Earth Strata Geotechnical Services, Inc.
Geotechnical, Environmental and Materials Testing Consultants

November 5, 2018

Project No. 182141-12A

Ms. Carissa Hainsworth
MIKE NAGGAR & ASSOCIATES
445 South D Street
Perris, CA 92570

Subject: Interpretive Report for Infiltration System Design, Proposed Convenience Store, Restaurant and Car Wash, Assessor's Parcel Numbers 329-110-019 and 329-110-023, Lot Numbers 93 and 94 of Romola Farms Subdivision, Located at 28480 and 28380 Highway 74, City of Menifee, Riverside County, California

Earth Strata Geotechnical Services, Inc. is pleased to present this infiltration feasibility report for the proposed commercial development, Assessor's Parcel Numbers 329-110-019 and 329-110-023, located at 28480 and 28380 Highway 74 in the City of Menifee, Riverside County, California. The purpose of our study was to determine the infiltration rates and physical characteristics of the subsurface earth materials within the proposed development. We have provided guidelines for the design of onsite bio swale retention systems, where applicable. This study is intended to provide onsite infiltration rates for the earth materials at the approximate depth near the proposed WQMP areas.

PROPERTY DESCRIPTION

The subject property is located at 28480 and 28380 Highway 74 in the City of Menifee, Riverside County, California. The approximate location of the site is shown on the Vicinity Map, Figure 1.

The subject property is comprised of approximately 5.53 acres of partially developed land. The site has been graded. Topographic relief at the subject property is relatively low with the terrain being generally flat. Elevations at the site range from approximately 1,460 to 1465 feet above mean sea level (msl), for a difference of about 5± feet across the entire site. Drainage within the subject property generally flows to the southwest.

The site is currently bordered by residential development to the west, commercial development to the south, as well as vacant property to the north and east. Most of the vegetation on the site consists of moderate amounts of annual weeds/grasses, along with small to large trees bordering the north and east portion of the subject site.

PROPOSED CONSTRUCTION

The proposed commercial development is expected to consist of concrete, wood or steel framed one- and/or two-story structures utilizing slab on grade construction with associated streets, landscape areas, and utilities. The current development plans include a gas station in the eastern portion of the subject site, along with three (3) future development areas positioned throughout the site.

SUBSURFACE EXPLORATION AND INFILTRATION TESTING

SUBSURFACE EXPLORATION

Subsurface exploration within the subject site was performed on April 12 and April 16, 2018 for the exploratory excavations. A truck mounted hollow-stem-auger drill rig was utilized to drill five (5) borings throughout the site to a maximum depth of 21.5 feet. The exploratory holes were excavated for geotechnical evaluation purposes with respect to the proposed developments and to interpret whether groundwater or impermeable soil layers were present. An underground utilities clearance was obtained from Underground Service Alert of Southern California, prior to the subsurface exploration. The approximate locations of the exploratory excavations are shown on the attached Infiltration Location Map, Plate 1 and descriptive logs are presented in Appendix A.

Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions may have been reconciled to reflect laboratory test results with regard to ASTM D 2487.

EARTH MATERIALS

The earth materials on the site are primarily comprised of artificial fill and Quaternary alluvial materials. A general description of the dominant earth materials observed on the site is provided below:

- Artificial Fill, Undocumented (map symbol Afu): Undocumented artificial fill materials were encountered throughout the site within the upper 2 to 4 feet during exploration. These materials are typically locally derived from the native materials and consist generally of light brown to reddish brown silty clayey sand.

- Quaternary Old Alluvial Fan Deposits (map symbol Qof): Quaternary old alluvial fan deposits were encountered beneath the undocumented artificial to the full depth of exploration. These old fan deposits consist predominately of interlayered reddish brown to dark brown, fine to coarse grained clayey sand, silty sand, sandy silt, and occasional poorly-graded sand. These deposits were generally noted to be in a dry to moist, medium dense to very dense state.

GROUNDWATER

Groundwater was not observed during our subsurface exploration.

INFILTRATION TESTING

The percolation testing method per Riverside County Health Department guidelines, with the Porchet Method conversion, was utilized to perform a total of eight (8) percolation tests on November 6 and 7, 2018 to evaluate near surface infiltration rates in order to estimate the amount of storm water runoff that can infiltrate into the WQMP areas. The percolation tests were performed in general accordance with the requirements of Appendix A of the Design Handbook for Low Impact Development Best Management Practices, prepared by Riverside County Flood Control and Water Conservation District. The percolation tests were performed within 5-foot-deep, 8- inch diameter tests holes. The final percolation test reading and infiltration rate is summarized in the following table and the test data recorded in the field is included in Appendix B.

INFILTRATION TEST SUMMARY

The following equation was used in order to convert the percolation rates to infiltration rates.

$$I_t = \frac{\Delta H\,(60)\,r}{\Delta t\,(r + 2Havg)}$$

TEST NUMBER	PERCOLATION HOLE DIAMETER (inches)	INFILTRATION HOLE DEPTH (ft.)	INFILTRATION RATE (in/hour)	DESCRIPTION
I-1	8	5	0.31	Silty SAND
I-2	8	5	0.18	Silty SAND
I-3	8	5	0.22	Silty SAND
I-4	8	5	0.06	Silty SAND
I-5	8	5	0.12	Silty SAND
I-6	8	5	0.17	Silty SAND
I-7	8	5	0.08	Silty SAND
I-8	8	5	0.06	Silty SAND

The infiltration test rates ranged from 0.06 to 0.31 inches per hour.

CONCLUSIONS AND RECOMMENDATIONS

General

From geotechnical and engineering geologic points of view, the proposed WQMP areas, where tested, is considered suitable for partial infiltration for the proposed development, provided the following conclusions and recommendations are incorporated into the plans and are implemented during construction.

Groundwater

Groundwater was not observed during our subsurface exploration. Potential groundwater impact is considered very low to low. Local well data indicates regional groundwater highs of approximately 46 feet below existing ground surface which meets the minimum separation of greater than 10 feet from the bottom of infiltration facility to the groundwater mark.

Geologic/ Geotechnical Screening

The proposed WQMP areas (see Plate 1) are located at a lower elevation than the proposed structures in competent native earth materials.

The proposed structures will be supported by compacted fill and competent earth materials, with groundwater at a depth of approximately 46 feet. According to the County of Riverside reports, the subject site is located in an area where liquefaction potential is considered low. As such, the potential for earthquake induced liquefaction and lateral spreading beneath the proposed structures is considered low due to the

recommended compacted fill, relatively low groundwater level, and the dense nature of the deeper onsite earth materials.

Preliminary laboratory test results indicate onsite earth materials exhibit an expansion potential of **LOW** as classified in accordance with 2016 CBC Section 1803.5.3 and ASTM D4829.

Therefore, infiltration within the proposed WQMP areas will not encroach on any proposed structures and will not increase the risk of geologic hazards.

Recommended Factor of Safety

The recommended factor of safety for the infiltration design is 3.

