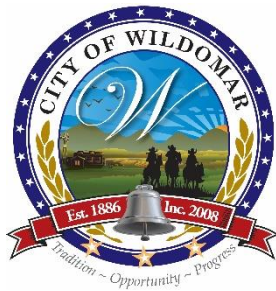


Appendix 7

Project Specific Water Quality Management Plan



Project Specific Water Quality Management Plan (WQMP)

Project Title: Chiquito Battery Energy Storage System and Substation, City of Wildomar

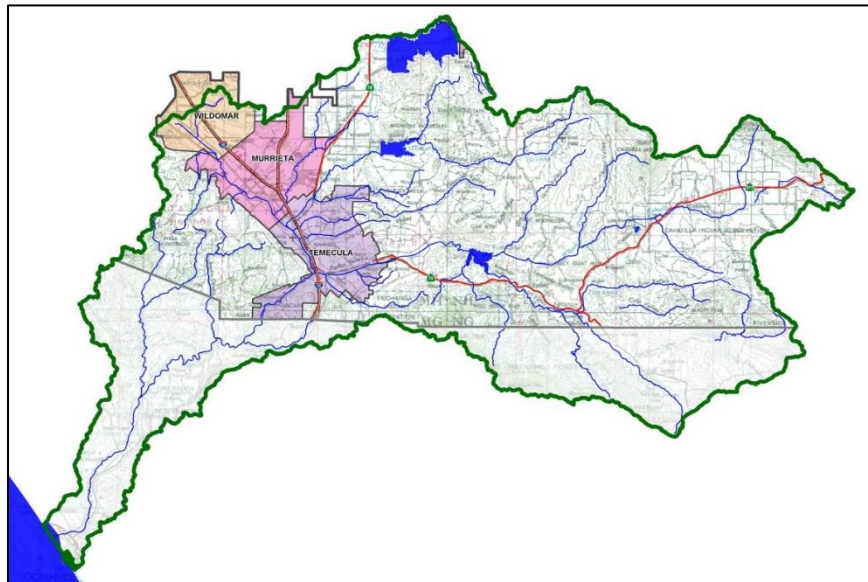
Prepared for: Chiquito Grid, LLC

Development No: Insert text here

Prepared by: Stantec Consulting, Inc.
38 Technology, Suite 200
Irvine, CA
Dale Watson, PE
Principal
949-923-6933

City Project No: Insert text here

WQMP Type: ☒ Preliminary (entitlement submittal)
☐ Final



Original Date Prepared: March 21, 2022; July 7, 2023

Revision Summary (post WQMP acceptance):

MARK	BY	DATE	REVISIONS	APPRV.	DATE
ENGINEER				CITY	

Prepared for Compliance with Regional Board Order No. R9-2013-0001 as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100

OWNER'S CERTIFICATION

This Project-Specific WQMP has been prepared for Hecate Grid, LLC by Stantec Consulting, Inc. for the Chiquito Battery Energy Storage System and Substation project.

This WQMP is intended to comply with the requirements of the City of Wildomar for Wildomar Municipal Code Ch. 13.12 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of storm water Best Management Practices until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Wildomar Water Quality Ordinance (Wildomar Municipal Code Ch. 13.12).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."



Owner's Signature

James Damon

Owner's Printed Name

July 7, 2023

Date

Director of Development

Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control Best Management Practices (BMPs) in this plan meet the requirements of Regional Water Quality Control Board Order No. **R9-2013-0001** as amended by Order Nos. **R9-2015-0001** and **R9-2015-0100**."



Preparer's Signature

Lynn Diaz

Preparer's Printed Name

July 7, 2023

Date

Civil Engineer

Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of PDP:	New Development
Type of Project:	Industrial
Planning Area:	N/A
Community Name:	N/A
Development Name:	N/A
PROJECT LOCATION	
Latitude & Longitude (DMS):	33° 35' 6.84" -117° 15' 16.65"
Project Watershed and Sub-Watershed:	Santa Margarita River HU, Murrieta HA, Wildomar HSA
24-Hour 85 th Percentile Storm Depth (inches):	0.74
Is project subject to Hydromodification requirements?	☒ Y ☐ N (Select based on Section A.3)
APN(s):	380-150-019/020
Map Book and Page No.:	380-15
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Energy Substation
Proposed or Potential SIC Code(s)	3629
Existing Impervious Area of Project Footprint (SF)	0
Total area of <u>proposed</u> Impervious Surfaces within the Project Limits (SF)/or Replacement	31,460
Total Project Area (ac)	2.98
Does the project consist of offsite road improvements?	☐ Y ☒ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
Is the project exempt from Hydromodification Performance Standards?	☐ Y ☐ N
Does the project propose the use of Alternative Compliance to satisfy BMP requirements? (note, alternative compliance is not allowed for coarse sediment performance standards)	☐ Y ☐ N
Has preparation of Project-Specific WQMP included coordination with other site plans?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Is the project located within any Multi-Species Habitat Conservation Plan area (MSHCP Criteria Cell?)	☐ Y ☒ N If "Y" insert Cell Number
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the Natural Resources Conservation Service (NRCS) soils type(s) present on the site (A, B, C and/or D)	Insert text here.

A.1 Maps and Site Plans

The Project Vicinity Map, Existing Condition Exhibit, and WQMP Site Plan are provided in Appendix A. Grading, drainage, landscape/plant palette and other pertinent construction plans are provided in Appendix 2. The WQMP Site Plan includes the following:

- Vicinity and location maps
- Parcel Boundary and Project Footprint
- Existing and Proposed Topography
- Drainage Management Areas (DMAs)
- Proposed Structural Best Management Practices (BMPs)
- Drainage Paths
- Drainage infrastructure, inlets, overflows
- Source Control BMPs
- Site Design BMPs
- Impervious Surfaces
- Pervious Surfaces (i.e. Landscaping)
- Standard Labeling

A.2 Identify Receiving Waters

Table A-1 below, lists in order of upstream to downstream, information of the Receiving Waters that the Project site is tributary to. The Receiving Waters Map is provided in Appendix 1.

Table A-1 Identification of Receiving Waters

Receiving Waters	USEPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Murrieta Creek	Chlorpyrifos Copper Indicator Bacteria Iron Manganese Phosphorus Toxicity Nitrogen	Municipal & Domestic Agricultural Industrial Service Industrial Process Contact Water Recreation (P) Non-contact Water Recreation Warm Freshwater Habitat Wildlife Habitat	300-FT
Santa Margarita River	Indicator Bacteria Manganese Nitrogen Phosphorus Toxicity	Municipal & Domestic Agricultural Industrial Service Industrial Process Contact Water Recreation Non-contact Water Recreation Warm Freshwater Habitat Cold Freshwater Habitat Wildlife Habitat Rate, Threatened, or Endangered Species	10.8 mi
Santa Margarita Lagoon / Pacific Ocean	Benthic Community Effects Chlorpyrifos Indicator Bacteria Nitrogen Phosphorus Toxicity	Contact Water Recreation Non-contact Water Recreation Estuarine Habitat Wildlife Habitat Rate, Threatened, or Endangered Species Marine Habitat Migration of Aquatic Organism Spawning, Reproduction, and/or Early Development	40 mi

A.3 Drainage System Susceptibility to Hydromodification

Table A-2 below, lists in order of the point of discharge at the project site down to the Santa Margarita River¹, each drainage system or receiving water that the project site is tributary to, the material of the drainage system, and any applicable exemptions. The summarized applicable hydromodification performance standards that will be documented are listed in Section E. Exempted categories of receiving waters include:

- Existing storm drains that discharge directly to water storage reservoirs, lakes, or enclosed embayments, or
- Conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- Other water bodies identified in an approved Watershed Management Area Analysis (WMAA) (See Exhibit G to the WQMP)

Table A-2 Identification of Susceptibility to Hydromodification

Drainage System	Drainage System Material	Hydromodification Exemption	Hydromodification Exempt
Storm Drain in Clinton Keith Rd. – 0.10 mi	36" Reinforced Concrete Pipe	None	☐ Y ☒ N
Murietta Creek – 10.8 miles	Earthen Channel vegetated	None	☐ Y ☒ N
Santa Margarita River – 29 miles	Earthen Channel vegetated	None	☐ Y ☒ N
Summary of Performance Standards			
☐ Hydromodification Exempt – Select if “Y” is selected in the Hydromodification Exempt column above, project is exempt from hydromodification requirements.			
☒ Not Exempt – Select if “N” is selected in any row of the Hydromodification Exempt column above. Project is subject to hydrologic control requirements and may be subject to sediment supply requirements.			

A.4 Additional Permits/Approvals required for the Project:

Table A-3 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	☒ N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☒ Y	☐ N

¹ Refer to Exhibit G of the WQMP for a map of exempt and potentially exempt areas. These maps are from the Draft SMR WMAA as of January 5, 2018 and will be replaced upon acceptance of the SMR WMAA.

Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) Consistency Approval (e.g., Joint Project Review (JPR), Determination of Biological Equivalent or Superior Preservation (DBESP))	☐ Y	☒ N
Other <i>(please list in the space below as required)</i>	☐ Y	☐ N

Section B: Optimize Site Utilization (LID Principles)

Project- Specific WQMP Site Design BMP Checklist	
The questions below help determine how to best optimize the Project and subsequently identify opportunities and/or constraints, and document compliance.	
SITE DESIGN REQUIREMENTS	
☐ Yes ☒ No ☐ N/A	Did you identify and preserve existing drainage patterns? Integrating existing drainage patterns into the site plan helps to maintain the time of concentration and infiltration rates of runoff, decreasing peak flows, and may also help preserve the contribution of Critical Coarse Sediment (i.e., Bed Sediment Supply) from the PDP to the Receiving Water. Preserve existing drainage patterns by: • Minimizing unnecessary site grading that would eliminate small depressions, where appropriate add additional “micro” storage throughout the site landscaping. • Where possible conform the PDP site layout along natural landforms, avoid excessive grading and disturbance of vegetation and soils, preserve or replicate the sites natural drainage features and patterns. • Set back PDP improvements from creeks, wetlands, riparian habitats and any other natural water bodies. • Use existing and proposed site drainage patterns as a natural design element, rather than using expensive impervious conveyance systems. Use depressed landscaped areas, vegetated buffers, and bioretention areas as amenities and focal points within the site and landscape design.
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. <i>Under existing conditions, the site is mounded with the high point being in the center of the site and all sides sloping away from the center. The elevation differential is 10-ft from center of site (elevation 1210) to the boundary (elevation 1200) with an average slope of 4% outwardly from the center. See Existing Conditions Hydrology Map in Appendix 2.</i> <i>Under developed conditions, the Project will be graded with a diagonal ridge across the site such that southwestern quadrant will sheet flow westerly at a 1.5% slope to the southwestern corner and the remainder of the site will sheet flow easterly at a 1.5% slope to the northeastern corner of the site. See WQMP Site Map in Appendix 1.</i>	
☐ Yes ☐ No ☒ N/A	Did you identify and protect existing vegetation? Identify any areas containing dense native vegetation or well-established trees, and try to avoid disturbing these areas. Soils with thick, undisturbed vegetation have a much higher capacity to store and infiltrate runoff than do disturbed soils. Reestablishment of a mature vegetative community may take decades. Sensitive areas, such as streams and floodplains should also be avoided. • Define the development envelope and protected areas, identifying areas that are most suitable for development and areas that should be left undisturbed. • Establish setbacks and buffer zones surrounding sensitive areas. • Preserve significant trees and other natural vegetation where possible.

Project- Specific WQMP Site Design BMP Checklist	
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. <i>There are no existing trees or shrubs on the site to preserve.</i>	
☒ Yes ☐ No ☐ N/A	Did you identify and preserve natural infiltration capacity? A key component of LID is taking advantage of a site's natural infiltration and storage capacity. A site survey and geotechnical investigation can help define areas with high potential for infiltration and surface storage. • Identify opportunities to locate LID Principles and Structural BMPs in highly pervious areas. Doing so will maximize infiltration and limit the amount of runoff generated. • Concentrate development on portions of the site with less permeable soils, and preserve areas that can promote infiltration.
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer.	
☒ Yes ☐ No ☐ N/A	Did you minimize impervious area? Look for opportunities to limit impervious cover through identification of the smallest possible land area that can be practically impacted or disturbed during site development. • Limit overall coverage of paving and roofs. This can be accomplished by designing compact, taller structures, narrower and shorter streets and sidewalks, clustering buildings and sharing driveways, smaller parking lots (fewer stalls, smaller stalls, and more efficient lanes), and indoor or underground parking. • Inventory planned impervious areas on your preliminary site plan. Identify where permeable pavements, or other permeable materials, such as crushed aggregate, turf block, permeable modular blocks, pervious concrete or pervious asphalt could be substituted for impervious concrete or asphalt paving. This will help reduce the amount of Runoff that may need to be addressed through Structural BMPs. • Examine site layout and circulation patterns and identify areas where landscaping can be substituted for pavement, such as for overflow parking. • Consider green roofs. Green roofs are roofing systems that provide a layer of soil/vegetative cover over a waterproofing membrane. A green roof mimics pre-development conditions by filtering, absorbing, and evapotranspiring precipitation to help manage the effects of an otherwise impervious rooftop.
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. <i>Impervious areas will only comprise 25% of the improvements and are limited to individual concrete pads for electrical equipment. The proposed access road will be an all-weather fire access road. Area between the electrical equipment pads will be gravel over native ground.</i>	

Project- Specific WQMP Site Design BMP Checklist	
☒ Yes ☐ No ☐ N/A	Did you identify and disperse runoff to adjacent pervious areas or small collection areas? Look for opportunities to direct runoff from impervious areas to adjacent landscaping, other pervious areas, or small collection areas where such runoff may be retained. This is sometimes referred to as reducing Directly Connected Impervious Areas. - Direct roof runoff into landscaped areas such as medians, parking islands, planter boxes, etc., and/or areas of pervious paving. Instead of having landscaped areas raised above the surrounding impervious areas, design them as depressed areas that can receive Runoff from adjacent impervious pavement. For example, a lawn or garden depressed 3"-4" below surrounding walkways or driveways provides a simple but quite functional landscape design element. - Detain and retain runoff throughout the site. On flatter sites, smaller Structural BMPs may be interspersed in landscaped areas among the buildings and paving. - On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas and LID BMPs and/or Hydrologic Control BMPs in lower areas. Low retaining walls may also be used to create terraces that can accommodate LID BMPs. Wherever possible, direct drainage from landscaped slopes offsite and not to impervious surfaces like parking lots. - Reduce curb maintenance and provide for allowances for curb cuts. - Design landscaped areas or other pervious areas to receive and infiltrate runoff from nearby impervious areas. - Use Tree Wells to intercept, infiltrate, and evapotranspire precipitation and runoff before it reaches structural BMPs. Tree wells can be used to limit the size of Drainage Management Areas that must be treated by structural BMPs. Guidelines for Tree Wells are included in the Tree Well Fact Sheet in the LID BMP Design Handbook.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. <i>Approximately 75% of the Project will be comprised of pervious material, gravel over natural ground around the individual electrical equipment concrete pads and an all-weather fire access road.</i>	
☒ Yes ☐ No ☐ N/A	Did you utilize native or drought tolerant species in site landscaping? Wherever possible, use native or drought tolerant species within site landscaping instead of alternatives. These plants are uniquely suited to local soils and climate and can reduce the overall demands for potable water use associated with irrigation.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.	

Project- Specific WQMP Site Design BMP Checklist	
☐ Yes ☐ No ☒ N/A	Did implement harvest and use of runoff? Under the Regional MS4 Permit, Harvest and Use BMPs must be employed to reduce runoff on any site where they are applicable and feasible. However, Harvest and Use BMPs are effective for retention of stormwater runoff only when there is adequate demand for non-potable water during the wet season. If demand for non-potable water is not sufficiently large, the actual retention of stormwater runoff will be diminished during larger storms or during back-to-back storms. For the purposes of planning level Harvest and Use BMP feasibility screening, Harvest and Use is only considered to be a feasible if the total average wet season demand for non-potable water is sufficiently large to use the entire DCV within 72 hours. If the average wet season demand for non-potable water is not sufficiently large to use the entire DCV within 72 hours, then Harvest and Use is not considered to be feasible and need not be considered further. The general feasibility and applicability of Harvest and Use BMPs should consider: - Any downstream impacts related to water rights that could arise from capturing storm water (not common). - Conflicts with recycled water used – where the project is conditioned to use recycled water for irrigation, this should be given priority over storm water capture as it is a year-round supply of water. - Code Compliance - If a particular use of captured storm water, and/or available methods for storage of captured storm water would be contrary to building codes in effect at the time of approval of the preliminary Project-Specific WQMP, then an evaluation of harvesting and use for that use would not be required. - Wet season demand – the applicant shall demonstrate, to the acceptance of the [Insert Jurisdiction], that there is adequate demand for harvested water during the wet season to drain the system in a reasonable amount of time.
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. <i>No recycled water is proposed for the Project.</i>	
☐ Yes ☐ No ☒ N/A	Did you keep the runoff from sediment producing pervious area hydrologically separate from developed areas that require treatment? Pervious area that qualify as self-treating areas or off-site open space should be kept separate from drainage to structural BMPs whenever possible. This helps limit the required size of structural BMPs, helps avoid impacts to sediment supply, and helps reduce clogging risk to BMPs.
Discuss how this was included or provide a discussion/justification for “No” or “N/A” answer. <i>The Project will be surrounded by a concrete block wall, so neither offsite runoff nor onsite run-on will occur. Onsite stormwater will be collected in an onsite storm drain system including two detention/biofiltration basins.</i>	

Section C: Delineate Drainage Management Areas (DMAs)

Table C-1 DMA Identification

DMA Name or Identification	Surface Type(s) ¹	Area (Sq. Ft.)	DMA Type
A	Mixed	33,620	To be Determined in Step 3
B1	Mixed	62,990	
B2	Mixed	21,850	
C	Landscape	9,850	

Step 3: DMA Classification

Each DMA will be classified as one of the following four types:

- Type 'A': Self-Treating Areas:
- Type 'B': Self-Retaining Areas
- Type 'C': Areas Draining to Self-Retaining Areas
- Type 'D': Areas Draining to BMPs

Step 3.A – Identify Type 'A' Self-Treating Area

Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

- ☒ Yes ☐ No Area is undisturbed from their natural condition OR restored with Native and/or California Friendly vegetative covers.
- ☐ Yes ☒ No Area is irrigated, if at all, with appropriate low water use irrigation systems to prevent irrigation runoff.
- ☒ Yes ☐ No Runoff from the area will not comingle with runoff from the developed portion of the site, or across other landscaped areas that do not meet the above criteria.

If all answers indicate "Yes," complete Table C-2 to document the DMAs that are classified as Self-Treating Areas.

Table C-2 Type 'A', Self-Treating Areas

DMA Name or Identification	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
C	9,850	Native Landscape	none

Step 3.B – Identify Type 'B' Self-Retaining Area and Type 'C' Areas Draining to Self-Retaining Areas

Type 'B' Self-Retaining Area: A Self-Retaining Area is shallowly depressed 'micro infiltration' areas designed to retain the Design Storm rainfall that reaches the area, without producing any Runoff.

Indicate if the DMAs meet the following criteria by answering "Yes," "No," or "N/A".

- ☐ Yes ☐ No ☒ N/A Slopes will be graded toward the center of the pervious area.
- ☒ Yes ☐ No ☐ N/A Soils will be freely draining to not create vector or nuisance conditions.
- ☐ Yes ☒ No ☐ N/A Inlet elevations of area/overflow drains, if any, should be clearly specified to be three inches or more above the low point to promote ponding.
- ☐ Yes ☒ No ☐ N/A Pervious pavements (e.g., crushed stone, porous asphalt, pervious concrete, or permeable pavers) can be self-retaining when constructed with a gravel base course four or more inches deep below any underdrain discharge elevation.

If all answers indicate "Yes," DMAs may be categorized as Type 'B', proceed to identify Type 'C' Areas Draining to Self-Retaining Areas.

Type 'C' Areas Draining to Self-Retaining Areas: Runoff from impervious or partially pervious areas can be managed by routing it to Self-Retaining Areas consistent with the LID Principle discussed in SMR WQMP Section 3.2.5 for 'Dispersing Runoff to Adjacent Pervious Areas'.

Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

- ☐ Yes ☒ No The drainage from the tributary area must be directed to and dispersed within the Self-Retaining Area.
- ☐ Yes ☒ No Area must be designed to retain the entire Design Storm runoff without flowing offsite.

If all answers indicate "Yes," DMAs may be categorized as Type 'C'.

Complete Table C-3 and Table C-4 to identify Type 'B' Self-Retaining Areas and Type 'C' Areas Draining to Self-Retaining Areas.

Table C-3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet)	Storm Depth (inches)	DMA Name / ID	[C] from Table C-4=	Required Retention Depth (inches)
		[A]	[B]		[C]	$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$

Table C-4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]

Note: (See Section 3.3 of SMR WQMP) Ensure that partially pervious areas draining to a Self-Retaining area do not exceed the following ratio:

$$\left(\frac{2}{\text{Impervious Fraction}} \right) : 1$$

(Tributary Area: Self-Retaining Area)

Step 3.C – Identify Type 'D' Areas Draining to BMPs

Areas draining to BMPs are those that could not be fully managed through LID Principles (DMA Types A through C) and will instead drain to an LID BMP and/or a Conventional Treatment BMP designed to manage water quality impacts from that area, and Hydromodification where necessary.

Complete Table C-5 to document which DMAs are classified as Areas Draining to BMPs

Table C-5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID Receiving Runoff from DMA
A	Detention Basin A – Without Infiltration
B1	Detention Basin B – Without Infiltration
B2	Detention Basin B – Without Infiltration

Note: More than one DMA may drain to a single LID BMP; however, one DMA may not drain to more than one BMP.

Section D: Implement LID BMPs

The Regional MS4 Permit requires the use of LID BMPs to provide retention or treatment of the DCV and includes a BMP hierarchy which requires Full Retention BMPs (Priority 1) to be considered before Biofiltration BMPs (Priority 2) and Flow-Through Treatment BMPs and Alternative Compliance BMPs (Priority 3). LID BMP selection must be based on technical feasibility and should be considered early in the site planning and design process. Use this section to document the selection of LID BMPs for each DMA. Note that feasibility is based on the DMA scale and may vary between DMAs based on site conditions.

D.1 Full Infiltration Applicability

An assessment of the feasibility of utilizing full infiltration BMPs is required for all projects, *except where it can be shown that site design LID principals fully retain the DCV (i.e., all DMAs are Type A, B, or C), or where Harvest and Use BMPs fully retain the DCV. Check the following box if applicable:*

- ☒ Site design LID principals fully retain the DCV (i.e., all DMAs are Type A, B, or C), (Proceed to Section E).

If the above box remains unchecked, perform a site-specific evaluation of the feasibility of Infiltration BMPs using each of the applicable criteria identified in Chapter 2.3.3 of the SMR WQMP and complete the remainder of Section D.1.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Copermittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the SMR WQMP.

A geotechnical report has been prepared and is included in Appendix 3. A Phase I Environmental Site Assessment has been prepared and is included in Appendix 4.

Infiltration Feasibility

Table D-1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the SMR WQMP in Chapter 2.3.3. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D-1 Infiltration Feasibility

Downstream Impacts (SMR WQMP Section 2.3.3.a)		
Does the project site...	YES	NO
...have any DMAs where infiltration would negatively impact downstream water rights or other Beneficial Uses ² ?		X
If Yes, list affected DMAs:		
Groundwater Protection (SMR WQMP Section 2.3.3.b)		
Does the project site...	YES	NO
...have any DMAs with industrial, and other land uses that pose a high threat to water quality, which cannot be treated by Bioretention BMPs? Or have DMAs with active industrial process areas?		X
If Yes, list affected DMAs:		
...have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
...have any DMAs located within 100 feet horizontally of a water supply well?		X
If Yes, list affected DMAs:		
...have any DMAs that would restrict BMP locations to within a 2:1 (horizontal: vertical) influence line extending from any septic leach line?		X
If Yes, list affected DMAs:		
...have any DMAs been evaluated by a licensed Geotechnical Engineer, Hydrogeologist, or Environmental Engineer, who has concluded that the soils do not have adequate physical and chemical characteristics for the protection of groundwater, and has treatment provided by amended media layers in Bioretention BMPs been considered in evaluating this factor?		X
If Yes, list affected DMAs:		
Public Safety and Offsite Improvements (SMR WQMP Section 2.3.3.c)		
Does the project site...	YES	NO
...have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
Infiltration Characteristics For LID BMPs (SMR WQMP Section 2.3.3.d)		
Does the project site...	YES	NO
...have factored infiltration rates of less than 0.8 inches / hour? (Note: on a case-by-case basis, the City may allow a factor of safety as low as 1.0 to support selection of full infiltration BMPs. Therefore, measured infiltration rates could be as low as 0.8 in/hr to support full infiltration. A higher factor of safety would be required for design in accordance with the LID BMP Design Handbook).		
If Yes, list affected DMAs:		
Cut/Fill Conditions (SMR WQMP Section 2.3.3.e)		
Does the project site...	YES	NO
...have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		
If Yes, list affected DMAs:		
Other Site-Specific Factors (SMR WQMP Section 2.3.3.f)		
Does the project site...	YES	NO
...have DMAs where the geotechnical investigation discovered other site-specific factors that would preclude effective and/or safe infiltration?		
Describe here:		

If you answered “Yes” to any of the questions above for any DMA, Infiltration BMPs that rely solely on infiltration should not be used for those DMAs and you should proceed to the assessment for Biofiltration BMPs below. Biofiltration BMPs that provide partial infiltration may still be feasible and should be

² Such a condition must be substantiated by sufficient modeling to demonstrate an impact and would be subject to [Insert Jurisdiction] discretion. There is not a standardized method for assessing this criterion. Water rights evaluations should be site-specific.

assessed in Section D.2. Summarize concerns identified in the Geotechnical Report, if any, that resulted in a “YES” response above in the table below.

Table D-2 Geotechnical Concerns for Onsite Infiltration

Type of Geotechnical Concern	DMAs Feasible (By Name or ID)	DMAs Infeasible (By Name or ID)
Collapsible Soil		
Expansive Soil		
Slopes		
Liquefaction		
Other		

D.2 Biofiltration Applicability

This section should document the applicability of biofiltration BMPs for Type D DMAs that are not feasible for full infiltration BMPs. The key decisions to be documented in this section include:

1. Are biofiltration BMPs with partial infiltration feasible?
 - a. Biofiltration BMPs must be designed to maximize incidental infiltration via a partial infiltration design unless it is demonstrated that this design is not feasible.
 - b. These designs can be used at sites with low infiltration rates where other feasibility factors do not preclude incidental infiltration.

Document summary in Table D-3.

2. If not, what are the factors that require the use of biofiltration with no infiltration? This may include:
 - a. Geotechnical hazards
 - b. Water rights issues
 - c. Water balance issues
 - d. Soil contamination or groundwater quality issues
 - e. Very low infiltration rates (factored rates < 0.1 in/hr)
 - f. Other factors, demonstrated to the acceptance of the City

If this applies to any DMAs, then rationale must be documented in Table D-3.

3. Are biofiltration BMPs infeasible?
 - a. If yes, then provide a site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee with jurisdiction over the Project site to discuss this option. Proceed to Section F to document your alternative compliance measures.

Table D-3 Evaluation of Biofiltration BMP Feasibility

DMA ID	Is Partial/ Incidental Infiltration Allowable? (Y/N)	Basis for Infeasibility of Partial Infiltration (provide summary and include supporting basis if partial infiltration not feasible)
A	N	Due to onsite electrical equipment and underground electrical conduits, onsite infiltration is not suitable.
B1	N	
B2	N	
C	Y	

Proprietary Biofiltration BMP Approval Criteria

If the project will use proprietary BMPs as biofiltration BMPs, then this section is completed to document that the proprietary BMPs are selected in accordance with Section 2.3.7 of the SMR WQMP. Proprietary Biofiltration BMPs must meet both of the following approval criteria:

1. Approval Criteria for All Proprietary BMPs, and
2. Acceptance Criteria for Proprietary Biofiltration BMPs.

When the use of proprietary biofiltration BMPs is proposed to meet the Pollutant Control performance standards, use Table D-4 to document that appropriate approval criteria have been met for the proposed BMPs. Add additional rows to document approval criteria are met for each type of BMP proposed.

Table D-4 Proprietary BMP Approval Requirement Summary

Proposed Proprietary Biofiltration BMP	Approval Criteria	Notes/Comments
Insert BMP Name and Manufacturer Here	☐ Proposed BMP has an active TAPE GULD Certification for the project pollutants of concern ³ or equivalent 3 rd party demonstrated performance.	Insert text here
	☐ The BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification.	Insert text here
	☐ The BMP includes biological features including vegetation supported by engineered or other growing media.	Describe features here.
	☐ The BMP is designed to maximize infiltration, or supplemental infiltration is provided to achieve retention equivalent to Biofiltration with Partial Infiltration BMPs if factored infiltration rate is between 0.1 and 0.8 inches/hour.	Describe supplemental retention practices if applicable.

³ Use Table F-1 and F-2 to identify and document the pollutants of concern and include these tables in Appendix 5.

	☐ The BMP is sized using one of two Biofiltration LID sizing options in Section 2.3.2 of the SRM WQMP.	List sizing method used, resulting size (i.e. volume or flow), and provided size (for proposed unit)
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D.3 Feasibility Assessment Summaries

From the Infiltration, Biofiltration with Partial Infiltration and Biofiltration with No Infiltration Sections above, complete Table D-5 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D-5 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy			No LID (Alternative Compliance)
	1. Infiltration	2. Biofiltration with Partial Infiltration	3. Biofiltration with No Infiltration	
A	☐	☐	☒	☐
B1	☐	☐	☒	☐
B2	☐	☐	☒	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a narrative in Table D-6 below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section F below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

This is based on the clarification letter titled “San Diego Water Board’s Expectations of Documentation to Support a Determination of Priority Development Project Infiltration Infeasibility” (April 28, 2017, Via email from San Diego Regional Water Quality Control Board to San Diego County Municipal Storm Water Copermittees⁴).

Table D-6 Summary of Infeasibility Documentation

Question	Narrative Summary (include reference to applicable appendix/attachment/report, as applicable)
a) When in the entitlement process did a geotechnical engineer analyze the site for infiltration feasibility?	Site was not analyzed for infiltration feasibility due to proposed use of site involving onsite electrical equipment and underground electrical conduits.
b) When in the entitlement process were other investigations conducted (e.g., groundwater quality, water rights) to	Refer to Geotechnical Investigation Report in Appendix 3.

⁴ <http://www.projectcleanwater.org/download/pdp-infiltration-infeasibility/>

evaluate infiltration feasibility?	
c) What was the scope and results of testing, if conducted, or rationale for why testing was not needed to reach findings?	
d) What public health and safety requirements affected infiltration locations?	
e) What were the conclusions and recommendations of the geotechnical engineer and/or other professional responsible for other investigations?	
f) What was the history of design discussions between the permittee and applicant for the proposed project, resulting in the final design determination related locations feasible for infiltration?	
g) What site design alternatives were considered to achieve infiltration or partial infiltration on site?	
h) What physical impairments (i.e., fire road egress, public safety considerations, utilities) and public safety concerns influenced site layout and infiltration feasibility?	
i) What LID Principles (site design BMPs) were included in the project site design?	Two onsite detention basins.

D.4 LID BMP Sizing

Each LID BMP must be designed to ensure that the DCV will be captured by the selected BMPs with no discharge to the storm drain or surface waters during the DCV size storm. Infiltration BMPs must at minimum be sized to capture the DCV to achieve pollutant control requirements.

Biofiltration BMPs must at a minimum be sized to:

- Treat 1.5 times the DCV not reliably retained on site using a volume-base or flow-based sizing method, or
- Include static storage volume, including pore spaces and pre-filter detention volume, at least 0.75 times the portion of the DCV not reliably retained on site.

First, calculate the DCV for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the required V_{BMP} using the methods included in Section 3 of the LID BMP Design Handbook. Utilize the worksheets found in the LID BMP Design Handbook or consult with the Copermittee to assist you in correctly sizing your LID BMPs. Use Table D-7 below to document the DCV for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D-7 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	<i>Detention Basins A and B Combined</i>		
	[A]		[B]	[C]	[A] x [C]			
A	33,620	Mixed	0.35	0.25	8,405	Design Storm Depth (in)	DCV, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
B1	62,990	Mixed	0.31	0.23	14,488			
B2	21,850	Mixed	0.18	0.16	3,496			
C	9,850	Landscape	0.10	0.11	1,084			
	128,310				27,473	0.74	1,694	2,488

[B], [C] is obtained as described in Section 2.6.1.b of the SMR WQMP

[E] is obtained from Exhibit A in the SMR WQMP

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6.

I_f Factor Calculations:

DMA A – $[(1.0 \times) + (0.10 \times)]/63,600$

Complete Table D-8 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. You can add rows to the table as needed. Alternatively, the Santa Margarita Hydrology Model (SMRHM) can be used to size LID BMPs to address the DCV and, if applicable, to size Hydrologic Control BMPs to meet the Hydrologic Performance Standard described in the SMR WQMP, as identified in Section E.

Table D-8 LID BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	Design Capture Volume (ft ³)	Proposed Volume (ft ³)
Basin A	A	Mixed	531	888
Basin B	B1 & B2	Mixed	1,113	1,600

If bioretention will include a capped underdrain, then include sizing calculations demonstrating that the BMP will meet infiltration sizing requirements with the underdrain capped and also meet biofiltration sizing requirements if the underdrain is uncapped.

Section E: Implement Hydrologic Control BMPs and Sediment Supply BMPs

If a completed Table 1.2 demonstrates that the project is exempt from Hydromodification Performance Standards, specify N/A and proceed to Section G.

- ☐ N/A Project is Exempt from Hydromodification Performance Standards.

If a PDP is not exempt from hydromodification requirements than the PDP must satisfy the requirements of the performance standards for hydrologic control BMPs and Sediment Supply BMPs. The PDP may choose to satisfy hydrologic control requirements using onsite or offsite BMPs (i.e. Alternative Compliance). Sediment supply requirements cannot be met via alternative compliance. If N/A is not selected above, select one of the two options below and complete the applicable sections.

- ☒ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control and Sediment Supply BMPs Onsite (complete Section E).
- ☐ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control Requirements using Alternative Compliance (complete Section F). Selection of this option must be approved by the Copermittee.

E.1 Hydrologic Control BMP Selection

Capture of the DCV and achievement of the Hydrologic Performance Standard may be met by combined and/or separate structural BMPs. The user should consider the full suite of Hydrologic Control BMPs to manage runoff from the post-development condition and meet the Hydrologic Performance Standard identified in this section.

The Hydrologic Performance Standard consists of matching or reducing the flow duration curve of post-development conditions to that of pre-existing, naturally occurring conditions, for the range of geomorphically significant flows (10% of the 2-year runoff event up to the 10-year runoff event). Select each of the hydrologic control BMP types that are applied to meet the above performance standard on the site.

- ☐ LID principles as defined in Section 3.2 of the SMR WQMP.
- ☒ Structural LID BMPs that may be modified or enlarged, if necessary, beyond the DCV.
- ☐ Structural Hydrologic Control BMPs that are distinct from the LID BMPs above. The LID BMP Design Handbook provides information not only on Hydrologic Control BMP design, but also on BMP design to meet the combined LID requirement and Hydrologic Performance Standard. The Handbook specifies the type of BMPs that can be used to meet the Hydrologic Performance Standard.

E.2 Hydrologic Control BMP Sizing

Hydrologic Control BMPs must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA for the range of geomorphically significant flows. Using SMRHM, (or another acceptable continuous simulation model if approved by the Copermittee) the applicant shall demonstrate that the performance of the Hydrologic Control BMPs complies with the Hydrologic Performance Standard. Complete Table E-1 below and identify, for each DMA, the type of Hydrologic Control BMP, if the SMRHM model confirmed the management (Identified as “passed” in SMRHM), the total volume capacity of the Hydrologic Control BMP, the Hydrologic Control BMP footprint at top floor elevation, and the drawdown time of the Hydrologic Control BMP. SMRHM summary reports should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table E-1 Hydrologic Control BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
Basin A	A	Bioretention Basin	☐	0.08	0.04	<24-Hr*
Basin B	B1 & B2	Bioretention Basin	☐	0.09	0.04	<24-Hr*
			☐			
			☐			

*Assumes no infiltration, rather complete discharge of treated flows through basin perforated subdrain pipes directly into storm drain.

If a bioretention BMP with capped underdrain is used and hydromodification requirements apply, then sizing calculations must demonstrate that the BMP meets flow duration control criteria with the underdrain capped and uncapped. Both calculations must be included.

E.3 Implement Sediment Supply BMPs

The sediment supply performance standard applies to PDPs for which hydromodification applied that have the potential to impact Potential Critical Coarse Sediment Yield Areas. Refer to Exhibit G of the WQMP to determine if there are onsite Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas. Select one of the two options below and include the Potential Critical Coarse Sediment Yield Area Exhibit showing your project location in Appendix 7.

- ☒ There are no mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site. The Sediment Supply Performance Standard is met with no further action.
- ☐ There are mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site, the Sediment Supply Performance Standard will be met through Option 1 or Option 2 below.

The applicant may refer to Section 3.6.4 of the SMR WQMP for a description of the methodology to meet the Sediment Supply Performance Standard. Select the applicable compliance pathway and complete the

appropriate sections to demonstrate compliance with the Sediment Supply Performance Standard if the second box is selected above:

- ☐ Avoid impacts related to any PDP activities to Potential Critical Coarse Sediment Yield Areas. Proceed to Section E.3.1.
- ☐ Complete a Site-Specific Critical Coarse Sediment Analysis. Proceed to Section E.3.2.

E.3.1 Option 1: Avoid Potential Critical Coarse Sediment Yield Areas and Potential Sediment Source Areas

The simplest approach for complying with the Sediment Supply Performance Standard is to avoid impacts to areas identified as Potential Critical Coarse Sediment Yield Areas or Potential Sediment Supply Areas. If a portion of PDP is identified as a Potential Critical Coarse Sediment Yield Area or a Potential Sediment Source Area, that PDP may still achieve compliance with the Sediment Supply Performance Standards if Potential Critical Coarse Sediment Yield Areas and Potential Sediment Supply Areas are avoided, i.e. areas are not developed and thereby delivery of Critical Coarse Sediment to the receiving waters is not impeded by site developments.

Provide a narrative describing how the PDP has avoided impacts to Potential Critical Coarse Sediment Yield Areas and/or Potential Sediment Source Areas below.

Insert narrative description here

If it is not feasible to avoid these areas, proceed to Option 2 to complete a Site-Specific Critical Coarse Sediment Analysis.

E.3.2 Option 2: Site-Specific Critical Coarse Sediment Analysis

Perform a stepwise assessment to ensure the maintenance of the pre-project source(s) of Critical Coarse Sediment (i.e., Bed Sediment Supply):

1. Determine whether the site or a portion of the site is a Significant Source of Bed Sediment Supply to the Receiving Channel (i.e., an actual verified Critical Coarse Sediment Yield Area);
2. Avoid areas identified as actual verified Critical Coarse Sediment Yield Areas in the PDP design and maintain pathways for discharge of Bed Sediment Supply from these areas to receiving waters.

Step 1: Identify if the site is an actual verified Critical Coarse Sediment Yield Area supplying Bed Sediment Supply to the receiving channel

- ☐ **Step 1.A** – Is the Bed Sediment of onsite streams similar to that of receiving streams?

Rate the similarity: ☐ High
☐ Medium
☐ Low

Results from the geotechnical and sieve analysis to be performed both onsite and in the receiving channel should be documented in Appendix 7. Of particular interest, the results of the sieve

analysis, the soil erodibility factor, a description of the topographic relief of the project area, and the lithology of onsite soils should be reported in Appendix 7.

- ☐ **Step 1.B** – Are onsite streams capable of delivering Bed Sediment Supply from the site, if any, to the receiving channel?

Rate the potential: ☐ High
☐ Medium
☐ Low

Results from the analyses of the sediment delivery potential to the receiving channel should be documented in Appendix 7 and identify, at a minimum, the Sediment Source, the distance to the receiving channel, the onsite channel density, the project watershed area, the slope, length, land use, and rainfall intensity.

- ☐ **Step 1.C** – Will the receiving channel adversely respond to a change in Bed Sediment Load?

Rate the need for bed sediment supply:
☐ High
☐ Medium
☐ Low

Results from the in-stream analysis to be performed both onsite should be documented in Appendix 7. The analysis should, at a minimum, quantify the bank stability and the degree of incision, provide a gradation of the Bed Sediment within the receiving channel, and identify if the channel is sediment supply-limited.

- ☐ **Step 1.D** – Summary of Step 1

Summarize in Table E.3 the findings of Step 1 and associate a score (in parenthesis) to each step. The sum of the three individual scores determines if a stream is a significant contributor to the receiving stream.

- Sum is equal to or greater than eight - Site is a significant source of sediment bed material – all on-site streams must be preserved or by-passed within the site plan. The applicant shall proceed to Step 2 for all onsite streams.
- Sum is greater than five but lower than eight. Site is a source of sediment bed material – some of the on-site streams must be preserved (with identified streams noted). The applicant shall proceed to Step 2 for the identified streams only.
- Sum is equal to or lower than five. Site is not a significant source of sediment bed material. The applicant may advance to Section F.

Table E-2 Triad Assessment Summary

Step	Rating			Total Score
1.A	☐ High (3)	☐ Medium (2)	☐ Low (1)	
1.B	☐ High (3)	☐ Medium (2)	☐ Low (1)	
1.C	☐ High (3)	☐ Medium (2)	☐ Low (1)	
Significant Source Rating of Bed Sediment to the receiving channel(s)				

Step 2: Avoid Development of Critical Coarse Sediment Yield Areas, Potential Sediment Sources Areas, and Preserve Pathways for Transport of Bed Sediment Supply to Receiving Waters

Onsite streams identified as a actual verified Critical Coarse Sediment Yield Areas should be avoided in the site design and transport pathways for Critical Coarse Sediment should be preserved

Check those that apply:

☐ The site design does avoid all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas

AND

☐ The drainage design bypasses flow and sediment from onsite upstream drainages identified as actual verified Critical Coarse Sediment Yield Areas to maintain Critical Coarse Sediment supply to receiving waters

(If both are yes, the applicant may disregard subsequent steps of Section E.3 and directly advance directly to Section G).

- Or -

☐ The site design **does NOT avoid** all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas

OR

☐ The project impacts transport pathways of Critical Coarse Sediment from onsite upstream drainages.

(If either of these are the case, the applicant may proceed with the subsequent steps of Section E.3).

Provide in Appendix 7 a site map that identifies all onsite channels and highlights those onsite channels that were identified as a Significant Source of Bed Sediment. The site map shall demonstrate, if feasible, that the site design avoids those onsite channels identified as a Significant Source of Bed Sediment. In addition, the applicant shall describe the characteristics of each onsite channel identified as a Significant Source of Bed Sediment. If the design plan cannot avoid the onsite channels, please provide a rationale for each channel individually.

The site map shall demonstrate that the drainage design bypasses those onsite channels that supply Critical Coarse Sediment to the receiving channel(s). In addition, the applicant shall describe the characteristics of each onsite channel identified as an actual verified Critical Coarse Sediment Yield Area.

Identified Channel #1 - Insert narrative description here

Identified Channel #2 - Insert narrative description here

Identified Channel #3 - Insert narrative description here

E.3.3 Sediment Supply BMPs to Result in No Net Impact to Downstream Receiving Waters

If impacts to Critical Coarse Sediment Yield Areas cannot be avoided, sediment supply BMPs must be implemented such there is no net impact to receiving waters. Sediment supply BMPs may consist of approaches that permit flux of bed sediment supply from Critical Coarse Sediment Yield Areas within the project boundary. This approach is subject to acceptance by the [Insert Jurisdiction]. It may require extensive documentation and analysis by qualified professionals to support this demonstration.

Appendix H of the San Diego Model BMP Design Manual provides additional information on site-specific investigation of Critical Coarse Sediment Supply areas.

<http://www.projectcleanwater.org/download/2018-model-bmp-design-manual/>

If applicable, insert narrative description here

Documentation of sediment supply BMPs should be detailed in Appendix 7.

Section F: Alternative Compliance

Alternative Compliance may be used to achieve compliance with pollutant control and/or hydromodification requirements for a given PDP. Alternative Compliance may be used under two scenarios, check the applicable box if the PDP is proposing to use Alternative Compliance to satisfy all or a portion of the Pollutant Control and/or Hydrologic Control requirements (but not sediment supply requirements)

- ☐ If it is not feasible to fully implement Infiltration or Biofiltration BMPs at a PDP site, Flow-Through Treatment Control BMPs may be used to treat pollutants contained in the portion of DCV not reliably retained on site and Alternative Compliance measures must also be implemented to mitigate for those pollutants in the DCV that are not retained or removed on site prior to discharging to a receiving water.
- ☐ Alternative Compliance is selected to comply with either pollutant control or hydromodification flow control requirements even if complying with these requirements is potentially feasible on-site. If such voluntary Alternative Compliance is implemented, Flow-Through Treatment Control BMPs must still be used to treat those pollutants in the portion of the DCV not reliably retained on site prior to discharging to a receiving water.

Refer to Section 2.7 of the SMR WQMP and consult the City for currently available Alternative Compliance pathways. Coordinate with the Copermittee if electing to participate in Alternative Compliance and complete the sections below to document implementation of the Flow-Through BMP component of the program.

F.1 Identify Pollutants of Concern

The purpose of this section is to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs and to document compliance and.

Utilize Table A-1 from Section A, which noted your project's Receiving Waters, to identify impairments for Receiving Waters (including downstream receiving waters) by completing Table F-1. Table F-1 includes the watersheds identified as impaired in the Approved 2010 303(d) list; check box corresponding with the PDP's receiving water. The most recent 303(d) lists are available from the State Water Resources Control Board website:

https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml).https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

Table F-1 Summary of Approved 2010 303(d) listed waterbodies and associated pollutants of concern for the Riverside County SMR Region and downstream waterbodies.

Water Body		Nutrients ¹	Metals ²	Toxicity	Bacteria and Pathogens	Pesticides and Herbicides	Sulfate	Total Dissolved Solids
☐	De Luz Creek	X	X				X	
☐	Long Canyon Creek		X		X	X		
☒	Murrieta Creek	X	X	X		X		
☐	Redhawk Channel	X	X		X	X		X
☐	Santa Gertudis Creek	X	X		X	X		
☐	Santa Margarita Estuary	X						
☐	Santa Margarita River (Lower)	X			X			
☒	Santa Margarita River (Upper)	X		X				
☒	Temecula Creek	X	X	X		X		X
☐	Warm Springs Creek	X	X		X	X		

¹ Nutrients include nitrogen, phosphorus and eutrophic conditions caused by excess nutrients.

² Metals includes copper, iron, and manganese.

Use Table F-2 to identify the pollutants identified with the project site. Indicate the applicable PDP Categories and/or Project Features by checking the boxes that apply. If the identified General Pollutant Categories are the same as those listed for your Receiving Waters, then these will be your Pollutants of Concern; check the appropriate box or boxes in the last row.

