8	61.7	99.9
#10	64.5	53.3	99.8
#30	52.7	42.3	99.3
#40	41.9	38.1	99.3
#50	31.2	33.7	99.1
#100	20.1	26.8	96.6
#200	15.7	19.1	78.2

SOIL DESCRIPTION

○ Yellowish Brown Silty SAND w/ Gravel (slightly plastic)

□ Yellowish Brown Silty SAND w/ Gravel grading to Weathered Rock

△ Olive Brown SILT w/ Sand

REMARKS:

○ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

□ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

△

○ Source: GT18-01 Sample No.: 01-04B Elev./Depth: 18.5-19'

□ Source: GT18-01 Sample No.: 01-06B Elev./Depth: 30.5-31'

△ Source: GT18-02 Sample No.: 02-09B Elev./Depth: 45.5-46'

COOPER TESTING LABORATORY

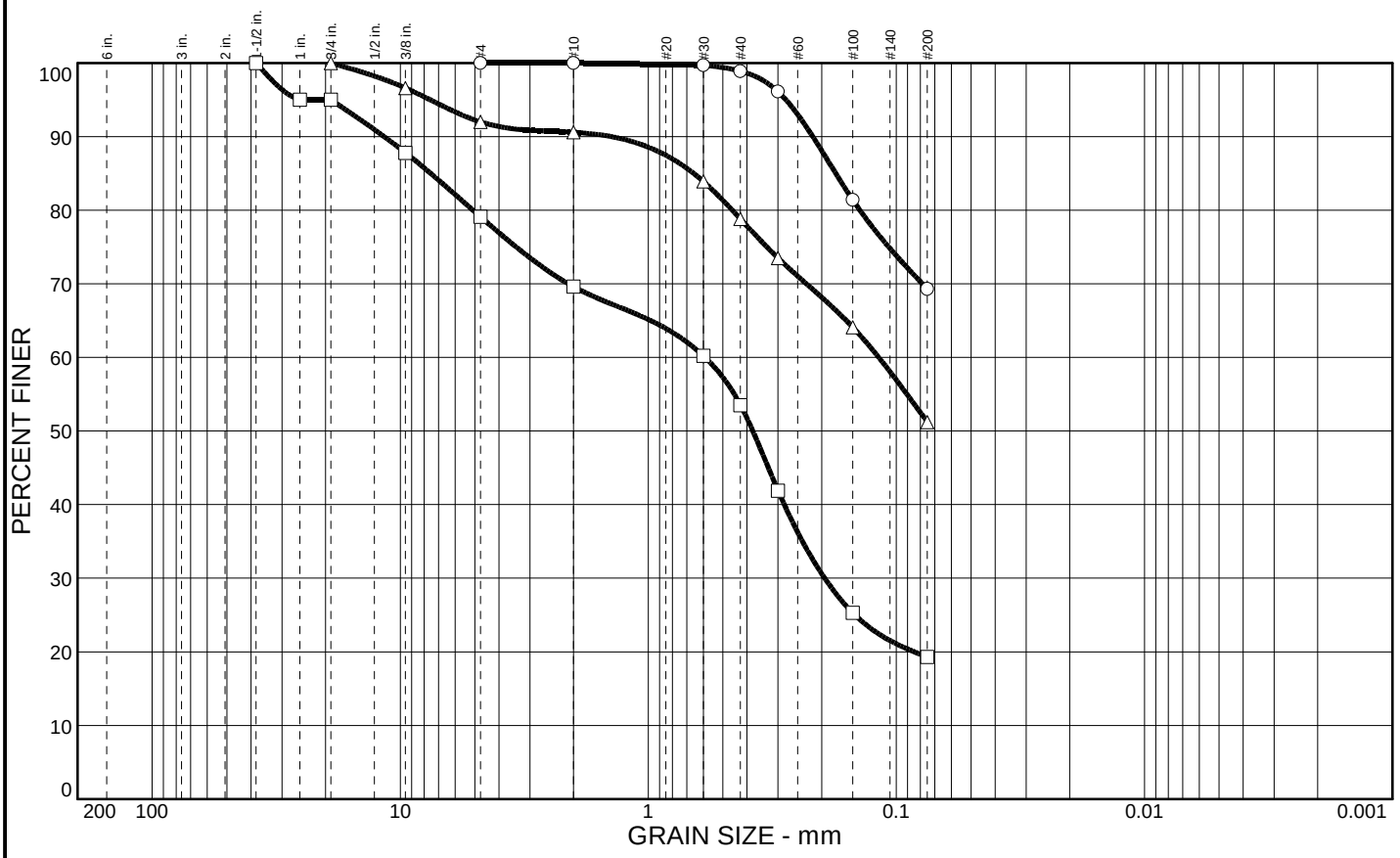
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			30.7	69.3					
□		20.9	59.8	19.3					
△		8.0	40.8	51.2					

SIEVE inches size	PERCENT FINER ○	□	△
1.5"		100.0	
1"		95.0	
3/4"		95.0	100.0
3/8"		87.8	96.6
GRAIN SIZE			
D_{60}		0.591	0.118
D_{30}		0.195	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	79.1	92.0
#10	100.0	69.6	90.6
#30	99.7	60.2	83.9
#40	98.9	53.5	78.8
#50	96.1	41.9	73.5
#100	81.4	25.3	64.1
#200	69.3	19.3	51.2

SOIL DESCRIPTION

○ Yellowish Brown Sandy CLAY

□ Dark Brown Clayey SAND w/ Gravel change to Olive Brown Clayey SAND w/ Gravel

△ Olive Sandy CLAY change to Yellowish Brown

REMARKS:

○

□ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

△

○ Source: GT18-03 Sample No.: 03-03B Elev./Depth: 12.5-13'

□ Source: GT18-03 Sample No.: 03-05B Elev./Depth: 20.5-21'

△ Source: GT18-03 Sample No.: 03-06C Elev./Depth: 26-26.5'

COOPER TESTING LABORATORY

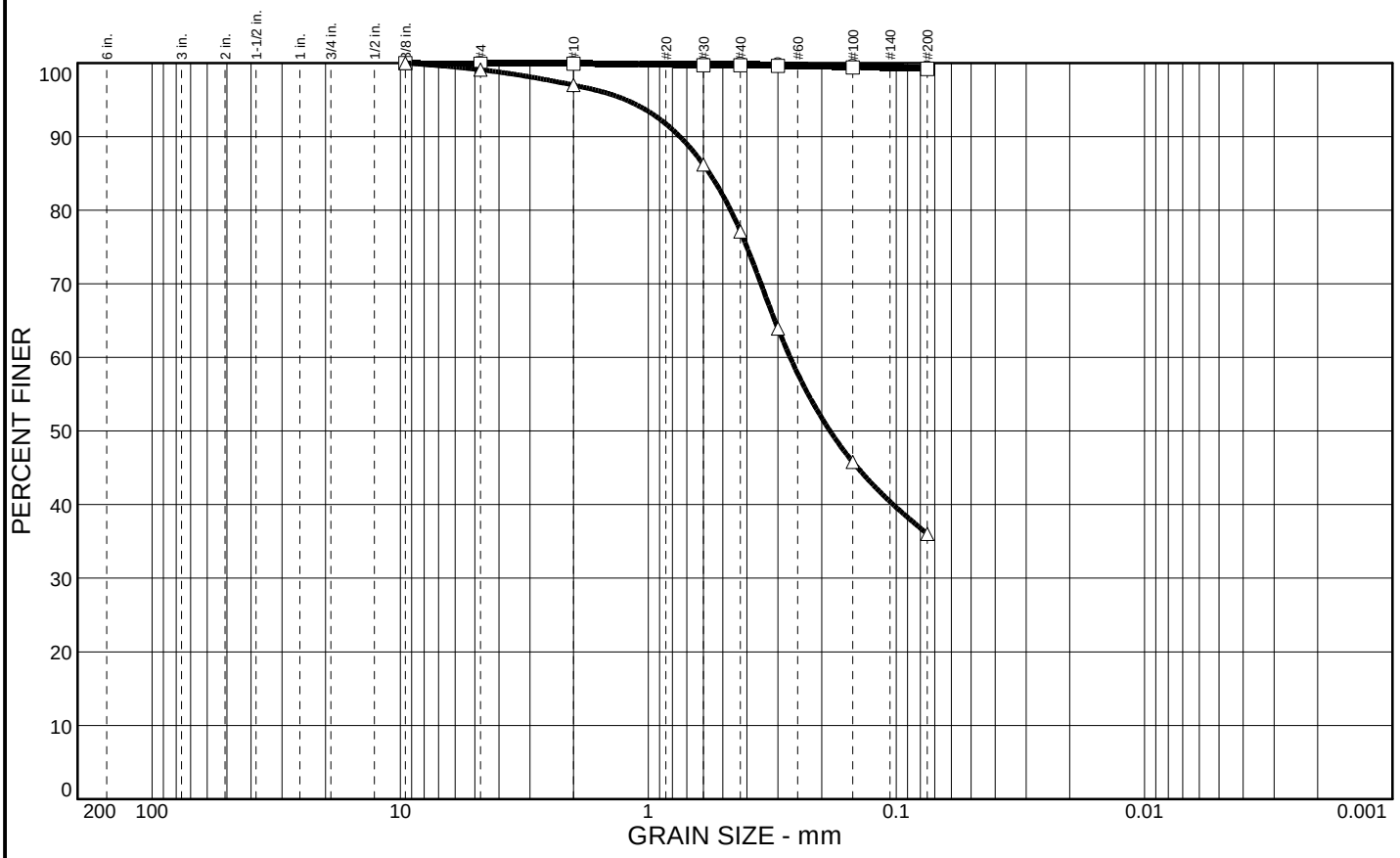
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			0.6	99.4		CH		28	64
□		0.1	0.7	99.2				28	71
△		0.9	63.1	36.0					

SIEVE inches size	PERCENT FINER ○	□	△
3/8"		100.0	100.0
GRAIN SIZE			
D_{60}			0.268
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	99.9	99.1
#10	100.0	99.9	97.0
#30	99.9	99.7	86.2
#40	99.9	99.7	77.1
#50	99.8	99.6	63.9
#100	99.6	99.4	45.8
#200	99.4	99.2	36.0

SOIL DESCRIPTION

○ Olive Gray Fat CLAY

□ Olive Brown Fat CLAY

△ Yellowish Brown Clayey SAND

REMARKS:

○

□

△

○ Source: GT18-03 Sample No.: 03-09 Elev./Depth: 40-41.5'

□ Source: GT18-05 Sample No.: 05-05 Elev./Depth: 25-26.5'

△ Source: GT18-06 Sample No.: 06-01B Elev./Depth: 6-6.5'

COOPER TESTING LABORATORY

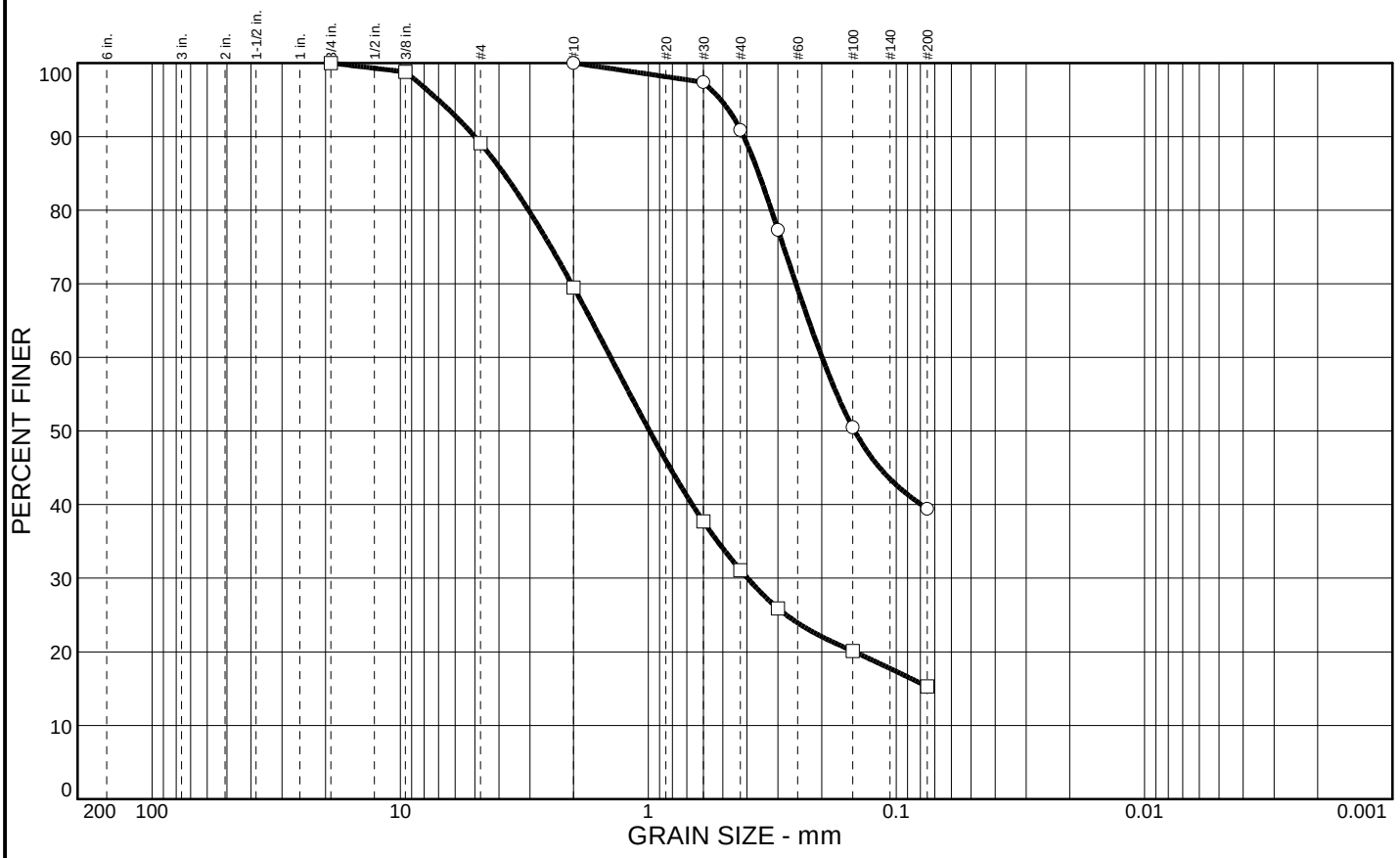
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			60.6	39.4					
□		10.9	73.8	15.3					

SIEVE inches size	PERCENT FINER ○	□	
3/4"		100.0	
3/8"		98.8	
GRAIN SIZE			
D_{60}	0.199	1.42	
D_{30}		0.398	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	
#4		89.1	
#10	100.0	69.5	
#30	97.4	37.7	
#40	90.9	31.1	
#50	77.3	25.9	
#100	50.5	20.1	
#200	39.4	15.3	

SOIL DESCRIPTION

○ Yellowish Brown Clayey SAND

□ Dark Brown Clayey SAND

REMARKS:

○

□

○ Source: GT18-06 Sample No.: 06-03 Elev./Depth: 15-16.5'

□ Source: GT18-06 Sample No.: 06-06B Elev./Depth: 31-31.5'

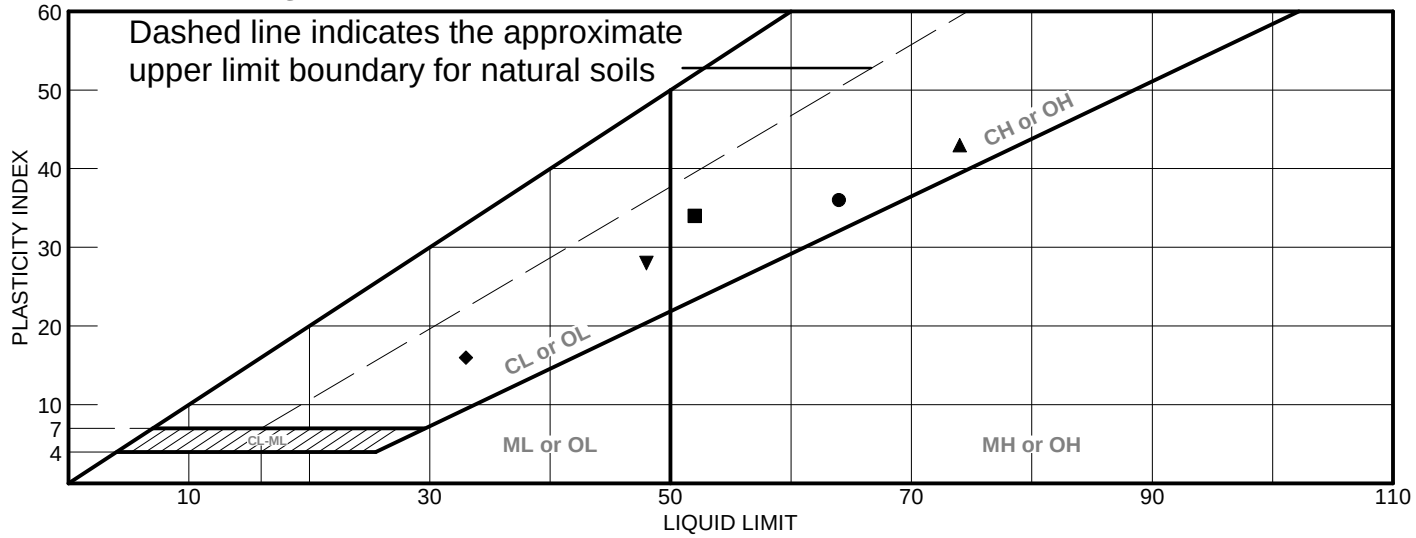
COOPER TESTING LABORATORY

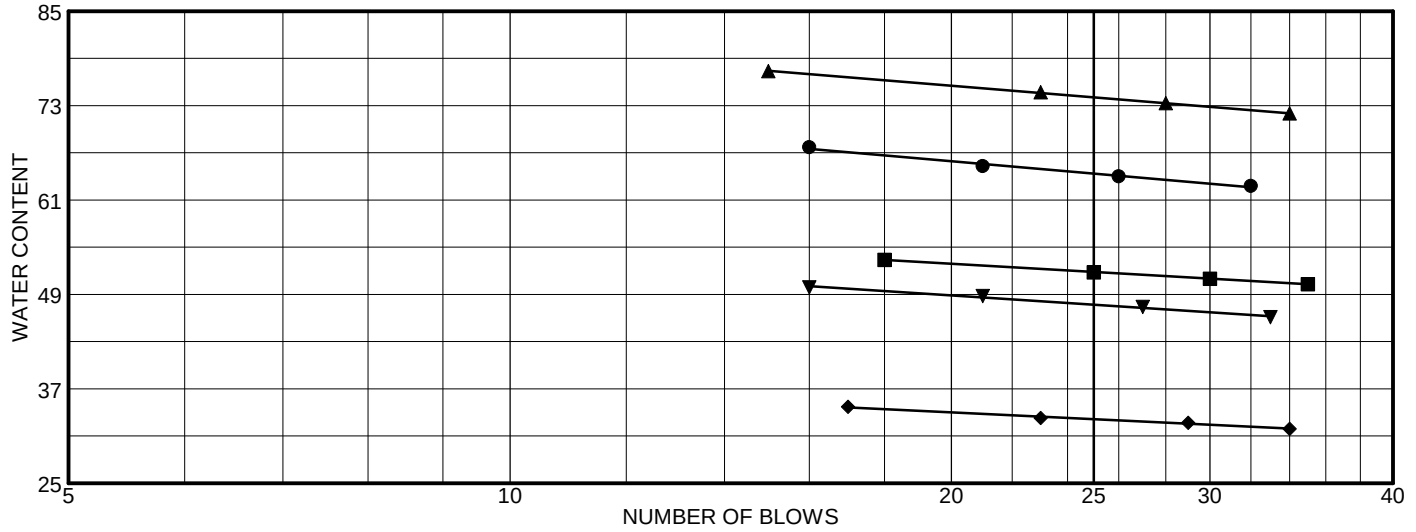
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352 Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Gray Fat CLAY	64	28	36	99.9	99.4	CH
■	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand	52	18	34			
▲	Olive Brown Fat CLAY	74	31	43			
◆	OLive Brown Mottled Gray Sandy Lean CLAY	33	17	16			
▼	Olive Brown Lean CLAY w/ Sand	48	20	28			

Project No. 461-352 **Client:** Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

●	**Source:** GT18-03	**Sample No.:** 03-09	**Elev./Depth:** 40-41.5'
■	**Source:** GT18-04	**Sample No.:** 04-03	**Elev./Depth:** 15-17.5(Tip-1")
▲	**Source:** GT18-04	**Sample No.:** 04-04	**Elev./Depth:** 20-22.5'
◆	**Source:** GT18-05	**Sample No.:** 05-02	**Elev./Depth:** 10-12.5(Tip-1")
▼	**Source:** GT18-05	**Sample No.:** 05-03	**Elev./Depth:** 15-17.5(Tip-

Remarks:

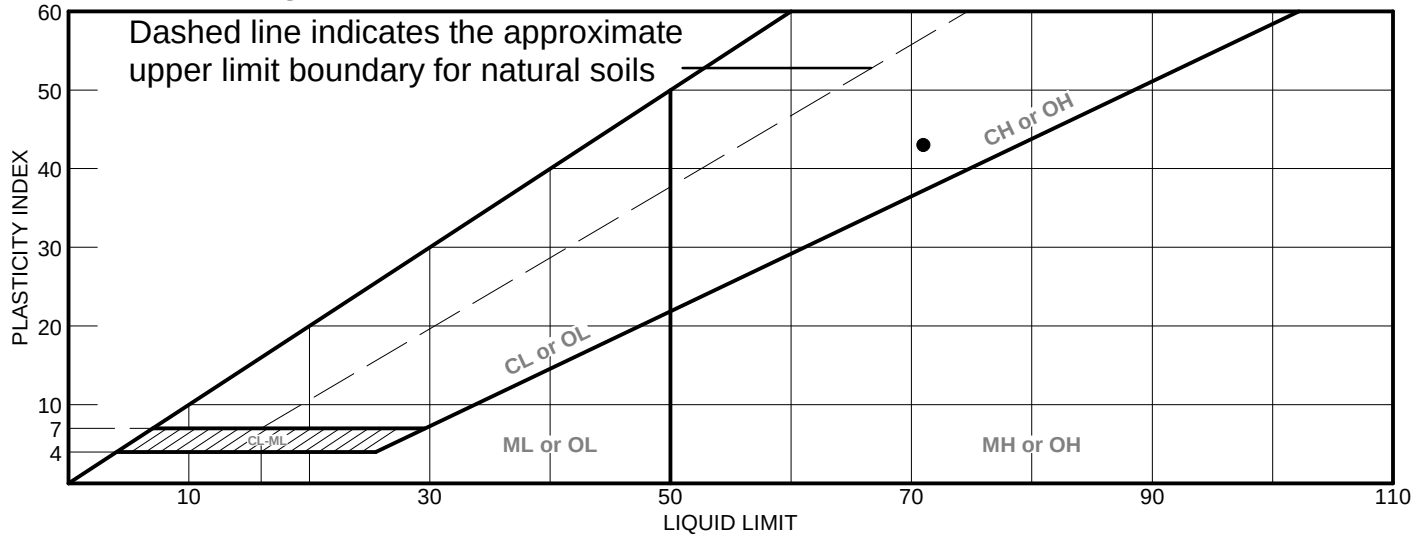
●
■
▲
◆
▼

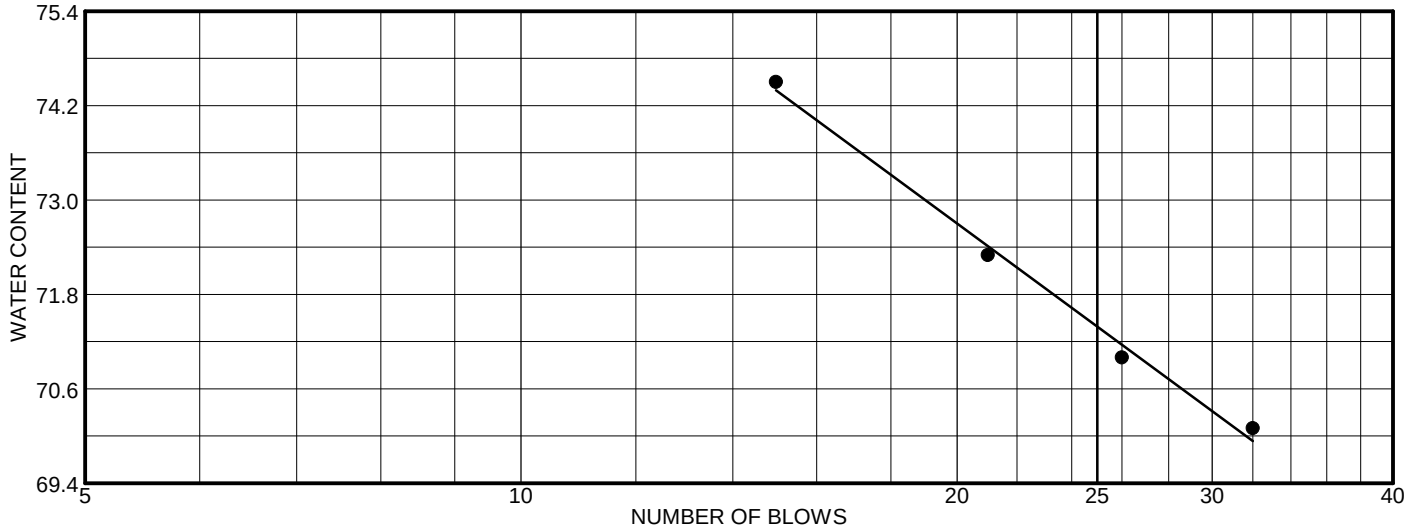
LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Brown Fat CLAY	71	28	43	99.7	99.2	

Project No. 461-352 **Client:** Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

● **Source:** GT18-05 **Sample No.:** 05-05 **Elev./Depth:** 25-26.5'

Remarks:

●

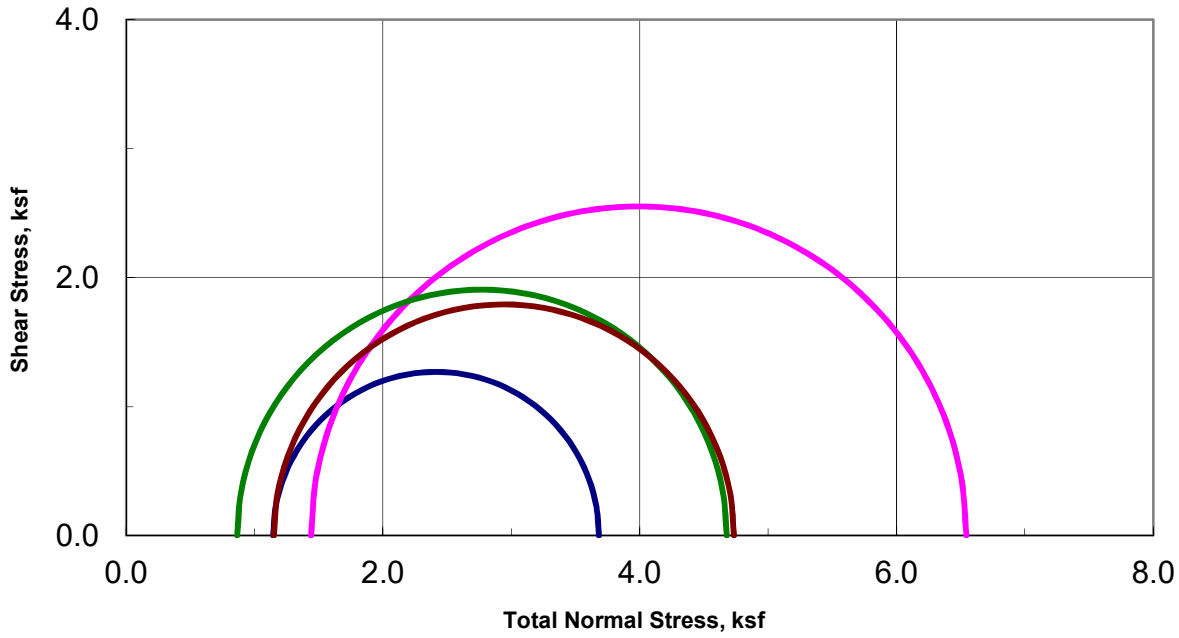
LIQUID AND PLASTIC LIMITS TEST REPORT

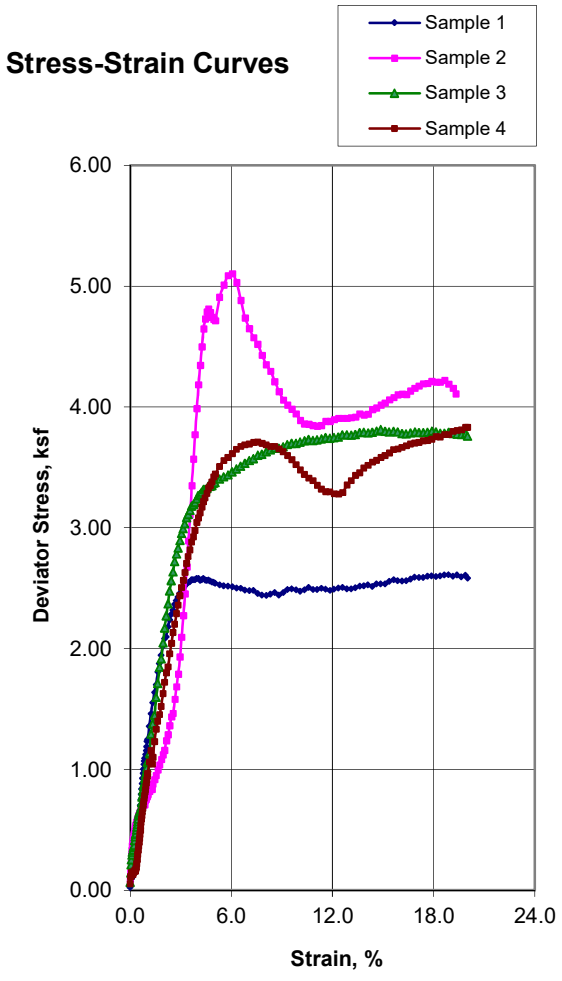
COOPER TESTING LABORATORY

Figure

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data				
	1	2	3	4
Moisture %	24.0	37.7	21.0	26.4
Dry Den,pcf	100.6	80.1	103.4	95.3
Void Ratio	0.676	1.103	0.631	0.769
Saturation %	96.0	92.2	89.7	92.9
Height in	5.97	5.97	5.97	6.00
Diameter in	2.87	2.87	2.87	2.87
Cell psi	8.0	10.0	6.0	8.0
Strain %	15.00	6.06	14.86	15.00
Deviator, ksf	2.537	5.103	3.812	3.584
Rate %/min	1.00	1.00	1.00	1.00
in/min	0.060	0.060	0.060	0.060
Job No.:	461-352			
Client:	Geosyntec Consultants			
Project:	WG2562-06			
Boring:	GT18-04	GT18-04	GT18-05	GT18-05
Sample:	04-03	04-04	05-02	05-03
Depth ft:	15-17.5(Tip-1")	20-22.5	10-12.5(Tip-1")	15-17.5(Tip-1.25")

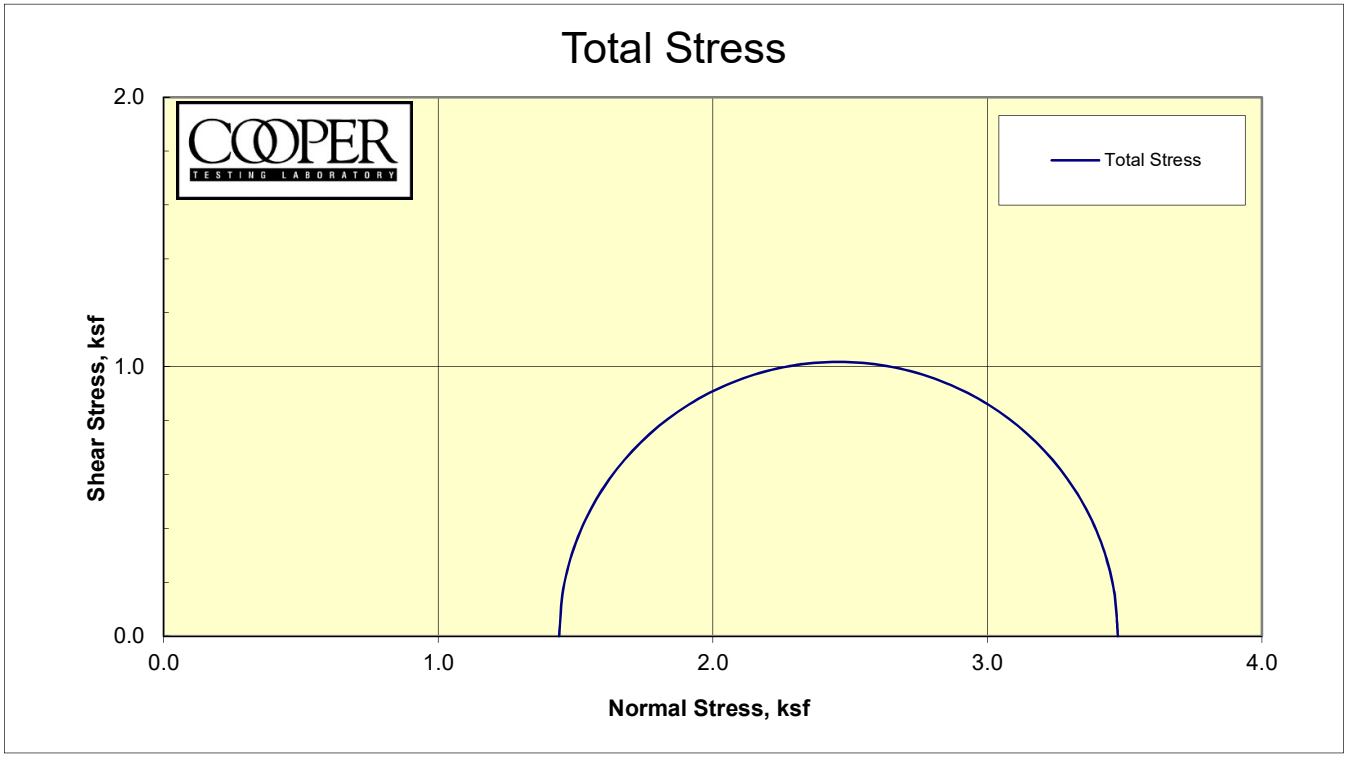
Visual Soil Description	
Sample #	
1	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand
2	Olive Brown Fat CLAY
3	Olive Brown Mottled Gray Sandy Lean CLAY
4	Olive Brown Lean CLAY w/ Sand

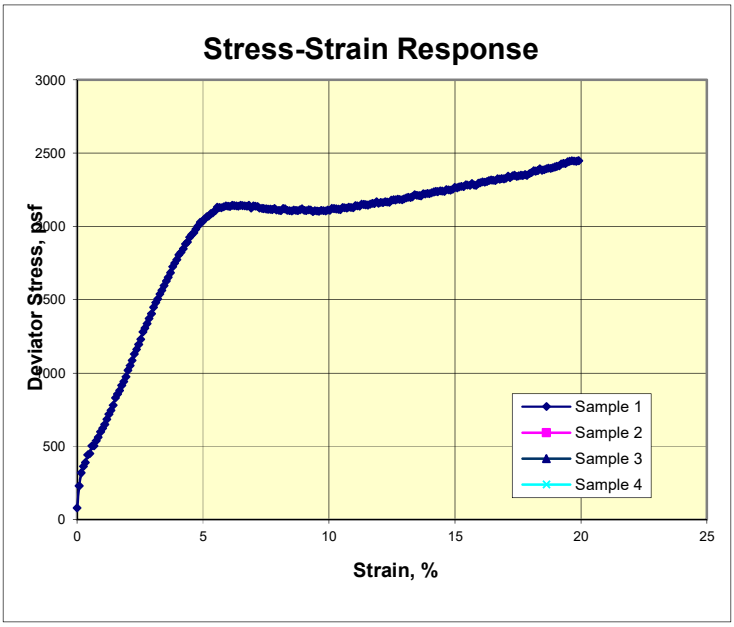
Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Triaxial Unconsolidated-Undrained

(ASTM D2850m)





Sample:	1	2	3	4
MC, %	37.4			
Dry Dens, pcf	83.5			
Sat. %	99.2			
Void Ratio	1.019			
Diameter in	2.87			
Height, in	5.98			
	Final			
MC, %	40.6			
Dry Dens, pcf	80.4			
Sat. %	100.0			
Void Ratio	1.096			
Diameter, in	2.91			
Height, in	6.02			
Cell, psi	78.5			
BP, psi	68.5			
	Effective Stresses At:			
Strain, %	5.0			
Deviator ksf	2.035			
Excess PP	0.000			
Sigma 1	3.475			
Sigma 3	1.440			
P, ksf	2.458			
Q, ksf	1.018			
Stress Ratio	2.413			
Rate in/min	0.0592			
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

Job No.: 461-352 **Date:** 6/3/2019

Client: Geosyntec Consultants BY:MD/DC

Project: WG2562-06

Sample 1) GT18-04_04-04 @ 20-22.5(Tip-7") Olive Brown Fat CLAY

Sample 2)

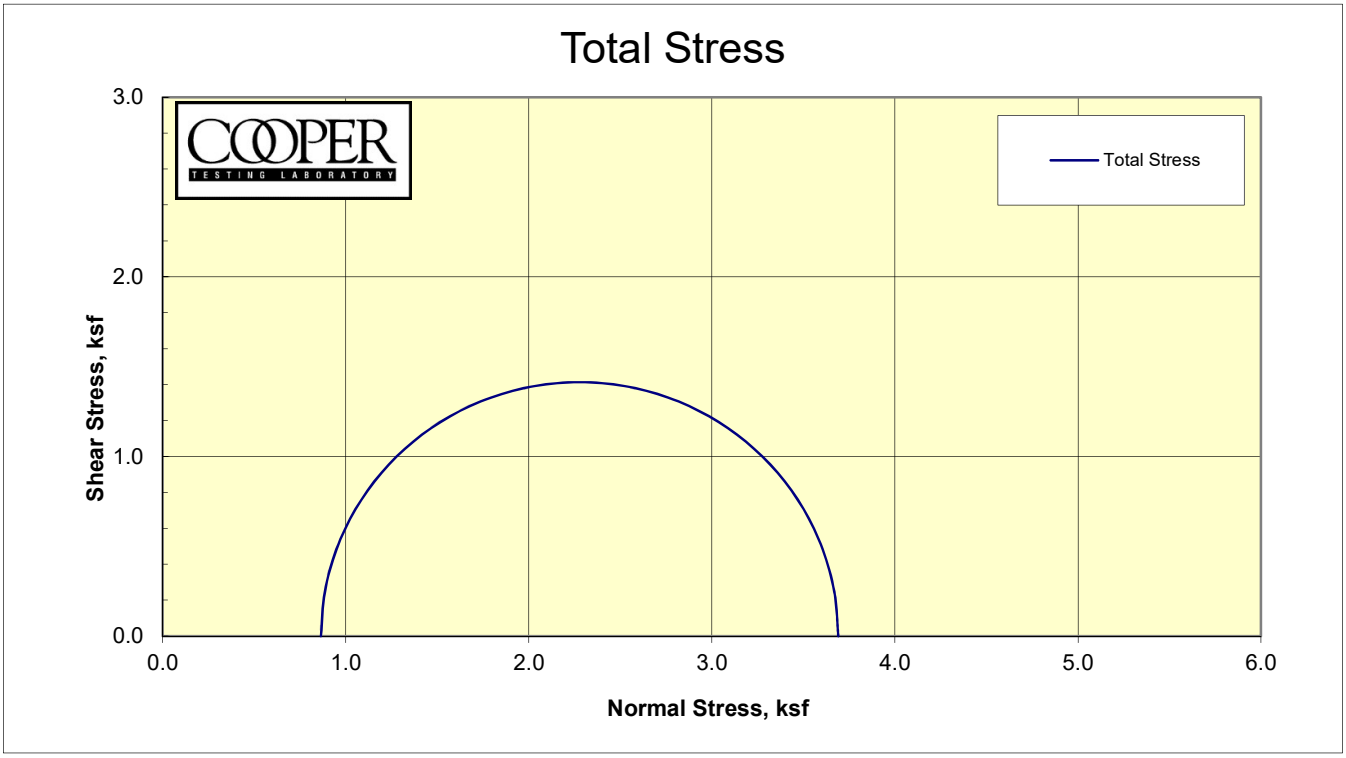
Sample 3)

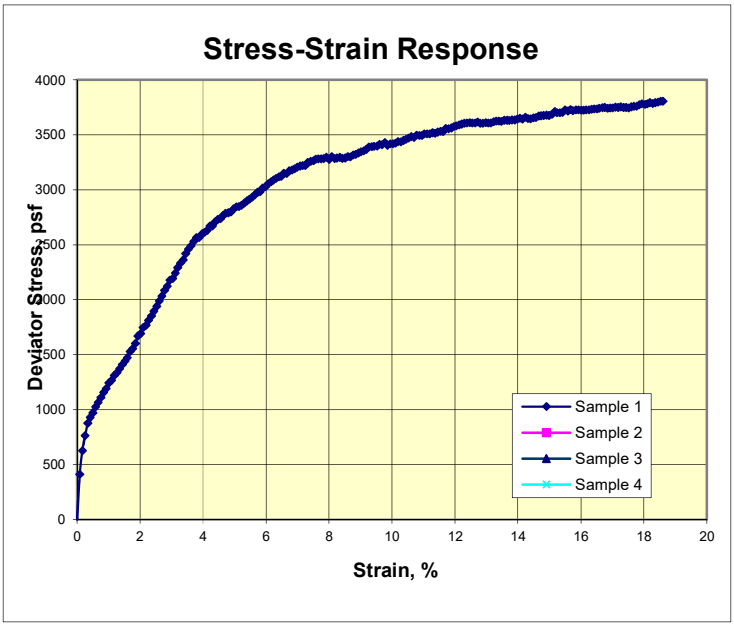
Sample 4)

REMARKS: Strengths picked at 5% strain.

*Sample was back-pressure saturated prior to shear.

Triaxial Unconsolidated-Undrained
(ASTM D2850m)





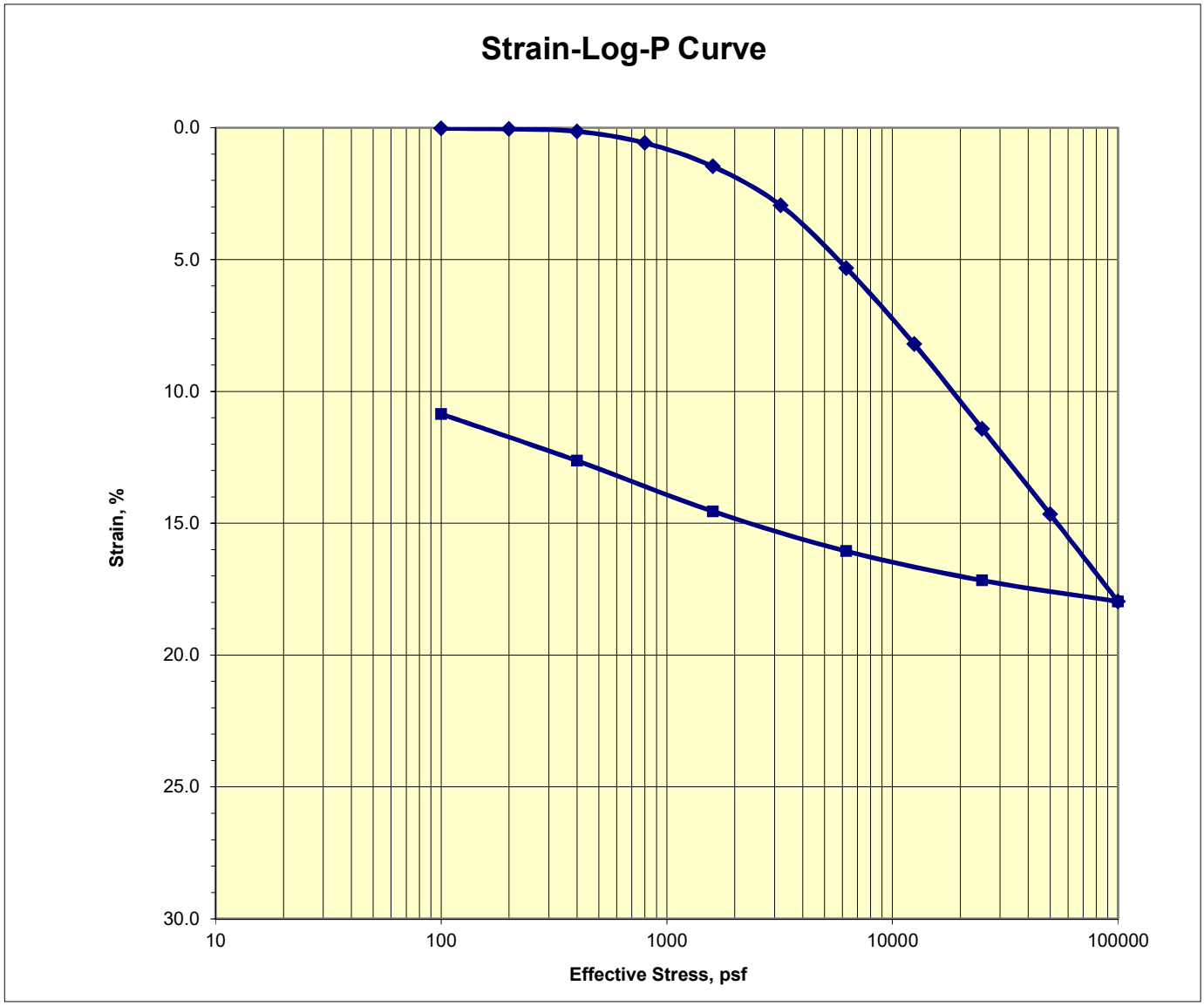
Sample:	1	2	3	4
MC, %	23.4			
Dry Dens, pcf	99.5			
Sat. %	91.3			
Void Ratio	0.693			
Diameter in	2.87			
Height, in	5.98			
	Final			
MC, %	26.3			
Dry Dens, pcf	98.5			
Sat. %	100.0			
Void Ratio	0.710			
Diameter, in	2.87			
Height, in	6.03			
Cell, psi	74.5			
BP, psi	68.5			
	Effective Stresses At:			
Strain, %	5.0			
Deviator ksf	2.827			
Excess PP	0.000			
Sigma 1	3.691			
Sigma 3	0.864			
P, ksf	2.277			
Q, ksf	1.413			
Stress Ratio	4.272			
Rate in/min	0.0584			
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

Job No.:	461-352	**Date:**	6/3/2019
Client:	Geosyntec Consultants		BY:MD/DC
Project:	WG2562-06		
Sample 1)	GT18-05_05-02 @ 10-12.5(Tip-7") Olive Brown Mottled Gray Sandy Lean CLAY		
Sample 2)			
Sample 3)			
Sample 4)			

REMARKS: Strengths picked at 5% strain.
*Sample was back-pressure saturated prior to shear.

Consolidation Test
ASTM D2435

Job No.:	461-352	**Boring:**	GT18-04	**Run By:**	MD
Client:	Geosyntec Consultants	**Sample:**	04-03	**Reduced:**	PJ
Project:	WG2526-06	**Depth, ft.:**	15-17.5(Tip-8.5")	**Checked:**	PJ/DC
Soil Type:	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand			**Date:**	7/23/2019

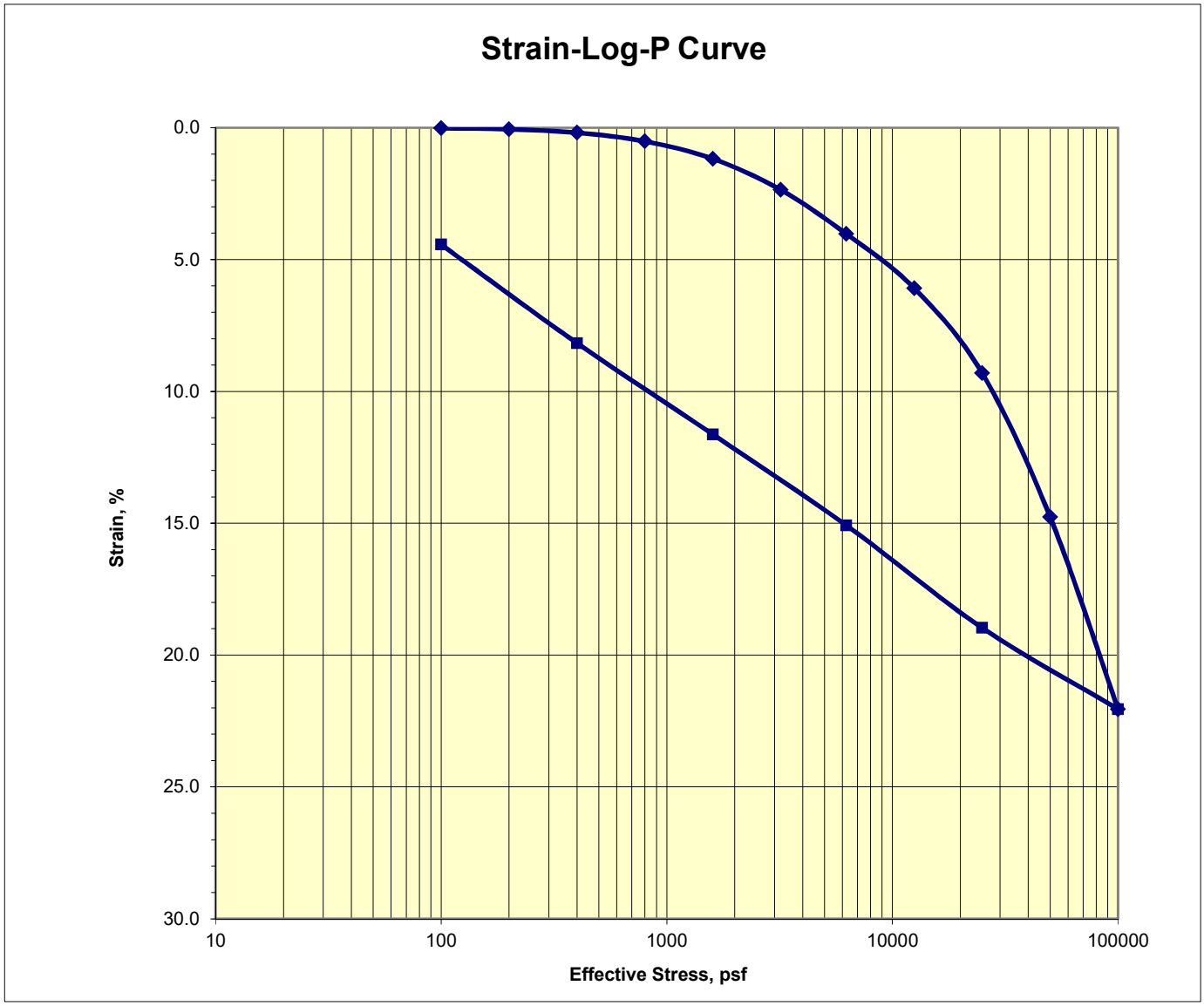


Assumed Gs 2.7	Initial	Final
Moisture %:	20.6	16.9
Dry Density, pcf:	103.9	115.8
Void Ratio:	0.622	0.456
% Saturation:	89.6	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	461-352	**Boring:**	GT18-04	**Run By:**	MD
Client:	Geosyntec Consultants	**Sample:**	04-04	**Reduced:**	PJ
Project:	WG2526-06	**Depth, ft.:**	20-22.5(Tip-16")	**Checked:**	PJ/DC
Soil Type:	Olive Brown Fat CLAY			**Date:**	7/23/2019



Assumed Gs 2.8	Initial	Final
Moisture %:	39.8	39.0
Dry Density, pcf:	80.1	83.6
Void Ratio:	1.182	1.092
% Saturation:	94.3	100.0

Remarks:

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Appendix H2. Subsurface Conditions for Proposed Transfer Station in Current Maintenance Building Area at Buena Vista Landfill Memo

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Geosyntec consultants

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Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036
www.geosyntec.com

Memorandum

Date:	6 September 2024
To:	Kasey Kolassa and Nicole Steele, County of Santa Cruz
Copies to:	Sangeeta Lewis
From:	Fabrizio Settepani, P.E., G.E. Xiaoyue Wang, Ph.D., P.E.
Subject:	Subsurface Conditions for Proposed Transfer Station in Current Maintenance Building Area at Buena Vista Landfill (Watsonville, CA) Geosyntec Project Number: WG3064

1. INTRODUCTION

This memorandum summarizes the subsurface conditions for preparing a draft environmental impact report (EIR) for a transfer station (TS) proposed at the current location of the Maintenance Building area at the Buena Vista Landfill (BVLF) property owned by the County of Santa Cruz at 150 Rountree Lane near Watsonville, California.

Figure 1 shows the existing site conditions in the area of the TS. Current facilities in the area include a Maintenance Building, storage containers and buildings, Module 2 and other BVLF environmental control systems (e.g., gas probes, monitoring wells) and paved areas.

We understand that the following items for geology and soils need to be addressed for the draft EIR for the project:

- Rupture of a known earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map
- Strong seismic ground shaking
- Liquefaction and its consequences such as lateral spreading and settlement
- Seismically-induced landslides and slope instabilities
- Expansive soils as defined in the California Building Code
- Soil erosion or loss of topsoil
- Soils incapable of supporting septic tanks or alternative wastewater disposal

The assessment of the above items would provide information regarding the planned project components in the project area and if they were susceptible to the above concerns and, if so, potential project mitigations.

To assess the site conditions for purposes of the EIR, we used information available and performed a limited field investigation in the vicinity of the proposed TS.

The purposes of the limited field investigation were to:

- Identify if waste fill is present south of the current closure limit of the BVLF
- Collect information related to subsurface conditions needed for the preliminary evaluation of the TS.

To confirm the findings of the limited field investigation, we recommend performing a site-specific investigation in accordance with the requirements in the California Building Code (CBC) for the final design of the TS.

2. 2022 FIELD INVESTIGATION

2.1 General

Between 4 April and 8 April 2022 Geosyntec performed a limited field investigation in the area of the Maintenance Building. The field investigation included performing shallow borings using hand augering and a direct push testing drill rig (DPT) and two cone penetration tests (CPT); see Figure 2 for the locations.

2.2 Pre-Drilling Activities

To assess the possible location of waste fill, Geosyntec reviewed historical drawings and overlaid the information on current (2021) topography. Based on the historical information, Geosyntec provided a series of points, spaced at 10-foot intervals, to the County for locating. The County's survey crew marked the points on the pavement as well as surveying other features like existing edges of pavement and concrete drainage ditches. This information was used as a starting point for the field investigation as described below.

Before drilling, Geosyntec visited the site on 22 March 2022 to mark the locations for the CPT and the extent of the area where the shallow borings would be conducted. Geosyntec met California Utility Locators, a private utility locator from Scotts Valley, California. The utility locator cleared the area of electrical and metal utilities. Geosyntec also called Underground Service Alert North (USA North 811) after marking the locations with white paint and received ticket number W208700227.

USA informed the following parties of Geosyntec's planned work:

- PACBEL = PACIFIC BELL
- PGESAL = PGE DISTRIBUTION - SALINAS

2.3 Exploration Activities

Geosyntec was onsite full time during the field activities to provide oversight and document the drilling and sampling activities. The drilling contractor for the work was Gregg Drilling LLC of Martinez, California (Gregg); their contractor's license is 1044456.

Gregg used a 20-ton truck-mounted CPT rig to perform two CPTs. The CPTs were performed in accordance with ASTM D5778. Gregg used a cone setup with a cone base area of 15 cm^2, a sleeve surface of 225 cm^2, and a cone net area ratio of 0.80. The cone setup has a pore pressure transducer and the ability to measure shear wave velocity with a geophone located 0.2 m behind the tip.

Gregg hand-augered the top 5 feet at each CPT location before pushing with the CPT rig. CPT22-01 was conducted to a depth of approximately 87.93 feet BGS (below the ground surface) until push refusal was encountered; shear wave velocities were measured at 5-foot-intervals. CPT22-02 was conducted to a depth of approximately 51 feet below the ground surface at the time of drilling. Appendix 1 includes detailed information for the CPT work.[1]

Gregg used a truck-mounted Marl M2.5T direct push test (DPT) rig at each DPT location. The rig allows for 4-foot sampling intervals (i.e., push). The hole diameter is 2.25 inches. Sampling is conducted with transparent polyvinyl chloride (PVC) liners. Gregg hand augered the top 5 feet at each location before sampling with the DPT rig or using the CPT rig.

The proposed footprint of the TS is in the Maintenance Building area which is south of and adjacent to a closed portion of Module 2. The DPT was used to check if waste fill is also present outside the closed portion of Module 2 and, if present, to better define the area of waste.

To assess the presence of waste, the protocol we followed was to:

1) Before mobilization the County's survey crew laid out initial locations for shallow DPT borings (DPT location A) based on a line of points estimated by Geosyntec based on the available information for the site (i.e., historical waste limit).

[1] The report includes information for CPT22-01 through CPT22-11. CPT22-01 and CPT22-02 were in the area of the TS. The remaining CPTs were performed in the area of the Old Landfill which is located west and south of Gallighan Slough. Gregg prepared one report for both field explorations.

2) If waste was not found at the first location (DPT location A), a second shallow boring (DPT location B) was performed 5 to 10 feet north of the pre-surveyed line (i.e., toward Module 2).

3) If waste was not found at the second location (DPT location B), a third shallow boring (DPT location C) was performed further north of the second boring (DPT location B) toward Module 2.

4) If waste was found at the second location (DPT location B), a third shallow boring (DPT location C) was performed south of the second location (DPT location B) but north of the first location (DPT location A).

The process was repeated until sufficient information was collected to establish the waste limit. At some locations which appeared to be outside the TS footprint, only one shallow boring was performed.

At each DPT location, samples were collected for visual assessment (i.e., to determine if the material encountered was waste or soil). After assessment, the samples were discharged in a dumpster located in the Maintenance Building area for disposal by the County. Free moisture (i.e., wet soil) was not observed at any location.

Gregg grouted the DPTs and the CPTs in accordance with County requirements. Gregg also placed an asphalt patch above the grout.

Geosyntec marked the exploration location with nails with small metal plates and painted the name of the exploration location for surveying by the County's surveyor. The County reported the locations in the local coordinate system. The CPT locations are tabulated below.

CPT	Northing	Easting	Elevation (feet)
CPT22-01	10,047.05	10,131.77	106.63
CPT22-02	10,058.69	10,048.42	107.06

Figure 2 shows the historical limit of waste, DPT locations, and the estimated limit of waste fill based on the 2022 field investigation. The estimated limit of waste is to the south of the closure limit of Module 2 and to the north of the historical limit of waste.

Appendix 2 includes Figure A-1 which tabulates the findings at the DPT locations in the TS area.

3. GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

EMCON[2] states that the area is underlain by at least 1,000 feet of a heterogeneous mixture of interbedded gravel, sand, silt, and clay. Surficial stream and terrace deposits overlie approximately 500 feet of fine sands of the Aromas formation. The Aromas formation in turn overlies the Purisima formation which is approximately 500 feet thick and composed of semiconsolidated sand, silt, clay, and shale.

The area is in coastal Santa Cruz County which has step-like marine terraces of Pleistocene age that consist of weakly consolidated to semiconsolidated heterogeneous deposits of moderately to poorly sorted silt, silty clay, sand, and gravel[3]. Geosyntec[4] has summarized that it is a naturally occurring valley within an uplifted marine terrace. It lies within a broad band of gently rolling hills of the Monterey Bay coastal plain. This gentle terrain has been incised by numerous small streams draining southward to the Pajaro River, including Harkins Slough to the east and Gallighan Slough to the southwest.

The Aromas Sand formation is the primary water-bearing unit and consists of aeolian (wind blown) and fluvial sand, silt, clay and gravel. Underlying the Aromas Sand formation is the Tertiary Purisima formation, which is too deep to be relevant to site hydrogeologic conditions.

Groundwater flow conditions are influenced regionally by agricultural and municipal pumping wells; water levels that were +5 to +15 feet MSL in the 1940s have declined to –5 feet MSL and lower in recent years.[5]

3.2 Subsurface Conditions in the Maintenance Building Area

3.2.1 Soils

Based on EMCON's study of the area geology[2], portions of BVLF are underlain by recent fluvial terrace deposits consisting of poorly consolidated, heterogeneous deposits of gravels, sands and

---

[2] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978.

[3] See United States Geological Survey (USGS) Open File Report 97-489; Geologic Map of Santa Cruz County, California.

[4] *Preliminary Closure and Postclosure Maintenance Plan; Buena Vista Drive Sanitary Landfill; Santa Cruz County, California*; prepared by Geosyntec Consultants, Inc.; Project WG2561D; April 2021, 27 July 2022.

[5] CH2M Hill. 1996. *Hydrogeological Assessment Report for the Buena Vista Landfill and Vicinity*, prepared for County of Santa Cruz, Santa Cruz County, California. May.

silts. The fluvial terrace deposits are underlain by the Aromas Formation. The Aromas Formation consists of clean, coarse- to medium-grained sands. The Aromas Formation is underlain by the Purisima Formation.

The area of the Maintenance Building is flat. Figure 2 includes the locations of borings, monitoring wells, and gas probes near the Maintenance Building. Figure 3 includes the footprint of the proposed TS with the limit of waste based on the 2022 field investigation in the area of the TS.

In 2008, Dees & Associates performed a field investigation for a building addition to the Maintenance Building.[6] Based on the blowcounts measured during the field investigation, the soils were medium dense from the ground surface to the explored depth of the two borings (B-1 and B-2 with depths of 16.5 feet below the ground surface at the time of drilling) and the sandy clay was very stiff. A tested coarse-grained soil sample was classified as silty sand with gravel and had a fines content of 20.5 percent. The dry unit weights range between 91.2 and 131.4 pounds per cubic foot (pcf). The natural moisture contents ranged between 10.3 percent and 27.3 percent. An expansion index test performed on a clay sample collected in boring B-1 at a depth of approximately 5 feet had an Expansion Index (EI) of 50; since the EI is greater than 20, the soil is potentially expansive and needs to be further evaluated if similar soils are present in the area of the TS.

Building footings or other structures founded on or adjacent to potentially expansive soils may require mitigation measures such as excavation and replacement with non-expansive soils, amendment of the expansive soils with lime or cement, construction of moisture barriers, grading of surfaces to drain away from the area, and/or restrictions on the use of irrigation and/or infiltration of stormwater into the subsurface.

Appendix 1 includes the CPT report for CPT22-01 and CPT22-02. Based on the two CPTs, the soils are primarily fine grained to a depth of approximately 25 feet, become coarser grained with depth with interbedded layers of fine-grained soils. The interpreted uncorrected blowcount from the CPTs at depths between 5 feet and 15 feet are approximately 10 to 15 blows per foot; these blowcounts are similar to the blowcounts collected at borings B-1 and B-2 (i.e., medium dense or stiff to very stiff). Below a depth of 25 feet, the coarse-grained soils are dense to very dense. In CPT22-01, push refusal was encountered at approximately 88 feet below the ground surface. Similarly, very dense materials were encountered during installation of the nearby gas probe GP-17.

---

[6] Dees & Associates, Inc. 2008. *Geotechnical Investigation for Proposed Maintenance Facility Addition, Buena Vista Landfill,* prepared for the Terra Coast Construction. October.

Appendix 3 includes the logs and information for previous exploration in the TS area (i.e., gas probes, monitoring well, borings, 2008 geotechnical report). The logs for landfill gas probes GP-7 and GP-8 are not available.

3.2.2 Groundwater

The Aromas Sand formation is the primary water-bearing unit beneath the BVLF and consists of aeolian (windblown) and fluvial sand, silt, clay and gravel.

Groundwater beneath the BVLF occurs in the Aromas Sand formation but also occurs in the overlying aeolian and terrace deposits. Perched groundwater zones occur in the aeolian and terrace deposits where the percolation of rainfall and irrigation is inhibited by low permeability horizons in near-surface deposits.

The nearest groundwater monitoring well to the area is MW-2 (Figure 2). The groundwater elevations since well construction in 1987 have varied between approximately -4.8 feet and 7.3 feet.[7] Based on the annual groundwater monitoring report, the groundwater (i.e., the water table) is at least 100 feet below the 2021 topography (i.e., the existing ground elevation) in the area of the parking lot and generally flow southeast. The groundwater monitoring reports for the site present detailed information. For reference, GP-17 (formerly named GP-9A) is located near the TS; GP-17 reached a depth of 80 feet below the ground surface and water was not encountered at the time of drilling.

As will be described below, liquefaction may be a concern for soils below the water table. Provided the soils remain dry (i.e., water is not infiltrated into the subgrade), the liquefaction potential is low because the depth to the water table is deep (about 90 feet to 100 feet below the existing ground surface at the time of drilling or at about elevation 0 feet approximately). Since liquefaction potential is low, surface displacement and seismically induced lateral spreading or seismic settlement is not expected.

3.3 Evaluation of Hazards

3.3.1 Introduction to Seismic Hazards

The California State Legislature passed the Alquist Priolo Earthquake Fault Zoning Act (APA) in 1972 and the Seismic Hazards Mapping Act (SHMA) in 1990 prompted by damaging earthquakes in northern and southern California, The SHMA requires the evaluation of sites for the effects of seismic hazards such as ground surface fault rupture, ground shaking, liquefaction,

[7] See Table 1 in *Draft 2024 Winter-Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561E; July 31, 2024.

settlement, lateral spreading, seismically-induced slope instabilities, landslides, and other hazards caused by earthquakes.

3.3.1.1 Faulting

No known active faults are present at the BVLF. For the BVLF, Geosyntec[8] identified the nearest faults to the BVLF are the Zayante-Vergales Fault located approximately 3.4 miles from the BVLF and the San Andreas fault system located approximately 6.2 miles from the BVLF.

3.3.1.2 Ground Shaking

The TS would be designed and constructed in conformance with the most recently adopted CBC design parameters, which are specifically tailored to minimize the risk of structure failure due to seismic hazards. Therefore, conformance with the CBC would ensure that impacts relating to ground shaking would be less than significant.

Using the information collected in CPT22-01 and CPT22-02[9] and the location of the TS, we estimate that the site classification for the TS is CD (dense sand or very stiff clay).

3.3.1.3 Liquefaction, Settlement, and Lateral Spreading

Liquefaction is a phenomenon where cohesionless soils (gravel, sand, and cohesionless silt) below the water table lose strength as a result of shaking under earthquake loading.

The deep groundwater table and the dense to very dense soils result in the TS area not being susceptible to liquefaction. Because the soils are not susceptible to liquefaction, lateral spreading, sand boils, and seismic settlements are not expected.

3.3.1.4 Landslides and Slope Instability

The TS will be constructed in a flat area or pad. Therefore, slope instability due to strong shaking is not foreseen for the TS.

The pad will be elevated and have retaining walls. The retaining walls will be designed in accordance with the CBC as part of final design; therefore, instability of the retaining walls is not foreseen.

---

[8] Geosyntec Consultants, Inc., *Letter-Report: Seismic Hazard Evaluation, Buena Vista Drive Sanitary Landfill, Watsonville, California*; 2003.

[9] To determine the site class, we used the shear wave velocity profile collected in CPT22-01.

3.3.1.5 Unstable Ground

Unstable ground conditions are not expected because as described above:

- The measured and interpreted blowcounts show that the sands are medium dense to very dense and the clays are stiff to hard.
- Landslides and slope instability are not expected.
- Liquefaction is not a concern because the water table is deep.

3.3.1.6 Preliminary Conclusions for Seismic Hazards

Based on the above, seismic hazards are not a concern for the TS. Furthermore, the TS will be designed in accordance with the CBC; therefore, the above topics will also be addressed in detail as part of final design for the TS.

3.3.2 Expansive Soils

An expansion index test reported by Dees & Associates[10] for a clay sample collected in boring B-1 at a depth of approximately 5 feet had an Expansion Index (EI) of 50. Soils with an EI greater than 20 are potentially expansive; therefore, building footings or other structures founded on or adjacent to these potentially expansive soils may require mitigation measures such as excavation and replacement with non-expansive soils, amendment of the expansive soils with lime or cement, construction of moisture barriers, grading of surfaces to drain away from the area, and/or restrictions on the use of irrigation and/or infiltration of stormwater into the subsurface.

3.3.3 Erosion and Loss of Top Soil

Currently, the surfaces in the area of the proposed TS include areas of asphalt and gravel pavements (i.e., current parking lots and landfill perimeter access roads) and vegetated areas (i.e., adjacent Modules 1 and 2 landfill slopes, other sloping areas). Furthermore, the BVLF falls under California's Industrial General Permit requirements; therefore, best management practices (BMPs) are routinely implemented and maintained.

During construction, soils may be exposed to the weather; however, as a regulatory requirement, a Stormwater Pollution and Prevention Plan (SWPPP) would be required if construction activities disturb more than one acre of land. The SWPPP would address construction impacts,

---

[10] Dees & Associates, Inc. 2008. *Geotechnical Investigation for Proposed Maintenance Facility Addition, Buena Vista Landfill,* prepared for the Terra Coast Construction. October.

especially during soil disturbing activities when soils are exposed to wind, rain and concentrated flows that could cause erosion. These mandatory requirements would minimize soil erosion. Furthermore, undisturbed areas will be fenced off and any top soil generated as part of grading activities will be stockpiled and protected for later use. Stockpiles will be covered with tarps, plastic sheeting, erosion control fabrics, or treated with biodegradable soil stabilizers.

After the TS is constructed:

- Much of the disturbed area would be nearly 100 percent impervious because it will be paved or developed as buildings. Therefore, the TS would not result in on-site erosion because all runoff would be directed to areas of BMPs and/or other storm drain infrastructure.
- Permanent fill or cut areas would be hydroseeded and vegetated.

We do not recommend infiltration of any collected stormwater as part of low impact development (LID) features so that the soils below the area are not impacted negatively (e.g., existing potentially expansive soils, long-term saturation of soils).

3.3.4 Septic Systems or Alternative Wastewater Disposal Systems

The current Maintenance Building area is served by septic tanks, and sewers for the disposal of wastewater from TS activities are not available. To address TS wastewater, an upgraded septic tank or a similar system will be constructed. The current septic tank will likely need to be abandoned because it is located near the western side of the current Maintenance Building and the Maintenance Building is located within the footprint of the TS (see Figure 3); the abandonment will need to be coordinated as part of final design of the TS. As for the LID features, we do not recommend infiltrating wastewater into the subsurface soils.

3.4 Waste Encountered Outside Final Closure Limit

Based on the findings of the field investigation, waste fill is present outside the final closure limit for Module 2 (Figure 3). The closure limit for Module 2 generally coincides with the existing concrete ditch along the toe of the Module 2 waste fill slope.

Options to address the waste fill include:

- Moving the proposed TS improvements footprint outside the limit of waste.
- Designing the proposed TS improvements so foundation concerns, such as compression and settlement of the waste within the project area do not affect the TS improvements.

- Removing the waste fill to the current limit of final closure (i.e., clean closure) and replacement with engineered fill.

If the waste fill in the area of the TS were left in place, the area will need to undergo final closure in accordance with Title 27 of the California Code of Regulations (27CCR); furthermore, the requirements in Section 21190 in 27CCR (see below) need to be followed.

If clean closure were selected, a final closure plan for clean closure meeting Section 21810 in 27CCR will need to be prepared.

The selected alternative will need to be approved by the Regional Water Quality Control Board (RWQCB) and CalRecycle.

3.5 Requirements for Buildings Constructed Near Landfills in Title 27 of the California Code of Regulations (27CCR)

The TS is planned as a replacement for the adjacent BVLF for the County's waste disposal needs. Since the TS will be located adjacent to closed Module 2 of the BVLF, the requirements in Title 27 (27CCR), Division 2, Subdivision 1, Chapter 3, Subchapter 5, Article 2 of §21190 (California Integrated Waste Management Board [CIWMB][11] Postclosure Land Use) may apply:

(a) Proposed postclosure land uses shall be designed and maintained to:

(1) protect public health and safety and prevent damage to structures, roads, utilities and gas monitoring and control systems;

(2) prevent public contact with waste, landfill gas and leachate; and

(3) prevent landfill gas explosions.

(b) The site design shall consider one or more proposed uses of the site toward which the operator will direct its efforts, or shall show development as open space, graded to harmonize with the setting and landscaped with native shrubbery or low maintenance ground cover.

(c) All proposed postclosure land uses, other than non-irrigated open space, on sites implementing closure or on closed sites shall be submitted to the Enforcement Agency (EA),[12] Regional Water Quality Control Board (RWQCB),[13] local air district and local land use agency. The EA shall review and approve proposed postclosure land uses if the project

[11] CalRecycle.
[12] EA – for the BVLF, Santa Cruz County Environmental Health.
[13] RWQCB – for the BVLF, the Central Coast Region.

involves structures within 1,000 feet of the disposal area, structures on top of waste, modification of the low permeability layer, or irrigation over waste.

(d) Construction on the site shall maintain the integrity of the final cover, drainage and erosion control systems, and gas monitoring and control systems. The owner or operator shall demonstrate to the satisfaction of the EA that the activities will not pose a threat to public health and safety and the environment. Any proposed modification or replacement of the low permeability layer of the final cover shall begin upon approval by the EA and the RWQCB.

(e) Construction of structural improvements on top of landfilled areas during the postclosure period shall meet the following conditions:

(1) automatic methane gas sensors, designed to trigger an audible alarm when methane concentrations are detected, shall be installed in all buildings;

(2) enclosed basement construction is prohibited;

(3) buildings shall be constructed to mitigate the effects of gas accumulation, which may include an active gas collection or passive vent systems;

(4) buildings and utilities shall be constructed to mitigate the effects of differential settlement. All utility connections shall be designed with flexible connections and utility collars;

(5) utilities shall not be installed in or below any low permeability layer of final cover;

(6) pilings shall not be installed in or through any bottom liner unless approved by the RWQCB;

(7) if pilings are installed in or through the low permeability layer of final cover, then the low permeability layer must be replaced or repaired; and

(8) periodic methane gas monitoring shall be conducted inside all buildings and underground utilities in accordance with §20933 of Article 6, of Subchapter 4 of this Chapter.

(f) The EA may require that an additional soil layer or building pad be placed on the final cover prior to construction to protect the integrity and function of the various layers of final cover.

(g) All on-site construction within 1,000 feet of the boundary of any disposal area shall be designed and constructed in accordance with the following, or in accordance with an

equivalent design which will prevent gas migration into the building, unless an exemption has been issued.

(1) a geomembrane or equivalent system with low permeability to landfill gas shall be installed between the concrete floor slab of the building and subgrade;

(2) a permeable layer of open graded material of clean aggregate with a minimum thickness of 12 inches shall be installed between the geomembrane and the subgrade or slab;

(3) a geotextile filter shall be utilized to prevent the introduction of fines into the permeable layer;

(4) perforated venting pipes shall be installed within the permeable layer and shall be designed to operate without clogging;

(5) the venting pipe shall be constructed with the ability to be connected to an induced draft exhaust system;

(6) automatic methane gas sensors shall be installed within the permeable gas layer, and inside the building to trigger an audible alarm when methane gas concentrations are detected; and

(7) periodic methane gas monitoring shall be conducted inside all buildings and underground utilities in accordance with Article 6, of Subchapter 4 of this Chapter (§20920 et seq.).

Another regulation that will need to be addressed by the design team is 22CCR § 64572 (Water Main Separation) which states:

(f) New water mains shall not be installed within 100 horizontal feet of the nearest edge of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 horizontal feet of the nearest edge of any cesspool, septic tank, sewage leach field, seepage pit, underground hazardous material storage tank, or groundwater recharge project site.

The above requirements would be addressed as part of final design with engineering controls.

3.6 Existing and New Infrastructure

Existing infrastructure for the BVLF such as landfill gas probes may need to be relocated as part of developing the TS. Figure 2 shows that landfill gas probes GP-7, GP-8, and GP-9 are in the area of the TS.

We do not recommend infiltrating water as part of LID practices because perched water may develop. Water may affect the above conclusions regarding liquefaction and expansive soils.

ATTACHMENTS

Figure 1 – Site Plan – Existing Conditions

Figure 2 – Site Plan – Exploration Locations

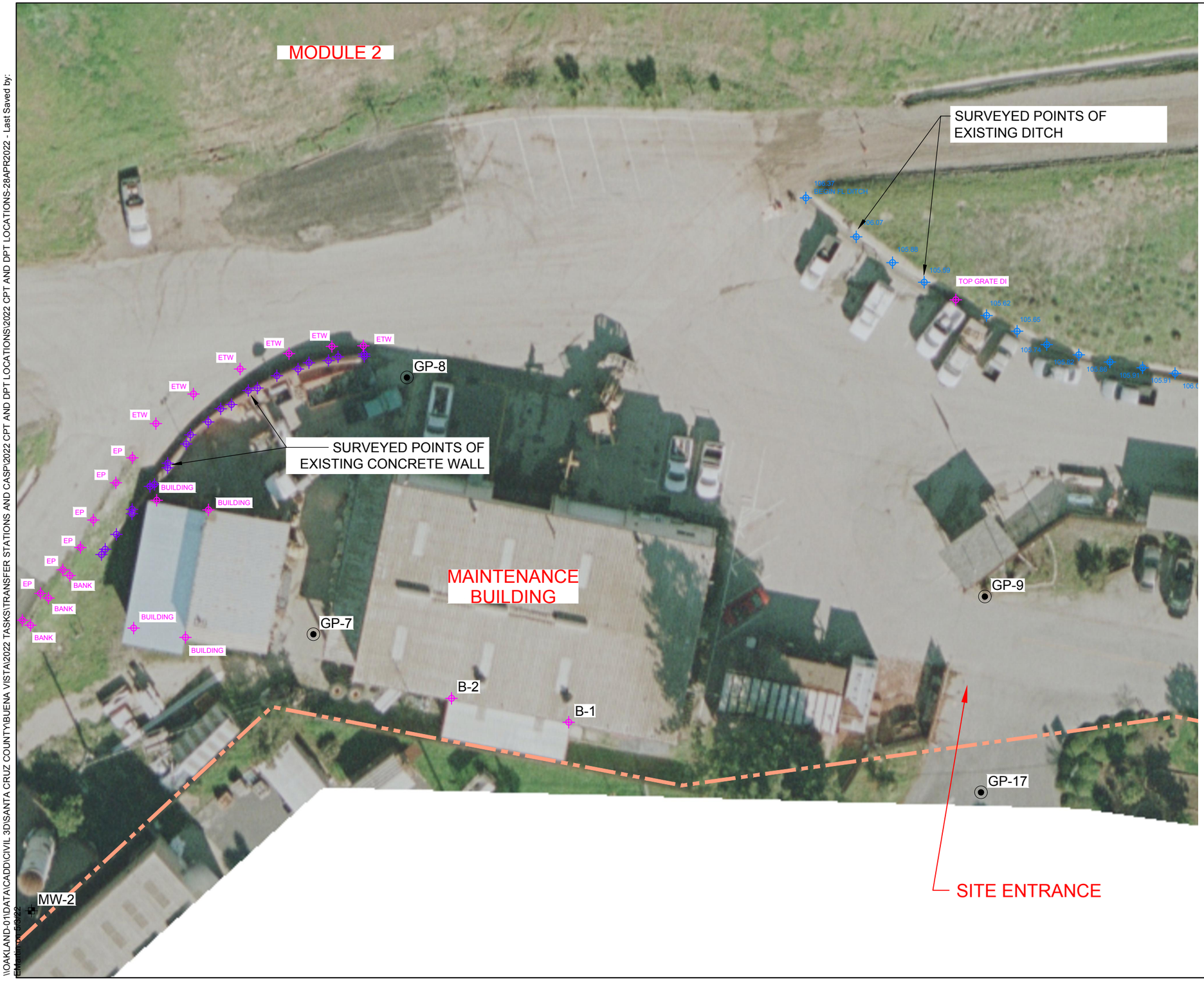
Figure 3 – Site Plan – Proposed Transfer Station

Appendix 1 – CPT Exploration Report

Appendix 2 – DPT Exploration Summary

Appendix 3 – Gas Probes, Monitoring Wells Log, Geotechnical Report

* * * * *



N

0 30 60

SCALE IN FEET

LEGEND

- APPROXIMATE PROPERTY LINE
- GP-7 — GAS PROBES
- MW-2 — MONITORING WELLS
- B-1 — GEOTECHNICAL BORINGS

NOTE:

1. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH. DATE OF AERIAL PHOTOGRAPHY BY AMERICAN AERIAL SURVEYS: 11-17-2021. COORDINATE GRID AND ELEVATIONS BASED ON LOCAL SYSTEM.

SITE PLAN - EXISTING CONDITIONS
BUENA VISTA LANDFILL
SANTA CRUZ COUNTY, CALIFORNIA

Geosyntec consultants

PROJECT NO: WG3064 | MAY 2022

FIGURE 1

I:\OAKLAND-01\DATA\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2022 TASKS\TRANSFER STATIONS AND CASP\2022 CPT AND DPT LOCATIONS\2022 CPT AND DPT LOCATIONS-28APR2022 - Last Saved by:
EMathis on 5/3/22

MODULE 2

EXISTING PAVEMENT CRACKS

DPT 22-101
DPT 22-110A
DPT 22-110B
DPT 22-102A
DPT 22-102B
DPT 22-102C
DPT 22-102D
DPT 22-103A
DPT 22-103B
DPT 22-103C
DPT 22-104A
DPT 22-104B
DPT 22-104C
DPT 22-105A
DPT 22-105B
DPT 22-105C
DPT 22-106A
DPT 22-106B
DPT 22-106C
DPT 22-106D
DPT 22-106E
DPT 22-107A
DPT 22-107B
DPT 22-107C
DPT 22-108
DPT 22-109
CPT 22-01
CPT 22-02
GP-7
GP-8
GP-9
GP-17
MW-2
B-1
B-2

Asphalt

x 106.5

x 105.5

x 105

x 105.6

MAINTENANCE BUILDING

SITE ENTRANCE

N

0 30 60

SCALE IN FEET

LEGEND

- APPROXIMATE PROPERTY LINE
- ASSUMED HISTORICAL WASTE LIMIT
- ESTIMATED LIMITED OF WASTE (NOTE 1)
- EXISTING CONCRETE DITCH/MODULE 2 CLOSURE (NOTE 3)
- DPT/CPT 22-103 — 2022 DPT & CPT LOCATIONS
- GP-7 — GAS PROBES
- MW-2 — MONITORING WELLS
- B-1 — GEOTECHNICAL BORINGS

NOTES:

1. LIMIT OF WASTE BASED ON 2022 FIELD INVESTIGATION.
2. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH. DATE OF AERIAL PHOTOGRAPHY BY AMERICAN AERIAL SURVEYS: 11-27-2023. COORDINATE GRID AND ELEVATIONS BASED ON LOCAL SYSTEM.
3. LIMIT OF CLOSURE BASED ON INFORMATION PROVIDED IN CONSTRUCTION QUALITY ASSURANCE REPORT, MODULE 1/2 FINAL COVER; BUENA VISTA LANDFILL, COUNTY OF SANTA CRUZ, CALIFORNIA; PREPARED BY THE COUNTY OF SANTA CRUZ, CALIFORNIA; DECEMBER 1995.

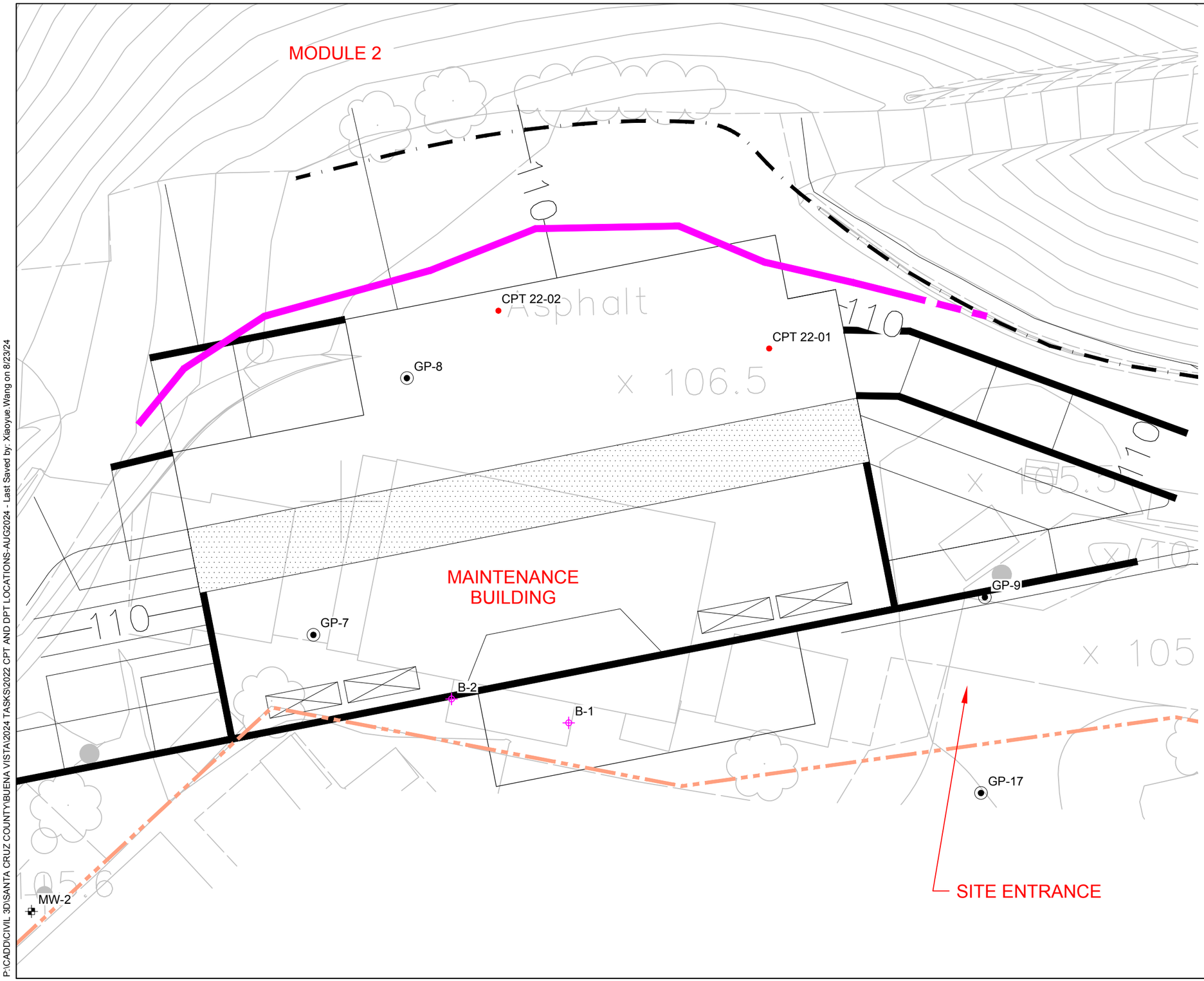
SITE PLAN - EXPLORATION LOCATIONS
BUENA VISTA LANDFILL
SANTA CRUZ COUNTY, CALIFORNIA

Geosyntec consultants

FIGURE 2

PROJECT NO: WG3064 | AUGUST 2024

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2024 TASKS\2022 CPT AND DPT LOCATIONS-AUG2024 - Last Saved by: Xiaoyue.Wang on 8/23/24



LEGEND

- APPROXIMATE PROPERTY LINE
- ESTIMATED LIMITED OF WASTE (NOTE 1)
- EXISTING CONCRETE DITCH/MODULE 2 CLOSURE (NOTE 3)
- CPT 22-02 — 2022 CPT LOCATIONS
- GP-7 — GAS PROBES
- MW-2 — MONITORING WELLS
- B-1 — GEOTECHNICAL BORINGS

NOTES:

1. LIMIT OF WASTE BASED ON 2022 FIELD INVESTIGATION.
2. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH. DATE OF AERIAL PHOTOGRAPHY BY AMERICAN AERIAL SURVEYS: 11-27-2023. COORDINATE GRID AND ELEVATIONS BASED ON LOCAL SYSTEM.
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SITE PLAN - PROPOSED TRANSFER STATION
BUENA VISTA LANDFILL
SANTA CRUZ COUNTY, CALIFORNIA

Geosyntec consultants

FIGURE 3

PROJECT NO: WG3064 | AUGUST 2024

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2024 TASKS\2022 CPT AND DPT LOCATIONS-AUG2024 - Last Saved by: Xiaoyue.Wang on 8/23/24

APPENDIX 1
CPT Exploration Report

CONE PENETRATION TESTING (CPT) REPORT

Gregg Drilling LLC

NOTE:
CPT22-01 and CPT22-02 are located in the maintenance area of the Buena Vista Landfill (150 Rountree Lane, Watsonville, CA). The remaining CPTs (CPT22-03 through CPT22-11) are located in the area of the Old Landfill to the West of Gallighan Slough.
CPT22-08, CPT22-09, and CPT22-10 were located outside the footprint of the Old Landfill.
CPT-22-03, CPT22-04, CPT22-05, CPT22-06, CPT22-07, and CPT22-11 were located within the footprint of the Old Landfill so were pushed through waste fill.

Prepared for: Geosyntec
Project D2229038
April 25, 2022

Prepared by: Eleni Pateras
epateras@greggdrilling.com

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Cone Penetration Test Data & Interpretation 5
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APPENDIX A: Cone Penetration Test Plots

APPENDIX B: Pore Pressure Dissipation Test Plots

APPENDIX C: Seismic Plots & Tables

April 25, 2022

Geosyntec
Attn: Emily Martin

Subject: CPT Site Investigation
Buena Vista Landfill
Watsonville, CA
GREGG Project Number: D2229038

Dear Emily:

The following report presents the results of Gregg Drilling's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☒
4	Groundwater Samples	(GWS)	☐
5	Soil Samples	(SS)	☐
6	Vapor Samples	(VS)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 562-427-6899.

Sincerely,

CPT Reports Team
Gregg Drilling, LLC.

Cone Penetration Testing (CPT) Procedure

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, Figure CPT.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (PPDT). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

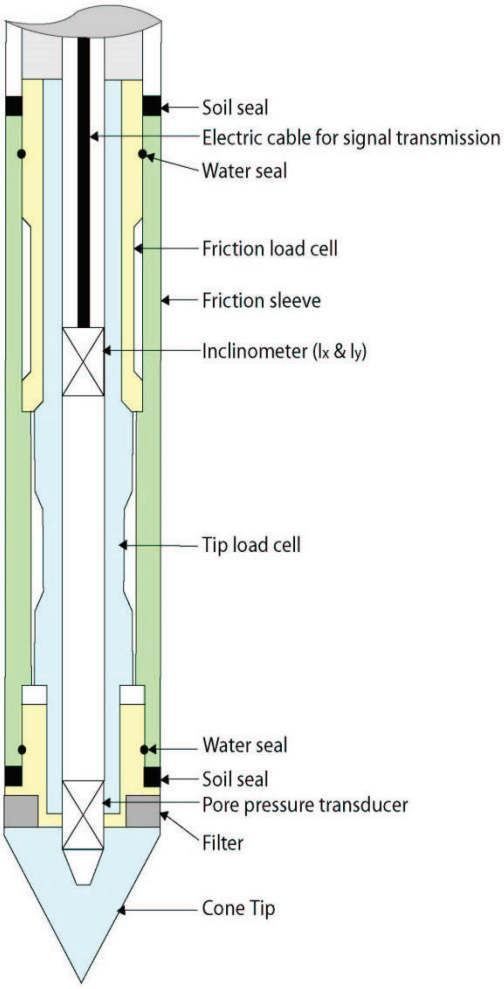


Figure CPT

15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

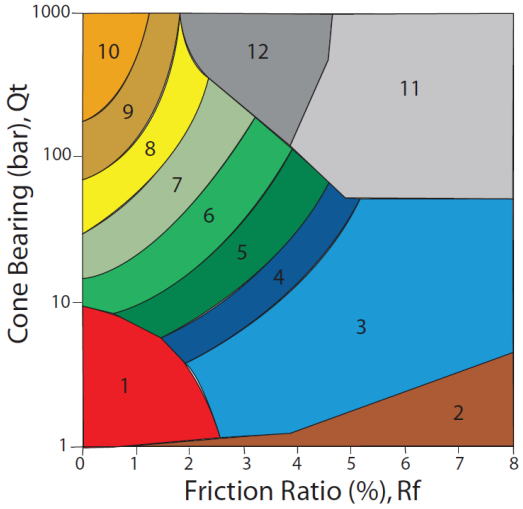
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1990) or normalized data (2010 and 2016). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (2010 and 2016) which can be displayed as SBTn (Figure SBTn). The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling LLC does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

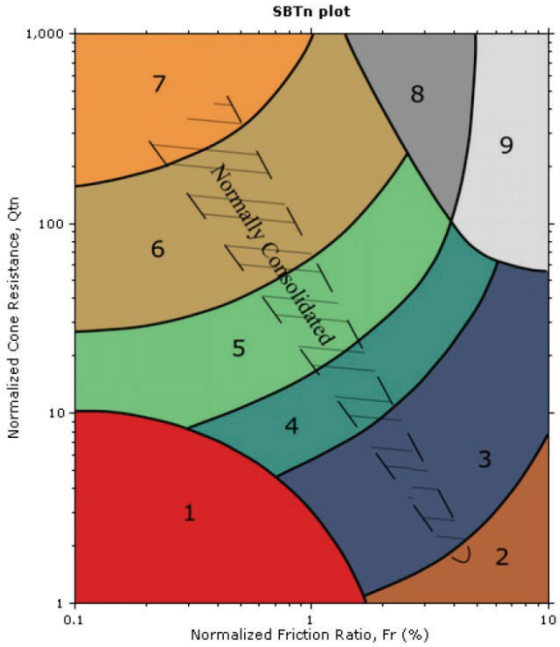
Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.

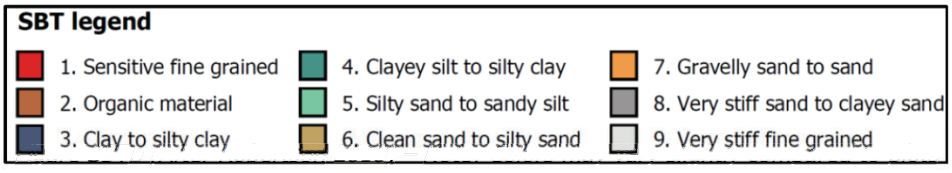


ZONE	Qt/N	SBT
1	2	Sensitive, fine grained
2	1	Organic materials
3	1	Clay
4	1.5	Silty clay to clay
5	2	Clayey silt to silty clay
6	2.5	Sandy silt to clayey silt
7	3	Silty sand to sandy silt
8	4	Sand to silty sand
9	5	Sand
10	6	Gravelly sand to sand
11	1	Very stiff fine grained*
12	2	Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1990) – Note: Colors may vary slightly compared to plots





Pore Pressure Dissipation Tests (PPDTs)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u)* with time is measured behind the tip of the cone and recorded.

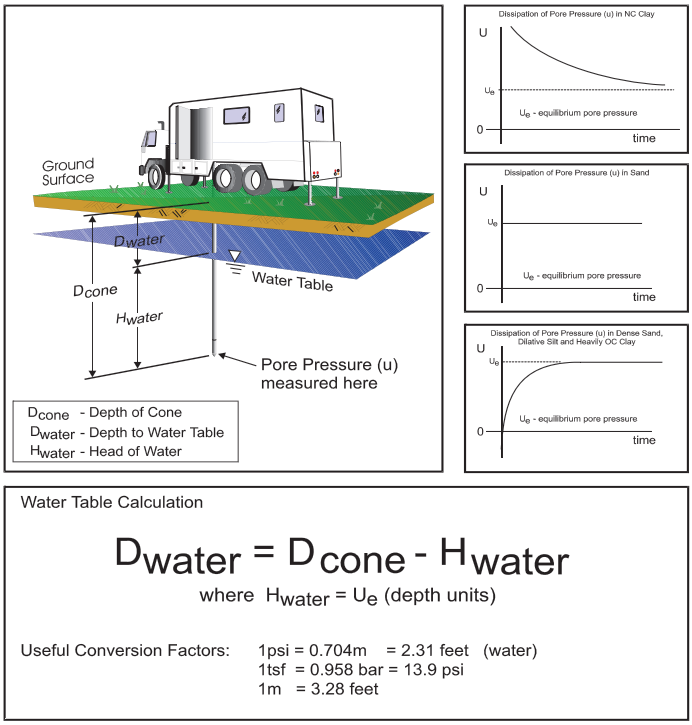
Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permeability (k_h)

To correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests completed for this project is included in Table 1.



Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

where $H_{water} = U_e$ (depth units)

Useful Conversion Factors: 1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

Figure PPDT

Seismic Cone Penetration Tests (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg Drilling's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δt). The difference in depth is calculated (Δd) and velocity can be determined using the simple equation: $v = \Delta d/\Delta t$

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.

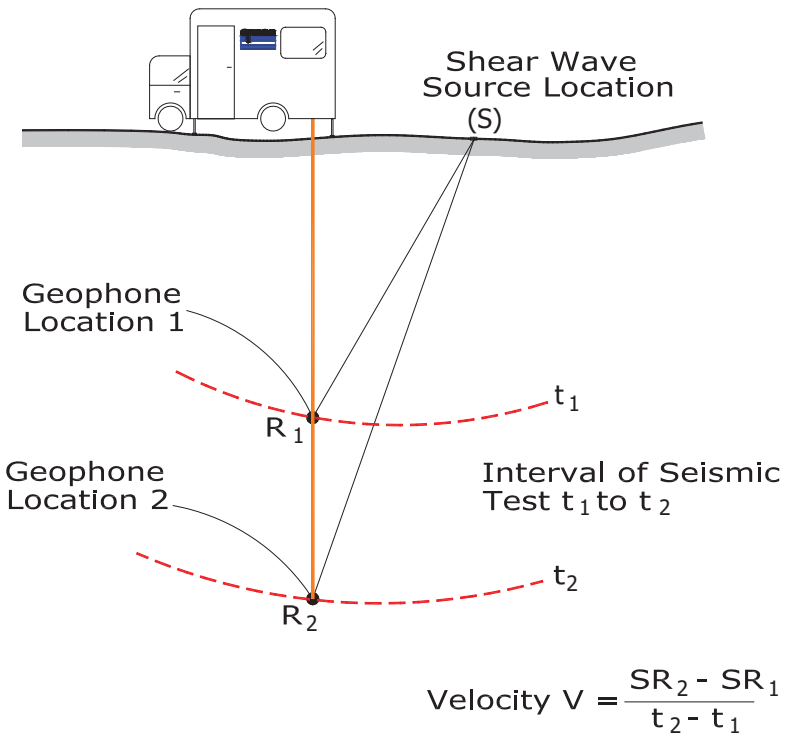


Figure SCPT

Soil Sampling

Gregg Drilling uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, *Figure SS*. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.

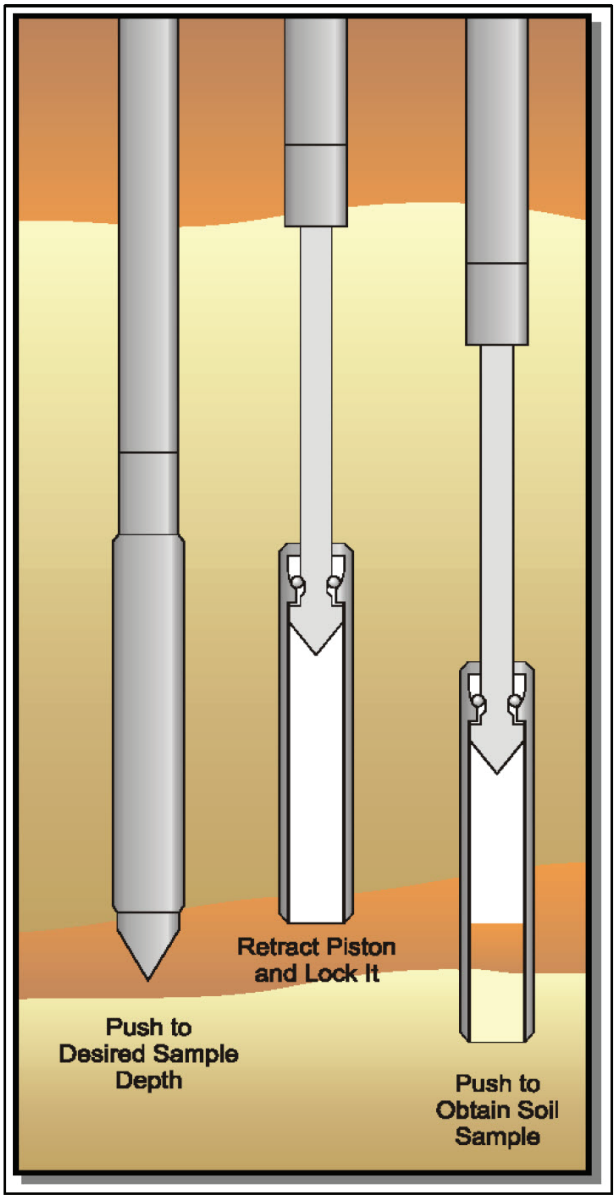


Figure SS

Ground Water Sampling

Gregg Drilling conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1¾ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

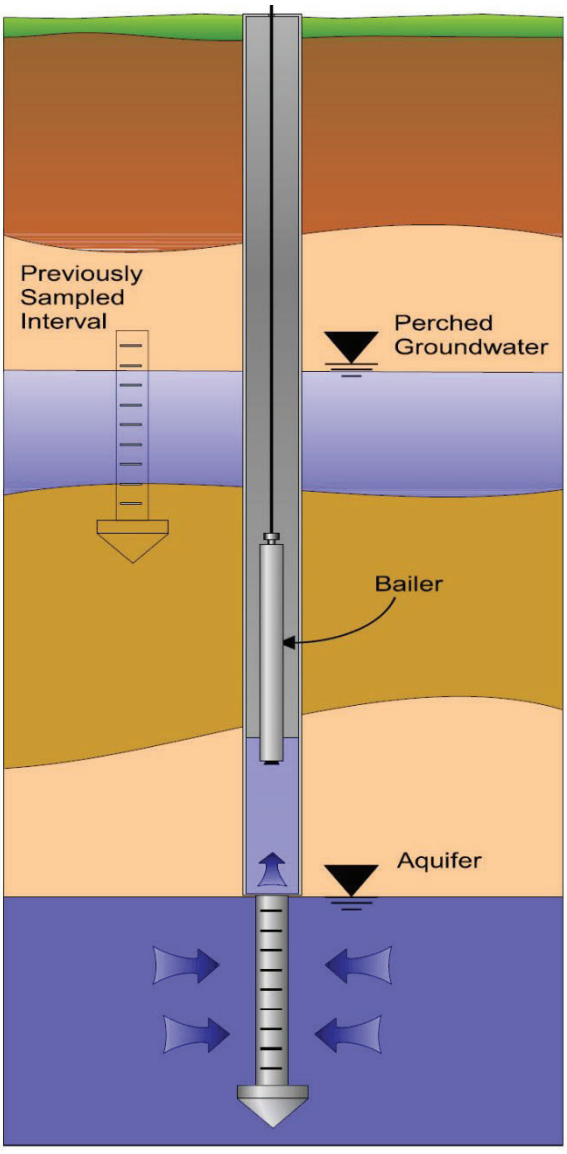


Figure GWS

References

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Mayne, P.W., "NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization", available through www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html, Section 5.3, pp. 107-112.

Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986 pp. 791-803.

Robertson, P.K., Sully, J., Woeller, D.J., Lunne, T., Powell, J.J.M., and Gillespie, D.J., "Guidelines for Estimating Consolidation Parameters in Soils from Piezocone Tests", Canadian Geotechnical Journal, Vol. 29, No. 4, August 1992, pp. 539-550.

Robertson, P.K., T. Lunne and J.J.M. Powell, "Geo-Environmental Application of Penetration Testing", Geotechnical Site Characterization, Robertson & Mayne (editors), 1998 Balkema, Rotterdam, ISBN 90 5410 939 4 pp 35-47.

Copies of ASTM Standards are available through www.astm.org

Table 1: Cone Penetration Testing Summary

CPT Sounding Identification	Date	Termination Depth (ft)	Depth of Soil Samples (ft)	Depth of Groundwater Samples (ft)	Depth of Pore Pressure Dissipation Tests (ft)
SCPT-22-01	4/7/2022	87.93	-	-	50.36, 87.93
CPT-22-02	4/6/2022	50.52	-	-	-
CPT-22-03	4/4/2022	62.17	-	-	-
SCPT-22-04	4/4/2022	44.95	-	-	-
SCPT-22-05*	4/5/2022	79.72	-	-	37.57, 64.14
SCPT-22-06	4/4/2022	42.65	-	-	-
CPT-22-07	4/5/2022	34.94	-	-	-
CPT-22-08	4/4/2022	50.52	-	-	-
CPT-22-09	4/8/2022	50.52	-	-	47.41
CPT-22-10	4/5/2022	51.02	-	-	27.56
CPT-22-11	4/8/2022	34.28	-	-	-

*Note: Seismic data was poor quality from 40-60ft and additional wave trace from 40-60ft were not calculated due to noise in the signal.

NOTE:
CPT22-01 and CPT22-02 are located in the maintenance area of the Buena Vista Landfill (150 Rountree Lane, Watsonville, CA). The remaining CPTs (CPT22-03 through CPT22-11) are located in the area of the Old Landfill to the West of Gallighan Slough.
CPT22-08, CPT22-09, and CPT22-10 were located outside the footprint of the Old Landfill.
CPT-22-03, CPT22-04, CPT22-05, CPT22-06, CPT22-07, and CPT22-11 were located within the footprint of the Old Landfill so were pushed through waste fill.

APPENDIX A:

CPT PLOTS

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-01 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

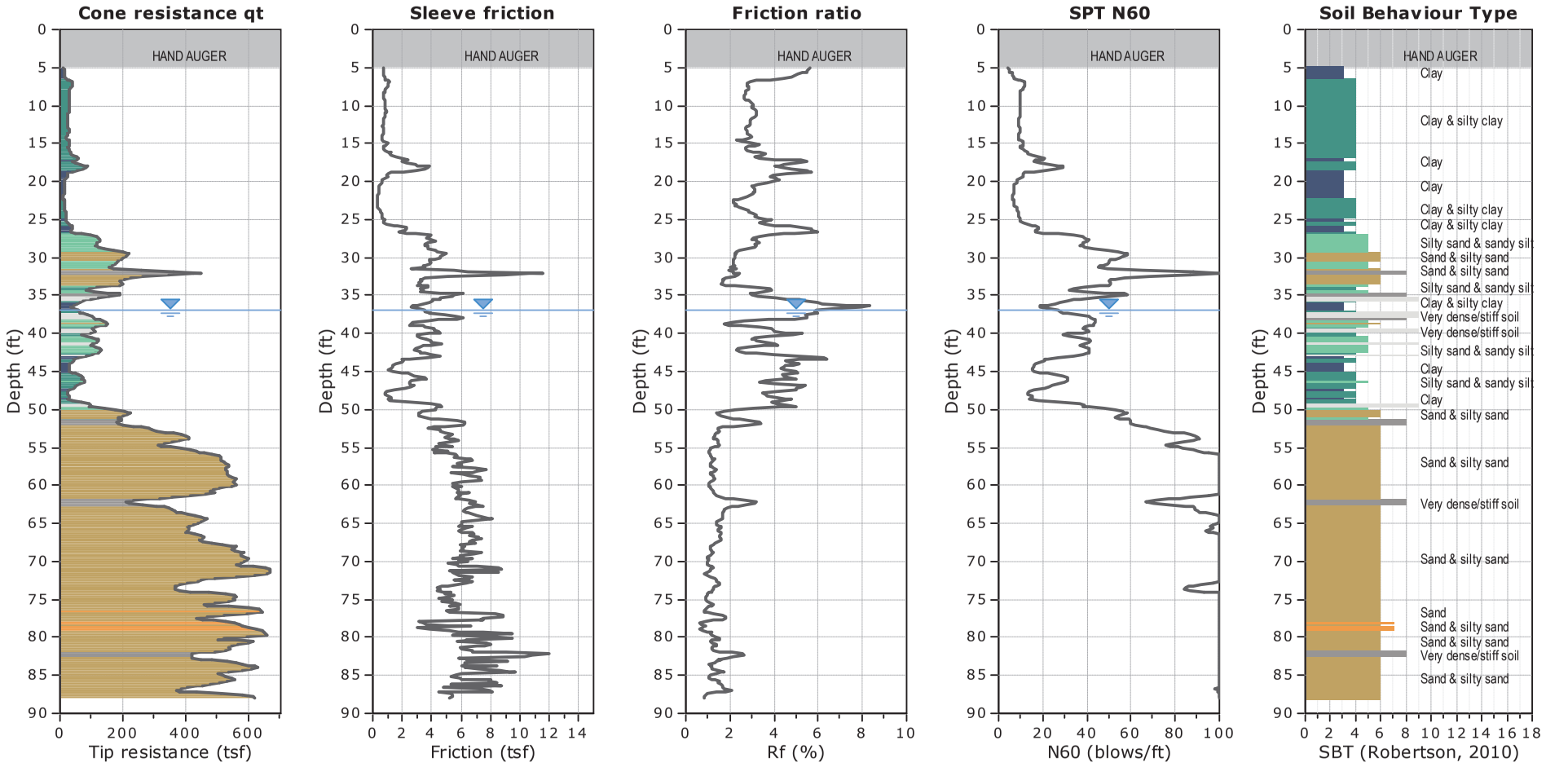
CPT: SCPT-22-01

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 87.93 ft, Date: 4/7/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-01 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

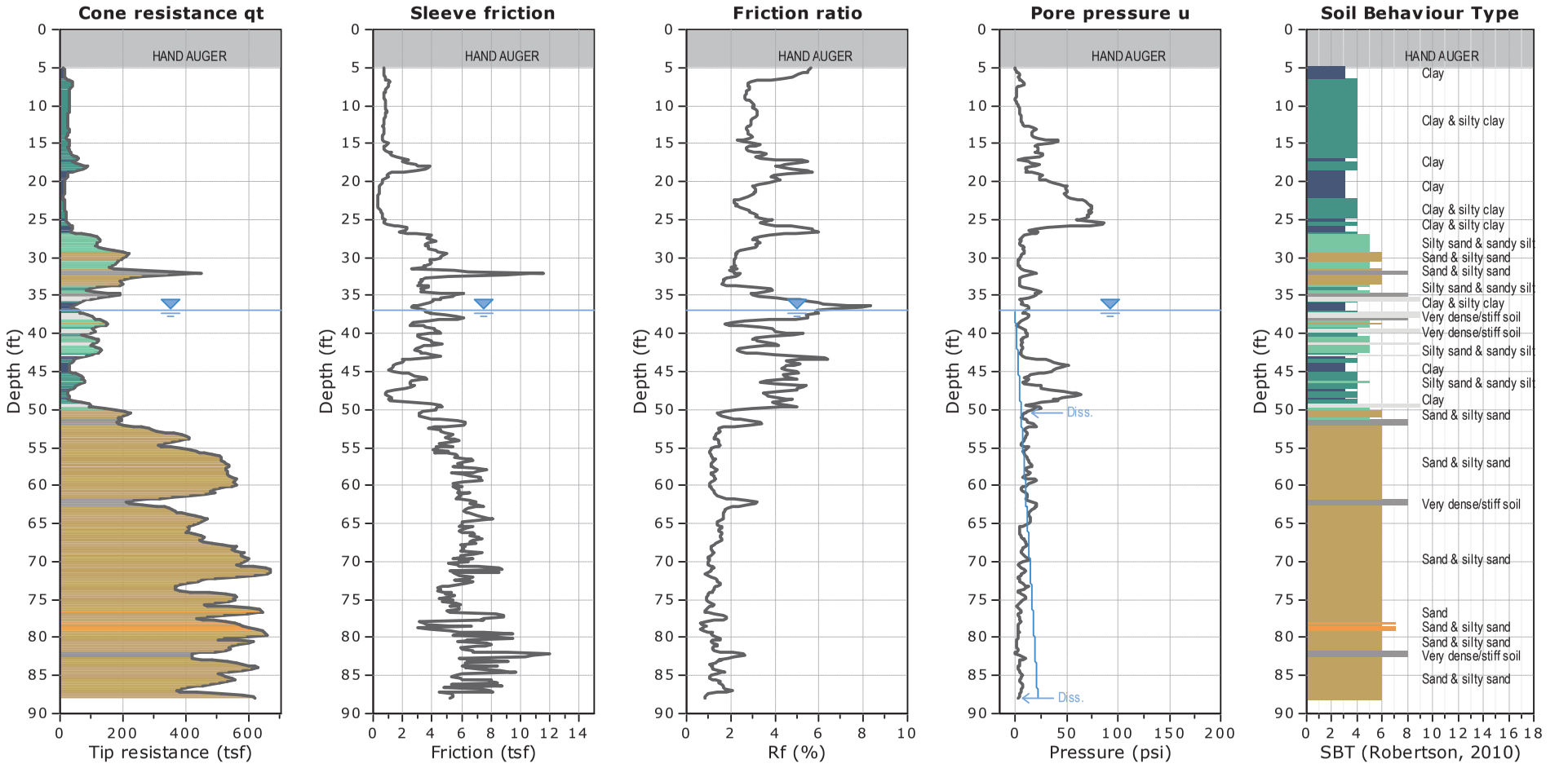
CPT: SCPT-22-01

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

Total depth: 87.93 ft, Date: 4/7/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-01 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

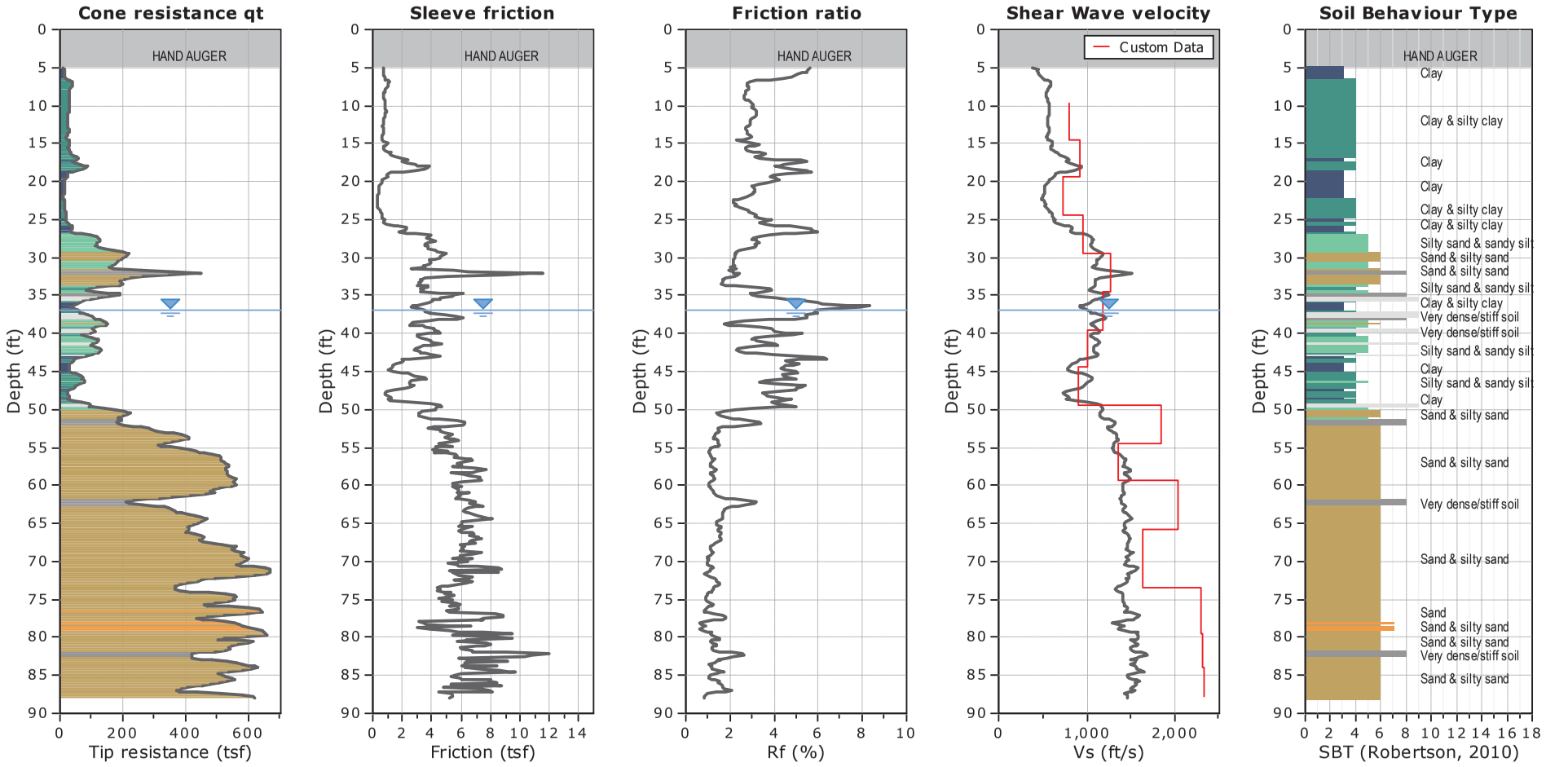
CPT: SCPT-22-01

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 87.93 ft, Date: 4/7/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-02 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

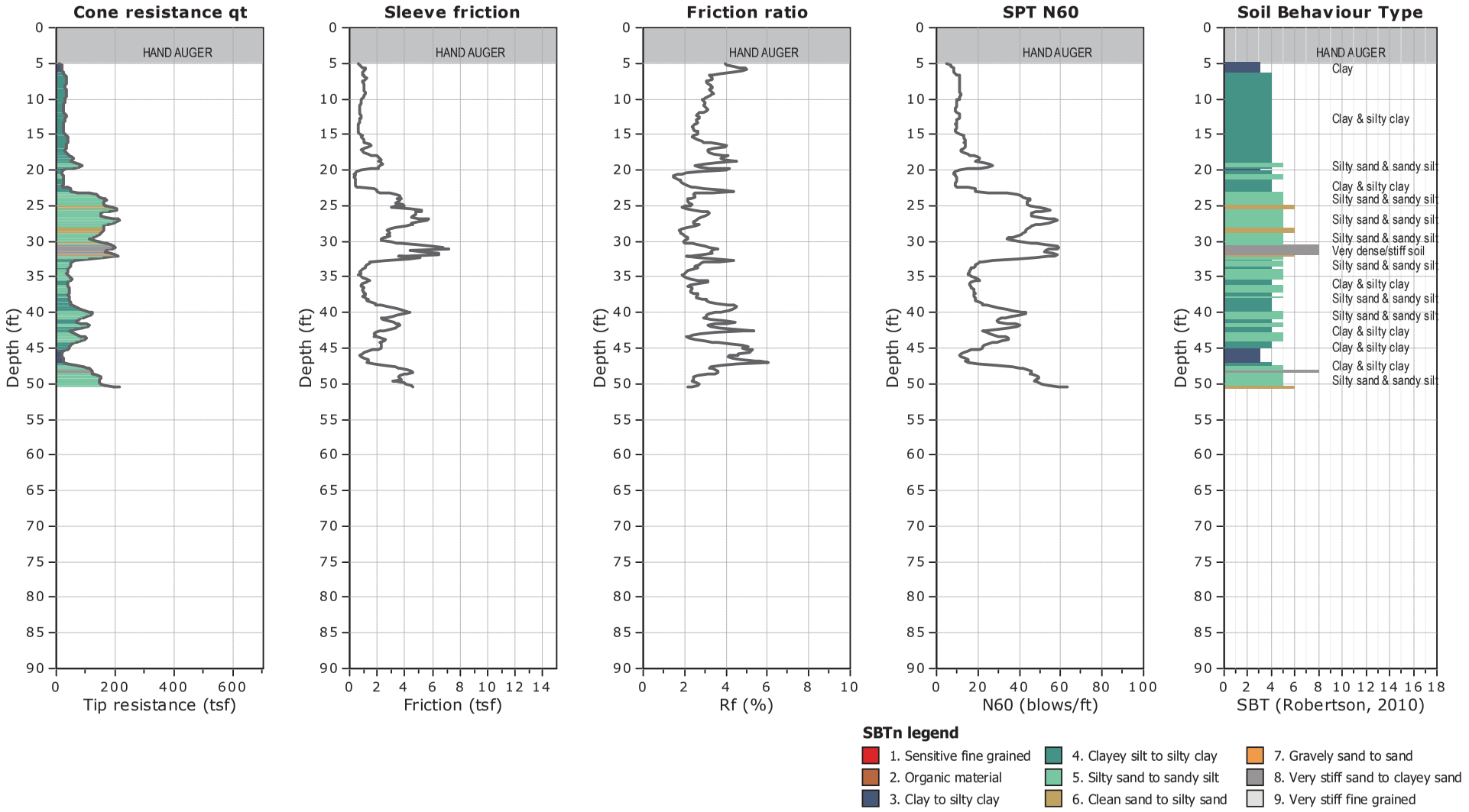
CPT: CPT-22-02

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/6/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-02 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

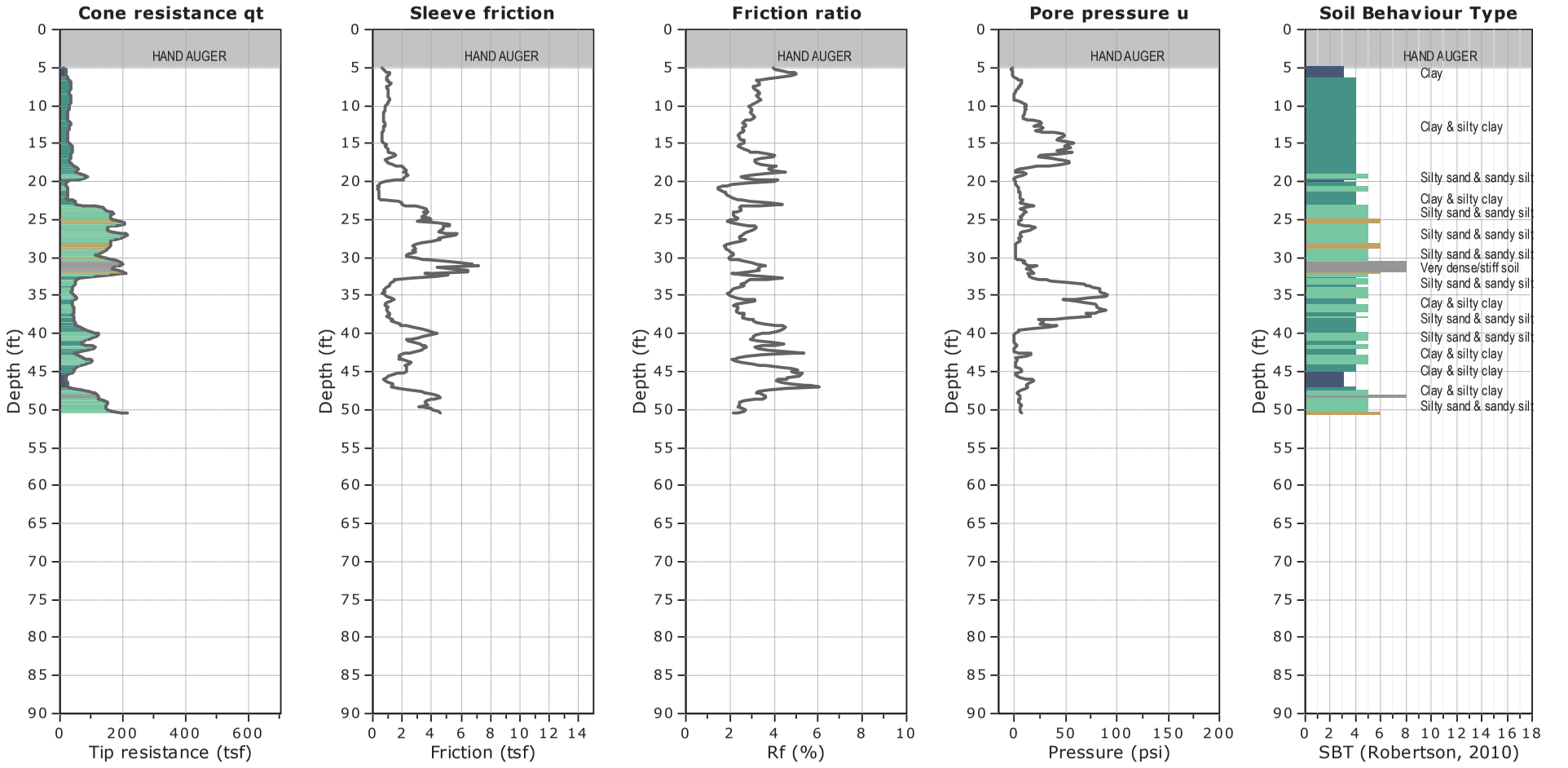
CPT: CPT-22-02

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/6/2022



SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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CPT22-03 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

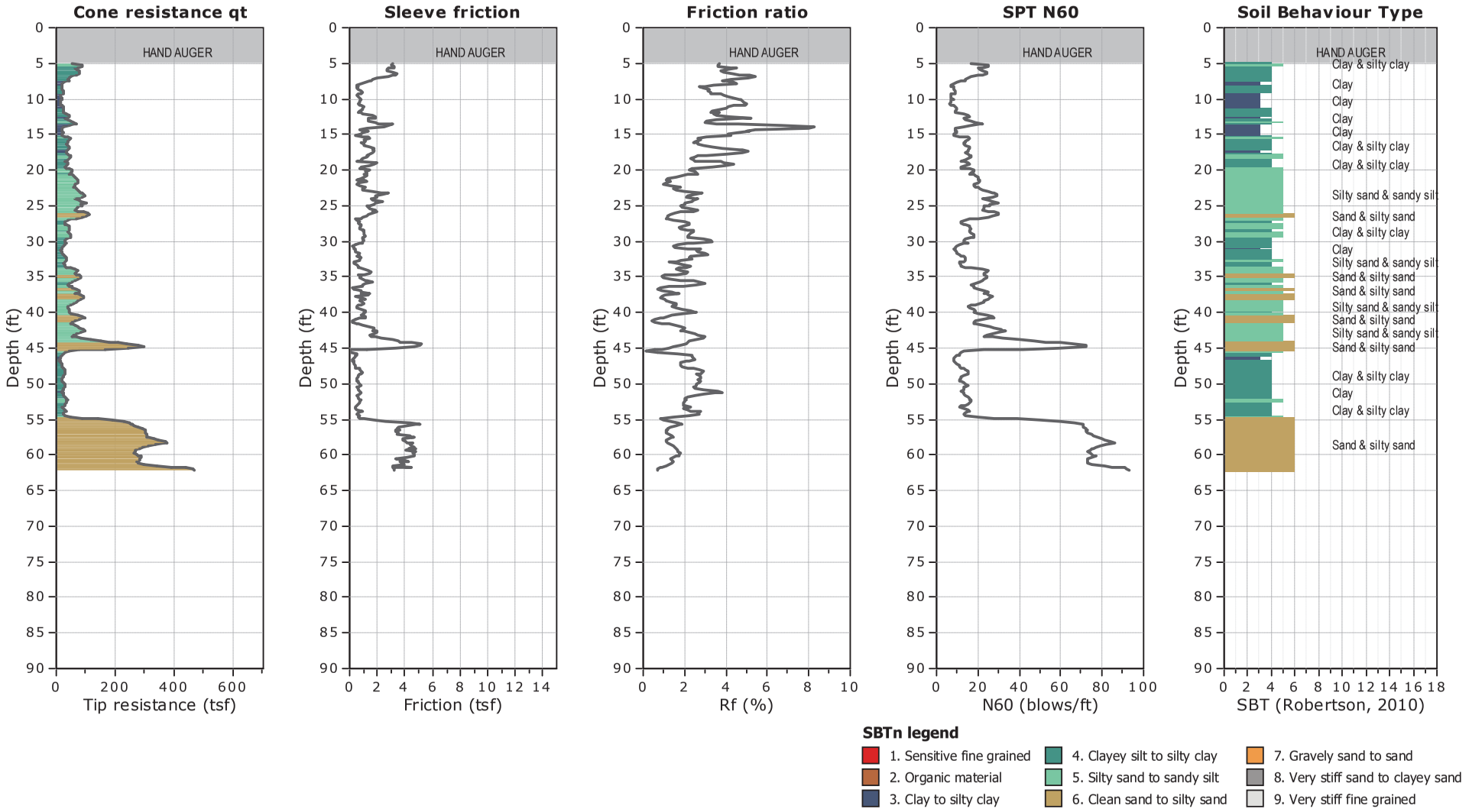
CPT: CPT-22-03

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 62.17 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-03 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

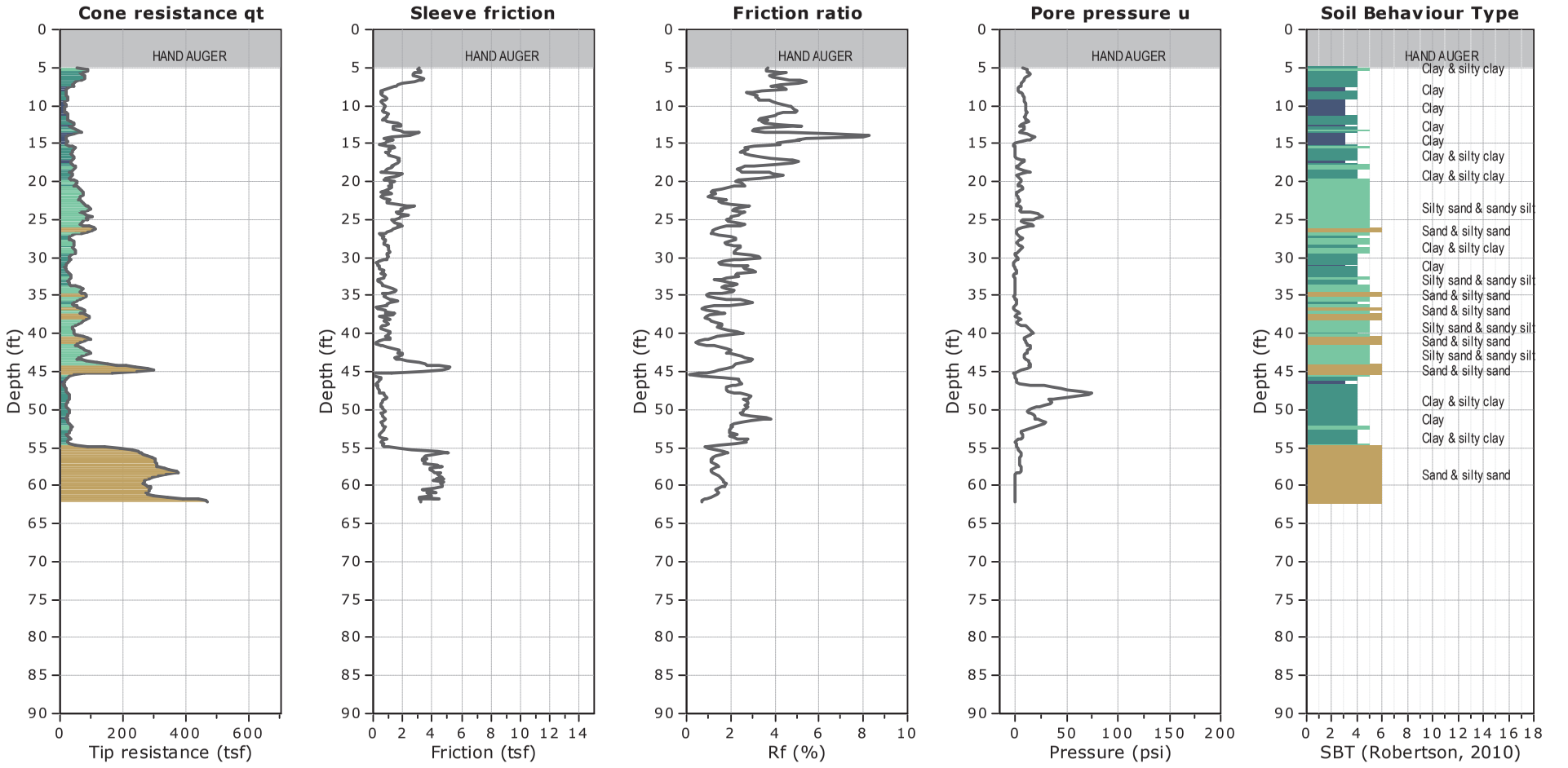
CPT: CPT-22-03

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 62.17 ft, Date: 4/4/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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SCPT22-04 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

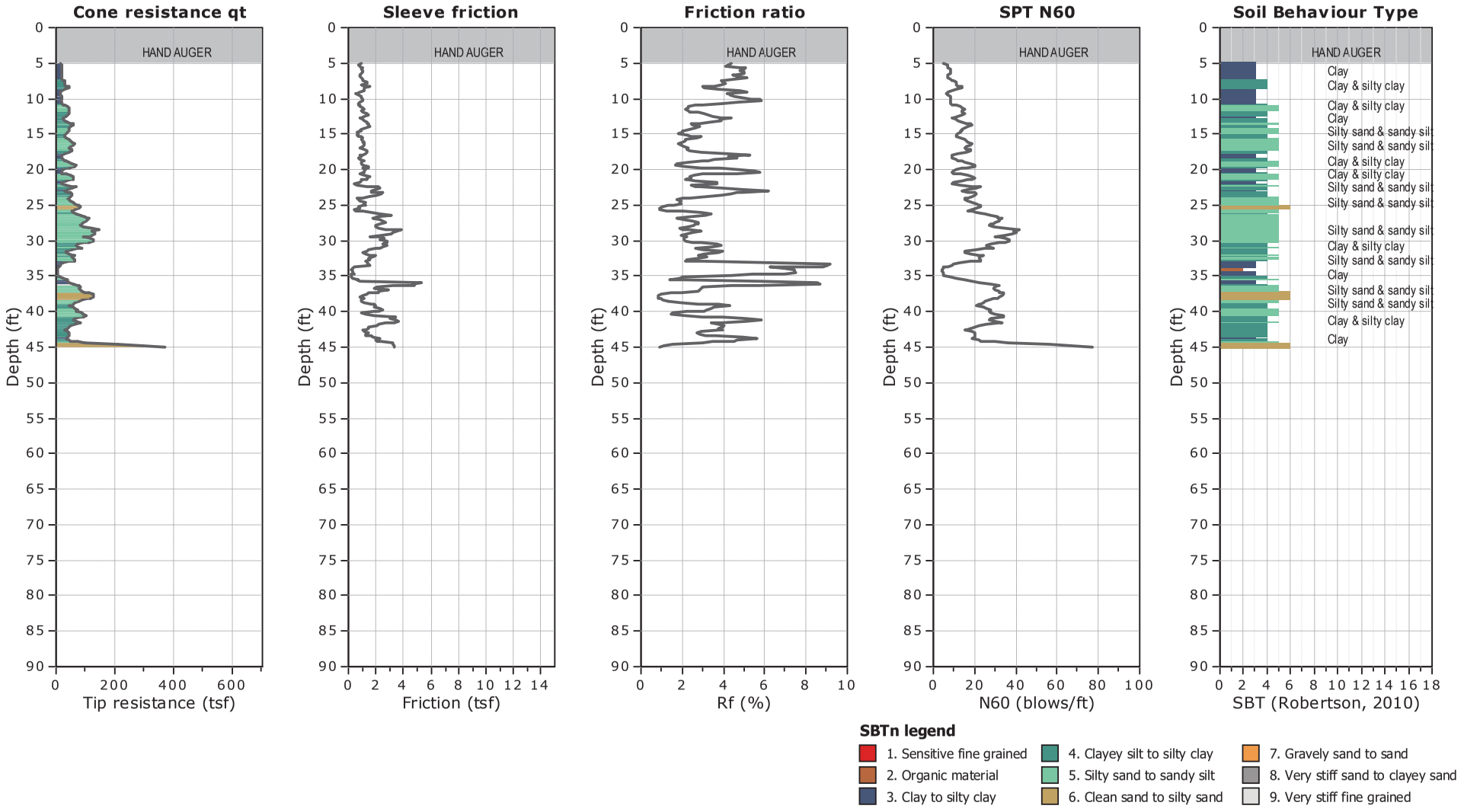
CPT: SCPT-22-04

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 44.95 ft, Date: 4/4/2022



GREGG DRILLING, LLC
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SCPT22-04 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

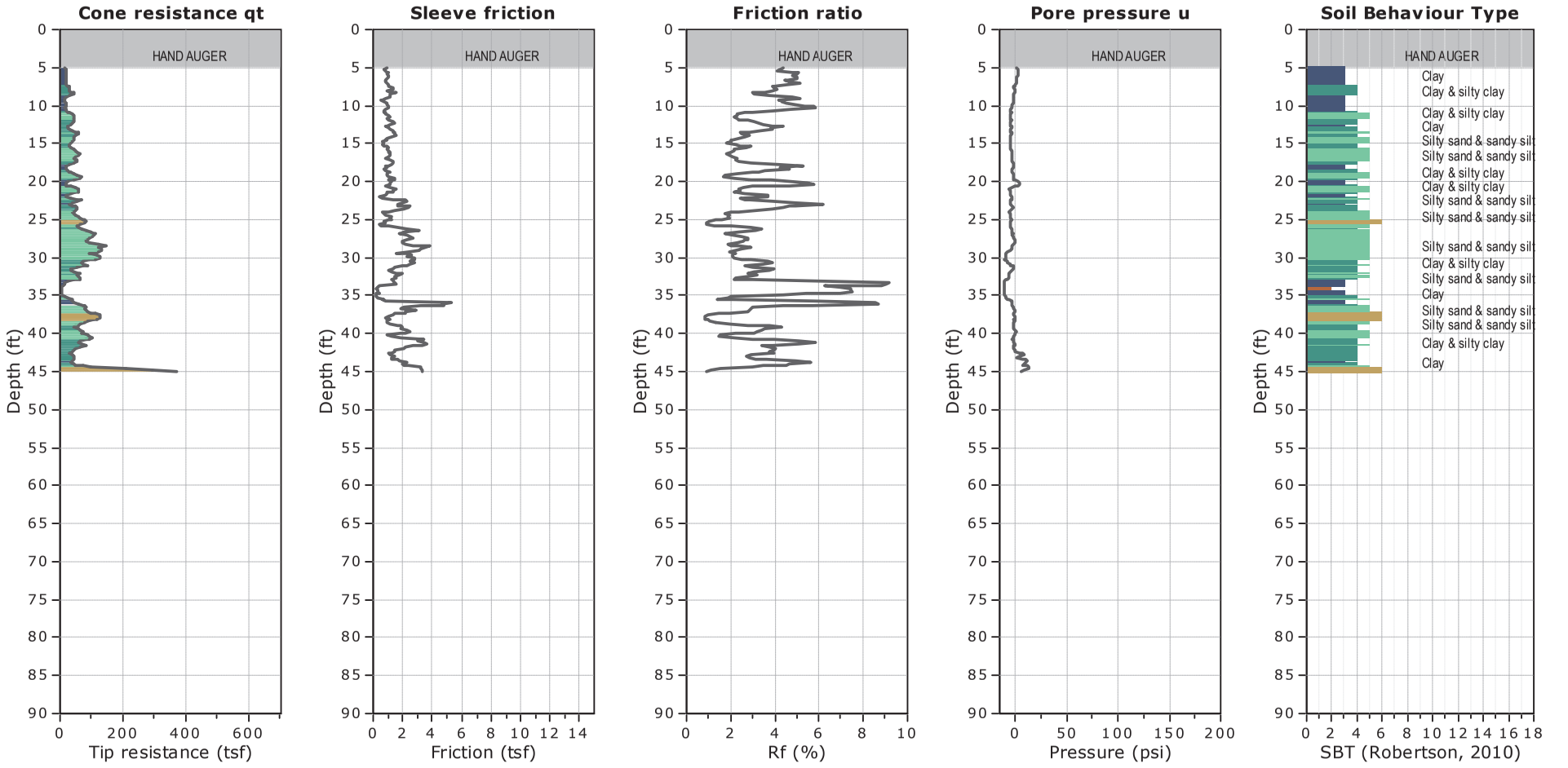
CPT: SCPT-22-04

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 44.95 ft, Date: 4/4/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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SCPT22-04 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

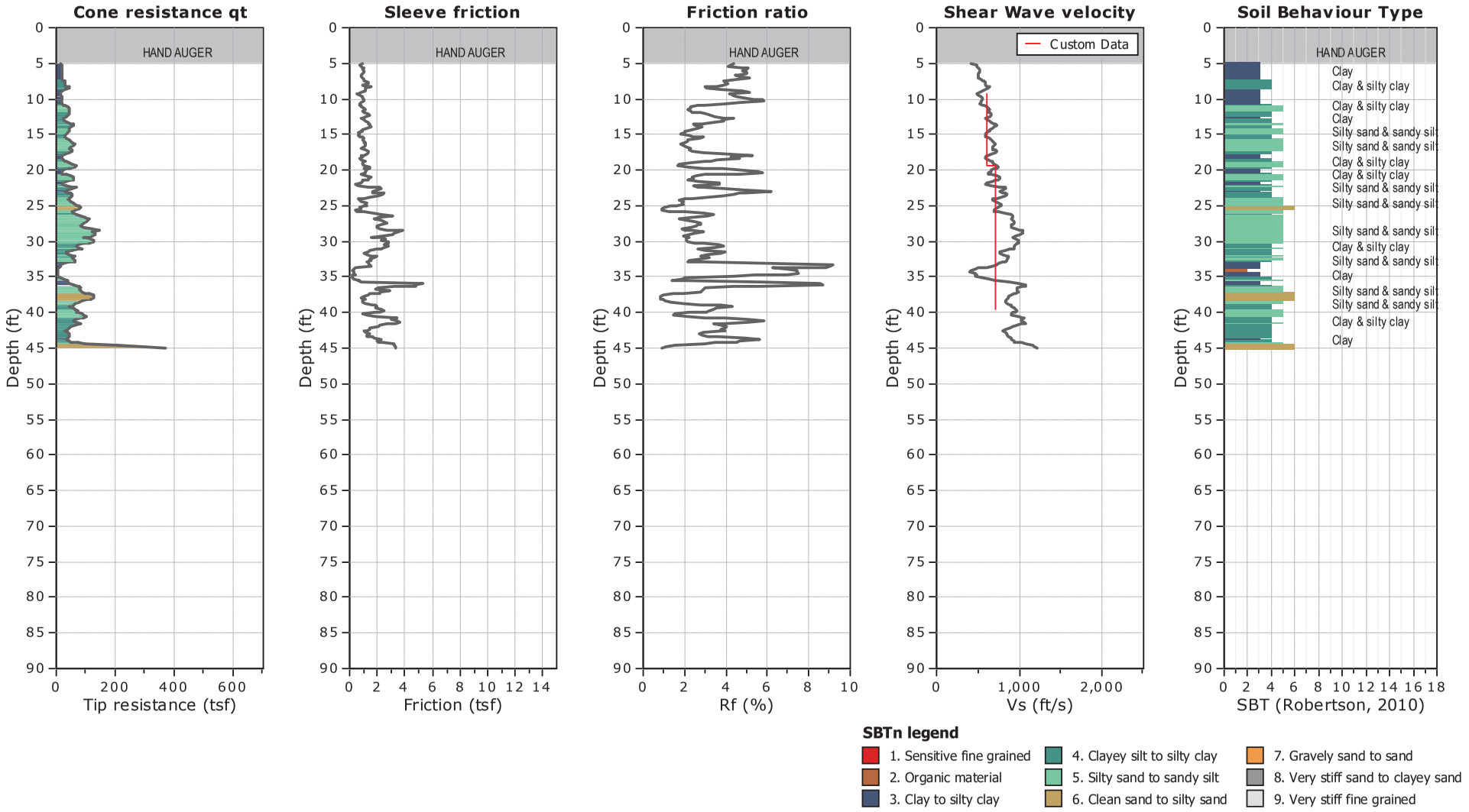
CPT: SCPT-22-04

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 44.95 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-05 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

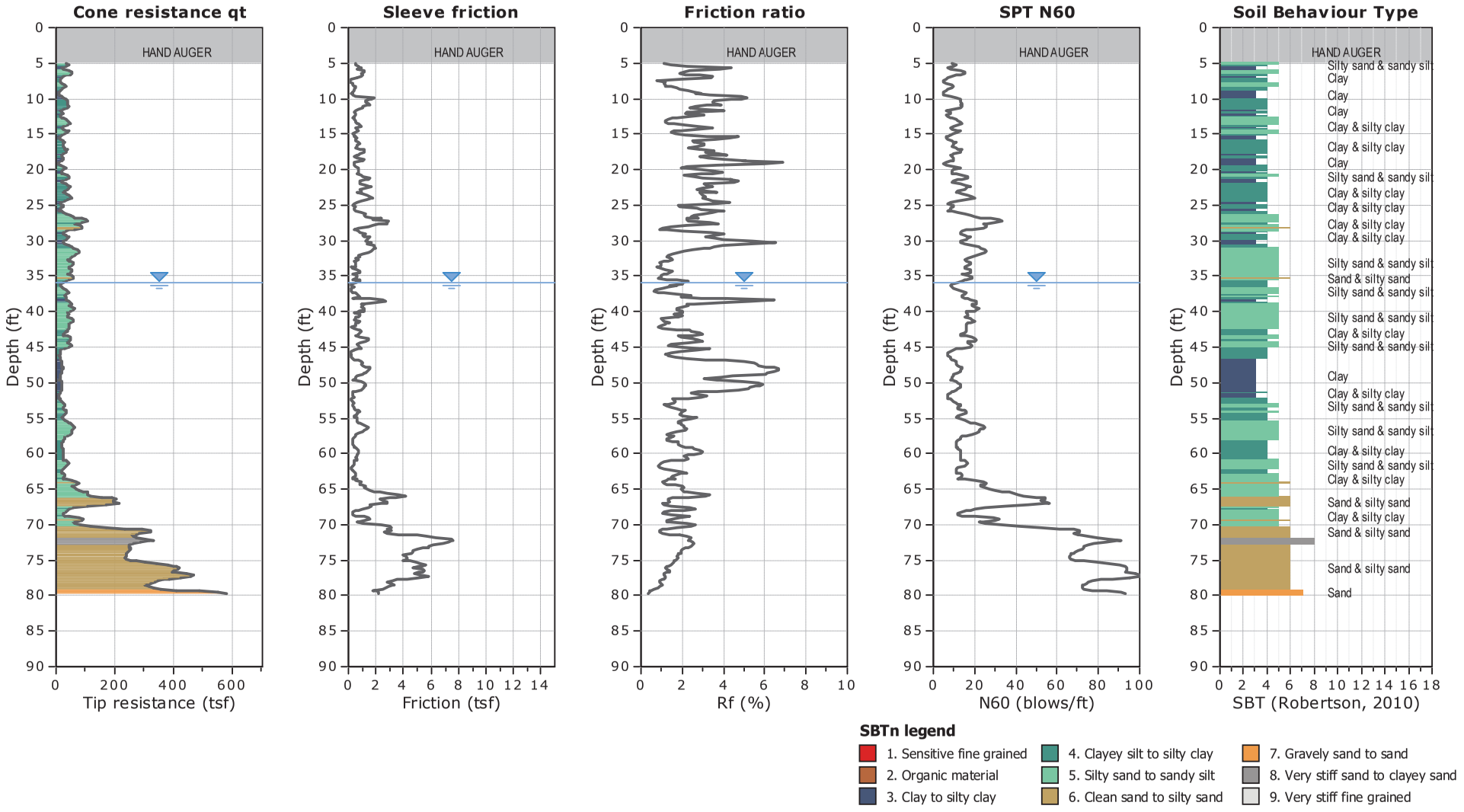
CPT: SCPT-22-05

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 79.72 ft, Date: 4/5/2022



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SCPT22-05 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

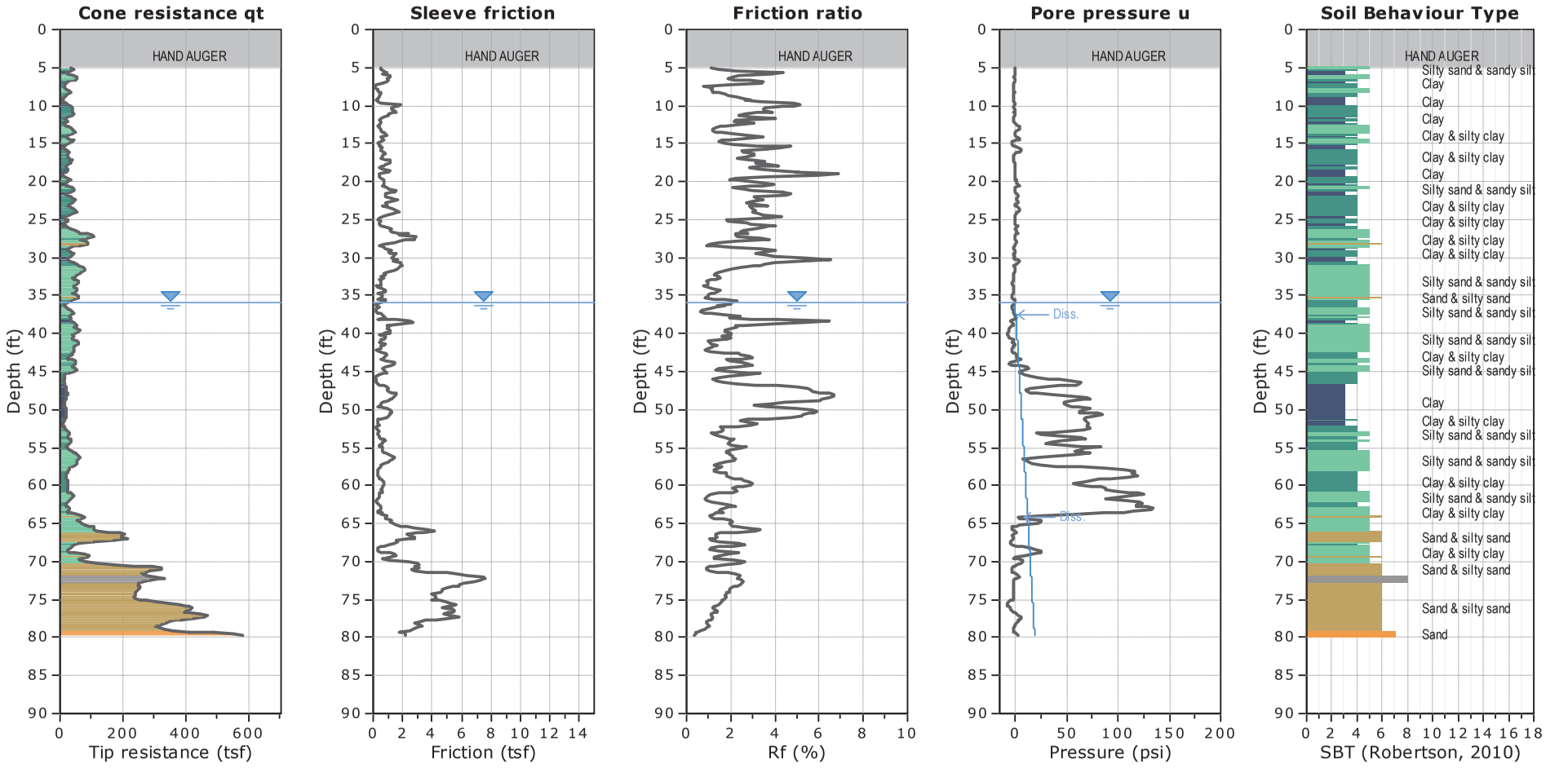
CPT: SCPT-22-05

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 79.72 ft, Date: 4/5/2022



SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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SCPT22-05 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

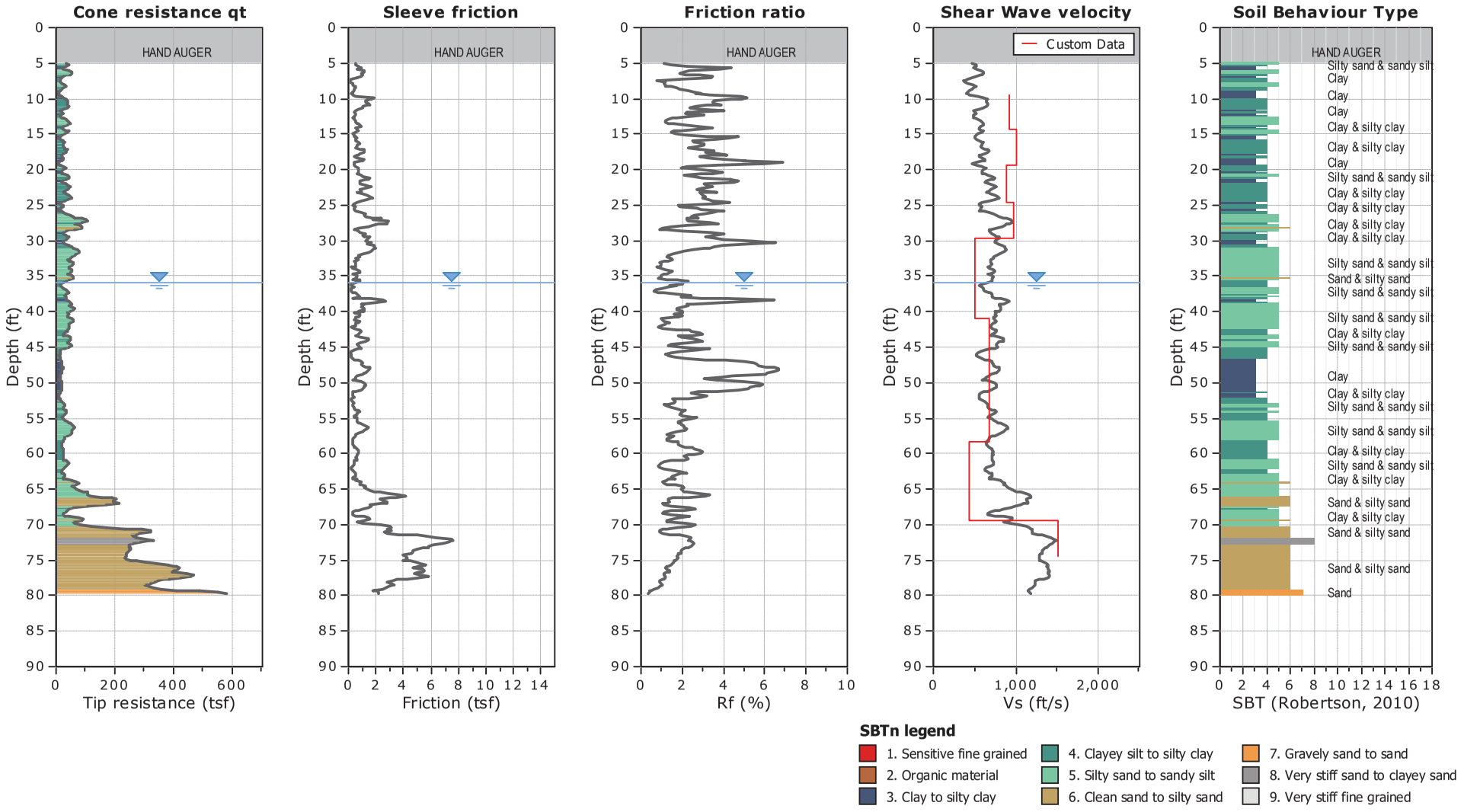
CPT: SCPT-22-05

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 79.72 ft, Date: 4/5/2022



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SCPT22-06 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

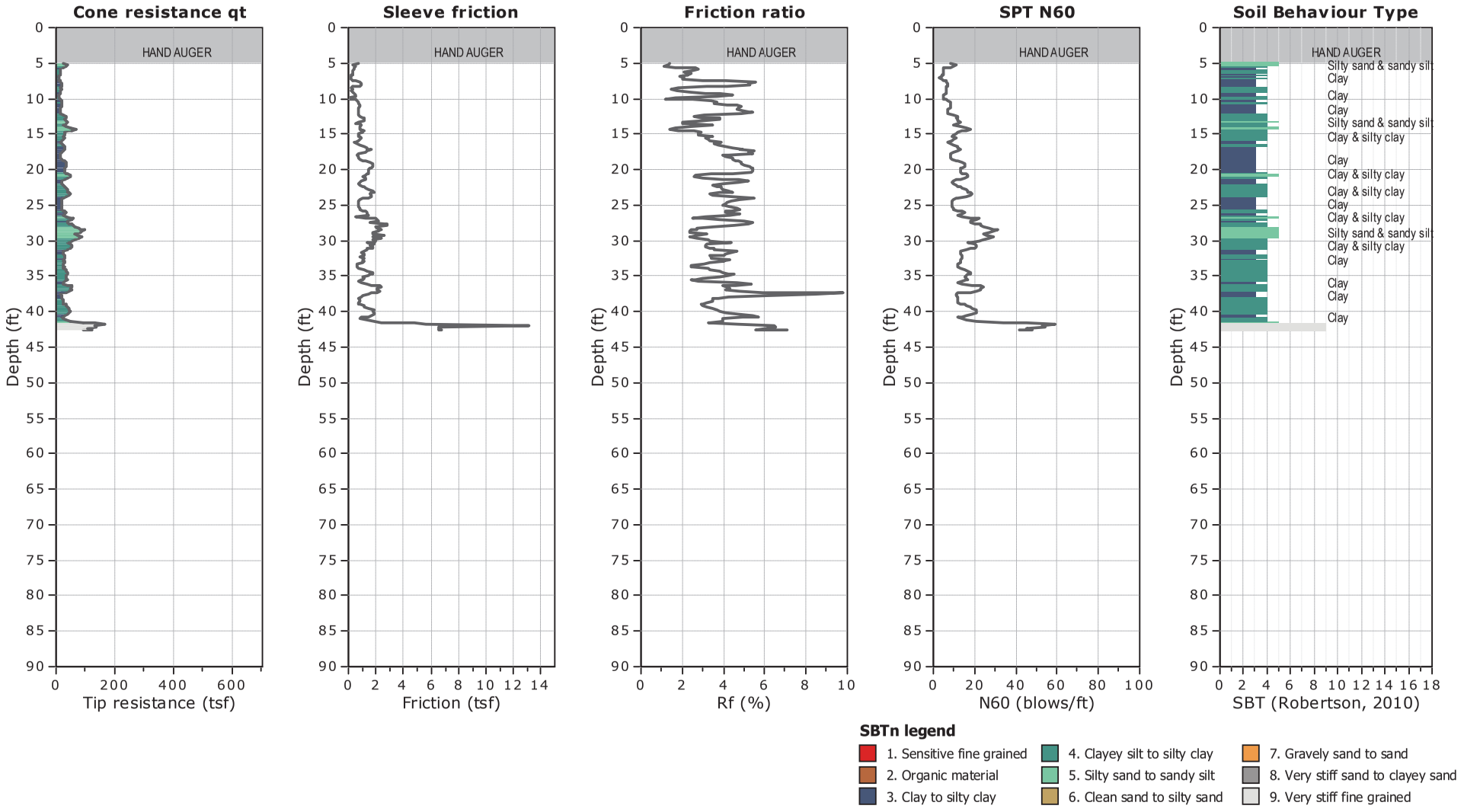
CPT: SCPT-22-06

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 42.65 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-06 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

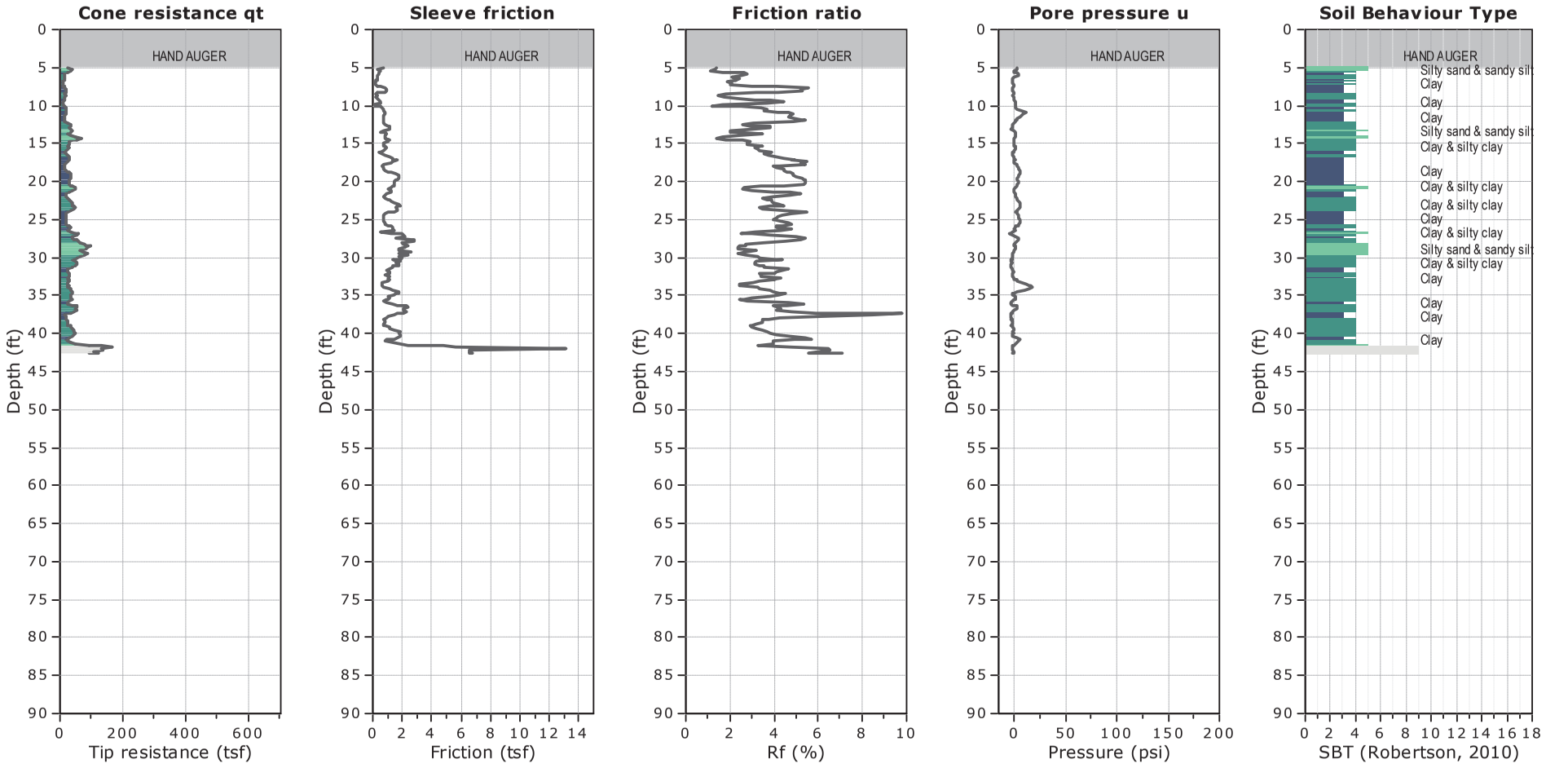
CPT: SCPT-22-06

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 42.65 ft, Date: 4/4/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
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SCPT22-06 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

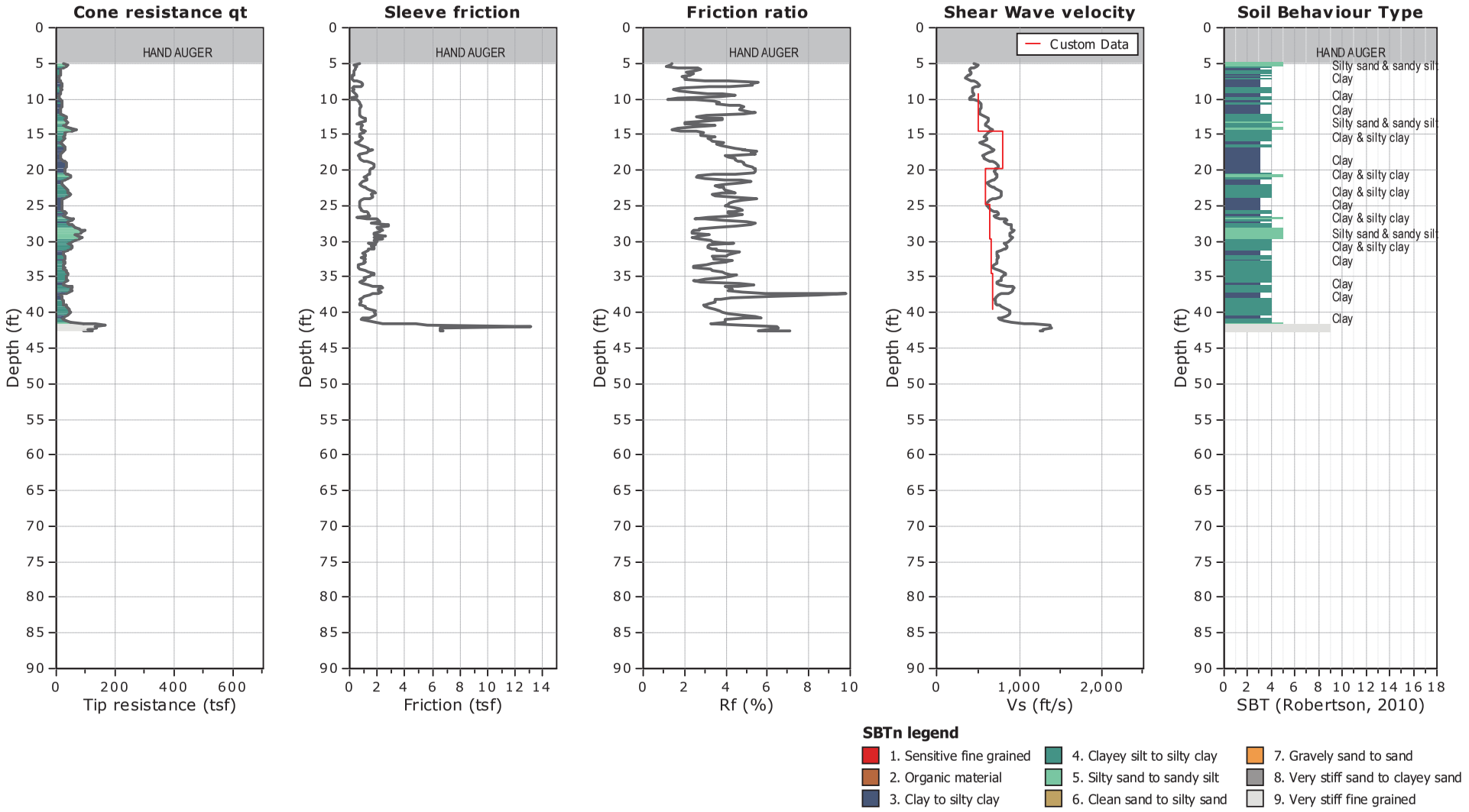
CPT: SCPT-22-06

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 42.65 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-07 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

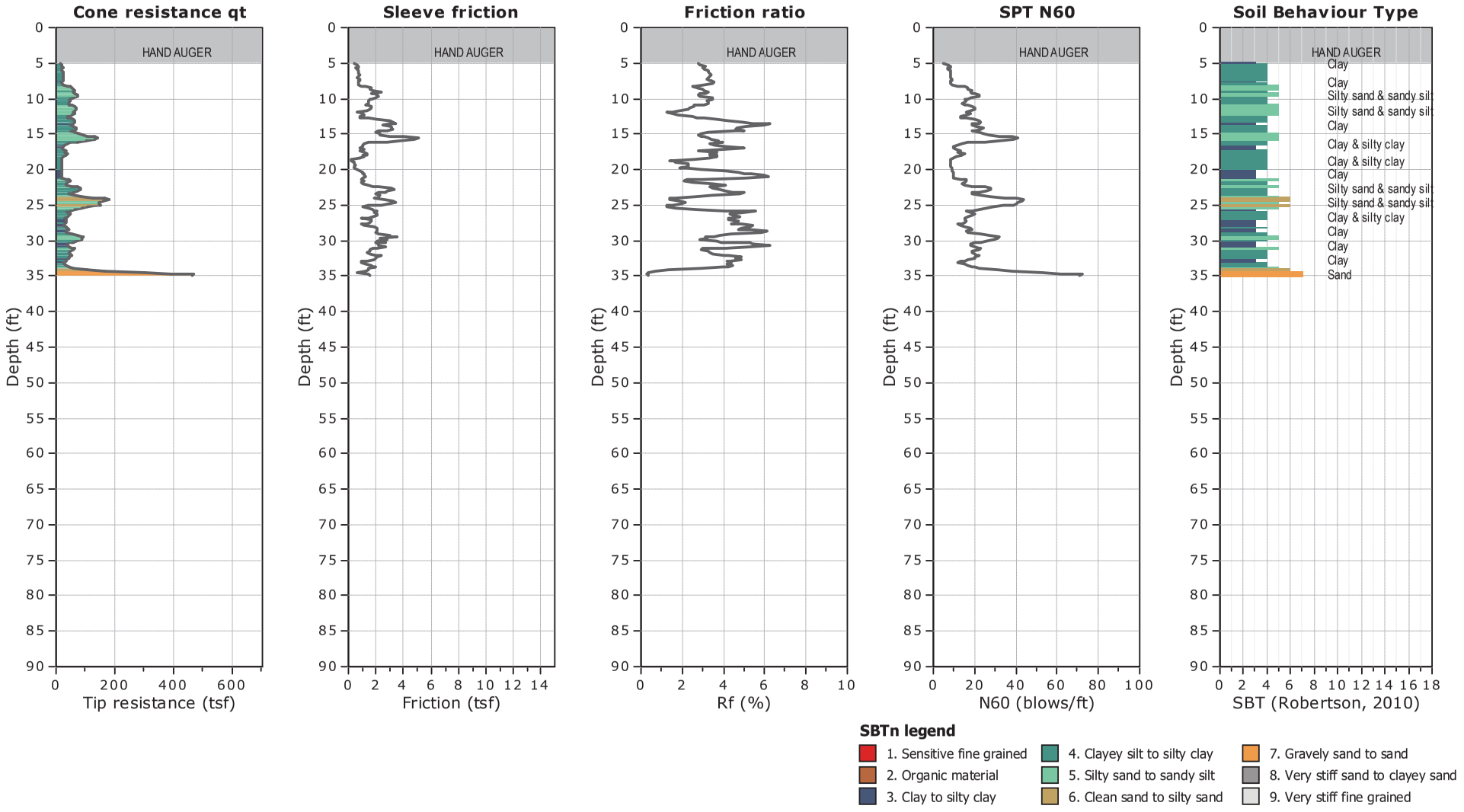
CPT: CPT-22-07

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.94 ft, Date: 4/5/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-07 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

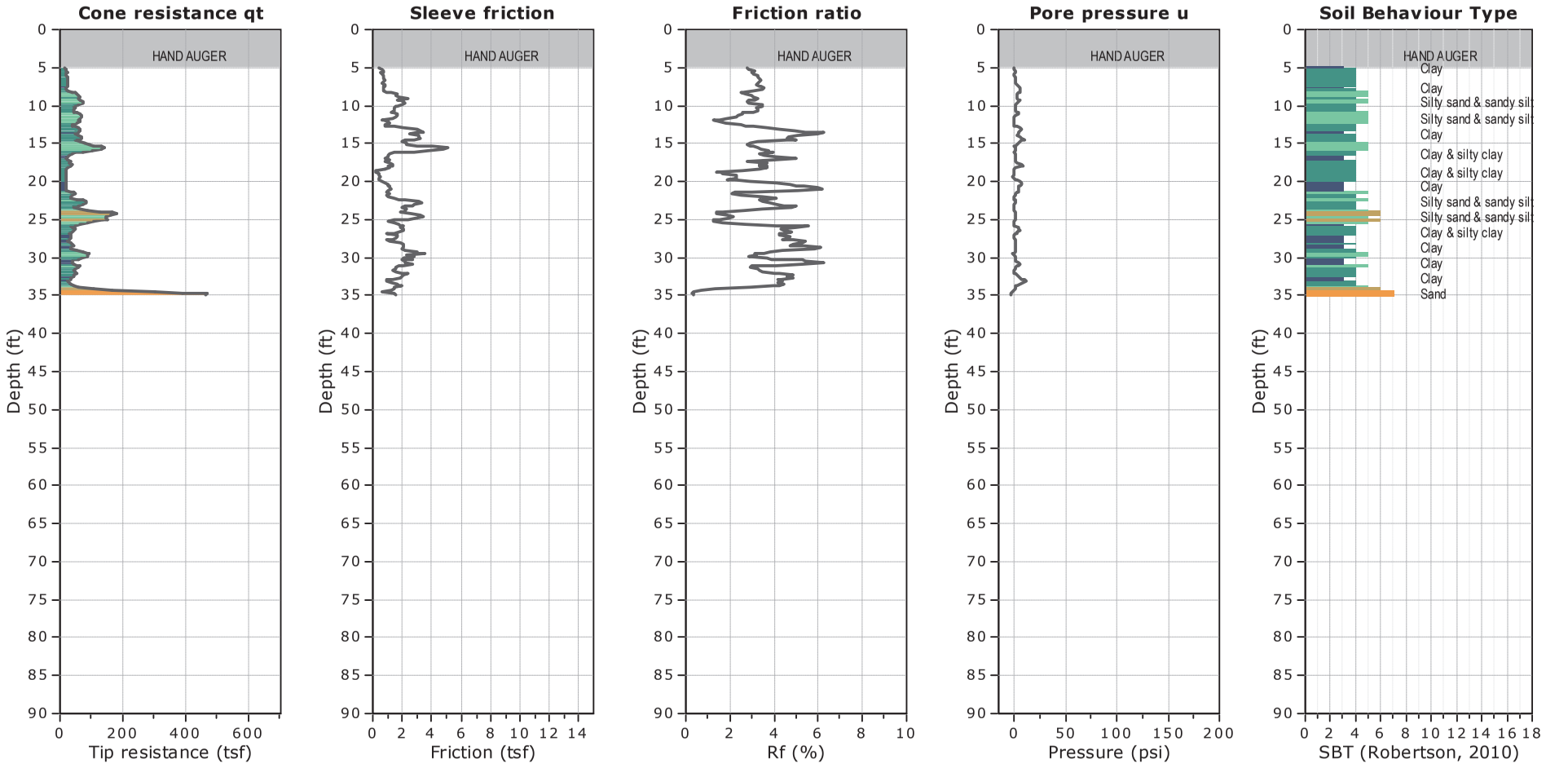
CPT: CPT-22-07

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.94 ft, Date: 4/5/2022



SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-08 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

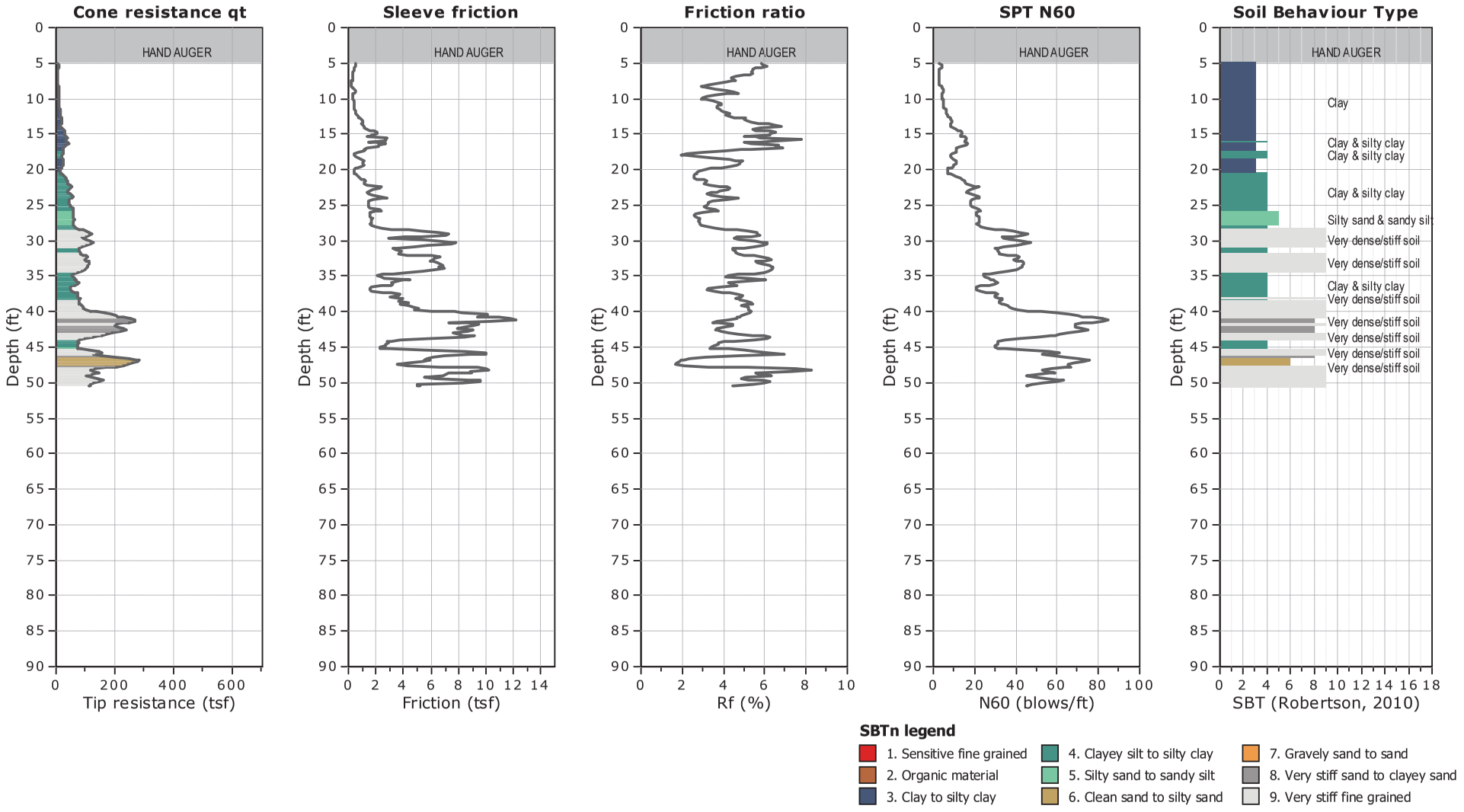
CPT: CPT-22-08

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-08 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

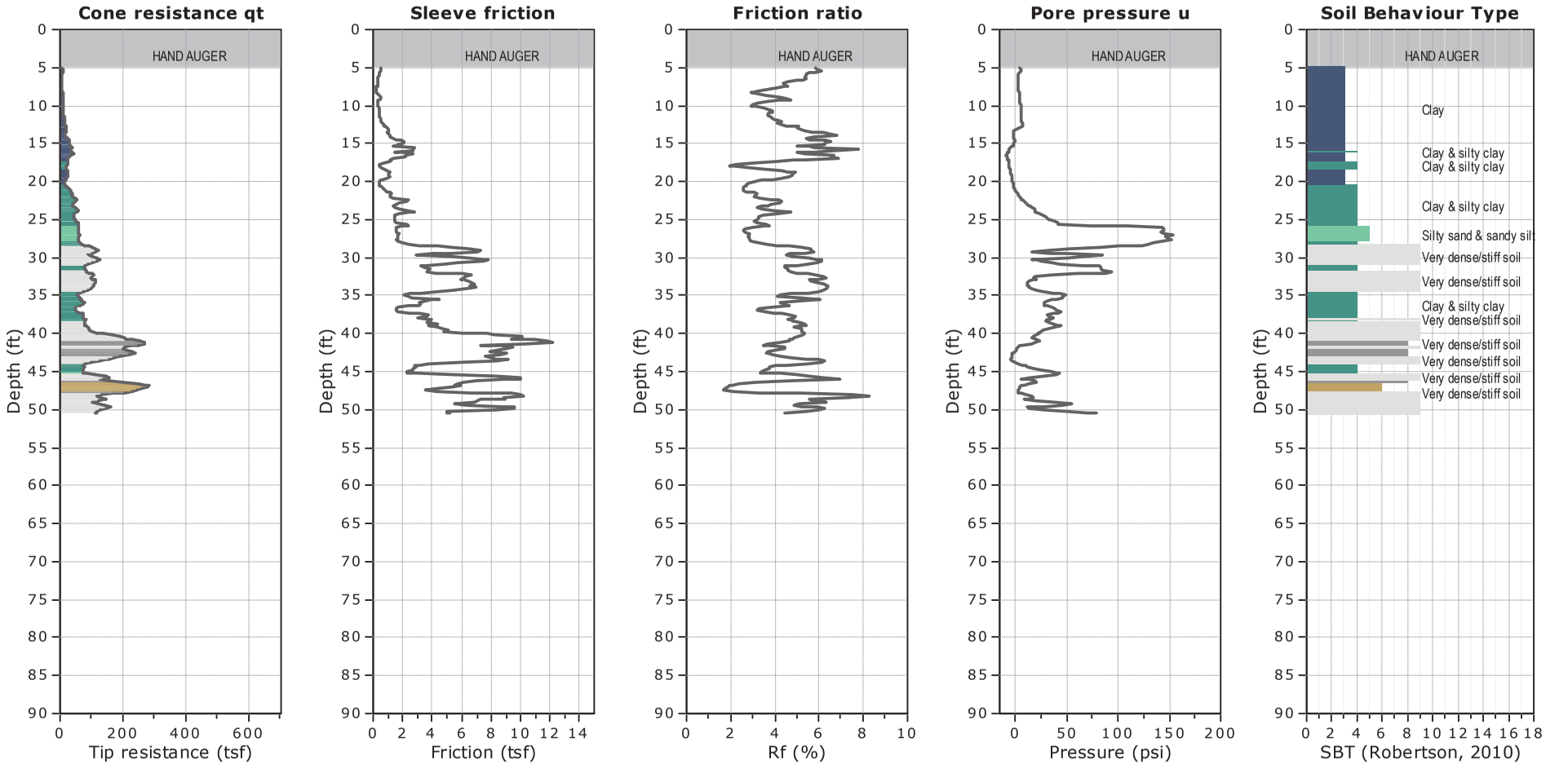
CPT: CPT-22-08

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/4/2022



SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-09 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

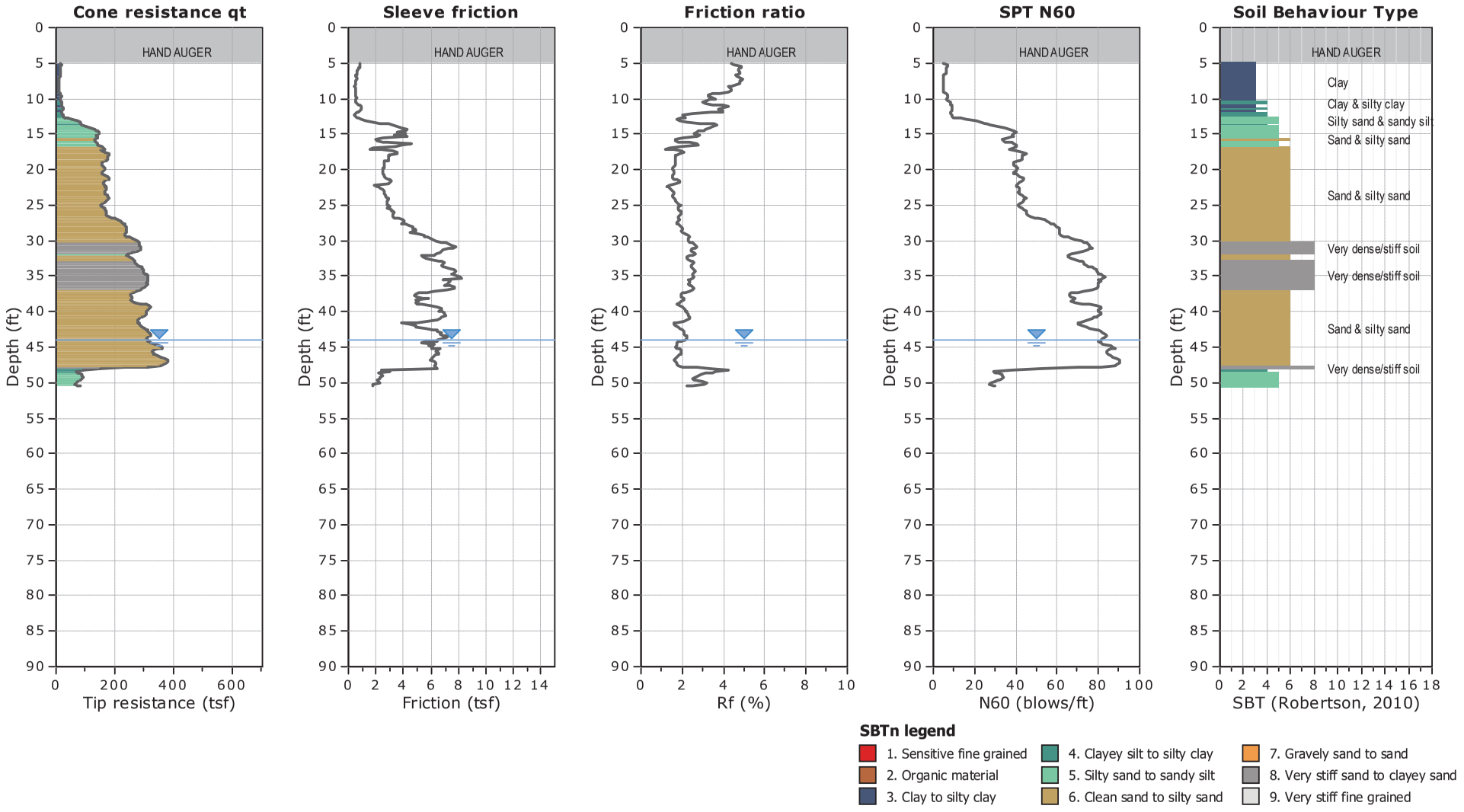
CPT: CPT-22-09

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/8/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-09 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

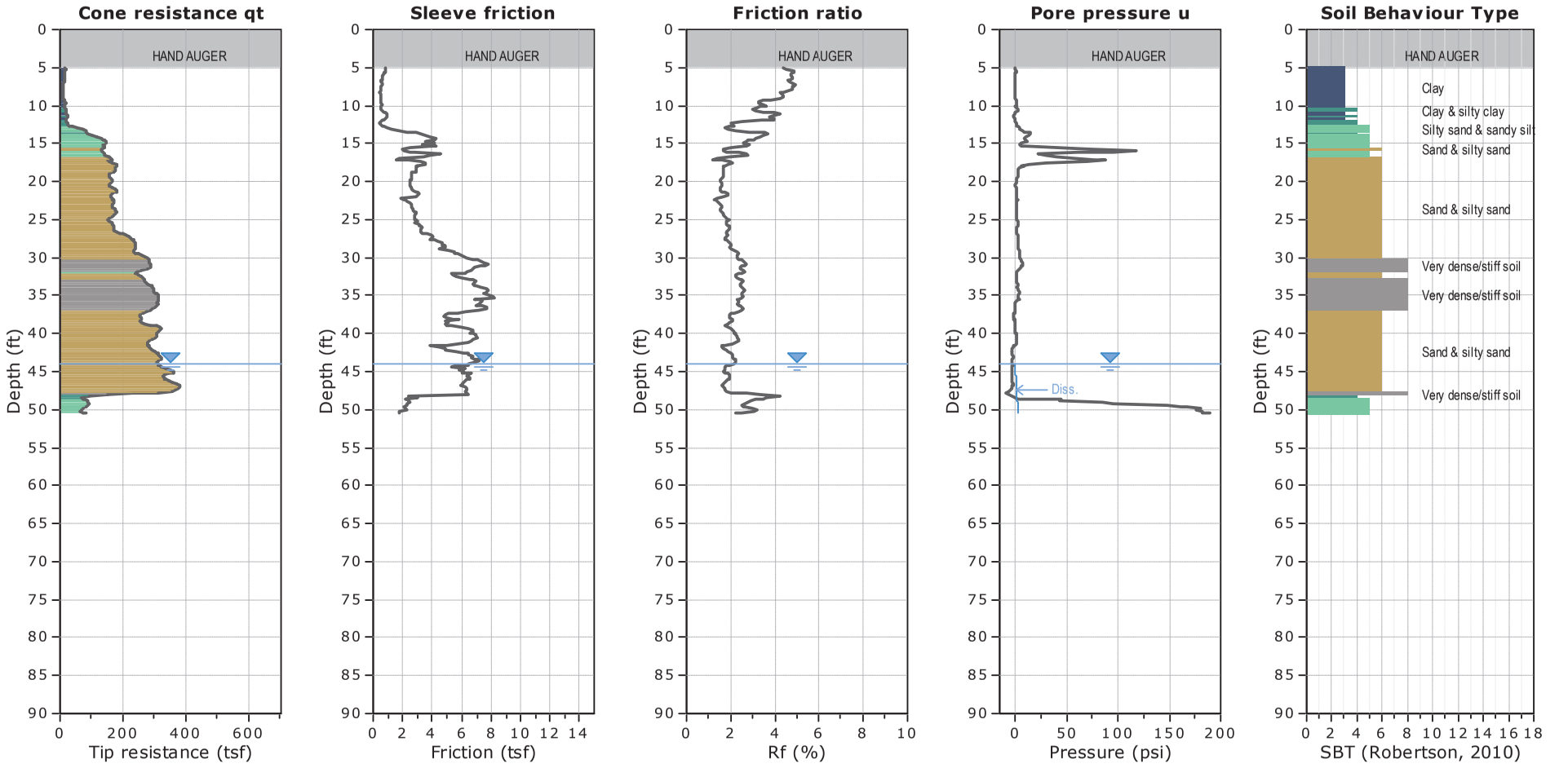
CPT: CPT-22-09

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/8/2022



SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-10 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

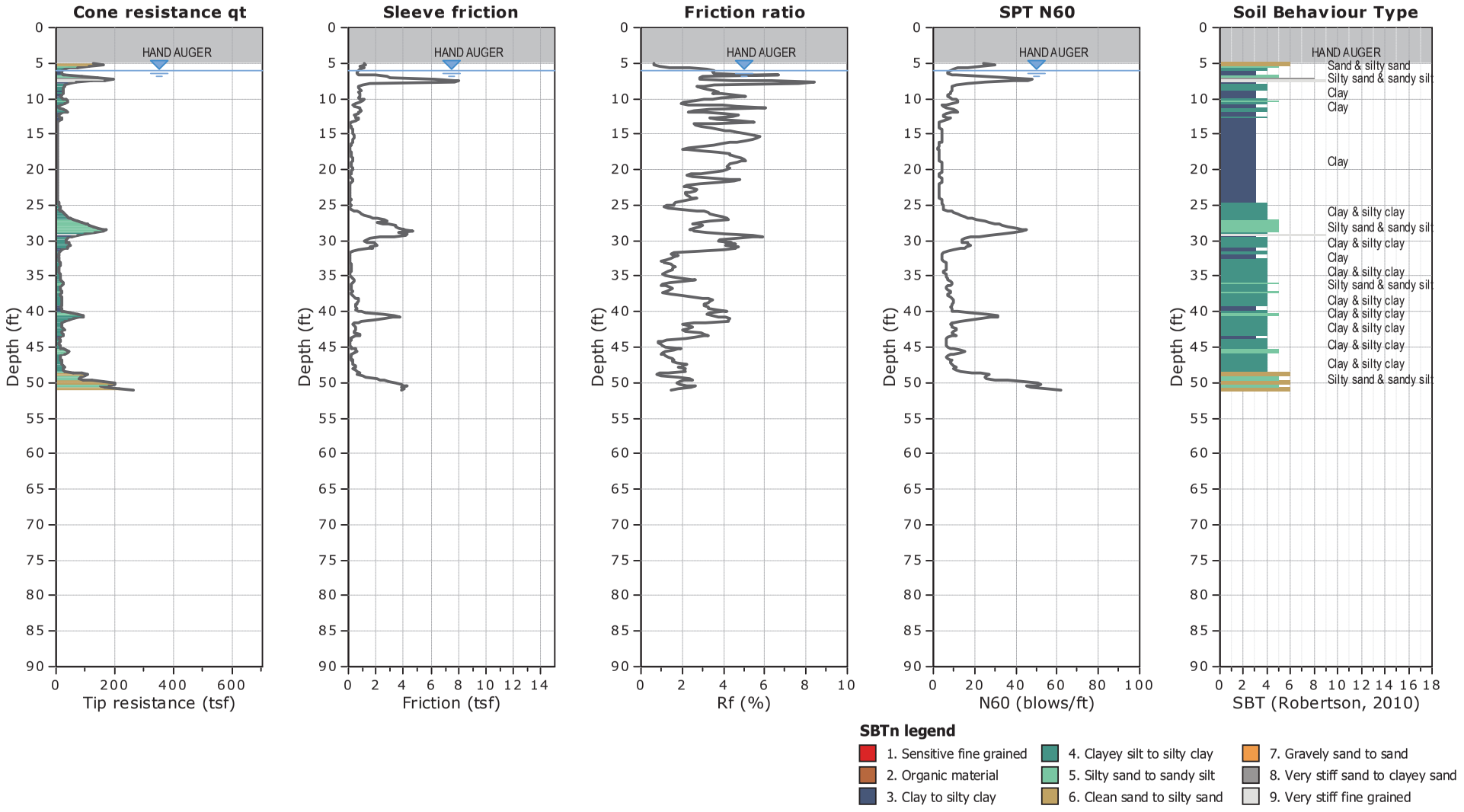
CPT: CPT-22-10

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 51.02 ft, Date: 4/5/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-10 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

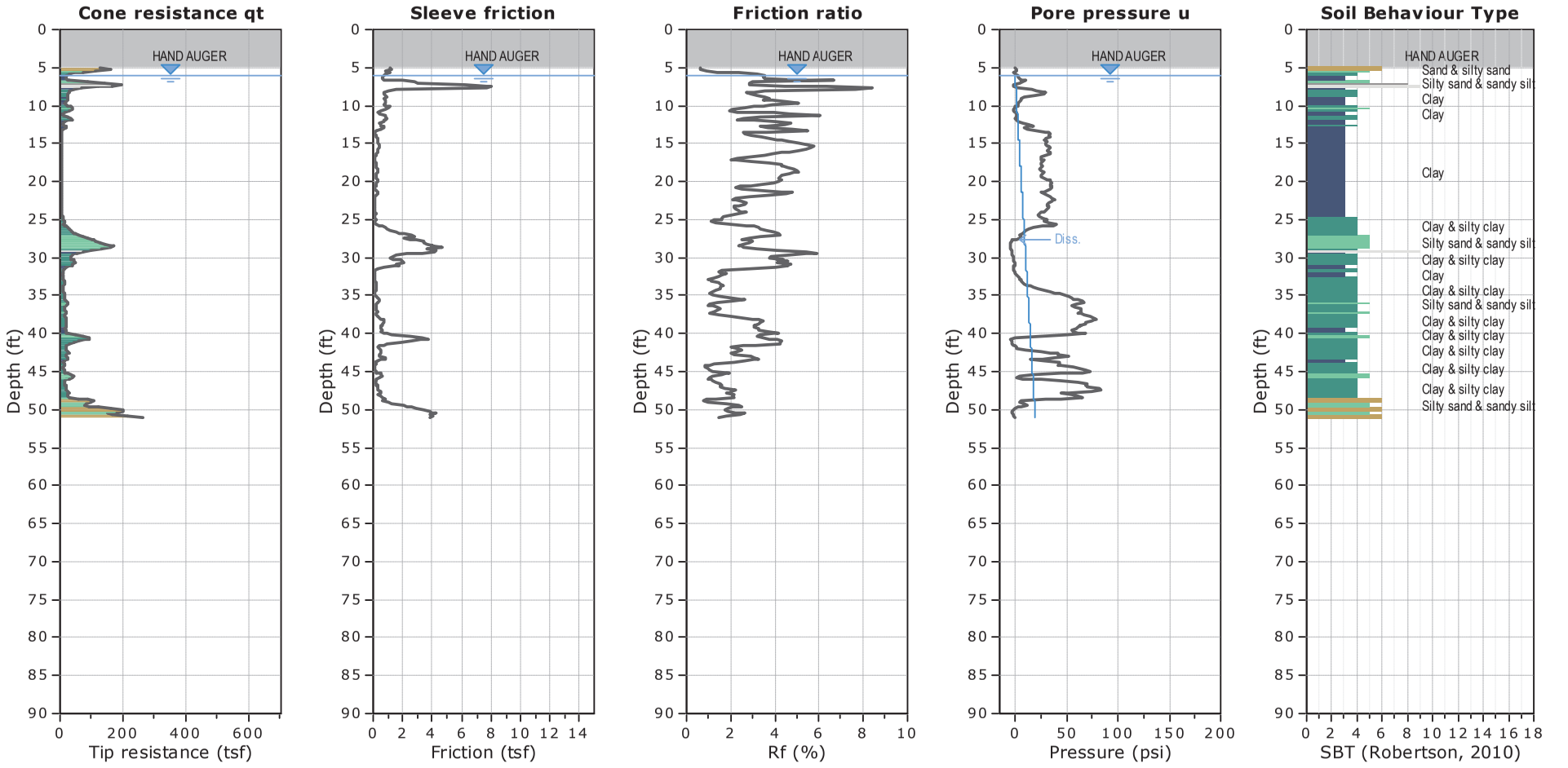
CPT: CPT-22-10

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 51.02 ft, Date: 4/5/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-11 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

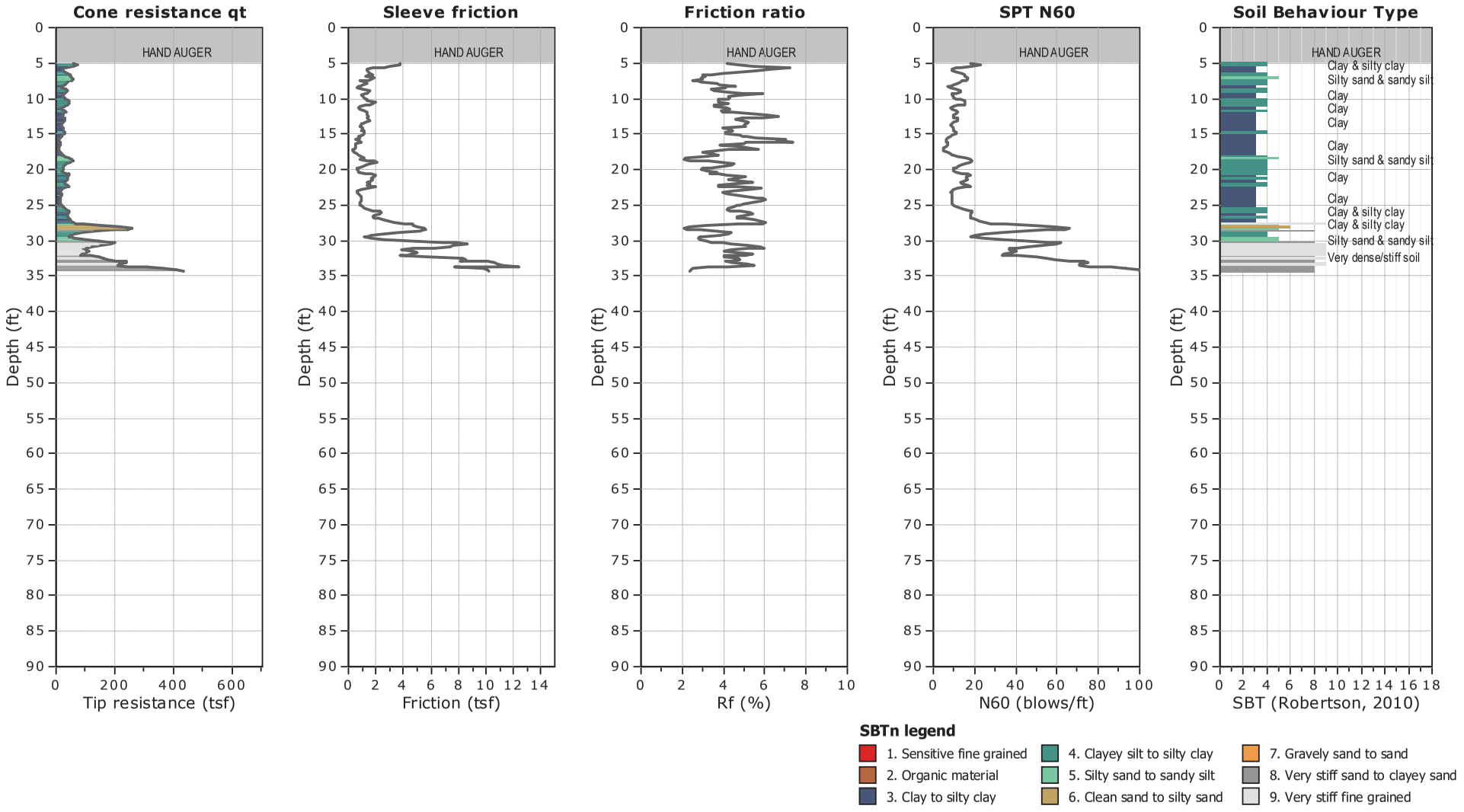
CPT: CPT-22-11

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.28 ft, Date: 4/8/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-11 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

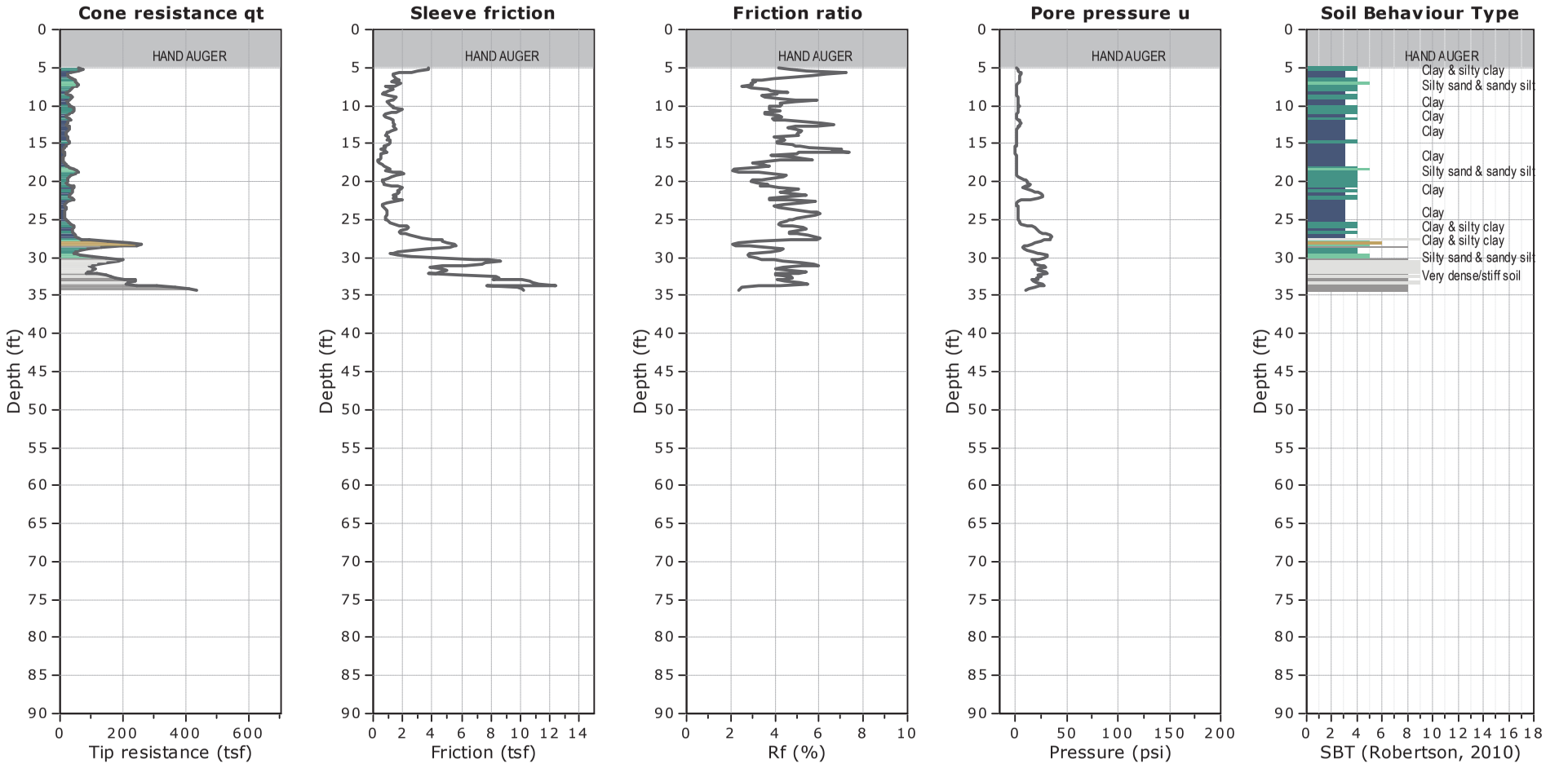
CPT: CPT-22-11

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.28 ft, Date: 4/8/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

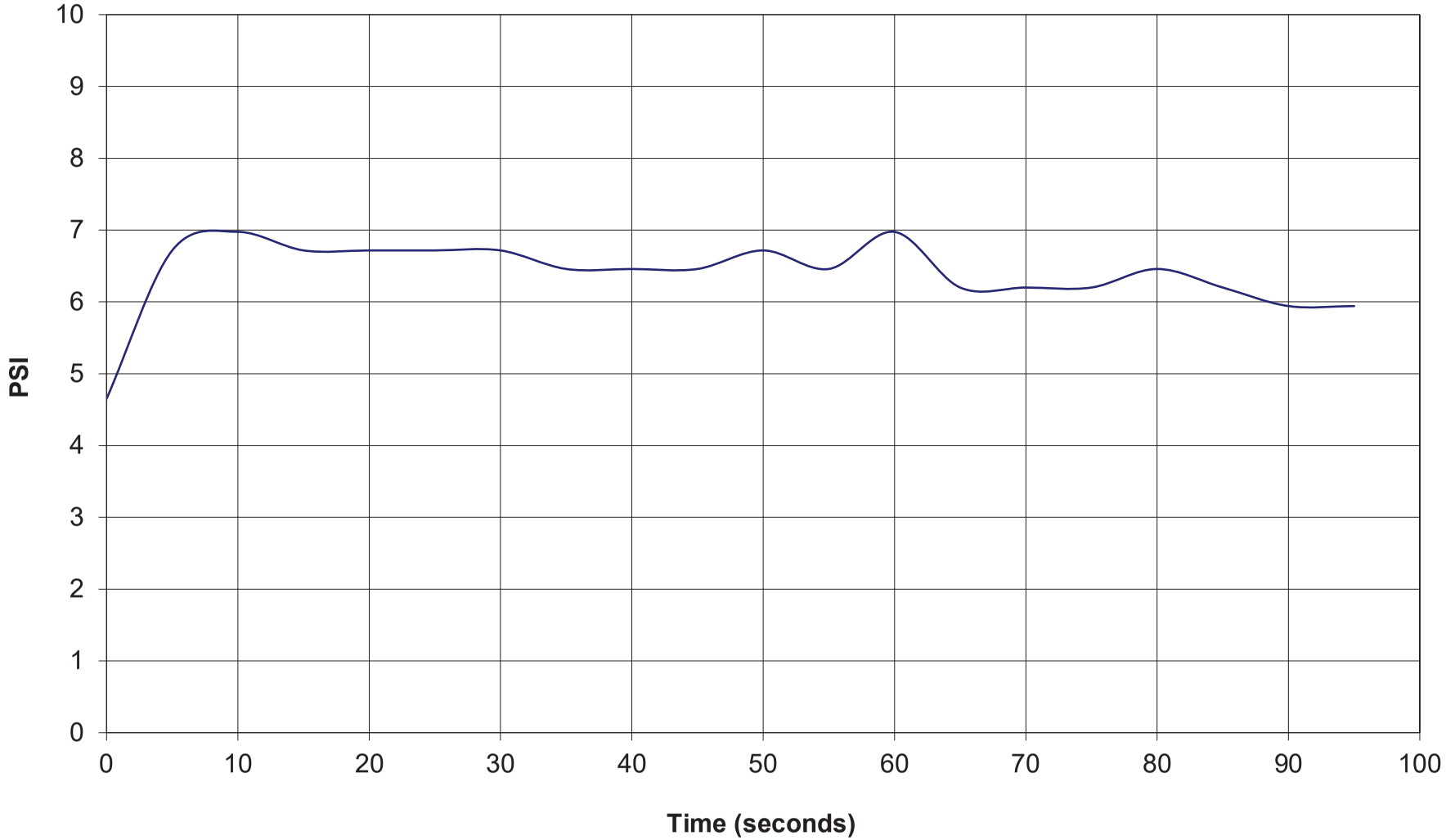
APPENDIX B:

PORE PRESSURE DISSIPATION TEST PLOTS

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

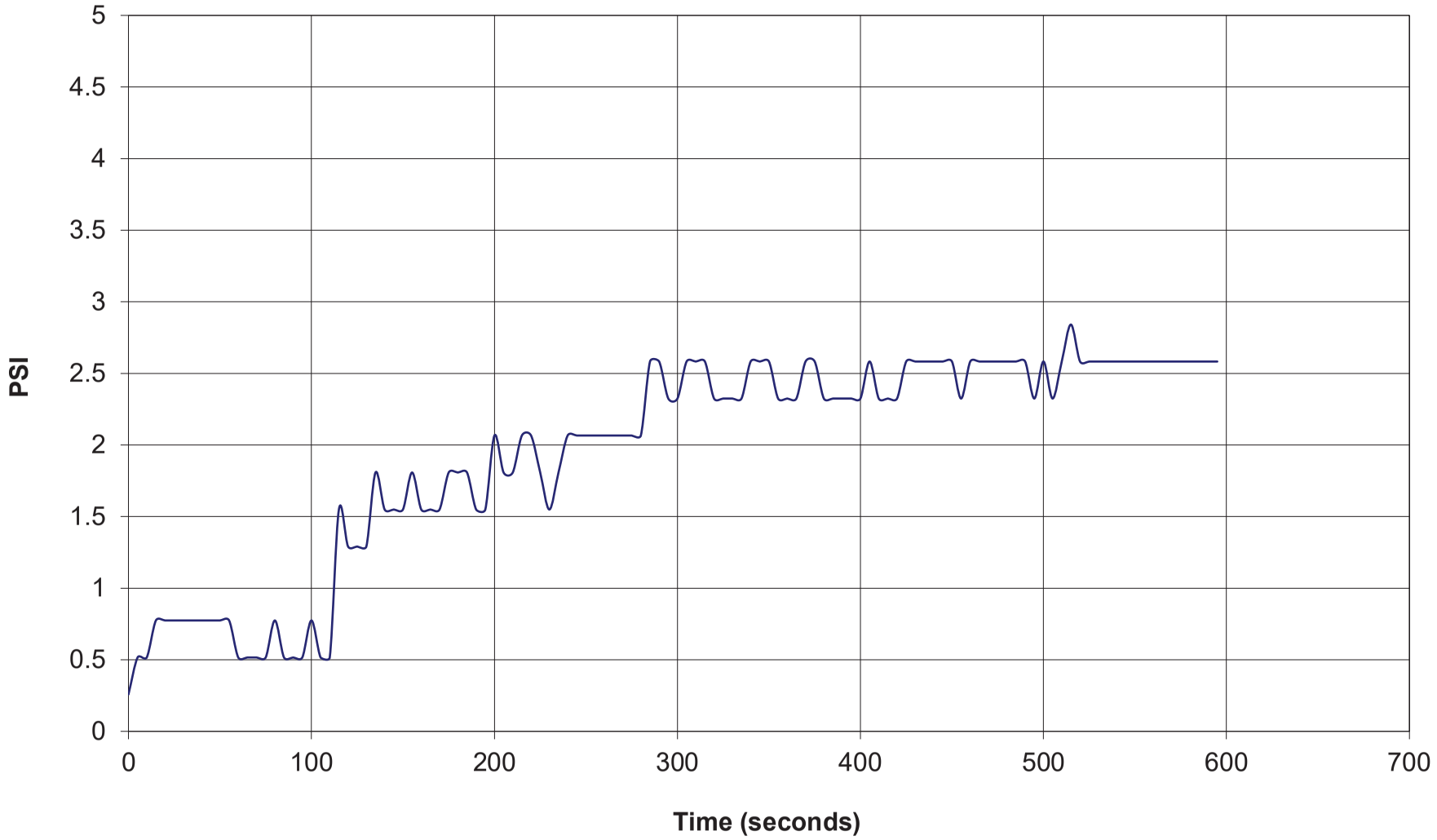
Sounding: CPT-22-01
Depth (ft): 50.36
Site: Buena Vista Landfill
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

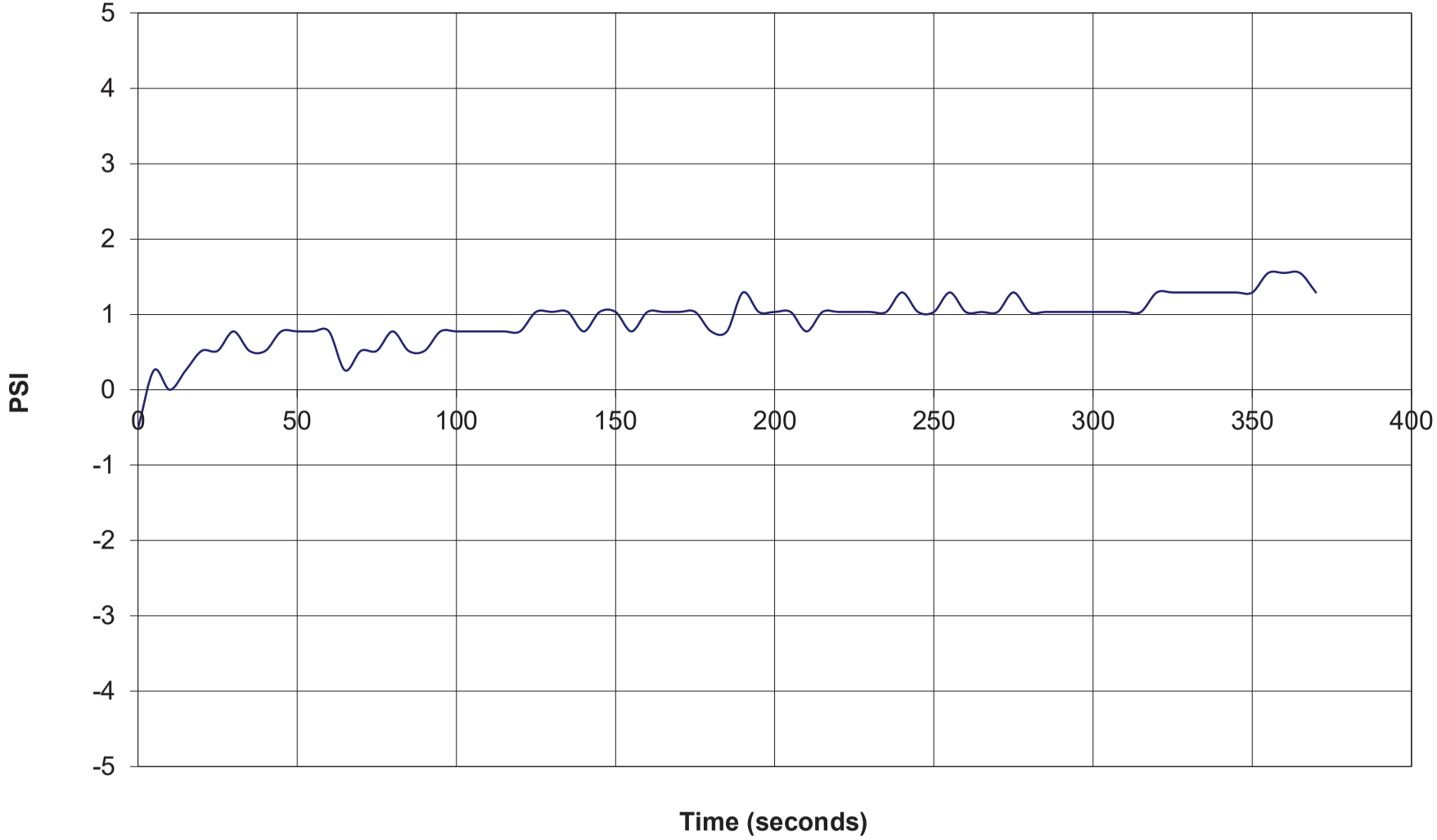
Sounding: CPT-22-01
Depth (ft): 87.93
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

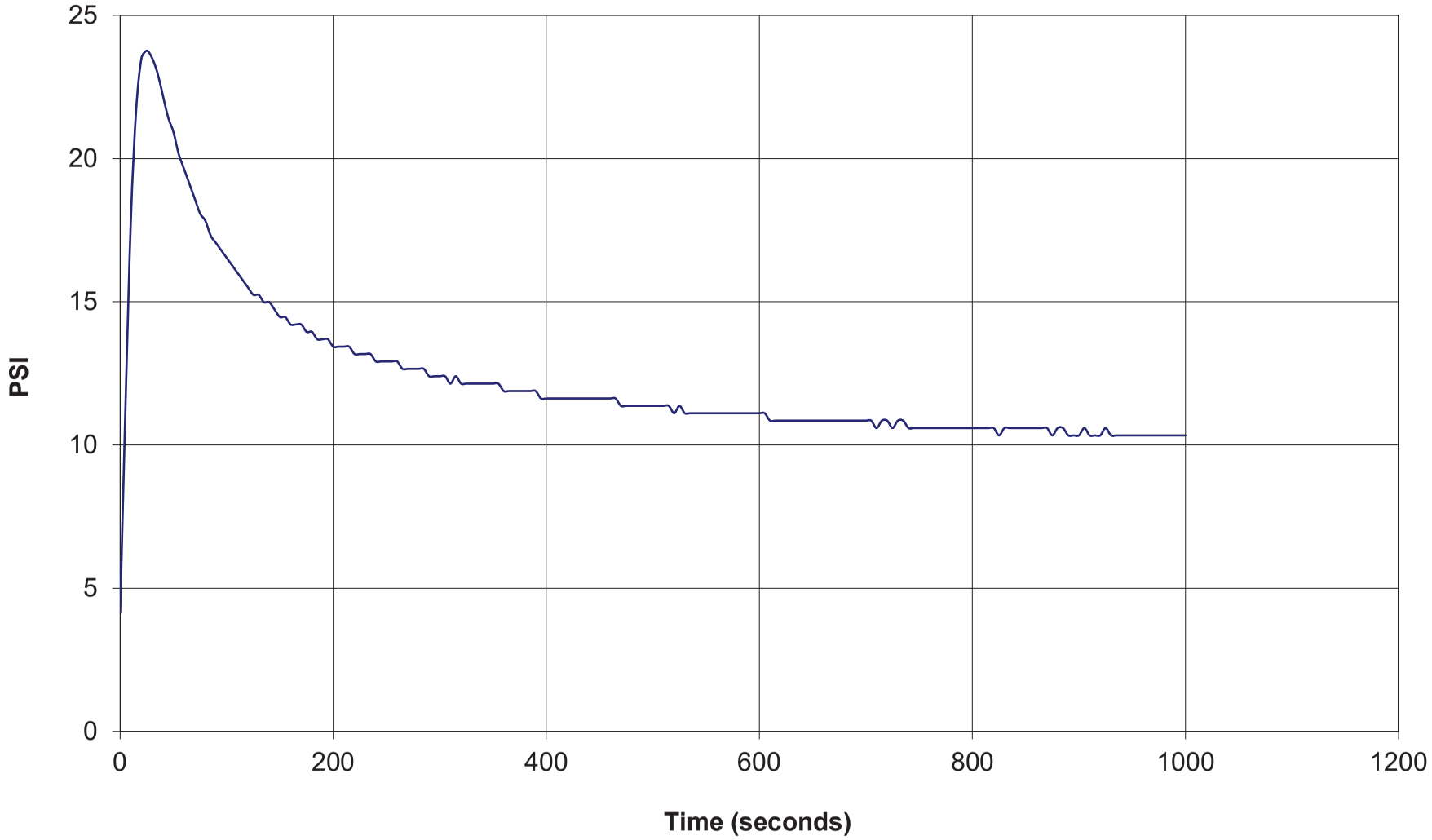
Sounding: SCPT-22-05
Depth (ft): 37.57
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

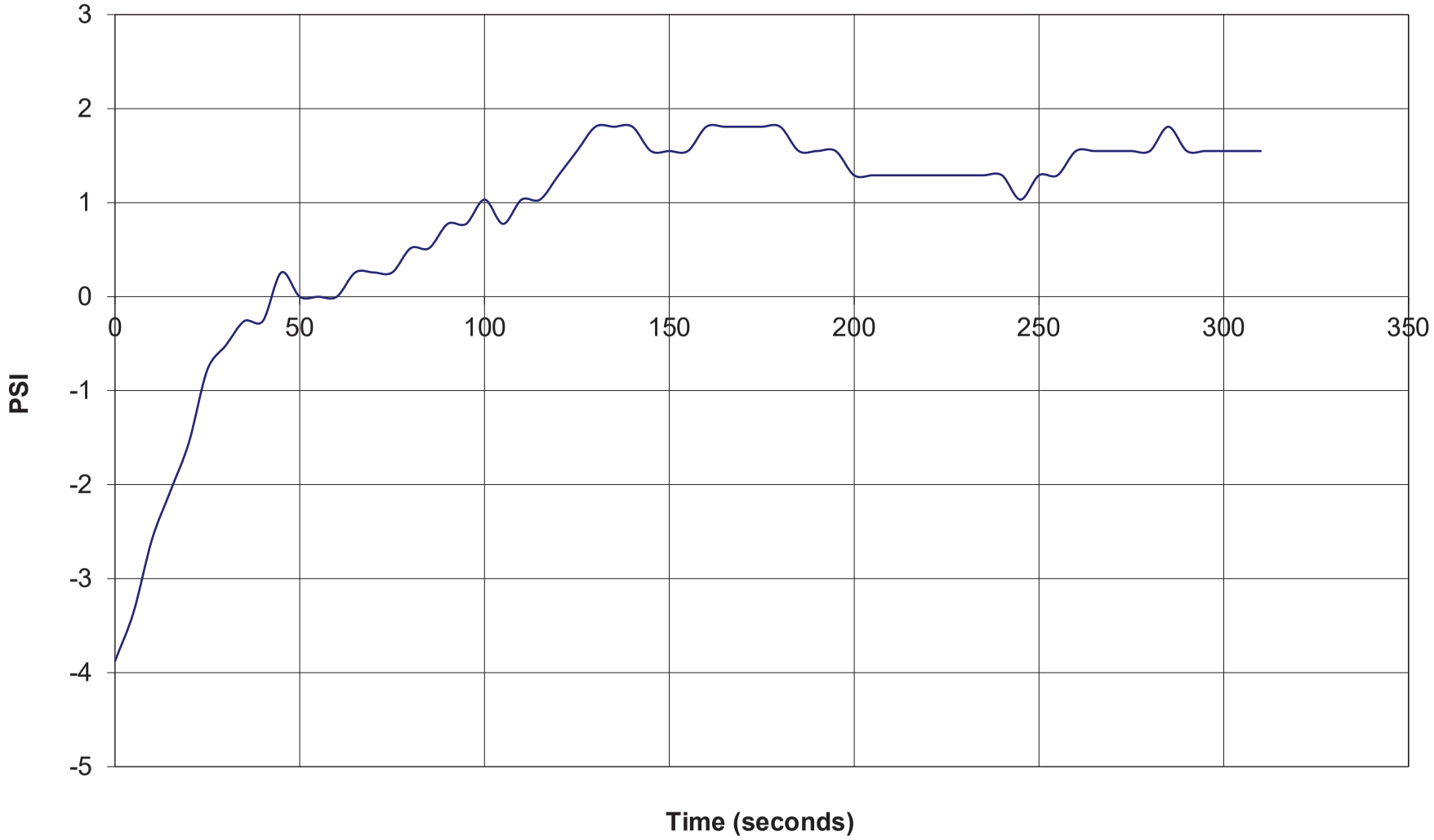
Sounding: SCPT-22-05
Depth (ft): 64.14
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

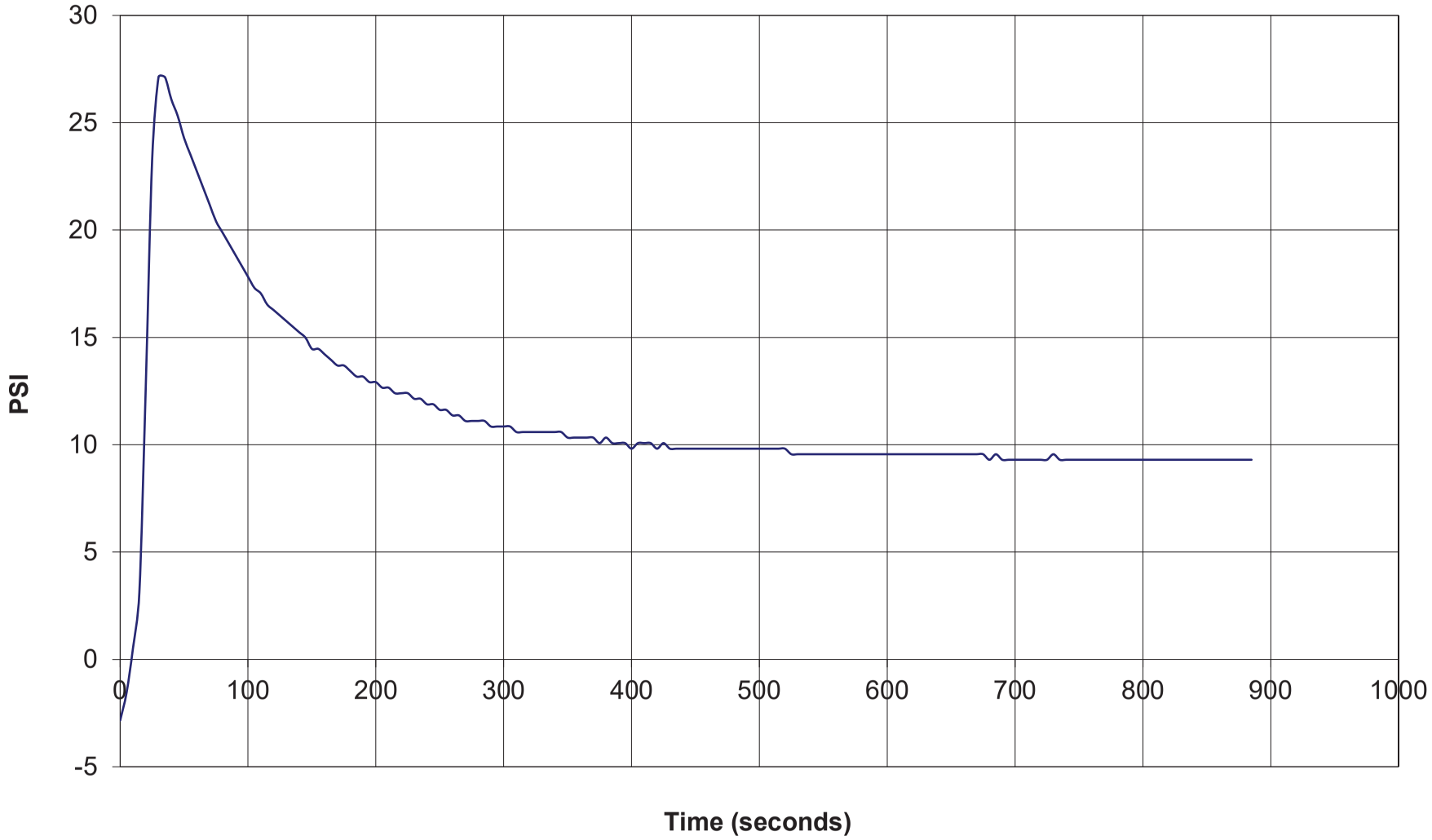
Sounding: CPT-22-09
Depth (ft): 47.41
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: CPT-22-10
Depth (ft): 27.56
Site: Buena Vista
Engineer: Emily Martin



APPENDIX C:

SEISMIC

PLOTS & TABLES

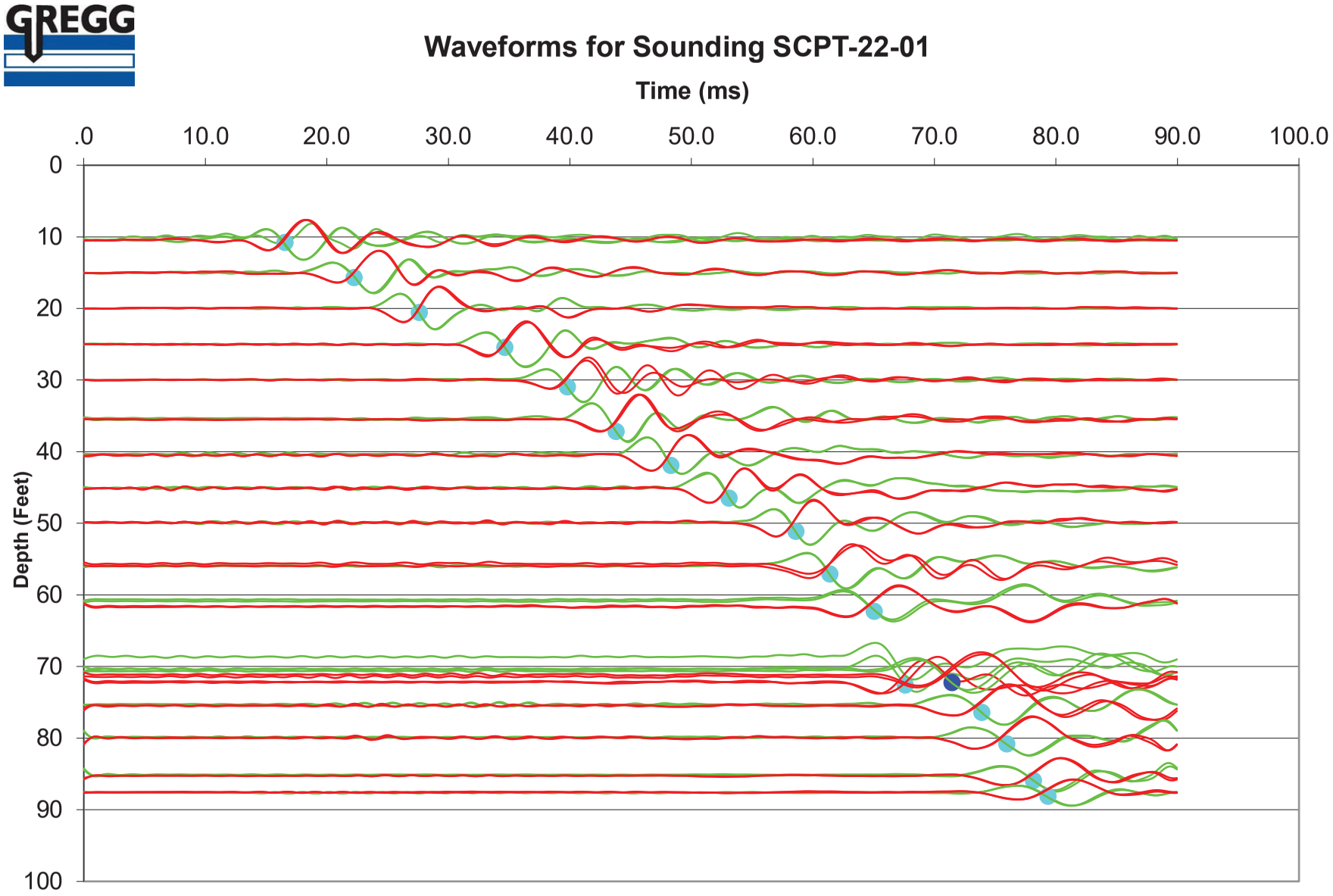
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-01
SCPT-22-01

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/07/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.50	9.84	9.98	9.98	16.4500			
15.09	14.43	14.53	4.55	22.1500	5.7000	798.0	12.14
20.01	19.35	19.42	4.90	27.4500	5.3000	923.9	16.89
25.10	24.44	24.50	5.07	34.4500	7.0000	724.3	21.90
30.02	29.36	29.41	4.91	39.5500	5.1000	963.1	26.90
35.10	34.44	34.49	5.08	43.5500	4.0000	1269.6	31.90
40.35	39.69	39.73	5.24	48.0000	4.4500	1178.4	37.07
45.11	44.45	44.48	4.75	52.7500	4.7500	1000.7	42.07
50.03	49.37	49.40	4.92	58.2500	5.5000	894.2	46.91
55.12	54.46	54.48	5.08	61.0000	2.7500	1848.2	51.92
60.04	59.38	59.40	4.92	64.6500	3.6500	1347.7	56.92
65.12	64.46	64.49	5.08	67.1500	2.5000	2033.4	61.92
75.46	74.80	74.82	10.33	73.4500	6.3000	1639.9	69.63
80.05	79.39	79.41	4.59	75.4500	2.0000	2296.0	77.10
85.14	84.48	84.49	5.08	77.6500	2.2000	2311.0	81.93
87.93	87.27	87.28	2.79	78.8500	1.2000	2323.5	85.87


GREGG
Waveforms for Sounding SCPT-22-01
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Depth (Feet)
0
10
20
30
40
50
60
70
80
90
100

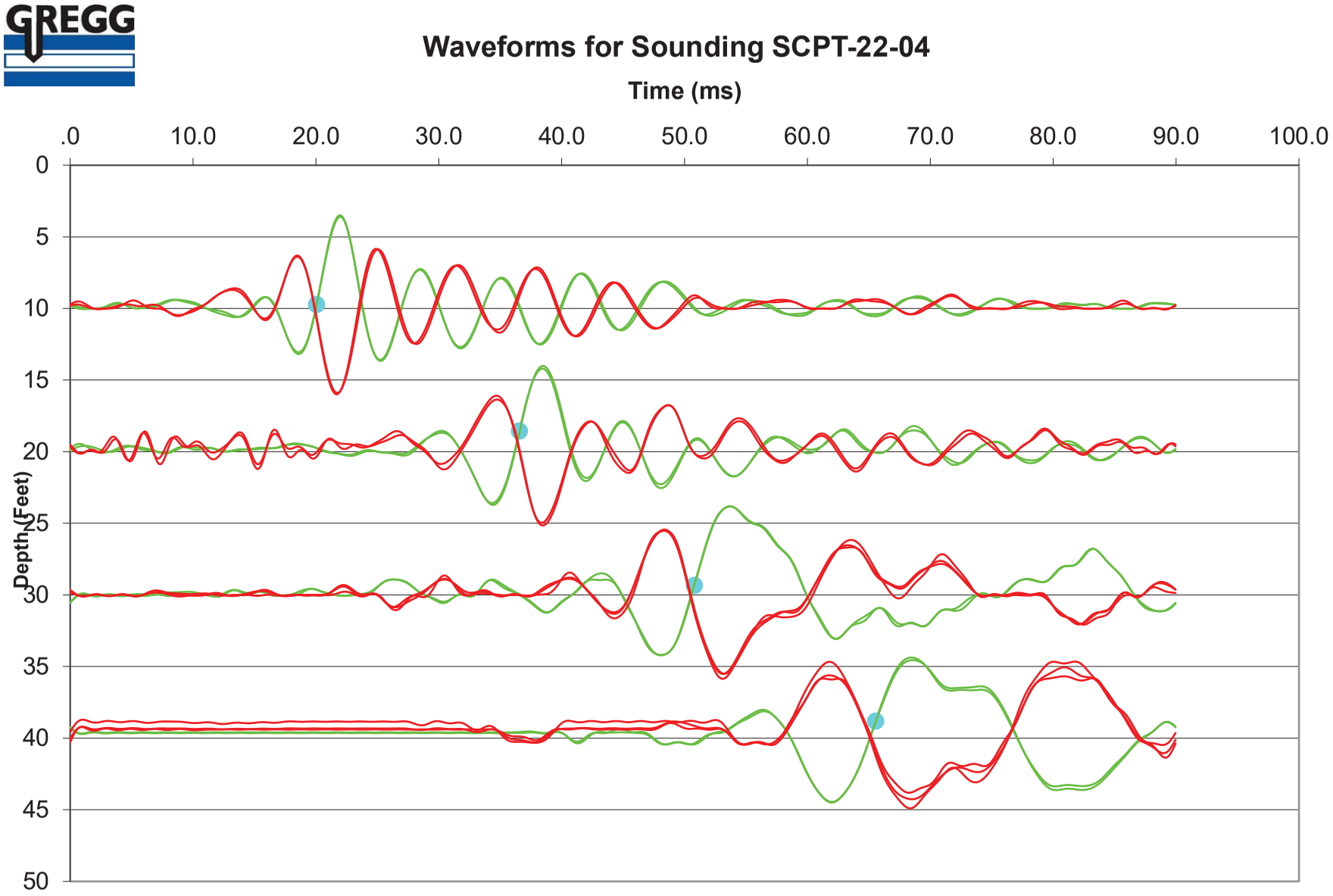
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-04
SCPT-22-04

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/04/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	19.9500			
20.01	19.35	19.42	9.93	36.3500	16.4000	605.5	14.35
30.02	29.36	29.41	9.98	50.5000	14.1500	705.4	24.36
40.35	39.69	39.73	10.32	65.1500	14.6500	704.6	34.53


GREGG
Waveforms for Sounding SCPT-22-04
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Depth (Feet)
0
5
10
15
20
25
30
35
40
45
50

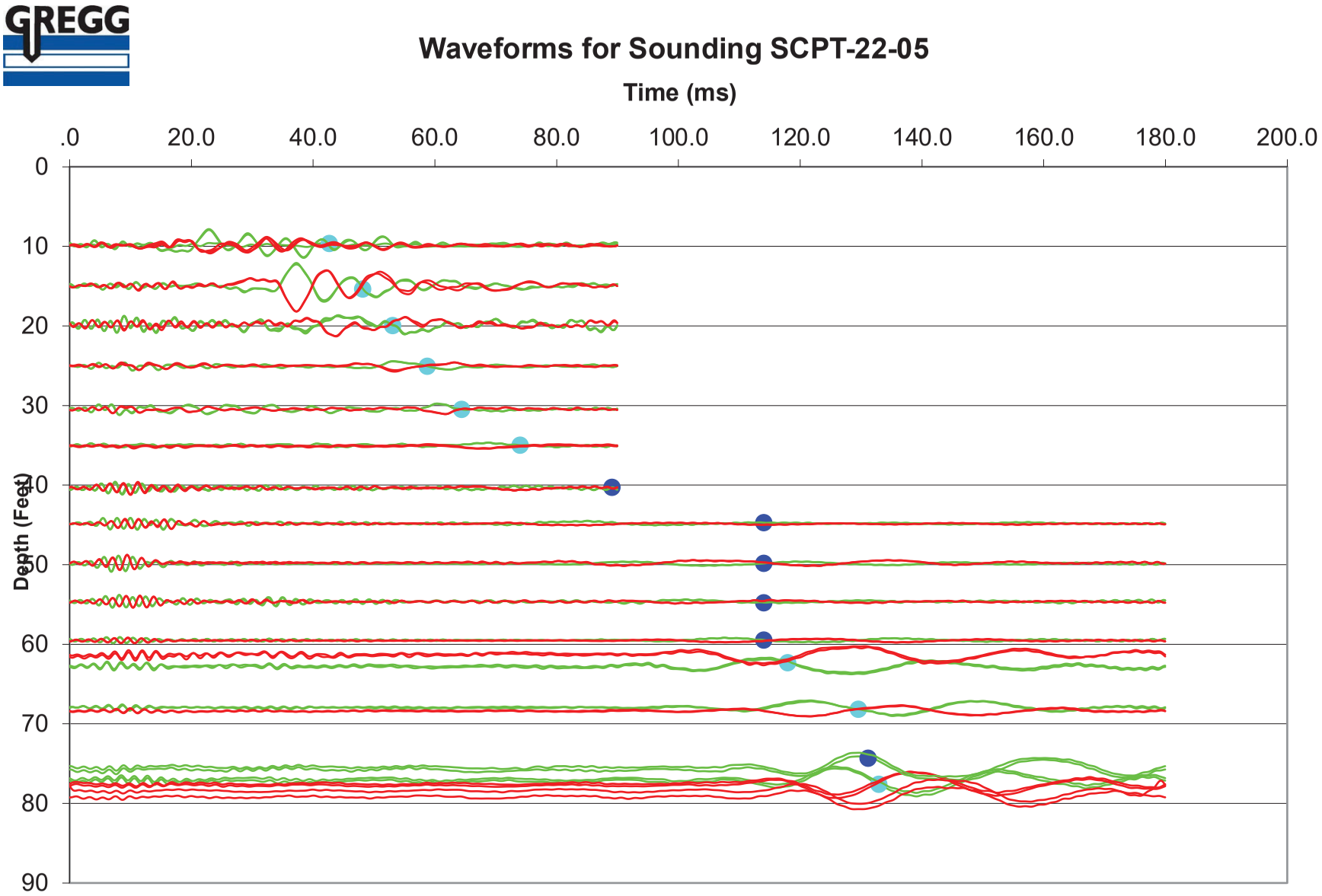
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-05
SCPT-22-05

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/05/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	42.4000			
15.09	14.43	14.53	5.03	47.8500	5.4500	923.6	11.89
20.01	19.35	19.42	4.90	52.7000	4.8500	1009.7	16.89
25.10	24.44	24.50	5.07	58.4000	5.7000	889.5	21.90
30.51	29.85	29.90	5.40	64.0000	5.6000	964.8	27.15
35.27	34.61	34.65	4.75	73.5500	9.5500	497.5	32.23
65.12	64.46	64.49	29.84	117.6000	44.0500	677.3	49.54
70.05	69.39	69.41	4.92	129.1500	11.5500	425.9	66.93
75.13	74.47	74.49	5.08	132.5000	3.3500	1517.6	71.93


GREGG
Waveforms for Sounding SCPT-22-05
Time (ms)
.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
0
10
20
30
40
50
60
70
80
90
Depth (Feet)

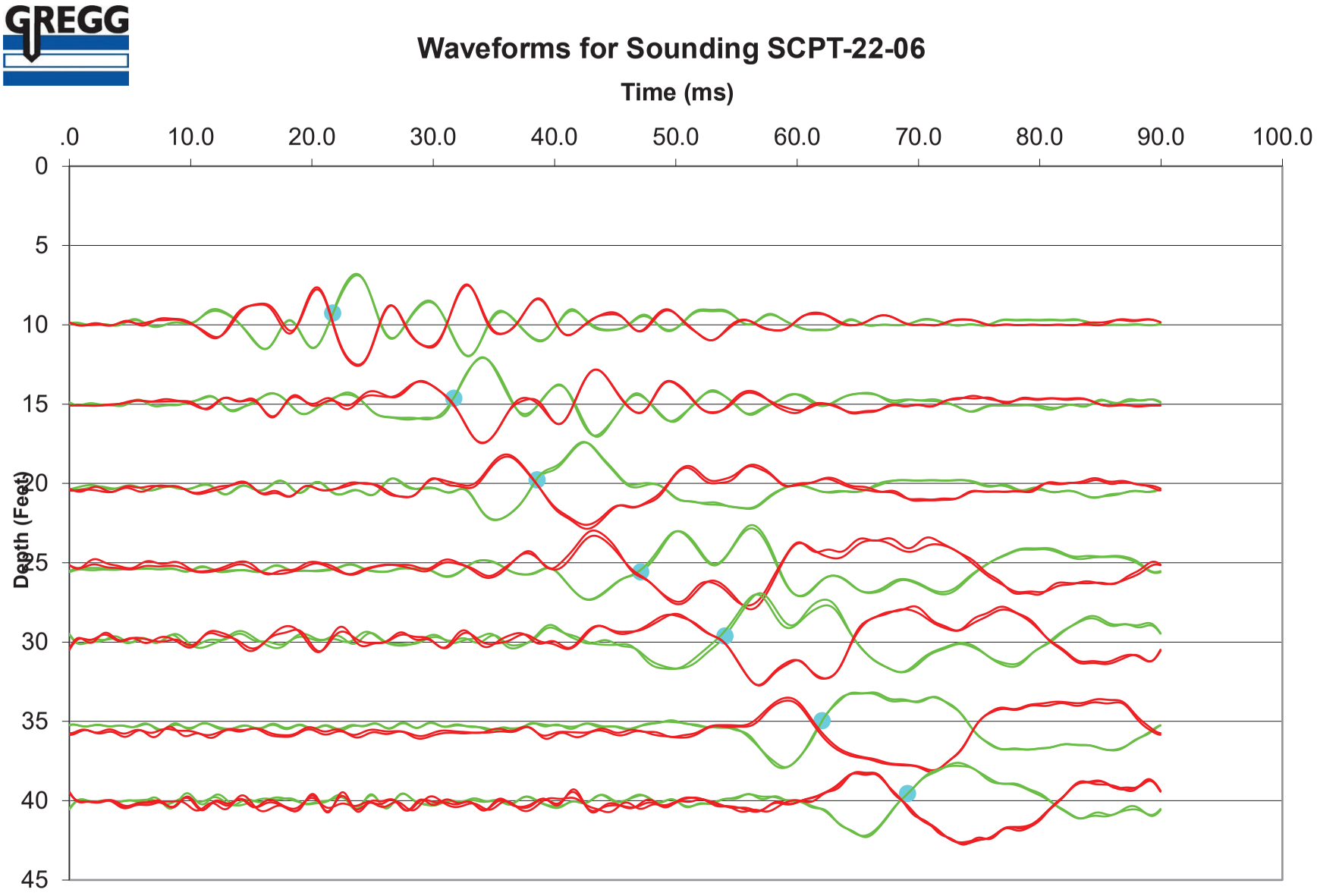
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-06
SCPT-22-06

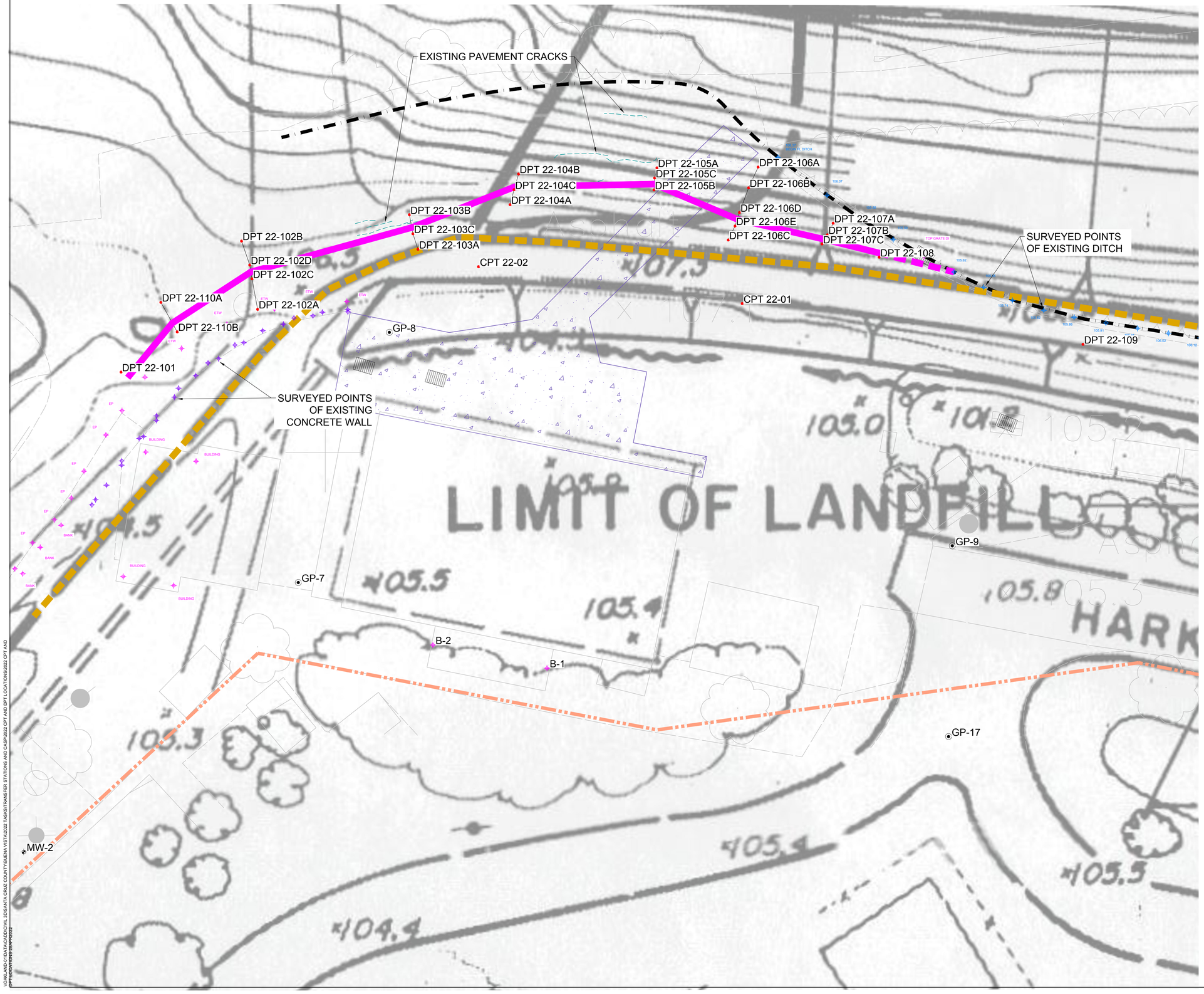
Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/04/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	21.6000			
15.09	14.43	14.53	5.03	31.5000	9.9000	508.4	11.89
20.51	19.85	19.92	5.39	38.3000	6.8000	792.2	17.14
25.59	24.93	24.99	5.07	46.8000	8.5000	596.6	22.39
30.02	29.36	29.41	4.42	53.7000	6.9000	640.7	27.15
35.27	34.61	34.65	5.24	61.6500	7.9500	659.4	31.98
40.03	39.37	39.40	4.75	68.6500	7.0000	678.9	36.99


GREGG
Waveforms for Sounding SCPT-22-06
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
0
5
10
15
20
25
30
35
40
45
Depth (Feet)

APPENDIX 2
DPT Exploration Summary



N

0 15 30

SCALE IN FEET

LEGEND

- APPROXIMATE PROPERTY LINE
- EXISTING CONCRETE DITCH
- ASSUMED HISTORICAL WASTE LIMIT
- ESTIMATED LIMITED OF WASTE (NOTE 1)
- DPT/CPT 22-103 — 2022 DPT & CPT LOCATIONS
- GP-7 — GAS PROBES
- MW-2 — MONITORING WELLS
- B-1 — GEOTECHNICAL BORINGS

Geosyntec Name	Total Depth of Exploration (ft)	Pavement Thickness (ft)	Soil Thickness (ft)	Waste Thickness (ft)	Bottom of Waste Encountered?
DPT22-101	12.0	0.3	3.6	1.0	Yes
DPT22-102A	12.0	0.3	11.6	0.0	N/A
DPT22-102B	5.0	0.3	3.6	1.0	No
DPT22-102C	6.0	0.3	6.0	0.0	N/A
DPT22-102D	8.0	0.3	3.6	1.0	Yes
DPT22-103A	8.0	0.3	7.6	0.0	N/A
DPT22-103B	8.0	0.3	4.6	1.0	Yes
DPT22-103C	8.0	0.3	7.6	0.0	N/A
DPT22-104A	5.0	0.4	4.7	0.0	N/A
DPT22-104B	5.0	0.4	2.1	0.5	Yes
DPT22-104C	5.0	0.4	4.7	0.0	N/A
DPT22-105A	8.0	0.3	3.2	2.5	Yes
DPT22-105B	8.0	0.3	7.2	0.0	N/A
DPT22-105C	5.0	0.3	2.7	1.0	Yes
DPT22-106A	8.0	0.4	2.1	5.5	No
DPT22-106B	8.0	0.4	2.1	3.5	Yes
DPT22-106C	3.0	0.4	2.6	0.0	N/A
DPT22-106D	8.0	0.4	2.6	1.0	Yes
DPT22-106E	5.0	0.4	4.6	0.0	N/A
DPT22-107A	5.0	0.3	2.0	0.5	Yes
DPT22-107B	2.5	0.3	1.6	0.5	No
DPT22-107C	5.0	0.3	4.7	0.0	N/A
DPT22-108	5.0	0.3	4.7	0.0	N/A
DPT22-109	5.0	0.3	4.7	0.0	N/A
DPT22-110A	12.0	0.3	6.7	3.0	Yes
DPT22-110B	8.0	0.3	7.7	0.0	N/A

NOTE:

1. LIMIT OF WASTE BASED ON 2022 FIELD INVESTIGATION
2. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH. DATE OF AERIAL PHOTOGRAPHY BY AMERICAN AERIAL SURVEYS: 11-17-2021. COORDINATE GRID AND ELEVATIONS BASED ON LOCAL SYSTEM.

