SOILS SOUTHWEST, INC.

SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

Report of Soil Infiltration Tests
Planned WQMP-BMP Storm Water Infiltration Retention Basins
Planned Truck and Trailer Facility
Waalew Road. Apple Valley, California
APN: 0440-014-11

Project No. 24019-BMP

May 14, 2024

Prepared for:

Weka, Inc.
236 W. Orange Show Road, Suite 114
San Bernardino, California 92408

soilssouthwest@aol.com
Established 1984

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May 14, 2024 Project No. 24019-BMP

Weka, Inc.
236 W. Orange Show Road, Suite 114
San Bernardino, California 92408

Attention: Mr. Jared Himie

Subject: Report of Soil Infiltration Tests
Planned WQMP-BMP Storm water Infiltration Retention Basins
Planned Truck and Trailer Facility
Waalew Road. Apple Valley, California
APN: 0440-014-11

Reference: 1. Site Plan by Bonadiman & Associates
2. Riverside County Low Impact Development BMP Design Handbook &
San Bernardino County Technical Guidance Document for Water Quality Management Plans Handbook

Gentlemen:

Presented herewith are the results of soils infiltration testing for the proposed WQMP-BMP stormwater Infiltration Basin design planned for the proposed site improvements to the existing Horsepower Ranch maintenance and equipment yard facility.

In general, the WQMP-BMP evaluations consisted of three (3) soil infiltration test borings, P-1, P-2, and P-3, within the general test locations as described in the development plan supplied (advanced to approximately 5 feet below the existing grade surface, respectively. The deeper boring evaluation was advanced to about 15 feet below grade to identify presence or absence of shallow-depth groundwater and shallow-depth impermeable layer, if any. Subsequent soils infiltration testing is performed using the standardized "falling-head" test methods, with the observed soil percolation rate being converted to infiltration rates using Porchet Method as per the guidelines of the Table 1, Infiltration Basin Option 2 method as described in the Appendix A of the Riverside County-Low Impact Development (LID) BMP design Handbook and as per the Appendix VII, Section VII.3.8.2: Infiltration Rate Evaluation Protocols as described in the San Bernardino County Technical Guidance Document for Water Quality Management Plans Handbook. Approximate test locations are shown on the attached Plate 1.

The soils encountered consist, in general, of upper 5 feet of consists of dry to damp slightly silty sands and silty sands with some damp to moist clayey sands (P-2) with occasional pebbles and scattered rock fragments to the proposed infiltration design system bottom of 5 feet below existing grade surface. For the exploratory deep boring (B-1), the soils primarily consist of upper 5 feet of fine to medium dry sands with some silts and pebbles overlying damp, slightly clayey fine to medium lumpy sand with pebbles and occasional rock fragments overlying dry fine to medium silty lumpy sands with pebbles, rock fragments, and scattered rock ½"-1" to the maximum depth of 15 feet explored. Test exploration logs are described in the Log of Borings P-1, P-2, P-3, and B-1, attached. No shallow-depth groundwater or layers considered impermeable to water was encountered.

Based on the testing completed, it is our opinion that the observed infiltration rates are 1.21 in/hr 0.00 inch/hr., and 0.67 inch/hr. for the test locations P-1, P-2, and P-3 respectively as described in Table II, Section 3.0 of this report. Considering the presence of lumpy damp to moist clayey sands within the tested depth for infiltration test borings, P-2 and P-3, infiltration tests results are low. Based on more favorable soils below the test depth (B-1@ 15 feet) , it is our opinion that deeper testing and/or deeper infiltration design system may be considered.

For design an appropriate safety factor to the observed rate should be considered as selected by the project design engineer.

We offer no other warranty express or implied.

Respectfully submitted,
Soils Southwest, Inc.

Moloy Gupta, RCE 31708

John Flippin, Project Supervisor

1.0 EXCAVATED TEST EXPLORATIONS

BMP soil percolation testing is performed at about 5 feet below grade for the test locations P-1 and P-2 respectively. An additional test boring (B-1) advanced to approximately 15 feet below grade surface is included primarily to identify presence or absence of groundwater and shallow depth bedrock, if any. The test explorations described are made using an 8-inch diameter hollow-stem auger drill rig for the test locations as shown on accompanying Plate 1. Water used during infiltration percolation testing is supplied by using a portable water jugs.

