Appendix E

Drainage Study

DRAINAGE STUDY

FOR

3233 E. Mission Oaks Blvd - Technicolor Building Remodel Project – IPD-53M(9)

Camarillo, California

December 12, 2017

PREPARED FOR

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SECTION 1 INTRODUCTION

Rexford Industrial Realty Inc. proposes to implement various modifications to the north side of the existing Technicolor Building property, located at 3233 E. Mission Oaks Blvd, in the City of Camarillo. The redevelopment includes parking lot re-configuration, building additions, loading dock additions, new trash enclosures, and other building interior improvements. The total disturbed area for the project is approximately 2.73 acres, with 1.38 acres on the west side of the building and 1.35 acres on the east side of the building.

Figure 1: Project Location Map

SECTION 2 MITIGATION CRITERIA

The reviewing agency for this project is the City of Camarillo. To minimize the impacts of the redevelopment on the existing drainage system, the proposed condition peak flows from the 10-, 25-, 50-, and 100-year storms will be attenuated back to the existing condition peaks. Procedures from the Ventura County Watershed Protection District (VCWPD) Design Hydrology Manual will be referenced to determine the appropriate detention volume.

To mitigate the potential water quality impacts, Best Management Practices (BMPs) (as described in the 2011 Ventura County Technical Guidance Manual [TGM], Errata Update 2015, and the Ventura County Municipal Stormwater Permit [Order 2010-0108]) will be

implemented to reduce the hydrologic and water quality impacts associated with this redevelopment. Additionally, a Post Construction Stormwater Management Plan (PCSMP) has been prepared which specifies the stormwater quality mitigation for this project, located in Appendix V of this report.

SECTION 3 PEAK RUNOFF ANALYSIS

3.1 EXISTING CONDITION PEAK RUNOFF

The following summary lists the sources and assumptions used to perform the time of concentration and peak flow calculations for the existing condition using the District's methodology:

a. The site is subdivided into two drainage areas, A1 and B1, with a predominant soil type of Soil Number 4, used in the VCRat model.
b. The rainfall zone of the project area is Zone K.
c. The contours and spot elevations from the topographic survey prepared by Encompass Consultant Group, Inc. were used for elevation references.
d. The Drainage Area Map for the existing condition provides the delineated areas and their associated effective impervious percentages. Typically, the effective imperviousness is less than total impervious area as a result of the impervious area runoff passing through pervious areas where some infiltration can occur. However, with the site already fully developed most of the runoff is conveyed over paved surfaces and into the storm drain system.

Table 1: Impervious Area (Existing Condition)

Subarea	Area (acres)	Total Imp (%)	Effective Imp (%)
A1	1.38	95	95
B1	1.35	91	91

e. The flow paths used in the Tc calculations and VCRat model are depicted in the Drainage Area Map.
f. The Tc calculation results for the existing condition are provided in Appendix I. Below is a summary of the results for all storm frequencies in minutes:

Table 2: Time of Concentration (Existing Condition)

Storm Frequency	Subarea A1	Subarea B1
$Tc_{10\text{-}yr}$ (min)	8	7

Storm Frequency	Subarea A1	Subarea B1
$Tc_{25\text{-}yr}$ (min)	7	6
$Tc_{50\text{-}yr}$ (min)	5	5
$Tc_{100\text{-}yr}$ (min)	5	5

g. Results for the existing condition VCRat models are provided in Appendix I and summarized below:

Table 2: Peak Runoff (Existing Condition)

Subarea	Area (acres)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
A1	1.38	4.0	5.0	5.9	6.9
B1	1.35	3.9	4.9	5.8	6.8
SUBTOTAL	2.73	7.9	9.9	11.7	13.7

3.2 PROPOSED CONDITION PEAK RUNOFF

The following summary lists the sources and assumptions used to perform the time of concentration and peak flow calculations for the proposed condition using the District's methodology:

a. Based on the latest site plan, the effective impervious percentages for the drainage areas are depicted in the table below. As noted in the existing condition discussion, the effective imperviousness and total impervious area is essentially the same since the site runoff is conveyed over paved surfaces and storm drain.

Table 4: Impervious Area (Proposed Condition)

Subarea	Area (acres)	Total Imp (%)	Effective Imp (%)
A2	1.38	89	89
B2	1.35	91	91

b. The flow paths used in the Tc calculations and VCRat model are depicted in the Drainage Area Map (Proposed Condition) provided in Appendix III.

c. The Tc calculation results for the proposed condition are provided in Appendix I. Below is a summary of the results for all storm frequencies in minutes:

Table 5: Time of Concentration (Proposed Condition)

Storm Frequency	Subarea A2	Subarea B2
$Tc_{10\text{-}yr}$ (min)	11	7
$Tc_{25\text{-}yr}$ (min)	10	6
$Tc_{50\text{-}yr}$ (min)	7	5
$Tc_{100\text{-}yr}$ (min)	7	5

d. Results for the existing condition VCRat models are provided in Appendix I and summarized below:

Table 6: Peak Runoff (Proposed Condition)

Subarea	Area (acres)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)
A2	1.38	2.9	4.0	5.0	5.9
B2	1.35	3.9	4.9	5.8	6.8
SUBTOTAL	2.73	6.8	8.9	10.8	12.7

e. The storm frequencies up to the 100-year event have been evaluated for the proposed condition. Confirmation that the mitigation criteria from the County requirement (that there will be no increase in flow for any design storm from the 10-, 25-, 50-, or 100-yr frequency) has been addressed and is confirmed by comparing of the existing condition peak runoff from Section 3.1.g to the proposed peak runoff condition from Section 3.2.d. All storm events are presented to decrease, or unchanged, in the proposed condition.

SECTION 4 PROPOSED CONDITION RUNOFF MITIGATION

With the existing condition already a fully developed site, the proposed redevelopment either maintaining the same (Drainage Area B) or decreasing (Drainage Area A) the impervious area, and the time of concentration remaining the same (Drainage Area B) or increasing (Drainage Area A), it is confirmed in Section 3 that there would be no increase in peak flows for all storm events, as a result of the redevelopment. Therefore, the mitigation required through an on-site detention basin will not be required.

SECTION 5 MITIGATION

5.1 WATER QUALITY IMPACT MITIGATION

The water quality impacts associated with land development is addressed in the Post Construction Stormwater Management Plan (PCSMP), which is included Appendix V for reference. The post-construction storm water management control measures to be implemented on this project have been designed to comply with the Ventura County Technical Guidance Manual (TGM) in reducing the Effective Impervious Area (EIA) to less than or equal to five percent (≤5%) of the total project area.

To comply with the TGM requirements, the water quality impacts associated with the development of this project will be mitigated by applying the following Best Management Practices (BMPs):

a. **INF-2: Infiltration Trench:** Infiltration trenches are long, narrow, gravel-filled trenches, often vegetated, that infiltrate stormwater runoff from small drainage areas. Infiltration trenches may include a shallow depression at the surface, but the majority of runoff is stored in the void space within the gravel and infiltrates through the sides and the bottom of the trench. However, this project proposes to construct the gravel-filled trench beneath the pavement area, acting as an infiltration basin.
    - Drainage Area A - The required infiltration area is 3,202 ft^2, and a maximum ponding depth of 1.08 ft. The design infiltration rate calculated is 0.18 in/hr, after applying reduction and safety factors. The measured rate is 0.50 in/hr. The basin will be able to infiltrate the required volume of 3,511 ft^3 (3,001 ft^3 for the stormwater quality design volume (SQDV) and 510 ft^3 for Step 7), assuming 32% void space for the gravel. Perforated drain pipes running along the length of the basin will be installed to promote a more even distribution of water.
    - Drainage Area B - The required infiltration area is 1,616 ft^2, and a maximum ponding depth of 38.46 ft. The design infiltration rate calculated is 6.41 in/hr, after applying reduction and safety factors. The measured rate is 18.00 in/hr. The basin will be able to infiltrate the required volume of 3,450 ft^3 (3,001 ft^3 for the SQDV and 449 ft^3 for Step 7), assuming 32% void space for the gravel. Perforated drain pipes running along the length of the basin will be installed to promote a more even distribution of water. With the infiltration rate greater than 2.4 in/hr, the runoff will be fully treated prior to conveying flows to the infiltration area.
    - The top of wall elevation for the weir wall within the diversion structure (Contech StormGate Manhole High Flow Bypass or approved equal) is set

to the maximum ponding height of the trench, allowing water to overflow for larger storm events and once the maximum ponding depth is exceeded.

b. **PT-1: Hydrodynamic Separation Device:** Pre-treatment of runoff is addressed through hydrodynamic separation devices, eliminating the necessity for a sediment forebay.
c. **PT-2: Catch Basin Insert:** Catch basin inserts are manufactured filters or fabric placed in a drop inlet to remove sediment and debris. The inserts are utilized as pre-treatment of runoff, prior to diverting flows into the infiltration area. The project proposes to use a Connector Pipe Screen (CPS).
d. **TCM-5: Cartridge Media Filter:** The project will implement the Cartridge Media Filter BMP to fully treat the stormwater runoff from easterly side of the project (Drainage Area B), since the infiltration rate exceeds 2.4 in/hr, prior to routing flows into the infiltration area. Cartridge media filters are manufactured devices that typically consist of a series of cylindrical vertical filters contained in a catch basin, manhole, or vault that provide treatment through filtration and sedimentation. The manhole or vault may be divided into multiple chambers where the first chamber acts as a pre-settling basin for removal of coarse sediment while another chamber acts as the filter bay and houses the filter cartridges.

The total required SQDV for the project site is 6,002 ft^3 (Both Drainage Areas A and B require 3,001 ft^3). Accounting for the mitigation of stormwater runoff from the $EIA_{allowable}$ and developed pervious surfaces specified in Step 7 of the TGM, an additional 959 ft^3 (Drainage Area A with 510 ft^3 and Drainage Area B with 449 ft^3) is included into the infiltration volume sizing.

5.2 HYDROMODIFICATION

The Interim Hydromodification Control Criteria in the TGM Step 8b: Hydromodification (Flow/Volume/Duration) Control Criteria states that *"Projects disturbing less than 50 acres must comply with the Stormwater Management Standards contained in the 2011 TGM (i.e., a combination of Retention BMPs, Biofiltration BMPs, and/or Treatment Control Measures)".* With the implementation of the proposed infiltration of the site, the project will comply with the interim criteria of the TGM. Additionally, Exemption 4) below is applicable to this project since the effective impervious area will not increase and infiltration BMPs will be implemented.

- *4) Redevelopment projects in existing urban areas that do not increase the effective impervious area or decrease the infiltration capacity of pervious areas compared to the pre-project condition.* (Refer to Camarillo Urban Area Map - Figure B-4 in Appendix IV)

SECTION 6 FEMA FLOOD HAZARD MAP

The FEMA Flood Map Service Center (https://msc.fema.gov/portal) provides the site-specific Flood Hazard Map relevant to the project site (Panel 932 of 1275; Map Number 06111C0932F; Map Revised January 7, 2015). The map of the project area shows that the majority of the site is within "Other Areas of Flood Hazard - Area with Reduced Flood Risk due to Levee. See Notes - Zone X (Shaded with stripes)". Areas of the site to the west and northeast are within Zone AO (Depth 2), which is a Special Flood Hazard Area with a depth of 2 ft.

A summary of the note referred to in Zone X (Shaded with stripes) states that the levee does not comply with the Section 65.10 of the NFIP Regulations, and that the panel will be revised at a later date to update the flood hazard data. In the meantime, the current flood data should continue to be used until the FIRM panel is revised. The current Flood Hazard Map is provided in Appendix IV.

SECTION 7 HYDRAULICS

A hydraulic analysis was conducted on the worst-case scenario for each main storm drain line, Lines A and B. The locations analyzed were determined to be at the flattest segments of the storm drain lines and towards the downstream end, which convey larger flows. All other reaches have steeper pipe slopes and further upstream, resulting in lesser flows to convey.

- Storm Drain Line "A" Location: 18-inch pipes downstream of the junctions to other laterals and the CDS unit.
- Storm Drain Line "B" Location: 12-inch pipes upstream of the junction to the 18-inch pipe and the Stormfilter unit.

Table 7: Storm Drain Hydraulics (Worst-Case)

Storm Drain	Pipe Size (inches)	Pipe Slope (ft/ft)	Tributary Area (Acres)	Q_{50} – Tributary Flows (cfs)	Full Flow Capacity (cfs)
Line A	18	0.0045	1.38	5.0	7.63
Line B	12	0.0029	0.44	1.9	2.08

SECTION 8 SUMMARY & CONCLUSIONS

The proposed redevelopment to the north side of the existing Technicolor Building property includes parking lot re-configuration, building additions, loading dock additions, new trash enclosures, and other building interior improvements. The total disturbed area for the project is approximately 2.73 acres, with 1.38 acres on the west side of the building and 1.35 acres on the east side of the building.

The redevelopment of the site does not increase peak flows for any storm event as a result of the following:

- The existing condition was already a fully developed site.
- The proposed redevelopment either maintained the same (Drainage Area B) or decreased (Drainage Area A) the impervious area.
- The time of concentration remained the same (Drainage Area B) or increased (Drainage Area A).
- Therefore, mitigation through an on-site detention basin will not be required.

To mitigate the potential water quality impacts, BMPs will be implemented to reduce the hydrologic and water quality effects associated with the development.

- Each drainage area will have a gravel basin beneath the asphalt concrete pavement to act as the main infiltration basin.
- Connector pipe screens and hydrodynamic separation devices are proposed for the pre-treatment of runoff prior to diverting flows into the infiltration area. Prior to routing flows into the infiltration area, a Cartridge Media Filter BMP will also be implemented for Drainage Area B to fully treat the stormwater runoff from easterly side of the project, since the infiltration rate exceeds 2.4 in/hr.
- The volumes from the $EIA_{allowable}$ and developed pervious surfaces are accounted for in the infiltration volumes (SQDV) of the BMPs, to address the mitigation requirements of Step 7 of the TGM.

Since the project disturbs less than 50 acres, the Interim Hydromodification Control Criteria is addressed with the implementation of the BMPs listed above. Additionally, the Hydromodification Exemption 4) is applicable to this project since the effective impervious area will not increase and infiltration BMPs will be implemented, improving the infiltration capacity of the site.

A FIRMette created for the project area shows that the majority of the site is within “Other Areas of Flood Hazard - Area with Reduced Flood Risk due to Levee. See Notes - Zone X (Shaded with stripes)”. Areas of the site to the west and northeast are within Zone AO (Depth 2), which is a Special Flood Hazard Area with a depth of 2 ft. The note referred to in Zone X (Shaded with stripes) states that the levee does not comply with NFIP Regulations, and a revised panel will update the flood hazard data at a later date. In the meantime, the current flood data can be used until the FIRM panel is revised.

SECTION 9 APPENDICES

DRAINAGE STUDY

APPENDIX I - HYDROLOGY CALCULATIONS

VENTURA COUNTY WATERSHED PROTECTION DISTRICT
TIME OF CONCENTRATION
TC Program Version: 2.6.2009.7
Project: Rexford TBR
Date: 3/30/2017 1:37:05 PM
Engineer: TJS
Consultant: ECG

S U M M A R Y O F C O M P U T A T I O N S

Watershed Name: Rexford TBR - Existing Condition

Name	Zone	Storm	Soil	Area (acres)	TC (min)
Drainage Area A	K	10	4.00	1.4 / 1	7.564 / 8
Drainage Area A	K	25	4.00	1.4 / 1	7.295 / 7
Drainage Area A	K	50	4.00	1.4 / 1	TC ERROR (use 5 min)
Drainage Area A	K	100	4.00	1.4 / 1	TC ERROR (use 5 min)
Drainage Area B	K	10	4.00	1.4 / 1	6.667 / 7
Drainage Area B	K	25	4.00	1.4 / 1	6.429 / 6
Drainage Area B	K	50	4.00	1.4 / 1	TC ERROR (use 5 min)
Drainage Area B	K	100	4.00	1.4 / 1	TC ERROR (use 5 min)

Watershed Name: Rexford TBR - Existing Condition

Sub-Area Name: Drainage Area A
Computing Tc for all rainfall frequencies for sub-area Drainage Area A...

Tc for frequency = 10.00: 7.564 Minutes
DATA FOR SUB AREA 1

SUB AREA TIME OF CONCENTRATION: 7.564 min. = 8 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 10
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 95
SUB AREA OUTPUT

Intensity (in/hr): 2.865
C Total: 0.938
Sum Q Segments (cfs): 3.71
Q Total (cfs): 3.71
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 453.85
Time of Concentration (min): 7.564

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 6.6667
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150
Contributing Area (acres): 0.4
Percent of Sub-Area (%): 29.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0110
Effective Slope: 0.0110
Q for Flow Path (cfs): 1.08
Avg Velocity (ft/s): 0.50
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.7338
Flow Type: Channel
Length (ft): 85
Top Elevation (ft): 150
Bottom Elevation (ft): 149.2
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 36.2
Bottom Width (ft): 20
Side Slope (H:V): 100
Manning's N: 0.016
Map Slope: 0.0094
Q for Flow Path (cfs): 1.34
Q Top (cfs): 1.08
Q Bottom (cfs): 2.42
Velocity Top (ft/s): 1.02
Velocity Bottom (ft/s): 1.30
Avg Velocity (ft/s): 1.16
Wave Velocity (ft/s): 1.93
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 0.1637
Flow Type: Street
Length (ft): 38
Top Elevation (ft): 149.2
Bottom Elevation (ft): 148.6
Contributing Area (acres): 0.48
Percent of Sub-Area (%): 34.8
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0158
Q for Flow Path (cfs): 1.29
Q Top (cfs): 2.42
Q Bottom (cfs): 3.71
Velocity Top (ft/s): 2.44
Velocity Bottom (ft/s): 2.72
Avg Velocity (ft/s): 2.58
Wave Velocity (ft/s): 3.87

Tc for frequency = 25.00: 7.295 Minutes
DATA FOR SUB AREA 1

SUB AREA TIME OF CONCENTRATION: 7.295 min. = 7 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 25
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 95
SUB AREA OUTPUT

Intensity (in/hr): 3.454
C Total: 0.940
Sum Q Segments (cfs): 4.48
Q Total (cfs): 4.48
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 437.73
Time of Concentration (min): 7.295

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 6.4437
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150
Contributing Area (acres): 0.4
Percent of Sub-Area (%): 29.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0110
Effective Slope: 0.0110
Q for Flow Path (cfs): 1.30
Avg Velocity (ft/s): 0.52
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.6956
Flow Type: Channel
Length (ft): 85
Top Elevation (ft): 150
Bottom Elevation (ft): 149.2
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 36.2
Bottom Width (ft): 20
Side Slope (H:V): 100
Manning's N: 0.016
Map Slope: 0.0094
Q for Flow Path (cfs): 1.62
Q Top (cfs): 1.30
Q Bottom (cfs): 2.92
Velocity Top (ft/s): 1.07
Velocity Bottom (ft/s): 1.38
Avg Velocity (ft/s): 1.22
Wave Velocity (ft/s): 2.04
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 0.1561
Flow Type: Street
Length (ft): 38
Top Elevation (ft): 149.2

Bottom Elevation (ft): 148.6
Contributing Area (acres): 0.48
Percent of Sub-Area (%): 34.8
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0158
Q for Flow Path (cfs): 1.56
Q Top (cfs): 2.92
Q Bottom (cfs): 4.48
Velocity Top (ft/s): 2.56
Velocity Bottom (ft/s): 2.85
Avg Velocity (ft/s): 2.70
Wave Velocity (ft/s): 4.06

Tc for frequency = 50.00: 4.090 Minutes
DATA FOR SUB AREA 1

SUB AREA TIME OF CONCENTRATION: 4.090 min. = 4 min. ** TC ERROR **

SUB AREA INPUT DATA

Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 50
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 95
SUB AREA OUTPUT

Intensity (in/hr): 5.160
C Total: 0.942
Sum Q Segments (cfs): 6.71
Q Total (cfs): 6.71
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 245.41
Time of Concentration (min): 4.090

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 3.3333
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150
Contributing Area (acres): 0.4
Percent of Sub-Area (%): 29.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0110
Effective Slope: 0.0110
Q for Flow Path (cfs): 1.95
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.6159
Flow Type: Channel
Length (ft): 85
Top Elevation (ft): 150
Bottom Elevation (ft): 149.2
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 36.2
Bottom Width (ft): 20
Side Slope (H:V): 100
Manning's N: 0.016
Map Slope: 0.0094
Q for Flow Path (cfs): 2.43
Q Top (cfs): 1.95
Q Bottom (cfs): 4.38
Velocity Top (ft/s): 1.20
Velocity Bottom (ft/s): 1.56
Avg Velocity (ft/s): 1.38
Wave Velocity (ft/s): 2.30
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 0.1410
Flow Type: Street
Length (ft): 38
Top Elevation (ft): 149.2

Bottom Elevation (ft): 148.6
Contributing Area (acres): 0.48
Percent of Sub-Area (%): 34.8
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0158
Q for Flow Path (cfs): 2.33
Q Top (cfs): 4.38
Q Bottom (cfs): 6.71
Velocity Top (ft/s): 2.83
Velocity Bottom (ft/s): 3.15
Avg Velocity (ft/s): 2.99
Wave Velocity (ft/s): 4.49

Tc for frequency = 100.00: 4.088 Minutes
DATA FOR SUB AREA 1

SUB AREA TIME OF CONCENTRATION: 4.088 min. = 4 min. ** TC ERROR **

SUB AREA INPUT DATA

Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 100
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 95
SUB AREA OUTPUT

Intensity (in/hr): 5.100
C Total: 0.942
Sum Q Segments (cfs): 6.63
Q Total (cfs): 6.63
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 245.27
Time of Concentration (min): 4.088

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 3.3333
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150
Contributing Area (acres): 0.4
Percent of Sub-Area (%): 29.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0110
Effective Slope: 0.0110
Q for Flow Path (cfs): 1.92
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.6131
Flow Type: Channel
Length (ft): 85
Top Elevation (ft): 150
Bottom Elevation (ft): 149.2
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 36.2
Bottom Width (ft): 20
Side Slope (H:V): 100
Manning's N: 0.016
Map Slope: 0.0094
Q for Flow Path (cfs): 2.40
Q Top (cfs): 1.92
Q Bottom (cfs): 4.33
Velocity Top (ft/s): 1.23
Velocity Bottom (ft/s): 1.55
Avg Velocity (ft/s): 1.39
Wave Velocity (ft/s): 2.31
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 0.1414
Flow Type: Street
Length (ft): 38
Top Elevation (ft): 149.2

Bottom Elevation (ft): 148.6
Contributing Area (acres): 0.48
Percent of Sub-Area (%): 34.8
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0158
Q for Flow Path (cfs): 2.31
Q Top (cfs): 4.33
Q Bottom (cfs): 6.63
Velocity Top (ft/s): 2.82
Velocity Bottom (ft/s): 3.15
Avg Velocity (ft/s): 2.99
Wave Velocity (ft/s): 4.48

Project: Rexford TBR
Date: 3/30/2017 1:37:05 PM
Engineer: TJS
Consultant: ECG

Sub-Area Name: Drainage Area B
Computing Tc for all rainfall frequencies for sub-area Drainage Area B...

Tc for frequency = 10.00: 6.667 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 6.667 min. = 7 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 10
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 3.094
C Total: 0.930
Sum Q Segments (cfs): 3.89
Q Total (cfs): 3.89
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 400.00
Time of Concentration (min): 6.667

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 6.6667
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.1
Bottom Elevation (ft): 149.7
Contributing Area (acres): 1.35
Percent of Sub-Area (%): 100.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0120
Effective Slope: 0.0120
Q for Flow Path (cfs): 3.89
Avg Velocity (ft/s): 0.50
Passed Scour Check: N/A

Tc for frequency = 25.00: 6.429 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 6.429 min. = 6 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 25
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 3.800
C Total: 0.933
Sum Q Segments (cfs): 4.79
Q Total (cfs): 4.79
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 385.76
Time of Concentration (min): 6.429

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 6.4293
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.1
Bottom Elevation (ft): 149.7
Contributing Area (acres): 1.35
Percent of Sub-Area (%): 100.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0120
Effective Slope: 0.0120
Q for Flow Path (cfs): 4.79
Avg Velocity (ft/s): 0.52
Passed Scour Check: N/A

Tc for frequency = 50.00: 3.333 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 3.333 min. = 3 min. ** TC ERROR **

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 50
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 5.900
C Total: 0.937
Sum Q Segments (cfs): 7.46
Q Total (cfs): 7.46
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 200.00
Time of Concentration (min): 3.333

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 3.3333
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.1
Bottom Elevation (ft): 149.7
Contributing Area (acres): 1.35
Percent of Sub-Area (%): 100.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0120
Effective Slope: 0.0120
Q for Flow Path (cfs): 7.46
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A

Tc for frequency = 100.00: 3.333 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 3.333 min. = 3 min. ** TC ERROR **

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 100
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 5.440
C Total: 0.937
Sum Q Segments (cfs): 6.88
Q Total (cfs): 6.88
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 200.00
Time of Concentration (min): 3.333

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 3.3333
Flow Type: Overland
Length (ft): 200
Top Elevation (ft): 152.1
Bottom Elevation (ft): 149.7
Contributing Area (acres): 1.35
Percent of Sub-Area (%): 100.0
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0120
Effective Slope: 0.0120
Q for Flow Path (cfs): 6.88
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A

(Intentionally Blank)

VENTURA COUNTY WATERSHED PROTECTION DISTRICT
TIME OF CONCENTRATION
TC Program Version: 2.6.2009.7
Project: Rexford TBR
Date: 4/18/2017 1:37:05 PM
Engineer: TJS
Consultant: ECG

S U M M A R Y O F C O M P U T A T I O N S

Watershed Name: Rexford TBR - Proposed Condition

Name	Zone	Storm	Soil	Area (acres)	TC (min)
Drainage Area A	K	10	4.00	1.4 / 1	10.688 / 11
Drainage Area A	K	25	4.00	1.4 / 1	10.152 / 10
Drainage Area A	K	50	4.00	1.4 / 1	7.068 / 7
Drainage Area A	K	100	4.00	1.4 / 1	7.033 / 7
Drainage Area B	K	10	4.00	1.4 / 1	6.846 / 7
Drainage Area B	K	25	4.00	1.4 / 1	5.538 / 6
Drainage Area B	K	50	4.00	1.4 / 1	TC ERROR
Drainage Area B	K	100	4.00	1.4 / 1	TC ERROR

```
---------------------------------------------------------------------------
Watershed Name: Rexford TBR - Proposed Condition
---------------------------------------------------------------------------
Sub-Area Name: Drainage Area A
Computing Tc for all rainfall frequencies for sub-area Drainage Area A...
---------------------------------------------------------------------------
Tc for frequency = 10.00: 10.688 Minutes
DATA FOR SUB AREA 1
---------------------------------------------------------------------------
SUB AREA TIME OF CONCENTRATION: 10.688 min. = 11 min.
---------------------------------------------------------------------------
SUB AREA INPUT DATA
---------------------------------------------------------------------------
Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 10
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 89
SUB AREA OUTPUT
---------------------------------------------------------------------------
Intensity (in/hr): 2.396
C Total: 0.921
Sum Q Segments (cfs): 3.04
Q Total (cfs): 3.04
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 641.31
Time of Concentration (min): 10.688
---------------------------------------------------------------------------
DATA FOR FLOW PATH 1
---------------------------------------------------------------------------
Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 6.2333
Flow Type: Overland
Length (ft): 187
Top Elevation (ft): 152.2
Bottom Elevation (ft): 149.1
Contributing Area (acres): 0.2
Percent of Sub-Area (%): 14.5
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0166
Effective Slope: 0.0166
Q for Flow Path (cfs): 0.44
Avg Velocity (ft/s): 0.50
Passed Scour Check: N/A
DATA FOR FLOW PATH 2
---------------------------------------------------------------------------
Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 1.3772
Flow Type: Street
Length (ft): 154
Top Elevation (ft): 149.1
Bottom Elevation (ft): 148.4
Contributing Area (acres): 0.8
Percent of Sub-Area (%): 58.0
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0045
Q for Flow Path (cfs): 1.76
Q Top (cfs): 0.44
Q Bottom (cfs): 2.21
Velocity Top (ft/s): 0.99
Velocity Bottom (ft/s): 1.49
Avg Velocity (ft/s): 1.24
Wave Velocity (ft/s): 1.86
DATA FOR FLOW PATH 3
---------------------------------------------------------------------------
```

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 3.0779
Flow Type: Pipe
Length (ft): 175
Top Elevation (ft): 145.7
Bottom Elevation (ft): 144.5
Contributing Area (acres): 0.38
Percent of Sub-Area (%): 27.5
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 30
Used Pipe Diameter (in): 30
Manning's N: 0.13
Map Slope: 0.0069
Q for Flow Path (cfs): 0.84
Q Top (cfs): 2.21
Q Bottom (cfs): 3.04
Avg Velocity (ft/s): 0.76
Wave Velocity (ft/s): 0.95

Tc for frequency = 25.00: 10.152 Minutes
DATA FOR SUB AREA 1

SUB AREA TIME OF CONCENTRATION: 10.152 min. = 10 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 25
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 89
SUB AREA OUTPUT

Intensity (in/hr): 2.806
C Total: 0.924
Sum Q Segments (cfs): 3.58
Q Total (cfs): 3.58
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 609.09
Time of Concentration (min): 10.152

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 5.9408
Flow Type: Overland
Length (ft): 187
Top Elevation (ft): 152.2
Bottom Elevation (ft): 149.1
Contributing Area (acres): 0.2
Percent of Sub-Area (%): 14.5
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0166
Effective Slope: 0.0166
Q for Flow Path (cfs): 0.52
Avg Velocity (ft/s): 0.52
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 1.3223
Flow Type: Street
Length (ft): 154
Top Elevation (ft): 149.1
Bottom Elevation (ft): 148.4
Contributing Area (acres): 0.8
Percent of Sub-Area (%): 58.0
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0045
Q for Flow Path (cfs): 2.07
Q Top (cfs): 0.52
Q Bottom (cfs): 2.59
Velocity Top (ft/s): 1.04
Velocity Bottom (ft/s): 1.55
Avg Velocity (ft/s): 1.29
Wave Velocity (ft/s): 1.94
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 2.8884
Flow Type: Pipe
Length (ft): 175
Top Elevation (ft): 145.7
Bottom Elevation (ft): 144.5

Contributing Area (acres): 0.38
Percent of Sub-Area (%): 27.5
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 33
Used Pipe Diameter (in): 33
Manning's N: 0.13
Map Slope: 0.0069
Q for Flow Path (cfs): 0.99
Q Top (cfs): 2.59
Q Bottom (cfs): 3.58
Avg Velocity (ft/s): 0.80
Wave Velocity (ft/s): 1.01

Tc for frequency = 50.00: 7.068 Minutes
DATA FOR SUB AREA 1

SUB AREA TIME OF CONCENTRATION: 7.068 min. = 7 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 50
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 89
SUB AREA OUTPUT

Intensity (in/hr): 3.771
C Total: 0.929
Sum Q Segments (cfs): 4.84
Q Total (cfs): 4.84
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 424.08
Time of Concentration (min): 7.068

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 3.1167
Flow Type: Overland
Length (ft): 187
Top Elevation (ft): 152.2
Bottom Elevation (ft): 149.1
Contributing Area (acres): 0.2
Percent of Sub-Area (%): 14.5
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0166
Effective Slope: 0.0166
Q for Flow Path (cfs): 0.70
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 1.2258
Flow Type: Street
Length (ft): 154
Top Elevation (ft): 149.1
Bottom Elevation (ft): 148.4
Contributing Area (acres): 0.8
Percent of Sub-Area (%): 58.0
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0045
Q for Flow Path (cfs): 2.80
Q Top (cfs): 0.70
Q Bottom (cfs): 3.50
Velocity Top (ft/s): 1.12
Velocity Bottom (ft/s): 1.67
Avg Velocity (ft/s): 1.40
Wave Velocity (ft/s): 2.09
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 2.7256
Flow Type: Pipe
Length (ft): 175
Top Elevation (ft): 145.7
Bottom Elevation (ft): 144.5

Contributing Area (acres): 0.38
Percent of Sub-Area (%): 27.5
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 36
Used Pipe Diameter (in): 36
Manning's N: 0.13
Map Slope: 0.0069
Q for Flow Path (cfs): 1.33
Q Top (cfs): 3.50
Q Bottom (cfs): 4.84
Avg Velocity (ft/s): 0.86
Wave Velocity (ft/s): 1.07

Tc for frequency = 100.00: 7.033 Minutes
DATA FOR SUB AREA 1

SUB AREA TIME OF CONCENTRATION: 7.033 min. = 7 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area A
Total Area (ac): 1.38
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 100
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 89
SUB AREA OUTPUT

Intensity (in/hr): 4.226
C Total: 0.931
Sum Q Segments (cfs): 5.43
Q Total (cfs): 5.43
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 421.98
Time of Concentration (min): 7.033

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 3.1167
Flow Type: Overland
Length (ft): 187
Top Elevation (ft): 152.2
Bottom Elevation (ft): 149.1
Contributing Area (acres): 0.2
Percent of Sub-Area (%): 14.5
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0166
Effective Slope: 0.0166
Q for Flow Path (cfs): 0.79
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 1.1907
Flow Type: Street
Length (ft): 154
Top Elevation (ft): 149.1
Bottom Elevation (ft): 148.4
Contributing Area (acres): 0.8
Percent of Sub-Area (%): 58.0
Street Width (ft): 32
Curb Height (in): 6
Map Slope: 0.0045
Q for Flow Path (cfs): 3.15
Q Top (cfs): 0.79
Q Bottom (cfs): 3.93
Velocity Top (ft/s): 1.15
Velocity Bottom (ft/s): 1.72
Avg Velocity (ft/s): 1.44
Wave Velocity (ft/s): 2.16
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 2.7256
Flow Type: Pipe
Length (ft): 175
Top Elevation (ft): 145.7
Bottom Elevation (ft): 144.5

Contributing Area (acres): 0.38
Percent of Sub-Area (%): 27.5
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 36
Used Pipe Diameter (in): 36
Manning's N: 0.13
Map Slope: 0.0069
Q for Flow Path (cfs): 1.49
Q Top (cfs): 3.93
Q Bottom (cfs): 5.43
Avg Velocity (ft/s): 0.87
Wave Velocity (ft/s): 1.07

Project: Rexford TBR
Date: 4/18/2017 1:37:05 PM
Engineer: TJS
Consultant: ECG

Sub-Area Name: Drainage Area B
Computing Tc for all rainfall frequencies for sub-area Drainage Area B...

Tc for frequency = 10.00: 6.846 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 6.846 min. = 7 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 10
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 3.094
C Total: 0.930
Sum Q Segments (cfs): 3.89
Q Total (cfs): 3.89
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 410.77
Time of Concentration (min): 6.846

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 4.0000
Flow Type: Overland
Length (ft): 120
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150.5
Contributing Area (acres): 0.1
Percent of Sub-Area (%): 7.4
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0142
Effective Slope: 0.0142
Q for Flow Path (cfs): 0.29
Avg Velocity (ft/s): 0.50
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.2254
Flow Type: Channel
Length (ft): 52
Top Elevation (ft): 150.5
Bottom Elevation (ft): 149.7
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 37.0
Bottom Width (ft): 4
Side Slope (H:V): 12
Manning's N: 0.012
Map Slope: 0.0154
Q for Flow Path (cfs): 1.44
Q Top (cfs): 0.29
Q Bottom (cfs): 1.73
Velocity Top (ft/s): 1.67
Velocity Bottom (ft/s): 3.00
Avg Velocity (ft/s): 2.33

Wave Velocity (ft/s): 3.85
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 2.6208
Flow Type: Pipe
Length (ft): 270
Top Elevation (ft): 146.7
Bottom Elevation (ft): 143.4
Contributing Area (acres): 0.75
Percent of Sub-Area (%): 55.6
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 12
Used Pipe Diameter (in): 24
Manning's N: 0.013
Map Slope: 0.0122
Q for Flow Path (cfs): 2.16
Q Top (cfs): 1.73
Q Bottom (cfs): 3.89
Avg Velocity (ft/s): 1.36
Wave Velocity (ft/s): 1.72

Tc for frequency = 25.00: 5.538 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 5.538 min. = 6 min.

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 25
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 3.800
C Total: 0.933
Sum Q Segments (cfs): 4.79
Q Total (cfs): 4.79
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 332.30
Time of Concentration (min): 5.538

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 3.8372
Flow Type: Overland
Length (ft): 120
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150.5
Contributing Area (acres): 0.1
Percent of Sub-Area (%): 7.4
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0142
Effective Slope: 0.0142
Q for Flow Path (cfs): 0.35
Avg Velocity (ft/s): 0.52
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.2122
Flow Type: Channel
Length (ft): 52
Top Elevation (ft): 150.5
Bottom Elevation (ft): 149.7
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 37.0
Bottom Width (ft): 4
Side Slope (H:V): 12
Manning's N: 0.012
Map Slope: 0.0154
Q for Flow Path (cfs): 1.77
Q Top (cfs): 0.35
Q Bottom (cfs): 2.13
Velocity Top (ft/s): 1.76
Velocity Bottom (ft/s): 3.20
Avg Velocity (ft/s): 2.48
Wave Velocity (ft/s): 4.08
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 1.4889
Flow Type: Pipe
Length (ft): 270
Top Elevation (ft): 146.7

Bottom Elevation (ft): 143.4
Contributing Area (acres): 0.75
Percent of Sub-Area (%): 55.6
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 15
Used Pipe Diameter (in): 24
Manning's N: 0.013
Map Slope: 0.0122
Q for Flow Path (cfs): 2.66
Q Top (cfs): 2.13
Q Bottom (cfs): 4.79
Avg Velocity (ft/s): 2.26
Wave Velocity (ft/s): 3.02

Tc for frequency = 50.00: 3.638 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 3.638 min. = 4 min. ** TC ERROR **

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 50
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 5.160
C Total: 0.936
Sum Q Segments (cfs): 6.52
Q Total (cfs): 6.52
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 218.25
Time of Concentration (min): 3.638

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 2.0000
Flow Type: Overland
Length (ft): 120
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150.5
Contributing Area (acres): 0.1
Percent of Sub-Area (%): 7.4
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0142
Effective Slope: 0.0142
Q for Flow Path (cfs): 0.48
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.1921
Flow Type: Channel
Length (ft): 52
Top Elevation (ft): 150.5
Bottom Elevation (ft): 149.7
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 37.0
Bottom Width (ft): 4
Side Slope (H:V): 12
Manning's N: 0.012
Map Slope: 0.0154
Q for Flow Path (cfs): 2.42
Q Top (cfs): 0.48
Q Bottom (cfs): 2.90
Velocity Top (ft/s): 1.95
Velocity Bottom (ft/s): 3.53
Avg Velocity (ft/s): 2.74
Wave Velocity (ft/s): 4.51
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 1.4454
Flow Type: Pipe
Length (ft): 270
Top Elevation (ft): 146.7

Bottom Elevation (ft): 143.4
Contributing Area (acres): 0.75
Percent of Sub-Area (%): 55.6
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 15
Used Pipe Diameter (in): 24
Manning's N: 0.013
Map Slope: 0.0122
Q for Flow Path (cfs): 3.62
Q Top (cfs): 2.90
Q Bottom (cfs): 6.52
Avg Velocity (ft/s): 2.43
Wave Velocity (ft/s): 3.11

Tc for frequency = 100.00: 3.636 Minutes
DATA FOR SUB AREA 2

SUB AREA TIME OF CONCENTRATION: 3.636 min. = 4 min. ** TC ERROR **

SUB AREA INPUT DATA

Sub Area Name: Drainage Area B
Total Area (ac): 1.35
Flood Zone: 3
Rainfall Zone: K
Storm Frequency (years): 100
Development Type: Industrial
Soil Type: 4.00
Percent Impervious: 91
SUB AREA OUTPUT

Intensity (in/hr): 5.100
C Total: 0.936
Sum Q Segments (cfs): 6.45
Q Total (cfs): 6.45
Sum Percent Area (%): 100.0
Sum of Flow Path Travel Times (sec): 218.16
Time of Concentration (min): 3.636

DATA FOR FLOW PATH 1

Flow Path Name: Flow Path 1
FLOW PATH TRAVEL TIME (min): 2.0000
Flow Type: Overland
Length (ft): 120
Top Elevation (ft): 152.2
Bottom Elevation (ft): 150.5
Contributing Area (acres): 0.1
Percent of Sub-Area (%): 7.4
Overland Type: Valley
Development Type: Industrial
Map Slope: 0.0142
Effective Slope: 0.0142
Q for Flow Path (cfs): 0.48
Avg Velocity (ft/s): 1.00
Passed Scour Check: N/A
DATA FOR FLOW PATH 2

Flow Path Name: Flow Path 2
FLOW PATH TRAVEL TIME (min): 0.1905
Flow Type: Channel
Length (ft): 52
Top Elevation (ft): 150.5
Bottom Elevation (ft): 149.7
Contributing Area (acres): 0.5
Percent of Sub-Area (%): 37.0
Bottom Width (ft): 4
Side Slope (H:V): 12
Manning's N: 0.012
Map Slope: 0.0154
Q for Flow Path (cfs): 2.39
Q Top (cfs): 0.48
Q Bottom (cfs): 2.86
Velocity Top (ft/s): 1.99
Velocity Bottom (ft/s): 3.54
Avg Velocity (ft/s): 2.76
Wave Velocity (ft/s): 4.55
DATA FOR FLOW PATH 3

Flow Path Name: Flow Path 3
FLOW PATH TRAVEL TIME (min): 1.4454
Flow Type: Pipe
Length (ft): 270
Top Elevation (ft): 146.7

Bottom Elevation (ft): 143.4
Contributing Area (acres): 0.75
Percent of Sub-Area (%): 55.6
Initial Pipe Diameter (in): 24
Calculated Pipe Diameter (in): 15
Used Pipe Diameter (in): 24
Manning's N: 0.013
Map Slope: 0.0122
Q for Flow Path (cfs): 3.58
Q Top (cfs): 2.86
Q Bottom (cfs): 6.45
Avg Velocity (ft/s): 2.41
Wave Velocity (ft/s): 3.11

(Intentionally Blank)