Table F-2 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)		General Pollutant Categories									
		Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease	Total Dissolved Solids	Sulfate
☐	Detached Residential Development	P	N	P	P	N	P	P	P	N	N
☐	Attached Residential Development	P	N	P	P	N	P	P	P ⁽²⁾	N	N
☒	Commercial/Industrial Development	P ⁽³⁾	P ⁽⁷⁾	P ⁽¹⁾	P ⁽¹⁾	P	P ⁽¹⁾	P	P	N	N
☐	Automotive Repair Shops	N	P	N	N	P ^(4, 5)	N	P	P	N	N
☐	Restaurants (>5,000 ft ²)	P	N	N	P ⁽¹⁾	N	N	P	P	N	N
☐	Hillside Development (>5,000 ft ²)	P	N	P	P	N	P	P	P	N	N
☐	Parking Lots (>5,000 ft ²)	P ⁽⁶⁾	P ⁽⁷⁾	P ⁽¹⁾	P ⁽¹⁾	P ⁽⁴⁾	P	P	P	N	N
☐	Streets, Highways, and Freeways	P ⁽⁶⁾	P ⁽⁷⁾	P ⁽¹⁾	P ⁽¹⁾	P ⁽⁴⁾	P	P	P	N	N
☐	Retail Gasoline Outlets	N	P ⁽⁷⁾	N	N	P ⁽⁴⁾	N	P	P	N	N
Project Priority Pollutant(s) of Concern		☐	☐	☐	☐	☒	☐	☒	☐	☐	☐

P = Potential

N = Not Potential

⁽¹⁾ A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

⁽²⁾ A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

⁽³⁾ A potential Pollutant is land use involving animal waste products; otherwise not expected

⁽⁴⁾ Including petroleum hydrocarbons

⁽⁵⁾ Including solvents

⁽⁶⁾ Bacterial indicators are routinely detected in pavement runoff

⁽⁷⁾ A potential source of metals, primarily copper and zinc. Iron, magnesium, and aluminum are commonly found in the environment and are commonly associated with soils, but are not primarily of anthropogenic stormwater origin in the municipal environment.

F.2 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential Pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must be selected to address the Project Priority Pollutants of Concern (identified above) and meet the acceptance criteria described in Section 2.3.7 of the SMR WQMP. Documentation of acceptance criteria must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table F-3 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID ¹	Priority Pollutant(s) of Concern to Mitigate ²	Removal Efficiency Percentage ³

¹ Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

² Cross Reference Table E.1 above to populate this column.

³ As documented in a Copermittee Approved Study and provided in Appendix 6.

F.3 Sizing Criteria

Utilize Table F-4 below to appropriately size flow-through BMPs to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.1 of the SMR WQMP for further information.

Table F-4 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I _f	DMA Runoff Factor	DMA Areas x Runoff Factor	Enter BMP Name / Identifier Here	
	[A]		[B]	[C]	[A] x [C]		
						Design Storm (in)	Design Flow Rate (cfs)
	A _T = Σ[A]				Σ= [D]	[E]	[F] = $\frac{[D] \times [E]}{[G]}$

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP

[E] either 0.2 inches or 2 times the 85th percentile hourly rainfall intensity

[G] = 43,560,.

F.4 Hydrologic Performance Standard – Alternative Compliance Approach

Alternative compliance options are only available if the governing Copermittee has acknowledged the infeasibility of onsite Hydrologic Control BMPs and approved an alternative compliance approach. See Section 3.5 and 3.6 of the SMR WQMP.

Select the pursued alternative and describe the specifics of the alternative:

- ☐ Offsite Hydrologic Control Management within the same channel system

Insert narrative description here

- ☐ In-Stream Restoration Project

Insert narrative description here

For Offsite Hydrologic Control BMP Option

Each Hydrologic Control BMP must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA by more than ten percent over a one-year period. Using SMRHM, the applicant shall demonstrate that the performance of each designed Hydrologic Control BMP is equivalent with the Hydrologic Performance Standard for onsite conditions. Complete Table F-5 below and identify, for each Hydrologic Control BMP, the equivalent DMA the Hydrologic Control BMP mitigates, that the SMRHM model passed, the total volume capacity of the BMP, the BMP footprint at top floor elevation, and the drawdown time of the BMP. SMRHM summary reports for the alternative approach should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table F-5 Offsite Hydrologic Control BMP Sizing

BMP Name / Type	Equivalent DMA (ac)	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
		☐			
		☐			
		☐			
		☐			

For Instream Restoration Option

Attach to Appendix 7 the technical report detailing the condition of the receiving channel subject to the proposed hydrologic and sediment regimes. Provide the full design plans for the in-stream restoration project that have been approved by the Copermittee. Utilize the San Diego Regional Water Quality Equivalency Guidance Document.

Section G: Implement Trash Capture BMPs

The City may require full trash capture BMPs to be installed as part of the project. Consult with the City to determine applicability.

Trash Capture BMPs may be applicable to Type 'D' DMAs, as defined in Section 2.3.4 of the SMR WQMP. Trash Capture BMPs are designed to treat Q_{TRASH} , the runoff flow rate generated during the 1-year 1-hour precipitation depth. Utilize Table G-1 to size Trash Capture BMP. Refer to Table G-2 to determine the Trash Capture Design Storm Intensity (E).

Table G-1 Sizing Trash Capture BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Enter BMP Name / Identifier Here	
	[A]		[B]	[C]	[A] x [C]		
	$\Lambda_T = \Sigma[A]$				$\Sigma = [D]$		
						Trash Capture Design Storm Intensity (in)	Trash Capture Design Flow Rate (cubic feet or cfs)
						[E]	$[F] = \frac{[D] \times [E]}{[G]}$

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP
[G] = 43,560

Table G-2 Approximate precipitation depth/intensity values for calculation of the Trash Capture Design Storm

City	1-year 1-hour Precipitation Depth/Intensity (inches/hr)
Murrieta	0.47
Temecula	0.50
Wildomar	0.37

Use Table G-3 to summarize and document the selection and sizing of Trash Capture BMPs.

Table G-3 Trash Capture BMPs

BMP Name / ID	DMA No(s)	BMP Type / Description	Required Trash Capture Flowrate (cfs)	Provided Trash Capture Flowrate (cfs)

Section H: Source Control BMPs

Source Control BMPs include permanent, structural features that may be required in your Project plans, such as roofs over and berms around trash and recycling areas, and Operational BMPs, such as regular sweeping and “housekeeping,” that must be implemented by the site’s occupant or user. The Maximum Extent Practicable (MEP) standard typically requires both types of BMPs. In general, Operational Source Control BMPs cannot be substituted for a feasible and effective Structural Source Control BMP. Complete checklist below to determine applicable Source Control BMPs for your site.

Project-Specific WQMP Source Control BMP Checklist		
All development projects must implement Source Control BMPs. Source Control BMPs are used to minimize pollutants that may discharge to the MS4. Refer to Chapter 3 (Section 3.8) of the SMR WQMP for additional information. Complete Steps 1 and 2 below to identify Source Control BMPs for the project site.		
STEP 1: IDENTIFY POLLUTANT SOURCES		
Review project site plans and identify the applicable pollutant sources. “Yes” indicates that the pollutant source is applicable to project site. “No” indicates that the pollutant source is not applicable to project site.		
☒ Yes ☐ No Storm Drain Inlets ☐ Yes ☒ No Floor Drains ☐ Yes ☒ No Sump Pumps ☐ Yes ☒ No Pets Control/Herbicide Application ☐ Yes ☒ No Food Service Areas ☐ Yes ☒ No Trash Storage Areas ☐ Yes ☒ No Industrial Processes ☐ Yes ☒ No Vehicle and Equipment Cleaning and Maintenance/Repair Areas	☐ Yes ☒ No Outdoor storage areas ☐ Yes ☒ No Material storage areas ☐ Yes ☒ No Fueling areas ☐ Yes ☒ No Loading Docks ☐ Yes ☒ No Fire Sprinkler Test/Maintenance water ☐ Yes ☒ No Plazas, Sidewalks and Parking Lots ☐ Yes ☒ No Pools, Spas, Fountains and other water features	
STEP 2: REQUIRED SOURCE CONTROL BMPs		
List each Pollutant source identified above in column 1 and fill in the corresponding Structural Source Control BMPs and Operational Control BMPs by referring to the Stormwater Pollutant Sources/Source Control Checklist included in Appendix 8. The resulting list of structural and operational source control BMPs must be implemented as long as the associated sources are present on the project site. Add additional rows as needed.		
Pollutant Source	Structural Source Control BMP	Operational Source Control BMP
Storm Drain Inlet	Mark inlets with “Only Rain Down the Storm Drain” or similar.	Drainage System Maintenance per CASQA SC-44
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here

Section I: Coordinate Submittal with Other Site Plans

Populate Table I-1 below to assist the plan checker in an expeditious review of your project. During construction and at completion, City inspectors will verify the installation of BMPs against the approved plans. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table I-1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here
Insert text here	Insert text here	Insert text here

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. The Copermittee with jurisdiction over the Project site can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Use Table I-2 to identify other applicable permits that may impact design of the site. If yes is answered to any of the items below, the Copermittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Table I-2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	☒ N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other (please list in the space below as required)	☐ Y	☒ N

Section J: Operation, Maintenance and Funding

The Copermittee with jurisdiction over the Project site will periodically verify that BMPs on your Project are maintained and continue to operate as designed. To make this possible, the Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement maintenance of BMPs in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized Operations and Maintenance or inspections but will require typical landscape maintenance as noted in Chapter 5, in the SMR WQMP. Include a brief description of typical landscape maintenance for these areas.

The Copermittee with jurisdiction over the Project site will also require that you prepare and submit a detailed BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a BMP Operation and Maintenance Plan are in Chapter 5 of the SMR WQMP.

Maintenance Mechanism: SunGrid Solutions, Inc.

Will the proposed BMPs be maintained by a Homeowners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Section K: Acronyms, Abbreviations and Definitions

Regional MS4 Permit	Order No. R9-2013-0001 as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100 an NPDES Permit issued by the San Diego Regional Water Quality Control Board.
Applicant	Public or private entity seeking the discretionary approval of new or replaced improvements from the Copermittee with jurisdiction over the project site. The Applicant has overall responsibility for the implementation and the approval of a Priority Development Project. The WQMP uses consistently the term “user” to refer to the applicant such as developer or project proponent. The WQMP employs also the designation “user” to identify the Registered Professional Civil Engineer responsible for submitting the Project-Specific WQMP, and designing the required BMPs.
Best Management Practice (BMP)	Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal storm water permits, BMPs are typically used in place of numeric effluent limits.
BMP Fact Sheets	BMP Fact Sheets are available in the LID BMP Design Handbook. Individual BMP Fact Sheets include siting considerations, and design and sizing guidelines for seven types of structural BMPs (infiltration basin, infiltration trench, permeable pavement, harvest-and-use, bioretention, extended detention basin, and sand filter).
California Stormwater Quality Association (CASQA)	Publisher of the California Stormwater Best Management Practices Handbooks, available at www.cabmphandbooks.com .
Conventional Treatment Control BMP	A type of BMP that provides treatment of storm water runoff. Conventional treatment control BMPs, while designed to treat particular Pollutants, typically do not provide the same level of volume reduction as LID BMPs, and commonly require more specialized maintenance than LID BMPs. As such, the Regional MS4 Permit and this WQMP require the use of LID BMPs wherever feasible, before Conventional Treatment BMPs can be considered or implemented.
Copermittees	The Regional MS4 Permit identifies the Cities of Murrieta, Temecula, and Wildomar, the County, and the District, as Copermittees for the SMR.
County	The abbreviation refers to the County of Riverside in this document.

CEQA	California Environmental Quality Act - a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.
CIMIS	California Irrigation Management Information System - an integrated network of 118 automated active weather stations all over California managed by the California Department of Water Resources.
CWA	Clean Water Act - is the primary federal law governing water pollution. Passed in 1972, the CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution by 1985, and ensuring that surface waters would meet standards necessary for human sports and recreation by 1983. CWA Section 402(p) is the federal statute requiring NPDES permits for discharges from MS4s.
CWA Section 303(d) Waterbody	Impaired water in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of urban runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.
Design Storm	The Regional MS4 Permit has established the 85th percentile, 24-hour storm event as the "Design Storm". The applicant may refer to Exhibit A to identify the applicable Design Storm Depth (D85) to the project.
DCV	Design Capture Volume (DCV) is the volume of runoff produced from the Design Storm to be mitigated through LID Retention BMPs, Other LID BMPs and Volume Based Conventional Treatment BMPs, as appropriate.
Design Flow Rate	The design flow rate represents the minimum flow rate capacity that flow-based conventional treatment control BMPs should treat to the MEP, when considered.
DCIA	Directly Connected Impervious Areas - those impervious areas that are hydraulically connected to the MS4 (i.e. street curbs, catch basins, storm drains, etc.) and thence to the structural BMP without flowing over pervious areas.
Discretionary Approval	A decision in which a Copermittee uses its judgment in deciding whether and how to carry out or approve a project.
District	Riverside County Flood Control and Water Conservation District.
DMA	A Drainage Management Area - a delineated portion of a project site that is hydraulically connected to a common structural BMP or conveyance point. The Applicant may refer to Section 3.3 for further guidelines on how to delineate DMAs.

Drawdown Time	Refers to the amount of time the design volume takes to pass through the BMP. The specified or incorporated drawdown times are to ensure that adequate contact or detention time has occurred for treatment, while not creating vector or other nuisance issues. It is important to abide by the drawdown time requirements stated in the fact sheet for each specific BMP.
Effective Area	Area which 1) is suitable for a BMP (for example, if infiltration is potentially feasible for the site based on infeasibility criteria, infiltration must be allowed over this area) and 2) receives runoff from impervious areas.
ESA	An Environmental Sensitive Area (ESA) designates an area "in which plants or animals life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments". (Reference: California Public Resources Code § 30107.5).
ET	Evapotranspiration (ET) is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is also an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity
FAR	The Floor Area Ratio (FAR) is the total square feet of a building divided by the total square feet of the lot the building is located on.
Flow-Based BMP	Flow-based BMPs are conventional treatment control BMPs that are sized to treat the design flow rate.
FPPP	Facility Pollution Prevention Plan
HCOC	Hydrologic Condition of Concern - Exists when the alteration of a site's hydrologic regime caused by development would cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects.
HMP	Hydromodification Management Plan - Plan defining Performance Standards for PDPs to manage increases in runoff discharge rates and durations.
Hydrologic Control BMP	BMP to mitigate the increases in runoff discharge rates and durations and meet the Performance Standards set forth in the HMP.
HSG	Hydrologic Soil Groups - soil classification to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSGs are A (very low runoff potential/high infiltration rate), B, C, and D (high runoff potential/very low infiltration rate)

Hydromodification	The Regional MS4 Permit identifies that increased volume, velocity, frequency and discharge duration of storm water runoff from developed areas has the potential to greatly accelerate downstream erosion, impair stream habitat in natural drainages, and negatively impact beneficial uses.
JRMP	A separate Jurisdictional Runoff Management Plan (JRMP) has been developed by each Copermittee and identifies the local programs and activities that the Copermittee is implementing to meet the Regional MS4 Permit requirements.
LID	Low Impact Development (LID) is a site design strategy with a goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques. LID site design BMPs help preserve and restore the natural hydrologic cycle of the site, allowing for filtration and infiltration which can greatly reduce the volume, peak flow rate, velocity, and pollutant loads of storm water runoff.
LID BMP	A type of storm water BMP that is based upon Low Impact Development concepts. LID BMPs not only provide highly effective treatment of storm water runoff, but also yield potentially significant reductions in runoff volume – helping to mimic the pre-project hydrologic regime, and also require less ongoing maintenance than Treatment Control BMPs. The applicant may refer to Chapter 2.
LID BMP Design Handbook	The LID BMP Design Handbook was developed by the Copermittees to provide guidance for the planning, design and maintenance of LID BMPs which may be used to mitigate the water quality impacts of PDPs within the County.
LID Bioretention BMP	LID Bioretention BMPs are bioretention areas are vegetated (i.e., landscaped) shallow depressions that provide storage, infiltration, and evapotranspiration, and provide for pollutant removal (e.g., filtration, adsorption, nutrient uptake) by filtering storm water through the vegetation and soils. In bioretention areas, pore spaces and organic material in the soils help to retain water in the form of soil moisture and to promote the adsorption of pollutants (e.g., dissolved metals and petroleum hydrocarbons) into the soil matrix. Plants use soil moisture and promote the drying of the soil through transpiration. The Regional MS4 Permit defines “retain” as to keep or hold in a particular place, condition, or position without discharge to surface waters.
LID Biofiltration BMP	BMPs that reduce stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration, and other biological and chemical processes. As storm water passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and plants, and collected through an underdrain.

LID Harvest and Reuse BMP	BMPs used to facilitate capturing storm water runoff for later use without negatively impacting downstream water rights or other Beneficial Uses.
LID Infiltration BMP	BMPs to reduce storm water runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Typical LID Infiltration BMPs include infiltration basins, infiltration trenches and pervious pavements.
LID Retention BMP	BMPs to ensure full onsite retention without runoff of the DCV such as infiltration basins, bioretention, chambers, trenches, permeable pavement and pavers, harvest and reuse.
LID Principles	Site design concepts that prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
MEP	Maximum Extent Practicable - standard established by the 1987 amendments to the Clean Water Act (CWA) for the reduction of Pollutant discharges from MS4s. Refer to Attachment C of the Regional MS4 Permit for a complete definition of MEP.
MF	Multi-family - zoning classification for parcels having 2 or more living residential units.
MS4	Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.
New Development Project	Defined by the Regional MS4 Permit as 'Priority Development Projects' if the project, or a component of the project meets the categories and thresholds described in Section 1.1.1.
NPDES	National Pollution Discharge Elimination System - Federal program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.
NRCS	Natural Resources Conservation Service

PDP	Priority Development Project - Includes New Development and Redevelopment project categories listed in Provision E.3.b of the Regional MS4 Permit.
Priority Pollutants of Concern	Pollutants expected to be present on the project site and for which a downstream water body is also listed as Impaired under the CWA Section 303(d) list or by a TMDL.
Project-Specific WQMP	A plan specifying and documenting permanent LID Principles and storm water BMPs to control post-construction Pollutants and storm water runoff for the life of the PDP, and the plans for operation and maintenance of those BMPs for the life of the project.
Receiving Waters	Waters of the United States.
Redevelopment Project	The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair. Project that meets the criteria described in Section 1.
Runoff Fund	Runoff Funds have not been established by the Copermittees and are not available to the Applicant. If established, a Runoff Fund will develop regional mitigation projects where PDPs will be able to buy mitigation credits if it is determined that implementing onsite controls is infeasible.
San Diego Regional Board	San Diego Regional Water Quality Control Board - The term "Regional Board", as defined in Water Code section 13050(b), is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200. State agency responsible for managing and regulating water quality in the SMR.
SCCWRP	Southern California Coastal Water Research Project
Site Design BMP	Site design BMPs prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
SF	Parcels with a zoning classification for a single residential unit.
SMC	Southern California Stormwater Monitoring Coalition
SMR	The Santa Margarita Region (SMR) represents the portion of the Santa Margarita Watershed that is included within the County of Riverside.

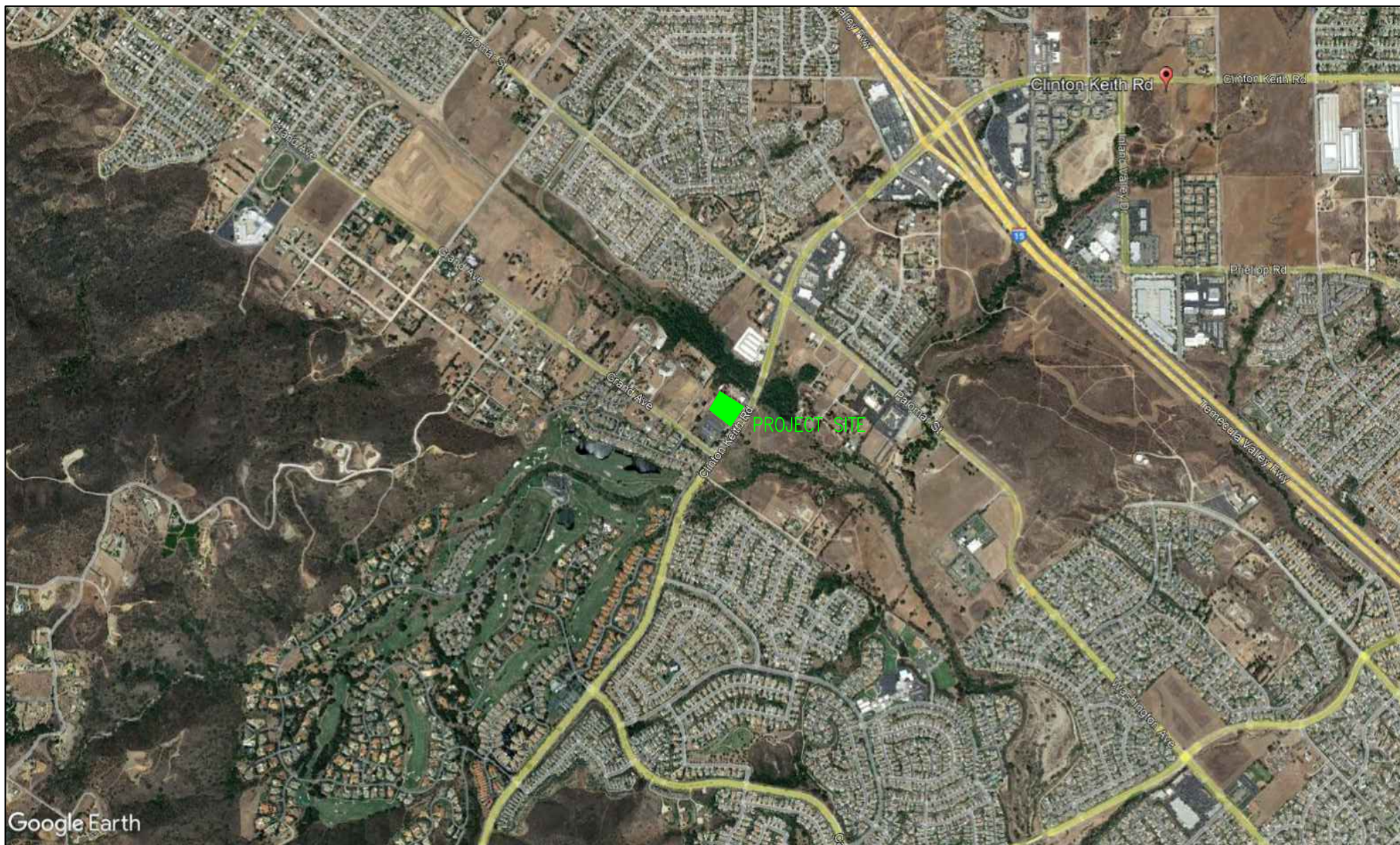
Source Control BMP	Source Control BMPs land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between Pollutants and runoff.
Structural BMP	Structures designed to remove pollutants from stormwater runoff and mitigate hydromodification impacts.
SWPPP	Storm Water Pollution Prevention Plan
Tentative Tract Map	Tentative Tract Maps are required for all subdivision creating five (5) or more parcels, five (5) or more condominiums as defined in Section 783 of the California Civil Code, a community apartment project containing five (5) or more parcels, or for the conversion of a dwelling to a stock cooperative containing five (5) or more dwelling units.
TMDL	Total Maximum Daily Load - the maximum amount of a Pollutant that can be discharged into a waterbody from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.
USEPA	United States Environmental Protection Agency
Volume-Based BMP	Volume-Based BMPs applies to BMPs where the primary mode of pollutant removal depends upon the volumetric capacity such as detention, retention, and infiltration systems.
WQMP	Water Quality Management Plan
Wet Season	The Regional MS4 Permit defines the wet season from October 1 through April 30.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

Complete the checklist below to verify all exhibits and components are included in the Project-Specific WQMP. Refer Section 4 of the SMR WQMP and Section D of this Template.

Map and Site Plan Checklist	
Indicate all Maps and Site Plans are included in your Project-Specific WQMP by checking the boxes below.	
☒	Vicinity and Location Map
☒	Existing Site Map (unless exiting conditions are included in WQMP Site Plan)
☒	WQMP Site Plan
☒	Parcel Boundary and Project Footprint
☒	Existing and Proposed Topography
☒	Drainage Management Areas (DMAs)
☒	Proposed Structural Best Management Practices (BMPs)
☒	Drainage Paths
☒	Drainage infrastructure, inlets, overflows
☒	Source Control BMPs
☒	Site Design BMPs
☐	Buildings, Roof Lines, Downspouts
☒	Impervious Surfaces
☒	Pervious Surfaces (i.e. Landscaping)
☒	Standard Labeling



Google Earth



Project: CHIQUITO BESS, WILDOMAR, CA

Description: VICINITY MAP



Stantec

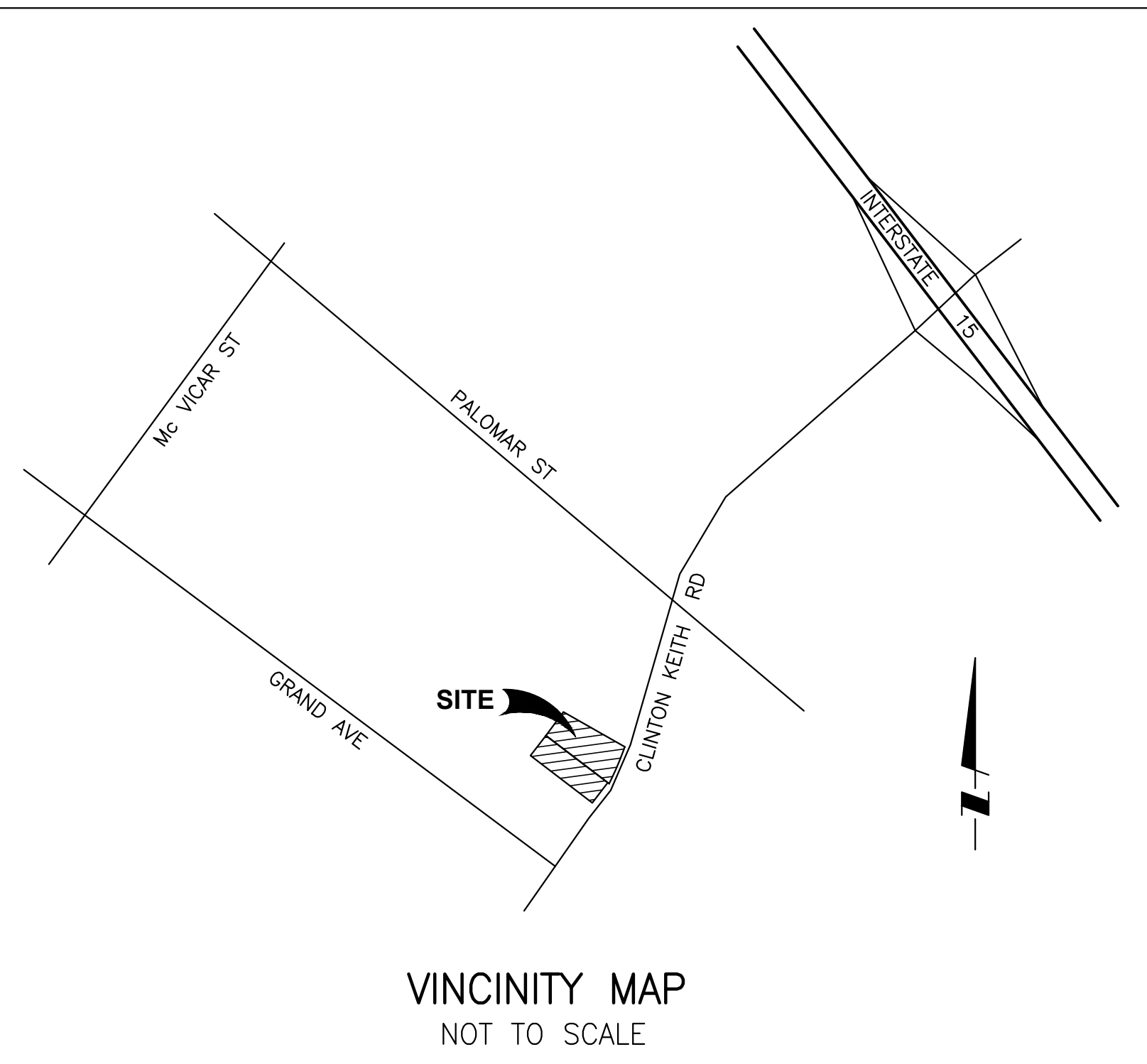
38 TECHNOLOGY DRIVE, SUITE 100
IRVINE, CA 92618
949.923.6000 stantec.com

Job No.: 185805178

Date: 02/18/2022



Project: CHIQUITO BESS, WILDOMAR, CA	
Description: EXISTING CONDITIONS EXHIBIT	
 Stantec 38 TECHNOLOGY DRIVE, SUITE 100 IRVINE, CA 92618 949.923.6000 stantec.com	
Job No.: 185805178	Date: 02/23/2022



LEGEND

- NEW BLOCK WALL
- DRAINAGE MANAGEMENT AREA BOUNDARY
- DRAINAGE MANAGEMENT AREA FLOW LINE
- EXISTING PROPERTY LINE
- PROJECT LIMITS
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED CENTERLINE
- PROPOSED GRADE BREAK
- PROPOSED FENCE
- DRAINAGE DIRECTION
- PROPOSED STORM DRAIN
- GRAVEL ACCESS ROAD (20,860 S.F.)
- LANDSCAPE (9,850 S.F.)
- ELECTRICAL EQUIPMENT CONCRETE PADS (26,420 S.F.)
- GRAVEL OVER NATIVE GROUND (69,720 S.F.)
- PROPOSED CONCRETE CATCH BASIN

STRUCTURAL BMP LEGEND

- BIORETENTION BASIN (3,660 S.F. COMBINED)

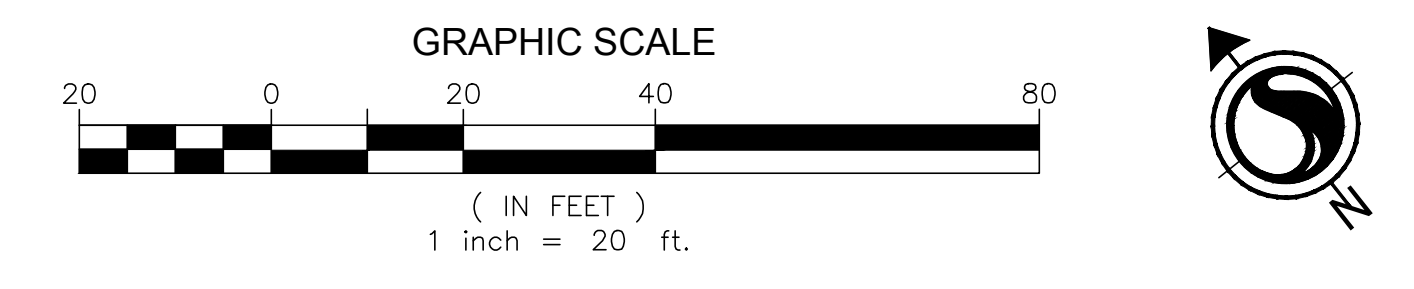
SOURCE CONTROL BMP LEGEND

- 1 STORM DRAIN INLET STENCILING PER CASQA* SD-13
*CALIFORNIA STORMWATER QUALITY ASSOCIATION

OPERATIONAL BMP LEGEND

- 2 REPLACE MULCH LAYER IN BASINS ANNUALLY PRIOR TO RAINY SEASON

PERVIOUS AREA: 104,090 S.F.
IMPERVIOUS AREA: 26,420 S.F.
PROJECT AREA: 130,510 S.F.



PREPARED BY: 38 TECHNOLOGY DRIVE, SUITE 100 IRVINE, CA 92618 949.923.6000 stantec.com DALE A. WATSON R.C.E. 59808 (EXP.12/31/22)	BUILDER: CHIQUITO GRID, LLC. 621 W. RANDOLPH STREET CHICAGO, IL 60661	CHIQUITO BATTERY ENERGY STORAGE SYSTEM CITY OF WILDOMAR CA	PLAN CHECK NO. _____
		CONCEPTUAL WQMP SITE PLAN	PERMIT NO. _____
		DATE: JULY 7, 2023	SHEET <u>1</u> OF <u>1</u>

JOB NO. 185805178

Appendix 2: Construction Plans

Grading and Drainage Plans

Examples of material to provide in Appendix 2 may include but are not limited to the following:

- Site grading plans from the Project's Civil Plan Set,
- Drainage plans showing the exiting condition and proposed drainage system from the project's drainage report,
- Other plan sheets containing elements that impact site grading and drainage.

Refer to Section 4 of the SMR WQMP and Section I of this Template.

VICINITY MAP
NOT TO SCALE

Mc VICAR ST

PALOMAR ST

GRAND AVE

CLINTON KEITH RD

INTERSTATE 15

SITE

[illegible]

PROPERTY LINE
EASEMENT
1205
PROPOSED CONTOUR
EXISTING CONTOUR
NEW BLOCK WALL
NEW RETAINING BLOCK WALL
NEW FENCE
NEW ACCESS ROAD
DAYLIGHT LINE

ESTIMATED TOTAL CUT: 5,590 CU YD
ESTIMATED TOTAL FILL: 1,545 CU YD
ESTIMATED TOTAL EXPORT: 4,045 CU YD

- ① CONSTRUCT 24" WIDE ALL-WEATHER FIRE ACCESS ROAD
- ② CONSTRUCT 6-FT HIGH BLOCK WALL.
- ③ CONSTRUCT 6-FT HIGH RETAINING BLOCK WALL, 4'-0" MAX RETAINING HEIGHT.
- ④ CONSTRUCT 24" WIDE DRIVEWAY PER RIVERSIDE COUNTY COMMERCIAL DRIVEWAY STD. 207A
- ⑤ INSTALL 6" PERFORATED PVC UNDERDRAIN PIPE.
- ⑥ INSTALL 12" PVC.
- ⑦ INSTALL 15" RCP.
- ⑧ INSTALL 18" RCP.
- ⑨ CONSTRUCT JUNCTION STRUCTURE.
- ⑩ CONSTRUCT CURB INLET, W=3.5'.

19,600 SF
520 LF
830 LF
2 EA
140 LF
490 LF
25 LF
140 LF
1 EA
2 EA

PROJECT SITE IS IN C-1/C-P (GENERAL COMMERCIAL) ZONE.

- ① AN EASEMENT TO SOUTHERN CALIFORNIA EDISON COMPANY FOR ELECTRICAL SYSTEMS AND COMMUNICATION SYSTEMS RECORDED APRIL 12, 1991 AS INSTRUMENT NO. 120469 OF OFFICIAL RECORDS.
- ② AN EASEMENT TO THE COUNTY OF RIVERSIDE FOR PUBLIC ROAD AND DRAINAGE PURPOSES, INCLUDING PUBLIC UTILITY AND PUBLIC SERVICES PURPOSES RECORDED JUNE 22, 1998 AS INSTRUMENT NO. 253765 OF OFFICIAL RECORDS.
- ③ EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: COUNTY OF RIVERSIDE
PURPOSE: SLOPES
RECORDING DATE: JANUARY 22, 1970
RECORDING NO.: 6711, OFFICIAL RECORDS
AFFECTS: AS DESCRIBED THEREIN
- ④ EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: SOUTHERN CALIFORNIA EDISON COMPANY
PURPOSE: PUBLIC UTILITIES
RECORDING DATE: SEPTEMBER 23, 1992
RECORDING NO.: 358320, OFFICIAL RECORDS
AFFECTS: AS DESCRIBED THEREIN
LIMITATIONS ON THE USE, BY THE OWNERS OF SAID LAND, OF THE EASEMENT AREA AS SET FORTH IN THE EASEMENT DOCUMENT SHOWN HEREINAFTER.
REFERENCE IS HEREBY MADE TO SAID DOCUMENT FOR FULL PARTICULARS.
- ⑤ EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO, AS GRANTED IN A DOCUMENT:
GRANTED TO: COUNTY OF RIVERSIDE
PURPOSE: WIDENING CLINTON KEITH ROAD AND BRIDGE AT MURRIETA CREEK
RECORDING DATE: DECEMBER 9, 1998
RECORDING NO.: 535071, OFFICIAL RECORDS
AFFECTS: AS DESCRIBED THEREIN

DRAWN BY: _____ VSYI		DATE: _____ 6/15/23
DESIGNED BY: _____ VSYI		DATE: _____ 6/15/23
CHECKED BY: _____ DW		DATE: _____ 6/15/23

 **Stantec**
9665 GRANITE RIDGE DRIVE, SUITE 220
SAN DIEGO, CA 92123
stantec.com

CHIQUITO GRID, LLC.
621 W. RANDOLPH STREET
CHICAGO, IL 30661

CONTACT PERSON:
JAMES DAMON
JDamon@HecateEnergy.com

WILDOMAR, CA

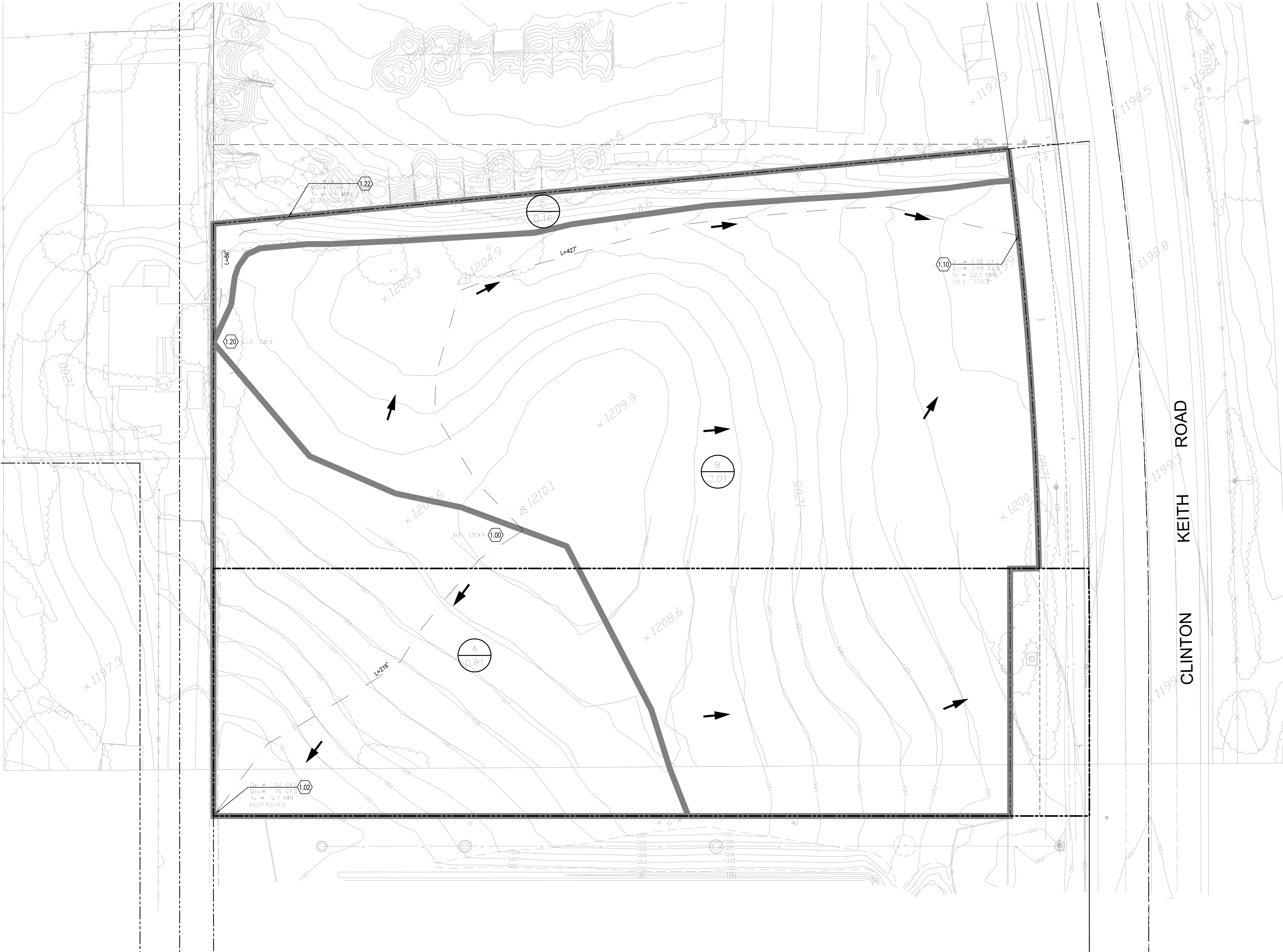
PLAN CHECK NO.

PROJECT NO.
22-0026-0138

SHEET 1 OF 1

JOB NO. 185805178

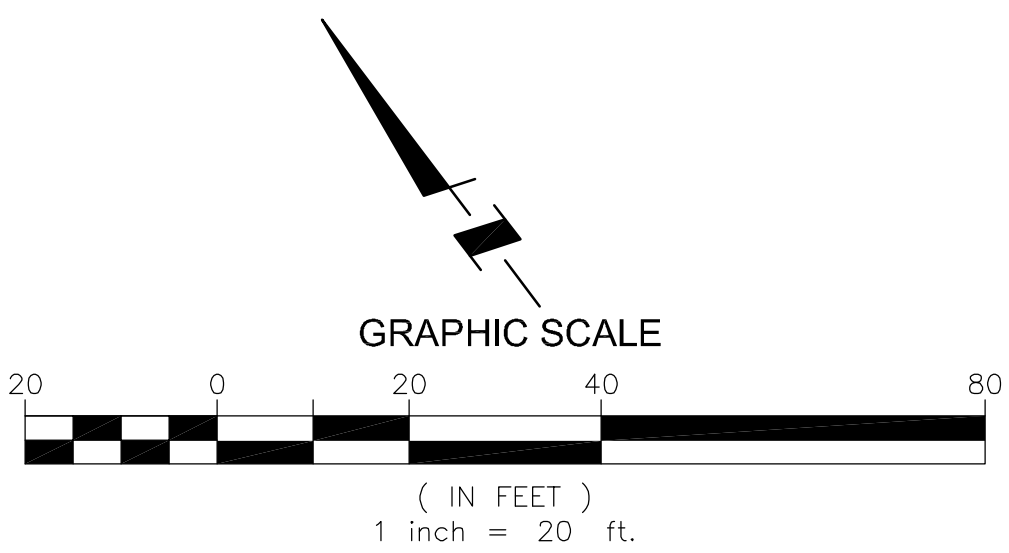
\\STANTEC\proj\155805178_battery\cadd\sheet\155805178_battery.dwg PLOTTER: F:\PLOTTERS\TCL.dwt PLOTTER: F:\PLOTTERS\TCL.dwt PLOTTER: F:\PLOTTERS\TCL.dwt



LEGEND

- HYDROLOGY BOUNDARY
- PROPERTY LINE
- TRAVEL PATH
- EXISTING CONTOUR LINE
- FLOW DIRECTION
- SUBAREA
- DRAINAGE AREA (ACRES)
- NODE
- 10-YEAR PEAK FLOW RATE
- TIME OF CONCENTRATION

- NOTES**
- AREAS ROUNDED TO NEAREST 0.01 ACRE
 - BASED ON THE RIVERSIDE COUNTY SOILS MAP (PLATE C-1.51), THE PROJECT SITE IS COMPOSED OF TYPE C SOIL.



PREPARED BY:

Stantec
38 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CA 92618
949.923.6000 stantec.com

PREPARED FOR:

CHIQUITO GRID, LLC
1455 CANYON BLVD., SUITE 218
BOULDER, CO 80502

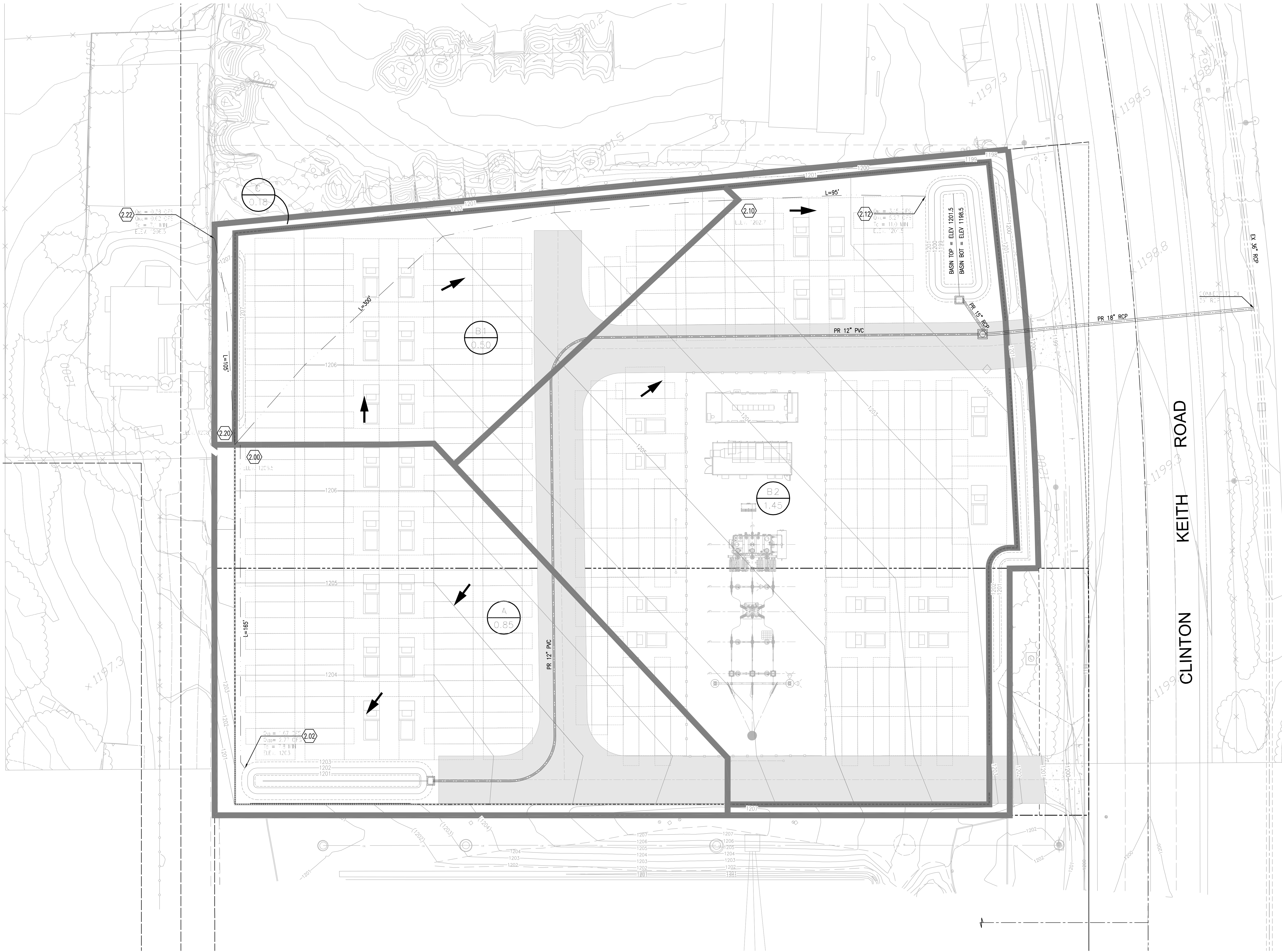
BATTERY ENERGY STORAGE SYSTEM FOR CHIQUITO

WILDOMAR, RIVERSIDE COUNTY, CA

HYDROLOGY MAP - EXISTING CONDITION

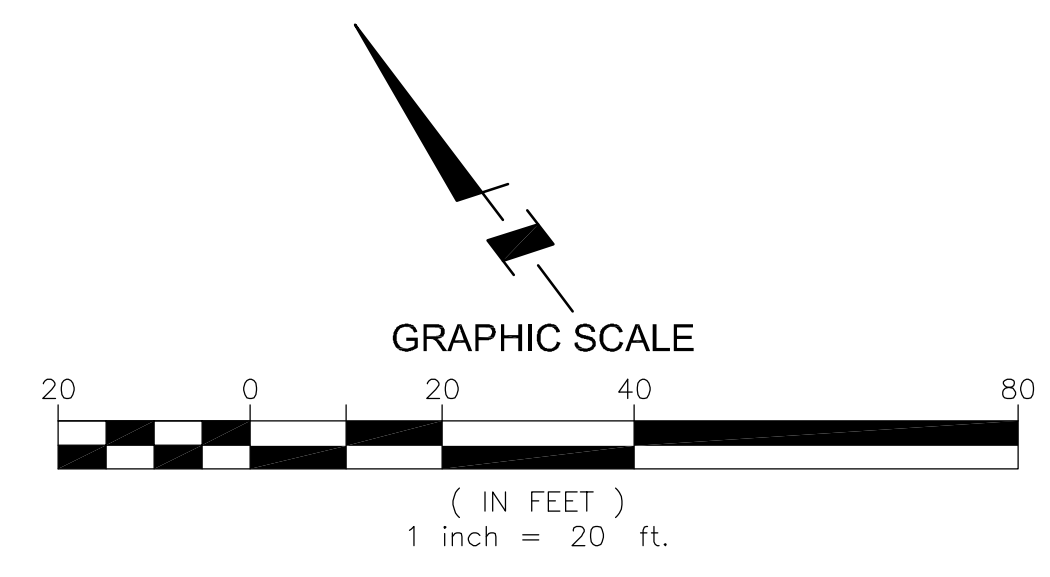
SHEET **1** OF **1**

JOB NO. 155805178



- LEGEND**
- HYDROLOGY BOUNDARY
 - PROPERTY LINE
 - TRAVEL PATH
 - EXISTING CONTOUR LINE
 - FLOW DIRECTION
 - SUBAREA
 - DRAINAGE AREA (ACRES)
 - NODE
 - 10-YEAR PEAK FLOW RATE
 - TIME OF CONCENTRATION

- NOTES**
- AREAS ROUNDED TO NEAREST 0.01 ACRE
 - BASED ON THE RIVERSIDE COUNTY SOILS MAP (PLATE C-1.51), THE PROJECT SITE IS COMPOSED OF TYPE C SOIL.



