Water Quality Management Plan (WQMP)

Project Name:

Bloomfield Avenue

Prepared for:

Rexford Industrial Realty, Inc

11620 Wilshire Boulevard, Suite 1000

Los Angeles, CA 90025

(424) 285-6474

Prepared by:

Kier + Wright

March 11, 2022

Engineer Garrett Readler Registration No. 76867

163 Technology Drive, Suite 150

Irvine, California, 92616

(949) 508-0202



Project Owner's Certification			
Permit/Application No.		Grading Permit No.	
Tract/Parcel Map No.	8026-019-022	Building Permit No.	
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			

This Water Quality Management Plan (WQMP) has been prepared for Rexford Industrial Realty by Kier & Wright. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current MS4 Permit for Waste Discharge Requirements for the Los Angeles County. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner: Rexford Industrial Realty, Inc			
Name	RJ Rieves		
Company	Rexford Industrial Realty		
Address	11620 Wilshire Boulevard, Suite 1000, Los Angeles, CA 90025		
Email	rrieves@rexfordindustrial.com		
Telephone #	(424) 285-6474		
Signature		Date	

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C ..... Geotechnical Study
D ..... Web Soil Survey Report
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Section I Discretionary Permit(s) and Water Quality Conditions

Project Information			
Permit/Application No.		Parcel Map No.	25237
Additional Information/ Comments:			
Water Quality Conditions			
Water Quality Conditions (list verbatim)	All Designated Projects must retain 100 percent of the SWQDv on-site through infiltration, evapotranspiration, stormwater runoff harvest and use, or a combination thereof unless it is demonstrated that it is technically infeasible to do so.		
Watershed-Based Plan Conditions			
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	N/A		

Section II Project Description

II.1 Project Description

The proposed project includes the demolition and removal of multiple one-story buildings as well as the parking lot. The proposed building will be 109,717 square feet. Runoff will be collected throughout the site and piped to storage chambers where they will flow out to dry wells to be infiltrated back into the ground.

The SIC Code will be known when the tenet of the building is known.

Description of Proposed Project				
Development Category (Verbatim from WQMP):	Planning priority project			
Project Area (ft_2): 225,456	Number of Dwelling Units: 0		SIC Code: TBD	
Narrative Project Description:	Single story spec warehouse with parking and landscape. Existing site to be demolished.			
Project Area	Pervious		Impervious	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	0 sf	0%	225,456 sf	100%
Post-Project Conditions	10,593 sf	5%	214,863 sf	95%
Drainage Patterns/Connections	The existing drainage patterns will be preserved.			

II.2 Potential Stormwater Pollutants

Pollutants of Concern			
Pollutant	Circle One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended-Solid/ Sediment	(E)	N	Erosion control to be provided. Runoff will be treated before being discharged.
Nutrients	(E)	N	Runoff will be treated before being discharged.
Heavy Metals	E	(N)	No manufacturing taking place.
Pathogens (Bacteria/Virus)	E	(N)	No onsite septic, discharge to public sewer.
Pesticides	E	(N)	Minimum use of pesticides on landscaping. Runoff will be treated before being discharged.
Oil and Grease	(E)	N	From parked vehicles and trucks. Runoff will be treated before being discharged.
Toxic Organic Compounds	E	(N)	No toxic substances used.
Trash and Debris	(E)	N	Trash will be disposed of within dumpsters. Site maintenance will be provided by local congregations on a weekly basis.

II.3 Post Development Drainage Characteristics

The proposed site will be split into four drainage areas where runoff will be captured and piped to an underground storage system. After reaching the storage system, the flow will enter dry wells to be infiltrated back into the site. The site has little offsite flow as the developed areas around it contain their own runoff.

II.4 Property Ownership/Management

The owner of the property is Rexford Industrial Realty.

Section III Site Description

III.1 Physical Setting

Planning Area/ Community Name	N/A
Location/Address	12118 Bloomfield Avenue Santa Fe Springs, CA 90670
Land Use	Commercial/ Industrial
Zoning	Industrial
Acreage	5.18
Predominant Soil Type	Quaternary-aged old alluvial fan deposits

III.2 Site Characteristics

Precipitation Zone	Type I rainfall distribution
Topography	The terrain slopes north to south with slopes generally less than 2%.
Drainage Patterns/Connections	The site flows to the south and then to the west where it is collected though and area drain
Soil Type, Geology, and Infiltration Properties	Hydrologic Soil Group C (See Appendix E)

Site Characteristics (continued)	
Hydrogeologic (Groundwater) Conditions	Groundwater was not encountered during any drilling of any of the bores. Due to this, the static groundwater table is considered to have existed at a depth in excess of 50 feet at the time.
Geotechnical Conditions (relevant to infiltration)	The majority of the site old alliuvial fan deposits with moderate to slow infiltration rate when thoroughly wet.
Off-Site Drainage	No offsite drainage is entering or crossing the site.
Utility and Infrastructure Information	Electrical, sanitary, and water will be supplied to the building.

Section IV Best Management Practices (BMPs)

IV. 1 Project Performance Criteria

Describe project performance criteria. Several steps must be followed in order to determine what performance criteria will apply to a project. These steps include:

(NOC Permit Area only) Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.		

Project Performance Criteria (continued)	
If HCOC exists, list applicable hydromodification control performance criteria	No hydrologic conditions of concern exist.
List applicable LID performance criteria	Dry wells will be used to infiltrate runoff from the site back into the ground
Calculate LID design storm capture volume for Project.	ΔSQDV = 14,769 CU-FT

IV.2. SITE DESIGN AND DRAINAGE PLAN

Describe site design and drainage plan including

- The site will be split into four drainage areas where flow will be directed to curb inlets and sent an underground storage system where it will be distributed to dry wells for infiltration back into the ground.
- Four DMA's have been designed with catch basins to capture flow
- WQMP plot plan: see sheets PG-GP and PG-SWQCP for the conceptual grading and drainage plan.

Pre-Development

Peak Flow Hydrologic Analysis

File location: Z:/2021/A21584/DOCS/ENTITLEMENT/CALCS/STORMWATER/12118 Bloomfield Ave. - 85th Pre.pdf
Version: HydroCalc 1.0.3

Input Parameters	
Project Name	12118 Bloomfield Ave.
Subarea ID	1
Area (ac)	5.18
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.0
Percent Impervious	0.01
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results	
Modeled (85th percentile storm) Rainfall Depth (in)	1.0
Peak Intensity (in/hr)	0.155
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.108
Time of Concentration (min)	88.0
Clear Peak Flow Rate (cfs)	0.0867
Burned Peak Flow Rate (cfs)	0.0867
24-Hr Clear Runoff Volume (ac-ft)	0.0462
24-Hr Clear Runoff Volume (cu-ft)	2014.1908

Post-Development

Peak Flow Hydrologic Analysis

File location: Z:/2021/A21584/DOCS/ENTITLEMENT/CALCS/STORMWATER/12118 Bloomfield Ave. - 85th.pdf
Version: HydroCalc 1.0.3

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Project Name	12118 Bloomfield Ave.
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85th Percentile Rainfall Depth (in)	1.0
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Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results	
Modeled (85th percentile storm) Rainfall Depth (in)	1.0
Peak Intensity (in/hr)	0.3039
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.9
Time of Concentration (min)	21.0
Clear Peak Flow Rate (cfs)	1.4169
Burned Peak Flow Rate (cfs)	1.4169
24-Hr Clear Runoff Volume (ac-ft)	0.3853
24-Hr Clear Runoff Volume (cu-ft)	16783.2939

$\Delta SQDV = POST\text{-}SQDV - PRE\text{-}SQDV$
$\Delta SQDV = 16783 - 2014$
$\Delta SQDV = 14769\ CU - FT$

IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

IV.3.1 Hydrologic Source Controls

Hydrological source control BMPs are not used on our project as we are retaining and infiltrating all of the stormwater on..

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☐
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐

IV.3.2 Infiltration BMPs

Dry wells will be used to infiltrate the runoff back into the ground. See Appendix E for details for dry wells.

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☒
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐
Other:	☐

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Name	Included?
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
Above-ground cisterns and basins	☐
Underground detention	☒
Other:	☐
Other:	☐
Other:	☐

Underground detention system will be used to store the flow while the dry wells are infiltrating the runoff.

IV.3.4 Biotreatment BMPs

Biotreatment BMPs are not used on site

Name	Included?
Bioretention with underdrains	☐
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☐
Wet extended detention basin	☐
Dry extended detention basins	☐
Other:	☐
Other:	☐

IV.3.5 Hydromodification Control BMPs

Hydromodification Control BMPs	
BMP Name	**BMP Description**
N/A	

IV.3.6 Treatment Control BMPs

Treatment Control BMPs	
BMP Name	**BMP Description**
N/A	

IV.3.7 Non-structural Source Control BMPs

Fill out non-structural source control check box forms or provide a brief narrative explaining if non- structural source controls were not used.

Non-Structural Source Control BMPs

Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☒	☐	
N6	Local Industrial Permit Compliance	☒	☐	
N7	Spill Contingency Plan	☐	☒	No storage tanks on site.
N8	Underground Storage Tank Compliance	☒	☐	
N9	Hazardous Materials Disclosure Compliance	☐	☒	No hazardous materials.
N10	Uniform Fire Code Implementation	☒	☐	
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☒	☐	
N13	Housekeeping of Loading Docks	☒	☐	
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Private Streets and Parking Lots	☒	☐	
N16	Retail Gasoline Outlets	☐	☒	N/A

IV.3.8 Structural Source Control BMPs

Fill out structural source control check box forms or provide a brief narrative explaining if Structural source controls were not used.

Structural Source Control BMPs

Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No material stored outside.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☒	☐	
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	No dewatering on site.
S6	Dock areas	☒	☐	
S7	Maintenance bays	☐	☒	No maintenance bays.
S8	Vehicle wash areas	☐	☒	No vehicle wash areas.
S9	Outdoor processing areas	☐	☒	No outdoor processing areas.
S10	Equipment wash areas	☐	☒	No equipment wash areas,
S11	Fueling areas	☐	☒	No fueling areas
S12	Hillside landscaping	☒	☐	
S13	Wash water control for food preparation areas	☐	☒	No food prep areas.
S14	Community car wash racks	☐	☒	No car wash racks.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

IV.4.1 Water Quality Credits

Water quality credits are not applicable.

Description of Proposed Project				
Project Types that Qualify for Water Quality Credits (Select all that apply):				
☐ Redevelopment projects that reduce the overall impervious footprint of the project site.	☐ Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.	☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).		
☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).	☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned		☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).	
☐ Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.	☐ Developments in a city center area.	☐ Developments in historic districts or historic preservation areas.	☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.	☐ In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.
Calculation of Water Quality Credits (if applicable)				

IV.4.2 Alternative Compliance Plan Information

Alternative compliance plan is not applicable.

Section V Inspection/Maintenance Responsibility for BMPs

BMP Inspection/Maintenance			
BMP	**Reponsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
Dry Well	Owner	Remove sediment and trash, replace cartridge filter, replace drain down filter.	Remove trash every 6-12 months. Remove sediment every 12-24 months. Replace cartridge and drain down filter every 12-24 months.
Education of property owners, tenants, and occupants	Owner	Distribute practical information materials that contribute to the protection of stormwater quality	Prior to construction and as needed
Activity restrictions	Owner	Restricts activities that compromise the surface water quality	As needed
Common area landscape management	Owner	Refer to CASQA BMP Handbook (SC-73)	Weekly and as needed
Title 22 CCR compliance	Owner	If hazardous waste is encountered, the management of the waste will comply with Title 22	As needed
Local industrial permit compliance	Owner	Ensure that clean stormwater is discharged from the site	As needed
Underground storage tank compliance	Owner	Ensure that underground storage tanks comply with state regulations	As needed
Uniform fire code implementation	Owner	Compliance with Article 80 of the Uniform Fire Code	During construction and as needed

BMP Inspection/Maintenance

BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Common area litter control	Owner	Refer to CASQA BMP Handbook (SC-60)	Weekly and as needed
Employee training	Owner	Training employees of businesses on practical information materials that contribute to the protection of stormwater quality	At hire and as needed
Housekeeping of loading docks	Owner	Refer to CASQA BMP Handbook (S-31)	Weekly and as needed
Common area catch basin inspection	Owner	Refer to CASQA BMP Handbook (SC-74)	80% of the area inspected, cleaned, and maintained annually with 100% of the facilities included in a two-year period
Street sweeping private streets and parking lots	Owner	Refer to CASQA BMP Handbook (SC-43 and SC-70)	Swept prior to the storm season and prior of the rainy season
Provide storm drain system stenciling and signage	Owner	Refer to CASQA BMP Handbook (SD-13)	Prior to construction and as needed
Design and construct trash amd waste storage areas to reduce pollution introduction	Owner	Refer to CASQA BMP Handbook (SD-32)	During design and construction phase
Use efficient irrigation systems and landscape design, water conservation, smart controllers, and source control	Owner	Refer to CASQA BMP Handbook (SD-12)	During design and construction phase
Protect slopes and channels and provide energy dissipation	Onwer	Install permanent stabilization BMP's on disturbed slopes and inspect for large debris that would disrupt flow	Prior to a rain event and as needed, check monthly
Dock areas	Owner	Refer to CASQA BMP Handbook (SD-31)	Prior to a rain event and as needed

BMP Inspection/Maintenance			
BMP	**Reponsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
Dry Well	Owner	Check to ensure water pecolated within 2 to 3 days following significant rain	Several times during the rainy season
Dry Well	Owner	Inspect pretreatment devices and diversion structures for signs and sediment buildup and structural damage	Semi-annually
Dry Well	Owner	Remove sediment and oil/grease from pretreatment devices and overflow structures	Annually
Dry Well	Owner	Scarify or otherwise aerate bottom of the drywell chamber. This is typically achieve using a vacuum on the top of the rock base a the bottom of the drywell chamber to expose clean rock. Import and place new rock to original depths	Annually
Dry Well	Owner	Excavate and/or vacuum topsoil to include some of the rock bedding to expsoe clean soil or rock. Import and place new topsoil or rock to previous depths	5-year

Section VI Site Plan and Drainage Plan

VI.1 SITE PLAN AND DRAINAGE PLAN

- See appendix for drainage plan.

VI.2 ELECTRONIC DATA SUBMITTAL

The minimum requirement is to provide submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open.

If the local jurisdiction requires specialized electronic document formats (CAD, GIS) to be submitted, this section will be used to describe the contents (e.g., layering, nomenclature, georeferencing, etc.) of these documents so that they may be interpreted efficiently and accurately.

Section VII Educational Materials

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Education Materials			
Residential Material (http://www.ocwatersheds.com)	**Check If Applicable**	**Business Material (http://www.ocwatersheds.com)**	**Check If Applicable**
The Ocean Begins at Your Front Door	☐	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☒
Tips for the Home Mechanic	☐	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☐	Proper Maintenance Practices for Your Business	☒
Household Tips	☐	**Other Material**	**Check If Attached**
Proper Disposal of Household Hazardous Waste	☐		
Recycle at Your Local Used Oil Collection Center (North County)	☐		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☐		☐
Sewer Spill	☐		☐
Tips for the Home Improvement Projects	☐		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☐		☐
Tips for Pool Maintenance	☐		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☐		☐
Tips for Projects Using Paint	☐		☐

Appendix A

Preliminary SWQC Plan

Peak Flow Hydrologic Analysis

File location: Z:/2021/A21594/DOCS/ENTITLEMENT/CALCS/STORMWATER/12118 Bloomfield Ave. - 85th Pre.pdf
Version: HydroCalc 1.0.3

Input Parameters	
Project Name	12118 Bloomfield Ave.
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Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.0
Percent Impervious	0.01
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results	
Modeled (85th percentile storm) Rainfall Depth (in)	1.0
Peak Intensity (in/hr)	0.155
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.108
Time of Concentration (min)	88.0
Clear Peak Flow Rate (cfs)	0.0867
Burned Peak Flow Rate (cfs)	0.0867
24-Hr Clear Runoff Volume (ac-ft)	0.0462
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Burned Peak Flow Rate (cfs)	1.4169
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24-Hr Clear Runoff Volume (cu-ft)	16783.2939

ΔSQDV = POST-SQDV - PRE-SQDV
ΔSQDV = 16783 - 2014
ΔSQDV = 14769 CU - FT

DESIGNATED PROJECT

Planter Sizing				
SQDV (cu-ft)	Design Infiltration Rate (in/hr)	Drawdown Time (hrs)	Ponding Depth (ft)	Stormwater Planter Area (sf)
1792	2.5	4.8	1	1792

OPERATION AND MAINTENANCE INFORMATION:

I. PROPERTY INFORMATION:
I.A. PROPERTY ADDRESS:
12118 BLOOMFIELD AVENUE
SANTA FE SPRINGS, CA 90670
I.B. PROPERTY OWNER:
REXFORD INDUSTRIAL REALTY, INC.
11620 WILSHIRE BOULEVARD, SUITE 610
LOS ANGELES, CA 90025

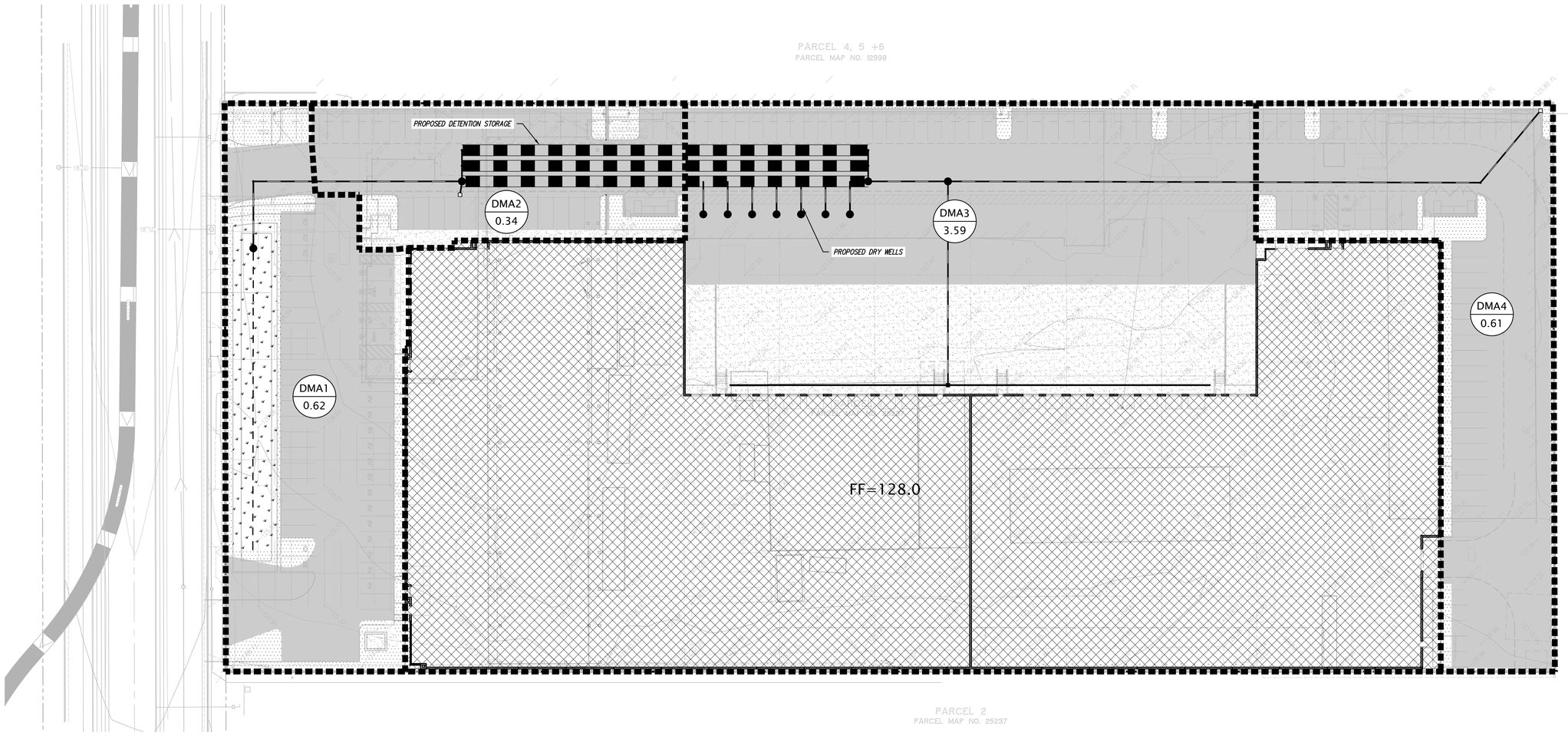
II. RESPONSIBLE PARTY FOR MAINTENANCE:
II.A. CONTACT:
REXFORD INDUSTRIAL REALTY, INC.
II.B. PHONE NUMBER OF CONTACT:
(424) 285-6474
II.C. EMAIL:
RRIEVES@REXFORDINDUSTRIAL.COM
II.D. ADDRESS:
11620 WILSHIRE BOULEVARD, SUITE 610,
LOS ANGELES, CA 90025

NORTH

0 15 30 60 90
Scale 1" = 30'

LEGEND

- TRIBUTARY AREA LIMITS
- LANDSCAPE AREA
- IMPERVIOUS ROOFTOP DRAINING TO BIO-SWALE
- IMPERVIOUS PAVEMENT DRAINING TO BIO-SWALE
- BIO-RETENTION TREATMENT AREA
- CONCRETE AREA



BY | NO. | REVISION

BY | NO. | REVISION

KIER+WRIGHT
163 Technology Drive
Irvine, CA 92620
Phone: (949) 508-0202
www.kierwright.com

STORMWATER QUALITY CONTROL PLAN
OF
12118 BLOOMFIELD AVE
FOR
RGA ARCHITECTS
SANTA FE SPRINGS, CALIFORNIA

DATE	FEB. 10, 2022
SCALE	AS SHOWN
DESIGNER	EK
DRAWN BY	MRF
JOB NO.	A21594
SHEET	C4.0
OF	4 SHEETS

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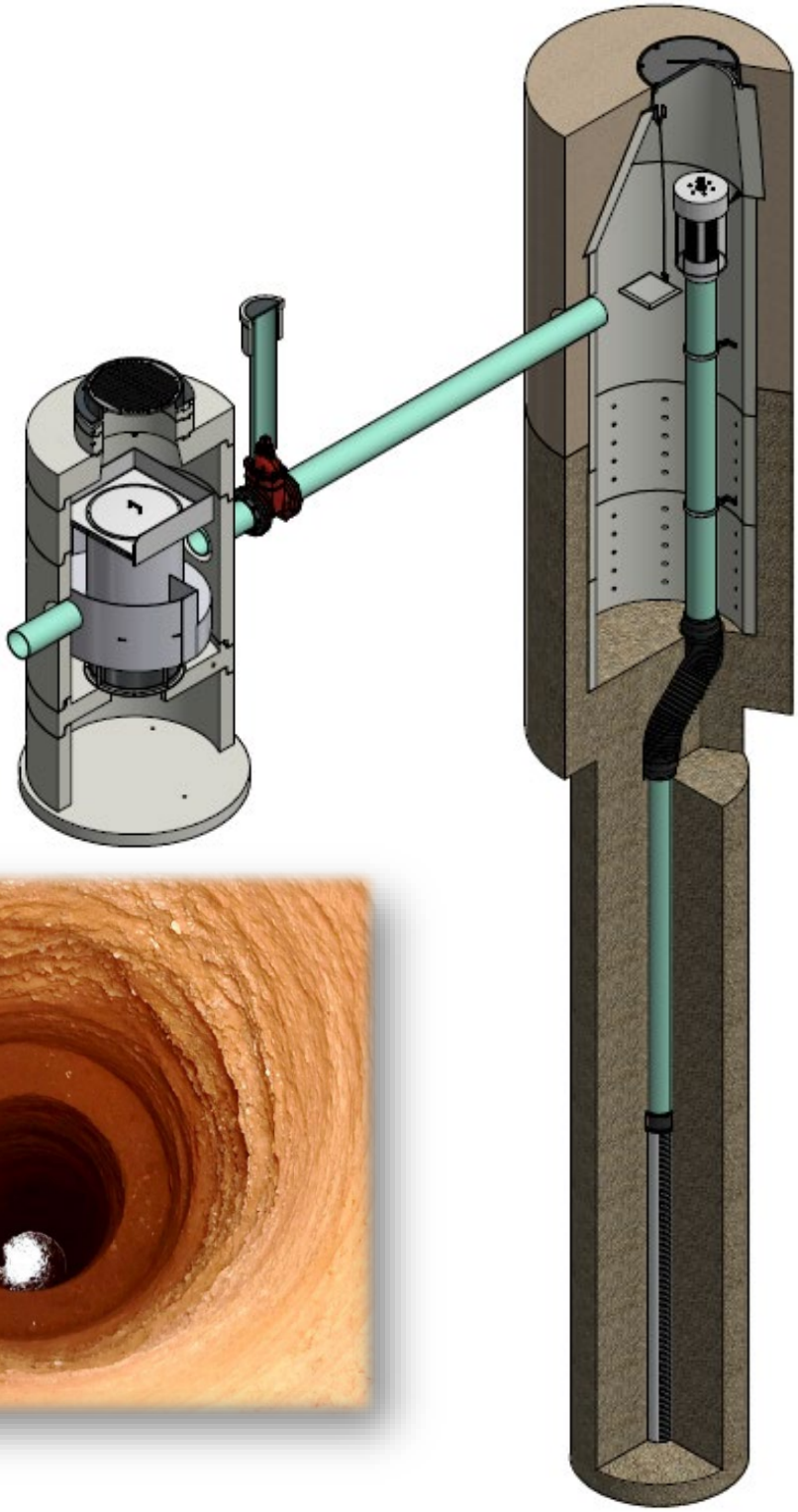
Appendix B

BMP Maintenance Manual

JENSEN STORMVAULT DRYWELL (SVDW)

OPERATION & MAINTENANCE MANUAL





Prepared For

Project Name:

Project Location:

Date:

JENSEN WATER RESOURCES

JENSEN STORMVAULT DRYWELL (SVDW)

INSPECTION, OPERATION & MAINTENANCE MANUAL

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PROJECT INFORMATION 1

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PROJECT INFORMATION
FOR
STORMVAULT DRYWELL (*SVDW*) UNITS

Project: _____

Location: _____

Subject: _____

SW Management Unit: ***STORMVAULT DRYWELL*** (***SVDW-42, -48 or -53***)

Model: ***SVDW-XX***

INTRODUCTION

Most of the following Operations, Maintenance, and Inspection Guidance for the StormVault Drywell (***SVDW***), has been taken from Drywell design and management documents generated by the Water Quality Division, Arizona Department of Environmental Quality's (ADEQ). The ADEQ has decades of practical experience in applying infiltration drywells for managing stormwater quality and volume. The California Drywell Guidance Research and Recommendations publication, dated March 2020 also provided relevant content for the following suggested inspection, operations, and maintenance of drywells. Several other public documents addressing the effective use of drywells are also sited in these guidelines.

- Drywells should be installed to dispose of only stormwater and urban surface run-off as defined in this guidance. Other discharges to a drywell may trigger requirements for regulation as an underground injection well under state and federal regulations.

Drywell Infiltration Configuration and Operation:

Drywells typically consist of a precast manhole chamber sized to hold specific minimum volume generally equal to or greater than 1,000-gallons. The bottom sections of this chamber are perforated precast manhole sections that rest on a bedding of clean rock. Below this chamber is a shaft drilled to a depth that typically penetrates a minimum of 10-ft into the infiltration zone determined from the geotechnical report, borings and field percolation tests. A drop pipe with perforations is placed in this drilled shaft and the shaft backfilled with clean rock to the bottom of

the near surface drywell chamber. The internal diameter of 42, 48 or 53-inches of the drywell chamber provides the numeric suffix for Jensen's ***StormVault Drywell*** (***SVDW***), model naming nomenclature: ***SVDW-42***, ***SVDW-48*** and ***SVDW-53.***

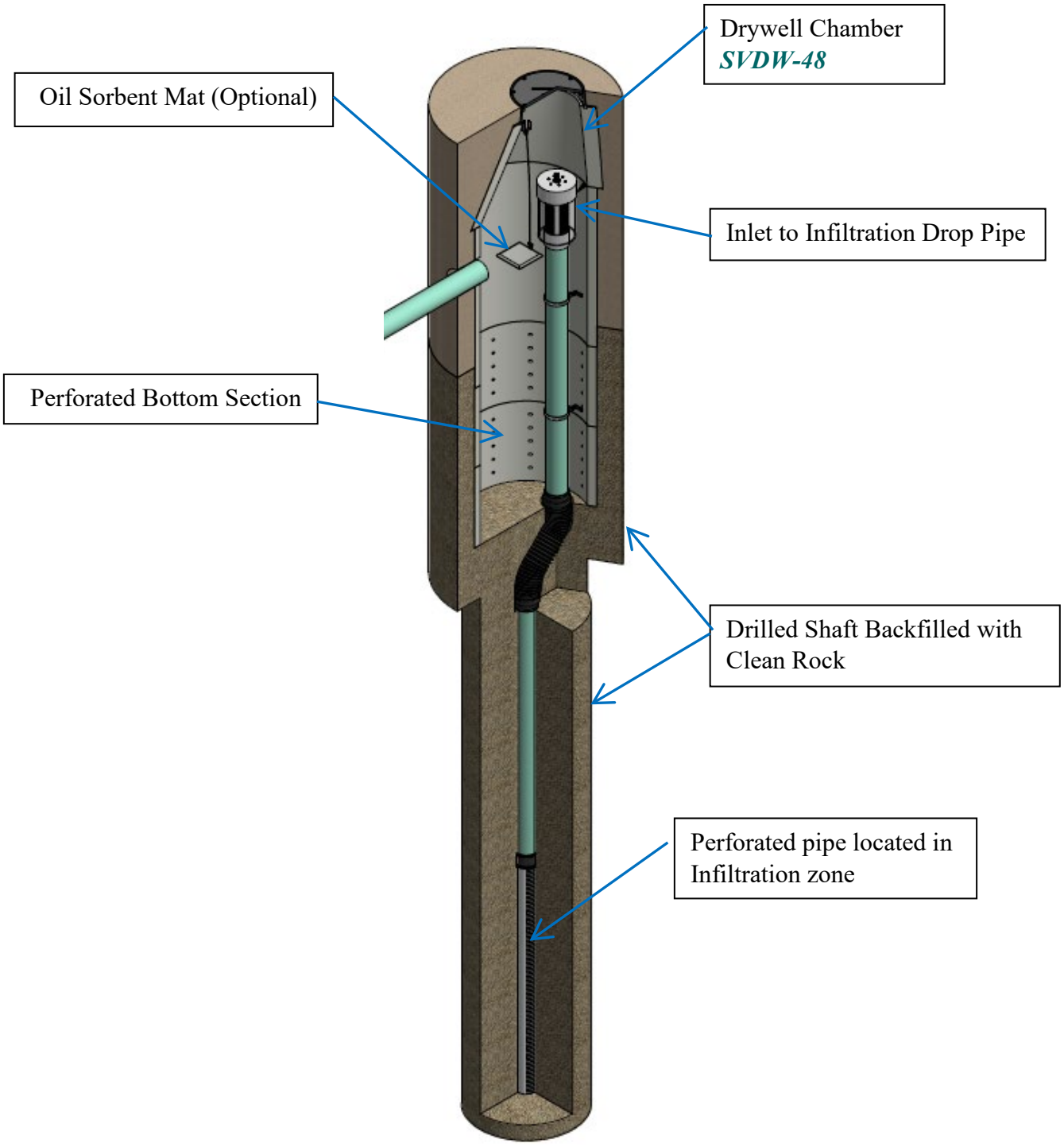


Figure 1 – Typical Drywell Model: ***SVDW-48***

PRETREATMENT EMPHASIS AND RECOMMENDATION

Without pretreatment and a regular schedule of inspection and maintenance, infiltration systems have been shown to have a relatively short lifespan. Without regular inspection along with preventative and responsive maintenance, an infiltration system is destined to either partially or completely fail within the first 5-years of operation (U.S. EPA. 1999a).

The most common reason for infiltration failure is clogging due to trash and debris, organic materials and especially sediment deposition. Upstream pretreatment greatly helps reduce these clogging mechanisms.

Jensen provides many different pretreatment systems that can be deployed as standalone measures or configured in a treatment train to best match the pollutants of concern in the stormwater inflows. These pretreatment systems include: Non-blocking screening systems for trash and debris and course sediments, sedimentation, coalescing and filtration systems or a treatment train of these processes upstream of the infiltration system. A built-in pretreatment system goes a long way to extend the life of the infiltration system.

The inspection and maintenance of pretreatment systems should be performed per that specific system's Operations and Maintenance Manual.

It is also a best practice to design a sedimentation area, zone within the infiltration system to reduce the need to maintain the infiltration portion of the system. The design of the StormVault Drywell (*SVDW*) system incorporates such a sedimentation chamber with a well-placed manway to enable easy equipment access to the full depth of the drywell chamber.

DRYWELL INFILRATION PERFORMANCE

Factors affecting performance: The performance of the infiltration system is expected to decrease with time as the void spaces in the infiltration rock bedding, back fill soil or in situ soils fill with fines transported into the system in stormwater runoff flows.

Modes of Infiltration Failure:

- Poor site selection
- Improper soil textures
- Lack of pretreatment structures
- Clogging of the soil
- Compaction of soil

- Improper maintenance of pretreatment unit or sediment chamber.
- Oil and Grease Smearing of infiltration surface.

The diminishing infiltration capacity of a drywell is a function of the pollutant and sediment loading into the Chamber and rock pack of the drywell system. Therefore, maintenance efforts for infiltration practices are typically focused on the removal of accumulated sediment, litter, and debris, though oil and greases are perhaps the most significant constituents that rapidly deteriorates infiltration capacities

INSPECTION AND MAINTENANCE

Regularly scheduled Inspection time frames and Maintenance practices for Drywells Infiltration Systems, (Adapted from Watershed Management Institute), follow. Though pretreatment systems will greatly increase the longterm infiltration capacity of the drywell and reduce the level of maintenance effort within the drywell chamber and its infiltrating drop pipe.

Inspection and Maintenance Activity	Schedule
Check to ensure water percolates withing 2 to 3-days following significant rain events	Several times during the Rainy Season
Inspect pretreatment devices and diversion structures for signs of sediment buildup and structural damage. Follow the Operations and Maintenance manual of the pretreatment unit.	Semi-Annually
Remove sediment and oil/grease from pretreatment devices and overflow structures. Sediment exceeds 3-inches throughout infiltration surface	Annually
Scarify or otherwise aerate bottom of the drywell chamber. This is typically achieved using a vacuum on the top of the rock base at the bottom of the drywell chamber to expose clean rock. Import and place new rock to original depths/thicknesses.	Annually
Excavate and/or vacuum topsoil to include some of the rock bedding to expose clean soil or rock. Import and place new topsoil or rock to previous depths.	5-year
If bypass capability is available, it may be possible to regain or increase the infiltration rate in the short term by providing an extended dry period.	Upon Failure

If any method of assessment indicating unacceptable low rates of infiltration, then remove the sediment layer or crust from the surface of the rock bedding at the bottom of the drywell chamber. If this does not sufficiently restore the design historical infiltration rate, the filter fabric beneath the rock bedding, if present, should be inspected and replaced if warranted. If infiltration rates do

not increase to acceptable levels, the infiltration bed surface area should be renovated and/or replaced.

Additionally, rejuvenation of the infiltration surface at the bottom of the drywell chamber can also be accomplished using a JetVac process, which is a high-pressure water spray system, most often self-propelled, but will probably have to be hand operated, possibly under confined space conditions. Scoured and suspended sediments flushed from the filter surface are vacuumed. Avoid focusing tight, high pressure water jets directly at the filter fabric, which will most likely cut the fabric. Adjust the pressure jet spray into a large effective spray arc to best wash over woven geotextiles, laid on angular rock.

Additionally, the infiltration drop pipe may be serviced by a well drilling company to swab and plunge as done for drinking well development. This practice is a last resort, and the drop pile must be without bends.

CLEANOUT AND DISPOSAL

A vactor truck is recommended for cleanout of the fluidized spray water or scraped off sediment. Standard vactor operations should be employed in the cleanout of the system on accumulated layers of solids accumulated at the bottom of the drywell chamber. Disposal of material from the pretreatment and drywell units should be in accordance with the local municipality's requirements.

Disposal of the decant liquid and materials to a Publicly Operated Wastewater Treatment Plant is recommended. Field decanting to the storm drainage system is not recommended, unless through a proven fine filtration process.

Solids can be disposed of in a similar fashion as those materials collected from street sweeping operations and catch-basin cleanouts.

CONFINED SPACE

The StormVault Drywell (*SVDW*) infiltration system is a confined space environment and only properly trained personnel possessing the necessary safety equipment should enter the unit to perform maintenance or inspection procedures. Inspections of the internal components can, in most cases, be accomplished using dip sticks and observations from the ground surface.

RECORDS OF OPERATION AND MAINTENANCE

It is recommended that the owner maintain annual records of the inspections, operation, and maintenance of the StormVault Drywell (*SVDW*) system to document the effective infiltration rate and maintenance effort of this important component of your storm water management program.

The attached **Annual Record of Operations and Maintenance** form (see **Appendix A**) is suggested and should be retained.

Please contact *Jensen Stormwater* for any information or guidance assistance:

Jensen Stormwater Systems (*Jensen Precast*)
521 Dunn Circle
Sparks, NV 89431
Toll Free: (877) 649-0095
Fax: (775) 440-2013

Appendix A

Annual Record of
Operations & Maintenance

ANNUAL RECORD OF INSPECTIONS, OPERATION AND MAINTENANCE

OWNER _____

ADDRESS _____

OWNER REPRESENTATIVE _____ **PHONE** _____

SITE LOCATION _____

INSPECTIONS:

Date	Sediment Depth	Observations & Comments (infiltration times following storms)	Inspector

OBSERVATIONS OF FUNCTION: _____

_____

_____

_____

CLEANOUT:

DATE	VOLUME SEDIMENTS	METHOD OF DISPOSAL OF SEDIMENTS, TRASH & DEBRIS

OBSERVATIONS OF FUNCTION: _____

_____

_____

_____

Appendix B
Site Location Plans

Appendix C
Plan & Profile Drawings & Details

Appendix C

Geotechnical Report

GEOTECHNICAL EXPLORATION REPORT
PROPOSED INDUSTRIAL BUILDING
12118 BLOOMFIELD AVENUE
SANTA FE SPRINGS, CALIFORNIA

Prepared for:

REXFORD INDUSTRIAL REALTY, INC.