MAINTENANCE SHOP AREA WITH 2022 INVESTIGATION POINTS
BUENA VISTA LANDFILL
SANTA CRUZ COUNTY, CALIFORNIA

Geosyntec consultants

PROJECT NO: WG3064 | MAY 2022

FIGURE A1

\\OAKLAND-01\DATA\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2022 TASKS\TRANSFER STATIONS AND CASP\2022 CPT AND DPT LOCATIONS\2022 CPT AND DPT LOCATIONS 05042022

APPENDIX 3

Gas Probes, Monitoring Wells Log, 2008
Geotechnical Report

MCON
SOCIATES
onsultants in Wastes
Management and
nvironmental Control

November 8, 1991
Project 307-01.53

Mr. R. Patrick Mathews
County of Santa Cruz
Department of Public Works
701 Ocean Street
Santa Cruz, California 95060

Note
P-9 = GP-9
P-10 = GP-10
P-11 = GP-11

Re: Installation of gas probes and wells

Dear Mr. Mathews:

EMCON Associates (EMCON) is submitting this report on the installation of a ground-water monitoring well, a piezometer, and soil-gas probes at the Buena Vista landfill, Buena Vista Road, Watsonville, California (figure 1). This work was performed in accordance with the workplan submitted to the County of Santa Cruz on March 25, 1991. The well is used to monitor water quality near the Module 2 expansion area, the piezometer, to monitor water levels west of the existing landfill, and the soil gas probes to monitor potential soil gas migration from the landfill.

Well and Piezometer Installation Procedures

One monitoring well (MW-6) and one piezometer (PZ-1) were installed at the site on June 14 and July 2, 1991, respectively (figure 2). The exploratory borings were drilled with hollow-stem auger drilling equipment. The augers were steam-cleaned between borings to prevent possible cross-contamination.

Soil samples were collected for geologic logging at 5-foot intervals with a 2-inch-diameter split-spoon sampler. A field geologist supervised by a California-state-registered geologist logged the samples according to the Unified Soils Classification System. The boring logs are provided in appendix A.

PJ3 3070153.G0W

LOG OF EXPLORATORY BORING

GP-9

PROJECT NUMBER 307-01.50 BORING NO. P-9

PROJECT NAME Buena Vista Landfill PAGE 1 OF 5

BY L. Gallagher DATE 7/3/91 SURFACE ELEV. ft.

RECOVERY (ft/ft)		PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				5			SANDY CLAY (CL), dark olive brown (2.5YR, 5/5); 15-20% fine to medium sand; trace gravel, angular to subrounded; damp.	
				10			CLAYEY SAND (SC), dark olive brown (2.5Y, 3/3); 25-30% moderate-plasticity fines; 70-75% fine to medium grained; trace gravel, angular to subrounded; damp.	
				15			SANDY CLAY (CL), olive brown (2.5Y, 4/4); low- to moderate-plasticity fines; 5-10% very fine to medium sand, subangular to subrounded; moist.	
				20				

EMCON ASSOCIATES

REMARKS

Boring drilled using 8-inch-diameter hollow-stem augers and completed as Tri-level Gas Probe. Boring logged from drill cuttings collected every 5 feet.

LOG OF EXPLORATORY BORING

GP-9

PROJECT NUMBER 307-01.50 BORING NO. P-9

PROJECT NAME Buena Vista Landfill PAGE 2 OF 5

BY L. Gallagher DATE 7/3/91 SURFACE ELEV. ft.

RECOVERY (ft/ft)		PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				25			SANDY CLAY (CL), continued. @20': trace pebbles. @25': 20-25% very fine to medium sand; gravel and pebbles absent.	
				30				
				35			GRAVEL (G), olive brown (2.5Y, 4/4); 5-10% fines; 15-20% fine to coarse sand; 30-35% gravel; 35-40% pebbles, subangular to rounded; damp.	
				40				

EMCON ASSOCIATES

REMARKS

Boring drilled using 8-inch-diameter hollow-stem augers and completed as Tri-level Gas Probe. Boring logged from drill cuttings collected every 5 feet.

LOG OF EXPLORATORY BORING

GP-9

PROJECT NUMBER 307-01.50 BORING NO. P-9

PROJECT NAME Buena Vista Landfill PAGE 3 OF 5

BY L. Gallagher DATE 7/3/91 SURFACE ELEV. ft.

RECOVERY (ft/ft)		PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				45			CLAYEY SAND (SC), olive brown (2.5Y, 4/4); 10-15% low- to moderate-plasticity fines; 70-75% very fine to medium sand, subangular to subrounded; 5-10% gravel, rounded to subrounded; damp.	
							@45': trace cobbles, <15mm-dia., subangular to subrounded.	
				50			SANDY CLAY (CL), olive brown (2.5Y, 4/4); 75-80% low- to moderate-plasticity fines; 20-25% medium to very coarse sand; trace gravel, rounded to subangular; damp.	
				55			@55': trace cobbles, <25mm-dia., subangular to subrounded.	
				60				

REMARKS

Boring drilled using 8-inch-diameter hollow-stem augers and completed as Tri-level Gas Probe. Boring logged from drill cuttings collected every 5 feet.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.50 BORING NO. P-9

PROJECT NAME Buena Vista Landfill PAGE 4 OF 5

BY L. Gallagher DATE 7/3/91 SURFACE ELEV. ft.

RECOVERY (ft/ft)		PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				65			SANDY CLAY (CL), continued.	
							GRAVEL (GW), olive brown (2.5Y, 4/4); 5-10% fines; 15-20% very fine to very coarse sand; 45-50% gravel; 15-20% pebbles <15mm-dia., subrounded to subangular; damp.	
				70			CLAYEY GRAVEL (GC), light olive brown (2.5Y, 5/3); 10-15% fines; 5-10% sand; 5-10% gravel; 65-75% pebbles <15mm-dia., subangular to rounded; damp.	
				75				
				80				

REMARKS

Boring drilled using 8-inch-diameter hollow-stem augers and completed as Tri-level Gas Probe. Boring logged from drill cuttings collected every 5 feet.

EMCON ASSOCIATES

GP-9

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.50 BORING NO. P-9

PROJECT NAME Buena Vista Landfill PAGE 5 OF 5

BY L. Gallagher DATE 7/3/91 SURFACE ELEV. ft.

RECOVERY (ft/ft)		PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				85			CLAYEY GRAVEL (GC), continued.	
							BORING TERMINATED AT 84 FEET.	
				90				
				95				
				100				

REMARKS

Boring drilled using 8-inch-diameter hollow-stem augers and completed as Tri-level Gas Probe. Boring logged from drill cuttings collected every 5 feet.

EMCON ASSOCIATES

Buena Vista Landfill - Gas Probe Installation

PREPARED FOR: Patrick Mathews/County of Santa Cruz
Brian Kennedy/ County of Santa Cruz

PREPARED BY: Mike Baillie/SFO

COPIES: Ana Demorest/SFO

DATE: July 30, 1999

Note
-GP-18 referred to in this report got buried and does not exist.
-GP-9A is existing GP-17.

Introduction

On July 27 and 28, 1999 CH2M HILL installed nested gas probes in two locations in Buena Vista Landfill in Santa Cruz County. The first probe location denoted GP-9A, is located along the west end of the landfill, adjacent to Rountree Lane near the jail facilities. The second probe location denoted GP-18 was located approximately 100 feet west of future Module 6, east of the Household Hazardous Waste facility.

Geotechnical Investigation

CH2M HILL performed a geotechnical investigation prior to installing the gas probes to evaluate the soil and groundwater conditions. Kvilhaug Well Drilling of Concord, California performed the drilling using an 8-inch outside diameter hollow stem auger. Disturbed soil samples were collected every 5 feet using the Standard Penetration Test (ASTM D1586) and were visually classified in general accordance with ASTM D2487. Gas probes were installed upon completion of the boreholes. Boring Logs are included in Appendix A.

Borehole GP-9A was drilled to a depth of 80 feet. The soil profile consists of sandy lean clay and clayey sand to a depth of approximately 15 feet underlain by dense to very dense, poorly graded sand with occasional interbedded silt to approximately 60 feet. Below 60 feet the sand grades into very dense, poorly graded gravel. No groundwater was encountered in GP-9A.

Borehole GP-18 was drilled to a depth of 35 feet. The soil profile consisted of approximately 25 feet of medium stiff to stiff, sandy lean clay and silt underlain by very dense, poorly graded sand. Groundwater was encountered approximately 33 feet below ground surface and the borehole was terminated at 35 feet.

Gas Probe Installation

Three gas probes were installed in borehole GP-9A and two were installed in GP-18. Each probe consists of 0.5-inch schedule 40 PVC, with 10 feet of 0.020-inch slotted well screen. Construction of the nested probes in GP-9A included placing the screens from 70 to 80 feet, 40 to 50 feet and 4 to 14 feet bgs. The nested probes in GP-18 had screen intervals from 20 to 30 feet and 5 to 15 feet bgs. Backfilling included #2/12 graded sand from the bottom of the

CH2MHILL

PROJECT NUMBER	BORING NUMBER		SHEET
151768.GW.ZZ	GP - 9A	GP-17	1 OF 3

SOIL BORING LOG

7/27/99

PROJECT : Buena Vista Landfill - Gass Probes — LOCATION : West end of Rountree Lane

ELEVATION : 108 ft. — DRILLING CONTRACTOR : Kvilhaug Well Drilling, Concord

DRILLING METHOD AND EQUIPMENT USED : 8" Hollow Stem Auger, Mobile B-61

WATER LEVELS : No Water Encountered — START : 08:00 — END : 17:00 — LOGGER : M. Baillie

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	3.5				Approx. 4 inches Asphalt Road Base	
5	5.0	1.5	S-1	4 - 9 - 14 (23)*	SANDY LEAN CLAY (CL), brown, moist, medium stiff	*2-inch Sampler PP = 2.75 TSF
	8.5					
10	10.0	1.5	S-2	8 - 15 - 16 (31)	CLAYEY SAND (SC), yellowish-red, moist, medium dense to dense, medium grained sand	PP spilts sample
	13.5					
15	15.0	1.5	S-3	15 - 17 - 25 (42)	CLAYEY SAND (SC) as above grading to POORLY GRADED SAND (SP), brown to brownish yellow, moist, dense	
	18.5					
20	20.0	1.5	S-4	6 - 5 - 5 (10)	SILT (ML), brown, moist, soft	PP = 0.75 TSF
	23.5					
25	25.0	1.5	S-5	14 - 24 - 34 (58)	POORLY GRADED SAND (SP), brown, moist, very dense, coarse grained	
	28.5					
30	30.0	1.5	S-6	20 - 22 - 38 (60)	POORLY GRADED SAND (SP), dark brown, moist, very dense, finer grained sand	

CH2MHILL

PROJECT NUMBER	BORING NUMBER		
151768.GW.ZZ	GP - 9A	GP-17	SHEET 2 OF 3

SOIL BORING LOG

7/27/99

PROJECT : Buena Vista Landfill - Gass Probes — LOCATION : West end of Rountree Lane

ELEVATION : 108 ft. — DRILLING CONTRACTOR : Kvilhaug Well Drilling, Concord

DRILLING METHOD AND EQUIPMENT USED : 8" Hollow Stem Auger, Mobile B-61

WATER LEVELS : No Water Encountered — START : 08:00 — END : 17:00 — LOGGER : M. Baillie

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	33.5					
35	35.0	1.5	S-7	20 - 30 - 47 (77)	POORLY GRADED SAND (SP), brown, moist, very dense, coarse grained	
	38.5					
40	40.0	1.5	S-8	18 - 25 - 32 (57)	POORLY GRADED SAND (SP) with interbedded silt, brown, moist, very dense	
	43.5					
45	45.0	1.4	S-9	24 - 30 - 50/5"	POORLY GRADED SAND (SP), brown, moist, very dense	
	48.5					
50	50.0	1.3	S-10	22 - 40 - 50/3"	POORLY GRADED SAND (SP), brown, moist, very dense, interspersed gravel	
	53.5					
55	55.0	1.4	S-11	28 - 30 - 50/5"	POORLY GRADED SAND (SP), brown, moist, very dense, coarse grained, interspersed gravel	
	58.5					
60	60.0	0.4	S-12	50/5"	POORLY GRADED SAND (SP), similar to S-11, interspersed gravel	

CH2MHILL

PROJECT NUMBER	BORING NUMBER		SHEET
151768.GW.ZZ	GP - 9A	GP-17	3 OF 3

SOIL BORING LOG

7/27/99

PROJECT : Buena Vista Landfill - Gass Probes — LOCATION : West end of Rountree Lane

ELEVATION : 108 ft. — DRILLING CONTRACTOR : Kvilhaug Well Drilling, Concord

DRILLING METHOD AND EQUIPMENT USED : 8" Hollow Stem Auger, Mobile B-61

WATER LEVELS : No Water Encountered — START : 08:00 — END : 17:00 — LOGGER : M. Baillie

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	63.5					
65	65.0	0.4	S-13	30 - 50/3"	POORLY GRADED GRAVEL (GP), brown, moist, very dense	
	68.5					
70	70.0	0.4	S-14	50/5"	POORLY GRADED GRAVEL (GP), brown, moist, very dense	
	73.5					
75	75.0	1.4	S-15	30 - 40 - 50/5"	POORLY GRADED GRAVEL (GP), brown, moist, very dense, increasing gravel size	
	78.5					
80	80.0	0.4	S-16	50/5"	POORLY GRADED GRAVEL (GP), brown, moist, very dense	
85					End Borehole GP - 9A Install Gas Probes	

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.32
PROJECT NAME Buena Vista Drive Landfill
BY CMF DATE 3/31 -4/3/87

BORING NO. MW-2
PAGE 1 OF 5
SURFACE ELEV. 105.60'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0		SC	CLAYEY SAND; yellowish brown (10YR, 5/8); 35% silt and clay; 65% fine to medium grained sand, grains mostly quartz with some feldspars and lithics; loose.
				5		ML	CLAYEY SILT to SANDY SILT; yellowish brown (10YR, 5/8); 50% clay and silt; 50% fine grained quartzose sand; medium dense; damp.
		13		10			
							@14': increasing sand amount.
				15		SC	CLAYEY SAND; yellowish brown (10YR, 5/8); 30% clay and silt; 70% fine to coarse grained quartzose sand; medium dense; damp.
		12		20			
				25		SM	SILTY SAND; brown (10YR, 4/3); 25% silt and clay; 70% fine to coarse grained sand, grains are quartzose with minor lithics; 5% gravel; dense to very dense; moist.
		50		30			
				35			@38': SANDY GRAVEL lens; reworked siltstones, sandstones, and quartz pebbles.
				40			

REMARKS

Borehole drilled using mud-rotary drilling equipment. Borehole converted to a 4.5-inch ground-water monitoring well as shown on Plate A-9.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.32
PROJECT NAME Buena Vista Drive Landfill
BY CMF DATE 3/31-4/3/87

BORING NO. MW-2
PAGE 2 OF 5
SURFACE ELEV. 105.60'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		68		40	SM		SILTY SAND; light yellowish brown (10YR, 6/4); 30% clay and silt; 70% fine to medium grained quartzose sand; trace gravel; well stratified; very dense; moist.
				45			
					SP/GP		SAND AND GRAVEL; dark yellowish brown (10YR, 4/4); medium to coarse grained sand, grains mostly quartz with some feldspars and lithics; gravel is composed of sandstone, chert, and quartz clasts; poorly stratified; very dense; moist.
		125		50			
				55			
		115		60			@60': very dark grayish brown (10YR, 3/2); moist to wet.
				65			
		163		70	SW		GRAVELLY SAND, very dark grayish brown (10YR, 3/2); 10% clay and silt; 65% sand; 25% gravel composed of chert, siltstone, sandstone, and graywacke clasts that are subrounded and iron oxide-stained; very dense; moist.
				75			
				80	GC		CLAYEY GRAVEL; dark yellowish brown

REMARKS

PLATE A-5

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.32 BORING NO. MW-2

PROJECT NAME Buena Vista Drive Landfill PAGE 3 OF 5

BY CMF DATE 3/31-4/3/87 SURFACE ELEV. 105.60'

TORVANE (TSF)	POCKET PENETRO-METER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
		135		80		GC	CLAYEY GRAVEL (continued): (10YR,4/4); to very pale brown (10YR, 7/4); 30% clay and silt; 35% sand; 35% gravel composed of rounded to subrounded sandstone, siltstone, graywacke, and chert clasts; very dense; wet.
				85			
		197		90			
				95		CL	CLAY; yellowish brown (10YR, 5/4) to light brownish gray (10YR, 6/2); 25% fine grained sand in thinly laminated interbeds; hard; dry to damp.
		66	▼ 4/17/87	100			
				105			@105': dark gray (2.5Y, 4/1); to light olive brown (2.5Y, 5/4).
		112		110			
				115			
				120			@120': trace of organic material.

REMARKS

PLATE A-6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.32 BORING NO. MW-2

PROJECT NAME Buena Vista Drive Landfill PAGE 4 OF 5

BY CMF DATE 3/31-4/3/87 SURFACE ELEV. 105.60'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		67		120		CL	CLAY; continued.
				125			
		212		130		SM	SILTY SAND; light olive brown (2.5Y, 5/4); 25% silt and clay; 60% fine to coarse grained sand; 15% gravel, sub-rounded to rounded clasts of various compositions with calcite and iron oxide coatings; very dense; moist; beginning of Aromas Formation.
				135			
		157/ 11"	▽ 4/2/87	140		SP	SAND; grayish brown (2.5Y, 5/2); 5% clay and silt; 95% fine to medium grained sand, grains mostly quartz with some magnetite; poorly graded; very dense; damp to wet.
				145			
		136/ 11"		150			
				155			
				160			

REMARKS

PLATE A-7

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.32 BORING NO. MW-2

PROJECT NAME Buena Vista Drive Landfill PAGE 5 OF 5

BY CMF DATE 3/31-4/3/87 SURFACE ELEV. 105.60'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				160		SP	SAND; continued.
				165			BOTTOM OF BORING AT 165 FEET
				170			
				175			
				180			
				185			
				190			
				195			
				200			

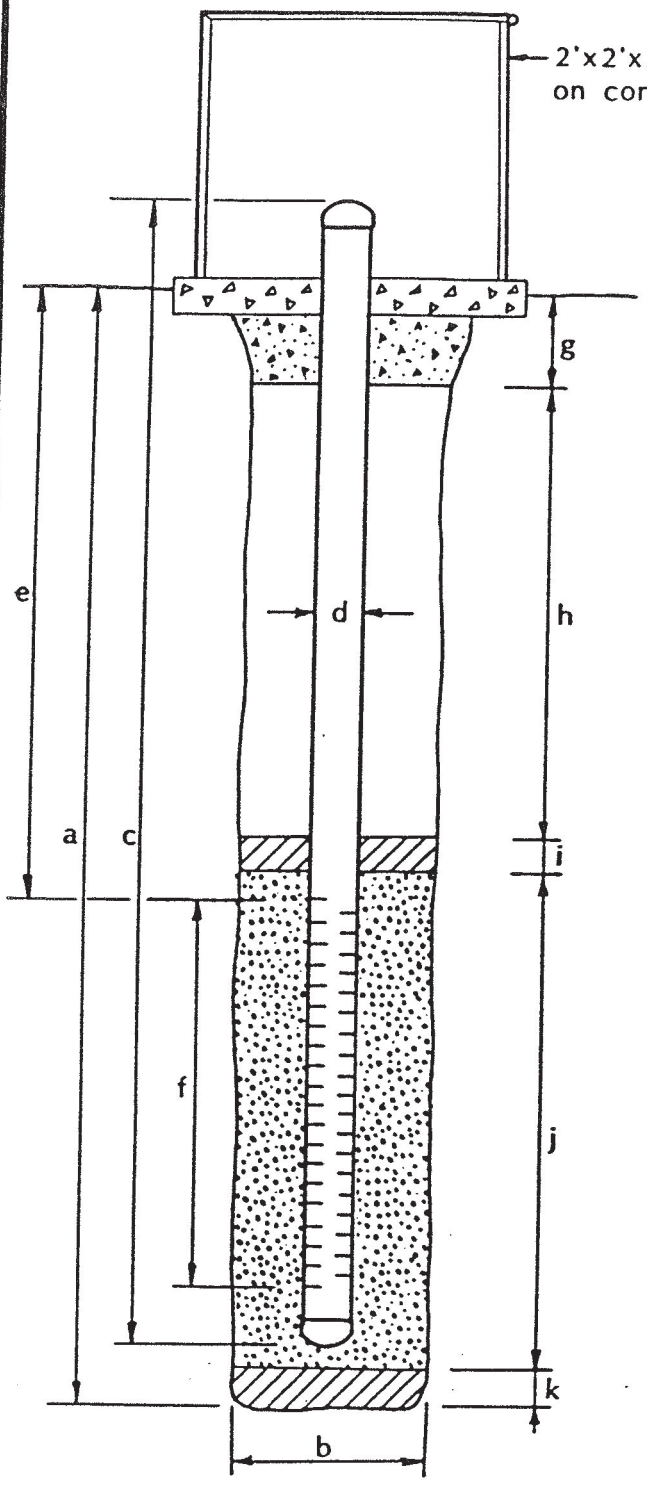
REMARKS

PLATE A-8

WELL DETAILS

PROJECT NUMBER 307-01.32
PROJECT NAME Buena Vista Drive Landfill
COUNTY Santa Cruz
WELL PERMIT NO. 87-086

BORING / WELL NO. MW-2
TOP OF CASING ELEV. 107.20'
GROUND SURFACE ELEV. 105.60'
DATUM Mean Sea Level



EXPLORATORY BORING

a. Total depth 165 ft.
b. Diameter 9 7/8 in.
Drilling method Mud Rotary

WELL CONSTRUCTION

c. Casing length 165 ft.
Material Schedule 40 PVC
d. Diameter 4.5 in.
e. Depth to top perforations 135 ft.
f. Perforated length 30 ft.
Perforated interval from 135 to 165 ft.
Perforation type Machine Slotted
Perforation size 0.020 inch
g. Surface seal (0-2') 2 ft.
Seal material Cement-Bentonite
h. Backfill (2-125') 123 ft.
Backfill material Cement-Bentonite
i. Seal (125-130') 5 ft.
Seal material Bentonite
j. Gravel pack (130-165') 35 ft.
Pack material 2 X 12 Sand
k. Bottom seal -- ft.
Seal material None

GEOTECHNCIAL INVESTIGATION
For
PROPOSED MAINTENANCE FACILITY ADDITION
BUENA VISTA LANDFILL
150 Roundtree Lane
Santa Cruz County, California

Prepared
For
TERRA COAST CONSTRUCTION
Scotts Valley, California

Prepared By
DEES & ASSOCIATES, INC.
Geotechnical Engineers
Project No. SCR-0335
October 2008

Dees & Associates, Inc.
Geotechnical Engineers
501 Mission Street, Suite 8A Santa Cruz, CA 95060 Phone (831) 427-1770 Fax (831) 427-1794

October 8, 2008

Project No. SCR-0335

TERRA COAST CONSTRUCTION
1727 Jackrabbit Ridge
Scotts Valley, California 95066

Attention: Douglas Arthur

Subject: Geotechnical Investigation

Reference: Proposed Maintenance Facility Addition
Buena Vista Landfill
150 Roundtree Lane, Watsonville
Santa Cruz County, California

Dear Mr. Arthur:

As requested, we have completed a Geotechnical Investigation for the new addition proposed for the existing maintenance building at the referenced site. The purpose of our investigation was to evaluate the soil conditions in the vicinity of the proposed addition and provide geotechnical recommendations for the proposed project.

This report presents the results, conclusions and recommendations of our investigation. If you have any questions regarding this report, please call our office.

Very truly yours,

DEES & ASSOCIATES, INC.

10-13-08

Rebecca L. Dees
Geotechnical Engineer
G.E. 2623

RLD/bd

Copies: 5 to Addressee
1 to Peter Boyce

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GEOTECHNICAL INVESTIGATION

Introduction

This report presents the results of our Geotechnical Investigation for a new addition proposed for the existing maintenance building at the Buena Vista Landfill, 150 Roundtree Lane in Santa Cruz County, California.

Purpose and Scope

The purpose of our investigation was to explore and evaluate surface and near surface soil conditions in the vicinity of the proposed addition and provide geotechnical recommendations for design and construction of the project.

The specific scope of our services was as follows:

1. Site reconnaissance and review of available data in our files pertinent to the site and vicinity.

2. Exploration of subsurface conditions consisting of logging and sampling of two (2) exploratory test borings drilled to 16.5 feet. The test borings were drilled with 6-inch diameter continuous flight auger equipment mounted on a truck. Soil samples were obtained from the borings and returned to the laboratory for testing.

3. Laboratory testing to evaluate the engineering properties of the subsoils.

4. Engineering analysis and evaluation of the resulting field and laboratory test data. Based on our findings, we have developed geotechnical design criteria for general site grading, slab-on-grade foundations, and general site drainage.

5. Preparation of this report presenting the results of our investigation.

Project Location and Description

The site is located at the Buena Vista Landfill, 150 Roundtree Lane, in Watsonville, California, Figure 1. The site is developed with several structures including a 110 foot long by 60 foot wide maintenance facility building located at the southern edge of the property. The project consists of adding a 15 foot wide by 38 foot long one-story addition to the existing maintenance building. See Figure 2.

The existing maintenance building and the proposed addition are situated on level ground and there are no slopes within 100 feet of the proposed addition. The proposed addition location is covered in gravel and some asphalt. A lawn is located on the other side of the property line a few feet south of the proposed addition.

Roof runoff from the maintenance building is collected in downspouts that discharge along the back of the building onto the adjacent ground. The water from the downspouts flows over the gravel surface and onto the lawn on the adjacent property.

Field Investigation

Subsurface conditions at the site were explored on September 24, 2008 with two (2)

exploratory test borings drilled 16.5 feet below grade. The borings were drilled with 6-inch diameter auger equipment mounted on a truck. The approximate location of our test borings are indicated on our Boring Site Plan, Figure 3. Our boring site plan is based on the preliminary plans provided to us.

Representative soil samples were obtained from the exploratory borings at selected depths, or at major strata changes. These samples were recovered using the 3.0 inch O.D. Modified California Sampler (L) or the Standard Terzaghi Sampler (T). The penetration resistance blow counts for the (L) and (T) noted on the boring logs were obtained as the sampler was dynamically driven into the in-situ soil. The test was performed by dropping a 140-pound hammer a 30-inch free fall distance enough times (blows) to drive the sampler 6 to 18 inches. The number of blows required to drive the sampler through each 6-inch penetration interval was recorded. The "blow count" recorded on the boring logs present the accumulated number of blows that were required to drive the sampler through the last 12 inches of that sample interval, unless otherwise noted. The blow counts indicated on the logs for the California Modified sampler (L) have been converted to an equivalent SPT blow count.

The soils encountered in the exploratory borings were continuously logged in the field and described in accordance with the Unified Soil Classification System (ASTM D2487 and D2488), Figure 4. The test boring logs are included on Figures 5 and 6 of this report. The test boring logs describe the soils encountered in our borings and may not reflect soil conditions in other areas of the site.

Laboratory Testing

The laboratory testing program was directed toward a determination of the physical and engineering properties of the soils underlying the site. Moisture content and dry density tests were performed on representative undisturbed soil samples in order to determine the consistency of the soil and the moisture variation throughout the explored soil profile. Grain size analyses were performed on select samples to aid in soil classification. An Expansion Index test was performed on the clayey foundation zone soils to determine the soils relative shrink/swell potential.

The results of all field and laboratory testing appear on the "Logs of Test Borings", opposite the sample tested.

Subsurface Soil Conditions

The Santa Cruz County Geologic Map indicates the site is underlain by Fluvial facies terrace deposits (Qwf) (Pleistocene), which are described as, "Semiconsolidated, moderately to poorly sorted silt, sand, silty clay, and gravel. May be more than 200 ft thick. Gravel, approximately 50 ft thick, is generally present 50 ft below surface of deposit and is both a local aquifer and significant source of gravel. Upper 5 to 15 ft of unit is moderately indurated owing to clay and iron oxide cementation in weathered zone".

Our borings encountered fluvial deposits consisting of layered silty sand, sandy clay and sand. The upper 3 to 3.5 feet of soil consisted of silty sand with some gravels. A 4.5 foot thick layer of sandy clay was encountered below the upper silty sands. A 5.5 to 7 foot thick layer of silty sand was encountered below the clay and sand with silt was encountered from

about 13 feet to the base of our borings 16.5 feet below grade.

The soils were medium dense from the ground surface to the base of our borings. The sandy clay has a low to moderate expansion potential and was very stiff.

The underlying soils are classified as a "Site Class D" for analysis using the 2007 California Building Code.

Groundwater

Groundwater was not encountered in our test borings. However, groundwater levels at the site may vary due to seasonal variations and other factors not evident during our investigation.

Seismicity

The project site is located about 5.1 km southwest of the Zayante Fault, 9.6 km southwest of the San Andreas Fault, 21.6 km northeast of the offshore Monterey Bay-Tularcitos fault and 31.2 km northeast of the offshore San Gregorio fault. The San Andreas Fault is the largest and most active of the faults, however, each fault is considered capable of generating moderate to severe ground shaking. It is reasonable to assume that the proposed development will be subject to at least one moderate to severe earthquake from one of the faults during the next fifty years. Structures designed in accordance with the most current seismic design codes should react well to seismic shaking.

The Seismic Design Category (SDC) for structures with an occupancy category of I or II is "D" for analysis using the 2007 California Building Code.

Liquefaction

Liquefaction occurs when saturated fine grained sands, silts and sensitive clays are subject to shaking during an earthquake and the water pressure within the pores build up leading to loss of strength. The excess pore water pressures then start to dissipate upwards and side ways. The primary movement is in an upward direction towards the ground surface which often results in ground settlement. Lateral dissipation of pore pressures could result in lateral spreading if soils liquefy near a slope face.

The site is not mapped in a known liquefaction zone, the soils are dense and no groundwater was encountered at the site, therefore, there is a very low potential for liquefaction to affect the proposed development.

Landsliding

The addition is level to gently sloped with slope gradients on the order of 2 to 10 percent and there are no steep slopes located within 100 feet of the proposed addition. Based on the dense consistency of the subsoils and the gentle slopes, there is a very low potential for landsliding to affect the proposed development.

DISCUSSIONS AND CONCLUSIONS

Based on the results of our investigation, the new maintenance facility addition proposed at the site are feasible provided the recommendations presented in this report are incorporated into the design and properly followed during construction of the development.

Primary geotechnical concerns for the project include providing firm, uniform support for foundations, controlling site drainage and designing for strong seismic shaking.

The soils were firm from the ground surface to the base of our borings. Shallow spread footing or slab-on-grade foundations may be used to support the proposed addition. Although the clay encountered 3.5 feet below grade has a low to moderate expansion potential when dried out, the clays were nearly saturated at the time of our investigation and only the top 18 inches of the clay is subject to moisture variations. Therefore, there is a low potential for expansion of the clays to affect the proposed development.

The ground surface around the addition is nearly level. Surface runoff around the addition should be controlled so surface water is not allowed to pond near foundation or pavements.

The site is located in a highly seismic region near several major fault zones. The proposed structure will most likely experience strong seismic shaking during the design lifetime. The foundation and structure should be designed utilizing the most current seismic design standards.

RECOMMENDATIONS

The following recommendations should be used as guidelines for preparing project plans and specifications:

General Site Grading

1. The geotechnical engineer should be notified at least four days prior to any grading or foundation excavating so the work in the field can be coordinated with the grading contractor and arrangements for testing and observation can be made. The recommendations of this report are based on the assumption that the geotechnical engineer will perform the required testing and observation during grading and construction. It is the owner's responsibility to make the necessary arrangements for these required services. After the earthwork operations have been completed and the geotechnical engineer has finished his observation of the work, no further earthwork operations shall be performed except with the approval of and under the observation of the geotechnical engineer.

2. We understand the addition will be constructed along existing grades and grading will be limited to foundation excavations and subgrade preparation below slabs-on-grade.

3. Areas to be graded should be cleared of all obstructions including loose fill and other unsuitable material. Existing depressions or voids created during site clearing should be backfilled with engineered fill.

4. Engineered fill should be moisture conditioned between 2 to 3 percent over optimum moisture content, placed in thin lifts less than 8-inches in loose thickness and compacted to at least 90 percent relative compaction. Where referenced in this report, Percent Relative Compaction and Optimum Moisture Content shall be based on ASTM Test Designation D1557-00.

5. The on-site soils are suitable for use as engineered fill. Soils used for engineered fill should be granular, have a Plasticity Index less than 15, be free of organic material, and contain no rocks or clods greater than 6 inches in diameter, with no more than 15 percent larger than 4 inches.

6. We understand the interior floor slab will have some fork lift traffic. The upper 8 inches of subgrade below the interior concrete slabs-on-grade floor should be compacted to at least 95 percent relative compaction to provide a firm base for slab support. The subgrade below exterior concrete walkways and patios and the subgrade below non-load bearing interior floor slabs should be compacted to at least 90 percent relative compaction.

7. Engineered fill should be observed and tested by our firm. At a minimum, in-place density tests should be performed as follows: one test for every 500 cubic yards of material placed for embankments, one test for every 100 to 200 cubic yards of material for backfill in trenches or around structures, one test for every 500 to 1,000 cubic yards of material for

relatively thin fill sections and one test whenever there is a definite suspicion of a change in the quality of moisture control or effectiveness in compaction.

Foundations

8. Spread footing or slab-on-grade foundations may be used to support the proposed addition. The base of all foundations should be embedded at least 12 inches into firm, native soil.

9. Spread footings and thickened slab footings should be at least 12 inches wide for one-story structures and 15 inches wide for two-story structures. Actual footing widths should be as required by the structural designer based on the actual loads transmitted to the foundation and applicable design standards. Footings located adjacent to other footings or utility trenches should have their bearing surfaces founded below an imaginary 1.5:1 plane projected upward from the bottom edge of the adjacent footings or utility trenches.

10. The foundation trenches should be kept moist and be thoroughly cleaned of slough or loose materials prior to pouring concrete. Footings should be deepened if any soft spots are encountered at the base of the footing excavations.

11. Spread footings and thickened slab footings designed in accordance with the above may be designed for an allowable soil bearing pressure of 1,800 psf for dead plus live loads. This value may be increased by one-third to include short-term seismic and wind loads.

12. Mat slab foundations designed in accordance with the above may be designed for an allowable soil bearing pressure of 900 psf for dead plus live loads. This value may be increased by one-third to include short-term seismic and wind loads.

13. Total and differential settlements under the proposed light building loads are anticipated to be less than 1 inch and 1/2 inch respectively.

14. Lateral load resistance for structures supported on footings may be developed in friction between the foundation bottom and the supporting subgrade. A friction coefficient of 0.30 is considered applicable. Where footings are poured neat against firm, native soil, a passive lateral pressure of 300 pcf, equivalent fluid weight, may be assumed. The top 12 inches of soil should be neglected in passive design.

15. Prior to placing concrete, foundation excavations should be thoroughly cleaned and observed by the soils engineer.

Concrete Slabs-on-Grade

16. The upper 8 inches of subgrade below the interior concrete slabs-on-grade floor should be compacted to at least 95 percent relative compaction to provide a firm base for slab support. The subgrade surface should be pre-moistened prior to placing concrete.

17. The subgrade below exterior concrete walkways and patios and the subgrade below non-load bearing interior floor slabs should be compacted to at least 90 percent relative compaction. The subgrade surface should be pre-moistened prior to placing concrete.

18. Dees & Associates, Inc. are not experts in the field of moisture proofing and vapor barriers. In areas where floor wetness would be undesirable, an expert, experienced with moisture transmission and vapor barriers should be consulted. At a minimum, a blanket of 4 inches of free-draining gravel should be placed beneath the floor slab to act as a capillary break. In order to minimize vapor transmission, an impermeable membrane should be placed over the gravel. The membrane should be covered with 2 inches of sand or rounded gravel to protect it during construction. The sand or gravel should be lightly moistened just prior to placing the concrete to aid in curing the concrete.

Site Drainage

19. Controlling surface and subsurface runoff is important to the performance of the project.

20. Surface drainage should include provisions for positive gradients so that surface runoff is not permitted to pond adjacent to foundations or other improvements. Where bare soil or pervious surfaces are located next to the foundation, the ground surface within 10 feet of the structure should be sloped at least 5 percent away from the foundation. Where impervious surfaces are used within 10 feet of the foundation, the impervious surface within 10 feet of the structure should be sloped at least 2 percent away from the foundation. Swales should be used to collect and remove surface runoff where the ground cannot be sloped the full 10 foot width away from the structure. Swales should be sloped at least 2 percent towards the discharge point.

21. Full roof gutters should be placed around the eves of the structure. Discharge from the roof gutters should be conveyed away from the downspouts and discharged away from improvements in a controlled manner.

Plan Review, Construction Observation, and Testing

22. Dees & Associates, Inc. should be provided the opportunity for a general review of the final project plans prior to construction to evaluate if our geotechnical recommendations have been properly interpreted and implemented. If our firm is not accorded the opportunity of making the recommended review, we can assume no responsibility for misinterpretation of our recommendations. We recommend that our office review the project plans prior to submittal to public agencies, to expedite project review. Dees & Associates, Inc. also requests the opportunity to observe and test grading operations and foundation excavations at the site. Observation of grading and foundation excavations allows anticipated soil conditions to be correlated to those actually encountered in the field during construction.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be given.

2. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to ensure that the Contractors and Subcontractors carry out such recommendations in the field. The conclusions and recommendations contained herein are professional opinions derived in accordance with current standards of professional practice. No other warranty expressed or implied is made.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside our control. Therefore, this report should not be relied upon after a period of three years without being reviewed by a soil engineer.

APPENDIX A

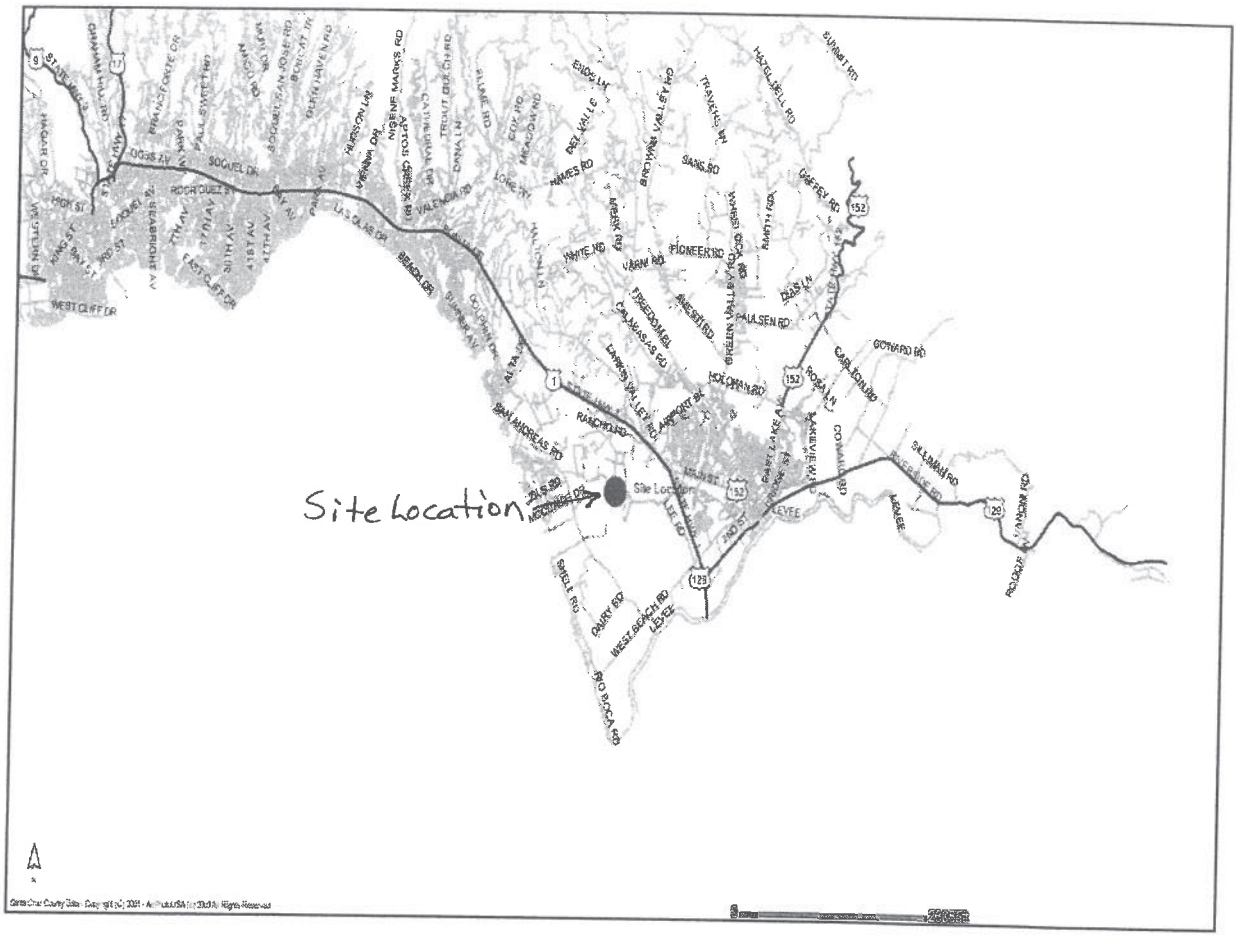
Site Vicinity Map

Site Plan

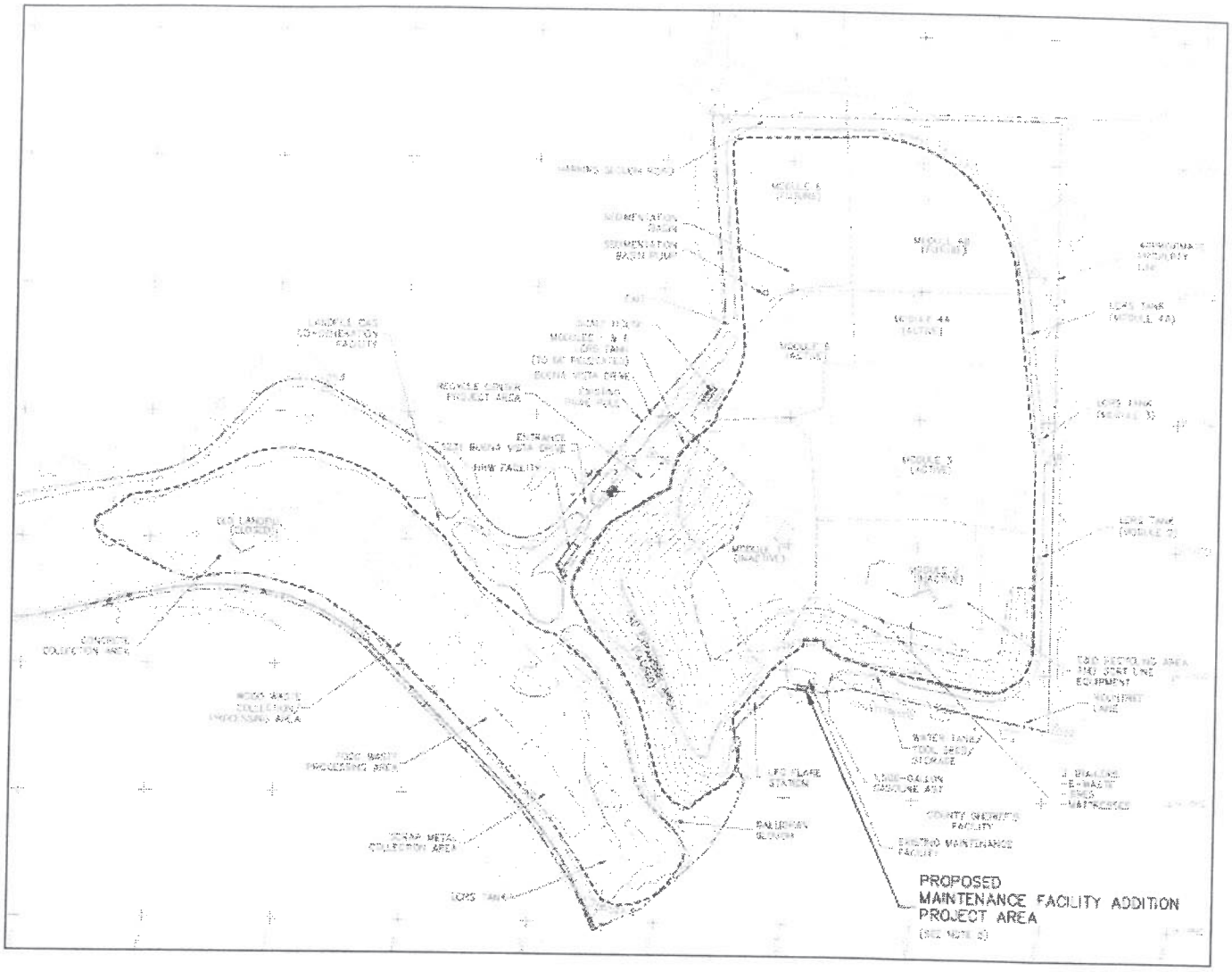
Boring Site Plan

Unified Soil Classification System

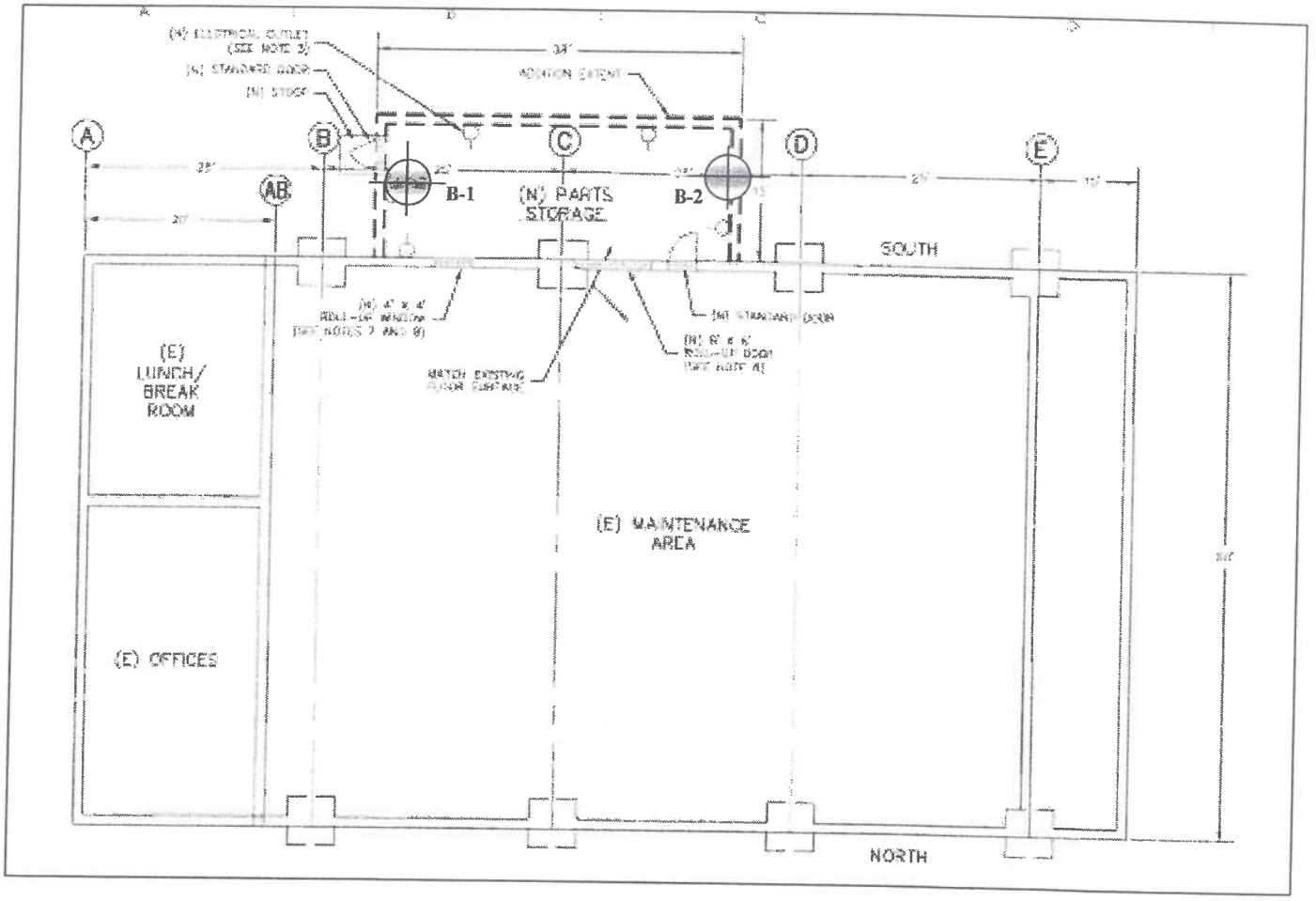
Logs of Test Borings



SITE VICINITY MAP	
Buena Vista Landfill 150 Roundtree Lane Santa Cruz County, CA	Drawn By: BD
Project No. SCR-0335	**FIGURE 1**



SITE PLAN BUENA VISTA LANDFILL MAINTENANCE FACILITY 150 Roundtree Lane SANTA CRUZ COUNTY, CALIFORNIA	SCALE: NTS
	OCTOBER 2008
	Drawn By: BD
Project No. SCR-0335	**FIGURE 2**



BORING SITE PLAN BUENA VISTA LANDFILL MAINTENANCE FACILITY 150 Roundtree Lane SANTA CRUZ COUNTY, CALIFORNIA	SCALE: AS SHOWN
	OCTOBER 2008
	Drawn By: BD
Project No. SCR-0335	**FIGURE 3**

THE UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES	CLASSIFICATION CRITERIA	
COARSE-GRAINED SOILS** MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE (THE NO. 200 SIEVE SIZE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE)	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS (< 5% FINES)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Wide range in grain sizes and substantial amounts of all intermediate particle sizes	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Predominantly one size or a range of sizes with some intermediate sizes missing Not meeting all gradation requirements for GW	
		GRAVELS WITH FINES (>12% FINES)	GM	Silty gravels, gravel-sand-silt mixtures	Non plastic fines or fines with low plasticity Atterberg limits below "A" line or PI < 4	Above "A" line with 4 < PI < 7 are borderline cases requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures	Plastic fines Atterburg limits above "A" line with PI > 7	
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS (<5% FINES)	SW	Well-graded sands, gravelly sands, little or no fines	Wide range in grain sizes and substantial amounts of all intermediate sizes missing	
			SP	Poorly graded sands, gravelly sands, little or no fines	Predominantly one size or a range of sizes with some intermediate sizes missing Not meeting all gradation requirements for SW	
		SANDS WITH FINES (>12% FINES)	SM	Silty sands, sand-silt mixtures	Non plastic fines or fines with low plasticity Atterburg limits below "A" line or PI < 4	Limits plotting in hatched zone with 4 < PI < 7 are borderline cases requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures	Plastic fines Atterburg limits above "A" line with PI > 7	
FINE-GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE (THE NO. 200 SIEVE SIZE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE)	SILTS AND CLAYS (LIQUID LIMIT < 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			OL	Organic silts and organic silty clays of low plasticity		
	SILTS AND CLAYS (LIQUID LIMIT > 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			CH	Inorganic clays of medium to high plasticity, organic silts		
			OH	Organic clays of medium to high plasticity, organic silts		
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils	Readily identified by color, odor, spongy feel and frequently by fibrous texture	

**Gravels and sands with 5% to 12 % fines are borderline cases requiring use of dual symbols.

RELATIVE DENSITY OF SANDS AND GRAVELS

DESCRIPTION	BLOW / FT*
VERY LOOSE	0 – 4
LOOSE	4 – 10
MEDIUM DENSE	10 – 30
DENSE	30 – 50
VERY DENSE	OVER 50

CONSISTENCY OF SILTS AND CLAYS

DESCRIPTION	BLOWS / FT*
VERY SOFT	0 – 2
SOFT	2 – 4
FIRM	4 – 8
STIFF	8 – 16
VERY STIFF	16 – 32
HARD	OVER 32

*Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. 12 vertical inches.

L ■ M ■ T □ B □

SAMPLE TYPES REFERENCED ON BORING LOGS

TEST BORING LOGS

LOGGED BY: BD DATE DRILLED: 9-24-08 BORING TYPE: 6" SS BORING NO: 1

DEPTH (FT.)	SAMPLE NO.	USC SYMBOL	SOIL DESCRIPTION	USC SOIL TYPE	BLOW COUNT (N60)	DRY DENSITY (PCF)	MOISTURE IN-SITU	MOISTURE	COHESION (PSF)	PHI ANGLE	% PASSING 200 SIEVE	PLASTICITY INDEX	MISC. LAB RESULTS
1	1-1-1		8 inches of Aggregate Baserock										
2			Orange brown Silty SAND with occasional baserock gravels, moist, medium dense	SM	18	131.4	11.2				20.5		
3	L 1-2												
4	T		Orange brown Sandy CLAY with charcoal, very moist, very stiff	CL	10		18.6						
5	1-3-2				13	91.2	27.3						EI= 50
6	L												
7	1-4				15		25.6						
8	T												
9			Orange brown fine Silty SAND with occasional angular gravels, moist, medium dense										
10	1-5-1												
11					19	103.4	20.5						
12	L												
13			Approximate Contact										
14			Orange brown medium-coarse SAND with Silt, damp, medium dense										
15	1-7				26								
16	T												
17			Boring Terminated @ 16 ½'										
18													
19													
20													
21													
22													
23													
24													
25													
26													

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Project No. SCR-0335

Figure No. 5

TEST BORING LOGS

LOGGED BY: BD DATE DRILLED: 9-24-08 BORING TYPE: 6" SS BORING NO: 2

DEPTH (FT.)	SAMPLE NO.	USC SYMBOL	SOIL DESCRIPTION	USC SOIL TYPE	BLOW COUNT (N60)	DRY DENSITY (PCF)	MOISTURE IN-SITU	MOISTURE	COHESION (PSF)	PHI ANGLE	% PASSING 200 SIEVE	PLASTICITY INDEX	MISC. LAB RESULTS
1	2-1-1		5" AC/ 8" Aggregate Baserock										
2	L		Grey Silty SAND with some angular gravels, moist, medium dense	SM	16	124.9	10.3						
3	2-2												
4	T		Orange mottled grey Sandy CLAY, moist to very moist, very stiff	CL	15		19.9				58.5		
5	2-3				16								
6													
7	T				14								
8	2-4		Orange brown fine Silty SAND, moist, medium dense	SM									
9													
10	T				19		23.5						
11													
12													
13													
14			Approximate Contact										
15	2-5		Orange brown medium to coarse SAND, damp, medium dense										
16	T				24		14.5						
17			Boring Terminated @ 16 ½'										
18													
19													
20													
21													
22													
23													
24													
25													
26													

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Project No. SCR-0335

Figure No. 6

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Appendix H3. Subsurface Conditions for Proposed CASP at Old Landfill at Buena Vista Landfill Memo

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Memorandum

Date:	16 September 2024
To:	Kasey Kolassa and Nicole Steele, County of Santa Cruz
Copies to:	Sangeeta Lewis
From:	Fabrizio Settepani, P.E., G.E. Xiaoyue Wang, Ph.D., P.E. Emily Martin
Subject:	Subsurface Conditions for Proposed CASP at Old Landfill at Buena Vista Landfill (Watsonville, CA) Geosyntec Project Number: WG3064

1. INTRODUCTION

This memorandum summarizes the subsurface conditions for preparing a draft environmental impact report (EIR) for a covered aerated static pile compost facility (CASP) on the top deck of the Old Landfill area at the Buena Vista Landfill (BVLF) property owned by the County of Santa Cruz at 150 Rountree Lane near Watsonville, California.

According to the *Joint Technical Document and Report of Disposal Site Information for the Buena Vista Drive Sanitary Landfill*, the Old Landfill was used as a municipal solid waste (MSW) disposal site that stopped receiving refuse in 1981 and was certified closed in 1986.

Figure 1 shows the existing site conditions in the area of the CASP (i.e., topographic map, groundwater monitoring wells, and landfill gas probes). The top deck of the Old Landfill is accessed by two access roads. A portion of the top deck is unoccupied whereas the County uses the southern portion of the top deck for storage. An inactive Union Pacific Railroad (formerly Southern Pacific Railroad) track is located along the western and southern sides of the Old Landfill and Gallighan Slough is located along its northern and eastern sides. The BVLF landfill gas to energy plant is also located on the northern side in an area between the limit of the Old Landfill and Gallighan Slough.

Appendix 1 includes the concept developed by SCS Engineers for the CASP; the CASP will require some demolition and/or relocation of the existing stored materials.

We understand that the following items for geology and soils need to be addressed for the draft EIR for the project:

- Rupture of a known earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map
- Strong seismic ground shaking
- Liquefaction and its consequences such as lateral spreading and settlement
- Seismically-induced landslides and slope instabilities
- Expansive soils as defined in the California Building Code
- Soil erosion or loss of topsoil
- Soils incapable of supporting septic tanks or alternative wastewater disposal

The assessment of the above items would inform if the planned project components in the project area are susceptible to the above concerns and, if so, how they could be mitigated.

To assess the site conditions for purposes of the EIR, we used information available for the area and also performed a limited field investigation in the area of the Old Landfill. For the final design of the CASP, we recommend performing a site-specific investigation in accordance with the requirements in the California Building Code (CBC) to confirm the findings of our limited field investigation. Also, because the CASP will be constructed above the Old Landfill, requirements in Title 27 of the California Code of Regulations (27CCR) will need to be followed.

2. REQUIREMENTS FOR STRUCTURES CONSTRUCTED NEAR LANDFILLS IN TITLE 27 OF THE CALIFORNIA CODE OF REGULATIONS (27CCR)

Because the CASP will be constructed above Old Landfill, the requirements in 27CCR, Division 2, Subdivision 1, Chapter 3, Subchapter 5, Article 2 of §21190 (California Integrated Waste Management Board [CIWMB][1] Postclosure Land Use) may apply:

(a) Proposed postclosure land uses shall be designed and maintained to:

(1) protect public health and safety and prevent damage to structures, roads, utilities and gas monitoring and control systems;

(2) prevent public contact with waste, landfill gas and leachate; and

(3) prevent landfill gas explosions.

[1] CalRecycle.

(b) The site design shall consider one or more proposed uses of the site toward which the operator will direct its efforts, or shall show development as open space, graded to harmonize with the setting and landscaped with native shrubbery or low maintenance ground cover.

(c) All proposed postclosure land uses, other than non-irrigated open space, on sites implementing closure or on closed sites shall be submitted to the Enforcement Agency (EA),[2] Regional Water Quality Control Board (RWQCB),[3] local air district and local land use agency. The EA shall review and approve proposed postclosure land uses if the project involves structures within 1,000 feet of the disposal area, structures on top of waste, modification of the low permeability layer, or irrigation over waste.

(d) Construction on the site shall maintain the integrity of the final cover, drainage and erosion control systems, and gas monitoring and control systems. The owner or operator shall demonstrate to the satisfaction of the EA that the activities will not pose a threat to public health and safety and the environment. Any proposed modification or replacement of the low permeability layer of the final cover shall begin upon approval by the EA and the RWQCB.

(e) Construction of structural improvements on top of landfilled areas during the postclosure period shall meet the following conditions:

(1) automatic methane gas sensors, designed to trigger an audible alarm when methane concentrations are detected, shall be installed in all buildings;

(2) enclosed basement construction is prohibited;

(3) buildings shall be constructed to mitigate the effects of gas accumulation, which may include an active gas collection or passive vent systems;

(4) buildings and utilities shall be constructed to mitigate the effects of differential settlement. All utility connections shall be designed with flexible connections and utility collars;

(5) utilities shall not be installed in or below any low permeability layer of final cover;

(6) pilings shall not be installed in or through any bottom liner unless approved by the RWQCB;

---

[2] EA – for the Old Landfill at the BVLF, Santa Cruz County Environmental Health.
[3] RWQCB – for the BVLF, the Central Coast Region.

(7) if pilings are installed in or through the low permeability layer of final cover, then the low permeability layer must be replaced or repaired; and

(8) periodic methane gas monitoring shall be conducted inside all buildings and underground utilities in accordance with §20933 of Article 6, of Subchapter 4 of this Chapter.

(f) The EA may require that an additional soil layer or building pad be placed on the final cover prior to construction to protect the integrity and function of the various layers of final cover.

(g) All on-site construction within 1,000 feet of the boundary of any disposal area shall be designed and constructed in accordance with the following, or in accordance with an equivalent design which will prevent gas migration into the building, unless an exemption has been issued.

(1) a geomembrane or equivalent system with low permeability to landfill gas shall be installed between the concrete floor slab of the building and subgrade;

(2) a permeable layer of open graded material of clean aggregate with a minimum thickness of 12 inches shall be installed between the geomembrane and the subgrade or slab;

(3) a geotextile filter shall be utilized to prevent the introduction of fines into the permeable layer;

(4) perforated venting pipes shall be installed within the permeable layer and shall be designed to operate without clogging;

(5) the venting pipe shall be constructed with the ability to be connected to an induced draft exhaust system;

(6) automatic methane gas sensors shall be installed within the permeable gas layer, and inside the building to trigger an audible alarm when methane gas concentrations are detected; and

(7) periodic methane gas monitoring shall be conducted inside all buildings and underground utilities in accordance with Article 6, of Subchapter 4 of this Chapter (§20920 et seq.).

Another regulation that will need to be addressed by the design team is 22CCR § 64572 (Water Main Separation) which states:

(f) New water mains shall not be installed within 100 horizontal feet of the nearest edge of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within

> *25 horizontal feet of the nearest edge of any cesspool, septic tank, sewage leach field, seepage pit, underground hazardous material storage tank, or groundwater recharge project site.*

The above requirements would be addressed as part of final design with engineering controls.

3. 2022 FIELD INVESTIGATION

3.1 General

Between 4 April and 8 April 2022 Geosyntec performed a limited field investigation on the top deck and on the access road to the top deck of the Old Landfill and at three locations located along the toe of the Old Landfill adjacent to Gallighan Slough. The field investigation included performing shallow borings using hand augering and a direct push testing drill rig (DPT) and cone penetration tests (CPT); see Figure 1 for the locations.

3.2 Pre-Drilling Activities

Before drilling, Geosyntec visited the site on 22 March 2022 to mark the locations for the CPT and the extent of the area where the shallow borings would be conducted. Geosyntec met California Utility Locators, a private utility locator from Scotts Valley, California. The utility locator cleared the area of electrical and metal utilities. Geosyntec also called Underground Service Alert North (USA North 811) after marking the locations with white paint and received ticket number W208700234.

USA informed the following parties of Geosyntec's planned work:

- PACBEL = PACIFIC BELL
- PGESAL = PGE DISTRIBUTION - SALINAS

3.3 Exploration Activities

Geosyntec was onsite full time during the field activities to provide oversight and document the drilling and sampling activities. The drilling contractor for the work was Gregg Drilling LLC of Martinez, California (Gregg); their contractor's license is 1044456.

3.3.1 Cone Penetration Tests

Gregg used a 20 ton truck-mounted CPT rig to perform CPTs. The CPTs were performed in accordance with ASTM D5778. Gregg used a cone setup with a cone base area of 15 cm^2, a sleeve surface of 225 cm^2, and a cone net area ratio of 0.80. The cone setup has a pore pressure transducer and also the ability to measure shear wave velocity with a geophone located 0.2 m behind the tip.

Gregg hand-augered the top 5 feet at each CPT location before pushing with the CPT rig.

As shown on Figure 1, three CPT (CPT22-08, CPT22-09, CPT22-10) were located along the toe of the Old Landfill along Gallighan Slough but outside the footprint of the Old Landfill. CPT22-05 was located on the access road to the top deck of the Old Landfill and within the footprint of the Old Landfill.

Five CPT (CPT-22-03, CPT22-04, CPT22-06, CPT22-07, CPT22-11) were located on the top deck. The depth reached at each CPT is tabulated below. Appendix 2 includes detailed information for the CPT work.[4]

CPT[5]	Total Depth (feet Below the Ground Surface - BGS)	Notes
CPT22-03	62.2	Top deck of the Old Landfill, pushed to refusal. No asphalt; clay layer encountered at 2 feet below the ground surface.
CPT22-04	45.0	Top deck of the Old Landfill, pushed to refusal. No asphalt; clay layer encountered at 3 feet below the ground surface.
CPT22-05	79.7	Lower access road to the top deck of the Old Landfill; within the footprint of the Old Landfill. 4 inches of asphalt, 2.5 feet of gravelly sand; at 3 feet: glass fragments, paper debris, wood fragments to 5 feet. No clay layer encountered.
CPT22-06	42.7	Top deck of the Old Landfill, pushed to refusal. Found clay layer between 4 feet and 5 feet below the ground surface. In top 5 feet: 2 inches of asphalt; clayey sand layer encountered between 3.5 feet and 5 feet below the ground surface.
CPT22-07	34.9	Top deck of the Old Landfill, pushed to refusal. No asphalt; clay layer encountered at 3 feet below the ground surface.

[4] The report includes information for CPT22-01 through CPT22-11. CPT22-01 and CPT22-02 are in the area of the current maintenance building for the BVLF (i.e., at 150 Rountree Lane, Watsonville) and were performed for the evaluation of a transfer station in this area. CPT22-03 through CPT22-11 were performed in the area of the Old Landfill which is located west and south of Gallighan Slough. Gregg prepared one report for both field explorations.
[5] CPT22-01 and CPT22-02 are located near the Maintenance Building area (150 Rountree Lane), south of Module 2 on the east side of Gallighan Slough and were performed to evaluate a potential transfer station.

CPT22-08	50.5	Adjacent to the landfill gas to energy plant; outside the footprint of the Old Landfill. 6 inches of asphalt, 5 feet of fill. Moist at 7.5 feet below the ground surface. No waste encountered.
CPT22-09	50.5	Near toe of Old Landfill slope, outside the footprint of the Old Landfill; along Gallighan Slough. No waste encountered.
CPT22-10	51.0	Near toe of Old Landfill slope; outside the footprint of the Old Landfill footprint; along Gallighan Slough, pushed to refusal. No waste encountered. Note: Direct Push Test (DPT)22-10 which was performed near CPT22-10 and within the Old Landfill footprint encountered waste at a depth of 9 feet.
CPT22-11	34.3	Top deck of the Old Landfill, pushed to refusal

3.3.2 Direct Push Tests

Gregg used a truck-mounted Marl M2.5T direct push test (DPT) rig at each DPT location. The rig allows for sampling intervals (i.e., push) that are 4 feet. The hole diameter is 2.25 inches. Sampling is conducted with transparent polyvinyl chloride (PVC) liners. Gregg hand augered the top 5 feet at each location before sampling with the DPT rig or using the CPT rig.

Drill cuttings were collected in plastic buckets which were disposed at a roll off container located adjacent to the Maintenance Building area for disposal by the County at the Buena Vista Landfill.

DPT22-04 was located approximately 2 feet west of CPT22-04. The total depth of exploration was 8 feet below existing ground surface. Two 2-inch diameter by 4-foot long direct push tubes with soil samples were collected and retained for potential laboratory testing, waste was not encountered within the top 8 feet; both DPT22-04 and CPT22-04 are on the top deck of the Old Landfill.

DPT22-10 was located approximately 20 feet Southwest of CPT22-10. The total depth of exploration was 12 feet bgs (below existing ground surface). Three 2-inch diameter by 4 foot long direct push tubes with soil samples were collected and retained for potential laboratory testing. Clayey soils were encountered in the top 4 feet from the ground surface. Waste was encountered between 4 feet and 9 feet bgs; silty sand with gravel was encountered below 9 feet bgs.

3.3.3 Survey of Exploration Locations

Gregg grouted the CPTs and the DPTs in accordance with County requirements. Geosyntec marked the exploration location with wooden lath and flagging and painted the name of the

exploration location for surveying by the County's surveyor. The surveyor reported the locations in the local coordinate system.

CPT/DPT[6]	Northing	Easting	Elevation (feet)
CPT22-03	9,567.17	9,100.72	91.79
CPT22-04	9,826.87	8,881.77	96.56
CPT22-05	10,094.23	9,009.31	49.47
CPT22-06	10,146.67	8,601.39	99.72
CPT22-07	10,271.75	8,410.03	104.31
CPT22-08	10,542.09	8,668.99	23.26
CPT22-09	10,804.16	8,053.18	41.72
CPT22-10	9,655.07	9,400.53	17.48
CPT22-11	9,867.38	8,741.53	96.61
DPT22-04 (near CPT22-04)	9,828.15	8,880.16	96.57
DPT22-10 (near CPT22-10)	9,641.14	9,386.51	18.90

[6] CPT22-01 and CPT22-02 located near the Maintenance Building area (150 Rountree Lane), south of Module 2 on the east side of Gallighan Slough.

3.4 Laboratory Testing

The results of two soil characterization tests on samples collected at the Old Landfill are tabulated below:

DPT	Depth	Liquid Limit	Plasticity Index	Fines Content	USCS
DPT22-04 near CPT22-04	5-7 feet	40	22	70	CL
DPT22-10 near CPT22-10	4-8 feet	34	19	44	SC

4. GEOLOGY AND HYDROGEOLOGY

4.1 Regional Geology

EMCON[7] states that the area is underlain by at least 1,000 feet of a heterogeneous mixture of interbedded gravel, sand, silt, and clay. Surficial stream and terrace deposits overlie approximately 500 feet of fine sands of the Aromas formation. The Aromas formation in turn overlies the Purisima formation which is approximately 500 feet thick and composed of semiconsolidated sand, silt, clay, and shale.

The area is in coastal Santa Cruz County which has step-like marine terraces of Pleistocene age that consist of weakly consolidated to semiconsolidated heterogeneous deposits of moderately to poorly sorted silt, silty clay, sand, and gravel[8]. Geosyntec[9] has summarized that it is a naturally occurring valley within an uplifted marine terrace. It lies within a broad band of gently rolling hills of the Monterey Bay coastal plain. This gentle terrain has been incised by numerous small streams draining southward to the Pajaro River, including Harkins Slough to the east and Gallighan Slough to the southwest.

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[7] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978.

[8] See United States Geological Survey (USGS) Open File Report 97-489; Geologic Map of Santa Cruz County, California.

[9] *Preliminary Closure and Postclosure Maintenance Plan; Buena Vista Drive Sanitary Landfill; Santa Cruz County, California*; prepared by Geosyntec Consultants, Inc.; Project WG2561D; April 2021, 27 July 2022.

The Aromas Sand formation is the primary water-bearing unit and consists of aeolian (wind blown) and fluvial sand, silt, clay and gravel. Underlying the Aromas Sand formation is the Tertiary Purisima formation, which is too deep to be relevant to site hydrogeologic conditions.

Groundwater flow conditions are influenced regionally by agricultural and municipal pumping wells; water levels that were +5 to +15 feet MSL in the 1940s have declined to –5 feet MSL and lower in recent years.[10]

4.2 Subsurface Conditions in the Old Landfill Area

4.2.1 Soils

Based on EMCON's study[11] of the area geology portions of BVLF are underlain by recent fluvial terrace deposits consisting of poorly consolidated, heterogeneous deposits of gravels, sands and silts. The fluvial terrace deposits are underlain by the Aromas Formation. The Aromas Formation consists of clean, coarse- to medium-grained sands. The Aromas Formation is underlain by the Purisima Formation.

Figure 1 includes the locations of borings, monitoring wells, and gas probes near the Old Landfill which include GT01-03, GT01-4, GP-14, GP-15, GP-24, GP-25, MW-4, MW-5, MW-8, MW-11, PZ-8, and PZ-15. Appendix 3 includes the available logs for previous exploration in the Old Landfill area (i.e., gas probes, monitoring well, borings).

Two borings (GT01-03 and GT01-04) were performed in 2001 to evaluate the subsurface conditions in the area of the landfill gas to energy plant.[12] From the ground surface at the time of drilling, down, approximately 9- to 13-foot-thick non-engineered fill and native soil layer consisting of low plasticity clay and clayey sand; an approximately 5-foot-thick layer of gravel to gravelly sand; and a fine-grained soil layer (silt to clay) to approximately 30 feet below the ground surface (BGS). Below 30 feet BGS, the soil becomes cohesionless. The non-engineered clay fill in the area is stiff. The gravelly sand layer is generally medium dense. The fine-grained soil layer beneath the gravelly sand layer is very stiff to hard. Driving refusal was encountered in GT01-03 when collecting blowcount at depths below 35 feet BGS.

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[10] CH2M Hill. 1996. *Hydrogeological Assessment Report for the Buena Vista Landfill and Vicinity*, prepared for County of Santa Cruz, Santa Cruz County, California. May.

[11] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978.

[12] *Geotechnical Report: Proposed Co-Generation Facility, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for the County of Santa Cruz, prepared by GeoSyntec Consultants, Inc.; Project WL0451; 12 February 2002.

CPT22-08 was performed as part of the 2022 Geosyntec field investigation in the area of the landfill gas to energy plan near boring GT01-04. The stratigraphy is similar to the one at GT01-04 with primarily fine grained to a depth of approximately 25 feet, become coarser grained with depth with interbedded layers of fine-grained soils. The uncorrected blowcount from the CPT at depths between 5 feet and approximately 27 feet range between less than 5 to approximately 20 blows per foot; at a depth of 27 feet to 50 feet BGS the uncorrected blowcount increase to more than 40 blows per foot which is similar to the uncorrected blowcount encountered in GT01-03 and GT01-04 at similar depths.

In CPT22-09, the soils are primarily fine grained to a depth of approximately 13 feet and then become coarser grained with depth. The uncorrected blowcount from the CPT at depths below 15 feet increase to 40 blows per foot.

4.2.2 Municipal Solid Waste Landfill

The CASP is proposed on the top deck of the Old Landfill. At the locations of the CPT completed in 2022 on the top deck, the thickness of MSW varies between 20 feet and 60 feet.

As described in the Introduction, the Old Landfill was closed in the mid-1980s. As part of the 2022 field investigation, we performed two DPTs (DPT22-04 on the top deck, and DPT22-10 at the start of the lower side slope of the Old Landfill near the toe of slope); at both locations, the thickness of soil above waste was approximately 8 feet. As described in Section 3, we tested two soil samples that classified as clayey sand (SC) and silty clay (CL) based on their Atterberg limits and sieve analyses.

At the CPT performed on the top deck of the Old Landfill, the thickness of soils above waste were generally more than 5 feet; except at CPT22-05, where we encountered waste below the existing pavement.

4.2.3 Groundwater

The Aromas Sand formation is the primary water-bearing unit beneath the BVLF and consists of aeolian (windblown) and fluvial sand, silt, clay and gravel.

Groundwater in the area of Old Landfill occurs in the Aromas Sand formation but also occurs in the overlying aeolian and terrace deposits, and along the Gallighan Slough. Figure 1 shows the groundwater monitoring wells, gas probes, and piezometers in the area of the Old Landfill which include GP-14, GP-15, GP-24, GP-25, MW-4, MW-5, MW-8, MW-11, PZ-8, and PZ-15. The direction of groundwater flow is southwest. The groundwater elevations at these wells have

varied between approximately -4.0 feet and 10.45 feet.[13] The groundwater monitoring reports for the site present detailed information.

4.3 Evaluation of Hazards

4.3.1 Introduction to Seismic Hazards

The California State Legislature passed the Alquist Priolo Earthquake Fault Zoning Act (APA) in 1972 and the Seismic Hazards Mapping Act (SHMA) in 1990 prompted by damaging earthquakes in northern and southern California, The SHMA requires the evaluation of sites for the effects of seismic hazards such as ground surface fault rupture, ground shaking, liquefaction, settlement, lateral spreading, seismically-induced slope instabilities, landslides, and other hazards caused by earthquakes.

4.3.1.1 Faulting

No known active faults are present at the BVLF. For the BVLF, Geosyntec[14] identified the nearest faults to the BVLF are the Zayante-Vergales Fault located approximately 3.4 miles from the BVLF and the San Andreas fault system located approximately 6.2 miles from the BVLF.

4.3.1.2 Ground Shaking

The CASP would be designed and constructed in conformance with the most recently adopted CBC design parameters, which are specifically tailored to minimize the risk of structure failure due to seismic hazards. Therefore, conformance with the CBC would ensure that impacts relating to ground shaking would be less than significant.

Based on the information presented on the information collected at the CPT in 2022, the facilities for the CASP will be underlain by the Old Landfill top deck where the thickness of municipal solid waste (MSW) is estimated to vary between approximately 15 feet to 60 feet.

The Old Landfill MSW has not been characterized; however, information published by CalRecycle[15] lists the following components in the residential and commercial waste stream, which can be assumed to also apply to the Old Landfill:

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[13] See Table 1 in *Draft 2024 Winter, Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561E; July 2024.
[14] Geosyntec Consultants, Inc., *Letter-Report: Seismic Hazard Evaluation, Buena Vista Drive Sanitary Landfill, Watsonville, California*; 2003.
[15] Solid Waste Characterization Home Page: CalRecycle, California Department of Resources Recycling and Recovery; figures listed herein have been rounded off. Accessed August 2022.

Component	Residential	Commercial
Paper	23%	31%
Glass	2%	2%
Metal	3%	7%
Electronics	2%	1%
Plastic	10%	9%
Other Organics	42%	40%
Inerts and Other	10%	8%
Household Hazardous Waste	0%	0%
Special Waste	2%	1%
Mixed Residue	6%	1%

The largest component is Other Organics which primarily includes food, leaves and grass, and prunings and cuttings. Based on its composition, MSW has been characterized as having similar behavior as peat. Furthermore, this assessment is based on the observed decomposition of MSW over time, which results in generation of landfill gas, and its observed compressibility over time, which results in settlement.

Given the subsurface conditions in the area of the CASP (i.e., as tabulated above other organics being more than 40%), at this time, the site classification for the CASP is F (soils requiring site response analysis because the soil profile includes peats and/or highly organic clays greater than 10 feet).

4.3.1.3 Liquefaction, Settlement, and Lateral Spreading

Liquefaction is a phenomenon where cohesionless soils (gravel, sand, and cohesionless silt) below the water table lose strength as a result of shaking under earthquake loading. Consequences of liquefaction include lateral spreading, sand boils, and seismic settlements.

As described earlier, portions of the Old Landfill are underlain by Terrace deposits and the Aromas Formation; however, along Gallighan Slough which is located to the east of the Old Landfill, stream channel deposits are present. Geosyntec identified a potentially liquefiable layer

as part of designing the foundation for the onsite Co-Generation Plant.[16] The County of Santa Cruz's website GISWeb shows that the area along Gallighan Slough is potentially liquefiable.

In 2022, based on our preliminary evaluation, a potentially liquefiable layer was identified between elevations 7 feet and 9 feet at CPT22-05, CPT22-08, and CPT22-10; these CPTs are located along the toe of the Old Landfill (i.e., along Gallighan Slough). Therefore, liquefaction potential and its effect on the Old Landfill and on the proposed development need to be evaluated as part of final design.

4.3.1.4 Landslides and Slope Instability

The CASP will be constructed on the top deck of the Old Landfill. CASP operations may require stockpiling and storage near the crest of the slopes at the Old Landfill. Therefore, the stability of the Old Landfill should be evaluated as part of final design.

4.3.1.5 Unstable Ground

As described in Section 4.3.1.3, some of the soils along Gallighan Slough are potentially liquefiable. Liquefaction can induce lateral spreading and slope instability which may affect the Old Landfill and the CASP. Therefore, further evaluations are needed as part of final design.

4.3.1.6 Preliminary Conclusions for Seismic Hazards

Based on the above, some of the seismic hazards are a concern for the Old Landfill; the above seismic hazards will be addressed in detail as part of final design for the CASP.

4.3.2 Expansive Soils

Expansive soils can cause damage to building foundations. The CASP will be constructed on the top deck of the Old Landfill. The top deck is currently overlain by a layer of aggregate base and asphalt. Below this layer, the Old Landfill is underlain by a clayey soil layer which together with the top layer constitutes the final cover for the Old Landfill. As described in Section 3, in accordance with the USCS, the soils classified as CL (low plasticity clay) and SC (clayey sand) which have low potential for expansion.

We understand that as part of developing the CASP, the existing top deck will be overlain by an asphalt concrete layer. The asphalt concrete layer can act as a barrier that minimizes infiltration; therefore, even if expansive soils were present, damage is expected to be small because of minimized infiltration.

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[16] *Geotechnical Report: Proposed Co-Generation Facility, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for the County of Santa Cruz, prepared by GeoSyntec Consultants, Inc.; Project WL0451; 12 February 2002.

We note that because the top deck is underlain by MSW and MSW will decompose over time, settlement is expected. Settlement would result in cracks of the asphalt concrete layer which may allow for infiltration of water. These cracks will need to be repaired as part of maintenance.

4.3.3 Erosion and Loss of Top Soil

Currently, the surface in the area of the proposed CASP include areas of asphalt and gravel pavements (i.e., current top deck and access roads) and vegetated areas (i.e., slopes of the Old Landfill). Furthermore, the BVLF falls under California's Industrial General Permit requirements; therefore, best management practices (BMPs) are routinely implemented and maintained.

During construction, soils may be exposed to the weather; however, a Stormwater Pollution and Prevention Plan (SWPPP) would be required if construction activities disturb more than one acre of land. The SWPPP addresses construction impacts, especially during soil disturbing activities when soils are exposed to wind, rain and concentrated flows that could cause erosion. These mandatory requirements would minimize soil erosion. Furthermore, undisturbed areas can be fenced off and any top soil generated as part of grading activities will be stockpiled and protected for later use. Stockpiles will be covered with tarps, plastic sheeting, erosion control fabrics, or treated with biodegradable soil stabilizers.

After the CASP is constructed much of the disturbed area would be nearly 100 percent impervious because it will be paved and runoff would be directed to areas of BMPs and/or other storm drain infrastructure. We do not recommend infiltration of any collected stormwater as part of low impact development (LID) features so that the MSW and the Old Landfill are not impacted negatively (e.g., enhanced decomposition, generation of leachate and landfill gas, long-term saturation of slopes which may cause landfill slope instability, seeps of leachate).

4.3.4 Septic Systems or Alternative Wastewater Disposal Systems

The Old Landfill does not have sewer infrastructure. Similarly to LID features and infiltration of liquid, we do not recommend infiltrating wastewater into the subsurface soils or construction of a leachfield.

4.4 Existing and New Infrastructure

Existing infrastructure for the Old Landfill such as landfill gas piping and leachate tank for the Old Landfill may need to be relocated as part of developing the CASP. Furthermore, the effect of the CASP on the final cover and on the Old Landfill will need to be evaluated as part of final design of the CASP.

We do not recommend infiltrating water as part of LID practices because leachate and leachate seeps may develop; furthermore, liquids can induce landfill slope instability.

4.5 Settlement

The CASP will be constructed on the top deck of the closed Old Landfill. Even though the waste has aged, it will continue to decompose over time. Waste decomposition results in long-term settlement. Also, placement of loads above the waste (e.g., stockpiling) will result in compression of the waste. Furthermore, the bottom of the Old Landfill is not even; therefore reversal of grades and differential settlement are possible

Appendix 1 shows that a concrete slab is proposed at the base of each CASP module. Concrete slabs crack when they undergo settlement. The cracks can be conduits for compost liquid to migrate outside the containment system. Therefore, settlement of the underlying materials below the CASP infrastructure (e.g., piping, ramps, slabs) should be addressed for final design of the CASP.

ATTACHMENTS

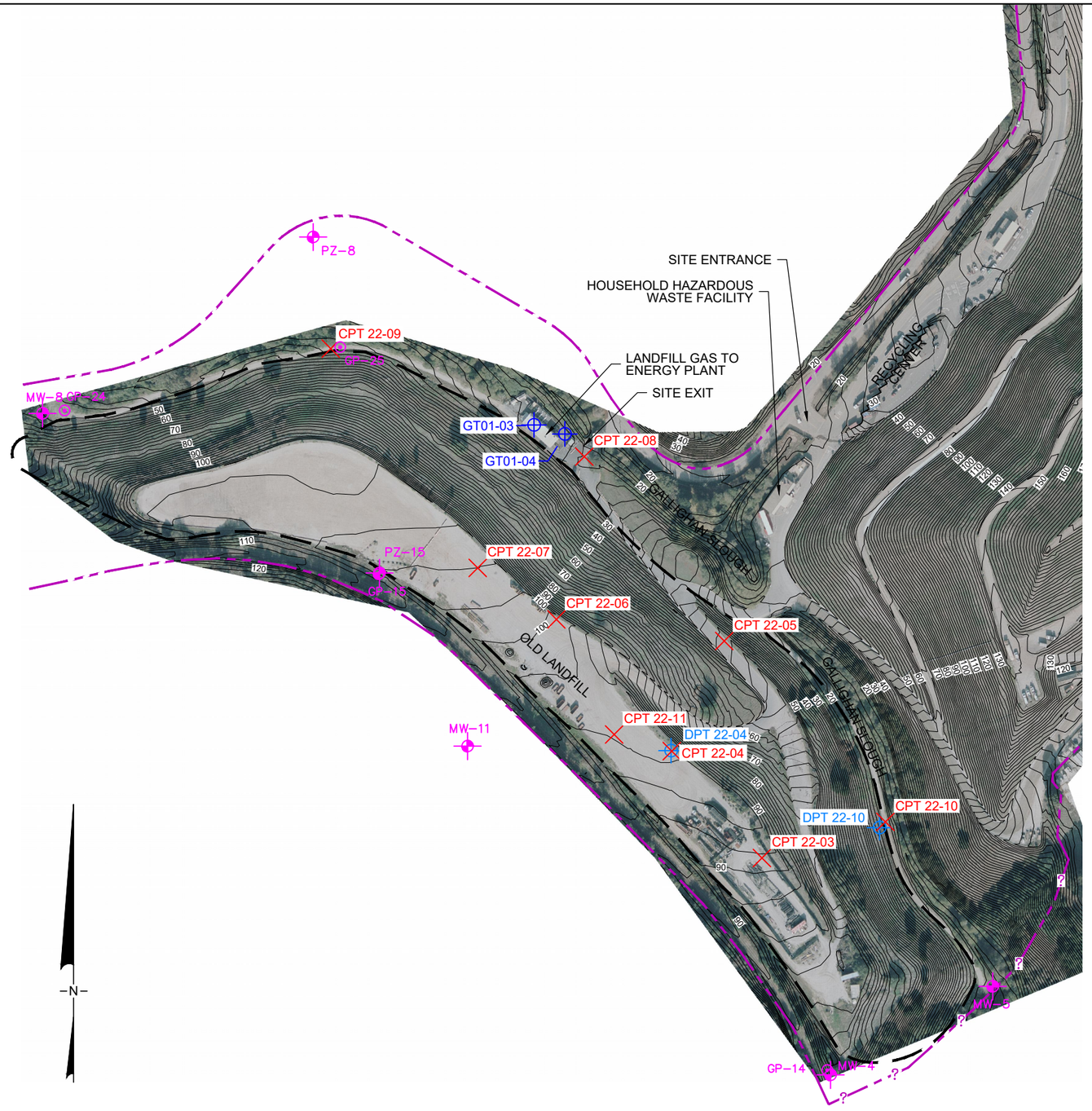
Figure 1 – Site Plan

Appendix 1 – CASP Conceptual Layout

Appendix 2 – CPT Exploration Report

Appendix 3 – Boring Logs

* * * * *



LEGEND

- 150 — EXISTING GROUND ELEVATION (10-FT, NOTE 1)
- EXISTING GROUND ELEVATION (2-FT, NOTE 1)
- APPROXIMATE PROPERTY LINE
- ESTIMATED LIMIT OF CLOSURE
- MW-11 PZ-8 — GROUNDWATER MONITORING WELL/PIEZOMETER (NOTE 2)
- GP-25 — LANDFILL GAS MONITORING PROBE (NOTE 2)
- GT01-04 — PREVIOUS BORING (NOTE 3)
- CPT 22-11 — CPT (NOTE 3)
- DPT 22-10 — DPT (NOTE 3)

NOTES:

1. EXISTING TOPOGRAPHY BY TETRA TECH DATED 27 NOVEMBER 2023. COORDINATE GRID AND ELEVATIONS BASED ON ASSUMED LOCAL SYSTEM PROVIDED BY COUNTY OF SANTA CRUZ (APRIL 2004).
2. UNLESS SURVEY INFORMATION IS AVAILABLE, LOCATIONS OF GROUNDWATER MONITORING WELLS, PIEZOMETERS, LANDFILL GAS PROBES, AND WATER SUPPLY WELLS SHOWN ARE APPROXIMATE.
3. LOCATIONS OF BORINGS GT01-03 AND GT01-04 WERE BASED ON 2001 FIELD INVESTIGATION BY GEOSYNTEC. LOCATIONS OF CPT 22-03 THROUGH CPT 22-11 AS WELL AS DPT 22-04 AND DPT 22-10 WERE BASED ON 2022 FIELD INVESTIGATIONS BY GEOSYNTEC.

SITE PLAN
OLD LANDFILL
BUENA VISTA LANDFILL
COUNTY OF SANTA CRUZ, CALICORNIA

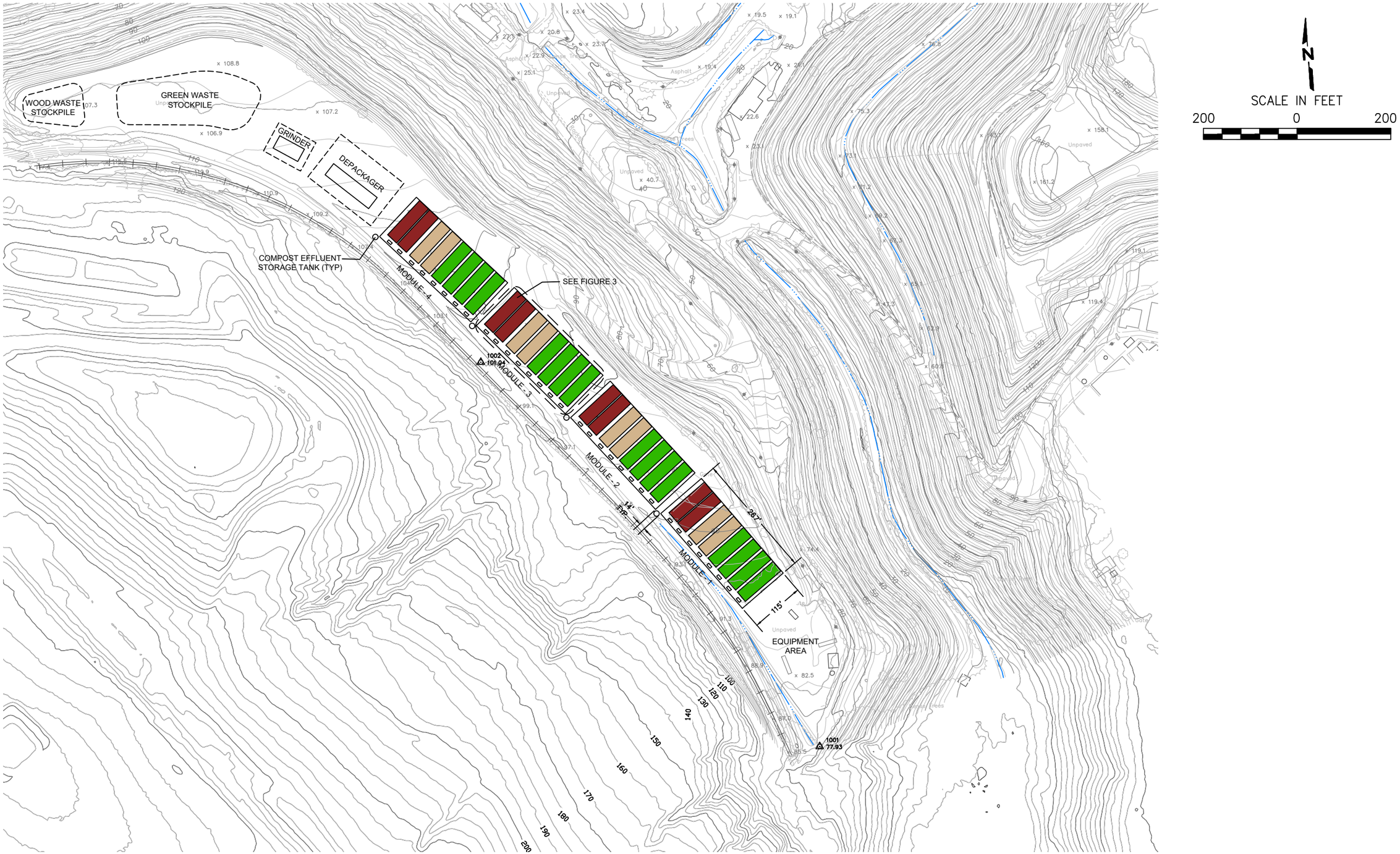
Geosyntec consultants

PROJECT NO: WG3064 | SEPTEMBER 2024

FIGURE 1

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2024 TASKS\FIGURE 1 - SITE PLAN - OLD LANDFILL - Last Saved by: Xiaoyue.Wang on 9/13/24

APPENDIX 1
CASP Conceptual Layout



SYMBOL LEGEND

- HIGH RATE COMPOSTING STAGE WITH GORE COVERS, (20 BUNKERS)
- MATURATION STAGE WITH GORE COVERS, (10 BUNKERS)
- FINISH STAGE WITHOUT COVERS, (10 BUNKERS)
- BLOWER UNIT / CONTROL PANEL

SCS ENGINEERS
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3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827-1808
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PROJ. NO.	DWN. BY:	ACAD FILE:
01219101.01 T-3	ATV/AAS	FIGURE 1
DATE	CHK. BY:	APP. BY:
5/14/2020	WLM	WLM

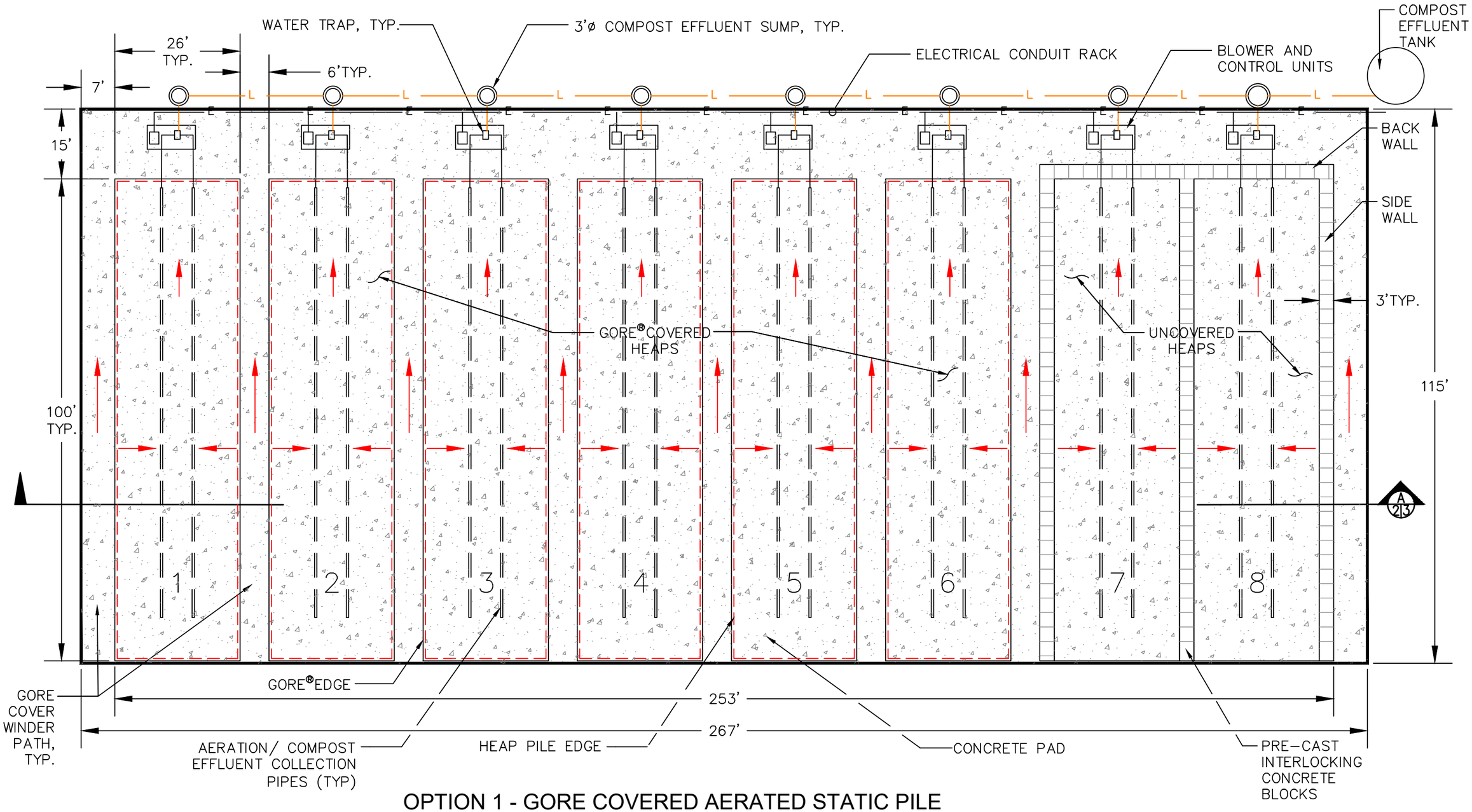
SHEET TITLE: OPTION 1– SITE LAYOUT PLAN – GORE CASP (64 TPY) AND PROPOSED COMPOST FACILITY LOCATIONS

PROJECT TITLE: BUENA VISTA LANDFILL
COUNTY OF SANTA CRUZ, CALIFORNIA

SCALE: AS NOTED

FIGURE NO. 1

R:\Solid Waste\Projects\Buena Vista Landfill\BV 2020 Compost Facility Design Permitting\Preliminary Design\Conceptual Layouts\Figure 1– Site Layout Plan – GORE CASP and Proposed Compost Facility Locations (5-12-20).dwg User:4747a s Plotted:May 14, 2020 – 5:53pm Last Save:May 14, 2020 – 5:44pm



OPTION 1 - GORE COVERED AERATED STATIC PILE BASE MODULE

SCALE IN FEET
20 0 20

SYMBOL LEGEND

EDGE OF GORE® COVER

DIRECTION OF FLOW

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PROJ. NO.	DWN. BY:	ACAD FILE:
01219101.01 T-3	ATV/AAS	FIGURE 2
DATE	CHK. BY:	APP. BY:
5/14/2020	WLM	WLM

SHEET TITLE
OPTION 1– GORE COVERED AERATED STATIC PILE BASE MODULE

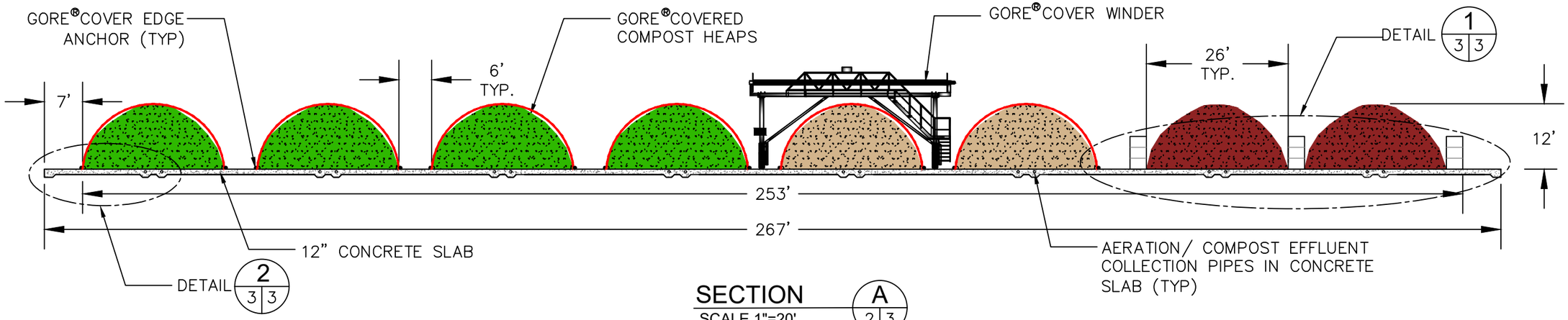
PROJECT TITLE
BUENA VISTA LANDFILL
COUNTY OF SANTA CRUZ, CALIFORNIA

SCALE:
AS NOTED

FIGURE NO.
2

R:\Solid Waste\Projects\Buena Vista Landfill\FEV 2020 Compost Facility Design Permitting\Preliminary Design\Conceptual Layouts\Figure 6 Option 2 - ASP Section - 5.12.2020.dwg User:47470 a Plotted:May 13, 2020 – 11:30am Last Saved:May 13, 2020 – 11:29am

PHASE I HIGH COMPOSTING STAGE (4 WEEKS)
PHASE II MATURATION STAGE (2 WEEKS) ®
PHASE III FINISHING STAGE (WITHOUT GORE COVER) (2 WEEKS)



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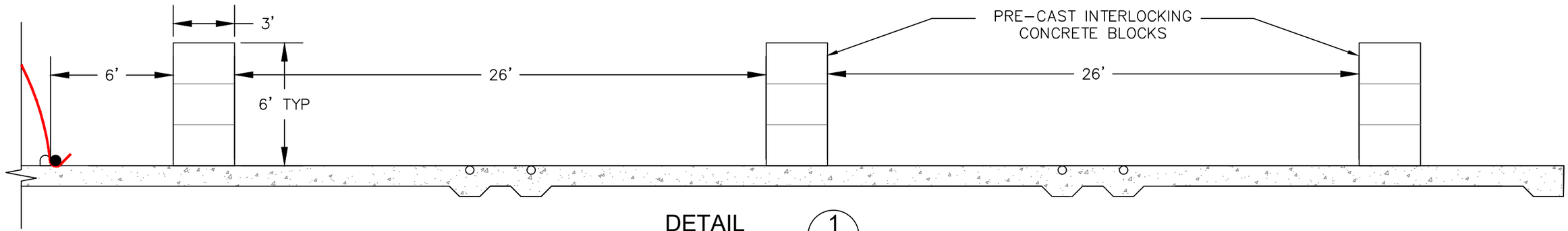

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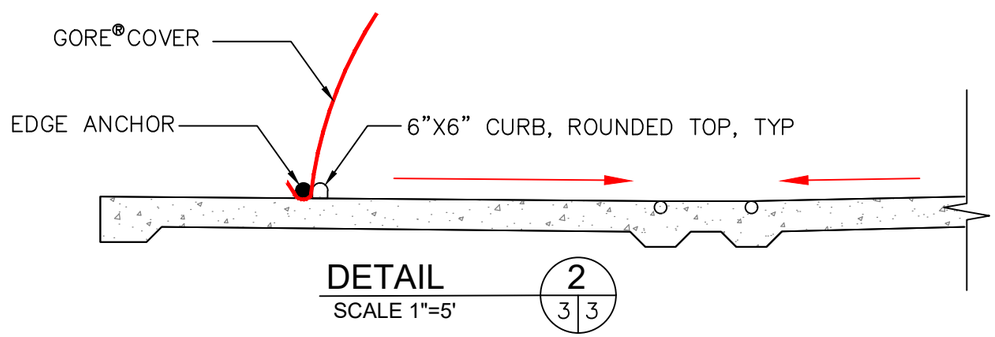
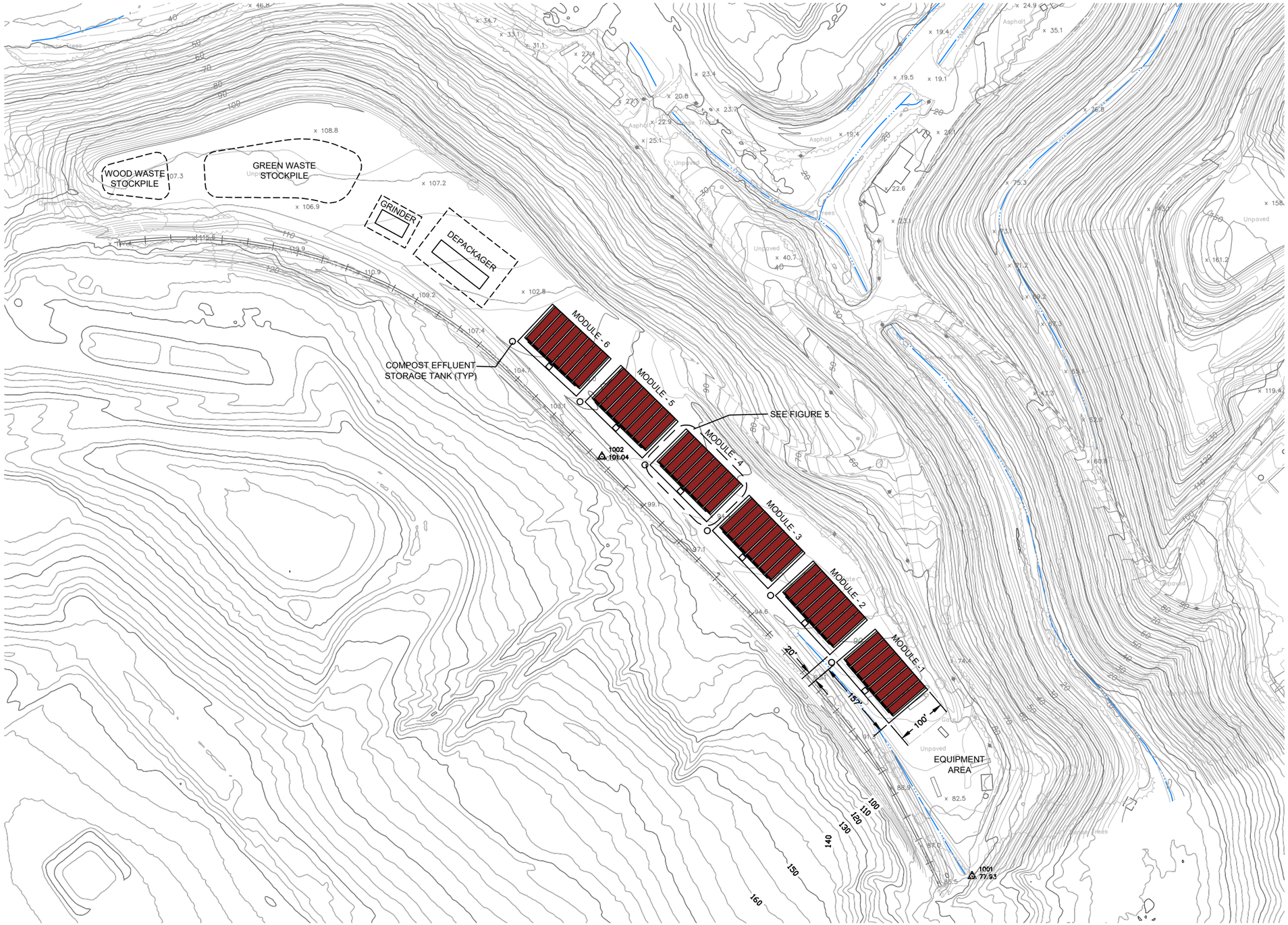


DETAIL 2 3 3
SCALE 1"=5'

SCALE IN FEET
20 0 20

SCS ENGINEERS ENVIRONMENTAL CONSULTANTS 3117 FITE CIRCLE, SUITE 108 SACRAMENTO, CALIFORNIA 95827-1808 PH. (916) 361-1297 FAX. (916) 361-1299	SHEET TITLE SECTION DETAIL
PROJ. NO. 01219101.01 T-3 · DWN. BY: ATV/AAS · ACAD FILE: FIGURE 3 DATE 5/14/2020 · CHK. BY: WLM · APP. BY: WLM	PROJECT TITLE BUENA VISTA LANDFILL COUNTY OF SANTA CRUZ, CALIFORNIA
SCALE: AS NOTED	FIGURE NO. 3

R:\Solid Waste\Projects\Buena Vista Landfill\BV 2020 Compost Facility Design Permitting\Preliminary Design\Conceptual Layouts\Figure 6 Option 2 ASP Section 5.12.2020.dwg User:ATV Plotted:May 13, 2020 – 9:10am Last Saved:May 13, 2020 – 9:03am



SYMBOL LEGEND

- FINISH STAGE
- BLOWER UNIT / CONTROL PANEL

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PROJ. NO.	DWN. BY:	ACAD FILE:
01219101.01 T-3	ATV/AAS	FIGURE 4
DATE	CHK. BY:	APP. BY:
5/14/2020	WLM	WLM

SHEET TITLE: OPTION 2– SITE LAYOUT PLAN – BUNKERS/COVERED BUILDING AND PROPOSED COMPOST FACILITY LOCATIONS

PROJECT TITLE: BUENA VISTA LANDFILL
COUNTY OF SANTA CRUZ, CALIFORNIA

SCALE: AS NOTED

FIGURE NO. 4

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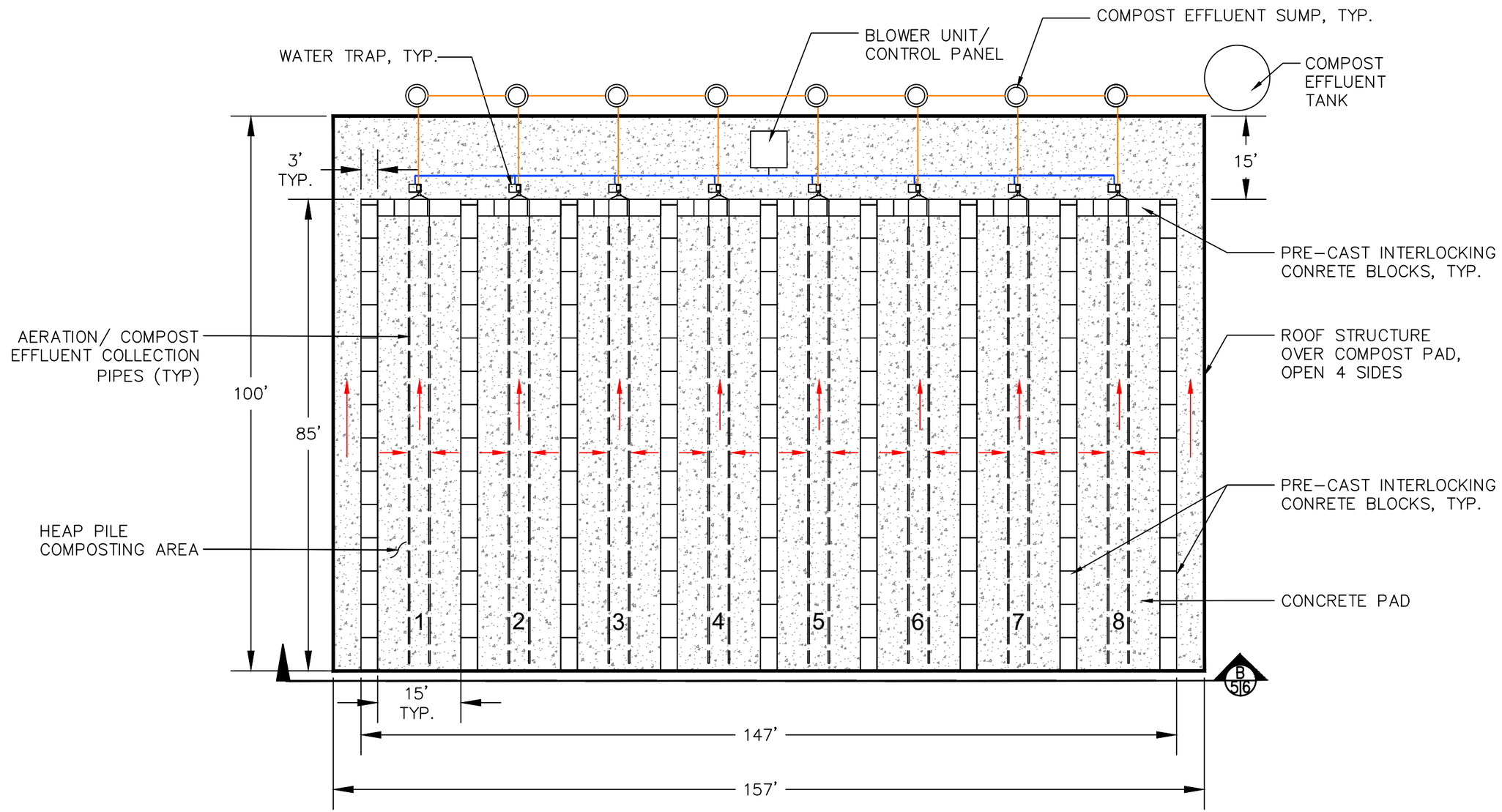

SYMBOL LEGEND

DIRECTION OF FLOW

SCALE IN FEET

20 0 20

OPTION 2 - AERATED STATIC PILE BASE MODULE WITH ROOF STRUCTURE

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3117 FITE CIRCLE, SUITE 108
SACRAMENTO, CALIFORNIA 95827-1808
PH. (916) 361-1297 FAX. (916) 361-1299

PROJ. NO.	DWN. BY:	ACAD FILE:
01219101.01 T-3	ATV/AAS	FIGURE 5
DATE	CHK. BY:	APP. BY:
5/14/2020	WLM	WLM

SHEET TITLE
OPTION 2- AERATED STATIC PILE BASE MODULE W/ ROOF STRUCTURE

PROJECT TITLE
BUENA VISTA LANDFILL
COUNTY OF SANTA CRUZ, CALIFORNIA

SCALE:
AS NOTED

FIGURE NO.
5

R:\Solid Waste\Projects\Buena Vista Landfill\BV 2020 Compost Facility Design Permitting\Preliminary Design\Conceptual Layouts\Figure 6 Option 2 - ASP Section 5.12.2020.dwg User:47470 a Plotted:May 13, 2020 – 11:31am Last Save:May 13, 2020 – 11:23am

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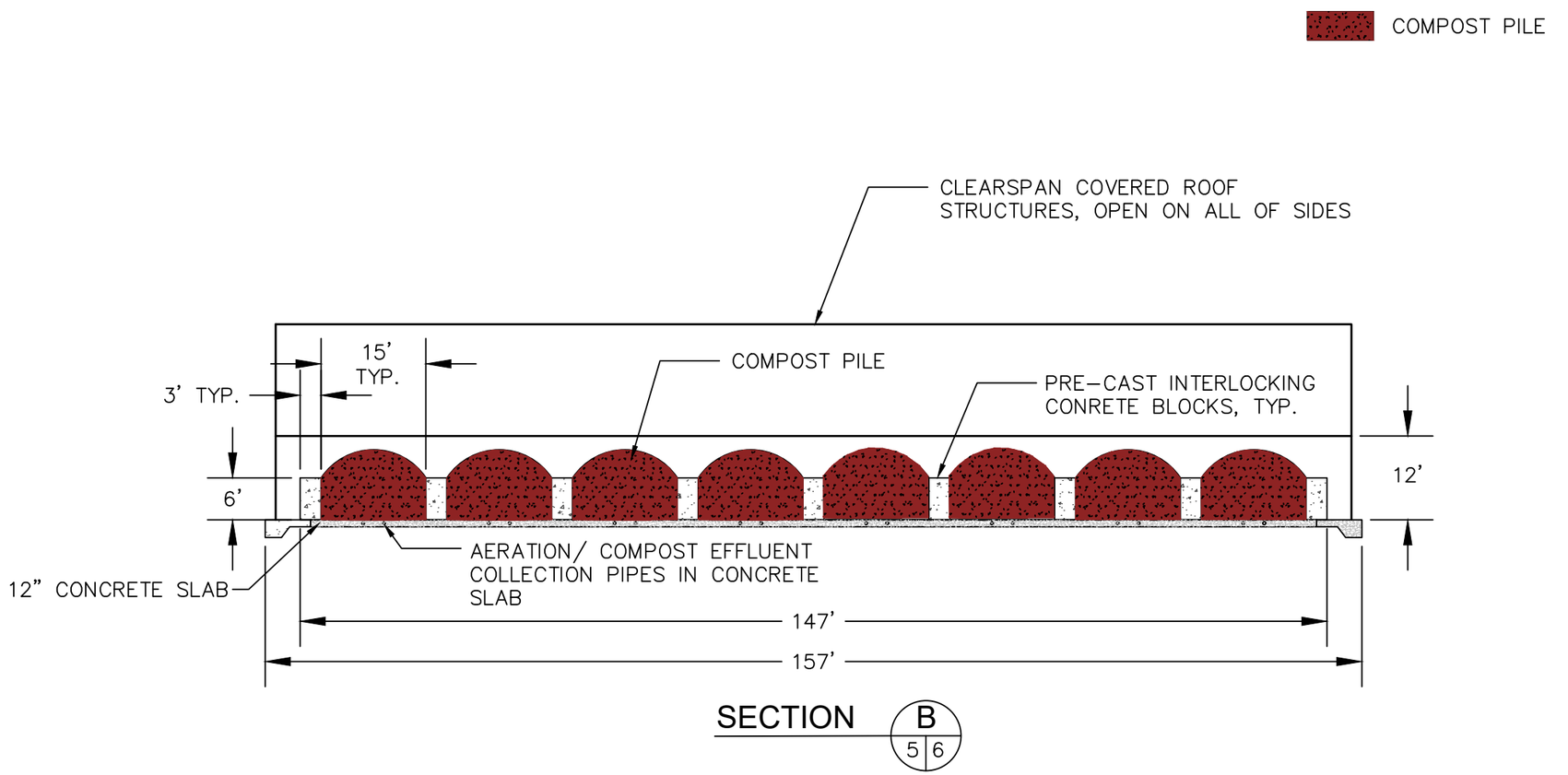

SECTION B 5|6

SCALE IN FEET
20 0 20

SCS ENGINEERS	SHEET TITLE: SECTION DETAIL	SCALE: AS NOTED
ENVIRONMENTAL CONSULTANTS 3117 FITE CIRCLE, SUITE 108 SACRAMENTO, CALIFORNIA 95827-1808 PH. (916) 361-1297 FAX. (916) 361-1299	PROJECT TITLE: BUENA VISTA LANDFILL COUNTY OF SANTA CRUZ, CALIFORNIA	FIGURE NO. 6
PROJ. NO. 01219101.01 T-3 / DWN. BY: ATV / ACAD FILE: FIGURE 6		
DATE 5/14/2020 / CHK. BY: WLM / APP. BY: WLM		

APPENDIX 2
CPT Exploration Report

CONE PENETRATION TESTING (CPT) REPORT

Gregg Drilling LLC

NOTE:
CPT22-01 and CPT22-02 are located in the maintenance area of the Buena Vista Landfill (150 Rountree Lane, Watsonville, CA). The remaining CPTs (CPT22-03 through CPT22-11) are located in the area of the Old Landfill to the West of Gallighan Slough.
CPT22-08, CPT22-09, and CPT22-10 were located outside the footprint of the Old Landfill.
CPT-22-03, CPT22-04, CPT22-05, CPT22-06, CPT22-07, and CPT22-11 were located within the footprint of the Old Landfill so were pushed through waste fill.

Prepared for: Geosyntec
Project D2229038
April 25, 2022

Prepared by: Eleni Pateras
epateras@greggdrilling.com

Table of Contents

Cone Penetration Testing (CPT) Procedure 3
15cm^2 Standard Cone Specifications 4
Cone Penetration Test Data & Interpretation 5
Pore Pressure Dissipation Tests (PPDTs) 7
Seismic Cone Penetration Tests (SCPT) 8
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APPENDIX A: Cone Penetration Test Plots

APPENDIX B: Pore Pressure Dissipation Test Plots

APPENDIX C: Seismic Plots & Tables

April 25, 2022

Geosyntec
Attn: Emily Martin

Subject: CPT Site Investigation
Buena Vista Landfill
Watsonville, CA
GREGG Project Number: D2229038

Dear Emily:

The following report presents the results of Gregg Drilling's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☒
4	Groundwater Samples	(GWS)	☐
5	Soil Samples	(SS)	☐
6	Vapor Samples	(VS)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact me at 562-427-6899.

Sincerely,

CPT Reports Team
Gregg Drilling, LLC.

Cone Penetration Testing (CPT) Procedure

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, Figure CPT.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (PPDT). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

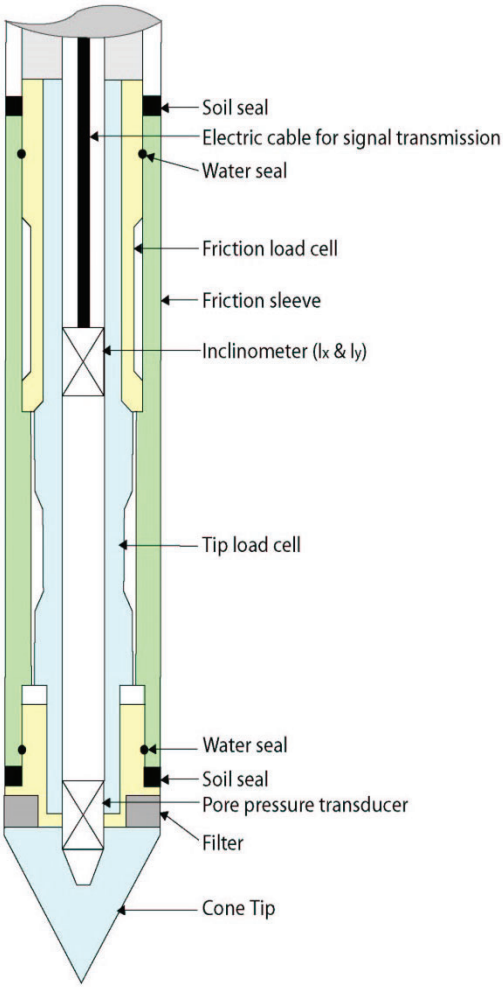


Figure CPT

15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

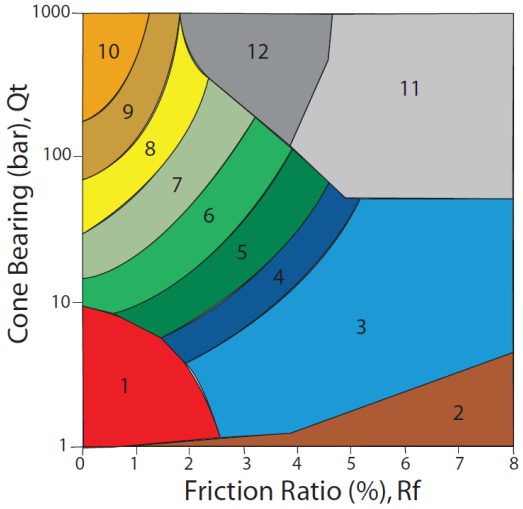
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1990) or normalized data (2010 and 2016). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (2010 and 2016) which can be displayed as SBTn (Figure SBTn). The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling LLC does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

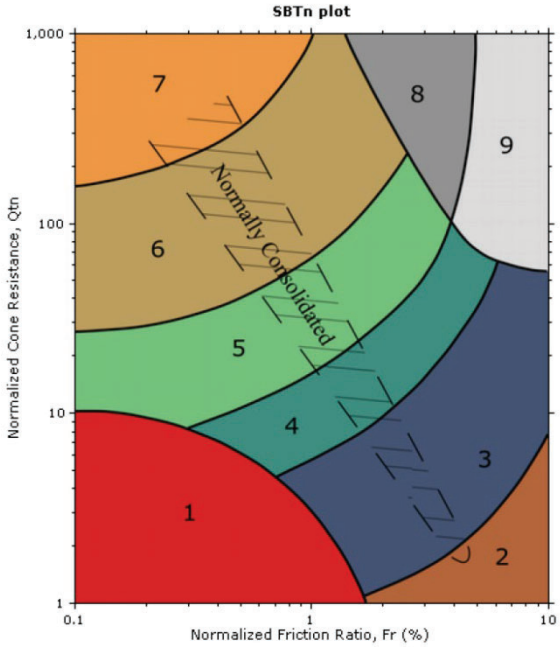
Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.

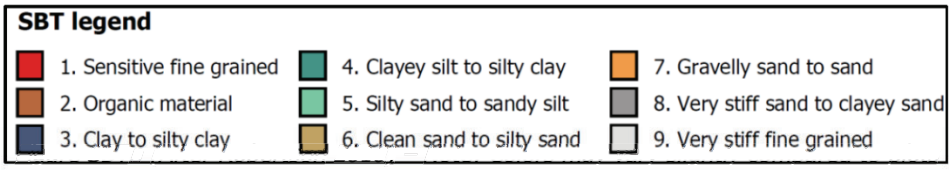


ZONE	Qt/N	SBT
1	2	Sensitive, fine grained
2	1	Organic materials
3	1	Clay
4	1.5	Silty clay to clay
5	2	Clayey silt to silty clay
6	2.5	Sandy silt to clayey silt
7	3	Silty sand to sandy silt
8	4	Sand to silty sand
9	5	Sand
10	6	Gravelly sand to sand
11	1	Very stiff fine grained*
12	2	Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1990) – Note: Colors may vary slightly compared to plots





Pore Pressure Dissipation Tests (PPDTs)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u)* with time is measured behind the tip of the cone and recorded.

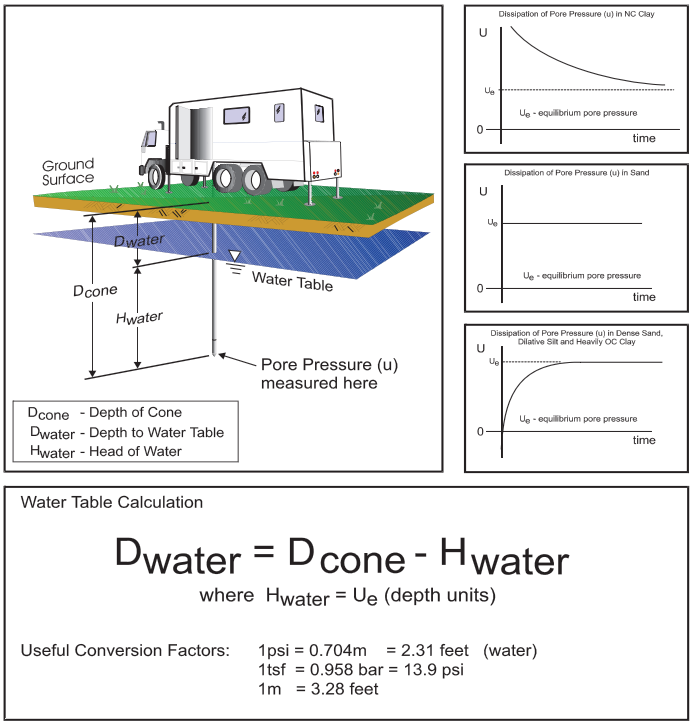
Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permeability (k_h)

To correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests completed for this project is included in Table 1.



Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

where $H_{water} = U_e$ (depth units)

Useful Conversion Factors: 1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

Figure PPDT

Seismic Cone Penetration Tests (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg Drilling's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δt). The difference in depth is calculated (Δd) and velocity can be determined using the simple equation: $v = \Delta d/\Delta t$

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.

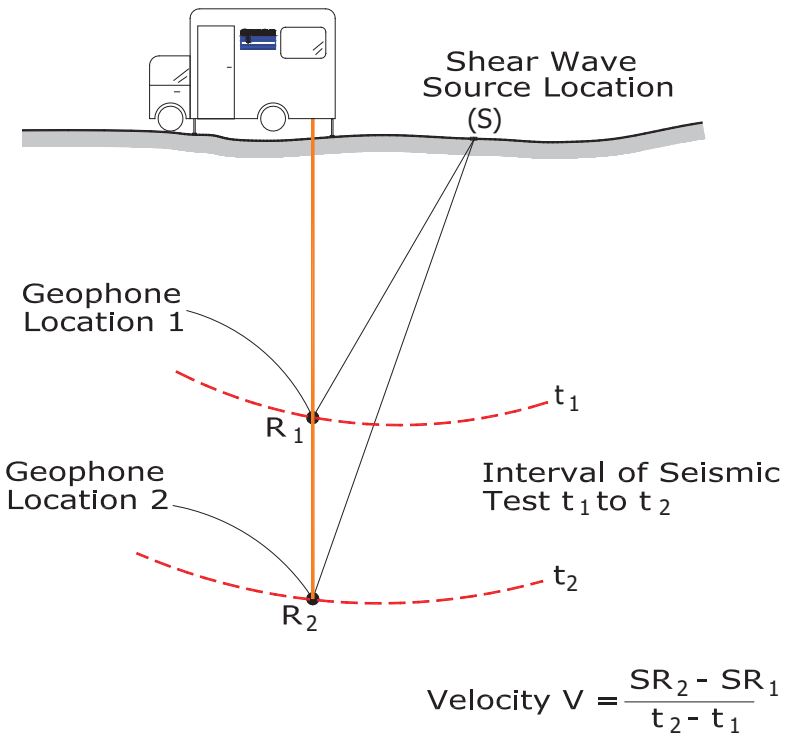


Figure SCPT

Soil Sampling

Gregg Drilling uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, *Figure SS*. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.

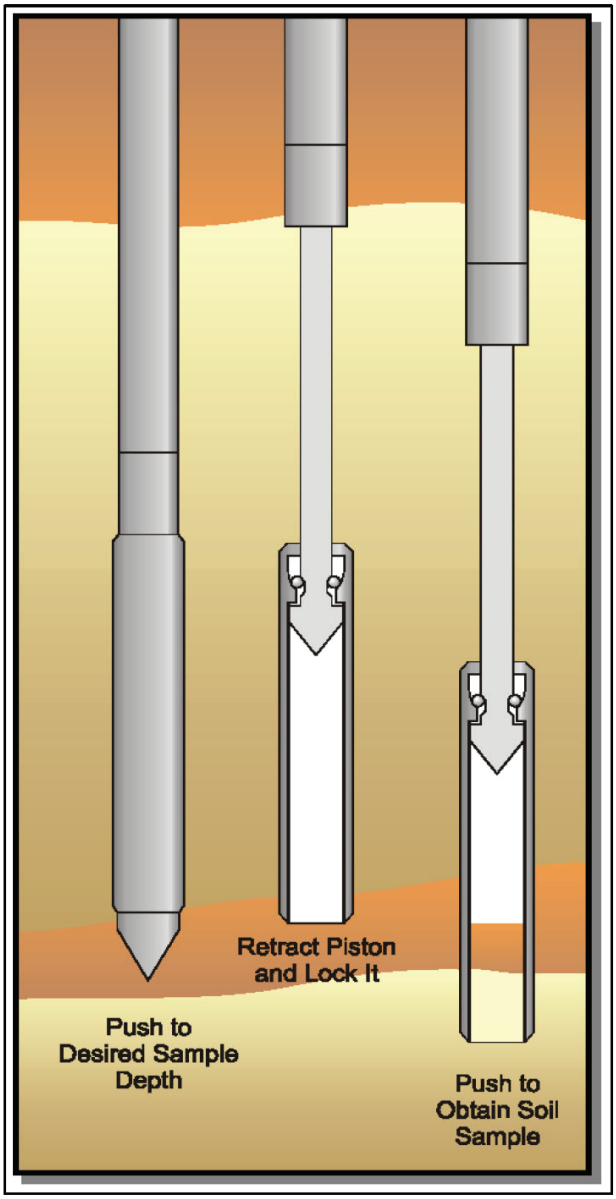


Figure SS

Ground Water Sampling

Gregg Drilling conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1¾ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

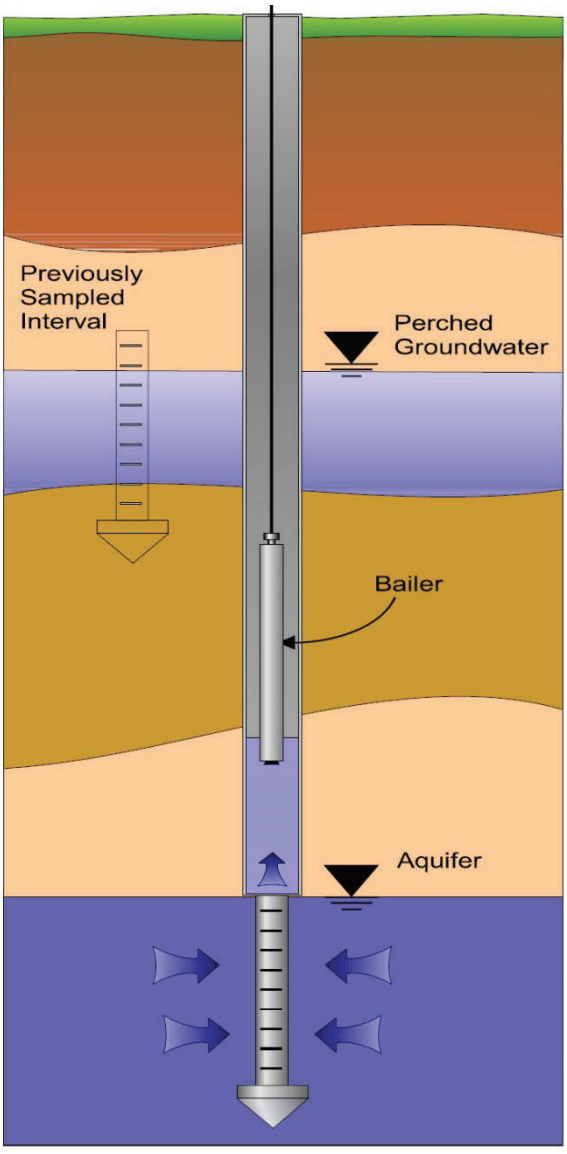


Figure GWS

References

Lunne, T., Robertson, P.K. and Powell, J.J.M., "Cone Penetration Testing in Geotechnical Practice" E & FN Spon. ISBN 0 419 23750, 1997

Roberston, P.K., "Soil Classification using the Cone Penetration Test", Canadian Geotechnical Journal, Vol. 27, 1990 pp. 151-158.

Robertson, P.K., 2009. Interpretation of Cone Penetration Tests – a unified approach. Canadian Geotechnical Journal, Volume 46: 1337-1355

Robertson, P.K., 2010, "Soil Behavior type from the CPT: an update", 2nd International Symposium on Cone Penetration Testing, Huntington Beach, CA, Vol.2. pp 575-583

Robertson, P.K., 2016. "CPT-based Soil Behaviour Type (SBT) Classification System – an update". Canadian Geotechnical Journal, 53(12); pp 1910-1927

Robertson, P.K. and Cabal, K.L., "Guide to Cone Penetration Testing for Geotechnical Engineering", 6th Edition, 2015, 145 p. Free online, http://www.greggdrilling.com/technical-guides.

Mayne, P.W., "NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization", available through www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html, Section 5.3, pp. 107-112.

Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986 pp. 791-803.

Robertson, P.K., Sully, J., Woeller, D.J., Lunne, T., Powell, J.J.M., and Gillespie, D.J., "Guidelines for Estimating Consolidation Parameters in Soils from Piezocone Tests", Canadian Geotechnical Journal, Vol. 29, No. 4, August 1992, pp. 539-550.

Robertson, P.K., T. Lunne and J.J.M. Powell, "Geo-Environmental Application of Penetration Testing", Geotechnical Site Characterization, Robertson & Mayne (editors), 1998 Balkema, Rotterdam, ISBN 90 5410 939 4 pp 35-47.

Copies of ASTM Standards are available through www.astm.org

Table 1: Cone Penetration Testing Summary

CPT Sounding Identification	Date	Termination Depth (ft)	Depth of Soil Samples (ft)	Depth of Groundwater Samples (ft)	Depth of Pore Pressure Dissipation Tests (ft)
SCPT-22-01	4/7/2022	87.93	-	-	50.36, 87.93
CPT-22-02	4/6/2022	50.52	-	-	-
CPT-22-03	4/4/2022	62.17	-	-	-
SCPT-22-04	4/4/2022	44.95	-	-	-
SCPT-22-05*	4/5/2022	79.72	-	-	37.57, 64.14
SCPT-22-06	4/4/2022	42.65	-	-	-
CPT-22-07	4/5/2022	34.94	-	-	-
CPT-22-08	4/4/2022	50.52	-	-	-
CPT-22-09	4/8/2022	50.52	-	-	47.41
CPT-22-10	4/5/2022	51.02	-	-	27.56
CPT-22-11	4/8/2022	34.28	-	-	-

*Note: Seismic data was poor quality from 40-60ft and additional wave trace from 40-60ft were not calculated due to noise in the signal.

NOTE:
CPT22-01 and CPT22-02 are located in the maintenance area of the Buena Vista Landfill (150 Rountree Lane, Watsonville, CA). The remaining CPTs (CPT22-03 through CPT22-11) are located in the area of the Old Landfill to the West of Gallighan Slough.
CPT22-08, CPT22-09, and CPT22-10 were located outside the footprint of the Old Landfill.
CPT-22-03, CPT22-04, CPT22-05, CPT22-06, CPT22-07, and CPT22-11 were located within the footprint of the Old Landfill so were pushed through waste fill.

APPENDIX A:

CPT PLOTS

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-01 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

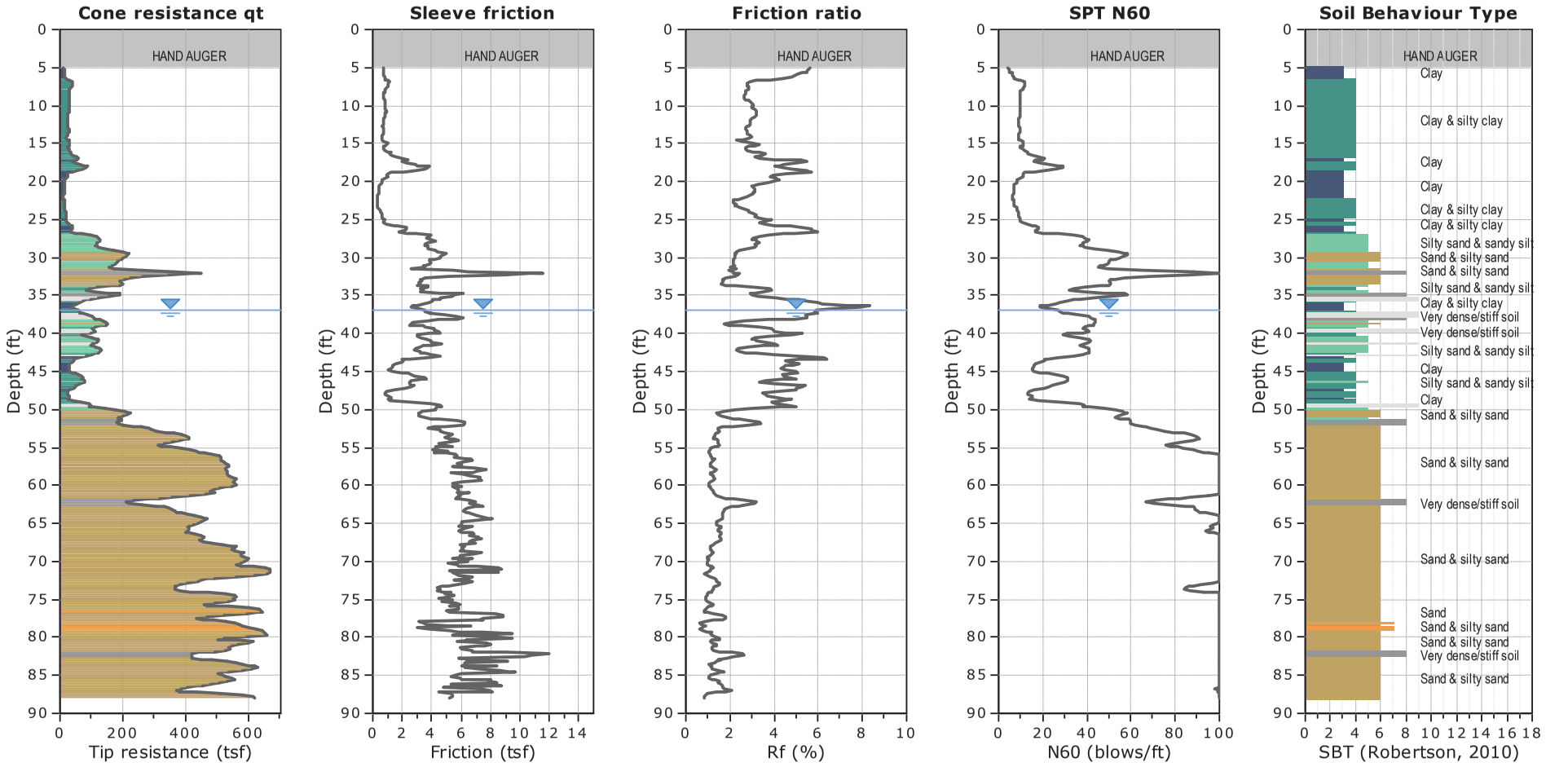
CPT: SCPT-22-01

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 87.93 ft, Date: 4/7/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-01 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

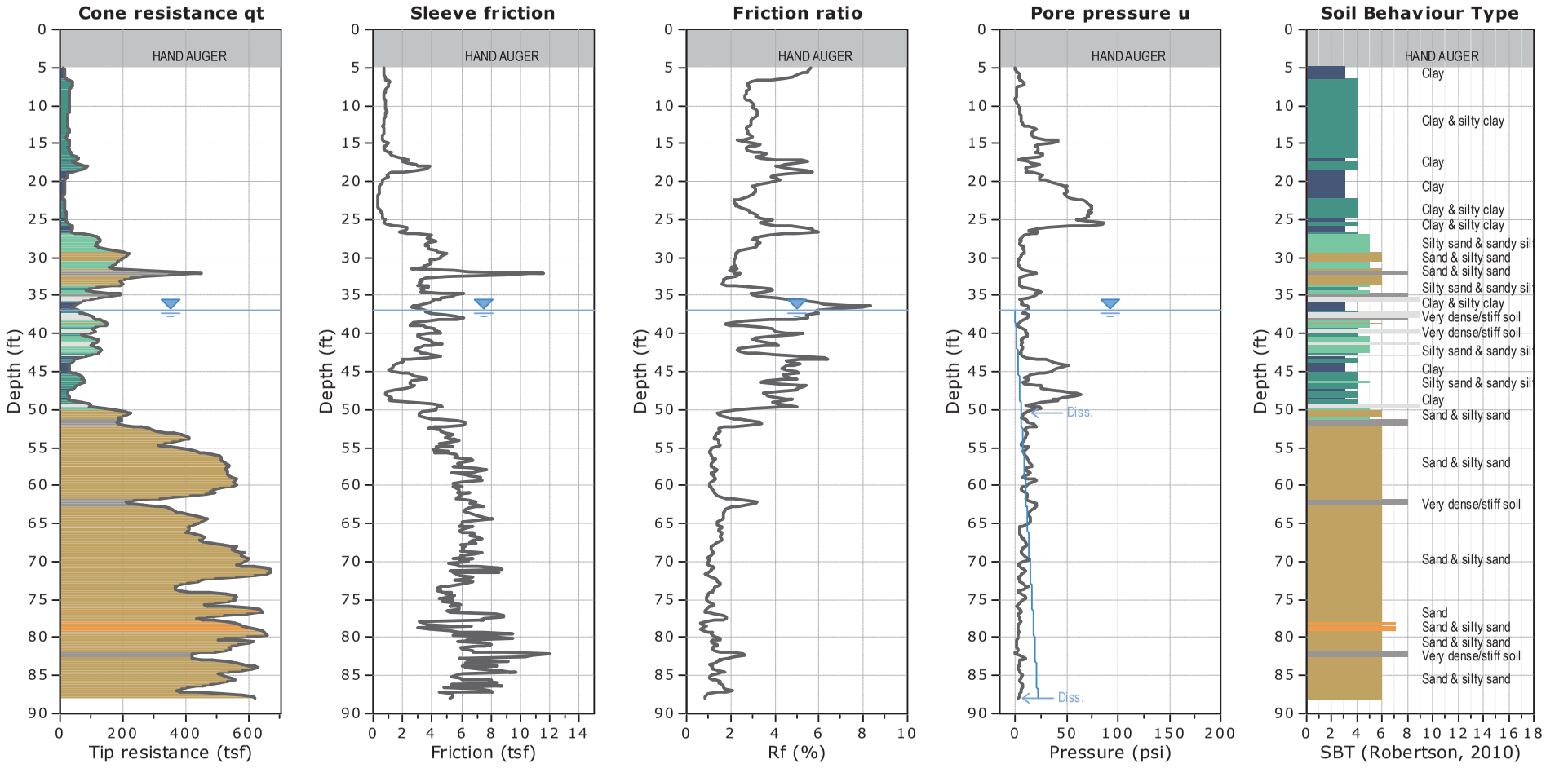
CPT: SCPT-22-01

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

Total depth: 87.93 ft, Date: 4/7/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-01 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

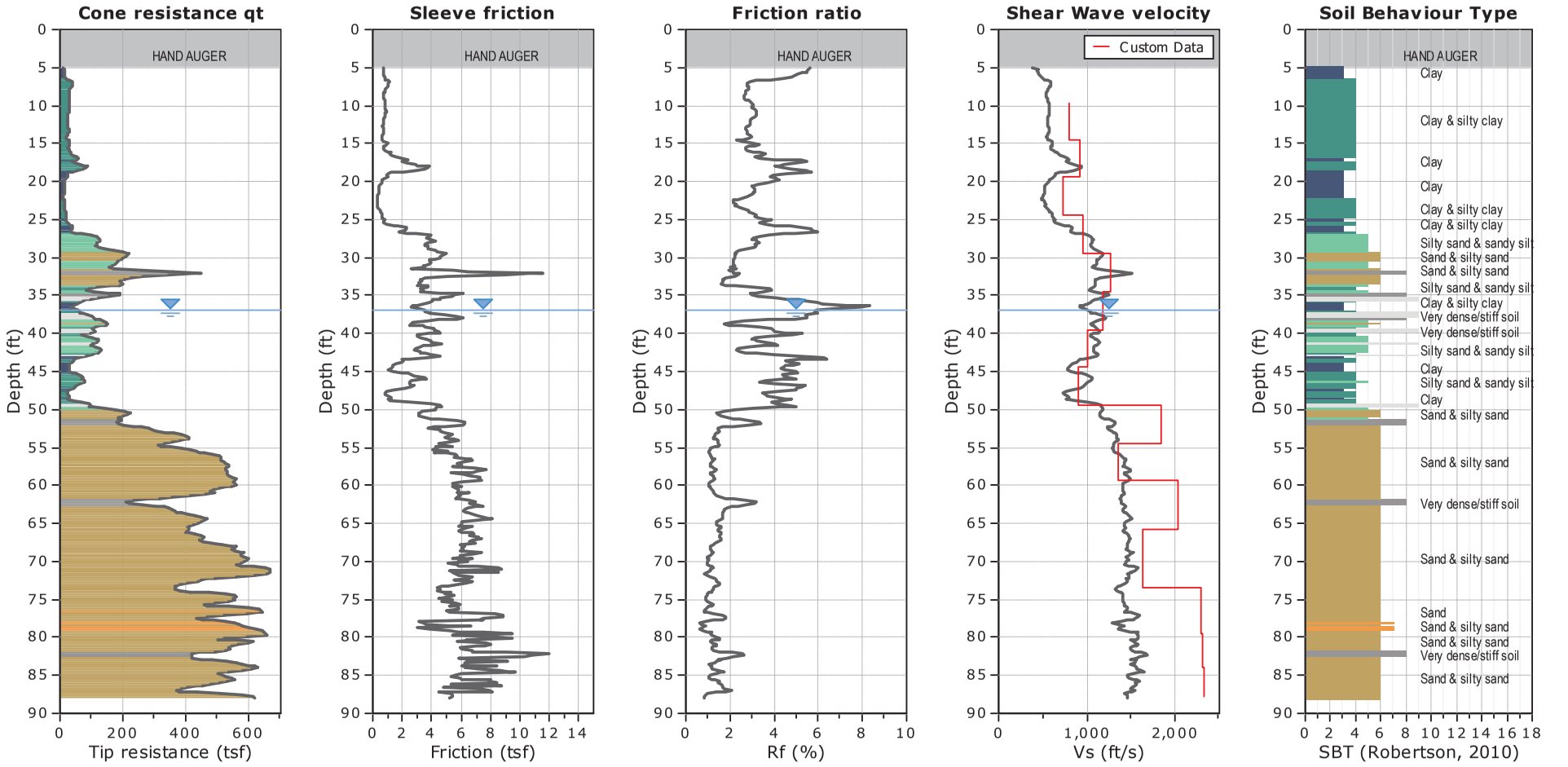
CPT: SCPT-22-01

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 87.93 ft, Date: 4/7/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-02 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

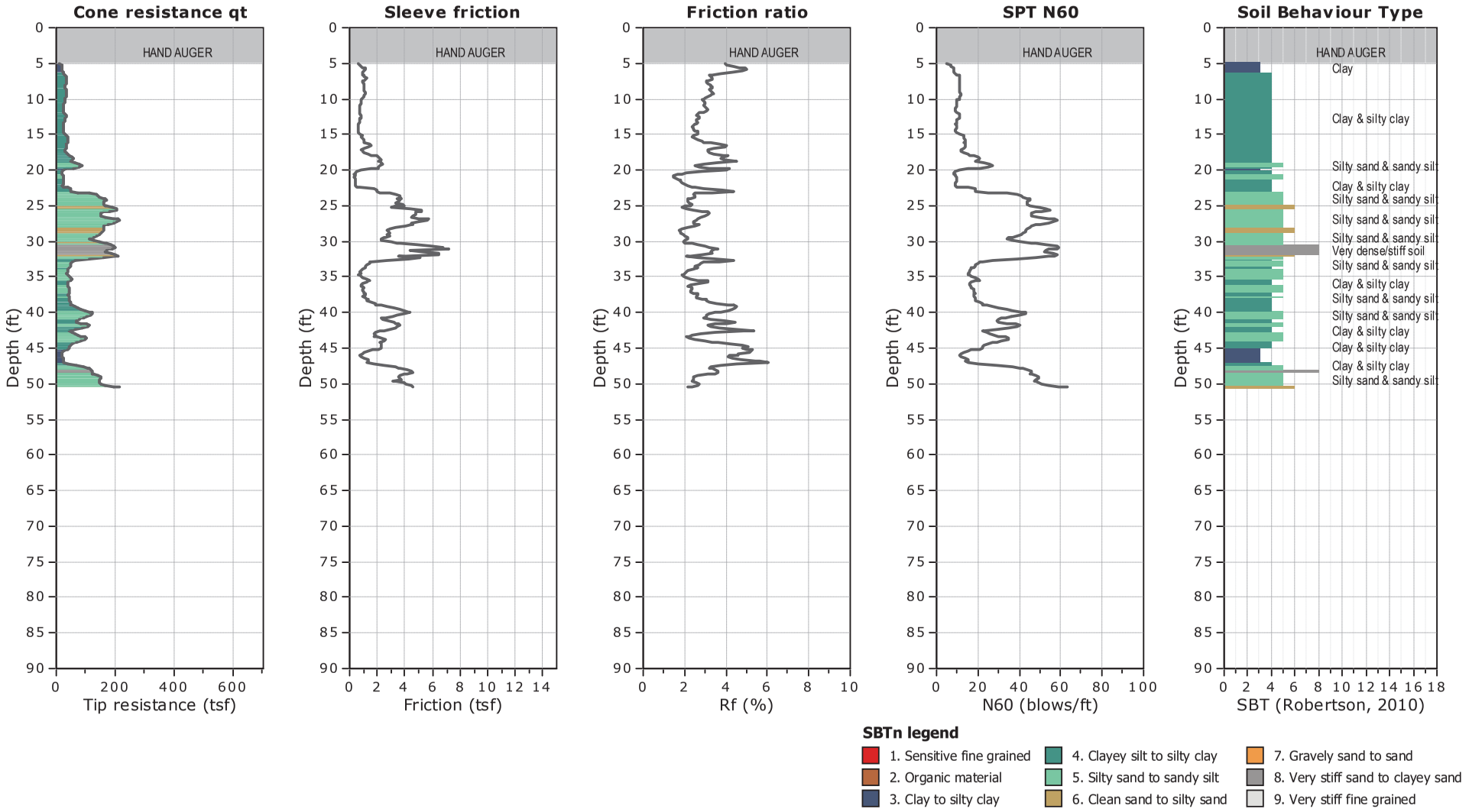
CPT: CPT-22-02

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/6/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-02 pushed in area of the Maintenance Building at the Buena Vista Landfill near 150 Rountree Lane, Watsonville, CA

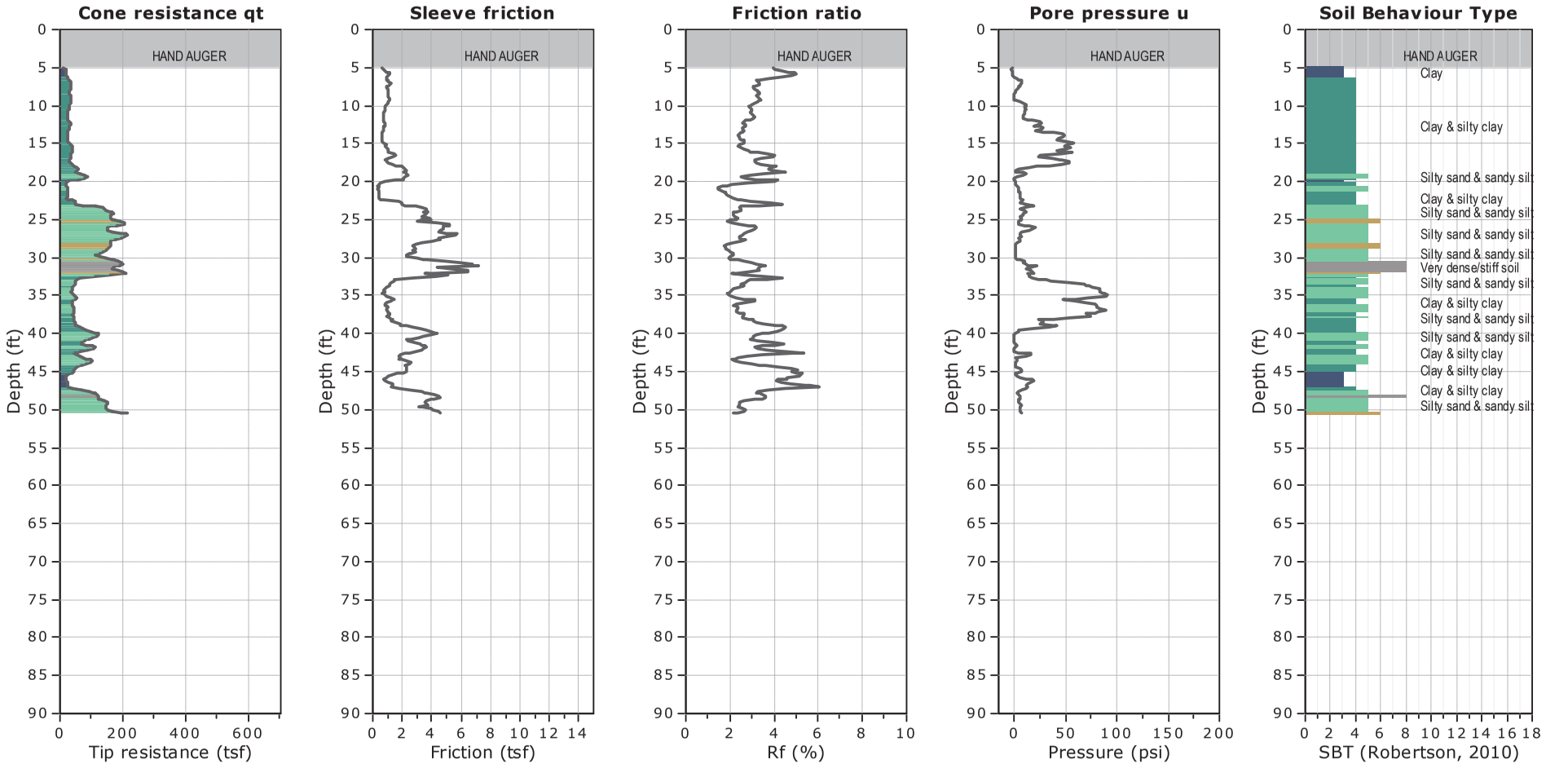
CPT: CPT-22-02

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/6/2022



SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-03 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

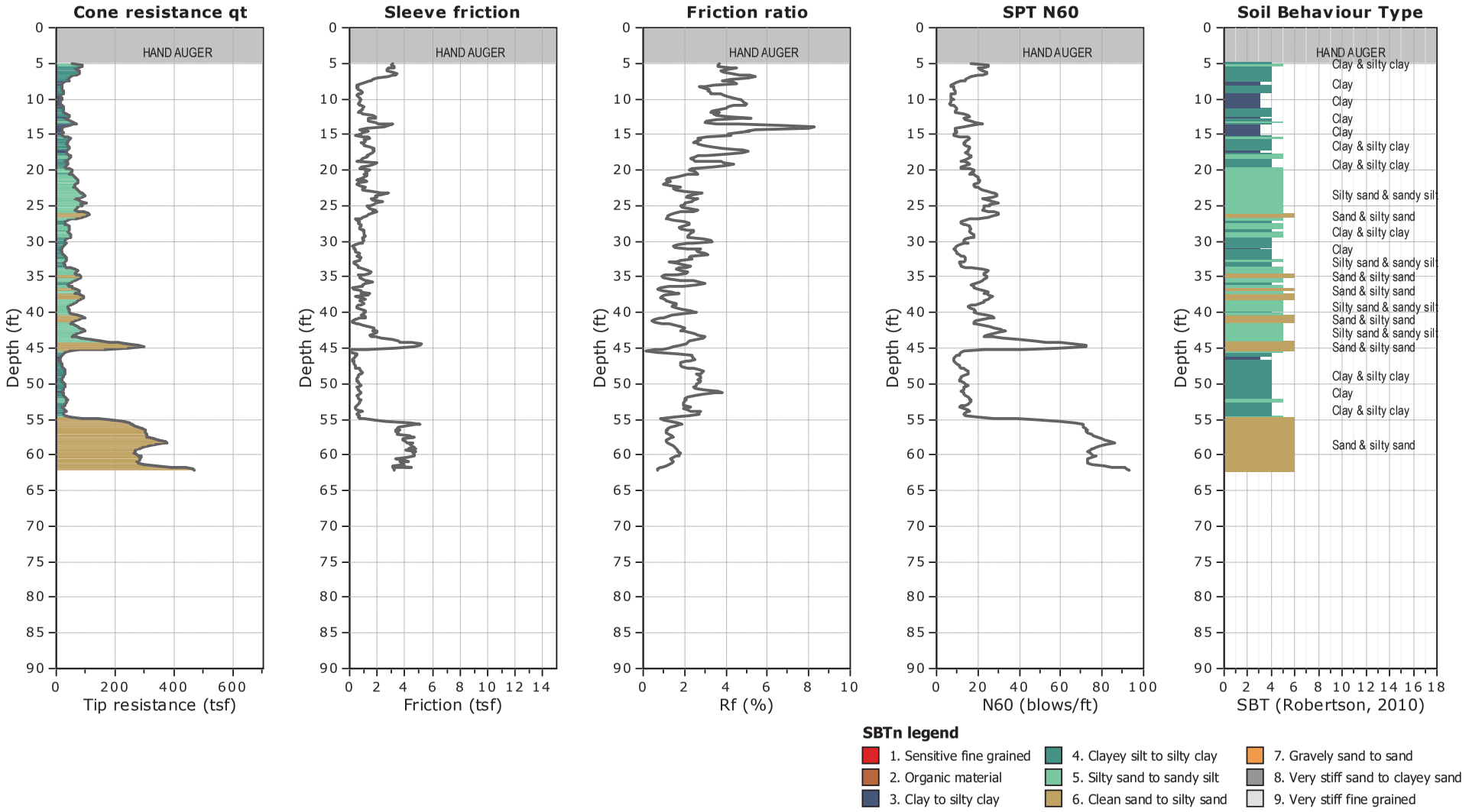
CPT: CPT-22-03

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 62.17 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-03 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

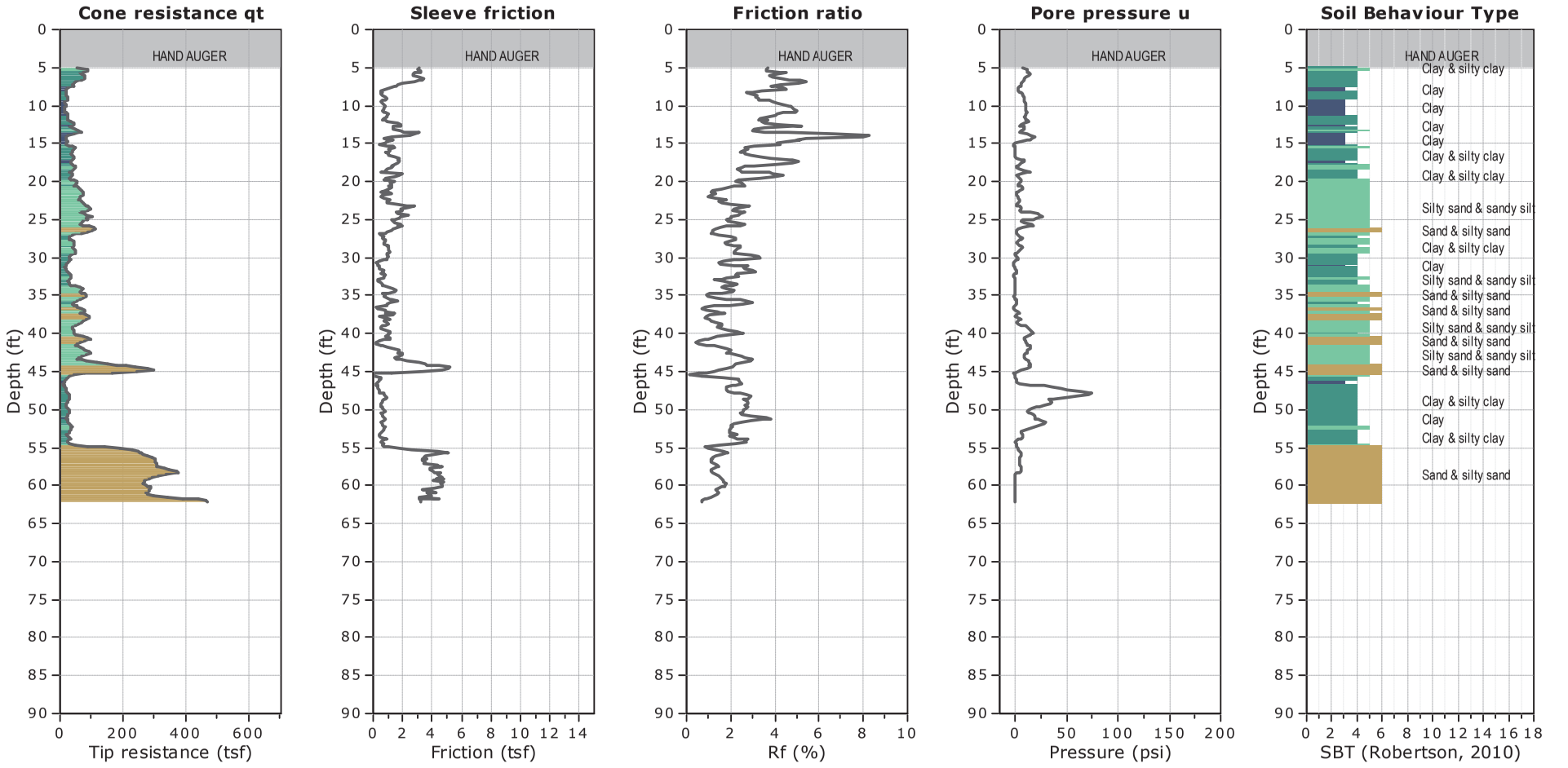
CPT: CPT-22-03

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 62.17 ft, Date: 4/4/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-04 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

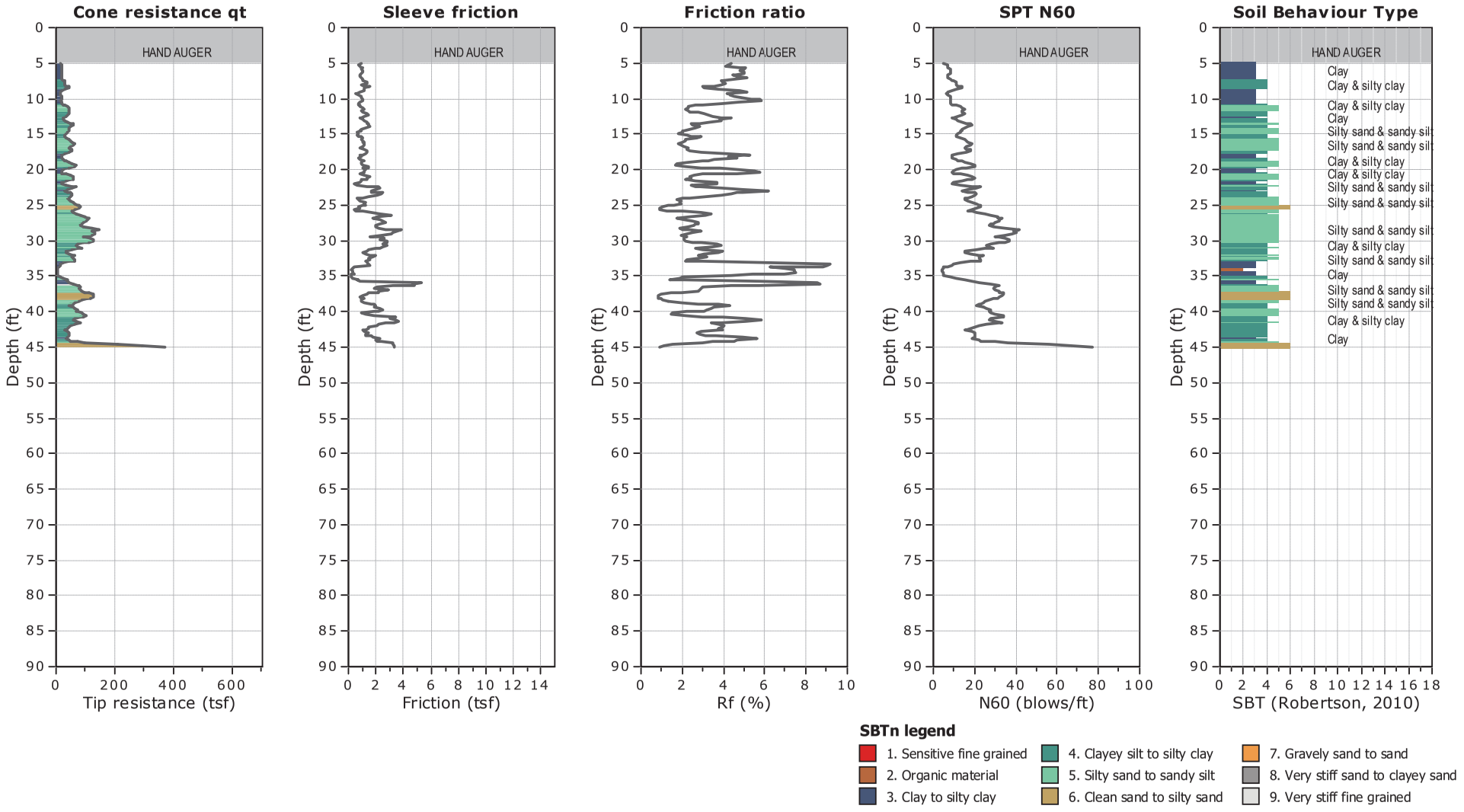
CPT: SCPT-22-04

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 44.95 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-04 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

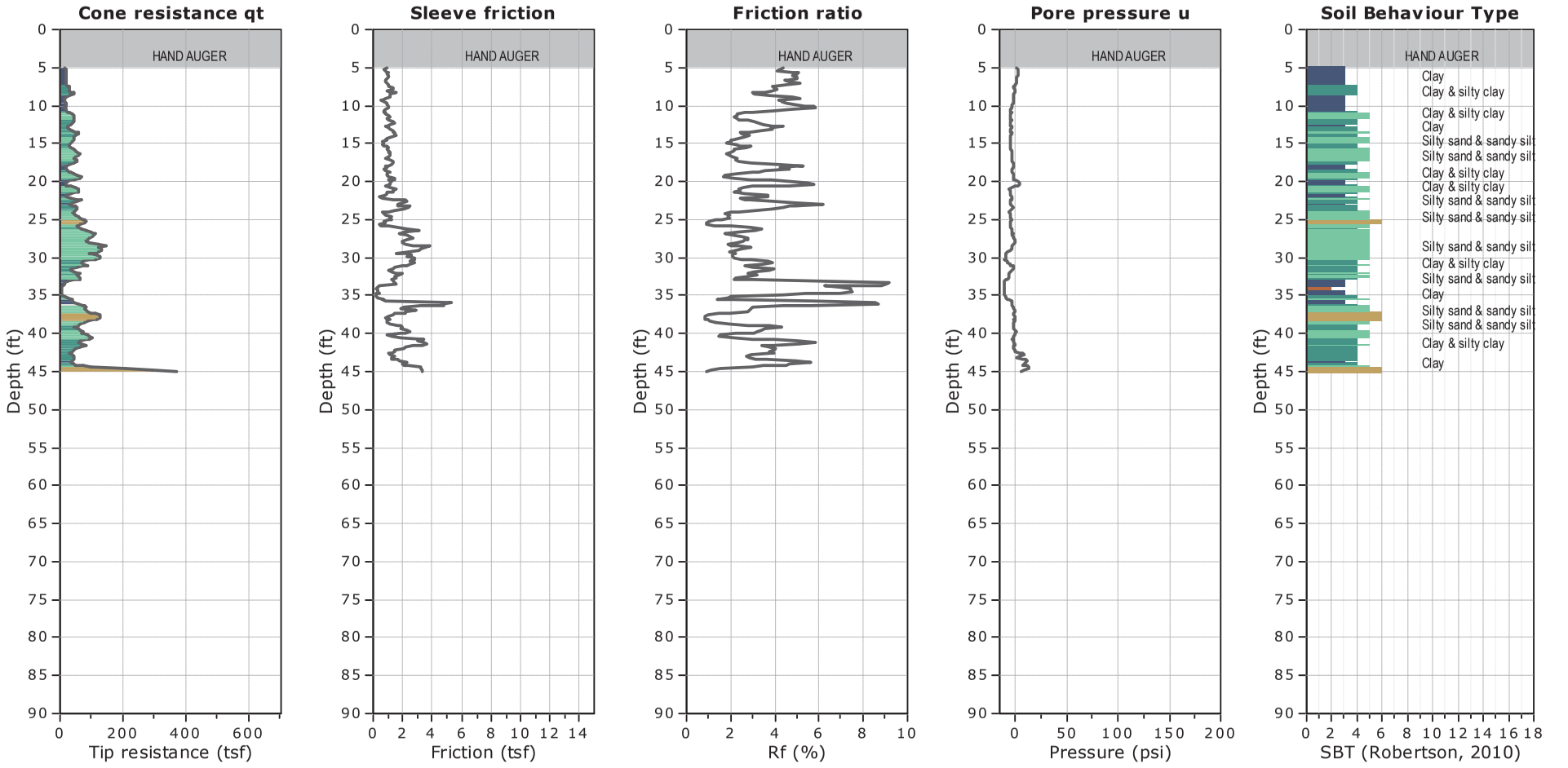
CPT: SCPT-22-04

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 44.95 ft, Date: 4/4/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-04 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

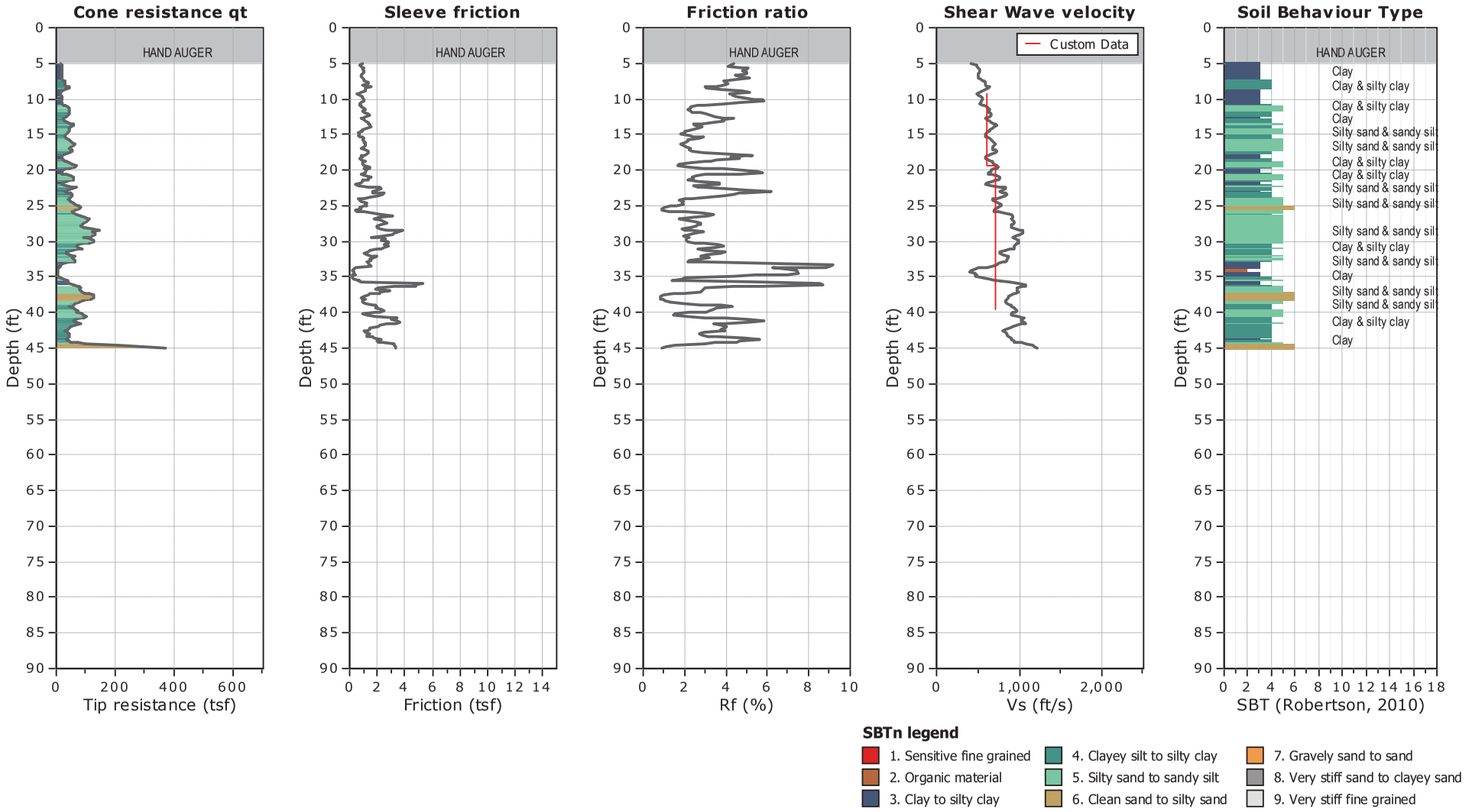
CPT: SCPT-22-04

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 44.95 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-05 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

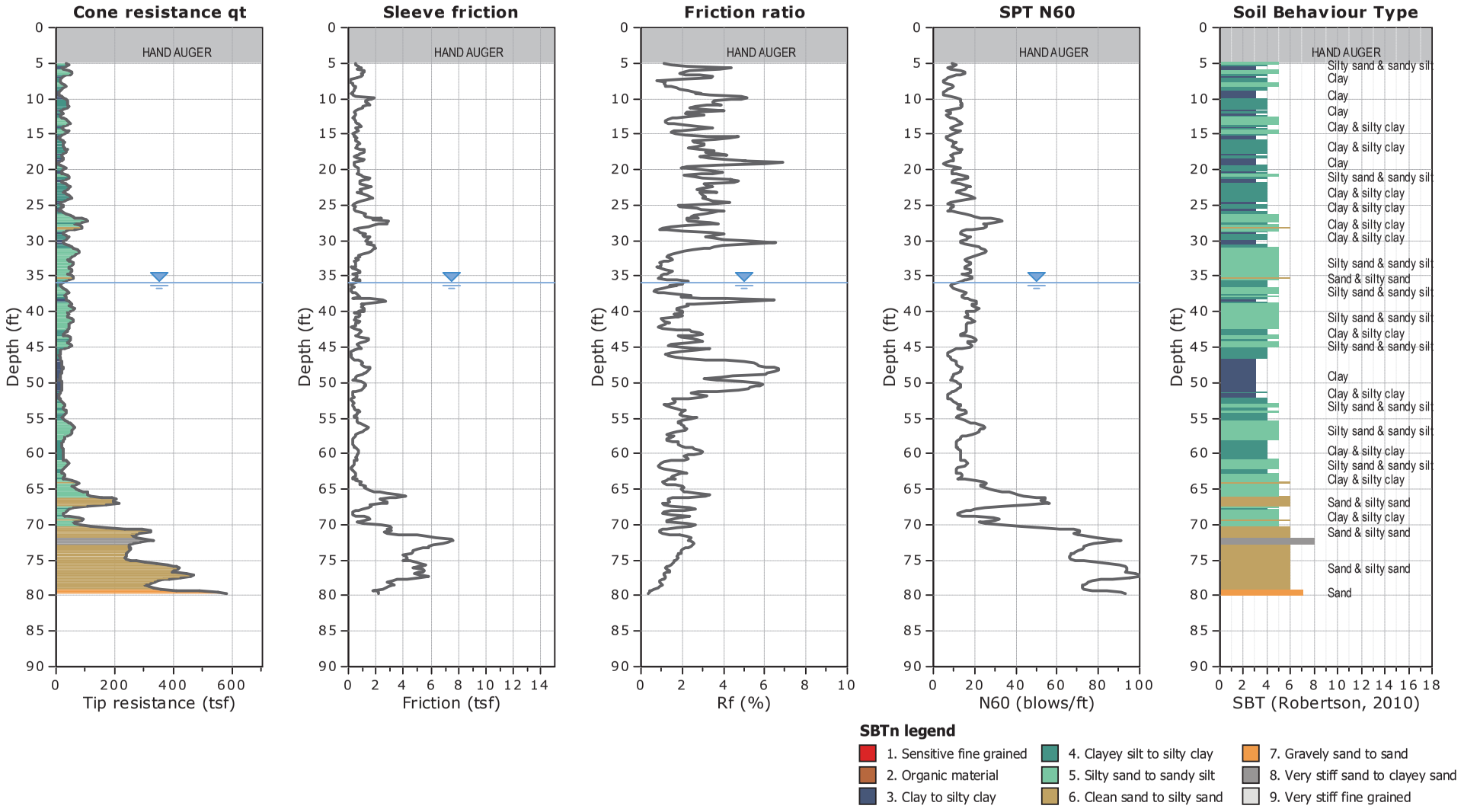
CPT: SCPT-22-05

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 79.72 ft, Date: 4/5/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-05 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

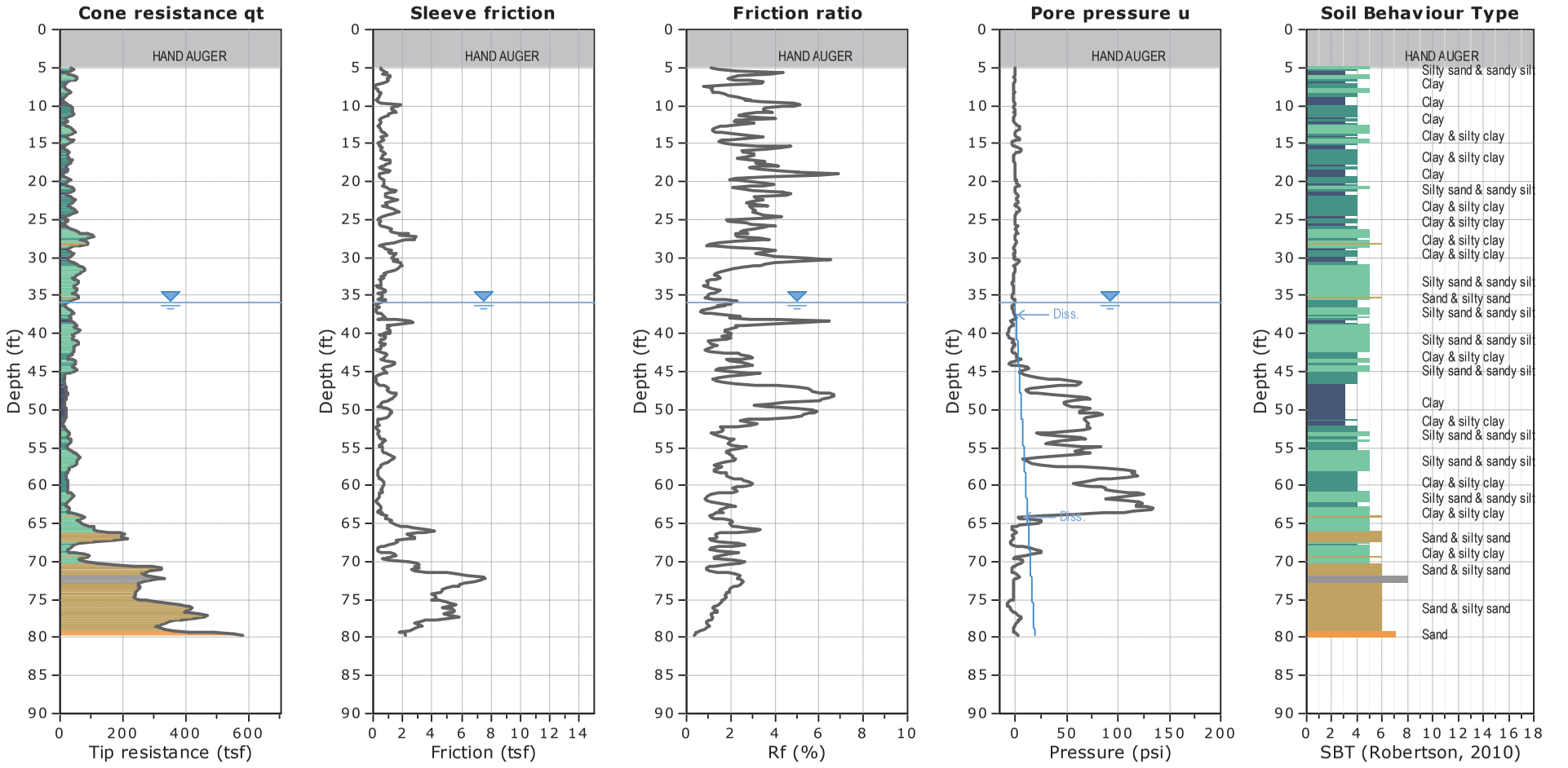
CPT: SCPT-22-05

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 79.72 ft, Date: 4/5/2022



SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-05 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

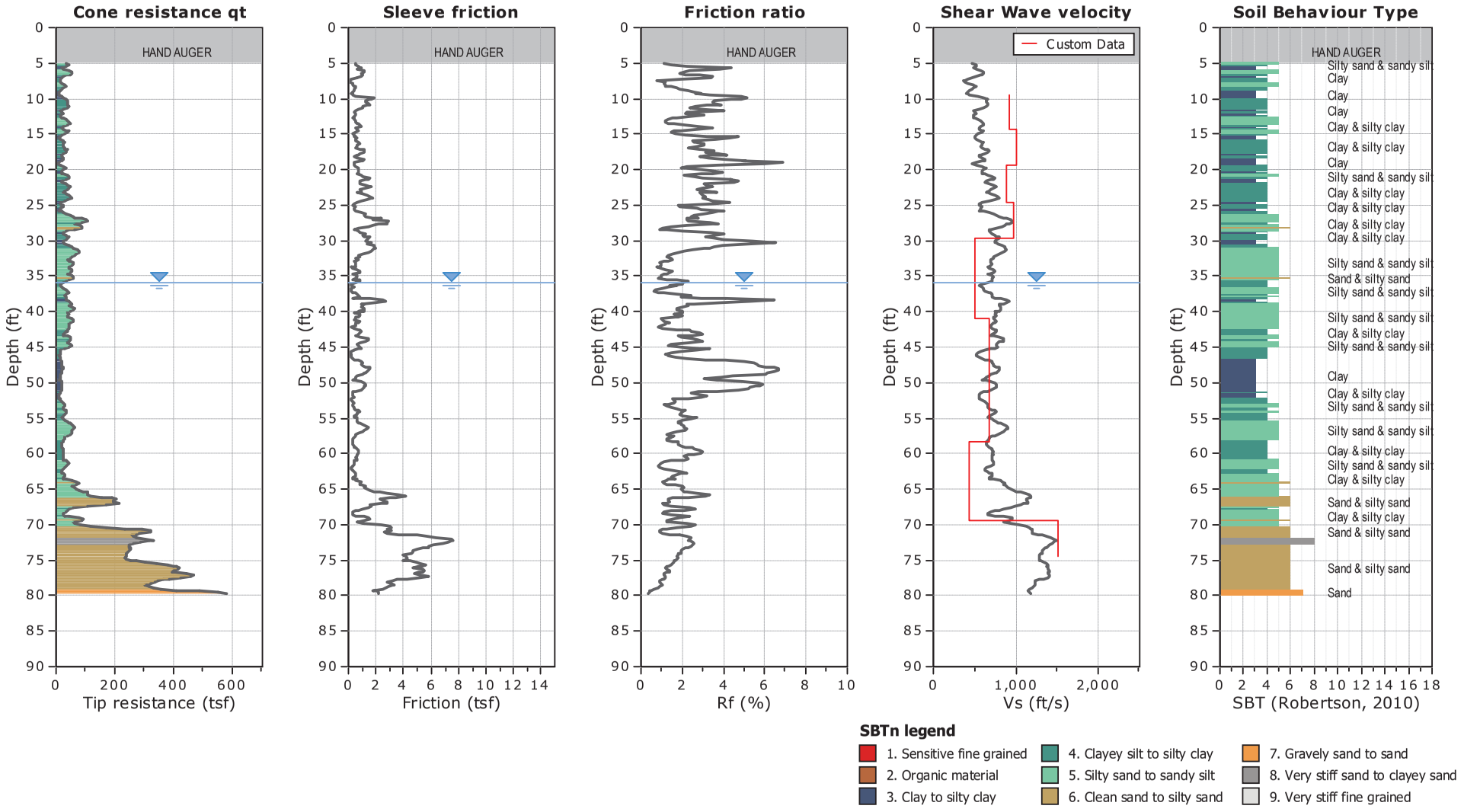
CPT: SCPT-22-05

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 79.72 ft, Date: 4/5/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-06 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

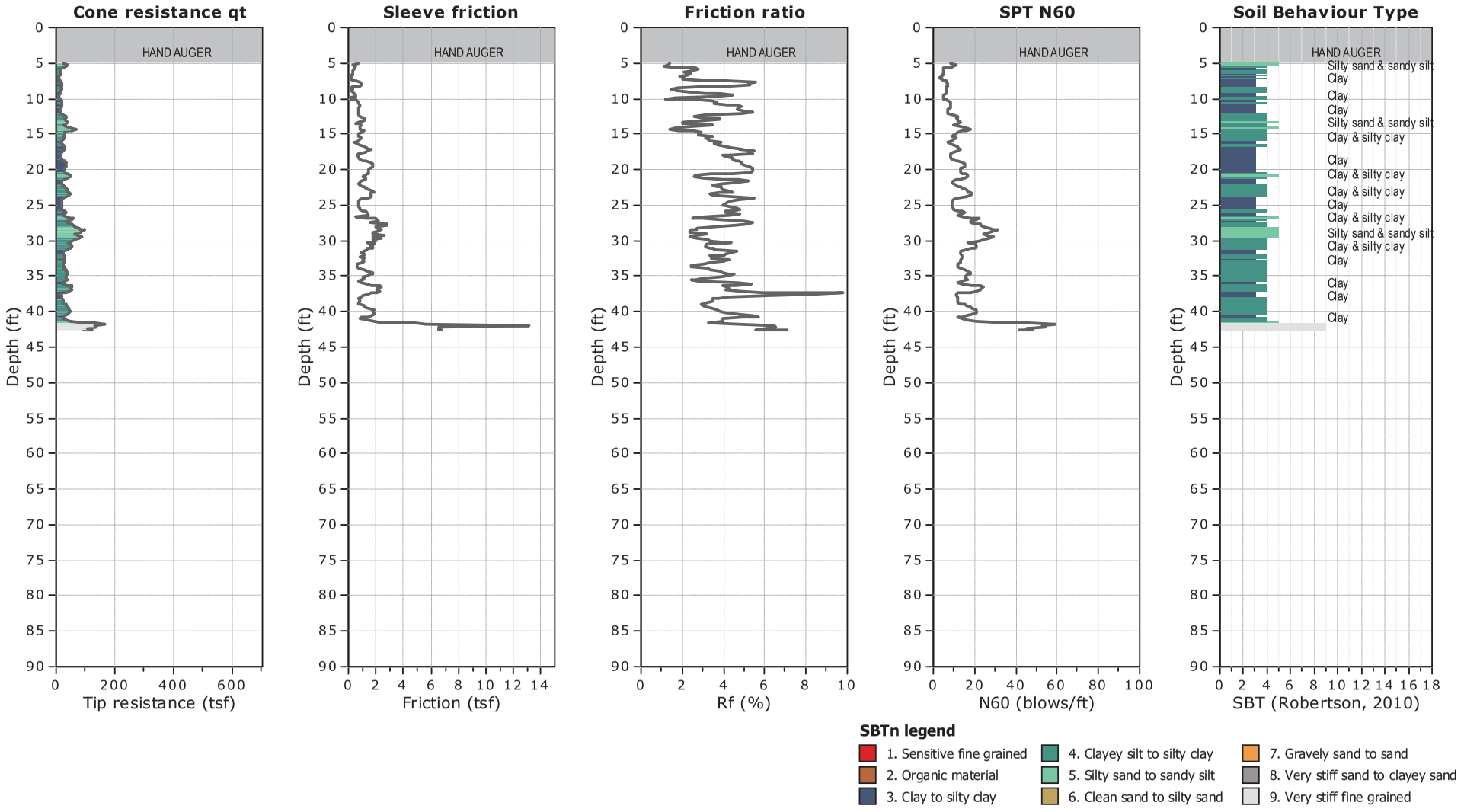
CPT: SCPT-22-06

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 42.65 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-06 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

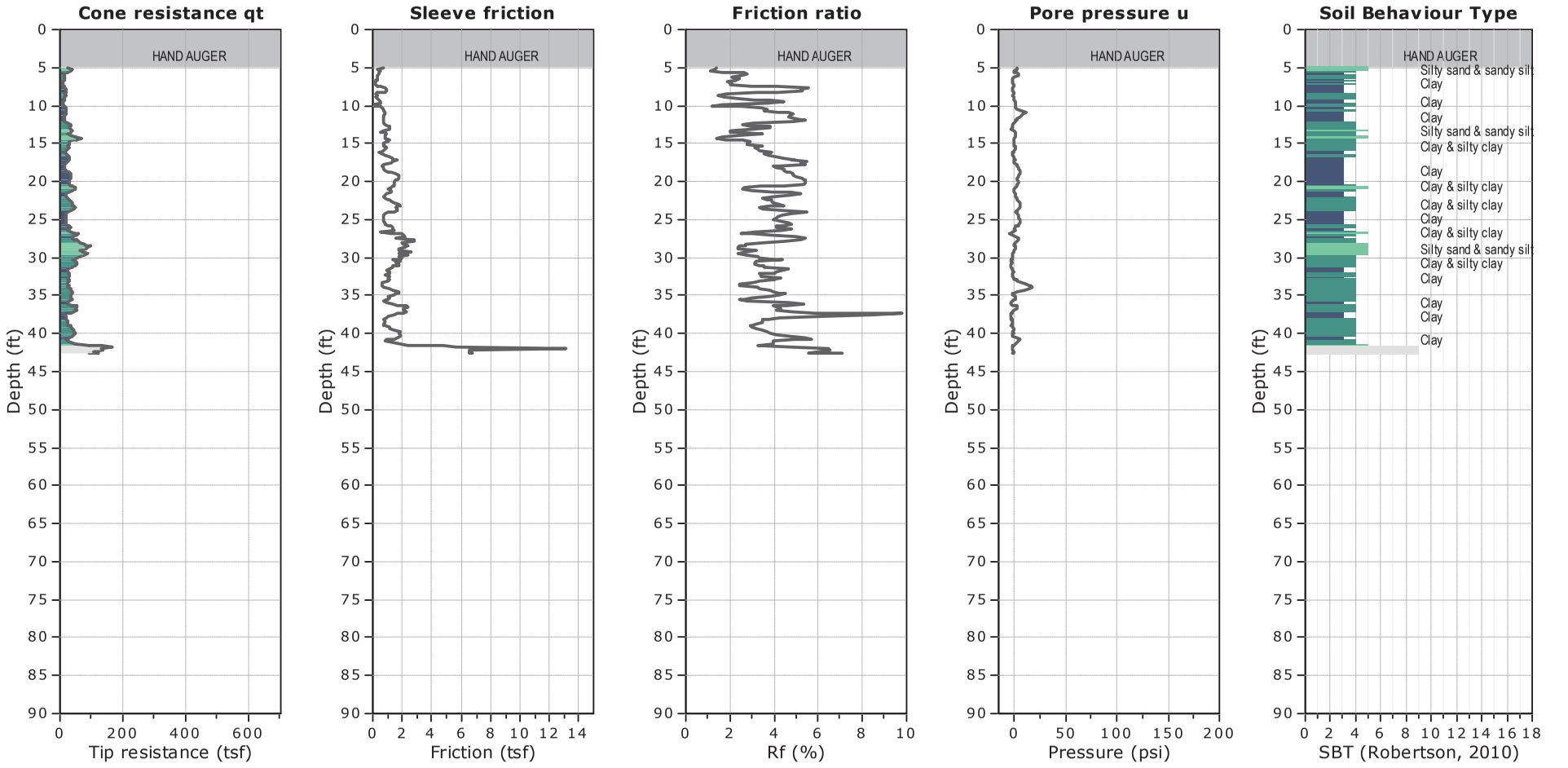
CPT: SCPT-22-06

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 42.65 ft, Date: 4/4/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

SCPT22-06 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

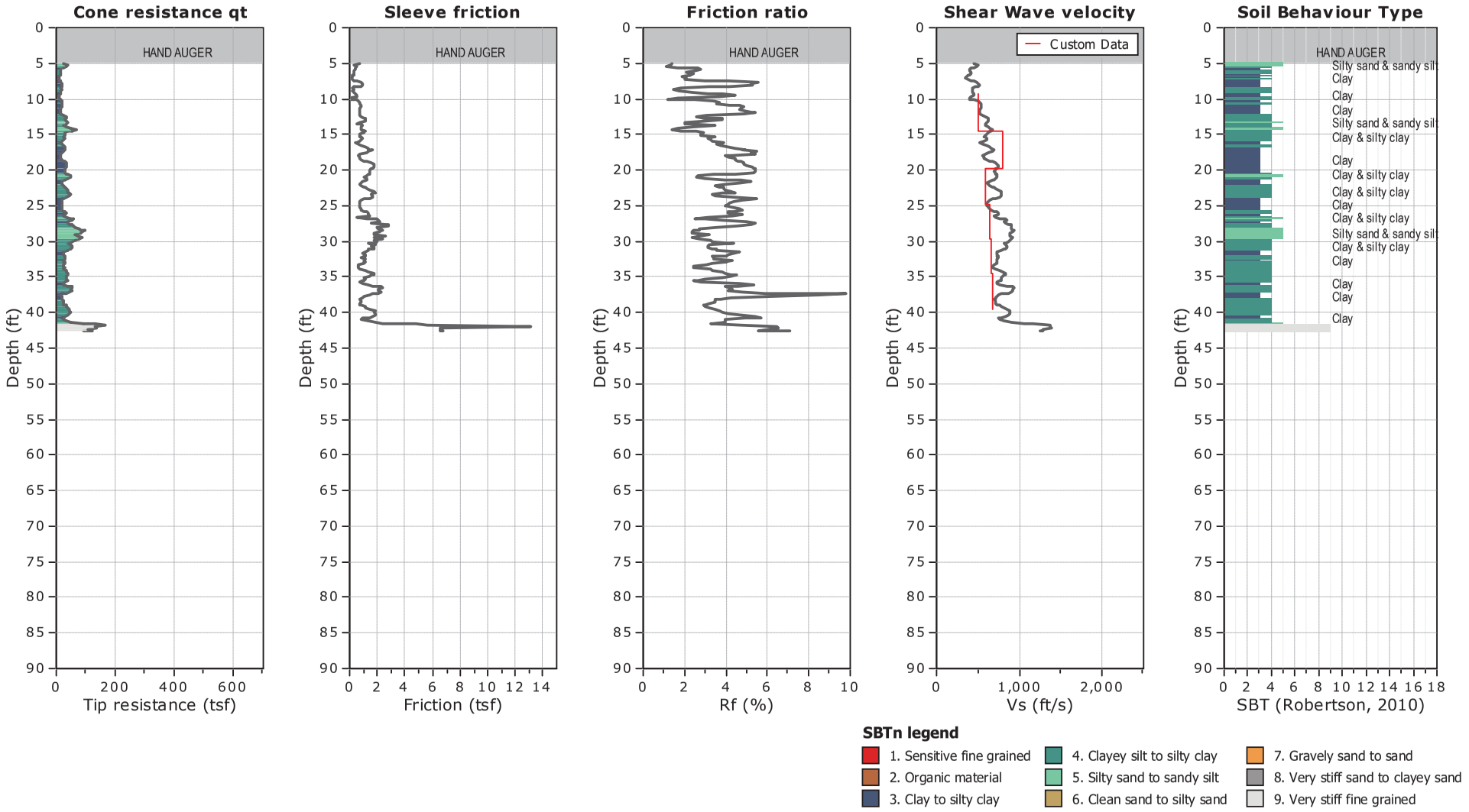
CPT: SCPT-22-06

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 42.65 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-07 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

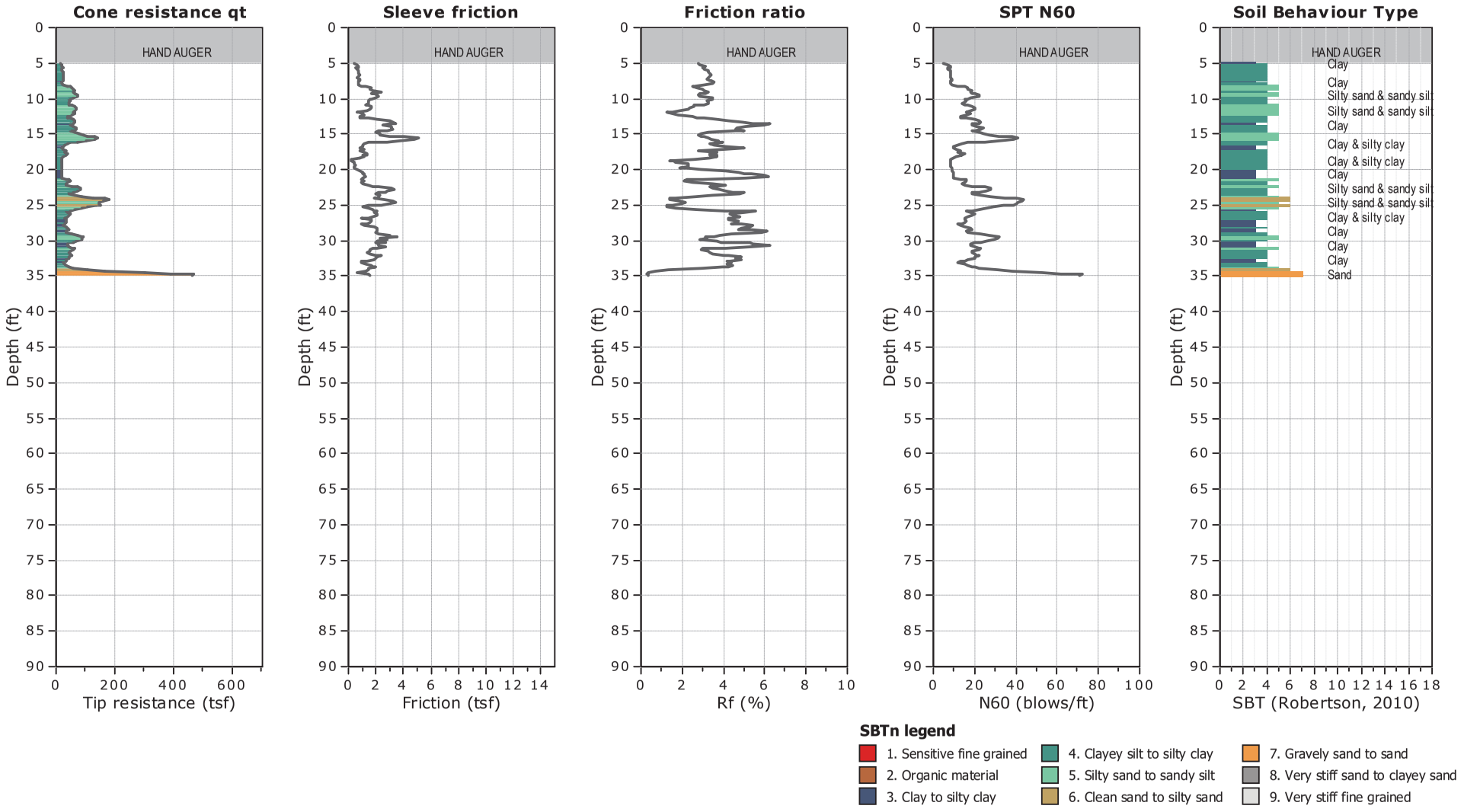
CPT: CPT-22-07

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.94 ft, Date: 4/5/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-07 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

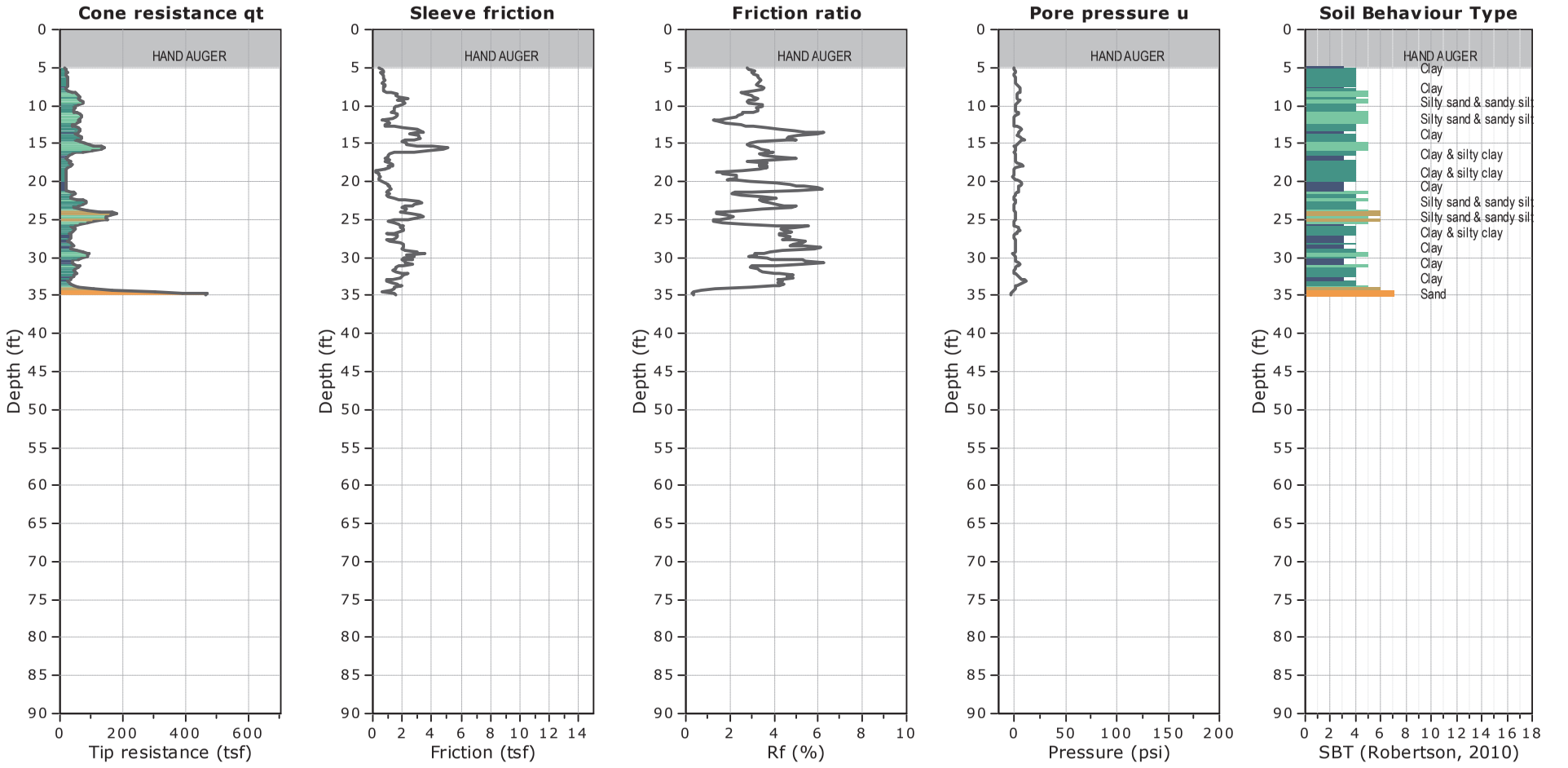
CPT: CPT-22-07

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.94 ft, Date: 4/5/2022



SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-08 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

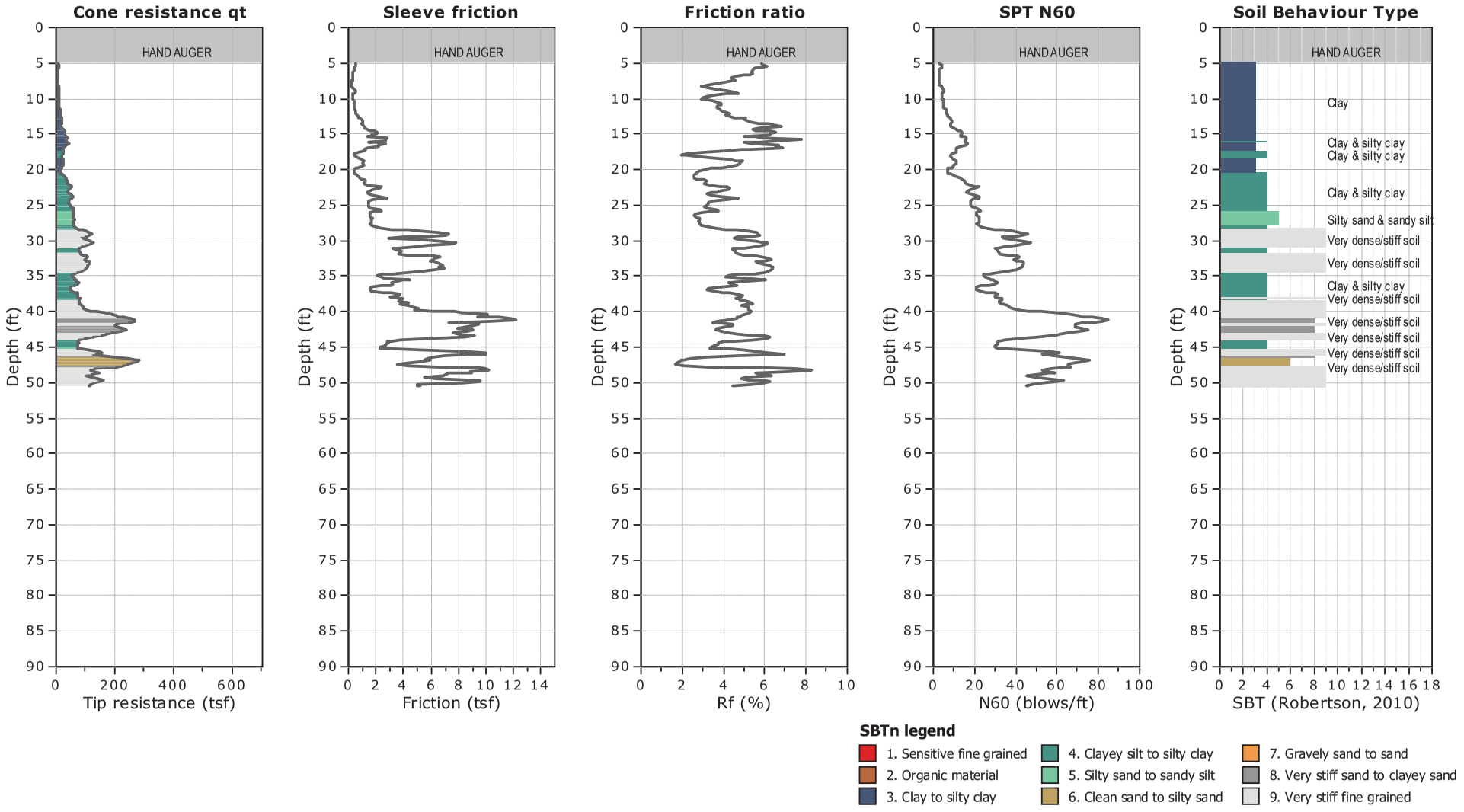
CPT: CPT-22-08

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/4/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-08 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

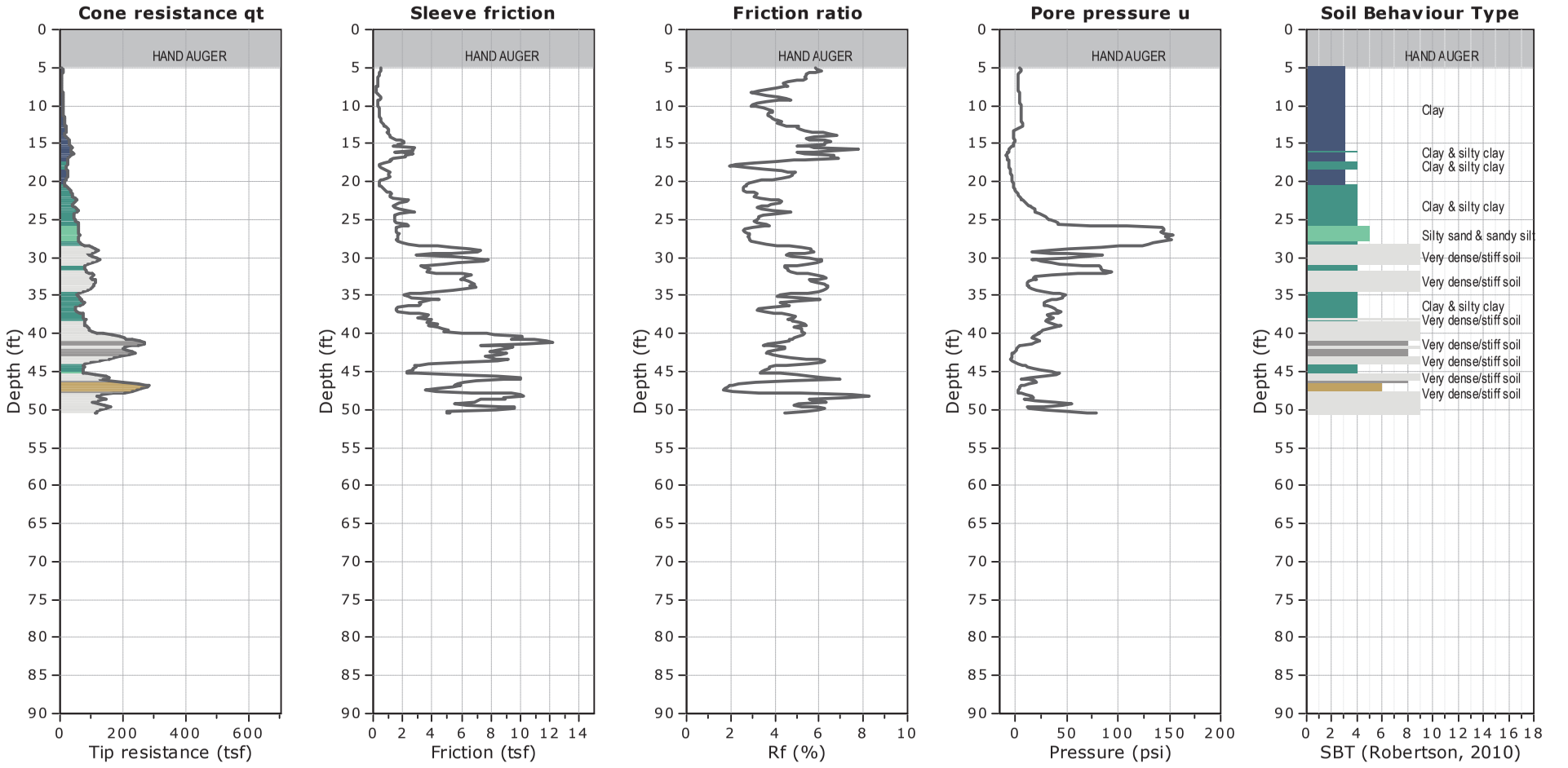
CPT: CPT-22-08

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/4/2022



SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-09 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

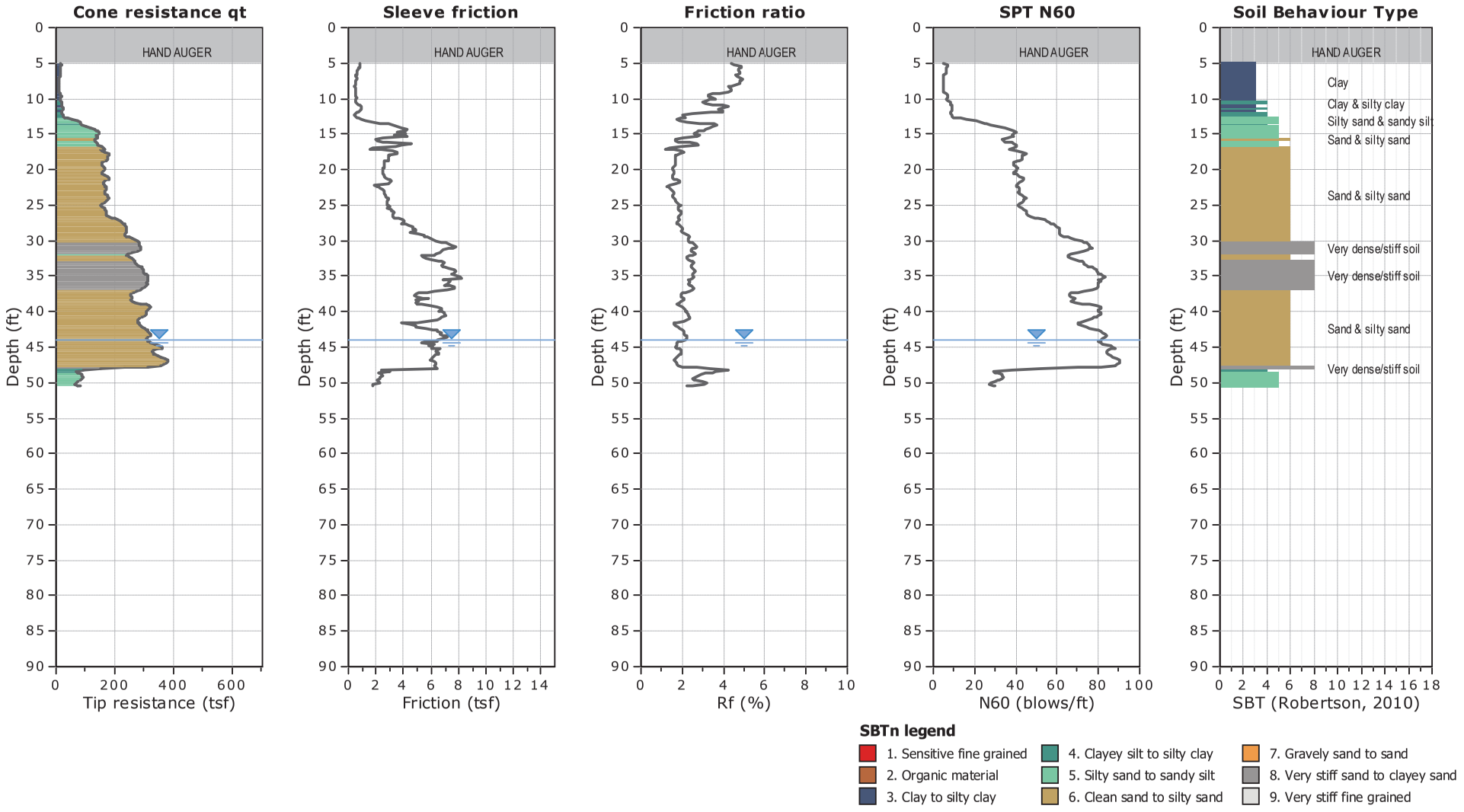
CPT: CPT-22-09

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/8/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-09 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

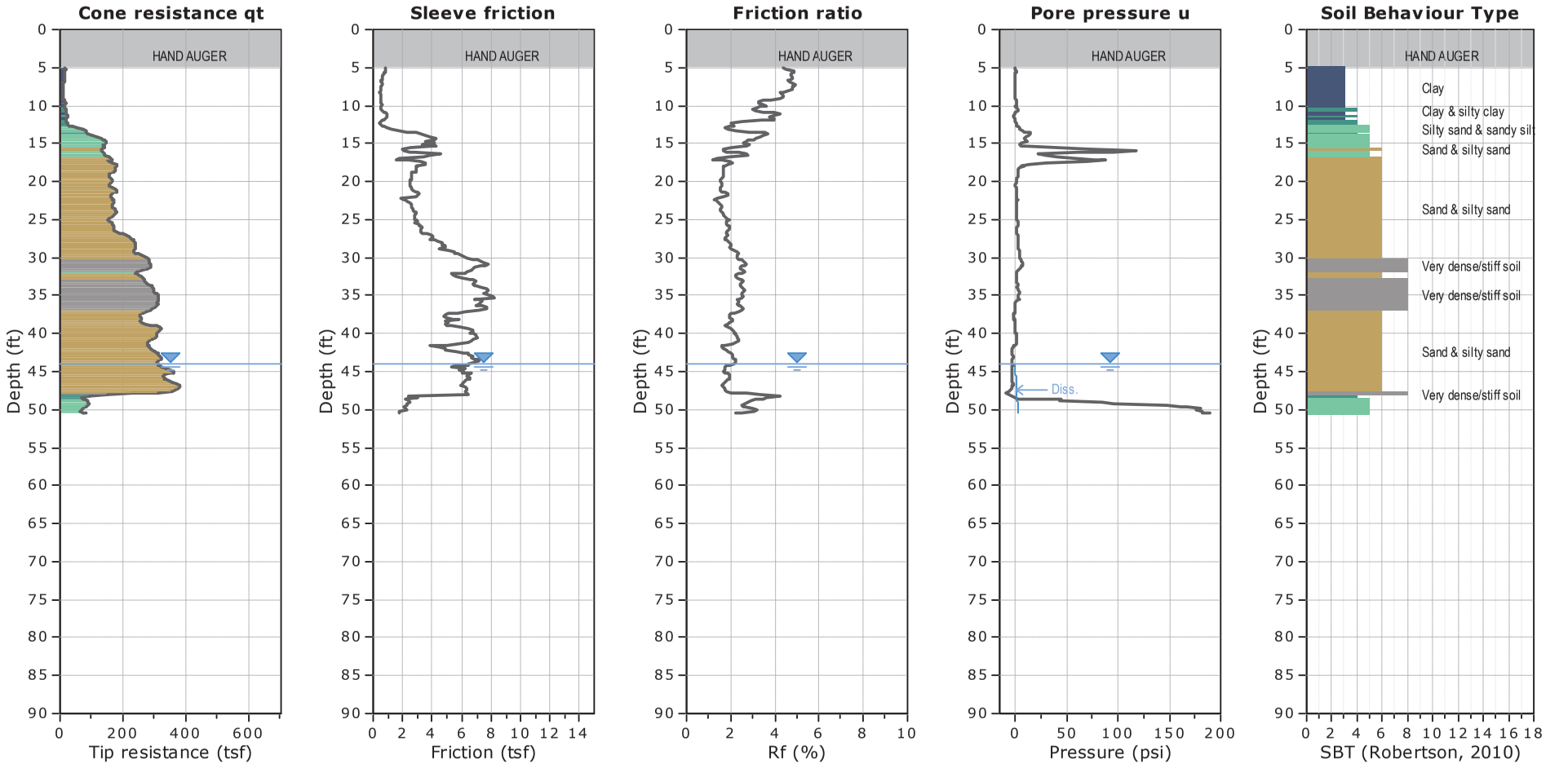
CPT: CPT-22-09

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 50.52 ft, Date: 4/8/2022



SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty clay	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to clayey sand
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-10 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

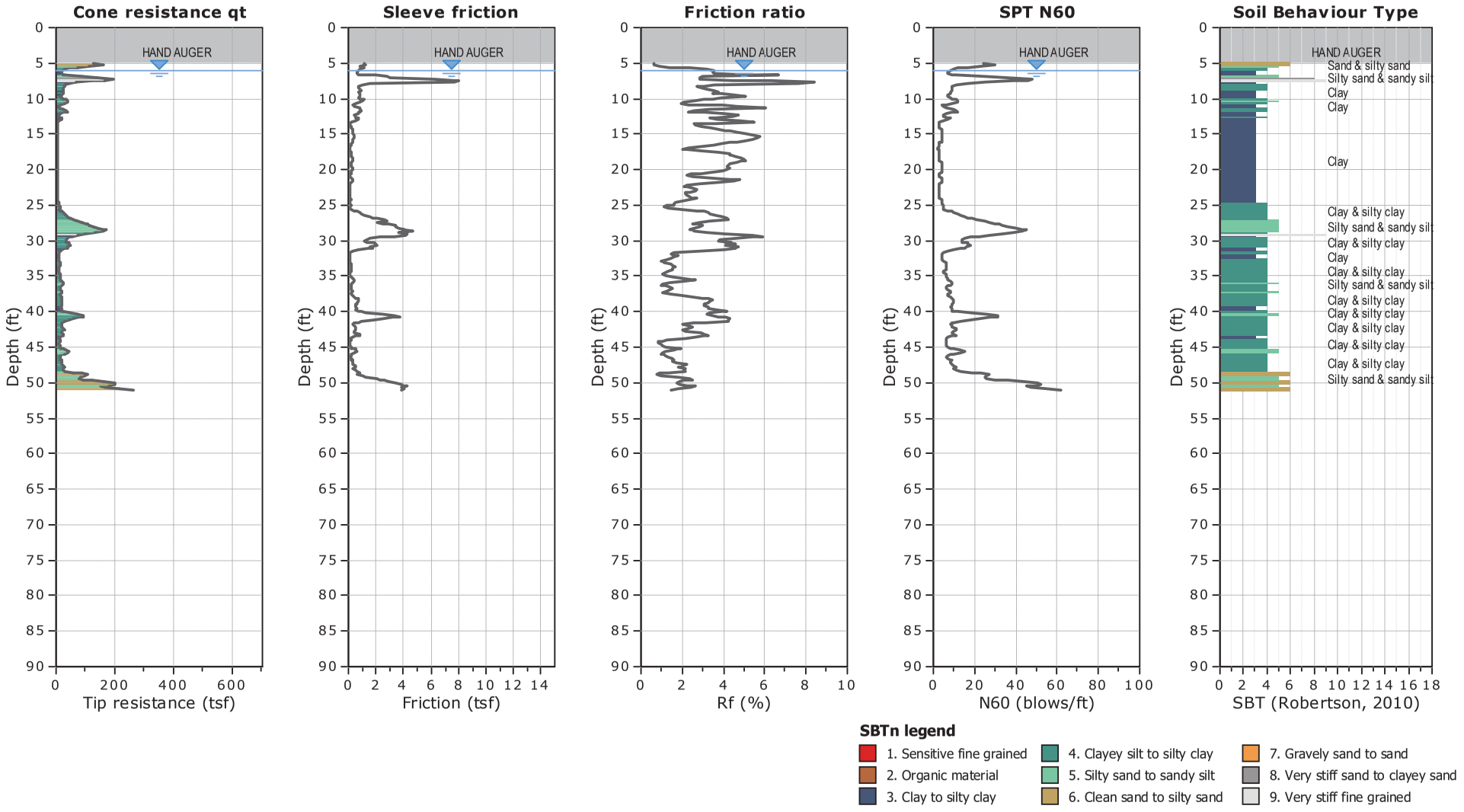
CPT: CPT-22-10

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 51.02 ft, Date: 4/5/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-10 pushed outside the footprint of the Old Landfill located to the West of Gallighan Slough.

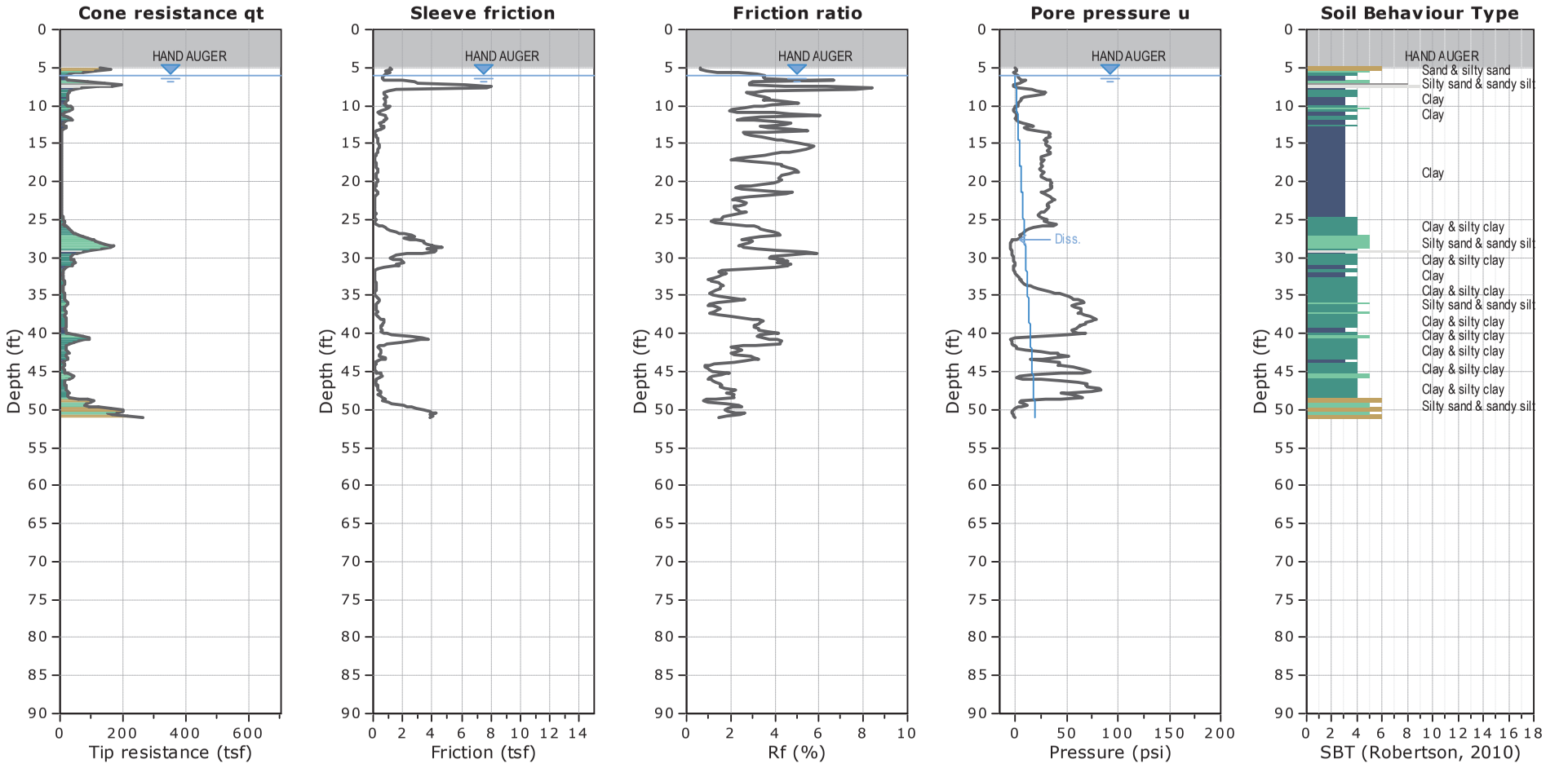
CPT: CPT-22-10

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 51.02 ft, Date: 4/5/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-11 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

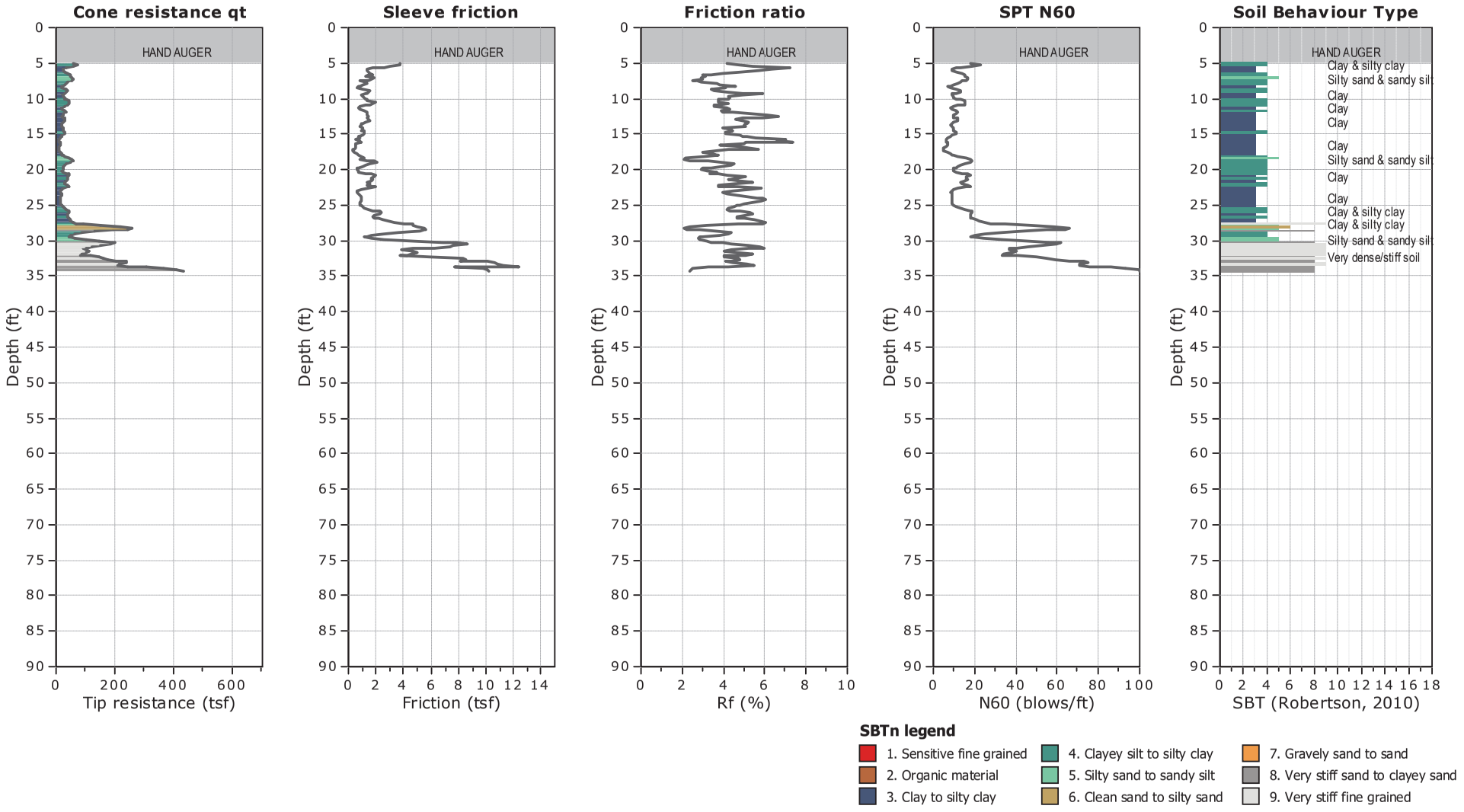
CPT: CPT-22-11

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.28 ft, Date: 4/8/2022



GREGG DRILLING, LLC
WWW.GREGGDRILLING.COM

CPT22-11 pushed within the footprint of the Old Landfill located to the West of Gallighan Slough. Therefore, pushed through waste fill.