PREPARED BY: Stantec 38 TECHNOLOGY DRIVE, SUITE 200 IRVINE, CA 92618 949.923.6000 stantec.com	PREPARED FOR: CH-QUITO GRID, LLC 1435 CANYON BLVD, SUITE 218 BOULDER, CO 80502	BATTERY ENERGY STORAGE SYSTEM FOR CHIQUITO		WILDOMAR, RIVERSIDE COUNTY, CA	SHEET <u>1</u> OF <u>1</u>	JOB NO. 155805178
		HYDROLOGY MAP - DEVELOPED CONDITION				

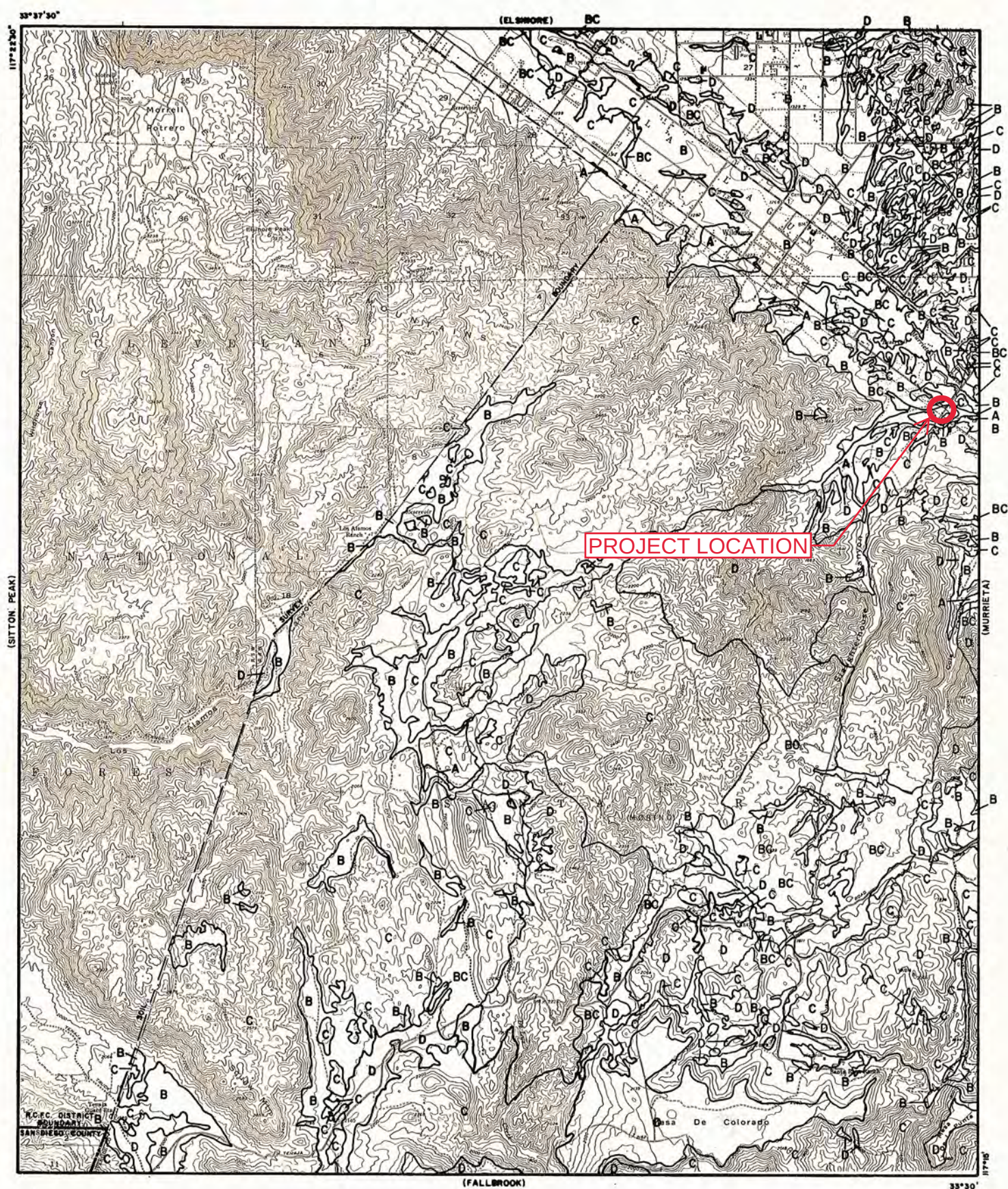
Appendix 3: Soils Information

Geotechnical Study, Other Infiltration Testing Data, and/or Other Documentation

Examples of material to provide in Appendix 3 may include but are not limited to the following:

- Geotechnical Study/Report prepared for the project,
- Additional soils testing data (if not included in the Geotechnical Study),
- Exhibits/Maps/Other Documentation of the Hydrologic Soils Groups (HSG)s at the project site.

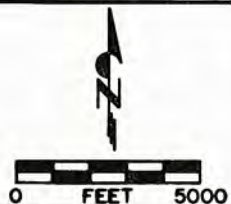
This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections A and D of this Template.



LEGEND

- SOILS GROUP BOUNDARY
- A SOILS GROUP DESIGNATION

RCFC&WCD
HYDROLOGY MANUAL



**HYDROLOGIC SOILS GROUP MAP
FOR
WILDOMAR**

**Proposed Chiquito BESS
Geotechnical Investigation
Report**



Prepared for:
Hecate Grid LLC
621 W. Randolph Street
Chicago, IL 60661

Prepared by:
Stantec Consulting Services Inc.
735 East Carnegie Drive, Suite
280
San Bernardino, CA 92408

Project No. 185805178

November 15, 2021



Stantec Consulting Services Inc.
735 East Carnegie Drive, Suite 280
San Bernardino, California 92408

November 15, 2021

Mr. Gabriel Wapner
Hecate Grid LLC
621 Randolph Street
Chicago, Illinois 60661

RE: **GEOTECHNICAL INVESTIGATION REPORT**
Chiquito Battery Energy Storage System Project
Near NEC of Clinton Keith Road and Grand Avenue
Wildomar, Riverside County, California

Dear Mr. Wapner:

This letter transmits Stantec Consulting Services Inc.'s (Stantec's) geotechnical investigation report for the 3.0 (+/-) acre site for a proposed battery energy storage system (BESS) development located near the northeast corner of Clinton Keith Road and Grand Avenue, in Wildomar, Riverside County, California. The purpose of this report is to evaluate the subsurface conditions and provide geotechnical recommendations for design and construction of the proposed development.

We appreciate the opportunity to work with you on this project. If you have any questions, please call us at the numbers below.

Respectfully submitted,

STANTEC CONSULTING SERVICES INC.

Jaret Fischer, PE
Principal Engineer
Phone: (909) 335-6116 ext. 8209
Jaret.Fischer@stantec.com

Evan Hsiao, PE, GE
Principal, Senior Geotechnical Engineer
Phone: (949) 923-6000
Evan.Hsiao@stantec.com

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**PROPOSED CHIQUITO BESS
GEOTECHNICAL INVESTIGATION REPORT**

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**PROPOSED CHIQUITO BESS
GEOTECHNICAL INVESTIGATION REPORT**

Introduction
November 15, 2021

1. INTRODUCTION

This report presents the results of Stantec's geotechnical investigation for the proposed 3.0 (+/-) acre Chiquito Battery Energy Storage System (BESS) development in Wildomar, Riverside County, California (the Site). The project location is shown on the Site Location Map, Figure 1 and the approximate area of the proposed development is shown on the Site Vicinity Map, Figure 2.

1.1 PROPOSED DEVELOPMENT

Based on similar projects, the development is expected to consist of shallow mat foundations to support the heavy equipment and shallow pad or spread footings to support light weight equipment. Preliminary development plans for the proposed project were not available at the time of this report. If actual foundation conditions differ from those indicated above, the recommendations of this report will need to be re-evaluated and are subject to change.

Given that there are no grading plans available, we have assumed that the final surface elevations will not vary significantly from existing site grades. The site grading and foundation plans should be provided to the Project Geotechnical Engineer for review. The recommendations in this report are subject to change based upon review of the site grading and foundation plans.

1.2 PURPOSE AND SCOPE OF WORK

1.2.1 Purpose

The purpose of this report is to evaluate the subsurface conditions at the Site and provide geotechnical recommendations for design and construction of the proposed project. This report has been prepared in general accordance with accepted geotechnical engineering principles and in general conformance with the approved proposal.

1.2.2 Scope of Work

Our scope of work consisted of the following:

- Perform a site reconnaissance to evaluate general geotechnical and site conditions,
- Perform a field subsurface exploration program consisting of drilling 7 hollow stem auger borings,
- Conduct field electrical resistivity testing at 4 locations,
- Perform geotechnical laboratory tests on selected samples,

PROPOSED CHIQUITO BESS GEOTECHNICAL INVESTIGATION REPORT

Introduction
November 15, 2021

- Perform geotechnical engineering analyses, and
- Preparation of this geotechnical investigation report for the proposed project.

DRAFT

**PROPOSED CHIQUITO BESS
GEOTECHNICAL INVESTIGATION REPORT**

Field Investigation
November 15, 2021

2. FIELD INVESTIGATION

2.1 PRE-DRILLING PROCEDURES

DigAlert (Underground Service Alert of Southern California) was notified before commencing subsurface exploration activities to identify underground utilities that could conflict with the proposed borings. In addition, a private utility locator was retained, and the upper five feet were hand augered to clear the boring locations for potential conflicts with underground utilities.

2.2 DRILLING OPERATIONS

Seven test borings (B1 through B7) were drilled using a CME-85 drill rig equipped with hollow-stem augers (HSA) on October 7, 2021, by ABC Liovin Drilling Inc. (ABC). Soil borings were advanced to depths ranging from approximately 21.5 (HSA borings B1 through B3 and B5 through B7) to 51.5 (HSA boring B4) feet below the existing ground surface (bgs), and their approximate locations are shown on the Subsurface Exploration Map, Figure 3. Drilling refusal was encountered at a depth of approximately 20.5 feet in boring B2 and 26 feet in boring B4. The borings were logged by a Stantec field geologist, who also collected samples of the materials encountered for examination and laboratory testing.

2.3 SAMPLING

Relatively undisturbed samples were obtained from the HSA borings using a modified California (CAL) sampler, which is a ring-lined split tube sampler with a 3-inch outer diameter and 2½-inch inner diameter. CAL sampling followed ASTM D3550 (Standard Practice for Ring-Lined Barrel Sampling of Soils) procedures. Disturbed samples were obtained using a Standard Penetration Test (SPT) sampler, which is a split tube sampler with a 2-inch outer diameter and 1⅝-inch inner diameter. SPTs were performed in general accordance with ASTM D1586 (Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils), and D6066 (Standard Practice for Determining the Normalized Penetration Resistance of Sands for Evaluation of Liquefaction Potential). Disturbed bulk samples were also obtained from the drill cuttings and hand auger boring.

The CAL and SPT samplers were driven with a 140-pound weight dropping 30 inches. The number of blows per 6-inch increment is noted on the boring logs. ABC provided a report (SPT, 2021) which indicates the average hammer energy efficiency on the drill rig used at the project was 71%.

Samples were classified in the field using the Unified Soil Classification System (USCS), in accordance with ASTM D2488 (Standard Practice for Description and Identification of Soils [Visual-Manual Method]) procedures. The laboratory testing confirmed or modified field classifications as necessary for presentation on the boring logs. Soil samples were removed from the samplers, placed in appropriate containers, and transported in accordance with ASTM D4220 (Standard

PROPOSED CHIQUITO BESS GEOTECHNICAL INVESTIGATION REPORT

Field Investigation
November 15, 2021

Practice for Preserving and Transporting Soil Samples). Upon completion, borings were backfilled with grout. The boring logs are included in Appendix A.

2.4 SOIL ELECTRICAL RESISTIVITY TESTING

A soil electrical resistivity study was conducted by Atlas Technical Consultants (ATC), which included collection of electrical resistivity data at the site, compilation and analysis of the data collected, and preparation of the data report as included in Appendix C of this report. Specifically, ATC conducted two crossing, nearly orthogonal resistivity soundings at four locations (R-1 through R-4) onsite for a total of eight lines. The roughly northeast-southwest trending lines are given an "a" designation (e.g., R-1a) and the roughly northwest-southeast lines are given a "b" designation (e.g., R-1b). In Appendix C, Figure 2 illustrates the approximate sounding locations, and Figure 3 illustrates the conditions in the study areas. A summary of the findings is provided in Section 7.3.

The data were collected in general accordance with ASTM G57 using an Advanced Geosciences, Inc. (AGI) MiniSting earth resistivity meter and four steel electrodes in a Wenner configuration. Soil resistance measurements were collected at electrode spacing distances of 2.5, 5, 10, 20, and 50 feet, along the two lines with the middle of each sounding generally located at a common center point. The stainless-steel electrodes were hammered into place and the soils surrounding the electrodes were moistened with saline water where necessary.

**PROPOSED CHIQUITO BESS
GEOTECHNICAL INVESTIGATION REPORT**

Laboratory Testing
November 15, 2021

3. LABORATORY TESTING

The following laboratory tests were performed in general accordance with ASTM and California Test procedures:

Table 1. Summary of Laboratory Tests

Type of Test	ASTM Designation	Number Performed
Sieve Analysis	ASTM D422 and ASTM C136	7
#200 Wash	ASTM D1140	3
Atterberg Limits	ASTM D4318	2
Direct Shear	ASTM D3080	7
Maximum Dry Density and Optimum Moisture Content (Modified Proctor)	ASTM D1557	3
Chemical Tests for Corrosion Potential	CA DOT test methods	3
Thermal Resistivity	ASTM D5334	4

The complete laboratory report is presented in Appendix B.

**PROPOSED CHIQUITO BESS
GEOTECHNICAL INVESTIGATION REPORT**

Geologic Setting and Site Conditions
November 15, 2021

4. GEOLOGIC SETTING AND SITE CONDITIONS

4.1 REGIONAL GEOLOGY

The site is located in the Peninsular Ranges geologic province which consists of a series of ranges separated by northwest trending valleys, subparallel to faults branching from the San Andreas Fault. The Peninsular Ranges extend into lower California and are bound on the east by the Colorado Desert. The Site resides in the portion of the province drained by surface runoff toward Bear Creek.

Geologic mapping presented in the United States Geological Survey (USGS) San Bernardino & Santa Ana 30' x 60' Quadrangle (USGS, 2006) indicates the site is underlain by Quaternary Sandstone Member deposits. Literature from USGS indicates the Sandstone Member deposits consist of Pleistocene sandstone containing cobble to boulder conglomerate beds.

4.2 SURFACE CONDITIONS

The project Site is approximately 3 acres in size and is occupied by vacant land. The project Site is bound by Clinton Keith Road followed by vacant land to the southeast, Grand Avenue followed by vacant land and single-family homes to the southwest, single-family homes and vacant land to the northwest, and a retail landscape materials business to the northeast.

The Site is generally flat and slopes downward from northwest to southeast. Based on Google Earth®, the ground surface of the Site is at an approximate elevation of 1,197 to 1,202 feet (WGS84 Datum).

4.3 SUBSURFACE CONDITIONS

The materials encountered in our borings are consist of with Quaternary Young Alluvial Valley (Qyv) deposits. A brief description of the subsurface conditions is provided in this section. Detailed descriptions of the subsurface conditions are provided in the boring logs included in Appendix A.

A description of the mapped soil units is provided below.

Quaternary Young Alluvial Valley (Qyv) Deposits – The near surface soils are mapped as Quaternary Sandstone Member deposits of Pleistocene age. However, the soils appear to be young alluvial valley deposits (Qyv) of Holocene and Late Pleistocene age. The deposits encountered consist of sand with variable amounts of silt and gravel (USCS: SP-SM, SM, SC), clay with variable amounts of sand (USCS: CL), and silt with variable amounts of sand (USCS: ML) to depths ranging from 18 to 25 feet below the ground surface (bgs). The sandy deposits were medium to dense to very dense and generally dry to moist. The clay and silt deposits were low in plasticity, stiff to hard in consistency, and moist to wet.

PROPOSED CHIQUITO BESS GEOTECHNICAL INVESTIGATION REPORT

Geologic Setting and Site Conditions
November 15, 2021

Heterogeneous Granitic Rocks (Khg) – Below the alluvial deposits in two soil borings (B2 and B4), cretaceous age Heterogeneous Granitic Rock (Kgh) was encountered to a depth of approximately 20.5 and 26 feet bgs, at drilling refusal. The bedrock consisted of grandiorite and was dry, hard, and slightly weathered.

Groundwater - Groundwater was encountered during this investigation in three soil borings (B4 – B6) at depths ranging from 19.5 feet to 23 feet. Historical high depth to groundwater is approximately 10 feet bgs (CGS, 2018). Groundwater in the site vicinity appears to flow to the southeast toward Murrieta Creek. Groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage.

DRAFT

**PROPOSED CHIQUITO BESS
GEOTECHNICAL INVESTIGATION REPORT**

Geologic Hazards
November 15, 2021

5. GEOLOGIC HAZARDS

5.1 FAULTING AND SURFACE FAULT RUPTURE

As in most parts of California, the Site is located in a seismically active area. The estimated closest distance from the Site to major nearby mapped active faults is presented in the table below.

The estimated distance of the Site to the nearest expected surface expression of an active fault is presented in the table below. The distance measurement was taken from a location in the middle of the site, which has a latitude of 33.808881°, and a longitude of -116.493477°.

Table 2. Faults in Site Vicinity

Fault	Distance (miles) ⁽¹⁾	Maximum Moment Magnitude ⁽¹⁾
Elsinore	0.4	7.9
San Jacinto	20.6	7.9
San Joaquin Hills	24.3	7.1
Chino	24.4	6.8
Newport Inglewood Connected	27.5	7.5

¹Measured from 2008 National Seismic Hazard Maps – Source Parameters Website - USGS (USGS, 2008).

The Site is not located within a currently mapped Alquist-Priolo Special Studies Fault Zone (CDMG, 2002b). As noted above, the nearest active fault is the Elsinore fault, located approximately 0.4 miles northeast of the Site. No active faults are known to underlie or project toward the site. Therefore, the probability of surface fault rupture at the site from a known active fault is considered low.

5.2 CALIFORNIA BUILDING CODE SEISMIC CRITERIA

A geologic hazard likely to affect the project is ground-shaking as a result of movement along an active fault zone in the vicinity of the Site. The seismic parameters in accordance with the 2019 California Building Code (CBC) are presented below:

Table 3. 2019 CBC Seismic Parameters and Peak Ground Acceleration

Parameter	Value
Site Coordinates	Latitude : 33.585297° Longitude : -117.254701°
Mapped Spectral Acceleration Value at Short Period: S_s	1.622g
Mapped Spectral Acceleration Value at 1-Second Period: S₁	0.604g
Seismic Site Classification	D
Short Period Site Coefficient: F_a	1.0
1-Second Period Site Coefficient: F_v	1.7
Site Class Adjusted Acceleration Value at Short Period: S_{MS}	1.622g

**PROPOSED CHIQUITO BESS
GEOTECHNICAL INVESTIGATION REPORT**

Geologic Hazards
November 15, 2021

Table 3. 2019 CBC Seismic Parameters and Peak Ground Acceleration

Parameter	Value
Site Class Adjusted Acceleration Value at 1-Second Period: S_{M1}	1.027g
Design Spectral Response Acceleration at Short Periods: S_{Ds}	1.082g
Design Spectral Response Acceleration at 1-Second Period: S_{D1}	0.688g
Peak Ground Acceleration adjusted for Site Class Effects: PGA_M	0.78g

ASCE 7-16 – Report generated through ASCE 7 Hazards Report website (ASCE, 2019) – accessed 11/15/21.

The values in Table 3 presume exemption 2 in Section 11.4.8 of ASCE 7-16 is applicable. If the project structural engineer determines exemption 2 does not apply, the values above will need to be reevaluated.

5.3 LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction is the transformation of a deposit of soil from a solid state to a liquefied state as a consequence of increased pore pressure and reduced effective stress. Often, this transformation results from the cyclic loading of an earthquake and the soil acquires “mobility” sufficient to permit both horizontal and vertical movements. Soils that are most susceptible to liquefaction are clean, loose, saturated (below groundwater), and uniformly graded sands. The vast majority of liquefaction hazards are associated with sandy soils and silty soils of low plasticity. Cohesive soils with a plasticity index (PI) greater than 7 are generally not considered susceptible to soil liquefaction, although they can be subject to cyclic softening if they are soft enough, and if the seismic demand is relatively high.

The Site is not located in a California Geological Survey Liquefaction Hazard Zone. This zone is defined as areas where historical occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation would be required.

The liquefaction potential and dynamic settlement were evaluated with the LiqSVs v1.3.3.1 computer program (Geologismiki, 2018) using the SPT data. Liquefaction triggering methods developed by Idriss and Boulanger (2014) were used in our liquefaction evaluation. Our evaluation was based on the site class adjusted peak ground acceleration of 0.78g, as presented in Table 3, and an earthquake magnitude of 7.7, the modal earthquake magnitude from the 2014 USGS deaggregation website. The in-situ groundwater level of 19 feet bgs was used to evaluate the cyclic resistance ratio of the on-site soil, and the historical high groundwater depth of approximately 10 feet was used to evaluate the cyclic stress ratio for the design earthquake (CGS, 2018).

Medium dense to very dense granular soils and stiff to hard fine-grained soils are generally present from the ground surface to a depth of at least 26 feet at the site. Based on the denseness of granular soils and consistency of fine-grained soils, most of these soils in the top 26 feet are not considered susceptible to liquefaction. Our evaluation indicates that relatively significant portions of the alluvial valley deposits between 17 and 23 feet bgs are subject to liquefaction induced

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settlement. Seismic induced surface settlement is estimated to be on the order of 1.3-inches. Differential settlement over a span of approximately 30 feet is estimated to be approximately half of the total settlement. The results of the liquefaction analyses using the LiqSVs software are provided in Appendix C - Liquefaction Analyses.

5.4 LIQUEFACTION-INDUCED LATERAL SPREADING

Liquefaction induced lateral spreading can occur in areas of sloping ground, or towards a free face. Given the relatively flat topography, distance to a free face, and low liquefaction susceptibility of soils, the potential for liquefaction-induced lateral spreading is considered low.

5.5 FLOODING, TSUNAMIS AND SEICHES

The Site is located within a FEMA Flood Zone X, which is an area of minimal flood hazard (FEMA, 2008). Therefore, damage due to flooding is considered low.

The Site is not located within a Tsunami Inundation Area; therefore, damage due to tsunamis is considered low.

5.6 EXPANSIVE SOILS

The near-surface soils (upper approximate 10 feet) have a low expansion potential. Our soil classifications and laboratory test results show that the near surface (upper 10 feet) samples tested are granular with low-plasticity fines. Accordingly, mitigation for expansive soils is not considered necessary for onsite soils at this Site.

If imported soils are used for earthwork, Stantec recommends that the proposed soils be tested for expansion potential prior to import. Imported soils should be approved by the Geotechnical Engineer before being imported.

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6. CONCLUSIONS

Based on our field exploration, laboratory testing and engineering and geologic analyses, it is our opinion that the Site is suitable for construction of the proposed BESS improvements from a geotechnical engineering and engineering geology viewpoint; however, there are existing geotechnical conditions associated with the Site that warrant mitigation and/or consideration during the planning stages. The main geotechnical conclusions for the project are presented in the following paragraphs.

- Holocene and Late Pleistocene age alluvial valley deposits were encountered throughout the site and primarily consist of sand with variable amounts of silt and gravel (USCS: SP-SM, SM, SC), clay with variable amounts of sand (USCS: CL), and silt with variable amounts of sand (USCS: ML) to depths ranging from 18 to 25 feet below the ground surface (bgs). The sandy deposits were medium to dense to very dense and generally dry to moist. The clay and silt deposits were low in plasticity, stiff to hard in consistency, and moist to wet.
- Bedrock was encountered below the alluvial deposits in two soil borings (B2 and B4) at a depth of approximately 18 and 25 feet bgs. Formational material included cretaceous age Heterogeneous Granitic Rock (Kgh) and extended to drilling refusal, which was encountered at a depth of approximately 20.5 and 26 feet bgs. The bedrock consisted of grandiorite and was dry, hard, and slightly weathered.
- Groundwater was encountered during this investigation in three soil borings (B4 – B6) at depths ranging from 19.5 feet to 23 feet. Historical high depth to groundwater is approximately 10 feet bgs (CGS, 2018). Groundwater in the site vicinity appears to flow to the southeast toward Murrieta Creek. Groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage.
- Some clay layers between the ground surface and a depth of approximately 50 feet are potentially susceptible to seismically induced settlement. Our evaluation indicates that portions of the alluvial valley deposits between 17 and 23 feet bgs are subject to liquefaction induced settlement. Seismic induced surface settlement is estimated to be on the order of 1.3-inches. Differential settlement over a span of approximately 30 feet is estimated to be approximately half of the total settlement. The results of the liquefaction analyses using the LiqSVs software are provided in Appendix C - Liquefaction Analyses.
- A key seismic hazard for the project is ground shaking caused by regionally active faults during a seismic event. The structures are likely to experience ground shaking during their design life. Geotechnical recommendations presented in this report are intended to reduce the seismic risk to an “acceptable level”, which means a level of

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mitigation that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project (14 CCR 3721 (a)).

- No active faults are known to underlie or project toward the site. Therefore, the probability of surface fault rupture occurring at the site from a known active fault is considered low.
- The Site is located within a FEMA Flood Zone X, which is an area with minimal flood risk (FEMA, 2008). Therefore, damage due to flooding is considered low.

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7. RECOMMENDATIONS

7.1 EARTHWORK

The following recommendations are provided regarding specific aspects of the proposed earthwork construction. These recommendations should be considered subject to revision based on Site layout, foundation loads, and additional geotechnical evaluation of the conditions observed by the Geotechnical Engineer during grading operations.

7.1.1 Site Preparation

Site preparation should begin with the removal of existing buried slabs and foundations, vegetation, highly organic soil, leach lines, septic tanks, and any other unsuitable materials, if found during grading. Existing underground utilities within the proposed construction areas, if any, should be completely removed and/or rerouted. Grading should conform to the guidelines presented in the 2019 California Building Code (CBC, 2019), as well as the pertinent requirements of the City of Wildomar and Riverside County.

7.1.2 Remedial Grading

Shallow Foundation Areas:

Existing soils should be excavated to a minimum depth of 3 feet below the bottom of the footings. The surface exposed by excavation should be scarified to a depth of 8 inches, moisture conditioned to within 3 percentage points of the optimum moisture content and compacted to 90 percent relative compaction based on the ASTM D1557 procedure. All references to optimum moisture content and relative compaction are based on this test method. Removal and replacement with compacted fill should extend at least three feet beyond the outside edge of the foundations.

The removed soils can be placed back in the excavation as compacted fill. The material should be replaced in 8-inch thick loose lifts, moisture conditioned to within 2 percentage points of optimum, and compacted to 90% relative compaction. Excavation, replacement, and compaction beneath shallow foundations should extend horizontally at least two feet beyond the outside edge of the footing areas unless constrained by property lines.

Concrete Pavement and Hardscape:

Remedial grading for pavement and hardscape areas should include removal of the existing soils to a depth of at least 12 inches below the existing ground surface or subgrade elevation, whichever is deeper. Subgrade elevation is defined as the top of soil elevation provided in the grading plan. The soil exposed at the base of the excavation should be scarified to a depth of 8

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inches, and moisture conditioned to within 2 percentage points of the optimum moisture content. Hardscape subgrade should be compacted to at least 90% relative compaction. Pavement subgrade should be compacted to at least 90% relative compaction.

Field Observations:

The Geotechnical Engineer should check the bottom of excavations. If soft, loose, or otherwise unsuitable soils are encountered, the depth of removal may need to be extended.

7.1.3 Fill Placement and Compaction

Excavated materials determined by the Geotechnical Engineer to be satisfactory can be reused as compacted fill. We anticipate that the majority of the excavated materials can be re-used as compacted fill soils. The Geotechnical Engineer should approve the fill material before placement.

Where large compaction equipment is used, such as sheep's foot or smooth drum compactors, fill should be placed in 6- to 8-inch thick loose, horizontal lifts, moisture conditioned to within 2 percentage points of the optimum moisture content and compacted to at least 90% relative compaction. Thinner lifts will be required for smaller compaction equipment. The maximum dry density and optimum moisture content for the evaluation of relative compaction should be determined in accordance with ASTM D1557.

7.1.4 Yielding Subgrade Conditions

The soil encountered at the bottom of the remedial grading excavations can exhibit "pumping" or yielding if they become saturated in response to periods of significant precipitation, such as during the winter rainy season. If this occurs, corrective measures should be performed with oversight from the Geotechnical Engineer.

In order to help stabilize the yielding subgrade soils within the bottom of the removal areas, the contractor can consider the placement of stabilization fabric or geo-grid over the yielding areas, depending on the relative severity of the yielding.

Mirafi 600X (or approved equivalent) stabilization fabric may be used for areas with low to moderate yielding conditions. Geo-grid such as Tensar TX-5 may be used for areas with moderate to severe yielding conditions. Uniform sized, ¾- to 2-inch crushed rock should be placed over the stabilization fabric or geo-grid. A 6- to 12-inch thick section of crushed rock will typically be necessary to stabilize yielding ground.

If significant voids are present in the crushed gravel, a filter fabric should be placed over the crushed gravel to prevent migration of fines into the gravel and thus potential settlement of the overlying fill. Fill soils, which should be placed and compacted in accordance with the recommendations presented herein, should then be placed over the fabric or geo-grid until

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design grades are reached. The crushed gravel and stabilization fabric or geo-grid should extend at least 5 feet laterally beyond the limits of the yielding areas.

7.1.5 Dewatering

Groundwater was encountered during this investigation in three soil borings (B4 through B6) at depths ranging from 19.5 feet to 23 feet. Given the anticipated shallow foundations, we do not anticipate that groundwater will be a significant consideration for this project.

7.1.6 Expansive Soil

The near-surface soils (approximately upper 10 feet) have a low expansion potential. Our soil classifications and laboratory test results show that the near surface (upper 10 feet) samples tested are granular with low-plasticity fines. Accordingly, mitigation for expansive soils is not considered necessary at this Site. The grading and foundation recommendations presented in this report reflect a low expansion potential.

7.1.7 Imported Material

Imported materials, if used for fill, should be predominately granular, contain no rocks or lumps greater than 3 inches in maximum dimension, and have an Expansion Index less than 20, and a Plasticity Index less than 15. Imported materials should be reviewed and approved by the Geotechnical Engineer before being brought to the Site.

7.1.8 Site Excavation Characteristics

During the recent geotechnical investigation, the soil boreholes were drilled using a truck-mounted, hollow stem auger drill rig. As the drilling was completed with moderate effort, conventional earth moving equipment should be capable of performing the excavations required for site development.

7.1.9 Oversized Material

Excavations may generate oversized material. Oversized material is defined as rocks or cemented clasts greater than 3 inches in largest dimension. Oversized material should be broken down to no greater than 3 inches in largest dimension for use in fill or be removed from the Site.

7.1.10 Temporary Excavations

The existing native soils can be considered Type C for excavation in accordance with OSHA and Cal-OSHA requirements. Temporary excavations should be shored or excavated with a slope not steeper than 1.5:1 (horizontal to vertical) in accordance with OSHA and Cal-OSHA requirements.

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The excavations should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing or raveling should be brought to the attention of the Geotechnical Engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation.

The project geotechnical engineer should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended near the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

7.1.11 Pipelines

Typical pipe bedding as specified in the Standard Specifications for Public Works Construction (GREENBOOK) may be used. As a minimum, it is recommended that pipe be supported on at least 4 inches of granular bedding material, such as 3/4-inch rock or clean coarse sand with less than 5 percent fines and a sand equivalent of 40 or more as evaluated by ASTM D2419.

The bedding should extend from the bottom of the trench to at least 1 foot above the top of the pipe. Sand bedding should be mechanically compacted to at least 90 percent relative compaction. Jetting of sand bedding should not be permitted.

Onsite material, imported select material, or 2-sack cement/sand slurry may be used as backfill in trenches above the pipe bedding. The material selected should match the engineering characteristics of the soils adjacent to the trench. Utility trench backfill beneath structures and hardscape should be compacted to at least 90% relative compaction.

The modulus of soil reaction (E') is used to characterize the stiffness of soil backfill placed along the sides of buried flexible pipelines. For the purpose of evaluating deflection due to the load associated with trench backfill over the pipe, a value of 1,500 pounds per square inch (lbs/in²) is recommended for the general site conditions assuming granular bedding material (sand or gravel) is placed around the pipe.

7.1.12 Surface Drainage

Final surface grades around structures should be designed to collect and direct surface water away from the structure and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2%. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5% within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained

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throughout the life of the proposed structures. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater can develop. Saturated soil zones may result in increased maintenance and could impact structure stability.

7.1.13 Grading Plan Review

Stantec should review the grading plans and earthwork specifications to ascertain whether the intent of the recommendations contained in this report have been implemented, and that no revised recommendations are needed due to changes in the development scheme.

7.2 FOUNDATIONS

7.2.1 Shallow Foundations

To mitigate seismically induced settlement, we recommend the new structures should be constructed with a stiffened foundation system in combination with a recompacted fill mat. The stiffened foundation system should consist of a rigid mat, post-tensioned slab, or a waffle foundation system tied together with grade beams.

If a rigid mat foundation is used, the mat slab should extend at least 12 inches below the adjacent ground surface. The mat thickness should be determined by the structural engineer. The mat can be designed assuming an allowable bearing pressure of 2,500 pounds per square foot for dead plus live loads, with a one-third increase for all loads including wind or seismic. This allowable bearing pressure is a net value; therefore, the weight of the mat can be neglected for design purposes. The mat should be integrally connected to all portions of the structure, so the entire foundation system moves as a unit. The mat should be reinforced with top and bottom steel in both directions to allow the foundation to span local irregularities that may result from potential differential settlement. As a minimum, we recommend that the mat be reinforced with sufficient top and bottom steel to span as a simple beam an unsupported distance of at least 10 feet. The mat can be designed using a modulus of subgrade reaction, K_v1 , of 250 pounds per cubic inch. The actual modulus of subgrade reaction would need to be adjusted for the plan dimensions of the mat.

We recommend incorporating flexible utility connections to the buildings to accommodate the estimated total and differential settlements.

7.2.2 Drilled Pier Foundations

To accommodate seismically-induced settlement, we recommend all drilled pier column footings consist of reinforced concrete drilled piers having a minimum diameter or width of 2.0 feet and embedded a minimum depth of 7 feet bgs. Based on these assumptions and the anticipated subsurface conditions, an allowable bearing pressure of 4,000 psf may be used in the design. For

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resistance to transient lateral loads, such as earthquake and wind loads, the aforementioned allowable bearing capacity may be increased by one-third.

7.2.3 Foundation Settlement

The following static and seismic foundation settlements are estimated.

Static Settlement: Less than 1-inch total settlement
 ½ inch differential settlement over 30 feet

Seismic Settlement: 1.3-inches total settlement
 0.7-inches differential settlement over 30 feet

7.2.4 Lateral Resistance

Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.30 can be used.

Passive pressure can be computed using an equivalent fluid pressure of 360 lbs/ft³ for level ground conditions. Active pressure can be computed using an equivalent fluid pressure of 40 lbs/ft³ for level ground conditions. Reductions for sloping ground should be made. The upper 1 foot of soil should not be relied on for active or passive support unless the ground is covered with pavements or slabs.

These pressures are based on level ground conditions in front and behind the foundation with no surcharge loads within 10 feet. The earth pressures indicated above do not include a safety factor; therefore, the design should include an appropriate safety factor for the overall performance of the system.

7.2.5 Foundation Plan Review

Stantec should review the foundation plans to ascertain that the intent of the recommendations in this report has been implemented and that revised recommendations are not necessary as a result of changes after this report was completed.

7.2.6 Foundation Excavation Observations

A representative working under direct supervision of the Geotechnical Engineer should observe the foundation excavations prior to forming or placing reinforcing steel.

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7.3 CORROSION POTENTIAL

Three samples of the onsite soils were tested to provide a preliminary indication of the corrosion potential of the onsite soils. The test results are presented in Appendix B. A brief discussion of the corrosion test results is provided in the following text.

- The samples tested had a soluble sulfate concentration ranging from 33 to 45 parts per million (ppm), which indicates the samples have a low sulfate corrosion potential relative to concrete. It should be noted that soluble sulfate in the irrigation water supply, and/or the use of fertilizer may cause the sulfate content in the surficial soils to increase with time. This may result in a higher sulfate exposure than that indicated by the test results reported herein. Studies have shown that the use of improved cements in the concrete, and a low water-cement ratio will improve the resistance of the concrete to sulfate exposure.
- The samples tested had a chloride concentration ranging from 23 ppm to 62 ppm, which indicates the sample has a negligible chloride corrosion potential relative to metal.
- The samples tested had a saturated resistivity ranging from 1,715 to 2,644 ohm-cm, which indicates the samples are moderately to severely corrosive.
- The sample tested had a pH ranging from 7.7 to 8.1, which indicates the samples are slightly alkaline.

Field Wenner four-point resistivity testing was conducted by Atlas Technical Consultants (ATC) at the Site. The results of the field resistivity testing indicate variable corrosion potential in the subsurface profile (Appendix C). In general, the resistivity decreases (higher corrosion potential) with increasing water content and salt concentration. In dry arid environments like that of the Site, seasonal low moisture content in near surface soils and evapotranspiration are important factors influencing corrosion potential of the soil profile. The field data (Appendix C) indicate relatively low to moderate (1,472 to 18,009 ohm-cm) and apparent low corrosion severe potential to ferrous metal in the near surface materials to a depth of at least 20 feet (note: the depth of the measured average resistivity in the soil profile is assumed to be equivalent to the probe spacing). Laboratory testing on saturated samples showed similar corrosion potential.

Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist: Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 1,500 ppm, or the pH is 5.5 or less (Caltrans, 2012).

Proposed import fill materials should be tested to evaluate their corrosion potential prior to being imported to the site.

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7.4 PRELIMINARY PAVEMENT DESIGN

7.4.1 Asphalt Concrete Pavement

Tentative driveway structural sections were developed based on the visual onsite soil classifications and an estimate of the anticipated traffic loading. The design below applies to driveway sections supported by the existing onsite soils.

An R-value of 10 has been assumed for preliminary design of pavement sections based on one laboratory test of the on-site material in the upper 5 feet. The actual R-value of the subgrade soils should be determined after grading to provide final pavement design. Flexible pavement sections have been calculated in general conformance with Caltrans guidelines. The project civil engineer and owner should review the pavement designations to determine appropriate locations for pavement thickness. Based on an assumed R-value of 10, the following pavement structural sections have been calculated.

Table 4. Flexible Pavement Sections

Traffic Type	Traffic Index	Asphalt Concrete (inches)	Aggregate Base* (inches)
Automobile Parking	5.0	3	9
Automobile Drive Lanes	5.5	3	11
Medium Truck Traffic	6.0	4	11.5
Heavy Truck Traffic	7.0	4.5	14

*Aggregate Base should conform to Class 2 Aggregate Base in accordance with the Caltrans Standard Specifications or Crushed Miscellaneous Base in accordance with the Standard Specifications for Public Works Construction.

Prior to placing base materials, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned to slightly above the optimum moisture content, and recompact to a dry density of at least 95% of the laboratory maximum. The base material should also be compacted to slightly above the optimum moisture content and a dry density of at least 95% of the laboratory maximum. Asphalt concrete should be compacted to at least 95% of the laboratory Hveem density in accordance with ASTM D2726.

Rigid concrete pavement (described below) should be placed in driveway entrance aprons and trash bin loading/storage areas. Concrete pavement design is provided in the following section.

7.4.2 Concrete Pavement

Concrete pavements have been calculated in general conformance with the procedure recommended by the American Concrete Institute (ACI 330R-08) using the parameters presented in Table 5. The following design parameters were used in our analyses.

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Table 5. Concrete Pavement Parameters

Design Parameter	Value
Modulus of Subgrade Reaction (k)	50 pci
Modulus of Concrete Rupture (M_R)	550 psi
Concrete Compressive Strength	3,700 psi
Traffic Categories (TC)	A and C
Average Daily Truck Traffic (ADTT)	10 and 100

Based on the parameters above, we recommend the following minimum concrete pavement thickness.

Table 6. Recommended Concrete Pavement Sections

Traffic Type	Pavement Thickness (inches)	Aggregate Base (inches)
Automobile Parking and Driveways (TC = A)	6	6
Heavy Truck Traffic and Fire Lane Areas (TC = C)	8	6

The project civil engineer should confirm whether the assumed ADTT is appropriate for the anticipated traffic level. Concrete compressive strength for pavement should be at least 3,700 psi. Minimum reinforcement should consist of #3 bars on 24-inch centers. Crack control joints should be placed in accordance with the American Concrete Institute (ACI) guidelines.

Prior to placing concrete, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned to slightly above the optimum moisture content, and recompact to a dry density of at least 95% of the laboratory maximum.

7.5 POST INVESTIGATION SERVICES

Post investigation services are an important and necessary continuation of this investigation, and it is recommended that Stantec be retained as the Geotechnical Engineer to perform such services. Final project grading and foundation plans, foundation details and specifications should be reviewed by Stantec prior to construction to ascertain that the intent of the recommendations presented herein have been applied to the design. Following review of plans and specifications, observation during construction should be performed to correlate the findings of this exploration with the actual subsurface conditions exposed.

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8. CLOSURE

Our conclusions, recommendations, and discussions presented herein are based upon an evaluation and interpretation of the findings from the field and laboratory programs, with interpolation and extrapolation of subsurface conditions between and beyond the exploration locations. This report contains information that is valid as of the report's date and to the extent directly known to Stantec. However, conditions can change with the passage of time or construction subsequent to this report's preparation that may invalidate, either partially or wholly, the conclusions and recommendations presented herein.

Inherent in most projects performed in the heterogeneous subsurface environment, continuing subsurface explorations and analyses may reveal conditions that are different than those described in this report. The findings and recommendations contained in this report were developed in accordance with generally accepted, current professional principles and practice ordinarily exercised, under similar circumstances, by geotechnical engineers and engineering geologists practicing in this locality. No other warranty, express or implied, is made.