11620 Wilshire Boulevard, 10th Floor
Los Angeles, California 90025

Project No. 13062.001

April 5, 2021

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

April 5, 2021

Project No. 13062.001

Rexford Industrial Realty, Inc.
11620 Wilshire Boulevard, 10th Floor
Los Angeles, California 90025

Attention: Mr. Tomas Narbutas

Subject: Geotechnical Exploration Report
Proposed Industrial Building
12118 Bloomfield Avenue
Santa Fe Springs, California

In accordance with our February 24, 2021 proposal, authorized on February 26, 2021; Leighton Consulting, Inc. (Leighton) has prepared this geotechnical exploration report for the subject project. We understand the proposed development will include demolition of the existing site improvements to allow for construction of a new one-story, Type III-B industrial building with a total building area of 107,472 square feet. The proposed concrete tilt-up building will be constructed at grade with associated truck parking and loading and surface parking. Ancillary improvements likely consist of utility infrastructure, pavement, flatwork, and landscaping.

The purpose of our geotechnical exploration was to evaluate the subsurface conditions at the site, identify potential geologic and seismic hazards that may impact the project, and provide geotechnical recommendations for design and construction of the proposed improvements as currently planned.

The project is considered feasible from a geotechnical standpoint. The results of our exploration, conclusions and recommendations are presented in this report.

17781 Cowan ▪ Irvine, CA 92614-6009
949.250.1421 ▪ 949.250.1114 Fax

We appreciate the opportunity to be of service to you on this project. If you have any questions or if we can be of further service, please contact us at ***(866) LEIGHTON***; or specifically at the phone extensions or e-mail addresses listed below.



Respectfully submitted,

LEIGHTON CONSULTING, INC.

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Distribution: (1) Addressee

Leighton

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1.0 INTRODUCTION

1.1 Site Description and Proposed Development

The project site is located at 12118 Bloomfield Avenue in the city of Santa Fe Springs, Los Angeles County, California. The site location (latitude 33.921399°, longitude -118.062595°) and immediate vicinity are shown on Figure 1, *Site Location Map.*

The project site is roughly rectangular in shape and covers approximately 5.16 acres. The site is bordered by Bloomfield Avenue to the west, existing commercial properties to the north and south, and by an existing railway easement to the east. Access to the site is via Bloomfield Avenue to the west. The site is currently occupied by an existing commercial facility that contains various commercial buildings and asphalt paved parking and access associated with the existing and active Crown Fence Supply Company.

The project site is relatively flat with sheet flow generally directed to the west across the site over paved surfaces to curbs and gutters. Review of the United States Geological Survey (USGS) 7.5-Minute Whittier Quadrangle (USGS, 1981) indicates the site is at approximately Elevation (El.) +125 feet mean sea level (msl).

Based on review of historical aerial photographs (NETR, 2021), the eastern portion of the site was mostly vacant and the western portion of the site was used for parking and portions of the western buildings appear to have been partially constructed. By 1963, the building in the western and northern portions of the site were constructed, and by 1972 the buildings in the central and eastern portion of the site were constructed.

Based on review of the *Conceptual Site Plan – Option #3* (Sheet A-1.0) for the project site, dated 12/23/2020, we understand that the proposed development will include demolition of the existing site improvements to allow for construction of a new one-story, Type III-B industrial building with a total building area of 107,472 square feet. The proposed concrete tilt-up building will be constructed at grade with associated truck parking and loading and surface parking. Ancillary improvements likely consist of utility infrastructure, pavement, flatwork, and landscaping.

1.2 Purpose and Scope

The purpose of our geotechnical exploration was to evaluate the subsurface conditions at the site relative to the proposed development concept and provide geotechnical recommendations to aid in the design and construction for the project as currently planned. The scope of this geotechnical exploration included the following tasks:

- *Background Review* – We reviewed readily available in-house geotechnical reports, literature, aerial photographs, and maps relevant to the site. We evaluated geological hazards and potential geotechnical issues that may significantly impact the site. The documents reviewed are listed in Section 5.0.

- *Pre-Field Exploration Activities* – A site visit was performed by a member of our technical staff to mark the proposed exploration locations. Underground Service Alert (USA) was notified to locate and mark existing underground utilities prior to our subsurface exploration.

- *Field Exploration* – Our subsurface exploration was performed on March 3, 2021; and included drilling, logging, and sampling of five (5) hollow-stem auger borings (designated LB-1 through LB-5) to depths between approximately 30 and 50 feet below the existing ground surface (bgs). Two (2) additional borings (designated LP-1 and LP-2) were drilled to an approximate depth of 10 feet bgs for subsequent percolation testing. The approximate locations of the explorations are shown on Figure 2, *Exploration Location Map.* The boring logs are presented in Appendix A, *Exploration Logs.*

  During drilling of the borings, bulk and drive samples were obtained for geotechnical laboratory testing. Driven ring samples were collected from the borings using a Modified California ring-lined sampler conducted in accordance with ASTM Test Method D 3550. Standard Penetration Tests (SPTs) were also performed within the borings in accordance with ASTM Test Method D 1586. Samples were collected at 2½- and 5-foot intervals throughout the depth of exploration. In both test methods, the sampler is driven below the bottom of the borehole by a 140-pound weight (hammer) free-falling 30 inches. The drilling rig was equipped with an automatic hammer to provide greater consistency in the drop height and striking frequency. The number of blows to drive the sampler the final 12-inches of the 18-inch drive interval is termed the "blowcount" or SPT N-value. The N-values provide a measure of relative density in granular (non-cohesive) soils and comparative consistency in

cohesive soils. The number of blows per 6 inches of penetration was recorded on the boring logs, see Appendix A.

The borings were logged in the field by a geologist from our firm. Each soil sample collected was reviewed and described in accordance with the Unified Soil Classification System (USCS). The samples were sealed and packaged for transportation to our laboratory for testing. After completion of drilling, the borings were backfilled to the ground surface with soil cuttings and patched with cold-mix asphalt concrete at the surface to match existing conditions.

- *Percolation Testing* – Borings LP-1 and LP-2 were converted to temporary percolation test wells upon completion of drilling and sampling. The test wells consisted of 2-inch slotted (0.020") PVC well casing surrounded by #3 Monterey Sand placed in the annulus of the well within the test zone. In-situ percolation testing was performed in general accordance with the County of Los Angeles Department of Public Works (LADPW) *Guidelines for Geotechnical Investigation* and Reporting, *Low Impact Development Stormwater Infiltration* (LADPW, 2017). The results of the percolation testing are presented in Appendix B, *Percolation Test Data*. Refer to the discussion of infiltration rate presented in Section 2.4.1, *Infiltration*. Upon completion of the percolation testing, the well casing was removed from each boring and the borings were backfilled with soil cuttings and patched at the surface with cold-mix asphalt concrete to match existing site conditions.

- *Laboratory Testing* – Laboratory tests were performed on selected soil samples obtained from the borings during our field investigation. The laboratory testing program was designed to evaluate the physical and engineering characteristics of the onsite soils. Tests performed during this investigation include:

  - In-situ Moisture Content and Dry Density (ASTM D 2216 and ASTM D 2937);
  - Atterberg Limits (ASTM D 4318);
  - Direct Shear (ASTM D 3080);
  - Consolidation (ASTM D 2435);
  - Maximum Dry Density (ASTM D 1557);
  - Expansion Index (ASTM D 4829);
  - R-value (California Test Method 301); and

- Corrosivity Suite – pH, Sulfate, Chloride, and Resistivity (California Test Methods 417, 422, and 532/643).

Results of the in-situ moisture content and dry density testing are presented on the boring logs in Appendix A. Other laboratory test results are presented in Appendix B, *Laboratory Test Results.*

- *Engineering Analysis* – The data obtained from our background review and field exploration were evaluated and analyzed to develop recommendations for the proposed development.

- *Report Preparation* – This report presents our findings, conclusions, and recommendations for the proposed development.

2.0 GEOTECHNICAL FINDINGS

2.1 Regional Geologic Setting

The site is located in the Los Angeles Basin in the northwestern portion of the Peninsular Ranges Geomorphic Province of Southern California. The Peninsular Ranges province extends approximately 900 miles southward from the Santa Monica Mountains to the tip of Baja California (Yerkes, et al., 1965) and is characterized by elongated, northwest-trending mountain ridges and sediment-floored valleys. The province includes numerous northwest trending fault zones, most of which either gradually truncate, merge with, or are terminated by faults that form the southern margin of the Transverse Ranges province. These northwest trending fault zones include the San Jacinto, Whittier-Elsinore, Palos Verdes, and Newport-Inglewood fault zones.

Approximately 65 million years ago (at the end of the Cretaceous Period) a deep, structural trough existed off the current coast of southern California (Yerkes, 1972). Over time, sedimentation filled the trough with hundreds to thousands of feet of sediment. About 7 million years ago, as sedimentation continued, an eastward shift of the boundary between the Pacific and North American plates to its present position would begin shaping the Los Angeles basin from this deep trough. Today the Los Angeles basin refers to the area defined by the Santa Monica, Whittier and Palos Verdes faults, and San Joaquin Hills. Basin depth is limited to the sediments deposited over the basement rock in the last 7 million years (Wright, 1991). The deepest part of the Los Angeles basin contains Tertiary to Quaternary-aged (65 million years and younger) marine and non-marine sedimentary rocks that are about 24,000 feet thick (Yerkes, et al, 1965; Wright, 1991). During the Pleistocene epoch (the last two million years) the region was flooded as sea level rose in response to the worldwide melting of the Pleistocene glaciers.

2.2 Surficial Geology

The subject site is located approximately 2.5-miles southeast of the unlined portion of the San Gabriel River channel at its closest point. Regional geologic mapping of the project site and vicinity indicates that near-surface native soils beneath the site consist of Quaternary-aged (Pleistocene) slightly to moderately consolidated old alluvial fan deposits comprised of varying proportions of silt, sand and gravel (Bedrossian and Roffers, 2010; Dibblee Jr., 2001). The surficial geologic units

mapped in the vicinity of the project site are shown on Figure 3, *Regional Geology Map.*

2.3 Subsurface Conditions

Based on our subsurface explorations, the site is underlain by a layer of undocumented artificial fill materials (Afu) overlying Quaternary-aged (Pleistocene) old alluvial fan deposits (Qoa). The artificial fill encountered in our borings at the explored locations is generally about 2 to 5 feet in thickness across the site, likely associated with the existing and previous site improvements. The fill soils consist primarily of locally derived sandy silt and silty sand. Localized thicker accumulations of the fill materials should be anticipated between explored locations during future earthwork construction, particularly below the existing buildings.

Below the artificial fill materials, old alluvial fan deposits (Qoa) were encountered in the borings to the maximum depth explored (50 feet bgs). The alluvial fan deposits encountered generally consist of brown to reddish brown and olive brown, slightly moist to moist, loose to very dense, clayey sand, silty sand, sand and sand, and soft to very stiff, sandy clay, silty clay, silt, sandy silt.

Detailed descriptions of the subsurface materials encountered in the borings are presented on the logs included in Appendix A. Some of the engineering properties of these soils are described in the following sections. The locations of the borings are shown on Figure 2, *Exploration Location Map*.

2.3.1 Expansive Soil Characteristics

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and which shrink when dried. Foundations constructed on these soils are subject to uplifting forces caused by the swelling. Without proper mitigation measures, heaving and cracking of both building foundations and slabs-on-grade could result.

Two (2) near-surface bulk soil samples obtained during our subsurface exploration were tested for expansion potential. The test results indicate Expansion Index (EI) values of 5 and 16 (“very low” potential for expansion). The Expansion Index laboratory test results are included in Appendix B of this report.

Variance in expansion potential of onsite soil is anticipated; therefore, additional testing is recommended upon completion of site grading and excavation to confirm the expansion potential presented in this report. For purposes of this report, and based upon visual characterization of alluvial materials at approximate foundation depth, low expansion potential of site materials may be considered to support design and verified upon completion of earthwork grading.

2.3.2 Soil Corrosivity

Two (2) near-surface bulk soil samples obtained during our subsurface exploration were tested for corrosivity to assess corrosion potential to buried concrete. The chemical analysis test results for the onsite soil from our geotechnical exploration are included in Appendix B of this report.

The test results indicate soluble sulfate concentrations of 33 and 49 parts per million (ppm), chloride contents of 60 and 90 ppm, pH values of 7.66 and 7.93, and minimum resistivity values of 1,900 and 4,640 ohm-cm.

The results of the resistivity tests indicate the underlying soil is moderately to severely corrosive to buried ferrous metals per ASTM STP 1013. Based on the measured water-soluble sulfate contents from the soil samples, concrete in contact with the soil is expected to have negligible exposure to sulfate attack per ACI 318 (ACI, 2014). The sample tested for water-soluble chloride content indicate a low potential for corrosion of steel in concrete due to the chloride content of the soil.

2.3.3 Soil Compressibility

Five (5) samples of the onsite soils recovered from the borings were subjected to consolidation testing to evaluate the compressibility of these materials under assumed loads representative of anticipated structural bearing stresses. The results of testing indicate these soils exhibit low compressibility potential. The results of testing are presented in Appendix B.

2.3.4 Shear Strength

Evaluation of the shear strength characteristics of the soils included laboratory direct shear testing. The results of testing are included in Appendix B as well as summary graphs that provide values of angle of internal friction (ø) and cohesion (c) for use in geotechnical analysis.

2.3.5 Excavation Characteristics

Based on our subsurface explorations performed at the site and our experience from grading jobs in the vicinity of the site, we anticipate the onsite artificial fill and native earth materials can generally be excavated using conventional excavation equipment in good operating condition.

2.4 Groundwater Conditions

Groundwater was not encountered at the site during our subsurface exploration performed at the site to the maximum depth of approximately 50 feet bgs. Based on review information available from CGS, the historically shallowest groundwater depth at the site is between approximately 15 and 20 feet bgs. However, based on review of groundwater level data available through the California Department of Water Resources for a well located approximately ¾-mile southeast of the project site (State Well ID 03S11W17F002S) for a monitoring period between 2011 and 2020, the shallowest groundwater level recorded was 81.7 feet bgs. Furthermore, the location of this well is along the reported historically shallowest groundwater depth contour line for 8 feet bgs.

Based on these findings, groundwater is not expected to pose a constraint during or after construction. Fluctuations of the groundwater level, localized zones of perched water, and an increase in soil moisture, should be anticipated during and following the rainy seasons or periods of locally intense rainfall or storm water runoff, or from stormwater infiltration.

2.4.1 Infiltration

Percolation testing was performed in temporary wells installed within borings LP-1 and LP-2 to evaluate the infiltration characteristics of subsurface soils. The percolation tests were conducted in general accordance with the County of Los Angeles Department of Public Works (LADPW) *Guidelines for Geotechnical Investigation* and Reporting, *Low Impact Development*

Stormwater Infiltration (LADPW, 2017). Results of the percolation testing are presented in Appendix B. The test locations and zones tested are shown on Figure 2.

A boring percolation test is useful for field measurements of the infiltration rate of soils, and is suited for testing when the design depth of the infiltration device is deeper than current existing grades, especially in areas where it is difficult to dig test pits, or where the depths of these test pits would be considerably deep. At the subject site, testing consisted of advancing the borings to general depths anticipated for the invert of typical infiltration devices.

The falling-head test method was employed for test well LP-1 in which the volume of discharge was calculated by adding the total volume of water that dropped within the PVC pipe and within the annulus, and incorporating a porosity reduction factor to account for the porosity of the annulus material. The flow area was based on the average water height within the slotted pipe section of the test well. The infiltration rate was calculated by dividing the rate of discharge by the infiltration surface area, or flow area.

Since the test well at LP-2 was allowing a favorable amount of water to percolate, the percolation test at this location was performed using a constant-head method which records the approximate volume of water delivered to the test zone while maintaining a relatively constant height of water in the well over the testing period. A water source was used to deliver water to the well at a relatively constant rate while recording the water height in the well. The measured infiltration rate for the constant-head percolation test was calculated by dividing the total volume of water infiltrated by the total duration of the test and dividing by the percolation surface area.

Detailed results of the field testing data and measured infiltration rate for the test well are presented in Appendix B. The test results are summarized in the table below:

Table 1 – Measured (Unfactored) Infiltration Rate

Test Well Designation	Approximate Depth of Test Zone (feet bgs)	Measured Infiltration Rate (inches per hour)
LP-1	5 to 10	0.06
LP-2	5 to 10	40

Based the results of our field percolation testing that was performed at the site, the infiltration characteristics of the subsurface soils are highly variable at the locations and depths tested. The measured (unfactored) infiltration rate for the two (2) tests performed were 0.06 inch per hour (LP-1) and 40 inches per hour (LP-2), respectively. Based on the predominately fine-grained soils encountered within the percolation test zone for LP-2, there is a potential that the high infiltrate measured at this location does not represent the actual native soil conditions. There is a possibility that the borehole for LP-2 may have been adjacent to a utility trench or similar anomaly that led to the significantly higher infiltration rate.

According to the County of Los Angeles Department of Public Works (LADPW) *Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration* (LADPW, 2017), the infiltration rate measured at LP-1 does not meet the minimum feasibility requirements. Should stormwater infiltration be considered for the project, we recommend additional testing be performed at the specific location and depth of the planned infiltration device to confirm that infiltration will be feasible due to the high variability in test results.

2.5 Surface Fault Rupture

Our review of available literature indicates that no known active faults have been mapped across the site, and the site is **not** located within a currently established *Alquist-Priolo Earthquake Fault Zone* (Bryant and Hart, 2007). Therefore, a surface fault rupture hazard evaluation is not mandated for this site and the potential for surface fault rupture at the site is expected to be low.

The location of the closest active faults to the site was evaluated using the United States Geological Survey (USGS) Earthquake Hazards Program National Seismic

Hazard Maps (USGS, 2008). The closest active fault to the site with the potential for surface fault rupture is the Whittier-Elsinore fault, located approximately 4.9 miles from the site. The San Andreas fault, which is the largest active fault in California, is approximately 37 miles northeast of the site on the north side of the San Gabriel Mountains. Major regional faults with surface expression in proximity to the site are shown on Figure 4, *Regional Fault and Historic Seismicity Map*.

2.6 Strong Ground Shaking

The principal seismic hazard to the site is ground shaking resulting from an earthquake occurring along any of several major active and potentially active faults in southern California (Figure 4). The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, the distance from the source, and the site response characteristics.

Accordingly, design of the project should be performed in accordance with all applicable current codes and standards utilizing the appropriate seismic design parameters to reduce seismic risk as defined by California Geological Survey (CGS) Chapter 2 of Special Publication 117A (CGS, 2008). The 2019 edition of the California Building Code (CBC) is the current edition of the code. Through compliance with these regulatory requirements and the utilization of appropriate seismic design parameters selected by the design professionals, potential effects relating to seismic shaking can be reduced.

The following code-based seismic parameters should be considered for design under the 2019 CBC:

Table 2 – 2019 CBC Based Ground Motion Parameters (Mapped Values)

Categorization/Coefficient	Code-Based
Site Latitude	33.921399°
Site Longitude	-118.062595°
Site Class	D (default)
Mapped Spectral Response Acceleration at Short Period (0.2 sec), S_S	1.672 g
Mapped Spectral Response Acceleration at Long Period (1 sec), S_1	0.598 g
Short Period (0.2 sec) Site Coefficient, F_a	1.2
Long Period (1 sec) Site Coefficient, F_v	null[1]
Adjusted Spectral Response Acceleration at Short Period (0.2 sec), S_{MS}	2.007 g
Adjusted Spectral Response Acceleration at Long Period (1 sec), S_{M1}	null[1]
Design Spectral Response Acceleration at Short Period (0.2 sec), S_{DS}	1.338 g
Design Spectral Response Acceleration at Long Period (1 sec), S_{D1}	null[1]
Site-adjusted geometric mean Peak Ground Acceleration, PGA_M	0.862 g

[1]Per Exception 2 in Section 11.4.8 of ASCE 7-16, seismic response coefficient C_S to be determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$

2.7 Liquefaction Potential

The term liquefaction is generally referenced to loss of strength and stiffness in soils due to build-up of pore water pressure when subject to cyclic or monotonic loading. Both sandy and clayey soils are susceptible to loss of strength and stiffness. Because of the difference in strength characteristic and methods for evaluating strength loss potential for granular and clayey soils, the term liquefaction is used for granular soils while cyclic softening is used for fine-grained soils (i.e. clays and plastic silts).

In general, adverse effects of liquefaction or cyclic softening include excessive ground settlement, loss of bearing support for structural foundations, and seismically-induced lateral ground deformations such as lateral spreading. Depending upon the relative thickness of the liquefied strata with respect to overlying non-liquefiable soils, other potentially adverse effects such as ground oscillation and ground fissuring may occur.

As shown on the *Seismic Hazard Zones* map for the Whittier Quadrangle (CGS, 1999), the project site is **not** located within a liquefaction hazard zone as identified by the State of California (Figure 5, *Seismic Hazard Map*). In addition, the site is underlain by Pleistocene aged alluvial sediments that are generally not considered to be susceptible to liquefaction, and current depth to groundwater is greater than 50 feet bgs. Based on these findings, the potential for liquefaction at the site is considered to be low.

2.8 Seismically-Induced Settlement

Seismically-induced settlement consists of dynamic settlement of unsaturated soil (above groundwater) and liquefaction-induced settlement (below groundwater). These settlements occur primarily within low density sandy soil due to reduction in volume during and shortly after an earthquake event.

Based on our evaluation of the site soils, the total seismically-induced settlement is estimated to be less than ½ inch. The differential settlement can be taken as half the total settlement over a horizontal distance of 30 feet.

2.9 Lateral Spreading

Liquefaction may also cause lateral spreading. For lateral spreading to occur, the liquefiable zone must be continuous, unconstrained laterally, and free to move along gently sloping ground toward an unconfined area. Since the site is relatively flat and constrained laterally, earthquake-induced lateral spreading is not considered a hazard at the site.

2.10 Earthquake-Induced Landsliding

As shown on Figure 5, the site is **not** mapped within a seismically-induced landslide hazard zone identified by the State of California (CGS, 1999). In addition, due to project site being relatively flat, it is our opinion that the potential for seismically-induced landslide hazard at the site is negligible.

2.11 Flooding

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map (FEMA, 2008a and 2008b), the project site is located within a flood hazard area identified as “Zone X”, which is defined as an area of minimal flood hazard. As shown on Figure 6, *Flood Hazard Zone Map*, the site is **not** located

within a 100- or 500-year flood hazard zone. Regionally, storm runoff flow is generally directed to the southwest.

Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of earthquakes. The project site is **not** located within a flood impact zone from dam failure as indicated on Figure 7, *Dam Inundation Map*. Therefore, the risk of seismically-induced flooding due to dam failure is considered low.

2.12 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the absence of an enclosed water body near the site and the inland location of the site, seiche and tsunami risks at the site are considered negligible.

2.13 Methane

Based on review of State of California Geologic Energy Management Division (CalGEM) records, the project site is not located within a documented oil field (CalGEM, 2021). As shown on Figure 8, *Oil Well Location Map,* the nearest oil field is the Santa Fe Springs oil field located approximately 2,200 feet to the north of the project site. The nearest documented oil well is located approximately 460 feet north of the site (API# 0403705867; Shamrock Syndicate Lease, Well No. 1) and is reported as idle (CalGEM, 2021). Based on these findings, methane hazard at the site is considered low.

3.0 GEOTECHNICAL DESIGN RECOMMENDATIONS

Based on this study, we conclude that the proposed development for the subject site is feasible from a geotechnical standpoint, provided that the recommendations presented in this report are properly incorporated in design and construction.

The proposed structural improvements may be supported on shallow spread-type foundations established in engineered fill. The floor slab may be supported directly on grade. There may be existing underground utilities that will also be impacted. Information on these utilities should be provided to Leighton for evaluation. All existing undocumented fill is recommended to be removed from below the proposed building footprint and other structural improvements prior to placement of engineered fill.

The recommendations below are based upon the exhibited geotechnical engineering properties of the soils and their anticipated response both during and after construction. The recommendations are also based upon proper field observation and testing during construction. The project geotechnical engineer should be notified of suspected variances in field conditions to determine the effect upon the recommendations subsequently presented. These recommendations are considered minimal and may be superseded by more restrictive requirements of the civil and structural engineers, the City of Santa Fe Springs, the County of Los Angeles and other governing agencies.

Leighton should review the grading plans, foundation plans and project specifications as they become available to verify that the recommendations presented in this report have been incorporated into the plans for this project.

3.1 Site Grading

All site grading should be performed in accordance with the applicable local codes and in accordance with the project specifications that are prepared by the appropriate design professional. Earthwork for the project is expected to include overexcavation and recompaction of existing fill soils below new improvement footprints. Leighton should review the final grading plan and landscape plan when it becomes available to verify the recommendations in this report.

3.1.1 Site Preparation

Prior to construction, the site should be cleared of any vegetation, trash, former foundation remnants and/or debris within the area of proposed grading. These materials should be removed from the site. Any

underground obstructions onsite should be removed. Efforts should be made to locate any existing utility lines to be removed or rerouted where interfering with the proposed construction. Any resulting cavities should be properly backfilled and compacted. After the site is cleared, the soils should be carefully observed for the removal of all unsuitable deposits.

3.1.2 Removals and Overexcavations

To provide uniform foundation support and reduce the potential for excessive static settlement, all existing undocumented fill and any unsuitable soil, as deemed by the geotechnical engineer, should be removed to expose suitable native soils and replaced as engineered fill below the proposed building and other structural improvements. Based on our field explorations, we estimate removals of existing undocumented fill will be approximately 2 to 5 feet below existing grade across most of the site, with localized areas anticipated to require deeper removals.

Removals should be performed such that all undocumented fill is removed and replaced as engineered fill. In addition, overexcavations should be performed such that a minimum of 3 feet of engineered fill is established below the proposed foundation elements. The lateral extent of overexcavation beyond foundations should be equal to the depth of overexcavation below the proposed foundations. The depth of overexcavation in non-structural areas planned for new pavement construction is recommended to be 2 feet below the current grade or planned subgrade elevation to develop a suitable bearing subgrade for pavement support. Deeper overexcavations in localized areas may be recommended during grading by a representative of the geotechnical engineer depending on observed subsurface conditions.

3.1.3 Excavation Bottom Preparation

All excavation bottoms or removal bottoms should be observed by a representative of the geotechnical engineer prior to placement of fill or other improvements to determine that geotechnically suitable soil is exposed. Excavation bottoms observed to be suitable for fill placement or other improvements should be scarified to a depth of at least 8 inches, moisture-conditioned as necessary to achieve a moisture content of at least 2 percentage points above the optimum moisture content, and then compacted

to a minimum of 90 percent of the laboratory derived maximum density as determined by ASTM Test Method D 1557 (Modified Proctor).

3.1.4 Fill Materials

On-site soil that is free of construction debris, organics, cobbles, boulders, rubble, or rock larger than 4-inches in largest dimension is suitable to be used as fill for support of structures. Any imported fill soil should be approved by the geotechnical engineer prior to import or use onsite.

3.1.5 Fill Placement and Compaction

Fill soils should be placed in loose lifts not exceeding 8 inches, moisture-conditioned to at least 2 percent above optimum moisture content, and compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM Test Method D 1557. Aggregate base should be compacted to a minimum of 95 percent relative compaction.

When grading is interrupted by heavy rains, fill operations should not be resumed until the moisture content and the dry density of the placed fill are satisfactory.

3.1.6 Shrinkage

The change in volume of excavated and recompacted soil varies according to soil type and location. This volume change is represented as a percentage increase (bulking) or decrease (shrinkage) in volume of fill after removal and recompaction. Field and laboratory data used in our calculations included laboratory-measured maximum dry density for the general soil type encountered at the subject site, the measured in-place densities of near surface soils encountered and our experience.

Based upon the results of the in-place density and the moisture-density relationship exhibited by representative bulk samples of the near surface soils, recompaction of the soils is anticipated to result in volume shrinkage in the range of 10 to 15 percent. The estimated shrinkage does not include material losses due to removal of organic material or other unsuitable bearing materials (debris, rubble, oversize material greater than 6-inches) and the actual shrinkage that occurs during grading may vary throughout the site.

3.1.7 Reuse of Concrete and Asphalt Rubble

If encountered during site clearing and/or during preparation activities, construction rubble (i.e., Portland cement concrete and asphalt concrete) may be incorporated in the proposed development. For use as structural fill, the processed material should be crushed to develop a relatively well-graded mixture with a maximum particle size of 3-inch nominal diameter. Concrete rubble should be free of rebar; processed asphalt pavement rubble may be used if mixed with the existing base course (where present) and soils in proportion of 1 part processed asphalt to 3 parts soil. For use as pavement base course, rubble should be crushed to satisfy gradation requirements of Section 200-2.4 of the SSPWC. Such materials must be free of and segregated from any hazardous materials and/or organic material of any kind

3.2 Foundation Design

Conventional spread footings established in engineered fill may be used to support proposed structural elements. Footings should be embedded a minimum 12 inches below the lowest adjacent grade. An allowable soil bearing pressure of 3,000 pounds per square foot (psf) may be used for footings with a minimum width of 12 inches for continuous footings and 18 inches for isolated footings.

The ultimate bearing capacity can be taken as 9,000 psf, which does not incorporate a factor of safety. A resistance factor of 0.45 should be used for initial bearing capacity evaluation with factored loads.

The allowable bearing capacity for shallow footings is based on a total static settlement of ½ inch. Differential settlement can be taken as half the total settlement over a horizontal distance of 30 feet.

For static loading, 50 pounds per cubic inch (pci) may be assumed as the modulus of subgrade reaction (*k*). For seismic loading, a *k* value of 150 pci may be assumed.

Since settlement is a function of footing size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls where a large differential loading condition exists. Once developed by the structural engineer, we should review total dead and sustained live loads for each column

including plan location and span distance, to evaluate if differential settlements between dissimilarly loaded columns will be tolerable. Excessive differential settlement can be mitigated with the use of reduced bearing pressures, deeper footing embedment, possibly changing overexcavation schemes and using imported base material under spread footings, or possibly other methods.

Resistance to lateral loads will be provided by a combination of friction between the soil and structure interface and passive pressure acting against the vertical portion of the footings structures. For calculating lateral resistance, a passive pressure of 300 psf per foot of depth to a maximum of 3,000 psf and a frictional coefficient of 0.30 may be used. Note that the passive and frictional coefficients do not include a factor of safety. The frictional resistance and the passive resistance of the soils can be combined without reduction in determining the total lateral resistance.

3.3 Slabs-on-Grade

Concrete slabs may be designed using a modulus of subgrade reaction of 100 pci provided the subgrade is prepared as described in Section 3.1. From a geotechnical standpoint, we recommend slab-on-grade be a minimum 5 inches thick with No. 3 rebar placed at the center of the slab at 24 inches on center in each direction. The structural engineer should design the actual thickness and reinforcement based on anticipated loading conditions. Where moisture-sensitive floor coverings or equipment is planned, the slabs should be protected by a minimum 10-mil-thick vapor barrier between the slab and subgrade. A coefficient of friction of 0.35 can be used between the floor slab and the vapor barrier.

Minor cracking of concrete after curing due to drying and shrinkage is normal and should be expected; however, concrete is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking. Additionally, our experience indicates that the use of reinforcement in slabs and foundations can generally reduce the potential but not eliminate for concrete cracking.

To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or weakened plane joints at frequent intervals. Joints should be laid out to form approximately square panels.

3.4 Cement Type and Corrosion Protection

Based on the results of laboratory testing, concrete structures in contact with the onsite soil are expected to have negligible exposure to water-soluble sulfates in the soil. Common Type II cement may be used for concrete construction onsite and the concrete should be designed in accordance with 2019 CBC requirements. However, concrete exposed to recycled water should be designed using Type V cement.

Based on our laboratory testing, the onsite soil is considered moderately corrosive to ferrous metals. Ferrous pipe should be avoided by using high-density polyethylene (HDPE) or other non-ferrous pipe when possible. Ferrous pipe, if used, should be protected by polyethylene bags, tap or coatings, di-electric fittings or other means to separate the pipe from onsite soils.

3.5 Retaining Walls

Recommended lateral earth pressures are provided as equivalent fluid unit weights, in psf/ft. or pcf. These values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Onsite soils are likely suitable to be used as retaining wall backfill due to its very low expansion potential; however, field and laboratory verification are recommended before use. Should site soil be considered for reuse behind retaining walls, it should be tested to ensure Expansion potential is less than 20 (EI<20). Recommended lateral earth pressures for retaining walls backfilled with sandy soils with drained conditions as shown on Figure 9, *Retaining Wall Backfill and Subdrain Detail* are as follows:

Table 3 – Retaining Wall Design Earth Pressures

Retaining Wall Condition (Level Backfill)	Equivalent Fluid Pressure (pounds-per-cubic-foot)*
Active (cantilever)	35
At-Rest (braced)	60
Passive Resistance (compacted fill)	300
Seismic Increment (add to active pressure)	20

Walls that are free to rotate or deflect may be designed using active earth pressure. For basement walls or walls that are fixed against rotation, the at-rest pressure should be used. For seismic condition, the pressure should be distributed as an inverted triangular distribution and the dynamic thrust should be applied at a height of 0.6H above the base of the wall.

3.5.1 Sliding and Overturning

Total depth of retained earth for design of walls and for uplift resistance, should be measured as the vertical height of the stem below the ground surface at the wall face for stem design, or measured at the heel of the footing for overturning and sliding. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of the soil over the wall footing, if drained, or 60 pcf if submerged, for properly compacted backfill.

3.5.2 Drainage

Adequate drainage may be provided by a subdrain system positioned behind the walls. Typically, this system consists of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with pervious backfill material described in Section 300-3.5.2 of the Standard Specifications for Public Works Construction (Green Book), 2018 Edition. This pervious backfill should extend at least 2 feet out from the wall and to within 2 feet of the outside finished grade. This pervious backfill and pipe should be wrapped in filter fabric, such as Mirafi 140N or equivalent, placed as described in Section 300-8.1 of the Standard Specifications for Public Works Construction (Green Book), 2018 Edition. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or Enkadrain drainage geocomposites, or similar, may be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill, particularly where horizontal space is limited adjacent to shoring (where walls are cast against shoring). These drainage panels should be connected to the perforated drainpipe at the base of the wall.

3.6 Paving

To provide support for paving, the subgrade soils should be prepared as recommended in the Section 3.1. Compaction of the subgrade, including trench backfills, to at least 90 percent of the maximum dry density as determined by ASTM Test Method D 1557, and achieving a firm, hard, and unyielding surface will be important for paving support. The preparation of the paving area subgrade should be performed immediately prior to placement of the base course.

Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet. Landscape areas must be separated from pavements with concrete curbs and/or edge drains. Excessive over-irrigation will have an adverse impact on adjacent pavements. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from paving, will result in premature pavement failure.

3.6.1 Asphalt Concrete

The required paving and base thicknesses will depend on the expected wheel loads and volume of traffic (Traffic Index or TI). Assuming that the paving subgrade will consist of engineered fill with an R-value greater than 25, compacted to at least 90 percent as recommended, the minimum recommended paving thicknesses are presented in the following table. Results of R-value testing on two (2) near surface samples of existing onsite soils indicate values of 25 and 50.

Table 4 – Asphalt Concrete Pavement Sections

Traffic Index	Asphalt Concrete (inches)	Base Course (inches)
5	3	8
6	4	8
7	4	12
8	5	12
9	6	14

The asphalt paving sections were determined using the Caltrans design method. We can determine the recommended paving and base course thicknesses for other Traffic Indices if required. Careful inspection is recommended to verify that the recommended thicknesses or greater are achieved, and that proper construction procedures are followed.

3.6.2 Portland Cement Concrete Paving

Concrete slabs-on-grade should be underlain by at least 2 feet of relatively non-expansive materials. We have assumed that the subgrade below paving will have an R-value of at least 25. Portland cement concrete (PCC) paving sections were determined in accordance with procedures developed by the Portland Cement Association. Concrete paving sections for a range of Traffic Indices are presented in the following table. We have assumed that the Portland cement concrete will have a compressive strength of at least 3,000 pounds per square inch.

Table 5 – PCC Pavement Sections

Traffic Index	PCC (inches)
5	6½
6	7
7	7½
8	8
9	8½

The paving should be provided with expansion joints at regular intervals no more than 15 feet in each direction. Load transfer devices, such as dowels or keys, are recommended at joints in the paving to reduce possible offsets.

The paving sections in the above table have been developed based on the strength of unreinforced concrete. Steel reinforcing and a 4-inch-thick aggregate base course layer under paving may be added to reduce cracking and to prolong the life of the paving.

3.6.3 Base Course

The base course for both asphalt concrete and Portland cement concrete paving should meet the specifications for Class 2 Aggregate Base as defined in Section 26 of the latest edition of the State of California, Department of Transportation, Standard Specifications. Alternatively, the base course could meet the specifications for untreated base as defined in Section 200-2 of the latest edition of the Standard Specifications for Public Works Construction. The base course should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM Test Method D 1557.

3.7 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations, and foundation excavations should be performed in accordance with project plans, specifications, and all OSHA requirements. Excavations 4 feet or deeper should be laid back or shored in accordance with OSHA requirements before personnel are allowed to enter.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the cut, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structure.

Temporary excavations should be treated in accordance with the State of California version of OSHA excavation regulations, Construction Safety Orders for Excavation General Requirements, Article 6, Section 1541, effective October 1, 1995. The sides of excavations should be shored or sloped in accordance with OSHA regulations. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾H:1V (horizontal:vertical) slope for Type A soils, 1H:1V for Type B soils, and 1½H:1V for Type C soils. Near-surface onsite soils are to be considered Type B soils.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor shall be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

3.8 Trench Backfill

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1 and 306-6 of the Standard Specifications for Public Works Construction, ("Greenbook"), 2018 Edition. Utility trenches can be backfilled with onsite sandy material free of rubble, debris, organic and oversized material up to (≤) 3-inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

(1) **Sand:** A uniform, sand material that has a Sand Equivalent (SE) greater-than-or-equal-to (≥) 30, passing the No. 4 U.S. Standard Sieve (or as specified by the pipe manufacturer), water densified in place, or

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the *Standard Specifications for Public Works Construction,* ("Greenbook"), 2018 Edition. CLSM should not be jetted.

Pipe bedding should extend at least 4 inches below the pipeline invert and at least 12 inches over the top of the pipeline. Native and clean fill soils can be used as backfill over the pipe bedding zone, and should be placed in thin lifts, moisture conditioned above optimum, and mechanically compacted to at least 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

3.9 Drainage and Landscaping

Building walls below grade should be waterproofed or at least damp proofed, depending upon the degree of moisture protection desired. Surface drainage should be designed to direct water away from foundations and toward approved drainage devices. Irrigation of landscaping should be controlled to maintain, as much as possible, consistent moisture content sufficient to provide healthy plant growth without overwatering.

3.10 Additional Geotechnical Services

Leighton should review the grading plans, foundation plans, and specifications when they are available to verify that the recommendations presented in this report have been properly interpreted and incorporated. In addition, should stormwater infiltration be considered for the project, we recommend additional testing be performed at the specific location and depth of the planned infiltration device to confirm that infiltration will be feasible due to the high variability in test results.

Geotechnical observation and testing should be provided during the following activities:

- Grading and excavation of the site;
- Subgrade Preparation;
- Compaction of all fill materials;
- Utility trench backfilling and compaction;
- Footing excavation and slab-on-grade preparation;
- Pavement subgrade and base preparation;
- Placement of asphalt concrete and/or concrete; and
- When any unusual conditions are encountered.