2.0 METHODOLOGY AND TEST PROCEDURES:

Following test boring completion, each of the test holes were fitted with perforated pvc pipes, underlain by 2-inch crushed rock at the bottoms to minimize potentials for scouring and caving. As per the handbook, for testing and to establish test intervals, each test hole was initially filled with 24-inch of water supplied as described.

During initial testing, since 6-inch or more water did not seep away in 25 minutes or less, subsequent percolation testing was performed at 30-minute time intervals for minimum six (6 hours, or until the soil percolation rates became relatively consistent for test borings, P-2 and P-3. For P-1since 6-inch or more water seeped away in 25 minutes or less, subsequent percolation testing was performed at 10-minute time intervals for minimum one (1) hour, or until the soil percolation rates became relatively consistent for test boringsActual testing included water placement at about 3 feet below the existing grade surface (inlet depth) or 24 inches above proposed infiltration chamber bottoms.

The final 10 and 30-minute recorded percolation test data were converted to an Infiltration Rate (I_t) in inches per hour using the "Porchet Method" equation as described in the Reference 2, Riverside County Low Impact Development BMP Design Handbook and San Bernardino County Technical Guidance Document for Water Quality Management Plans Handbook. The logs of soil percolation rates, along with the log for the deep test exploration and necessary calculations, are attached.

3.0 INFILTRATION TEST RESULTS

Based on the testing completed at the test locations and to the test depth described, it is our opinion that the observed soil *infiltration* rates are 1.21 in/hr 0.00 inch/hr. and 0.67 inch/hr. for the test locations P-1, P-2, and P-3 respectively. Calculations to convert the standardized "falling head" percolation rates to "infiltration" rates were in accordance with the Section 2.3 of the referenced County Handbooks are described in the following Table I and II. *It is suggested that in design, use of an appropriate safety factor should be used to the observed rates as selected by the design engineer.*

3.1. Conversion Summary and Calculations

TABLE I

Based on the testing completed, the following describes the observed field percolation rates for WQMP-BMP converted to soils design infiltration rate as per the referenced design handbooks. Actual field test data are attached.

Infiltration Rate for BMP Design

Test Date & Test No. (5-10-2024)	Relative Site Location	Test Depth (ft.) Below Grade	Observed Soil Percolation Rates (inch/hour.)	Design Infiltration Rates following Conversion of Soil Percolation Rates using Porchet Method (with no Factor of Safety)
P-1	North	5	2.5	1.21
P-2	Center	5	0.0	0.00
P-3	South	5	4.0	0.67

TABLE II

Conversion Table (Porchet Method)

Test No.	Depth Test (inches)	Time Interval	Initial Depth (inch)	Final Depth (inch)	Initial Water Height (inch)	Final Water Height (inch)	Change in Height/ Time	Average Head Height/Time
	D_T	ΔT (Min)	D_O (in)	D_f (in)	$H_o=D_t-D_o$	$H_f=D_t-D_f$	$\Delta H= H_f-H_O$	$H_{avg} = (H_o+H_f)/2$
P-1	60	10	36	38.5	24.0	21.5	2.5	22.75
P-2	60	30	36	36.0	24.0	24.0	0.0	24.0
P-3	60	30	36	40.0	24.0	20.0	4.0	22.0

	Observed Infiltration Rate (It)=ΔH60r/Δt(r+2Havg)		
	A	B	C (Factor of Safety not included)
Test No.	ΔH60r	Δt(r+2Havg)	A/B=in/hr
P-1	600	495	1.21
P-2	0	1560	0.00
P-3	960	1440	0.67

In design, use of an appropriate safety factor should be considered to account for long-term saturation, inconsistencies in subsoil conditions, along with the potential for silting of percolating soils.

The infiltration rates described are based on the in-situ testing completed at the locations as suggested by the project civil engineer. In the event the test locations and the test depths described vary considerably supplemental soils infiltration testing may be warranted.