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 10-Year
Existing Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Existing																			
2A	040	K10	8	95	14	38		14	38	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	4	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	4	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 38 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 5.46 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.76	200	0.83	300	1.06	400	1.29
500	1.63	600	1.86	700	2.35	800	2.88	900	3.56
1000	4.94	1050	5.49	1100	5.96	1110	7.51	1120	8.19
1130	8.35	1131	8.65	1132	8.95	1133	9.25	1134	9.55
1135	9.85	1136	10.35	1137	10.85	1138	11.35	1139	11.55
1140	11.75	1141	12.21	1142	12.67	1143	13.13	1144	13.39
1145	13.65	1146	14.15	1147	14.65	1148	16.05	1149	17.69
1150	19.83	1151	24.94	1152	33.02	1153	37.64	1154	37.54
1155	36.94	1156	35.35	1157	33.26	1158	30.68	1159	25.12
1160	16.55	1161	11.00	1162	9.95	1163	9.40	1164	8.95
1165	8.50	1166	8.05	1167	7.63	1168	7.20	1169	7.20
1170	7.20	1171	6.99	1172	6.78	1173	6.58	1174	6.37
1175	6.16	1176	5.95	1177	5.74	1178	5.53	1179	5.53
1180	5.53	1181	5.49	1182	5.44	1183	5.39	1184	5.34
1185	5.30	1186	5.25	1187	5.20	1188	5.16	1189	5.16
1190	5.16	1191	5.13	1192	5.11	1193	5.08	1194	5.06
1195	5.04	1196	5.01	1197	4.99	1198	4.97	1199	4.97
1200	4.97	1201	4.97	1202	4.97	1203	4.97	1204	4.97
1205	4.97	1206	4.97	1207	4.97	1208	4.97	1209	4.97
1210	4.97	1211	4.81	1212	4.66	1213	4.51	1214	4.36
1215	4.21	1216	4.06	1217	3.90	1218	3.75	1219	3.75
1220	3.75	1221	3.75	1222	3.75	1223	3.75	1224	3.75
1225	3.75	1226	3.75	1227	3.75	1228	3.75	1229	3.75
1230	3.75	1231	3.65	1232	3.54	1233	3.44	1234	3.33
1235	3.22	1236	3.12	1237	3.01	1238	2.91	1239	2.91
1240	2.91	1241	2.91	1242	2.91	1243	2.91	1244	2.91
1245	2.91	1246	2.91	1247	2.91	1248	2.91	1249	2.91
1250	2.91	1251	2.91	1252	2.91	1253	2.91	1254	2.91
1255	2.91	1256	2.91	1257	2.91	1258	2.91	1259	2.91
1260	2.91	1261	2.85	1262	2.80	1263	2.74	1264	2.69
1265	2.63	1266	2.57	1267	2.52	1268	2.46	1269	2.46
1270	2.46	1271	2.46	1272	2.46	1273	2.46	1274	2.46
1275	2.46	1276	2.46	1277	2.46	1278	2.46	1279	2.46
1280	2.46	1281	2.46	1282	2.46	1283	2.46	1284	2.46
1285	2.46	1286	2.46	1287	2.46	1288	2.46	1289	2.46
1290	2.46	1291	2.46	1292	2.46	1293	2.46	1294	2.46
1295	2.46	1296	2.46	1297	2.46	1298	2.46	1299	2.46
1300	2.46	1310	1.80	1320	1.80	1330	1.80	1340	1.80
1350	1.14	1360	1.14	1370	1.14	1380	1.14	1390	1.14
1400	1.14	1420	0.76	1440	0.76	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.55 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.08	200	0.08	300	0.11	400	0.13
500	0.16	600	0.19	700	0.23	800	0.29	900	0.36
1000	0.49	1050	0.55	1100	0.60	1110	0.75	1120	0.82
1130	0.83	1131	0.86	1132	0.89	1133	0.92	1134	0.95
1135	0.99	1136	1.04	1137	1.09	1138	1.14	1139	1.16
1140	1.18	1141	1.22	1142	1.27	1143	1.31	1144	1.34
1145	1.37	1146	1.42	1147	1.47	1148	1.61	1149	1.77
1150	1.98	1151	2.49	1152	3.30	1153	3.76	1154	3.75
1155	3.69	1156	3.54	1157	3.33	1158	3.07	1159	2.51
1160	1.66	1161	1.10	1162	1.00	1163	0.94	1164	0.89
1165	0.85	1166	0.81	1167	0.76	1168	0.72	1169	0.72
1170	0.72	1171	0.70	1172	0.68	1173	0.66	1174	0.64
1175	0.62	1176	0.60	1177	0.57	1178	0.55	1179	0.55
1180	0.55	1181	0.55	1182	0.54	1183	0.54	1184	0.53
1185	0.53	1186	0.53	1187	0.52	1188	0.52	1189	0.52
1190	0.52	1191	0.51	1192	0.51	1193	0.51	1194	0.51
1195	0.50	1196	0.50	1197	0.50	1198	0.50	1199	0.50
1200	0.50	1201	0.50	1202	0.50	1203	0.50	1204	0.50
1205	0.50	1206	0.50	1207	0.50	1208	0.50	1209	0.50
1210	0.50	1211	0.48	1212	0.47	1213	0.45	1214	0.44
1215	0.42	1216	0.41	1217	0.39	1218	0.38	1219	0.38
1220	0.38	1221	0.38	1222	0.38	1223	0.38	1224	0.38
1225	0.38	1226	0.38	1227	0.38	1228	0.38	1229	0.38
1230	0.38	1231	0.36	1232	0.35	1233	0.34	1234	0.33
1235	0.32	1236	0.31	1237	0.30	1238	0.29	1239	0.29
1240	0.29	1241	0.29	1242	0.29	1243	0.29	1244	0.29
1245	0.29	1246	0.29	1247	0.29	1248	0.29	1249	0.29
1250	0.29	1251	0.29	1252	0.29	1253	0.29	1254	0.29
1255	0.29	1256	0.29	1257	0.29	1258	0.29	1259	0.29
1260	0.29	1261	0.29	1262	0.28	1263	0.27	1264	0.27
1265	0.26	1266	0.26	1267	0.25	1268	0.25	1269	0.25
1270	0.25	1271	0.25	1272	0.25	1273	0.25	1274	0.25
1275	0.25	1276	0.25	1277	0.25	1278	0.25	1279	0.25
1280	0.25	1281	0.25	1282	0.25	1283	0.25	1284	0.25
1285	0.25	1286	0.25	1287	0.25	1288	0.25	1289	0.25
1290	0.25	1291	0.25	1292	0.25	1293	0.25	1294	0.25
1295	0.25	1296	0.25	1297	0.25	1298	0.25	1299	0.25
1300	0.25	1310	0.18	1320	0.18	1330	0.18	1340	0.18
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.08	1440	0.08	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.55 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.08	200	0.08	300	0.11	400	0.13
500	0.16	600	0.19	700	0.23	800	0.29	900	0.36
1000	0.49	1050	0.55	1100	0.60	1110	0.75	1120	0.82
1130	0.83	1131	0.86	1132	0.89	1133	0.92	1134	0.95
1135	0.99	1136	1.04	1137	1.09	1138	1.14	1139	1.16
1140	1.18	1141	1.22	1142	1.27	1143	1.31	1144	1.34
1145	1.37	1146	1.42	1147	1.47	1148	1.61	1149	1.77
1150	1.98	1151	2.49	1152	3.30	1153	3.76	1154	3.75
1155	3.69	1156	3.54	1157	3.33	1158	3.07	1159	2.51
1160	1.66	1161	1.10	1162	1.00	1163	0.94	1164	0.89
1165	0.85	1166	0.81	1167	0.76	1168	0.72	1169	0.72
1170	0.72	1171	0.70	1172	0.68	1173	0.66	1174	0.64
1175	0.62	1176	0.60	1177	0.57	1178	0.55	1179	0.55
1180	0.55	1181	0.55	1182	0.54	1183	0.54	1184	0.53
1185	0.53	1186	0.53	1187	0.52	1188	0.52	1189	0.52
1190	0.52	1191	0.51	1192	0.51	1193	0.51	1194	0.51
1195	0.50	1196	0.50	1197	0.50	1198	0.50	1199	0.50
1200	0.50	1201	0.50	1202	0.50	1203	0.50	1204	0.50
1205	0.50	1206	0.50	1207	0.50	1208	0.50	1209	0.50
1210	0.50	1211	0.48	1212	0.47	1213	0.45	1214	0.44
1215	0.42	1216	0.41	1217	0.39	1218	0.38	1219	0.38
1220	0.38	1221	0.38	1222	0.38	1223	0.38	1224	0.38
1225	0.38	1226	0.38	1227	0.38	1228	0.38	1229	0.38
1230	0.38	1231	0.36	1232	0.35	1233	0.34	1234	0.33
1235	0.32	1236	0.31	1237	0.30	1238	0.29	1239	0.29
1240	0.29	1241	0.29	1242	0.29	1243	0.29	1244	0.29
1245	0.29	1246	0.29	1247	0.29	1248	0.29	1249	0.29
1250	0.29	1251	0.29	1252	0.29	1253	0.29	1254	0.29
1255	0.29	1256	0.29	1257	0.29	1258	0.29	1259	0.29
1260	0.29	1261	0.29	1262	0.28	1263	0.27	1264	0.27
1265	0.26	1266	0.26	1267	0.25	1268	0.25	1269	0.25
1270	0.25	1271	0.25	1272	0.25	1273	0.25	1274	0.25
1275	0.25	1276	0.25	1277	0.25	1278	0.25	1279	0.25
1280	0.25	1281	0.25	1282	0.25	1283	0.25	1284	0.25
1285	0.25	1286	0.25	1287	0.25	1288	0.25	1289	0.25
1290	0.25	1291	0.25	1292	0.25	1293	0.25	1294	0.25
1295	0.25	1296	0.25	1297	0.25	1298	0.25	1299	0.25
1300	0.25	1310	0.18	1320	0.18	1330	0.18	1340	0.18
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.08	1440	0.08	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J10                                G1
006    14  002A 040095001408K10                             1
006    14  003AF010         J10                     00000102 1
006    14  003F 010      099J10                             1 F
006    14  004A 010      099J10                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 25-Year
Existing Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Existing																			
2A	040	K25	7	95	14	45		14	45	1154	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	5	1154	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	5	1154	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 45 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 6.32 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.76	200	1.02	300	1.30	400	1.64
500	2.05	600	2.44	700	2.96	800	3.46	900	3.50
1000	5.12	1050	6.38	1100	7.87	1110	8.59	1120	8.83
1130	10.83	1131	11.05	1132	11.27	1133	11.48	1134	11.70
1135	11.92	1136	12.36	1137	12.81	1138	13.04	1139	13.27
1140	13.50	1141	13.91	1142	14.32	1143	14.50	1144	14.68
1145	14.87	1146	15.38	1147	15.90	1148	16.28	1149	22.14
1150	27.98	1151	33.81	1152	39.66	1153	45.29	1154	45.46
1155	44.78	1156	38.39	1157	32.00	1158	25.62	1159	19.23
1160	12.70	1161	11.22	1162	10.55	1163	10.12	1164	9.70
1165	9.27	1166	8.85	1167	8.43	1168	8.43	1169	8.43
1170	8.43	1171	8.21	1172	8.00	1173	7.80	1174	7.59
1175	7.39	1176	7.18	1177	6.97	1178	6.97	1179	6.97
1180	6.97	1181	6.82	1182	6.67	1183	6.52	1184	6.37
1185	6.22	1186	6.06	1187	5.91	1188	5.91	1189	5.91
1190	5.91	1191	5.77	1192	5.63	1193	5.49	1194	5.35
1195	5.21	1196	5.07	1197	4.93	1198	4.93	1199	4.93
1200	4.93	1201	4.93	1202	4.93	1203	4.93	1204	4.93
1205	4.93	1206	4.93	1207	4.93	1208	4.93	1209	4.93
1210	4.93	1211	4.81	1212	4.70	1213	4.59	1214	4.47
1215	4.36	1216	4.25	1217	4.13	1218	4.13	1219	4.13
1220	4.13	1221	4.13	1222	4.13	1223	4.13	1224	4.13
1225	4.13	1226	4.13	1227	4.13	1228	4.13	1229	4.13
1230	4.13	1231	4.04	1232	3.95	1233	3.86	1234	3.76
1235	3.67	1236	3.58	1237	3.49	1238	3.49	1239	3.49
1240	3.49	1241	3.49	1242	3.49	1243	3.49	1244	3.49
1245	3.49	1246	3.49	1247	3.49	1248	3.49	1249	3.49
1250	3.49	1251	3.49	1252	3.49	1253	3.49	1254	3.49
1255	3.49	1256	3.49	1257	3.49	1258	3.49	1259	3.49
1260	3.49	1261	3.43	1262	3.37	1263	3.31	1264	3.25
1265	3.19	1266	3.13	1267	3.07	1268	3.07	1269	3.07
1270	3.07	1271	3.07	1272	3.07	1273	3.07	1274	3.07
1275	3.07	1276	3.07	1277	3.07	1278	3.07	1279	3.07
1280	3.07	1281	3.07	1282	3.07	1283	3.07	1284	3.07
1285	3.07	1286	3.07	1287	3.07	1288	3.07	1289	3.07
1290	3.07	1291	3.07	1292	3.07	1293	3.07	1294	3.07
1295	3.07	1296	3.07	1297	3.07	1298	3.07	1299	3.07
1300	3.07	1310	2.24	1320	2.24	1330	2.24	1340	2.24
1350	1.40	1360	1.40	1370	1.40	1380	1.40	1390	1.40
1400	1.40	1420	0.83	1440	0.83	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.63 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.08	200	0.10	300	0.13	400	0.16
500	0.20	600	0.24	700	0.30	800	0.35	900	0.35
1000	0.51	1050	0.64	1100	0.79	1110	0.86	1120	0.88
1130	1.08	1131	1.10	1132	1.13	1133	1.15	1134	1.17
1135	1.19	1136	1.24	1137	1.28	1138	1.30	1139	1.33
1140	1.35	1141	1.39	1142	1.43	1143	1.45	1144	1.47
1145	1.49	1146	1.54	1147	1.59	1148	1.63	1149	2.21
1150	2.80	1151	3.38	1152	3.97	1153	4.53	1154	4.55
1155	4.48	1156	3.84	1157	3.20	1158	2.56	1159	1.92
1160	1.27	1161	1.12	1162	1.05	1163	1.01	1164	0.97
1165	0.93	1166	0.89	1167	0.84	1168	0.84	1169	0.84
1170	0.84	1171	0.82	1172	0.80	1173	0.78	1174	0.76
1175	0.74	1176	0.72	1177	0.70	1178	0.70	1179	0.70
1180	0.70	1181	0.68	1182	0.67	1183	0.65	1184	0.64
1185	0.62	1186	0.61	1187	0.59	1188	0.59	1189	0.59
1190	0.59	1191	0.58	1192	0.56	1193	0.55	1194	0.53
1195	0.52	1196	0.51	1197	0.49	1198	0.49	1199	0.49
1200	0.49	1201	0.49	1202	0.49	1203	0.49	1204	0.49
1205	0.49	1206	0.49	1207	0.49	1208	0.49	1209	0.49
1210	0.49	1211	0.48	1212	0.47	1213	0.46	1214	0.45
1215	0.44	1216	0.42	1217	0.41	1218	0.41	1219	0.41
1220	0.41	1221	0.41	1222	0.41	1223	0.41	1224	0.41
1225	0.41	1226	0.41	1227	0.41	1228	0.41	1229	0.41
1230	0.41	1231	0.40	1232	0.39	1233	0.39	1234	0.38
1235	0.37	1236	0.36	1237	0.35	1238	0.35	1239	0.35
1240	0.35	1241	0.35	1242	0.35	1243	0.35	1244	0.35
1245	0.35	1246	0.35	1247	0.35	1248	0.35	1249	0.35
1250	0.35	1251	0.35	1252	0.35	1253	0.35	1254	0.35
1255	0.35	1256	0.35	1257	0.35	1258	0.35	1259	0.35
1260	0.35	1261	0.34	1262	0.34	1263	0.33	1264	0.32
1265	0.32	1266	0.31	1267	0.31	1268	0.31	1269	0.31
1270	0.31	1271	0.31	1272	0.31	1273	0.31	1274	0.31
1275	0.31	1276	0.31	1277	0.31	1278	0.31	1279	0.31
1280	0.31	1281	0.31	1282	0.31	1283	0.31	1284	0.31
1285	0.31	1286	0.31	1287	0.31	1288	0.31	1289	0.31
1290	0.31	1291	0.31	1292	0.31	1293	0.31	1294	0.31
1295	0.31	1296	0.31	1297	0.31	1298	0.31	1299	0.31
1300	0.31	1310	0.22	1320	0.22	1330	0.22	1340	0.22
1350	0.14	1360	0.14	1370	0.14	1380	0.14	1390	0.14
1400	0.14	1420	0.08	1440	0.08	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.63 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.08	200	0.10	300	0.13	400	0.16
500	0.20	600	0.24	700	0.30	800	0.35	900	0.35
1000	0.51	1050	0.64	1100	0.79	1110	0.86	1120	0.88
1130	1.08	1131	1.10	1132	1.13	1133	1.15	1134	1.17
1135	1.19	1136	1.24	1137	1.28	1138	1.30	1139	1.33
1140	1.35	1141	1.39	1142	1.43	1143	1.45	1144	1.47
1145	1.49	1146	1.54	1147	1.59	1148	1.63	1149	2.21
1150	2.80	1151	3.38	1152	3.97	1153	4.53	1154	4.55
1155	4.48	1156	3.84	1157	3.20	1158	2.56	1159	1.92
1160	1.27	1161	1.12	1162	1.05	1163	1.01	1164	0.97
1165	0.93	1166	0.89	1167	0.84	1168	0.84	1169	0.84
1170	0.84	1171	0.82	1172	0.80	1173	0.78	1174	0.76
1175	0.74	1176	0.72	1177	0.70	1178	0.70	1179	0.70
1180	0.70	1181	0.68	1182	0.67	1183	0.65	1184	0.64
1185	0.62	1186	0.61	1187	0.59	1188	0.59	1189	0.59
1190	0.59	1191	0.58	1192	0.56	1193	0.55	1194	0.53
1195	0.52	1196	0.51	1197	0.49	1198	0.49	1199	0.49
1200	0.49	1201	0.49	1202	0.49	1203	0.49	1204	0.49
1205	0.49	1206	0.49	1207	0.49	1208	0.49	1209	0.49
1210	0.49	1211	0.48	1212	0.47	1213	0.46	1214	0.45
1215	0.44	1216	0.42	1217	0.41	1218	0.41	1219	0.41
1220	0.41	1221	0.41	1222	0.41	1223	0.41	1224	0.41
1225	0.41	1226	0.41	1227	0.41	1228	0.41	1229	0.41
1230	0.41	1231	0.40	1232	0.39	1233	0.39	1234	0.38
1235	0.37	1236	0.36	1237	0.35	1238	0.35	1239	0.35
1240	0.35	1241	0.35	1242	0.35	1243	0.35	1244	0.35
1245	0.35	1246	0.35	1247	0.35	1248	0.35	1249	0.35
1250	0.35	1251	0.35	1252	0.35	1253	0.35	1254	0.35
1255	0.35	1256	0.35	1257	0.35	1258	0.35	1259	0.35
1260	0.35	1261	0.34	1262	0.34	1263	0.33	1264	0.32
1265	0.32	1266	0.31	1267	0.31	1268	0.31	1269	0.31
1270	0.31	1271	0.31	1272	0.31	1273	0.31	1274	0.31
1275	0.31	1276	0.31	1277	0.31	1278	0.31	1279	0.31
1280	0.31	1281	0.31	1282	0.31	1283	0.31	1284	0.31
1285	0.31	1286	0.31	1287	0.31	1288	0.31	1289	0.31
1290	0.31	1291	0.31	1292	0.31	1293	0.31	1294	0.31
1295	0.31	1296	0.31	1297	0.31	1298	0.31	1299	0.31
1300	0.31	1310	0.22	1320	0.22	1330	0.22	1340	0.22
1350	0.14	1360	0.14	1370	0.14	1380	0.14	1390	0.14
1400	0.14	1420	0.08	1440	0.08	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J25                                G1
006    14  002A 040095001407K25                             1
006    14  003AF010         J25                     00000102 1
006    14  003F 010      099J25                             1 F
006    14  004A 010      099J25                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 50-Year
Existing Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Existing																			
2A	040	K50	5	95	14	60		14	60	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 60 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 7.93 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.76	200	1.36	300	1.74	400	2.27
500	2.80	600	3.49	700	4.06	800	4.51	900	5.31
1000	6.60	1050	6.73	1100	7.99	1110	8.75	1120	10.27
1130	10.83	1131	10.98	1132	11.12	1133	11.26	1134	11.41
1135	11.55	1136	12.67	1137	13.79	1138	14.91	1139	16.03
1140	17.15	1141	17.92	1142	18.69	1143	19.46	1144	20.22
1145	20.98	1146	21.49	1147	22.00	1148	22.67	1149	23.97
1150	27.50	1151	37.84	1152	50.57	1153	59.97	1154	59.17
1155	54.55	1156	41.98	1157	27.02	1158	15.23	1159	12.99
1160	12.35	1161	11.55	1162	10.75	1163	9.95	1164	9.15
1165	8.35	1166	8.35	1167	8.35	1168	8.35	1169	8.35
1170	8.35	1171	8.19	1172	8.04	1173	7.88	1174	7.73
1175	7.58	1176	7.58	1177	7.58	1178	7.58	1179	7.58
1180	7.58	1181	7.58	1182	7.58	1183	7.58	1184	7.58
1185	7.58	1186	7.58	1187	7.58	1188	7.58	1189	7.58
1190	7.58	1191	7.35	1192	7.13	1193	6.90	1194	6.67
1195	6.44	1196	6.44	1197	6.44	1198	6.44	1199	6.44
1200	6.44	1201	6.44	1202	6.44	1203	6.44	1204	6.44
1205	6.44	1206	6.44	1207	6.44	1208	6.44	1209	6.44
1210	6.44	1211	6.22	1212	5.99	1213	5.76	1214	5.53
1215	5.31	1216	5.31	1217	5.31	1218	5.31	1219	5.31
1220	5.31	1221	5.31	1222	5.31	1223	5.31	1224	5.31
1225	5.31	1226	5.31	1227	5.31	1228	5.31	1229	5.31
1230	5.31	1231	5.16	1232	5.00	1233	4.85	1234	4.70
1235	4.55	1236	4.55	1237	4.55	1238	4.55	1239	4.55
1240	4.55	1241	4.55	1242	4.55	1243	4.55	1244	4.55
1245	4.55	1246	4.55	1247	4.55	1248	4.55	1249	4.55
1250	4.55	1251	4.55	1252	4.55	1253	4.55	1254	4.55
1255	4.55	1256	4.55	1257	4.55	1258	4.55	1259	4.55
1260	4.55	1261	4.47	1262	4.40	1263	4.32	1264	4.25
1265	4.17	1266	4.17	1267	4.17	1268	4.17	1269	4.17
1270	4.17	1271	4.17	1272	4.17	1273	4.17	1274	4.17
1275	4.17	1276	4.17	1277	4.17	1278	4.17	1279	4.17
1280	4.17	1281	4.17	1282	4.17	1283	4.17	1284	4.17
1285	4.17	1286	4.17	1287	4.17	1288	4.17	1289	4.17
1290	4.17	1291	4.17	1292	4.17	1293	4.17	1294	4.17
1295	4.17	1296	4.17	1297	4.17	1298	4.17	1299	4.17
1300	4.17	1310	3.03	1320	3.03	1330	3.03	1340	3.03
1350	1.90	1360	1.90	1370	1.90	1380	1.90	1390	1.90
1400	1.89	1420	0.95	1440	0.95	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.79 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.08	200	0.14	300	0.17	400	0.23
500	0.28	600	0.35	700	0.41	800	0.45	900	0.53
1000	0.66	1050	0.67	1100	0.80	1110	0.87	1120	1.03
1130	1.08	1131	1.10	1132	1.11	1133	1.13	1134	1.14
1135	1.16	1136	1.27	1137	1.38	1138	1.49	1139	1.60
1140	1.72	1141	1.79	1142	1.87	1143	1.95	1144	2.02
1145	2.10	1146	2.15	1147	2.20	1148	2.27	1149	2.40
1150	2.75	1151	3.78	1152	5.06	1153	6.00	1154	5.92
1155	5.46	1156	4.20	1157	2.70	1158	1.52	1159	1.30
1160	1.24	1161	1.16	1162	1.08	1163	1.00	1164	0.91
1165	0.83	1166	0.83	1167	0.83	1168	0.83	1169	0.83
1170	0.83	1171	0.82	1172	0.80	1173	0.79	1174	0.77
1175	0.76	1176	0.76	1177	0.76	1178	0.76	1179	0.76
1180	0.76	1181	0.76	1182	0.76	1183	0.76	1184	0.76
1185	0.76	1186	0.76	1187	0.76	1188	0.76	1189	0.76
1190	0.76	1191	0.74	1192	0.71	1193	0.69	1194	0.67
1195	0.64	1196	0.64	1197	0.64	1198	0.64	1199	0.64
1200	0.64	1201	0.64	1202	0.64	1203	0.64	1204	0.64
1205	0.64	1206	0.64	1207	0.64	1208	0.64	1209	0.64
1210	0.64	1211	0.62	1212	0.60	1213	0.58	1214	0.55
1215	0.53	1216	0.53	1217	0.53	1218	0.53	1219	0.53
1220	0.53	1221	0.53	1222	0.53	1223	0.53	1224	0.53
1225	0.53	1226	0.53	1227	0.53	1228	0.53	1229	0.53
1230	0.53	1231	0.52	1232	0.50	1233	0.49	1234	0.47
1235	0.45	1236	0.45	1237	0.45	1238	0.45	1239	0.45
1240	0.45	1241	0.45	1242	0.45	1243	0.45	1244	0.45
1245	0.45	1246	0.45	1247	0.45	1248	0.45	1249	0.45
1250	0.45	1251	0.45	1252	0.45	1253	0.45	1254	0.45
1255	0.45	1256	0.45	1257	0.45	1258	0.45	1259	0.45
1260	0.45	1261	0.45	1262	0.44	1263	0.43	1264	0.42
1265	0.42	1266	0.42	1267	0.42	1268	0.42	1269	0.42
1270	0.42	1271	0.42	1272	0.42	1273	0.42	1274	0.42
1275	0.42	1276	0.42	1277	0.42	1278	0.42	1279	0.42
1280	0.42	1281	0.42	1282	0.42	1283	0.42	1284	0.42
1285	0.42	1286	0.42	1287	0.42	1288	0.42	1289	0.42
1290	0.42	1291	0.42	1292	0.42	1293	0.42	1294	0.42
1295	0.42	1296	0.42	1297	0.42	1298	0.42	1299	0.42
1300	0.42	1310	0.30	1320	0.30	1330	0.30	1340	0.30
1350	0.19	1360	0.19	1370	0.19	1380	0.19	1390	0.19
1400	0.19	1420	0.09	1440	0.09	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.79 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.08	200	0.14	300	0.17	400	0.23
500	0.28	600	0.35	700	0.41	800	0.45	900	0.53
1000	0.66	1050	0.67	1100	0.80	1110	0.87	1120	1.03
1130	1.08	1131	1.10	1132	1.11	1133	1.13	1134	1.14
1135	1.16	1136	1.27	1137	1.38	1138	1.49	1139	1.60
1140	1.72	1141	1.79	1142	1.87	1143	1.95	1144	2.02
1145	2.10	1146	2.15	1147	2.20	1148	2.27	1149	2.40
1150	2.75	1151	3.78	1152	5.06	1153	6.00	1154	5.92
1155	5.46	1156	4.20	1157	2.70	1158	1.52	1159	1.30
1160	1.24	1161	1.16	1162	1.08	1163	1.00	1164	0.91
1165	0.83	1166	0.83	1167	0.83	1168	0.83	1169	0.83
1170	0.83	1171	0.82	1172	0.80	1173	0.79	1174	0.77
1175	0.76	1176	0.76	1177	0.76	1178	0.76	1179	0.76
1180	0.76	1181	0.76	1182	0.76	1183	0.76	1184	0.76
1185	0.76	1186	0.76	1187	0.76	1188	0.76	1189	0.76
1190	0.76	1191	0.74	1192	0.71	1193	0.69	1194	0.67
1195	0.64	1196	0.64	1197	0.64	1198	0.64	1199	0.64
1200	0.64	1201	0.64	1202	0.64	1203	0.64	1204	0.64
1205	0.64	1206	0.64	1207	0.64	1208	0.64	1209	0.64
1210	0.64	1211	0.62	1212	0.60	1213	0.58	1214	0.55
1215	0.53	1216	0.53	1217	0.53	1218	0.53	1219	0.53
1220	0.53	1221	0.53	1222	0.53	1223	0.53	1224	0.53
1225	0.53	1226	0.53	1227	0.53	1228	0.53	1229	0.53
1230	0.53	1231	0.52	1232	0.50	1233	0.49	1234	0.47
1235	0.45	1236	0.45	1237	0.45	1238	0.45	1239	0.45
1240	0.45	1241	0.45	1242	0.45	1243	0.45	1244	0.45
1245	0.45	1246	0.45	1247	0.45	1248	0.45	1249	0.45
1250	0.45	1251	0.45	1252	0.45	1253	0.45	1254	0.45
1255	0.45	1256	0.45	1257	0.45	1258	0.45	1259	0.45
1260	0.45	1261	0.45	1262	0.44	1263	0.43	1264	0.42
1265	0.42	1266	0.42	1267	0.42	1268	0.42	1269	0.42
1270	0.42	1271	0.42	1272	0.42	1273	0.42	1274	0.42
1275	0.42	1276	0.42	1277	0.42	1278	0.42	1279	0.42
1280	0.42	1281	0.42	1282	0.42	1283	0.42	1284	0.42
1285	0.42	1286	0.42	1287	0.42	1288	0.42	1289	0.42
1290	0.42	1291	0.42	1292	0.42	1293	0.42	1294	0.42
1295	0.42	1296	0.42	1297	0.42	1298	0.42	1299	0.42
1300	0.42	1310	0.30	1320	0.30	1330	0.30	1340	0.30
1350	0.19	1360	0.19	1370	0.19	1380	0.19	1390	0.19
1400	0.19	1420	0.09	1440	0.09	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J50                                G1
006    14  002A 040095001405K50                             1
006    14  003AF010         J50                     00000102 1
006    14  003F 010      099J50                             1 F
006    14  004A 010      099J50                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 100-Year
Existing Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Existing																			
2A	040	K100	5	95	14	67		14	67	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	7	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	7	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 67 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 10.66 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	3.41	200	3.71	300	4.25	400	4.25
500	4.47	600	4.70	700	4.93	800	5.15	900	5.68
1000	6.60	1050	7.73	1100	8.14	1110	10.75	1120	9.87
1130	13.15	1131	13.15	1132	13.15	1133	13.63	1134	14.27
1135	14.75	1136	14.43	1137	15.23	1138	15.39	1139	15.39
1140	15.71	1141	17.47	1142	17.95	1143	18.59	1144	19.39
1145	21.30	1146	22.57	1147	24.00	1148	25.43	1149	34.82
1150	42.93	1151	40.23	1152	59.17	1153	67.28	1154	59.17
1155	49.62	1156	50.41	1157	29.09	1158	18.27	1159	15.39
1160	14.27	1161	12.83	1162	11.87	1163	11.23	1164	11.71
1165	10.27	1166	10.11	1167	9.63	1168	9.47	1169	9.15
1170	8.67	1171	8.67	1172	8.83	1173	8.51	1174	7.58
1175	8.19	1176	7.88	1177	7.58	1178	7.43	1179	7.28
1180	7.28	1181	7.28	1182	7.43	1183	7.43	1184	7.43
1185	7.43	1186	7.28	1187	7.28	1188	7.43	1189	7.43
1190	7.28	1191	7.43	1192	7.28	1193	7.28	1194	7.28
1195	7.43	1196	7.28	1197	7.43	1198	7.43	1199	7.28
1200	7.28	1201	7.13	1202	6.97	1203	6.67	1204	6.67
1205	6.37	1206	6.37	1207	6.37	1208	6.37	1209	6.37
1210	6.37	1211	6.37	1212	6.37	1213	6.52	1214	6.37
1215	6.37	1216	6.52	1217	6.52	1218	6.37	1219	6.37
1220	6.52	1221	6.52	1222	6.37	1223	6.37	1224	6.52
1225	6.52	1226	6.37	1227	6.37	1228	6.52	1229	6.52
1230	6.37	1231	6.37	1232	6.52	1233	6.37	1234	6.22
1235	6.37	1236	6.37	1237	6.22	1238	6.37	1239	6.37
1240	6.22	1241	6.37	1242	6.37	1243	6.22	1244	6.37
1245	6.37	1246	6.22	1247	6.37	1248	6.37	1249	6.22
1250	6.37	1251	6.37	1252	6.22	1253	6.37	1254	6.37
1255	6.22	1256	6.37	1257	6.37	1258	6.22	1259	6.37
1260	6.37	1261	6.22	1262	6.06	1263	5.91	1264	5.76
1265	5.76	1266	5.61	1267	5.61	1268	5.76	1269	5.76
1270	5.61	1271	5.61	1272	5.76	1273	5.76	1274	5.61
1275	5.61	1276	5.76	1277	5.76	1278	5.61	1279	5.61
1280	5.76	1281	5.76	1282	5.61	1283	5.61	1284	5.76
1285	5.76	1286	5.61	1287	5.61	1288	5.76	1289	5.76
1290	5.61	1291	5.61	1292	5.76	1293	5.61	1294	5.61
1295	5.61	1296	5.76	1297	5.76	1298	5.76	1299	5.61
1300	5.76	1310	4.70	1320	4.78	1330	4.78	1340	4.70
1350	3.56	1360	3.49	1370	3.56	1380	3.56	1390	3.49
1400	3.56	1420	2.46	1440	2.46	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 7 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.07 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.34	200	0.37	300	0.42	400	0.42
500	0.45	600	0.47	700	0.49	800	0.52	900	0.57
1000	0.66	1050	0.77	1100	0.81	1110	1.08	1120	0.99
1130	1.32	1131	1.32	1132	1.32	1133	1.36	1134	1.43
1135	1.48	1136	1.44	1137	1.52	1138	1.54	1139	1.54
1140	1.57	1141	1.75	1142	1.80	1143	1.86	1144	1.94
1145	2.13	1146	2.26	1147	2.40	1148	2.54	1149	3.48
1150	4.29	1151	4.02	1152	5.92	1153	6.73	1154	5.92
1155	4.96	1156	5.04	1157	2.91	1158	1.83	1159	1.54
1160	1.43	1161	1.28	1162	1.19	1163	1.12	1164	1.17
1165	1.03	1166	1.01	1167	0.96	1168	0.95	1169	0.91
1170	0.87	1171	0.87	1172	0.88	1173	0.85	1174	0.76
1175	0.82	1176	0.79	1177	0.76	1178	0.74	1179	0.73
1180	0.73	1181	0.73	1182	0.74	1183	0.74	1184	0.74
1185	0.74	1186	0.73	1187	0.73	1188	0.74	1189	0.74
1190	0.73	1191	0.74	1192	0.73	1193	0.73	1194	0.73
1195	0.74	1196	0.73	1197	0.74	1198	0.74	1199	0.73
1200	0.73	1201	0.71	1202	0.70	1203	0.67	1204	0.67
1205	0.64	1206	0.64	1207	0.64	1208	0.64	1209	0.64
1210	0.64	1211	0.64	1212	0.64	1213	0.65	1214	0.64
1215	0.64	1216	0.65	1217	0.65	1218	0.64	1219	0.64
1220	0.65	1221	0.65	1222	0.64	1223	0.64	1224	0.65
1225	0.65	1226	0.64	1227	0.64	1228	0.65	1229	0.65
1230	0.64	1231	0.64	1232	0.65	1233	0.64	1234	0.62
1235	0.64	1236	0.64	1237	0.62	1238	0.64	1239	0.64
1240	0.62	1241	0.64	1242	0.64	1243	0.62	1244	0.64
1245	0.64	1246	0.62	1247	0.64	1248	0.64	1249	0.62
1250	0.64	1251	0.64	1252	0.62	1253	0.64	1254	0.64
1255	0.62	1256	0.64	1257	0.64	1258	0.62	1259	0.64
1260	0.64	1261	0.62	1262	0.61	1263	0.59	1264	0.58
1265	0.58	1266	0.56	1267	0.56	1268	0.58	1269	0.58
1270	0.56	1271	0.56	1272	0.58	1273	0.58	1274	0.56
1275	0.56	1276	0.58	1277	0.58	1278	0.56	1279	0.56
1280	0.58	1281	0.58	1282	0.56	1283	0.56	1284	0.58
1285	0.58	1286	0.56	1287	0.56	1288	0.58	1289	0.58
1290	0.56	1291	0.56	1292	0.58	1293	0.56	1294	0.56
1295	0.56	1296	0.58	1297	0.58	1298	0.58	1299	0.56
1300	0.58	1310	0.47	1320	0.48	1330	0.48	1340	0.47
1350	0.36	1360	0.35	1370	0.36	1380	0.36	1390	0.35
1400	0.36	1420	0.25	1440	0.25	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 7 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.07 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.34	200	0.37	300	0.42	400	0.42
500	0.45	600	0.47	700	0.49	800	0.52	900	0.57
1000	0.66	1050	0.77	1100	0.81	1110	1.08	1120	0.99
1130	1.32	1131	1.32	1132	1.32	1133	1.36	1134	1.43
1135	1.48	1136	1.44	1137	1.52	1138	1.54	1139	1.54
1140	1.57	1141	1.75	1142	1.80	1143	1.86	1144	1.94
1145	2.13	1146	2.26	1147	2.40	1148	2.54	1149	3.48
1150	4.29	1151	4.02	1152	5.92	1153	6.73	1154	5.92
1155	4.96	1156	5.04	1157	2.91	1158	1.83	1159	1.54
1160	1.43	1161	1.28	1162	1.19	1163	1.12	1164	1.17
1165	1.03	1166	1.01	1167	0.96	1168	0.95	1169	0.91
1170	0.87	1171	0.87	1172	0.88	1173	0.85	1174	0.76
1175	0.82	1176	0.79	1177	0.76	1178	0.74	1179	0.73
1180	0.73	1181	0.73	1182	0.74	1183	0.74	1184	0.74
1185	0.74	1186	0.73	1187	0.73	1188	0.74	1189	0.74
1190	0.73	1191	0.74	1192	0.73	1193	0.73	1194	0.73
1195	0.74	1196	0.73	1197	0.74	1198	0.74	1199	0.73
1200	0.73	1201	0.71	1202	0.70	1203	0.67	1204	0.67
1205	0.64	1206	0.64	1207	0.64	1208	0.64	1209	0.64
1210	0.64	1211	0.64	1212	0.64	1213	0.65	1214	0.64
1215	0.64	1216	0.65	1217	0.65	1218	0.64	1219	0.64
1220	0.65	1221	0.65	1222	0.64	1223	0.64	1224	0.65
1225	0.65	1226	0.64	1227	0.64	1228	0.65	1229	0.65
1230	0.64	1231	0.64	1232	0.65	1233	0.64	1234	0.62
1235	0.64	1236	0.64	1237	0.62	1238	0.64	1239	0.64
1240	0.62	1241	0.64	1242	0.64	1243	0.62	1244	0.64
1245	0.64	1246	0.62	1247	0.64	1248	0.64	1249	0.62
1250	0.64	1251	0.64	1252	0.62	1253	0.64	1254	0.64
1255	0.62	1256	0.64	1257	0.64	1258	0.62	1259	0.64
1260	0.64	1261	0.62	1262	0.61	1263	0.59	1264	0.58
1265	0.58	1266	0.56	1267	0.56	1268	0.58	1269	0.58
1270	0.56	1271	0.56	1272	0.58	1273	0.58	1274	0.56
1275	0.56	1276	0.58	1277	0.58	1278	0.56	1279	0.56
1280	0.58	1281	0.58	1282	0.56	1283	0.56	1284	0.58
1285	0.58	1286	0.56	1287	0.56	1288	0.58	1289	0.58
1290	0.56	1291	0.56	1292	0.58	1293	0.56	1294	0.56
1295	0.56	1296	0.58	1297	0.58	1298	0.58	1299	0.56
1300	0.58	1310	0.47	1320	0.48	1330	0.48	1340	0.47
1350	0.36	1360	0.35	1370	0.36	1380	0.36	1390	0.35
1400	0.36	1420	0.25	1440	0.25	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099A97                                G1
006    14  002A 040095001405B98                             1
006    14  003AF010         A97                     00000102 1
006    14  003F 010      099A97                             1 F
006    14  004A 010      099A97                             1  2
999
```

(Intentionally Blank)

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 10-Year
Existing Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Existing																			
2A	040	K10	7	91	14	40		14	40	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	4	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	4	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 40 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 5.25 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.73	200	0.80	300	1.02	400	1.23
500	1.56	600	1.78	700	2.25	800	2.76	900	3.41
1000	4.73	1050	5.26	1100	5.71	1110	7.19	1120	7.84
1130	8.00	1131	8.35	1132	8.69	1133	9.04	1134	9.38
1135	9.73	1136	10.30	1137	10.87	1138	11.10	1139	11.33
1140	11.56	1141	12.09	1142	12.62	1143	12.92	1144	13.21
1145	13.51	1146	14.08	1147	14.65	1148	15.96	1149	17.84
1150	20.27	1151	26.09	1152	35.31	1153	40.31	1154	40.19
1155	38.49	1156	36.11	1157	33.16	1158	26.82	1159	17.06
1160	11.22	1161	10.01	1162	9.38	1163	8.86	1164	8.35
1165	7.83	1166	7.37	1167	6.90	1168	6.90	1169	6.90
1170	6.90	1171	6.67	1172	6.44	1173	6.21	1174	5.99
1175	5.76	1176	5.53	1177	5.30	1178	5.30	1179	5.30
1180	5.30	1181	5.25	1182	5.20	1183	5.15	1184	5.09
1185	5.04	1186	4.99	1187	4.94	1188	4.94	1189	4.94
1190	4.94	1191	4.91	1192	4.89	1193	4.86	1194	4.83
1195	4.81	1196	4.78	1197	4.76	1198	4.76	1199	4.76
1200	4.76	1201	4.76	1202	4.76	1203	4.76	1204	4.76
1205	4.76	1206	4.76	1207	4.76	1208	4.76	1209	4.76
1210	4.76	1211	4.59	1212	4.42	1213	4.26	1214	4.09
1215	3.93	1216	3.76	1217	3.59	1218	3.59	1219	3.59
1220	3.59	1221	3.59	1222	3.59	1223	3.59	1224	3.59
1225	3.59	1226	3.59	1227	3.59	1228	3.59	1229	3.59
1230	3.59	1231	3.48	1232	3.36	1233	3.25	1234	3.13
1235	3.02	1236	2.90	1237	2.78	1238	2.78	1239	2.78
1240	2.78	1241	2.78	1242	2.78	1243	2.78	1244	2.78
1245	2.78	1246	2.78	1247	2.78	1248	2.78	1249	2.78
1250	2.78	1251	2.78	1252	2.78	1253	2.78	1254	2.78
1255	2.78	1256	2.78	1257	2.78	1258	2.78	1259	2.78
1260	2.78	1261	2.72	1262	2.66	1263	2.60	1264	2.54
1265	2.48	1266	2.42	1267	2.36	1268	2.36	1269	2.36
1270	2.36	1271	2.36	1272	2.36	1273	2.36	1274	2.36
1275	2.36	1276	2.36	1277	2.36	1278	2.36	1279	2.36
1280	2.36	1281	2.36	1282	2.36	1283	2.36	1284	2.36
1285	2.36	1286	2.36	1287	2.36	1288	2.36	1289	2.36
1290	2.36	1291	2.36	1292	2.36	1293	2.36	1294	2.36
1295	2.36	1296	2.36	1297	2.36	1298	2.36	1299	2.36
1300	2.36	1310	1.72	1320	1.72	1330	1.72	1340	1.72
1350	1.09	1360	1.09	1370	1.09	1380	1.09	1390	1.09
1400	1.09	1420	0.73	1440	0.73	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.53 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.08	300	0.10	400	0.12
500	0.16	600	0.18	700	0.23	800	0.28	900	0.34
1000	0.47	1050	0.53	1100	0.57	1110	0.72	1120	0.78
1130	0.80	1131	0.83	1132	0.87	1133	0.90	1134	0.94
1135	0.97	1136	1.03	1137	1.09	1138	1.11	1139	1.13
1140	1.16	1141	1.21	1142	1.26	1143	1.29	1144	1.32
1145	1.35	1146	1.41	1147	1.47	1148	1.60	1149	1.78
1150	2.03	1151	2.61	1152	3.53	1153	4.03	1154	4.02
1155	3.85	1156	3.61	1157	3.32	1158	2.68	1159	1.71
1160	1.12	1161	1.00	1162	0.94	1163	0.89	1164	0.83
1165	0.78	1166	0.74	1167	0.69	1168	0.69	1169	0.69
1170	0.69	1171	0.67	1172	0.64	1173	0.62	1174	0.60
1175	0.58	1176	0.55	1177	0.53	1178	0.53	1179	0.53
1180	0.53	1181	0.52	1182	0.52	1183	0.51	1184	0.51
1185	0.50	1186	0.50	1187	0.49	1188	0.49	1189	0.49
1190	0.49	1191	0.49	1192	0.49	1193	0.49	1194	0.48
1195	0.48	1196	0.48	1197	0.48	1198	0.48	1199	0.48
1200	0.48	1201	0.48	1202	0.48	1203	0.48	1204	0.48
1205	0.48	1206	0.48	1207	0.48	1208	0.48	1209	0.48
1210	0.48	1211	0.46	1212	0.44	1213	0.43	1214	0.41
1215	0.39	1216	0.38	1217	0.36	1218	0.36	1219	0.36
1220	0.36	1221	0.36	1222	0.36	1223	0.36	1224	0.36
1225	0.36	1226	0.36	1227	0.36	1228	0.36	1229	0.36
1230	0.36	1231	0.35	1232	0.34	1233	0.32	1234	0.31
1235	0.30	1236	0.29	1237	0.28	1238	0.28	1239	0.28
1240	0.28	1241	0.28	1242	0.28	1243	0.28	1244	0.28
1245	0.28	1246	0.28	1247	0.28	1248	0.28	1249	0.28
1250	0.28	1251	0.28	1252	0.28	1253	0.28	1254	0.28
1255	0.28	1256	0.28	1257	0.28	1258	0.28	1259	0.28
1260	0.28	1261	0.27	1262	0.27	1263	0.26	1264	0.25
1265	0.25	1266	0.24	1267	0.24	1268	0.24	1269	0.24
1270	0.24	1271	0.24	1272	0.24	1273	0.24	1274	0.24
1275	0.24	1276	0.24	1277	0.24	1278	0.24	1279	0.24
1280	0.24	1281	0.24	1282	0.24	1283	0.24	1284	0.24
1285	0.24	1286	0.24	1287	0.24	1288	0.24	1289	0.24
1290	0.24	1291	0.24	1292	0.24	1293	0.24	1294	0.24
1295	0.24	1296	0.24	1297	0.24	1298	0.24	1299	0.24
1300	0.24	1310	0.17	1320	0.17	1330	0.17	1340	0.17
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.07	1440	0.07	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.53 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.08	300	0.10	400	0.12
500	0.16	600	0.18	700	0.23	800	0.28	900	0.34
1000	0.47	1050	0.53	1100	0.57	1110	0.72	1120	0.78
1130	0.80	1131	0.83	1132	0.87	1133	0.90	1134	0.94
1135	0.97	1136	1.03	1137	1.09	1138	1.11	1139	1.13
1140	1.16	1141	1.21	1142	1.26	1143	1.29	1144	1.32
1145	1.35	1146	1.41	1147	1.47	1148	1.60	1149	1.78
1150	2.03	1151	2.61	1152	3.53	1153	4.03	1154	4.02
1155	3.85	1156	3.61	1157	3.32	1158	2.68	1159	1.71
1160	1.12	1161	1.00	1162	0.94	1163	0.89	1164	0.83
1165	0.78	1166	0.74	1167	0.69	1168	0.69	1169	0.69
1170	0.69	1171	0.67	1172	0.64	1173	0.62	1174	0.60
1175	0.58	1176	0.55	1177	0.53	1178	0.53	1179	0.53
1180	0.53	1181	0.52	1182	0.52	1183	0.51	1184	0.51
1185	0.50	1186	0.50	1187	0.49	1188	0.49	1189	0.49
1190	0.49	1191	0.49	1192	0.49	1193	0.49	1194	0.48
1195	0.48	1196	0.48	1197	0.48	1198	0.48	1199	0.48
1200	0.48	1201	0.48	1202	0.48	1203	0.48	1204	0.48
1205	0.48	1206	0.48	1207	0.48	1208	0.48	1209	0.48
1210	0.48	1211	0.46	1212	0.44	1213	0.43	1214	0.41
1215	0.39	1216	0.38	1217	0.36	1218	0.36	1219	0.36
1220	0.36	1221	0.36	1222	0.36	1223	0.36	1224	0.36
1225	0.36	1226	0.36	1227	0.36	1228	0.36	1229	0.36
1230	0.36	1231	0.35	1232	0.34	1233	0.32	1234	0.31
1235	0.30	1236	0.29	1237	0.28	1238	0.28	1239	0.28
1240	0.28	1241	0.28	1242	0.28	1243	0.28	1244	0.28
1245	0.28	1246	0.28	1247	0.28	1248	0.28	1249	0.28
1250	0.28	1251	0.28	1252	0.28	1253	0.28	1254	0.28
1255	0.28	1256	0.28	1257	0.28	1258	0.28	1259	0.28
1260	0.28	1261	0.27	1262	0.27	1263	0.26	1264	0.25
1265	0.25	1266	0.24	1267	0.24	1268	0.24	1269	0.24
1270	0.24	1271	0.24	1272	0.24	1273	0.24	1274	0.24
1275	0.24	1276	0.24	1277	0.24	1278	0.24	1279	0.24
1280	0.24	1281	0.24	1282	0.24	1283	0.24	1284	0.24
1285	0.24	1286	0.24	1287	0.24	1288	0.24	1289	0.24
1290	0.24	1291	0.24	1292	0.24	1293	0.24	1294	0.24
1295	0.24	1296	0.24	1297	0.24	1298	0.24	1299	0.24
1300	0.24	1310	0.17	1320	0.17	1330	0.17	1340	0.17
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.07	1440	0.07	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J10                                G1
006    14  002A 040091001407K10                             1
006    14  003AF010         J10                     00000102 1
006    14  003F 010      099J10                             1 F
006    14  004A 010      099J10                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 25-Year
Existing Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS							ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)	AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---	0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Existing																		
2A	040	K25	6	91	14	50	14	50	1154	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																		
3AF: Control/Diversion: 10% to channel A																		
3AF	---	---	--	--	---	---	14	5	1154	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---	14	5	1154	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 50 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 6.07 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.73	200	0.98	300	1.25	400	1.57
500	1.96	600	2.34	700	2.83	800	3.31	900	3.35
1000	4.90	1050	6.11	1100	7.54	1110	8.24	1120	8.48
1130	10.49	1131	10.75	1132	11.00	1133	11.26	1134	11.51
1135	11.77	1136	12.29	1137	12.56	1138	12.82	1139	13.09
1140	13.36	1141	13.84	1142	14.05	1143	14.27	1144	14.48
1145	14.69	1146	15.29	1147	15.68	1148	16.13	1149	22.96
1150	29.74	1151	36.54	1152	42.96	1153	49.51	1154	49.65
1155	42.50	1156	35.06	1157	27.63	1158	20.21	1159	12.58
1160	11.35	1161	10.56	1162	10.07	1163	9.57	1164	9.08
1165	8.58	1166	8.08	1167	8.08	1168	8.08	1169	8.08
1170	8.08	1171	7.83	1172	7.60	1173	7.37	1174	7.14
1175	6.91	1176	6.68	1177	6.68	1178	6.68	1179	6.68
1180	6.68	1181	6.51	1182	6.34	1183	6.17	1184	6.00
1185	5.83	1186	5.66	1187	5.66	1188	5.66	1189	5.66
1190	5.66	1191	5.51	1192	5.35	1193	5.19	1194	5.03
1195	4.88	1196	4.72	1197	4.72	1198	4.72	1199	4.72
1200	4.72	1201	4.72	1202	4.72	1203	4.72	1204	4.72
1205	4.72	1206	4.72	1207	4.72	1208	4.72	1209	4.72
1210	4.72	1211	4.59	1212	4.47	1213	4.34	1214	4.21
1215	4.09	1216	3.96	1217	3.96	1218	3.96	1219	3.96
1220	3.96	1221	3.96	1222	3.96	1223	3.96	1224	3.96
1225	3.96	1226	3.96	1227	3.96	1228	3.96	1229	3.96
1230	3.96	1231	3.85	1232	3.75	1233	3.65	1234	3.55
1235	3.44	1236	3.34	1237	3.34	1238	3.34	1239	3.34
1240	3.34	1241	3.34	1242	3.34	1243	3.34	1244	3.34
1245	3.34	1246	3.34	1247	3.34	1248	3.34	1249	3.34
1250	3.34	1251	3.34	1252	3.34	1253	3.34	1254	3.34
1255	3.34	1256	3.34	1257	3.34	1258	3.34	1259	3.34
1260	3.34	1261	3.27	1262	3.21	1263	3.14	1264	3.07
1265	3.01	1266	2.94	1267	2.94	1268	2.94	1269	2.94
1270	2.94	1271	2.94	1272	2.94	1273	2.94	1274	2.94
1275	2.94	1276	2.94	1277	2.94	1278	2.94	1279	2.94
1280	2.94	1281	2.94	1282	2.94	1283	2.94	1284	2.94
1285	2.94	1286	2.94	1287	2.94	1288	2.94	1289	2.94
1290	2.94	1291	2.94	1292	2.94	1293	2.94	1294	2.94
1295	2.94	1296	2.94	1297	2.94	1298	2.94	1299	2.94
1300	2.94	1310	2.14	1320	2.14	1330	2.14	1340	2.14
1350	1.34	1360	1.34	1370	1.34	1380	1.34	1390	1.34
1400	1.34	1420	0.80	1440	0.80	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.61 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.10	300	0.12	400	0.16
500	0.20	600	0.23	700	0.28	800	0.33	900	0.34
1000	0.49	1050	0.61	1100	0.75	1110	0.82	1120	0.85
1130	1.05	1131	1.07	1132	1.10	1133	1.13	1134	1.15
1135	1.18	1136	1.23	1137	1.26	1138	1.28	1139	1.31
1140	1.34	1141	1.38	1142	1.41	1143	1.43	1144	1.45
1145	1.47	1146	1.53	1147	1.57	1148	1.61	1149	2.30
1150	2.97	1151	3.65	1152	4.30	1153	4.95	1154	4.96
1155	4.25	1156	3.51	1157	2.76	1158	2.02	1159	1.26
1160	1.14	1161	1.06	1162	1.01	1163	0.96	1164	0.91
1165	0.86	1166	0.81	1167	0.81	1168	0.81	1169	0.81
1170	0.81	1171	0.78	1172	0.76	1173	0.74	1174	0.71
1175	0.69	1176	0.67	1177	0.67	1178	0.67	1179	0.67
1180	0.67	1181	0.65	1182	0.63	1183	0.62	1184	0.60
1185	0.58	1186	0.57	1187	0.57	1188	0.57	1189	0.57
1190	0.57	1191	0.55	1192	0.53	1193	0.52	1194	0.50
1195	0.49	1196	0.47	1197	0.47	1198	0.47	1199	0.47
1200	0.47	1201	0.47	1202	0.47	1203	0.47	1204	0.47
1205	0.47	1206	0.47	1207	0.47	1208	0.47	1209	0.47
1210	0.47	1211	0.46	1212	0.45	1213	0.43	1214	0.42
1215	0.41	1216	0.40	1217	0.40	1218	0.40	1219	0.40
1220	0.40	1221	0.40	1222	0.40	1223	0.40	1224	0.40
1225	0.40	1226	0.40	1227	0.40	1228	0.40	1229	0.40
1230	0.40	1231	0.39	1232	0.38	1233	0.36	1234	0.35
1235	0.34	1236	0.33	1237	0.33	1238	0.33	1239	0.33
1240	0.33	1241	0.33	1242	0.33	1243	0.33	1244	0.33
1245	0.33	1246	0.33	1247	0.33	1248	0.33	1249	0.33
1250	0.33	1251	0.33	1252	0.33	1253	0.33	1254	0.33
1255	0.33	1256	0.33	1257	0.33	1258	0.33	1259	0.33
1260	0.33	1261	0.33	1262	0.32	1263	0.31	1264	0.31
1265	0.30	1266	0.29	1267	0.29	1268	0.29	1269	0.29
1270	0.29	1271	0.29	1272	0.29	1273	0.29	1274	0.29
1275	0.29	1276	0.29	1277	0.29	1278	0.29	1279	0.29
1280	0.29	1281	0.29	1282	0.29	1283	0.29	1284	0.29
1285	0.29	1286	0.29	1287	0.29	1288	0.29	1289	0.29
1290	0.29	1291	0.29	1292	0.29	1293	0.29	1294	0.29
1295	0.29	1296	0.29	1297	0.29	1298	0.29	1299	0.29
1300	0.29	1310	0.21	1320	0.21	1330	0.21	1340	0.21
1350	0.13	1360	0.13	1370	0.13	1380	0.13	1390	0.13
1400	0.13	1420	0.08	1440	0.08	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.61 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.10	300	0.12	400	0.16
500	0.20	600	0.23	700	0.28	800	0.33	900	0.34
1000	0.49	1050	0.61	1100	0.75	1110	0.82	1120	0.85
1130	1.05	1131	1.07	1132	1.10	1133	1.13	1134	1.15
1135	1.18	1136	1.23	1137	1.26	1138	1.28	1139	1.31
1140	1.34	1141	1.38	1142	1.41	1143	1.43	1144	1.45
1145	1.47	1146	1.53	1147	1.57	1148	1.61	1149	2.30
1150	2.97	1151	3.65	1152	4.30	1153	4.95	1154	4.96
1155	4.25	1156	3.51	1157	2.76	1158	2.02	1159	1.26
1160	1.14	1161	1.06	1162	1.01	1163	0.96	1164	0.91
1165	0.86	1166	0.81	1167	0.81	1168	0.81	1169	0.81
1170	0.81	1171	0.78	1172	0.76	1173	0.74	1174	0.71
1175	0.69	1176	0.67	1177	0.67	1178	0.67	1179	0.67
1180	0.67	1181	0.65	1182	0.63	1183	0.62	1184	0.60
1185	0.58	1186	0.57	1187	0.57	1188	0.57	1189	0.57
1190	0.57	1191	0.55	1192	0.53	1193	0.52	1194	0.50
1195	0.49	1196	0.47	1197	0.47	1198	0.47	1199	0.47
1200	0.47	1201	0.47	1202	0.47	1203	0.47	1204	0.47
1205	0.47	1206	0.47	1207	0.47	1208	0.47	1209	0.47
1210	0.47	1211	0.46	1212	0.45	1213	0.43	1214	0.42
1215	0.41	1216	0.40	1217	0.40	1218	0.40	1219	0.40
1220	0.40	1221	0.40	1222	0.40	1223	0.40	1224	0.40
1225	0.40	1226	0.40	1227	0.40	1228	0.40	1229	0.40
1230	0.40	1231	0.39	1232	0.38	1233	0.36	1234	0.35
1235	0.34	1236	0.33	1237	0.33	1238	0.33	1239	0.33
1240	0.33	1241	0.33	1242	0.33	1243	0.33	1244	0.33
1245	0.33	1246	0.33	1247	0.33	1248	0.33	1249	0.33
1250	0.33	1251	0.33	1252	0.33	1253	0.33	1254	0.33
1255	0.33	1256	0.33	1257	0.33	1258	0.33	1259	0.33
1260	0.33	1261	0.33	1262	0.32	1263	0.31	1264	0.31
1265	0.30	1266	0.29	1267	0.29	1268	0.29	1269	0.29
1270	0.29	1271	0.29	1272	0.29	1273	0.29	1274	0.29
1275	0.29	1276	0.29	1277	0.29	1278	0.29	1279	0.29
1280	0.29	1281	0.29	1282	0.29	1283	0.29	1284	0.29
1285	0.29	1286	0.29	1287	0.29	1288	0.29	1289	0.29
1290	0.29	1291	0.29	1292	0.29	1293	0.29	1294	0.29
1295	0.29	1296	0.29	1297	0.29	1298	0.29	1299	0.29
1300	0.29	1310	0.21	1320	0.21	1330	0.21	1340	0.21
1350	0.13	1360	0.13	1370	0.13	1380	0.13	1390	0.13
1400	0.13	1420	0.08	1440	0.08	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J25                                G1
006    14  002A 040091001406K25                             1
006    14  003AF010         J25                     00000102 1
006    14  003F 010      099J25                             1 F
006    14  004A 010      099J25                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 50-Year
Existing Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Existing																			
2A	040	K50	5	91	14	60		14	60	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 60 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 7.63 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.73	200	1.31	300	1.67	400	2.18
500	2.69	600	3.34	700	3.88	800	4.32	900	5.08
1000	6.32	1050	6.45	1100	7.65	1110	8.40	1120	9.93
1130	10.49	1131	10.64	1132	10.78	1133	10.93	1134	11.07
1135	11.22	1136	12.34	1137	13.46	1138	14.59	1139	15.71
1140	16.83	1141	17.60	1142	18.37	1143	19.14	1144	19.90
1145	20.66	1146	21.17	1147	21.67	1148	22.34	1149	23.64
1150	27.16	1151	37.47	1152	50.18	1153	59.55	1154	58.76
1155	54.15	1156	41.60	1157	26.68	1158	14.91	1159	12.66
1160	12.02	1161	11.22	1162	10.41	1163	9.61	1164	8.81
1165	8.00	1166	8.00	1167	8.00	1168	8.00	1169	8.00
1170	8.00	1171	7.84	1172	7.70	1173	7.55	1174	7.41
1175	7.26	1176	7.26	1177	7.26	1178	7.26	1179	7.26
1180	7.26	1181	7.26	1182	7.26	1183	7.26	1184	7.26
1185	7.26	1186	7.26	1187	7.26	1188	7.26	1189	7.26
1190	7.26	1191	7.04	1192	6.83	1193	6.61	1194	6.39
1195	6.17	1196	6.17	1197	6.17	1198	6.17	1199	6.17
1200	6.17	1201	6.17	1202	6.17	1203	6.17	1204	6.17
1205	6.17	1206	6.17	1207	6.17	1208	6.17	1209	6.17
1210	6.17	1211	5.95	1212	5.74	1213	5.52	1214	5.30
1215	5.08	1216	5.08	1217	5.08	1218	5.08	1219	5.08
1220	5.08	1221	5.08	1222	5.08	1223	5.08	1224	5.08
1225	5.08	1226	5.08	1227	5.08	1228	5.08	1229	5.08
1230	5.08	1231	4.94	1232	4.79	1233	4.65	1234	4.50
1235	4.36	1236	4.36	1237	4.36	1238	4.36	1239	4.36
1240	4.36	1241	4.36	1242	4.36	1243	4.36	1244	4.36
1245	4.36	1246	4.36	1247	4.36	1248	4.36	1249	4.36
1250	4.36	1251	4.36	1252	4.36	1253	4.36	1254	4.36
1255	4.36	1256	4.36	1257	4.36	1258	4.36	1259	4.36
1260	4.36	1261	4.28	1262	4.21	1263	4.14	1264	4.07
1265	3.99	1266	3.99	1267	3.99	1268	3.99	1269	3.99
1270	3.99	1271	3.99	1272	3.99	1273	3.99	1274	3.99
1275	3.99	1276	3.99	1277	3.99	1278	3.99	1279	3.99
1280	3.99	1281	3.99	1282	3.99	1283	3.99	1284	3.99
1285	3.99	1286	3.99	1287	3.99	1288	3.99	1289	3.99
1290	3.99	1291	3.99	1292	3.99	1293	3.99	1294	3.99
1295	3.99	1296	3.99	1297	3.99	1298	3.99	1299	3.99
1300	3.99	1310	2.90	1320	2.90	1330	2.90	1340	2.90
1350	1.82	1360	1.82	1370	1.82	1380	1.82	1390	1.82
1400	1.81	1420	0.91	1440	0.91	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.76 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.13	300	0.17	400	0.22
500	0.27	600	0.33	700	0.39	800	0.43	900	0.51
1000	0.63	1050	0.64	1100	0.77	1110	0.84	1120	0.99
1130	1.05	1131	1.06	1132	1.08	1133	1.09	1134	1.11
1135	1.12	1136	1.23	1137	1.35	1138	1.46	1139	1.57
1140	1.68	1141	1.76	1142	1.84	1143	1.91	1144	1.99
1145	2.07	1146	2.12	1147	2.17	1148	2.23	1149	2.36
1150	2.72	1151	3.75	1152	5.02	1153	5.95	1154	5.88
1155	5.41	1156	4.16	1157	2.67	1158	1.49	1159	1.27
1160	1.20	1161	1.12	1162	1.04	1163	0.96	1164	0.88
1165	0.80	1166	0.80	1167	0.80	1168	0.80	1169	0.80
1170	0.80	1171	0.78	1172	0.77	1173	0.76	1174	0.74
1175	0.73	1176	0.73	1177	0.73	1178	0.73	1179	0.73
1180	0.73	1181	0.73	1182	0.73	1183	0.73	1184	0.73
1185	0.73	1186	0.73	1187	0.73	1188	0.73	1189	0.73
1190	0.73	1191	0.70	1192	0.68	1193	0.66	1194	0.64
1195	0.62	1196	0.62	1197	0.62	1198	0.62	1199	0.62
1200	0.62	1201	0.62	1202	0.62	1203	0.62	1204	0.62
1205	0.62	1206	0.62	1207	0.62	1208	0.62	1209	0.62
1210	0.62	1211	0.60	1212	0.57	1213	0.55	1214	0.53
1215	0.51	1216	0.51	1217	0.51	1218	0.51	1219	0.51
1220	0.51	1221	0.51	1222	0.51	1223	0.51	1224	0.51
1225	0.51	1226	0.51	1227	0.51	1228	0.51	1229	0.51
1230	0.51	1231	0.49	1232	0.48	1233	0.46	1234	0.45
1235	0.44	1236	0.44	1237	0.44	1238	0.44	1239	0.44
1240	0.44	1241	0.44	1242	0.44	1243	0.44	1244	0.44
1245	0.44	1246	0.44	1247	0.44	1248	0.44	1249	0.44
1250	0.44	1251	0.44	1252	0.44	1253	0.44	1254	0.44
1255	0.44	1256	0.44	1257	0.44	1258	0.44	1259	0.44
1260	0.44	1261	0.43	1262	0.42	1263	0.41	1264	0.41
1265	0.40	1266	0.40	1267	0.40	1268	0.40	1269	0.40
1270	0.40	1271	0.40	1272	0.40	1273	0.40	1274	0.40
1275	0.40	1276	0.40	1277	0.40	1278	0.40	1279	0.40
1280	0.40	1281	0.40	1282	0.40	1283	0.40	1284	0.40
1285	0.40	1286	0.40	1287	0.40	1288	0.40	1289	0.40
1290	0.40	1291	0.40	1292	0.40	1293	0.40	1294	0.40
1295	0.40	1296	0.40	1297	0.40	1298	0.40	1299	0.40
1300	0.40	1310	0.29	1320	0.29	1330	0.29	1340	0.29
1350	0.18	1360	0.18	1370	0.18	1380	0.18	1390	0.18
1400	0.18	1420	0.09	1440	0.09	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.76 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.13	300	0.17	400	0.22
500	0.27	600	0.33	700	0.39	800	0.43	900	0.51
1000	0.63	1050	0.64	1100	0.77	1110	0.84	1120	0.99
1130	1.05	1131	1.06	1132	1.08	1133	1.09	1134	1.11
1135	1.12	1136	1.23	1137	1.35	1138	1.46	1139	1.57
1140	1.68	1141	1.76	1142	1.84	1143	1.91	1144	1.99
1145	2.07	1146	2.12	1147	2.17	1148	2.23	1149	2.36
1150	2.72	1151	3.75	1152	5.02	1153	5.95	1154	5.88
1155	5.41	1156	4.16	1157	2.67	1158	1.49	1159	1.27
1160	1.20	1161	1.12	1162	1.04	1163	0.96	1164	0.88
1165	0.80	1166	0.80	1167	0.80	1168	0.80	1169	0.80
1170	0.80	1171	0.78	1172	0.77	1173	0.76	1174	0.74
1175	0.73	1176	0.73	1177	0.73	1178	0.73	1179	0.73
1180	0.73	1181	0.73	1182	0.73	1183	0.73	1184	0.73
1185	0.73	1186	0.73	1187	0.73	1188	0.73	1189	0.73
1190	0.73	1191	0.70	1192	0.68	1193	0.66	1194	0.64
1195	0.62	1196	0.62	1197	0.62	1198	0.62	1199	0.62
1200	0.62	1201	0.62	1202	0.62	1203	0.62	1204	0.62
1205	0.62	1206	0.62	1207	0.62	1208	0.62	1209	0.62
1210	0.62	1211	0.60	1212	0.57	1213	0.55	1214	0.53
1215	0.51	1216	0.51	1217	0.51	1218	0.51	1219	0.51
1220	0.51	1221	0.51	1222	0.51	1223	0.51	1224	0.51
1225	0.51	1226	0.51	1227	0.51	1228	0.51	1229	0.51
1230	0.51	1231	0.49	1232	0.48	1233	0.46	1234	0.45
1235	0.44	1236	0.44	1237	0.44	1238	0.44	1239	0.44
1240	0.44	1241	0.44	1242	0.44	1243	0.44	1244	0.44
1245	0.44	1246	0.44	1247	0.44	1248	0.44	1249	0.44
1250	0.44	1251	0.44	1252	0.44	1253	0.44	1254	0.44
1255	0.44	1256	0.44	1257	0.44	1258	0.44	1259	0.44
1260	0.44	1261	0.43	1262	0.42	1263	0.41	1264	0.41
1265	0.40	1266	0.40	1267	0.40	1268	0.40	1269	0.40
1270	0.40	1271	0.40	1272	0.40	1273	0.40	1274	0.40
1275	0.40	1276	0.40	1277	0.40	1278	0.40	1279	0.40
1280	0.40	1281	0.40	1282	0.40	1283	0.40	1284	0.40
1285	0.40	1286	0.40	1287	0.40	1288	0.40	1289	0.40
1290	0.40	1291	0.40	1292	0.40	1293	0.40	1294	0.40
1295	0.40	1296	0.40	1297	0.40	1298	0.40	1299	0.40
1300	0.40	1310	0.29	1320	0.29	1330	0.29	1340	0.29
1350	0.18	1360	0.18	1370	0.18	1380	0.18	1390	0.18
1400	0.18	1420	0.09	1440	0.09	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J50                                G1
006    14  002A 040091001405K50                             1
006    14  003AF010         J50                     00000102 1
006    14  003F 010      099J50                             1 F
006    14  004A 010      099J50                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 100-Year
Existing Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Existing																			
2A	040	K100	5	91	14	67		14	67	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	7	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	7	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE

NO ISSUES OR WARNINGS DETECTED

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Existing
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 67 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 10.25 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	3.27	200	3.56	300	4.07	400	4.07
500	4.29	600	4.50	700	4.72	800	4.94	900	5.44
1000	6.32	1050	7.41	1100	7.80	1110	10.41	1120	9.53
1130	12.82	1131	12.82	1132	12.82	1133	13.30	1134	13.94
1135	14.43	1136	14.11	1137	14.91	1138	15.07	1139	15.07
1140	15.39	1141	17.15	1142	17.63	1143	18.27	1144	19.07
1145	20.98	1146	22.24	1147	23.67	1148	25.10	1149	34.45
1150	42.55	1151	39.85	1152	58.76	1153	66.84	1154	58.76
1155	49.22	1156	50.02	1157	28.74	1158	17.95	1159	15.07
1160	13.95	1161	12.50	1162	11.54	1163	10.90	1164	11.38
1165	9.93	1166	9.77	1167	9.29	1168	9.13	1169	8.81
1170	8.32	1171	8.32	1172	8.48	1173	8.16	1174	7.26
1175	7.84	1176	7.55	1177	7.26	1178	7.12	1179	6.97
1180	6.97	1181	6.97	1182	7.12	1183	7.12	1184	7.12
1185	7.12	1186	6.97	1187	6.97	1188	7.12	1189	7.12
1190	6.97	1191	7.12	1192	6.97	1193	6.97	1194	6.97
1195	7.12	1196	6.97	1197	7.12	1198	7.12	1199	6.97
1200	6.97	1201	6.83	1202	6.68	1203	6.39	1204	6.39
1205	6.10	1206	6.10	1207	6.10	1208	6.10	1209	6.10
1210	6.10	1211	6.10	1212	6.10	1213	6.25	1214	6.10
1215	6.10	1216	6.25	1217	6.25	1218	6.10	1219	6.10
1220	6.25	1221	6.25	1222	6.10	1223	6.10	1224	6.25
1225	6.25	1226	6.10	1227	6.10	1228	6.25	1229	6.25
1230	6.10	1231	6.10	1232	6.25	1233	6.10	1234	5.95
1235	6.10	1236	6.10	1237	5.95	1238	6.10	1239	6.10
1240	5.95	1241	6.10	1242	6.10	1243	5.95	1244	6.10
1245	6.10	1246	5.95	1247	6.10	1248	6.10	1249	5.95
1250	6.10	1251	6.10	1252	5.95	1253	6.10	1254	6.10
1255	5.95	1256	6.10	1257	6.10	1258	5.95	1259	6.10
1260	6.10	1261	5.95	1262	5.81	1263	5.66	1264	5.52
1265	5.52	1266	5.37	1267	5.37	1268	5.52	1269	5.52
1270	5.37	1271	5.37	1272	5.52	1273	5.52	1274	5.37
1275	5.37	1276	5.52	1277	5.52	1278	5.37	1279	5.37
1280	5.52	1281	5.52	1282	5.37	1283	5.37	1284	5.52
1285	5.52	1286	5.37	1287	5.37	1288	5.52	1289	5.52
1290	5.37	1291	5.37	1292	5.52	1293	5.37	1294	5.37
1295	5.37	1296	5.52	1297	5.52	1298	5.52	1299	5.37
1300	5.52	1310	4.50	1320	4.57	1330	4.58	1340	4.50
1350	3.41	1360	3.34	1370	3.41	1380	3.41	1390	3.34
1400	3.41	1420	2.36	1440	2.36	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 7 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.03 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.33	200	0.36	300	0.41	400	0.41
500	0.43	600	0.45	700	0.47	800	0.49	900	0.54
1000	0.63	1050	0.74	1100	0.78	1110	1.04	1120	0.95
1130	1.28	1131	1.28	1132	1.28	1133	1.33	1134	1.39
1135	1.44	1136	1.41	1137	1.49	1138	1.51	1139	1.51
1140	1.54	1141	1.71	1142	1.76	1143	1.83	1144	1.91
1145	2.10	1146	2.22	1147	2.37	1148	2.51	1149	3.44
1150	4.26	1151	3.99	1152	5.88	1153	6.68	1154	5.88
1155	4.92	1156	5.00	1157	2.87	1158	1.80	1159	1.51
1160	1.39	1161	1.25	1162	1.15	1163	1.09	1164	1.14
1165	0.99	1166	0.98	1167	0.93	1168	0.91	1169	0.88
1170	0.83	1171	0.83	1172	0.85	1173	0.82	1174	0.73
1175	0.78	1176	0.76	1177	0.73	1178	0.71	1179	0.70
1180	0.70	1181	0.70	1182	0.71	1183	0.71	1184	0.71
1185	0.71	1186	0.70	1187	0.70	1188	0.71	1189	0.71
1190	0.70	1191	0.71	1192	0.70	1193	0.70	1194	0.70
1195	0.71	1196	0.70	1197	0.71	1198	0.71	1199	0.70
1200	0.70	1201	0.68	1202	0.67	1203	0.64	1204	0.64
1205	0.61	1206	0.61	1207	0.61	1208	0.61	1209	0.61
1210	0.61	1211	0.61	1212	0.61	1213	0.62	1214	0.61
1215	0.61	1216	0.62	1217	0.62	1218	0.61	1219	0.61
1220	0.62	1221	0.62	1222	0.61	1223	0.61	1224	0.62
1225	0.62	1226	0.61	1227	0.61	1228	0.62	1229	0.62
1230	0.61	1231	0.61	1232	0.62	1233	0.61	1234	0.60
1235	0.61	1236	0.61	1237	0.60	1238	0.61	1239	0.61
1240	0.60	1241	0.61	1242	0.61	1243	0.60	1244	0.61
1245	0.61	1246	0.60	1247	0.61	1248	0.61	1249	0.60
1250	0.61	1251	0.61	1252	0.60	1253	0.61	1254	0.61
1255	0.60	1256	0.61	1257	0.61	1258	0.60	1259	0.61
1260	0.61	1261	0.60	1262	0.58	1263	0.57	1264	0.55
1265	0.55	1266	0.54	1267	0.54	1268	0.55	1269	0.55
1270	0.54	1271	0.54	1272	0.55	1273	0.55	1274	0.54
1275	0.54	1276	0.55	1277	0.55	1278	0.54	1279	0.54
1280	0.55	1281	0.55	1282	0.54	1283	0.54	1284	0.55
1285	0.55	1286	0.54	1287	0.54	1288	0.55	1289	0.55
1290	0.54	1291	0.54	1292	0.55	1293	0.54	1294	0.54
1295	0.54	1296	0.55	1297	0.55	1298	0.55	1299	0.54
1300	0.55	1310	0.45	1320	0.46	1330	0.46	1340	0.45
1350	0.34	1360	0.33	1370	0.34	1380	0.34	1390	0.33
1400	0.34	1420	0.24	1440	0.24	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 7 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.03 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.33	200	0.36	300	0.41	400	0.41
500	0.43	600	0.45	700	0.47	800	0.49	900	0.54
1000	0.63	1050	0.74	1100	0.78	1110	1.04	1120	0.95
1130	1.28	1131	1.28	1132	1.28	1133	1.33	1134	1.39
1135	1.44	1136	1.41	1137	1.49	1138	1.51	1139	1.51
1140	1.54	1141	1.71	1142	1.76	1143	1.83	1144	1.91
1145	2.10	1146	2.22	1147	2.37	1148	2.51	1149	3.44
1150	4.26	1151	3.99	1152	5.88	1153	6.68	1154	5.88
1155	4.92	1156	5.00	1157	2.87	1158	1.80	1159	1.51
1160	1.39	1161	1.25	1162	1.15	1163	1.09	1164	1.14
1165	0.99	1166	0.98	1167	0.93	1168	0.91	1169	0.88
1170	0.83	1171	0.83	1172	0.85	1173	0.82	1174	0.73
1175	0.78	1176	0.76	1177	0.73	1178	0.71	1179	0.70
1180	0.70	1181	0.70	1182	0.71	1183	0.71	1184	0.71
1185	0.71	1186	0.70	1187	0.70	1188	0.71	1189	0.71
1190	0.70	1191	0.71	1192	0.70	1193	0.70	1194	0.70
1195	0.71	1196	0.70	1197	0.71	1198	0.71	1199	0.70
1200	0.70	1201	0.68	1202	0.67	1203	0.64	1204	0.64
1205	0.61	1206	0.61	1207	0.61	1208	0.61	1209	0.61
1210	0.61	1211	0.61	1212	0.61	1213	0.62	1214	0.61
1215	0.61	1216	0.62	1217	0.62	1218	0.61	1219	0.61
1220	0.62	1221	0.62	1222	0.61	1223	0.61	1224	0.62
1225	0.62	1226	0.61	1227	0.61	1228	0.62	1229	0.62
1230	0.61	1231	0.61	1232	0.62	1233	0.61	1234	0.60
1235	0.61	1236	0.61	1237	0.60	1238	0.61	1239	0.61
1240	0.60	1241	0.61	1242	0.61	1243	0.60	1244	0.61
1245	0.61	1246	0.60	1247	0.61	1248	0.61	1249	0.60
1250	0.61	1251	0.61	1252	0.60	1253	0.61	1254	0.61
1255	0.60	1256	0.61	1257	0.61	1258	0.60	1259	0.61
1260	0.61	1261	0.60	1262	0.58	1263	0.57	1264	0.55
1265	0.55	1266	0.54	1267	0.54	1268	0.55	1269	0.55
1270	0.54	1271	0.54	1272	0.55	1273	0.55	1274	0.54
1275	0.54	1276	0.55	1277	0.55	1278	0.54	1279	0.54
1280	0.55	1281	0.55	1282	0.54	1283	0.54	1284	0.55
1285	0.55	1286	0.54	1287	0.54	1288	0.55	1289	0.55
1290	0.54	1291	0.54	1292	0.55	1293	0.54	1294	0.54
1295	0.54	1296	0.55	1297	0.55	1298	0.55	1299	0.54
1300	0.55	1310	0.45	1320	0.46	1330	0.46	1340	0.45
1350	0.34	1360	0.33	1370	0.34	1380	0.34	1390	0.33
1400	0.34	1420	0.24	1440	0.24	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099A97                                G1
006    14  002A 040091001405B98                              1
006    14  003AF010         A97                     00000102 1
006    14  003F 010      099A97                              1 F
006    14  004A 010      099A97                              1  2
999
```