4.0 LIMITATIONS

This geotechnical exploration does not address the potential for encountering hazardous soil at this site. In addition, this report was necessarily based in part upon data obtained from a limited number of observances, site visits, soil samples, tests, analyses, histories of occurrences, spaced subsurface explorations and limited information on historical events and observations. Such information is, by necessity, incomplete. Please also refer GBA's *Important Information About Your Geotechnical Report* (included at the rear of the text), presenting additional information and limitations regarding geotechnical engineering studies and reports. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, the findings, conclusions, and recommendations presented in this report are only valid if Leighton Consulting, Inc. has the opportunity to observe subsurface conditions during grading and construction, to confirm that our data are representative for the site. Leighton Consulting, Inc. should also review the construction plans and project specifications, when available, to comment on the geotechnical aspects.

This report was prepared using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing at this time in Los Angeles County. We do not make any warranty, either expressed or implied.

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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FIGURES



Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 2,000 '	Date: April 2021

Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SITE LOCATION MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

Figure 1

Leighton

Map Saved as V:\Drafting\13062\001\Maps\13062-001_F01_SLM_2021-04-02.mxd on 3/5/2021 4:17:02 PM

Legend

LB-5 Approximate location of hollow-stem auger boring showing total depth (T.D.) in feet below existing grade. Groundwater not encountered during drilling

LP-2 Approximate location of hollow-stem auger boring converted to temporary percolation test well showing total depth (T.D.) and depth of percolation test in feet below existing grade. Groundwater not encountered during drilling.

Approximate Site Boundary

NOT A PART

BLOOMFIELD AVENUE (100' WIDE PUBLIC RIGHT OF WAY)

EXISTING RAILROAD EASMENT (100 FT ROW)

PROPOSED INDUSTRIAL BUILDING
LOT AREA= 224,770 SF
TOTAL BUILDING AREA= 107,472 SF
FF=103,472 SF
MF= 4,000 SF (3.72 %)
B, S1,F1 OCCUPANCY/ZONE M2/FAR=0.478 (1.5:1 MAX)
TYPE III-B/FIRE SPRINKLER/DOCK HIGH/32 FT INT.CLR
INDUSTRIAL USE=99,472 SF/OFFICE=8,000 SF (7.44 %)
REQUIRED PARKING= 124 STALLS
PROVIDED PARKING= 144 STALLS
GENERAL PLAN LAND USE: LIGHT MANUF ZONE

UNIT #1
53,736 SF TOTAL
92 STALLS PROVIDED

UNIT #2
53,736 SF TOTAL
92 STALLS PROVIDED

LP-1
T.D.10'
No G.W.
Perc Test@5-10'

LP-2
T.D.10'
No G.W.
Perc Test@5-10'

LB-1
T.D.50.4'
No G.W.

LB-2
T.D.31.5'
No G.W.

LB-3
T.D.31.5'
No G.W.

LB-4
T.D.31.5'
No G.W.

LB-5
T.D.31.5'
No G.W.

3 HOUR RATED WALL
DEMISE WALL
1 HOUR WALL
MAX DEPTH DIM PER FIRE CODE
MEZZ ABOVE
OFFICE
TOTAL 4,000 SF
2,000 SF UP
2,000 SF DN
ENTRY
FORKLIFT RAMP
TRUCK PARKING
16 LOADING DOCK POSITIONS/4 TRUCK PARKING POSITION
TRUCK YARD
PARKING AREA
FIRE APPARATUS STD PUMPER INTERMEDIATE TURN AROUND
LOS ANGELES COUNTY FIRE DEPT ACCESS (26' WIDE)
EXISTING STREET SIDE WALK
NEW DRIVEWAY
walkway
ELECT.
T.E.
CAV
EV

50'–0" 50'–0" 97'–0" 569'–4" (OVERALL LENGHT BUILDING DIM)
30'–0" 19'–0" 24'–0" 19'–0" 5'–0" 284'–8" 284'–8" 23'–0" 37'–0" 50'–0" 1'–0" 6'–0"
30'–0" 20'–0" 50'–0" 30'–0" 134'–8" 72'–0" 19'–0" 30'–0" 82'–8" 222'–0"
125'–6" 318'–5" 125'–6" 60'–0"

N

0 60 120
Feet

A_t= Total Tabular A
Frontage Increase
F= Building perimete
P= Perimeter of enti
W= Width of public
Do not type in a valu
the perimeter of the
exterior wall and ope
(9144 mm) shall be u

Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 60 '	Date: April 2021

Base Map: Conceptual Site Plan, Sheet A1-0
from Rexford Construction, Dated 12/28/2020

Author: Leighton Geomatics (btran)

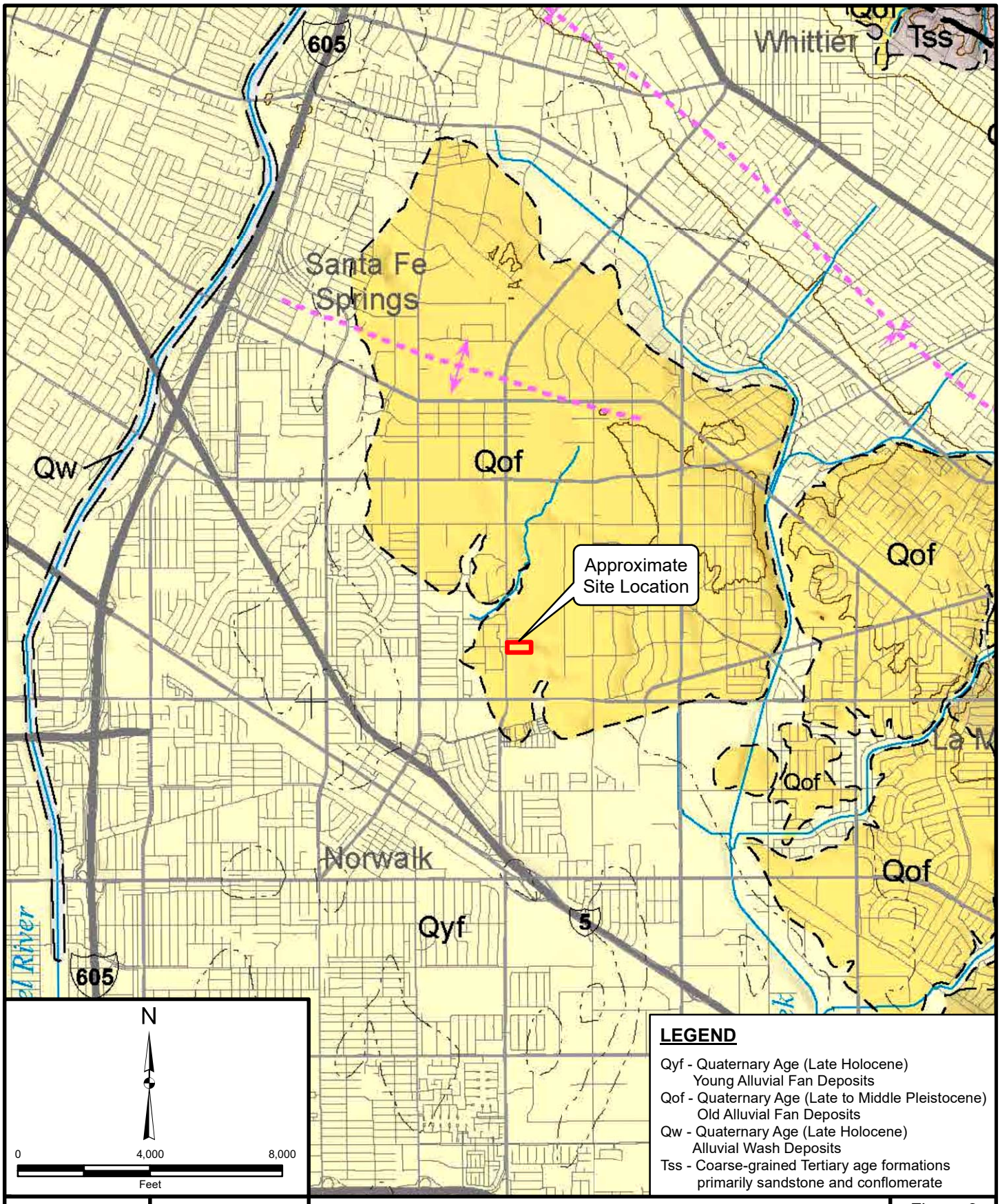
EXPLORATION LOCATION MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

Figure 2

Leighton

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LEGEND

Qyf - Quaternary Age (Late Holocene)
Young Alluvial Fan Deposits
Qof - Quaternary Age (Late to Middle Pleistocene)
Old Alluvial Fan Deposits
Qw - Quaternary Age (Late Holocene)
Alluvial Wash Deposits
Tss - Coarse-grained Tertiary age formations
primarily sandstone and conflomerate

Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 4,000 '	Date: April 2021

Base Map: Geologic Compilation of Quaternary Surficial Deposits in Southern California, Orange County, July 2010
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (btran)

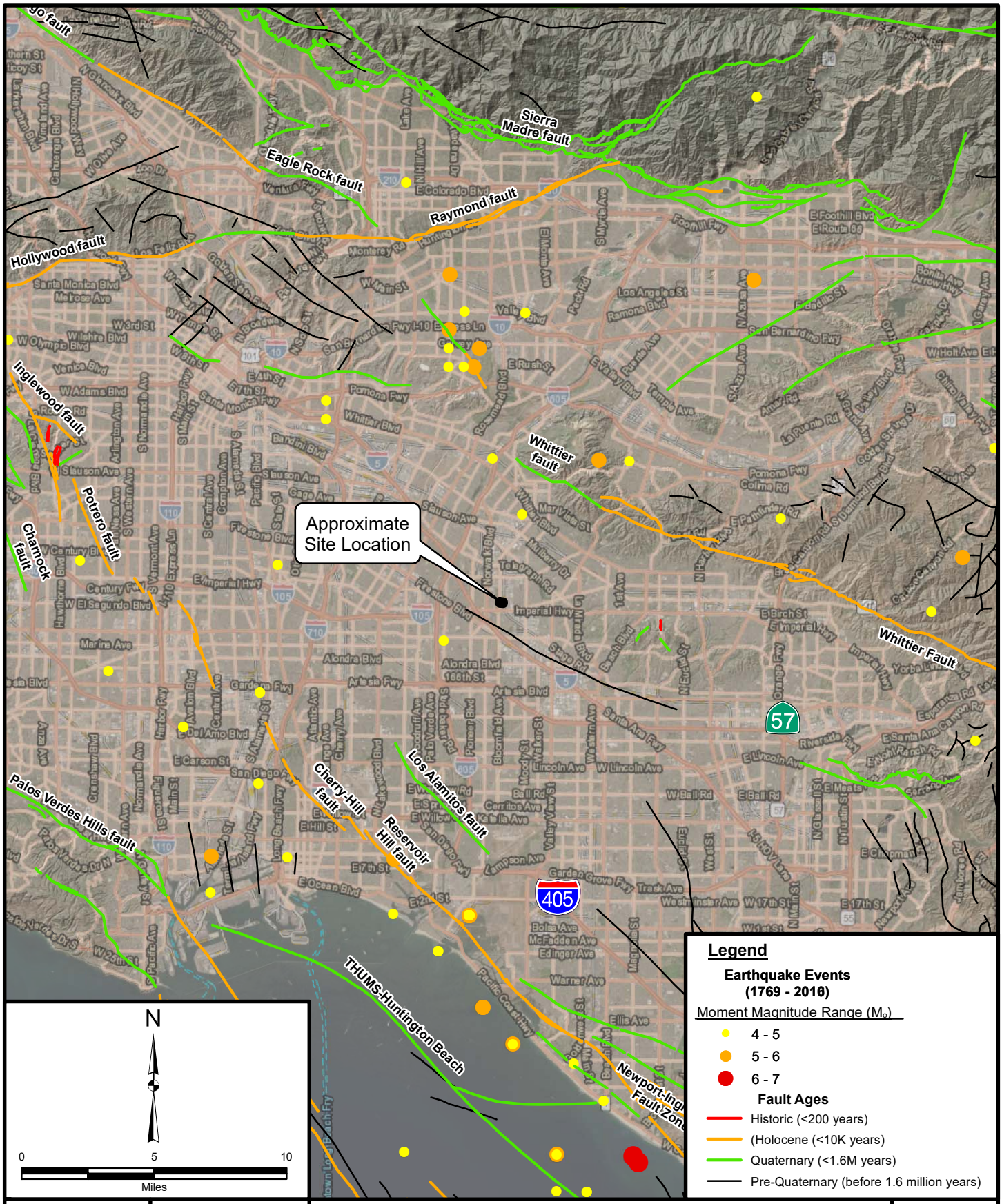
REGIONAL GEOLOGY MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

Figure 3

Leighton

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Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 5 miles	Date: April 2021

Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton, Bryant, W. A. (compiler), 2005, Digital Database of Quaternary and Younger Faults from the Fault Activity Map of California, version 2.0: CGS, USGS, SCEC.
Author: Leighton Geomatics (btran)

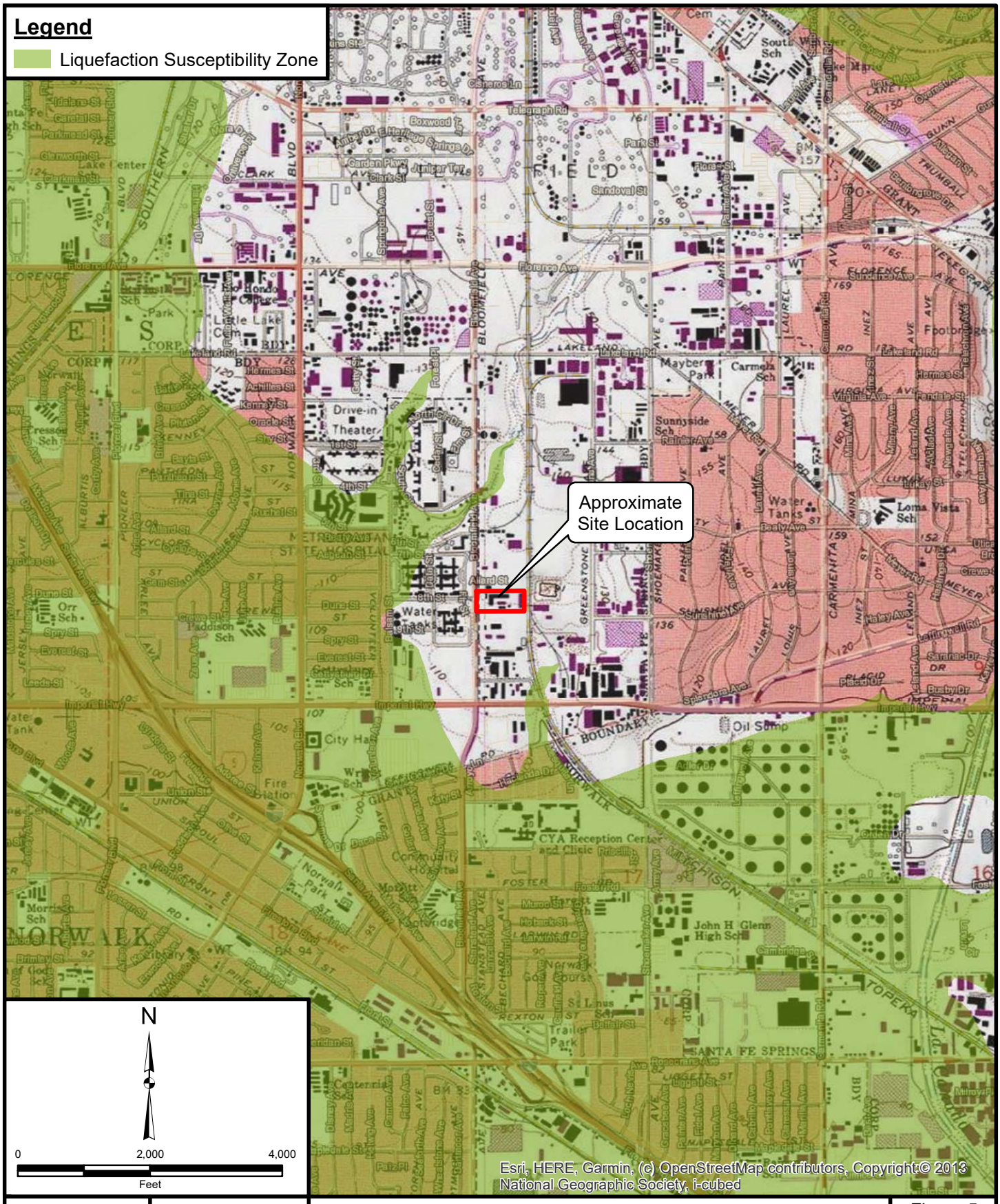
REGIONAL FAULT AND HISTORICAL SEISMICITY MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

Figure 4

Leighton

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Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 2,000 '	Date: April 2021

Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (btran)

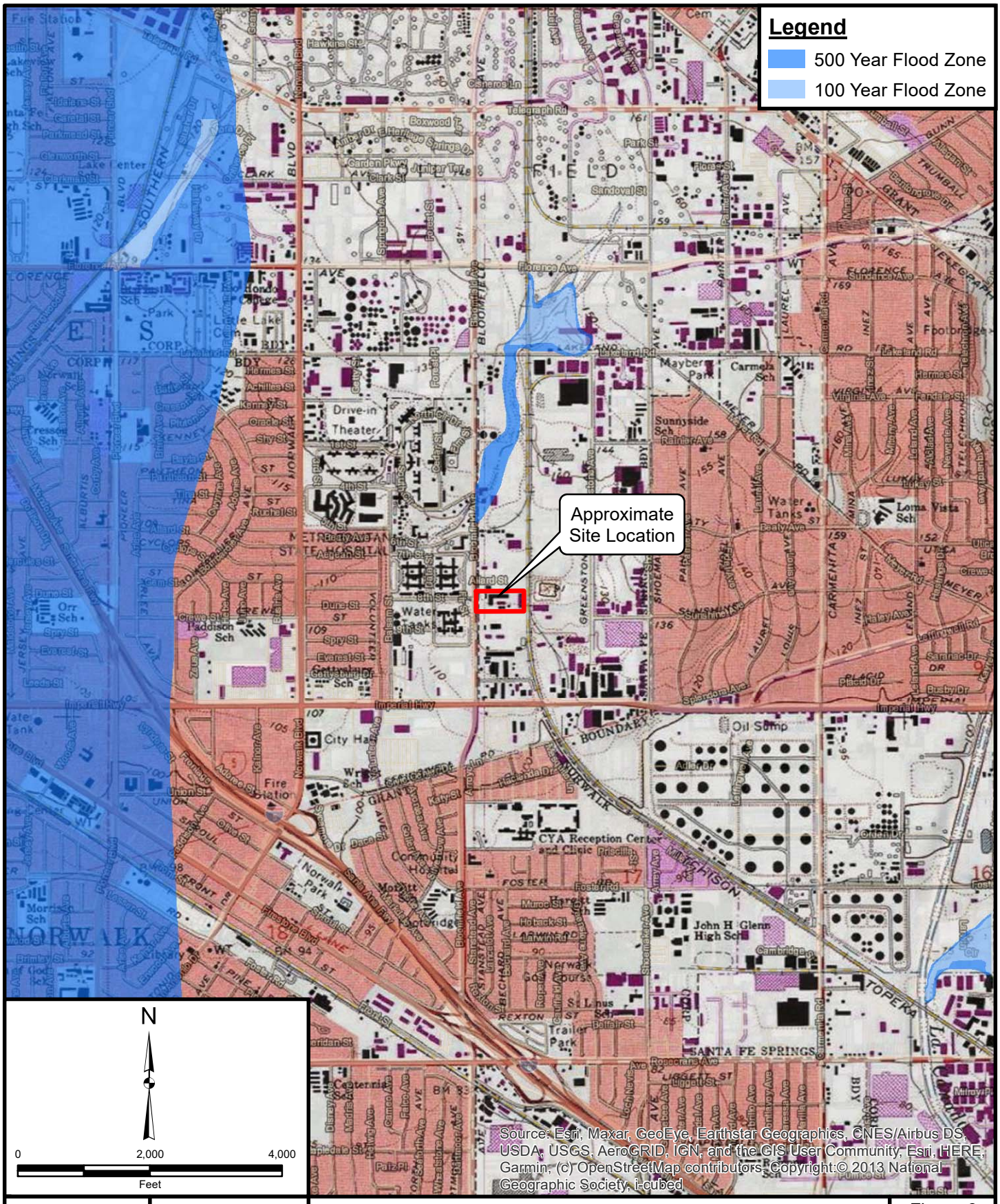
SEISMIC HAZARD MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

Figure 5

Leighton

Map Saved as V:\Drafting\13062\001\Maps\13062-001_F05_SHM_2021-04-02.mxd on 3/5/2021 4:18:45 PM



Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 2,000 '	Date: April 2021

Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton, CA DWR, FEMA
Author: Leighton Geomatics (btran)

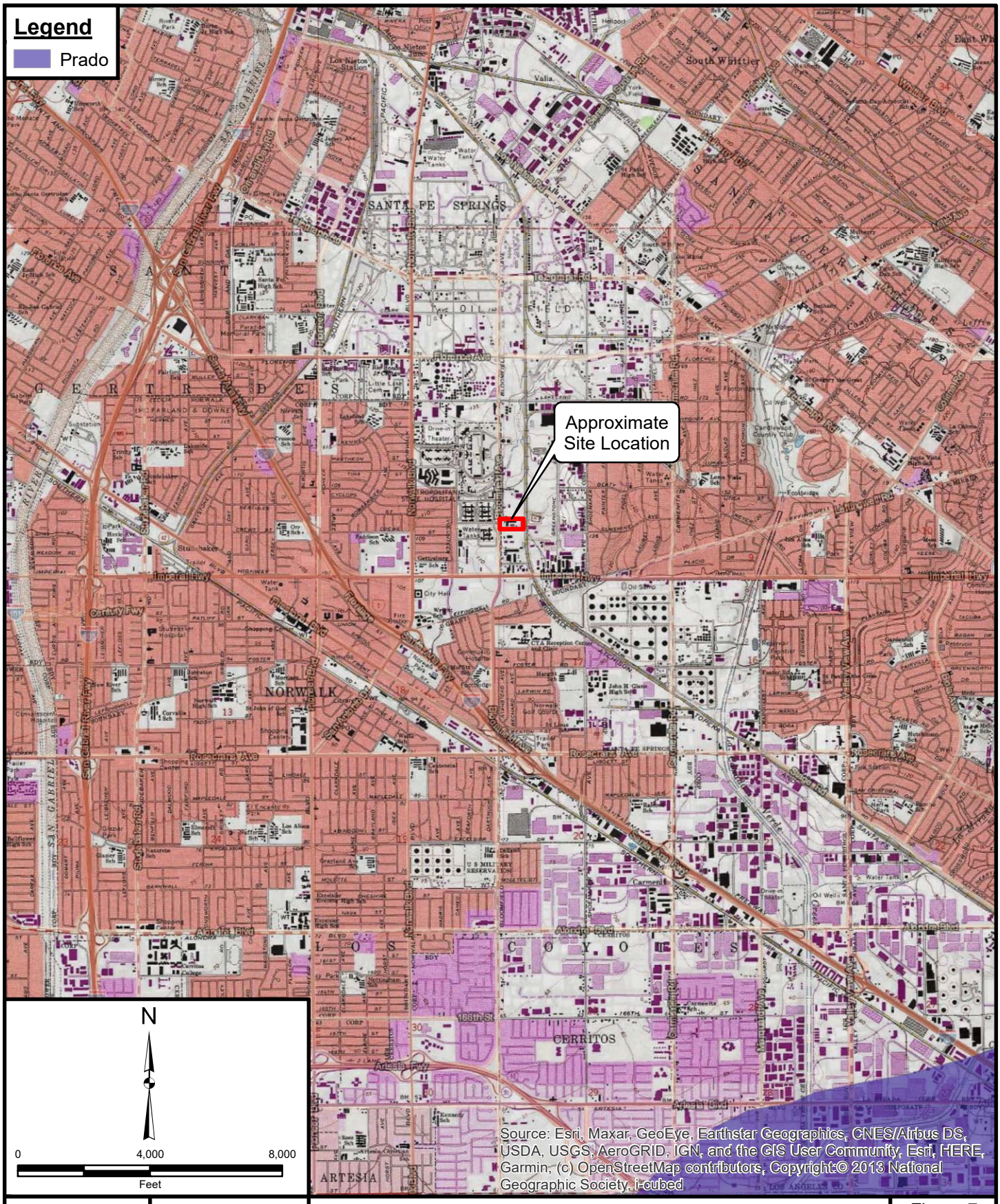
FLOOD HAZARD ZONE MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

Figure 6

Leighton

Map Saved as V:\Drafting\13062\001\Maps\13062-001_F06_FHM_2021-04-02.mxd on 3/5/2021 1:20:01 PM



Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 4,000 '	Date: April 2021

Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton, CA DWR, FEMA
Author: Leighton Geomatics (btran)

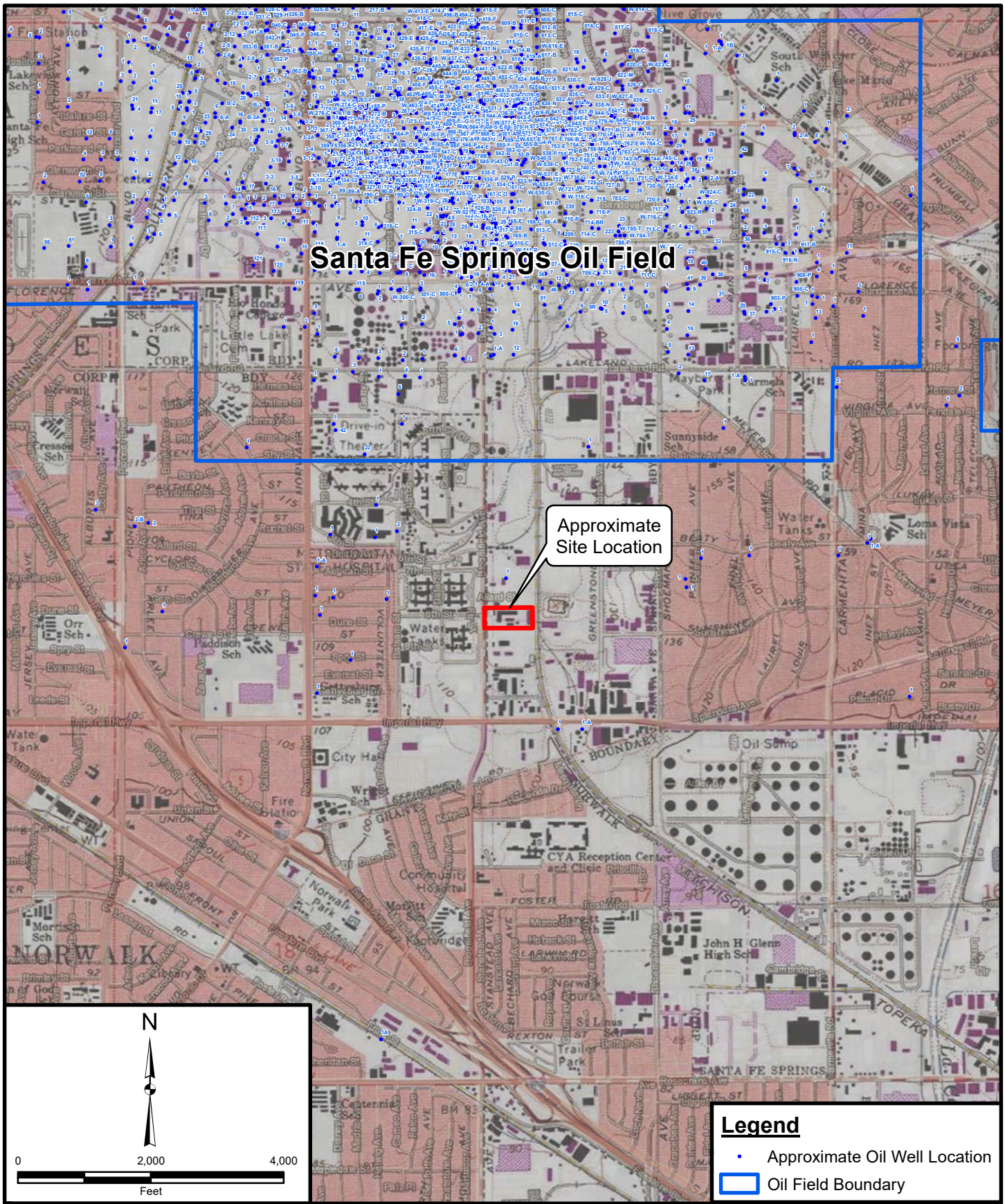
DAM INUNDATION MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

Figure 7

Leighton

Map Saved as V:\Drafting\13062\001\Maps\13062-001_F07_DIM_2021-04-02.mxd on 3/5/2021 1:23:45 PM



Project: 13062.001	Eng/Geol: CCK/JMP
Scale:1 " = 2,000 '	Date: April 2021

Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton, CA DWR, FEMA
Author: Leighton Geomatics (btran)

OIL WELL LOCATION MAP

12118 Bloomfield Avenue
Santa Fe Springs, California

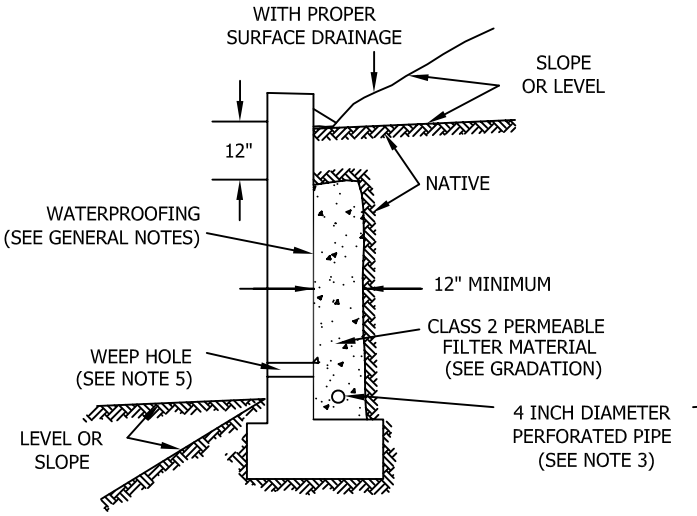
Figure 8

Leighton

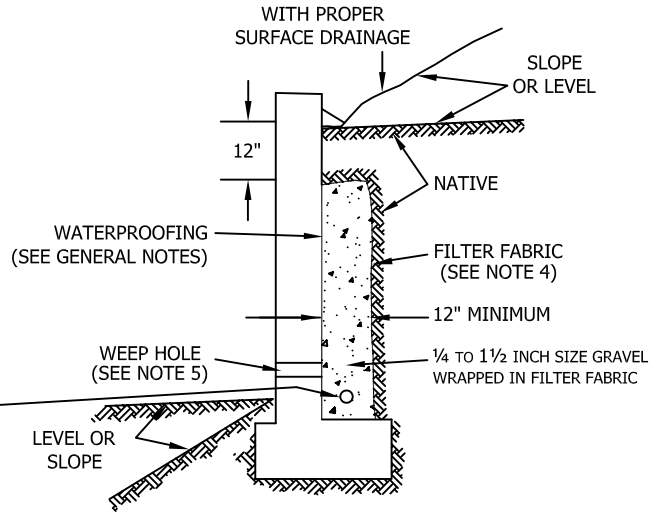
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SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

OPTION 1: PIPE SURROUNDED WITH CLASS 2 PERMEABLE MATERIAL



OPTION 2: GRAVEL WRAPPED IN FILTER FABRIC



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

RETAINING WALL BACKFILL AND SUBDRAIN DETAIL FOR WALLS 6 FEET OR LESS IN HEIGHT

WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤50

Leighton

FIGURE 9

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APPENDIX A

EXPLORATION LOGS

Leighton

GEOTECHNICAL BORING LOG LB-1

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
125	0								@0': 5-inches Asphalt Concrete over Subgrade.	
				B-1				ML	**Artificial Fill, undocumented (Afu):** @0.42': Sandy SILT, dark brown, moist, fine sand.	CN, CR DS, EI Mx, RV
								SM-ML	**Quaternary Old Alluvial Fan Deposits (Qof)** @2': Sandy SILT to Silty SAND, strong brown, moist, fine to coarse sand.	
120	5			R-1	5 9 12			CL	@5': Sandy CLAY, strong brown, slightly moist, stiff, fine to medium sand, some coarse sand.	AL, CN, DS
								SC	@6.33': Grades to Clayey SAND, medium dense, fine sand.	
115	10			S-1	3 6 9		14	CL	@10': CLAY, dark reddish brown, moist, stiff, trace very fine to fine sand, some MnO spots, weak blocky structure.	AL
110	15			R-2	18 22 25			ML	@15': SILT, mottled olive grey and reddish brown, slightly moist, hard, very fine to fine sand, pinhole pores, CaCO3 veins and pockets.	CN, DS
105	20			S-2	9 13 16		5	SP	@20': SAND, olive brown, moist, medium dense, fine sand, pinhole pores, cemented, becoming pervasively FeO-stained by 20.5' to become dark orange brown, less well cemented, trace medium to coarse sand.	
100	25			R-3	16 31 45	106	3		@25': SAND, greyish brown, moist, very dense, with FeO-staining, predominantly fine sand, trace medium to coarse sand, grading coarser to some medium sand.	
95	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-1

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
95	30			S-3	8 14 10		7	SP-GP ML	@30': SAND, grey-brown, moist, medium dense, predominantly fine sand, few medium to coarse sand, grading slightly coarser. @31.25': SAND with gravel, grey-brown, moist, fine to medium sand, some coarse sand, fine gravel. @31.33': SILT, olive grey, slightly moist, very stiff, laminated, with FeO-stained and CaCO3-impacted laminations.	
90	35			R-4	4 10 24	112	18	SC	@35': Clayey SAND, olive grey to olive brown, moist, medium dense, predominantly fine sand, some medium to coarse sand, trace to few fine gravel.	
85	40			S-4	4 7 14		17	ML	@40': Sandy SILT with clay, olive grey, moist, very stiff, very fine sand, some CaCO3 pockets, grading to SILT with sand, olive grey, with abundant FeO-stained orange veins and blebs, moist, very stiff, very fine sand, no CaCO3.	
80	45			R-5	12 22 33	116	15	SM-ML	@45': Interbedded Sandy SILT and Silty SAND, olive and olive brown, respectively, moist, hard/very dense, very fine to fine sand, CaCO3 nodules, trace coarse sand and fine gravel, FeO stains.	
75	50			S-5	50/5"		18	GC	@50': Pieces of broken rock surrounded by dark reddish brown CLAY.	
70	55								**Total Depth: 50.4' bgs** **No groundwater encountered during drilling** **Boring backfilled with soil cuttings, surface patched with cold-mix asphalt concrete.**	
65	60									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-2

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
125	0			B-1				ML	@0': 4-inches Asphalt Concrete over Subgrade. **Artificial Fill, undocumented (Afu):** @0.33': Sandy SILT, dark brown, moist, fine sand.	
								SC-CL	**Quaternary Old Alluvial Fan Deposits (Qof)** @2': Sandy CLAY to Clayey SAND, orange brown, moist, fine to coarse sand.	
120	5			S-1	3 6 11		12	CL	@5': Sandy CLAY to CLAY with sand, dark brown, moist, very stiff, predominantly fine sand, some medium to coarse sand with waxy clay films, massive.	
115	10			R-1	8 28 28	106	26	SP-SC SC ML	@10': SAND with gravel and clay, orange brown, dense, moist, fine to medium sand, some coarse sand, fine gravel. @11': Grades to Clayey SAND, dark reddish brown, moist, fine to coarse sand, few fine gravel. @11.25': Sandy SILT, mottled olive brown and olive grey, moist, hard, laminated, fine sand.	
110	15			S-2	5 11 12		13		@15': Sandy SILT, olive brown, moist, very stiff, fine sand, massive.	
105	20			R-2	9 21 50/5"	100	27	ML SM	@20': SILT, mottled olive and reddish brown, hard, with MnO spotting. @21.25': Silty SAND, grey brown, moist, very dense, fine sand.	
100	25			S-3	6 17 23		3			
95	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-2

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
95	30			R-3	14 15 50/6"	118	8	ML	@30': SILT, mottled olive and reddish brown, hard, with MnO spotting and CaCO3 nodules.	
								SP-SM	@31.33': SAND to Silty SAND, grey-brown, moist, very dense, fine sand.	
90	35								**Total Depth: 31.5' bgs** **No groundwater encountered during drilling** **Boring backfilled with soil cuttings, surface patched with cold-mix asphalt concrete.**	
85	40									
80	45									
75	50									
70	55									
65	60									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-3

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
125	0								*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
									@0': 4-inches Asphalt Concrete over 2-inches Aggregate Base.	
				B-1				SM	**Artificial Fill, undocumented (Afu):** @0.5': Silty SAND with clay, reddish brown, moist, fine sand.	
								CL	**Quaternary Old Alluvial Fan Deposits (Qof)** @2': Sandy CLAY, reddish brown, moist, predominantly fine sand, some medium sand.	
120	5			R-1	7 10 14	116	14	SC-CL	@5': Very stiff, with trace to few coarse sand, grading between Sandy CLAY and Clayey SAND.	
115	10			S-1	3 10 17		16	ML	@10': Sandy SILT, olive brown, slightly moist to moist, very stiff, very fine sand, grades less sandy, gains FeO stains and some CaCO3 veins.	
110	15			R-2	13 21 22	97	16	SM-ML	@15': Interbedded Sandy SILT and Silty SAND, olive brown, moist, very stiff/medium dense, very fine sand, some FeO staining and FeO-filled or lined pinhole pores.	
105	20			S-2	5 13 15		3	SP	@20': SAND, grayish brown, moist, medium dense, predominantly fine sand, some medium sand, trace to few coarse sand, trace fine gravel, patchy yellow (FeO) staining.	
100	25			R-3		108	3		@25': Dense.	
					16 31 22			ML	@26.5': SILT with clay, olive brown, slightly moist to moist, pervasive FeO and MnO spots.	
95	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-3

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
95	30			S-3	5 13 15		13	CL-ML	@30': Silty CLAY to Clayey SILT, olive brown, moist, very stiff, with 3-inches broken limestone, then SILT, olive, moist, very stiff, FeO staining.	
									Total Depth: 31.5' bgs **No groundwater encountered during drilling** **Boring backfilled with soil cuttings, surface patched with cold-mix asphalt concrete.**	
90	35									
85	40									
80	45									
75	50									
70	55									
65	60									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-4