It should be noted that over prolong use and lack of maintenance the detention/infiltration basins or deep chambers constructed based on the suggested design rate may experience much lower infiltration rates due to the accumulation of silts, fines, soils, and others. Regular maintenance of the chambers in the form of removal of debris, oil and fines are strongly recommended. A maintenance record of such is suggested for future use, if any.

Suggested Requirements for Standard Stormwater BMP Installation

The invert of stormwater infiltration should be set at least 10 feet above the groundwater elevation and should not be placed on steep slopes to create conditions for slopes instability.

When adequately installed, it is our opinion that the Stormwater infiltration systems installed should not increase the potentials for static or seismic settlement of structures.

Stormwater infiltration installed should not place an increased surcharge on structures or foundations on or its adjacent. The pore water pressure should not increase the soils retained by retaining structures.

The invert of stormwater infiltration should be set back at least 15 feet and outside a 1:1 plan drawn up from the bottom of adjacent foundations.

Stormwater infiltration should not be located near utility lines where the introduction of stormwater could cause damage to utilities or settlement of trench backfill.

Stormwater infiltration systems should not be allowed within 100 feet of any potable groundwater production well.

Once installed, regular maintenance of the detention systems is recommended.

Stormwater infiltration shall not be located near utility lines where the introduction of stormwater could cause damage to utilities or settlement of trench backfill.

Stormwater infiltration is not allowed within 100 feet of any potable groundwater production well.

Once installed, regular maintenance of the installed systems should be considered.