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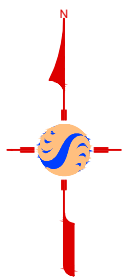
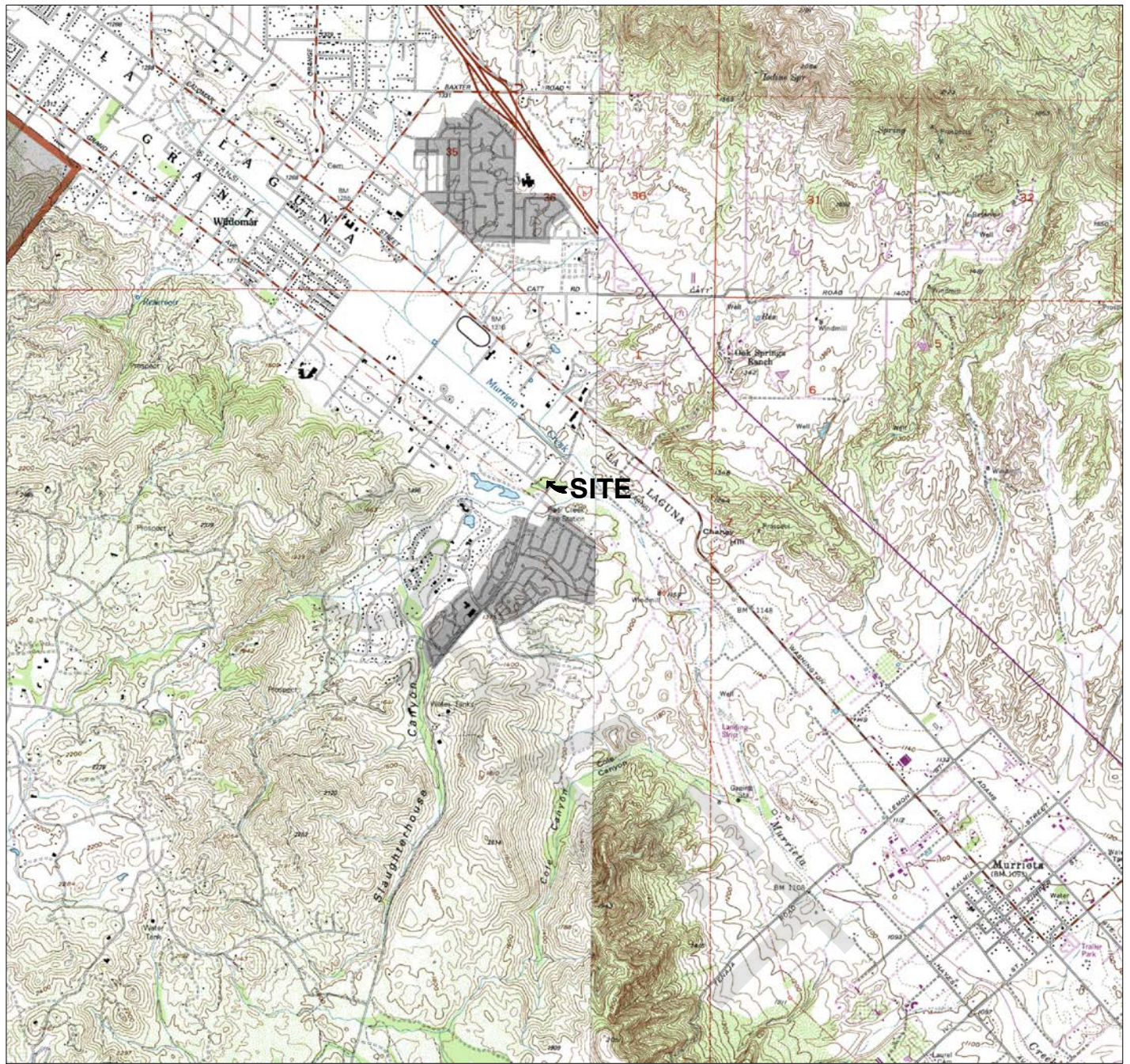
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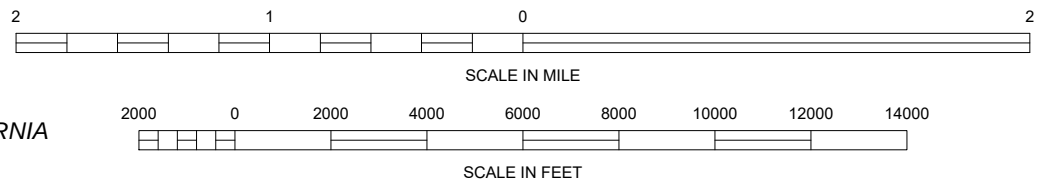
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FIGURES



CALIFORNIA



REFERENCE: USGS 7.5 X 15 MINUTE QUADRANGLE; WILDOMAR, CA 1997



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FOR:
**CHIKUITO BATTERY ENERGY
STORAGE SYSTEM PROJECT
NEAR NEC CLINTON KEITH ROAD
AND GRAND AVENUE
WILDOMAR, CALIFORNIA**

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185805178

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FIGURE:
1

DATE:
11/5/2021



EXPLANATION

APPROXIMATE PROJECT BOUNDARY



0 300 600

APPROXIMATE SCALE (FEET)

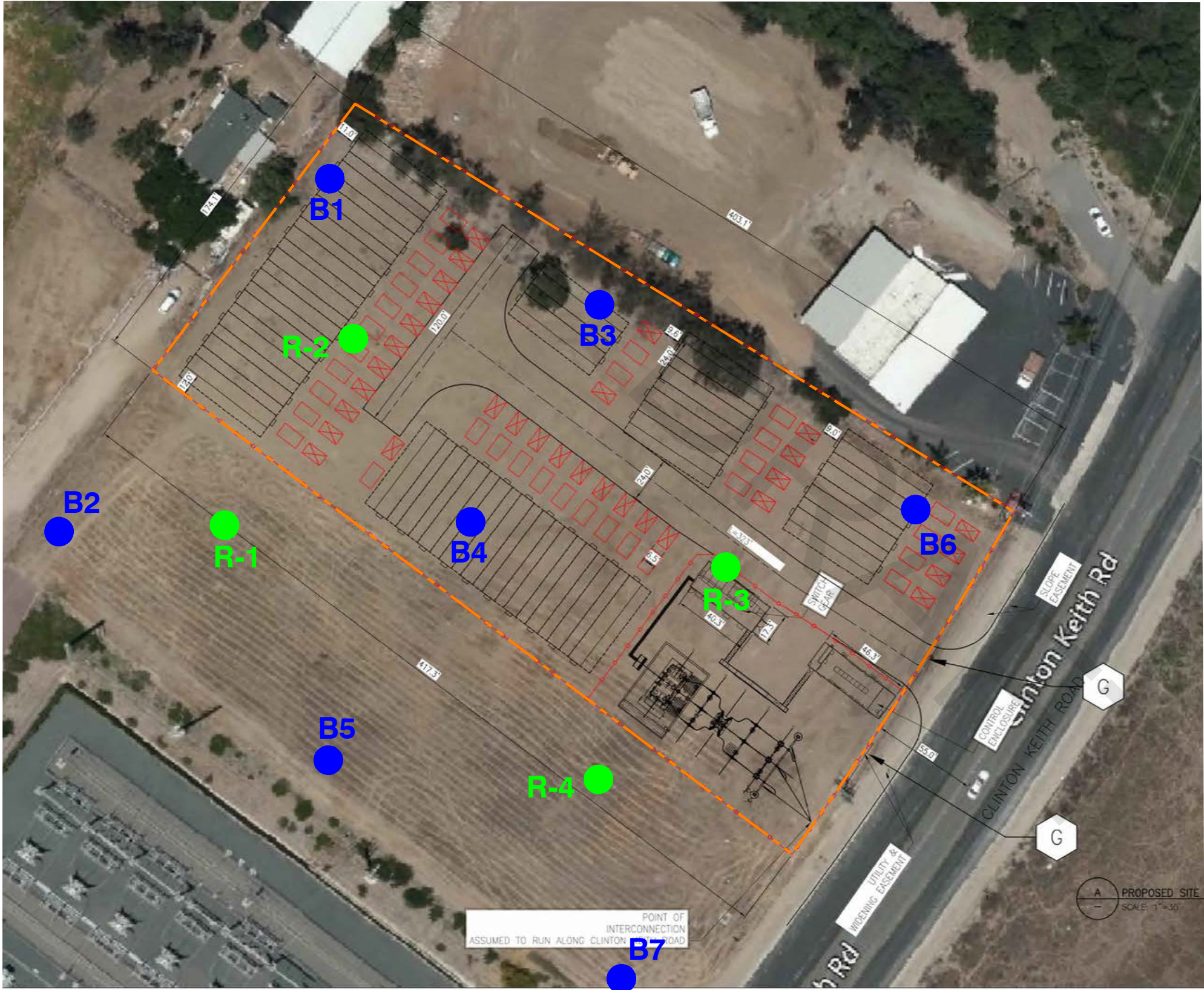


735 E CARNEGIE DRIVE, SUITE 280
SAN BERNARDINO, CA 92408
PHONE: (909) 335-6116 FAX: (909) 335-6120

FOR: CHIKUITO BATTERY ENERGY STORAGE SYSTEM PROJECT NEAR NEC CLINTON KEITH ROAD AND GRAND AVENUE WILDOMAR, CALIFORNIA	
JOB NUMBER: 185805178	DRAWN BY: JEF

SITE VICINITY MAP	
CHECKED BY: JEF	APPROVED BY: JEF

FIGURE: 2
DATE: 11/5/2021



EXPLANATION

B7

R-4

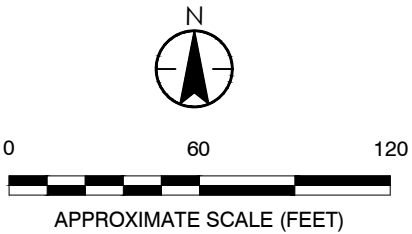
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APPROXIMATE PROJECT BOUNDARY

APPROXIMATE GEOTECHNICAL SOIL BORING LOCATIONS

APPROXIMATE ELECTRICAL RESISTIVITY TEST LOCATIONS



Stantec 735 E CARNEGIE DRIVE, SUITE 280 SAN BERNARDINO, CA 92408 PHONE: (909) 335-6116 FAX: (909) 335-6120	FOR: CHIQUITO BATTERY ENERGY STORAGE SYSTEM PROJECT NEAR NEC CLINTON KEITH ROAD AND GRAND AVENUE WILDOMAR, CALIFORNIA		SUBSURFACE EXPLORATION MAP		FIGURE: 3
	JOB NUMBER: 185805178	DRAWN BY: JEF	CHECKED BY: JEF	APPROVED BY: JEF	DATE: 11/5/2021

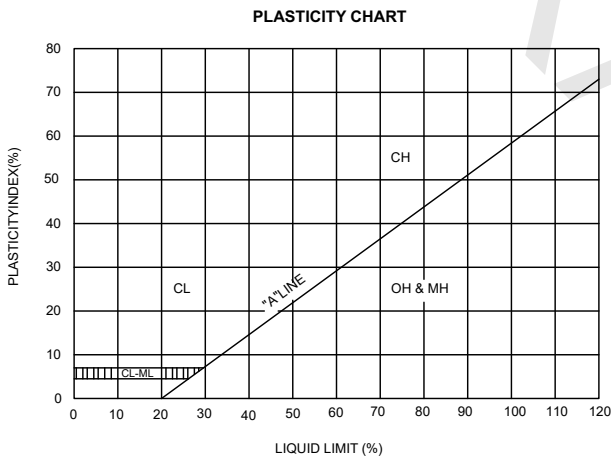
DRAFT

APPENDIX A BORING LOGS

UNIFIED SOIL CLASSIFICATION (ASTM D-2487)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	*CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL	
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL	
		*GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL	
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL	
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	*CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND	
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND	
		*SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND	
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND	
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY	
			PI>4 AND PLOTS<"A" LINE	ML	SILT	
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT	
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY	
			PI PLOTS <"A" LINE	MH	ELASTIC SILT	
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT	
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT	

* Dual symbols required for fines content between 5% and 12%



SAMPLER TYPES

	SPT		Shelby Tube
	Modified California (2.5" I.D.)		No Recovery
	Rock Core		Grab Sample

ADDITIONAL TESTS

COR - CHEMICAL ANALYSIS (CORROSIVITY)	PI - PLASTICITY INDEX
CD - CONSOLIDATED DRAINED TRIAXIAL	EI - EXPANSION INDEX
CN - CONSOLIDATION	TC - CYCLIC TRIAXIAL
CU - CONSOLIDATED UNDRAINED TRIAXIAL	TV - TORVANE SHEAR
DS - DIRECT SHEAR	UC - UNCONFINED COMPRESSION
PP - POCKET PENETROMETER (TSF)	(1.5) - (WITH SHEAR STRENGTH IN KSF)
#200 - Percent Passing #200 SIEVE	UU - UNCONSOLIDATED UNDRAINED TRIAXIAL
RV - R-VALUE	
SA - SIEVE ANALYSIS: % PASSING	
	WATER
	LEVEL

PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)				
SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

LEGEND TO BORING LOGS AND SOIL DESCRIPTIONS



PROJECT: **Hecate Chiquito BESS**
LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
PROJECT NUMBER: **185805178**
DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
DRILLING COMPANY: **ABC Liovin**
DRILLING EQUIPMENT: **CME-75**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-1 PAGE 1 OF 1



NORTHING (ft):
LATITUDE: **33° 35' 9.03"**
GROUND ELEV (ft): **1211**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NE**
WELL CASING DIAMETER (in): **---**
LOGGED BY: **K. Grasso**

EASTING (ft):
LONGITUDE: **117° 15' 17.94"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **21.5**
WELL DEPTH (ft): **---**
BOREHOLE DIAMETER (in): **8**
CHECKED BY: **J. Fischer**

GEO FORM 304 HECATE_CHIQUITO_SOIL_BORING_LOGS.GPJ SECOR INTL_GDT 11/19/21

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			<u>QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Q_{yy})</u>						
		SM	SILTY SAND WITH GRAVEL ; SM; 10YR 3/2 very dark grayish brown; 10% fine gravel; 59% fine to coarse grained sand; 31% fines; dry; no petroleum hydrocarbon odor (PHCO); no staining.		B-1-Bulk	MDD, CORR, TR			
					B-1-2'	SA			
5			10YR 3/3 dark brown; 10% fine gravel; 50% fine to coarse grained sand; 40% fines; moist; very dense below 5 feet.		B-1-5'		20 31 42		5
					B-1-7'	DS	24 29 50-5"		
10		CL	CLAY WITH SAND AND GRAVEL ; CL; 10YR 3/3 dark brown; 20% fine gravel; 25% fine to coarse grained sand; 55% fines; moist; very stiff; low plasticity; no PHCO; no staining.		B-1-10'		10 12 16		10
15			10% fine gravel; 10% fine to coarse grained sand; 80% fines below 15 feet.		B-1-15'		13 16 33		15
20		SM	SILTY SAND ; SM; 10YR 3/2 very dark grayish brown; 90% fine to coarse grained sand; 10% fines; moist; medium dense; no PHCO; no staining.		B-1-20'		3 5 8		20
			Hole terminated at 21.5 feet.						

PROJECT: **Hecate Chiquito BESS**
LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
PROJECT NUMBER: **185805178**
DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
DRILLING COMPANY: **ABC Liovin**
DRILLING EQUIPMENT: **CME-75**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-2 PAGE 1 OF 1



NORTHING (ft):
LATITUDE: **33° 35' 7.07"**
GROUND ELEV (ft): **1205**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NE**
WELL CASING DIAMETER (in): **---**
LOGGED BY: **K. Grasso**

EASTING (ft):
LONGITUDE: **117° 15' 19.64"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **20.5**
WELL DEPTH (ft): **---**
BOREHOLE DIAMETER (in): **8**
CHECKED BY: **J. Fischer**

GEO FORM 304 HECATE_CHIQUITO_SOIL_BORING_LOGS.GPJ SECOR INTL_GDT 11/19/21

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			<u>QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Qyv)</u>						
		SM	SILTY SAND WITH GRAVEL ; SM; 10YR 3/3 dark brown; 5% gravel; 85% fine to coarse grained sand; 10% fines; moist; no petroleum hydrocarbon odor (PHCO); no staining.		B-2-Bulk	TR			
					B-2-2'	SA			
5		CL	CLAY WITH SAND ; CL; 10YR 4/3 brown; 35% fine to medium grained sand; 65% fines; moist; hard; low plasticity; no PHCO; no staining.		B-2-5'	DS, #200, AL	11 31 50-3"		5
			CLAY WITH SAND AND GRAVEL ; 5% fine gravel; 15% fine to coarse grained sand; 80% fines; moist; very stiff below 5 feet		B-2-7'		4 10 13		
10			CLAY WITH SAND ; 10% fine to coarse grained sand; 90% fines below 10 feet		B-2-10'		7 13 28		10
15			CLAY WITH SAND AND GRAVEL ; 5% fine gravel; 15% fine to coarse grained sand; 80% fines below 15 feet		B-2-15'		6 8 16		15
			<u>HETEROGENEOUS GRANITIC ROCK (Khg)</u>						
			Grandiorite; hard; dry; slightly weathered						
20			Refusal at 20.5 feet. Hole terminated at 20.5 feet.		B-2-20'		50-2"		20

PROJECT: **Hecate Chiquito BESS**
LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
PROJECT NUMBER: **185805178**
DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
DRILLING COMPANY: **ABC Liovin**
DRILLING EQUIPMENT: **CME-75**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-3 PAGE 1 OF 1



NORTHING (ft):
LATITUDE: **33° 35' 8.22"**
GROUND ELEV (ft): **1207**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NE**
WELL CASING DIAMETER (in): **---**
LOGGED BY: **K. Grasso**

EASTING (ft):
LONGITUDE: **117° 15' 16.17"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **21.5**
WELL DEPTH (ft): **---**
BOREHOLE DIAMETER (in): **8**
CHECKED BY: **J. Fischer**

GEO FORM 304 HECATE_CHIQUITO_SOIL_BORING_LOGS.GPJ SECOR INTL_GDT 11/19/21

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			<u>QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Q_{yy})</u>						
		SM	SILTY SAND WITH GRAVEL ; SM; 10YR 4/3 brown; 12% fine gravel; 58% fine to coarse grained sand; 30% fines; dry; no PHCO; no staining.		B-3-2'	SA			
5			Very dense below 5 feet		B-3-5'		18 36 50-5"		5
			2% fine gravel; 61% fine to coarse grained sand; 37% fines; medium dense below 7 feet		B-3-7'	DS, SA	12 27 33		
10		CL	CLAY TRACE SAND ; CL; 10YR 3/3 dark brown; 5% fine to medium grained sand; 95% fines; moist; very stiff; low plasticity; no PHCO; no staining.		B-3-10'		5 13 13		10
15					B-3-15'		9 23 41		15
20		SM	SILTY SAND WITH GRAVEL ; SM; 10YR 4/3 brown; 10% fine gravel; 60% fine to coarse grained sand; 30% fines; wet; very dense; no PHCO; no staining.		B-3-20'		9 25 29		20
			Hole terminated at 21.5 feet.						

PROJECT: **Hecate Chiquito BESS**
LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
PROJECT NUMBER: **185805178**

DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
DRILLING COMPANY: **ABC Liovin**
DRILLING EQUIPMENT: **CME-75**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-4 PAGE 1 OF 2



NORTHING (ft): EASTING (ft):
LATITUDE: **33° 35' 7.07"** LONGITUDE: **117° 15' 16.93"**
GROUND ELEV (ft): **1209** TOC ELEV (ft):
INITIAL DTW (ft): **23.0** BOREHOLE DEPTH (ft): **26.0**
STATIC DTW (ft): **23.0** WELL DEPTH (ft): ---
WELL CASING DIAMETER (in): --- BOREHOLE DIAMETER (in): **8**
LOGGED BY: **K. Grasso** CHECKED BY: **J. Fischer**

GEO FORM 304 HECATE_CHIQUITO_SOIL_BORING_LOGS.GPJ SECOR INTL_GDT 11/19/21

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			<u>QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Qyv)</u>						
		SM	SILTY SAND WITH GRAVEL ; SM; 10YR 3/4 dark yellowish brown; 10% fine gravel; 70% fine to coarse grained sand; 20% fines; moist; no PHCO; no staining.		B-4-Bulk	MDD, CORR			
					B-4-2'				
5		SP-SM	POORLY GRADED SAND WITH SILT ; SP-SM; 10YR 3/3 dark brown; 10% fine gravel; 80% fine to coarse grained sand; 10% fines; moist; very dense; no PHCO; no staining.		B-4-5'	DS	15 50-6"		5
		SM	SILTY SAND TRACE GRAVEL ; SM; 5% fine gravel; 45% fine to coarse grained sand; 50% fines; moist; medium dense; no PHCO; no staining.		B-4-7'		5 10 15		
10			SILTY SAND WITH GRAVEL ; 10% fine gravel; 70% fine to coarse grained sand; 20% fines below 10 feet		B-4-10'	DS	10 18 25		10
15		CL	CLAY WITH SAND ; CL; 5% fine to coarse grained sand; 95% fines; moist; very stiff; low plasticity; no PHCO; no staining.		B-4-15'		3 5 21		15
20			5% fine gravel; 10% fine to coarse grained sand; 85% fines; stiff below 20 feet		B-4-20'		3 5 20		20

PROJECT: **Hecate Chiquito BESS**
 LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
 PROJECT NUMBER: **185805178**

DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
 INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
 DRILLING COMPANY: **ABC Liovin**
 DRILLING EQUIPMENT: **CME-75**
 DRILLING METHOD: **Hollow Stem Auger**
 SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-4 PAGE 2 OF 2



NORTHING (ft): EASTING (ft):
 LATITUDE: **33° 35' 7.07"** LONGITUDE: **117° 15' 16.93"**
 GROUND ELEV (ft): **1209** TOC ELEV (ft):
 INITIAL DTW (ft): **23.0** BOREHOLE DEPTH (ft): **26.0**
 STATIC DTW (ft): **23.0** WELL DEPTH (ft): ---
 WELL CASING DIAMETER (in): --- BOREHOLE DIAMETER (in): **8**
 LOGGED BY: **K. Grasso** CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
25			HETEROGENEOUS GRANITIC ROCK (Khg) Grandiorite; hard; dry; slightly weathered Refusal at 26 feet. Hole terminated at 26 feet.		B-4-25'		50-6"		25
30									30
35									35
40									40

PROJECT: **Hecate Chiquito BESS**
 LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
 PROJECT NUMBER: **185805178**
 DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
 INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
 DRILLING COMPANY: **ABC Liovin**
 DRILLING EQUIPMENT: **CME-75**
 DRILLING METHOD: **Hollow Stem Auger**
 SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-5 PAGE 1 OF 1



NORTHING (ft):
 LATITUDE: **33° 35' 5.85"**
 GROUND ELEV (ft): **1207**
 INITIAL DTW (ft): **19.6**
 STATIC DTW (ft): **19.6**
 WELL CASING DIAMETER (in): ---
 LOGGED BY: **K. Grasso**

EASTING (ft):
 LONGITUDE: **117° 15' 17.83"**
 TOC ELEV (ft):
 BOREHOLE DEPTH (ft): **21.5**
 WELL DEPTH (ft): ---
 BOREHOLE DIAMETER (in): **8**
 CHECKED BY: **J. Fischer**

GEO FORM 304 HECATE_CHIQUITO_SOIL_BORING_LOGS.GPJ SECOR INTL_GDT 11/19/21

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			<u>QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Q_{yy})</u>						
		ML	SILT WITH SAND ; ML; 10YR 3/3 dark brown; 2% fine gravel; 40% fine to coarse grained sand; 58% fines; dry; no PHCO; no staining.		B-5-2'	SA			
5		SC	SAND WITH CLAY AND GRAVEL ; SC; 10YR 3/2 very dark grayish brown; 5% fine gravel; 55% fine to coarse grained sand; 40% fines; moist; dense; no PHCO; no staining.		B-5-5'	#200, AL	11 21 24		5
					B-5-7'	DS	11 17 32		
10		CL	CLAY WITH SAND ; CL; 10YR 3/2 very dark grayish brown; 10% fine to medium grained sand; 90% fines; moist; very stiff; no PHCO; no staining.		B-5-10'		5 7 12		10
15					B-5-15'		9 29 50-5"		15
20			20% fine to medium grained sand; 80% fines below 20 feet		B-5-20'		7 18 50-5"		20
			Hole terminated at 21.5 feet.						

PROJECT: **Hecate Chiquito BESS**
 LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
 PROJECT NUMBER: **185805178**

DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
 INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
 DRILLING COMPANY: **ABC Liovin**
 DRILLING EQUIPMENT: **CME-75**
 DRILLING METHOD: **Hollow Stem Auger**
 SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-6 PAGE 1 OF 1



NORTHING (ft):
 LATITUDE: **33° 35' 7.21"**
 GROUND ELEV (ft): **1204**
 INITIAL DTW (ft): **19**
 STATIC DTW (ft): **19**
 WELL CASING DIAMETER (in): **---**
 LOGGED BY: **K. Grasso**

EASTING (ft):
 LONGITUDE: **117° 15' 14.18"**
 TOC ELEV (ft):
 BOREHOLE DEPTH (ft): **21.5**
 WELL DEPTH (ft): **---**
 BOREHOLE DIAMETER (in): **8**
 CHECKED BY: **J. Fischer**

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			<u>QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Qyv)</u>						
		SM	SILTY SAND WITH GRAVEL ; SM; 10YR 3/3 dark brown; 30% fine gravel; 49% fine to coarse grained sand; 21% fines; dry; noPHCO; no staining.		B-6-Bulk	TR			
					B-6-2'	SA			
5			Medium dense below 5 feet.		B-6-5'		12 12 9		5
		SC	CLAYEY SAND ; SC; 10YR 3/2 very dark grayish brown; 20% fine gravel; 65% fine to coarse grained sand; 15% fines; moist; medium dense; no PHCO; no staining.		B-6-7'		8 9 18		
10					B-6-10'	DS	4 9 21		10
15			10YR 3/3 dark brown; 25% gravel; 55% fine to coarse grained sand; 20% fines; dense below 15 feet.		B-6-15'		9 21 19		15
20			Medium dense below 20 feet.		B-6-20'		4 12 25		20
			Hole terminated at 21.5 feet.						

PROJECT: **Hecate Chiquito BESS**
LOCATION: **Clinton Keith Rd & Grand Ave, Wildomar, CA**
PROJECT NUMBER: **185805178**

DRILLING: STARTED **10/7/21** COMPLETED: **10/7/21**
INSTALLATION: STARTED **10/7/21** COMPLETED: **10/7/21**
DRILLING COMPANY: **ABC Liovin**
DRILLING EQUIPMENT: **CME-75**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING EQUIPMENT: **Split Spoon**

WELL / TEST PIT / BOREHOLE NO:

B-7 PAGE 1 OF 1



NORTHING (ft):
LATITUDE: **33° 35' 4.78"**
GROUND ELEV (ft): **1206**
INITIAL DTW (ft): **NE**
STATIC DTW (ft): **NE**
WELL CASING DIAMETER (in): **---**
LOGGED BY: **K. Grasso**

EASTING (ft):
LONGITUDE: **117° 15' 16.07"**
TOC ELEV (ft):
BOREHOLE DEPTH (ft): **21.5**
WELL DEPTH (ft): **---**
BOREHOLE DIAMETER (in): **8**
CHECKED BY: **J. Fischer**

GEO FORM 304 HECATE_CHIQUITO_SOIL_BORING_LOGS.GPJ SECOR INTL_GDT 11/19/21

Time & Depth (feet)	Graphic Log	USCS	Description	Sample	Time Sample ID	Geotechnical Lab Testing	Blow Count	PID Reading (ppmv)	Depth (feet)
			<u>QUATERNARY YOUNG ALLUVIAL VALLEY DEPOSITS (Q_{yy})</u>						
		SM	SILTY SAND ; SM; 10YR 4/3 brown; 11% fine gravel; 50% fine to coarse grained sand; 39% fines; dry; no PHCO; no staining.		B-7-Bulk	MDD, CORR, TR			
					B-7-1'	SA			
5		SC	CLAYEY SAND ; SC; 10YR 3/3 dark brown; 5% fine gravel; 53% fine to coarse grained sand; 42% fines; moist; dense; no PHCO; no staining. Medium dense below 7 feet		B-7-5'	#200	11 12 18		5
					B-7-7'		7 7 18		
10		CL	SANDY CLAY ; CL; 10YR 3/6 dark yellowish brown; 5% fine gravel; 35% fine to coarse grained sand; 60% fines; moist; very stiff; no PHCO; no staining.		B-7-10'		7 12 15		10
15			5% fine gravel; 15% fine to coarse grained sand; 80% fines below 15 feet		B-7-15'		5 10 27		15
20		SM	SILTY SAND WITH GRAVEL ; SM; 10YR 3/6 dark yellowish brown; 5% fine gravel; 70% fine to coarse grained sand; 25% fines; moist; very dense; no PHCO; no staining.		B-7-20'		37 50-6"		20
			Hole terminated at 21.5 feet.						

DRAFT

APPENDIX B LABORATORY TEST RESULTS

Gradation Analysis

ASTM D 422

Project Name Hecate Chiquito BESS

Source Grab

Project Number 185805178

Lab ID B1-2'

Preparation Method ASTM D 1140 Method A

Particle Shape

Particle Hardness

Sample Dry Mass (g)	392.10
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Moisture Content (%)	4.1
----------------------	-----

Date Received 10-18-2021

Preparation Date 10-21-2021

Test Date 10-22-2021

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
1/2"	0.00	0.0	100.0
3/8"	13.40	3.4	96.6
No. 4	23.70	6.0	90.5
No. 8	30.60	7.8	82.7
No. 16	45.20	11.5	71.2
No. 30	37.40	9.5	61.7
No. 50	38.80	9.9	51.8
No. 100	41.00	10.5	41.3
No. 200	38.00	9.7	31.6
Pan	124.00	31.6	---

% Gravel	9.5
----------	-----

% Sand	58.9
--------	------

% Fines	31.6
---------	------

Fines Classification	ML
----------------------	----

D ₁₀ (mm)	N/A
----------------------	-----

D ₃₀ (mm)	N/A
----------------------	-----

D_{30} (mm)	N/A
D_{60} (mm)	N/A

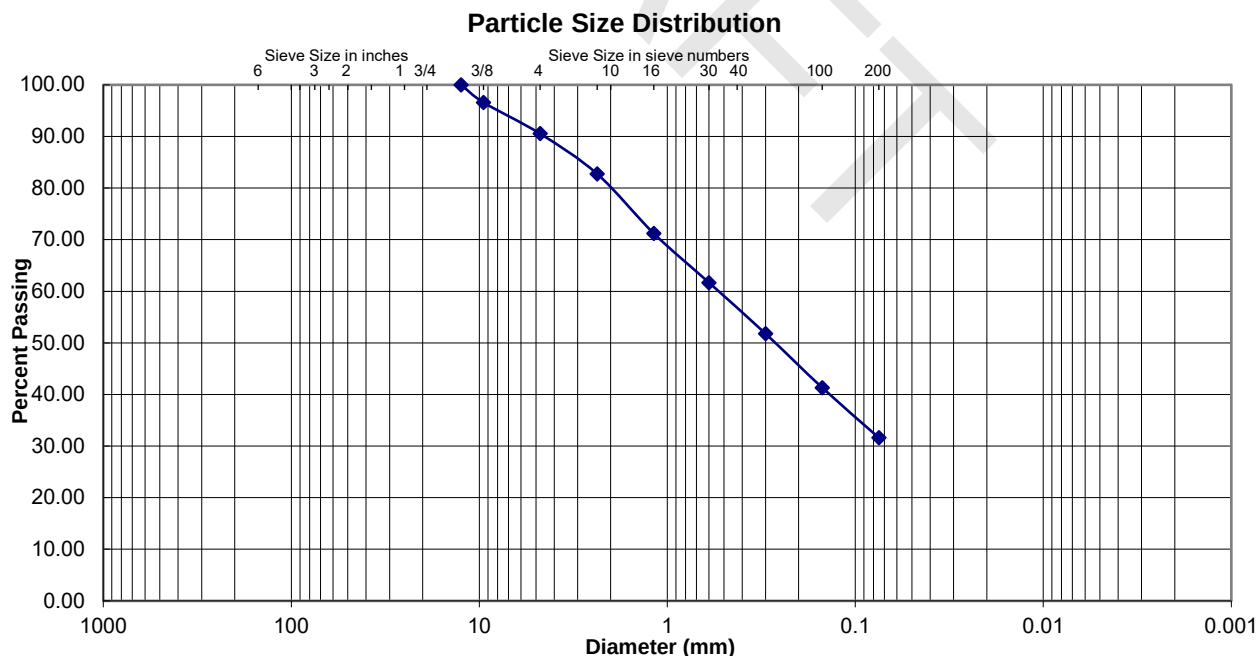
Cu N/A

Cc N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.



Comments

Reviewed By JF

Gradation Analysis

ASTM D 422

Project Name Hecate Chiquito BESS

Source Grab

Project Number 185805178

Lab ID B2-2'

Preparation Method ASTM D 1140 Method A

Particle Shape

Particle Hardness

Sample Dry Mass (g)	307.90
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Moisture Content (%)	4.4
----------------------	-----

Date Received 10-18-2021

Preparation Date 10-21-2021

Test Date 10-22-2021

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
3/8"	0.00	0.0	100.0
No. 4	9.40	3.1	96.9
No. 8	13.70	4.4	92.5
No. 16	18.80	6.1	86.4
No. 30	22.80	7.4	79.0
No. 50	26.40	8.6	70.4
No. 100	34.00	11.0	59.4
No. 200	39.00	12.7	46.7
Pan	143.80	46.7	---

% Gravel	3.1
----------	-----

% Sand	50.2
--------	------

% Fines	46.7
---------	------

Fines Classification	ML
----------------------	----

D ₁₀ (mm)	N/A
----------------------	-----

D ₃₀ (mm)	N/A
----------------------	-----

D_{30} (mm)	N/A
D_{60} (mm)	N/A

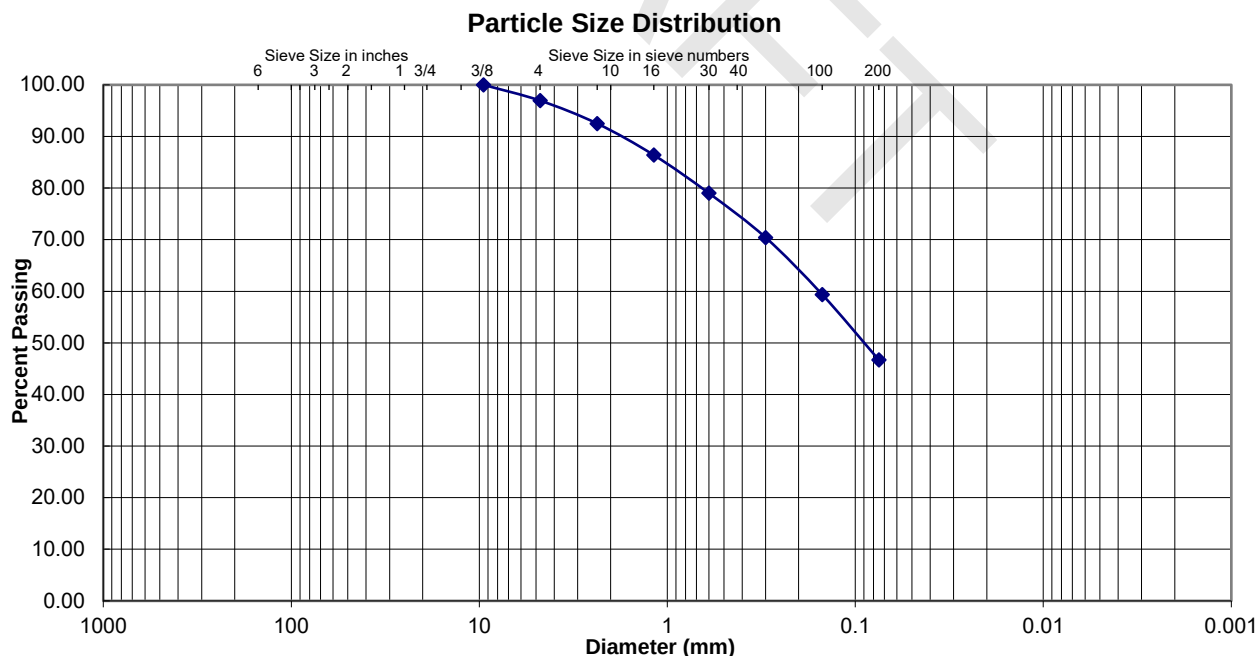
Cu N/A

Cc N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.



Comments

Reviewed By _____ JF

Project Name Hecate Chiquito BESS
Source CalMod
Preparation Method ASTM D 1140 Method A

Project Number 185805178
Lab ID B2-5'
Date Received 10-18-2021
Test Date 10-21-2021

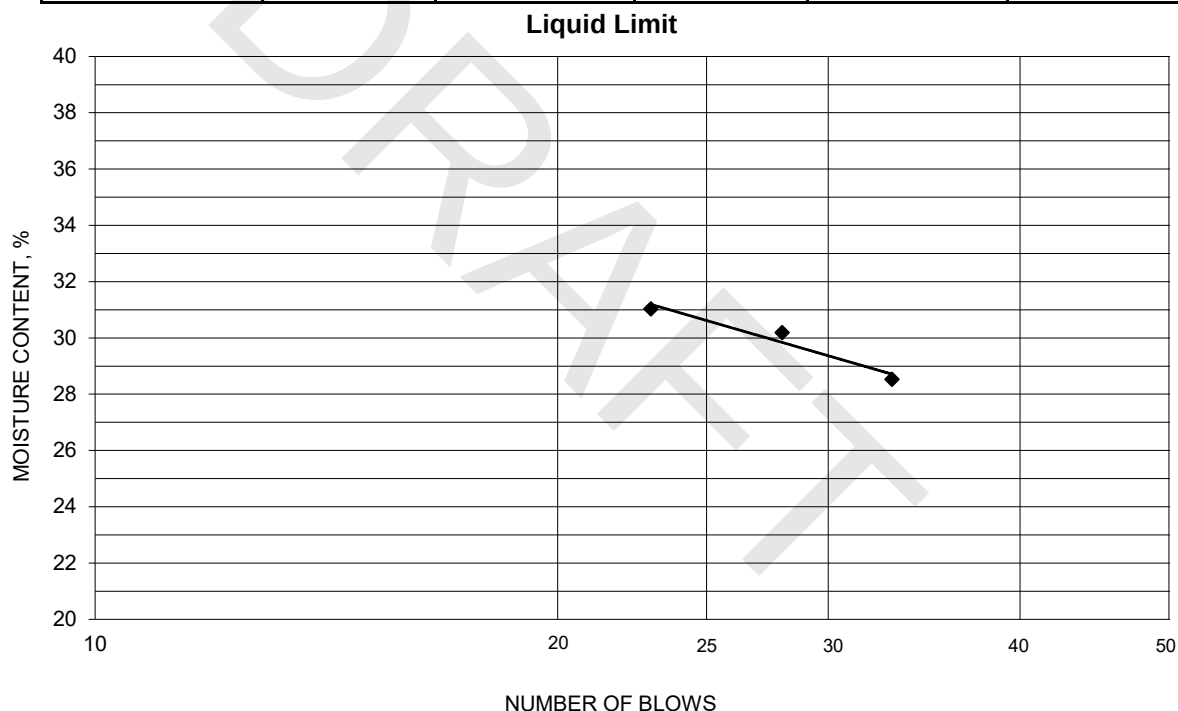
Initial Sample Wet Mass (g)	<u>231.50</u>	Moisture Content (%)	<u>9.9</u>
Initial Oven Dry Sample Mass (g)	<u>210.70</u>		
Final Oven Dry Sample Mass (g)	<u>72.80</u>		
Materials Finer Than 75µm (No. 200) Sieve (g)	<u>137.90</u>		
Percent Finer Than 75µm (No. 200) Sieve (%)	<u>65.4</u>		

Comments _____

Reviewed By JF

Project	Hecate Chiquito BESS	Project No.	185805178
Source	CalMod	Lab ID	B2-5'
Tested By	JP	Test Method	ASTM D 4318
Test Date	02-25-2021	Prepared	Dry
		% + No. 40	10
		Date Received	10-18-2021

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
17.49	16.60	13.48	33	28.5	31
19.75	18.28	13.41	28	30.2	
19.72	18.28	13.64	23	31.0	



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
19.73	18.85	13.74	17.2	17	14

Remarks: USCS Soil Type = Clay (CL)

Reviewed By JF

Gradation Analysis

ASTM D 422

Project Name Hecate Chiquito BESS

Source Grab

Project Number 185805178

Lab ID B3-2'

Preparation Method ASTM D 1140 Method A

Particle Shape

Particle Hardness

Sample Dry Mass (g)	318.70
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Moisture Content (%)	4.2
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Date Received 10-18-2021

Preparation Date 10-21-2021

Test Date 10-22-2021

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
1/2"	0.00	0.0	100.0
3/8"	16.90	5.3	94.7
No. 4	20.40	6.4	88.3
No. 8	25.40	8.0	80.3
No. 16	34.60	10.9	69.5
No. 30	30.80	9.7	59.8
No. 50	32.20	10.1	49.7
No. 100	32.90	10.3	39.4
No. 200	29.70	9.3	30.1
Pan	95.80	30.1	---

% Gravel	11.7
----------	------

% Sand	<u>58.2</u>
--------	-------------

% Fines	30.1
---------	------

Fines Classification	ML
----------------------	----

D ₁₀ (mm)	N/A
----------------------	-----

D ₃₀ (mm)	N/A
----------------------	-----

D ₆₀ (mm)	N/A
----------------------	-----

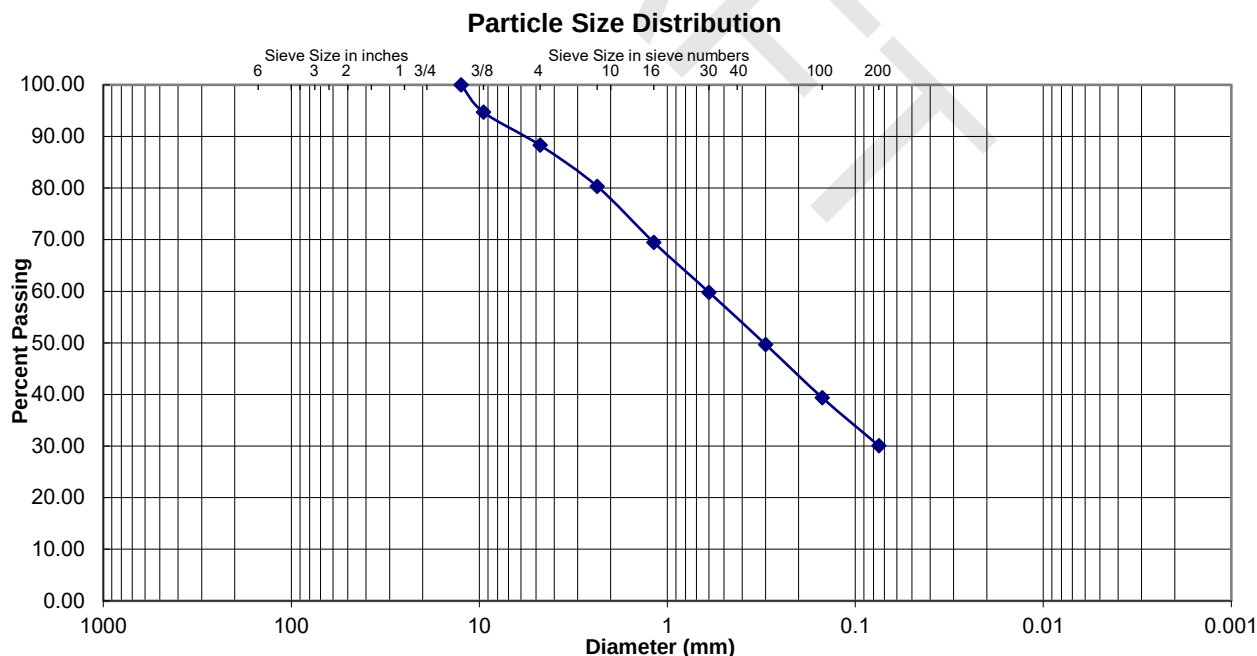
Cu N/A

Cc N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.



Comments

Reviewed By _____ JF

Gradation Analysis

ASTM D 422

Project Name Hecate Chiquito BESS

Source	CalMod
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Project Number 185805178

Lab ID B3-7'

Preparation Method ASTM D 1140 Method A

Particle Shape

Particle Hardness

Sample Dry Mass (g)	316.40
---------------------	--------

Moisture Content (%)	7.5
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Date Received 10-18-2021

Preparation Date 10-21-2021

Test Date 10-22-2021

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
3/8"	0.00	0.0	100.0
No. 4	6.70	2.1	97.9
No. 8	21.80	6.9	91.0
No. 16	32.00	10.1	80.9
No. 30	31.20	9.9	71.0
No. 50	38.10	12.0	59.0
No. 100	36.90	11.7	47.3
No. 200	33.80	10.7	36.6
Pan	115.90	36.6	---

% Gravel	2.1
----------	-----

% Sand	61.3
--------	------

% Fines	36.6
---------	------

Fines Classification	ML
----------------------	----

D ₁₀ (mm)	N/A
----------------------	-----

D ₃₀ (mm)	N/A
----------------------	-----

D_{30} (mm)	N/A
D_{60} (mm)	N/A

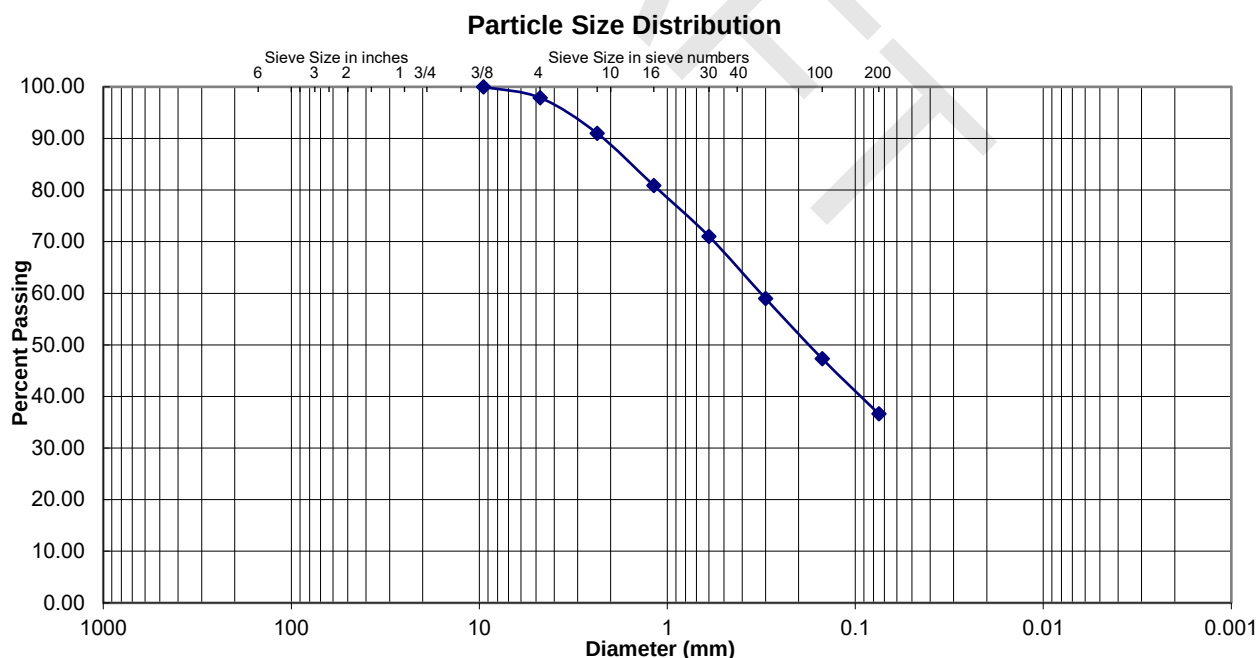
Cu N/A

Cc N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.