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
125	0								@0': 4-inches Asphalt Concrete over 6-inches Aggregate Base.	
				B-1				SM	**Quaternary Old Alluvial Fan Deposits (Qof)** @0.83': Silty SAND, dark reddish brown, moist, fine sand, few to some clay.	
120	5			S-1	5 9 11		13	CL	@5': Sandy CLAY with silt, dark reddish brown, moist, very stiff, fine sand, fine sand, few pinhole pores, trace medium sand.	
115	10			R-1	3 3 6	102	8	SP-SM	@10': SAND with silt to Silty SAND, olive brown, slightly moist, loose, fine sand, few CaCO3 nodules.	
110	15			S-2	9 13 17		6	SP	@15': SAND, olive brown, moist, medium dense, fine sand, with FeO-stained zones and few CaCO3 veins.	
105	20			R-2	11 23 28	105	7	SP	@20': SAND to SAND with silt, grey with regions of pervasive red-orange FeO staining, moist, dense, fine sand, trace CaCO3 intergranular pockets.	
100	25			S-3	7 14 19		9	ML SP-GP SP	@25': Sandy SILT, olive brown, moist, hard, laminated, fine sand. @25.2': Gravelly SAND, dark yellowish brown, moist, dense, fine to coarse sand, fine gravel. @25.33': SAND, dark yellowish brown, moist, dense, fine to medium sand, some coarse sand, few fine gravel, FeO-stained thin beds.	
95	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-4

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	125'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
95	30			R-3	16 29 26	107	5		@30': SAND, grayish brown, moist, dense, fine sand, trace to few medium sand, cemented.	
								SC	@31.4': Clayey SAND, dark grey brown, slightly moist to moist, dense, predominantly fine sand, indistinct bedding, with few Sandy CLAY laminations and trace charcoal or decomposed organic matter.	
90	35								**Total Depth: 31.5' bgs** **No groundwater encountered during drilling** **Boring backfilled with soil cuttings, surface patched with cold-mix asphalt concrete.**	
85	40									
80	45									
75	50									
70	55									
65	60									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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GEOTECHNICAL BORING LOG LB-5

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	124'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				SM	@0': 3-inches Asphalt Concrete over Subgrade.	CN, CR DS, EI Mx, RV
									Artificial Fill, undocumented (Afu):	
									@0.25': Silty SAND, dark brown, moist, fine to medium sand, some coarse sand.	
								SC	**Quaternary Old Alluvial Fan Deposits (Qof)**	
									@2': Clayey SAND, orange brown, slightly moist, fine sand.	
120	5			R-1	4 5 8	113	10		@5': Loose, with pinhole pores, CaCO3 veins, variable clay content, few beds of Clayey SAND.	CN, DS
115	10			S-1	8 15 20		14	ML SM	@10': Sandy SILT, light grey brown, slightly moist, hard, very fine to fine sand, pervasive CaCO3 veins, fine gravel-sized limestone clasts, some pinhole pores, few MnO-lined. @11': Grades to Silty SAND, grey-brown, slightly moist, dense fine sand.	
110	15			R-2	20 43 50/5"	108	17	ML	@15': Sandy SILT, olive grey, slightly moist, hard, with regions of pervasive MnO-spotting, FeO-staining, CaCO3 veins and blebs, few pinhole pores.	
105	20			S-2	6 16 22		8	SP-SC SP	@20': SAND with clay, olive grey, slightly moist, dense, fine sand, abundant CaCO3, especially in laminations of brown CLAY. @20.43': SAND, grey brown, moist, dense, predominantly fine sand, few medium sand, trace coarse sand.	
100	25			R-3	7 16 28	115	17	ML	@25': Clayey Sandy SILT, mottled reddish brown and olive grey, moist to very moist, fine sand, pervasive FeO stains, MnO spotting and regions of CaCO3 veins and nodules, few to some FeO-lined pores.	
95	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-5

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	124'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			S-3	5 10 12		13	ML	@30': Sandy SILT, grayish brown, moist, very stiff, very fine sand, regions of abundant CaCO3 nodules, grades less sandy to SILT with sand.	
90	35								**Total Depth: 31.5' bgs** **No groundwater encountered during drilling** **Boring backfilled with soil cuttings, surface patched with cold-mix asphalt concrete.**	
85	40									
80	45									
75	50									
70	55									
65	60									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LP-1

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	124'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0								@0': 5-inches Asphalt Concrete over Subgrade.	
				B-1				SM-ML	**Artificial Fill, undocumented (Afu):**	
									@0.42': Sandy SILT to Silty SAND, strong brown, slightly moist, predominantly fine sand, some medium sand, trace to few coarse sand, few clay.	
120	5			S-1	6 9 12		11	CL	**Quaternary Old Alluvial Fan Deposits (Qof)**	
									@5.25': Sandy CLAY, strong brown, slightly moist, very stiff, predominantly fine to medium sand, some coarse sand with waxy clay film, fine root hairs.	
115				S-2	5 10 8		15	ML	@8.5': Sandy SILT, mottled olive reddish brown, slightly moist, very stiff, very fine sand, FeO and MnO spots and veins, few clayey pockets.	
	10								**Total Depth: 10' bgs** **No groundwater encountered during drilling** **Boring converted to temporary percolation well** **Boring backfilled with soil cuttings, surface patched with cold-mix asphalt concrete.**	
110										
	15									
105										
	20									
100										
	25									
95										
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LP-2

Project No.	13062.001	**Date Drilled**	3-3-21
Project	Rexford Bloomfield	**Logged By**	KMD
Drilling Co.	Martini Drilling Co.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	123'
Location	12118 Bloomfield Avenue, Santa Fe Springs	**Sampled By**	KMD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				SM-ML	@0': 4-inches Asphalt Concrete over Subgrade. **Artificial Fill, undocumented (Afu):** @0.33': Sandy SILT to Silty SAND, strong brown, slightly moist, predominantly fine sand, few clay.	
120										
	5			S-1	5 9 10		10	CL	**Quaternary Old Alluvial Fan Deposits (Qof)** @5': Sandy Silty CLAY, strong brown, slightly moist, very stiff, fine to medium sand, massive.	
115				S-2	1 2 1		16	ML	@8.5': Sandy SILT, olive, slightly moist, soft, very fine sand, minor MnO spotting.	
	10								**Total Depth: 10' bgs** **No groundwater encountered during drilling** **Boring converted to temporary percolation well** **Boring backfilled with soil cuttings, surface patched with cold-mix asphalt concrete.**	
110										
	15									
105										
	20									
100										
	25									
95										
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

APPENDIX B

PERCOLATION TEST DATA

Leighton

Boring Percolation Test Data Sheet

Project Number:	13062.001	**Test Hole Number:**	LP-1
Project Name:	Rexford Bloomfield Ave.	**Date Excavated:**	3/3/2021
Earth Description:	Alluvium	**Date Tested:**	3/4/2021
Liquid Description:	Tap water	**Depth of boring (ft):**	10
Tested By:	KMD	**Radius of boring (in):**	4
Time Interval Standard		**Radius of casing (in):**	1
Start Time for Pre-Soak:	7:36	**Length of slotted of casing (ft):**	5
Start Time for Standard:	8:38	**Depth to Initial Water Depth (ft):**	5
Standard Time Interval		**Porosity of Annulus Material, *n* :**	0.35
Between Readings, mins:	30	**Bentonite Plug at Bottom:** No	

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
P1	7:36	30	5.00	60.0	3.5	0.09
	8:06		5.29	56.5		
P2	8:06	30	4.94	60.7	2.8	0.07
	8:36		5.17	58.0		
1	8:36	30	4.99	60.1	2.3	0.06
	9:06		5.18	57.8		
2	9:06	30	5.00	60.0	2.6	0.07
	9:36		5.22	57.4		
3	9:36	30	5.00	60.0	2.5	0.06
	10:06		5.21	57.5		
4	10:06	30	5.00	60.0	2.5	0.06
	10:36		5.21	57.5		
5	10:36	30	5.02	59.8	2.4	0.06
	11:06		5.22	57.4		
6	11:06	30	5.00	60.0	2.5	0.06
	11:36		5.21	57.5		
7	11:06	30	5.00	60.0	2.4	0.06
	11:36		5.20	57.6		
8	11:36	30	5.00	60.0	2.4	0.06
	12:06		5.20	57.6		
9	12:06	30	5.00	60.0	2.4	0.06
	12:36		5.20	57.6		

Infiltration Rate (I) = Discharge Volume/Surface Area of Test Section/Time Interval

Measured Infiltration Rate, I (Average of Last 3 ReadingsLast Readings) = **0.06** **in./hr.**

Boring Percolation Test Data Sheet

Project Number:	13062.001	**Test Hole Number:**	LP-2
Project Name:	Rexford Bloomfield Ave.	**Date Excavated:**	3/3/2021
Earth Description:	Alluvium	**Date Tested:**	3/4/2021
Liquid Description:	Tap water	**Depth of boring (ft):**	10
Tested By:	KMD	**Radius of boring, r (in):**	4
		Diameter of casing (in):	2
		Length of slotted of casing (ft):	5
		Depth to Initial Water Depth (ft):	6
		Porosity of Annulus Material, *n* :	0.35
		Bentonite Plug at Bottom:	No

Field Percolation Data

Reading	Time	Time Interval, Δt (minutes)	Depth to Water (feet bgs)	Water Height, H (inches)	Cumulative Water Volume Delivered (gallons)
1	9:36	-	-	-	0.0
2	9:46	10	6.00	48.0	36.2
3	9:56	10	5.76	50.9	72.3
4	10:06	10	5.39	55.3	108.5
5	10:16	10	5.03	59.6	144.6
6	10:26	10	6.80	38.4	180.8
7	10:36	10	6.65	40.2	216.9
8	10:46	10	6.56	41.3	253.1
9	10:56	10	6.42	43.0	289.2
10	11:06	10	6.32	44.2	325.4
11	11:16	10	6.25	45.0	361.5
12	11:16	10	6.19	45.7	397.7
13	11:16	10	6.07	47.2	433.8
14	11:26	10	6.01	47.9	470.0
15	11:36	10	5.91	49.1	506.1

High Flowrate Percolation Test Calculation

Total Volume of Water Delivered (gallons)	506.1
Total Volume of Water Delivered (cubic inches)	116909.1
Average Water Height (inches)	46.8
Average Percolation Surface Area (cubic Inches)	1227.3
Duration of Test (minutes)	140
Duration of Test (hours)	2.33

$$\text{Measured Infiltration Rate} = (\text{Total Volume})/(\text{Test Duration})/(\text{Surface Area})$$

Measured Infiltration Rate (inches per hour) = 40.8

APPENDIX C

LABORATORY TEST RESULTS

Leighton

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Leighton

Project Name:	Rexford Bloomfield Ave.	Tested By:	J. Gonzalez	Date:	03/10/21
Project No.:	13062.001	Checked By:	A. Santos	Date:	03/11/21
Boring No.:	LB-1	Depth (ft.):	0-5		
Sample No.:	B-1				
Soil Identification:	Dark yellowish brown silty sand (SM)				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3867	3970	3916			
Weight of Mold (g)	1868	1868	1868			
Net Weight of Soil (g)	1999	2102	2048			
Wet Weight of Soil + Cont. (g)	314.9	316.1	325.3			
Dry Weight of Soil + Cont. (g)	301.4	296.3	299.6			
Weight of Container (g)	38.8	38.4	39.3			
Moisture Content (%)	5.14	7.68	9.87			
Wet Density (pcf)	132.3	139.2	135.6			
Dry Density (pcf)	125.9	129.2	123.4			

Maximum Dry Density (pcf) **129.4** **Optimum Moisture Content (%)** **7.2**

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
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)
Use if +#4 is >20% and +3/8 in. is 20% or less

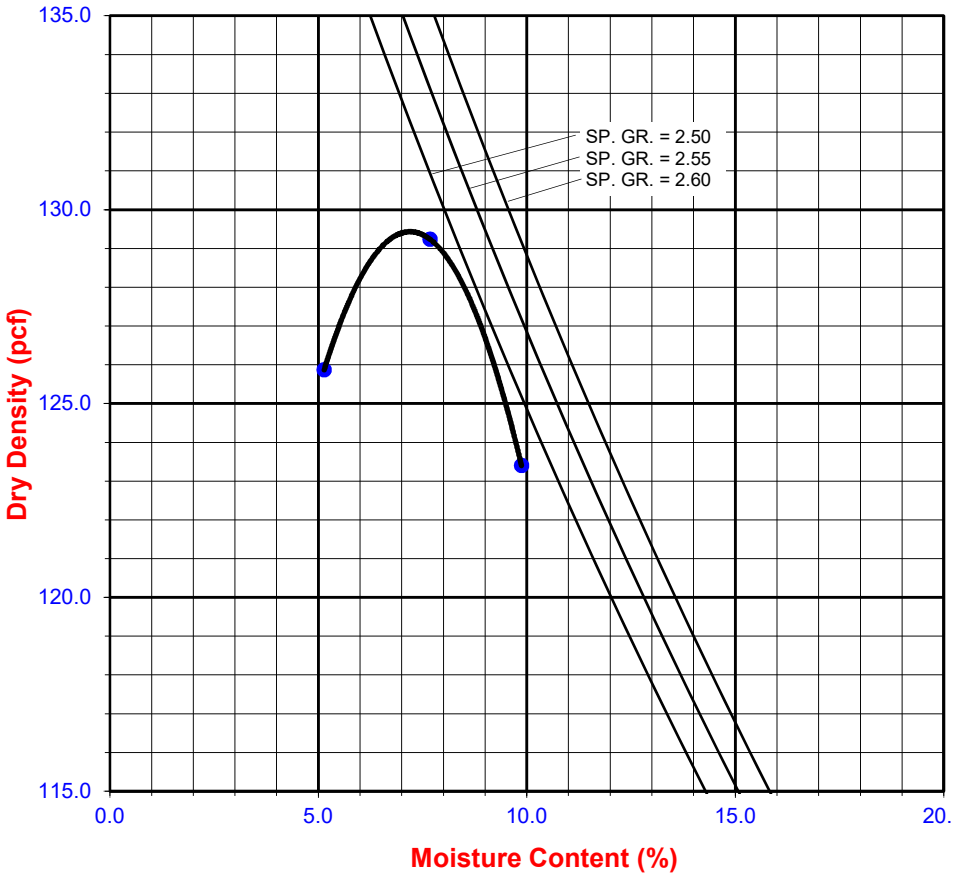
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Leighton

Project Name:	Rexford Bloomfield Ave	Tested By:	J. Gonzalez	Date:	03/09/21
Project No.:	13062.001	Checked By:	A. Santos	Date:	03/11/21
Boring No.:	LB-5	Depth (ft.):	0-5		
Sample No.:	B-1				
Soil Identification:	Dark yellowish brown clayey sand (SC)				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03330 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3810	3987	3890			
Weight of Mold (g)	1868	1868	1868			
Net Weight of Soil (g)	1942	2119	2022			
Wet Weight of Soil + Cont. (g)	322.0	247.1	302.6			
Dry Weight of Soil + Cont. (g)	304.6	228.9	274.2			
Weight of Container (g)	39.3	38.0	39.2			
Moisture Content (%)	6.56	9.53	12.09			
Wet Density (pcf)	128.6	140.3	133.9			
Dry Density (pcf)	120.7	128.1	119.4			

Maximum Dry Density (pcf) **128.2** **Optimum Moisture Content (%)** **9.2**

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
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)
Use if +#4 is >20% and +3/8 in. is 20% or less

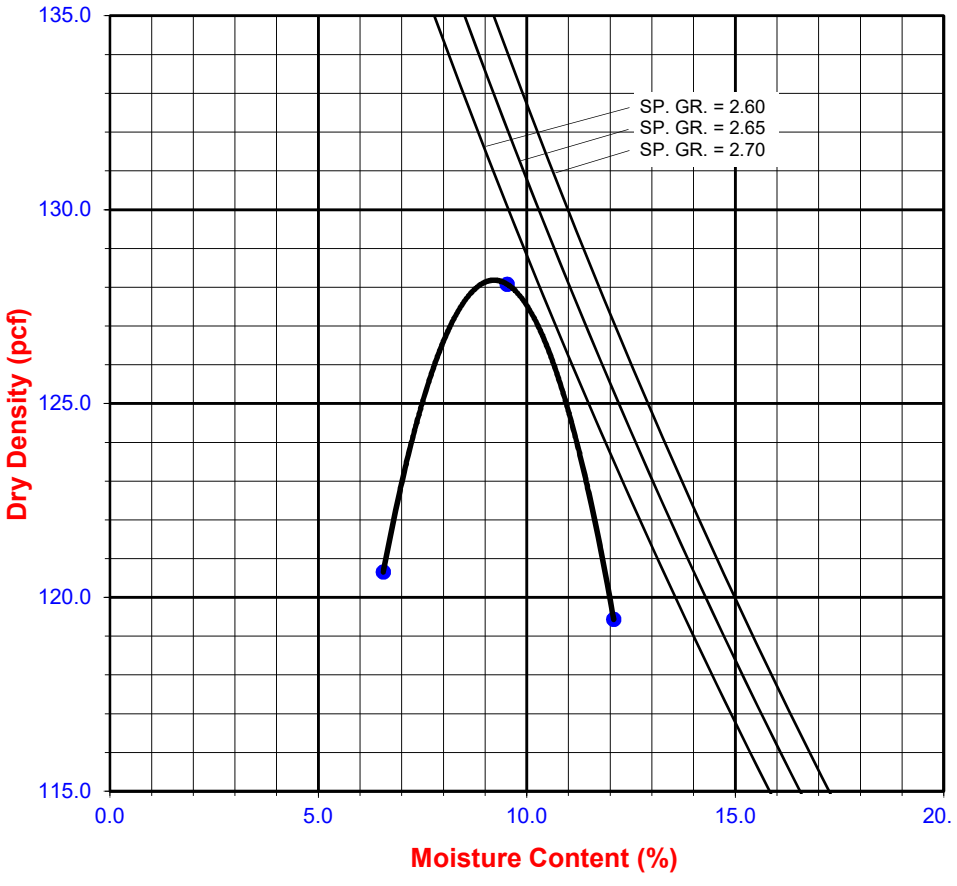
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



ATTERBERG LIMITS

ASTM D 4318

Project Name:	Rexford Bloomfield Ave.	Tested By:	Y. Nguyen	Date:	03/22/21
Project No. :	13062.001	Input By:	J. Ward	Date:	04/01/21
Boring No.:	LB-1	Checked By:	J. Ward		
Sample No.:	R-1	Depth (ft.)	5.0		
Soil Identification:	Brown silty, clayey sand (SC-SM)				

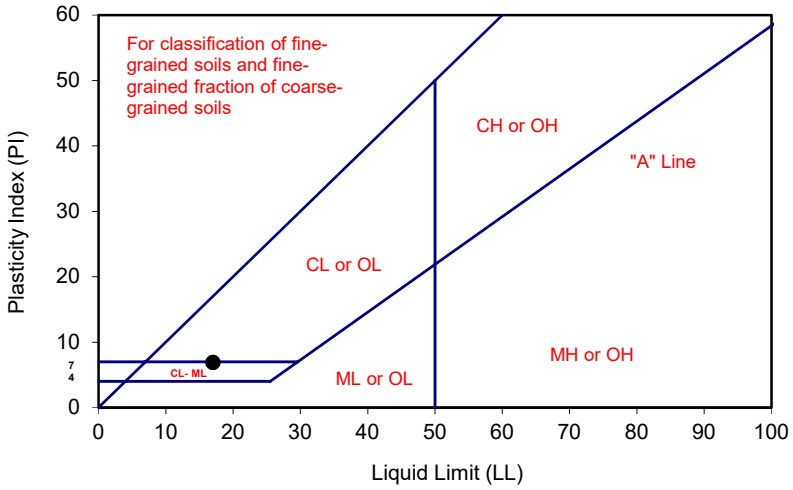
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			32	24	16	
Wet Wt. of Soil + Cont. (g)	9.62	9.58	20.43	22.57	20.99	
Dry Wt. of Soil + Cont. (g)	8.83	8.80	17.74	19.45	17.93	
Wt. of Container (g)	1.06	1.02	1.06	1.05	1.02	
Moisture Content (%) [Wn]	10.17	10.03	16.13	16.96	18.10	

Liquid Limit	**17**
Plastic Limit	**10**
Plasticity Index	**7**
Classification	**CL-ML**

PI at "A" - Line = 0.73(LL-20) -2.19

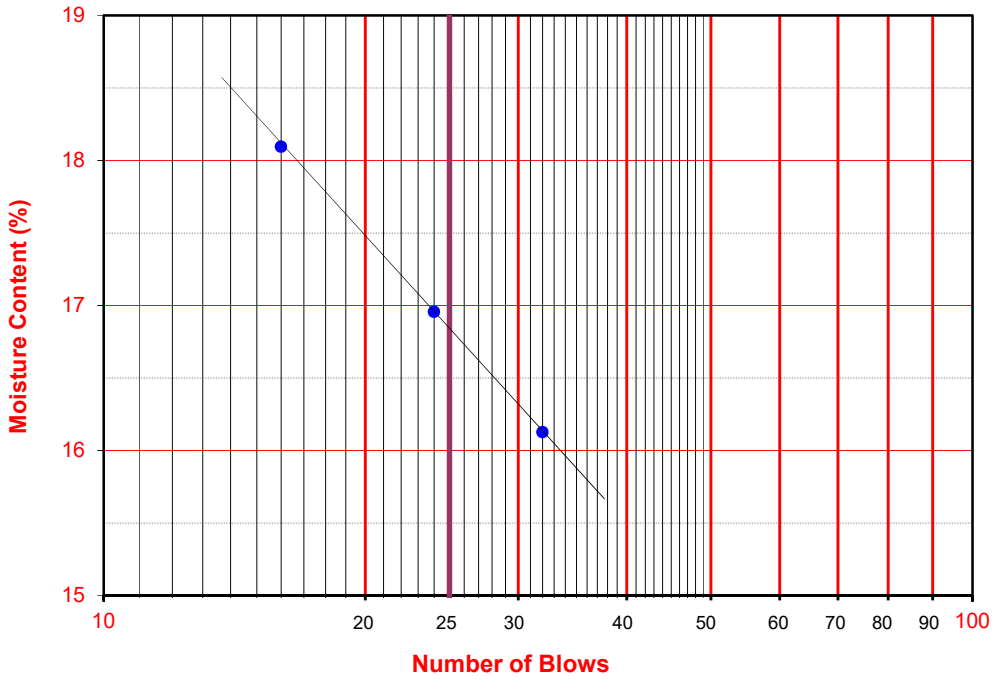
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

	Wet Preparation Multipoint - Wet
X	Dry Preparation Multipoint - Dry
X	Procedure A Multipoint Test
	Procedure B One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	Rexford Bloomfield Ave.	Tested By:	S. Felter	Date:	03/17/21
Project No. :	13062.001	Input By:	J. Ward	Date:	04/01/21
Boring No.:	LB-1	Checked By:	J. Ward		
Sample No.:	S-1	Depth (ft.)	10.0		
Soil Identification:	Brown lean clay (CL)				

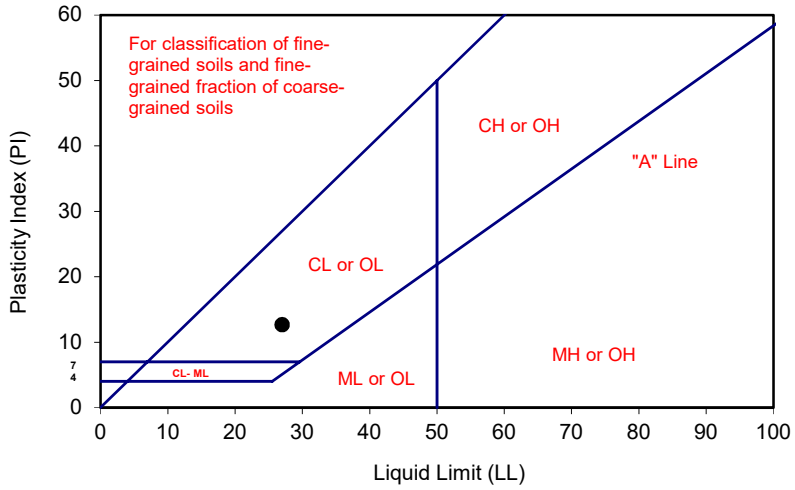
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			34	27	17	
Wet Wt. of Soil + Cont. (g)	10.08	10.30	21.10	20.73	21.21	
Dry Wt. of Soil + Cont. (g)	8.96	9.14	16.97	16.52	16.74	
Wt. of Container (g)	1.09	1.10	1.10	1.04	1.06	
Moisture Content (%) [Wn]	14.23	14.43	26.02	27.20	28.51	

Liquid Limit	**27**
Plastic Limit	**14**
Plasticity Index	**13**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 5.11

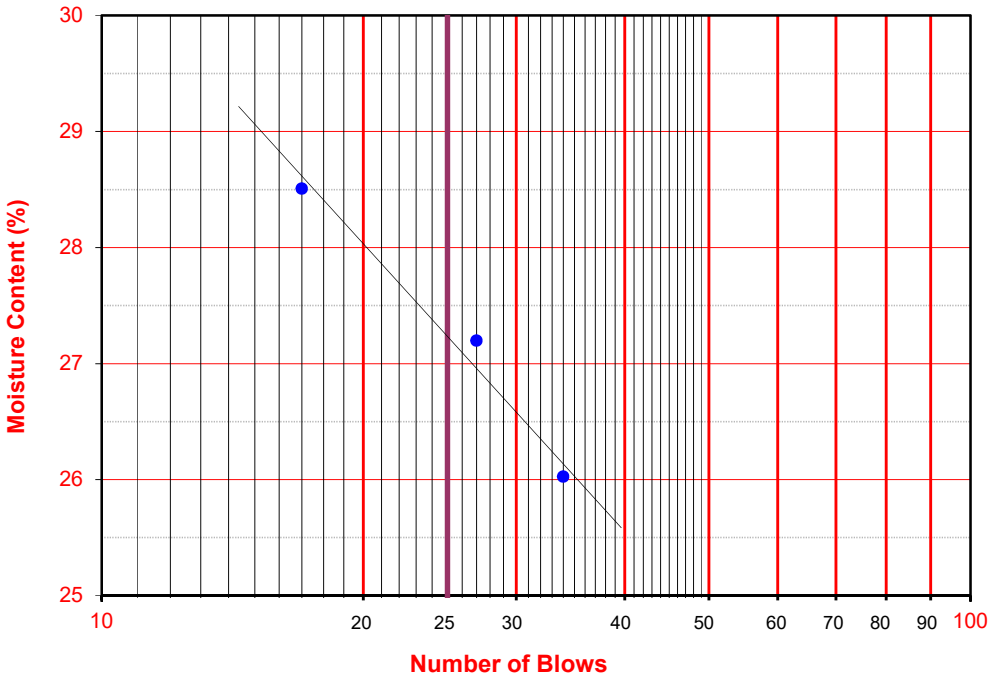
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [X] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Rexford Bloomfield Ave.	Tested By:	G. Berdy	Date:	03/23/21
Project No.:	13062.001	Checked By:	J. Ward	Date:	04/02/21
Boring No.:	LB-1	Depth (ft.):	0-5		
Sample No.:	B-1				
Soil Identification:	Dark yellowish brown silty sand (SM)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0045
Wt. Comp. Soil + Mold (g)	641.80	462.70
Wt. of Mold (g)	202.00	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	O	O
Wet Wt. of Soil + Cont. (g)	880.80	664.70
Dry Wt. of Soil + Cont. (g)	827.10	614.96
Wt. of Container (g)	0.00	202.00
Moisture Content (%)	6.49	12.04
Wet Density (pcf)	132.7	138.9
Dry Density (pcf)	124.6	124.0
Void Ratio	0.353	0.359
Total Porosity	0.261	0.264
Pore Volume (cc)	54.0	55.0
Degree of Saturation (%) [S_{meas}]	**49.6**	90.5

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
03/23/21	13:57	1.0	0	0.6600
03/23/21	14:07	1.0	10	0.6590
Add Distilled Water to the Specimen				
03/23/21	14:30	1.0	23	0.6630
03/24/21	6:06	1.0	959	0.6645
03/24/21	7:38	1.0	1051	0.6645

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**5**

Leighton

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Rexford Bloomfield Ave.	Tested By:	G. Berdy	Date:	03/23/21
Project No.:	13062.001	Checked By:	J. Ward	Date:	04/02/21
Boring No.:	LB-5	Depth (ft.):	0-5		
Sample No.:	B-1				
Soil Identification:	Dark yellowish brown clayey sand (SC)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0145
Wt. Comp. Soil + Mold (g)	625.80	461.40
Wt. of Mold (g)	191.60	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	O	O
Wet Wt. of Soil + Cont. (g)	872.80	653.00
Dry Wt. of Soil + Cont. (g)	817.30	598.15
Wt. of Container (g)	0.00	191.60
Moisture Content (%)	6.79	13.49
Wet Density (pcf)	131.0	137.2
Dry Density (pcf)	122.6	120.9
Void Ratio	0.375	0.395
Total Porosity	0.272	0.283
Pore Volume (cc)	56.4	59.4
Degree of Saturation (%) [S_{meas}]	**48.9**	92.3

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
03/23/21	14:30	1.0	0	0.6060
03/23/21	14:40	1.0	10	0.6045
Add Distilled Water to the Specimen				
03/23/21	15:00	1.0	20	0.6145
03/24/21	6:05	1.0	925	0.6205
03/24/21	7:40	1.0	1020	0.6205

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**16**

Leighton

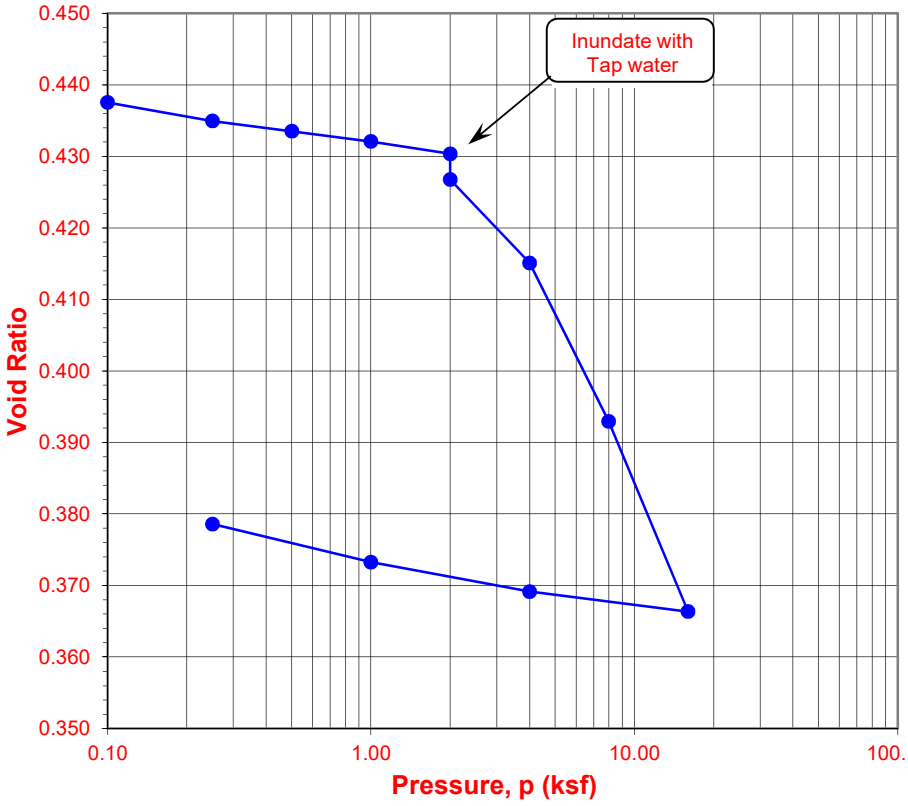
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: Rexford Bloomfield Ave.
Project No.: 13062.001
Boring No.: LB-1
Sample No.: B-1
Soil Identification: Dark yellowish brown silty sand (SM)

Tested By: G. Bathala Date: 03/11/21
Checked By: J. Ward Date: 04/01/21
Depth (ft.): 0-5
Sample Type: 90% Remold

Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	196.46
Weight of Ring (g):	45.48
Height after consol. (in.):	0.9588
Before Test	
Wt. of Wet Sample+Cont. (g):	211.08
Wt. of Dry Sample+Cont. (g):	200.87
Weight of Container (g):	57.18
Initial Moisture Content (%)	7.1
Initial Dry Density (pcf)	117.2
Initial Saturation (%):	44
Initial Vertical Reading (in.)	0.2032
After Test	
Wt. of Wet Sample+Cont. (g):	271.08
Wt. of Dry Sample+Cont. (g):	254.23
Weight of Container (g):	67.87
Final Moisture Content (%)	11.96
Final Dry Density (pcf):	122.2
Final Saturation (%):	85
Final Vertical Reading (in.)	0.2477
Specific Gravity (assumed):	2.70
Water Density (pcf):	62.43

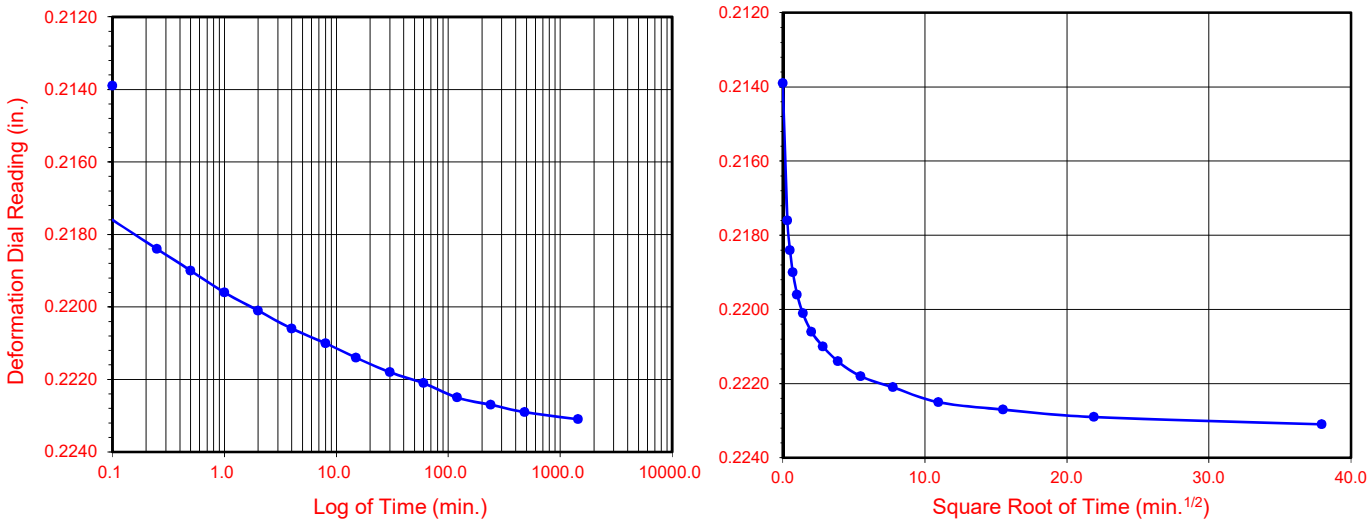


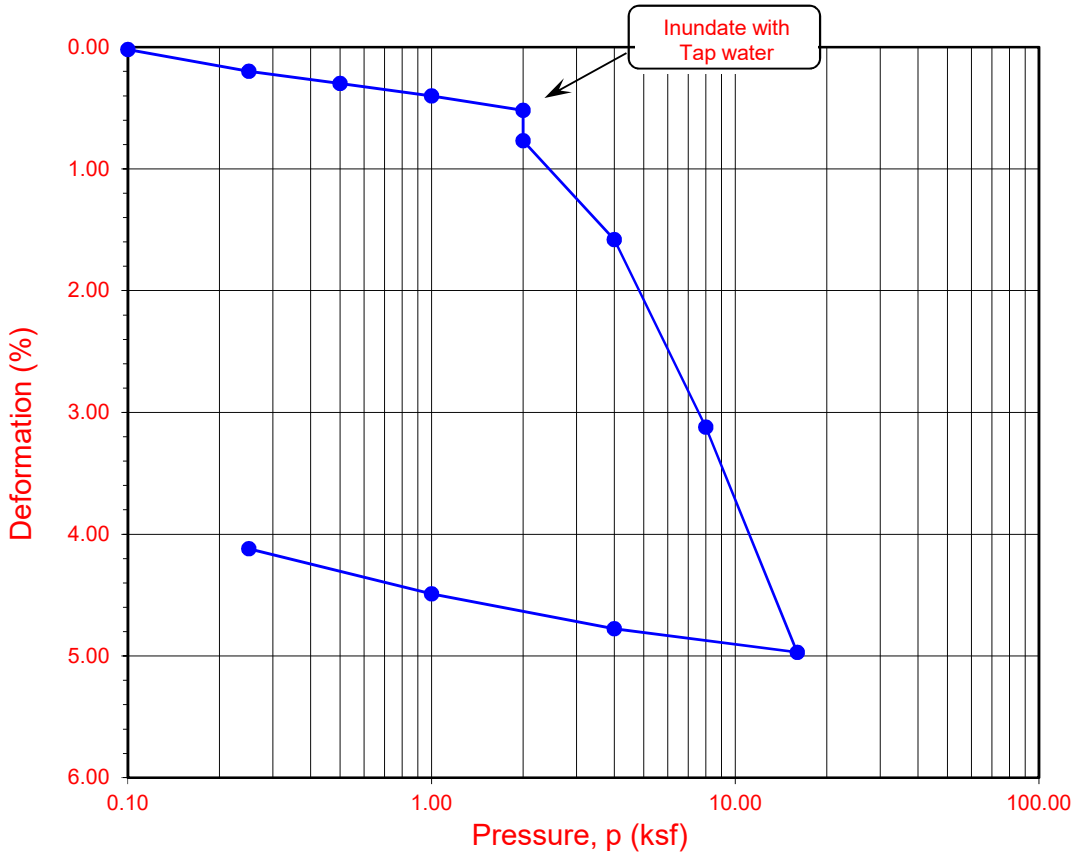
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deforma-tion (%)
0.10	0.2034	0.9998	0.00	0.02	0.438	0.02
0.25	0.2056	0.9976	0.04	0.24	0.435	0.20
0.50	0.2071	0.9961	0.09	0.39	0.434	0.30
1.00	0.2091	0.9941	0.19	0.59	0.432	0.40
2.00	0.2114	0.9918	0.30	0.82	0.430	0.52
2.00	0.2139	0.9893	0.30	1.07	0.427	0.77
4.00	0.2231	0.9801	0.41	1.99	0.415	1.58
8.00	0.2399	0.9633	0.55	3.67	0.393	3.12
16.00	0.2601	0.9431	0.72	5.69	0.366	4.97
4.00	0.2566	0.9467	0.56	5.34	0.369	4.78
1.00	0.2525	0.9507	0.44	4.93	0.373	4.49
0.25	0.2477	0.9555	0.33	4.45	0.379	4.12

Time Readings @ 4.0 ksf

Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)
3/15/21	8:45:00	0.0	0.0	0.2139
3/15/21	8:45:06	0.1	0.3	0.2176
3/15/21	8:45:15	0.2	0.5	0.2184
3/15/21	8:45:30	0.5	0.7	0.2190
3/15/21	8:46:00	1.0	1.0	0.2196
3/15/21	8:47:00	2.0	1.4	0.2201
3/15/21	8:49:00	4.0	2.0	0.2206
3/15/21	8:53:00	8.0	2.8	0.2210
3/15/21	9:00:00	15.0	3.9	0.2214
3/15/21	9:15:00	30.0	5.5	0.2218
3/15/21	9:45:00	60.0	7.7	0.2221
3/15/21	10:45:00	120.0	11.0	0.2225
3/15/21	12:45:00	240.0	15.5	0.2227
3/15/21	16:45:00	480.0	21.9	0.2229
3/16/21	8:45:00	1440.0	37.9	0.2231

Time Readings @ 4.0 ksf





Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
LB-1	**B-1**	**0-5**	**7.1**	**12.0**	**117.2**	**122.2**	**0.438**	**0.379**	**44**	**85**

Soil Identification: Dark yellowish brown silty sand (SM)

Leighton

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 13062.001

Rexford Bloomfield Ave.