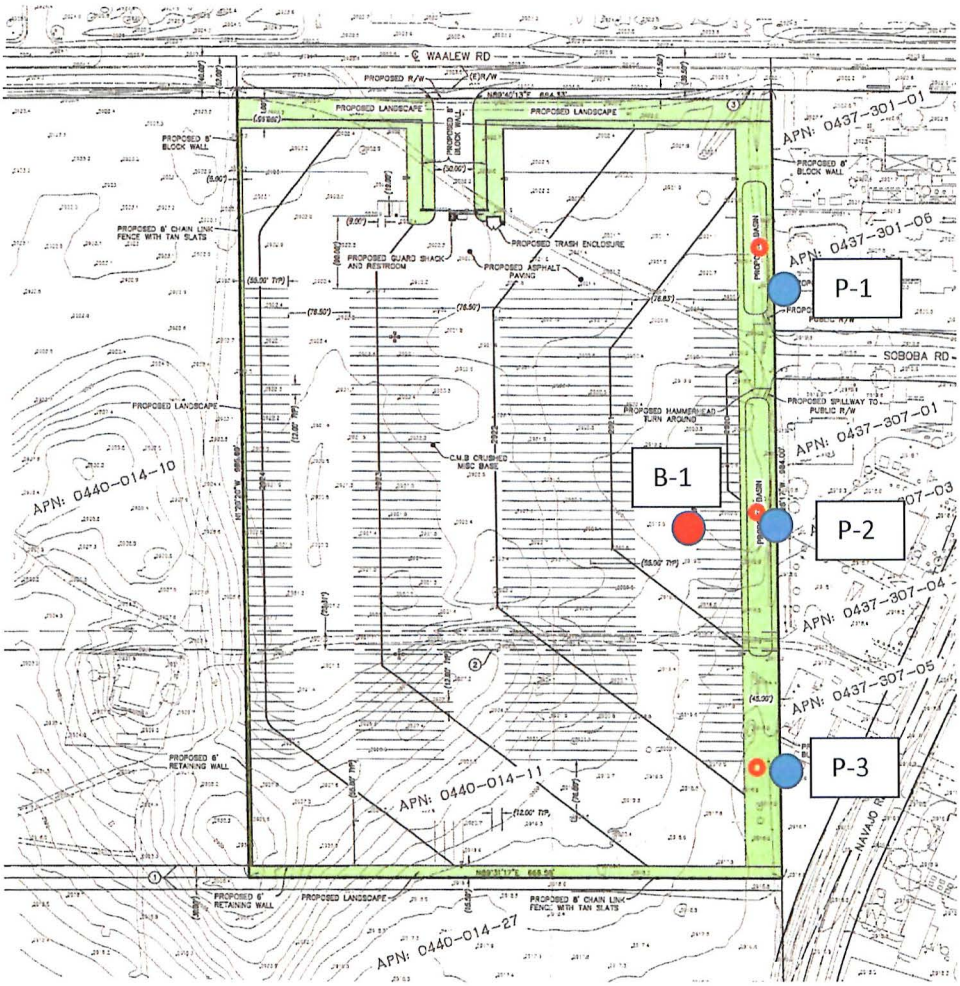
LOG OF TEST BORINGS

PERCOLATION TEST DATA

And
LABORATORY ANALYSES

PLOT PLAN AND TEST LOCATIONS
Planned Truck and Trailer Facility
Waalew Road,Apple Valley, California
APN: 0440-014-11

(Schematic, not to scale)



Legend:
- P-1 Approximate Location of BMP Testing
- B-1 Approximate Location of Deep Boring
- Delineation by Project Engineer

Plate 1

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-1

Project: Weka, Inc.		**Job No.:** 24019-BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** May 10,2024

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			surface weeds, gravels SAND - tan, silty, fine to medium, scattered pebbles
					SP-SM		5	- color change to yellowish tan, slightly silty, fine to medium, traces of clay, slightly lumpy, pebbles, scattered rock fragments, dry
							10	- End of infiltration test boring @ 5.0 ft. - no bedrock - no groundwater - 3" perforated socked PVC pipe installed with gravel at bottom
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location

Proposed Truck Tractor Facility
Waalew Road
Apple Valley, California

Plate #

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-2

Project: Weka, Inc.		**Job No.:** 24019-BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** May 10,2024

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP-SM			surface weeds
								SAND - light brown to gray brown, slightly silty, fine to medium, scattered pebbles, damp
					SC		5	- clayey, lumpy, damp to moist
								- End of infiltration test boring @ 5.0 ft. - no bedrock - no groundwater - 3" perforated socked PVC pipe installed with gravel at bottom
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Truck Tractor Facility Waalew Road Apple Valley, California	**Plate #**

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING P-3

Project: Weka, Inc.		**Job No.:** 24019-BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** May 10,2024

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP-SM			surface weeds
								SAND - yellow tan brown, slightly silty, fine to medium, slightly lumpy, occasional pebbles, dry to damp
							5	
								- End of infiltration test boring @ 5.0 ft. - no bedrock - no groundwater - 3" perforated socked PVC pipe installed with gravel at bottom
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Truck Tractor Facility Waalew Road Apple Valley, California	**Plate #**

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-1

Project: Weka, Inc.		**Job No.:** 24019-BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** May 10,2024

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SP-SM			surface weeds
								SAND - tan brown, slightly silty, fine to medium, pebbles, dry
							5	- color change to grayish tan brown, fine to medium, occasional pebbles
					SM-SC			- color change to tan, slightly clayey and silty, lumpy, fine to medium, damp
							10	- with pebbles, occasional rock fragments, dry
					SM			- color change to yellow, silty, lumpy, fine to medium, pebbles, rock fragments, scattered rock 1/2"-1" , dry
							15	- End of deep exploratory boring @ 15.0 ft. - no bedrock - no groundwater
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Truck Tractor Facility Waalew Road Apple Valley, California	**Plate #**

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty sand
	Poorly graded sand with silt
	Clayey sand
	Poorly graded clayey silty sand

Notes:

1. Exploratory borings were drilled on May 10,2024 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

Conversion Table (Porchet Method)
Weka, Inc.
Waalew Road w/o Navajo Road, Apple Valley
Project No. 24019-BMP