Comments

Reviewed By _____ JF

Gradation Analysis

ASTM D 422

Project Name Hecate Chiquito BESS

Source Grab

Project Number 185805178

Lab ID B5-2'

Preparation Method ASTM D 1140 Method A

Particle Shape

Particle Hardness

Sample Dry Mass (g)	342.70
---------------------	--------

Moisture Content (%)	5.5
----------------------	-----

Date Received 10-18-2021

Preparation Date	10-21-2021
------------------	------------

Test Date 10-22-2021

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
1/2"	0.00	0.0	100.0
3/8"	4.60	1.3	98.7
No. 4	3.10	0.9	97.8
No. 8	8.20	2.4	95.4
No. 16	12.60	3.7	91.7
No. 30	16.80	4.9	86.8
No. 50	22.50	6.6	80.2
No. 100	34.10	10.0	70.3
No. 200	43.00	12.5	57.7
Pan	197.80	57.7	---

% Gravel	2.2
----------	-----

% Sand	40.0
--------	------

% Fines	57.7
---------	------

Fines Classification	ML
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D ₁₀ (mm)	N/A
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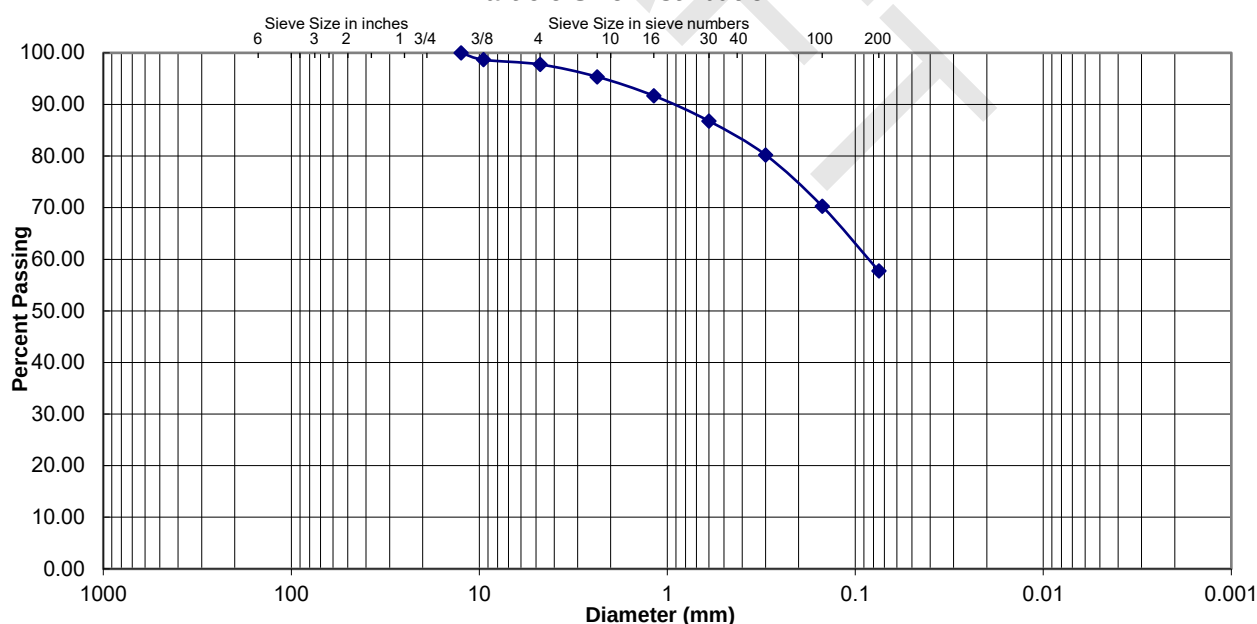
D ₃₀ (mm)	N/A
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D_{30} (mm)	N/A
D_{60} (mm)	N/A

Cu N/A

C_c N/A

Particle Size Distribution



Comments

Reviewed By _____ JF

Project Name Hecate Chiquito BESS
Source SPT
Preparation Method ASTM D 1140 Method A

Project Number 185805178
Lab ID B5-5'
Date Received 10-18-2021
Test Date 10-21-2021

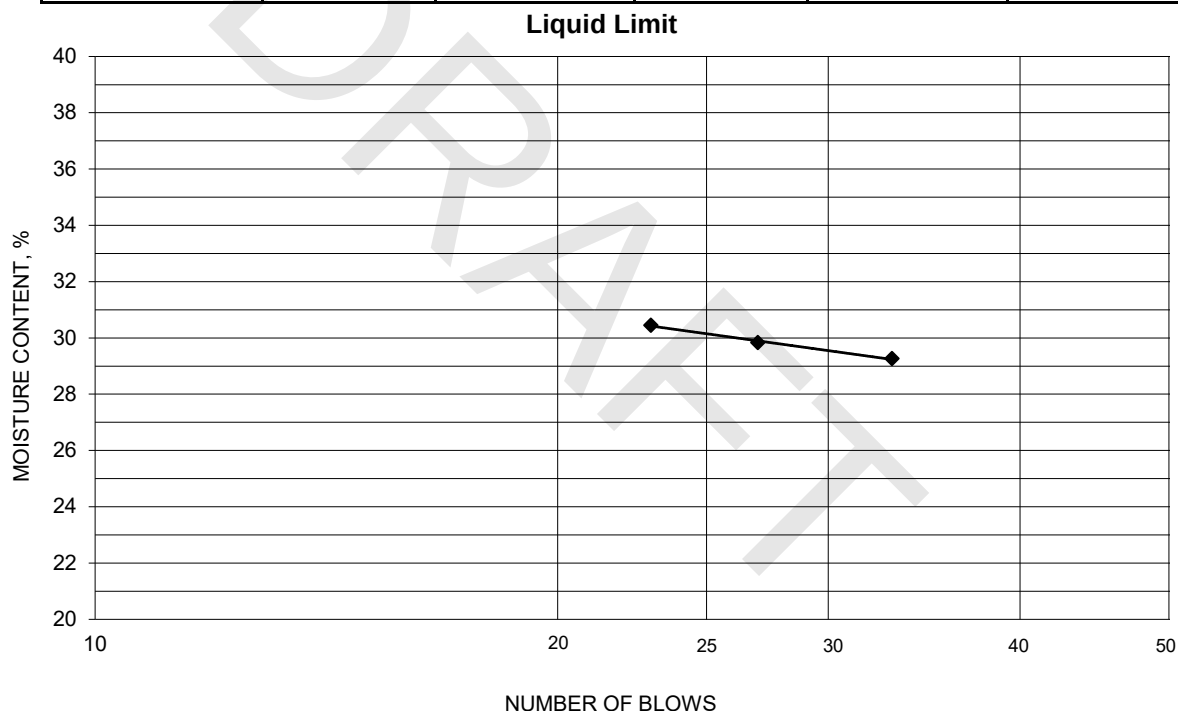
Initial Sample Wet Mass (g)	<u>240.10</u>	Moisture Content (%)	<u>15.5</u>
Initial Oven Dry Sample Mass (g)	<u>207.80</u>		
Final Oven Dry Sample Mass (g)	<u>124.70</u>		
Materials Finer Than 75µm (No. 200) Sieve (g)	<u>83.10</u>		
Percent Finer Than 75µm (No. 200) Sieve (%)	<u>40.0</u>		

Comments

Reviewed By JF

Project	Hecate Chiquito BESS	Project No.	185805178
Source	SPT	Lab ID	B5-5'
Tested By	JP	Test Method	ASTM D 4318
Test Date	02-25-2021	Prepared	Dry
		% + No. 40	20
		Date Received	10-18-2021

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Number of Blows	Water Content (%)	Liquid Limit
19.19	17.92	13.58	33	29.3	30
18.26	17.18	13.56	27	29.8	
18.63	17.43	13.49	23	30.5	



PLASTIC LIMIT AND PLASTICITY INDEX

Wet Soil and Tare Mass (g)	Dry Soil and Tare Mass (g)	Tare Mass (g)	Water Content (%)	Plastic Limit	Plasticity Index
20.48	19.30	13.43	20.1	20	10

Remarks: USCS Soil Type = Clay (CL)

Reviewed By JF

Project Name Hecate Chiquito BESS
 Source Grab

 Project Number 185805178

 Lab ID B6-2'

 Preparation Method ASTM D 1140 Method A

 Date Received 10-18-2021

 Preparation Date 10-21-2021

Particle Shape _____

 Test Date 10-22-2021

Particle Hardness _____

 Sample Dry Mass (g) 352.40

 Moisture Content (%) 4.9

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
1"	0.00	0.0	100.0
3/4"	55.20	15.7	84.3
1/2"	22.30	6.3	78.0
3/8"	11.00	3.1	74.9
No. 4	17.60	5.0	69.9
No. 8	27.10	7.7	62.2
No. 16	34.40	9.8	52.4
No. 30	26.30	7.5	45.0
No. 50	27.80	7.9	37.1
No. 100	30.20	8.6	28.5
No. 200	27.70	7.9	20.7
Pan	72.80	20.7	---

 % Gravel 30.1

 % Sand 49.2

 % Fines 20.7

 Fines Classification ML

 D₁₀ (mm) N/A

 D₃₀ (mm) N/A

 D₆₀ (mm) N/A

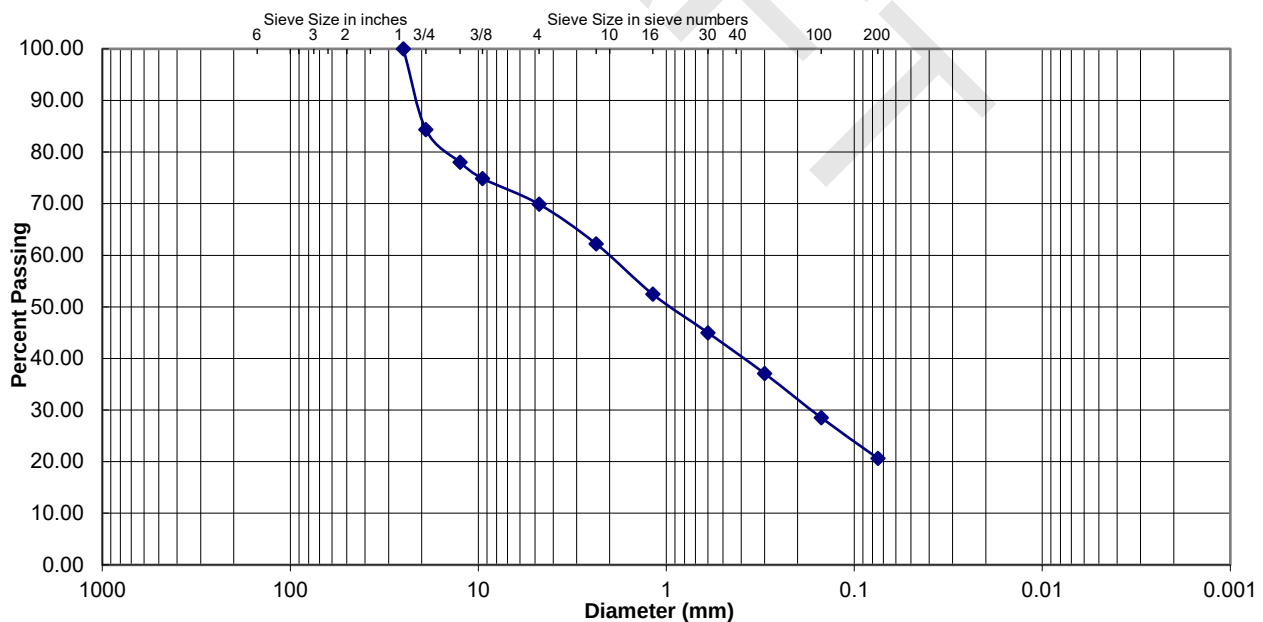
 Cu N/A

 Cc N/A

Classification

Silty Sand (SM) with Gravel

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution


Comments _____

Reviewed By _____

Project Name Hecate Chiquito BESS

 Source Grab

 Project Number 185805178

 Lab ID B7-2'

 Preparation Method ASTM D 1140 Method A

Particle Shape _____

Particle Hardness _____

 Sample Dry Mass (g) 369.10

 Moisture Content (%) 3.8

 Date Received 10-18-2021

 Preparation Date 10-21-2021

 Test Date 10-22-2021

Analysis based on total sample.

Sieve Size	Grams Retained	% Retained	% Passing
3/4"	0.00	0.0	100.0
1/2"	29.40	8.0	92.0
3/8"	0.00	0.0	92.0
No. 4	11.70	3.2	88.9
No. 8	22.40	6.1	82.8
No. 16	44.60	12.1	70.7
No. 30	40.20	10.9	59.8
No. 50	20.90	5.7	54.2
No. 100	20.10	5.4	48.7
No. 200	35.00	9.5	39.2
Pan	144.80	39.2	---

 % Gravel 11.1

 % Sand 49.6

 % Fines 39.2

 Fines Classification ML

 D₁₀ (mm) N/A

 D₃₀ (mm) N/A

 D₆₀ (mm) N/A

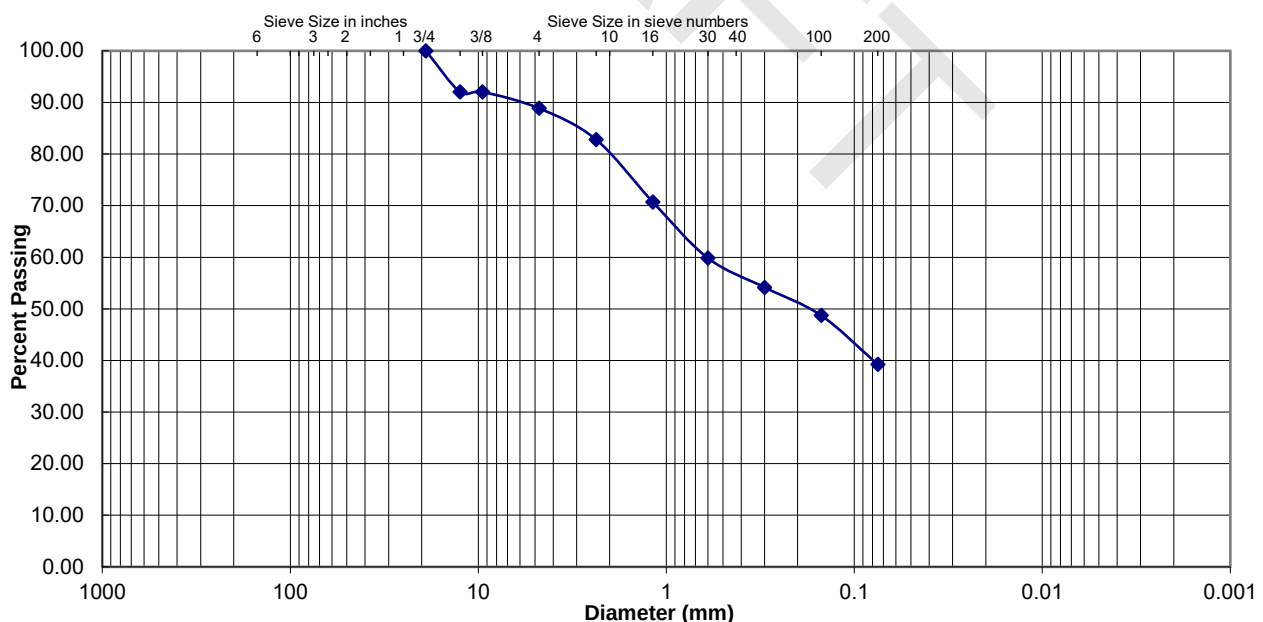
 Cu N/A

 Cc N/A

Classification

Silty Sand (SM)

Classification determined by ASTM D 2487. -200 material classification determined by visual assessment, ASTM D 2488.

Particle Size Distribution


Comments _____

Reviewed By _____

Project Name Hecate Chiquito BESS
Source SPT

Project Number 185805178
Lab ID B7-5'

Preparation Method ASTM D 1140 Method A

Date Received 10-18-2021
Test Date 10-21-2021

Initial Sample Wet Mass (g)	<u>214.50</u>	Moisture Content (%)	<u>10.5</u>
Initial Oven Dry Sample Mass (g)	<u>194.20</u>		
Final Oven Dry Sample Mass (g)	<u>113.70</u>		
Materials Finer Than 75µm (No. 200) Sieve (g)	<u>80.50</u>		
Percent Finer Than 75µm (No. 200) Sieve (%)	<u>41.5</u>		

Comments

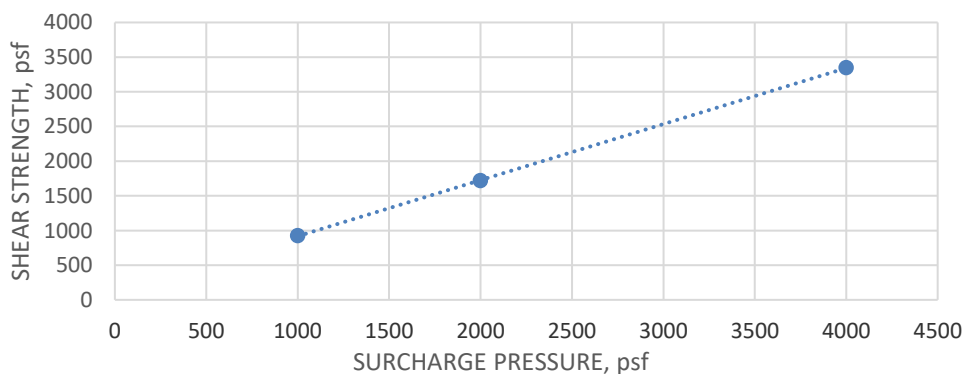
Reviewed By

JD & S Testing

Direct Shear Moisture Content & Density

Project Name: Hecate Chiquito BESS Project Number: 185805178
 Sampled By: Client Sample Date: 10/7/2021 Lab #: B1-7
 Source/Location: B1-7 Tested By: JP
 Description: _____ Test Date: 10/23/2021

Shearing Rate (in./min.)		0.040		
Normal Pressure (psf)		1000	2000	4000
[A]	Initial Weight of Wet Soil + Ring (0.1g)	195.1	203.1	203.6
[B]	Weight of Ring (0.1g)	45.5	44.3	45.6
[C] = [A] - [B]	Initial Weight of Wet Soil (0.1g)	149.6	158.8	158.0
[D]	Initial Reading	Time	0.0000	0.0000
		Time		
		Time		
		Time		
[E]	Final Reading	Time	0.0231	0.0148
[F] = [E] - [D]	Height Change		0.0231	0.0148
[G] = 1 - [F]	Final Height		0.9769	0.9852
Shear Strength (psf)		924	1716	3346
[H]	Final Weight of Wet Soil (0.1g)	157.1	169.6	167.8
[J]	Weight of Dry Soil (0.1g)	137.0	149.8	147.7
[K]	Specific Gravity	2.7		
[L]	Maximum Dry Density (0.1pcf)	120.4		
[M]	Initial Volume (0.01 cubic inch)	4.60	4.60	4.60
[P] = ([C] - [J]) / [J]	Initial Moisture Content (0.1%)	9.2%	6.0%	7.0%
[Q] = [C] / [M] * 3.81	Initial Wet Density (0.1pcf)	123.9	131.5	130.9
[R] = [Q] / (1 + [P])	Initial Dry Density (0.1pcf)	113.5	124.1	122.3
[S] = [P] x [K] x [R] / ([K] x 62.3) - [R]	Initial Saturation (0.1%)	56.2%	48.3%	53.7%
[T] = [R] / [L]	Initial Relative Compaction (0.1%)	94.2%	103.0%	101.6%
[U] = [M] X [G]	Final Volume (0.01 cubic inch)	4.49	4.53	4.58
[V] = ([H] - [J]) / [J]	Final Moisture Content (0.1%)	14.7%	13.2%	13.6%
[W] = [H] / [U] * 3.81	Final Wet Density (0.1pcf)	133.2	142.6	139.6
[X] = [W] / (1 + [V])	Final Dry Density (0.1pcf)	116.2	125.9	122.9
[Y] = [V] x [K] x [X] / ([K] x 62.3) - [X]	Final Saturation (0.1%)	88.4%	106.3%	99.6%
[Z] = [X] / [L]	Final Relative Compaction (0.1%)	96.4%	104.6%	102.0%



Cohesion (psf)	110
Friction Angle (degrees)	39

Remarks: _____

Reviewed by: _____

JD & S Testing

Direct Shear Moisture Content & Density

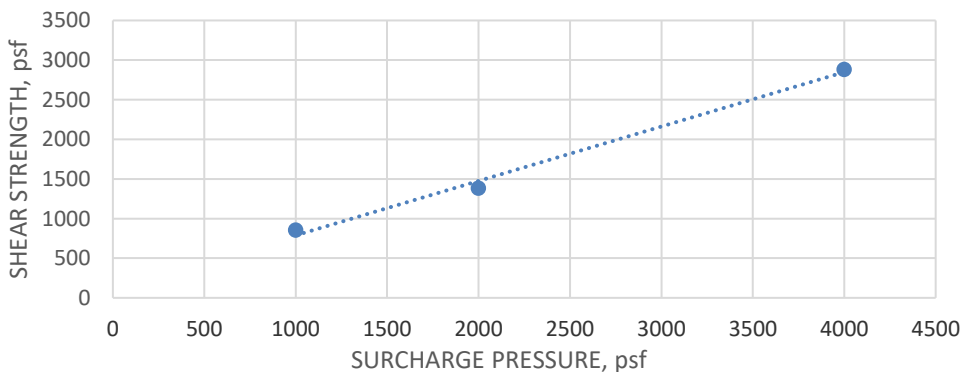
Project Name: Hecate Chiquito BESS Project Number: 185805178

Sampled By: Client Sample Date: 10/7/2021 Lab #: B2-5

Source/Location: B2-5 Tested By: JP

Description: _____ Test Date: 10/23/2021

Shearing Rate (in./min.)		0.040		
Normal Pressure (psf)		1000	2000	4000
[A]	Initial Weight of Wet Soil + Ring (0.1g)	200.7	197.9	192.7
[B]	Weight of Ring (0.1g)	45.6	45.7	45.6
[C] = [A] - [B]	Initial Weight of Wet Soil (0.1g)	155.1	152.2	147.1
[D]	Initial Reading	Time	0.0000	0.0000
		Time		
		Time		
		Time		
[E]	Final Reading	Time	0.0315	0.0052
[F] = [E] - [D]	Height Change		0.0315	0.0052
[G] = 1 - [F]	Final Height		0.9685	0.9948
Shear Strength (psf)		852	1380	2880
[H]	Final Weight of Wet Soil (0.1g)	161.8	159.6	152.4
[J]	Weight of Dry Soil (0.1g)	134.9	133.7	128.2
[K]	Specific Gravity	2.7		
[L]	Maximum Dry Density (0.1pcf)	110.0		
[M]	Initial Volume (0.01 cubic inch)	4.60	4.60	4.60
[P] = ([C] - [J]) / [J]	Initial Moisture Content (0.1%)	15.0%	13.8%	14.7%
[Q] = [C] / [M] * 3.81	Initial Wet Density (0.1pcf)	128.5	126.1	121.8
[R] = [Q] / (1 + [P])	Initial Dry Density (0.1pcf)	111.7	110.7	106.2
[S] = [P] x [K] x [R] / ([K] x 62.3) - [R]	Initial Saturation (0.1%)	92.0%	81.9%	78.2%
[T] = [R] / [L]	Initial Relative Compaction (0.1%)	101.6%	100.7%	96.5%
[U] = [M] x [G]	Final Volume (0.01 cubic inch)	4.46	4.58	4.54
[V] = ([H] - [J]) / [J]	Final Moisture Content (0.1%)	19.9%	19.4%	18.9%
[W] = [H] / [U] * 3.81	Final Wet Density (0.1pcf)	138.4	132.9	127.8
[X] = [W] / (1 + [V])	Final Dry Density (0.1pcf)	115.4	111.3	107.5
[Y] = [V] x [K] x [X] / ([K] x 62.3) - [X]	Final Saturation (0.1%)	117.5%	102.3%	90.3%
[Z] = [X] / [L]	Final Relative Compaction (0.1%)	104.9%	101.2%	97.8%



Cohesion (psf)	110
Friction Angle (degrees)	34

Remarks: _____

Reviewed by: _____

JD & S Testing

Direct Shear Moisture Content & Density

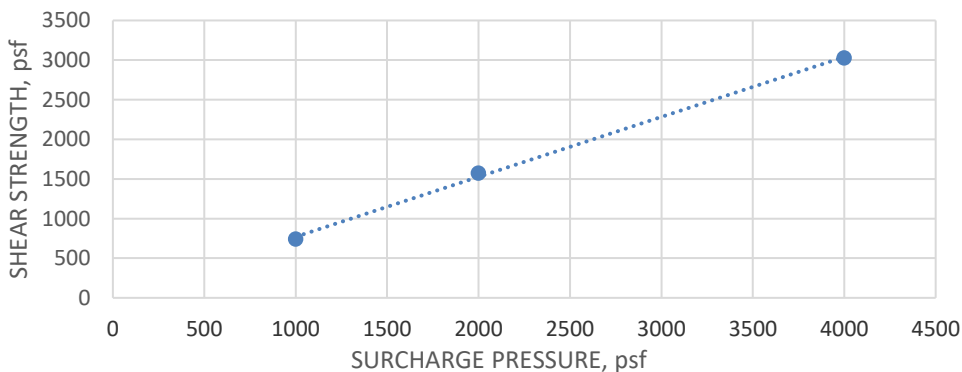
Project Name: Hecate Chiquito BESS Project Number: 185805178

Sampled By: Client Sample Date: 10/7/2021 Lab #: B3-7

Source/Location: B3-7 Tested By: JP

Description: _____ Test Date: 10/23/2021

Shearing Rate (in./min.)		0.040		
Normal Pressure (psf)		1000	2000	4000
[A]	Initial Weight of Wet Soil + Ring (0.1g)	198.7	200.7	201.6
[B]	Weight of Ring (0.1g)	45.6	46.1	45.3
[C] = [A] - [B]	Initial Weight of Wet Soil (0.1g)	153.1	154.6	156.3
[D]	Initial Reading	Time	0.0000	0.0000
		Time		
		Time		
		Time		
[E]	Final Reading	Time	0.0235	0.0141
[F] = [E] - [D]	Height Change		0.0235	0.0141
[G] = 1 - [F]	Final Height		0.9765	0.9859
Shear Strength (psf)		740	1572	3024
[H]	Final Weight of Wet Soil (0.1g)	160.8	161.6	164.3
[J]	Weight of Dry Soil (0.1g)	141.6	143.2	145.0
[K]	Specific Gravity	2.7		
[L]	Maximum Dry Density (0.1pcf)	119.1		
[M]	Initial Volume (0.01 cubic inch)	4.60	4.60	4.60
[P] = ([C] - [J]) / [J]	Initial Moisture Content (0.1%)	8.1%	8.0%	7.8%
[Q] = [C] / [M] * 3.81	Initial Wet Density (0.1pcf)	126.8	128.0	129.5
[R] = [Q] / (1 + [P])	Initial Dry Density (0.1pcf)	117.3	118.6	120.1
[S] = [P] x [K] x [R] / ([K] x 62.3) - [R]	Initial Saturation (0.1%)	54.6%	55.5%	56.6%
[T] = [R] / [L]	Initial Relative Compaction (0.1%)	98.4%	99.6%	100.8%
[U] = [M] x [G]	Final Volume (0.01 cubic inch)	4.49	4.54	4.57
[V] = ([H] - [J]) / [J]	Final Moisture Content (0.1%)	13.6%	12.8%	13.3%
[W] = [H] / [U] * 3.81	Final Wet Density (0.1pcf)	136.4	135.8	136.9
[X] = [W] / (1 + [V])	Final Dry Density (0.1pcf)	120.1	120.3	120.8
[Y] = [V] x [K] x [X] / ([K] x 62.3) - [X]	Final Saturation (0.1%)	91.4%	87.1%	91.6%
[Z] = [X] / [L]	Final Relative Compaction (0.1%)	100.8%	101.0%	101.4%



Cohesion (psf)	20
Friction Angle (degrees)	37

Remarks: _____

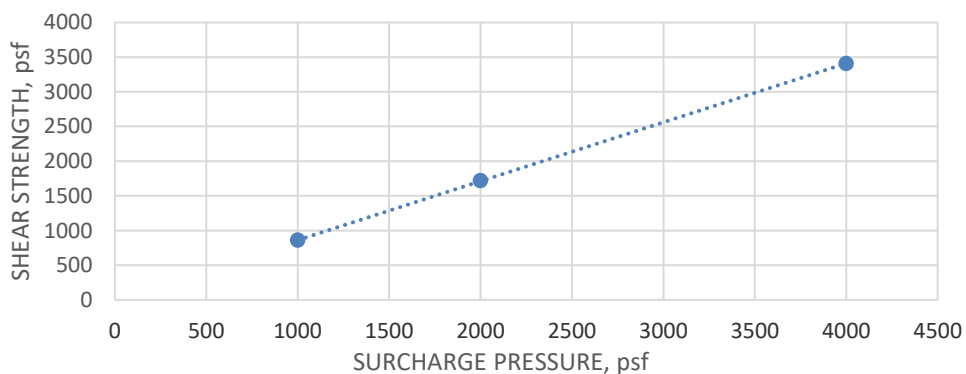
Reviewed by: _____

JD & S Testing

Direct Shear Moisture Content & Density

Project Name: Hecate Chiquito BESS Project Number: 185805178
 Sampled By: Client Sample Date: 10/7/2021 Lab #: B4-5
 Source/Location: B4-5 Tested By: JP
 Description: _____ Test Date: 10/23/2021

Shearing Rate (in./min.)		0.040		
Normal Pressure (psf)		1000	2000	4000
[A]	Initial Weight of Wet Soil + Ring (0.1g)	194.2	192.6	197.5
[B]	Weight of Ring (0.1g)	43.0	42.3	46.3
[C] = [A] - [B]	Initial Weight of Wet Soil (0.1g)	151.2	150.3	151.2
[D]	Initial Reading	Time	0.0000	0.0000
		Time		
		Time		
		Time		
[E]	Final Reading	Time	0.0040	0.0052
[F] = [E] - [D]	Height Change		0.0040	0.0052
[G] = 1 - [F]	Final Height		0.9960	0.9948
Shear Strength (psf)		858	1716	3408
[H]	Final Weight of Wet Soil (0.1g)	159.3	158.1	160.3
[J]	Weight of Dry Soil (0.1g)	138.4	139.4	142.5
[K]	Specific Gravity	2.7		
[L]	Maximum Dry Density (0.1pcf)	116.5		
[M]	Initial Volume (0.01 cubic inch)	4.60	4.60	4.60
[P] = ([C] - [J]) / [J]	Initial Moisture Content (0.1%)	9.2%	7.8%	6.1%
[Q] = [C] / [M] * 3.81	Initial Wet Density (0.1pcf)	125.2	124.5	125.2
[R] = [Q] / (1 + [P])	Initial Dry Density (0.1pcf)	114.6	115.5	118.0
[S] = [P] x [K] x [R] / ([K] x 62.3) - [R]	Initial Saturation (0.1%)	58.4%	49.8%	41.1%
[T] = [R] / [L]	Initial Relative Compaction (0.1%)	98.4%	99.1%	101.3%
[U] = [M] X [G]	Final Volume (0.01 cubic inch)	4.58	4.58	4.57
[V] = ([H] - [J]) / [J]	Final Moisture Content (0.1%)	15.1%	13.4%	12.5%
[W] = [H] / [U] * 3.81	Final Wet Density (0.1pcf)	132.5	131.6	133.5
[X] = [W] / (1 + [V])	Final Dry Density (0.1pcf)	115.1	116.1	118.7
[Y] = [V] x [K] x [X] / ([K] x 62.3) - [X]	Final Saturation (0.1%)	88.3%	80.6%	80.9%
[Z] = [X] / [L]	Final Relative Compaction (0.1%)	98.8%	99.6%	101.9%



Cohesion (psf)	20
Friction Angle (degrees)	40

Remarks: _____ Reviewed by: _____

JD & S Testing

Direct Shear Moisture Content & Density

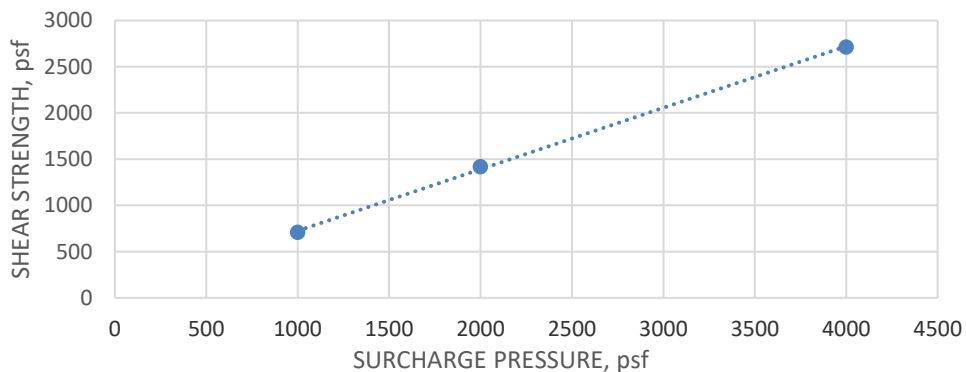
Project Name: Hecate Chiquito BESS Project Number: 185805178

Sampled By: Client Sample Date: 10/7/2021 Lab #: B4-10

Source/Location: B4-10 Tested By: JP

Description: _____ Test Date: 10/23/2021

Shearing Rate (in./min.)		0.040		
Normal Pressure (psf)		1000	2000	4000
[A]	Initial Weight of Wet Soil + Ring (0.1g)	203.4	198.2	201.4
[B]	Weight of Ring (0.1g)	45.8	45.6	45.7
[C] = [A] - [B]	Initial Weight of Wet Soil (0.1g)	157.6	152.6	155.7
[D]	Initial Reading	Time	0.0000	0.0000
		Time		
		Time		
		Time		
[E]	Final Reading	Time	0.0108	0.0018
[F] = [E] - [D]	Height Change		0.0108	0.0018
[G] = 1 - [F]	Final Height		0.9892	0.9981
Shear Strength (psf)		708	1416	2712
[H]	Final Weight of Wet Soil (0.1g)	160.9	155.8	158.0
[J]	Weight of Dry Soil (0.1g)	139.5	135.7	137.4
[K]	Specific Gravity	2.7		
[L]	Maximum Dry Density (0.1pcf)	114.4		
[M]	Initial Volume (0.01 cubic inch)	4.60	4.60	4.60
[P] = ([C] - [J]) / [J]	Initial Moisture Content (0.1%)	13.0%	12.5%	13.3%
[Q] = [C] / [M] * 3.81	Initial Wet Density (0.1pcf)	130.5	126.4	129.0
[R] = [Q] / (1 + [P])	Initial Dry Density (0.1pcf)	115.5	112.4	113.8
[S] = [P] x [K] x [R] / ([K] x 62.3) - [R]	Initial Saturation (0.1%)	86.8%	76.1%	85.2%
[T] = [R] / [L]	Initial Relative Compaction (0.1%)	101.0%	98.3%	99.5%
[U] = [M] x [G]	Final Volume (0.01 cubic inch)	4.55	4.59	4.59
[V] = ([H] - [J]) / [J]	Final Moisture Content (0.1%)	15.3%	14.8%	15.0%
[W] = [H] / [U] * 3.81	Final Wet Density (0.1pcf)	134.7	129.3	131.1
[X] = [W] / (1 + [V])	Final Dry Density (0.1pcf)	116.8	112.6	114.0
[Y] = [V] x [K] x [X] / ([K] x 62.3) - [X]	Final Saturation (0.1%)	94.1%	81.0%	85.2%
[Z] = [X] / [L]	Final Relative Compaction (0.1%)	102.1%	98.4%	99.7%



Cohesion (psf)	60
Friction Angle (degrees)	34

Remarks: _____

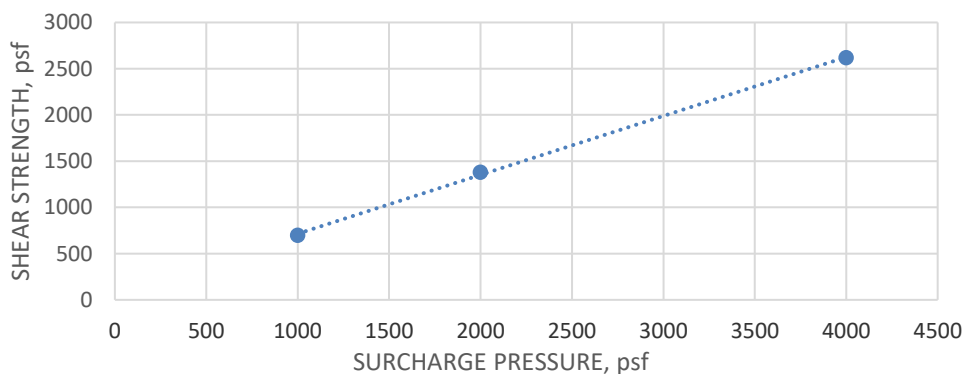
Reviewed by: _____

JD & S Testing

Direct Shear Moisture Content & Density

Project Name: Hecate Chiquito BESS Project Number: 185805178
 Sampled By: Client Sample Date: 10/7/2021 Lab #: B5-7
 Source/Location: B5-7 Tested By: JP
 Description: _____ Test Date: 10/23/2021

Shearing Rate (in./min.)		0.040		
Normal Pressure (psf)		1000	2000	4000
[A]	Initial Weight of Wet Soil + Ring (0.1g)	210.3	205.9	206.0
[B]	Weight of Ring (0.1g)	46.0	46.1	44.9
[C] = [A] - [B]	Initial Weight of Wet Soil (0.1g)	164.3	159.8	161.1
[D]	Initial Reading	Time	0.0000	0.0000
		Time		
		Time		
		Time		
[E]	Final Reading	Time	0.0176	0.0169
[F] = [E] - [D]	Height Change		0.0176	0.0169
[G] = 1 - [F]	Final Height		0.9824	0.9831
Shear Strength (psf)		696	1380	2616
[H]	Final Weight of Wet Soil (0.1g)	167.4	162.5	164.1
[J]	Weight of Dry Soil (0.1g)	141.8	137.3	137.8
[K]	Specific Gravity	2.7		
[L]	Maximum Dry Density (0.1pcf)	115.6		
[M]	Initial Volume (0.01 cubic inch)	4.60	4.60	4.60
[P] = ([C] - [J]) / [J]	Initial Moisture Content (0.1%)	15.9%	16.4%	16.9%
[Q] = [C] / [M] * 3.81	Initial Wet Density (0.1pcf)	136.1	132.4	133.4
[R] = [Q] / (1 + [P])	Initial Dry Density (0.1pcf)	117.4	113.7	114.1
[S] = [P] x [K] x [R] / ([K] x 62.3) - [R]	Initial Saturation (0.1%)	114.8%	107.5%	112.7%
[T] = [R] / [L]	Initial Relative Compaction (0.1%)	101.6%	98.4%	98.8%
[U] = [M] x [G]	Final Volume (0.01 cubic inch)	4.52	4.52	4.56
[V] = ([H] - [J]) / [J]	Final Moisture Content (0.1%)	18.1%	18.4%	19.1%
[W] = [H] / [U] * 3.81	Final Wet Density (0.1pcf)	141.1	136.9	137.1
[X] = [W] / (1 + [V])	Final Dry Density (0.1pcf)	119.6	115.7	115.1
[Y] = [V] x [K] x [X] / ([K] x 62.3) - [X]	Final Saturation (0.1%)	119.8%	109.1%	111.7%
[Z] = [X] / [L]	Final Relative Compaction (0.1%)	103.4%	100.1%	99.6%



Cohesion (psf)	80
Friction Angle (degrees)	32

Remarks: _____

Reviewed by: _____

JD & S Testing

Direct Shear Moisture Content & Density

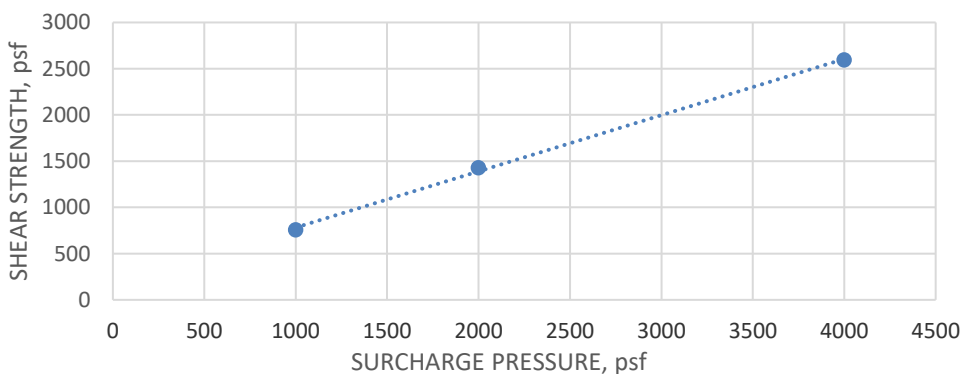
Project Name: Hecate Chiquito BESS Project Number: 185805178

Sampled By: Client Sample Date: 10/7/2021 Lab #: B6-10

Source/Location: B6-10 Tested By: JP

Description: _____ Test Date: 10/23/2021

Shearing Rate (in./min.)		0.040		
Normal Pressure (psf)		1000	2000	4000
[A]	Initial Weight of Wet Soil + Ring (0.1g)	205.8	211.3	208.4
[B]	Weight of Ring (0.1g)	46.2	45.7	45.8
[C] = [A] - [B]	Initial Weight of Wet Soil (0.1g)	159.6	165.6	162.6
[D]	Initial Reading	Time	0.0000	0.0000
		Time		
		Time		
		Time		
[E]	Final Reading	Time	0.0131	0.0070
[F] = [E] - [D]	Height Change		0.0131	0.0070
[G] = 1 - [F]	Final Height		0.9869	0.9930
Shear Strength (psf)		756	1428	2592
[H]	Final Weight of Wet Soil (0.1g)	162.0	168.1	164.1
[J]	Weight of Dry Soil (0.1g)	131.5	138.3	136.2
[K]	Specific Gravity	2.7		
[L]	Maximum Dry Density (0.1pcf)	112.5		
[M]	Initial Volume (0.01 cubic inch)	4.60	4.60	4.60
[P] = ([C] - [J]) / [J]	Initial Moisture Content (0.1%)	21.4%	19.7%	19.4%
[Q] = [C] / [M] * 3.81	Initial Wet Density (0.1pcf)	132.2	137.2	134.7
[R] = [Q] / (1 + [P])	Initial Dry Density (0.1pcf)	108.9	114.5	112.8
[S] = [P] x [K] x [R] / ([K] x 62.3) - [R]	Initial Saturation (0.1%)	128.6%	136.2%	127.2%
[T] = [R] / [L]	Initial Relative Compaction (0.1%)	96.8%	101.8%	100.2%
[U] = [M] x [G]	Final Volume (0.01 cubic inch)	4.54	4.57	4.57
[V] = ([H] - [J]) / [J]	Final Moisture Content (0.1%)	23.2%	21.5%	20.5%
[W] = [H] / [U] * 3.81	Final Wet Density (0.1pcf)	136.0	140.2	136.7
[X] = [W] / (1 + [V])	Final Dry Density (0.1pcf)	110.4	115.4	113.4
[Y] = [V] x [K] x [X] / ([K] x 62.3) - [X]	Final Saturation (0.1%)	119.5%	127.0%	114.5%
[Z] = [X] / [L]	Final Relative Compaction (0.1%)	98.1%	102.5%	100.8%



Cohesion (psf)	180
Friction Angle (degrees)	31

Remarks: _____

Reviewed by: _____

**AP Engineering and Testing, Inc.**

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2607 Pomona Boulevard | Pomona, CA 91768

t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com**COMPACTION TEST**

Client: Stantec Consulting, Inc.
 Project Name: Hecate Chiquito BESS
 Project No.: 185805178
 Boring No.: B1
 Sample Type: Bulk
 Visual Sample Description: Clayey Sand

AP Number: 21-1023
 Tested By: SM Date: 10/20/21
 Calculated By: NR Date: 10/21/21
 Checked By: AP Date: 10/21/21
 Sample Date: 10/07/21

METHOD A
 MOLD VOLUME (CU.FT) 0.0333

Compaction Method ☒ ASTM D1557
☐ ASTM D698
 Preparation Method ☐ Moist
☒ Dry

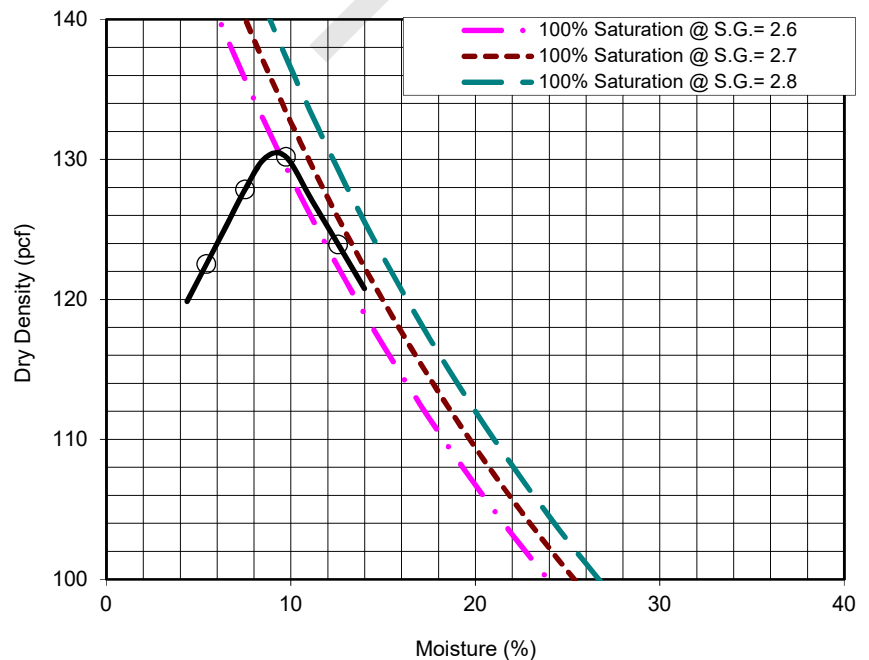
Wt. Comp. Soil + Mold (gm.)	3929	4010	3959	3803		
Wt. of Mold (gm.)	1850	1850	1850	1850		
Net Wt. of Soil (gm.)	2079	2160	2109	1953		
Container No.						
Wt. of Container (gm.)	150.06	149.83	141.31	138.32		
Wet Wt. of Soil + Cont. (gm.)	666.46	604.04	611.43	572.28		
Dry Wt. of Soil + Cont. (gm.)	630.36	563.78	558.96	549.96		
Moisture Content (%)	7.52	9.73	12.56	5.42		
Wet Density (pcf)	137.47	142.86	139.48	129.17		
Dry Density (pcf)	127.86	130.19	123.92	122.52		

Maximum Dry Density (pcf) 130.3
 Maximum Dry Density w/ Rock Correction (pcf) 131.9

Optimum Moisture Content (%) 9.1
 Optimum Moisture Content w/ Rock Correction (%) 8.6

PROCEDURE USED

- ☒ **METHOD A: Percent of Oversize:** 5.4%
 Soil Passing No. 4 (4.75 mm) Sieve
 Mold : 4 in. (101.6 mm) diameter
 Layers : 5 (Five)
 Blows per layer : 25 (twenty-five)
- ☐ **METHOD B: Percent of Oversize:** N/A
 Soil Passing 3/8 in. (9.5 mm) Sieve
 Mold : 4 in. (101.6 mm) diameter
 Layers : 5 (Five)
 Blows per layer : 25 (twenty-five)
- ☐ **METHOD C: Percent of Oversize:** N/A
 Soil Passing 3/4 in. (19.0 mm) Sieve
 Mold : 6 in. (152.4 mm) diameter
 Layers : 5 (Five)
 Blows per layer : 56 (fifty-six)



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Client: Stantec Consulting, Inc.
Project Name: Hecate Chiquito BESS
Project No.: 185805178
Boring No.: B4
Sample Type: Bulk
Visual Sample Description: Clayey Sand

AP Number: 21-1023
Tested By: SM Date: 10/20/21
Calculated By: NR Date: 10/21/21
Checked By: AP Date: 10/21/21
Sample Date: 10/07/21

METHOD

MOLD VOLUME (CU.FT)

A0.0333

Compaction Method

☒ ASTM D1557☐ ASTM D698

Preparation Method

☐ Moist☒ Dry

Wt. Comp. Soil + Mold (gm.)	3794	3928	3926	3883		
Wt. of Mold (gm.)	1850	1850	1850	1850		
Net Wt. of Soil (gm.)	1944	2078	2076	2033		
Container No.						
Wt. of Container (gm.)	149.89	137.87	148.11	143.51		
Wet Wt. of Soil + Cont. (gm.)	508.06	599.89	663.43	745.83		
Dry Wt. of Soil + Cont. (gm.)	488.16	558.60	608.93	701.66		
Moisture Content (%)	5.88	9.81	11.83	7.91		
Wet Density (pcf)	128.57	137.43	137.30	134.46		
Dry Density (pcf)	121.43	125.15	122.78	124.60		

Maximum Dry Density (pcf)

125.5

Optimum Moisture Content (%)

9.0

Maximum Dry Density w/ Rock Correction (pcf)

N/A

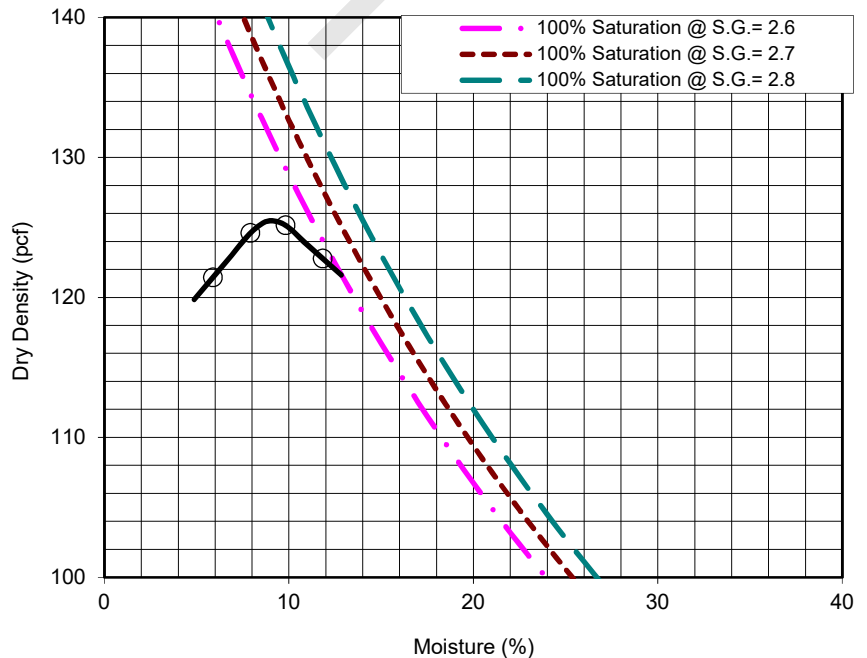
Optimum Moisture Content w/ Rock Correction (%)

N/A**PROCEDURE USED**

☒ **METHOD A: Percent of Oversize:** 2.1%
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

☐ **METHOD B: Percent of Oversize:** N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

☐ **METHOD C: Percent of Oversize:** N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



**AP Engineering and Testing, Inc.**

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Client: Stantec Consulting, Inc.
Project Name: Hecate Chiquito BESS
Project No.: 185805178
Boring No.: B7
Sample Type: Bulk
Visual Sample Description: Sandy Clay

AP Number: 21-1023
Tested By: SM Date: 10/20/21
Calculated By: NR Date: 10/21/21
Checked By: AP Date: 10/21/21
Sample Date: 10/07/21

METHOD

MOLD VOLUME (CU.FT)

A0.0333

Compaction Method

☒ ASTM D1557☐ ASTM D698

Preparation Method

☐ Moist☒ Dry

Wt. Comp. Soil + Mold (gm.)	3885	3829	3883	3733		
Wt. of Mold (gm.)	1851	1851	1851	1851		
Net Wt. of Soil (gm.)	2035	1978	2032	1883		
Container No.						
Wt. of Container (gm.)	138.45	140.16	146.16	149.30		
Wet Wt. of Soil + Cont. (gm.)	322.42	301.27	331.92	328.04		
Dry Wt. of Soil + Cont. (gm.)	303.14	287.87	309.26	317.21		
Moisture Content (%)	11.71	9.07	13.89	6.45		
Wet Density (pcf)	134.56	130.82	134.39	124.50		
Dry Density (pcf)	120.46	119.94	118.00	116.96		

Maximum Dry Density (pcf)

120.9

Optimum Moisture Content (%)

10.7

Maximum Dry Density w/ Rock Correction (pcf)

N/A

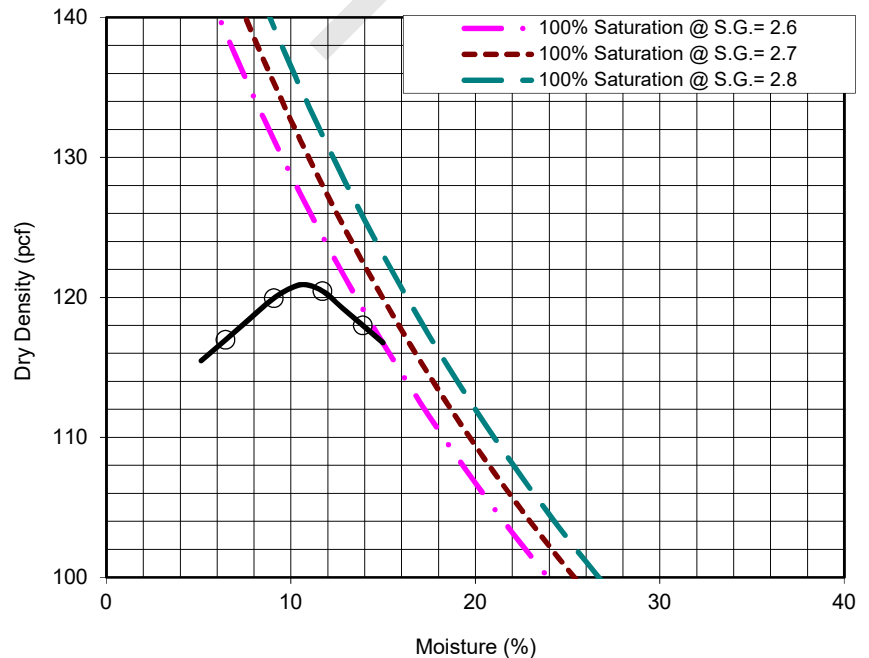
Optimum Moisture Content w/ Rock Correction (%)

N/A**PROCEDURE USED**

☒ **METHOD A: Percent of Oversize:** 3.1%
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

☐ **METHOD B: Percent of Oversize:** N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)

☐ **METHOD C: Percent of Oversize:** N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)



**AP Engineering and Testing, Inc.**

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t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com**CORROSION TEST RESULTS**Client Name: Stantec Consulting, Inc.AP Job No.: 21-1023Project Name: Hecate Chiquito BESSDate: 10/19/21Project No.: 185805178

Boring No.	Sample Type	Sample Date	Soil Description	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
B1	Bulk	10/07/21	Clayey Sand	2,145	8.1	38	52
B4	Bulk	10/07/21	Clayey Sand	2,644	7.9	33	23
B7	Bulk	10/07/21	Sandy Clay	1,715	7.7	45	62

NOTES: Resistivity Test and pH: California Test Method 643

Sulfate Content : California Test Method 417

Chloride Content : California Test Method 422

ND = Not Detectable

NA = Not Sufficient Sample

NR = Not Requested

Jaret Fischer
Stantec Consulting Services, Inc.-San Bernadino
735 East Carnegie Drive, Suite 280
San Bernadino, CA 92408

Phone: 909-255-8209
Fax:
Other: E-REPORTS ONLY

Project: Misc. Laboratory Services - Stantec
Project Manager: Jesse Roeske
File #: B190986I

THERMAL RESISTIVITY TESTING REPORT

Our representative(s) performed work on the above referenced project. Attached you will find the corresponding inspection and/or test reports. Please refer to the attached reports for details and locations of our testing and inspection services.