Based on the data presented in this report and the recommendations set forth herein, it is the opinion of Earth Strata Geotechnical Services that the WQMP area can be designed for an infiltration rate of 0.26 inches per hour in the vicinity of P-1, P-2, P-3, and P-4 and 0.14 inches per hour in the vicinity of P-5, P-6, P-7, and P-8.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **Ms. Carissa Hainsworth** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth Strata Geotechnical Services should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth-Strata not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

Earth Strata Geotechnical Services should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth Strata Geotechnical Services should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth-Strata during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

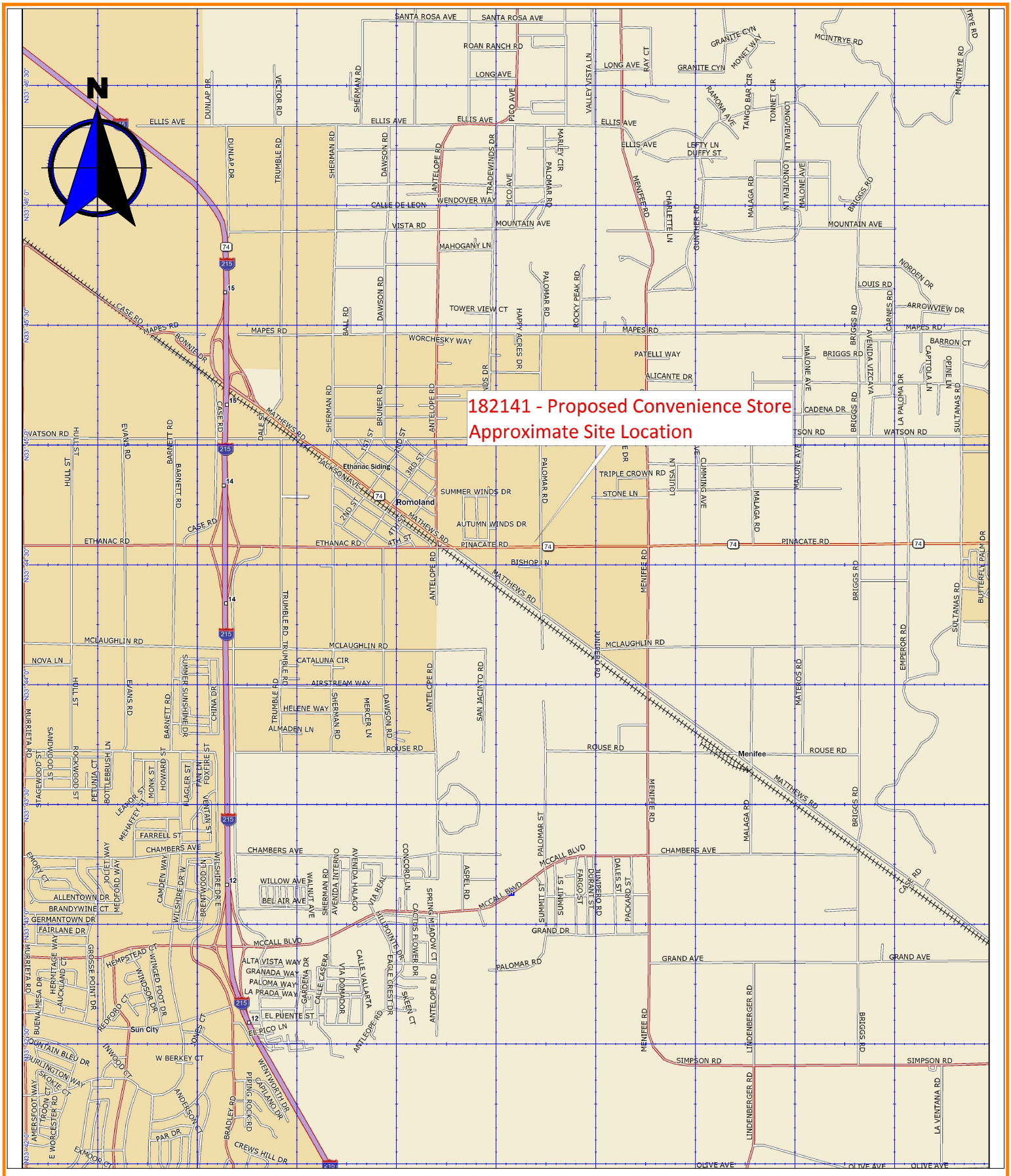
EARTH STRATA GEOTECHNICAL SERVICES, INC.

Stephen M. Poole, PE 40219
President
Principal Engineer

SMP/jf

Distribution: (4) Addressee

Attachments: Figure 1 – Vicinity Map *(Rear of Text)*
Appendix A - Exploratory Logs *(Rear of Text)*
Appendix B – Infiltration Test Sheets *(Rear of Text)*
Plate 1 – Infiltration Location Map *(Rear of Text)*



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PROPOSED CONVENIENCE STORE | 182141-12A

VICINITY MAP | SCALE 1:40,625

APR 2018 | FIGURE 1

APPENDIX A

EXPLORATORY LOGS

Geotechnical Boring Log B-1

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0		0-5'				**Artificial Fill, Undocumented (Afu):**
					SC	Clayey SAND; dark brown, slightly moist, medium dense, fine to coarse sand,
	19	2.5'	121.7	9.1		trace gravel
						Quaternary Old Alluvial Fan Deposits (Qof):
					SP-SC	Poorly-graded SAND with Clay; strong brown, dry, very dense, fine to coarse sand,
5	71/11"	5'	120.5	7.0		trace gravel
	47	7.5'	116.3	11.6		
					SM	Silty SAND; strong brown, dry, very dense, fine to coarse sand, trace clay and gravel
10	97/9"	10'	111.3	9.2		
15	90/9"	15'	113.5	11.2		
20	50/6"	20'	97.8	12.7		
						Total Depth: 21 feet
						No Groundwater
25						
30						

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Geotechnical Boring Log B-2

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; dark brown, slightly moist, dense, fine to coarse sand,
	44	2.5'	114.8	6.6		trace clay and gravel
						Quaternary Old Alluvial Fan Deposits (Qof):
					SM	Silty SAND; strong brown, dry, very dense, fine to coarse sand
5	50/3"	5'	107.5	6.6		
	50/5"	7.5'			SC	Clayey SAND; dark brown, dry, very dense, fine to coarse sand
10	50/6"	10'	105.3	5.9		
					SM	Silty SAND; stron brown, slightly moist, very dense, fine to coarse sand, trace clay
15	50/5.5"	15'	116.0	10.2		
20	87	20'	103.2	9.5	ML	Sandy SILT; yellowish brown, dry, very dense, fine to medium sand, trace clay
						Total Depth: 21.5 feet
						No Groundwater
25						
30						

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Geotechnical Boring Log B-3

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; light brown, dry, medium dense, fine to medium sand
	43	2.5'	115.5	1.5		Dense below 3 feet
5						**Quaternary Old Alluvial Fan Deposits (Qof):**
	80	5'	125.2	6.7	SC	Clayey SAND; dark brown, dry, very dense, fine to coarse sand
	41	7.5'	120.9	12.1	SP-SM	Poorly-graded SAND with Silt; brown, moist, dense, fine to coarse sand
10	83/5"	10'	108.6	12.8		
15	52	15'	107.2	19.1	SM	Silty SAND; brown, moist, very dense, fine to medium sand, trace clay
20	70	20'	106.0	15.5	ML	Sandy SILT; brown, moist, very dense, fine to coarse sand
						Total Depth: 21.5 feet
						No Groundwater
25						
30						