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Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 10-Year
Proposed Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Proposed																			
2A	040	K10	11	89	14	31		14	31	1154	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	3	1154	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	3	1154	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 31 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 5.16 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.71	200	0.78	300	0.99	400	1.21
500	1.53	600	1.74	700	2.20	800	2.70	900	3.34
1000	4.63	1050	5.14	1100	5.58	1110	6.90	1120	7.61
1130	7.81	1131	8.05	1132	8.27	1133	8.49	1134	8.71
1135	8.93	1136	9.30	1137	9.66	1138	10.03	1139	10.39
1140	10.76	1141	11.31	1142	11.65	1143	11.99	1144	12.32
1145	12.66	1146	13.17	1147	13.53	1148	14.55	1149	15.94
1150	17.69	1151	21.59	1152	27.44	1153	30.78	1154	30.88
1155	30.62	1156	30.29	1157	29.79	1158	29.29	1159	28.13
1160	26.63	1161	24.43	1162	20.08	1163	13.50	1164	9.44
1165	8.67	1166	8.27	1167	7.94	1168	7.62	1169	7.33
1170	7.04	1171	6.61	1172	6.46	1173	6.32	1174	6.18
1175	6.04	1176	5.89	1177	5.75	1178	5.61	1179	5.47
1180	5.33	1181	5.15	1182	5.12	1183	5.09	1184	5.06
1185	5.02	1186	4.99	1187	4.96	1188	4.93	1189	4.89
1190	4.86	1191	4.81	1192	4.80	1193	4.78	1194	4.76
1195	4.75	1196	4.73	1197	4.72	1198	4.70	1199	4.68
1200	4.67	1201	4.65	1202	4.65	1203	4.65	1204	4.65
1205	4.65	1206	4.65	1207	4.65	1208	4.65	1209	4.65
1210	4.65	1211	4.55	1212	4.45	1213	4.34	1214	4.24
1215	4.14	1216	4.03	1217	3.93	1218	3.83	1219	3.72
1220	3.62	1221	3.52	1222	3.52	1223	3.52	1224	3.52
1225	3.52	1226	3.52	1227	3.52	1228	3.52	1229	3.52
1230	3.52	1231	3.44	1232	3.37	1233	3.30	1234	3.23
1235	3.16	1236	3.08	1237	3.01	1238	2.94	1239	2.87
1240	2.79	1241	2.72	1242	2.72	1243	2.72	1244	2.72
1245	2.72	1246	2.72	1247	2.72	1248	2.72	1249	2.72
1250	2.72	1251	2.72	1252	2.72	1253	2.72	1254	2.72
1255	2.72	1256	2.72	1257	2.72	1258	2.72	1259	2.72
1260	2.72	1261	2.68	1262	2.65	1263	2.61	1264	2.57
1265	2.53	1266	2.50	1267	2.46	1268	2.42	1269	2.38
1270	2.35	1271	2.31	1272	2.31	1273	2.31	1274	2.31
1275	2.31	1276	2.31	1277	2.31	1278	2.31	1279	2.31
1280	2.31	1281	2.31	1282	2.31	1283	2.31	1284	2.31
1285	2.31	1286	2.31	1287	2.31	1288	2.31	1289	2.31
1290	2.31	1291	2.31	1292	2.31	1293	2.31	1294	2.31
1295	2.31	1296	2.31	1297	2.31	1298	2.31	1299	2.31
1300	2.31	1310	1.74	1320	1.69	1330	1.69	1340	1.69
1350	1.12	1360	1.07	1370	1.07	1380	1.07	1390	1.07
1400	1.06	1420	0.71	1440	0.71	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 3 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.51 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.08	300	0.10	400	0.12
500	0.15	600	0.17	700	0.22	800	0.27	900	0.33
1000	0.46	1050	0.51	1100	0.56	1110	0.69	1120	0.76
1130	0.78	1131	0.80	1132	0.83	1133	0.85	1134	0.87
1135	0.89	1136	0.93	1137	0.97	1138	1.00	1139	1.04
1140	1.08	1141	1.13	1142	1.17	1143	1.20	1144	1.23
1145	1.27	1146	1.32	1147	1.35	1148	1.46	1149	1.59
1150	1.77	1151	2.16	1152	2.74	1153	3.08	1154	3.09
1155	3.06	1156	3.03	1157	2.98	1158	2.93	1159	2.81
1160	2.66	1161	2.44	1162	2.01	1163	1.35	1164	0.94
1165	0.87	1166	0.83	1167	0.79	1168	0.76	1169	0.73
1170	0.70	1171	0.66	1172	0.65	1173	0.63	1174	0.62
1175	0.60	1176	0.59	1177	0.58	1178	0.56	1179	0.55
1180	0.53	1181	0.52	1182	0.51	1183	0.51	1184	0.51
1185	0.50	1186	0.50	1187	0.50	1188	0.49	1189	0.49
1190	0.49	1191	0.48	1192	0.48	1193	0.48	1194	0.48
1195	0.47	1196	0.47	1197	0.47	1198	0.47	1199	0.47
1200	0.47	1201	0.47	1202	0.47	1203	0.47	1204	0.47
1205	0.47	1206	0.47	1207	0.47	1208	0.47	1209	0.47
1210	0.47	1211	0.45	1212	0.44	1213	0.43	1214	0.42
1215	0.41	1216	0.40	1217	0.39	1218	0.38	1219	0.37
1220	0.36	1221	0.35	1222	0.35	1223	0.35	1224	0.35
1225	0.35	1226	0.35	1227	0.35	1228	0.35	1229	0.35
1230	0.35	1231	0.34	1232	0.34	1233	0.33	1234	0.32
1235	0.32	1236	0.31	1237	0.30	1238	0.29	1239	0.29
1240	0.28	1241	0.27	1242	0.27	1243	0.27	1244	0.27
1245	0.27	1246	0.27	1247	0.27	1248	0.27	1249	0.27
1250	0.27	1251	0.27	1252	0.27	1253	0.27	1254	0.27
1255	0.27	1256	0.27	1257	0.27	1258	0.27	1259	0.27
1260	0.27	1261	0.27	1262	0.26	1263	0.26	1264	0.26
1265	0.25	1266	0.25	1267	0.25	1268	0.24	1269	0.24
1270	0.23	1271	0.23	1272	0.23	1273	0.23	1274	0.23
1275	0.23	1276	0.23	1277	0.23	1278	0.23	1279	0.23
1280	0.23	1281	0.23	1282	0.23	1283	0.23	1284	0.23
1285	0.23	1286	0.23	1287	0.23	1288	0.23	1289	0.23
1290	0.23	1291	0.23	1292	0.23	1293	0.23	1294	0.23
1295	0.23	1296	0.23	1297	0.23	1298	0.23	1299	0.23
1300	0.23	1310	0.17	1320	0.17	1330	0.17	1340	0.17
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.07	1440	0.07	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 3 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.51 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.08	300	0.10	400	0.12
500	0.15	600	0.17	700	0.22	800	0.27	900	0.33
1000	0.46	1050	0.51	1100	0.56	1110	0.69	1120	0.76
1130	0.78	1131	0.80	1132	0.83	1133	0.85	1134	0.87
1135	0.89	1136	0.93	1137	0.97	1138	1.00	1139	1.04
1140	1.08	1141	1.13	1142	1.17	1143	1.20	1144	1.23
1145	1.27	1146	1.32	1147	1.35	1148	1.46	1149	1.59
1150	1.77	1151	2.16	1152	2.74	1153	3.08	1154	3.09
1155	3.06	1156	3.03	1157	2.98	1158	2.93	1159	2.81
1160	2.66	1161	2.44	1162	2.01	1163	1.35	1164	0.94
1165	0.87	1166	0.83	1167	0.79	1168	0.76	1169	0.73
1170	0.70	1171	0.66	1172	0.65	1173	0.63	1174	0.62
1175	0.60	1176	0.59	1177	0.58	1178	0.56	1179	0.55
1180	0.53	1181	0.52	1182	0.51	1183	0.51	1184	0.51
1185	0.50	1186	0.50	1187	0.50	1188	0.49	1189	0.49
1190	0.49	1191	0.48	1192	0.48	1193	0.48	1194	0.48
1195	0.47	1196	0.47	1197	0.47	1198	0.47	1199	0.47
1200	0.47	1201	0.47	1202	0.47	1203	0.47	1204	0.47
1205	0.47	1206	0.47	1207	0.47	1208	0.47	1209	0.47
1210	0.47	1211	0.45	1212	0.44	1213	0.43	1214	0.42
1215	0.41	1216	0.40	1217	0.39	1218	0.38	1219	0.37
1220	0.36	1221	0.35	1222	0.35	1223	0.35	1224	0.35
1225	0.35	1226	0.35	1227	0.35	1228	0.35	1229	0.35
1230	0.35	1231	0.34	1232	0.34	1233	0.33	1234	0.32
1235	0.32	1236	0.31	1237	0.30	1238	0.29	1239	0.29
1240	0.28	1241	0.27	1242	0.27	1243	0.27	1244	0.27
1245	0.27	1246	0.27	1247	0.27	1248	0.27	1249	0.27
1250	0.27	1251	0.27	1252	0.27	1253	0.27	1254	0.27
1255	0.27	1256	0.27	1257	0.27	1258	0.27	1259	0.27
1260	0.27	1261	0.27	1262	0.26	1263	0.26	1264	0.26
1265	0.25	1266	0.25	1267	0.25	1268	0.24	1269	0.24
1270	0.23	1271	0.23	1272	0.23	1273	0.23	1274	0.23
1275	0.23	1276	0.23	1277	0.23	1278	0.23	1279	0.23
1280	0.23	1281	0.23	1282	0.23	1283	0.23	1284	0.23
1285	0.23	1286	0.23	1287	0.23	1288	0.23	1289	0.23
1290	0.23	1291	0.23	1292	0.23	1293	0.23	1294	0.23
1295	0.23	1296	0.23	1297	0.23	1298	0.23	1299	0.23
1300	0.23	1310	0.17	1320	0.17	1330	0.17	1340	0.17
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.07	1440	0.07	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J10                                G1
006    14  002A 040089001411K10                             1
006    14  003AF010         J10                     00000102 1
006    14  003F 010      099J10                             1 F
006    14  004A 010      099J10                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 25-Year
Proposed Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Proposed																			
2A	040	K25	10	89	14	36		14	36	1154	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	4	1154	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	4	1154	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 36 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 5.97 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.71	200	0.96	300	1.22	400	1.53
500	1.92	600	2.29	700	2.77	800	3.24	900	3.28
1000	4.79	1050	5.98	1100	7.37	1110	8.07	1120	8.31
1130	10.33	1131	10.48	1132	10.63	1133	10.79	1134	10.94
1135	11.09	1136	11.40	1137	11.72	1138	12.03	1139	12.35
1140	12.66	1141	12.95	1142	13.24	1143	13.52	1144	13.81
1145	14.10	1146	14.46	1147	14.82	1148	15.22	1149	19.47
1150	23.66	1151	27.73	1152	31.79	1153	35.95	1154	36.30
1155	36.09	1156	35.48	1157	34.87	1158	34.22	1159	29.77
1160	25.32	1161	20.58	1162	15.80	1163	10.91	1164	9.88
1165	9.40	1166	9.10	1167	8.81	1168	8.51	1169	8.21
1170	7.91	1171	7.76	1172	7.61	1173	7.48	1174	7.34
1175	7.21	1176	7.07	1177	6.94	1178	6.80	1179	6.67
1180	6.53	1181	6.43	1182	6.34	1183	6.24	1184	6.14
1185	6.04	1186	5.94	1187	5.84	1188	5.74	1189	5.64
1190	5.54	1191	5.45	1192	5.36	1193	5.26	1194	5.17
1195	5.08	1196	4.99	1197	4.89	1198	4.80	1199	4.71
1200	4.62	1201	4.62	1202	4.62	1203	4.62	1204	4.62
1205	4.62	1206	4.62	1207	4.62	1208	4.62	1209	4.62
1210	4.62	1211	4.54	1212	4.47	1213	4.39	1214	4.32
1215	4.24	1216	4.17	1217	4.09	1218	4.02	1219	3.95
1220	3.87	1221	3.87	1222	3.87	1223	3.87	1224	3.87
1225	3.87	1226	3.87	1227	3.87	1228	3.87	1229	3.87
1230	3.87	1231	3.81	1232	3.75	1233	3.69	1234	3.63
1235	3.57	1236	3.51	1237	3.45	1238	3.39	1239	3.33
1240	3.27	1241	3.27	1242	3.27	1243	3.27	1244	3.27
1245	3.27	1246	3.27	1247	3.27	1248	3.27	1249	3.27
1250	3.27	1251	3.27	1252	3.27	1253	3.27	1254	3.27
1255	3.27	1256	3.27	1257	3.27	1258	3.27	1259	3.27
1260	3.27	1261	3.23	1262	3.19	1263	3.15	1264	3.11
1265	3.07	1266	3.03	1267	2.99	1268	2.95	1269	2.92
1270	2.88	1271	2.88	1272	2.88	1273	2.88	1274	2.88
1275	2.88	1276	2.88	1277	2.88	1278	2.88	1279	2.88
1280	2.88	1281	2.88	1282	2.88	1283	2.88	1284	2.88
1285	2.88	1286	2.88	1287	2.88	1288	2.88	1289	2.88
1290	2.88	1291	2.88	1292	2.88	1293	2.88	1294	2.88
1295	2.88	1296	2.88	1297	2.88	1298	2.88	1299	2.88
1300	2.88	1310	2.10	1320	2.10	1330	2.10	1340	2.09
1350	1.31	1360	1.31	1370	1.31	1380	1.31	1390	1.31
1400	1.31	1420	0.78	1440	0.78	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.60 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.10	300	0.12	400	0.15
500	0.19	600	0.23	700	0.28	800	0.32	900	0.33
1000	0.48	1050	0.60	1100	0.74	1110	0.81	1120	0.83
1130	1.03	1131	1.05	1132	1.06	1133	1.08	1134	1.09
1135	1.11	1136	1.14	1137	1.17	1138	1.20	1139	1.23
1140	1.27	1141	1.29	1142	1.32	1143	1.35	1144	1.38
1145	1.41	1146	1.45	1147	1.48	1148	1.52	1149	1.95
1150	2.37	1151	2.77	1152	3.18	1153	3.59	1154	3.63
1155	3.61	1156	3.55	1157	3.49	1158	3.42	1159	2.98
1160	2.53	1161	2.06	1162	1.58	1163	1.09	1164	0.99
1165	0.94	1166	0.91	1167	0.88	1168	0.85	1169	0.82
1170	0.79	1171	0.78	1172	0.76	1173	0.75	1174	0.73
1175	0.72	1176	0.71	1177	0.69	1178	0.68	1179	0.67
1180	0.65	1181	0.64	1182	0.63	1183	0.62	1184	0.61
1185	0.60	1186	0.59	1187	0.58	1188	0.57	1189	0.56
1190	0.55	1191	0.54	1192	0.54	1193	0.53	1194	0.52
1195	0.51	1196	0.50	1197	0.49	1198	0.48	1199	0.47
1200	0.46	1201	0.46	1202	0.46	1203	0.46	1204	0.46
1205	0.46	1206	0.46	1207	0.46	1208	0.46	1209	0.46
1210	0.46	1211	0.45	1212	0.45	1213	0.44	1214	0.43
1215	0.42	1216	0.42	1217	0.41	1218	0.40	1219	0.39
1220	0.39	1221	0.39	1222	0.39	1223	0.39	1224	0.39
1225	0.39	1226	0.39	1227	0.39	1228	0.39	1229	0.39
1230	0.39	1231	0.38	1232	0.37	1233	0.37	1234	0.36
1235	0.36	1236	0.35	1237	0.34	1238	0.34	1239	0.33
1240	0.33	1241	0.33	1242	0.33	1243	0.33	1244	0.33
1245	0.33	1246	0.33	1247	0.33	1248	0.33	1249	0.33
1250	0.33	1251	0.33	1252	0.33	1253	0.33	1254	0.33
1255	0.33	1256	0.33	1257	0.33	1258	0.33	1259	0.33
1260	0.33	1261	0.32	1262	0.32	1263	0.31	1264	0.31
1265	0.31	1266	0.30	1267	0.30	1268	0.30	1269	0.29
1270	0.29	1271	0.29	1272	0.29	1273	0.29	1274	0.29
1275	0.29	1276	0.29	1277	0.29	1278	0.29	1279	0.29
1280	0.29	1281	0.29	1282	0.29	1283	0.29	1284	0.29
1285	0.29	1286	0.29	1287	0.29	1288	0.29	1289	0.29
1290	0.29	1291	0.29	1292	0.29	1293	0.29	1294	0.29
1295	0.29	1296	0.29	1297	0.29	1298	0.29	1299	0.29
1300	0.29	1310	0.21	1320	0.21	1330	0.21	1340	0.21
1350	0.13	1360	0.13	1370	0.13	1380	0.13	1390	0.13
1400	0.13	1420	0.08	1440	0.08	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.60 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.10	300	0.12	400	0.15
500	0.19	600	0.23	700	0.28	800	0.32	900	0.33
1000	0.48	1050	0.60	1100	0.74	1110	0.81	1120	0.83
1130	1.03	1131	1.05	1132	1.06	1133	1.08	1134	1.09
1135	1.11	1136	1.14	1137	1.17	1138	1.20	1139	1.23
1140	1.27	1141	1.29	1142	1.32	1143	1.35	1144	1.38
1145	1.41	1146	1.45	1147	1.48	1148	1.52	1149	1.95
1150	2.37	1151	2.77	1152	3.18	1153	3.59	1154	3.63
1155	3.61	1156	3.55	1157	3.49	1158	3.42	1159	2.98
1160	2.53	1161	2.06	1162	1.58	1163	1.09	1164	0.99
1165	0.94	1166	0.91	1167	0.88	1168	0.85	1169	0.82
1170	0.79	1171	0.78	1172	0.76	1173	0.75	1174	0.73
1175	0.72	1176	0.71	1177	0.69	1178	0.68	1179	0.67
1180	0.65	1181	0.64	1182	0.63	1183	0.62	1184	0.61
1185	0.60	1186	0.59	1187	0.58	1188	0.57	1189	0.56
1190	0.55	1191	0.54	1192	0.54	1193	0.53	1194	0.52
1195	0.51	1196	0.50	1197	0.49	1198	0.48	1199	0.47
1200	0.46	1201	0.46	1202	0.46	1203	0.46	1204	0.46
1205	0.46	1206	0.46	1207	0.46	1208	0.46	1209	0.46
1210	0.46	1211	0.45	1212	0.45	1213	0.44	1214	0.43
1215	0.42	1216	0.42	1217	0.41	1218	0.40	1219	0.39
1220	0.39	1221	0.39	1222	0.39	1223	0.39	1224	0.39
1225	0.39	1226	0.39	1227	0.39	1228	0.39	1229	0.39
1230	0.39	1231	0.38	1232	0.37	1233	0.37	1234	0.36
1235	0.36	1236	0.35	1237	0.34	1238	0.34	1239	0.33
1240	0.33	1241	0.33	1242	0.33	1243	0.33	1244	0.33
1245	0.33	1246	0.33	1247	0.33	1248	0.33	1249	0.33
1250	0.33	1251	0.33	1252	0.33	1253	0.33	1254	0.33
1255	0.33	1256	0.33	1257	0.33	1258	0.33	1259	0.33
1260	0.33	1261	0.32	1262	0.32	1263	0.31	1264	0.31
1265	0.31	1266	0.30	1267	0.30	1268	0.30	1269	0.29
1270	0.29	1271	0.29	1272	0.29	1273	0.29	1274	0.29
1275	0.29	1276	0.29	1277	0.29	1278	0.29	1279	0.29
1280	0.29	1281	0.29	1282	0.29	1283	0.29	1284	0.29
1285	0.29	1286	0.29	1287	0.29	1288	0.29	1289	0.29
1290	0.29	1291	0.29	1292	0.29	1293	0.29	1294	0.29
1295	0.29	1296	0.29	1297	0.29	1298	0.29	1299	0.29
1300	0.29	1310	0.21	1320	0.21	1330	0.21	1340	0.21
1350	0.13	1360	0.13	1370	0.13	1380	0.13	1390	0.13
1400	0.13	1420	0.08	1440	0.08	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J25                                G1
006    14  002A 040089001410K25                             1
006    14  003AF010         J25                     00000102 1
006    14  003F 010      099J25                             1 F
006    14  004A 010      099J25                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 50-Year
Proposed Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Proposed																			
2A	040	K50	7	89	14	49		14	49	1154	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	5	1154	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	5	1154	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 49 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 7.49 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.71	200	1.28	300	1.63	400	2.13
500	2.63	600	3.27	700	3.80	800	4.23	900	4.97
1000	6.18	1050	6.31	1100	7.49	1110	8.23	1120	9.76
1130	10.33	1131	10.43	1132	10.53	1133	10.64	1134	10.74
1135	10.84	1136	11.75	1137	12.66	1138	13.46	1139	14.26
1140	15.06	1141	16.42	1142	17.77	1143	18.32	1144	18.87
1145	19.41	1146	20.32	1147	21.22	1148	21.69	1149	22.62
1150	25.13	1151	32.84	1152	42.27	1153	49.07	1154	49.07
1155	47.82	1156	45.67	1157	41.93	1158	32.97	1159	22.35
1160	13.92	1161	11.74	1162	10.71	1163	10.13	1164	9.56
1165	8.98	1166	8.41	1167	7.83	1168	7.83	1169	7.83
1170	7.83	1171	7.71	1172	7.61	1173	7.51	1174	7.41
1175	7.31	1176	7.20	1177	7.10	1178	7.10	1179	7.10
1180	7.10	1181	7.10	1182	7.10	1183	7.10	1184	7.10
1185	7.10	1186	7.10	1187	7.10	1188	7.10	1189	7.10
1190	7.10	1191	6.95	1192	6.80	1193	6.65	1194	6.49
1195	6.34	1196	6.19	1197	6.04	1198	6.04	1199	6.04
1200	6.04	1201	6.04	1202	6.04	1203	6.04	1204	6.04
1205	6.04	1206	6.04	1207	6.04	1208	6.04	1209	6.04
1210	6.04	1211	5.88	1212	5.73	1213	5.58	1214	5.43
1215	5.28	1216	5.12	1217	4.97	1218	4.97	1219	4.97
1220	4.97	1221	4.97	1222	4.97	1223	4.97	1224	4.97
1225	4.97	1226	4.97	1227	4.97	1228	4.97	1229	4.97
1230	4.97	1231	4.87	1232	4.77	1233	4.67	1234	4.57
1235	4.46	1236	4.36	1237	4.26	1238	4.26	1239	4.26
1240	4.26	1241	4.26	1242	4.26	1243	4.26	1244	4.26
1245	4.26	1246	4.26	1247	4.26	1248	4.26	1249	4.26
1250	4.26	1251	4.26	1252	4.26	1253	4.26	1254	4.26
1255	4.26	1256	4.26	1257	4.26	1258	4.26	1259	4.26
1260	4.26	1261	4.21	1262	4.16	1263	4.11	1264	4.06
1265	4.01	1266	3.96	1267	3.91	1268	3.91	1269	3.91
1270	3.91	1271	3.91	1272	3.91	1273	3.91	1274	3.91
1275	3.91	1276	3.91	1277	3.91	1278	3.91	1279	3.91
1280	3.91	1281	3.91	1282	3.91	1283	3.91	1284	3.91
1285	3.91	1286	3.91	1287	3.91	1288	3.91	1289	3.91
1290	3.91	1291	3.91	1292	3.91	1293	3.91	1294	3.91
1295	3.91	1296	3.91	1297	3.91	1298	3.91	1299	3.91
1300	3.91	1310	2.84	1320	2.84	1330	2.84	1340	2.84
1350	1.78	1360	1.78	1370	1.78	1380	1.78	1390	1.78
1400	1.78	1420	0.89	1440	0.89	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.75 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.13	300	0.16	400	0.21
500	0.26	600	0.33	700	0.38	800	0.42	900	0.50
1000	0.62	1050	0.63	1100	0.75	1110	0.82	1120	0.98
1130	1.03	1131	1.04	1132	1.05	1133	1.06	1134	1.07
1135	1.08	1136	1.18	1137	1.27	1138	1.35	1139	1.43
1140	1.51	1141	1.64	1142	1.78	1143	1.83	1144	1.89
1145	1.94	1146	2.03	1147	2.12	1148	2.17	1149	2.26
1150	2.51	1151	3.28	1152	4.23	1153	4.91	1154	4.91
1155	4.78	1156	4.57	1157	4.19	1158	3.30	1159	2.24
1160	1.39	1161	1.17	1162	1.07	1163	1.01	1164	0.96
1165	0.90	1166	0.84	1167	0.78	1168	0.78	1169	0.78
1170	0.78	1171	0.77	1172	0.76	1173	0.75	1174	0.74
1175	0.73	1176	0.72	1177	0.71	1178	0.71	1179	0.71
1180	0.71	1181	0.71	1182	0.71	1183	0.71	1184	0.71
1185	0.71	1186	0.71	1187	0.71	1188	0.71	1189	0.71
1190	0.71	1191	0.69	1192	0.68	1193	0.66	1194	0.65
1195	0.63	1196	0.62	1197	0.60	1198	0.60	1199	0.60
1200	0.60	1201	0.60	1202	0.60	1203	0.60	1204	0.60
1205	0.60	1206	0.60	1207	0.60	1208	0.60	1209	0.60
1210	0.60	1211	0.59	1212	0.57	1213	0.56	1214	0.54
1215	0.53	1216	0.51	1217	0.50	1218	0.50	1219	0.50
1220	0.50	1221	0.50	1222	0.50	1223	0.50	1224	0.50
1225	0.50	1226	0.50	1227	0.50	1228	0.50	1229	0.50
1230	0.50	1231	0.49	1232	0.48	1233	0.47	1234	0.46
1235	0.45	1236	0.44	1237	0.43	1238	0.43	1239	0.43
1240	0.43	1241	0.43	1242	0.43	1243	0.43	1244	0.43
1245	0.43	1246	0.43	1247	0.43	1248	0.43	1249	0.43
1250	0.43	1251	0.43	1252	0.43	1253	0.43	1254	0.43
1255	0.43	1256	0.43	1257	0.43	1258	0.43	1259	0.43
1260	0.43	1261	0.42	1262	0.42	1263	0.41	1264	0.41
1265	0.40	1266	0.40	1267	0.39	1268	0.39	1269	0.39
1270	0.39	1271	0.39	1272	0.39	1273	0.39	1274	0.39
1275	0.39	1276	0.39	1277	0.39	1278	0.39	1279	0.39
1280	0.39	1281	0.39	1282	0.39	1283	0.39	1284	0.39
1285	0.39	1286	0.39	1287	0.39	1288	0.39	1289	0.39
1290	0.39	1291	0.39	1292	0.39	1293	0.39	1294	0.39
1295	0.39	1296	0.39	1297	0.39	1298	0.39	1299	0.39
1300	0.39	1310	0.28	1320	0.28	1330	0.28	1340	0.28
1350	0.18	1360	0.18	1370	0.18	1380	0.18	1390	0.18
1400	0.18	1420	0.09	1440	0.09	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.75 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.13	300	0.16	400	0.21
500	0.26	600	0.33	700	0.38	800	0.42	900	0.50
1000	0.62	1050	0.63	1100	0.75	1110	0.82	1120	0.98
1130	1.03	1131	1.04	1132	1.05	1133	1.06	1134	1.07
1135	1.08	1136	1.18	1137	1.27	1138	1.35	1139	1.43
1140	1.51	1141	1.64	1142	1.78	1143	1.83	1144	1.89
1145	1.94	1146	2.03	1147	2.12	1148	2.17	1149	2.26
1150	2.51	1151	3.28	1152	4.23	1153	4.91	1154	4.91
1155	4.78	1156	4.57	1157	4.19	1158	3.30	1159	2.24
1160	1.39	1161	1.17	1162	1.07	1163	1.01	1164	0.96
1165	0.90	1166	0.84	1167	0.78	1168	0.78	1169	0.78
1170	0.78	1171	0.77	1172	0.76	1173	0.75	1174	0.74
1175	0.73	1176	0.72	1177	0.71	1178	0.71	1179	0.71
1180	0.71	1181	0.71	1182	0.71	1183	0.71	1184	0.71
1185	0.71	1186	0.71	1187	0.71	1188	0.71	1189	0.71
1190	0.71	1191	0.69	1192	0.68	1193	0.66	1194	0.65
1195	0.63	1196	0.62	1197	0.60	1198	0.60	1199	0.60
1200	0.60	1201	0.60	1202	0.60	1203	0.60	1204	0.60
1205	0.60	1206	0.60	1207	0.60	1208	0.60	1209	0.60
1210	0.60	1211	0.59	1212	0.57	1213	0.56	1214	0.54
1215	0.53	1216	0.51	1217	0.50	1218	0.50	1219	0.50
1220	0.50	1221	0.50	1222	0.50	1223	0.50	1224	0.50
1225	0.50	1226	0.50	1227	0.50	1228	0.50	1229	0.50
1230	0.50	1231	0.49	1232	0.48	1233	0.47	1234	0.46
1235	0.45	1236	0.44	1237	0.43	1238	0.43	1239	0.43
1240	0.43	1241	0.43	1242	0.43	1243	0.43	1244	0.43
1245	0.43	1246	0.43	1247	0.43	1248	0.43	1249	0.43
1250	0.43	1251	0.43	1252	0.43	1253	0.43	1254	0.43
1255	0.43	1256	0.43	1257	0.43	1258	0.43	1259	0.43
1260	0.43	1261	0.42	1262	0.42	1263	0.41	1264	0.41
1265	0.40	1266	0.40	1267	0.39	1268	0.39	1269	0.39
1270	0.39	1271	0.39	1272	0.39	1273	0.39	1274	0.39
1275	0.39	1276	0.39	1277	0.39	1278	0.39	1279	0.39
1280	0.39	1281	0.39	1282	0.39	1283	0.39	1284	0.39
1285	0.39	1286	0.39	1287	0.39	1288	0.39	1289	0.39
1290	0.39	1291	0.39	1292	0.39	1293	0.39	1294	0.39
1295	0.39	1296	0.39	1297	0.39	1298	0.39	1299	0.39
1300	0.39	1310	0.28	1320	0.28	1330	0.28	1340	0.28
1350	0.18	1360	0.18	1370	0.18	1380	0.18	1390	0.18
1400	0.18	1420	0.09	1440	0.09	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J50                                G1
006    14  002A 040089001407K50                             1
006    14  003AF010         J50                     00000102 1
006    14  003F 010      099J50                             1 F
006    14  004A 010      099J50                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 100-Year
Proposed Condition Drainage Area A