Test N no.	Test Hole Depth (inches) D_T	Time Interval Δ_T	Initial Depth (inches) D_O (in)	Final Depth (inches) D_f (in)	Initial Water Height (inches) $H_O=D_T-D_O$	Final Water Height (inches) $H_f = D_T-D_f$	Change Height/Time $\Delta H/\Delta D= H_O-H_f$	Average Head Height/Time $Havg = (H_O+H_f)/2$
P-1	60	10	36	38.5	24	21.5	2.5	22.75
P-2	60	30	36	36	24	24	0	24
P-2	60	30	36	40	24	20	4	22

	Observed Infiltration Rate (It) = ΔH60r/Δt (r+2Havg)		
	A	B	C
	ΔH60r	Δt (r+2H_{avg})	A/B= inch/hr
P-1	600	495	**1.21**
P-2	0	1560	**0.00**
P-3	960	1440	**0.67**

Legend

Δ H/ΔD = Observed Field Rate

H_O = inches of water filled from bottom

D_O = initial height of water (inches) from bottom

D_f = final heigh of water (inches) from bottom

Columns A-B-C : Porchet Conversion Calculations

Column C: Observed Rate following Porchet Conversion

D_t = depth of test hole bottom (inches)

Percolation Test Data Sheet

North

Project: WEKA INC LUCERNE RD. APPLE VALLEY			Project No. 24019-BMP
Test Hole No:	P-1	Tested By: RM	Date: 5-10-24
Depth of Test Hole, D_T	60	USCS Soil Classification	
Test Hole Dimensions (inches)			Length / Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=	

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 inches??? (Y/N)
1	10:30	10:55	25	36	51	15	Y
2	10:57	11:22	25	36	48.5	12.5	Y

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	11:23	11:33	10	36	42.0	6	1.67
2	11:35	11:45	10	36	40.0	4	2.50
3	11:45	11:55	10	36	38.5	2.5	4.00
4	11:55	12:05	10	36	38.5	2.5	4.00
5	12:05	12:15	10	36	38.5	2.5	4.00
6	12:15	12:25	10	36	38.5	2.5	4.00
7	12:25	12:35	10	36	38.5	2.5	4.00
8	12:37	12:47	10	36	38.5	2.5	4.00
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							

Comments

Percolation Test Data Sheet CENTER

Project: WEKA INC LUARLEW RD. APPLEVALLEY			Project No. 24019-BMP
Test Hole No:	P-2	Tested By: RM	Date: 5-10-24
Depth of Test Hole, D_T	60	USCS Soil Classification	
Test Hole Dimensions (inches)		Length	Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=	

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 inches??? (Y/N)
1	10:34	10:59	25	36	36	0	N
2	10:59	11:24	25	36	36	0	N

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	11:24	11:54	:30	36.25	36.25	0.25	
2	11:54	12:24	:30	36.25	36.25	0.00	
3	12:24	12:54	:30	36.25	36.25	0.00	
4	12:54	1:24	:30	36.25	36.25	0.00	
5	1:24	1:54	:30	36.25	36.25	0.00	
6	1:54	2:24	:30	36.25	36.5	0.5	
7	2:24	2:54	:30	36.5	36.5	0.0	
8	2:54	3:24	:30	36.5	36.5	0.0	
9	3:24	3:54	:30	36.5	36.5	0.0	
10	3:54	4:24	:30	36.5	36.5	0.0	
11							
12							
13							
14							
15							
16							
17							
18							

NO REFILL

Comments

Percolation Test Data Sheet SOUTH

Project: WEKA INC LUALEW RD. APPLE VALLEY			Project No. 24019-BMP
Test Hole No:	P-3	Tested By: RM	Date: 5-10-24
Depth of Test Hole, D_T	60	USCS Soil Classification	
Test Hole Dimensions (inches)			Length / Width
Diameter (if round)=	8.0 in.	Sides (if rectangular)=	

Sandy Soil Criteria Test *

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Greater Than or Equal to 6.0 inches??? (Y/N)
1	10:40	11:05	25	36	45	9	Y
2	11:05	11:30	25	36	41	5	N

* If two consective measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fiill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25."