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Geotechnical Boring Log B-4

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; medium brown, slightly moist, medium dense, fine to coarse sand
	15	2.5'	115.0	7.1		
5	21	5'	120.8	11.8		**Quaternary Old Alluvial Fan Deposits (Qof):**
					SC	Clayey SAND; dark brown, slightly moist, medium dense, fine to coarse sand
	28	7.5'	126.8	10.1		
10	67	10'	130.2	9.4		Very dense below 10 feet
						Clay nodules below 12 feet
15	84	15	118.3	14.9		
						Total Depth: 16.5 feet
						No Groundwater
20						
25						
30						

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Geotechnical Boring Log B-5

Date: April 12, 2018	**Project Name: Hwy 74 & Palomar Road** **Page: 1 of 1**
Project Number: 182141-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Artificial Fill, Undocumented (Afu):**
					SM	Silty SAND; reddish brown, slightly moist, medium dense, fine to coarse sand
	26	2.5'	121.6	5.7		**Quaternary Old Alluvial Fan Deposits (Qof):**
					SM	Silty SAND; brown, slightly moist, medium dense, fine to coarse sand, trace clay
5	30	5'	126.4	3.8		
	62	7.5'	112.9	11.1		Very dense below 7 feet
					SC	Clayey SAND; reddish brown, slightly moist, very dense, fine to coarse sand
10	89/10"	10'	110.7	9.6		
					ML	Sandy SILT; reddish brown, slightly moist, very dense, fine to coarse sand
15	79/11"	15'	99.8	20.3		
						Total Depth: 16.5 feet
						No Groundwater
20						
25						
30						

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APPENDIX B

INFILTRATION TEST SHEETS

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-1
Soil Classification: Silty SAND
Test Hole Depth (in): 48

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start 11/6/18 10:00
Stop 11/7/18 14:00

Amount of Water Used / Comments
APPROX. 200 Gallons

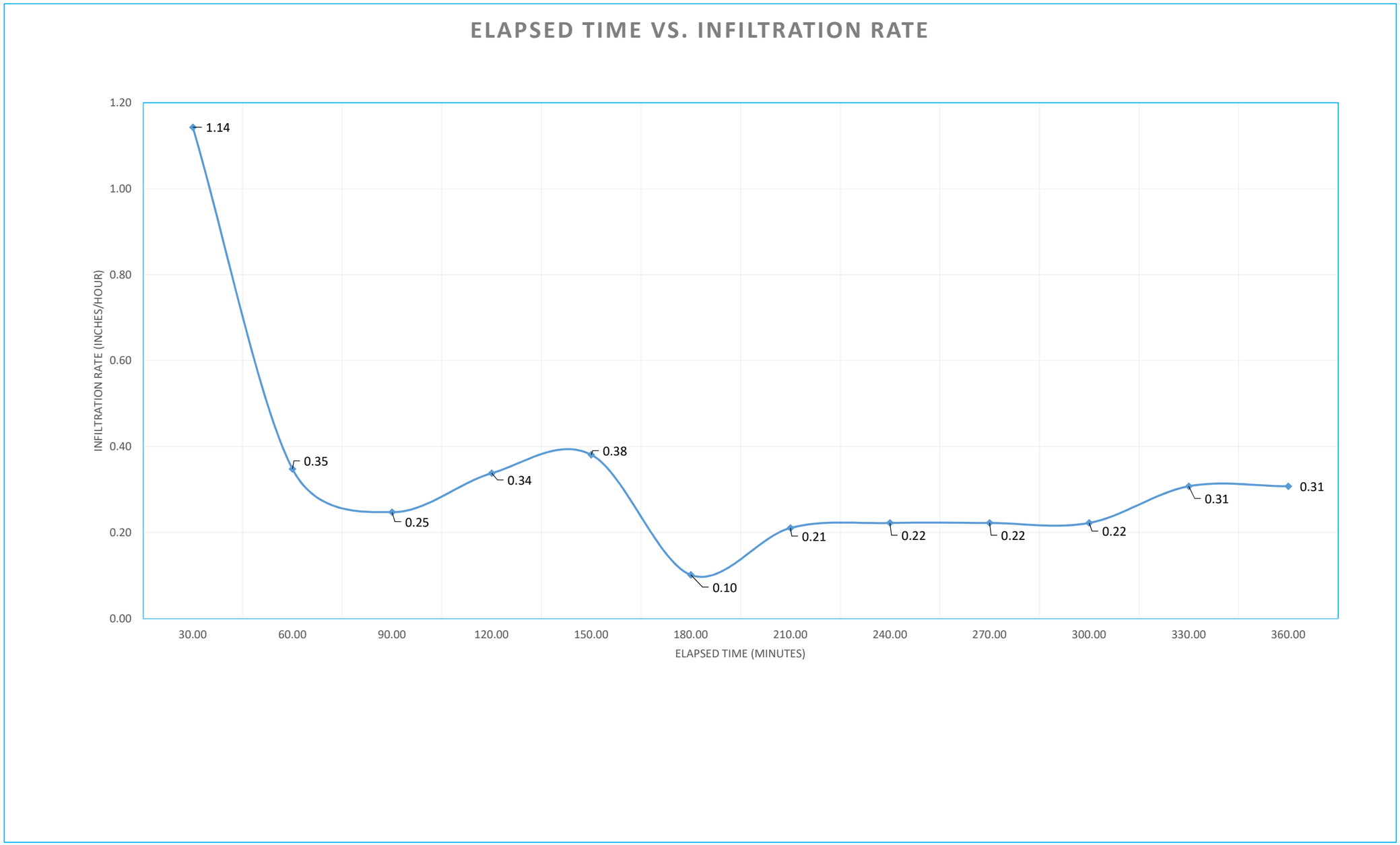
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:00 10:30	30	30	38	8.00	4	60.00
10:30 11:00	30	38	40	2.00	15	60.00
11:00 11:30	30	37.	38.5	1.50	20	60.00
11:30 12:00	30	38.5	40	1.50	20	55.00
12:00 12:30	30	35	37	2.00	15	55.00
12:30 13:00	30	37	37.5	0.50	60	55.00
13:00 13:30	30	37.5	38.5	1.00	30	55.00
13:30 14:00	30	38.5	39.5	1.00	30	55.00
14:00 14:30	30	38.5	39.5	1.00	30	55.00
14:30 15:00	30	38.5	39.5	1.00	30	55.00
15:00 15:30	30	38.5	39.5	1.00	30	50.00
15:30 16:00	30	38.5	39.5	1.00	30	50.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	30.00	22.00	60.00	4.00	8.00	26.00	1.14	30.00
30.00	22.00	20.00	60.00	4.00	2.00	21.00	0.35	60.00
30.00	23.00	21.50	60.00	4.00	1.50	22.25	0.25	90.00
30.00	16.50	15.00	55.00	4.00	1.50	15.75	0.34	120.00
30.00	20.00	18.00	55.00	4.00	2.00	19.00	0.38	150.00
30.00	18.00	17.50	55.00	4.00	0.50	17.75	0.10	180.00
30.00	17.50	16.50	55.00	4.00	1.00	17.00	0.21	210.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	240.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	270.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	300.00
30.00	11.50	10.50	50.00	4.00	1.00	11.00	0.31	330.00
30.00	11.50	10.50	50.00	4.00	1.00	11.00	0.31	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-1



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-2
Soil Classification: Silty SAND
Test Hole Depth (in): 48