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea A - Proposed																			
2A	040	K100	7	89	14	55		14	55	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea A - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 55 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 10.06 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	3.20	200	3.48	300	3.98	400	3.98
500	4.19	600	4.40	700	4.62	800	4.83	900	5.33
1000	6.18	1050	7.24	1100	7.63	1110	10.25	1120	9.36
1130	12.66	1131	12.66	1132	12.66	1133	13.00	1134	13.46
1135	13.80	1136	13.57	1137	14.15	1138	14.61	1139	15.06
1140	15.29	1141	15.87	1142	16.44	1143	17.58	1144	18.04
1145	19.52	1146	20.99	1147	22.35	1148	23.26	1149	30.03
1150	36.83	1151	35.81	1152	49.30	1153	55.08	1154	55.08
1155	54.06	1156	46.92	1157	39.44	1158	39.44	1159	23.93
1160	16.32	1161	13.92	1162	12.54	1163	11.51	1164	11.51
1165	10.59	1166	10.13	1167	9.21	1168	9.10	1169	9.56
1170	8.75	1171	7.94	1172	8.17	1173	7.94	1174	8.06
1175	7.83	1176	7.10	1177	7.41	1178	7.10	1179	7.00
1180	7.00	1181	6.90	1182	6.90	1183	6.80	1184	6.90
1185	7.00	1186	6.90	1187	6.90	1188	6.90	1189	6.90
1190	6.90	1191	6.90	1192	6.80	1193	6.90	1194	6.90
1195	6.90	1196	6.80	1197	6.90	1198	6.90	1199	6.90
1200	6.90	1201	6.70	1202	6.59	1203	6.49	1204	6.39
1205	6.19	1206	6.09	1207	5.99	1208	5.99	1209	5.99
1210	5.99	1211	5.88	1212	5.99	1213	6.09	1214	5.99
1215	5.99	1216	5.99	1217	6.09	1218	6.09	1219	5.99
1220	5.99	1221	6.09	1222	6.09	1223	5.99	1224	5.99
1225	6.09	1226	6.09	1227	5.99	1228	5.99	1229	6.09
1230	6.09	1231	5.99	1232	5.99	1233	5.99	1234	5.99
1235	5.99	1236	5.88	1237	5.88	1238	5.99	1239	5.88
1240	5.88	1241	5.99	1242	5.88	1243	5.88	1244	5.99
1245	5.88	1246	5.88	1247	5.99	1248	5.88	1249	5.88
1250	5.99	1251	5.88	1252	5.88	1253	5.99	1254	5.88
1255	5.88	1256	5.99	1257	5.88	1258	5.88	1259	5.99
1260	5.88	1261	5.88	1262	5.78	1263	5.58	1264	5.58
1265	5.58	1266	5.38	1267	5.28	1268	5.28	1269	5.38
1270	5.38	1271	5.28	1272	5.28	1273	5.38	1274	5.38
1275	5.28	1276	5.28	1277	5.38	1278	5.38	1279	5.28
1280	5.28	1281	5.38	1282	5.38	1283	5.28	1284	5.28
1285	5.38	1286	5.38	1287	5.28	1288	5.28	1289	5.38
1290	5.38	1291	5.28	1292	5.28	1293	5.28	1294	5.38
1295	5.28	1296	5.28	1297	5.38	1298	5.38	1299	5.28
1300	5.38	1310	4.40	1320	4.47	1330	4.47	1340	4.40
1350	3.34	1360	3.27	1370	3.34	1380	3.34	1390	3.27
1400	3.34	1420	2.31	1440	2.31	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.01 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.32	200	0.35	300	0.40	400	0.40
500	0.42	600	0.44	700	0.46	800	0.48	900	0.53
1000	0.62	1050	0.72	1100	0.76	1110	1.02	1120	0.94
1130	1.27	1131	1.27	1132	1.27	1133	1.30	1134	1.35
1135	1.38	1136	1.36	1137	1.41	1138	1.46	1139	1.51
1140	1.53	1141	1.59	1142	1.64	1143	1.76	1144	1.80
1145	1.95	1146	2.10	1147	2.24	1148	2.33	1149	3.00
1150	3.68	1151	3.58	1152	4.93	1153	5.51	1154	5.51
1155	5.41	1156	4.69	1157	3.94	1158	3.94	1159	2.39
1160	1.63	1161	1.39	1162	1.25	1163	1.15	1164	1.15
1165	1.06	1166	1.01	1167	0.92	1168	0.91	1169	0.96
1170	0.88	1171	0.79	1172	0.82	1173	0.79	1174	0.81
1175	0.78	1176	0.71	1177	0.74	1178	0.71	1179	0.70
1180	0.70	1181	0.69	1182	0.69	1183	0.68	1184	0.69
1185	0.70	1186	0.69	1187	0.69	1188	0.69	1189	0.69
1190	0.69	1191	0.69	1192	0.68	1193	0.69	1194	0.69
1195	0.69	1196	0.68	1197	0.69	1198	0.69	1199	0.69
1200	0.69	1201	0.67	1202	0.66	1203	0.65	1204	0.64
1205	0.62	1206	0.61	1207	0.60	1208	0.60	1209	0.60
1210	0.60	1211	0.59	1212	0.60	1213	0.61	1214	0.60
1215	0.60	1216	0.60	1217	0.61	1218	0.61	1219	0.60
1220	0.60	1221	0.61	1222	0.61	1223	0.60	1224	0.60
1225	0.61	1226	0.61	1227	0.60	1228	0.60	1229	0.61
1230	0.61	1231	0.60	1232	0.60	1233	0.60	1234	0.60
1235	0.60	1236	0.59	1237	0.59	1238	0.60	1239	0.59
1240	0.59	1241	0.60	1242	0.59	1243	0.59	1244	0.60
1245	0.59	1246	0.59	1247	0.60	1248	0.59	1249	0.59
1250	0.60	1251	0.59	1252	0.59	1253	0.60	1254	0.59
1255	0.59	1256	0.60	1257	0.59	1258	0.59	1259	0.60
1260	0.59	1261	0.59	1262	0.58	1263	0.56	1264	0.56
1265	0.56	1266	0.54	1267	0.53	1268	0.53	1269	0.54
1270	0.54	1271	0.53	1272	0.53	1273	0.54	1274	0.54
1275	0.53	1276	0.53	1277	0.54	1278	0.54	1279	0.53
1280	0.53	1281	0.54	1282	0.54	1283	0.53	1284	0.53
1285	0.54	1286	0.54	1287	0.53	1288	0.53	1289	0.54
1290	0.54	1291	0.53	1292	0.53	1293	0.53	1294	0.54
1295	0.53	1296	0.53	1297	0.54	1298	0.54	1299	0.53
1300	0.54	1310	0.44	1320	0.45	1330	0.45	1340	0.44
1350	0.33	1360	0.33	1370	0.33	1380	0.33	1390	0.33
1400	0.33	1420	0.23	1440	0.23	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.01 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.32	200	0.35	300	0.40	400	0.40
500	0.42	600	0.44	700	0.46	800	0.48	900	0.53
1000	0.62	1050	0.72	1100	0.76	1110	1.02	1120	0.94
1130	1.27	1131	1.27	1132	1.27	1133	1.30	1134	1.35
1135	1.38	1136	1.36	1137	1.41	1138	1.46	1139	1.51
1140	1.53	1141	1.59	1142	1.64	1143	1.76	1144	1.80
1145	1.95	1146	2.10	1147	2.24	1148	2.33	1149	3.00
1150	3.68	1151	3.58	1152	4.93	1153	5.51	1154	5.51
1155	5.41	1156	4.69	1157	3.94	1158	3.94	1159	2.39
1160	1.63	1161	1.39	1162	1.25	1163	1.15	1164	1.15
1165	1.06	1166	1.01	1167	0.92	1168	0.91	1169	0.96
1170	0.88	1171	0.79	1172	0.82	1173	0.79	1174	0.81
1175	0.78	1176	0.71	1177	0.74	1178	0.71	1179	0.70
1180	0.70	1181	0.69	1182	0.69	1183	0.68	1184	0.69
1185	0.70	1186	0.69	1187	0.69	1188	0.69	1189	0.69
1190	0.69	1191	0.69	1192	0.68	1193	0.69	1194	0.69
1195	0.69	1196	0.68	1197	0.69	1198	0.69	1199	0.69
1200	0.69	1201	0.67	1202	0.66	1203	0.65	1204	0.64
1205	0.62	1206	0.61	1207	0.60	1208	0.60	1209	0.60
1210	0.60	1211	0.59	1212	0.60	1213	0.61	1214	0.60
1215	0.60	1216	0.60	1217	0.61	1218	0.61	1219	0.60
1220	0.60	1221	0.61	1222	0.61	1223	0.60	1224	0.60
1225	0.61	1226	0.61	1227	0.60	1228	0.60	1229	0.61
1230	0.61	1231	0.60	1232	0.60	1233	0.60	1234	0.60
1235	0.60	1236	0.59	1237	0.59	1238	0.60	1239	0.59
1240	0.59	1241	0.60	1242	0.59	1243	0.59	1244	0.60
1245	0.59	1246	0.59	1247	0.60	1248	0.59	1249	0.59
1250	0.60	1251	0.59	1252	0.59	1253	0.60	1254	0.59
1255	0.59	1256	0.60	1257	0.59	1258	0.59	1259	0.60
1260	0.59	1261	0.59	1262	0.58	1263	0.56	1264	0.56
1265	0.56	1266	0.54	1267	0.53	1268	0.53	1269	0.54
1270	0.54	1271	0.53	1272	0.53	1273	0.54	1274	0.54
1275	0.53	1276	0.53	1277	0.54	1278	0.54	1279	0.53
1280	0.53	1281	0.54	1282	0.54	1283	0.53	1284	0.53
1285	0.54	1286	0.54	1287	0.53	1288	0.53	1289	0.54
1290	0.54	1291	0.53	1292	0.53	1293	0.53	1294	0.54
1295	0.53	1296	0.53	1297	0.54	1298	0.54	1299	0.53
1300	0.54	1310	0.44	1320	0.45	1330	0.45	1340	0.44
1350	0.33	1360	0.33	1370	0.33	1380	0.33	1390	0.33
1400	0.33	1420	0.23	1440	0.23	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099A97                                G1
006    14  002A 040089001407B98                             1
006    14  003AF010         A97                     00000102 1
006    14  003F 010      099A97                             1 F
006    14  004A 010      099A97                             1  2
999
```

(Intentionally Blank)

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 10-Year
Proposed Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS							ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)	AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---	0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Proposed																		
2A	040	K10	7	91	14	40	14	40	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																		
3AF: Control/Diversion: 10% to channel A																		
3AF	---	---	--	--	---	---	14	4	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---	14	4	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE

NO ISSUES OR WARNINGS DETECTED

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 40 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 5.25 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.73	200	0.80	300	1.02	400	1.23
500	1.56	600	1.78	700	2.25	800	2.76	900	3.41
1000	4.73	1050	5.26	1100	5.71	1110	7.19	1120	7.84
1130	8.00	1131	8.35	1132	8.69	1133	9.04	1134	9.38
1135	9.73	1136	10.30	1137	10.87	1138	11.10	1139	11.33
1140	11.56	1141	12.09	1142	12.62	1143	12.92	1144	13.21
1145	13.51	1146	14.08	1147	14.65	1148	15.96	1149	17.84
1150	20.27	1151	26.09	1152	35.31	1153	40.31	1154	40.19
1155	38.49	1156	36.11	1157	33.16	1158	26.82	1159	17.06
1160	11.22	1161	10.01	1162	9.38	1163	8.86	1164	8.35
1165	7.83	1166	7.37	1167	6.90	1168	6.90	1169	6.90
1170	6.90	1171	6.67	1172	6.44	1173	6.21	1174	5.99
1175	5.76	1176	5.53	1177	5.30	1178	5.30	1179	5.30
1180	5.30	1181	5.25	1182	5.20	1183	5.15	1184	5.09
1185	5.04	1186	4.99	1187	4.94	1188	4.94	1189	4.94
1190	4.94	1191	4.91	1192	4.89	1193	4.86	1194	4.83
1195	4.81	1196	4.78	1197	4.76	1198	4.76	1199	4.76
1200	4.76	1201	4.76	1202	4.76	1203	4.76	1204	4.76
1205	4.76	1206	4.76	1207	4.76	1208	4.76	1209	4.76
1210	4.76	1211	4.59	1212	4.42	1213	4.26	1214	4.09
1215	3.93	1216	3.76	1217	3.59	1218	3.59	1219	3.59
1220	3.59	1221	3.59	1222	3.59	1223	3.59	1224	3.59
1225	3.59	1226	3.59	1227	3.59	1228	3.59	1229	3.59
1230	3.59	1231	3.48	1232	3.36	1233	3.25	1234	3.13
1235	3.02	1236	2.90	1237	2.78	1238	2.78	1239	2.78
1240	2.78	1241	2.78	1242	2.78	1243	2.78	1244	2.78
1245	2.78	1246	2.78	1247	2.78	1248	2.78	1249	2.78
1250	2.78	1251	2.78	1252	2.78	1253	2.78	1254	2.78
1255	2.78	1256	2.78	1257	2.78	1258	2.78	1259	2.78
1260	2.78	1261	2.72	1262	2.66	1263	2.60	1264	2.54
1265	2.48	1266	2.42	1267	2.36	1268	2.36	1269	2.36
1270	2.36	1271	2.36	1272	2.36	1273	2.36	1274	2.36
1275	2.36	1276	2.36	1277	2.36	1278	2.36	1279	2.36
1280	2.36	1281	2.36	1282	2.36	1283	2.36	1284	2.36
1285	2.36	1286	2.36	1287	2.36	1288	2.36	1289	2.36
1290	2.36	1291	2.36	1292	2.36	1293	2.36	1294	2.36
1295	2.36	1296	2.36	1297	2.36	1298	2.36	1299	2.36
1300	2.36	1310	1.72	1320	1.72	1330	1.72	1340	1.72
1350	1.09	1360	1.09	1370	1.09	1380	1.09	1390	1.09
1400	1.09	1420	0.73	1440	0.73	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.53 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.08	300	0.10	400	0.12
500	0.16	600	0.18	700	0.23	800	0.28	900	0.34
1000	0.47	1050	0.53	1100	0.57	1110	0.72	1120	0.78
1130	0.80	1131	0.83	1132	0.87	1133	0.90	1134	0.94
1135	0.97	1136	1.03	1137	1.09	1138	1.11	1139	1.13
1140	1.16	1141	1.21	1142	1.26	1143	1.29	1144	1.32
1145	1.35	1146	1.41	1147	1.47	1148	1.60	1149	1.78
1150	2.03	1151	2.61	1152	3.53	1153	4.03	1154	4.02
1155	3.85	1156	3.61	1157	3.32	1158	2.68	1159	1.71
1160	1.12	1161	1.00	1162	0.94	1163	0.89	1164	0.83
1165	0.78	1166	0.74	1167	0.69	1168	0.69	1169	0.69
1170	0.69	1171	0.67	1172	0.64	1173	0.62	1174	0.60
1175	0.58	1176	0.55	1177	0.53	1178	0.53	1179	0.53
1180	0.53	1181	0.52	1182	0.52	1183	0.51	1184	0.51
1185	0.50	1186	0.50	1187	0.49	1188	0.49	1189	0.49
1190	0.49	1191	0.49	1192	0.49	1193	0.49	1194	0.48
1195	0.48	1196	0.48	1197	0.48	1198	0.48	1199	0.48
1200	0.48	1201	0.48	1202	0.48	1203	0.48	1204	0.48
1205	0.48	1206	0.48	1207	0.48	1208	0.48	1209	0.48
1210	0.48	1211	0.46	1212	0.44	1213	0.43	1214	0.41
1215	0.39	1216	0.38	1217	0.36	1218	0.36	1219	0.36
1220	0.36	1221	0.36	1222	0.36	1223	0.36	1224	0.36
1225	0.36	1226	0.36	1227	0.36	1228	0.36	1229	0.36
1230	0.36	1231	0.35	1232	0.34	1233	0.32	1234	0.31
1235	0.30	1236	0.29	1237	0.28	1238	0.28	1239	0.28
1240	0.28	1241	0.28	1242	0.28	1243	0.28	1244	0.28
1245	0.28	1246	0.28	1247	0.28	1248	0.28	1249	0.28
1250	0.28	1251	0.28	1252	0.28	1253	0.28	1254	0.28
1255	0.28	1256	0.28	1257	0.28	1258	0.28	1259	0.28
1260	0.28	1261	0.27	1262	0.27	1263	0.26	1264	0.25
1265	0.25	1266	0.24	1267	0.24	1268	0.24	1269	0.24
1270	0.24	1271	0.24	1272	0.24	1273	0.24	1274	0.24
1275	0.24	1276	0.24	1277	0.24	1278	0.24	1279	0.24
1280	0.24	1281	0.24	1282	0.24	1283	0.24	1284	0.24
1285	0.24	1286	0.24	1287	0.24	1288	0.24	1289	0.24
1290	0.24	1291	0.24	1292	0.24	1293	0.24	1294	0.24
1295	0.24	1296	0.24	1297	0.24	1298	0.24	1299	0.24
1300	0.24	1310	0.17	1320	0.17	1330	0.17	1340	0.17
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.07	1440	0.07	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 4 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.53 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.08	300	0.10	400	0.12
500	0.16	600	0.18	700	0.23	800	0.28	900	0.34
1000	0.47	1050	0.53	1100	0.57	1110	0.72	1120	0.78
1130	0.80	1131	0.83	1132	0.87	1133	0.90	1134	0.94
1135	0.97	1136	1.03	1137	1.09	1138	1.11	1139	1.13
1140	1.16	1141	1.21	1142	1.26	1143	1.29	1144	1.32
1145	1.35	1146	1.41	1147	1.47	1148	1.60	1149	1.78
1150	2.03	1151	2.61	1152	3.53	1153	4.03	1154	4.02
1155	3.85	1156	3.61	1157	3.32	1158	2.68	1159	1.71
1160	1.12	1161	1.00	1162	0.94	1163	0.89	1164	0.83
1165	0.78	1166	0.74	1167	0.69	1168	0.69	1169	0.69
1170	0.69	1171	0.67	1172	0.64	1173	0.62	1174	0.60
1175	0.58	1176	0.55	1177	0.53	1178	0.53	1179	0.53
1180	0.53	1181	0.52	1182	0.52	1183	0.51	1184	0.51
1185	0.50	1186	0.50	1187	0.49	1188	0.49	1189	0.49
1190	0.49	1191	0.49	1192	0.49	1193	0.49	1194	0.48
1195	0.48	1196	0.48	1197	0.48	1198	0.48	1199	0.48
1200	0.48	1201	0.48	1202	0.48	1203	0.48	1204	0.48
1205	0.48	1206	0.48	1207	0.48	1208	0.48	1209	0.48
1210	0.48	1211	0.46	1212	0.44	1213	0.43	1214	0.41
1215	0.39	1216	0.38	1217	0.36	1218	0.36	1219	0.36
1220	0.36	1221	0.36	1222	0.36	1223	0.36	1224	0.36
1225	0.36	1226	0.36	1227	0.36	1228	0.36	1229	0.36
1230	0.36	1231	0.35	1232	0.34	1233	0.32	1234	0.31
1235	0.30	1236	0.29	1237	0.28	1238	0.28	1239	0.28
1240	0.28	1241	0.28	1242	0.28	1243	0.28	1244	0.28
1245	0.28	1246	0.28	1247	0.28	1248	0.28	1249	0.28
1250	0.28	1251	0.28	1252	0.28	1253	0.28	1254	0.28
1255	0.28	1256	0.28	1257	0.28	1258	0.28	1259	0.28
1260	0.28	1261	0.27	1262	0.27	1263	0.26	1264	0.25
1265	0.25	1266	0.24	1267	0.24	1268	0.24	1269	0.24
1270	0.24	1271	0.24	1272	0.24	1273	0.24	1274	0.24
1275	0.24	1276	0.24	1277	0.24	1278	0.24	1279	0.24
1280	0.24	1281	0.24	1282	0.24	1283	0.24	1284	0.24
1285	0.24	1286	0.24	1287	0.24	1288	0.24	1289	0.24
1290	0.24	1291	0.24	1292	0.24	1293	0.24	1294	0.24
1295	0.24	1296	0.24	1297	0.24	1298	0.24	1299	0.24
1300	0.24	1310	0.17	1320	0.17	1330	0.17	1340	0.17
1350	0.11	1360	0.11	1370	0.11	1380	0.11	1390	0.11
1400	0.11	1420	0.07	1440	0.07	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J10                                G1
006    14  002A 040091001407K10                             1
006    14  003AF010         J10                     00000102 1
006    14  003F 010      099J10                             1 F
006    14  004A 010      099J10                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 25-Year
Proposed Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Proposed																			
2A	040	K25	6	91	14	50		14	50	1154	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	5	1154	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	5	1154	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 50 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 6.07 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.73	200	0.98	300	1.25	400	1.57
500	1.96	600	2.34	700	2.83	800	3.31	900	3.35
1000	4.90	1050	6.11	1100	7.54	1110	8.24	1120	8.48
1130	10.49	1131	10.75	1132	11.00	1133	11.26	1134	11.51
1135	11.77	1136	12.29	1137	12.56	1138	12.82	1139	13.09
1140	13.36	1141	13.84	1142	14.05	1143	14.27	1144	14.48
1145	14.69	1146	15.29	1147	15.68	1148	16.13	1149	22.96
1150	29.74	1151	36.54	1152	42.96	1153	49.51	1154	49.65
1155	42.50	1156	35.06	1157	27.63	1158	20.21	1159	12.58
1160	11.35	1161	10.56	1162	10.07	1163	9.57	1164	9.08
1165	8.58	1166	8.08	1167	8.08	1168	8.08	1169	8.08
1170	8.08	1171	7.83	1172	7.60	1173	7.37	1174	7.14
1175	6.91	1176	6.68	1177	6.68	1178	6.68	1179	6.68
1180	6.68	1181	6.51	1182	6.34	1183	6.17	1184	6.00
1185	5.83	1186	5.66	1187	5.66	1188	5.66	1189	5.66
1190	5.66	1191	5.51	1192	5.35	1193	5.19	1194	5.03
1195	4.88	1196	4.72	1197	4.72	1198	4.72	1199	4.72
1200	4.72	1201	4.72	1202	4.72	1203	4.72	1204	4.72
1205	4.72	1206	4.72	1207	4.72	1208	4.72	1209	4.72
1210	4.72	1211	4.59	1212	4.47	1213	4.34	1214	4.21
1215	4.09	1216	3.96	1217	3.96	1218	3.96	1219	3.96
1220	3.96	1221	3.96	1222	3.96	1223	3.96	1224	3.96
1225	3.96	1226	3.96	1227	3.96	1228	3.96	1229	3.96
1230	3.96	1231	3.85	1232	3.75	1233	3.65	1234	3.55
1235	3.44	1236	3.34	1237	3.34	1238	3.34	1239	3.34
1240	3.34	1241	3.34	1242	3.34	1243	3.34	1244	3.34
1245	3.34	1246	3.34	1247	3.34	1248	3.34	1249	3.34
1250	3.34	1251	3.34	1252	3.34	1253	3.34	1254	3.34
1255	3.34	1256	3.34	1257	3.34	1258	3.34	1259	3.34
1260	3.34	1261	3.27	1262	3.21	1263	3.14	1264	3.07
1265	3.01	1266	2.94	1267	2.94	1268	2.94	1269	2.94
1270	2.94	1271	2.94	1272	2.94	1273	2.94	1274	2.94
1275	2.94	1276	2.94	1277	2.94	1278	2.94	1279	2.94
1280	2.94	1281	2.94	1282	2.94	1283	2.94	1284	2.94
1285	2.94	1286	2.94	1287	2.94	1288	2.94	1289	2.94
1290	2.94	1291	2.94	1292	2.94	1293	2.94	1294	2.94
1295	2.94	1296	2.94	1297	2.94	1298	2.94	1299	2.94
1300	2.94	1310	2.14	1320	2.14	1330	2.14	1340	2.14
1350	1.34	1360	1.34	1370	1.34	1380	1.34	1390	1.34
1400	1.34	1420	0.80	1440	0.80	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.61 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.10	300	0.12	400	0.16
500	0.20	600	0.23	700	0.28	800	0.33	900	0.34
1000	0.49	1050	0.61	1100	0.75	1110	0.82	1120	0.85
1130	1.05	1131	1.07	1132	1.10	1133	1.13	1134	1.15
1135	1.18	1136	1.23	1137	1.26	1138	1.28	1139	1.31
1140	1.34	1141	1.38	1142	1.41	1143	1.43	1144	1.45
1145	1.47	1146	1.53	1147	1.57	1148	1.61	1149	2.30
1150	2.97	1151	3.65	1152	4.30	1153	4.95	1154	4.96
1155	4.25	1156	3.51	1157	2.76	1158	2.02	1159	1.26
1160	1.14	1161	1.06	1162	1.01	1163	0.96	1164	0.91
1165	0.86	1166	0.81	1167	0.81	1168	0.81	1169	0.81
1170	0.81	1171	0.78	1172	0.76	1173	0.74	1174	0.71
1175	0.69	1176	0.67	1177	0.67	1178	0.67	1179	0.67
1180	0.67	1181	0.65	1182	0.63	1183	0.62	1184	0.60
1185	0.58	1186	0.57	1187	0.57	1188	0.57	1189	0.57
1190	0.57	1191	0.55	1192	0.53	1193	0.52	1194	0.50
1195	0.49	1196	0.47	1197	0.47	1198	0.47	1199	0.47
1200	0.47	1201	0.47	1202	0.47	1203	0.47	1204	0.47
1205	0.47	1206	0.47	1207	0.47	1208	0.47	1209	0.47
1210	0.47	1211	0.46	1212	0.45	1213	0.43	1214	0.42
1215	0.41	1216	0.40	1217	0.40	1218	0.40	1219	0.40
1220	0.40	1221	0.40	1222	0.40	1223	0.40	1224	0.40
1225	0.40	1226	0.40	1227	0.40	1228	0.40	1229	0.40
1230	0.40	1231	0.39	1232	0.38	1233	0.36	1234	0.35
1235	0.34	1236	0.33	1237	0.33	1238	0.33	1239	0.33
1240	0.33	1241	0.33	1242	0.33	1243	0.33	1244	0.33
1245	0.33	1246	0.33	1247	0.33	1248	0.33	1249	0.33
1250	0.33	1251	0.33	1252	0.33	1253	0.33	1254	0.33
1255	0.33	1256	0.33	1257	0.33	1258	0.33	1259	0.33
1260	0.33	1261	0.33	1262	0.32	1263	0.31	1264	0.31
1265	0.30	1266	0.29	1267	0.29	1268	0.29	1269	0.29
1270	0.29	1271	0.29	1272	0.29	1273	0.29	1274	0.29
1275	0.29	1276	0.29	1277	0.29	1278	0.29	1279	0.29
1280	0.29	1281	0.29	1282	0.29	1283	0.29	1284	0.29
1285	0.29	1286	0.29	1287	0.29	1288	0.29	1289	0.29
1290	0.29	1291	0.29	1292	0.29	1293	0.29	1294	0.29
1295	0.29	1296	0.29	1297	0.29	1298	0.29	1299	0.29
1300	0.29	1310	0.21	1320	0.21	1330	0.21	1340	0.21
1350	0.13	1360	0.13	1370	0.13	1380	0.13	1390	0.13
1400	0.13	1420	0.08	1440	0.08	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 5 cfs
TIME OF PEAK: 1154 minutes
HYDROGRAPH VOLUME: 0.61 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.10	300	0.12	400	0.16
500	0.20	600	0.23	700	0.28	800	0.33	900	0.34
1000	0.49	1050	0.61	1100	0.75	1110	0.82	1120	0.85
1130	1.05	1131	1.07	1132	1.10	1133	1.13	1134	1.15
1135	1.18	1136	1.23	1137	1.26	1138	1.28	1139	1.31
1140	1.34	1141	1.38	1142	1.41	1143	1.43	1144	1.45
1145	1.47	1146	1.53	1147	1.57	1148	1.61	1149	2.30
1150	2.97	1151	3.65	1152	4.30	1153	4.95	1154	4.96
1155	4.25	1156	3.51	1157	2.76	1158	2.02	1159	1.26
1160	1.14	1161	1.06	1162	1.01	1163	0.96	1164	0.91
1165	0.86	1166	0.81	1167	0.81	1168	0.81	1169	0.81
1170	0.81	1171	0.78	1172	0.76	1173	0.74	1174	0.71
1175	0.69	1176	0.67	1177	0.67	1178	0.67	1179	0.67
1180	0.67	1181	0.65	1182	0.63	1183	0.62	1184	0.60
1185	0.58	1186	0.57	1187	0.57	1188	0.57	1189	0.57
1190	0.57	1191	0.55	1192	0.53	1193	0.52	1194	0.50
1195	0.49	1196	0.47	1197	0.47	1198	0.47	1199	0.47
1200	0.47	1201	0.47	1202	0.47	1203	0.47	1204	0.47
1205	0.47	1206	0.47	1207	0.47	1208	0.47	1209	0.47
1210	0.47	1211	0.46	1212	0.45	1213	0.43	1214	0.42
1215	0.41	1216	0.40	1217	0.40	1218	0.40	1219	0.40
1220	0.40	1221	0.40	1222	0.40	1223	0.40	1224	0.40
1225	0.40	1226	0.40	1227	0.40	1228	0.40	1229	0.40
1230	0.40	1231	0.39	1232	0.38	1233	0.36	1234	0.35
1235	0.34	1236	0.33	1237	0.33	1238	0.33	1239	0.33
1240	0.33	1241	0.33	1242	0.33	1243	0.33	1244	0.33
1245	0.33	1246	0.33	1247	0.33	1248	0.33	1249	0.33
1250	0.33	1251	0.33	1252	0.33	1253	0.33	1254	0.33
1255	0.33	1256	0.33	1257	0.33	1258	0.33	1259	0.33
1260	0.33	1261	0.33	1262	0.32	1263	0.31	1264	0.31
1265	0.30	1266	0.29	1267	0.29	1268	0.29	1269	0.29
1270	0.29	1271	0.29	1272	0.29	1273	0.29	1274	0.29
1275	0.29	1276	0.29	1277	0.29	1278	0.29	1279	0.29
1280	0.29	1281	0.29	1282	0.29	1283	0.29	1284	0.29
1285	0.29	1286	0.29	1287	0.29	1288	0.29	1289	0.29
1290	0.29	1291	0.29	1292	0.29	1293	0.29	1294	0.29
1295	0.29	1296	0.29	1297	0.29	1298	0.29	1299	0.29
1300	0.29	1310	0.21	1320	0.21	1330	0.21	1340	0.21
1350	0.13	1360	0.13	1370	0.13	1380	0.13	1390	0.13
1400	0.13	1420	0.08	1440	0.08	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J25                                G1
006    14  002A 040091001406K25                             1
006    14  003AF010         J25                     00000102 1
006    14  003F 010      099J25                             1 F
006    14  004A 010      099J25                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 50-Year
Proposed Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION									
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Proposed																			
2A	040	K50	5	91	14	60		14	60	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	6	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 60 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 7.63 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.73	200	1.31	300	1.67	400	2.18
500	2.69	600	3.34	700	3.88	800	4.32	900	5.08
1000	6.32	1050	6.45	1100	7.65	1110	8.40	1120	9.93
1130	10.49	1131	10.64	1132	10.78	1133	10.93	1134	11.07
1135	11.22	1136	12.34	1137	13.46	1138	14.59	1139	15.71
1140	16.83	1141	17.60	1142	18.37	1143	19.14	1144	19.90
1145	20.66	1146	21.17	1147	21.67	1148	22.34	1149	23.64
1150	27.16	1151	37.47	1152	50.18	1153	59.55	1154	58.76
1155	54.15	1156	41.60	1157	26.68	1158	14.91	1159	12.66
1160	12.02	1161	11.22	1162	10.41	1163	9.61	1164	8.81
1165	8.00	1166	8.00	1167	8.00	1168	8.00	1169	8.00
1170	8.00	1171	7.84	1172	7.70	1173	7.55	1174	7.41
1175	7.26	1176	7.26	1177	7.26	1178	7.26	1179	7.26
1180	7.26	1181	7.26	1182	7.26	1183	7.26	1184	7.26
1185	7.26	1186	7.26	1187	7.26	1188	7.26	1189	7.26
1190	7.26	1191	7.04	1192	6.83	1193	6.61	1194	6.39
1195	6.17	1196	6.17	1197	6.17	1198	6.17	1199	6.17
1200	6.17	1201	6.17	1202	6.17	1203	6.17	1204	6.17
1205	6.17	1206	6.17	1207	6.17	1208	6.17	1209	6.17
1210	6.17	1211	5.95	1212	5.74	1213	5.52	1214	5.30
1215	5.08	1216	5.08	1217	5.08	1218	5.08	1219	5.08
1220	5.08	1221	5.08	1222	5.08	1223	5.08	1224	5.08
1225	5.08	1226	5.08	1227	5.08	1228	5.08	1229	5.08
1230	5.08	1231	4.94	1232	4.79	1233	4.65	1234	4.50
1235	4.36	1236	4.36	1237	4.36	1238	4.36	1239	4.36
1240	4.36	1241	4.36	1242	4.36	1243	4.36	1244	4.36
1245	4.36	1246	4.36	1247	4.36	1248	4.36	1249	4.36
1250	4.36	1251	4.36	1252	4.36	1253	4.36	1254	4.36
1255	4.36	1256	4.36	1257	4.36	1258	4.36	1259	4.36
1260	4.36	1261	4.28	1262	4.21	1263	4.14	1264	4.07
1265	3.99	1266	3.99	1267	3.99	1268	3.99	1269	3.99
1270	3.99	1271	3.99	1272	3.99	1273	3.99	1274	3.99
1275	3.99	1276	3.99	1277	3.99	1278	3.99	1279	3.99
1280	3.99	1281	3.99	1282	3.99	1283	3.99	1284	3.99
1285	3.99	1286	3.99	1287	3.99	1288	3.99	1289	3.99
1290	3.99	1291	3.99	1292	3.99	1293	3.99	1294	3.99
1295	3.99	1296	3.99	1297	3.99	1298	3.99	1299	3.99
1300	3.99	1310	2.90	1320	2.90	1330	2.90	1340	2.90
1350	1.82	1360	1.82	1370	1.82	1380	1.82	1390	1.82
1400	1.81	1420	0.91	1440	0.91	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.76 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.13	300	0.17	400	0.22
500	0.27	600	0.33	700	0.39	800	0.43	900	0.51
1000	0.63	1050	0.64	1100	0.77	1110	0.84	1120	0.99
1130	1.05	1131	1.06	1132	1.08	1133	1.09	1134	1.11
1135	1.12	1136	1.23	1137	1.35	1138	1.46	1139	1.57
1140	1.68	1141	1.76	1142	1.84	1143	1.91	1144	1.99
1145	2.07	1146	2.12	1147	2.17	1148	2.23	1149	2.36
1150	2.72	1151	3.75	1152	5.02	1153	5.95	1154	5.88
1155	5.41	1156	4.16	1157	2.67	1158	1.49	1159	1.27
1160	1.20	1161	1.12	1162	1.04	1163	0.96	1164	0.88
1165	0.80	1166	0.80	1167	0.80	1168	0.80	1169	0.80
1170	0.80	1171	0.78	1172	0.77	1173	0.76	1174	0.74
1175	0.73	1176	0.73	1177	0.73	1178	0.73	1179	0.73
1180	0.73	1181	0.73	1182	0.73	1183	0.73	1184	0.73
1185	0.73	1186	0.73	1187	0.73	1188	0.73	1189	0.73
1190	0.73	1191	0.70	1192	0.68	1193	0.66	1194	0.64
1195	0.62	1196	0.62	1197	0.62	1198	0.62	1199	0.62
1200	0.62	1201	0.62	1202	0.62	1203	0.62	1204	0.62
1205	0.62	1206	0.62	1207	0.62	1208	0.62	1209	0.62
1210	0.62	1211	0.60	1212	0.57	1213	0.55	1214	0.53
1215	0.51	1216	0.51	1217	0.51	1218	0.51	1219	0.51
1220	0.51	1221	0.51	1222	0.51	1223	0.51	1224	0.51
1225	0.51	1226	0.51	1227	0.51	1228	0.51	1229	0.51
1230	0.51	1231	0.49	1232	0.48	1233	0.46	1234	0.45
1235	0.44	1236	0.44	1237	0.44	1238	0.44	1239	0.44
1240	0.44	1241	0.44	1242	0.44	1243	0.44	1244	0.44
1245	0.44	1246	0.44	1247	0.44	1248	0.44	1249	0.44
1250	0.44	1251	0.44	1252	0.44	1253	0.44	1254	0.44
1255	0.44	1256	0.44	1257	0.44	1258	0.44	1259	0.44
1260	0.44	1261	0.43	1262	0.42	1263	0.41	1264	0.41
1265	0.40	1266	0.40	1267	0.40	1268	0.40	1269	0.40
1270	0.40	1271	0.40	1272	0.40	1273	0.40	1274	0.40
1275	0.40	1276	0.40	1277	0.40	1278	0.40	1279	0.40
1280	0.40	1281	0.40	1282	0.40	1283	0.40	1284	0.40
1285	0.40	1286	0.40	1287	0.40	1288	0.40	1289	0.40
1290	0.40	1291	0.40	1292	0.40	1293	0.40	1294	0.40
1295	0.40	1296	0.40	1297	0.40	1298	0.40	1299	0.40
1300	0.40	1310	0.29	1320	0.29	1330	0.29	1340	0.29
1350	0.18	1360	0.18	1370	0.18	1380	0.18	1390	0.18
1400	0.18	1420	0.09	1440	0.09	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 6 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 0.76 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.07	200	0.13	300	0.17	400	0.22
500	0.27	600	0.33	700	0.39	800	0.43	900	0.51
1000	0.63	1050	0.64	1100	0.77	1110	0.84	1120	0.99
1130	1.05	1131	1.06	1132	1.08	1133	1.09	1134	1.11
1135	1.12	1136	1.23	1137	1.35	1138	1.46	1139	1.57
1140	1.68	1141	1.76	1142	1.84	1143	1.91	1144	1.99
1145	2.07	1146	2.12	1147	2.17	1148	2.23	1149	2.36
1150	2.72	1151	3.75	1152	5.02	1153	5.95	1154	5.88
1155	5.41	1156	4.16	1157	2.67	1158	1.49	1159	1.27
1160	1.20	1161	1.12	1162	1.04	1163	0.96	1164	0.88
1165	0.80	1166	0.80	1167	0.80	1168	0.80	1169	0.80
1170	0.80	1171	0.78	1172	0.77	1173	0.76	1174	0.74
1175	0.73	1176	0.73	1177	0.73	1178	0.73	1179	0.73
1180	0.73	1181	0.73	1182	0.73	1183	0.73	1184	0.73
1185	0.73	1186	0.73	1187	0.73	1188	0.73	1189	0.73
1190	0.73	1191	0.70	1192	0.68	1193	0.66	1194	0.64
1195	0.62	1196	0.62	1197	0.62	1198	0.62	1199	0.62
1200	0.62	1201	0.62	1202	0.62	1203	0.62	1204	0.62
1205	0.62	1206	0.62	1207	0.62	1208	0.62	1209	0.62
1210	0.62	1211	0.60	1212	0.57	1213	0.55	1214	0.53
1215	0.51	1216	0.51	1217	0.51	1218	0.51	1219	0.51
1220	0.51	1221	0.51	1222	0.51	1223	0.51	1224	0.51
1225	0.51	1226	0.51	1227	0.51	1228	0.51	1229	0.51
1230	0.51	1231	0.49	1232	0.48	1233	0.46	1234	0.45
1235	0.44	1236	0.44	1237	0.44	1238	0.44	1239	0.44
1240	0.44	1241	0.44	1242	0.44	1243	0.44	1244	0.44
1245	0.44	1246	0.44	1247	0.44	1248	0.44	1249	0.44
1250	0.44	1251	0.44	1252	0.44	1253	0.44	1254	0.44
1255	0.44	1256	0.44	1257	0.44	1258	0.44	1259	0.44
1260	0.44	1261	0.43	1262	0.42	1263	0.41	1264	0.41
1265	0.40	1266	0.40	1267	0.40	1268	0.40	1269	0.40
1270	0.40	1271	0.40	1272	0.40	1273	0.40	1274	0.40
1275	0.40	1276	0.40	1277	0.40	1278	0.40	1279	0.40
1280	0.40	1281	0.40	1282	0.40	1283	0.40	1284	0.40
1285	0.40	1286	0.40	1287	0.40	1288	0.40	1289	0.40
1290	0.40	1291	0.40	1292	0.40	1293	0.40	1294	0.40
1295	0.40	1296	0.40	1297	0.40	1298	0.40	1299	0.40
1300	0.40	1310	0.29	1320	0.29	1330	0.29	1340	0.29
1350	0.18	1360	0.18	1370	0.18	1380	0.18	1390	0.18
1400	0.18	1420	0.09	1440	0.09	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099J50                                G1
006    14  002A 040091001405K50                             1
006    14  003AF010         J50                     00000102 1
006    14  003F 010      099J50                             1 F
006    14  004A 010      099J50                             1  2
999
```

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Modified Rational Model Results Report

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Project Description

Rexford Industrial Technicolor Building Remodel Hydrology
Storm Event: 100-Year
Proposed Condition Drainage Area B

VCRat version: 2.6.2009.7
VCRain version: 200703
DOS EXE version: PC 2.2-200809

Ventura County Watershed Protection District
Modified Rational Method Hydrology Program (VCRat v2.6)

Job: 14 Project: Rexford Industrial Technicolor Building Remodel

Model Results

SUBAREA DATA AND RESULTS								ACCUMULATED DATA			ROUTING AFTER ACCUMULATION								
NODE ID	SOIL TYPE	RAIN ZONE	TC (MIN)	% IMP	AREA (AC)	FLOW (CFS)		AREA (AC)	FLOW (CFS)	TIME (MIN)	CHANNEL TYPE	LENGTH (FT)	SLOPE (FT/FT)	SIZE (FT)	H:V (Z)	N VALUES CHNL	N VALUES SIDES	VEL (FT/S)	DEPTH (FT)
1A	---	---	--	--	---	---		0	0	----	-------	----	-------	---	----	-----	-----	--	--
2A : Subarea B - Proposed																			
2A	040	K100	5	91	14	67		14	67	1153	-------	----	-------	---	----	-----	-----	--	--
3AF: Clearing Lateral Bank: F																			
3AF: Control/Diversion: 10% to channel A																			
3AF	---	---	--	--	---	---		14	7	1153	-------	----	-------	---	----	-----	-----	--	--
4A	---	---	--	--	---	---		14	7	1153	-------	----	-------	---	----	-----	-----	--	--

Issue/Warning Messages

TYPE	ERR NO	PROCEDURE	LOCATION	MESSAGE
NO ISSUES OR WARNINGS DETECTED				

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 2A

DESCRIPTION: Subarea B - Proposed
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 67 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 10.25 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	3.27	200	3.56	300	4.07	400	4.07
500	4.29	600	4.50	700	4.72	800	4.94	900	5.44
1000	6.32	1050	7.41	1100	7.80	1110	10.41	1120	9.53
1130	12.82	1131	12.82	1132	12.82	1133	13.30	1134	13.94
1135	14.43	1136	14.11	1137	14.91	1138	15.07	1139	15.07
1140	15.39	1141	17.15	1142	17.63	1143	18.27	1144	19.07
1145	20.98	1146	22.24	1147	23.67	1148	25.10	1149	34.45
1150	42.55	1151	39.85	1152	58.76	1153	66.84	1154	58.76
1155	49.22	1156	50.02	1157	28.74	1158	17.95	1159	15.07
1160	13.95	1161	12.50	1162	11.54	1163	10.90	1164	11.38
1165	9.93	1166	9.77	1167	9.29	1168	9.13	1169	8.81
1170	8.32	1171	8.32	1172	8.48	1173	8.16	1174	7.26
1175	7.84	1176	7.55	1177	7.26	1178	7.12	1179	6.97
1180	6.97	1181	6.97	1182	7.12	1183	7.12	1184	7.12
1185	7.12	1186	6.97	1187	6.97	1188	7.12	1189	7.12
1190	6.97	1191	7.12	1192	6.97	1193	6.97	1194	6.97
1195	7.12	1196	6.97	1197	7.12	1198	7.12	1199	6.97
1200	6.97	1201	6.83	1202	6.68	1203	6.39	1204	6.39
1205	6.10	1206	6.10	1207	6.10	1208	6.10	1209	6.10
1210	6.10	1211	6.10	1212	6.10	1213	6.25	1214	6.10
1215	6.10	1216	6.25	1217	6.25	1218	6.10	1219	6.10
1220	6.25	1221	6.25	1222	6.10	1223	6.10	1224	6.25
1225	6.25	1226	6.10	1227	6.10	1228	6.25	1229	6.25
1230	6.10	1231	6.10	1232	6.25	1233	6.10	1234	5.95
1235	6.10	1236	6.10	1237	5.95	1238	6.10	1239	6.10
1240	5.95	1241	6.10	1242	6.10	1243	5.95	1244	6.10
1245	6.10	1246	5.95	1247	6.10	1248	6.10	1249	5.95
1250	6.10	1251	6.10	1252	5.95	1253	6.10	1254	6.10
1255	5.95	1256	6.10	1257	6.10	1258	5.95	1259	6.10
1260	6.10	1261	5.95	1262	5.81	1263	5.66	1264	5.52
1265	5.52	1266	5.37	1267	5.37	1268	5.52	1269	5.52
1270	5.37	1271	5.37	1272	5.52	1273	5.52	1274	5.37
1275	5.37	1276	5.52	1277	5.52	1278	5.37	1279	5.37
1280	5.52	1281	5.52	1282	5.37	1283	5.37	1284	5.52
1285	5.52	1286	5.37	1287	5.37	1288	5.52	1289	5.52
1290	5.37	1291	5.37	1292	5.52	1293	5.37	1294	5.37
1295	5.37	1296	5.52	1297	5.52	1298	5.52	1299	5.37
1300	5.52	1310	4.50	1320	4.57	1330	4.58	1340	4.50
1350	3.41	1360	3.34	1370	3.41	1380	3.41	1390	3.34
1400	3.41	1420	2.36	1440	2.36	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3A

3AF: Clearing Lateral Bank: F
TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 7 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.03 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.33	200	0.36	300	0.41	400	0.41
500	0.43	600	0.45	700	0.47	800	0.49	900	0.54
1000	0.63	1050	0.74	1100	0.78	1110	1.04	1120	0.95
1130	1.28	1131	1.28	1132	1.28	1133	1.33	1134	1.39
1135	1.44	1136	1.41	1137	1.49	1138	1.51	1139	1.51
1140	1.54	1141	1.71	1142	1.76	1143	1.83	1144	1.91
1145	2.10	1146	2.22	1147	2.37	1148	2.51	1149	3.44
1150	4.26	1151	3.99	1152	5.88	1153	6.68	1154	5.88
1155	4.92	1156	5.00	1157	2.87	1158	1.80	1159	1.51
1160	1.39	1161	1.25	1162	1.15	1163	1.09	1164	1.14
1165	0.99	1166	0.98	1167	0.93	1168	0.91	1169	0.88
1170	0.83	1171	0.83	1172	0.85	1173	0.82	1174	0.73
1175	0.78	1176	0.76	1177	0.73	1178	0.71	1179	0.70
1180	0.70	1181	0.70	1182	0.71	1183	0.71	1184	0.71
1185	0.71	1186	0.70	1187	0.70	1188	0.71	1189	0.71
1190	0.70	1191	0.71	1192	0.70	1193	0.70	1194	0.70
1195	0.71	1196	0.70	1197	0.71	1198	0.71	1199	0.70
1200	0.70	1201	0.68	1202	0.67	1203	0.64	1204	0.64
1205	0.61	1206	0.61	1207	0.61	1208	0.61	1209	0.61
1210	0.61	1211	0.61	1212	0.61	1213	0.62	1214	0.61
1215	0.61	1216	0.62	1217	0.62	1218	0.61	1219	0.61
1220	0.62	1221	0.62	1222	0.61	1223	0.61	1224	0.62
1225	0.62	1226	0.61	1227	0.61	1228	0.62	1229	0.62
1230	0.61	1231	0.61	1232	0.62	1233	0.61	1234	0.60
1235	0.61	1236	0.61	1237	0.60	1238	0.61	1239	0.61
1240	0.60	1241	0.61	1242	0.61	1243	0.60	1244	0.61
1245	0.61	1246	0.60	1247	0.61	1248	0.61	1249	0.60
1250	0.61	1251	0.61	1252	0.60	1253	0.61	1254	0.61
1255	0.60	1256	0.61	1257	0.61	1258	0.60	1259	0.61
1260	0.61	1261	0.60	1262	0.58	1263	0.57	1264	0.55
1265	0.55	1266	0.54	1267	0.54	1268	0.55	1269	0.55
1270	0.54	1271	0.54	1272	0.55	1273	0.55	1274	0.54
1275	0.54	1276	0.55	1277	0.55	1278	0.54	1279	0.54
1280	0.55	1281	0.55	1282	0.54	1283	0.54	1284	0.55
1285	0.55	1286	0.54	1287	0.54	1288	0.55	1289	0.55
1290	0.54	1291	0.54	1292	0.55	1293	0.54	1294	0.54
1295	0.54	1296	0.55	1297	0.55	1298	0.55	1299	0.54
1300	0.55	1310	0.45	1320	0.46	1330	0.46	1340	0.45
1350	0.34	1360	0.33	1370	0.34	1380	0.34	1390	0.33
1400	0.34	1420	0.24	1440	0.24	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 3F