Trial No.	Start Time	Stop Time	Δt Time Interval (min)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	ΔT/ΔD Percolation Rate (min./in.)
1	11:30	12:00	30	36	42	6	~~1.67~~ 5.0
2	12:00	12:30	30	36	42	6	5.00
3	12:32	1:02	30	36	41	5	6.00
4	1:08	1:38	30	36	41	5	6.00
5	1:38	2:08	30	36	41	5	6.00
6	2:08	2:38	30	36	40.5	4.5	6.67
7	2:38	3:08	30	36	40.5	4.5	6.67
8	3:08	3:38	30	36	40.0	4.0	7.50
9	3:38	4:08	30	36	40.0	4.0	7.50
10	4:08	4:38	30	36	40.0	4.0	7.50
11							
12							
13							
14							
15							
16							
17							
18							

Comments

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 1)

1 Remaining LID DCV not met by site design BMP (ft^3): *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item19*			
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix C of the TGD for WQMP for minimum requirements for assessment methods*	1.21	0.0	0.67
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*			
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*			
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*			
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*			
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*			
8 Infiltrating surface area, *SA_{BMP}* (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*			
9 Amended soil depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*			
10 Amended soil porosity			
11 Gravel depth, *d_{media}* (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*			
12 Gravel porosity			
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*			
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*			
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*			
16 Total Retention Volume from LID Infiltration BMPs: *(Sum of Items 14 and 15 for all infiltration BMP included in plan)*			
17 Fraction of DCV achieved with infiltration BMP: % *Retention% = Item 16 / Form 4.2-1 Item 7*			
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☐ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*			

GRAIN SIZE DISTRIBUTION

Project: Weka, Inc. **Job #** 24019-BMP

Location: Waalew Rd. w/o Navajo Rd, Apple Valley **Boring No:** P-2 @ 5.0 ft **Sample No:** 2