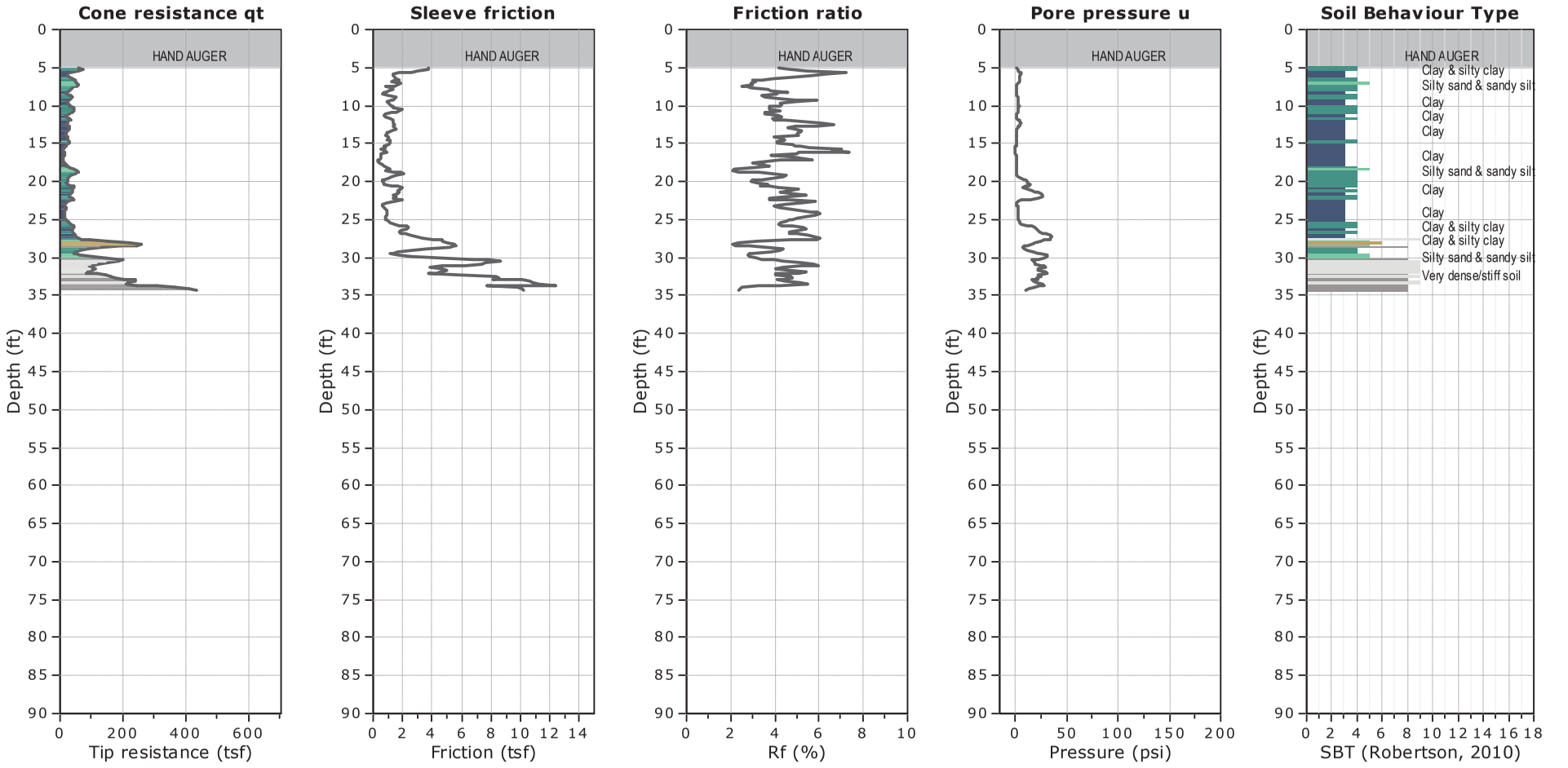
CPT: CPT-22-11

CLIENT: GEOSYNTEC

SITE: BUENA VISTA LANDFILL, WATSONVILLE, CA

FIELD REP: EMILY MARTIN
Cone ID: GDC-94

Total depth: 34.28 ft, Date: 4/8/2022



WATER TABLE FOR ESTIMATING PURPOSES ONLY

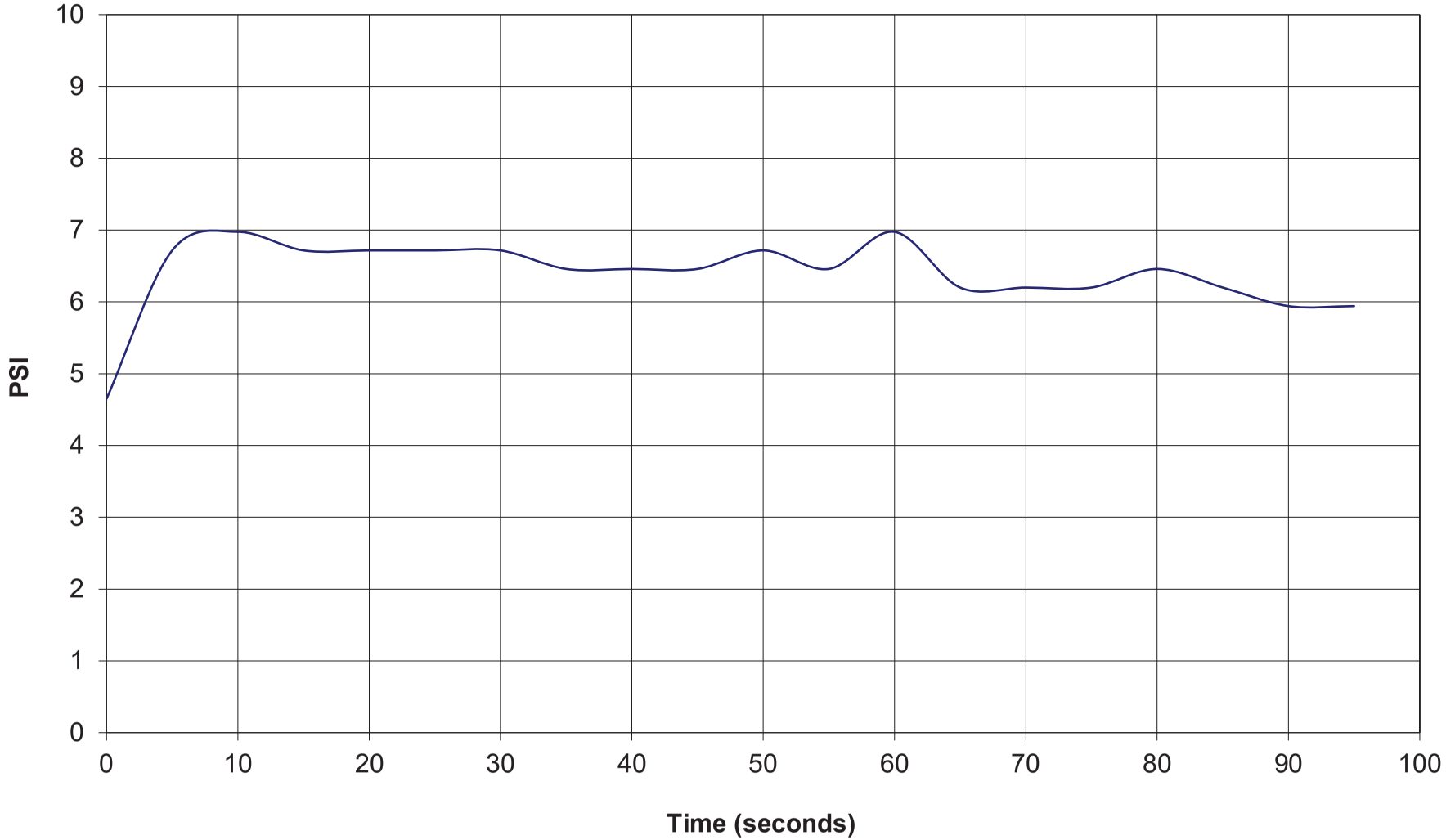
APPENDIX B:

PORE PRESSURE DISSIPATION TEST PLOTS

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

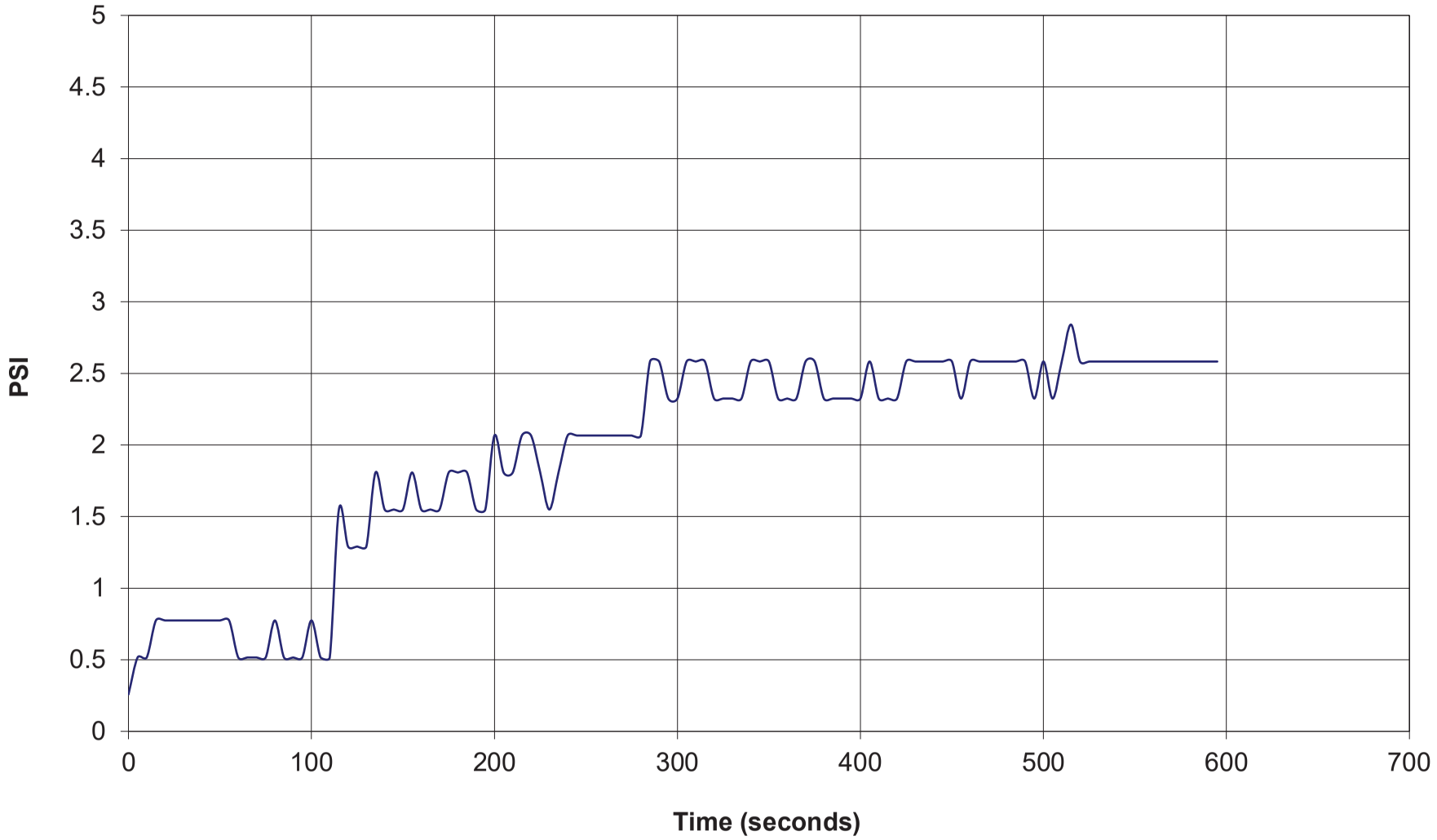
Sounding: CPT-22-01
Depth (ft): 50.36
Site: Buena Vista Landfill
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

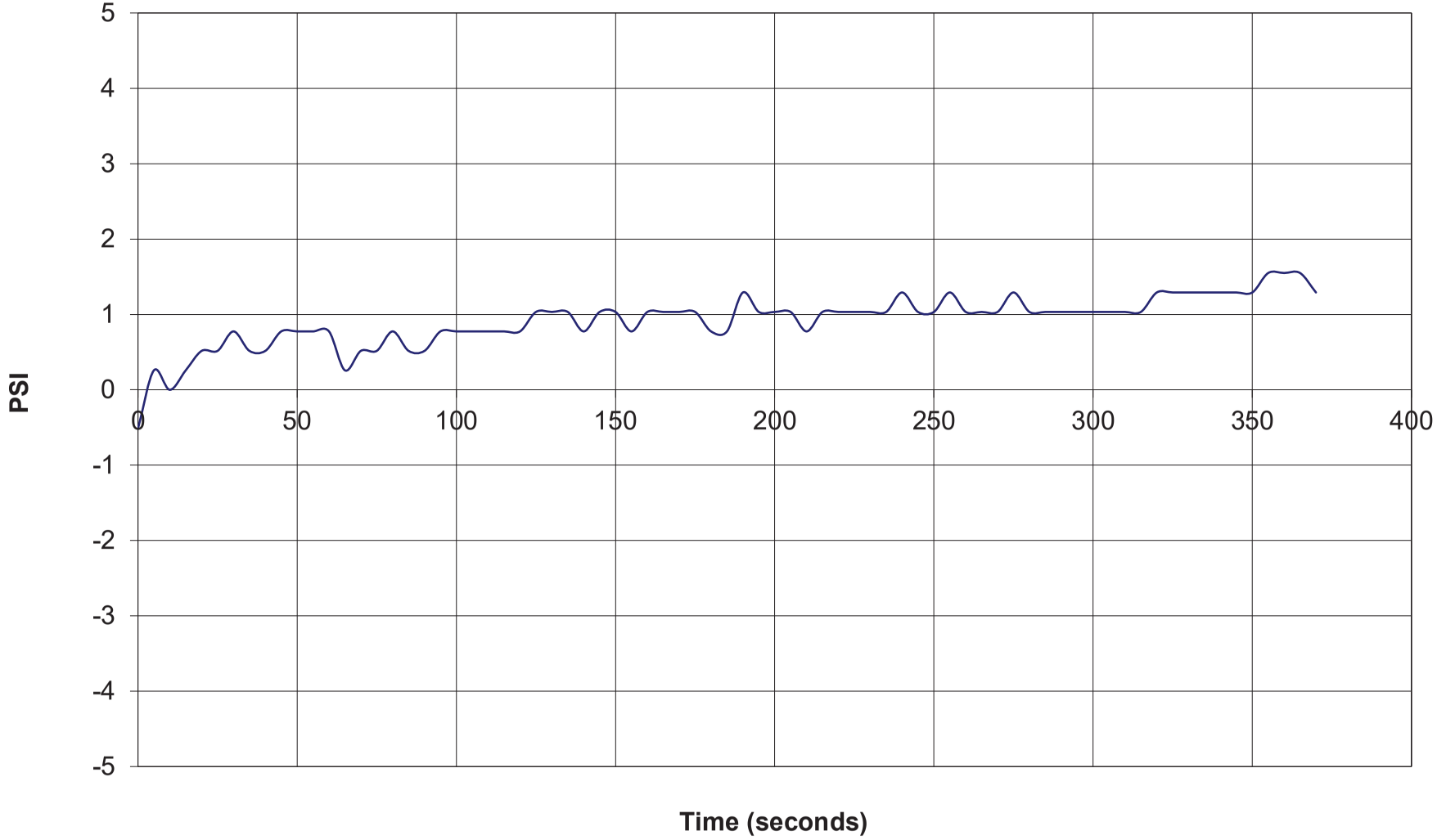
Sounding: CPT-22-01
Depth (ft): 87.93
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

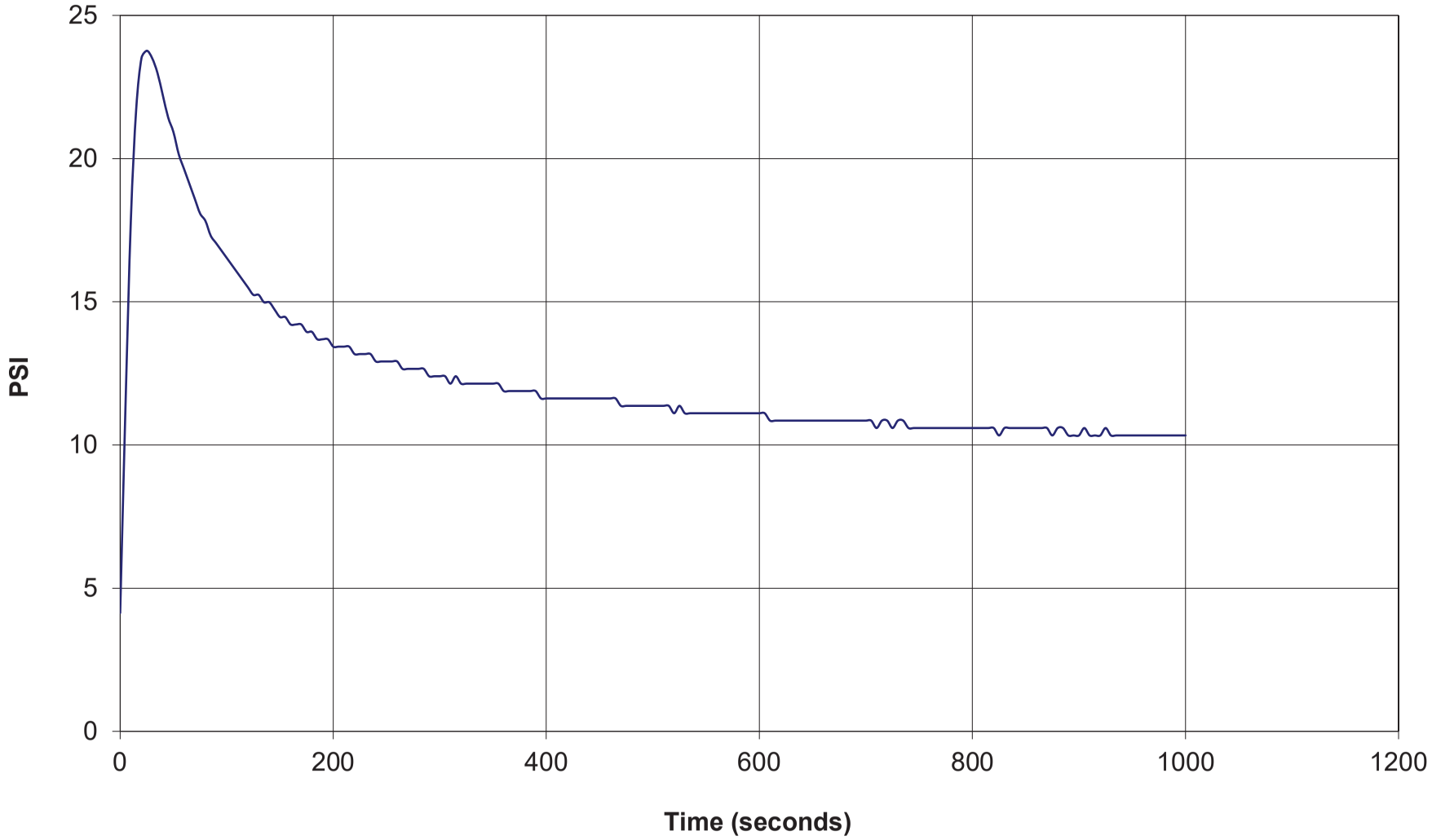
Sounding: SCPT-22-05
Depth (ft): 37.57
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

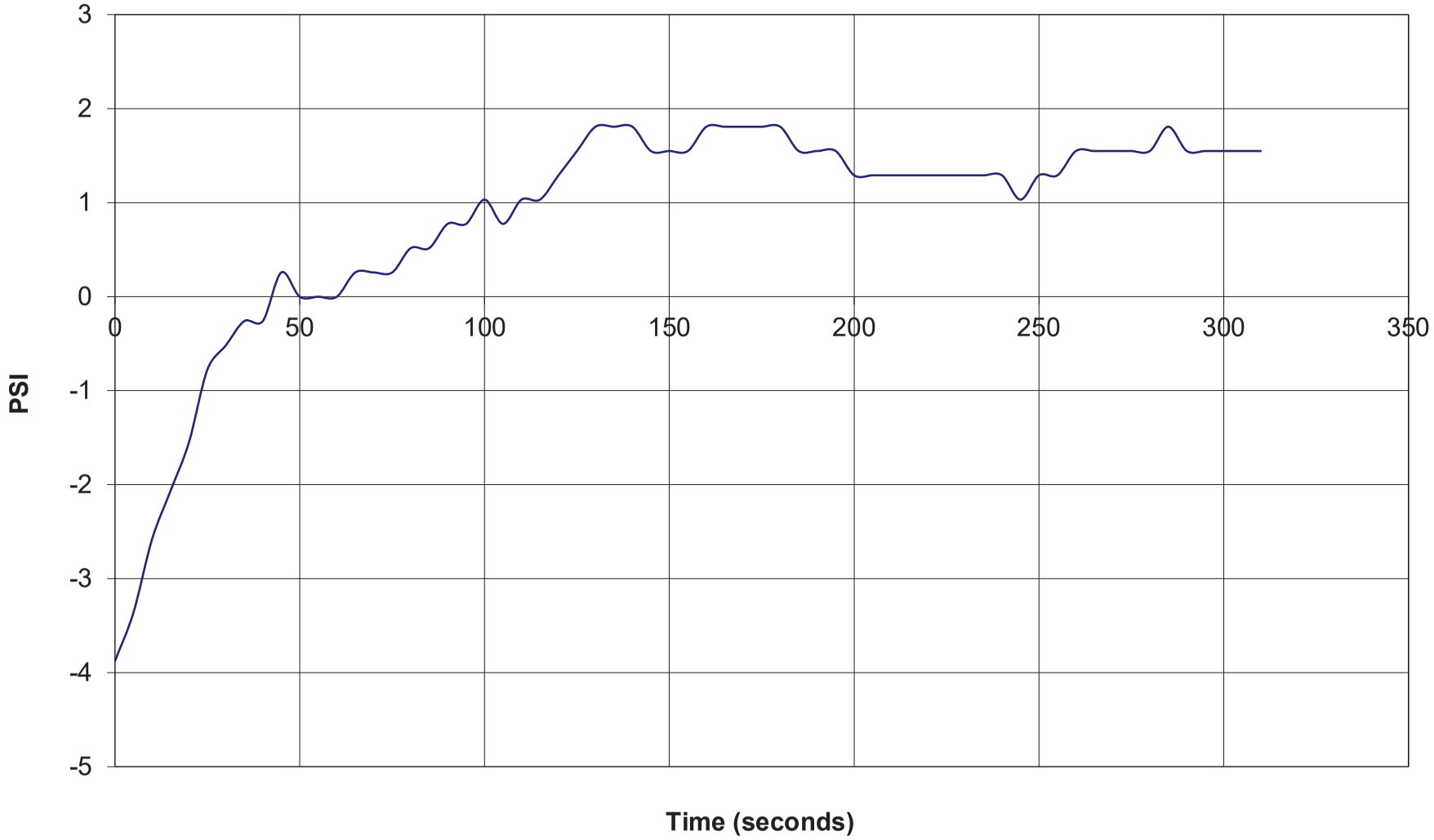
Sounding: SCPT-22-05
Depth (ft): 64.14
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

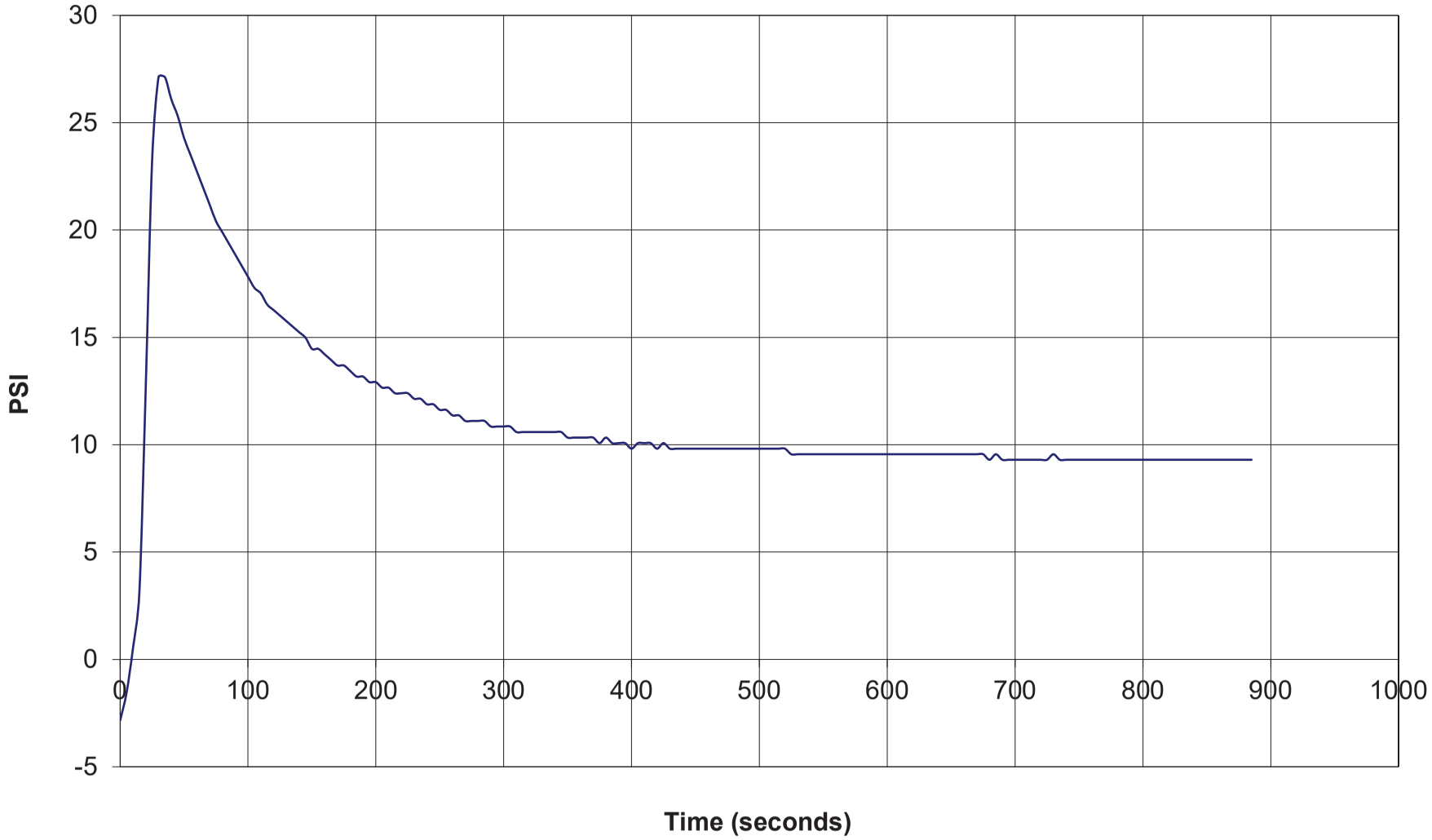
Sounding: CPT-22-09
Depth (ft): 47.41
Site: Buena Vista
Engineer: Emily Martin



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: CPT-22-10
Depth (ft): 27.56
Site: Buena Vista
Engineer: Emily Martin



APPENDIX C:

SEISMIC

PLOTS & TABLES

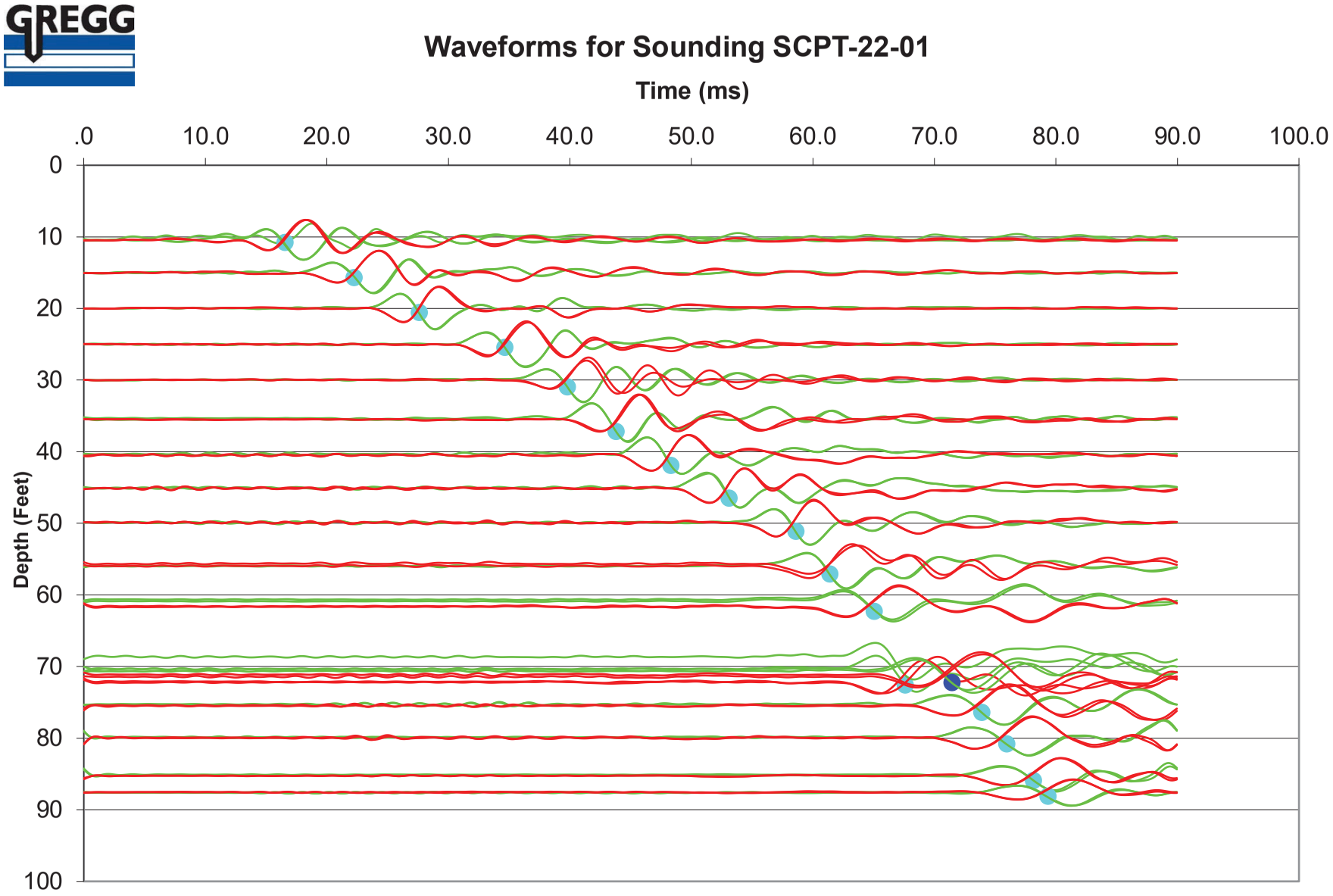
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-01
SCPT-22-01

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/07/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.50	9.84	9.98	9.98	16.4500			
15.09	14.43	14.53	4.55	22.1500	5.7000	798.0	12.14
20.01	19.35	19.42	4.90	27.4500	5.3000	923.9	16.89
25.10	24.44	24.50	5.07	34.4500	7.0000	724.3	21.90
30.02	29.36	29.41	4.91	39.5500	5.1000	963.1	26.90
35.10	34.44	34.49	5.08	43.5500	4.0000	1269.6	31.90
40.35	39.69	39.73	5.24	48.0000	4.4500	1178.4	37.07
45.11	44.45	44.48	4.75	52.7500	4.7500	1000.7	42.07
50.03	49.37	49.40	4.92	58.2500	5.5000	894.2	46.91
55.12	54.46	54.48	5.08	61.0000	2.7500	1848.2	51.92
60.04	59.38	59.40	4.92	64.6500	3.6500	1347.7	56.92
65.12	64.46	64.49	5.08	67.1500	2.5000	2033.4	61.92
75.46	74.80	74.82	10.33	73.4500	6.3000	1639.9	69.63
80.05	79.39	79.41	4.59	75.4500	2.0000	2296.0	77.10
85.14	84.48	84.49	5.08	77.6500	2.2000	2311.0	81.93
87.93	87.27	87.28	2.79	78.8500	1.2000	2323.5	85.87


GREGG
Waveforms for Sounding SCPT-22-01
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Depth (Feet)
0
10
20
30
40
50
60
70
80
90
100

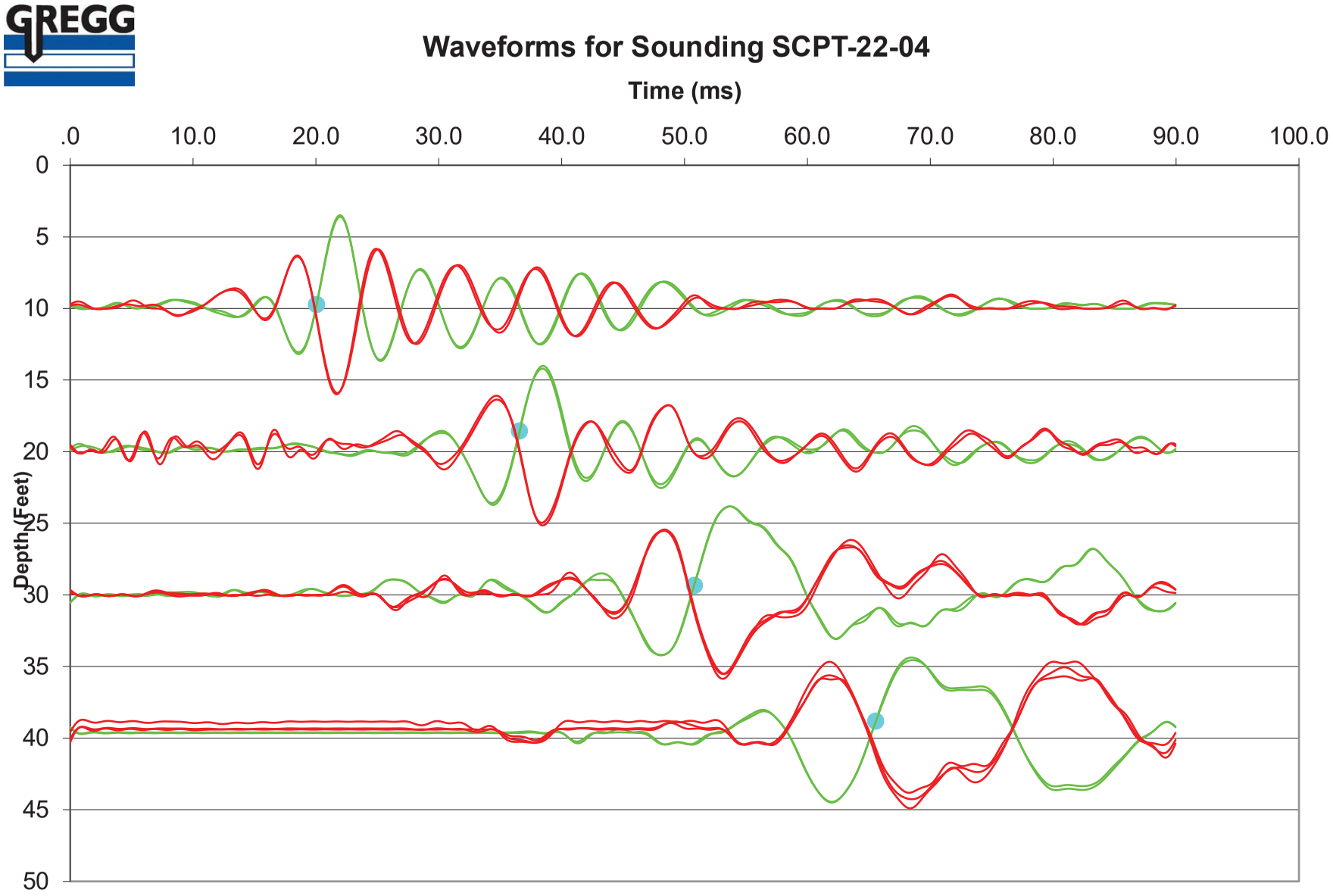
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-04
SCPT-22-04

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/04/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	19.9500			
20.01	19.35	19.42	9.93	36.3500	16.4000	605.5	14.35
30.02	29.36	29.41	9.98	50.5000	14.1500	705.4	24.36
40.35	39.69	39.73	10.32	65.1500	14.6500	704.6	34.53


GREGG
Waveforms for Sounding SCPT-22-04
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
Depth (Feet)
0
5
10
15
20
25
30
35
40
45
50

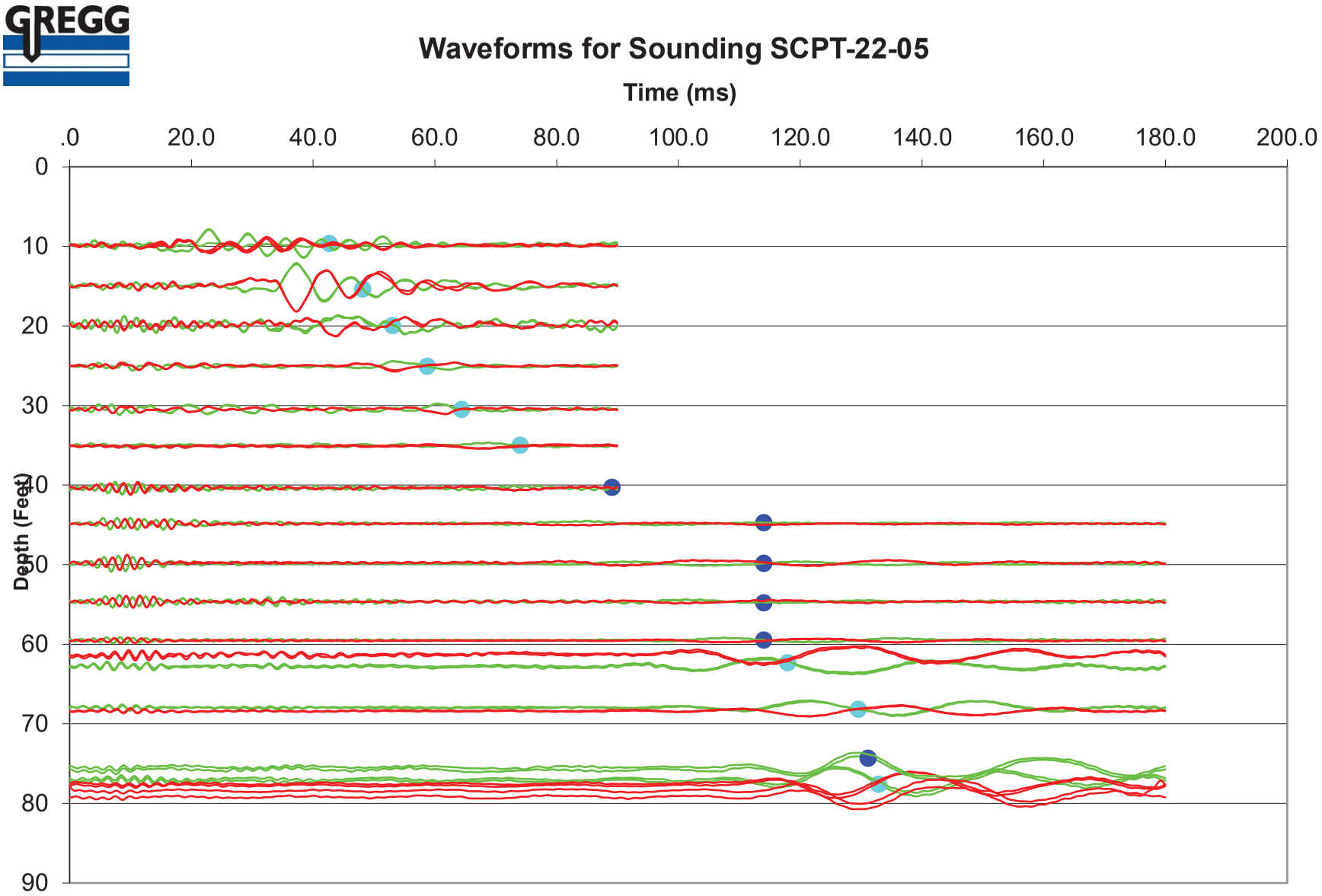
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-05
SCPT-22-05

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/05/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	42.4000			
15.09	14.43	14.53	5.03	47.8500	5.4500	923.6	11.89
20.01	19.35	19.42	4.90	52.7000	4.8500	1009.7	16.89
25.10	24.44	24.50	5.07	58.4000	5.7000	889.5	21.90
30.51	29.85	29.90	5.40	64.0000	5.6000	964.8	27.15
35.27	34.61	34.65	4.75	73.5500	9.5500	497.5	32.23
65.12	64.46	64.49	29.84	117.6000	44.0500	677.3	49.54
70.05	69.39	69.41	4.92	129.1500	11.5500	425.9	66.93
75.13	74.47	74.49	5.08	132.5000	3.3500	1517.6	71.93


GREGG
Waveforms for Sounding SCPT-22-05
Time (ms)
.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
0
10
20
30
40
50
60
70
80
90
Depth (Feet)

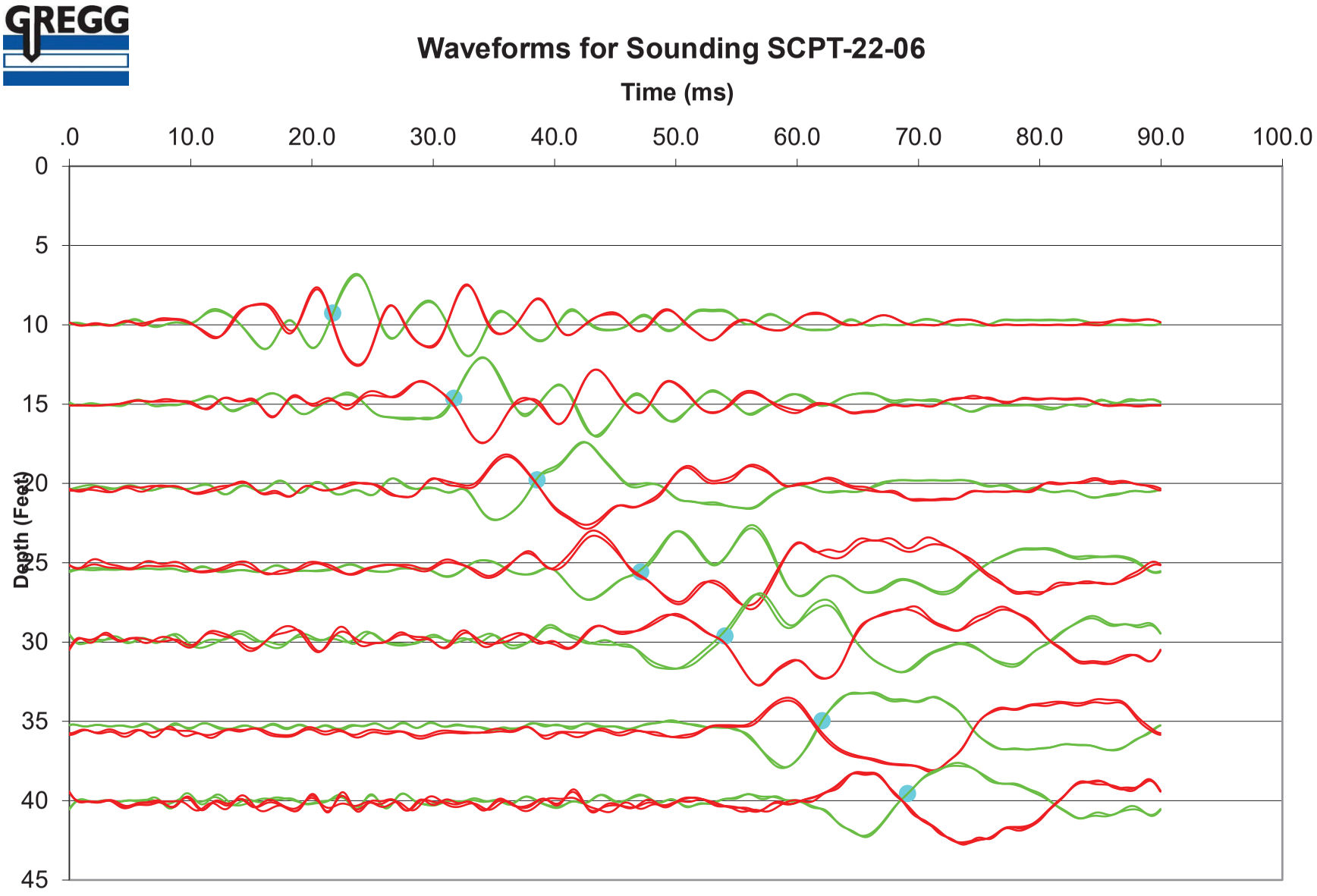
Shear Wave Velocity Calculations

Buena Vista Landfill
SCPT-22-06
SCPT-22-06

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

04/04/22

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
10.01	9.35	9.49	9.49	21.6000			
15.09	14.43	14.53	5.03	31.5000	9.9000	508.4	11.89
20.51	19.85	19.92	5.39	38.3000	6.8000	792.2	17.14
25.59	24.93	24.99	5.07	46.8000	8.5000	596.6	22.39
30.02	29.36	29.41	4.42	53.7000	6.9000	640.7	27.15
35.27	34.61	34.65	5.24	61.6500	7.9500	659.4	31.98
40.03	39.37	39.40	4.75	68.6500	7.0000	678.9	36.99


GREGG
Waveforms for Sounding SCPT-22-06
Time (ms)
.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
0
5
10
15
20
25
30
35
40
45
Depth (Feet)

APPENDIX 3
Boring Logs

GEOSYNTEC CONSULTANTS
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KEY SHEET
CLASSIFICATIONS AND SYMBOLS

Project: Buena Vista Landfill

Location: Watsonville, California **Project Number: WL0387 PM**

EMPIRICAL CORRELATIONS WITH STANDARD PENETRATION RESISTANCE N VALUES *

	N Value * (Blows/ft)	Consistency	Unconfined Compressive Strength (tons/sq ft)
FINE GRAINED SOILS	0 - 2	Very Soft	<0.25
	3 - 4	Soft	0.25 - 0.50
	5 - 8	Medium Stiff	0.50 - 1.00
	9 - 15	Stiff	1.00 - 2.00
	16 - 30	Very Stiff	2.00 - 4.00
	>30	Hard	>4.00

	N Value * (Blows/ft)	Relative Density
COARSE GRAINED SOILS	0 - 4	Very Loose
	5 - 10	Loose
	11 - 30	Medium Dense
	31 - 50	Dense
	>50	Very Dense

* ASTM D 1586; number of blows of 140-pound hammer falling 30 inches to drive a 2-inch-O.D., 1.4-inch-I.D. sampler one foot.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

MAJOR DIVISIONS			SYMBOLS	DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL COARSER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO.4 SIEVE	CLEAN GRAVELS — LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES — APPRECIABLE AMOUNT OF FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING NO.4 SIEVE	CLEAN SANDS — LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES — APPRECIABLE AMOUNT OF FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL FINER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

NOTE: DUAL SYMBOLS USED FOR BORDERLINE CLASSIFICATIONS

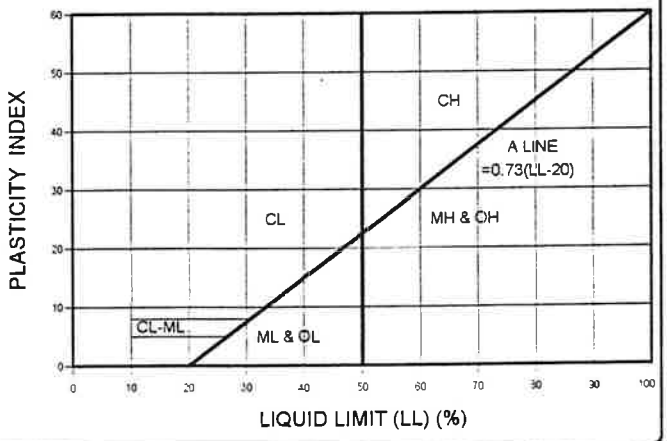
PARTICLE SIZE IDENTIFICATION

BOULDERS	>300 mm
COBBLES	75 - 300 mm
GRAVEL: COARSE	19.0 - 75 mm
GRAVEL: FINE	4.75 - 19 mm
SAND: COARSE	2.00 - 4.75 mm
SAND: MEDIUM	0.425 - 2.00 mm
SAND: FINE	0.075 - 0.425 mm
SILT	0.075 - 0.002 mm
CLAY	<0.002 mm

WELL GRADED - HAVING WIDE RANGE OF GRAIN SIZES AND APPRECIABLE AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES

POORLY GRADED - PREDOMINANTLY ONE GRAIN SIZE, OR HAVING A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING

PLASTICITY CHART



SAMPLE SYMBOLS

- SPT split spoon (2-inch OD)
- Shelby tube (3-inch OD)
- California Modified (3-inch OD) with brass liners (2.5-inch OD)
- Pitcher Barrel with Shelby tube as liner
- Bulk sample
- Grab sample

WELL SYMBOLS

- Concrete or cement grout
- Cement-bentonite grout or slurry
- Bentonite
- Filter sand
- Screen in filter sand
- Slough

WATER LEVEL SYMBOLS

- Water level at time of drilling
- Static water level measured at specified time after drilling/sampling or well completion

GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Soil descriptions and stratum lines are interpretive, and actual changes may be gradual. Field descriptions may have been modified to reflect results of laboratory tests.
2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

Template: GEOSYNTEC_3_KEY; Proj ID: BUENVIST.GPJ; Printed: 9/4/01

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LOG OF BORING GT-01-03

Project: Buena Vista Landfill
Proposed CoGen Plant Area

Location: Watsonville, California

Project Number: WL0387 PM

Start Date	7/13/01	Finish Date	7/13/01	Total Depth Drilled (ft bgs)	51.5
Drilling Method	Mud Rotary	Drilling Contractor	Pitcher Drilling Company	Ground Surface Elevation (ft MSL)	25.8
Drill Rig	Failing 1500 (truck-mounted)	Hammer Type	Aboveground, safety	Borehole Backfill	Portland cement grout
Sampling Method(s)	SPT, Shelby tube, bulk	Hammer Weight/Drop	140 lbs / 30 inches	Depth to Groundwater	Not measured (drilling with mud)
Location	In energy plant area	Coordinates	N 10,619 E 8,547	Logger C. Meehan	Reviewer F.W. Settepani

Elevation, feet	Depth, feet	Sample Interval / Recovery, in./in.	Blows per 6 in. [SPT-N] or Hydraulic Down-Pressure	Pocket Penetrometer, tsf	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND TEST RESULTS
25	0					FILL: Brown, sandy CLAY (CL), 60% low to medium plasticity fines, 40% fine sand, damp	Logging near-surface soil from cuttings.
		17/18	5-7-10 [17]			Very stiff	AW-rod used for driving SPT samplers above 50 ft bgs. NW-rod (exploration rod) used for SPT samplers below 50 ft bgs.
20	5	19/30	100 psi 150 psi	1.0		Dark brown, clayey SAND (SC), 55% fine sand, 45% low plasticity fines, moist	Push Shelby 2.5 ft; 100 psi for 2 ft, then 150 psi. LL=35, PL=18, PI=17 Sieve Analysis: % Fines=47 % Gravel=0 S_u=1050 psf (tested at natural moisture content)
15	10	14/18	7-10-12 [22]			Dark brown, silty SAND (SM), 80% fine sand, 20% low plasticity fines, trace gravel, medium dense, moist	
10	15	10/18	7-10-10 [20]			GRAVEL with silt (GP-GM), 90% gravel (1/2 to 1 inch, angular), 10% nonplastic fines, medium dense, moist	
		13/18	5-6-10 [16]			Gray SILT (ML) to CLAY (CL), 100% low plasticity fines, very stiff, damp	
5	20	13/24	150 psi 300 psi			Becomes more plastic, hard	Push Shelby tube 2 ft; 150 psi for 1.5 ft, 300 psi below.
0	25	17/18	15-20-24 [44]				LL=49, PL=28, PI=21
	30						

Template: GEOSYN_3_SOIL; Proj ID: BUENVIST.GPJ; Printed: Dec 18, 01

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LOG OF BORING GT-01-03

Project: Buena Vista Landfill
Proposed CoGen Plant Area

Location: Watsonville, California

Project Number: WL0387 PM

Elevation, feet	Depth, feet	Sample Interval	Recovery, in./in.	Blows per 6 in. [SPT-N] or Hydraulic Down-Pressure	Pocket Penetrometer, tsf	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND TEST RESULTS
	30						Gray SILT (ML) to CLAY (CL), hard, damp (continued)	
-5			16/18	10-20-31 [51]			Light brown, silty SAND (SM) to sandy SILT (ML), 50% fine sand, 50% nonplastic to low plasticity fines, very dense, moist	
	35		15/15	15-32-50/3"				
-10								Gray-blue material in return fluid at 38 ft.
							Gray, silty SAND (SM), 60% fine sand, 40% nonplastic fines, very dense, moist	
	40		14/16	12-30-50/4"				
-15								
	45		13/17	12-32-50/5"			Sand grades coarser	
-20								
	50		12/17	21-30-50/5"			Increase in sand content	
-25								
							Boring drilled and sampled to 51.5 feet bgs	Borehole grouted at completion of drilling.
	55							
-30								
	60							
-35								
	65							

Template GEOSYN_3_SOIL; Proj ID BUENVIST.GPJ, Printed Dec 18, 01

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LOG OF BORING GT-01-04

Sheet 1 of 1

Project: Buena Vista Landfill
Proposed CoGen Plant Area

Location: Watsonville, California

Project Number: WL0387 PM

Start Date	7/13/01	Finish Date	7/13/01	Total Depth Drilled (ft bgs)	26.5
Drilling Method	Mud Rotary	Drilling Contractor	Pitcher Drilling Company	Ground Surface Elevation (ft MSL)	23.2
Drill Rig	Failing 1500 (truck-mounted)	Hammer Type	Aboveground, safety	Borehole Backfill	Portland cement grout
Sampling Method(s)	SPT, Shelby tube, bulk	Hammer Weight/Drop	140 lbs / 30 inches	Depth to Groundwater	Not measured (drilling with mud)
Location	In energy plant area	Coordinates	N 10,597 E 8,622	Logger C. Meehan	Reviewer F.W. Settepani

Elevation, feet	Depth, feet	Sample Interval	Recovery, in./in.	Blows per 6 in. [SPT-N] or Hydraulic Down-Pressure	Pocket Penetrometer, tsf	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND TEST RESULTS
20	0						FILL: Brown, sandy CLAY (CL) to clayey SAND (SC), 50% medium plasticity fines, 50% fine to medium sand, moist	Logging near-surface soil from cuttings.
			16/18	3-7-7 [14]			Brownish gray, sandy silty CLAY (CL), 70% medium plasticity fines, 30% fine to medium sand, stiff, moist	AW-rod used for driving all SPT samplers at GT-01-04.
15	5		25/27	50 psi 100 psi 250 psi	2.25		Becomes dark brown, with some organics (roots) Becomes very stiff	Push Shelby tube 2.25 ft; 50 psi for 0.5 ft, 100 psi for 1.5 ft; 250 for last 3 in.
10	10		14/18	5-8-11 [19]				
10							Brown, SAND with silt and gravel (SP-SM), 50% sand, 40% gravel, 10% fines, medium dense, moist	
5	15		9/18	5-6-6 [12]				Sieve Analysis: % Fines=11 % Gravel=38
0	20		24/24	100 psi 300 psi	4.5		Brown, silty CLAY (CL), 100% medium plasticity fines, moist	Push Shelby tube 2 ft; 100 psi for 1 ft, 300 psi below; bent tube.
-5	25		18/18	7-14-21 [35]			Becomes more plastic, gray, hard	LL=62, PL=31, PI=31
	30						Boring drilled and sampled to 26.5 feet bgs	Borehole grouted at completion of drilling.

Template GEOSYN_3_SOIL; Proj ID BUENVIST.GPJ; Printed Dec 18, 01

GP-14

CH2M HILL

PROJECT NUMBER	BORING NUMBER	
BAE 35259.LG.CN	GP-15	SHEET 1 OF

WELL COMPLETION LOG

PROJECT Buena Vista Landfill, County of Santa Cruz **LOCATION** Near MW-4, Southeast Corner of Old Landfill

ELEVATION 76.00 MSL (Top of Casing) **DRILLING CONTRACTOR** Kvilhaug Well Drilling, Concord, CA

DRILLING METHOD AND EQUIPMENT Mobile B-61, 8-inch o.d. hollow stem auger

WATER LEVELS Perched water at 27'BGS **START** 2-22-95 **FINISH** 2-23-95 **LOGGER** Thom Little

See Boring Log
For Drilling Details

GP-14

CH2M HILL

PROJECT NUMBER	BORING NUMBER
BAE 35259 LG CN	GP-15

SHEET 1 OF 2

SOIL BORING LOG

PROJECT Buena Vista Landfill, County of Santa Cruz **LOCATION** Near MW-4, Southeast Corner of Old Landfill

ELEVATION 76.00 MSL (Top of Casing) **DRILLING CONTRACTOR** Kvilhaug Well Drilling, Concord, CA

DRILLING METHOD AND EQUIPMENT Mobile B-61, 8-inch o.d. hollow stem auger

WATER LEVELS Perched water at 27'BGS **START** 2-22-95 **FINISH** 2-23-95 **LOGGER** Thom Little

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: TYPE AND NUMBER	SAMPLE: RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS TESTS AND INSTRUMENTATION
					Use geologic log from MW-4 for geologic description. No samples during the drilling and installation of this cluster of gas probes.	Driller: Mike Helper: George
						Clayey Sand
5.0					Boring terminated 60 feet below ground surface.	
						wet, perched water flowing off of side slope west of rig.
10.0						
						@12', perched water interval continues
15.0						
						Clay interbed.
20.0						
25.0						
						Clayey Sand to Clayey Gravel, appears wet. Drill to 40' BGS and stop. Wait overnight. Water rises to 27 feet BGS inside augers.

GP-14

PROJECT NUMBER	BORING NUMBER
BAE35259.LG.CN	GP-15 SHEET 2 OF 2

SOIL BORING LOG

PROJECT Buena Vista Landfill, County of Santa Cruz LOCATION Near MW-4, Southeast Corner of Old Landfill

ELEVATION 76.00 MSL (Top of Casing) DRILLING CONTRACTOR Kvilhaug Well Drilling, Concord, CA

DRILLING METHOD AND EQUIPMENT Mobile B-61, 8-inch o.d. hollow stem auger

WATER LEVELS Perched water at 27'BGS START 2-22-95 FINISH 2-23-95 LOGGER Thom Little

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: TYPE AND NUMBER	SAMPLE: RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
35.0						
40.0						
45.0						methane gas coming out of augers 2/23/95, continue drilling
50.0						
55.0						

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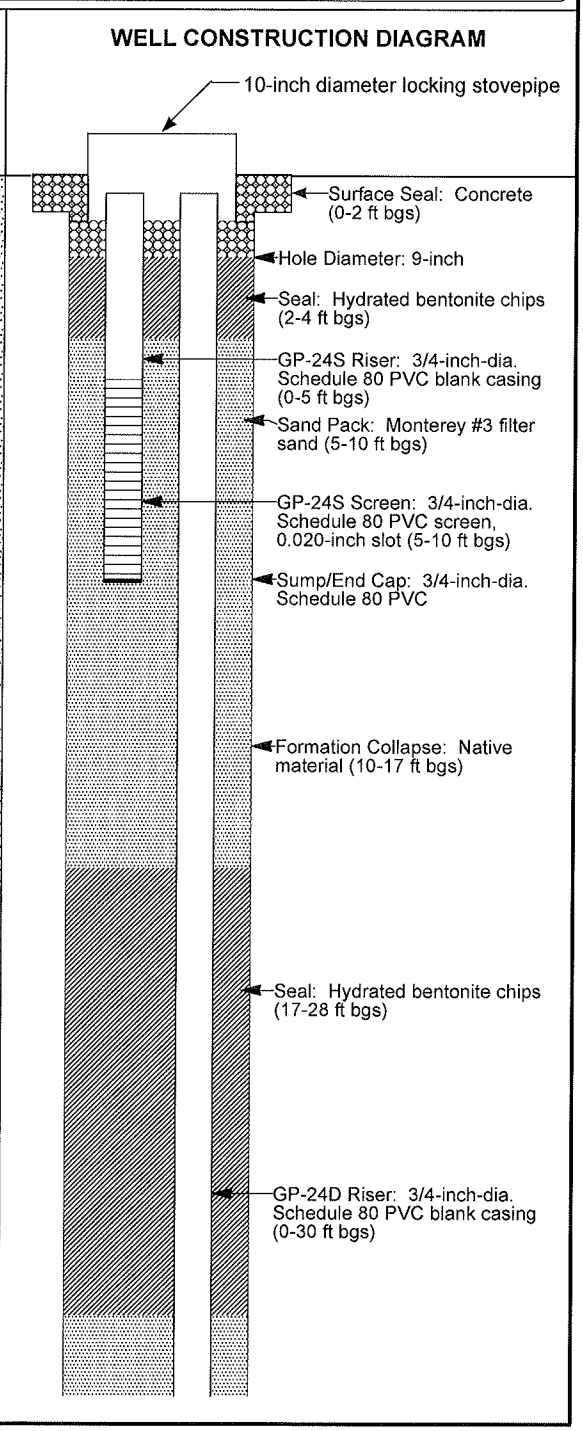
LOG OF GP-24

Project: Buena Vista Landfill

Location: Watsonville, CA **Project Number: WG1169**

Start Date	9/21/09	Finish Date	9/21/09	Total Depth Drilled (feet bgs)	40.0		
Drilling Method	Air Percussion Hammer	Drilling Contractor	Layne Christensen	Ground Surface Elevation (feet MSL)	Not available		
Drill Rig	AP1000 Percussion Hammer	Sampling Method	SPT split spoon	Top of PVC Casing Elevation (feet MSL)	Not Available		
Borehole Diameter	9-inches	Hammer Data	140-lb percussion hammer	Logger	N. Gotberg	Reviewer	J. Fortuna
Coordinate Location	Not surveyed	Remarks					

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log
0		[Borehole logged from cuttings in upper 8.5 feet.]	
10	9/10/8 100%	POORLY GRADED SAND (SP), very dark grey (7.5YR 2/1), wet, 90% fine grained sand, 5% silt, 5% medium sand, loose.	
15		Change in cuttings to clay observed at 15 ft.	
20	8/10/13 100%	LEAN CLAY WITH SAND (CL), very dark brown (7.5 YR 2/2), moist, 85% clay, 15% fine sand, stiff, medium plasticity.	
25		Change in drill rig response at 27 ft.	
30	8/11/13 100%	CLAYEY SAND (SC), very dark grayish brown (10YR 3/2), moist, 40% lean clay, 60% fine grained sand,	



Template: OAKLAND_WELL; Proj ID: WG1169.REVISED.GPJ; Printed: 10/22/2009

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LOG OF GP-24

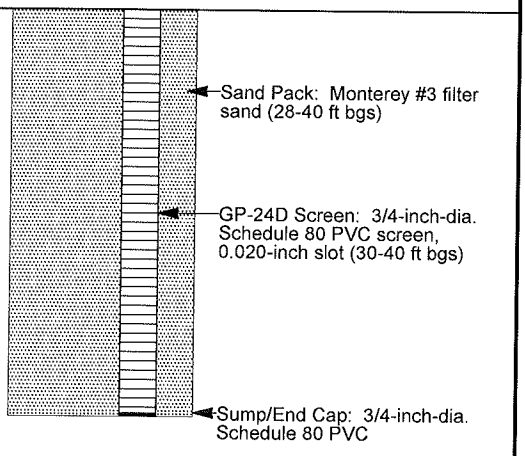
Sheet 2 of 2

Project: Buena Vista Landfill

Location: Watsonville, CA

Project Number: WG1169

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log
	30			medium dense.	
	35				
		9/11/18 100%		POORLY GRADED SAND (SP), dark yellowish brown (10YR 4/4), moist, 85% fine grained sand, 15% clay, medium dense.	
	40			Total Depth = 40 ft	
	45				
	50				
	55				
	60				
	65				



Template: OAKLAND_WELL; Proj ID: WG1169.REVISED.GPJ; Printed: 10/1/2009

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LOG OF GP-25

Sheet 1 of 1

Project: Buena Vista Landfill

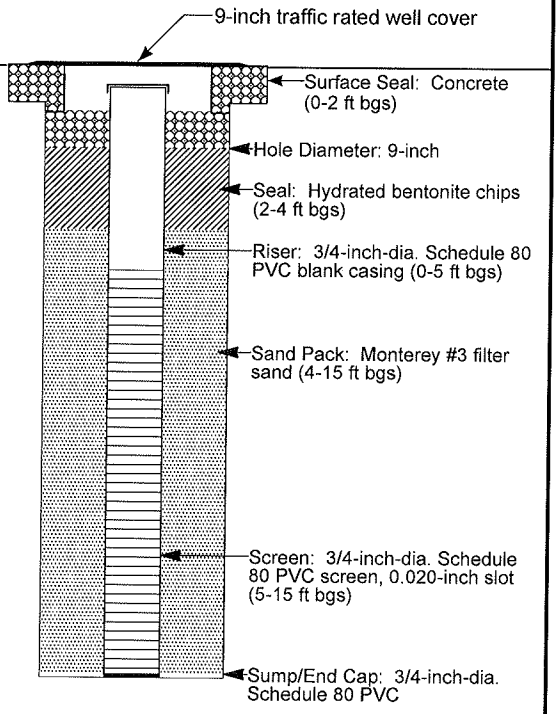
Location: Watsonville, CA

Project Number: WG1169

Start Date	9/21/09	Finish Date	9/21/09	Total Depth Drilled (feet bgs)	16.0		
Drilling Method	Air Percussion Hammer	Drilling Contractor	Layne Christensen	Ground Surface Elevation (feet MSL)	Not available		
Drill Rig	AP1000 Percussion Hammer	Sampling Method	SPT split spoon	Top of PVC Casing Elevation (feet MSL)	Not Available		
Borehole Diameter	9-inches	Hammer Data	140-lb percussion hammer	Logger	N. Gotberg	Reviewer	J. Fortuna
Coordinate Location	Not surveyed	Remarks					

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log
	0			[Borehole logged from cuttings in upper 8.5 feet.]	
	5				
	10	41/29/31 30%		WELL GRADED SAND (SW), light grey (5YR 7/2), dry, 15% silt, 30% fine sand, 20% medium sand, 20% course sand, 15% gravel, rounded to subangular, dense.	
	15			Becomes wet at 15.5 ft.	
				Total Depth = 16 ft	
	20				
	25				
	30				

WELL CONSTRUCTION DIAGRAM



Template: OAKLAND_WELL; Proj ID: WG1169.REVISED.GPJ; Printed: 10/1/2009

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.40 BORING NO. MW-4

PROJECT NAME Buena Vista Landfill

BY JH DATE 10/09/87 SURFACE ELEV. 80.26

PHOTO-VAC (ppm)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0		GM	SILTY GRAVEL, dark brown (10YR, 4/3); 20-35% fines; 30-40% medium grained sand; 30% fine gravel; gravel is greenstone & mafics; quartz sand with rare to occasional mica; unstratified; wood chips; loose.
				5		GP	SANDY GRAVEL, dark brown (7.5YR, 4/4); 5-10% fines; 70% fine to medium sand; 20% fine gravel; gravels are rounded sandstones, graywackes, and mafics; sand is micaceous with rare coarse-grained biotite & muscovtite; loose; moderate iron oxide weathering. @12-13': fines increase to 20-30%; GM/GC.
				10		GM-GC	
				15		CL	CLAY, gray to dark gray (2.5Y, N6/N4); no discernable sand; rare thinly laminated layers of black organic matter (dark, twigs); hard; moderate plasticity; dry to damp.
				20		CL	GRAVELLY CLAY, brown to pale brown (10YR, 5/3 to 10YR, 7/3); 70% fines; 10% sand; 10-20% fine gravel; poorly bedded; poorly sorted; gravels are quartz, siltstones, sandstones, and graywackes; very stiff; dry, with rootlets.
				25		GM-GC	SILTY TO CLAYEY GRAVEL, yellowish brown (10YR, 5/6); 20-40% fines; 30% medium to very coarse sand; 30% fine gravel; rare cobbles (3"); gravels are quartzites & mafics; sand is ~60% quartz, 20% lithics; no bedding; poorly sorted; dense; damp.
				30			
				35			
				40			

REMARKS

A 6-inch diameter pilot boring was drilled with mud rotary drilling equipment to 124 feet, then reamed to a diameter of 9 inches. The boring was completed as a 4.5-inch diameter monitoring well as described on the attached Well Detail.

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.40 BORING NO. MW-4

PROJECT NAME Buena Vista Landfill PAGE 2 OF 4

BY JH DATE 10/09/87 SURFACE ELEV. 80.26

PHOTO-VAC (ppm)	POCKET PENETRO-METER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
				40		GM-GC	SILTY TO CLAYEY GRAVEL (continued)
				45		SM	SILTY SAND, strong brown (7.5YR, 5/8); 30% fines; 70% fine sand; thinly bedded; dipping ~5 degrees; micaceous; iron oxide stain along bedding; moderately dense; damp.
						CL	CLAY, grayish brown (10YR, 5/2); <5% fine sand; massive; low plasticity; very stiff; dry.
				50		SW	GRAVELLY SAND, dark brown (10YR, 3/3); 5-10% fines; 70% coarse to very coarse sand; 15% fine to medium gravel; sand is quartzose with 20% lithics; gravel is hard mafics, siltstones & chert; no bedding; loose; wet (possible perched water table).
				55			
				60			
				65		GC	CLAYEY GRAVEL, dark yellowish brown (10YR, 4/4); 20-30% fines; 20% medium to coarse sand; 30-50% gravel to small cobbles; gravel and cobbles are mixed mafics, siltstones & graywackes; no bedding; thin lenses (2") of grayish brown clay (as at 47').
				70		CL	SILTY CLAY, gray to grayish brown (10YR, 5/1 to 10YR, 5/2); <5% fine sand; no bedding; occasional iron oxide stained lamina; very stiff; low plasticity; dry. @73': thin organic-rich layer; blackened bark, twigs, mulch.
			▼	75			
				80			

REMARKS

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.40 BORING NO. MW-4

PROJECT NAME Buena Vista Landfill PAGE 3 OF 4

BY JH DATE 10/09/87 SURFACE ELEV. 80.26

PHOTO-VAC (ppm)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				80		CL	SILTY CLAY (continued)
							@84': increasing sand content to 10% fine sand.
				85		SW	SAND TO GRAVELLY SAND, dark gray brown (10YR, 4/2); 10% fines; 50-70% fine to medium sand; 20% coarse sand; 0 to 20% fine to coarse gravel; quartzose micaceous sand; moderately weathered; dense; damp to moist.
				90		GW	@90': increasing gravel.
				95			SANDY GRAVEL, dark brown (10YR, 3/3); with orange oxide staining; <10% fines; 20-60% medium to coarse sand; 40-80% gravel, coarse to fine; with rare cobbles to >3" (broken by core); gravel is hard siltstones, granitics, graywackes & cherts; unstratified; medium dense; moist to wet.
				100			
				105			@104': sample is wet.
				110			
				115			@114': sample is wet; cobbles increase to 10-20%.
				120			

REMARKS

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.40 BORING NO. MW-4

PROJECT NAME Buena Vista Landfill PAGE 4 OF 4

BY JH DATE 10/09/87 SURFACE ELEV. 80.26

PHOTO-VAC (ppm)	POCKET PENETRO-METER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
				120			SANDY GRAVEL (continued)
				125			BOTTOM OF BORING AT 124 FEET. Terminated hole.
				130			
				135			
				140			
				145			
				150			
				155			
				160			

REMARKS

PLATE

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.49 BORING NO. MW-5

PROJECT NAME BUENA VISTA DRIVE LANDFILL PAGE 1 OF 4

BY K. BOWERS DATE 12/1/89 SURFACE ELEV. 11.40 ft.

TORVANE (tsf)	POCKET PENETROMETER (tsf)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				0			**SANDY CLAY (CL)**; very dark gray (2.5Y, N3/0); 70-80% low-plasticity fines, 20-30% fine- to medium-grained sand; stiff; moist	
		10		5			@ 5': 60-70% low-plasticity fines; 30-40% fine- to coarse-grained sand; common root traces; wood fragments; stiff; moist.	
		4		10			**PEAT (PT)**; black (2.5YR, 2.5/0); 5-10% low-plasticity fines; 10-20% fine- to coarse-grained sand; common root traces; wood fragments; soft; damp.	
		2	▽	15			**SANDY CLAY (CL)**; dark gray (2.5Y, N4/0); 60-80% low-plasticity fines; 20-30% fine- to medium-grained sand; 10-20% organics; firm; moist. @ 19': wet.	
				20				

REMARKS

Boring drilled with 8-inch-diameter hollow-stem augers to 75 feet then grouted to surface due to hole problems. A boring was drilled 3-feet from original hole and converted to 2-inch-diameter ground-water monitoring well.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.49 BORING NO. MW-5

PROJECT NAME BUENA VISTA DRIVE LANDFILL PAGE 2 OF 4

BY K. BOWERS DATE 12/1/89 SURFACE ELEV. 11.40 ft.

TORVANE (tsf)	POCKET PENETROMETER (tsf)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
		3					SANDY CLAY (CL), continued.	
		40		25			CLAYEY SAND (SC); olive gray (5Y, 5/2); 20-35% low- to medium-plasticity fines; 65-80% fine- to medium-grained sand; common root traces; common iron staining; medium dense; wet.	
		21		30			@ 30': trace fine to coarse gravel; medium dense; wet.	
		19		35			@ 35': 15-30% low- to medium-plasticity fines; 70-85% fine- to coarse-grained sand; medium dense; wet.	
				40				

REMARKS

Boring drilled with 8-inch-diameter hollow-stem augers to 75 feet then grouted to surface due to hole problems. A boring was drilled 3-feet from original hole and converted to 2-inch-diameter ground-water monitoring well.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.49 BORING NO. MW-5

PROJECT NAME BUENA VISTA DRIVE LANDFILL PAGE 3 OF 4

BY K. BOWERS DATE 12/1/89 SURFACE ELEV. 11.40 ft.

TORVANE (tsf)	POCKET PENETRO-METER (tsf)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
		29					CLAY (CL); mottled light olive brown (2.5Y, 5/4) and dark grayish brown (2.5Y, 4/2); 85-95% low- to medium-plasticty fines; 5-15% fine-grained sand; iron staining; very stiff; damp to moist.	
		63		45			SAND (SP); dark grayish brown (2.5Y, 4/2); 10-20% low-plasticty fines; 75-90% fine- to coarse-grained; trace-5% fine gravel; subangular to subrounded; very dense; wet. (AROMAS FORMATION)	
		50/.5'		50			@ 50': 5-10% low-plasticty fines; 75-90% fine- to coarse-grained; 5-15% fine to coarse gravel; very dense; wet.	
		50/.5'		55			@ 55': 5-10% low-plasticty fines; 60-70% fine- to coarse-grained; 20-35% fine to coarse gravel; very dense; wet.	
				60				

REMARKS

Boring drilled with 8-inch-diameter hollow-stem augers to 75 feet then grouted to surface due to hole problems. A boring was drilled 3-feet from original hole and converted to 2-inch-diameter ground-water monitoring well.

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.49 BORING NO. MW-5

PROJECT NAME BUENA VISTA DRIVE LANDFILL PAGE 4 OF 4

BY K. BOWERS DATE 12/1/89 SURFACE ELEV. 11.40 ft.

TORVANE (tsf)	POCKET PENETROMETER (tsf)	PENETRATION (blws/ft)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION	WELL DETAIL
				65			SAND (SP), continued. @ 60': no sample recovery below 60 feet; flowing sands in hole.	
				70				
				75			BOTTOM OF BORING AT 75 FEET.	
				80				

REMARKS

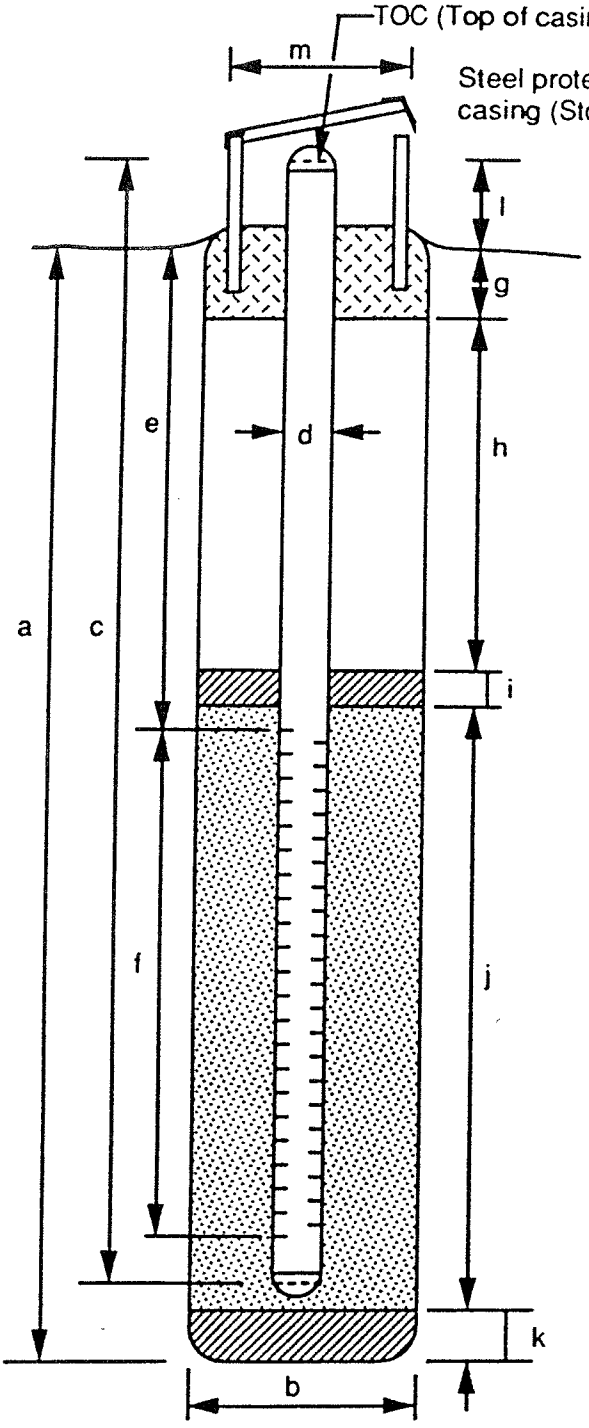
Boring drilled with 8-inch-diameter hollow-stem augers to 75 feet then grouted to surface due to hole problems. A boring was drilled 3-feet from original hole and converted to 2-inch-diameter ground-water monitoring well.

EMCON ASSOCIATES

WELL DETAILS

PROJECT NUMBER 307-01.49
PROJECT NAME Buena Vista Drive Landfill
LOCATION Santa Cruz County, California
WELL PERMIT NO. 89267

BORING / WELL NO. MW-5
TOP OF CASING ELEV. 11.40 ft.
GROUND SURFACE ELEV. _____
DATUM MSL
INSTALLATION DATE 12/1/89



EXPLORATORY BORING

a. Total depth 40.0 ft.
b. Diameter 8 in.
Drilling method Hollow-Stem Auger

WELL CONSTRUCTION

c. Total casing length 39.0 ft.
Material Schedule 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 26.4 ft.
f. Perforated length 12.4 ft.
Perforated interval from 26.4 to 38.8 ft.
Perforation type Machine slotted
Perforation size 0.020 in.
g. Surface seal _____ ft.
Material _____
h. Backfill 21.5 ft.
Material Cement-bentonite grout
i. Seal 2.5 ft.
Material Bentonite
j. Gravel pack 15.0 ft.
Gravel pack interval from 24.0 to 39.0 ft.
Material 12 x 20 Lonestar sand
k. Bottom seal/fill 1.0 ft.
Material Bentonite
l. Casing stickup _____ ft.
m. Protective casing diameter _____ in.

Form prepared by E.H.

MW-08
(previously MW-4a)

DUPLICATE
Driller's Copy

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

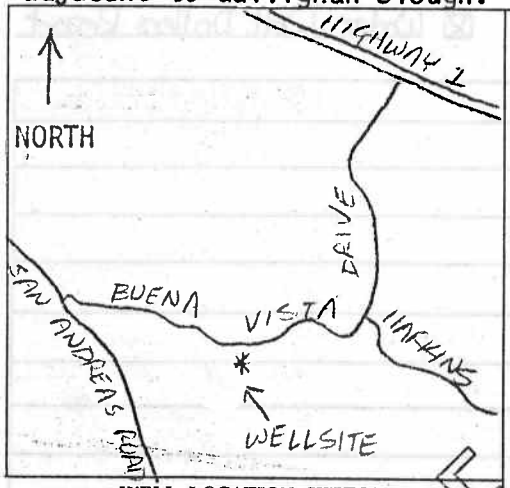
No. 198105

Notice of Intent No. _____
Local Permit No. or Date _____

State Well No. _____
Other Well No. _____

(1) OWNER: Name Santa Cruz County Public Works
Address 701 Ocean St., Santa Cruz, CA 95060
City Attn: Bob Biddle Zip _____

(2) LOCATION OF WELL (See instructions):
County Santa Cruz Owner's Well Number BVMW #4
Well address if different from above Buena Vista Landfill
Township 12 S Range 1 E Section 2
Distance from cities, roads, railroads, fences, etc. 3 miles west of Watsonville adjacent to Buena Vista Drive, at the west end of the Buena Vista Landfill, adjacent to Gallighan Slough.



WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☐
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☒

(5) EQUIPMENT:
Rotary ☒ Reverse ☐
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☒ No ☐ Size # 8 Sand
Diameter of bore 10 5/8
Packed from 33 to 85 ft.

(7) CASING INSTALLED:
Steel ☐ Plastic ☒ Concrete ☐

(8) PERFORATIONS:
Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
+ 2½	-45	5	160 psi	-45	-85	.040
-85	-87	5	160psi			

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 33 ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval _____ ft.
Method of sealing Concrete

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion -40 ft.

(11) WELL TESTS:
Was well test made? Yes ☐ No ☒ If yes, by whom? _____
Type of test Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test _____ ft. At end of test _____ ft
Discharge _____ gal/min after _____ hours Water temperature _____
Chemical analysis made? Yes ☐ No ☒ If yes, by whom? _____
Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) WELL LOG: Total depth 90 ft. Depth of completed well 87.5 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	14	Brown and Grey Clayey Sand
14	35	Brown and Green Sandy Clay
35	37	Sandy Gravel
37	46	Medium Brown Clayey Silt
46	54	Blue Sandy Gravel and Gravelly Sand
54	85	Reddish Brown Silty Sand
85	90	Reddish Brown Silty Sand with some Gravel

Note : During development, well casing filled with fine sand from -87½ to -73 feet.

Work started 3/11 19 85 Completed 3/22 19 85

XXXXX XXXXXXXX STATEMENT: of Geologist:

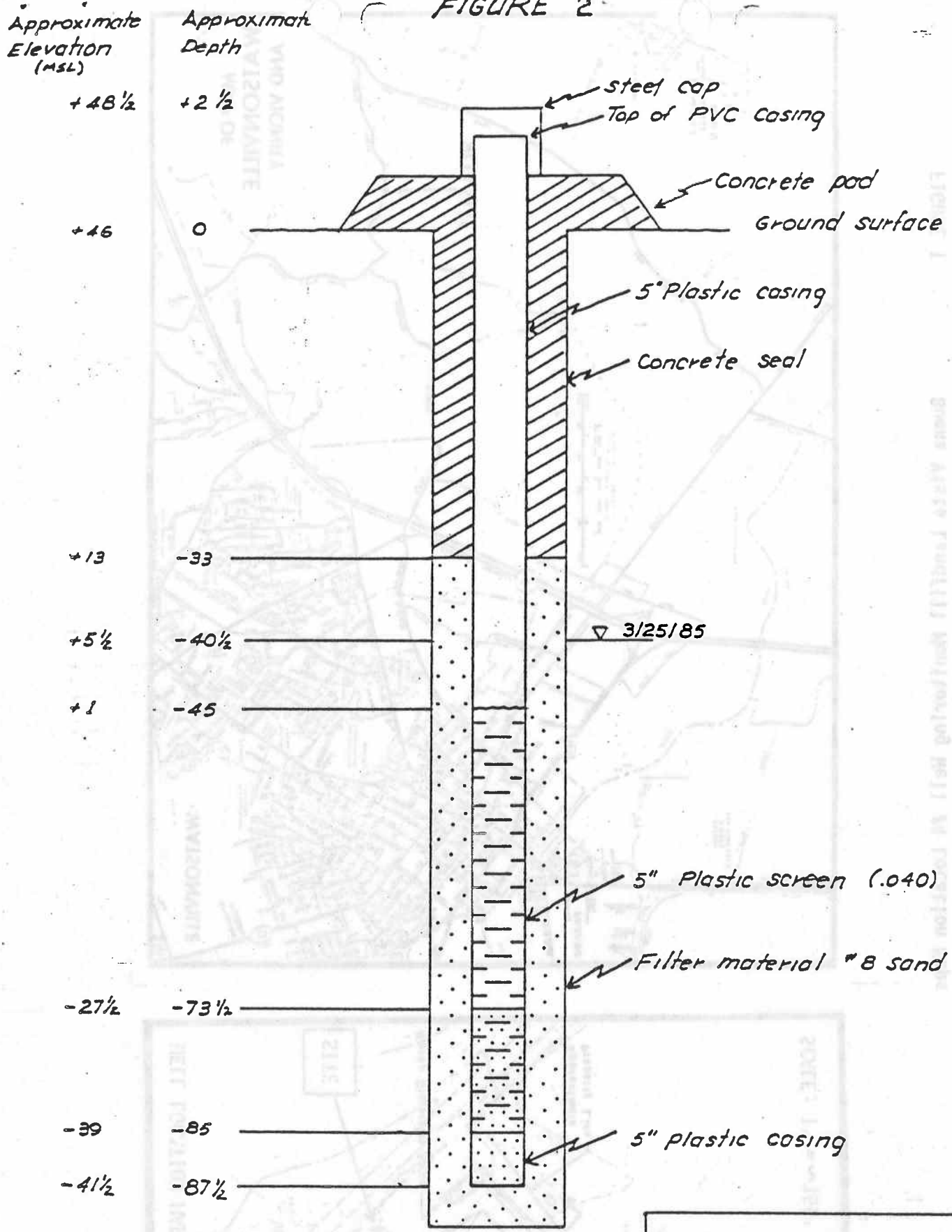
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SIGNED _____ (Well Driller)
NAME Mark Foxx, Rogers Johnson & Associates (Person, firm, or corporation) (Typed or printed)
Address 1729 Seabright Ave., Santa Cruz, CA 9b062
City _____ Zip _____
License No. CEG # 1016 Date of this report 3/25/85

CONFIDENTIAL
NOT FOR PUBLIC USE
WATER CODE SEC. 13752

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

FIGURE 2



Buena Vista Monitoring Well
Number # 8
Sectional Details As-Built
3-25-85

CH2M HILL

PROJECT NUMBER	BORING NUMBER
136056.MW.FW	MW-11 SHEET 1 OF 3

SOIL BORING LOG

PROJECT Monitoring Well Installation **LOCATION** City of Watsonville Landfill

ELEVATION ~138 ft. msl **DRILLING CONTRACTOR** Kvilhaug Well Drilling

DRILLING METHOD AND EQUIPMENT Mud Rotary,16" dia,drilled lower 93' w/10" dia HSA

WATER LEVELS Not measured **START** 9/5/96 **FINISH** 9/17/96 **LOGGER** T. Little

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL	SAMPLE: TYPE AND NUMBER	SAMPLE: RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SAND TO CLAYEY SAND, (SP-SC), yellowish brown (10YR5/6); 10% fines; 90% fine to medium sand; moist; no odor		Upper 67' drilled with mud rotary drilling techniques using 16" bit
5.0							
10.0							
15.0							
20.0					POORLY GRADED SAND, (SP), yellow brown (10YR5/6), 5% fines; 95% fine sand; well sorted; grains are rounded; chert; metamorphic rock fragments common; quartz most abundant; moist; loose; no odor		
25.0							
30.0							
35.0							
40.0					As above, (SP)		Hole staying open very well. Using only air.
45.0					Slight indication of water entering borehole @ 45' caving in @ 45'		
50.0					As above, (SP)		
					Locally interbedded CLAYEY SAND, (SC)		
55.0					As above; all fine sand; trace fines		

PROJECT NUMBER	BORING NUMBER
136056.MW.FW	MW-11 SHEET 2 OF 3

SOIL BORING LOG

PROJECT Monitoring Well Installation LOCATION City of Watsonville Landfill

ELEVATION ~138 ft. msl DRILLING CONTRACTOR Kvilhaug Well Drilling

DRILLING METHOD AND EQUIPMENT Mud Rotary,16" dia,drilled lower 93' w/10" dia HSA

WATER LEVELS Not measured START 9/5/96 FINISH 9/17/96 LOGGER T. Little

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SAND (continued)		
65.0					CLAY TO SANDY CLAY, (CL-CH), dark gray (5Y4/6); 85% low to high plasticity; 15% fine sand; organic debris; wood chips are common		65-67', drill 12" down into still clay material 1419 stop 12" drilling thin mud
70.0							
75.0					Dilling change, same sandy on roots		Switched to air rotary drilling methods
	79						
80.0	80.5	SPT	1.0	30-35-50 (>50)	POORLY GRADED SAND, (SP), yellow brown (10YR5/6), 5% fines; 95% fine to coarse sand; trace gravel; locally laminated sharp contact with underlying clay		
85.0					@ 81', FAT CLAY, (CH), olive (5Y4/4), 95-100% high plasticity fines; 5% fine sand		
	90						
90.0	91.5	SPT	1.0	18-22-25 (47)	POORLY GRADED SAND, (SP), yellowish brown (10YR5/6), trace fines; 100% fine to medium sand (f:m:=1:5); locally interbedded medium sand overlying fine sand @ base; clast present @ 91'; liesegang banding common; dense; damp		
95.0							
	100						
100.0	101.5	SPT	1.0	40-50/5" (>50)	As above, (SP), fine to coarse sand; trace gravel		
	105						
105.0	106.5	SPT	0.5	50/5" (>50)	GRAVELLY SAND, (SP), 65% fine to coarse sand; 35% fine gravel; dry; dense		
110.0							@ 110' drilling becomes slow, material is dense
	115						
115.0	116	SPT	0.5	100/7" (>50)	SAND TO CLAYEY SAND, (SP-SC), olive (5Y4/3); 10% fines; 80% fine to coarse sand (f:m:c=1:5:10); 10% fine gravel; subrounded to rounded; damp; dense		9/10/96, contact

CH2M HILL

PROJECT NUMBER	BORING NUMBER	
136056.MW.FW	MW-11	SHEET 3 OF 3

SOIL BORING LOG

PROJECT Monitoring Well Installation LOCATION City of Watsonville Landfill

ELEVATION ~138 ft. msl DRILLING CONTRACTOR Kvilhaug Well Drilling

DRILLING METHOD AND EQUIPMENT Mud Rotary,16" dia,drilled lower 93' w/10" dia HSA

WATER LEVELS Not measured START 9/5/96 FINISH 9/17/96 LOGGER T. Little

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE TYPE AND NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SAND TO CLAYEY SAND, (SP-SC) (continued)		
	125						
125.0	126.5	MC	1.5	30-40-45 (>50)	SILT AND CLAY INTERLAMINATED, (ML-CH), brown and dark gray alternating; root casts and fragmented rocks common		Contact Material on sampler, should be perched water on clay
					@ 126.0-126.5', LEAN CLAY, (CL), dark gray ("blue"); 100% low plasticity fines; hard; organic plant debris throughout		
130.0							
	135						
135.0	136.5	MC	0.9	30-50/5" (>50)	SAND TO SILTY SAND, (SP-SM), olive (5Y4/3); 10% non plastic fines; 90% fine sand; locally interbedded with little clay; dense; wet		
140.0							
	145						
145.0	146.5	MC	0.9	35-50/5" (>50)	As above; (SP-SM), vertical burrows present; thickly laminated to thinly bedded; wet		Very tight
	150						
150.0	151.5	MC	0.5	100/7" (>50)	POORLY GRADED SAND, (SP), olive (5Y4/3); trace 5% non plastic fines; 95-100% fine to medium sand (f:m:=10:1); wet flowing sand; no odor		
	155						
155.0	156.5	MC	0.5	100/7" (>50)	As above, (SP)		
160.0					Bottom of boring @ 160'		
165.0							
170.0							
175.0							

Appendix H4. Subsurface Conditions for Proposed Transfer Station on County Property Northeast of Buena Vista Landfill

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Geosyntec consultants

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Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036
www.geosyntec.com

Memorandum

Date:	4 September 2024, modified 19 February 2026
To:	Kasey Kolassa and Nicole Steele, County of Santa Cruz
Copies to:	Sangeeta Lewis
From:	Fabrizio Settepani, P.E., G.E. Xiaoyue Wang, Ph.D., P.E.
Subject:	Subsurface Conditions for Proposed Transfer Station on County Property Northeast of Buena Vista Landfill (Watsonville, CA) Geosyntec Project Number: WG3064

1. INTRODUCTION

This memorandum summarizes the subsurface conditions for preparing a draft environmental impact report (EIR) for a transfer station (TS) proposed in the northeast area of the Buena Vista Landfill (BVLF) property owned by the County of Santa Cruz near Watsonville, California and located northeast (NE) of the Buena Vista Drive Landfill (Landfill) across Harkins Slough Road.

Figure 1 shows the existing site conditions in the area of the TS. Figure 2 shows the layout prepared by SCS Engineers for the proposed transfer station.

Current facilities in the area include a County storage yard, Module 4B and other BVLF environmental control systems (e.g., gas probes, monitoring wells, leachate storage tank).

As can be observed, to develop the TS, Harkins Slough Road will be re-aligned and the area will be graded by excavating or adding engineered fill to create a pad. The planned TS is located beyond the landfill footprint in either native or fill soils .

We understand that the following items for geology and soils need to be addressed for the draft environmental impact report (EIR) for the project:

- Rupture of a known earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map
- Strong seismic ground shaking
- Liquefaction and its consequences such as lateral spreading and settlement
- Landslides and slope instability
- Unstable ground

- Expansive soils as defined in the California Building Code
- Soil erosion or loss of topsoil
- Soils incapable of supporting septic tanks or alternative wastewater disposal

The assessment of the above items would provide information regarding the planned project components in the project area if they were susceptible to the above concerns and, if so, how they would be mitigated.

To assess the site conditions for purposes of the EIR, we used information available from previous geotechnical work performed in the vicinity of the proposed TS.[1] For final design of the TS, we recommend performing a site-specific investigation in accordance with the requirements in the California Building Code (CBC).

2. GEOLOGY AND HYDROGEOLOGY

2.1 Regional Geology

EMCON[2] states that the area is underlain by at least 1,000 feet of a heterogeneous mixture of interbedded gravel, sand, silt, and clay. Surficial stream and terrace deposits overlie approximately 500 feet of fine sands of the Aromas formation. The Aromas formation in turn overlies the Purisima formation which is approximately 500 feet thick and composed of semiconsolidated sand, silt, clay, and shale.

The area is in coastal Santa Cruz County which has step-like marine terraces of Pleistocene age that consist of weakly consolidated to semiconsolidated heterogeneous deposits of moderately to poorly sorted silt, silty clay, sand, and gravel.[3] Geosyntec[4] summarized that it is a naturally occurring valley within an uplifted marine terrace. It lies within a broad band of gently rolling hills of the Monterey Bay coastal plain. This gentle terrain has been incised by numerous small

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[1] See *Memorandum from Geosyntec Consultants, Inc. to the County of Santa Cruz: Field Investigation, Laboratory Testing, and Subsurface Conditions; County Property Northeast of Buena Vista Landfill (Watsonville, CA)* dated 4 June 2020.

[2] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978.

[3] See United States Geological Survey (USGS) Open File Report 97-489; Geologic Map of Santa Cruz County, California.

[4] *Preliminary Closure and Postclosure Maintenance Plan; Buena Vista Drive Sanitary Landfill; Santa Cruz County, California*; prepared by Geosyntec Consultants, Inc.; Project WG2561D; April 2021, 27 July 2022.

streams draining southward to the Pajaro River, including Harkins Slough to the east and Gallighan Slough to the southwest.

The Aromas Sand formation is the primary water-bearing unit and consists of aeolian (wind blown) and fluvial sand, silt, clay and gravel. Underlying the Aromas Sand formation is the Tertiary Purisima formation, which is too deep to be relevant to site hydrogeologic conditions.

Groundwater flow conditions are influenced regionally by agricultural and municipal pumping wells. Water levels that were +5 to +15 feet MSL in the 1940s have declined to –5 feet MSL and lower in recent years. [5]

2.2 Subsurface Conditions in NE Area

2.2.1 Soils

Based on EMCON's study of the area geology,[2] portions of BVLF are underlain by recent fluvial terrace deposits consisting of poorly consolidated, heterogeneous deposits of gravels, sands and silts. The fluvial terrace deposits are underlain by the Aromas Formation. The Aromas Formation consists of clean, coarse- to medium-grained sands. The Aromas Formation is underlain by the Purisima Formation.

In 2018 Geosyntec[6] performed a field investigation and testing program which is included in Appendix 1. A summary of the information follows below.

The area is relatively flat (northern portion of the site) and slopes toward the southeast and toward the west. Two of the borings (GT18-04 and GT18-05) are at the toe of the slope toward the west; the other four borings are on the flat portion of the site (GT18-01, GT18-02, GT18-03, and GT18-06). Figure 2 includes the locations of borings, gas probes, and nearby monitoring wells.

Geosyntec reviewed the 1984 predevelopment topography in the area and estimates that the upper 10 feet to 15 feet in GT18-04 and GT18-05 consists of fill placed as part of constructing the realignment of Harkins Slough Road.[7] The fill is primarily silty clay.

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[5] CH2M Hill. 1996. *Hydrogeological Assessment Report for the Buena Vista Landfill and Vicinity*, prepared for County of Santa Cruz, Santa Cruz County, California. May.

[6] *Memorandum from Geosyntec Consultants, Inc. to the County of Santa Cruz: Field Investigation, Laboratory Testing, and Subsurface Conditions; County Property Northeast of Buena Vista Landfill (Watsonville, CA)* dated 4 June 2020.

[7] *Geotechnical Investigation: Harkins Slough Road Relocation Sanitary Landfill Expansion Buena Vista Drive, Santa Cruz County, California*; prepared for Santa Cruz County Department of Public Works; prepared by EMCON Associates; project 307-01.13; July 1985.

Borings GT18-01, GT18-02, GT18-03, and GT18-06 show that the top 15 feet to 25 feet consist of clays and clayey sands; with depth the soils become silty and gravelly sands.

Based on the blowcounts measured during the 2018 field investigation, the sands are medium dense to very dense and the clays are stiff to hard.

The tested[8] coarse-grained soils samples are sands with gravel that classified as GP, GM, SP, SM, and SC in accordance with the USCS and had fines contents between 15.3 percent and 39.4 percent. The gravel contents in the sands ranged between 0 percent and 38.3 percent.

The fine-grained soils are primarily medium to high plasticity clays with USCS classification CL and CH. The liquid limits (LL) range between 33 and 74 and the plasticity indices (PI) range between 16 and 43. The dry unit weights range between 80.1 and 103.4 pounds per cubic foot (pcf). The natural moisture contents ranged between 21 percent and 37.7 percent.

The high to medium plasticity clays (CH and CL) were found at depths of approximately 10 feet and 25 feet below the existing ground surface at the time of drilling or starting at elevation 88 feet approximately. Soils with a plasticity index of 15 or greater may be potentially expansive; therefore, building footings or other structures founded or adjacent to these potentially expansive soils may require mitigation measures such as excavation and replacement with non-expansive soils, amendment of the expansive soils with lime or cement, construction of moisture barriers, grading of surfaces to drain away from the area, and/or restrictions on the use of irrigation and/or infiltration of stormwater into the subsurface.

Three relatively undisturbed samples of fine-grained soils tested for unconsolidated-undrained strength at natural moisture contents had strengths between 1,270 psf and 2,355 psf at strains of 5 percent. Two of the relatively undisturbed samples tested at natural moisture contents were also tested after being backpressure saturated. When backpressure saturated, the unconsolidated undrained strengths at strains of 5 percent decreased from 2,355 psf (natural moisture content) to 1,018 psf (backpressure saturated), and from 1,685 psf (natural moisture content) to 1,414 psf (backpressure saturated).

2.2.2 Groundwater

The Aromas Sand formation is the primary water-bearing unit beneath the BVLF and consists of aeolian (windblown) and fluvial sand, silt, clay and gravel.

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[8] *Memorandum from Geosyntec Consultants, Inc. to the County of Santa Cruz: Field Investigation, Laboratory Testing, and Subsurface Conditions; County Property Northeast of Buena Vista Landfill (Watsonville, CA)* dated 4 June 2020.

Groundwater beneath the BVLF occurs in the Aromas Sand formation but also occurs in the overlying aeolian and terrace deposits. Perched groundwater zones occur in the aeolian and terrace deposits where the percolation of rainfall and irrigation is inhibited by low permeability horizons in near-surface deposits.

Groundwater was not encountered during the 2018 field investigation. Based on visual cues during drilling, groundwater is deep and below the depth of exploration. The soil was dry to moist; therefore, no water table was assumed to correct the field blowcounts. The nearest groundwater monitoring well to the TS area is MW-13 where groundwater elevations since well construction in 2007 have varied between approximately -5.2 feet and 7.7 feet.[9] MW-14 is located west of the TS area where the groundwater elevations since well construction in 2020 have varied between approximately -0.1 foot and 7.6 feet. The direction of groundwater flow is generally to the east.[10] The groundwater monitoring reports for the site present detailed information.

Based on the annual groundwater monitoring report, the groundwater (i.e., the water table) is at least 90 feet below the 2017 topography of GT18-04 and GT18-05 and deeper at the other boring locations. Two gas probes GP-20 and GP-21 are also located near the TS. MW-13 and the gas probes will need to be protected or relocated as part of developing the TS. Appendix 2 includes the logs of MW-13, MW-14, and the gas probes.

As will be described below, liquefaction may be a concern for soils below the water table. Provided the soils remain dry (i.e., water is not infiltrated into the subgrade), the liquefaction potential is low because the depth to the water table is deep (about 90 feet below the existing ground surface at the time of drilling or at about elevation 0 feet approximately). Since liquefaction potential is low, surface displacement and seismically induced lateral spreading or seismic settlement is not expected.

2.3 Proposed Pad Conditions and Re-Alignment of Harkins Slough Road

The pad for the TS requires excavation and cut slopes and the construction of engineered fills. The proposed slopes vary between approximately 8 percent and 3.0 (horizontal) to 1.0 (vertical) and have heights of up to 12 feet approximately. As required by the CBC, these slopes will be evaluated by the Geotechnical Engineer during final design.

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[9] See Table 1 in *Draft 2024 Winter-Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561E; July 31, 2024.
[10] See Table 1 in *Draft 2024 Winter-Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561E; July 31, 2024.

Also, to construct the pad for the TS, the re-alignment of Harkins Slough Road is proposed. The re-alignment will require areas of cut and fill. The proposed slope on the southeastern side of the pad is approximately 2.5 (horizontal) to 1.0 (vertical). The proposed slope is steeper than 3.0 (horizontal) to 1.0 (vertical); therefore, as required in Section 18 of the CBC:

- Static and seismic slope stability will need to be evaluated as part of final design of the Harkins Slough Road re-alignment for the design of the TS pad
- The TS will need to be located to maintain minimum clearances and setbacks from the top of slope
- The compacted fills and slopes will need to meet the specific criteria required in the CBC and developed by the Geotechnical Engineer during final design.

2.4 Evaluation of Hazards

2.4.1 Introduction to Seismic Hazards

The California State Legislature passed the Alquist Priolo Earthquake Fault Zoning Act (APA) in 1972 and the Seismic Hazards Mapping Act (SHMA) in 1990 prompted by damaging earthquakes in northern and southern California. The SHMA requires the evaluation of sites for the effects of seismic hazards such as ground surface fault rupture, ground shaking, liquefaction, settlement, lateral spreading, seismically-induced slope instabilities, landslides, and other hazards caused by earthquakes.

2.4.1.1 Faulting

No known active faults are present at the BVLF. For the BVLF, Geosyntec[11] identified the nearest faults to the BVLF are the Zayante-Vergales Fault located approximately 3.4 miles from the BVLF and the San Andreas fault system located approximately 6.2 miles from the BVLF.

2.4.1.2 Ground Shaking

The planned TS would be designed and constructed in conformance with the most recently adopted CBC design parameters, which are specifically tailored to minimize the risk of structure failure due to seismic hazards. Therefore, conformance with the CBC would ensure that impacts relating to ground shaking would be less than significant.

Using the information collected in the borings performed in 2018 and the planned location of the TS, we estimate that the site classification for the TS is D (Medium dense sand or stiff clay).

[11] Geosyntec Consultants, Inc., *Letter-Report: Seismic Hazard Evaluation, Buena Vista Drive Sanitary Landfill, Watsonville, California*; 2003.

2.4.1.3 Liquefaction, Settlement, and Lateral Spreading

Liquefaction is a phenomenon where cohesionless soils gravel, sand, and cohesionless silt) below the water table lose strength as a result of shaking under earthquake loading.

The stiff to very stiff cohesive soils, the medium dense to very dense cohesionless soils, and the deep groundwater table result in the planned TS area not being susceptible to liquefaction. Because the soils are not susceptible to liquefaction, lateral spreading, sand boils, and seismic settlements are not expected.

2.4.1.4 Landslides and Slope Instability

The planned TS will be constructed in a flat area or pad outside the landfill limits. To create the pad, a slope is proposed on the eastern side of the TS. Fills and cut slopes to create the pad will be designed as required by the CBC. The compacted fills will meet the specific criteria required in the CBC and developed by the Geotechnical Engineer during final design; therefore, landslides and slope instability due to strong shaking is not foreseen.[12]

2.4.1.5 Unstable Ground

Unstable ground conditions are not expected because as described above:

- The measured blowcounts show that the sands are medium dense to very dense and the clays are stiff to hard.
- Landslides and slope instability are not expected.
- Liquefaction is not a concern because the water table is deep[13].

2.4.1.6 Preliminary Conclusions for Seismic Hazards

Based on the above, seismic hazards are not a concern for the planned TS. Furthermore, the TS will be designed in accordance with the CBC; therefore, the above topics will also be addressed in detail as part of final design for the TS.

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[12] The Geographic Information System (GIS) for the County of Santa Cruz shows a queried (?) Questionable Landslide Deposit to the west of the proposed area for the TS. We note that a portion of this area was filled with engineered fill when Harkins Slough Road was realigned in the 1980s. Furthermore, the queried area extends into the area where Module 4B of the BVLF was constructed; a landslide was not identified during the excavation of Module 4B.

[13] If perched water were to develop, liquefaction potential would need to be re-evaluated.

2.4.2 Expansive Soils

High to medium plasticity clays (CH and CL) were found at depths of approximately 10 feet and 25 feet below the existing ground surface at the time of drilling or starting at elevation 88 feet approximately. Soils with a plasticity index of 15 or greater may be potentially expansive; therefore, building footings or other structures such as the load out tunnel founded or adjacent to these potentially expansive soils may require mitigation measures such as excavation and replacement with non-expansive soils, amendment of the expansive soils with lime or cement, construction of moisture barriers, grading of surfaces to drain away from the area, and/or restrictions on the use of irrigation and/or infiltration of stormwater into the subsurface.

2.4.3 Erosion and Loss of Top Soil

Currently, the surfaces in the area of the proposed TS include gravel covered areas (i.e,, the current storage area located north of Harkins Slough Road) and roadways (i.e., the existing perimeter road along the eastern and northern sides of the BVLF), areas of asphalt pavement (i.e., current alignment of Harkins Slough Road), and vegetated areas (i.e., adjacent Module 4B landfill slopes, other sloping areas). Furthermore, the BVLF falls under California's Industrial General Permit requirements; therefore, best management practices (BMPs) are routinely implemented and maintained.

During construction, soils may be exposed to the elements; however, as a regulatory requirement, a Stormwater Pollution and Prevention Plan (SWPPP) would be required if construction activities disturb more than one acre of land. The SWPPP would address construction impacts, especially during soil disturbing activities when soil is exposed to wind, rain and concentrated flows that could cause erosion. These mandatory requirements would minimize soil erosion. Furthermore, undisturbed areas will be fenced off and any topsoil generated as part of grading activities will be stockpiled and protected for later use. Stockpiles will be covered with tarps, plastic sheeting, erosion control fabrics, or treated with biodegradable soil stabilizers.

After the TS is constructed:

- Much of the disturbed area would be nearly 100 percent impervious because it will be paved or developed as buildings. Therefore, the TS would not result in on-site erosion because all runoff would be directed to areas of BMPs and/or other storm drain infrastructure.
- Permanent fill and cut slopes would be hydroseeded and vegetated.

We do not recommend infiltration of any collected stormwater to address erosion and sedimentation as part of low impact development (LID) features so that the soils below the area

are not impacted negatively (e.g., existing potentially expansive soils, long-term saturation of soils).

2.4.4 Septic Systems or Alternative Wastewater Disposal Systems

Sewers for the disposal of wastewater from TS activities are not available; therefore, we understand that a septic tank or similar system will be constructed to address TS wastewater needs. As for the LID features, we do not recommend infiltrating wastewater into the subsurface soils.

2.5 Requirements for Buildings Constructed Near Landfills in Title 27 of the California Code of Regulations (27CCR)

The TS is planned as a collection point for the transfer of the County's waste to another landfill once the capacity of the adjacent BVLF is depleted. Since the TS will be located adjacent to the BVLF, some offset and monitoring requirements in Title 27 (27CCR), Division 2, Subdivision 1, Chapter 3, Subchapter 5, Article 2 of §21190 (California Integrated Waste Management Board [CIWMB] Postclosure Land Use) in 27CCR may apply and will be addressed as part of final design.

2.6 Existing and New Infrastructure

Existing infrastructure for the BVLF such as leachate tank, leachate lines, monitoring wells, and landfill gas probes may need to be relocated as part of developing the TS.

We do not recommend infiltrating water as part of LID practices because perched water may develop. Water may affect the above conclusions regarding liquefaction and expansive soils.

ATTACHMENTS

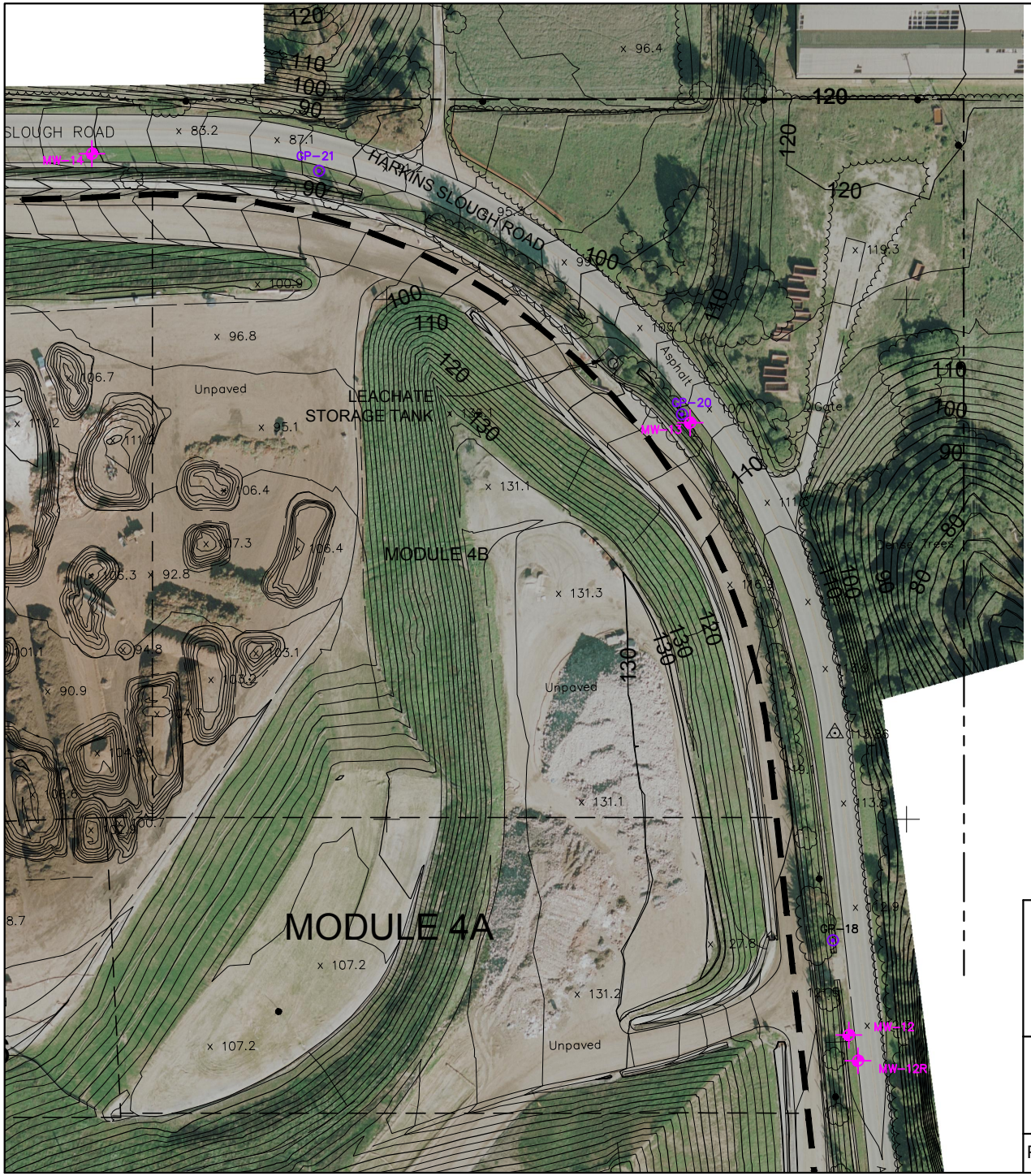
Figure 1 – Site Plan – Existing Conditions

Figure 2 – Site Plan – Proposed Transfer Station

Appendix 1 – Memorandum dated 4 June 2020

Appendix 2 – Gas Probes and Monitoring Wells Logs

* * * * *



0 150'

SCALE IN FEET

N

LEGEND

150	EXISTING GROUND ELEVATION (10-FT CONTOUR, NOTE 1)
	EXISTING GROUND ELEVATION (2-FT CONTOUR, NOTE 1)
	APPROXIMATE PROPERTY LINE
	APPROXIMATE LANDFILL FOOTPRINT
MW-13	GROUNDWATER MONITORING WELL
GP-21	LANDFILL GAS MONITORING PROBE

NOTES:

1. EXISTING TOPOGRAPHY BY TETRA TECH GEOMATIC TECHNOLOGIES DATED 27 NOVEMBER 2023. COORDINATE GRID AND ELEVATIONS BASED ON ASSUMED LOCAL SYSTEM PROVIDED BY COUNTY OF SANTA CRUZ (APRIL 2004).

2. UNLESS SURVEY INFORMATION IS AVAILABLE, LOCATIONS OF GROUNDWATER MONITORING WELLS, PIEZOMETERS, LANDFILL GAS PROBES, AND WATER SUPPLY WELLS SHOWN ARE APPROXIMATE.

SITE PLAN
EXISTING CONDITIONS
BUENA VISTA LANDFILL
COUNTY OF SANTA CRUZ, CALIFORNIA

Geosyntec consultants

FIGURE 1

PROJECT NO: WG3064

AUGUST 2024

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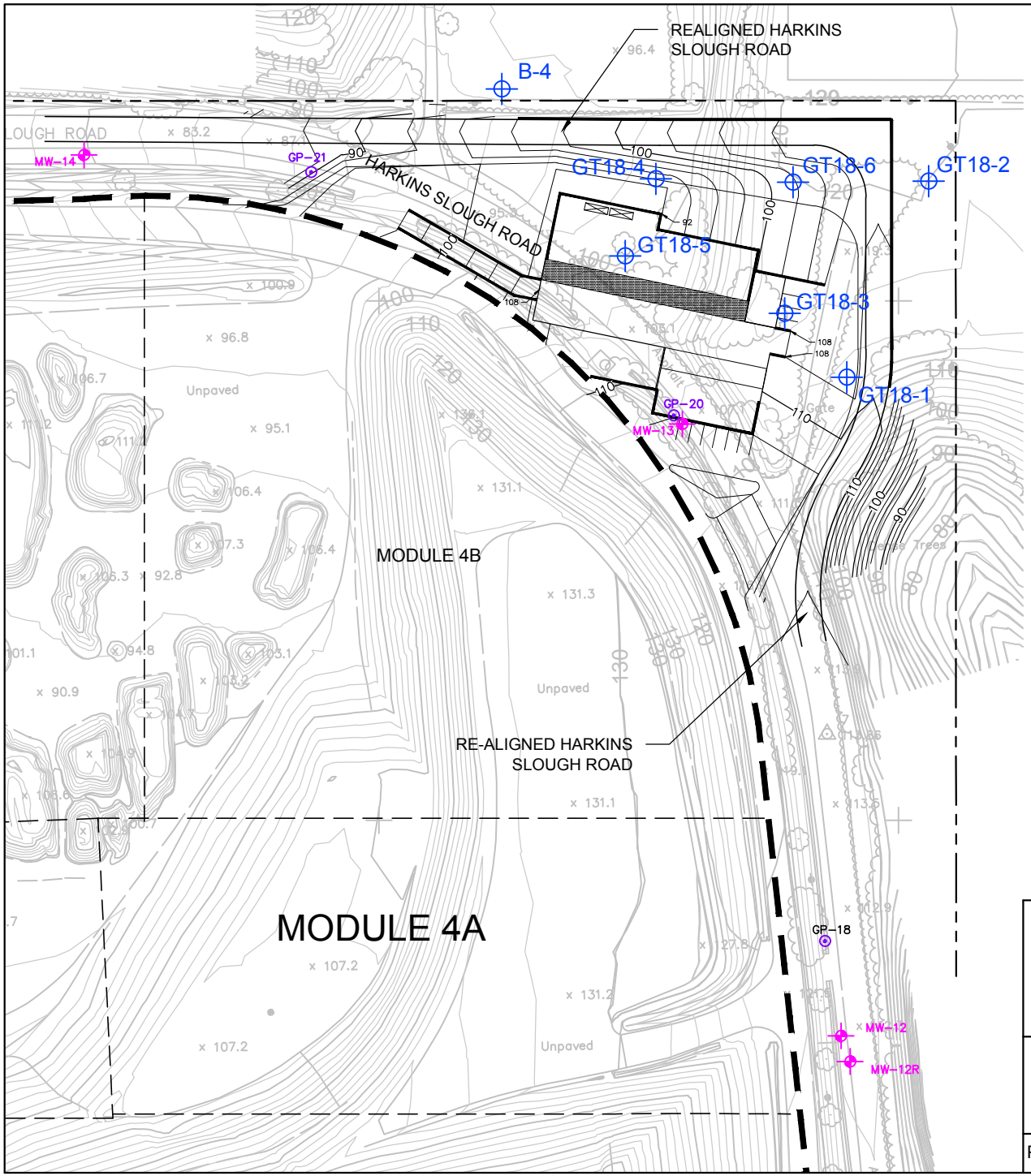

N

0 150'

SCALE IN FEET

LEGEND

- 150 EXISTING GROUND ELEVATION (10-FT CONTOUR, NOTE 1)
- EXISTING GROUND ELEVATION (2-FT CONTOUR, NOTE 1)
- APPROXIMATE PROPERTY LINE
- APPROXIMATE LANDFILL FOOTPRINT
- MW-13 GROUNDWATER MONITORING WELL
- GP-21 LANDFILL GAS MONITORING PROBE
- B-4 GT18-6 PREVIOUS BORING (NOTE 3)

NOTES:

1. EXISTING TOPOGRAPHY BY TETRA TECH GEOMATIC TECHNOLOGIES DATED 27 NOVEMBER 2023. COORDINATE GRID AND ELEVATIONS BASED ON ASSUMED LOCAL SYSTEM PROVIDED BY COUNTY OF SANTA CRUZ (APRIL 2004).

2. UNLESS SURVEY INFORMATION IS AVAILABLE, LOCATIONS OF GROUNDWATER MONITORING WELLS, PIEZOMETERS, LANDFILL GAS PROBES, AND WATER SUPPLY WELLS SHOWN ARE APPROXIMATE.

3. LOCATION OF BORING B-4 WAS PROVIDED BY EMCON DATED JULY 1985. LOCATIONS OF BORINGS GT18-1 THROUGH GT18-6 WERE BASED ON 2022 FIELD INVESTIGATION BY GEOSYNTEC.

SITE PLAN
PROPOSED NE TRANSFER STATION
BUENA VISTA LANDFILL
COUNTY OF SANTA CRUZ, CALIFORNIA

Geosyntec consultants

FIGURE 2

PROJECT NO: WG3064

AUGUST 2024

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2024 TASKS\FIGURES - NETS_2024REV - Last Saved by: Xiaoyue.Wang on 8/21/24

APPENDIX 1

Memorandum dated 4 June 2020

Geosyntec consultants

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Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036
www.geosyntec.com

Memorandum

Date:	4 June 2020
To:	Kasey Kolassa, County of Santa Cruz
Copies to:	Sangeeta Lewis; File WG2562
From:	Fabrizio Settepani, P.E., G.E.
Subject:	Field Investigation, Laboratory Testing, and Subsurface Conditions County Property Northeast of Buena Vista Landfill (Watsonville, CA) Geosyntec Project Number: WG2562

1. GENERAL

This memorandum summarizes the geotechnical drilling, soil sampling, and testing performed by Geosyntec Consultants, Inc. (Geosyntec) for the property owned by the County of Santa Cruz near Watsonville, California and located northeast (NE) of the Buena Vista Drive Landfill (Landfill) across Harkins Slough Road.

The fieldwork activities included performing geotechnical drilling and collecting soil samples at six borings GT18-01 through GT18-06. Figure 1 presents the final borehole locations. The field work was performed between 12 November and 15 November 2018.

The memorandum also includes borings from a previous field investigation, describes the laboratory testing program, and summarizes the subsurface conditions in the area.

2. PRE-DRILLING ACTIVITIES

Before drilling, Geosyntec visited the site on 5 November 2018 to mark the boring locations and met California Utility Locators, a private utility locator from Scotts Valley, California. The utility locator cleared the boring locations and the surrounding area of electrical and metal utilities. Geosyntec also called Underground Service Alert (USA) after marking the locations with white paint and received ticket number X830900918-00X.

USA informed the following parties of Geosyntec's planned work:

- CTYWAT = CITY OF WATSONVILLE
- PACBEL = PACIFIC BELL
- PGESAL = PGE DISTRIBUTION SALINAS

Geosyntec called the County of Santa Cruz and was informed that a drilling permit was not required for a geotechnical field investigation.

Geosyntec also reviewed existing borings in the area of the proposed sediment basin. Attachment 1 includes the existing boring log in the area of the proposed sediment basin.

Geosyntec contracted with Pitcher Services LLC (California C57 Contractor No.1044895) of East Palo Alto, California to perform the geotechnical drilling. As will be described below, Pitcher performed the energy measurement of the sampling setup at boring GT18-03.

3. DRILLING AND SAMPLING ACTIVITIES

Geosyntec was onsite full time during the field activities to provide oversight and to document the drilling and sampling activities.

Pitcher used a Failing 1500 (PD59) truck-mounted drill rig to perform the drilling. The drill rig was equipped with an automatic slide hammer with 30-inch drop for collection of split-spoon samples. The drilling program included both mud rotary and solid stem auger drilling as described below.

Solid stem augers were used in the top 5 feet to allow the setting of a casing that would in turn allow the use of mud rotary drilling techniques. Samples were collected at minimum 5 feet intervals.

The depth of exploration varied between 51.5 feet and 82 feet below the existing ground surface at the time of drilling. The mud rotary drilling technique did not allow for open borehole groundwater level measurement. The moisture content description indicated on the borehole logs was based on visual observation of soil sample moisture conditions; therefore, the depths are approximate and do not represent stabilized groundwater conditions. Groundwater was not encountered to the maximum depth explored in any of the six borings.

Soil sampling was performed using: (1) standard penetration test (SPT), split-spoon sampler (1-3/8 inch inside diameter [ID], 2 inch outside diameter [OD]) without liners to measure blow counts in general accordance with ASTM D1586, (2) modified California split spoon with liners (2.5 inch ID, 3 inch OD) to measure blow counts, and (3) thin-wall Shelby tube sampler (3-feet long by 3-inch diameter).

Soils collected using the samplers were retained in individual Ziplock plastic bags. A 140-pound hammer was used for driving samples with the SPT samplers, and a 300-pound hammer was used for the modified California sampler. Soil samples collected during drilling were logged for lithologic characterization consistent with the Unified Soil Classification System (USCS) in general accordance with ASTM D2487/2488, and were retained for potential laboratory testing.

The boring logs include soil classifications based on laboratory testing results of samples selected by Geosyntec. Attachment 2 includes the 2018 boring logs.

Pitcher performed energy calibration measurements of the drill rig hammer system during the drilling and sampling at boring GT18-03 on 13 November 2018. Calibration measurements were obtained during sampling using both the SPT and California modified samplers. Pitcher prepared a report detailing the methods and results of the energy measurements; Attachment 3 includes the energy report.

As the drilling progressed, the drill cuttings and drilling mud were pumped into 55-gallon drums, and the drums were sealed once full. After the field investigation concluded, workers from the County of Santa Cruz transported the filled drums to the Buena Vista Landfill for disposal.

After drilling had been performed at each location, the driller backfilled each boring to the ground surface with cement bentonite grout. The boring locations were staked, labeled, and flagged for surveying.

4. POST-DRILLING ACTIVITIES

A County survey crew surveyed the completed boring locations based on the site's local coordinate system. The information is tabulated below:

BORING	NORTHING	EASTING	ELEVATION	DEPTH (ft-bgs)
GT18-01	11,926.38	10,950.23	115.3 feet	51.5 feet
GT18-02	12,115.01	11,028.95	120.0 feet	51.5 feet
GT18-03	11,987.99	10,890.42	118.7 feet	82.0 feet
GT18-04	12,117.50	10,766.48	98.0 feet	52.0 feet
GT18-05	12,043.20	10,736.99	99.6 feet	53.5 feet
GT18-06	12,114.08	10,898.48	120.1 feet	51.5 feet

All retained soil samples (i.e., Shelby tubes, brass rings, plastic bags, and bulk bucket samples) collected during drilling were packaged and transported to Geosyntec's office in Oakland, California.

5. LABORATORY TESTING

After the field investigation, Geosyntec inspected the soil samples and selected samples for laboratory testing. Laboratory testing was performed for Geosyntec by Cooper Testing Laboratory of Palo Alto, California. The following tests were performed:

LABORATORY TEST	ASTM DESIGNATION	PURPOSE
Moisture Content/Dry Density	D2937	Subsurface characterization, slope stability analyses.
Grain size	D422	Subsurface characterization, liquefaction analyses.
Atterberg limits	D4318	Subsurface characterization, liquefaction analyses, consolidation settlement.
Consolidation	D2435	Consolidation settlement. Test was performed in case property will be used for alternative use in the future.
Unconsolidated Undrained (UU) Triaxial test	D2850	Strength of natural (subsurface), slope stability analyses and future use of property.

Table 1 lists the test results. Attachment 4 includes the soil test data sheets. The laboratory test results indicate that:

- The tested coarse-grained soils samples are sands with gravel that classified as GP, GM, SP, SM, and SC in accordance with the USCS and had fines contents between 15.3 percent and 39.4 percent. The gravel contents in the sands ranged between 0 percent and 38.3 percent.
- The fine-grained soils are primarily medium to high plasticity clays with USCS classification CL and CH, the liquid limits (LL) range between 33 and 74 and the plasticity indices (PI) range between 16 and 43. The dry unit weights range between 80.1 and 103.4 pounds per cubic foot (pcf). The natural moisture contents ranged between 21 percent and 37.7 percent.
- The relatively undisturbed samples of fine-grained soils tested for unconsolidated-undrained strength at natural moisture contents had strengths between 1,270 psf and 2,355 psf at strains of 5 percent.

- Two of the relatively undisturbed samples tested at natural moisture contents were also backpressure saturated and tested for unconsolidated-undrained strength had strengths of 1,018 psf and 1,414 psf at strains of 5 percent versus 2,355 psf and 1,685 psf, respectively at natural moisture contents.

6. SUBSURFACE CONDITIONS

6.1 Area Geology

EMCON[1] states that the area is underlain by at least 1,000 feet of a heterogeneous mixture of interbedded gravel, sand, silt, and clay. Surficial stream and terrace deposits overlie approximately 500 feet of fine sands of the Aromas formation. The Aromas formation in turn overlies the Purisima formation which is approximately 500 feet thick and composed of semiconsolidated sand, silt, clay, and shale.

The area is in coastal Santa Cruz County which has step-like marine terraces of Pleistocene age that consist of weakly consolidated to semiconsolidated heterogeneous deposits of moderately to poorly sorted silt, silty clay, sand, and gravel[2]. Geosyntec[3] summarized that it is a naturally occurring valley within an uplifted marine terrace. It lies within a broad band of gently rolling hills of the Monterey Bay coastal plain. This gentle terrain has been incised by numerous small streams draining southward to the Pajaro River, including Harkins Slough to the east and Gallighan Slough to the southwest.

The Aromas Sand formation is the primary water-bearing unit and consists of aeolian (wind blown) and fluvial sand, silt, clay and gravel. Underlying the Aromas Sand formation is the Tertiary Purisima formation, which is too deep to be relevant to site hydrogeologic conditions. Groundwater beneath the site occurs in the Aromas Sand formation but also occurs in the overlying aeolian and terrace deposits. Perched groundwater zones occur in the aeolian and terrace deposits where the percolation of rainfall and irrigation is inhibited by low permeability horizons in near-surface deposits.

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[1] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978

[2] See United States Geological Survey (USGS) Open File Report 97-489; Geologic Map of Santa Cruz County, California.

[3] *Preliminary Closure and Postclosure Maintenance Plan; Buena Vista Drive Sanitary Landfill; Santa Cruz County, California*; prepared by Geosyntec Consultants, Inc.; Project WG1019 and WG1394; July 2008, Amended May 2011, December 2011, May 2016.

Groundwater flow conditions are influenced regionally by agricultural and municipal pumping wells. Based on information for the Landfill, the direction of groundwater flow is southeast and water levels range between –5 feet and +5 feet MSL.

6.2 Subsurface Conditions in NE Corner Area

The area is relatively flat (upper portion of the site) and slopes toward the southeast and toward the west. Two of the borings (GT18-04 and GT18-05) are at the toe of the slope toward the west; the other four borings are on the flat portion of the site (GT18-01, GT18-02, GT18-03, and GT18-06).

Geosyntec reviewed the predevelopment topography from 1984 in the area and estimates that the upper 10 feet to 15 feet in GT18-04 and GT18-05 consists of fill that was placed as part of constructing the realignment of Harkins Slough Road[4]. The fill is primarily silty clay.

Borings GT18-01, GT18-02, GT18-03, and GT18-06 show that the top 15 feet to 25 feet consist of clays and clayey sands; with depth the soils become silty and gravelly sands.

Based on the blowcounts measured during the field investigation, the sands are medium dense to very dense and the clays are stiff to hard.

Groundwater was not encountered during the field investigation. Based on visual cues during drilling, groundwater is deep and below the depth of exploration. The soils were dry to moist and this assumption was used to correct field blowcount (i.e., no water table was assumed to correct the field blowcounts).

The nearest groundwater monitoring well to the area is MW-13 located on the Landfill side and across Harkins Slough Road about 200 feet south of the area. The groundwater elevations since well construction in 2007 vary between -5.21 feet and 4.81 feet[5]. Based on this information, the groundwater (i.e., the water table) is at least 90 feet below the 2017 topography (GT18-04 and GT18-05) and deeper at the other boring locations.

ATTACHMENTS

Figure 1 – 2018 Field Investigation Locations

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[4] *Geotechnical Investigation: Harkins Slough Road Relocation Sanitary Landfill Expansion Buena Vista Drive, Santa Cruz County, California*; prepared for Santa Cruz County Department of Public Works; prepared by EMCON Associates; project 307-01.13; July 1985.

[5] See Table 1 in *2019 Winter, Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561; 5 August 2019.

Table 1 – Summary of Laboratory Test Results

Attachment 1 – Previous Boring Logs

Attachment 2 – Geosyntec Boring Logs

Attachment 3 – Energy Measurement Report

Attachment 4 – Laboratory Test Results

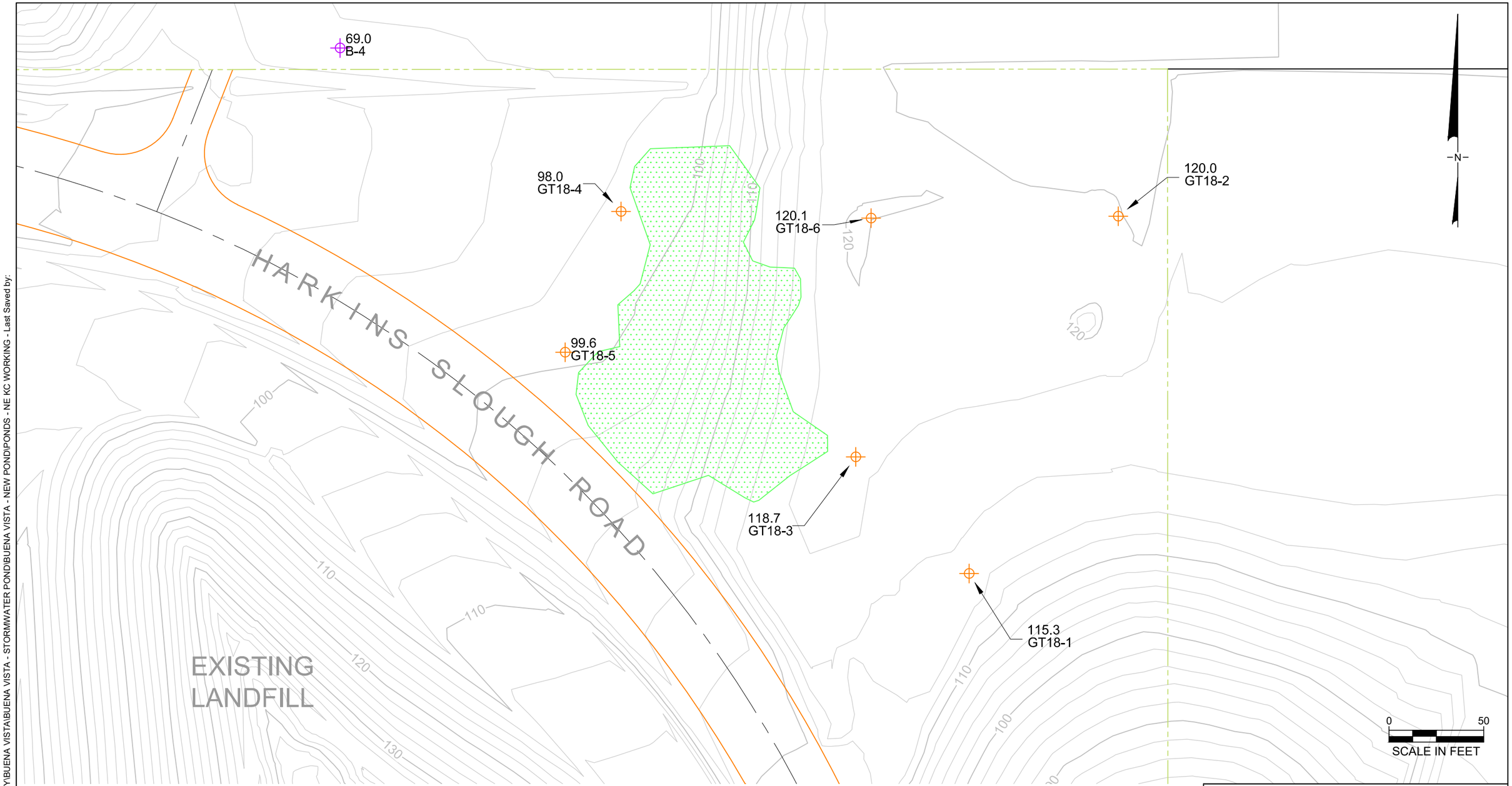
* * * * *

Table 1
Summary of Laboratory Test Results
Northeast Property
Buena Vista Landfill
Watsonville, California

Boring	Sample Location					Dry Unit Weight	Natural Moisture Content	Wet Unit Weight	Void Ratio G_s=2.65	Estimated Initial Degree of Saturation G_s=2.65	USCS	Soil Description	LL	PL	PI	Gravel Content	Sand Content	Fines Content	S_u at 5% strain	Confining Pressure	Test Conditions
	Sample ID	From (ft-BGS)	To (ft-BGS)	Midpoint Depth (ft-BGS)	Midpoint Elevation (ft-MSL)	(pcf)	(%)	(pcf)		(%)			(%)	(%)	(%)	(%)	(%)	(%)	(psf)	(psi)	
GT18-01	01-04B	18.5	19.0	18.8	96.6						SM	Yellowish Brown Silty SAND w/ Gravel				28.2	56.1	15.7			
GT18-01	01-06B	30.5	31.0	30.8	84.6						SM	Yellowish Brown Silty SAND w/ Gravel				38.3	42.6	19.1			
GT18-02	02-09B	45.5	46.0	45.8	74.3						ML	Olive Brown SILT w/ Sand				0.1	21.7	78.2			
GT18-03	03-03B	12.5	13.0	12.8	105.9						CL	Yellowish Brown Sandy CLAY				0.0	30.7	69.3			
GT18-03	03-05B	20.5	21.0	20.8	97.9						SC	Dark Brown Clayey SAND w/ Gravel changes to Olive Brown				20.9	59.8	19.3			
GT18-03	03-06C	26.0	26.5	26.3	92.4						CL	Olive Sandy CLAY changes to Yellowish Brown				8.0	40.8	51.2			
GT18-03	03-09	40.0	41.5	40.8	77.9						CH	Olive Gray Fat CLAY	64	28	36	0.0	0.6	99.4			
GT18-04	04-03	15.0	17.5	16.3	81.7	100.6	24.0	124.7	0.64	99%	CH	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand	52	18	34				1270	8.0	Natural MC
GT18-04	04-04	20.0	22.5	21.3	76.7	80.1	37.7	110.3	1.06	94%	CH	Olive Brown Fat CLAY	74	31	43				2355	10.0	Natural MC
						83.5	37.4	114.7	0.98	101%									1018	10.0	Backpressure Saturated
GT18-05	05-02	10.0	12.5	11.3	88.4	103.4	21.0	125.1	0.60	93%	CL	Olive Brown Mottled Gray Sandy Lean CLAY	33	17	16				1685	6.0	Natural MC
						99.5	23.4	122.8	0.66	94%									1414	6.0	Backpressure Saturated
GT18-05	05-03	15.0	17.5	16.3	83.4	95.3	26.4	120.5	0.74	95%	CL	Olive Brown Lean CLAY w/ Sand	48	20	28				1710	8.0	Natural MC
GT18-05	05-05	25.0	26.5	25.8	73.9						CH	Olive Brown Fat CLAY	71	28	43	0.1	0.7	99.2			
GT18-06	06-01B	6.0	6.5	6.3	113.8						SC	Yellowish Brown Clayey SAND				0.9	63.1	36.0			
GT18-06	06-03	15.0	16.5	15.8	104.3						SC	Yellowish Brown Clayey SAND				0.0	60.6	39.4			
GT18-06	06-06B	31.0	31.5	31.3	88.8						SC	Dark Brown Clayey SAND				10.9	73.8	15.3			

Abbreviations:
BGS: below the ground surface at the time of drilling
ft: feet
LL: Liquid Limit (Atterberg Limits)
MSL: Mean Sea Level
pcf: Pounds per cubic foot
PI: Plasticity Index (PI = LL - PL)
PL: Plastic Limit (Atterberg Limits)
psf: Pounds per square foot
psi: Pounds per square inch
USCS: Unified Soil Classification System

Symbols:
G_s: Specific gravity
S_u: Undrained shear strength



LEGEND

- 100 — EXISTING GROUND CONTOUR (10 FT)
- EXISTING GROUND CONTOUR (2 FT)
- PROPERTY LINE
- RIGHT OF WAY
- COAST LIVE OAK WOODLAND
- 2018 BORING LOCATION
- 1985 BORING LOCATION (EMCON)

NOTES:

1. TOPOGRAPHIC DATA FROM 17 AUGUST 2017 AERIAL PHOTOGRAPHY BY TETRA TECH GEOMATIC TECHNOLOGIES OF LAFAYETTE, CALIFORNIA AND AMERICAN AERIAL SURVEYS, INC. OF IONE, CALIFORNIA.
2. BORING ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL AT THE TIME OF DRILLING.

2018 FIELD INVESTIGATION LOCATIONS
BUENA VISTA DRIVE LANDFILL
SANTA CRUZ COUNTY

Geosyntec consultants

PROJECT NO: WG2562 | FEBRUARY 2020

FIGURE 1

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\BUENA VISTA - STORMWATER POND\BUENA VISTA - NEW PONDS - NE KC WORKING - Last Saved by: ABekar on 3/26/20

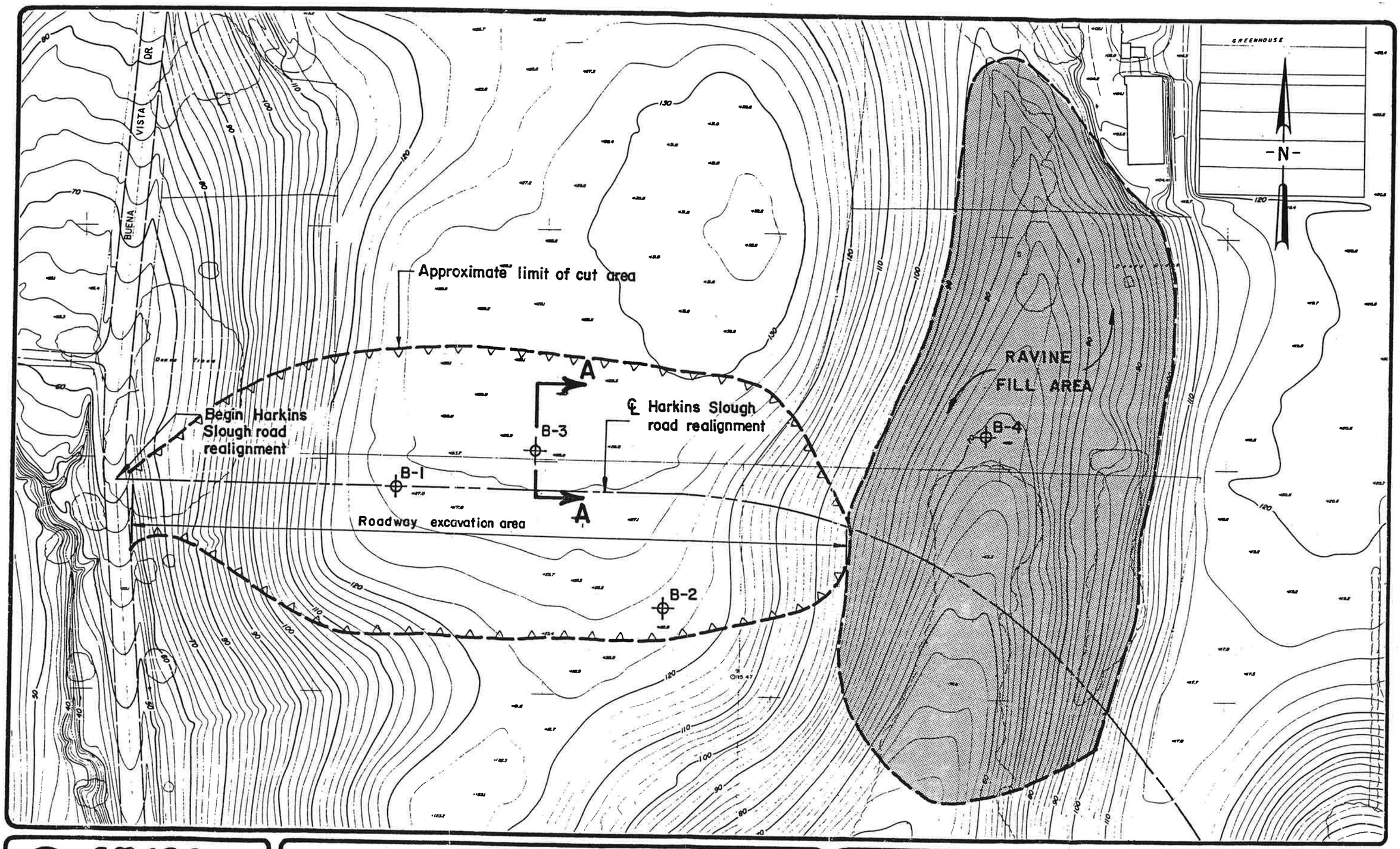
ATTACHMENT 1
PREVIOUS BORING LOGS

GEOTECHNICAL INVESTIGATION
HARKINS SLOUGH ROAD RELOCATION
SANITARY LANDFILL EXPANSION
BUENA VISTA DRIVE
SANTA CRUZ COUNTY, CALIFORNIA

Prepared for
SANTA CRUZ COUNTY DEPARTMENT OF PUBLIC WORKS
July 1985

EMCON Associates
90 Archer Street
San Jose, California 95112

Project 307-01.13



EMCON Associates
San Jose, California

SCALE IS OFF - SHOULD BE 1" = 100'

Scale 0 200 400 600 800 Feet

COUNTY OF SANTA CRUZ
HARKINS SLOUGH ROAD RELOCATION PROJECT
AT BUENA VISTA LANDFILL EXPANSION
SANTA CRUZ COUNTY, CALIFORNIA

BORING LOCATION MAP

FIGURE 1

PROJECT NO. 307-01.13

Appendix A

FIELD INVESTIGATION

The subsurface soil and ground-water conditions beneath the investigation area were explored by drilling four borings between the dates of March 22 to April 10, 1985. These borings were drilled with a truck-mounted hollow-stem auger and were logged by our geologist, who also obtained undisturbed and disturbed soil samples.

Soil samples were obtained by driving a 2-1/2-inch-diameter Modified California sampler or 2-inch split-spoon sampler into the soil at selected depths using a 140-pound hammer and a drop of 30 inches. Representative bulk samples of auger cuttings were taken from the borings for visual classification and laboratory testing.

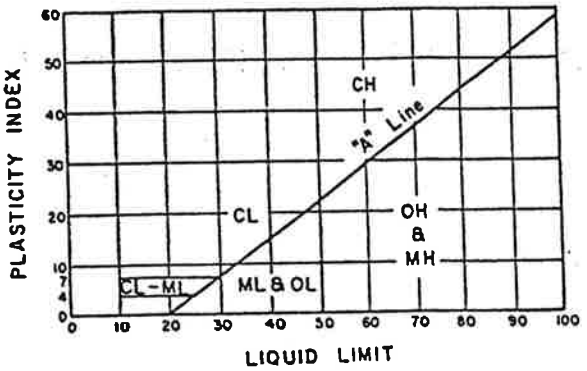
Logs of the soils and other subsurface conditions encountered by the borings in the study area are presented on Plates A-1 through A-4. The classification system used to describe the logs is presented on Plate A-5, Method of Classification.

MAJOR DIVISIONS		SYMBOLS	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 1/2 of soil > no. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > no. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction < no. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (More than 1/2 of soil < no. 200 sieve size)	SILTS & CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

CLASSIFICATION CHART
(Unified Soil Classification System)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

GRAIN SIZE CHART



PLASTICITY CHART

METHOD OF SOIL CLASSIFICATION

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13
PROJECT NAME Buena Vista Landfill
BY WMC DATE 3/22 & 3/25/85

BORING NO. B-1
PAGE 1 OF 2
SURFACE ELEV. 127'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0		CL-CH	SILTY CLAY, dark brown (10YR 3/3), 10% fine quartz grains, roots and organic debris, soft, moist.
		50/10"		5			SANDY CLAY, yellow-brown (10YR 5/6), 40% sand, very fine to fine grained, <5% mica quartz and rock fragments, hard, damp.
		27		10			decreasing sand.
		20		15			10% carbonaceous material, silty, moderately plastic, stiff, damp.
	4.0	45		20			interbedded clayey sand lenses, firm, moist
	4.5+	44		25			olive gray (5Y 6/2), with brown (10YR 5/6) mottling, 15% organics, sandy, hard, damp. increased plasticity.
		56		30		SP	Iron (orange) and manganese (black) staining, thin interbedded sand lenses.
	3.75	50		35		CL	SAND, yellow-brown (10YR 5/6), very fine to fine grained, poorly graded, predominantly quartz with <5% mica, very dense, damp.
				40		SP	CLAY, olive (5Y 5/3), iron staining along striations, stiff, damp.

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-1a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-1

PROJECT NAME Buena Vista Landfill — PAGE 2 OF 2

BY WMC DATE 3/22/85 & 3/25/85 — SURFACE ELEV. 127'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		54		40		SP	SAND, yellow-brown (10YR 6/6), very fine grained, poorly graded, few clayey lenses, very dense, damp.
		51		45		CL	CLAY, light yellow brown (2.5Y 6/4), iron staining, sand filled animal burrows, hard, damp. sandy, fine to medium grained.
		50		50		SM-SP	SAND, yellow-brown (10YR 5/8), medium to coarse grained, 5% rounded pebbles ½" in diameter, 30% fines.
		52		55			brownish-gray (2.5YR 6/2), medium grained, very dense, damp.
		51		60			gravelly interbedded clay lenses, light olive (5Y 6/3), sand filled burrows with iron stained contacts.
		66		65			dark yellow-brown (10YR 4/6), fine to medium grained, no clay fines.
		72	▽	70			olive gray (5Y 3/2), alternating silt to coarse grained sand in a fining upward sequence (1" to 2") intervals, wet.
						CL	CLAY, dark gray (2.5Y 4/0), iron staining, stiff, damp.
	2.8			75			TERMINATED BORING AT 76 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-1b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-2

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 3/25/85 — SURFACE ELEV. 123'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0	CL		CLAY, dark brown (10YR 3/2), silty, damp.
							increasing sand.
		44		5			yellow-brown (10YR 5/4), 30 to 40% very fine to fine quartz and plagioclase grains weathered to white clay, hard, damp.
				10			no sand, slightly silty, damp.
		30		15	SC		CLAYEY SAND, yellow-brown (10YR 5/4), 40% clay fines, 1% plant debris, medium dense, damp.
	3.4	24		20	CH		CLAY, olive gray (5Y 5/2), extensive iron staining along rootholes, <5% sandy, very stiff, damp.
				25	SC		CLAYEY SAND, yellow-brown (10YR 5/6), very fine to fine grained, poorly graded, interbedded clay (extensively oxidized), very dense, damp.
		56		30			
	2.75			35	CH		CLAY, olive - gray (5Y 5/2), minor iron staining, slightly silty, very stiff, damp.
					SC		CLAYEY SAND, brown (10YR 4/3), very fine to fine grained, poorly graded, very dense, damp.
				40			

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-2a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 BORING NO. B-2

PROJECT NAME Buena Vista Landfill PAGE 2 OF 2

BY WMC DATE 3/25/85 SURFACE ELEV. 123'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		57/8"		40		SC	CLAYEY SAND, (continued)
							decrease in clay content.
				45		SP	SAND, yellow-brown (10YR 5/6), very fine grained, poorly graded, very dense, damp.
				50			BORING TERMINATED AT 51 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-2b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-3

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 129'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						CL	SANDY CLAY, yellow-brown (10YR 5/4), soft, moist.
		62		5		SC	CLAYEY SAND, dark yellow-brown (10YR 4/4), finely laminated, quartz and altered plagioclase grains, very dense, damp.
		40		10			interbedded clay lenses with carbonaceous material, damp.
		28		15		CH	CLAY, olive gray (5Y 4/2), minor gray (5Y 6/1) mottling, slightly sandy, altered plagioclase grains, 1% rock fragments, very stiff, damp.
	2.60	31		20			olive gray (5Y 5/2), orange mottling, very stiff.
				25			
							increasing sandy interbedding.
	4.0	42		30			olive (5Y 5/3).
		68		35		SP	SAND, yellow-brown (10YR 5/6), fine grained, poorly graded, <10% clay fines, very dense, damp.
							interbedded clay lenses, very stiff.
				40			

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-3a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-3

PROJECT NAME Buena Vista Landfill — PAGE 2 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 129.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40			SAND (continued)
				45			
	4.0/4.5	35		50		CL	CLAY, light olive brown (2.5Y 5/4), thin silty laminations, iron staining along thin fractures, very stiff, damp.
				55		SP	SAND, yellow-brown (10YR 5/4), fine-medium grained, interbedded clay lenses, damp.
		50/5"		60			dark yellow-brown (10YR 3/4), medium-coarse grained, poorly graded, very dense.
							BORING TERMINATED AT 60 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-3b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307.01.13 — BORING NO. B-4

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 69.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						CH-CL	SANDY CLAY, very dark gray (10YR 3/1), soft, moist.
	1.3	19		5			CLAY, yellow-brown (10YR 5/4), moderately plastic, firm, damp.
	3.0	30		10			very dark gray-brown (10YR 3/2), silty, 5% carbonaceous material.
	2.1	21		15			interbedded sand lenses, very fine grained, predominantly quartz with 10% mica, orange mottling, stiff, clay.
	1.25	20		20			dark gray-brown (10YR 4/2), sandy, decreased plasticity.
	3.5	27		25			yellow-brown (10YR 5/4), 10-15% carbonaceous matter and rootholes.
							increasing sand, very fine grained.
		65		30		SC	CLAYEY SAND, gray-brown (2.5Y 5/2), very fine grained, 20 to 30% clay fines, thin orange laminations, very dense, damp.
		50/4"	▽	35			interbedded poorly graded sand lenses, fine grained, 5% rounded pebbles.
		50/6"		40		GP	SANDY GRAVEL

REMARKS

Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-4a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13
PROJECT NAME Buena Vista Landfill
BY WMC DATE 4/10/85

BORING NO. B-4
PAGE 2 OF 2
SURFACE ELEV. 69.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40		GP	SANDY GRAVEL, dark brown (7.5YR 4/4), 40% medium to coarse sand, 60% fine gravel, very dense, wet.
		50/4"		45			increasing gravel size.
							REFUSAL AT 45 FEET

REMARKS

EMCON ASSOCIATES

PLATE A-4b

ATTACHMENT 2
GEOSYNTEC BORING LOGS

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

PROJECT Northeast Sediment Basin
PROJECT LOCATION Buena Vista Landfill
PROJECT NUMBER WG2562/02

KEY SHEET - CLASSIFICATIONS AND SYMBOLS

GS FORM: 01-KEY/SYMBOLS

EMPIRICAL CORRELATIONS WITH STANDARD PENETRATION RESISTANCE N VALUES *

	N VALUE * (BLOWS/FT)	CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TONS/SQ FT)
FINE GRAINED SOILS	0 - 2	VERY SOFT	<0.25
	3 - 4	SOFT	0.25 - 0.50
	5 - 8	FIRM	0.50 - 1.00
	9 - 15	STIFF	1.00 - 2.00
	16 - 30	VERY STIFF	2.00 - 4.00
	31 - 50	HARD	>4.00
	>50	VERY HARD	

	N VALUE * (BLOWS/FT)	RELATIVE DENSITY
COARSE GRAINED SOILS	0 - 4	VERY LOOSE
	5 - 10	LOOSE
	11 - 30	MEDIUM DENSE
	31 - 50	DENSE
	>50	VERY DENSE

* ASTM D 1586; NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 IN. O.D., 1.4 IN. I.D. SAMPLER ONE FOOT.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

MAJOR DIVISIONS			SYMBOLS	DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL COARSER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO.4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO.4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL FINER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

NOTE: DUAL SYMBOLS USED FOR BORDERLINE CLASSIFICATIONS

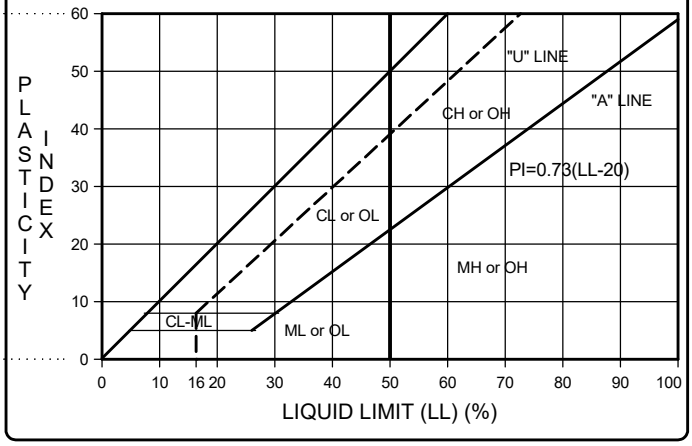
PARTICLE SIZE IDENTIFICATION

USCS (SOILS ONLY) *		SEDIMENTARY (ROCK ONLY)	
BOULDER	>300 mm	BOULDER	>256 mm
COBBLE	75 - 300 mm	COBBLE	64 - 256 mm
GRAVEL: COARSE	20 - 75 mm	PEBBLE	4 - 64 mm
GRAVEL: FINE	4.75 - 20 mm	GRANULE	2 - 4 mm
		SAND: V. COARSE	1 - 2 mm
SAND: COARSE	2 - 4.75 mm	SAND: COARSE	0.5 - 1 mm
SAND: MEDIUM	0.42 - 2 mm	SAND: MEDIUM	0.25 - 0.5 mm
SAND: FINE	0.074 - 0.42 mm	SAND: FINE	0.125 - 0.25 mm
		SAND: V. FINE	0.063 - 0.125 mm
SILT/CLAY	<0.074 mm	SILT	0.004 - 0.063 mm
		CLAY	<0.004 mm

* WELL GRADED - HAVING WIDE RANGE OF GRAIN SIZES AND APPRECIABLE AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES
* POORLY GRADED - PREDOMINANTLY ONE GRAIN SIZE, OR HAVING A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING

PERCENTAGE OF PARTICLE TYPE IN DECREASING ORDER OF PARTICLE SIZE (GRAVEL,SAND,FINES)

PLASTICITY CHART



OTHER MATERIAL SYMBOLS

- Conglomerate/ Agglomerate
- Sandstone
- Silty Sandstone
- Clayey Sandstone
- Sandy Siltstone
- Siltstone
- Claystone
- Clayey Siltstone/ Silty Claystone
- Sandy Claystone
- Granitic/Intrusive
- Volcanic/Extrusive
- Metamorphic
- Limestone
- Dolomite
- Glacial Till
- Landslide Debris
- Marker Bed
- Artificial Fill
- Refuse
- Concrete/Asphalt

WELL SYMBOLS

- CONCRETE
- GROUT
- BENTONITE SEAL
- TRANSITION SAND
- SAND/GRAVEL PACK
- NATIVE/SLUFF
- CENTRALIZER

SAMPLE TYPE AND OTHER SYMBOLS

- BULK SAMPLE
- STANDARD PENETRATION TEST
- MODIFIED CALIFORNIA SAMPLE
- PITCHER BARREL
- SHELBY TUBE
- CORE SAMPLE

- Water Level at Time Drilling, or as Shown
- Static Water Level
- Pump Inlet
- Loss of Drilling Fluid
- MSL: Mean Sea Level
- AGS: Above Ground Surface
- BGS: Below Ground Surface
- BTOC: Below Top of Casing
- HSA: Hollow Stem Auger

01-KEY/SYMBOLS BVLF NE SB BORING LOGS 02.18.20.GPJ GEOSNTEC.GDT 2/18/20

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-01 **SHEET** 1 OF 2
START DATE 11/12/2018 8:10:00 AM **ELEVATION DATA**
FINISH DATE 11/12/2018 1:45:00 PM **GROUND SURFACE** 115.3 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	115	Silty SAND (SM): brown, dry to lightly damp, [0,80,20], no plasticity, loose, roots and debris encountered																
	114																	
	113																	
	112									Glass or plastic encountered.								
	111																	
5	110	Sandy Lean CLAY (CL): tan with rust-colored mottling, dry, [0,30,70], low plasticity, very stiff		01-01		8 11 17	28											
	109																	
	108																	
	107																	
	106																	
10	105							27										
	104			01-02														
	103	Color transitioned to yellowish brown																
	102																	
	101	Silty SAND (SM): yellowish brown, damp to wet, [0,70,30], no plasticity, medium dense						50										
15	100			01-03														
	99																	
	98																	
	97	Silty SAND with Gravel (SM): yellowish brown, damp to wet, no plasticity, medium dense				18 15 8	23											
	96			01-04									28.2	56.1	15.7			
20	95																	
	94																	
	93																	
	92																	
	91			01-05		10 14 17	31											
25	90									Gravel >1" observed in cuttings.								
	89																	
	88																	
	87																	
	86																	
30																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11926.38
EASTING: 10950.23
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-01 **SHEET** 2 OF 2
START DATE 11/12/2018 8:10:00 AM **ELEVATION DATA**
FINISH DATE 11/12/2018 1:45:00 PM **GROUND SURFACE** 115.3 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	85	Silty SAND w/ Gravel (SM): yellowish brown, dry to damp, no plasticity, dense.		01-06		13 16 18	34						38.3	42.6	19.1			
5	80	Silty SAND w/ Gravel (SM): olive to gray, damp to moist, [0,80,20], low plasticity.		01-07				73										
10	75	Poorly-graded SAND (SP): brown, dry to damp, [0,90,10], no plasticity.		01-08		7 13 17	30	67										
15	70	Transitioned from rust-colored mottling to gray sand.		01-09		11 16 31	47	83										
20	65	Poorly-graded SAND (SP): gray and brown with rust mottling, moist, [10,80,10], no plasticity, very dense.		01-10		21 42 50/5"		78										
25	60																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11926.38
EASTING: 10950.23
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-02 **SHEET** 1 OF 2
START DATE 11/12/2018 3:00:00 PM **ELEVATION DATA**
FINISH DATE 11/13/2018 7:00:00 AM **GROUND SURFACE** 120 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	119	Silty Lean CLAY with Gravel (CL): brown, dry, [10,20,70], low plasticity, soft, gravel pieces less than 1" in size								~2" aggregate base at surface									
	118																		
	117																		
	116																		
5	115	Clayey SAND (SC): brown with rust-colored mottling, moist, [0,80,20], low plast, dense		02-01		10 17 25	42	33											
	114																		
	113																		
	112																		
	111																		
10	110	Clayey SAND with Gravel (SC): brown to black with rust-colored mottling, moist, [20,60,20], dense		02-02		9 14 20	34	56											
	109																		
	108																		
	107																		
	106																		
15	105	Less gravel, [10,70,20], dense		02-03		11 15 18	33	67											
	104																		
	103																		
	102																		
	101																		
20	100	More gravel, [20,60,20], medium dense		02-04		7 9 15	24	56											
	99																		
	98																		
	97																		
	96																		
25	95	Less gravel, [10,80,10], medium dense		02-05		11 12 16	28	67											
	94																		
	93																		
	92																		
	91																		
30	90																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12115.01
EASTING: 11028.95
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-02 **SHEET** 2 OF 2
START DATE 11/12/2018 3:00:00 PM **ELEVATION DATA**
FINISH DATE 11/13/2018 7:00:00 AM **GROUND SURFACE** 120 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	89	Silty SAND (SM-SP): olive brown, damp, [0,90,10], no plasticity, medium dense, no gravel.	02-06		4 7 10	17	61										
	88																
	87																
	86																
35	85	Fines increase to 20%															
	84		02-07		12 10 15	25	89										
	83																
	82																
	81																
40	80	SILT with Sand (ML): olive brown, damp, no to low plasticity, medium dense					70										
	79																
	78		02-08														
	77																
	76																
45	75								Observed gravel in cuttings								
	74		02-09		7 8 15	23	83					0.1	21.7	78.2			
	73																
	72																
	71																
50	70	Silty SAND (SM): olive brown, dry to damp, [0,85,15], nonplastic fines, fine sand															
	69		02-10		12 19 32	51	83										
	68																
	67																
	66																
55	65																
	64																
	63																
	62																
	61																
60	60																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12115.01
EASTING: 11028.95
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 1 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	118	Sandy Lean CLAY (CL): yellowish brown, dry, [0,20,80], low to medium plasticity, soft, observed organic roots in upper 2"															
5	113	Sandy Lean CLAY (CL): yellowish brown, dry to moist, [5,20,75], low plasticity, very stiff, gravel observed (<1/2")		03-01		17 50/6"		33	08:45								
10	108	Sandy Lean CLAY (CL): yellowish brown, damp, low plasticity, very stiff, no gravel observed		03-02				58	10:15								
	106			03-03		6 8 13	21		10:30			0	30.7	69.3			
15	103	Sandy Lean Clay (CL): yellowish brown with rust-colored mottling, damp, [0,40,60], low plasticity, stiff		03-04				83	11:00								
20	98	Clayey SAND with Gravel (SC): dark brown changes to olive brown, moist, low plasticity, very stiff, observed gravel less than 1/4"		03-05		5 8 11	19	61	11:20			20.9	59.8	19.3			
25	93			03-06		9 6 6	12	83	11:45								
	92	Sandy Lean CLAY (CL): olive changes to yellowish brown, moist, low plasticity, stiff										8	40.8	51.2			
	90	Gravelly SAND (SP): brown, moist, [40,50,10], rounded to subrounded gravel		03-07				67	12:00								
30	89																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

03-GEOTECH2-SCC BVLF NE SB BORING LOGS 02.19.20.GPJ GEOSNTEC.GDT 2/19/20

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 2 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
35	83	SILT (ML): olive gray, moist, [0,20,80], no plasticity, dense, no observed gravel		03-08				90	12:45								
40	78	Fat CLAY (CH): olive gray, high plasticity, hard		03-09		13 13 20	33	83	13:30			0	0.6	99.4	64	28	36
45	73	SILT (ML): olive gray, moist, [0,20,80], no plasticity, very dense, no gravel observed		03-10		14 48 50/4"		44	14:00								
50	68	Silty SAND (SM): brown and tan, damp, [0,80,20], no plasticity, very dense, no gravel observed, medium sand.		03-11		28 50/5"		83	14:20								
55	63	Silty SAND with Gravel (SM): brown and dark brown, damp, [10,70,20], no plasticity, very dense, observed <1/4" gravel		03-12		12 35 50/5.5"		83	15:00								
60	59																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 3 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	58	Gravelly SAND (SP): brown and tan, damp, [30,70,0], no plasticity, medium dense, no observed fines		03-13		9 9 10	19	33	15:30									
	57																	
	56																	
	55																	
	54																	
65	53	Sandy GRAVEL (GP): dark brown, [60,30,10], no plasticity, very dense, gravel approximately 1/4-3/4"		03-14		42 50/6"		67	16:00									
	52																	
	51																	
	50																	
	49																	
70	48	Gravelly SAND (SP): brown to dark brown, damp, [30,70,0], no plasticity, very dense		03-15		7 22 46	68	83	16:20									
	47																	
	46																	
	45																	
	44																	
75	43	Silty SAND (SM): olive with rust-color mottling, damp[0,70,30], cemented, dense		03-16		25 25 24	49	67	16:45									
	42																	
	41																	
	40																	
	39																	
80	38	Silty SAND (SM): olive with rust-color mottling, damp, [0,70,30], cemented, very dense		03-17		14 33 50/4"		33	17:30									
	37																	
	36																	
	35																	
	34																	
85	33																	
	32																	
	31																	
	30																	
	29																	
90																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-04 **SHEET** 1 OF 2
START DATE 11/14/2018 7:45:00 AM **ELEVATION DATA**
FINISH DATE 11/14/2018 1:00:00 PM **GROUND SURFACE** 98 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 52 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	97	Silty Lean CLAY (CL): dark brown, dry, [0,20,80], low plasticity, soft, roots observed in upper 1" [FILL]																
5	93	Silty Lean CLAY (CL): olive gray and tan with rust-color mottling, moist, [0,20,80], low plasticity, stiff [FILL]		04-01		7 12 16	28	44	08:45									
10	88	SILT to Silty SAND (ML/SM): olive brown, [0,50,50], damp, low plasticity		04-02				87	09:00									
15	83	Fat CLAY with Sand (CH): greenish gray mottled dark gray, [0,10,90], high plasticity		04-03				87	09:30	15': consolidation test performed. Su=1270 psf, 5% strain, 8 psi confinement, natural water content. Observed gravel in cuttings.	124.7	24				52	18	34
20	78	Fat CLAY (CH): olive brown with rust-color mottling, [0,10,90], high plasticity, stiff		04-04				87	10:00	20': consolidation test performed. Su=2355 psf, 5% strain, 10 psi confinement, natural water content. Su=1018 psf, 5% strain, 10 psi confinement, backpressure saturation.	114.7	37.4				74	31	43
25	73			04-05				83	10:30									
30	68	Silty SAND (SM): brown and tan, [0,80,20], no plasticity, very dense, fine sand		04-06		17 35 50/5"		33	10:45									

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12117.5
EASTING: 10766.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-04 **SHEET** 2 OF 2
START DATE 11/14/2018 7:45:00 AM **ELEVATION DATA**
FINISH DATE 11/14/2018 1:00:00 PM **GROUND SURFACE** 98 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 52 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	67									Drill rig chattering.								
	66																	
	65																	
	64																	
35	63	Silty SAND with Gravel (SM): brown and black, damp, [20,60,20], no plasticity, very dense, cemented		04-07		23 33 50/5"		78	11:15									
	62																	
	61									Drill rig chattering from 37' to 40'.								
	60																	
	59																	
40	58	Silty SAND with Gravel (SM): brown and black, damp, [10,60,30], dense, finer sand and less gravel		04-08		9 16 26	42	78	11:30									
	57																	
	56																	
	55																	
	54																	
45	53																	
	52	Silty CLAY (CL): olive gray, moist, [0,10,90], low plasticity, very stiff		04-09		22 21 16	37	72	12:00									
	51																	
	50																	
	49																	
50	48	Silty SAND (SM): olive brown, damp, [0,70,30], no plasticity, dense, fine sand		04-10				67	12:15									
	47			04-11		14 18 18	36	78	12:30									
	46																	
	45																	
	44																	
55	43																	
	42																	
	41																	
	40																	
	39																	
60	38																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12117.5
EASTING: 10766.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-05 **SHEET** 1 OF 2
START DATE 11/14/2018 2:00:00 PM **ELEVATION DATA**
FINISH DATE 11/15/2018 10:00:00 AM **GROUND SURFACE** 99.6 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 53.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	99	Silty Lean CLAY (CL): light brown to brown, dry, [0,20,80], low plasticity, loose, observed roots in top 2". Increasing moisture and sand content with depth. [FILL]																	
	98																		
	97																		
	96																		
5	95																		
	94	Silty SAND (SM): olive brown, dry, [0,70,30], no plasticity, medium dense, fine sand [FILL]		05-01		4 7 9	16	44	15:00										
	93																		
	92																		
	91																		
	90																		
10	89	Sandy Lean CLAY (CL): olive brown mottled gray, moist, moist, [0,30,70], low plasticity [FILL]						87	15:15	10': Su=1685 psf, 5% strain, 6 psi confine, natural water content. Su=1414 psf, 5% strain, 6 psi confine, backpressure saturation.									
	88			05-02							122.8	23.4				33	17	16	
	87																		
	86																		
	85																		
15	84	Sandy Lean CLAY (CL): olive brown, moist, [0,10,90], low plasticity						87	15:30	15': Su=1710 psf, 5% strain, 8 psi confine, natural water content.									
	83			05-03							120.5	26.4				48	20	28	
	82																		
	81																		
	80																		
20	79	Sandy Lean CLAY (CL): olive brown, moist, [0,20,80], low to medium plasticity, soft to stiff in zones						87	15:50	Vary zones of stiffness from 20-22.5', rounded gravel between 1/8" and 1/4" observed.									
	78			05-04															
	77																		
	76																		
	75																		
25	74	Fat CLAY (CH): olive brown, [0,70,30], high plasticity, very stiff				5 10 10	20	50	16:15				0.1	0.7	99.2	71	28	43	
	73			05-05															
	72																		
	71							100	06:45										
	70	Silty SAND (SM): tan to light brown with rust-color mottling, moist, [0,70,30], nonplastic		05-06															
30																			

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12043.2
EASTING: 10736.99
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-05 **SHEET** 2 OF 2
START DATE 11/14/2018 2:00:00 PM **ELEVATION DATA**
FINISH DATE 11/15/2018 10:00:00 AM **GROUND SURFACE** 99.6 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 53.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
35	69																		
	68	Silty SAND (SM): tan to light brown, dry to damp, [0,80,20], very dense, nonplastic		05-07		21 48 50/5"		33	07:45										
	67																		
	66																		
	65																		
35	64																		
	63																		
	62	More sand, [0,90,10]		05-08		14 23 30	53	78	08:15										
	61																		
40	60																		
	59																		
	58																		
	57	Silty SAND with Gravel (SM): tan and brown, damp, [10,80,10], dense, nonplastic, rounded rocks ~1", angular gravel		05-09		18 33 36	69	78	08:35										
	56																		
	55																		
45	54																		
	53																		
	52	Dense, more gravel		05-10		22 15 36	51	72	09:00										
	51																		
50	50																		
	49																		
	48																		
	47			05-11		15 21 22	43	67	09:20										
	46	Clayey SAND with Gravel (SC): grayish brown, damp, [10,50,40], low plasticity fines, dense, cemented																	
55	45																		
	44																		
	43																		
	42																		
	41																		
60	40																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12043.2
EASTING: 10736.99
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

03-GEOTECH2-SCC BVLF NE SB BORING LOGS 02.19.20.GPJ GEOSNTEC.GDT 2/19/20

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-06 **SHEET** 1 OF 2
START DATE 11/15/2018 11:15:00 AM **ELEVATION DATA**
FINISH DATE 11/15/2018 4:35:00 PM **GROUND SURFACE** 120.1 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	120	Clayey SAND (SC): yellowish brown, dry, [0,70,30], low plasticity, fine sand								2" aggregate base on surface. Top surface smoothed by loader to provide access for drill rig.								
5	115	Clayey SAND (SC): yellowish brown, low plasticity, medium dense		06-01		4 6 9	15	44	12:00				0.9	63.1	36			
10	110	Clayey SAND (SC): yellowish brown, moist, [0,70,30], medium dense		06-02		4 9 9	18	50	12:20									
15	105			06-03		5 9 7	16		12:35				0	60.6	39.4			
20	100	Silty SAND (SM): light brown to brown, moist, [0,85,15], nonplastic		06-04				0	12:50									
25	95	Silty SAND with Gravel (SM): light brown to brown, [10,60,30], nonplastic, medium dense, observed gravel <1/4"		06-05		9 10 10	20	67	13:15	Drill rig chattering								
30	90																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12114.08
EASTING: 10898.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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BOREHOLE LOG

BORING GT18-06 **SHEET** 2 OF 2
START DATE 11/15/2018 11:15:00 AM **ELEVATION DATA**
FINISH DATE 11/15/2018 4:35:00 PM **GROUND SURFACE** 120.1 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	89	Clayey SAND (SC): dark brown, medium dense		06-06		7 8 10	18		13:45			10.9	73.8	15.3			
5	88																
10	87																
15	86																
20	85							47	14:15								
25	84			06-07													
30	83																
35	82																
40	81	SILT (ML): grayish brown with rust-color mottling, moist, [0,10,90], low plasticity, medium stiff		06-08		5 8 8	16	100	14:40								
45	80																
50	79			06-09				40	14:55								
55	78																
60	77																
65	76																
70	75																
75	74																
80	73																
85	72																
90	71																
95	70	Silty SAND (SM): brown and tan, dry to damp, [0,80,20], nonplastic, very dense		06-10		17 33 48	81		15:30								
100	69																
105	68																
110	67																
115	66																
120	65																
125	64																
130	63																
135	62																
140	61																
145	60																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12114.08
EASTING: 10898.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

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ATTACHMENT 3
ENERGY MEASUREMENTS

November 15, 2018

Geosyntec Consultants
Attn: Fabrizio Settepani

Re: Standard Penetration Energy Measurements
Automatic Hammer on Mud Rotary Drill Rig, PD-59
Buena Vista Landfill Northeast Sediment Basin Project Area, Boring GT18-03

Dear Mr.Settepani,

This report offers results of energy measurements and related calculations made on November 13, 2018 during Standard Penetration Testing (SPT) and sampling on Pitcher Drilling's mud rotary drill rig. Dynamic tests were performed on an instrumented section of NWJ drill rod attached to the sampler rod string. All dynamic measurements were obtained and recorded using a SPT Analyzer®.

Average Energy for 140lb hammer: 81%
Average Energy for 300lb hammer: 87%

Depth (bgs-ft)	Sampler	Hammer Weight (lb)	Avg ETR (%)
5	SPT	140	75.8
12	Mod Cal	300	85.9
20	Mod Cal	300	88.1
25	Mod Cal	300	85.1
40	SPT	140	84.3
45	SPT	140	81.5
50	Mod Cal	300	86.5
55	Mod Cal	300	86.7
60.5	Mod Cal	300	87.6
65	Mod Cal	300	86.8
70	Mod Cal	300	86.2
75	SPT	140	82.8
80.5	SPT	140	80.3

Note: If the SPT Analyzer did not measure all blows for a sample depth, the reported blow count and therefore calculated N60 value in the following tables will be incorrect. Often blows are excluded from calculations if the sensors are loose or have drifted from the baseline. Field records of actual blow count values should be used in place of the blow counts shown in the following tables.

Equipment:

SPT energy measurements were made on SPT and Modified California samplers driven by the hammer/anvil system on the Pitcher Drilling drill rig on November 13, 2018. The rig was tested on the Buena Vista Landfill Project area. In total, 13 energy measurements were collected corresponding to 13 different samples at increasing depth.

Gregg used a SPT Analyzer (SPTA) to acquire and process measurements of force and velocity with every impact of the automatic hammer on the sample rods. Gregg follows the procedure outlined in ASTM D4633. Two strain gauges mounted on a two foot section of NWJ rod measured force, while two piezoresistive accelerometers bolted on the same rod measured acceleration. The gauges were mounted approximately 6" from the top of the rod.
Analog signals from the gauges and accelerometers were collected, digitized, displayed in real-time, and stored by the SPTA. Selected output from the SPTA for each recorded impact of the hammer included:

- Maximum force in the rod (FMX)
- Maximum velocity in the rod (VMX)
- Maximum calculated transferred energy (EFV)
- Blows per minute (BPM)
- Energy transferred to the rods (ETR)

Data and Calculations:

The purpose of testing was to measure the energy transferred from the hammer to the drill rod and to calculate the energy efficiency of the hammer. The SPTA measurements of force and velocity were reviewed after field testing and analyzed to calculate the transferred energy (EFV).

The maximum energy transferred past the gauge location, EFV, is computed by the SPTA using force (F) and velocity (V) records as follows:

$$EMX = \int_a^b F(t)\, V(t)\, dt$$

The time "a" corresponds to the start of the record when the energy transfer begins and "b" is the time at which energy transferred to the rod reaches a maximum value. The energy transferred is defined as ETR, and is usually used to define the efficiency of the hammer/anvil system.

Results:

Tables for each sample depth summarize the average calculated energies for each sample tested as well as the details for each sample. It is shown that the overall average (ETR) energy for this system is 81% for the 140lb hammer and 87% for the 300lb hammer. The Summary of SPT Test Results table at the end provides a summary of all the samples tested at each sampling depth. The plots and tables present selected measured and calculated results as a function of blow number. The results include:

- the blow number
- BC (blow count in feet) *NOTE: This is calculated by dividing the number of blows for each 6" of penetration by the 6" depth interval and is therefore only approximate. If some blows were deleted due to erroneous or poor data, the penetration depths are not correct.
- FMX (maximum rod force)
- VMX (maximum rod velocity)
- BPM (blows per minute)
- EFV (energy using the Force Velocity method in ft-lbs)
- ETR (energy transferred as a percentage of maximum)

At the end of each table is a statistical evaluation of the results for each variable including the average, standard deviation, maximum, minimum and what blow number these maximums and minimums occurred.

If you have any questions or comments on this report, please do not hesitate to call our office at (562) 427-6899.

Sincerely,

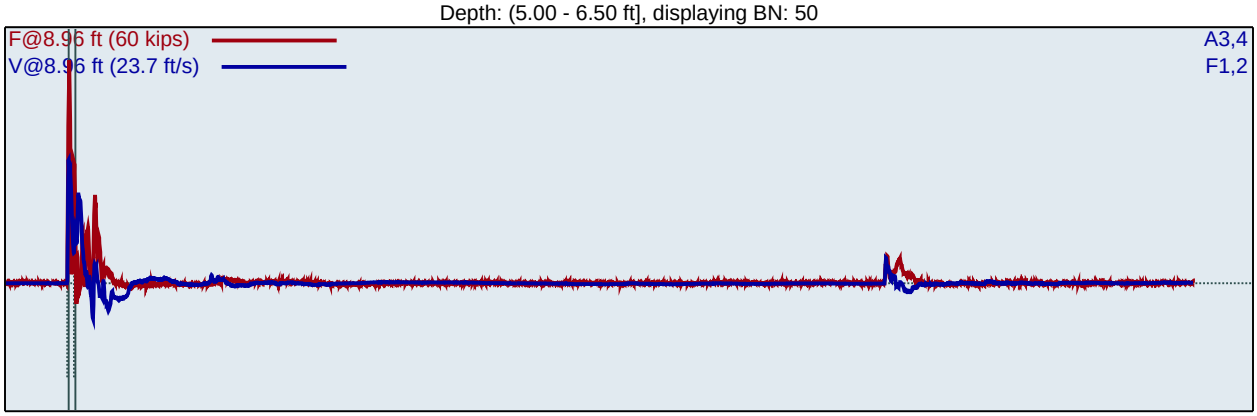
Kelly Cabal

Kelly Cabal
Data Management & Communications
Gregg Drilling, LLC

Appendix A

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 8.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (5.00 - 6.50 ft], displaying BN: 50



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 348 mv/6.4v/5000g (1) VF1
A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
1	2	42	13.4	1.9	303	86.6
2	2	50	13.1	1.9	288	82.2
3	50	50	12.2	37.3	254	72.7
4	50	50	11.8	37.8	257	73.4
5	50	51	11.5	37.6	264	75.5
6	50	52	11.4	37.8	268	76.6
7	50	52	11.1	37.7	271	77.3
8	50	51	11.2	37.8	263	75.1
9	50	52	11.4	37.9	271	77.5
10	50	51	10.8	37.8	251	71.8
11	50	51	11.4	37.9	262	74.9
12	50	53	11.6	37.8	269	76.8
13	50	52	11.4	37.8	267	76.2
14	50	52	11.0	37.8	261	74.6
15	50	51	11.0	37.8	259	73.9
16	50	52	11.2	37.8	267	76.2
17	50	52	11.6	37.7	269	76.9
18	50	51	11.2	37.9	265	75.7
19	50	52	11.4	37.8	267	76.2
20	50	50	11.0	37.9	256	73.0
21	50	52	11.5	38.0	264	75.4
22	50	52	11.3	37.9	261	74.6
23	50	52	11.5	37.8	264	75.4
24	50	52	11.4	37.9	267	76.1
25	50	52	11.4	37.8	271	77.5
26	50	52	11.3	37.9	262	75.0
27	50	52	11.3	37.9	264	75.6
28	50	52	11.4	37.8	264	75.5
29	50	52	11.3	37.9	260	74.3

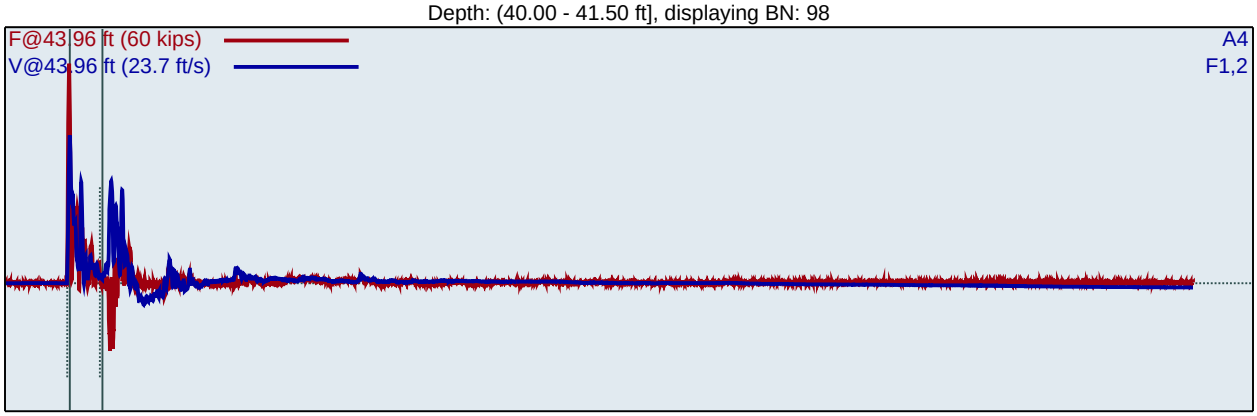
30	50	52	11.4	37.8	265	75.7
31	50	52	11.5	37.9	266	76.0
32	50	52	11.4	37.8	266	76.1
33	50	52	11.3	38.0	266	76.1
34	50	52	11.4	38.0	267	76.4
35	50	52	11.5	37.8	265	75.8
36	50	51	11.1	37.9	262	74.7
37	50	51	11.2	37.9	264	75.4
38	50	52	11.4	37.9	269	77.0
39	50	51	11.3	37.9	268	76.6
40	50	52	11.1	38.0	262	75.0
41	50	52	11.3	37.9	265	75.8
42	50	52	11.4	38.1	263	75.2
43	50	51	10.9	37.8	259	74.1
44	50	52	11.3	38.0	262	74.9
45	50	52	11.4	37.8	261	74.6
46	50	52	11.1	37.9	263	75.1
47	50	52	11.2	38.0	263	75.1
48	50	51	11.2	37.8	263	75.2
49	50	52	11.3	38.0	264	75.4
50	50	52	11.4	38.0	266	76.1
51	50	53	11.5	37.9	271	77.4
52	50	53	11.6	38.0	269	76.8
	Average	52	11.3	37.8	264	75.5
	Std Dev	1	0.2	0.1	4	1.2
	Maximum	53	12.2	38.1	271	77.5
	Minimum	50	10.8	37.3	251	71.8

N-value: 50

Sample Interval Time: 110.70 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 43.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (40.00 - 41.50 ft], displaying BN: 98



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
55	13	51	12.2	38.5	294	84.0
56	13	52	12.8	38.2	299	85.5
57	13	52	12.4	38.1	299	85.6
58	13	51	11.8	38.0	296	84.7
59	13	53	12.0	38.1	296	84.6
60	13	52	12.1	38.0	295	84.4
61	13	52	12.2	38.0	298	85.0
62	13	52	12.0	38.1	299	85.5
63	13	52	12.9	38.1	297	84.9
64	13	52	12.5	38.1	299	85.6
65	13	52	12.8	38.2	301	86.1
66	13	51	13.4	38.1	300	85.7
67	13	52	12.5	38.2	295	84.3
68	13	52	12.2	38.1	294	84.1
69	13	52	12.6	38.3	299	85.6
70	13	53	13.4	38.1	299	85.3
71	13	52	13.6	38.3	297	84.8
72	13	52	12.6	38.2	299	85.5
73	13	53	13.1	38.2	300	85.8
74	13	53	13.8	38.2	301	85.9
75	13	52	13.6	38.1	304	87.0
76	13	52	13.3	38.2	303	86.4
77	13	52	13.2	38.4	302	86.2
78	13	52	12.6	38.2	299	85.4
79	13	52	12.6	38.3	301	86.0
80	13	52	13.4	38.4	297	84.7
81	20	53	12.9	38.1	293	83.7
82	20	52	12.9	38.3	295	84.2
83	20	52	12.8	38.3	294	83.9
84	20	52	12.7	38.2	288	82.3
85	20	52	12.2	38.3	287	81.9
86	20	53	12.6	38.2	294	83.9

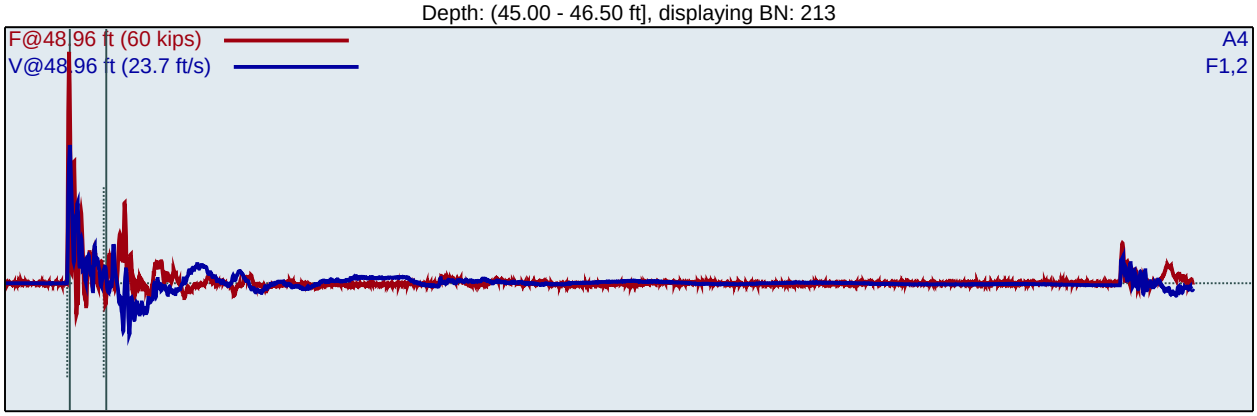
87	20	53	13.0	38.3	293	83.6
88	20	52	12.9	38.2	292	83.3
89	20	52	12.6	38.2	286	81.8
90	20	51	11.8	38.2	284	81.2
91	20	51	13.1	38.1	296	84.5
92	20	53	13.5	38.4	296	84.5
93	20	53	13.4	38.4	292	83.3
94	20	52	12.9	38.2	291	83.2
95	20	52	13.1	38.3	293	83.8
96	20	52	13.5	38.2	292	83.4
97	20	52	13.9	38.4	292	83.4
98	20	51	13.7	38.3	299	85.3
99	20	52	13.8	38.3	300	85.6
100	20	52	13.5	38.4	287	82.1
	Average	52	13.1	38.3	295	84.3
	Std Dev	1	0.5	0.1	5	1.4
	Maximum	53	13.9	38.4	304	87.0
	Minimum	51	11.8	38.1	284	81.2

N-value: 33

Sample Interval Time: 70.75 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 48.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (45.00 - 46.50 ft], displaying BN: 213



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
104	14	54	12.1	37.6	286	81.6
105	14	54	12.1	37.7	289	82.6
106	14	54	12.0	37.8	284	81.2
107	14	54	12.1	37.6	286	81.8
108	14	53	11.8	37.5	284	81.2
109	14	53	12.1	37.5	285	81.6
110	14	53	11.7	37.8	280	80.0
111	14	53	12.0	37.7	279	79.8
112	14	53	11.9	37.8	290	82.9
113	14	54	12.1	37.8	288	82.3
114	14	54	12.3	38.0	281	80.2
115	14	53	11.8	37.8	283	80.8
116	14	54	12.3	37.5	281	80.3
117	14	53	12.5	37.4	286	81.8
118	48	54	12.8	37.6	279	79.8
119	48	54	12.1	37.7	280	80.1
120	48	53	11.8	37.5	280	80.1
121	48	54	12.1	37.4	281	80.2
122	48	53	12.1	37.7	290	82.8
123	48	53	12.3	37.5	284	81.0
124	48	53	12.4	37.5	279	79.7
125	48	52	12.7	37.5	281	80.2
126	48	53	12.5	37.6	286	81.7
127	48	53	12.8	37.6	280	80.0
128	48	53	12.9	37.5	286	81.8
129	48	53	12.8	37.5	288	82.2
130	48	53	13.1	37.6	293	83.7
131	48	53	13.0	37.7	288	82.4
132	48	53	12.7	37.5	288	82.3
133	48	52	12.9	37.5	292	83.5
134	48	53	12.7	37.4	286	81.8
135	48	54	12.6	37.5	288	82.4

136	48	54	12.2	37.6	278	79.4
137	48	54	12.3	37.7	281	80.4
138	48	54	12.5	37.7	278	79.4
139	48	54	12.6	37.5	282	80.6
140	48	54	12.3	37.4	288	82.3
141	48	54	12.5	37.7	273	78.1
142	48	54	12.2	37.6	286	81.8
143	48	54	12.2	37.7	285	81.4
144	48	54	12.4	37.6	283	81.0
145	48	53	12.8	37.7	286	81.7
146	48	54	12.2	37.9	282	80.6
147	48	54	12.1	37.6	281	80.2
148	48	54	12.3	37.8	288	82.4
149	48	55	12.5	37.7	289	82.7
150	48	54	12.4	37.9	283	80.9
151	48	55	13.0	37.8	289	82.5
152	48	55	12.6	37.9	287	82.1
153	48	55	12.5	37.9	289	82.6
154	48	55	12.7	37.7	293	83.7
155	48	54	12.4	37.7	286	81.8
156	48	53	12.2	37.9	283	80.8
157	48	54	12.3	37.8	279	79.7
158	48	54	12.2	38.0	281	80.4
159	48	53	11.9	37.8	271	77.6
160	48	53	12.2	37.7	282	80.5
161	48	54	12.6	37.7	282	80.5
162	48	54	12.7	37.8	283	80.8
163	48	55	12.6	37.7	284	81.2
164	48	54	12.5	37.7	282	80.4
165	48	53	12.4	37.7	289	82.6
166	50	55	12.3	37.6	283	80.9
167	50	54	12.6	37.5	284	81.1
168	50	54	12.5	37.2	280	80.1
169	50	54	12.6	37.6	287	81.9
170	50	55	12.4	37.9	285	81.5
171	50	54	12.2	37.8	283	81.0
172	50	54	12.2	37.8	283	81.0
173	50	54	12.3	37.9	274	78.4
174	50	54	12.1	37.9	280	79.9
175	50	54	12.3	37.7	282	80.5
176	50	54	12.1	37.7	287	82.0
177	50	54	12.1	37.7	285	81.3
178	50	54	12.4	37.7	295	84.2
179	50	54	12.1	37.7	284	81.0
180	50	54	12.2	37.8	282	80.6
181	50	54	12.4	37.9	285	81.5
182	50	55	12.7	37.8	291	83.0
183	50	54	12.6	37.9	288	82.3
184	50	54	12.7	37.7	290	82.9
185	50	55	12.5	37.7	287	82.0
186	50	54	12.7	37.9	296	84.5
187	50	54	12.4	37.9	283	81.0
188	50	55	12.5	37.7	289	82.6
189	50	55	12.4	37.9	289	82.7
190	50	54	12.2	38.0	285	81.3
191	50	55	12.4	37.8	286	81.7
192	50	54	12.6	37.8	305	87.1
193	50	55	12.4	37.8	287	82.0
194	50	55	12.4	37.8	286	81.7
195	50	55	12.5	37.8	289	82.4
196	50	55	12.4	38.0	294	84.0

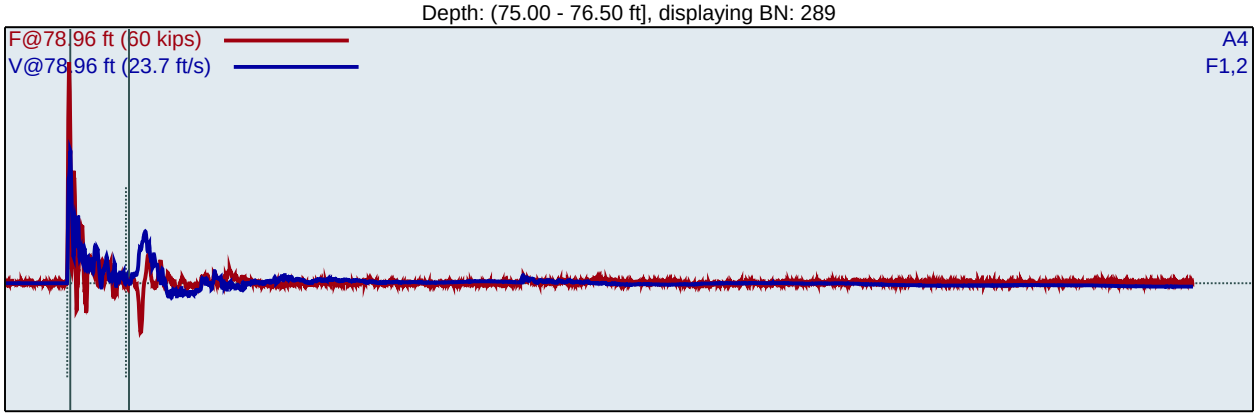
197	50	56	12.0	38.0	286	81.8
198	50	54	12.1	37.8	281	80.4
199	50	54	12.4	37.6	285	81.5
200	50	54	12.6	37.8	287	82.1
201	50	55	12.7	37.8	288	82.2
202	50	55	12.6	37.9	289	82.6
203	50	54	12.6	37.9	286	81.6
204	50	54	12.3	37.9	282	80.5
205	50	54	12.4	38.0	285	81.3
206	50	54	12.6	38.0	286	81.7
207	50	55	12.5	37.9	288	82.2
208	50	53	12.5	38.1	287	82.1
209	50	54	12.5	37.9	286	81.6
210	50	53	12.5	37.8	290	82.9
211	50	54	12.9	37.8	290	82.7
212	50	55	12.9	37.9	279	79.8
213	50	54	12.8	38.1	287	81.9
214	50	55	12.8	37.8	285	81.4
215	50	55	12.7	37.8	285	81.6
	Average	54	12.5	37.7	285	81.5
	Std Dev	1	0.3	0.2	5	1.4
	Maximum	56	13.1	38.1	305	87.1
	Minimum	52	11.8	37.2	271	77.6

N-value: 98

Sample Interval Time: 176.61 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 78.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (75.00 - 76.50 ft], displaying BN: 289



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
218	25	52	11.9	37.8	290	82.8
219	25	49	12.2	37.9	286	81.8
220	25	54	11.3	37.7	293	83.8
221	25	53	11.6	37.8	293	83.6
222	25	53	11.7	37.8	294	83.9
223	25	53	12.1	37.8	293	83.6
224	25	54	11.6	37.8	294	84.0
225	25	54	11.6	37.8	292	83.5
226	25	53	11.8	37.7	295	84.2
227	25	54	11.6	37.7	291	83.2
228	25	53	11.7	37.7	294	84.0
229	25	54	11.5	37.8	289	82.6
230	25	53	11.4	37.8	289	82.7
231	25	54	11.5	37.6	289	82.7
232	25	53	11.5	37.7	295	84.3
233	25	54	11.4	37.7	287	82.0
234	25	53	11.9	37.7	293	83.6
235	25	53	11.9	37.8	294	84.1
236	25	54	11.6	37.7	292	83.3
237	25	54	11.4	37.7	292	83.4
238	25	54	11.5	37.8	287	82.1
239	25	53	11.5	37.9	292	83.6
240	25	54	11.6	37.7	291	83.3
241	25	54	11.1	37.7	290	82.8
242	25	53	11.7	37.6	285	81.4
243	25	54	11.4	37.8	292	83.4
244	25	53	11.1	37.6	286	81.8
245	25	53	11.3	37.5	290	83.0
246	25	53	11.6	37.6	294	84.1
247	25	54	11.1	37.6	290	82.8
248	25	53	11.3	37.5	289	82.5
249	25	53	11.8	37.7	298	85.1

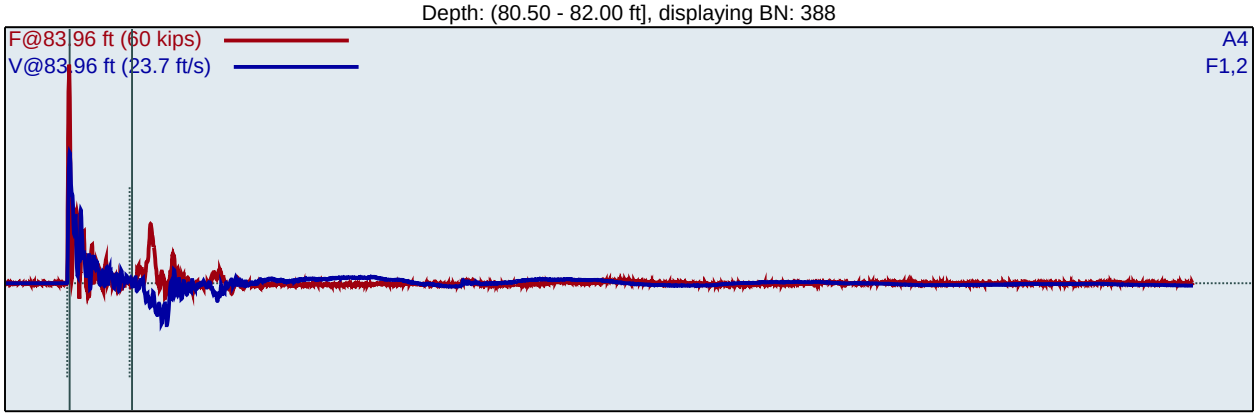
250	25	53	11.2	37.7	289	82.5
251	25	53	11.2	37.7	289	82.6
252	25	53	11.1	37.5	288	82.3
253	25	53	10.9	37.7	286	81.8
254	25	53	11.3	37.8	288	82.2
255	25	53	11.0	37.6	284	81.3
256	25	54	11.1	37.7	288	82.4
257	25	53	11.1	37.6	288	82.2
258	25	53	11.1	37.7	290	82.8
259	25	54	11.2	37.7	294	83.9
260	25	53	10.9	37.6	285	81.4
261	25	53	11.5	37.6	295	84.3
262	25	53	11.2	37.7	290	82.9
263	25	54	11.3	37.6	292	83.6
264	25	50	12.2	37.7	286	81.7
265	25	53	11.3	37.6	286	81.7
266	25	53	11.8	37.5	293	83.7
267	25	53	11.7	37.5	288	82.2
268	24	54	11.3	37.5	289	82.6
269	24	54	11.2	37.5	284	81.1
270	24	50	12.3	37.8	282	80.6
271	24	54	10.9	37.5	288	82.3
272	24	53	11.7	37.6	292	83.5
273	24	54	11.1	37.6	291	83.0
274	24	54	11.6	37.7	296	84.5
275	24	53	11.0	37.5	291	83.2
276	24	51	12.4	37.7	290	82.7
277	24	54	11.7	37.4	299	85.4
278	24	51	12.1	37.7	287	82.0
279	24	54	11.4	37.6	294	83.9
280	24	54	11.3	37.7	290	82.8
281	24	51	12.4	37.6	290	82.9
282	24	54	11.4	37.6	292	83.4
283	24	52	12.3	37.8	292	83.5
284	24	52	12.4	37.6	295	84.4
285	24	54	11.3	37.6	292	83.6
286	24	51	12.2	37.8	288	82.4
287	24	50	12.5	37.5	288	82.3
288	24	54	11.6	37.6	291	83.2
289	24	52	12.3	37.7	290	82.9
290	24	54	11.5	37.6	286	81.8
291	24	54	11.4	37.6	285	81.6
	Average	53	11.5	37.6	290	82.8
	Std Dev	1	0.5	0.1	4	1.0
	Maximum	54	12.5	37.8	299	85.4
	Minimum	50	10.9	37.4	282	80.6

N-value: 49

Sample Interval Time: 116.30 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 83.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (80.50 - 82.00 ft], displaying BN: 388



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
294	14	51	11.5	36.8	283	80.9
295	14	50	11.4	36.9	279	79.7
296	14	50	11.1	37.1	282	80.6
297	14	50	11.6	37.1	276	78.8
298	14	50	11.5	36.9	280	80.1
299	14	50	11.6	37.2	285	81.5
300	14	50	11.9	37.2	284	81.2
301	14	49	11.4	37.2	271	77.6
302	14	50	11.6	36.9	280	80.1
303	14	50	11.6	37.2	277	79.2
304	14	49	11.4	37.0	276	78.9
305	14	50	11.6	37.3	279	79.7
306	14	50	12.0	37.2	290	83.0
307	14	50	11.5	37.2	272	77.6
308	33	51	12.2	37.2	288	82.2
309	33	51	12.0	37.4	284	81.1
310	33	48	11.4	37.3	275	78.7
311	33	50	11.9	37.3	284	81.0
312	33	49	11.5	37.2	272	77.6
313	33	50	11.7	37.3	274	78.2
314	33	50	11.7	37.3	276	79.0
315	33	50	12.0	37.4	278	79.5
316	33	51	11.8	37.1	283	80.9
317	33	51	11.8	37.4	281	80.2
318	33	48	11.2	37.3	271	77.5
319	33	51	12.0	37.3	284	81.1
320	33	50	11.7	37.4	281	80.3
321	33	51	11.8	37.3	282	80.6
322	33	50	11.7	37.3	279	79.7
323	33	51	11.5	37.3	285	81.3
324	33	49	11.3	37.3	273	78.1
325	33	51	11.7	37.2	280	79.9

326	33	52	12.4	37.4	286	81.8
327	33	51	12.0	37.2	282	80.5
328	33	51	11.8	37.3	280	80.0
329	33	51	12.2	37.2	283	80.9
330	33	51	12.2	37.4	282	80.6
331	33	52	12.4	37.4	282	80.6
332	33	51	11.7	37.4	277	79.0
333	33	50	11.7	37.4	275	78.4
334	33	51	12.0	37.4	281	80.2
335	33	51	11.9	37.3	281	80.4
336	33	51	12.0	37.3	281	80.3
337	33	51	11.9	37.3	282	80.7
338	33	51	12.1	37.3	281	80.4
339	33	51	11.9	37.3	282	80.7
340	33	51	11.9	37.2	285	81.4
341	50	51	11.9	37.4	280	80.1
342	50	51	11.9	37.4	282	80.6
343	50	51	12.3	37.4	284	81.3
344	50	51	12.0	37.5	282	80.5
345	50	51	11.9	37.3	280	79.9
346	50	50	11.7	37.4	278	79.6
347	50	51	12.6	37.4	287	82.0
348	50	51	12.5	37.3	281	80.2
349	50	51	12.0	37.4	282	80.4
350	50	51	12.1	37.4	284	81.1
351	50	51	11.8	37.5	277	79.2
352	50	51	12.0	37.5	284	81.2
353	50	51	11.9	37.5	281	80.3
354	50	50	11.7	37.3	276	78.9
355	50	51	12.2	37.5	285	81.4
356	50	51	11.8	37.4	277	79.1
357	50	51	12.0	37.5	280	79.9
358	50	51	12.0	37.4	281	80.3
359	50	51	12.1	37.4	282	80.7
360	50	51	12.4	37.4	284	81.2
361	50	52	12.3	37.4	285	81.4
362	50	51	12.1	37.4	280	80.1
363	50	52	12.2	37.4	280	80.0
364	50	51	11.9	37.4	282	80.6
365	50	49	11.7	37.5	279	79.6
366	50	50	12.1	37.4	282	80.4
367	50	51	12.0	37.4	280	80.0
368	50	49	11.8	37.4	277	79.1
369	50	51	12.2	37.3	281	80.3
370	50	51	12.3	37.3	283	80.7
371	50	51	12.3	37.5	284	81.0
372	50	51	12.3	37.5	283	80.9
373	50	51	12.1	37.4	284	81.1
374	50	50	12.1	37.6	280	80.1
375	50	51	12.0	37.4	280	80.0
376	50	51	12.6	37.4	286	81.8
377	50	49	11.5	37.4	276	78.7
378	50	50	11.8	37.5	276	78.9
379	50	51	12.0	37.3	281	80.4
380	50	51	12.7	37.5	288	82.2
381	50	50	11.9	37.3	278	79.4
382	50	51	12.3	37.5	284	81.1
383	50	51	12.1	37.5	284	81.2
384	50	51	12.2	37.4	282	80.7
385	50	51	12.1	37.6	285	81.6
386	50	51	12.1	37.4	282	80.5

387	50	52	12.3	37.6	282	80.7
388	50	51	12.1	37.5	283	81.0
389	50	52	12.2	37.4	288	82.3
390	50	51	11.9	37.4	280	79.9
	Average	51	12.0	37.4	281	80.3
	Std Dev	1	0.3	0.1	3	1.0
	Maximum	52	12.7	37.6	288	82.3
	Minimum	48	11.2	37.1	271	77.5

N-value: 83

Sample Interval Time: 154.24 seconds.

Summary of SPT Test Results

Project: PD59, Test Date: 11/13/18

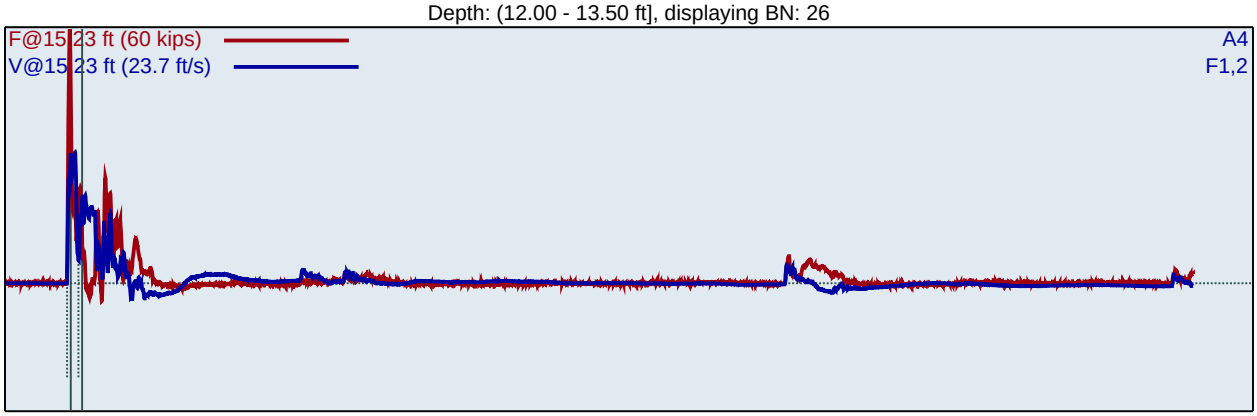
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
8.96	**2-50-0**	**50**	**67**	52	11.3	37.8	264	75.5
43.96	**13-13-20**	**33**	**44**	52	13.1	38.3	295	84.3
48.96	**14-48-50**	**98**	**131**	54	12.5	37.7	285	81.5
78.96	**25-25-24**	**49**	**65**	53	11.5	37.6	290	82.8
83.96	**14-33-50**	**83**	**111**	51	12.0	37.4	281	80.3
		Overall Average Values:		52	12.1	37.7	283	80.7
		Standard Deviation:		2	0.6	0.3	10	2.8
		Overall Maximum Value:		56	13.9	38.4	305	87.1
		Overall Minimum Value:		48	10.8	37.1	251	71.8

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 15.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (12.00 - 13.50 ft], displaying BN: 26



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
2	6	61	13.0	2.6	624	83.2
3	6	61	12.6	33.6	632	84.3
4	6	61	12.1	34.2	646	86.2
5	6	61	12.1	34.7	643	85.7
6	6	61	11.9	34.7	645	86.0
7	6	61	11.9	34.8	648	86.4
8	8	61	11.9	34.8	647	86.3
9	8	61	11.9	35.0	650	86.7
10	8	61	11.9	35.0	648	86.4
11	8	61	12.2	35.1	631	84.2
12	8	61	12.2	35.2	630	84.0
13	8	61	11.8	35.1	640	85.3
14	8	61	11.8	35.3	640	85.3
15	8	61	11.7	35.3	644	85.8
16	13	61	11.8	35.4	613	81.8
17	13	62	12.1	35.4	647	86.2
18	13	61	12.1	35.5	647	86.2
19	13	61	11.9	35.5	640	85.3
20	13	61	11.7	35.4	633	84.4
21	13	62	11.9	35.5	647	86.2
22	13	61	11.9	35.4	649	86.5
23	13	62	11.9	35.5	648	86.4
24	13	62	11.9	35.4	648	86.4
25	13	61	11.9	35.4	669	89.2
26	13	61	12.1	35.3	652	87.0
27	13	61	11.9	35.4	654	87.2
28	13	62	11.9	35.3	650	86.7

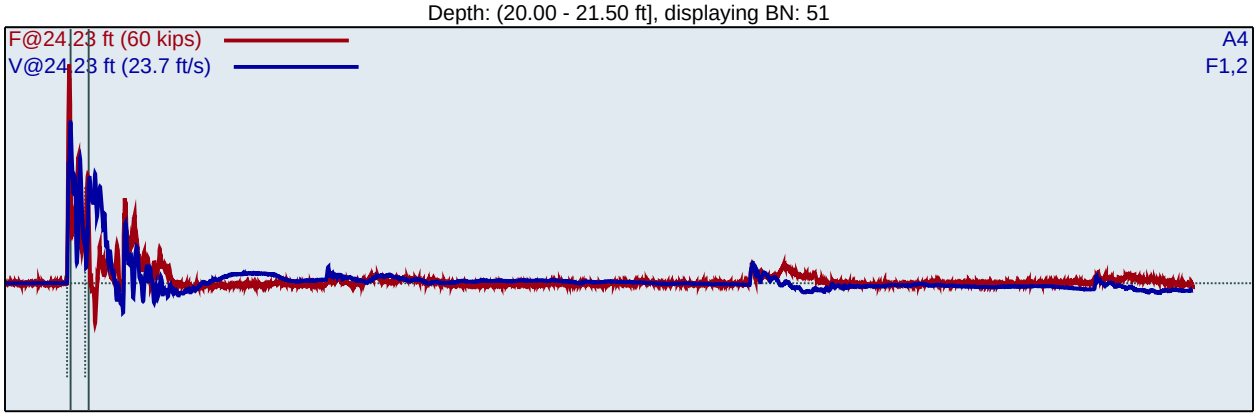
Average	61	11.9	35.3	644	85.9
Std Dev	0	0.1	0.2	11	1.4
Maximum	62	12.2	35.5	669	89.2
Minimum	61	11.7	34.8	613	81.8

N-value: 21

Sample Interval Time: 44.48 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 24.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (20.00 - 21.50 ft], displaying BN: 51



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

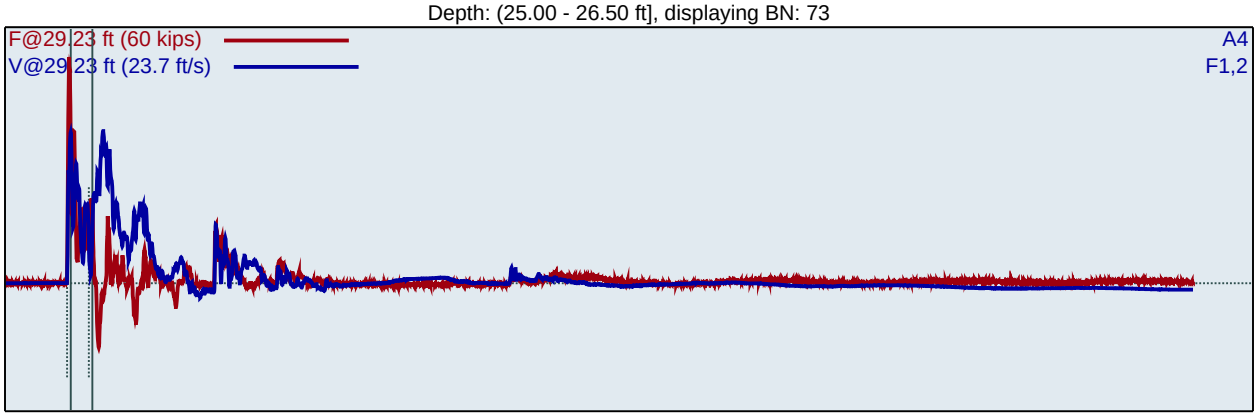
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
30	5	51	14.3	1.9	646	86.2
31	5	51	14.5	34.4	653	87.0
32	5	51	14.7	34.9	659	87.9
33	5	50	14.7	35.1	653	87.0
34	5	51	14.7	35.1	650	86.7
35	8	51	14.5	35.1	661	88.2
36	8	51	14.6	35.2	665	88.6
37	8	52	14.5	35.3	659	87.9
38	8	51	14.6	35.3	668	89.1
39	8	51	14.7	35.4	664	88.6
40	8	52	14.4	35.4	667	88.9
41	8	51	14.6	35.5	656	87.5
42	8	52	14.4	35.5	661	88.1
43	11	51	14.8	35.5	656	87.4
44	11	52	14.6	35.6	668	89.1
45	11	51	14.7	35.6	658	87.7
46	11	52	14.6	35.6	668	89.0
47	11	52	14.7	35.6	664	88.5
48	11	52	14.8	8.6	660	88.0
49	11	51	14.9	35.5	659	87.9
50	11	52	14.8	35.5	658	87.7
51	11	51	14.9	35.4	661	88.1
52	11	51	14.8	35.5	653	87.0
53	11	51	14.7	35.5	656	87.5
	Average	51	14.7	34.0	661	88.1
	Std Dev	0	0.1	6.0	5	0.6
	Maximum	52	14.9	35.6	668	89.1
	Minimum	51	14.4	8.6	653	87.0

N-value: 19

Sample Interval Time: 44.26 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 29.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (25.00 - 26.50 ft], displaying BN: 73



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

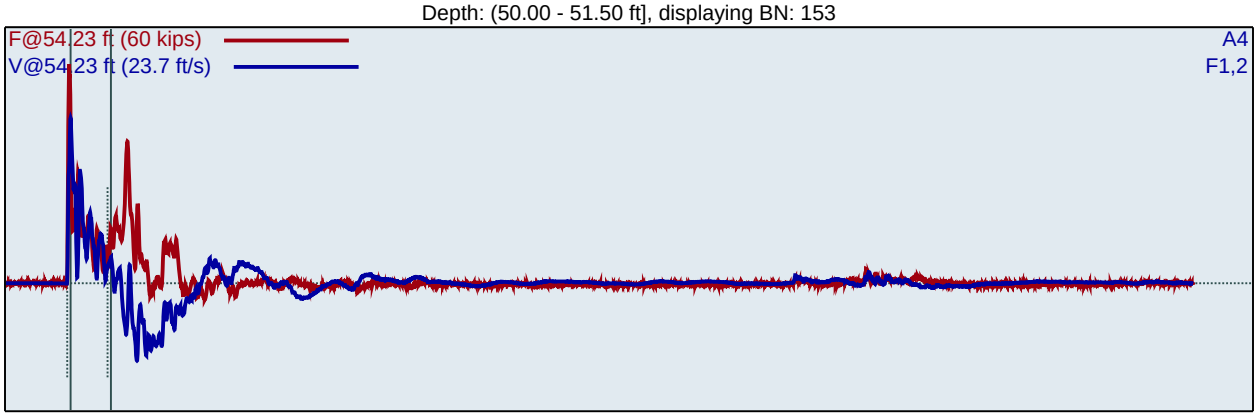
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
55	9	53	13.7	2.9	644	85.8
56	9	53	13.6	35.2	638	85.1
57	9	53	13.7	35.4	638	85.0
58	9	53	13.6	35.3	640	85.4
59	9	53	13.6	35.4	636	84.8
60	9	53	13.6	35.5	641	85.5
61	9	53	13.5	35.4	643	85.7
62	9	53	13.5	35.5	637	85.0
63	9	53	13.5	35.5	637	84.9
64	6	53	13.5	35.6	647	86.3
65	6	53	13.5	35.5	641	85.4
66	6	53	13.4	35.5	638	85.1
67	6	53	14.1	35.5	626	83.5
68	6	53	14.0	35.6	632	84.2
69	6	53	14.0	35.5	632	84.3
70	6	53	14.1	35.6	632	84.2
71	6	53	14.0	35.6	636	84.7
72	6	53	14.4	35.6	645	86.0
73	6	53	14.1	35.6	650	86.6
74	6	53	14.1	35.7	640	85.3
75	6	53	13.9	35.8	640	85.4
	Average	53	13.9	35.6	638	85.1
	Std Dev	0	0.3	0.1	7	0.9
	Maximum	53	14.4	35.8	650	86.6
	Minimum	53	13.4	35.5	626	83.5

N-value: 12

Sample Interval Time: 33.85 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 54.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (50.00 - 51.50 ft], displaying BN: 153



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
78	28	51	15.5	34.9	643	85.7
79	28	52	15.5	34.6	634	84.5
80	28	51	15.2	35.0	631	84.1
81	28	51	15.2	34.7	643	85.8
82	28	51	15.3	34.8	646	86.1
83	28	51	15.4	34.9	642	85.6
84	28	51	15.2	34.9	639	85.3
85	28	51	15.2	34.9	640	85.3
86	28	51	15.3	34.9	643	85.7
87	28	51	15.2	35.0	649	86.5
88	28	52	15.1	35.0	637	85.0
89	28	51	15.2	35.0	644	85.8
90	28	52	15.2	35.0	645	86.0
91	28	51	15.2	34.9	636	84.9
92	28	51	15.2	34.9	647	86.2
93	28	52	15.0	35.0	644	85.8
94	28	51	15.2	35.0	646	86.1
95	28	51	15.0	35.1	641	85.4
96	28	51	15.1	34.9	645	85.9
97	28	51	15.1	35.0	641	85.5
98	28	51	15.1	35.0	645	86.1
99	28	51	15.3	34.9	653	87.1
100	28	51	15.3	35.2	655	87.3
101	28	51	15.0	35.2	650	86.7
102	28	51	15.1	35.2	649	86.6
103	28	51	15.1	35.3	653	87.1
104	28	51	15.1	34.9	645	86.0
105	28	51	15.0	35.0	647	86.3
106	50	51	15.1	35.2	644	85.8
107	50	51	15.2	35.1	649	86.5
108	50	51	15.1	35.0	641	85.5
109	50	51	15.2	35.0	638	85.1

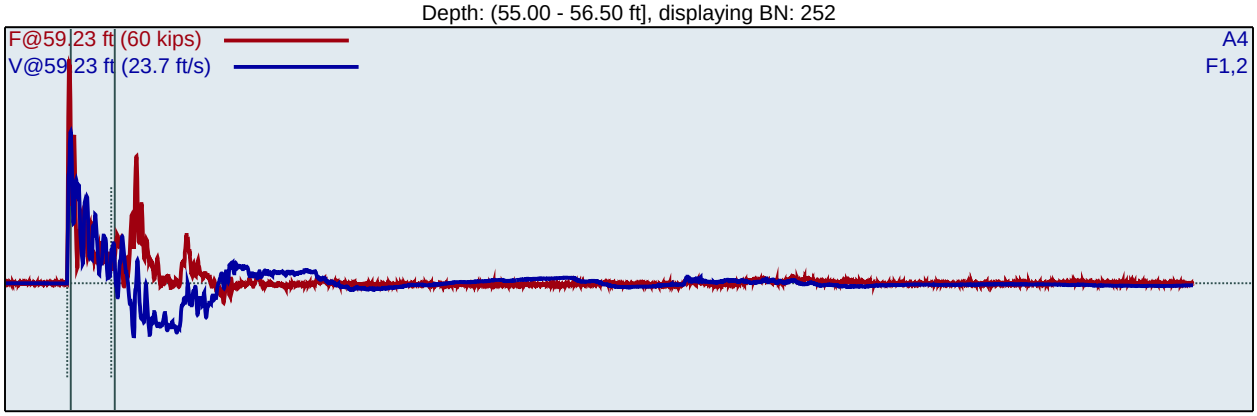
110	50	51	15.2	35.1	645	85.9
111	50	51	15.1	34.9	641	85.5
112	50	51	15.2	34.9	647	86.2
113	50	51	15.3	35.2	652	86.9
114	50	51	15.1	35.0	645	86.0
115	50	51	15.2	34.9	649	86.5
116	50	51	15.2	35.4	644	85.9
117	50	51	15.2	35.2	638	85.1
118	50	51	15.3	35.0	660	88.0
119	50	51	15.2	35.4	649	86.5
120	50	51	15.2	35.3	645	86.0
121	50	51	15.2	35.2	643	85.8
122	50	51	15.2	35.2	644	85.8
123	50	51	15.2	35.4	649	86.6
124	50	51	15.3	35.1	654	87.2
125	50	51	15.2	35.0	655	87.4
126	50	51	15.3	35.2	650	86.7
127	50	51	15.2	35.2	646	86.2
128	50	51	15.3	35.0	651	86.8
129	50	51	15.2	35.0	650	86.6
130	50	51	15.3	35.1	654	87.2
131	50	50	15.4	34.7	658	87.8
132	50	51	15.2	35.0	652	86.9
133	50	51	15.2	34.9	652	87.0
134	50	51	15.3	34.9	645	86.0
135	50	51	15.2	35.0	653	87.1
136	50	51	15.3	35.2	667	88.9
137	50	51	15.4	35.0	661	88.2
138	50	51	15.6	34.9	659	87.8
139	50	52	15.3	35.1	652	87.0
140	50	51	15.5	35.3	651	86.8
141	50	51	15.2	35.0	651	86.8
142	50	51	15.4	34.9	665	88.6
143	50	51	15.5	35.3	660	88.0
144	50	51	15.5	34.9	649	86.5
145	50	51	15.5	35.3	664	88.5
146	50	51	15.3	35.3	654	87.2
147	50	51	15.3	35.0	661	88.2
148	50	52	15.5	35.1	660	88.0
149	50	51	15.2	35.5	652	86.9
150	50	51	15.2	35.1	650	86.7
151	50	51	15.3	35.4	638	85.0
152	50	51	15.2	35.1	651	86.8
153	50	51	15.3	35.4	652	87.0
154	50	51	15.4	35.0	666	88.9
155	50	51	15.3	35.3	657	87.6
	Average	51	15.3	35.1	651	86.8
	Std Dev	0	0.1	0.2	7	1.0
	Maximum	52	15.6	35.5	667	88.9
	Minimum	50	15.1	34.7	638	85.0

N-value: 50

Sample Interval Time: 131.85 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 59.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (55.00 - 56.50 ft], displaying BN: 252



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
158	12	53	14.4	35.6	652	87.0
159	12	53	14.3	35.7	649	86.6
160	12	53	14.3	35.8	651	86.8
161	12	53	14.3	35.6	659	87.9
162	12	53	14.3	35.6	653	87.1
163	12	52	14.3	35.7	648	86.4
164	12	52	14.4	35.6	655	87.3
165	12	52	14.2	35.5	650	86.7
166	12	52	14.4	35.6	656	87.4
167	12	53	14.2	35.5	649	86.5
168	12	52	14.1	35.8	648	86.4
169	12	52	14.3	35.6	651	86.9
170	35	53	14.3	35.7	653	87.1
171	35	53	14.1	35.8	652	87.0
172	35	53	14.0	35.8	650	86.7
173	35	53	14.1	35.6	655	87.3
174	35	53	14.2	35.7	656	87.5
175	35	52	14.2	35.6	642	85.6
176	35	52	14.4	35.7	643	85.7
177	35	52	14.2	35.7	638	85.0
178	35	52	14.3	35.8	640	85.3
179	35	53	14.1	35.6	655	87.4
180	35	53	14.0	35.8	649	86.6
181	35	53	14.1	35.7	649	86.5
182	35	53	14.2	35.8	645	85.9
183	35	53	14.0	35.8	654	87.1
184	35	53	14.1	35.5	657	87.6
185	35	53	14.2	35.7	645	86.0
186	35	53	14.3	35.7	640	85.3
187	35	53	14.2	35.6	640	85.4
188	35	53	14.1	35.7	645	86.0
189	35	53	14.2	35.7	645	85.9

190	35	52	14.2	35.8	650	86.7
191	35	52	14.2	35.6	652	86.9
192	35	52	14.2	35.6	647	86.2
193	35	52	14.3	35.7	650	86.7
194	35	52	14.5	35.7	659	87.8
195	35	52	14.4	35.8	647	86.2
196	35	52	14.5	35.7	652	86.9
197	35	52	14.6	35.9	647	86.3
198	35	53	14.4	35.7	644	85.8
199	35	53	14.3	35.8	648	86.4
200	35	53	14.4	35.6	652	86.9
201	35	53	14.2	35.6	647	86.2
202	35	53	14.3	35.7	645	86.1
203	35	53	14.3	35.8	650	86.7
204	35	53	14.3	35.7	648	86.4
205	50	53	14.2	36.0	655	87.3
206	50	53	14.2	35.9	652	86.9
207	50	53	14.1	35.9	654	87.1
208	50	53	14.2	35.9	653	87.1
209	50	53	14.1	35.9	649	86.6
210	50	54	14.3	35.7	656	87.5
211	50	53	14.3	35.7	658	87.8
212	50	53	14.3	35.7	661	88.2
213	50	53	14.3	35.8	654	87.2
214	50	53	14.6	35.7	653	87.1
215	50	52	14.3	35.7	646	86.1
216	50	53	14.7	35.7	648	86.4
217	50	53	14.7	35.7	653	87.1
218	50	53	14.4	35.8	663	88.4
219	50	53	14.1	35.7	657	87.6
220	50	52	14.2	35.7	649	86.6
221	50	53	13.9	35.8	658	87.8
222	50	54	14.0	35.8	656	87.5
223	50	54	14.1	35.7	666	88.8
224	50	54	14.2	35.9	663	88.4
225	50	53	14.5	35.8	649	86.5
226	50	53	14.4	35.8	662	88.3
227	50	53	14.2	35.8	653	87.0
228	50	53	14.7	35.6	653	87.0
229	50	53	14.2	35.8	644	85.8
230	50	52	14.6	35.7	652	86.9
231	50	52	14.5	35.8	640	85.4
232	50	53	14.6	35.7	653	87.1
233	50	52	14.4	35.8	645	86.1
234	50	53	14.4	35.8	637	85.0
235	50	53	14.5	35.8	648	86.4
236	50	53	14.3	35.8	640	85.3
237	50	53	14.2	36.1	643	85.8
238	50	53	14.3	35.6	655	87.3
239	50	53	14.2	35.8	652	86.9
240	50	53	14.0	35.7	647	86.3
241	50	53	14.0	35.7	653	87.1
242	50	52	14.0	35.9	654	87.3
243	50	53	14.1	35.9	645	86.0
244	50	53	13.9	35.9	649	86.5
245	50	52	13.8	35.7	656	87.4
246	50	53	13.9	36.0	652	87.0
247	50	53	14.0	35.9	653	87.0
248	50	53	13.8	35.9	653	87.1
249	50	53	13.9	35.7	649	86.5
250	50	53	14.0	35.8	649	86.6

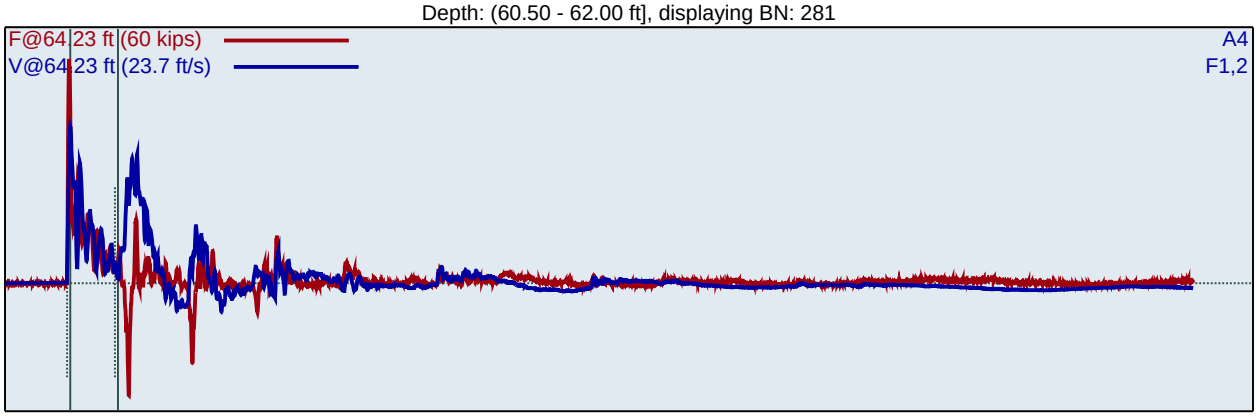
251	50	53	14.2	35.7	651	86.8
252	50	52	14.0	35.7	646	86.1
253	50	53	14.0	35.7	646	86.1
254	50	52	14.1	35.8	652	86.9
	Average	53	14.2	35.7	650	86.7
	Std Dev	0	0.2	0.1	6	0.8
	Maximum	54	14.7	36.1	666	88.8
	Minimum	52	13.8	35.5	637	85.0

N-value: 85

Sample Interval Time: 161.20 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 64.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (60.50 - 62.00 ft], displaying BN: 281



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
256	9	52	14.4	1.9	639	85.3
257	9	52	14.5	35.2	634	84.6
258	9	52	14.5	35.3	671	89.4
259	9	53	14.5	35.1	669	89.2
260	9	53	14.6	35.5	667	88.9
261	9	53	14.6	35.4	665	88.7
262	9	53	14.5	35.5	664	88.5
263	9	53	14.5	35.5	670	89.3
264	9	53	14.5	35.6	668	89.0
265	9	53	14.7	35.5	670	89.3
266	9	53	14.8	35.6	645	86.0
267	9	53	14.7	35.5	672	89.6
268	9	53	14.5	35.6	669	89.2
269	9	53	14.7	35.5	667	88.9
270	9	53	14.6	35.6	662	88.3
271	9	53	14.6	35.6	670	89.3
272	9	53	14.8	35.6	668	89.1
273	9	53	14.5	35.6	661	88.1
274	10	53	14.6	35.6	644	85.8
275	10	53	14.5	35.5	663	88.5
276	10	53	14.4	35.5	651	86.7
277	10	53	14.6	35.5	638	85.0
278	10	53	14.6	35.6	648	86.4
279	10	52	14.5	35.6	634	84.5
280	10	53	14.5	35.7	636	84.8
281	10	53	14.5	35.6	661	88.1
282	10	53	14.4	35.6	665	88.7
283	10	53	14.2	35.8	660	88.0

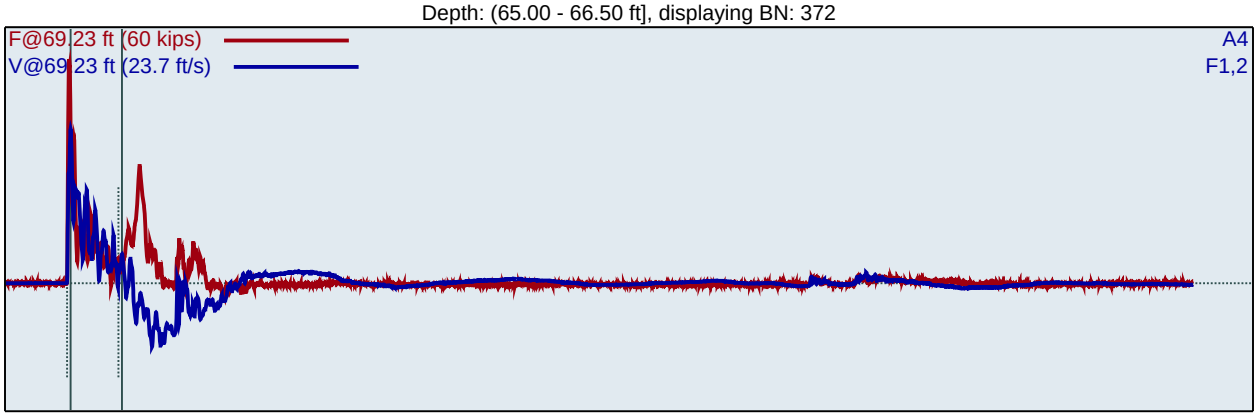
Average	53	14.6	35.6	657	87.6
Std Dev	0	0.1	0.1	12	1.6
Maximum	53	14.8	35.8	672	89.6
Minimum	52	14.2	35.5	634	84.5

N-value: 19

Sample Interval Time: 45.52 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 69.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (65.00 - 66.50 ft], displaying BN: 372



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
284	41	53	14.2	1.9	646	86.2
285	41	53	14.2	2.2	642	85.6
286	41	52	14.2	35.2	648	86.4
287	41	52	14.1	35.3	647	86.3
288	41	53	14.0	35.4	648	86.4
289	41	53	14.0	35.2	651	86.7
290	41	53	14.1	35.3	646	86.1
291	41	53	14.1	35.1	654	87.2
292	41	53	14.0	35.4	653	87.1
293	41	53	14.1	35.4	655	87.3
294	41	52	14.2	35.4	661	88.2
295	41	52	14.2	35.5	658	87.7
296	41	52	14.1	35.4	653	87.1
297	41	52	14.3	35.4	656	87.4
298	41	52	14.3	35.4	653	87.0
299	41	52	14.2	35.4	658	87.7
300	41	52	14.3	35.4	655	87.4
301	41	52	14.2	35.5	647	86.3
302	41	52	14.5	35.4	636	84.8
303	41	52	14.4	35.4	638	85.1
304	41	52	14.0	35.3	638	85.0
305	41	52	13.9	35.4	645	86.0
306	41	52	13.9	35.4	643	85.8
307	41	52	14.2	35.5	640	85.3
308	41	52	14.5	35.3	642	85.6
309	41	52	14.4	35.3	646	86.1
310	41	52	14.4	35.5	642	85.6
311	41	52	14.5	35.4	645	86.0
312	41	52	14.4	35.5	644	85.8
313	41	52	14.4	35.5	645	86.0
314	41	52	14.4	35.5	644	85.9
315	41	52	14.3	35.5	646	86.2

316	41	52	14.2	35.4	642	85.6
317	41	52	14.4	35.3	646	86.1
318	41	51	14.3	35.5	642	85.6
319	41	52	14.3	35.7	658	87.7
320	41	52	14.3	35.4	643	85.8
321	41	51	14.6	35.6	649	86.6
322	41	52	14.4	35.6	641	85.5
323	41	52	14.4	35.5	638	85.1
324	41	52	14.4	35.5	641	85.5
325	50	52	14.4	35.5	643	85.8
326	50	52	14.3	35.7	649	86.6
327	50	52	14.3	35.8	646	86.1
328	50	52	14.3	35.5	641	85.5
329	50	52	14.3	35.6	639	85.1
330	50	52	14.5	35.6	648	86.4
331	50	52	14.3	35.5	641	85.5
332	50	52	14.2	35.8	641	85.4
333	50	52	14.3	35.7	647	86.2
334	50	52	14.3	35.7	640	85.4
335	50	52	14.3	35.7	649	86.5
336	50	52	14.3	35.7	643	85.8
337	50	52	14.3	35.7	645	86.0
338	50	52	14.3	35.6	646	86.2
339	50	52	14.4	35.6	645	86.0
340	50	52	14.3	35.7	645	86.1
341	50	52	14.3	35.6	654	87.3
342	50	52	14.3	35.7	653	87.1
343	50	52	14.2	35.8	647	86.3
344	50	52	14.2	35.7	647	86.3
345	50	52	14.3	35.5	648	86.4
346	50	52	14.2	35.7	648	86.4
347	50	52	14.3	35.5	649	86.5
348	50	52	14.2	35.5	666	88.7
349	50	52	14.1	35.4	655	87.3
350	50	52	14.2	35.5	662	88.3
351	50	52	14.6	35.4	653	87.1
352	50	52	14.5	35.5	647	86.3
353	50	52	14.5	35.3	651	86.8
354	50	52	14.5	35.4	654	87.2
355	50	52	14.3	35.5	652	86.9
356	50	52	14.4	35.6	651	86.8
357	50	52	14.4	35.6	652	87.0
358	50	52	14.4	35.4	650	86.7
359	50	52	14.4	35.7	650	86.7
360	50	52	14.3	35.3	655	87.3
361	50	53	14.1	35.6	661	88.1
362	50	52	14.2	35.7	649	86.5
363	50	53	14.2	35.7	654	87.2
364	50	53	13.9	35.7	661	88.2
365	50	53	14.3	35.4	659	87.8
366	50	53	14.4	35.7	656	87.5
367	50	53	14.2	35.5	652	87.0
368	50	52	14.4	36.1	658	87.7
369	50	52	14.3	35.9	655	87.4
370	50	52	14.4	36.1	654	87.2
371	50	52	14.5	36.2	653	87.1
372	50	52	14.3	36.3	657	87.7
373	50	52	14.6	36.3	658	87.8
374	50	52	14.5	36.1	659	87.8

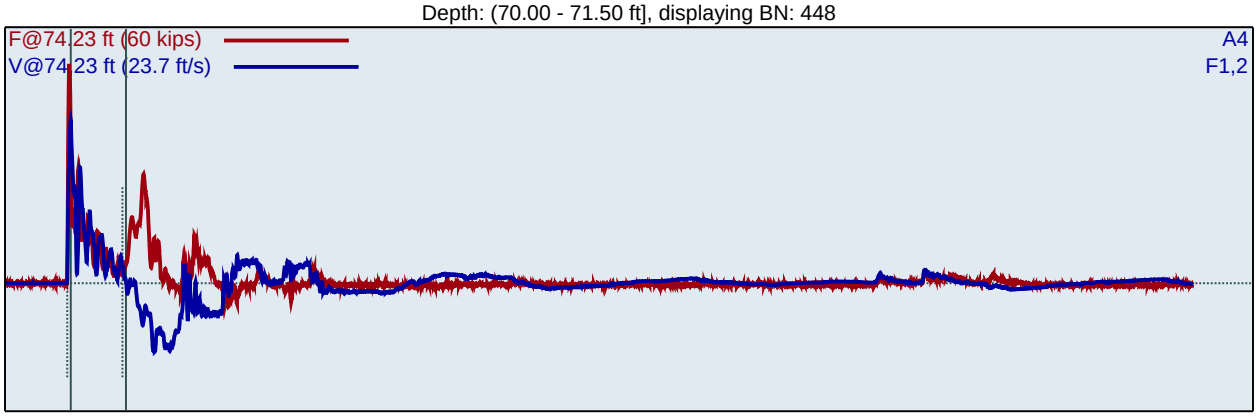
Average	52	14.3	35.7	651	86.8
Std Dev	0	0.1	0.2	6	0.8
Maximum	53	14.6	36.3	666	88.7
Minimum	52	13.9	35.3	639	85.1

N-value: 50

Sample Interval Time: 177.25 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 74.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (70.00 - 71.50 ft], displaying BN: 448



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
376	7	51	14.7	2.1	621	82.8
377	7	51	14.7	34.1	631	84.1
378	7	52	14.8	34.3	636	84.8
379	7	52	14.7	34.4	649	86.5
380	7	51	14.8	34.4	647	86.3
381	7	51	14.5	34.6	644	85.9
382	7	52	14.7	34.7	655	87.3
383	22	52	14.8	34.7	630	84.0
384	22	52	14.6	34.8	621	82.8
385	22	52	14.8	34.8	634	84.5
386	22	52	14.7	34.9	628	83.8
387	22	52	14.7	34.7	638	85.1
388	22	51	14.7	35.0	612	81.6
389	22	51	15.0	34.8	650	86.7
390	22	51	14.7	34.9	649	86.5
391	22	52	14.8	35.0	645	86.0
392	22	52	14.9	35.0	659	87.9
393	22	52	14.8	34.9	646	86.1
394	22	52	14.9	35.0	654	87.1
395	22	51	15.0	35.0	652	87.0
396	22	52	14.9	34.9	648	86.4
397	22	52	14.9	34.9	650	86.6
398	22	51	14.9	35.2	653	87.0
399	22	51	15.0	35.0	655	87.4
400	22	51	15.1	35.0	655	87.3
401	22	51	15.0	35.0	657	87.6
402	22	51	15.1	35.0	661	88.2
403	22	51	15.2	34.9	653	87.1
404	22	51	15.2	35.2	652	86.9
405	46	51	14.8	34.9	645	86.0
406	46	51	14.9	34.9	637	84.9
407	46	51	14.8	34.8	653	87.1

408	46	51	15.0	34.7	657	87.6
409	46	51	14.5	34.7	639	85.2
410	46	51	15.1	34.7	645	86.0
411	46	51	14.9	34.8	649	86.6
412	46	51	14.7	34.7	652	86.9
413	46	52	14.6	34.6	646	86.1
414	46	51	14.6	34.7	644	85.9
415	46	51	14.7	34.8	645	85.9
416	46	51	14.8	34.8	654	87.3
417	46	51	14.7	34.9	646	86.1
418	46	51	14.8	34.8	648	86.4
419	46	51	14.7	34.7	649	86.5
420	46	52	14.8	35.0	642	85.6
421	46	51	14.9	35.0	657	87.6
422	46	51	14.8	35.2	654	87.2
423	46	51	15.0	35.1	654	87.2
424	46	52	14.8	35.4	650	86.7
425	46	51	15.0	35.2	660	87.9
426	46	52	14.8	35.7	649	86.5
427	46	51	15.0	35.2	643	85.7
428	46	51	14.9	35.3	646	86.2
429	46	51	15.0	35.8	648	86.4
430	46	51	15.2	35.1	649	86.6
431	46	51	15.0	35.6	640	85.3
432	46	52	15.0	35.7	650	86.6
433	46	51	15.0	35.3	647	86.3
434	46	51	15.1	35.7	644	85.9
435	46	52	14.9	35.8	651	86.9
436	46	51	15.2	35.8	646	86.1
437	46	52	14.7	35.6	639	85.2
438	46	52	14.9	35.7	646	86.2
439	46	51	15.1	35.4	649	86.5
440	46	51	14.8	35.5	640	85.3
441	46	51	15.1	35.4	657	87.5
442	46	52	14.8	35.4	643	85.7
443	46	52	14.9	35.3	638	85.0
444	46	52	15.1	35.3	645	86.1
445	46	52	14.9	35.3	652	87.0
446	46	52	15.0	34.7	646	86.2
447	46	51	15.0	34.8	637	84.9
448	46	51	15.1	34.8	642	85.6
449	46	51	14.9	35.0	643	85.7
450	46	52	14.9	34.7	643	85.8
	Average	51	14.9	35.1	647	86.2
	Std Dev	0	0.2	0.3	9	1.1
	Maximum	52	15.2	35.8	661	88.2
	Minimum	51	14.5	34.6	612	81.6

N-value: 68

Sample Interval Time: 126.81 seconds.