TOTAL AREA TO HYDROGRAPH: 0 acres
HYDROGRAPH PEAK: 0 cfs
TIME OF PEAK: 0 minutes
HYDROGRAPH VOLUME: 0.00 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.00	200	0.00	300	0.00	400	0.00
500	0.00	600	0.00	700	0.00	800	0.00	900	0.00
1000	0.00	1050	0.00	1100	0.00	1110	0.00	1120	0.00
1130	0.00	1131	0.00	1132	0.00	1133	0.00	1134	0.00
1135	0.00	1136	0.00	1137	0.00	1138	0.00	1139	0.00
1140	0.00	1141	0.00	1142	0.00	1143	0.00	1144	0.00
1145	0.00	1146	0.00	1147	0.00	1148	0.00	1149	0.00
1150	0.00	1151	0.00	1152	0.00	1153	0.00	1154	0.00
1155	0.00	1156	0.00	1157	0.00	1158	0.00	1159	0.00
1160	0.00	1161	0.00	1162	0.00	1163	0.00	1164	0.00
1165	0.00	1166	0.00	1167	0.00	1168	0.00	1169	0.00
1170	0.00	1171	0.00	1172	0.00	1173	0.00	1174	0.00
1175	0.00	1176	0.00	1177	0.00	1178	0.00	1179	0.00
1180	0.00	1181	0.00	1182	0.00	1183	0.00	1184	0.00
1185	0.00	1186	0.00	1187	0.00	1188	0.00	1189	0.00
1190	0.00	1191	0.00	1192	0.00	1193	0.00	1194	0.00
1195	0.00	1196	0.00	1197	0.00	1198	0.00	1199	0.00
1200	0.00	1201	0.00	1202	0.00	1203	0.00	1204	0.00
1205	0.00	1206	0.00	1207	0.00	1208	0.00	1209	0.00
1210	0.00	1211	0.00	1212	0.00	1213	0.00	1214	0.00
1215	0.00	1216	0.00	1217	0.00	1218	0.00	1219	0.00
1220	0.00	1221	0.00	1222	0.00	1223	0.00	1224	0.00
1225	0.00	1226	0.00	1227	0.00	1228	0.00	1229	0.00
1230	0.00	1231	0.00	1232	0.00	1233	0.00	1234	0.00
1235	0.00	1236	0.00	1237	0.00	1238	0.00	1239	0.00
1240	0.00	1241	0.00	1242	0.00	1243	0.00	1244	0.00
1245	0.00	1246	0.00	1247	0.00	1248	0.00	1249	0.00
1250	0.00	1251	0.00	1252	0.00	1253	0.00	1254	0.00
1255	0.00	1256	0.00	1257	0.00	1258	0.00	1259	0.00
1260	0.00	1261	0.00	1262	0.00	1263	0.00	1264	0.00
1265	0.00	1266	0.00	1267	0.00	1268	0.00	1269	0.00
1270	0.00	1271	0.00	1272	0.00	1273	0.00	1274	0.00
1275	0.00	1276	0.00	1277	0.00	1278	0.00	1279	0.00
1280	0.00	1281	0.00	1282	0.00	1283	0.00	1284	0.00
1285	0.00	1286	0.00	1287	0.00	1288	0.00	1289	0.00
1290	0.00	1291	0.00	1292	0.00	1293	0.00	1294	0.00
1295	0.00	1296	0.00	1297	0.00	1298	0.00	1299	0.00
1300	0.00	1310	0.00	1320	0.00	1330	0.00	1340	0.00
1350	0.00	1360	0.00	1370	0.00	1380	0.00	1390	0.00
1400	0.00	1420	0.00	1440	0.00	1460	0.00	1500	0.00

Hydrograph Printouts

HYDROGRAPH PRINTOUT AT: 4A

TOTAL AREA TO HYDROGRAPH: 14 acres
HYDROGRAPH PEAK: 7 cfs
TIME OF PEAK: 1153 minutes
HYDROGRAPH VOLUME: 1.03 acre-ft

TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)	TIME (min)	FLOW (cfs)
0	0.00	100	0.33	200	0.36	300	0.41	400	0.41
500	0.43	600	0.45	700	0.47	800	0.49	900	0.54
1000	0.63	1050	0.74	1100	0.78	1110	1.04	1120	0.95
1130	1.28	1131	1.28	1132	1.28	1133	1.33	1134	1.39
1135	1.44	1136	1.41	1137	1.49	1138	1.51	1139	1.51
1140	1.54	1141	1.71	1142	1.76	1143	1.83	1144	1.91
1145	2.10	1146	2.22	1147	2.37	1148	2.51	1149	3.44
1150	4.26	1151	3.99	1152	5.88	1153	6.68	1154	5.88
1155	4.92	1156	5.00	1157	2.87	1158	1.80	1159	1.51
1160	1.39	1161	1.25	1162	1.15	1163	1.09	1164	1.14
1165	0.99	1166	0.98	1167	0.93	1168	0.91	1169	0.88
1170	0.83	1171	0.83	1172	0.85	1173	0.82	1174	0.73
1175	0.78	1176	0.76	1177	0.73	1178	0.71	1179	0.70
1180	0.70	1181	0.70	1182	0.71	1183	0.71	1184	0.71
1185	0.71	1186	0.70	1187	0.70	1188	0.71	1189	0.71
1190	0.70	1191	0.71	1192	0.70	1193	0.70	1194	0.70
1195	0.71	1196	0.70	1197	0.71	1198	0.71	1199	0.70
1200	0.70	1201	0.68	1202	0.67	1203	0.64	1204	0.64
1205	0.61	1206	0.61	1207	0.61	1208	0.61	1209	0.61
1210	0.61	1211	0.61	1212	0.61	1213	0.62	1214	0.61
1215	0.61	1216	0.62	1217	0.62	1218	0.61	1219	0.61
1220	0.62	1221	0.62	1222	0.61	1223	0.61	1224	0.62
1225	0.62	1226	0.61	1227	0.61	1228	0.62	1229	0.62
1230	0.61	1231	0.61	1232	0.62	1233	0.61	1234	0.60
1235	0.61	1236	0.61	1237	0.60	1238	0.61	1239	0.61
1240	0.60	1241	0.61	1242	0.61	1243	0.60	1244	0.61
1245	0.61	1246	0.60	1247	0.61	1248	0.61	1249	0.60
1250	0.61	1251	0.61	1252	0.60	1253	0.61	1254	0.61
1255	0.60	1256	0.61	1257	0.61	1258	0.60	1259	0.61
1260	0.61	1261	0.60	1262	0.58	1263	0.57	1264	0.55
1265	0.55	1266	0.54	1267	0.54	1268	0.55	1269	0.55
1270	0.54	1271	0.54	1272	0.55	1273	0.55	1274	0.54
1275	0.54	1276	0.55	1277	0.55	1278	0.54	1279	0.54
1280	0.55	1281	0.55	1282	0.54	1283	0.54	1284	0.55
1285	0.55	1286	0.54	1287	0.54	1288	0.55	1289	0.55
1290	0.54	1291	0.54	1292	0.55	1293	0.54	1294	0.54
1295	0.54	1296	0.55	1297	0.55	1298	0.55	1299	0.54
1300	0.55	1310	0.45	1320	0.46	1330	0.46	1340	0.45
1350	0.34	1360	0.33	1370	0.34	1380	0.34	1390	0.33
1400	0.34	1420	0.24	1440	0.24	1460	0.00	1500	0.00

VCRat Model Input

Model Lines

```
005    14  001A Header place holder
005    14  002A Header place holder
005    14  003AFHeader place holder
005    14  003F Split Header place holder
005    14  004A Header place holder
999
999
006    14  001A 010      099A97                                G1
006    14  002A 040091001405B98                              1
006    14  003AF010         A97                     00000102 1
006    14  003F 010      099A97                              1 F
006    14  004A 010      099A97                              1  2
999
```

DRAINAGE STUDY

APPENDIX II – HYDRAULIC CALCULATIONS

Cross Section for Mainline SD - Area A

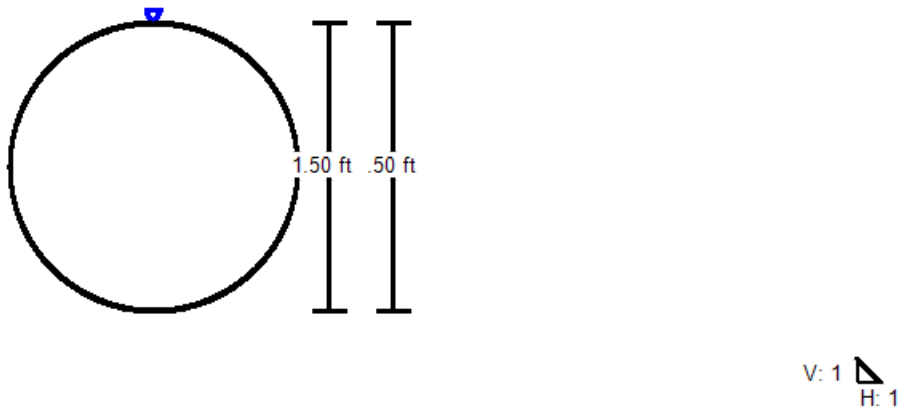
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00450	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft
Discharge	7.63	ft³/s

Cross Section Image



Worksheet for Mainline SD - Area A

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00450	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft
Discharge	7.63	ft^3/s

Results

Discharge	7.63	ft^3/s
Normal Depth	1.50	ft
Flow Area	1.77	ft^2
Wetted Perimeter	4.71	ft
Hydraulic Radius	0.38	ft
Top Width	0.00	ft
Critical Depth	1.07	ft
Percent Full	100.0	%
Critical Slope	0.00611	ft/ft
Velocity	4.32	ft/s
Velocity Head	0.29	ft
Specific Energy	1.79	ft
Froude Number	0.00	
Maximum Discharge	8.21	ft^3/s
Discharge Full	7.63	ft^3/s
Slope Full	0.00450	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

Worksheet for Mainline SD - Area A

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.07	ft
Channel Slope	0.00450	ft/ft
Critical Slope	0.00611	ft/ft

Cross Section for Mainline SD - Area B

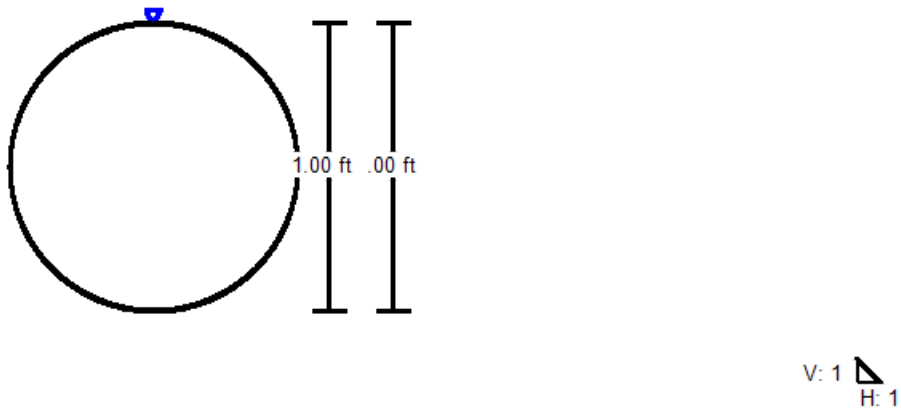
Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00290	ft/ft
Normal Depth	1.00	ft
Diameter	1.00	ft
Discharge	2.08	ft³/s

Cross Section Image



Worksheet for Mainline SD - Area B

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00290	ft/ft
Normal Depth	1.00	ft
Diameter	1.00	ft
Discharge	2.08	ft^3/s

Results

Discharge	2.08	ft^3/s
Normal Depth	1.00	ft
Flow Area	0.79	ft^2
Wetted Perimeter	3.14	ft
Hydraulic Radius	0.25	ft
Top Width	0.00	ft
Critical Depth	0.62	ft
Percent Full	100.0	%
Critical Slope	0.00594	ft/ft
Velocity	2.65	ft/s
Velocity Head	0.11	ft
Specific Energy	1.11	ft
Froude Number	0.00	
Maximum Discharge	2.24	ft^3/s
Discharge Full	2.08	ft^3/s
Slope Full	0.00290	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%

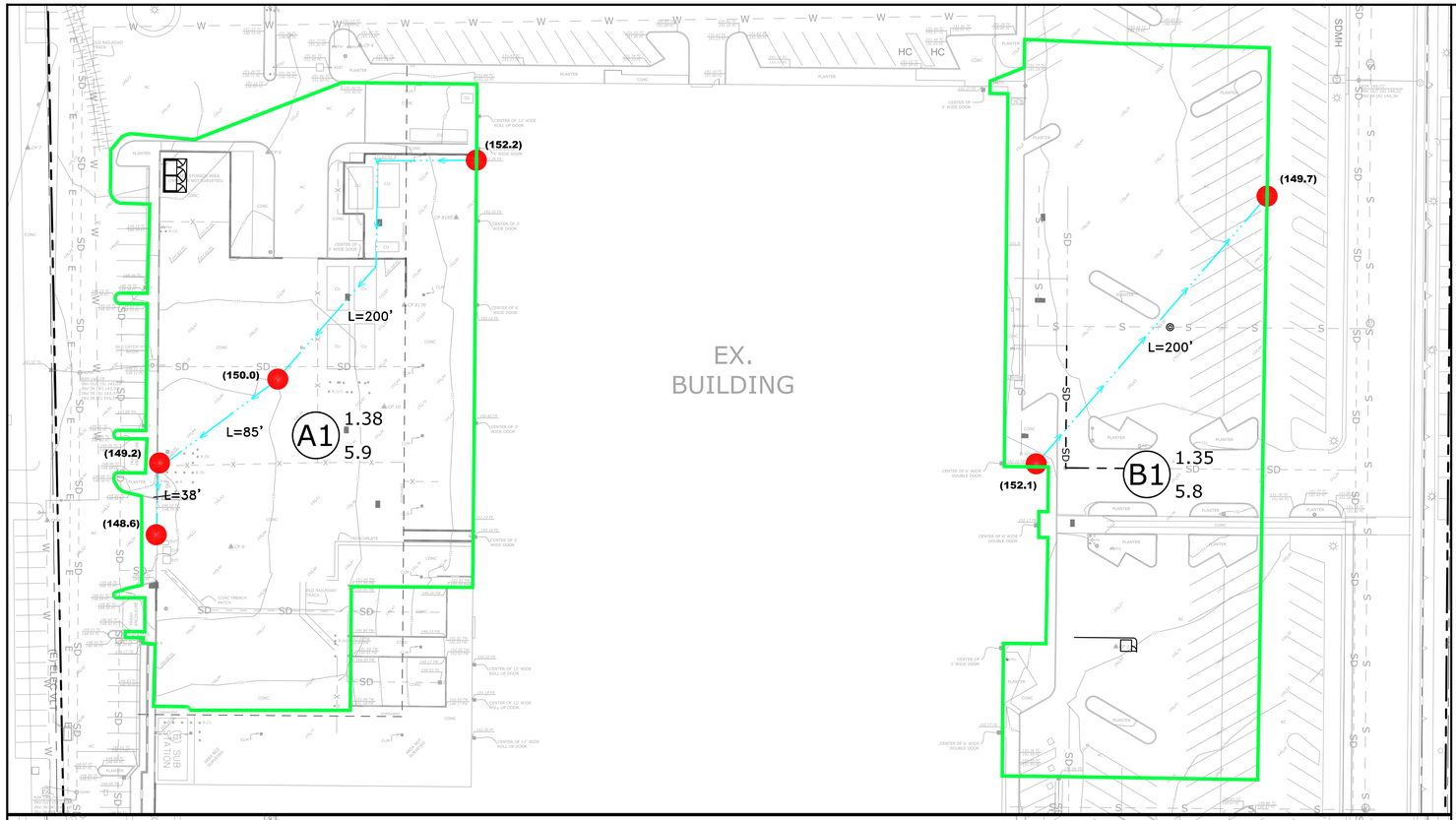
Worksheet for Mainline SD - Area B

GVF Output Data

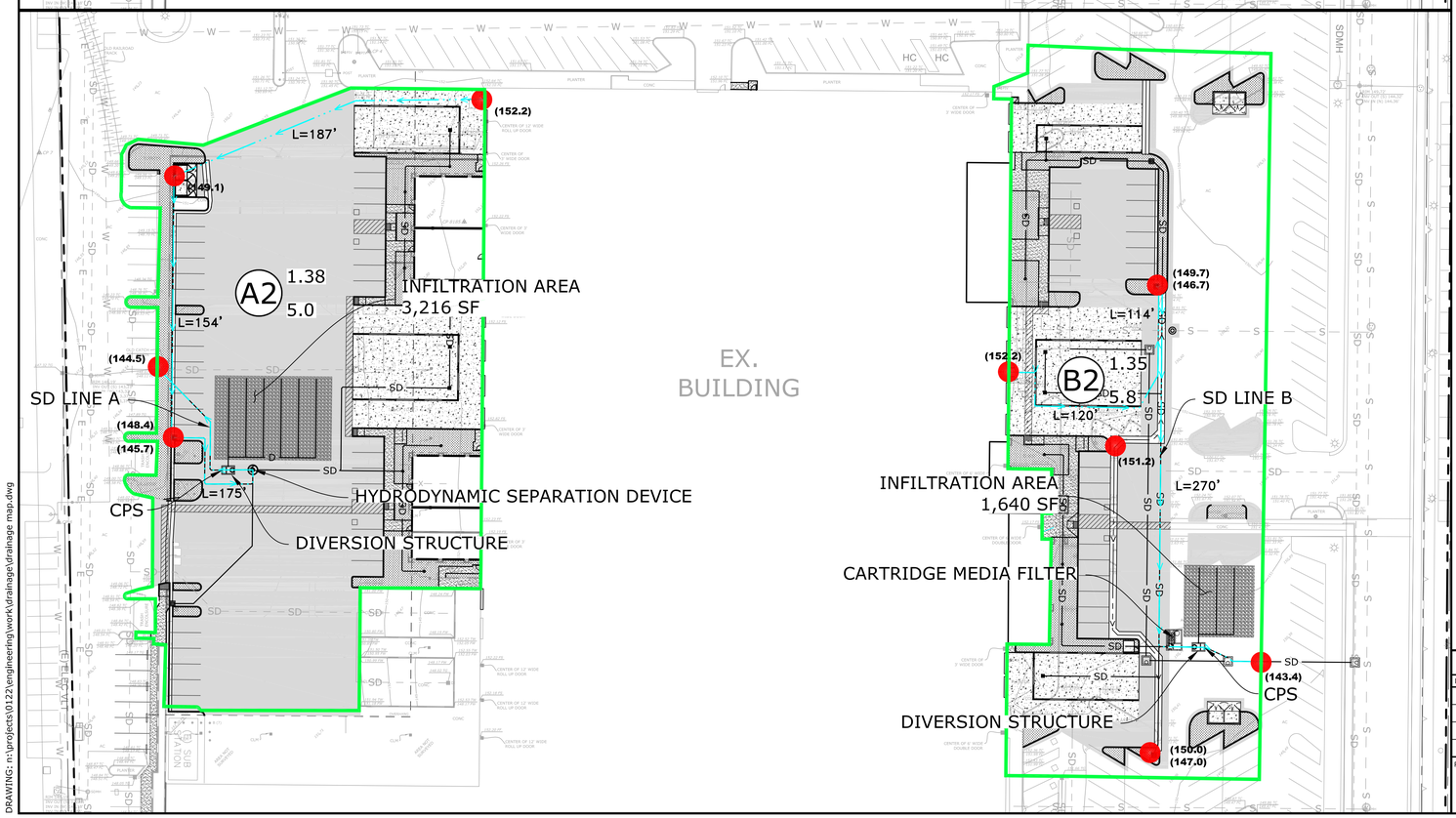
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.00	ft
Critical Depth	0.62	ft
Channel Slope	0.00290	ft/ft
Critical Slope	0.00594	ft/ft

DRAINAGE STUDY

APPENDIX III - DRAINAGE MAP



DRAINAGE AREAS (EXISTING CONDITION)



DRAINAGE AREAS (PROPOSED CONDITION)

LEGEND

TRIBUTARY AREA BOUNDARY

TC FLOW PATH

(184) ELEVATION POINT

A2 — 1.38 AREA (ACRES); 5.0 Q50 (CFS); WATERSHED/TRIBUTARY DESIGNATION

PCSMP AREA (EXISTING CONDITION)

DRAINAGE AREA A:

IMPERVIOUS TOTAL	=	57,000 SF / 1.31 AC
PERVIOUS TOTAL	=	3,200 SF / 0.07 AC
TOTAL AREA A	=	60,200 SF / 1.38 AC

DRAINAGE AREA B:

IMPERVIOUS TOTAL	=	53,400 SF /1.23 AC
PERVIOUS TOTAL	=	5,300 SF / 0.12 AC
TOTAL AREA B	=	58,700 SF / 1.35 AC

PCSMP AREA (PROPOSED CONDITION)

DRAINAGE AREA A:

IMPERVIOUS TOTAL	=	53,500 SF / 1.23 AC
PERVIOUS TOTAL	=	6,700 SF / 0.15 AC
TOTAL AREA A	=	60,200 SF / 1.38 AC

DRAINAGE AREA B:

IMPERVIOUS TOTAL	=	53,500 SF /1.23 AC
PERVIOUS TOTAL	=	5,200 SF / 0.12 AC
TOTAL AREA B	=	58,700 SF / 1.35 AC

DRAINAGE AREAS (EXISTING CONDITION)

SUBAREA	ACREAGE (AC)	Q_{10} (CFS)	Q_{25} (CFS)	Q_{50} (CFS)	Q_{100} (CFS)
A1	1.38	4.0	5.0	5.9	6.9
B1	1.35	3.9	4.9	5.8	6.8
TOTAL	2.73	7.9	9.9	11.7	13.7

NOTE: Q10 UNIT RUNOFF RATE IN CFS/ACRE = A: 2.9; B: 2.9
Q25 UNIT RUNOFF RATE IN CFS/ACRE = A: 3.6; B: 3.6
Q50 UNIT RUNOFF RATE IN CFS/ACRE = A: 4.3; B: 4.3
Q100 UNIT RUNOFF RATE IN CFS/ACRE = A: 5.0; B: 5.0

DRAINAGE AREAS (PROPOSED CONDITION)

SUBAREA	ACREAGE (AC)	Q_{10} (CFS)	Q_{25} (CFS)	Q_{50} (CFS)	Q_{100} (CFS)
A2	1.38	2.9	4.0	5.0	5.9
B2	1.35	3.9	4.9	5.8	6.8
TOTAL	2.73	6.8	8.9	10.8	12.7

NOTE: Q10 UNIT RUNOFF RATE IN CFS/ACRE = A: 2.1; B: 2.9
Q25 UNIT RUNOFF RATE IN CFS/ACRE = A: 2.9; B: 3.6
Q50 UNIT RUNOFF RATE IN CFS/ACRE = A: 3.6; B: 4.3
Q100 UNIT RUNOFF RATE IN CFS/ACRE = A: 4.3; B: 5.0

TOTAL AREA (EXISTING CONDITION)

IMPERVIOUS TOTAL	=	1,160,000 SF / 26.63 AC
PERVIOUS TOTAL	=	229,000 SF / 5.26 AC
TOTAL AREA A	=	1,389,000 SF / 31.89 AC

ALTERED AREA

TOTAL ALTERED AREA: 1.38 AC (AREA A) + 1.35 AC (AREA B) = 2.73 AC

EXISTING IMPERVIOUS AREA ALTERED: 1.31 AC (AREA A) + 1.23 AC (AREA B) = 2.54 AC

N W E S

SCALE: 1"=40'

0 40 80 120

REVISIONS

MARK	DATE	DESCRIPTION	BY

REVIEWED BY:

DATE

DATE

REGISTERED PROFESSIONAL ENGINEER TRISTAN J. SANTOS NO 71473 CIVIL STATE OF CALIFORNIA

ECG Encompass Consultant Group
333 N. LANTANA ST, SUITE 287, CAMARILLO, CA 93010
PHONE: 805.322.4443 WEBSITE: WWW.ECGCIVIL.COM

TRISTAN J. SANTOS DATE: 10/27/17
PROJECT ENGINEER
R.C.E. 71473 12/31/17

REXFORD INDUSTRIAL REALTY INC.
TECHNICOLOR BUILDING REMODEL
DRAINAGE AREA MAP
CITY OF CAMARILLO

SCALE: HORIZ. 1" = 40' VERT. N/A

WORK ORDER 0122
DRAWN BY: TJS
CHECKED BY: GHP

SHEET NO. 1 OF 1

DRAWING: n:\projects\0122\engineering\work\drainage\drainage map.dwg

DRAINAGE STUDY

APPENDIX IV - REFERENCE MATERIALS

Ventura County Soil Numbers

1

2

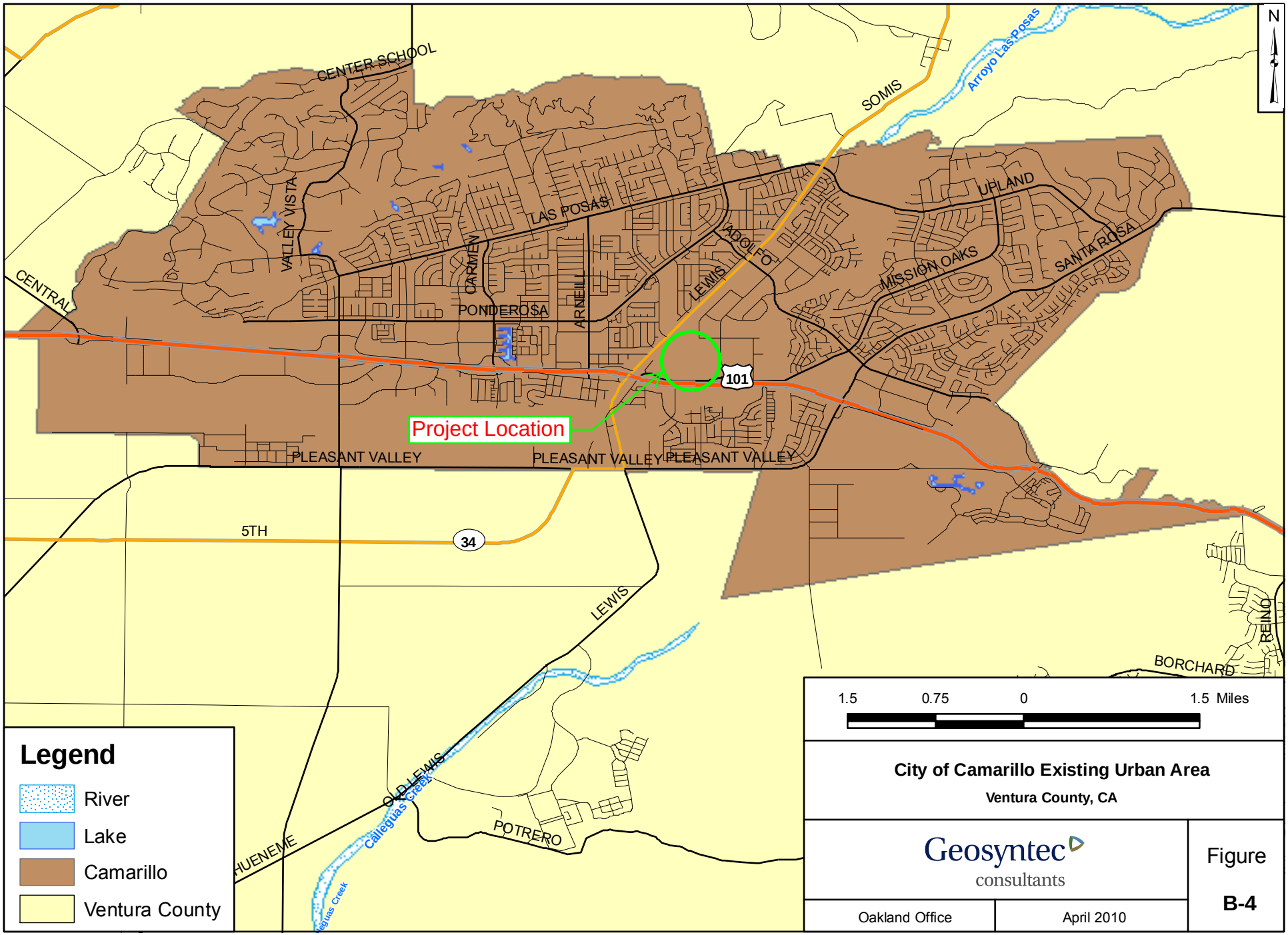
3

4

5

6

7



City of Camarillo Existing Urban Area

Ventura County, CA

Geosyntec consultants

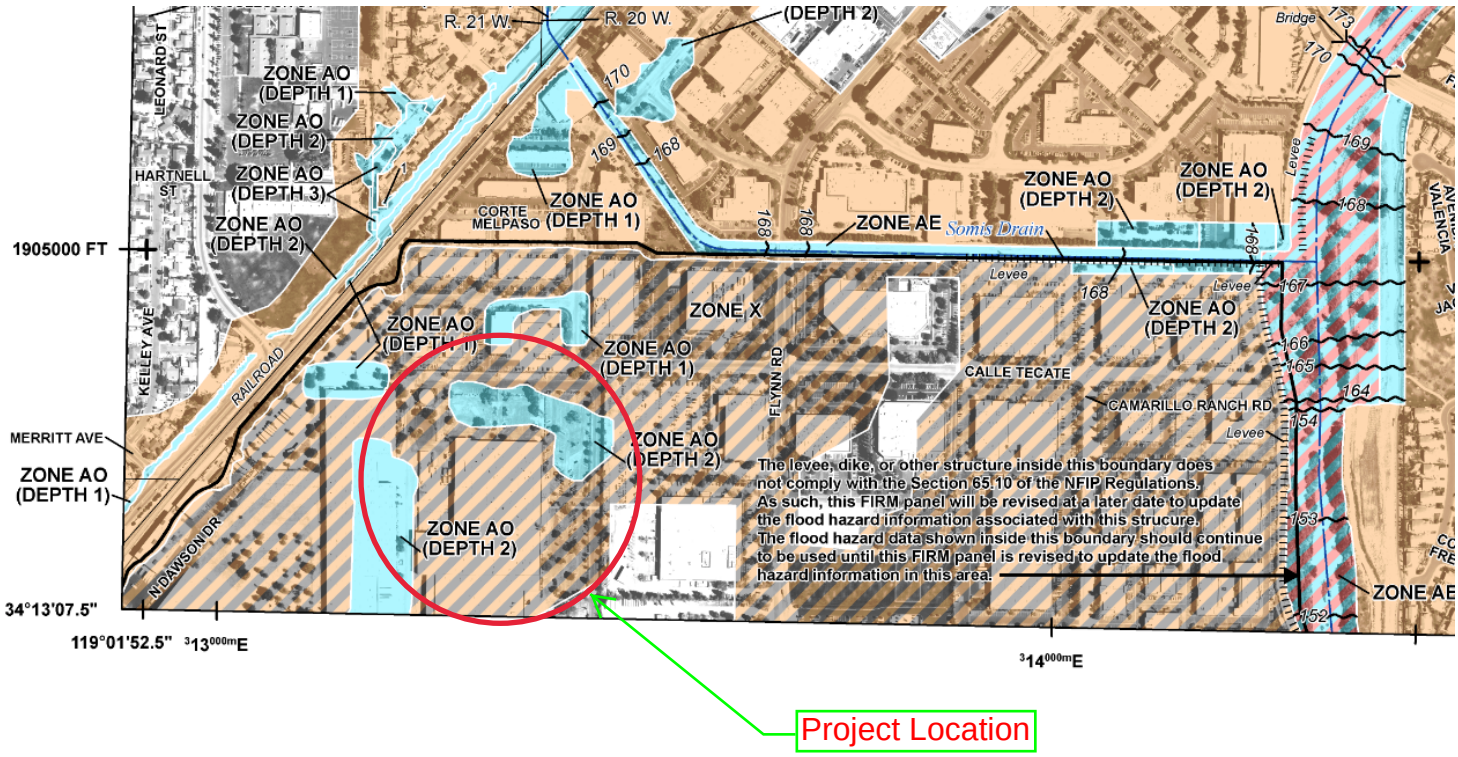
Oakland Office

April 2010

Figure

B-4

P:\GIS\Ventura_County_Manual\Projects\B-4_Camarillo_MS4_Pop_Areas_092410.mxd, WHL, September 24, 2010



NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by Ventura County GIS Department. Aerial photographs were provided by Keystone Aerials Inc., dated 2013.

SCALE

N

Map Projection:
Universal Transverse Mercator Zone 11N; North American Datum 1983
Western Hemisphere; Vertical Datum: NAVD88

1 inch = 500ft 1:6,000

0 250 500 750 1,000 2,000 Feet

0 125 250 500 Meters

PANEL LOCATOR

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A,V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
OTHER AREAS	NO SCREEN Areas of Minimal Flood Hazard *Zone X*
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Accredited or Provisionally Accredited Levee, Dike, or Floodwall
	Non-accredited Levee, Dike, or Floodwall
OTHER FEATURES	E 18.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	8 Coastal Transect
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

VENTURA COUNTY, CALIFORNIA
and Incorporated Areas

PANEL **932** OF **1275**

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAMARILLO, CITY OF	065020	0932	F
VENTURA COUNTY	060413	0932	F

VERSION NUMBER
2.1.2.1
MAP NUMBER
06111C0932F

MAP REVISED
JANUARY 7, 2015

DRAINAGE STUDY

APPENDIX V - POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

City of Camarillo

Department of Public Works
MEMORANDUM

DATE: June 26, 2017

TO: Greg Musser, Tristan J. Santos, Encompass Consultant Group (805-416-8716)
For Rexford Industrial Realty Inc.

FROM: Anita Kuhlman, Stormwater Program Manager

SUBJECT: **Approval – Post Construction Stormwater Mgmt. Plan (PCSMP) (SW0024) IPD-53m, 3233 E. Mission Oaks Blvd. Technicolor Building**

The attached PCSMP dated June 22, 2017, meets the City of Camarillo Public Works Department approval and verifies how this project will meet the post-construction stormwater mitigation requirements of Board Order 2010-0108.

This memo as well as the PCSMP's site drainage map which outlines the Stormwater quality mitigation controls should be submitted to the Community Development Department with the development application.

The PCSMP shall be incorporated into the project plans. Any changes to the PCSMP must be approved by the Public Works Department.

Please call me at 805-383-5659 if you have any questions.

Attachment - PCSMP SW0024 dated 6/22/2017

Package received by: **Date:**

26 JUNE 2017

VENTURA COUNTYWIDE STORMWATER QUALITY PROGRAM
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN (PCSMP)
FOR
3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)
PARCEL #: APN 160-0-010-730

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

Preparation/Revision Date: **6/22/2017 (2nd Submittal: 10/27/2017)**

Prepared for:
Name of Owner/Developer: Rexford Industrial Realty Inc.
Stress Address: 11620 Wilshire Boulevard Suite 1000
City, State, Zip Code: Los Angeles CA 90025
Telephone: (310) 966-1680

Prepared by:
Name and Title of Preparer: Tristan J. Santos, Senior Engineer
Company Name: Encompass Consultant Group, Inc.
Stress Address: 333 N Lantana Street, Suite 287
City, State, Zip Code: Camarillo, CA, 93010
Telephone: (805) 416-1698

I hereby certify that the information provided in this Application is correct.

Application Prepared by: Gregory J. Musser, Encompass Consultant Group, Inc.
Print Name and Firm

Signed
Signature of Project Engineer in the Firm Named Above

Title Civil Engineer RCE No. 77627, Exp. 06/30/19
Affix Professional registration stamp of the person named above with signature and expiration date

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 1: DETERMINE PROJECT APPLICABILITY

Instructions:
For new development projects, answer yes, no, or NA to questions (1) - (10) below.
For redevelopment projects , answer yes, no, or NA to questions (11) - (13) below.

NEW DEVELOPMENT PROJECTS	
Does the new development project fall within categories (1) - (10) below?	
Project Type and/or Characteristics	**Y/N/NA**
1) Development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area **→go to Step 2**	N/A
2) Industrial parks with 10,000 square feet or more of total altered surface area **→go to Step 2**	N/A
3) Commercial strip malls with 10,000 square feet or more of impervious surface area **→go to Step 2**	N/A
4) Retail gasoline outlets with 5,000 square feet or more of total altered surface area **→go to Step 2**	N/A
5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of total altered surface area **→go to Step 2**	N/A
6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces **→go to Step 2**	N/A
7) Streets, roads, highways, and freeway construction of 10,000 square feet or more of impervious surface area **→ go to Roadway Projects**	N/A
8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) of 5,000 square feet or more of total altered surface area **→go to Step 2**	N/A
9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious surface area **→go to Step 2**	N/A

10) Single-family hillside homes (see Section 2 of the TGM for specific requirements) **→go to SF Hillside**	N/A

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

PROJECT APPLICABILITY, CONT.

REDEVELOPMENT PROJECTS	
For redevelopment projects that fall within categories (1) through (9) above, and that conduct land-disturbing activities that result in the creation, or addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site, answer questions 11-13 below.Existing single-family dwelling and accessory structures are exempt from redevelopment projects unless such projects create, add, or replace 10,000 square feet of impervious surface area.	
Project Type and/or Characteristics	**Y/N/NA**
11) Projects where redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was not subject to the post development stormwater quality control requirements of Board Order 00-108, these projects must mitigate the entire redevelopment project area **→go to Step 2**	N
12) Projects where redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development was subject to the post development stormwater quality control requirements of Board Order 00-108, the project must mitigate only the altered portion of the redevelopment project area and not the entire project area **→go to Step 2**	N
13) Projects where redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development these projects must mitigate only the altered portion of the redevelopment project area and not the entire project area **→go to Step 2**	Y

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 2: ASSESS SITE CONDITIONS

Provide an assessment of the project site using the following tables

New Development Project General Characteristics

General Project Characteristics	Area (acres)
Total Project Site Area	
Total Disturbed Area	
Total Existing (Pre-Project) Impervious Area	
Post-Project Impervious Area [1]	
Area of Green Roof (ET-1) [1]	
Area Draining to Hydrologic Source Controls (ET-2) [1]	
Revised Post-Project Impervious Area	0.00
Project Imperviousness (%)	

Redevelopment Project General Characteristics

General Project Characteristics	Area (acres)
Total Project Site Area	31.89
Total Altered Area [6]	2.73
Total Existing (Pre-Project) Impervious Area	26.63
Was existing (pre-project) impervious area subject to post-development stormwater quality control requirements? [2]	N
Amount of Existing Impervious Area Altered [3]	2.54
Amount of Impervious Area Added	-0.08
% Alteration of Existing Impervious Area [4]	9.24%
Post-Project Impervious Area (Impervious Area to be Mitigated) [1], [4]	2.46
Area of Green Roof (ET-1) [1]	
Area Draining to Hydrologic Source Controls (ET-2) [1]	
Revised Post-Project Impervious Area	2.46
Project Imperviousness (%) [5]	90.11%

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

Project Description

Briefly describe project:
The proposed redevelopment of the Technicolor Building property, at 3233 E. Mission Oaks Blvd, includes parking lot re-configuration, building additions, loading dock additions, new trash enclosures, and other building interior improvements. The total disturbed area for the project is about 2.73 acres, with 1.38 acres on the west side of the building and 1.35 acres on the east side. Stormwater quality mitigation is achieved through two underground infiltration trenches (INF-2), using a CDS unit, StormFilter, and CB inserts for pretreatment.
Describe current and proposed zoning and land use designation:
City of Camarillo Zoning Map designates the site within "M2" (General Manufacturing).
Describe topography of project area. Identify low and high points and the location of steep slopes (provide a range of grades):
The westerly side of the project slopes topographically from the east to west, with elevations ranging from 152 ft to 148 ft. The easterly side of the project drains to the southeasterly corner of the site, with approximate elevations ranging from 152 ft to 147 ft.
Describe the site's soil types (A, B, C, D) and geological conditions
Per the Ventura County Soils Map the project site is located in an area with Soil Number 4, per the Ventura County Technical Guidance Manual (TGM), is within Group B soils. Borings encountered artificial fill , underlain by alluvium. Refer to attachments for geotechnical report excerpts. *Attach soil type information*

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

Project Description, cont'd

Describe the site's groundwater conditions (e.g. depth to seasonal high groundwater):
No groundwater was encountered in the borings taken at the site , with the deepest boring depth going down 51 ft.

Is there offsite drainage on the site? If so, identify the location(s) and source(s) of offsite drainage and the volume of water running onto the site:
No offsite run-on is anticipated on the project site.
Describe any existing utilities within the project area that would limit the possible locations of certain BMPs:
Based on the known elevations for the existing utilities, it is not a a limiting factor in the possible locations of certain BMPs at this time.
Describe any environmentally sensitive areas (e.g. riparian areas, wetlands) within the project area:
There are no known environmentally sensitive areas within the project area.

Geotechnical considerations:	
Does the site contain any of the following characteristics:	**Y/N/NA**
Collapsible Soil	Y
Expansion Soil	Y
Potential for seismically-inducted soil liquefaction	N
Additional considerations:	
The geotechnical report states that there is the potential for about 1.2 inch of hydroconsolidation. Since groundwater was not encountered during geotechnicall field explorations to a depth of 50 ft, potential for liquefaction is considered low. The site does not lie within a required zone of study for liquefaction by the State of California (see theattached map by California Geologic Survey, Seismic Hazard Zones, Camarillo 7.5-Minute Quadrangle, 2003a). Expansion index testing was found to be in the "medium" expansion range. *Attach relevant geotechnical information*	

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 2: POLLUTANTS OF CONCERN

Pollutants of Concern (See Section 3.3 of 2011 TGM)

Activity / Potential Land Uses	Potential Pollutant*								
	Sediment	Nutrients	Metals	Pesticides	Oxygen Demanding Substances	Toxic Organics	Oil & Grease	Bacteria	Trash and Debris
Industrial	X	X	X	X	X	X	X	X	X
Other [fill in if necessary]									
Other [fill in if necessary]									

*Denote potential pollutant with "x"

Receiving Waterbody Listings (see Section 3.3. of 2011 TGM)

Receiving Waterbody (watershed indicated in parentheses)	**Constituent Group [7]**	**Distance to Project (ft)**
Calleguas Creek watershed above Potrero Rd (Calleguas Creek)	Bacteria, Salts, Trash, Metals, Nutrients, Pesticides, PCBs, Sediment	3300.00
Other [fill in if necessary]		

[1] Applicant should enter post-project impervious cover prior to accounting for green roof and hydrologic source control (HSC) credits. Volume reduction provided by green roofs and HSCs are accounted for implicitly in the sizing calcuations for BMPs by assuming the roof area covered by a green roof or the area draining to a HSC is pervious rather than impervious when caluclating the runoff coefficient for the site. Green roofs and HSCs are not required to be considered for all project locations and types. **In order to obtain credit, Green Roofs and HSCs must be designed as specified in the 2011 TGM.** Additional detail on Green Roofs (ET-1) and HSCs (ET-2) can be found in Section 6 of the 2011 TGM.

[2] Land-disturbing activity that results in the creation or addition or replacement of less than 5,000 square feet of impervious surface area on an already developed site, or that results in a decrease in impervious area which was subject to the post development stormwater quality control requirements of Board Order 00-108, is not subject to mitigation unless so directed by the local permitting agency

[3] Redevelopment does not include routine maintenance activities that are conducted to maintain the original line and grade, hydraulic capacity, or original purpose of the facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways, that does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Agencies' flood control, drainage, and wet utilities projects that maintain original line and grade or hydraulic capacity are considered routine maintenance. Redevelopment also does not include the repaving of existing roads to maintain original line and grade.

[4] "% Alteration of Existing Impervious Area" determines the 50% threshold which is key in determining portion of site that must comply with post-construction requirements - see Step 1 redevelopment categories for more detail. The amount of "Post Project Impervious Area" that must adhere to post-construction requirements is dependant on 50% threshold

[5] "Project Imperviousness" is calculated using the "Total Project Area" except when redevelopment projects that must mitigate only the altered portion of the redevelopment project area. In this case, the "Total Disturbed Area" is used to calculate "Project Imperviousness"

[6] For the purposes of this calculation, Total Altered Area shall mean any area that is altered as a result of land disturbance, such as clearing, grading, grubbing, and excavation. This excludes areas used exclusively for temporary stockpiling.

[7] If a waterbody is listed for "toxicity" and the cause and/or contribution to toxicity is known, then the consituent group known to contribute to toxicity are listed here (in lieu of listing "toxicity")

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 3: APPLY SITE DESIGN PRINCIPLES AND TECHNIQUES

Provide a brief description of site design principles and techniques included within the proposed project site.

Site Design Measures [1]	Included? Y/N/NA	Brief Description of the Site Design Measure
Site Planning	Y	Site grading will direct stormwater runoff towards BMPs for treatment prior to discharging offsite.
Protect and Restore Natural Areas	N/A	Redevelopment of an existing building and parking lot.
Minimize Land Disturbance	Y	The project will only disturb areas of the fully developed site required for the remodel and renovation.
Minimize Impervious Cover	Y	Landscaped areas on westerly side will increase from the existing condition. The easterly side of the site will remain the same.
Apply LID at Various Scales	Y	The increased landscaped areas on the westerly side will help reduce the effective imperviousness of the site by treating and retaining onsite stormwater runoff.
Implement Integrated Water Resource Management Practices	Y	Infiltration of stormwater runoff.

[1] Refer to Section 4.2 - 4.7 of the 2011 TGM for applicable Design Criteria.

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 4: APPLY SOURCE CONTROL MEASURES

Provide a brief description of the source control measures included in the proposed project site.

Site-Specific Source Control Measures[1]	Included? Y/N/NA	Brief Description of the Source Control Measure
S-1: Storm Drain Message and Signage	Y	Storm drain signage will be implemented.
S-2: Outdoor Material Storage Area Design	N/A	
S-3: Outdoor Trash Storage and Waste Handling Area Design	Y	An area(s) will be designated for trash storage and waste handling. Covered trash enclosures per City Specifications.
S-4: Outdoor Loading/Unloading Dock Area Design	Y	Runoff from proposed docks will be collected into the storm drain system, pretreated by CDS or StormFilter before entering infiltration trench, and is included in the SQDV calculations for infiltration.
S-5: Outdoor Repair/Maintenance Bay Design	N/A	
S-6: Outdoor Vehicle /Equipment/ Accessory Washing Area Design	N/A	
S-7: Fueling Area Design	N/A	
S-8: Proof of Control Measure Maintenance	Y	A maintenance plan will be provided.

[1] Refer to Fact Sheets in Section 5 of the 2011 TGM for detailed information and design criteria

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 5: APPLY BMPS TO REDUCE EIA TO <=5%

New development and redevelopment projects (Categories 1-6, 8, and 9) must reduce EIA to <=5%

Step 5a: Calculate Allowable EIA

EIA is defined as impervious area that is hydrologically connected via sheet flow over a hardened conveyance or impervious surface without any intervening medium to mitigate flow volume.

The allowable "EIA" for a project is calculated as:

$$EIA_{allowable} = (A_{project})*(\%_{allowable}) \qquad \text{Equation 2-1}$$

Where:

$EIA_{allowable}$ = The maximum impervious area from which runoff can be treated and discharged offsite (and not retained onsite) [acres]

$A_{project}$ = The total project area [acres] [1]

$\%_{allowable}$ = 5 percent

Input:		Units
$A_{project}$ [1]	2.73	Acres
$\%_{allowable}$	5.00%	Percent
$EIA_{allowable}$	**0.14**	Acres

Step 5b: Calculate Impervious Area to be Retained

The impervious area from which runoff must be retained onsite is the total impervious area minus the EIA allowable, which should be calculated as follows:

$$A_{retain} = TIA - EIA_{allowable} = (IMP*A_{project}) - EIA_{allowable} \qquad \text{Equation 2-2}$$

Where:

A_{retain} = the drainage area from which runoff must be retained [acres]

TIA = total impervious area [acres]

IMP = imperviousness of project area (%)

Input:		Units
Imperviousness	90.11%	
$A_{project}$ [1]	2.73	Acres
$EIA_{allowable}$	0.14	Acres
A_{retain}	**2.32**	Acres

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

BMPS TO REDUCE EIA TO <=5%, CONT.

Step 5c: Calculate the Volume to be Retained (SQDV)

The runoff volume that is to be retained onsite should be calculated using Equation 2-3 below:

$$V_{retain} = C*(0.75/12)*A_{retain} \qquad \text{Equation 2-3}$$

Where:

V_{retain} = The stormwater quality design volume (SQDV) that must be retained onsite [ac-ft]

C = runoff coefficient (equals 0.95 for impervious surfaces)

Input:		**Units**
C	0.95	
A_{retain}	2.32	Acres
V_{retain}	0.138	ac-ft
	44,955.7	gallons
	6,009.7	cu.ft.

Continue to Step 5d

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 5d: SELECT RETENTION BMPs

Select and size Retention BMPs to meet the 5% EIA Requirement. Retention BMPs include INF1-6, RWH-1, and ET 1 and 2. See 2011 TGM, Section 6 for more information.

Retention BMPs	Included? Y/N	Drainage Area Retained (acres) [2]	Drainage Area Runoff Coefficient	Volume Retained (SQDV) (ac-ft) [1],[2]	If not applicable, state brief reason
Infiltration BMPs					
INF-1: Infiltration Basin			0.95		Infiltration BMP suitable to treat entire site.
INF-2: Infiltration Trench	Y	2.73	0.95	0.162	Two underground infiltration trenches.
INF-3: Bioretention			0.95		Infiltration BMP suitable to treat entire site.
INF-4: Drywell			0.95		Infiltration BMP suitable to treat entire site.
INF-5: Permeable Pavement			0.95		Infiltration BMP suitable to treat entire site.
INF-6: Proprietary Infiltration			0.95		Infiltration BMP suitable to treat entire site.
Rainwater Harvesting BMPs					
RWH-1: Rainwater Harvesting			2		Infiltration BMP suitable to treat entire site.
TOTAL Volume Retained				0.162	ac-ft
				52,818.8	gallons
				7,060.8	cu.ft.
REMAINING Volume to meet 5% EIA requirement				0.0	ac-ft
				-7,863	gallons
				-1,051	cu.ft.

[1] SQDV Methodology #3 used here.
[2] If a Retention BMP is used more than once on a site (i.e., 2 Infiltration Trenches implemented on one site) then drainage area and volume retained shown here should be additive. A separate BMP sizing worksheet (see Appendix E of the 2011 TGM) should be submitted for each BMP.