Please note the below testing parameters assigned for use in Thermal Resistivity Testing, ASTM D5334:

COMPACTION

- The compaction information will either be accepted as reported by the client or verified internally for use in determining compaction and moisture percentages of the samples used to create the Thermal Dry Out Curve.

MAXIMUM PARTICLE SIZE

- Due to the sensitive nature of the thermal probe used to gather measurements, and the volume of the molding apparatus, material to be used in this test has been scalped using the NO. 10 to allow for pilot hole drilling and insertion of the thermal probe.
- A rubber pestle was used to break up aggregations so as not to alter particle sizes and misrepresent the maximum particle size of the sample.

0% MOISTURE POINT

- In an attempt to facilitate in-situ conditions the 0% moisture point was determined by molding the point at the optimum moisture content, drying the sample to constant mass, cooling in a desiccator, and subsequently testing the point for thermal resistivity instead of molding the point at 0% moisture and subsequently testing.

If there are questions concerning the attachment(s), please contact the project manager at (208) 376-4748.

Jaret Fischer
Stantec Consulting Services, Inc.-San Bernadino
735 East Carnegie Drive, Suite 280
San Bernadino, CA 92408

Phone: 909-255-8209
Fax:
Other: E-REPORTS ONLY

Project: Misc. Laboratory Services – Stantec
Project Manager: Jesse Roeske
Lab Technician: Alexander Hanle
Test Date: November 8, 2021

As requested Atlas has performed Thermal Resistivity testing on the sample referenced below. The testing was performed in accordance with current standards indicated below. The results obtained in our laboratory were as follows:

Source and Description:	The sample was collected and delivered by the client. Test results apply to the sample as received.				
Date Obtained:	October 21, 2021				
Atlas Sample ID:	8062 (B190986L)				
Client Sample ID:	185805178 – Hecate Chiquito BESS – B6				
Sampling and Preparation:	ASTM D75:		ASTM D2216:	X	Client Provided Instruction: X
Test Standard:	ASTM D5334:				

Proctor, Compaction Information

Atlas Determined Proctor Value (lbs/ft ³):	NA	Client Provided Proctor Value (lbs/ft ³):	X
ASTM D1557 (Modified Proctor, 5 Lifts):	120.9	ASTM D698 (Standard Proctor, 3 Lifts):	
Optimum Moisture (% of Sample Dry Mass):	10.7		

Requested Testing Parameters

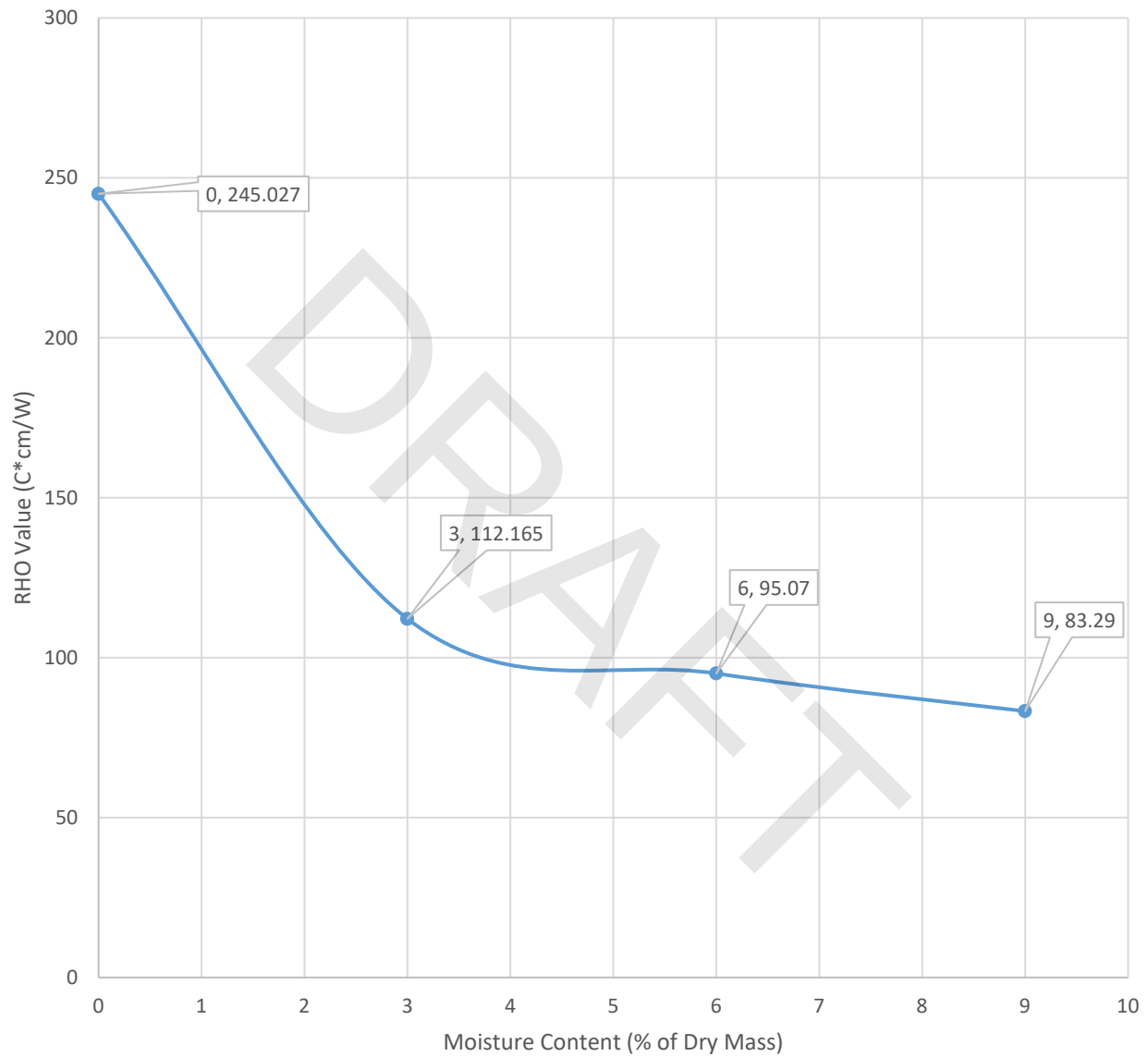
Requested Molding Dry Density (lbs/ft ³):	108.8 (±0.5 lbs/ft ³)
Requested Method Consolidation Lifts:	5
Requested Compaction % of Proctor Value:	90%
Requested Number of Tests / Moisture Points per Sample:	4

Thermal Resistivity Testing Results

Trial Number:	Moisture Content (% of Sample Dry Mass):	Thermal Resistivity (°C•cm/W)
Sample #1	0	245.027
Sample #2	3	112.165
Sample #3	6	95.0700
Sample #4	9	83.29

NOTE: Confirmation tests are conducted on previously compacted, tested specimens and are used to confirm the acceptable, reportable results of the original testing. Confirmation tests are for information only and will not be reported as acceptable, reportable values.

Hecate Chiquito BESS - B6



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If there are questions concerning this report (*B190986L-110821=L=S-Thermal218062*), please contact the project manager at (208) 376-4748.

Respectfully submitted,

ATLAS TECHNICAL CONSULTANTS



Jesse Roeske

Boise Laboratory Coordinator

Note: The recording of false, fictitious or fraudulent statements or entries on this document may be punishable as a felony under Federal Statute.
CC:

DRAFT

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Other: E-REPORTS ONLY

Project: Misc. Laboratory Services - Stantec
Project Manager: Jesse Roeske
File #: B190986I

THERMAL RESISTIVITY TESTING REPORT

Our representative(s) performed work on the above referenced project. Attached you will find the corresponding inspection and/or test reports. Please refer to the attached reports for details and locations of our testing and inspection services.

Please note the below testing parameters assigned for use in Thermal Resistivity Testing, ASTM D5334:

COMPACTION

- The compaction information will either be accepted as reported by the client or verified internally for use in determining compaction and moisture percentages of the samples used to create the Thermal Dry Out Curve.

MAXIMUM PARTICLE SIZE

- Due to the sensitive nature of the thermal probe used to gather measurements, and the volume of the molding apparatus, material to be used in this test has been scalped using the NO. 10 to allow for pilot hole drilling and insertion of the thermal probe.
- A rubber pestle was used to break up aggregations so as not to alter particle sizes and misrepresent the maximum particle size of the sample.

0% MOISTURE POINT

- In an attempt to facilitate in-situ conditions the 0% moisture point was determined by molding the point at the optimum moisture content, drying the sample to constant mass, cooling in a desiccator, and subsequently testing the point for thermal resistivity instead of molding the point at 0% moisture and subsequently testing.

If there are questions concerning the attachment(s), please contact the project manager at (208) 376-4748.

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Stantec Consulting Services, Inc.-San Bernadino
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San Bernadino, CA 92408

Phone: 909-255-8209
Fax:
Other: E-REPORTS ONLY

Project: Misc. Laboratory Services – Stantec
Project Manager: Jesse Roeske
Lab Technician: Alexander Hanle
Test Date: November 8, 2021

As requested Atlas has performed Thermal Resistivity testing on the sample referenced below. The testing was performed in accordance with current standards indicated below. The results obtained in our laboratory were as follows:

Source and Description:	The sample was collected and delivered by the client. Test results apply to the sample as received.				
Date Obtained:	October 21, 2021				
Atlas Sample ID:	8063 (B190986L)				
Client Sample ID:	185805178 – Hecate Chiquito BESS – B7				
Sampling and Preparation:	ASTM D75:		ASTM D2216:	X	Client Provided Instruction: X
Test Standard:	ASTM D5334:				

Proctor, Compaction Information

Atlas Determined Proctor Value (lbs/ft ³):	NA	Client Provided Proctor Value (lbs/ft ³):	X
ASTM D1557 (Modified Proctor, 5 Lifts):	120.9	ASTM D698 (Standard Proctor, 3 Lifts):	
Optimum Moisture (% of Sample Dry Mass):	10.7		

Requested Testing Parameters

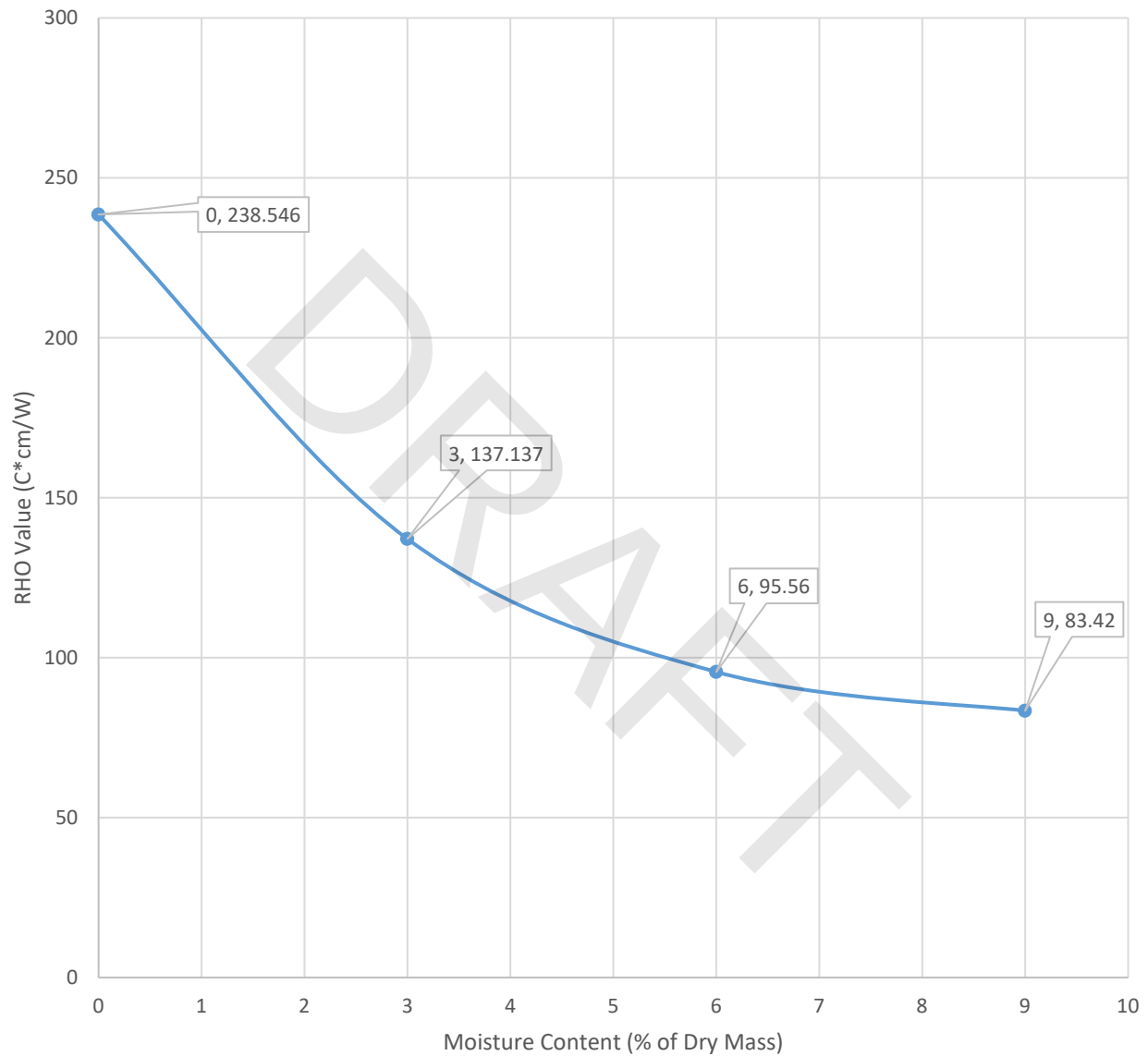
Requested Molding Dry Density (lbs/ft ³):	108.8 (±0.5 lbs/ft ³)
Requested Method Consolidation Lifts:	5
Requested Compaction % of Proctor Value:	90%
Requested Number of Tests / Moisture Points per Sample:	4

Thermal Resistivity Testing Results

Trial Number:	Moisture Content (% of Sample Dry Mass):	Thermal Resistivity (°C•cm/W)
Sample #1	0	238.546
Sample #2	3	137.137
Sample #3	6	95.560
Sample #4	9	83.420

NOTE: Confirmation tests are conducted on previously compacted, tested specimens and are used to confirm the acceptable, reportable results of the original testing. Confirmation tests are for information only and will not be reported as acceptable, reportable values.

Hecate Chiquito BESS - B7



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If there are questions concerning this report (*B190986L-110821=L=S-Thermal218063*), please contact the project manager at (208) 376-4748.

Respectfully submitted,

ATLAS TECHNICAL CONSULTANTS



Jesse Roeske

Boise Laboratory Coordinator

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735 East Carnegie Drive, Suite 280
San Bernadino, CA 92408

Phone: 909-255-8209
Fax:
Other: E-REPORTS ONLY

Project: Misc. Laboratory Services - Stantec
Project Manager: Jesse Roeske
File #: B190986I

THERMAL RESISTIVITY TESTING REPORT

Our representative(s) performed work on the above referenced project. Attached you will find the corresponding inspection and/or test reports. Please refer to the attached reports for details and locations of our testing and inspection services.

Please note the below testing parameters assigned for use in Thermal Resistivity Testing, ASTM D5334:

COMPACTION

- The compaction information will either be accepted as reported by the client or verified internally for use in determining compaction and moisture percentages of the samples used to create the Thermal Dry Out Curve.

MAXIMUM PARTICLE SIZE

- Due to the sensitive nature of the thermal probe used to gather measurements, and the volume of the molding apparatus, material to be used in this test has been scalped using the NO. 10 to allow for pilot hole drilling and insertion of the thermal probe.
- A rubber pestle was used to break up aggregations so as not to alter particle sizes and misrepresent the maximum particle size of the sample.

0% MOISTURE POINT

- In an attempt to facilitate in-situ conditions the 0% moisture point was determined by molding the point at the optimum moisture content, drying the sample to constant mass, cooling in a desiccator, and subsequently testing the point for thermal resistivity instead of molding the point at 0% moisture and subsequently testing.

If there are questions concerning the attachment(s), please contact the project manager at (208) 376-4748.

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Phone: 909-255-8209
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Other: E-REPORTS ONLY

Project: Misc. Laboratory Services – Stantec
Project Manager: Jesse Roeske
Lab Technician: Alexander Hanle
Test Date: November 8, 2021

As requested Atlas has performed Thermal Resistivity testing on the sample referenced below. The testing was performed in accordance with current standards indicated below. The results obtained in our laboratory were as follows:

Source and Description:	The sample was collected and delivered by the client. Test results apply to the sample as received.				
Date Obtained:	October 21, 2021				
Atlas Sample ID:	8064 (B190986L)				
Client Sample ID:	185805178 – Hecate Chiquito BESS – B1				
Sampling and Preparation:	ASTM D75:		ASTM D2216:	X	Client Provided Instruction: X
Test Standard:	ASTM D5334:				

Proctor, Compaction Information

Atlas Determined Proctor Value (lbs/ft ³):	NA	Client Provided Proctor Value (lbs/ft ³):	X
ASTM D1557 (Modified Proctor, 5 Lifts):	131.9	ASTM D698 (Standard Proctor, 3 Lifts):	
Optimum Moisture (% of Sample Dry Mass):	8.6		

Requested Testing Parameters

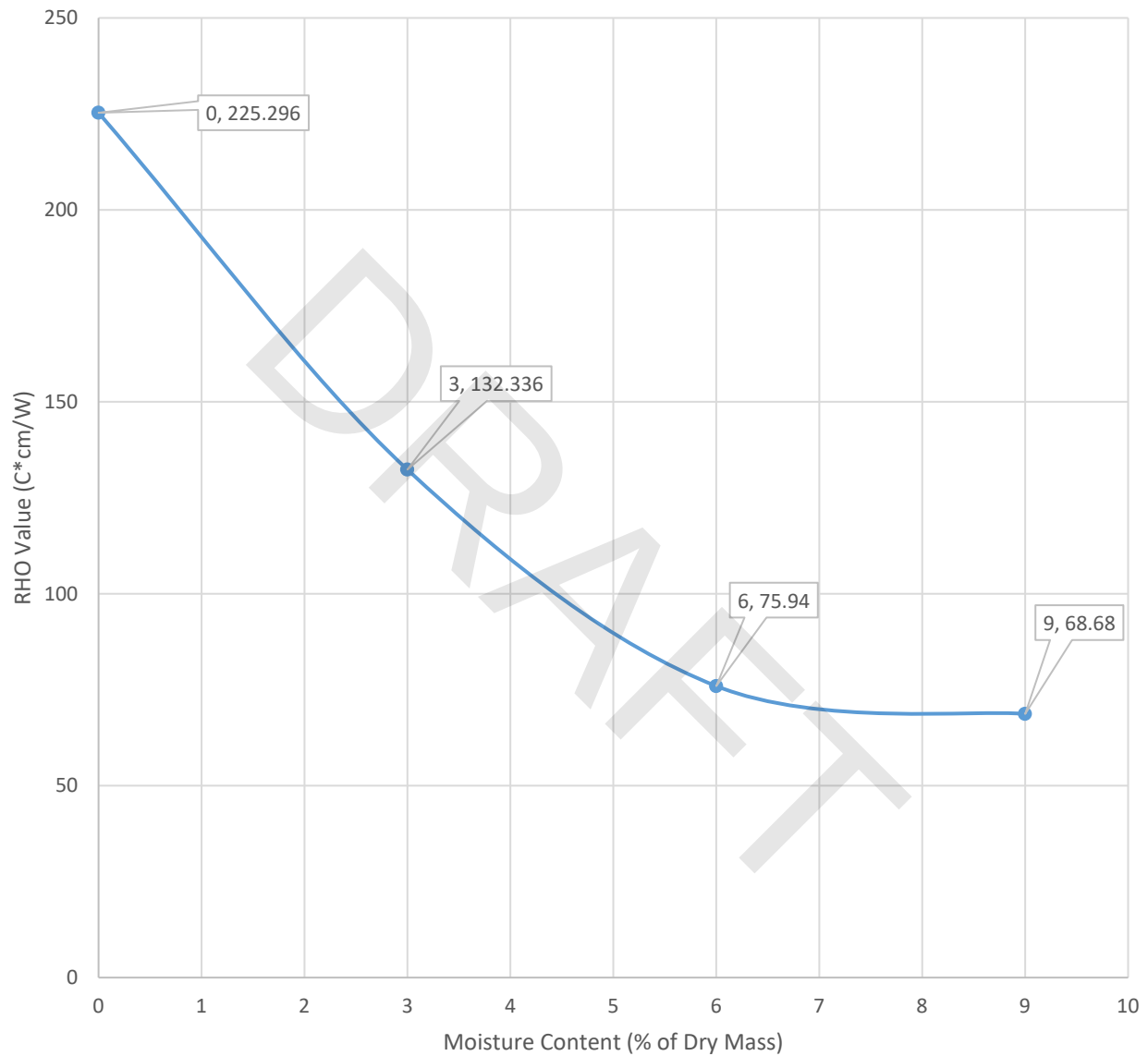
Requested Molding Dry Density (lbs/ft ³):	108.8 (±0.5 lbs/ft ³)
Requested Method Consolidation Lifts:	5
Requested Compaction % of Proctor Value:	90%
Requested Number of Tests / Moisture Points per Sample:	4

Thermal Resistivity Testing Results

Trial Number:	Moisture Content (% of Sample Dry Mass):	Thermal Resistivity (°C•cm/W)
Sample #1	0	225.296
Sample #2	3	132.336
Sample #3	6	75.94
Sample #4	9	68.68

NOTE: Confirmation tests are conducted on previously compacted, tested specimens and are used to confirm the acceptable, reportable results of the original testing. Confirmation tests are for information only and will not be reported as acceptable, reportable values.

Hecate Chiquito BESS - B1



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If there are questions concerning this report (*B190986L-110821=L=S-Thermal218064*), please contact the project manager at (208) 376-4748.

Respectfully submitted,

ATLAS TECHNICAL CONSULTANTS



Jesse Roeske

Boise Laboratory Coordinator

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CC:

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Jaret Fischer
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735 East Carnegie Drive, Suite 280
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Phone: 909-255-8209
Fax:
Other: E-REPORTS ONLY

Project: Misc. Laboratory Services - Stantec

Project Manager: Jesse Roeske
File #: B190986I

THERMAL RESISTIVITY TESTING REPORT

Our representative(s) performed work on the above referenced project. Attached you will find the corresponding inspection and/or test reports. Please refer to the attached reports for details and locations of our testing and inspection services.

Please note the below testing parameters assigned for use in Thermal Resistivity Testing, ASTM D5334:

COMPACTION

- The compaction information will either be accepted as reported by the client or verified internally for use in determining compaction and moisture percentages of the samples used to create the Thermal Dry Out Curve.

MAXIMUM PARTICLE SIZE

- Due to the sensitive nature of the thermal probe used to gather measurements, and the volume of the molding apparatus, material to be used in this test has been scalped using the NO. 10 to allow for pilot hole drilling and insertion of the thermal probe.
- A rubber pestle was used to break up aggregations so as not to alter particle sizes and misrepresent the maximum particle size of the sample.

0% MOISTURE POINT

- In an attempt to facilitate in-situ conditions the 0% moisture point was determined by molding the point at the optimum moisture content, drying the sample to constant mass, cooling in a desiccator, and subsequently testing the point for thermal resistivity instead of molding the point at 0% moisture and subsequently testing.

If there are questions concerning the attachment(s), please contact the project manager at (208) 376-4748.

Jaret Fischer
Stantec Consulting Services, Inc.-San Bernadino
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San Bernadino, CA 92408

Phone: 909-255-8209
Fax:
Other: E-REPORTS ONLY

Project: Misc. Laboratory Services – Stantec
Project Manager: Jesse Roeske
Lab Technician: Alexander Hanle
Test Date: November 8, 2021

As requested Atlas has performed Thermal Resistivity testing on the sample referenced below. The testing was performed in accordance with current standards indicated below. The results obtained in our laboratory were as follows:

Source and Description:	The sample was collected and delivered by the client. Test results apply to the sample as received.				
Date Obtained:	October 21, 2021				
Atlas Sample ID:	8065 (B190986L)				
Client Sample ID:	185805178 – Hecate Chiquito BESS – B2				
Sampling and Preparation:	ASTM D75:		ASTM D2216:	X	Client Provided Instruction: X
Test Standard:	ASTM D5334:				

Proctor, Compaction Information

Atlas Determined Proctor Value (lbs/ft ³):	NA	Client Provided Proctor Value (lbs/ft ³):	X
ASTM D1557 (Modified Proctor, 5 Lifts):	131.9	ASTM D698 (Standard Proctor, 3 Lifts):	
Optimum Moisture (% of Sample Dry Mass):	8.6		

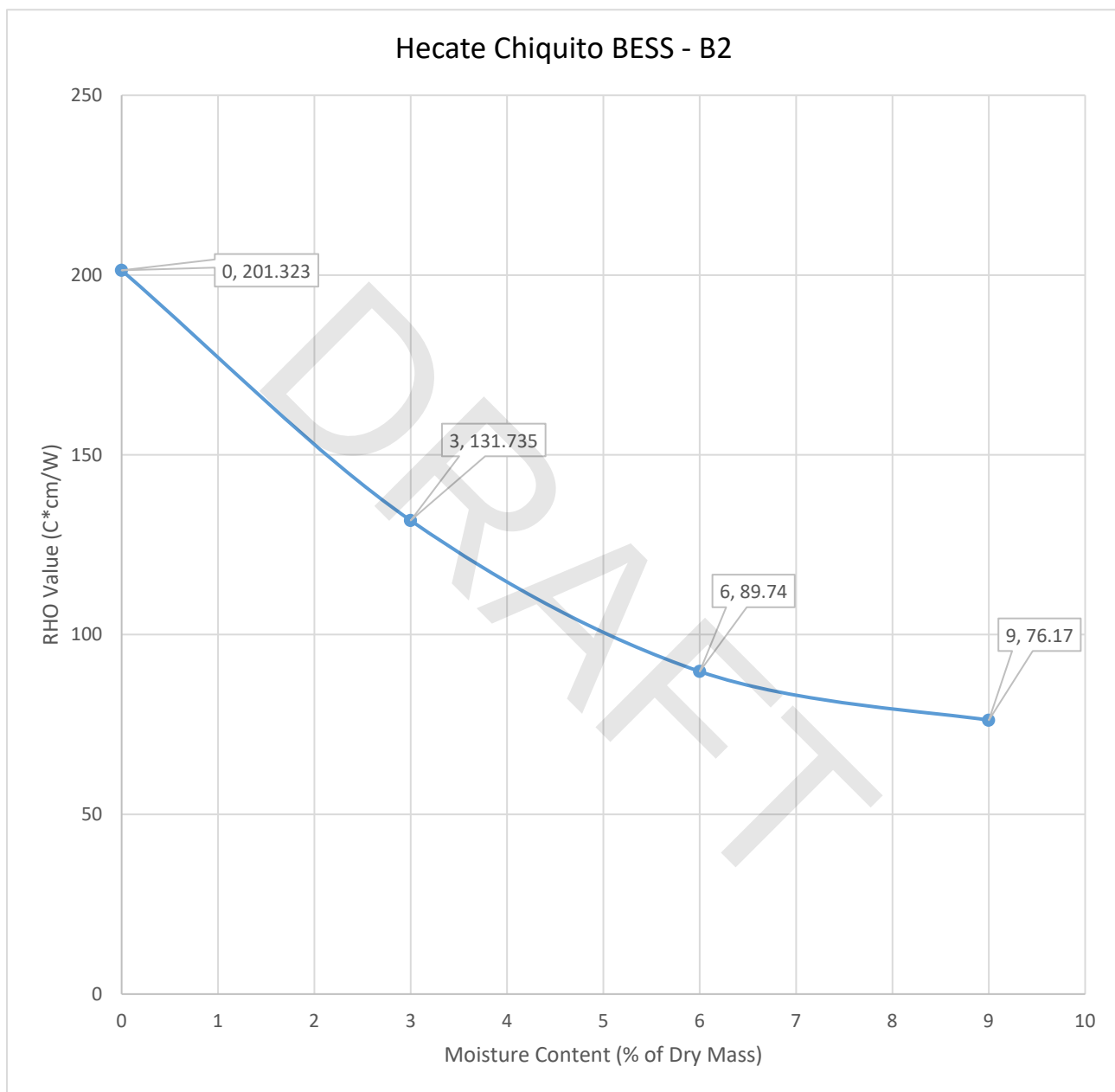
Requested Testing Parameters

Requested Molding Dry Density (lbs/ft ³):	118.7 (±0.5 lbs/ft ³)
Requested Method Consolidation Lifts:	5
Requested Compaction % of Proctor Value:	90%
Requested Number of Tests / Moisture Points per Sample:	4

Thermal Resistivity Testing Results

Trial Number:	Moisture Content (% of Sample Dry Mass):	Thermal Resistivity (°C•cm/W)
Sample #1	0	201.323
Sample #2	3	131.735
Sample #3	6	89.740
Sample #4	9	76.170

NOTE: Confirmation tests are conducted on previously compacted, tested specimens and are used to confirm the acceptable, reportable results of the original testing. Confirmation tests are for information only and will not be reported as acceptable, reportable values.



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If there are questions concerning this report (*B190986L-110821=L=S-Thermal218065*), please contact the project manager at (208) 376-4748.

Respectfully submitted,

ATLAS TECHNICAL CONSULTANTS



Jesse Roeske

Boise Laboratory Coordinator

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CC:

DRAFT

APPENDIX C
SOIL ELECTRICAL RESISTIVITY TEST RESULTS



6280 Riverdale Street
San Diego, CA 92120
(877) 215-4321 | oneatlas.com

November 16, 2021

Atlas No. 121412SWG
Report No. 1

MR. JARET FISCHER
STANTEC
735 EAST CARNEGIE DRIVE, SUITE 280
SAN BERNARDINO, CA 92408

**Subject: Geophysical Evaluation – Electrical Resistivity
Grand Avenue & Clinton Keith Road
Wildomar, California**

Dear Mr. Fischer:

In accordance with your authorization, Atlas has performed a geophysical evaluation pertaining to a site located at Grand Avenue and Clinton Keith Road in Wildomar California (Figure 1). The purpose of our evaluation was to collect in-situ electrical resistivity measurements. Our services were conducted on October 22nd, 2021. This report presents our methodology, equipment used, analysis, and results.

Our scope of services for the project included collection of electrical resistivity data at the site, compilation of the data collected, and preparation of this data report. Specifically, we conducted four soundings at the project site (R-1 through R-4). Each sounding consisted of two orthogonal test lines with eight lines in total (R-1a, R-1b, R-2a, R-2b, R-3a, R-3b, R-4a and R-4b) at locations and electrode spacings selected by you and your office. Figure 2 illustrates the approximate sounding locations, and Figures 3a and 3b depict the general site conditions in the study area.

The data was collected in general accordance with ASTM G57 using an Advanced Geosciences, Inc. (AGI) MiniSting earth resistivity meter and four steel electrodes in a Wenner configuration. For each line, soil resistance measurements were collected at electrode spacings of 2, 4, 6, 8, 12, 20, 30 and 50 feet along the line. Stainless steel electrodes were hammered in place at your specified locations and the soils surrounding the electrodes were moistened with saline water (potable water with added table salt) to help overcome soil contact resistance.

The results of the electrical resistivity study are presented in Figures 4a and 4b. The collected measurements are generally consistent (with some slight variations) indicating that the subsurface conditions at depth are fairly uniform with respect to apparent resistivity.

The field services and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding



the conclusions presented in this report. Please also note that our evaluation was limited to measuring in-situ apparent soil resistivity at four sounding locations selected by your office.

Atlas should be contacted if the reader has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of this report by parties other than the client is undertaken at said parties' sole risk.

We appreciate the opportunity to be of service on this project. Should you have any questions related to this report, please contact the undersigned at your convenience.

Respectfully submitted,
Atlas Technical Consultants LLC

Paul W. Gresoro
Staff Geophysicist

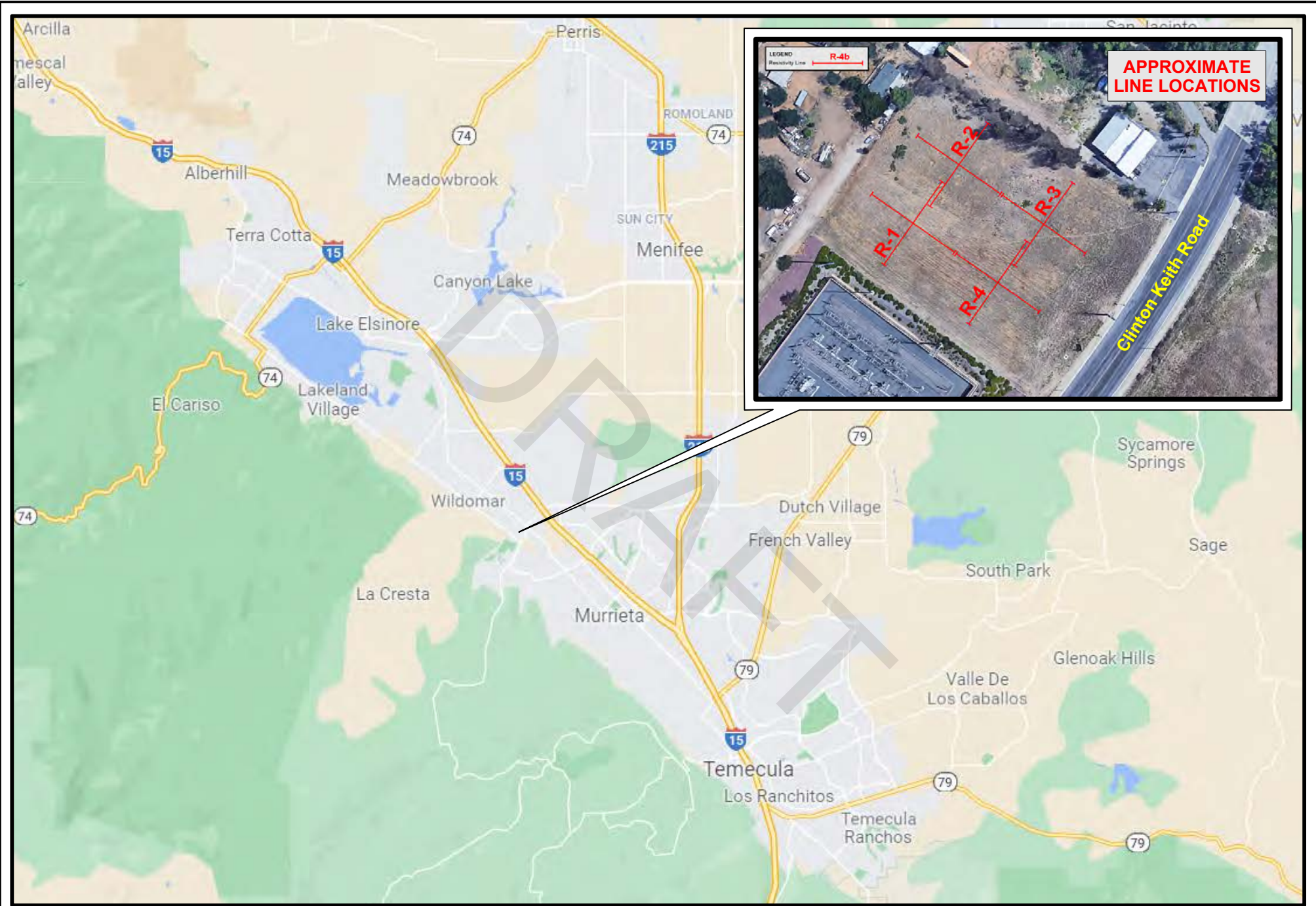
PWG/DJD/PFL/ds

Attachments: Figure 1 – Site Location Map
Figure 2 – Line Location Map
Figure 3a – Site Photographs (R-1 and R-2)
Figure 3b – Site Photographs (R-3 and R-4)
Figure 4a – Electrical Resistivity Results (R-1 and R-2)
Figure 4b – Electrical Resistivity Results (R-3 and R-4)

Distribution: Jaret.Fischer@stantec.com

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist





SITE LOCATION MAP



Grand Ave & Clinton Keith Road
Murrieta, California

Project No.: 121412SWG Date: 11/21



Figure 1



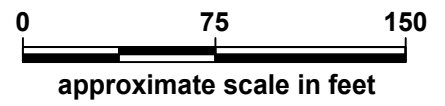
LINE LOCATION MAP

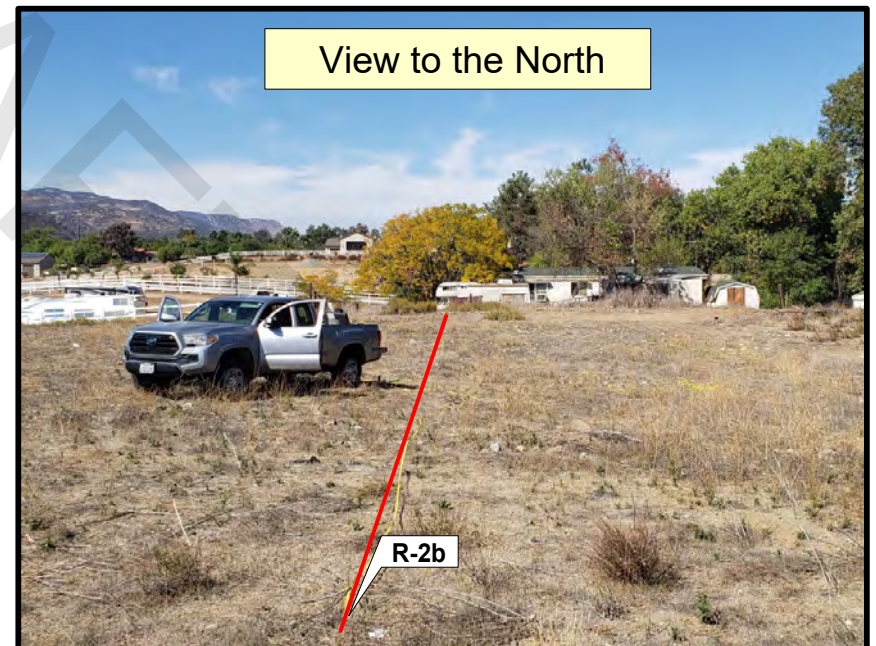
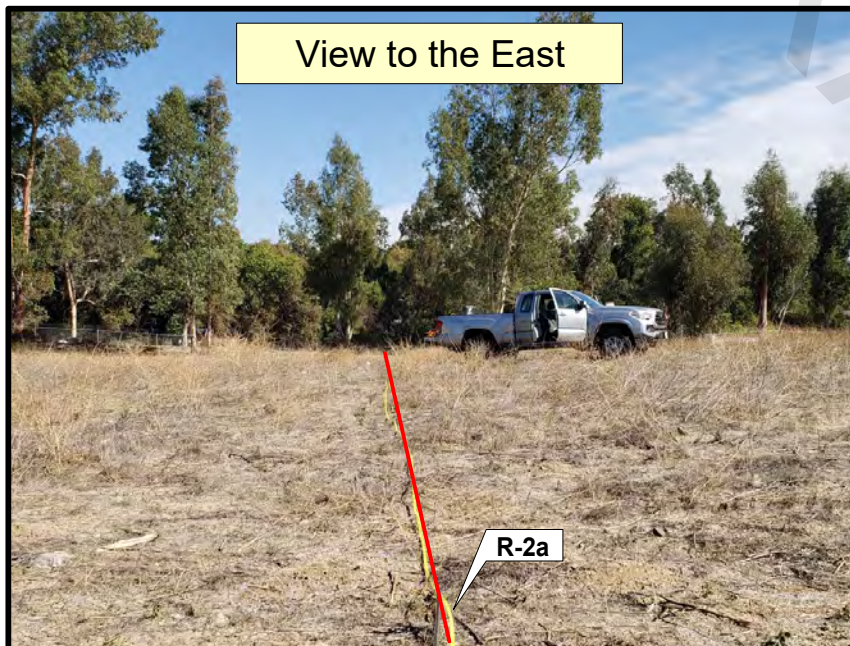
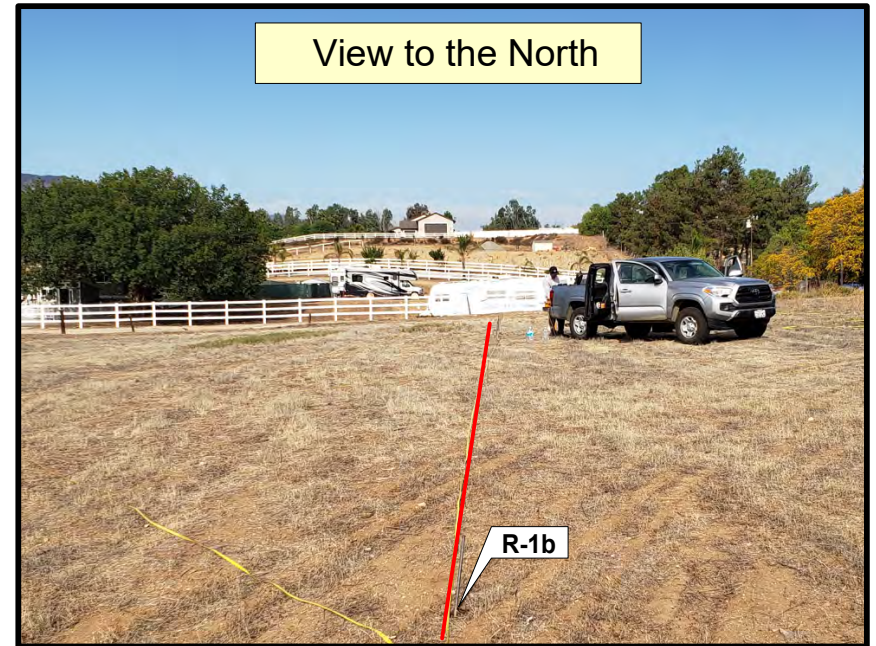
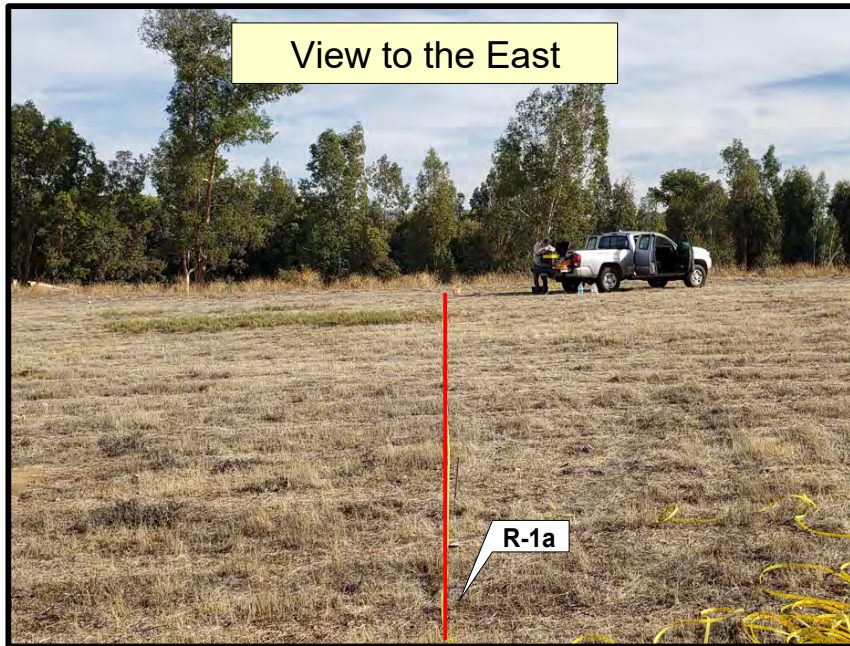