Summary of SPT Test Results

Project: PD59, Test Date: 11/13/18

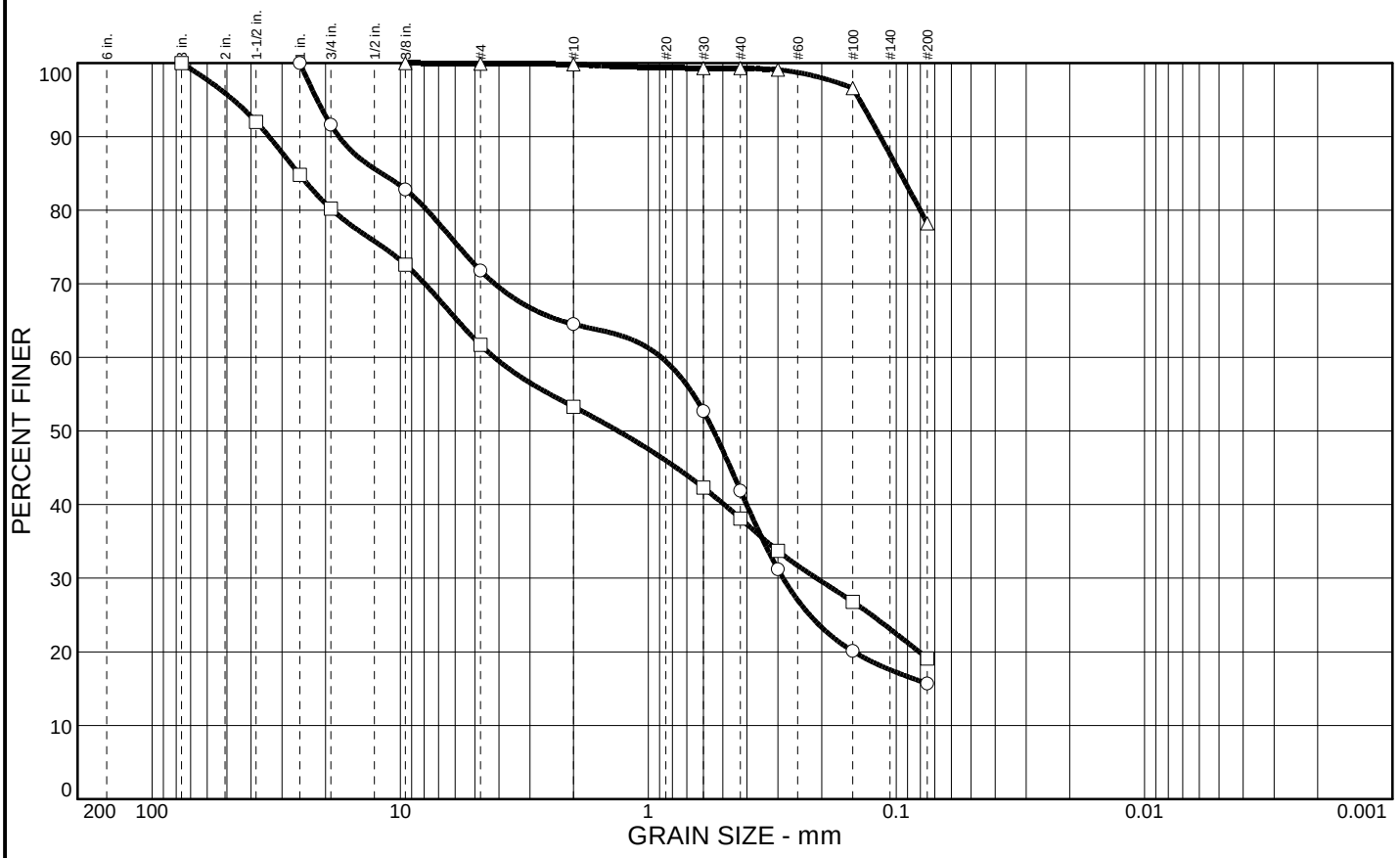
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
15.23	**6-8-13**	**21**	**30**	61	11.9	35.3	644	85.9
24.23	**5-8-11**	**19**	**27**	51	14.7	34.0	661	88.1
29.23	**9-6-6**	**12**	**17**	53	13.9	35.6	638	85.1
54.23	**28-50-0**	**50**	**72**	51	15.3	35.1	651	86.8
59.23	**12-35-50**	**85**	**122**	53	14.2	35.7	650	86.7
64.23	**9-9-10**	**19**	**27**	53	14.6	35.6	657	87.6
69.23	**41-50-0**	**50**	**72**	52	14.3	35.7	651	86.8
74.23	**7-22-46**	**68**	**98**	51	14.9	35.1	647	86.2
		Overall Average Values:		53	14.4	35.4	650	86.7
		Standard Deviation:		2	0.8	1.5	9	1.2
		Overall Maximum Value:		62	15.6	36.3	672	89.6
		Overall Minimum Value:		50	11.7	8.6	612	81.6

ATTACHMENT 4
LABORATORY TEST RESULTS

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		28.2	56.1	15.7					
□		38.3	42.6	19.1					
△		0.1	21.7	78.2					

SIEVE inches size	PERCENT FINER ○	□	△
3"		100.0	
1.5"		92.0	
1"	100.0	84.8	
3/4"	91.6	80.2	
3/8"	82.8	72.6	100.0
GRAIN SIZE			
D_{60}	0.886	4.18	
D_{30}	0.286	0.210	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	71.8	61.7	99.9
#10	64.5	53.3	99.8
#30	52.7	42.3	99.3
#40	41.9	38.1	99.3
#50	31.2	33.7	99.1
#100	20.1	26.8	96.6
#200	15.7	19.1	78.2

SOIL DESCRIPTION

○ Yellowish Brown Silty SAND w/ Gravel (slightly plastic)

□ Yellowish Brown Silty SAND w/ Gravel grading to Weathered Rock

△ Olive Brown SILT w/ Sand

REMARKS:

○ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

□ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

△

○ Source: GT18-01 Sample No.: 01-04B Elev./Depth: 18.5-19'

□ Source: GT18-01 Sample No.: 01-06B Elev./Depth: 30.5-31'

△ Source: GT18-02 Sample No.: 02-09B Elev./Depth: 45.5-46'

COOPER TESTING LABORATORY

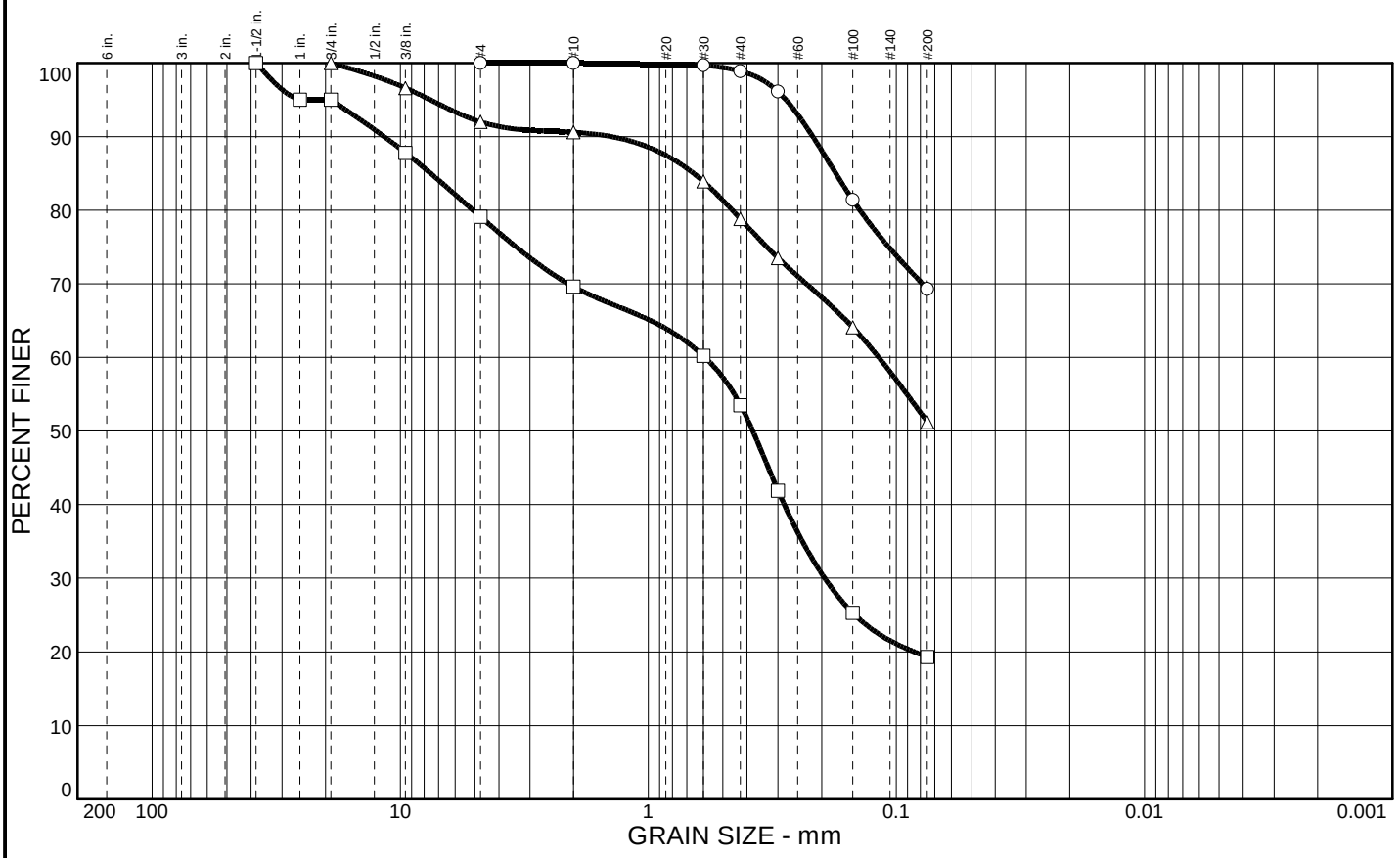
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			30.7	69.3					
□		20.9	59.8	19.3					
△		8.0	40.8	51.2					

SIEVE inches size	PERCENT FINER ○	□	△
1.5"		100.0	
1"		95.0	
3/4"		95.0	100.0
3/8"		87.8	96.6
GRAIN SIZE			
D_{60}		0.591	0.118
D_{30}		0.195	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	79.1	92.0
#10	100.0	69.6	90.6
#30	99.7	60.2	83.9
#40	98.9	53.5	78.8
#50	96.1	41.9	73.5
#100	81.4	25.3	64.1
#200	69.3	19.3	51.2

SOIL DESCRIPTION

○ Yellowish Brown Sandy CLAY

□ Dark Brown Clayey SAND w/ Gravel change to Olive Brown Clayey SAND w/ Gravel

△ Olive Sandy CLAY change to Yellowish Brown

REMARKS:

○

□ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

△

○ Source: GT18-03 Sample No.: 03-03B Elev./Depth: 12.5-13'

□ Source: GT18-03 Sample No.: 03-05B Elev./Depth: 20.5-21'

△ Source: GT18-03 Sample No.: 03-06C Elev./Depth: 26-26.5'

COOPER TESTING LABORATORY

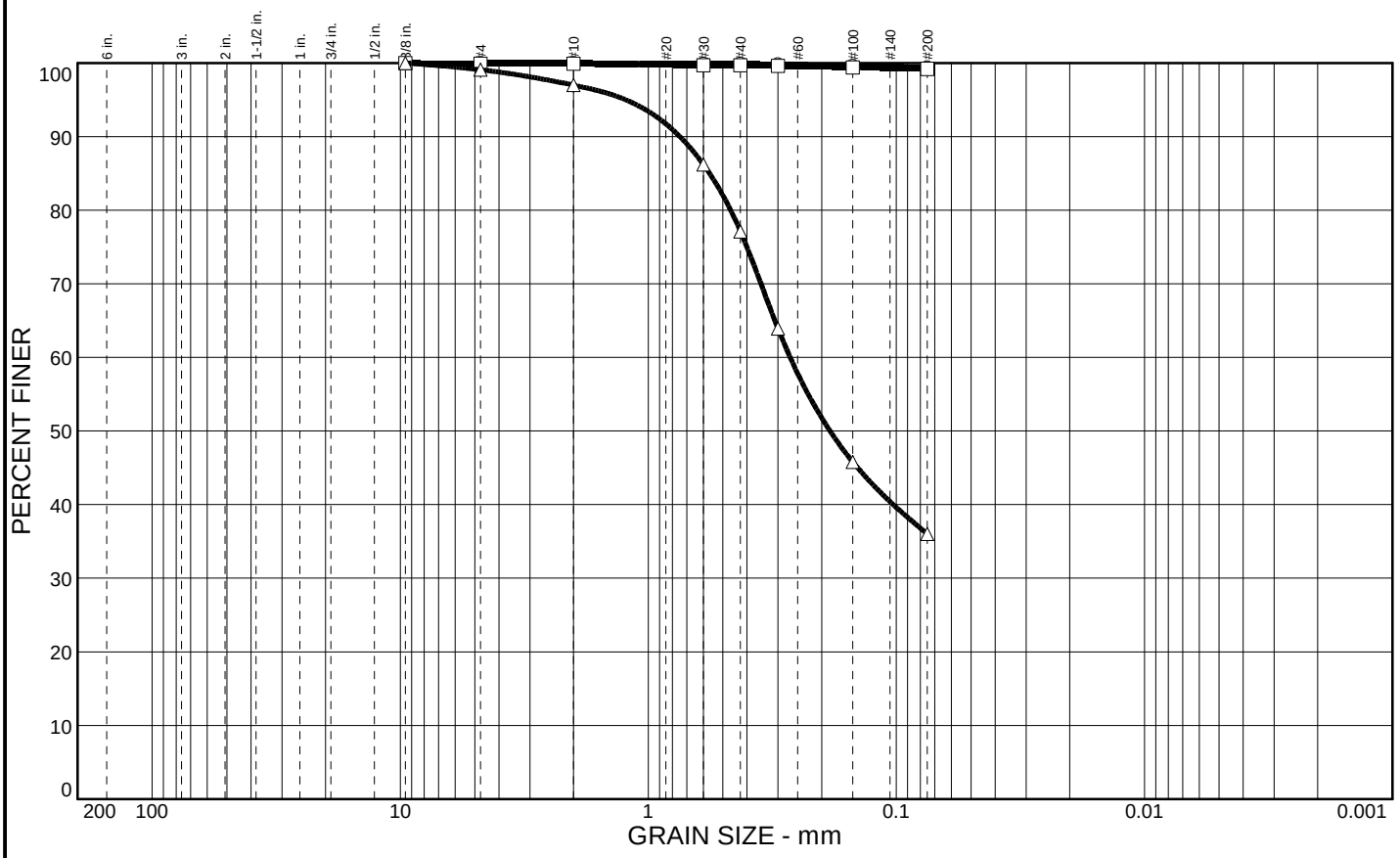
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			0.6	99.4		CH		28	64
□		0.1	0.7	99.2				28	71
△		0.9	63.1	36.0					

SIEVE inches size	PERCENT FINER ○	□	△
3/8"		100.0	100.0
GRAIN SIZE			
D_{60}			0.268
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	99.9	99.1
#10	100.0	99.9	97.0
#30	99.9	99.7	86.2
#40	99.9	99.7	77.1
#50	99.8	99.6	63.9
#100	99.6	99.4	45.8
#200	99.4	99.2	36.0

SOIL DESCRIPTION

○ Olive Gray Fat CLAY

□ Olive Brown Fat CLAY

△ Yellowish Brown Clayey SAND

REMARKS:

○

□

△

○ Source: GT18-03 Sample No.: 03-09 Elev./Depth: 40-41.5'

□ Source: GT18-05 Sample No.: 05-05 Elev./Depth: 25-26.5'

△ Source: GT18-06 Sample No.: 06-01B Elev./Depth: 6-6.5'

COOPER TESTING LABORATORY

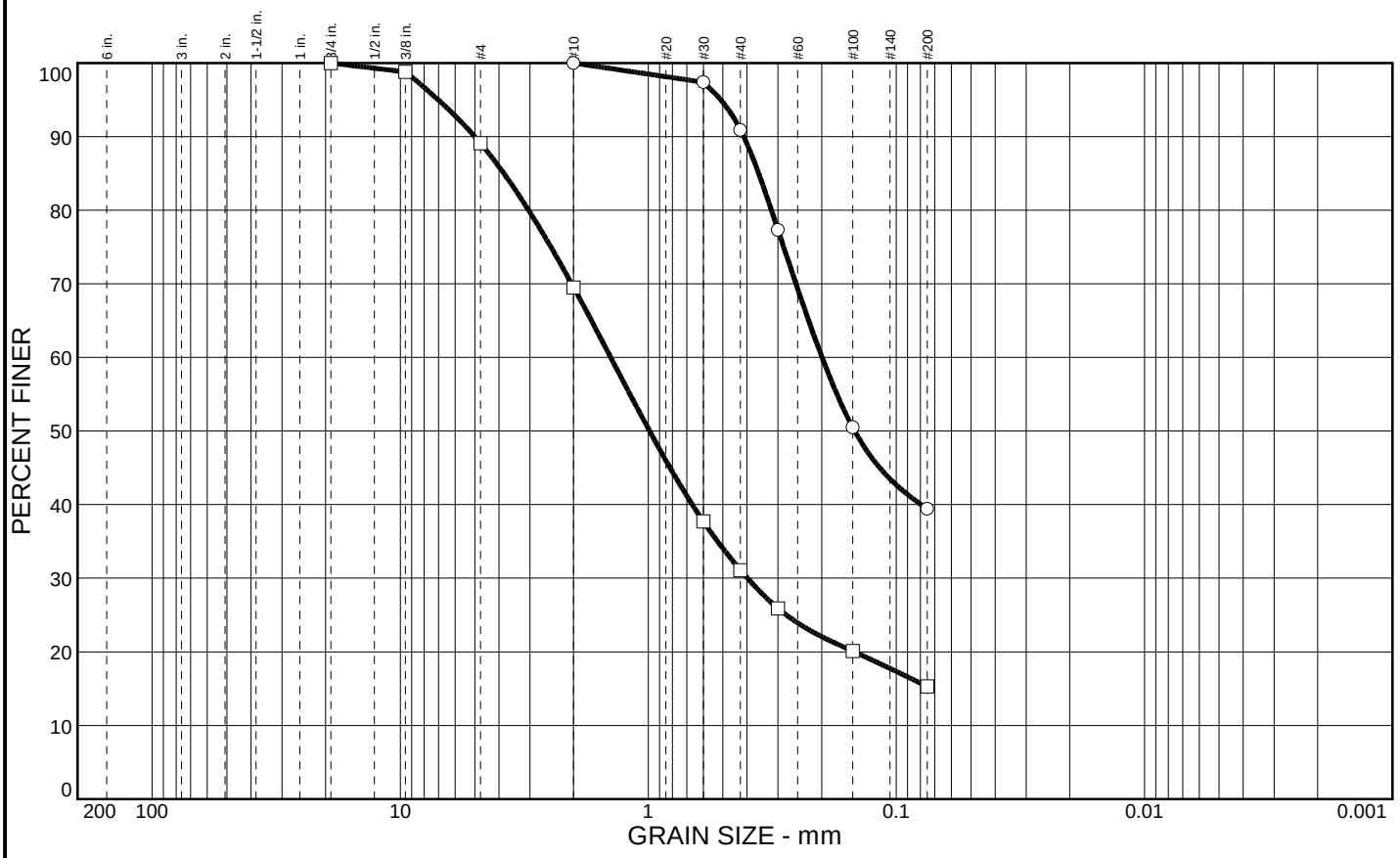
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			60.6	39.4					
□		10.9	73.8	15.3					

SIEVE inches size	PERCENT FINER ○	□	
3/4"		100.0	
3/8"		98.8	
GRAIN SIZE			
D_{60}	0.199	1.42	
D_{30}		0.398	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	
#4		89.1	
#10	100.0	69.5	
#30	97.4	37.7	
#40	90.9	31.1	
#50	77.3	25.9	
#100	50.5	20.1	
#200	39.4	15.3	

SOIL DESCRIPTION

○ Yellowish Brown Clayey SAND

□ Dark Brown Clayey SAND

REMARKS:

○

□

○ Source: GT18-06 Sample No.: 06-03 Elev./Depth: 15-16.5'

□ Source: GT18-06 Sample No.: 06-06B Elev./Depth: 31-31.5'

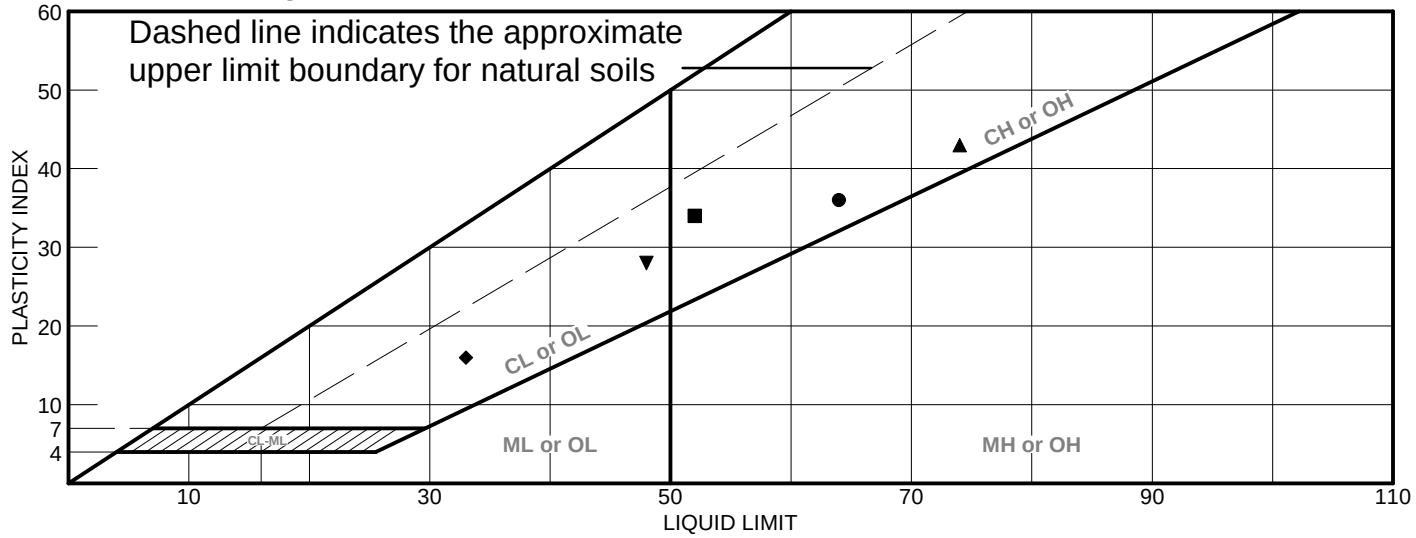
COOPER TESTING LABORATORY

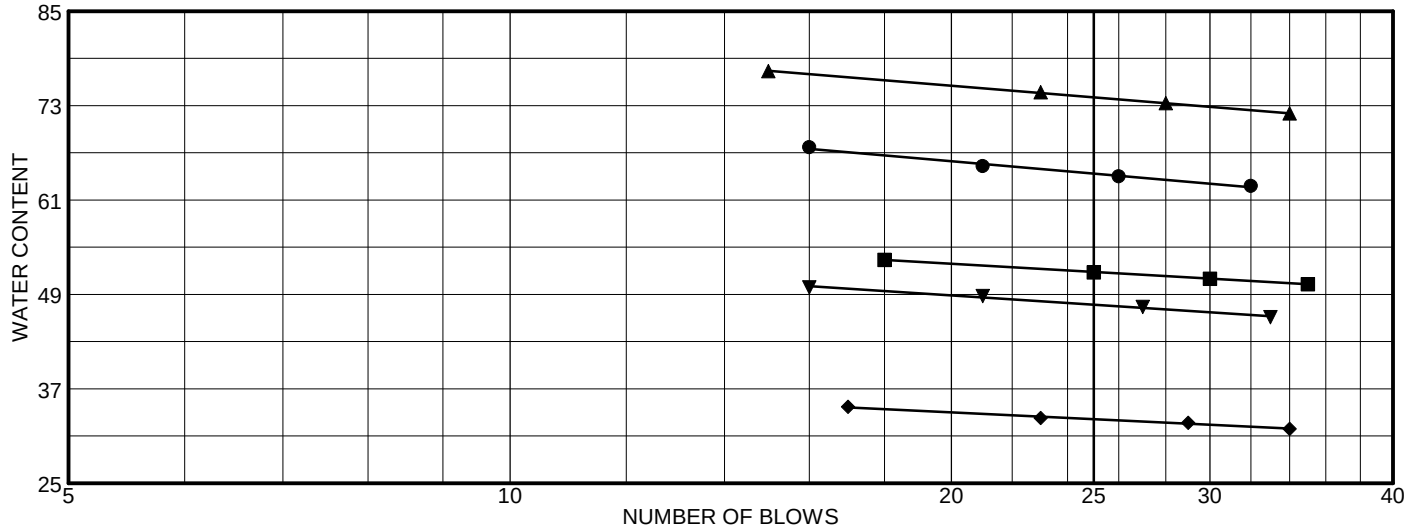
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352 Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Gray Fat CLAY	64	28	36	99.9	99.4	CH
■	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand	52	18	34			
▲	Olive Brown Fat CLAY	74	31	43			
◆	OLive Brown Mottled Gray Sandy Lean CLAY	33	17	16			
▼	Olive Brown Lean CLAY w/ Sand	48	20	28			

Project No. 461-352 **Client:** Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

●	**Source:** GT18-03	**Sample No.:** 03-09	**Elev./Depth:** 40-41.5'
■	**Source:** GT18-04	**Sample No.:** 04-03	**Elev./Depth:** 15-17.5(Tip-1")
▲	**Source:** GT18-04	**Sample No.:** 04-04	**Elev./Depth:** 20-22.5'
◆	**Source:** GT18-05	**Sample No.:** 05-02	**Elev./Depth:** 10-12.5(Tip-1")
▼	**Source:** GT18-05	**Sample No.:** 05-03	**Elev./Depth:** 15-17.5(Tip-

Remarks:

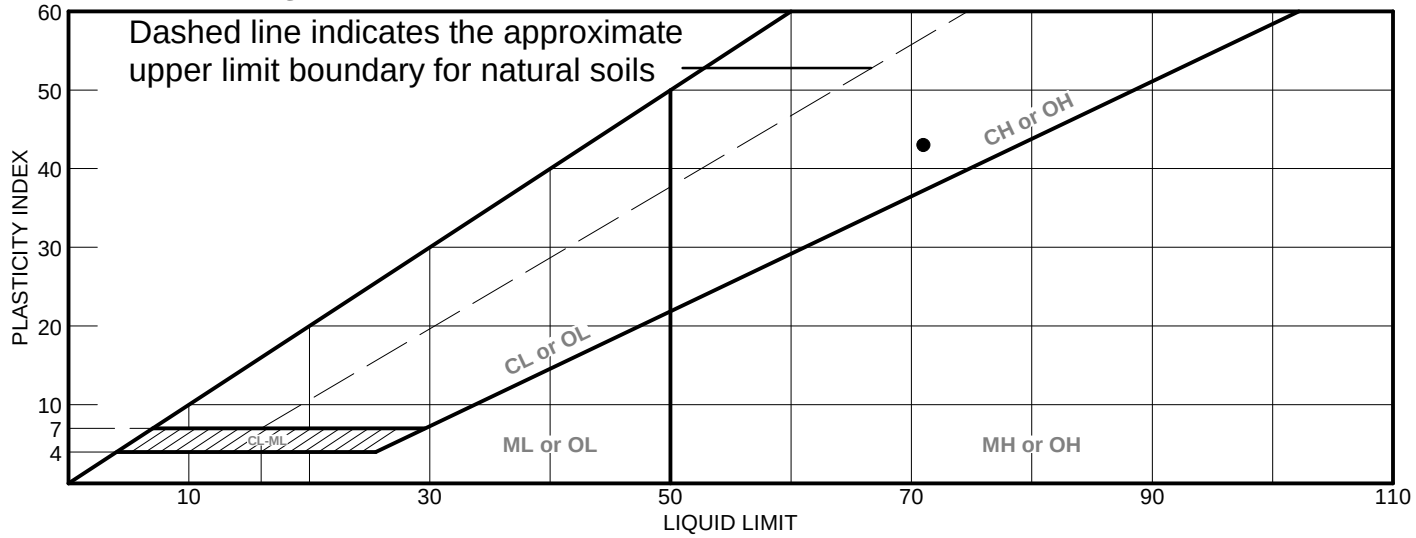
●
■
▲
◆
▼

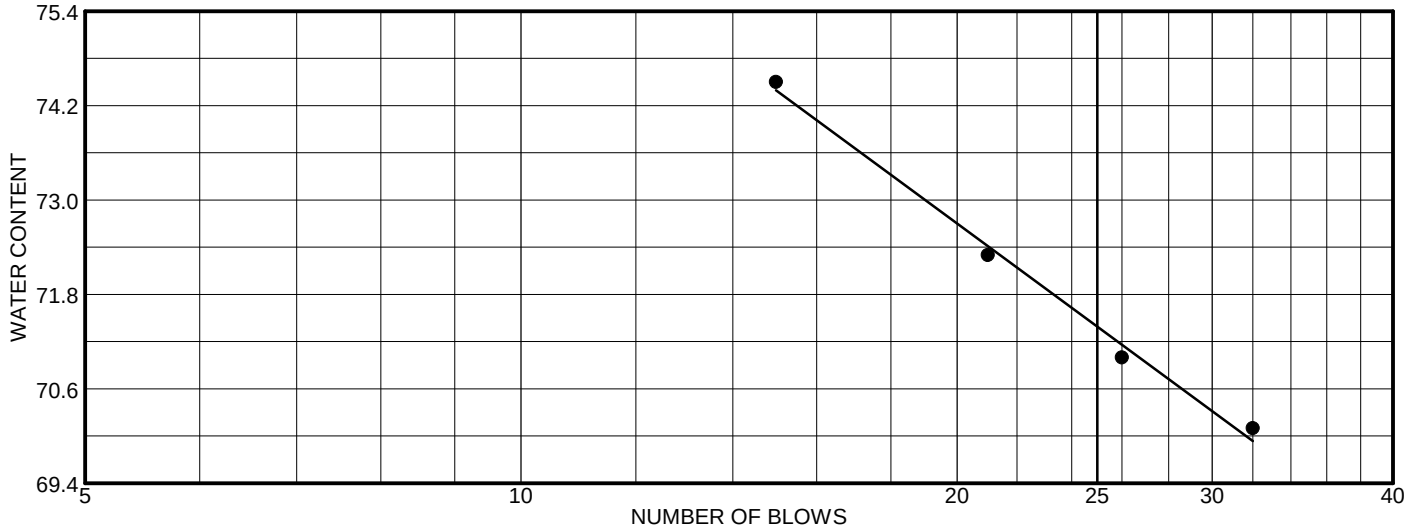
LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Brown Fat CLAY	71	28	43	99.7	99.2	

Project No. 461-352 **Client:** Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

● **Source:** GT18-05 **Sample No.:** 05-05 **Elev./Depth:** 25-26.5'

Remarks:

●

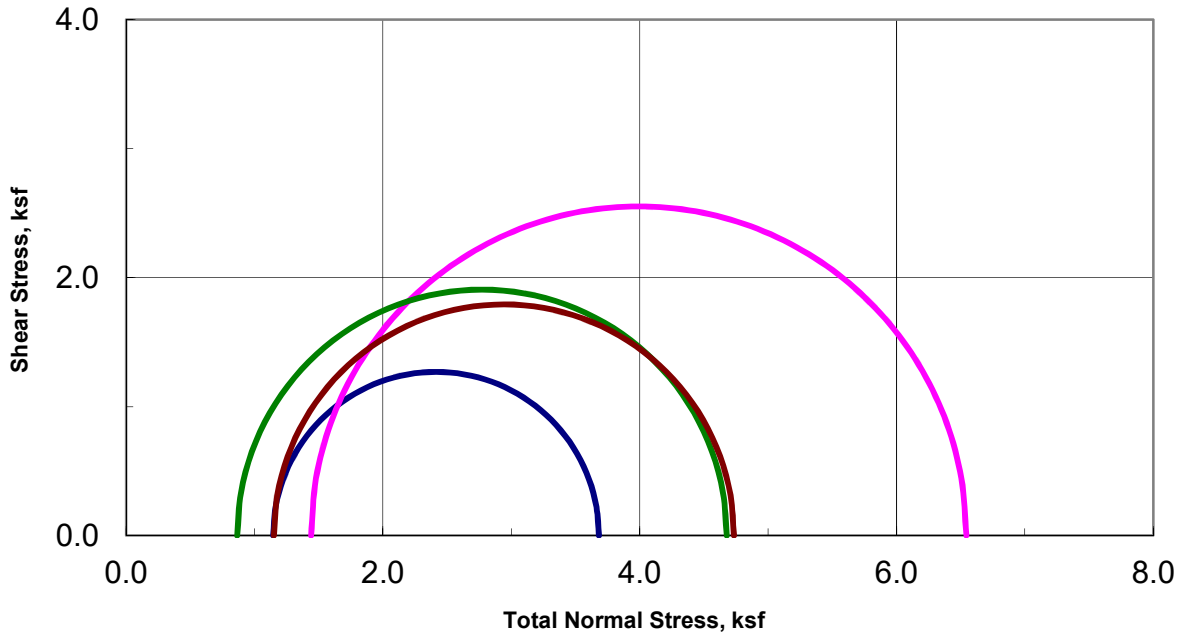
LIQUID AND PLASTIC LIMITS TEST REPORT

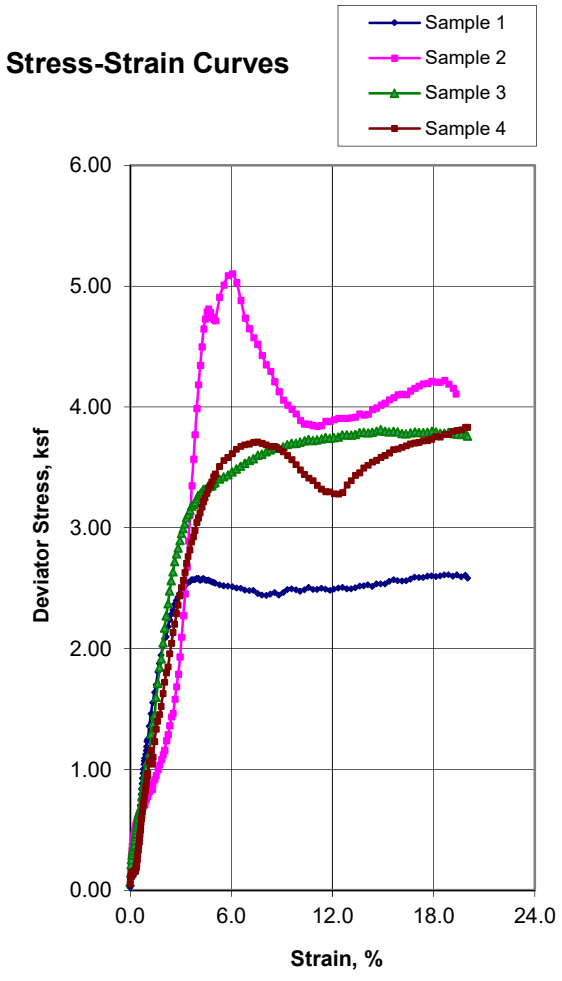
COOPER TESTING LABORATORY

Figure

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data				
	1	2	3	4
Moisture %	24.0	37.7	21.0	26.4
Dry Den,pcf	100.6	80.1	103.4	95.3
Void Ratio	0.676	1.103	0.631	0.769
Saturation %	96.0	92.2	89.7	92.9
Height in	5.97	5.97	5.97	6.00
Diameter in	2.87	2.87	2.87	2.87
Cell psi	8.0	10.0	6.0	8.0
Strain %	15.00	6.06	14.86	15.00
Deviator, ksf	2.537	5.103	3.812	3.584
Rate %/min	1.00	1.00	1.00	1.00
in/min	0.060	0.060	0.060	0.060
Job No.:	461-352			
Client:	Geosyntec Consultants			
Project:	WG2562-06			
Boring:	GT18-04	GT18-04	GT18-05	GT18-05
Sample:	04-03	04-04	05-02	05-03
Depth ft:	15-17.5(Tip-1")	20-22.5	10-12.5(Tip-1")	15-17.5(Tip-1.25")

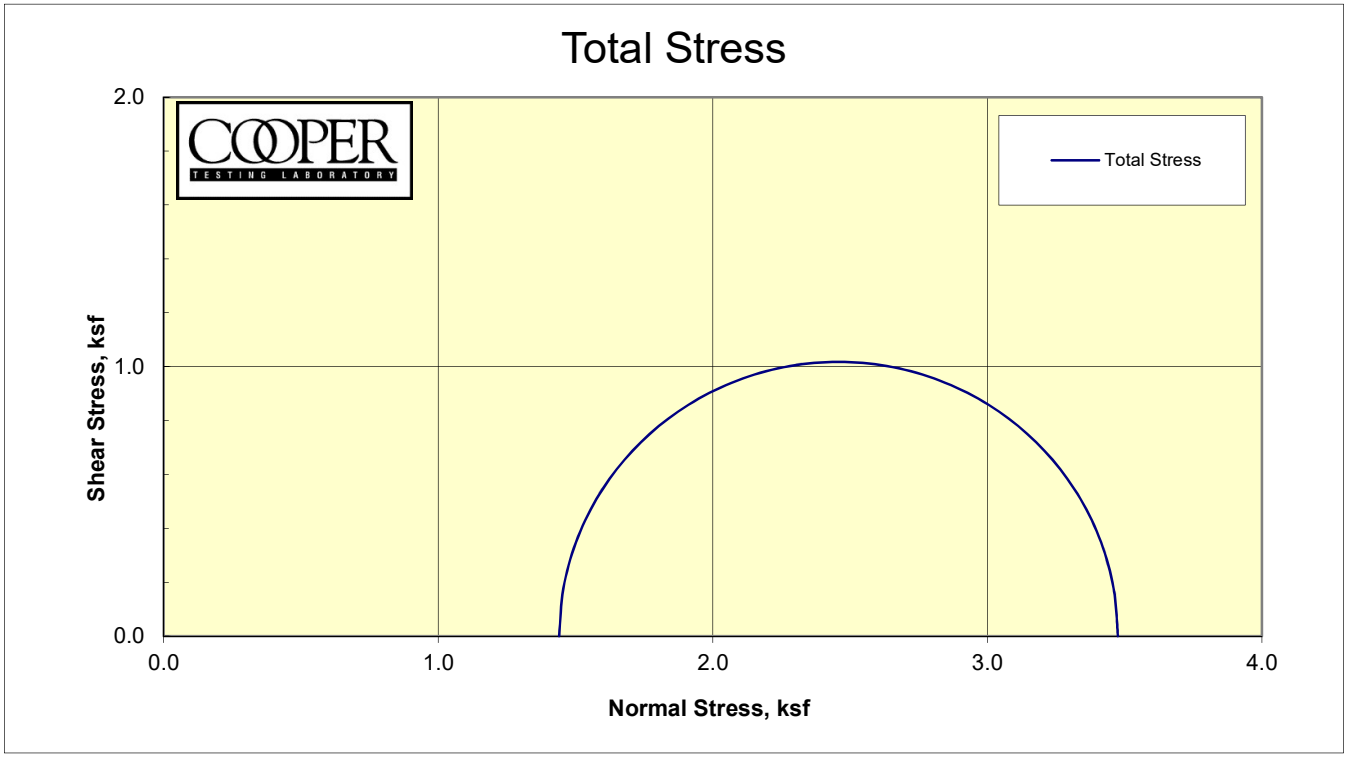
Visual Soil Description	
Sample #	
1	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand
2	Olive Brown Fat CLAY
3	Olive Brown Mottled Gray Sandy Lean CLAY
4	Olive Brown Lean CLAY w/ Sand

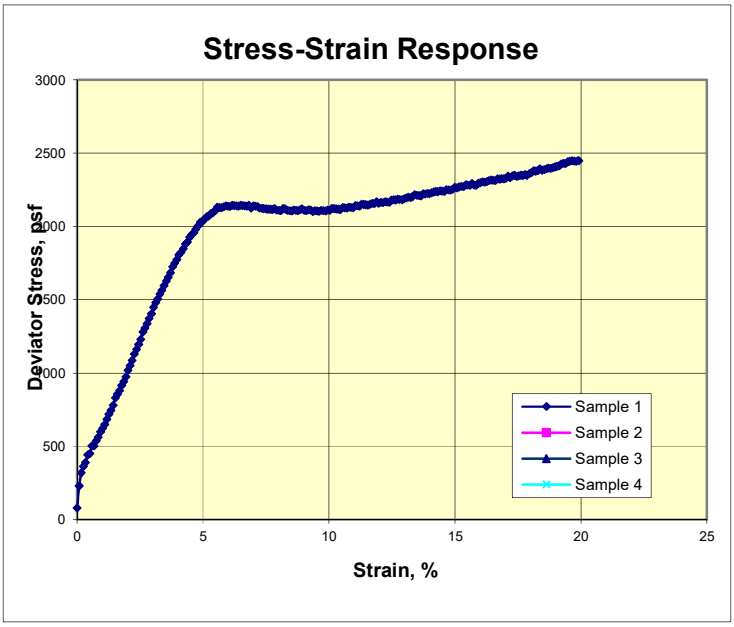
Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Triaxial Unconsolidated-Undrained

(ASTM D2850m)





Sample:	1	2	3	4
MC, %	37.4			
Dry Dens, pcf	83.5			
Sat. %	99.2			
Void Ratio	1.019			
Diameter in	2.87			
Height, in	5.98			
	Final			
MC, %	40.6			
Dry Dens, pcf	80.4			
Sat. %	100.0			
Void Ratio	1.096			
Diameter, in	2.91			
Height, in	6.02			
Cell, psi	78.5			
BP, psi	68.5			
	Effective Stresses At:			
Strain, %	5.0			
Deviator ksf	2.035			
Excess PP	0.000			
Sigma 1	3.475			
Sigma 3	1.440			
P, ksf	2.458			
Q, ksf	1.018			
Stress Ratio	2.413			
Rate in/min	0.0592			
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

Job No.: 461-352 **Date:** 6/3/2019

Client: Geosyntec Consultants BY:MD/DC

Project: WG2562-06

Sample 1) GT18-04_04-04 @ 20-22.5(Tip-7") Olive Brown Fat CLAY

Sample 2)

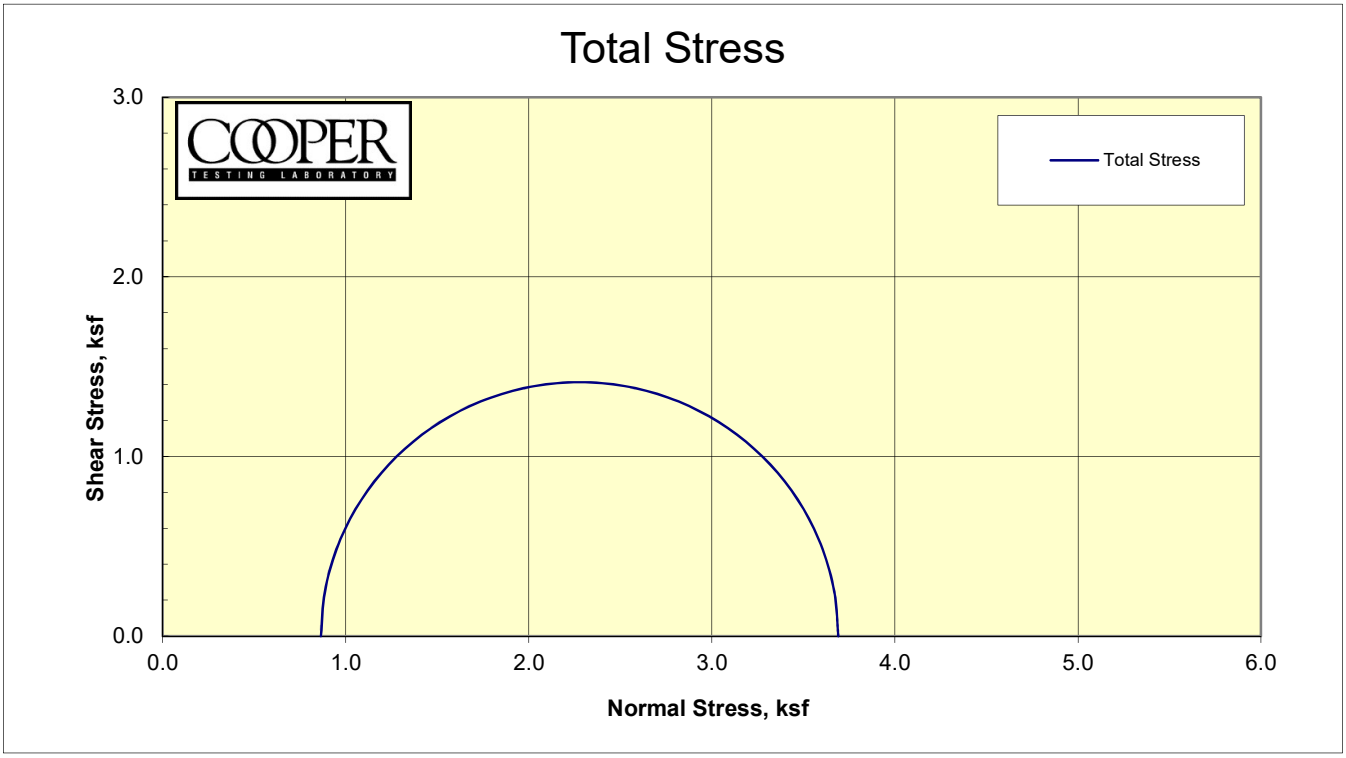
Sample 3)

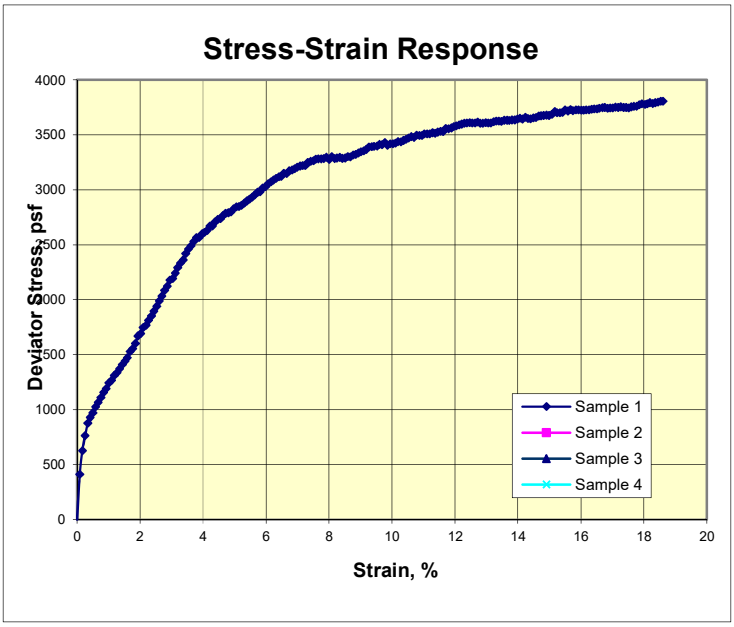
Sample 4)

REMARKS: Strengths picked at 5% strain.

*Sample was back-pressure saturated prior to shear.

Triaxial Unconsolidated-Undrained
(ASTM D2850m)





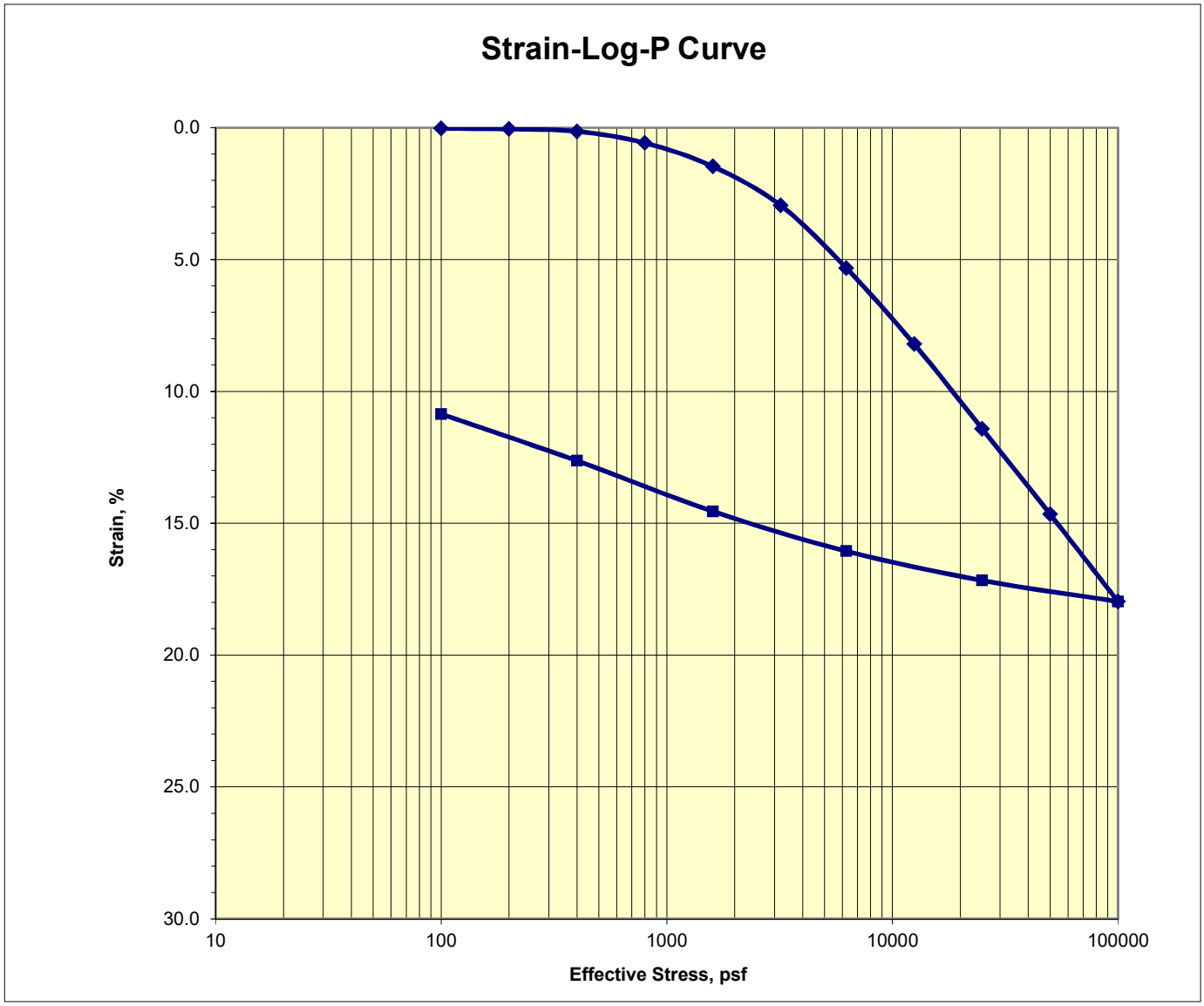
Sample:	1	2	3	4
MC, %	23.4			
Dry Dens, pcf	99.5			
Sat. %	91.3			
Void Ratio	0.693			
Diameter in	2.87			
Height, in	5.98			
	Final			
MC, %	26.3			
Dry Dens, pcf	98.5			
Sat. %	100.0			
Void Ratio	0.710			
Diameter, in	2.87			
Height, in	6.03			
Cell, psi	74.5			
BP, psi	68.5			
	Effective Stresses At:			
Strain, %	5.0			
Deviator ksf	2.827			
Excess PP	0.000			
Sigma 1	3.691			
Sigma 3	0.864			
P, ksf	2.277			
Q, ksf	1.413			
Stress Ratio	4.272			
Rate in/min	0.0584			
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

Job No.:	461-352	**Date:**	6/3/2019
Client:	Geosyntec Consultants		BY:MD/DC
Project:	WG2562-06		
Sample 1)	GT18-05_05-02 @ 10-12.5(Tip-7") Olive Brown Mottled Gray Sandy Lean CLAY		
Sample 2)			
Sample 3)			
Sample 4)			

REMARKS: Strengths picked at 5% strain.
*Sample was back-pressure saturated prior to shear.

Consolidation Test
ASTM D2435

Job No.:	461-352	**Boring:**	GT18-04	**Run By:**	MD
Client:	Geosyntec Consultants	**Sample:**	04-03	**Reduced:**	PJ
Project:	WG2526-06	**Depth, ft.:**	15-17.5(Tip-8.5")	**Checked:**	PJ/DC
Soil Type:	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand			**Date:**	7/23/2019

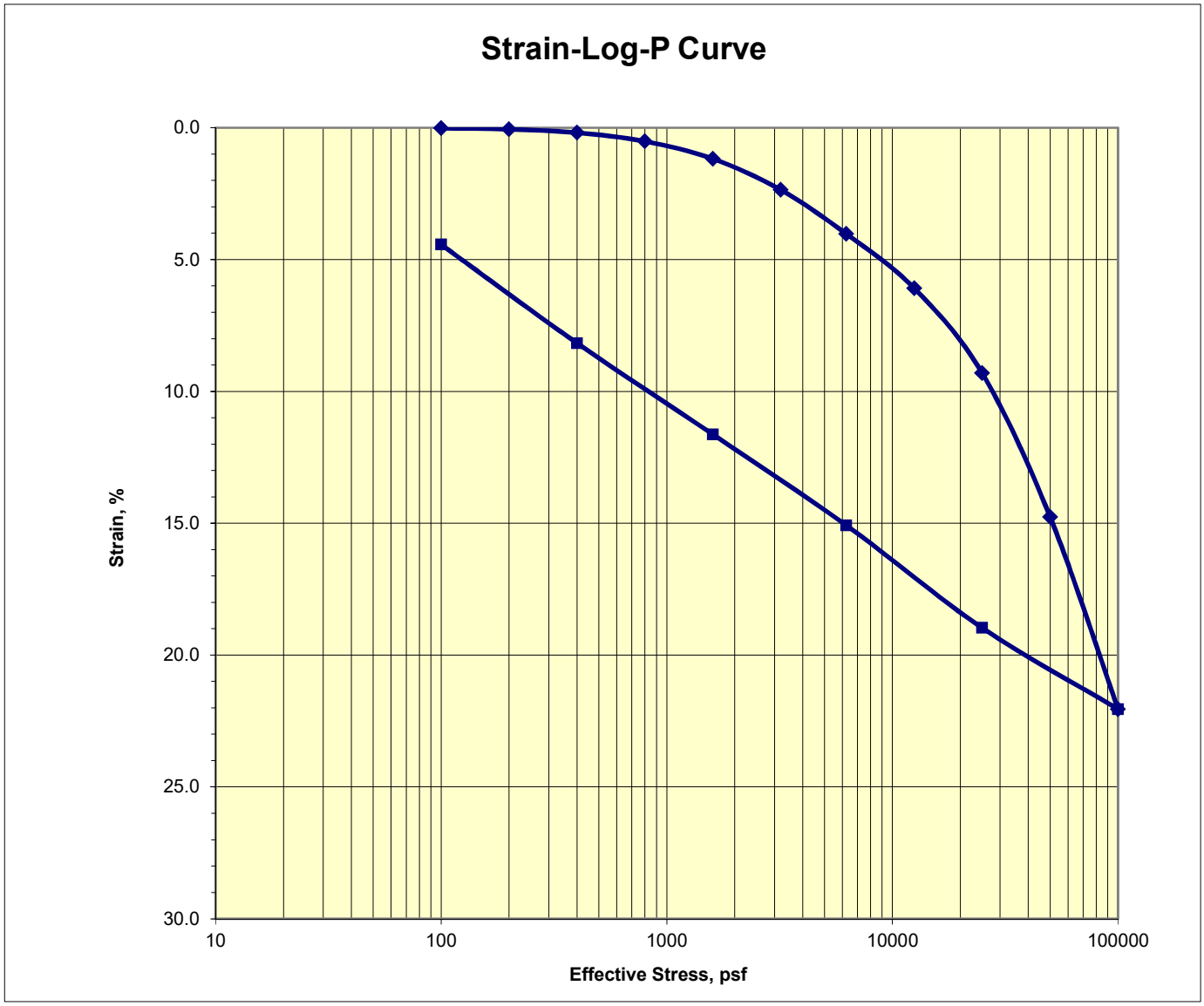


Assumed Gs 2.7	Initial	Final
Moisture %:	20.6	16.9
Dry Density, pcf:	103.9	115.8
Void Ratio:	0.622	0.456
% Saturation:	89.6	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	461-352	**Boring:**	GT18-04	**Run By:**	MD
Client:	Geosyntec Consultants	**Sample:**	04-04	**Reduced:**	PJ
Project:	WG2526-06	**Depth, ft.:**	20-22.5(Tip-16")	**Checked:**	PJ/DC
Soil Type:	Olive Brown Fat CLAY			**Date:**	7/23/2019



Assumed Gs 2.8	Initial	Final
Moisture %:	39.8	39.0
Dry Density, pcf:	80.1	83.6
Void Ratio:	1.182	1.092
% Saturation:	94.3	100.0

Remarks:

APPENDIX 2
Gas Probes and Monitoring Wells Logs

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF BORING / WELL GP-20

Project: Buena Vista Landfill

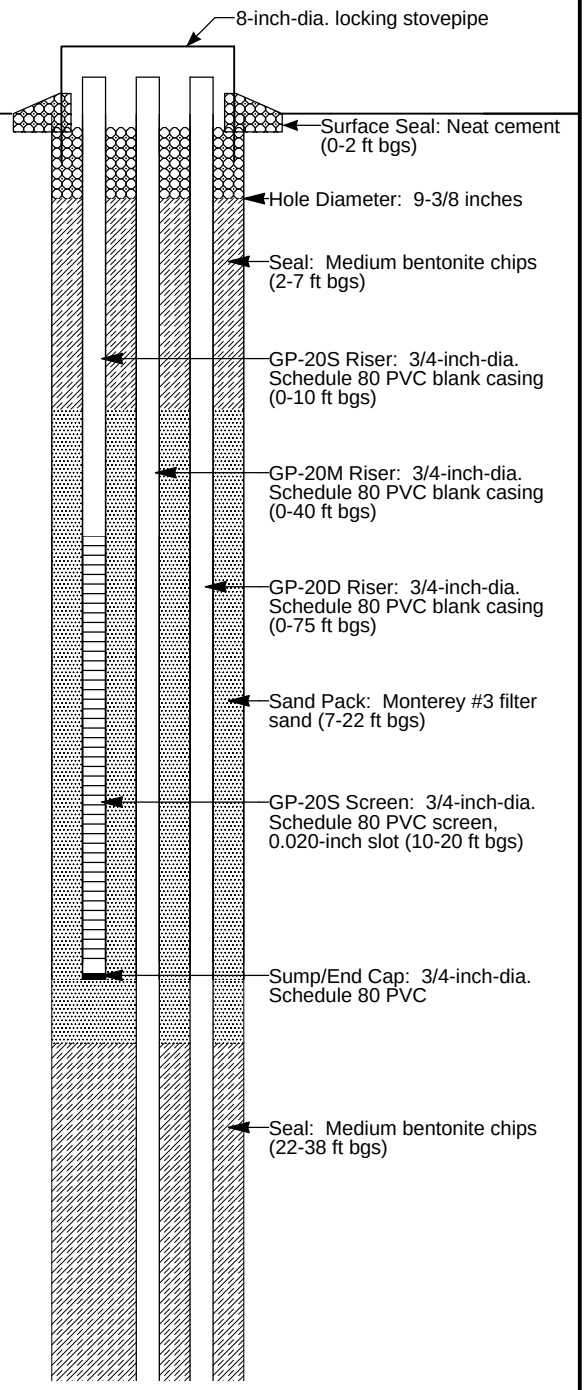
Location: Watsonville, California **Project Number: WG1019 / 02**

Start Date	**7/17/07**	Finish Date	**7/18/07**	Total Depth Drilled (feet bgs)	**86.0**		
Drilling Method	**ARCH**	Drilling Contractor	**Layne Christensen (Fontana)**	Ground Surface Elevation (feet MSL)	**Not available**		
Drill Rig	**AP1000 Percussion Hammer**	Sampling Method	**SPT split spoon**	Top of PVC Casing Elevation (feet MSL)	**Not available**		
Borehole Diameter	**9-3/8 inches**	Hammer Data	**140-lb percussion hammer**	Logger	**N. Mullaugh**	Reviewer	**E. Benede**
Coordinate Location	**Not surveyed**	Remarks					

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	0			[Borehole not logged in upper 5 feet.]
	5		---	SILTY SAND (SM), dark yellowish brown (10YR 3/6), moist, 70% fine sand, 25% low plasticity fines, 5% fine subangular quartzite gravel
	10		50/5"	SILTY SAND WITH GRAVEL (SM), dark yellowish brown (10YR 3/6), moist, 60% fine sand, 20% low plasticity fines, 20% fine subangular to subrounded granitic and quartzite gravel to 1/4 inch, very dense
	15		20-25-35	POORLY GRADED SAND WITH SILT (SP-SM), yellowish brown (10YR 5/4), moist, 90% fine sand, 10% low plasticity fines, very dense
	20			
	25		10-20-27	LEAN CLAY (CL), very pale brown (10YR 7/3), moist, 100% low plasticity fines, stiff [Sand coming out of cyclone at 26 feet.]
	30			

Graphic Log

WELL CONSTRUCTION DIAGRAM



Template: GEOSYNTEC_WELL; Proj ID: BUENVIST.GPJ; Printed: 6/16/2008

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF BORING / WELL GP-20

Project: Buena Vista Landfill

Location: Watsonville, California **Project Number: WG1019 / 02**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
30		WELL-GRADED SAND (SW), dark yellowish brown (10YR 3/6), moist, 100% fine to coarse sand, subangular to subrounded coarse-sand-size granitic fragments, very dense		Hole Diameter: 9-3/8 inches
				Seal: Medium bentonite chips (22-38 ft bgs)
35	40-50/4"			GP-20M Riser: 3/4-inch-dia. Schedule 80 PVC blank casing (0-40 ft bgs)
40				GP-20D Riser: 3/4-inch-dia. Schedule 80 PVC blank casing (0-75 ft bgs)
				Sand Pack: Monterey #3 filter sand (38-52 ft bgs)
45	50/5"	[Coarse gravel to cobbles coming out of cyclone.]		GP-20M Screen: 3/4-inch-dia. Schedule 80 PVC screen, 0.020-inch slot (40-50 ft bgs)
50				Sump/End Cap: 3/4-inch-dia. Schedule 80 PVC
				Seal: Medium bentonite chips (52-73 ft bgs)
55	50/5"	Sand grades finer; 95% fine to medium sand, 5% coarse sand-size subangular to subrounded granitic fragments		
60				
65				

Template: GEOSYNTEC_WELL; Proj ID: BUENVIST.GPJ; Printed: 6/16/2008

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
Telephone: 510.836.3034
Fax: 510.836.3036

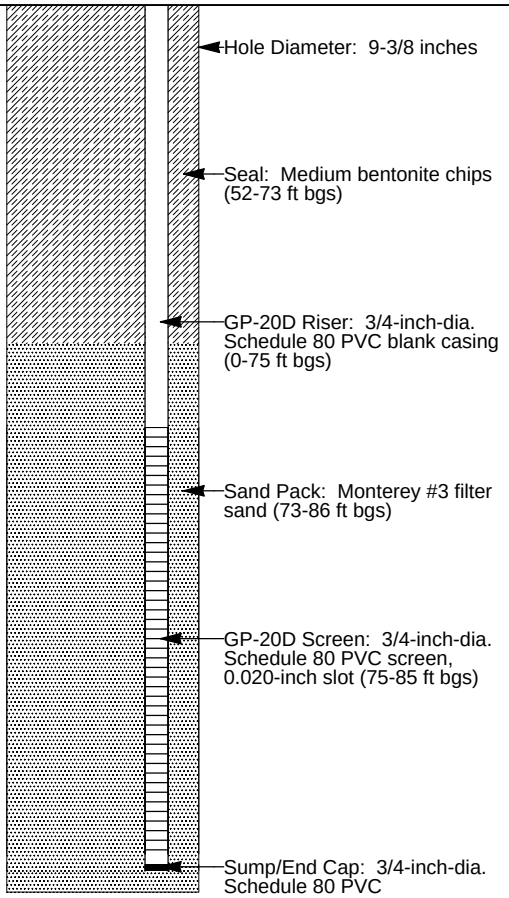
LOG OF BORING / WELL GP-20

Project: Buena Vista Landfill

Location: Watsonville, California **Project Number: WG1019 / 02**

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log
	65			WELL-GRADED SAND (SW) (continued)	
			27-50/3"	LEAN CLAY (CL), dark yellowish brown (10YR 4/6), moist, 95% low plasticity fines, 5% fine subrounded gravel to 1/4 inch	
				WELL-GRADED SAND (SW), dark yellowish brown (10YR 3/6), moist, 95% fine to medium sand, 5% coarse subrounded sand	
	70				
	75		28-50/3"		
	80				
	85		30-50/2"	WELL-GRADED SAND WITH GRAVEL (SW), very dark grayish brown (10YR 3/2), moist, 75% medium to coarse sand, 25% fine subangular to subrounded gravel to 1/4 inch	
				Bottom of boring at 86.0 feet bgs	
	90				
	95				
	100				

WELL CONSTRUCTION DIAGRAM



Template: GEOSYNTEC_WELL; Proj ID: BUENVIST.GPJ; Printed: 6/16/2008

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF BORING / WELL GP-21

Project: Buena Vista Landfill

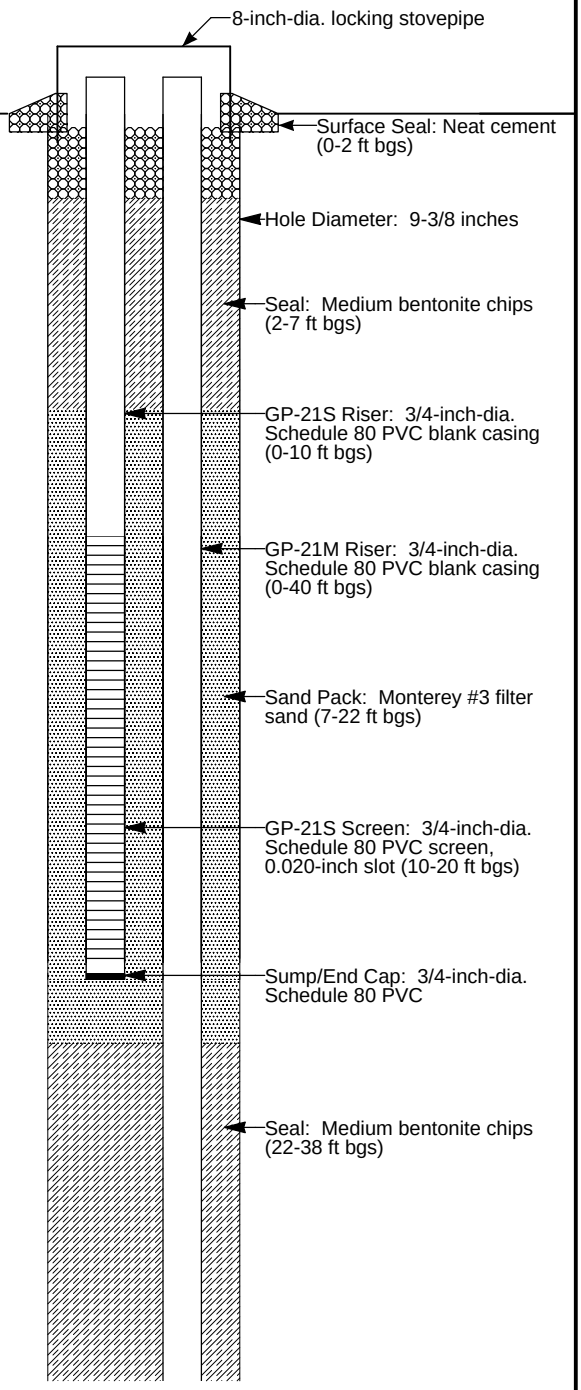
Location: Watsonville, California **Project Number: WG1019 / 02**

Start Date	**7/19/07**	Finish Date	**7/20/07**	Total Depth Drilled (feet bgs)	**51.5**		
Drilling Method	**ARCH**	Drilling Contractor	**Layne Christensen (Fontana)**	Ground Surface Elevation (feet MSL)	**Not available**		
Drill Rig	**AP1000 Percussion Hammer**	Sampling Method	**SPT split spoon**	Top of PVC Casing Elevation (feet MSL)	**Not available**		
Borehole Diameter	**9-3/8 inches**	Hammer Data	**140-lb percussion hammer**	Logger	**N. Mullaugh**	Reviewer	**E. Benede**
Coordinate Location	**Not surveyed**	Remarks	**Used sand catcher in SPT sampler.**				

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	0			[Borehole not logged in upper 5 feet.]
	5		22-30-42	LEAN CLAY (CL), yellowish brown (10YR 5/4), moist, 95% low plasticity fines, 5% fine sand, firm
	10		13-26-30	SILT (ML), dark yellowish brown (10YR 5/4) with trace orange mottling, moist, 100% nonplastic fines, stiff
	15		40-50/4"	
	20		25-50/3"	POORLY GRADED SAND (SP), light yellowish brown (10YR 6/4), moist, 95% fine sand, 5% nonplastic fines, dense to very dense
	25		27-50/4"	WELL-GRADED SAND (SW), yellowish brown (10YR 5/6), moist, 95% fine to medium sand, 5% fine subrounded gravel to 1/4 inch, dense to very dense
	30			

Graphic Log

WELL CONSTRUCTION DIAGRAM



Template: GEOSYNTEC_WELL; Proj ID: BUENVIST.GPJ; Printed: 6/16/2008

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF BORING / WELL GP-21

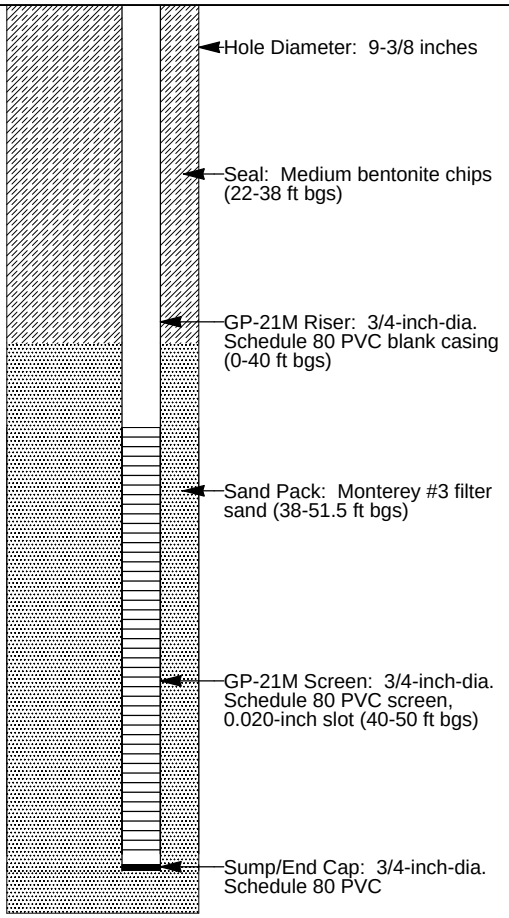
Project: Buena Vista Landfill

Location: Watsonville, California **Project Number: WG1019 / 02**

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	30		50/2"	WELL-GRADED SAND WITH CLAY AND GRAVEL (SW-SC), dark yellowish brown (10YR 4/6), moist, 70% fine to coarse sand, 20% fine subangular to subrounded gravel to 1/4 inch, 10% low plasticity fines
	35		28-50/3"	WELL-GRADED SAND (SW), dark yellowish brown (10YR 4/4), moist, 95% fine to medium sand, 5% fine subangular gravel to 1/4 inch, dense to very dense
	40		27-50/3"	CLAYEY SAND WITH GRAVEL (SC), dark yellowish brown (10YR 3/6), moist, 60% fine to coarse sand, 20% low plasticity fines, 20% fine subrounded gravel to 1/4 inch, dense to very dense
	45		50/5"	WELL-GRADED SAND WITH GRAVEL (SW), dark brown (10YR 3/3), moist, 80% fine to coarse sand, 20% fine subangular to subrounded gravel to 1/4 inch, very dense
	50		--	Gravel content increases to 30%
				Bottom of boring at 51.5 feet bgs
	55			
	60			
	65			

Graphic Log

WELL CONSTRUCTION DIAGRAM



Template: GEOSYNTEC_WELL; Proj ID: BUENVIST.GPJ; Printed: 6/16/2008

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

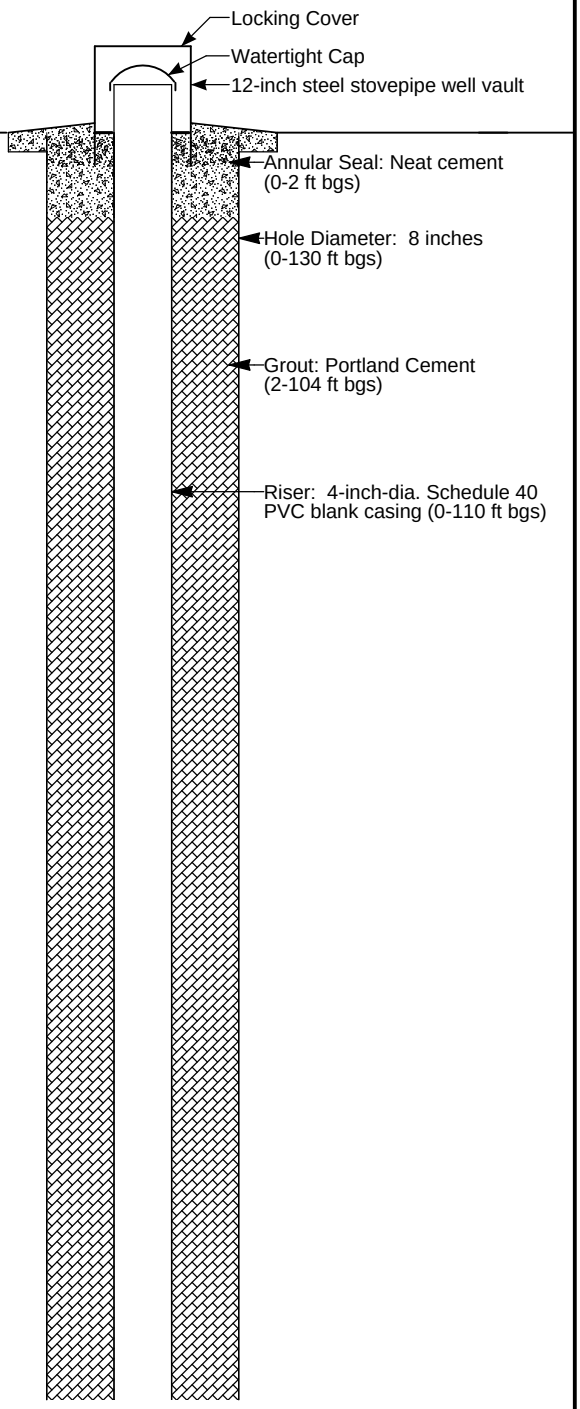
Location: Watsonville, CA **Project Number: MW-13**

Start Date	**7/25/07**	Finish Date	**7/27/07**	Total Depth Drilled (feet bgs)	**131.0**
Drilling Method	**Sonic**	Drilling Contractor	**Prosonic**	Ground Surface Elevation (feet MSL)	**MSL**
Drill Rig	**Sonic**	Sampling Method	**Continuous Core**	Top of PVC Casing Elevation (feet MSL)	**109.47**
Borehole Diameter	**9 in.**	Hammer Data		Logger **N Mullaugh**	Reviewer **E Benede**
Coordinate Location	**N 11881.18 E 10792.22**	Remarks			

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	0			CLAYEY SAND (SC) dark yellowish brown (10yr 4/6), moist, 60% fine sand, 40% low plasticity fines, loose.
	5		100	WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/6), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".
	10			WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC) dark yellowish brown (10yr 4/6), moist, 70% fine to coarse sand, 20% large subangular subround gravel up to 1", 10% low palsticity fines.
	15		100	
				POORLY GRADED SAND (SP) dark yellowish brown (10yr 3/6), wet, 90% medium sands, 10% small sub angular subround gravel up to 1/2".
	20			LEAN CLAY (CL) brown (10yr 5/3), moist, 100% medium plasticity clay, stiff.
	25		100	
	30			WELL GRADED SAND (SW) brown (10yr 5/3), moist,

Graphic Log

WELL CONSTRUCTION DIAGRAM



Template: GEOSYNTEC_WELL; Proj ID: BVLF MW13.GPJ; Printed: 10/31/2007

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
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LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

Location: Watsonville, CA **Project Number: MW-13**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
30		85% fine to medium sand, 10% subangular subround large gravel, 5% low plasticity fines.		
35	100	WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/4), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".		
		CLAYEY SAND WITH GRAVEL (SC) brown (10yr 4/3), moist, 50% fine to medium sand, 30% high plasticty fines, 20% subangular subround large gravel up to 1".		
40		WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/4), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".		
45	100	CLAYEY SAND WITH GRAVEL (SC) brown (10yr 4/3), moist, 50% fine to medium sand, 30% high plasticty fines, 20% subangular subround small gravel up to 1/2".		
50		WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC) dark yellowish brown (10yr 5/4), moist, 70% fine to coarse sand, 20% subangular to round large gravel up to 1 1/2", 10% medium plasticity fines.		
55	100	WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/6), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".		
60				
		LEAN CLAY (CL) brown (10yr 4/3), moist, 90% low		
65				

Template: GEOSYNTEC_WELL; Proj ID: BVLF MW13.GPJ; Printed: 10/31/2007

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475 14th Street, Suite 400
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LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

Location: Watsonville, CA **Project Number: MW-13**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
65	100	plasticity fines, 10% fine sand, stiff.		
		POORLY GRADED SAND (SP) dark yellowish brown (10yr 4/4), moist, 100% medium sand, uniform.		
70				
75	100			
		WELL GRADED SAND WITH GRAVEL (SW) brown (10yr 4/3), moist, 70% fine to coarse sand, 25% subangular subround large gravel up to 1", 5% low plasticity fines.		
80				
85	100			
90		WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC) dark yellowish brown (10yr 5/4), moist, 70% fine to coarse sand, 20% subangular to round large gravel up to 1", 10% medium plasticity fines.		
		POORLY GRADED SAND WITH CLAY (SP-SC) brown (10yr 4/3), moist, 90% medium sand, 10% medium plasticity fines.		
95	100			
		CLAYEY SAND (SC) light brownish gray (10yr 6/2), moist, 60% fine sand, 40% medium plasticity fines, stiff.		
100				

Template: GEOSYNTEC_WELL; Proj ID: BVLF MW13.GPJ; Printed: 10/31/2007

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LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

Location: Watsonville, CA **Project Number: MW-13**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
105	100	POORLY GRADED SAND WITH CLAY (SP-SC) light brownish gray (10yr 6/2), wet, 90% fine sand, 10% medium placticity clay.		Seal: Medium bentonite chips (104-107 ft bgs)
110				Sand Pack: Monterey #3 sand sand (107-130 ft bgs)
115	100	WELL GRADED SAND (SW) light brownish gray (10yr 6/2), wet, 90% fine to coarse sand, 5% subangular round large gravel up to 1", 5% medium plasticity fines.		Screen: 4-inch-dia. Schedule 40 PVC casing, 0.020-inch slot (110-130 ft bgs)
120				
125	100			
130				End Cap: 4-inch-dia. threaded Schedule 40 PVC
		Total Depth = 131 feet bgs		
135				

Template: GEOSYNTEC_WELL; Proj ID: BVLF MW13.GPJ; Printed: 10/31/2007

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3043 Gold Canal Drive
Suite 100
Rancho Cordova, California 95670
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Fax: 916-550-9498

WELL NUMBER MW-14

CLIENT Santa Cruz County
PROJECT NAME Buena Vista Landfill
PROJECT NUMBER WG2726
PROJECT LOCATION Watsonville, CA
DATE STARTED 9/3/19 **COMPLETED** 9/6/19
GROUND ELEVATION TOC 82.35 ft **HOLE SIZE** 10 inches
DRILLING CONTRACTOR Cascade Drilling LP
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary Casing Hammer
AT TIME OF DRILLING 75.00 ft below ground surface
LOGGED BY FPK **CHECKED BY** NKG
AT END OF DRILLING 81.10 ft below ground surface
NOTES NAD83 Zone 3, NGVD 29 N1,796,279.5 E6,178,646.0
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					
		SW-SM		(SW-SM) Well graded SAND with silt, brownish yellow (10YR 6/8), dry, fine to coarse sand, non plastic fines, (0% gravel, 90% sand, 10% fines).	Standpipe with two concrete bollards
10				10.0	
		SW		(SW) Well graded SAND, dark yellowish brown (10YR 4/4), dry, fine to coarse sand, (0% gravel, 100% sand, 0% fines).	
20				20.0	
		SW		(SW) Well graded SAND with gravel, dark yellowish brown (10YR 4/4), moist, fine to coarse sand, fine subrounded gravel, (15% gravel, 85% sand, 0% fines).	
25				25.0	
		SC		(SC) Clayey SAND with gravel, brown (7.5YR 5/4), moist, fine subrounded gravel, fine to coarse sand, medium plasticity fines, (5% gravel, 80% sand, 15% fines).	
30				30.0	
		GW-GC		(GW-GC) Well graded GRAVEL with clay and sand, brown (7.5YR 4/4), moist, fine to coarse subrounded gravel, medium to coarse sand, medium plasticity fines, (50% gravel, 30% sand, 20% fines).	
35				35.0	

GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 9/25/19 15:04 - C:\USERS\FKAN\DESKTOP\BUENA VISTA - MW-14.GPJ

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Rancho Cordova, California 95670
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Fax: 916-550-9498

WELL NUMBER MW-14

CLIENT Santa Cruz County **PROJECT NAME** Buena Vista Landfill

PROJECT NUMBER WG2726 **PROJECT LOCATION** Watsonville, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					
		CL		(CL) Sandy lean CLAY, yellowish brown (10YR 5/6), moist, fine rounded gravel, medium sand, medium plasticity fines, (20% gravel, 20% sand, 60% fines).	
40				40.0	4" ID PVC Blank
		CH		(CH) Fat CLAY with SAND, pale brown (10YR 6/3), medium sand, high plasticity fines, (0% gravel, 25% sand, 75% fines).	
45				45.0	
		SM		(SM) Silty SAND, dark yellowish brown (10YR 4/4), moist, fine sand, low plasticity fines, (0% gravel, 80% sand, 20% fines).	
50				50.0	Portland cement grout tremie application
		SW-SM		(SW-SM) Well graded SAND with silt, dark yellowish brown (10YR 4/4), moist, fine to coarse sand, non plastic fines, (0% gravel, 90% sand, 10% fines).	
55					
60				60.0	
		SC		(SC) Clayey SAND with gravel, dark yellowish brown (10YR 4/4), moist, sub rounded gravel, medium sand, medium plasticity fines, (20% gravel, 40% sands, 40% fines).	
65				65.0	Bentonite Seal
		GP		(GP) Poorly graded GRAVEL, brown (10YR 4/3), moist, angular fine gravel, medium to coarse sand, (90% gravel, 10% sand, 0% fines).	
70				70.0	
		GW		(GW) Well graded GRAVEL, brown (10YR 4/3), moist, fine to coarse subangular gravel, coarse sand, (90% gravel, 10% sand, 0% fines).	
75				75.0 ▽	

GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 9/25/19 15:04 - C:\USERS\FKAN\DESKTOP\BUENA VISTA - MW-14.GPJ

(Continued Next Page)

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WELL NUMBER MW-14

CLIENT Santa Cruz County **PROJECT NAME** Buena Vista Landfill

PROJECT NUMBER WG2726 **PROJECT LOCATION** Watsonville, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75					
80		SM		(SM) Silty SAND, dark yellowish brown (10YR 4/4), wet, fine to coarse sand, non plastic fines, (0% gravel, 70% sand, 30% fines).	Cemex #3 Lapis Lustre sand pack
85				85.0	4" PVC 0.020" Well Screen
		SC		(SC) Clayey SAND, dark yellowish brown (10YR 4/4), wet, fine to medium sand, medium plasticity fines, (0% gravel, 70% sand, 30% fines).	
90				90.0	
		SC		(SC) Clayey SAND with gravel, dark yellowish brown (10YR 4/4), wet, fine rounded gravel, fine to coarse sand, medium plasticity fines, (30% gravel, 40% sand, 30% fines).	
				92.0	

Bottom of borehole at 92.0 feet.

GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 9/25/19 15:04 - C:\USERS\FKAN\DESKTOP\BUENA VISTA - MW-14.GPJ

Appendix I. FAA No Hazard Determination

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Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2024-AWP-7619-OE

Issued Date: 09/09/2024

David Carlson
County of Santa Cruz
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Existing Municipal Solid Waste Landfill Transfer Station A
Location:	Watsonville, CA
Latitude:	36-55-13.44N NAD 83
Longitude:	121-48-28.92W
Heights:	124 feet site elevation (SE)
	40 feet above ground level (AGL)
	164 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The FAA has identified the need for an analysis of potential wildlife hazards to aircraft as described in Advisory Circular 150/5200-33, Hazardous Wildlife Attractants on or Near Airports, to be accomplished for this proposal in accordance with 40 Code of Federal Regulation (CFR) 258 section 258.10. Owners or operators of new, existing, and lateral expansions of Municipal Solid Waste Landfill (MSWLF) units that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used by only piston-type aircraft, must demonstrate the MSWLF units design and operation do not pose a bird hazard to aircraft.

When the services of a wildlife damage management biologist are required, the FAA recommends that land use developers contact a consultant specializing in wildlife damage management or the appropriate United States Department of Agriculture (USDA) State Director of Wildlife Services. The USDA's state offices can be found on their website: (https://www.aphis.usda.gov).

This determination expires on 03/09/2026 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

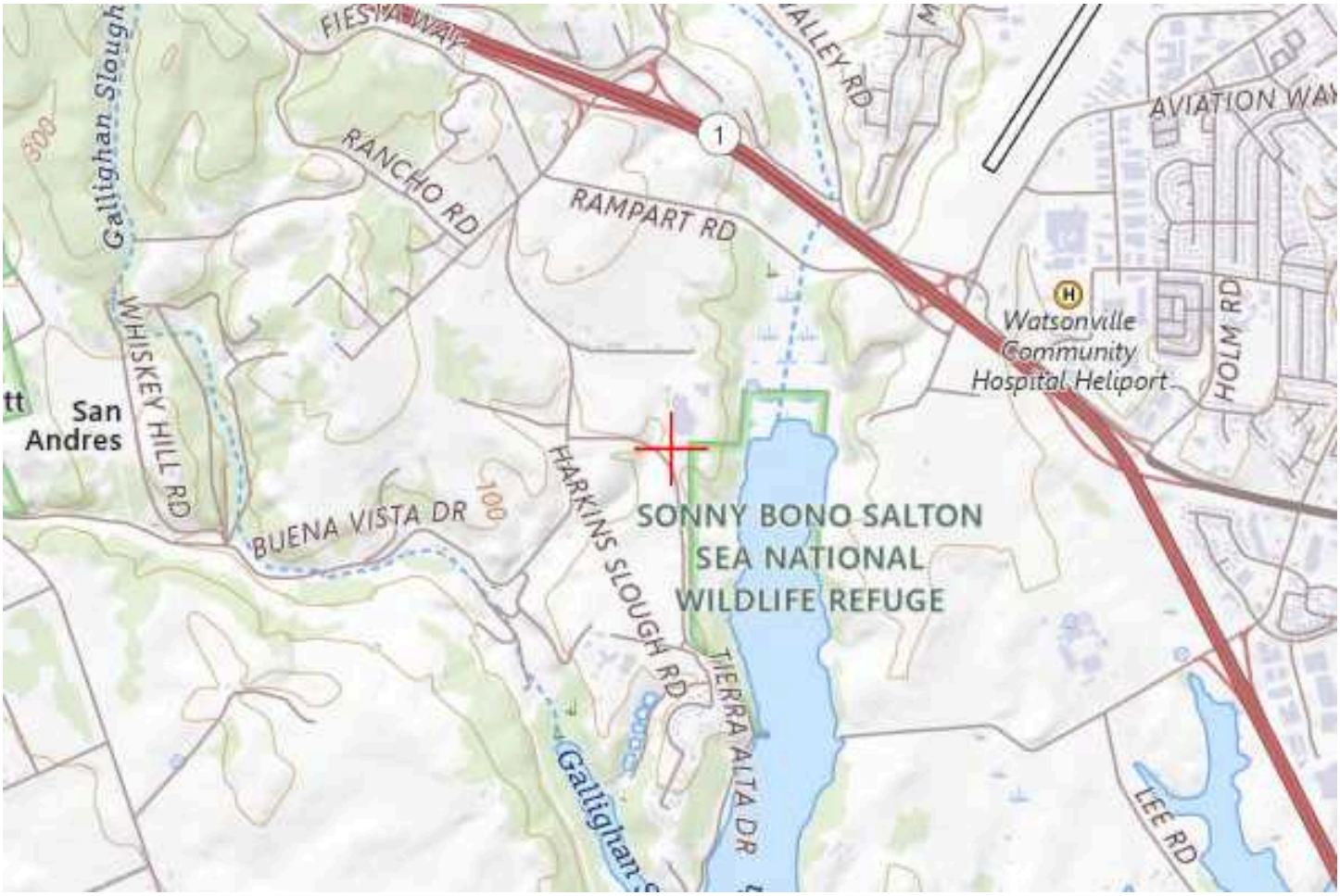
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact Justin Hetland, at (847) 294-8084, or justin.hetland@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-AWP-7619-OE.

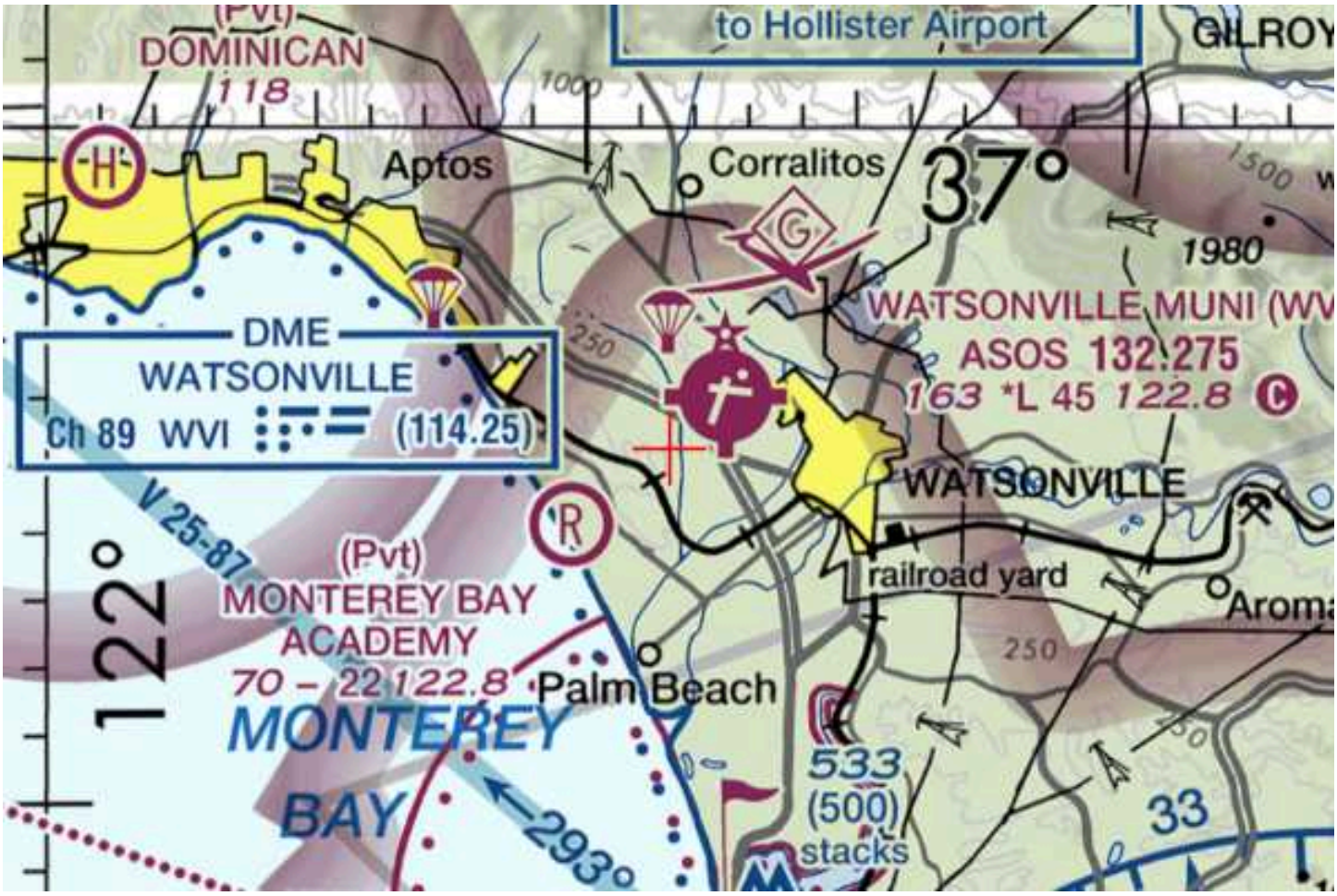
Signature Control No: 625020986-632406332 (DNE)
Julie A. Morgan
Manager, Obstruction Evaluation Group

Attachment(s)
Map(s)

TOPO Map for ASN 2024-AWP-7619-OE



Sectional Map for ASN 2024-AWP-7619-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2024-AWP-7620-OE

Issued Date: 09/09/2024

David Carlson
County of Santa Cruz
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Existing Municipal Solid Waste Landfill Transfer Station B
Location:	Watsonville, CA
Latitude:	36-54-53.76N NAD 83
Longitude:	121-48-39.41W
Heights:	110 feet site elevation (SE)
	40 feet above ground level (AGL)
	150 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The FAA has identified the need for an analysis of potential wildlife hazards to aircraft as described in Advisory Circular 150/5200-33, Hazardous Wildlife Attractants on or Near Airports, to be accomplished for this proposal in accordance with 40 Code of Federal Regulation (CFR) 258 section 258.10. Owners or operators of new, existing, and lateral expansions of Municipal Solid Waste Landfill (MSWLF) units that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used by only piston-type aircraft, must demonstrate the MSWLF units design and operation do not pose a bird hazard to aircraft.

When the services of a wildlife damage management biologist are required, the FAA recommends that land use developers contact a consultant specializing in wildlife damage management or the appropriate United States Department of Agriculture (USDA) State Director of Wildlife Services. The USDA's state offices can be found on their website: (https://www.aphis.usda.gov).

This determination expires on 03/09/2026 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

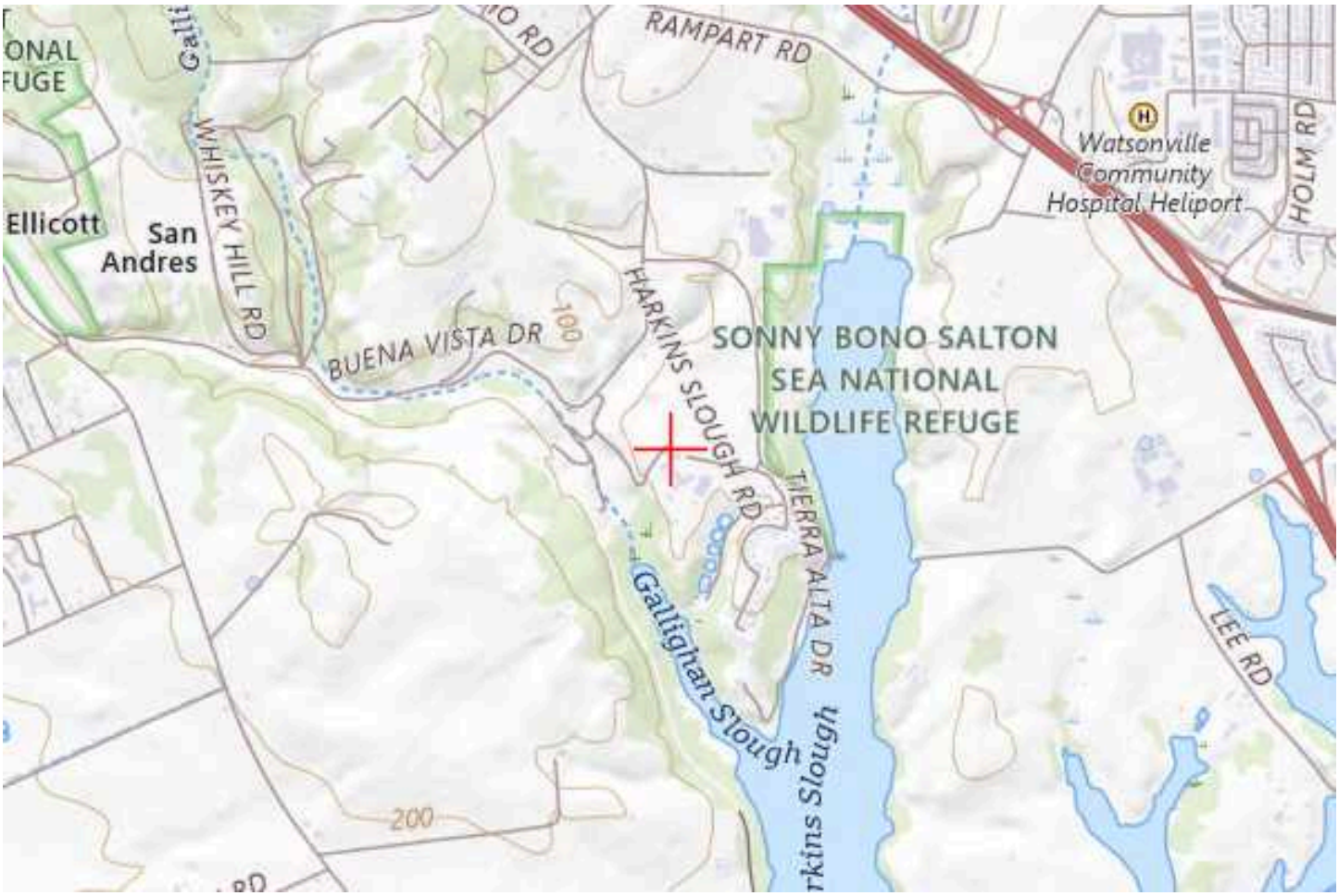
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact Justin Hetland, at (847) 294-8084, or justin.hetland@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-AWP-7620-OE.

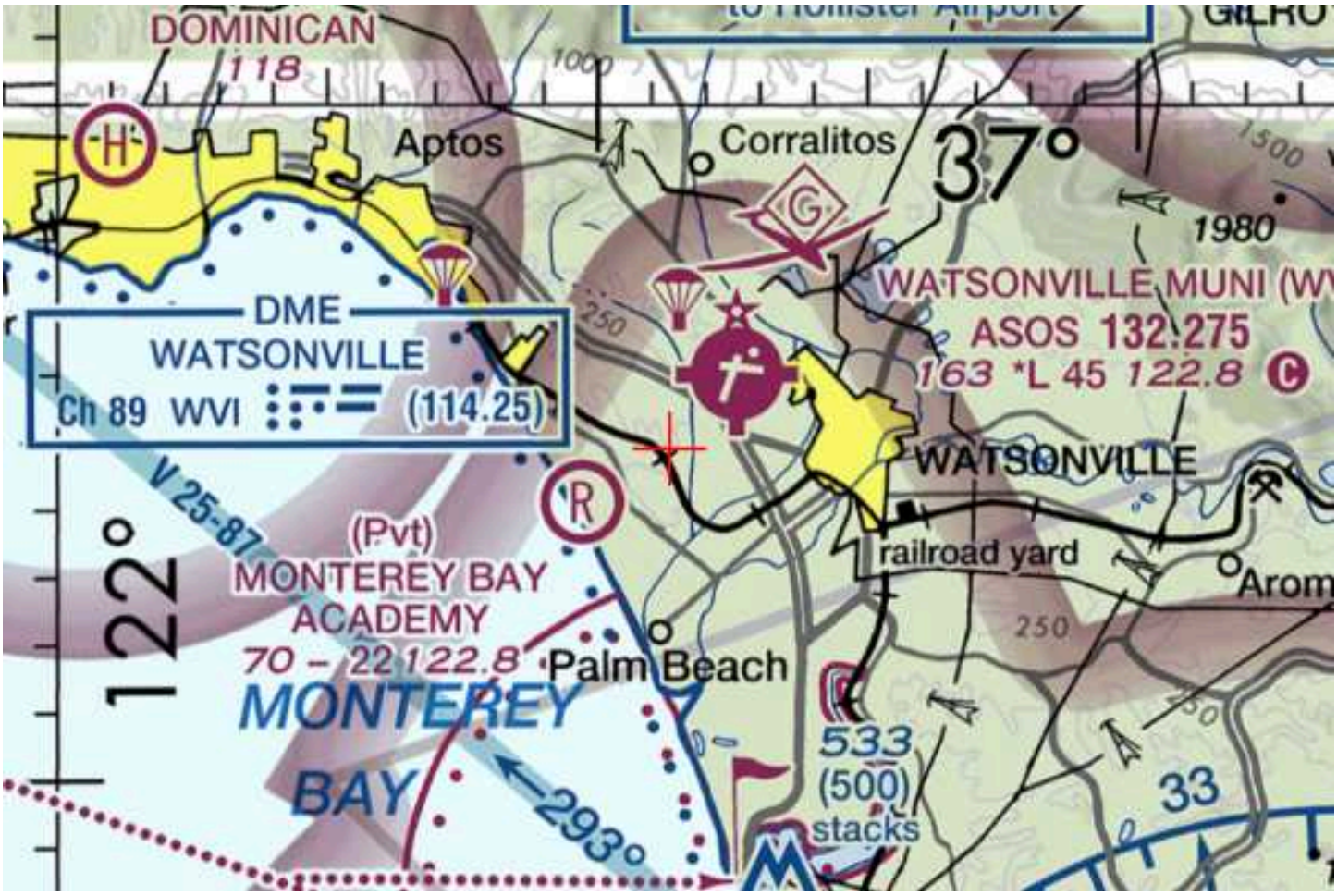
Signature Control No: 625020990-632406330 (DNE)
Julie A. Morgan
Manager, Obstruction Evaluation Group

Attachment(s)
Map(s)

TOPO Map for ASN 2024-AWP-7620-OE



Sectional Map for ASN 2024-AWP-7620-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2024-AWP-7621-OE

Issued Date: 09/09/2024

David Carlson
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701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Existing Municipal Solid Waste Landfill Organics Diversion Facility Option 1
Location:	Watsonville, CA
Latitude:	36-55-10.83N NAD 83
Longitude:	121-48-36.61W
Heights:	100 feet site elevation (SE) 40 feet above ground level (AGL) 140 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The FAA has identified the need for an analysis of potential wildlife hazards to aircraft as described in Advisory Circular 150/5200-33, Hazardous Wildlife Attractants on or Near Airports, to be accomplished for this proposal in accordance with 40 Code of Federal Regulation (CFR) 258 section 258.10. Owners or operators of new, existing, and lateral expansions of Municipal Solid Waste Landfill (MSWLF) units that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used by only piston-type aircraft, must demonstrate the MSWLF units design and operation do not pose a bird hazard to aircraft.

When the services of a wildlife damage management biologist are required, the FAA recommends that land use developers contact a consultant specializing in wildlife damage management or the appropriate United States Department of Agriculture (USDA) State Director of Wildlife Services. The USDA's state offices can be found on their website: (https://www.aphis.usda.gov).

This determination expires on 03/09/2026 unless:

(a) the construction is started (not necessarily completed) and FAA Form 7460-2, Notice of Actual Construction or Alteration, is received by this office.
(b) extended, revised, or terminated by the issuing office.
(c) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power, except those frequencies specified in the Colo Void Clause Coalition; Antenna System Co-Location; Voluntary Best Practices, will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.This determination includes all previously filed frequencies and power for this structure.

If construction or alteration is dismantled or destroyed, you must submit notice to the FAA within 5 days after the construction or alteration is dismantled or destroyed.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

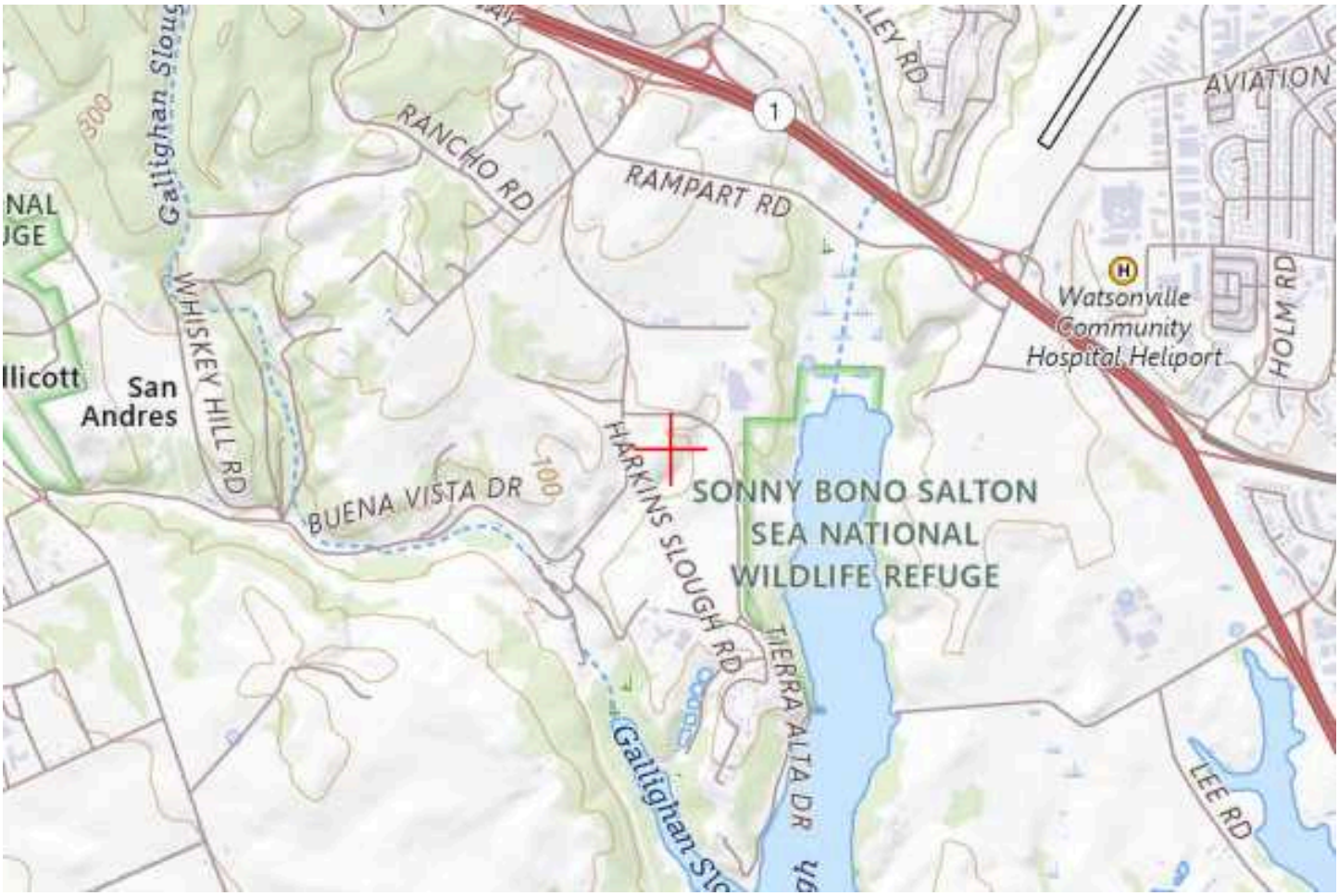
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact Justin Hetland, at (847) 294-8084, or justin.hetland@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-AWP-7621-OE.

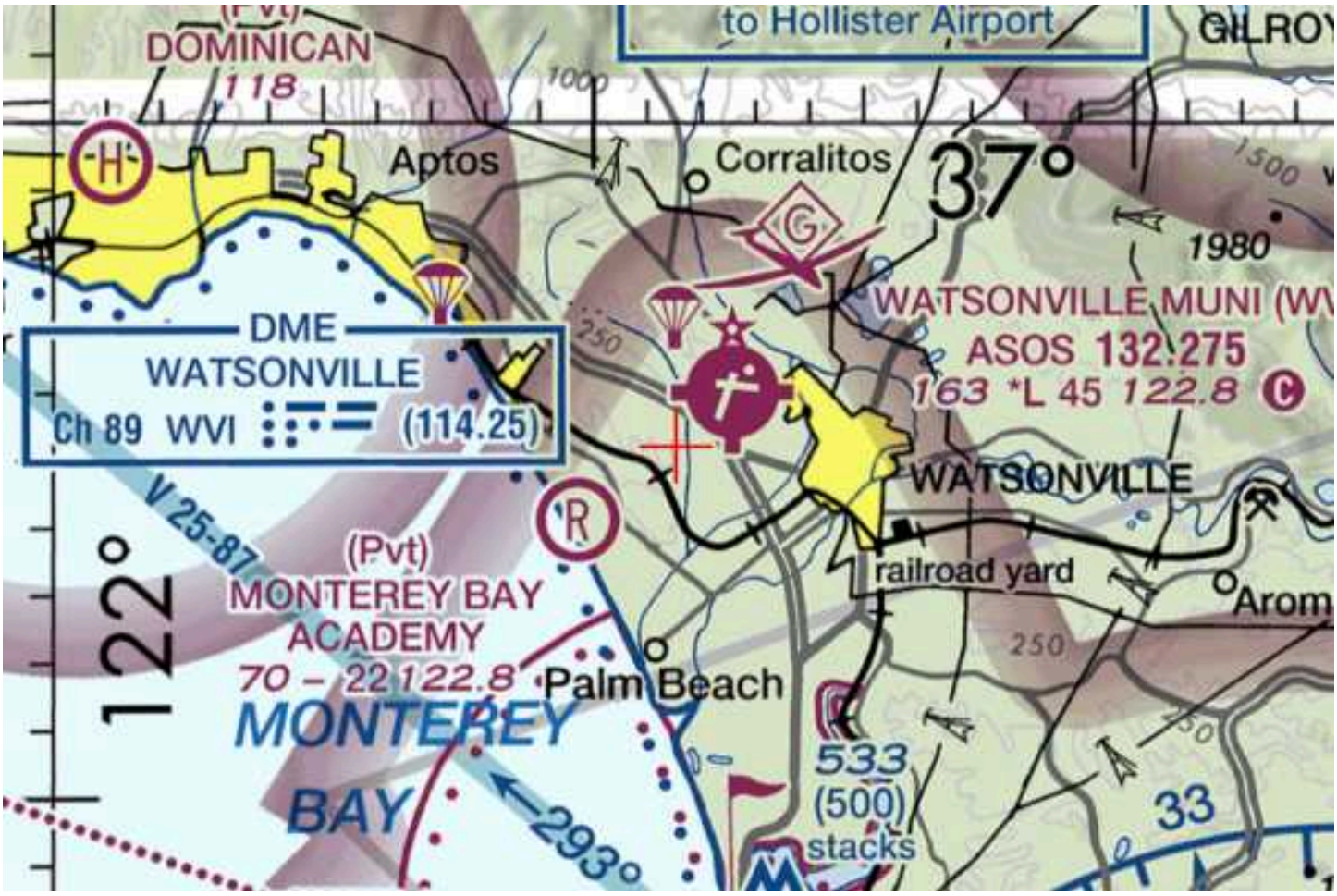
Signature Control No: 625020993-632406331 (DNE)
Julie A. Morgan
Manager, Obstruction Evaluation Group

Attachment(s)
Map(s)

TOPO Map for ASN 2024-AWP-7621-OE



Sectional Map for ASN 2024-AWP-7621-OE



Mail Processing Center
Federal Aviation Administration
Southwest Regional Office
Obstruction Evaluation Group
10101 Hillwood Parkway
Fort Worth, TX 76177

Aeronautical Study No.
2024-AWP-7622-OE

Issued Date: 09/09/2024

David Carlson
County of Santa Cruz
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Existing Municipal Solid Waste Landfill Organics Diversion Facility Option 2
Location:	Watsonville, CA
Latitude:	36-54-57.53N NAD 83
Longitude:	121-49-02.11W
Heights:	110 feet site elevation (SE)
	40 feet above ground level (AGL)
	150 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be e-filed any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part 1)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part 2)

Based on this evaluation, marking and lighting are not necessary for aviation safety. However, if marking/ lighting are accomplished on a voluntary basis, we recommend it be installed in accordance with FAA Advisory circular 70/7460-1 M.

The FAA has identified the need for an analysis of potential wildlife hazards to aircraft as described in Advisory Circular 150/5200-33, Hazardous Wildlife Attractants on or Near Airports, to be accomplished for this proposal in accordance with 40 Code of Federal Regulation (CFR) 258 section 258.10. Owners or operators of new, existing, and lateral expansions of Municipal Solid Waste Landfill (MSWLF) units that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used by only piston-type aircraft, must demonstrate the MSWLF units design and operation do not pose a bird hazard to aircraft.

When the services of a wildlife damage management biologist are required, the FAA recommends that land use developers contact a consultant specializing in wildlife damage management or the appropriate United States Department of Agriculture (USDA) State Director of Wildlife Services. The USDA's state offices can be found on their website: (https://www.aphis.usda.gov).

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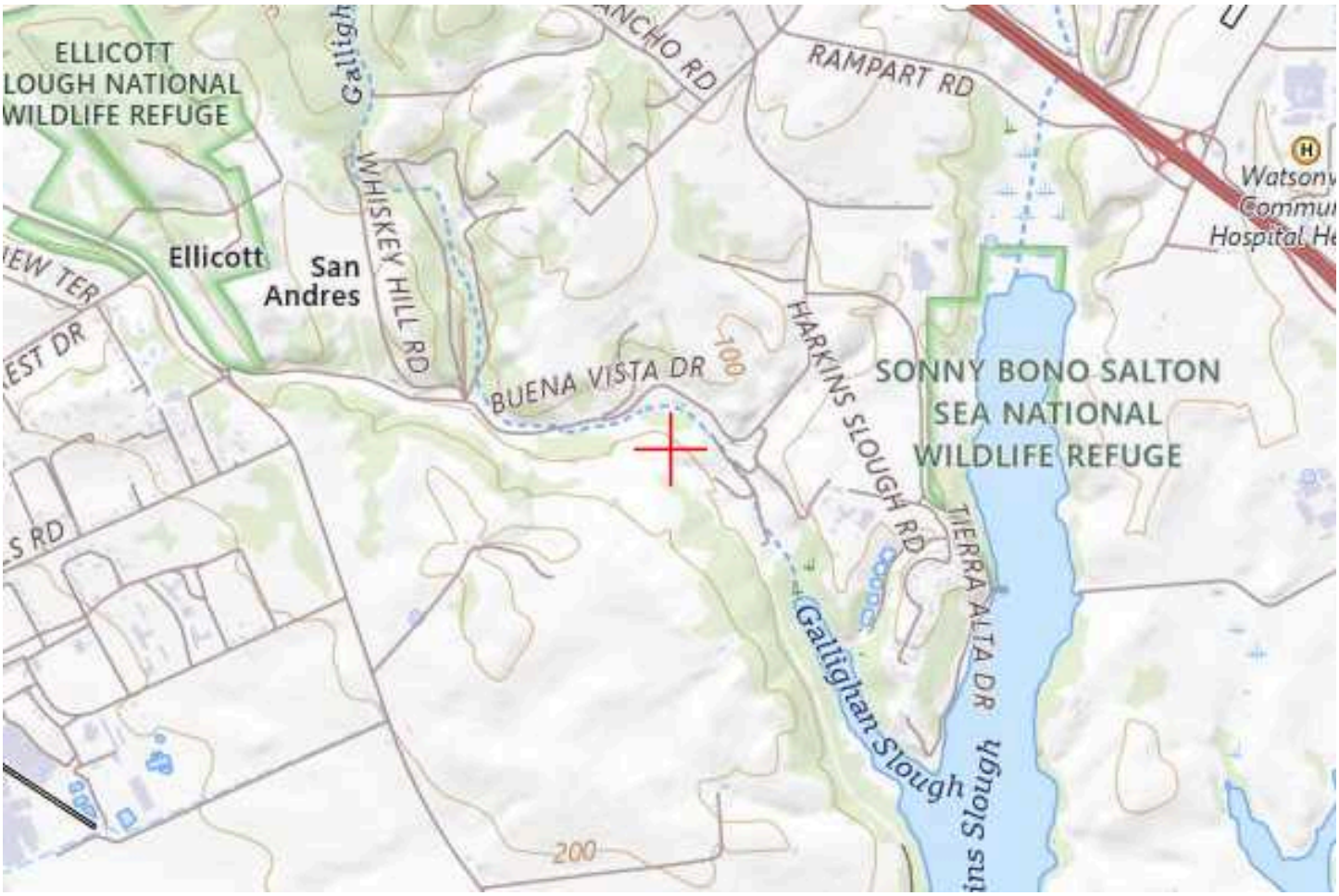
This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact Justin Hetland, at (847) 294-8084, or justin.hetland@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2024-AWP-7622-OE.

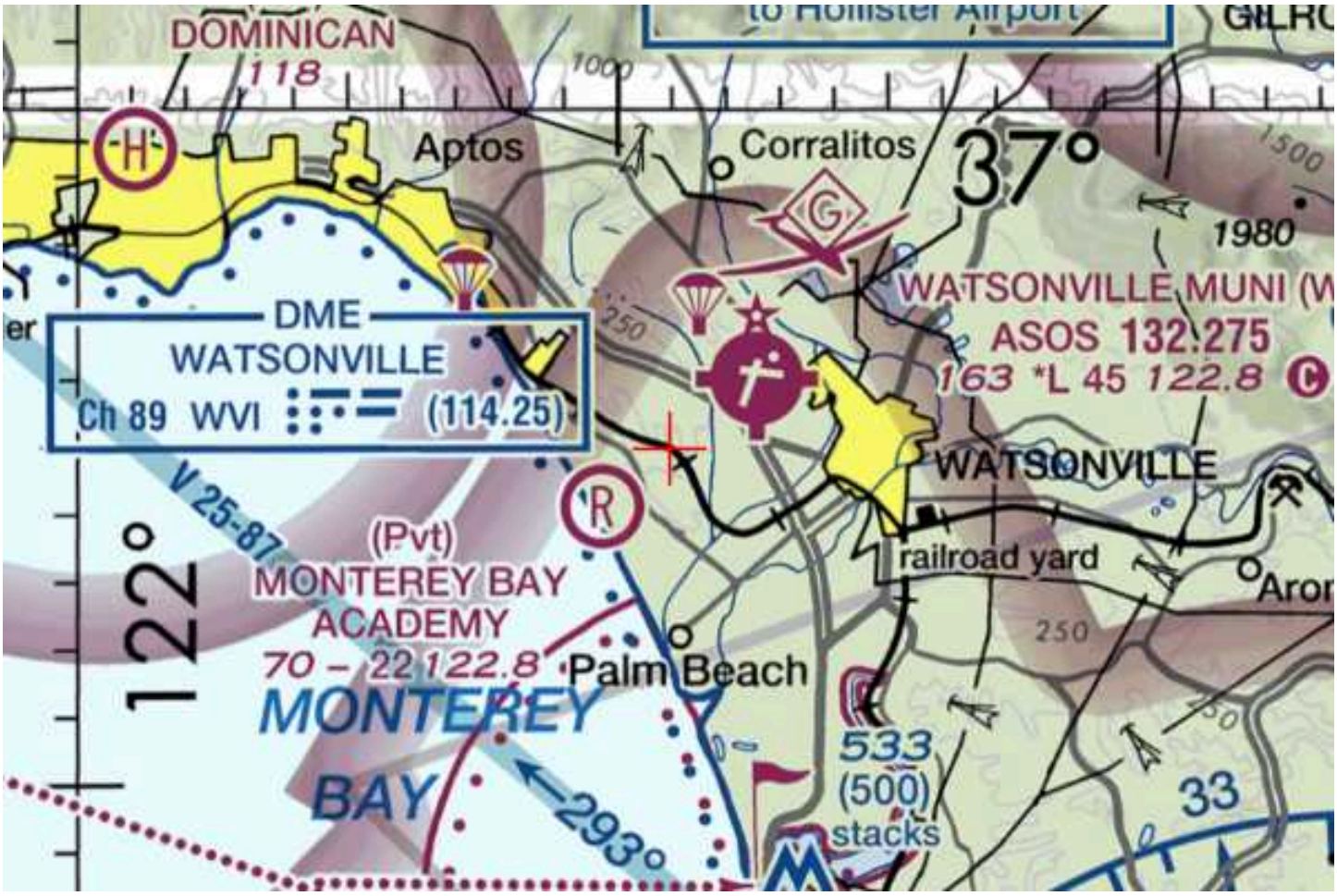
Signature Control No: 625020994-632406333 (DNE)
Julie A. Morgan
Manager, Obstruction Evaluation Group

Attachment(s)
Map(s)

TOPO Map for ASN 2024-AWP-7622-OE



Sectional Map for ASN 2024-AWP-7622-OE



Appendix J. Drainage Report

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Buena Vista Redevelopment Project Drainage Report

Santa Cruz County Department of Public Works
701 Ocean Street
Santa Cruz, CA 95060

SCS ENGINEERS

02221033.00 | July 20, 2025

1881 Campus Commons Drive
Reston, VA 20190

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Attachment C Pre-Development Drainage Divides Map
Attachment D Post-Development Drainage Divides Map
Attachment E Drainage Area Calculations
Attachment F Hydraflow Graphs

1.0 BACKGROUND

The purpose of this drainage report is to highlight the existing and proposed conditions of the redevelopment areas associated with this project. The report will describe both the existing and proposed conditions indicate the pre-development and post-development stormwater runoff volumes. Any potential impacts to the site will be identified and recommendations for best management practices to prevent erosion damage and proper sediment controls will be discussed.

2.0 SITE DESCRIPTION

The County of Santa Cruz (County) owns and operates the Buena Vista Landfill located in unincorporated Santa Cruz County. As of November 2022, the landfill has an estimated remaining capacity ranging from 6 to 16 years depending on rate of disposal at the landfill.

The County is planning a redevelopment project to address solid waste handling after landfill closure. The aspects of this project include the construction of two transfer stations, Transfer Station A (TSA) and Transfer Station B (TSB), provides two options for organics management, and develop a fueling/staging area for landfill equipment.

The property is located south of the Watsonville Municipal Airport at the intersection of Buena Vista Drive and Harkins Slough Road and is part of the Watson Slough watershed. The property sits between two major waterways of this watershed being Harkings Slough and Gallighan Slough. FEMA Flood Insurance Rate Maps do not indicate the property is located in any Special Flood Hazard Areas. FEMA Maps for this area can be found in **Attachment B – FEMA Flood Insurance Rate Map**. Presently, the majority of the stormwater runoff is contained on site and ultimately drains to Gallighan Slough.

3.0 TRANSFER STATION A

One of the main aspects of this project, TSA, is planned to be located in the northeast corner of the property on a partially undeveloped area. In order to make TSA work in this location, the existing Harkins Slough Road needs to be re-aligned around the new TSA building. The intention of this is to keep transfer station and operations traffic separate from residential traffic that routinely travel Harkins Slough. See **Attachment A** for TSA location.

3.1 EXISTING CONDITION

The existing condition of this area is mainly grassland cover with impervious area consisting of the paved Harkins Slough Road. Existing drainage patterns indicate a small portion of stormwater runoff drains to the east into Harkins Slough while the vast majority drains to the west via a roadside ditch. This ditch also collets runoff from the north neighboring agricultural property. This ditch travels to the intersection of Harkins Slough Road and Buena Vista Drive where it enters a culvert underneath Harkins Slough Road into the Buena Vista Drive road side ditch. This ditch ultimately outfalls into Gallighan Slough.

Pre-development calculations for Ditch 1 are performed using the Rational Method. This utilizes the acreage, runoff coefficient, and rainfall event to calculate the runoff volume. Ditch 1 receives stormwater runoff from DA 2 and DA 3 as shown on **Attachment C – Pre-Development Drain Divides Map**. Utilizing a 5 minutes time of concentration and a conservative ditch n-value of 0.08 (dense

brush), the approximate volume of runoff conveyed by this channel is 23.22 cfs. Calculations for this ditch have been performed with Hydraflow Express and can be found in **Attachment F**.

3.2 PROPOSED CONDITION

The two ways the drainage conditions will be impacted by construction of Transfer Station A are the addition of impervious area, and the re-alignment of Harkins Slough Road. Harkins Slough Road will be realigned to the northeast perimeter of the Project site, adjacent to the north and east property lines. The portion of Harkins Slough Road extending along the northern Project perimeter would be sited to avoid the existing drainage ditch (possible improvement/restoration if needed). The new Harkins Slough Road is crowned in the middle shedding stormwater runoff in both directions. Stormwater would be conveyed either through existing ditches or to the proposed low spot adjacent to the transfer tunnel. There would be a new inlet here to collect runoff with measures to prevent unwanted solid waste from entering the conveyance system. It should be noted that there will be no landfill equipment/traffic traveling on this road as to not impact any outside drainages from onsite sediment/contaminants.

Stormwater surface runoff from new impervious surfaces within Transfer Station A facility limits would be collected at the low point, as mentioned above, adjacent to the transfer tunnel, and conveyed via storm pipe infrastructure into the landfills existing stormwater channel. Filtration measures to be taken can include stormceptors or filtration inlet bags. Contact water from inside TSA would be collected and held in a storage tank for pump and haul removal.

The addition of TSA will impact both DA 2 and DA 3. These drainage areas will have a reduction in size, but DA 2 will have a slight increase in impervious area due to the realignment of Harkins Slough Road. Even though there is an increase in impervious area, the overall reduction of the drainages provides reduced runoff volume though Ditch 1. The post-development calculation is 21.95 cfs, a reduction of 5.5%.

The second impact will be to DA 5 which also conveys runoff from DA 6 and DA 10. Pre-development calculations indicate the total runoff (DA 5 + DA 6 + DA 10) for DA 5 is 37.91 cfs. DA 5 will now also convey runoff from the new TSA. With a large addition of impervious area, the total post-development runoff is now 37.09 cfs. As with Ditch 1, this is a reduction in runoff volume from the closure grading decreasing DA 6 and DA 10.

All calculations performed can be found in Attachments E and F.

4.0 TRANSFER STATION B

Transfer Station B is located at the current site of the maintenance building and landfill office in the south portion of the site. In order to develop TSB, the maintenance building and offices will need to be demolished and removed to accommodate the new operations. TSB will have direct access to the fueling/staging area so landfill equipment and transfer trailers can continue to access the site without adding trips on Harkins Slough Road.

4.1 EXISTING CONDITION

The majority of the drainage in this location comes from the landfill itself. This portion of the landfill is capped and closed and consist of vegetative ground cover. The maintenance building as well as the surrounding roads and parking account for all of the existing impervious area within this drainage. The water currently drains from north to south to existing stormwater infrastructure. This

consists of three drainage inlets and stormwater piping that outfalls to a concrete drainage ditch moving in the east direction towards the Harkins Slough and Rountree Lane intersection.

This area has multiple drainage inlets that were inaccessible during an initial survey so this area is analyzed utilizing the one outlet for a pre and post condition. Pre-development runoff calculations indicate a runoff of 14.23 cfs.

4.2 PROPOSED CONDITION

The proposed condition at TSB will maintain the existing drainage pattern to the extent possible by utilizing the existing inlets/drainage pipe or replacing them to existing design condition. As with TSA, TSB will also utilize filtration measures in any inlets to capture trash or sediment that may be from waste transfer operations. The proposed work is located within the limits of existing impervious area.

The post-development drainage area will remain the same size, however there will be a slight increase in impervious area creating an increase of 1.8% runoff volume. Calculations indicate a post-development runoff of 14.49 cfs. This increase in runoff volume can be conveyed successfully through the existing or replaced stotmwater pipe.

5.0 ORGANICS DIVERSION FACILITY OPTION 1

5.1 EXISTING CONDITION

Organics Diversion Facility Option 1 (ODF Option 1) would be a continuation of the existing organics operation currently located at the northern portion of the landfill over Modules 4A and 4B. Existing organic materials currently diverted are vegetation/yard waste and food waste. These operations take place on the landfills intermediate grade with drainage patterns down to existing perimeter swales and culverts.

Current DA 7 includes the existing organics diversion and has a calculated pre-development flow of 35.82 cfs.

Culvert 4 has been evaluated as part of this drainage. This culvert conveys stormwater from DA 1, DA 2, DA 3, DA 4, DA 5, DA 6. DA 7, and DA 10 for a total volume of 113.39 cfs as shown. The calculations indicate the culvert has sufficient capacity to handle the 10-year stormwater event.

5.2 PROPOSED CONDITION

The plan for ODF Option 1 is to continue the operations on the landfill but to allow the landfill to utilize more landfilling airspace, the operations will be moved to a higher elevation. The new elevation will be 30 to 40 feet higher. In moving to a higher elevation, the landfill will have additional stormwater conveyance systems in place such as stormwater benches. Stormwater runoff will travel to the north and enter the stormwater bench traveling down the slope into the perimeter conveyance channel. The ODF Option 1 area will be paved to allow for easy driving and limit stormwater infiltration into the waste mass. As such, this will create an increase in runoff from this area which will need to be slowed/diverted to prevent overflows in the downstream channels. Additional measures that can be taken include supplemental grassed channels, stone check dams, and erosion control matting. Any stormwater that will come in contact with certain organics such as food waste will be kept under a roof structure such as a canopy to prevent infiltration and contaminants in the runoff. Runoff on the paved surface can also be diverted using concrete barriers to minimize any contact water leaving the area.

DA 7 will increase in size by about 5 acres the addition of ODF Option 1. Along with the drainage area size increase, there is also an increase in impervious area of 6.80 acres. This generates a big increase of the post-development flow of 54.14 cfs. The culvert 4 post-development calculations is now performed with a runoff volume of 125.57 cfs. As shown in the culvert report, this increase in runoff does not affect the capacity of the culvert.

6.0 ORGANICS DIVERSION FACILITY OPTION 2

6.1 EXISTING CONDITION

Organics Diversion Facility Option 2 (ODF Option 2) is planned to be a full-scale composting operation located on the old landfill top deck to the west of the site. The top deck of the old landfill is approximately 10 acres in size and is comprised of a gravel/dirt final cover. This area has two current drainage patterns, a small portion to the north west and the remainder to the south drainage swale which outfalls into recognized wetlands before entering Gallighan Slough.

Existing ground cover at this location is a mix of gravel and dirt generating a runoff volume of 23.36 cfs into Ditch 5.

6.2 PROPOSED CONDITION

The intent for the operations would be to maintain the same grades as much as possible and pave the operation area just as ODF Option 1 would be. The existing swale would go through restoration similar to the north drainage located to TSA. This would allow the swale to be restored to its design condition for proper conveyance. DA 12 will have an increased runoff coefficient due to the impervious material changing from gravel to asphalt, but the drainage area will decrease because any stormwater that comes in contact with the compost piles is considered contact water and will be collected separately. This causes a reduction in runoff volume of approximately 8.5%. The new volume will be 21.38 cfs.

BMPs could still be installed in this area to prevent any sediment from entering the conveyance channel caused from composting operations. These may be filter logs or check dams installed in the channel to capture sediment.

7.0 EQUIPMENT PARKING AND STORAGE AREA

7.1 EIXTING CONDITION

An equipment parking and storage are is an optional component to the redevelopment project. The preferred location for this is on the south side of the property on vacant, undeveloped land owned by the County. This location has limited impervious area (small roadway), mainly consisting of vegetated area draining to the south towards wastewater treatment ponds. Existing calculations have determined the stormwater runoff is approximately 22.31 cfs.

7.2 PROPOSED CONDITION

The proposed area would include a new paved staging/fueling area while maintaining the existing grades creating an increase in stormwater runoff. To accommodate this, stormwater measure may need to be taken such as grassed swales, gravel disconnect areas, level spreaders, or check dams to dissipate the runoff to a non-erosive flow. As this area will be utilized by landfill equipment and

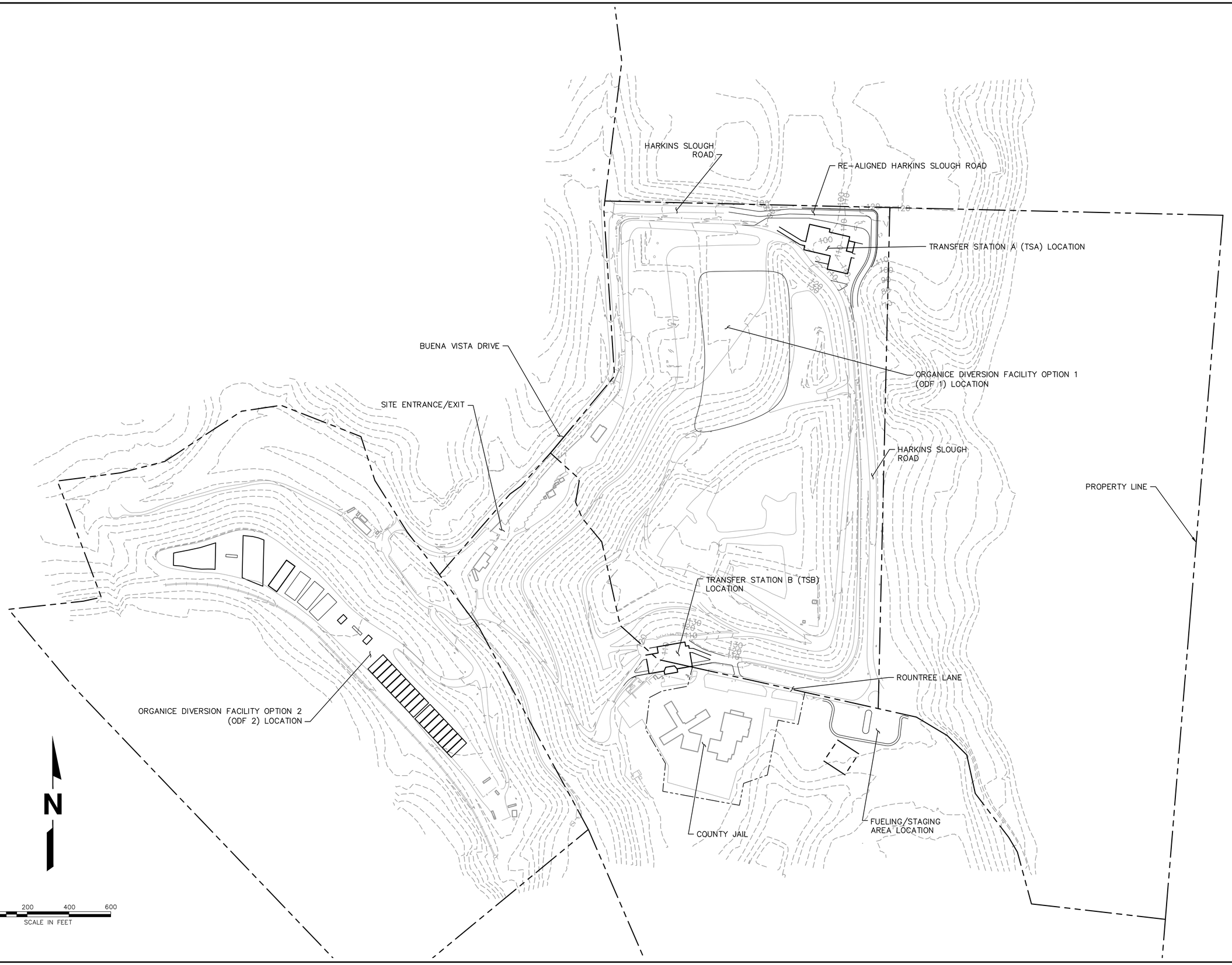
waste transfer trailers, filter logs should be installed as well to prevent unwanted sediment from leaving and impacting the surrounding area. The stormwater runoff will increase by 5.8% to 23.60 cfs.

8.0 SUMMARY

Based on the preliminary calculations performed, the existing stormwater infrastructure on site has the capacity to handle an increase of stormwater runoff. It should be noted that Culvert 5 has sedimentation issues and the County has plans to replace this culvert with either a 10' x 10' box culvert, a 12' circular culvert, or a bridge. To be conservative, the Culvert 5 calculations were performed with a 10' x 10' box culvert. This ensures any of these options will provide enough capacity to handle all stormwater flows.

Appendix A

Site Location Map



NO.	REVISION	DATE

SHEET TITLE
SITE LOCATION MAP

PROJECT TITLE
BUENA VISTA LANDFILL DRAINAGE DIVIDES

CLIENT
COUNTY OF SANTA CRUZ
RECYCLING AND SOLID WASTE SERVICES
701 OCEAN STREET, ROOM 410
SANTA CRUZ, CALIFORNIA 95060

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
11260 ROGER BACON DRIVE - RESTON, VA 20190
PH. (703) 471-6150 FAX. (703) 471-6676

PROJ. NO.	DWN. BY:	D/A R'VW BY:
02221033.00	SRS	KEA
DSN. BY:	CHK. BY:	APP. BY:
SRS	KEA	MAK

CADD FILE:
SANTA CRUZ TS

DATE:
APRIL 2025

SCALE:
AS SHOWN

DRAWING NO.
1 of **1**

Appendix B

FEMA Flood Map

121°50'37.99"W 36°56'21.61"N

121°48'44.63"W 36°54'15.94"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **10/16/2024 11:36 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

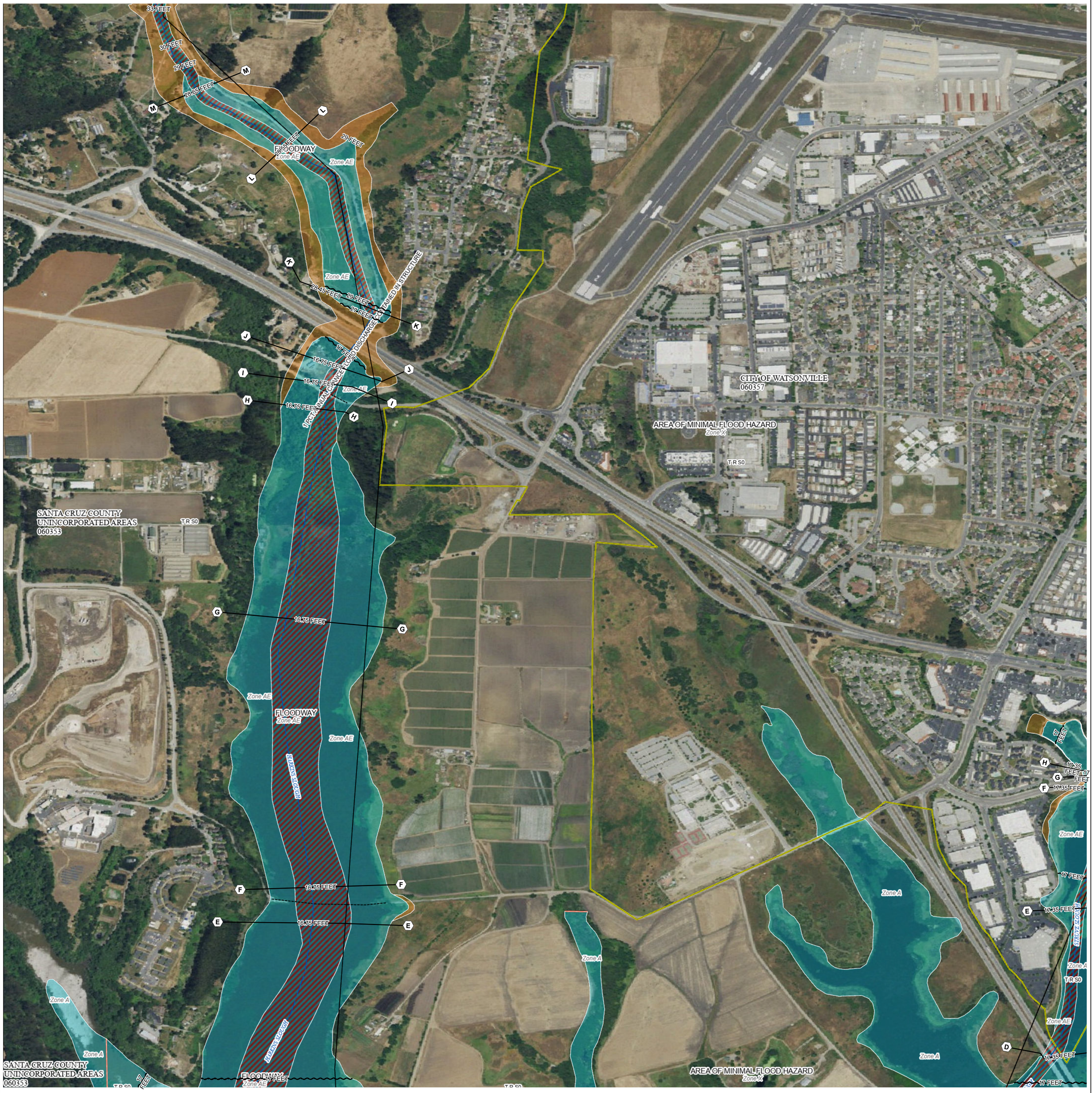
PANEL **387** OF **456**

Panel Contains:

COMMUNITY	NUMBER	PANEL
SANTA CRUZ COUNTY	060353	0387
CITY OF WATSONVILLE	060357	0387

MAP NUMBER
06087C0387F
EFFECTIVE DATE
September 29, 2

121°48'45.49"W 36°56'21.61"N



121°46'52.13"W 36°54'15.94"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **10/16/2024 11:37 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

PANEL **391** OF **456**

Panel Contains:

COMMUNITY	NUMBER	PANEL
SANTA CRUZ COUNTY	060353	0391
CITY OF WATSONVILLE	060357	0391

MAP NUMBER
06087C0391E
EFFECTIVE DATE
May 16, 2012

Appendix C

Pre-development Drainage Divides Map

DA 1 = 5.77 ACRES
C = 0.52
I = 3.13 IN/HR
Q10 = 9.39 CFS

DA 2 = 12.33 ACRES
C = 0.50
I = 3.13 IN/HR
Q10 = 19.30 CFS

CULVERT 2
DA 2 + DA 3

CULVERT 1
DA 3

DA 3 = 4.17 ACRES
C = 0.50
I = 3.13 IN/HR
Q10 = 3.92 CFS

CULVERT 6
DA 6 + DA 10

DITCH 1
DA 2 + DA 3

DA 5 = 1.11 ACRES
C = 0.61
I = 3.13 IN/HR
Q10 = 2.12 CFS

DA 4 = 3.95 ACRES
C = 0.57
I = 3.13 IN/HR
Q10 = 7.05 CFS

STORM PIPE 1
DA 5 + DA 6 + DA 10

DITCH 4 (PRE
DA 6 + DA 10

DA 6 = 7.59 ACRES
C = 0.50
I = 3.13 IN/HR
Q10 = 11.88 CFS

DITCH 2
DA 2 + DA 3 + DA 4

CULVERT 3
DA 2 + DA 3 +
DA 4

DA 7 = 21.19 ACRES
C = 0.54
I = 3.13 IN/HR
Q10 = 35.82 CFS

DA 8 = 10.34 ACRES
C = 0.54
I = 3.13 IN/HR
Q10 = 17.48 CFS

DA 11 = 10.23 ACRES
C = 0.58
I = 3.13 IN/HR
Q10 = 18.57 CFS

DA XX = X.XX ACRES
C = 0.50
I = 3.13 IN/HR
Q10 = CFS

CULVERT 8
DA XX

DITCH 3
DA 1 + DA 2 + DA 3 + DA 4 +
DA 5 + DA 6 + DA 7 + DA 10

DA 9 = 3.86 ACRES
C = 0.60
I = 3.13 IN/HR
Q10 = 7.25 CFS

CULVERT 7
DA 10

CULVERT 4
DA 1 + DA 2 + DA 3 +DA 4 +
DA 5 + DA 6 + DA 7 + DA 10

DA 10 = 15.28 ACRES
C = 0.50
I = 3.13
Q10 = 23.91 CFS

DA 13 = 8.12 ACRES
C = 0.56
I = 3.13 IN/HR
Q10 = 14.23 CFS

STORM PIPE 2
DA 13

DA 14 = 5.33 ACRES
C = 0.52
I = 3.13 IN/HR
Q10 = 8.68 CFS

CULVERT 5
DA 1 + DA 2 + DA 3 +DA 4 +
DA 5 + DA 6 + DA 7 + DA 8
+ DA 9 + DA 10 + DA 11

DA 12 = 9.57 ACRES
C = 0.78
I = 3.13 IN/HR
Q10 = 23.36 CFS

DA 15 = 13.71 ACRES
C = 0.52
I = 3.13
Q10 = 22.31 CFS

DITCH 5
DA 12

LANDFILL PERIMETER ROAD

N

0 200 400 600
SCALE IN FEET

NO.	REVISION	DATE

SHEET TITLE
PRE-DEVELOPMENT

PROJECT TITLE
BUENA VISTA LANDFILL
DUAL TRANSFER STATION

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET, ROOM 410
SANTA CRUZ, CALIFORNIA 95060

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
11260 ROGER BACON DRIVE - RESTON, VA 20190
PH. (703) 471-6150 FAX. (703) 471-6676

PROJ. NO. 02221033.00
DSN. BY: SRS
DWN. BY: SRS
CHK. BY: KEA
Q/A REV'W BY: KEA
APP. BY: MAK

CADD FILE:
SANTA CRUZ TS

DATE:
APRIL 2025

SCALE:
AS SHOWN

DRAWING NO.
701 of **X**

Appendix D

Post-development Drainage Divides Map

DA 1 = 5.77 ACRES
C = 0.52
I = 3.13 IN/HR
Q10 = 9.39 CFS

DA 2 = 11.22 ACRES
C = 0.52
I = 3.13 IN/HR
Q10 = 18.26 CFS

STORM PIPE 5
DA 5

CULVERT 2
DA 2 + DA 3

CULVERT 1
DA 3

DA 3 = 3.93 ACRES
C = 0.50
I = 3.13 IN/HR
Q10 = 3.69 CFS

DA 5 = 5.52 ACRES
C = 0.78
I = 3.13 IN/HR
Q10 = 13.48 CFS

DITCH 1
DA 2 + DA 3

STORM PIPE 4
DA 5 + DA 6 + DA 10

DA 4 = 1.69 ACRES
C = 0.56
I = 3.13 IN/HR
Q10 = 2.96 CFS

STORM PIPE 1
DA 5 + DA 6 + DA 10

STORM PIPE 3
DA 6 + DA 10

DITCH 2
DA 2 + DA 3 + DA 4

DA 6 = 2.79 ACRES
C = 0.50
I = 3.13 IN/HR
Q10 = 4.37 CFS

DITCH 4 POST
DA 5 +DA 6 + DA 10

CULVERT 3
DA 2 + DA 3 +
DA 4

DA 7 = 26.63 ACRES
C = 0.65
I = 3.13 IN/HR
Q10 = 54.18 CFS

DA 11 = 10.23 ACRES
C = 0.58
I = 3.13 IN/HR
Q10 = 18.57 CFS

DITCH 3
DA 1 + DA 2 + DA 3 + DA 4 +
DA 5 + DA 6 + DA 7 + DA 10

CULVERT 8
DA XX

CULVERT 7
DA 10

DA 9 = 3.86 ACRES
C = 0.60
I = 3.13 IN/HR
Q10 = 7.25 CFS

CULVERT 4
DA 1 + DA 2 + DA 3 +DA 4 +
DA 5 + DA 6 + DA 7 + DA 10

DA 8 = 11.50 ACRES
C = 0.55
I = 3.13 IN/HR
Q10 = 19.80 CFS

DA 10 = 11.82 ACRES
C = 0.52
I = 3.13
Q10 = 19.24 CFS

DA 13 = 8.12 ACRES
C = 0.57
I = 3.13 IN/HR
Q10 = 14.49 CFS

STORM PIPE 2
DA 13

DA 14 = 5.33 ACRES
C = 0.57
I = 3.13 IN/HR
Q10 = 9.51 CFS

LANDFILL PERIMETER ROAD

CULVERT 5
DA 1 + DA 2 + DA 3 +DA 4 +
DA 5 + DA 6 + DA 7 + DA 8
+ DA 9 + DA 10 + DA 11

DA 12 = 8.23 ACRES
C = 0.83
I = 3.13 IN/HR
Q10 = 21.38 CFS

DITCH 5
DA 12

DA 15 = 13.71 ACRES
C = 0.55
I = 3.13
Q10 = 23.60 CFS

N

0 200 400 600
SCALE IN FEET

NO.	REVISION	DATE

SHEET TITLE
POST-DEVELOPMENT

PROJECT TITLE
BUENA VISTA LANDFILL
DUAL TRANSFER STATION

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET, ROOM 410
SANTA CRUZ, CALIFORNIA 95060

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
11260 ROGER BACON DRIVE - RESTON, VA 20190
PH. (703) 471-6150 FAX (703) 471-6676

PROJ. NO. 02221033.00
DSN. BY: SRS
DWN. BY: SRS
CHK. BY: KEA
Q/A REV BY: KEA
APP. BY: MAK

CADD FILE: SANTA CRUZ TS

DATE: APRIL 2025

SCALE: AS SHOWN

DRAWING NO.
702 of **X**

Appendix E

Drainage Area Calculations

Existing C	Impervious C
0.5	0.9

INPUT | OUTPUT

DA	Drainage Area
C	Runnoff Coefficient
I	Rainfall Intensity
IP	Impervious Area
Tc	Time of Concentration

DA-1 PRE		
DA	5.77	ACRES
C	0.52	
I	3.13	IN/HR
Tc	5	MIN
IP	0.3	ACRES
Q10	**9.39**	CFS

DA-2 PRE		
DA	12.33	ACRES
C	0.50	
I	3.13	IN/HR
Tc	5	MIN
IP	0	ACRES
Q10	**19.30**	CFS

DA-3 PRE		
DA	4.17	ACRES
C	0.50	
I	3.13	IN/HR
Tc	60	MIN
IP	0	ACRES
Q10	**6.53**	CFS

DA-1 POST		
DA	5.77	ACRES
C	0.52	
I	3.13	IN/HR
Tc	5	MIN
IP	0.3	ACRES
Q10	**9.39**	CFS

DA-2 POST		
DA	11.22	ACRES
C	0.52	
I	3.13	IN/HR
Tc	5	MIN
IP	0.57	ACRES
Q10	**18.26**	CFS

DA-3 POST		
DA	3.93	ACRES
C	0.50	
I	3.13	IN/HR
Tc	60	MIN
IP	0	ACRES
Q10	**6.15**	CFS

DA-4 PRE		
DA	3.95	ACRES
C	0.57	
I	3.13	IN/HR
Tc	5	MIN
IP	0.74	ACRES
Q10	**7.05**	CFS

DA-5 PRE		
DA	1.11	ACRES
C	0.61	
I	3.13	IN/HR
Tc	5	MIN
IP	0.3	ACRES
Q10	**2.12**	CFS

DA-6 PRE		
DA	7.59	ACRES
C	0.50	
I	3.13	IN/HR
Tc	60	MIN
IP	0	ACRES
Q10	**11.88**	CFS

DA-4 POST		
DA	1.69	ACRES
C	0.56	
I	3.13	IN/HR
Tc	5	MIN
IP	0.25	ACRES
Q10	**2.96**	CFS

DA-5 POST		
DA	5.52	ACRES
C	0.78	
I	3.13	IN/HR
Tc	5	MIN
IP	3.83	ACRES
Q10	**13.48**	CFS

DA-6 POST		
DA	2.79	ACRES
C	0.50	
I	3.13	IN/HR
Tc	60	MIN
IP	0	ACRES
Q10	**4.37**	CFS

DA-7 PRE		
DA	21.19	ACRES
C	0.54	
I	3.13	IN/HR
Tc	5	MIN
IP	2.18	ACRES
Q10	**35.82**	CFS

DA-8 PRE		
DA	10.34	ACRES
C	0.54	
I	3.13	IN/HR
Tc	5	MIN
IP	1.12	ACRES
Q10	**17.48**	CFS

DA-9 PRE		
DA	3.86	ACRES
C	0.60	
I	3.13	IN/HR
Tc	60	MIN
IP	0.95	ACRES
Q10	**7.25**	CFS

DA-7 POST		
DA	26.63	ACRES
C	0.65	
I	3.13	IN/HR
Tc	5	MIN
IP	10.2	ACRES
Q10	**54.18**	CFS

DA-8 POST		
DA	11.5	ACRES
C	0.55	
I	3.13	IN/HR
Tc	5	MIN
IP	1.41	ACRES
Q10	**19.80**	CFS

DA-9 POST		
DA	3.86	ACRES
C	0.60	
I	3.13	IN/HR
Tc	60	MIN
IP	0.95	ACRES
Q10	**7.25**	CFS

DA-10 PRE		
DA	15.28	ACRES
C	0.50	
I	3.13	IN/HR
Tc	5	MIN
IP	0	ACRES
Q10	**23.91**	CFS

DA-11 PRE		
DA	10.23	ACRES
C	0.58	
I	3.13	IN/HR
Tc	5	MIN
IP	2.11	ACRES
Q10	**18.57**	CFS

DA-12 PRE		
DA	9.57	ACRES
C	0.78	
I	3.13	IN/HR
Tc	60	MIN
IP	6.76	ACRES
Q10	**23.36**	CFS

DA-10 POST		
DA	11.82	ACRES
C	0.52	
I	3.13	IN/HR
Tc	5	MIN
IP	0.59	ACRES
Q10	**19.24**	CFS

DA-11 POST		
DA	10.23	ACRES
C	0.58	
I	3.13	IN/HR
Tc	5	MIN
IP	2.11	ACRES
Q10	**18.57**	CFS

DA-12 POST		
DA	8.23	ACRES
C	0.83	
I	3.13	IN/HR
Tc	60	MIN
IP	6.76	ACRES
Q10	**21.38**	CFS

DA-13 PRE		
DA	8.12	ACRES
C	0.56	
I	3.13	IN/HR
Tc	60	MIN
IP	1.24	ACRES
Q10	**14.23**	CFS

DA-14 PRE		
DA	5.33	ACRES
C	0.52	
I	3.13	IN/HR
Tc	60	MIN
IP	0.3	ACRES
Q10	**8.68**	CFS

DA-15 PRE		
DA	13.71	ACRES
C	0.52	
I	3.13	IN/HR
Tc	60	MIN
IP	0.56	ACRES
Q10	**22.31**	CFS

DA-13 POST		
DA	8.12	ACRES
C	0.57	
I	3.13	IN/HR
Tc	60	MIN
IP	1.44	ACRES
Q10	**14.49**	CFS

DA-14 POST		
DA	5.33	ACRES
C	0.57	
I	3.13	IN/HR
Tc	60	MIN
IP	0.88	ACRES
Q10	**9.51**	CFS

DA-15 POST		
DA	13.71	ACRES
C	0.55	
I	3.13	IN/HR
Tc	60	MIN
IP	1.85	ACRES
Q10	**23.60**	CFS

NOAA Atlas 14, Volume 6, Version 2
Location name: Watsonville, California, USA*
Latitude: 36.9159°, Longitude: -121.8099°
Elevation: 183 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.85 (1.62-2.15)	2.22 (1.93-2.57)	2.71 (2.35-3.16)	3.13 (2.69-3.68)	3.73 (3.07-4.60)	4.22 (3.37-5.34)	4.74 (3.67-6.18)	5.29 (3.95-7.15)	6.07 (4.30-8.66)	6.72 (4.55-10.0)
10-min	1.33 (1.16-1.54)	1.59 (1.38-1.84)	1.94 (1.69-2.26)	2.25 (1.93-2.65)	2.68 (2.20-3.29)	3.02 (2.42-3.83)	3.40 (2.63-4.43)	3.79 (2.83-5.13)	4.36 (3.08-6.21)	4.81 (3.26-7.18)
15-min	1.07 (0.932-1.24)	1.28 (1.12-1.48)	1.57 (1.36-1.82)	1.81 (1.56-2.13)	2.16 (1.78-2.66)	2.44 (1.95-3.08)	2.74 (2.12-3.57)	3.06 (2.28-4.14)	3.51 (2.48-5.01)	3.88 (2.63-5.78)
30-min	0.742 (0.648-0.858)	0.888 (0.772-1.03)	1.09 (0.944-1.26)	1.26 (1.08-1.48)	1.50 (1.23-1.84)	1.69 (1.35-2.14)	1.90 (1.47-2.48)	2.12 (1.58-2.87)	2.43 (1.72-3.47)	2.69 (1.82-4.01)
60-min	0.507 (0.442-0.587)	0.606 (0.528-0.703)	0.742 (0.644-0.863)	0.858 (0.736-1.01)	1.02 (0.840-1.26)	1.16 (0.923-1.46)	1.30 (1.00-1.69)	1.45 (1.08-1.96)	1.66 (1.18-2.37)	1.84 (1.24-2.74)
2-hr	0.366 (0.319-0.423)	0.436 (0.380-0.506)	0.532 (0.461-0.619)	0.613 (0.526-0.721)	0.728 (0.598-0.896)	0.821 (0.656-1.04)	0.918 (0.711-1.20)	1.02 (0.763-1.38)	1.17 (0.829-1.67)	1.29 (0.875-1.92)
3-hr	0.300 (0.261-0.347)	0.358 (0.312-0.415)	0.437 (0.379-0.509)	0.504 (0.433-0.594)	0.600 (0.492-0.737)	0.676 (0.540-0.854)	0.756 (0.585-0.987)	0.842 (0.628-1.14)	0.963 (0.681-1.37)	1.06 (0.719-1.58)
6-hr	0.208 (0.182-0.241)	0.251 (0.219-0.291)	0.309 (0.268-0.360)	0.359 (0.308-0.422)	0.428 (0.352-0.526)	0.484 (0.386-0.611)	0.542 (0.420-0.707)	0.604 (0.451-0.818)	0.692 (0.490-0.988)	0.763 (0.517-1.14)
12-hr	0.133 (0.116-0.154)	0.164 (0.143-0.191)	0.207 (0.180-0.242)	0.244 (0.210-0.288)	0.297 (0.244-0.365)	0.339 (0.271-0.429)	0.384 (0.297-0.502)	0.433 (0.323-0.586)	0.502 (0.355-0.716)	0.558 (0.378-0.832)
24-hr	0.088 (0.080-0.099)	0.112 (0.101-0.126)	0.144 (0.130-0.163)	0.172 (0.154-0.195)	0.210 (0.183-0.246)	0.241 (0.206-0.288)	0.274 (0.229-0.333)	0.308 (0.252-0.385)	0.357 (0.281-0.463)	0.396 (0.302-0.530)
2-day	0.055 (0.050-0.062)	0.070 (0.064-0.079)	0.090 (0.081-0.102)	0.106 (0.095-0.121)	0.128 (0.111-0.150)	0.145 (0.124-0.173)	0.162 (0.135-0.197)	0.179 (0.146-0.224)	0.203 (0.160-0.264)	0.222 (0.169-0.297)
3-day	0.041 (0.037-0.046)	0.052 (0.047-0.059)	0.067 (0.060-0.075)	0.078 (0.070-0.089)	0.093 (0.081-0.109)	0.105 (0.090-0.125)	0.116 (0.097-0.142)	0.128 (0.104-0.160)	0.144 (0.113-0.186)	0.156 (0.119-0.208)
4-day	0.034 (0.031-0.038)	0.043 (0.039-0.049)	0.055 (0.050-0.062)	0.064 (0.058-0.073)	0.077 (0.067-0.090)	0.086 (0.073-0.102)	0.095 (0.079-0.115)	0.104 (0.085-0.130)	0.116 (0.091-0.150)	0.125 (0.095-0.167)
7-day	0.024 (0.022-0.027)	0.031 (0.028-0.035)	0.039 (0.035-0.044)	0.045 (0.040-0.051)	0.053 (0.046-0.063)	0.059 (0.051-0.071)	0.065 (0.055-0.080)	0.071 (0.058-0.089)	0.079 (0.062-0.102)	0.084 (0.064-0.113)
10-day	0.019 (0.017-0.021)	0.024 (0.021-0.027)	0.030 (0.027-0.034)	0.035 (0.031-0.040)	0.041 (0.036-0.048)	0.046 (0.039-0.055)	0.050 (0.042-0.061)	0.055 (0.045-0.068)	0.060 (0.047-0.078)	0.064 (0.049-0.086)
20-day	0.012 (0.011-0.014)	0.016 (0.014-0.018)	0.020 (0.018-0.022)	0.023 (0.021-0.026)	0.027 (0.024-0.032)	0.030 (0.026-0.036)	0.033 (0.027-0.040)	0.035 (0.029-0.044)	0.039 (0.030-0.050)	0.041 (0.031-0.055)
30-day	0.010 (0.009-0.011)	0.013 (0.012-0.014)	0.016 (0.015-0.018)	0.019 (0.017-0.022)	0.022 (0.019-0.026)	0.024 (0.021-0.029)	0.027 (0.022-0.032)	0.029 (0.023-0.036)	0.031 (0.024-0.040)	0.033 (0.025-0.044)
45-day	0.008 (0.007-0.009)	0.010 (0.009-0.012)	0.013 (0.012-0.015)	0.015 (0.014-0.018)	0.018 (0.016-0.021)	0.020 (0.017-0.024)	0.021 (0.018-0.026)	0.023 (0.019-0.029)	0.025 (0.019-0.032)	0.026 (0.020-0.035)
60-day	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.011 (0.010-0.013)	0.013 (0.012-0.015)	0.015 (0.013-0.018)	0.017 (0.014-0.020)	0.018 (0.015-0.022)	0.020 (0.016-0.025)	0.021 (0.017-0.028)	0.022 (0.017-0.030)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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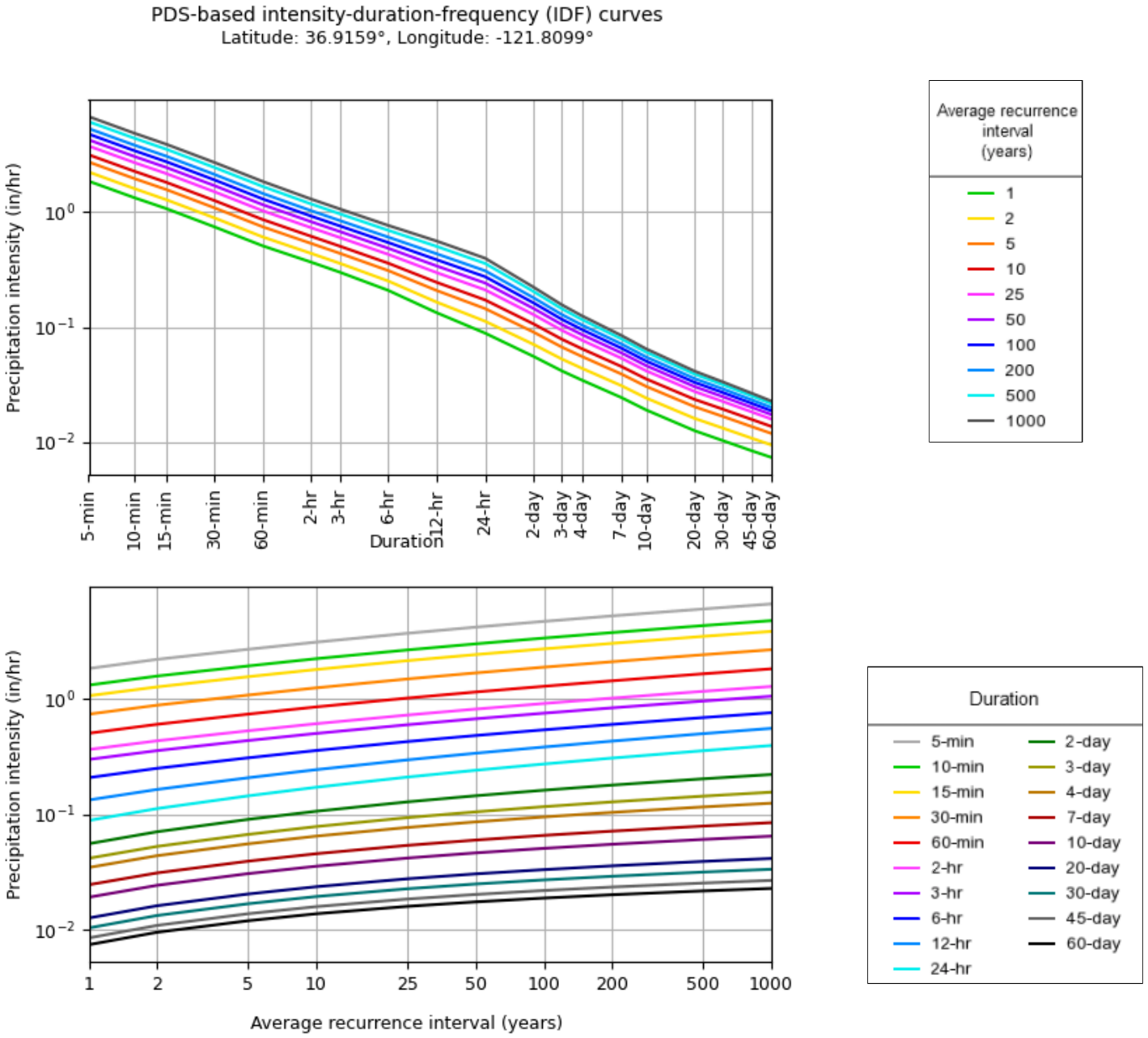
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Feb 26 19:59:08 2025

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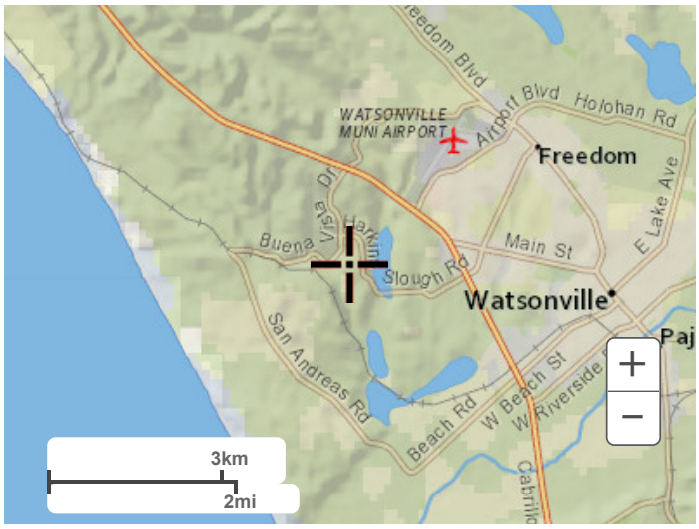
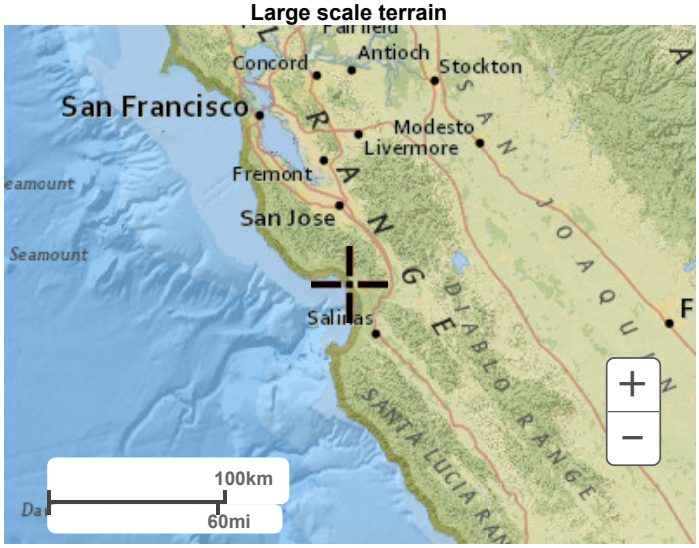
Maps & aerials

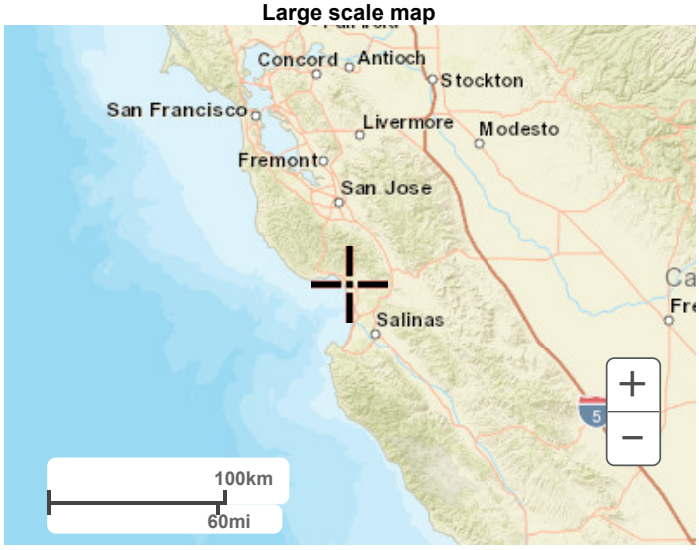
Small scale terrain



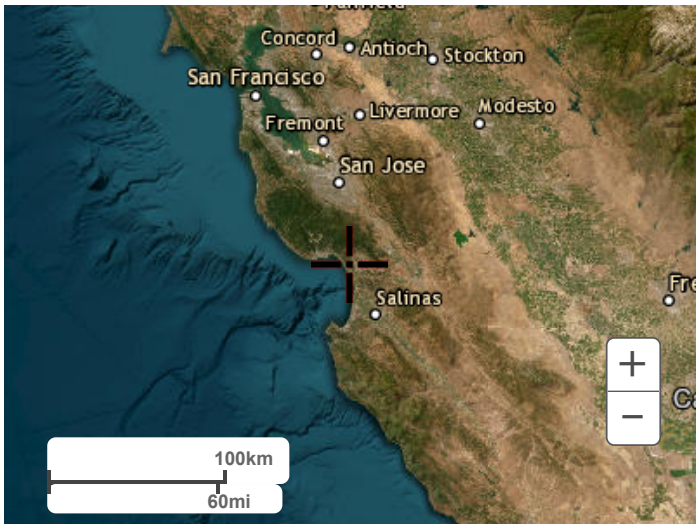
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
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Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix F

Hydraflow Graphs

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

CULVERT 1 - PRE

Invert Elev Dn (ft)	=	88.00
Pipe Length (ft)	=	25.00
Slope (%)	=	8.00
Invert Elev Up (ft)	=	90.00
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

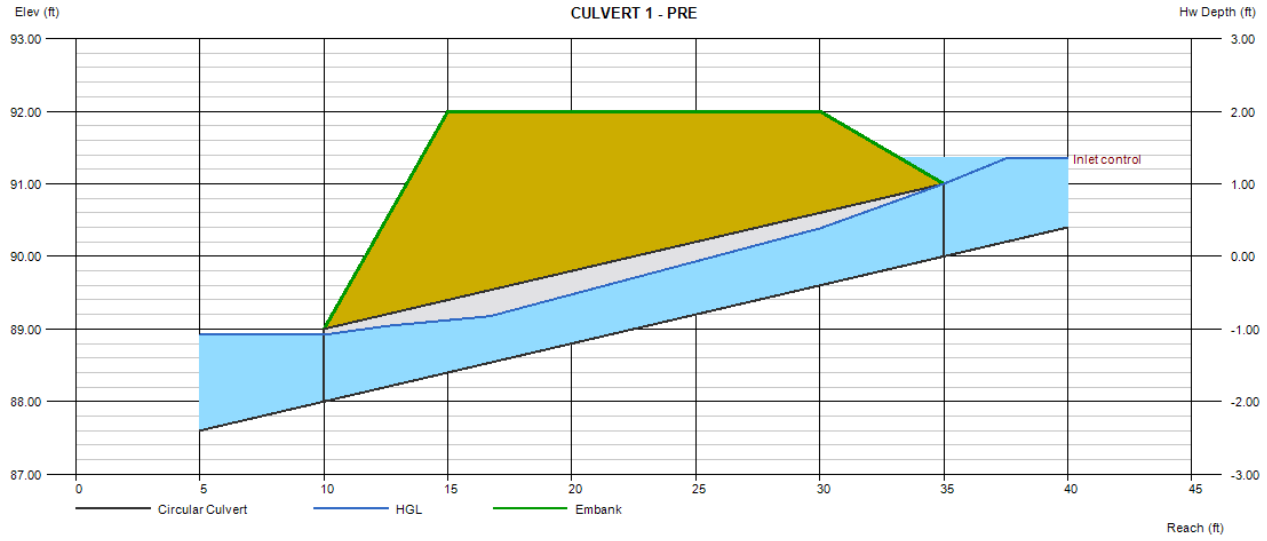
Top Elevation (ft)	=	92.00
Top Width (ft)	=	15.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	3.92
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	3.92
Qpipe (cfs)	=	3.92
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.19
Veloc Up (ft/s)	=	5.57
HGL Dn (ft)	=	88.92
HGL Up (ft)	=	90.84
Hw Elev (ft)	=	91.35
Hw/D (ft)	=	1.35
Flow Regime	=	Inlet Control



Culvert Report

CULVERT 1 - POST

Invert Elev Dn (ft)	=	88.00
Pipe Length (ft)	=	25.00
Slope (%)	=	8.00
Invert Elev Up (ft)	=	90.00
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

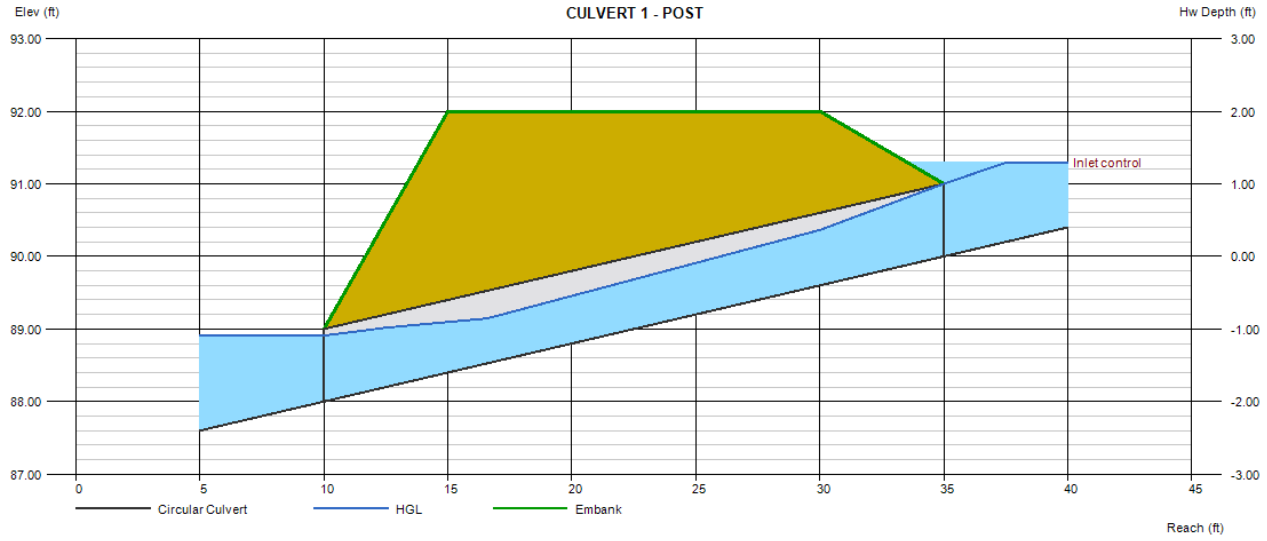
Top Elevation (ft)	=	92.00
Top Width (ft)	=	15.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	3.69
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	3.69
Qpipe (cfs)	=	3.69
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.92
Veloc Up (ft/s)	=	5.37
HGL Dn (ft)	=	88.91
HGL Up (ft)	=	90.82
Hw Elev (ft)	=	91.29
Hw/D (ft)	=	1.29
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 2 - PRE

Invert Elev Dn (ft)	=	54.79
Pipe Length (ft)	=	65.47
Slope (%)	=	2.20
Invert Elev Up (ft)	=	56.23
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0018, 2, 0.0292, 0.74, 0.2

Embankment

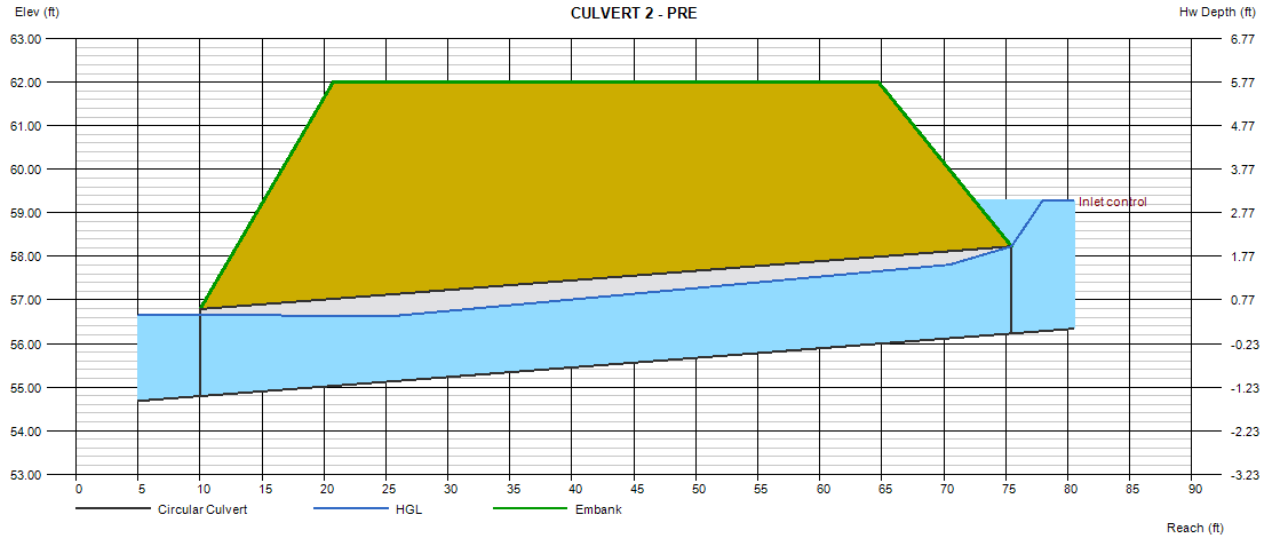
Top Elevation (ft)	=	62.00
Top Width (ft)	=	44.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	23.22
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	23.22
Qpipe (cfs)	=	23.22
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	7.64
Veloc Up (ft/s)	=	8.11
HGL Dn (ft)	=	56.65
HGL Up (ft)	=	57.94
Hw Elev (ft)	=	59.28
Hw/D (ft)	=	1.53
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 2 - POST

Invert Elev Dn (ft)	=	54.79
Pipe Length (ft)	=	65.47
Slope (%)	=	2.20
Invert Elev Up (ft)	=	56.23
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0018, 2, 0.0292, 0.74, 0.2

Embankment

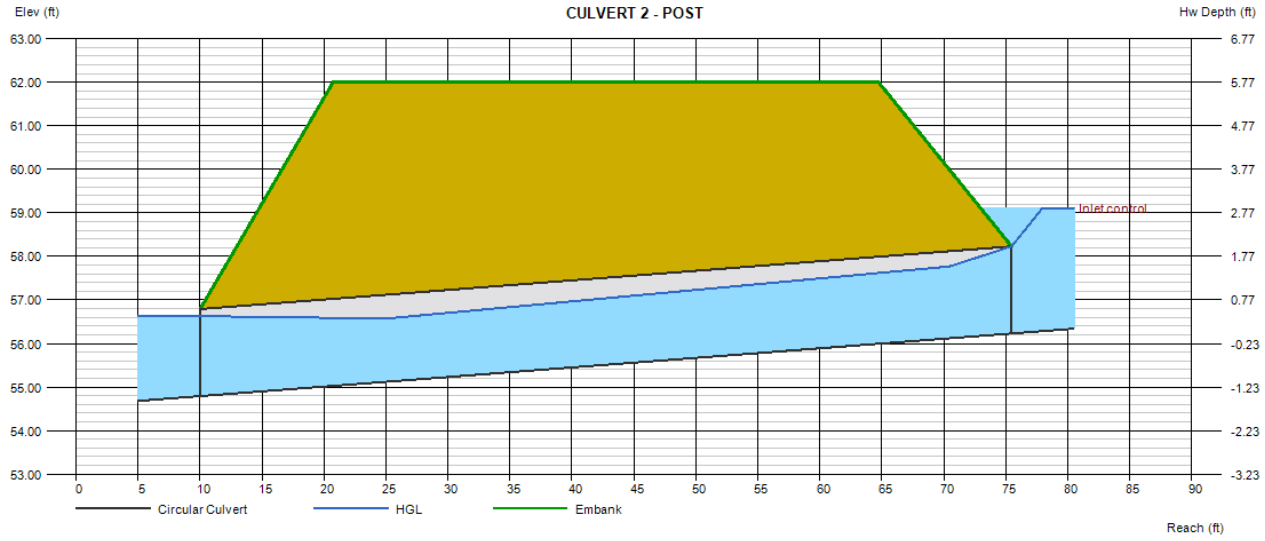
Top Elevation (ft)	=	62.00
Top Width (ft)	=	44.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	21.95
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	21.95
Qpipe (cfs)	=	21.95
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	7.27
Veloc Up (ft/s)	=	7.82
HGL Dn (ft)	=	56.63
HGL Up (ft)	=	57.90
Hw Elev (ft)	=	59.11
Hw/D (ft)	=	1.44
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 3 - PRE

Invert Elev Dn (ft)	=	27.20
Pipe Length (ft)	=	80.00
Slope (%)	=	2.87
Invert Elev Up (ft)	=	29.50
Rise (in)	=	28.0
Shape	=	Arch
Span (in)	=	56.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Arch Corrugated Metal
Culvert Entrance	=	90D headwall (A)
Coeff. K,M,c,Y,k	=	0.0083, 2, 0.0379, 0.69, 0.5

Embankment

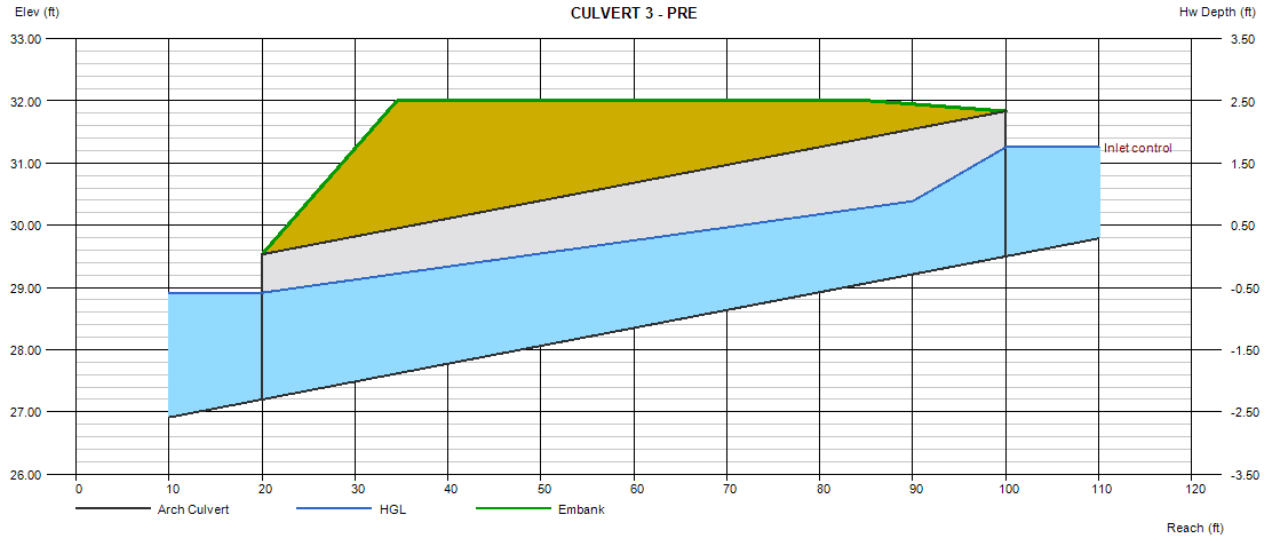
Top Elevation (ft)	=	32.00
Top Width (ft)	=	51.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	30.27
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	30.27
Qpipe (cfs)	=	30.27
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	4.20
Veloc Up (ft/s)	=	6.14
HGL Dn (ft)	=	28.92
HGL Up (ft)	=	30.60
Hw Elev (ft)	=	31.26
Hw/D (ft)	=	0.75
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 3 - POST

Invert Elev Dn (ft)	=	27.20
Pipe Length (ft)	=	80.00
Slope (%)	=	2.87
Invert Elev Up (ft)	=	29.50
Rise (in)	=	28.0
Shape	=	Arch
Span (in)	=	56.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Arch Corrugated Metal
Culvert Entrance	=	90D headwall (A)
Coeff. K,M,c,Y,k	=	0.0083, 2, 0.0379, 0.69, 0.5

Embankment

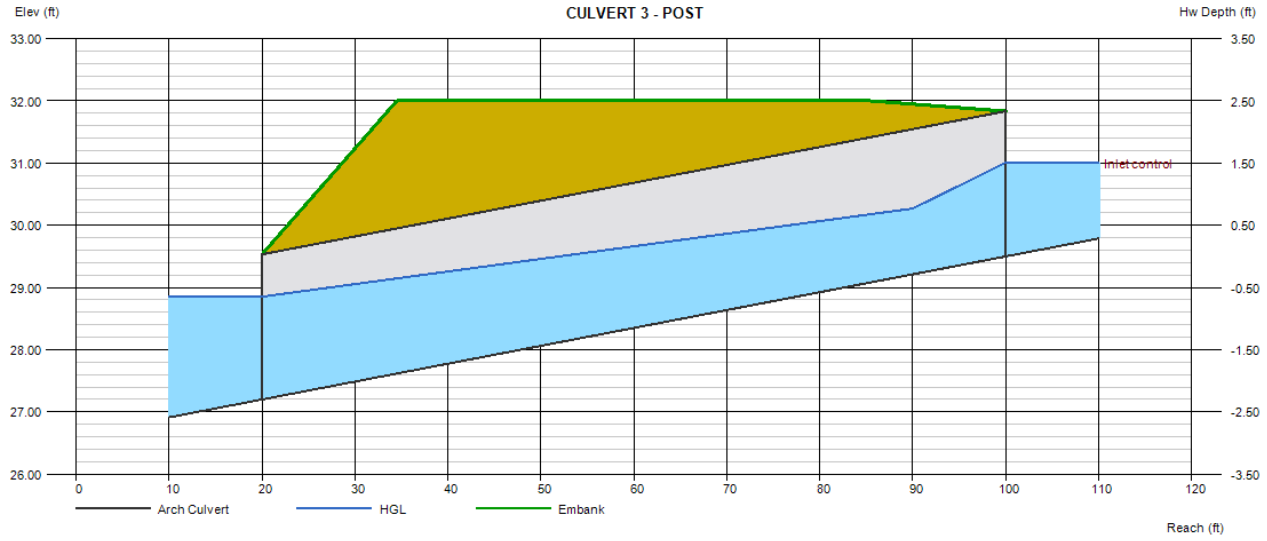
Top Elevation (ft)	=	32.00
Top Width (ft)	=	51.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	24.91
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	24.91
Qpipe (cfs)	=	24.91
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.55
Veloc Up (ft/s)	=	5.66
HGL Dn (ft)	=	28.85
HGL Up (ft)	=	30.47
Hw Elev (ft)	=	31.01
Hw/D (ft)	=	0.65
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 4 - PRE

Invert Elev Dn (ft)	=	16.50
Pipe Length (ft)	=	89.00
Slope (%)	=	0.67
Invert Elev Up (ft)	=	17.10
Rise (in)	=	39.0
Shape	=	Box
Span (in)	=	84.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Tapered inlet throat
Coeff. K,M,c,Y,k	=	0.475, 0.667, 0.0179, 0.97, 0.2

Embankment

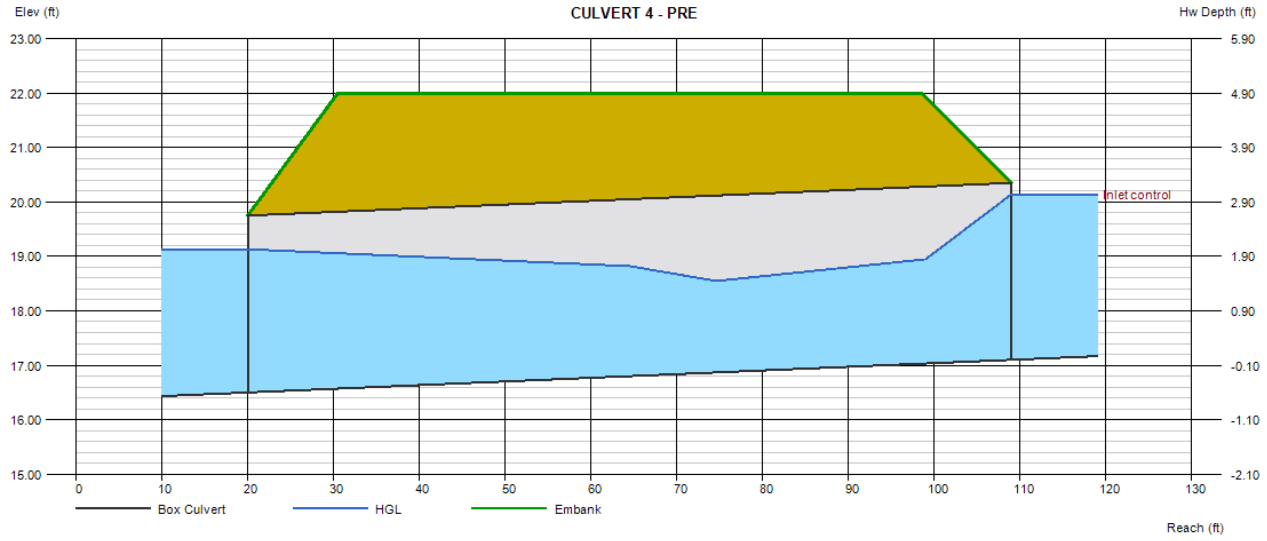
Top Elevation (ft)	=	22.00
Top Width (ft)	=	68.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	113.39
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	113.39
Qpipe (cfs)	=	113.39
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.16
Veloc Up (ft/s)	=	8.05
HGL Dn (ft)	=	19.13
HGL Up (ft)	=	19.11
Hw Elev (ft)	=	20.14
Hw/D (ft)	=	0.94
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 4 - POST

Invert Elev Dn (ft)	=	16.50
Pipe Length (ft)	=	89.00
Slope (%)	=	0.67
Invert Elev Up (ft)	=	17.10
Rise (in)	=	39.0
Shape	=	Box
Span (in)	=	84.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Tapered inlet throat
Coeff. K,M,c,Y,k	=	0.475, 0.667, 0.0179, 0.97, 0.2

Embankment

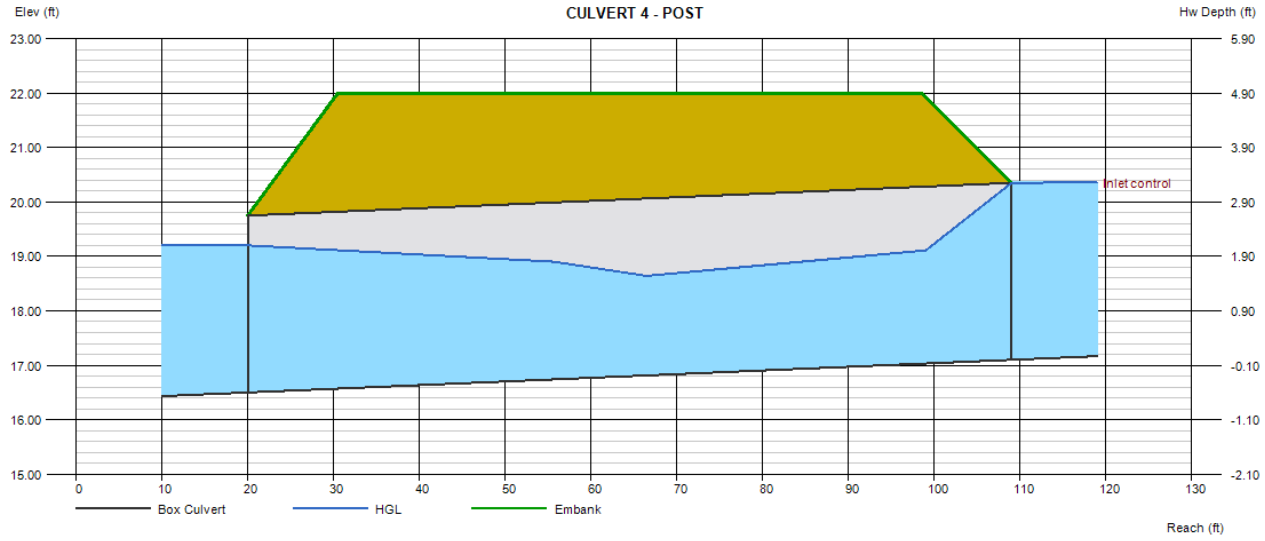
Top Elevation (ft)	=	22.00
Top Width (ft)	=	68.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	125.57
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	125.57
Qpipe (cfs)	=	125.57
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.64
Veloc Up (ft/s)	=	8.33
HGL Dn (ft)	=	19.20
HGL Up (ft)	=	19.25
Hw Elev (ft)	=	20.36
Hw/D (ft)	=	1.00
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 5 - PRE

Invert Elev Dn (ft)	=	14.00
Pipe Length (ft)	=	73.00
Slope (%)	=	2.74
Invert Elev Up (ft)	=	16.00
Rise (in)	=	120.0
Shape	=	Box
Span (in)	=	120.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Slope tapered, more favorable edges
Coeff. K,M,c,Y,k	=	0.5, 0.667, 0.0378, 0.71, 0.2

Embankment

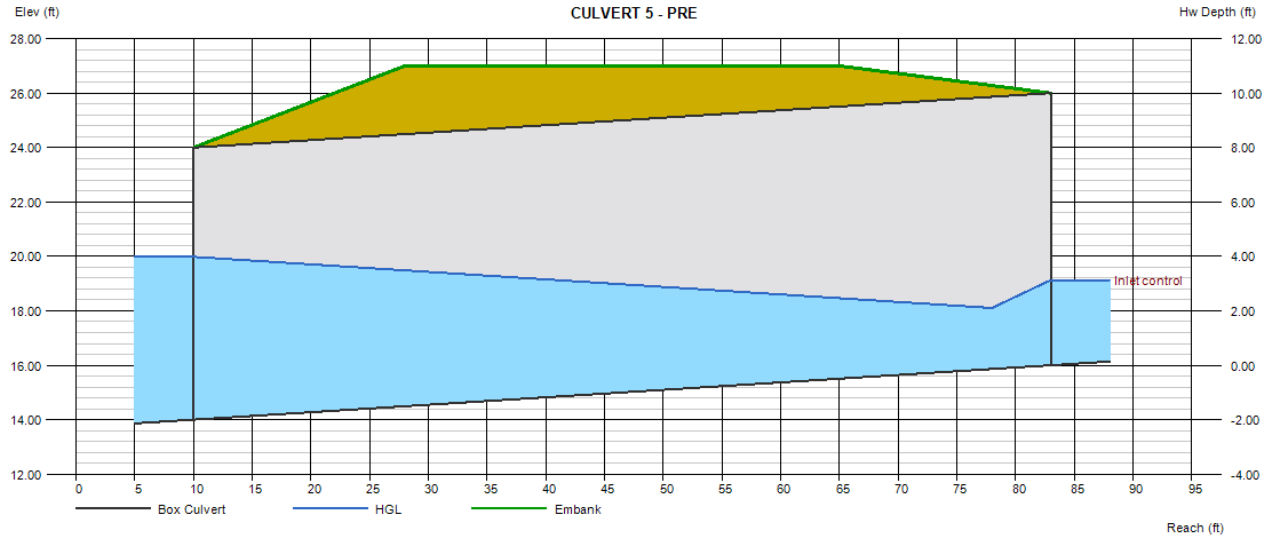
Top Elevation (ft)	=	27.00
Top Width (ft)	=	37.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	156.69
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	156.69
Qpipe (cfs)	=	156.69
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.62
Veloc Up (ft/s)	=	7.96
HGL Dn (ft)	=	19.98
HGL Up (ft)	=	17.97
Hw Elev (ft)	=	19.13
Hw/D (ft)	=	0.31
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

CULVERT 5 - POST

Invert Elev Dn (ft)	=	14.00
Pipe Length (ft)	=	73.00
Slope (%)	=	2.74
Invert Elev Up (ft)	=	16.00
Rise (in)	=	120.0
Shape	=	Box
Span (in)	=	120.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Slope tapered, more favorable edges
Coeff. K,M,c,Y,k	=	0.5, 0.667, 0.0378, 0.71, 0.2

Embankment

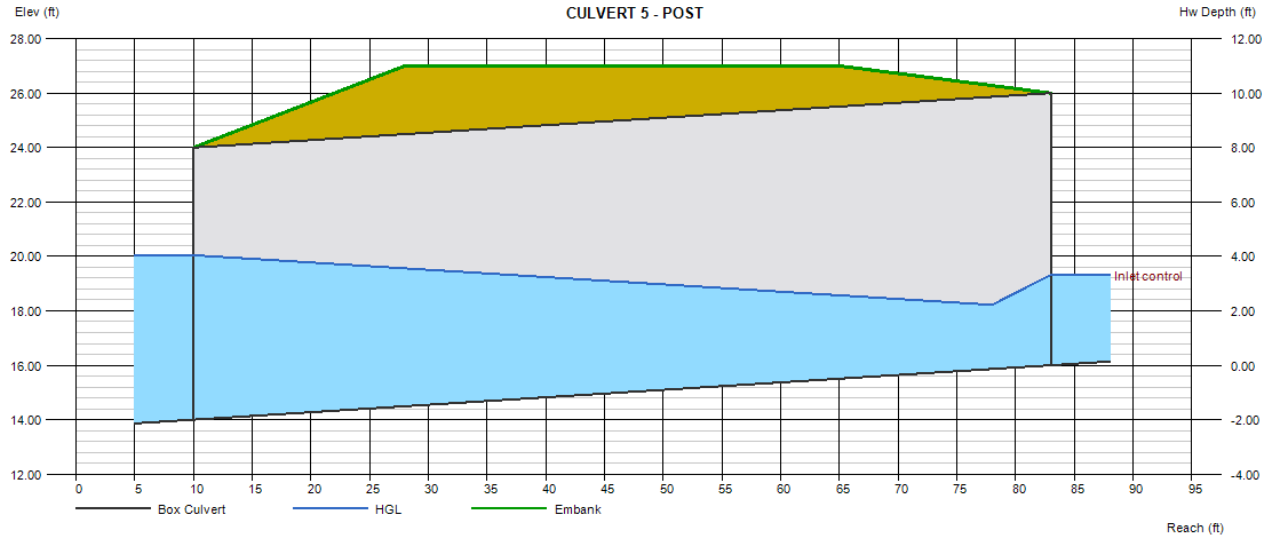
Top Elevation (ft)	=	27.00
Top Width (ft)	=	37.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	171.19
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	171.19
Qpipe (cfs)	=	171.19
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.83
Veloc Up (ft/s)	=	8.20
HGL Dn (ft)	=	20.04
HGL Up (ft)	=	18.09
Hw Elev (ft)	=	19.32
Hw/D (ft)	=	0.33
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

CULVERT 6 - PRE

Invert Elev Dn (ft)	=	93.73
Pipe Length (ft)	=	128.13
Slope (%)	=	4.65
Invert Elev Up (ft)	=	99.69
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Headwall
Coeff. K,M,c,Y,k	=	0.0078, 2, 0.0379, 0.69, 0.5

Embankment

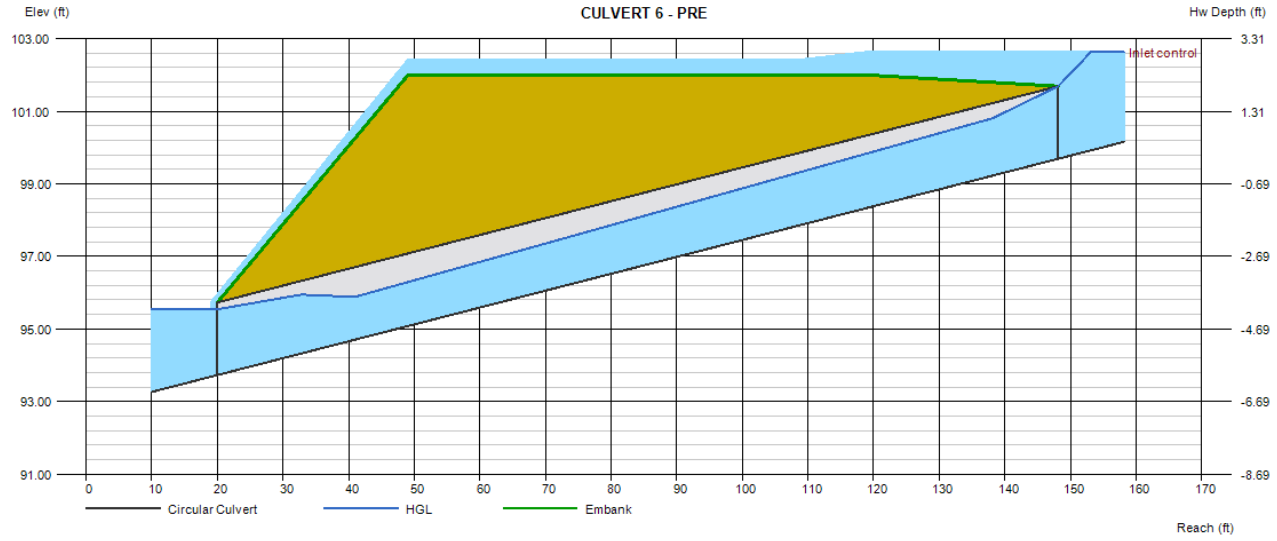
Top Elevation (ft)	=	102.00
Top Width (ft)	=	70.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	35.79
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	35.79
Qpipe (cfs)	=	20.49
Qovertop (cfs)	=	15.30
Veloc Dn (ft/s)	=	6.85
Veloc Up (ft/s)	=	7.51
HGL Dn (ft)	=	95.54
HGL Up (ft)	=	101.31
Hw Elev (ft)	=	102.64
Hw/D (ft)	=	1.47
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

CULVERT 6 - POST

Invert Elev Dn (ft)	=	93.73
Pipe Length (ft)	=	128.13
Slope (%)	=	4.65
Invert Elev Up (ft)	=	99.69
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

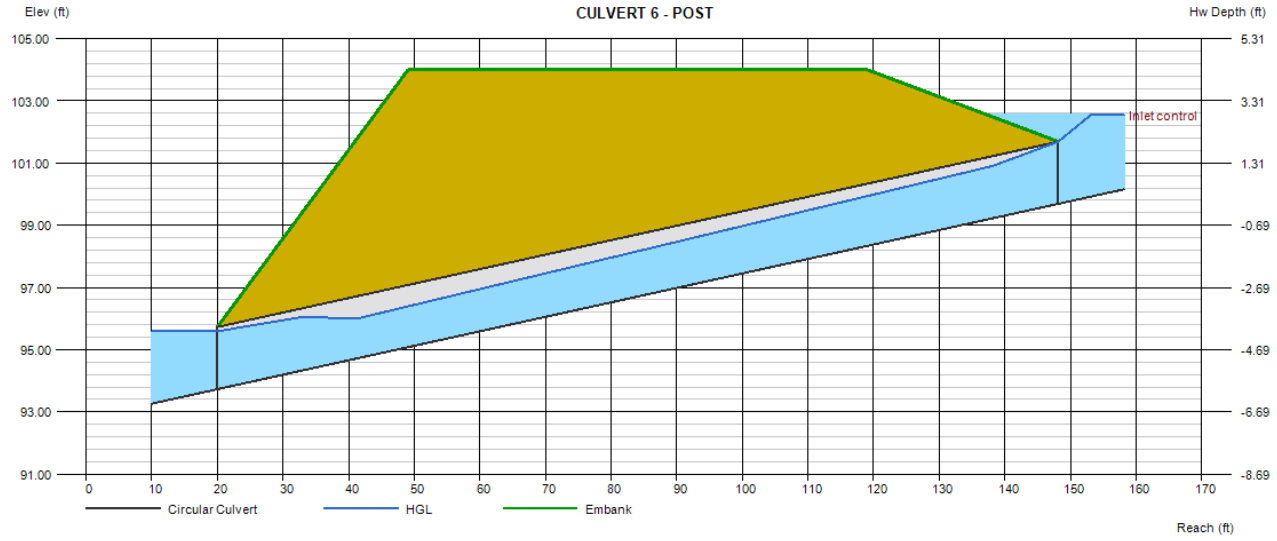
Top Elevation (ft)	=	104.00
Top Width (ft)	=	70.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	23.61
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	23.61
Qpipe (cfs)	=	23.61
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	7.75
Veloc Up (ft/s)	=	8.20
HGL Dn (ft)	=	95.59
HGL Up (ft)	=	101.41
Hw Elev (ft)	=	102.55
Hw/D (ft)	=	1.43
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

CULVERT 7 - PRE

Invert Elev Dn (ft)	=	116.00
Pipe Length (ft)	=	97.00
Slope (%)	=	2.06
Invert Elev Up (ft)	=	118.00
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

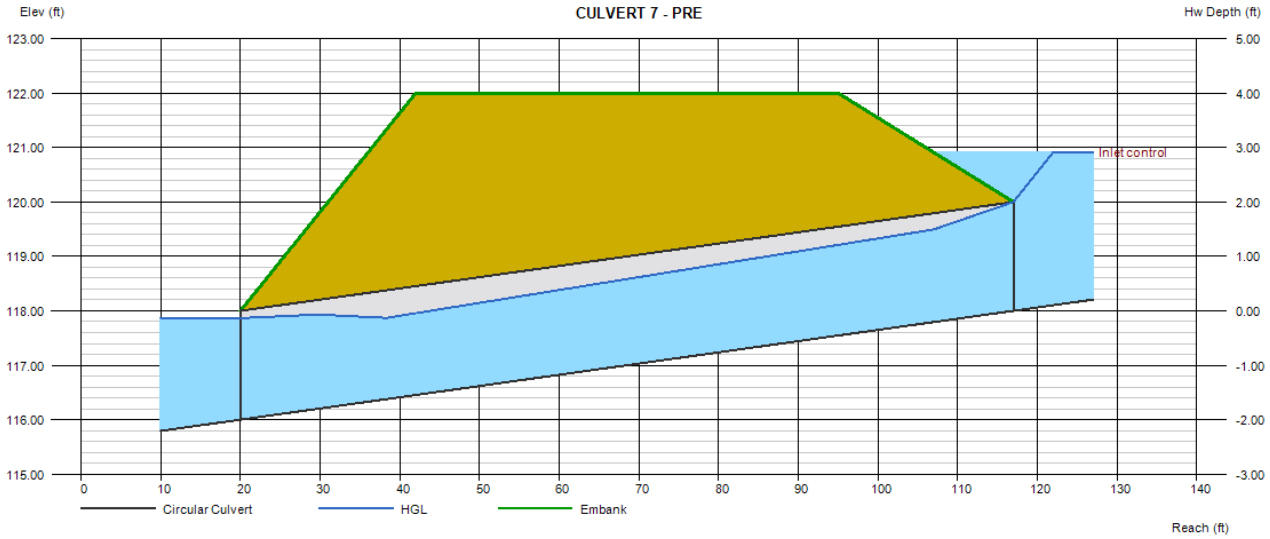
Top Elevation (ft)	=	122.00
Top Width (ft)	=	53.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	23.91
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	23.91
Qpipe (cfs)	=	23.91
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	7.84
Veloc Up (ft/s)	=	8.27
HGL Dn (ft)	=	117.87
HGL Up (ft)	=	119.73
Hw Elev (ft)	=	120.91
Hw/D (ft)	=	1.46
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

CULVERT 7 - POST

Invert Elev Dn (ft)	=	116.00
Pipe Length (ft)	=	97.00
Slope (%)	=	2.06
Invert Elev Up (ft)	=	118.00
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

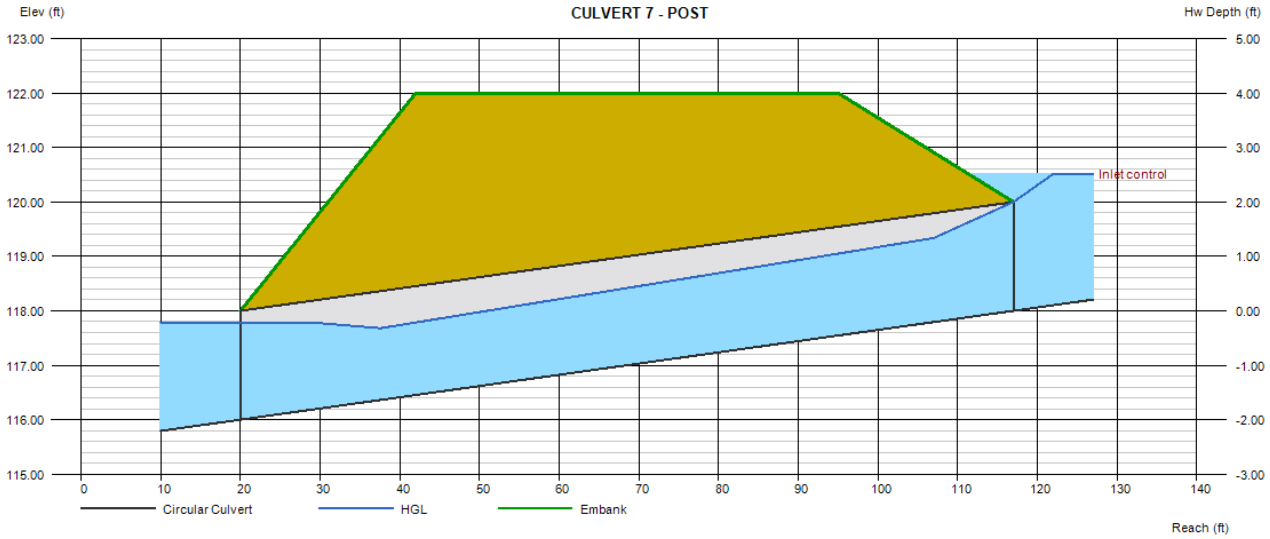
Top Elevation (ft)	=	122.00
Top Width (ft)	=	53.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	19.24
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	19.24
Qpipe (cfs)	=	19.24
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.49
Veloc Up (ft/s)	=	7.24
HGL Dn (ft)	=	117.79
HGL Up (ft)	=	119.58
Hw Elev (ft)	=	120.51
Hw/D (ft)	=	1.26
Flow Regime	=	Inlet Control



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

DITCH 1 - PRE

Triangular

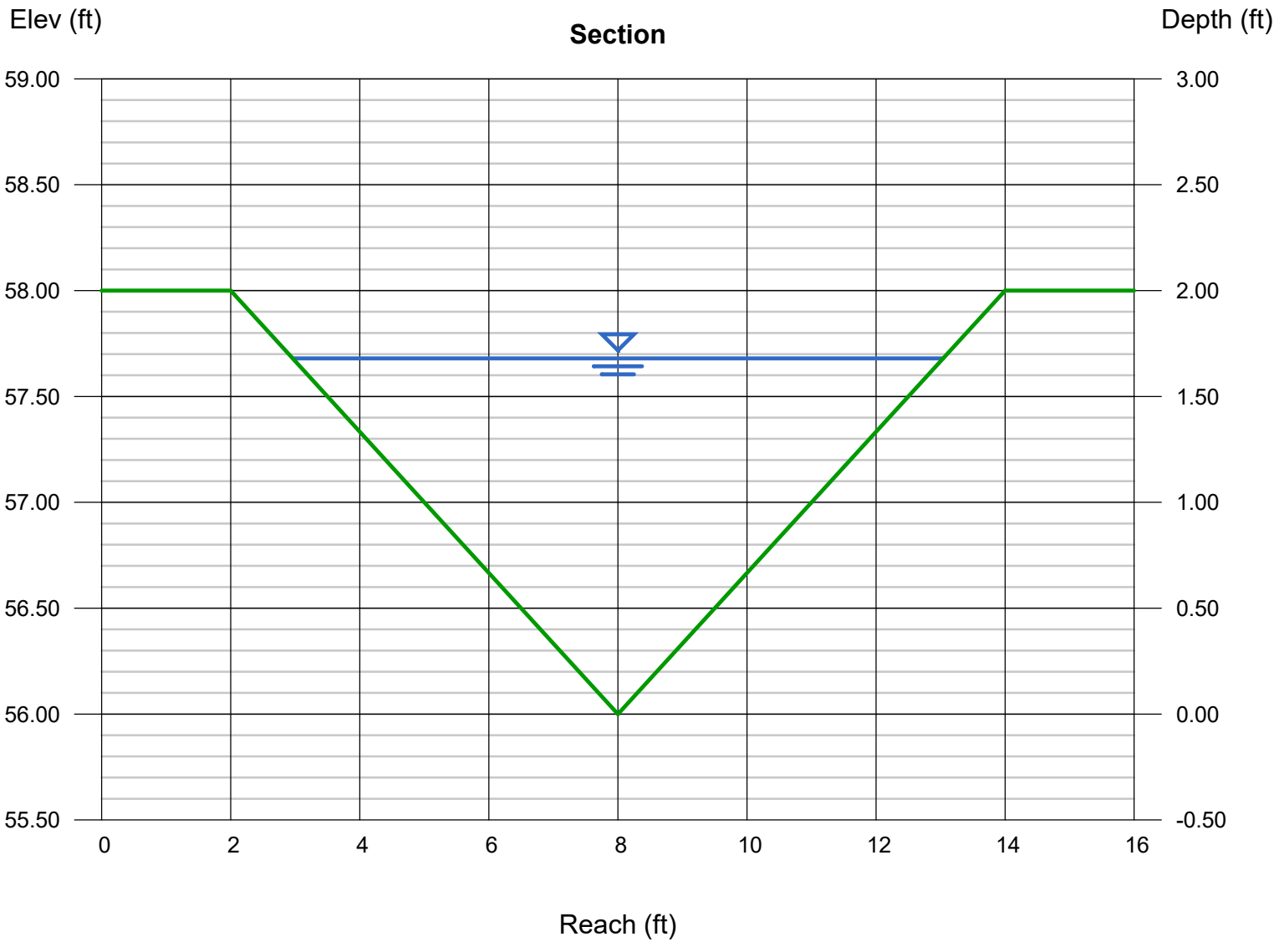
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 56.00
Slope (%)	= 3.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.22

Highlighted

Depth (ft)	= 1.68
Q (cfs)	= 23.22
Area (sqft)	= 8.47
Velocity (ft/s)	= 2.74
Wetted Perim (ft)	= 10.63
Crit Depth, Yc (ft)	= 1.31
Top Width (ft)	= 10.08
EGL (ft)	= 1.80



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

DITCH 1 - POST

Triangular

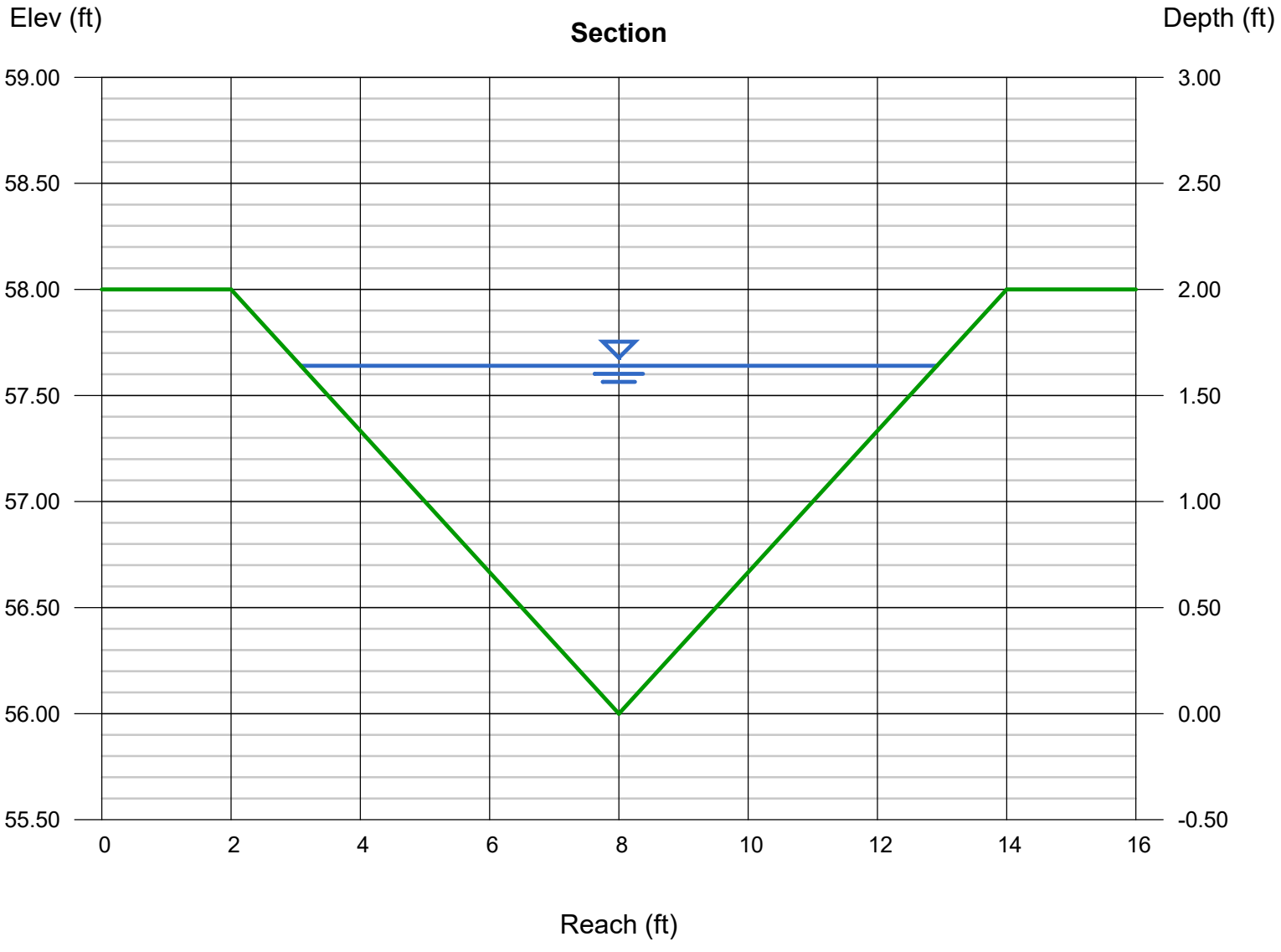
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 56.00
Slope (%)	= 3.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 21.95

Highlighted

Depth (ft)	= 1.64
Q (cfs)	= 21.95
Area (sqft)	= 8.07
Velocity (ft/s)	= 2.72
Wetted Perim (ft)	= 10.37
Crit Depth, Yc (ft)	= 1.28
Top Width (ft)	= 9.84
EGL (ft)	= 1.76



Channel Report

DITCH 2 - PRE

Triangular

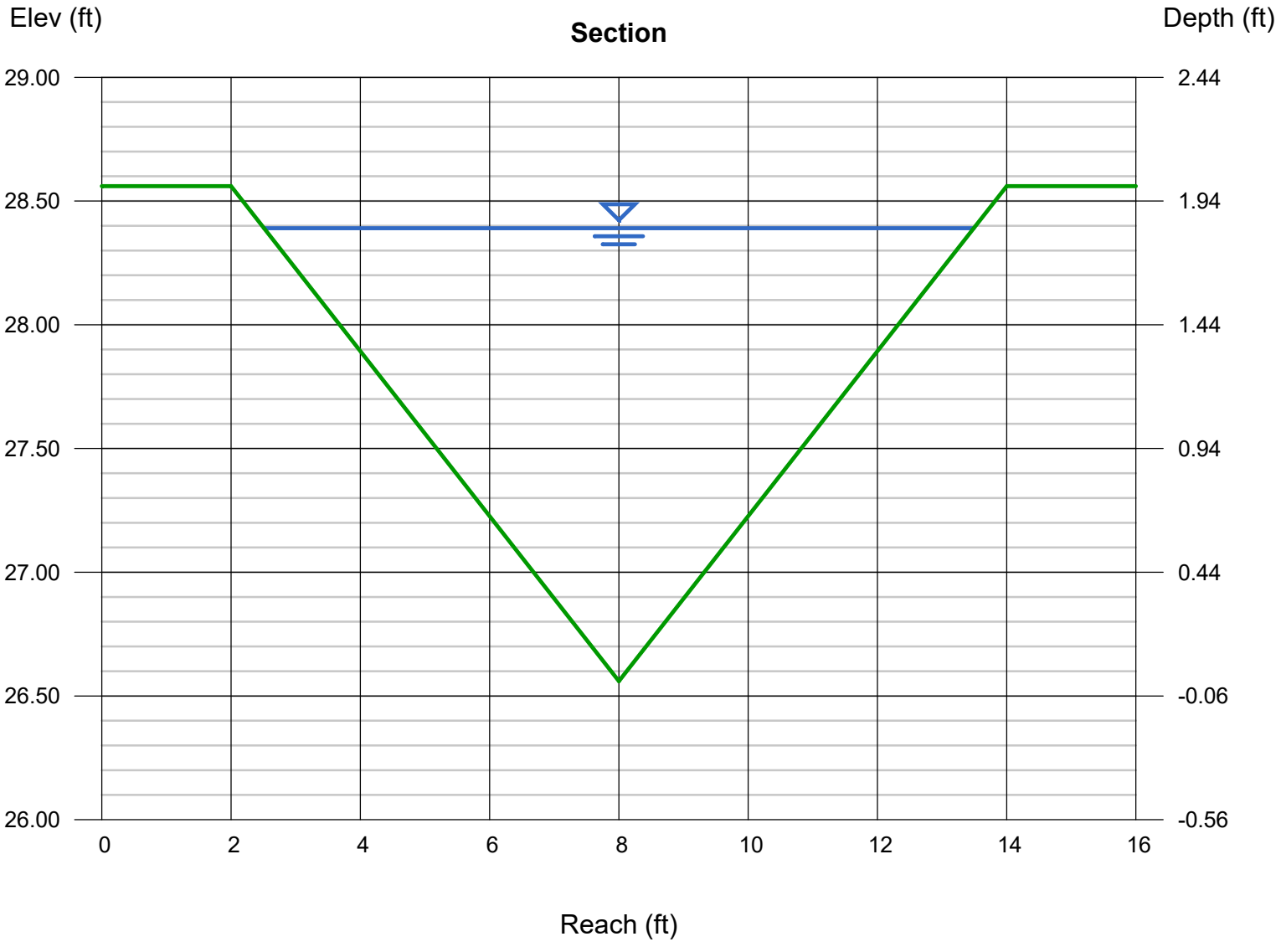
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 26.56
Slope (%)	= 3.27
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 30.27

Highlighted

Depth (ft)	= 1.83
Q (cfs)	= 30.27
Area (sqft)	= 10.05
Velocity (ft/s)	= 3.01
Wetted Perim (ft)	= 11.57
Crit Depth, Yc (ft)	= 1.45
Top Width (ft)	= 10.98
EGL (ft)	= 1.97



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

DITCH 2 - POST

Triangular

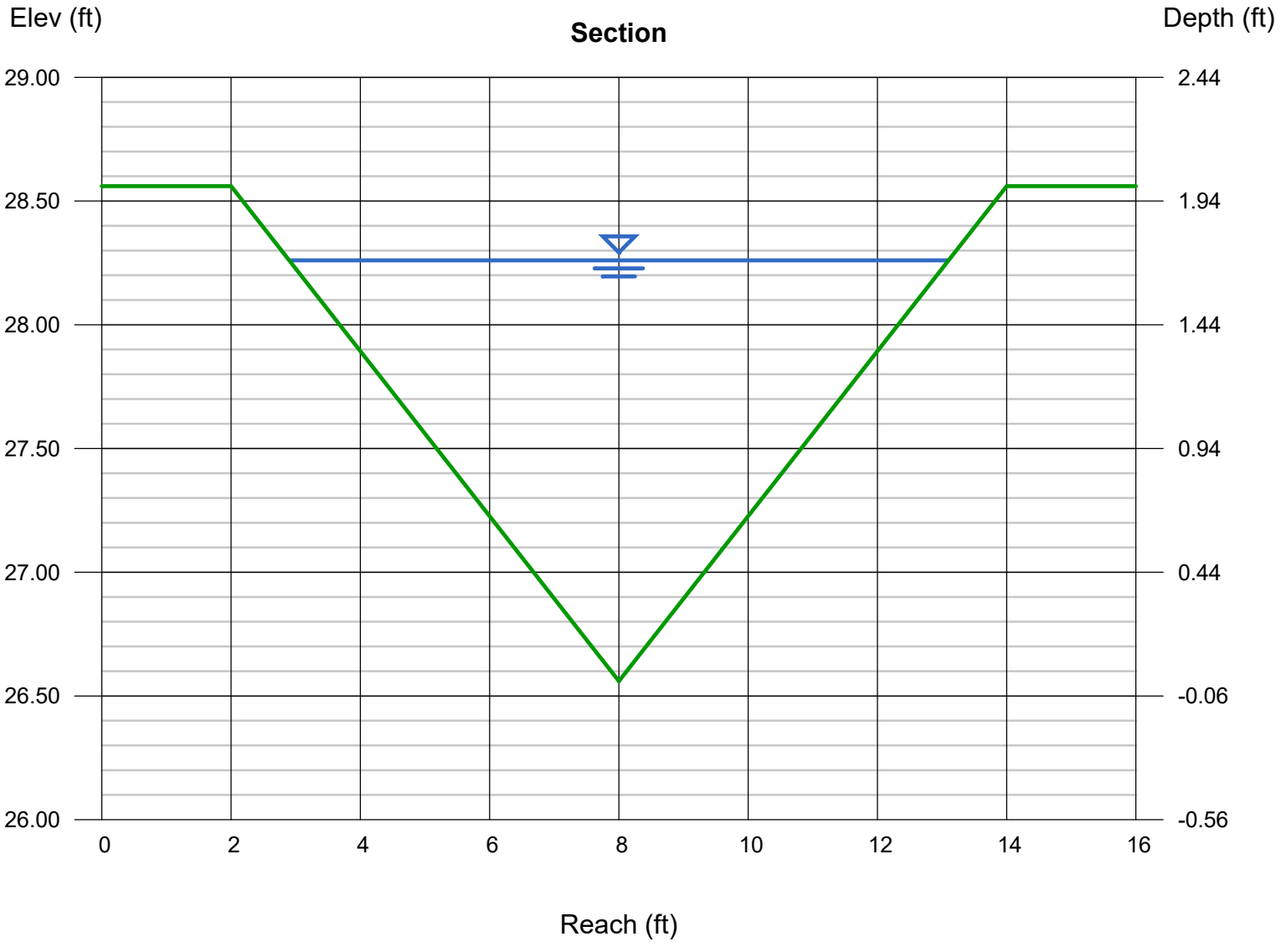
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 26.56
Slope (%)	= 3.27
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 24.91

Highlighted

Depth (ft)	= 1.70
Q (cfs)	= 24.91
Area (sqft)	= 8.67
Velocity (ft/s)	= 2.87
Wetted Perim (ft)	= 10.75
Crit Depth, Yc (ft)	= 1.34
Top Width (ft)	= 10.20
EGL (ft)	= 1.83



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

DITCH 3 - PRE

Triangular

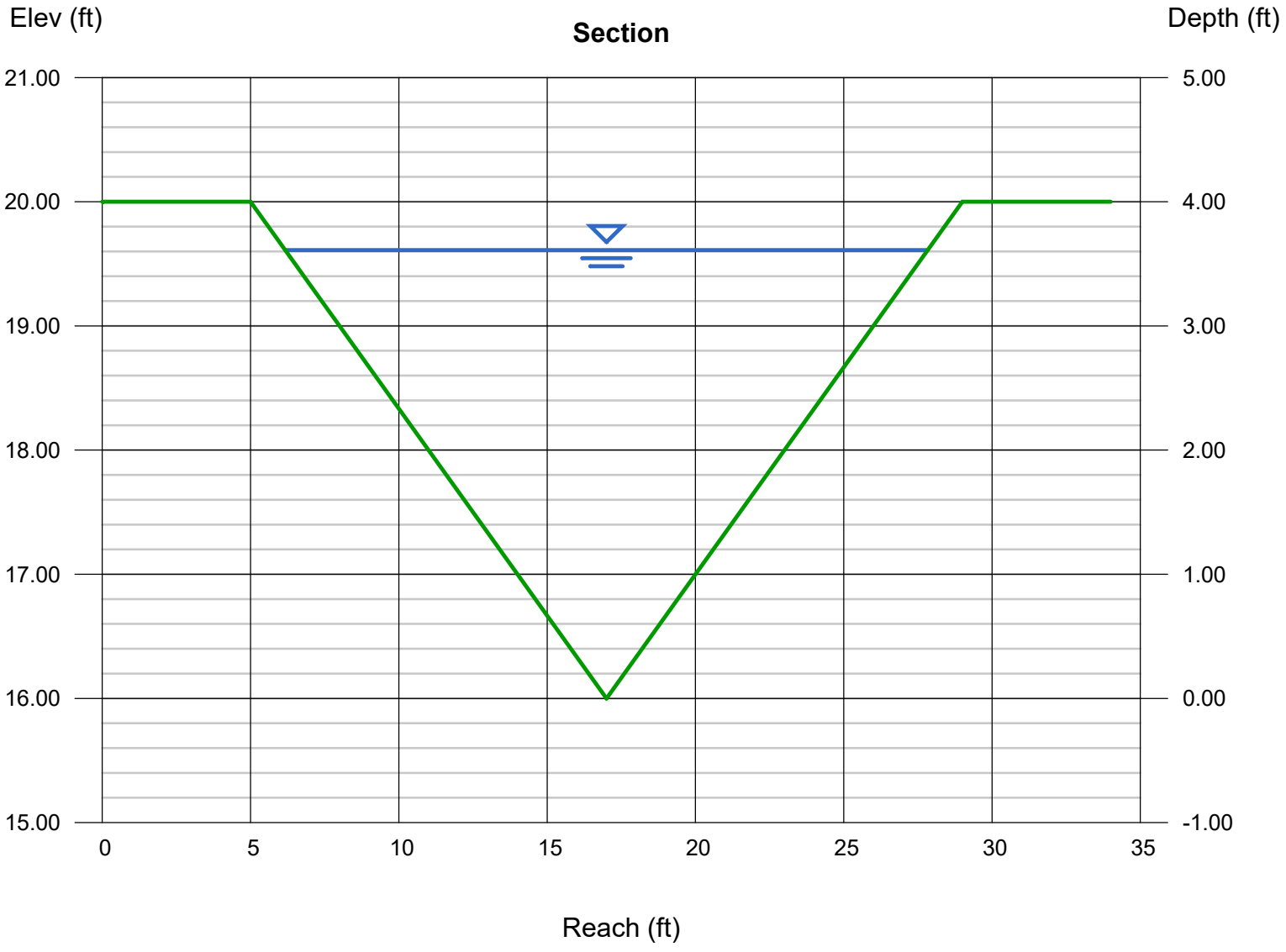
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 4.00
Invert Elev (ft)	= 16.00
Slope (%)	= 1.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 103.71

Highlighted

Depth (ft)	= 3.61
Q (cfs)	= 103.71
Area (sqft)	= 39.10
Velocity (ft/s)	= 2.65
Wetted Perim (ft)	= 22.83
Crit Depth, Yc (ft)	= 2.37
Top Width (ft)	= 21.66
EGL (ft)	= 3.72



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Jul 20 2026

DITCH 3 - POST

Triangular

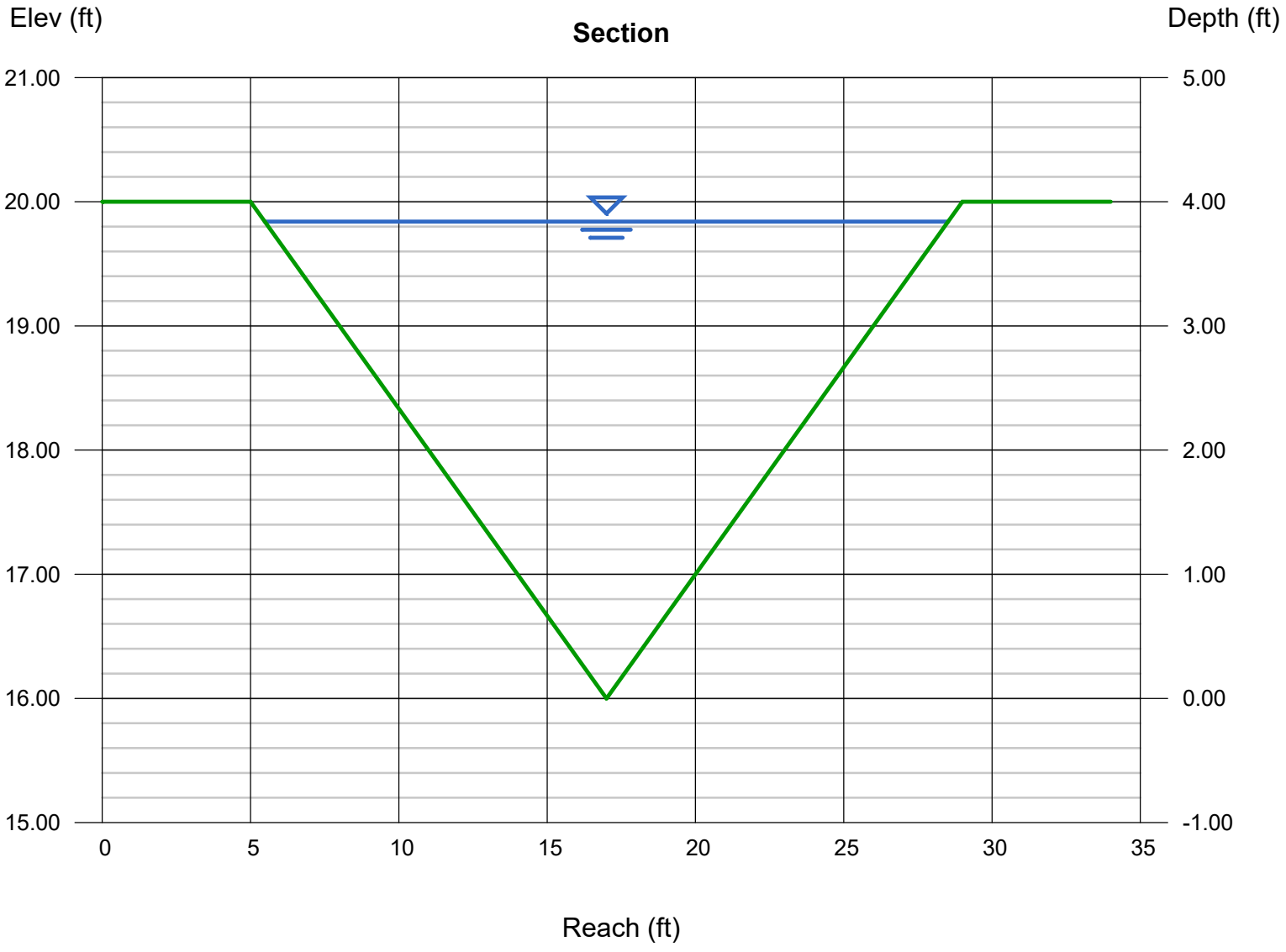
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 4.00
Invert Elev (ft)	= 16.00
Slope (%)	= 1.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 122.30