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

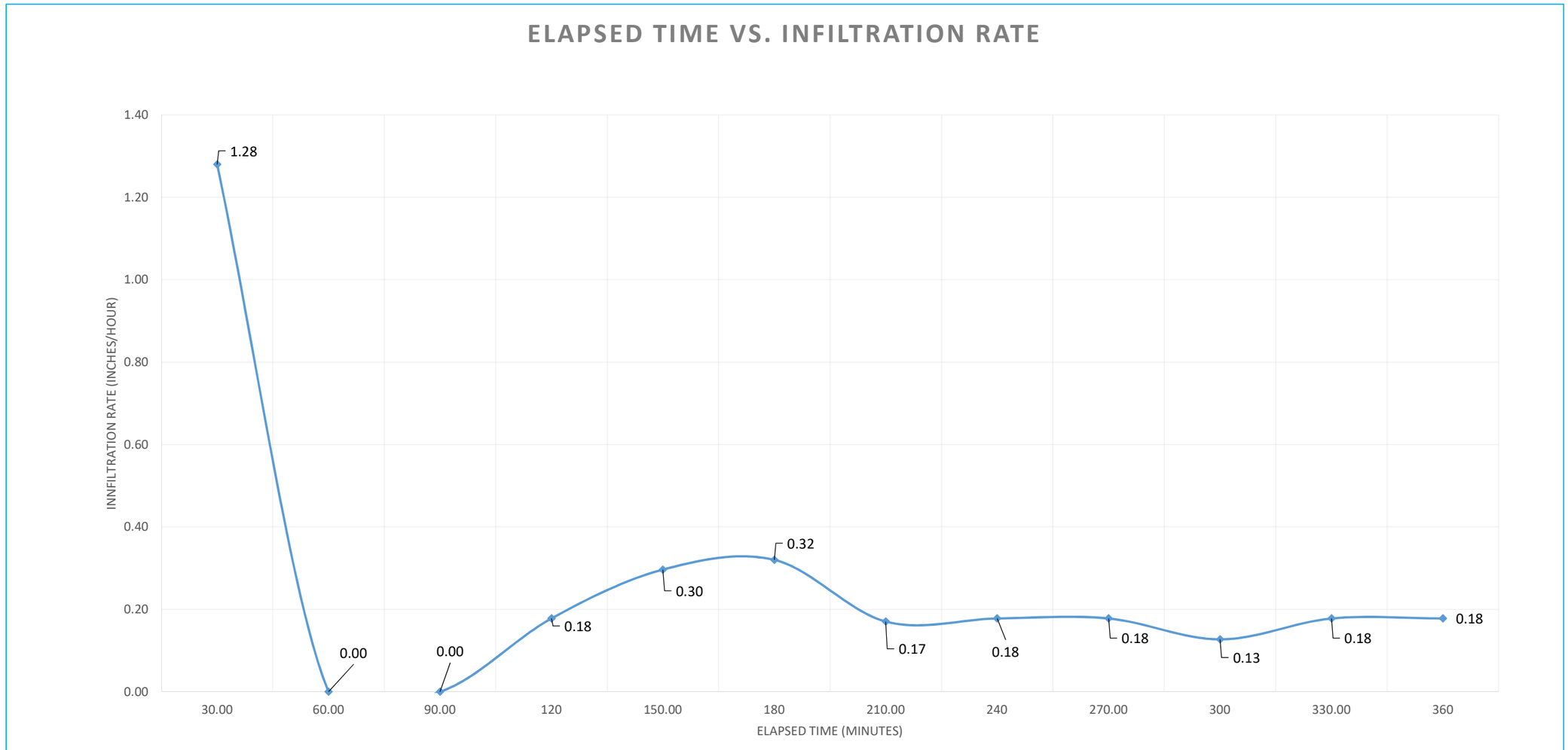
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:01						
10:31	30	28	36	8.00	4	55.00
10:31						
11:01	30	36	36	0.00	#DIV/0!	55.00
11:01						
11:31	30	34	34	0.00	#DIV/0!	55.00
11:31						
12:01	30	34	35	1.00	30	55.00
12:01						
12:31	30	29	31	2.00	15	55.00
12:31						
13:01	30	31	33	2.00	15	55.00
13:01						
13:31	30	33	34	1.00	30	55.00
13:31						
14:01	30	34	35	1.00	30	55.00
14:01						
14:31	30	34	35	1.00	30	55.00
14:31						
15:01	30	34	35	1.00	30	5.00
15:01						
15:31	30	34	35	1.00	30	55.00
15:31						
16:01	30	34	35	1.00	30	55.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	27.00	19.00	55.00	4.00	8.00	23.00	1.28	30.00
30.00	19.00	19.00	55.00	4.00	0.00	19.00	0.00	60.00
30.00	21.00	21.00	55.00	4.00	0.00	21.00	0.00	90.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	120.00
30.00	26.00	24.00	55.00	4.00	2.00	25.00	0.30	150.00
30.00	24.00	22.00	55.00	4.00	2.00	23.00	0.32	180.00
30.00	22.00	21.00	55.00	4.00	1.00	21.50	0.17	210.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	240.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	270.00
30.00	-29.00	-30.00	5.00	4.00	1.00	29.50	0.13	300.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	330.00
30.00	21.00	20.00	55.00	4.00	1.00	20.50	0.18	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-2



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-3
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