If onsite Retention BMPs cannot feasibly be used to meet the 5% EIA Requirement, move onto Step 5e; if 5%EIA Requirement is met go to Step 7

	Y/N/NA
A completed copy of the applicable "BMP Sizing Worksheet(s)" for the project's Retention BMPs from Appendix E of the 2011 TGM is included as an attachment. BMPs must be sized to meet the SQDV or SQDF (See Section 2 Step 7 of the 2011 TGM).	Y

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

STEP 7: APPLY TREATMENT CONTRL MEASURES

► *Stormwater runoff from EIA and developed pervious surfaces must be mitigated using Retention BMPs, Biofiltration BMPs, or Treatment Control Measures (See Chapter 6 of 2011 TGM).*
► *Treatment Control Measures should be selected per the BMP selection process outlined in Section 3.3 of the 2011 TGM.*
► *BMPs must be sized to meet the SQDV or SQDF. See Section 2, Step 7 of the 2011 for guidance on calculating the SQDV and SQDF.*

	Y/N
Completed copy of the applicable "BMP Sizing Worksheet(s)" for the project's stormwater BMP(s) from Appendix E of the 2011 Technical Guidance Manual is included.	Y

Project Name: 3233 E. Mission Oaks Blvd -Technicolor Bldg Remodel - IPD-53M(9)

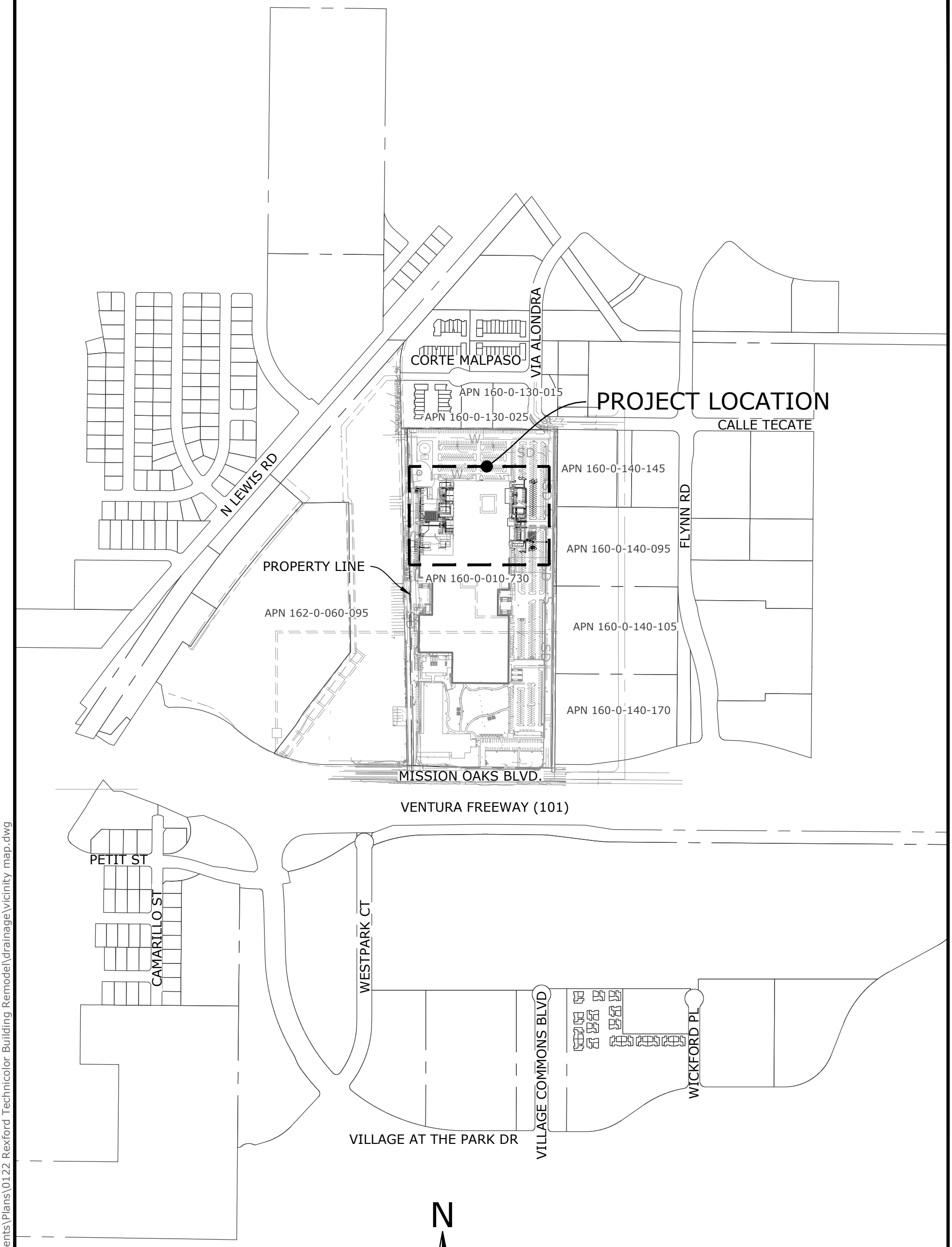
ADDITIONAL REQUIRED SUBMITTALS

Yes	**Site map** that includes: o Property boundary o Major roadways or landmarks o Scale and north arrow o Drainage areas o Surrounding land uses o Presence of Environmentally Sensitive Areas o Open space preservation areas o Impervious areas o Natural hydrologic features o Location of discharge(s) o Existing and planned utilities o Topography (including steep slopes) o Key activities such as outdoor material storage, parking, food preparation, etc. o Potential pollutant areas (e.g., fueling island) o Location of nearby (within 2,000 ft of development project) bus or train station(s) o Location and type of source control measures o Location and type of stormwater BMPs
Yes	**BMP Sizing Worksheet(s)** (see Appendix E of 2011 TGM); design specifiations and details must also be provided for Green Roofs and Hydrologic Source Controls (ET-1 & 2)
Yes	**Stormwater Treatment Device Access and Maintenance Agreement** (see City of Camarillo web page (www.ci.camarillo.ca.us) "forms" for electronic copy or contact Anita Kuhlman at 805-383-5659)
Yes	**Maintenance Plan** (See Appendix I of 2011 TGM for guidance)
	Technical Infeasibility Analysis – if Retention BMPs cannot be used, the applicant must submit a site-specific analysis showing technical infeasibility as described in Section 3.2 of the 2011 TGM. Technical infeasibility may include some (or all) of the components submitted with soil, groundwater and/or geotechnical reports. Technical infeasibility must also account for Rainwater Harvesting. Rainwater Harvesting is not required to be used if the available demands do not meet the volume required for 80% capture using a 72-hour drawndown time (See RWH-1 in Section 6 of the 2011 TGM for more detail).
Yes	**Soil Type Information** (may include site specific analyses, available geologic or geotechnical reports and/ or the Ventura Hydrology Manual Soil Map zoomed into site level)
Yes	**Groundwater Information** (may include available groundwater data, site specific redoximorphic analytical/groundwater monitoring results, or known groundwater impacts such as contaminated sites registered with the State Water Board)
Yes	**Geotechnical Reports** (may include site specific analyses with information on collapsible soils, expansive soil, liquefaction, or groundwater mounding analysis)

	Rainwater Harvesting - Include calculations and justification for rainwater harvesting demand. Section 3.2 for guidance of the 2011 TGM.

PCSMP

APPENDIX A – MAPS



Encompass Consultant Group
333 N. LANTANA ST, SUITE 287, CAMARILLO, CA 93010
PHONE: 805.322.4443 WEBSITE: WWW.ECGCIVIL.COM

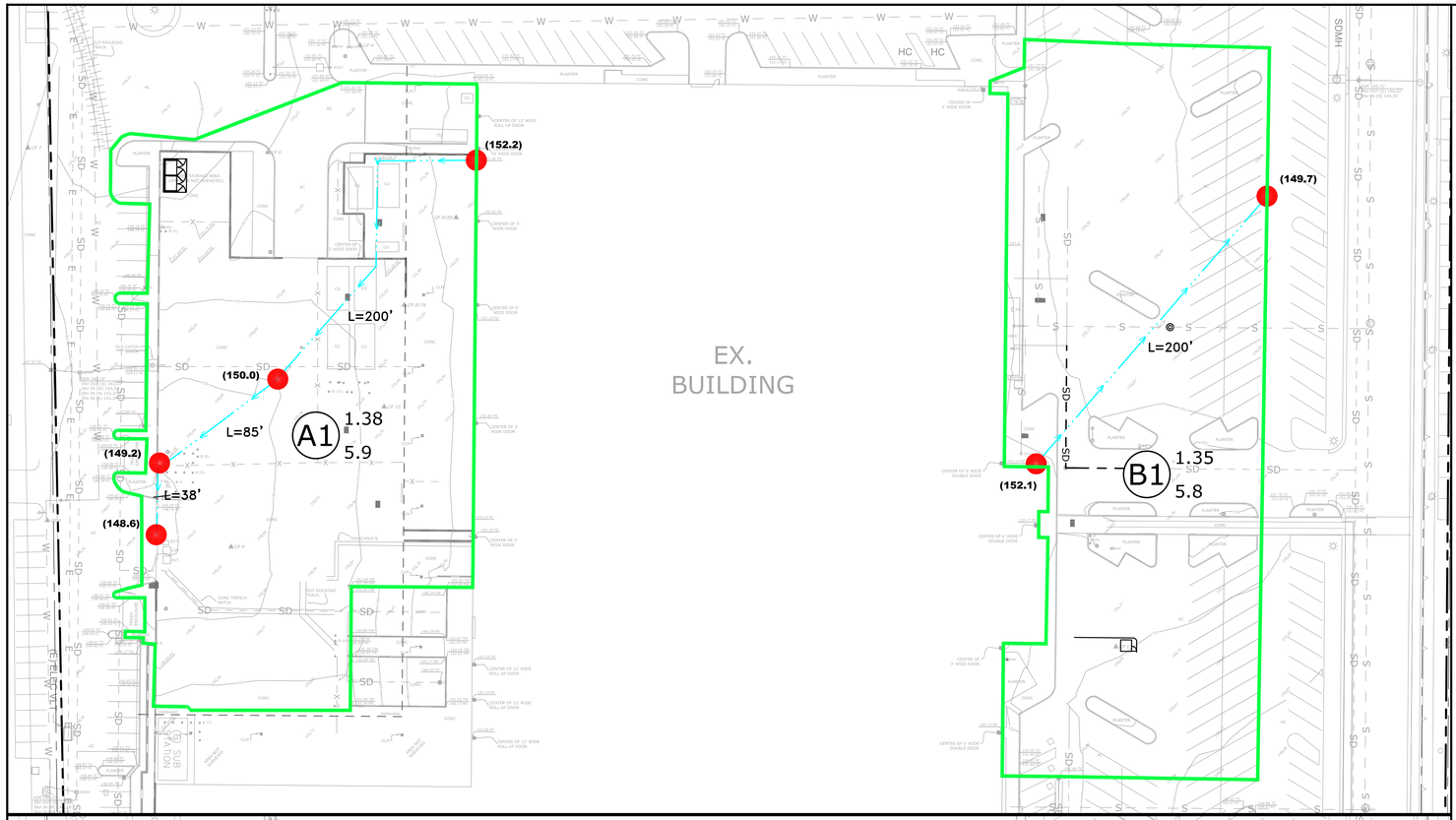
WO: 0122 SCALE: 1"=500'

SCALE: 1"=500'

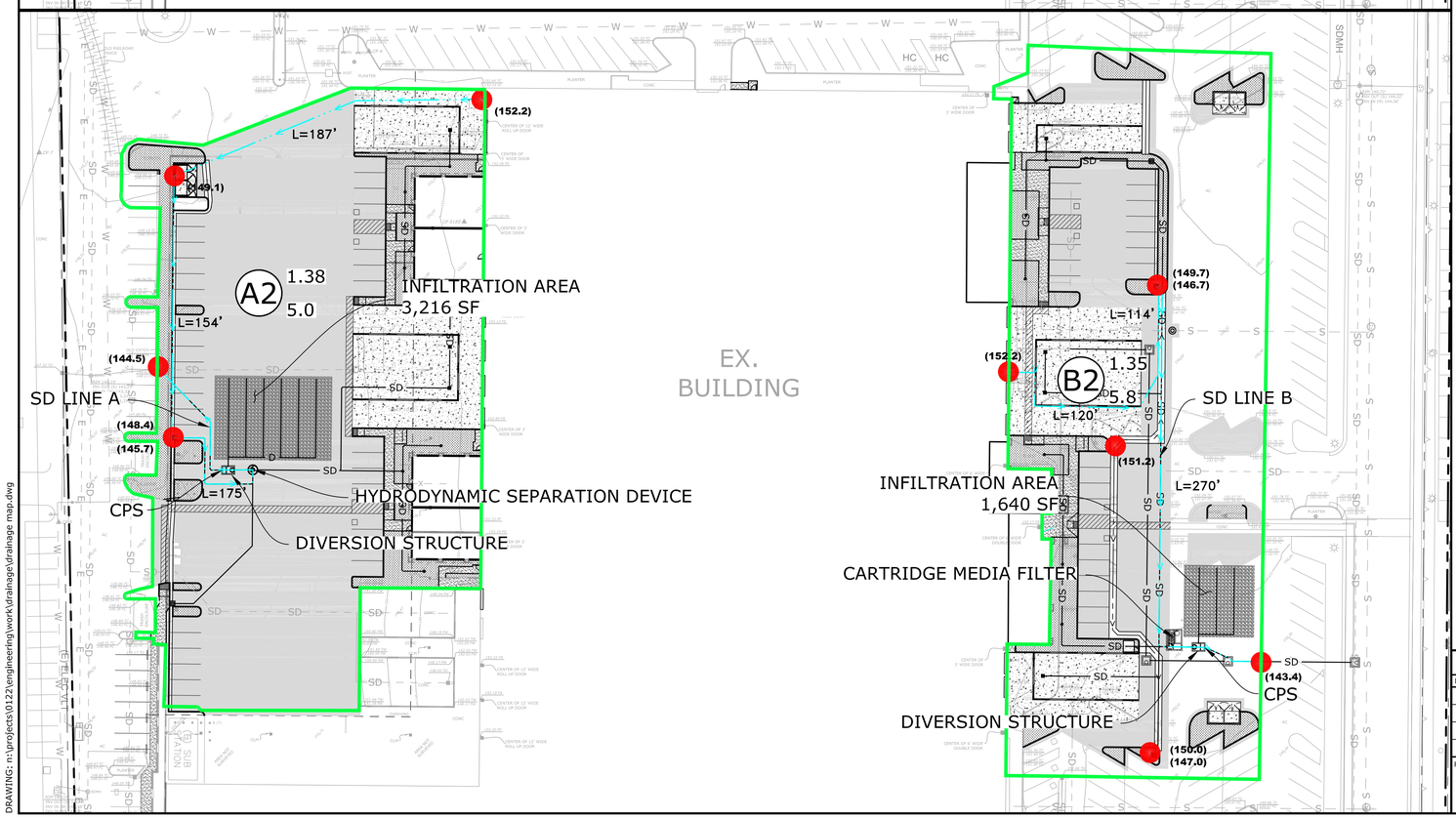
0 500 1000 1500

3233 E. MISSION OAKS BLVD.
REXFORD INDUSTRIAL REALTY INC.
TECHNICOLOR BUILDING REMODEL
VICINITY MAP
CITY OF CAMARILLO, CA

C:\Users\tsantos\Desktop\Documents\Plans\0122 Rexford Technicolor Building Remodel\drainage\vicinity map.dwg



DRAINAGE AREAS (EXISTING CONDITION)



DRAINAGE AREAS (PROPOSED CONDITION)

LEGEND

TRIBUTARY AREA BOUNDARY

TC FLOW PATH

(184) ELEVATION POINT

A2 — 1.38 AREA (ACRES); 5.0 Q50 (CFS); WATERSHED/TRIBUTARY DESIGNATION

PCSMP AREA (EXISTING CONDITION)

DRAINAGE AREA A:

IMPERVIOUS TOTAL	=	57,000 SF / 1.31 AC
PERVIOUS TOTAL	=	3,200 SF / 0.07 AC
TOTAL AREA A	=	60,200 SF / 1.38 AC

DRAINAGE AREA B:

IMPERVIOUS TOTAL	=	53,400 SF /1.23 AC
PERVIOUS TOTAL	=	5,300 SF / 0.12 AC
TOTAL AREA B	=	58,700 SF / 1.35 AC

PCSMP AREA (PROPOSED CONDITION)

DRAINAGE AREA A:

IMPERVIOUS TOTAL	=	53,500 SF / 1.23 AC
PERVIOUS TOTAL	=	6,700 SF / 0.15 AC
TOTAL AREA A	=	60,200 SF / 1.38 AC

DRAINAGE AREA B:

IMPERVIOUS TOTAL	=	53,500 SF /1.23 AC
PERVIOUS TOTAL	=	5,200 SF / 0.12 AC
TOTAL AREA B	=	58,700 SF / 1.35 AC

DRAINAGE AREAS (EXISTING CONDITION)

SUBAREA	ACREAGE (AC)	Q_{10} (CFS)	Q_{25} (CFS)	Q_{50} (CFS)	Q_{100} (CFS)
A1	1.38	4.0	5.0	5.9	6.9
B1	1.35	3.9	4.9	5.8	6.8
TOTAL	2.73	7.9	9.9	11.7	13.7

NOTE: Q10 UNIT RUNOFF RATE IN CFS/ACRE = A: 2.9; B: 2.9
Q25 UNIT RUNOFF RATE IN CFS/ACRE = A: 3.6; B: 3.6
Q50 UNIT RUNOFF RATE IN CFS/ACRE = A: 4.3; B: 4.3
Q100 UNIT RUNOFF RATE IN CFS/ACRE = A: 5.0; B: 5.0

DRAINAGE AREAS (PROPOSED CONDITION)

SUBAREA	ACREAGE (AC)	Q_{10} (CFS)	Q_{25} (CFS)	Q_{50} (CFS)	Q_{100} (CFS)
A2	1.38	2.9	4.0	5.0	5.9
B2	1.35	3.9	4.9	5.8	6.8
TOTAL	2.73	6.8	8.9	10.8	12.7

NOTE: Q10 UNIT RUNOFF RATE IN CFS/ACRE = A: 2.1; B: 2.9
Q25 UNIT RUNOFF RATE IN CFS/ACRE = A: 2.9; B: 3.6
Q50 UNIT RUNOFF RATE IN CFS/ACRE = A: 3.6; B: 4.3
Q100 UNIT RUNOFF RATE IN CFS/ACRE = A: 4.3; B: 5.0

TOTAL AREA (EXISTING CONDITION)

IMPERVIOUS TOTAL	=	1,160,000 SF / 26.63 AC
PERVIOUS TOTAL	=	229,000 SF / 5.26 AC
TOTAL AREA A	=	1,389,000 SF / 31.89 AC

ALTERED AREA

TOTAL ALTERED AREA: 1.38 AC (AREA A) + 1.35 AC (AREA B) = 2.73 AC

EXISTING IMPERVIOUS AREA ALTERED: 1.31 AC (AREA A) + 1.23 AC (AREA B) = 2.54 AC

N W E S

SCALE: 1"=40'

0 40 80 120

REVISIONS

MARK	DATE	DESCRIPTION	BY

REVIEWED BY:

DATE

DATE

REGISTERED PROFESSIONAL ENGINEER TRISTAN J. SANTOS NO 71473 CIVIL STATE OF CALIFORNIA

ECG Encompass Consultant Group
333 N. LANTANA ST, SUITE 287, CAMARILLO, CA 93010
PHONE: 805.322.4443 WEBSITE: WWW.ECGCIVIL.COM

TRISTAN J. SANTOS DATE: 10/27/17
PROJECT ENGINEER
R.C.E. 71473 12/31/17

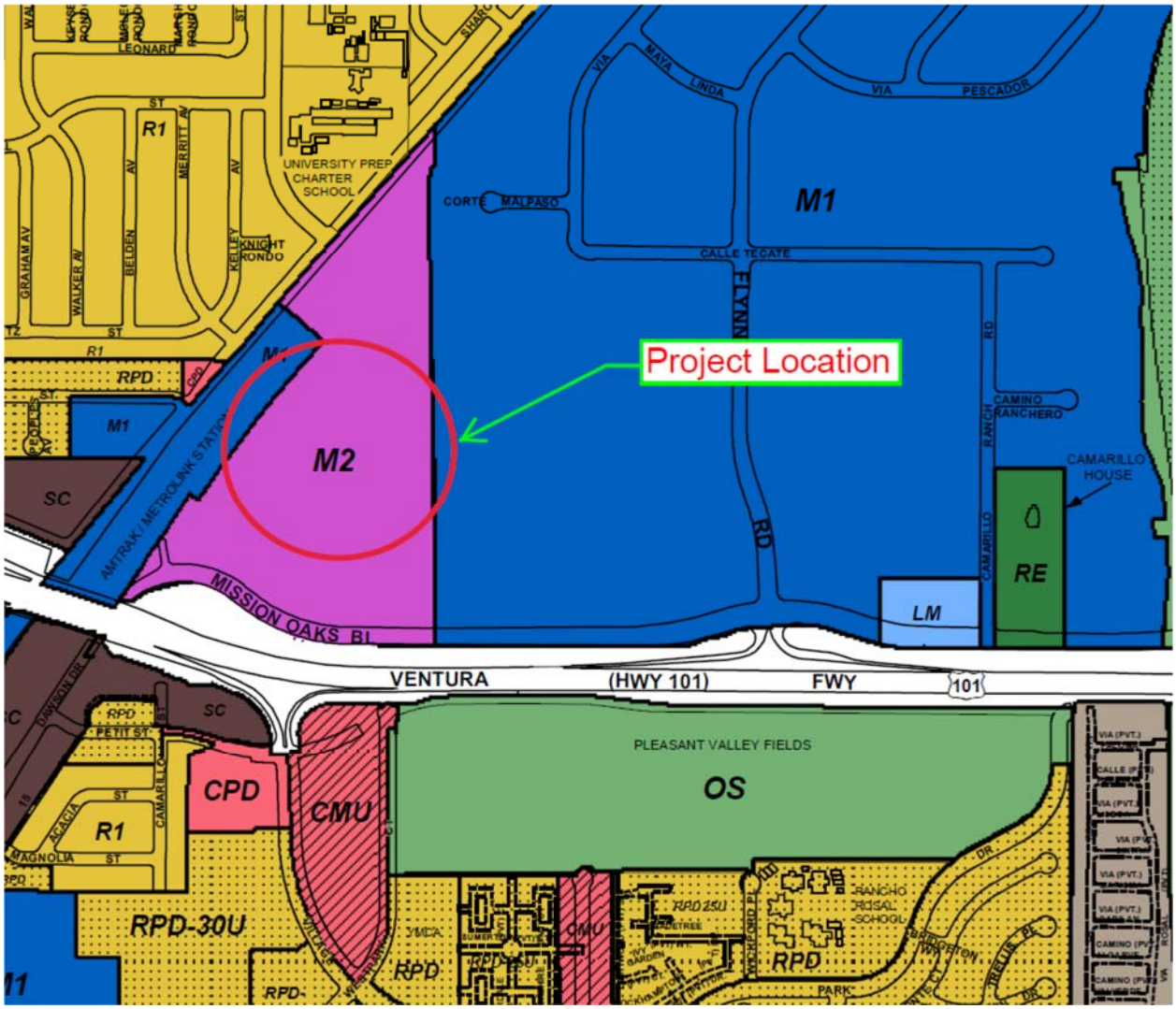
REXFORD INDUSTRIAL REALTY INC.
TECHNICOLOR BUILDING REMODEL
DRAINAGE AREA MAP
CITY OF CAMARILLO

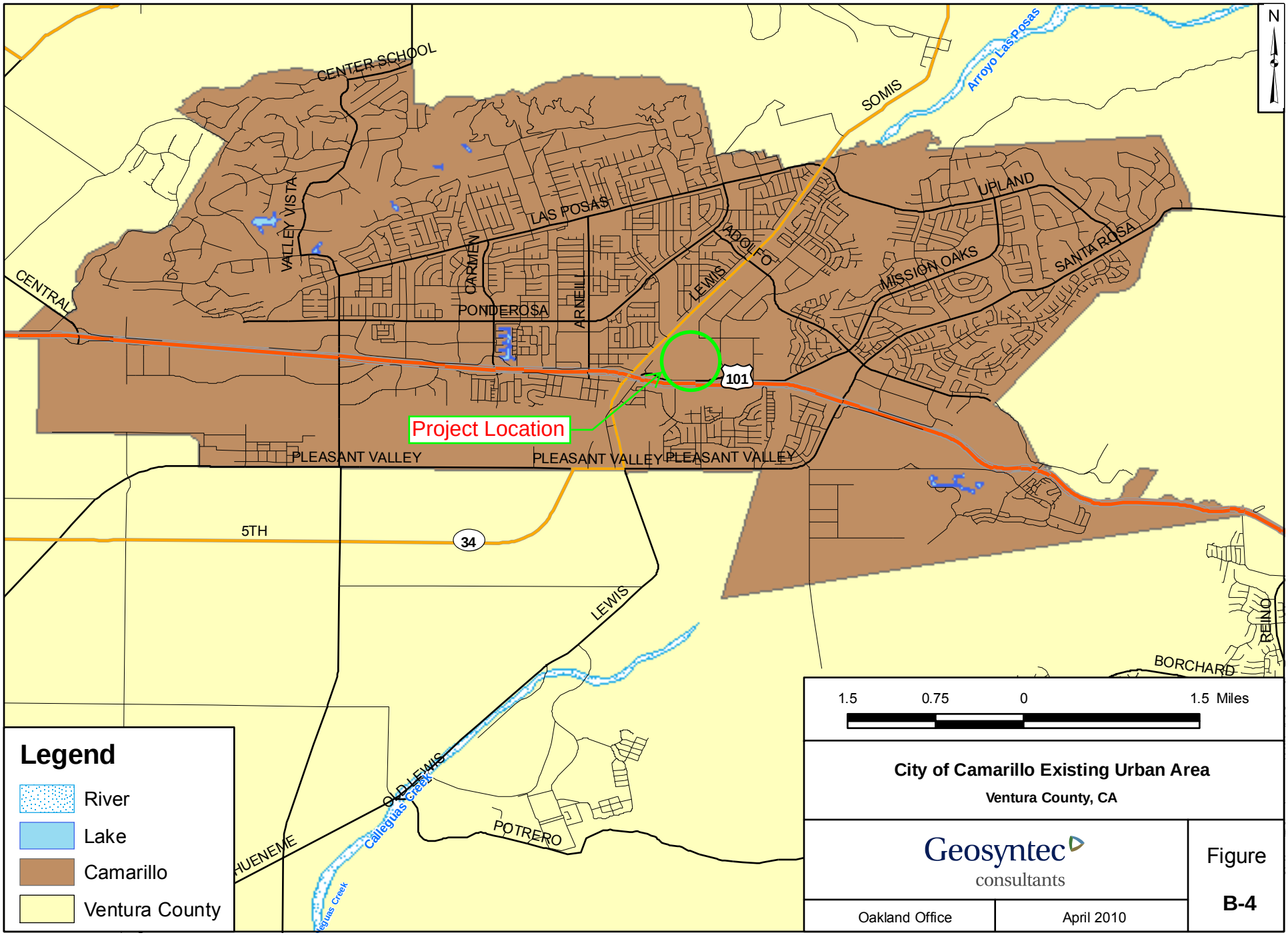
SCALE: HORIZ. 1" = 40' VERT. N/A

WORK ORDER 0122
DRAWN BY: TJS
CHECKED BY: GHP

SHEET NO. 1 OF 1

DRAWING: n:\projects\0122\engineering\work\drainage\drainage map.dwg


Project Location
M2
M1
R1
RPD
SC
CPD
CMU
OS
RE
LM
PLEASANT VALLEY FIELDS
UNIVERSITY PREP CHARTER SCHOOL
KNIGHT RONDO
AMTRAK / METROLINK STATION
MISSION OAKS BL
VENTURA (HWY 101) FWY
101
CORTE MALPASO
CALLE TECATE
VIA MAYA LINDA
VIA PESCADOR
FLYNN RD
CAMINO RANCHERO
CAMARILLO HOUSE
LEONARD ST
GRAHAM AV
WALKER AV
BELDEN AV
MERRITT AV
KELLEY AV
DAWSON DR
PETIT ST
ACACIA ST
MAGNOLIA ST
CAMARILLO ST
RPD-30U
RPD-15U
YMCA
RANCHO ROSAL SCHOOL
PARK



City of Camarillo Existing Urban Area

Ventura County, CA

Geosyntec consultants

Oakland Office

April 2010

Figure

B-4

P:\GIS\Ventura_County_Manual\Projects\B-4_Camarillo_MS4_Pop_Areas_092410.mxd, WHL, September 24, 2010

Legend

- BIOL Designated Waterbody
- 303(d) Listed Waterbody
- Environmentally Sensitive Habitat Areas
- Lake
- National Forest

Existing Urban Area

- Camarillo
- Fillmore
- Moorpark
- Oxnard
- Santa Paula
- Simi Valley
- Thousand Oaks
- Port Hueneme
- Ventura
- Ojai
- Urban County
- Non-Urban County
- Adjacent County

10 5 0 10 Miles

Environmentally Sensitive Areas
Ventura County, CA

Geosyntec consultants

Oakland Office | April 2010

Figure **B-2**

B-2_Ventura_County_ESA_042910.mxd, WHL, September 1, 2010

PCSMP

APPENDIX B – REFERENCE DOCUMENTS & FACT SHEETS

County View

Parcel Report

APN	APN Suffix	Document Date	Document Number	Tract Number	Map Number	Situs Number	Situs Direction	Situs Street	Situs Suffix	Acreage
160001073	0	20160711	160096562	No data exists	No data exists	3233	E	MISSION OAKS	BL	31.89

Category

Geographic Layer	Exists In Parcel
Data Field Name	Data Field Value

Cities

City Boundary	Yes
City Name	Camarillo

Election Precincts

Election Precinct	Yes
Precinct Name	CAMARILLO NO. 308

Political Districts

Assembly Districts	Yes
Name	Jacqui Irwin
Ordinal	44TH
Senatorial Districts	Yes
Name	Hannah Beth Jackson
Ordinal	19TH
Congressional Districts	Yes
Name	Julia Brownley
Ordinal	26TH
Supervisorial Districts	Yes
Elected Official	Kelly Long
Ordinal	3rd

School Districts

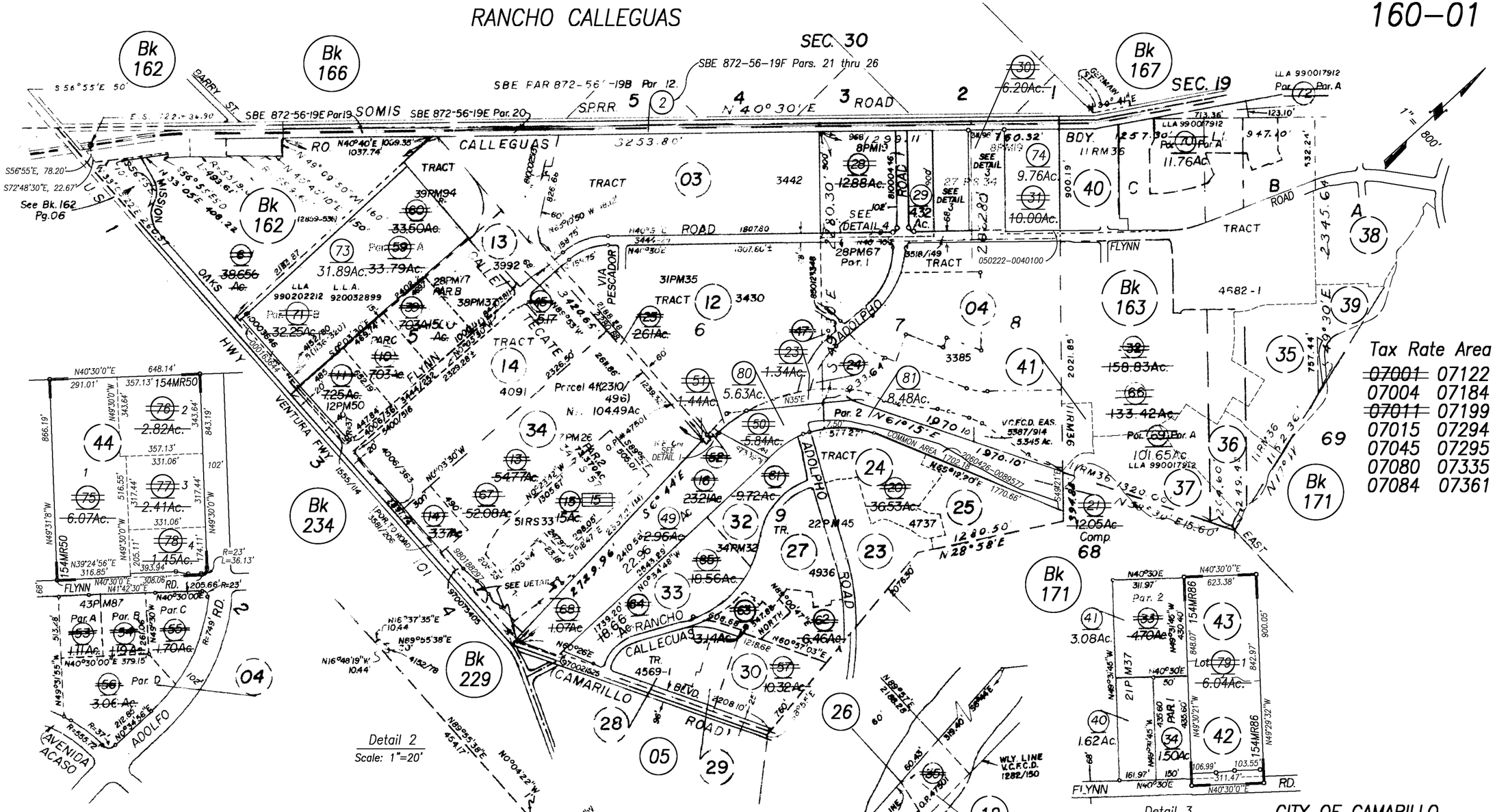
Elementary School Districts	Yes
District Name	PLEASANT VALLEY
Secondary School Districts	Yes
District Name	OXNARD UNION

Category	
Geographic Layer	**Exists In Parcel**
Data Field Name	Data Field Value
Land Use	
County SOAR	No
General Plan	Yes
GENPLANDES	Urban
Zoning	Yes
ZONE	Camarillo
Hazards	
Earthquake Fault Hazard Zones	No
Liquefaction	No
Tsunami Inundation	No
Biological Resources	
Regional Wildlife Corridors	No

WARNING: The information contained herein was created by the Ventura County Geographic Information System (GIS), which is designed and operated solely for the convenience of the County and related contract entities. The County does not warrant the accuracy of this information, and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.

RANCHO CALLEGUAS

160–01



CITY OF CAMARILLO
Ventura County Assessor's Map.

Assessor's Block Numbers Shown in Ellipses.
Assessor's Parcel Numbers Shown in Circles.
Assessor's Mineral Numbers Shown in Squares.

Tract 5455, M.R. Bk.154, Pg.86
Portion Tract 5522, M.R. Bk.154, Pg.50
Rancho Calleguas, M.R. Bk.17, Pg.16
Rancho Calleguas, M.R. Bk.11, Pg.32

NOTE: ASSESSOR PARCELS SHOWN ON THIS PAGE DO NOT NECESSARILY CONSTITUTE LEGAL LOTS. CHECK WITH COUNTY SURVEYOR'S OFFICE OR PLANNING DIVISION TO VERIFY.

DRAWN		REVISED	7–22–2009
REDRAWN		CREATED	
INKED	PLOTTED	EFFECTIVE	ROLL
PREVIOUS Bk.163, Portion Pg.05			
Compiled By Ventura County Assessor's Office			

BK. 160 , PG. 01 REVISION LOG

DATE	REFERENCE DOC.	Code	EXPLANATION Description	VOID A.P.N.(s)	RESIDUAL A.P.N.(s)	NEW A.P.N.(s)
Roll–Year 10–11						To Pg.44
7/22/2009	090616–0099330	Condo Plan	Tr.5522 Lot 4	160–0–010–785		

Sizing Worksheet **INF-2: Underground Infiltration Trench - Drainage Area A**

Designer: Tristan Santos Project Proponent: Rexford Industrial Realty Inc. Date: June 22 2017 Project: Rexford Technicolor Building Remodel Location: Camarillo, CA	
Type of Vegetation: (Check type used or describe "Other")	____ Native Grasses ____ Irrigated Turf Grass _NA_ Other
Outflow Collection:	
Step 1: Determine water quality design volume	
1-1. Enter Project area (acres), $A_{project}$	$A_{project}$ = 1.38 acres
1-2. Enter the maximum allowable percent of the Project area that may be effective impervious area (%) (refer to permit), ranges from 5-30%, $\%_{allowable}$	$\%_{allowable}$ = 5 %
1-3. Determine the maximum allowable effective impervious area (acres), $EIA_{allowable} = (A_{project})*(\%_{allowable})$	$EIA_{allowable}$= 0.07 acres
1-4. Enter Project impervious fraction, *Imp* (e.g. 60% = 0.60)	Imp= 0.89
1-5. Determine the Project Total Impervious area (acres), $TIA=A_{project}*Imp$	TIA= 1.23 acres
1-6. Determine the total area from which runoff must be retained (acres), $A_{retain}=TIA-EIA_{allowable}$	A_{retain} = 1.16 acres
1-7. Determine pervious runoff coefficient using Table E-1, C_p	C_p = 0.05
1-8. Calculate runoff coefficient, $C = 0.95*imp + C_p\ (1-imp)$	C = 0.95
1-9. Enter design rainfall depth of the storm (in), P_i	P_i = 0.75 in

1-10. Calculate rainfall depth (ft), $P = P_i/12$	P =0.0625 ft
1-11. Calculate water quality design volume (ft³), $SQDV=43560 \times C^*P^*A_{retain}$	SQDV= 3,511 ft³ 510 ft3 (Step 7) + 3,001 ft3: 3,511 ft3
Step 2: Determine the design percolation rate	
2-1. Enter measured soil percolation rate (in/hr, 0.5 in/hr min.), $P_{measured}$	$P_{measured}$ = 0.50 in/hr Per infiltration testing IT-3
2-2. Determine percolation rate correction factor, S_A based on suitability assessment (see Section 6 INF-1)	S_A = 1.25
2-3. Determine percolation rate correction factor, S_B based on design (see Section 6 INF-1)	S_b = 2.25
2-4. Calculate combined safety factor, $S = S_A \times S_b$	S = 2.81
2-5. Calculate the design percolation rate (in/hr), $P_{design} = P_{measured}/S$	P_{design} = 0.18 in/hr
Step 3: Calculate the surface area	
3-1. Enter required drain time(hours,72 hrs max.), t	t = 72 hrs
3-2. Calculate max. depth of runoff that can be infiltrated within the t (ft), $d_{max} = P_{design}\ t/12$	d_{max} = 1.08 ft
3-3. For basins, select ponding depth (ft), d_p, such that $d_p \leq d_{max}$	d_p = N/A ft
3-4. For trenches, enter trench fill aggregate porosity, n_t	n_t = 0.32
3-5. For trenches, enter depth of trench fill (ft), d_t	d_t = 3.33 ft
3-5. For trenches, select ponding depth d_p such that $d_p \leq d_{max} - n_t d_t$	d_p= 0 ft
3-6. Enter the time to fill infiltration basin or trench with water (Use 2 hours for most designs), T	T = 2 hrs

3-7. Calculate infiltrating surface area for infiltration basin (ft²): $A_b = SQDV/((T\ P_{design}/12)+d_p)$ OR Calculate infiltrating surface area for infiltration trenches or aggregate- filled drywells (ft²): $A_t = SQDV/((T\ P_{design}/12)+n_t d_t+dp)$	A_b = ft² A_t = 3,202 ft²
Step 4: Size the forebay (infiltration basins or trenches)	
If a separate pre-treatment unit is designed for the infiltration facility, skip to Step 5. If not, continue through 4-1 through 4-4. Pre-treatment through Hydrodynamic Separation Device and connector pipe screen.	
4-1. Calculate the volume of the forebay (ft³), $V_{forebay}$=0.25*SQDV	$V_{forebay}$= N/A ft³
4-2. Determine forebay depth (ft), $d_{forebay}$	$d_{forebay}$= ft
4-3. Calculate forebay bottom surface area (ft²), $A_{forebay}=V_{forebay}/d_{forebay}$	$A_{forebay}$= ft²
4-4. Provide outlet pipe such that the forebay drains to the infiltration facility within 10 minutes.	
Step 5: Provide conveyance capacity for filter clogging	
5-1.The infiltration facility should be placed off-line, but an emergency overflow must still be provided in the event the filter becomes clogged. Design emergency overflow in accordance with applicable standards of the Ventura County Flood Control District or local jurisdiction.	Diversion structure outlet acts as basin overflow for infiltration basin volume, with top of weir set at maximum ponding elevation of the basin.

Sizing Worksheet **INF-2: Underground Infiltration Trench - Drainage Area B**

Designer: Tristan Santos Project Proponent: Rexford Industrial Realty Inc. Date: June 22, 2017 Project: Rexford Technicolor Building Remodel Location: Camarillo, CA	
Type of Vegetation: (Check type used or describe "Other")	____ Native Grasses ____ Irrigated Turf Grass _N/A_ Other
Outflow Collection:	
Step 1: Determine water quality design volume	
1-1. Enter Project area (acres), $A_{project}$	$A_{project}$ = 1.35 acres
1-2. Enter the maximum allowable percent of the Project area that may be effective impervious area (%) (refer to permit), ranges from 5-30%, $\%_{allowable}$	$\%_{allowable}$ = 5 %
1-3. Determine the maximum allowable effective impervious area (acres), $EIA_{allowable} = (A_{project})*(\%_{allowable})$	$EIA_{allowable}$= 0.07 acres
1-4. Enter Project impervious fraction, *Imp* (e.g. 60% = 0.60)	Imp= 0.91
1-5. Determine the Project Total Impervious area (acres), $TIA=A_{project}*Imp$	TIA= 1.23 acres
1-6. Determine the total area from which runoff must be retained (acres), $A_{retain}=TIA-EIA_{allowable}$	A_{retain} = 1.16 acres
1-7. Determine pervious runoff coefficient using Table E-1, C_p	C_p = 0.05
1-8. Calculate runoff coefficient, $C = 0.95*imp + C_p\ (1-imp)$	C = 0.95
1-9. Enter design rainfall depth of the storm (in), P_i	P_i = 0.75 in

1-10. Calculate rainfall depth (ft), $P = P_i/12$	P =0.0625 ft
1-11. Calculate water quality design volume (ft³), $SQDV=43560 \times C^*P^*A_{retain}$	SQDV= 3,450 ft³ 449 ft3 (Step 7) + 3,001 ft3: 3,579 ft3
Step 2: Determine the design percolation rate	
2-1. Enter measured soil percolation rate (in/hr, 0.5 in/hr min.), $P_{measured}$	$P_{measured}$ = 18.00 in/hr Per infitlration tetsting IT-1
2-2. Determine percolation rate correction factor, S_A based on suitability assessment (see Section 6 INF-1)	S_A = 1.25
2-3. Determine percolation rate correction factor, S_B based on design (see Section 6 INF-1)	S_b = 2.25
2-4. Calculate combined safety factor, $S = S_A \times S_b$	S = 2.81
2-5. Calculate the design percolation rate (in/hr), $P_{design} = P_{measured}/S$	P_{design} = 6.41 in/hr
Step 3: Calculate the surface area	
3-1. Enter required drain time(hours,72 hrs max.), t	t = 72 hrs
3-2. Calculate max. depth of runoff that can be infiltrated within the t (ft), $d_{max} = P_{design}\ t/12$	d_{max} = 38.46 ft
3-3. For basins, select ponding depth (ft), d_p, such that $d_p \leq d_{max}$	d_p = N/A ft
3-4. For trenches, enter trench fill aggregate porosity, n_t	n_t = 0.32
3-5. For trenches, enter depth of trench fill (ft), d_t	d_t = 3.33 ft
3-5. For trenches, select ponding depth d_p such that $d_p \leq d_{max} - n_t d_t$	d_p= 0 ft
3-6. Enter the time to fill infiltration basin or trench with water (Use 2 hours for most designs), T	T = 2 hrs

3-7. Calculate infiltrating surface area for infiltration basin (ft²): $A_b = SQDV/((T\ P_{design}/12)+d_p)$ OR Calculate infiltrating surface area for infiltration trenches or aggregate- filled drywells (ft²): $A_t = SQDV/((T\ P_{design}/12)+n_t d_t+dp)$	A_b = ft² A_t = 1,616 ft²
Step 4: Size the forebay (infiltration basins or trenches)	
If a separate pre-treatment unit is designed for the infiltration facility, skip to Step 5. If not, continue through 4-1 through 4-4. With an infiltration rate greater than 2.4 in/hr, full treatment is required and achieved through cartridge media filters.	
4-1. Calculate the volume of the forebay (ft³), $V_{forebay}$=0.25*SQDV	$V_{forebay}$= N/A ft³
4-2. Determine forebay depth (ft), $d_{forebay}$	$d_{forebay}$= ft
4-3. Calculate forebay bottom surface area (ft²), $A_{forebay}=V_{forebay}/d_{forebay}$	$A_{forebay}$= ft²
4-4. Provide outlet pipe such that the forebay drains to the infiltration facility within 10 minutes.	
Step 5: Provide conveyance capacity for filter clogging	
5-1.The infiltration facility should be placed off-line, but an emergency overflow must still be provided in the event the filter becomes clogged. Design emergency overflow in accordance with applicable standards of the Ventura County Flood Control District or local jurisdiction.	Diversion structure outlet acts as basin overflow for infiltration basin volume, with top of weir set at maximum ponding elevation of the basin.

Drainage Area A - SQDV Sizing for Step 7 of the TGM:

The volume of runoff produced from a 0.75 inch storm event:

- Q_{SQDV} = C x (0.75/12) x A = 0.85 x 0.0625 in x (0.22 ac) = 0.0117 acre-ft (510 cf) [Equation 2-14]
  - C = 0.95 * imp + Cp (1-imp) [Equation 2-13]
    = 0.95 * 0.89 + 0.05 (1-0.89) = 0.85
    - imp = impervious fraction
    - C_p = pervious runoff coefficient, based on soil type using table below:

Ventura Soil Type (Soil Number)	Cp value
1	0.15
2	0.10
3	0.10
4	**0.05**
5	0.05
6	0
7	0

  - 0.75 = the design rainfall depth (in) [based on sizing method (3)] A_{trib}
  - A = 0.07 acres($EIA_{allowable}$) + 0.15 acres(Developed Pervious: Landscaping)

Treatment of $EIA_{allowable}$ and pervious area is accounted for in the area treated and therefore Step 7 of the TGM is not required.

Drainage Area B - SQDV Sizing for Step 7 of the TGM:

The volume of runoff produced from a 0.75 inch storm event:

- Q_{SQDV} = C x (0.75/12) x A = 0.87 x 0.0625 in x (0.19 ac) = 0.0103 acre-ft (449 cf) [Equation 2-14]
  - C = 0.95 * imp + Cp (1-imp) [Equation 2-13]
    = 0.95 * 0.91 + 0.05 (1-0.91) = 0.87
    - imp = impervious fraction
    - C_p = pervious runoff coefficient, based on soil type using table below:

Ventura Soil Type (Soil Number)	Cp value
1	0.15
2	0.10
3	0.10
4	**0.05**
5	0.05
6	0
7	0

  - 0.75 = the design rainfall depth (in) [based on sizing method (3)] A_{trib}
  - A = 0.07 acres($EIA_{allowable}$) + 0.12 acres(Developed Pervious: Landscaping)

Treatment of $EIA_{allowable}$ and pervious area is accounted for in the area treated and therefore Step 7 of the TGM is not required.

SQDF for Full-Treatment Biofiltration Prior to Infiltration (Drainage Area B):

Runoff produced from a 0.2 in/hr average rainfall intensity:

- Q_{SQDF} = C x I x A = 0.87 x 0.2 in/hr x (1.35 ac)
  - = 0.24 cfs [Equation 2-14]
  - C = 0.95 * imp + Cp (1-imp) [Equation 2-13]
    = 0.95 * 0.91 + 0.05 (1-0.91) = 0.87
    - imp = impervious fraction
    - C_p = pervious runoff coefficient, based on soil type using table below:

Ventura Soil Type (Soil Number)	Cp value
1	0.15
2	0.10
3	0.10
4	**0.05**
5	0.05
6	0
7	0

  - I = average rainfall intensity (inches/hour) for a duration equal to the time of concentration of the watershed [equal to 0.2 in/hr for method (1)]
  - A = 1.35 acres (Drainage Area B)

Per Contech's Filter Cartridge Calculation Sheet (12" tall float cartridge), SQDF (cfs) x 449 / 10 GPM = No. of cartridges required; 0.24 cfs x 449 / 10 GPM = 10.78 cartridges = **11 cartridges required**

- Depth to seasonal high groundwater/impervious layer – groundwater mounding may become an issue during excessively wet conditions where shallow aquifers or shallow clay lenses are present.

Table 6-2: Suitability Assessment Related Considerations for Infiltration Facility Safety Factors

Consideration	High Concern	Medium Concern	Low Concern
Assessment methods	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates	Direct measurement of ≥ 50 percent of infiltration area with localized infiltration measurement methods (e.g., infiltrometer)	Direct measurement of ≥ 50 percent of infiltration area with localized infiltration measurement methods or Use of extensive test pit infiltration measurement methods
Ventura Hydrology Manual soil number (measured infiltration rate)	3 (f = 0.5 – 0.64)	4 or 5 (f = 0.65 –0.91)	6 or 7 (f = 0.92 or higher)
Site soil variability	Highly variable soils indicated from site assessment or limited soil borings collected during site assessment	Soil borings/test pits indicate moderately homogeneous soils	Multiple soil borings/test pits indicate relatively homogeneous soils
Depth to groundwater/ impervious layer	<10 ft below facility bottom	10-30 ft below facility bottom	>30 below facility bottom

Localized infiltration testing refers to methods such as the double ring infiltrometer test (ASTM D3385-88), which measure infiltration rates over an area less than 10 sq-ft and do not attempt to account for soil heterogeneity. Extensive infiltration testing refers to methods that include excavating a significant portion of the proposed infiltration area, filling the excavation with water, and monitoring drawdown. In all cases, testing should be conducted in the area of the proposed BMP where, based on geotechnical data, soils appear least likely to support infiltration.

Design related considerations include (Table 6-3):

- Size of area tributary to facility – all things being equal, both physical and economic risk factors related to infiltration facilities increase with an increase

in the tributary area served. Therefore facilities serving larger tributary areas should use more restrictive adjustment factors.

- Level of pretreatment/expected influent sediment loads – credit should be given for good pretreatment by allowing less restrictive factors to account for the reduced probability of clogging from high sediment loading. Also, facilities designed to capture runoff from relatively clean surfaces such as rooftops are likely to see low sediment loads and therefore should be allowed to apply less restrictive safety factors.

- Redundancy – facilities that consist of multiple subsystems operating in parallel such that parts of the system remains functional when other parts fail and/or bypass, should be rewarded for the built-in redundancy with less restrictive correction and safety factors. For example, if bypass flows would be at least partially treated by another BMP, the risk of discharging untreated runoff in the event of clogging the primary facility is reduced. A bioretention facility that overflows to a landscaped area is another example. Compaction during construction – proper construction oversight is needed during construction to ensure that the bottoms of infiltration facility are not overly compacted. Facilities that do not commit to proper construction practices and oversight should have to use more restrictive correction and safety factors.

Table 6-3: Design Related Considerations for Infiltration Facility Safety Factors

Consideration	High Concern	Medium Concern	Low Concern
Tributary area size	Greater than 10 acres.	Greater than 2 acres but less than 10 acres.	2 acres or less.
Level of pre-treatment/ expected influent sediment loads	Pre-treatment from gross solids removal devices only, such as hydrodynamic separators, racks and screens, AND tributary area includes landscaped areas, steep slopes, high traffic areas, or any other areas expected to produce high sediment, trash, or debris loads.	Good pre-treatment with BMPs that mitigate coarse sediments such as vegetated swales AND influent sediment loads from the tributary area are expected to be relatively low (e.g., low traffic, mild slopes, disconnected impervious areas, etc.).	Excellent pre-treatment with BMPs that mitigate fine sediments such as bioretention or media filtration OR sedimentation or facility only treats runoff from relatively clean surfaces, such as rooftops.
Redundancy of treatment	No redundancy in BMP treatment train.	Medium redundancy, other BMPs available in treatment train to maintain at least 50% of function of facility in event of failure.	High redundancy, multiple components capable of operating independently and in parallel, maintaining at least 90% of facility functionality in event of failure.