Highlighted

Depth (ft)	= 3.84
Q (cfs)	= 122.30
Area (sqft)	= 44.24
Velocity (ft/s)	= 2.76
Wetted Perim (ft)	= 24.29
Crit Depth, Yc (ft)	= 2.53
Top Width (ft)	= 23.04
EGL (ft)	= 3.96



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

DITCH 4 - PRE

Triangular

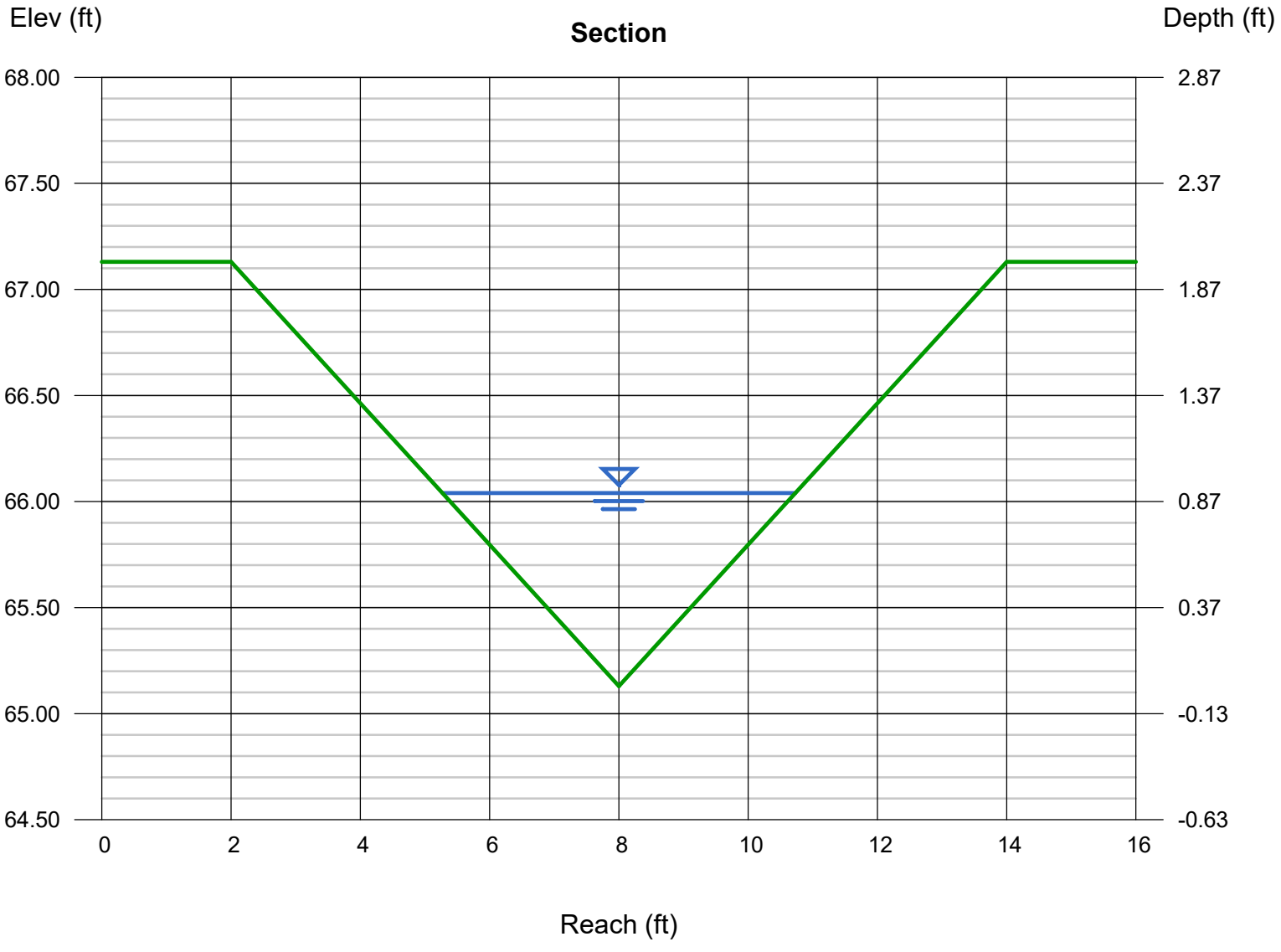
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 65.13
Slope (%)	= 4.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 35.13

Highlighted

Depth (ft)	= 0.91
Q (cfs)	= 35.13
Area (sqft)	= 2.48
Velocity (ft/s)	= 14.14
Wetted Perim (ft)	= 5.76
Crit Depth, Yc (ft)	= 1.54
Top Width (ft)	= 5.46
EGL (ft)	= 4.02



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

DITCH 4 - POST

Triangular

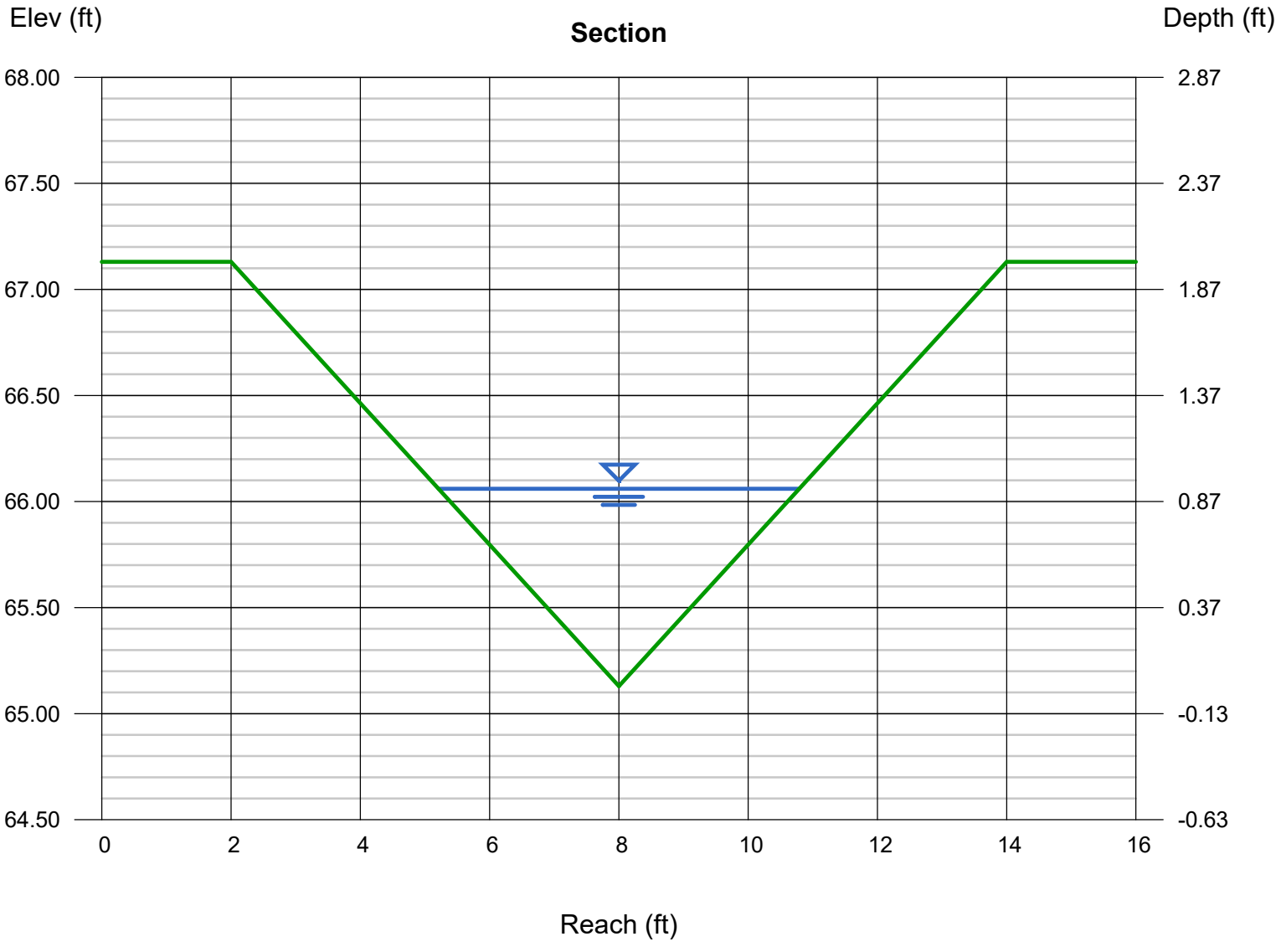
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 65.13
Slope (%)	= 4.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 37.09

Highlighted

Depth (ft)	= 0.93
Q (cfs)	= 37.09
Area (sqft)	= 2.59
Velocity (ft/s)	= 14.29
Wetted Perim (ft)	= 5.88
Crit Depth, Yc (ft)	= 1.57
Top Width (ft)	= 5.58
EGL (ft)	= 4.11



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

DITCH 5 - PRE

Triangular

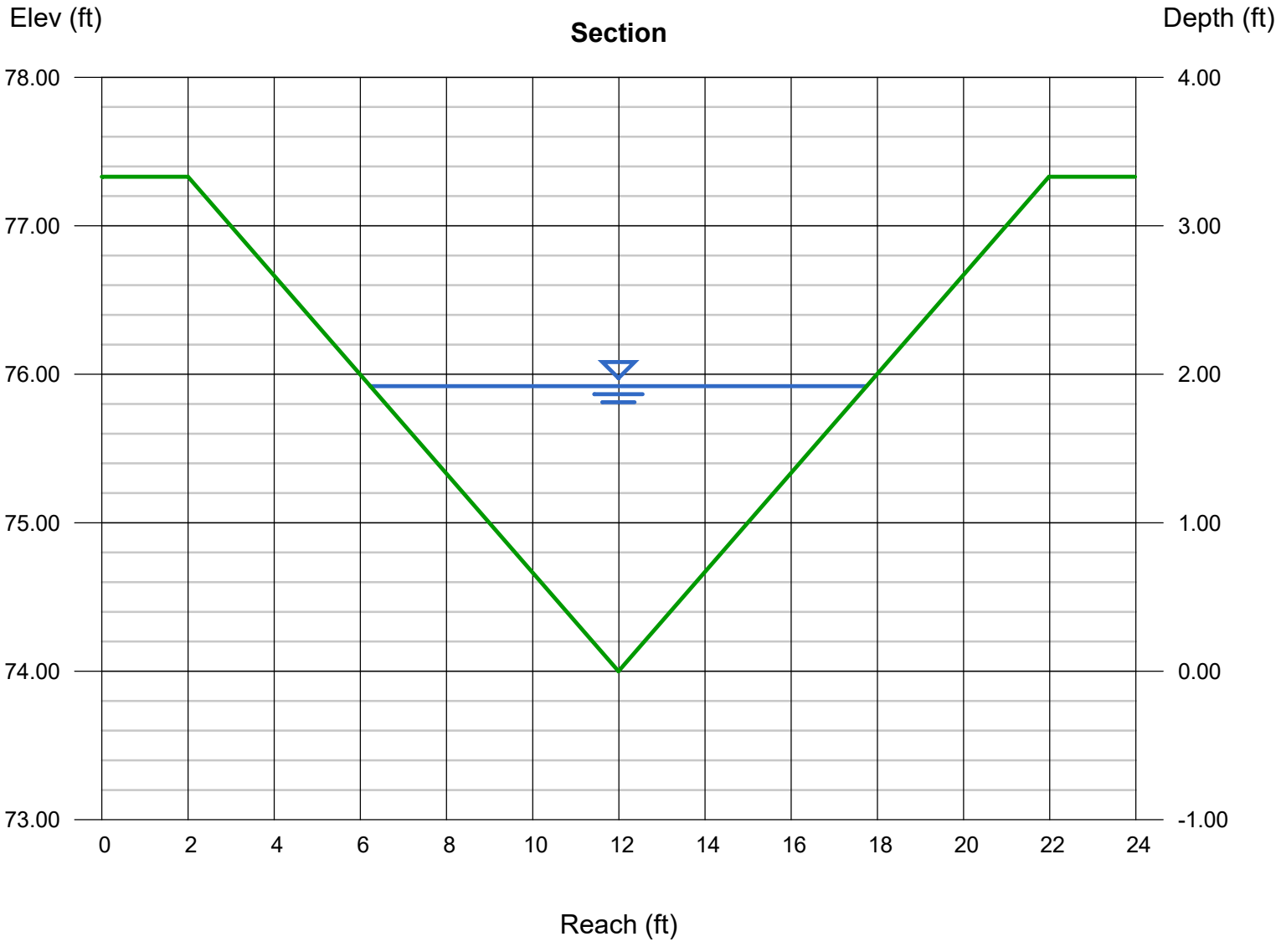
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 3.33
Invert Elev (ft)	= 74.00
Slope (%)	= 1.50
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.36

Highlighted

Depth (ft)	= 1.92
Q (cfs)	= 23.36
Area (sqft)	= 11.06
Velocity (ft/s)	= 2.11
Wetted Perim (ft)	= 12.14
Crit Depth, Yc (ft)	= 1.31
Top Width (ft)	= 11.52
EGL (ft)	= 1.99



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

DITCH 5 - POST

Triangular

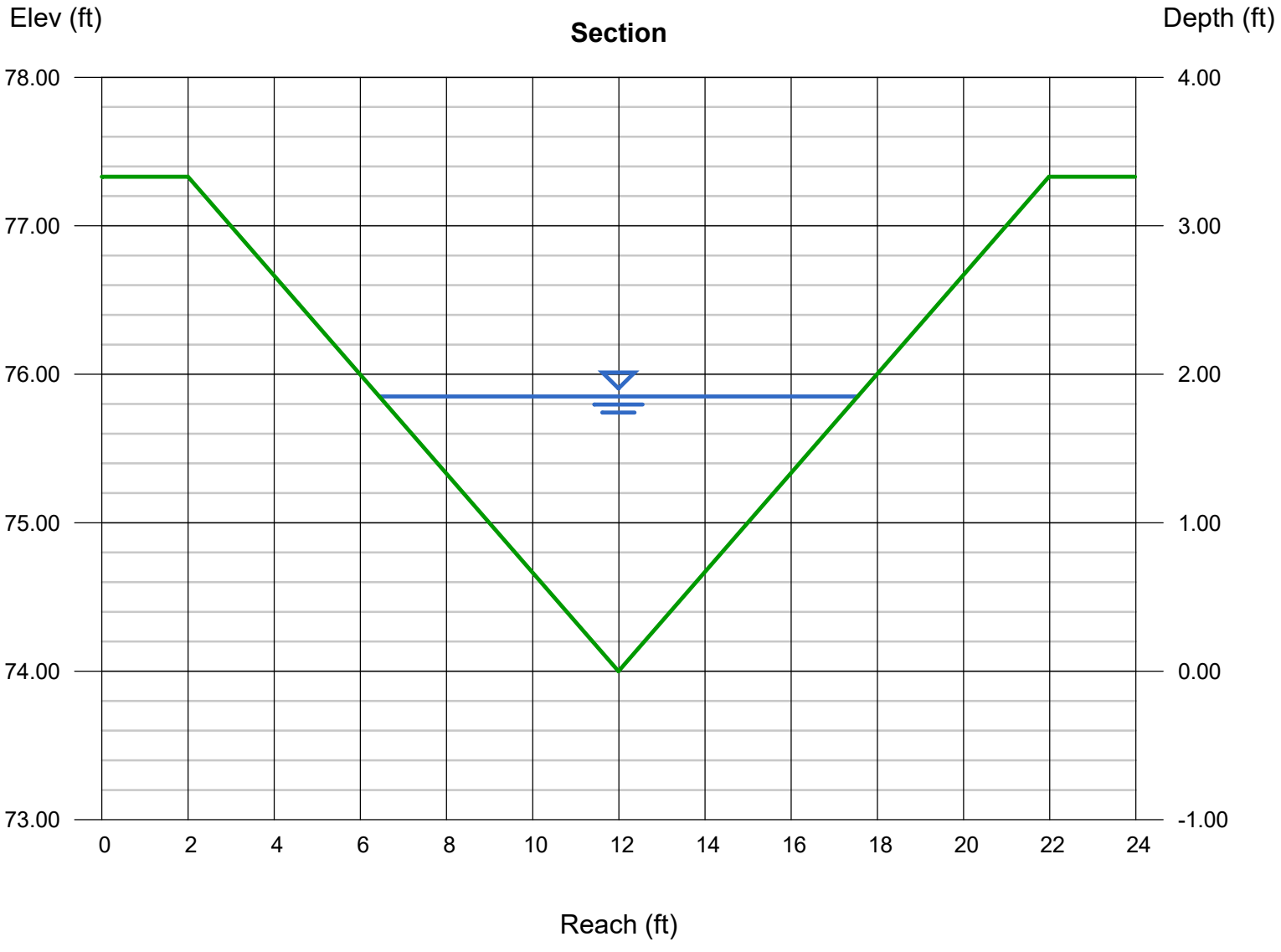
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 3.33
Invert Elev (ft)	= 74.00
Slope (%)	= 1.50
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 21.38

Highlighted

Depth (ft)	= 1.85
Q (cfs)	= 21.38
Area (sqft)	= 10.27
Velocity (ft/s)	= 2.08
Wetted Perim (ft)	= 11.70
Crit Depth, Yc (ft)	= 1.26
Top Width (ft)	= 11.10
EGL (ft)	= 1.92



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

STORM PIPE 1 - PRE

Circular

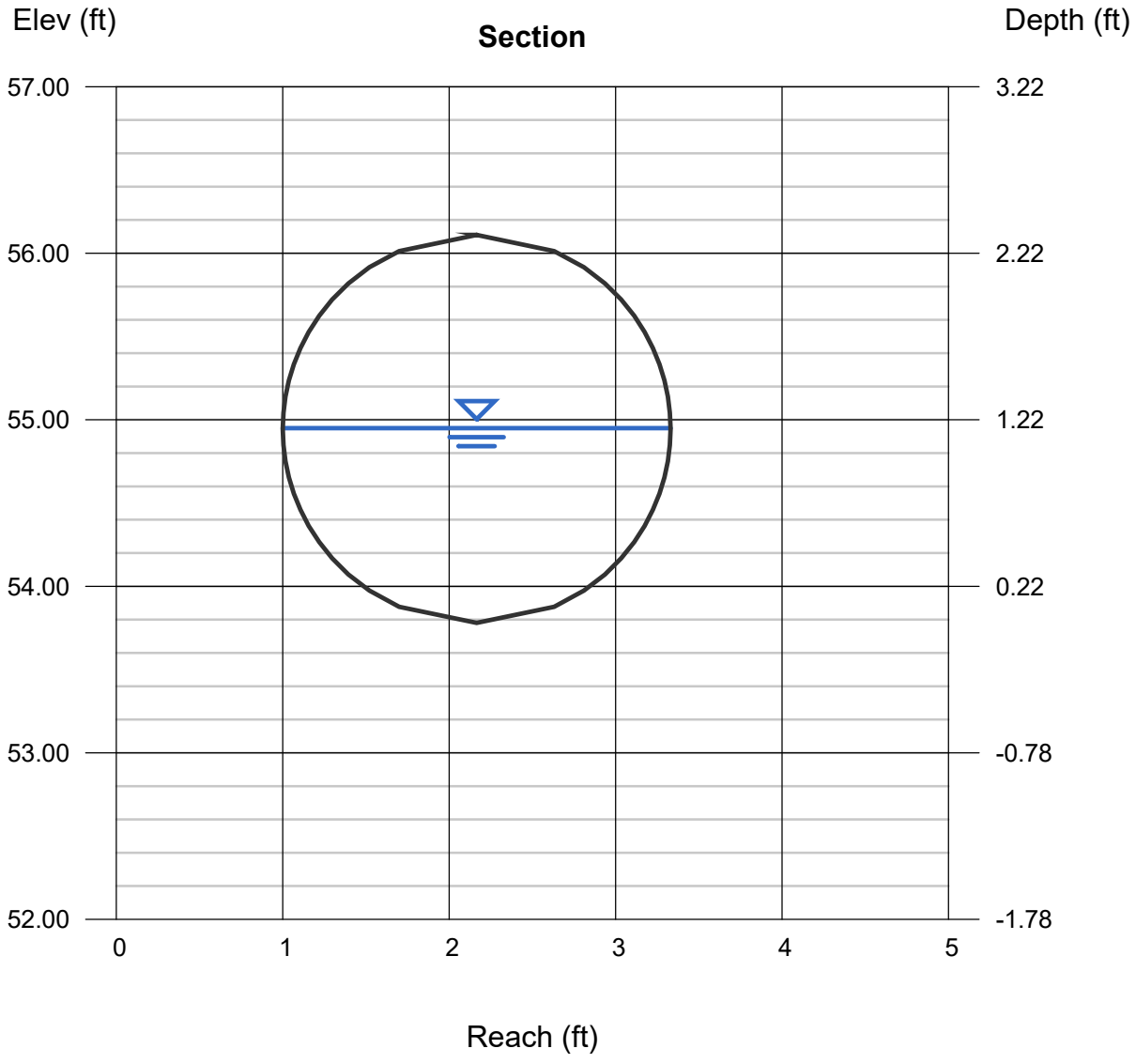
Diameter (ft)	= 2.33
Invert Elev (ft)	= 53.78
Slope (%)	= 4.91
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 37.91

Highlighted

Depth (ft)	= 1.17
Q (cfs)	= 37.91
Area (sqft)	= 2.16
Velocity (ft/s)	= 17.58
Wetted Perim (ft)	= 3.68
Crit Depth, Yc (ft)	= 2.08
Top Width (ft)	= 2.33
EGL (ft)	= 5.97



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

STORM PIPE 1 - POST

Circular

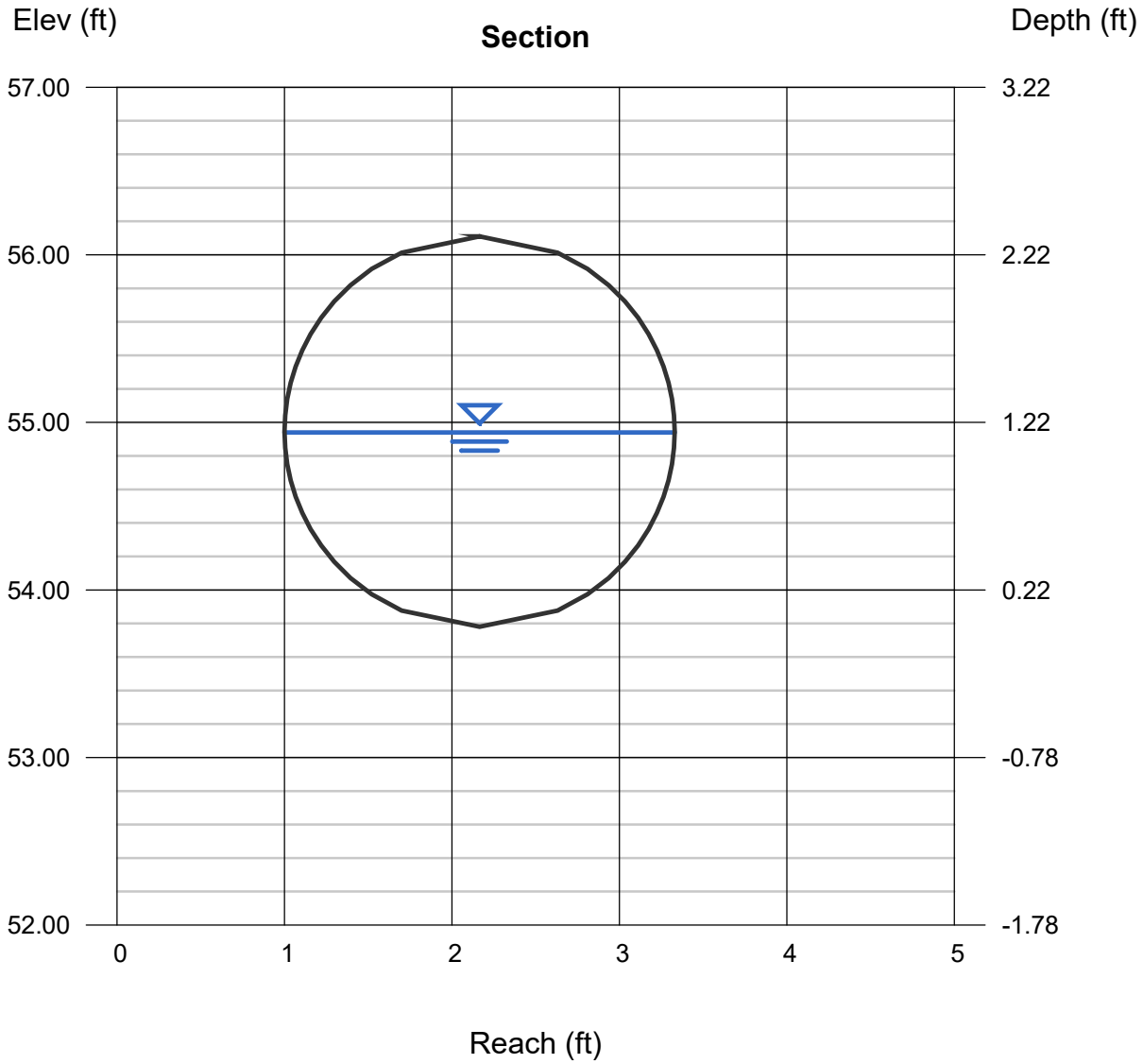
Diameter (ft)	= 2.33
Invert Elev (ft)	= 53.78
Slope (%)	= 4.91
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 37.09

Highlighted

Depth (ft)	= 1.16
Q (cfs)	= 37.09
Area (sqft)	= 2.13
Velocity (ft/s)	= 17.42
Wetted Perim (ft)	= 3.66
Crit Depth, Yc (ft)	= 2.06
Top Width (ft)	= 2.33
EGL (ft)	= 5.88



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

STORM PIPE 2 - PRE

Circular

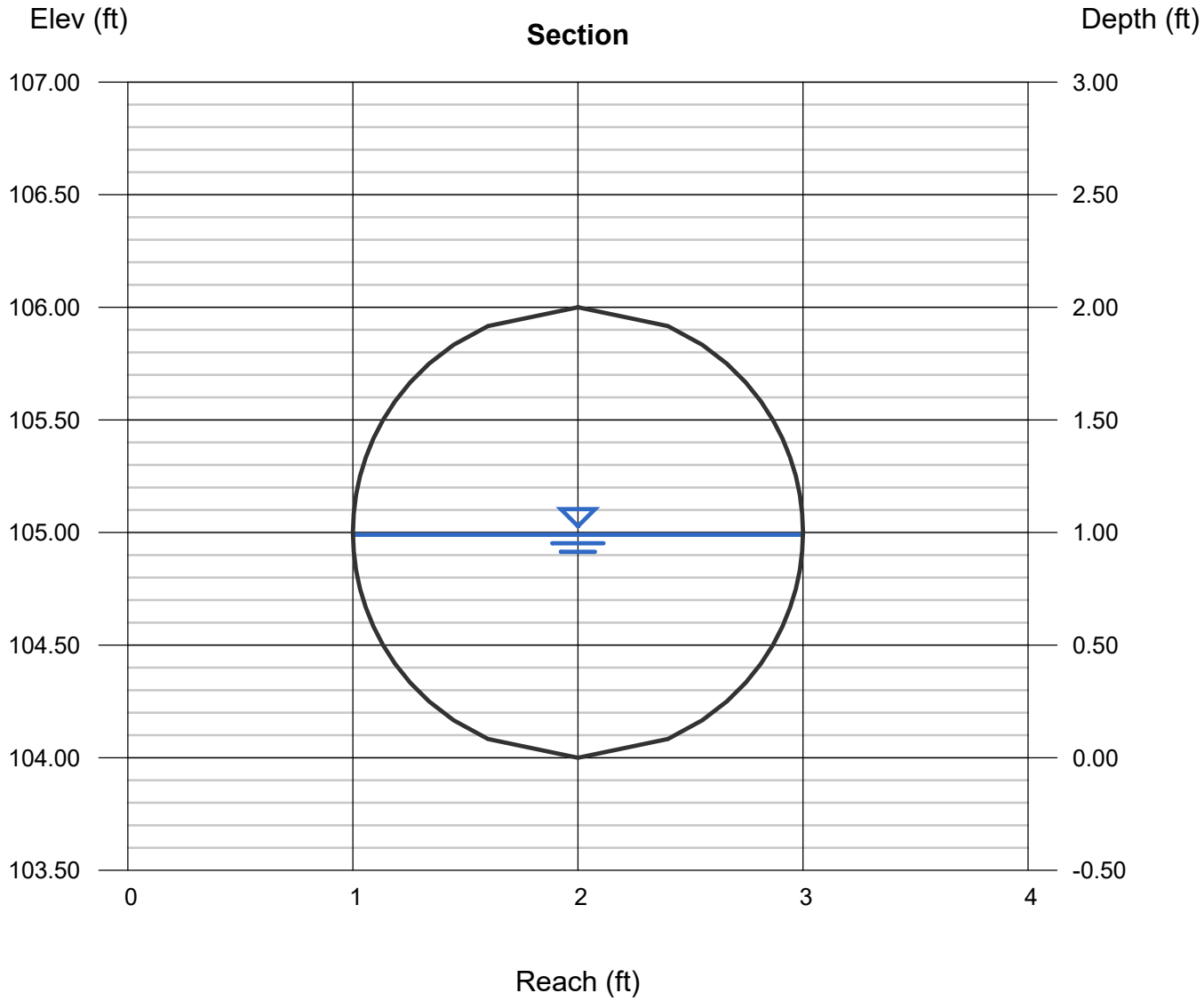
Diameter (ft)	= 2.00
Invert Elev (ft)	= 104.00
Slope (%)	= 1.40
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.23

Highlighted

Depth (ft)	= 0.99
Q (cfs)	= 14.23
Area (sqft)	= 1.56
Velocity (ft/s)	= 9.13
Wetted Perim (ft)	= 3.13
Crit Depth, Yc (ft)	= 1.36
Top Width (ft)	= 2.00
EGL (ft)	= 2.28



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

STORM PIPE 2 - PRE

Circular

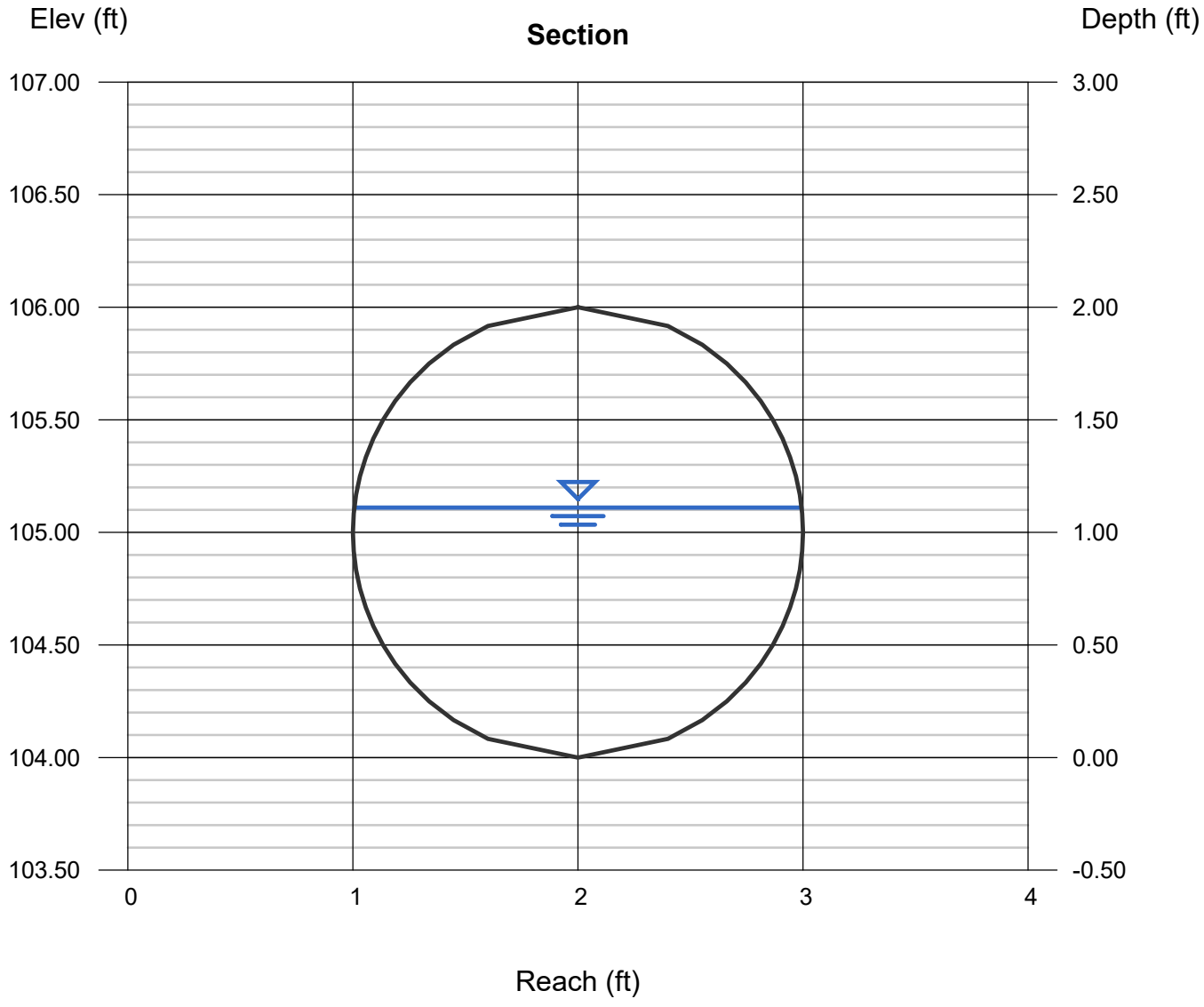
Diameter (ft)	= 2.00
Invert Elev (ft)	= 104.00
Slope (%)	= 1.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 14.49

Highlighted

Depth (ft)	= 1.11
Q (cfs)	= 14.49
Area (sqft)	= 1.80
Velocity (ft/s)	= 8.06
Wetted Perim (ft)	= 3.37
Crit Depth, Yc (ft)	= 1.38
Top Width (ft)	= 1.99
EGL (ft)	= 2.12



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

STORM PIPE 3 - POST

Circular

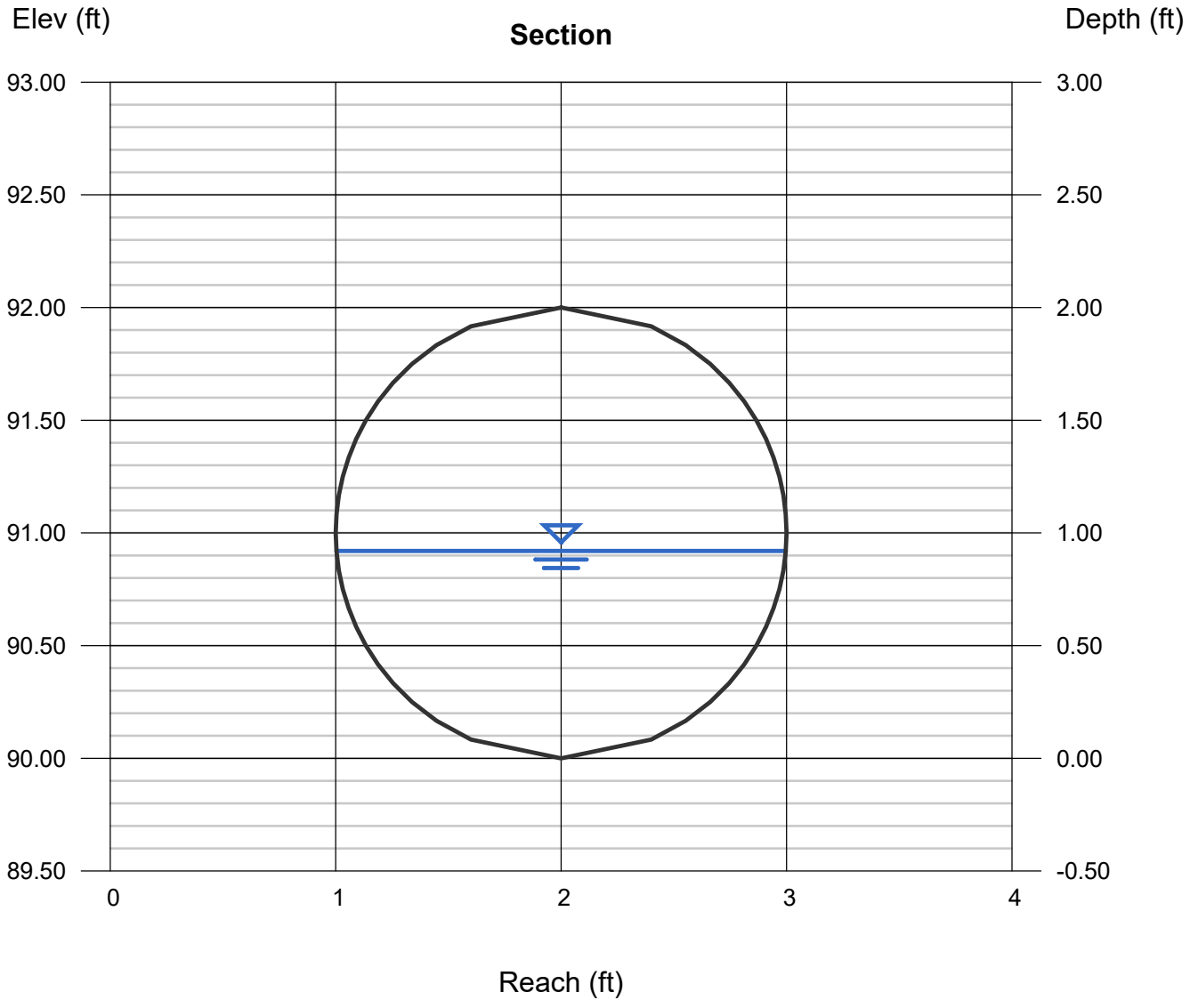
Diameter (ft)	= 2.00
Invert Elev (ft)	= 90.00
Slope (%)	= 5.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 23.61

Highlighted

Depth (ft)	= 0.92
Q (cfs)	= 23.61
Area (sqft)	= 1.42
Velocity (ft/s)	= 16.63
Wetted Perim (ft)	= 2.99
Crit Depth, Yc (ft)	= 1.73
Top Width (ft)	= 1.99
EGL (ft)	= 5.22



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

STORM PIPE 4 - POST

Circular

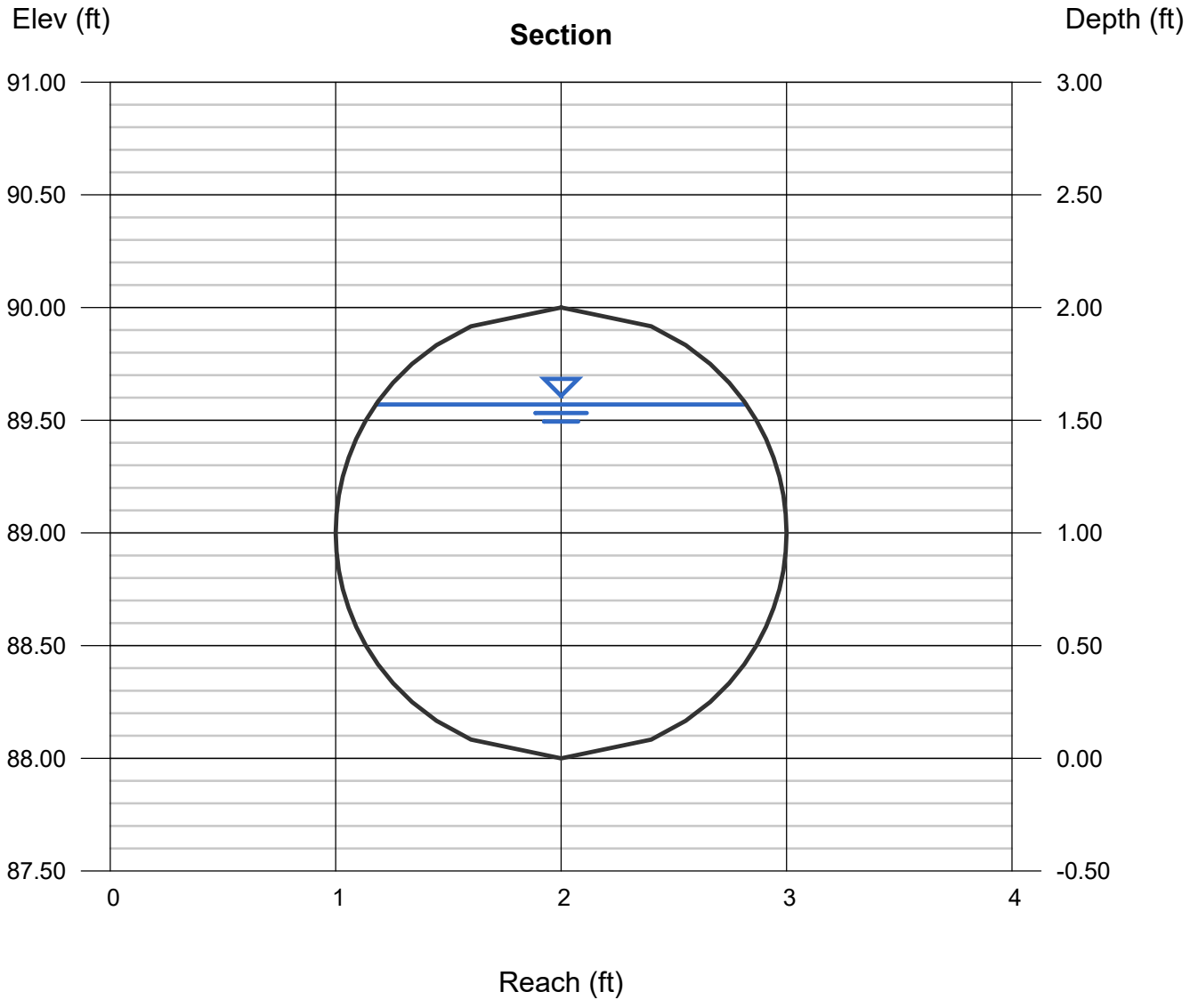
Diameter (ft)	= 2.00
Invert Elev (ft)	= 88.00
Slope (%)	= 2.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 37.09

Highlighted

Depth (ft)	= 1.57
Q (cfs)	= 37.09
Area (sqft)	= 2.65
Velocity (ft/s)	= 14.00
Wetted Perim (ft)	= 4.36
Crit Depth, Yc (ft)	= 1.94
Top Width (ft)	= 1.64
EGL (ft)	= 4.62



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Apr 30 2025

STORM PIPE 5 - POST

Circular

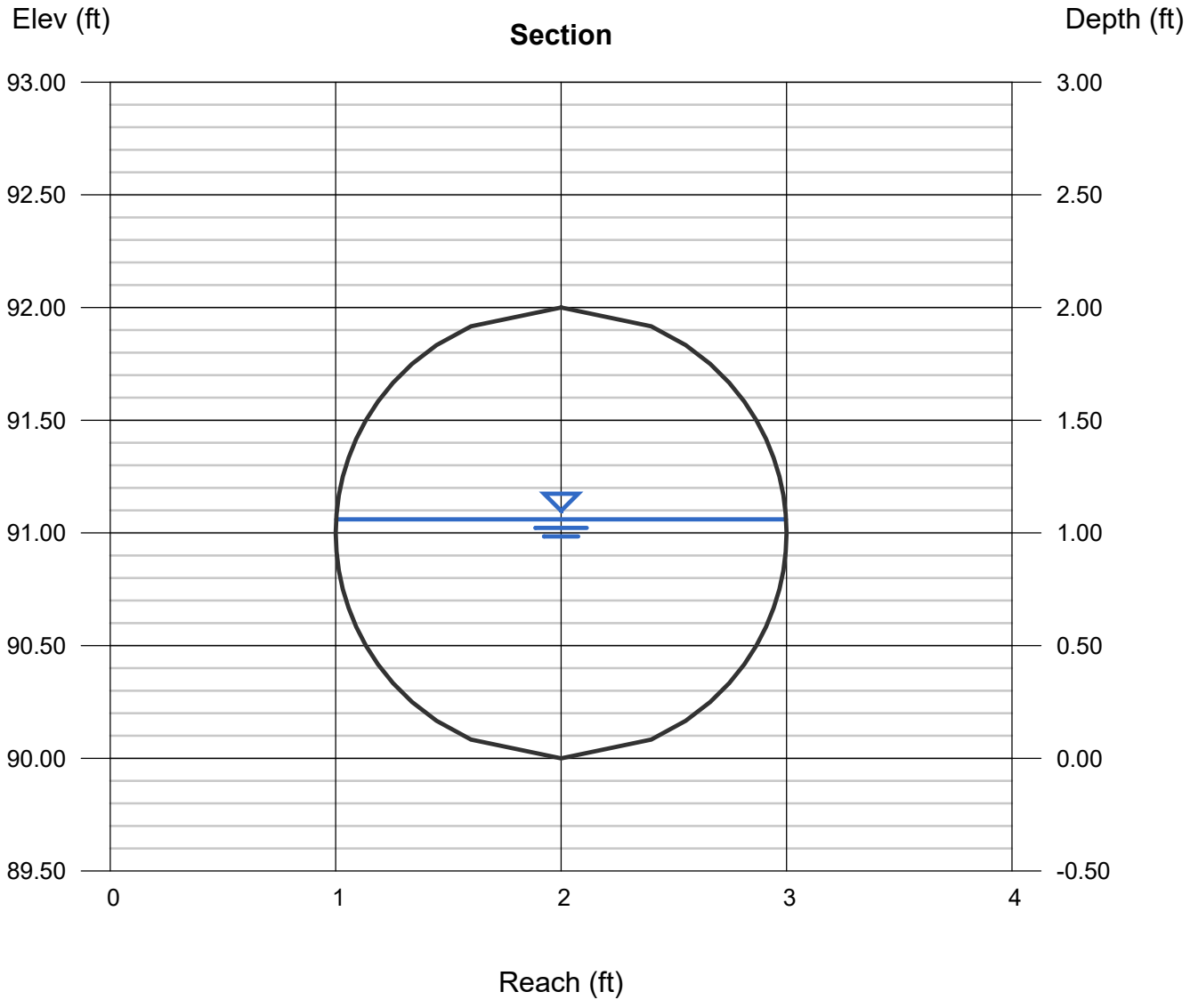
Diameter (ft)	= 2.00
Invert Elev (ft)	= 90.00
Slope (%)	= 1.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 13.48

Highlighted

Depth (ft)	= 1.06
Q (cfs)	= 13.48
Area (sqft)	= 1.70
Velocity (ft/s)	= 7.93
Wetted Perim (ft)	= 3.27
Crit Depth, Yc (ft)	= 1.32
Top Width (ft)	= 2.00
EGL (ft)	= 2.04



Appendix K. Noise

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TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number:
Project Name: Buena Vista Landfill

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Kimley-Horn 2024
Community Noise Descriptor: L_{dn}: _____ CNEL: X

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	87.13%	4.63%	8.24%
Medium-Duty Trucks	92.87%	2.69%	4.44%
Heavy-Duty Trucks	98.00%	1.00%	1.00%

"-" = contour is located within the roadway right-of-way.
Distance is from the centerline of the roadway segment to the receptor location.

Analysis Condition / Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix: Medium Trucks	Vehicle Mix: Heavy Trucks	**CNEL at 50 Feet**	Distance from Centerline of Roadway to Contour: 70 CNEL	65 CNEL	60 CNEL	55 CNEL
Buena Vista Drive												
SR-1 NB Ramps to SR-1 SB Ramps, existing	2	0	5,870	35	0	6.3%	0.1%	**62.3**	-	-	85	269
SR-1 NB Ramps to SR-1 SB Ramps, Interim	2	0	7,130	35	0	6.3%	0.1%	**63.2**	-	33	103	327
SR-1 NB Ramps to SR-1 SB Ramps, Interim + Project	2	0	7,330	35	0	6.1%	0.1%	**63.2**	-	33	105	333
SR-1 NB Ramps to SR-1 SB Ramps, Cumulative	2	0	8,750	35	0	6.3%	0.1%	**64.0**	-	40	127	402
SR-1 NB Ramps to SR-1 SB Ramps, Cumulative + Project	2	0	8,990	35	0	8.3%	0.1%	**64.6**	-	45	144	454
Buena Vista Drive												
SR-1 SB Ramps to Ranport Rd/Fiesta Way, existing	2	0	3,670	35	0	5.2%	0.1%	**60.0**	-	-	51	160
SR-1 SB Ramps to Ranport Rd/Fiesta Way, Interim	2	0	4,520	35	0	5.2%	0.1%	**61.0**	-	-	62	197
SR-1 SB Ramps to Ranport Rd/Fiesta Way, Interim + Project	2	0	4,720	35	0	9.9%	0.1%	**62.1**	-	-	80	254
SR-1 SB Ramps to Ranport Rd/Fiesta Way, Cumulative	2	0	5,920	35	0	5.2%	0.1%	**62.1**	-	-	82	258
SR-1 SB Ramps to Ranport Rd/Fiesta Ways, Cumulative + Proje	2	0	5,920	35	0	8.3%	0.1%	**62.8**	-	-	95	299
Buena Vista Drive												
Ranport Rd/Fiesta Way to Harkins Slough Rd, existing	2	0	3,880	35	0	3.9%	0.1%	**60.0**	-	-	50	158
Ranport Rd/Fiesta Way to Harkins Slough Rd, Interim	2	0	4,220	35	0	3.9%	0.1%	**60.4**	-	-	54	172
Ranport Rd/Fiesta Way to Harkins Slough Rd, Interim + Project	2	0	4,420	35	0	8.7%	0.1%	**61.6**	-	-	72	227
Ranport Rd/Fiesta Way to Harkins Slough Rd, Cumulative	2	0	4,860	35	0	3.9%	0.1%	**61.0**	-	-	63	198
Ranport Rd/Fiesta Way to Harkins Slough Rd, Cumulative + Pro	2	0	4,920	35	0	8.0%	0.1%	**61.9**	-	-	77	244
Buena Vista Drive												
Harkins Slough Rd to Landfill Entrance, existing	2	0	2,790	35	0	5.1%	0.1%	**58.8**	-	-	38	121
Harkins Slough Rd to Landfill Entrance, Interim	2	0	2,900	35	0	5.1%	0.1%	**59.0**	-	-	40	126
Harkins Slough Rd to Landfill Entrance, Interim + Project	2	0	3,200	35	0	12.5%	0.2%	**60.8**	-	-	61	191
Harkins Slough Rd to Landfill Entrance, Cumulative	2	0	3,050	35	0	5.1%	0.1%	**59.2**	-	-	42	132
Harkins Slough Rd to Landfill Entrance, Cumulative + Project	2	0	3,410	35	0	11.7%	0.2%	**61.0**	-	-	63	198
Buena Vista Drive												
Landfill Entrance to San Andreas Drive, existing	2	0	2,790	35	0	3.9%	0.1%	**58.6**	-	-	36	113
Landfill Entrance to San Andreas Drive, Interim	2	0	3,650	35	0	3.9%	0.1%	**59.7**	-	-	47	148
Landfill Entrance to San Andreas Drive, Interim + Project	2	0	3,650	35	0	4.2%	0.1%	**59.8**	-	-	48	151
Landfill Entrance to San Andreas Drive, Cumulative	2	0	4,690	35	0	3.9%	0.1%	**60.8**	-	-	60	191
Landfill Entrance to San Andreas Drive, Cumulative + Project	2	0	4,690	35	0	4.2%	0.1%	**60.9**	-	-	61	194

Appendix L. Traffic Analysis

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Buena Vista Landfill Transfer Station

Traffic Impact Assessment
FINAL

July 2025

Prepared for

Prepared by

10 South Almaden Boulevard, Suite 1250
San José, CA 95113

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1 INTRODUCTION

The County of Santa Cruz is proposing the Buena Vista Landfill Redevelopment Project (Project) in the unincorporated Santa Cruz County. The Buena Vista Landfill is currently permitted to reach a maximum elevation of 200 feet and, as of November 2022, has an estimated remaining capacity or site life ranging from 6 to 16 years (2028-2038) depending on the rate of the annual tonnage of waste disposed at the landfill. This traffic analysis assumes the landfill site reaches its capacity in Year 2032.

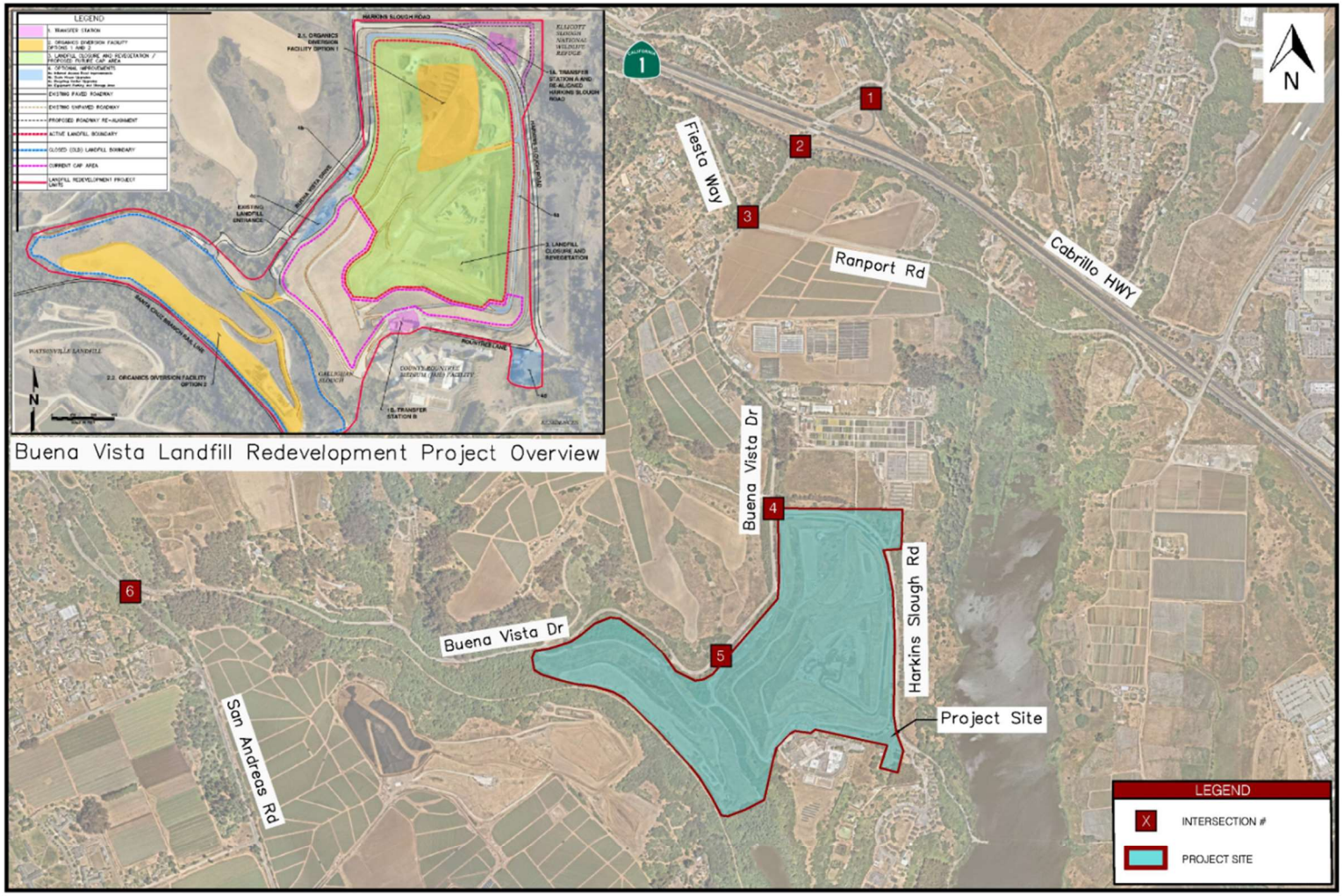
The purpose of the County's redevelopment Project to ensure an orderly landfill closure program that meets State requirements and provides on-going solid waste handling capabilities to allow the County to meet State required waste management goals for waste reduction, source separation, materials recycling, and organics diversion.

1.1 Project Location

The Buena Vista Landfill site is located at the south-east corner of the intersection of Harkins Slough Road and Buena Vista Drive in unincorporated southern Santa Cruz County, within the California Coastal Zone. Access to the Buena Vista Landfill site is via three vehicular access points; two driveways along Buena Vista Drive and one driveway is on Roundtree Ln. which is accessed via Harkin Slough Road.

To the northwest, north and northeast of the landfill site land uses are agricultural in nature and public facilities are located to the southeast, south, and southwest of the landfill site. These public facilities include the County's Rountree Medium (Jail)Facility, the Buena Vista Migrant Center (farmworker housing and childcare facility), and the Housing Authority's affordable housing complex known as Tierra Alta. The City of Watsonville's landfill is located southwest of the County's "Old Landfill" and is accessed from San Andreas Road. The Project site location is shown in **Figure 1**.

Figure 1: Project Site Location



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Buena Vista Landfill Traffic Study
Figure 1
Project Location and Study Intersections

1.3 Study Scenarios

This transportation impact analysis is based on the following development conditions:

- **Scenario 1: Existing (2022) Conditions**

  Existing AM and PM peak-hour traffic volumes, intersection geometry and traffic control based on Year 2022 traffic count data.

- **Scenario 2: Interim (2032) Conditions**

  Represents existing intersection geometry, traffic control and adjusted existing peak hour-traffic volumes based on the growth factor observed between the Base Year (2019) and Interim (2032) conditions per the Santa Cruz County Travel Demand Model.

- **Scenario 3: Interim (2032) Plus Project Conditions**

  Peak-hour traffic volumes based on the interim (2032) conditions and adding the Project net vehicle trips to the existing geometry and traffic control.

- **Scenario 4: Cumulative (2045) Conditions**

  Represents existing intersection geometry, traffic control and adjusted existing peak hour-traffic volumes based on the growth factor observed between the Base Year (2019) and Interim (2045) conditions per the Santa Cruz County Travel Demand Model.

- **Scenario 5: Cumulative (2045) Plus Project Conditions**

  Peak-hour traffic volumes based on the cumulative (2045) conditions and adding the Project net vehicle trips to the existing geometry and traffic control.

1.4 Intersection Level-of-Service Criteria and Thresholds

Analysis of potential impacts at roadway intersections is based on the concept of Level of Service (LOS). The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the Highway Capacity Manual (HCM) and Synchro 10 traffic analysis software. HCM methodologies include procedures for analyzing side-street stop-controlled (SSSC), all-way stop-controlled (AWSC), and signalized intersections. The SSSC procedure defines LOS as a function of average control delay for each minor street approach movement. Conversely, the AWSC and signalized intersection procedures define LOS as a function of average control delay for the overall intersection. **Table 1** relates the operational characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	Less than 10	less than 10

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
B	Stable traffic. Traffic flows smoothly with few delays.	less than or equal to 10 to 20	less than or equal to 10 to 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	less than or equal to 20 to 35	less than or equal to 15 to 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	less than or equal to 35 to 55	less than or equal to 25 to 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	less than or equal to 55 to 80	less than or equal to 35 to 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	greater than or equal to 80	greater than or equal to 50

Sources: Transportation Research Board, *Highway Capacity Manual 6*, National Research Council.

Project impacts are determined by comparing conditions without the proposed Project to those with the proposed Project. Significant impacts for intersections are created when traffic from the proposed Project causes the LOS to fall below the maintaining agency's LOS threshold or causes deficient intersections to deteriorate further, per the criteria indicated below.

County of Santa Cruz Standards

Per Santa Cruz County General Plan Policy AM-6.2.1, all development projects are required to provide multimodal roadway improvements necessary to achieve a minimum level of service (LOS) of "D", except for those where lesser LOS has been accepted by the County pursuant to the criteria specifically identified in Table 3-2 of the General Plan. When development is proposed on roads where a LOS E or F standard has been accepted, development projects are required to identify feasible mitigation in the form of road improvements, a fair share contribution to a road improvement program, or other in-lieu mitigation for the transportation system.

2 EXISTING TRANSPORTATION CONDITIONS

This chapter describes the existing conditions of the transportation system within the study area. It describes transportation facilities near the Project site, including the roadway network, transit service, and pedestrian and bicycle facilities. The analysis of existing intersection operations is included in Chapters 4, 5, and 6.

2.1 Existing Roadway Network

The following local and regional roadways provide access to the Project site:

SR-1 is a 4-lane highway that connects with State Route 17 and 129 and travels in a north-south direction in the County of Santa Cruz. Regional access to the existing Buena Vista Landfill site is primarily from Highway 1 located towards the east of the Project site.

Buena Vista Dr is a two-lane collector street and provides the main entrance to the Project site and other residential and agricultural land uses. The roadway has a posted speed limit of 35 mph. There are no sidewalk or bike lane on either side of the street. The roadway is designated as a major collector street.

Harkins Slough Rd is a two-lane collector street and provides the main entrance to the Project site and other residential and agricultural land uses. There is no posted speed limit sign on this road. There are no sidewalk or bike lane on either side of the street. The roadway is designated as a major collector street.

Fiesta Way is a two-lane collector street within the vicinity of the Project site and provides access to residential and agricultural land uses. There is no posted speed limit sign on this road. There are no sidewalk or bike lane on either side of the street. The roadway is designated as a local street.

Ranport Rd is a two-lane collector street within the vicinity of the Project site and provides access to residential and agricultural land uses. There is no posted speed limit sign on this road There are no sidewalk or bike lane on either side of the street. The roadway is designated as a local street.

2.2 Existing Pedestrian and Bicycle Facilities

Pedestrian and bicycle activity within Project vicinity are not active along several facilities with an established pedestrian and bicycle infrastructure. There are no sidewalk or bike lane within the study area. The closest bike route to the study location is Class II bike lane on San Andreas Road.

2.3 Existing Transit Facilities

The transit operators within the County of Santa Cruz are, Santa Cruz Metropolitan Transit District (METRO), and Monterey Salinas Transit (MST). However, there are not any transit facilities in the vicinity of the Project site as shown in the Figures 2 and Figure 3.

Figure 2: Santa Cruz METRO Bus Network Map

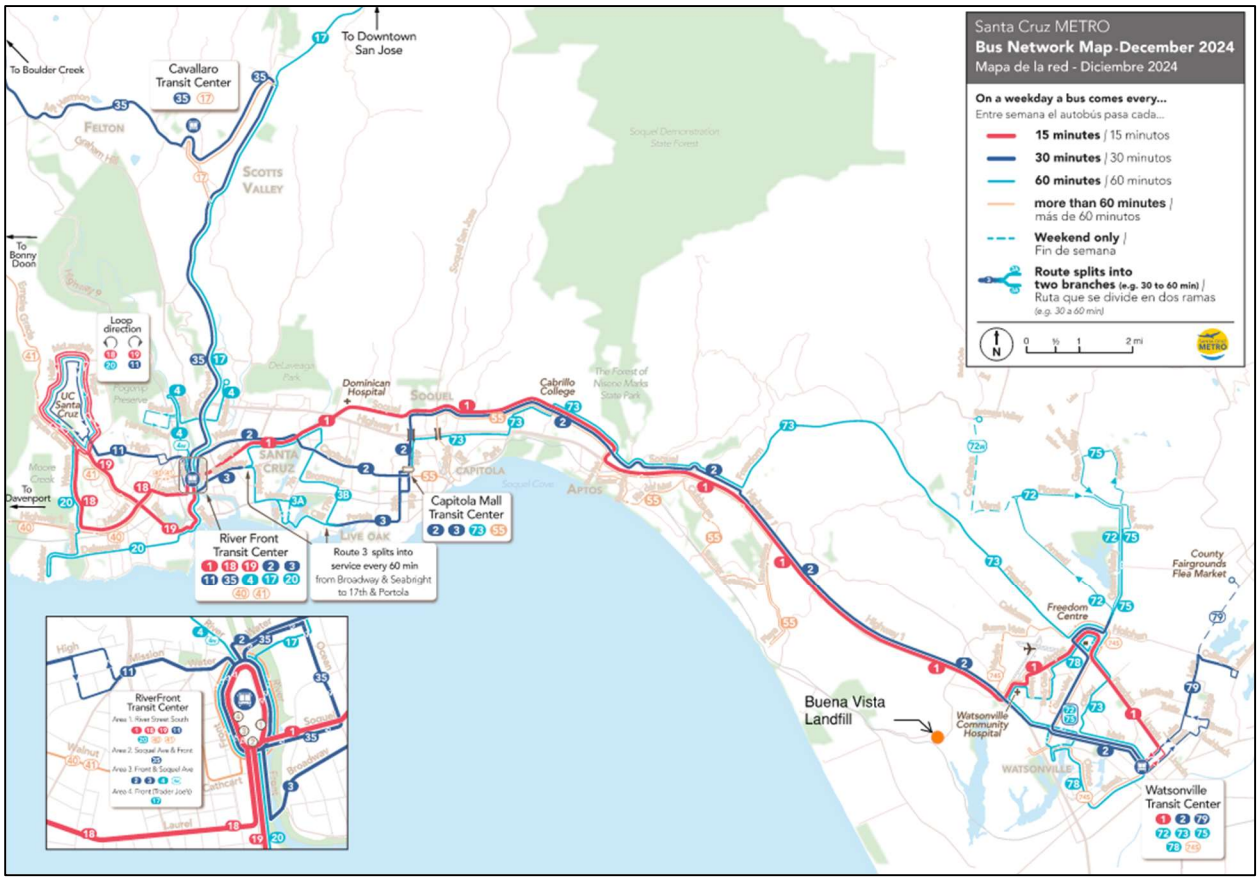


Figure 3: South County Bus Network Map

2.4 Study Intersections

The study intersections were selected in coordination with the County Staff based on the likelihood of potential traffic adverse effects and were evaluated per the standards and guidelines set forth by the Santa Cruz County and Caltrans. The six (6) intersections studied in this TA are listed below.

1. Buena Vista Drive / SR-1 NB Ramps
2. Buena Vista Drive / SR-1 SB Ramps
3. Buena Vista / Ranport Rd / Fiesta Way
4. Buena Vista Drive / Harkins Slough Rd
5. Buena Vista Drive / Landfill Entrance
6. Buena Vista Drive / San Andreas Road

3 PROJECT DESCRIPTION

The County of Santa Cruz is proposing the Buena Vista Landfill Redevelopment Project (Project) in the unincorporated Santa Cruz County. The Buena Vista Landfill is currently permitted to reach a maximum elevation of 200 feet and, as of November 2022, has an estimated remaining capacity or site life ranging from 6 to 16 years (2028-2038) depending on the rate of the annual tonnage of waste disposed at the landfill.

The purpose of the County's redevelopment Project to ensure an orderly landfill closure program that meets State requirements and provides on-going solid waste handling capabilities to allow the County to meet State required waste management goals for waste reduction, source separation, materials recycling, and organics diversion. The Project includes transitioning the Buena Vista Landfill to the Buena Vista Transfer Station, allowing County residents, businesses, and commercial waste haulers to continue bringing solid waste, household hazardous waste, recyclables, and organic materials to the landfill site.

Once landfill waste burial operations end: 1) Solid waste would be loaded into transfer trucks and transported to a regional landfill. 2) Organic materials would continue to be preprocessed onsite and either further processed on site or transferred to other compost processing plants for conversion to recoverable organic products as required by State law. 3) The landfill closure and revegetation plan would be implemented. Recyclables would continue to be sorted at either the existing or a redeveloped recycling facility onsite. The Project includes the following three key components:

1. **Transfer Stations.** Two new waste transfer stations would be developed at the landfill site to implement transfer station operations for waste handling and transport. Transfer Station A, located in the undeveloped northeast corner of the site, would serve self-haulers (residents and businesses). Transfer Station B, located at the current site of the maintenance building in the south portion of the site, would serve franchise haulers and larger commercial vehicles. Harkins Slough Road would be realigned around Transfer Station A to accommodate existing traffic and to contain all solid waste operational traffic on internal roadways.

2. **Organics Diversion Facility**. A new organics diversion facility (ODF) would be developed to continue the existing organics pre-processing activities and support additional processing and diversion in compliance with State law organics diversion requirements. The organics diversion facility would be located either within the existing active landfill footprint in the northern portion of the site (ODF Option 1) or on the "top deck" of the Old Landfill in the southwest portion of the site (ODF Option 2). ODF Option 1 (Onsite pre-processing on Current Landfill and Offsite Composting) would reduce maximum landfill capacity, and Option 2 (Onsite Preprocessing and Composting on Old Landfill Site) would allow the landfill to reach maximum capacity. The Project overview is attached in **Appendix A**.

3. **Landfill Closure and Revegetation**. Once capacity of the current active landfill area in the center of the site is reached, the landfill closure and revegetation plan would be implemented.

Additionally, the Project includes the following optional improvements and the required General Plan/Local Coastal Program Land Use Designation and Zoning Map Amendments.

Optional Improvements. The Project could include the following improvements onsite to support the project purpose and components described above:

a. **Internal Access Road Improvements**. Internal roadway improvements could include asphalt paving of existing unpaved roads and repaving of existing worn and deteriorated roads.
b. **Scale House Upgrades**. Upgrades could include additional scales with radio frequency identification (RFID) to improve traffic flow and scale house operations.
c. **Recycling Center.** The existing recycling center could be relocated and expanded onsite to accommodate recovery of more mandated materials, increase transportation efficiency, and include a marketing and storage facility for sale and reuse.
d. Equipment Parking and Storage Area. A new transfer truck/trailer and heavy equipment parking and storage area, including vehicle fueling and electric vehicle charging facilities, could be located on the south side of the property between the Rountree Facility and Buena Vista Migrant Center (farmworker housing and childcare facility)/Tierra Alta affordable housing complex.

Administrative Updates. To support the key Project components listed above, the Project requires and thus includes the following updates:

a. Agricultural Resource Map Amendment
b. General Plan/Local Coastal Program Map Amendment
c. Zoning Map Amendment

Harkins Slough Road Realignment: Harkins Slough Road currently divides the Project site, located between the proposed Transfer Station A site and the active landfill area. To separate local traffic from Buena Vista facility traffic, Harkins Slough Road would be realigned to the northeast perimeter of the Project site, adjacent to the north and east property lines. This realignment would keep the general public on Harkins Slough Road, outside the facility fence. The 90-degree turn would require stop signs to control traffic in each direction[1].

Vehicular Circulation: The overall vehicular circulation is shown in **Appendix A** and described briefly below for each Transfer Station.

- Transfer Station A: Transfer trucks servicing Transfer Station A would enter the facility on Buena Vista Drive and take an internal facility road located within the currently permitted landfill footprint that circles the facility perimeter so that large trucks would not need to turn around once they enter the facility. Transfer trucks would head southeast on the perimeter road, past Transfer Station B, and continue east as the road parallels Rountree Lane and turns north to parallel the north/south portion of Harkins Slough Road before arriving on the east end of Transfer Station A. Transfer trucks will then enter the load out tunnel from the east and exit the tunnel on the west. After loading at Transfer Station A, the transfer trucks would merge onto the same internal road used by self-haulers to exit the facility on Buena Vista Drive. No facility

[1] The County of Santa Cruz Public Works Division, Roads & Transportation, approved the proposed realignment of Harkins Slough Road and the addition of stop signs at this location, and determined it would not present a design hazard or disrupt traffic flow because of the relatively low volume of vehicle trips to land uses on this portion of Harkins Slough Road (farm worker housing, Roundtree jail, and landfill employees).

traffic would use Harkins Slough Road. The only transfer station related traffic on Harkins Slough Road would mirror existing conditions of staff arriving/departing from work.

- Transfer Station B: Franchise and commercial waste haulers would enter the facility at the existing entrance on Buena Vista Drive and then travel southeast on the internal facility perimeter road. They would enter the transfer station on the west side of the building, unload solid waste inside on the tipping floor, and exit on the east side of the building. To navigate back to the Buena Vista Drive entrance/exit, empty franchise and commercial waste trucks would continue on the internal facility perimeter road travelling in a counter clock-wise direction, merging with empty self-hauler traffic after passing Transfer Station A, before exiting the facility.

3.1 Project Trip Generation

The proposed Project trip generation was estimated separately for the employees and for the transfer trucks which will transfer the consolidated large solid waste from the Project site to the ReGen Monterey Landfill facility in the City of Marina.

Project employee trips were estimated based on the office space within Transfer Station A (1,500 sq. ft.) and Transfer Station B (3,800 sq. ft.). The landfill operations are expected to remain unchanged and will be from 7:30 AM to 3:30 PM (Monday to Tuesday & Thursday to Saturday) and from 7:30 AM to 2:30 PM on Wednesday. Under existing conditions, a total of approximately 40-45 employees work at the Buena Vista landfill site and the employees' number is expected to remain the same. All employees will work on a single shift, arriving in the morning and leaving in the afternoon. It should be noted that the number of employees is expected to remain the same with the construction of the Project. The employee daily trip estimates from Institute of Transportation Engineers (ITE), 11th Edition for Small Office Building (ITE 712) is summarized in **Table 2** below:

Table 2: Project Trip Generation – Based on Office Square Footage

LAND USE / DESCRIPTION [1,2]	PROJECT SIZE		WEEKDAY TOTAL DAILY TRIPS
Trip Generation Rates (ITE)			
Small Office Building (ITE 712)	Per	1,000 Sq Ft	16.19
Future Vehicle-Trips			
Buena Vista Landfill (Transfer Station A Office)	1.500	1,000 Sq Ft	24
Buena Vista Landfill (Transfer Station B Office)	3.800	1,000 Sq Ft	62
		Project Vehicle-Trips	**86**
Notes:			
1. Based on latest project description.			
2. Daily, AM, and PM trips based on average land use rates from the Institute of Traffic Engineers (ITE) Trip Generation 11th Edition			

As per ITE 11th Edition, the Project is expected to generate 86 daily trips related to office space.

The other trips associated with the proposed Project involves transfer trucks which are commercial semi-trucks hauling 40- to 55-foot enclosed trailers. These trucks will transfer the consolidated large solid waste from the Project site to the ReGen Monterey Landfill facility located 19 miles south in the City of Marina.

This traffic impact assessment report assumes Organic Diversion Facility (ODF) Option 2, which estimates the landfill will reach final permitted grades between 2030-2034. For traffic analysis, it was assumed that the landfill reaches its capacity in Year 2032.

The amount of anticipated waste arriving at the Project site is expected to increase from existing conditions to cumulative (2045) conditions. The amount of increase in waste arriving is assumed to be proportional to the increase in population within the Santa Cruz County. Therefore, using the County's Travel Demand Model, a percent growth in population was estimated and this percent growth was applied to the existing waste arriving at the Project site to estimate the waste arriving when the landfill reaches its capacity (i.e., in Year 2032 landfill closure) and in Year 2045. This increase in waste will be associated with an increase in trips to the Project site, however, it should be noted that the Project itself does not generate this additional traffic until the landfill operation ceases and the transfer station operations commence. Trips generated before the closure are unrelated to the project, while trips generated after the closure are associated with the project, as it enables these trips to arrive and depart (transfer station).

Based on the 'Buena Vista Date/Time Analysis Report (from 06/01/2021 to 05/31/2022), the average inbound waste arriving at the landfill site was approximately 445 tons. During the Interim (2032) Conditions, a total of approximately 470 tons of waste is anticipated to arrive at the Project site and during Cumulative (2045) Conditions, a total of approximately 450 tons of waste is anticipated. It should be noted that soil will not be accepted at the Project site once the landfill reaches its capacity in Year 2032 and hence the reduction in total tons of waste in Year 2045.

The number of transfer trucks need to transfer the waste arriving at the Project site to ReGen Monterey Landfill facility and other locations was estimated assuming a 20 tons capacity of a single transfer truck. A total of 24 daily transfer trucks during the Interim (2032) Conditions and 23 daily trucks during the Cumulative (2045) Conditions were estimated to transfer the waste arriving at the Project site. The number of trips is summarized in **Table 3** below.

As shown in Table 3, the total number of truck trips estimated during the AM peak hour was 14 trips (8 In, 6 Out) during the Interim (2032) Conditions and 13 trips (7 In, 6 Out) during the Cumulative (2045) Conditions. No truck trips are anticipated during the PM peak period (i.e., 4 to 6 PM) as the Project site closes at 3:30 PM.

3.2 Project Trip Distribution

All estimated Project truck trips will be to and from Buena Vista landfill site to the ReGen Monterey Landfill site, therefore the Project trips were distributed on the road network accordingly.

3.3 Project Trip Assignment

Figure 4 shows the Project truck trips assigned to the road network based on the Project trip distribution.

Table 3: Project Trip Generation – Based on Truck Volumes

Item	Quantity	Units	Notes
Travel Time Estimates			
Approximate travel time (mins) from Buena Vista Landfill to ReGen Monterey Landfill - (One Direction)	35-40	mins	Source: Google Maps shows 20-26 mins depending upon the time of departure for passenger cars. Additional time was added for trucks to account for lower speeds
Time taken at Buena Vista Transfer Station to load one truck (in mins)	20	mins	Input from County
Time taken at ReGen Monterey Landfill Site to unload one truck (in mins)	20	mins	Input from County
Total time taken (in mins) by 1 Truck (from Buena Vista to ReGen Monterey Landfill and back)	110-115	mins	Estimated Value
Number of trips by 1 Truck (from Buena Vista to ReGen Monterey Landfill and back) in a day	3.5 to 4	Trips	Estimated Value (Based on work timings for Buena Vista and ReGen)
Estimated Waste			
Total Waste Arriving at the Project Site under Existing Conditions	448	tons	Estimated value using Buena Vista Date/Time Analysis Report (from 06/01/201 to 05/31/2022) and percent growth in population from Santa Cruz County Travel Demand Model
Estimated Waste Arriving at the Project Site During Interim (2032) Conditions	470	tons	
Estimated Waste Arriving at the Project Site During Cumulative (2045) Conditions	450	tons	
No. of Daily Trucks			
Interim (2032) Conditions - No. of Daily Trucks Needed to transfer the waste from Buena Vista to ReGen Monterey Landfill	24	no.	Assuming 20 tons capacity of a single transfer truck
Cumulative (2045) Conditions - No. of Daily Trucks Needed to transfer the waste from Buena Vista to ReGen Monterey Landfill	23	no.	Assuming 20 tons capacity of a single transfer truck
No. of Trucks During AM Peak Hour			

Item	Quantity	Units	Notes
Project Trips - Interim (2032) Conditions - No. of trucks transferring the waste from Buena Vista to ReGen Monterey Landfill during the AM Peak Hour	8	trucks	Estimated value. A total of approximately 8 trucks will be needed to transfer the waste from Buena Vista Landfill Site to ReGen facility (Each truck can make 3.5 trips per day, therefore a total of 8 trucks are needed to transfer. For a conservative case analysis, all trucks were assumed to arrive during the morning peak hour.
	6	trucks	Outbound (Assuming 6 trucks are able to exit during the morning peak hour, as it takes 20 mins to load a truck and each transfer station can load 3 trucks during an hour)
Project Trips - Cumulative (2045) Conditions - No. of trucks transferring the waste from Buena Vista to ReGen Monterey Landfill during the AM Peak Hour	7	trucks	Estimated value. A total of approximately 7 trucks will be needed to transfer the waste from Buena Vista Landfill Site to ReGen facility (Each truck can make 3.5 trips per day, therefore a total of 7 trucks are needed to transfer. For a conservative case analysis, all trucks were assumed to arrive during the morning peak hour.
	6	trucks	Outbound (Assuming 6 trucks are able to exit during the morning peak hour, as it takes 20 mins to load a truck and each transfer station can load 3 trucks during an hour)
No. of Trucks During PM Peak Hour			
Project Trips - Interim (2032) Conditions - No. of trucks transferring the waste from Buena Vista to ReGen Monterey Landfill during the PM Peak Hour	0	trucks	No truck trips are anticipated during the PM peak hour as the Buena Vista landfill site closes at 3:30 PM
	0	trucks	
Project Trips - Cumulative (2045) Conditions - No. of trucks transferring the waste from Buena Vista to ReGen Monterey Landfill during the PM Peak Hour	0	trucks	No truck trips are anticipated during the PM peak hour as the Buena Vista landfill site closes at 3:30 PM
	0	trucks	

Figure 4: Project Trip Volumes

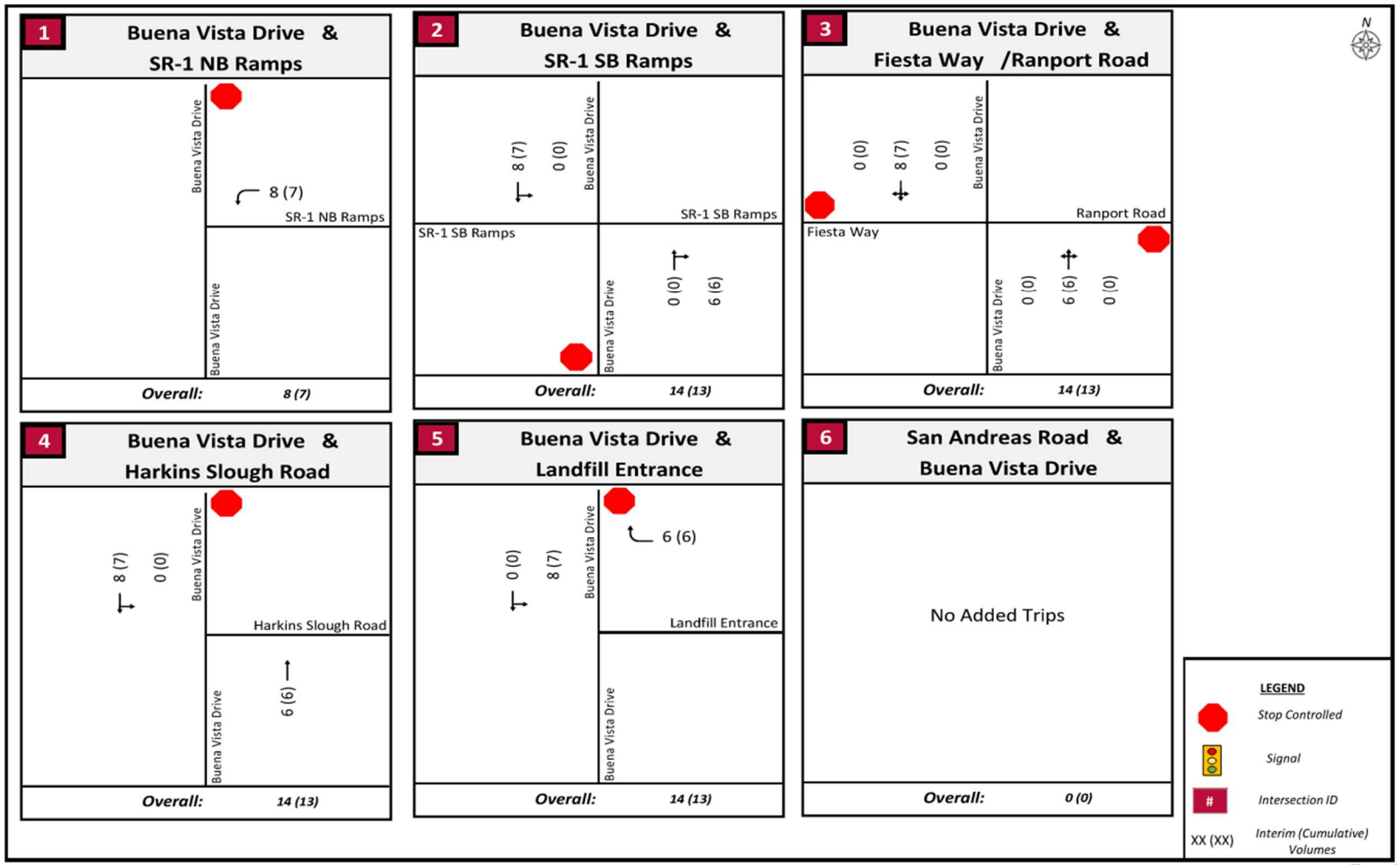


Figure 4
Project Trip Volumes

4 INTERSECTION OPERATIONS

This chapter describes the local transportation analysis including intersection operations analysis for: Existing, Interim (2032), Interim (2032) plus Project, Cumulative (2045), and Cumulative (2045) plus Project; intersection vehicle queuing analysis; signal warrant analysis; and mitigation measures for any adverse effects to intersection level of service caused by the Project.

4.1 Existing Traffic Counts

Traffic counts for Year 2022 were determined from new turning movement counts collected on Thursday, 05/19/2022 for the six study intersections (6) during AM (7-9) and PM (4-6) peak periods. Peak hour volumes during each intersection's respective peak were conservatively used in this analysis. Existing intersection lane geometry and peak hour turning movement volumes are shown in Figure 5 and Figure 6 respectively. Intersection turning movement counts are provided in the **Appendix B**.

In addition to the intersection turning movement counts, driveway counts were collected at all three existing driveways for a typical Monday, Thursday, Friday, and Saturday. These driveway counts are also attached in **Appendix B.**

Figure 5: Existing Intersection Lane Geometry

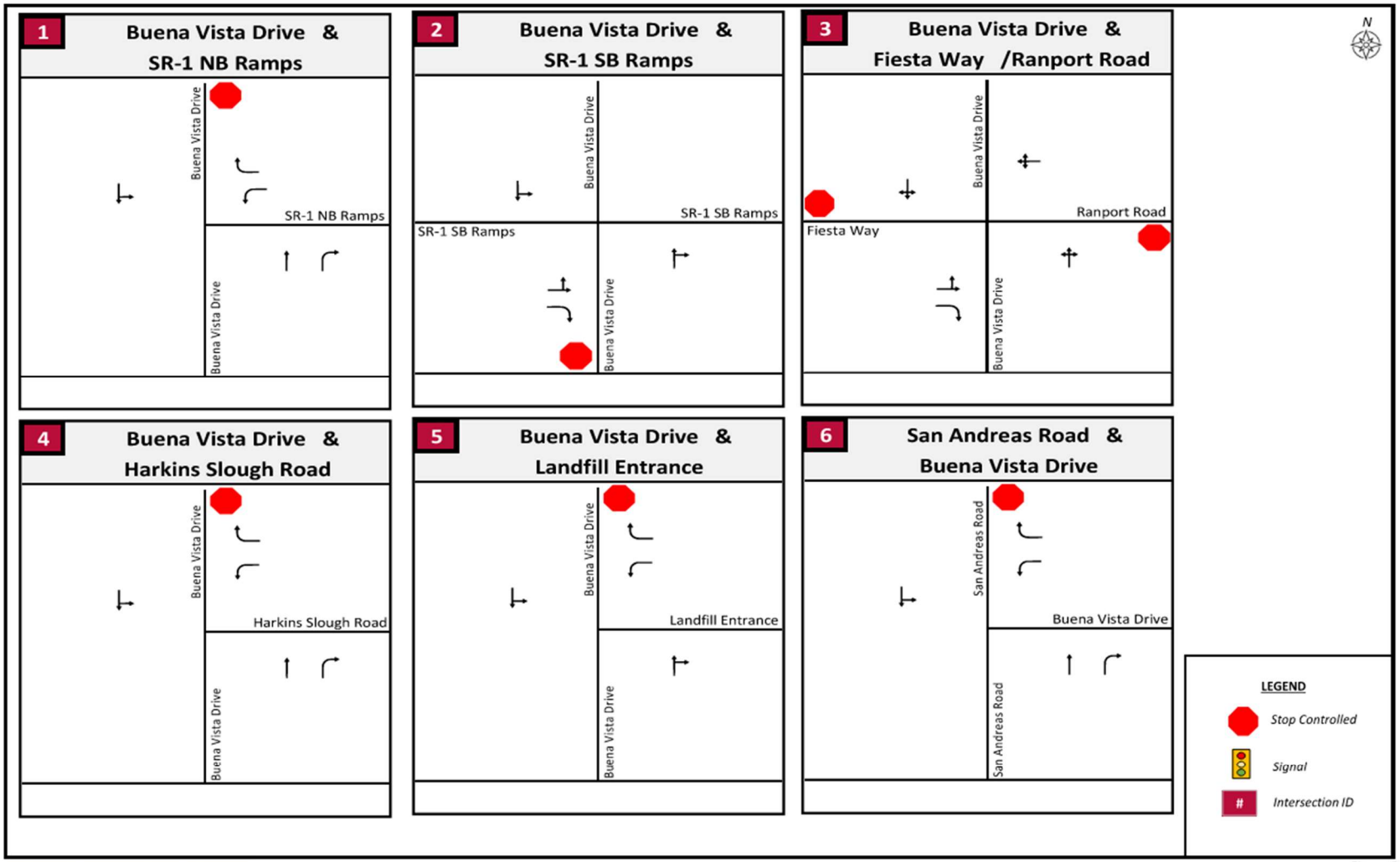


Figure 6: Existing Conditions Peak Hour Turning Movement Volumes

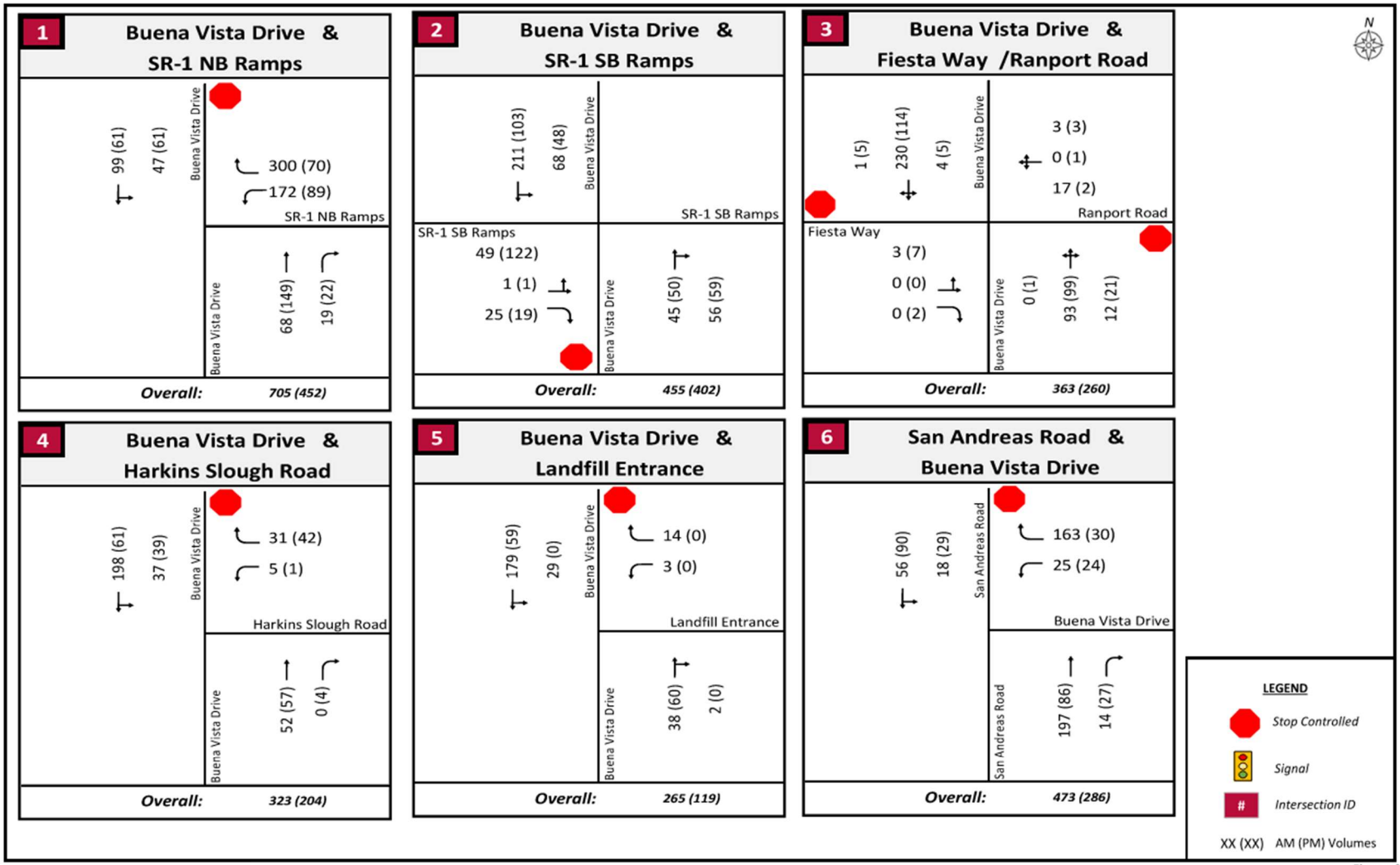


Figure 6
Existing Conditions Lane Geometry and Intersection Control

4.2 Existing Conditions LOS Analysis

Traffic operations were evaluated at the study intersections under Existing conditions, and the results of the analysis are presented in **Table 4**. Synchro output sheets are provided in the **Appendix C**.

Table 4: Intersection Operations Summary for Existing Conditions

#	Intersection	Maintaining Agency	Control Type	Existing Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	9.7	A	-	6.1	A
				WB	12.55	B	WB	11.54	B
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	3.1	A	-	4.9	A
				EB	12.39	B	EB	11.81	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	0.9	A	-	0.8	A
				EB	11.87	B	EB	10.23	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.9	A	-	3.3	A
				WB	9.35	A	WB	9.11	A
5	Buena Vista Dr / Landfill Entrance/Exit	SCC	SSSC	-	1.6	A	-	0	A
				WB	9.4	A	WB	0	A
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	5.0	A	-	2.7	A
				WB	11.58	B	WB	10.0	B

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

*6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold.***

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour under Existing Conditions.

4.3 Interim (2032) Conditions LOS Analysis

The Interim (2032) Condition's scenario was evaluated using the Santa Cruz County Travel Demand Model by SCCRTC to develop Interim (2032) traffic volumes at the study intersections. The model was run for both the Base year (2019) conditions and Interim (2032) conditions. The Interim (2032) volumes at the study intersections were estimated using the growth observed between the Base Year (2019) and Interim (2032) Conditions and applying the estimated growth/year to the existing (2022) traffic counts to arrive at interim traffic volumes for the year 2032. Traffic operations and traffic volumes for the study intersections under Interim (2032) conditions are shown below in **Table 5** and **Figure 7**.

Table 5: Intersection Operation Summary for Interim (2032) Conditions

#	Intersection	Maintaining Agency	Control Type	Interim 2032 Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	10.9	B	-	6.3	A
				WB	14.76	B	WB	12.77	B
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	3.6	A	-	5.2	A
				EB	14.02	B	EB	12.75	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	0.9	A	-	1.6	A
				EB	13.07	B	EB	11.51	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.8	A	-	3.1	A
				WB	9.37	A	WB	9.12	A
5	Buena Vista Dr / Landfill Entrance/Exit	SCC	SSSC	-	1.6	A	-	0	A
				WB	9.43	A	WB	0	A
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.6	A	-	2.2	A
				WB	12.33	B	WB	11.93	B

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

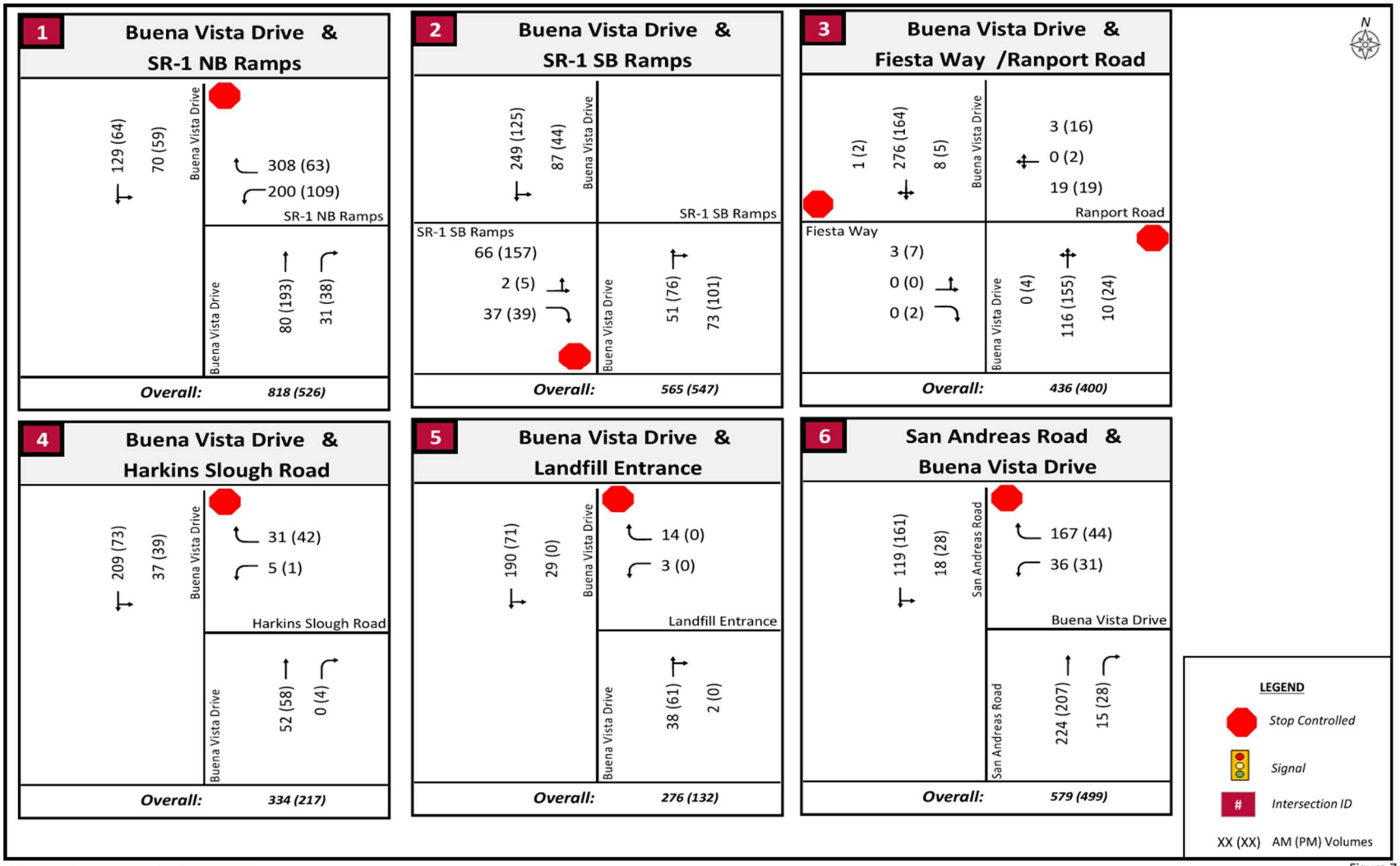
4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in ***bold.***

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Project is not anticipated to create a significant traffic adverse effect under Interim (2032) conditions. Synchro output sheets are provided in the **Appendix C.**

Figure 7: Interim (2032) Conditions Peak Hour Turning Movement Volumes



Kimley»Horn

Figure 7
Interim (2032) Conditions Peak Hour Turning Movement Volumes

4.4 Interim (2032) Plus Project Conditions LOS Analysis

The Interim (2032) plus Project volumes at the study intersections were estimated by adding the number of trips anticipated to be generated by the proposed transfer stations and trips generated from hauling/transferring solid waste to the Marina Landfill site to the volume from interim (2032) condition. Traffic operations and traffic volumes for the study intersections under interim (2032) plus Project conditions are shown below in the **Table 6** and **Figure 8**.

Table 6: Intersection Operation Summary for Interim (2032) Plus Project Conditions

#	Intersection	Maintaining Agency	Control Type	Interim 2032 Plus Project Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	11.2	B	-	6.3	A
				WB	15.08	C	WB	12.77	B
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	3.6	A	-	5.2	A
				EB	14.18	B	EB	12.75	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	0.9	A	-	1.6	A
				EB	13.29	B	EB	11.51	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.8	A	-	3.1	A
				WB	9.44	A	WB	9.12	A
5	Buena Vista Dr / Landfill Entrance/Exit	SCC	SSSC	-	2	A	-	0	A
				WB	9.36	A	WB	0	A
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.6	A	-	2.2	A
				WB	12.33	B	WB	11.93	B

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

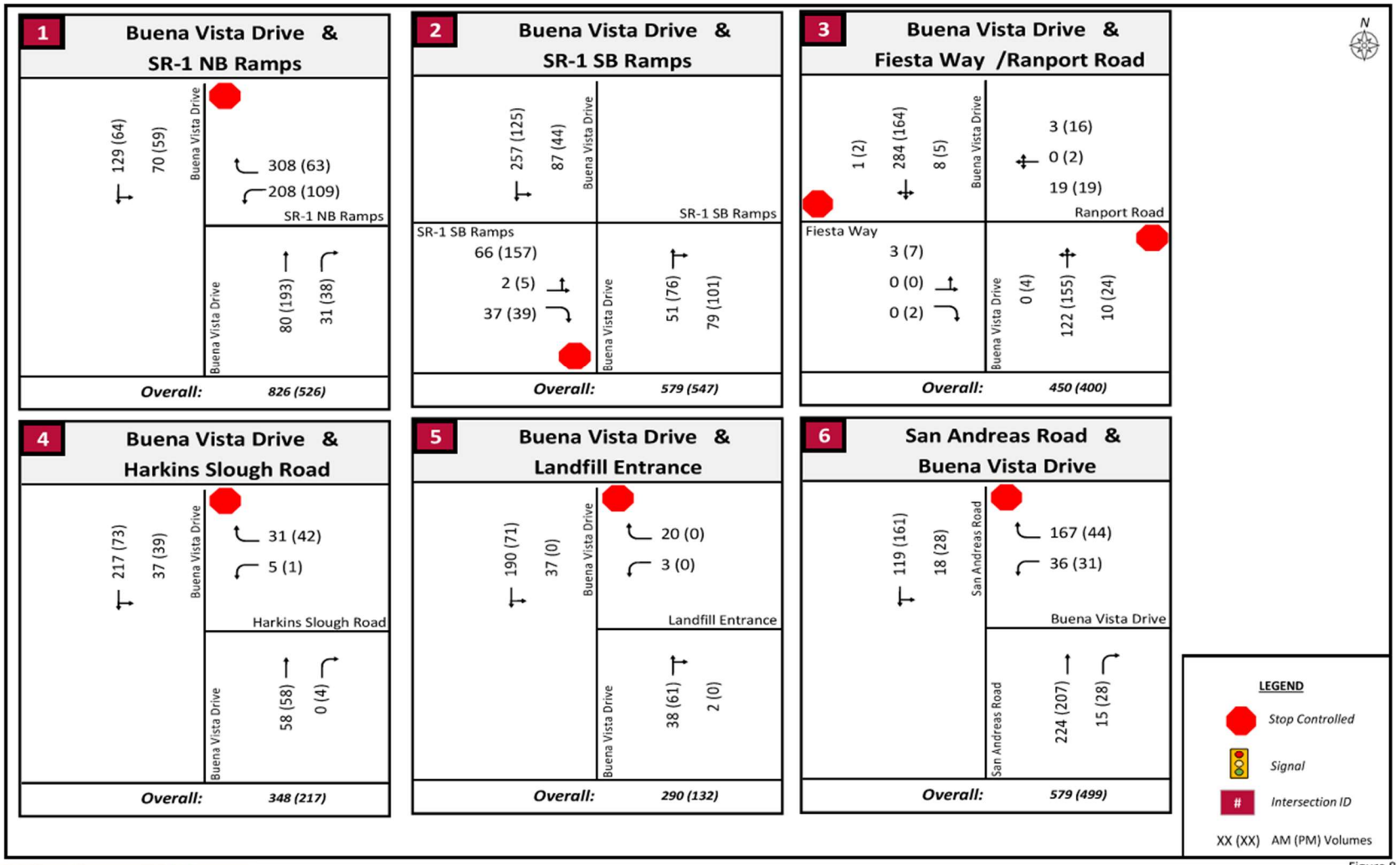
4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

*6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold.***

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Project is not anticipated to create a significant traffic adverse effect under Interim (2032) plus Project conditions. Synchro output sheets are provided in the **Appendix C.**

Figure 8: Interim (2032) Plus Project Conditions Peak Hour Turning Movement Volumes



Kimley»Horn

Figure 8
Interim (2032) Plus Project Conditions Peak Hour Turning Movement Volumes

4.5 Cumulative (2045) Conditions LOS Analysis

The Cumulative (2045) Condition's scenario was evaluated using the Santa Cruz County Travel Demand Model by SCCRTC to develop Cumulative (2045) traffic volumes at the study intersections. The model was run for both the Base year (2019) conditions and Interim (2045) conditions. The Cumulative (2045) volumes at the study intersections were estimated using the growth observed between the Base Year (2019) and Cumulative (2045) Conditions and applying the estimated growth/year to the existing (2022) traffic counts to arrive at cumulative traffic volumes for the year 2045. Traffic operations and traffic volumes for the study intersections under cumulative (2032) conditions are shown below in **Table 7** and **Figure 9**.

Table 7: Intersection Operation Summary for Cumulative (2045) Conditions

#	Intersection	Maintaining Agency	Control Type	Cumulative 2045 Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	16.5	C	-	6.9	A
				WB	23.8	C	WB	15.06	C
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	4.5	A	-	5.9	A
				EB	17.46	C	EB	14.6	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	1.0	A	-	2.5	A
				EB	14.82	B	WB	14.96	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.8	A	-	2.9	A
				WB	9.4	A	WB	9.13	A
5	Buena Vista Dr / Landfill Entrance/Exit	SCC	SSSC	-	1.5	A	-	0	A
				WB	9.48	A	WB	0	A
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.4	A	-	2.4	A
				WB	13.6	B	WB	16.13	C

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

*6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold.***

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Project is not anticipated to create a significant traffic adverse effect under cumulative (2045) conditions. Synchro output sheets are provided in the **Appendix C.**

Figure 9: Cumulative (2045) Conditions Peak Hour Turning Movement Volumes

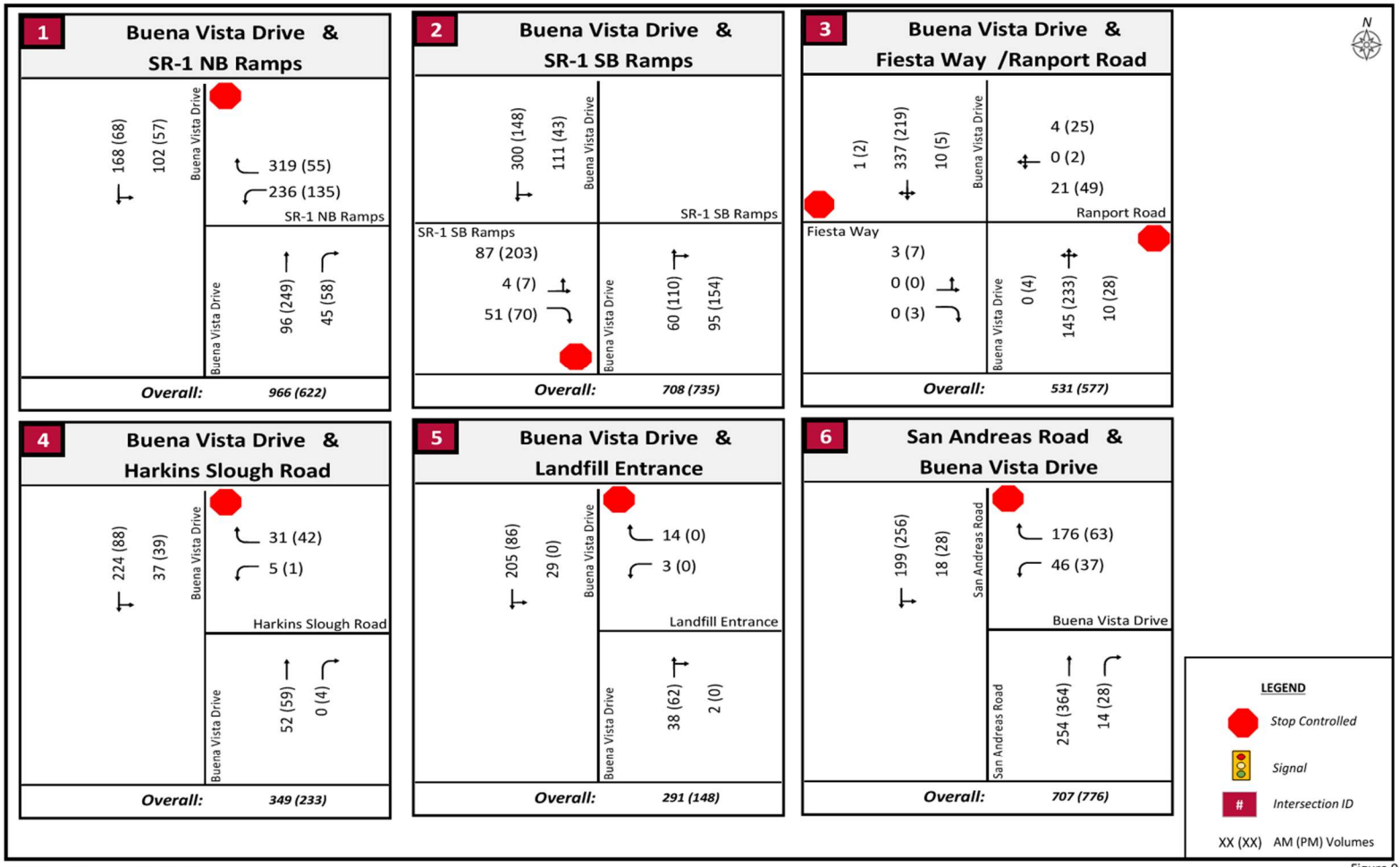


Figure 9
Cumulative (2045) Conditions Peak Hour Turning Movement Volumes

4.6 Cumulative (2045) Plus Project Conditions LOS Analysis

The Cumulative (2045) plus Project volumes at the study intersections were estimated by adding the number of trips anticipated to be generated by the proposed transfer stations and trips generated from hauling/transferring solid waste to the Marina Landfill site to the volume from cumulative (2045) condition. Traffic operations and traffic volumes for the study intersections under cumulative (2045) plus Project conditions are shown below in the **Table 8** and **Figure 10.**

Table 8: Intersection Operation Summary for Cumulative (2045) Plus Project Conditions

#	Intersection	Maintaining Agency	Control Type	Cumulative 2045 Plus Project Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	17.5	C	-	6.9	A
				WB	25.19	D	WB	15.06	C
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	4.5	A	-	5.9	A
				EB	17.7	C	EB	14.6	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	1.0	A	-	2.5	A
				EB	15.07	C	WB	14.96	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.7	A	-	2.9	A
				WB	9.47	A	WB	9.13	A
5	Buena Vista Dr / Landfill Entrance/Exit	SCC	SSSC	-	1.8	A	-	0	A
				WB	9.39	A	WB	0	A
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.4	A	-	2.4	A
				WB	13.6	B	WB	16.13	C

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

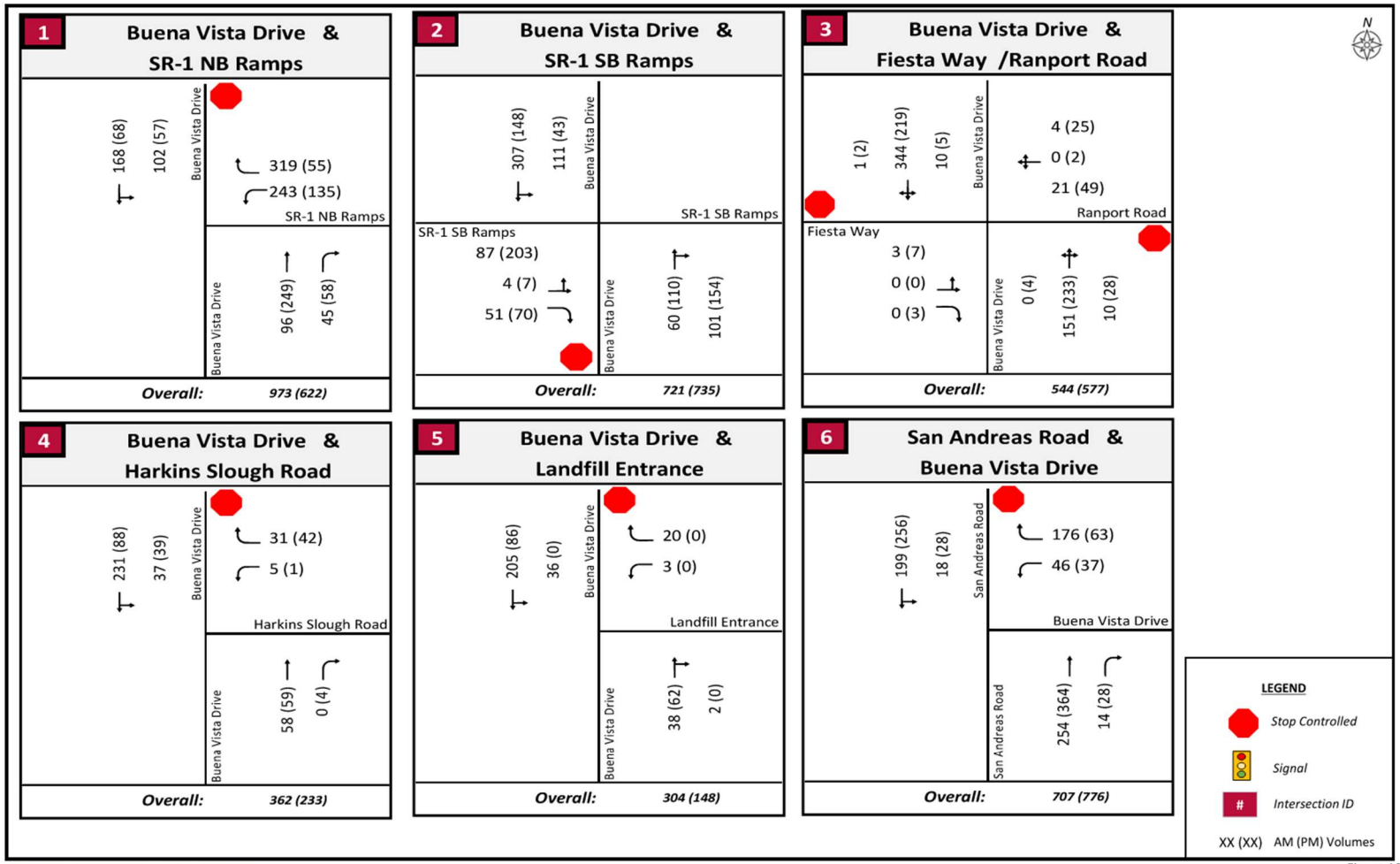
4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in ***bold.***

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Project is not anticipated to create a significant traffic adverse effect under cumulative (2045) plus Project conditions. Synchro output sheets are provided in the **Appendix C.**

Figure 10: Cumulative (2045) Plus Project Conditions Peak Hour Turning Movement Volumes



4.7 Intersection Queuing Analysis

Select study intersections near the Project site were evaluated for left-turn queuing capacity and storage analysis for each study scenario and summarized in **Table 9** and **Table 10** for AM peak hour and PM peak hour respectively. The 95th queuing length reported in **Table 9** for Buena Vista Dr/SR 1-NB ramps and Buena Vista Dr/SR 1-SB ramps for AM peak hour are based on 10 SimTraffic runs. Since there are no added Project trips under PM peak hour, therefore, SimTraffic has not used for PM peak hour queuing analysis.

It was observed that sufficient storage has been provided for all the movements at the study intersections during both AM and PM peak hour. The Project is not anticipated to increase the vehicle queue and create an adverse effect to the study intersection during AM and PM peak. SimTraffic results are attached in **Appendix D**.

Table 9: Intersection Queuing Analysis – AM Peak Hour

AM PEAK HOUR														
#	Intersection Name	Approach	Direction	Total Storage (ft/ln)	Existing Conditions		Interim 2032 Conditions		Interim 2032 Plus Project Conditions		Cumulative 2045 Conditions		Cumulative 2045 Plus Project Conditions	
					95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?
1	SR-1 NB Ramps / Buena Vista Dr.	SR-1 NB Ramps	WBL	125	73	YES	87	YES	89	YES	101	YES	118	YES
			WBR	1098	0	YES	0	YES	0	YES	0	YES	6	YES
2	SR-1 SB Ramps / Buena Vista Dr.	SR-1 SB Ramps	EBL/T	1856	64	YES	67	YES	70	YES	77	YES	81	YES
			EBR	100	0	YES	0	YES	0	YES	0	YES	0	YES
4	Harkins Slough Rd. / Buena Vista Dr.	Harkins Slough Rd	WBL	135	0	YES	0	YES	0	YES	0	YES	0	YES
			WBR	820	3	YES	3	YES	5	YES	3	YES	5	YES
5	Buena Vista Dr. / Landfill Entrance/Exit	Landfill Entrance	WBL	50	0	YES	0	YES	0	YES	0	YES	0	YES
			WBR	50	3	YES	3	YES	3	YES	3	YES	0	YES

Notes:

1. Analysis performed using HCM 7 methodologies.

2. 95th Percentile Queue Length in Feet (Assumption:1 Vehicle – 25 feet). NBR - Northbound Right; NBL - Northbound Left; SBR - Southbound Right; SBL - Southbound Left; WBR - Westbound Right; WBL - Westbound Left; EBR - Eastbound Right; EBL - Eastbound Left

3. Single lane approach in Northbound (NB) and Southbound (SB) direction. Queues reported for the lane group.

4. Ramp queueing (Intersection 1 and 2) results are based on SimTraffic runs.

Table 10: Intersection Queuing Analysis - PM Peak Hour

PM PEAK HOUR														
#	Intersection Name	Approach	Direction	Total Storage (ft/ln)	Existing Conditions		Interim 2032 Conditions		Interim 2032 Plus Project Conditions		Cumulative 2045 Conditions		Cumulative 2045 Plus Project Conditions	
					95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?
1	SR-1 NB Ramps / Buena Vista Dr.	SR-1 NB Ramps	WBL	125	23	YES	33	YES	33	YES	50	YES	50	YES
			WBR	1098	10	YES	10	YES	10	YES	10	YES	10	YES
2	SR-1 SB Ramps / Buena Vista Dr.	SR-1 SB Ramps	EBL/T	1856	20	YES	30	YES	30	YES	50	YES	50	YES
			EBR	100	3	YES	5	YES	5	YES	8	YES	8	YES
4	Harkins Slough Rd. / Buena Vista Dr.	Harkins Slough Rd	WBL	135	0	YES	0	YES	0	YES	0	YES	0	YES
			WBR	820	5	YES	5	YES	5	YES	5	YES	5	YES
5	Buena Vista Dr. / Landfill Entrance/Exit	Landfill Entrance	WBL	50	0	YES	0	YES	0	YES	0	YES	0	YES
			WBR	50	0	YES	0	YES	0	YES	0	YES	0	YES

Notes:

1. Analysis performed using HCM 7 methodologies.

2. 95th Percentile Queue Length in Feet (Assumption:1 Vehicle – 25 feet). NBR - Northbound Right; NBL - Northbound Left; SBR - Southbound Right; SBL - Southbound Left; WBR - Westbound Right; WBL - Westbound Left; EBR - Eastbound Right; EBL - Eastbound Left

3. Single lane approach in Northbound (NB) and Southbound (SB) direction. Queues reported for the lane group.

4. Ramp queueing (Intersection 1 and 2) results are based on SimTraffic runs.

4.8 Signal Warrant Analysis

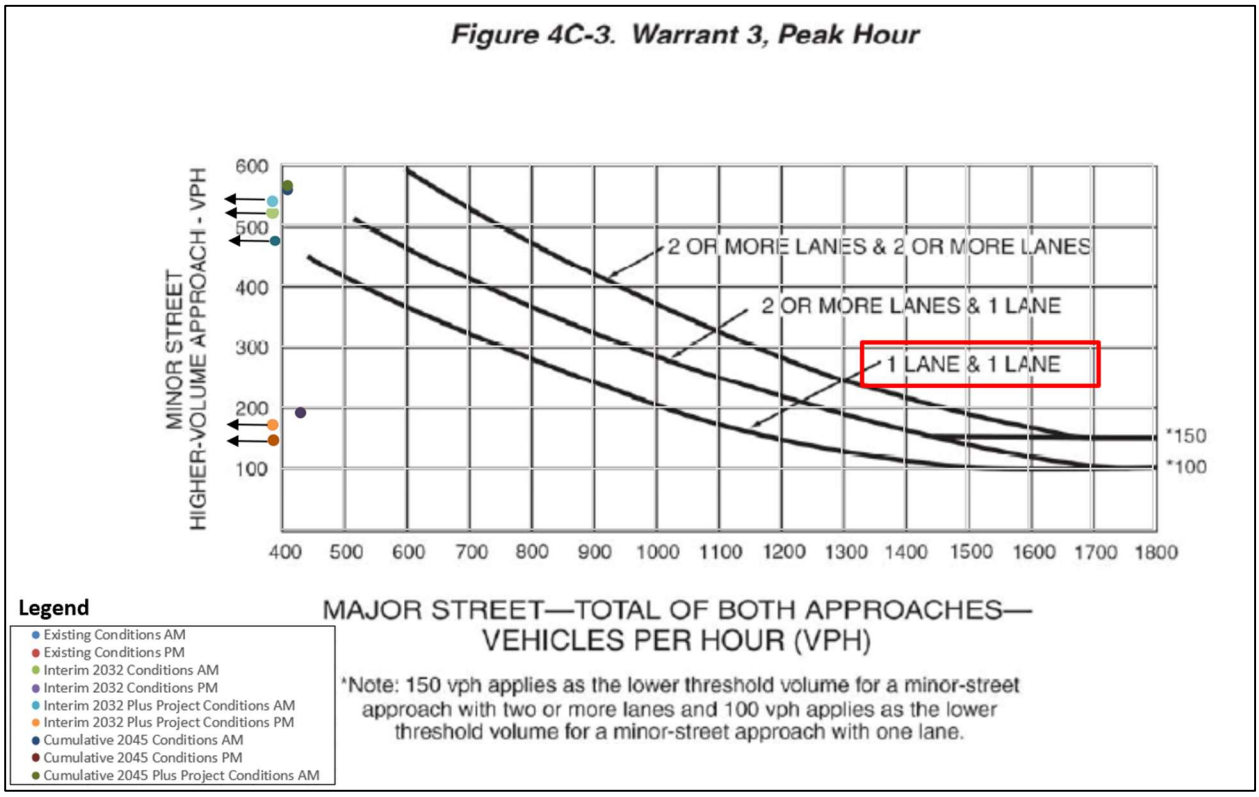
Peak hour signal warrant analysis was conducted at the study intersections for both AM and PM peak hours. Traffic counts were collected at the study intersections on Thursday 05/19/2022 during AM (7-9) and PM (4-6) peak periods.

Peak hour signal Warrant #3 from the California Manual on Uniform Traffic Control Devices (CAMUTCD) was evaluated to determine if a signal warranted at the study intersections under the following scenarios:

- Existing Conditions
- Interim (2032) Conditions
- Interim (2032) Plus Project Conditions
- Cumulative (2045) Conditions
- Cumulative (2045) Plus Project Conditions

As shown in **Figure 11**, the intersection Buena Vista Dr and SR 1 – NB Ramps meets the Peak Hour Warrant #3 requirements during Cumulative (2045) Conditions during AM peak hour without the Project and continues to meet the requirements under Cumulative (2045) Plus Project Conditions during AM peak hour.

Figure 11: Signal Warrant Analysis - Buena Vista Dr & SR 1-NB Ramps



Signal warrant #3 for Buena Vista Dr & SR 1 – NB Ramps intersection under cumulative (2045) and cumulative (2045) plus Project conditions during AM peak hour were analyzed using the following assumptions:

- Cumulative (2045) Conditions
    - Major Street – 1 Lanes
    - Minor Street – 1 Lanes
    - AM Major Street Volume (Total of Both Approaches): 411 vehicles
    - AM Minor Streat Volume (Higher Volume Approach): 555 vehicles

- Cumulative (2045) Plus Project Conditions
    - Major Street – 1 Lanes
    - Minor Street – 1 Lanes
    - AM Major Street Volume (Total of Both Approaches): 411 vehicles
    - AM Minor Streat Volume (Higher Volume Approach): 562 vehicles

It is recommended that the County conduct a detailed Signal Warrants analysis to determine whether other warrants identified in the CAMUTCD are met. The intersection of Buena Vista Drive & SR-1 NB Ramps is an off-ramp intersection and therefore coordination with Caltrans is needed to finalize the improvements.

6 VMT ANALYSIS

The thresholds of significance, as currently adopted by Santa Cruz County, are summarized in **Table 11** below. Since the proposed project falls under the category of office or service type, the threshold of significance is based on the VMT per Employee efficiency metric.

Table 11: VMT Analysis Inputs

Land Use	VMT Threshold	Basis
Residential	8.9 VMT/capita	15% below existing county-wide average VMT per capita.
Office or Service	7.4 Work VMT/Employee	15% below existing county-wide average Work VMT per employee
Retail	Net regional change	Using the county as the basis (instead of the tri-county region)
Other Employment	Work VMT/Employee	15% below existing county-wide average Work VMT per employee for similar land uses
Other Customer	Net regional change	Using the county as the basis

VMT Screening

A VMT screening was conducted for the proposed Project. The County's VMT Guidelines provide details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant VMT impact without conducting a more detailed VMT analysis. Screening thresholds are broken down into different project types under the presumption that they would result in a less-than-significant transportation impact. The following applicable screening thresholds were evaluated for the Project.

Small Projects

This screening criteria applies to projects with low trip generation per existing CEQA exemptions. Projects generating less than 110 trips per day are presumed to have a less-than-significant VMT impact.

The proposed Project can be screened out of VMT analysis based on Small Projects screening criteria and presumed to have a less-than-significant impact based on the office space within Transfer Station A (1,500 sq. ft.) and Transfer Station B (3,800 sq. ft.). The landfill operations are expected to remain unchanged and will be from 7:30 AM to 3:30 PM (Monday to Tuesday & Thursday to Saturday) and from 7:30 AM to 2:30 PM on Wednesday. Under existing conditions, a total of approximately 40-45 employees work at the Buena Vista landfill site and the employees' number is expected to remain the same. All employees will work on a single shift, arriving in the morning and leaving in the afternoon. The employee daily trip estimates from Institute of Transportation Engineers (ITE), 11th Edition for Small Office Building (ITE 712) is summarized in **Table 12** below:

As per ITE 11th Edition, the Project is expected to generate 86 daily trips related to office space. This threshold indicates a level of vehicle activity unlikely to result in significant transportation impacts.

Since the number of daily employee trips are less than 110 daily trips, the Project is presumed to result in a **less than significant** transportation impact concerning VMT related to employee trips and is screened from further analysis based on the number of employee vehicle trips generated.

Table 12: Project Trip Generation – Based on Office Square Footage

LAND USE / DESCRIPTION [1,2]	PROJECT SIZE		WEEKDAY TOTAL DAILY TRIPS
Trip Generation Rates (ITE)			
Small Office Building (ITE 712)	Per	1,000 Sq Ft	16.19
Future Vehicle-Trips			
Buena Vista Landfill (Transfer Station A Office)	1.500	1,000 Sq Ft	24
Buena Vista Landfill (Transfer Station B Office)	3.800	1,000 Sq Ft	62
		Project Vehicle-Trips	**86**
Notes:			
1. Based on latest project description.			
2. Daily, AM, and PM trips based on average land use rates from the Institute of Traffic Engineers (ITE) Trip Generation 11th Edition			

The other trips associated with the proposed Project involves transfer trucks which are commercial semi-trucks hauling 40- to 55-foot enclosed trailers. These trucks will transfer the consolidated large solid waste from the Project site to the ReGen Monterey Landfill facility located 19 miles south in the City of Marina. The amount of anticipated waste arriving at the Project site is expected to increase with the increase in population and employment within the Santa Cruz County. This increase in waste will be associated with increase in trips to the Project site, however, it should be noted that the Project itself does not generate this additional traffic and as such does not cause any increase in VMT. Therefore, no VMT transportation impacts are anticipated with the Project, and the truck trips below are provided for informational purposes.

During the Interim (2032) Conditions, a total of approximately 472 tons of waste is anticipated to arrive at the Project site and during Cumulative (2045) Conditions, a total of approximately 450 tons of waste is anticipated. It should be noted that soil will not be accepted at the Project site once the landfill reaches its capacity in Year 2032 and hence the reduction in total tons of waste in Year 2045. The amount of waste will be transferred to ReGen Monterey Landfill facility using 24 daily transfer trucks during the Interim (2032) Conditions and 23 daily trucks during the Cumulative (2045) Conditions.

The number of daily truck trips during the Interim (2032) Conditions and during Cumulative (2045) Conditions are shown in **Table 13** below.

Table 13 – Project Trip Generation – Based on Truck Volumes

Item	Quantity	Units	Notes
Travel Time Estimates			
Approximate travel time (mins) from Buena Vista Landfill to ReGen Monterey Landfill - (One Direction)	35-40	mins	Source: Google Maps shows 20-26 mins depending upon the time of departure for passenger cars. Additional time was added for trucks to account for lower speeds

Item	Quantity	Units	Notes
Time taken at Buena Vista Transfer Station to load one truck (in mins)	20	mins	Input from County
Time taken at ReGen Monterey Landfill Site to unload one truck (in mins)	20	mins	Input from County
Total time taken (in mins) by 1 Truck (from Buena Vista to ReGen Monterey Landfill and back)	110-115	mins	Estimated Value
Number of trips by 1 Truck (from Buena Vista to ReGen Monterey Landfill and back) in a day	3.5 to 4	Trips	Estimated Value (Based on work timings for Buena Vista and ReGen)
Estimated Waste			
Total Waste Arriving at the Project Site under Existing Conditions	448	tons	Estimated value using Buena Vista Date/Time Analysis Report (from 06/01/201 to 05/31/2022) and percent growth in population from Santa Cruz County Travel Demand Model
Estimated Waste Arriving at the Project Site During Interim (2032) Conditions	470	tons	
Estimated Waste Arriving at the Project Site During Cumulative (2045) Conditions	450	tons	
No. of Daily Trucks			
Interim (2032) Conditions - No. of Daily Trucks Needed to transfer the waste from Buena Vista to ReGen Monterey Landfill	24	no.	Assuming 20 tons capacity of a single transfer truck
Cumulative (2045) Conditions - No. of Daily Trucks Needed to transfer the waste from Buena Vista to ReGen Monterey Landfill	23	no.	Assuming 20 tons capacity of a single transfer truck

It should be noted that the primary goal of using VMT in CEQA is to assess the environmental impact of light duty and passenger vehicle traffic generated by a project, not the impact of commercial trucks. Therefore, the Project is presumed to result in a **less than significant** transportation impact concerning VMT. In summary, the Project meets the VMT screening criteria set by Santa Cruz County and thus is anticipated to result in a less-than-significant VMT impact without conducting a more detailed VMT analysis.

8 APPENDICES

Appendices A – Project Overview Map and Vehicular Circulation
Appendices B – Intersection Turning Movement Counts and Driveway Counts
Appendices C – Synchro Outputs – All Scenarios
Appendices D – Ramp Queuing - SimTraffic

Appendices A – Project Overview Map and Vehicular Circulation

TRAFFIC FLOW LEGEND	
	TRANSFER STATION A TRAFFIC
	TRANSFER STATION B TRAFFIC
	COMPOST FACILITY TRAFFIC OPTION 1
	COMPOST FACILITY TRAFFIC OPTION 2
	FUELING/STAGING TRAFFIC
	HARKINS SLOUGH TRAFFIC

TRANSFER STATION A

OPTION 1
ORGANICS MANAGEMENT
LOCATION

BUENA VISTA LANDFILL

TRANSFER STATION B

OPTION 2 NEW
COMPOST FACILITY

N

0 150 300 450
SCALE IN FEET

30% SET

NO.	REVISION	DATE

SHEET TITLE
OVERALL TRAFFIC PLAN

PROJECT TITLE
BUENA VISTA REDEVELOPMENT PROJECT
SANTA CRUZ COUNTY

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET
SANTA CRUZ, CA 95060

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
1881 CAMPUS COMMONS DRIVE - RESTON, VA 20191
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PROJ. NO.	DWN. BY:	CHK. BY:	Q/A REVIEW BY:	APP. BY:
02221033.00	SRS	KEA	KEA	KEA
DSN. BY: SRS				

CADD FILE:

DATE: JULY 2023

SCALE: AS SHOWN

DRAWING NO.
C400 of **X**

DRAWN BY: SRS DATE: 02/01/2024 FILE NAME: BUENA VISTA LANDFILL IMPROVEMENTS

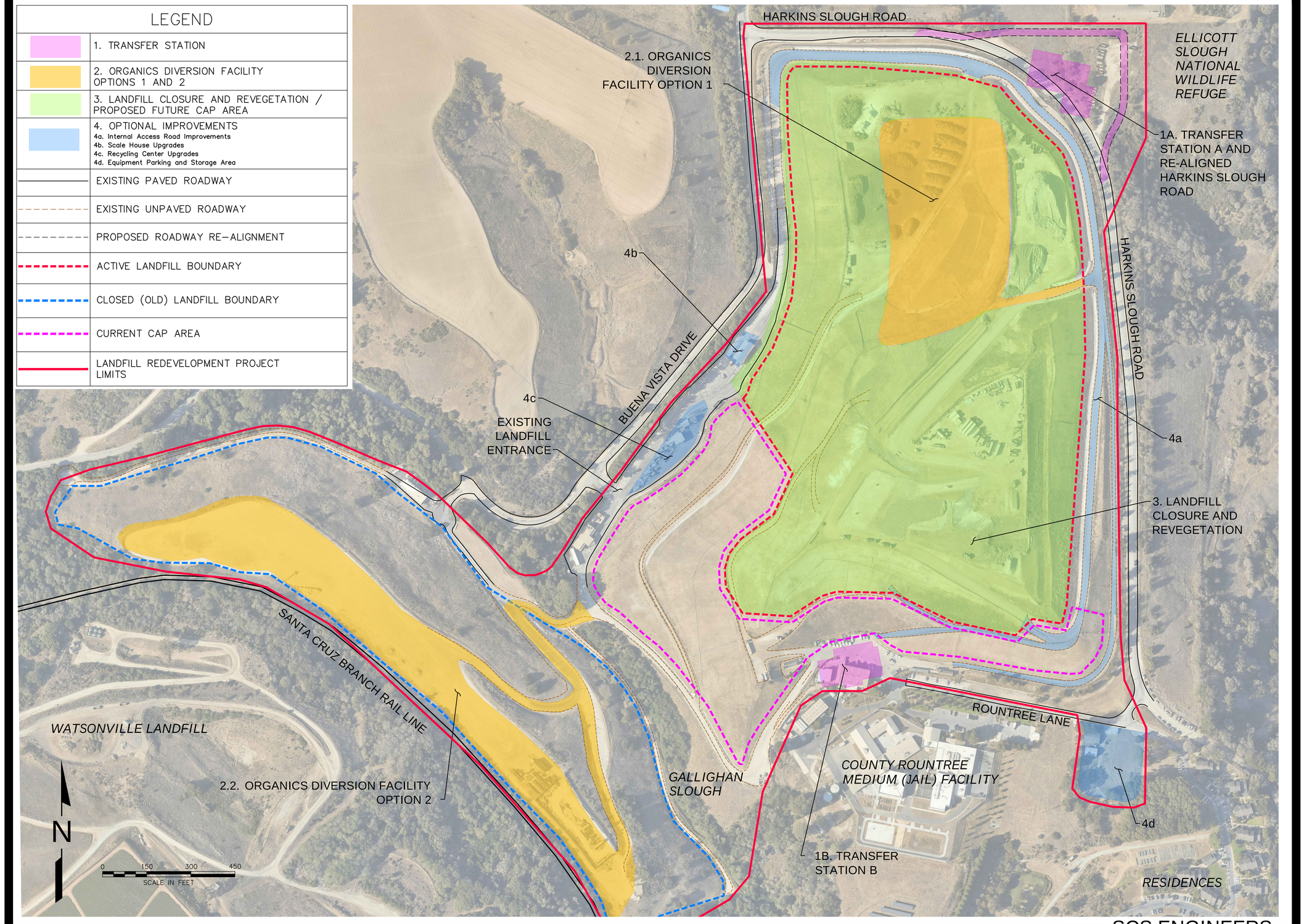

FIGURE 1. BUENA VISTA LANDFILL REDEVELOPMENT PROJECT OVERVIEW

30% SET

TRAFFIC FLOW LEGEND

- TRANSFER TRAILER TRAFFIC
- DROP OFF TRAFFIC
- HARKINS SLOUGH 2-WAY TRAFFIC
- COMPOST FACILITY TRAFFIC OPTION 1

HARKINS SLOUGH NORMAL TRAFFIC (2-WAY)

PROPOSED HARKINS SLOUGH RE-ALIGNMENT

RESIDENTIAL DROP OFF TRAFFIC

PROPOSED TRANSFER STATION A

PROPERTY LINE

OPTION 1 ORGANICS FACILITY TRAFFIC

PROPOSED ORGANICS MANAGEMENT OPTION 1

TRANSFER TRAILER TRAFFIC

CURRENT VIEWPORT LOCATION

BUENA VISTA LANDFILL

KEY MAP INSET
SCALE: 1" = 1000'

N

0 30 60 90
SCALE IN FEET

NO.	REVISION	DATE

SHEET TITLE: **TRAFFIC PLAN I**

PROJECT TITLE: **BUENA VISTA REDEVELOPMENT PROJECT SANTA CRUZ COUNTY**

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET
SANTA CRUZ, CA 95060

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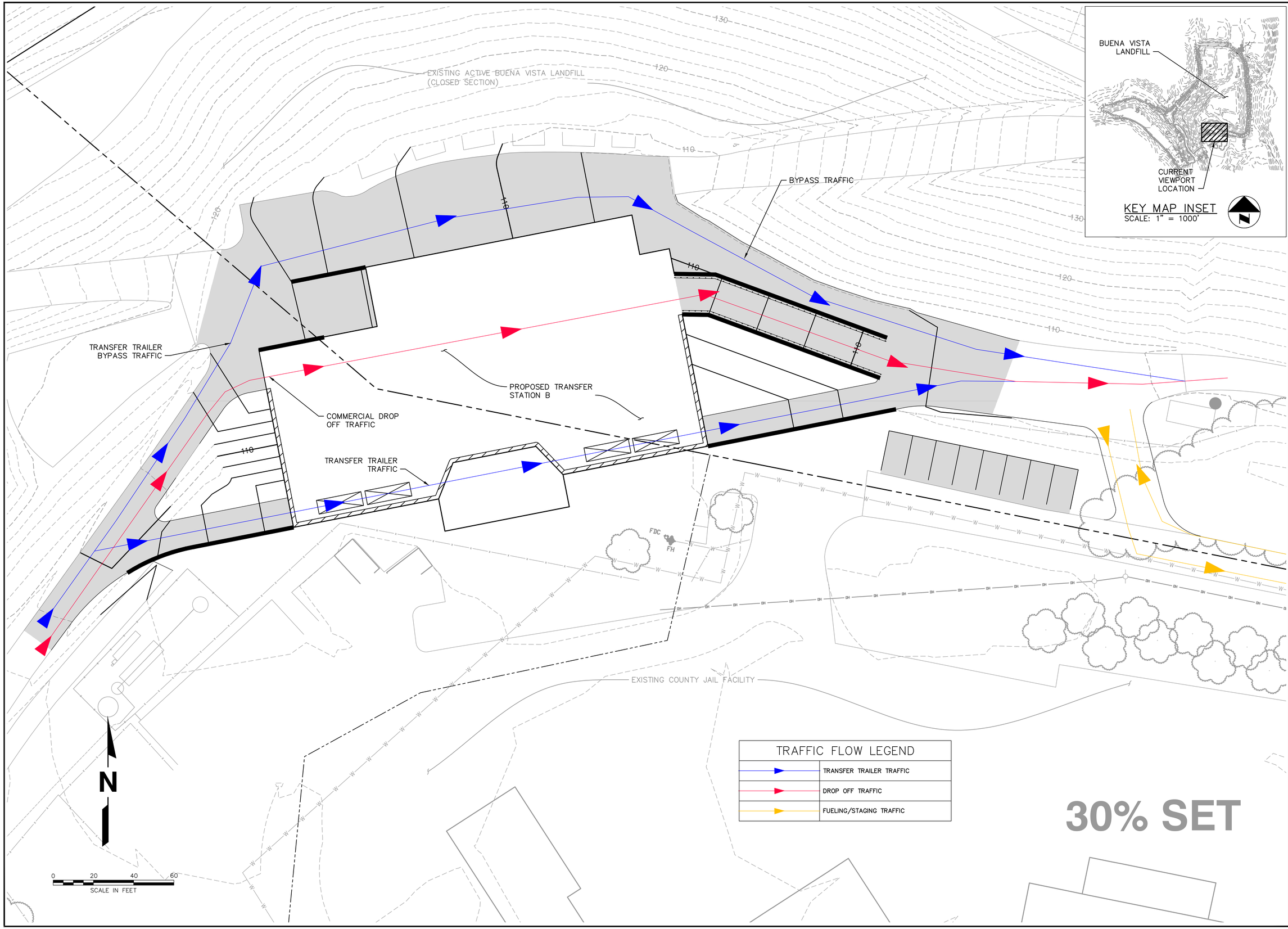
PROJ. NO: 02221033.00
DSN. BY: SRS
DWN. BY: SRS
CHK. BY: KEA
QA/QC BY: KEA
APP. BY: KEA

CADD FILE:

DATE: JULY 2023

SCALE: AS SHOWN

DRAWING NO.
C401 of **X**



NO.	REVISION	DATE

SHEET TITLE
TRAFFIC PLAN II

PROJECT TITLE
BUENA VISTA REDEVELOPMENT PROJECT
SANTA CRUZ COUNTY

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET
SANTA CRUZ, CA 95060

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PROJ. NO. 02221033.00
DSN. BY: SRS
DWN. BY: SRS
CHK. BY: KEA
O/A R'W BY: KEA
APP. BY: KEA

CADD FILE:

DATE: JULY 2023

SCALE: AS SHOWN

DRAWING NO.
C402 of **X**

EXISTING SITE ENTRANCE

ALTERNATE COMPOST DROP OFF ENTRANCE AND EXIT

COMPOST DROP OFF TRAFFIC OPTION 1

OPTION 2 NEW COMPOST FACILITY

TRAFFIC FLOW LEGEND	
	COMPOST DROP OFF TRAFFIC
	ALTERNATE DROP OFF TRAFFIC

BUENA VISTA LANDFILL

CURRENT VIEWPORT LOCATION

KEY MAP INSET
SCALE: 1" = 1000'

N

0 80 160 240
SCALE IN FEET

30% SET

NO.	REVISION	DATE

SHEET TITLE
TRAFFIC PLAN III

PROJECT TITLE
BUENA VISTA REDEVELOPMENT PROJECT
SANTA CRUZ COUNTY

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET
SANTA CRUZ, CA 95060

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
1881 CAMPUS COMMONS DRIVE - RESTON, VA 20191
PH. (703) 471-6150 FAX. (703) 471-6676

PROJ. NO. 02221033.00
DSN. BY: SRS
DWN. BY: SRS
CHK. BY: KEA
S/A RVW BY: KEA
APP. BY: KEA

CADD FILE:

DATE: JULY 2023

SCALE: AS SHOWN

DRAWING NO.
C403 of X

30% SET

EXISTING ACTIVE BUENA VISTA LANDFILL
(CLOSED SECTION)

EXISTING COUNTY JAIL FACILITY

LANDFILL PERIMETER ROAD

ROUNTREE LANE

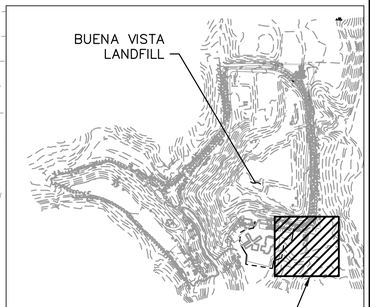
130
120
110

N

0 40 80 120
SCALE IN FEET

TRAFFIC FLOW LEGEND

FUELING/STAGING TRAFFIC



KEY MAP INSET
SCALE: 1" = 1000'

NO.	REVISION	DATE

SHEET TITLE
TRAFFIC PLAN IV

PROJECT TITLE
BUENA VISTA REDEVELOPMENT PROJECT
SANTA CRUZ COUNTY

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET
SANTA CRUZ, CA 95060

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS, INC.
1881 CAMPUS COMMONS DRIVE - RESTON, VA 20191
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PROJ. NO. 02221033.00
DSN. BY: SRS
DRN. BY: SRS
CHK. BY: KEA
QA/QC BY: KEA
APP. BY: KEA

CADD FILE:

DATE: JULY 2023

SCALE: AS SHOWN

DRAWING NO.
C404 of X

30% SET

HARKINS SLOUGH ROAD

N

0 60 120 180
SCALE IN FEET

TRAFFIC FLOW LEGEND

	TRANSFER TRAILER TRAFFIC
	DROP OFF TRAFFIC
	HARKINS SLOUGH 2-WAY TRAFFIC
	COMPOST FACILITY TRAFFIC OPTION 1

CURRENT VIEWPORT LOCATION

BUENA VISTA LANDFILL

KEY MAP INSET
SCALE: 1" = 1000'

NO.	REVISION	DATE

SHEET TITLE: **TRAFFIC PLAN V**

PROJECT TITLE: **BUENA VISTA REDEVELOPMENT PROJECT**
SANTA CRUZ COUNTY

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET
SANTA CRUZ, CA 95060

SCS ENGINEERS
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PROJ. NO: 02221033.00
DSN. BY: SRS
DWN. BY: SRS
CHK. BY: KEA
QA/QC BY: KEA
APP. BY: KEA

CADD FILE:

DATE: OCTOBER 2022

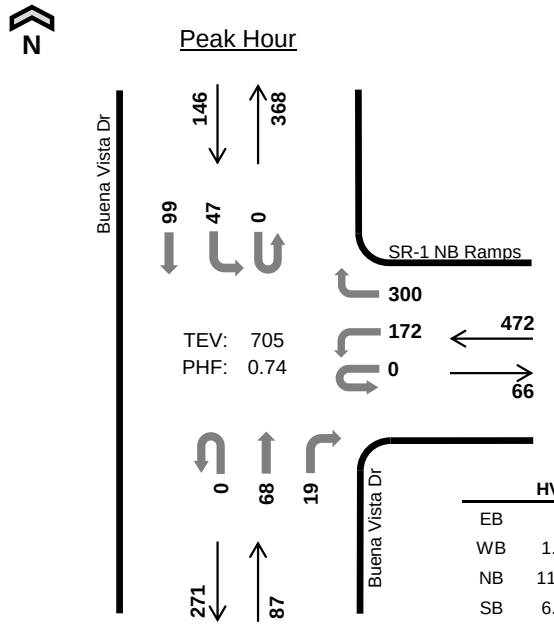
SCALE: AS SHOWN

DRAWING NO.
C405 of **X**

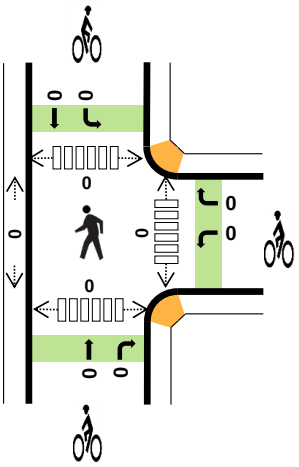
Appendices B – Intersection Turning Movement Counts and Driveway Counts

Buena Vista Dr
SR-1 NB Ramps

Date: 05/19/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM



	HV %:	PHF
EB	-	-
WB	1.7%	0.66
NB	11.5%	0.91
SB	6.8%	0.83
TOTAL	4.0%	0.74



Two-Hour Count Summaries

Interval Start	0 Eastbound				SR-1 NB Ramps Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**23**	**0**	**80**	**0**	**0**	**16**	**6**	**0**	**16**	**14**	**0**	**155**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**47**	**0**	**133**	**0**	**0**	**16**	**6**	**0**	**11**	**24**	**0**	**237**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**66**	**0**	**44**	**0**	**0**	**22**	**2**	**0**	**13**	**24**	**0**	**171**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**36**	**0**	**43**	**0**	**0**	**14**	**5**	**0**	**7**	**37**	**0**	**142**	**705**
8:00 AM	0	0	0	0	0	21	0	17	0	0	23	3	0	5	21	0	90	640
8:15 AM	0	0	0	0	0	15	0	12	0	0	16	5	0	9	12	0	69	472
8:30 AM	0	0	0	0	0	19	0	10	0	0	18	4	0	8	20	0	79	380
8:45 AM	0	0	0	0	1	14	0	7	0	0	15	8	0	8	10	0	63	301
Count Total	0	0	0	0	1	241	0	346	0	0	140	39	0	77	162	0	1,006	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**172**	**0**	**300**	**0**	**0**	**68**	**19**	**0**	**47**	**99**	**0**	**705**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**1**	**0**	**0**	**8**	**2**	**0**	**2**	**8**	**0**	**28**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**4%**	**-**	**0%**	**-**	**-**	**12%**	**11%**	**-**	**4%**	**8%**	**-**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	**0**	**4**	**1**	**1**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:15 AM	**0**	**0**	**3**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**3**	**4**	**2**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**1**	**2**	**6**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:00 AM	0	5	3	2	*10*	0	0	0	0	*0*	0	0	0	0	*0*
8:15 AM	0	0	2	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	5	1	2	*8*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	2	3	1	*6*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	20	19	16	*55*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**8**	**10**	**10**	***28***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				SR-1 NB Ramps				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**6**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**0**	**0**	**1**	**0**	**4**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**1**	**1**	**0**	**9**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**5**	**0**	**9**	**28**
8:00 AM	0	0	0	0	0	2	0	3	0	0	2	1	0	0	2	0	10	32
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	3	31
8:30 AM	0	0	0	0	0	5	0	0	0	0	1	0	0	0	2	0	8	30
8:45 AM	0	0	0	0	0	1	0	1	0	0	2	1	0	0	1	0	6	27
Count Total	0	0	0	0	0	15	0	5	0	0	14	5	0	3	13	0	55	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**1**	**0**	**0**	**8**	**2**	**0**	**2**	**8**	**0**	**28**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	0			SR-1 NB Ramps			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

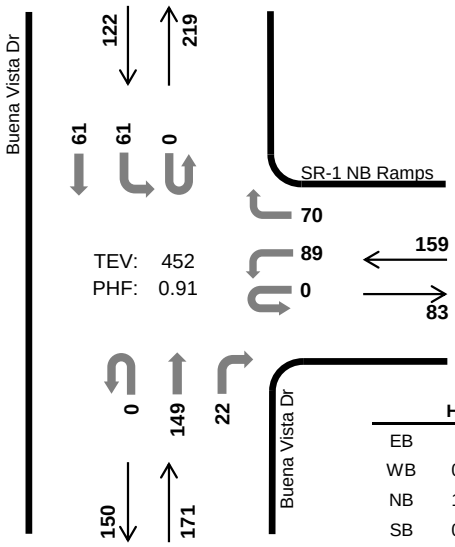
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
SR-1 NB Ramps

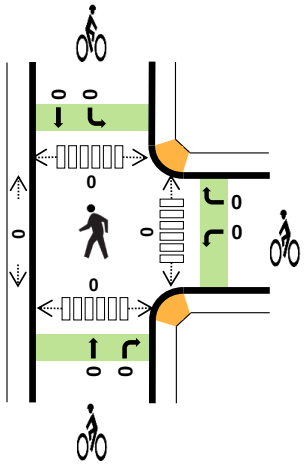
Date: 05/19/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	0.0%	0.92
NB	1.8%	0.84
SB	0.8%	0.74
TOTAL	0.9%	0.91



Two-Hour Count Summaries

Interval Start		0 Eastbound				SR-1 NB Ramps Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	0	0	0	2	21	0	16	0	0	26	6	0	11	17	0	99	0
4:15 PM		0	0	0	0	0	20	0	19	0	0	33	3	0	19	21	0	115	0
4:30 PM		0	0	0	0	1	21	0	24	0	0	35	5	0	7	11	0	104	0
4:45 PM		0	0	0	0	0	22	0	12	0	0	31	3	0	13	20	0	101	419
5:00 PM		**0**	**0**	**0**	**0**	**0**	**23**	**0**	**18**	**0**	**0**	**40**	**11**	**0**	**16**	**13**	**0**	**121**	441
5:15 PM		**0**	**0**	**0**	**0**	**0**	**23**	**0**	**18**	**0**	**0**	**36**	**6**	**0**	**20**	**21**	**0**	**124**	450
5:30 PM		**0**	**0**	**0**	**0**	**0**	**21**	**0**	**22**	**0**	**0**	**30**	**4**	**0**	**9**	**12**	**0**	**98**	444
5:45 PM		**0**	**0**	**0**	**0**	**0**	**22**	**0**	**12**	**0**	**0**	**43**	**1**	**0**	**16**	**15**	**0**	**109**	**452**
Count Total		0	0	0	0	3	173	0	141	0	0	274	39	0	111	130	0	871	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**89**	**0**	**70**	**0**	**0**	**149**	**22**	**0**	**61**	**61**	**0**	**452**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**4**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**0%**	**-**	**-**	**2%**	**0%**	**-**	**0%**	**2%**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	3	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	1	2	2	*5*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	1	2	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**0**	**0**	**2**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	0	3	10	4	*17*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**3**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				SR-1 NB Ramps				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	4	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	2	0	0	1	1	0	5	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	3	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	13
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	10
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	5
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	4
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**4**
Count Total	0	0	0	0	0	1	0	2	0	0	10	0	0	1	3	0	17	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**4**	**0**

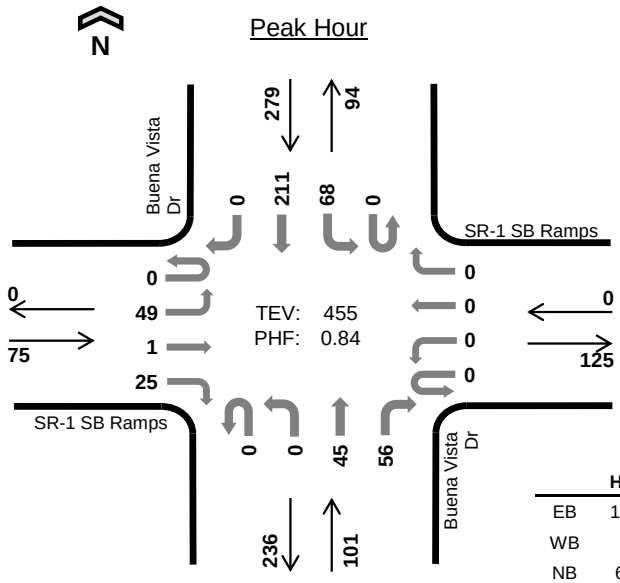
Two-Hour Count Summaries - Bikes

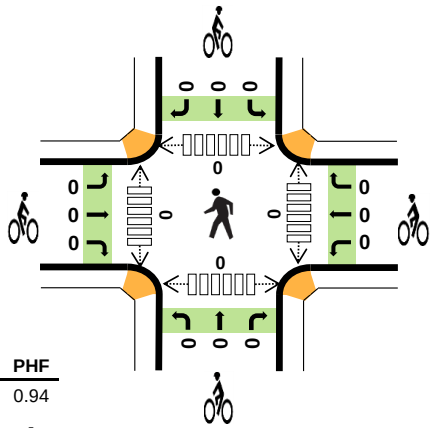
Interval Start	0			SR-1 NB Ramps			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
SR-1 SB Ramps

Date: 05/19/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM





	HV %:	PHF
EB	18.7%	0.94
WB	-	-
NB	6.9%	0.97
SB	5.0%	0.78
TOTAL	7.7%	0.84

Two-Hour Count Summaries

Interval Start		SR-1 SB Ramps Eastbound				SR-1 SB Ramps Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	7	0	3	0	0	0	0	0	0	14	10	0	8	25	0	67	0
7:15 AM		**0**	**11**	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**13**	**0**	**14**	**60**	**0**	**118**	0
7:30 AM		**0**	**14**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**13**	**0**	**12**	**78**	**0**	**135**	0
7:45 AM		**0**	**12**	**1**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**19**	**0**	**24**	**48**	**0**	**115**	435
8:00 AM		**0**	**12**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**11**	**0**	**18**	**25**	**0**	**87**	**455**
8:15 AM		0	14	1	5	0	0	0	0	0	0	6	15	0	10	19	0	70	407
8:30 AM		0	13	0	8	0	0	0	0	0	0	11	20	0	12	28	0	92	364
8:45 AM		0	11	0	8	0	0	0	0	0	0	10	16	0	5	18	0	68	317
Count Total		0	94	2	49	0	0	0	0	0	0	86	117	0	103	301	0	752	0
Peak Hour	**All**	**0**	**49**	**1**	**25**	**0**	**0**	**0**	**0**	**0**	**0**	**45**	**56**	**0**	**68**	**211**	**0**	**455**	**0**
	HV	**0**	**7**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**2**	**0**	**4**	**10**	**0**	**35**	**0**
	HV%	**-**	**14%**	**0%**	**28%**	**-**	**-**	**-**	**-**	**-**	**-**	**11%**	**4%**	**-**	**6%**	**5%**	**-**	**8%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	2	4	*6*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**3**	**0**	**3**	**4**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**4**	**0**	**1**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**2**	**0**	**2**	**4**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**5**	**0**	**1**	**4**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	1	0	3	2	*6*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	2	0	5	6	*13*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	1	0	5	1	*7*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	18	0	22	27	*67*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**14**	**0**	**7**	**14**	***35***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	SR-1 SB Ramps				SR-1 SB Ramps				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	3	0	6	0
7:15 AM	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**4**	**0**	**10**	0
7:30 AM	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**7**	0
7:45 AM	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**3**	**1**	**0**	**8**	31
8:00 AM	**0**	**1**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**3**	**0**	**10**	**35**
8:15 AM	0	1	0	0	0	0	0	0	0	0	1	2	0	0	2	0	6	31
8:30 AM	0	0	0	2	0	0	0	0	0	0	1	4	0	0	6	0	13	37
8:45 AM	0	0	0	1	0	0	0	0	0	0	2	3	0	0	1	0	7	36
Count Total	0	8	0	10	0	0	0	0	0	0	10	12	0	5	22	0	67	0
Peak Hour	**0**	**7**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**2**	**0**	**4**	**10**	**0**	**35**	**0**

Two-Hour Count Summaries - Bikes

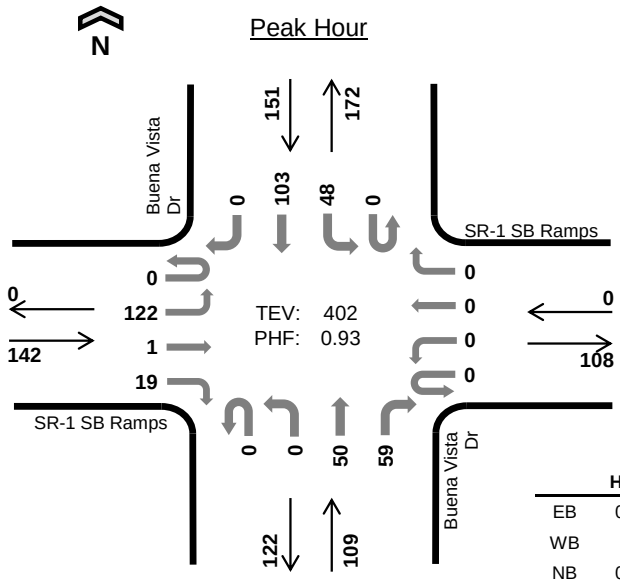
Interval Start	SR-1 SB Ramps			SR-1 SB Ramps			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

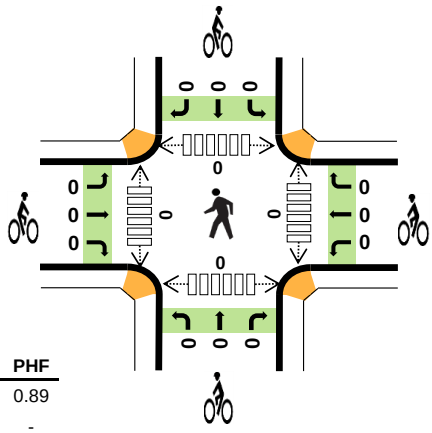
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
SR-1 SB Ramps

Date: 05/19/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM

Peak Hour





	HV %:	PHF
EB	0.7%	0.89
WB	-	-
NB	0.9%	0.88
SB	0.7%	0.84
TOTAL	0.7%	0.93

Two-Hour Count Summaries

Interval Start		SR-1 SB Ramps Eastbound				SR-1 SB Ramps Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	21	1	2	0	0	0	0	0	0	10	21	0	11	27	0	93	0
4:15 PM		0	28	0	3	0	0	0	0	0	0	10	20	0	18	22	0	101	0
4:30 PM		0	30	0	7	0	0	0	0	0	0	9	19	0	10	23	0	98	0
4:45 PM		0	25	1	2	0	0	0	0	0	0	9	14	0	17	25	0	93	385
5:00 PM		**0**	**32**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**12**	**0**	**12**	**25**	**0**	**105**	397
5:15 PM		**0**	**28**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**14**	**0**	**15**	**30**	**0**	**104**	400
5:30 PM		**0**	**28**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**13**	**0**	**8**	**23**	**0**	**85**	387
5:45 PM		**0**	**34**	**1**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**20**	**0**	**13**	**25**	**0**	**108**	**402**
Count Total		0	226	3	33	0	0	0	0	0	0	88	133	0	104	200	0	787	0
Peak Hour	**All**	**0**	**122**	**1**	**19**	**0**	**0**	**0**	**0**	**0**	**0**	**50**	**59**	**0**	**48**	**103**	**0**	**402**	**0**
	HV	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**3**	**0**
	HV%	**-**	**1%**	**0%**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**2%**	**0%**	**-**	**0%**	**1%**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	0	0	1	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	1	0	1	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	1	0	1	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**1**	**0**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	4	0	3	3	*10*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**1**	**0**	**1**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	SR-1 SB Ramps Eastbound				SR-1 SB Ramps Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	7
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	5
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	4
5:30 PM	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	4
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	4	0	0	0	0	0	0	0	0	1	2	0	0	3	0	10	0
Peak Hour	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**3**	**0**

Two-Hour Count Summaries - Bikes

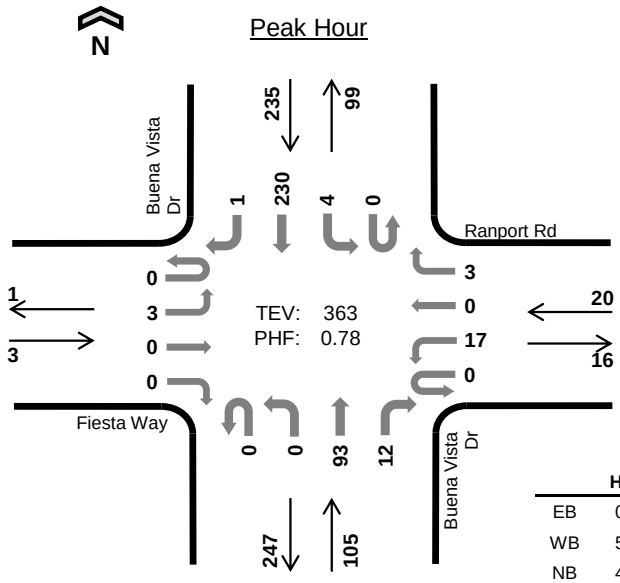
Interval Start	SR-1 SB Ramps Eastbound			SR-1 SB Ramps Westbound			Buena Vista Dr Northbound			Buena Vista Dr Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

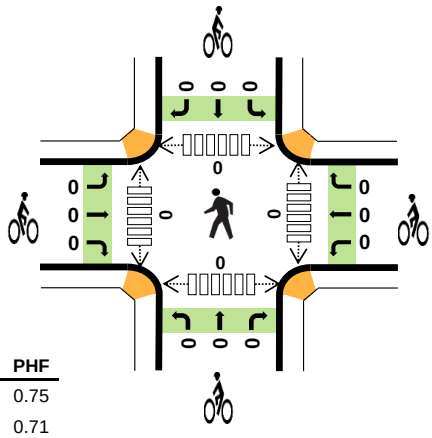
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
Fiesta Way

Date: 05/19/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM

Peak Hour





	HV %:	PHF
EB	0.0%	0.75
WB	5.0%	0.71
NB	4.8%	0.88
SB	6.8%	0.72
TOTAL	6.1%	0.78

Two-Hour Count Summaries

Interval Start		Fiesta Way (Eastbound)				Ranport Rd (Westbound)				Buena Vista Dr (Northbound)				Buena Vista Dr (Southbound)				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	0	1	0	2	0	1	0	0	24	1	0	1	32	0	62	0
7:15 AM		**0**	**0**	**0**	**0**	**0**	**3**	**0**	**2**	**0**	**0**	**22**	**1**	**0**	**3**	**65**	**0**	**96**	0
7:30 AM		**0**	**1**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**25**	**4**	**0**	**1**	**80**	**1**	**117**	0
7:45 AM		**0**	**1**	**0**	**0**	**0**	**6**	**0**	**1**	**0**	**0**	**22**	**1**	**0**	**0**	**53**	**0**	**84**	359
8:00 AM		**0**	**1**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**24**	**6**	**0**	**0**	**32**	**0**	**66**	**363**
8:15 AM		0	2	0	0	0	6	0	1	0	0	18	2	0	0	22	1	52	319
8:30 AM		0	0	0	1	0	2	0	1	0	0	30	5	0	0	33	3	75	277
8:45 AM		0	2	0	0	0	4	0	0	0	0	24	2	0	2	22	0	56	249
Count Total		0	7	0	2	0	31	0	6	0	0	189	22	0	7	339	5	608	0
Peak Hour	**All**	**0**	**3**	**0**	**0**	**0**	**17**	**0**	**3**	**0**	**0**	**93**	**12**	**0**	**4**	**230**	**1**	**363**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**5**	**0**	**0**	**0**	**15**	**1**	**22**	**0**
	HV%	**-**	**0%**	**-**	**-**	**-**	**0%**	**-**	**33%**	**-**	**-**	**5%**	**0%**	**-**	**0%**	**7%**	**100%**	**6%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	2	4	*6*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**0**	**1**	**2**	**5**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**0**	**0**	**3**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**0**	**1**	**7**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	0	0	2	2	*4*	0	0	0	0	*0*	0	0	0	3	*3*
8:30 AM	0	0	5	7	*12*	0	0	0	0	*0*	0	0	0	1	*1*
8:45 AM	0	0	2	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	1	16	31	*48*	0	0	0	0	*0*	0	0	0	4	*4*
Peak Hour	**0**	**1**	**5**	**16**	***22***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Fiesta Way				Ranport Rd				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	6	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**5**	**0**	**8**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**3**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**3**	20
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**7**	**0**	**8**	**22**
8:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	4	18
8:30 AM	0	0	0	0	0	0	0	0	0	0	5	0	0	0	7	0	12	27
8:45 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	4	28
Count Total	0	0	0	0	0	0	0	1	0	0	16	0	0	0	30	1	48	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**5**	**0**	**0**	**0**	**15**	**1**	**22**	**0**

Two-Hour Count Summaries - Bikes

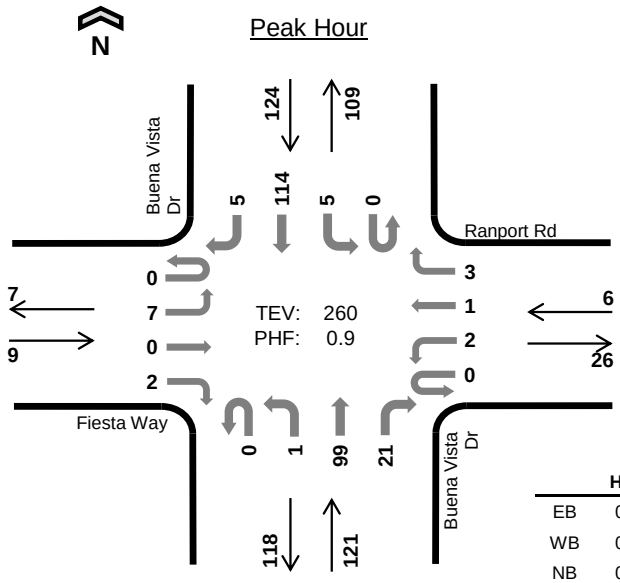
Interval Start	Fiesta Way			Ranport Rd			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

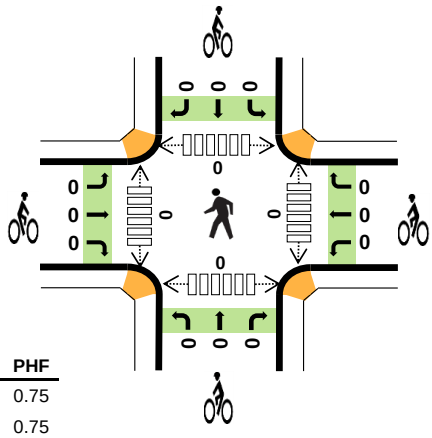
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
Fiesta Way

Date: 05/19/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 5:00 PM to 6:00 PM

Peak Hour





	HV %:	PHF
EB	0.0%	0.75
WB	0.0%	0.75
NB	0.8%	0.84
SB	0.8%	0.94
TOTAL	0.8%	0.90

Two-Hour Count Summaries

Interval Start		Fiesta Way (Eastbound)				Ranport Rd (Westbound)				Buena Vista Dr (Northbound)				Buena Vista Dr (Southbound)				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	2	0	1	0	2	0	1	0	0	27	1	0	0	27	2	63	0
4:15 PM		0	2	0	0	0	3	1	1	0	1	26	5	0	2	22	1	64	0
4:30 PM		0	0	0	0	0	2	0	0	0	0	30	3	0	1	27	1	64	0
4:45 PM		0	1	0	0	0	3	0	2	0	0	19	4	0	1	24	2	56	247
5:00 PM		**0**	**3**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**26**	**6**	**0**	**1**	**30**	**1**	**69**	253
5:15 PM		**0**	**2**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**24**	**2**	**0**	**1**	**30**	**2**	**64**	253
5:30 PM		**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**6**	**0**	**1**	**26**	**1**	**55**	244
5:45 PM		**0**	**2**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**29**	**7**	**0**	**2**	**28**	**1**	**72**	**260**
Count Total		0	12	0	3	0	12	2	7	0	2	201	34	0	9	214	11	507	0
Peak Hour	**All**	**0**	**7**	**0**	**2**	**0**	**2**	**1**	**3**	**0**	**1**	**99**	**21**	**0**	**5**	**114**	**5**	**260**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	**0**
	HV%	**-**	**0%**	**-**	**0%**	**-**	**0%**	**0%**	**0%**	**-**	**0%**	**1%**	**0%**	**-**	**0%**	**1%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:45 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	0	0	3	3	*6*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Fiesta Way				Ranport Rd				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	3
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	3
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	3
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
Count Total	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	6	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	**0**

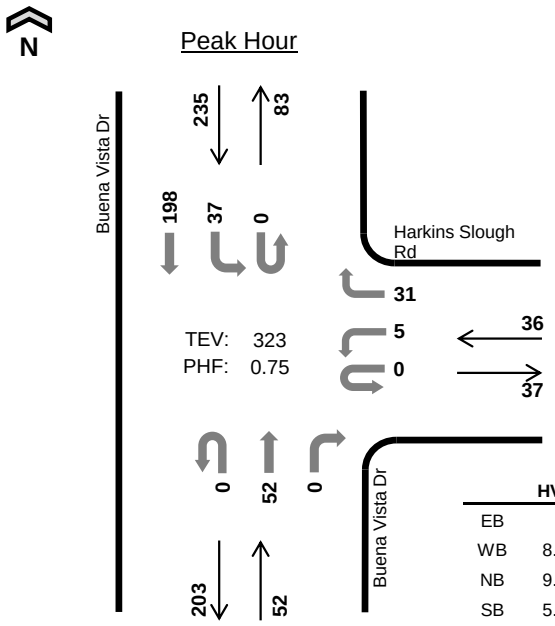
Two-Hour Count Summaries - Bikes

Interval Start	Fiesta Way			Ranport Rd			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

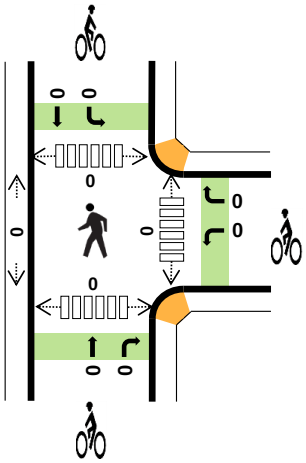
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
Harkins Slough Rd

Date: 05/19/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	-	-
WB	8.3%	0.69
NB	9.6%	0.62
SB	5.5%	0.72
TOTAL	6.5%	0.75



Two-Hour Count Summaries

Interval Start	0 Eastbound				Harkins Slough Rd Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	4	0	11	0	0	7	0	0	8	18	0	48	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**9**	**0**	**0**	**5**	**0**	**0**	**8**	**56**	**0**	**79**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**12**	**0**	**0**	**12**	**0**	**0**	**11**	**71**	**0**	**107**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**6**	**0**	**0**	**14**	**0**	**0**	**11**	**48**	**0**	**81**	315
8:00 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**	**0**	**0**	**21**	**0**	**0**	**7**	**23**	**0**	**56**	**323**
8:15 AM	0	0	0	0	0	0	0	5	0	0	10	0	0	4	24	0	43	287
8:30 AM	0	0	0	0	0	0	0	8	0	0	20	0	0	5	18	0	51	231
8:45 AM	0	0	0	0	0	1	0	4	0	0	16	0	0	7	17	0	45	195
Count Total	0	0	0	0	0	10	0	59	0	0	105	0	0	61	275	0	510	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**31**	**0**	**0**	**52**	**0**	**0**	**37**	**198**	**0**	**323**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**5**	**0**	**0**	**3**	**10**	**0**	**21**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**10%**	**-**	**-**	**10%**	**-**	**-**	**8%**	**5%**	**-**	**7%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	3	0	5	*8*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**0**	**1**	**1**	**4**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**0**	**1**	**2**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**2**	**1**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**0**	**2**	**6**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	0	1	2	4	*7*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	0	6	5	*11*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	2	4	3	*9*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	9	17	30	*56*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**3**	**5**	**13**	***21***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				Harkins Slough Rd				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	1	0	2	0	0	0	0	0	0	5	0	8	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**4**	**0**	**6**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**3**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**4**	21
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**1**	**5**	**0**	**8**	**21**
8:15 AM	0	0	0	0	0	0	0	1	0	0	2	0	0	1	3	0	7	22
8:30 AM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	5	0	11	30
8:45 AM	0	0	0	0	0	1	0	1	0	0	4	0	0	0	3	0	9	35
Count Total	0	0	0	0	0	2	0	7	0	0	17	0	0	4	26	0	56	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**5**	**0**	**0**	**3**	**10**	**0**	**21**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	0			Harkins Slough Rd			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

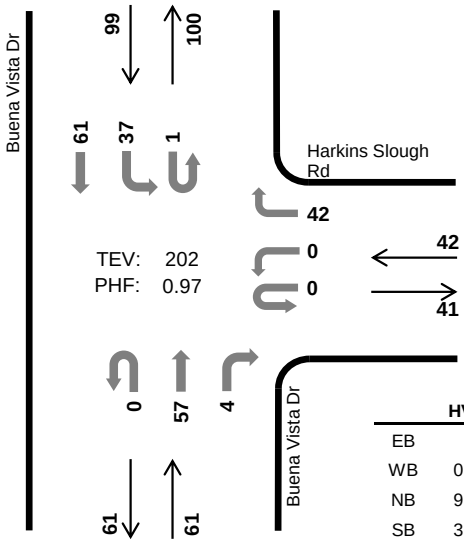
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
Harkins Slough Rd

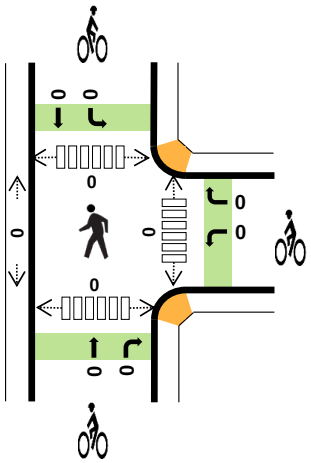
Date: 05/19/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	0.0%	0.81
NB	9.8%	0.85
SB	3.0%	0.95
TOTAL	4.5%	0.97



Two-Hour Count Summaries

Interval Start	0 Eastbound				Harkins Slough Rd Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**0**	**11**	**2**	**0**	**12**	**14**	**0**	**52**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**0**	**17**	**0**	**1**	**8**	**15**	**0**	**52**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**0**	**17**	**1**	**0**	**9**	**15**	**0**	**52**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**12**	**1**	**0**	**8**	**17**	**0**	**46**	**202**
5:00 PM	0	0	0	0	0	0	0	13	0	0	10	0	0	15	14	0	52	202
5:15 PM	0	0	0	0	0	0	0	8	0	0	16	1	0	13	10	0	48	198
5:30 PM	0	0	0	0	0	0	0	10	0	0	12	0	0	14	9	0	45	191
5:45 PM	0	0	0	0	0	0	0	9	0	0	19	1	0	13	8	0	50	195
Count Total	0	0	0	0	0	0	0	82	0	0	114	6	1	92	102	0	397	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**42**	**0**	**0**	**57**	**4**	**1**	**37**	**61**	**0**	**202**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**3**	**0**	**9**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**-**	**9%**	**25%**	**0%**	**0%**	**5%**	**-**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**0**	**0**	**3**	**3**	***6***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	0	1	1	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	1	7	4	*12*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**6**	**3**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				Harkins Slough Rd				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**3**	**0**	**6**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**9**
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:15 PM	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	3	5
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Count Total	0	0	0	0	0	0	0	1	0	0	6	1	0	1	3	0	12	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**3**	**0**	**9**	**0**

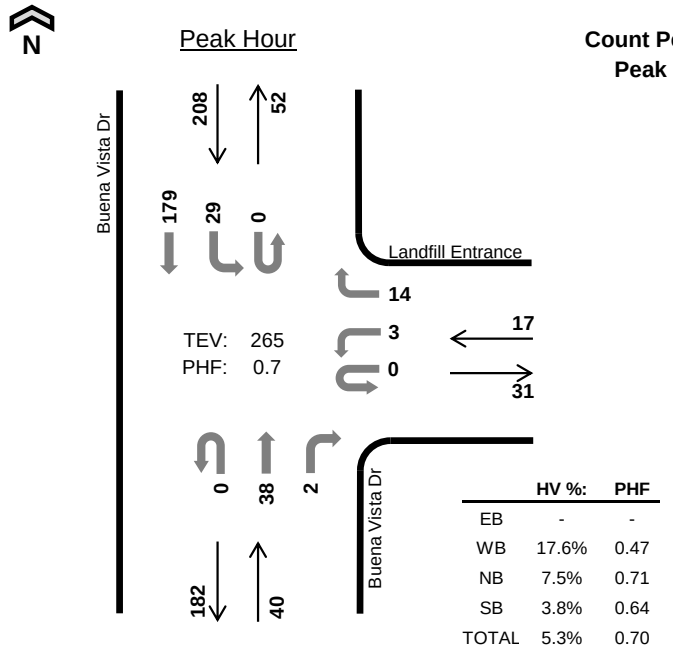
Two-Hour Count Summaries - Bikes

Interval Start	0			Harkins Slough Rd			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

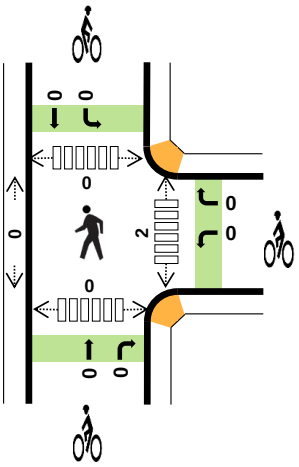
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
Landfill Entrance

Date: 05/19/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	-	-
WB	17.6%	0.47
NB	7.5%	0.71
SB	3.8%	0.64
TOTAL	5.3%	0.70



Two-Hour Count Summaries

Interval Start		0 Eastbound				Landfill Entrance Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	0	0	0	0	0	0	0	0	7	0	0	1	18	0	26	0
7:15 AM		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**47**	**0**	**52**	0
7:30 AM		**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**9**	**1**	**0**	**12**	**69**	**0**	**94**	0
7:45 AM		**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**	**0**	**0**	**11**	**0**	**0**	**5**	**49**	**0**	**70**	242
8:00 AM		**0**	**0**	**0**	**0**	**0**	**1**	**0**	**8**	**0**	**0**	**13**	**1**	**0**	**12**	**14**	**0**	**49**	**265**
8:15 AM		0	0	0	0	0	1	0	3	0	0	6	2	0	7	17	0	36	249
8:30 AM		0	0	0	0	0	1	0	11	0	0	9	0	0	6	10	0	37	192
8:45 AM		0	0	0	0	0	3	0	9	0	0	7	0	0	11	8	0	38	160
Count Total		0	0	0	0	0	8	0	37	0	0	67	4	0	54	232	0	402	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**14**	**0**	**0**	**38**	**2**	**0**	**29**	**179**	**0**	**265**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**3**	**0**	**0**	**6**	**2**	**0**	**14**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**33%**	**-**	**14%**	**-**	**-**	**8%**	**0%**	**-**	**21%**	**1%**	**-**	**5%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	4	*4*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**1**	**1**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**0**	**0**	*2*
7:45 AM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**2**	**0**	**5**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	0	2	2	2	*6*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	4	0	4	*8*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	6	0	3	*9*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	15	5	21	*41*	0	0	0	0	*0*	2	0	0	0	*2*
Peak Hr	**0**	**3**	**3**	**8**	***14***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**0**	**0**	***2***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				Landfill Entrance				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**4**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	11
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**4**	**1**	**0**	**7**	**14**
8:15 AM	0	0	0	0	0	1	0	1	0	0	1	1	0	2	0	0	6	18
8:30 AM	0	0	0	0	0	0	0	4	0	0	0	0	0	3	1	0	8	22
8:45 AM	0	0	0	0	0	2	0	4	0	0	0	0	0	3	0	0	9	30
Count Total	0	0	0	0	0	4	0	11	0	0	4	1	0	14	7	0	41	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**3**	**0**	**0**	**6**	**2**	**0**	**14**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	0			Landfill Entrance			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

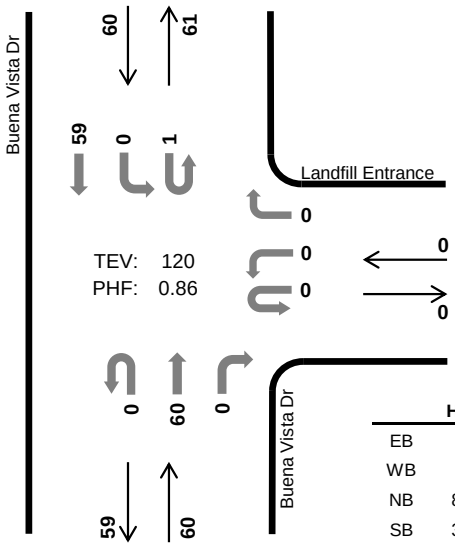
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Buena Vista Dr
Landfill Entrance

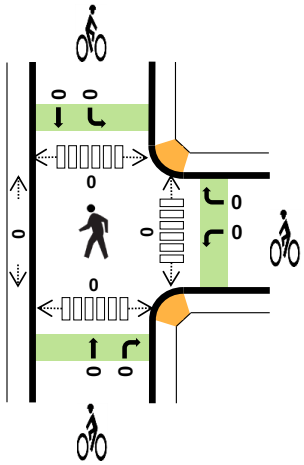
Date: 05/19/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	-	-
NB	8.3%	0.75
SB	3.3%	0.88
TOTAL	5.8%	0.86



Two-Hour Count Summaries

Interval Start	0 Eastbound				Landfill Entrance Westbound				Buena Vista Dr Northbound				Buena Vista Dr Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**0**	**0**	**12**	**0**	**25**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**1**	**0**	**15**	**0**	**31**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**0**	**15**	**0**	**35**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**17**	**0**	**29**	**120**
5:00 PM	0	0	0	0	0	0	0	0	0	0	9	0	0	0	14	0	23	118
5:15 PM	0	0	0	0	0	0	0	0	0	0	16	0	0	0	9	0	25	112
5:30 PM	0	0	0	0	0	0	0	0	0	0	13	0	0	0	10	0	23	100
5:45 PM	0	0	0	0	0	0	0	0	0	0	20	0	0	0	8	0	28	99
Count Total	0	0	0	0	0	0	0	0	0	0	118	0	1	0	100	0	219	0
Peak Hour All	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**0**	**1**	**0**	**59**	**0**	**120**	**0**
Peak Hour HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**2**	**0**	**7**	**0**
Peak Hour HV%	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**8%**	**-**	**0%**	**-**	**3%**	**-**	**6%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	**0**	**0**	**3**	**2**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:15 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:15 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	6	2	*8*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**5**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				Landfill Entrance				Buena Vista Dr				Buena Vista Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**2**	**0**	**5**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	**7**
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	0	0	0	0	0	0	6	0	0	0	2	0	8	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**2**	**0**	**7**	**0**

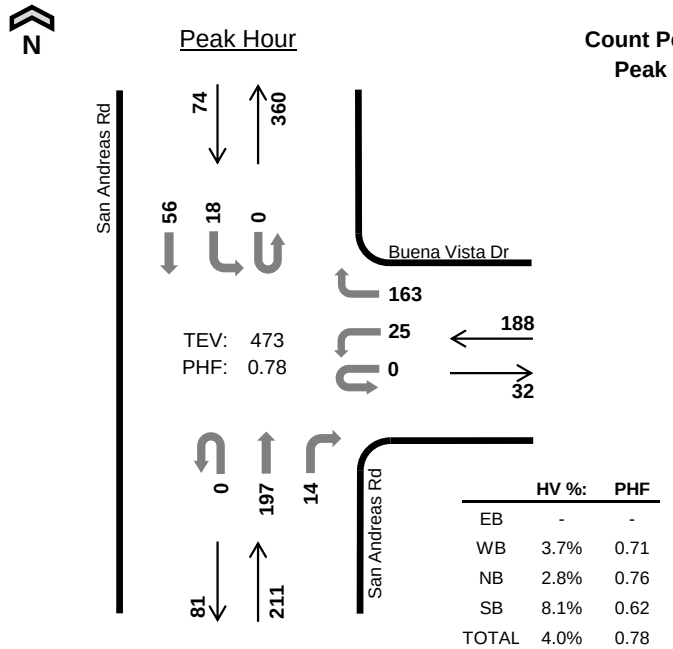
Two-Hour Count Summaries - Bikes

Interval Start	0			Landfill Entrance			Buena Vista Dr			Buena Vista Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

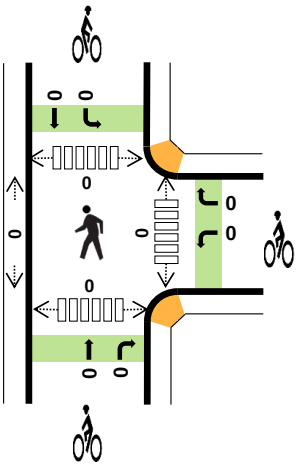
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

San Andreas Rd
Buena Vista Dr

Date: 05/19/2022
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:15 AM to 8:15 AM



	HV %:	PHF
EB	-	-
WB	3.7%	0.71
NB	2.8%	0.76
SB	8.1%	0.62
TOTAL	4.0%	0.78



Two-Hour Count Summaries

Interval Start		0 Eastbound				Buena Vista Dr Westbound				San Andreas Rd Northbound				San Andreas Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	0	0	0	5	0	10	0	0	28	1	0	5	11	0	60	0
7:15 AM		**0**	**0**	**0**	**0**	**0**	**6**	**0**	**39**	**0**	**0**	**54**	**1**	**0**	**2**	**13**	**0**	**115**	0
7:30 AM		**0**	**0**	**0**	**0**	**0**	**8**	**0**	**58**	**0**	**0**	**65**	**4**	**0**	**4**	**13**	**0**	**152**	0
7:45 AM		**0**	**0**	**0**	**0**	**0**	**8**	**0**	**50**	**0**	**0**	**50**	**7**	**0**	**3**	**9**	**0**	**127**	454
8:00 AM		**0**	**0**	**0**	**0**	**0**	**3**	**0**	**16**	**0**	**0**	**28**	**2**	**0**	**9**	**21**	**0**	**79**	**473**
8:15 AM		0	0	0	0	0	3	0	15	0	0	25	1	0	8	19	0	71	429
8:30 AM		0	0	0	0	0	4	0	4	0	0	29	2	0	8	16	0	63	340
8:45 AM		0	0	0	0	0	3	0	9	0	0	16	1	0	5	11	0	45	258
Count Total		0	0	0	0	0	40	0	201	0	0	295	19	0	44	113	0	712	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**25**	**0**	**163**	**0**	**0**	**197**	**14**	**0**	**18**	**56**	**0**	**473**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**5**	**0**	**0**	**6**	**0**	**0**	**0**	**6**	**0**	**19**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**8%**	**-**	**3%**	**-**	**-**	**3%**	**0%**	**-**	**0%**	**11%**	**-**	**4%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	2	2	1	*5*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	**0**	**4**	**2**	**1**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:30 AM	**0**	**1**	**1**	**3**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**1**	**2**	**1**	***4***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**1**	**1**	**1**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:15 AM	0	1	2	2	*5*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	3	1	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	13	12	9	*34*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**7**	**6**	**6**	***19***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	2	0	0	2	0	0	0	1	0	5	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**7**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**5**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**4**	21
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**3**	**19**
8:15 AM	0	0	0	0	0	0	0	1	0	0	2	0	0	2	0	0	5	17
8:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	13
8:45 AM	0	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	4	13
Count Total	0	0	0	0	0	3	0	10	0	0	12	0	0	2	7	0	34	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**5**	**0**	**0**	**6**	**0**	**0**	**0**	**6**	**0**	**19**	**0**

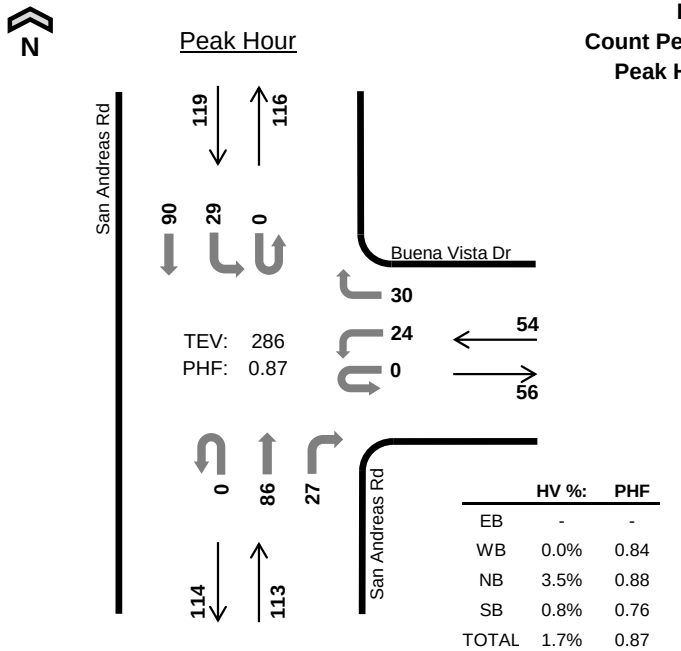
Two-Hour Count Summaries - Bikes

Interval Start	0			Buena Vista Dr			San Andreas Rd			San Andreas Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
8:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

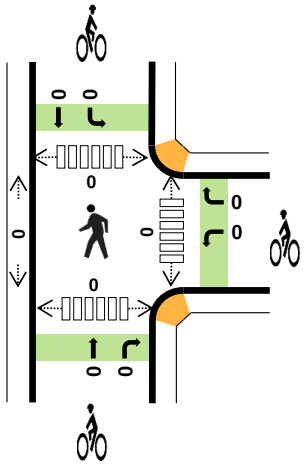
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

San Andreas Rd
Buena Vista Dr

Date: 05/19/2022
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV %:	PHF
EB	-	-
WB	0.0%	0.84
NB	3.5%	0.88
SB	0.8%	0.76
TOTAL	1.7%	0.87



Two-Hour Count Summaries

Interval Start		0 Eastbound				Buena Vista Dr Westbound				San Andreas Rd Northbound				San Andreas Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	0	0	0	0	5	0	6	0	0	17	9	0	3	22	0	62	0
4:15 PM		**0**	**0**	**0**	**0**	**0**	**10**	**0**	**3**	**0**	**0**	**16**	**8**	**0**	**8**	**25**	**0**	**70**	0
4:30 PM		**0**	**0**	**0**	**0**	**0**	**5**	**0**	**11**	**0**	**0**	**21**	**6**	**0**	**12**	**27**	**0**	**82**	0
4:45 PM		**0**	**0**	**0**	**0**	**0**	**5**	**0**	**10**	**0**	**0**	**23**	**7**	**0**	**3**	**16**	**0**	**64**	278
5:00 PM		**0**	**0**	**0**	**0**	**0**	**4**	**0**	**6**	**0**	**0**	**26**	**6**	**0**	**6**	**22**	**0**	**70**	**286**
5:15 PM		0	0	0	0	0	5	0	6	0	0	29	10	0	3	17	0	70	286
5:30 PM		0	0	0	0	0	3	0	5	0	0	15	6	0	9	16	0	54	258
5:45 PM		0	0	0	0	1	4	0	2	0	0	16	8	0	8	17	0	56	250
Count Total		0	0	0	0	1	41	0	49	0	0	163	60	0	52	162	0	528	0
Peak Hour	**All**	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**30**	**0**	**0**	**86**	**27**	**0**	**29**	**90**	**0**	**286**	**0**
	HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**1**	**0**	**5**	**0**
	HV%	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**0%**	**-**	**-**	**5%**	**0%**	**-**	**0%**	**1%**	**-**	**2%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	2	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:30 PM	**0**	**0**	**1**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**0**	**2**	**0**	***2***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:15 PM	0	0	2	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	2	8	1	*11*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**0**	**0**	**4**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	0				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	4	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**2**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	9
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2	5
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	0	0	0	1	0	1	0	0	6	2	0	0	1	0	11	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**1**	**0**	**5**	**0**

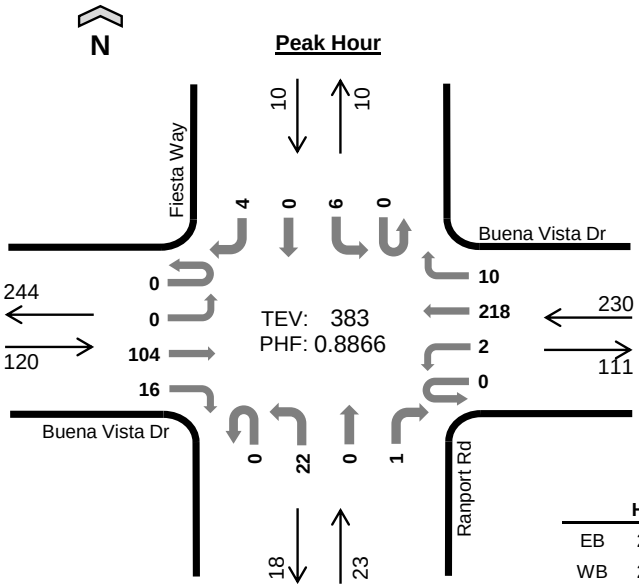
Two-Hour Count Summaries - Bikes

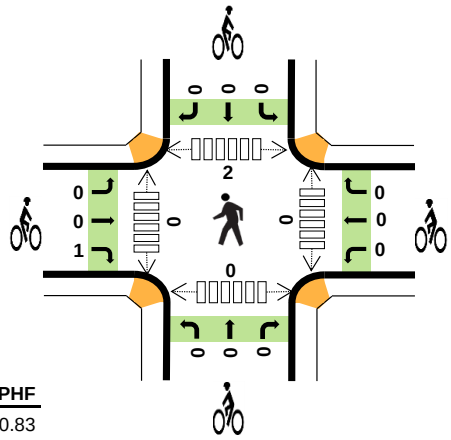
Interval Start	0			Buena Vista Dr			San Andreas Rd			San Andreas Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Fiesta Way
Buena Vista Dr

Date: 8/21/2024
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV%	PHF
EB	23%	0.83
WB	20%	0.93
NB	13%	0.96
SB	0%	0.63
TOTAL	20%	0.89

Peak Hour Count Summaries

Peak Hour Interval Start		Buena Vista Dr Eastbound				Buena Vista Dr Westbound				Ranport Rd Northbound				Fiesta Way Southbound				15-min Total	Rolling Hour Total
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:30 AM		0	0	19	4	0	1	60	1	0	6	0	0	0	0	0	1	92	0
7:45 AM		0	0	32	2	0	0	52	2	0	6	0	0	0	3	0	0	97	0
8:00 AM		0	0	30	6	0	0	56	2	0	5	0	1	0	2	0	0	102	0
8:15 AM		0	0	23	4	0	1	50	5	0	5	0	0	0	1	0	3	92	383
Pk Hr	All	0	0	104	16	0	2	218	10	0	22	0	1	0	6	0	4	383	
	HV	0	0	27	1	0	0	45	0	0	2	0	1	0	0	0	0	76	
	HV%	-	-	26%	6%	-	0%	21%	0%	-	9%	-	100%	-	0%	-	0%	20%	

Note: For complete count summary (all intervals), see following pages.
*** Heavy Vehicle Classifications include FHWA Classes 4-13.*
*** Count Summaries include heavy vehicles, but exclude bicycles in overall count.*

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
7:30 AM	2	12	0	0	*14*	0	0	0	0	*0*	0	0	0	0	*0*
7:45 AM	7	8	1	0	*16*	0	0	0	0	*0*	0	0	0	0	*0*
8:00 AM	13	13	2	0	*28*	1	0	0	0	*1*	0	0	0	0	*0*
8:15 AM	6	12	0	0	*18*	0	0	0	0	*0*	0	0	2	0	*2*
Peak Hour	28	45	3	0	*76*	1	0	0	0	*1*	0	0	2	0	*2*

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Count Summaries - All Vehicles

Interval Start	Buena Vista Dr				Buena Vista Dr				Ranport Rd				Fiesta Way				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	17	3	0	0	37	1	0	3	0	1	0	2	0	0	65	0
7:15 AM	0	0	21	2	2	1	39	0	0	3	0	0	0	1	0	2	71	0
7:30 AM	**0**	**0**	**19**	**4**	**0**	**1**	**60**	**1**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**1**	**92**	**0**
7:45 AM	**0**	**0**	**32**	**2**	**0**	**0**	**52**	**2**	**0**	**6**	**0**	**0**	**0**	**3**	**0**	**0**	**97**	**325**
8:00 AM	**0**	**0**	**30**	**6**	**0**	**0**	**56**	**2**	**0**	**5**	**0**	**1**	**0**	**2**	**0**	**0**	**102**	**362**
8:15 AM	**0**	**0**	**23**	**4**	**0**	**1**	**50**	**5**	**0**	**5**	**0**	**0**	**0**	**1**	**0**	**3**	**92**	**383**
8:30 AM	0	0	33	7	0	1	32	0	0	3	0	1	0	0	0	0	77	368
8:45 AM	0	1	36	4	0	0	33	0	0	4	0	0	0	1	0	0	79	350
Count Total	0	2	211	32	2	4	359	11	0	35	0	3	0	10	0	6	675	
Pk Hr All	**0**	**0**	**104**	**16**	**0**	**2**	**218**	**10**	**0**	**22**	**0**	**1**	**0**	**6**	**0**	**4**	**383**	
Pk Hr HV	**0**	**0**	**27**	**1**	**0**	**0**	**45**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**76**	
Pk Hr HV%	**-**	**-**	**26%**	**6%**	**-**	**0%**	**21%**	**0%**	**-**	**9%**	**-**	**100%**	**-**	**0%**	**-**	**0%**	**20%**	

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
7:00 AM	1	2	0	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	2	4	0	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	**2**	**12**	**0**	**0**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7:45 AM	**7**	**8**	**1**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:00 AM	**13**	**13**	**2**	**0**	**28**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
8:15 AM	**6**	**12**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**
8:30 AM	12	4	0	0	*16*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	12	6	0	0	*18*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	55	61	3	0	*119*	1	0	0	0	*1*	0	0	2	0	*2*
Peak Hour	**28**	**45**	**3**	**0**	***76***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**2**	**0**	**2**

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Count Summaries - Heavy Vehicles

Interval Start	Buena Vista Dr				Buena Vista Dr				Ranport Rd				Fiesta Way				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0
7:15 AM	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	6	0
7:30 AM	**0**	**0**	**2**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**14**	**0**
7:45 AM	**0**	**0**	**7**	**0**	**0**	**0**	**8**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**16**	**39**
8:00 AM	**0**	**0**	**12**	**1**	**0**	**0**	**13**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**28**	**64**
8:15 AM	**0**	**0**	**6**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**76**
8:30 AM	0	0	12	0	0	0	4	0	0	0	0	0	0	0	0	0	16	78
8:45 AM	0	0	11	1	0	0	6	0	0	0	0	0	0	0	0	0	18	80
Count Total	0	0	53	2	0	0	61	0	0	2	0	1	0	0	0	0	119	
Pk Hr Heavy	**0**	**0**	**27**	**1**	**0**	**0**	**45**	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**76**	

Count Summaries - Bikes

Interval Start	Buena Vista Dr				Buena Vista Dr				Ranport Rd				Fiesta Way				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:00 AM	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
8:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
Pk Hr Bike	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	

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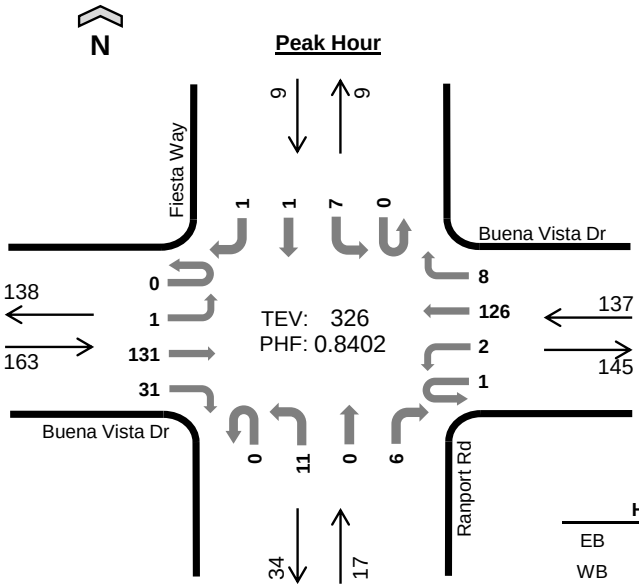
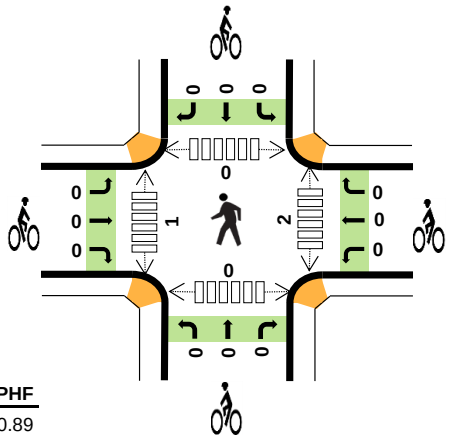
Fiesta Way
Buena Vista Dr

Date: 8/21/2024
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM





	HV%	PHF
EB	4%	0.89
WB	8%	0.86
NB	0%	0.71
SB	0%	0.45
TOTAL	5%	0.84

Peak Hour Count Summaries

Peak Hour Interval Start		Buena Vista Dr Eastbound				Buena Vista Dr Westbound				Ranport Rd Northbound				Fiesta Way Southbound				15-min Total	Rolling Hour Total
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:15 PM		0	0	27	6	0	1	38	1	0	4	0	0	0	0	0	0	77	0
4:30 PM		0	0	32	9	0	0	31	3	0	1	0	1	0	1	0	0	78	0
4:45 PM		0	0	34	9	0	1	35	2	0	3	0	2	0	2	0	1	89	0
5:00 PM		0	1	38	7	1	0	22	2	0	3	0	3	0	4	1	0	82	326
Pk Hr	All	0	1	131	31	1	2	126	8	0	11	0	6	0	7	1	1	326	
	HV	0	0	6	0	0	0	11	0	0	0	0	0	0	0	0	0	17	
	HV%	-	0%	5%	0%	0%	0%	9%	0%	-	0%	-	0%	-	0%	0%	0%	5%	

Note: For complete count summary (all intervals), see following pages.
*** Heavy Vehicle Classifications include FHWA Classes 4-13.*
*** Count Summaries include heavy vehicles, but exclude bicycles in overall count.*

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
4:15 PM	1	4	0	0	*5*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	2	4	0	0	*6*	0	0	0	0	*0*	2	0	0	0	*2*
4:45 PM	1	3	0	0	*4*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	2	0	0	0	*2*	0	0	0	0	*0*	0	1	0	0	*1*
Peak Hour	6	11	0	0	*17*	0	0	0	0	*0*	2	1	0	0	*3*

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Count Summaries - All Vehicles

Interval Start	Buena Vista Dr				Buena Vista Dr				Ranport Rd				Fiesta Way				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	41	17	0	1	36	1	0	1	0	2	0	1	0	0	100	0
4:15 PM	**0**	**0**	**27**	**6**	**0**	**1**	**38**	**1**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**77**	**0**
4:30 PM	**0**	**0**	**32**	**9**	**0**	**0**	**31**	**3**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**0**	**78**	**0**
4:45 PM	**0**	**0**	**34**	**9**	**0**	**1**	**35**	**2**	**0**	**3**	**0**	**2**	**0**	**2**	**0**	**1**	**89**	**344**
5:00 PM	**0**	**1**	**38**	**7**	**1**	**0**	**22**	**2**	**0**	**3**	**0**	**3**	**0**	**4**	**1**	**0**	**82**	**326**
5:15 PM	0	0	20	4	0	0	35	3	0	3	0	0	0	2	0	0	67	316
5:30 PM	0	1	27	2	0	0	26	4	0	1	1	1	0	1	1	0	65	303
5:45 PM	0	2	20	7	0	3	23	1	0	0	1	3	0	2	0	1	63	277
Count Total	0	4	239	61	1	6	246	17	0	16	2	12	0	13	2	2	621	
Pk Hr All	**0**	**1**	**131**	**31**	**1**	**2**	**126**	**8**	**0**	**11**	**0**	**6**	**0**	**7**	**1**	**1**	**326**	
Pk Hr HV	**0**	**0**	**6**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	
Pk Hr HV%	**-**	**0%**	**5%**	**0%**	**0%**	**0%**	**9%**	**0%**	**-**	**0%**	**-**	**0%**	**-**	**0%**	**0%**	**0%**	**5%**	

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
4:00 PM	2	1	0	0	*3*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	**1**	**4**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:30 PM	**2**	**4**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**
4:45 PM	**1**	**3**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:00 PM	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**
5:15 PM	0	2	0	0	*2*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	1	0	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	0	0	1	0	*1*	0	0	0	0	*0*
Count Total	9	14	0	0	*23*	0	0	1	0	*1*	2	1	0	0	*3*
Peak Hour	**6**	**11**	**0**	**0**	***17***	**0**	**0**	**0**	**0**	***0***	**2**	**1**	**0**	**0**	**3**

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Count Summaries - Heavy Vehicles

Interval Start	Buena Vista Dr				Buena Vista Dr				Ranport Rd				Fiesta Way				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	3	0
4:15 PM	**0**	**0**	**1**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**
4:30 PM	**0**	**0**	**2**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**
4:45 PM	**0**	**0**	**1**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**18**
5:00 PM	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**17**
5:15 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	14
5:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	9
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Count Total	0	0	7	2	0	1	13	0	0	0	0	0	0	0	0	0	23	
Pk Hr Heavy	**0**	**0**	**6**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	

Count Summaries - Bikes

Interval Start	Buena Vista Dr				Buena Vista Dr				Ranport Rd				Fiesta Way				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
Count Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	
Pk Hr Bike	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

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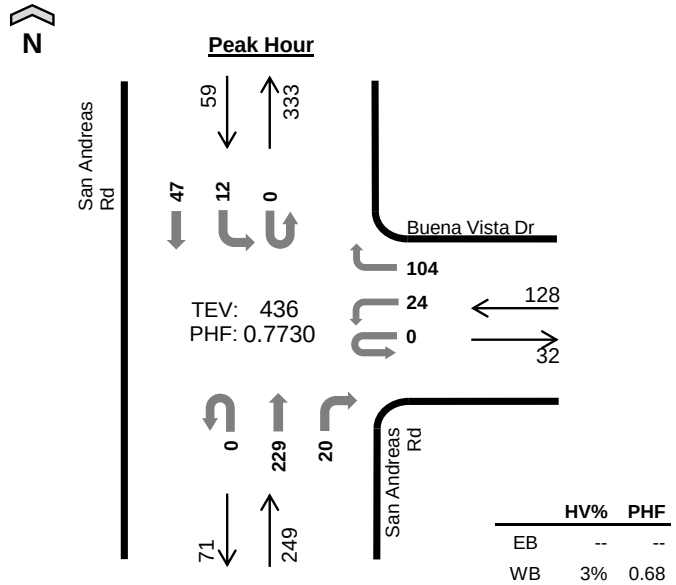
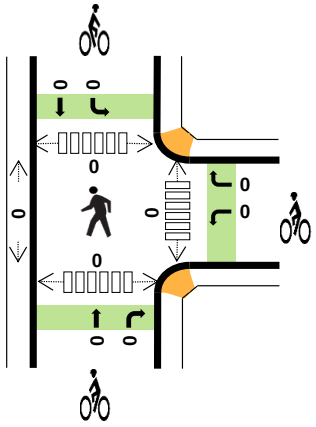
San Andreas Rd
Buena Vista Dr

Date: 8/21/2024
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:00 AM to 8:00 AM



	HV%	PHF
EB	--	--
WB	3%	0.68
NB	4%	0.82
SB	10%	0.82
TOTAL	4%	0.77



Peak Hour Count Summaries

Peak Hour Interval Start		n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	0	0	0	9	0	14	0	0	35	6	0	2	15	0	81	0
7:15 AM		0	0	0	0	0	3	0	20	0	0	56	5	0	2	8	0	94	0
7:30 AM		0	0	0	0	0	5	0	30	0	0	67	4	0	2	12	0	120	0
7:45 AM		0	0	0	0	0	7	0	40	0	0	71	5	0	6	12	0	141	436
Pk Hr	All	0	0	0	0	0	24	0	104	0	0	229	20	0	12	47	0	436	
	HV	0	0	0	0	0	1	0	3	0	0	8	1	0	0	6	0	19	
	HV%	-	-	-	-	-	4%	-	3%	-	-	3%	5%	-	0%	13%	-	4%	

Note: For complete count summary (all intervals), see following pages.
*** Heavy Vehicle Classifications include FHWA Classes 4-13.*
*** Count Summaries include heavy vehicles, but exclude bicycles in overall count.*

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
7:00 AM	0	1	2	5	*8*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
7:30 AM	0	1	2	1	*4*	0	0	0	0	*0*	0	0	0	0	*0*
7:45 AM	0	1	5	0	*6*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	0	4	9	6	*19*	0	0	0	0	*0*	0	0	0	0	*0*

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Count Summaries - All Vehicles

Interval Start	n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**14**	**0**	**0**	**35**	**6**	**0**	**2**	**15**	**0**	**81**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**20**	**0**	**0**	**56**	**5**	**0**	**2**	**8**	**0**	**94**	**0**
7:30 AM	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**30**	**0**	**0**	**67**	**4**	**0**	**2**	**12**	**0**	**120**	**0**
7:45 AM	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**40**	**0**	**0**	**71**	**5**	**0**	**6**	**12**	**0**	**141**	**436**
8:00 AM	0	0	0	0	0	4	0	19	0	0	31	5	0	5	15	0	79	434
8:15 AM	0	0	0	0	0	10	0	28	0	0	27	3	0	4	17	0	89	429
8:30 AM	0	0	0	0	0	3	0	20	0	0	35	8	0	10	18	0	94	403
8:45 AM	0	0	0	0	0	8	0	11	0	0	25	7	0	14	24	0	89	351
Count Total	0	0	0	0	0	49	0	182	0	0	347	43	0	45	121	0	787	
Pk Hr All	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**104**	**0**	**0**	**229**	**20**	**0**	**12**	**47**	**0**	**436**	
Pk Hr HV	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**8**	**1**	**0**	**0**	**6**	**0**	**19**	
Pk Hr HV%	**-**	**-**	**-**	**-**	**-**	**4%**	**-**	**3%**	**-**	**-**	**3%**	**5%**	**-**	**0%**	**13%**	**-**	**4%**	

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
7:00 AM	**0**	**1**	**2**	**5**	**8**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7:15 AM	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7:30 AM	**0**	**1**	**2**	**1**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7:45 AM	**0**	**1**	**5**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:00 AM	0	0	1	3	*4*	0	0	0	0	*0*	0	0	0	0	*0*
8:15 AM	0	7	2	1	*10*	0	0	0	0	*0*	0	0	0	0	*0*
8:30 AM	0	1	1	3	*5*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	0	6	2	*8*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	12	19	15	*46*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**0**	**4**	**9**	**6**	***19***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	**0**

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Count Summaries - Heavy Vehicles

Interval Start	n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**5**	**0**	**8**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**
7:30 AM	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**4**	**0**
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**6**	**19**
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	2	1	0	4	15
8:15 AM	0	0	0	0	0	0	0	7	0	0	2	0	0	0	1	0	10	24
8:30 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	2	1	0	5	25
8:45 AM	0	0	0	0	0	0	0	0	0	0	3	3	0	2	0	0	8	27
Count Total	0	0	0	0	0	1	0	11	0	0	13	6	0	6	9	0	46	
Pk Hr Heavy	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**8**	**1**	**0**	**0**	**6**	**0**	**19**	

Count Summaries - Bikes

Interval Start	n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
7:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
7:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pk Hr Bike	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

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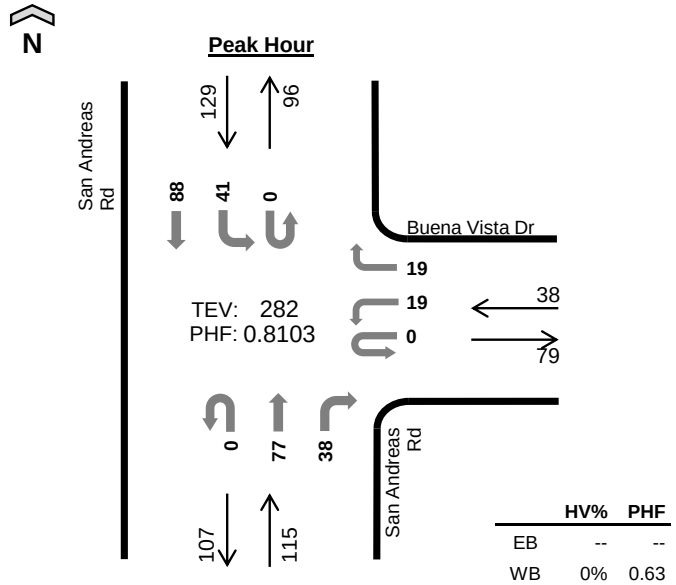
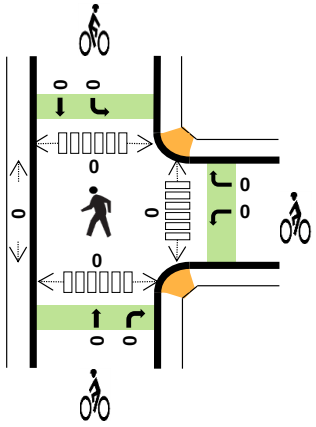
San Andreas Rd
Buena Vista Dr

Date: 8/21/2024
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV%	PHF
EB	--	--
WB	0%	0.63
NB	3%	0.85
SB	5%	0.85
TOTAL	3%	0.81



Peak Hour Count Summaries

Peak Hour Interval Start		n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:15 PM		0	0	0	0	0	3	0	6	0	0	10	8	0	13	23	0	63	0
4:30 PM		0	0	0	0	0	5	0	5	0	0	22	8	0	10	28	0	78	0
4:45 PM		0	0	0	0	0	3	0	1	0	0	22	11	0	11	21	0	69	0
5:00 PM		0	0	0	0	0	8	0	7	0	0	23	11	0	7	16	0	72	282
Pk Hr	All	0	0	0	0	0	19	0	19	0	0	77	38	0	41	88	0	282	
	HV	0	0	0	0	0	0	0	0	0	0	2	1	0	1	5	0	9	
	HV%	-	-	-	-	-	0%	-	0%	-	-	3%	3%	-	2%	6%	-	3%	

Note: For complete count summary (all intervals), see following pages.
*** Heavy Vehicle Classifications include FHWA Classes 4-13.*
*** Count Summaries include heavy vehicles, but exclude bicycles in overall count.*

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
4:15 PM	0	0	1	4	*5*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	0	0	2	2	*4*	0	0	0	0	*0*	0	0	0	0	*0*
4:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
5:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	0	0	3	6	*9*	0	0	0	0	*0*	0	0	0	0	*0*

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Count Summaries - All Vehicles

Interval Start	n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	4	0	4	0	0	16	12	0	27	14	0	77	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**6**	**0**	**0**	**10**	**8**	**0**	**13**	**23**	**0**	**63**	**0**
4:30 PM	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**5**	**0**	**0**	**22**	**8**	**0**	**10**	**28**	**0**	**78**	**0**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**1**	**0**	**0**	**22**	**11**	**0**	**11**	**21**	**0**	**69**	**287**
5:00 PM	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**7**	**0**	**0**	**23**	**11**	**0**	**7**	**16**	**0**	**72**	**282**
5:15 PM	0	0	0	0	0	4	0	0	0	0	20	2	0	5	18	0	49	268
5:30 PM	0	0	0	0	0	4	0	9	0	0	17	6	0	5	28	0	69	259
5:45 PM	0	0	0	0	0	2	0	6	0	0	16	4	0	4	17	0	49	239
Count Total	0	0	0	0	0	33	0	38	0	0	146	62	0	82	165	0	526	
Pk Hr All	**0**	**0**	**0**	**0**	**0**	**19**	**0**	**19**	**0**	**0**	**77**	**38**	**0**	**41**	**88**	**0**	**282**	
Pk Hr HV	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**1**	**5**	**0**	**9**	
Pk Hr HV%	**-**	**-**	**-**	**-**	**-**	**0%**	**-**	**0%**	**-**	**-**	**3%**	**3%**	**-**	**2%**	**6%**	**-**	**3%**	

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	E	W	N	S	Total
4:00 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	**0**	**0**	**1**	**4**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:30 PM	**0**	**0**	**2**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:15 PM	0	0	1	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:30 PM	0	0	0	1	*1*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	0	4	7	*11*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hour	**0**	**0**	**3**	**6**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	**0**

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Count Summaries - Heavy Vehicles

Interval Start	n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**3**	**0**	**5**	**0**
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**4**	**0**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	5
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	0	0	0	0	0	0	0	0	3	1	0	1	6	0	11	
Pk Hr Heavy	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**1**	**5**	**0**	**9**	

Count Summaries - Bikes

Interval Start	n/a				Buena Vista Dr				San Andreas Rd				San Andreas Rd				15-min Total	Rolling Hour Total
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:30 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4:45 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:00 PM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pk Hr Bike	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

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Location: Driveway 1 (Buena Vista Dr. / Main Entrance)
Date: 05-19-2022
Site Code: 1

	Thursday, May 19, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	0
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	28
7:15	0	0	0	0	0	0	
7:30	2	2	11	1	2	0	
7:45	0	0	5	5	0	0	
8:00	2	3	6	5	5	1	76
8:15	1	2	6	2	2	0	
8:30	0	1	3	7	3	4	
8:45	0	0	8	6	3	6	
9:00	1	0	5	7	6	4	75
9:15	0	1	10	4	4	2	
9:30	0	0	5	4	2	4	
9:45	1	1	3	9	1	1	
10:00	0	1	9	5	4	2	83
10:15	0	0	3	6	5	6	
10:30	3	3	1	6	6	2	
10:45	1	0	7	3	3	7	
11:00	6	2	8	3	2	3	124
11:15	2	3	8	9	14	2	
11:30	2	4	12	6	3	10	
11:45	2	1	5	9	5	3	
12:00	5	3	7	9	1	8	92
12:15	3	3	7	8	5	2	
12:30	3	2	4	3	1	3	
12:45	3	1	4	1	2	4	
13:00	5	7	5	8	5	2	89
13:15	1	0	4	7	2	6	
13:30	1	2	6	7	3	2	
13:45	1	1	4	4	3	3	
14:00	1	0	3	3	1	3	63
14:15	2	2	8	5	1	2	
14:30	2	2	4	10	0	0	
14:45	2	1	3	4	4	0	
15:00	0	3	7	2	2	1	40
15:15	4	4	4	7	2	4	
15:30	0	0	0	0	0	0	
15:45	0	0	0	0	0	0	
16:00	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**56**	**55**	**185**	**175**	**102**	**97**	**670**

Location: Driveway 1 (Buena Vista Dr. / Main Entrance)
Date: 05-20-2022
Site Code: 1

	Friday, May 20, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	**0**
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	**36**
7:15	0	0	0	0	0	0	
7:30	1	2	2	9	2	5	
7:45	0	0	2	6	4	3	
8:00	0	0	3	5	2	2	**76**
8:15	0	1	5	8	1	3	
8:30	1	1	12	9	5	3	
8:45	0	2	5	3	3	2	
9:00	3	3	5	7	3	6	**102**
9:15	0	0	6	9	8	2	
9:30	1	3	8	9	2	7	
9:45	1	2	9	3	3	2	
10:00	1	2	4	8	5	5	**117**
10:15	1	0	5	12	4	5	
10:30	1	0	7	10	4	5	
10:45	1	0	8	12	9	8	
11:00	1	5	13	5	6	3	**121**
11:15	5	1	7	11	2	4	
11:30	2	2	5	9	7	6	
11:45	0	1	11	4	5	6	
12:00	2	3	6	16	8	7	**126**
12:15	1	4	7	6	7	3	
12:30	3	4	9	10	4	1	
12:45	2	0	10	9	1	3	
13:00	2	2	3	6	4	2	**104**
13:15	2	5	12	8	0	2	
13:30	6	4	7	7	2	5	
13:45	1	2	7	12	2	1	
14:00	2	1	12	10	6	3	**117**
14:15	2	1	8	8	2	3	
14:30	3	5	8	9	4	2	
14:45	1	2	7	13	3	2	
15:00	3	2	8	6	2	1	**37**
15:15	2	0	10	1	0	2	
15:30	0	0	0	0	0	0	
15:45	0	0	0	0	0	0	
16:00	0	0	0	0	0	0	**0**
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**51**	**60**	**231**	**260**	**120**	**114**	**836**

Location: Driveway 1 (Buena Vista Dr. / Main Entrance)
Date: 05-21-2022
Site Code: 1

	Saturday, May 21, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	**0**
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	**61**
7:15	0	0	0	0	0	0	
7:30	1	4	4	21	0	5	
7:45	4	5	7	8	2	0	
8:00	1	3	12	8	4	3	**103**
8:15	0	2	7	4	1	1	
8:30	5	6	9	8	2	0	
8:45	4	1	9	11	0	2	
9:00	0	6	12	9	1	1	**104**
9:15	5	8	8	5	2	1	
9:30	7	4	5	4	2	1	
9:45	4	3	6	10	0	0	
10:00	2	4	5	10	0	3	**111**
10:15	4	3	9	13	1	2	
10:30	4	4	14	6	3	2	
10:45	2	2	10	5	1	2	
11:00	2	5	8	13	2	2	**107**
11:15	4	2	6	4	2	1	
11:30	4	4	10	8	0	2	
11:45	2	5	7	9	3	2	
12:00	7	4	8	10	1	1	**106**
12:15	3	2	6	7	1	2	
12:30	4	5	8	7	1	1	
12:45	1	7	7	11	1	1	
13:00	2	4	6	12	2	0	**125**
13:15	8	8	10	9	1	0	
13:30	5	5	13	11	0	0	
13:45	4	4	11	10	0	0	
14:00	2	3	13	14	0	0	**107**
14:15	2	4	9	8	1	1	
14:30	2	0	10	6	0	0	
14:45	4	6	8	12	2	0	
15:00	4	2	7	6	0	2	**39**
15:15	1	3	5	9	0	0	
15:30	0	0	0	0	0	0	
15:45	0	0	0	0	0	0	
16:00	0	0	0	0	0	0	**0**
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**104**	**128**	**269**	**288**	**36**	**38**	**863**

Location: Driveway 1 (Buena Vista Dr. / Main Entrance)
Date: 05-23-2022
Site Code: 1

	Monday, May 23, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	0
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	53
7:15	0	0	0	0	0	0	
7:30	1	1	1	20	0	9	
7:45	0	0	9	6	3	3	
8:00	0	2	10	7	9	4	109
8:15	1	0	5	10	3	4	
8:30	2	3	6	5	6	2	
8:45	0	3	8	9	5	5	
9:00	3	4	4	9	3	3	94
9:15	3	0	11	5	4	1	
9:30	4	2	9	8	3	4	
9:45	0	1	7	4	1	1	
10:00	2	6	1	9	4	3	105
10:15	1	2	5	12	4	4	
10:30	5	2	7	9	2	2	
10:45	1	0	9	9	1	5	
11:00	4	5	15	9	5	5	156
11:15	6	6	10	11	7	7	
11:30	2	1	11	8	7	4	
11:45	1	4	11	9	5	3	
12:00	1	1	8	14	3	2	146
12:15	2	2	8	14	3	8	
12:30	0	2	15	13	6	4	
12:45	2	1	16	14	5	2	
13:00	2	1	13	5	2	6	129
13:15	1	1	11	16	2	3	
13:30	1	2	10	19	4	6	
13:45	0	2	4	10	7	1	
14:00	3	4	10	15	5	1	147
14:15	8	4	20	11	2	1	
14:30	3	2	14	8	2	3	
14:45	1	2	9	14	1	4	
15:00	5	2	11	10	6	3	61
15:15	3	1	13	4	1	1	
15:30	0	0	1	0	0	0	
15:45	0	0	0	0	0	0	
16:00	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**68**	**69**	**302**	**326**	**121**	**114**	**1000**

Location: Driveway 2 (Buena Vista Dr & Second Driveway)
Date: 05-19-2022
Site Code: 2

	Thursday, May 19, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	**0**
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	**1**
7:15	0	0	0	0	0	0	
7:30	0	1	0	0	0	0	
7:45	0	0	0	0	0	0	
8:00	0	0	0	0	0	0	**0**
8:15	0	0	0	0	0	0	
8:30	0	0	0	0	0	0	
8:45	0	0	0	0	0	0	
9:00	0	0	0	0	0	0	**0**
9:15	0	0	0	0	0	0	
9:30	0	0	0	0	0	0	
9:45	0	0	0	0	0	0	
10:00	0	0	0	0	0	0	**2**
10:15	0	0	0	0	0	0	
10:30	0	0	0	0	1	1	
10:45	0	0	0	0	0	0	
11:00	0	0	0	0	0	0	**1**
11:15	0	1	0	0	0	0	
11:30	0	0	0	0	0	0	
11:45	0	0	0	0	0	0	
12:00	0	0	0	0	0	0	**1**
12:15	0	0	0	0	0	0	
12:30	0	1	0	0	0	0	
12:45	0	0	0	0	0	0	
13:00	0	0	0	0	0	0	**0**
13:15	0	0	0	0	0	0	
13:30	0	0	0	0	0	0	
13:45	0	0	0	0	0	0	
14:00	0	0	0	0	0	0	**0**
14:15	0	0	0	0	0	0	
14:30	0	0	0	0	0	0	
14:45	0	0	0	0	0	0	
15:00	0	0	0	0	0	0	**17**
15:15	0	0	0	0	0	0	
15:30	0	0	0	6	0	0	
15:45	0	6	0	3	0	2	
16:00	0	3	0	0	0	0	**3**
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**0**	**12**	**0**	**9**	**1**	**3**	**25**

Location: Driveway 2 (Buena Vista Dr & Second Driveway)
Date: 05-20-2022
Site Code: 2

	Friday, May 20, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	0
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	2
7:15	0	1	0	0	0	0	
7:30	0	0	0	1	0	0	
7:45	0	0	0	0	0	0	
8:00	0	0	0	0	0	0	1
8:15	0	0	0	1	0	0	
8:30	0	0	0	0	0	0	
8:45	0	0	0	0	0	0	
9:00	0	0	0	0	0	0	3
9:15	0	0	0	2	0	0	
9:30	0	1	0	0	0	0	
9:45	0	0	0	0	0	0	
10:00	0	0	0	2	0	0	3
10:15	0	0	0	0	0	0	
10:30	0	0	0	0	0	0	
10:45	0	0	0	1	0	0	
11:00	0	1	0	0	0	0	2
11:15	0	1	0	0	0	0	
11:30	0	0	0	0	0	0	
11:45	0	0	0	0	0	0	
12:00	0	1	0	1	0	0	2
12:15	0	0	0	0	0	0	
12:30	0	0	0	0	0	0	
12:45	0	0	0	0	0	0	
13:00	0	0	0	0	0	0	1
13:15	0	0	0	0	0	0	
13:30	0	0	0	0	0	0	
13:45	0	0	0	1	0	0	
14:00	0	0	0	0	0	0	8
14:15	1	1	0	1	0	0	
14:30	0	1	0	2	0	0	
14:45	0	2	0	0	0	0	
15:00	0	0	0	0	0	0	13
15:15	0	0	0	0	0	0	
15:30	0	4	0	5	0	3	
15:45	0	1	0	0	0	0	
16:00	0	5	0	0	0	0	5
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**1**	**19**	**0**	**17**	**0**	**3**	**40**

Location: Driveway 2 (Buena Vista Dr & Second Driveway)
Date: 05-21-2022
Site Code: 2

	Saturday, May 21, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	0
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	2
7:15	0	0	0	0	0	0	
7:30	0	0	0	1	0	0	
7:45	0	1	0	0	0	0	
8:00	0	0	0	1	0	0	2
8:15	0	0	0	0	0	0	
8:30	0	0	0	1	0	0	
8:45	0	0	0	0	0	0	
9:00	0	0	0	0	0	0	3
9:15	0	1	0	0	0	0	
9:30	0	1	0	0	0	0	
9:45	0	1	0	0	0	0	
10:00	0	0	0	1	0	0	2
10:15	0	1	0	0	0	0	
10:30	0	0	0	0	0	0	
10:45	0	0	0	0	0	0	
11:00	0	0	0	2	0	0	3
11:15	0	0	0	0	0	0	
11:30	0	0	0	0	0	0	
11:45	0	1	0	0	0	0	
12:00	0	0	0	1	0	0	7
12:15	0	0	0	2	1	1	
12:30	0	0	0	0	0	0	
12:45	0	2	0	0	0	0	
13:00	0	1	0	1	0	0	5
13:15	0	1	0	0	0	0	
13:30	0	1	0	0	0	0	
13:45	0	1	0	0	0	0	
14:00	0	1	0	0	0	0	1
14:15	0	0	0	0	0	0	
14:30	0	0	0	0	0	0	
14:45	0	0	0	0	0	0	
15:00	0	0	0	0	0	0	31
15:15	0	0	0	0	0	0	
15:30	0	5	0	15	0	1	
15:45	0	2	1	6	0	1	
16:00	0	3	0	0	0	0	3
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**0**	**23**	**1**	**31**	**1**	**3**	**59**

Location: Driveway 2 (Buena Vista Dr & Second Driveway)
Date: 05-23-2022
Site Code: 2

	Monday, May 23, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	**0**
6:45	0	0	0	0	0	0	
7:00	0	0	0	0	0	0	**1**
7:15	0	0	0	0	0	0	
7:30	0	0	0	0	0	0	
7:45	0	0	0	1	0	0	
8:00	0	0	0	0	0	0	**0**
8:15	0	0	0	0	0	0	
8:30	0	0	0	0	0	0	
8:45	0	0	0	0	0	0	
9:00	0	0	1	1	0	0	**3**
9:15	0	0	0	0	0	0	
9:30	0	1	0	0	0	0	
9:45	0	0	0	0	0	0	
10:00	0	0	0	0	0	0	**1**
10:15	0	0	0	0	0	1	
10:30	0	0	0	0	0	0	
10:45	0	0	0	0	0	0	
11:00	1	2	0	0	0	0	**5**
11:15	1	1	0	0	0	0	
11:30	0	0	0	0	0	0	
11:45	0	0	0	0	0	0	
12:00	0	0	0	0	0	0	**3**
12:15	0	0	0	1	0	0	
12:30	0	0	1	1	0	0	
12:45	0	0	0	0	0	0	
13:00	0	0	0	0	0	0	**1**
13:15	0	0	0	1	0	0	
13:30	0	0	0	0	0	0	
13:45	0	0	0	0	0	0	
14:00	0	0	0	0	1	0	**3**
14:15	0	0	1	1	0	0	
14:30	0	0	0	0	0	0	
14:45	0	0	0	0	0	0	
15:00	0	0	0	1	0	0	**18**
15:15	0	0	0	0	0	0	
15:30	0	1	0	8	0	2	
15:45	0	2	0	4	0	0	
16:00	0	0	0	1	0	0	**1**
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**2**	**7**	**3**	**20**	**1**	**3**	**36**

Location: Driveway 3 (Roundtree Ln.)
Date: 05-19-2022
Site Code: 3

	Thursday, May 19, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	3	1	1	0	0	0	13
6:45	5	0	3	0	0	0	
7:00	5	1	2	0	0	2	20
7:15	2	0	0	1	0	1	
7:30	0	0	0	1	1	0	
7:45	0	0	1	2	0	1	
8:00	0	0	1	1	0	0	5
8:15	1	0	0	0	0	1	
8:30	0	0	0	1	0	0	
8:45	0	0	0	0	0	0	
9:00	0	0	2	0	0	1	6
9:15	0	0	0	0	0	0	
9:30	0	0	0	0	0	1	
9:45	0	0	1	1	0	0	
10:00	0	0	0	0	0	0	4
10:15	0	0	0	0	0	0	
10:30	0	0	1	1	0	0	
10:45	0	0	1	1	0	0	
11:00	0	0	1	0	0	0	3
11:15	0	0	0	0	0	0	
11:30	0	0	0	1	0	0	
11:45	0	1	0	0	0	0	
12:00	0	0	0	0	0	0	2
12:15	1	1	0	0	0	0	
12:30	0	0	0	0	0	0	
12:45	0	0	0	0	0	0	
13:00	0	0	0	0	0	0	2
13:15	0	0	0	0	0	0	
13:30	0	0	0	1	0	0	
13:45	0	0	1	0	0	0	
14:00	0	0	1	1	1	0	8
14:15	0	0	0	0	1	1	
14:30	0	0	0	0	1	1	
14:45	0	0	1	0	0	0	
15:00	0	0	0	0	0	0	12
15:15	0	0	1	0	0	0	
15:30	0	1	1	3	0	0	
15:45	2	2	1	0	1	0	
16:00	1	2	1	0	0	0	4
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**20**	**9**	**21**	**15**	**5**	**9**	**79**

Location: Driveway 3 (Roundtree Ln.)
Date: 05-20-2022
Site Code: 3

	Friday, May 20, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	1	0	0	0	12
6:45	5	0	5	1	0	0	
7:00	6	1	1	1	0	0	15
7:15	1	0	0	1	0	2	
7:30	0	0	0	0	0	0	
7:45	0	0	2	0	0	0	
8:00	0	0	0	0	0	0	2
8:15	1	0	0	0	0	0	
8:30	0	0	0	0	0	0	
8:45	0	0	0	0	0	1	
9:00	1	0	0	0	0	0	4
9:15	0	0	0	0	0	0	
9:30	0	0	0	0	0	1	
9:45	1	0	1	0	0	0	
10:00	0	1	0	0	0	0	6
10:15	1	0	0	1	0	0	
10:30	0	1	0	1	0	0	
10:45	0	0	0	1	0	0	
11:00	0	0	0	0	0	0	3
11:15	0	0	0	0	0	0	
11:30	0	2	0	0	0	0	
11:45	0	0	1	0	0	0	
12:00	0	0	1	0	0	0	10
12:15	1	1	0	2	0	1	
12:30	2	0	1	0	0	0	
12:45	1	0	0	0	0	0	
13:00	0	0	0	0	0	0	4
13:15	0	0	0	0	0	0	
13:30	0	1	1	2	0	0	
13:45	0	0	0	0	0	0	
14:00	0	0	0	0	0	0	4
14:15	0	1	0	0	0	0	
14:30	0	1	0	0	0	1	
14:45	0	0	0	0	1	0	
15:00	0	0	2	0	0	0	9
15:15	0	1	0	0	0	0	
15:30	0	0	0	2	0	0	
15:45	1	3	0	0	0	0	
16:00	0	1	0	0	0	0	1
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**21**	**14**	**16**	**12**	**1**	**6**	**70**

Location: Driveway 3 (Roundtree Ln.)
Date: 05-21-2022
Site Code: 3

	Saturday, May 21, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	0	0	0	0	0	0	7
6:45	5	0	2	0	0	0	
7:00	1	3	0	0	0	0	7
7:15	1	0	0	0	0	0	
7:30	1	0	0	0	0	0	
7:45	0	0	0	0	0	1	
8:00	0	0	0	0	0	0	1
8:15	1	0	0	0	0	0	
8:30	0	0	0	0	0	0	
8:45	0	0	0	0	0	0	
9:00	0	0	1	0	0	0	2
9:15	0	0	0	0	0	0	
9:30	0	0	0	0	0	0	
9:45	0	0	1	0	0	0	
10:00	0	0	0	0	0	0	0
10:15	0	0	0	0	0	0	
10:30	0	0	0	0	0	0	
10:45	0	0	0	0	0	0	
11:00	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	
11:30	0	0	0	0	0	0	
11:45	0	0	0	0	0	0	
12:00	0	0	0	0	0	0	1
12:15	0	0	0	0	1	0	
12:30	0	0	0	0	0	0	
12:45	0	0	0	0	0	0	
13:00	0	0	0	0	0	0	0
13:15	0	0	0	0	0	0	
13:30	0	0	0	0	0	0	
13:45	0	0	0	0	0	0	
14:00	0	0	0	0	0	0	1
14:15	0	0	0	0	0	0	
14:30	0	0	0	0	0	1	
14:45	0	0	0	0	0	0	
15:00	0	0	0	0	0	0	2
15:15	0	0	0	0	0	0	
15:30	0	0	0	0	0	0	
15:45	1	1	0	0	0	0	
16:00	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**10**	**4**	**4**	**0**	**1**	**2**	**21**

Location: Driveway 3 (Roundtree Ln.)
Date: 05-23-2022
Site Code: 3

	Monday, May 23, 2022						
	Passenger Vehicles		Pick-Up Trucks		Heavy Vehicles		Total
Time	Volume		Volume		Volume		
	WB	EB	WB	EB	WB	EB	
6:30	2	0	2	0	0	0	11
6:45	4	0	3	0	0	0	
7:00	3	0	1	1	0	1	14
7:15	1	0	0	4	0	1	
7:30	0	0	0	0	0	1	
7:45	0	0	0	0	1	0	
8:00	0	0	0	0	0	0	2
8:15	0	0	0	0	0	0	
8:30	0	0	0	0	0	0	
8:45	0	0	0	0	0	2	
9:00	0	0	0	0	0	0	4
9:15	0	0	0	2	0	0	
9:30	0	0	0	0	1	1	
9:45	0	0	0	0	0	0	
10:00	0	0	0	0	0	0	1
10:15	0	0	0	1	0	0	
10:30	0	0	0	0	0	0	
10:45	0	0	0	0	0	0	
11:00	0	0	1	0	0	0	4
11:15	1	0	0	0	0	0	
11:30	0	1	0	0	0	0	
11:45	0	0	1	0	0	0	
12:00	0	0	0	0	0	0	2
12:15	0	1	0	0	0	0	
12:30	0	0	0	0	0	0	
12:45	1	0	0	0	0	0	
13:00	0	0	0	0	0	0	3
13:15	0	0	1	1	0	0	
13:30	0	0	1	0	0	0	
13:45	0	0	0	0	0	0	
14:00	0	0	0	0	0	1	6
14:15	0	0	1	0	0	1	
14:30	0	0	0	1	0	0	
14:45	0	0	1	1	0	0	
15:00	0	0	0	0	0	0	10
15:15	0	1	0	2	0	0	
15:30	0	1	0	3	0	0	
15:45	0	1	1	0	1	0	
16:00	1	1	1	0	0	0	3
16:15	0	0	0	0	0	0	
12-HOUR TOTAL	**13**	**6**	**14**	**16**	**3**	**8**	**60**

Appendices C – Synchro Outputs – All Scenarios

Intersection	
Int Delay, s/veh	9.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	172	300	68	19	47	99
Future Vol, veh/h	172	300	68	19	47	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	261	455	75	21	57	119