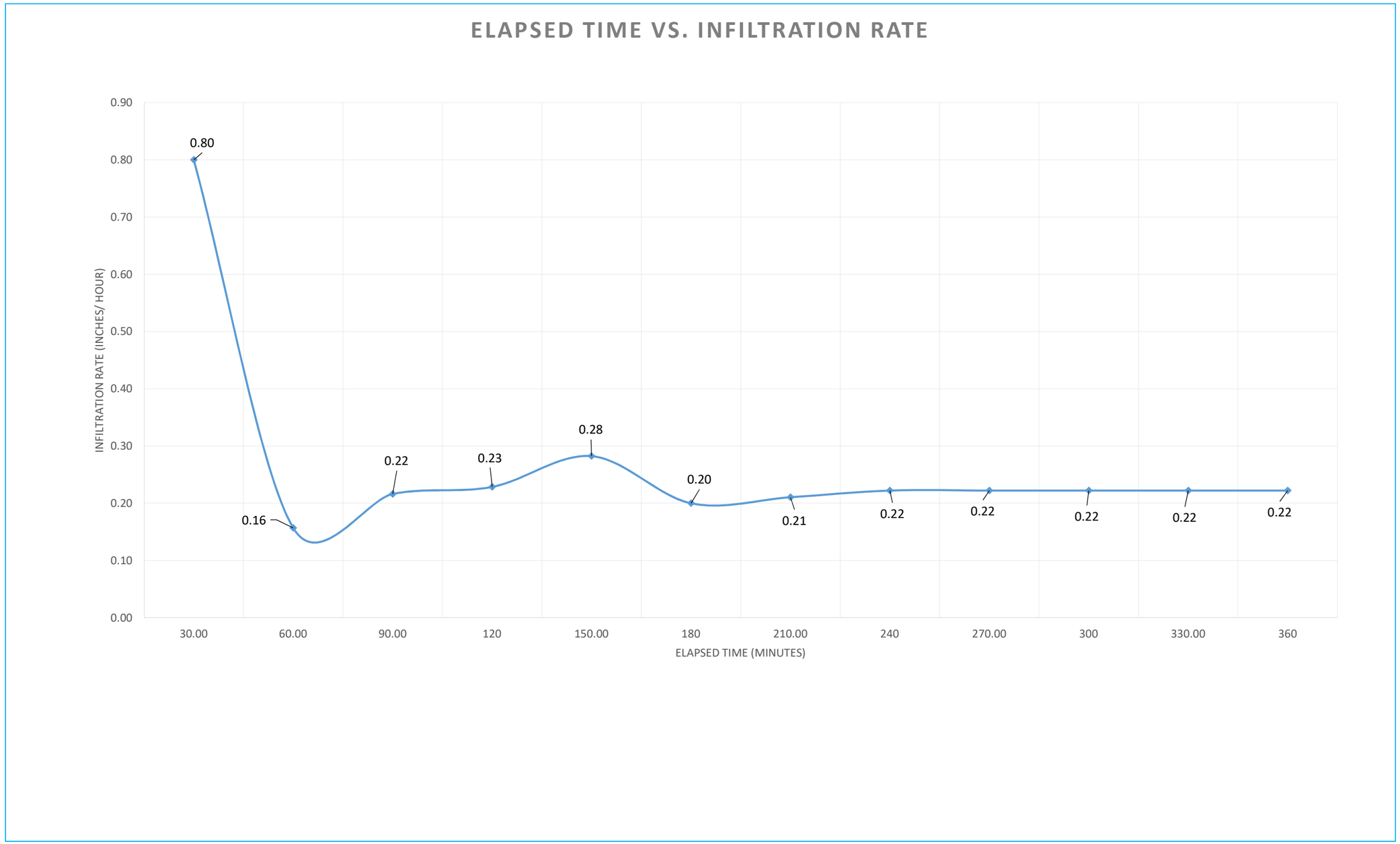
Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:02						
10:32	30	40	44	4.00	8	60.00
10:32						
11:02	30	44	44.5	0.50	60	55.00
11:02						
11:32	30	38	39	1.00	30	55.00
11:32						
12:02	30	39	40	1.00	30	55.00
12:02						
12:32	30	35	36.5	1.50	20	55.00
12:32						
13:02	30	36.5	37.5	1.00	30	55.00
13:02						
13:32	30	37.5	38.5	1.00	30	55.00
13:32						
14:02	30	38.5	39.5	1.00	30	55.00
14:02						
14:32	30	38.5	39.5	1.00	30	55.00
14:32						
15:02	30	38.5	39.5	1.00	30	55.00
15:02						
15:32	30	38.5	39.5	1.00	30	55.00
15:32						
16:02	30	38.5	39.5	1.00	30	55.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	20.00	16.00	60.00	4.00	4.00	18.00	0.80	30.00
30.00	11.00	10.50	55.00	4.00	0.50	10.75	0.16	60.00
30.00	17.00	16.00	55.00	4.00	1.00	16.50	0.22	90.00
30.00	16.00	15.00	55.00	4.00	1.00	15.50	0.23	120.00
30.00	20.00	18.50	55.00	4.00	1.50	19.25	0.28	150.00
30.00	18.50	17.50	55.00	4.00	1.00	18.00	0.20	180.00
30.00	17.50	16.50	55.00	4.00	1.00	17.00	0.21	210.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	240.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	270.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	300.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	330.00
30.00	16.50	15.50	55.00	4.00	1.00	16.00	0.22	360.00

Job No.: 182141-12A

Job Name: HWY 74 & PALOMAR ROAD

Test Hole Number: P-3



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-4
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/6/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

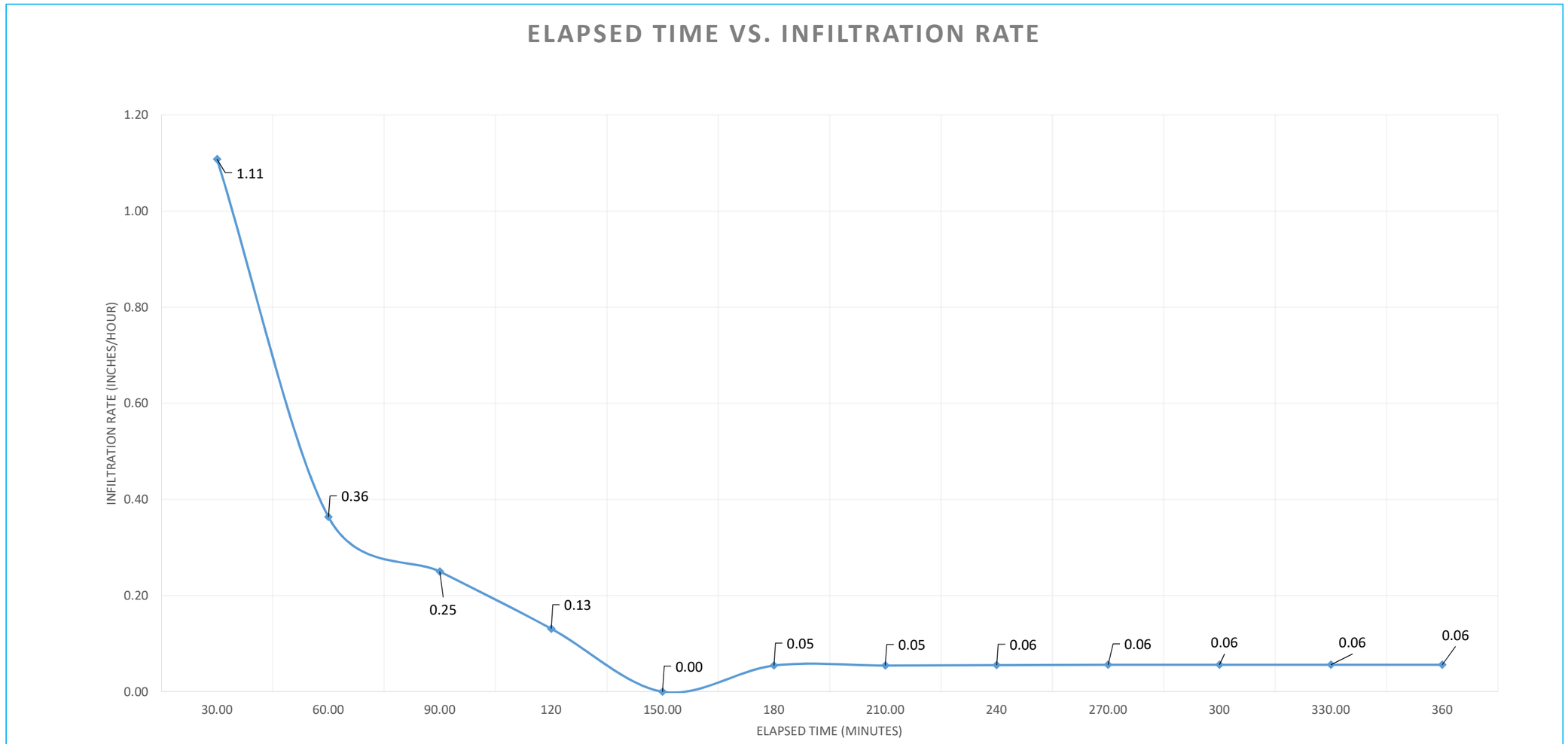
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
10:03						
10:33	30	25	34	9.00	4	60.00
10:33						
11:03	30	34	36	2.00	15	55.00
11:03						
11:33	30	24	26	2.00	15	55.00
11:33						
12:03	30	26	27	1.00	30	55.00
12:03						
12:33	30	20	20	0.00	#DIV/0!	55.00
12:33						
13:03	30	20	20.5	0.50	60	55.00
13:03						
13:33	30	20	20.5	0.50	60	55.00
13:33						
14:03	30	20.5	21	0.50	60	55.00
14:03						
14:33	30	21	21.5	0.50	60	55.00
14:33						
15:03	30	21	21.5	0.50	60	55.00
15:03						
15:33	30	21	21.5	0.50	60	55.00
15:33						
16:03	30	21	21.5	0.50	60	55.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	35.00	26.00	60.00	4.00	9.00	30.50	1.11	30.00
30.00	21.00	19.00	55.00	4.00	2.00	20.00	0.36	60.00
30.00	31.00	29.00	55.00	4.00	2.00	30.00	0.25	90.00
30.00	29.00	28.00	55.00	4.00	1.00	28.50	0.13	120.00
30.00	35.00	35.00	55.00	4.00	0.00	35.00	0.00	150.00
30.00	35.00	34.50	55.00	4.00	0.50	34.75	0.05	180.00
30.00	35.00	34.50	55.00	4.00	0.50	34.75	0.05	210.00
30.00	34.50	34.00	55.00	4.00	0.50	34.25	0.06	240.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	270.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	300.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	330.00
30.00	34.00	33.50	55.00	4.00	0.50	33.75	0.06	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-4