Consideration	High Concern	Medium Concern	Low Concern
Compaction during construction	Construction of facility on a compacted site or elevated probability of unintended/ indirect compaction.	Medium probability of unintended/ indirect compaction.	Heavy equipment actively prohibited from infiltration areas during construction and low probability of unintended/ indirect compaction.

Adjust the measured short-term infiltration rate using a weighted average of several safety factors using the worksheet shown in Table 6-4 below. The design percolation rate would be determined as follows:

- For each consideration shown in Table 6-2 and Table 6-3 above, determine whether the consideration is a high, medium, or low concern.
- For all high concerns, assign a factor value of 3, for medium concerns, assign a factor value of 2, and for low concerns assign a factor value of 1.
- Multiply each of the factors by the corresponding weight to get a product.
- Sum the products within each factor category to obtain a safety factor for each.
- Multiply the two safety factors together to get the final combined safety factor. If the combined safety factor is less than 2, then use 2 as the safety factor.
- Divide the measured short-term infiltration rate by the combined safety factor to obtain the adjusted design percolation rate for use in sizing the infiltration facility.

Table 6-4: Infiltration Facility Safety Factor Determination Worksheet

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	1	0.25
		Predominant soil texture	0.25	2	0.50
		Site soil variability	0.25	1	0.25
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			1.25
B	Design	Tributary area size	0.25	2	0.50
		Level of pre-treatment/ expected sediment loads	0.25	2	0.50
		Redundancy	0.25	3	0.75
		Compaction during construction	0.25	2	0.50
		Design Safety Factor, $S_B = \Sigma p$			2.25
Combined Safety Factor = S_A x S_B					2.81

PCSMP

APPENDIX C – STORMWATER MAINTENANCE AGREEMENT

RECORDED AT THE REQUEST OF
AND WHEN RECORDED MAIL TO:

City Clerk
City of Camarillo
601 Carmen Drive
Camarillo, California 93010

Recorded for the benefit of City of Camarillo.
No fee required (Government Code §27383)

STORMWATER TREATMENT DEVICE ACCESS AND MAINTENANCE AGREEMENT FOR PROJECT NO. IPD-53M(9)

OWNER: Rexford Industrial Realty Inc.

PROPERTY ADDRESS: 3233 E. Mission Oaks Blvd, Camarillo CA (APN 160-0-010-730)

THIS AGREEMENT is made and entered into this 30 day of OCTOBER, 2017, by and between Rexford Industrial Realty Inc. ("Owner") and the City of Camarillo, a general law city and municipal corporation ("City").

1. **RECITALS**. This Agreement is entered into with reference to the following:

   A. Owner owns real property ("Property") in City's jurisdiction, more specifically described in attached Exhibit "A" and shown on the vicinity map in Exhibit "B", each of which is incorporated by this reference.

   B. At the time of initial approval of development project known as 3233 E. Mission Oaks Blvd - Technicolor Building Remodel on the Property, City required the project to employ on-site control measures to minimize pollutants in urban runoff.

   C. Owner intends to install the following device(s) (2) underground infiltration trenches, (1) hydrodynamic separation device (CDS unit), (2) Connector Pipe Screen, (1) Cartridge Media Filter (Stormfilter) ("Device") as the on-site control measure(s) to minimize pollutants in urban runoff (as shown in the attached Exhibit "C", which is incorporated by this reference, and on the Stormwater Pollution Control or Prevention Plan No. 2017-15).

D. The Device must be installed in accordance with approved plans and specifications shown on City Drawings Nos. C- 16779 through C- 16786 on file with City Engineer, and incorporated by this reference.

E. The Device, installed on private property and draining only private property, is a private facility and all maintenance or replacement of the Device is the sole responsibility of Owner in accordance with the terms of this Agreement.

F. Owner is aware that periodic and continuous maintenance, including, without limitation, filter material replacement and sediment removal, is required to assure peak performance of the Device, and that such maintenance activity will require compliance with all local, state, or federal laws and regulations, including those pertaining to confined space and waste disposal methods in effect at the time such maintenance occurs.

2. **ACCESS**. Owner grants a license to City's designee for complete access, of any duration, to the Device and its immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City's Director of Public Works ("Director"), no advance notice, for the purpose of inspection, sampling, testing of the Device, and, in case of emergency, to undertake all necessary repairs or other preventative measures at Owner's expense as provided below. City will make every effort at all times to minimize and avoid interference with Owner's use of the Property.

3. **MAINTENANCE.** Owner will use its best efforts to diligently maintain the Device in a manner assuring peak performance at all times. Refer to the Stormwater Pollution Control/Prevention Plan for further maintenance instructions and the attached Exhibit "C". All reasonable precautions will be exercised by Owner and Owner's representative or contractor in the removal and extraction of material(s) from the Device and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. In October of each year, Owner will provide City with documentation identifying the date of inspection, type and quantity of material(s) removed and disposal destination, and other maintenance performed.

4. **DEFAULT.** Should Owner, or its successors or assigns, fail to accomplish the necessary maintenance contemplated by this Agreement within ten (10) days after being given written notice by City, City is authorized to take any maintenance action needed and charge the entire cost and expense to Owner or Owner's successors or assigns, including administrative costs, attorneys' fees and interest at the maximum rate authorized by law from the date of notice of any expenses incurred by City until paid in full.

5. **SECURITY.** City may require Owner to post security in form and for a time period satisfactory to City to guarantee the performance of this Agreement. Should Owner fail to perform the obligations under this Agreement, City may, in the case of a cash bond, act for Owner using the proceeds from it, or in the case of a surety bond, require the surety to perform the obligations of the Agreement. As an additional remedy, Director may cause the withdrawal of any previous stormwater related approval with respect to the property on which a Device has been installed until such time as Owner repays to City its reasonable costs.

6. **RECORDATION**. This Agreement will be recorded in the Ventura County Recorder's Office at Owner's expense and will constitute notice to all successors and assigns of title to the Property of Owner's obligations, and also a lien in such amount as will fully reimburse City, including interest, subject to foreclosure in event of default in payment.

7. **ENFORCEMENT.** In the event City initiates legal action occasioned by any default or action of Owner, or its successors or assigns, then Owner and its successors or assigns agree to pay all costs incurred by City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same may become a lien against the Property.

8. **RUNS WITH PROPERTY.** The burdens and benefits in this Agreement constitute covenants that run with the Property and constitute a lien upon the Property.

9. **SUCCESSORS.** This Agreement is binding upon the heirs, successors, executors, administrators and assigns of the parties. The term "Owner" includes not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner will notify any successor to title of all or part of the Property about the existence of this Agreement. Owner will provide this notice before such successor obtains an interest in all or part of the Property. Owner will provide a copy of such notice to City at the same time such notice is provided to the successor.

10. **TIME IS OF ESSENCE**. Time is of essence in the performance of this Agreement.

11. **NOTICES.** Any notice to a party required or called for in this Agreement will be served in person, or by deposit in the U.S. Mail, first-class postage prepaid, to the address set forth below. Notice will be deemed effective upon receipt, or 72 hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice to the other party.

IF TO CITY:

Public Works Department - Stormwater Program
601 Carmen Drive
Camarillo, California 93010

IF TO OWNER:

Rexford Industrial Realty Inc.
11620 Wilshire Boulevard Suite 1000
Los Angeles CA 90025
Telephone # (310) 966-1680

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

CITY OF CAMARILLO:

_____
Dave Norman
City Manager

ATTEST:

_____
City Clerk

APPROVED AS TO FORM BY:
Don Davis, Assistant City Attorney
November 15, 2006

OWNER:

(If a legal entity such as a corporation, partnership, limited liability company, or trust, please print the entity's name and name and title of signer above signature line and then sign. If individual, please print name of signer above signature line.)

_____
Bruce Herbkersman - SENIOR VICE PRESIDENT CONSTRUCTION & DEVELOPMENT
Rexford Industrial Realty Inc.

_____

_____

NOTARIES ON FOLLOWING PAGE

c: Public Works Department (2)
Public Works Stormwater
City GIS Dept.
Owner

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Los Angeles)
On October 30, 2017 before me, Judy Jones-Eschman, a Notary Public,
Date *Here Insert Name and Title of the Officer*
personally appeared Bruce Herbkersman
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(~~s~~) whose name(~~s~~) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(~~s~~) on the instrument the person(~~s~~), or the entity upon behalf of which the person(~~s~~) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

JUDY JONES-ESCHMAN
Commission # 2141455
Notary Public - California
Los Angeles County
My Comm. Expires Feb 2, 2020

Signature
Signature of Notary Public

Place Notary Seal Above

OPTIONAL

Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document:
Document Date: Number of Pages:
Signer(s) Other Than Named Above:

Capacity(ies) Claimed by Signer(s)

Signer's Name:
☐ Corporate Officer — Title(s):
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other:
Signer Is Representing:

Signer's Name:
☐ Corporate Officer — Title(s):
☐ Partner — ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator
☐ Other:
Signer Is Representing:

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EXHIBIT A

LEGAL DESCRIPTION

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY OF VENTURA, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

PARCEL 1: (ASSESSOR'S PARCEL NUMBER: 160-0-010-730)

PARCEL B, AS SHOWN AND DESIGNATED ON THAT CERTAIN LOT LINE ADJUSTMENT NO. LD-431A, RECORDED NOVEMBER 5, 1999 AS DOCUMENT NO. 99-202212 OF OFFICIAL RECORDS, IN THE CITY OF CAMARILLO, COUNTY OF VENTURA, STATE OF CALIFORNIA, AS SHOWN ON A MAP RECORDED IN BOOK 39, PAGES 94, 95 AND 96 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT THEREFROM, THAT PORTION OF THE ABOVE DESCRIBED PARCEL, AS CONVEYED TO THE CITY OF CAMARILLO, BY DEED RECORDED OCTOBER 18, 2000 AS INSTRUMENT NO. 00-163644.

EXCEPTING THEREFROM ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND OTHER MINERALS LYING BELOW A DEPTH OF 500 FEET, WITH NO RIGHTS OF SURFACE ENTRY IN SAID PROPERTY, AS EXCEPTED IN AN INSTRUMENT RECORDED NOVEMBER 2, 1978 IN BOOK 5250, PAGE 787 OF OFFICIAL RECORDS.

PARCEL 2:

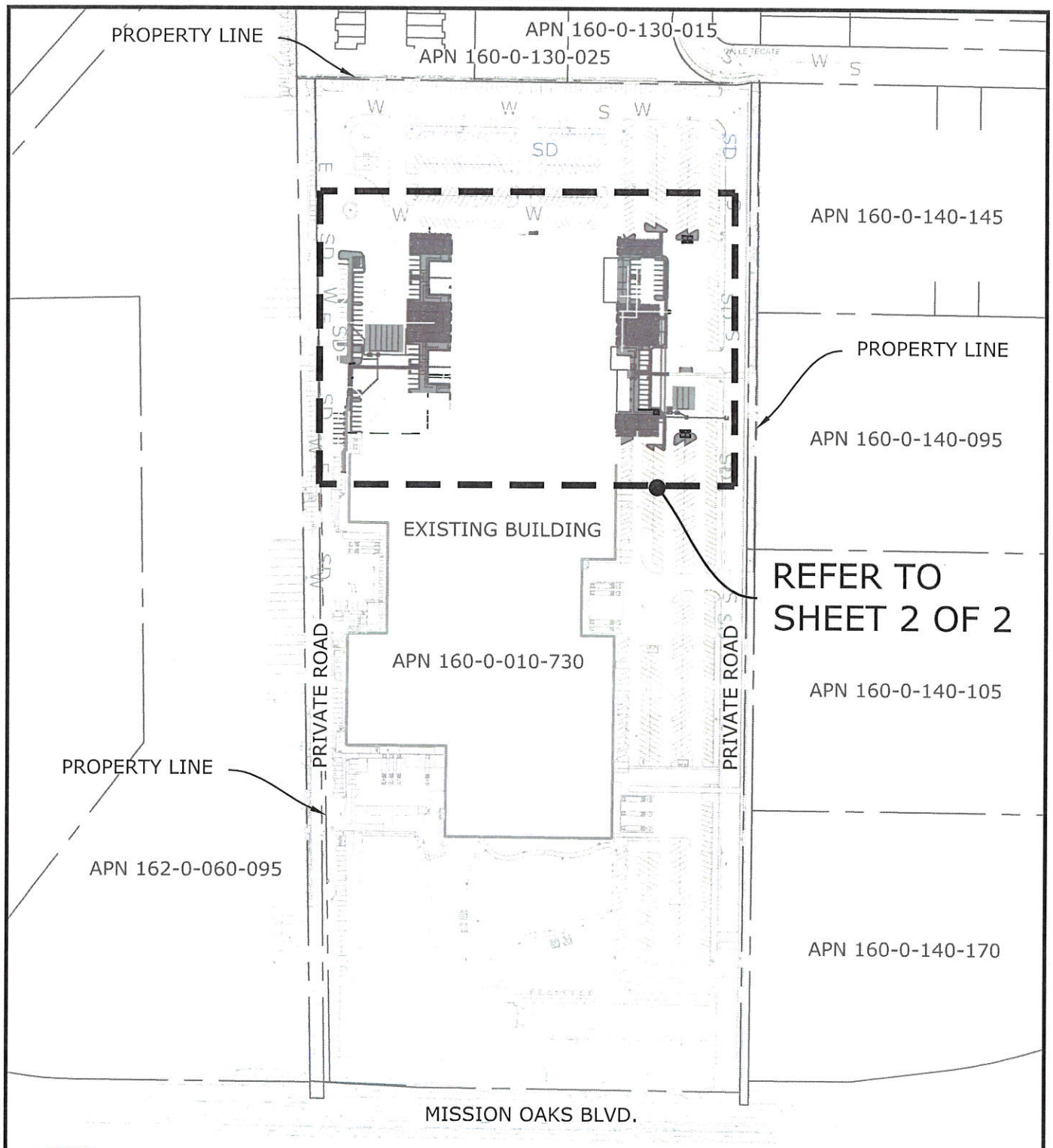
A NON-EXCLUSIVE EASEMENT FOR THE CONSTRUCTION, OPERATION, MAINTENANCE, REPAIR AND REPLACEMENT OF A RAILROAD SPUR OR DRILL TRACK OVER A STRIP OF LAND 30 FEET WIDE, THE CENTER LINE OF WHICH IS THE NORTHERLY 1483.87 FEET OF THE 1ST COURSE OF THE ROSE CAMARILLO PETIT LAND AND OF THE 7TH COURSE OF THE AVE CAMARILLO FITZGERALD LAND AND THE ENTIRE 2ND COURSE OF THE ROSE CAMARILLO PETIT LAND AND THE 8TH COURSE OF THE AVE CAMARILLO FITZGERALD LAND, AND THE EASTERLY LINE OF WHICH IS THE CONTINUATION OF THE CURVE CONCENTRIC TO THE 2ND COURSE OF THE ROSE CAMARILLO PETIT LAND AND TO THE 8TH COURSE OF THE AVE CAMARILLO FITZGERALD LAND TO THE INTERSECTION WITH THE NORTHERLY LINE OF SAID LOT 5, MORE PARTICULARLY DESCRIBED IN THAT DEED RECORDED SEPTEMBER 10, 1965 IN BOOK 2859 PAGE 536 OF OFFICIAL RECORDS.

EXCEPTING THEREFROM THAT PORTION OF SAID EASEMENT LYING WITHIN THE ABOVE DESCRIBED PARCEL 1.

PARCEL 3:

A NON-EXCLUSIVE EASEMENT FOR THE INSTALLATION, CONSTRUCTION, USE, REPAIR, MAINTENANCE AND REPLACEMENT OF THE UTILITY FACILITIES OVER THAT PORTION OF PARCEL 1 OF PARCEL MAP LD-348 LOCATED IN THE CITY OF CAMARILLO, COUNTY OF VENTURA, STATE OF CALIFORNIA, AS SHOWN ON MAP ON FILE IN BOOK 56 OF PARCEL MAPS, PAGES 32 THROUGH 35 THEREOF, IN THE OFFICE OF THE COUNTY RECORDER OF SAID VENTURA COUNTY, CALIFORNIA.

EXHIBIT B



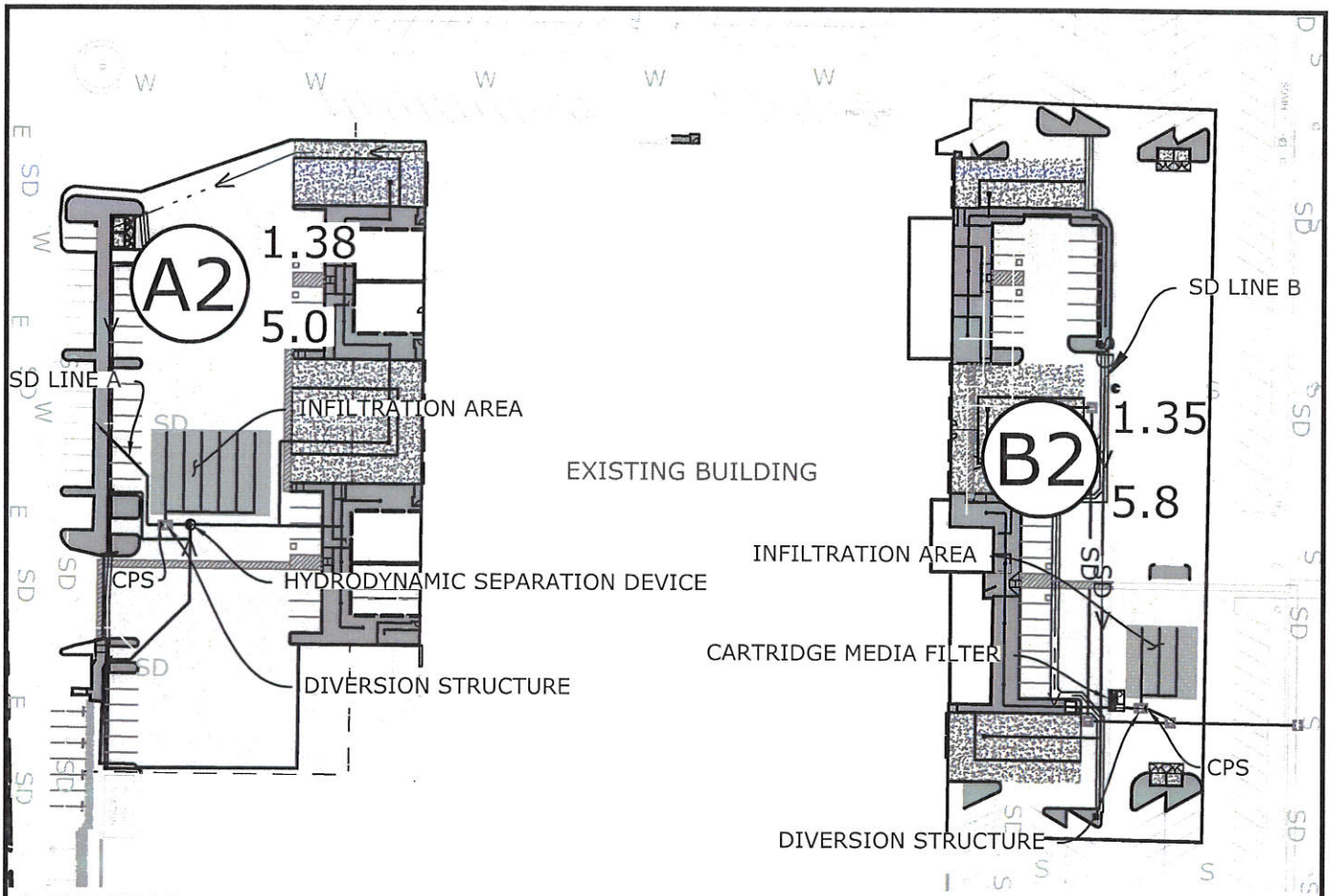
Encompass Consultant Group
333 N. LANTANA ST, SUITE 287, CAMARILLO, CA 93010
PHONE: 805.322.4443 WEBSITE: WWW.ECGCIVIL.COM

3233 E. MISSION OAKS BLVD - IPD-53M-(9)
REXFORD INDUSTRIAL REALTY INC.
TECHNICOLOR BUILDING REMODEL
DRAINAGE MAP EXHIBIT "B"
CITY OF CAMARILLO, CA

W.O. 00122 SCALE: 1" = 250'

1 OF 2

EXHIBIT B



LEGEND

TC FLOW PATH

DRAINAGE AREA BOUNDARY

INFILTRATION TRENCH

A2 1.38 — AREA (ACRES)

5.0 — Q50 (CFS)

DRAINAGE AREA

CDS UNIT

CARTRIDGE MEDIA FILTER

SD — SD PROPOSED STORM DRAIN

CONNECTOR PIPE SCREEN (CPS)

ECG
Encompass Consultant Group
333 N. LANTANA ST, SUITE 287, CAMARILLO, CA 93010
PHONE: 805.322.4443 WEBSITE: WWW.ECGCIVIL.COM

3233 E. MISSION OAKS BLVD - IPD-53M-(9)
REXFORD INDUSTRIAL REALTY INC.
TECHNICOLOR BUILDING REMODEL
DRAINAGE MAP EXHIBIT "B"
CITY OF CAMARILLO, CA

W.O. 00122 SCALE: 1" = 100'

2 OF 2

EXHIBIT C
Minimum Maintenance Requirements For Post-Construction Treatment Devices

Maintenance logs will be required by the City of Camarillo in October of each year for all post-construction devices listed below. At a minimum, the maintenance log should include documentation identifying the device, its location, date of inspection, inspector's name and signature, type and quantity of material(s) removed, disposal destination, and other maintenance performed. The California Stormwater BMP Handbooks referred to below can be obtained at www.cabmphandbooks.com and the Ventura County Technical Guidance Manual for Stormwater Quality Control Measures can be obtained at www.vcstormwater.org.

Treatment Device	Minimum Maintenance Requirements/Schedule
Onsite trash enclosures constructed with solid roof that protects against stormwater entering refuse bins.	Inspect yearly prior to October 1 for leaks. Remove solids, stains and/or residue from floor and walls of trash enclosure with dry methods when possible. If water must be used after sweeping/using absorbents, collect water and discharge through grease interceptor to the sewer (check with local Sanitation Department before discharging to sewer). Do not hose down area to a storm drain. Refer also to Calif. Stormwater Municipal BMP Handbook – SC-34.
Onsite storm drains & catch basins	All onsite catch basins to be inspected and cleaned at least twice a year. Once immediately prior to October 1 and after April 1st. Additional cleanings may be required if more than 40% full.
Parking lots & sidewalks	Sidewalks and parking lots to be swept regularly to prevent accumulation of litter and debris. Litter, debris and any cleaning agents will be trapped and collected and disposed of properly to prevent entry into storm drain system. Refer also to Calif. Stormwater Municipal BMP Handbook – SC-43 & SC-71.
Underground Infiltration Trench (2)	Inspect trench semiannually, after each significant storm, or more frequently, if needed. Check/correct as required: Sediment accumulation in the diversion structure. Remove litter and debris from bottom as required. Remove sediment when accumulation reaches 25% of original design depth, or if resuspension is observed. Inspect outlet for clogging a minimum of twice a year, before and after the rainy season, after large storms, and more frequently if needed. Correct observed problems as necessary. Clean forebay frequently to reduce frequency of main basin cleaning. Control mosquitoes, as necessary. Refer also to Ventura County Technical Guidance Manual Section 6.
Biofilters (Swales) N/A	Check annually for signs of erosion, vegetation loss, and channelization of the flow. The grass should be mowed when it reaches a height of 6 inches. Allowing the grass to grow taller may cause it to thin and become less effective. The clippings should be removed. Refer also to V.C. Technical Guidance Manual for Stormwater Quality Control Measures #T-2 & Calif. Stormwater Municipal BMP Handbook – TC-30.

Treatment Device	Minimum Maintenance Requirements/Schedule
Grease Interceptors/Traps N/A	Interceptor/trap should be inspected a minimum of every six months and cleaned a minimum of once per year or as required whenever sufficient grease/oils accumulate on the surface of the downstream compartment or it is determined by the City Industrial Waste Inspector that any grease/oil is being discharged. Check for corrosion.
Media Filter, Clarifier, Wet Vault, Vortex Separator, Hydrodynamic Systems Device Name: CDS Unit (1) Model#: CDS1515-3-C-DTL Mfr.(Name & Address): Contech Engineered Solutions LLC 9025 Centre Pointe Dr., Suite 400 West Chester, OH 45069	Follow manufacturer's recommended maintenance specifications. Inspect unit twice during first wet season of operation, setting the cleaning frequency accordingly. Annually inspect for floating debris, sediment buildup, and accumulated petroleum products. Remove accumulated sediment in vault after construction in the drainage area is complete. Recommended frequency of cleaning ranges from one to two years – confirm with manufacturer. Maintenance consists of removal of accumulated material with an educator truck. It may be necessary to remove and dispose of the floatables separately due to the presence of petroleum product. Control mosquitoes, as necessary. Annual maintenance is typical. Refer also to Calif. Stormwater Municipal BMP Handbook – MP-50 & MP-51.
Drain Insert N/A Mfr.(Name & Address): _____ _____ _____ Model: _____	Follow manufacturer's recommended maintenance specifications. At the beginning of the wet season and after significant storms, inspect for proper functioning and remove sediment buildup. After construction, verify that stormwater enters the unit and does not leak around the perimeter. Refer also to Calif. Stormwater Municipal BMP Handbook – MP-52.
Other BMP Connector Pipe Screen/Trash Device FlexStorm by ADS (contact: Ocean Blue Environmental) 925 West Esther St., Long Beach, CA (562) 624-4120 www.ocean-blue.com Model: 22W12D15H or equivalent Quantity: (2)	*Identify minimum maintenance* Inspect for proper functioning and remove trash buildup when accumulation reaches 25% of inlet capacity and at the beginning of the wet season and after significant storm.
8'x11' Peak Diversion StormFilter Manufacturer: Contech Engineered Solutions LLC 9025 Centre Pointe Dr., Suite 400 West Chester, OH 45069 (800) 338-1122 www.ContechES.com Model: Peak Diversion StormFilter 8'x11' with 12" tall float cartridges Quantity: (1 vault with 11 cartridges)	Follow manufacturer's recommended maintenance specifications. Inspect unit twice during first wet season of operation, setting the cleaning frequency accordingly. Annually inspect for floating debris, sediment buildup, and accumulated petroleum products. Remove accumulated sediment in vault after construction in the drainage area is complete. Recommended frequency of cleaning ranges from one to two years – confirm with manufacturer. Maintenance consists of removal of accumulated material with an educator truck. It may be necessary to remove and dispose of the floatables separately due to the presence of petroleum product. Control mosquitoes, as necessary. Annual maintenance is typical. Refer also to Calif. Stormwater Municipal BMP Handbook – MP-50 & MP-51.

PCSMP

APPENDIX D – STORMWATER MAINTENANCE PLAN

Storm Water Maintenance Plan

3233 E. Mission Oaks Blvd - Technicolor Building Remodel Project IPD-53M(9)

Encompass Consultant Group
333 N LANTANA STREET, SUITE 287
CAMARILLO, CA 93010
P (805) 322-4443
F (805) 445-7522

SITE MAP

1) See Appendix A.

BASELINE DESCRIPTIONS

1) The property owner(s) responsible for the operation and maintenance of the storm water management control measures shown in the Site Map is:
    - Rexford Industrial Realty Inc.
      Attn: Bruce Herbkersman
      11620 Wilshire Boulevard Suite 1000
      Los Angeles CA 90025
      (310) 966-1680

2) Financing for the operation, inspection, routine maintenance, and upkeep of storm water control measures will be provided by the Owner.

3) As itemized in Exhibit C of the project's *Stormwater Treatment Device and Maintenance Agreement*, the following permanent storm water control measures are implemented on the project site:
    - The onsite trash enclosure will be constructed with a solid roof that protects against storm water entering the refuse bins. Refer to California Stormwater Municipal BMP Handbook – SC-34.
    - Storm drains and catch basins will be inspected and cleaned at least twice a year.
    - Parking lots, streets, and sidewalks will be swept regularly to prevent accumulation of litter and debris. Refer to California Stormwater Municipal BMP Handbook – SC-43 and SC-71.
    - Hydrodynamic Separation Device (CDS unit) shall be inspected twice during first wet season of operation, setting the cleaning frequency accordingly. Annually inspect for floating debris, sediment buildup, and accumulated petroleum products. Remove accumulated sediment in vault after construction in the drainage area is complete. Recommended frequency of cleaning ranges from one to two years – confirm with manufacturer. Maintenance consists of removal of accumulated material with a vacuum truck. It may be necessary to remove and dispose of the floatables separately due to the presence of petroleum product. Control mosquitoes, as necessary. Annual maintenance is typical.
    - The on-site infiltration trenches will be inspected and maintained regularly in accordance with the *Stormwater Treatment Device and Maintenance Agreement*. Refer to California Stormwater Municipal BMP Handbook – TC-11.

- Connector pipe screen/trash devices will be inspected for proper functioning at the beginning of the wet season, after heavy rain, and end of wet season.
- Cartridge Media Filter (Contech Peak Diversion StormFilter) shall be inspected twice during first wet season of operation, setting the cleaning frequency accordingly. Annually inspect for floating debris, sediment buildup, and accumulated petroleum products. Remove accumulated sediment in vault after construction in the drainage area is complete. Recommended frequency of cleaning ranges from one to two years – confirm with manufacturer. Follow manufacturer's recommended maintenance specifications.

4) Maintenance and waste disposal activities will be performed for the following post-construction storm water treatment measures:
   - Hydrodynamic Separation Device (CDS unit): Recommended frequency of cleaning ranges from one to two years – confirm with manufacturer. Maintenance consists of removal of accumulated material with a vacuum truck. It may be necessary to remove and dispose of the floatables separately due to the presence of petroleum product. Annual maintenance is typical.
   - The infiltration trenches will be inspected and cleaned regularly in accordance with the *Stormwater Treatment Device and Maintenance Agreement*. Refer to California Stormwater Municipal BMP Handbook – TC-11.
   - Cartridge Media Filter (Contech Peak Diversion StormFilter: Remove accumulated sediment in vault after construction in the drainage area is complete. Recommended frequency of cleaning ranges from one to two years – confirm with manufacturer. Follow manufacturer's recommended maintenance specifications.
   - The following table provides a schedule of maintenance activities for all site storm water control measures:

Table 1: Maintenance Measures for Storm Water Control Devices

Storm Water Control Measure	Number of Annual Inspections	Inspection and Maintenance Date (if applicable)	Minimum Maintenance Required
Trash Enclosure	Regular Inspections	Monthly	Remove solids, stains, and or residue from floor and walls of trash enclosure with dry methods when possible. No discharge of wash water shall be allowed into storm drain.

Storm Water Control Measure	Number of Annual Inspections	Inspection and Maintenance Date (if applicable)	Minimum Maintenance Required
Storm Drains & Catch Basins	2	Once prior to Oct 1st and once after April 1st, and after significant rain events.	Clean pipe(s) and catch basins of accumulated sediment, trash, and debris. May require confined space training/certification.
Parking Lots, Streets, & Sidewalks	Regular Inspections	Monthly	Sweep pavement surface monthly to prevent accumulation of litter and debris. Litter, debris, and any cleaning agents will be trapped and collected and disposed of properly to prevent entry into storm drain system.
Connector Pipe Screen/Trash Device	2	Beginning and end of the wet season, and after significant storms	Inspect for proper functioning and remove trash buildup when accumulation reaches 25% of inlet capacity. May require confined space training/certification.
Hydrodynamic Separation Device (CDS Unit)	Semi-Annually	Beginning and end of the wet season, and after significant storms	Annually inspect for floating debris, sediment buildup, and accumulated petroleum products. Remove accumulated sediment in vault after construction in the drainage area is complete. It may be necessary to remove and dispose of the floatables separately due to the presence of petroleum product. Control mosquitoes, as necessary. Annual maintenance is typical. May require confined space training/certification.
Cartridge Media Filter (StormFilter)	Semi-Annually	Beginning and end of the wet season, and after significant storms	Annually inspect for floating debris, sediment buildup, and accumulated petroleum products. Remove accumulated sediment in vault after construction in the drainage area is complete. Replace media cartridge during dry weather as needed (when full or damaged). Follow manufacturer's guidelines. OSHA rules for confined space entry must be followed if vault entry is required. May require confined space training/certification.

Storm Water Control Measure	Number of Annual Inspections	Inspection and Maintenance Date (if applicable)	Minimum Maintenance Required
Infiltration Trench	Semi-annually and after extreme events	Once prior to Oct 1st and once after April 1st, and after significant rain events.	Check/correct as required: sediment accumulation in the diversion structure. Remove litter and debris from structure bottom as required. Inspect outlet for clogging a minimum of twice a year, before and after the rainy season, after large storms, and more frequently if needed. Correct observed problems as necessary. Refer to Section 6 of Ventura County Technical Guidance Manual for additional operation and maintenance requirements for infiltration.

5) Housekeeping procedures for prohibiting illicit discharges or potential illicit discharges to the storm drain will be implemented onsite in accordance with Ventura County's *Industrial/Commercial Clean Business Program* Fact Sheets, as provided in Appendix B. Some of those measures include:
    - Prevent spills from entering storm drains and discharge points.
    - Eliminate illegal connections to the storm drain.
    - Routinely inspect and clean out all storm drains, discharge points & catch basins.
    - Control litter by sweeping and picking up litter regularly.
    - Clean mats in a sink or use a mat cleaning service.
    - Use "dry" cleaning methods (sweep rather than hose down) to clean shop floors, materials processing and storage areas, access roads and parking lots.
    - Clean up spills immediately to minimize safety hazards and prevent discharge to the storm drain system.
    - Train all employees.
    - Utilize native vegetation to reduce water, fertilizer or pesticide needs.
    - Use landscaping pesticides and fertilizers only as needed and apply as directed.
    - Avoid over-watering to prevent excess runoff.
    - Use integrated pest management (IPM) where appropriate.
    - Use non-toxic substitute for chemicals when possible.
    - Control litter by sweeping and picking up trash on a regular basis.

SPILL PLAN

1) Emergency Notification Procedures:

- In the event of a spill, contact Bruce Herbkersman at (310) 966-1680.

- The following agencies shall be notified immediately in the event of a spill:

  - Local emergency response: **911**
  - Ventura County Spill Hotline (805) 320-6244
  - City of Camarillo Illicit Discharge Spill Hotline (805) 388-5338
  - State Office of Emergency Services (OES) (800) 852-7550
  - Ventura County Environmental Health Dept. (805) 654-2813
  - State Regional Water Quality Control Board (213) 576-6600
  - Department of Toxic Substance Control (DTSC) (800) 260-3972
    (if waste oil is spilled)
    DTSC after-hours Spill Line (800) 852-7550

- If a reportable quantity or more flows off-site from the property, follow the sequence of actions noted above and notify:

  - National Response Center (800) 424-8802

- For spills that threaten navigable water, follow the sequence of actions noted above and notify:

  - United States Coast Guard (562) 980-4444

- When reporting to government agencies is required, notification should be made as soon as possible. Below are possible questions that the agency may ask.

- Document all reports to regulatory agencies. Ask the name and position of person you have contacted and note the agency and the time of your call. Write this information down.

  - Give the facility name, address, and phone number as well as your name and position.
  - Date and time of the spill:
    1. Time or estimate time spill began.
    2. Duration of spill or if it is continuing.
    3. Location of spill.
  - Spill information:

1. Materials spilled.
2. Volume or estimated volume spilled.
3. Has spill entered storm drain or navigable waters? If so, how much? Is there potential for the spill to enter storm drain or navigable waters?
4. The source of the discharge.
5. A description of all affected media (e.g. water and/or soil).
6. The cause of the discharge.
7. Damages or injuries caused by the discharge.

- Response measures taken:
  1. For containment.
  2. For clean-up.
  3. Has the source been stopped?
  4. Will an evacuation be required?
  5. Name of individuals and organizations who have been contacted.

- Weather:
  1. Raining?
  2. Air temperature?
  3. Wind speed and direction?
- Do not wait until all information is known to contact agencies.
- Do not hang up until all questions are answered.

2) The following spill response procedures provide guidelines for use by those on duty to respond to releases. They are not meant to supplant the use of common sense and good judgment during emergencies. Do not contact any spilled material unless wearing proper personal protective equipment.

- **NOTIFY SUPERVISOR**. As soon as it is safe, notify your supervisor.

  - If the spill involves fire, the supervisor will call 911 immediately.
  - The supervisor will notify the O&M Coordinator and take charge until the O&M Coordinator arrives.
  - The O&M Coordinator will take charge of the situation on arrival.

- **EVACUATE** the immediate area.

- **AID** any persons that have been injured or contaminated or are in danger of being injured or contaminated. Do not put yourself in danger trying to save someone else. If someone is contaminated with material, avoid contacting that person.

- **STOP FLOW**, if it is safe to do so. Stop the source of the spill and contain the material that has already been spilled. Do this only if it can be accomplished safely without endangering life or property. Minimizing the amount of material spilled reduces the potential for discharge and the amount of clean up necessary.

- **ALERT OTHERS** in the area to stay clear.

- **ELIMINATE IGNITION SOURCES** in the area.

- **CONTAIN SPILL** if it has, or is about to, enter storm drains. Place absorbent material into position to contain the spill. Care should be used to prevent the spill from leaving the site or entering sewers and storm drains.

- **CLEAN UP** spilled material with absorbent materials, dikes, etc. Contact contractors (see next page) for assistance if necessary.

- **NOTIFY** personnel and agencies presented above.

- O&M Coordinator Responsibilities:

    - In charge of overall incident response
    - Calling emergency numbers as required
    - Notifying people in the area and advising them to stay away from the spill
    - Coordinating with outside emergency response and providing technical information
    - Reporting emergency incidents to appropriate agencies
    - Authorizing non-emergency cleanup measures
    - Ensuring compliance with applicable federal, state, and local rules and regulations.

- Response Equipment – External Response Equipment:

    - Contractors may be contacted to provide the following spill response equipment (see below):
        1. Bins and equipment for used absorbent removal
        2. Vacuum truck to collect and remove spilled material

- Spill Response Contractor(s):

_____ _____

_____ _____

3) Spill Cleanup Procedures:

- Material generated during spill response activities must be disposed of in accordance with applicable federal, state, and local regulations.

- There may be various types of waste generated during response activities. Below is a list of common materials and disposal requirements.

    - Free product: If there is a large amount of this material, a vacuum truck should be contacted to collect and haul it to a licensed treatment, storage, and disposal facility for recycling or disposal. Small spills may be cleaned up using absorbent material.
    - Soiled rags, booms, and absorbent material should be drummed up and sent to a licensed treatment, storage, and disposal facility for disposal.

4) Material that enters storm drains at the site will travel through the storm drain system which discharges into Calleguas Creek, which ultimately flows to the Pacific Ocean.

5) Sampling Plan

- During a spill, it may be possible for contaminated material to enter the storm drain. If contaminated material enters the storm drain, it may be prudent to take samples to document the amount of material released.

- If sampling is performed, samples should be taken at the storm drain inlet where contaminated material is entering.

- The samples must be sent to a state-certified laboratory for analysis. The following procedures will be used for taking the samples:

    - Collect samples in sampling containers. Ensure that the sample is free of excess debris (i.e. leaves, paper fragments, etc.). Fill the container to the top.
    - The closed sample containers may be sealed with custody tape, which can be obtained from the test laboratory with the sample bottles. Do not seal the bottles with other types of tape (scotch,

duct, cellophane, etc.) as organic material from the tape may contaminate the sample.

- Label samples with the following information:

Company Name	Date Sampled
Time Sampled	Collection Point
Sample Description	Preservative
Analysis Required	Special Requirements

- The laboratory should be instructed to analyze for the constituents which may have been discharged. In the event of an oil spill, the sample should be analyzed for "Oil & Grease."
- Complete a chain-of-custody form recording pertinent information including the information listed above and the signature of the person taking the sample. The test laboratory will provide the chain-of-custody forms.
- If possible, chill the samples to 4°C (40°F) until the samples are delivered to the laboratory. Do not freeze the samples.
- Send the samples to a state-certified laboratory, or call the laboratory to have the samples picked up.

FACILITY CHANGES

1) This O&M will be amended:

   - When there is a change in operations which may significantly affect the character or quantity of pollutants discharging from the site, or

   - When plans are made to modify the approved treatment devices.

2) Minor administrative changes to the O&M (changes in names, phone numbers, etc.) may be made by the O&M Coordinator.

3) Amendments to the O&M will be noted on the Amendment Log in Appendix D.

TRAINING

1) Training shall be provided to all individuals responsible for the maintenance and operations of the onsite facilities.

2) Training shall include:
   - Good housekeeping procedures defined in the plan.
   - Proper maintenance of all pollution mitigation devices.
   - Identification and cleanup procedures for spills and overflows.

- Large-scale spill or hazardous material response.
- Safety concerns when maintaining devices and cleaning spills.

BASIC INSPECTION AND MAINTENANCE ACTIVITIES

1) The Developer shall maintain onsite a log for inspector names, dates and storm water control measure devices to be inspected and maintained. Checklists for each inspection and maintenance category are provided in Appendix C.

2) Once annually, perform testing of any mechanical or electrical devices prior to wet weather.

3) Report any significant changes in storm water management control measures to the site management. As appropriate, assure mechanical devices are working properly and/or landscaped BMP plantings are irrigated and nurtured to promote thick growth.

4) Note any significant maintenance requirements due to spills or unexpected discharges.

5) As appropriate, perform maintenance and replacement as scheduled and as needed in a timely manner to assure storm water management control measures are performing as designed and approved.

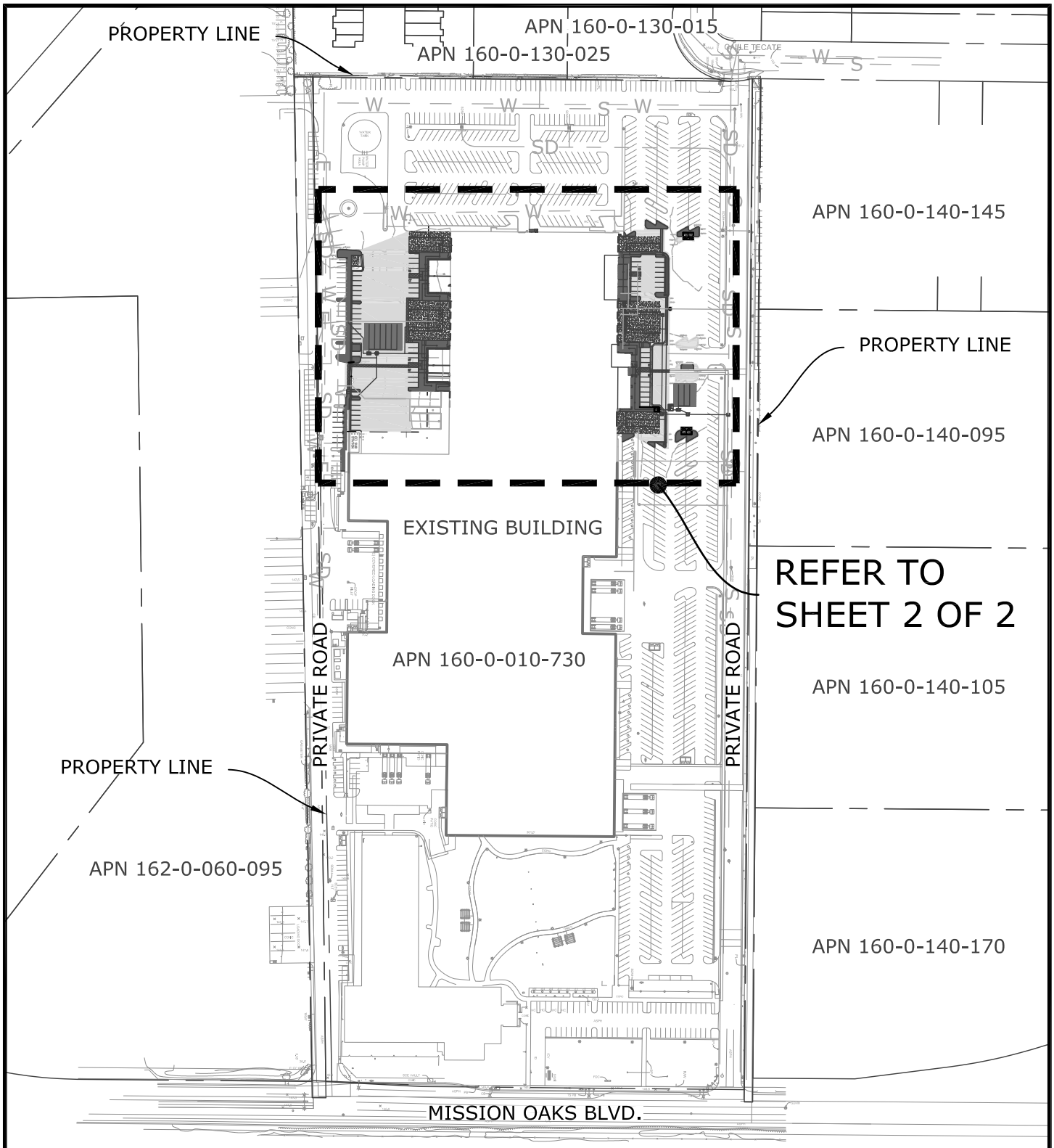
6) Assure unauthorized low-flow discharges from the property do not by-pass storm water control measures.

7) Perform an annual assessment of each pollution generation operation and its associated storm water management control measures to determine if any part of the pollution reduction train can be improved.