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	307	75	0	-	75	0
Stage 1	75	-	-	-	-	-
Stage 2	233	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	681	992	-	0	1512	-
Stage 1	943	-	-	0	-	-
Stage 2	801	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	653	992	-	-	1512	-
Mov Cap-2 Maneuver	653	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	769	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.55	0	2.41
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	653	992	1512	-
HCM Lane V/C Ratio	-	0.399	0.458	0.037	-
HCM Control Delay (s/veh)	-	14.1	11.7	7.5	-
HCM Lane LOS	-	B	B	A	-
HCM 95th %tile Q(veh)	-	1.9	2.4	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	1	25	0	0	0	0	45	56	68	211	0
Future Vol, veh/h	49	1	25	0	0	0	0	45	56	68	211	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	52	1	27	0	0	0	0	46	58	87	271	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	491	549	271	-	0	0	104	0	0
Stage 1	445	445	-	-	-	-	-	-	-
Stage 2	46	104	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	516	446	710	0	-	-	1463	-	0
Stage 1	621	578	-	0	-	-	-	-	0
Stage 2	946	813	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	479	0	710	-	-	-	1463	-	-
Mov Cap-2 Maneuver	479	0	-	-	-	-	-	-	-
Stage 1	621	0	-	-	-	-	-	-	-
Stage 2	880	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.39	0	1.86
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	479	710	439	-
HCM Lane V/C Ratio	-	-	0.111	0.037	0.06	-
HCM Control Delay (s/veh)	-	-	13.4	10.3	7.6	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.2	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	17	0	3	0	93	12	4	230	1
Future Vol, veh/h	3	0	0	17	0	3	0	93	12	4	230	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	24	0	4	0	106	14	6	319	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	437	451	320	443	444	113	321	0	0	119	0	0
Stage 1	331	331	-	113	113	-	-	-	-	-	-	-
Stage 2	106	119	-	331	332	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	533	507	725	528	511	863	1250	-	-	1481	-	-
Stage 1	686	649	-	897	806	-	-	-	-	-	-	-
Stage 2	905	801	-	687	648	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	528	505	725	526	509	863	1250	-	-	1481	-	-
Mov Cap-2 Maneuver	528	505	-	526	509	-	-	-	-	-	-	-
Stage 1	683	646	-	897	806	-	-	-	-	-	-	-
Stage 2	900	801	-	684	645	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.87	11.79	0	0.13
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1250	-	-	528	-	559	31	-	-
HCM Lane V/C Ratio	-	-	-	0.008	-	0.05	0.004	-	-
HCM Control Delay (s/veh)	0	-	-	11.9	0	11.8	7.4	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	52	0	37	198
Future Vol, veh/h	5	31	52	0	37	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	84	0	51	275

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	462	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	378	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	562	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	539	954	-	-	1476	-
Mov Cap-2 Maneuver	539	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	669	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.35	0	1.19
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	539	954	1476	-
HCM Lane V/C Ratio	-	-	0.013	0.047	0.035	-
HCM Control Delay (s/veh)	-	-	11.8	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	14	38	2	29	179
Future Vol, veh/h	3	14	38	2	29	179
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	6	30	54	3	45	280

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	427	57	0	0	58	0
Stage 1	57	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	4.31	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	2.389	-
Pot Cap-1 Maneuver	530	977	-	-	1433	-
Stage 1	892	-	-	-	-	-
Stage 2	635	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	509	975	-	-	1430	-
Mov Cap-2 Maneuver	509	-	-	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	611	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.4	0	1.06
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	509	975	1430	-
HCM Lane V/C Ratio	-	-	0.013	0.031	0.032	-
HCM Control Delay (s/veh)	-	-	12.2	8.8	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	163	197	14	18	56
Future Vol, veh/h	25	163	197	14	18	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	35	230	259	18	29	90

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	408	259	0	0	259	0
Stage 1	259	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	588	777	-	-	1317	-
Stage 1	770	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	575	777	-	-	1317	-
Mov Cap-2 Maneuver	575	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.58	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	575	777	438	-
HCM Lane V/C Ratio	-	-	0.061	0.295	0.022	-
HCM Control Delay (s/veh)	-	-	11.7	11.6	7.8	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	1.2	0.1	-

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	89	70	149	22	61	61
Future Vol, veh/h	89	70	149	22	61	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	135	106	164	24	73	73

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	384	164	0	-	164	0
Stage 1	164	-	-	-	-	-
Stage 2	220	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	615	886	-	0	1403	-
Stage 1	861	-	-	0	-	-
Stage 2	811	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	581	886	-	-	1403	-
Mov Cap-2 Maneuver	581	-	-	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.54	0	3.85
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	581	886	1403	-
HCM Lane V/C Ratio	-	0.232	0.12	0.052	-
HCM Control Delay (s/veh)	-	13.1	9.6	7.7	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0.9	0.4	0.2	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	122	1	19	0	0	0	0	50	59	48	103	0
Future Vol, veh/h	122	1	19	0	0	0	0	50	59	48	103	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	130	1	20	0	0	0	0	52	61	62	132	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	307	367	132	-	0	0	112	0	0
Stage 1	255	255	-	-	-	-	-	-	-
Stage 2	52	112	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	661	565	852	0	-	-	1453	-	0
Stage 1	760	700	-	0	-	-	-	-	0
Stage 2	941	806	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	631	0	852	-	-	-	1453	-	-
Mov Cap-2 Maneuver	631	0	-	-	-	-	-	-	-
Stage 1	760	0	-	-	-	-	-	-	-
Stage 2	898	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.81	0	2.41
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	631	852	572	-
HCM Lane V/C Ratio	-	-	0.207	0.024	0.042	-
HCM Control Delay (s/veh)	-	-	12.2	9.3	7.6	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	2	1	3	1	99	21	5	114	5
Future Vol, veh/h	7	0	2	2	1	3	1	99	21	5	114	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	3	3	1	4	1	113	24	7	158	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	291	314	162	299	306	124	165	0	0	136	0	0
Stage 1	176	176	-	127	127	-	-	-	-	-	-	-
Stage 2	115	139	-	172	179	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	665	605	888	657	611	849	1425	-	-	1460	-	-
Stage 1	831	757	-	882	795	-	-	-	-	-	-	-
Stage 2	894	786	-	834	755	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	656	601	888	651	607	849	1425	-	-	1460	-	-
Mov Cap-2 Maneuver	656	601	-	651	607	-	-	-	-	-	-	-
Stage 1	826	754	-	881	794	-	-	-	-	-	-	-
Stage 2	887	785	-	827	751	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	10.23	10.01	0.06	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	14	-	-	656	888	727	72	-	-
HCM Lane V/C Ratio	0.001	-	-	0.014	0.003	0.012	0.005	-	-
HCM Control Delay (s/veh)	7.5	0	-	10.6	9.1	10	7.5	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	57	4	39	61
Future Vol, veh/h	1	42	57	4	39	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	92	6	54	85

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	285	92	0	0	98	0
Stage 1	92	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	710	944	-	-	1458	-
Stage 1	937	-	-	-	-	-
Stage 2	844	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	682	944	-	-	1458	-
Mov Cap-2 Maneuver	682	-	-	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	812	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.11	0	2.95
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	682	944	1458	-
HCM Lane V/C Ratio	-	-	0.002	0.064	0.037	-
HCM Control Delay (s/veh)	-	-	10.3	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	60	0	0	59
Future Vol, veh/h	0	0	60	0	0	59
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	0	0	85	0	0	92

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	177	85	0	-	-	-
Stage 1	85	-	-	-	-	-
Stage 2	92	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	-	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	-	-
Pot Cap-1 Maneuver	747	942	-	0	0	-
Stage 1	866	-	-	0	0	-
Stage 2	859	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	747	942	-	-	-	-
Mov Cap-2 Maneuver	747	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	859	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s/veh)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	30	86	27	29	90
Future Vol, veh/h	24	30	86	27	29	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	34	42	113	36	47	145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	352	113	0	0	113	0
Stage 1	113	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	634	937	-	-	1489	-
Stage 1	897	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	612	937	-	-	1489	-
Mov Cap-2 Maneuver	612	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10	0	1.83
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	612	937	439	-
HCM Lane V/C Ratio	-	-	0.055	0.045	0.031	-
HCM Control Delay (s/veh)	-	-	11.2	9	7.5	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	10.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	200	308	80	31	70	129
Future Vol, veh/h	200	308	80	31	70	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	303	467	88	34	84	155

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	412	88	0	-	88	0
Stage 1	88	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	592	976	-	0	1495	-
Stage 1	930	-	-	0	-	-
Stage 2	728	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	556	976	-	-	1495	-
Mov Cap-2 Maneuver	556	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.76	0	2.66
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	556	976	1495	-
HCM Lane V/C Ratio	-	0.545	0.478	0.056	-
HCM Control Delay (s/veh)	-	19	12	7.6	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	3.3	2.6	0.2	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	66	2	37	0	0	0	0	51	73	87	249	0
Future Vol, veh/h	66	2	37	0	0	0	0	51	73	87	249	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	70	2	39	0	0	0	0	53	75	112	319	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	595	670	319	-	0	0	128	0	0
Stage 1	542	542	-	-	-	-	-	-	-
Stage 2	53	128	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	448	381	665	0	-	-	1434	-	0
Stage 1	559	523	-	0	-	-	-	-	0
Stage 2	940	794	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	406	0	665	-	-	-	1434	-	-
Mov Cap-2 Maneuver	406	0	-	-	-	-	-	-	-
Stage 1	559	0	-	-	-	-	-	-	-
Stage 2	851	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.02	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	406	665	466	-
HCM Lane V/C Ratio	-	-	0.178	0.059	0.078	-
HCM Control Delay (s/veh)	-	-	15.8	10.8	7.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.2	0.3	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	19	0	3	0	116	10	8	276	1
Future Vol, veh/h	3	0	0	19	0	3	0	116	10	8	276	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	27	0	4	0	132	11	11	383	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	538	549	384	543	544	138	385	0	0	143	0	0
Stage 1	406	406	-	138	138	-	-	-	-	-	-	-
Stage 2	132	143	-	406	407	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	457	446	668	454	449	835	1185	-	-	1452	-	-
Stage 1	625	601	-	870	787	-	-	-	-	-	-	-
Stage 2	877	782	-	626	601	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	450	442	668	449	444	835	1185	-	-	1452	-	-
Mov Cap-2 Maneuver	450	442	-	449	444	-	-	-	-	-	-	-
Stage 1	619	595	-	870	787	-	-	-	-	-	-	-
Stage 2	872	782	-	620	595	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.07	13.03	0	0.21
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1185	-	-	450	-	479	50	-	-
HCM Lane V/C Ratio	-	-	-	0.009	-	0.065	0.008	-	-
HCM Control Delay (s/veh)	0	-	-	13.1	0	13	7.5	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	52	0	37	209
Future Vol, veh/h	5	31	52	0	37	209
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	84	0	51	290

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	477	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	551	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	528	954	-	-	1476	-
Mov Cap-2 Maneuver	528	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	658	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.37	0	1.13
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	528	954	1476	-
HCM Lane V/C Ratio	-	-	0.014	0.047	0.035	-
HCM Control Delay (s/veh)	-	-	11.9	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	14	38	2	29	190
Future Vol, veh/h	3	14	38	2	29	190
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	6	30	54	3	45	297

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	444	57	0	0	58	0
Stage 1	57	-	-	-	-	-
Stage 2	388	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	4.31	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	2.389	-
Pot Cap-1 Maneuver	517	977	-	-	1433	-
Stage 1	892	-	-	-	-	-
Stage 2	623	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	497	975	-	-	1430	-
Mov Cap-2 Maneuver	497	-	-	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	600	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.43	0	1.01
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	497	975	1430	-
HCM Lane V/C Ratio	-	-	0.013	0.031	0.032	-
HCM Control Delay (s/veh)	-	-	12.3	8.8	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	167	224	15	18	119
Future Vol, veh/h	36	167	224	15	18	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	51	235	295	20	29	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	545	295	0	0	295	0
Stage 1	295	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	489	742	-	-	1278	-
Stage 1	742	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	477	742	-	-	1278	-
Mov Cap-2 Maneuver	477	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.33	0	1.04
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	477	742	236	-
HCM Lane V/C Ratio	-	-	0.106	0.317	0.023	-
HCM Control Delay (s/veh)	-	-	13.4	12.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	1.4	0.1	-

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	109	63	193	38	59	64
Future Vol, veh/h	109	63	193	38	59	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	165	95	212	42	71	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	431	212	0	-	212	0
Stage 1	212	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	577	833	-	0	1346	-
Stage 1	819	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	545	833	-	-	1346	-
Mov Cap-2 Maneuver	545	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	768	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.77	0	3.75
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	545	833	1346	-
HCM Lane V/C Ratio	-	0.303	0.115	0.053	-
HCM Control Delay (s/veh)	-	14.4	9.9	7.8	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	1.3	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Future Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	167	5	41	0	0	0	0	78	104	56	160	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	351	456	160	-	0	0	182	0	0
Stage 1	273	273	-	-	-	-	-	-	-
Stage 2	78	182	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	623	504	821	0	-	-	1369	-	0
Stage 1	746	688	-	0	-	-	-	-	0
Stage 2	915	752	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	594	0	821	-	-	-	1369	-	-
Mov Cap-2 Maneuver	594	0	-	-	-	-	-	-	-
Stage 1	746	0	-	-	-	-	-	-	-
Stage 2	874	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.75	0	2.02
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	594	821	469	-
HCM Lane V/C Ratio	-	-	0.29	0.051	0.041	-
HCM Control Delay (s/veh)	-	-	13.5	9.6	7.7	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Future Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	3	27	3	23	5	176	27	7	228	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	430	456	229	441	443	190	231	0	0	203	0	0
Stage 1	243	243	-	199	199	-	-	-	-	-	-	-
Stage 2	187	213	-	242	244	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	539	504	815	530	512	779	1349	-	-	1380	-	-
Stage 1	765	708	-	808	740	-	-	-	-	-	-	-
Stage 2	820	730	-	766	707	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	516	499	815	524	507	779	1349	-	-	1380	-	-
Mov Cap-2 Maneuver	516	499	-	524	507	-	-	-	-	-	-	-
Stage 1	761	704	-	805	737	-	-	-	-	-	-	-
Stage 2	790	728	-	759	703	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.51	11.47	0.17	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	38	-	-	516	815	609	53	-	-
HCM Lane V/C Ratio	0.003	-	-	0.018	0.003	0.086	0.005	-	-
HCM Control Delay (s/veh)	7.7	0	-	12.1	9.4	11.5	7.6	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.3	0	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	58	4	39	73
Future Vol, veh/h	1	42	58	4	39	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	94	6	54	101

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	303	94	0	0	100	0
Stage 1	94	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	693	942	-	-	1456	-
Stage 1	935	-	-	-	-	-
Stage 2	830	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	665	942	-	-	1456	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	797	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.12	0	2.64
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	665	942	1456	-
HCM Lane V/C Ratio	-	-	0.002	0.065	0.037	-
HCM Control Delay (s/veh)	-	-	10.4	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	61	0	0	71
Future Vol, veh/h	0	0	61	0	0	71
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	0	0	86	0	0	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	197	86	0	-	-	-
Stage 1	86	-	-	-	-	-
Stage 2	111	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	-	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	-	-
Pot Cap-1 Maneuver	727	941	-	0	0	-
Stage 1	865	-	-	0	0	-
Stage 2	842	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	727	941	-	-	-	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	865	-	-	-	-	-
Stage 2	842	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s/veh)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	44	207	28	28	161
Future Vol, veh/h	31	44	207	28	28	161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	44	62	272	37	45	260

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	622	272	0	0	272	0
Stage 1	272	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	441	764	-	-	1303	-
Stage 1	760	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	423	764	-	-	1303	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.93	0	1.16
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	423	764	267	-
HCM Lane V/C Ratio	-	-	0.103	0.081	0.035	-
HCM Control Delay (s/veh)	-	-	14.5	10.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.3	0.1	-

Intersection	
Int Delay, s/veh	11.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	208	308	80	31	70	129
Future Vol, veh/h	208	308	80	31	70	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	315	467	88	34	84	155

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	412	88	0	-	88	0
Stage 1	88	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	592	976	-	0	1495	-
Stage 1	930	-	-	0	-	-
Stage 2	728	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	556	976	-	-	1495	-
Mov Cap-2 Maneuver	556	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.08	0	2.66
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	556	976	1495	-
HCM Lane V/C Ratio	-	0.567	0.478	0.056	-
HCM Control Delay (s/veh)	-	19.6	12	7.6	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	3.5	2.6	0.2	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	66	2	37	0	0	0	0	51	79	87	257	0
Future Vol, veh/h	66	2	37	0	0	0	0	51	79	87	257	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	70	2	39	0	0	0	0	53	81	112	329	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	605	687	329	-	0	0	134	0	0
Stage 1	553	553	-	-	-	-	-	-	-
Stage 2	53	134	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	442	372	656	0	-	-	1426	-	0
Stage 1	553	518	-	0	-	-	-	-	0
Stage 2	940	789	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	399	0	656	-	-	-	1426	-	-
Mov Cap-2 Maneuver	399	0	-	-	-	-	-	-	-
Stage 1	553	0	-	-	-	-	-	-	-
Stage 2	850	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.18	0	1.96
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	399	656	455	-
HCM Lane V/C Ratio	-	-	0.181	0.06	0.078	-
HCM Control Delay (s/veh)	-	-	16	10.8	7.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2	0.3	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	19	0	3	0	122	10	8	284	1
Future Vol, veh/h	3	0	0	19	0	3	0	122	10	8	284	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	27	0	4	0	139	11	11	394	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	556	567	395	561	562	144	396	0	0	150	0	0
Stage 1	417	417	-	144	144	-	-	-	-	-	-	-
Stage 2	139	150	-	417	418	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	445	436	658	441	438	827	1174	-	-	1444	-	-
Stage 1	617	594	-	863	781	-	-	-	-	-	-	-
Stage 2	869	777	-	617	594	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	438	431	658	437	434	827	1174	-	-	1444	-	-
Mov Cap-2 Maneuver	438	431	-	437	434	-	-	-	-	-	-	-
Stage 1	611	589	-	863	781	-	-	-	-	-	-	-
Stage 2	865	777	-	611	588	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.29	13.25	0	0.21
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1174	-	-	438	-	467	49	-	-
HCM Lane V/C Ratio	-	-	-	0.009	-	0.066	0.008	-	-
HCM Control Delay (s/veh)	0	-	-	13.3	0	13.3	7.5	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	58	0	37	217
Future Vol, veh/h	5	31	58	0	37	217
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	94	0	51	301

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	498	94	0	0	94	0
Stage 1	94	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	536	942	-	-	1464	-
Stage 1	935	-	-	-	-	-
Stage 2	678	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	513	942	-	-	1464	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	650	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.44	0	1.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	513	942	1464	-
HCM Lane V/C Ratio	-	-	0.014	0.048	0.035	-
HCM Control Delay (s/veh)	-	-	12.1	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	20	38	2	37	190
Future Vol, veh/h	3	20	38	2	37	190
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	6	43	54	3	58	297

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	469	57	0	0	58	0
Stage 1	57	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	4.31	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	2.389	-
Pot Cap-1 Maneuver	500	977	-	-	1433	-
Stage 1	892	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	475	975	-	-	1430	-
Mov Cap-2 Maneuver	475	-	-	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.36	0	1.24
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	475	975	1430	-
HCM Lane V/C Ratio	-	-	0.013	0.044	0.04	-
HCM Control Delay (s/veh)	-	-	12.7	8.9	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	167	224	15	18	119
Future Vol, veh/h	36	167	224	15	18	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	51	235	295	20	29	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	545	295	0	0	295	0
Stage 1	295	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	489	742	-	-	1278	-
Stage 1	742	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	477	742	-	-	1278	-
Mov Cap-2 Maneuver	477	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.33	0	1.04
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	477	742	236	-
HCM Lane V/C Ratio	-	-	0.106	0.317	0.023	-
HCM Control Delay (s/veh)	-	-	13.4	12.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	1.4	0.1	-

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	109	63	193	38	59	64
Future Vol, veh/h	109	63	193	38	59	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	165	95	212	42	71	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	431	212	0	-	212	0
Stage 1	212	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	577	833	-	0	1346	-
Stage 1	819	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	545	833	-	-	1346	-
Mov Cap-2 Maneuver	545	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	768	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.77	0	3.75
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	545	833	1346	-
HCM Lane V/C Ratio	-	0.303	0.115	0.053	-
HCM Control Delay (s/veh)	-	14.4	9.9	7.8	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	1.3	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Future Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	167	5	41	0	0	0	0	78	104	56	160	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	351	456	160	-	0	0	182	0	0
Stage 1	273	273	-	-	-	-	-	-	-
Stage 2	78	182	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	623	504	821	0	-	-	1369	-	0
Stage 1	746	688	-	0	-	-	-	-	0
Stage 2	915	752	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	594	0	821	-	-	-	1369	-	-
Mov Cap-2 Maneuver	594	0	-	-	-	-	-	-	-
Stage 1	746	0	-	-	-	-	-	-	-
Stage 2	874	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.75	0	2.02
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	594	821	469	-
HCM Lane V/C Ratio	-	-	0.29	0.051	0.041	-
HCM Control Delay (s/veh)	-	-	13.5	9.6	7.7	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Future Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	3	27	3	23	5	176	27	7	228	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	430	456	229	441	443	190	231	0	0	203	0	0
Stage 1	243	243	-	199	199	-	-	-	-	-	-	-
Stage 2	187	213	-	242	244	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	539	504	815	530	512	779	1349	-	-	1380	-	-
Stage 1	765	708	-	808	740	-	-	-	-	-	-	-
Stage 2	820	730	-	766	707	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	516	499	815	524	507	779	1349	-	-	1380	-	-
Mov Cap-2 Maneuver	516	499	-	524	507	-	-	-	-	-	-	-
Stage 1	761	704	-	805	737	-	-	-	-	-	-	-
Stage 2	790	728	-	759	703	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.51	11.47	0.17	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	38	-	-	516	815	609	53	-	-
HCM Lane V/C Ratio	0.003	-	-	0.018	0.003	0.086	0.005	-	-
HCM Control Delay (s/veh)	7.7	0	-	12.1	9.4	11.5	7.6	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.3	0	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	58	4	39	73
Future Vol, veh/h	1	42	58	4	39	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	94	6	54	101

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	303	94	0	0	100	0
Stage 1	94	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	693	942	-	-	1456	-
Stage 1	935	-	-	-	-	-
Stage 2	830	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	665	942	-	-	1456	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	797	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.12	0	2.64
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	665	942	1456	-
HCM Lane V/C Ratio	-	-	0.002	0.065	0.037	-
HCM Control Delay (s/veh)	-	-	10.4	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	61	0	0	71
Future Vol, veh/h	0	0	61	0	0	71
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	0	0	86	0	0	111

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	197	86	0	-	-	-
Stage 1	86	-	-	-	-	-
Stage 2	111	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	-	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	-	-
Pot Cap-1 Maneuver	727	941	-	0	0	-
Stage 1	865	-	-	0	0	-
Stage 2	842	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	727	941	-	-	-	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	865	-	-	-	-	-
Stage 2	842	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s/veh)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	44	207	28	28	161
Future Vol, veh/h	31	44	207	28	28	161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	44	62	272	37	45	260

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	622	272	0	0	272	0
Stage 1	272	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	441	764	-	-	1303	-
Stage 1	760	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	423	764	-	-	1303	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.93	0	1.16
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	423	764	267	-
HCM Lane V/C Ratio	-	-	0.103	0.081	0.035	-
HCM Control Delay (s/veh)	-	-	14.5	10.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.3	0.1	-

Intersection	
Int Delay, s/veh	16.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	236	319	96	45	102	168
Future Vol, veh/h	236	319	96	45	102	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	358	483	105	49	123	202

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	554	105	0	-	105	0
Stage 1	105	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	490	954	-	0	1473	-
Stage 1	914	-	-	0	-	-
Stage 2	639	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	444	954	-	-	1473	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	579	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	23.8	0	2.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	444	954	1473	-
HCM Lane V/C Ratio	-	0.805	0.506	0.083	-
HCM Control Delay (s/veh)	-	39	12.6	7.7	-
HCM Lane LOS	-	E	B	A	-
HCM 95th %tile Q(veh)	-	7.4	2.9	0.3	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	4	51	0	0	0	0	60	95	111	300	0
Future Vol, veh/h	87	4	51	0	0	0	0	60	95	111	300	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	93	4	54	0	0	0	0	62	98	142	385	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	731	829	385	-	0	0	160	0	0
Stage 1	669	669	-	-	-	-	-	-	-
Stage 2	62	160	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	372	308	609	0	-	-	1395	-	0
Stage 1	487	459	-	0	-	-	-	-	0
Stage 2	931	769	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	323	0	609	-	-	-	1395	-	-
Mov Cap-2 Maneuver	323	0	-	-	-	-	-	-	-
Stage 1	487	0	-	-	-	-	-	-	-
Stage 2	810	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	17.46	0	2.13
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	323	609	486	-
HCM Lane V/C Ratio	-	-	0.299	0.089	0.102	-
HCM Control Delay (s/veh)	-	-	20.8	11.5	7.9	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.3	0.3	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	21	0	4	0	145	10	10	337	1
Future Vol, veh/h	3	0	0	21	0	4	0	145	10	10	337	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	30	0	6	0	165	11	14	468	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	661	673	469	666	668	170	469	0	0	176	0	0
Stage 1	497	497	-	170	170	-	-	-	-	-	-	-
Stage 2	165	176	-	496	497	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	378	379	599	376	382	799	1103	-	-	1412	-	-
Stage 1	559	548	-	836	761	-	-	-	-	-	-	-
Stage 2	842	757	-	560	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	371	374	599	371	377	799	1103	-	-	1412	-	-
Mov Cap-2 Maneuver	371	374	-	371	377	-	-	-	-	-	-	-
Stage 1	552	541	-	836	761	-	-	-	-	-	-	-
Stage 2	836	757	-	552	541	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	14.82	14.73	0	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1103	-	-	371	-	405	52	-	-
HCM Lane V/C Ratio	-	-	-	0.011	-	0.087	0.01	-	-
HCM Control Delay (s/veh)	0	-	-	14.8	0	14.7	7.6	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.3	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	52	0	37	224
Future Vol, veh/h	5	31	52	0	37	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	84	0	51	311

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	498	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	536	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	513	954	-	-	1476	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	643	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.4	0	1.07
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	513	954	1476	-
HCM Lane V/C Ratio	-	-	0.014	0.047	0.035	-
HCM Control Delay (s/veh)	-	-	12.1	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	14	38	2	29	205
Future Vol, veh/h	3	14	38	2	29	205
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	6	30	54	3	45	320

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	468	57	0	0	58	0
Stage 1	57	-	-	-	-	-
Stage 2	411	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	4.31	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	2.389	-
Pot Cap-1 Maneuver	501	977	-	-	1433	-
Stage 1	892	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	481	975	-	-	1430	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	584	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.48	0	0.94
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	481	975	1430	-
HCM Lane V/C Ratio	-	-	0.013	0.031	0.032	-
HCM Control Delay (s/veh)	-	-	12.6	8.8	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	176	254	14	18	199
Future Vol, veh/h	46	176	254	14	18	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	65	248	334	18	29	321

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	713	334	0	0	334	0
Stage 1	334	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	389	705	-	-	1236	-
Stage 1	712	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	378	705	-	-	1236	-
Mov Cap-2 Maneuver	378	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.6	0	0.66
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	378	705	149	-
HCM Lane V/C Ratio	-	-	0.171	0.351	0.023	-
HCM Control Delay (s/veh)	-	-	16.5	12.8	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	1.6	0.1	-

Intersection	
Int Delay, s/veh	6.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	135	55	249	58	57	68
Future Vol, veh/h	135	55	249	58	57	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	205	83	274	64	69	82

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	493	274	0	-	274	0
Stage 1	274	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	532	770	-	0	1278	-
Stage 1	768	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	502	770	-	-	1278	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.06	0	3.64
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	502	770	1278	-
HCM Lane V/C Ratio	-	0.408	0.108	0.054	-
HCM Control Delay (s/veh)	-	17	10.2	8	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	2	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Future Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	216	7	74	0	0	0	0	113	159	55	190	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	413	572	190	-	0	0	272	0	0
Stage 1	300	300	-	-	-	-	-	-	-
Stage 2	113	272	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	573	433	790	0	-	-	1268	-	0
Stage 1	725	669	-	0	-	-	-	-	0
Stage 2	882	688	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	545	0	790	-	-	-	1268	-	-
Mov Cap-2 Maneuver	545	0	-	-	-	-	-	-	-
Stage 1	725	0	-	-	-	-	-	-	-
Stage 2	840	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.6	0	1.79
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	545	790	405	-
HCM Lane V/C Ratio	-	-	0.41	0.094	0.043	-
HCM Control Delay (s/veh)	-	-	16.1	10	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	2	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Future Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	4	69	3	35	5	265	32	7	304	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	595	625	306	608	611	281	307	0	0	297	0	0
Stage 1	319	319	-	290	290	-	-	-	-	-	-	-
Stage 2	275	306	-	318	321	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	419	404	739	411	412	690	1265	-	-	1276	-	-
Stage 1	696	656	-	722	676	-	-	-	-	-	-	-
Stage 2	735	665	-	698	655	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	391	399	739	404	407	690	1265	-	-	1276	-	-
Mov Cap-2 Maneuver	391	399	-	404	407	-	-	-	-	-	-	-
Stage 1	692	652	-	719	673	-	-	-	-	-	-	-
Stage 2	692	663	-	689	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.08	14.96	0.12	0.17
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	27	-	-	391	739	468	40	-	-
HCM Lane V/C Ratio	0.004	-	-	0.024	0.005	0.229	0.005	-	-
HCM Control Delay (s/veh)	7.9	0	-	14.4	9.9	15	7.8	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.9	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	59	4	39	88
Future Vol, veh/h	1	42	59	4	39	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	95	6	54	122

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	326	95	0	0	102	0
Stage 1	95	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	673	940	-	-	1454	-
Stage 1	934	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	646	940	-	-	1454	-
Mov Cap-2 Maneuver	646	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	780	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.13	0	2.33
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	646	940	1454	-
HCM Lane V/C Ratio	-	-	0.002	0.065	0.037	-
HCM Control Delay (s/veh)	-	-	10.6	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	62	0	0	86
Future Vol, veh/h	0	0	62	0	0	86
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	0	0	87	0	0	134

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	222	87	0	-	-	-
Stage 1	87	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	-	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	-	-
Pot Cap-1 Maneuver	703	939	-	0	0	-
Stage 1	864	-	-	0	0	-
Stage 2	821	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	703	939	-	-	-	-
Mov Cap-2 Maneuver	703	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	821	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s/veh)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	63	364	28	28	256
Future Vol, veh/h	37	63	364	28	28	256
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	52	89	479	37	45	413

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	982	479	0	0	479	0
Stage 1	479	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	269	585	-	-	1094	-
Stage 1	611	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	255	585	-	-	1094	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	563	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.13	0	0.83
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	255	585	177	-
HCM Lane V/C Ratio	-	-	0.205	0.152	0.041	-
HCM Control Delay (s/veh)	-	-	22.7	12.3	8.4	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.5	0.1	-

Intersection	
Int Delay, s/veh	17.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	243	319	96	45	102	168
Future Vol, veh/h	243	319	96	45	102	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	368	483	105	49	123	202

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	554	105	0	-	105	0
Stage 1	105	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	490	954	-	0	1473	-
Stage 1	914	-	-	0	-	-
Stage 2	639	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	444	954	-	-	1473	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	579	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	25.19	0	2.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	444	954	1473	-
HCM Lane V/C Ratio	-	0.829	0.506	0.083	-
HCM Control Delay (s/veh)	-	41.7	12.6	7.7	-
HCM Lane LOS	-	E	B	A	-
HCM 95th %tile Q(veh)	-	7.9	2.9	0.3	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	4	51	0	0	0	0	60	101	111	307	0
Future Vol, veh/h	87	4	51	0	0	0	0	60	101	111	307	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	93	4	54	0	0	0	0	62	104	142	394	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	740	844	394	-	0	0	166	0	0
Stage 1	678	678	-	-	-	-	-	-	-
Stage 2	62	166	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	367	302	602	0	-	-	1388	-	0
Stage 1	483	455	-	0	-	-	-	-	0
Stage 2	931	765	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	319	0	602	-	-	-	1388	-	-
Mov Cap-2 Maneuver	319	0	-	-	-	-	-	-	-
Stage 1	483	0	-	-	-	-	-	-	-
Stage 2	809	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	17.7	0	2.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	319	602	478	-
HCM Lane V/C Ratio	-	-	0.303	0.09	0.103	-
HCM Control Delay (s/veh)	-	-	21.1	11.6	7.9	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.3	0.3	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	21	0	4	0	151	10	10	344	1
Future Vol, veh/h	3	0	0	21	0	4	0	151	10	10	344	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	30	0	6	0	172	11	14	478	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	678	689	478	683	684	177	479	0	0	183	0	0
Stage 1	506	506	-	177	177	-	-	-	-	-	-	-
Stage 2	172	183	-	506	507	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	369	371	591	366	374	792	1094	-	-	1404	-	-
Stage 1	552	543	-	829	756	-	-	-	-	-	-	-
Stage 2	835	752	-	553	543	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	361	366	591	361	369	792	1094	-	-	1404	-	-
Mov Cap-2 Maneuver	361	366	-	361	369	-	-	-	-	-	-	-
Stage 1	545	536	-	829	756	-	-	-	-	-	-	-
Stage 2	829	752	-	545	535	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	15.07	14.99	0	0.21
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	361	-	396	51	-	-
HCM Lane V/C Ratio	-	-	-	0.011	-	0.089	0.01	-	-
HCM Control Delay (s/veh)	0	-	-	15.1	0	15	7.6	0	-
HCM Lane LOS	A	-	-	C	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.3	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	58	0	37	231
Future Vol, veh/h	5	31	58	0	37	231
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	94	0	51	321

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	517	94	0	0	94	0
Stage 1	94	-	-	-	-	-
Stage 2	424	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	522	942	-	-	1464	-
Stage 1	935	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	500	942	-	-	1464	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	636	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.47	0	1.04
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	500	942	1464	-
HCM Lane V/C Ratio	-	-	0.015	0.048	0.035	-
HCM Control Delay (s/veh)	-	-	12.3	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	20	38	2	36	205
Future Vol, veh/h	3	20	38	2	36	205
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	6	43	54	3	56	320

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	490	57	0	0	58	0
Stage 1	57	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	4.31	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	2.389	-
Pot Cap-1 Maneuver	486	977	-	-	1433	-
Stage 1	892	-	-	-	-	-
Stage 2	593	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	462	975	-	-	1430	-
Mov Cap-2 Maneuver	462	-	-	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	565	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.39	0	1.14
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	462	975	1430	-
HCM Lane V/C Ratio	-	-	0.014	0.044	0.039	-
HCM Control Delay (s/veh)	-	-	12.9	8.9	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	176	254	14	18	199
Future Vol, veh/h	46	176	254	14	18	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	65	248	334	18	29	321

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	713	334	0	0	334	0
Stage 1	334	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	389	705	-	-	1236	-
Stage 1	712	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	378	705	-	-	1236	-
Mov Cap-2 Maneuver	378	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.6	0	0.66
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	378	705	149	-
HCM Lane V/C Ratio	-	-	0.171	0.351	0.023	-
HCM Control Delay (s/veh)	-	-	16.5	12.8	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	1.6	0.1	-

Intersection	
Int Delay, s/veh	6.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	135	55	249	58	57	68
Future Vol, veh/h	135	55	249	58	57	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	205	83	274	64	69	82

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	493	274	0	-	274	0
Stage 1	274	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	532	770	-	0	1278	-
Stage 1	768	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	502	770	-	-	1278	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.06	0	3.64
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	502	770	1278	-
HCM Lane V/C Ratio	-	0.408	0.108	0.054	-
HCM Control Delay (s/veh)	-	17	10.2	8	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	2	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Future Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	216	7	74	0	0	0	0	113	159	55	190	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	413	572	190	-	0	0	272	0	0
Stage 1	300	300	-	-	-	-	-	-	-
Stage 2	113	272	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	573	433	790	0	-	-	1268	-	0
Stage 1	725	669	-	0	-	-	-	-	0
Stage 2	882	688	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	545	0	790	-	-	-	1268	-	-
Mov Cap-2 Maneuver	545	0	-	-	-	-	-	-	-
Stage 1	725	0	-	-	-	-	-	-	-
Stage 2	840	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.6	0	1.79
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	545	790	405	-
HCM Lane V/C Ratio	-	-	0.41	0.094	0.043	-
HCM Control Delay (s/veh)	-	-	16.1	10	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	2	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Future Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	4	69	3	35	5	265	32	7	304	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	595	625	306	608	611	281	307	0	0	297	0	0
Stage 1	319	319	-	290	290	-	-	-	-	-	-	-
Stage 2	275	306	-	318	321	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	419	404	739	411	412	690	1265	-	-	1276	-	-
Stage 1	696	656	-	722	676	-	-	-	-	-	-	-
Stage 2	735	665	-	698	655	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	391	399	739	404	407	690	1265	-	-	1276	-	-
Mov Cap-2 Maneuver	391	399	-	404	407	-	-	-	-	-	-	-
Stage 1	692	652	-	719	673	-	-	-	-	-	-	-
Stage 2	692	663	-	689	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.08	14.96	0.12	0.17
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	27	-	-	391	739	468	40	-	-
HCM Lane V/C Ratio	0.004	-	-	0.024	0.005	0.229	0.005	-	-
HCM Control Delay (s/veh)	7.9	0	-	14.4	9.9	15	7.8	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.9	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	59	4	39	88
Future Vol, veh/h	1	42	59	4	39	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	95	6	54	122

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	326	95	0	0	102	0
Stage 1	95	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	673	940	-	-	1454	-
Stage 1	934	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	646	940	-	-	1454	-
Mov Cap-2 Maneuver	646	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	780	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.13	0	2.33
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	646	940	1454	-
HCM Lane V/C Ratio	-	-	0.002	0.065	0.037	-
HCM Control Delay (s/veh)	-	-	10.6	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	62	0	0	86
Future Vol, veh/h	0	0	62	0	0	86
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	47	47	71	71	64	64
Heavy Vehicles, %	33	14	8	0	21	1
Mvmt Flow	0	0	87	0	0	134

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	222	87	0	-	-	-
Stage 1	87	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.73	6.34	-	-	-	-
Critical Hdwy Stg 1	5.73	-	-	-	-	-
Critical Hdwy Stg 2	5.73	-	-	-	-	-
Follow-up Hdwy	3.797	3.426	-	-	-	-
Pot Cap-1 Maneuver	703	939	-	0	0	-
Stage 1	864	-	-	0	0	-
Stage 2	821	-	-	0	0	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	703	939	-	-	-	-
Mov Cap-2 Maneuver	703	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	821	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s/veh)	-	0	0	-
HCM Lane LOS	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	63	364	28	28	256
Future Vol, veh/h	37	63	364	28	28	256
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	52	89	479	37	45	413

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	982	479	0	0	479	0
Stage 1	479	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	269	585	-	-	1094	-
Stage 1	611	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	255	585	-	-	1094	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	563	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.13	0	0.83
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	255	585	177	-
HCM Lane V/C Ratio	-	-	0.205	0.152	0.041	-
HCM Control Delay (s/veh)	-	-	22.7	12.3	8.4	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.5	0.1	-

Appendices D – Ramp Queuing - SimTraffic

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	SB
Directions Served	L	LT
Maximum Queue (ft)	87	42
Average Queue (ft)	46	5
95th Queue (ft)	73	26
Link Distance (ft)	1029	425
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	NB	SB
Directions Served	LT	TR	LT
Maximum Queue (ft)	73	8	52
Average Queue (ft)	33	0	8
95th Queue (ft)	64	8	32
Link Distance (ft)	184	170	770
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	NB	NB	SB
Directions Served	L	T	R	LT
Maximum Queue (ft)	106	4	5	45
Average Queue (ft)	53	0	0	6
95th Queue (ft)	87	5	5	28
Link Distance (ft)	1029	770		425
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			130	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	SB
Directions Served	LT	LT
Maximum Queue (ft)	82	56
Average Queue (ft)	36	11
95th Queue (ft)	67	37
Link Distance (ft)	184	770
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	NB	SB
Directions Served	L	T	LT
Maximum Queue (ft)	112	4	42
Average Queue (ft)	54	0	5
95th Queue (ft)	89	5	26
Link Distance (ft)	1029	770	425
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	SB
Directions Served	LT	LT
Maximum Queue (ft)	80	63
Average Queue (ft)	36	10
95th Queue (ft)	70	39
Link Distance (ft)	184	770
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	NB	NB	SB
Directions Served	L	T	R	LT
Maximum Queue (ft)	129	17	24	51
Average Queue (ft)	61	0	1	8
95th Queue (ft)	101	9	13	35
Link Distance (ft)	1029	770		425
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			130	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	NB	SB
Directions Served	LT	TR	LT
Maximum Queue (ft)	94	8	74
Average Queue (ft)	43	0	15
95th Queue (ft)	77	6	47
Link Distance (ft)	184	170	770
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	R	LT
Maximum Queue (ft)	143	6	8	11	69
Average Queue (ft)	70	0	0	0	11
95th Queue (ft)	118	6	6	7	42
Link Distance (ft)	1029	1029	770		425
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				130	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	NB	SB
Directions Served	LT	TR	LT
Maximum Queue (ft)	95	16	87
Average Queue (ft)	45	1	20
95th Queue (ft)	81	8	59
Link Distance (ft)	184	170	770
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Appendix M. CAG Siting Study

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CITIZENS ADVISORY GROUP FINAL REPORT

SANTA CRUZ COUNTY DISPOSAL FACILITY SITING STUDY

A SUMMARY OF WORK PERFORMED BY THE SANTA CRUZ COUNTY INTEGRATED WASTE MANANGEMENT LOCAL TASK FORCE CITIZENS ADVISORY GROUP

Prepared by
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
DECEMBER 11, 2003

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Appendix C - Landfill Site Ranking Criteria with Associated Weights

Appendix D – Information Sources Associated with Landfill Site Ranking Criteria

Introduction

State law (California Public Resources Code Section 40000 and California Code of Regulations Sections 17000-18000) governs the placement, development and operations of solid waste facilities in California, such as landfills and transfer stations. For establishing sites for such facilities, this law is implemented through the County Integrated Waste Management Plan. This plan is adopted by local government and approved by the state.

In the year 2000, the Santa Cruz County Board of Supervisors directed the Santa Cruz County Public Works Department to initiate a study of possible options for a replacement landfill once the County's Buena Vista Landfill reached capacity, projected to be in 2020. In addition, each of the four incorporated cities agreed to an inter-agency memorandum of understanding to co-sponsor the study with the county. This action was consistent with the Siting Element of the 1996 Santa Cruz County Integrated Waste Management Plan which called for a study of disposal options and of feasibility of a landfill site that could serve all five local jurisdictions.

The Santa Cruz County Integrated Waste Management Local Task Force (LTF) represents all five jurisdictions and was established as a forum for addressing solid waste issues of regional concern. The Task Force established a subcommittee, the Citizens Advisory Group, to conduct the initial phase of this study. Representatives to the Citizens Advisory Group were appointed from each city, from the five county supervisorial districts and from the Farm Bureau and the Sierra Club.

The charge to the Citizens Advisory Group (CAG) was to identify, review and rank possible locations for three types of solid waste disposal facilities and report back to the Local Task Force with recommendations. These facilities types were landfill, transfer station and transfer station in combination with ancillary facilities such as materials recovery, composting or residuals conversion.

The CAG decided to first examine potential locations for landfill facilities, then look at locations for transfer stations and transfer station-combinations. The Local Task Force has also indicated its preference to consider only possible locations for landfills as its first priority. Consistent with this approach, this report addresses landfill sites only. A report on possible locations for transfer stations and transfer station-combination facilities will be prepared at a later date.

Study Methodology – Study Area Selection

The Siting Element of the Santa Cruz County Integrated Waste Management Plan sets forth the basic process and criteria for locating sites. Two types of criteria are given in the Siting Element: exclusionary and ranking. The exclusionary criteria are used to identify broad areas that are not appropriate for disposal facilities. The ranking criteria are used, in the aggregate, to indicate the relative preference of specific candidate locations. Appendix A contains the Siting Element version of these criteria.

As a first step the Local Task Force set basic parameters for selecting sites:

1- minimum size of 100 ac (to provide at least 20 years of disposal capacity)
2- exclusion areas per state & local laws and policies

a. active fault zone
b. floodplain
c. liquefaction zone
d. groundwater recharge areas
e. reservoir protection areas
f. urban services line (landfills only)

3- other exclusion areas
a. public land (e.g., state or local parks)
b. privately held dedicated open space (e.g., Sempervirens, Coast Land & Dairies)

The CAG then reviewed the wording of each ranking criterion to clarify its meaning and its practical application; minor wording changes were made. The LTF then reviewed these criteria and approved the clarifying language. Three criteria were set aside for use in a later stage of the selection process, as their application in the early stages of the study would not be meaningful (see Appendix B). CAG then assigned weights to the remaining 17 ranking criteria, indicating which they considered to be more important than others. Appendix B contains the final ranking criteria language. Appendix C shows the associated weighting.

The CAG next undertook a screening process to filter out inappropriate areas of the county. Figure 1 describes the details of this process. A Countywide map was prepared showing the above exclusion areas and parcel sizes. Parcels that were not entirely within the above exclusion constraints were considered. Thirty one study areas, consisting of parcels of 100+ acres or contiguous parcels of at least 20 acres and totaling at least 100 acres, were identified.

A more detailed examination of these 31 Study Areas was conducted using parcel specific information on these practical exclusion factors:

- Access- not considered if road access (existing or potential) was impractical due to physical constraints of natural features,
- Water supply watershed / least disturbed watershed- parcels within these designated watersheds were excluded,
- Unsuitable topography- if the overall topography was so steep that development of a landfill would not be physically practical, the area was excluded.

Eight Study Areas were dropped based on these factors and 23 Study Areas remained. In addition, two of five parcels were dropped from one Study Area based on watershed constraints. Figure 2 is a map showing the countywide distribution of the Study Areas.

Study Methodology – Study Area Evaluation

CAG then undertook a detailed review of individual Study Areas that entailed examination of available information pertaining to the 17 ranking criteria, as they applied to each specific Study Area. See Appendix C for a list of the ranking criteria and associated weights used for this study.

FIGURE 1

STUDY AREA SELECTION PROCESS

FILTERING FACTORS

Size Threshold

> parcels 100 acres or larger

> combination of contiguous parcels 20 acres or larger totaling 100 acres or more

Exclusion Category 1

> exclusion areas per state & local laws and policies

a. active fault zone
b. floodplain
c. liquefaction zone
d. groundwater recharge areas
e. reservoir protection areas
f. urban services line (landfills only)

Exclusion Category 2

> other exclusion areas

a. public land (e.g., state or local parks)
b. privately held dedicated open space (e.g., Sempervirens, Coast Land)

Exclusion Category 3

> practical exclusions

a. water resource protection (water supply watersheds, least disturbed watersheds)
b. poor accessibility
c. topography unsuitable for landfill development

FILTERING PROCESS

1st Filter

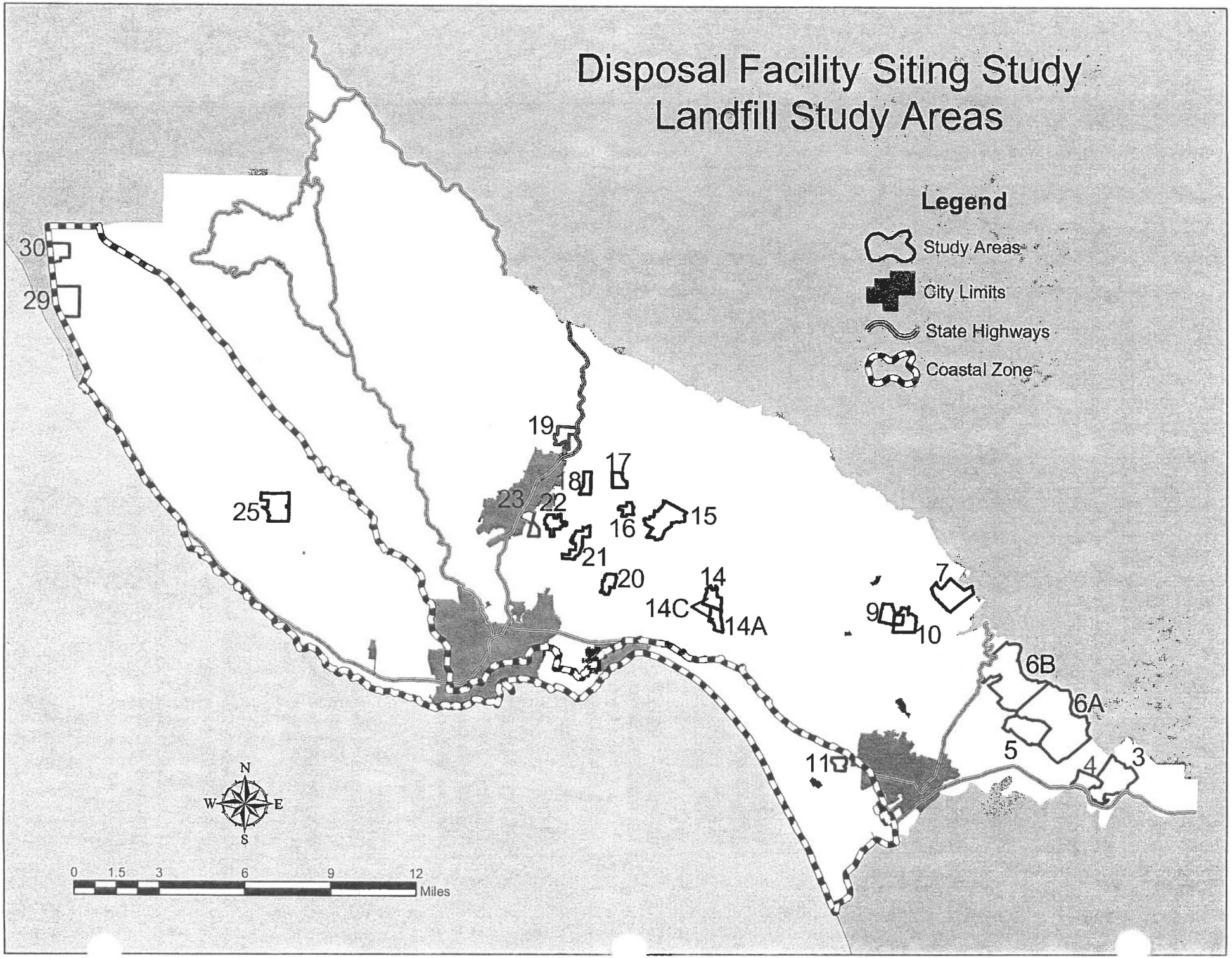
Working with exclusion information plotted on countywide maps, large areas of the county were identified for further study if they did not fall entirely within either of the first two exclusion categories.

2nd Filter

Using countywide maps showing the areas defined by the first filter, 31 areas of the county that 1) did not fall entirely within the third exclusion category and 2) met the parcel size threshold were identified for further study. Parcels that were only partially within exclusion areas were retained for closer examination.

3rd Filter

31 Study Areas (comprised of 60+ parcels) were examined in greater detail (using larger scale parcel-specific maps) against the above 3 exclusion categories. 8 Study Areas were dropped because there was not sufficient acreage outside of the exclusion areas to meet the size threshold. The remaining Study Areas were then examined on a parcel-specific basis. Some Study Areas consisted on a single parcel, others contained 2 or more parcels.


Disposal Facility Siting Study
Landfill Study Areas
Legend
Study Areas
City Limits
State Highways
Coastal Zone
30
29
25
19
17
18
23
22
16
15
21
20
14
14C
14A
7
9
10
6B
6A
5
4
3
11
N
W
E
S
0
1.5
3
6
9
12
Miles

During this phase of detailed review the CAG made adjustments to several Study Area boundaries based on the availability of more precise information. An adjacent parcel was added to Study Area 10 after it was determined from viewing the aerial photos and maps that there might be suitable area on that parcel. Adjacent parcels were also added to Study Areas 15, 19 and 22 under the same conditions. For scoring purposes, a new Study Area (14C) was created by combining two existing Study Areas (14 and 14A). The intent was to reflect the potential for landfill development there that would have fewer impacts. This resulted in the final number of 24 Study Areas that were scored.

The CAG used the following information to evaluate each of the Study Areas against the ranking criteria.

A. Maps specific to each Study Area depicting:
   1. Surface water resources: designated constraint areas, plus streams, lakes, rivers, other water bodies
   2. Parcel boundaries and sizes
   3. Soils suitable for landfill liner and cover material
   4. Class I-III Agricultural soils
   5. Sensitive Habitats
   6. Exclusionary Constraint areas
   7. Acreage of subject parcel that is NOT within any exclusion area
   8. Compatible/Incompatible Adjacent Land Uses within 1000'
   9. Streets and roadways
   10. Surrounding Density (General Plan Land Use) within 1 mile
   11. Scenic Resource Areas and topography within 1 mile

B. Aerial photograph of each Study Area with parcel boundaries and 20-foot contour lines indicated.

C. Slope analysis map of each Study Area showing contour lines and areas of five categories of slope: 0-10%, 10-20%, 20-30%, 30-40% and greater than 40%.

D. Countywide map of census tract demographics (2000) on ethnicity and household income in relation to Study Area locations.

E. Maps that had been prepared for the state mandated Drinking Water Source Assessment Program (DWSAP) which identified zones of protection around public water supply wells.

F. Tabular data:
   1. distance from each Study Area to the wasteshed centroid
   2. air quality/odor density-distance matrix
   3. acreage of Class I-III ag soils and ag uses for each parcel

G. Text describing the basis for map designations (e.g., biotic resources), addressing the assessment of criteria for which information was not explicitly mapped (groundwater separation, capacity, low cost, post-closure use), and providing additional detail on the mapped information.

Appendix D shows the above information as it is associated with each of the 17 criteria and describes its source.

CAG members received the information listed above in advance of each meeting. At the meeting the CAG discussed the information as it applied to each Study Area. Individuals familiar with a particular geographical area or topic contributed their knowledge to the group discussion. The charge to the Advisory Group was to evaluate and rank the Study Areas as public citizens. Their scoring reflects the best judgment of each member as a lay person not a technical expert. The information utilized was the best available and was intended to provide for an initial screening, selection and ranking of possible locations, with the results to be subject to detailed technical investigation prior to selection of final candidate locations.

One issue that arose during the course of the Study Area review was that of parcels located within the Timber Production zone district (TPZ). These parcels are subject to additional state regulation and establishing their use for a landfill would at the very least be more complicated and possibly not allowed. County Counsel has indicated that conversion of TPZ parcels should be considered only if no other reasonably feasible alternative is available. For these reasons the LTF decided that locations without TPZ zoning would be examined prior to those zoned TPZ. While the CAG scores assigned to Study Areas do not reflect their TPZ status, the list of ranked parcels resulting from the CAG review (Table 1) does indicate which Study Areas have TPZ zoning.

Of the 24 Study Areas evaluated by the CAG, 9 have no TPZ, 9 are all TPZ, and 6 have a mix of TPZ parcels and non-TPZ parcels. Of this last group, there are 3 Study Areas with at least 100 acres on separate non-TPZ parcel(s) in each Study Area. The Task Force has decided that it will examine these 3 Study Areas and determine if it is worthwhile to remove the TPZ parcels and then re-evaluate the remaining acreage in the Study Area.

Study Methodology – Study Area Scoring

CAG members individually scored each study area against each of the 17 ranking criteria as follows:

Study Area strongly meets the criteria – 5
Study Area definitely meets the criteria – 4
Study Area adequately meets the criteria – 3
Study Area somewhat meets the criteria – 2
Study Area barely meets the criteria – 1
Study Area does not meet the criteria – 0

These scores were then multiplied by the weight assigned to the respective criteria to yield the total point score for that Study Area.

The results of this scoring are shown in Table 1. The Study Areas are shown in ranked order, with the Study Area receiving the most points listed first. Both total points and average points are shown. Table 1 shows all 24 Study Areas; the 15 that are shaded have a (potentially conflicting) TPZ designation.

TABLE 1

DISPOSAL FACILITY SITING STUDY
24 LANDILL STUDY AREAS
RANKED BY CITIZENS ADVISORY GROUP PREFERENCE

ranked by total pts	Study Area	ranked by avg pts	overall rank
5747	3	522	1
5405	14C	491	2
5403	21	491	3
5390	4	490	4
5390	16	490	5
5389	30	490	6
5372	29	488	7
5367	22	488	8
5305	23	482	9
5304	15	482	10
5286	7	481	11
5230	19	475	12
5202	20	473	13
4967	18	452	14
4951	14	450	15
4927	6A	448	16
4840	6B	440	17
4784	17	435	18
4777	25	434	19
4727	5	430	20
4687	14A	426	21
4604	11	419	22
4394	10	399	23
4364	9	397	24

NOTES:
1) Middle column indicates Study Area.
2) Study Areas with shaded numbers contain parcels in Timber Production zone districts.
3) Study Areas with **bold numbers** have non-TPZ parcels with more than 100 acres (see explanation in report text).
4) Study Areas with no shading have no TPZ parcels.
5) 'Total points' represents sum total of all points assigned across all criteria.
6) 'Avg points' represents total divided by number of scorers (11).

Table 2 represents the CAG recommendation to the Local Task Force, consistent with the LTF preference to first consider only Study Areas without TPZ. The right hand column shows the overall rank of these Study Areas.

TABLE 2

9 STUDY AREAS WITH NO TPZ

ranked by total pts	Study Area	ranked by avg pts	overall rank
5747	3	522	1
5390	4	490	4
5202	20	473	13
4967	18	452	14
4927	6A	448	16
4727	5	430	20
4604	11	419	22
4394	10	399	23
4364	9	397	24

Table 3 shows the relative ranking of the additional 3 Study Areas with a partial TPZ designation and at least 100 acres on separate non-TPZ parcels within each respective Study Area. As these 3 may be determined to be suitable for a landfill, they have been included in this table showing the top-ranked locations.

TABLE 3

9 STUDY AREAS WITH NO TPZ AND
3 STUDY AREAS (SHADED) WITH PARTIAL TPZ

ranked by total pts	Study Area	ranked by avg pts	overall rank
5747	3	522	1
5390	4	490	4
5367	22	488	8
5202	20	473	13
4967	18	452	14
4927	6A	448	16
4840	6B	440	17
4777	25	434	19
4727	5	430	20
4604	11	419	22
4394	10	399	23
4364	9	397	24

APPENDIX A

DISPOSAL FACILTY SITING CRITERIA

EXCERPTED FROM

SANTA CRUZ COUNTY

1996 COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

COUNTYWIDE SITING ELEMENT

5.3 SITING CRITERIA

5.3.1 Environmental Considerations (Engineering Constraints)

a. Landfills shall not be located on a known Holocene fault.
   CCR, Title 23, Chapter 15, Article 3, Section 2533[d])
b. Landfills shall not be located in a 100-year flood plain.
   (40 Code of Federal Regulations [CFR], Part 258, Subpart B, Section 258.11)
c. Landfills shall not be located in areas susceptible to soil liquefaction.

5.3.2 Environmental Impacts

a. Landfills shall not be located in Sensitive Habitats or on prime agricultural soils (SCS Class I-III) unless it is determined through environmental review that any adverse impacts on the resource will be mitigated and that there is no feasible less damaging alternative.
b. Landfills shall not be located so as to pollute surface or ground water unless it is determined through environmental review that any adverse impacts on the resource will be mitigated and that there is no feasible less damaging alternative.
c. Landfills shall be located in a manner which will ensure that wastes will be a minimum of 5 feet above the highest anticipated elevation of underlying ground water. (CCR, Section 2530[c])
d. Potential disposal facility sites where operations will not be easily visible shall be ranked more favorably than sites where operations are easily visible from off site, or where site operations cause an impairment of scenic resources.
e. Potential disposal sites that utilize terrain offering natural buffering of site noise and screening of operations shall be ranked more favorably than sites where the potential for noise impacts to neighboring populations is more likely.
f. Landfills shall not be located so as to significantly degrade ambient air quality unless it is determined through environmental review that any adverse impacts on the resource will be mitigated and that there is no feasible less damaging alternative.

5.3.3 Socio-economic Considerations

a. Disposal facilities shall be established only in areas designated or authorized for solid waste facilities in an applicable city or county General Plan. (Public Resources Code [PRC], Section 41702)
b. Disposal facilities shall be compatible with adjacent General Plan land uses. (Public Resources Code [PRC], Section 41702[c])
c. Landfills shall only be located in areas of sufficient size and potential future disposal capacity to provide a minimum 20 years of permitted disposal capacity.
d. Potential disposal facility sites in areas of low population density shall be ranked more favorably than proposed sites in more densely populated areas.
e. Preference shall be given to proposed sites where facility design and operation can facilitate useful post-closure activities.

f. Potential disposal facility sites with low land acquisition costs, capital development costs, facility operation costs and waste hauling costs shall be ranked more favorably than sites with higher such costs.
g. Potential landfill sites with adequate supplies of low permeability soils available for use as cover and liner material shall be ranked more favorably than sites which must incur significant costs to import soil or other acceptable cover material.
h. New or expanded landfills shall be located further than 10,000 feet from airport runways used by turbojet aircraft and further than 5,000 feet from airport runways used solely by piston-type aircraft unless it is demonstrated that the operation will not pose a bird hazard to aircraft. (40 CFR, Part 258, Subpart B, Section 258.10)
i. Facility sites that have the following access features shall be ranked more favorably than those that don't: primary access via state highways, access from major transportation routes to candidate sites minimize travel on residential streets, haul routes traverse all-weather paved roads; bridge load capacity and overhead clearance are adequate for anticipated vehicle types.
j. Potential landfill sites located closer to the center point of refuse generation for the wasteshed the landfill is intended to serve will be ranked more favorably than more distant sites.

5.3.4 Legal Considerations

a. New or expanded disposal facilities shall be required at all times to be in compliance with applicable federal, state, and local statutes, permits, minimum operating standards and monitoring requirements. This includes, but is not limited to, the requirements of the California Integrated Waste Management Board, Regional Water Quality Control Boards, local air pollution control districts, local jurisdictions, and all utilities, service districts, or agencies which have jurisdiction over the installation of improvements or which provide services to disposal facilities.
b. All other factors being equal, potential disposal facility sites in areas that will not require eminent domain shall be ranked more favorably than sites owned by unwilling sellers.

APPENDIX B

LANDFILL SITE RANKING CRITERIA

DEVELOPED BY

SANTA CRUZ COUNTY

DISPOSAL FACILITY SITING STUDY

CITIZENS ADVISORY GROUP

SANTA CRUZ COUNTY
DISPOSAL FACILITY SITING STUDY
SITE RANKING CRITERIA

In reviewing the language of the Countywide Siting Element, the Citizens Advisory Group recognized that a number of criteria were more or less relevant to various stages in the overall siting process. This page explains the use of those criteria listed below.

Phased application
The following four criteria were applied on a phased basis to remain consistent with the language of the Countywide Siting Element. During the initial site evaluation phase and ranking conducted by the CAG, these criteria were used to rank the relative suitability of study areas with the understanding that during the final phase of the study, environmental review, the more stringent test would be applied. These four criteria were scored accordingly.

1. Prime Agricultural Soils
2. Sensitive Habitats
3. Surface or Ground Water Pollution
7. Air Quality

Set Aside
These next three criteria were acknowledged to be relevant on a practical basis only in the final stage of the siting process when a small number of sites are evaluated. The County General Plan only identifies existing disposal sites. Any new site would require approval of a General Plan amendment as a first step to permitting. Application of the Regulatory Compliance test would happen during environmental review. Whether a property owner was a willing seller would only be known at the time that specific inquiries are made to a particular parcel, once the range of possibilities has been narrowed down to the final contenders. These three criteria were not scored.

8. General Plan
18. Regulatory Compliance
19. Willing Seller

Neutral Scoring
It was recognized that, in the early stages, these three criteria can be assessed in only very broad terms. Ground water information can only be accurately known as a result of on-site geo-technical investigations. Hence this criterion is relevant after that stage in the selection process. A better reading of post-closure use and cost would also come once on-site investigations have been completed. By consensus of the CAG, these three criteria were all scored as adequate.

4. Separation from Underlying Ground Water
12. Post-closure Activities
13. Costs

SANTA CRUZ COUNTY
DISPOSAL FACILITY SITING STUDY
SITE RANKING CRITERIA

This document presents the site ranking criteria with language clarifications made by the Citizens Advisory Group on March 14, 2001, May 9, 2001 and July 11, 2001.

1. **Prime Agricultural Soils**
   A. For use with first phase of site evaluation:
   Disposal facilities NOT located on prime agricultural soils (*NRCS* Class I-III) shall be ranked more favorably than those located in on prime agricultural soils.
   B. For use with final phase of site evaluation:
   Disposal facilities shall not be located on prime agricultural soils unless it is determined through environmental review that any adverse impacts on the resource will be mitigated and that there is no feasible less damaging alternative.

2. **Sensitive Habitats**
   A. For use with first phase of site evaluation:
   Disposal facilities NOT located in Sensitive Habitats shall be ranked more favorably than those located in Sensitive Habitats.
   B. For use with final phase of site evaluation:
   Disposal facilities shall not be located in Sensitive Habitats unless it is determined through environmental review that any adverse impacts on the resource will be mitigated and that there is no feasible less damaging alternative.

3. **Surface or Ground Water Pollution**
   A. For use with first phase of site evaluation:
   Disposal facilities located so as to avoid polluting surface or ground water shall be ranked more favorably than those that do not.
   B. For use with final phase of site evaluation:
   Disposal facilities shall be located so as to not pollute surface or ground water unless it is determined through environmental review that any adverse impacts on the resource will be mitigated and that there is no feasible less damaging alternative.

4. **Separation from Underlying Ground Water**
   Potential sites that enable landfills to be located in a manner which will ensure that wastes will be a minimum of 5 feet above the highest anticipated elevation of underlying ground water shall be ranked higher than sites that do not.

5. **Scenic Resources**
   Potential disposal facility sites where operations will not be easily visible shall be ranked more favorably than sites where operations are easily visible from off site, or where site operations cause an impairment of scenic resources.

6. **Site Noise**
Potential disposal sites that offer natural buffering of site noise and screening of operations shall be ranked more favorably than sites where the potential for noise impacts to neighboring populations is more likely.

7. **Air Quality**
A. For use with first phase of site evaluation:
Potential sites that enable disposal facilites to be located so as to NOT significantly degrade ambient air quality shall be ranked more favorably than sites that do not.
B. For use with final phase of site evaluation:
Disposal facilites shall not be located so as to significantly degrade ambient air quality unless it is determined through environmental review that any adverse impacts on the resource will be mitigated and that there is no feasible less damaging alternative.

8. **General Plan**
For use with final phase of site evaluation
Potential sites that enable disposal facilites to be established in areas that could be designated or authorized for solid waste facilities in an applicable city or county General Plan shall be ranked more favorably than sites not likely to receive such designations.

9. **Adjacent Land Use Compatibility**
Landfill sites where Designations #s 1-4, below, extend 1000 feet from property boundary are considered compatible adjacent land uses and are thus ranked more favorably than sites where they do not.

Depending on favorable site circumstances, such as buffering topographic features, sites where Designations #s 5-9, below, extend 1000 feet from property boundary are considered compatible adjacent land uses and are thus ranked more favorably than sites where Designations #s 10-18 exist within 1000'.

Compatible General Plan Land Use Designations Include:
1. Public Facility (excluding schools, cemetaries, churches, hospitals)
2. Agriculture
3. Quarry
4. Heavy Industry

Compatibility Is Possible but Depends on Site Specifics:
5. Mountain Residential (if 20+ acre parcels), may include Timber Production
6. Rural Residential (if 20+ acre parcels)
7. Resource Conservation, may include Timber Production
8. Lake, Reservior, Lagoon
9. Parks and Recreation

Incompatible Land Use Designations Include:
10. Office Commercial
11. Neighborhood Commercial

12. Community Commercial
13. Visitor Accomdations
14. Service Commercial
15. Light Industrial
16. Urban Open Space
17. Suburban Residential
18. Urban Residential (4).

Any sites with the following Designations or conditions within 1000' are considered incompatible with adjacent land uses:
a) schools, cemetaries, churches, hospitals;
b) Mountain Residential or Rural Residential Designations and densities greater than 1 dwelling unit per 20 acres;
c) Resource Conservation, Lake, Reservior, Lagoon or Parks and Recreation Designations and with conficting, potentially conflicting, or no favorable site circumstances or;
d) Office Commercial, Neighborhood Commercial, Community Commercial, Visitor Accomdations, Service Commercial, Light Industrial, Urban Open Space, Suburban Residential or Urban Residential Designations.

10. Disposal Capacity
Potential landfill sites with sufficient size and potential future disposal capacity to provide a minimum 20 years of permitted disposal capacity shall be ranked more favorably than sites with less capacity; plus, the greater the capacity beyond 20 years the more favorable the ranking.

11. Population Density
Potential disposal facility sites in areas of low population density shall be ranked more favorably than proposed sites in more densely populated areas.

12. Post-Closure Activities
Preference shall be given to proposed sites where facility design and operation can facilitate useful post-closure activities, such as open space, recreation, agriculture, habitat.

13. Costs
Potential disposal facility sites with low land acquisition costs, capital development costs, facility operation costs and waste hauling costs shall be ranked more favorably than sites with higher such costs.

14. Cover and Liner Material
Potential landfill sites with adequate supplies of low permeability soils available for use as cover and liner material shall be ranked more favorably than sites which must incur significant costs to import soil or other acceptable cover material.

15. Airport Runways
Potential sites for new or expanded landfills located further than 10,000 feet from airport runways used by turbojet aircraft and further than 5,000 feet from airport runways used solely

by piston-type aircraft, unless it is demonstrated that the operation will not pose a bird hazard to aircraft, shall be ranked more favorably than those closer.

16. **Access**
Potential disposal facility sites that have the following access features shall be ranked more favorably than those that don't:
> primary access via state highways
> access from major transportation routes to candidate sites minimize travel on residential streets
> haul routes traverse all-weather paved roads
> bridge load capacity adequate for anticipated vehicle types
> overhead clearance adequate for anticipated vehicle types.

17. **Wasteshed Center Point**
Potential disposal facility sites located closer to the center point of refuse generation for the wasteshed the landfill is intended to serve will be ranked more favorably than more distant sites.

18. **Regulatory Compliance**
For use with final phase of site evaluation
Potential disposal facility sites which do not prevent or preclude any facility established thereupon from being in compliance with applicable federal, state, and local statutes, permits, minimum operating standards and monitoring requirements shall be ranked more favorably than sites that do.

19. **Willing Seller (Eminent Domain)**
For use with final phase of site evaluation
All other factors being equal, potential disposal facility sites in areas that will not require eminent domain shall be ranked more favorably than sites owned by unwilling sellers.

20. **Environmental Justice (Social Equity)**
Landfills located in Census Tracts with a minority population greater than the countywide average and with a median household income lesser than the countywide average shall be ranked less favorably than other locations.

APPENDIX C

LANDFILL SITE RANKING CRITERIA

WITH ASSOCIATED WEIGHTS

ESTABLISHED BY

SANTA CRUZ COUNTY

DISPOSAL FACILITY SITING STUDY

CITIZENS ADVISORY GROUP

LANDFILL SITE EVALUATION SHEET

STUDY AREA: _____

Candidate site meets the criteria:

Strongly	**5**
Defintely	**4**
Adequately	**3**
Somewhat	**2**
Barely	**1**
Does not	**0**

	CRITERIA	weight	site:	SCORE	
1	**Surface Water Pollution**	17	will not cause		
2	**Groundwater Separation**	16	has adequate		
3	**Class I-III Ag Soils**	15	is not located on		
4	**Sensitive Habitat**	14	is not located in		
5	**Air Quality / Odor**	13	will not degrade		
6	**Adjacent Land Use Compatibility**	12	has		
7	**20 Year Capacity**	11	is large enough for		
8	**Visibility/Scenic Area**	10	will not degrade		
9	**Access**	9	has		
10	**Low Density Area**	9	is located in		
11	**Terrain Buffer for Noise**	7	has adequate		
12	**Wasteshed Centroid**	6	is located close to		
13	**On-site Soil for Liner & Cover**	5	has adequate		
14	**Low Costs**	4	has		
15	**Airport Runway Clearance**	3	meets		
16	**Environmental Justice**	2	addresses		
17	**Post-Closure Use**	2	is suitable for		

TOTAL SCORE	

APPENDIX D

INFORMATION SOURCES ASSOCIATED WITH LANDFILL SITING CRITERIA

UTILIZED BY

SANTA CRUZ COUNTY

DISPOSAL FACILITY SITING STUDY

CITIZENS ADVISORY GROUP

INFORMATION SOURCES USED FOR EVALUATION OF LANDFILL SITING CRITERIA

EXCLUSIONARY CRITERIA

1. Active Fault Zone:
Holocene faults as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

2. Floodplain:
100-year floodplain as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

3. Liquefaction:
Areas of high and medium liquefaction potential as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

4. Ground Water Recharge Areas:
Areas of primary ground water recharge as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

5. Reservoir Protection Areas:
Areas mapped as reservoir protection areas in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

6. Urban Services Line:
Urban Services Line as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

7. Public Land
Lands mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System as public land.

8. Privately Held Dedicated Open Space
Lands mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System as privately held dedicated open space.

9. Access
Streets and roads as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

10. Water resources
Lands mapped as Water Supply Watershed and Least Disturbed Watershed in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System.

11. Unsuitable topography
USGS topographic maps; relief and topographic maps from the Santa Cruz County Geographic Information System.

SITE RANKING CRITERIA

1. Prime Agricultural Soils
Class I, II and III soils as mapped by the Natural Resource Conservation Services (formerly Soil Conservation Service) and contained in the Santa Cruz County Geographic Information System. This information is shown on each individual Study Area map. A table indicating the number of acres of such soils on each parcel in a particular study area is included with this Appendix on page D-6.

2. Sensitive Habitats
Areas that fall within the Santa Cruz County General Plan definition of Sensitive Habitat, as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System under the categories of Grassland, Special Forest, Biotic Resource, Riparian Woodland and California Natural Diversity Database. This information is shown on each individual Study Area map. A narrative list of individual biotic resources specific to particular study areas is included with this Appendix on page D-7.

3. Surface or Ground Water Pollution
Primary groundwater Recharge areas mapped in the Santa Cruz County Geographic Information System served as indicators for potential ground water contamination. Surface waters including perennial and ephemeral streams, lakes, lagoons and other bodies of water mapped in the Santa Cruz County Geographic Information System served as indicators for potential surface water contamination. This information is shown on each individual Study Area map.

County Environmental Health is in the process of compiling maps of, and protective land use policies for, countywide water resource protection areas. There are 5 components to this.

a. Drinking Water Source Assessment Program (DWSAP) -- Wellhead Protection Zones
This is a state mandated program. Maps are being prepared of water wells used for public drinking water sources and 'concentric' zones around each well. Three zones will be identified: 2-yr, 5-yr and 10-yr zones. These are the estimated distances that it takes water on the surface to reach the groundwater from which the well is pumping. Some water districts are doing the mapping on their own; EH is doing it for most districts and is coordinating the countywide report. Environmental Health is proposing a limit on any land use with a high potential for contamination within 1000 feet of such a well or within the 2-yr capture zone.

b. Critical Ground Water Areas
These are the entire area underlain by important water supply aquifers. They are labeled critical because they are all in a state of overdraft. Groundwater recharge takes place within large recharge areas (mapped on GIS) and within smaller sites with favorable soil and subsurface geologic conditions (not mapped). At present Environmental Health is not proposing any limits on any land use within these areas.

c. Streamside Corridors
100-250 feet alongside streams, mapped as Riparian Corridors (Sensitive Habitats) on the GIS system.

d. Water Supply Watersheds
Mapped on the GIS system.

e. Groundwater Recharge Areas
Mapped on the GIS system. In the process of being updated with more recent information.

4. Separation from Underlying Ground Water
This criterion was scored as 'Adequate' in this initial stage of Study Area review as it is dependent on on-site geo-technical investigation for an accurate determination.

5. Scenic Resources / Visibility
Scenic Resource Areas as mapped in the Santa Cruz County General Plan and the Santa Cruz County Geographic Information System. Evaluation of this criterion also utilized topographic lines and relief map to provide an indication of terrain features that might mitigate visibility. This information is shown on each individual Study Area map.

6. Site Noise (Terrain Buffer for Noise)
This criterion utilized topographic lines and relief map to provide an indication of terrain features that might mitigate noise emanating from a particular study area. This information was used in conjunction with the mapped location of nearby densities. This information is shown on each individual Study Area map.

7. Air Quality (Odor)
Evaluation of this criterion was limited to judgment on the potential for odor impacts. Without site specific information on prevailing wind conditions, the distance to various land use and densities and topography were key factors. This criterion used a density-distance matrix as a guide for scoring the proximity of odor receptors. See accompanying chart on page D-9.

8. Adjacent Land Use Compatibility
Land uses defined in the Santa Cruz County General Plan and mapped in the Santa Cruz County Geographic Information System were categorized in three levels of compatibility using 1000 feet as a threshold. This is consistent with the same distance used for General

Plan compatibility for surface mining operations. This parcel-based compatibility information is shown on each individual Study Area map.

9. Disposal Capacity

The Local Task Force determined 100 acres to be the minimum area necessary for 20 years of capacity. Study Areas with a larger area outside of any exclusionary constraints could be scored higher to reflect potential for greater capacity. Amount of acreage outside of any exclusionary constraints indicated on each individual Study Area map.

10. Population Density

Land use densities defined in the Santa Cruz County General Plan and mapped in the Santa Cruz County Geographic Information System shown within a 1-mile zone around study areas; parcel boundaries also shown. Density categories listed from least dense to most dense. This information is shown on each individual Study Area map.

11. Post-Closure Activities

This criterion was scored as 'Adequate' in this initial stage of Study Area review as it is dependent on on-site geo-technical investigation for an accurate determination.

12. Costs

This criterion was scored as 'Adequate' in this initial stage of Study Area review as it is dependent on on-site geo-technical investigation for an accurate determination.

13. Cover and Liner Material

Three grades of clay soil types with the necessary engineering properties for use as liner and cover material were identified and mapped using the Santa Cruz County Geographic Information System. This information is shown on each individual Study Area map.

14. Airport Runway Clearance

As only one Study Area fell within the category measured by this criterion, a small map was generated from the Santa Cruz County Geographic Information System depicting the distance threshold. This map accompanies this Appendix on page D-10.

15. Access

Information on roads and streets was mapped from the Santa Cruz County Geographic Information System. This information is shown on each individual Study Area map.

16. Wasteshed Center Point

The wasteshed center point is defined as the center point of solid waste generation. The purpose of this measurement is to identify centrally-located sites. Absent specific geographic-based information on solid waste generation, the geographic center point for population was used. This location is approximately Highway 1 and 41st Avenue. A chart was prepared showing the approximate distance from this point to each Study Area. The chart accompanies this Appendix on page D-11.

17. Environmental Justice

This criterion is defined as a function of population ethnicity and median household income. Both of these factors were obtained from the 2000 Census, with Census Tract numbers being the smallest geographic units available. A separate map was prepared for this criterion as the information came in late. This map is included in this Appendix on page D-12.

DISPOSAL FACILITY SITING STUDY
ACRES OF CLASS I-III AGRICULUTRAL SOILS

PARCEL	STUDY AREA	I-III Soils (acres)	Agricultural Use	Other	ZONING
	3	34	grazing	**CLCA**	CA
	4	0.4	grazing	**CLCA**	CA
	5	38	grazing	**CE**	CA
1	6A	18	grazing	**CLCA**	CA
2	6A	100	grazing	**CLCA**	CA
1	6B		grazing		TP
2	6B		grazing		TP
3	6B	12	grazing	**CLCA**	CA
4	6B		grazing		CA
	7		grazing		TP
	9	26	grazing cultivation		CA
1	10	4	cultivation	**CLCA**	CA
2	10		cultivation	**CLCA**	CA
3	10	4			SU
4	10	47	cultivation		CA
1	11	4	horse training		CA
2	11	7	greenhouse		CA
3	11	19	cultivation		CA
4	11	3	horse training		CA
5	11		horse training		CA
6	11	26	cultivation		CA
	14A	20			TP
1	14	20			TP
2	14	0.4			TP
3	14	1			TP
1	15	0.3			TP
2	15A				TP
1	16				SU
2	16				TP
	17				TP
1	18				SU
2	18	10			SU
3	18	0.1			SU
1	19				TP
2	19				TP
3	19				TP
1	20	32			RA
2	20	9			RA
1	21				TP
2	21	5			A
3	21	0.4			RA
4	21	9			TP
5	21				TP
1	22				A
2	22				PR
3	22				A
4	22	4			TP
5	22				A
1	23	1			TP
2	23A				TP
3	24				A
1	25	44		**OSE**	SU
2	25	102			TP
3	25	1			TP
	29				TP
	30	13			TP

CLCA = California Land Conservation Act (Williamson Act) contract
CE = private land conservation easement
OSE = Open Space Easement contract

DETAIL OF BIOTIC RESOURCES

The Biotic Resources Area designation on the 'Sensitive Habitat' frame of the map includes both Sensitive Habitat and Environmentally Sensitive Habitat, as defined in the County General Plan. The specific bases for the Biotic Resources Area designation for each study area are listed below. Where a specific biotic resource has been mapped (e.g., riparian woodland or CNDDB aquatic community, etc.) the map frame shows this information.

Study Area 3

The Biotic Resource designation for this study area is based on the presence of habitat for raptors (hawks, golden eagle) and red-legged frog. The frog habitat is obviously only in the vicinity of water on the property.

Study Area 4

The Biotic Resource designation for this study area is based on the presence of habitat for raptors and red-legged frog. The frog habitat is obviously only in the vicinity of water on the property.

Study Area 5

The Biotic Resource designation for this study area is based on the presence of habitat for raptors, red-legged frog, and riparian species.

Study Area 6A

The Biotic Resource designation for this study area is based on the presence of habitat for raptors, red-legged frog, and riparian species. Fish habitat is doubtful.

Study Area 6B

The Biotic Resource designation for this study area is based on the presence of habitat for raptors, red-legged frog, plus the presence of riparian species and possibly steelhead (Hughes Creek).

Study Area 7

The Biotic Resource designation for this study area is based on the presence of habitat for raptors, red-legged frog, plus the presence of riparian species and possibly steelhead (Green Valley Creek).

Study Areas 9 &10

The Biotic Resource designation for this study area is based on the presence of habitat for red-legged frog, plus the presence of riparian species and steelhead (Green Valley Creek).

Study Area 11

The Biotic Resource designation for this study area is based on the presence of habitat for long-toed salamander and red-legged frog.

Study Area 15

The Biotic Resource designation for this study area is based on the presence of habitat for red-legged frog, plus the presence of riparian species and steelhead (Soquel Creek).

Study Area 17

The Biotic Resource designation for this study area is based on the presence of habitat for red-legged frog, plus the presence of riparian species and steelhead (West Branch Soquel Creek).

Study Area 19

The Biotic Resource designation for this study area is based on the possible presence of rare or endangered plant species.

Study Area 20

The Biotic Resource designation for this study area is based on the possible presence of rare or endangered plant species and resident rainbow trout.

Study Area 21

The Biotic Resource designation for this study area is based on the possible presence of steelhead in Branciforte Creek.

Study Areas 22

The Biotic Resource designation for this study area is based on possible presence of steelhead in Granite Creek downstream from this location.

Study Area 23-23A-24

The Biotic Resource designation for this study area is based on the possible presence of rare or endangered plant species and steelhead in Carbonera Creek downstream from this location.

Study Area 25

The Biotic Resource designation for this study area is based on the presence of habitat for red-legged frog, possible presence of rare or endangered plants, plus the presence of riparian species, coho salmon and steelhead (San Vicente Creek and Mill Creek).

Study Area 29

The Biotic Resource designation for this study area is based on the presence of habitat for red-legged frog, plus the presence of riparian species and steelhead.

Study Area 30

The Biotic Resource designation for this study area is based on the presence of habitat for red-legged frog, possible presence of rare or endangered plants, plus the presence of riparian species, coho salmon and steelhead (Whitehouse Creek).

AIR QUALITY / ODOR CRITERION

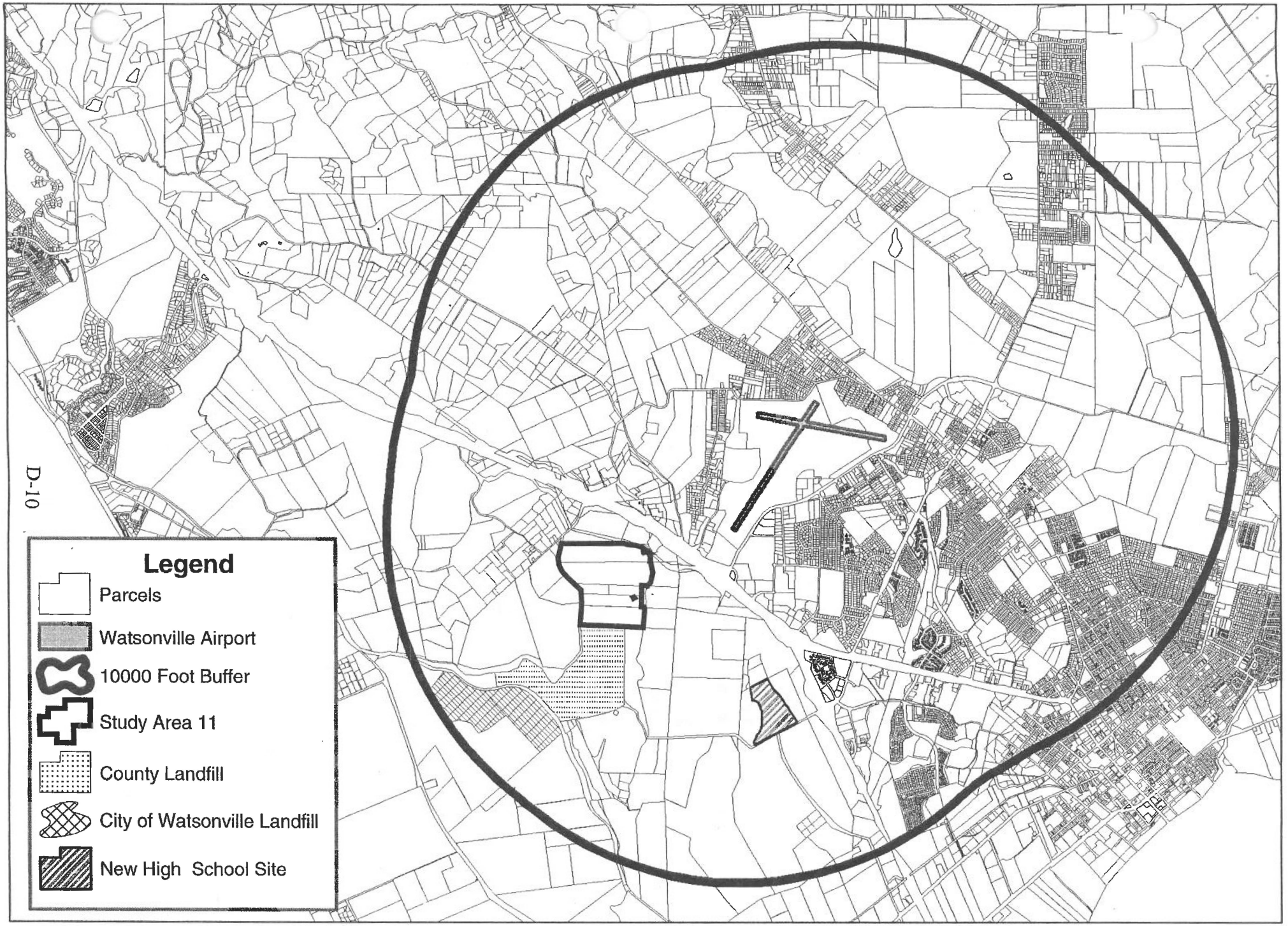
DENISTY – DISTANCE SCORING MATRIX

Density

Mtn Res	**2**	**3**	**4**	**5**	**5**
Rural Res	**1**	**2**	**3**	**4**	**5**
Suburban Res	**0**	**0**	**1**	**2**	**3**
Distance	0'	1000'	2000'	3000'	4000'	5000'

Distance from Study Area boundaries based on flat map measurement and is approximate. Refer to "Compatible Land Uses" and "Density of Surrounding Area" map frames for distance guides.

Density categories based on General Plan Land Use categories; Suburban Residential is more dense, Mountain Residential is less dense. Refer to above map frames for relative parcel sizes within categories. Parcels shaded as 'Incompatible' are 11-20 acres in size; parcels with cross-hatch are 10 acres or less in size.



Study Area 11
Watsonville Airport Proximity

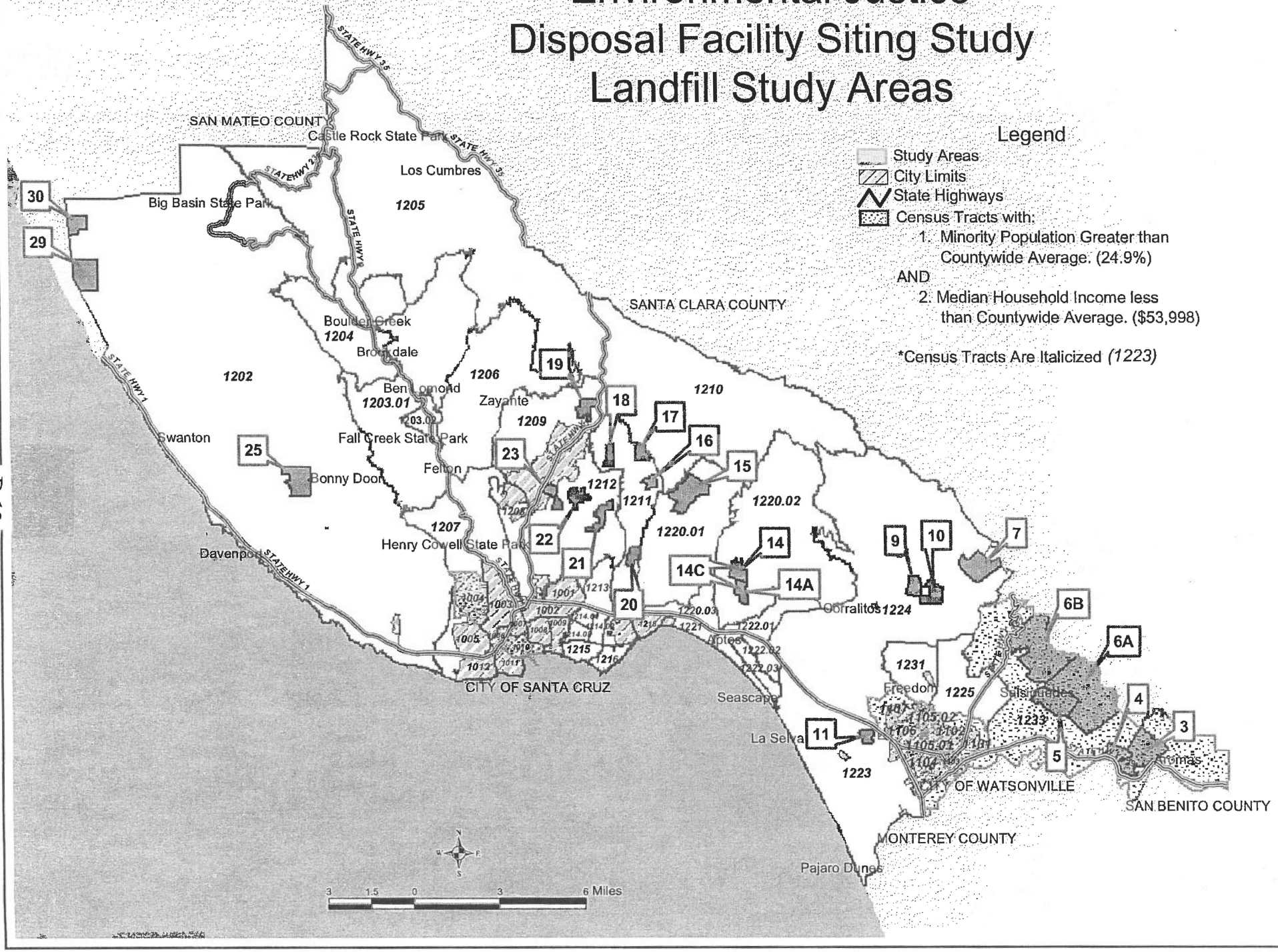
DISTANCE TO WASTE CENTROID

Study Area	feet	miles	distance in miles	range	score
3	95300	18.0	2.4	0	5
4	93000	17.6	3.1	3	5
5	82500	15.6	4.2	4	4
6A	80000	15.2	4.3		4
6B	76800	14.5	4.4		4
7	65900	12.5	4.4		4
9	57500	10.9	4.6		4
10	58600	11.1	4.7		4
11	50200	9.5	4.8		4
14	23200	4.4	4.9		4
14A	22000	4.2	5.5		4
15	26000	4.9	5.6	6	4
16	25000	4.7	7.3	7	3
17	29600	5.6	9.5		3
18	28800	5.5	10.9		3
19	38700	7.3	11.1		3
20	12500	2.4	12.3		3
21	16200	3.1	12.5	13	3
2	22700	4.3	14.5	14	2
23	25400	4.8	15.2		2
23A	24500	4.6	15.6		2
24	23200	4.4	17.6		2
25	65000	12.3	18.0	18	2
29	114300	21.6	21.6	19	1
30	120500	22.8	22.8	23	1

DISTANCE IN MILES	SCORE
0 - 3.9	5
4.0 - 6.9	4
7.0 - 13.9	3
14.0 - 18.9	2
19.0 - 23.0	1

1. Select Study Area and note distance to centroid.
2. Using distance/score lists, find score associated with the identified distance for that Study Area.

Environmental Justice
Disposal Facility Siting Study
Landfill Study Areas



SANTA CRUZ COUNTY - 2000 CENSUS INFORMATION
INCOME AND ETHNICITY BY CENSUS TRACT

Census Tracts with Median Household Income Lower than Countywide Average **AND** Minority Population Greater than County Wide Average
Census Tracts with Median Household Income **Lower** than Countywide Average
Census Tracts with Minority Population **Greater** than County Wide Average

	COUNTYWIDE MEDIAN HOUSEHOLD INCOME		PERSONS PER SQUARE MILE	COUNTYWIDE AVERAGE % WHITE
	$53,998			75.1
CENSUS TRACT	**INCOME**	**POPULATION**	**DENSITY**	**ETHNICITY**
1001	66,467	2220	1751	88.7
1002	48,777	7063	7530	76.3
1003	81,314	2875	1372	88.8
1004	33,636	4179	2313	63.5
1005	62,099	4916	2312	82.8
1006	62,552	3169	7600	86.1
1007	31,250	1882	5185	80.4
1008	43,822	6803	9371	76.3
1009	46,649	4314	6198	84.1
1010	31,754	7743	9595	68.7
1011	55,788	5436	7134	84.0
1012	64,583	2751	1652	84.1
1101	32,275	5861	6105	49.2
1102	47,868	7204	6264	51.3
1103	31,736	7683	16739	38.7
1104	32,583	5224	2263	34.7
1105.01	38,638	7218	10152	49.1
1105.02	41,278	6165	10854	39.3
1106	38,852	7544	8060	40.6
1107	51,731	3616	2145	50.1
1202	76,912	4191	37	86.8
1203.01	66,538	5396	280	91.6
1203.02	56,667	2874	2242	90.3
1204	62,467	5475	532	89.9
1205	82,080	6238	110	91.6
1206	72,431	5141	390	91.7
1207	56,859	5234	611	83.6
1208	77,715	6103	2010	92.1
1209	71,922	7823	814	86.8
1210	100,828	3549	124	93.3
1211	52,117	2710	367	89.7
1212	79,625	6286	499	90.9
1213	50,658	4181	2731	79.2
1214.01	53,510	2708	5836	81.1
1214.02	44,531	4071	7681	75.1
1214.03	47,125	3276	6618	77.9
1215	39,057	5533	7927	78.8
1216	43,096	6573	7891	84.9
1217	45,025	7387	7242	78.1
1218	47,337	4962	6844	88.0
1220.01	71,803	5126	426	87.9
1220.02	85,073	3554	176	91.9
1220.03	56,452	6463	3034	85.6
1221	57,150	3210	3750	90.6
1222.01	66,956	6536	1965	88.1
1222.02	92,195	2041	2019	91.8
1222.03	70,833	3590	3815	91.5
1223	65,637	4032	248	80.0
1224	67,446	7127	174	84.6
1225	54,224	6349	1410	49.3
1231	45,558	2450	824	97.2
1233	48,984	1547	55	70.5

Appendix N. Agriculture Viability Study for Alternative 3

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Santa Cruz County, California

April 15, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

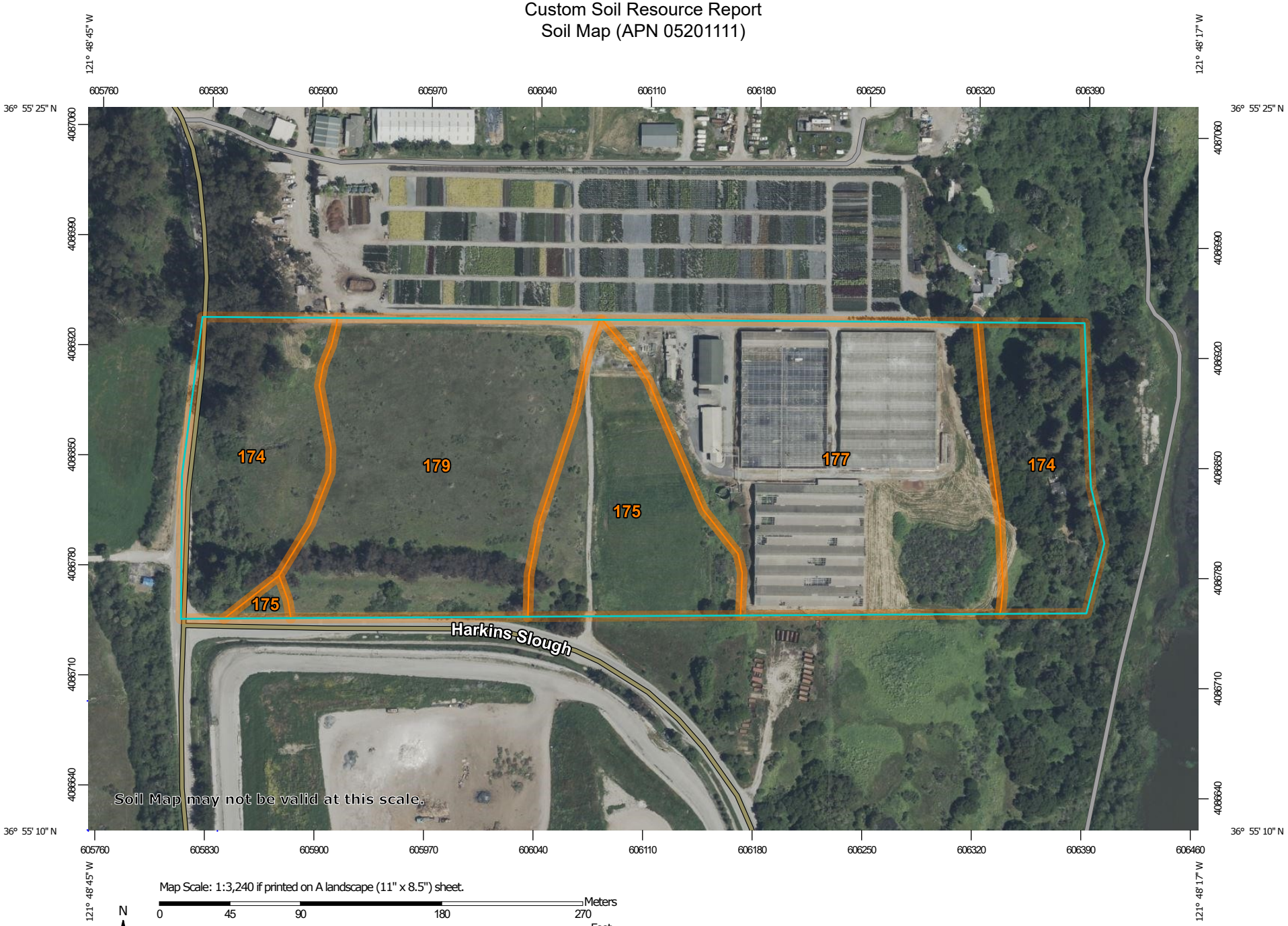
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (APN 05201111)



Map Scale: 1:3,240 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Cruz County, California
Survey Area Data: Version 19, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2024—May 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (APN 05201111)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
174	Tierra-Watsonville complex, 15 to 30 percent slopes	6.6	24.6%
175	Tierra-Watsonville complex, 30 to 50 percent slopes	4.0	14.7%
177	Watsonville loam, 2 to 15 percent slopes	9.1	33.5%
179	Watsonville loam, thick surface, 2 to 15 percent slopes	7.3	27.2%
Totals for Area of Interest		**27.0**	**100.0%**

Map Unit Descriptions (APN 05201111)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Santa Cruz County, California

174—Tierra-Watsonville complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: h9g2
Elevation: 20 to 1,200 feet
Mean annual precipitation: 14 to 28 inches
Mean annual air temperature: 57 to 59 degrees F
Frost-free period: 245 to 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Tierra and similar soils: 55 percent
Watsonville and similar soils: 30 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tierra

Setting

Landform: Fan terraces, Marine terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 66 inches: clay

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R015XD115CA - CLAYPAN
Hydric soil rating: No

Description of Watsonville

Setting

Landform: Fan terraces, Marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 18 inches: loam
H2 - 18 to 39 inches: clay
H3 - 39 to 63 inches: sandy clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R014XD089CA - CLAYPAN
Hydric soil rating: Yes

Minor Components

Elkhorn, sandy loam

Percent of map unit: 5 percent
Hydric soil rating: No

Pfeiffer, gravelly sandy loam

Percent of map unit: 4 percent
Hydric soil rating: No

Los osos, loam

Percent of map unit: 2 percent
Hydric soil rating: No

Tierra

Percent of map unit: 1 percent
Hydric soil rating: No

175—Tierra-Watsonville complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: h9g3
Elevation: 20 to 1,200 feet

Mean annual precipitation: 14 to 28 inches
Mean annual air temperature: 57 to 59 degrees F
Frost-free period: 245 to 275 days
Farmland classification: Not prime farmland

Map Unit Composition

Tierra and similar soils: 50 percent
Watsonville and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tierra

Setting

Landform: Marine terraces, Fan terraces
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 66 inches: clay

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XD115CA - CLAYPAN
Hydric soil rating: No

Description of Watsonville

Setting

Landform: Marine terraces, Fan terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 18 inches: loam
H2 - 18 to 39 inches: clay
H3 - 39 to 63 inches: sandy clay loam

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R014XD089CA - CLAYPAN
Hydric soil rating: Yes

Minor Components

Elkhorn, sandy loam

Percent of map unit: 5 percent
Hydric soil rating: No

Los osos, loam

Percent of map unit: 4 percent
Hydric soil rating: No

Baywood

Percent of map unit: 2 percent
Hydric soil rating: No

Diablo, clay

Percent of map unit: 2 percent
Hydric soil rating: No

Tierra

Percent of map unit: 1 percent
Hydric soil rating: No

Pfeiffer, gravelly sandy loam

Percent of map unit: 1 percent
Hydric soil rating: No

177—Watsonville loam, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: h9g5
Elevation: 20 to 1,200 feet
Mean annual precipitation: 28 inches

Mean annual air temperature: 57 degrees F
Frost-free period: 245 to 275 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Watsonville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Watsonville

Setting

Landform: Marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 18 inches: loam
H2 - 18 to 39 inches: clay
H3 - 39 to 63 inches: sandy clay loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R014XD089CA - CLAYPAN
Hydric soil rating: Yes

Minor Components

Elkhorn, sandy loam

Percent of map unit: 5 percent
Hydric soil rating: No

Pinto, loam

Percent of map unit: 4 percent
Hydric soil rating: No

Watsonville, thick surface

Percent of map unit: 3 percent
Landform: Marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread

Hydric soil rating: Yes

Danville

Percent of map unit: 1 percent
Hydric soil rating: No

Elder

Percent of map unit: 1 percent
Hydric soil rating: No

Cropley, silty clay

Percent of map unit: 1 percent
Hydric soil rating: No

179—Watsonville loam, thick surface, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: h9g7
Elevation: 20 to 1,200 feet
Mean annual precipitation: 28 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 245 to 275 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Watsonville and similar soils: 85 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Watsonville

Setting

Landform: Marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 18 inches: loam
H2 - 18 to 39 inches: clay
H3 - 39 to 63 inches: sandy clay loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R014XG912CA - Loamy Terrace, F004BO100CA - Coastal redwood slopes
Hydric soil rating: Yes

Minor Components

Danville, loam

Percent of map unit: 5 percent
Hydric soil rating: No

Elder, sandy loam

Percent of map unit: 4 percent
Hydric soil rating: No

Elkhorn, sandy loam

Percent of map unit: 2 percent
Hydric soil rating: No

Pinto, loam

Percent of map unit: 2 percent
Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

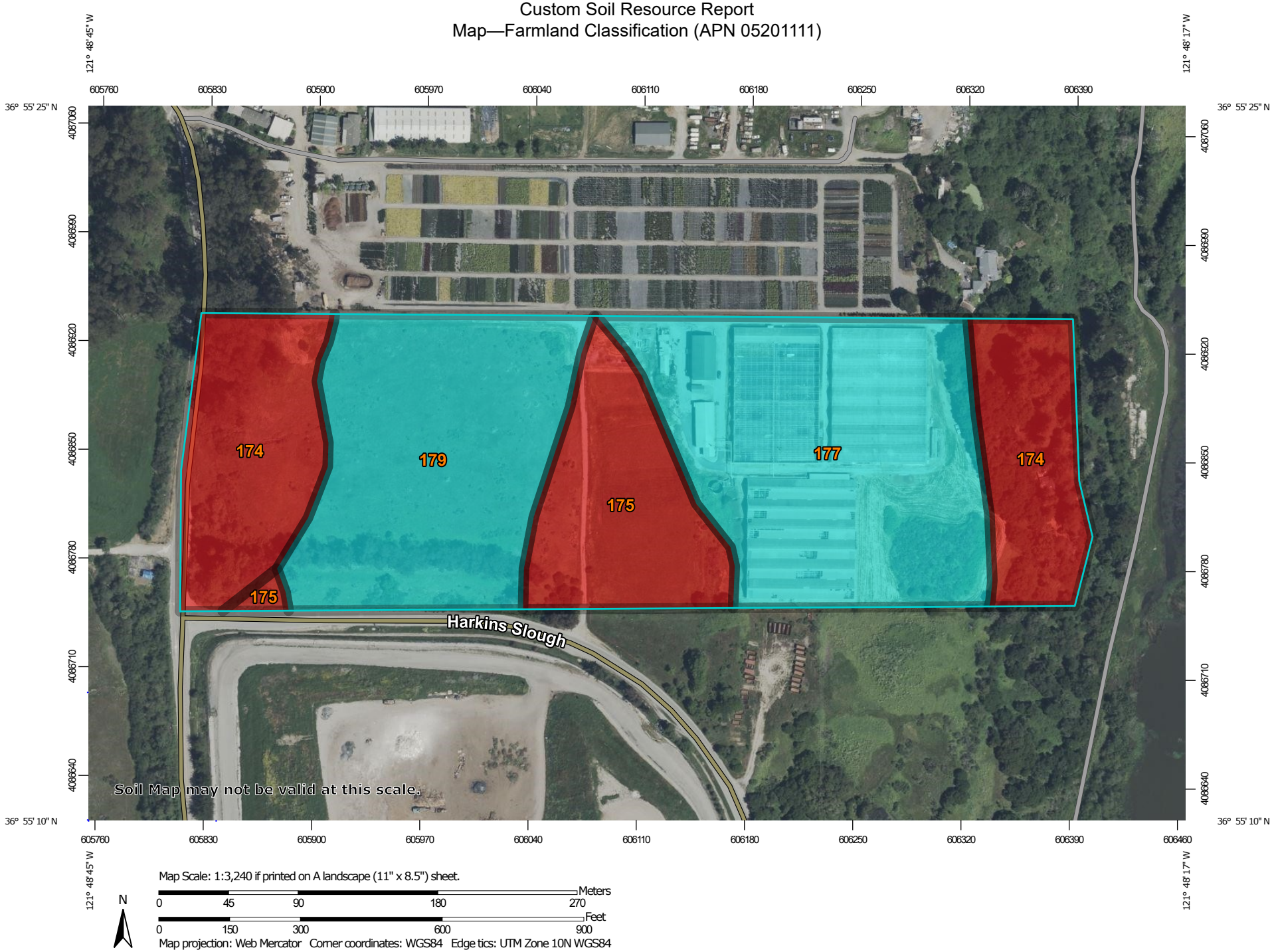
Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Farmland Classification (APN 05201111)

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Custom Soil Resource Report
Map—Farmland Classification (APN 05201111)



Map Scale: 1:3,240 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

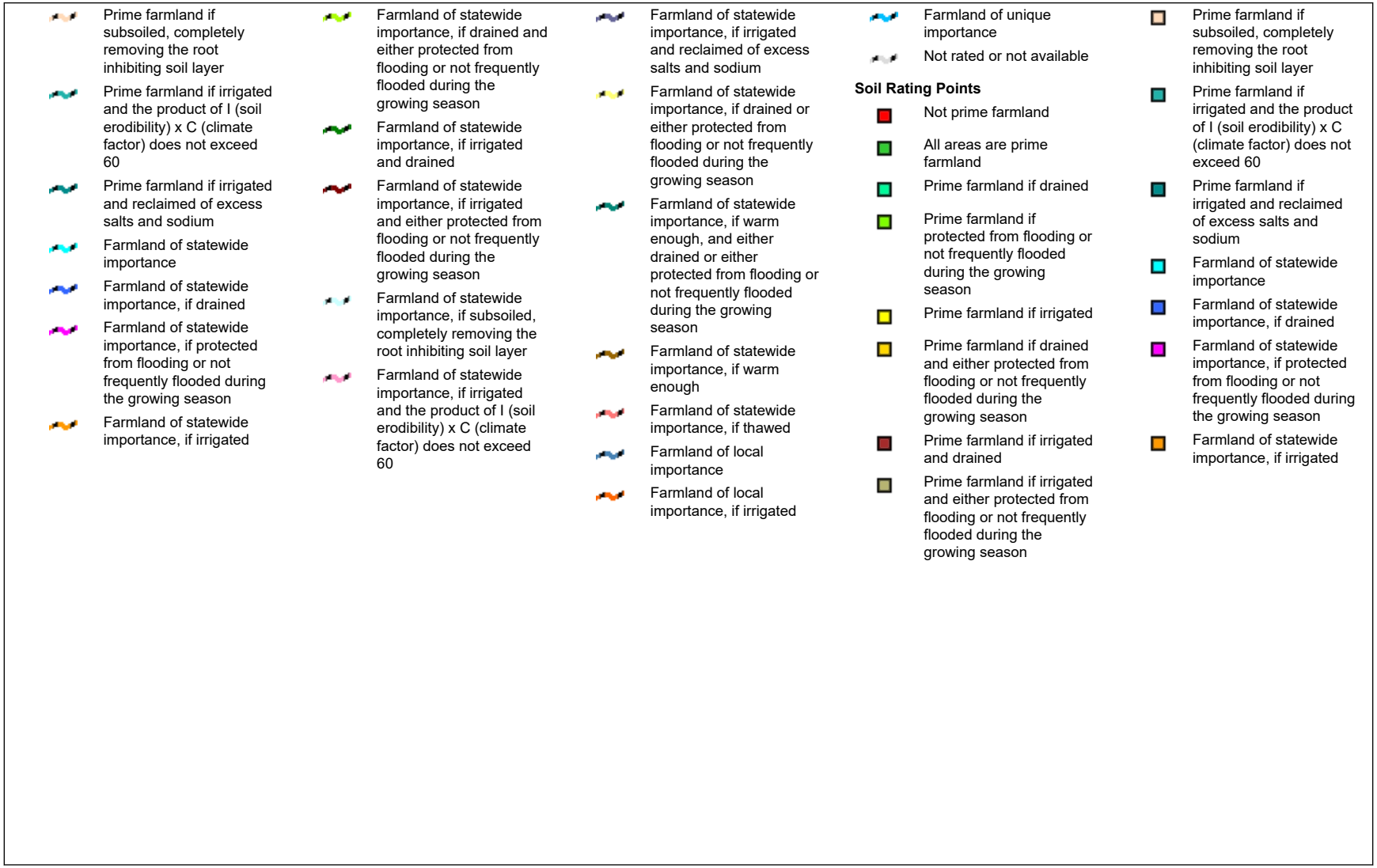
Soils

Soil Rating Polygons

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of statewide importance, if drained
- Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated
- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Soil Rating Lines

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season


Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated
Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated and drained
Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if warm enough
Farmland of statewide importance, if thawed
Farmland of local importance
Farmland of local importance, if irrigated
Farmland of unique importance
Not rated or not available
Soil Rating Points
Not prime farmland
All areas are prime farmland
Prime farmland if drained
Prime farmland if protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
Prime farmland if irrigated and drained
Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
Prime farmland if subsoiled, completely removing the root inhibiting soil layer
Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
Prime farmland if irrigated and reclaimed of excess salts and sodium
Farmland of statewide importance
Farmland of statewide importance, if drained
Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
Farmland of statewide importance, if irrigated

- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Santa Cruz County, California
Survey Area Data: Version 19, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2024—May 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Farmland Classification (APN 05201111)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
174	Tierra-Watsonville complex, 15 to 30 percent slopes	Not prime farmland	6.6	24.6%
175	Tierra-Watsonville complex, 30 to 50 percent slopes	Not prime farmland	4.0	14.7%
177	Watsonville loam, 2 to 15 percent slopes	Farmland of statewide importance	9.1	33.5%
179	Watsonville loam, thick surface, 2 to 15 percent slopes	Farmland of statewide importance	7.3	27.2%
Totals for Area of Interest			**27.0**	**100.0%**

Rating Options—Farmland Classification (APN 05201111)

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

California Revised Storie Index (CA) (APN 05201111)

The Revised Storie Index is a rating system based on soil properties that govern the potential for soil map unit components to be used for irrigated agriculture in California.

The Revised Storie Index assesses the productivity of a soil from the following four characteristics:

- Factor A: degree of soil profile development

- Factor B: texture of the surface layer

- Factor C: steepness of slope

- Factor X: drainage class, landform, erosion class, flooding and ponding frequency and duration, soil pH, soluble salt content as measured by electrical conductivity, and sodium adsorption ratio

Revised Storie Index numerical ratings have been combined into six classes as follows:

- Grade 1: Excellent (81 to 100)

- Grade 2: Good (61 to 80)

- Grade 3: Fair (41 to 60)

- Grade 4: Poor (21 to 40)

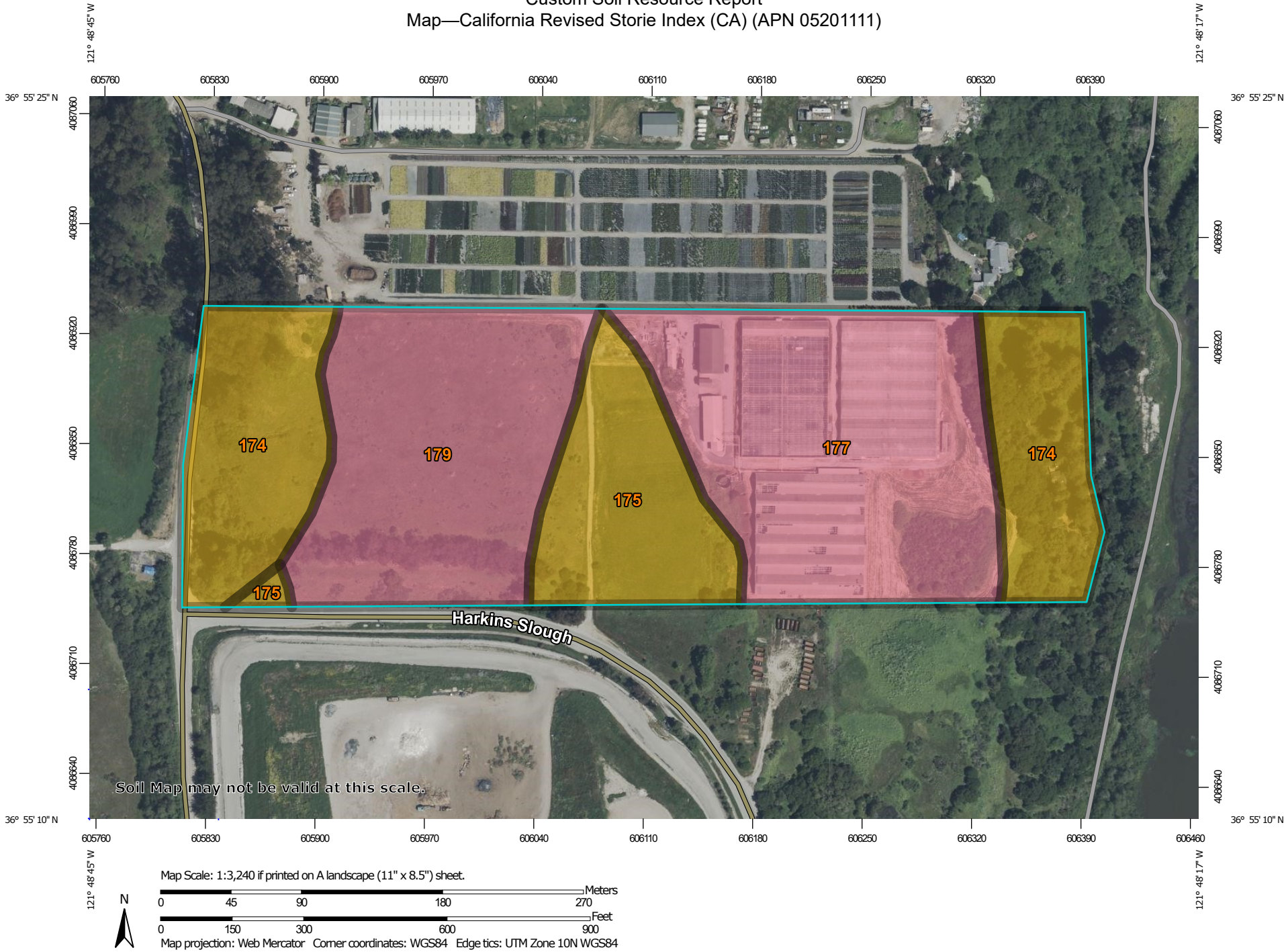
- Grade 5: Very poor (11 to 20)

- Grade 6: Nonagricultural (10 or less)

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Custom Soil Resource Report
Map—California Revised Storie Index (CA) (APN 05201111)



Map Scale: 1:3,240 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Grade 1 - Excellent
- Grade 2 - Good
- Grade 3 - Fair
- Grade 4 - Poor
- Grade 5 - Very Poor
- Grade 6 - Nonagricultural
- Not rated
- Not rated or not available

Soil Rating Lines
- Grade 1 - Excellent
- Grade 2 - Good
- Grade 3 - Fair
- Grade 4 - Poor
- Grade 5 - Very Poor
- Grade 6 - Nonagricultural
- Not rated
- Not rated or not available

Soil Rating Points
- Grade 1 - Excellent
- Grade 2 - Good
- Grade 3 - Fair
- Grade 4 - Poor
- Grade 5 - Very Poor
- Grade 6 - Nonagricultural
- Not rated
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Cruz County, California
Survey Area Data: Version 19, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2024—May 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—California Revised Storie Index (CA) (APN 05201111)

Map unit symbol	Map unit name	Rating	Component name (percent)	Acres in AOI	Percent of AOI
174	Tierra-Watsonville complex, 15 to 30 percent slopes	Grade 4 - Poor	Tierra (55%)	6.6	24.6%
175	Tierra-Watsonville complex, 30 to 50 percent slopes	Grade 4 - Poor	Tierra (50%)	4.0	14.7%
177	Watsonville loam, 2 to 15 percent slopes	Grade 5 - Very Poor	Watsonville (85%)	9.1	33.5%
179	Watsonville loam, thick surface, 2 to 15 percent slopes	Grade 5 - Very Poor	Watsonville (85%)	7.3	27.2%
Totals for Area of Interest				**27.0**	**100.0%**

Rating Options—California Revised Storie Index (CA) (APN 05201111)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Irrigated Capability Class (APN 05201111)

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are included in this data set.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

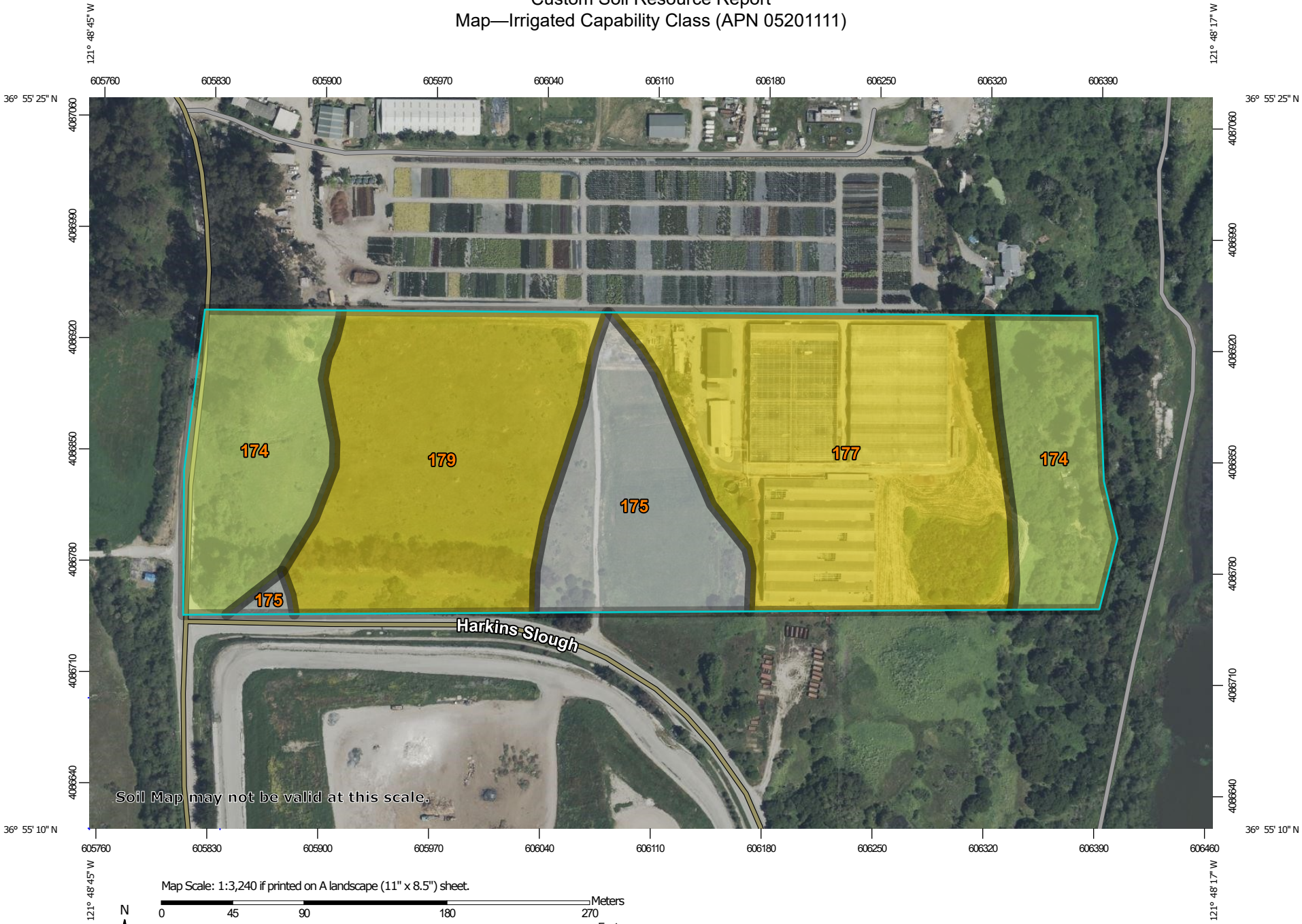
Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Custom Soil Resource Report
Map—Irrigated Capability Class (APN 05201111)



Map Scale: 1:3,240 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Capability Class - 1
- Capability Class - 2
- Capability Class - 3
- Capability Class - 4
- Capability Class - 5
- Capability Class - 6
- Capability Class - 7
- Capability Class - 8
- Not rated or not available

Soil Rating Lines

- Capability Class - 1
- Capability Class - 2
- Capability Class - 3
- Capability Class - 4
- Capability Class - 5
- Capability Class - 6
- Capability Class - 7
- Capability Class - 8
- Not rated or not available

Soil Rating Points

- Capability Class - 1
- Capability Class - 2
- Capability Class - 3
- Capability Class - 4
- Capability Class - 5
- Capability Class - 6
- Capability Class - 7
- Capability Class - 8
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Survey Area Data: Version 19, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2024—May 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Irrigated Capability Class (APN 05201111)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
174	Tierra-Watsonville complex, 15 to 30 percent slopes	4	6.6	24.6%
175	Tierra-Watsonville complex, 30 to 50 percent slopes		4.0	14.7%
177	Watsonville loam, 2 to 15 percent slopes	3	9.1	33.5%
179	Watsonville loam, thick surface, 2 to 15 percent slopes	3	7.3	27.2%
Totals for Area of Interest			**27.0**	**100.0%**

Rating Options—Irrigated Capability Class (APN 05201111)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Irrigated Capability Subclass (APN 05201111)

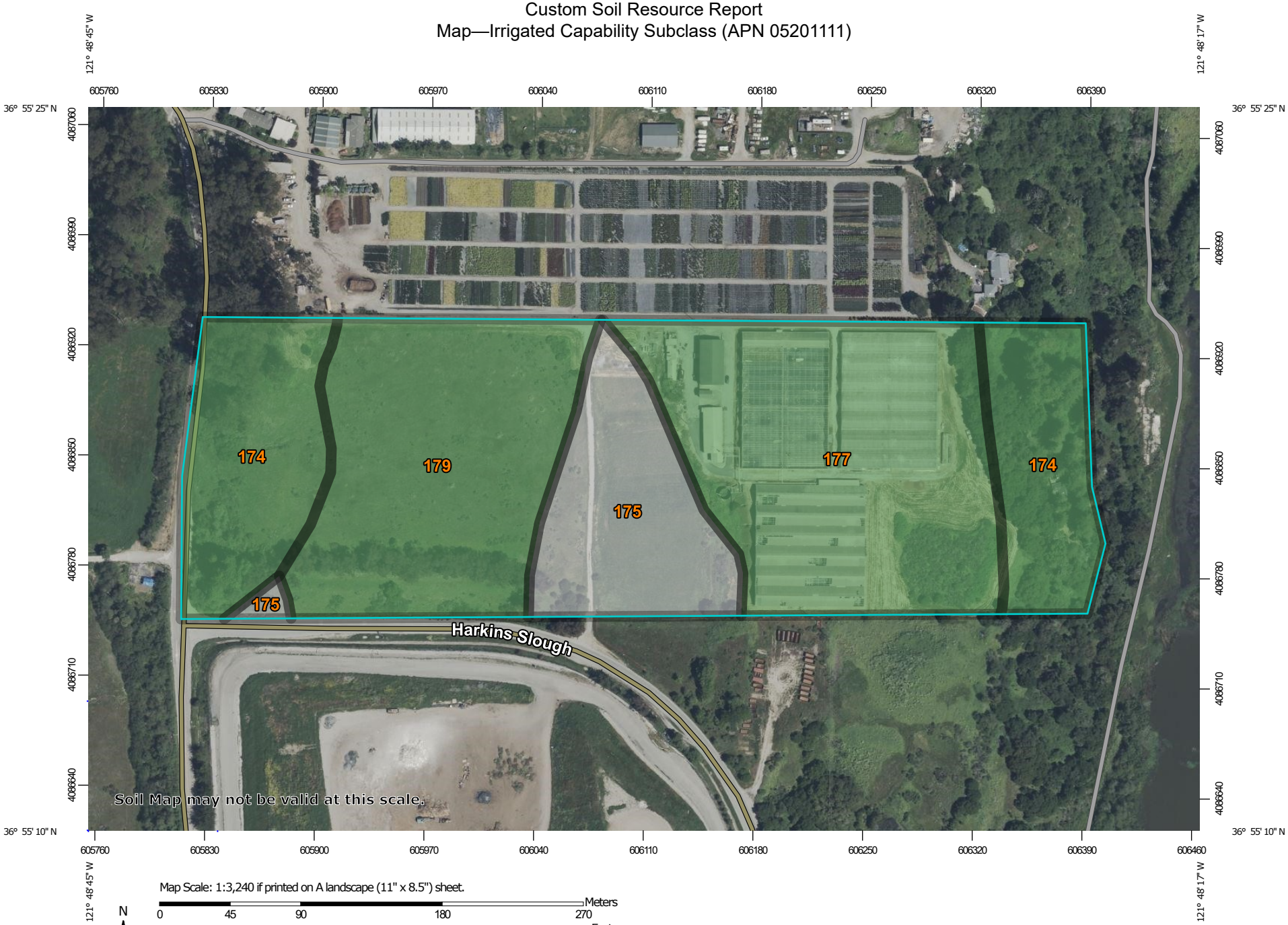
Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are included in this data set.

Capability subclasses are soil groups within one capability class. They are designated by adding a small letter, "e," "w," "s," or "c," to the class numeral, for example, 2e. The letter "e" shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; "w" shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); "s" shows that the soil is limited mainly because it is shallow, droughty, or stony; and "c," used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by "w," "s," or "c" because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, or wildlife habitat.

Custom Soil Resource Report
Map—Irrigated Capability Subclass (APN 05201111)



Map Scale: 1:3,240 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

Soil Rating Lines
- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

Soil Rating Points
- Erosion
- Soil limitation within the rooting zone
- Excess water
- Climate condition
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

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Survey Area Data: Version 19, Sep 2, 2025

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Date(s) aerial images were photographed: Apr 17, 2024—May 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Irrigated Capability Subclass (APN 05201111)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
174	Tierra-Watsonville complex, 15 to 30 percent slopes	e	6.6	24.6%
175	Tierra-Watsonville complex, 30 to 50 percent slopes		4.0	14.7%
177	Watsonville loam, 2 to 15 percent slopes	e	9.1	33.5%
179	Watsonville loam, thick surface, 2 to 15 percent slopes	e	7.3	27.2%
Totals for Area of Interest			**27.0**	**100.0%**

Rating Options—Irrigated Capability Subclass (APN 05201111)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Hydric Rating by Map Unit (APN 05201111)

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either

saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

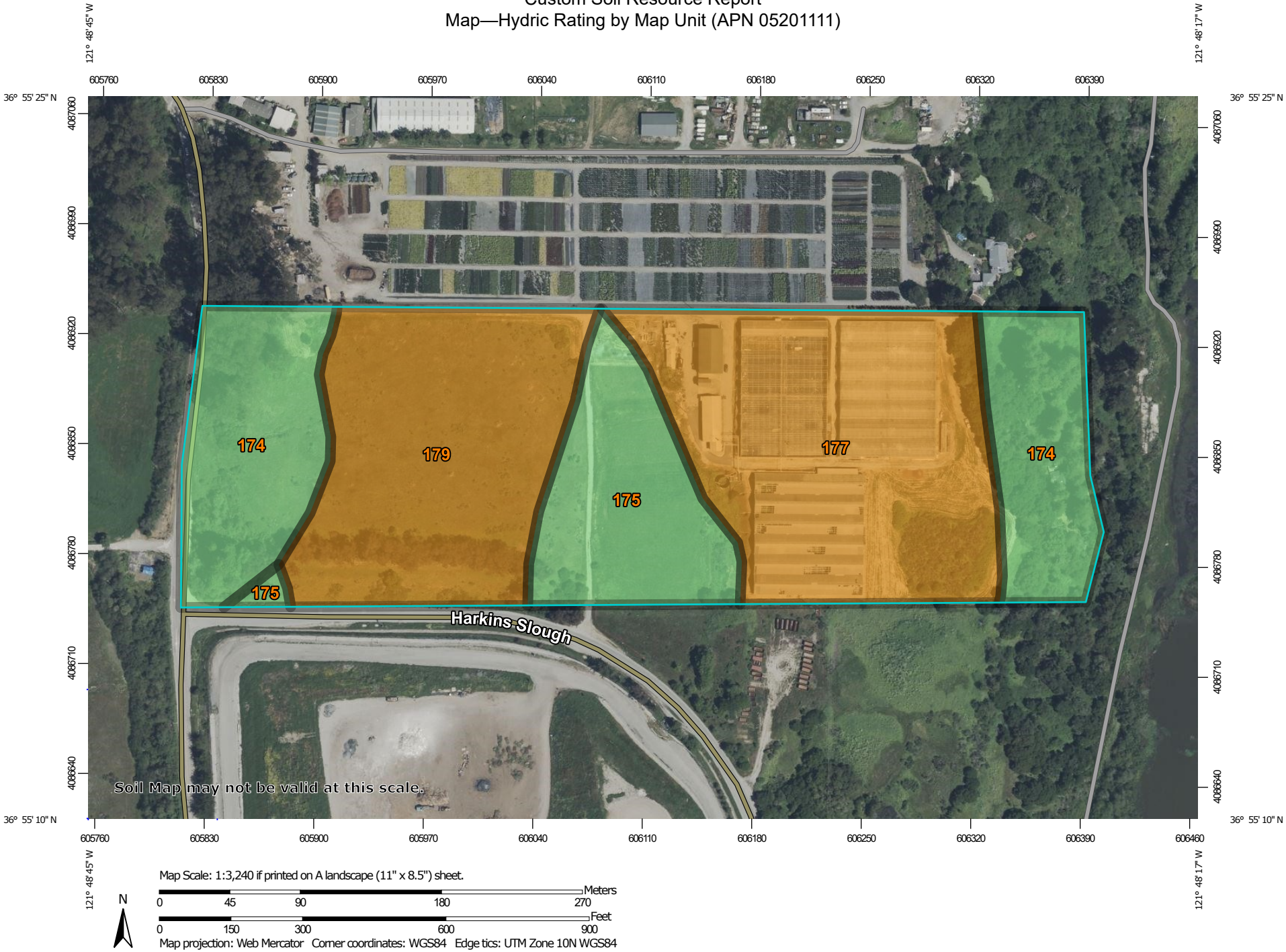
Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Custom Soil Resource Report
Map—Hydric Rating by Map Unit (APN 05201111)



Map Scale: 1:3,240 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Cruz County, California
Survey Area Data: Version 19, Sep 2, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 17, 2024—May 1, 2024

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydric Rating by Map Unit (APN 05201111)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
174	Tierra-Watsonville complex, 15 to 30 percent slopes	30	6.6	24.6%
175	Tierra-Watsonville complex, 30 to 50 percent slopes	30	4.0	14.7%
177	Watsonville loam, 2 to 15 percent slopes	88	9.1	33.5%
179	Watsonville loam, thick surface, 2 to 15 percent slopes	85	7.3	27.2%
Totals for Area of Interest			**27.0**	**100.0%**

Rating Options—Hydric Rating by Map Unit (APN 05201111)

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

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United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

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Appendix O. Air Quality for Alternative 3

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BV Landfill - Alternative 3 Detailed Report

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3.5. Building Construction (2028)

3.5.1. Onsite - Unmitigated

3.5.2. Offsite - Unmitigated

3.5.3. Onsite - Mitigated

3.5.4. Offsite - Mitigated

3.6. Paving (2028)

3.6.1. Onsite - Unmitigated

3.6.2. Offsite - Unmitigated

3.6.3. Onsite - Mitigated

3.6.4. Offsite - Mitigated

3.7. Architectural Coating (2028)

3.7.1. Onsite - Unmitigated

3.7.2. Offsite - Unmitigated

3.7.3. Onsite - Mitigated

3.7.4. Offsite - Mitigated

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

4.1.2. Mitigated

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

4.2.2. Electricity Emissions By Land Use - Mitigated

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

4.2.4. Natural Gas Emissions By Land Use - Mitigated

4.3. Area Emissions by Source

4.3.1. Unmitigated

4.3.2. Mitigated

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

4.4.2. Mitigated

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

4.5.2. Mitigated

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

4.6.2. Mitigated

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

4.7.2. Mitigated

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

4.8.2. Mitigated

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

4.9.2. Mitigated

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

5. Activity Data

5.1. Construction Schedule

5.2. Off-Road Equipment

5.2.1. Unmitigated

5.2.2. Mitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.3.2. Mitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.9.2. Mitigated

5.10. Operational Area Sources

5.10.1. Hearths

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.10.4. Landscape Equipment - Mitigated

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.11.2. Mitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.12.2. Mitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.13.2. Mitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.14.2. Mitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.15.2. Mitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

5.18.2.2. Mitigated

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

6.2. Initial Climate Risk Scores

6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

7.6. Health & Equity Custom Measures

8. User Changes to Default Data

8.1. Justifications

8.2. Project Characteristics

8.2.1. Project Details

8.3. Land Use

8.4. Construction

8.4.1. Construction Phases

8.4.7. On-Road Fugitive Dust

8.5. Operations

8.5.1. Mobile Sources

8.5.1.1. Vehicle Data

8.5.1.2. Fleet Mix

8.5.1.4. Road Dust

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	BV Landfill - Alternative 3
Construction Start Date	6/1/2027
Operational Year	2029
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	1.80000
Precipitation (days)	36.6000
Location	36.92190785288655, -121.81004471878157
County	Santa Cruz
City	Unincorporated
Air District	Monterey Bay ARD
Air Basin	North Central Coast
TAZ	3128
EDFZ	6
Electric Utility	Central Coast Community Energy
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.43

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Manufacturing	71.5000	1000sqft	1.64000	71,500.0	0.00000	0.00000	—	Transfer Station

General Office Building	4.80000	1000sqft	0.11000	4,800.00	0.00000	0.00000	—	Office
Manufacturing	61.6000	1000sqft	1.41500	61,600.0	0.00000	0.00000	—	ODF
Manufacturing	61.6000	1000sqft	1.41500	61,600.0	0.00000	0.00000	—	Recycling Center
Other Asphalt Surfaces	415.000	1000sqft	9.53000	0.00000	0.00000	0.00000	—	Parking/Roads

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Energy	E-15	Require All-Electric Development

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	199.619	32.1999	30.8616	0.12504	1.17173	39.7972	40.6834	1.07799	4.59920	5.42173	—	11,611.3	11,611.3	0.87177	1.32076	13.6446	12,040.3
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.43199	10.8242	17.0039	0.02777	0.34531	15.5575	15.9029	0.31839	1.65728	1.97566	—	3,634.46	3,634.46	0.18071	0.14578	0.09703	3,682.52
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	11.3047	7.88732	8.83788	0.02412	0.25636	7.54663	7.80299	0.23653	1.00324	1.23977	—	2,592.59	2,592.59	0.15272	0.17086	0.99836	2,648.32
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.06311	1.43944	1.61291	0.00440	0.04679	1.37726	1.42405	0.04317	0.18309	0.22626	—	429.233	429.233	0.02528	0.02829	0.16529	438.460

2.2. Construction Emissions by Year

2.2.1. Total Construction Emissions by Year, Unmitigated

Includes both onsite and offsite emissions.

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	3.13905	32.1999	30.8616	0.12504	1.17173	39.7972	40.6834	1.07799	4.59920	5.42173	—	11,611.3	11,611.3	0.87177	1.32076	13.6446	12,040.3
2028	199.619	10.1653	16.8055	0.02777	0.30898	15.5575	15.8665	0.28496	1.65728	1.94224	—	3,634.33	3,634.33	0.17085	0.13958	3.44018	3,683.64
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.43199	10.8242	17.0039	0.02776	0.34531	15.5575	15.9029	0.31839	1.65728	1.97566	—	3,634.46	3,634.46	0.18071	0.14578	0.09703	3,682.52
2028	1.36469	10.2600	16.7739	0.02777	0.30898	15.5575	15.8665	0.28496	1.65728	1.94224	—	3,609.74	3,609.74	0.17452	0.14141	0.08926	3,656.33
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.83304	7.88732	8.83788	0.02412	0.25636	7.54663	7.80299	0.23653	1.00324	1.23977	—	2,592.59	2,592.59	0.15272	0.17086	0.99836	2,648.32
2028	11.3047	2.35352	3.81836	0.00613	0.07349	2.90251	2.97600	0.06775	0.31061	0.37835	—	786.980	786.980	0.03719	0.02810	0.30167	796.585
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.15203	1.43944	1.61291	0.00440	0.04679	1.37726	1.42405	0.04317	0.18309	0.22626	—	429.233	429.233	0.02528	0.02829	0.16529	438.460
2028	2.06311	0.42952	0.69685	0.00112	0.01341	0.52971	0.54312	0.01236	0.05669	0.06905	—	130.293	130.293	0.00616	0.00465	0.04994	131.884

2.2.2. Onsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	3.05170	27.9724	28.2794	0.06093	1.17173	7.66623	8.83797	1.07799	3.93995	5.01795	—	6,598.08	6,598.08	0.26765	0.05353	0.00000	6,620.72

2028	199.546	8.92495	12.9352	0.02340	0.30024	0.00000	0.30024	0.27622	0.00000	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	0.00000	2,405.68
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.02988	9.39093	12.9379	0.02340	0.33657	0.00000	0.33657	0.30965	0.00000	0.30965	—	2,397.08	2,397.08	0.09724	0.01945	0.00000	2,405.30
2028	0.99143	8.92495	12.9352	0.02340	0.30024	0.00000	0.30024	0.27622	0.00000	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	0.00000	2,405.68
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.70302	6.29323	7.25346	0.01395	0.24510	0.80911	1.05421	0.22549	0.27111	0.49660	—	1,470.98	1,470.98	0.05967	0.01193	0.00000	1,476.03
2028	11.2282	2.10160	3.05971	0.00530	0.07184	0.00000	0.07184	0.06609	0.00000	0.06609	—	545.207	545.207	0.02212	0.00442	0.00000	547.078
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.12830	1.14851	1.32376	0.00254	0.04473	0.14766	0.19239	0.04115	0.04948	0.09063	—	243.538	243.538	0.00988	0.00198	0.00000	244.373
2028	2.04914	0.38354	0.55840	0.00097	0.01311	0.00000	0.01311	0.01206	0.00000	0.01206	—	90.2652	90.2652	0.00366	0.00073	0.00000	90.5750

2.2.3. Offsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.40467	12.2993	5.77123	0.09251	0.09026	34.2568	34.3470	0.09026	3.76023	3.85049	—	8,184.40	8,184.40	0.73276	1.29296	13.6446	8,601.66
2028	0.39365	1.24037	3.87020	0.00437	0.00874	15.5575	15.5663	0.00874	1.65728	1.66602	—	1,236.88	1,236.88	0.07359	0.12013	3.44018	1,277.96
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.40212	1.43330	4.06594	0.00437	0.00874	15.5575	15.5663	0.00874	1.65728	1.66602	—	1,237.38	1,237.38	0.08347	0.12633	0.09703	1,277.22
2028	0.37326	1.33505	3.83863	0.00437	0.00874	15.5575	15.5663	0.00874	1.65728	1.66602	—	1,212.28	1,212.28	0.07727	0.12196	0.08926	1,250.65
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.13002	1.59409	1.58441	0.01018	0.01126	6.73751	6.74878	0.01104	0.73213	0.74317	—	1,121.61	1,121.61	0.09305	0.15893	0.99836	1,172.30
2028	0.07655	0.25192	0.75865	0.00083	0.00166	2.90251	2.90416	0.00166	0.31061	0.31226	—	241.773	241.773	0.01507	0.02368	0.30167	249.507

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.02373	0.29092	0.28916	0.00186	0.00206	1.22960	1.23165	0.00202	0.13361	0.13563	—	185.695	185.695	0.01541	0.02631	0.16529	194.087
2028	0.01397	0.04597	0.13845	0.00015	0.00030	0.52971	0.53001	0.00030	0.05669	0.05699	—	40.0283	40.0283	0.00250	0.00392	0.04994	41.3087

2.2.4. Total Construction Emissions by Year, Mitigated

Includes both onsite and offsite emissions.

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	3.13905	32.1999	30.8616	0.12504	1.17173	39.7972	40.6834	1.07799	4.59920	5.42173	—	11,611.3	11,611.3	0.87177	1.32076	13.6446	12,040.3
2028	199.619	10.1653	16.8055	0.02777	0.30898	15.5575	15.8665	0.28496	1.65728	1.94224	—	3,634.33	3,634.33	0.17085	0.13958	3.44018	3,683.64
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.43199	10.8242	17.0039	0.02776	0.34531	15.5575	15.9029	0.31839	1.65728	1.97566	—	3,634.46	3,634.46	0.18071	0.14578	0.09703	3,682.52
2028	1.36469	10.2600	16.7739	0.02777	0.30898	15.5575	15.8665	0.28496	1.65728	1.94224	—	3,609.74	3,609.74	0.17452	0.14141	0.08926	3,656.33
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.83304	7.88732	8.83788	0.02412	0.25636	7.54663	7.80299	0.23653	1.00324	1.23977	—	2,592.59	2,592.59	0.15272	0.17086	0.99836	2,648.32
2028	11.3047	2.35352	3.81836	0.00613	0.07349	2.90251	2.97600	0.06775	0.31061	0.37835	—	786.980	786.980	0.03719	0.02810	0.30167	796.585
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.15203	1.43944	1.61291	0.00440	0.04679	1.37726	1.42405	0.04317	0.18309	0.22626	—	429.233	429.233	0.02528	0.02829	0.16529	438.460
2028	2.06311	0.42952	0.69685	0.00112	0.01341	0.52971	0.54312	0.01236	0.05669	0.06905	—	130.293	130.293	0.00616	0.00465	0.04994	131.884

2.2.5. Onsite Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	3.05170	27.9724	28.2794	0.06093	1.17173	7.66623	8.83797	1.07799	3.93995	5.01795	—	6,598.08	6,598.08	0.26765	0.05353	0.00000	6,620.72
2028	199.546	8.92495	12.9352	0.02340	0.30024	0.00000	0.30024	0.27622	0.00000	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	0.00000	2,405.68
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	1.02988	9.39093	12.9379	0.02340	0.33657	0.00000	0.33657	0.30965	0.00000	0.30965	—	2,397.08	2,397.08	0.09724	0.01945	0.00000	2,405.30
2028	0.99143	8.92495	12.9352	0.02340	0.30024	0.00000	0.30024	0.27622	0.00000	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	0.00000	2,405.68
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.70302	6.29323	7.25346	0.01395	0.24510	0.80911	1.05421	0.22549	0.27111	0.49660	—	1,470.98	1,470.98	0.05967	0.01193	0.00000	1,476.03
2028	11.2282	2.10160	3.05971	0.00530	0.07184	0.00000	0.07184	0.06609	0.00000	0.06609	—	545.207	545.207	0.02212	0.00442	0.00000	547.078
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.12830	1.14851	1.32376	0.00254	0.04473	0.14766	0.19239	0.04115	0.04948	0.09063	—	243.538	243.538	0.00988	0.00198	0.00000	244.373
2028	2.04914	0.38354	0.55840	0.00097	0.01311	0.00000	0.01311	0.01206	0.00000	0.01206	—	90.2652	90.2652	0.00366	0.00073	0.00000	90.5750

2.2.6. Offsite Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.40467	12.2993	5.77123	0.09251	0.09026	34.2568	34.3470	0.09026	3.76023	3.85049	—	8,184.40	8,184.40	0.73276	1.29296	13.6446	8,601.66
2028	0.39365	1.24037	3.87020	0.00437	0.00874	15.5575	15.5663	0.00874	1.65728	1.66602	—	1,236.88	1,236.88	0.07359	0.12013	3.44018	1,277.96
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.40212	1.43330	4.06594	0.00437	0.00874	15.5575	15.5663	0.00874	1.65728	1.66602	—	1,237.38	1,237.38	0.08347	0.12633	0.09703	1,277.22
2028	0.37326	1.33505	3.83863	0.00437	0.00874	15.5575	15.5663	0.00874	1.65728	1.66602	—	1,212.28	1,212.28	0.07727	0.12196	0.08926	1,250.65

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.13002	1.59409	1.58441	0.01018	0.01126	6.73751	6.74878	0.01104	0.73213	0.74317	—	1,121.61	1,121.61	0.09305	0.15893	0.99836	1,172.30
2028	0.07655	0.25192	0.75865	0.00083	0.00166	2.90251	2.90416	0.00166	0.31061	0.31226	—	241.773	241.773	0.01507	0.02368	0.30167	249.507
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2027	0.02373	0.29092	0.28916	0.00186	0.00206	1.22960	1.23165	0.00202	0.13361	0.13563	—	185.695	185.695	0.01541	0.02631	0.16529	194.087
2028	0.01397	0.04597	0.13845	0.00015	0.00030	0.52971	0.53001	0.00030	0.05669	0.05699	—	40.0283	40.0283	0.00250	0.00392	0.04994	41.3087

2.3. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	7.11435	11.3737	28.3698	0.03890	0.45067	0.02026	0.47093	0.42570	0.00530	0.43100	220.433	5,926.24	6,146.68	22.8171	0.27233	50.7917	6,849.05
Mit.	6.99138	9.13801	26.4918	0.02548	0.28076	0.02026	0.30101	0.25579	0.00530	0.26108	220.433	3,258.64	3,479.07	22.5811	0.26730	50.7917	4,174.04
% Reduced	2%	20%	7%	34%	38%	—	36%	40%	—	39%	—	45%	43%	1%	2%	—	39%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.68864	11.3045	19.6869	0.03837	0.43526	0.02026	0.45552	0.41405	0.00530	0.41935	220.433	5,890.03	6,110.46	22.8157	0.27210	50.6955	6,812.63
Mit.	5.56568	9.06873	17.8089	0.02496	0.26535	0.02026	0.28560	0.24414	0.00530	0.24943	220.433	3,222.42	3,442.85	22.5796	0.26708	50.6955	4,137.63
% Reduced	2%	20%	10%	35%	39%	—	37%	41%	—	41%	—	45%	44%	1%	2%	—	39%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	6.39808	8.75320	20.5184	0.03161	0.36957	0.01700	0.38656	0.35188	0.00445	0.35633	220.433	5,143.94	5,364.38	22.7852	0.26523	50.7295	6,063.78
Mit.	6.27512	6.51746	18.6404	0.01820	0.19965	0.01700	0.21665	0.18196	0.00445	0.18641	220.433	2,476.34	2,696.77	22.5491	0.26021	50.7295	3,388.77
% Reduced	2%	26%	9%	42%	46%	—	44%	48%	—	48%	—	52%	50%	1%	2%	—	44%

Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.16765	1.59746	3.74461	0.00577	0.06745	0.00310	0.07055	0.06422	0.00081	0.06503	36.4952	851.639	888.134	3.77235	0.04391	8.39885	1,003.93
Mit.	1.14521	1.18944	3.40187	0.00332	0.03644	0.00310	0.03954	0.03321	0.00081	0.03402	36.4952	409.986	446.481	3.73326	0.04308	8.39885	561.049
% Reduced	2%	26%	9%	42%	46%	—	44%	48%	—	48%	—	52%	50%	1%	2%	—	44%

2.4. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00664	0.05544	0.10368	0.00044	0.00056	0.02026	0.02081	0.00053	0.00530	0.00583	—	46.9170	46.9170	0.00344	0.00594	0.09872	48.8711
Area	6.06006	0.07301	8.67672	0.00052	0.01541	—	0.01541	0.01165	—	0.01165	—	35.6799	35.6799	0.00150	0.00031	—	35.8086
Energy	0.12297	2.23574	1.87802	0.01341	0.16992	—	0.16992	0.16992	—	0.16992	—	3,132.31	3,132.31	0.42269	0.02764	—	3,151.11
Water	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Waste	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Off-Road	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56
Total	7.11435	11.3737	28.3698	0.03890	0.45067	0.02026	0.47093	0.42570	0.00530	0.43100	220.433	5,926.24	6,146.68	22.8171	0.27233	50.7917	6,849.05
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00647	0.05916	0.09748	0.00043	0.00056	0.02026	0.02082	0.00053	0.00530	0.00583	—	46.3814	46.3814	0.00349	0.00602	0.00256	48.2645
Area	4.63453	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.12297	2.23574	1.87802	0.01341	0.16992	—	0.16992	0.16992	—	0.16992	—	3,132.31	3,132.31	0.42269	0.02764	—	3,151.11
Water	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Waste	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929

Off-Road	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56
Total	5.68864	11.3045	19.6869	0.03837	0.43526	0.02026	0.45552	0.41405	0.00530	0.41935	220.433	5,890.03	6,110.46	22.8157	0.27210	50.6955	6,812.63
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00552	0.04969	0.08111	0.00037	0.00048	0.01700	0.01748	0.00046	0.00445	0.00490	—	39.7574	39.7574	0.00297	0.00513	0.03654	41.3976
Area	5.61092	0.05000	5.94296	0.00035	0.01056	—	0.01056	0.00798	—	0.00798	—	24.4383	24.4383	0.00103	0.00021	—	24.5264
Energy	0.12297	2.23574	1.87802	0.01341	0.16992	—	0.16992	0.16992	—	0.16992	—	3,132.31	3,132.31	0.42269	0.02764	—	3,151.11
Water	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Waste	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Off-Road	0.65868	6.41777	12.6163	0.01747	0.18862	—	0.18862	0.17353	—	0.17353	—	1,891.55	1,891.55	0.07673	0.01535	—	1,898.04
Total	6.39808	8.75320	20.5184	0.03161	0.36957	0.01700	0.38656	0.35188	0.00445	0.35633	220.433	5,143.94	5,364.38	22.7852	0.26523	50.7295	6,063.78
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00101	0.00907	0.01480	0.00007	0.00009	0.00310	0.00319	0.00008	0.00081	0.00090	—	6.58230	6.58230	0.00049	0.00085	0.00605	6.85384
Area	1.02399	0.00913	1.08459	0.00006	0.00193	—	0.00193	0.00146	—	0.00146	—	4.04604	4.04604	0.00017	0.00003	—	4.06063
Energy	0.02244	0.40802	0.34274	0.00245	0.03101	—	0.03101	0.03101	—	0.03101	—	518.589	518.589	0.06998	0.00458	—	521.703
Water	—	—	—	—	—	—	—	—	—	—	14.5549	9.25282	23.8077	1.49615	0.03591	—	71.9126
Waste	—	—	—	—	—	—	—	—	—	—	21.9403	0.00000	21.9403	2.19286	0.00000	—	76.7617
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.39280	8.39280
Off-Road	0.12021	1.17124	2.30248	0.00319	0.03442	—	0.03442	0.03167	—	0.03167	—	313.168	313.168	0.01270	0.00254	—	314.243
Total	1.16765	1.59746	3.74461	0.00577	0.06745	0.00310	0.07055	0.06422	0.00081	0.06503	36.4952	851.639	888.134	3.77235	0.04391	8.39885	1,003.93

2.5. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00664	0.05544	0.10368	0.00044	0.00056	0.02026	0.02081	0.00053	0.00530	0.00583	—	46.9170	46.9170	0.00344	0.00594	0.09872	48.8711

Area	6.06006	0.07301	8.67672	0.00052	0.01541	—	0.01541	0.01165	—	0.01165	—	35.6799	35.6799	0.00150	0.00031	—	35.8086
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	464.702	464.702	0.18660	0.02262	—	476.107
Water	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Waste	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Off-Road	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56
Total	6.99138	9.13801	26.4918	0.02548	0.28076	0.02026	0.30101	0.25579	0.00530	0.26108	220.433	3,258.64	3,479.07	22.5811	0.26730	50.7917	4,174.04
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00647	0.05916	0.09748	0.00043	0.00056	0.02026	0.02082	0.00053	0.00530	0.00583	—	46.3814	46.3814	0.00349	0.00602	0.00256	48.2645
Area	4.63453	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	464.702	464.702	0.18660	0.02262	—	476.107
Water	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Waste	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Off-Road	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56
Total	5.56568	9.06873	17.8089	0.02496	0.26535	0.02026	0.28560	0.24414	0.00530	0.24943	220.433	3,222.42	3,442.85	22.5796	0.26708	50.6955	4,137.63
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00552	0.04969	0.08111	0.00037	0.00048	0.01700	0.01748	0.00046	0.00445	0.00490	—	39.7574	39.7574	0.00297	0.00513	0.03654	41.3976
Area	5.61092	0.05000	5.94296	0.00035	0.01056	—	0.01056	0.00798	—	0.00798	—	24.4383	24.4383	0.00103	0.00021	—	24.5264
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	464.702	464.702	0.18660	0.02262	—	476.107
Water	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Waste	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Off-Road	0.65868	6.41777	12.6163	0.01747	0.18862	—	0.18862	0.17353	—	0.17353	—	1,891.55	1,891.55	0.07673	0.01535	—	1,898.04
Total	6.27512	6.51746	18.6404	0.01820	0.19965	0.01700	0.21665	0.18196	0.00445	0.18641	220.433	2,476.34	2,696.77	22.5491	0.26021	50.7295	3,388.77
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	0.00101	0.00907	0.01480	0.00007	0.00009	0.00310	0.00319	0.00008	0.00081	0.00090	—	6.58230	6.58230	0.00049	0.00085	0.00605	6.85384
Area	1.02399	0.00913	1.08459	0.00006	0.00193	—	0.00193	0.00146	—	0.00146	—	4.04604	4.04604	0.00017	0.00003	—	4.06063
Energy	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	76.9367	76.9367	0.03089	0.00374	—	78.8250
Water	—	—	—	—	—	—	—	—	—	—	14.5549	9.25282	23.8077	1.49615	0.03591	—	71.9126
Waste	—	—	—	—	—	—	—	—	—	—	21.9403	0.00000	21.9403	2.19286	0.00000	—	76.7617
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.39280	8.39280
Off-Road	0.12021	1.17124	2.30248	0.00319	0.03442	—	0.03442	0.03167	—	0.03167	—	313.168	313.168	0.01270	0.00254	—	314.243
Total	1.14521	1.18944	3.40187	0.00332	0.03644	0.00310	0.03954	0.03321	0.00081	0.03402	36.4952	409.986	446.481	3.73326	0.04308	8.39885	561.049

3. Construction Emissions Details

3.1. Demolition (2027)

3.1.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.21478	19.9005	18.6307	0.03253	0.79594	—	0.79594	0.73226	—	0.73226	—	3,426.90	3,426.90	0.13901	0.02780	—	3,438.66
Demolition	—	—	—	—	—	5.54038	5.54038	—	0.83897	0.83897	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12136	1.09044	1.02086	0.00178	0.04361	—	0.04361	0.04012	—	0.04012	—	187.775	187.775	0.00762	0.00152	—	188.420

Demoliti	—	—	—	—	—	0.30358	0.30358	—	0.04597	0.04597	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02215	0.19901	0.18631	0.00033	0.00796	—	0.00796	0.00732	—	0.00732	—	31.0883	31.0883	0.00126	0.00025	—	31.1950
Demolition	—	—	—	—	—	0.05540	0.05540	—	0.00839	0.00839	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.1.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06817	0.04690	0.65365	0.00000	0.00000	2.24558	2.24558	0.00000	0.23779	0.23779	—	107.040	107.040	0.00619	0.00453	0.41510	108.961
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.19405	12.2524	5.11759	0.09251	0.09026	32.0112	32.1015	0.09026	3.52244	3.61270	—	8,077.36	8,077.36	0.72657	1.28842	13.2295	8,492.70
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00364	0.00284	0.03349	0.00000	0.00000	0.11114	0.11114	0.00000	0.01182	0.01182	—	5.61705	5.61705	0.00038	0.00025	0.00981	5.71028
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.01051	0.69201	0.28128	0.00507	0.00507	1.58666	1.59173	0.00495	0.17603	0.18098	—	442.599	442.599	0.03981	0.07060	0.31295	464.945
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00067	0.00052	0.00611	0.00000	0.00000	0.02028	0.02028	0.00000	0.00216	0.00216	—	0.92997	0.92997	0.00006	0.00004	0.00162	0.94540
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Hauling	0.00192	0.12629	0.05133	0.00093	0.00093	0.28957	0.29049	0.00090	0.03213	0.03303	—	73.2772	73.2772	0.00659	0.01169	0.05181	76.9770

3.1.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.21478	19.9005	18.6307	0.03253	0.79594	—	0.79594	0.73226	—	0.73226	—	3,426.90	3,426.90	0.13901	0.02780	—	3,438.66
Demolition	—	—	—	—	—	5.54038	5.54038	—	0.83897	0.83897	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12136	1.09044	1.02086	0.00178	0.04361	—	0.04361	0.04012	—	0.04012	—	187.775	187.775	0.00762	0.00152	—	188.420
Demolition	—	—	—	—	—	0.30358	0.30358	—	0.04597	0.04597	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02215	0.19901	0.18631	0.00033	0.00796	—	0.00796	0.00732	—	0.00732	—	31.0883	31.0883	0.00126	0.00025	—	31.1950
Demolition	—	—	—	—	—	0.05540	0.05540	—	0.00839	0.00839	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.1.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06817	0.04690	0.65365	0.00000	0.00000	2.24558	2.24558	0.00000	0.23779	0.23779	—	107.040	107.040	0.00619	0.00453	0.41510	108.961
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.19405	12.2524	5.11759	0.09251	0.09026	32.0112	32.1015	0.09026	3.52244	3.61270	—	8,077.36	8,077.36	0.72657	1.28842	13.2295	8,492.70
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00364	0.00284	0.03349	0.00000	0.00000	0.11114	0.11114	0.00000	0.01182	0.01182	—	5.61705	5.61705	0.00038	0.00025	0.00981	5.71028
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.01051	0.69201	0.28128	0.00507	0.00507	1.58666	1.59173	0.00495	0.17603	0.18098	—	442.599	442.599	0.03981	0.07060	0.31295	464.945
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00067	0.00052	0.00611	0.00000	0.00000	0.02028	0.02028	0.00000	0.00216	0.00216	—	0.92997	0.92997	0.00006	0.00004	0.00162	0.94540
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00192	0.12629	0.05133	0.00093	0.00093	0.28957	0.29049	0.00090	0.03213	0.03303	—	73.2772	73.2772	0.00659	0.01169	0.05181	76.9770

3.2. Site Preparation (2027)

3.2.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	3.05170	27.9724	28.2794	0.04891	1.17173	—	1.17173	1.07799	—	1.07799	—	5,297.82	5,297.82	0.21490	0.04298	—	5,316.00
Dust From Material Movement	—	—	—	—	—	7.66623	7.66623	—	3.93995	3.93995	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08361	0.76637	0.77478	0.00134	0.03210	—	0.03210	0.02953	—	0.02953	—	145.146	145.146	0.00589	0.00118	—	145.644
Dust From Material Movement	—	—	—	—	—	0.21003	0.21003	—	0.10794	0.10794	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01526	0.13986	0.14140	0.00024	0.00586	—	0.00586	0.00539	—	0.00539	—	24.0305	24.0305	0.00097	0.00019	—	24.1130
Dust From Material Movement	—	—	—	—	—	0.03833	0.03833	—	0.01970	0.01970	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07953	0.05471	0.76259	0.00000	0.00000	2.61984	2.61984	0.00000	0.27742	0.27742	—	124.881	124.881	0.00722	0.00529	0.48428	127.122
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00213	0.00165	0.01954	0.00000	0.00000	0.06483	0.06483	0.00000	0.00690	0.00690	—	3.27661	3.27661	0.00022	0.00014	0.00572	3.33100
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00039	0.00030	0.00357	0.00000	0.00000	0.01183	0.01183	0.00000	0.00126	0.00126	—	0.54248	0.54248	0.00004	0.00002	0.00095	0.55148
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.05170	27.9724	28.2794	0.04891	1.17173	—	1.17173	1.07799	—	1.07799	—	5,297.82	5,297.82	0.21490	0.04298	—	5,316.00
Dust From Material Movement	—	—	—	—	—	7.66623	7.66623	—	3.93995	3.93995	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08361	0.76637	0.77478	0.00134	0.03210	—	0.03210	0.02953	—	0.02953	—	145.146	145.146	0.00589	0.00118	—	145.644
Dust From Material Movement	—	—	—	—	—	0.21003	0.21003	—	0.10794	0.10794	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01526	0.13986	0.14140	0.00024	0.00586	—	0.00586	0.00539	—	0.00539	—	24.0305	24.0305	0.00097	0.00019	—	24.1130
Dust From Material Movement	—	—	—	—	—	0.03833	0.03833	—	0.01970	0.01970	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07953	0.05471	0.76259	0.00000	0.00000	2.61984	2.61984	0.00000	0.27742	0.27742	—	124.881	124.881	0.00722	0.00529	0.48428	127.122
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00213	0.00165	0.01954	0.00000	0.00000	0.06483	0.06483	0.00000	0.00690	0.00690	—	3.27661	3.27661	0.00022	0.00014	0.00572	3.33100
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00039	0.00030	0.00357	0.00000	0.00000	0.01183	0.01183	0.00000	0.00126	0.00126	—	0.54248	0.54248	0.00004	0.00002	0.00095	0.55148
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.3. Grading (2027)

3.3.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.94546	25.5801	27.2816	0.06093	1.04307	—	1.04307	0.95962	—	0.95962	—	6,598.08	6,598.08	0.26765	0.05353	—	6,620.72
Dust From Material Movement	—	—	—	—	—	3.59521	3.59521	—	1.42584	1.42584	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24209	2.10247	2.24233	0.00501	0.08573	—	0.08573	0.07887	—	0.07887	—	542.308	542.308	0.02200	0.00440	—	544.169
Dust From Material Movement	—	—	—	—	—	0.29550	0.29550	—	0.11719	0.11719	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04418	0.38370	0.40922	0.00091	0.01565	—	0.01565	0.01439	—	0.01439	—	89.7852	89.7852	0.00364	0.00073	—	90.0934
Dust From Material Movement	—	—	—	—	—	0.05393	0.05393	—	0.02139	0.02139	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.3.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09089	0.06253	0.87153	0.00000	0.00000	2.99411	2.99411	0.00000	0.31705	0.31705	—	142.721	142.721	0.00825	0.00605	0.55346	145.282
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.10270	6.48435	2.70838	0.04896	0.04777	16.9413	16.9890	0.04777	1.86418	1.91195	—	4,274.78	4,274.78	0.38452	0.68187	7.00142	4,494.59
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.00729	0.00567	0.06698	0.00000	0.00000	0.22227	0.22227	0.00000	0.02364	0.02364	—	11.2341	11.2341	0.00075	0.00050	0.01963	11.4206
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00834	0.54935	0.22329	0.00402	0.00402	1.25956	1.26359	0.00393	0.13974	0.14367	—	351.354	351.354	0.03160	0.05604	0.24843	369.094
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00133	0.00104	0.01222	0.00000	0.00000	0.04056	0.04056	0.00000	0.00431	0.00431	—	1.85993	1.85993	0.00012	0.00008	0.00325	1.89080
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00152	0.10026	0.04075	0.00073	0.00073	0.22987	0.23060	0.00072	0.02550	0.02622	—	58.1707	58.1707	0.00523	0.00928	0.04113	61.1078

3.3.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.94546	25.5801	27.2816	0.06093	1.04307	—	1.04307	0.95962	—	0.95962	—	6,598.08	6,598.08	0.26765	0.05353	—	6,620.72
Dust From Material Movement	—	—	—	—	—	3.59521	3.59521	—	1.42584	1.42584	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24209	2.10247	2.24233	0.00501	0.08573	—	0.08573	0.07887	—	0.07887	—	542.308	542.308	0.02200	0.00440	—	544.169
Dust From Material Movement	—	—	—	—	—	0.29550	0.29550	—	0.11719	0.11719	—	—	—	—	—	—	—

Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04418	0.38370	0.40922	0.00091	0.01565	—	0.01565	0.01439	—	0.01439	—	89.7852	89.7852	0.00364	0.00073	—	90.0934
Dust From Material Movement	—	—	—	—	—	0.05393	0.05393	—	0.02139	0.02139	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.3.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09089	0.06253	0.87153	0.00000	0.00000	2.99411	2.99411	0.00000	0.31705	0.31705	—	142.721	142.721	0.00825	0.00605	0.55346	145.282
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.10270	6.48435	2.70838	0.04896	0.04777	16.9413	16.9890	0.04777	1.86418	1.91195	—	4,274.78	4,274.78	0.38452	0.68187	7.00142	4,494.59
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00729	0.00567	0.06698	0.00000	0.00000	0.22227	0.22227	0.00000	0.02364	0.02364	—	11.2341	11.2341	0.00075	0.00050	0.01963	11.4206
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00834	0.54935	0.22329	0.00402	0.00402	1.25956	1.26359	0.00393	0.13974	0.14367	—	351.354	351.354	0.03160	0.05604	0.24843	369.094
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00133	0.00104	0.01222	0.00000	0.00000	0.04056	0.04056	0.00000	0.00431	0.00431	—	1.85993	1.85993	0.00012	0.00008	0.00325	1.89080
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Hauling	0.00152	0.10026	0.04075	0.00073	0.00073	0.22987	0.23060	0.00072	0.02550	0.02622	—	58.1707	58.1707	0.00523	0.00928	0.04113	61.1078

3.4. Building Construction (2027)

3.4.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.02988	9.39093	12.9379	0.02340	0.33657	—	0.33657	0.30965	—	0.30965	—	2,397.08	2,397.08	0.09724	0.01945	—	2,405.30
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.02988	9.39093	12.9379	0.02340	0.33657	—	0.33657	0.30965	—	0.30965	—	2,397.08	2,397.08	0.09724	0.01945	—	2,405.30
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25596	2.33395	3.21550	0.00581	0.08365	—	0.08365	0.07696	—	0.07696	—	595.751	595.751	0.02417	0.00483	—	597.796
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04671	0.42595	0.58683	0.00106	0.01527	—	0.01527	0.01404	—	0.01404	—	98.6334	98.6334	0.00400	0.00080	—	98.9719
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37859	0.26046	3.63036	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	594.503	594.503	0.03436	0.02518	2.30545	605.171
Vendor	0.02608	1.06541	0.45967	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	667.985	667.985	0.04360	0.10115	1.44303	700.661
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37676	0.32865	3.59042	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	569.286	569.286	0.03987	0.02518	0.05968	577.846
Vendor	0.02536	1.10464	0.47553	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	668.099	668.099	0.04360	0.10115	0.03736	699.370
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09181	0.07145	0.84362	0.00000	0.00000	2.79967	2.79967	0.00000	0.29780	0.29780	—	141.501	141.501	0.00945	0.00626	0.24719	143.850
Vendor	0.00630	0.27111	0.11621	0.00109	0.00217	0.69338	0.69555	0.00217	0.07620	0.07837	—	166.028	166.028	0.01084	0.02514	0.15463	173.945
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01676	0.01304	0.15396	0.00000	0.00000	0.51094	0.51094	0.00000	0.05435	0.05435	—	23.4271	23.4271	0.00157	0.00104	0.04093	23.8160
Vendor	0.00115	0.04948	0.02121	0.00020	0.00040	0.12654	0.12694	0.00040	0.01391	0.01430	—	27.4878	27.4878	0.00179	0.00416	0.02560	28.7986
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.02988	9.39093	12.9379	0.02340	0.33657	—	0.33657	0.30965	—	0.30965	—	2,397.08	2,397.08	0.09724	0.01945	—	2,405.30
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.02988	9.39093	12.9379	0.02340	0.33657	—	0.33657	0.30965	—	0.30965	—	2,397.08	2,397.08	0.09724	0.01945	—	2,405.30
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.25596	2.33395	3.21550	0.00581	0.08365	—	0.08365	0.07696	—	0.07696	—	595.751	595.751	0.02417	0.00483	—	597.796
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04671	0.42595	0.58683	0.00106	0.01527	—	0.01527	0.01404	—	0.01404	—	98.6334	98.6334	0.00400	0.00080	—	98.9719
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37859	0.26046	3.63036	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	594.503	594.503	0.03436	0.02518	2.30545	605.171
Vendor	0.02608	1.06541	0.45967	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	667.985	667.985	0.04360	0.10115	1.44303	700.661

Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37676	0.32865	3.59042	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	569.286	569.286	0.03987	0.02518	0.05968	577.846
Vendor	0.02536	1.10464	0.47553	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	668.099	668.099	0.04360	0.10115	0.03736	699.370
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09181	0.07145	0.84362	0.00000	0.00000	2.79967	2.79967	0.00000	0.29780	0.29780	—	141.501	141.501	0.00945	0.00626	0.24719	143.850
Vendor	0.00630	0.27111	0.11621	0.00109	0.00217	0.69338	0.69555	0.00217	0.07620	0.07837	—	166.028	166.028	0.01084	0.02514	0.15463	173.945
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01676	0.01304	0.15396	0.00000	0.00000	0.51094	0.51094	0.00000	0.05435	0.05435	—	23.4271	23.4271	0.00157	0.00104	0.04093	23.8160
Vendor	0.00115	0.04948	0.02121	0.00020	0.00040	0.12654	0.12694	0.00040	0.01391	0.01430	—	27.4878	27.4878	0.00179	0.00416	0.02560	28.7986
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5. Building Construction (2028)

3.5.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99143	8.92495	12.9352	0.02340	0.30024	—	0.30024	0.27622	—	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	—	2,405.68
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.99143	8.92495	12.9352	0.02340	0.30024	—	0.30024	0.27622	—	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	—	2,405.68
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18820	1.69417	2.45542	0.00444	0.05699	—	0.05699	0.05243	—	0.05243	—	455.095	455.095	0.01846	0.00369	—	456.656
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03435	0.30919	0.44811	0.00081	0.01040	—	0.01040	0.00957	—	0.00957	—	75.3461	75.3461	0.00306	0.00061	—	75.6047
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.36757	0.23895	3.42945	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	584.522	584.522	0.03436	0.02334	2.13458	594.472
Vendor	0.02608	1.00142	0.44075	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	652.356	652.356	0.03923	0.09678	1.30560	683.484
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.34790	0.28931	3.38346	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	559.746	559.746	0.03804	0.02518	0.05534	568.256
Vendor	0.02536	1.04574	0.45517	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	652.535	652.535	0.03923	0.09678	0.03392	682.391
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.06465	0.05049	0.60715	0.00000	0.00000	2.13833	2.13833	0.00000	0.22745	0.22745	—	106.268	106.268	0.00687	0.00478	0.17525	108.040
Vendor	0.00481	0.19589	0.08490	0.00083	0.00166	0.52959	0.53125	0.00166	0.05820	0.05986	—	123.847	123.847	0.00745	0.01837	0.10720	129.615
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01180	0.00921	0.11080	0.00000	0.00000	0.39025	0.39025	0.00000	0.04151	0.04151	—	17.5939	17.5939	0.00114	0.00079	0.02901	17.8872
Vendor	0.00088	0.03575	0.01549	0.00015	0.00030	0.09665	0.09695	0.00030	0.01062	0.01092	—	20.5042	20.5042	0.00123	0.00304	0.01775	21.4592
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99143	8.92495	12.9352	0.02340	0.30024	—	0.30024	0.27622	—	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	—	2,405.68
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99143	8.92495	12.9352	0.02340	0.30024	—	0.30024	0.27622	—	0.27622	—	2,397.46	2,397.46	0.09725	0.01945	—	2,405.68
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18820	1.69417	2.45542	0.00444	0.05699	—	0.05699	0.05243	—	0.05243	—	455.095	455.095	0.01846	0.00369	—	456.656
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.03435	0.30919	0.44811	0.00081	0.01040	—	0.01040	0.00957	—	0.00957	—	75.3461	75.3461	0.00306	0.00061	—	75.6047
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.36757	0.23895	3.42945	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	584.522	584.522	0.03436	0.02334	2.13458	594.472
Vendor	0.02608	1.00142	0.44075	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	652.356	652.356	0.03923	0.09678	1.30560	683.484
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.34790	0.28931	3.38346	0.00000	0.00000	12.4720	12.4720	0.00000	1.32067	1.32067	—	559.746	559.746	0.03804	0.02518	0.05534	568.256
Vendor	0.02536	1.04574	0.45517	0.00437	0.00874	3.08559	3.09433	0.00874	0.33661	0.34534	—	652.535	652.535	0.03923	0.09678	0.03392	682.391
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06465	0.05049	0.60715	0.00000	0.00000	2.13833	2.13833	0.00000	0.22745	0.22745	—	106.268	106.268	0.00687	0.00478	0.17525	108.040
Vendor	0.00481	0.19589	0.08490	0.00083	0.00166	0.52959	0.53125	0.00166	0.05820	0.05986	—	123.847	123.847	0.00745	0.01837	0.10720	129.615
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01180	0.00921	0.11080	0.00000	0.00000	0.39025	0.39025	0.00000	0.04151	0.04151	—	17.5939	17.5939	0.00114	0.00079	0.02901	17.8872
Vendor	0.00088	0.03575	0.01549	0.00015	0.00030	0.09665	0.09695	0.00030	0.01062	0.01092	—	20.5042	20.5042	0.00123	0.00304	0.01775	21.4592
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.6. Paving (2028)

3.6.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.68524	6.62754	9.90989	0.01395	0.25554	—	0.25554	0.23510	—	0.23510	—	1,511.03	1,511.03	0.06129	0.01226	—	1,516.22
Paving	1.24843	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03755	0.36315	0.54301	0.00076	0.01400	—	0.01400	0.01288	—	0.01288	—	82.7962	82.7962	0.00336	0.00067	—	83.0803
Paving	0.06841	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00685	0.06628	0.09910	0.00014	0.00256	—	0.00256	0.00235	—	0.00235	—	13.7079	13.7079	0.00056	0.00011	—	13.7549
Paving	0.01248	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.6.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06618	0.04302	0.61747	0.00000	0.00000	2.24558	2.24558	0.00000	0.23779	0.23779	—	105.243	105.243	0.00619	0.00420	0.38433	107.035
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00336	0.00262	0.03156	0.00000	0.00000	0.11114	0.11114	0.00000	0.01182	0.01182	—	5.52312	5.52312	0.00036	0.00025	0.00911	5.61518
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00061	0.00048	0.00576	0.00000	0.00000	0.02028	0.02028	0.00000	0.00216	0.00216	—	0.91441	0.91441	0.00006	0.00004	0.00151	0.92966
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.6.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.68524	6.62754	9.90989	0.01395	0.25554	—	0.25554	0.23510	—	0.23510	—	1,511.03	1,511.03	0.06129	0.01226	—	1,516.22
Paving	1.24843	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03755	0.36315	0.54301	0.00076	0.01400	—	0.01400	0.01288	—	0.01288	—	82.7962	82.7962	0.00336	0.00067	—	83.0803
Paving	0.06841	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00685	0.06628	0.09910	0.00014	0.00256	—	0.00256	0.00235	—	0.00235	—	13.7079	13.7079	0.00056	0.00011	—	13.7549
Paving	0.01248	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.6.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06618	0.04302	0.61747	0.00000	0.00000	2.24558	2.24558	0.00000	0.23779	0.23779	—	105.243	105.243	0.00619	0.00420	0.38433	107.035
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00336	0.00262	0.03156	0.00000	0.00000	0.11114	0.11114	0.00000	0.01182	0.01182	—	5.52312	5.52312	0.00036	0.00025	0.00911	5.61518
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00061	0.00048	0.00576	0.00000	0.00000	0.02028	0.02028	0.00000	0.00216	0.00216	—	0.91441	0.91441	0.00006	0.00004	0.00151	0.92966
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.7. Architectural Coating (2028)

3.7.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10731	0.80814	1.11833	0.00173	0.01536	—	0.01536	0.01413	—	0.01413	—	133.517	133.517	0.00542	0.00108	—	133.975
Architectural Coatings	199.439	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00588	0.04428	0.06128	0.00009	0.00084	—	0.00084	0.00077	—	0.00077	—	7.31600	7.31600	0.00030	0.00006	—	7.34111
Architectural Coatings	10.9281	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00107	0.00808	0.01118	0.00002	0.00015	—	0.00015	0.00014	—	0.00014	—	1.21125	1.21125	0.00005	0.00001	—	1.21540
Architectural Coatings	1.99439	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.7.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07351	0.04779	0.68589	0.00000	0.00000	2.49439	2.49439	0.00000	0.26413	0.26413	—	116.904	116.904	0.00687	0.00467	0.42692	118.894
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00373	0.00291	0.03505	0.00000	0.00000	0.12345	0.12345	0.00000	0.01313	0.01313	—	6.13508	6.13508	0.00040	0.00028	0.01012	6.23735
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00068	0.00053	0.00640	0.00000	0.00000	0.02253	0.02253	0.00000	0.00240	0.00240	—	1.01573	1.01573	0.00007	0.00005	0.00168	1.03266
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.7.3. Onsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10731	0.80814	1.11833	0.00173	0.01536	—	0.01536	0.01413	—	0.01413	—	133.517	133.517	0.00542	0.00108	—	133.975
Architectural Coatings	199.439	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00588	0.04428	0.06128	0.00009	0.00084	—	0.00084	0.00077	—	0.00077	—	7.31600	7.31600	0.00030	0.00006	—	7.34111
Architectural Coatings	10.9281	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00107	0.00808	0.01118	0.00002	0.00015	—	0.00015	0.00014	—	0.00014	—	1.21125	1.21125	0.00005	0.00001	—	1.21540
Architectural Coatings	1.99439	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.7.4. Offsite - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07351	0.04779	0.68589	0.00000	0.00000	2.49439	2.49439	0.00000	0.26413	0.26413	—	116.904	116.904	0.00687	0.00467	0.42692	118.894
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00373	0.00291	0.03505	0.00000	0.00000	0.12345	0.12345	0.00000	0.01313	0.01313	—	6.13508	6.13508	0.00040	0.00028	0.01012	6.23735
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00068	0.00053	0.00640	0.00000	0.00000	0.02253	0.02253	0.00000	0.00240	0.00240	—	1.01573	1.01573	0.00007	0.00005	0.00168	1.03266
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00664	0.05544	0.10368	0.00044	0.00056	0.02026	0.02081	0.00053	0.00530	0.00583	—	46.9170	46.9170	0.00344	0.00594	0.09872	48.8711
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00664	0.05544	0.10368	0.00044	0.00056	0.02026	0.02081	0.00053	0.00530	0.00583	—	46.9170	46.9170	0.00344	0.00594	0.09872	48.8711
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00647	0.05916	0.09748	0.00043	0.00056	0.02026	0.02082	0.00053	0.00530	0.00583	—	46.3814	46.3814	0.00349	0.00602	0.00256	48.2645
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00647	0.05916	0.09748	0.00043	0.00056	0.02026	0.02082	0.00053	0.00530	0.00583	—	46.3814	46.3814	0.00349	0.00602	0.00256	48.2645
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00101	0.00907	0.01480	0.00007	0.00009	0.00310	0.00319	0.00008	0.00081	0.00090	—	6.58230	6.58230	0.00049	0.00085	0.00605	6.85384
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00101	0.00907	0.01480	0.00007	0.00009	0.00310	0.00319	0.00008	0.00081	0.00090	—	6.58230	6.58230	0.00049	0.00085	0.00605	6.85384

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00664	0.05544	0.10368	0.00044	0.00056	0.02026	0.02081	0.00053	0.00530	0.00583	—	46.9170	46.9170	0.00344	0.00594	0.09872	48.8711
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00664	0.05544	0.10368	0.00044	0.00056	0.02026	0.02081	0.00053	0.00530	0.00583	—	46.9170	46.9170	0.00344	0.00594	0.09872	48.8711
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00647	0.05916	0.09748	0.00043	0.00056	0.02026	0.02082	0.00053	0.00530	0.00583	—	46.3814	46.3814	0.00349	0.00602	0.00256	48.2645
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00647	0.05916	0.09748	0.00043	0.00056	0.02026	0.02082	0.00053	0.00530	0.00583	—	46.3814	46.3814	0.00349	0.00602	0.00256	48.2645
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00101	0.00907	0.01480	0.00007	0.00009	0.00310	0.00319	0.00008	0.00081	0.00090	—	6.58230	6.58230	0.00049	0.00085	0.00605	6.85384
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00101	0.00907	0.01480	0.00007	0.00009	0.00310	0.00319	0.00008	0.00081	0.00090	—	6.58230	6.58230	0.00049	0.00085	0.00605	6.85384

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	442.145	442.145	0.17755	0.02152	—	452.997
General Office Building	—	—	—	—	—	—	—	—	—	—	—	22.5562	22.5562	0.00906	0.00110	—	23.1098
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	464.702	464.702	0.18660	0.02262	—	476.107
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	442.145	442.145	0.17755	0.02152	—	452.997
General Office Building	—	—	—	—	—	—	—	—	—	—	—	22.5562	22.5562	0.00906	0.00110	—	23.1098
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	464.702	464.702	0.18660	0.02262	—	476.107

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	73.2022	73.2022	0.02939	0.00356	—	74.9989
General Office Building	—	—	—	—	—	—	—	—	—	—	—	3.73443	3.73443	0.00150	0.00018	—	3.82609
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	76.9367	76.9367	0.03089	0.00374	—	78.8250

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	442.145	442.145	0.17755	0.02152	—	452.997
General Office Building	—	—	—	—	—	—	—	—	—	—	—	22.5562	22.5562	0.00906	0.00110	—	23.1098
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	464.702	464.702	0.18660	0.02262	—	476.107
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	442.145	442.145	0.17755	0.02152	—	452.997
General Office Building	—	—	—	—	—	—	—	—	—	—	—	22.5562	22.5562	0.00906	0.00110	—	23.1098

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	464.702	464.702	0.18660	0.02262	—	476.107
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	73.2022	73.2022	0.02939	0.00356	—	74.9989
General Office Building	—	—	—	—	—	—	—	—	—	—	—	3.73443	3.73443	0.00150	0.00018	—	3.82609
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	76.9367	76.9367	0.03089	0.00374	—	78.8250

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.12136	2.20661	1.85356	0.01324	0.16770	—	0.16770	0.16770	—	0.16770	—	2,632.86	2,632.86	0.23301	0.00496	—	2,640.16
General Office Building	0.00160	0.02912	0.02446	0.00017	0.00221	—	0.00221	0.00221	—	0.00221	—	34.7477	34.7477	0.00308	0.00007	—	34.8441
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.12297	2.23574	1.87802	0.01341	0.16992	—	0.16992	0.16992	—	0.16992	—	2,667.61	2,667.61	0.23608	0.00502	—	2,675.01
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Manufact	0.12136	2.20661	1.85356	0.01324	0.16770	—	0.16770	0.16770	—	0.16770	—	2,632.86	2,632.86	0.23301	0.00496	—	2,640.16
General Office Building	0.00160	0.02912	0.02446	0.00017	0.00221	—	0.00221	0.00221	—	0.00221	—	34.7477	34.7477	0.00308	0.00007	—	34.8441
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.12297	2.23574	1.87802	0.01341	0.16992	—	0.16992	0.16992	—	0.16992	—	2,667.61	2,667.61	0.23608	0.00502	—	2,675.01
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.02215	0.40271	0.33827	0.00242	0.03061	—	0.03061	0.03061	—	0.03061	—	435.900	435.900	0.03858	0.00082	—	437.109
General Office Building	0.00029	0.00531	0.00446	0.00003	0.00040	—	0.00040	0.00040	—	0.00040	—	5.75288	5.75288	0.00051	0.00001	—	5.76884
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.02244	0.40802	0.34274	0.00245	0.03101	—	0.03101	0.03101	—	0.03101	—	441.653	441.653	0.03909	0.00083	—	442.878

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000

Total	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consumer Products	4.30195	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.33258	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.42553	0.07301	8.67672	0.00052	0.01541	—	0.01541	0.01165	—	0.01165	—	35.6799	35.6799	0.00150	0.00031	—	35.8086
Total	6.06006	0.07301	8.67672	0.00052	0.01541	—	0.01541	0.01165	—	0.01165	—	35.6799	35.6799	0.00150	0.00031	—	35.8086
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	4.30195	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.33258	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	4.63453	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.78511	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.06070	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.17819	0.00913	1.08459	0.00006	0.00193	—	0.00193	0.00146	—	0.00146	—	4.04604	4.04604	0.00017	0.00003	—	4.06063
Total	1.02399	0.00913	1.08459	0.00006	0.00193	—	0.00193	0.00146	—	0.00146	—	4.04604	4.04604	0.00017	0.00003	—	4.06063

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	4.30195	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.33258	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.42553	0.07301	8.67672	0.00052	0.01541	—	0.01541	0.01165	—	0.01165	—	35.6799	35.6799	0.00150	0.00031	—	35.8086
Total	6.06006	0.07301	8.67672	0.00052	0.01541	—	0.01541	0.01165	—	0.01165	—	35.6799	35.6799	0.00150	0.00031	—	35.8086
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	4.30195	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.33258	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	4.63453	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.78511	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.06070	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.17819	0.00913	1.08459	0.00006	0.00193	—	0.00193	0.00146	—	0.00146	—	4.04604	4.04604	0.00017	0.00003	—	4.06063

Total	1.02399	0.00913	1.08459	0.00006	0.00193	—	0.00193	0.00146	—	0.00146	—	4.04604	4.04604	0.00017	0.00003	—	4.06063

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	86.2773	54.8483	141.126	8.86878	0.21287	—	426.279
General Office Building	—	—	—	—	—	—	—	—	—	—	1.63478	1.03927	2.67405	0.16805	0.00403	—	8.07713
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	86.2773	54.8483	141.126	8.86878	0.21287	—	426.279
General Office Building	—	—	—	—	—	—	—	—	—	—	1.63478	1.03927	2.67405	0.16805	0.00403	—	8.07713
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Manufacturing	—	—	—	—	—	—	—	—	—	—	14.2842	9.08076	23.3650	1.46833	0.03524	—	70.5753
General Office Building	—	—	—	—	—	—	—	—	—	—	0.27066	0.17206	0.44272	0.02782	0.00067	—	1.33726
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	14.5549	9.25282	23.8077	1.49615	0.03591	—	71.9126

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	86.2773	54.8483	141.126	8.86878	0.21287	—	426.279
General Office Building	—	—	—	—	—	—	—	—	—	—	1.63478	1.03927	2.67405	0.16805	0.00403	—	8.07713
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	86.2773	54.8483	141.126	8.86878	0.21287	—	426.279
General Office Building	—	—	—	—	—	—	—	—	—	—	1.63478	1.03927	2.67405	0.16805	0.00403	—	8.07713

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	87.9121	55.8876	143.800	9.03682	0.21690	—	434.356
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	14.2842	9.08076	23.3650	1.46833	0.03524	—	70.5753
General Office Building	—	—	—	—	—	—	—	—	—	—	0.27066	0.17206	0.44272	0.02782	0.00067	—	1.33726
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	14.5549	9.25282	23.8077	1.49615	0.03591	—	71.9126

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	130.115	0.00000	130.115	13.0045	0.00000	—	455.228
General Office Building	—	—	—	—	—	—	—	—	—	—	2.40582	0.00000	2.40582	0.24045	0.00000	—	8.41716
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	130.115	0.00000	130.115	13.0045	0.00000	—	455.228
General Office Building	—	—	—	—	—	—	—	—	—	—	2.40582	0.00000	2.40582	0.24045	0.00000	—	8.41716
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	21.5420	0.00000	21.5420	2.15305	0.00000	—	75.3682
General Office Building	—	—	—	—	—	—	—	—	—	—	0.39831	0.00000	0.39831	0.03981	0.00000	—	1.39356
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	21.9403	0.00000	21.9403	2.19286	0.00000	—	76.7617

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	130.115	0.00000	130.115	13.0045	0.00000	—	455.228
General Office Building	—	—	—	—	—	—	—	—	—	—	2.40582	0.00000	2.40582	0.24045	0.00000	—	8.41716

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	130.115	0.00000	130.115	13.0045	0.00000	—	455.228
General Office Building	—	—	—	—	—	—	—	—	—	—	2.40582	0.00000	2.40582	0.24045	0.00000	—	8.41716
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	132.521	0.00000	132.521	13.2450	0.00000	—	463.645
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	21.5420	0.00000	21.5420	2.15305	0.00000	—	75.3682
General Office Building	—	—	—	—	—	—	—	—	—	—	0.39831	0.00000	0.39831	0.03981	0.00000	—	1.39356
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	21.9403	0.00000	21.9403	2.19286	0.00000	—	76.7617

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6813	50.6813
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01167	0.01167
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6813	50.6813
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01167	0.01167
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.39086	8.39086
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00193	0.00193
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.39280	8.39280

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6813	50.6813
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01167	0.01167
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6813	50.6813
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01167	0.01167
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50.6929	50.6929
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Manufacturing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.39086	8.39086
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00193	0.00193
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.39280	8.39280

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.36364	3.39386	6.19529	0.00845	0.12172	—	0.12172	0.11198	—	0.11198	—	914.729	914.729	0.03711	0.00742	—	917.868

Tractors/	0.56104	5.61571	11.5161	0.01608	0.14307	—	0.14307	0.13162	—	0.13162	—	1,740.72	1,740.72	0.07061	0.01412	—	1,746.69
Total	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.36364	3.39386	6.19529	0.00845	0.12172	—	0.12172	0.11198	—	0.11198	—	914.729	914.729	0.03711	0.00742	—	917.868
Tractors/ Loaders/ Backhoes	0.56104	5.61571	11.5161	0.01608	0.14307	—	0.14307	0.13162	—	0.13162	—	1,740.72	1,740.72	0.07061	0.01412	—	1,746.69
Total	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.04727	0.44120	0.80539	0.00110	0.01582	—	0.01582	0.01456	—	0.01456	—	107.878	107.878	0.00438	0.00088	—	108.248
Tractors/ Loaders/ Backhoes	0.07293	0.73004	1.49709	0.00209	0.01860	—	0.01860	0.01711	—	0.01711	—	205.290	205.290	0.00833	0.00167	—	205.995
Total	0.12021	1.17124	2.30248	0.00319	0.03442	—	0.03442	0.03167	—	0.03167	—	313.168	313.168	0.01270	0.00254	—	314.243

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.36364	3.39386	6.19529	0.00845	0.12172	—	0.12172	0.11198	—	0.11198	—	914.729	914.729	0.03711	0.00742	—	917.868
Tractors/ Loaders/ Backhoes	0.56104	5.61571	11.5161	0.01608	0.14307	—	0.14307	0.13162	—	0.13162	—	1,740.72	1,740.72	0.07061	0.01412	—	1,746.69
Total	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.36364	3.39386	6.19529	0.00845	0.12172	—	0.12172	0.11198	—	0.11198	—	914.729	914.729	0.03711	0.00742	—	917.868
Tractors/ Loaders/ Backhoes	0.56104	5.61571	11.5161	0.01608	0.14307	—	0.14307	0.13162	—	0.13162	—	1,740.72	1,740.72	0.07061	0.01412	—	1,746.69
Total	0.92468	9.00957	17.7114	0.02453	0.26479	—	0.26479	0.24360	—	0.24360	—	2,655.45	2,655.45	0.10772	0.02154	—	2,664.56
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Forklifts	0.04727	0.44120	0.80539	0.00110	0.01582	—	0.01582	0.01456	—	0.01456	—	107.878	107.878	0.00438	0.00088	—	108.248
Tractors/ Loaders/ Backhoes	0.07293	0.73004	1.49709	0.00209	0.01860	—	0.01860	0.01711	—	0.01711	—	205.290	205.290	0.00833	0.00167	—	205.995
Total	0.12021	1.17124	2.30248	0.00319	0.03442	—	0.03442	0.03167	—	0.03167	—	313.168	313.168	0.01270	0.00254	—	314.243

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	6/1/2027	6/29/2027	5.00000	20.0000	—
Site Preparation	Site Preparation	6/30/2027	7/14/2027	5.00000	10.00000	—
Grading	Grading	7/15/2027	8/26/2027	5.00000	30.0000	—
Building Construction	Building Construction	8/27/2027	4/6/2028	5.00000	160.000	—
Paving	Paving	4/7/2028	5/4/2028	5.00000	20.0000	—
Architectural Coating	Architectural Coating	5/5/2028	6/1/2028	5.00000	20.0000	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	1.000000	8.00000	33.0000	0.73000
Demolition	Excavators	Diesel	Average	3.00000	8.00000	36.0000	0.38000
Demolition	Rubber Tired Dozers	Diesel	Average	2.00000	8.00000	367.000	0.40000
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00000	8.00000	367.000	0.40000
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00000	8.00000	84.0000	0.37000
Grading	Excavators	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Grading	Graders	Diesel	Average	1.000000	8.00000	148.000	0.41000
Grading	Rubber Tired Dozers	Diesel	Average	1.000000	8.00000	367.000	0.40000
Grading	Scrapers	Diesel	Average	2.00000	8.00000	423.000	0.48000
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00000	8.00000	84.0000	0.37000
Building Construction	Cranes	Diesel	Average	1.000000	7.00000	367.000	0.29000

Building Construction	Forklifts	Diesel	Average	3.00000	8.00000	82.0000	0.20000
Building Construction	Generator Sets	Diesel	Average	1.000000	8.00000	14.0000	0.74000
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00000	7.00000	84.0000	0.37000
Building Construction	Welders	Diesel	Average	1.000000	8.00000	46.0000	0.45000
Paving	Pavers	Diesel	Average	2.00000	8.00000	81.0000	0.42000
Paving	Paving Equipment	Diesel	Average	2.00000	8.00000	89.0000	0.36000
Paving	Rollers	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Architectural Coating	Air Compressors	Diesel	Average	1.000000	6.00000	37.0000	0.48000

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	1.000000	8.00000	33.0000	0.73000
Demolition	Excavators	Diesel	Average	3.00000	8.00000	36.0000	0.38000
Demolition	Rubber Tired Dozers	Diesel	Average	2.00000	8.00000	367.000	0.40000
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00000	8.00000	367.000	0.40000
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00000	8.00000	84.0000	0.37000
Grading	Excavators	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Grading	Graders	Diesel	Average	1.000000	8.00000	148.000	0.41000
Grading	Rubber Tired Dozers	Diesel	Average	1.000000	8.00000	367.000	0.40000
Grading	Scrapers	Diesel	Average	2.00000	8.00000	423.000	0.48000
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00000	8.00000	84.0000	0.37000
Building Construction	Cranes	Diesel	Average	1.000000	7.00000	367.000	0.29000
Building Construction	Forklifts	Diesel	Average	3.00000	8.00000	82.0000	0.20000
Building Construction	Generator Sets	Diesel	Average	1.000000	8.00000	14.0000	0.74000
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00000	7.00000	84.0000	0.37000

Building Construction	Welders	Diesel	Average	1.000000	8.00000	46.0000	0.45000
Paving	Pavers	Diesel	Average	2.00000	8.00000	81.0000	0.42000
Paving	Paving Equipment	Diesel	Average	2.00000	8.00000	89.0000	0.36000
Paving	Rollers	Diesel	Average	2.00000	8.00000	36.0000	0.38000
Architectural Coating	Air Compressors	Diesel	Average	1.000000	6.00000	37.0000	0.48000

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	Worker	15.0000	9.71000	LDA,LDT1,LDT2
Demolition	Vendor	—	6.06000	HHDT,MHDT
Demolition	Hauling	102.350	20.0000	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	Worker	17.5000	9.71000	LDA,LDT1,LDT2
Site Preparation	Vendor	—	6.06000	HHDT,MHDT
Site Preparation	Hauling	0.00000	20.0000	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	Worker	20.0000	9.71000	LDA,LDT1,LDT2
Grading	Vendor	—	6.06000	HHDT,MHDT
Grading	Hauling	54.1667	20.0000	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	Worker	83.3100	9.71000	LDA,LDT1,LDT2
Building Construction	Vendor	32.6981	6.06000	HHDT,MHDT
Building Construction	Hauling	0.00000	20.0000	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	Worker	15.0000	9.71000	LDA,LDT1,LDT2
Paving	Vendor	0.00000	6.06000	HHDT,MHDT

Paving	Hauling	0.00000	20.0000	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	Worker	16.6620	9.71000	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	6.06000	HHDT,MHDT
Architectural Coating	Hauling	0.00000	20.0000	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	Worker	15.0000	9.71000	LDA,LDT1,LDT2
Demolition	Vendor	—	6.06000	HHDT,MHDT
Demolition	Hauling	102.350	20.0000	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	Worker	17.5000	9.71000	LDA,LDT1,LDT2
Site Preparation	Vendor	—	6.06000	HHDT,MHDT
Site Preparation	Hauling	0.00000	20.0000	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	Worker	20.0000	9.71000	LDA,LDT1,LDT2
Grading	Vendor	—	6.06000	HHDT,MHDT
Grading	Hauling	54.1667	20.0000	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	Worker	83.3100	9.71000	LDA,LDT1,LDT2
Building Construction	Vendor	32.6981	6.06000	HHDT,MHDT
Building Construction	Hauling	0.00000	20.0000	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	Worker	15.0000	9.71000	LDA,LDT1,LDT2
Paving	Vendor	0.00000	6.06000	HHDT,MHDT
Paving	Hauling	0.00000	20.0000	HHDT

Paving	Onsite truck	—	—	HHDT
Architectural Coating	Worker	16.6620	9.71000	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	6.06000	HHDT,MHDT
Architectural Coating	Hauling	0.00000	20.0000	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00000	0.00000	299,250	99,750.0	24,907.6

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00000	0.00000	0.00000	178,000	0.00000
Site Preparation	0.00000	0.00000	15.0000	0.00000	0.00000
Grading	0.00000	13,000.0	90.0000	0.00000	0.00000
Paving	0.00000	0.00000	0.00000	0.00000	9.53000

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

Water Demolished Area	2	36%	36%

5.7. Construction Paving

Phase Name	Land Use	Area Paved (acres)	% Asphalt
Paving	Manufacturing	0.00000	0%
Paving	General Office Building	0.00000	0%
Paving	Manufacturing	0.00000	0%
Paving	Manufacturing	0.00000	0%
Paving	Other Asphalt Surfaces	9.53000	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2027	0.00000	233.280	0.03300	0.00400
2028	0.00000	157.750	0.03300	0.00400

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Manufacturing	133.991	133.991	0.00000	41,920.0	2,559.23	2,559.23	0.00000	800,673
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Manufacturing	133.991	133.991	0.00000	41,920.0	2,559.23	2,559.23	0.00000	800,673
General Office Building	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Manufacturing	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Other Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

5.10. Operational Area Sources

5.10.1. Hearths

Land Use	Hearth Type	Unmitigated (number)	Mitigated (number)
Manufacturing	Wood Fireplaces	0	0
Manufacturing	Gas Fireplaces	0	0
Manufacturing	Propane Fireplaces	0	0
Manufacturing	Electric Fireplaces	0	0
Manufacturing	No Fireplaces	0	0
Manufacturing	Conventional Wood Stoves	0	0
Manufacturing	Catalytic Wood Stoves	0	0
Manufacturing	Non-Catalytic Wood Stoves	0	0
Manufacturing	Pellet Wood Stoves	0	0
General Office Building	Wood Fireplaces	0	0
General Office Building	Gas Fireplaces	0	0
General Office Building	Propane Fireplaces	0	0
General Office Building	Electric Fireplaces	0	0
General Office Building	No Fireplaces	0	0

General Office Building	Conventional Wood Stoves	0	0
General Office Building	Catalytic Wood Stoves	0	0
General Office Building	Non-Catalytic Wood Stoves	0	0
General Office Building	Pellet Wood Stoves	0	0
Manufacturing	Wood Fireplaces	0	0
Manufacturing	Gas Fireplaces	0	0
Manufacturing	Propane Fireplaces	0	0
Manufacturing	Electric Fireplaces	0	0
Manufacturing	No Fireplaces	0	0
Manufacturing	Conventional Wood Stoves	0	0
Manufacturing	Catalytic Wood Stoves	0	0
Manufacturing	Non-Catalytic Wood Stoves	0	0
Manufacturing	Pellet Wood Stoves	0	0
Manufacturing	Wood Fireplaces	0	0
Manufacturing	Gas Fireplaces	0	0
Manufacturing	Propane Fireplaces	0	0
Manufacturing	Electric Fireplaces	0	0
Manufacturing	No Fireplaces	0	0
Manufacturing	Conventional Wood Stoves	0	0
Manufacturing	Catalytic Wood Stoves	0	0
Manufacturing	Non-Catalytic Wood Stoves	0	0
Manufacturing	Pellet Wood Stoves	0	0
Other Asphalt Surfaces	Wood Fireplaces	0	0
Other Asphalt Surfaces	Gas Fireplaces	0	0
Other Asphalt Surfaces	Propane Fireplaces	0	0
Other Asphalt Surfaces	Electric Fireplaces	0	0
Other Asphalt Surfaces	No Fireplaces	0	0
Other Asphalt Surfaces	Conventional Wood Stoves	0	0

Other Asphalt Surfaces	Catalytic Wood Stoves	0	0
Other Asphalt Surfaces	Non-Catalytic Wood Stoves	0	0
Other Asphalt Surfaces	Pellet Wood Stoves	0	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0.00000	0.00000	299,250	99,750.0	24,907.6

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00000
Summer Days	day/yr	250.000

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00000
Summer Days	day/yr	250.000

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Manufacturing	721,161	82.1800	0.0330	0.0040	3,016,891
General Office Building	100,183	82.1800	0.0330	0.0040	108,422
Manufacturing	621,308	82.1800	0.0330	0.0040	2,599,168
Manufacturing	621,308	82.1800	0.0330	0.0040	2,599,168

Other Asphalt Surfaces	0.00000	82.1800	0.0330	0.0040	0.00000

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Manufacturing	721,161	82.1800	0.0330	0.0040	0.00000
General Office Building	100,183	82.1800	0.0330	0.0040	0.00000
Manufacturing	621,308	82.1800	0.0330	0.0040	0.00000
Manufacturing	621,308	82.1800	0.0330	0.0040	0.00000
Other Asphalt Surfaces	0.00000	82.1800	0.0330	0.0040	0.00000

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Manufacturing	16,534,375	0.00000
General Office Building	853,122	0.00000
Manufacturing	14,245,000	0.00000
Manufacturing	14,245,000	0.00000
Other Asphalt Surfaces	0.00000	0.00000

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Manufacturing	16,534,375	0.00000
General Office Building	853,122	0.00000
Manufacturing	14,245,000	0.00000
Manufacturing	14,245,000	0.00000
Other Asphalt Surfaces	0.00000	0.00000

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Manufacturing	88.6600	0.00000
General Office Building	4.46400	0.00000
Manufacturing	76.3840	0.00000
Manufacturing	76.3840	0.00000
Other Asphalt Surfaces	0.00000	0.00000

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Manufacturing	88.6600	0.00000
General Office Building	4.46400	0.00000
Manufacturing	76.3840	0.00000
Manufacturing	76.3840	0.00000
Other Asphalt Surfaces	0.00000	0.00000

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088.00	0.30000	4.00000	4.00000	18.0000
General Office Building	Household refrigerators and/or freezers	R-134a	1,430.00	0.01679	0.60000	0.00000	1.000000
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088.00	0.00180	4.00000	4.00000	18.0000

Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088.00	0.30000	4.00000	4.00000	18.0000
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088.00	0.30000	4.00000	4.00000	18.0000

5.14.2. Mitigated

Land Use	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088.00	0.30000	4.00000	4.00000	18.0000
General Office Building	Household refrigerators and/or freezers	R-134a	1,430.00	0.01679	0.60000	0.00000	1.000000
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088.00	0.00180	4.00000	4.00000	18.0000
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088.00	0.30000	4.00000	4.00000	18.0000
Manufacturing	Other commercial A/C and heat pumps	R-410A	2,088.00	0.30000	4.00000	4.00000	18.0000

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Forklifts	Diesel	Average	6.00000	8.00000	82.0000	0.20000
Tractors/Loaders/Backhoes	Diesel	Average	6.00000	8.00000	84.0000	0.37000

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Forklifts	Diesel	Average	6.00000	8.00000	82.0000	0.20000

Tractors/Loaders/Backhoes	Diesel	Average	6.00000	8.00000	84.0000	0.37000

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	6.83000	annual days of extreme heat
Extreme Precipitation	6.05000	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	14.1600	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.

The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	14.9222
AQ-PM	2.71313
AQ-DPM	42.6882
Drinking Water	70.4883
Lead Risk Housing	47.3220
Pesticides	99.5517
Toxic Releases	8.90223
Traffic	69.7000
Effect Indicators	—
CleanUp Sites	63.1019
Groundwater	64.2205
Haz Waste Facilities/Generators	80.1853
Impaired Water Bodies	99.5170
Solid Waste	97.8694
Sensitive Population	—
Asthma	62.6869
Cardio-vascular	41.9492
Low Birth Weights	52.3608
Socioeconomic Factor Indicators	—

Education	58.5042
Housing	31.1660
Linguistic	52.0097
Poverty	37.8894
Unemployment	59.3831

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	68.47170538
Employed	33.54292314
Median HI	77.41562941
Education	—
Bachelor's or higher	74.51559091
High school enrollment	7.327088413
Preschool enrollment	83.90863596
Transportation	—
Auto Access	81.29090209
Active commuting	41.03682792
Social	—
2-parent households	58.82201976
Voting	74.02797382
Neighborhood	—
Alcohol availability	73.69434108
Park access	29.20569742
Retail density	9.303220839
Supermarket access	9.983318363

Tree canopy	92.41627101
Housing	—
Homeownership	74.16912614
Housing habitability	87.37328372
Low-inc homeowner severe housing cost burden	42.5895034
Low-inc renter severe housing cost burden	89.84986526
Uncrowded housing	84.29359682
Health Outcomes	—
Insured adults	42.7691518
Arthritis	0.0
Asthma ER Admissions	30.7
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	66.4
Cognitively Disabled	74.6
Physically Disabled	69.8
Heart Attack ER Admissions	60.9
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—

Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	41.6
Children	50.1
Elderly	12.2
English Speaking	45.2
Foreign-born	31.6
Outdoor Workers	7.8
Climate Change Adaptive Capacity	—
Impervious Surface Cover	92.0
Traffic Density	42.1
Traffic Access	0.0
Other Indices	—
Hardship	27.2
Other Decision Support	—
2016 Voting	85.3

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	69.0000
Healthy Places Index Score for Project Location (b)	66.0000
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

8.1. Justifications

Screen	Justification
Characteristics: Utility Information	Site served by 3CE
Land Use	Revised to total disturbance area of 14.11 acre
Construction: Construction Phases	Reduced building construction to fit in 12-month construction period. Building construction overestimated for type of structures required for facilities.
Construction: On-Road Fugitive Dust	Site accessible from paved roads.
Operations: Vehicle Data	Revised to project-specific trip estimate. Consistent with Proposed Project.
Operations: Fleet Mix	Revised consistent with Proposed Project.
Operations: Road Dust	Project would pave site

8.2. Project Characteristics

8.2.1. Project Details

Model Parameter	Default Value	New Value
Electric Utility	Pacific Gas & Electric Company	Central Coast Community Energy

8.3. Land Use

Model Parameter	Units	Default Value	New Value
Lot Area	acre	1.64141	1.64000
Landscape Area	sq. ft	—	0.00000
Special Landscape Area	sq. ft	—	0.00000
Lot Area	acre	0.11019	0.11000
Landscape Area	sq. ft	—	0.00000
Special Landscape Area	sq. ft	—	0.00000
Lot Area	acre	1.41414	1.41500
Landscape Area	sq. ft	—	0.00000
Special Landscape Area	sq. ft	—	0.00000
Lot Area	acre	1.41414	1.41500
Landscape Area	sq. ft	—	0.00000
Special Landscape Area	sq. ft	—	0.00000
Lot Area	acre	9.52709	9.53000
Landscape Area	sq. ft	—	0.00000
Special Landscape Area	sq. ft	—	0.00000

8.4. Construction

8.4.1. Construction Phases

Phase Type	Phase Name	Model Parameter	Default Value	New Value
Building Construction	Building Construction	End Date	10/20/2028	4/6/2028
Building Construction	Building Construction	Work Days per Phase	300.000	160.000
Paving	Paving	Start Date	10/21/2028	4/7/2028
Paving	Paving	End Date	11/18/2028	5/4/2028
Architectural Coating	Architectural Coating	Start Date	11/19/2028	5/5/2028

Architectural Coating	Architectural Coating	End Date	12/17/2028	6/1/2028

8.4.7. On-Road Fugitive Dust

Phase Name	Model Parameter	Units	Default Value	New Value
Demolition	Worker Trip Paved	%	52.0000	99.0000
Demolition	Vendor Trip Paved	%	52.0000	99.0000
Demolition	Hauling Trip Paved	%	52.0000	99.0000
Site Preparation	Worker Trip Paved	%	52.0000	99.0000
Site Preparation	Vendor Trip Paved	%	52.0000	99.0000
Site Preparation	Hauling Trip Paved	%	52.0000	99.0000
Grading	Worker Trip Paved	%	52.0000	99.0000
Grading	Vendor Trip Paved	%	52.0000	99.0000
Grading	Hauling Trip Paved	%	52.0000	99.0000
Building Construction	Worker Trip Paved	%	52.0000	99.0000
Building Construction	Vendor Trip Paved	%	52.0000	99.0000
Building Construction	Hauling Trip Paved	%	52.0000	99.0000
Paving	Worker Trip Paved	%	52.0000	99.0000
Paving	Vendor Trip Paved	%	52.0000	99.0000
Paving	Hauling Trip Paved	%	52.0000	99.0000
Architectural Coating	Worker Trip Paved	%	52.0000	99.0000
Architectural Coating	Vendor Trip Paved	%	52.0000	99.0000
Architectural Coating	Hauling Trip Paved	%	52.0000	99.0000

8.5. Operations

8.5.1. Mobile Sources

8.5.1.1. Vehicle Data

Land Use	Model Parameter	Units	Default Value	New Value
Manufacturing	Weekday Trip Rate	size/day	3.93000	1.87400
Manufacturing	Saturday Trip Rate	size/day	6.42000	1.87400
Manufacturing	Sunday Trip Rate	size/day	5.09000	0.00000
Manufacturing	Non-Res H-W Trip Length	miles	12.5608	19.1000
Manufacturing	Non-Res W-O Trip Length	miles	9.45214	19.1000
Manufacturing	Non-Res O-O Trip Length	miles	7.89786	19.1000
General Office Building	Weekday Trip Rate	size/day	9.74000	0.00000
General Office Building	Saturday Trip Rate	size/day	2.21000	0.00000
General Office Building	Sunday Trip Rate	size/day	0.70000	0.00000
Manufacturing	Weekday Trip Rate	size/day	3.93000	0.00000
Manufacturing	Saturday Trip Rate	size/day	6.42000	0.00000
Manufacturing	Sunday Trip Rate	size/day	5.09000	0.00000
Manufacturing	Weekday Trip Rate	size/day	3.93000	0.00000
Manufacturing	Saturday Trip Rate	size/day	6.42000	0.00000
Manufacturing	Sunday Trip Rate	size/day	5.09000	0.00000

8.5.1.2. Fleet Mix

Land Use	Season	Model Parameter	Units	Default Value	New Value
Manufacturing	A	Heavy-Heavy-Duty Trucks	%	1%	< 0.5%
Manufacturing	A	Passenger Cars	%	46%	0%
Manufacturing	A	Light-Duty Trucks 1	%	5%	1%
Manufacturing	A	Light-Duty Trucks 2	%	24%	0%
Manufacturing	A	Light Heavy-Duty Trucks 1	%	3%	0%
Manufacturing	A	Light Heavy-Duty Trucks 2	%	1%	0%
Manufacturing	A	Motorcycles	%	3%	0%
Manufacturing	A	Medium-Duty Trucks	%	15%	0%
Manufacturing	A	Motor Homes	%	< 0.5%	0%

Manufacturing	A	Medium-Heavy-Duty Trucks	%	1%	0%
Manufacturing	A	Other Buses	%	< 0.5%	0%
Manufacturing	A	School Buses	%	< 0.5%	0%
Manufacturing	A	Urban Buses	%	< 0.5%	0%
Manufacturing	S	Heavy-Heavy-Duty Trucks	%	1%	< 0.5%
Manufacturing	S	Passenger Cars	%	46%	0%
Manufacturing	S	Light-Duty Trucks 1	%	5%	1%
Manufacturing	S	Light-Duty Trucks 2	%	24%	0%
Manufacturing	S	Light Heavy-Duty Trucks 1	%	3%	0%
Manufacturing	S	Light Heavy-Duty Trucks 2	%	1%	0%
Manufacturing	S	Motorcycles	%	3%	0%
Manufacturing	S	Medium-Duty Trucks	%	15%	0%
Manufacturing	S	Motor Homes	%	< 0.5%	0%
Manufacturing	S	Medium-Heavy-Duty Trucks	%	1%	0%
Manufacturing	S	Other Buses	%	< 0.5%	0%
Manufacturing	S	School Buses	%	< 0.5%	0%
Manufacturing	S	Urban Buses	%	< 0.5%	0%
Manufacturing	W	Heavy-Heavy-Duty Trucks	%	1%	< 0.5%
Manufacturing	W	Passenger Cars	%	46%	0%
Manufacturing	W	Light-Duty Trucks 1	%	5%	1%
Manufacturing	W	Light-Duty Trucks 2	%	24%	0%
Manufacturing	W	Light Heavy-Duty Trucks 1	%	3%	0%
Manufacturing	W	Light Heavy-Duty Trucks 2	%	1%	0%
Manufacturing	W	Motorcycles	%	3%	0%
Manufacturing	W	Medium-Duty Trucks	%	15%	0%
Manufacturing	W	Motor Homes	%	< 0.5%	0%
Manufacturing	W	Medium-Heavy-Duty Trucks	%	1%	0%
Manufacturing	W	Other Buses	%	< 0.5%	0%

Manufacturing	W	School Buses	%	< 0.5%	0%
Manufacturing	W	Urban Buses	%	< 0.5%	0%

8.5.1.4. Road Dust

Model Parameter	Units	Default Value	New Value
% Paved	%	52.0000	100.0000

Appendix P. Intentionally omitted

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Appendix Q. Geotech Memo for Alternative 3

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Geosyntec consultants

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Memorandum

Date:	19 February 2026
To:	Kasey Kolassa and Nicole Steele, County of Santa Cruz
Copies to:	Sangeeta Lewis
From:	Fabrizio Settepani, P.E., G.E.
Subject:	Subsurface Conditions for Proposed Transfer Station on APN 052-011-11 Watsonville, California Geosyntec Project Number: WG2561G

1. INTRODUCTION

This memorandum provides geologic and soils information that is pertinent to siting a transfer station (TS) on a portion of Assessor Parcel Number (APN) 052-011-11 (Parcel) located north of the Buena Vista Drive Landfill (BVLF). The site address is 1203 Buena Vista Drive in Watsonville, California. The nearest intersection to the Parcel is Buena Vista Drive and Harkins Slough Road. Current facilities in the area include a house and greenhouses. The County of Santa Cruz owns property to the south of the Parcel which includes the public roads and the adjacent BVLF. Figure 1 shows the site vicinity.

The soils and geology in the area of the BVLF have been extensively characterized; this information will be used to assess the conditions at the Parcel. Information available from previous geotechnical work performed in the vicinity of the proposed TS[1] and information available in public sources (e.g., the California Department of Water Resources) was used to prepare this memorandum. For final design of the TS, we recommend performing a site-specific investigation in accordance with the requirements in the California Building Code (CBC).

Figure 2 shows the current topography in the area of the TS and the planned layout prepared by SCS Engineers. For this memorandum, APN 052-011-11 is divided into three portions: western, center, and eastern. The western portion borders Buena Vista Drive and rises to a plateau that reaches approximately Elevation 130 feet. The center portion is a ravine that is currently at approximately Elevation 100 feet. In approximately 1986, the ravine was partially filled in when Harkins Slough Road was re-aligned further south to accommodate the BVLF Expansion. The

[1] See *Memorandum from Geosyntec Consultants, Inc. to the County of Santa Cruz: Field Investigation, Laboratory Testing, and Subsurface Conditions; County Property Northeast of Buena Vista Landfill (Watsonville, CA)* dated 4 June 2020.

eastern portion is also a plateau currently at elevations ranging between 110 feet and 115 feet. The proposed TS is located on the center and eastern portions of the Parcel.

We understand that the following items for geology and soils need to be addressed for the draft environmental impact report (EIR) for the project:

- Rupture of a known earthquake fault as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map
- Strong seismic ground shaking
- Liquefaction and its consequences such as lateral spreading and settlement
- Landslides and slope instability
- Unstable ground
- Expansive soils as defined in the California Building Code
- Soil erosion or loss of topsoil
- Soils incapable of supporting septic tanks or alternative wastewater disposal

The assessment of the above items provides information regarding the planned project components in the project area to see if they are susceptible to the above concerns and, if so, how they would be mitigated.

2. GEOLOGY AND HYDROGEOLOGY

As described in the Introduction, the geology and hydrogeology at the BVLF, located immediately to the south of the Parcel, have been extensively characterized; specifically, geotechnical borings and testing were performed as part of for the re-alignment of Harkins Slough Road and to design a stormwater pond. The stormwater pond was never constructed. Additional information was found in the files of the California Department of Water Resources.

2.1 Regional Geology

EMCON[2] states that the area is underlain by at least 1,000 feet of a heterogeneous mixture of interbedded gravel, sand, silt, and clay. Surficial stream and terrace deposits overlie approximately 500 feet of fine sands of the Aromas formation. The Aromas formation in turn overlies the Purisima formation which is approximately 500 feet thick and composed of semiconsolidated sand, silt, clay, and shale.

[2] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978.

The area is in coastal Santa Cruz County which has step-like marine terraces of Pleistocene age that consist of weakly consolidated to semiconsolidated heterogeneous deposits of moderately to poorly sorted silt, silty clay, sand, and gravel.[3] Geosyntec[4] summarized that it is a naturally occurring valley within an uplifted marine terrace. It lies within a broad band of gently rolling hills of the Monterey Bay coastal plain. This gentle terrain has been incised by numerous small streams draining southward to the Pajaro River, including Harkins Slough to the east and Gallighan Slough to the southwest.

The Aromas Sand formation is the primary water-bearing unit and consists of aeolian (wind blown) and fluvial sand, silt, clay and gravel. Underlying the Aromas Sand formation is the Tertiary Purisima formation, which is too deep to be relevant to site hydrogeologic conditions.

Groundwater flow conditions are influenced regionally by agricultural and municipal pumping wells. Water levels that were +5 to +15 feet MSL in the 1940s have declined to –5 feet MSL and lower in recent years.[5]

2.2 Subsurface Conditions

2.2.1 Soils

Based on EMCON's study of the area geology,[2] portions of BVLF are underlain by recent fluvial terrace deposits consisting of poorly consolidated, heterogeneous deposits of gravels, sands and silts. The fluvial terrace deposits are underlain by the Aromas Formation. The Aromas Formation consists of clean, coarse- to medium-grained sands. The Aromas Formation is underlain by the Purisima Formation.

The proposed TS is located on the center and eastern portions of the Parcel. Figure 2 shows the locations of seven cross sections cut across the proposed TS. Sections 1, 2, and 3 are east-west. Sections 4, 5, and 6 are north-south. Section 7 is northeast-southwest. Figures 3 and 4 show the cross sections.

Each cross section shows the proposed finish grade, the existing topography and, where available, the topography in 1984[6]. In the central portion, the 1984 grades are as much as 30 feet below the proposed finish grades and below the existing topography; this difference in elevation is attributed to the filling of a ravine as part of constructing the Harkins Slough Road re-

[3] See United States Geological Survey (USGS) Open File Report 97-489; Geologic Map of Santa Cruz County, California.
[4] *Preliminary Closure and Postclosure Maintenance Plan; Buena Vista Drive Sanitary Landfill; Santa Cruz County, California*; prepared by Geosyntec Consultants, Inc.; Project WG2561D; April 2021, 27 July 2022.
[5] CH2M Hill. 1996. *Hydrogeological Assessment Report for the Buena Vista Landfill and Vicinity*, prepared for County of Santa Cruz, Santa Cruz County, California. May.
[6] The 1984 grades use a local vertical datum.

alignment project in approximately 1986. Section 7 shows the area of the 1984 topography that we have available. We note that approximately 4 to 10 feet of new fill will be placed above existing fill. The placement of new fill above existing fill could result in settlement of the existing fill; therefore, an evaluation of the subsurface conditions along the center of the Parcel will be needed as part of final design for the TS.

In 2018 Geosyntec[7] performed a field investigation and testing program in an area located south of the southern boundary of APN 052-011-11 and north of Harkins Slough Road that is owned by the County. The field investigation and testing programs findings are included in Appendix 1. A summary of the information follows below. Figure 1 shows the vicinity map.

Figure 2 shows the locations of the 2018 borings with respect to APN 052-011-11. The borings were completed in County-owned property located north of Harkins Slough Road. Two of the borings (GT18-04 and GT18-05) are in the area of the former ravine; the other four borings are on a flat portion of the site (GT18-01, GT18-02, GT18-03, and GT18-06) located to the east of the former ravine.

As part of the 2018 evaluation, Geosyntec reviewed the 1984 predevelopment topography in the area and estimates that the upper 10 feet to 15 feet in GT18-04 and GT18-05 consists of fill placed as part of constructing the realignment of Harkins Slough Road[8]. The fill is primarily silty clay. Borings GT18-01, GT18-02, GT18-03, and GT18-06 show that the top 15 feet to 25 feet consist of clays and clayey sands; with depth the soils become silty and gravelly sands.

Based on the blowcounts measured during the 2018 field investigation, the sands are medium dense to very dense and the clays are stiff to hard.

The tested[9] coarse-grained soils samples are sands with gravel that classified as GP, GM, SP, SM, and SC in accordance with the USCS and had fines contents between 15.3 percent and 39.4 percent. The gravel contents in the sands ranged between 0 percent and 38.3 percent.

The fine-grained soils are primarily medium to high plasticity clays with USCS classification CL and CH. The liquid limits (LL) range between 33 and 74 and the plasticity indices (PI) range

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[7] *Memorandum from Geosyntec Consultants, Inc. to the County of Santa Cruz: Field Investigation, Laboratory Testing, and Subsurface Conditions; County Property Northeast of Buena Vista Landfill (Watsonville, CA)* dated 4 June 2020.

[8] *Geotechnical Investigation: Harkins Slough Road Relocation Sanitary Landfill Expansion Buena Vista Drive, Santa Cruz County, California*; prepared for Santa Cruz County Department of Public Works; prepared by EMCON Associates; project 307-01.13; July 1985.

[9] *Memorandum from Geosyntec Consultants, Inc. to the County of Santa Cruz: Field Investigation, Laboratory Testing, and Subsurface Conditions; County Property Northeast of Buena Vista Landfill (Watsonville, CA)* dated 4 June 2020.

between 16 and 43. The dry unit weights range between 80.1 and 103.4 pounds per cubic foot (pcf). The natural moisture contents ranged between 21 percent and 37.7 percent.

The high to medium plasticity clays (CH and CL) were found at depths of approximately 10 feet and 25 feet below the existing ground surface at the time of drilling or starting at elevation 88 feet approximately. Soils with a plasticity index of 15 or greater may be potentially expansive; therefore, building footings or other structures such as the load-out tunnel that are founded or adjacent to these potentially expansive soils may require mitigation measures such as excavation and replacement with non-expansive soils, amendment of the expansive soils with lime or cement, construction of moisture barriers, grading of surfaces to drain away from the area, and/or restrictions on the use of irrigation and/or infiltration of stormwater into the subsurface.

We also researched the database maintained by the California Department of Water Resources for water wells and found State Well Number 12/01-1 within the Parcel. The well was completed in 1983 and its log presents the following stratigraphy: Top soil at depths between 0 and 4 feet below the ground surface (BGS); blue and brown clay layers between 4 and 93 feet BGS; coarse gravel between 93 and 126 feet BGS; layers of brown clay and gravel between 126 and 160 feet BGS; red sand between 160 feet and 195 feet BGS, and brown clay between 195 and 210 feet BGS.

The ground elevation at the Parcel ranges between Elevation 100 feet and 130 feet; therefore, we estimate that top soil and the blue and brown clay layers extend to approximately Elevation 0 to 20 feet (i.e., ground Elevation ranging between 100 – 130 feet minus depths ranging between 4 and 126 feet BGS) with the coarse gravel layer underlying the clayey soils.

Comparing the description of the soils encountered in State Well Number 12/01-01 with the soils encountered during the 2018 field investigation, the clays layers in State Well Number 12/01-01 are similar; therefore, the soils in APN 052-011-11 are potentially expansive and will need to be mitigated if encountered (e.g., amended, drainage, moisture barriers, and avoiding infiltration into the subsurface).

2.2.2 Groundwater

The Aromas Sand formation is the primary water-bearing unit beneath the BVLF and consists of aeolian (windblown) and fluvial sand, silt, clay and gravel.

Groundwater beneath the BVLF occurs in the Aromas Sand formation but also occurs in the overlying aeolian and terrace deposits. Perched groundwater zones occur in the aeolian and terrace deposits where the percolation of rainfall and irrigation is inhibited by low permeability horizons in near-surface deposits.

Groundwater was not encountered during the 2018 field investigation in the area to the south of APN 052-011-11. Based on visual cues during drilling, groundwater is deep and below the depth

of exploration. The soil was dry to moist; therefore, no water table correction was applied to the field blowcounts. The nearest groundwater monitoring well to the area is MW-13 where groundwater elevations since well construction in 2007 have varied between approximately -5.2 feet and 7.7 feet.[10] MW-14 is located west of the area where the groundwater elevations since well construction in 2020 have varied between approximately -0.1 foot and 7.6 feet. The direction of groundwater flow is generally to the east.[11] The groundwater monitoring reports for the BVLF present detailed information.

Based on the annual groundwater monitoring report, the groundwater (i.e., the water table) is at least 90 feet below the 2017 topography of GT18-04 and GT18-05 and deeper at the other boring locations. Gas probes GP-20 and GP-21 are also located nearby. Appendix 2 includes the logs of MW-13, MW-14, and the gas probes.

State Well 12/01-01 located in APN 052-011-11 was constructed in 1983. The well log (see Appendix 3) shows that the depth to first encountered water at the time of drilling was 95 feet BGS but does not provide an estimate of ground surface elevation or northing and easting coordinates. Harkins Slough Road had not been realigned in 1983. It is unlikely that the well would have been drilled within the ravine area. Therefore, the ground surface at the time of drilling was likely between elevation 100 feet and 130 feet (i.e., the current elevations at the Parcel), and groundwater was first encountered between Elevation 5 and 35 feet (i.e., Elevation 100 or 130 feet minus a depth of 95 feet) or lower. Based on these estimated elevations, groundwater is deep and would not impact the transfer station foundation.

As will be described below, liquefaction may be a concern for soils below the water table. Provided the soils remain dry (i.e., water is not infiltrated into the subgrade), the liquefaction potential is low because the depth to the water table is deep (about 90 feet below the existing ground surface at the time of drilling or at about elevation 0 feet approximately). Since liquefaction potential is low, surface displacement and seismically induced lateral spreading or seismic settlement is not expected.

2.3 Proposed Site Conditions

The pad for the TS requires soil excavation and the construction of engineered fills. A stormwater pond is also proposed. Figures 3 and 4 show cuts ranging between 5 and 15 feet and fills as deep as 10 feet. These fill thicknesses are above the current topography and do not include the depth of fill previously placed to re-align Harkins Slough Road. Placement of fill can

[10] See Table 1 in *Draft 2024 Winter-Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561E; July 31, 2024.
[11] See Table 1 in *Draft 2024 Winter-Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561E; July 31, 2024.

induce settlement; therefore, as part of final design of the TS, settlement evaluations will need to be conducted.

The proposed grades for the pad are relatively flat (i.e., less than 2%) to 6%. A stormwater pond with a depth less than 10 feet is proposed; its side slopes are inclined at 3 (horizontal) to 1 (vertical). Vertical cuts, which would require construction of retaining walls, are also shown (see Section 3 in Figure 3 and Sections 5 and 6 in Figure 4). As required by the CBC, these slopes will be evaluated by the Geotechnical Engineer during final design as required in Section 18 of the CBC:

- The TS will need to be located to maintain minimum clearances and setbacks from the tops of slopes
- The compacted fills and slopes will need to meet the specific criteria required in the CBC and developed by the Geotechnical Engineer during final design.

2.4 Evaluation of Hazards

2.4.1 Introduction to Seismic Hazards

The California State Legislature passed the Alquist Priolo Earthquake Fault Zoning Act (APA) in 1972 and the Seismic Hazards Mapping Act (SHMA) in 1990 prompted by damaging earthquakes in northern and southern California. The SHMA requires the evaluation of sites for the effects of seismic hazards such as ground surface fault rupture, ground shaking, liquefaction, settlement, lateral spreading, seismically-induced slope instabilities, landslides, and other hazards caused by earthquakes.

2.4.1.1 Faulting

No known active faults are present at the Parcel. The nearest faults are the Zayante-Vergales Fault located approximately 3.2 miles from the Parcel and the San Andreas fault system located approximately 6.1 miles from the Parcel.

2.4.1.2 Ground Shaking

The TS would be designed and constructed in conformance with the most recently adopted CBC design parameters which are tailored to minimize the risk of structure failure due to seismic hazards. Therefore, conformance with the CBC would ensure that impacts relating to ground shaking would be less than significant.

The soil descriptions in the log for State Well Number 12/01-1 appear similar to those encountered during the 2018 field investigation. Using the information collected in the borings performed in 2018 which are located south of the Parcel, the site classification for the TS is D (Medium dense sand or stiff clay).

2.4.1.3 Liquefaction, Settlement, and Lateral Spreading

Liquefaction is a phenomenon where cohesionless soils gravel, sand, and cohesionless silt) below the water table lose strength as a result of shaking under earthquake loading.

The stiff to very stiff cohesive soils, the medium dense to very dense cohesionless soils, and the deep groundwater table identified in the field investigation south of the Parcel are not susceptible to liquefaction. Because the soils are not susceptible to liquefaction, lateral spreading, sand boils, and seismic settlements are not expected.

2.4.1.4 Landslides and Slope Instability

The TS will be constructed above flat areas or pads. Fills, cut slopes, and retaining walls to create the pad will be designed as required by the CBC. The compacted fills will meet the specific criteria required in the CBC and developed by the Geotechnical Engineer during final design; therefore, landslides and slope instability due to strong shaking is not foreseen.[12]

2.4.1.5 Unstable Ground

Unstable ground conditions are not expected because as described above:

- The measured blowcounts show that the sands are medium dense to very dense and the clays are stiff to hard.
- Landslides and slope instability are not expected.
- Liquefaction is not a concern because the water table is deep.[13]

2.4.1.6 Preliminary Conclusions for Seismic Hazards

Based on the above, seismic hazards are not a concern for the TS. Furthermore, the TS will be designed in accordance with the CBC; therefore, the above topics will also be addressed in detail as part of final design for the TS.

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[12] The Geographic Information System (GIS) for the County of Santa Cruz shows a queried (?) Questionable Landslide Deposit to the west of the proposed area for the TS. We note that a portion of this area was filled with engineered fill when Harkins Slough Road was realigned in the 1980s. Furthermore, the queried area extends into the area where Module 4B of the BVLF was constructed; a landslide was not identified during the excavation of Module 4B.

[13] If perched water were to develop, liquefaction potential would need to be re-evaluated.

2.4.2 Expansive Soils

The County's geographic information system (GIS) website shows that a portion of the soils in APN 052-011-11 may be expansive. This finding agrees with the 2018 field investigation that found high to medium plasticity clays (CH and CL) at depths of approximately 10 feet and 25 feet below the existing ground surface at the time of drilling or starting at Elevation 88 feet approximately. Similarly, blue and brown clay layers were found during the drilling of State Well 12/01-01; these clays have been assumed to have similar properties as those encountered during the 2018 field investigation so would need to be evaluated for expansion potential.

Soils with a plasticity index of 15 or greater may be potentially expansive; therefore, building footings or other structures founded or adjacent to these potentially expansive soils may require mitigation measures such as excavation and replacement with non-expansive soils, amendment of the expansive soils with lime or cement, construction of moisture barriers, grading of surfaces to drain away from the area, and/or restrictions on the use of irrigation and/or infiltration of stormwater into the subsurface.

2.4.3 Erosion and Loss of Top Soil

Currently, the surfaces in APN 052-011-11 are vegetated or have structures. During construction, soils may be exposed to the elements; however, as a regulatory requirement, a Stormwater Pollution and Prevention Plan (SWPPP) is required if construction activities disturb more than one acre of land. The SWPPP would address construction impacts during soil disturbing activities when soil is exposed to wind, rain and concentrated flows that could cause erosion. These mandatory requirements would minimize soil erosion. Furthermore, undisturbed areas will be fenced off and any topsoil generated as part of grading activities will be stockpiled and protected for later use. Stockpiles will be covered with tarps, plastic sheeting, erosion control fabrics, or treated with biodegradable soil stabilizers.

After the TS is constructed:

- Much of the disturbed area would be nearly 100 percent impervious because it will be paved or developed as buildings. Therefore, the TS would not result in on-site erosion because all runoff would be directed to areas of BMPs and/or other storm drain infrastructure.
- Permanent fill and cut slopes would be hydroseeded and vegetated.

We do not recommend infiltration of any collected stormwater to address erosion and sedimentation as part of low impact development (LID) features so that the soils below the area are not impacted negatively (e.g., existing potentially expansive soils, long-term saturation of soils which can result in soils becoming liquefiable).

A pond is proposed for the TS; we recommend the lining of the pond with an impervious liner (i.e., a geomembrane) so that the collected water does not infiltrate into the subgrade; as described earlier, soils may become liquefiable when saturated. Furthermore, if unlined, water collected in the pond that infiltrates may result in seeps along the access road located along the southern boundary of APN 052-011-11.

2.4.4 Septic Systems or Alternative Wastewater Disposal Systems

Sewers for the disposal of wastewater from TS activities are not available; therefore, we understand that a septic tank or similar system will be constructed to address TS wastewater needs. As for the LID features, we do not recommend infiltrating wastewater into the subsurface soils.

ATTACHMENTS

Figure 1 – Map View

Figure 2 – Site Plan

Figure 3 – Sections 1, 2, 3

Figure 3 – Sections 4, 5, 6, 7

Appendix 1 – Memorandum dated 4 June 2020

Appendix 2 – Gas Probes and Monitoring Wells Logs

Appendix 3 – State Well 12/01-01 Log

* * * * *

0 400
SCALE IN FEET

LEGEND

- EXISTING GROUND CONTOUR (10-FT) (NOTE 1)
- APPROXIMATE PROPERTY LINE
- APPROXIMATE LANDFILL FOOTPRINT
- APPROXIMATE LIMIT OF MODULE
- CLOSED LANDFILL AREA

NOTES:

1. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH GEOMATIC TECHNOLOGIES DATED FEBRUARY 4, 2026. COORDINATE GRID AND ELEVATIONS BASED ON STATE PLANE SYSTEM.

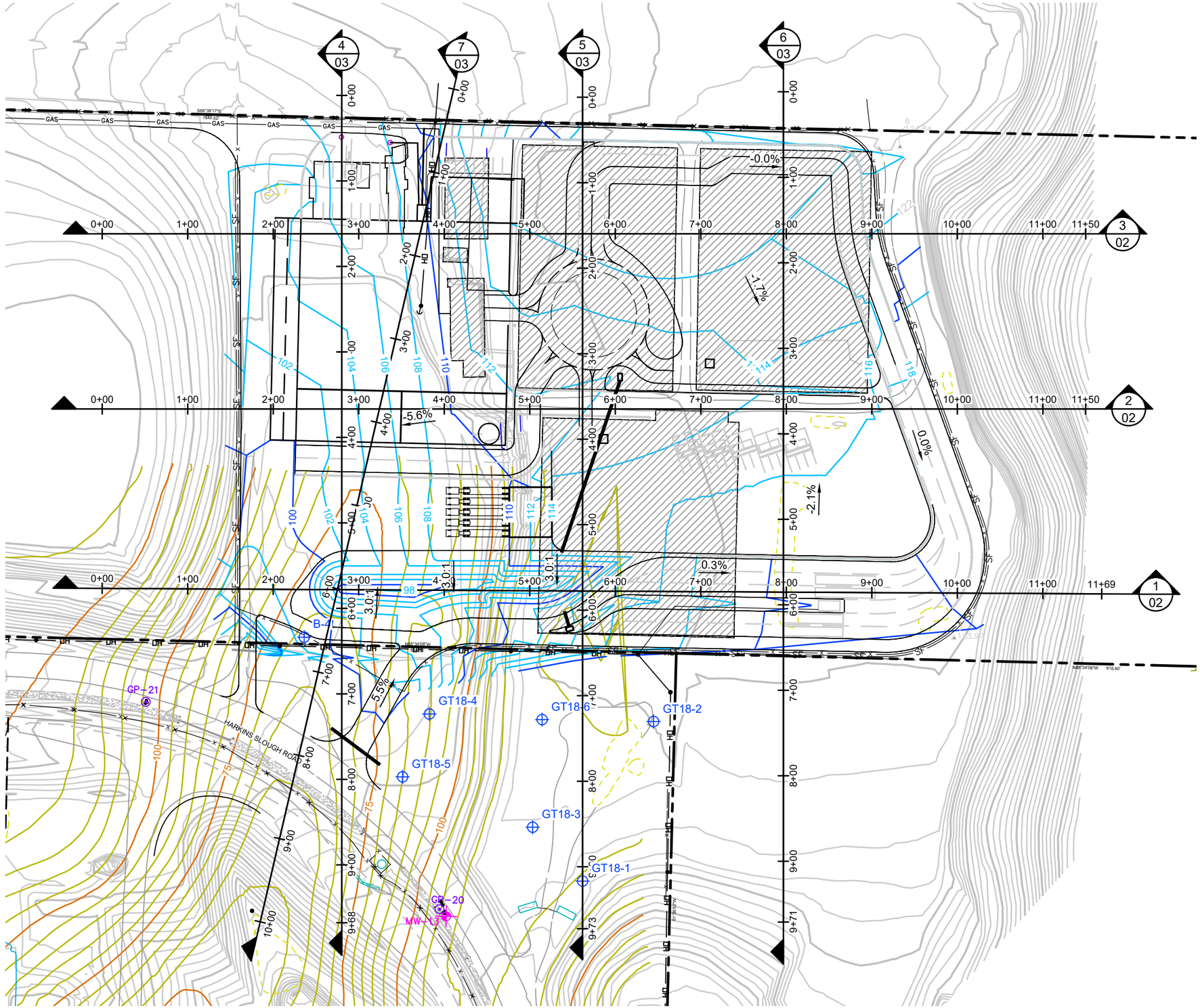
MAP VIEW

Geosyntec consultants

FIGURE 1

PROJECT NO: WG2561G | FEBRUARY 2026

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2026 TASKS\EIR RELATED\FIG 1_OVERALL - Last Saved by: Loan.Nguyen on 2/17/26



N

0 120

SCALE IN FEET

LEGEND

- 100 — EXISTING TOPOGRAPHY (10-FT) (NOTE 1)
- EXISTING TOPOGRAPHY (2-FT) (NOTE 1)
- 110 — PROPOSED FINISH GRADES (10-FT)
- 104 — PROPOSED FINISH GRADES (2-FT)
- 100 — EXISTING GRADE 1984 (25-FT) (NOTE 2)
- EXISTING GRADE 1984 (5-FT) (NOTE 2)
- APPROXIMATE PROPERTY LINE
- APPROXIMATE LANDFILL FOOTPRINT
- MW-13 GROUNDWATER MONITORING WELL
- GP-21 LANDFILL GAS MONITORING PROBE
- B-4 GT18-6 PREVIOUS BORING

NOTES:

1. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH. DATE AERIAL PHOTOGRAPHY BY AMERICAN AERIAL SURVEYS: FEBRUARY 4, 2026. COORDINATE GRID BASED ON STATE PLANE SYSTEM.
2. 1984 TOPOGRAPHY PROVIDED BY AEROGEODETIC, BASED ON LOCAL DATUM.