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-5
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

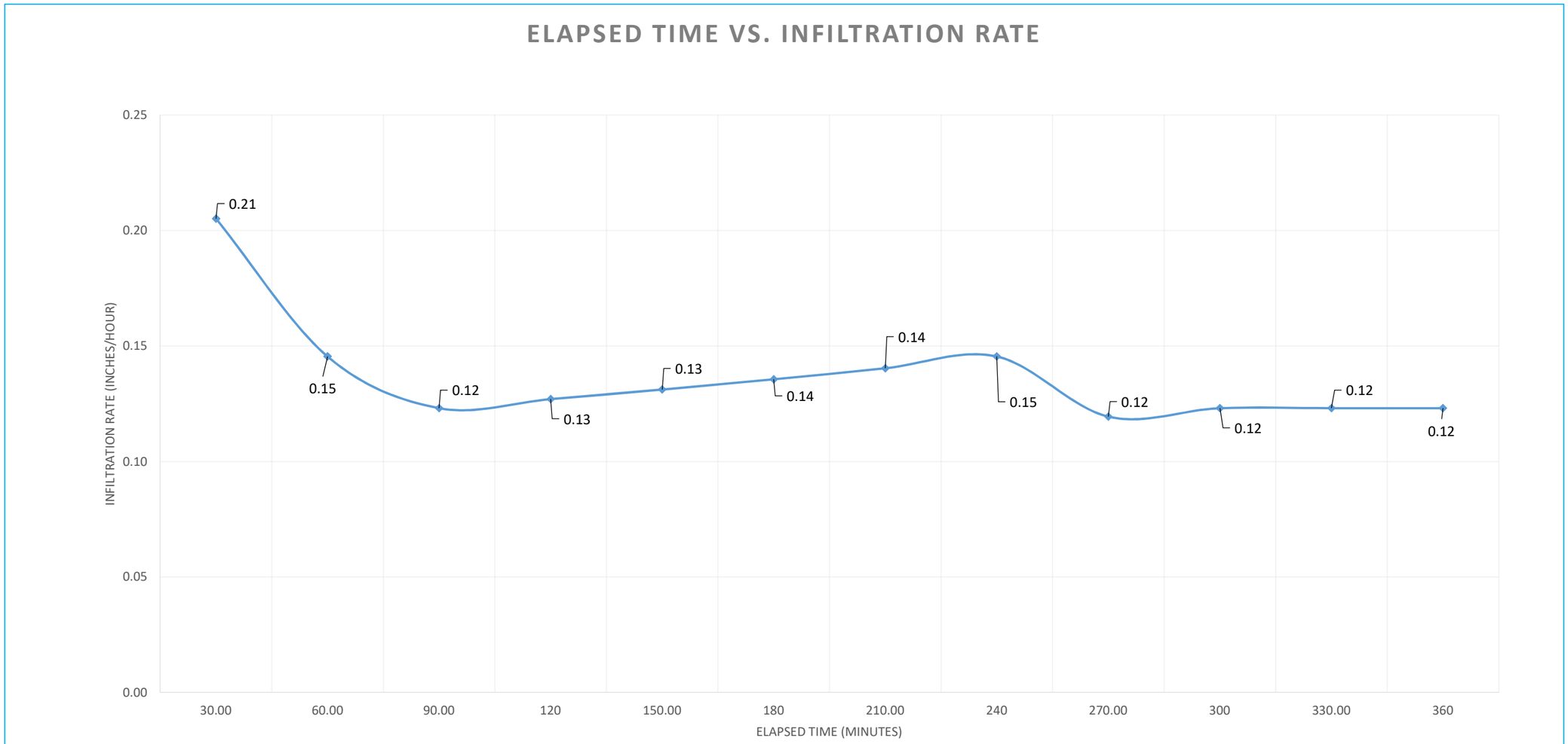
Time	*Time Interval (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*	*Total Depth of Percolation Hole*
8:00						
8:30	30	42	43	1.00	30	60.00
8:30						
9:00	30	43	43.5	0.50	60	55.00
9:00						
9:30	30	40.5	41	0.50	60	55.00
9:30						
10:00	30	41	41.5	0.50	60	55.00
10:00						
10:30	30	41.5	42	0.50	60	55.00
10:30						
11:00	30	42	42.5	0.50	60	55.00
11:00						
11:30	30	42.5	43	0.50	60	55.00
11:30						
12:00	30	43	43.5	0.50	60	55.00
12:00						
12:30	30	40	40.5	0.50	60	55.00
12:30						
13:00	30	40.5	41	0.50	60	55.00
13:00						
13:30	30	40.5	41	0.50	60	55.00
13:30						
14:00	30	40.5	41	0.50	60	55.00

Time interval Δt	*Initial Water H_0*	*Final Water H_f*	*Total Depth of Test Hole D_t*	*Raduis of Perc Hole r*	*ΔH*	*H Avg*	*ΔH 60 r)/(Δt (r+2Havg)) It*	*ELAPSED TIME Δt*
30.00	18.00	17.00	60.00	4.00	1.00	17.50	0.21	30.00
30.00	12.00	11.50	55.00	4.00	0.50	11.75	0.15	60.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	90.00
30.00	14.00	13.50	55.00	4.00	0.50	13.75	0.13	120.00
30.00	13.50	13.00	55.00	4.00	0.50	13.25	0.13	150.00
30.00	13.00	12.50	55.00	4.00	0.50	12.75	0.14	180.00
30.00	12.50	12.00	55.00	4.00	0.50	12.25	0.14	210.00
30.00	12.00	11.50	55.00	4.00	0.50	11.75	0.15	240.00
30.00	15.00	14.50	55.00	4.00	0.50	14.75	0.12	270.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	300.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	330.00
30.00	14.50	14.00	55.00	4.00	0.50	14.25	0.12	360.00

Job No.: 182141-12A

Job Name: HWY 74 & PALOMAR ROAD

Test Hole Number: P-5



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-6
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Amount of Water Used / Comments
APPROX. 200 Gallons