Grand Ave & Clinton Keith Road
Murrieta, California

Project No.: 121412SWG Date: 11/21

ATLAS
Figure 2





SITE PHOTOGRAPHS

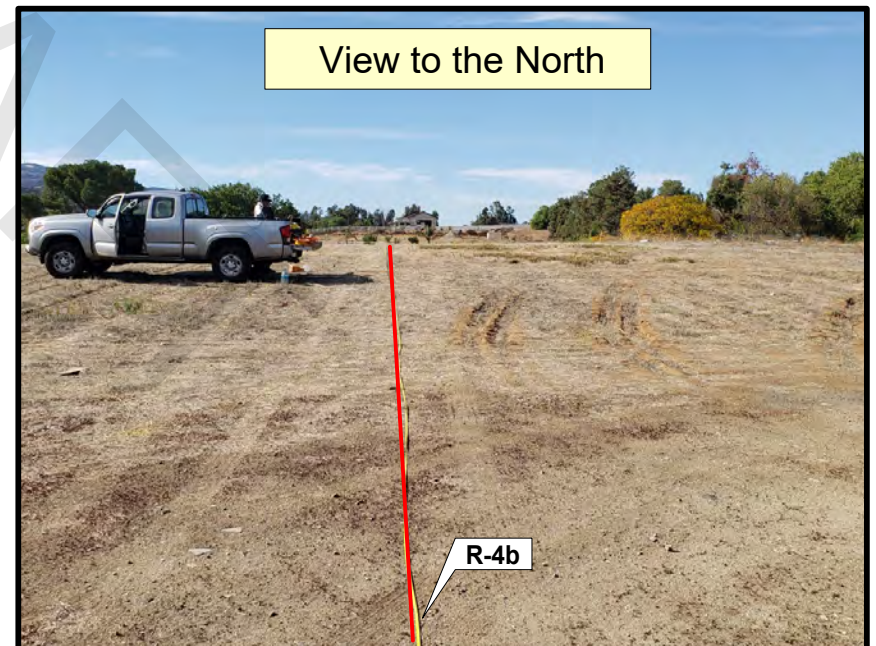
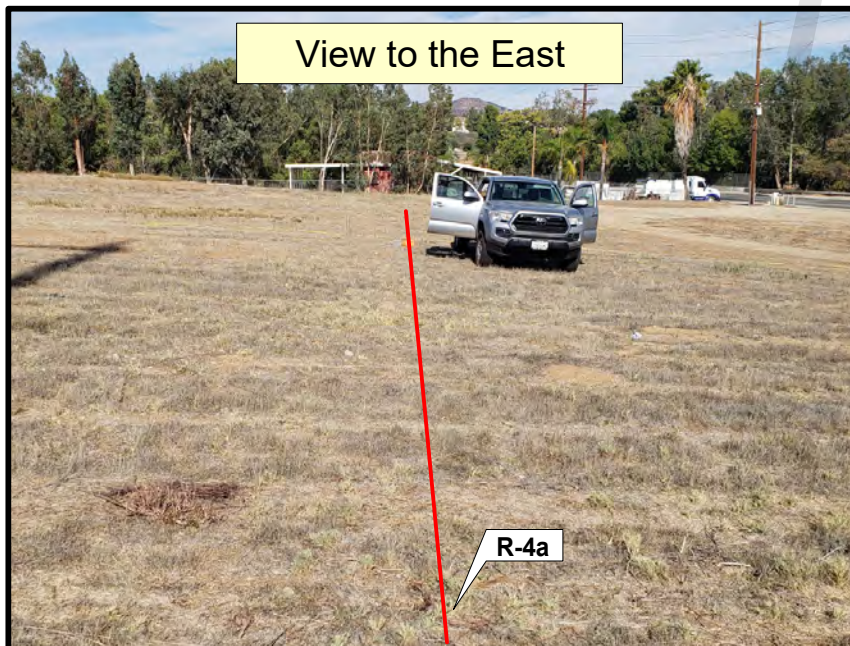
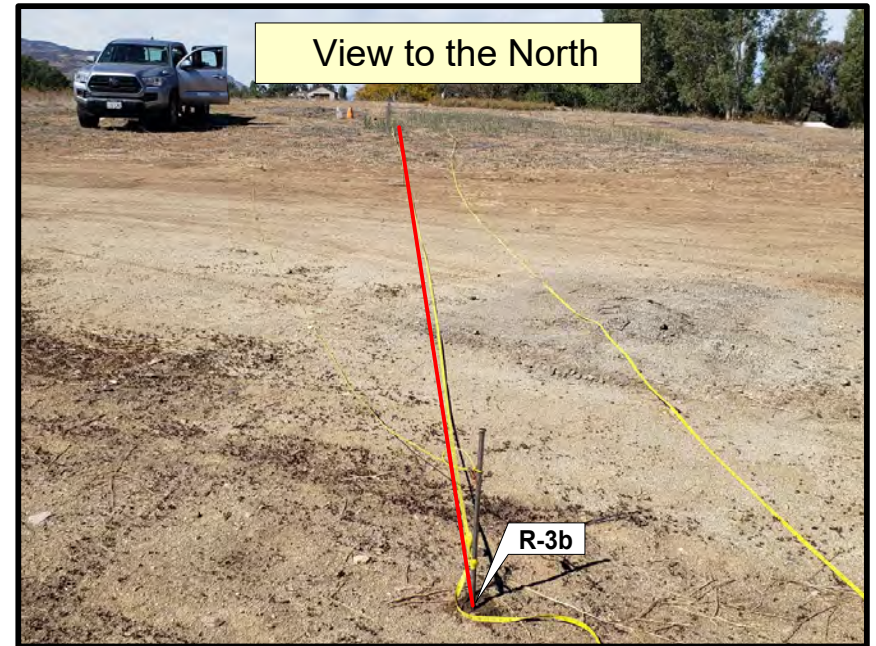
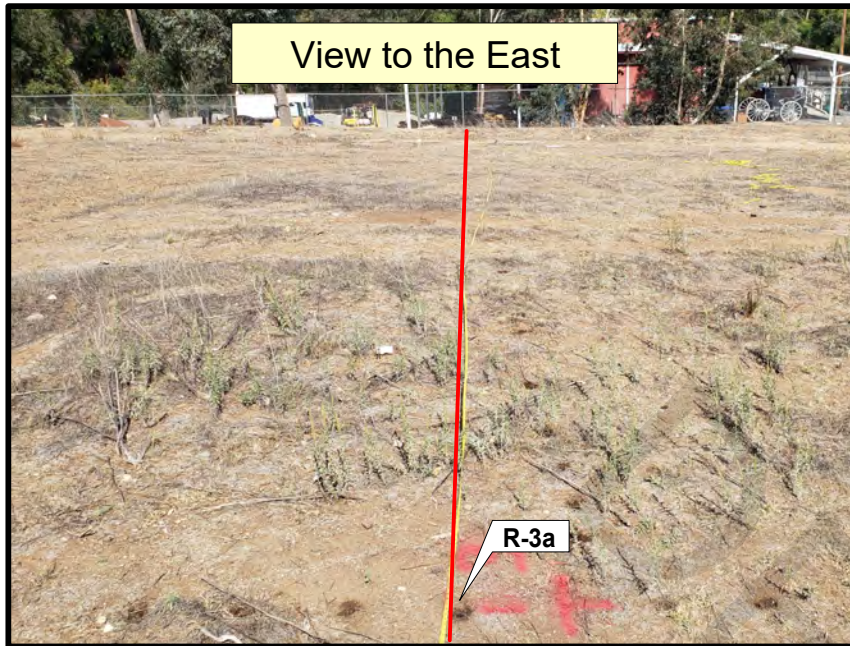
Grand Ave & Clinton Keith Road
Murrieta, California

Project No.: 121412SWG

Date: 11/21



Figure 3a



SITE PHOTOGRAPHS

Grand Ave & Clinton Keith Road
Murrieta, California

Project No.: 121412SWG

Date: 11/21



Figure 3b

Line No. Orientation	Spacing (ft)	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity	
					(ohm-cm)	(ohm-ft)
R-1a	2	5.705	15.42	0.0	5906.21	193.77
E-W	4	5.466	4.42	0.1	3388.98	111.19
	6	10.65	2.92	0.1	3352.98	110.01
	8	10.74	1.99	0.0	3051.92	100.13
	12	10.93	1.10	0.1	2518.76	82.64
	20	6.603	0.54	0.2	2074.83	68.07
	30	9.904	0.33	0.3	1908.60	62.62
	50	13.75	0.24	0.3	2250.26	73.83
R-1b	2	5.633	14.09	0.0	5396.79	177.06
N-S	4	10.79	4.88	0.1	3740.60	122.72
	6	6.99	2.86	0.0	3280.59	107.63
	8	3.858	1.89	0.0	2892.59	94.90
	12	6.974	1.12	0.0	2583.10	84.75
	20	7.228	0.59	0.2	2254.09	73.95
	30	8.701	0.36	0.0	2077.51	68.16
	50	12.63	0.24	0.1	2330.69	76.47
R-2a	2	9.376	47.02	0.0	18009.73	590.87
E-W	4	9.801	17.43	0.0	13352.17	438.06
	6	9.001	5.71	0.0	6560.03	215.22
	8	11.2	2.91	0.0	4450.72	146.02
	12	5.557	0.95	0.1	2191.50	71.90
	20	6.035	0.46	0.0	1750.80	57.44
	30	7.331	0.32	0.1	1838.51	60.32
	50	9.386	0.24	0.2	2313.46	75.90
R-2b	2	7.981	37.38	0.0	14317.39	469.73
N-S	4	7.929	9.75	0.0	7471.24	245.12
	6	8.902	3.52	0.0	4044.72	132.70
	8	6.848	2.17	0.0	3321.57	108.98
	12	7.677	0.90	0.0	2072.92	68.01
	20	6.948	0.53	0.1	2036.53	66.82
	30	6.946	0.37	0.1	2097.05	68.80
	50	6.916	0.27	0.0	2598.81	85.26

**ELECTRICAL RESISTIVITY
RESULTS
(R-1 and R-2)**

Grand Ave & Clinton Keith Road
Murrieta, California

Project No.: 121412SWG

Date: 11/21



Figure 4a

Line No. Orientation	Spacing (ft)	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity	
					(ohm-cm)	(ohm-ft)
R-3a	2	7.16	13.65	0.0	5228.26	171.53
E-W	4	9.038	3.47	0.0	2658.18	87.21
	6	7.052	2.13	0.1	2448.66	80.34
	8	9.801	1.35	0.1	2065.26	67.76
	12	6.287	0.75	0.1	1730.04	56.76
	20	6.523	0.44	0.2	1696.79	55.67
	30	7.878	0.31	0.2	1754.05	57.55
	50	14.26	0.24	0.1	2256.96	74.05
R-3b	2	7.415	15.08	0.0	5775.98	189.50
N-S	4	8.953	4.07	0.0	3118.57	102.32
	6	9.341	1.84	0.1	2109.69	69.22
	8	7.029	1.13	0.0	1732.79	56.85
	12	4.714	0.73	0.1	1673.27	54.90
	20	6	0.42	0.1	1592.23	52.24
	30	9.995	0.31	0.0	1780.48	58.41
	50	11.58	0.25	0.1	2396.76	78.63
R-4a	2	6.565	11.41	0.0	4370.29	143.38
E-W	4	7.283	2.26	0.0	1728.96	56.72
	6	8.999	1.52	0.1	1743.14	57.19
	8	9.584	1.06	0.1	1624.02	53.28
	12	13.32	0.71	0.1	1632.83	53.57
	20	7.515	0.40	0.0	1539.75	50.52
	30	14.87	0.29	0.1	1647.76	54.06
	50	14.08	0.21	0.2	2043.43	67.04
R-4b	2	7.349	10.45	0.0	4002.59	131.32
N-S	4	8.33	3.25	0.0	2492.71	81.78
	6	9.28	1.60	0.1	1832.76	60.13
	8	8.093	1.07	0.0	1645.47	53.99
	12	7.164	0.64	0.1	1472.88	48.32
	20	8.689	0.46	0.0	1774.93	58.23
	30	8.26	0.32	0.0	1848.85	60.66
	50	12.7	0.23	0.2	2154.50	70.69

**ELECTRICAL RESISTIVITY
RESULTS
(R-1 and R-2)**

Grand Ave & Clinton Keith Road
Murrieta, California

Project No.: 121412SWG

Date: 11/21



Figure 4b

APPENDIX D
LIQUEFACTION ANALYSIS

SPT BASED LIQUEFACTION ANALYSIS REPORT

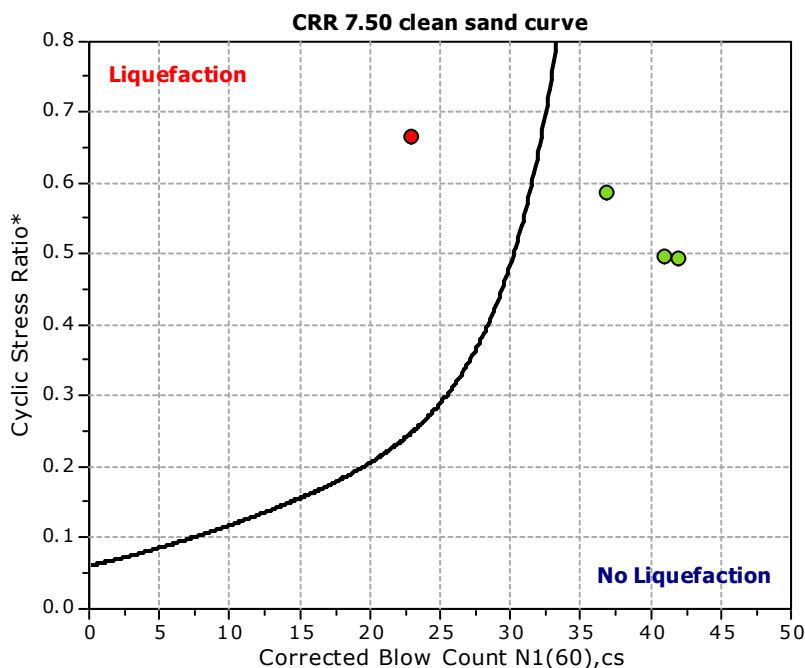
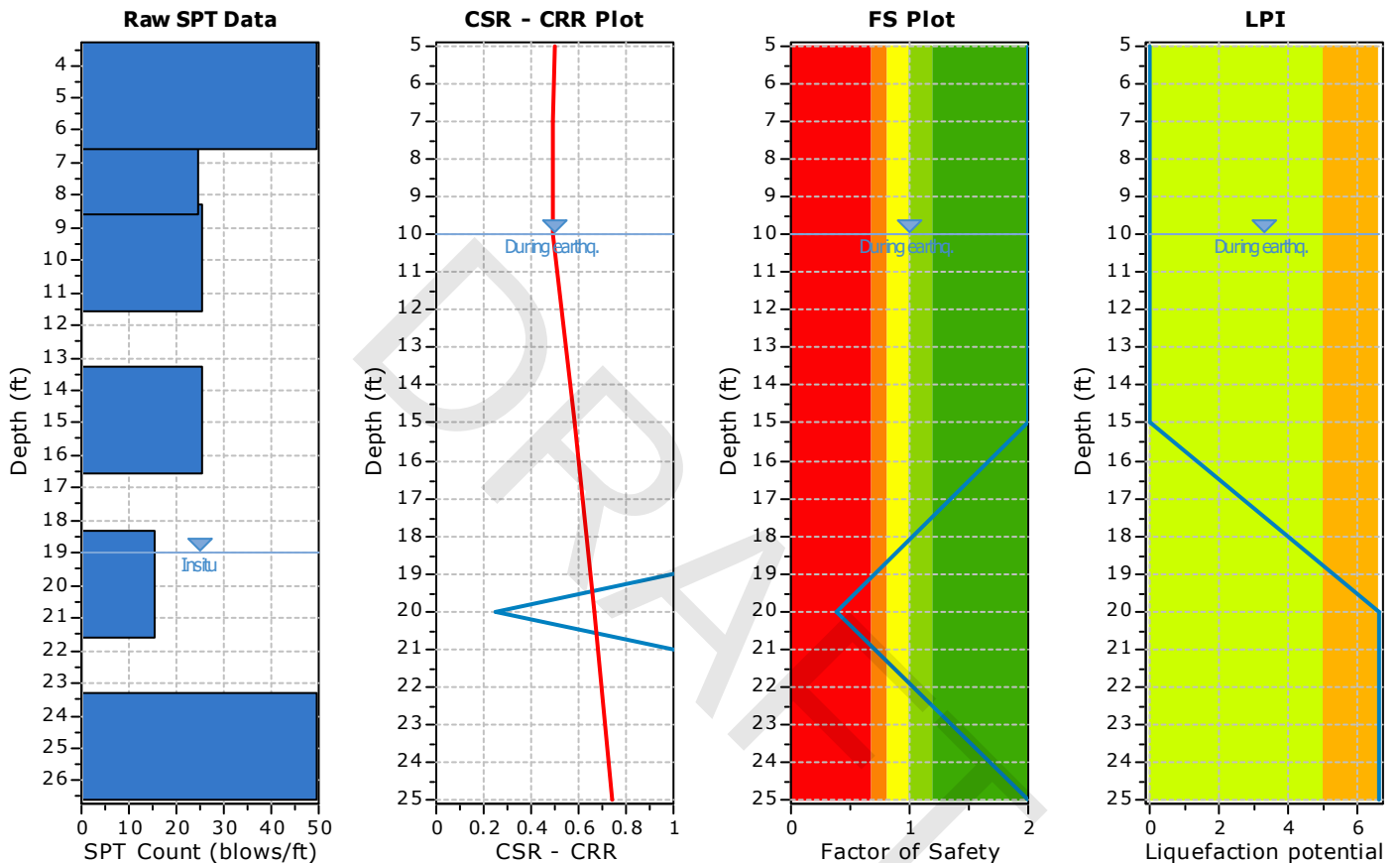
Project title : Hecate Chiquito BESS

SPT Name: B4

Location : Near NEC Clinton Keith Road and Grand Avenue, Wildomar, CA

:: Input parameters and analysis properties ::

Analysis method:	Boulanger & Idriss, 2014	G.W.T. (in-situ):	19.00 ft
Fines correction method:	Boulanger & Idriss, 2014	G.W.T. (earthq.):	10.00 ft
Sampling method:	Sampler wo liners	Earthquake magnitude M_w :	7.70
Borehole diameter:	200mm	Peak ground acceleration:	0.78 g
Rod length:	3.30 ft	Eq. external load:	0.00 tsf
Hammer energy ratio:	1.17		



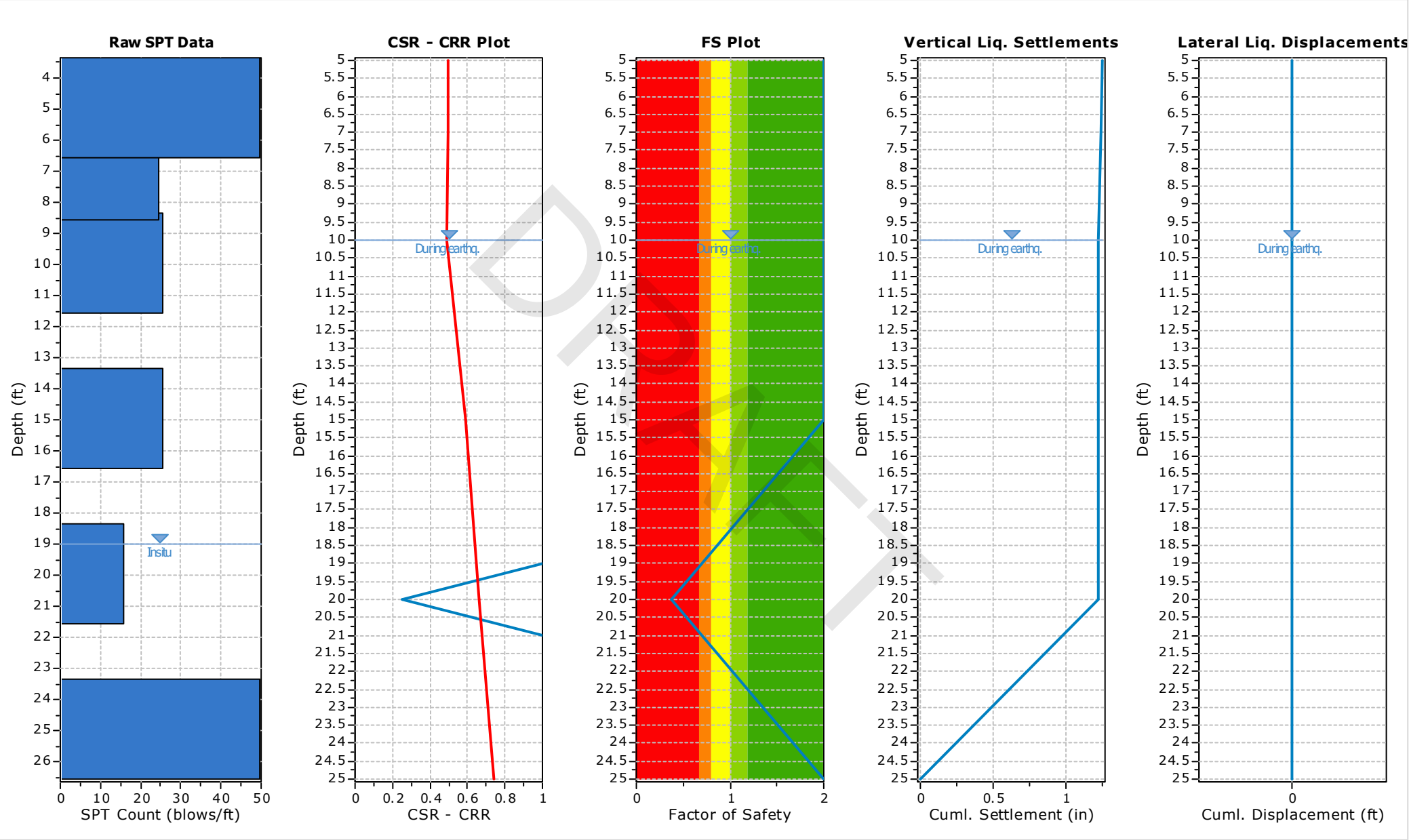
F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

:: Overall Liquefaction Assessment Analysis Plots ::



:: Field input data ::

Test Depth (ft)	SPT Field Value (blows)	Fines Content (%)	Unit Weight (pcf)	Infl. Thickness (ft)	Can Liquefy
5.00	50	0.00	130.00	5.00	No
7.00	25	0.00	120.00	2.00	No
10.00	26	0.00	120.00	5.00	Yes
15.00	26	0.00	120.00	5.00	Yes
20.00	16	0.00	115.00	5.00	Yes
25.00	50	0.00	135.00	5.00	Yes

Abbreviations

Depth: Depth at which test was performed (ft)
 SPT Field Value: Number of blows per foot
 Fines Content: Fines content at test depth (%)
 Unit Weight: Unit weight at test depth (pcf)
 Infl. Thickness: Thickness of the soil layer to be considered in settlements analysis (ft)
 Can Liquefy: User defined switch for excluding/including test depth from the analysis procedure

:: Cyclic Resistance Ratio (CRR) calculation data ::

Depth (ft)	SPT Field Value	Unit Weight (pcf)	σ_v (tsf)	u_o (tsf)	σ'_{vo} (tsf)	m	C_N	C_E	C_B	C_R	C_S	$(N_1)_{60}$	FC (%)	$\Delta(N_1)_{60}$	$(N_1)_{60cs}$	CRR _{7.5}
5.00	50	130.00	0.33	0.00	0.33	0.26	1.36	1.17	1.15	0.75	1.20	83	0.00	0.00	83	4.000
7.00	25	120.00	0.45	0.00	0.45	0.29	1.28	1.17	1.15	0.80	1.20	41	0.00	0.00	41	4.000
10.00	26	120.00	0.63	0.00	0.63	0.29	1.16	1.17	1.15	0.85	1.20	42	0.00	0.00	42	4.000
15.00	26	120.00	0.93	0.00	0.93	0.32	1.04	1.17	1.15	0.85	1.20	37	0.00	0.00	37	4.000
20.00	16	115.00	1.21	0.03	1.18	0.41	0.96	1.17	1.15	0.95	1.20	23	0.00	0.00	23	0.249
25.00	50	135.00	1.55	0.19	1.36	0.26	0.94	1.17	1.15	0.95	1.20	72	0.00	0.00	72	4.000

Abbreviations

σ_v : Total stress during SPT test (tsf)
 u_o : Water pore pressure during SPT test (tsf)
 σ'_{vo} : Effective overburden pressure during SPT test (tsf)
 m: Stress exponent normalization factor
 C_N : Overburden correction factor
 C_E : Energy correction factor
 C_B : Borehole diameter correction factor
 C_R : Rod length correction factor
 C_S : Liner correction factor
 $N_{1(60)}$: Corrected N_{SPT} to a 60% energy ratio
 $\Delta(N_1)_{60}$: Equivalent clean sand adjustment
 $N_{1(60)cs}$: Corrected $N_{1(60)}$ value for fines content
 CRR_{7.5}: Cyclic resistance ratio for M=7.5

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	σ_{veq} (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF _{max}	$(N_1)_{60cs}$	MSF	CSR _{eq,M=7.5}	$K_{\sigma_{\text{sigma}}}$	CSR*	FS
5.00	130.00	0.33	0.00	0.33	1.00	1.00	0.505	2.20	83	0.92	0.548	1.10	0.498	2.000 ●
7.00	120.00	0.45	0.00	0.45	0.99	1.00	0.503	2.20	41	0.92	0.545	1.10	0.496	2.000 ●
10.00	120.00	0.63	0.00	0.63	0.98	1.00	0.499	2.20	42	0.92	0.541	1.10	0.492	2.000 ●
15.00	120.00	0.93	0.16	0.77	0.97	1.00	0.592	2.20	37	0.92	0.642	1.09	0.587	2.000 ●
20.00	115.00	1.21	0.31	0.90	0.96	1.00	0.652	1.62	23	0.96	0.680	1.02	0.664	0.376 ●
25.00	135.00	1.55	0.47	1.08	0.94	1.00	0.682	2.20	72	0.92	0.739	0.99	0.744	2.000 ●

:: Cyclic Stress Ratio calculation (CSR fully adjusted and normalized) ::

Depth (ft)	Unit Weight (pcf)	$\sigma_{v,eq}$ (tsf)	$u_{o,eq}$ (tsf)	$\sigma'_{vo,eq}$ (tsf)	r_d	α	CSR	MSF _{max}	$(N_1)_{60cs}$	MSF	CSR _{eq,M=7.5}	$K_{\sigma gma}$	CSR*	FS
------------	-------------------	-----------------------	------------------	-------------------------	-------	----------	-----	--------------------	----------------	-----	-------------------------	------------------	------	----

Abbreviations

$\sigma_{v,eq}$: Total overburden pressure at test point, during earthquake (tsf)
 $u_{o,eq}$: Water pressure at test point, during earthquake (tsf)
 $\sigma'_{vo,eq}$: Effective overburden pressure, during earthquake (tsf)
 r_d : Nonlinear shear mass factor
 α : Improvement factor due to stone columns
 CSR : Cyclic Stress Ratio
 MSF : Magnitude Scaling Factor
 CSR_{eq,M=7.5}: CSR adjusted for M=7.5
 $K_{\sigma gma}$: Effective overburden stress factor
 CSR*: CSR fully adjusted (user FS applied)***
 FS: Calculated factor of safety against soil liquefaction

*** User FS: 1.00

:: Liquefaction potential according to Iwasaki ::

Depth (ft)	FS	F	wz	Thickness (ft)	I_L
5.00	2.000	0.00	9.24	2.00	0.00
7.00	2.000	0.00	8.93	2.00	0.00
10.00	2.000	0.00	8.48	3.00	0.00
15.00	2.000	0.00	7.71	5.00	0.00
20.00	0.376	0.62	6.95	5.00	6.61
25.00	2.000	0.00	6.19	5.00	0.00

Overall potential I_L : 6.61 $I_L = 0.00$ - No liquefaction I_L between 0.00 and 5 - Liquefaction not probable I_L between 5 and 15 - Liquefaction probable $I_L > 15$ - Liquefaction certain**:: Vertical settlements estimation for dry sands ::**

Depth (ft)	$(N_1)_{60}$	τ_{av}	p	G_{max} (tsf)	α	b	γ	ϵ_{15}	N_c	ϵ_{Nc} (%)	Δh (ft)	ΔS (in)
5.00	83	0.16	0.22	0.91	0.14	12561.74	0.00	0.00	17.10	0.01	5.00	0.008
7.00	41	0.22	0.30	0.84	0.14	10403.13	0.00	0.00	17.10	0.03	2.00	0.016

Cumulative settlements: 0.025**Abbreviations**

τ_{av} : Average cyclic shear stress
 p: Average stress
 G_{max} : Maximum shear modulus (tsf)
 α, b : Shear strain formula variables
 γ : Average shear strain
 ϵ_{15} : Volumetric strain after 15 cycles
 N_c : Number of cycles
 ϵ_{Nc} : Volumetric strain for number of cycles N_c (%)
 Δh : Thickness of soil layer (in)
 ΔS : Settlement of soil layer (in)

:: Vertical & Lateral displacements estimation for saturated sands ::

Depth (ft)	$(N_1)_{60cs}$	γ_{lim} (%)	F_α	FS _{liq}	γ_{max} (%)	e_v (%)	dz (ft)	S_{v-1D} (in)	LDI (ft)
------------	----------------	--------------------	------------	-------------------	--------------------	-----------	---------	-----------------	----------

:: Vertical & Lateral displacements estimation for saturated sands ::									
Depth (ft)	(N ₁) _{60cs}	Y _{lim} (%)	F _a	FS _{liq}	Y _{max} (%)	e _v (%)	dz (ft)	S _{v-1D} (in)	LDI (ft)
10.00	42	0.56	-0.96	2.000	0.00	0.00	5.00	0.000	0.00
15.00	37	1.56	-0.58	2.000	0.00	0.00	5.00	0.000	0.00
20.00	23	11.27	0.35	0.376	11.27	2.04	5.00	1.227	0.00
25.00	72	0.00	-3.47	2.000	0.00	0.00	5.00	0.000	0.00
Cumulative settlements:								1.227	0.00

Abbreviations

Y_{lim}: Limiting shear strain (%)
 F_a/N: Maximum shear strain factor
 Y_{max}: Maximum shear strain (%)
 e_v: Post liquefaction volumetric strain (%)
 S_{v-1D}: Estimated vertical settlement (in)
 LDI: Estimated lateral displacement (ft)

DRAFT

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Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Examples of material to provide in Appendix 4 may include but are not limited to the following:

- Environmental Site Assessments conducted for the project,
- Other information on Past Site Use that impacts the feasibility of LID BMP implementation on the site.

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.



**Chiquito Battery Energy Storage
Site: APN 380150020
Phase I Environmental Site
Assessment**

December 1, 2021

Prepared for:

Mr. Gabriel Wapner,
Chiquito Grid LLC (Hecate)
621 W Randolph Street
Chicago, IL 60661

Prepared by:

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290 Conejo Ridge Avenue
Thousand Oaks, CA 91362

Project No.: 185805178

Sign-off Sheet and Signatures of Environmental Professionals

This document entitled Chiquito Battery Energy Storage Site: APN 380150020 Phase I Environmental Site Assessment was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Chiquito Grid LLC (Hecate) (the "Client"). Any reliance on this document by any third party is strictly prohibited. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

All information, conclusions, and recommendations provided by Stantec in this document regarding the Phase I ESA have been prepared under the supervision of and reviewed by the professionals whose signatures appear below.

Author: _____

Emily Medler, B.Sc., Environmental Scientist

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR 312. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Property. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Quality Reviewer: _____

Lewis Simons, Principal Geologist

Independent Reviewer: _____

Lindsay McDonough, Senior Environmental Planner



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**CHIQUITO BATTERY ENERGY STORAGE SITE: APN 380150020
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Abbreviations

AAI	All Appropriate Inquiry
amsl	above mean sea level
APN	Assessor's Parcel Number
AST	Aboveground Storage Tank
ASTM	ASTM International
BER	Business Environmental Risk
CalGEM	Geologic Energy Management Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
Client	Hecate Energy Grid, LLC.
CREC	Controlled Recognized Environmental Conditions
DOC	California Department of Conservation
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EDR	Environmental Data Resources Inc.
EP	Environmental Professional
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FOIA	Freedom of Information Act
HREC	Historical Recognized Environmental Conditions
LUST	Leaking Underground Storage Tank
NRCS	National Resource Conservation Service
RCFD	Riverside County Fire Department
REC	Recognized Environmental Conditions
ROW	right-of-way
SCE	Southern California Edison



CHIKUITO BATTERY ENERGY STORAGE SITE: APN 380150020
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Stantec	Stantec Consulting Services Inc.
SWRCB	California State Water Resources Control Board
USDA	United States Department of Agriculture
User	Hecate Energy Grid, LLC
USGS	United States Geological Survey
UST	Underground Storage Tank
VEC	Vapor Encroachment Condition



**CHIQUITO BATTERY ENERGY STORAGE SITE: APN 380150020
PHASE I ENVIRONMENTAL SITE ASSESSMENT**

Summary
December 1, 2021

1.0 SUMMARY

Stantec Consulting Services Inc. (Stantec) has completed a Phase I Environmental Site Assessment (ESA) report of the property located at [Assessor's Parcel Number (APN) 380150020] (the "Subject Property"), on behalf of Hecate Energy Grid, LLC (the "Client"). The work was performed according to Stantec's proposal and terms and conditions dated November 19, 2021 and accepted by the Client on November 20, 2021. Hecate Energy Grid, LLC (the "User") has been designated as the User of this report.

The Phase I ESA was conducted in conformance with the requirements of ASTM International (ASTM) Designation E 1527-13, and All Appropriate Inquiry (AAI) as defined by the U.S.-Environmental Protection Act (EPA) in Title 40 of the Code of Federal Regulations, Part 312, except as may have been modified by the scope of work, and terms and conditions, requested by the Client. Any exceptions to, or deletions from, the ASTM or AAI practice are described in Section 2.3.

The Property consists of approximately 1.10 acres of undeveloped land. The Property is zoned as Rural Residential and has a general plan land use designation of Commercial Retail (City of Wildomar 2021). Surrounding properties are a mix of public facilities, residential, and commercial properties. A Property location map is illustrated on Figure 1. A Property map illustrating the main features of the Property is provided as Figure 2. Photographs taken during the site reconnaissance visit are provided in Appendix A.

We have performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527 of APN 380150020 or the "Property". Any exceptions to, or deletions from, this practice are described in the Data Gaps section of this report. This assessment has revealed no evidence of recognized environmental conditions (RECs) in connection with the Property.

The following Business Environmental Risks (BERs) were identified in connection with the assessment of the Subject Property:

- The existing, undeveloped condition of the Subject Property is likely to support endangered or special status biological resources. A biological resources assessment was conducted prior to this Phase I ESA. Results of the survey indicated most of the Subject Property consists of non-native grassland and one special-status species, paniculate tarplant, was observed on the Subject Property. No additional special-status wildlife species were observed during the assessment, however due to its close proximity to Murrieta Creek there is potential for the riparian vegetation to support special status and other common bird species. Lastly, the assessment indicated burrowing owls have the potential to occur within non-native grasslands of the Subject Property. These potential biological resources represent a BER and should be considered during development of the planned use of the Subject Property.
- The Subject Property is located on the Willard Fault within the Elsinore Fault Zone. The Subject Property's proximity to the Willard fault represents a BER and should be considered during development of the planned use of the Subject Property.



CHIQUITO BATTERY ENERGY STORAGE SITE: APN 380150020
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- The Subject Property is located within 300 feet of Murrieta Creek, which is mapped as a regulatory floodway. Per FEMA maps prepared for the area, the Subject Property is located within Zone X (minimal flood hazard risk), however, a flood zone AE (flood zone areas that present a 1% annual chance of flooding and a 26% chance over the life of a 30-year mortgage, according to FEMA) was mapped directly next to the southeast to east boundary of the Subject Property. The Subject Property's proximity to a Zone AE flood zone towards the southeast to east boundary represents a BER and should be considered during development of the planned use of the Subject Property.



CHIQUITO BATTERY ENERGY STORAGE SITE: APN 380150020 PHASE I ENVIRONMENTAL SITE ASSESSMENT

Introduction
December 1, 2021

2.0 INTRODUCTION

The objective of this Phase I ESA was to perform All Appropriate Inquiry (AAI) into the past ownership and uses of the Subject Property consistent with good commercial or customary practice as outlined by ASTM International (ASTM) in “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”, Designation E1527-13. “All Appropriate Inquiry” (AAI) is the process for evaluating a property’s environmental conditions for the purpose of qualifying for landowner liability protections under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), following final rule of Part 312 of Title 40, Code of Federal Regulations (40 CFR Part 312). The purpose of this Phase I ESA was to identify, to the extent feasible, adverse environmental conditions including recognized environmental conditions (“RECs”) of the Subject Property.

The ASTM E1527-13 standard indicates that the purpose of the Phase I ESA is to identify RECs, including historical recognized environmental conditions (“HRECs”), and controlled recognized environmental conditions (“CRECs”) that may exist at a property. The term “recognized environmental conditions” means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property:

1. Due to any release to the environment;
2. Under conditions indicative of a release to the environment; or
3. Under conditions that pose a material threat of a future release to the environment.

ASTM defines a “HREC” as a REC that has occurred in connection with a property but has been addressed to the satisfaction of the applicable regulatory authority and meets current unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (e.g., property use restrictions, activity and use limitations, institutional controls, or engineering controls). Before calling the past release a HREC, the environmental professional (EP) must determine whether the past release is a REC when the current Phase I ESA is conducted (e.g., if there has been a change in the regulations). If the EP considers the past release to be a REC at the time the Phase I ESA is conducted, the condition shall be included in the conclusions section of the report as a REC.

ASTM defines a “CREC” as a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (e.g., as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), but with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g., property use restrictions, activity and use limitations, institutional controls, or engineering controls).

As defined by ASTM, RECs can include hazardous substances or petroleum products present under conditions in compliance with laws if that presence represents a material threat of future release. The presence of hazardous substances or petroleum products is, however, not a REC if that presence is a *de minimis* condition. *De minimis* conditions are minor occurrences of contamination that generally do not present a material risk to human health and would not likely be subject to enforcement action if brought to



CHIKUITO BATTERY ENERGY STORAGE SITE: APN 380150020 PHASE I ENVIRONMENTAL SITE ASSESSMENT

Introduction
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the attention of governmental agencies. ASTM also considers the potential for a business environmental risk (BER), defined as a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of the Subject Property, not necessarily limited to those environmental issues required to be investigated by the ASTM standard. Consideration of BERs may involve addressing one or more ASTM non-scope considerations.

This Phase I ESA was conducted in accordance with our proposal to Hecate Energy Grid, LLC dated November 19, 2021 and Client's authorization on November 20, 2021. The scope of work conducted during this Phase I ESA consisted of a visual reconnaissance of the Subject Property, interviews with key individuals, and review of reasonably ascertainable documents. The scope of work did not include an assessment for environmental regulatory compliance of any facility ever operated at the Subject Property (past or present), or sampling and analyzing of environmental media. Stantec was not contracted to perform an independent evaluation of the purchase or lease price of the Subject Property and its relationship to current fair market value. The conclusions presented in this Phase I ESA report are professional opinions based on data described herein. The opinions are subject to the limitations described in Section 2.3.

ASTM E1527-13 notes that the availability of record information varies from source to source. The User or EP is not obligated to identify, obtain, or review every possible source that might exist with respect to a property. Instead, ASTM identifies record information that is reasonably ascertainable from standard sources. "Reasonably ascertainable" means:

1. Information that is publicly available;
2. Information that is obtainable from its source within reasonable time and cost constraints; and
3. Information that is practicably reviewable.

2.1 SUBJECT PROPERTY DESCRIPTION

The Subject Property consists of approximately 1.10 acres of undeveloped land. The Subject Property is zoned as Rural Residential and has a general plan land use designation of Commercial Retail (City of Wildomar 2021). Surrounding properties are a mix of public facilities, residential, and commercial properties. A Subject Property location map is illustrated on Figure 1. A Subject Property map illustrating the main features of the Subject Property is provided as Figure 2. Photographs taken during the site reconnaissance visit are provided in Appendix A.

2.2 SPECIAL TERMS, CONDITIONS, AND ADDITIONAL ASSUMPTIONS

There were no special terms, conditions, or additional assumptions associated with this Phase I ESA.

2.3 EXCEPTIONS AND LIMITING CONDITIONS

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided and given the schedule and



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budget constraints established by the client. No other representations, warranties, or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential and actual liabilities and conditions associated with the Subject Property.

This report provides an evaluation of selected environmental conditions associated with the Subject Property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available, and the results of the work. They are not a certification of the Subject Property's environmental condition.

The client did not provide or contract Stantec to provide recorded title records or search results for environmental liens or activity and use limitations encumbering the property or in connection with the Subject Property. Stantec did obtain historical records that document the property history in 5-year intervals. Although this represents data gaps, these data gaps are not considered to impact the EPs ability to identify RECs unless stated as such. Based on the information obtained during the course of this ESA and general knowledge of development at and near the Subject Property, the absence of this information did not affect the ability of the EPs to identify RECs, HRECs, CRECs, or *de minimis* conditions.

This report has been prepared for the exclusive use of the client identified herein and any use of or reliance on this report by any third party is prohibited, except as may be consented to in writing by Stantec or as required by law. The provision of any such consent is at Stantec's sole and unfettered discretion and will only be authorized pursuant to the conditions of Stantec's standard form reliance letter. Stantec assumes no responsibility for losses, damages, liabilities, or claims, howsoever arising, from third party use of this report.

Project Specific limiting conditions are provided in Section 2.2.

The conclusions are based on the conditions encountered at the Subject Property by Stantec at the time the work was conducted.

As the purpose of this report is to identify Subject Property conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the Subject Property is beyond the scope of this assessment.

The findings, observations, and conclusions expressed by Stantec in this report are not an opinion concerning the compliance of any past or present owner or operator of the Subject Property which is the subject of this report with any Federal, state, provincial or local law or regulation.

This report presents professional opinions and findings of a scientific and technical nature. It does not and shall not be construed to offer a legal opinion or representations as to the requirements of, nor



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compliance with, environmental laws, rules, regulations, or policies of Federal, state, provincial or local governmental agencies. It is recommended that issues raised by the report should be reviewed for the client by its legal counsel.

Stantec specifically disclaims any responsibility to update the conclusions in this report if new or different information later becomes available or if the conditions or activities on the property subsequently change.

2.4 PERSONNEL QUALIFICATIONS

This Phase I ESA was conducted by, or under the supervision of, an individual that meets the ASTM definition of an EP. The credentials of the EP and other key Stantec personnel involved in conducting this Phase I ESA are provided in Appendix B.



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User-Provided Information
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3.0 USER-PROVIDED INFORMATION

ASTM E1527-13 describes responsibilities of the User to complete certain tasks in connection with the performance of “All Appropriate Inquiries” into the Subject Property. The ASTM standard requires that the EP request information from the User on the results of those tasks because that information can assist in the identification of RECs, CRECs, HRECs, or *de minimis* conditions in connection with the Subject Property. Towards that end, Stantec requested that the User provide the following documents and information:

Stantec forwarded the ASTM recommended User Questionnaire to James Damon, representative from Hecate Energy Grid, LLC. As the date of this document, Stantec has not received a completed User Questionnaire from the Client.



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4.0 RECORDS REVIEW

The objective of consulting historical sources of information is to develop the history of the Subject Property and surrounding area and evaluate if past uses may have resulted in RECs. Physical setting records are evaluated to determine if the physical setting may have contributed to adverse environmental conditions in connection with the Subject Property. During the review of historical records, Stantec attempted to identify uses of the Subject Property from the present to the first developed use of the Subject Property. Stantec's research included the reasonably ascertainable and useful records described in this section.

4.1 PHYSICAL SETTING

A summary of the physical setting of the Subject Property is provided in the table below with additional details in the following subsections

Topography:	U.S. Geological Survey (USGS) Wildomar 7.5-minute topographic quadrangle (USGS 2012)
Soil/Bedrock Data:	According to the U.S. Department of Agriculture (USDA): Natural Resources Conservation Service (NRCS) Web Soil Survey nearby soils consists of sandy loam and very fine sandy loam (USDA 2021). This area is characterized by Marine and Nonmarine (Continental) Sedimentary rocks with older alluvium lake, playa, and terrace deposits (SWRCB 2021).
Estimated Depth to Groundwater/ Estimated Direction of Gradient:	California Department of Water Resources (DWR) and USGS Groundwater Data reported depth to groundwater ranges from 1190 feet above mean sea level (feet amsl). The groundwater gradient is expected to be towards the north, northwest (DWR 2020). Stantec reviewed the State Water Resource Control Board (SWRCB) Geotracker online environmental database for sites reporting depth to groundwater. The closest site with depth to groundwater information is a former leaking underground storage tank (LUST) cleanup site identified as the Inland Valley Regional Medical Center located at 36485 Inland Valley Drive, Wildomar, CA 92595. Although currently identified as a case closed site, the last reported depth to groundwater was 1,330-1343 feet amsl in the fourth quarter Groundwater Monitoring Well Sampling and Gradient Assessment dated November 8, 2004 (Frey Environmental 2004).
NOTE: Site-specific groundwater flow direction and depth can only be determined by conducting site-specific testing, which Stantec has not conducted.	



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4.1.1 Subject Property Topography and Surface Water Flow

The Subject Property is located at an elevation of approximately 1200 feet amsl. Based on the topography of the existing and surrounding surface conditions, surface water flows southwest on the Subject Property into drainage channels leading to the Murrieta Creek.

4.1.2 Regional and Subject Property Geology

The Subject Property is located in the southern portion of the Elsinore Valley, a tectonically controlled valley found within the Perris Block which is part of the Peninsular Ranges Geomorphic Province (VCS Environmental 2017). The structurally depressed troughs are filled with nonmarine sediments of upper Pliocene, while the ridges are typically composed of plutonic igneous rocks, metasedimentary rocks, and late-stage intrusive dikes (Quinn and Kerridge 2018). The Elsinore Valley is a complex geologic structural formation that has formed by extensional faulting along the Elsinore Fault Zone (VCS Environmental 2017). The Perris block is the region between the San Jacinto and Elsinore-Chino fault zones, bounded on the north by the Cucamonga (San Gabriel) Fault, on the south by a vaguely delineated boundary near the southern end of the Temecula Valley, and on the southwest by the Santa Ana Mountains (Quinn and Kerridge 2018). The Subject Property is located on the Willard fault in the Elsinore Fault Zone. This fault zone is right lateral strike-slip fault zone extending for approximately 110 miles from the City of Whittier to the City of Murrieta in California. The Elsinore Fault Zone is reported to be one of the quietest fault zones in southern California (SCEDC 2021).

4.1.3 Regional and Subject Property Hydrogeology

The Subject Property is located in the Temecula Valley Groundwater Basin. The Temecula Valley Groundwater Basin underlies several valleys in the southwestern Riverside County and a portion of northern San Diego County. The basin is bounded by nonwater-bearing crystalline rocks of the Peninsular Ranges (DWR 2004). The overlying valleys are drained mainly by Wilson, Temecula, Murrieta, Warm Springs, and Pechanga Creeks to the Santa Margarita River which flows west out of the Temecula Valley. The primary water bearing material of this basin is quaternary alluvium, estimated to reach more than 2,500 feet thick. Holocene alluvial deposits consist of unconsolidated gravel, sand, silt, and clay that are generally about 100 to 125 feet thick but can reach 200 feet thick. Groundwater is extracted from residuum and from fractured rocks beneath the basin (DWR 2004). The Lancaster, Aguanga, and Agua Caliente faults and several strands of the Elsinore fault zone cross the basin and may affect groundwater movement. The Wildomar fault is a groundwater barrier that produces differences in water level and pressure in the northwestern part of the basin. Natural recharge of the alluvium is from direct precipitation and percolation in the Warm Springs, Tualota, Santa Gertrudis, Murrieta, and Pechanga Creeks and the Temecula River (DWR 2004).