04-21

Leighton

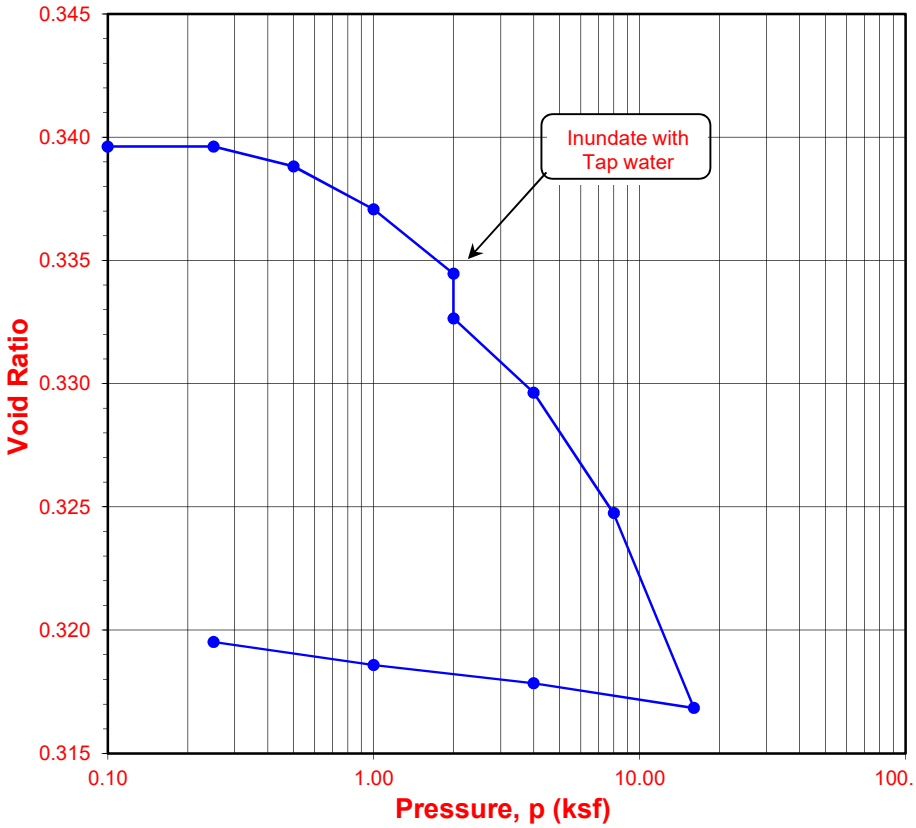
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: Rexford Bloomfield Ave.
Project No.: 13062.001
Boring No.: LB-1
Sample No.: R-1
Soil Identification: Brown silty, clayey sand (SC-SM)

Tested By: G. Bathala Date: 03/10/21
Checked By: J. Ward Date: 04/01/21
Depth (ft.): 5.0
Sample Type: Ring

Sample Diameter (in.)	2.415
Sample Thickness (in.)	1.000
Wt. of Sample + Ring (g)	211.59
Weight of Ring (g)	44.89
Height after consol. (in.)	0.9849
Before Test	
Wt.Wet Sample+Cont. (g)	238.20
Wt.of Dry Sample+Cont. (g)	222.26
Weight of Container (g)	65.86
Initial Moisture Content (%)	10.2
Initial Dry Density (pcf)	125.8
Initial Saturation (%)	81
Initial Vertical Reading (in.)	0.2886
After Test	
Wt.of Wet Sample+Cont. (g)	268.81
Wt. of Dry Sample+Cont. (g)	253.29
Weight of Container (g)	57.18
Final Moisture Content (%)	10.26
Final Dry Density (pcf)	127.7
Final Saturation (%)	87
Final Vertical Reading (in.)	0.2708
Specific Gravity (assumed)	2.70
Water Density (pcf)	62.43

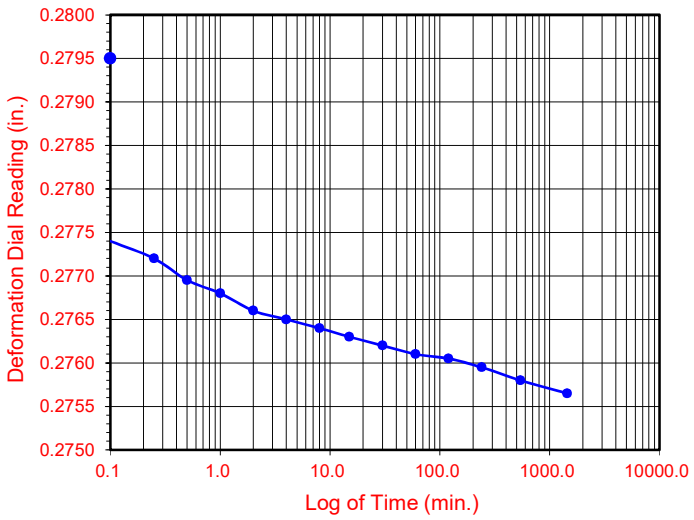


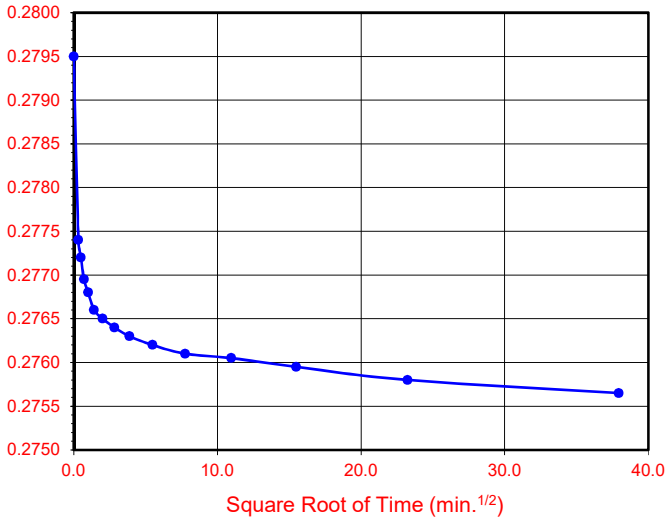
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.2885	0.9999	0.00	0.01	0.340	0.01
0.25	0.2880	0.9994	0.05	0.06	0.340	0.01
0.50	0.2866	0.9980	0.13	0.20	0.339	0.07
1.00	0.2843	0.9957	0.23	0.43	0.337	0.20
2.00	0.2809	0.9923	0.38	0.78	0.334	0.40
2.00	0.2795	0.9909	0.38	0.91	0.333	0.53
4.00	0.2757	0.9871	0.54	1.30	0.330	0.76
8.00	0.2702	0.9816	0.72	1.84	0.325	1.12
16.00	0.2621	0.9735	0.94	2.65	0.317	1.71
4.00	0.2651	0.9765	0.72	2.36	0.318	1.64
1.00	0.2680	0.9794	0.48	2.06	0.319	1.58
0.25	0.2708	0.9822	0.27	1.78	0.320	1.51

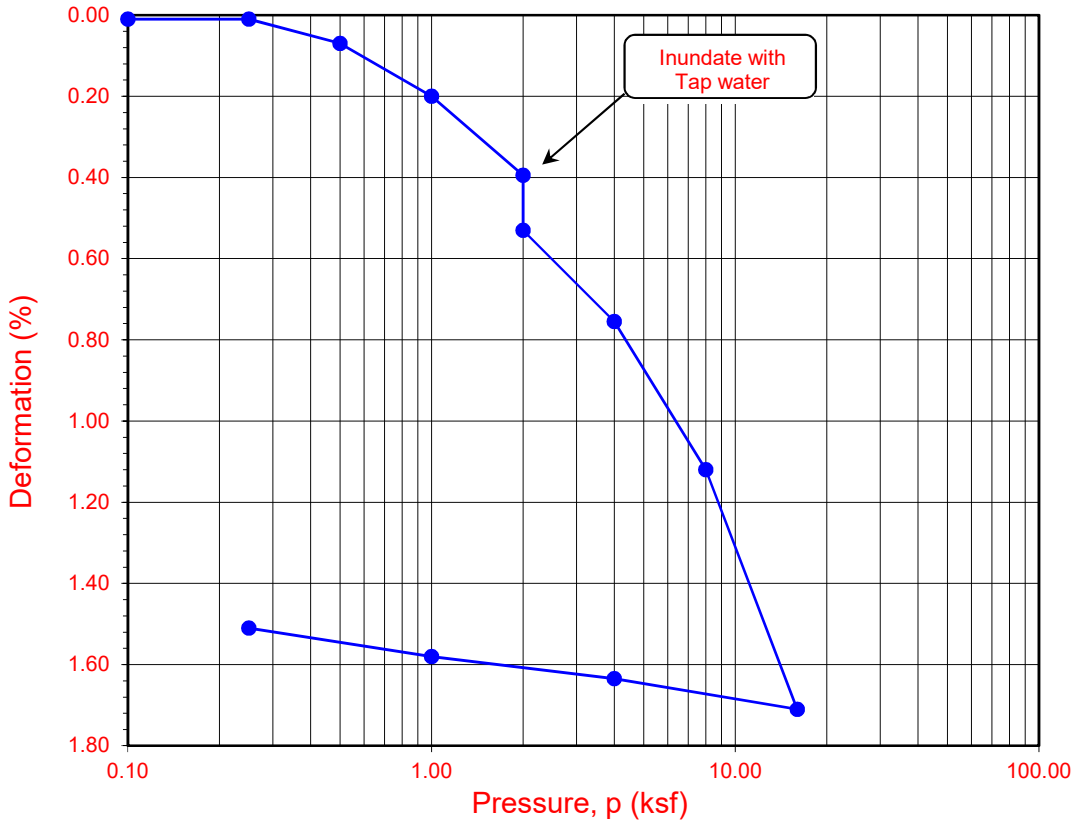
Time Readings @ 4 ksf

Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)
3/13/21	6:35:00	0.0	0.0	0.2795
3/13/21	6:35:06	0.1	0.3	0.2774
3/13/21	6:35:15	0.2	0.5	0.2772
3/13/21	6:35:30	0.5	0.7	0.2770
3/13/21	6:36:00	1.0	1.0	0.2768
3/13/21	6:37:00	2.0	1.4	0.2766
3/13/21	6:39:00	4.0	2.0	0.2765
3/13/21	6:43:00	8.0	2.8	0.2764
3/13/21	6:50:00	15.0	3.9	0.2763
3/13/21	7:05:00	30.0	5.5	0.2762
3/13/21	7:35:00	60.0	7.7	0.2761
3/13/21	8:35:00	120.0	11.0	0.2761
3/13/21	10:35:00	240.0	15.5	0.2760
3/13/21	15:35:00	540.0	23.2	0.2758
3/14/21	6:35:00	1440.0	37.9	0.2757

Time Readings @ 4 ksf







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
LB-1	**R-1**	**5.0**	**10.2**	**10.3**	**125.8**	**127.7**	**0.340**	**0.320**	**81**	**87**

Soil Identification: Brown silty, clayey sand (SC-SM)

Leighton

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 13062.001

Rexford Bloomfield Ave.

04-21

Leighton

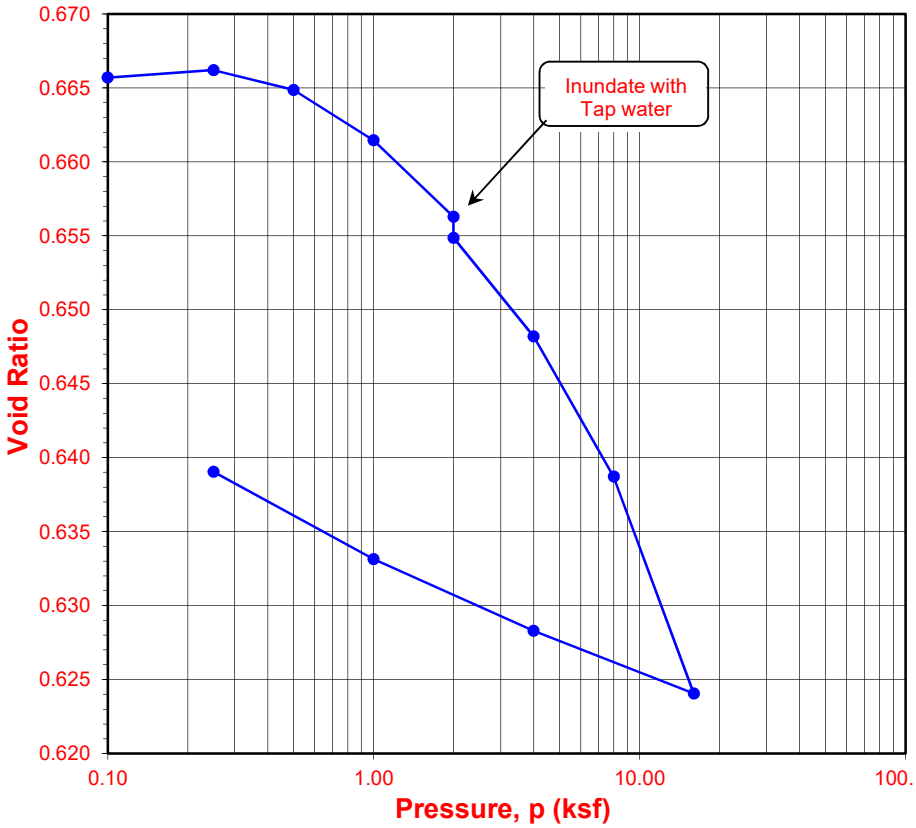
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: Rexford Bloomfield Ave.
Project No.: 13062.001
Boring No.: LB-1
Sample No.: R-2
Soil Identification: Light olive brown silt (ML)

Tested By: G. Bathala Date: 03/10/21
Checked By: J. Ward Date: 04/01/21
Depth (ft.): 15.0
Sample Type: Ring

Sample Diameter (in.)	2.415
Sample Thickness (in.)	1.000
Wt. of Sample + Ring (g)	173.19
Weight of Ring (g)	42.06
Height after consol. (in.)	0.9839
Before Test	
Wt.Wet Sample+Cont. (g)	174.67
Wt.of Dry Sample+Cont. (g)	166.81
Weight of Container (g)	65.76
Initial Moisture Content (%)	7.8
Initial Dry Density (pcf)	101.2
Initial Saturation (%)	32
Initial Vertical Reading (in.)	0.2863
After Test	
Wt.of Wet Sample+Cont. (g)	258.26
Wt. of Dry Sample+Cont. (g)	231.44
Weight of Container (g)	69.50
Final Moisture Content (%)	22.37
Final Dry Density (pcf)	101.3
Final Saturation (%)	91
Final Vertical Reading (in.)	0.2670
Specific Gravity (assumed)	2.70
Water Density (pcf)	62.43

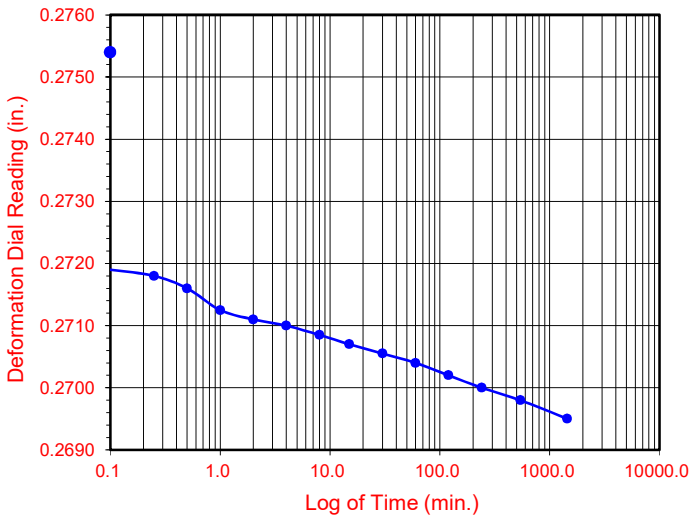


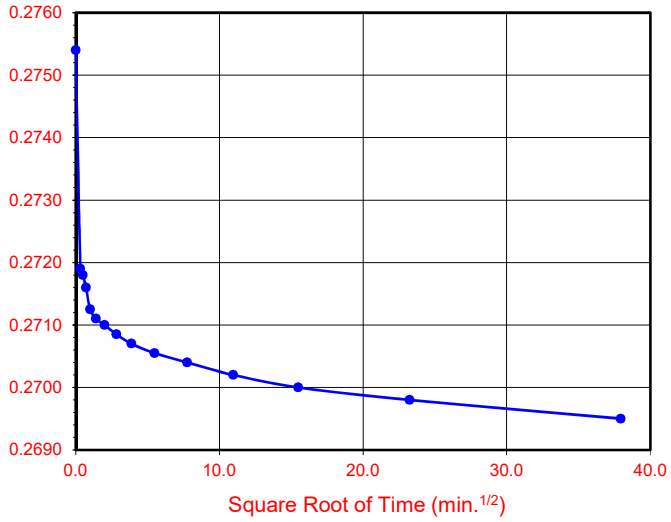
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.2862	0.9999	0.00	0.01	0.666	0.01
0.25	0.2856	0.9993	0.09	0.07	0.666	-0.02
0.50	0.2839	0.9976	0.18	0.24	0.665	0.06
1.00	0.2808	0.9945	0.29	0.55	0.661	0.26
2.00	0.2763	0.9900	0.43	1.01	0.656	0.58
2.00	0.2754	0.9891	0.43	1.09	0.655	0.66
4.00	0.2695	0.9832	0.62	1.68	0.648	1.06
8.00	0.2616	0.9753	0.84	2.47	0.639	1.63
16.00	0.2505	0.9642	1.07	3.58	0.624	2.51
4.00	0.2555	0.9692	0.83	3.09	0.628	2.26
1.00	0.2613	0.9750	0.54	2.51	0.633	1.97
0.25	0.2670	0.9807	0.32	1.93	0.639	1.61

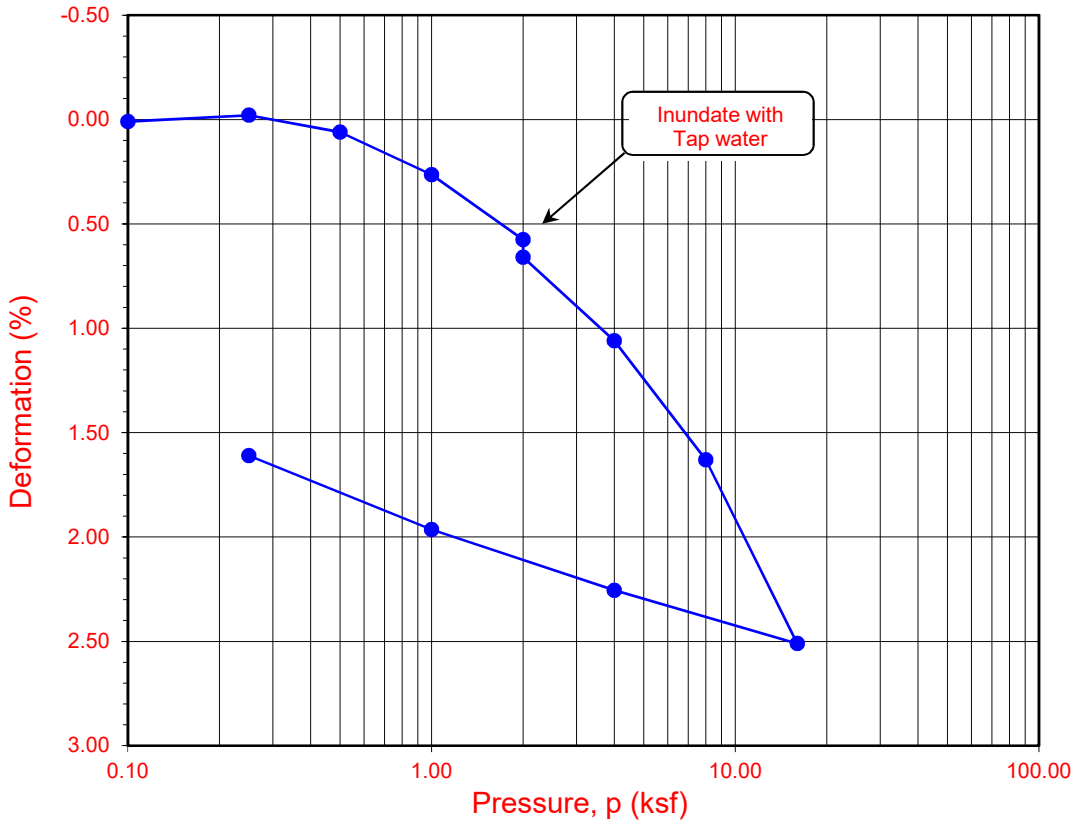
Time Readings @ 4 ksf

Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)
3/13/21	6:40:00	0.0	0.0	0.2754
3/13/21	6:40:06	0.1	0.3	0.2719
3/13/21	6:40:15	0.2	0.5	0.2718
3/13/21	6:40:30	0.5	0.7	0.2716
3/13/21	6:41:00	1.0	1.0	0.2713
3/13/21	6:42:00	2.0	1.4	0.2711
3/13/21	6:44:00	4.0	2.0	0.2710
3/13/21	6:48:00	8.0	2.8	0.2709
3/13/21	6:55:00	15.0	3.9	0.2707
3/13/21	7:10:00	30.0	5.5	0.2706
3/13/21	7:40:00	60.0	7.7	0.2704
3/13/21	8:40:00	120.0	11.0	0.2702
3/13/21	10:40:00	240.0	15.5	0.2700
3/13/21	15:40:00	540.0	23.2	0.2698
3/14/21	6:40:00	1440.0	37.9	0.2695

Time Readings @ 4 ksf







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
LB-1	**R-2**	**15.0**	**7.8**	**22.4**	**101.2**	**101.3**	**0.666**	**0.639**	**32**	**91**

Soil Identification: Light olive brown silt (ML)

Leighton

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 13062.001

Rexford Bloomfield Ave.

04-21

Leighton

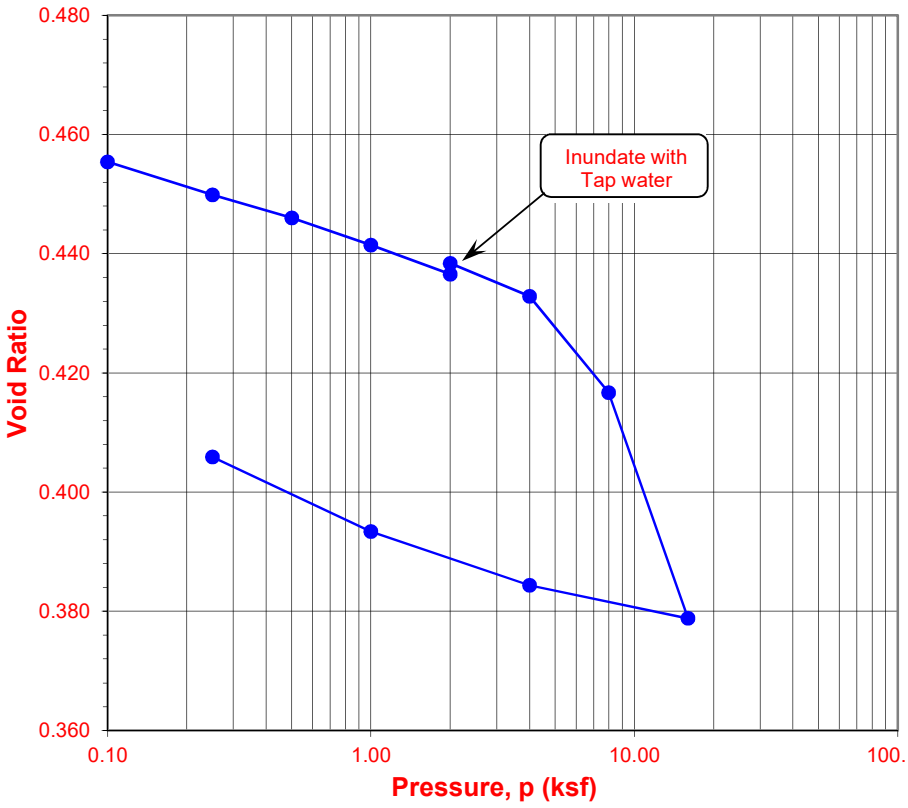
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: Rexford Bloomfield Ave.
Project No.: 13062.001
Boring No.: LB-5
Sample No.: B-1
Soil Identification: Dark yellowish brown clayey sand (SC)

Tested By: G. Bathala Date: 03/11/21
Checked By: J. Ward Date: 04/01/21
Depth (ft.): 0-5
Sample Type: 90% Remold

Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	197.39
Weight of Ring (g):	45.51
Height after consol. (in.):	0.9657
Before Test	
Wt. of Wet Sample+Cont. (g):	207.30
Wt. of Dry Sample+Cont. (g):	195.05
Weight of Container (g):	60.36
Initial Moisture Content (%)	9.1
Initial Dry Density (pcf)	115.8
Initial Saturation (%):	54
Initial Vertical Reading (in.)	0.1267
After Test	
Wt. of Wet Sample+Cont. (g):	268.77
Wt. of Dry Sample+Cont. (g):	249.24
Weight of Container (g):	64.67
Final Moisture Content (%)	14.04
Final Dry Density (pcf):	119.8
Final Saturation (%):	93
Final Vertical Reading (in.)	0.1621
Specific Gravity (assumed):	2.70
Water Density (pcf):	62.43

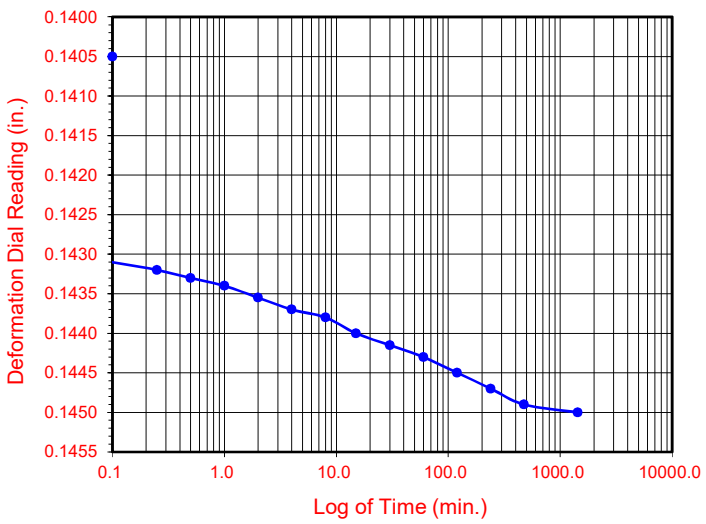


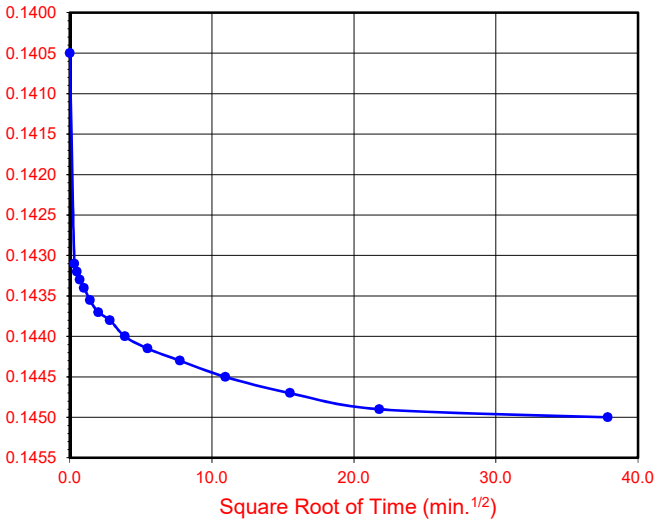
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deforma-tion (%)
0.10	0.1270	0.9997	0.00	0.03	0.455	0.03
0.25	0.1311	0.9956	0.03	0.44	0.450	0.41
0.50	0.1342	0.9926	0.07	0.74	0.446	0.67
1.00	0.1378	0.9889	0.12	1.11	0.441	0.99
2.00	0.1418	0.9850	0.18	1.51	0.437	1.33
2.00	0.1405	0.9862	0.18	1.38	0.438	1.20
4.00	0.1450	0.9817	0.25	1.83	0.433	1.58
8.00	0.1570	0.9697	0.34	3.03	0.417	2.69
16.00	0.1843	0.9424	0.47	5.76	0.379	5.29
4.00	0.1791	0.9476	0.33	5.24	0.384	4.91
1.00	0.1718	0.9549	0.22	4.51	0.393	4.29
0.25	0.1621	0.9646	0.11	3.54	0.406	3.43

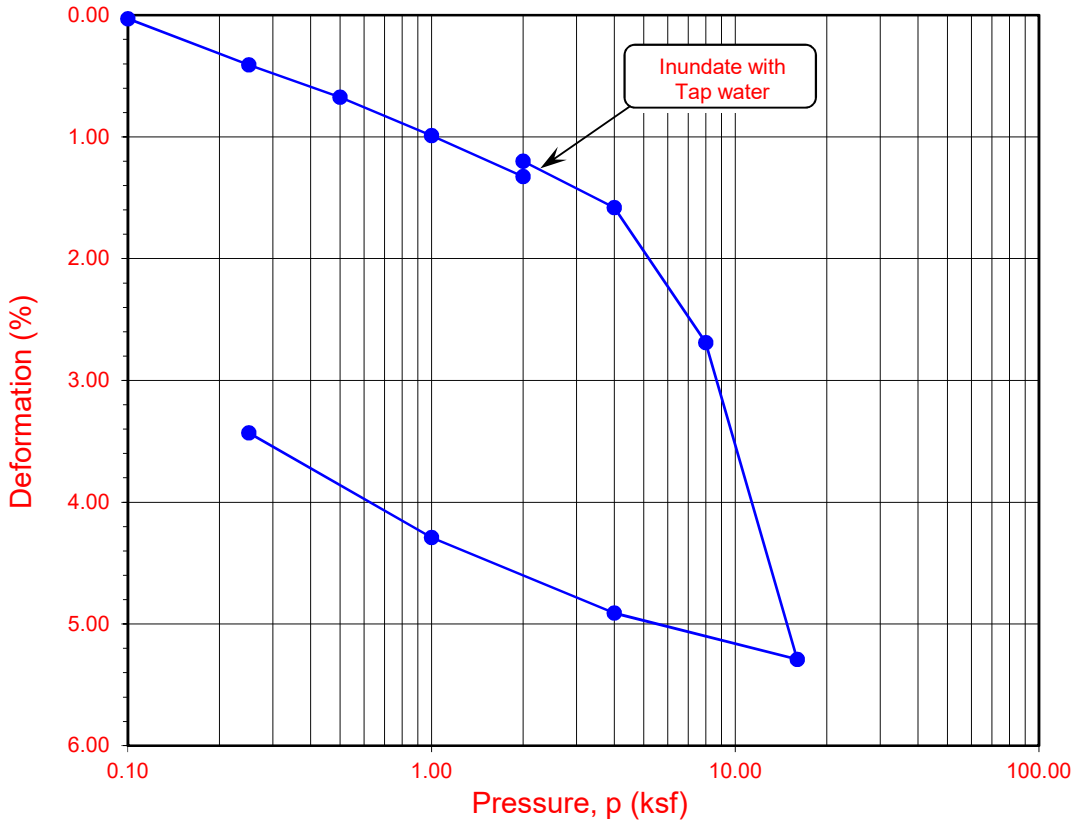
Time Readings @ 4.0 ksf

Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)
3/15/21	8:50:00	0.0	0.0	0.1405
3/15/21	8:50:06	0.1	0.3	0.1431
3/15/21	8:50:15	0.2	0.5	0.1432
3/15/21	8:50:30	0.5	0.7	0.1433
3/15/21	8:51:00	1.0	1.0	0.1434
3/15/21	8:52:00	2.0	1.4	0.1436
3/15/21	8:54:00	4.0	2.0	0.1437
3/15/21	8:58:00	8.0	2.8	0.1438
3/15/21	9:05:00	15.0	3.9	0.1440
3/15/21	9:20:00	30.0	5.5	0.1442
3/15/21	9:50:00	60.0	7.7	0.1443
3/15/21	10:50:00	120.0	11.0	0.1445
3/15/21	12:50:00	240.0	15.5	0.1447
3/15/21	16:45:00	475.0	21.8	0.1449
3/16/21	8:45:00	1435.0	37.9	0.1450

Time Readings @ 4.0 ksf







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
LB-5	**B-1**	**0-5**	**9.1**	**14.0**	**115.8**	**119.8**	**0.456**	**0.406**	**54**	**93**

Soil Identification: Dark yellowish brown clayey sand (SC)

Leighton

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 13062.001

Rexford Bloomfield Ave.