Date / Time
Start
Stop

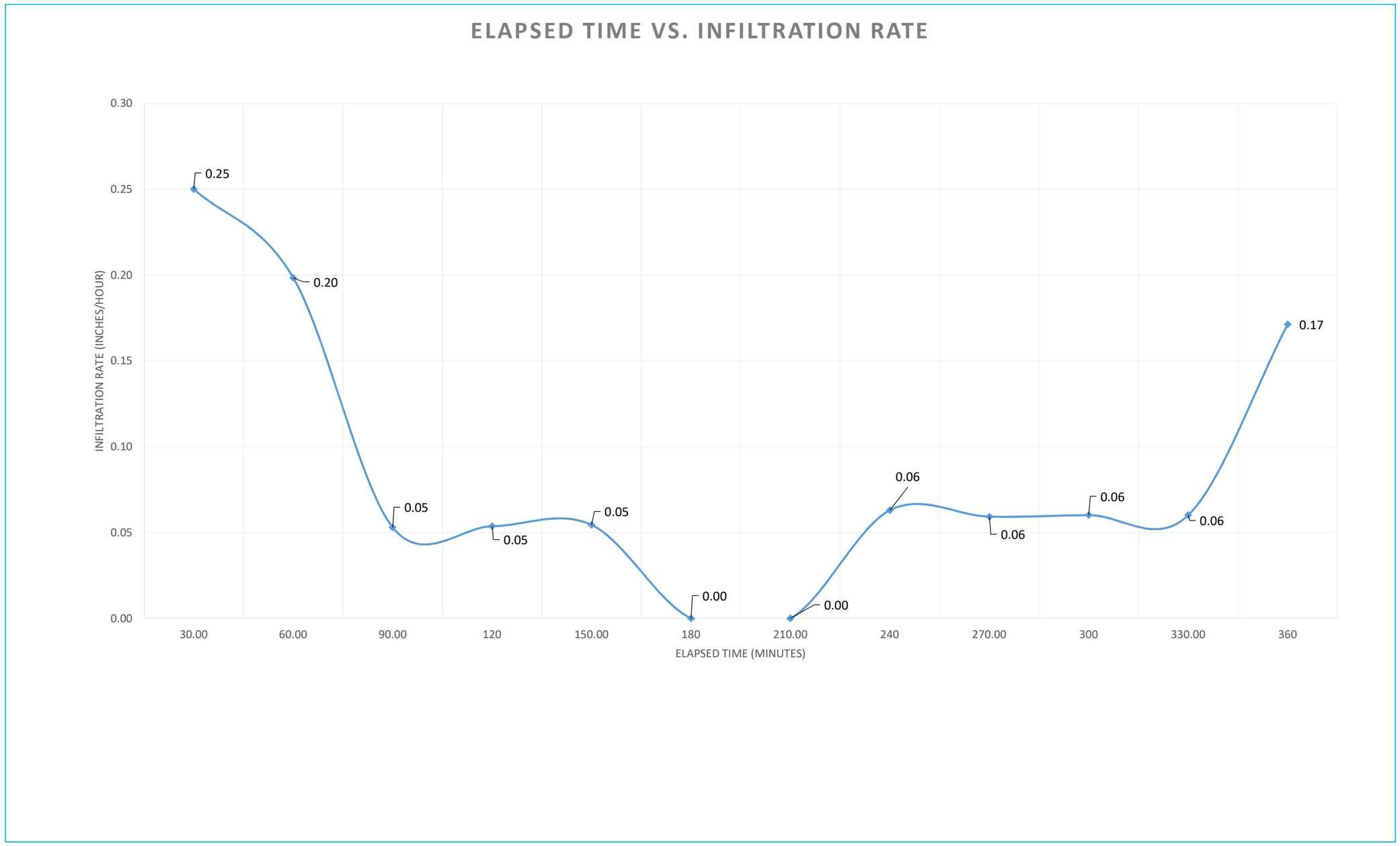
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
r_2Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
8:01	30	24	26	2.00	15	55.00
8:31						
8:31	30	26	27.5	1.50	20	55.00
9:01						
9:00	30	19	19.5	0.50	60	55.00
9:30						
9:30	30	19.5	20	0.50	60	55.00
10:00						
10:00	30	20	20.5	0.50	60	55.00
10:30						
10:30	30	20.5	20.5	0.00	0	50.00
11:00						
11:00	30	20.5	20.5	0.00	0	48.00
11:30						
11:30	30	18	18.5	0.50	60	48.00
12:00						
12:00	30	16	16.5	0.50	60	48.00
12:30						
12:30	30	16.5	17	0.50	60	48.00
13:00						
13:00	30	16.5	17	0.50	60	48.00
13:30						
13:30	30	16.6	18	1.40	22	48.00
14:00						

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	31.00	29.00	55.00	4.00	2.00	30.00	0.25	30.00
30.00	29.00	27.50	55.00	4.00	1.50	28.25	0.20	60.00
30.00	36.00	35.50	55.00	4.00	0.50	35.75	0.05	90.00
30.00	35.50	35.00	55.00	4.00	0.50	35.25	0.05	120.00
30.00	35.00	34.50	55.00	4.00	0.50	34.75	0.05	150.00
30.00	29.50	29.50	50.00	4.00	0.00	29.50	0.00	180.00
30.00	27.50	27.50	48.00	4.00	0.00	27.50	0.00	210.00
30.00	30.00	29.50	48.00	4.00	0.50	29.75	0.06	240.00
30.00	32.00	31.50	48.00	4.00	0.50	31.75	0.06	270.00
30.00	31.50	31.00	48.00	4.00	0.50	31.25	0.06	300.00
30.00	31.50	31.00	48.00	4.00	0.50	31.25	0.06	330.00
30.00	31.40	30.00	48.00	4.00	1.40	30.70	0.17	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-6



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-7
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Amount of Water Used / Comments
APPROX. 200 Gallons