SITE PLAN

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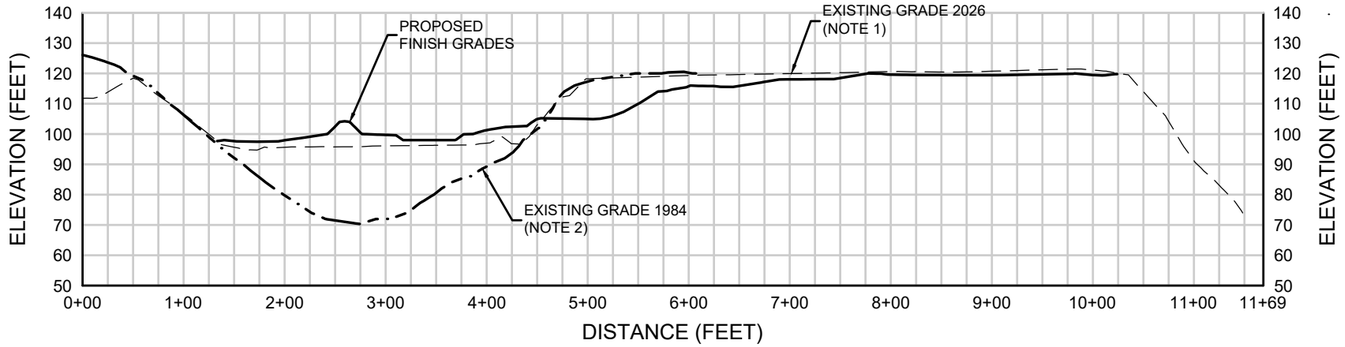
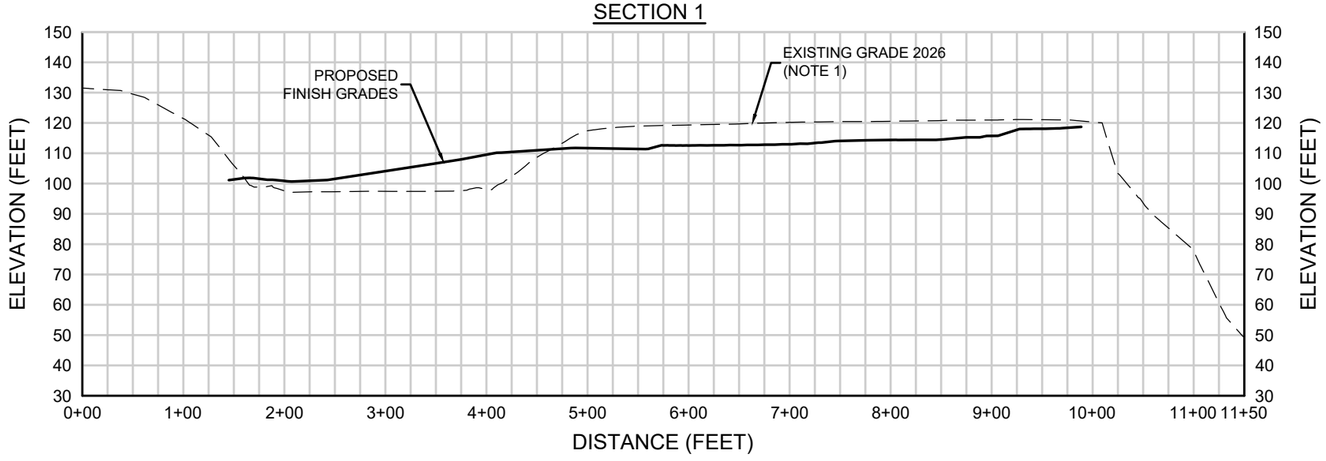
PROJECT NO: WG2561G | FEBRUARY 2026

FIGURE 2

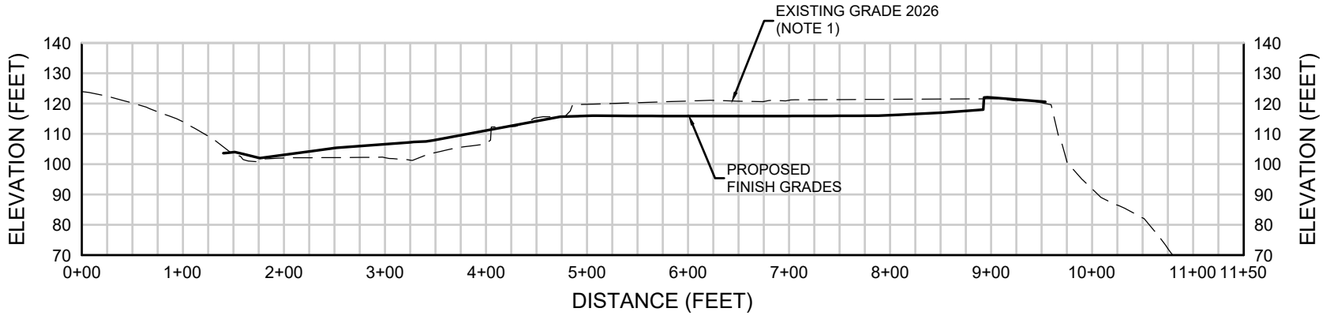
P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2026 TASKS\EIR RELATED\FIG2_SITE PLAN - Last Saved by: Loan.Nguyen on 2/17/26



SECTION 1



SECTION 2



SECTION 3

LEGEND

- EXISTING GRADE 2026 (NOTE 1)
- EXISTING GRADE 1984 (NOTE 2)
- PROPOSED FINISH GRADES

NOTES:

1. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH. DATE AERIAL PHOTOGRAPHY BY AMERICAN AERIAL SURVEYS: 2-4-2026. COORDINATE GRID BASED ON STATE PLANE SYSTEM.
2. 1984 TOPOGRAPHY PROVIDED BY AEROGEODETIC, BASED ON LOCAL DATUM.

0 150 300

HORIZONTAL SCALE IN FEET

0 50 100

VERTICAL SCALE IN FEET

SECTIONS 1, 2, 3

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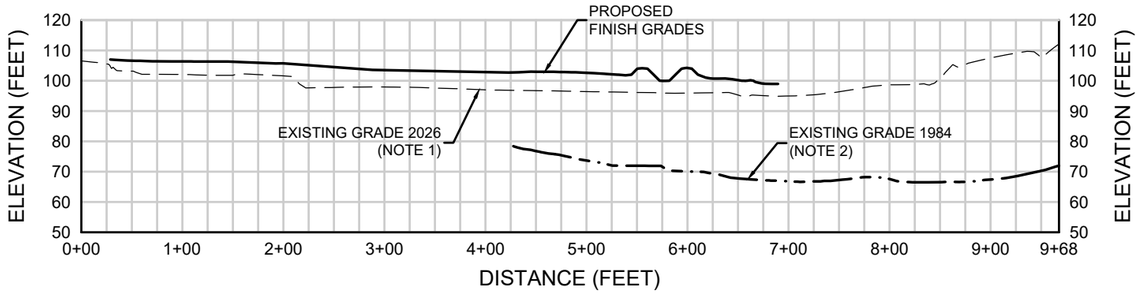
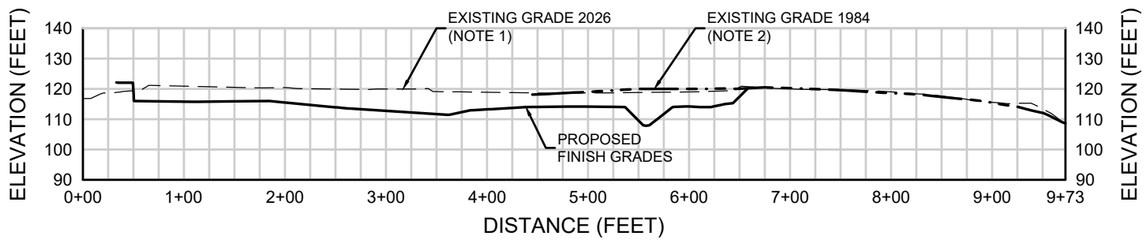
PROJECT NO: WG2561G | FEBRUARY 2026

FIGURE 3

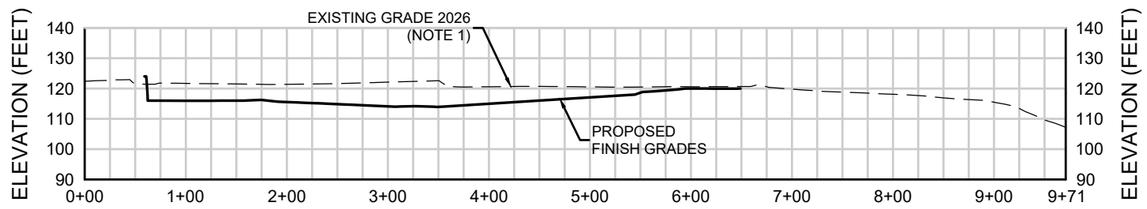
P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2026 TASKS\EIR RELATED\FIG2_SITE PLAN - Last Saved by: Loan.Nguyen on 2/17/26



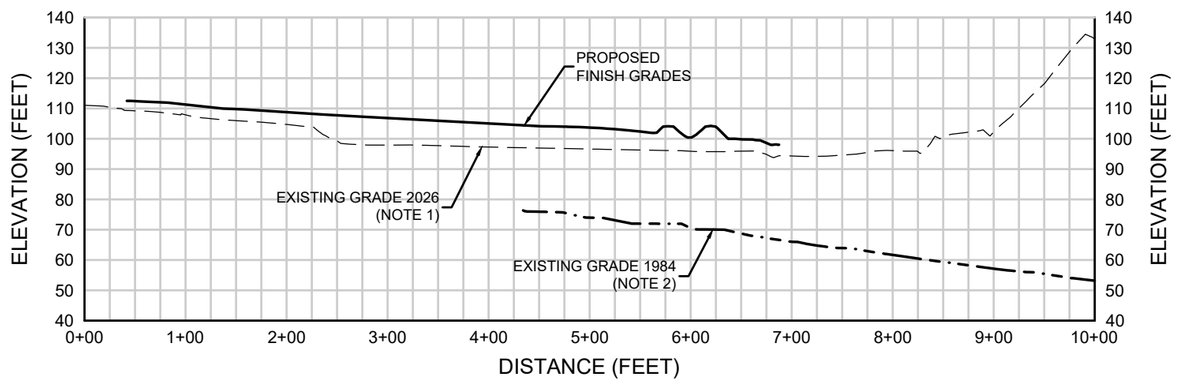
SECTION 4



SECTION 5



SECTION 6



SECTION 7

LEGEND

- EXISTING GRADE 2026 (NOTE 1)
- EXISTING GRADE 1984 (NOTE 2)
- PROPOSED FINISH GRADES

NOTES:

1. EXISTING TOPOGRAPHY PREPARED BY TETRA TECH. DATE AERIAL PHOTOGRAPHY BY AMERICAN AERIAL SURVEYS: 2-4-2026. COORDINATE GRID BASED ON STATE PLANE SYSTEM.
2. 1984 TOPOGRAPHY PROVIDED BY AEROGEODETIC, BASED ON LOCAL DATUM.

0 150 300
HORIZONTAL SCALE IN FEET

0 50 100
VERTICAL SCALE IN FEET

SECTIONS 4, 5, 6, 7

Geosyntec consultants

FIGURE 4

PROJECT NO: WG2561G | FEBRUARY 2026

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\2026 TASKS\EIR RELATED\FIG2_SITE PLAN - Last Saved by: Loan.Nguyen on 2/17/26

APPENDIX 1

Memorandum dated 4 June 2020

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036
www.geosyntec.com

Memorandum

Date:	4 June 2020
To:	Kasey Kolassa, County of Santa Cruz
Copies to:	Sangeeta Lewis; File WG2562
From:	Fabrizio Settepani, P.E., G.E.
Subject:	Field Investigation, Laboratory Testing, and Subsurface Conditions County Property Northeast of Buena Vista Landfill (Watsonville, CA) Geosyntec Project Number: WG2562

1. GENERAL

This memorandum summarizes the geotechnical drilling, soil sampling, and testing performed by Geosyntec Consultants, Inc. (Geosyntec) for the property owned by the County of Santa Cruz near Watsonville, California and located northeast (NE) of the Buena Vista Drive Landfill (Landfill) across Harkins Slough Road.

The fieldwork activities included performing geotechnical drilling and collecting soil samples at six borings GT18-01 through GT18-06. Figure 1 presents the final borehole locations. The field work was performed between 12 November and 15 November 2018.

The memorandum also includes borings from a previous field investigation, describes the laboratory testing program, and summarizes the subsurface conditions in the area.

2. PRE-DRILLING ACTIVITIES

Before drilling, Geosyntec visited the site on 5 November 2018 to mark the boring locations and met California Utility Locators, a private utility locator from Scotts Valley, California. The utility locator cleared the boring locations and the surrounding area of electrical and metal utilities. Geosyntec also called Underground Service Alert (USA) after marking the locations with white paint and received ticket number X830900918-00X.

USA informed the following parties of Geosyntec's planned work:

- CTYWAT = CITY OF WATSONVILLE
- PACBEL = PACIFIC BELL
- PGESAL = PGE DISTRIBUTION SALINAS

Geosyntec called the County of Santa Cruz and was informed that a drilling permit was not required for a geotechnical field investigation.

Geosyntec also reviewed existing borings in the area of the proposed sediment basin. Attachment 1 includes the existing boring log in the area of the proposed sediment basin.

Geosyntec contracted with Pitcher Services LLC (California C57 Contractor No.1044895) of East Palo Alto, California to perform the geotechnical drilling. As will be described below, Pitcher performed the energy measurement of the sampling setup at boring GT18-03.

3. DRILLING AND SAMPLING ACTIVITIES

Geosyntec was onsite full time during the field activities to provide oversight and to document the drilling and sampling activities.

Pitcher used a Failing 1500 (PD59) truck-mounted drill rig to perform the drilling. The drill rig was equipped with an automatic slide hammer with 30-inch drop for collection of split-spoon samples. The drilling program included both mud rotary and solid stem auger drilling as described below.

Solid stem augers were used in the top 5 feet to allow the setting of a casing that would in turn allow the use of mud rotary drilling techniques. Samples were collected at minimum 5 feet intervals.

The depth of exploration varied between 51.5 feet and 82 feet below the existing ground surface at the time of drilling. The mud rotary drilling technique did not allow for open borehole groundwater level measurement. The moisture content description indicated on the borehole logs was based on visual observation of soil sample moisture conditions; therefore, the depths are approximate and do not represent stabilized groundwater conditions. Groundwater was not encountered to the maximum depth explored in any of the six borings.

Soil sampling was performed using: (1) standard penetration test (SPT), split-spoon sampler (1-3/8 inch inside diameter [ID], 2 inch outside diameter [OD]) without liners to measure blow counts in general accordance with ASTM D1586, (2) modified California split spoon with liners (2.5 inch ID, 3 inch OD) to measure blow counts, and (3) thin-wall Shelby tube sampler (3-feet long by 3-inch diameter).

Soils collected using the samplers were retained in individual Ziplock plastic bags. A 140-pound hammer was used for driving samples with the SPT samplers, and a 300-pound hammer was used for the modified California sampler. Soil samples collected during drilling were logged for lithologic characterization consistent with the Unified Soil Classification System (USCS) in general accordance with ASTM D2487/2488, and were retained for potential laboratory testing.

The boring logs include soil classifications based on laboratory testing results of samples selected by Geosyntec. Attachment 2 includes the 2018 boring logs.

Pitcher performed energy calibration measurements of the drill rig hammer system during the drilling and sampling at boring GT18-03 on 13 November 2018. Calibration measurements were obtained during sampling using both the SPT and California modified samplers. Pitcher prepared a report detailing the methods and results of the energy measurements; Attachment 3 includes the energy report.

As the drilling progressed, the drill cuttings and drilling mud were pumped into 55-gallon drums, and the drums were sealed once full. After the field investigation concluded, workers from the County of Santa Cruz transported the filled drums to the Buena Vista Landfill for disposal.

After drilling had been performed at each location, the driller backfilled each boring to the ground surface with cement bentonite grout. The boring locations were staked, labeled, and flagged for surveying.

4. POST-DRILLING ACTIVITIES

A County survey crew surveyed the completed boring locations based on the site's local coordinate system. The information is tabulated below:

BORING	NORTHING	EASTING	ELEVATION	DEPTH (ft-bgs)
GT18-01	11,926.38	10,950.23	115.3 feet	51.5 feet
GT18-02	12,115.01	11,028.95	120.0 feet	51.5 feet
GT18-03	11,987.99	10,890.42	118.7 feet	82.0 feet
GT18-04	12,117.50	10,766.48	98.0 feet	52.0 feet
GT18-05	12,043.20	10,736.99	99.6 feet	53.5 feet
GT18-06	12,114.08	10,898.48	120.1 feet	51.5 feet

All retained soil samples (i.e., Shelby tubes, brass rings, plastic bags, and bulk bucket samples) collected during drilling were packaged and transported to Geosyntec's office in Oakland, California.

5. LABORATORY TESTING

After the field investigation, Geosyntec inspected the soil samples and selected samples for laboratory testing. Laboratory testing was performed for Geosyntec by Cooper Testing Laboratory of Palo Alto, California. The following tests were performed:

LABORATORY TEST	ASTM DESIGNATION	PURPOSE
Moisture Content/Dry Density	D2937	Subsurface characterization, slope stability analyses.
Grain size	D422	Subsurface characterization, liquefaction analyses.
Atterberg limits	D4318	Subsurface characterization, liquefaction analyses, consolidation settlement.
Consolidation	D2435	Consolidation settlement. Test was performed in case property will be used for alternative use in the future.
Unconsolidated Undrained (UU) Triaxial test	D2850	Strength of natural (subsurface), slope stability analyses and future use of property.

Table 1 lists the test results. Attachment 4 includes the soil test data sheets. The laboratory test results indicate that:

- The tested coarse-grained soils samples are sands with gravel that classified as GP, GM, SP, SM, and SC in accordance with the USCS and had fines contents between 15.3 percent and 39.4 percent. The gravel contents in the sands ranged between 0 percent and 38.3 percent.
- The fine-grained soils are primarily medium to high plasticity clays with USCS classification CL and CH, the liquid limits (LL) range between 33 and 74 and the plasticity indices (PI) range between 16 and 43. The dry unit weights range between 80.1 and 103.4 pounds per cubic foot (pcf). The natural moisture contents ranged between 21 percent and 37.7 percent.
- The relatively undisturbed samples of fine-grained soils tested for unconsolidated-undrained strength at natural moisture contents had strengths between 1,270 psf and 2,355 psf at strains of 5 percent.

- Two of the relatively undisturbed samples tested at natural moisture contents were also backpressure saturated and tested for unconsolidated-undrained strength had strengths of 1,018 psf and 1,414 psf at strains of 5 percent versus 2,355 psf and 1,685 psf, respectively at natural moisture contents.

6. SUBSURFACE CONDITIONS

6.1 Area Geology

EMCON[1] states that the area is underlain by at least 1,000 feet of a heterogeneous mixture of interbedded gravel, sand, silt, and clay. Surficial stream and terrace deposits overlie approximately 500 feet of fine sands of the Aromas formation. The Aromas formation in turn overlies the Purisima formation which is approximately 500 feet thick and composed of semiconsolidated sand, silt, clay, and shale.

The area is in coastal Santa Cruz County which has step-like marine terraces of Pleistocene age that consist of weakly consolidated to semiconsolidated heterogeneous deposits of moderately to poorly sorted silt, silty clay, sand, and gravel[2]. Geosyntec[3] summarized that it is a naturally occurring valley within an uplifted marine terrace. It lies within a broad band of gently rolling hills of the Monterey Bay coastal plain. This gentle terrain has been incised by numerous small streams draining southward to the Pajaro River, including Harkins Slough to the east and Gallighan Slough to the southwest.

The Aromas Sand formation is the primary water-bearing unit and consists of aeolian (wind blown) and fluvial sand, silt, clay and gravel. Underlying the Aromas Sand formation is the Tertiary Purisima formation, which is too deep to be relevant to site hydrogeologic conditions. Groundwater beneath the site occurs in the Aromas Sand formation but also occurs in the overlying aeolian and terrace deposits. Perched groundwater zones occur in the aeolian and terrace deposits where the percolation of rainfall and irrigation is inhibited by low permeability horizons in near-surface deposits.

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[1] *Geotechnical Investigation and Waste Management Studies, Buena Vista Drive Sanitary Landfill, Santa Cruz County*; prepared for the County of Santa Cruz, prepared by EMCON Associates; Project 307.1.1; 8 December 1978

[2] See United States Geological Survey (USGS) Open File Report 97-489; Geologic Map of Santa Cruz County, California.

[3] *Preliminary Closure and Postclosure Maintenance Plan; Buena Vista Drive Sanitary Landfill; Santa Cruz County, California*; prepared by Geosyntec Consultants, Inc.; Project WG1019 and WG1394; July 2008, Amended May 2011, December 2011, May 2016.

Groundwater flow conditions are influenced regionally by agricultural and municipal pumping wells. Based on information for the Landfill, the direction of groundwater flow is southeast and water levels range between –5 feet and +5 feet MSL.

6.2 Subsurface Conditions in NE Corner Area

The area is relatively flat (upper portion of the site) and slopes toward the southeast and toward the west. Two of the borings (GT18-04 and GT18-05) are at the toe of the slope toward the west; the other four borings are on the flat portion of the site (GT18-01, GT18-02, GT18-03, and GT18-06).

Geosyntec reviewed the predevelopment topography from 1984 in the area and estimates that the upper 10 feet to 15 feet in GT18-04 and GT18-05 consists of fill that was placed as part of constructing the realignment of Harkins Slough Road[4]. The fill is primarily silty clay.

Borings GT18-01, GT18-02, GT18-03, and GT18-06 show that the top 15 feet to 25 feet consist of clays and clayey sands; with depth the soils become silty and gravelly sands.

Based on the blowcounts measured during the field investigation, the sands are medium dense to very dense and the clays are stiff to hard.

Groundwater was not encountered during the field investigation. Based on visual cues during drilling, groundwater is deep and below the depth of exploration. The soils were dry to moist and this assumption was used to correct field blowcount (i.e., no water table was assumed to correct the field blowcounts).

The nearest groundwater monitoring well to the area is MW-13 located on the Landfill side and across Harkins Slough Road about 200 feet south of the area. The groundwater elevations since well construction in 2007 vary between -5.21 feet and 4.81 feet[5]. Based on this information, the groundwater (i.e., the water table) is at least 90 feet below the 2017 topography (GT18-04 and GT18-05) and deeper at the other boring locations.

ATTACHMENTS

Figure 1 – 2018 Field Investigation Locations

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[4] *Geotechnical Investigation: Harkins Slough Road Relocation Sanitary Landfill Expansion Buena Vista Drive, Santa Cruz County, California*; prepared for Santa Cruz County Department of Public Works; prepared by EMCON Associates; project 307-01.13; July 1985.

[5] See Table 1 in *2019 Winter, Spring Semi-Annual Monitoring Report, Buena Vista Drive Sanitary Landfill, Watsonville, California*; prepared for County of Santa Cruz, Department of Public Works; WG2561; 5 August 2019.

Table 1 – Summary of Laboratory Test Results

Attachment 1 – Previous Boring Logs

Attachment 2 – Geosyntec Boring Logs

Attachment 3 – Energy Measurement Report

Attachment 4 – Laboratory Test Results

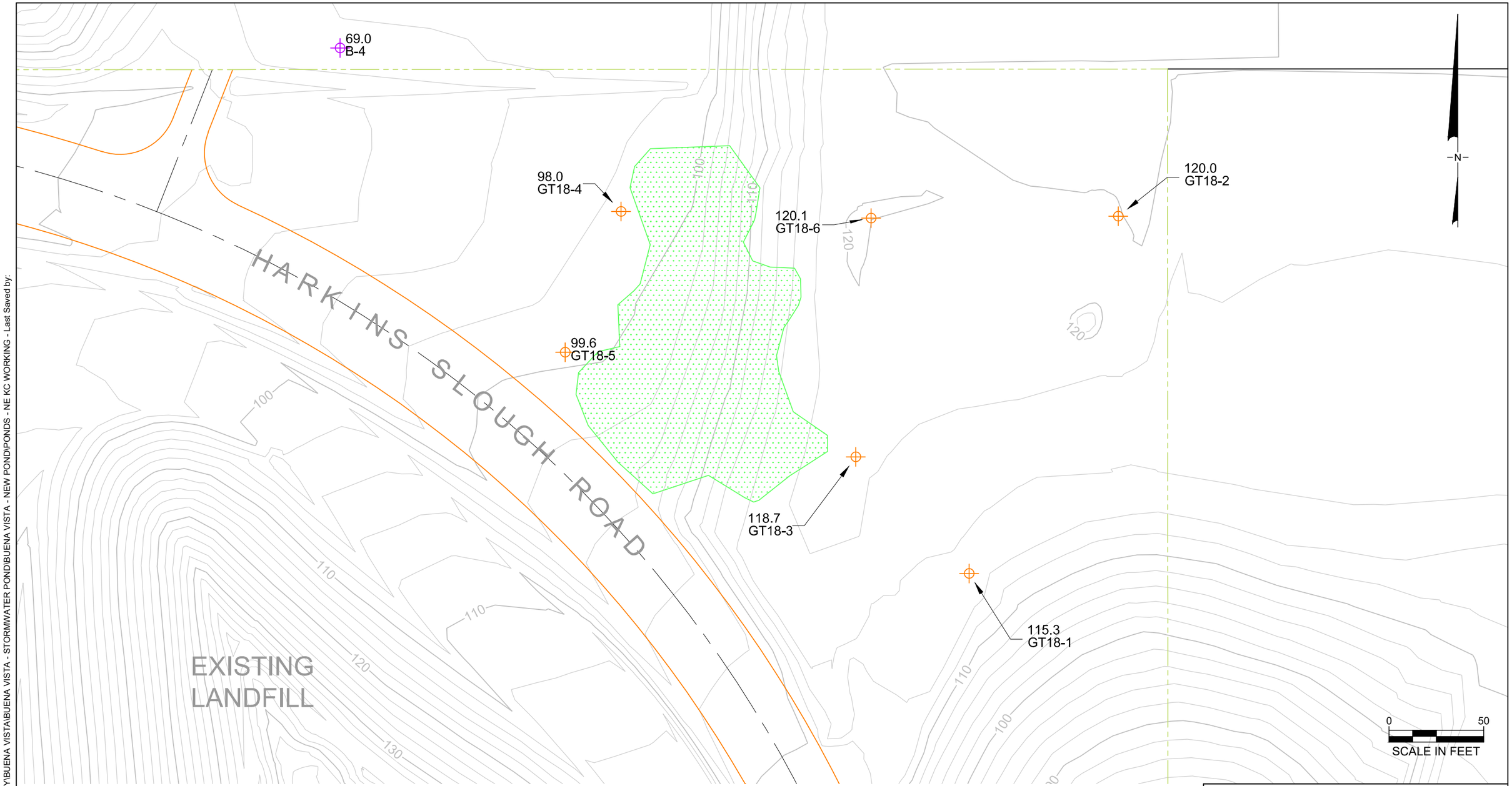
* * * * *

Table 1
Summary of Laboratory Test Results
Northeast Property
Buena Vista Landfill
Watsonville, California

Boring	Sample Location					Dry Unit Weight	Natural Moisture Content	Wet Unit Weight	Void Ratio G_s=2.65	Estimated Initial Degree of Saturation G_s=2.65	USCS	Soil Description	LL	PL	PI	Gravel Content	Sand Content	Fines Content	S_u at 5% strain	Confining Pressure	Test Conditions
	Sample ID	From (ft-BGS)	To (ft-BGS)	Midpoint Depth (ft-BGS)	Midpoint Elevation (ft-MSL)	(pcf)	(%)	(pcf)		(%)			(%)	(%)	(%)	(%)	(%)	(%)	(psf)	(psi)	
GT18-01	01-04B	18.5	19.0	18.8	96.6						SM	Yellowish Brown Silty SAND w/ Gravel				28.2	56.1	15.7			
GT18-01	01-06B	30.5	31.0	30.8	84.6						SM	Yellowish Brown Silty SAND w/ Gravel				38.3	42.6	19.1			
GT18-02	02-09B	45.5	46.0	45.8	74.3						ML	Olive Brown SILT w/ Sand				0.1	21.7	78.2			
GT18-03	03-03B	12.5	13.0	12.8	105.9						CL	Yellowish Brown Sandy CLAY				0.0	30.7	69.3			
GT18-03	03-05B	20.5	21.0	20.8	97.9						SC	Dark Brown Clayey SAND w/ Gravel changes to Olive Brown				20.9	59.8	19.3			
GT18-03	03-06C	26.0	26.5	26.3	92.4						CL	Olive Sandy CLAY changes to Yellowish Brown				8.0	40.8	51.2			
GT18-03	03-09	40.0	41.5	40.8	77.9						CH	Olive Gray Fat CLAY	64	28	36	0.0	0.6	99.4			
GT18-04	04-03	15.0	17.5	16.3	81.7	100.6	24.0	124.7	0.64	99%	CH	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand	52	18	34				1270	8.0	Natural MC
GT18-04	04-04	20.0	22.5	21.3	76.7	80.1	37.7	110.3	1.06	94%	CH	Olive Brown Fat CLAY	74	31	43				2355	10.0	Natural MC
						83.5	37.4	114.7	0.98	101%									1018	10.0	Backpressure Saturated
GT18-05	05-02	10.0	12.5	11.3	88.4	103.4	21.0	125.1	0.60	93%	CL	Olive Brown Mottled Gray Sandy Lean CLAY	33	17	16				1685	6.0	Natural MC
						99.5	23.4	122.8	0.66	94%									1414	6.0	Backpressure Saturated
GT18-05	05-03	15.0	17.5	16.3	83.4	95.3	26.4	120.5	0.74	95%	CL	Olive Brown Lean CLAY w/ Sand	48	20	28				1710	8.0	Natural MC
GT18-05	05-05	25.0	26.5	25.8	73.9						CH	Olive Brown Fat CLAY	71	28	43	0.1	0.7	99.2			
GT18-06	06-01B	6.0	6.5	6.3	113.8						SC	Yellowish Brown Clayey SAND				0.9	63.1	36.0			
GT18-06	06-03	15.0	16.5	15.8	104.3						SC	Yellowish Brown Clayey SAND				0.0	60.6	39.4			
GT18-06	06-06B	31.0	31.5	31.3	88.8						SC	Dark Brown Clayey SAND				10.9	73.8	15.3			

Abbreviations:
BGS: below the ground surface at the time of drilling
ft: feet
LL: Liquid Limit (Atterberg Limits)
MSL: Mean Sea Level
pcf: Pounds per cubic foot
PI: Plasticity Index (PI = LL - PL)
PL: Plastic Limit (Atterberg Limits)
psf: Pounds per square foot
psi: Pounds per square inch
USCS: Unified Soil Classification System

Symbols:
G_s: Specific gravity
S_u: Undrained shear strength



LEGEND

- 100 — EXISTING GROUND CONTOUR (10 FT)
- EXISTING GROUND CONTOUR (2 FT)
- PROPERTY LINE
- RIGHT OF WAY
- COAST LIVE OAK WOODLAND
- 2018 BORING LOCATION
- 1985 BORING LOCATION (EMCON)

NOTES:

1. TOPOGRAPHIC DATA FROM 17 AUGUST 2017 AERIAL PHOTOGRAPHY BY TETRA TECH GEOMATIC TECHNOLOGIES OF LAFAYETTE, CALIFORNIA AND AMERICAN AERIAL SURVEYS, INC. OF IONE, CALIFORNIA.
2. BORING ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL AT THE TIME OF DRILLING.

2018 FIELD INVESTIGATION LOCATIONS
BUENA VISTA DRIVE LANDFILL
SANTA CRUZ COUNTY

Geosyntec consultants

PROJECT NO: WG2562 | FEBRUARY 2020

FIGURE 1

P:\CADD\CIVIL 3D\SANTA CRUZ COUNTY\BUENA VISTA\BUENA VISTA - STORMWATER POND\BUENA VISTA - NEW PONDS - NE KC WORKING - Last Saved by: ABekar on 3/26/20

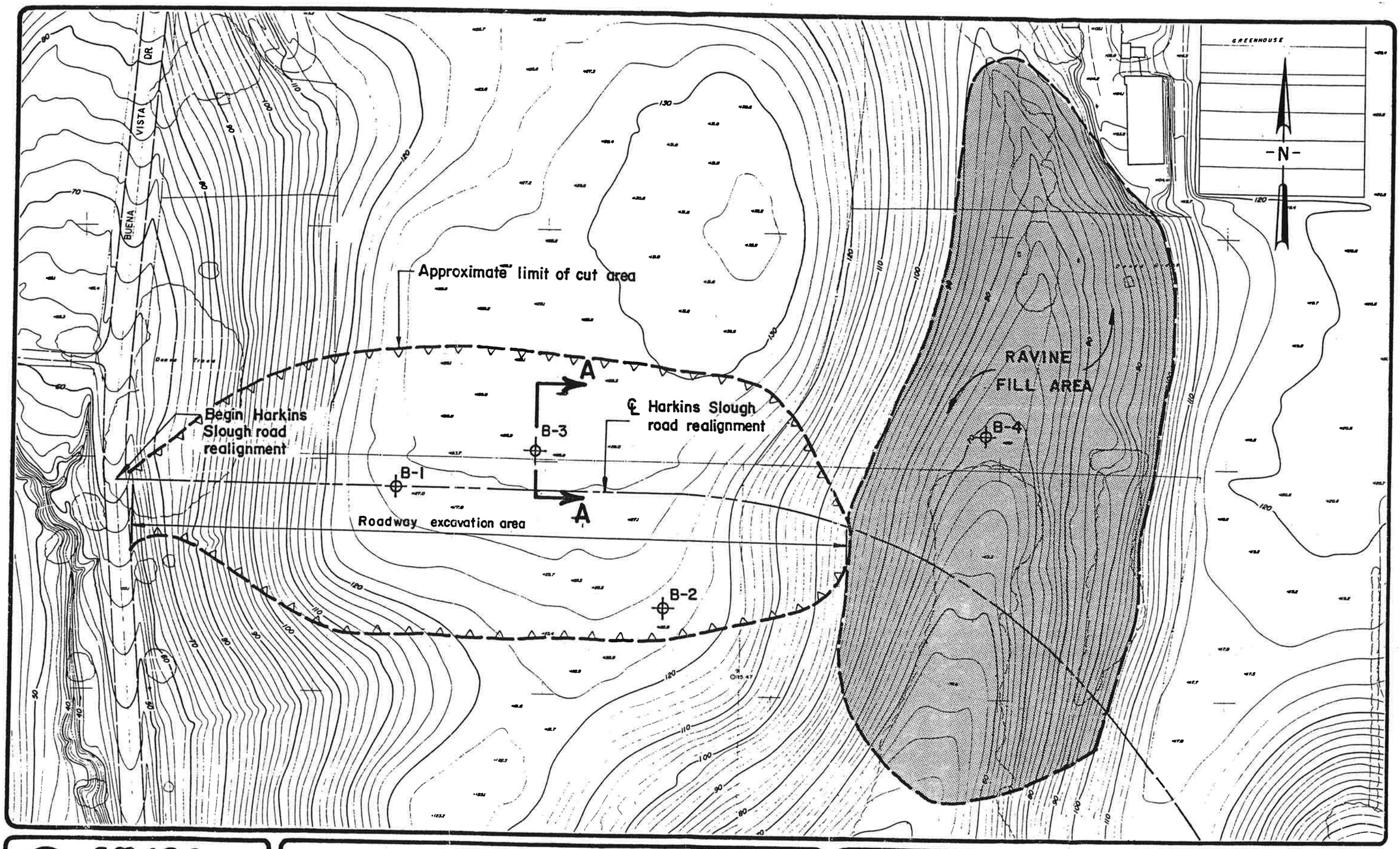
ATTACHMENT 1
PREVIOUS BORING LOGS

GEOTECHNICAL INVESTIGATION
HARKINS SLOUGH ROAD RELOCATION
SANITARY LANDFILL EXPANSION
BUENA VISTA DRIVE
SANTA CRUZ COUNTY, CALIFORNIA

Prepared for
SANTA CRUZ COUNTY DEPARTMENT OF PUBLIC WORKS
July 1985

EMCON Associates
90 Archer Street
San Jose, California 95112

Project 307-01.13



EMCON Associates
San Jose, California

SCALE IS OFF - SHOULD BE 1" = 100'

Scale 0 200 400 600 800 Feet

COUNTY OF SANTA CRUZ
HARKINS SLOUGH ROAD RELOCATION PROJECT
AT BUENA VISTA LANDFILL EXPANSION
SANTA CRUZ COUNTY, CALIFORNIA

BORING LOCATION MAP

FIGURE 1

PROJECT NO. 307-01.13

Appendix A

FIELD INVESTIGATION

The subsurface soil and ground-water conditions beneath the investigation area were explored by drilling four borings between the dates of March 22 to April 10, 1985. These borings were drilled with a truck-mounted hollow-stem auger and were logged by our geologist, who also obtained undisturbed and disturbed soil samples.

Soil samples were obtained by driving a 2-1/2-inch-diameter Modified California sampler or 2-inch split-spoon sampler into the soil at selected depths using a 140-pound hammer and a drop of 30 inches. Representative bulk samples of auger cuttings were taken from the borings for visual classification and laboratory testing.

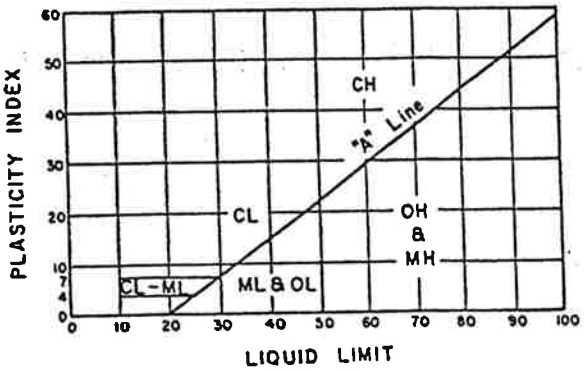
Logs of the soils and other subsurface conditions encountered by the borings in the study area are presented on Plates A-1 through A-4. The classification system used to describe the logs is presented on Plate A-5, Method of Classification.

MAJOR DIVISIONS		SYMBOLS	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 1/2 of soil > no. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > no. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction < no. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (More than 1/2 of soil < no. 200 sieve size)	SILTS & CLAYS LL < 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

CLASSIFICATION CHART
(Unified Soil Classification System)

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
coarse	No. 4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

GRAIN SIZE CHART



PLASTICITY CHART

METHOD OF SOIL CLASSIFICATION

EMCON ASSOCIATES

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13
PROJECT NAME Buena Vista Landfill
BY WMC DATE 3/22 & 3/25/85

BORING NO. B-1
PAGE 1 OF 2
SURFACE ELEV. 127'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0		CL-CH	SILTY CLAY, dark brown (10YR 3/3), 10% fine quartz grains, roots and organic debris, soft, moist.
		50/10"		5			SANDY CLAY, yellow-brown (10YR 5/6), 40% sand, very fine to fine grained, <5% mica quartz and rock fragments, hard, damp.
		27		10			decreasing sand.
		20		15			10% carbonaceous material, silty, moderately plastic, stiff, damp.
	4.0	45		20			interbedded clayey sand lenses, firm, moist
	4.5+	44		25			olive gray (5Y 6/2), with brown (10YR 5/6) mottling, 15% organics, sandy, hard, damp. increased plasticity.
		56		30		SP	Iron (orange) and manganese (black) staining, thin interbedded sand lenses.
	3.75	50		35		CL	SAND, yellow-brown (10YR 5/6), very fine to fine grained, poorly graded, predominantly quartz with <5% mica, very dense, damp.
				40		SP	CLAY, olive (5Y 5/3), iron staining along striations, stiff, damp.

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-1a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-1

PROJECT NAME Buena Vista Landfill — PAGE 2 OF 2

BY WMC DATE 3/22/85 & 3/25/85 — SURFACE ELEV. 127'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		54		40		SP	SAND, yellow-brown (10YR 6/6), very fine grained, poorly graded, few clayey lenses, very dense, damp.
		51		45		CL	CLAY, light yellow brown (2.5Y 6/4), iron staining, sand filled animal burrows, hard, damp. sandy, fine to medium grained.
		50		50		SM-SP	SAND, yellow-brown (10YR 5/8), medium to coarse grained, 5% rounded pebbles ½" in diameter, 30% fines.
		52		55			brownish-gray (2.5YR 6/2), medium grained, very dense, damp.
		51		60			gravelly interbedded clay lenses, light olive (5Y 6/3), sand filled burrows with iron stained contacts.
		66		65			dark yellow-brown (10YR 4/6), fine to medium grained, no clay fines.
		72	▽	70			olive gray (5Y 3/2), alternating silt to coarse grained sand in a fining upward sequence (1" to 2") intervals, wet.
						CL	CLAY, dark gray (2.5Y 4/0), iron staining, stiff, damp.
	2.8			75			TERMINATED BORING AT 76 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-1b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-2

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 3/25/85 — SURFACE ELEV. 123'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				0	CL		CLAY, dark brown (10YR 3/2), silty, damp.
							increasing sand.
		44		5			yellow-brown (10YR 5/4), 30 to 40% very fine to fine quartz and plagioclase grains weathered to white clay, hard, damp.
				10			no sand, slightly silty, damp.
		30		15	SC		CLAYEY SAND, yellow-brown (10YR 5/4), 40% clay fines, 1% plant debris, medium dense, damp.
	3.4	24		20	CH		CLAY, olive gray (5Y 5/2), extensive iron staining along rootholes, <5% sandy, very stiff, damp.
				25	SC		CLAYEY SAND, yellow-brown (10YR 5/6), very fine to fine grained, poorly graded, interbedded clay (extensively oxidized), very dense, damp.
		56		30			
	2.75			35	CH		CLAY, olive - gray (5Y 5/2), minor iron staining, slightly silty, very stiff, damp.
					SC		CLAYEY SAND, brown (10YR 4/3), very fine to fine grained, poorly graded, very dense, damp.
				40			

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-2a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 BORING NO. B-2

PROJECT NAME Buena Vista Landfill PAGE 2 OF 2

BY WMC DATE 3/25/85 SURFACE ELEV. 123'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
		57/8"		40		SC	CLAYEY SAND, (continued)
							decrease in clay content.
				45		SP	SAND, yellow-brown (10YR 5/6), very fine grained, poorly graded, very dense, damp.
				50			BORING TERMINATED AT 51 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-2b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-3

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 129'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						CL	SANDY CLAY, yellow-brown (10YR 5/4), soft, moist.
		62		5		SC	CLAYEY SAND, dark yellow-brown (10YR 4/4), finely laminated, quartz and altered plagioclase grains, very dense, damp.
		40		10			interbedded clay lenses with carbonaceous material, damp.
		28		15		CH	CLAY, olive gray (5Y 4/2), minor gray (5Y 6/1) mottling, slightly sandy, altered plagioclase grains, 1% rock fragments, very stiff, damp.
	2.60	31		20			olive gray (5Y 5/2), orange mottling, very stiff.
				25			
							increasing sandy interbedding.
	4.0	42		30			olive (5Y 5/3).
		68		35		SP	SAND, yellow-brown (10YR 5/6), fine grained, poorly graded, <10% clay fines, very dense, damp.
							interbedded clay lenses, very stiff.
				40			

REMARKS Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-3a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13 — BORING NO. B-3

PROJECT NAME Buena Vista Landfill — PAGE 2 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 129.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40			SAND (continued)
				45			
	4.0/4.5	35		50		CL	CLAY, light olive brown (2.5Y 5/4), thin silty laminations, iron staining along thin fractures, very stiff, damp.
				55		SP	SAND, yellow-brown (10YR 5/4), fine-medium grained, interbedded clay lenses, damp.
		50/5"		60			dark yellow-brown (10YR 3/4), medium-coarse grained, poorly graded, very dense.
							BORING TERMINATED AT 60 FEET.

REMARKS

EMCON ASSOCIATES

PLATE A-3b

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307.01.13 — BORING NO. B-4

PROJECT NAME Buena Vista Landfill — PAGE 1 OF 2

BY WMC DATE 4/10/85 — SURFACE ELEV. 69.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						CH-CL	SANDY CLAY, very dark gray (10YR 3/1), soft, moist.
	1.3	19		5			CLAY, yellow-brown (10YR 5/4), moderately plastic, firm, damp.
	3.0	30		10			very dark gray-brown (10YR 3/2), silty, 5% carbonaceous material.
	2.1	21		15			interbedded sand lenses, very fine grained, predominantly quartz with 10% mica, orange mottling, stiff, clay.
	1.25	20		20			dark gray-brown (10YR 4/2), sandy, decreased plasticity.
	3.5	27		25			yellow-brown (10YR 5/4), 10-15% carbonaceous matter and rootholes.
							increasing sand, very fine grained.
		65		30		SC	CLAYEY SAND, gray-brown (2.5Y 5/2), very fine grained, 20 to 30% clay fines, thin orange laminations, very dense, damp.
		50/4"	▽	35			interbedded poorly graded sand lenses, fine grained, 5% rounded pebbles.
		50/6"		40		GP	SANDY GRAVEL

REMARKS

Boring backfilled with cuttings.

EMCON ASSOCIATES

PLATE A-4a

LOG OF EXPLORATORY BORING

PROJECT NUMBER 307-01.13
PROJECT NAME Buena Vista Landfill
BY WMC DATE 4/10/85

BORING NO. B-4
PAGE 2 OF 2
SURFACE ELEV. 69.0'

TORVANE (TSF)	POCKET PENETROMETER (TSF)	PENETRATION (Blows/Ft.)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
				40		GP	SANDY GRAVEL, dark brown (7.5YR 4/4), 40% medium to coarse sand, 60% fine gravel, very dense, wet.
		50/4"		45			increasing gravel size.
							REFUSAL AT 45 FEET

REMARKS

EMCON ASSOCIATES

PLATE A-4b

ATTACHMENT 2
GEOSYNTEC BORING LOGS

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

PROJECT Northeast Sediment Basin
PROJECT LOCATION Buena Vista Landfill
PROJECT NUMBER WG2562/02

KEY SHEET - CLASSIFICATIONS AND SYMBOLS

GS FORM: 01-KEY/SYMBOLS

EMPIRICAL CORRELATIONS WITH STANDARD PENETRATION RESISTANCE N VALUES *

	N VALUE * (BLOWS/FT)	CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TONS/SQ FT)
FINE GRAINED SOILS	0 - 2	VERY SOFT	<0.25
	3 - 4	SOFT	0.25 - 0.50
	5 - 8	FIRM	0.50 - 1.00
	9 - 15	STIFF	1.00 - 2.00
	16 - 30	VERY STIFF	2.00 - 4.00
	31 - 50	HARD	>4.00
	>50	VERY HARD	

	N VALUE * (BLOWS/FT)	RELATIVE DENSITY
COARSE GRAINED SOILS	0 - 4	VERY LOOSE
	5 - 10	LOOSE
	11 - 30	MEDIUM DENSE
	31 - 50	DENSE
	>50	VERY DENSE

* ASTM D 1586; NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 IN. O.D., 1.4 IN. I.D. SAMPLER ONE FOOT.

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

MAJOR DIVISIONS			SYMBOLS	DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL COARSER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO.4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO.4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL FINER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENT

NOTE: DUAL SYMBOLS USED FOR BORDERLINE CLASSIFICATIONS

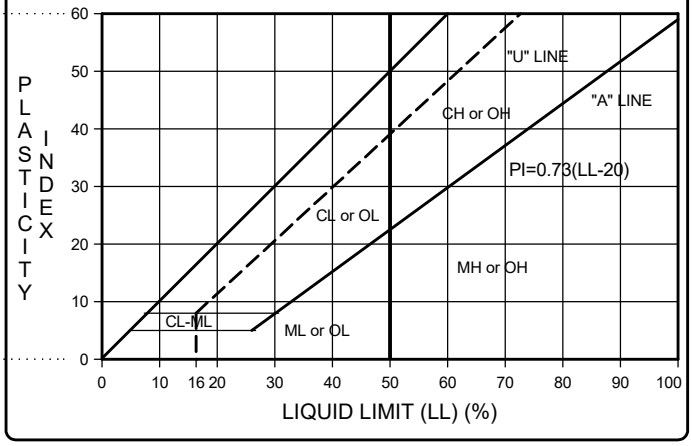
PARTICLE SIZE IDENTIFICATION

USCS (SOILS ONLY) *		SEDIMENTARY (ROCK ONLY)	
BOULDER	>300 mm	BOULDER	>256 mm
COBBLE	75 - 300 mm	COBBLE	64 - 256 mm
GRAVEL: COARSE	20 - 75 mm	PEBBLE	4 - 64 mm
GRAVEL: FINE	4.75 - 20 mm	GRANULE	2 - 4 mm
		SAND: V. COARSE	1 - 2 mm
SAND: COARSE	2 - 4.75 mm	SAND: COARSE	0.5 - 1 mm
SAND: MEDIUM	0.42 - 2 mm	SAND: MEDIUM	0.25 - 0.5 mm
SAND: FINE	0.074 - 0.42 mm	SAND: FINE	0.125 - 0.25 mm
		SAND: V. FINE	0.063 - 0.125 mm
SILT/CLAY	<0.074 mm	SILT	0.004 - 0.063 mm
		CLAY	<0.004 mm

* WELL GRADED - HAVING WIDE RANGE OF GRAIN SIZES AND APPRECIABLE AMOUNTS OF ALL INTERMEDIATE PARTICLE SIZES
* POORLY GRADED - PREDOMINANTLY ONE GRAIN SIZE, OR HAVING A RANGE OF SIZES WITH SOME INTERMEDIATE SIZES MISSING

PERCENTAGE OF PARTICLE TYPE IN DECREASING ORDER OF PARTICLE SIZE (GRAVEL,SAND,FINES)

PLASTICITY CHART



OTHER MATERIAL SYMBOLS

- Conglomerate/ Agglomerate
- Sandstone
- Silty Sandstone
- Clayey Sandstone
- Sandy Siltstone
- Siltstone
- Claystone
- Clayey Siltstone/ Silty Claystone
- Sandy Claystone
- Granitic/Intrusive
- Volcanic/Extrusive
- Metamorphic
- Limestone
- Dolomite
- Glacial Till
- Landslide Debris
- Marker Bed
- Artificial Fill
- Refuse
- Concrete/Asphalt

WELL SYMBOLS

- CONCRETE
- GROUT
- BENTONITE SEAL
- TRANSITION SAND
- SAND/GRAVEL PACK
- NATIVE/SLUFF
- CENTRALIZER

SAMPLE TYPE AND OTHER SYMBOLS

- BULK SAMPLE
- STANDARD PENETRATION TEST
- MODIFIED CALIFORNIA SAMPLE
- PITCHER BARREL
- SHELBY TUBE
- CORE SAMPLE

- Water Level at Time Drilling, or as Shown
- Static Water Level
- Pump Inlet
- Loss of Drilling Fluid
- MSL: Mean Sea Level
- AGS: Above Ground Surface
- BGS: Below Ground Surface
- BTOC: Below Top of Casing
- HSA: Hollow Stem Auger

01-KEY/SYMBOLS BVLF NE SB BORING LOGS 02.18.20.GPJ GEOSNTEC.GDT 2/18/20

Geosyntec consultants
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Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-01 **SHEET** 1 OF 2
START DATE 11/12/2018 8:10:00 AM **ELEVATION DATA**
FINISH DATE 11/12/2018 1:45:00 PM **GROUND SURFACE** 115.3 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	115	Silty SAND (SM): brown, dry to lightly damp, [0,80,20], no plasticity, loose, roots and debris encountered																
	114																	
	113																	
	112									Glass or plastic encountered.								
	111																	
5	110	Sandy Lean CLAY (CL): tan with rust-colored mottling, dry, [0,30,70], low plasticity, very stiff		01-01		8 11 17	28											
	109																	
	108																	
	107																	
	106																	
10	105							27										
	104			01-02														
	103	Color transitioned to yellowish brown																
	102																	
	101	Silty SAND (SM): yellowish brown, damp to wet, [0,70,30], no plasticity, medium dense						50										
15	100			01-03														
	99																	
	98																	
	97	Silty SAND with Gravel (SM): yellowish brown, damp to wet, no plasticity, medium dense				18 15 8	23											
	96			01-04									28.2	56.1	15.7			
20	95																	
	94																	
	93																	
	92																	
	91			01-05		10 14 17	31											
25	90									Gravel >1" observed in cuttings.								
	89																	
	88																	
	87																	
	86																	
30																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11926.38
EASTING: 10950.23
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-01 **SHEET** 2 OF 2
START DATE 11/12/2018 8:10:00 AM **ELEVATION DATA**
FINISH DATE 11/12/2018 1:45:00 PM **GROUND SURFACE** 115.3 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	85	Silty SAND w/ Gravel (SM): yellowish brown, dry to damp, no plasticity, dense.		01-06		13 16 18	34						38.3	42.6	19.1			
5	80	Silty SAND w/ Gravel (SM): olive to gray, damp to moist, [0,80,20], low plasticity.		01-07				73										
10	75	Poorly-graded SAND (SP): brown, dry to damp, [0,90,10], no plasticity.		01-08		7 13 17	30	67										
15	70	Transitioned from rust-colored mottling to gray sand.		01-09		11 16 31	47	83										
20	65	Poorly-graded SAND (SP): gray and brown with rust mottling, moist, [10,80,10], no plasticity, very dense.		01-10		21 42 50/5"		78										
25	60																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11926.38
EASTING: 10950.23
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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Phone: (510) 836-3034
Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-02 **SHEET** 1 OF 2
START DATE 11/12/2018 3:00:00 PM **ELEVATION DATA**
FINISH DATE 11/13/2018 7:00:00 AM **GROUND SURFACE** 120 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	119	Silty Lean CLAY with Gravel (CL): brown, dry, [10,20,70], low plasticity, soft, gravel pieces less than 1" in size								~2" aggregate base at surface									
	118																		
	117																		
	116																		
5	115	Clayey SAND (SC): brown with rust-colored mottling, moist, [0,80,20], low plast, dense		02-01		10 17 25	42	33											
	114																		
	113																		
	112																		
	111																		
10	110	Clayey SAND with Gravel (SC): brown to black with rust-colored mottling, moist, [20,60,20], dense		02-02		9 14 20	34	56											
	109																		
	108																		
	107																		
	106																		
15	105	Less gravel, [10,70,20], dense		02-03		11 15 18	33	67											
	104																		
	103																		
	102																		
	101																		
20	100	More gravel, [20,60,20], medium dense		02-04		7 9 15	24	56											
	99																		
	98																		
	97																		
	96																		
25	95	Less gravel, [10,80,10], medium dense		02-05		11 12 16	28	67											
	94																		
	93																		
	92																		
	91																		
30	90																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12115.01
EASTING: 11028.95
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
1111 Broadway, 6th Fl
Oakland, CA 94607
Phone: (510) 836-3034
Fax: (510) 836-3036

GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-02 **SHEET** 2 OF 2
START DATE 11/12/2018 3:00:00 PM **ELEVATION DATA**
FINISH DATE 11/13/2018 7:00:00 AM **GROUND SURFACE** 120 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	89	Silty SAND (SM-SP): olive brown, damp, [0,90,10], no plasticity, medium dense, no gravel.	02-06		4 7 10	17	61										
	88																
	87																
	86																
35	85	Fines increase to 20%															
	84		02-07		12 10 15	25	89										
	83																
	82																
	81																
40	80	SILT with Sand (ML): olive brown, damp, no to low plasticity, medium dense					70										
	79																
	78		02-08														
	77																
	76																
45	75								Observed gravel in cuttings								
	74		02-09		7 8 15	23	83					0.1	21.7	78.2			
	73																
	72																
	71																
50	70	Silty SAND (SM): olive brown, dry to damp, [0,85,15], nonplastic fines, fine sand															
	69		02-10		12 19 32	51	83										
	68																
	67																
	66																
55	65																
	64																
	63																
	62																
	61																
60	60																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12115.01
EASTING: 11028.95
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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Phone: (510) 836-3034
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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 1 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	118	Sandy Lean CLAY (CL): yellowish brown, dry, [0,20,80], low to medium plasticity, soft, observed organic roots in upper 2"															
5	113	Sandy Lean CLAY (CL): yellowish brown, dry to moist, [5,20,75], low plasticity, very stiff, gravel observed (<1/2")		03-01		17 50/6"		33	08:45								
10	108	Sandy Lean CLAY (CL): yellowish brown, damp, low plasticity, very stiff, no gravel observed		03-02				58	10:15								
	106			03-03		6 8 13	21		10:30			0	30.7	69.3			
15	103	Sandy Lean Clay (CL): yellowish brown with rust-colored mottling, damp, [0,40,60], low plasticity, stiff		03-04				83	11:00								
20	98	Clayey SAND with Gravel (SC): dark brown changes to olive brown, moist, low plasticity, very stiff, observed gravel less than 1/4"		03-05		5 8 11	19	61	11:20			20.9	59.8	19.3			
25	93			03-06		9 6 6	12	83	11:45								
	92	Sandy Lean CLAY (CL): olive changes to yellowish brown, moist, low plasticity, stiff										8	40.8	51.2			
	90	Gravelly SAND (SP): brown, moist, [40,50,10], rounded to subrounded gravel		03-07				67	12:00								
30	89																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

03-GEOTECH2-SCC BVLF NE SB BORING LOGS 02.19.20.GPJ GEOSNTEC.GDT 2/19/20

Geosyntec consultants
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Oakland, CA 94607
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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 2 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
35	83	SILT (ML): olive gray, moist, [0,20,80], no plasticity, dense, no observed gravel		03-08				90	12:45								
40	78	Fat CLAY (CH): olive gray, high plasticity, hard		03-09		13 13 20	33	83	13:30			0	0.6	99.4	64	28	36
45	73	SILT (ML): olive gray, moist, [0,20,80], no plasticity, very dense, no gravel observed		03-10		14 48 50/4"		44	14:00								
50	68	Silty SAND (SM): brown and tan, damp, [0,80,20], no plasticity, very dense, no gravel observed, medium sand.		03-11		28 50/5"		83	14:20								
55	63	Silty SAND with Gravel (SM): brown and dark brown, damp, [10,70,20], no plasticity, very dense, observed <1/4" gravel		03-12		12 35 50/5.5"		83	15:00								
60	59																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

Geosyntec consultants
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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-03 **SHEET** 3 OF 3
START DATE 11/13/2019 8:15:00 AM **ELEVATION DATA**
FINISH DATE 11/13/2018 6:15:00 PM **GROUND SURFACE** 118.7 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 82 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	58	Gravelly SAND (SP): brown and tan, damp, [30,70,0], no plasticity, medium dense, no observed fines		03-13		9 9 10	19	33	15:30									
	57																	
	56																	
	55																	
	54																	
65	53	Sandy GRAVEL (GP): dark brown, [60,30,10], no plasticity, very dense, gravel approximately 1/4-3/4"		03-14		42 50/6"		67	16:00									
	52																	
	51																	
	50																	
	49																	
70	48	Gravelly SAND (SP): brown to dark brown, damp, [30,70,0], no plasticity, very dense		03-15		7 22 46	68	83	16:20									
	47																	
	46																	
	45																	
	44																	
75	43	Silty SAND (SM): olive with rust-color mottling, damp[0,70,30], cemented, dense		03-16		25 25 24	49	67	16:45									
	42																	
	41																	
	40																	
	39																	
80	38	Silty SAND (SM): olive with rust-color mottling, damp, [0,70,30], cemented, very dense		03-17		14 33 50/4"		33	17:30									
	37																	
	36																	
	35																	
	34																	
85	33																	
	32																	
	31																	
	30																	
	29																	
90																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 11987.99
EASTING: 10890.42
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-04 **SHEET** 1 OF 2
START DATE 11/14/2018 7:45:00 AM **ELEVATION DATA**
FINISH DATE 11/14/2018 1:00:00 PM **GROUND SURFACE** 98 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 52 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	97	Silty Lean CLAY (CL): dark brown, dry, [0,20,80], low plasticity, soft, roots observed in upper 1" [FILL]																
5	93	Silty Lean CLAY (CL): olive gray and tan with rust-color mottling, moist, [0,20,80], low plasticity, stiff [FILL]		04-01		7 12 16	28	44	08:45									
10	88	SILT to Silty SAND (ML/SM): olive brown, [0,50,50], damp, low plasticity		04-02				87	09:00									
15	83	Fat CLAY with Sand (CH): greenish gray mottled dark gray, [0,10,90], high plasticity		04-03				87	09:30	15': consolidation test performed. Su=1270 psf, 5% strain, 8 psi confinement, natural water content. Observed gravel in cuttings.	124.7	24				52	18	34
20	78	Fat CLAY (CH): olive brown with rust-color mottling, [0,10,90], high plasticity, stiff		04-04				87	10:00	20': consolidation test performed. Su=2355 psf, 5% strain, 10 psi confinement, natural water content. Su=1018 psf, 5% strain, 10 psi confinement, backpressure saturation.	114.7	37.4				74	31	43
25	73			04-05				83	10:30									
30	68	Silty SAND (SM): brown and tan, [0,80,20], no plasticity, very dense, fine sand		04-06		17 35 50/5"		33	10:45									

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12117.5
EASTING: 10766.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-04 **SHEET** 2 OF 2
START DATE 11/14/2018 7:45:00 AM **ELEVATION DATA**
FINISH DATE 11/14/2018 1:00:00 PM **GROUND SURFACE** 98 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 52 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 6) Plasticity
2) Color 7) Density/Consistency
3) Moisture 8) Other (Mineral Content, Discoloration, Odor, etc.)
4) Grain Size
5) Percentage

COMMENTS
1) Rig Behavior
2) Air Monitoring
3) Pocket Pen
4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	67									Drill rig chattering.								
	66																	
	65																	
	64																	
35	63	Silty SAND with Gravel (SM): brown and black, damp, [20,60,20], no plasticity, very dense, cemented		04-07		23 33 50/5"		78	11:15									
	62																	
	61									Drill rig chattering from 37' to 40'.								
	60																	
	59																	
40	58	Silty SAND with Gravel (SM): brown and black, damp, [10,60,30], dense, finer sand and less gravel		04-08		9 16 26	42	78	11:30									
	57																	
	56																	
	55																	
	54																	
45	53																	
	52	Silty CLAY (CL): olive gray, moist, [0,10,90], low plasticity, very stiff		04-09		22 21 16	37	72	12:00									
	51																	
	50																	
	49																	
50	48	Silty SAND (SM): olive brown, damp, [0,70,30], no plasticity, dense, fine sand		04-10				67	12:15									
	47			04-11		14 18 18	36	78	12:30									
	46																	
	45																	
	44																	
55	43																	
	42																	
	41																	
	40																	
	39																	
60	38																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12117.5
EASTING: 10766.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-05 **SHEET** 1 OF 2
START DATE 11/14/2018 2:00:00 PM **ELEVATION DATA**
FINISH DATE 11/15/2018 10:00:00 AM **GROUND SURFACE** 99.6 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 53.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
	99	Silty Lean CLAY (CL): light brown to brown, dry, [0,20,80], low plasticity, loose, observed roots in top 2". Increasing moisture and sand content with depth. [FILL]																	
	98																		
	97																		
	96																		
5	95																		
	94	Silty SAND (SM): olive brown, dry, [0,70,30], no plasticity, medium dense, fine sand [FILL]		05-01		4 7 9	16	44	15:00										
	93																		
	92																		
	91																		
	90																		
10	89	Sandy Lean CLAY (CL): olive brown mottled gray, moist, moist, [0,30,70], low plasticity [FILL]						87	15:15	10': Su=1685 psf, 5% strain, 6 psi confine, natural water content. Su=1414 psf, 5% strain, 6 psi confine, backpressure saturation.									
	88			05-02							122.8	23.4				33	17	16	
	87																		
	86																		
	85																		
15	84	Sandy Lean CLAY (CL): olive brown, moist, [0,10,90], low plasticity						87	15:30	15': Su=1710 psf, 5% strain, 8 psi confine, natural water content.									
	83			05-03							120.5	26.4				48	20	28	
	82																		
	81																		
	80																		
20	79	Sandy Lean CLAY (CL): olive brown, moist, [0,20,80], low to medium plasticity, soft to stiff in zones						87	15:50	Vary zones of stiffness from 20-22.5', rounded gravel between 1/8" and 1/4" observed.									
	78			05-04															
	77																		
	76																		
	75																		
25	74	Fat CLAY (CH): olive brown, [0,70,30], high plasticity, very stiff				5 10 10	20	50	16:15				0.1	0.7	99.2	71	28	43	
	73			05-05															
	72																		
	71							100	06:45										
	70	Silty SAND (SM): tan to light brown with rust-color mottling, moist, [0,70,30], nonplastic		05-06															
30																			

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12043.2
EASTING: 10736.99
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-05 **SHEET** 2 OF 2
START DATE 11/14/2018 2:00:00 PM **ELEVATION DATA**
FINISH DATE 11/15/2018 10:00:00 AM **GROUND SURFACE** 99.6 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 53.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION (1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS (1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
35	69																		
	68	Silty SAND (SM): tan to light brown, dry to damp, [0,80,20], very dense, nonplastic		05-07		21 48 50/5"		33	07:45										
	67																		
	66																		
	65																		
35	64																		
	63																		
	62	More sand, [0,90,10]		05-08		14 23 30	53	78	08:15										
	61																		
40	60																		
	59																		
	58																		
	57	Silty SAND with Gravel (SM): tan and brown, damp, [10,80,10], dense, nonplastic, rounded rocks ~1", angular gravel		05-09		18 33 36	69	78	08:35										
	56																		
	55																		
45	54																		
	53																		
	52	Dense, more gravel		05-10		22 15 36	51	72	09:00										
	51																		
50	50																		
	49																		
	48																		
	47			05-11		15 21 22	43	67	09:20										
	46	Clayey SAND with Gravel (SC): grayish brown, damp, [10,50,40], low plasticity fines, dense, cemented																	
55	45																		
	44																		
	43																		
	42																		
	41																		
60	40																		

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12043.2
EASTING: 10736.99
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

03-GEOTECH2-SCC BVLF NE SB BORING LOGS 02.19.20.GPJ GEOSNTEC.GDT 2/19/20

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-06 **SHEET** 1 OF 2
START DATE 11/15/2018 11:15:00 AM **ELEVATION DATA**
FINISH DATE 11/15/2018 4:35:00 PM **GROUND SURFACE** 120.1 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	COMMENTS	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	120	Clayey SAND (SC): yellowish brown, dry, [0,70,30], low plasticity, fine sand								2" aggregate base on surface. Top surface smoothed by loader to provide access for drill rig.								
5	115	Clayey SAND (SC): yellowish brown, low plasticity, medium dense		06-01		4 6 9	15	44	12:00				0.9	63.1	36			
10	110	Clayey SAND (SC): yellowish brown, moist, [0,70,30], medium dense		06-02		4 9 9	18	50	12:20									
15	105			06-03		5 9 7	16		12:35				0	60.6	39.4			
20	100	Silty SAND (SM): light brown to brown, moist, [0,85,15], nonplastic		06-04				0	12:50									
25	95	Silty SAND with Gravel (SM): light brown to brown, [10,60,30], nonplastic, medium dense, observed gravel <1/4"		06-05		9 10 10	20	67	13:15	Drill rig chattering								
30	90																	

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12114.08
EASTING: 10898.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

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GS FORM: GEOTECH2-SCC

BOREHOLE LOG

BORING GT18-06 **SHEET** 2 OF 2
START DATE 11/15/2018 11:15:00 AM **ELEVATION DATA**
FINISH DATE 11/15/2018 4:35:00 PM **GROUND SURFACE** 120.1 ft
LOCATION Buena Vista Landfill **DATUM**
PROJECT Northeast Sediment Basin **TOTAL DEPTH** 51.5 ft bgs
PROJECT NUMBER WG2562/02 **DEPTH TO WATER** N/E

DESCRIPTION
1) Soil Name (USCS) 2) Color 3) Moisture 4) Grain Size 5) Percentage 6) Plasticity 7) Density/Consistency 8) Other (Mineral Content, Discoloration, Odor, etc.)

COMMENTS
1) Rig Behavior 2) Air Monitoring 3) Pocket Pen 4) Tor Vane

DEPTH (ft-bgs)	ELEVATION (ft)	DESCRIPTION	GRAPHIC LOG	SAMPLE NO.	TYPE	BLOWS PER 6"	N VALUE	RECOVERY (%)	TIME (00:00)	WET DENSITY (pcf)	WATER CONTENT (%)	PERCENT GRAVEL (%)	PERCENT SAND (%)	PERCENT FINES (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX
0	89	Clayey SAND (SC): dark brown, medium dense		06-06		7 8 10	18		13:45			10.9	73.8	15.3			
5	88																
10	87																
15	86																
20	85							47	14:15								
25	84			06-07													
30	83																
35	82																
40	81	SILT (ML): grayish brown with rust-color mottling, moist, [0,10,90], low plasticity, medium stiff		06-08		5 8 8	16	100	14:40								
45	80																
50	79			06-09				40	14:55								
55	78																
60	77																
65	76																
70	75																
75	74																
80	73																
85	72																
90	71																
95	70	Silty SAND (SM): brown and tan, dry to damp, [0,80,20], nonplastic, very dense		06-10		17 33 48	81		15:30								
100	69																
105	68																
110	67																
115	66																
120	65																
125	64																
130	63																
135	62																
140	61																
145	60																

CONTRACTOR: Pitcher Drilling Co
EQUIPMENT: Failing 1500 (PD59)
DRILL MTHD: Mud Rotary
HAMMER TYPE: Automatic
BOREHOLE DIAMETER: 5

NORTHING: 12114.08
EASTING: 10898.48
COORDINATE SYSTEM:

LOGGER K. Chan **REVIEWER** F. Settepani

NOTES:
1. Groundwater was not encountered during drilling.
2. Grain size and percentage in the material descriptions are based on visual observations.

SEE KEY SHEET FOR SYMBOLS AND ABBREVIATIONS

ATTACHMENT 3
ENERGY MEASUREMENTS

November 15, 2018

Geosyntec Consultants
Attn: Fabrizio Settepani

Re: Standard Penetration Energy Measurements
Automatic Hammer on Mud Rotary Drill Rig, PD-59
Buena Vista Landfill Northeast Sediment Basin Project Area, Boring GT18-03

Dear Mr.Settepani,

This report offers results of energy measurements and related calculations made on November 13, 2018 during Standard Penetration Testing (SPT) and sampling on Pitcher Drilling's mud rotary drill rig. Dynamic tests were performed on an instrumented section of NWJ drill rod attached to the sampler rod string. All dynamic measurements were obtained and recorded using a SPT Analyzer®.

Average Energy for 140lb hammer: 81%
Average Energy for 300lb hammer: 87%

Depth (bgs-ft)	Sampler	Hammer Weight (lb)	Avg ETR (%)
5	SPT	140	75.8
12	Mod Cal	300	85.9
20	Mod Cal	300	88.1
25	Mod Cal	300	85.1
40	SPT	140	84.3
45	SPT	140	81.5
50	Mod Cal	300	86.5
55	Mod Cal	300	86.7
60.5	Mod Cal	300	87.6
65	Mod Cal	300	86.8
70	Mod Cal	300	86.2
75	SPT	140	82.8
80.5	SPT	140	80.3

Note: If the SPT Analyzer did not measure all blows for a sample depth, the reported blow count and therefore calculated N60 value in the following tables will be incorrect. Often blows are excluded from calculations if the sensors are loose or have drifted from the baseline. Field records of actual blow count values should be used in place of the blow counts shown in the following tables.

Equipment:

SPT energy measurements were made on SPT and Modified California samplers driven by the hammer/anvil system on the Pitcher Drilling drill rig on November 13, 2018. The rig was tested on the Buena Vista Landfill Project area. In total, 13 energy measurements were collected corresponding to 13 different samples at increasing depth.

Gregg used a SPT Analyzer (SPTA) to acquire and process measurements of force and velocity with every impact of the automatic hammer on the sample rods. Gregg follows the procedure outlined in ASTM D4633. Two strain gauges mounted on a two foot section of NWJ rod measured force, while two piezoresistive accelerometers bolted on the same rod measured acceleration. The gauges were mounted approximately 6" from the top of the rod.
Analog signals from the gauges and accelerometers were collected, digitized, displayed in real-time, and stored by the SPTA. Selected output from the SPTA for each recorded impact of the hammer included:

- Maximum force in the rod (FMX)
- Maximum velocity in the rod (VMX)
- Maximum calculated transferred energy (EFV)
- Blows per minute (BPM)
- Energy transferred to the rods (ETR)

Data and Calculations:

The purpose of testing was to measure the energy transferred from the hammer to the drill rod and to calculate the energy efficiency of the hammer. The SPTA measurements of force and velocity were reviewed after field testing and analyzed to calculate the transferred energy (EFV).

The maximum energy transferred past the gauge location, EFV, is computed by the SPTA using force (F) and velocity (V) records as follows:

$$EMX = \int_a^b F(t)\, V(t)\, dt$$

The time "a" corresponds to the start of the record when the energy transfer begins and "b" is the time at which energy transferred to the rod reaches a maximum value. The energy transferred is defined as ETR, and is usually used to define the efficiency of the hammer/anvil system.

Results:

Tables for each sample depth summarize the average calculated energies for each sample tested as well as the details for each sample. It is shown that the overall average (ETR) energy for this system is 81% for the 140lb hammer and 87% for the 300lb hammer. The Summary of SPT Test Results table at the end provides a summary of all the samples tested at each sampling depth. The plots and tables present selected measured and calculated results as a function of blow number. The results include:

- the blow number
- BC (blow count in feet) *NOTE: This is calculated by dividing the number of blows for each 6" of penetration by the 6" depth interval and is therefore only approximate. If some blows were deleted due to erroneous or poor data, the penetration depths are not correct.
- FMX (maximum rod force)
- VMX (maximum rod velocity)
- BPM (blows per minute)
- EFV (energy using the Force Velocity method in ft-lbs)
- ETR (energy transferred as a percentage of maximum)

At the end of each table is a statistical evaluation of the results for each variable including the average, standard deviation, maximum, minimum and what blow number these maximums and minimums occurred.

If you have any questions or comments on this report, please do not hesitate to call our office at (562) 427-6899.

Sincerely,

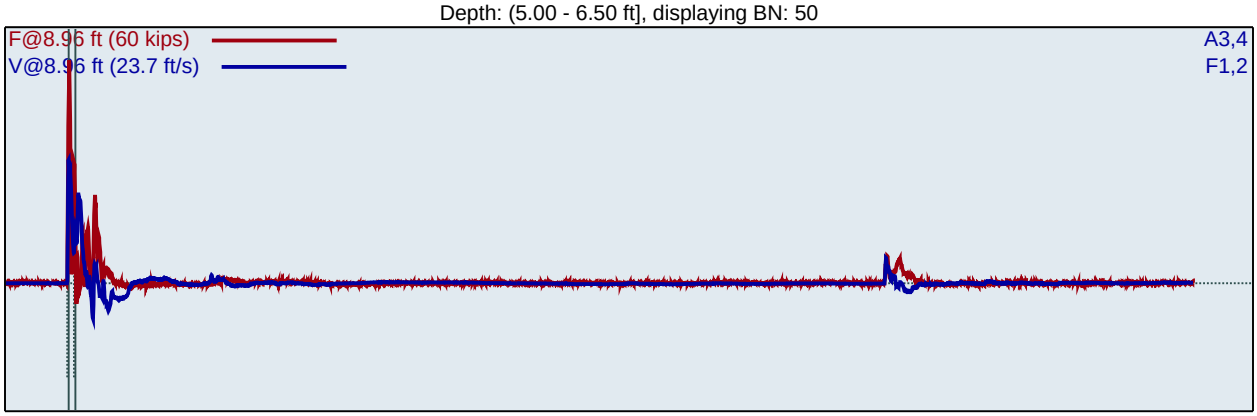
Kelly Cabal

Kelly Cabal
Data Management & Communications
Gregg Drilling, LLC

Appendix A

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 8.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (5.00 - 6.50 ft], displaying BN: 50



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 348 mv/6.4v/5000g (1) VF1
A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
1	2	42	13.4	1.9	303	86.6
2	2	50	13.1	1.9	288	82.2
3	50	50	12.2	37.3	254	72.7
4	50	50	11.8	37.8	257	73.4
5	50	51	11.5	37.6	264	75.5
6	50	52	11.4	37.8	268	76.6
7	50	52	11.1	37.7	271	77.3
8	50	51	11.2	37.8	263	75.1
9	50	52	11.4	37.9	271	77.5
10	50	51	10.8	37.8	251	71.8
11	50	51	11.4	37.9	262	74.9
12	50	53	11.6	37.8	269	76.8
13	50	52	11.4	37.8	267	76.2
14	50	52	11.0	37.8	261	74.6
15	50	51	11.0	37.8	259	73.9
16	50	52	11.2	37.8	267	76.2
17	50	52	11.6	37.7	269	76.9
18	50	51	11.2	37.9	265	75.7
19	50	52	11.4	37.8	267	76.2
20	50	50	11.0	37.9	256	73.0
21	50	52	11.5	38.0	264	75.4
22	50	52	11.3	37.9	261	74.6
23	50	52	11.5	37.8	264	75.4
24	50	52	11.4	37.9	267	76.1
25	50	52	11.4	37.8	271	77.5
26	50	52	11.3	37.9	262	75.0
27	50	52	11.3	37.9	264	75.6
28	50	52	11.4	37.8	264	75.5
29	50	52	11.3	37.9	260	74.3

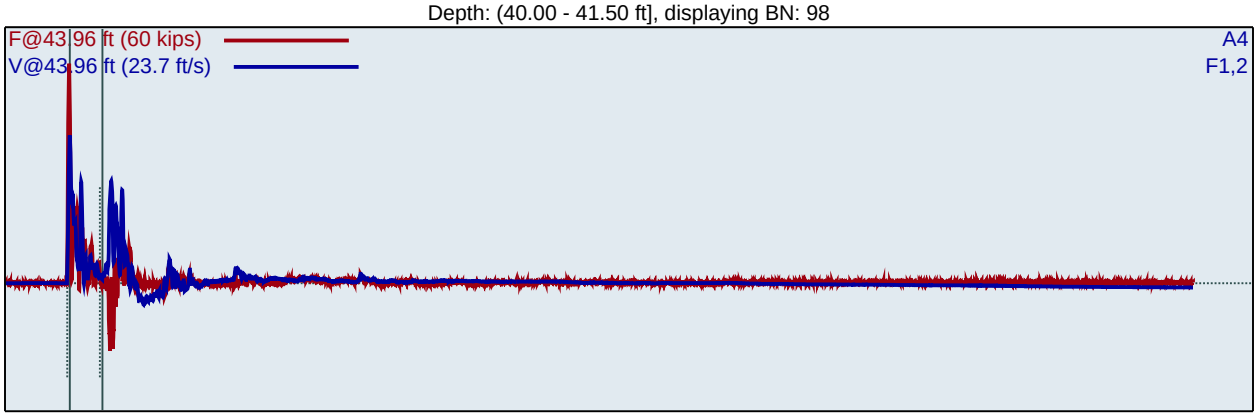
30	50	52	11.4	37.8	265	75.7
31	50	52	11.5	37.9	266	76.0
32	50	52	11.4	37.8	266	76.1
33	50	52	11.3	38.0	266	76.1
34	50	52	11.4	38.0	267	76.4
35	50	52	11.5	37.8	265	75.8
36	50	51	11.1	37.9	262	74.7
37	50	51	11.2	37.9	264	75.4
38	50	52	11.4	37.9	269	77.0
39	50	51	11.3	37.9	268	76.6
40	50	52	11.1	38.0	262	75.0
41	50	52	11.3	37.9	265	75.8
42	50	52	11.4	38.1	263	75.2
43	50	51	10.9	37.8	259	74.1
44	50	52	11.3	38.0	262	74.9
45	50	52	11.4	37.8	261	74.6
46	50	52	11.1	37.9	263	75.1
47	50	52	11.2	38.0	263	75.1
48	50	51	11.2	37.8	263	75.2
49	50	52	11.3	38.0	264	75.4
50	50	52	11.4	38.0	266	76.1
51	50	53	11.5	37.9	271	77.4
52	50	53	11.6	38.0	269	76.8
	Average	52	11.3	37.8	264	75.5
	Std Dev	1	0.2	0.1	4	1.2
	Maximum	53	12.2	38.1	271	77.5
	Minimum	50	10.8	37.3	251	71.8

N-value: 50

Sample Interval Time: 110.70 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 43.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (40.00 - 41.50 ft], displaying BN: 98



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
55	13	51	12.2	38.5	294	84.0
56	13	52	12.8	38.2	299	85.5
57	13	52	12.4	38.1	299	85.6
58	13	51	11.8	38.0	296	84.7
59	13	53	12.0	38.1	296	84.6
60	13	52	12.1	38.0	295	84.4
61	13	52	12.2	38.0	298	85.0
62	13	52	12.0	38.1	299	85.5
63	13	52	12.9	38.1	297	84.9
64	13	52	12.5	38.1	299	85.6
65	13	52	12.8	38.2	301	86.1
66	13	51	13.4	38.1	300	85.7
67	13	52	12.5	38.2	295	84.3
68	13	52	12.2	38.1	294	84.1
69	13	52	12.6	38.3	299	85.6
70	13	53	13.4	38.1	299	85.3
71	13	52	13.6	38.3	297	84.8
72	13	52	12.6	38.2	299	85.5
73	13	53	13.1	38.2	300	85.8
74	13	53	13.8	38.2	301	85.9
75	13	52	13.6	38.1	304	87.0
76	13	52	13.3	38.2	303	86.4
77	13	52	13.2	38.4	302	86.2
78	13	52	12.6	38.2	299	85.4
79	13	52	12.6	38.3	301	86.0
80	13	52	13.4	38.4	297	84.7
81	20	53	12.9	38.1	293	83.7
82	20	52	12.9	38.3	295	84.2
83	20	52	12.8	38.3	294	83.9
84	20	52	12.7	38.2	288	82.3
85	20	52	12.2	38.3	287	81.9
86	20	53	12.6	38.2	294	83.9

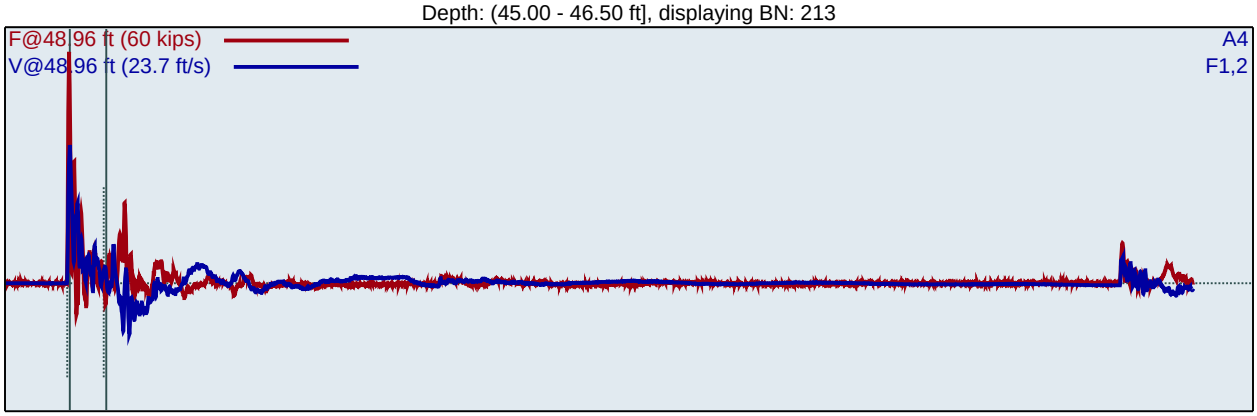
87	20	53	13.0	38.3	293	83.6
88	20	52	12.9	38.2	292	83.3
89	20	52	12.6	38.2	286	81.8
90	20	51	11.8	38.2	284	81.2
91	20	51	13.1	38.1	296	84.5
92	20	53	13.5	38.4	296	84.5
93	20	53	13.4	38.4	292	83.3
94	20	52	12.9	38.2	291	83.2
95	20	52	13.1	38.3	293	83.8
96	20	52	13.5	38.2	292	83.4
97	20	52	13.9	38.4	292	83.4
98	20	51	13.7	38.3	299	85.3
99	20	52	13.8	38.3	300	85.6
100	20	52	13.5	38.4	287	82.1
	Average	52	13.1	38.3	295	84.3
	Std Dev	1	0.5	0.1	5	1.4
	Maximum	53	13.9	38.4	304	87.0
	Minimum	51	11.8	38.1	284	81.2

N-value: 33

Sample Interval Time: 70.75 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 48.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (45.00 - 46.50 ft], displaying BN: 213



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
104	14	54	12.1	37.6	286	81.6
105	14	54	12.1	37.7	289	82.6
106	14	54	12.0	37.8	284	81.2
107	14	54	12.1	37.6	286	81.8
108	14	53	11.8	37.5	284	81.2
109	14	53	12.1	37.5	285	81.6
110	14	53	11.7	37.8	280	80.0
111	14	53	12.0	37.7	279	79.8
112	14	53	11.9	37.8	290	82.9
113	14	54	12.1	37.8	288	82.3
114	14	54	12.3	38.0	281	80.2
115	14	53	11.8	37.8	283	80.8
116	14	54	12.3	37.5	281	80.3
117	14	53	12.5	37.4	286	81.8
118	48	54	12.8	37.6	279	79.8
119	48	54	12.1	37.7	280	80.1
120	48	53	11.8	37.5	280	80.1
121	48	54	12.1	37.4	281	80.2
122	48	53	12.1	37.7	290	82.8
123	48	53	12.3	37.5	284	81.0
124	48	53	12.4	37.5	279	79.7
125	48	52	12.7	37.5	281	80.2
126	48	53	12.5	37.6	286	81.7
127	48	53	12.8	37.6	280	80.0
128	48	53	12.9	37.5	286	81.8
129	48	53	12.8	37.5	288	82.2
130	48	53	13.1	37.6	293	83.7
131	48	53	13.0	37.7	288	82.4
132	48	53	12.7	37.5	288	82.3
133	48	52	12.9	37.5	292	83.5
134	48	53	12.7	37.4	286	81.8
135	48	54	12.6	37.5	288	82.4

136	48	54	12.2	37.6	278	79.4
137	48	54	12.3	37.7	281	80.4
138	48	54	12.5	37.7	278	79.4
139	48	54	12.6	37.5	282	80.6
140	48	54	12.3	37.4	288	82.3
141	48	54	12.5	37.7	273	78.1
142	48	54	12.2	37.6	286	81.8
143	48	54	12.2	37.7	285	81.4
144	48	54	12.4	37.6	283	81.0
145	48	53	12.8	37.7	286	81.7
146	48	54	12.2	37.9	282	80.6
147	48	54	12.1	37.6	281	80.2
148	48	54	12.3	37.8	288	82.4
149	48	55	12.5	37.7	289	82.7
150	48	54	12.4	37.9	283	80.9
151	48	55	13.0	37.8	289	82.5
152	48	55	12.6	37.9	287	82.1
153	48	55	12.5	37.9	289	82.6
154	48	55	12.7	37.7	293	83.7
155	48	54	12.4	37.7	286	81.8
156	48	53	12.2	37.9	283	80.8
157	48	54	12.3	37.8	279	79.7
158	48	54	12.2	38.0	281	80.4
159	48	53	11.9	37.8	271	77.6
160	48	53	12.2	37.7	282	80.5
161	48	54	12.6	37.7	282	80.5
162	48	54	12.7	37.8	283	80.8
163	48	55	12.6	37.7	284	81.2
164	48	54	12.5	37.7	282	80.4
165	48	53	12.4	37.7	289	82.6
166	50	55	12.3	37.6	283	80.9
167	50	54	12.6	37.5	284	81.1
168	50	54	12.5	37.2	280	80.1
169	50	54	12.6	37.6	287	81.9
170	50	55	12.4	37.9	285	81.5
171	50	54	12.2	37.8	283	81.0
172	50	54	12.2	37.8	283	81.0
173	50	54	12.3	37.9	274	78.4
174	50	54	12.1	37.9	280	79.9
175	50	54	12.3	37.7	282	80.5
176	50	54	12.1	37.7	287	82.0
177	50	54	12.1	37.7	285	81.3
178	50	54	12.4	37.7	295	84.2
179	50	54	12.1	37.7	284	81.0
180	50	54	12.2	37.8	282	80.6
181	50	54	12.4	37.9	285	81.5
182	50	55	12.7	37.8	291	83.0
183	50	54	12.6	37.9	288	82.3
184	50	54	12.7	37.7	290	82.9
185	50	55	12.5	37.7	287	82.0
186	50	54	12.7	37.9	296	84.5
187	50	54	12.4	37.9	283	81.0
188	50	55	12.5	37.7	289	82.6
189	50	55	12.4	37.9	289	82.7
190	50	54	12.2	38.0	285	81.3
191	50	55	12.4	37.8	286	81.7
192	50	54	12.6	37.8	305	87.1
193	50	55	12.4	37.8	287	82.0
194	50	55	12.4	37.8	286	81.7
195	50	55	12.5	37.8	289	82.4
196	50	55	12.4	38.0	294	84.0

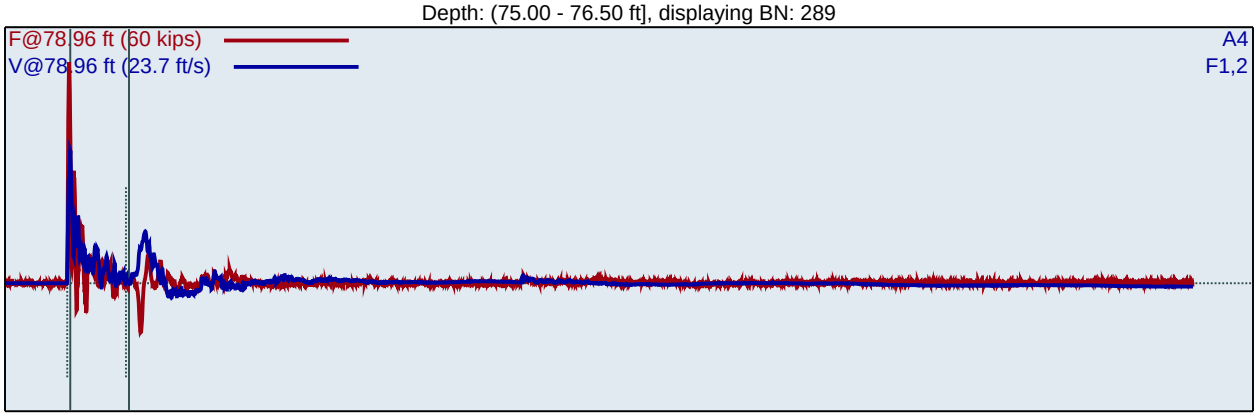
197	50	56	12.0	38.0	286	81.8
198	50	54	12.1	37.8	281	80.4
199	50	54	12.4	37.6	285	81.5
200	50	54	12.6	37.8	287	82.1
201	50	55	12.7	37.8	288	82.2
202	50	55	12.6	37.9	289	82.6
203	50	54	12.6	37.9	286	81.6
204	50	54	12.3	37.9	282	80.5
205	50	54	12.4	38.0	285	81.3
206	50	54	12.6	38.0	286	81.7
207	50	55	12.5	37.9	288	82.2
208	50	53	12.5	38.1	287	82.1
209	50	54	12.5	37.9	286	81.6
210	50	53	12.5	37.8	290	82.9
211	50	54	12.9	37.8	290	82.7
212	50	55	12.9	37.9	279	79.8
213	50	54	12.8	38.1	287	81.9
214	50	55	12.8	37.8	285	81.4
215	50	55	12.7	37.8	285	81.6
	Average	54	12.5	37.7	285	81.5
	Std Dev	1	0.3	0.2	5	1.4
	Maximum	56	13.1	38.1	305	87.1
	Minimum	52	11.8	37.2	271	77.6

N-value: 98

Sample Interval Time: 176.61 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 78.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (75.00 - 76.50 ft], displaying BN: 289



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
218	25	52	11.9	37.8	290	82.8
219	25	49	12.2	37.9	286	81.8
220	25	54	11.3	37.7	293	83.8
221	25	53	11.6	37.8	293	83.6
222	25	53	11.7	37.8	294	83.9
223	25	53	12.1	37.8	293	83.6
224	25	54	11.6	37.8	294	84.0
225	25	54	11.6	37.8	292	83.5
226	25	53	11.8	37.7	295	84.2
227	25	54	11.6	37.7	291	83.2
228	25	53	11.7	37.7	294	84.0
229	25	54	11.5	37.8	289	82.6
230	25	53	11.4	37.8	289	82.7
231	25	54	11.5	37.6	289	82.7
232	25	53	11.5	37.7	295	84.3
233	25	54	11.4	37.7	287	82.0
234	25	53	11.9	37.7	293	83.6
235	25	53	11.9	37.8	294	84.1
236	25	54	11.6	37.7	292	83.3
237	25	54	11.4	37.7	292	83.4
238	25	54	11.5	37.8	287	82.1
239	25	53	11.5	37.9	292	83.6
240	25	54	11.6	37.7	291	83.3
241	25	54	11.1	37.7	290	82.8
242	25	53	11.7	37.6	285	81.4
243	25	54	11.4	37.8	292	83.4
244	25	53	11.1	37.6	286	81.8
245	25	53	11.3	37.5	290	83.0
246	25	53	11.6	37.6	294	84.1
247	25	54	11.1	37.6	290	82.8
248	25	53	11.3	37.5	289	82.5
249	25	53	11.8	37.7	298	85.1

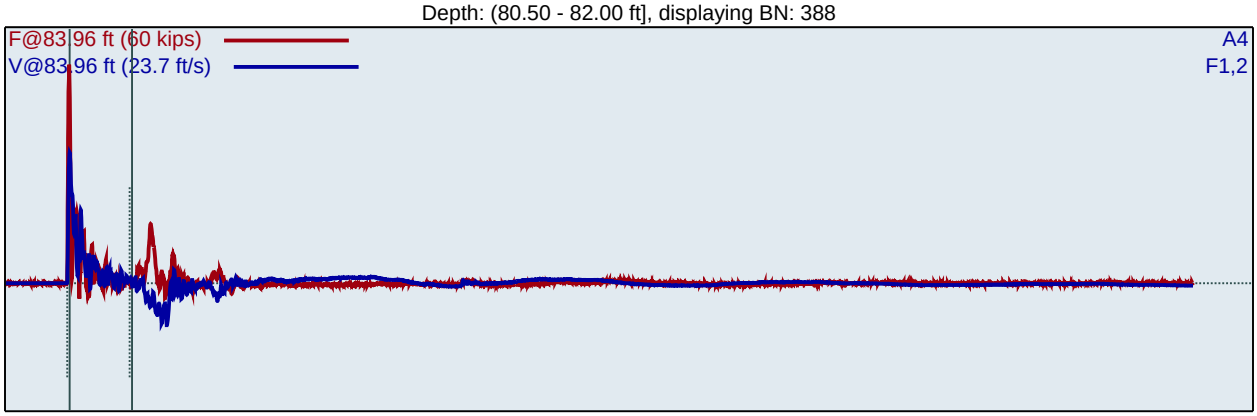
250	25	53	11.2	37.7	289	82.5
251	25	53	11.2	37.7	289	82.6
252	25	53	11.1	37.5	288	82.3
253	25	53	10.9	37.7	286	81.8
254	25	53	11.3	37.8	288	82.2
255	25	53	11.0	37.6	284	81.3
256	25	54	11.1	37.7	288	82.4
257	25	53	11.1	37.6	288	82.2
258	25	53	11.1	37.7	290	82.8
259	25	54	11.2	37.7	294	83.9
260	25	53	10.9	37.6	285	81.4
261	25	53	11.5	37.6	295	84.3
262	25	53	11.2	37.7	290	82.9
263	25	54	11.3	37.6	292	83.6
264	25	50	12.2	37.7	286	81.7
265	25	53	11.3	37.6	286	81.7
266	25	53	11.8	37.5	293	83.7
267	25	53	11.7	37.5	288	82.2
268	24	54	11.3	37.5	289	82.6
269	24	54	11.2	37.5	284	81.1
270	24	50	12.3	37.8	282	80.6
271	24	54	10.9	37.5	288	82.3
272	24	53	11.7	37.6	292	83.5
273	24	54	11.1	37.6	291	83.0
274	24	54	11.6	37.7	296	84.5
275	24	53	11.0	37.5	291	83.2
276	24	51	12.4	37.7	290	82.7
277	24	54	11.7	37.4	299	85.4
278	24	51	12.1	37.7	287	82.0
279	24	54	11.4	37.6	294	83.9
280	24	54	11.3	37.7	290	82.8
281	24	51	12.4	37.6	290	82.9
282	24	54	11.4	37.6	292	83.4
283	24	52	12.3	37.8	292	83.5
284	24	52	12.4	37.6	295	84.4
285	24	54	11.3	37.6	292	83.6
286	24	51	12.2	37.8	288	82.4
287	24	50	12.5	37.5	288	82.3
288	24	54	11.6	37.6	291	83.2
289	24	52	12.3	37.7	290	82.9
290	24	54	11.5	37.6	286	81.8
291	24	54	11.4	37.6	285	81.6
	Average	53	11.5	37.6	290	82.8
	Std Dev	1	0.5	0.1	4	1.0
	Maximum	54	12.5	37.8	299	85.4
	Minimum	50	10.9	37.4	282	80.6

N-value: 49

Sample Interval Time: 116.30 seconds.

PD59 5
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 83.96 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (80.50 - 82.00 ft], displaying BN: 388



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
294	14	51	11.5	36.8	283	80.9
295	14	50	11.4	36.9	279	79.7
296	14	50	11.1	37.1	282	80.6
297	14	50	11.6	37.1	276	78.8
298	14	50	11.5	36.9	280	80.1
299	14	50	11.6	37.2	285	81.5
300	14	50	11.9	37.2	284	81.2
301	14	49	11.4	37.2	271	77.6
302	14	50	11.6	36.9	280	80.1
303	14	50	11.6	37.2	277	79.2
304	14	49	11.4	37.0	276	78.9
305	14	50	11.6	37.3	279	79.7
306	14	50	12.0	37.2	290	83.0
307	14	50	11.5	37.2	272	77.6
308	33	51	12.2	37.2	288	82.2
309	33	51	12.0	37.4	284	81.1
310	33	48	11.4	37.3	275	78.7
311	33	50	11.9	37.3	284	81.0
312	33	49	11.5	37.2	272	77.6
313	33	50	11.7	37.3	274	78.2
314	33	50	11.7	37.3	276	79.0
315	33	50	12.0	37.4	278	79.5
316	33	51	11.8	37.1	283	80.9
317	33	51	11.8	37.4	281	80.2
318	33	48	11.2	37.3	271	77.5
319	33	51	12.0	37.3	284	81.1
320	33	50	11.7	37.4	281	80.3
321	33	51	11.8	37.3	282	80.6
322	33	50	11.7	37.3	279	79.7
323	33	51	11.5	37.3	285	81.3
324	33	49	11.3	37.3	273	78.1
325	33	51	11.7	37.2	280	79.9

326	33	52	12.4	37.4	286	81.8
327	33	51	12.0	37.2	282	80.5
328	33	51	11.8	37.3	280	80.0
329	33	51	12.2	37.2	283	80.9
330	33	51	12.2	37.4	282	80.6
331	33	52	12.4	37.4	282	80.6
332	33	51	11.7	37.4	277	79.0
333	33	50	11.7	37.4	275	78.4
334	33	51	12.0	37.4	281	80.2
335	33	51	11.9	37.3	281	80.4
336	33	51	12.0	37.3	281	80.3
337	33	51	11.9	37.3	282	80.7
338	33	51	12.1	37.3	281	80.4
339	33	51	11.9	37.3	282	80.7
340	33	51	11.9	37.2	285	81.4
341	50	51	11.9	37.4	280	80.1
342	50	51	11.9	37.4	282	80.6
343	50	51	12.3	37.4	284	81.3
344	50	51	12.0	37.5	282	80.5
345	50	51	11.9	37.3	280	79.9
346	50	50	11.7	37.4	278	79.6
347	50	51	12.6	37.4	287	82.0
348	50	51	12.5	37.3	281	80.2
349	50	51	12.0	37.4	282	80.4
350	50	51	12.1	37.4	284	81.1
351	50	51	11.8	37.5	277	79.2
352	50	51	12.0	37.5	284	81.2
353	50	51	11.9	37.5	281	80.3
354	50	50	11.7	37.3	276	78.9
355	50	51	12.2	37.5	285	81.4
356	50	51	11.8	37.4	277	79.1
357	50	51	12.0	37.5	280	79.9
358	50	51	12.0	37.4	281	80.3
359	50	51	12.1	37.4	282	80.7
360	50	51	12.4	37.4	284	81.2
361	50	52	12.3	37.4	285	81.4
362	50	51	12.1	37.4	280	80.1
363	50	52	12.2	37.4	280	80.0
364	50	51	11.9	37.4	282	80.6
365	50	49	11.7	37.5	279	79.6
366	50	50	12.1	37.4	282	80.4
367	50	51	12.0	37.4	280	80.0
368	50	49	11.8	37.4	277	79.1
369	50	51	12.2	37.3	281	80.3
370	50	51	12.3	37.3	283	80.7
371	50	51	12.3	37.5	284	81.0
372	50	51	12.3	37.5	283	80.9
373	50	51	12.1	37.4	284	81.1
374	50	50	12.1	37.6	280	80.1
375	50	51	12.0	37.4	280	80.0
376	50	51	12.6	37.4	286	81.8
377	50	49	11.5	37.4	276	78.7
378	50	50	11.8	37.5	276	78.9
379	50	51	12.0	37.3	281	80.4
380	50	51	12.7	37.5	288	82.2
381	50	50	11.9	37.3	278	79.4
382	50	51	12.3	37.5	284	81.1
383	50	51	12.1	37.5	284	81.2
384	50	51	12.2	37.4	282	80.7
385	50	51	12.1	37.6	285	81.6
386	50	51	12.1	37.4	282	80.5

387	50	52	12.3	37.6	282	80.7
388	50	51	12.1	37.5	283	81.0
389	50	52	12.2	37.4	288	82.3
390	50	51	11.9	37.4	280	79.9
	Average	51	12.0	37.4	281	80.3
	Std Dev	1	0.3	0.1	3	1.0
	Maximum	52	12.7	37.6	288	82.3
	Minimum	48	11.2	37.1	271	77.5

N-value: 83

Sample Interval Time: 154.24 seconds.

Summary of SPT Test Results

Project: PD59, Test Date: 11/13/18

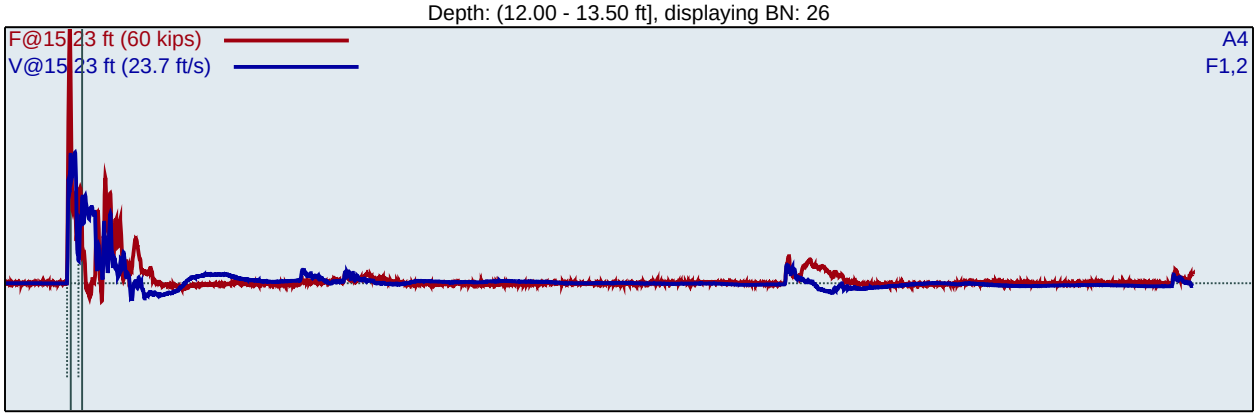
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
8.96	**2-50-0**	**50**	**67**	52	11.3	37.8	264	75.5
43.96	**13-13-20**	**33**	**44**	52	13.1	38.3	295	84.3
48.96	**14-48-50**	**98**	**131**	54	12.5	37.7	285	81.5
78.96	**25-25-24**	**49**	**65**	53	11.5	37.6	290	82.8
83.96	**14-33-50**	**83**	**111**	51	12.0	37.4	281	80.3
		Overall Average Values:		52	12.1	37.7	283	80.7
		Standard Deviation:		2	0.6	0.3	10	2.8
		Overall Maximum Value:		56	13.9	38.4	305	87.1
		Overall Minimum Value:		48	10.8	37.1	251	71.8

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 15.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (12.00 - 13.50 ft], displaying BN: 26



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
2	6	61	13.0	2.6	624	83.2
3	6	61	12.6	33.6	632	84.3
4	6	61	12.1	34.2	646	86.2
5	6	61	12.1	34.7	643	85.7
6	6	61	11.9	34.7	645	86.0
7	6	61	11.9	34.8	648	86.4
8	8	61	11.9	34.8	647	86.3
9	8	61	11.9	35.0	650	86.7
10	8	61	11.9	35.0	648	86.4
11	8	61	12.2	35.1	631	84.2
12	8	61	12.2	35.2	630	84.0
13	8	61	11.8	35.1	640	85.3
14	8	61	11.8	35.3	640	85.3
15	8	61	11.7	35.3	644	85.8
16	13	61	11.8	35.4	613	81.8
17	13	62	12.1	35.4	647	86.2
18	13	61	12.1	35.5	647	86.2
19	13	61	11.9	35.5	640	85.3
20	13	61	11.7	35.4	633	84.4
21	13	62	11.9	35.5	647	86.2
22	13	61	11.9	35.4	649	86.5
23	13	62	11.9	35.5	648	86.4
24	13	62	11.9	35.4	648	86.4
25	13	61	11.9	35.4	669	89.2
26	13	61	12.1	35.3	652	87.0
27	13	61	11.9	35.4	654	87.2
28	13	62	11.9	35.3	650	86.7

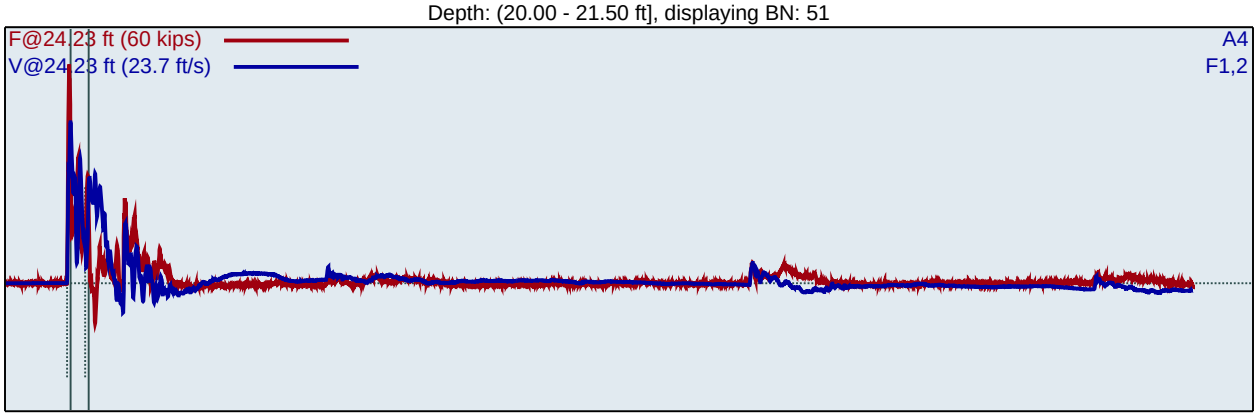
Average	61	11.9	35.3	644	85.9
Std Dev	0	0.1	0.2	11	1.4
Maximum	62	12.2	35.5	669	89.2
Minimum	61	11.7	34.8	613	81.8

N-value: 21

Sample Interval Time: 44.48 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 24.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (20.00 - 21.50 ft], displaying BN: 51



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

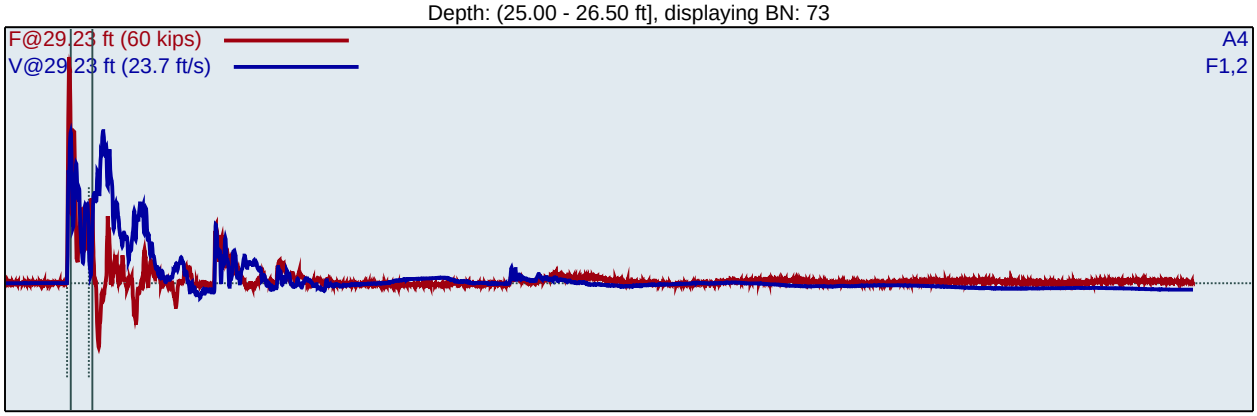
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
30	5	51	14.3	1.9	646	86.2
31	5	51	14.5	34.4	653	87.0
32	5	51	14.7	34.9	659	87.9
33	5	50	14.7	35.1	653	87.0
34	5	51	14.7	35.1	650	86.7
35	8	51	14.5	35.1	661	88.2
36	8	51	14.6	35.2	665	88.6
37	8	52	14.5	35.3	659	87.9
38	8	51	14.6	35.3	668	89.1
39	8	51	14.7	35.4	664	88.6
40	8	52	14.4	35.4	667	88.9
41	8	51	14.6	35.5	656	87.5
42	8	52	14.4	35.5	661	88.1
43	11	51	14.8	35.5	656	87.4
44	11	52	14.6	35.6	668	89.1
45	11	51	14.7	35.6	658	87.7
46	11	52	14.6	35.6	668	89.0
47	11	52	14.7	35.6	664	88.5
48	11	52	14.8	8.6	660	88.0
49	11	51	14.9	35.5	659	87.9
50	11	52	14.8	35.5	658	87.7
51	11	51	14.9	35.4	661	88.1
52	11	51	14.8	35.5	653	87.0
53	11	51	14.7	35.5	656	87.5
	Average	51	14.7	34.0	661	88.1
	Std Dev	0	0.1	6.0	5	0.6
	Maximum	52	14.9	35.6	668	89.1
	Minimum	51	14.4	8.6	653	87.0

N-value: 19

Sample Interval Time: 44.26 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 29.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (25.00 - 26.50 ft], displaying BN: 73



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

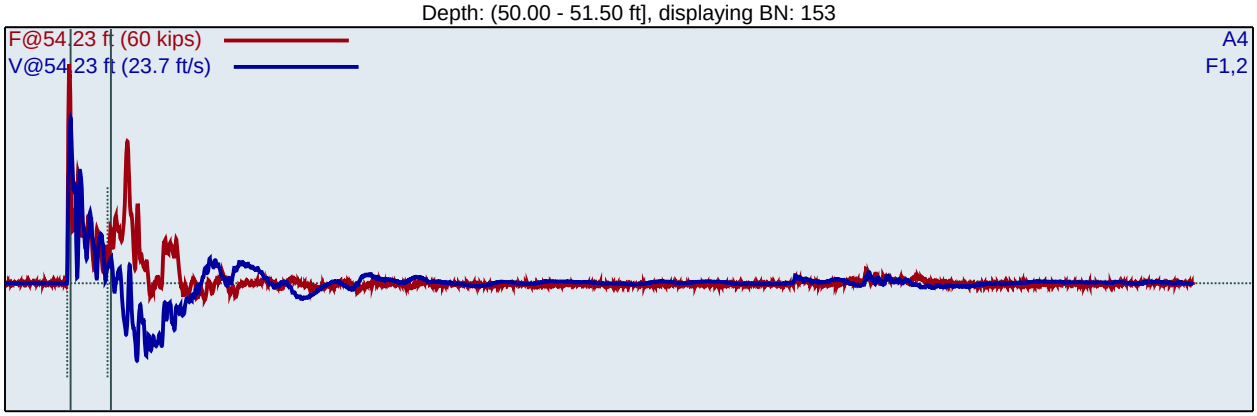
BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
55	9	53	13.7	2.9	644	85.8
56	9	53	13.6	35.2	638	85.1
57	9	53	13.7	35.4	638	85.0
58	9	53	13.6	35.3	640	85.4
59	9	53	13.6	35.4	636	84.8
60	9	53	13.6	35.5	641	85.5
61	9	53	13.5	35.4	643	85.7
62	9	53	13.5	35.5	637	85.0
63	9	53	13.5	35.5	637	84.9
64	6	53	13.5	35.6	647	86.3
65	6	53	13.5	35.5	641	85.4
66	6	53	13.4	35.5	638	85.1
67	6	53	14.1	35.5	626	83.5
68	6	53	14.0	35.6	632	84.2
69	6	53	14.0	35.5	632	84.3
70	6	53	14.1	35.6	632	84.2
71	6	53	14.0	35.6	636	84.7
72	6	53	14.4	35.6	645	86.0
73	6	53	14.1	35.6	650	86.6
74	6	53	14.1	35.7	640	85.3
75	6	53	13.9	35.8	640	85.4
	Average	53	13.9	35.6	638	85.1
	Std Dev	0	0.3	0.1	7	0.9
	Maximum	53	14.4	35.8	650	86.6
	Minimum	53	13.4	35.5	626	83.5

N-value: 12

Sample Interval Time: 33.85 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 54.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (50.00 - 51.50 ft], displaying BN: 153



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
78	28	51	15.5	34.9	643	85.7
79	28	52	15.5	34.6	634	84.5
80	28	51	15.2	35.0	631	84.1
81	28	51	15.2	34.7	643	85.8
82	28	51	15.3	34.8	646	86.1
83	28	51	15.4	34.9	642	85.6
84	28	51	15.2	34.9	639	85.3
85	28	51	15.2	34.9	640	85.3
86	28	51	15.3	34.9	643	85.7
87	28	51	15.2	35.0	649	86.5
88	28	52	15.1	35.0	637	85.0
89	28	51	15.2	35.0	644	85.8
90	28	52	15.2	35.0	645	86.0
91	28	51	15.2	34.9	636	84.9
92	28	51	15.2	34.9	647	86.2
93	28	52	15.0	35.0	644	85.8
94	28	51	15.2	35.0	646	86.1
95	28	51	15.0	35.1	641	85.4
96	28	51	15.1	34.9	645	85.9
97	28	51	15.1	35.0	641	85.5
98	28	51	15.1	35.0	645	86.1
99	28	51	15.3	34.9	653	87.1
100	28	51	15.3	35.2	655	87.3
101	28	51	15.0	35.2	650	86.7
102	28	51	15.1	35.2	649	86.6
103	28	51	15.1	35.3	653	87.1
104	28	51	15.1	34.9	645	86.0
105	28	51	15.0	35.0	647	86.3
106	50	51	15.1	35.2	644	85.8
107	50	51	15.2	35.1	649	86.5
108	50	51	15.1	35.0	641	85.5
109	50	51	15.2	35.0	638	85.1

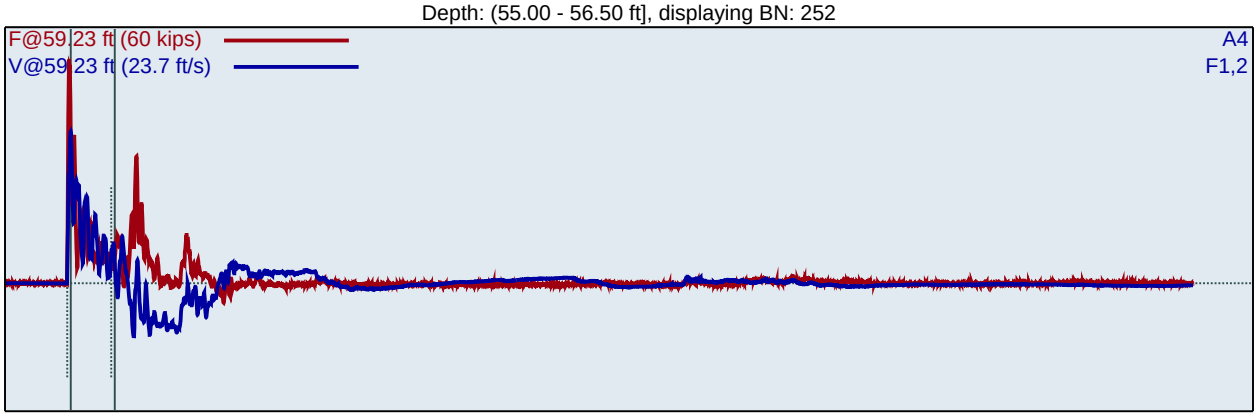
110	50	51	15.2	35.1	645	85.9
111	50	51	15.1	34.9	641	85.5
112	50	51	15.2	34.9	647	86.2
113	50	51	15.3	35.2	652	86.9
114	50	51	15.1	35.0	645	86.0
115	50	51	15.2	34.9	649	86.5
116	50	51	15.2	35.4	644	85.9
117	50	51	15.2	35.2	638	85.1
118	50	51	15.3	35.0	660	88.0
119	50	51	15.2	35.4	649	86.5
120	50	51	15.2	35.3	645	86.0
121	50	51	15.2	35.2	643	85.8
122	50	51	15.2	35.2	644	85.8
123	50	51	15.2	35.4	649	86.6
124	50	51	15.3	35.1	654	87.2
125	50	51	15.2	35.0	655	87.4
126	50	51	15.3	35.2	650	86.7
127	50	51	15.2	35.2	646	86.2
128	50	51	15.3	35.0	651	86.8
129	50	51	15.2	35.0	650	86.6
130	50	51	15.3	35.1	654	87.2
131	50	50	15.4	34.7	658	87.8
132	50	51	15.2	35.0	652	86.9
133	50	51	15.2	34.9	652	87.0
134	50	51	15.3	34.9	645	86.0
135	50	51	15.2	35.0	653	87.1
136	50	51	15.3	35.2	667	88.9
137	50	51	15.4	35.0	661	88.2
138	50	51	15.6	34.9	659	87.8
139	50	52	15.3	35.1	652	87.0
140	50	51	15.5	35.3	651	86.8
141	50	51	15.2	35.0	651	86.8
142	50	51	15.4	34.9	665	88.6
143	50	51	15.5	35.3	660	88.0
144	50	51	15.5	34.9	649	86.5
145	50	51	15.5	35.3	664	88.5
146	50	51	15.3	35.3	654	87.2
147	50	51	15.3	35.0	661	88.2
148	50	52	15.5	35.1	660	88.0
149	50	51	15.2	35.5	652	86.9
150	50	51	15.2	35.1	650	86.7
151	50	51	15.3	35.4	638	85.0
152	50	51	15.2	35.1	651	86.8
153	50	51	15.3	35.4	652	87.0
154	50	51	15.4	35.0	666	88.9
155	50	51	15.3	35.3	657	87.6
	Average	51	15.3	35.1	651	86.8
	Std Dev	0	0.1	0.2	7	1.0
	Maximum	52	15.6	35.5	667	88.9
	Minimum	50	15.1	34.7	638	85.0

N-value: 50

Sample Interval Time: 131.85 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 59.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (55.00 - 56.50 ft], displaying BN: 252



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
158	12	53	14.4	35.6	652	87.0
159	12	53	14.3	35.7	649	86.6
160	12	53	14.3	35.8	651	86.8
161	12	53	14.3	35.6	659	87.9
162	12	53	14.3	35.6	653	87.1
163	12	52	14.3	35.7	648	86.4
164	12	52	14.4	35.6	655	87.3
165	12	52	14.2	35.5	650	86.7
166	12	52	14.4	35.6	656	87.4
167	12	53	14.2	35.5	649	86.5
168	12	52	14.1	35.8	648	86.4
169	12	52	14.3	35.6	651	86.9
170	35	53	14.3	35.7	653	87.1
171	35	53	14.1	35.8	652	87.0
172	35	53	14.0	35.8	650	86.7
173	35	53	14.1	35.6	655	87.3
174	35	53	14.2	35.7	656	87.5
175	35	52	14.2	35.6	642	85.6
176	35	52	14.4	35.7	643	85.7
177	35	52	14.2	35.7	638	85.0
178	35	52	14.3	35.8	640	85.3
179	35	53	14.1	35.6	655	87.4
180	35	53	14.0	35.8	649	86.6
181	35	53	14.1	35.7	649	86.5
182	35	53	14.2	35.8	645	85.9
183	35	53	14.0	35.8	654	87.1
184	35	53	14.1	35.5	657	87.6
185	35	53	14.2	35.7	645	86.0
186	35	53	14.3	35.7	640	85.3
187	35	53	14.2	35.6	640	85.4
188	35	53	14.1	35.7	645	86.0
189	35	53	14.2	35.7	645	85.9

190	35	52	14.2	35.8	650	86.7
191	35	52	14.2	35.6	652	86.9
192	35	52	14.2	35.6	647	86.2
193	35	52	14.3	35.7	650	86.7
194	35	52	14.5	35.7	659	87.8
195	35	52	14.4	35.8	647	86.2
196	35	52	14.5	35.7	652	86.9
197	35	52	14.6	35.9	647	86.3
198	35	53	14.4	35.7	644	85.8
199	35	53	14.3	35.8	648	86.4
200	35	53	14.4	35.6	652	86.9
201	35	53	14.2	35.6	647	86.2
202	35	53	14.3	35.7	645	86.1
203	35	53	14.3	35.8	650	86.7
204	35	53	14.3	35.7	648	86.4
205	50	53	14.2	36.0	655	87.3
206	50	53	14.2	35.9	652	86.9
207	50	53	14.1	35.9	654	87.1
208	50	53	14.2	35.9	653	87.1
209	50	53	14.1	35.9	649	86.6
210	50	54	14.3	35.7	656	87.5
211	50	53	14.3	35.7	658	87.8
212	50	53	14.3	35.7	661	88.2
213	50	53	14.3	35.8	654	87.2
214	50	53	14.6	35.7	653	87.1
215	50	52	14.3	35.7	646	86.1
216	50	53	14.7	35.7	648	86.4
217	50	53	14.7	35.7	653	87.1
218	50	53	14.4	35.8	663	88.4
219	50	53	14.1	35.7	657	87.6
220	50	52	14.2	35.7	649	86.6
221	50	53	13.9	35.8	658	87.8
222	50	54	14.0	35.8	656	87.5
223	50	54	14.1	35.7	666	88.8
224	50	54	14.2	35.9	663	88.4
225	50	53	14.5	35.8	649	86.5
226	50	53	14.4	35.8	662	88.3
227	50	53	14.2	35.8	653	87.0
228	50	53	14.7	35.6	653	87.0
229	50	53	14.2	35.8	644	85.8
230	50	52	14.6	35.7	652	86.9
231	50	52	14.5	35.8	640	85.4
232	50	53	14.6	35.7	653	87.1
233	50	52	14.4	35.8	645	86.1
234	50	53	14.4	35.8	637	85.0
235	50	53	14.5	35.8	648	86.4
236	50	53	14.3	35.8	640	85.3
237	50	53	14.2	36.1	643	85.8
238	50	53	14.3	35.6	655	87.3
239	50	53	14.2	35.8	652	86.9
240	50	53	14.0	35.7	647	86.3
241	50	53	14.0	35.7	653	87.1
242	50	52	14.0	35.9	654	87.3
243	50	53	14.1	35.9	645	86.0
244	50	53	13.9	35.9	649	86.5
245	50	52	13.8	35.7	656	87.4
246	50	53	13.9	36.0	652	87.0
247	50	53	14.0	35.9	653	87.0
248	50	53	13.8	35.9	653	87.1
249	50	53	13.9	35.7	649	86.5
250	50	53	14.0	35.8	649	86.6

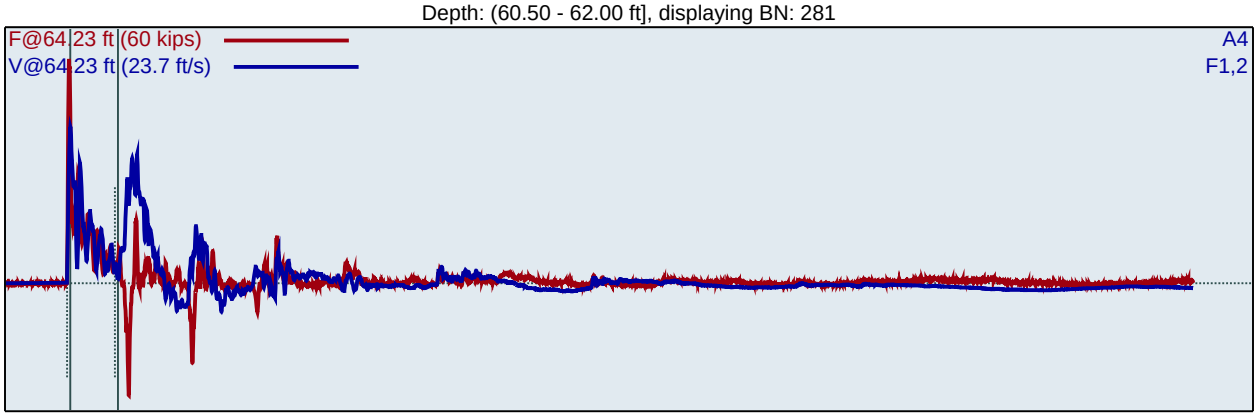
251	50	53	14.2	35.7	651	86.8
252	50	52	14.0	35.7	646	86.1
253	50	53	14.0	35.7	646	86.1
254	50	52	14.1	35.8	652	86.9
	Average	53	14.2	35.7	650	86.7
	Std Dev	0	0.2	0.1	6	0.8
	Maximum	54	14.7	36.1	666	88.8
	Minimum	52	13.8	35.5	637	85.0

N-value: 85

Sample Interval Time: 161.20 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 64.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (60.50 - 62.00 ft], displaying BN: 281



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
256	9	52	14.4	1.9	639	85.3
257	9	52	14.5	35.2	634	84.6
258	9	52	14.5	35.3	671	89.4
259	9	53	14.5	35.1	669	89.2
260	9	53	14.6	35.5	667	88.9
261	9	53	14.6	35.4	665	88.7
262	9	53	14.5	35.5	664	88.5
263	9	53	14.5	35.5	670	89.3
264	9	53	14.5	35.6	668	89.0
265	9	53	14.7	35.5	670	89.3
266	9	53	14.8	35.6	645	86.0
267	9	53	14.7	35.5	672	89.6
268	9	53	14.5	35.6	669	89.2
269	9	53	14.7	35.5	667	88.9
270	9	53	14.6	35.6	662	88.3
271	9	53	14.6	35.6	670	89.3
272	9	53	14.8	35.6	668	89.1
273	9	53	14.5	35.6	661	88.1
274	10	53	14.6	35.6	644	85.8
275	10	53	14.5	35.5	663	88.5
276	10	53	14.4	35.5	651	86.7
277	10	53	14.6	35.5	638	85.0
278	10	53	14.6	35.6	648	86.4
279	10	52	14.5	35.6	634	84.5
280	10	53	14.5	35.7	636	84.8
281	10	53	14.5	35.6	661	88.1
282	10	53	14.4	35.6	665	88.7
283	10	53	14.2	35.8	660	88.0

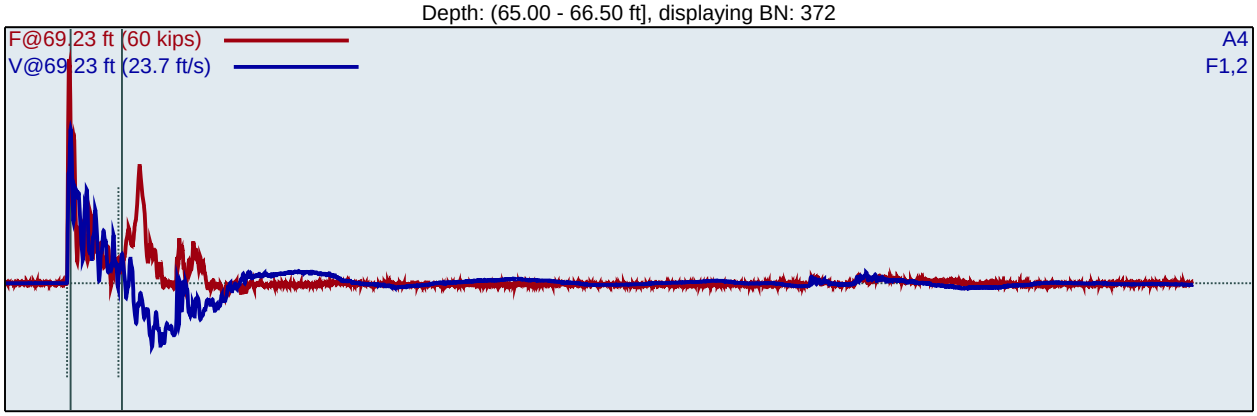
Average	53	14.6	35.6	657	87.6
Std Dev	0	0.1	0.1	12	1.6
Maximum	53	14.8	35.8	672	89.6
Minimum	52	14.2	35.5	634	84.5

N-value: 19

Sample Interval Time: 45.52 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 69.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (65.00 - 66.50 ft], displaying BN: 372



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
284	41	53	14.2	1.9	646	86.2
285	41	53	14.2	2.2	642	85.6
286	41	52	14.2	35.2	648	86.4
287	41	52	14.1	35.3	647	86.3
288	41	53	14.0	35.4	648	86.4
289	41	53	14.0	35.2	651	86.7
290	41	53	14.1	35.3	646	86.1
291	41	53	14.1	35.1	654	87.2
292	41	53	14.0	35.4	653	87.1
293	41	53	14.1	35.4	655	87.3
294	41	52	14.2	35.4	661	88.2
295	41	52	14.2	35.5	658	87.7
296	41	52	14.1	35.4	653	87.1
297	41	52	14.3	35.4	656	87.4
298	41	52	14.3	35.4	653	87.0
299	41	52	14.2	35.4	658	87.7
300	41	52	14.3	35.4	655	87.4
301	41	52	14.2	35.5	647	86.3
302	41	52	14.5	35.4	636	84.8
303	41	52	14.4	35.4	638	85.1
304	41	52	14.0	35.3	638	85.0
305	41	52	13.9	35.4	645	86.0
306	41	52	13.9	35.4	643	85.8
307	41	52	14.2	35.5	640	85.3
308	41	52	14.5	35.3	642	85.6
309	41	52	14.4	35.3	646	86.1
310	41	52	14.4	35.5	642	85.6
311	41	52	14.5	35.4	645	86.0
312	41	52	14.4	35.5	644	85.8
313	41	52	14.4	35.5	645	86.0
314	41	52	14.4	35.5	644	85.9
315	41	52	14.3	35.5	646	86.2

316	41	52	14.2	35.4	642	85.6
317	41	52	14.4	35.3	646	86.1
318	41	51	14.3	35.5	642	85.6
319	41	52	14.3	35.7	658	87.7
320	41	52	14.3	35.4	643	85.8
321	41	51	14.6	35.6	649	86.6
322	41	52	14.4	35.6	641	85.5
323	41	52	14.4	35.5	638	85.1
324	41	52	14.4	35.5	641	85.5
325	50	52	14.4	35.5	643	85.8
326	50	52	14.3	35.7	649	86.6
327	50	52	14.3	35.8	646	86.1
328	50	52	14.3	35.5	641	85.5
329	50	52	14.3	35.6	639	85.1
330	50	52	14.5	35.6	648	86.4
331	50	52	14.3	35.5	641	85.5
332	50	52	14.2	35.8	641	85.4
333	50	52	14.3	35.7	647	86.2
334	50	52	14.3	35.7	640	85.4
335	50	52	14.3	35.7	649	86.5
336	50	52	14.3	35.7	643	85.8
337	50	52	14.3	35.7	645	86.0
338	50	52	14.3	35.6	646	86.2
339	50	52	14.4	35.6	645	86.0
340	50	52	14.3	35.7	645	86.1
341	50	52	14.3	35.6	654	87.3
342	50	52	14.3	35.7	653	87.1
343	50	52	14.2	35.8	647	86.3
344	50	52	14.2	35.7	647	86.3
345	50	52	14.3	35.5	648	86.4
346	50	52	14.2	35.7	648	86.4
347	50	52	14.3	35.5	649	86.5
348	50	52	14.2	35.5	666	88.7
349	50	52	14.1	35.4	655	87.3
350	50	52	14.2	35.5	662	88.3
351	50	52	14.6	35.4	653	87.1
352	50	52	14.5	35.5	647	86.3
353	50	52	14.5	35.3	651	86.8
354	50	52	14.5	35.4	654	87.2
355	50	52	14.3	35.5	652	86.9
356	50	52	14.4	35.6	651	86.8
357	50	52	14.4	35.6	652	87.0
358	50	52	14.4	35.4	650	86.7
359	50	52	14.4	35.7	650	86.7
360	50	52	14.3	35.3	655	87.3
361	50	53	14.1	35.6	661	88.1
362	50	52	14.2	35.7	649	86.5
363	50	53	14.2	35.7	654	87.2
364	50	53	13.9	35.7	661	88.2
365	50	53	14.3	35.4	659	87.8
366	50	53	14.4	35.7	656	87.5
367	50	53	14.2	35.5	652	87.0
368	50	52	14.4	36.1	658	87.7
369	50	52	14.3	35.9	655	87.4
370	50	52	14.4	36.1	654	87.2
371	50	52	14.5	36.2	653	87.1
372	50	52	14.3	36.3	657	87.7
373	50	52	14.6	36.3	658	87.8
374	50	52	14.5	36.1	659	87.8

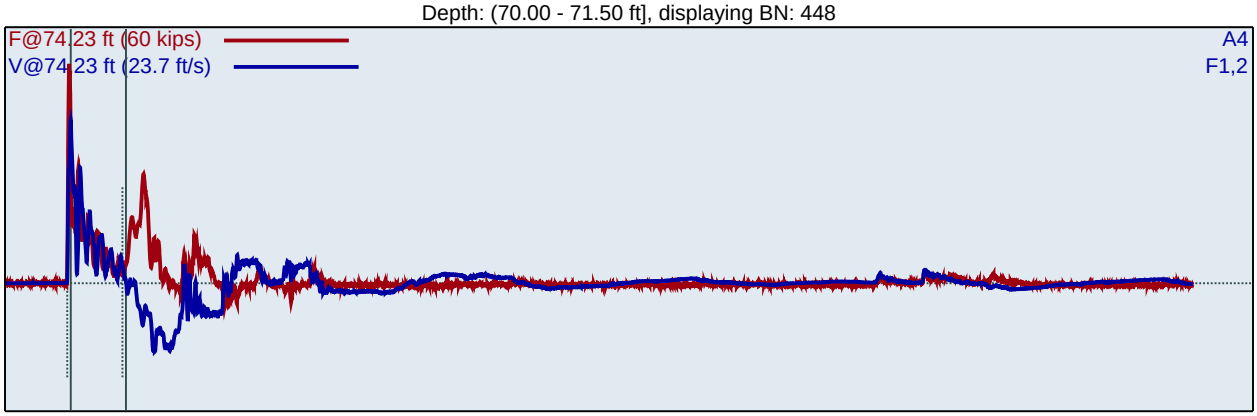
Average	52	14.3	35.7	651	86.8
Std Dev	0	0.1	0.2	6	0.8
Maximum	53	14.6	36.3	666	88.7
Minimum	52	13.9	35.3	639	85.1

N-value: 50

Sample Interval Time: 177.25 seconds.

PD59 12
TRAVIS LOGAN Test date: 11/13/18
AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 74.23 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (70.00 - 71.50 ft], displaying BN: 448



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A4 (PR): [K5675] 320 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
376	7	51	14.7	2.1	621	82.8
377	7	51	14.7	34.1	631	84.1
378	7	52	14.8	34.3	636	84.8
379	7	52	14.7	34.4	649	86.5
380	7	51	14.8	34.4	647	86.3
381	7	51	14.5	34.6	644	85.9
382	7	52	14.7	34.7	655	87.3
383	22	52	14.8	34.7	630	84.0
384	22	52	14.6	34.8	621	82.8
385	22	52	14.8	34.8	634	84.5
386	22	52	14.7	34.9	628	83.8
387	22	52	14.7	34.7	638	85.1
388	22	51	14.7	35.0	612	81.6
389	22	51	15.0	34.8	650	86.7
390	22	51	14.7	34.9	649	86.5
391	22	52	14.8	35.0	645	86.0
392	22	52	14.9	35.0	659	87.9
393	22	52	14.8	34.9	646	86.1
394	22	52	14.9	35.0	654	87.1
395	22	51	15.0	35.0	652	87.0
396	22	52	14.9	34.9	648	86.4
397	22	52	14.9	34.9	650	86.6
398	22	51	14.9	35.2	653	87.0
399	22	51	15.0	35.0	655	87.4
400	22	51	15.1	35.0	655	87.3
401	22	51	15.0	35.0	657	87.6
402	22	51	15.1	35.0	661	88.2
403	22	51	15.2	34.9	653	87.1
404	22	51	15.2	35.2	652	86.9
405	46	51	14.8	34.9	645	86.0
406	46	51	14.9	34.9	637	84.9
407	46	51	14.8	34.8	653	87.1

408	46	51	15.0	34.7	657	87.6
409	46	51	14.5	34.7	639	85.2
410	46	51	15.1	34.7	645	86.0
411	46	51	14.9	34.8	649	86.6
412	46	51	14.7	34.7	652	86.9
413	46	52	14.6	34.6	646	86.1
414	46	51	14.6	34.7	644	85.9
415	46	51	14.7	34.8	645	85.9
416	46	51	14.8	34.8	654	87.3
417	46	51	14.7	34.9	646	86.1
418	46	51	14.8	34.8	648	86.4
419	46	51	14.7	34.7	649	86.5
420	46	52	14.8	35.0	642	85.6
421	46	51	14.9	35.0	657	87.6
422	46	51	14.8	35.2	654	87.2
423	46	51	15.0	35.1	654	87.2
424	46	52	14.8	35.4	650	86.7
425	46	51	15.0	35.2	660	87.9
426	46	52	14.8	35.7	649	86.5
427	46	51	15.0	35.2	643	85.7
428	46	51	14.9	35.3	646	86.2
429	46	51	15.0	35.8	648	86.4
430	46	51	15.2	35.1	649	86.6
431	46	51	15.0	35.6	640	85.3
432	46	52	15.0	35.7	650	86.6
433	46	51	15.0	35.3	647	86.3
434	46	51	15.1	35.7	644	85.9
435	46	52	14.9	35.8	651	86.9
436	46	51	15.2	35.8	646	86.1
437	46	52	14.7	35.6	639	85.2
438	46	52	14.9	35.7	646	86.2
439	46	51	15.1	35.4	649	86.5
440	46	51	14.8	35.5	640	85.3
441	46	51	15.1	35.4	657	87.5
442	46	52	14.8	35.4	643	85.7
443	46	52	14.9	35.3	638	85.0
444	46	52	15.1	35.3	645	86.1
445	46	52	14.9	35.3	652	87.0
446	46	52	15.0	34.7	646	86.2
447	46	51	15.0	34.8	637	84.9
448	46	51	15.1	34.8	642	85.6
449	46	51	14.9	35.0	643	85.7
450	46	52	14.9	34.7	643	85.8
	Average	51	14.9	35.1	647	86.2
	Std Dev	0	0.2	0.3	9	1.1
	Maximum	52	15.2	35.8	661	88.2
	Minimum	51	14.5	34.6	612	81.6

N-value: 68

Sample Interval Time: 126.81 seconds.

Summary of SPT Test Results

Project: PD59, Test Date: 11/13/18

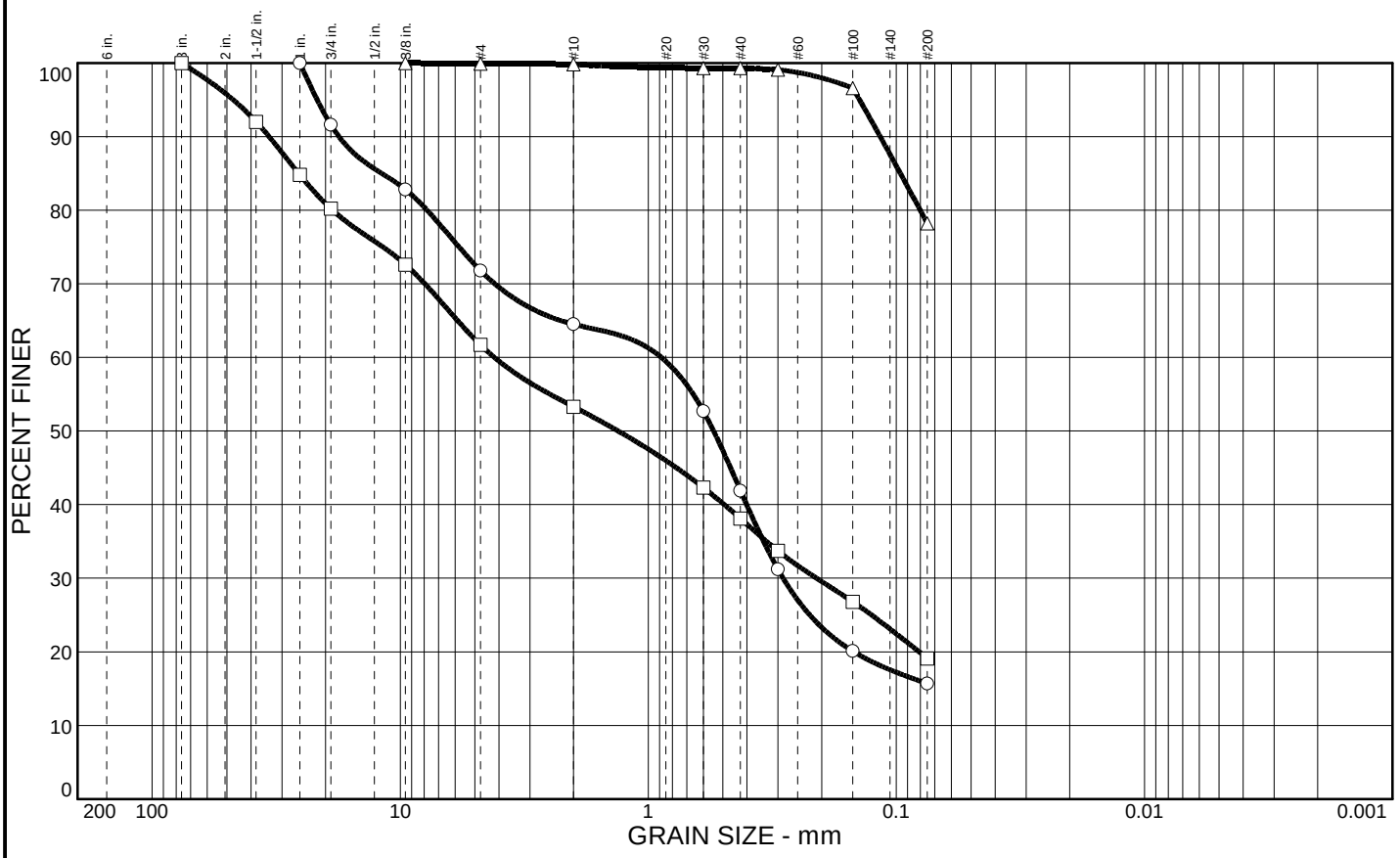
FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
15.23	**6-8-13**	**21**	**30**	61	11.9	35.3	644	85.9
24.23	**5-8-11**	**19**	**27**	51	14.7	34.0	661	88.1
29.23	**9-6-6**	**12**	**17**	53	13.9	35.6	638	85.1
54.23	**28-50-0**	**50**	**72**	51	15.3	35.1	651	86.8
59.23	**12-35-50**	**85**	**122**	53	14.2	35.7	650	86.7
64.23	**9-9-10**	**19**	**27**	53	14.6	35.6	657	87.6
69.23	**41-50-0**	**50**	**72**	52	14.3	35.7	651	86.8
74.23	**7-22-46**	**68**	**98**	51	14.9	35.1	647	86.2
		Overall Average Values:		53	14.4	35.4	650	86.7
		Standard Deviation:		2	0.8	1.5	9	1.2
		Overall Maximum Value:		62	15.6	36.3	672	89.6
		Overall Minimum Value:		50	11.7	8.6	612	81.6

ATTACHMENT 4
LABORATORY TEST RESULTS

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○		28.2	56.1	15.7					
□		38.3	42.6	19.1					
△		0.1	21.7	78.2					

SIEVE inches size	PERCENT FINER ○	□	△
3"		100.0	
1.5"		92.0	
1"	100.0	84.8	
3/4"	91.6	80.2	
3/8"	82.8	72.6	100.0
GRAIN SIZE			
D_{60}	0.886	4.18	
D_{30}	0.286	0.210	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	71.8	61.7	99.9
#10	64.5	53.3	99.8
#30	52.7	42.3	99.3
#40	41.9	38.1	99.3
#50	31.2	33.7	99.1
#100	20.1	26.8	96.6
#200	15.7	19.1	78.2

SOIL DESCRIPTION

○ Yellowish Brown Silty SAND w/ Gravel (slightly plastic)

□ Yellowish Brown Silty SAND w/ Gravel grading to Weathered Rock

△ Olive Brown SILT w/ Sand

REMARKS:

○ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

□ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

△

○ Source: GT18-01 Sample No.: 01-04B Elev./Depth: 18.5-19'

□ Source: GT18-01 Sample No.: 01-06B Elev./Depth: 30.5-31'

△ Source: GT18-02 Sample No.: 02-09B Elev./Depth: 45.5-46'

COOPER TESTING LABORATORY

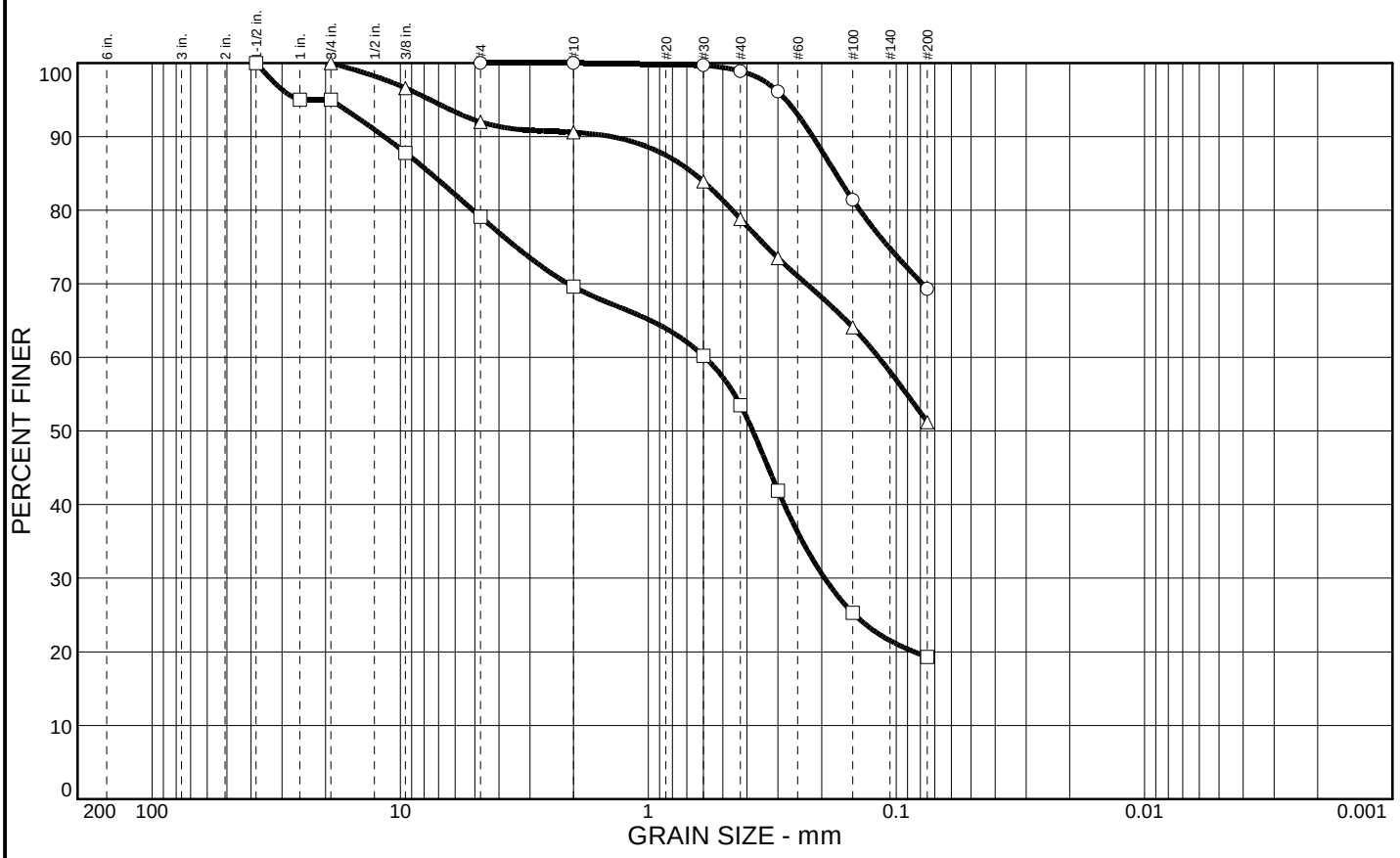
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			30.7	69.3					
□		20.9	59.8	19.3					
△		8.0	40.8	51.2					

SIEVE inches size	PERCENT FINER ○	□	△
1.5"		100.0	
1"		95.0	
3/4"		95.0	100.0
3/8"		87.8	96.6
GRAIN SIZE			
D_{60}		0.591	0.118
D_{30}		0.195	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	79.1	92.0
#10	100.0	69.6	90.6
#30	99.7	60.2	83.9
#40	98.9	53.5	78.8
#50	96.1	41.9	73.5
#100	81.4	25.3	64.1
#200	69.3	19.3	51.2

SOIL DESCRIPTION

○ Yellowish Brown Sandy CLAY

□ Dark Brown Clayey SAND w/ Gravel change to Olive Brown Clayey SAND w/ Gravel

△ Olive Sandy CLAY change to Yellowish Brown

REMARKS:

○

□ Due to the small sample size, relative to the largest particle size, this data should be considered to be approximate.

△

○ Source: GT18-03 Sample No.: 03-03B Elev./Depth: 12.5-13'

□ Source: GT18-03 Sample No.: 03-05B Elev./Depth: 20.5-21'

△ Source: GT18-03 Sample No.: 03-06C Elev./Depth: 26-26.5'

COOPER TESTING LABORATORY

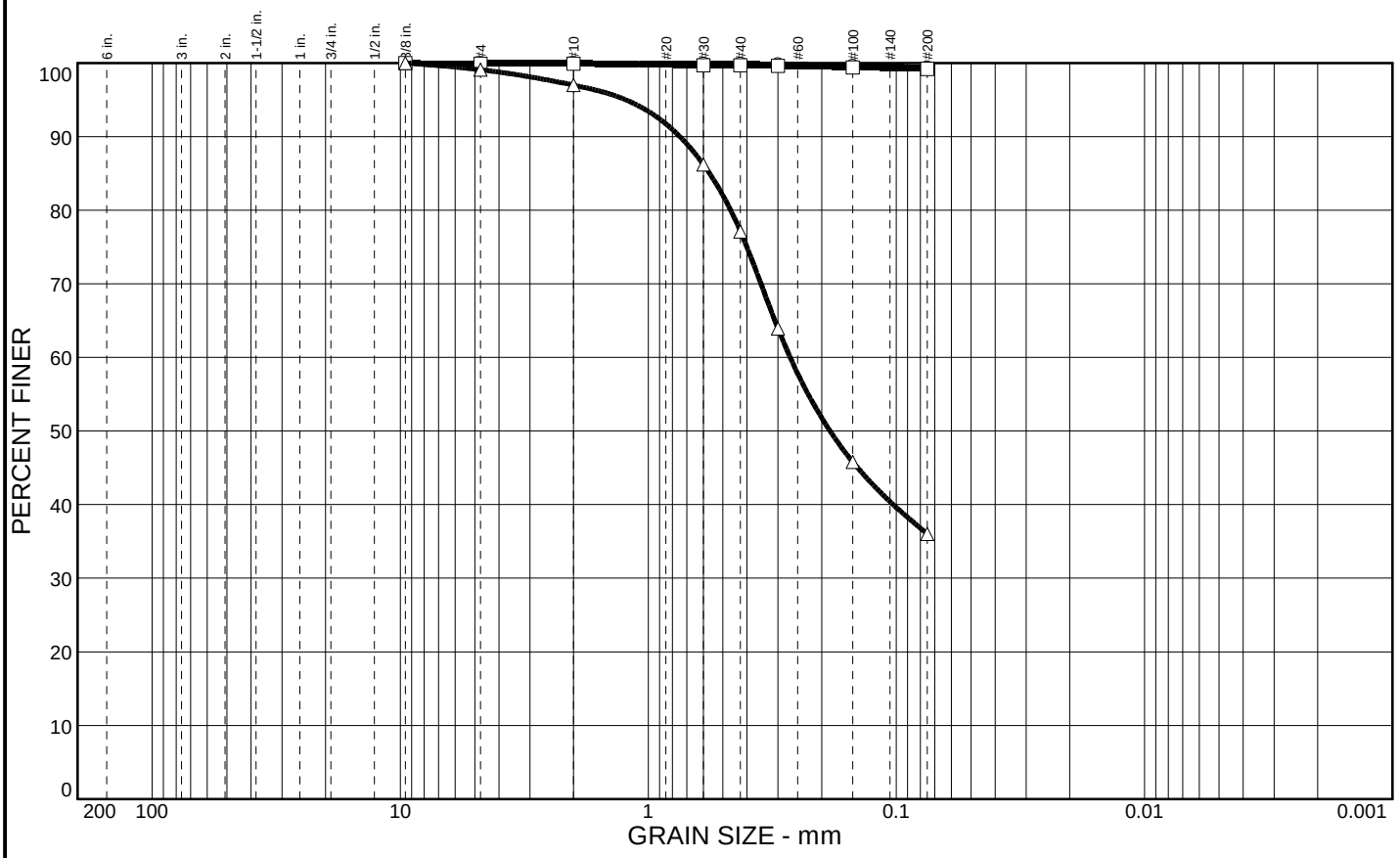
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			0.6	99.4		CH		28	64
□		0.1	0.7	99.2				28	71
△		0.9	63.1	36.0					

SIEVE inches size	PERCENT FINER ○	□	△
3/8"		100.0	100.0
GRAIN SIZE			
D_{60}			0.268
D_{30}			
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	△
#4	100.0	99.9	99.1
#10	100.0	99.9	97.0
#30	99.9	99.7	86.2
#40	99.9	99.7	77.1
#50	99.8	99.6	63.9
#100	99.6	99.4	45.8
#200	99.4	99.2	36.0

SOIL DESCRIPTION

○ Olive Gray Fat CLAY

□ Olive Brown Fat CLAY

△ Yellowish Brown Clayey SAND

REMARKS:

○

□

△

○ Source: GT18-03 Sample No.: 03-09 Elev./Depth: 40-41.5'

□ Source: GT18-05 Sample No.: 05-05 Elev./Depth: 25-26.5'

△ Source: GT18-06 Sample No.: 06-01B Elev./Depth: 6-6.5'

COOPER TESTING LABORATORY

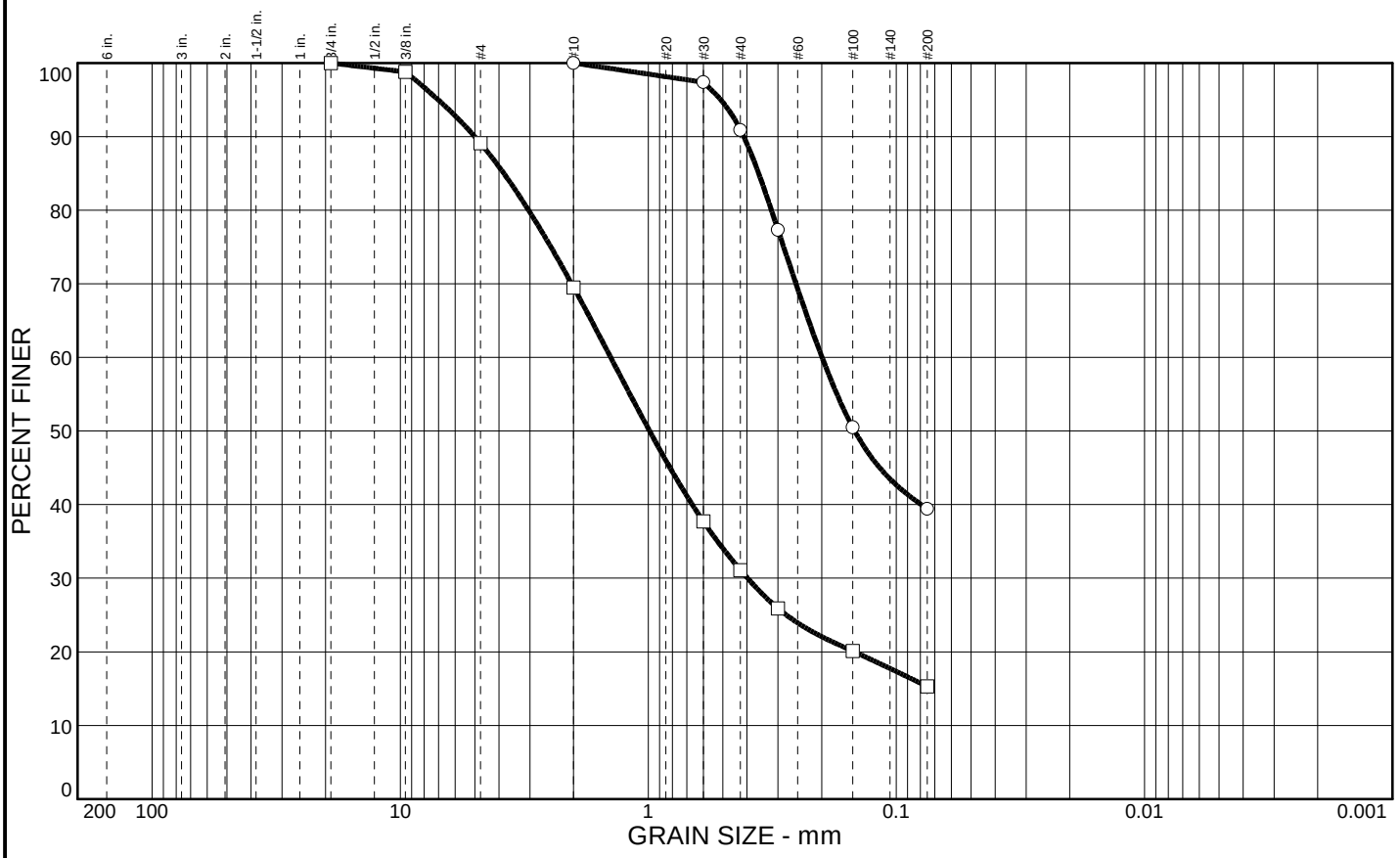
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352

Figure

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
○			60.6	39.4					
□		10.9	73.8	15.3					

SIEVE inches size	PERCENT FINER ○	□	
3/4"		100.0	
3/8"		98.8	
GRAIN SIZE			
D_{60}	0.199	1.42	
D_{30}		0.398	
D_{10}			
COEFFICIENTS			
C_c			
C_u			

SIEVE number size	PERCENT FINER ○	□	
#4		89.1	
#10	100.0	69.5	
#30	97.4	37.7	
#40	90.9	31.1	
#50	77.3	25.9	
#100	50.5	20.1	
#200	39.4	15.3	

SOIL DESCRIPTION

○ Yellowish Brown Clayey SAND

□ Dark Brown Clayey SAND

REMARKS:

○

□

○ Source: GT18-06 Sample No.: 06-03 Elev./Depth: 15-16.5'

□ Source: GT18-06 Sample No.: 06-06B Elev./Depth: 31-31.5'

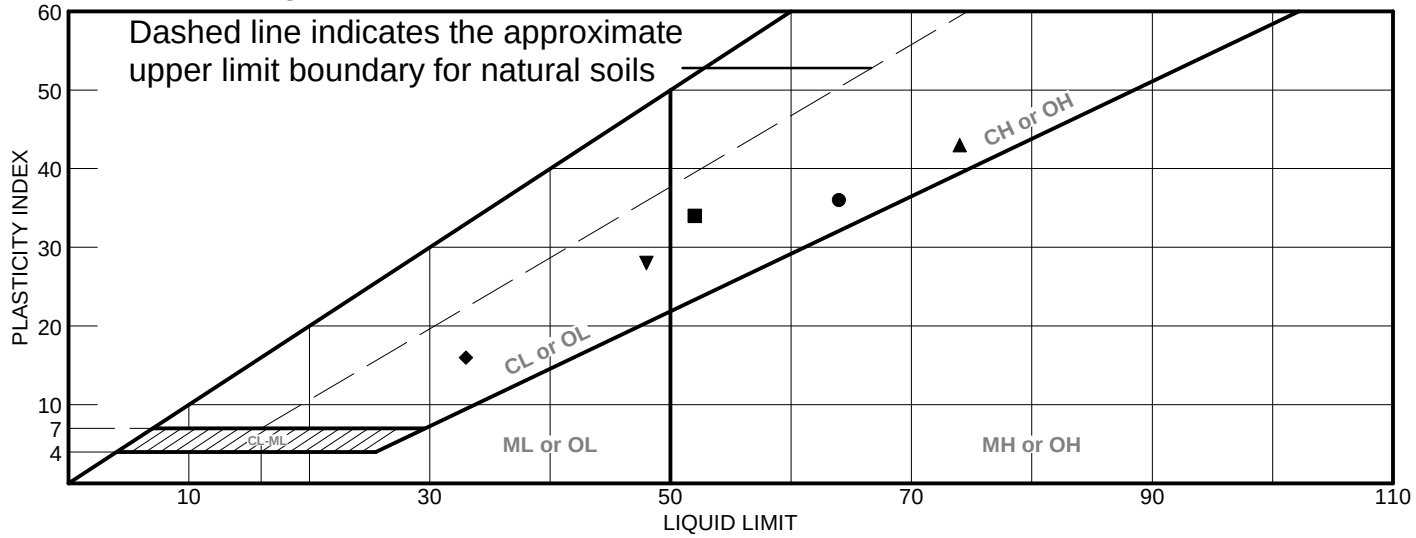
COOPER TESTING LABORATORY

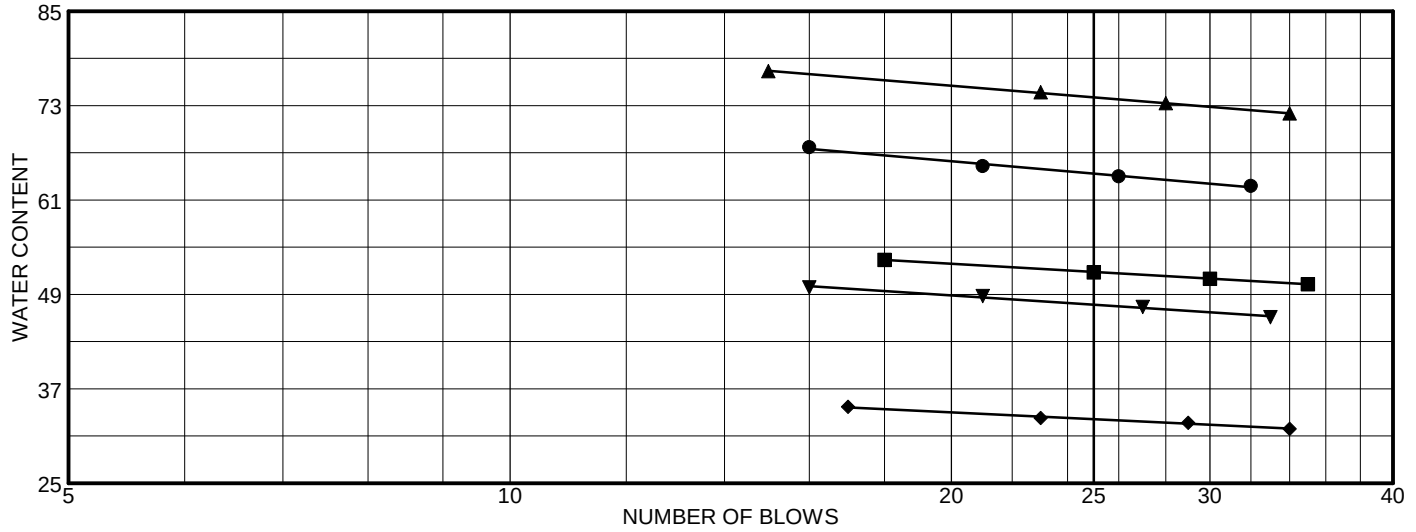
Client: Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

Project No.: 461-352 Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Gray Fat CLAY	64	28	36	99.9	99.4	CH
■	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand	52	18	34			
▲	Olive Brown Fat CLAY	74	31	43			
◆	OLive Brown Mottled Gray Sandy Lean CLAY	33	17	16			
▼	Olive Brown Lean CLAY w/ Sand	48	20	28			

Project No. 461-352 **Client:** Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

●	**Source:** GT18-03	**Sample No.:** 03-09	**Elev./Depth:** 40-41.5'
■	**Source:** GT18-04	**Sample No.:** 04-03	**Elev./Depth:** 15-17.5(Tip-1")
▲	**Source:** GT18-04	**Sample No.:** 04-04	**Elev./Depth:** 20-22.5'
◆	**Source:** GT18-05	**Sample No.:** 05-02	**Elev./Depth:** 10-12.5(Tip-1")
▼	**Source:** GT18-05	**Sample No.:** 05-03	**Elev./Depth:** 15-17.5(Tip-

Remarks:

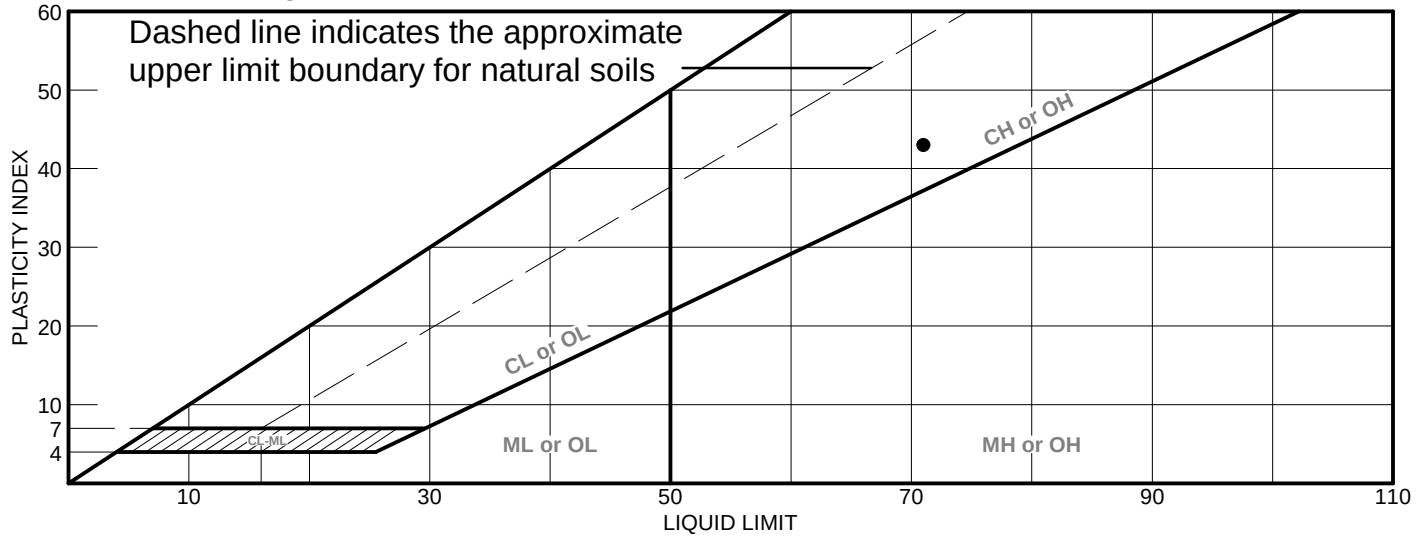
●
■
▲
◆
▼

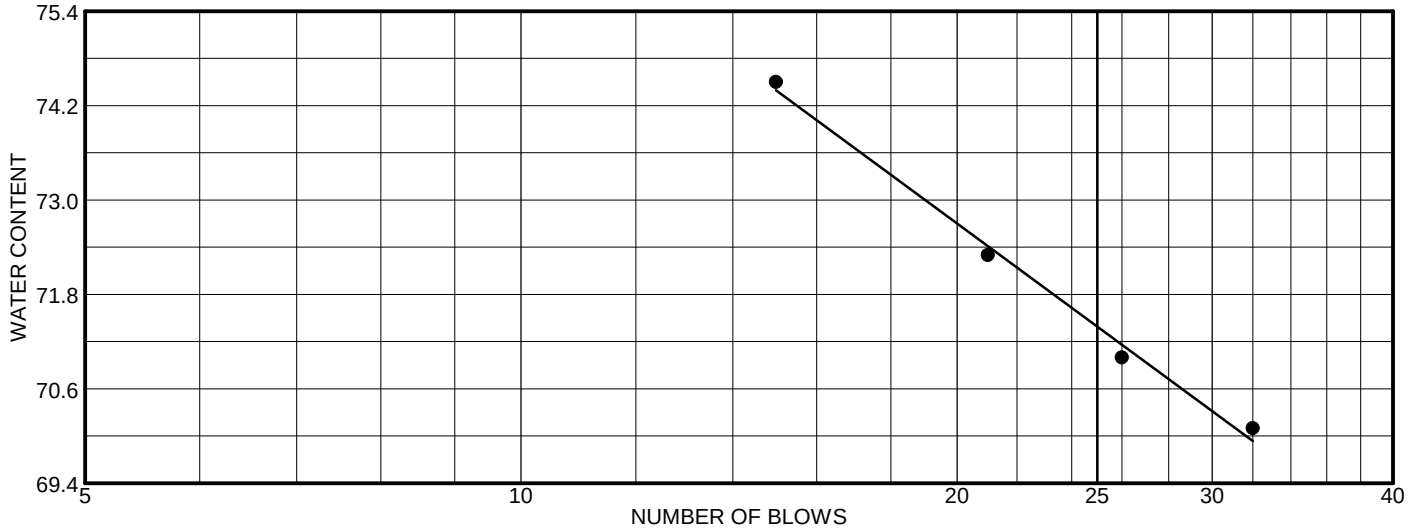
LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Brown Fat CLAY	71	28	43	99.7	99.2	

Project No. 461-352 **Client:** Geosyntec Consultants

Project: Proposed NE Pond at Buena Vista Landfill - WG2562-06

● **Source:** GT18-05 **Sample No.:** 05-05 **Elev./Depth:** 25-26.5'

Remarks:

●

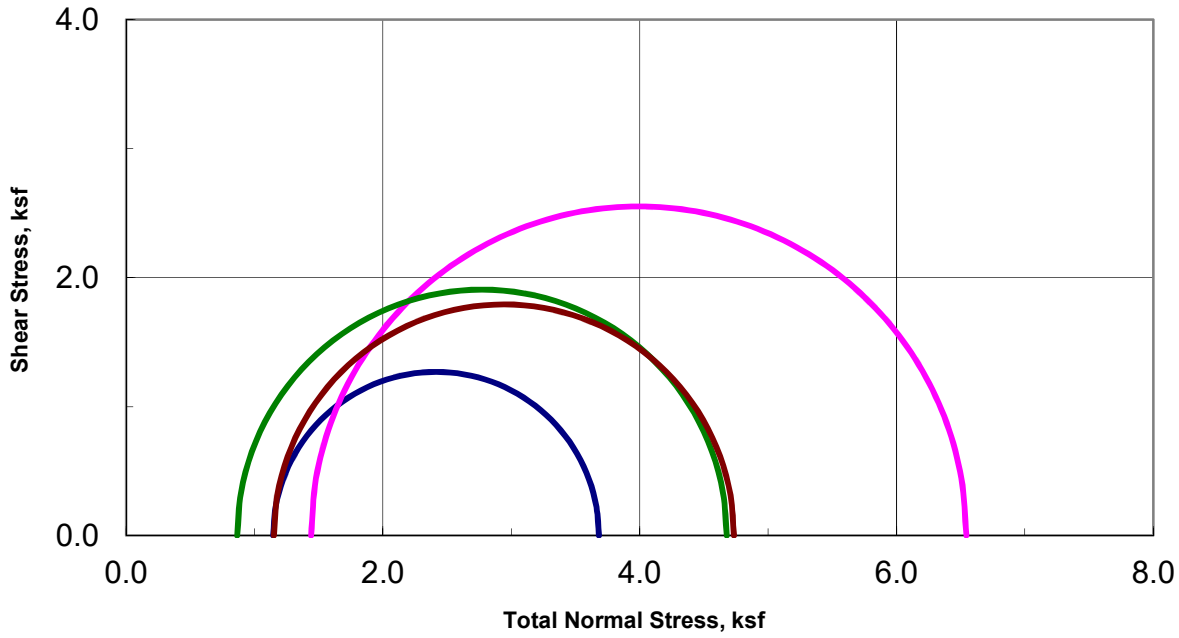
LIQUID AND PLASTIC LIMITS TEST REPORT

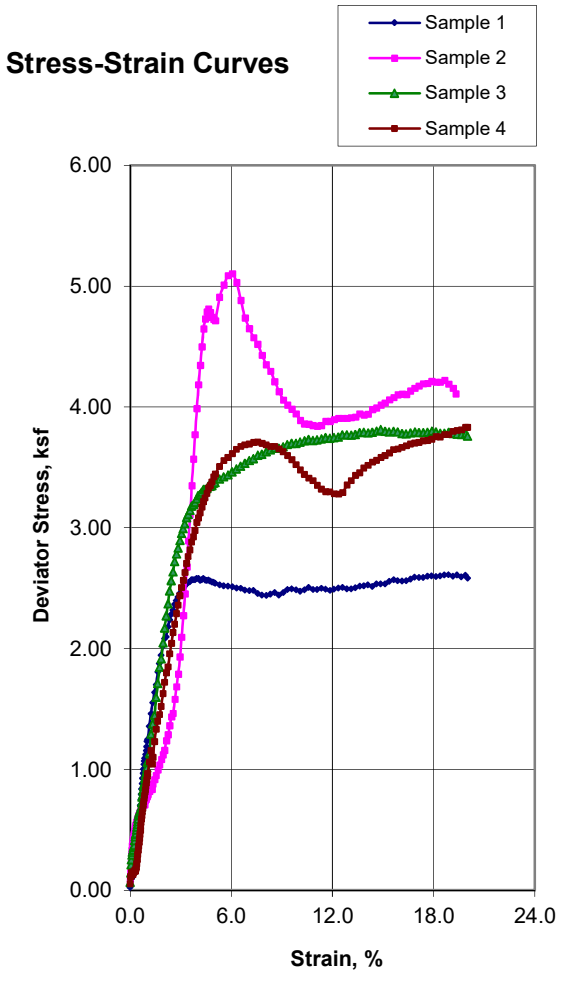
COOPER TESTING LABORATORY

Figure

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test
ASTM D2850





Sample Data				
	1	2	3	4
Moisture %	24.0	37.7	21.0	26.4
Dry Den,pcf	100.6	80.1	103.4	95.3
Void Ratio	0.676	1.103	0.631	0.769
Saturation %	96.0	92.2	89.7	92.9
Height in	5.97	5.97	5.97	6.00
Diameter in	2.87	2.87	2.87	2.87
Cell psi	8.0	10.0	6.0	8.0
Strain %	15.00	6.06	14.86	15.00
Deviator, ksf	2.537	5.103	3.812	3.584
Rate %/min	1.00	1.00	1.00	1.00
in/min	0.060	0.060	0.060	0.060
Job No.:	461-352			
Client:	Geosyntec Consultants			
Project:	WG2562-06			
Boring:	GT18-04	GT18-04	GT18-05	GT18-05
Sample:	04-03	04-04	05-02	05-03
Depth ft:	15-17.5(Tip-1")	20-22.5	10-12.5(Tip-1")	15-17.5(Tip-1.25")

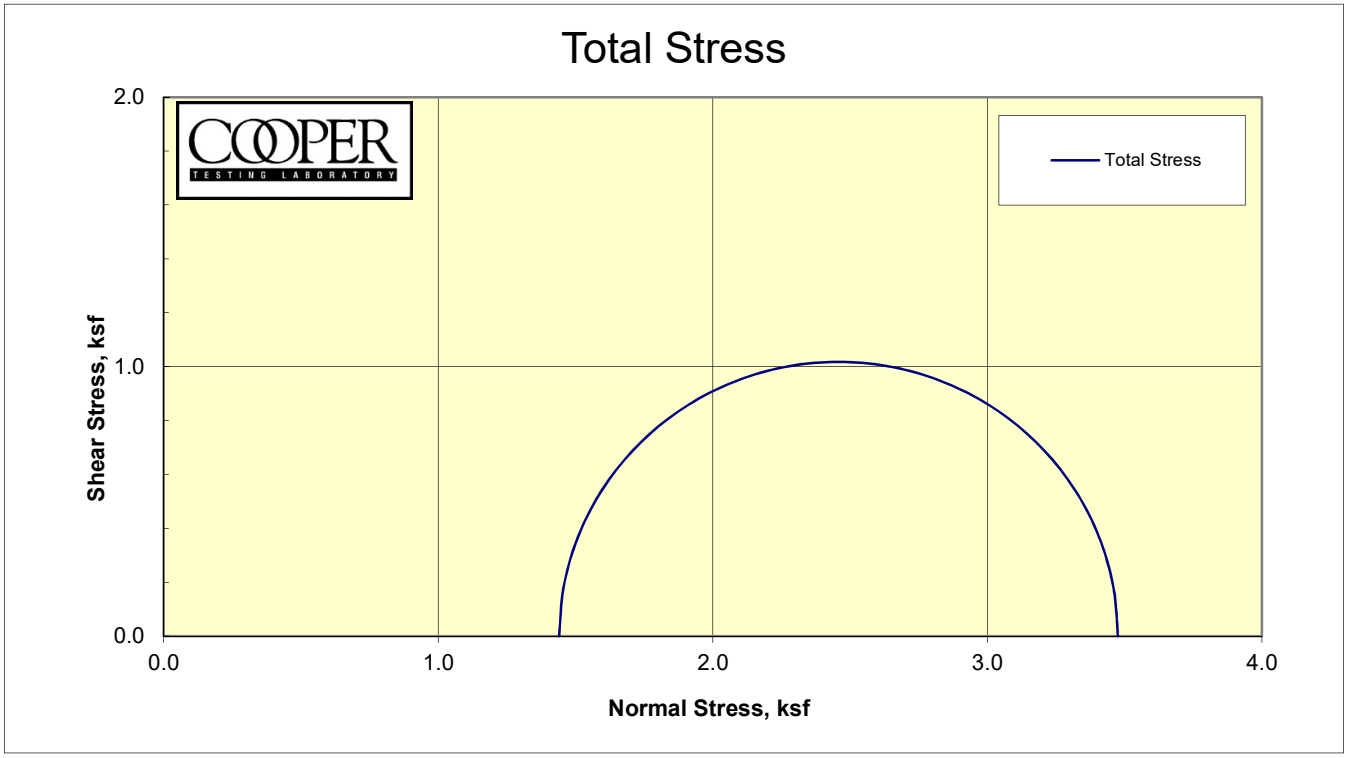
Visual Soil Description	
Sample #	
1	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand
2	Olive Brown Fat CLAY
3	Olive Brown Mottled Gray Sandy Lean CLAY
4	Olive Brown Lean CLAY w/ Sand

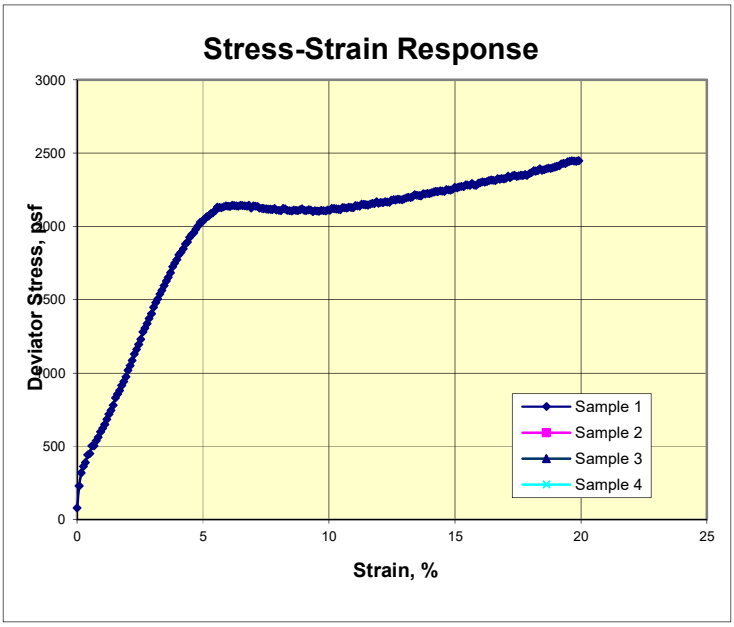
Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Triaxial Unconsolidated-Undrained

(ASTM D2850m)





Sample:	1	2	3	4
MC, %	37.4			
Dry Dens, pcf	83.5			
Sat. %	99.2			
Void Ratio	1.019			
Diameter in	2.87			
Height, in	5.98			
	Final			
MC, %	40.6			
Dry Dens, pcf	80.4			
Sat. %	100.0			
Void Ratio	1.096			
Diameter, in	2.91			
Height, in	6.02			
Cell, psi	78.5			
BP, psi	68.5			
	Effective Stresses At:			
Strain, %	5.0			
Deviator ksf	2.035			
Excess PP	0.000			
Sigma 1	3.475			
Sigma 3	1.440			
P, ksf	2.458			
Q, ksf	1.018			
Stress Ratio	2.413			
Rate in/min	0.0592			
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

Job No.: 461-352 **Date:** 6/3/2019

Client: Geosyntec Consultants BY:MD/DC

Project: WG2562-06

Sample 1) GT18-04_04-04 @ 20-22.5(Tip-7") Olive Brown Fat CLAY

Sample 2)

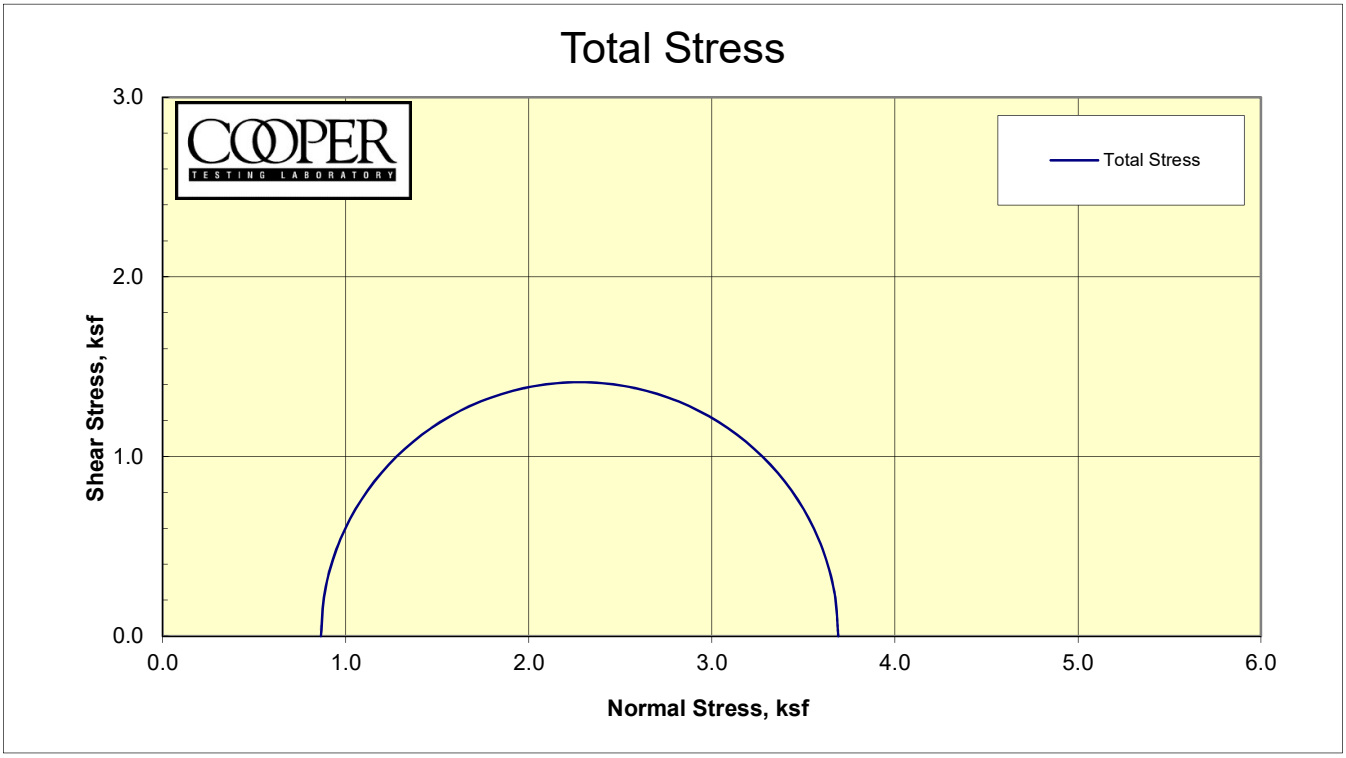
Sample 3)

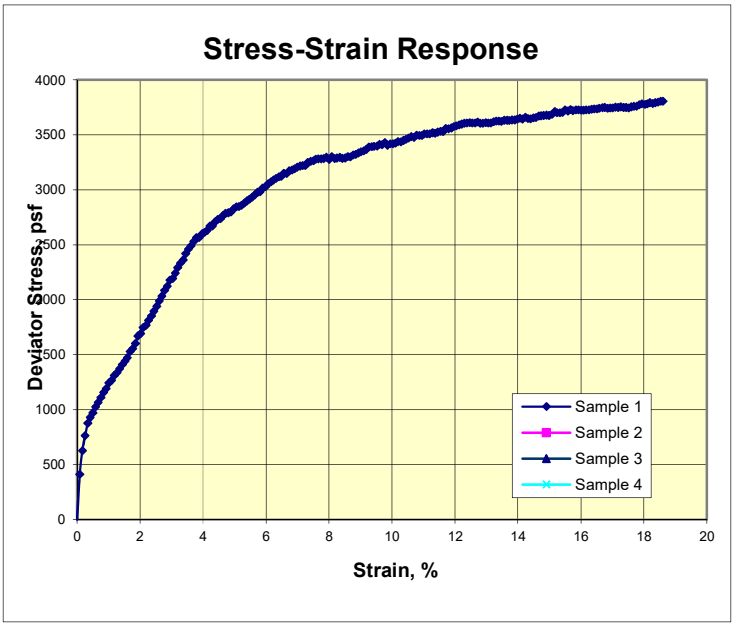
Sample 4)

REMARKS: Strengths picked at 5% strain.

*Sample was back-pressure saturated prior to shear.

Triaxial Unconsolidated-Undrained
(ASTM D2850m)





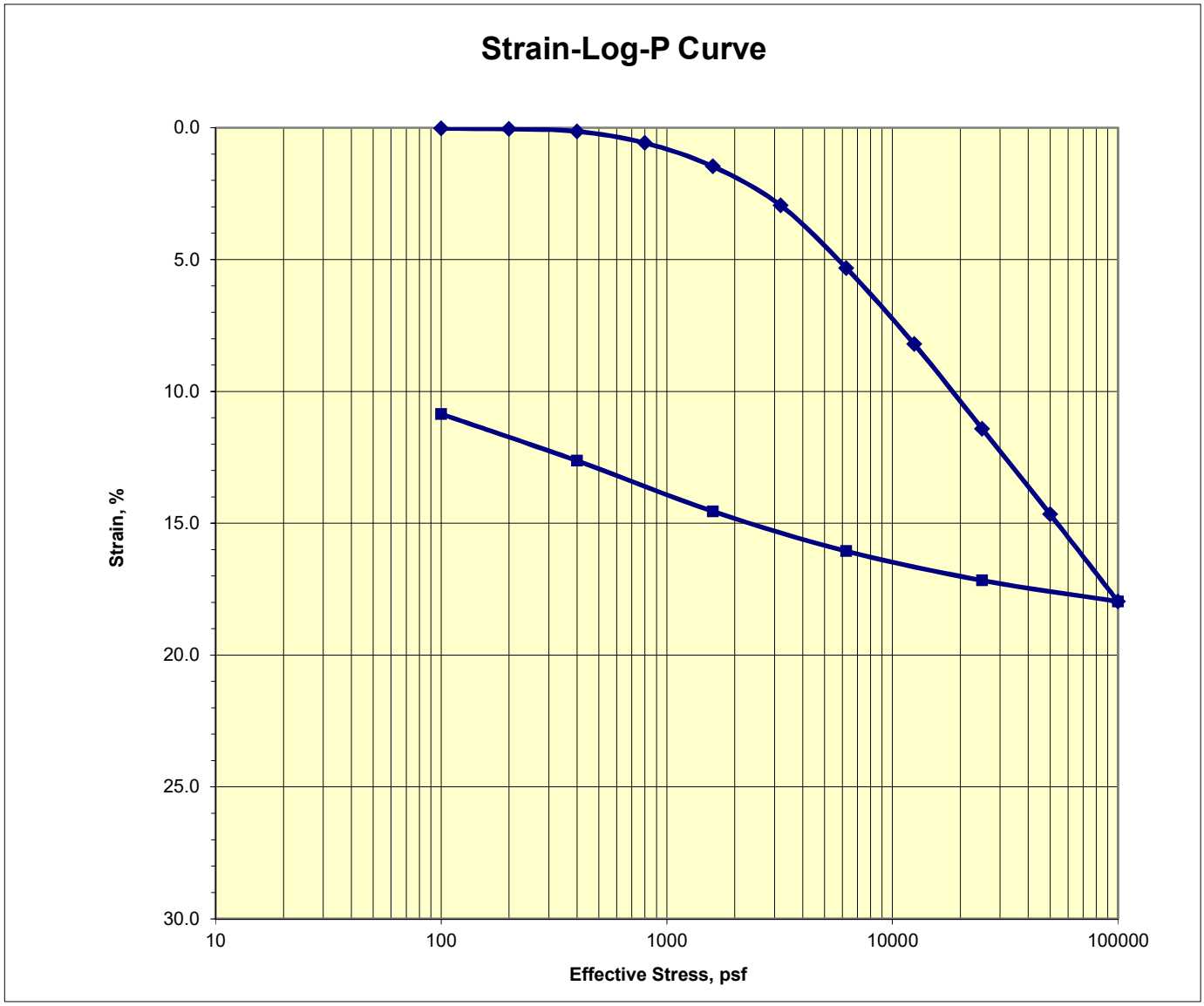
Sample:	1	2	3	4
MC, %	23.4			
Dry Dens, pcf	99.5			
Sat. %	91.3			
Void Ratio	0.693			
Diameter in	2.87			
Height, in	5.98			
	Final			
MC, %	26.3			
Dry Dens, pcf	98.5			
Sat. %	100.0			
Void Ratio	0.710			
Diameter, in	2.87			
Height, in	6.03			
Cell, psi	74.5			
BP, psi	68.5			
	Effective Stresses At:			
Strain, %	5.0			
Deviator ksf	2.827			
Excess PP	0.000			
Sigma 1	3.691			
Sigma 3	0.864			
P, ksf	2.277			
Q, ksf	1.413			
Stress Ratio	4.272			
Rate in/min	0.0584			
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

Job No.:	461-352	**Date:**	6/3/2019
Client:	Geosyntec Consultants		BY:MD/DC
Project:	WG2562-06		
Sample 1)	GT18-05_05-02 @ 10-12.5(Tip-7") Olive Brown Mottled Gray Sandy Lean CLAY		
Sample 2)			
Sample 3)			
Sample 4)			

REMARKS: Strengths picked at 5% strain.
*Sample was back-pressure saturated prior to shear.

Consolidation Test
ASTM D2435

Job No.:	461-352	**Boring:**	GT18-04	**Run By:**	MD
Client:	Geosyntec Consultants	**Sample:**	04-03	**Reduced:**	PJ
Project:	WG2526-06	**Depth, ft.:**	15-17.5(Tip-8.5")	**Checked:**	PJ/DC
Soil Type:	Greenish Gray Mottled Dark Gray Fat CLAY w/ Sand			**Date:**	7/23/2019

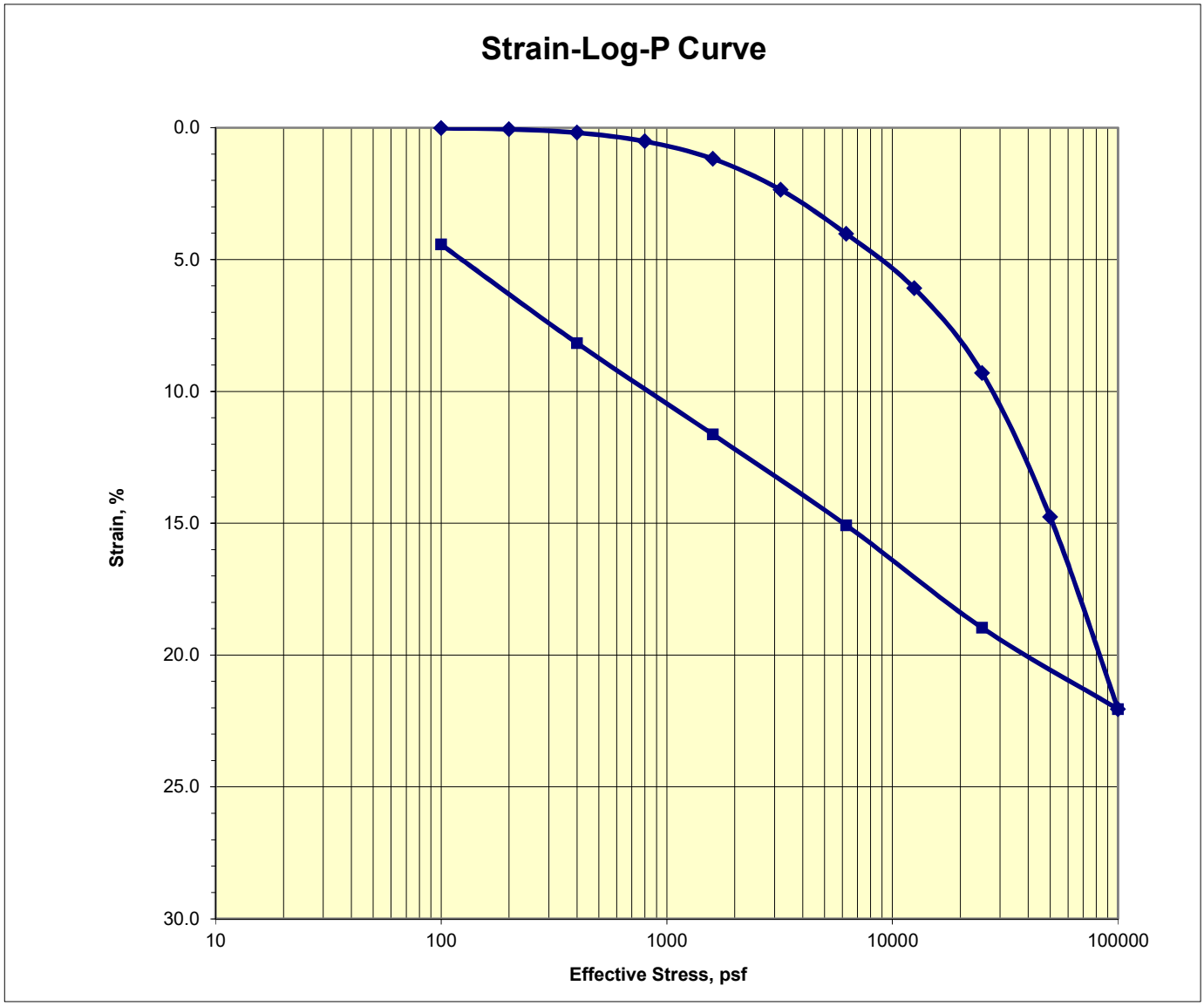


Assumed Gs 2.7	Initial	Final
Moisture %:	20.6	16.9
Dry Density, pcf:	103.9	115.8
Void Ratio:	0.622	0.456
% Saturation:	89.6	100.0

Remarks:

Consolidation Test
ASTM D2435

Job No.:	461-352	**Boring:**	GT18-04	**Run By:**	MD
Client:	Geosyntec Consultants	**Sample:**	04-04	**Reduced:**	PJ
Project:	WG2526-06	**Depth, ft.:**	20-22.5(Tip-16")	**Checked:**	PJ/DC
Soil Type:	Olive Brown Fat CLAY			**Date:**	7/23/2019



Assumed Gs 2.8	Initial	Final
Moisture %:	39.8	39.0
Dry Density, pcf:	80.1	83.6
Void Ratio:	1.182	1.092
% Saturation:	94.3	100.0

Remarks:

APPENDIX 2
Gas Probes and Monitoring Wells Logs

Geosyntec consultants
475 14th Street, Suite 400
Oakland, California 94612
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF BORING / WELL GP-20

Project: Buena Vista Landfill

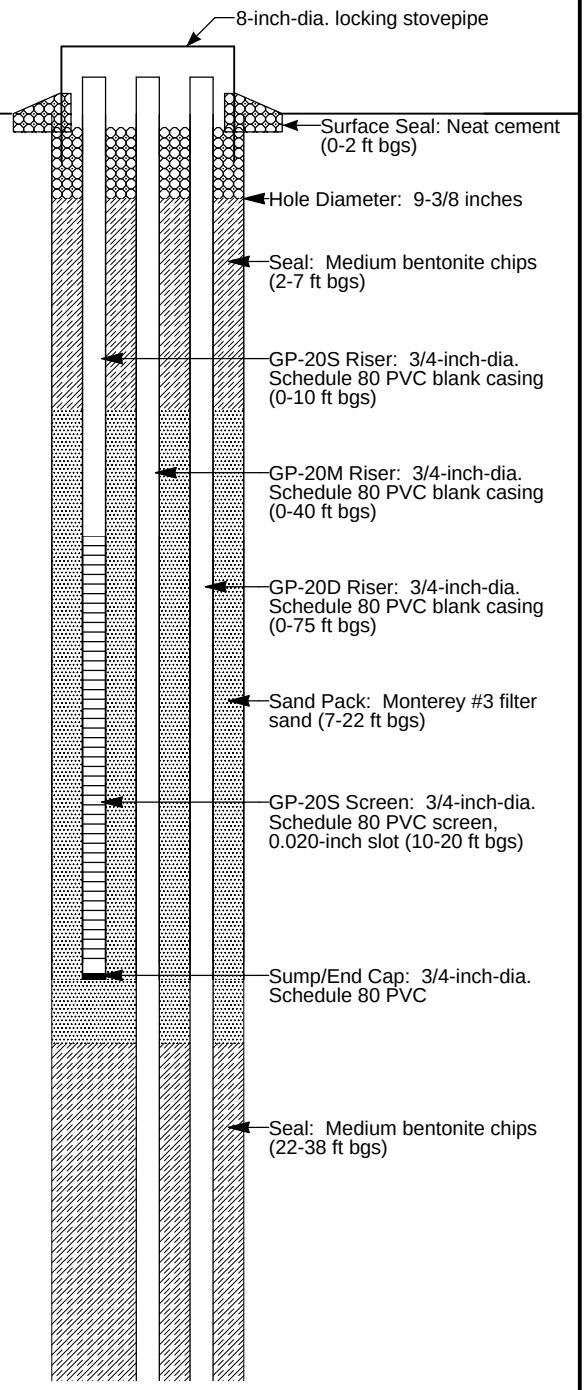
Location: Watsonville, California **Project Number: WG1019 / 02**

Start Date	**7/17/07**	Finish Date	**7/18/07**	Total Depth Drilled (feet bgs)	**86.0**		
Drilling Method	**ARCH**	Drilling Contractor	**Layne Christensen (Fontana)**	Ground Surface Elevation (feet MSL)	**Not available**		
Drill Rig	**AP1000 Percussion Hammer**	Sampling Method	**SPT split spoon**	Top of PVC Casing Elevation (feet MSL)	**Not available**		
Borehole Diameter	**9-3/8 inches**	Hammer Data	**140-lb percussion hammer**	Logger	**N. Mullaugh**	Reviewer	**E. Benede**
Coordinate Location	**Not surveyed**	Remarks					

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	0			[Borehole not logged in upper 5 feet.]
	5		---	SILTY SAND (SM), dark yellowish brown (10YR 3/6), moist, 70% fine sand, 25% low plasticity fines, 5% fine subangular quartzite gravel
	10		50/5"	SILTY SAND WITH GRAVEL (SM), dark yellowish brown (10YR 3/6), moist, 60% fine sand, 20% low plasticity fines, 20% fine subangular to subrounded granitic and quartzite gravel to 1/4 inch, very dense
	15		20-25-35	POORLY GRADED SAND WITH SILT (SP-SM), yellowish brown (10YR 5/4), moist, 90% fine sand, 10% low plasticity fines, very dense
	20			
	25		10-20-27	LEAN CLAY (CL), very pale brown (10YR 7/3), moist, 100% low plasticity fines, stiff [Sand coming out of cyclone at 26 feet.]
	30			

Graphic Log

WELL CONSTRUCTION DIAGRAM



Template: GEOSYNTEC_WELL; Proj ID: BUENVIST.GPJ; Printed: 6/16/2008

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LOG OF BORING / WELL GP-20

Project: Buena Vista Landfill

Location: Watsonville, California **Project Number: WG1019 / 02**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
30		WELL-GRADED SAND (SW), dark yellowish brown (10YR 3/6), moist, 100% fine to coarse sand, subangular to subrounded coarse-sand-size granitic fragments, very dense		Hole Diameter: 9-3/8 inches
				Seal: Medium bentonite chips (22-38 ft bgs)
35	40-50/4"			GP-20M Riser: 3/4-inch-dia. Schedule 80 PVC blank casing (0-40 ft bgs)
40				GP-20D Riser: 3/4-inch-dia. Schedule 80 PVC blank casing (0-75 ft bgs)
				Sand Pack: Monterey #3 filter sand (38-52 ft bgs)
45	50/5"	[Coarse gravel to cobbles coming out of cyclone.]		GP-20M Screen: 3/4-inch-dia. Schedule 80 PVC screen, 0.020-inch slot (40-50 ft bgs)
50				Sump/End Cap: 3/4-inch-dia. Schedule 80 PVC
				Seal: Medium bentonite chips (52-73 ft bgs)
55	50/5"	Sand grades finer; 95% fine to medium sand, 5% coarse sand-size subangular to subrounded granitic fragments		
60				
65				

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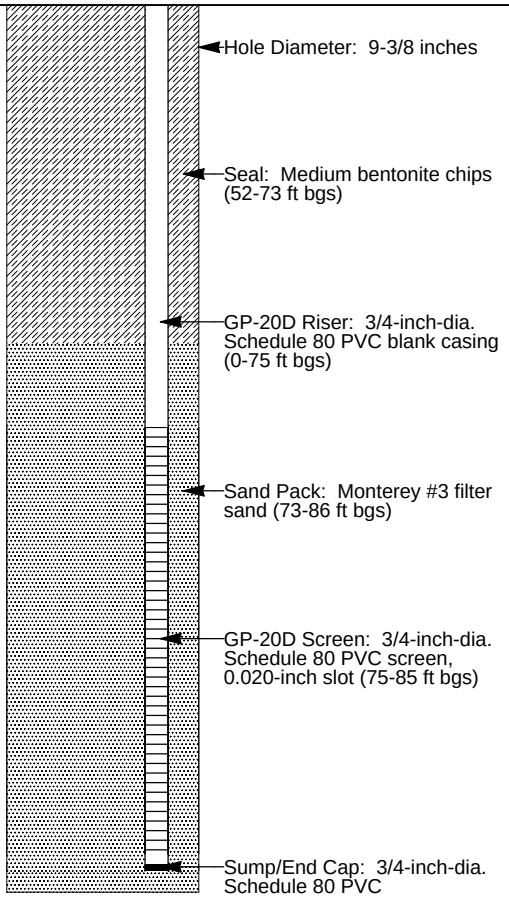
LOG OF BORING / WELL GP-20

Project: Buena Vista Landfill

Location: Watsonville, California **Project Number: WG1019 / 02**

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log
	65			WELL-GRADED SAND (SW) (continued)	
			27-50/3"	LEAN CLAY (CL), dark yellowish brown (10YR 4/6), moist, 95% low plasticity fines, 5% fine subrounded gravel to 1/4 inch	
				WELL-GRADED SAND (SW), dark yellowish brown (10YR 3/6), moist, 95% fine to medium sand, 5% coarse subrounded sand	
	70				
	75		28-50/3"		
	80				
	85		30-50/2"	WELL-GRADED SAND WITH GRAVEL (SW), very dark grayish brown (10YR 3/2), moist, 75% medium to coarse sand, 25% fine subangular to subrounded gravel to 1/4 inch	
				Bottom of boring at 86.0 feet bgs	
	90				
	95				
	100				

WELL CONSTRUCTION DIAGRAM



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LOG OF BORING / WELL GP-21

Project: Buena Vista Landfill

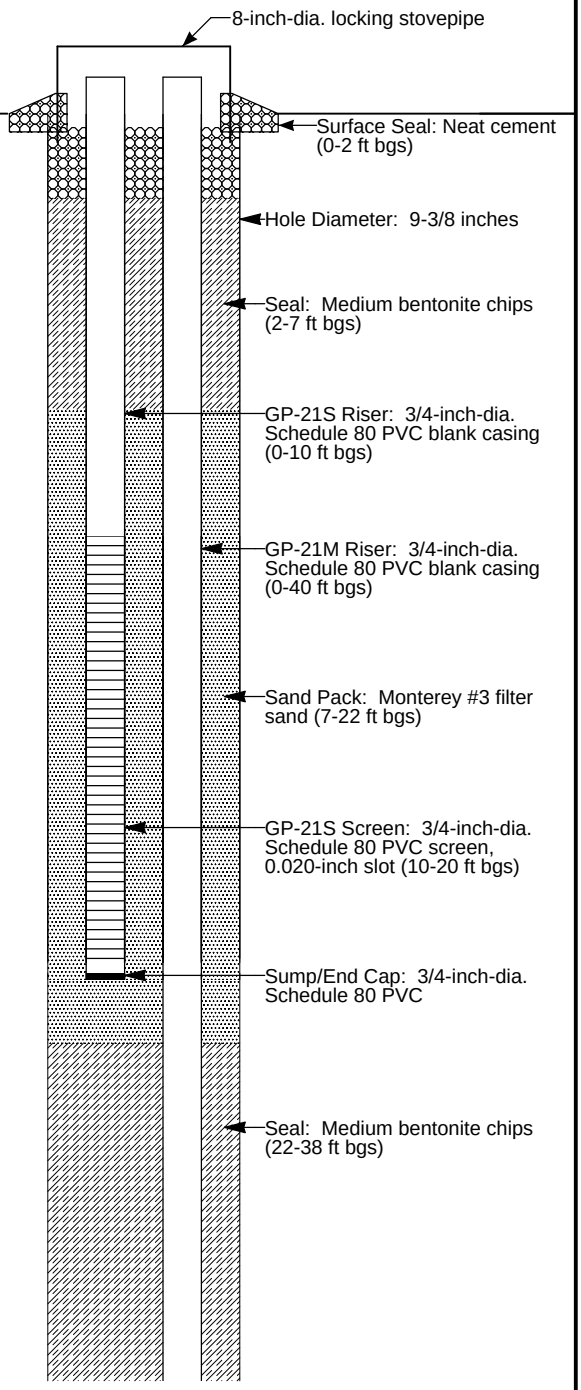
Location: Watsonville, California **Project Number: WG1019 / 02**

Start Date	**7/19/07**	Finish Date	**7/20/07**	Total Depth Drilled (feet bgs)	**51.5**		
Drilling Method	**ARCH**	Drilling Contractor	**Layne Christensen (Fontana)**	Ground Surface Elevation (feet MSL)	**Not available**		
Drill Rig	**AP1000 Percussion Hammer**	Sampling Method	**SPT split spoon**	Top of PVC Casing Elevation (feet MSL)	**Not available**		
Borehole Diameter	**9-3/8 inches**	Hammer Data	**140-lb percussion hammer**	Logger	**N. Mullaugh**	Reviewer	**E. Benede**
Coordinate Location	**Not surveyed**	Remarks	**Used sand catcher in SPT sampler.**				

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	0			[Borehole not logged in upper 5 feet.]
	5		22-30-42	LEAN CLAY (CL), yellowish brown (10YR 5/4), moist, 95% low plasticity fines, 5% fine sand, firm
	10		13-26-30	SILT (ML), dark yellowish brown (10YR 5/4) with trace orange mottling, moist, 100% nonplastic fines, stiff
	15		40-50/4"	
	20		25-50/3"	POORLY GRADED SAND (SP), light yellowish brown (10YR 6/4), moist, 95% fine sand, 5% nonplastic fines, dense to very dense
	25		27-50/4"	WELL-GRADED SAND (SW), yellowish brown (10YR 5/6), moist, 95% fine to medium sand, 5% fine subrounded gravel to 1/4 inch, dense to very dense
	30			

Graphic Log

WELL CONSTRUCTION DIAGRAM



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LOG OF BORING / WELL GP-21

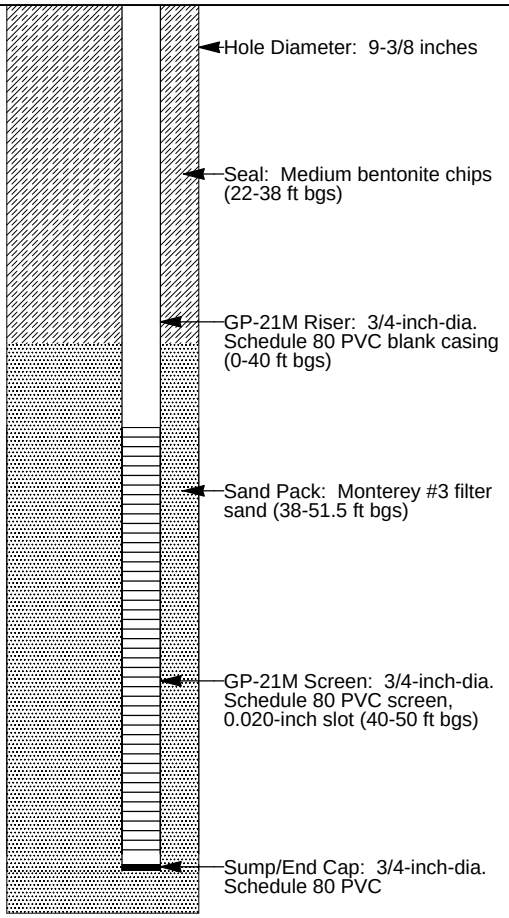
Project: Buena Vista Landfill

Location: Watsonville, California **Project Number: WG1019 / 02**

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	30		50/2"	WELL-GRADED SAND WITH CLAY AND GRAVEL (SW-SC), dark yellowish brown (10YR 4/6), moist, 70% fine to coarse sand, 20% fine subangular to subrounded gravel to 1/4 inch, 10% low plasticity fines
	35		28-50/3"	WELL-GRADED SAND (SW), dark yellowish brown (10YR 4/4), moist, 95% fine to medium sand, 5% fine subangular gravel to 1/4 inch, dense to very dense
	40		27-50/3"	CLAYEY SAND WITH GRAVEL (SC), dark yellowish brown (10YR 3/6), moist, 60% fine to coarse sand, 20% low plasticity fines, 20% fine subrounded gravel to 1/4 inch, dense to very dense
	45		50/5"	WELL-GRADED SAND WITH GRAVEL (SW), dark brown (10YR 3/3), moist, 80% fine to coarse sand, 20% fine subangular to subrounded gravel to 1/4 inch, very dense
	50		--	Gravel content increases to 30%
				Bottom of boring at 51.5 feet bgs
	55			
	60			
	65			

Graphic Log

WELL CONSTRUCTION DIAGRAM



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LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

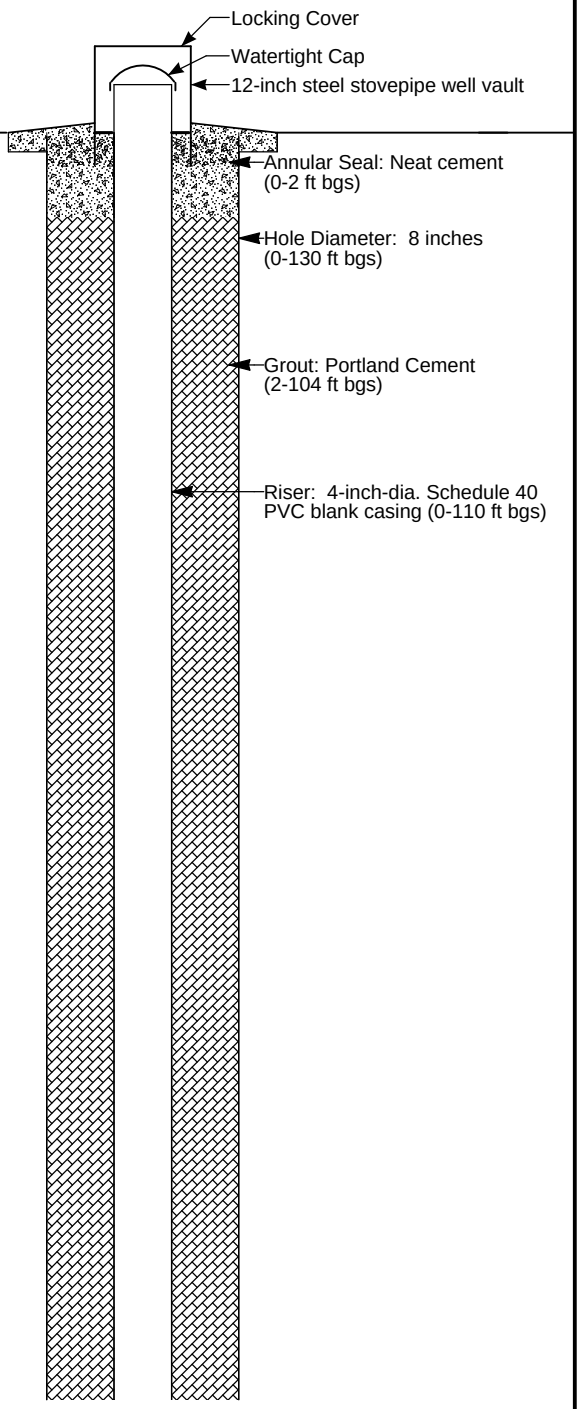
Location: Watsonville, CA **Project Number: MW-13**

Start Date	**7/25/07**	Finish Date	**7/27/07**	Total Depth Drilled (feet bgs)	**131.0**
Drilling Method	**Sonic**	Drilling Contractor	**Prosonic**	Ground Surface Elevation (feet MSL)	**MSL**
Drill Rig	**Sonic**	Sampling Method	**Continuous Core**	Top of PVC Casing Elevation (feet MSL)	**109.47**
Borehole Diameter	**9 in.**	Hammer Data		Logger **N Mullaugh**	Reviewer **E Benede**
Coordinate Location	**N 11881.18 E 10792.22**	Remarks			

Elevation, feet	Depth, feet	Sample Interval	Blows per 6 inches	MATERIAL DESCRIPTION
	0			CLAYEY SAND (SC) dark yellowish brown (10yr 4/6), moist, 60% fine sand, 40% low plasticity fines, loose.
	5		100	WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/6), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".
	10			WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC) dark yellowish brown (10yr 4/6), moist, 70% fine to coarse sand, 20% large subangular subround gravel up to 1", 10% low palsticity fines.
	15		100	
				POORLY GRADED SAND (SP) dark yellowish brown (10yr 3/6), wet, 90% medium sands, 10% small sub angular subround gravel up to 1/2".
	20			LEAN CLAY (CL) brown (10yr 5/3), moist, 100% medium plasticity clay, stiff.
	25		100	
	30			WELL GRADED SAND (SW) brown (10yr 5/3), moist,

Graphic Log

WELL CONSTRUCTION DIAGRAM



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LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

Location: Watsonville, CA **Project Number: MW-13**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
30		85% fine to medium sand, 10% subangular subround large gravel, 5% low plasticity fines.		
35	100	WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/4), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".		
		CLAYEY SAND WITH GRAVEL (SC) brown (10yr 4/3), moist, 50% fine to medium sand, 30% high plasticty fines, 20% subangular subround large gravel up to 1".		
40		WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/4), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".		
45	100	CLAYEY SAND WITH GRAVEL (SC) brown (10yr 4/3), moist, 50% fine to medium sand, 30% high plasticty fines, 20% subangular subround small gravel up to 1/2".		
50		WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC) dark yellowish brown (10yr 5/4), moist, 70% fine to coarse sand, 20% subangular to round large gravel up to 1 1/2", 10% medium plasticity fines.		
55	100	WELL GRADED SAND WITH GRAVEL (SW) dark yellowish brown (10yr 4/6), moist, 80% fine to coarse sand, 20% large sub angular subround granitic gravel up to 1".		
60				
		LEAN CLAY (CL) brown (10yr 4/3), moist, 90% low		
65				

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LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

Location: Watsonville, CA **Project Number: MW-13**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
65	100	plasticity fines, 10% fine sand, stiff.		
		POORLY GRADED SAND (SP) dark yellowish brown (10yr 4/4), moist, 100% medium sand, uniform.		
70				
75	100			
		WELL GRADED SAND WITH GRAVEL (SW) brown (10yr 4/3), moist, 70% fine to coarse sand, 25% subangular subround large gravel up to 1", 5% low plasticity fines.		
80				
85	100			
90		WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC) dark yellowish brown (10yr 5/4), moist, 70% fine to coarse sand, 20% subangular to round large gravel up to 1", 10% medium plasticity fines.		
		POORLY GRADED SAND WITH CLAY (SP-SC) brown (10yr 4/3), moist, 90% medium sand, 10% medium plasticity fines.		
95	100			
		CLAYEY SAND (SC) light brownish gray (10yr 6/2), moist, 60% fine sand, 40% medium plasticity fines, stiff.		
100				

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LOG OF Boring/Well MW-13

Project: Buena Vista Landfill

Location: Watsonville, CA **Project Number: MW-13**

Elevation, feet / Depth, feet	Sample Interval / Blows per 6 inches	MATERIAL DESCRIPTION	Graphic Log	WELL CONSTRUCTION DIAGRAM
105	100	POORLY GRADED SAND WITH CLAY (SP-SC) light brownish gray (10yr 6/2), wet, 90% fine sand, 10% medium placticity clay.		Seal: Medium bentonite chips (104-107 ft bgs)
110				Sand Pack: Monterey #3 sand sand (107-130 ft bgs)
115	100	WELL GRADED SAND (SW) light brownish gray (10yr 6/2), wet, 90% fine to coarse sand, 5% subangular round large gravel up to 1", 5% medium plasticity fines.		Screen: 4-inch-dia. Schedule 40 PVC casing, 0.020-inch slot (110-130 ft bgs)
120				
125	100			
130				End Cap: 4-inch-dia. threaded Schedule 40 PVC
		Total Depth = 131 feet bgs		
135				

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Rancho Cordova, California 95670
Telephone: 916-637-8048
Fax: 916-550-9498

WELL NUMBER MW-14

CLIENT Santa Cruz County
PROJECT NAME Buena Vista Landfill
PROJECT NUMBER WG2726
PROJECT LOCATION Watsonville, CA
DATE STARTED 9/3/19 **COMPLETED** 9/6/19
GROUND ELEVATION TOC 82.35 ft **HOLE SIZE** 10 inches
DRILLING CONTRACTOR Cascade Drilling LP
GROUND WATER LEVELS:
DRILLING METHOD Air Rotary Casing Hammer
AT TIME OF DRILLING 75.00 ft below ground surface
LOGGED BY FPK **CHECKED BY** NKG
AT END OF DRILLING 81.10 ft below ground surface
NOTES NAD83 Zone 3, NGVD 29 N1,796,279.5 E6,178,646.0
AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0					
		SW-SM		(SW-SM) Well graded SAND with silt, brownish yellow (10YR 6/8), dry, fine to coarse sand, non plastic fines, (0% gravel, 90% sand, 10% fines).	Standpipe with two concrete bollards
10				10.0	
		SW		(SW) Well graded SAND, dark yellowish brown (10YR 4/4), dry, fine to coarse sand, (0% gravel, 100% sand, 0% fines).	
20				20.0	
		SW		(SW) Well graded SAND with gravel, dark yellowish brown (10YR 4/4), moist, fine to coarse sand, fine subrounded gravel, (15% gravel, 85% sand, 0% fines).	
25				25.0	
		SC		(SC) Clayey SAND with gravel, brown (7.5YR 5/4), moist, fine subrounded gravel, fine to coarse sand, medium plasticity fines, (5% gravel, 80% sand, 15% fines).	
30				30.0	
		GW-GC		(GW-GC) Well graded GRAVEL with clay and sand, brown (7.5YR 4/4), moist, fine to coarse subrounded gravel, medium to coarse sand, medium plasticity fines, (50% gravel, 30% sand, 20% fines).	
35				35.0	

GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 9/25/19 15:04 - C:\USERS\FKAN\DESKTOP\BUENA VISTA - MW-14.GPJ

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Telephone: 916-637-8048
Fax: 916-550-9498

WELL NUMBER MW-14

CLIENT Santa Cruz County **PROJECT NAME** Buena Vista Landfill

PROJECT NUMBER WG2726 **PROJECT LOCATION** Watsonville, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35					
		CL		(CL) Sandy lean CLAY, yellowish brown (10YR 5/6), moist, fine rounded gravel, medium sand, medium plasticity fines, (20% gravel, 20% sand, 60% fines).	
40				40.0	4" ID PVC Blank
		CH		(CH) Fat CLAY with SAND, pale brown (10YR 6/3), medium sand, high plasticity fines, (0% gravel, 25% sand, 75% fines).	
45				45.0	
		SM		(SM) Silty SAND, dark yellowish brown (10YR 4/4), moist, fine sand, low plasticity fines, (0% gravel, 80% sand, 20% fines).	
50				50.0	Portland cement grout tremie application
		SW-SM		(SW-SM) Well graded SAND with silt, dark yellowish brown (10YR 4/4), moist, fine to coarse sand, non plastic fines, (0% gravel, 90% sand, 10% fines).	
55					
60				60.0	
		SC		(SC) Clayey SAND with gravel, dark yellowish brown (10YR 4/4), moist, sub rounded gravel, medium sand, medium plasticity fines, (20% gravel, 40% sands, 40% fines).	
65				65.0	Bentonite Seal
		GP		(GP) Poorly graded GRAVEL, brown (10YR 4/3), moist, angular fine gravel, medium to coarse sand, (90% gravel, 10% sand, 0% fines).	
70				70.0	
		GW		(GW) Well graded GRAVEL, brown (10YR 4/3), moist, fine to coarse subangular gravel, coarse sand, (90% gravel, 10% sand, 0% fines).	
75				75.0 ▽	

GENERAL BH / TP / WELL - GINT STD US LAB.GDT - 9/25/19 15:04 - C:\USERS\FKAN\DESKTOP\BUENA VISTA - MW-14.GPJ

(Continued Next Page)

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WELL NUMBER MW-14

CLIENT Santa Cruz County **PROJECT NAME** Buena Vista Landfill

PROJECT NUMBER WG2726 **PROJECT LOCATION** Watsonville, CA

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75					
80		SM		(SM) Silty SAND, dark yellowish brown (10YR 4/4), wet, fine to coarse sand, non plastic fines, (0% gravel, 70% sand, 30% fines).	Cemex #3 Lapis Lustre sand pack
85				85.0	4" PVC 0.020" Well Screen
		SC		(SC) Clayey SAND, dark yellowish brown (10YR 4/4), wet, fine to medium sand, medium plasticity fines, (0% gravel, 70% sand, 30% fines).	
90				90.0	
		SC		(SC) Clayey SAND with gravel, dark yellowish brown (10YR 4/4), wet, fine rounded gravel, fine to coarse sand, medium plasticity fines, (30% gravel, 40% sand, 30% fines).	
				92.0	

Bottom of borehole at 92.0 feet.

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APPENDIX 3

State Well 12/01-01 Log

ORIGINAL

File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do not fill in

No. 247801

State Well No. 12/01-1

Other Well No.

...e of Intent No.

...l Permit No. or Date 1040

(1)

Addre

City

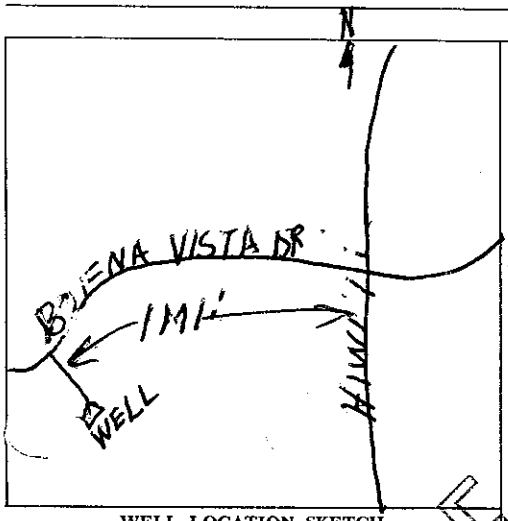
(2) **LOCATION OF WELL** (See instructions):

County Santa Cruz Owner's Well Number

Well address if different from above 1203 Buena Vista Drive

Township Range Section

Distance from cities, roads, railroads, fences, etc.



WELL LOCATION SKETCH

(3) **TYPE OF WORK:**

New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) **PROPOSED USE:**

Domestic ☐
Irrigation ☒
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

(5) **EQUIPMENT:**

Rotary ☒ Reverse ☐
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) **GRAVEL PACK:**

Yes ☒ No ☐ Size 10
Diameter of bore 26
Packed from 50 to 204 ft.

(7) **CASING INSTALLED:**

Steel ☐ Plastic ☒ Concrete ☐

(8) **PERFORATIONS:**

Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
0	164	10	SDR21	164	204	pvc well screen

(9) **WELL SEAL:**

Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 50 ft.

Were strata sealed against pollution? Yes ☒ No ☐ Interval solid ft.

Method of sealing cement grout thru tailing pipe

(10) **WATER LEVELS:**

Depth of first water, if known 95 ft.

Standing level after well completion 95 ft.

(11) **WELL TESTS:**

Was well test made? Yes ☒ No ☐ If yes, by whom? Self

Type of test Pump ☒ Bailer ☐ Air lift ☐

Depth to water at start of test 95 ft. At end of test 150 ft

Discharge 125 gal/min after 4 hours Water temperature cool

Chemical analysis made? Yes ☐ No ☒ If yes, by whom?

Was electric log made? Yes ☐ No ☒ If yes, attach copy to this report

(12) **WELL LOG:** Total depth 210 ft. Depth of completed well 204 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	4	Top soil
4	36	Blue clay
36	55	Brown clay
55	93	Blue clay
93	126	Coarse gravel
126	160	Layers brown clay & gravel
160	195	Red sand
195	210	Brown clay

Work started 7-6 19 83 Completed 7-8 19 83

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SIGNED James I. Ash (Well Driller)

NAME FRED ASH & SONS, INC. (Person, firm, or corporation) (Typed or printed)

Address 1225 Castroville Blvd.

City Salinas Zip 93907

License No. 391942 Date of this report 8-4-83

CONFIDENTIAL
NOT FOR PUBLIC USE
WATER CODE SEC. 13752

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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Appendix R. Hydro Drainage Memo for Alternative 3

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Alternate 3 – Combined Facilities on Adjacent Property Drainage Report

Santa Cruz County Department of Public Works
701 Ocean Street
Santa Cruz, CA 95060

SCS ENGINEERS

02221033.00 | September 3, 2026

1881 Campus Commons Drive
Reston, VA 20190

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Attachment C Pre-Development Drainage Divides Map
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Attachment E Drainage Area Calculations
Attachment F Hydraflow Graphs

1.0 BACKGROUND

The purpose of this drainage report is to highlight the existing and proposed conditions of the redevelopment area associated with this project. This report will describe both the existing and proposed conditions of the project area and describe the pre-development and post-development stormwater runoff volumes. Any potential impacts to the site will be identified and recommendations for best management practices to prevent erosion damage and proper sediment controls will be discussed.

2.0 SITE DESCRIPTION

The County of Santa Cruz (County) owns and operates the Buena Vista Landfill located in unincorporated Santa Cruz County. As of November 2022, the landfill has an estimated remaining capacity ranging from 6 to 16 years depending on rate of disposal at the landfill.

The County is planning a redevelopment project to address solid waste handling after landfill closure. To properly handle solid waste post-closure, the new facility will need to incorporate areas to accept different waste streams. This planned development will incorporate a transfer station, recycle center, organics diversion, and bulk waste collection such as mattresses, e-waste and other larger waste streams.

This project is planned to be primarily situated on the adjacent property located at 1203 Buena Vista Drive, which is the north adjacent property, with a small area of the current County landfill property being utilized. The parcel is 26.95 acres, but only approximately 11 acres on the eastern portion of the property will be utilized for development. The western half of the property is vegetated and will remain untouched during this development. See **Attachment A – Site Location Map** for a detailed location of the property.

The property sits next to the major Harkings Slough watershed and ultimately drains to the Gallighan Slough. FEMA Flood Insurance Rate Maps do not indicate the property is in any Special Flood Hazard Areas. FEMA Maps for this area can be found in **Attachment B – FEMA Flood Insurance Rate Map**.

3.0 EXISTING CONDITION

The existing use of this property was a previous greenhouse for growing produce. The property has three greenhouse buildings approximately 52,000, 56,000, and 59,000 square feet in size, two sheds, bathroom, boiler house, packing shed and internal roadways that contribute to the existing impervious area which totals to approximately 4.5 acres. The low point of the property is in the middle and the contours have created a type of drainage swale to convey the stormwater through the property. Stormwater runoff conveys from the east, west, and from the north property to this swale and a culvert on the County's property before continuing to convey through the Harkins Slough ditch. The stormwater continues along Harkins Slough Road, then crosses, traveling parallel to Buena Vista Drive and ultimately outfalls into Galligan Slough.

As an example, pre-development calculations for Culvert 1 are performed using the Rational Method. This utilizes the acreage, runoff coefficient, and rainfall event to calculate the runoff volume. Culvert 1 receives stormwater runoff from Drainage Area 3 (DA 3) as shown on **Attachment C – Pre-Development Drain Divides Map**. Utilizing a 10-year 15 minutes time of concentration of 1.81 inches/hour (Santa Cruz Design Manual), drainage area of 7.91 acres and a runoff coefficient of 0.71, the approximate stormwater runoff volume is 10.17 cubic feet per second (cfs). After reviewing

the analysis, it is shown that the culvert can convey the estimated runoff from this drainage area. The headwater at the inlet does rise above the top of pipe but the flow is still able to exit the culvert with no issues. A larger storm may cause overtopping. Calculations for this culvert have been performed with Hydraflow Express and can be found in **Attachment F**.

4.0 PROPOSED CONDITION

As mentioned above, the proposed condition for this project will include a new 71,500 square foot transfer station, a 71,700 square foot organics diversion (30,500 s.f.) and recycle center (41,200 s.f.) building, new office, scale and scale house, loading docks for bulk items and a parking/storage area for County use. All these improvements and the paving required to accommodate constant traffic from customers and transfer trailers entails in approximately 7.13 acres of impervious area. This is an increase of around 2.63 acres or 36%. Post-development drainage areas can be found in **Attachment D – Post-Development Drain Divides Map**.

The proposed layout of this combined facility has been designed to utilize the existing topo in mind. The transfer trailer tunnel has been located at a lower elevation to help prevent major excavation of the site and preliminarily graded to convey stormwater runoff in the same manor as the existing condition. Due to the increase in the impervious area, stormwater ponds have been designed and placed at the low spot of the site to provide detention of the runoff and slowly release it into the drainage systems. This has been analyzed as Pond 1. This pond collects runoff from DA 3 + DA 13 + DA 14. Calculations for this pond can be found in **Attachment F**.

Looking at the post-development analysis of Culvert 1, we can see the culvert is going to be replaced with a new culvert due to the new alignment of the transfer trailer exit road and grading on both sides of the road. The culvert will be upsized from 18 inches to 24 inches and have a longer length. This culvert will be conveying stormwater from Pond 1 and DA 15. Pond 1 will be discharging 5.2 cfs and DA 15 will discharge 1.2 cfs for a total of 6.4 cfs. As shown in the culvert report, the new larger culvert will not have any issues conveying the post development flow.

Calculations for various ditches and culverts which were completed for the downstream analysis can also be found in **Attachment F**.

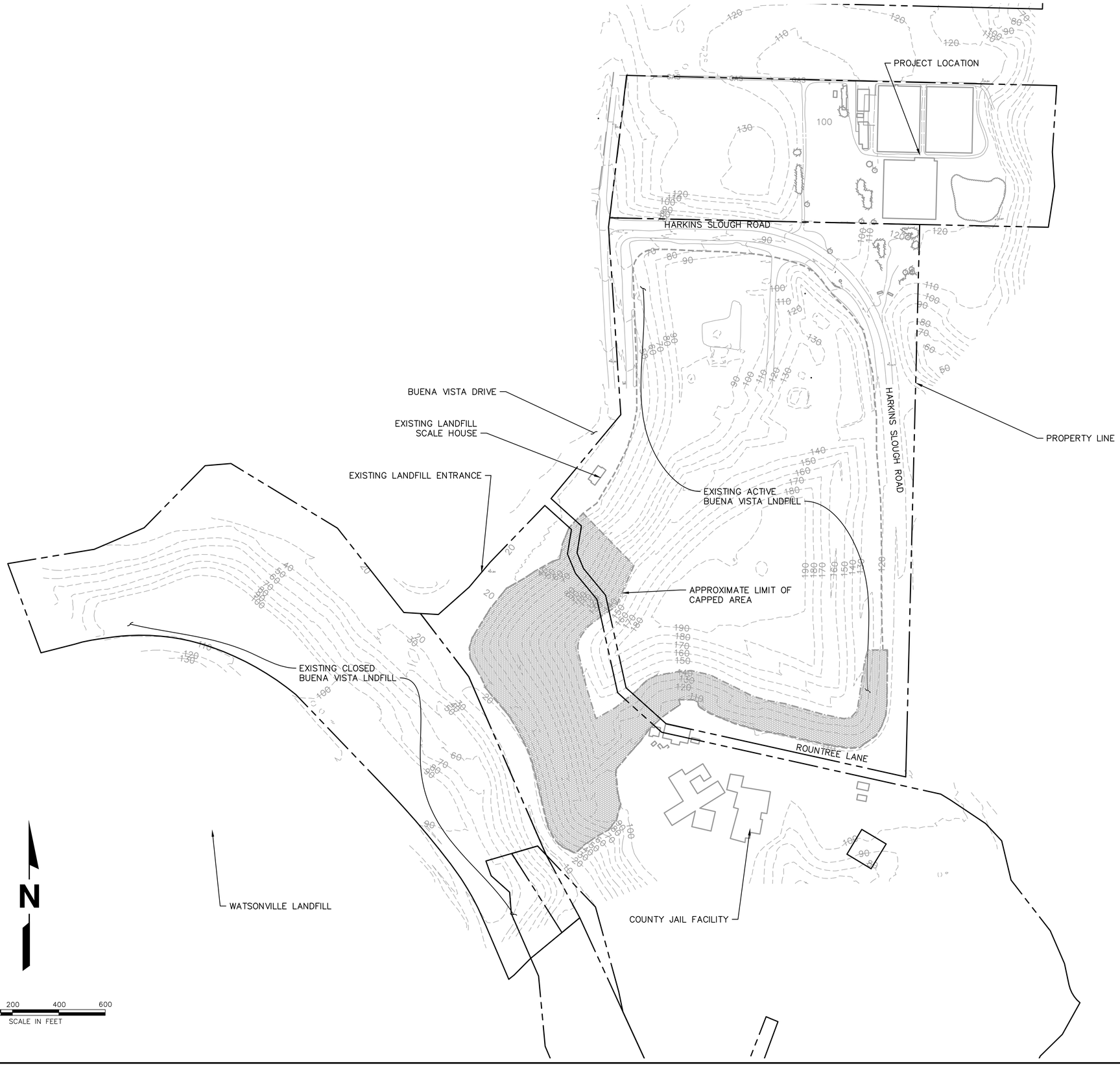
When examining the downstream analysis, we can look at the ultimate outfall into Galligan Slough which is Culvert 5. This culvert must convey almost all the stormwater runoff from the County property. The County plans to replace this culvert with either a 10’ x 10’ box culvert, a 12’ circular culvert, or a bridge. To be conservative, the Culvert 5 calculations were performed with a 10’ x 10’ box culvert. This ensures any of these options will provide enough capacity to handle all stormwater flows. The pre-development runoff volume is 113.23 cfs and the post-development runoff volume is 113.54 cfs. In both situations Culvert 5 has no issues handling this flow.

5.0 SUMMARY

Based on the preliminary calculations performed, the existing stormwater infrastructure on site has the capacity to handle an increase of stormwater runoff. The addition of a stormwater detention pond helps make this achievable and maintains a pre and post-development runoff volume. This development does not negatively impact the stormwater conveyance systems in place.