Stantec reviewed the SWRCB Geotracker online environmental database for sites reporting a depth to groundwater. The closest site with depth groundwater information is a former LUST cleanup site identified as the Inland Valley Regional Medical Center located at 36485 Inland Valley Drive, Wildomar, CA 92595. Although currently identified as a case closed site, the last reported depth to groundwater was 1,330-



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1343 feet amsl in the fourth quarter Groundwater Monitoring Well Sampling and Gradient Assessment dated November 8, 2004 (Frey Environmental 2004).

4.2 FEDERAL, STATE AND TRIBAL ENVIRONMENTAL RECORDS

A regulatory agency database search report was obtained from Environmental Data Resources Inc. (EDR), a third-party environmental database search firm. A complete copy of the database search report, including the date the report was prepared, the date the information was last updated, and the definition of databases searched, is provided in Appendix C.

Stantec evaluated the information listed within the database relative to potential impact to the Subject Property, assessing the potential for impacts based in part on the physical setting. As part of this process, inferences have been made regarding the likely groundwater flow direction at or near the Subject Property. As described in 4.1.3, the inferred shallow groundwater flow direction is likely to be in the north, northwest.

Observations about the Subject Property and surrounding sites made during the Subject Property reconnaissance are provided in more detail in Section 5.

4.2.1 Listings for Nearby Sites with Potential to Impact Subject Property

Stantec assessed data presented in the EDR report to evaluate the potential for conditions on adjacent and nearby sites to pose a REC, CREC, or HREC for the Subject Property.

Based on the evaluation, the following individual facility was identified as the most likely potential of impact to the Subject Property. The basis for why the following listed databases creates a REC for the Subject Property is also provided.

Listed Facility Name/Address	Database Listing	Distance/Direction from Subject Property	REC? (YES / NO)
Bear Creek Golf Course; 22771 Grand Avenue	SWEEPS Underground Storage Tank (UST)	600 feet west of the Subject Property	No
No additional information was reported. Based on lack of reported violations or releases, this site listing is not considered a REC.			

4.2.2 Listings for Nearby Sites with Potential to Impact Subject Property

Stantec assessed data presented in the environmental agency database search report to evaluate the potential for conditions on adjacent and nearby sites to pose a REC, CREC, or HREC for the Subject Property. The evaluation included an opinion of the potential for contamination by hazardous substances or petroleum products to migrate to the Subject Property from a nearby property, including by vapor migration or encroachment (i.e., potential for a vapor encroachment condition [VEC]).



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Stantec considers the other listings in the database search report provided in Appendix C to not constitute potential RECs for the Subject Property.

4.3 LOCAL/REGIONAL ENVIRONMENTAL RECORDS

Stantec checked the following sources to obtain information pertaining to Subject Property use and/or indications of RECs in connection with the Subject Property:

4.3.1 Riverside County Environmental Health Department

Agency Name Contact Information	Finding
Riverside County Environmental Health Department DEHRecordsMgmt@rivco.org Date of contact: November 2, 2021	Stantec submitted a Freedom of Information Act (FOIA) request to the Riverside County Environmental Health Department on November 2, 2021 and received a response indicating no records were found.

4.3.2 Department of Toxic Substances Control

Agency Name, Contact Information	Findings
Department of Toxic Substances Control (DTSC) San Diego SanDiegoFileRoom@dtsc.ca.gov Date of Contact: November 2, 2021	Stantec submitted a FOIA request to the DTSC on November 2, 2021 and received a response no records were found.

4.3.3 Riverside County Fire Department

Agency Name Contact Information	Finding
Riverside County Fire Department (RCFD) RRURecords@fire.ca.gov Date of contact: November 2, 2021	Stantec submitted a records request to RCFD on November 2, 2021 and received a response indicating no records were found.

4.3.4 City of Wildomar Building and Safety Department

Agency Name, Contact Information	Findings
City of Wildomar Building and Safety Department records@rivco.com Date of Contact: November 2, 2021	Stantec submitted a records request to the Building and Safety Department on November 2, 2021 and received the following records: April 28, 1971: Permit No. 190053to replace electrical service and gas line



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Agency Name, Contact Information	Findings
	March 1, 1972: Permit No. 202460 issued for demolition of a cabin Refer to Appendix D Agency Records for copies of these permits.

4.4 HISTORICAL RECORDS REVIEW

4.4.1 Land Title Records/Deeds

Land title records, deeds, environmental liens, and activity and use limitation documentation was not provided by the User, and public records were not searched by Stantec.

4.4.2 Aerial Photographs

Stantec reviewed historical aerial photographs provided by EDR. The general type of activity on a property and land use changes can often be discerned from the type and layout of structures visible in the photographs. However, specific elements of a facility's operation usually cannot be discerned from aerial photographs alone. The following table summarizes Stantec's observations of the reviewed historical aerial photographs.

Year	Scale	Observations, Subject Property and Adjoining Properties
1949	1"=500'	Present day Clinton Keith Road and Grand Avenue are visible on this photograph as paved roads. The Subject Property and surrounding areas appear to be undeveloped. A drainage path or creek can be visible to the south of the Subject Property.
1953	1"=500'	The Subject Property remains unchanged from the 1949 photograph. Some developments are visible approximately 750 feet to the west of the Subject Property.
1961	1"=500'	The Subject Property remains unchanged from the 1949 photograph. The properties directly to the west, northwest show evidence of grading or vegetation clearing.
1967	1"=500'	No significant changes in land use are visible from the 1961 photograph.
1974	1"=500'	No significant changes in land use are visible from the 1967 photograph.
1978	1"=500'	Surrounding properties are now distinguishable from one another with distinguished property boundaries. Murrieta Creek is visible to the north of the Subject Property.
1985	1"=500'	The Subject Property remains unchanged. Various surrounding properties are developed with single family homes. The drainage path or creek is still visible to the south of the Subject Property.
1989	1"=500'	No significant changes in land use are visible from the 1989 photograph.



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Year	Scale	Observations, Subject Property and Adjoining Properties
1994	1"=500'	Significant land use development is visible in surrounding properties. The areas surrounding the Subject Property now show various residential homes and tracks. Thick vegetation overgrowth is visible on the property directly south of the Subject Property.
1997	1"=500'	No significant changes in land use are visible from the 1994 photograph. The property to south appears to have been cleared of minimal vegetation, however mature trees are still present.
2002	1"=500'	No significant changes in land use are visible from the 1997 photograph. The property to south appears to now be developed further and covered with asphalt.
2005	1"=500'	The Subject Property remains unchanged from the 2002 photograph. The land approximately 800 feet to the southwest is developed into a golf course.
2009	1"=500'	No significant changes in land use from the 2002 photograph.
2012	1"=500'	The Subject Property remains unchanged from the 2009 photograph. The adjacent property to the south is now developed as the Southern California Edison (SCE) Tenaja Substation.
2016	1"=500'	No significant changes in land use from the 2012 photograph.

Name of aerial photograph source: The EDR Aerial Photo Decade Package

4.4.3 City Directories

Stantec retained a third party to research available reverse city directories for the Subject Property, in approximately five-year intervals. The following is a summary of Stantec's review of the city directory listings:

Year	Subject/Adjoining Property	Listed Occupants
2014	32695 Clinton Keith Road	Bear Creek Feed& Supply
2005	32575 Clinton Keith Road	Lopez, Juan M
	32695 Clinton Keith Road	VIP Monitoring
2000	32757 Clinton Keith Road	Lopez, Juan
	32695 Clinton Keith Road	Price, Ted Rancho Land Sales
1995	32575 Clinton Keith Road	Lopez, Juan
	32625 Clinton Keith Road	Helash, John
	32695 Clinton Keith Road	Price, Ted Rancho Land Sales
1992	32575 Clinton Keith Road	Lopez, Juan
	32625 Clinton Keith Road	Helash, John



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Year	Subject/Adjoining Property	Listed Occupants
	32695 Clinton Keith Road	Price, Ted Rancho Land Sales
1985	32575 Clinton Keith Road	Wright, Jean
	32610 Clinton Keith Road	Hilde, Phillip
	32625 Clinton Keith Road	Helash, John
1980	32610 Clinton Keith Road	Hilde, Phillip

Name of city directories and source: The EDR City Directory Abstract

4.4.4 Historical Fire Insurance Maps

Fire insurance maps were developed for use by insurance companies to depict facilities, properties, and their uses for many locations throughout the United States. These maps provide information on the history of prior land use and are useful in assessing whether there may be potential environmental contamination on or near the Subject Property. These maps, which have been periodically updated since the late 19th century, often provide valuable insight into historical Subject Property uses.

Stantec requested fire insurance maps from EDR; however, no coverage exists for the Subject Property. The Sanborn® Map Search Report indicating “no coverage” is presented in Appendix C.

4.4.5 Historical Topographic Maps

Stantec obtained and reviewed historical topographic maps to help identify past proposed Subject Property usage and areas of potential environmental concern. USGS 7.5-minute Topographic Maps of the Wildomar, California Quadrangle (scale 1:24,000) to help identify past Subject Property usage and areas of potential environmental concern.

No RECs were noted during our review of the topographic maps. Copies of the historical maps are provided in Appendix C. The following table summarizes the maps reviewed and our observations.

Year	Scale	Observations, Subject Property and Adjoining Sites
1901	1:125,000	Based on the scale, no details regarding specific development of the Subject Property were observed. No structures or indicators of potential RECs were presented on the map.
1942	1:62,500	
1943	1:62,500	
1947	1:50,000	
1953	1:24,000	
1973	1:24,000	Clinton Keith Road and Murrieta Creek are presented on these maps. No structures are present on the Subject Property and surrounding properties.
1982	1:24,000	
1988	1:24,000	
1997	1:24,000	



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Year	Scale	Observations, Subject Property and Adjoining Sites
2012	1:24,000	This map provides little detail of the Subject Property, adjoining, and nearby properties. All surrounding residential streets appear to be developed to their current conditions.

Name of maps and source: The EDR Historical Topographic Map Report

4.4.6 Other Historical Sources

Stantec reviewed the Department of Conservation (DOC), Geologic Energy Management Division (CalGEM) online well finder database to determine the number and status of historical oil and gas wells on the Subject Property and in the surrounding areas. The nearest buried and plugged oil gas well is approximately 4.72 miles to the southeast of the Subject Property (DOC 2021). No historical, or current, oil and gas wells were identified within the Subject Property.

No other historical sources were researched.



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Site Reconnaissance
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5.0 SITE RECONNAISSANCE

A visit to the Subject Property and its vicinity was conducted by Emily Medler on November 11, 2021. Access to the Subject Property was provided by public right-of-way (ROW). Stantec was unaccompanied during the Subject Property visit. Figure 2 provides information about the Subject Property and adjoining sites and the location of potential areas of environmental concern. Photographs collected during the Subject Property visit are included in Appendix A.

5.1 SITE RECONNAISSANCE METHODOLOGY

The site reconnaissance focused on observation of current conditions and observable indications of past uses and conditions of the Subject Property that may indicate the presence of RECs. The reconnaissance of the Subject Property was conducted on foot and Stantec utilized the following methodology to observe the Subject Property:

- Traverse the outer Subject Property boundary.
- Traverse transects across the Subject Property.
- Traverse the periphery of all structures on the Subject Property.
- Visually observe accessible interior areas expected to be used by occupants or the public, maintenance and repair areas, utility areas, and a representative sample of occupied spaces.

Weather conditions during the visit to the Subject Property were clear and sunny. There were no weather-related Subject Property access restrictions encountered during the reconnaissance visit.

5.2 GENERAL DESCRIPTION

Subject Property and Area Description:	The Subject Property is located at APN 380150020. The Subject Property is a vacant, undeveloped parcel within the City of Wildomar. The surrounding area consists of residential, commercial, and open space use.
Subject Property Operations.	The Subject Property is zoned as Rural Residential and is a vacant lot with no active operations.
Structures, Roads, Other Improvements:	None observed.
Subject Property Size (acres):	1.10 acres
Estimated % of Subject Property Covered by Buildings and/or Pavement:	0%, site is covered with minimal vegetation and grasses
Observed Current Subject Property Use/Operations:	Vacant lot
Observed Evidence of Past Subject Property Use(s):	None observed.



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Sewage Disposal Method (and age):	City of Wildomar Public Works Department
Potable Water Source:	Elsinore Valley Municipal Water District
Electric Utility:	SCE

5.3 HAZARDOUS SUBSTANCES AND PETROLEUM PRODUCTS

The following table summarizes Stantec's observations during the Subject Property reconnaissance.

Observations	Description/Location
Hazardous Substances and Petroleum Products as Defined by CERCLA 42 U.S.C. § 9601(14):	None observed.
Drums (≥ 5 gallons):	None observed.
Strong, Pungent, or Noxious Odors:	None observed.
Pools of Liquid:	None observed.
Unidentified Substance Containers:	None observed.
PCB-Containing Equipment:	None observed.
Other Observed Evidence of Hazardous Substances or Petroleum Products:	None observed.

5.4 INTERIOR OBSERVATIONS

The area within the Subject Property is undeveloped, vacant land. As such, no interior observations were made during the site reconnaissance.

5.5 EXTERIOR OBSERVATIONS

Stantec made the following observations during the site reconnaissance of exterior areas of the Subject Property and/or identified the following information during the interview or records review portions of the assessment:

Observations	Description
On-site Pits, Ponds, or Lagoons:	None observed.
Stained Soil or Pavement:	None observed.
Stressed Vegetation:	Two-tracks were observed throughout the Subject Property assumed to be associated with various vegetation management (i.e., mowing)



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Observations	Description
Waste Streams and Waste Collection Areas:	None observed.
Solid Waste Disposal:	No areas indicative of solid waste disposal were observed.
Potential Areas of Fill Placement:	No mounds, piles, or depressions suggesting the placement of fill material were observed on the Subject Property.
Wastewater:	No exterior wastewater discharge was observed.
Stormwater:	The conditions were dry at the time of the site reconnaissance conducted by Stantec on November 11, 2021. Based on the locations of storm drains, stormwater flows south, southwest from the site to the drainage culvert located on SCE's property adjacent to the southwest.
Wells:	None observed.
Septic Systems:	No visible evidence of the existence of a septic system was observed.
Other Exterior Observations:	Observed on the Subject Property were two aboveground, high voltage markers. These markers do not represent a REC.

5.6 UNDERGROUND STORAGE TANKS/STRUCTURES

Existing USTs:	No visible evidence (fill pipes, vent pipes, dispensers, surface patches), which would indicate the presence of USTs, was discovered during the site reconnaissance.
Former USTs:	No visible evidence (fill pipes, vent pipes, dispensers, surface patches), reports, or other evidence of the former presence of USTs was discovered during this Phase I ESA.
Other Underground Structures:	None observed.

5.7 ABOVEGROUND STORAGE TANKS

Existing ASTs:	No visible evidence (fill pipes, vent pipes, dispensers, surface stains), which would indicate the presence of ASTs, was discovered during the site reconnaissance.
Former ASTs:	No visible evidence (fill pipes, vent pipes, dispensers, surface stains), reports, or other evidence of the former presence of ASTs was discovered during this Phase I ESA.

5.8 ADJOINING PROPERTIES

5.8.1 Current Uses of Adjoining Properties

As viewed from the Subject Property and/or from public ROW, Stantec made the following observations about use and activities on adjoining sites:



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NORTH	Subject Property consists of a vacant lot and a commercial business (Blue Rock Landscaping Materials).
EAST	This site appears to be undeveloped.
SOUTH	Subject Property to the south is developed as an electrical substation (SCE Tenaja Substation).
WEST	The adjacent to the west of the Subject Property consists of a residential neighborhood.

5.8.2 Observed Evidence of Past Uses of Adjoining Properties

Observations of adjoining sites providing indications of past use and activities, if any, are described below.

NORTH	None Observed.
EAST	None Observed.
SOUTH	None Observed.
WEST	None Observed.

5.8.3 Pits, Ponds or Lagoons on Adjoining Properties

As viewed from the Subject Property and/or from public rights-of-way, Stantec made the following observations about the presence of pits, ponds, and lagoons on adjoining sites:

NORTH	Murrieta Creek was observed approximately 300 feet to the north of the Subject Property.
EAST	None observed.
SOUTH	None observed.
WEST	None observed.

5.9 OBSERVED PHYSICAL SETTING

Topography of the Subject Property and Surrounding Area:	The Subject Property has a general topographic gradient trend to the south, southwest, and surrounding areas have a general topographic gradient trending north, northwest.
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Interviews
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6.0 INTERVIEWS

Interviews were unable to be conducted with the current owner of the Subject Property.



Evaluation
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7.0 EVALUATION

This section provides a summary overview of Findings, Opinions, and Conclusions.

7.1 FINDINGS AND OPINIONS

Information gathered from interviews, reviews of existing data, and a property inspection was evaluated to determine if RECs are present in connection with the Subject Property. Based on this information, Stantec made the following finding and developed the following opinion.

- Stantec observed the adjacent property as an electrical substation (SCE Tenaja Substation). Given the recent development of the substation, future development of the Subject Property, and no evidence of prior violations, the Tenaja Substation does not represent a REC.
- Due to the existing conditions and the site being undeveloped, there is potential to encounter various biological resources or endangered species. A biological resources assessment was conducted prior to this Phase I ESA. Results of the survey indicated most of the Subject Property consists of non-native grassland and one special-status species paniculate tarplant, was observed on the Subject Property. No additional special-status wildlife species were observed during the assessment, however due to its close proximity to Murrieta Creek, there is potential for the riparian vegetation to support special status and other common bird species. Lastly, the assessment indicated burrowing owls have the potential to occur within non-native grasslands of the Subject Property. These potential biological resources represent a BER.
- The Subject Property is located on the Willard fault of the Elsinore fault zone. The Subject Property's close proximity to these faults represents a BER and should be considered during development of the planned use of the Subject Property.
- The Subject Property is located within 300 feet of Murrieta Creek, which is mapped as a regulatory floodway. The Subject Property is located in Zone X (minimal flood hazard risk), however, a flood zone AE (flood zone areas that present a 1% annual chance of flooding and a 26% chance over the life of a 30-year mortgage, according to FEMA) was mapped close to the southeast to east boundary of the Subject Property.
- The Subject Property's close proximity to a regulatory flood way and Zone AE represents a BER and should be considered during development of the planned use of the Subject Property.



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7.2 DATA GAPS

The federal AAI final rule [40 CFR 312.10(a)] and ASTM E1527-13 identify a “data gap” as the lack or inability to obtain information required by the standards and practices of the rule despite good faith efforts by the EP or the User.

Any data gaps resulting from the Phase I ESA described in this report are listed and discussed below.

Gap	Discussion
Deletions or Exceptions from Scope of Work Referenced in Section 1.4:	None.
Weather-Related Restrictions to Site Reconnaissance:	None.
Facility Access Restrictions to Site Reconnaissance:	None.
Other Site Reconnaissance Restrictions:	None.
Data Gaps from Environmental Records Review:	None.
Data Gaps from Historical Records Review:	None.
Data Gaps from Interviews:	The current owner of the Subject Property was not interviewed during the completion of this assessment. However, a user questionnaire was issued to Hecate and Stantec is awaiting the completed questionnaire, which will be incorporated into this report upon receipt.
Other Data Gaps:	None.

7.3 CONCLUSIONS

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 of APN 380150020, the “Subject Property”. Any exceptions to, or deletions from, this practice are described in Section 2.3 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the Subject Property.

The following Business Environmental Risks (BERs) were identified in connection with the assessment of the Subject Property:

- The existing, undeveloped condition of the Subject Property is likely to support endangered or special status biological resources. A biological resources assessment was conducted prior to this Phase I ESA. Results of the survey indicated most of the Subject Property consists of non-native grassland and one special-status species, paniculate tarplant, was observed on the



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Subject Property. Additionally, no special-status wildlife species were observed during the assessment, however due to its close proximity to Murrieta Creek there is potential for the riparian vegetation to support special status and other common bird species. Lastly, the assessment indicated burrowing owls have the potential to occur within non-native grasslands of the Subject Property. These potential biological resources represent a BER and should be considered during development of the planned use of the Subject Property.

- The Subject Property is located on the Willard Fault within the Elsinore Fault Zone. The Subject Property's proximity to the Willard fault represents a BER and should be considered during development of the planned use of the Subject Property.
- The Subject Property is located within 300 feet of Murrieta Creek, which is mapped as a regulatory floodway. Per FEMA maps prepared for the area, the Subject Property is located within Zone X (minimal flood hazard risk), however, a flood zone AE (flood zone areas that present a 1% annual chance of flooding and a 26% chance over the life of a 30-year mortgage, according to FEMA) was mapped directly next to the southeast to east boundary of the Subject Property. The Subject Property's proximity to a Zone AE flood zone towards the southeast to east boundary represents a BER and should be considered during development of the planned use of the Subject Property.



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8.0 REFERENCES

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FIGURES



APPENDICES



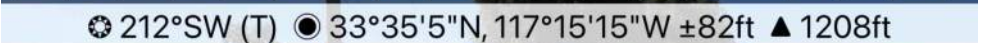
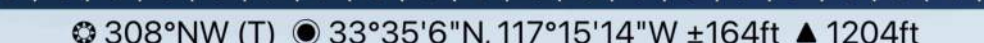
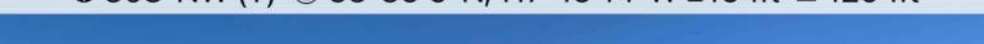
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Appendix A Photographs of the Property and Vicinity
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Appendix A Photographs of the Property and Vicinity

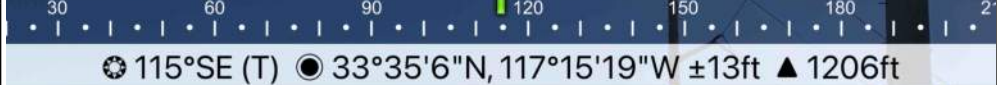


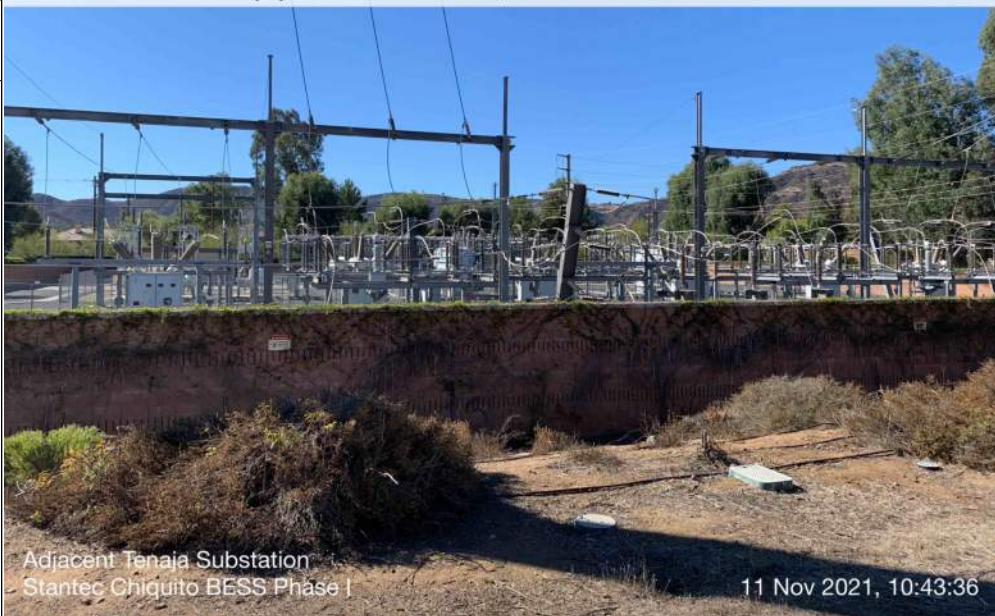
Client:	Hecate Energy Grid, LLC.	Project:	Chiquito Battery Energy Storage System Phase I ESA
Site Name:	Chiquito	Site Location:	Wildomar, California
Photograph ID: 1	 ☀ 349°N (T) 🕒 33°35'4"N, 117°15'16"W ±22ft ▲ 1208ft		
Direction: North	 PP1 Stantec Chiquito BESS Phase I 11 Nov 2021, 10:29:43		
Survey Date: 11/11/2021			
Comments: From PP1, looking North at the Property and adjacent parcel boundary. Ornamental vegetation and electrical poles can be seen along this boundary.	 ☀ 64°NE (T) 🕒 33°35'4"N, 117°15'16"W ±39ft ▲ 1209ft		
Photograph ID: 2	 PP1 Stantec Chiquito BESS Phase I 11 Nov 2021, 10:30:01		
Direction: Northeast, east			
Survey Date: 11/11/2021			
Comments: From PP1, looking northeast, east at the Property and Clinton Keith Road. The property adjacent to the north and nearby business, Blue Rock Landscaping materials, is visible in the background.			

Client:	Hecate Energy Grid, LLC.	Project:	Chiquito Battery Energy Storage System Phase I ESA
Site Name:	Chiquito	Site Location:	Wildomar, California
Photograph ID: 3			
Direction: Southwest			
Survey Date: 11/11/2021			
Comments: View of aboveground high-voltage markers along the eastern boundary of the Property.	 Above ground high voltage markers Stantec Chiquito BESS Phase I 11 Nov 2021, 10:31:31		
Photograph ID: 4			
Direction: Northwest			
Survey Date: 11/11/2021			
Comments: View of the Property from the southeastern corner of the Property facing northwest.	 PP2 Stantec Chiquito BESS Phase I 11 Nov 2021, 10:32:42		

Client:	Hecate Energy Grid, LLC.	Project:	Chiquito Battery Energy Storage System Phase I ESA
Site Name:	Chiquito	Site Location:	Wildomar, California
Photograph ID: 5	 Adjacent parcel across Clinton Keith rd Stantec Chiquito BESS Phase I PP2 11 Nov 2021, 10:33:44		
Direction: East, southeast			
Survey Date: 11/11/2021			
Comments: View from the Property facing east, southeast at the nearby open space property across Clinton Keith Road. Additionally, an electrical pole is visible along the eastern boudnary.			
Photograph ID: 6	 Stantec Chiquito BESS Phase I PP3 11 Nov 2021, 10:36:31		
Direction: South			
Survey Date: 11/11/2021			
Comments: From PP3, view of the Property facing south at the adjacent Southern California Edison (SCE) Tenaja Substation.			

Client: Hecate Energy Grid, LLC.		Project: Chiquito Battery Energy Storage System Phase I ESA	
Site Name: Chiquito		Site Location: Wildomar, California	
Photograph ID: 7	NE 60 90 120 150 180 210 ☀ 125°SE (T) ● 33°35'7"N, 117°15'18"W ±29ft ▲ 1212ft  Stantec Chiquito BESS Phase I PP3 11 Nov 2021, 10:36:48		
Direction: Southeast			
Survey Date: 11/11/2021			
Comments: From PP3, view of the Property and adjacent parcel boundary facing southeast. Various two-tracks are visible throughout the site. Assumed to be associated with various vegetation management.			
Photograph ID: 8	S 180 210 SW 240 270 W 300 NW 330 ☀ 264°W (T) ● 33°35'8"N, 117°15'19"W ±29ft ▲ 1209ft  Adjacent parcel Stantec Chiquito BESS Phase I PP3 11 Nov 2021, 10:37:37		
Direction: West			
Survey Date: 11/11/2021			
Comments: From PP3, view of the adjacent residential properties to the west.			

Client:	Hecate Energy Grid, LLC.	Project:	Chiquito Battery Energy Storage System Phase I ESA
Site Name:	Chiquito	Site Location:	Wildomar, California
Photograph ID: 9			
Direction: East, southeast			
Survey Date: 11/11/2021			
Comments: From PP4, view of the Property boundary with the adjacent SCE Tenaja Substation. Four electrical poles and ornamental landscaping is visible along this boundary.	 Stantec Chiquito BESS Phase I 11 Nov 2021, 10:38:48 PP4		
Photograph ID: 10			
Direction: East, southeast			
Survey Date: 11/11/2021			
Comments: View of the drainage culvert on the adjacent SCE Tenaja Substation property to the south. The culvert is approximately 2-3 feet wide. No runoff was observed at the site reconnaissance.	 Drainage on adjacent property Stantec Chiquito BESS Phase I 11 Nov 2021, 10:41:13 PP4		

Client:	Hecate Energy Grid, LLC.	Project:	Chiquito Battery Energy Storage System Phase I ESA
Site Name:	Chiquito	Site Location:	Wildomar, California
Photograph ID: 11	S SW W NW 150 180 210 240 270 300 330 ☀ 237°SW (T) ● 33°35'5"N, 117°15'17"W ±32ft ▲ 1208ft  Adjacent Tenaja Substation Stantec Chiquito BESS Phase I 11 Nov 2021, 10:43:36		
Direction: Southwest			
Survey Date: 11/11/2021			
Comments: View of the SCE Tenaja Substation from the Property.			
Photograph ID: 12	NW N NE E 300 330 0 30 60 90 120 ☀ 32°NE (T) ● 33°35'2"N, 117°15'19"W ±13ft ▲ 1213ft  Adjacent Tenaja substation Stantec Chiquito BESS Phase I 11 Nov 2021, 10:48:01		
Direction: North, northeast			
Survey Date: 11/11/2021			
Comments: View of the SCE Tenaja Substation entrance to the south of the Property.			

32°NE (T) 33°35'2"N, 117°15'19"W ±13ft ▲ 1213ft

 Adjacent Tenaja substation
 Stantec Chiquito BESS Phase I

11 Nov 2021, 10:48:01

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Appendix B Stantec Resumes
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Appendix B STANTEC RESUMES



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Appendix C Environmental Data Resources Report
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Appendix C ENVIRONMENTAL DATA RESOURCES REPORT



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Appendix D Agency Records
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Appendix D AGENCY RECORDS



Appendix 5: LID Feasibility Supplemental Information

Information that supports or supplements the determination of LID technical feasibility documented in Section D

Examples of material to provide in Appendix 5 may include but are not limited to the following:

- Technical feasibility criteria for DMAs
- Site specific analysis of technical infeasibility of all LID BMPs (if Alternative Compliance is needed)
- Documentation of Approval criteria for Proprietary Biofiltration BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.

Appendix 6: LID BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation to supplement Section D

Examples of material to provide in Appendix 6 may include but are not limited to the following:

- DCV calculations,
- LID BMP sizing calculations from Exhibit C of the SMR WQMP
- Design details/drawings from manufacturers for proprietary BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 3.4 of the SMR WQMP and Sections D.4 of this Template.

Santa Margarita Watershed BMP Design Volume, V_{BMP} (Rev. 03-2012)		Legend:	Required Entries Calculated Cells
(Note this worksheet shall only be used in conjunction with BMP designs from the LID BMP Design Handbook)			
Company Name	Stantec	Date	7/5/2023
Designed by	L. Diaz	County/City Case No	
Company Project Number/Name	185805178 / Chiquito BESS		
Drainage Area Number/Name	A		
Enter the Area Tributary to this Feature		$A_T =$	0.77 acres
85 th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E			
Site Location	Township	T 07 S	
	Range	R 04 W	
	Section	1	
Enter the 85 th Percentile, 24-hour Rainfall Depth	$D_{85} =$	0.74	
Determine the Effective Impervious Fraction			
Type of post-development surface cover (use pull down menu)	Mixed Surface Types		
Effective Impervious Fraction	$I_f =$	0.35	
Calculate the composite Runoff Coefficient, C for the BMP Tributary Area			
Use the following equation based on the WEF/ASCE Method $C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$		$C =$	0.25
Determine Design Storage Volume, V_{BMP}			
Calculate V_U , the 85% Unit Storage Volume $V_U = D_{85} \times C$	$V_u =$	0.19	(in*ac)/ac
Calculate the design storage volume of the BMP, V_{BMP} . $V_{BMP} (ft^3) = \frac{V_U (in\text{-}ac/ac) \times A_T (ac) \times 43,560 (ft^2/ac)}{12 (in/ft)}$			
		$V_{BMP} =$	531 ft^3
Notes:			

<u>Santa Margarita Watershed</u> BMP Design Flow Rate, Q_{BMP} (Rev. 03-2012)		Legend:	Required Entries Calculated Cells
Company Name	Stantec	Date	7/5/2023
Designed by	L. Diaz	County/City Case No	
Company Project Number/Name	185805178 / Chiquito BESS		
Drainage Area Number/Name	A		
Enter the Area Tributary to this Feature	$A_T = 0.77$ acres		
Determine the Effective Impervious Fraction			
Type of post-development surface cover (use pull down menu)	Mixed Surface Types		
Effective Impervious Fraction	$I_f = 0.35$		
Calculate the composite Runoff Coefficient, C for the BMP Tributary Area			
Use the following equation based on the WEF/ASCE Method			
$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$		$C = 0.25$	
BMP Design Flow Rate			
$Q_{BMP} = C \times I \times A_T$		$Q_{BMP} = 0.0$ ft ³ /s	
Notes:			

Santa Margarita Watershed BMP Design Volume, V_{BMP} (Rev. 03-2012)		Legend:	Required Entries Calculated Cells
(Note this worksheet shall only be used in conjunction with BMP designs from the LID BMP Design Handbook)			
Company Name	Stantec	Date	7/5/2023
Designed by	L. Diaz	County/City Case No	
Company Project Number/Name			
Drainage Area Number/Name	B1		
Enter the Area Tributary to this Feature		$A_T =$	1.45 acres
85 th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E			
Site Location	Township	T 07 S	
	Range	R 04 W	
	Section	1	
Enter the 85 th Percentile, 24-hour Rainfall Depth	$D_{85} =$	0.74	
Determine the Effective Impervious Fraction			
Type of post-development surface cover (use pull down menu)	Mixed Surface Types		
Effective Impervious Fraction	$I_f =$	0.31	
Calculate the composite Runoff Coefficient, C for the BMP Tributary Area			
Use the following equation based on the WEF/ASCE Method $C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$		$C =$	0.23
Determine Design Storage Volume, V_{BMP}			
Calculate V_U , the 85% Unit Storage Volume	$V_U = D_{85} \times C$	$V_u =$	0.17 (in*ac)/ac
Calculate the design storage volume of the BMP, V_{BMP} . $V_{BMP} (ft^3) = \frac{V_U (in\text{-}ac/ac) \times A_T (ac) \times 43,560 (ft^2/ac)}{12 (in/ft)}$		$V_{BMP} =$	895 ft ³
Notes:			

<u>Santa Margarita Watershed</u> BMP Design Flow Rate, Q_{BMP} (Rev. 03-2012)		Legend:	Required Entries Calculated Cells
Company Name	Stantec	Date	7/5/2023
Designed by	L. Diaz	County/City Case No	
Company Project Number/Name	185805178 / Chiquito BESS		
Drainage Area Number/Name	B1		
Enter the Area Tributary to this Feature	$A_T = 1.45$ acres		
Determine the Effective Impervious Fraction			
Type of post-development surface cover (use pull down menu)	Mixed Surface Types		
Effective Impervious Fraction	$I_f = 0.31$		
Calculate the composite Runoff Coefficient, C for the BMP Tributary Area			
Use the following equation based on the WEF/ASCE Method			
$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$		$C = 0.23$	
BMP Design Flow Rate			
$Q_{BMP} = C \times I \times A_T$		$Q_{BMP} = 0.1$ ft ³ /s	
Notes:			

Santa Margarita Watershed BMP Design Volume, V_{BMP} (Rev. 03-2012)		Legend:	Required Entries Calculated Cells
(Note this worksheet shall only be used in conjunction with BMP designs from the LID BMP Design Handbook)			
Company Name	Stantec	Date	7/5/2023
Designed by	L. Diaz	County/City Case No	
Company Project Number/Name	185805178 / Chiquito BESS		
Drainage Area Number/Name	B2		
Enter the Area Tributary to this Feature		$A_T =$	0.5 acres
85 th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E			
Site Location	Township	T 07 S	
	Range	R 04 W	
	Section	1	
Enter the 85 th Percentile, 24-hour Rainfall Depth	$D_{85} =$	0.74	
Determine the Effective Impervious Fraction			
Type of post-development surface cover (use pull down menu)	Mixed Surface Types		
Effective Impervious Fraction	$I_f =$	0.18	
Calculate the composite Runoff Coefficient, C for the BMP Tributary Area			
Use the following equation based on the WEF/ASCE Method $C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$		$C =$	0.16
Determine Design Storage Volume, V_{BMP}			
Calculate V_U , the 85% Unit Storage Volume $V_U = D_{85} \times C$	$V_u =$	0.12	(in*ac)/ac
Calculate the design storage volume of the BMP, V_{BMP} . $V_{BMP} (ft^3) = \frac{V_U (in\text{-}ac/ac) \times A_T (ac) \times 43,560 (ft^2/ac)}{12 (in/ft)}$			
		$V_{BMP} =$	218 ft ³
Notes:			

Appendix 7: Hydromodification

Supporting Detail Relating to compliance with the Hydromodification Performance Standards

Examples of material to provide in Appendix 7 may include but are not limited to the following:

- Hydromodification Exemption Exhibit,
- Potential Critical Coarse Sediment Yield Area Mapping
- Hydromodification BMP sizing calculations,
- SMRHM report files,
- Site-Specific Critical Coarse Sediment Analysis,
- Design details/drawings from manufacturers for proprietary BMPs

This information should support the hydromodification exemption (if applicable) and hydrologic control BMP and Sediment Supply BMP sections of this Template. Refer to Section 2.4 and 3.6 of the SMR WQMP and Sections E of this Template.

Bioretention Facility - Design Procedure		BMP ID Basin A	Legend:	Required Entries
				Calculated Cells
Company Name:	Stantec		Date:	7/7/2023
Designed by:	L. Diaz		County/City Case No.:	
Design Volume				
Enter the area tributary to this feature			$A_T =$	0.8 acres
Enter V_{BMP} determined from Section 2.1 of this Handbook			$V_{BMP} =$	531 ft ³
Enter the measured infiltration rate			$I =$	0.00 in/hr
Enter the Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" of this BMP Design Handbook)			$FS =$	0.00
Enter factored infiltration rate (design)			$I_{factored} =$	#DIV/0! in/hr
Bioretention Facility Surface Area				
Depth of Surface Ponding Layer (6" minimum, 12" maximum)			$d_p =$	1.0 inches
Depth of Engineered Soil Media (24" to 36"; 18" allowed if vertically constr			$d_s =$	24.0 inches
Depth of Gravel Storage Layer (Optional Layer; up to 30")			$d_g =$	12.0 inches
Note: Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches (30 inch bulk depth) unless higher permeability media is used to allow faster filling of this layer.				
Total Effective Depth, d_E				
$d_E(ft) = d_p(ft) + [(0.3) \times d_s(ft) + (0.4) \times d_g(ft)]$			$d_E =$	1.08 feet
Required Effective Footprint Area, A_{BMP}				
$A_{BMP} (ft^2) = \frac{V_{BMP} (ft^3)}{d_E (ft)}$			$A_{BMP} =$	490 ft ²
Proposed Surface Area (shall not be less than A_{BMP})			$A =$	1,787 ft ²
Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding depth of the basin. The underlying gravel layer should extend to this contour. For systems with vertical walls, the effective area is the full footprint.				
Message: Facility meets the Minimum Footprint				
Drawdown Time (must be less than 72 hours)			$T_{Dd} =$	#DIV/0! hr
#DIV/0!				
Bioretention Facility Properties				
Side Slopes in Bioretention Facility			$z =$	4 :1
Longitudinal Slope of Site (3% maximum)				0.5 %
Check Dam Spacing				0 feet
Describe Vegetation:				
Notes:				

Bioretention Facility - Design Procedure		BMP ID Basin B	Legend:	Required Entries
				Calculated Cells
Company Name:	Stantec		Date:	7/7/2023
Designed by:	L. Diaz		County/City Case No.:	
Design Volume				
Enter the area tributary to this feature			$A_T =$	1.9 acres
Enter V_{BMP} determined from Section 2.1 of this Handbook			$V_{BMP} =$	1,113 ft ³
Enter the measured infiltration rate			$I =$	0.00 in/hr
Enter the Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" of this BMP Design Handbook)			$FS =$	0.00
Enter factored infiltration rate (design)			$I_{factored} =$	#DIV/0! in/hr
Bioretention Facility Surface Area				
Depth of Surface Ponding Layer (6" minimum, 12" maximum)			$d_p =$	1.0 inches
Depth of Engineered Soil Media (24" to 36"; 18" allowed if vertically constr			$d_s =$	24.0 inches
Depth of Gravel Storage Layer (Optional Layer; up to 30")			$d_g =$	12.0 inches
Note: Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches (30 inch bulk depth) unless higher permeability media is used to allow faster filling of this layer.				
Total Effective Depth, d_E				
$d_E(ft) = d_p(ft) + [(0.3) \times d_s(ft) + (0.4) \times d_g(ft)]$			$d_E =$	1.08 feet
Required Effective Footprint Area, A_{BMP}				
$A_{BMP} (ft^2) = \frac{V_{BMP} (ft^3)}{d_E (ft)}$			$A_{BMP} =$	1,027 ft ²
Proposed Surface Area (shall not be less than A_{BMP})			$A =$	1,862 ft ²
Note: This area shall be measured at the mid-ponding depth of the BMP. For systems with side-slopes, this should be the contour that is midway between the floor of the basin and the maximum water quality ponding depth of the basin. The underlying gravel layer should extend to this contour. For systems with vertical walls, the effective area is the full footprint.				
Message: Facility meets the Minimum Footprint				
Drawdown Time (must be less than 72 hours)			$T_{Dd} =$	#DIV/0! hr
#DIV/0!				
Bioretention Facility Properties				
Side Slopes in Bioretention Facility			$z =$	4 :1
Longitudinal Slope of Site (3% maximum)				0.5 %
Check Dam Spacing				0 feet
Describe Vegetation:				
Notes:				

Chiquito BESS

Basin Sizing Calculations

6/15/2023

Low Loss Rate - PERCENT

$$(0.90) - (0.80 * A_i)$$

$$A_i =$$

0 Existing Condition
0.148 Proposed Condition

$$\text{Existing Condition} = (0.90) - (0.80 * 0) = 0.9 * 100 = 90$$

$$\text{Proposed Condition} = (0.90) - (0.80 * 0.148) = 0.7816 * 100 = 78$$

Constant Loss Rate - Inches / Hour

$$F = F_p (1.0 - (0.9 * A_i))$$

$$A_i =$$

0 Existing Condition
0.148 Proposed Condition

Existing Condition

$$RI = 79$$

for Grass, Annual or Perennial Cover type, AMC II, Soil Group C
(Based on Plate E-6.1)

$$\text{Infiltration Rate} = 0.32 \text{ in/hr} \quad \text{for } RI=79 \quad (\text{Based on Plate E-6.2})$$

$$F = 0.32 (1.0 - 0.9 * 0) = 0.32 \text{ in/hr}$$

Proposed Condition

$$RI = 91$$

for graded land
(Based on Plate E-6.1)

$$\text{Infiltration Rate} = 0.12 \text{ in/hr} \quad \text{for } RI=91 \quad (\text{Based on Plate E-6.2})$$

$$F = 0.12 (1.0 - (0.9 * 0.148)) = 0.104 \text{ in/hr}$$

Basin Sizing

Pre-development Volume (Drainage Areas A, B and C) = 0.29 ac-ft

Post-development Volume (Drainage Areas A, B and C) = 0.34 ac-ft

$$\text{Volume required to be detained} = 0.34 \text{ ac-ft} - 0.29 \text{ ac-ft} = 0.05 \text{ ac-ft} =$$

2,178 cf

Northwest Detention Pond with ponding @ 1-ft = 888 cf

Southeast Detention Pond with ponding @ 1.50 ft = 1,600 cf

$$\text{Total Detention Volume Provided} = 1,600 \text{ cf} + 888 \text{ cf} =$$

2,488 cf

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Include a copy of the completed Pollutant Sources/Source Control Checklist used to document Source Control BMPs in Section H of this Template.

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the 2014 SMR WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1 on page 31 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. On-site storm drain inlets	☒ Locations of inlets.	☒ Mark all inlets with the words “Only Rain Down the Storm Drain” or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	☒ Maintain and periodically repaint or replace inlet markings. ☐ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☒ See applicable operational BMPs in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ☐ Include the following in lease agreements: “Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains.”
☐ B. Interior floor drains and elevator shaft sump pumps		☐ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.
☐ C. Interior parking garages		☐ State that parking garage floor drains will be plumbed to the sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ D1. Need for future indoor & structural pest control		☐ Note building design features that discourage entry of pests.	☐ Provide Integrated Pest Management information to owners, lessees, and operators.
☒ D2. Landscape/ Outdoor Pesticide Use	☐ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ☐ Show self-retaining landscape areas, if any. ☒ Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)	State that final landscape plans will accomplish all of the following. ☐ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☒ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ☐ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☒ Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒ Maintain landscaping using minimum or no pesticides. ☒ See applicable operational BMPs in “What you should know for.....Landscape and Gardening” at http://www.rcflood.org/stormwater/Downloads/LandscapeGardenBrochure.pdf ☒ Provide IPM information to new owners, lessees and operators.

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ E. Pools, spas, ponds, decorative fountains, and other water features.	☐ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	☐ If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	☐ See applicable operational BMPs in “Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain” at http://www.rcflood.org/stormwater/Downloads/poolsandspas.pdf
☐ F. Food service	☐ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☐ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☐ Describe the location and features of the designated cleaning area. ☐ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	☐ See the brochure, “The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries” at http://www.rcflood.org/stormwater/downloads/FoodServ.pdf Provide this brochure to new site owners, lessees, and operators.
☐ G. Refuse areas	☐ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ☐ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ☐ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☐ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☐ State that signs will be posted on or near dumpsters with the words “Do not dump hazardous materials here” or similar.	☐ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post “no hazardous materials” signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ H. Industrial processes.	☐ Show process area.	☐ If industrial processes are to be located on site, state: “All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.”	☐ See Fact Sheet SC-10, “Non-Stormwater Discharges” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure “Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities” at http://www.rcflood.org/stormwater/Downloads/IndustrialCommercialFacilities.pdf
☐ I. Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	☐ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ☐ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ☐ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	☐ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat/	☐ See the Fact Sheets SC-31, “Outdoor Liquid Container Storage” and SC-33, “Outdoor Storage of Raw Materials ” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ J. Vehicle and Equipment Cleaning	☐ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	☐ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ☐ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to “Outdoor Cleaning Activities and Professional Mobile Service Providers” for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://www.rcflood.org/stormwater/downloads/OutdoorCleaningActivities.pdf
			☐ Car dealerships and similar may rinse cars with water only.

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ K. Vehicle/Equipment Repair and Maintenance	☐ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ☐ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ☐ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	☐ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ☐ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ☐ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ☐ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ☐ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ☐ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ L. Fuel Dispensing Areas	☐ Fueling areas ⁶ shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ☐ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area ¹ .] The canopy [or cover] shall not drain onto the fueling area.		☐ The property owner shall dry sweep the fueling area routinely. ☐ See the Fact Sheet SD-30 , “Fueling Areas” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

⁶ The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ M. Loading Docks	☐ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ☐ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ☐ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☐ Move loaded and unloaded items indoors as soon as possible. ☐ See Fact Sheet SC-30, “Outdoor Loading and Unloading,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ N. Fire Sprinkler Test Water		☐ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☐ See the note in Fact Sheet SC-41, “Building and Grounds Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other Sources ☐ Boiler drain lines ☐ Condensate drain lines ☐ Rooftop equipment ☐ Drainage sumps ☐ Roofing, gutters, and trim. ☐ Other sources		☐ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ☐ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☐ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ☐ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ☐ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. ☐ Include controls for other sources as specified by local reviewer.	

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ P. Plazas, sidewalks, and parking lots.			☐ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Include the completed Operation and Maintenance Plan in this Appendix along with additional documentation of Finance and Maintenance Recording Mechanisms for the site. Refer to Sections 3.10 and 5 of the SMR WQMP and Section J of this Template.

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

Examples of material to provide in Appendix 10 may include but are not limited to the following:

- BMP Fact Sheets for proposed BMPs form Exhibit C: LID BMP Design Handbook of the SMR WQMP,
- Source control information and training material for site owners and operators,
- O&M training material,
- Other educational/training material related to site drainage and BMPs.