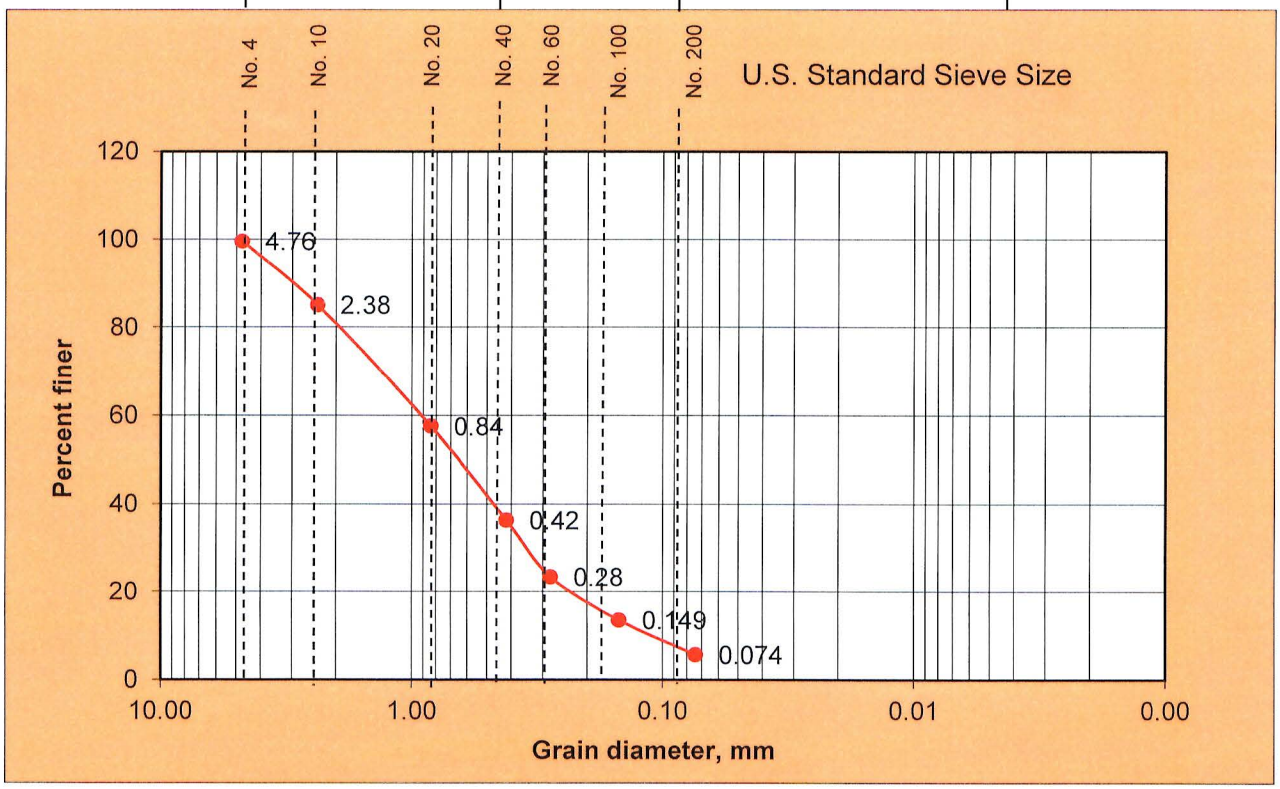
Description of Soil: SP

Date of Sample: 5/10/2024

Tested By: JF **Date of Testing:** 5/14/2024

Sieve No.	Sieve Openings in mm	Percent Finer	Grain Size	% Retained
4	4.76	99.66	Gravel	0.5
10	2.38	85.18	Med. to Crs	60.5
20	0.84	57.66	Fines	33
40	0.42	36.36	Silts/Clays	6
60	0.28	23.46		
100	0.149	13.56		
200	0.074	5.76		

Gravel	Sand			
	Coarse to Medium	Fine	Silt	Clay



Visual Soil Description : SAND - fine to coarse with traces of silts, pebbles.

Soil Classification: SP

System: USC

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

Expansion Index

ASTM D 4829

Machine No: 1
Project No: 24019-F
Depth (ft): 5 ft.
Location: Waalew Road, Apple Valley
Date: 5-13-24

Project Name: Weka Inc.
Lot/Boring/Trench: P2
Tract No:
Technician: JF

TEST DATA		Load: 144 lb	Ring = 1" x 4"
	Dial Reading	Time (h:m)	Date
Dry / 10 min	0	2:55	5/13/2024
Inundate	0	3:05	5/13/2024
Reading	16	3:15	5/13/2024
Reading	41.0	4:15	5/13/2024
Reading	45.0	4:35	5/13/2024
EI (measured)	52.0	8:22	5/14/2024

DEGREE OF SATURATION DATA	Test A	Test B
A. Initial Moisture Content (%)	17.14%	13.44%
B. Weight of wet soil + Ring (g)	609.20	590.40
C. Weight of Ring (g)	188.70	188.70
D. Weight of Wet Soil (g) (B-C)	420.50	401.70
E. Weight of Dry Soil (g) (D/(1 + A))	358.97	354.11
F. Wet Density (pcf) D g/cubic cm/207 cubic cm convert to pcf (x 62.4) (1gram/cubic cm = 62.4 lbs cubic foot)	126.76	121.09
G. Dry Density (pcf) E g/cubic cm/207 cubic cm convert to pcf (x 62.4)	108.21	106.75
H. Weight of Water (pcf) (A/100 x G)	18.55	14.35
I. Volume of Solids (cubic ft) (G/(2.7 sp. Gravity x 62.4))	0.64	0.63
J. Volume of Voids (cubic ft) (1-I)	0.36	0.37
Degree of saturation (%) Volume of water/volume of void x 100 H/62.4/J (%)	83.09	62.75

Expansion Potential			
	Test A	Test B	
0 - 20	N/A	↔	VERY LOW
21 - 50	N/A	↔	LOW
51 - 90	N/A	↔	MEDIUM
91 - 130	N/A	N/A	HIGH
>130	N/A	N/A	VERY HIGH

FINAL RESULTS		
Expansion Index (EI60) (A)		Final Moisture Content (%) 26.5
Expansion Index (EI60) (B)	61.00	← Note: Disregard Test (B) if Degree of Saturation is 0.0

CORRECTION FOR DEGREE OF SATURATION

EI60 = EI measured - (50-S measured) x ((65 + EI measured) / (220 - S measured))