04-21

Leighton

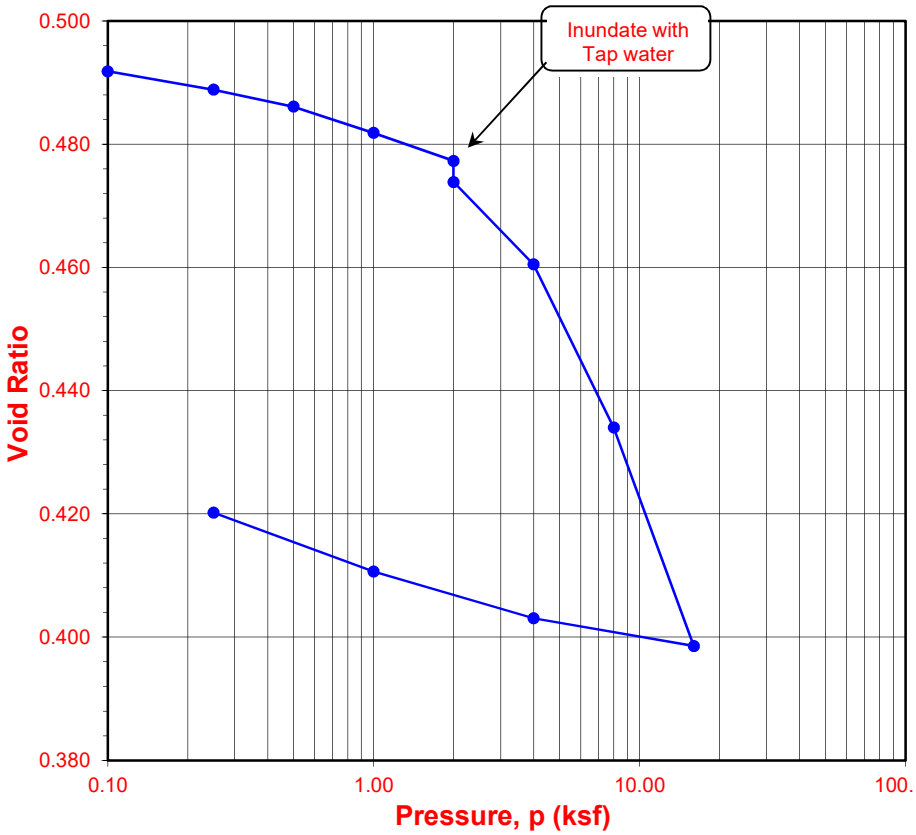
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name: Rexford Bloomfield Ave.
Project No.: 13062.001
Boring No.: LB-5
Sample No.: R-1
Soil Identification: Yellowish brown clayey sand (SC)

Tested By: G. Bathala Date: 03/10/21
Checked By: J. Ward Date: 04/01/21
Depth (ft.): 5.0
Sample Type: Ring

Sample Diameter (in.)	2.415
Sample Thickness (in.)	1.000
Wt. of Sample + Ring (g)	191.67
Weight of Ring (g)	40.75
Height after consol. (in.)	0.9519
Before Test	
Wt.Wet Sample+Cont. (g)	201.23
Wt.of Dry Sample+Cont. (g)	188.06
Weight of Container (g)	69.37
Initial Moisture Content (%)	11.1
Initial Dry Density (pcf)	113.0
Initial Saturation (%)	61
Initial Vertical Reading (in.)	0.3063
After Test	
Wt.of Wet Sample+Cont. (g)	255.96
Wt. of Dry Sample+Cont. (g)	235.65
Weight of Container (g)	59.81
Final Moisture Content (%)	15.03
Final Dry Density (pcf)	118.0
Final Saturation (%)	95
Final Vertical Reading (in.)	0.2565
Specific Gravity (assumed)	2.70
Water Density (pcf)	62.43

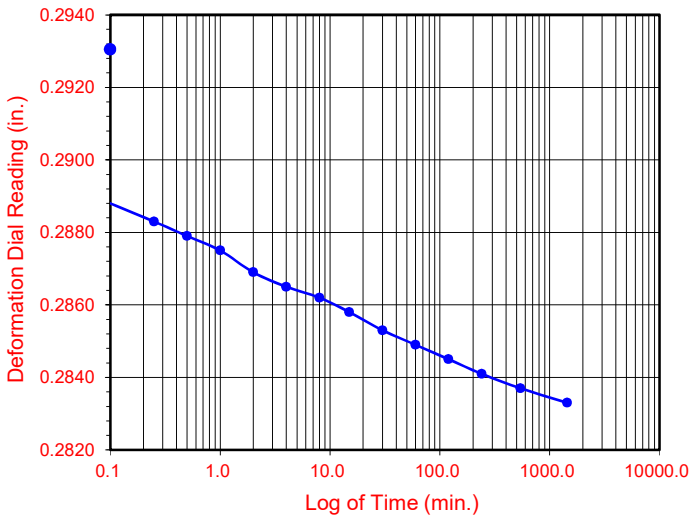


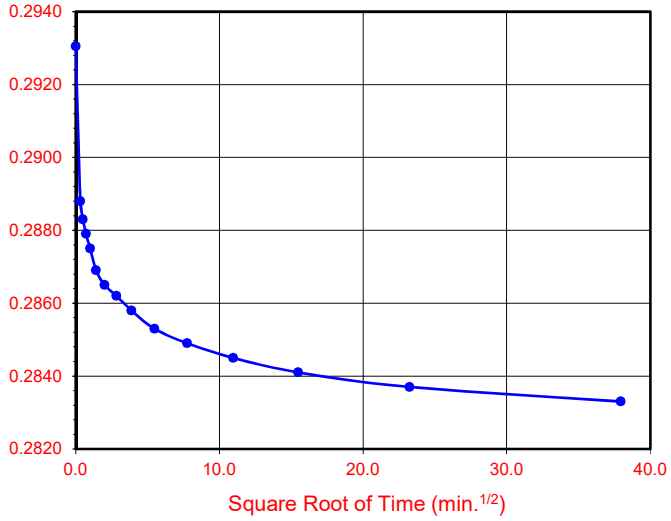
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deformation (%)
0.10	0.3062	0.9999	0.00	0.01	0.492	0.01
0.25	0.3041	0.9978	0.01	0.22	0.489	0.21
0.50	0.3021	0.9958	0.03	0.43	0.486	0.40
1.00	0.2989	0.9926	0.06	0.74	0.482	0.68
2.00	0.2954	0.9891	0.11	1.10	0.477	0.99
2.00	0.2931	0.9868	0.11	1.33	0.474	1.22
4.00	0.2833	0.9770	0.19	2.30	0.461	2.11
8.00	0.2642	0.9579	0.33	4.22	0.434	3.89
16.00	0.2385	0.9322	0.52	6.78	0.399	6.26
4.00	0.2431	0.9368	0.36	6.32	0.403	5.96
1.00	0.2495	0.9432	0.23	5.68	0.411	5.45
0.25	0.2565	0.9502	0.17	4.98	0.420	4.81

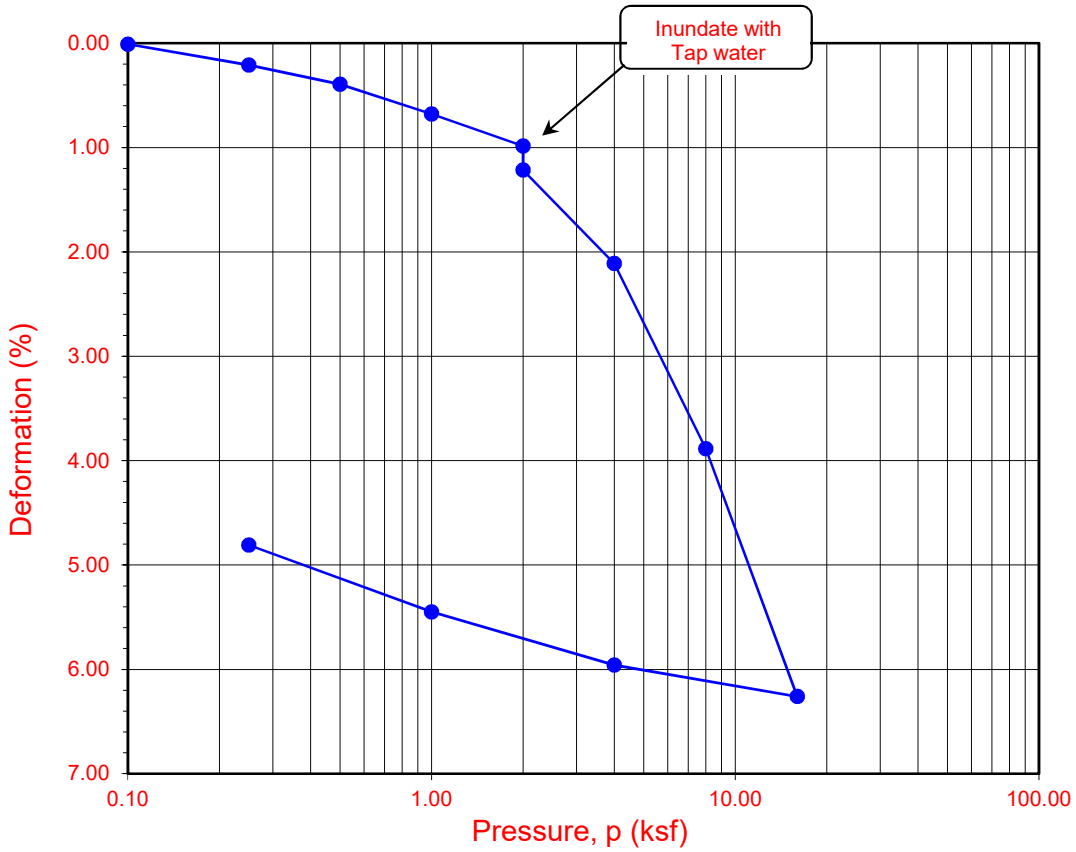
Time Readings @ 4 ksf

Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)
3/13/21	6:45:00	0.0	0.0	0.2931
3/13/21	6:45:06	0.1	0.3	0.2888
3/13/21	6:45:15	0.2	0.5	0.2883
3/13/21	6:45:30	0.5	0.7	0.2879
3/13/21	6:46:00	1.0	1.0	0.2875
3/13/21	6:47:00	2.0	1.4	0.2869
3/13/21	6:49:00	4.0	2.0	0.2865
3/13/21	6:53:00	8.0	2.8	0.2862
3/13/21	7:00:00	15.0	3.9	0.2858
3/13/21	7:15:00	30.0	5.5	0.2853
3/13/21	7:45:00	60.0	7.7	0.2849
3/13/21	8:45:00	120.0	11.0	0.2845
3/13/21	10:45:00	240.0	15.5	0.2841
3/13/21	15:45:00	540.0	23.2	0.2837
3/14/21	6:45:00	1440.0	37.9	0.2833

Time Readings @ 4 ksf







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
LB-5	**R-1**	**5.0**	**11.1**	**15.0**	**113.0**	**118.0**	**0.492**	**0.420**	**61**	**95**

Soil Identification: Yellowish brown clayey sand (SC)

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ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 13062.001

Rexford Bloomfield Ave.

04-21

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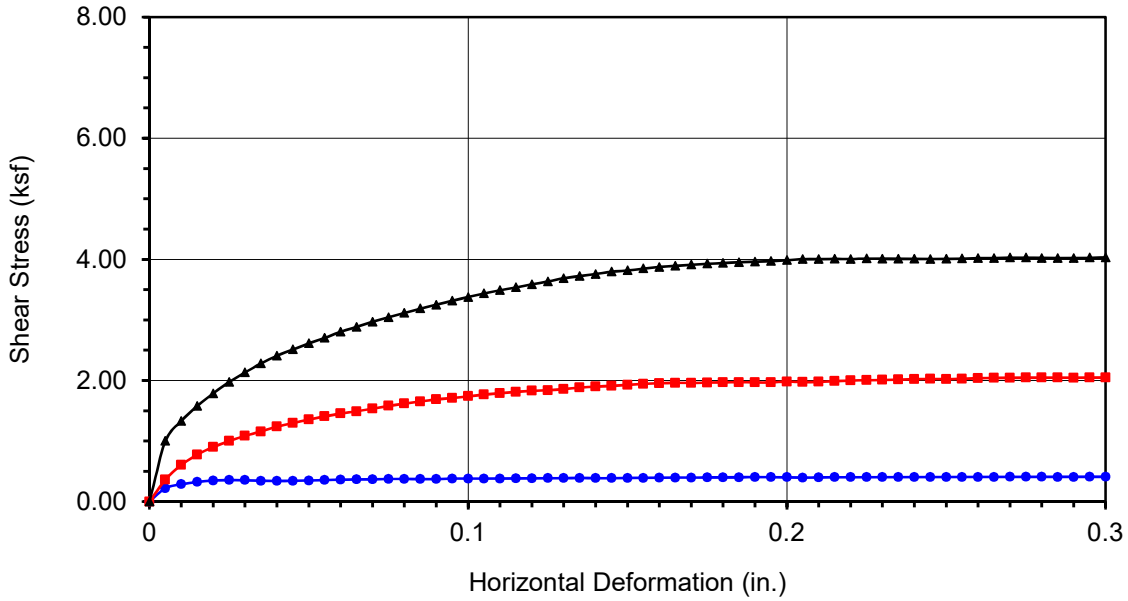
DIRECT SHEAR TEST

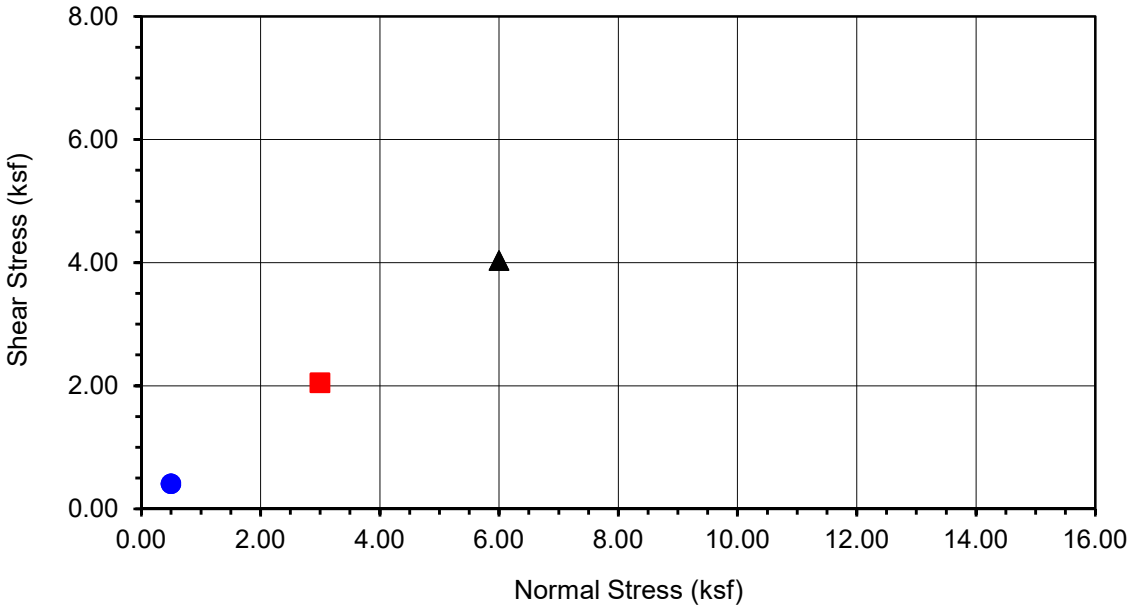
Consolidated Drained - ASTM D 3080

Project Name:	Rexford Bloomfield Ave.	Tested By:	G. Bathala	Date:	03/16/21
Project No.:	13062.001	Checked By:	J. Ward	Date:	04/01/21
Boring No.:	LB-1	Sample Type:	90% Remold		
Sample No.:	B-1	Depth (ft.):	0-5		

Soil Identification: Dark yellowish brown silty sand (SM)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	195.68	194.90	195.93
Weight of Ring(gm):	45.39	44.46	45.49
Before Shearing			
Weight of Wet Sample+Cont.(gm):	211.08	211.08	211.08
Weight of Dry Sample+Cont.(gm):	200.87	200.87	200.87
Weight of Container(gm):	57.18	57.18	57.18
Vertical Rdg.(in): Initial	0.0000	0.2972	0.2516
Vertical Rdg.(in): Final	-0.0059	0.3199	0.2891
After Shearing			
Weight of Wet Sample+Cont.(gm):	228.40	215.62	208.24
Weight of Dry Sample+Cont.(gm):	210.78	199.83	192.86
Weight of Container(gm):	72.42	60.91	53.69
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**LB-1**
Sample No.	**B-1**
Depth (ft)	**0-5**
Sample Type: 90% Remold	
Soil Identification: Dark yellowish brown silty sand (SM)	

Normal Stress (kip/ft²)	0.500	3.000	6.000
Peak Shear Stress (kip/ft²)	● 0.409	■ 2.047	▲ 4.030
Shear Stress @ End of Test (ksf)	○ 0.409	□ 2.047	△ 4.030
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	7.11	7.11	7.11
Dry Density (pcf)	116.7	116.8	116.8
Saturation (%)	43.2	43.3	43.3
Soil Height Before Shearing (in.)	0.9941	0.9773	0.9625
Final Moisture Content (%)	12.7	11.4	11.1

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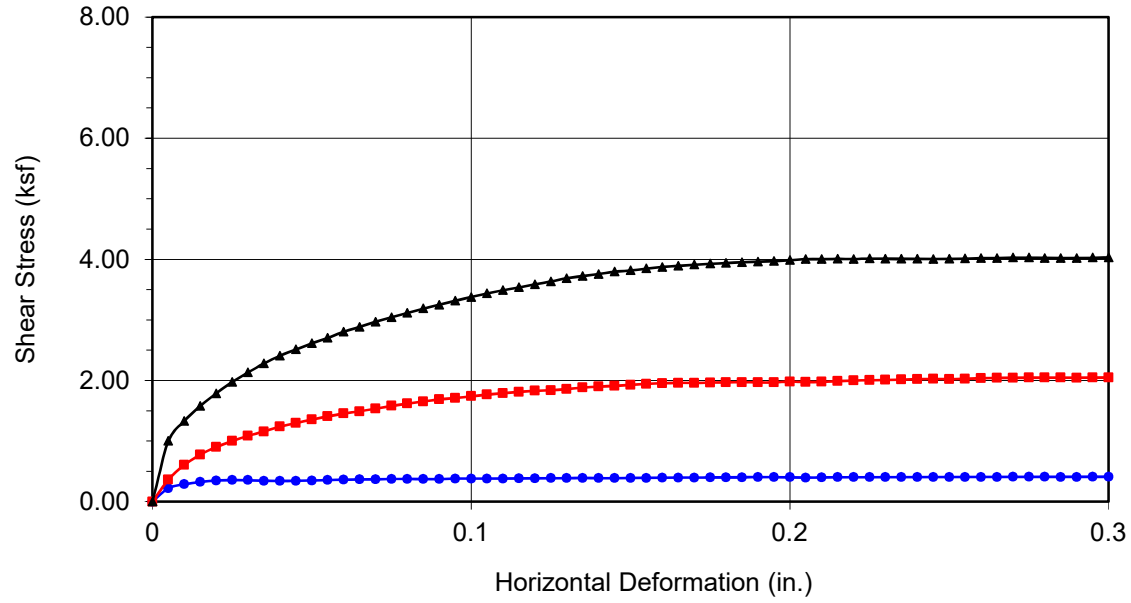
DIRECT SHEAR TEST RESULTS

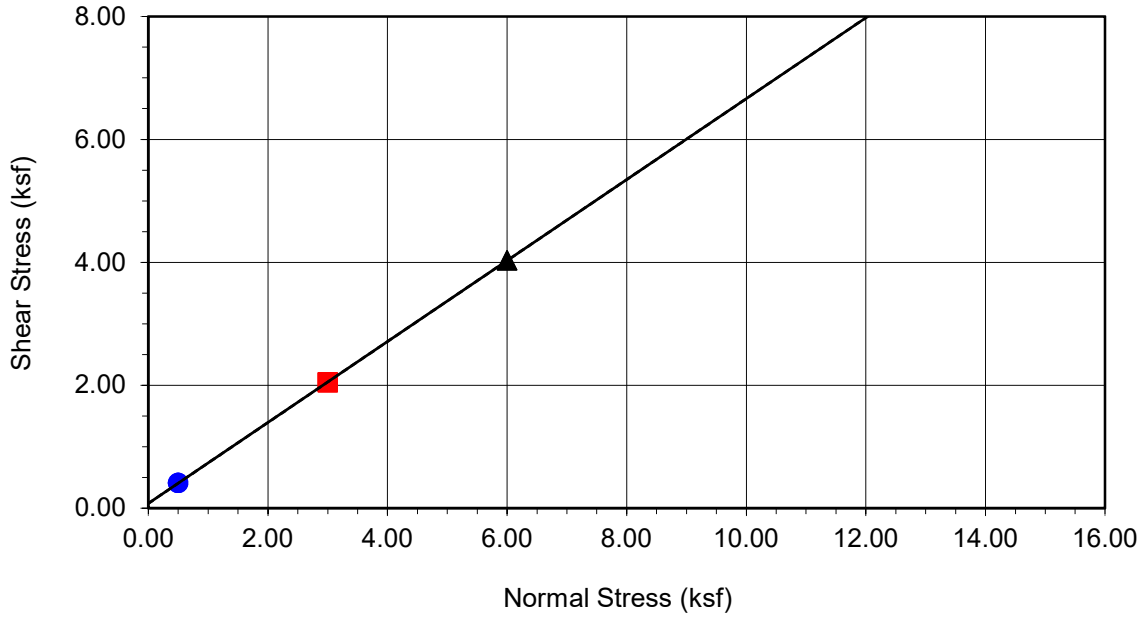
Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

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Boring No.	**LB-1**
Sample No.	**B-1**
Depth (ft)	**0-5**
Sample Type:	90% Remold
Soil Identification:	Dark yellowish brown silty sand (SM)

Strength Parameters

	C (psf)	ϕ (°)
Peak	77	33
Ultimate	77	33

Normal Stress (kip/ft²)	0.500	3.000	6.000
Peak Shear Stress (kip/ft²)	● 0.409	■ 2.047	▲ 4.030
Shear Stress @ End of Test (ksf)	○ 0.409	□ 2.047	△ 4.030
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	7.11	7.11	7.11
Dry Density (pcf)	116.7	116.8	116.8
Saturation (%)	43.2	43.3	43.3
Soil Height Before Shearing (in.)	0.9941	0.9773	0.9625
Final Moisture Content (%)	12.7	11.4	11.1

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DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21

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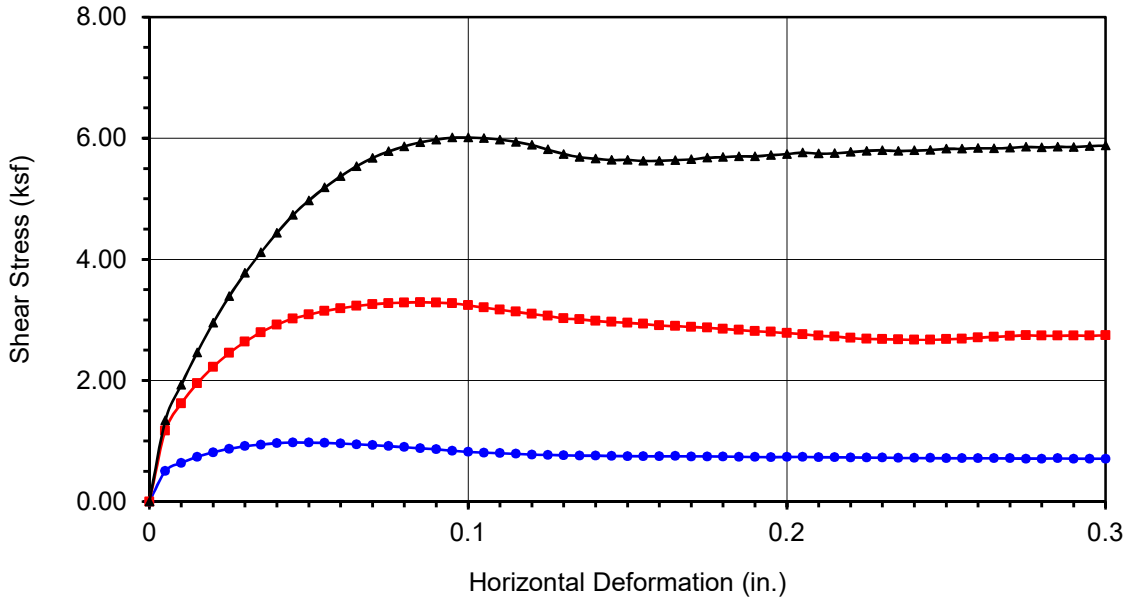
DIRECT SHEAR TEST

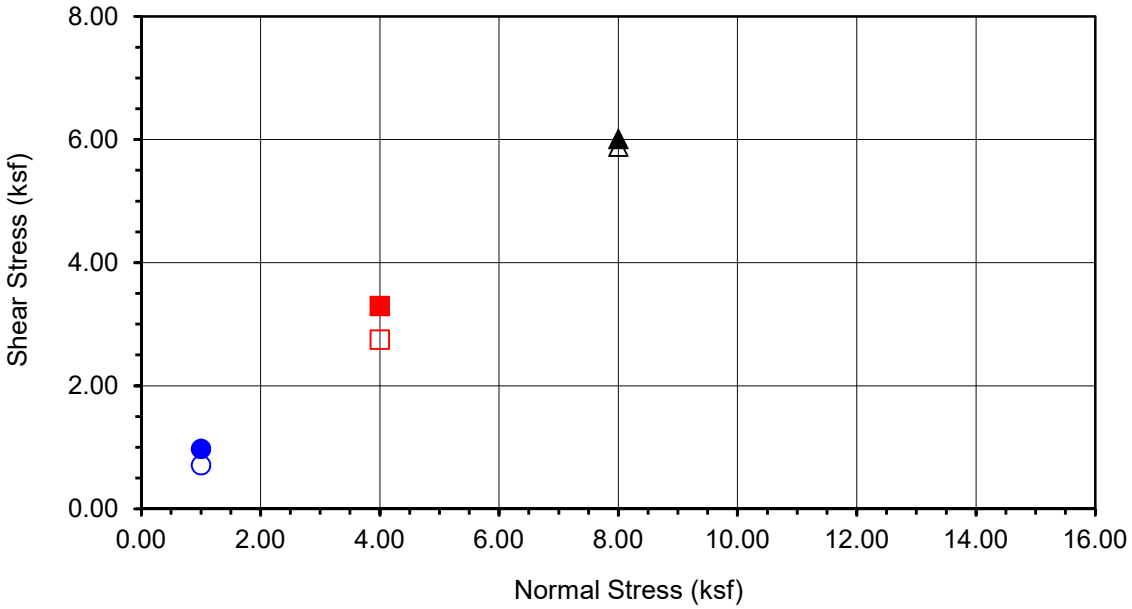
Consolidated Drained - ASTM D 3080

Project Name:	Rexford Bloomfield Ave.	Tested By:	G. Bathala	Date:	03/16/21
Project No.:	13062.001	Checked By:	J. Ward	Date:	04/01/21
Boring No.:	LB-1	Sample Type:	Ring		
Sample No.:	R-1	Depth (ft.):	5.0		

Soil Identification: Brown silty, clayey sand (SC-SM)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	209.51	213.10	213.34
Weight of Ring(gm):	44.78	45.55	44.73
Before Shearing			
Weight of Wet Sample+Cont.(gm):	238.20	238.20	238.20
Weight of Dry Sample+Cont.(gm):	222.26	222.26	222.26
Weight of Container(gm):	65.86	65.86	65.86
Vertical Rdg.(in): Initial	0.2609	0.2590	0.0000
Vertical Rdg.(in): Final	0.2670	0.2741	-0.0262
After Shearing			
Weight of Wet Sample+Cont.(gm):	232.39	243.55	234.55
Weight of Dry Sample+Cont.(gm):	214.95	227.73	219.52
Weight of Container(gm):	67.88	77.78	68.27
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**LB-1**
Sample No.	**R-1**
Depth (ft)	**5**
Sample Type:	
Ring	
Soil Identification:	
Brown silty, clayey sand (SC-SM)	

Normal Stress (kip/ft²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 0.975	■ 3.292	▲ 6.008
Shear Stress @ End of Test (ksf)	○ 0.707	□ 2.745	△ 5.879
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	10.19	10.19	10.19
Dry Density (pcf)	124.3	126.5	127.3
Saturation (%)	77.3	82.6	84.8
Soil Height Before Shearing (in.)	0.9939	0.9849	0.9738
Final Moisture Content (%)	11.9	10.6	9.9

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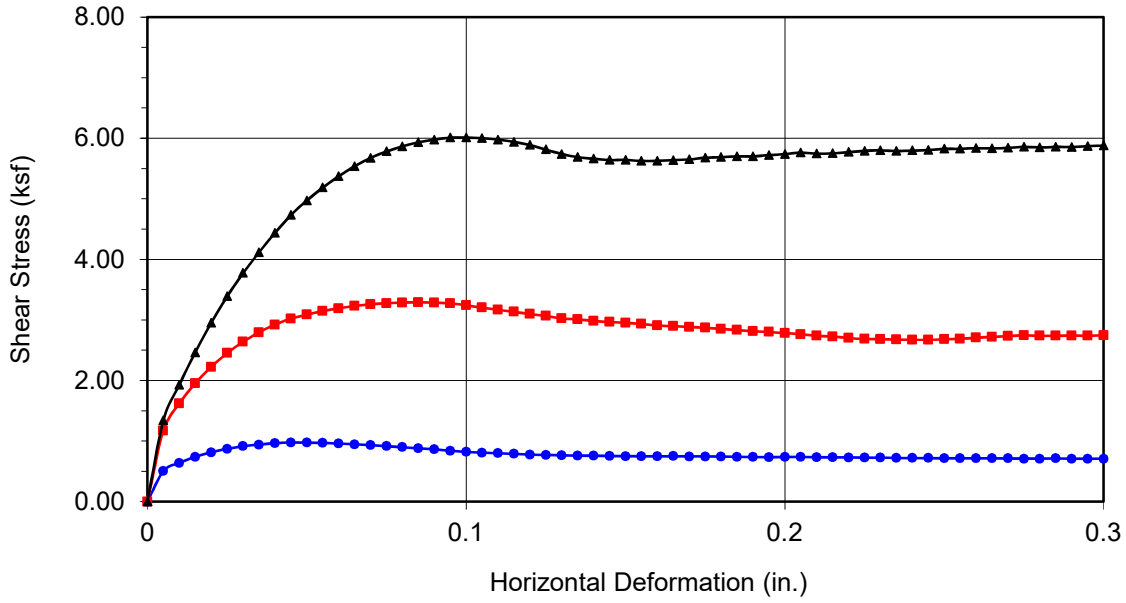
DIRECT SHEAR TEST RESULTS

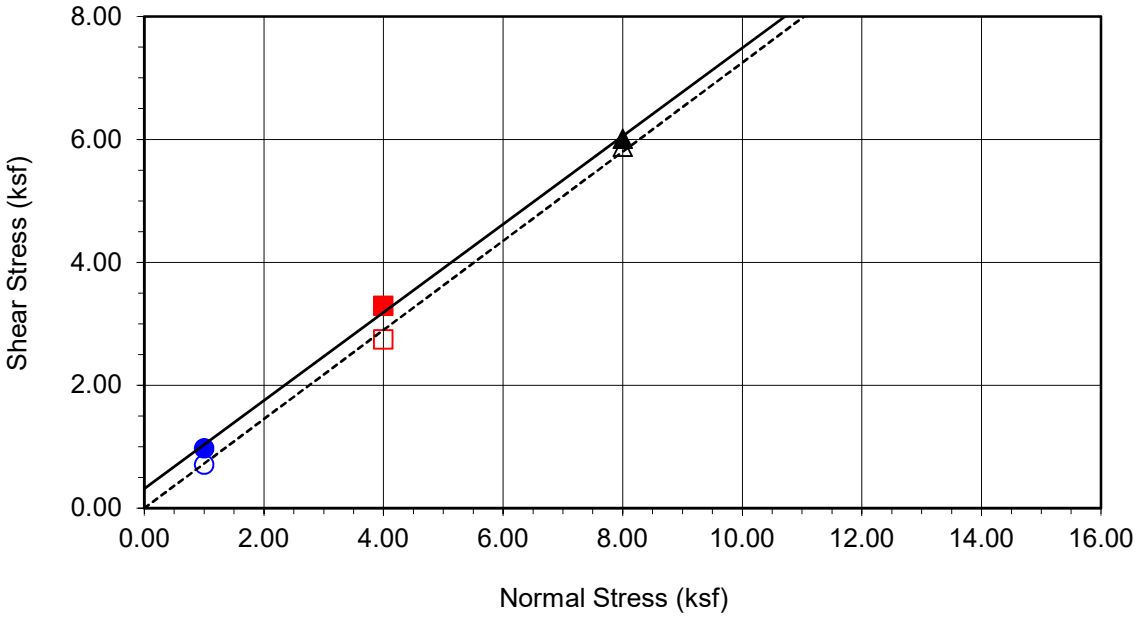
Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21





Boring No.	**LB-1**
Sample No.	**R-1**
Depth (ft)	**5**
Sample Type:	Ring
Soil Identification:	Brown silty, clayey sand (SC-SM)

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	319	36
Ultimate	0	36

Normal Stress (kip/ft²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 0.975	■ 3.292	▲ 6.008
Shear Stress @ End of Test (ksf)	○ 0.707	□ 2.745	△ 5.879
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	10.19	10.19	10.19
Dry Density (pcf)	124.3	126.5	127.3
Saturation (%)	77.3	82.6	84.8
Soil Height Before Shearing (in.)	0.9939	0.9849	0.9738
Final Moisture Content (%)	11.9	10.6	9.9

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DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21

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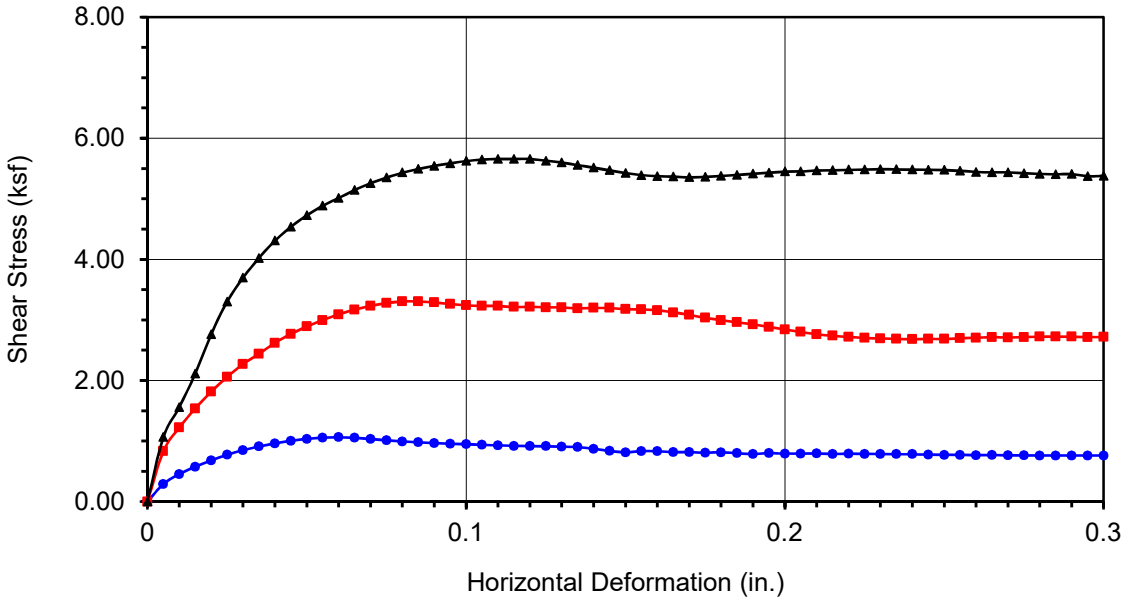
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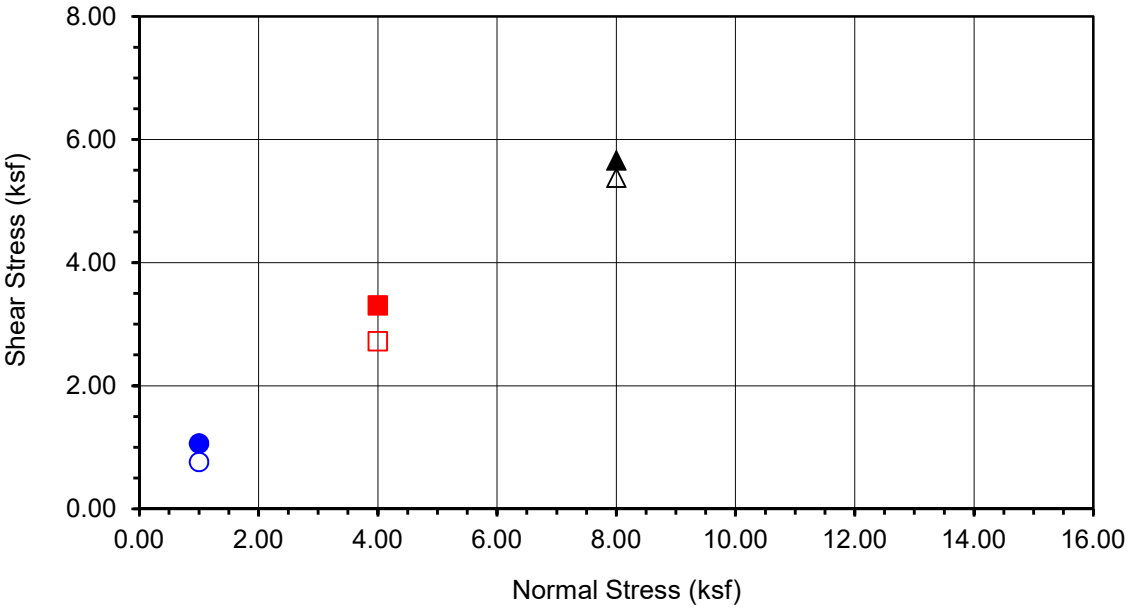
Consolidated Drained - ASTM D 3080

Project Name:	Rexford Bloomfield Ave.	Tested By:	G. Bathala	Date:	03/17/21
Project No.:	13062.001	Checked By:	J. Ward	Date:	04/01/21
Boring No.:	LB-1	Sample Type:	Ring		
Sample No.:	R-2	Depth (ft.):	15.0		

Soil Identification: Light olive brown silt (ML)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	172.09	176.03	174.80
Weight of Ring(gm):	42.45	45.61	43.15
Before Shearing			
Weight of Wet Sample+Cont.(gm):	174.67	174.67	174.67
Weight of Dry Sample+Cont.(gm):	166.81	166.81	166.81
Weight of Container(gm):	65.76	65.76	65.76
Vertical Rdg.(in): Initial	0.2356	0.2233	0.0000
Vertical Rdg.(in): Final	0.2432	0.2404	-0.0378
After Shearing			
Weight of Wet Sample+Cont.(gm):	205.01	171.69	222.75
Weight of Dry Sample+Cont.(gm):	177.57	149.71	196.10
Weight of Container(gm):	60.90	57.18	77.78
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**LB-1**
Sample No.	**R-2**
Depth (ft)	**15**
Sample Type: Ring	
Soil Identification: Light olive brown silt (ML)	

Normal Stress (kip/ft²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.063	■ 3.304	▲ 5.656
Shear Stress @ End of Test (ksf)	○ 0.761	□ 2.719	△ 5.379
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	7.78	7.78	7.78
Dry Density (pcf)	100.0	100.6	101.6
Saturation (%)	30.7	31.1	31.9
Soil Height Before Shearing (in.)	0.9924	0.9829	0.9622
Final Moisture Content (%)	23.5	23.8	22.5

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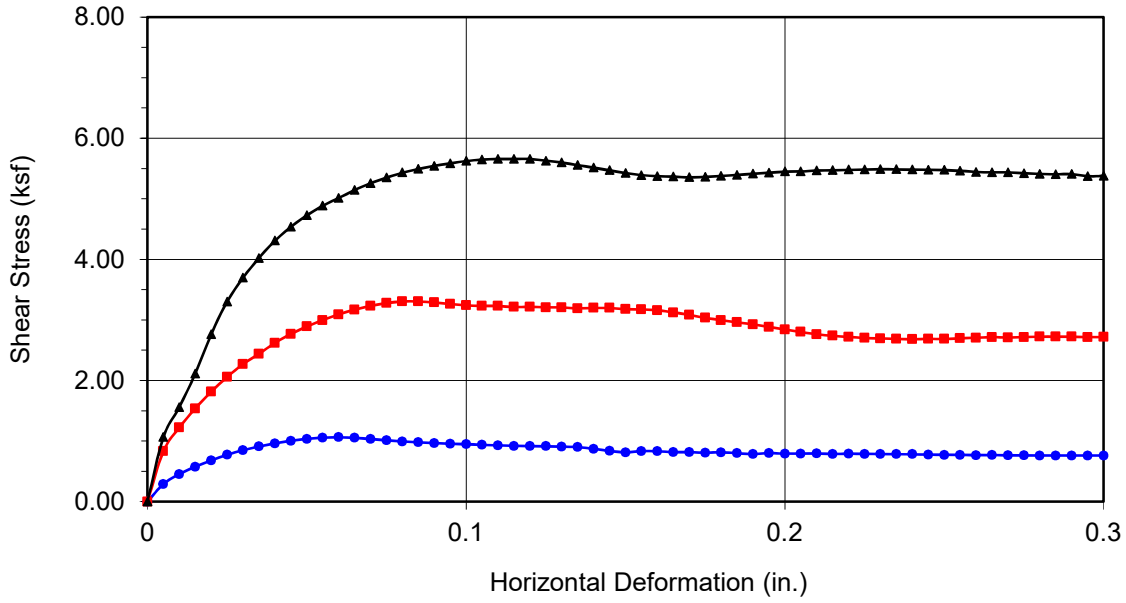
DIRECT SHEAR TEST RESULTS

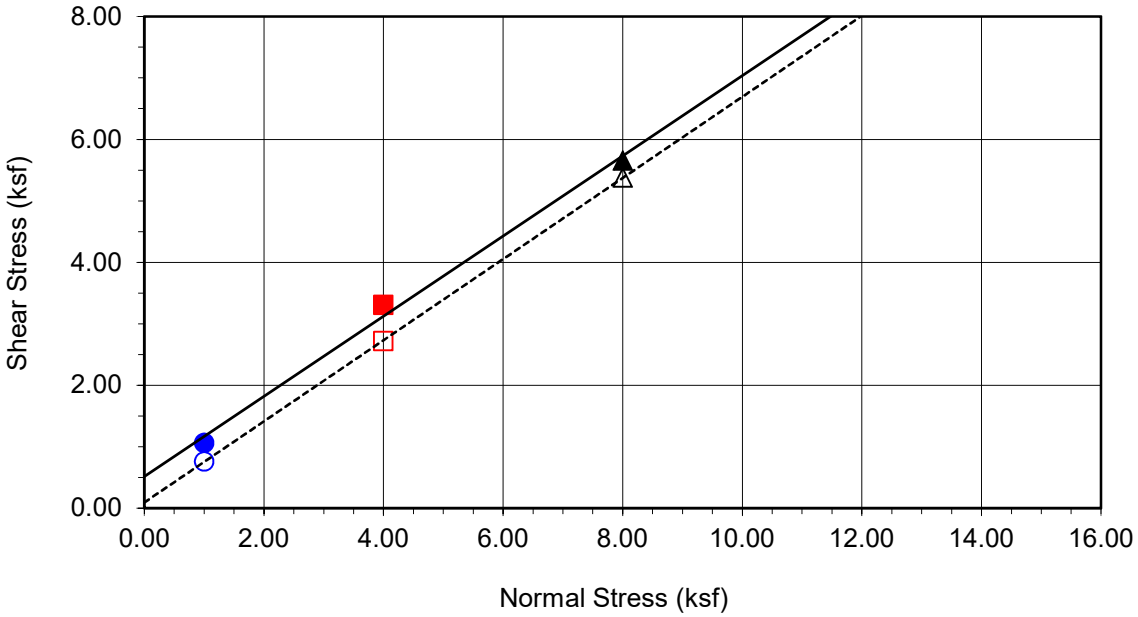
Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21