Appendix A

Site Location Map



NO.	REVISION	DATE

SHEET TITLE
SITE LOCATION MAP

PROJECT TITLE
BUENA VISTA REDEVELOPMENT PROJECT
SANTA CRUZ COUNTY

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET
SANTA CRUZ, CA 95060

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
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1881 CAMPUS COMMONS DRIVE - RESTON, VA 20191
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PROJ. NO. 02221033.00
DSN. BY: SRS
DRN. BY: SRS
CHK. BY: KEA
Q/A R/W BY: KEA
APP. BY: KEA

CADD FILE:

DATE: SEPT. 2026

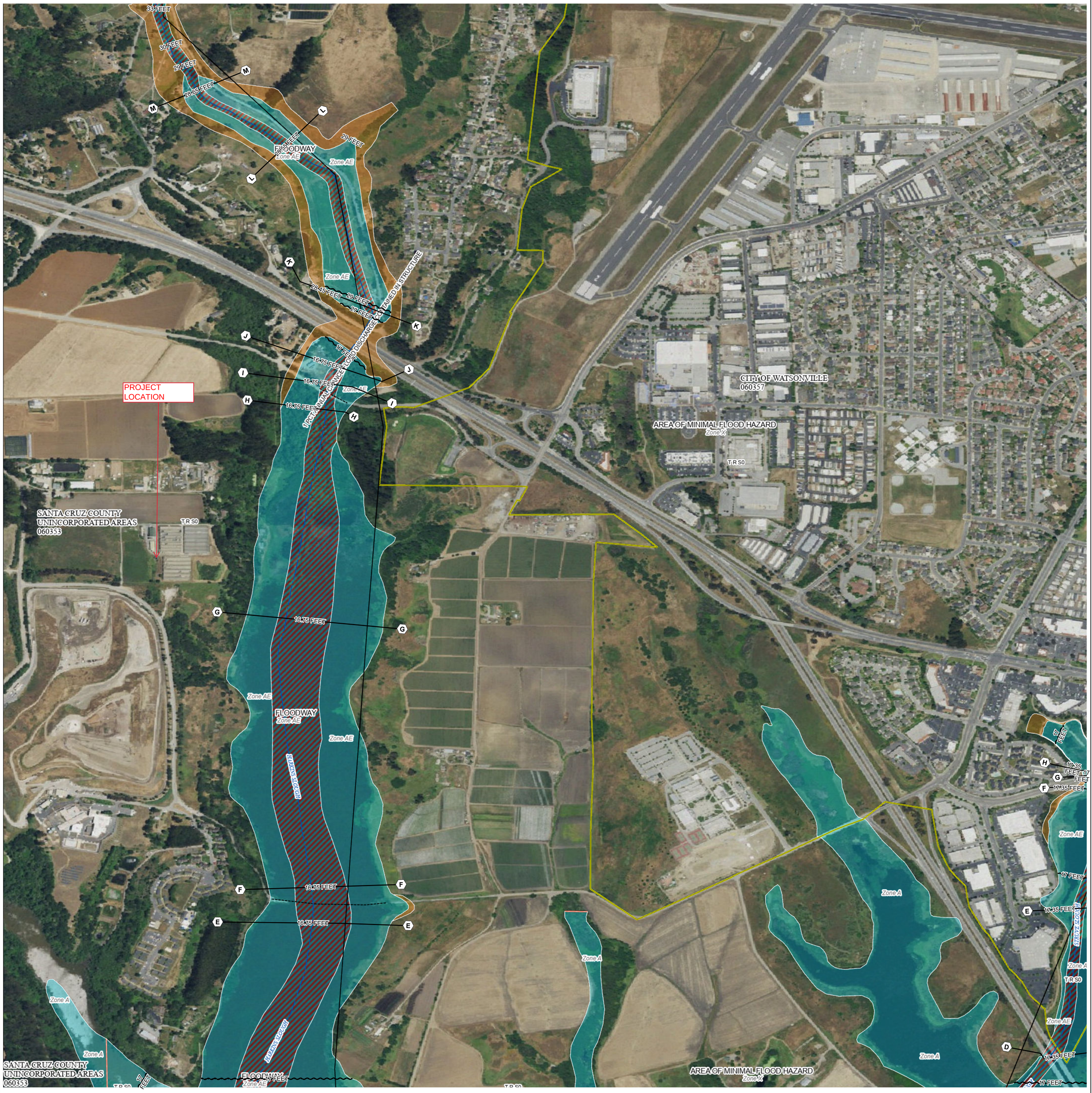
SCALE: AS SHOWN

DRAWING NO. 1 of 1

Appendix B

FEMA Flood Map

121°48'45.49"W 36°56'21.61"N



121°46'52.13"W 36°54'15.94"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR DRAFT FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **10/16/2024 11:37 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88

For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

PANEL 391 OF 456

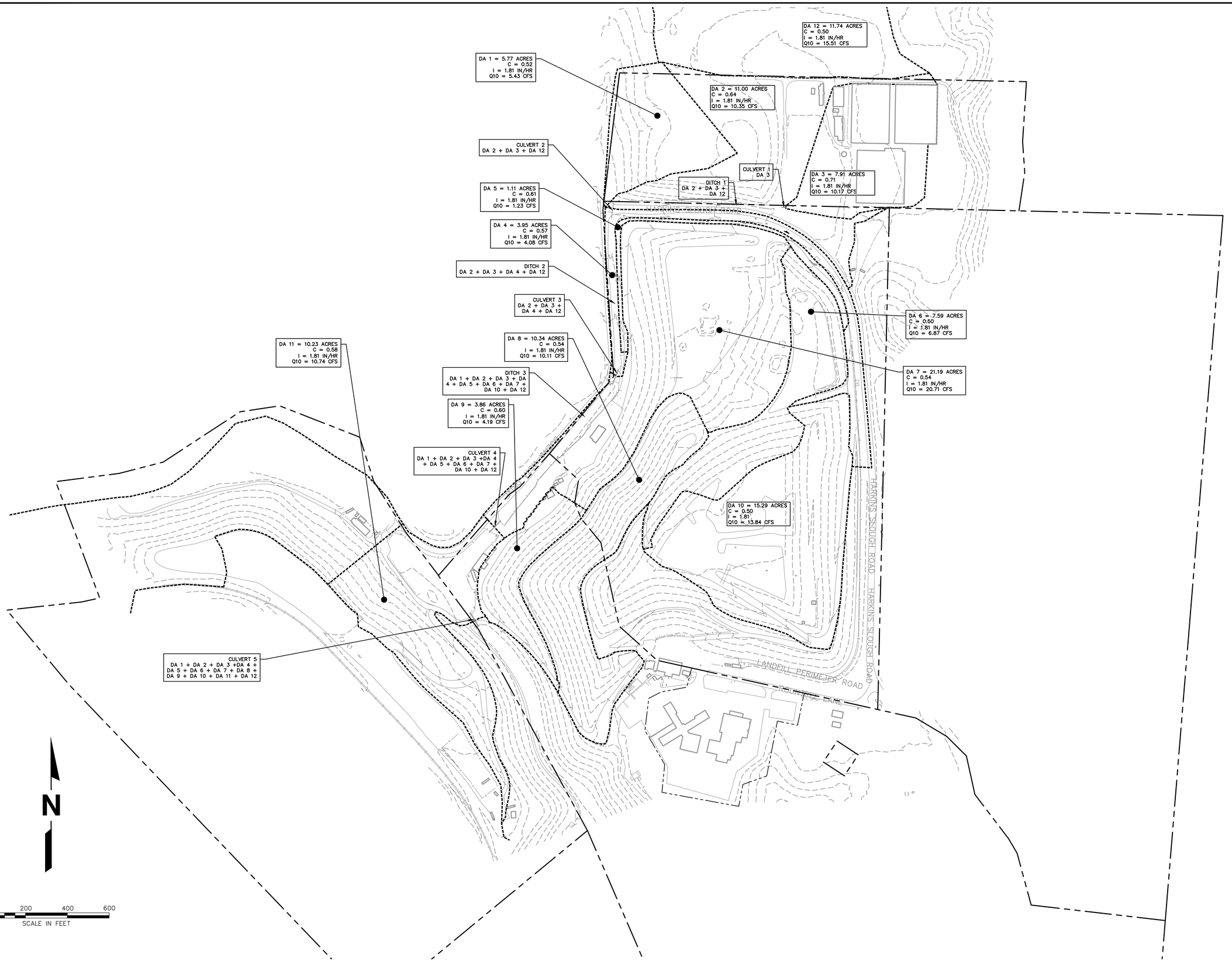
Panel Contains:

COMMUNITY	NUMBER	PANEL
SANTA CRUZ COUNTY	060353	0391
CITY OF WATSONVILLE	060357	0391

MAP NUMBER
06087C0391E
EFFECTIVE DATE
May 16, 2012

Appendix C

Pre-development Drainage Divides Map



NO.	REVISION	DATE

SHEET TITLE: **PRE-DEVELOPMENT**

PROJECT TITLE: **BUENA VISTA LANDFILL**
DUAL TRANSFER STATION

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET, ROOM 410
SANTA CRUZ, CALIFORNIA 95060

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PROJ. NO.	DWN. BY:	C/A RVW BY:
02221033.00	SRS	KEA
DSN. BY:	CHK. BY:	APP. BY:
SRS	KEA	MAK

CADD FILE: SANTA CRUZ TS

DATE: SEPT. 2026

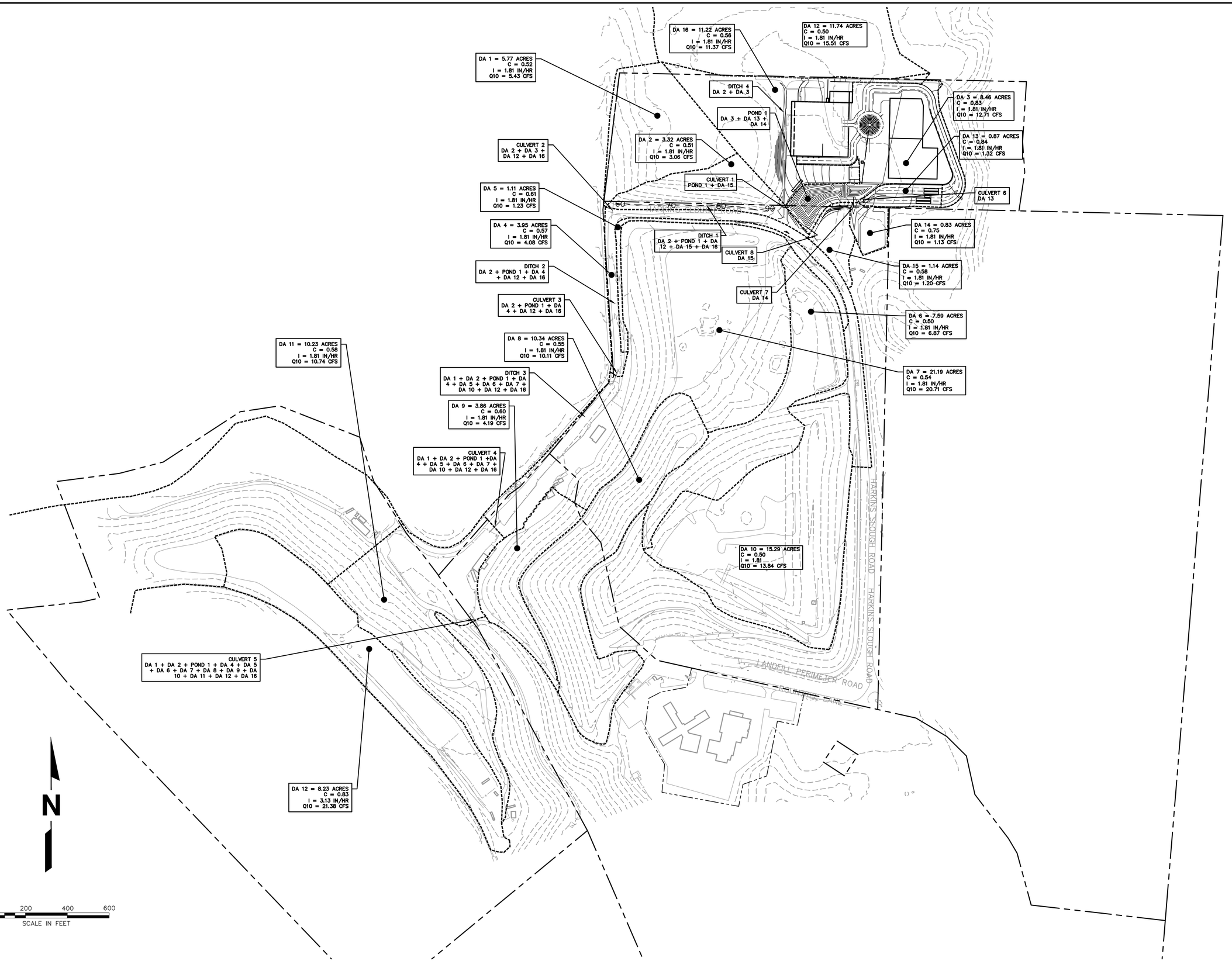
SCALE: AS SHOWN

DRAWING NO.

1 of **1**

Appendix D

Post-development Drainage Divides Map



NO.	REVISION	DATE

SHEET TITLE
POST-DEVELOPMENT

PROJECT TITLE
BUENA VISTA LANDFILL
DUAL TRANSFER STATION

CLIENT
SANTA CRUZ COUNTY
DEPARTMENT OF PUBLIC WORKS
701 OCEAN STREET, ROOM 410
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DSN. BY: SRS
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CHK. BY: KEA
Q/A RVW BY: KEA
APP. BY: MAK

CADD FILE: SANTA CRUZ TS
DATE: SEPT. 2026
SCALE: AS SHOWN
DRAWING NO. **1** of 1

Appendix E

Drainage Area Calculations

Existing C	Impervious C
0.5	0.9

INPUT	OUTPUT

DA	Drainage Area
C	Runnoff Coefficient
I	Rainfall Intensity
IP	Impervious Area
Tc	Time of Concentration

DA-1 PRE		
DA	5.77	ACRES
C	0.52	
I	1.81	IN/HR
Tc	5	MIN
IP	0.3	ACRES
Q10	**5.43**	CFS

DA-2 PRE		
DA	11	ACRES
C	0.52	
I	1.81	IN/HR
Tc	5	MIN
IP	0.5	ACRES
Q10	**10.35**	CFS

DA-3 PRE		
DA	7.91	ACRES
C	0.71	
I	1.81	IN/HR
Tc	5	MIN
IP	4.06	ACRES
Q10	**10.17**	CFS

DA-1 POST		
DA	5.77	ACRES
C	0.52	
I	1.81	IN/HR
Tc	5	MIN
IP	0.3	ACRES
Q10	**5.43**	CFS

DA-2 POST		
DA	13.97	ACRES
C	0.52	
I	1.81	IN/HR
Tc	5	MIN
IP	0.57	ACRES
Q10	**13.15**	CFS

DA-3 POST		
DA	8.46	ACRES
C	0.83	
I	1.81	IN/HR
Tc	5	MIN
IP	6.9	ACRES
Q10	**12.71**	CFS

DA-4 PRE		
DA	3.95	ACRES
C	0.57	
I	1.81	IN/HR
Tc	5	MIN
IP	0.74	ACRES
Q10	**4.08**	CFS

DA-5 PRE		
DA	1.11	ACRES
C	0.61	
I	1.81	IN/HR
Tc	5	MIN
IP	0.3	ACRES
Q10	**1.23**	CFS

DA-6 PRE		
DA	7.59	ACRES
C	0.50	
I	1.81	IN/HR
Tc	5	MIN
IP	0	ACRES
Q10	**6.87**	CFS

DA-4 POST		
DA	3.95	ACRES
C	0.57	
I	1.81	IN/HR
Tc	5	MIN
IP	0.74	ACRES
Q10	**4.08**	CFS

DA-5 POST		
DA	1.11	ACRES
C	0.61	
I	1.81	IN/HR
Tc	5	MIN
IP	0.3	ACRES
Q10	**1.23**	CFS

DA-6 POST		
DA	7.59	ACRES
C	0.50	
I	1.81	IN/HR
Tc	5	MIN
IP	0	ACRES
Q10	**6.87**	CFS

DA-7 PRE		
DA	21.19	ACRES
C	0.54	
I	1.81	IN/HR
Tc	5	MIN
IP	2.18	ACRES
Q10	**20.71**	CFS

DA-8 PRE		
DA	10.34	ACRES
C	0.54	
I	1.81	IN/HR
Tc	5	MIN
IP	1.12	ACRES
Q10	**10.11**	CFS

DA-9 PRE		
DA	3.86	ACRES
C	0.60	
I	1.81	IN/HR
Tc	5	MIN
IP	0.95	ACRES
Q10	**4.19**	CFS

DA-7 POST		
DA	21.19	ACRES
C	0.54	
I	1.81	IN/HR
Tc	5	MIN
IP	2.18	ACRES
Q10	**20.71**	CFS

DA-8 POST		
DA	10.34	ACRES
C	0.54	
I	1.81	IN/HR
Tc	5	MIN
IP	1.12	ACRES
Q10	**10.11**	CFS

DA-9 POST		
DA	3.86	ACRES
C	0.60	
I	1.81	IN/HR
Tc	5	MIN
IP	0.95	ACRES
Q10	**4.19**	CFS

DA-10 PRE		
DA	15.29	ACRES
C	0.50	
I	1.81	IN/HR
Tc	5	MIN
IP	0	ACRES
Q10	**13.84**	CFS

DA-11 PRE		
DA	10.23	ACRES
C	0.58	
I	1.81	IN/HR
Tc	5	MIN
IP	2.11	ACRES
Q10	**10.74**	CFS

DA-12 PRE		
DA	11.74	ACRES
C	0.73	
I	1.81	IN/HR
Tc	5	MIN
IP	6.76	ACRES
Q10	**15.51**	CFS

DA-10 POST		
DA	15.29	ACRES
C	0.50	
I	1.81	IN/HR
Tc	5	MIN
IP	0	ACRES
Q10	**13.84**	CFS

DA-11 POST		
DA	10.23	ACRES
C	0.58	
I	1.81	IN/HR
Tc	5	MIN
IP	2.11	ACRES
Q10	**10.74**	CFS

DA-12 POST		
DA	11.74	ACRES
C	0.73	
I	1.81	IN/HR
Tc	5	MIN
IP	6.76	ACRES
Q10	**15.51**	CFS

DA-13 POST		
DA	0.87	ACRES
C	0.84	
I	1.81	IN/HR
Tc	5	MIN
IP	0.75	ACRES
Q10	**1.32**	CFS

DA-14 POST		
DA	0.83	ACRES
C	0.75	
I	1.81	IN/HR
Tc	5	MIN
IP	0.51	ACRES
Q10	**1.13**	CFS

DA-15 POST		
DA	1.14	ACRES
C	0.58	
I	1.81	IN/HR
Tc	5	MIN
IP	0.23	ACRES
Q10	**1.20**	CFS

DA-16 POST		
DA	11.22	ACRES
C	0.56	
I	1.81	IN/HR
Tc	5	MIN
IP	1.81	ACRES
Q10	**11.37**	CFS

Appendix F

Hydraflow Graphs

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 1 - PRE

Invert Elev Dn (ft)	=	88.00
Pipe Length (ft)	=	25.00
Slope (%)	=	8.00
Invert Elev Up (ft)	=	90.00
Rise (in)	=	18.0
Shape	=	Circular
Span (in)	=	18.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Culvert
Culvert Entrance	=	Smooth tapered inlet throat
Coeff. K,M,c,Y,k	=	0.534, 0.555, 0.0196, 0.9, 0.2

Embankment

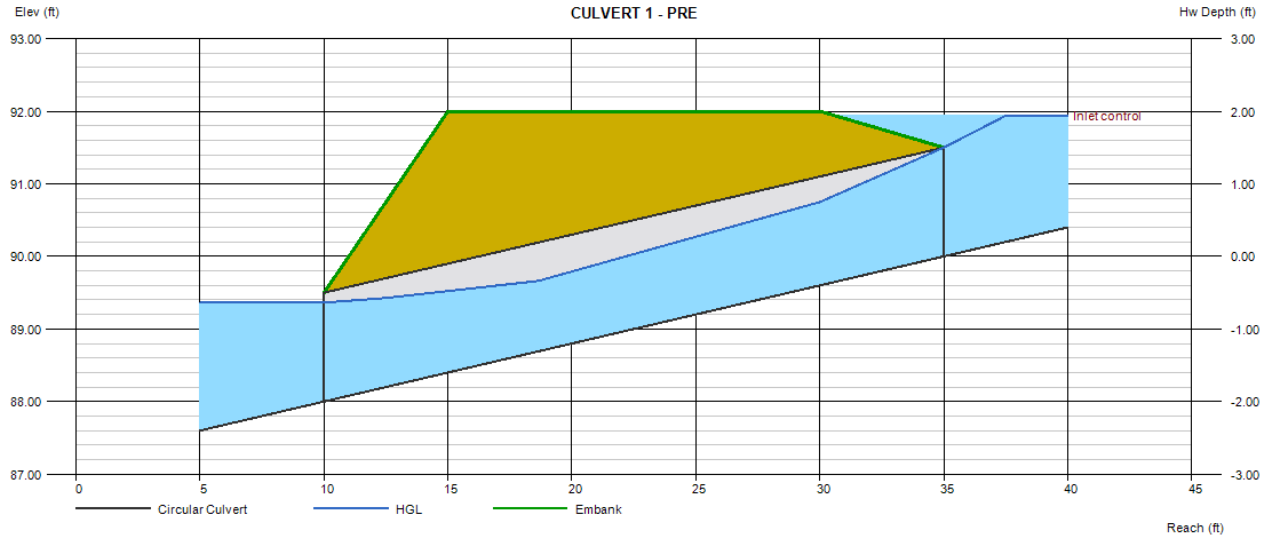
Top Elevation (ft)	=	92.00
Top Width (ft)	=	15.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	10.17
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	10.17
Qpipe (cfs)	=	10.17
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.03
Veloc Up (ft/s)	=	6.57
HGL Dn (ft)	=	89.36
HGL Up (ft)	=	91.23
Hw Elev (ft)	=	91.94
Hw/D (ft)	=	1.29
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 1 - POST

Invert Elev Dn (ft)	=	88.00
Pipe Length (ft)	=	30.00
Slope (%)	=	6.67
Invert Elev Up (ft)	=	90.00
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

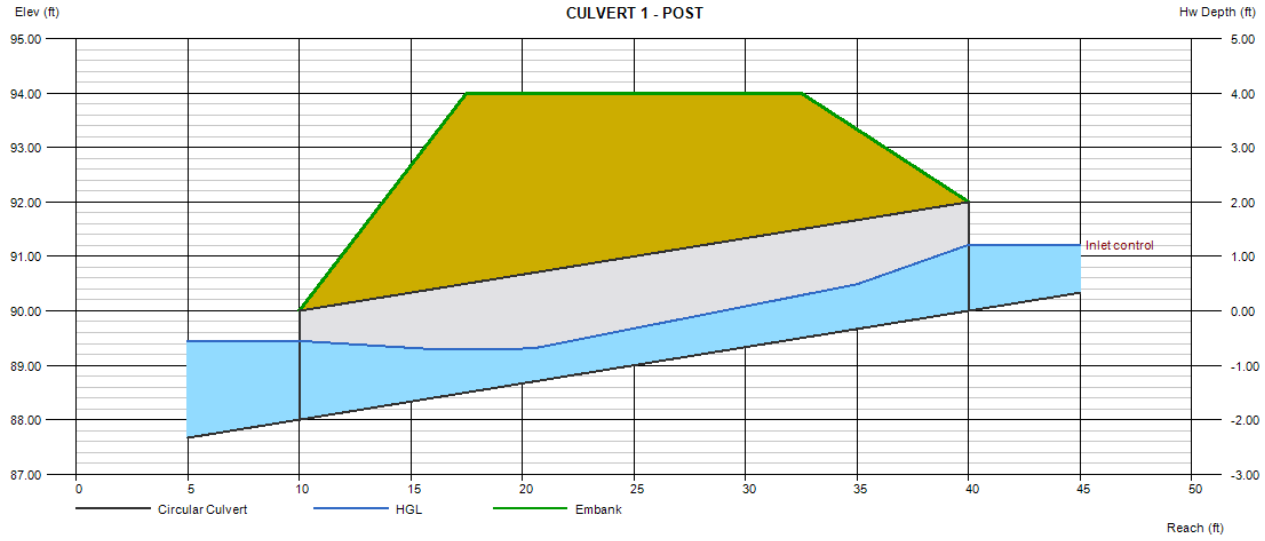
Top Elevation (ft)	=	94.00
Top Width (ft)	=	15.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	6.40
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	6.40
Qpipe (cfs)	=	6.40
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.63
Veloc Up (ft/s)	=	4.70
HGL Dn (ft)	=	89.45
HGL Up (ft)	=	90.89
Hw Elev (ft)	=	91.21
Hw/D (ft)	=	0.61
Flow Regime	=	Inlet Control



Culvert Report

CULVERT 2 - PRE

Invert Elev Dn (ft)	=	54.79
Pipe Length (ft)	=	65.47
Slope (%)	=	2.20
Invert Elev Up (ft)	=	56.23
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0018, 2, 0.0292, 0.74, 0.2

Embankment

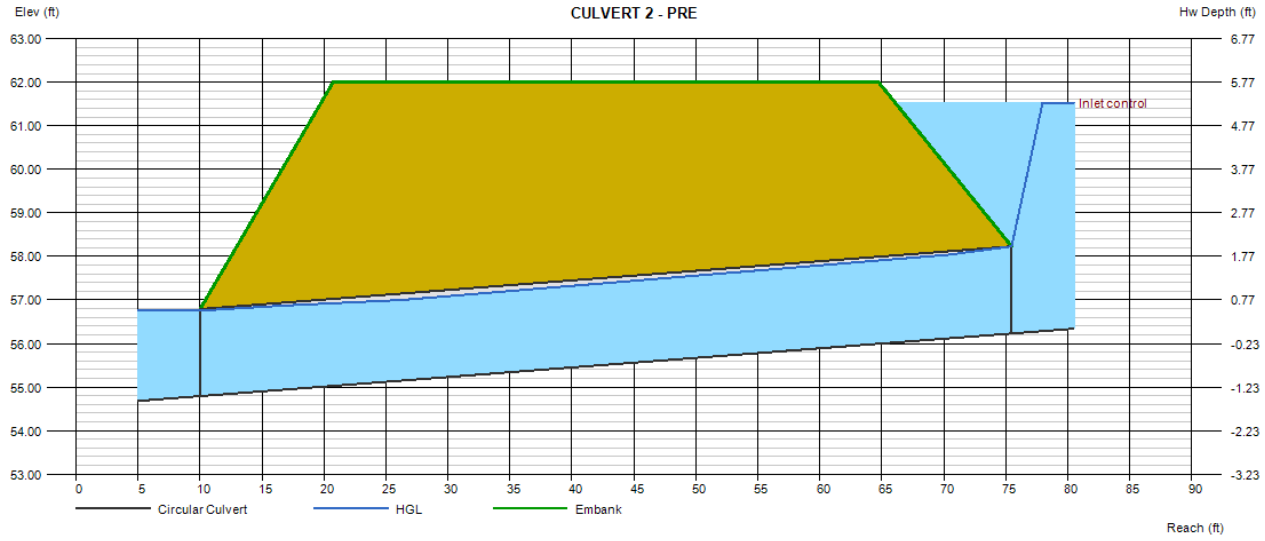
Top Elevation (ft)	=	62.00
Top Width (ft)	=	44.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	36.03
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	36.03
Qpipe (cfs)	=	36.03
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	11.52
Veloc Up (ft/s)	=	11.60
HGL Dn (ft)	=	56.75
HGL Up (ft)	=	58.16
Hw Elev (ft)	=	61.53
Hw/D (ft)	=	2.65
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 2 - POST

Invert Elev Dn (ft)	=	54.79
Pipe Length (ft)	=	65.47
Slope (%)	=	2.20
Invert Elev Up (ft)	=	56.23
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0018, 2, 0.0292, 0.74, 0.2

Embankment

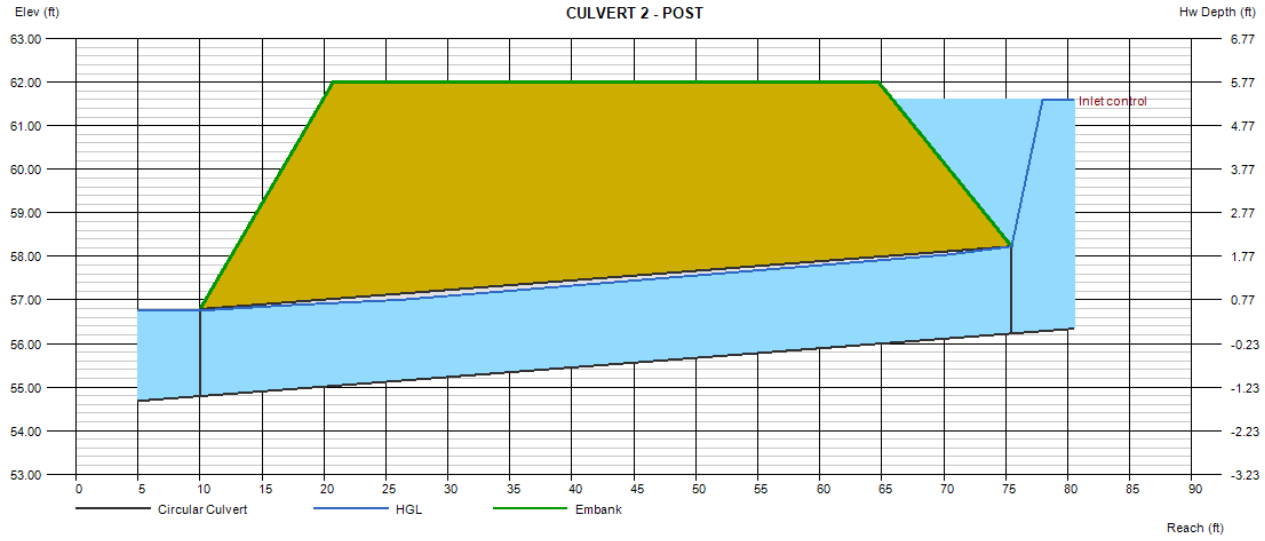
Top Elevation (ft)	=	62.00
Top Width (ft)	=	44.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	36.34
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	36.34
Qpipe (cfs)	=	36.34
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	11.61
Veloc Up (ft/s)	=	11.70
HGL Dn (ft)	=	56.76
HGL Up (ft)	=	58.16
Hw Elev (ft)	=	61.60
Hw/D (ft)	=	2.68
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 3 - PRE

Invert Elev Dn (ft)	=	27.20
Pipe Length (ft)	=	80.00
Slope (%)	=	2.87
Invert Elev Up (ft)	=	29.50
Rise (in)	=	28.0
Shape	=	Arch
Span (in)	=	56.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Arch Corrugated Metal
Culvert Entrance	=	90D headwall (A)
Coeff. K,M,c,Y,k	=	0.0083, 2, 0.0379, 0.69, 0.5

Embankment

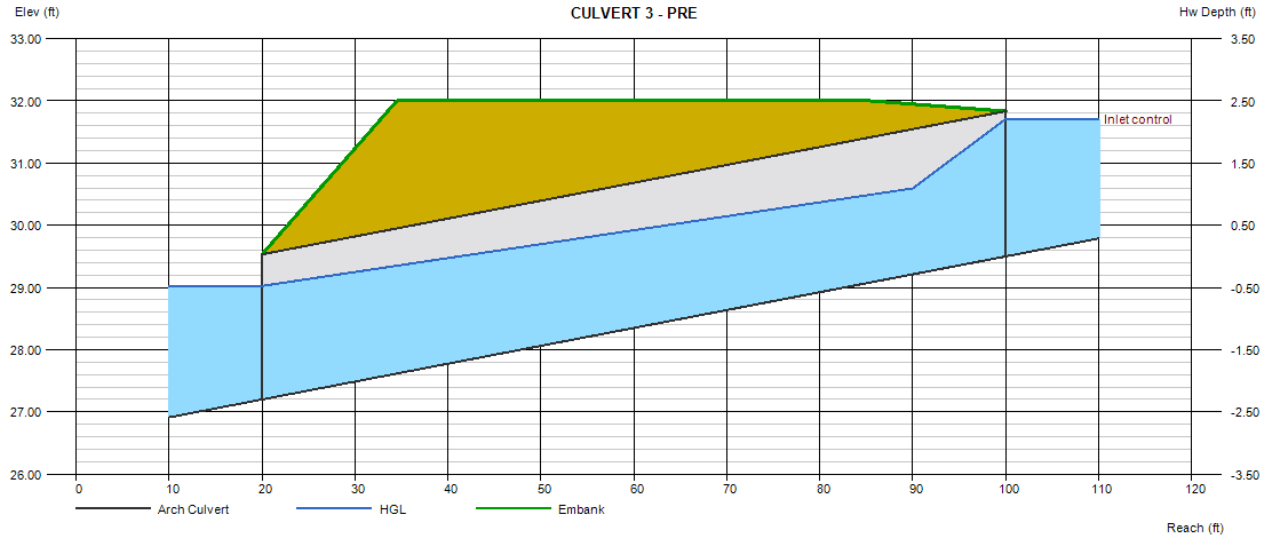
Top Elevation (ft)	=	32.00
Top Width (ft)	=	51.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	40.11
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	40.11
Qpipe (cfs)	=	40.11
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.32
Veloc Up (ft/s)	=	6.91
HGL Dn (ft)	=	29.03
HGL Up (ft)	=	30.82
Hw Elev (ft)	=	31.71
Hw/D (ft)	=	0.95
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 3 - POST

Invert Elev Dn (ft)	=	27.20
Pipe Length (ft)	=	80.00
Slope (%)	=	2.87
Invert Elev Up (ft)	=	29.50
Rise (in)	=	28.0
Shape	=	Arch
Span (in)	=	56.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Arch Corrugated Metal
Culvert Entrance	=	90D headwall (A)
Coeff. K,M,c,Y,k	=	0.0083, 2, 0.0379, 0.69, 0.5

Embankment

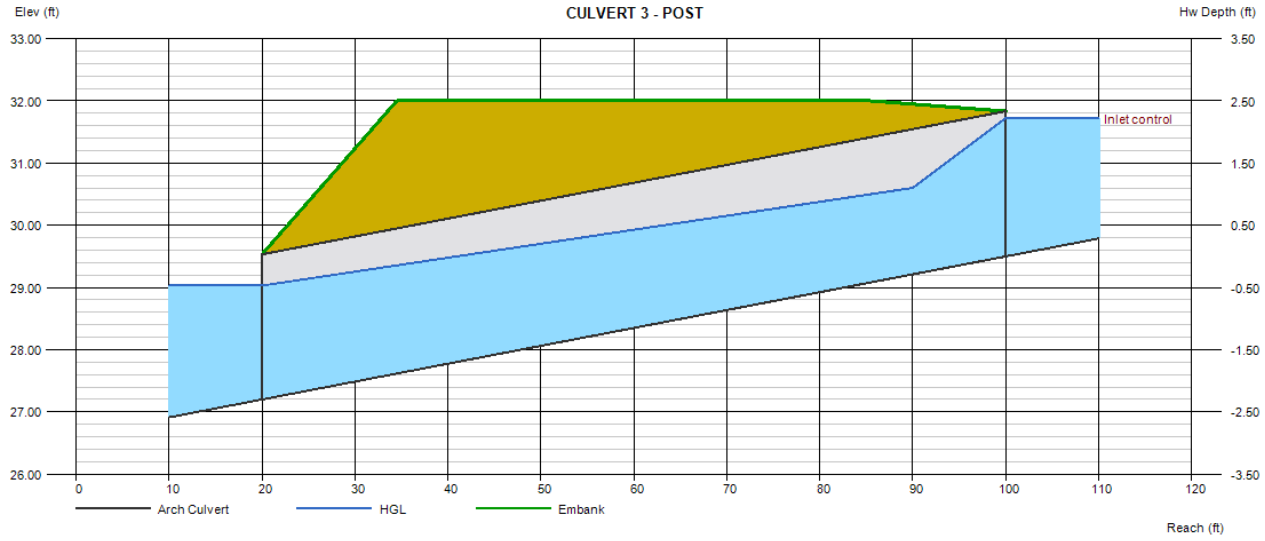
Top Elevation (ft)	=	32.00
Top Width (ft)	=	51.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	40.42
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	40.42
Qpipe (cfs)	=	40.42
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.35
Veloc Up (ft/s)	=	6.92
HGL Dn (ft)	=	29.03
HGL Up (ft)	=	30.83
Hw Elev (ft)	=	31.72
Hw/D (ft)	=	0.95
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 4 - PRE

Invert Elev Dn (ft)	=	16.50
Pipe Length (ft)	=	89.00
Slope (%)	=	0.67
Invert Elev Up (ft)	=	17.10
Rise (in)	=	39.0
Shape	=	Box
Span (in)	=	84.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Tapered inlet throat
Coeff. K,M,c,Y,k	=	0.475, 0.667, 0.0179, 0.97, 0.2

Embankment

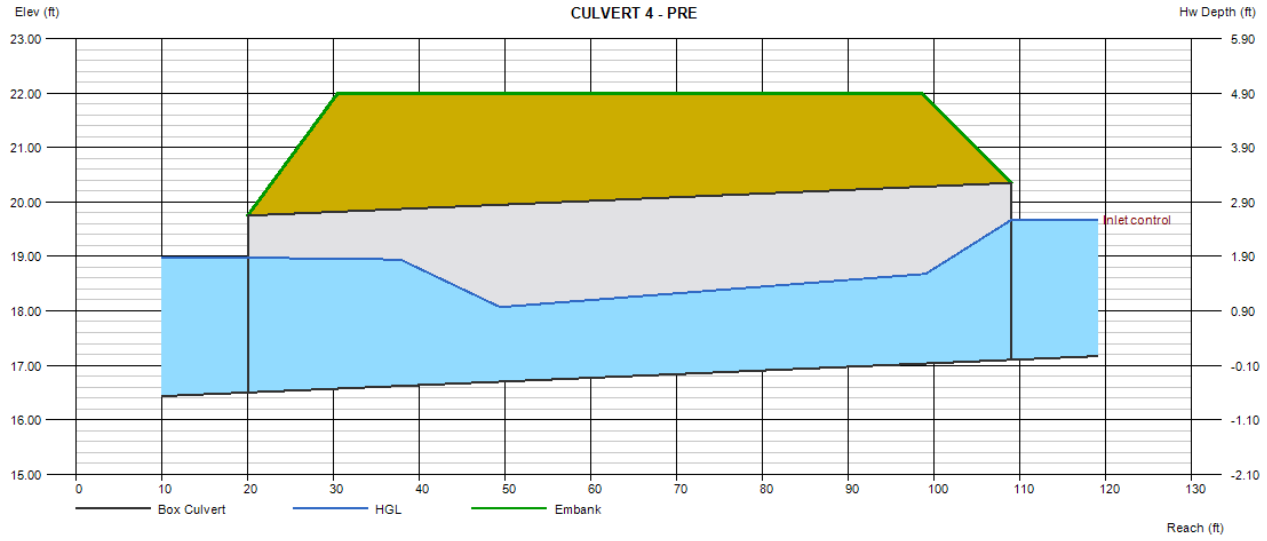
Top Elevation (ft)	=	22.00
Top Width (ft)	=	68.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	88.19
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	88.19
Qpipe (cfs)	=	88.19
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.09
Veloc Up (ft/s)	=	7.40
HGL Dn (ft)	=	18.98
HGL Up (ft)	=	18.80
Hw Elev (ft)	=	19.67
Hw/D (ft)	=	0.79
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 4 - POST

Invert Elev Dn (ft)	=	16.50
Pipe Length (ft)	=	89.00
Slope (%)	=	0.67
Invert Elev Up (ft)	=	17.10
Rise (in)	=	39.0
Shape	=	Box
Span (in)	=	84.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Tapered inlet throat
Coeff. K,M,c,Y,k	=	0.475, 0.667, 0.0179, 0.97, 0.2

Embankment

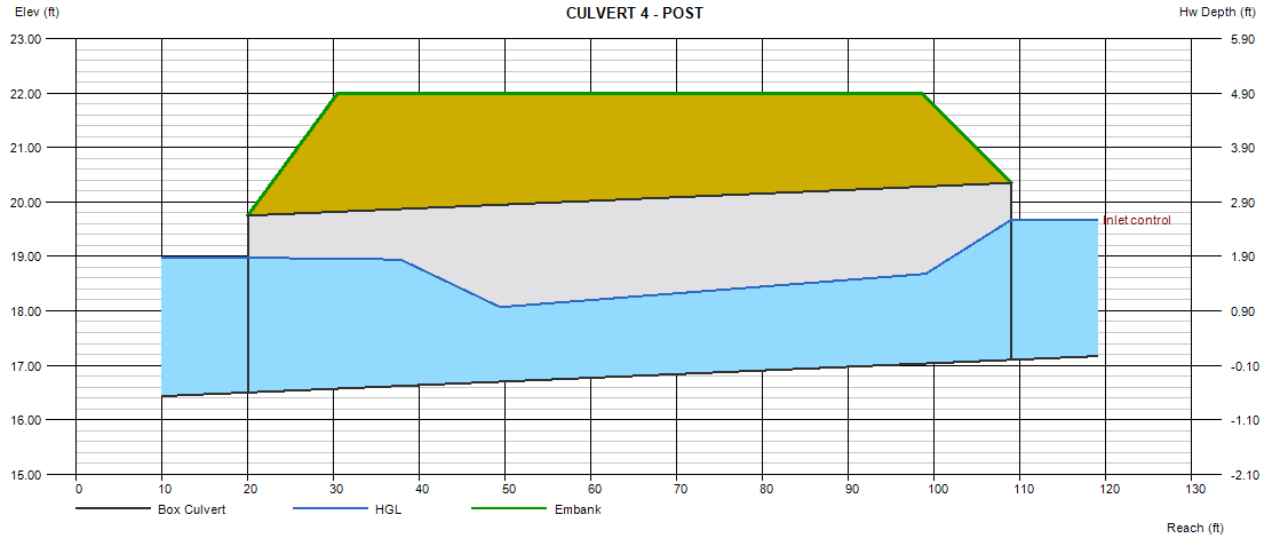
Top Elevation (ft)	=	22.00
Top Width (ft)	=	68.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	88.26
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	88.26
Qpipe (cfs)	=	88.26
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	5.09
Veloc Up (ft/s)	=	7.41
HGL Dn (ft)	=	18.98
HGL Up (ft)	=	18.80
Hw Elev (ft)	=	19.67
Hw/D (ft)	=	0.79
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 5 - PRE

Invert Elev Dn (ft)	=	14.00
Pipe Length (ft)	=	73.00
Slope (%)	=	2.74
Invert Elev Up (ft)	=	16.00
Rise (in)	=	120.0
Shape	=	Box
Span (in)	=	120.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Slope tapered, more favorable edges
Coeff. K,M,c,Y,k	=	0.5, 0.667, 0.0378, 0.71, 0.2

Embankment

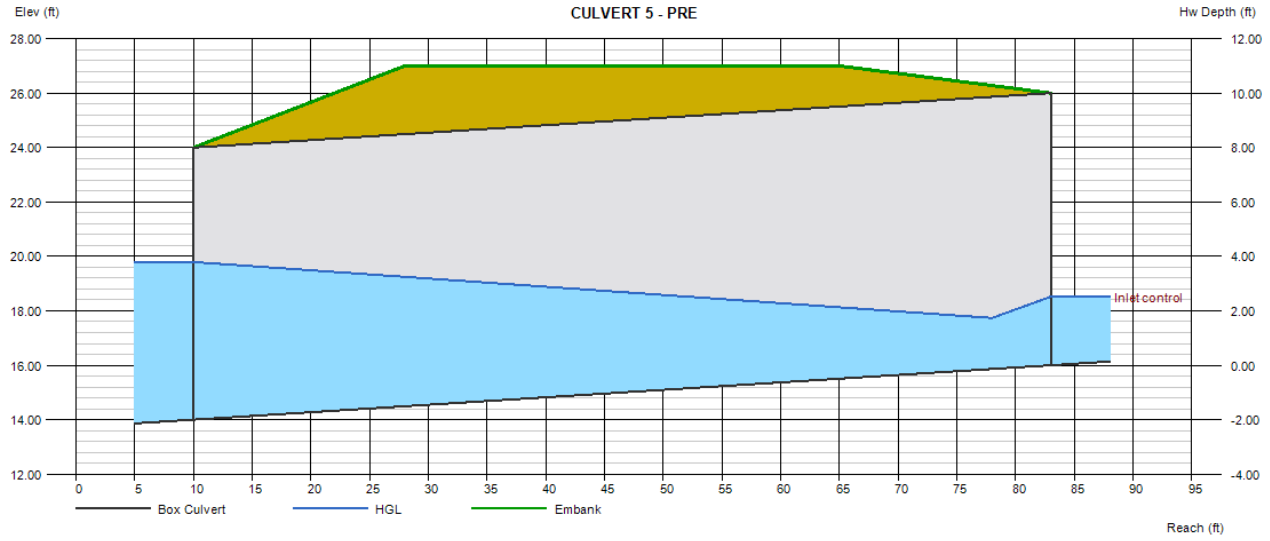
Top Elevation (ft)	=	27.00
Top Width (ft)	=	37.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	113.23
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	113.23
Qpipe (cfs)	=	113.23
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.95
Veloc Up (ft/s)	=	7.14
HGL Dn (ft)	=	19.79
HGL Up (ft)	=	17.58
Hw Elev (ft)	=	18.52
Hw/D (ft)	=	0.25
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 5 - POST

Invert Elev Dn (ft)	=	14.00
Pipe Length (ft)	=	73.00
Slope (%)	=	2.74
Invert Elev Up (ft)	=	16.00
Rise (in)	=	120.0
Shape	=	Box
Span (in)	=	120.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Rectagular Concrete
Culvert Entrance	=	Slope tapered, more favorable edges
Coeff. K,M,c,Y,k	=	0.5, 0.667, 0.0378, 0.71, 0.2

Embankment

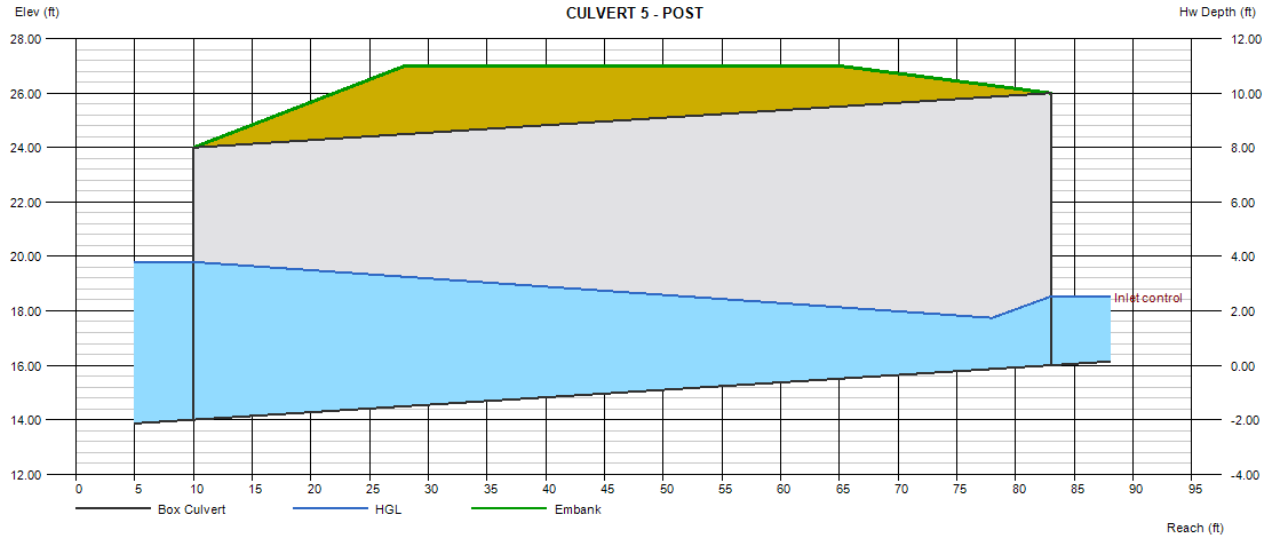
Top Elevation (ft)	=	27.00
Top Width (ft)	=	37.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	113.54
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	113.54
Qpipe (cfs)	=	113.54
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.96
Veloc Up (ft/s)	=	7.15
HGL Dn (ft)	=	19.79
HGL Up (ft)	=	17.59
Hw Elev (ft)	=	18.52
Hw/D (ft)	=	0.25
Flow Regime	=	Inlet Control



Culvert Report

CULVERT 6 - POST

Invert Elev Dn (ft)	=	110.00
Pipe Length (ft)	=	20.00
Slope (%)	=	12.50
Invert Elev Up (ft)	=	112.50
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

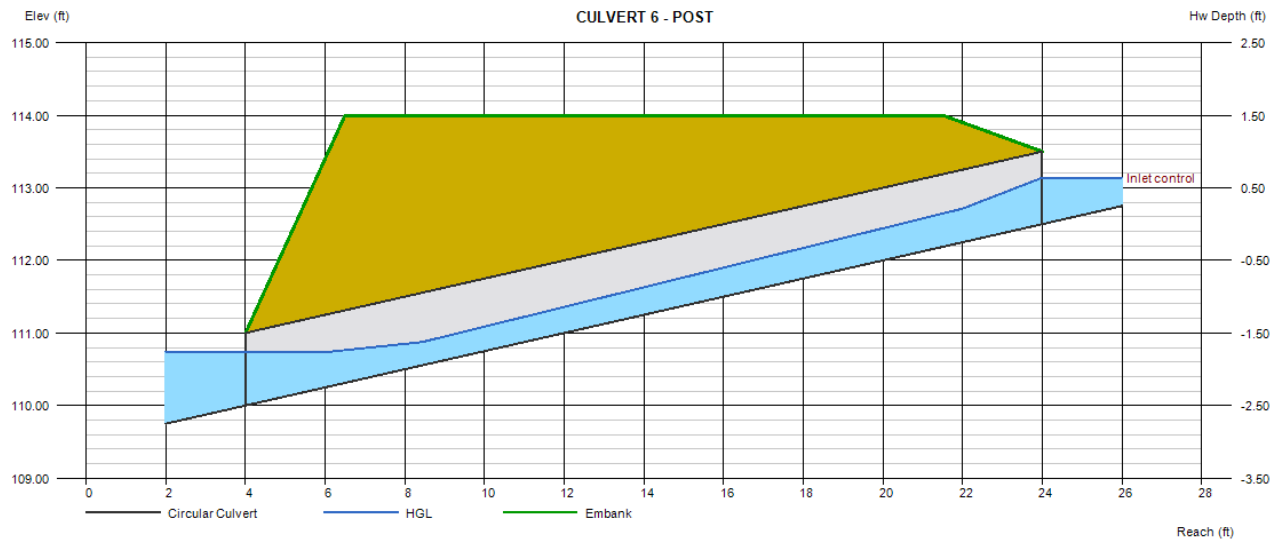
Top Elevation (ft)	=	114.00
Top Width (ft)	=	15.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	1.32
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	1.32
Qpipe (cfs)	=	1.32
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.11
Veloc Up (ft/s)	=	3.49
HGL Dn (ft)	=	110.74
HGL Up (ft)	=	112.99
Hw Elev (ft)	=	113.14
Hw/D (ft)	=	0.64
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 7 - POST

Invert Elev Dn (ft)	=	109.00
Pipe Length (ft)	=	50.00
Slope (%)	=	3.00
Invert Elev Up (ft)	=	110.50
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

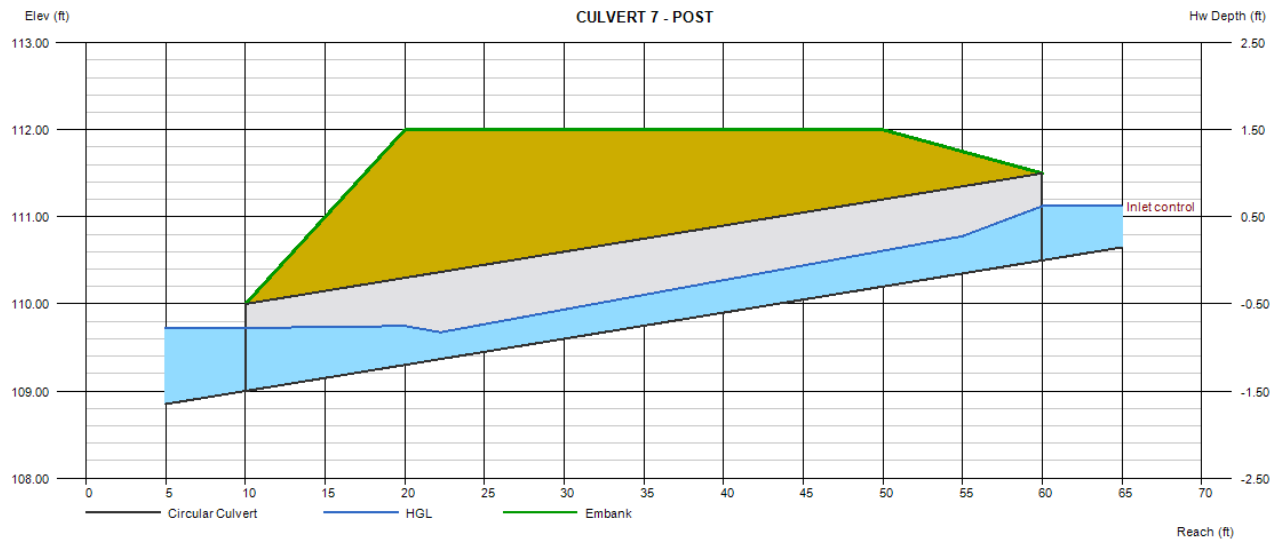
Top Elevation (ft)	=	112.00
Top Width (ft)	=	30.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	1.13
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	1.13
Qpipe (cfs)	=	1.13
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.86
Veloc Up (ft/s)	=	3.32
HGL Dn (ft)	=	109.72
HGL Up (ft)	=	110.95
Hw Elev (ft)	=	111.12
Hw/D (ft)	=	0.62
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

CULVERT 8 - POST

Invert Elev Dn (ft)	=	97.00
Pipe Length (ft)	=	70.00
Slope (%)	=	0.71
Invert Elev Up (ft)	=	97.50
Rise (in)	=	12.0
Shape	=	Circular
Span (in)	=	12.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

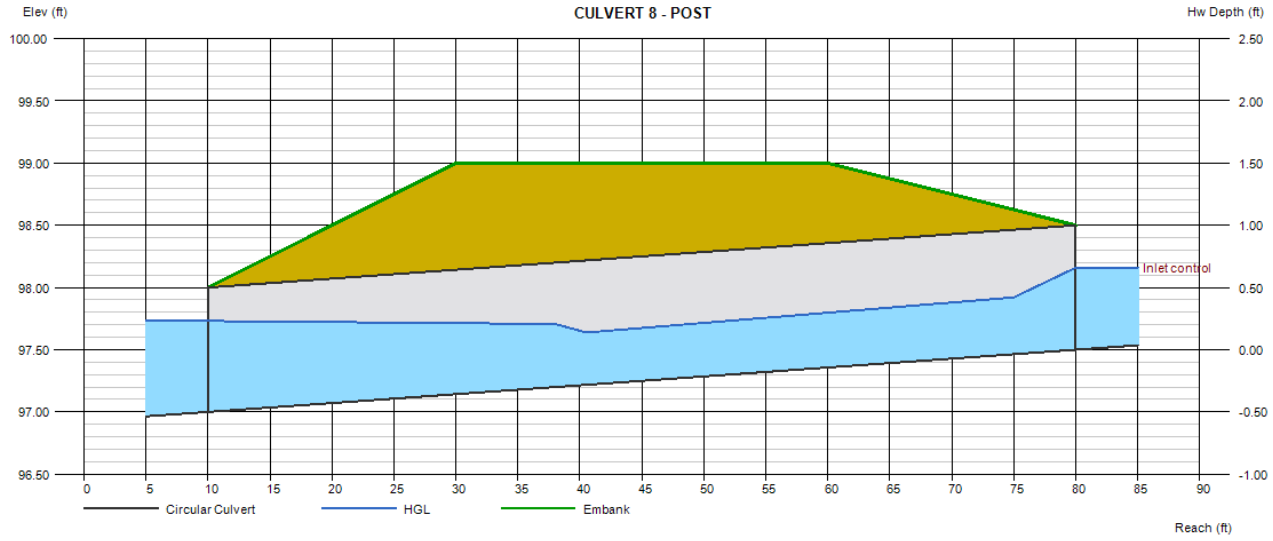
Top Elevation (ft)	=	99.00
Top Width (ft)	=	30.00
Crest Width (ft)	=	10.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	1.20
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	1.20
Qpipe (cfs)	=	1.20
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	1.95
Veloc Up (ft/s)	=	3.39
HGL Dn (ft)	=	97.73
HGL Up (ft)	=	97.96
Hw Elev (ft)	=	98.16
Hw/D (ft)	=	0.66
Flow Regime	=	Inlet Control



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

DITCH 1 - PRE

Triangular

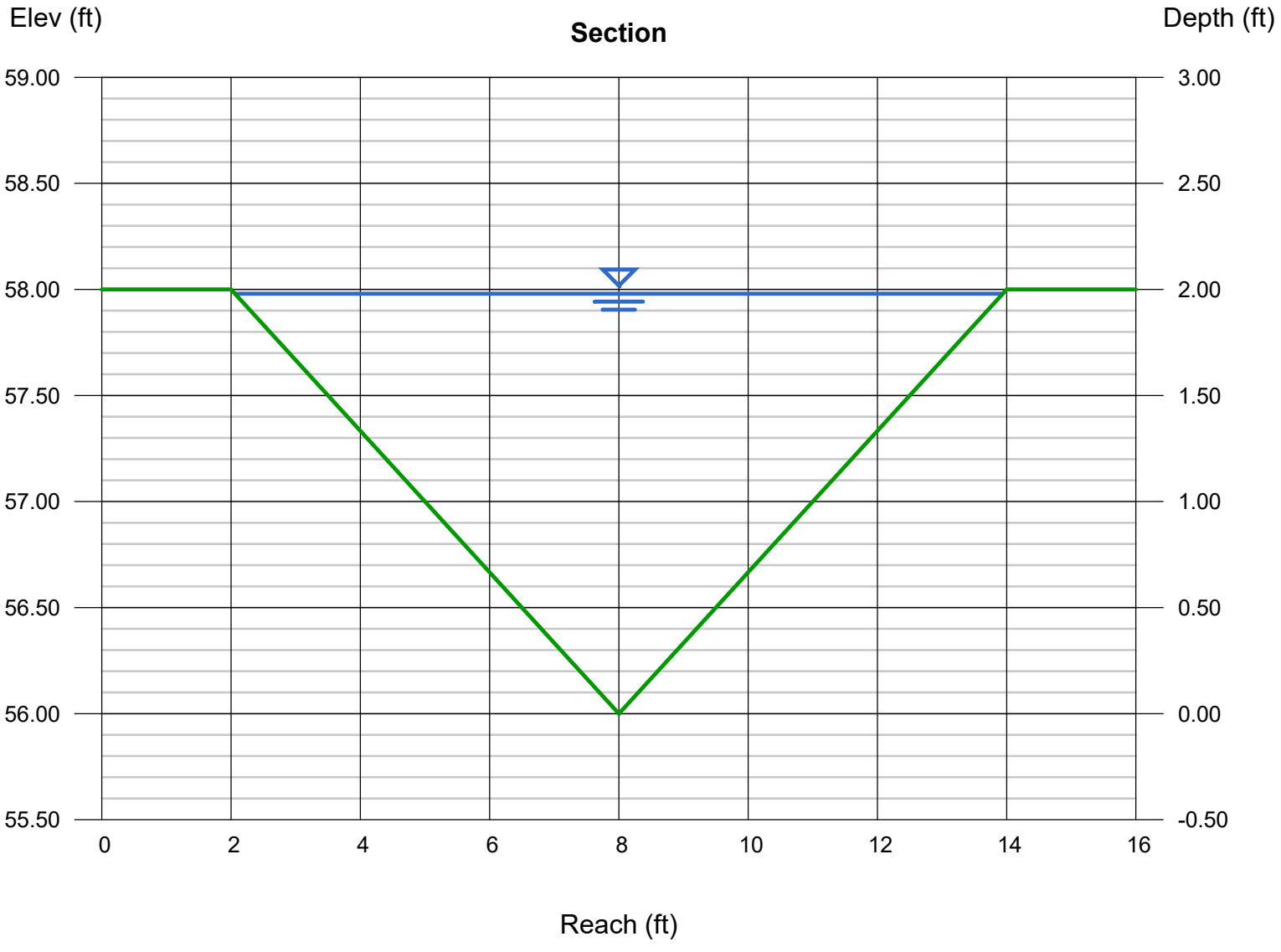
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 56.00
Slope (%)	= 3.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 36.03

Highlighted

Depth (ft)	= 1.98
Q (cfs)	= 36.03
Area (sqft)	= 11.76
Velocity (ft/s)	= 3.06
Wetted Perim (ft)	= 12.52
Crit Depth, Yc (ft)	= 1.56
Top Width (ft)	= 11.88
EGL (ft)	= 2.13



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

DITCH 1 - POST

Triangular

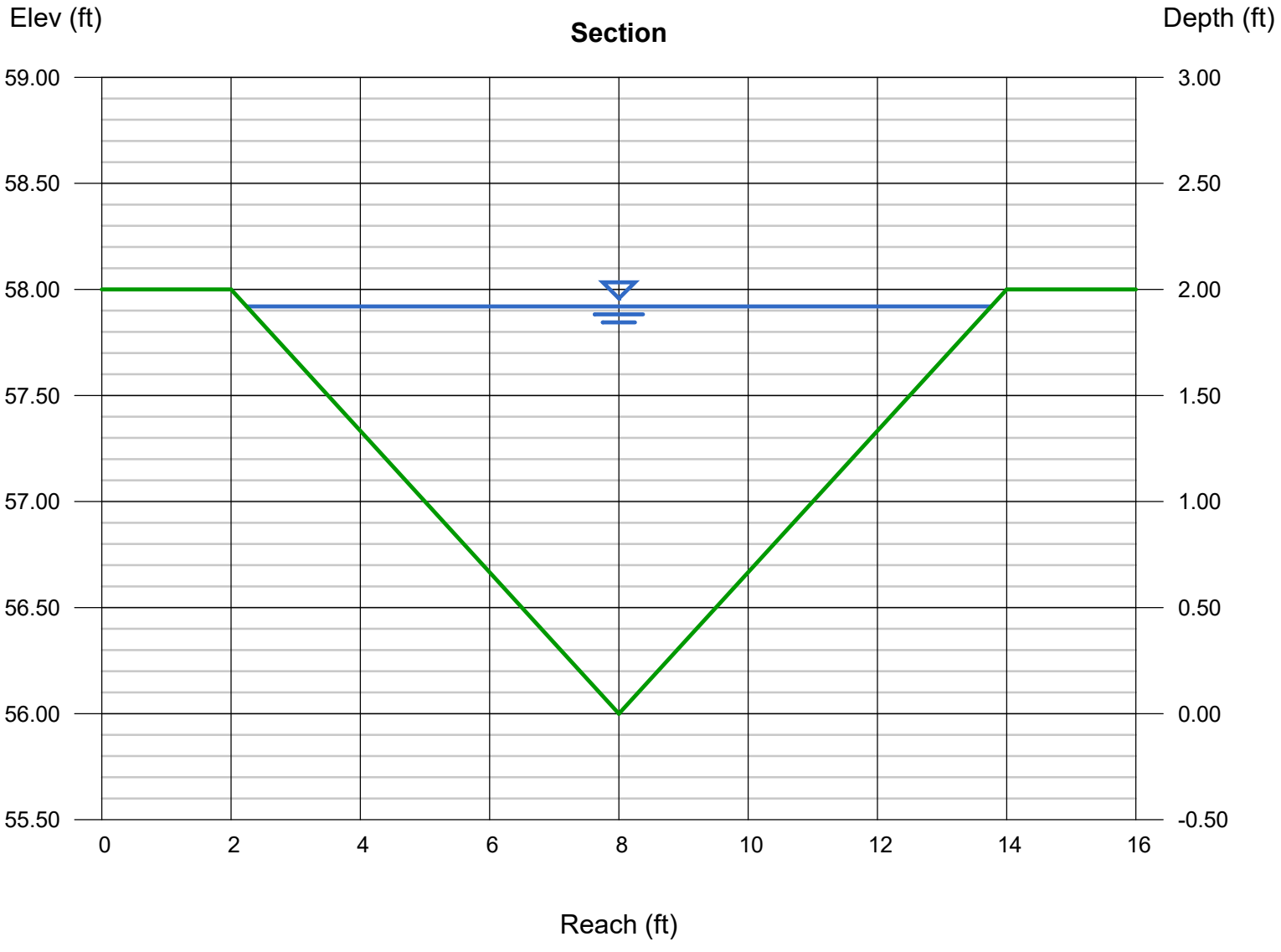
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 56.00
Slope (%)	= 3.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 33.28

Highlighted

Depth (ft)	= 1.92
Q (cfs)	= 33.28
Area (sqft)	= 11.06
Velocity (ft/s)	= 3.01
Wetted Perim (ft)	= 12.14
Crit Depth, Yc (ft)	= 1.51
Top Width (ft)	= 11.52
EGL (ft)	= 2.06



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

DITCH 2 - PRE

Triangular

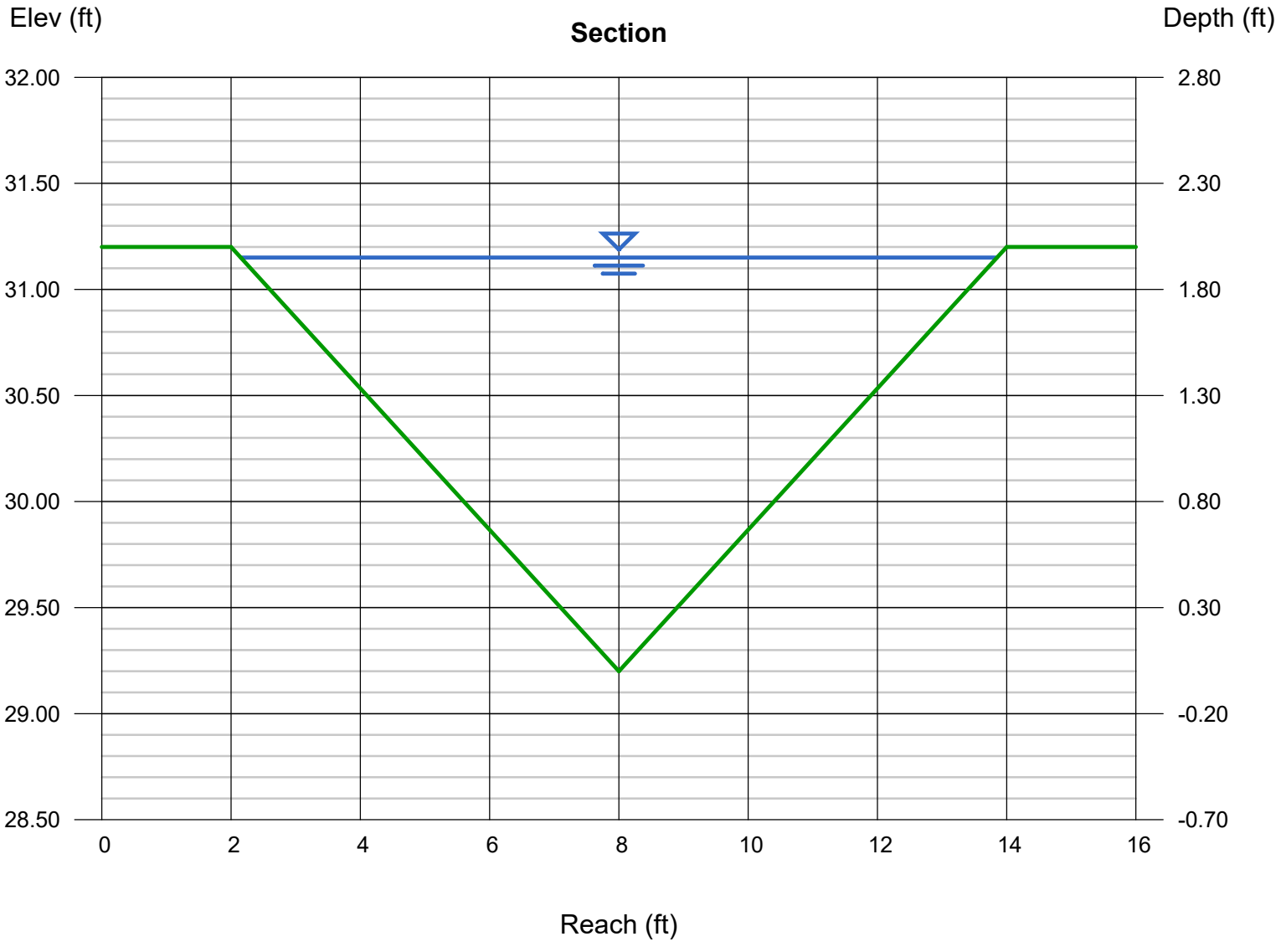
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 29.20
Slope (%)	= 4.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 40.11

Highlighted

Depth (ft)	= 1.95
Q (cfs)	= 40.11
Area (sqft)	= 11.41
Velocity (ft/s)	= 3.52
Wetted Perim (ft)	= 12.33
Crit Depth, Yc (ft)	= 1.62
Top Width (ft)	= 11.70
EGL (ft)	= 2.14



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

DITCH 2 - POST

Triangular

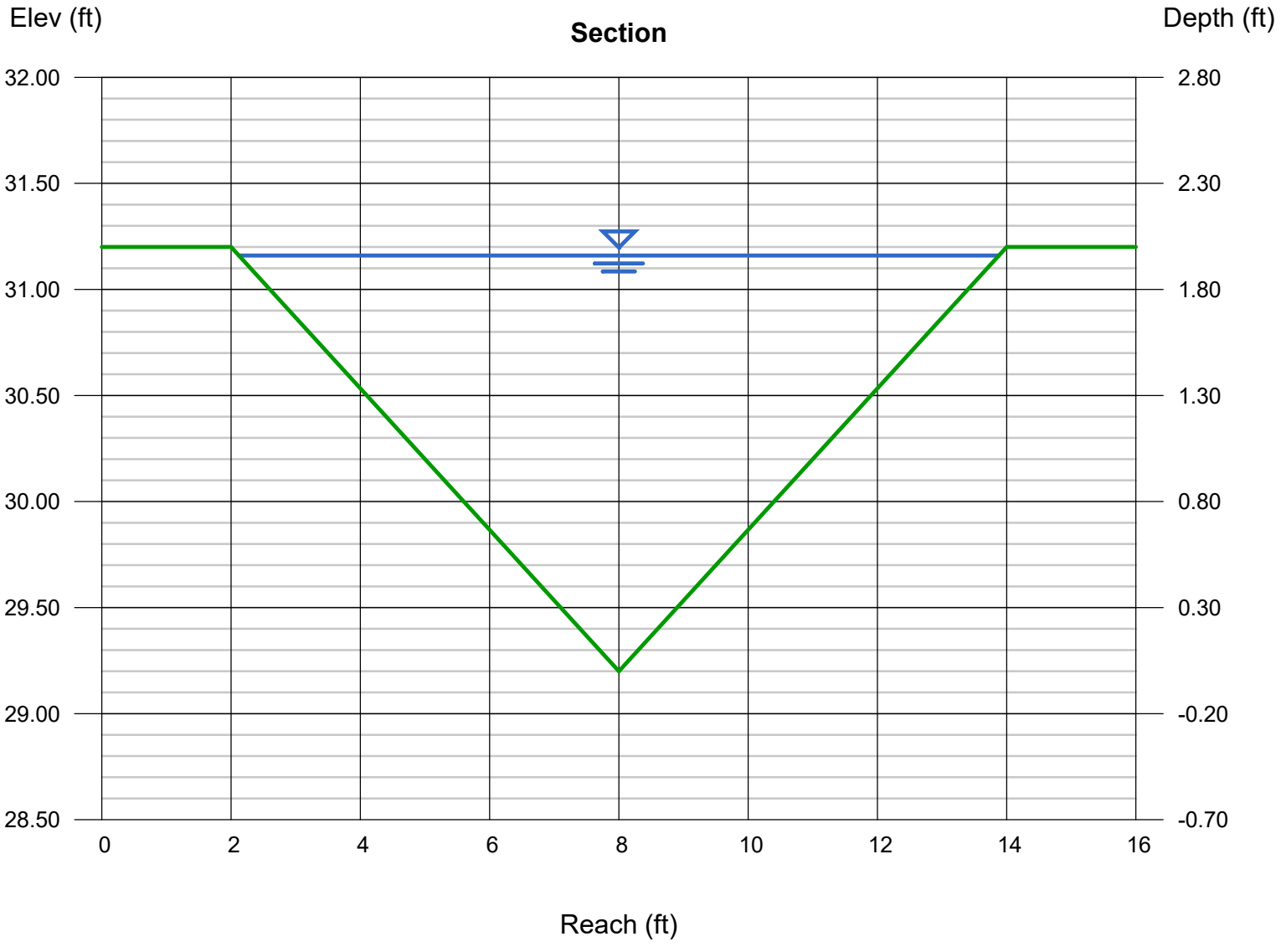
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 29.20
Slope (%)	= 4.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 40.42

Highlighted

Depth (ft)	= 1.96
Q (cfs)	= 40.42
Area (sqft)	= 11.52
Velocity (ft/s)	= 3.51
Wetted Perim (ft)	= 12.40
Crit Depth, Yc (ft)	= 1.63
Top Width (ft)	= 11.76
EGL (ft)	= 2.15



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

DITCH 3 - PRE

Triangular

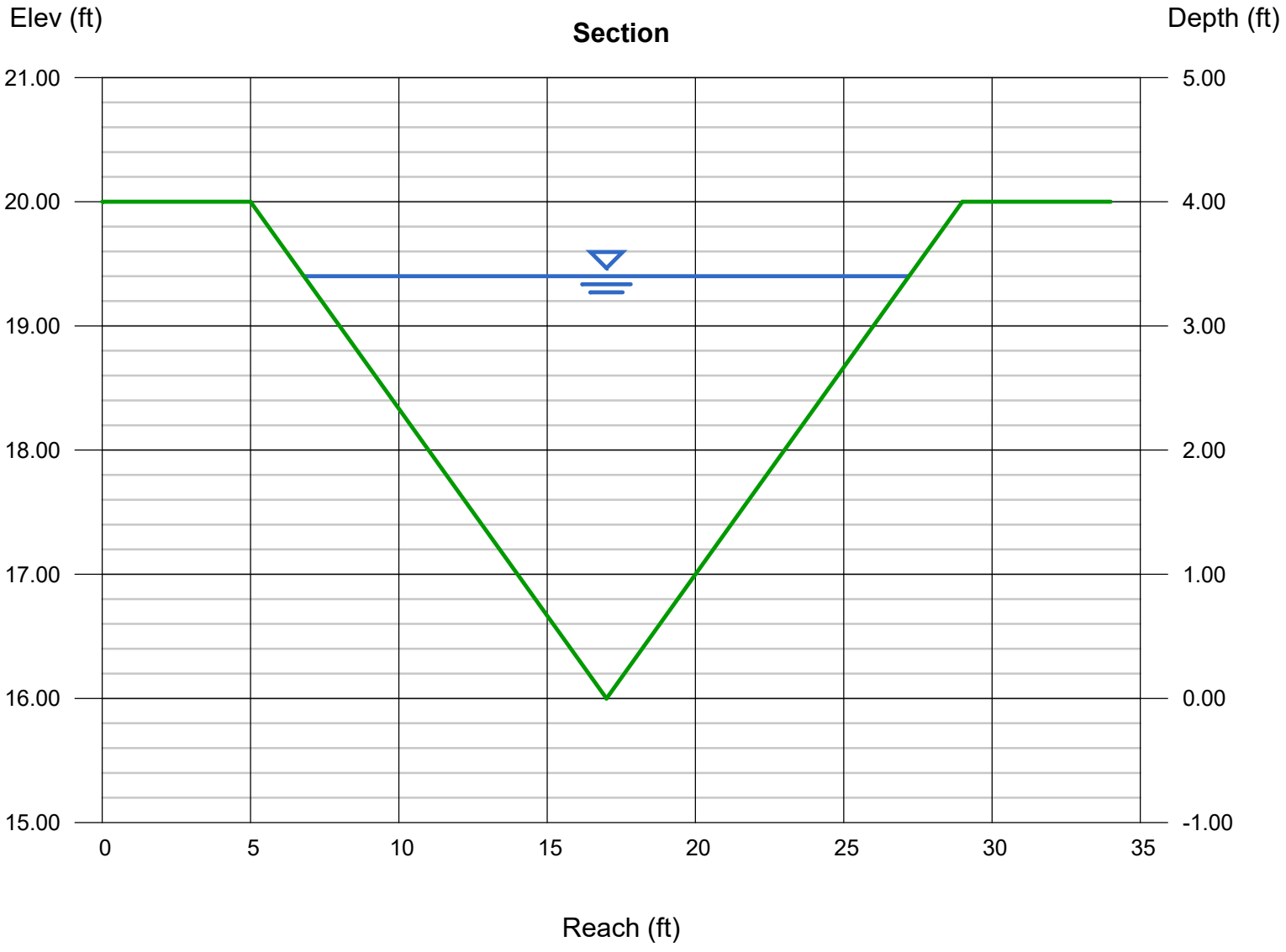
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 4.00
Invert Elev (ft)	= 16.00
Slope (%)	= 1.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 88.19

Highlighted

Depth (ft)	= 3.40
Q (cfs)	= 88.19
Area (sqft)	= 34.68
Velocity (ft/s)	= 2.54
Wetted Perim (ft)	= 21.50
Crit Depth, Yc (ft)	= 2.22
Top Width (ft)	= 20.40
EGL (ft)	= 3.50



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

DITCH 3 - POST

Triangular

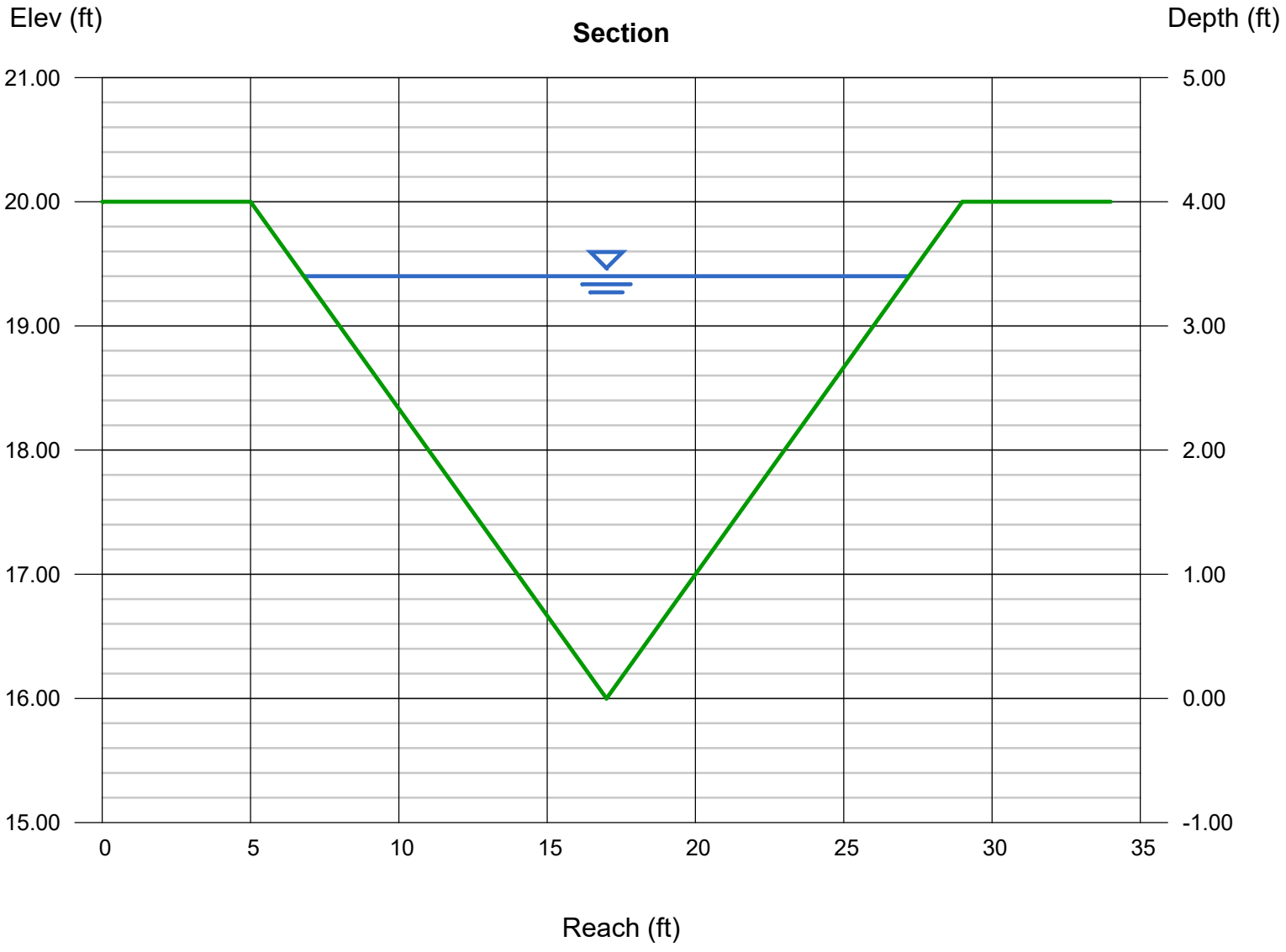
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 4.00
Invert Elev (ft)	= 16.00
Slope (%)	= 1.00
N-Value	= 0.080

Calculations

Compute by:	Known Q
Known Q (cfs)	= 88.26

Highlighted

Depth (ft)	= 3.40
Q (cfs)	= 88.26
Area (sqft)	= 34.68
Velocity (ft/s)	= 2.54
Wetted Perim (ft)	= 21.50
Crit Depth, Yc (ft)	= 2.22
Top Width (ft)	= 20.40
EGL (ft)	= 3.50



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Sep 2 2026

DITCH 4 - POST

Triangular

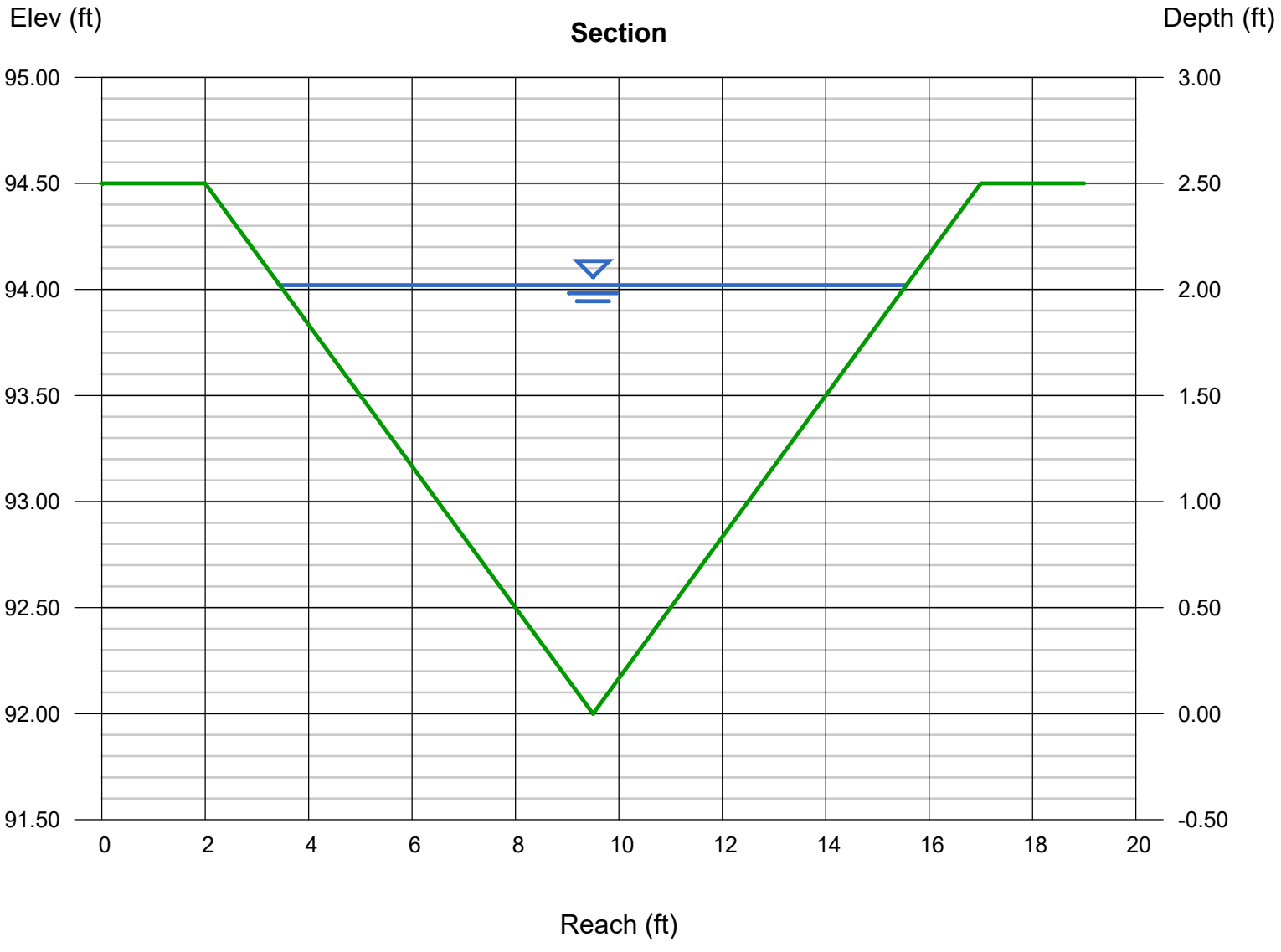
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.50
Invert Elev (ft)	= 92.00
Slope (%)	= 1.50
N-Value	= 0.080

Calculations

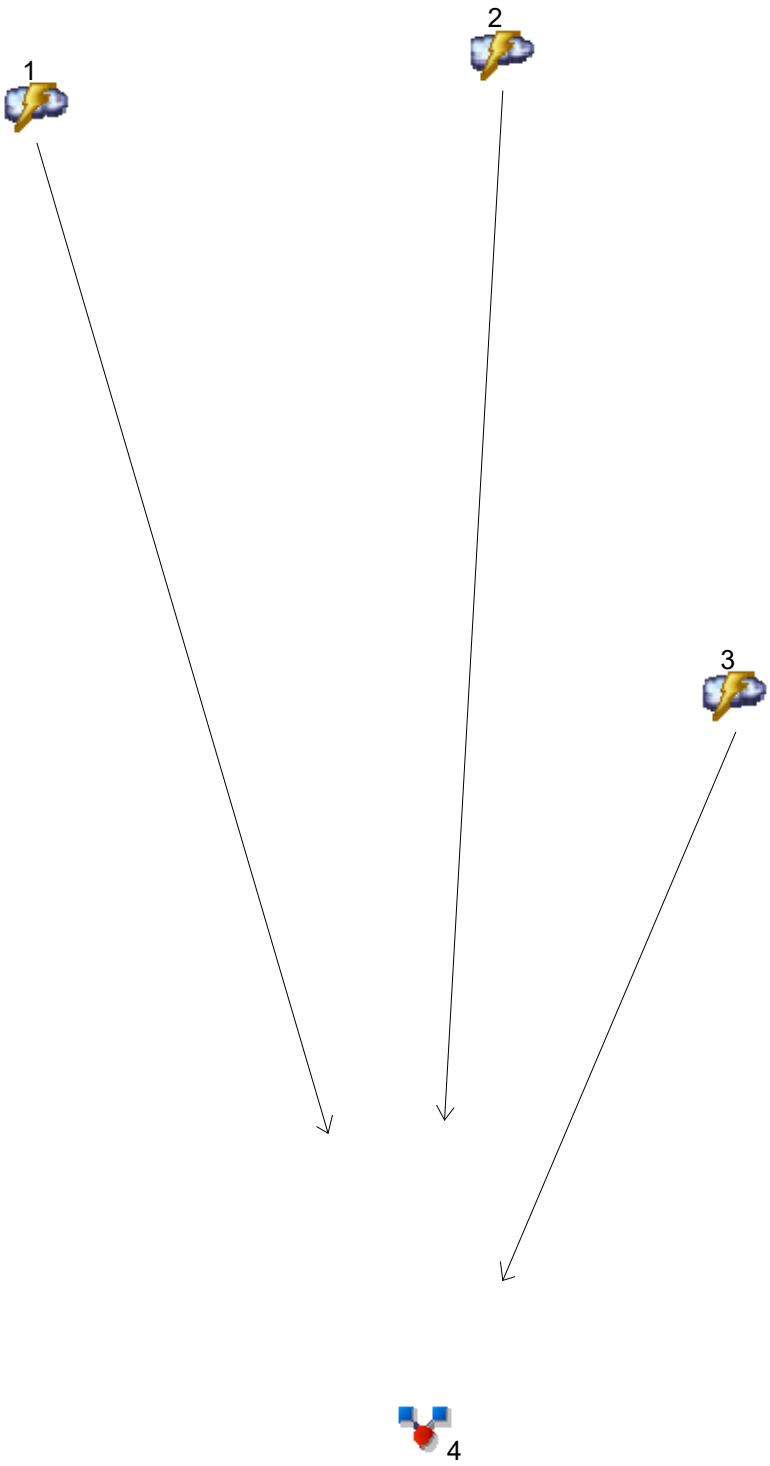
Compute by:	Known Q
Known Q (cfs)	= 26.88

Highlighted

Depth (ft)	= 2.02
Q (cfs)	= 26.88
Area (sqft)	= 12.24
Velocity (ft/s)	= 2.20
Wetted Perim (ft)	= 12.78
Crit Depth, Yc (ft)	= 1.38
Top Width (ft)	= 12.12
EGL (ft)	= 2.09



Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Rational	DA 13
2	Rational	DA 14
3	Rational	DA 3
4	Combine	<no description>

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Rational	------	-------	0.925	-------	-------	1.333	-------	-------	2.009	DA 13
2	Rational	------	-------	0.788	-------	-------	1.135	-------	-------	1.711	DA 14
3	Rational	------	-------	8.883	-------	-------	12.81	-------	-------	19.30	DA 3
4	Combine	1, 2, 3	-------	10.60	-------	-------	15.28	-------	-------	23.02	<no description>

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

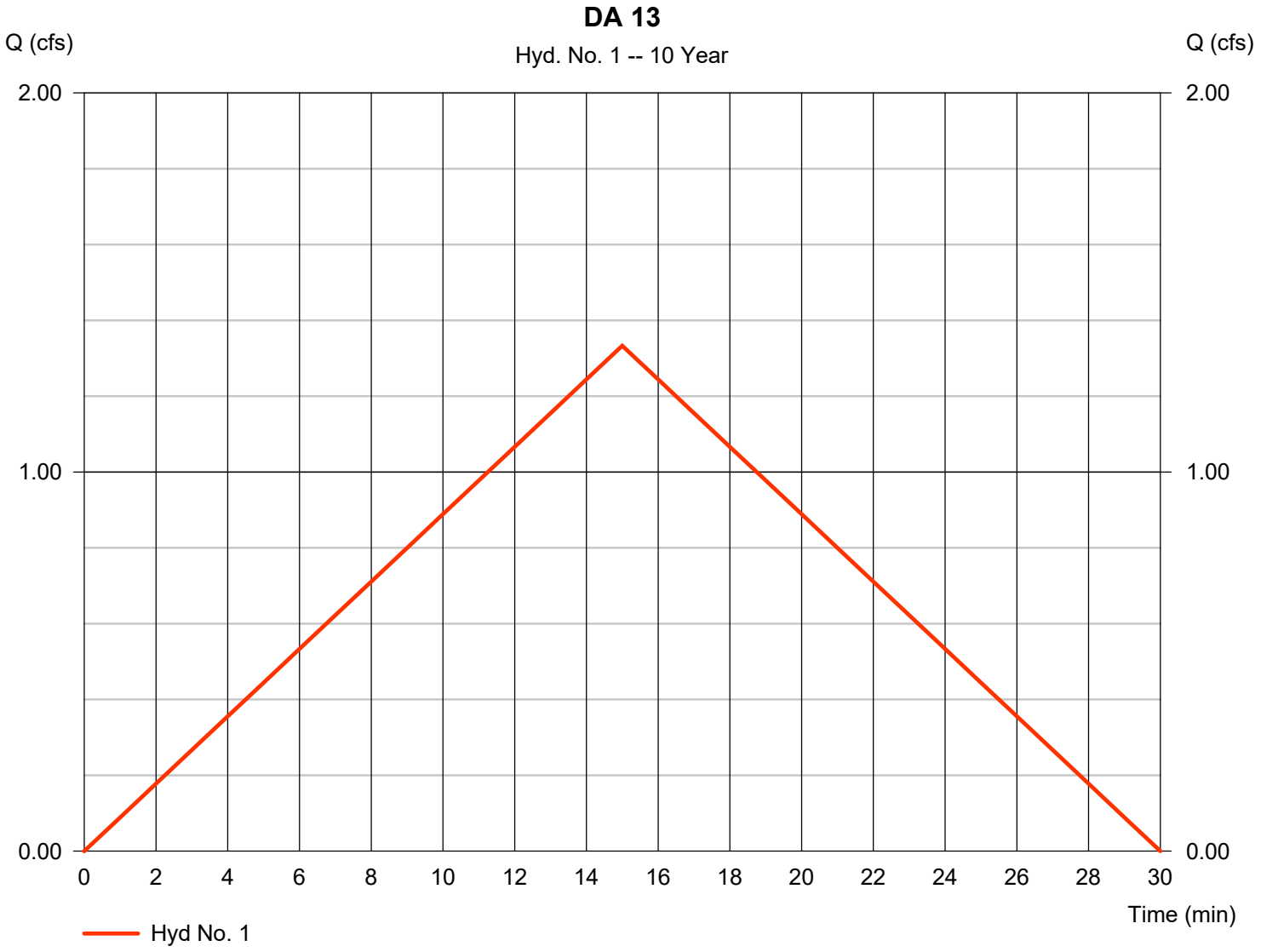
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.333	1	15	1,200	------	------	------	DA 13
2	Rational	1.135	1	15	1,022	------	------	------	DA 14
3	Rational	12.81	1	15	11,527	------	------	------	DA 3
4	Combine	15.28	1	15	13,749	1, 2, 3	------	------	<no description>

Hydrograph Report

Hyd. No. 1

DA 13

Hydrograph type	=	Rational	Peak discharge	=	1.333 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	1,200 cuft
Drainage area	=	0.870 ac	Runoff coeff.	=	0.84
Intensity	=	1.824 in/hr	Tc by User	=	15.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1

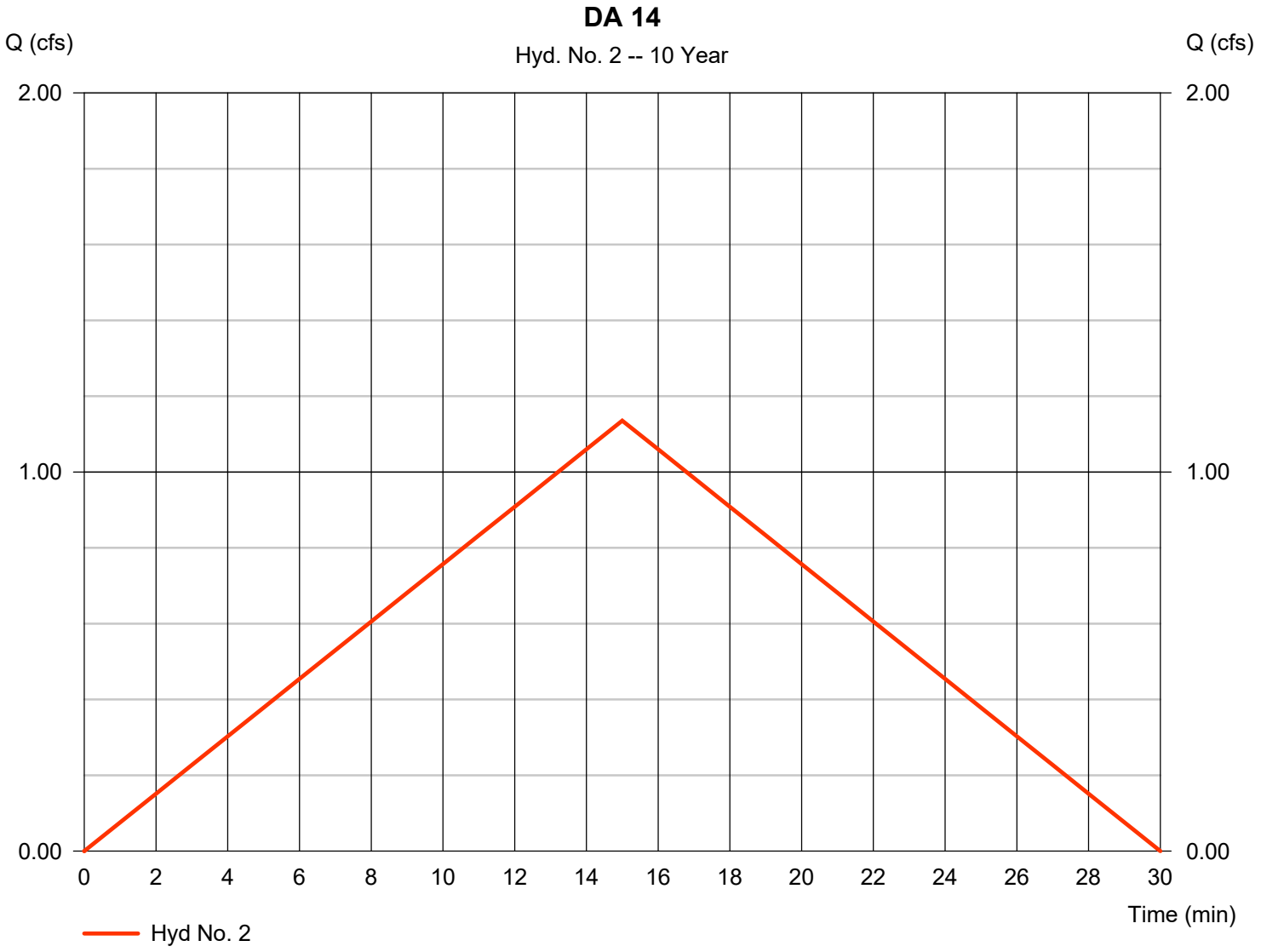


Hydrograph Report

Hyd. No. 2

DA 14

Hydrograph type	=	Rational	Peak discharge	=	1.135 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	1,022 cuft
Drainage area	=	0.830 ac	Runoff coeff.	=	0.75
Intensity	=	1.824 in/hr	Tc by User	=	15.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1



Hydrograph Report

Hyd. No. 3

DA 3

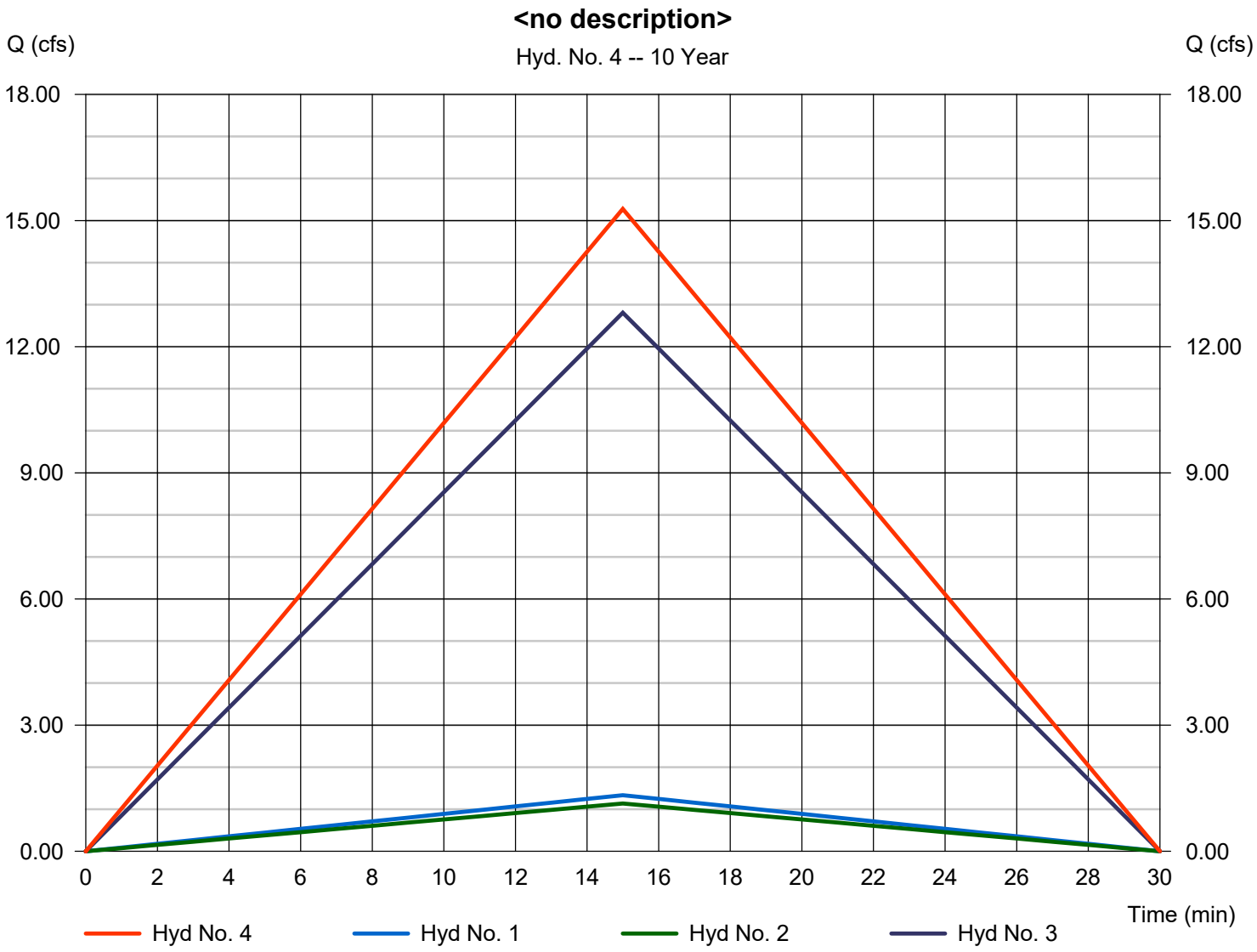
Hydrograph type	=	Rational	Peak discharge	=	12.81 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	11,527 cuft
Drainage area	=	8.460 ac	Runoff coeff.	=	0.83
Intensity	=	1.824 in/hr	Tc by User	=	15.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1

Hydrograph Report

Hyd. No. 4

<no description>

Hydrograph type	=	Combine	Peak discharge	=	15.28 cfs
Storm frequency	=	10 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	13,749 cuft
Inflow hyds.	=	1, 2, 3	Contrib. drain. area	=	10.160 ac



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 Thursday, 09 / 3 / 2026

Pond No. 1 - POND 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 96.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	0.00	00	0	0
96.00	96.00	91	2,919	2,919
98.00	98.00	791	767	3,686
100.00	100.00	2,111	2,796	6,482
102.00	102.00	4,698	6,638	13,120
104.00	104.00	7,528	12,114	25,234
106.00	106.00	10,705	18,138	43,373
108.00	108.00	14,186	24,807	68,180

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	0.00	0.00	0.00
Crest El. (ft)	= 107.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	0.00	---	---	---	---	0.00	---	---	---	---	---	0.000
96.00	2,919	96.00	---	---	---	---	0.00	---	---	---	---	---	0.000
98.00	3,686	98.00	---	---	---	---	0.00	---	---	---	---	---	0.000
100.00	6,482	100.00	---	---	---	---	0.00	---	---	---	---	---	0.000
102.00	13,120	102.00	---	---	---	---	0.00	---	---	---	---	---	0.000
104.00	25,234	104.00	---	---	---	---	0.00	---	---	---	---	---	0.000
106.00	43,373	106.00	---	---	---	---	0.00	---	---	---	---	---	0.000
108.00	68,180	108.00	---	---	---	---	5.20	---	---	---	---	---	5.200

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025 — Thursday, 09 / 3 / 2026

Pond No. 1 - POND 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 96.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	0.00	00	0	0
96.00	96.00	91	2,919	2,919
98.00	98.00	791	767	3,686
100.00	100.00	2,111	2,796	6,482
102.00	102.00	4,698	6,638	13,120
104.00	104.00	7,528	12,114	25,234
106.00	106.00	10,705	18,138	43,373
108.00	108.00	14,186	24,807	68,180

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

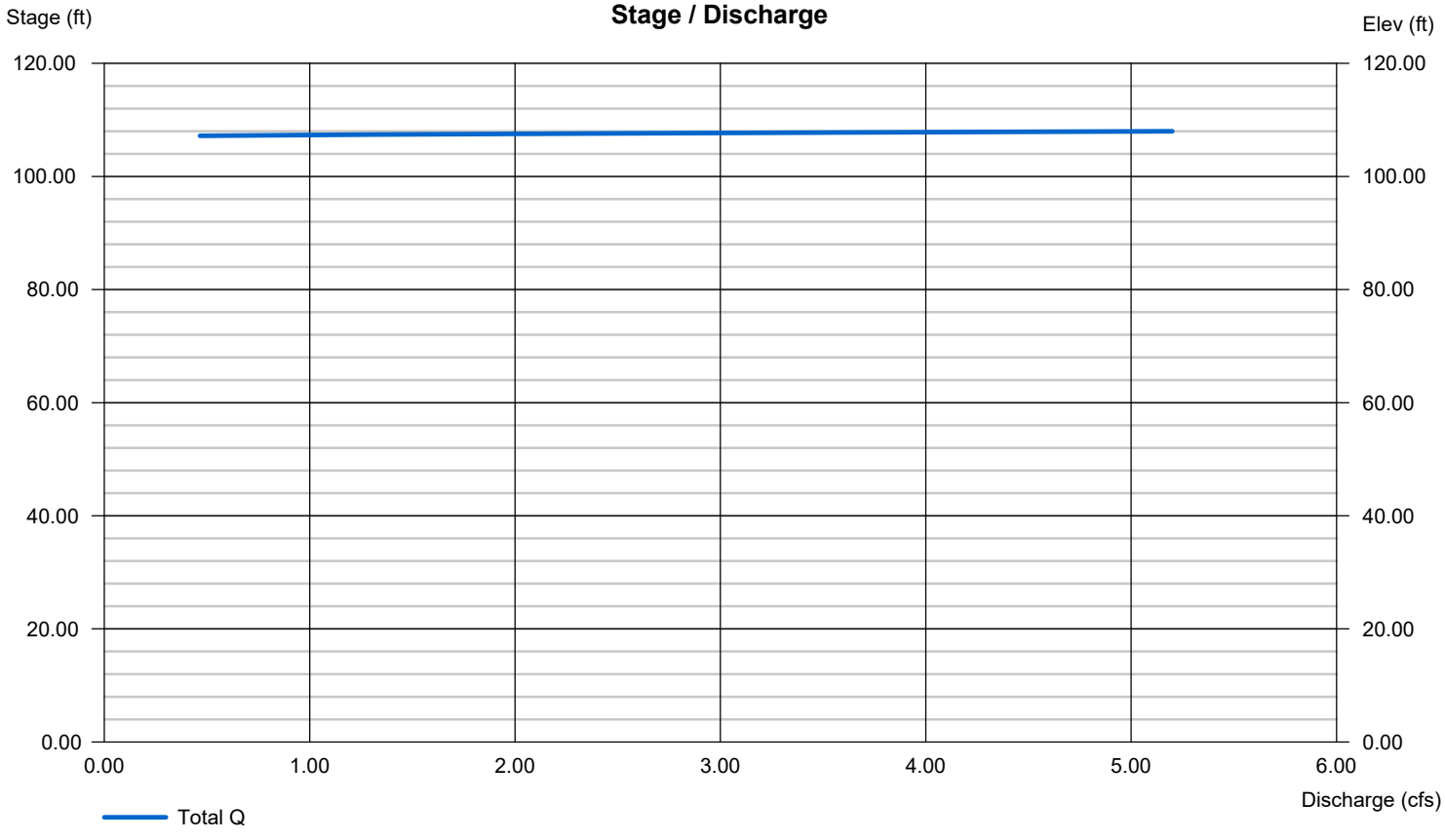
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	0.00	0.00	0.00
Crest El. (ft)	= 107.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Appendix S. Noise Modeling for Alternative 3

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TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number:
Project Name: Buena Vista Landfill

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Kimley-Horn 2024
Community Noise Descriptor: L_{dn}: ____ CNEL: X

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	87.13%	4.63%	8.24%
Medium-Duty Trucks	92.87%	2.69%	4.44%
Heavy-Duty Trucks	98.00%	1.00%	1.00%

"-" = contour is located within the roadway right-of-way.
Distance is from the centerline of the roadway segment to the receptor location.

Analysis Condition / Roadway, Segment	Lanes	Median Width	ADT Volume	Design Speed (mph)	Alpha Factor	Vehicle Mix: Medium Trucks	Vehicle Mix: Heavy Trucks	Distance from Centerline of Roadway: CNEL at 50 Feet	Distance to Contour: 70 CNEL	65 CNEL	60 CNEL	55 CNEL	Calc Dist	Traffic Volumes: Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Leve: A	MT	HT	Dist Adj	Ld: A	MT	HT	Total	Le: A	MT	HT	Total	Ln: A	MT	HT	Total	DISTANCE TO CONTOUR (2): 70 CNEL	65 CNEL	60 CNEL	55 CNEL
Buena Vista Drive																																										
SR-1 NB Ramps to SR-1 SB Ramps, existing	2	0	5,870	35	0	6.3%	0.1%	**62.3**	-	-	85	269	50	5,115	272	484	341	5	10	0	16	0	65.1	74.8	80.0	0.0	60.3	58.6	45.7	62.6	52.5	48.0	30.6	53.8	51.4	46.6	27.0	52.7	9	27	85	269
SR-1 NB Ramps to SR-1 SB Ramps, Interim	2	0	7,130	35	0	6.3%	0.1%	**63.2**	-	33	103	327	50	6,213	330	588	414	6	12	0	20	0	65.1	74.8	80.0	0.0	61.2	59.4	46.6	63.5	53.3	48.8	31.5	54.7	52.3	47.4	27.9	53.5	10	33	103	327
SR-1 NB Ramps to SR-1 SB Ramps, Interim + Project	2	0	7,572	35	0	6.1%	0.1%	**63.4**	-	34	109	344	50	6,598	350	624	426	7	12	0	20	0	65.1	74.8	80.0	0.0	61.4	59.5	46.7	63.7	53.6	49.0	31.6	54.9	52.5	47.5	28.0	53.7	11	34	109	344
SR-1 NB Ramps to SR-1 SB Ramps, Cumulative	2	0	8,750	35	0	6.3%	0.1%	**64.0**	-	40	127	402	50	7,624	405	721	508	8	15	0	24	0	65.1	74.8	80.0	0.0	62.0	60.3	47.5	64.4	54.2	49.7	32.4	55.6	53.2	48.3	28.8	54.4	13	40	127	402
SR-1 NB Ramps to SR-1 SB Ramps, Cumulative + Project	2	0	9,192	35	0	8.3%	0.1%	**64.7**	-	46	147	465	50	8,009	425	758	712	11	21	0	34	0	65.1	74.8	80.0	0.0	62.2	61.8	48.9	65.1	54.4	51.2	33.8	56.1	53.3	49.8	30.2	54.9	15	46	147	465
Buena Vista Drive																																										
SR-1 SB Ramps to Ranport Rd/Fiesta Way, existing	2	0	3,670	35	0	5.2%	0.1%	**60.0**	-	-	51	160	50	3,198	170	302	177	3	5	0	8	0	65.1	74.8	80.0	0.0	58.3	55.7	42.9	60.3	50.5	45.1	27.8	51.6	49.4	43.7	24.2	50.5	5	16	51	160
SR-1 SB Ramps to Ranport Rd/Fiesta Way, Interim	2	0	4,520	35	0	5.2%	0.1%	**61.0**	-	-	62	197	50	3,938	209	373	218	3	6	0	10	0	65.1	74.8	80.0	0.0	59.2	56.6	43.8	61.2	51.4	46.0	28.7	52.5	50.3	44.6	25.1	51.4	6	20	62	197
SR-1 SB Ramps to Ranport Rd/Fiesta Way, Interim + Project	2	0	4,805	35	0	9.9%	0.1%	**62.1**	-	-	82	259	50	4,187	222	396	440	7	13	0	21	0	65.1	74.8	80.0	0.0	59.3	59.7	46.8	62.6	51.5	49.1	31.7	53.5	50.5	47.7	28.1	52.3	8	26	82	259
SR-1 SB Ramps to Ranport Rd/Fiesta Way, Cumulative	2	0	5,920	35	0	5.2%	0.1%	**62.1**	-	-	82	258	50	5,158	274	488	285	4	8	0	14	0	65.1	74.8	80.0	0.0	60.4	57.8	45.0	62.4	52.6	47.2	29.8	53.7	51.5	45.8	26.2	52.5	8	26	82	258
SR-1 SB Ramps to Ranport Rd/Fiesta Ways, Cumulative + Proj	2	0	5,925	35	0	8.3%	0.1%	**62.8**	-	-	95	299	50	5,163	274	488	459	7	13	0	22	0	65.1	74.8	80.0	0.0	60.2	59.9	47.0	63.2	52.5	49.3	31.9	54.2	51.4	47.9	28.3	53.0	9	30	95	299
Buena Vista Drive																																										
Ranport Rd/Fiesta Way to Harkins Slough Rd, existing	2	0	3,880	35	0	3.9%	0.1%	**60.0**	-	-	50	158	50	3,381	179	320	141	2	4	0	7	0	65.1	74.8	80.0	0.0	58.6	54.7	41.9	60.2	50.8	44.1	26.8	51.6	49.7	42.7	23.2	50.5	5	16	50	158
Ranport Rd/Fiesta Way to Harkins Slough Rd, Interim	2	0	4,220	35	0	3.9%	0.1%	**60.4**	-	-	54	172	50	3,677	195	348	153	2	4	0	7	0	65.1	74.8	80.0	0.0	59.0	55.1	42.3	60.5	51.1	44.5	27.1	52.0	50.0	43.1	23.5	50.9	5	17	54	172
Ranport Rd/Fiesta Way to Harkins Slough Rd, Interim + Project	2	0	4,563	35	0	8.7%	0.1%	**61.7**	-	-	74	234	50	3,976	211	376	369	6	11	0	18	0	65.1	74.8	80.0	0.0	59.1	58.9	46.1	62.1	51.3	48.3	31.0	53.1	50.3	46.9	27.4	51.9	7	23	74	234
Ranport Rd/Fiesta Way to Harkins Slough Rd, Cumulative	2	0	4,860	35	0	3.9%	0.1%	**61.0**	-	-	63	198	50	4,235	225	401	176	3	5	0	8	0	65.1	74.8	80.0	0.0	59.6	55.7	42.9	61.2	51.7	45.1	27.8	52.6	50.7	43.7	24.2	51.5	6	20	63	198
Ranport Rd/Fiesta Way to Harkins Slough Rd, Cumulative + Prc	2	0	5,023	35	0	8.0%	0.1%	**62.0**	-	-	79	250	50	4,377	232	414	371	6	11	0	18	0	65.1	74.8	80.0	0.0	59.5	58.9	46.1	62.4	51.8	48.4	31.0	53.4	50.7	46.9	27.4	52.2	8	25	79	250
Buena Vista Drive																																										
Harkins Slough Rd to Landfill Entrance, existing	2	0	2,790	35	0	5.1%	0.1%	**58.8**	-	-	38	121	50	2,431	129	230	132	2	4	0	6	0	65.1	74.8	80.0	0.0	57.1	54.4	41.6	59.1	49.3	43.8	26.5	50.4	48.2	42.4	22.9	49.2	4	12	38	121
Harkins Slough Rd to Landfill Entrance, Interim	2	0	630	35	0	5.1%	0.1%	**52.4**	-	-	-	-	50	549	29	52	30	0	1	0	1	0	65.1	74.8	80.0	0.0	50.7	48.0	35.1	52.6	42.8	37.4	20.0	43.9	41.8	36.0	16.4	42.8	1	3	9	27
Harkins Slough Rd to Landfill Entrance, Interim + Project	2	0	853	35	0	12.5%	0.2%	**55.1**	-	-	-	51	50	743	39	70	99	2	3	0	5	0	65.1	74.8	80.0	0.0	51.6	53.2	40.4	55.6	44.0	42.6	25.3	46.4	42.9	41.2	21.7	45.2	2	5	16	51
Harkins Slough Rd to Landfill Entrance, Cumulative	2	0	640	35	0	5.1%	0.1%	**52.4**	-	-	-	-	50	558	30	53	30	0	1	0	1	0	65.1	74.8	80.0	0.0	50.7	48.0	35.2	52.7	42.9	37.5	20.1	44.0	41.8	36.0	16.5	42.9	1	3	9	28
Harkins Slough Rd to Landfill Entrance, Cumulative + Project	2	0	853	35	0	11.7%	0.2%	**55.0**	-	-	-	50	50	743	39	70	93	1	3	0	4	0	65.1	74.8	80.0	0.0	51.6	52.9	40.1	55.5	44.0	42.3	25.0	46.3	42.9	40.9	21.4	45.1	2	5	16	50
Buena Vista Drive																																										
Landfill Entrance to San Andreas Drive, existing	2	0	2,790	35	0	3.9%	0.1%	**58.6**	-	-	36	113	50	2,431	129	230	101	2	3	0	5	0	65.1	74.8	80.0	0.0	57.2	53.3	40.5	58.7	49.3	42.7	25.3	50.2	48.3	41.3	21.7	49.1	4	11	36	113
Landfill Entrance to San Andreas Drive, Interim	2	0	2,200	35	0	3.9%	0.1%	**57.5**	-	-	-	89	50	1,917	102	181	80	1	2	0	4	0	65.1	74.8	80.0	0.0	56.2	52.3	39.4	57.7	48.3	41.7	24.3	49.2	47.2	40.3	20.7	48.0	3	9	28	89
Landfill Entrance to San Andreas Drive, Interim + Project	2	0	2,201	35	0	4.2%	0.1%	**57.6**	-	-	-	91	50	1,918	102	181	85	1	2	0	4	0	65.1	74.8	80.0	0.0	56.2	52.6	39.7	57.8	48.3	42.0	24.6	49.2	47.2	40.6	21.0	48.1	3	9	29	91
Landfill Entrance to San Andreas Drive, Cumulative	2	0	3,210	35	0	3.9%	0.1%	**59.2**	-	-	41	131	50	2,797	148	265	116	2	3	0	6	0	65.1	74.8	80.0	0.0	57.8	53.9	41.1	59.4	49.9	43.3	26.0	50.8	48.9	41.9	22.4	49.7	4	13	41	131
Landfill Entrance to San Andreas Drive, Cumulative + Project	2	0	3,211	35	0	4.2%	0.1%	**59.2**	-	-	42	133	50	2,798	149	265	124	2	4	0	6	0	65.1	74.8	80.0	0.0	57.8	54.2	41.3	59.4	49.9	43.6	26.2	50.9	48.9	42.2	22.6	49.7	4	13	42	133

Appendix T. Traffic Analysis for Alternatives

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MEMORANDUM

To:	Nicole Steel, Project Manager, Capital Projects
	General Services Department, County of Santa Cruz
From:	Ali Mustafa, PTP/RSP$_1$, Shahrzad Rahgozar, Kimley-Horn and Associates, Inc.
Date:	4 June 2026
Subject:	Buena Vista Project Alternatives – Traffic Analysis Memo

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The County of Santa Cruz is proposing the Buena Vista Landfill Redevelopment Project (Proposed Project) in the unincorporated Santa Cruz County. The Buena Vista Landfill is currently permitted to reach a maximum elevation of 200 feet and, as of November 2022, has an estimated remaining capacity or site life ranging from 6 to 16 years (2028-2038) depending on the rate of the annual tonnage of waste disposed of at the landfill. This traffic analysis assumes the landfill site reaches its capacity in Year 2032.

The purpose of the County's Proposed Project to ensure an orderly landfill closure program that meets State requirements and provides on-going solid waste handling capabilities to allow the County to meet State required waste management goals for waste reduction, source separation, recycling materials, and organics diversion.

The Proposed Project includes locating Transfer Station A on undeveloped land in the northeast corner of the landfill property, Transfer Station B where the existing office/maintenance buildings are located, and an organics division facility either at its current location or another location within the landfill property. The recycling center and household hazardous waste collection would remain at their current location within the landfill property.

A detailed Traffic Impact Assessment (TIA) was completed for the Proposed Project in July 2025. Since completion of the TIA for the Proposed Project, the County has identified the following alternatives to the Proposed Project for analysis and consideration:

- **Alternative 1 (Transfer Station A on South Side of Rountree Lane)** – This alternative relocates Transfer Station A from the northeast corner to the southeast corner, east of existing Rountree Medium (Jail) Facility. All the other project components, including the access to and from the landfill facility, remain the same as the Proposed Project.
- **Alternative 2 (No Project)**
- **Alternative 3 (Combined Facilities on Adjacent Property)** – This alternative relocates Transfer Station A and Transfer Station B, as well as the organics division facility and recycling center, to the adjacent property to the north at 1203 Buena Vista Drive (APN 052-011-11). The Alternative 3 site is shown in **Figure 1.**

This Traffic Analysis Memo evaluates the potential environmental effects with a quantitative analysis for Alternative 3, and provides a qualitative analysis for Alternative 1 and Alternative 2.

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Figure 1

Alternative 3 Site

INTERSECTION LEVEL OF SERVICE CRITERIA

Analysis of potential impacts at roadway intersections is based on the concept of Level of Service (LOS). The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of Service for this study were determined using methods defined in the Highway Capacity Manual (HCM) and Synchro 10 traffic analysis software.

HCM methodologies include procedures for analyzing side-street stop-controlled (SSSC), all-way stop-controlled (AWSC), and signalized intersections. The SSSC procedure defines LOS as a function of average control delay for each minor street approach movement. Conversely, the AWSC and signalized intersection procedures define LOS as a function of average control delay for the overall intersection. **Table 1** relates the operational characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	Less than 10	less than 10
B	Stable traffic. Traffic flows smoothly with few delays.	less than or equal to 10 to 20	less than or equal to 10 to 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	less than or equal to 20 to 35	less than or equal to 15 to 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	less than or equal to 35 to 55	less than or equal to 25 to 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	less than or equal to 55 to 80	less than or equal to 35 to 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	greater than or equal to 80	greater than or equal to 50
Sources: Transportation Research Board, *Highway Capacity Manual 6*, National Research Council.			

In general, project impacts are determined by comparing traffic conditions with and without the project. Significant impacts for intersections are created when traffic from the project causes the LOS to fall below the LOS threshold established by the lead agency or causes deficient intersections to deteriorate further.

County of Santa Cruz Standards

Per Santa Cruz County General Plan Policy AM-6.2.1, all development projects are required to provide multimodal roadway improvements necessary to achieve a minimum level of service (LOS) of "D", except for those where lesser LOS has been accepted by the County pursuant to the criteria specifically identified in Table 3-2 of the General Plan. When development is proposed on roads where a LOS E or F standard has been accepted, development projects are required to identify feasible mitigation in the form of road improvements, a fair share contribution to a road improvement program, or other in-lieu mitigation for the transportation system.

EXISTING CONDITIONS

This section describes the existing conditions of the transportation system within the study area. It describes transportation facilities near the Buena Vista Landfill and Alternative 3 site, including the roadway network. It should be noted that there is no change in the transit, pedestrian and bicycle facilities, which are documented as part of the detailed traffic analysis for the Proposed Project dated July 2025.

Existing Roadway Network

The following local and regional roadways provide access to the Buena Vista Landfill and Alternative 3 site:

SR-1 is a 4-lane highway that connects State Route (SR) 17 and SR-129 and travels in a north-south direction in the County of Santa Cruz. Regional access to the Buena Vista Landfill and Alternative 3 site is primarily from Highway 1 located approximately one mile to the northeast.

Buena Vista Dr is a two-lane collector street and provides the main entrance to the Buena Vista Landfill and other residential and agricultural land uses. The roadway has a posted speed limit of 35 mph. There are no sidewalks or bike lanes on either side of the street. The roadway is designated as a major collector street.

Harkins Slough Rd is a two-lane collector street and provides the main entrance to the Alternative 3 site and other residential and agricultural land uses. There is no posted speed limit sign on this road. There are no sidewalks or bike lanes on either side of the street. The roadway is designated as a major collector street.

Study Intersections

The study intersections were selected based on the likelihood of potential traffic adverse effects and were evaluated per the standards and guidelines set forth by the Santa Cruz County and Caltrans. The six (6) intersections studied for the Alternative 3 Site are listed below.

1. Buena Vista Drive / SR-1 NB Ramps
2. Buena Vista Drive / SR-1 SB Ramps
3. Buena Vista / Ranport Rd / Fiesta Way
4. Buena Vista Drive / Harkins Slough Rd
5. Harkins Slough Rd / Alternative 3 Site Access Road
6. Buena Vista Drive / San Andreas Road

The study intersections are shown in **Figure 2**.

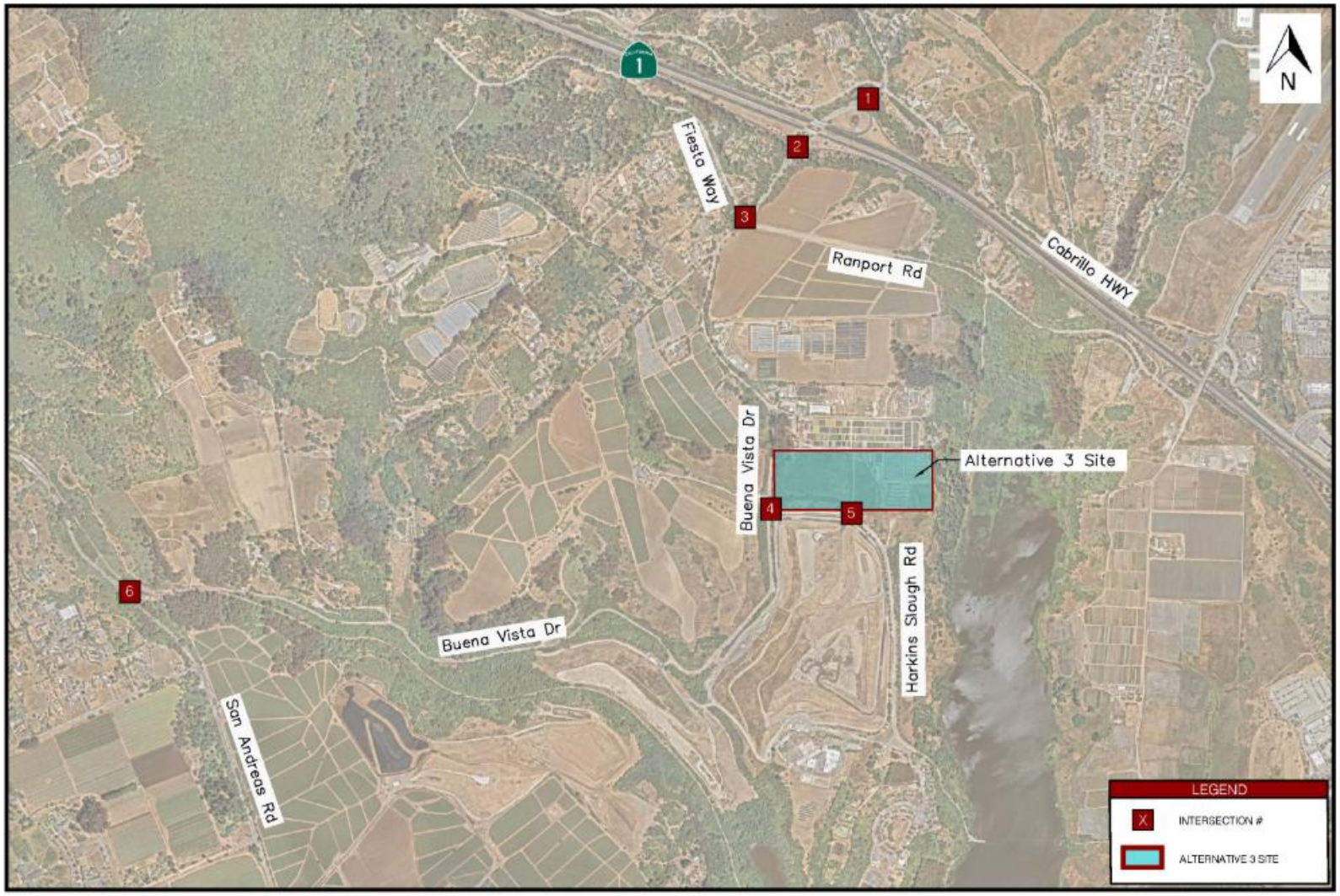

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Figure 2

Alternative 3 Location and Study Intersections

DETAILED ANALYSIS OF ALTERNATIVE 3

PROJECT DESCRIPTION

Alternative 3 (Combined Facilities on Adjacent Property) would include new combined facilities on the adjacent property, which is located immediately north of the Buena Vista Landfill. The combined facilities would include transfer station, organics diversion facility, recycling center, scale house, and office. Alternative 3 is shown in **Figure 3**.

The Alternative 3 site is located at 1203 Buena Vista Drive (APN 052-011-11), which is immediately north of the Buena Vista Landfill. The parcel is 26.95 acres, but only 11 acres on the eastern portion of the property would be used for the combined facilities. Additionally, approximately 1 acre of the County-owned landfill property to the south (i.e., the undeveloped area between the adjacent property line and Harkins Slough Road), would be used for the combined facilities ingress and egress (driveways) and improvements to the Harkins Slough Road Drainage. Existing land uses on the 11-acre eastern portion of the property (where the combined facilities would be located) include three large greenhouses, packing shed, boiler house, bathroom/lunchroom, and several other miscellaneous structures associated with previous cattle grazing uses that are no longer occurring. Additionally, there is a small residence currently occupied by a property owner in the far eastern portion of the property. The western portion of the property is undeveloped grassland and will remain as is. Implementation of Alternative 3 assumes the entire 26.95-acre property would be purchased by the County, and the occupant of the residence would vacate the property.

Internal roadways include the paved driveway along the northern property line, from Buena Vista Drive on the west to the residence on the east; an unpaved roadway extending from the driveway around the two northern greenhouses; and a paved roadway extending from the driveway to Harkins Slough Road to the south, effectively bisecting the property in the middle. The western portion of the adjacent property was historically used for cattle grazing and is currently undeveloped, except for the paved driveway along the northern property line.

PROJECT COMPONENTS

Alternative 3 would include the following components: Transfer Station, Organics Diversion Facility, Recycling Center, and Scale House. The primary difference compared to the Proposed Project is that these ongoing operations would occur on the adjacent property to the north, which would be acquired by the County, rather than within the current Buena Vista landfill property. The County plans to continue equipment maintenance, parking, storage, and household hazardous waste collection operations at their current locations on the Buena Vista landfill property and ongoing maintenance associated with the closed landfill.

TRANSFER STATION

The approximately 71,500-SF transfer station would serve self-haulers (residents and businesses), franchise haulers, and larger commercial vehicles. Transfer trucks travel from the north to the south of the transfer station (yellow flow lines on **Figure 3**), but all haulers are entering/exiting on the east side of the transfer station. The solid waste would be unloaded in the transfer station, and transfer trucks would collect and transport it to the regional waste disposal facility. Contact water from within the transfer station would be collected and held in a storage tank for pump and haul removal.

An office of up to 4,800 SF would be connected to the north side of the transfer station, and there would be approximately 25 parking spaces for employees and visitors. The office would include a conference/break room, storage/utility room, restrooms, and a viewing area for observing transfer station operation.

ORGANICS DIVERSION FACILITY

The County would continue to divert and process organic materials (e.g., vegetation/yard waste, food waste) at the combined facility, instead of the current operation on the active landfill, in compliance with State organics diversion requirements. The organics diversion facility (ODF) would be located east of the transfer station.

RECYCLE CENTER

The current recycling center on the Buena Vista Landfill site is located near the main landfill entrance and would be relocated to the new combined facility.

SCALE HOUSE

The scale house and scales would be located on the south side of the facility near the Harkins Slough Road entrance. All public access to the waste disposal site, including access to the recycling facility, would come through the Harkins Slough Road entrance and pass through the Scale House.

VEHICULAR CIRCULATION

Transfer Station traffic (self-haulers, franchise haulers, larger commercial vehicles), as well as ODF and Recycling Center traffic, would enter the facility from Harkins Slough Road and travel north and east to the Scale House, continue in a counter-clockwise direction around the combined facility to access the needed services, and return through the Scale House to exit the facility at the same location on Harkins Slough Road (i.e., using the same driveway for ingress/egress).

Transfer trailer traffic would also enter the facility from Harkins Slough Road, but they would stay on the outer perimeter to and through the transfer station and then exit without comingling with the other traffic in smaller vehicles (refer to yellow arrows in Figure 3). Transfer trucks would be used instead of smaller trucks to reduce the number of trips needed to convey waste to other locations, and to focus the use of specialized waste collection trucks on neighborhood and commercial waste collection. Harkins Slough Road would be modified at the Proposed driveway location, and no further improvements are planned.

Employee access to the Alternative 3 site would be similar to existing conditions, whereby County staff arrive at 150 Rountree Lane via Harkins Slough Rd. from Buena Vista Dr. The employees would access the Alternative 3 site via Harkins Slough Road from Buena Vista Drive.

PROJECT TRIP GENERATION

The project trip generation would be the same for the Proposed Project and Alternative 3. The Proposed Project trip generation was estimated separately for the employees and for the transfer trucks, which will transfer the consolidated solid waste from the transfer station to the ReGen Monterey Landfill facility in the City of Marina.

Project employee trips were estimated based on the office space (up to 4,800 SF) on the north side of the Transfer Station. The hours of operation would be the same as current landfill operations, which are from 7:30 AM to 3:30 PM (Monday to Tuesday & Thursday to Saturday) and from 7:30 AM to 2:30 PM on Wednesday. Under existing conditions, a total of approximately 40-45 employees work at the Buena Vista Landfill site, and the employees' number is expected to remain the same. All employees work on a single shift, arriving in the morning and leaving in the afternoon. The number of employees is expected to remain the same with implementation of the Proposed Project and Alternatives 1 and 3. It should be noted that these employees are currently accounted for in the traffic count data collected.

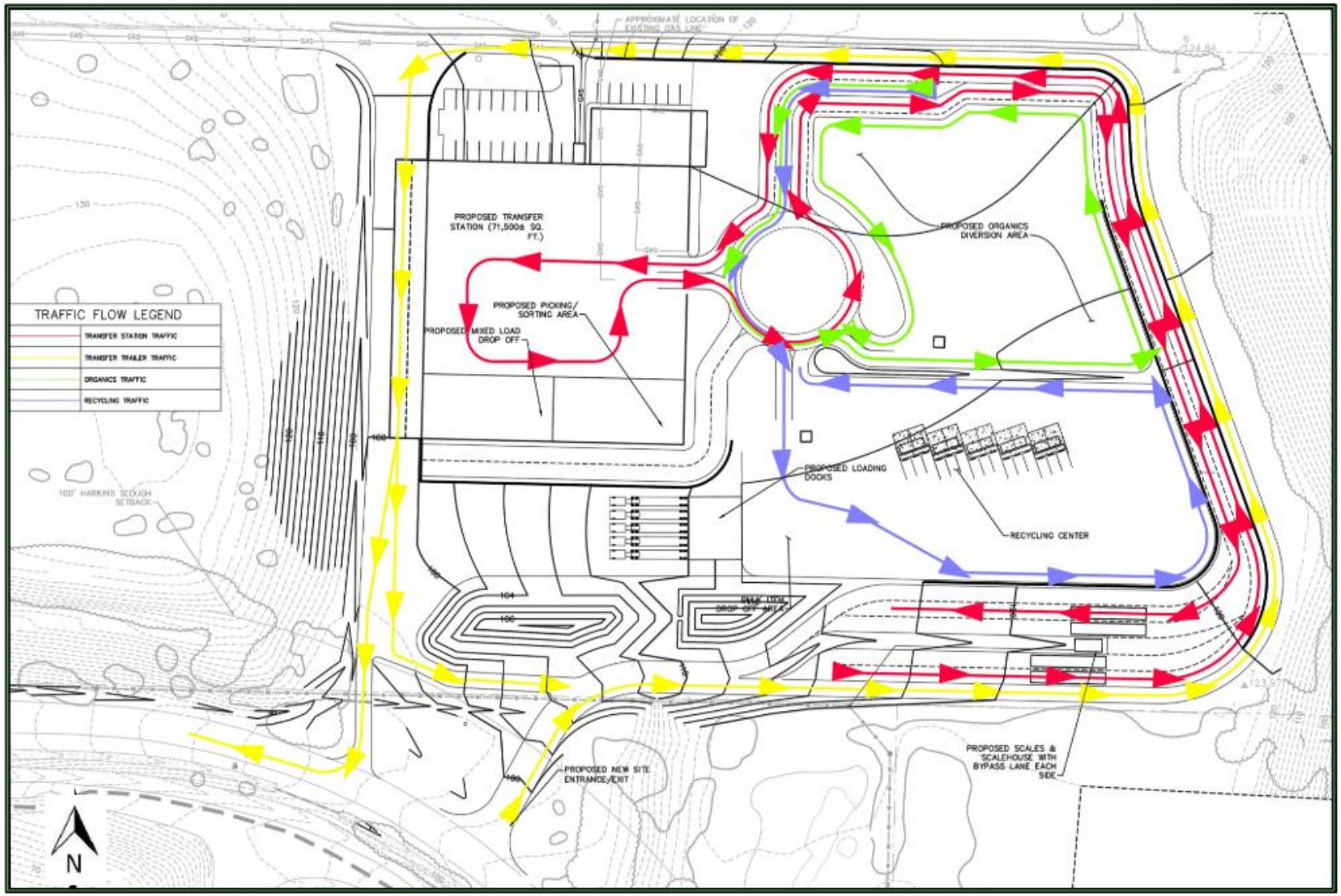

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Figure 3

Alternative 3 Traffic Circulation

The employee daily trip estimates from Institute of Transportation Engineers (ITE), 11th Edition for Small Office Building (ITE 712) is summarized in **Table 2** below:

Table 2: Project Trip Generation – Based on Office Square Footage

LAND USE / DESCRIPTION [1]	PROJECT SIZE		WEEKDAY TOTAL DAILY TRIPS
Trip Generation Rates (ITE)			
Small Office Building (ITE 712)	Per	1,000 Sq Ft	16.19
Future Vehicle-Trips			
Alternative 3 (Transfer Station Office)	4.800	1,000 Sq Ft	78
		Project Vehicle-Trips	78
Notes:			
1. Daily, AM, and PM trips based on average land use rates from the Institute of Traffic Engineers (ITE) Trip Generation 11th Edition			

Although the ITE released its 12th Edition Trip Generation Manual in August 2025, trip generation estimates for the office land use were calculated using the ITE 11th Edition Trip Generation Manual to maintain consistency with the previous traffic analysis conducted for the Proposed Project.

The other trips involve transfer trucks which are commercial semi-trucks hauling 40- to 55-foot enclosed trailers. These trucks will transfer the consolidated solid waste from the transfer station to the ReGen Monterey Landfill facility located 19 miles south in the City of Marina.

This TIA for the Proposed Project assumes Organic Diversion Facility (ODF) Option 2, which estimates the landfill will reach final permitted grades between 2030-2034. The traffic analysis for Alternative 3 assumes that the landfill reaches its capacity in Year 2032.

The amount of anticipated waste arriving at the transfer station is expected to increase from existing conditions to cumulative (2045) conditions. The amount of increase in waste arriving is assumed to be proportional to the increase in population within Santa Cruz County. Therefore, using the County's Travel Demand Model, a percent growth in population was estimated and this percent growth was applied to the existing waste arriving at the Project site to estimate the waste arriving when the landfill reaches its capacity (i.e., in Year 2032 landfill closure) and in Year 2045. This increase in waste will be associated with an increase in trips to the transfer station; however, it should be noted that Alternative 3 does not generate this additional traffic until the landfill operation ceases and the transfer station operations commence. Trips generated before the closure are unrelated to Alternative 3, while trips generated after the closure are associated with Alternative 3, as it enables these trips to arrive and depart (transfer station) for ReGen Monterey Landfill facility.

Based on the 'Buena Vista Date/Time Analysis Report (from 06/01/2021 to 05/31/2022), the average inbound waste arriving at the Buena Vista Landfill was approximately 445 tons. During the Interim (2032)

Conditions, a total of approximately 470 tons of waste is anticipated; and during Cumulative (2045) Conditions, a total of approximately 450 tons of waste is anticipated. It should be noted that soil will not be accepted once the landfill reaches its capacity in Year 2032 and hence the reduction in total tons of waste in Year 2045.

The number of transfer trucks needed to transfer the waste to ReGen Monterey Landfill facility and other locations was estimated assuming a 20 tons capacity of a single transfer truck. A total of 24 daily transfer trucks during the Interim (2032) Conditions and 23 daily trucks during the Cumulative (2045) Conditions were estimated to transfer the waste arriving at Alternative 3 site. The number of trips is summarized in **Table 3** below.

As shown in **Table 3**, the total number of truck trips estimated during the AM peak hour was 14 trips (8 In, 6 Out) during the Interim (2032) Conditions and 13 trips (7 In, 6 Out) during the Cumulative (2045) Conditions. No truck trips are anticipated during the PM peak period (i.e., 4 to 6 PM) as Alternative 3 Site is expected to close at 3:30 PM.

PROJECT TRIP DISTRIBUTION

All estimated Project truck trips will be to and from Alternative 3 site to the ReGen Monterey Landfill site, therefore the Project trips were distributed on the road network accordingly.

PROJECT TRIP ASSIGNMENT

Figure 4 shows the Alternative 3 Project truck trips assigned to the road network based on the Project trip distribution.

Table 3: Alternative 3 Trip Generation – Based on Truck Volumes

Item	Quantity	Units	Notes
Travel Time Estimates			
Approximate travel time (mins) from Alternative 3 Site to ReGen Monterey Landfill - (One Direction)	35-40	mins	Source: Google Maps shows 20-26 mins depending upon the time of departure for passenger cars. Additional time was added for trucks to account for lower speeds
Time taken at Alternative 3 Transfer Station to load one truck (in mins)	20	mins	Input from County
Time taken at ReGen Monterey Landfill Site to unload one truck (in mins)	20	mins	Input from County
Total time taken (in mins) by 1 Truck (from Alternative 3 Site to ReGen Monterey Landfill and back)	110-115	mins	Estimated Value
Number of trips by 1 Truck (from Alternative 3 site to ReGen Monterey Landfill and back) in a day	3.5 to 4	Trips	Estimated Value (Based on work timings for Alternative 3 site and ReGen Monterey Landfill)
Estimated Waste			

Item	Quantity	Units	Notes
Total Waste Arriving at the Alternative 3 Site under Existing Conditions	448	tons	Estimated value using Buena Vista Landfill Date/Time Analysis Report (from 06/01/201 to 05/31/2022) and percent growth in population from Santa Cruz County Travel Demand Model
Estimated Waste Arriving at the Alternative 3 Site During Interim (2032) Conditions	470	tons	
Estimated Waste Arriving at the Alternative 3 Site During Cumulative (2045) Conditions	450	tons	
No. of Daily Trucks			
Interim (2032) Conditions - No. of Daily Trucks Needed to transfer the waste from Alternative 3 Ste to ReGen Monterey Landfill	24	no.	Assuming 20 tons capacity of a single transfer truck
Cumulative (2045) Conditions - No. of Daily Trucks Needed to transfer the waste from Alternative 3 Site to ReGen Monterey Landfill	23	no.	Assuming 20 tons capacity of a single transfer truck
No. of Trucks During AM Peak Hour			
Project Trips - Interim (2032) Conditions - No. of trucks transferring the waste from Alternative 3 Site to ReGen Monterey Landfill during the AM Peak Hour	8	trucks	Estimated value. A total of approximately 8 trucks will be needed to transfer the waste from Alternative 3 Site to ReGen Monterey Landfill facility (Each truck can make 3.5 trips per day, therefore a total of 8 trucks are needed to transfer. For a conservative case analysis, all trucks were assumed to arrive during the morning peak hour.
	6	trucks	Outbound (Assuming 6 trucks are able to exit during the morning peak hour, as it takes 20 mins to load a truck and each transfer station can load 3 trucks during an hour)
Project Trips - Cumulative (2045) Conditions - No. of trucks transferring the waste from Alternative 3 Site to ReGen Monterey Landfill during the AM Peak Hour	7	trucks	Estimated value. A total of approximately 7 trucks will be needed to transfer the waste from Alternative 3 Site to ReGen Monterey Landfill facility (Each truck can make 3.5 trips per day, therefore a total of 7 trucks are needed to transfer. For a conservative case analysis, all trucks were assumed to arrive during the morning peak hour.

Item	Quantity	Units	Notes
	6	trucks	Outbound (Assuming 6 trucks are able to exit during the morning peak hour, as it takes 20 mins to load a truck and each transfer station can load 3 trucks during an hour)
No. of Trucks During PM Peak Hour			
Project Trips - Interim (2032) Conditions - No. of trucks transferring the waste from Alternative 3 Site to ReGen Monterey Landfill during the PM Peak Hour	0	trucks	No truck trips are anticipated during the PM peak hour as Alternative 3 Site is expected to close at 3:30 PM
	0	trucks	
Project Trips - Cumulative (2045) Conditions - No. of trucks transferring the waste from Alternative 3 Site to ReGen Monterey Landfill during the PM Peak Hour	0	trucks	No truck trips are anticipated during the PM peak hour as Alternative 3 Site is expected to close at 3:30 PM
	0	trucks	

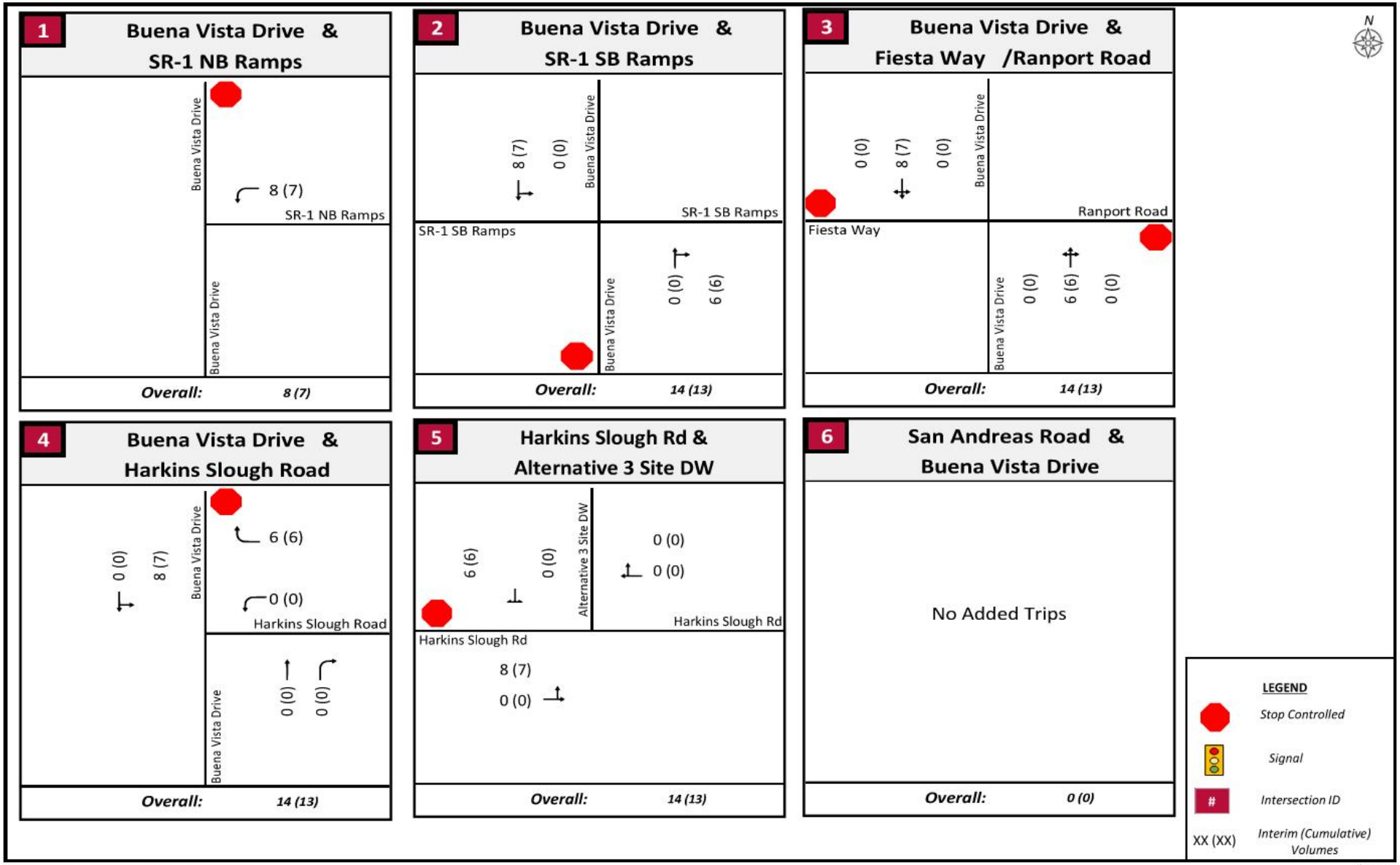

Figure 4
Alternative 3 Trip Volumes

INTERSECTION OPERATIONS

This chapter describes the local transportation analysis including intersection operations analysis for: Existing, Interim (2032), Interim (2032) plus Project, Cumulative (2045), and Cumulative (2045) plus Project; intersection vehicle queuing analysis; signal warrant analysis; and mitigation measures for any adverse effects to intersection level of service caused by Project Alternative 3.

Existing Conditions

Existing traffic count data and lane geometry are shown in **Figure 5** and **Figure 6**. Existing conditions study intersection level of service are shown in **Table 4** below and Synchro output sheets are provided in **Appendix**.

Table 4: Intersection Operation Summary for Existing Conditions

#	Intersection	Maintaining Agency	Control Type	Existing Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	9.7	A	-	6.1	A
				WB	12.55	B	WB	11.54	B
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	3.1	A	-	4.9	A
				EB	12.39	B	EB	11.81	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	0.9	A	-	0.8	A
				EB	11.87	B	EB	10.23	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.9	A	-	3.3	A
				WB	9.35	A	WB	9.11	A
5	Harkins Slough Rd / Alternative 3 Site Driveway	SCC	SSSC	-	-	-	-	-	-
				-	-	-	-	-	-
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	5.0	A	-	2.7	A
				WB	11.58	B	WB	10.0	B

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

*6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour under Existing Conditions.

Interim (2032) Conditions LOS Analysis

The Interim (2032) Condition's scenario was evaluated using the Santa Cruz County Travel Demand Model by SCCRTC (Santa Cruz County Regional Transportation Commission) to develop Interim (2032) traffic volumes at the study intersections. The model was run for both the Base year (2019) conditions and Interim (2032) conditions. The Interim (2032) volumes at the study intersections were estimated using the growth observed between the Base Year (2019) and Interim (2032) Conditions and applying the estimated growth/year to the existing (2022) traffic counts to arrive at interim traffic volumes for the year 2032. Traffic operations and traffic volumes for the study intersections under Interim (2032) conditions are shown below in **Table 5** and **Figure 7**.

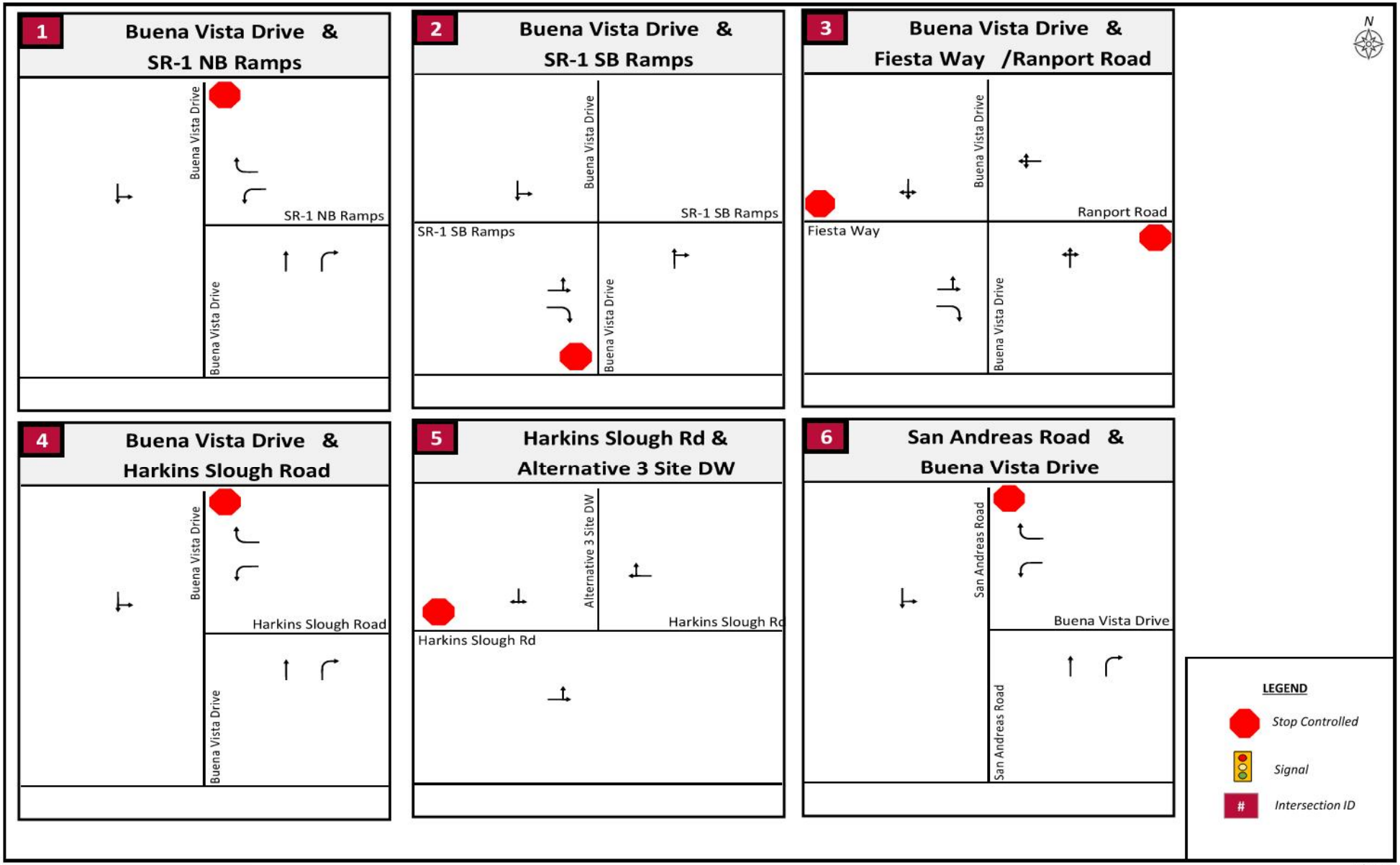

Figure 5
Existing Conditions Lane Geometry

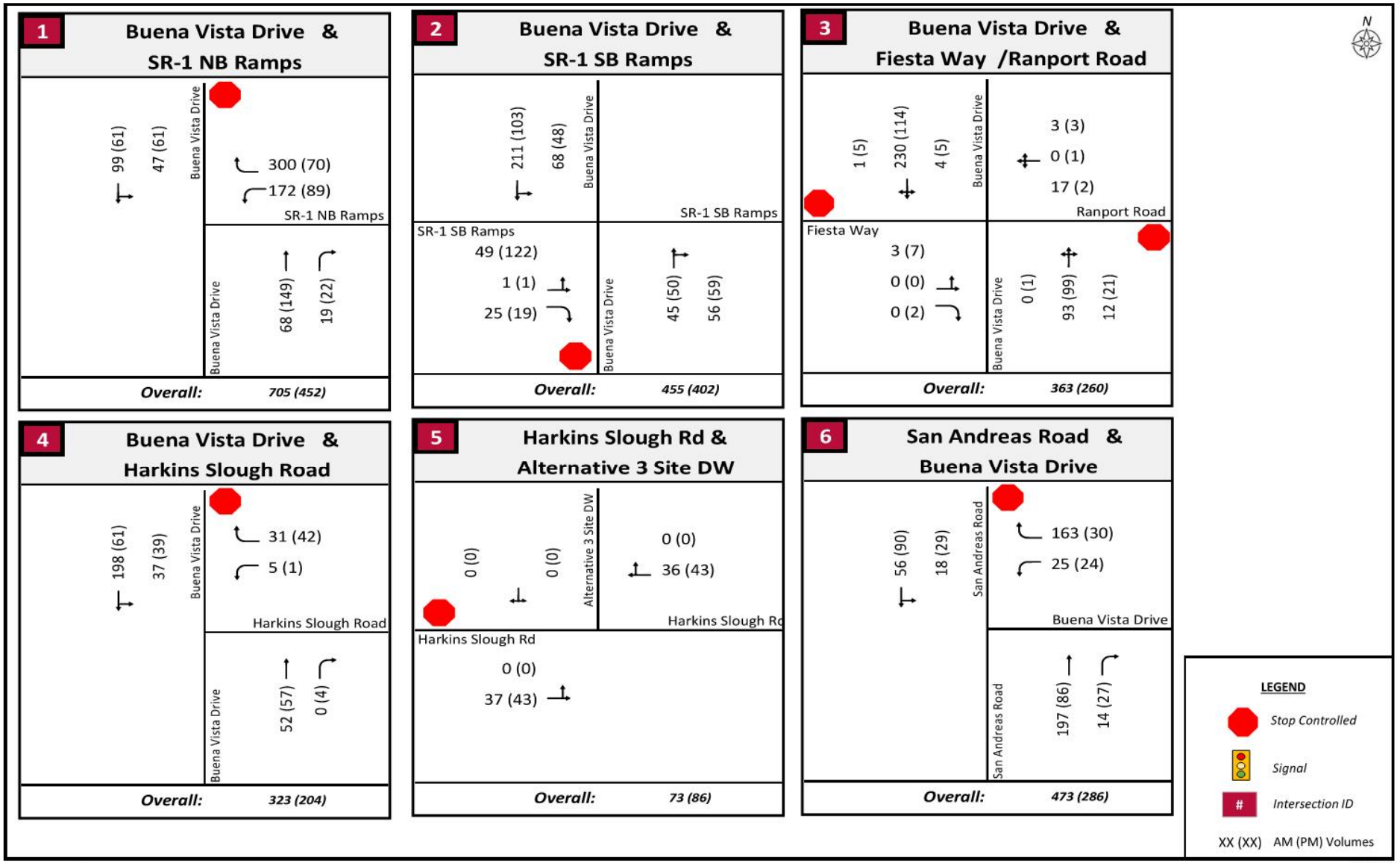

Figure 6
Existing Conditions Peak Hour Turning Movement Volumes

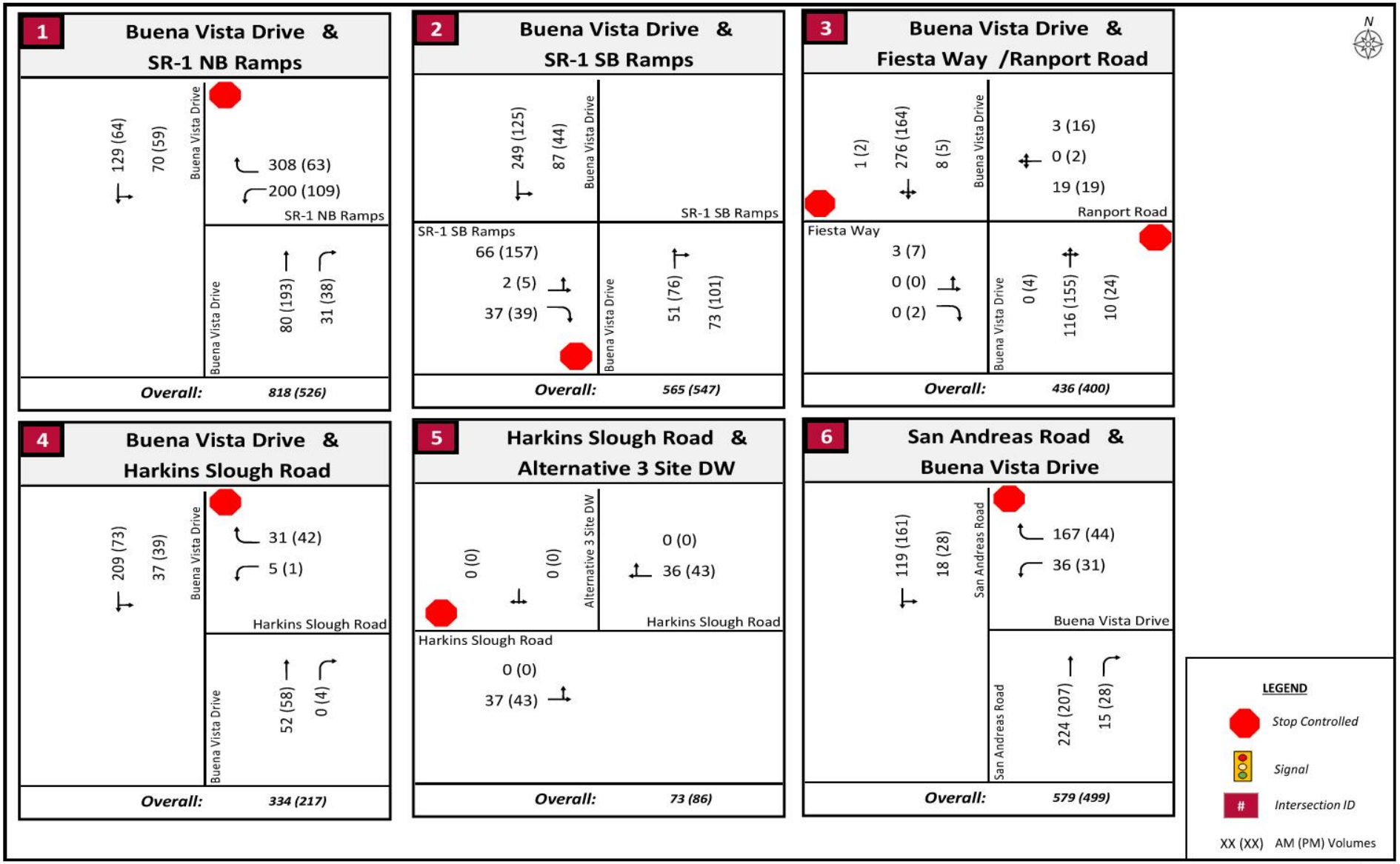

Figure 7
Interim (2032) Conditions Peak Hour Turning Movement Volumes

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Alternative 3 is not anticipated to create a significant traffic adverse effect under Interim (2032) conditions. Synchro output sheets are provided in the **Appendix.**

Table 5: Intersection Operation Summary for Interim (2032) Conditions

#	Intersection	Maintaining Agency	Control Type	Interim 2032 Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	10.9	B	-	6.3	A
				WB	14.76	B	WB	12.77	B
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	3.6	A	-	5.2	A
				EB	14.02	B	EB	12.75	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	0.9	A	-	1.6	A
				EB	13.07	B	EB	11.51	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.8	A	-	3.1	A
				WB	9.37	A	WB	9.12	A
5	Harkins Slough Rd / Alternative 3 Site Driveway	SCC	SSSC	-	0	A	-	0	A
				-	-	-	-	-	-
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.6	A	-	2.2	A
				WB	12.33	B	WB	11.93	B

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

*6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in **bold**.*

Interim (2032) Plus Project Conditions LOS Analysis

The Interim (2032) plus Project volumes at the study intersections were estimated by adding the number of trips anticipated to be generated by the transfer station and trips generated from hauling/transferring solid waste to the ReGen Marina Landfill site to the volume from interim (2032) condition. Traffic operations and traffic volumes for the study intersections under interim (2032) plus Project conditions are shown below in **Table 6** and **Figure 8.**

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Alternative 3 is not anticipated to create a significant traffic adverse effect under Interim (2032) plus Project conditions. Synchro output sheets are provided in the **Appendix.**

Table 6: Intersection Operation Summary for Interim (2032) Plus Alternative 3 Conditions

#	Intersection	Maintaining Agency	Control Type	Interim 2032 Plus Alternative 3 Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	11.7	B	-	6.3	A
				WB	15.74	C	WB	12.77	B
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	3.5	A	-	5.2	A
				EB	14.46	B	EB	12.75	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	0.9	A	-	1.6	A
				EB	13.55	B	EB	11.51	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	2.3	A	-	3.4	A
				WB	9.44	A	WB	9.16	A
5	Harkins Slough Rd / Alternative 3 Site Driveway	SCC	SSSC	-	2.1	A	-	1.0	A
				SB	8.51	A	SB	8.54	A
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.6	A	-	2.2	A
				WB	12.33	B	WB	11.93	B

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in ***bold.***

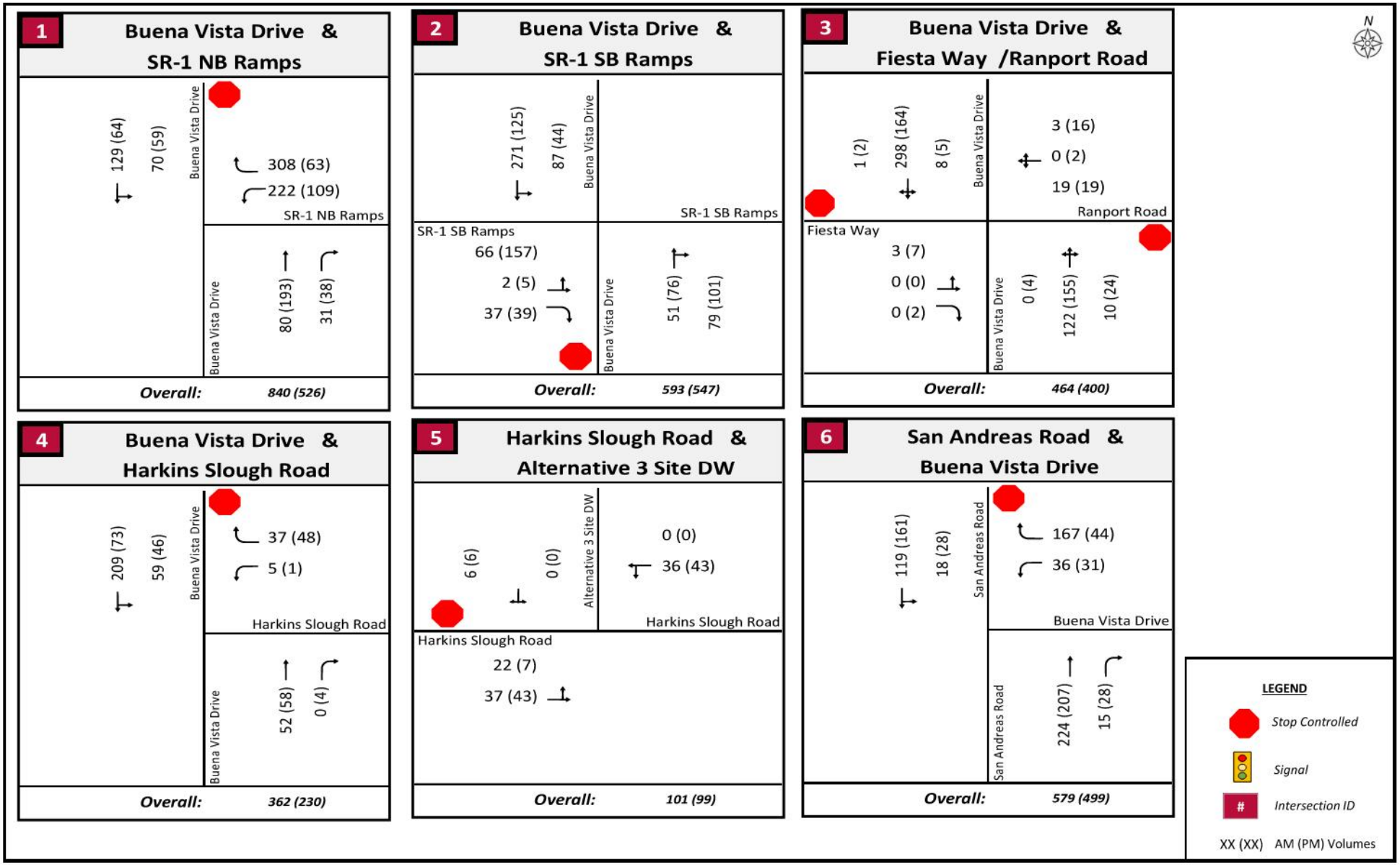

Figure 8
Interim (2032) Plus Alternative 3 Conditions Peak Hour Turning Movement Volumes

Cumulative (2045) Project Conditions LOS Analysis

The Cumulative (2045) Condition's scenario was evaluated using the Santa Cruz County Travel Demand Model by SCCRTC to develop Cumulative (2045) traffic volumes at the study intersections. The model was run for both the Base year (2019) conditions and Interim (2045) conditions. The Cumulative (2045) volumes at the study intersections were estimated using the growth observed between the Base Year (2019) and Cumulative (2045) Conditions and applying the estimated growth/year to the existing (2022) traffic counts to arrive at cumulative traffic volumes for the year 2045. Traffic operations and traffic volumes for the study intersections under cumulative (2032) conditions are shown below in **Table 7** and **Figure 9**.

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Alternative 3 is not anticipated to create a significant traffic adverse effect under cumulative (2045) conditions. Synchro output sheets are provided in the **Appendix.**

Table 7: Intersection Operation Summary for Cumulative (2045) Conditions

#	Intersection	Maintaining Agency	Control Type	Cumulative 2045 Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	16.5	C	-	6.9	A
				WB	23.8	C	WB	15.06	C
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	4.5	A	-	5.9	A
				EB	17.46	C	EB	14.6	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	1.0	A	-	2.5	A
				EB	14.82	B	WB	14.96	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	1.8	A	-	2.9	A
				WB	9.4	A	WB	9.13	A
5	Harkins Slough Rd / Alternative 3 Site Driveway	SCC	SSSC	-	0	A	-	0	A
				-	-	-	-	-	-
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.4	A	-	2.4	A
				WB	13.6	B	WB	16.13	C

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in ***bold.***

Cumulative (2045) Plus Project Conditions LOS Analysis

The Cumulative (2045) plus Project volumes at the study intersections were estimated by adding the number of trips anticipated to be generated by the transfer station at the Alternative 3 Site and trips generated from hauling/transferring solid waste to the Marina Landfill site to the volume from cumulative (2045) condition. Traffic operations and traffic volumes for the study intersections under cumulative (2045) plus Project conditions are shown below in **Table 8** and **Figure 10.**

All study intersections are anticipated to operate at acceptable LOS during the AM and PM peak hour, and the Alternative 3 is not anticipated to create a significant traffic adverse effect under cumulative (2045) plus Project conditions. Synchro output sheets are provided in the **Appendix.**

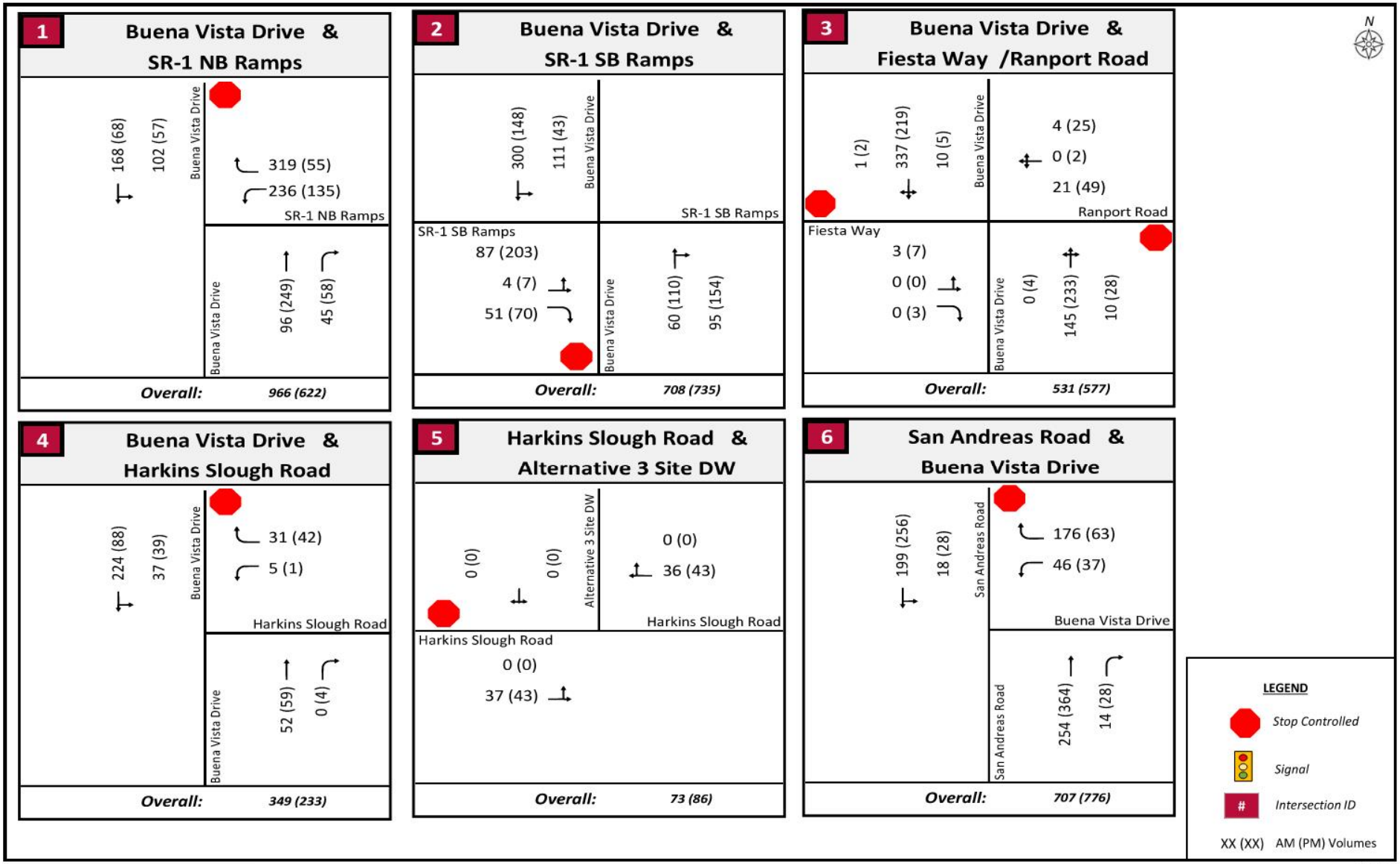

Figure 9
Cumulative (2045) Conditions Peak Hour Turning Movement Volumes

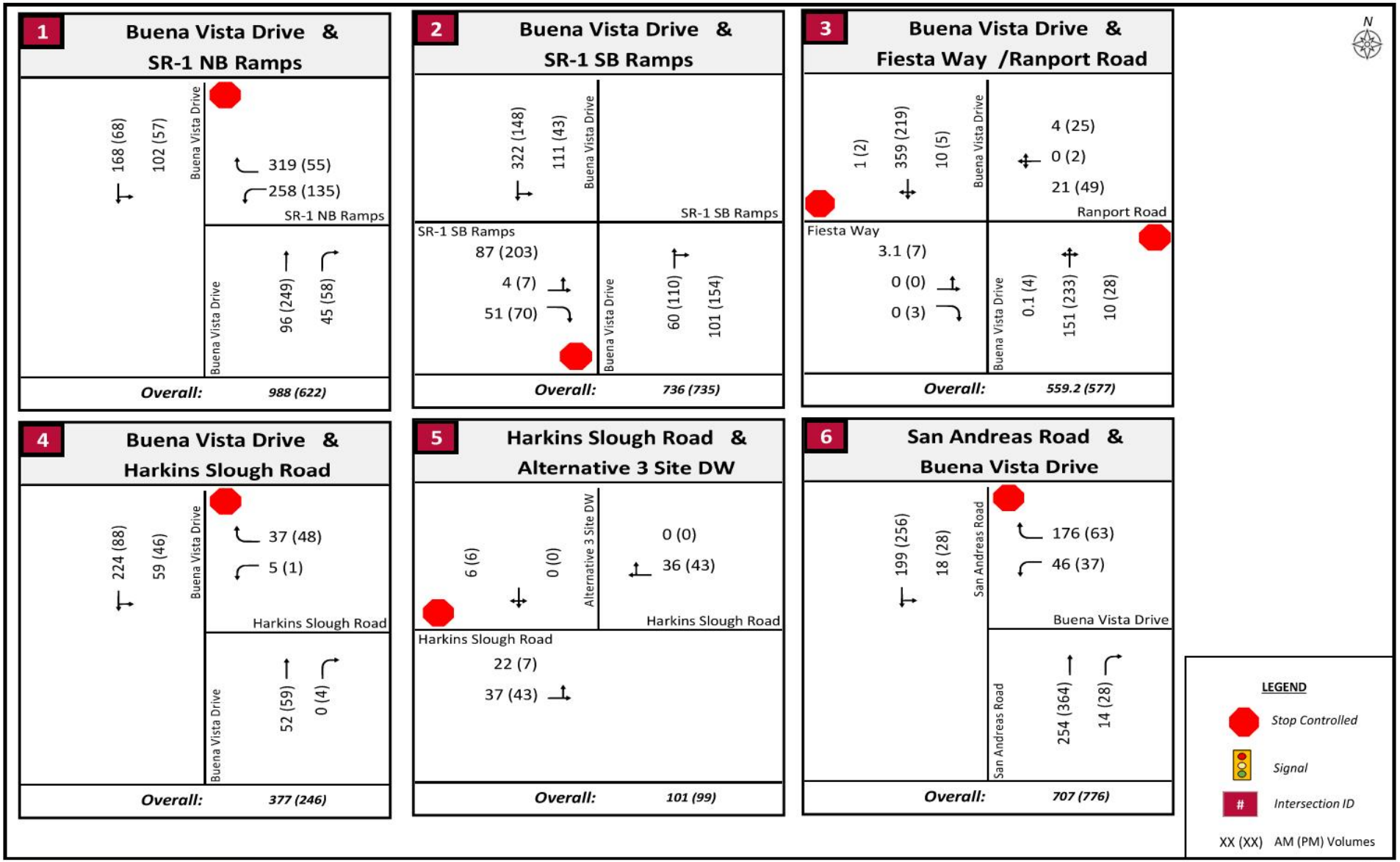

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Figure 10
Cumulative (2045) Plus Alternative 3 Conditions Peak Hour Turning Movement Volumes

Table 8: Intersection Operation Summary for Cumulative (2045) Plus Alternative 3 Conditions

#	Intersection	Maintaining Agency	Control Type	Cumulative 2045 Plus Aalternative 3 Conditions					
				AM Peak Hour			PM Peak Hour		
				Movement	Delay	LOS	Movement	Delay	LOS
1	SR-1 NB Ramps / Buena Vista Dr	Caltrans	SSSC	-	20.0	C	-	6.9	A
				WB	28.81	D	WB	15.06	C
2	SR-1 SB Ramps / Buena Vista Dr	Caltrans	SSSC	-	4.4	A	-	5.9	A
				EB	18.19	C	EB	14.6	B
3	Fiesta Way / Ranport Rd / Buena Vista Dr	SCC	SSSC	-	1.0	A	-	2.5	A
				EB	15.41	C	WB	14.96	B
4	Buena Vista Dr / Harkins Slough Rd	SCC	SSSC	-	2.2	A	-	3.2	A
				WB	9.47	A	WB	9.17	A
5	Harkins Slough Rd / Alternative 3 Site Driveway	SCC	SSSC	-	2.1	A	-	1.0	A
				SB	8.51	A	SB	8.54	A
6	Buena Vista Dr / San Andreas Rd	SCC	SSSC	-	4.4	A	-	2.4	A
				WB	13.6	B	WB	16.13	C

Notes:

1. Analysis performed using HCM 7th Edition methodologies.

2. Delay indicated in seconds/vehicle.

3. Signal = Signal Control; AWSC = All-Way Stop Control; SSSC = Side-Street Stop Control

4. Caltrans = California Department of Transportation; SCC = Santa Cruz County.

5. Caltrans LOS standard is D; SCC LOS standard is D.

6. Intersections that operate below maintaining agency's LOS standard are highlighted and shown in ***bold.***

Intersection Queuing Analysis

Intersection queuing analysis was conducted at study intersections for both AM and PM peak hours as part of the Proposed Project detailed Final Traffic Impact Assessment (TIA) study dated July 2025. Please refer to Section 4.7 of the report.

For Alternative 3, the project trips will remain unchanged at all study intersections, except for the intersection of Buena Vista Dr. / Harkin Slough Rd., therefore, queuing analysis was only conducted for this intersection as part of this traffic analysis for Alternative 3. In addition, since no project trips are added during the PM peak hour, the queuing analysis was conducted for AM peak hour only and the results are summarized in **Table 9**.

It was observed that sufficient storage has been provided for all the movements at the study intersection of Buena Vista Dr. / Harkin Slough Rd. during both AM and PM peak hour. The Alternative 3 is not anticipated to increase the vehicle queue and create an adverse effect at the study intersection during the AM peak period.

Table 9: Intersection Queuing Analysis – Alternative 3 (AM Peak Hour)

AM PEAK HOUR															
#	Intersection Name	Approach	Direction	Total Storage (ft/ln)	Existing Conditions		Interim 2032 Conditions		Interim 2032 Plus Alternative 3 Conditions		Cumulative 2045 Conditions		Cumulative 2045 Plus Alternative 3 Conditions	
					95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?	95th Percentile Queue Length (feet)[2]	Sufficient Storage?
4	Harkins Slough Rd. / Buena Vista Dr.	Harkins Slough Rd	WBL	135	17	YES	0	YES	14	YES	0	YES	15	YES
			WBR	820	33	YES	3	YES	36	YES	3	YES	36	YES

Notes:

1. Analysis performed using HCM 7 methodologies.
2. 95th Percentile Queue Length in Feet (Assumption:1 Vehicle – 25 feet). NBR - Northbound Right; NBL - Northbound Left; SBR - Southbound Right; SBL - Southbound Left; WBR - Westbound Right; WBL - Westbound Left; EBR - Eastbound Right; EBL - Eastbound Left
3. Single lane approach in Northbound (NB) and Southbound (SB) direction. Queues reported for the lane group.

Signal Warrant Analysis

Peak hour signal warrant analysis was conducted at the study intersection of Buena Vista Dr. & SR-1 NB Ramps for both AM and PM peak hours as part of the Proposed Project detailed Final Traffic Impact Assessment (TIA) study dated July 2025. Please refer to Section 4.8 of this report.

Sight Distance Analysis

A preliminary stopping sight distance (SSD) and intersection sight distance (ISD) analysis was conducted to determine the feasibility of the Alternative 3 driveway location. The AASHTO methodology was used in this analysis. The sight distance needed under various assumptions of physical conditions and driver behavior is directly related to vehicle speeds and to the resultant distances traversed during perception-reaction time and braking.

Stopping sight distance is defined as the sum of reaction distance and braking distance. The reaction distance is based on the reaction time of the driver while the braking distance is dependent upon the vehicle speed and the coefficient of friction between the tires and roadway as the vehicle decelerates to a complete stop. This sight distance analysis indicates the minimum visibility that is required for an approaching vehicle to stop safely if a vehicle from the project driveway enters or exits the approaching road. The driver should also have an unobstructed view of the intersection, including any traffic-control devices, and sufficient lengths along the intersecting road to permit the driver to anticipate and avoid potential collisions.

For vehicles entering Harkins Slough Rd from the Alternative 3 driveway, the AASHTO method evaluates sight distance from a vehicle exiting the driveway to a vehicle approaching from either direction. The intersection sight distance is defined along intersection approach legs and across their included corners known as departure sight triangles. These specified areas should be clear of obstructions that might block a driver's view of potentially conflicting vehicles. Intersection sight distance is measured from a point 3.5-feet above the existing grade (driver's eye) along the potential driveway to a 3.5-foot object height in the center of the approaching lane on the roadway. A vehicle setback of 14.5 ft in a stopped position from the edge of shoulder was assumed for determining intersection sight distance.

Alternative 3 Site Driveway Sight Distance

Minimum sight distance criteria for the potential driveways along the study roadways was determined from the AASHTO Geometric Design of Highways and Streets 7th Edition (Green Book). For the purposes of this analysis, a design speed of 25 mph (30 mph posted speed limit) was assumed along Harkins Slough Rd. AASHTO standard time gap variables for passenger cars stopped on the Alternative 3 project driveway

were used for Case B2 (right-turn) and Case B1 (left-turn). Based on the existing traffic control, minimum sight distance was calculated for the following scenarios:

- Stopping Sight Distance on Harkins Slough Road
- Intersection Sight Distance Case B – Stop control at the proposed project driveways
    - Case B1 – Left turn from the minor road
    - Case B2 – Right turn from the minor road

Minimum SSD and ISD values were obtained from Table 9-7 and Table 9-9 of the AASHTO Green Book. A site visit was taken to measure the available sight distance and departure sight triangles at the Alternative 3 driveway location. From a 14.5-foot setback from the edge of travel way, the measured available sight distance varies in each direction of Harkins Slough Rd. **Table 10** summarizes the intersection and stopping sight distance at the project driveway.

Table 10: Alternative 3 Driveway – Sight Distance

Type	Design Speed (MPH)	Required Sight Distance (ft)	Actual Sight Distance (ft)	Sufficient Sight Distance?
Harkins Slough Road & Alternative 3 Site Driveway				
SSD on Primary Road	30	200	>355	Yes
ISD Case B1 (Left Turn)	30	355	>355	Yes
ISD Case B2 (Right Turn)	30	290	>355	Yes

The Alternative 3 driveway location satisfy the minimum stopping sight distance required for all approaches on Harkins Slough Rd. Vehicles on the road will have sufficient sight distance to react and stop safely if a vehicle from the project driveway enters or exits the road. Vehicles entering the Harkins Slough Road from the Alternative 3 driveway will also have sufficient intersection sight distance to make a left or right turn onto the road per AASHTO scenarios.

Overall, the Alternative 3 driveway location is feasible and provides sufficient sight distance for traffic conditions. During the site visit, it was observed that roadside trees may obstruct the required sight lines. To ensure vehicles can see vehicles traveling on the roadway, selective trimming of trees and vegetation in coordination with a qualified biologist or arborist is recommended as part of the driveway installation process. An exhibit comparing the design and measured available stopping and intersection sight distances is shown in **Figure 11**.

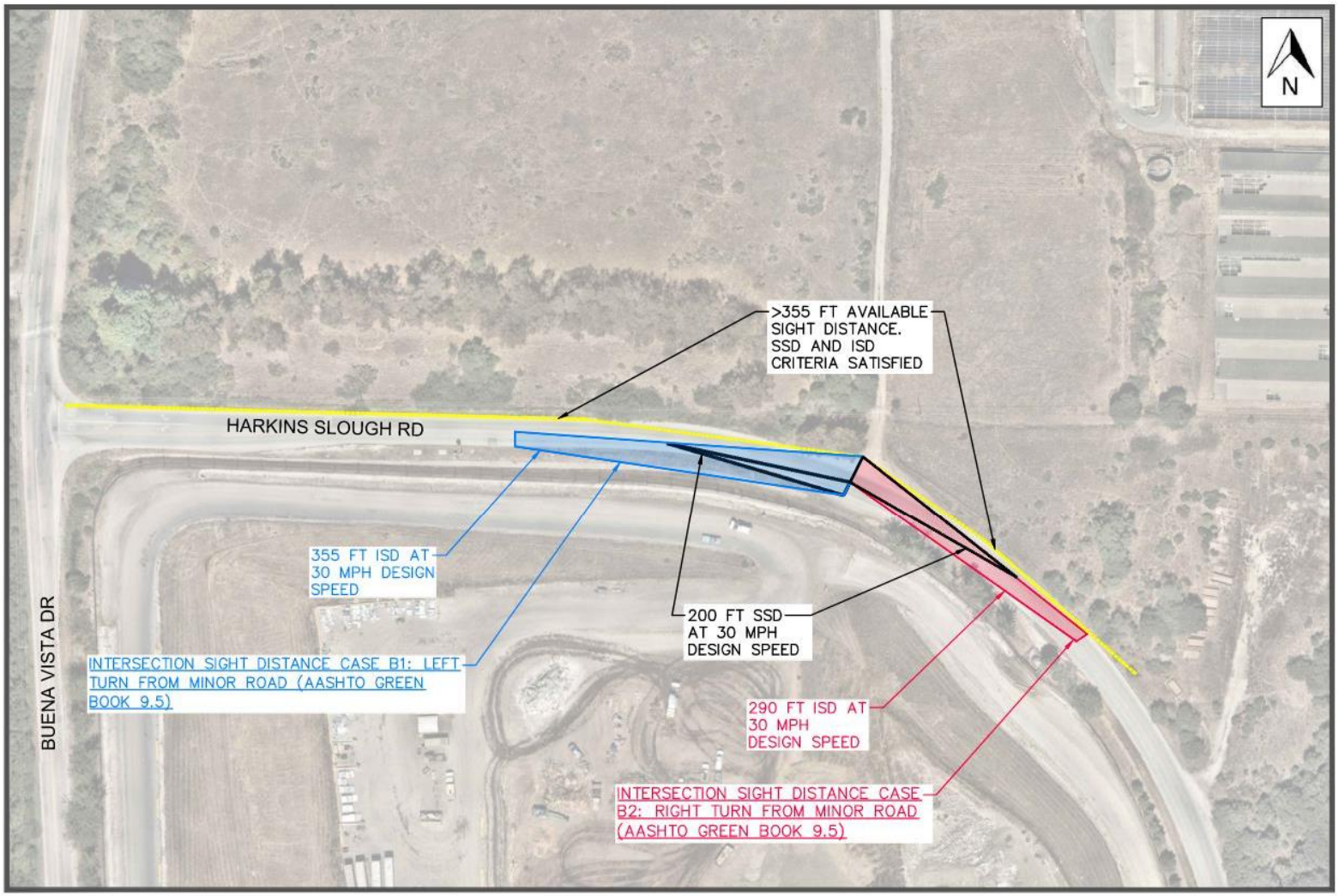

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Figure 11

Alternative 3 (Miyashita) Sight Distance Analysis

VMT ANALYSIS

The thresholds of significance, as currently adopted by Santa Cruz County, are summarized in **Table 11** below. Since Proposed Alternative 3 falls under the category of office or service type, the threshold of significance is based on the VMT per Employee efficiency metric.

Table 11: VMT Analysis Inputs

Land Use	VMT Threshold	Basis
Residential	8.9 VMT/capita	15% below existing county-wide average VMT per capita.
Office or Service	7.4 Work VMT/Employee	15% below existing county-wide average Work VMT per employee
Retail	Net regional change	Using the county as the basis (instead of the tri-county region)
Other Employment	Work VMT/Employee	15% below existing county-wide average Work VMT per employee for similar land uses
Other Customer	Net regional change	Using the county as the basis

VMT Screening

A VMT screening was conducted for Alternative 3. The County's VMT Guidelines provide details on appropriate screening thresholds that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant VMT impact without conducting a more detailed VMT analysis. Screening thresholds are broken down into different project types under the presumption that they would result in a less-than-significant transportation impact. The following applicable screening thresholds were evaluated for Alternative 3.

Small Projects

This screening criteria applies to projects with low trip generation per existing CEQA exemptions. Projects generating less than 110 trips per day are presumed to have a less-than-significant VMT impact.

Like the Proposed Project, Alternative 3 can be screened out of VMT analysis based on Small Projects screening criteria and presumed to have a less-than-significant impact based on the office space with 4,800 sq. ft. The operations are expected to remain unchanged and will be from 7:30 AM to 3:30 PM (Monday to Tuesday & Thursday to Saturday) and from 7:30 AM to 2:30 PM on Wednesday. Under existing conditions, a total of approximately 40-45 employees work at the Buena Vista Landfill site and the number of employees at the combined facilities at the Alternative 3 site is expected to remain the same. All employees will work on a single shift, arriving in the morning and leaving in the afternoon. The employee daily trip estimates from Institute of Transportation Engineers (ITE), 11th Edition for Small Office Building (ITE 712) is summarized in **Table 12** below:

As per ITE 11th Edition, the Alternative 3 is expected to generate 78 daily trips related to office space. This threshold indicates a level of vehicle activity unlikely to result in significant transportation impacts.

Since the number of daily employee trips are less than 110 daily trips, Alternative 3 is presumed to result in a **less than significant** transportation impact concerning VMT related to employee trips and is screened from further analysis based on the number of employee vehicle trips generated.

Although the ITE released its 12th Edition Trip Generation Manual in August 2025, trip generation estimates for the office land use were calculated using the ITE 11th Edition Trip Generation Manual to maintain consistency with the previous traffic analysis conducted for the Proposed Project.

Table 12: Alternative 3 Trip Generation – Based on Office Square Footage

LAND USE / DESCRIPTION [1]	PROJECT SIZE		WEEKDAY TOTAL DAILY TRIPS
Trip Generation Rates (ITE)			
Small Office Building (ITE 712)	Per	1,000 Sq Ft	16.19
Future Vehicle-Trips			
Alternative 3 (Transfer Station Office)	4.800	1,000 Sq Ft	78
		Project Vehicle-Trips	78
Notes:			
1. Daily, AM, and PM trips based on average land use rates from the Institute of Traffic Engineers (ITE) Trip Generation 11th Edition			

The other trips associated with Alternative 3 involves transfer trucks which are commercial semi-trucks hauling 40- to 55-foot enclosed trailers. These trucks will transfer the consolidated solid waste from Alternative 3 site to the ReGen Monterey Landfill facility located 19 miles south in the City of Marina. The amount of anticipated waste arriving at Alternative 3 site is expected to increase with the increase in population and employment within the Santa Cruz County. This increase in waste will be associated with increase in trips to Alternative 3 site, however, it should be noted that Alternative 3 itself does not generate this additional traffic and as such does not cause any increase in VMT. Therefore, no VMT transportation impacts are anticipated with Alternative 3, and the truck trips below are provided for informational purposes.

During the Interim (2032) Conditions, a total of approximately 472 tons of waste is anticipated to arrive at Alternative 3 site and during Cumulative (2045) Conditions, a total of approximately 450 tons of waste is anticipated. It should be noted that soil will not be accepted at the Alternative 3 transfer station once the landfill reaches its capacity in Year 2032 and hence the reduction in total tons of waste in Year 2045. The amount of waste will be transferred to ReGen Monterey Landfill facility using 24 daily transfer trucks during the Interim (2032) Conditions and 23 daily trucks during the Cumulative (2045) Conditions.

The number of daily truck trips during the Interim (2032) Conditions and during Cumulative (2045) Conditions are shown in **Table 13** below.

Table 13 – Alternative 3 Trip Generation – Based on Truck Volumes

Item	Quantity	Units	Notes
Travel Time Estimates			
Approximate travel time (mins) from Alternative 3 Site to ReGen Monterey Landfill - (One Direction)	35-40	mins	Source: Google Maps shows 20-26 mins depending upon the time of departure for passenger cars. Additional time was added for trucks to account for lower speeds
Time taken at Alternative 3 Transfer Station to load one truck (in mins)	20	mins	Input from County
Time taken at ReGen Monterey Landfill Site to unload one truck (in mins)	20	mins	Input from County
Total time taken (in mins) by 1 Truck (from Alternative 3 Site to ReGen Monterey Landfill and back)	110-115	mins	Estimated Value
Number of trips by 1 Truck (from Alternative 3 Site to ReGen Monterey Landfill and back) in a day	3.5 to 4	Trips	Estimated Value (Based on work timings for Alternative 3 Site and ReGen)
Estimated Waste			
Total Waste Arriving at Alternative 3 Site under Existing Conditions	448	tons	Estimated value using Buena Vista Date/Time Analysis Report (from 06/01/201 to 05/31/2022) and percent growth in population from Santa Cruz County Travel Demand Model
Estimated Waste Arriving at Alternative 3 Site During Interim (2032) Conditions	470	tons	
Estimated Waste Arriving at Alternative 3 Site During Cumulative (2045) Conditions	450	tons	
No. of Daily Trucks			
Interim (2032) Conditions - No. of Daily Trucks Needed to transfer the waste from Alternative 3 Site to ReGen Monterey Landfill	24	no.	Assuming 20 tons capacity of a single transfer truck
Cumulative (2045) Conditions - No. of Daily Trucks Needed to transfer the waste from Alternative 3 Site Vista to ReGen Monterey Landfill	23	no.	Assuming 20 tons capacity of a single transfer truck

It should be noted that the primary goal of using VMT in CEQA is to assess the environmental impact of light duty and passenger vehicle traffic generated by a project, not the impact of commercial trucks.

Therefore, Alternative 3 is presumed to result in a **less than significant** transportation impact concerning VMT. In summary, Alternative 3 meets the VMT screening criteria set by Santa Cruz County and thus is anticipated to result in a less-than-significant VMT impact without conducting a more detailed VMT analysis.

QUALITATIVE ASSESSMENT OF ALTERNATIVE 1

Alternative 1 (Transfer Station A on South Side of Rountree Lane) relocates Transfer Station A of the Proposed Project from northeast corner to southeast corner, east of existing Rountree Medium (Jail) Facility. All the other project components, including the access to and from the landfill facility, would remain the same as the Proposed Project.

Travel patterns for Alternative 1 would be same as the Proposed Project with self-haulers using main landfill entrance on Buena Vista Drive and an internal roadway to access Transfer Station A to unload their solid waste and materials for diversion (appliances, mattresses, carpet, etc.). Transfer trucks would use the same access roads to collect and transport materials to a regional waste disposal facility or recycling facilities. To separate local/public traffic from transfer station traffic, Rountree Lane would be realigned to extend around the south side of Transfer Station A. This realignment would keep the local traffic on Rountree Lane, outside the facility fence.

Under Alternative 1, the northeast corner would remain undeveloped, and Harkins Slough Realignment is not required. It should be noted that as part of the Proposed Project, the County of Santa Cruz Public Works Division, Roads & Transportation, approved the realignment of Harkins Slough Road and the addition of stop signs at this location, and determined it would not present a design hazard or disrupt traffic flow because of the relatively low volume of vehicle trips to land uses on this portion of Harkins Slough Road. The traffic impacts of Alternative 1 would be similar to those of the Proposed Project and would result in no significant impact. No mitigations are required.

QUALITATIVE ASSESSMENT OF ALTERNATIVE 2

Under Alternative 2 (No Project) scenario, the Buena Vista Landfill would not be redeveloped as proposed and transfer stations would not be constructed to transport solid waste to the regional facility. The Buena Vista Landfill would no longer accept solid waste (refuse), and the landfill would be closed in accordance with the Landfill Closure Plan when the landfill reaches full capacity. With the closure of landfill, traffic volumes within the vicinity of the Buena Vista Landfill site will be less than existing conditions. However, increase in traffic volumes along SR-1 are expected as self-haulers and commercial haulers travel to other regional landfill sites or the Ben Lomond Transfer Station in north Santa Cruz County.

With the closure of the Buena Vista Landfill and no transfer station to accept the solid waste, it is estimated a total of 107 commercial waste hauling trips (franchise hauler and commercial drop boxes) would be diverted from the Buena Vista site to the ReGen Monterey Landfill per week. It is also estimated that 1,372 self-haul waste disposal trips would self-select to haul their loads to either the Ben Lomond Transfer Station or to ReGen Monterey Landfill each week. The additional self-haul waste disposal trips to Ben Lomond would increase waste volume at that location and increase the number of waste hauling transfer truck trips sent from Ben Lomond to ReGen Monterey Landill for disposal. These additional trips to Ben Lomond and ReGen Monterey Landfill facilities are likely to result in an increase of regional VMT.

APPENDICES

Synchro – Level of Service (LOS) Analysis Results

Intersection	
Int Delay, s/veh	9.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	172	300	68	19	47	99
Future Vol, veh/h	172	300	68	19	47	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	261	455	75	21	57	119

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	307	75	0	-	75	0
Stage 1	75	-	-	-	-	-
Stage 2	233	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	681	992	-	0	1512	-
Stage 1	943	-	-	0	-	-
Stage 2	801	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	653	992	-	-	1512	-
Mov Cap-2 Maneuver	653	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	769	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.55	0	2.41
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	653	992	1512	-
HCM Lane V/C Ratio	-	0.399	0.458	0.037	-
HCM Control Delay (s/veh)	-	14.1	11.7	7.5	-
HCM Lane LOS	-	B	B	A	-
HCM 95th %tile Q(veh)	-	1.9	2.4	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	1	25	0	0	0	0	45	56	68	211	0
Future Vol, veh/h	49	1	25	0	0	0	0	45	56	68	211	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	52	1	27	0	0	0	0	46	58	87	271	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	491	549	271	-	0	0	104	0	0
Stage 1	445	445	-	-	-	-	-	-	-
Stage 2	46	104	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	516	446	710	0	-	-	1463	-	0
Stage 1	621	578	-	0	-	-	-	-	0
Stage 2	946	813	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	479	0	710	-	-	-	1463	-	-
Mov Cap-2 Maneuver	479	0	-	-	-	-	-	-	-
Stage 1	621	0	-	-	-	-	-	-	-
Stage 2	880	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.39	0	1.86
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	479	710	439	-
HCM Lane V/C Ratio	-	-	0.111	0.037	0.06	-
HCM Control Delay (s/veh)	-	-	13.4	10.3	7.6	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.2	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	17	0	3	0	93	12	4	230	1
Future Vol, veh/h	3	0	0	17	0	3	0	93	12	4	230	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	24	0	4	0	106	14	6	319	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	437	451	320	443	444	113	321	0	0	119	0	0
Stage 1	331	331	-	113	113	-	-	-	-	-	-	-
Stage 2	106	119	-	331	332	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	533	507	725	528	511	863	1250	-	-	1481	-	-
Stage 1	686	649	-	897	806	-	-	-	-	-	-	-
Stage 2	905	801	-	687	648	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	528	505	725	526	509	863	1250	-	-	1481	-	-
Mov Cap-2 Maneuver	528	505	-	526	509	-	-	-	-	-	-	-
Stage 1	683	646	-	897	806	-	-	-	-	-	-	-
Stage 2	900	801	-	684	645	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.87	11.79	0	0.13
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1250	-	-	528	-	559	31	-	-
HCM Lane V/C Ratio	-	-	-	0.008	-	0.05	0.004	-	-
HCM Control Delay (s/veh)	0	-	-	11.9	0	11.8	7.4	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	52	0	37	198
Future Vol, veh/h	5	31	52	0	37	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	84	0	51	275

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	462	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	378	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	562	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	539	954	-	-	1476	-
Mov Cap-2 Maneuver	539	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	669	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.35	0	1.19
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	539	954	1476	-
HCM Lane V/C Ratio	-	-	0.013	0.047	0.035	-
HCM Control Delay (s/veh)	-	-	11.8	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	163	197	14	18	56
Future Vol, veh/h	25	163	197	14	18	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	35	230	259	18	29	90

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	408	259	0	0	259	0
Stage 1	259	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	588	777	-	-	1317	-
Stage 1	770	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	575	777	-	-	1317	-
Mov Cap-2 Maneuver	575	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	845	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.58	0	1.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	575	777	438	-
HCM Lane V/C Ratio	-	-	0.061	0.295	0.022	-
HCM Control Delay (s/veh)	-	-	11.7	11.6	7.8	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	1.2	0.1	-

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	89	70	149	22	61	61
Future Vol, veh/h	89	70	149	22	61	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	135	106	164	24	73	73

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	384	164	0	-	164	0
Stage 1	164	-	-	-	-	-
Stage 2	220	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	615	886	-	0	1403	-
Stage 1	861	-	-	0	-	-
Stage 2	811	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	581	886	-	-	1403	-
Mov Cap-2 Maneuver	581	-	-	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.54	0	3.85
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	581	886	1403	-
HCM Lane V/C Ratio	-	0.232	0.12	0.052	-
HCM Control Delay (s/veh)	-	13.1	9.6	7.7	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0.9	0.4	0.2	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	122	1	19	0	0	0	0	50	59	48	103	0
Future Vol, veh/h	122	1	19	0	0	0	0	50	59	48	103	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	130	1	20	0	0	0	0	52	61	62	132	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	307	367	132	-	0	0	112	0	0
Stage 1	255	255	-	-	-	-	-	-	-
Stage 2	52	112	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	661	565	852	0	-	-	1453	-	0
Stage 1	760	700	-	0	-	-	-	-	0
Stage 2	941	806	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	631	0	852	-	-	-	1453	-	-
Mov Cap-2 Maneuver	631	0	-	-	-	-	-	-	-
Stage 1	760	0	-	-	-	-	-	-	-
Stage 2	898	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	11.81	0	2.41
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	631	852	572	-
HCM Lane V/C Ratio	-	-	0.207	0.024	0.042	-
HCM Control Delay (s/veh)	-	-	12.2	9.3	7.6	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.1	0.1	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	2	1	3	1	99	21	5	114	5
Future Vol, veh/h	7	0	2	2	1	3	1	99	21	5	114	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	3	3	1	4	1	113	24	7	158	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	291	314	162	299	306	124	165	0	0	136	0	0
Stage 1	176	176	-	127	127	-	-	-	-	-	-	-
Stage 2	115	139	-	172	179	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	665	605	888	657	611	849	1425	-	-	1460	-	-
Stage 1	831	757	-	882	795	-	-	-	-	-	-	-
Stage 2	894	786	-	834	755	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	656	601	888	651	607	849	1425	-	-	1460	-	-
Mov Cap-2 Maneuver	656	601	-	651	607	-	-	-	-	-	-	-
Stage 1	826	754	-	881	794	-	-	-	-	-	-	-
Stage 2	887	785	-	827	751	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	10.23	10.01	0.06	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	14	-	-	656	888	727	72	-	-
HCM Lane V/C Ratio	0.001	-	-	0.014	0.003	0.012	0.005	-	-
HCM Control Delay (s/veh)	7.5	0	-	10.6	9.1	10	7.5	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	0	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	57	4	39	61
Future Vol, veh/h	1	42	57	4	39	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	92	6	54	85

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	285	92	0	0	98	0
Stage 1	92	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	710	944	-	-	1458	-
Stage 1	937	-	-	-	-	-
Stage 2	844	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	682	944	-	-	1458	-
Mov Cap-2 Maneuver	682	-	-	-	-	-
Stage 1	937	-	-	-	-	-
Stage 2	812	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.11	0	2.95
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	682	944	1458	-
HCM Lane V/C Ratio	-	-	0.002	0.064	0.037	-
HCM Control Delay (s/veh)	-	-	10.3	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	30	86	27	29	90
Future Vol, veh/h	24	30	86	27	29	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	34	42	113	36	47	145

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	352	113	0	0	113	0
Stage 1	113	-	-	-	-	-
Stage 2	239	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	634	937	-	-	1489	-
Stage 1	897	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	612	937	-	-	1489	-
Mov Cap-2 Maneuver	612	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	760	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	10	0	1.83
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	612	937	439	-
HCM Lane V/C Ratio	-	-	0.055	0.045	0.031	-
HCM Control Delay (s/veh)	-	-	11.2	9	7.5	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	0.1	-

Intersection	
Int Delay, s/veh	10.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	200	308	80	31	70	129
Future Vol, veh/h	200	308	80	31	70	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	303	467	88	34	84	155

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	412	88	0	-	88	0
Stage 1	88	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	592	976	-	0	1495	-
Stage 1	930	-	-	0	-	-
Stage 2	728	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	556	976	-	-	1495	-
Mov Cap-2 Maneuver	556	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	14.76	0	2.66
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	556	976	1495	-
HCM Lane V/C Ratio	-	0.545	0.478	0.056	-
HCM Control Delay (s/veh)	-	19	12	7.6	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	3.3	2.6	0.2	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	66	2	37	0	0	0	0	51	73	87	249	0
Future Vol, veh/h	66	2	37	0	0	0	0	51	73	87	249	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	70	2	39	0	0	0	0	53	75	112	319	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	595	670	319	-	0	0	128	0	0
Stage 1	542	542	-	-	-	-	-	-	-
Stage 2	53	128	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	448	381	665	0	-	-	1434	-	0
Stage 1	559	523	-	0	-	-	-	-	0
Stage 2	940	794	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	406	0	665	-	-	-	1434	-	-
Mov Cap-2 Maneuver	406	0	-	-	-	-	-	-	-
Stage 1	559	0	-	-	-	-	-	-	-
Stage 2	851	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.02	0	2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	406	665	466	-
HCM Lane V/C Ratio	-	-	0.178	0.059	0.078	-
HCM Control Delay (s/veh)	-	-	15.8	10.8	7.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.2	0.3	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	19	0	3	0	116	10	8	276	1
Future Vol, veh/h	3	0	0	19	0	3	0	116	10	8	276	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	27	0	4	0	132	11	11	383	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	538	549	384	543	544	138	385	0	0	143	0	0
Stage 1	406	406	-	138	138	-	-	-	-	-	-	-
Stage 2	132	143	-	406	407	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	457	446	668	454	449	835	1185	-	-	1452	-	-
Stage 1	625	601	-	870	787	-	-	-	-	-	-	-
Stage 2	877	782	-	626	601	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	450	442	668	449	444	835	1185	-	-	1452	-	-
Mov Cap-2 Maneuver	450	442	-	449	444	-	-	-	-	-	-	-
Stage 1	619	595	-	870	787	-	-	-	-	-	-	-
Stage 2	872	782	-	620	595	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.07	13.03	0	0.21
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1185	-	-	450	-	479	50	-	-
HCM Lane V/C Ratio	-	-	-	0.009	-	0.065	0.008	-	-
HCM Control Delay (s/veh)	0	-	-	13.1	0	13	7.5	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	52	0	37	209
Future Vol, veh/h	5	31	52	0	37	209
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	84	0	51	290

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	477	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	551	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	686	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	528	954	-	-	1476	-
Mov Cap-2 Maneuver	528	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	658	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.37	0	1.13
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	528	954	1476	-
HCM Lane V/C Ratio	-	-	0.014	0.047	0.035	-
HCM Control Delay (s/veh)	-	-	11.9	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	37	36	0	0	0
Future Vol, veh/h	0	37	36	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	40	39	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	39	0	-	0	79	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1571	-	-	-	923	1032
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	982	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1571	-	-	-	923	1032
Mov Cap-2 Maneuver	-	-	-	-	923	-
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	982	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1571	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	167	224	15	18	119
Future Vol, veh/h	36	167	224	15	18	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	51	235	295	20	29	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	545	295	0	0	295	0
Stage 1	295	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	489	742	-	-	1278	-
Stage 1	742	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	477	742	-	-	1278	-
Mov Cap-2 Maneuver	477	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.33	0	1.04
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	477	742	236	-
HCM Lane V/C Ratio	-	-	0.106	0.317	0.023	-
HCM Control Delay (s/veh)	-	-	13.4	12.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	1.4	0.1	-

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	109	63	193	38	59	64
Future Vol, veh/h	109	63	193	38	59	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	165	95	212	42	71	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	431	212	0	-	212	0
Stage 1	212	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	577	833	-	0	1346	-
Stage 1	819	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	545	833	-	-	1346	-
Mov Cap-2 Maneuver	545	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	768	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.77	0	3.75
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	545	833	1346	-
HCM Lane V/C Ratio	-	0.303	0.115	0.053	-
HCM Control Delay (s/veh)	-	14.4	9.9	7.8	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	1.3	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Future Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	167	5	41	0	0	0	0	78	104	56	160	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	351	456	160	-	0	0	182	0	0
Stage 1	273	273	-	-	-	-	-	-	-
Stage 2	78	182	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	623	504	821	0	-	-	1369	-	0
Stage 1	746	688	-	0	-	-	-	-	0
Stage 2	915	752	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	594	0	821	-	-	-	1369	-	-
Mov Cap-2 Maneuver	594	0	-	-	-	-	-	-	-
Stage 1	746	0	-	-	-	-	-	-	-
Stage 2	874	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.75	0	2.02
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	594	821	469	-
HCM Lane V/C Ratio	-	-	0.29	0.051	0.041	-
HCM Control Delay (s/veh)	-	-	13.5	9.6	7.7	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Future Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	3	27	3	23	5	176	27	7	228	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	430	456	229	441	443	190	231	0	0	203	0	0
Stage 1	243	243	-	199	199	-	-	-	-	-	-	-
Stage 2	187	213	-	242	244	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	539	504	815	530	512	779	1349	-	-	1380	-	-
Stage 1	765	708	-	808	740	-	-	-	-	-	-	-
Stage 2	820	730	-	766	707	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	516	499	815	524	507	779	1349	-	-	1380	-	-
Mov Cap-2 Maneuver	516	499	-	524	507	-	-	-	-	-	-	-
Stage 1	761	704	-	805	737	-	-	-	-	-	-	-
Stage 2	790	728	-	759	703	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.51	11.47	0.17	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	38	-	-	516	815	609	53	-	-
HCM Lane V/C Ratio	0.003	-	-	0.018	0.003	0.086	0.005	-	-
HCM Control Delay (s/veh)	7.7	0	-	12.1	9.4	11.5	7.6	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.3	0	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	58	4	39	73
Future Vol, veh/h	1	42	58	4	39	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	94	6	54	101

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	303	94	0	0	100	0
Stage 1	94	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	693	942	-	-	1456	-
Stage 1	935	-	-	-	-	-
Stage 2	830	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	665	942	-	-	1456	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	797	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.12	0	2.64
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	665	942	1456	-
HCM Lane V/C Ratio	-	-	0.002	0.065	0.037	-
HCM Control Delay (s/veh)	-	-	10.4	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	43	43	0	0	0
Future Vol, veh/h	0	43	43	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	47	47	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	47	0	-	0	93	47
Stage 1	-	-	-	-	47	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1561	-	-	-	906	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	976	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1561	-	-	-	906	1023
Mov Cap-2 Maneuver	-	-	-	-	906	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1561	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	44	207	28	28	161
Future Vol, veh/h	31	44	207	28	28	161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	44	62	272	37	45	260

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	622	272	0	0	272	0
Stage 1	272	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	441	764	-	-	1303	-
Stage 1	760	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	423	764	-	-	1303	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.93	0	1.16
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	423	764	267	-
HCM Lane V/C Ratio	-	-	0.103	0.081	0.035	-
HCM Control Delay (s/veh)	-	-	14.5	10.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.3	0.1	-

Intersection	
Int Delay, s/veh	11.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	222	308	80	31	70	129
Future Vol, veh/h	222	308	80	31	70	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	336	467	88	34	84	155

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	412	88	0	-	88	0
Stage 1	88	-	-	-	-	-
Stage 2	324	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	592	976	-	0	1495	-
Stage 1	930	-	-	0	-	-
Stage 2	728	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	556	976	-	-	1495	-
Mov Cap-2 Maneuver	556	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.74	0	2.66
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	556	976	1495	-
HCM Lane V/C Ratio	-	0.605	0.478	0.056	-
HCM Control Delay (s/veh)	-	20.9	12	7.6	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	4	2.6	0.2	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	66	2	37	0	0	0	0	51	79	87	271	0
Future Vol, veh/h	66	2	37	0	0	0	0	51	79	87	271	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	70	2	39	0	0	0	0	53	81	112	347	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	623	705	347	-	0	0	134	0	0
Stage 1	571	571	-	-	-	-	-	-	-
Stage 2	53	134	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	431	364	641	0	-	-	1426	-	0
Stage 1	543	508	-	0	-	-	-	-	0
Stage 2	940	789	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	389	0	641	-	-	-	1426	-	-
Mov Cap-2 Maneuver	389	0	-	-	-	-	-	-	-
Stage 1	543	0	-	-	-	-	-	-	-
Stage 2	849	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.46	0	1.88
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	389	641	437	-
HCM Lane V/C Ratio	-	-	0.186	0.061	0.078	-
HCM Control Delay (s/veh)	-	-	16.3	11	7.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2	0.3	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	19	0	3	0	122	10	8	298	1
Future Vol, veh/h	3	0	0	19	0	3	0	122	10	8	298	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	27	0	4	0	139	11	11	414	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	575	587	415	580	582	144	415	0	0	150	0	0
Stage 1	437	437	-	144	144	-	-	-	-	-	-	-
Stage 2	139	150	-	436	438	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	432	425	642	428	427	827	1155	-	-	1444	-	-
Stage 1	602	583	-	863	781	-	-	-	-	-	-	-
Stage 2	869	777	-	603	582	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	425	420	642	424	423	827	1155	-	-	1444	-	-
Mov Cap-2 Maneuver	425	420	-	424	423	-	-	-	-	-	-	-
Stage 1	596	577	-	863	781	-	-	-	-	-	-	-
Stage 2	865	777	-	597	577	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.55	13.5	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1155	-	-	425	-	454	47	-	-
HCM Lane V/C Ratio	-	-	-	0.009	-	0.068	0.008	-	-
HCM Control Delay (s/veh)	0	-	-	13.5	0	13.5	7.5	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.2	0	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	37	52	0	59	209
Future Vol, veh/h	5	37	52	0	59	209
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	54	84	0	82	290

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	538	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	454	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	508	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	644	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	474	954	-	-	1476	-
Mov Cap-2 Maneuver	474	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	601	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.44	0	1.67
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	474	954	1476	-
HCM Lane V/C Ratio	-	-	0.015	0.056	0.056	-
HCM Control Delay (s/veh)	-	-	12.7	9	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.2	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	37	36	0	0	6
Future Vol, veh/h	22	37	36	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	40	39	0	0	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	39	0	-	0	127	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	88	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1571	-	-	-	867	1032
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	935	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1571	-	-	-	854	1032
Mov Cap-2 Maneuver	-	-	-	-	854	-
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	935	-

Approach	EB	WB	SB
HCM Control Delay, s/v	2.73	0	8.51
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	671	-	-	-	1032
HCM Lane V/C Ratio	0.015	-	-	-	0.006
HCM Control Delay (s/veh)	7.3	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	167	224	15	18	119
Future Vol, veh/h	36	167	224	15	18	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	51	235	295	20	29	192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	545	295	0	0	295	0
Stage 1	295	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	489	742	-	-	1278	-
Stage 1	742	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	477	742	-	-	1278	-
Mov Cap-2 Maneuver	477	-	-	-	-	-
Stage 1	742	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.33	0	1.04
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	477	742	236	-
HCM Lane V/C Ratio	-	-	0.106	0.317	0.023	-
HCM Control Delay (s/veh)	-	-	13.4	12.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	1.4	0.1	-

Intersection	
Int Delay, s/veh	6.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	109	63	193	38	59	64
Future Vol, veh/h	109	63	193	38	59	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	165	95	212	42	71	77

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	431	212	0	-	212	0
Stage 1	212	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	577	833	-	0	1346	-
Stage 1	819	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	545	833	-	-	1346	-
Mov Cap-2 Maneuver	545	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	768	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	12.77	0	3.75
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	545	833	1346	-
HCM Lane V/C Ratio	-	0.303	0.115	0.053	-
HCM Control Delay (s/veh)	-	14.4	9.9	7.8	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	1.3	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Future Vol, veh/h	157	5	39	0	0	0	0	76	101	44	125	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	167	5	41	0	0	0	0	78	104	56	160	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	351	456	160	-	0	0	182	0	0
Stage 1	273	273	-	-	-	-	-	-	-
Stage 2	78	182	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	623	504	821	0	-	-	1369	-	0
Stage 1	746	688	-	0	-	-	-	-	0
Stage 2	915	752	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	594	0	821	-	-	-	1369	-	-
Mov Cap-2 Maneuver	594	0	-	-	-	-	-	-	-
Stage 1	746	0	-	-	-	-	-	-	-
Stage 2	874	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	12.75	0	2.02
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	594	821	469	-
HCM Lane V/C Ratio	-	-	0.29	0.051	0.041	-
HCM Control Delay (s/veh)	-	-	13.5	9.6	7.7	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.2	0.1	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Future Vol, veh/h	7	0	2	19	2	16	4	155	24	5	164	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	3	27	3	23	5	176	27	7	228	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	430	456	229	441	443	190	231	0	0	203	0	0
Stage 1	243	243	-	199	199	-	-	-	-	-	-	-
Stage 2	187	213	-	242	244	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	539	504	815	530	512	779	1349	-	-	1380	-	-
Stage 1	765	708	-	808	740	-	-	-	-	-	-	-
Stage 2	820	730	-	766	707	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	516	499	815	524	507	779	1349	-	-	1380	-	-
Mov Cap-2 Maneuver	516	499	-	524	507	-	-	-	-	-	-	-
Stage 1	761	704	-	805	737	-	-	-	-	-	-	-
Stage 2	790	728	-	759	703	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.51	11.47	0.17	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	38	-	-	516	815	609	53	-	-
HCM Lane V/C Ratio	0.003	-	-	0.018	0.003	0.086	0.005	-	-
HCM Control Delay (s/veh)	7.7	0	-	12.1	9.4	11.5	7.6	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.3	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	48	58	4	46	73
Future Vol, veh/h	1	48	58	4	46	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	70	94	6	64	101

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	323	94	0	0	100	0
Stage 1	94	-	-	-	-	-
Stage 2	229	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	675	942	-	-	1456	-
Stage 1	935	-	-	-	-	-
Stage 2	814	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	644	942	-	-	1456	-
Mov Cap-2 Maneuver	644	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	776	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.16	0	2.93
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	644	942	1456	-
HCM Lane V/C Ratio	-	-	0.002	0.074	0.044	-
HCM Control Delay (s/veh)	-	-	10.6	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	43	43	0	0	6
Future Vol, veh/h	7	43	43	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	47	47	0	0	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	47	0	-	0	109	47
Stage 1	-	-	-	-	47	-
Stage 2	-	-	-	-	62	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1561	-	-	-	889	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	961	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1561	-	-	-	884	1023
Mov Cap-2 Maneuver	-	-	-	-	884	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	961	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.02	0	8.54
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	252	-	-	-	1023
HCM Lane V/C Ratio	0.005	-	-	-	0.006
HCM Control Delay (s/veh)	7.3	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	44	207	28	28	161
Future Vol, veh/h	31	44	207	28	28	161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	44	62	272	37	45	260

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	622	272	0	0	272	0
Stage 1	272	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	441	764	-	-	1303	-
Stage 1	760	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	423	764	-	-	1303	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	672	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	11.93	0	1.16
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	423	764	267	-
HCM Lane V/C Ratio	-	-	0.103	0.081	0.035	-
HCM Control Delay (s/veh)	-	-	14.5	10.1	7.9	0
HCM Lane LOS	-	-	B	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.3	0.1	-

Intersection	
Int Delay, s/veh	16.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	236	319	96	45	102	168
Future Vol, veh/h	236	319	96	45	102	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	358	483	105	49	123	202

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	554	105	0	-	105	0
Stage 1	105	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	490	954	-	0	1473	-
Stage 1	914	-	-	0	-	-
Stage 2	639	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	444	954	-	-	1473	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	579	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	23.8	0	2.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	444	954	1473	-
HCM Lane V/C Ratio	-	0.805	0.506	0.083	-
HCM Control Delay (s/veh)	-	39	12.6	7.7	-
HCM Lane LOS	-	E	B	A	-
HCM 95th %tile Q(veh)	-	7.4	2.9	0.3	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	4	51	0	0	0	0	60	95	111	300	0
Future Vol, veh/h	87	4	51	0	0	0	0	60	95	111	300	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	93	4	54	0	0	0	0	62	98	142	385	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	731	829	385	-	0	0	160	0	0
Stage 1	669	669	-	-	-	-	-	-	-
Stage 2	62	160	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	372	308	609	0	-	-	1395	-	0
Stage 1	487	459	-	0	-	-	-	-	0
Stage 2	931	769	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	323	0	609	-	-	-	1395	-	-
Mov Cap-2 Maneuver	323	0	-	-	-	-	-	-	-
Stage 1	487	0	-	-	-	-	-	-	-
Stage 2	810	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	17.46	0	2.13
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	323	609	486	-
HCM Lane V/C Ratio	-	-	0.299	0.089	0.102	-
HCM Control Delay (s/veh)	-	-	20.8	11.5	7.9	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	1.2	0.3	0.3	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	21	0	4	0	145	10	10	337	1
Future Vol, veh/h	3	0	0	21	0	4	0	145	10	10	337	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	30	0	6	0	165	11	14	468	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	661	673	469	666	668	170	469	0	0	176	0	0
Stage 1	497	497	-	170	170	-	-	-	-	-	-	-
Stage 2	165	176	-	496	497	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	378	379	599	376	382	799	1103	-	-	1412	-	-
Stage 1	559	548	-	836	761	-	-	-	-	-	-	-
Stage 2	842	757	-	560	548	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	371	374	599	371	377	799	1103	-	-	1412	-	-
Mov Cap-2 Maneuver	371	374	-	371	377	-	-	-	-	-	-	-
Stage 1	552	541	-	836	761	-	-	-	-	-	-	-
Stage 2	836	757	-	552	541	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	14.82	14.73	0	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1103	-	-	371	-	405	52	-	-
HCM Lane V/C Ratio	-	-	-	0.011	-	0.087	0.01	-	-
HCM Control Delay (s/veh)	0	-	-	14.8	0	14.7	7.6	0	-
HCM Lane LOS	A	-	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.3	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	31	52	0	37	224
Future Vol, veh/h	5	31	52	0	37	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	45	84	0	51	311

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	498	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	536	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	513	954	-	-	1476	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	643	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.4	0	1.07
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	513	954	1476	-
HCM Lane V/C Ratio	-	-	0.014	0.047	0.035	-
HCM Control Delay (s/veh)	-	-	12.1	9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.1	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	37	36	0	0	0
Future Vol, veh/h	0	37	36	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	40	39	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	39	0	-	0	79	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1571	-	-	-	923	1032
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	982	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1571	-	-	-	923	1032
Mov Cap-2 Maneuver	-	-	-	-	923	-
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	982	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1571	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	176	254	14	18	199
Future Vol, veh/h	46	176	254	14	18	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	65	248	334	18	29	321

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	713	334	0	0	334	0
Stage 1	334	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	389	705	-	-	1236	-
Stage 1	712	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	378	705	-	-	1236	-
Mov Cap-2 Maneuver	378	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.6	0	0.66
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	378	705	149	-
HCM Lane V/C Ratio	-	-	0.171	0.351	0.023	-
HCM Control Delay (s/veh)	-	-	16.5	12.8	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	1.6	0.1	-

Intersection	
Int Delay, s/veh	6.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	135	55	249	58	57	68
Future Vol, veh/h	135	55	249	58	57	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	205	83	274	64	69	82

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	493	274	0	-	274	0
Stage 1	274	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	532	770	-	0	1278	-
Stage 1	768	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	502	770	-	-	1278	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.06	0	3.64
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	502	770	1278	-
HCM Lane V/C Ratio	-	0.408	0.108	0.054	-
HCM Control Delay (s/veh)	-	17	10.2	8	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	2	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Future Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	216	7	74	0	0	0	0	113	159	55	190	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	413	572	190	-	0	0	272	0	0
Stage 1	300	300	-	-	-	-	-	-	-
Stage 2	113	272	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	573	433	790	0	-	-	1268	-	0
Stage 1	725	669	-	0	-	-	-	-	0
Stage 2	882	688	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	545	0	790	-	-	-	1268	-	-
Mov Cap-2 Maneuver	545	0	-	-	-	-	-	-	-
Stage 1	725	0	-	-	-	-	-	-	-
Stage 2	840	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.6	0	1.79
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	545	790	405	-
HCM Lane V/C Ratio	-	-	0.41	0.094	0.043	-
HCM Control Delay (s/veh)	-	-	16.1	10	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	2	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Future Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	4	69	3	35	5	265	32	7	304	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	595	625	306	608	611	281	307	0	0	297	0	0
Stage 1	319	319	-	290	290	-	-	-	-	-	-	-
Stage 2	275	306	-	318	321	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	419	404	739	411	412	690	1265	-	-	1276	-	-
Stage 1	696	656	-	722	676	-	-	-	-	-	-	-
Stage 2	735	665	-	698	655	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	391	399	739	404	407	690	1265	-	-	1276	-	-
Mov Cap-2 Maneuver	391	399	-	404	407	-	-	-	-	-	-	-
Stage 1	692	652	-	719	673	-	-	-	-	-	-	-
Stage 2	692	663	-	689	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.08	14.96	0.12	0.17
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	27	-	-	391	739	468	40	-	-
HCM Lane V/C Ratio	0.004	-	-	0.024	0.005	0.229	0.005	-	-
HCM Control Delay (s/veh)	7.9	0	-	14.4	9.9	15	7.8	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.9	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	42	59	4	39	88
Future Vol, veh/h	1	42	59	4	39	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	61	95	6	54	122

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	326	95	0	0	102	0
Stage 1	95	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	673	940	-	-	1454	-
Stage 1	934	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	646	940	-	-	1454	-
Mov Cap-2 Maneuver	646	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	780	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.13	0	2.33
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	646	940	1454	-
HCM Lane V/C Ratio	-	-	0.002	0.065	0.037	-
HCM Control Delay (s/veh)	-	-	10.6	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	43	43	0	0	0
Future Vol, veh/h	0	43	43	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	47	47	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	47	0	-	0	93	47
Stage 1	-	-	-	-	47	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1561	-	-	-	906	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	976	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1561	-	-	-	906	1023
Mov Cap-2 Maneuver	-	-	-	-	906	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	SB
HCM Control Delay, s/v	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1561	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s/veh)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	63	364	28	28	256
Future Vol, veh/h	37	63	364	28	28	256
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	52	89	479	37	45	413

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	982	479	0	0	479	0
Stage 1	479	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	269	585	-	-	1094	-
Stage 1	611	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	255	585	-	-	1094	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	563	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.13	0	0.83
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	255	585	177	-
HCM Lane V/C Ratio	-	-	0.205	0.152	0.041	-
HCM Control Delay (s/veh)	-	-	22.7	12.3	8.4	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.5	0.1	-

Intersection	
Int Delay, s/veh	20

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	258	319	96	45	102	168
Future Vol, veh/h	258	319	96	45	102	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	391	483	105	49	123	202

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	554	105	0	-	105	0
Stage 1	105	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	490	954	-	0	1473	-
Stage 1	914	-	-	0	-	-
Stage 2	639	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	444	954	-	-	1473	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	579	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	28.8	1	2.9
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	444	954	1473	-
HCM Lane V/C Ratio	-	0.88	0.506	0.083	-
HCM Control Delay (s/veh)	-	48.9	12.6	7.7	-
HCM Lane LOS	-	E	B	A	-
HCM 95th %tile Q(veh)	-	9.2	2.9	0.3	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	4	51	0	0	0	0	60	101	111	322	0
Future Vol, veh/h	87	4	51	0	0	0	0	60	101	111	322	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	93	4	54	0	0	0	0	62	104	142	413	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	759	863	413	-	0	0	166	0	0
Stage 1	697	697	-	-	-	-	-	-	-
Stage 2	62	166	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	358	294	587	0	-	-	1388	-	0
Stage 1	473	446	-	0	-	-	-	-	0
Stage 2	931	765	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	310	0	587	-	-	-	1388	-	-
Mov Cap-2 Maneuver	310	0	-	-	-	-	-	-	-
Stage 1	473	0	-	-	-	-	-	-	-
Stage 2	807	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	18.19	0	2.02
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	310	587	461	-
HCM Lane V/C Ratio	-	-	0.312	0.092	0.103	-
HCM Control Delay (s/veh)	-	-	21.8	11.8	7.9	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.3	0.3	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	21	0	4	0	151	10	10	359	1
Future Vol, veh/h	3	0	0	21	0	4	0	151	10	10	359	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	4	0	0	30	0	6	0	172	11	14	499	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	699	710	499	704	705	177	500	0	0	183	0	0
Stage 1	527	527	-	177	177	-	-	-	-	-	-	-
Stage 2	172	183	-	526	528	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	357	361	575	355	363	792	1075	-	-	1404	-	-
Stage 1	538	531	-	829	756	-	-	-	-	-	-	-
Stage 2	835	752	-	539	531	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	350	356	575	350	358	792	1075	-	-	1404	-	-
Mov Cap-2 Maneuver	350	356	-	350	358	-	-	-	-	-	-	-
Stage 1	531	524	-	829	756	-	-	-	-	-	-	-
Stage 2	829	752	-	531	524	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	15.41	15.32	0	0.21
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1075	-	-	350	-	384	49	-	-
HCM Lane V/C Ratio	-	-	-	0.011	-	0.092	0.01	-	-
HCM Control Delay (s/veh)	0	-	-	15.4	0	15.3	7.6	0	-
HCM Lane LOS	A	-	-	C	A	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0.3	0	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	37	52	0	59	224
Future Vol, veh/h	5	37	52	0	59	224
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	7	54	84	0	82	311

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	559	84	0	0	84	0
Stage 1	84	-	-	-	-	-
Stage 2	475	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	494	954	-	-	1476	-
Stage 1	944	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	460	954	-	-	1476	-
Mov Cap-2 Maneuver	460	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.47	0	1.58
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	460	954	1476	-
HCM Lane V/C Ratio	-	-	0.016	0.056	0.056	-
HCM Control Delay (s/veh)	-	-	12.9	9	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.2	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	37	36	0	0	6
Future Vol, veh/h	22	37	36	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	40	39	0	0	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	39	0	-	0	127	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	88	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1571	-	-	-	867	1032
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	935	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1571	-	-	-	854	1032
Mov Cap-2 Maneuver	-	-	-	-	854	-
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	935	-

Approach	EB	WB	SB
HCM Control Delay, s/v	2.73	0	8.51
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	671	-	-	-	1032
HCM Lane V/C Ratio	0.015	-	-	-	0.006
HCM Control Delay (s/veh)	7.3	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	46	176	254	14	18	199
Future Vol, veh/h	46	176	254	14	18	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	65	248	334	18	29	321

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	713	334	0	0	334	0
Stage 1	334	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	389	705	-	-	1236	-
Stage 1	712	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	378	705	-	-	1236	-
Mov Cap-2 Maneuver	378	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	13.6	0	0.66
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	378	705	149	-
HCM Lane V/C Ratio	-	-	0.171	0.351	0.023	-
HCM Control Delay (s/veh)	-	-	16.5	12.8	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	1.6	0.1	-

Intersection	
Int Delay, s/veh	6.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	135	55	249	58	57	68
Future Vol, veh/h	135	55	249	58	57	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Yield	-	Free	-	None
Storage Length	-	0	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	66	66	91	91	83	83
Heavy Vehicles, %	4	0	12	11	4	8
Mvmt Flow	205	83	274	64	69	82

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	493	274	0	-	274	0
Stage 1	274	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.44	6.2	-	-	4.14	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.3	-	-	2.236	-
Pot Cap-1 Maneuver	532	770	-	0	1278	-
Stage 1	768	-	-	0	-	-
Stage 2	812	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	502	770	-	-	1278	-
Mov Cap-2 Maneuver	502	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	15.06	0	3.64
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	502	770	1278	-
HCM Lane V/C Ratio	-	0.408	0.108	0.054	-
HCM Control Delay (s/veh)	-	17	10.2	8	-
HCM Lane LOS	-	C	B	A	-
HCM 95th %tile Q(veh)	-	2	0.4	0.2	-

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Future Vol, veh/h	203	7	70	0	0	0	0	110	154	43	148	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	25	25	25	97	97	97	78	78	78
Heavy Vehicles, %	14	0	28	0	0	0	0	11	4	6	5	0
Mvmt Flow	216	7	74	0	0	0	0	113	159	55	190	0

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	413	572	190	-	0	0	272	0	0
Stage 1	300	300	-	-	-	-	-	-	-
Stage 2	113	272	-	-	-	-	-	-	-
Critical Hdwy	6.54	6.5	6.48	-	-	-	4.16	-	-
Critical Hdwy Stg 1	5.54	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.552	-	-	-	2.254	-	-
Pot Cap-1 Maneuver	573	433	790	0	-	-	1268	-	0
Stage 1	725	669	-	0	-	-	-	-	0
Stage 2	882	688	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	545	0	790	-	-	-	1268	-	-
Mov Cap-2 Maneuver	545	0	-	-	-	-	-	-	-
Stage 1	725	0	-	-	-	-	-	-	-
Stage 2	840	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	14.6	0	1.79
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT
Capacity (veh/h)	-	-	545	790	405	-
HCM Lane V/C Ratio	-	-	0.41	0.094	0.043	-
HCM Control Delay (s/veh)	-	-	16.1	10	8	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	2	0.3	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Future Vol, veh/h	7	0	3	49	2	25	4	233	28	5	219	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	71	71	71	88	88	88	72	72	72
Heavy Vehicles, %	0	0	0	0	0	33	0	5	0	0	7	100
Mvmt Flow	9	0	4	69	3	35	5	265	32	7	304	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	595	625	306	608	611	281	307	0	0	297	0	0
Stage 1	319	319	-	290	290	-	-	-	-	-	-	-
Stage 2	275	306	-	318	321	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.53	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.597	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	419	404	739	411	412	690	1265	-	-	1276	-	-
Stage 1	696	656	-	722	676	-	-	-	-	-	-	-
Stage 2	735	665	-	698	655	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	391	399	739	404	407	690	1265	-	-	1276	-	-
Mov Cap-2 Maneuver	391	399	-	404	407	-	-	-	-	-	-	-
Stage 1	692	652	-	719	673	-	-	-	-	-	-	-
Stage 2	692	663	-	689	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	13.08	14.96	0.12	0.17
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	27	-	-	391	739	468	40	-	-
HCM Lane V/C Ratio	0.004	-	-	0.024	0.005	0.229	0.005	-	-
HCM Control Delay (s/veh)	7.9	0	-	14.4	9.9	15	7.8	0	-
HCM Lane LOS	A	A	-	B	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0.9	0	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	48	59	4	46	88
Future Vol, veh/h	1	48	59	4	46	88
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	135	0	-	50	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	69	69	62	62	72	72
Heavy Vehicles, %	0	10	10	0	8	5
Mvmt Flow	1	70	95	6	64	122

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	345	95	0	0	102	0
Stage 1	95	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.4	6.3	-	-	4.18	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	-	-	2.272	-
Pot Cap-1 Maneuver	656	940	-	-	1454	-
Stage 1	934	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	625	940	-	-	1454	-
Mov Cap-2 Maneuver	625	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	759	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	9.17	0	2.61
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	625	940	1454	-
HCM Lane V/C Ratio	-	-	0.002	0.074	0.044	-
HCM Control Delay (s/veh)	-	-	10.8	9.1	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0.2	0.1	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	43	43	0	0	6
Future Vol, veh/h	7	43	43	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	47	47	0	0	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	47	0	-	0	109	47
Stage 1	-	-	-	-	47	-
Stage 2	-	-	-	-	62	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1561	-	-	-	889	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	961	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1561	-	-	-	884	1023
Mov Cap-2 Maneuver	-	-	-	-	884	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	961	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.02	0	8.54
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	252	-	-	-	1023
HCM Lane V/C Ratio	0.005	-	-	-	0.006
HCM Control Delay (s/veh)	7.3	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	63	364	28	28	256
Future Vol, veh/h	37	63	364	28	28	256
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	Yield	-	None
Storage Length	100	0	-	100	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	76	76	62	62
Heavy Vehicles, %	8	3	3	0	0	11
Mvmt Flow	52	89	479	37	45	413

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	982	479	0	0	479	0
Stage 1	479	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.48	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	269	585	-	-	1094	-
Stage 1	611	-	-	-	-	-
Stage 2	595	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	255	585	-	-	1094	-
Mov Cap-2 Maneuver	255	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	563	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	16.13	0	0.83
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	255	585	177	-
HCM Lane V/C Ratio	-	-	0.205	0.152	0.041	-
HCM Control Delay (s/veh)	-	-	22.7	12.3	8.4	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.5	0.1	-

SimTraffic – Queuing Analysis Results

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	SB
Directions Served	L	LT
Maximum Queue (ft)	87	42
Average Queue (ft)	46	5
95th Queue (ft)	73	26
Link Distance (ft)	1029	425
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	NB	SB
Directions Served	LT	TR	LT
Maximum Queue (ft)	73	8	52
Average Queue (ft)	33	0	8
95th Queue (ft)	64	8	32
Link Distance (ft)	184	170	770
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Buena Vista Dr & Harkins Slough Rd

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (ft)	24	49	51
Average Queue (ft)	3	13	3
95th Queue (ft)	17	33	24
Link Distance (ft)			87
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)	135		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	NB	NB	SB
Directions Served	L	T	R	LT
Maximum Queue (ft)	106	4	5	45
Average Queue (ft)	53	0	0	6
95th Queue (ft)	87	5	5	28
Link Distance (ft)	1029	770		425
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			130	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	SB
Directions Served	LT	LT
Maximum Queue (ft)	82	56
Average Queue (ft)	36	11
95th Queue (ft)	67	37
Link Distance (ft)	184	770
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	NB	NB	SB
Directions Served	L	T	R	LT
Maximum Queue (ft)	114	16	15	56
Average Queue (ft)	54	1	1	6
95th Queue (ft)	89	10	9	32
Link Distance (ft)	1029	770		425
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			130	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	NB	SB
Directions Served	LT	TR	LT
Maximum Queue (ft)	91	5	69
Average Queue (ft)	39	0	12
95th Queue (ft)	75	6	43
Link Distance (ft)	184	170	770
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Buena Vista Dr & Harkins Slough Rd

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (ft)	21	52	53
Average Queue (ft)	3	15	5
95th Queue (ft)	14	36	27
Link Distance (ft)		617	87
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)	135		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	NB	NB	SB
Directions Served	L	T	R	LT
Maximum Queue (ft)	129	17	24	51
Average Queue (ft)	61	0	1	8
95th Queue (ft)	101	9	13	35
Link Distance (ft)	1029	770		425
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			130	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	NB	SB
Directions Served	LT	TR	LT
Maximum Queue (ft)	94	8	74
Average Queue (ft)	43	0	15
95th Queue (ft)	77	6	47
Link Distance (ft)	184	170	770
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 1: Buena Vista Dr & SR-1 NB Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	L	R	T	R	LT
Maximum Queue (ft)	132	39	2	15	55
Average Queue (ft)	67	2	0	1	9
95th Queue (ft)	111	24	0	11	37
Link Distance (ft)	1029	1029	770		425
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				130	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 2: Buene Vista Dr/Buena Vista Dr & SR-1 SB Ramps

Movement	EB	NB	SB
Directions Served	LT	TR	LT
Maximum Queue (ft)	111	8	94
Average Queue (ft)	47	0	17
95th Queue (ft)	87	4	54
Link Distance (ft)	184	170	770
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Buena Vista Landfill
Queuing and Blocking Report

Cumulative 2045 Plus Alternative 3 Conditions
AM Peak

Intersection: 4: Buena Vista Dr & Harkins Slough Rd

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (ft)	24	50	55
Average Queue (ft)	3	15	4
95th Queue (ft)	15	36	27
Link Distance (ft)			87
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)	135		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Field Visit Pictures

Harkins Slough Dr and Alternative 3 Driveway
Standing on Harking Slough Dr, Looking toward the Driveway

Harkins Slough Dr and Alternative 3 Driveway

Standing on Alternative 3 Driveway (14.5 ft behind edge of Travel Lane) Looking West

Harkins Slough Dr and Alternative 3 Driveway
Standing on Alternative 3 Driveway (14.5 ft behind edge of Travel Lane) Looking East

Harkins Slough Dr and Alternative 3 Driveway
Standing on Alternative 3 (<14.5 ft behind edge of Travel Lane) Looking East