Date / Time
Start
Stop

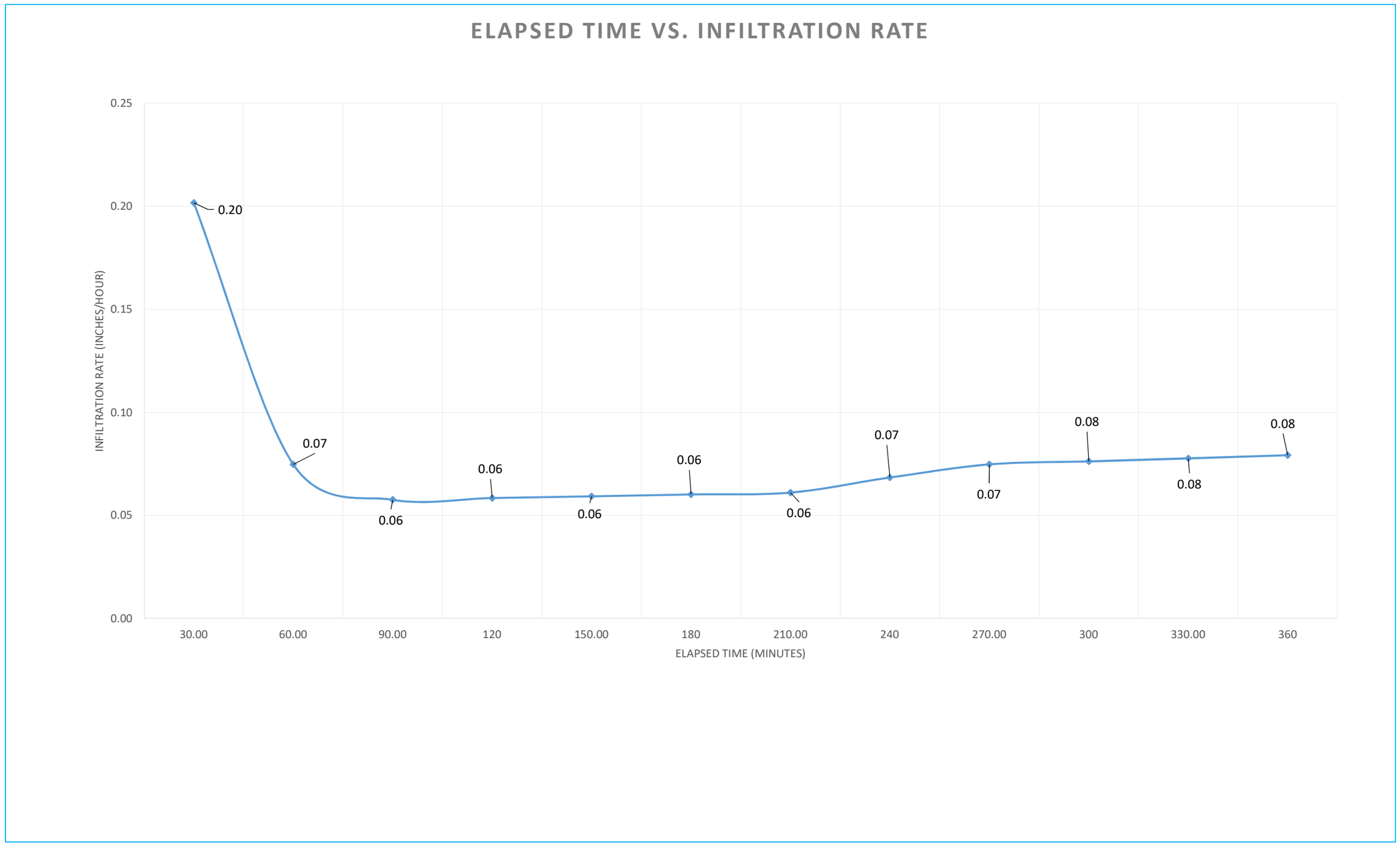
"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
8:02						
8:32	30	26.5	28	1.50	20	55.00
8:32						
9:02	30	28	28.5	0.50	60	53.00
9:02						
9:32	30	20	20.5	0.50	60	53.00
9:32						
10:02	30	20.5	21	0.50	60	53.00
10:02						
10:32	30	21	21.5	0.50	60	53.00
10:32						
11:02	30	21.5	22	0.50	60	53.00
11:02						
11:32	30	22	22.5	0.50	60	53.00
11:32						
12:02	30	22.5	23	0.50	60	50.00
12:02						
12:32	30	23	23.5	0.50	60	48.00
12:32						
13:02	30	23.5	24	0.50	60	48.00
13:02						
13:32	30	24	24.5	0.50	60	48.00
13:32						
14:02	30	24.5	25	0.50	60	48.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	28.50	27.00	55.00	4.00	1.50	27.75	0.20	30.00
30.00	25.00	24.50	53.00	4.00	0.50	24.75	0.07	60.00
30.00	33.00	32.50	53.00	4.00	0.50	32.75	0.06	90.00
30.00	32.50	32.00	53.00	4.00	0.50	32.25	0.06	120.00
30.00	32.00	31.50	53.00	4.00	0.50	31.75	0.06	150.00
30.00	31.50	31.00	53.00	4.00	0.50	31.25	0.06	180.00
30.00	31.00	30.50	53.00	4.00	0.50	30.75	0.06	210.00
30.00	27.50	27.00	50.00	4.00	0.50	27.25	0.07	240.00
30.00	25.00	24.50	48.00	4.00	0.50	24.75	0.07	270.00
30.00	24.50	24.00	48.00	4.00	0.50	24.25	0.08	300.00
30.00	24.00	23.50	48.00	4.00	0.50	23.75	0.08	330.00
30.00	23.50	23.00	48.00	4.00	0.50	23.25	0.08	360.00

Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-7



Job No.: 182141-12A
Job Name: HWY 74 & PALOMAR ROAD
Test Hole Number: P-8
Soil Classification: Silty SAND
Test Hole Depth (in): 60

Tested By: RG
Test Hole Diameter (inches): 8
Date Excavated: 11/5/2018
Date Tested: 11/7/2018

Time Interval of Presoak
24 Hours

Date / Time
Start
Stop

Amount of Water Used / Comments
APPROX. 200 Gallons

"It" is the tested infiltration rate.
Time interval, Δt Initial Depth to Water, D_0
Final Depth to Water, D_f Total Depth of Test Hole, D_T
$_2$Test Hole Radius, r
The conversion equation is used:
"Havg" is the average head height over the time interval.

$$It = \frac{\Delta H\ 60\ r}{\Delta t(r+2Havg)}$$

Time	Time Interval (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)	Total Depth of Percolation Hole
8:03						
8:33	30	37.5	38	0.50	60	60.00
8:33						
9:03	30	38	39	1.00	30	55.00
9:03						
9:33	30	39	40	1.00	30	55.00
9:33						
10:03	30	28.5	29	0.50	60	55.00
10:03						
10:33	30	29	29.5	0.50	60	55.00
10:33						
11:03	30	29.5	30	0.50	60	55.00
11:03						
11:33	30	30	30.5	0.50	60	55.00
11:33						
12:03	30	30.5	31	0.50	60	55.00
12:03						
12:33	30	26	26.5	0.50	60	55.00
12:33						
13:03	30	26.5	27	0.50	60	60.00
13:03						
13:33	30	27	27.5	0.50	60	60.00
13:33						
14:03	30	27.5	28	0.50	60	60.00

Time interval Δt	Initial Water H_0	Final Water H_f	Total Depth of Test Hole D_t	Raduis of Perc Hole r	ΔH	H Avg	ΔH 60 r)/(Δt (r+2Havg)) It	ELAPSED TIME Δt
30.00	22.50	22.00	60.00	4.00	0.50	22.25	0.08	30.00
30.00	17.00	16.00	55.00	4.00	1.00	16.50	0.22	60.00
30.00	16.00	15.00	55.00	4.00	1.00	15.50	0.23	90.00
30.00	26.50	26.00	55.00	4.00	0.50	26.25	0.07	120.00
30.00	26.00	25.50	55.00	4.00	0.50	25.75	0.07	150.00
30.00	25.50	25.00	55.00	4.00	0.50	25.25	0.07	180.00
30.00	25.00	24.50	55.00	4.00	0.50	24.75	0.07	210.00
30.00	24.50	24.00	55.00	4.00	0.50	24.25	0.08	240.00
30.00	29.00	28.50	55.00	4.00	0.50	28.75	0.07	270.00
30.00	33.50	33.00	60.00	4.00	0.50	33.25	0.06	300.00
30.00	33.00	32.50	60.00	4.00	0.50	32.75	0.06	330.00
30.00	32.50	32.00	60.00	4.00	0.50	32.25	0.06	360.00

Job No.: 182141-12A

Job Name: HWY 74 & PALOMAR ROAD

Test Hole Number: P-8