Boring No.	**LB-1**
Sample No.	**R-2**
Depth (ft)	**15**
Sample Type:	Ring
Soil Identification:	Light olive brown silt (ML)

Strength Parameters

	C (psf)	ϕ (°)
Peak	514	33
Ultimate	93	33

Normal Stress (kip/ft²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 1.063	■ 3.304	▲ 5.656
Shear Stress @ End of Test (ksf)	○ 0.761	□ 2.719	△ 5.379
Deformation Rate (in./min.)	0.0025	0.0025	0.0025
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	7.78	7.78	7.78
Dry Density (pcf)	100.0	100.6	101.6
Saturation (%)	30.7	31.1	31.9
Soil Height Before Shearing (in.)	0.9924	0.9829	0.9622
Final Moisture Content (%)	23.5	23.8	22.5

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DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

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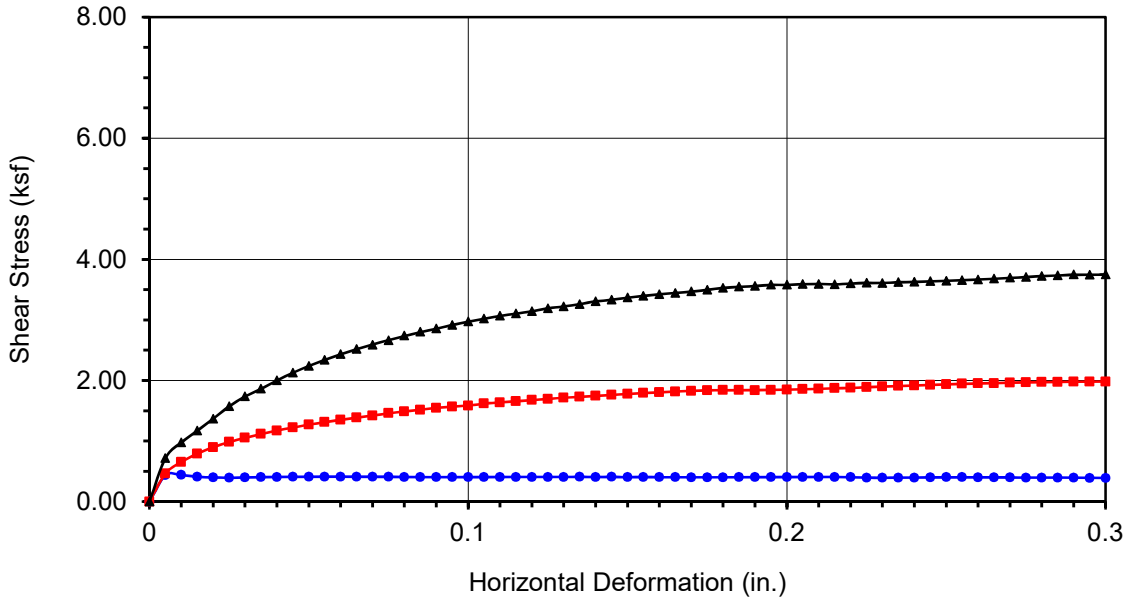
DIRECT SHEAR TEST

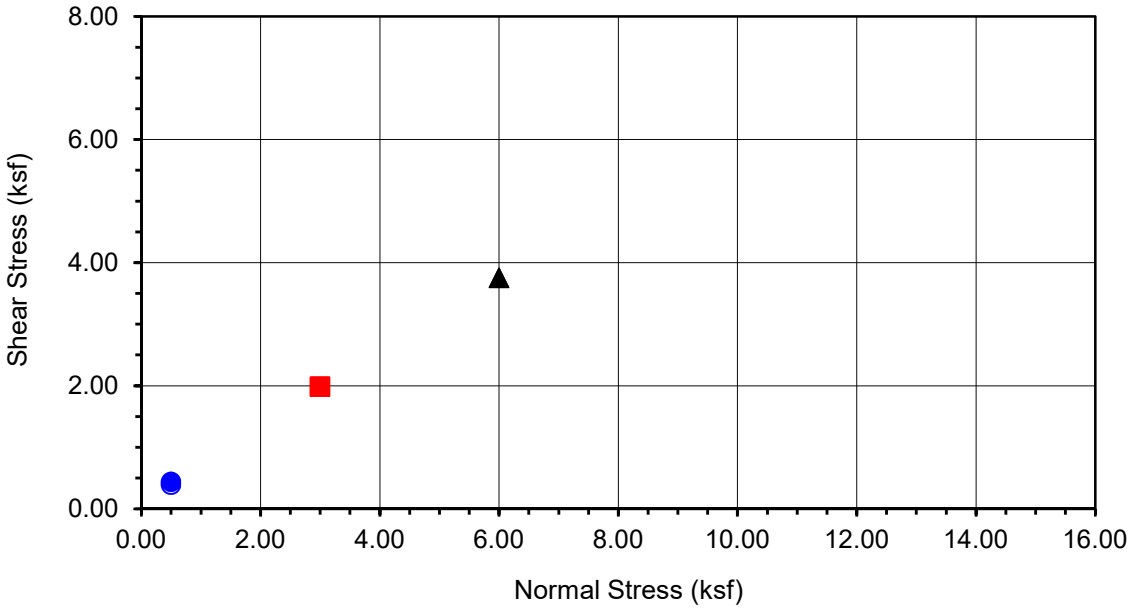
Consolidated Drained - ASTM D 3080

Project Name:	Rexford Bloomfield Ave.	Tested By:	G. Bathala	Date:	03/15/21
Project No.:	13062.001	Checked By:	J. Ward	Date:	04/02/21
Boring No.:	LB-5	Sample Type:	90% Remold		
Sample No.:	B-1	Depth (ft.):	0-5		

Soil Identification: Dark yellowish brown clayey sand (SC)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	197.18	197.48	196.43
Weight of Ring(gm):	45.37	45.46	45.70
Before Shearing			
Weight of Wet Sample+Cont.(gm):	207.30	207.30	207.30
Weight of Dry Sample+Cont.(gm):	195.05	195.05	195.05
Weight of Container(gm):	60.36	60.36	60.36
Vertical Rdg.(in): Initial	0.2584	0.2783	0.0000
Vertical Rdg.(in): Final	0.2577	0.2979	-0.0289
After Shearing			
Weight of Wet Sample+Cont.(gm):	219.94	225.37	209.92
Weight of Dry Sample+Cont.(gm):	198.64	206.00	191.87
Weight of Container(gm):	60.94	67.87	55.16
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**LB-5**
Sample No.	**B-1**
Depth (ft)	**0-5**
Sample Type: 90% Remold	
Soil Identification: Dark yellowish brown clayey sand (SC)	

Normal Stress (kip/ft²)	0.500	3.000	6.000
Peak Shear Stress (kip/ft²)	● 0.440	■ 1.981	▲ 3.751
Shear Stress @ End of Test (ksf)	○ 0.390	□ 1.981	△ 3.751
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.09	9.09	9.09
Dry Density (pcf)	115.7	115.9	114.9
Saturation (%)	53.8	54.0	52.6
Soil Height Before Shearing (in.)	1.0007	0.9804	0.9711
Final Moisture Content (%)	15.5	14.0	13.2

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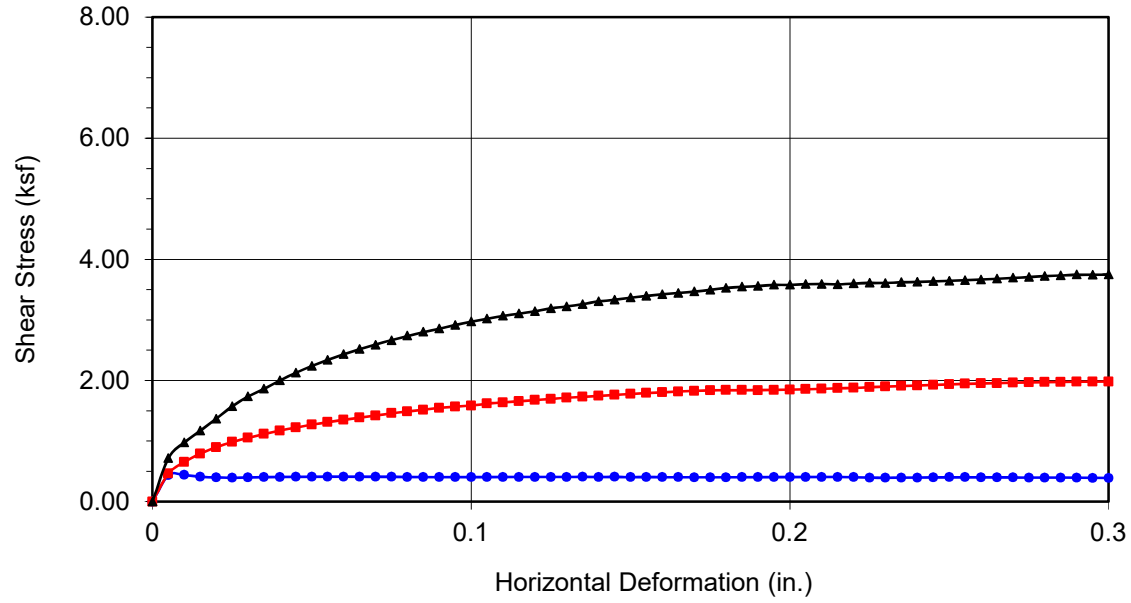
DIRECT SHEAR TEST RESULTS

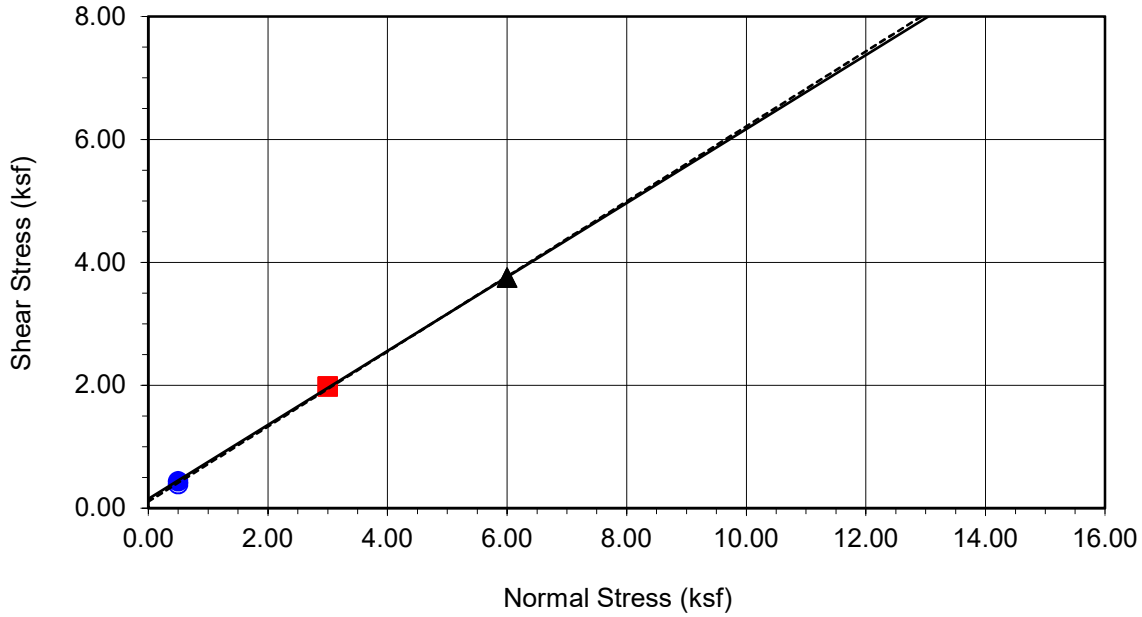
Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21





Boring No.	**LB-5**
Sample No.	**B-1**
Depth (ft)	**0-5**
Sample Type:	90% Remold
Soil Identification:	Dark yellowish brown clayey sand (SC)

Strength Parameters

	C (psf)	ϕ (°)
Peak	152	31
Ultimate	108	31

Normal Stress (kip/ft²)	0.500	3.000	6.000
Peak Shear Stress (kip/ft²)	● 0.440	■ 1.981	▲ 3.751
Shear Stress @ End of Test (ksf)	○ 0.390	□ 1.981	△ 3.751
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	9.09	9.09	9.09
Dry Density (pcf)	115.7	115.9	114.9
Saturation (%)	53.8	54.0	52.6
Soil Height Before Shearing (in.)	1.0007	0.9804	0.9711
Final Moisture Content (%)	15.5	14.0	13.2

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DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21

Leighton

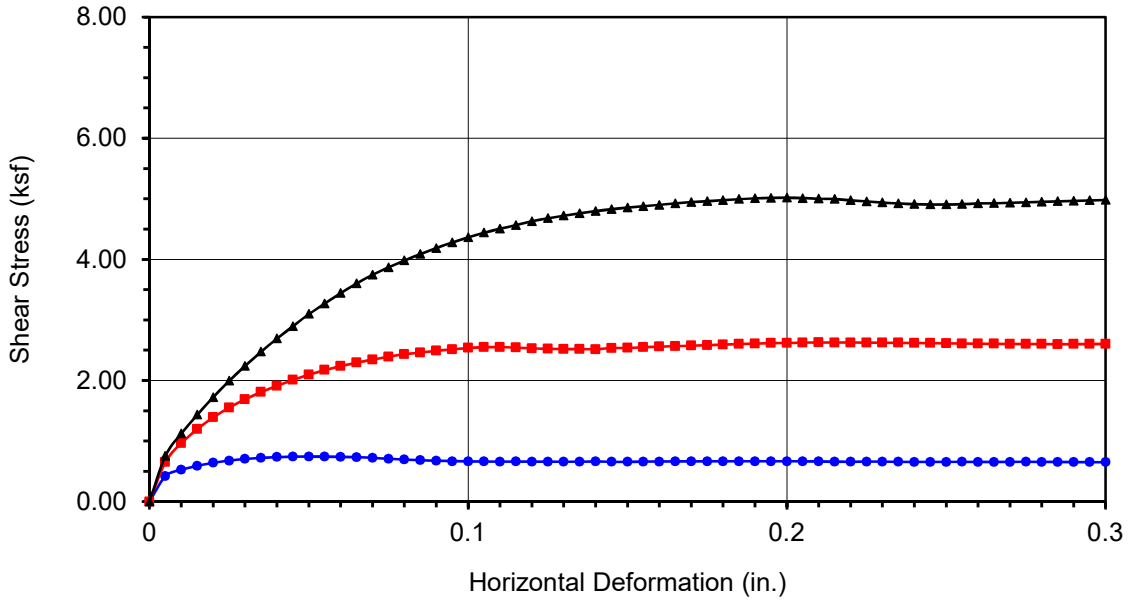
DIRECT SHEAR TEST

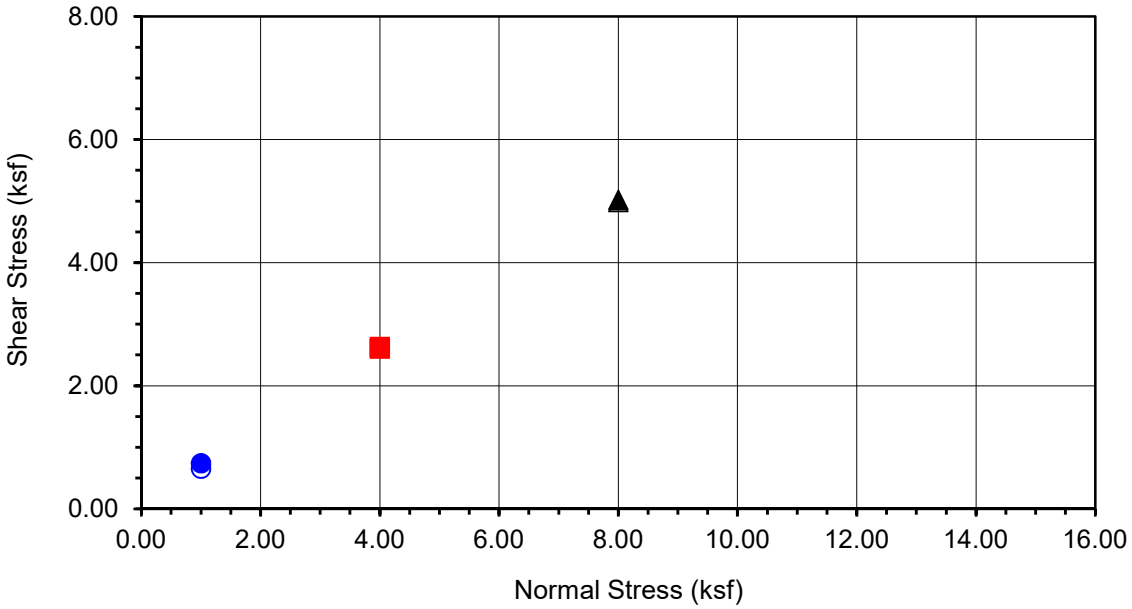
Consolidated Drained - ASTM D 3080

Project Name:	Rexford Bloomfield Ave.	Tested By:	G. Bathala	Date:	03/17/21
Project No.:	13062.001	Checked By:	J. Ward	Date:	04/01/21
Boring No.:	LB-5	Sample Type:	Ring		
Sample No.:	R-1	Depth (ft.):	5.0		

Soil Identification: Yellowish brown clayey sand (SC)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	194.52	193.15	201.08
Weight of Ring(gm):	45.78	42.21	45.74
Before Shearing			
Weight of Wet Sample+Cont.(gm):	201.23	201.23	201.23
Weight of Dry Sample+Cont.(gm):	188.06	188.06	188.06
Weight of Container(gm):	69.37	69.37	69.37
Vertical Rdg.(in): Initial	0.2735	0.2649	0.0000
Vertical Rdg.(in): Final	0.2805	0.2868	-0.0449
After Shearing			
Weight of Wet Sample+Cont.(gm):	222.35	215.31	219.72
Weight of Dry Sample+Cont.(gm):	199.46	195.23	201.09
Weight of Container(gm):	67.90	61.37	64.67
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**LB-5**
Sample No.	**R-1**
Depth (ft)	**5**
Sample Type: Ring	
Soil Identification: Yellowish brown clayey sand (SC)	

Normal Stress (kip/ft²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 0.742	■ 2.628	▲ 5.017
Shear Stress @ End of Test (ksf)	○ 0.651	□ 2.603	△ 4.980
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.10	11.10	11.10
Dry Density (pcf)	111.3	113.0	116.3
Saturation (%)	58.3	60.9	66.6
Soil Height Before Shearing (in.)	0.9930	0.9781	0.9551
Final Moisture Content (%)	17.4	15.0	13.7

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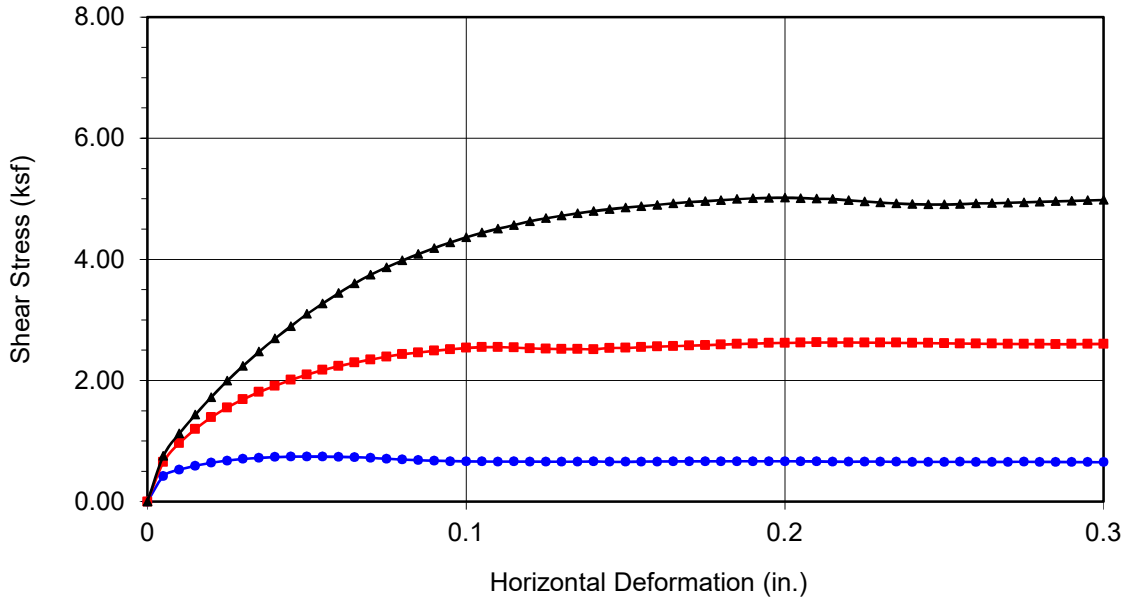
DIRECT SHEAR TEST RESULTS

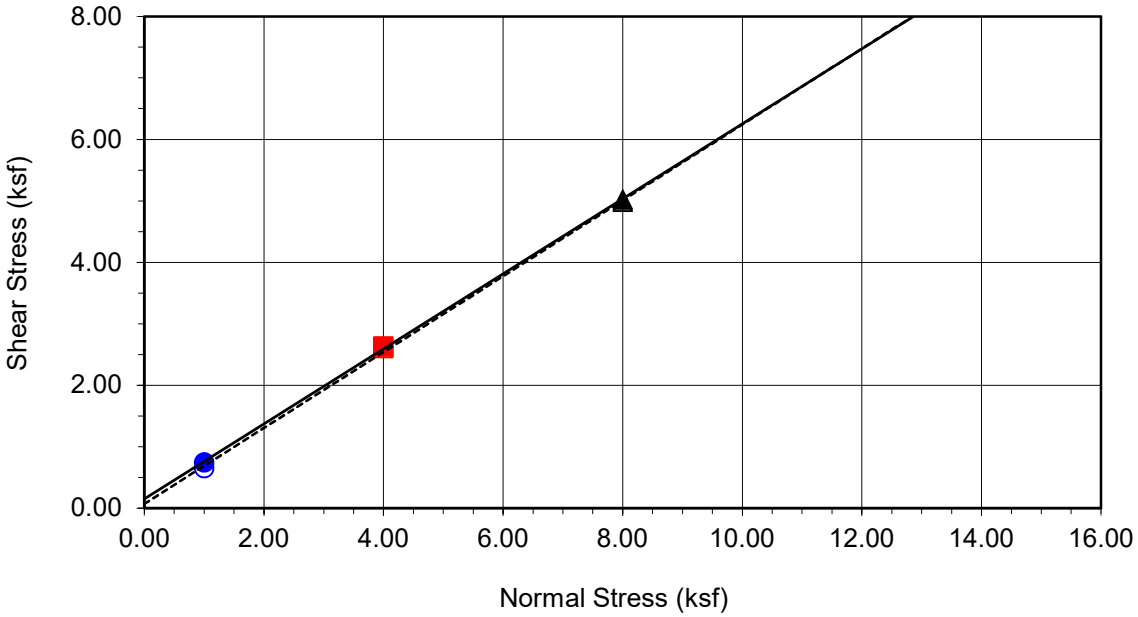
Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21





Boring No.	**LB-5**
Sample No.	**R-1**
Depth (ft)	**5**
Sample Type:	Ring
Soil Identification: Yellowish brown clayey sand (SC)	

Strength Parameters

	C (psf)	ϕ (°)
Peak	152	31
Ultimate	70	32

Normal Stress (kip/ft²)	1.000	4.000	8.000
Peak Shear Stress (kip/ft²)	● 0.742	■ 2.628	▲ 5.017
Shear Stress @ End of Test (ksf)	○ 0.651	□ 2.603	△ 4.980
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.10	11.10	11.10
Dry Density (pcf)	111.3	113.0	116.3
Saturation (%)	58.3	60.9	66.6
Soil Height Before Shearing (in.)	0.9930	0.9781	0.9551
Final Moisture Content (%)	17.4	15.0	13.7

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DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 13062.001

Rexford Bloomfield Ave.

03-21

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R-VALUE TEST RESULTS

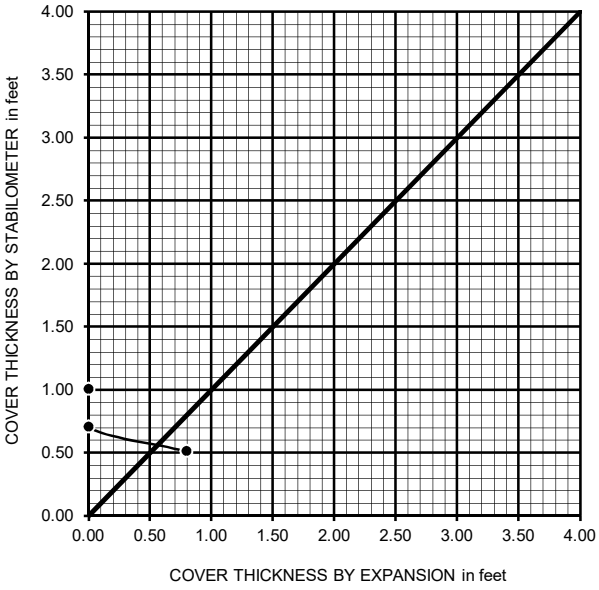
DOT CA Test 301

PROJECT NAME:	Rexford Bloomfield Ave.	PROJECT NUMBER:	13062.001
BORING NUMBER:	LB-1	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	A. Santos
SAMPLE DESCRIPTION:	Dark yellowish brown SM	DATE COMPLETED:	3/25/2021

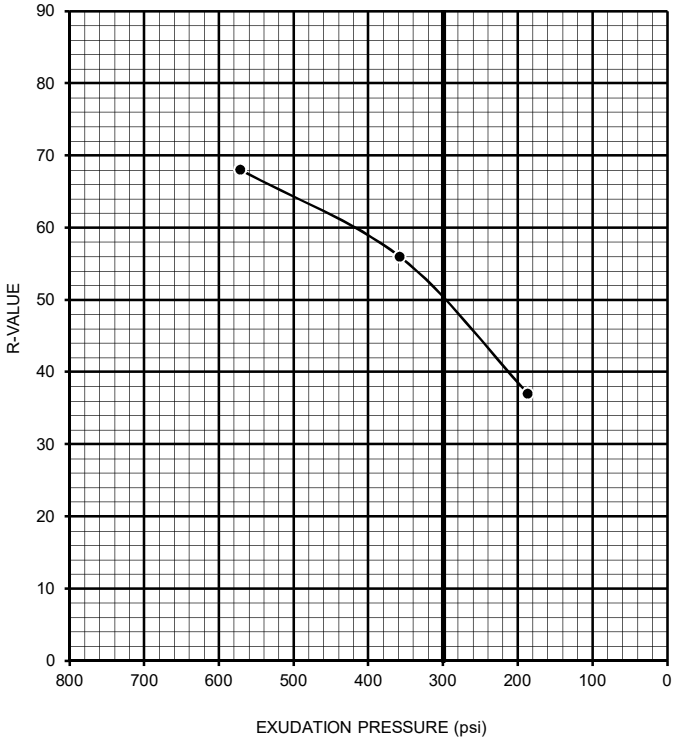
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	9.4	10.2	10.7
HEIGHT OF SAMPLE, Inches	2.30	2.53	2.40
DRY DENSITY, pcf	129.1	123.6	128.2
COMPACTOR PRESSURE, psi	200	150	100
EXUDATION PRESSURE, psi	571	358	187
EXPANSION, Inches x 10exp-4	24	0	0
STABILITY Ph 2,000 lbs (160 psi)	28	45	68
TURNS DISPLACEMENT	4.50	5.10	5.25
R-VALUE UNCORRECTED	72	56	39
R-VALUE CORRECTED	68	56	37

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.51	0.70	1.01
EXPANSION PRESSURE THICKNESS, ft.	0.80	0.00	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	65
R-VALUE BY EXUDATION:	50
EQUILIBRIUM R-VALUE:	50

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R-VALUE TEST RESULTS

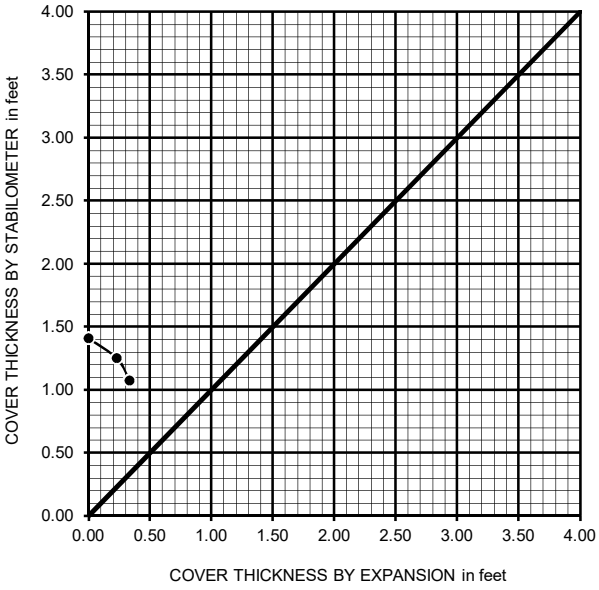
DOT CA Test 301

PROJECT NAME:	Rexford Bloomfield Ave.	PROJECT NUMBER:	13062.001
BORING NUMBER:	LB-5	DEPTH (FT.):	0-5
SAMPLE NUMBER:	B-1	TECHNICIAN:	O. Figueroa
SAMPLE DESCRIPTION:	Dark yellowish brown SC	DATE COMPLETED:	3/19/2021

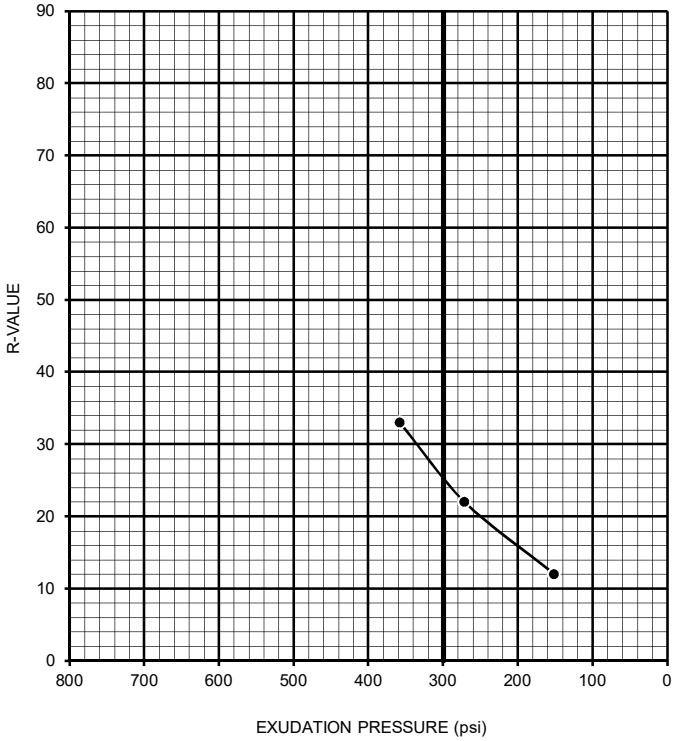
TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	11.8	12.3	13.2
HEIGHT OF SAMPLE, Inches	2.46	2.50	2.56
DRY DENSITY, pcf	126.6	124.9	122.7
COMPACTOR PRESSURE, psi	125	80	60
EXUDATION PRESSURE, psi	358	271	151
EXPANSION, Inches x 10exp-4	10	7	0
STABILITY Ph 2,000 lbs (160 psi)	82	102	124
TURNS DISPLACEMENT	4.90	5.00	5.10
R-VALUE UNCORRECTED	33	22	12
R-VALUE CORRECTED	33	22	12

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	1.07	1.25	1.41
EXPANSION PRESSURE THICKNESS, ft.	0.33	0.23	0.00

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	66
R-VALUE BY EXUDATION:	25
EQUILIBRIUM R-VALUE:	25

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TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Rexford Bloomfield Ave. Tested By : ACS/GEB/GB Date: 03/21/21

Project No. : 13062.001 Checked By: J. Ward Date: 04/02/21

Boring No.	LB-1	LB-5		
Sample No.	B-1	B-1		
Sample Depth (ft)	0-5	0-5		
Soil Identification:	Dark yellowish brown SM	Dark yellowish brown SC		
Wet Weight of Soil + Container (g)	0.00	0.00		
Dry Weight of Soil + Container (g)	0.00	0.00		
Weight of Container (g)	1.00	1.00		
Moisture Content (%)	0.00	0.00		
Weight of Soaked Soil (g)	100.40	100.10		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	16	92		
Crucible No.	16	17		
Furnace Temperature (°C)	860	860		
Time In / Time Out	8:45/9:30	8:45/9:30		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	18.4709	22.2161		
Wt. of Crucible (g)	18.4697	22.2153		
Wt. of Residue (g) (A)	0.0012	0.0008		
PPM of Sulfate (A) x 41150	49.38	32.92		
PPM of Sulfate, Dry Weight Basis	**49**	**33**		

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30	30		
ml of AgNO3 Soln. Used in Titration (C)	1.1	0.8		
PPM of Chloride (C -0.2) * 100 * 30 / B	90	60		
PPM of Chloride, Dry Wt. Basis	**90**	**60**		

pH TEST, DOT California Test 643

pH Value	**7.93**	**7.66**		
Temperature °C	22.4	22.6		

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SOIL RESISTIVITY TEST

DOT CA TEST 643

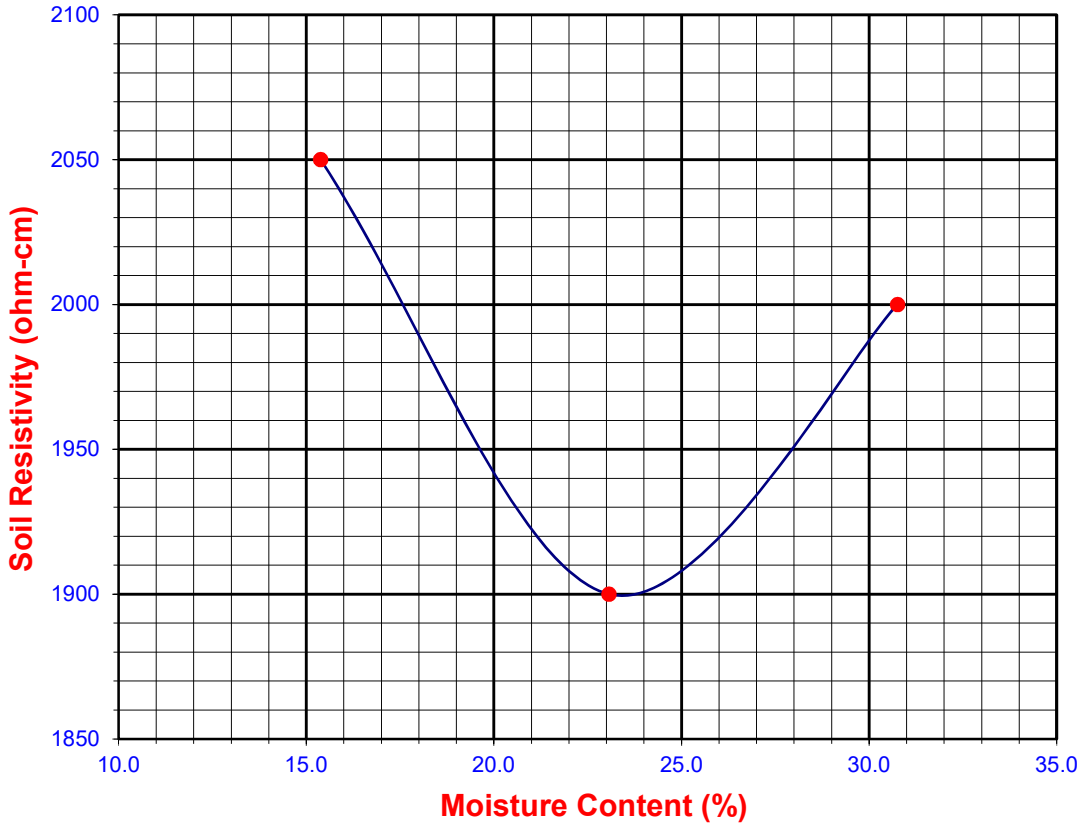
Project Name:	Rexford Bloomfield Ave.		Tested By :	Y. Nguyen	Date: 03/24/21
Project No. :	13062.001		Checked By:	J. Ward	Date: 04/02/21
Boring No.:	LB-1		Depth (ft.) :	0-5	
Sample No. :	B-1				
Soil Identification:*	Dark yellowish brown SM				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	15.38	2050	2050
2	30	23.07	1900	1900
3	40	30.76	2000	2000
4				
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	0.00
Dry Wt. of Soil + Cont. (g)	0.00
Wt. of Container (g)	1.00
Container No.	
Initial Soil Wt. (g) (Wt)	130.03
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
1900	**23.4**	**49**	**90**	**7.93**	**22.4**



Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Rexford Bloomfield Ave.		Tested By :	Y. Nguyen	Date: 03/24/21
Project No. :	13062.001		Checked By:	J. Ward	Date: 04/02/21
Boring No.:	LB-5		Depth (ft.) :	0-5	
Sample No. :	B-1				

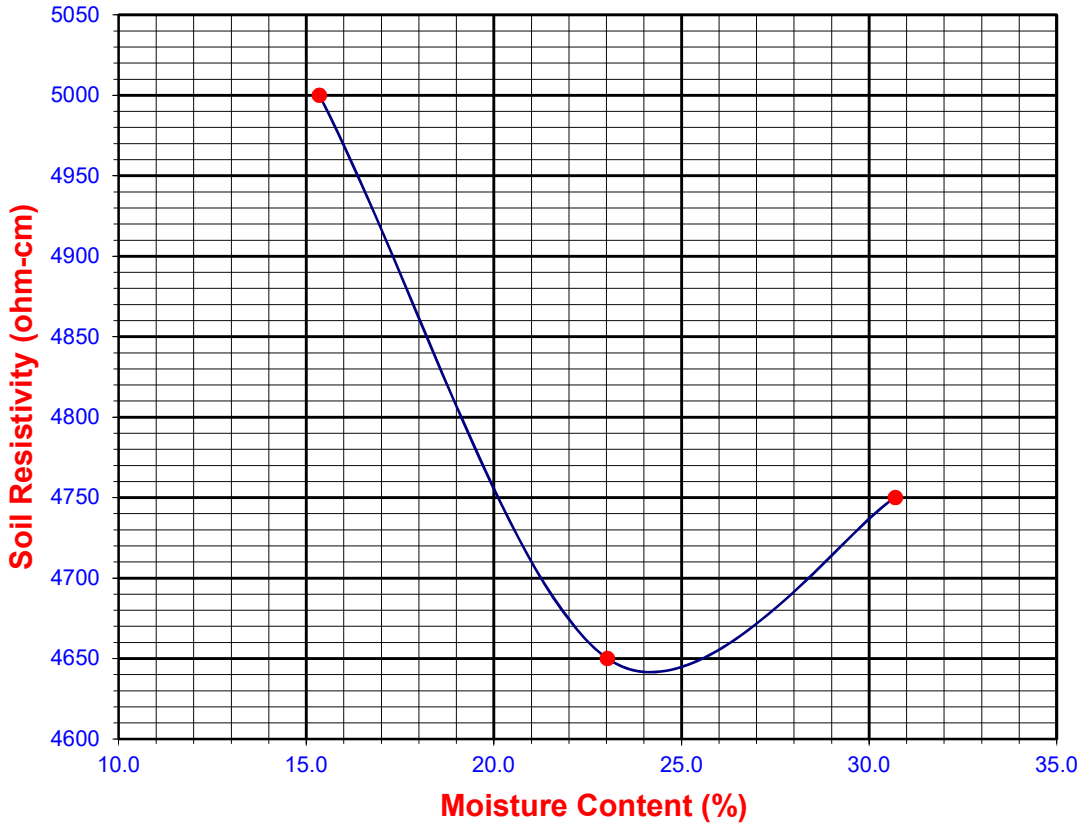
Soil Identification:* Dark yellowish brown SC

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	15.35	5000	5000
2	30	23.03	4650	4650
3	40	30.70	4750	4750
4				
5				

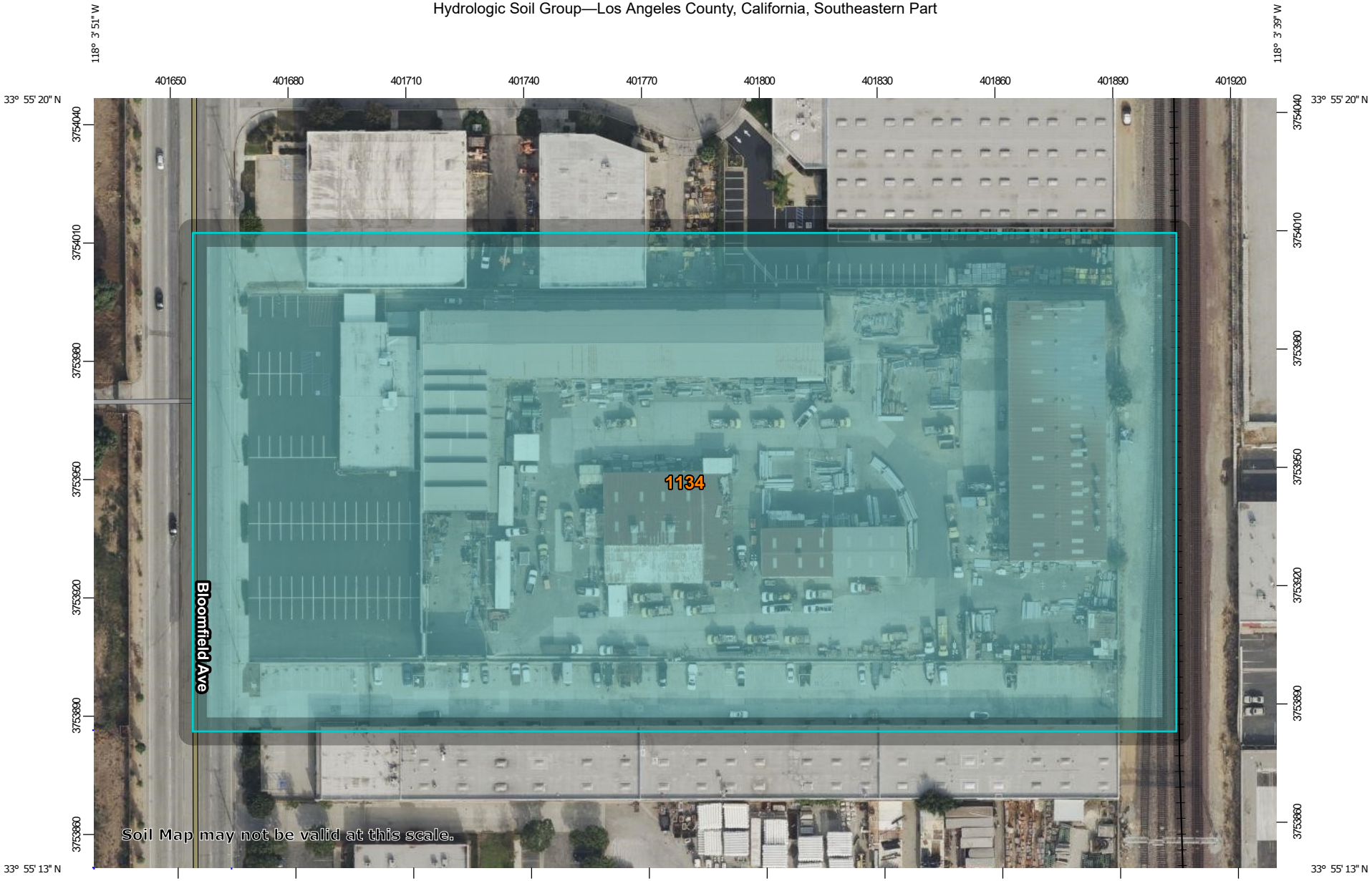
Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	0.00
Dry Wt. of Soil + Cont. (g)	0.00
Wt. of Container (g)	1.00
Container No.	
Initial Soil Wt. (g) (Wt)	130.28
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
4640	**24.2**	**33**	**60**	**7.66**	**22.6**



Appendix D

Web Soil Survey



Map Scale: 1:1,380 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Los Angeles County, California, Southeastern Part
Survey Area Data: Version 8, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 19, 2020—Dec 5, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1134	Urban land-Thums-Pierview complex, 0 to 5 percent slopes	C	7.9	100.0%
Totals for Area of Interest			**7.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

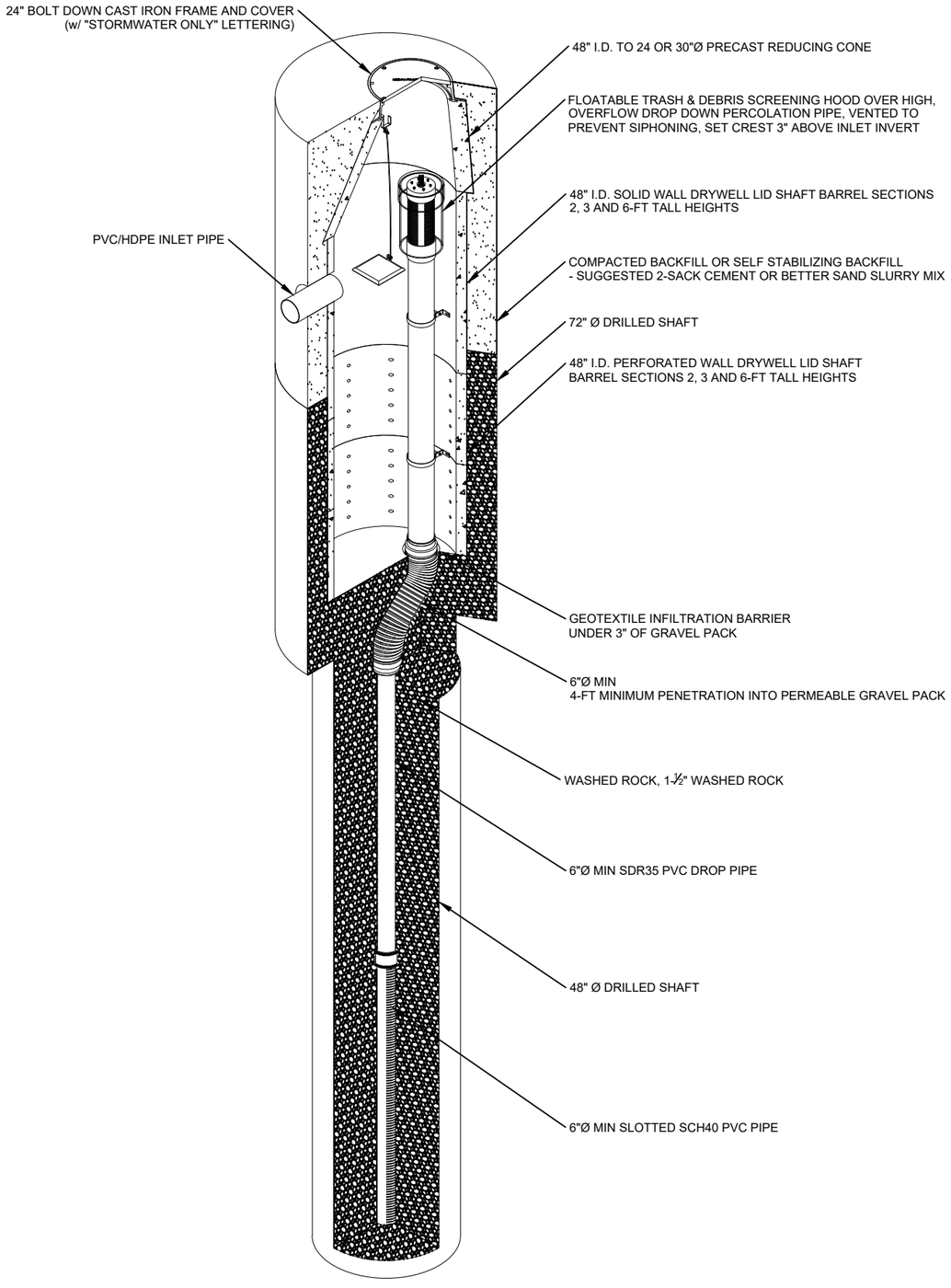
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix E

Dry Well Details



DRYWELL, LID INFILTRATION SHAFT

SEE DETAILS, SHEET 2

STORMVAULT DRYWELL - LID INFILTRATION SHAFTING

MODEL: SVDW-48, SINGLE DRYWELL LID SHAFT

HYDRAULIC INFILTRATION CAPACITY:

1. INFILTRATION CAPACITY OF A GIVEN DRYWELL IS PRIMARILY DETERMINED BY THE SITE SPECIFIC SOIL CHARACTERISTICS AT A GIVEN INSTALLATION AND THE SURFACE AREA OF THE DRILLED SHAFT.
2. THE PERFORATIONS OF THE LINER AND SLOTTED INFILTRATION PIPING ARE SECONDARY, NON-GOVERNING FACTORS IN DETERMINING THE INFILTRATION CAPACITY OF AN INDIVIDUAL DRYWELL.

SIZING:

1. AN EXCELL BASED DRYWELL DESIGN WORKSHEET IS AVAILABLE FOR DOWNLOAD FROM JENSEN'S WEBSITE, SEE THE DRYWELL INFILTRATION SYSTEMS SECTION OF https://www.jensenprecast.com/water-resources/stormwater/. THIS DRYWELL DESIGN WORKSHEET IS TO BE USED IN COMBINATION WITH SITE SPECIFIC GEOTECHNICAL REPORT THAT EXPLICITLY PROVIDES INFILTRATION DESIGN PARAMETERS OF THE IN-SITU SUBSOIL STRATUMS SUCH AS PERMEABILITY VALUES IN UNITS OF INCHES PER HOUR (IN/HR). REGIONAL INFILTRATION GUIDELINES AND REGULATIONS SHALL GOVERN FINAL DRYWELL DESIGN.
2. MORE SITE SPECIFIC DETAILS ARE AVAILABLE UPON REQUEST.

PRETREATMENT NOTES:

1. PRETREATMENT SHOULD BE CONSIDERED TO ADDRESS CONCERNS FOR THE FOLLOWING WATER QUALITY CONSTITUENTS:
   - FINE AND COARSE SOLIDS AND TOTAL SUSPENDED SOLIDS
   - OIL AND GREASE ABSORBENT
   - OIL FLOATATION
   - COARSE SCREENING OF TRASH AND DEBRIS
2. THE DRYWELL CHAMBER OF THIS UNIT HAS SOME INHERENT TREATMENT CAPACITY FOR SEDIMENTATION AND FLOATATION ALONG WITH DEPLOYMENT OF SORBENT MATS FOR THE CAPTURE OF OIL AND GREASES.
3. PRETREATMENT: JENSEN OFFERS A WIDE RANGE OF WATER TREATMENT SYSTEMS TO PROVIDE PRETREATMENT PRIOR TO INFILTRATION. PRETREATMENT CONSIDERATIONS START WITH A SIMPLE WATER QUALITY MANHOLE FOR SEDIMENTATION AND FLOATATION THROUGH BAFFLE PIPING AS WELL AS DIRECT SCREENING OF NEUTRALLY BUOYANT DEBRIS. MORE ADVANCED PRETREATMENT SYSTEMS AVAILABLE FROM JENSEN STORMWATER INCLUDE JENSEN DEFLECTIVE SEPARATOR, JENSEN HIGH VELOCITY INTERCEPTOR, SAND/OIL AND GREASE INTERCEPTORS, TRUE COALESCING MEDIA AND PLATE SYSTEMS AS WELL AS PHYSICAL AND/OR CATIONIC EXCHANGE FILTRATION OF SOLIDS OR TARGETED DISSOLVED HEAVY METALS, NUTRIENTS AND BACTERIA.

GENERAL NOTES:

1. THIS LAYOUT SKETCH IS PROVIDED IN A SCHEMATIC FORMAT.
2. PLAN VIEW WITH FRAMES AND COVERS ARE NOT SHOWN FOR CLARITY.
3. OIL SORBENT MATS TO BE EQUIPPED WITH RETAINING CORD AND RING, SECURED TO OR UNDER FRAME AND COVER FOR HAND ACCESS INSTALLED BY CONTRACTOR.
4. DESIGN LOAD: H-20 TRAFFIC PER AASHTO LOADING METHODS.
5. CONTACT JENSEN PRECAST FOR OTHER INSTALLATION DEPTHS, INLET/OUTLET CONFIGURATIONS, AND/OR LOADING CONDITIONS FOR STRUCTURAL DESIGN REVISION TO MEET PROJECT SPECIFIC NEEDS.

CONSTRUCTION NOTES:

1. CONTRACTOR TO VERIFY VERTICAL DIMENSIONS OF ALL PRECAST PIECES IN FIELD.
2. VERIFY BASE MATERIAL ELEVATIONS BEFORE PLACING PRECAST COMPONENTS OR BACKFILLING.
3. APPLY BUTYL MASTIC AND/OR GROUT TO SEAL JOINTS OF MANHOLE AND DRYWELL JOINTS.
4. APPLY LOAD TO MASTIC SEAL IN JOINTS OF PRECAST MANHOLE AND DRYWELL SECTIONS TO COMPRESS SEALANT IF NECESSARY.
5. PRECAST MANHOLE AND DRYWELL SECTIONS TO BE SET IN THE CENTER OF THE DRILLED SHAFT.

MATERIALS:

1. ALL DIMENSIONS ARE IN FEET OR FRACTIONAL INCHES.
2. PRECAST MATERIALS AND MANUFACTURING METHODS OF CONES AND CYLINDERS REINFORCED TO CONFORM TO AASHTO LOADING METHODS.
3. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH F'c = 3,000-psi AT 28-DAYS.
4. THE PORTLAND CEMENT USED IN THE PRECAST SECTION SHALL MEET THE REQUIREMENTS OF TYPE II/V HIGH SULFATE RESISTANT CEMENT IN ACCORDANCE WITH ASTM CLASS M C-150.
5. GEOTEXTILE BARRIER SHALL BE 4-OUNCE NON-WOVEN FABRIC.

LIFTING WEIGHTS:

1. HEAVIEST PICK WEIGHT IS 3,600-LBS
2. JENSEN CRANE TRUCK CAN SET A MAXIMUM OF 25,000-LBS AT 15-FT OFFSET DISTANCE FROM CENTER OF CRANE TRUNNION.

48in Dia Drywell.idw

DISCLAIMERS, INCLUDING BUT NOT LIMITED TO:

1.) All elevations have been provided by others, and have not been verified by Jensen Precast. Contractor to verify all dimensions and elevations in field prior to installation.
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JENSEN STORMWATER SYSTEMS
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(855) 468-5600

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PROJECT NAME

CITY, STATE

PART NUMBER:	48in Drywell with Half Cut for ISO	DRAWN BY:	T. Handke
CREATED:		MODIFIED:	7/28/2021

REV:

SHEET: 1 OF 2

STORMVAULT DRYWELL - LID INFILTRATION SHAFTING

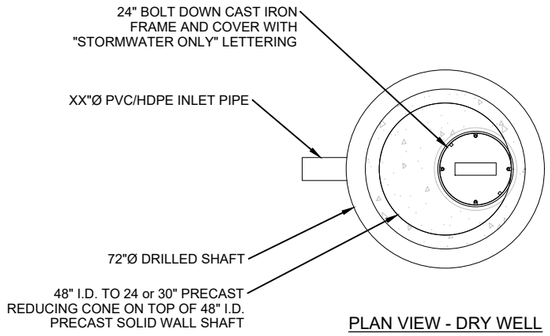
MODEL: SVDW-48, SINGLE DRYWELL LID SHAFT

STORMVAULT DRYWELL LID INFILTRATION DIMENSION TABLE

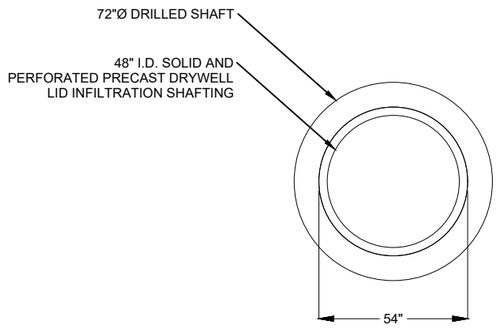
LABEL	A	B	C	D	E	F	G	H	I	J
DESCRIPTION & UNITS	DRYWELL'S TOTAL DEPTH (XX'-XX")	DEPTH OF 72-IN Ø DRILLED SHAFT (XX'-XX")	DEPTH OF 48-IN Ø DRILLED SHAFT (XX'-XX")	STORMVAULT DRYWELL HEIGHT (XX'-XX")	DEPTH TO INLET PIPE INVERT (XX'-XX")	STORMVAULT DRYWELL DEPTH BELOW INLET INVERT (XX'-XX")	INLET PIPE DIAMETER & TYPE SDR 35 PVC	DIAMETER OF PVC OVERFLOW DROP PIPE (XX")	DIAMETER Ø OF SDR-35 OVERFLOW DROP PIPE (XX")	DIAMETER OF SLOTTED SCH40 PVC PIPE (XX")
SVDWs #1 - 6	40'-00"	17'-00"	23'-00"	15'-00"	6'-8.5"±	40'-00"	6"	6"	6"	6"

PRECAST STORMVAULTS #1 THUR #6 DRYWELL HEIGHTS	
24"Ø FRAME AND COVER	1-EA
3" TALL 24" Ø GRADE RINGS	2-EA
48"Ø MANHOLE ECCENTRIC CONE	3'-00"
48"Ø SOLID WALL	7'-00"
48"Ø PERFORATED WALL	4'-00"

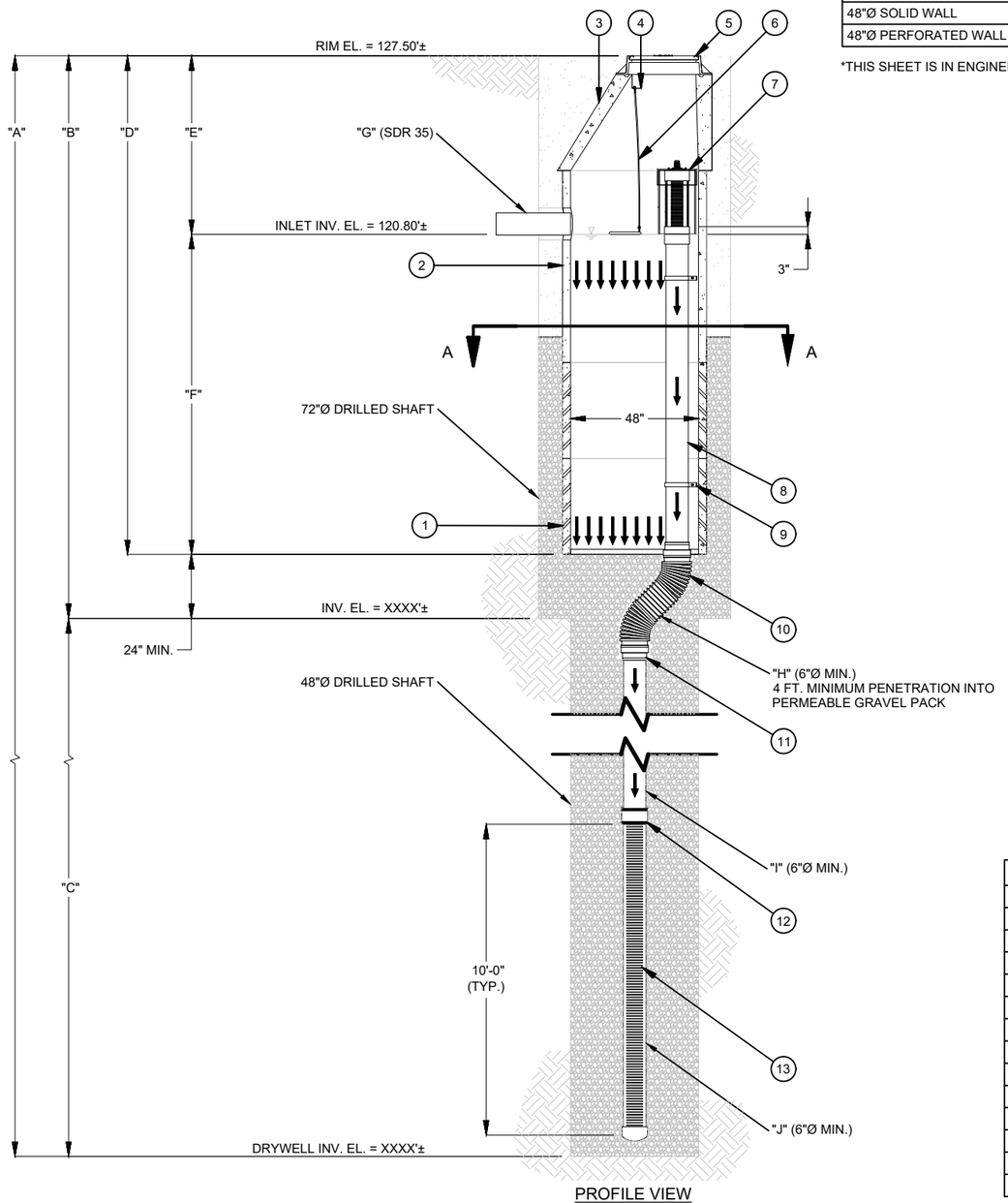
*THIS SHEET IS IN ENGINEERING & CONSTRUCTION FORMATTED DETAIL.



PLAN VIEW - DRY WELL



SECTION A-A - INFILTRATION SHAFTING



PROFILE VIEW

BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION
1	2	48" I.D. PERFORATED WALL DRYWELL LID SHAFT BARREL
2	1	48" I.D. WALL DRYWELL LID SHAFT BARREL
3	1	48" I.D. TO 24 or 30" PRECAST REDUCING CONE
4	1	SS HOOK
5	1	24"Ø BOLT DOWN CAST IRON FRAME & COVER
6	1	TETHER TO OIL ABSORBENT MAT 12" X 12"
7	1	FLOATABLE TRASH AND DEBRIS SHIELD AND SCREENING HOOD
8	20 LF	6"Ø SDR35 PVC DROP PIPE *CUT TO LENGTH AS NECESSARY*
9	2	6" ADJUSTABLE STANDOFF PIPE CLAMP
10	1	6"Ø CORRUGATED HDPE FLEX PIPE
11	2	6"Ø COUPLING SDR35 TO CORRUGATED HDPE
12	1	6"Ø SDR35 TO SCH40 PVC COUPLING
13	10 LF	6"Ø SLOTTED PIPE SCH 40

48in Dia Drywell.idw

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12118 BLOOMFIELD AVE

SANTA FE SPRINGS, CA

PART NUMBER:	48-in Diameter Drywell	DRAWN BY:	T. Handke & W. STEIN
CREATED:	7/28/2021	MODIFIED:	3/9/2022

REV:

SHEET: 2 OF 2

DRYWELL DESIGN WORKSHEET

PROJECT SUMMARY

DATE:	3/9/2022
PROJECT NAME:	12118 Bloomfield Ave
LOCATION:	Santa Fe Springs, CA
DESIGNED BY:	*Jake Marshall*
COMPANY:	*Kier & Wright*
TELEPHONE:	office: , cell: (916) 996-3659
EMAIL:	jmarshall@kierwright.com

SVDW STORMVAULT JENSEN STORMWATER BMP/LID SYSTEMS
A Division of Jensen Precast

FOR DETAIL DESIGN, ASSISTANCE, DRAWINGS, AND PRICING CONTACT JENSEN STORMWATER SYSTEMS @ (877) 649-0095

Project input values

Blue highlighted cells require acceptance of default value or data entry by user for new project design values

GIVEN VALUES FROM GEOTECHNICAL REPORT &/or PERCOLATION TESTS

Measured Infiltation Rate:	0.62375	-in/hr, This site averaged value already includes a ***Reduction Factor*** of 2
Safety Factor:	1	A.K.A.: Reduction Factor in many Geotechnical Reports
Mitigated Volume:	0	-ft^3, (cuft)
Allowable Drawdown Time:	96	-hours
Minimum Drawdown Time:	3	-hours
Minimum Depth to Infiltration:	40	-ft
Starting Depth of Infiltration Zone:	15	-ft
Ending Depth of Infiltration Zone:	40	-ft
Depth to Groundwater (Design Depth):	60	-ft
Porosity of Drywell's Rock Pack:	40	%

DESIGN INFILTRATION RATE

Infiltration Design Rate = (Measured Infiltration Rate)/(Safety Factor) = (0.62375-in/hr)/(1)

Conversion: in/hr to ft/s:

Infiltration Design Rate =	0.624	-in/hr	0.00002315 -ft/sec = 1-in/hr
Infiltration Design Rate =	0.00001444	-ft/s, (fps)	3,600 -sec = 1-hr

DRYWELL DESIGN PARAMETERS

Depth to Pipe Inverts:	8	-ft
Upper Drywell Manhole Structure Diameter:	4	-ft
Upper Drywell Manhole's Depth:	15	-ft
Upper Drywell Interior Manhole Chamber's Area =	12.57	-ft^2
Upper Drywell Interior Manhole Area/Foot of Depth =	12.57	-ft^2/ft
Drill Diameter for Precast Chamber:	6	-ft
Drywell Shaft Area per Foot of Depth of the Precast Chamber =	18.85	-ft^2/ft
Drywell Shaft Base Area =	28.27	-ft^2, (sqft)
Over Drill Depth of 6-ft Dia Chamber Hole:	2	-ft
Total Depth of 6-ft Dia hole for Precast Chamber:	17.00	-ft
Rock Filled Drywell Shaft Diameter:	4	-ft
Drywell Shaft Area per Foot of Depth =	12.57	-ft^2/ft
Drywell Shaft Base Area =	12.57	-ft^2, (sqft)
Starting Depth of Infiltration Zone:	12	-ft
Ending Depth of Infiltration Zone:	40	-ft
Infiltration Zone Height =	28	-ft
Drywell Shaft Bottom Depth:	40	-ft
Depth of Rock Filled Drywell Shaft Below Manhole Structure =	23.00	-ft
Height of Infiltration Zone at bottom of Drywell Chamber Shaft =	5	-ft

DRYWELL SIZING / DESIGN CALCULATIONS

Drywell's Infiltration Area = (Chamber Infiltration Zone Height)•(Shaft Area/ft)+(Infiltration Zone Height (Shaft Area/ft) + Shaft Bottom Area

= (5-ft)•(18.85-sqft/ft)+ (23-ft)•(12.57-sqf/ft)+(12.57-sqft)

Drywell's Infiltration Area = 396 -ft^2, (sqft)

Drywell Infiltation Rate = (Drywell's Infitration Area)•(Infiltration Design Rate)

= (396-sqft)•(0.00001444-fps)

Drywell Infiltation Rate = 0.0057 -ft^3/s, (cfs)

INFILTRATION VOLUME CAPACITY OVER DRAWDOWN TIMES

Infil Vol Cap = (Drywell Infiltration Rate)•(Allowable Drawdown Time)

Infiltration Volume Over 96-hours = (0.0057-in/hr)•(96-hr)•(1-hr/3600-sec)

Infiltration Volume Over 96-hours = 1,970 -ft^3, (cuft)

Infiltration Volume Over 3-hours = (0.0057-in/hr)•(3-hr)•(1-hr/3600-sec)

Infiltration Volume Over 3-hours = 62 -ft^3, (cuft)

DRYWELL SYSTEM'S STORAGE VOLUME(s)

Manhole Structure Storage Volume = (Height of Manhole Chamber)•(Manhole Chamber Area per Foot of Depth)

= (15-ft)•(12.57-sqft/ft)

Manhole Chamber Storage Volume = 188 -ft^3, (cuft)

Drywell Storage Volume = (Drywell Area per Foot of Depth)•(Drywll Shaft Depth)•(Porisity of Drywll Rock Pack)

= (2-ft)•(28.27-sqft)•(40%)+(23-ft)•(12.57-sqft)•(40%)

Drywell Shaft Storage Volume = 138 -ft^3, (cuft)

Total Available Storage Volume per Drywell System = (Manhole Volume) + (Drywell Volume)

= (188-cuft) + (138-cuft)

Drywell's Total Available Storage Volume = 327 -ft^3, (cuft)

TOTAL MITIGATED VOLUME(s) OF DRYWELL SYSTEM(s)

Mitigated Volume for 96-hr drawdown Time = (Drywell's Total Available Storage Volume) + (96-hr Infiltration Volume)

Mitigated 96-hr Volume = 2,297 -ft^3, (cuft)

Mitigated Volume for 3-hr drawdown Time = (Drywell's Total Available Storage Volume) + (3-hr Infiltration Volume)

Mitigated 3-hr Volume = 389 -ft^3, (cuft)

6 = Number of Drywells

Mitigated 96-hr Volume for all 6 Drywells =	13,782	-ft^3, (cuft)
Mitigated 3-hr Volume for all 6 Drywells =	2,334	-ft^3, (cuft)

Project: 12118 Bloomfield Ave
Location: Santa Fe Springs, CA

Averaged Percolation Values

Test Hole Number	Boring Depth	Design Infiltration Rate (DIR) Adjusted by a Safety Factor, A.K.A.: ***Reduction Factor*** of 2		Design Hydraulic Surface Infiltration Rate (DIR/Aperc)	
	(ft)	(in/hr)	**(cfs)**	$(in/hr)/ft^2$	cfs/ft^2
LP-3	45	0.550	0.0000127	0.0235	0.000000544
LP-4	30	0.670	0.0000155	0.0448	0.000001036
LP-5	45	0.425	0.0000098	0.0172	0.000000399
LP-6	30	0.850	0.0000197	0.0389	0.000000901
Averaged Values:	***37.5***	***0.62375***	***0.0000144***	***0.03110816***	***0.000000720***

Flow Conversions

(gpm)	(ft^3/s)	$(in\text{-}ft^2)/hr$
448.83	1	43,200

Boring Percolation Test Data Sheet

Project Number:	13062.002	**Test Hole Number:**	LP-3
Project Name:	Rexford Bloomfield Ave.	**Date Excavated:**	12/13/2021
Earth Description:	Alluvium	**Date Tested:**	12/15/2021
Liquid Description:	Tap water	**Depth of boring (ft):**	45
Tested By:	MM	**Radius of boring (in):**	4
Time Interval Standard		**Radius of casing (in):**	1
Start Time for Pre-Soak:	12/13/21 8:00 AM	**Length of slotted of casing (ft):**	15
Start Time for Standard:	12/15/21 7:08 AM	**Depth to Initial Water Depth (ft):**	30
Standard Time Interval		**Porosity of Annulus Material, *n* :**	0.35
Between Readings, mins:	30	**Bentonite Plug at Bottom:**	no

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
1	7:08	30	30.00	180.0	95.8	1.12
	7:38		37.98	84.2		
2	7:40	30	30.00	180.0	94.7	1.10
	8:10		37.89	85.3		
3	8:16	30	30.00	180.0	95.8	1.12
	8:46		37.98	84.2		
4	8:49	30	30.00	180.0	95.0	1.10
	9:19		37.92	85.0		
5	9:21	30	30.00	180.0	94.8	1.10
	9:51		37.90	85.2		
6	9:54	30	30.00	180.0	94.4	1.09
	10:24		37.87	85.6		

Infiltration Rate (I) = Discharge Volume/Surface Area of Test Section/Time Interval

Measured Infiltration Rate, I (Average of Last 3 ReadingsLast Readings) = **1.10** **in./hr.**

Design Infiltration Rate

Reduction Factor from Test Procedure, RF_t =	2
Reduction Factor for Site Variability, # of Tests and Investigation, RF_v =	1
Reduction Factor for Long Term Siltation, Plugging and Maintenance, RFs =	1
Reduction Factor, RF = RF_t x RF_v x RF_s =	2

Design Infiltration Rate = Measured Infiltration Rate / Reduction Factor (RF) = **0.55** **in./hr.**

Boring Percolation Test Data Sheet

Project Number:	13062.002	**Test Hole Number:**	LP-4
Project Name:	Rexford Bloomfield Ave.	**Date Excavated:**	12/13/2021
Earth Description:	Alluvium	**Date Tested:**	12/16/2021
Liquid Description:	Tap water	**Depth of boring (ft):**	30
Tested By:	MM	**Radius of boring (in):**	4
Time Interval Standard		**Radius of casing (in):**	1
Start Time for Pre-Soak:	12/13/21 8:00 AM	**Length of slotted of casing (ft):**	10
Start Time for Standard:	12/16/21 8:04 AM	**Depth to Initial Water Depth (ft):**	20
Standard Time Interval		**Porosity of Annulus Material, *n* :**	0.35
Between Readings, mins:	30	**Bentonite Plug at Bottom:**	no

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
1	8:04	30	20.00	120.0	72.5	1.32
	8:34		26.04	47.5		
2	8:36	30	20.00	120.0	72.8	1.33
	9:06		26.07	47.2		
3	9:12	30	20.00	120.0	73.4	1.35
	9:42		26.12	46.6		
4	9:45	30	20.00	120.0	73.4	1.35
	10:15		26.12	46.6		
5	10:17	30	20.00	120.0	73.2	1.34
	10:47		26.10	46.8		
6	10:50	30	20.00	120.0	73.1	1.34
	11:20		26.09	46.9		

Infiltration Rate (I) = Discharge Volume/Surface Area of Test Section/Time Interval

Measured Infiltration Rate, I (Average of Last 3 ReadingsLast Readings) = 1.34 in./hr.

Design Infiltration Rate

Reduction Factor from Test Procedure, RF_t =	2
Reduction Factor for Site Variability, # of Tests and Investigation, RF_v =	1
Reduction Factor for Long Term Siltation, Plugging and Maintenance, RFs =	1
Reduction Factor, RF = RF_t x RF_v x RF_s =	2

Design Infiltration Rate = Measured Infiltration Rate / Reduction Factor (RF) = 0.67 in./hr.

Boring Percolation Test Data Sheet

Project Number:	13062.002	**Test Hole Number:**	LP-5
Project Name:	Rexford Bloomfield Ave.	**Date Excavated:**	12/13/2021
Earth Description:	Alluvium	**Date Tested:**	12/15/2021
Liquid Description:	Tap water	**Depth of boring (ft):**	45
Tested By:	MM	**Radius of boring (in):**	4
Time Interval Standard		**Radius of casing (in):**	1
Start Time for Pre-Soak:	12/13/21 8:00 AM	**Length of slotted of casing (ft):**	15
Start Time for Standard:	12/15/21 10:33 AM	**Depth to Initial Water Depth (ft):**	30
Standard Time Interval		**Porosity of Annulus Material, *n* :**	0.35
Between Readings, mins:	30	**Bentonite Plug at Bottom:**	no

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
1	10:33	30	30.00	180.0	81.5	0.90
	11:03		36.79	98.5		
2	11:05	30	30.00	180.0	80.3	0.88
	11:35		36.69	99.7		
3	11:41	30	30.00	180.0	79.1	0.87
	12:11		36.59	100.9		
4	12:14	30	30.00	180.0	78.5	0.86
	12:44		36.54	101.5		
5	12:46	30	30.00	180.0	77.8	0.85
	13:16		36.48	102.2		
6	13:19	30	30.00	180.0	77.2	0.84
	13:49		36.43	102.8		

Infiltration Rate (I) = Discharge Volume/Surface Area of Test Section/Time Interval

Measured Infiltration Rate, I (Average of Last 3 ReadingsLast Readings) = 0.85 in./hr.

Design Infiltration Rate

Reduction Factor from Test Procedure, RF_t =	2
Reduction Factor for Site Variability, # of Tests and Investigation, RF_v =	1
Reduction Factor for Long Term Siltation, Plugging and Maintenance, RFs =	1
Reduction Factor, RF = RF_t x RF_v x RF_s =	2

Design Infiltration Rate = Measured Infiltration Rate / Reduction Factor (RF) = 0.42 in./hr.

Boring Percolation Test Data Sheet

Project Number:	13062.002	**Test Hole Number:**	LP-6
Project Name:	Rexford Bloomfield Ave.	**Date Excavated:**	12/13/2021
Earth Description:	Alluvium	**Date Tested:**	12/16/2021
Liquid Description:	Tap water	**Depth of boring (ft):**	30
Tested By:	MM	**Radius of boring (in):**	4
Time Interval Standard		**Radius of casing (in):**	1
Start Time for Pre-Soak:	12/13/21 8:00 AM	**Length of slotted of casing (ft):**	10
Start Time for Standard:	12/16/21 7:05 AM	**Depth to Initial Water Depth (ft):**	23
Standard Time Interval		**Porosity of Annulus Material, *n* :**	0.35
Between Readings, mins:	30	**Bentonite Plug at Bottom:**	no

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
1	7:05	30	22.50	90.0	52.9	1.26
	7:35		26.91	37.1		
2	7:37	30	22.50	90.0	53.2	1.27
	8:07		26.93	36.8		
3	8:13	30	22.50	90.0	51.6	1.22
	8:43		26.80	38.4		
4	8:46	30	22.50	90.0	51.6	1.22
	9:16		26.80	38.4		
5	9:18	30	22.50	90.0	52.0	1.23
	9:48		26.83	38.0		
6	9:51	30	22.50	90.0	52.1	1.23
	10:21		26.84	37.9		

Infiltration Rate (I) = Discharge Volume/Surface Area of Test Section/Time Interval

Measured Infiltration Rate, I (Average of Last 3 ReadingsLast Readings) = **1.23** **in./hr.**

Design Infiltration Rate

Reduction Factor from Test Procedure, RF_t =	2
Reduction Factor for Site Variability, # of Tests and Investigation, RF_v =	1
Reduction Factor for Long Term Siltation, Plugging and Maintenance, RFs =	1
Reduction Factor, RF = RF_t x RF_v x RF_s =	2

Design Infiltration Rate = Measured Infiltration Rate / Reduction Factor (RF) = **0.61** **in./hr.**