MAINTENANCE PLAN

APPENDIX A – SITE MAP

EXHIBIT B



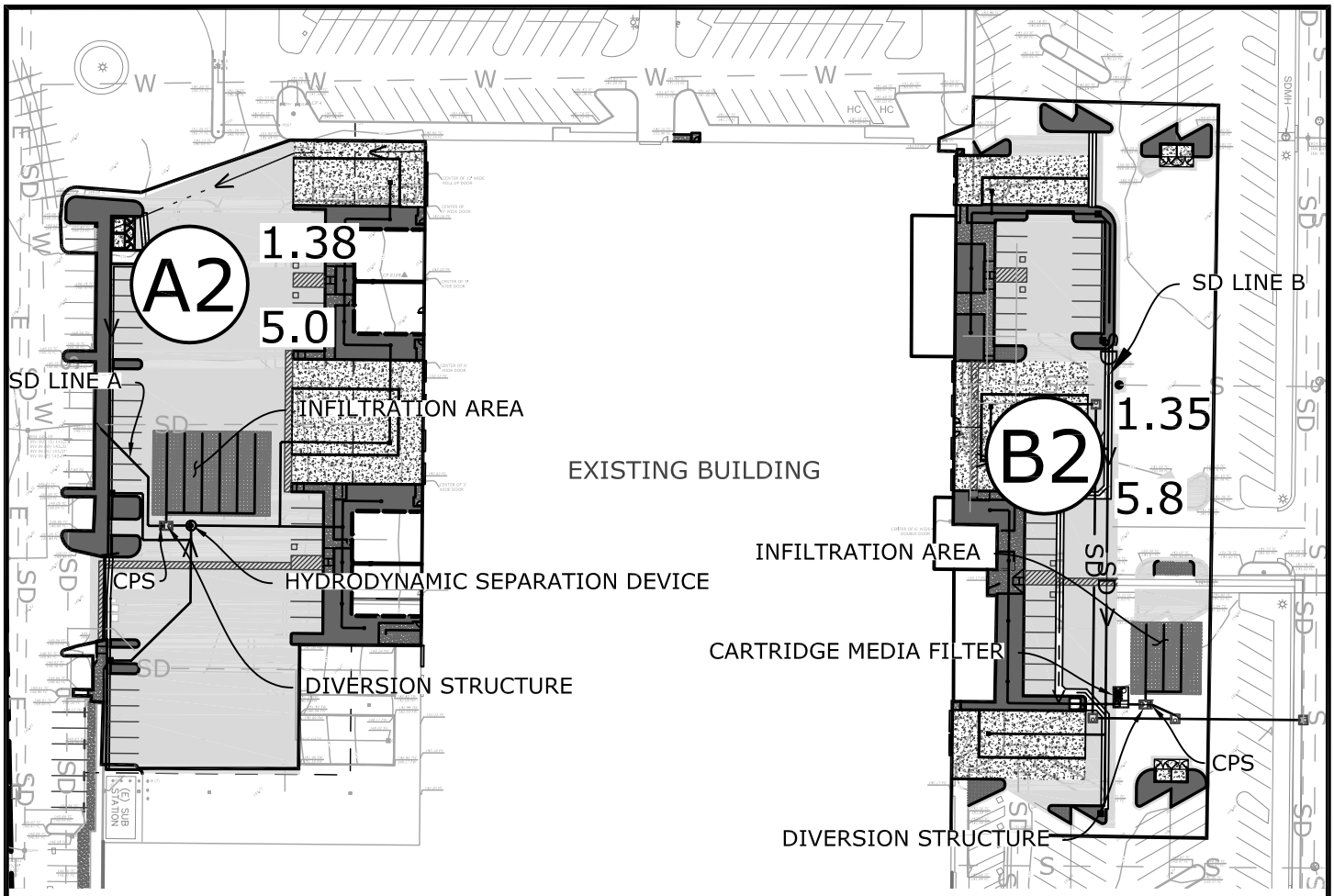
Encompass Consultant Group
333 N. LANTANA ST, SUITE 287, CAMARILLO, CA 93010
PHONE: 805.322.4443 WEBSITE: WWW.ECGCIVIL.COM

3233 E. MISSION OAKS BLVD - IPD-53M-(9)
REXFORD INDUSTRIAL REALTY INC.
TECHNICOLOR BUILDING REMODEL
DRAINAGE MAP EXHIBIT "B"
CITY OF CAMARILLO, CA

W.O. 00122

SCALE: 1" = 250'

EXHIBIT B



LEGEND

TC FLOW PATH

DRAINAGE AREA BOUNDARY

INFILTRATION TRENCH

A2 — DRAINAGE AREA

1.38 — AREA (ACRES)

5.0 — Q50 (CFS)

CDS UNIT

CARTRIDGE MEDIA FILTER

SD — SD — PROPOSED STORM DRAIN

CONNECTOR PIPE SCREEN (CPS)

Encompass Consultant Group
333 N. LANTANA ST, SUITE 287, CAMARILLO, CA 93010
PHONE: 805.322.4443 WEBSITE: WWW.ECGCIVIL.COM

3233 E. MISSION OAKS BLVD - IPD-53M-(9)
REXFORD INDUSTRIAL REALTY INC.
TECHNICOLOR BUILDING REMODEL
DRAINAGE MAP EXHIBIT "B"
CITY OF CAMARILLO, CA

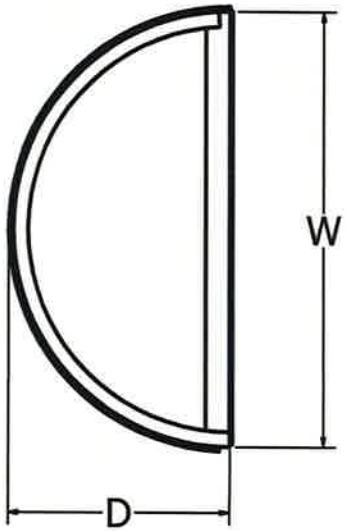
W.O. 00122

SCALE: 1" = 100'

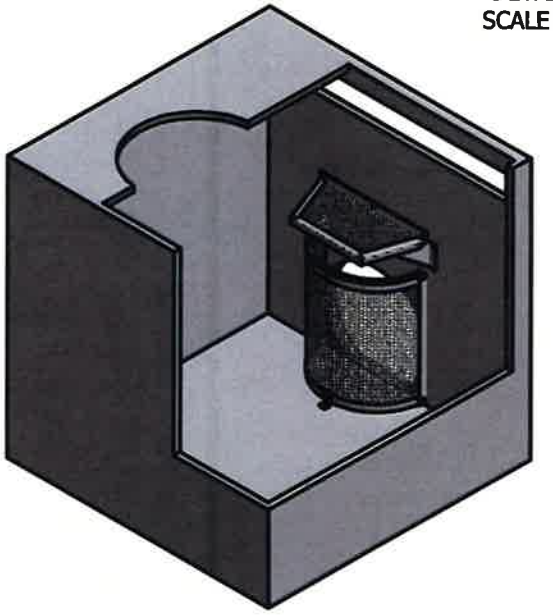
MAINTENANCE PLAN

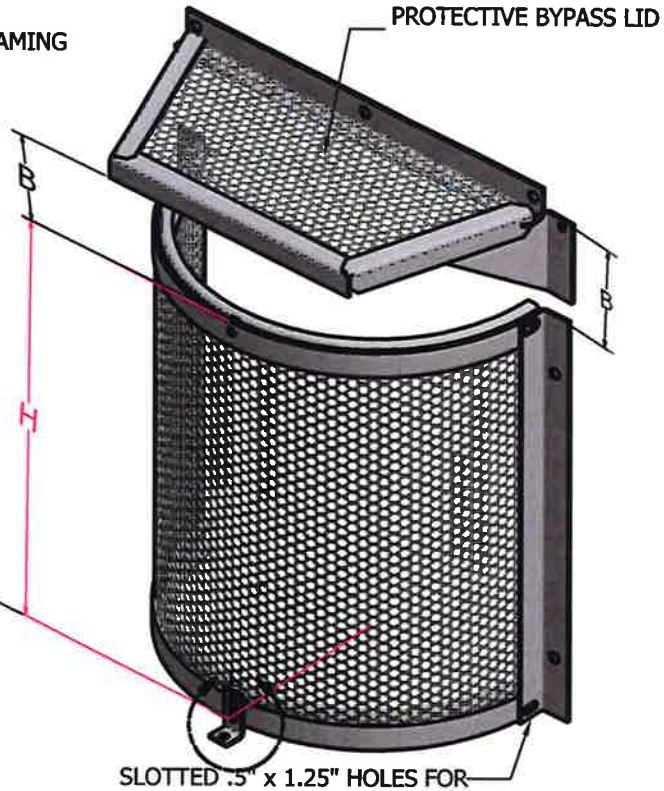
APPENDIX B – REFERENCE DOCUMENTS & FACT SHEETS

ADS FLEXSTORM CPS PRODUCT SELECTION GUIDE



DETAIL C
SCALE 1 / 2





CONNECTOR PIPE SCREEN SELECTION GUIDE

Model	W	D	H	Q_{screen} Flow Rate (cfs)	CFS BYPASS RATINGS for lid designs with 6" Freeboard									
					Q4	H_4	Q6	H_6	Q8	H_8	Q10	H_{10}	Q12	H_{12}
22W12D15H	22	12	15	6.31	4.29	11	6.14	10	7.76	9	9.15	8	10.27	7
32W15D15H	32	15	15	8.57	5.83	11	8.33	10	10.54	9	12.42	8	13.94	7
42W18D15H	42	18	15	10.83	7.36	11	10.53	10	13.32	9	15.70	8	17.62	7
22W12D18H	22	12	18	8.72	3.66	8	5.13	7	6.34	6	7.23	5	12.27	10
26W8D18H	26	8	18	8.72	3.66	8	5.13	7	6.34	6	7.23	5	12.87	11
32W15D18H	32	15	18	11.84	4.97	8	6.97	7	8.61	6	9.82	5	16.67	10
42W18D18H	42	18	18	14.96	6.28	8	8.81	7	10.88	6	12.41	5	21.06	10

CB width (ft)	Max Q_{10} (cfs)	Max Q_{t-1} (cfs)
3.5	2.8	0.6
7	5.3	1.2
10	7.5	1.7
14	10	2.2
21	13.9	3.1
28	17.3	3.8

MAXIMUM CATCH BASIN FLOW RATINGS (MIN. 3.5' DEPTH)

FLEXSTORM INLET FILTERS

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BY INLET & PIPE PROTECTION, INC
A DIVISION OF ADS, INC.
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(866) 287-8655 PH
(630) 355-3477 FX
INFO@INLETFILTERS.COM

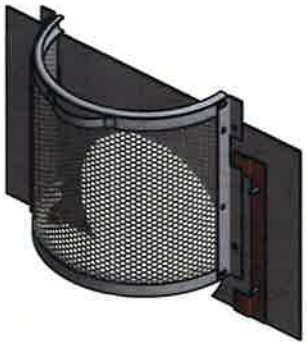
SIZE	FRAME TYPE	DWG NO	REV
C	CPS	FLEXSTORM-CPS	A

SCALE

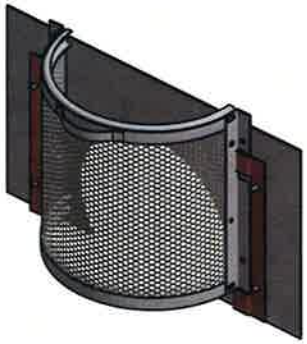
SHEET 1 OF 1

REMOVABLE CPS DETAIL

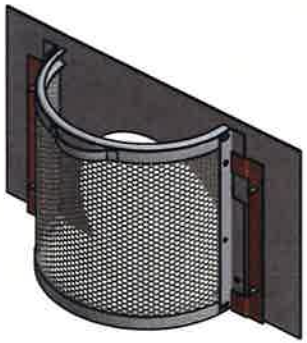
STEP 1



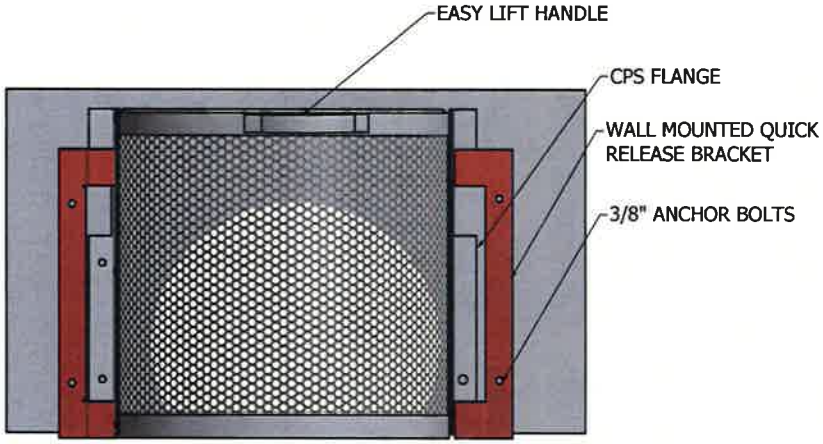
STEP 2



STEP 3



STEP 4



INSTALLATION INSTRUCTIONS

1. LOWER SCREEN INTO CATCH BASIN THROUGH MANHOLE OPENING.

2. RAISE THE UNIT ABOVE THE WALL MOUNTED BRACKETS.

3. MOVE THE UNIT TOWARDS WALL UNTIL FLANGES ARE FLUSH WITH WALL.

4. LOWER THE SCREEN ~3" UNTIL CPS FLANGES ARE CAPTURED BEHIND WALL MOUNTED BRACKETS. ENSURE BASE IS FLUSH TO CATCH BASIN FLOOR.

DRAWN dgarb	3/30/2015	
CHECKED		TITLE
QA		
MFG		
APPROVED		
		SIZE C / DWG NO Removable CPS 1 / REV
		SCALE / SHEET 1 OF 1

ADS FLEXSTORM CPS ORIENTATIONS

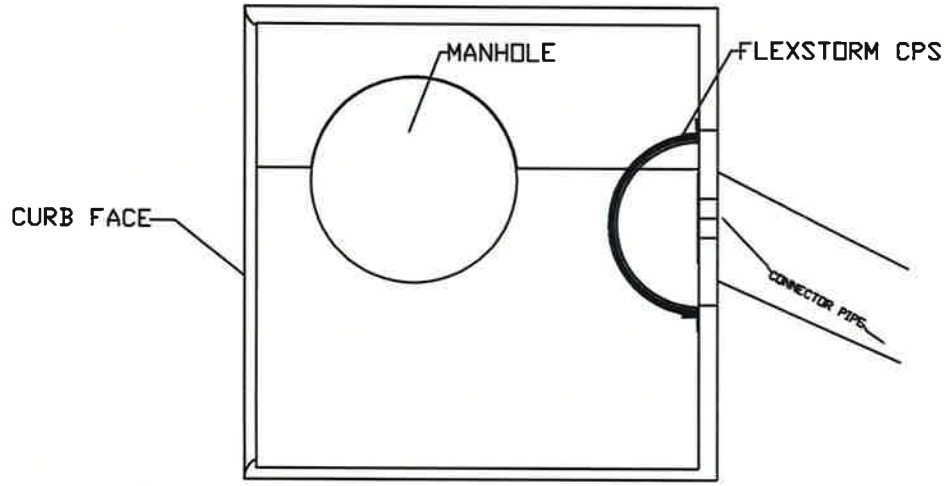


FIG 1: FLEXSTORM CPS STANDARD CONFIGURATION

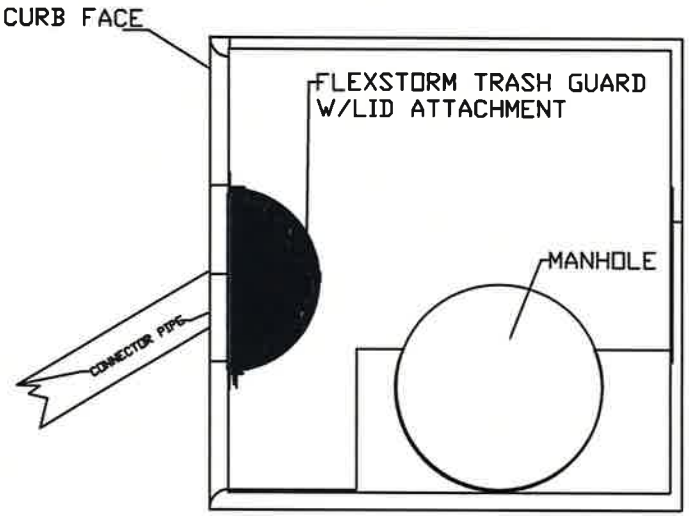


FIG 2: FLEXSTORM CPS WITH LID

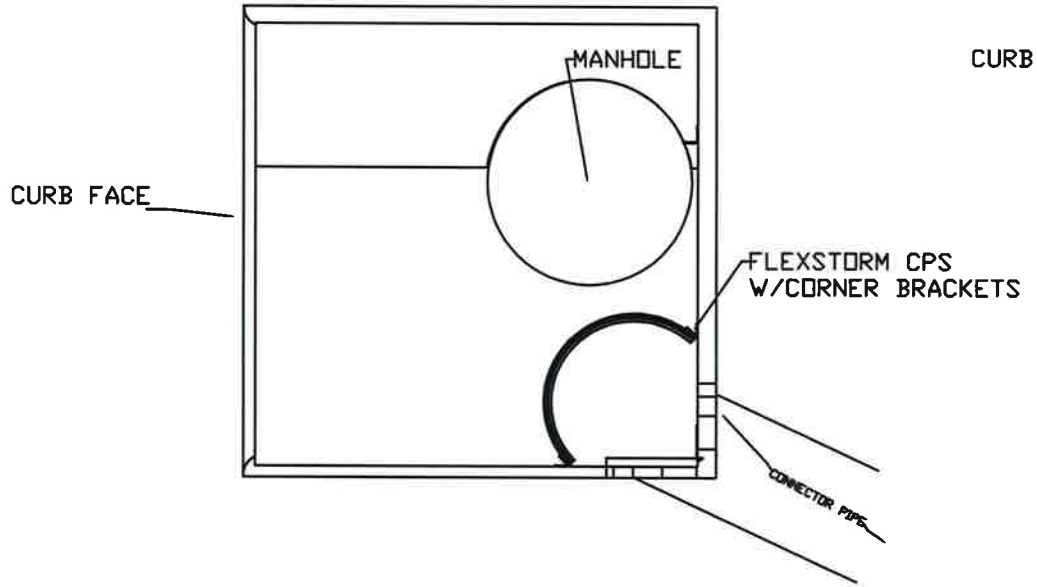


FIG 3: FLEXSTORM CPS WITH CORNER BRACKETS (CORNER CONFIGURATION)

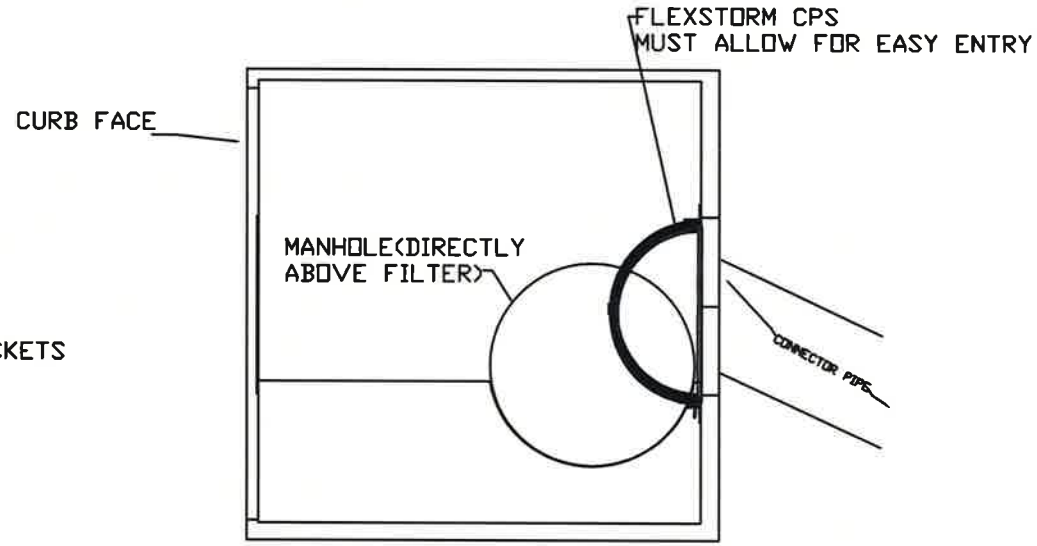


FIG 4: FLEXSTORM CPS WITH EASY REMOVAL

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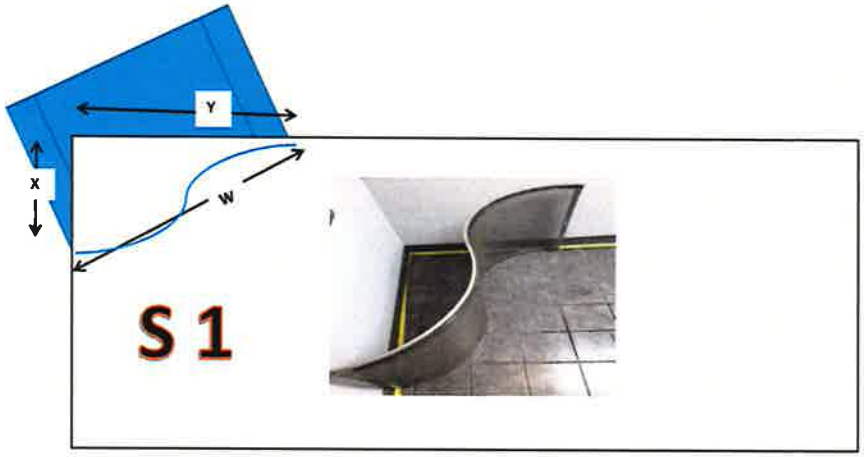
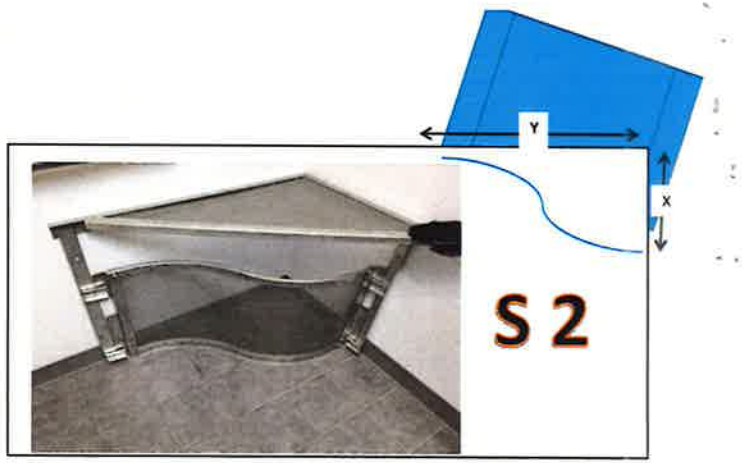
SIZE	DRAWN BY	DWG NO	REV
C	DG	FLEXSTORM-CPS	A
SCALE			SHEET 1 OF 1

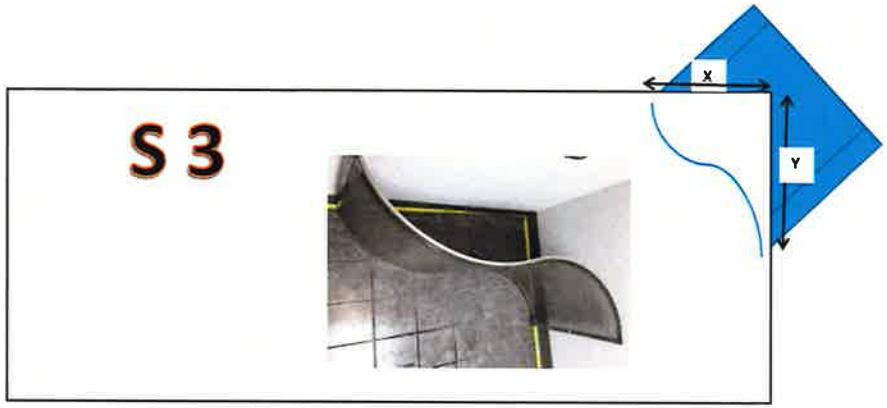




To Select Model, Identify the LOCATION (S1, S2, S3, S4) of the outlet pipe and select the model based on flow and bypass ratings required for the catch basin size. The LOCATION identifies the which side the right angle L bracket must be secured to the CPS (either Left or Right side) ie 36SL or 36SR.

LEFT SIDE MOUNTING ORIENTATIONS

MODEL SIZES AND LOCATION						30/60 DEGREE	
Ref Model Ratings	Corner S Model #	Location	CPS L-bracket	W	L	Y	X
22W12D	36SL	S1, S3	left	34	36	30	18
22W12D	36SR	S2, S4	right	34	36	30	18
32W15D	48SL	S1, S3	left	45	48	42	24
32W15D	48SR	S2, S4	right	45	48	42	24
42W18D	60SL	S1, S3	left	53	60	45	32
42W18D	60SR	S2, S4	right	53	60	45	32



RIGHT SIDE MOUNTING ORIENTATIONS

ORDERING INFORMATION							
CATCH BASIN SIZE	PIPE POSITION (S1,S2, S3, S4)	X (PIPE)	Y (PIPE)	PIPE SIZE	MODEL BASED ON FLOW RATING REQUIREMENTS AND X, Y DIMS	LID REQUIRED? (YES/NO)	BYPASS HEIGHT

CPS Flow Rates by Model

$Q_{screen} = cA_{screen}\sqrt{2gh}$

c=.53; g=32.2

Model	W	D	H	Effective h_{screen} (ft)	L_{screen} (ft)	A_{screen} (Net open area)	Q_{screen} Flow Rate (cfs)	L_{bypass}(ft)	Min BYPASS RATINGS for lid designs with 6" Freeboard									
									B=4"		B=6"		B=8"		B=10"		B=12"	
									Q4	H_4	Q6	H_6	Q8	H_8	Q10	H_{10}	Q12	H_{12}
22W12D15H	22	12	15	1.0417	2.7917	1.4540	6.31	3.00	4.61	11	6.59	10	8.34	9	9.83	8	11.03	7
32W15D15H	32	15	15	1.0417	3.7917	1.9748	8.57	4.00	6.15	11	8.79	10	11.12	9	13.10	8	14.71	7
42W18D15H	42	18	15	1.0417	4.7917	2.4957	10.83	5.00	7.68	11	10.99	10	13.90	9	16.38	8	18.39	7
22W12D18H	22	12	18	1.2917	2.7917	1.8030	8.72	3.00	3.93	8	5.52	7	6.81	6	7.77	5	13.19	10
26W8D18H	26	11	18	1.2917	2.7917	1.8030	8.72	3.00	3.93	8	5.52	7	6.81	6	7.77	5	13.83	11
32W15D18H	32	15	18	1.2917	3.7917	2.4488	11.84	4.00	5.24	8	7.35	7	9.08	6	10.36	5	17.58	10
42W18D18H	42	18	18	1.2917	4.7917	3.0946	14.96	5.00	6.55	8	9.19	7	11.35	6	12.95	5	21.98	10

Bypass ratings in Black are for 3.5' Vb Minimum Catch Basin Depths

Bypass ratings in Red are for 4' Vb Minimum Catch Basin Depths

Equation 5: $Q_{bypass} = c_{bypass}A_{bypass}\sqrt{2gH}$

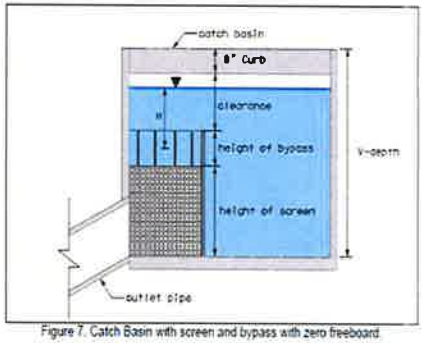
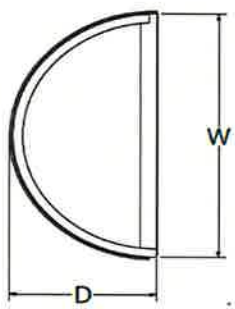
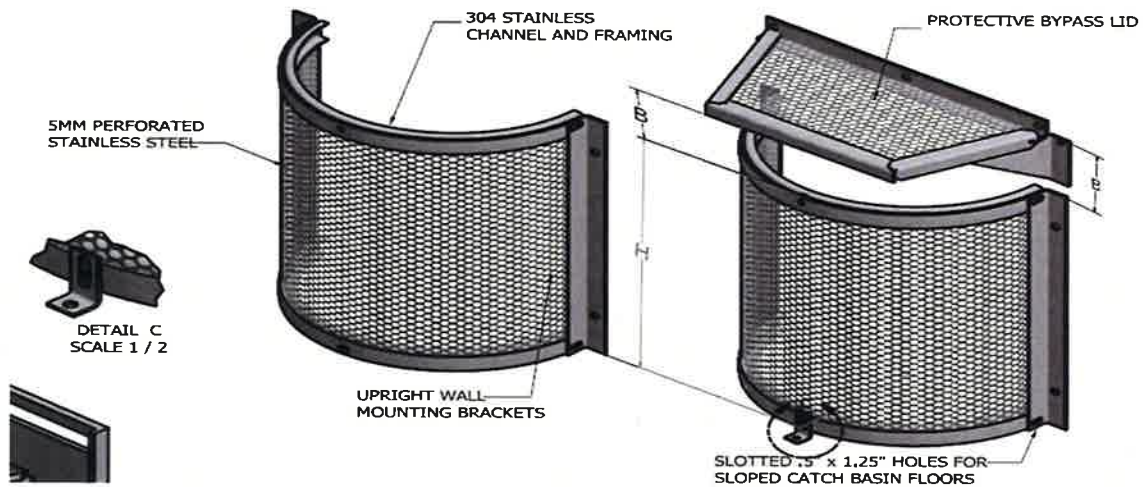


Figure 7. Catch Basin with screen and bypass with zero freeboard

Catch Basin Ratings for one year and		
CB width (ft)	Max Q_{10} (cfs)	Max Q_{1-1} (cfs)
3.5	2.8	0.6
7	5.3	1.2
10	7.5	1.7
14	10	2.2
21	13.9	3.1
28	17.3	3.8





CPS SELECTION CONSIDERATIONS

When selecting the proper CPS one must determine the Max Q_{1-1} of the Catch Basin (based on CB width) and verify the Flexstorm Screen Flow Rate Q_{screen} exceeds that number. It is recommended that the height of the screen be equal to or greater than the height of the pipe (dia), however this is not a requirement in shallow catch basins where a shorter, wider screen may be implemented in order to achieve the minimum required Bypass Rating while maintaining a 4" clearance from the flow line. The Byass Rating Q_{bypass} must meet the Max Q_{10} for the catch basin. This applies to any diameter pipe, which are sized typically to meet the 10 year Q_{10} flow rating. With this in mind, the installer must choose or verify the minimum bypass "B " height for the chosen base Model from the table, which already accounts for 6" freeboard. The CPS lids are only required when the connector pipe is located below the curb line and flow could fall behind the CPS.

ADS FLEXSTORM CPS - QUICK RELEASE INSTALLATION INSTRUCTIONS

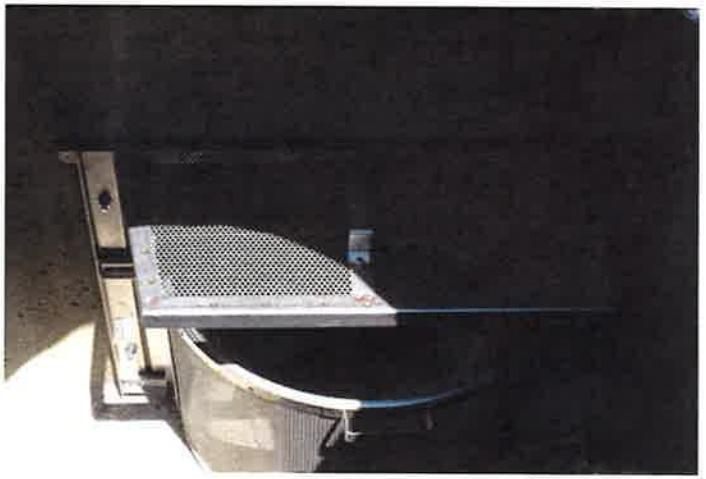
1. Align base CPS unit over outlet pipe. 2. Position Quick Release Mounting Brackets on wall . 3. Mark Holes and Drill 3/8" dia anchor bdts. 4. Secure Mounting Brackets to the wall.

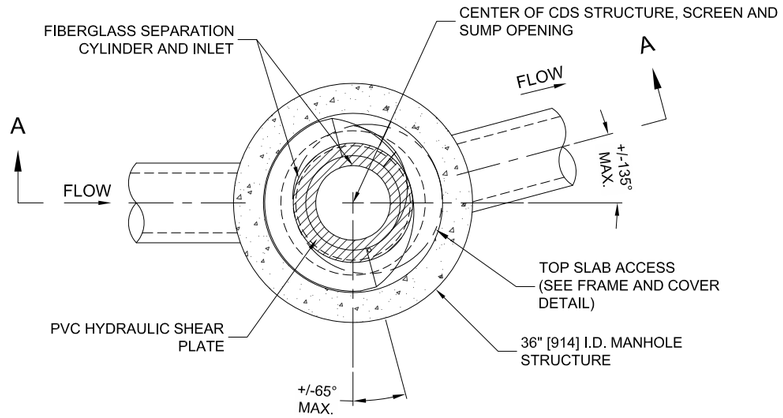
4. Push CPS firmly against the wall aligning the notched opening on the CPS flange bracket with top capture arm on the Mounting Bracket. 5. Slide down until CPS is secured against the floor.

6. Secure Quick Release Lid behind the top of the Mounting Bracket and wedge downward until it rests firmly against the bracket thus setting your bypass height.

S-Shaped Corner Configurations

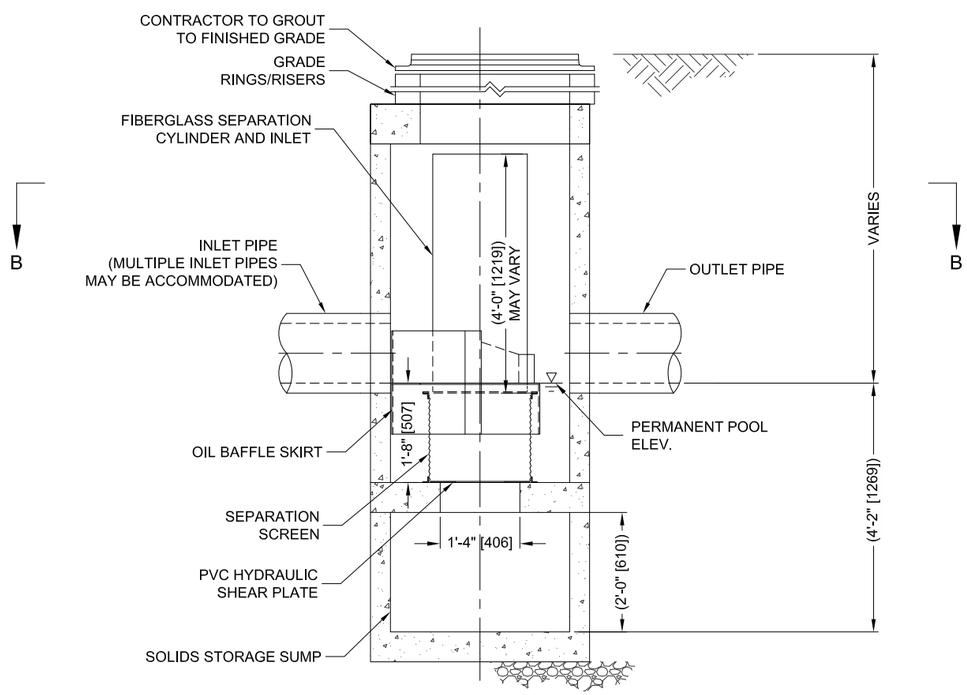
Semi-Circular Configuration





PLAN VIEW B-B

N.T.S.



ELEVATION A-A

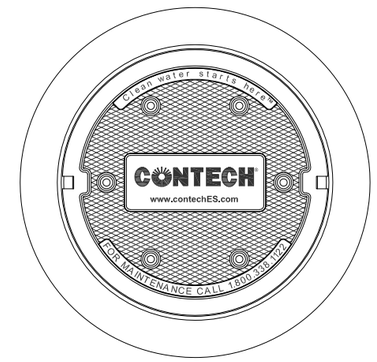
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,798,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 0.50 [14.16 L/s] CFS, OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 6.0 [170 L/s] CFS. IF THE SITE CONDITIONS EXCEED 6.0 [170 L/s] CFS, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN.



FRAME AND COVER

(DIAMETER VARIES)

N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			0.24 CFS
PEAK FLOW RATE (CFS OR L/s)			5.0 CFS
RETURN PERIOD OF PEAK FLOW (YRS)			50
SCREEN APERTURE (2400 OR 4700)			4700
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	144.95	HDPE	12
INLET PIPE 2	144.97	HDPE	12
OUTLET PIPE	144.92	HDPE	18
RIM ELEVATION			149.7
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
	N/A	N/A	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS1515-3-C
ONLINE CDS
STANDARD DETAIL

I:\COMMON\CAD\TREATMENT\22 CDS\40 STANDARD DRAWINGS\ONLINE (CDS-C)\DWG\CDS1515-3-C-DTL.DWG 2/27/2017 11:46 AM

CONTECH®
CONSTRUCTION PRODUCTS INC.

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.5	0.4
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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CONTECH Construction Products Inc. provides site solutions for the civil engineering industry. CONTECH's portfolio includes bridges, drainage, sanitary sewer, stormwater and earth stabilization products. For information on other CONTECH division offerings, visit contech-cpi.com or call 800.338.1122

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The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

CONTECH CONSTRUCTION PRODUCTS INC.
800.925.5240
contechstormwater.com

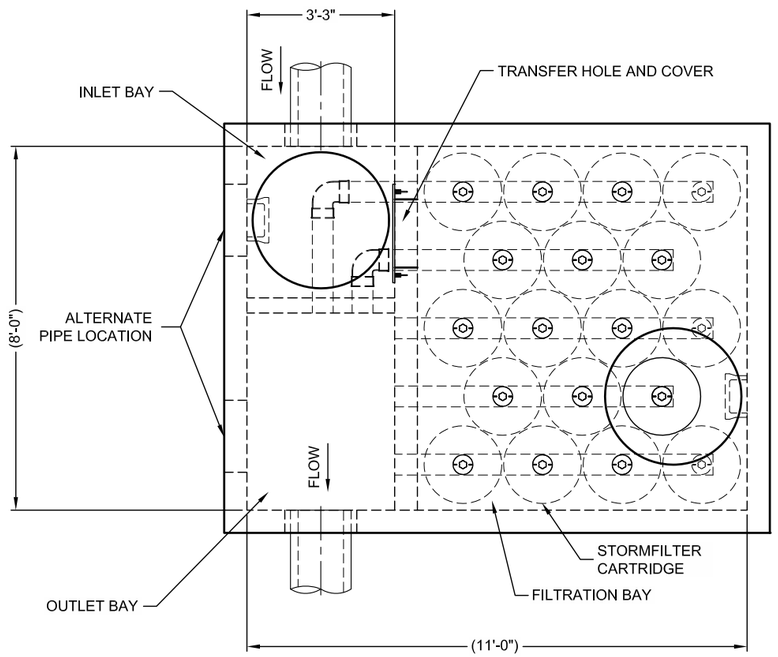
CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

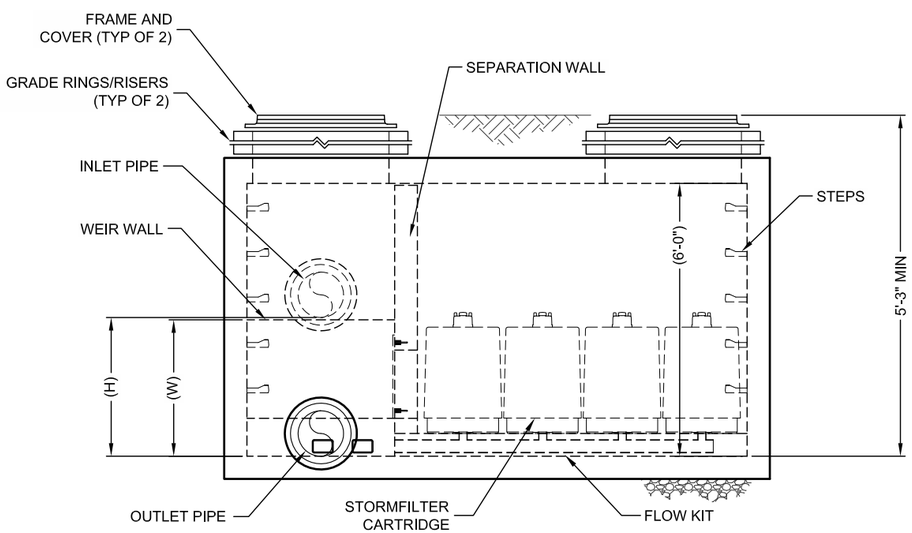
Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than eighteen inches the system should be cleaned out. **Note: To avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.



PLAN



ELEVATION

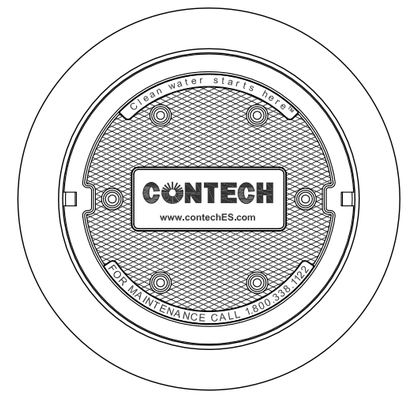
The Stormwater Management StormFilter®

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING: U.S. PATENTS: 5,322,629; 5,324,579; 5,707,527; 5,985,157; 6,027,639; 6,045,046; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

STORMFILTER DESIGN TABLE

- THE 8' x 11' PEAK DIVERSION STORMFILTER TREATMENT CAPACITY VARIES BY CARTRIDGE COUNT AND LOCALLY APPROVED SURFACE AREA SPECIFIC FLOW RATE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.
- THE PEAK DIVERSION STORMFILTER IS AVAILABLE IN A LEFT INLET (AS SHOWN) OR RIGHT INLET CONFIGURATION.
- ALL PARTS AND INTERNAL ASSEMBLY PROVIDED BY CONTECH UNLESS OTHERWISE NOTED.

CARTRIDGE HEIGHT	27"		18"		LOW DROP	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	3.05'		2.3'		1.8'	
HEIGHT OF WEIR (W)	3.00'		2.25'		1.75'	
TREATMENT BY MEDIA SURFACE AREA	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	10	5



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (cfs)	0.24
PEAK FLOW RATE (cfs)	5.8
RETURN PERIOD OF PEAK FLOW (yrs)	50
# OF CARTRIDGES REQUIRED (12" TALL FLOAT)	11
CARTRIDGE FLOW RATE	10 GPM
MEDIA TYPE (CSF, PERLITE, ZPG)	PERLITE

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE	145.25	HDPE	18"
OUTLET PIPE	143.45	HDPE	18"

INLET BAY RIM ELEVATION	150.8
FILTER BAY RIM ELEVATION	150.9

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	N/A	N/A

NOTES/SPECIAL REQUIREMENTS:

PERFORMANCE SPECIFICATION

FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES**. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **37 SECONDS**.
SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM)**. SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM).**

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.

INSTALLATION NOTES

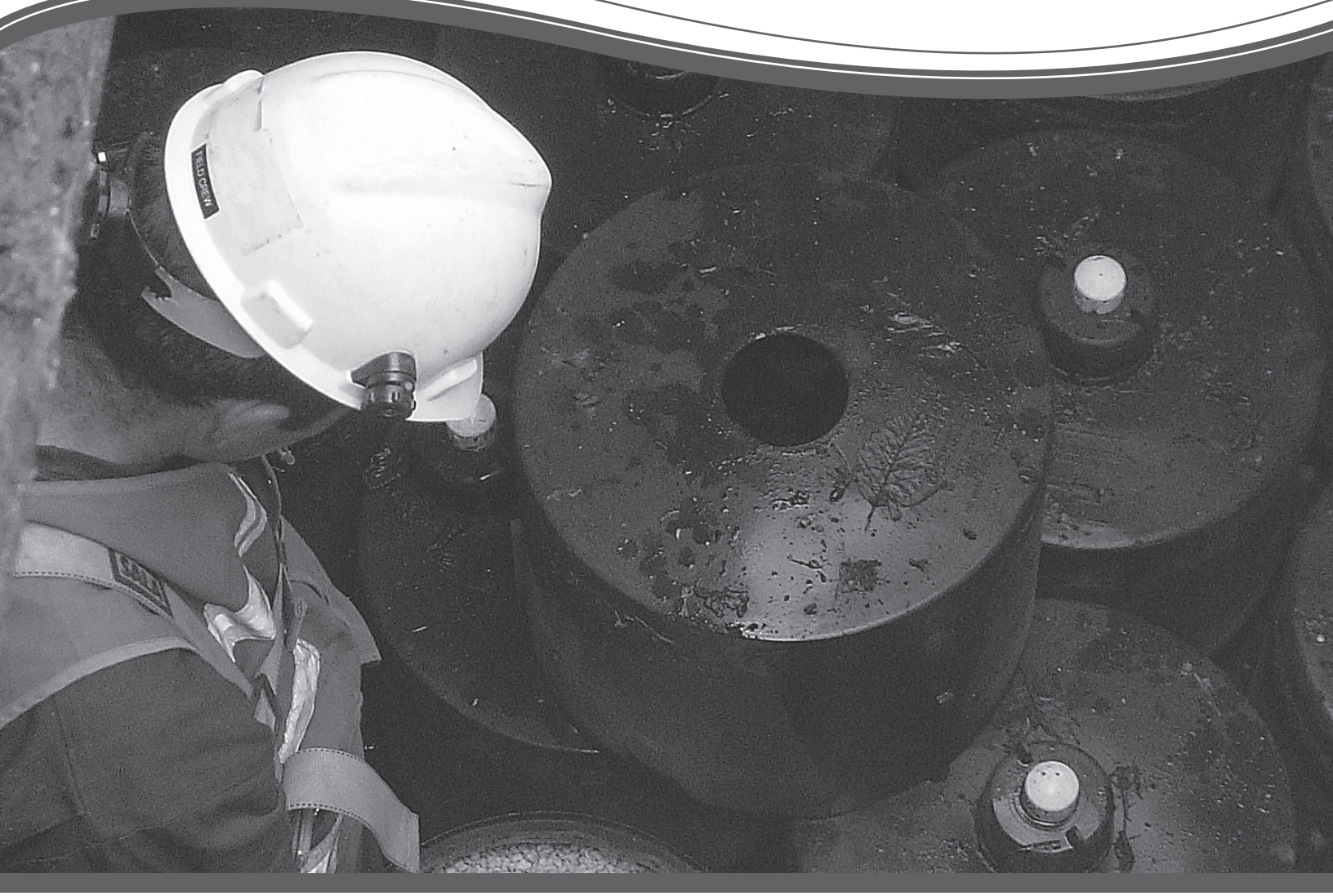
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
F. CONTRACTOR TO REMOVE THE TRANSFER HOLE COVER WHEN THE SYSTEM IS BROUGHT ONLINE.

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

THE STORMWATER MANAGEMENT STORMFILTER
8' x 11' PEAK DIVERSION STORMFILTER
STANDARD DETAIL

URBANGREEN®

StormFilter Inspection and Maintenance Procedures



CONTECH®
ENGINEERED SOLUTIONS

The Stormwater Management
StormFilter®

Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter out and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

Maintenance Procedures

Although there are many effective maintenance options, we believe the following procedure to be efficient, using common equipment and existing maintenance protocols. The following two-step procedure is recommended:

1. Inspection

- Inspection of the vault interior to determine the need for maintenance.

2. Maintenance

- Cartridge replacement
- Sediment removal

Timing for Inspection and Maintenance

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection, the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.

In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows, as well as for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, during dryer months in late summer to early fall.

Frequency of Maintenance

The primary factor for determining frequency of maintenance for the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis, in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

The average maintenance lifecycle is approximately 1-3 years. Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions. Regulatory requirements or a chemical spill can shift maintenance timing as well.

The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs.

Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

- **Warning**: In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct an inspection:

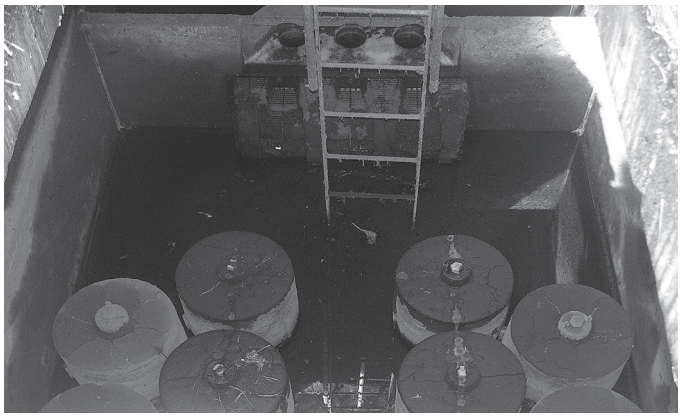
- **Important:** Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to whether or not maintenance is needed.

Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered)

1. Sediment loading on the vault floor.
   a. If >4" of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
   a. If >1/4" of accumulation, maintenance is required.
3. Submerged cartridges.
   a. If >4" of static water in the cartridge bay for more than 24 hours after end of rain event, maintenance is required.
4. Plugged media.
   a. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
   a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
   a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
   a. If pronounced scum line (say ≥ 1/4" thick) is present above top cap, maintenance is required.
8. Calendar Lifecycle.
   a. If system has not been maintained for 3 years maintenance is required.



Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

- **Important**: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flow is occurring.

Replacement cartridges can be delivered to the site or to the customer's facility. Replacement cartridges are available from Contech Engineered Solutions.

- **Warning**: In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment, offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

Method 1:

A. Maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Unscrew (counterclockwise rotations) each filter cartridge from the underdrain connector. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact Contech Engineered Solutions for suggested attachment devices.

- **Important:** Note that cartridges containing leaf media (CSF) do not require unscrewing from their connectors. Take care not to damage the manifold connectors. This connector should remain installed in the manifold and could be capped during the maintenance activity to prevent sediments from entering the underdrain manifold.

B. Remove the used cartridges (up to 250 lbs. each) from the vault.

- **Important:** Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner unless Contech Engineered Solutions performs the maintenance activities and damage is not related to discharges to the system.

C. Set the used cartridge aside or load onto the hauling truck.

D. Continue steps a through c until all cartridges have been removed.

Method 2:

A. Enter the vault using appropriate confined space protocols.

B. Unscrew the cartridge cap.

C. Remove the cartridge hood screws (3) hood and float.

D. At location under structure access, tip the cartridge on its side.

- **Important**: Note that cartridges containing media other than the leaf media require unscrewing from their threaded connectors. Take care not to damage the manifold connectors. This connector should remain installed in the manifold and capped if necessary.

D. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.

E. Set the empty, used cartridge aside or load onto the hauling truck.

F. Continue steps a through e until all cartridges have been removed.

8. Remove accumulated sediment from the floor of the vault and from the forebay. For convenience, this can be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors. The connectors are short sections of 2-inch schedule 40 PVC, or threaded schedule 80 PVC that should protrude about 1″ above the floor of the vault. Lightly wash down the vault interior.
   a. If desired, apply a light coating of FDA approved silicon lube to the outside of the exposed portion of the connectors. This ensures a watertight connection between the cartridge and the drainage pipe.
   b. Replace any damaged connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.

11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used **empty** cartridges to Contech Engineered Solutions.

Inspection Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other ☐

Sediment Thickness in Forebay: _____ Date: _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Estimated Flow from Drainage Pipes (if available): _____

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water: _____

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal: _____

☐ Minor Structural Repairs: _____

☐ Drainage Area Report _____

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

Items Needing Further Work: _____

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Review the condition reports from the previous inspection visits.

StormFilter Maintenance Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vau☐ Cast-In-Plac☐ Linear Catch Basi☐ Manhol☐ Other☐

List Safety Procedures and Equipment Used: _____

_____

_____

System Observations

Months in Service:

Oil in Forebay: Ye☐ No ☐

Sediment Depth in Forebay: _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Drainage Area Report

Excessive Oil Loading: Ye☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Ye☐ No ☐ Source: _____

Erosion of Landscaped Areas: Ye☐ No ☐ Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Ye☐ No ☐ Details: _____

Replace Cartridges: Ye☐ No ☐ Details: _____

Sediment Removed: Ye☐ No ☐ Details: _____

Quantity of Sediment Removed (estimate?):

Minor Structural Repairs: Ye☐ No ☐ Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes:

_____

_____

_____

_____

_____

_____

_____

Related Maintenance Activities -

Performed on an as-needed basis

StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal, a number of options are available; including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

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Support

- Drawings and specifications are available at contechstormwater.com.
- Site-specific design support is available from our engineers.

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Ventura Countywide Stormwater Quality Management Program

Fact Sheet - Storm Drains and Discharge Points

Return to Fact Sheet index

You are responsible to keep storm drains and other discharge points (drainage channels, sheet flow areas, etc.) clean throughout the entire facility (indoors and outdoors), including perimeter areas where surface runoff exits the property.	
WHY ARE STORM DRAINS & DISCHARGE POINTS A PROBLEM?	
Dirt, oil, grease and litter are washed down the storm drain with each rainfall event creating polluted runoff. Polluted runoff from your facility can reach water bodies and other wildlife habitats and harm fish, birds and human life.	
WHAT CAN I DO?	PREVENT POLLUTED RUNOFF FROM ENTERING STORM DRAINS AND DISCHARGE POINTS BY:
	• Implementing Best Management Practices (BMPs) as listed below • Training employees on BMPs, good housekeeping practices & spill response
BEST MANAGEMENT PRACTICES	• Prevent spills from entering storm drains and discharge points. • Eliminate illegal connections to the storm drain. • Routinely inspect and clean out all storm drains, discharge points & catch basins. • Control litter by sweeping and picking up litter regularly. • Clean mats in a sink or use a mat cleaning service. • Collect all wastewater and discharge to the sanitary sewer. • Use "dry" cleaning methods (sweep rather than hose down) to clean shop floors, materials processing and storage areas, access roads and parking lots. • Use secondary containment measures for waste storage areas. • Practice good housekeeping to minimize liability, reduce costs and make detection of spills and potential problems easier to identify. • Clean up spills immediately to minimize safety hazards and prevent discharge to the storm drain system. • Train all employees. Your success depends on a well-trained staff.

Ventura Countywide Stormwater Quality Management Program

Fact Sheet - Buildings and Grounds Maintenance

Return to Fact Sheet index

You are responsible for preventing contaminants from contributing to polluted stormwater runoff in areas where building or grounds maintenance is conducted (landscaping, cleaning activities, etc.)	
WHY IS BUILDING & GROUNDS MAINTENANCE A CONCERN?	
Areas where building or grounds maintenance is conducted can contribute contaminants to runoff when measures have not been taken to prevent discharges. The overuse of pesticides and fertilizers, over-watering and inadequate erosion control may result in an illegal discharge.	
WHAT CAN I DO?	PREVENT POLLUTED RUNOFF BY:
	• Implementing Best Management Practices (BMPs) as listed below • Training employees on BMPs, good housekeeping practices & spill response
BEST MANAGEMENT PRACTICES	• Utilize native vegetation to reduce water, fertilizer or pesticide needs. • Use landscaping pesticides and fertilizers only as needed and apply as directed. • Avoid over-watering to prevent excess runoff. • Use integrated pest management (IPM) where appropriate. • Sweep paved surfaces, rather than hosing down or using blowers. • Properly contain and dispose of waste water, sweepings and sediments. • Use non-toxic substitute for chemicals when possible. • Regularly inspect and clean storm drains. • Control litter by sweeping and picking up trash on a regular basis. • Clean up spills immediately to minimize safety hazards and prevent discharge to the storm drain system. • Train all employees. Your success depends on a well-trained staff.

This page last updated on Tuesday, July 14, 2009
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Ventura Countywide Stormwater Quality Management Program

Ventura Countywide Stormwater Quality Management Program

Fact Sheet - Cleaning of Floors and Outside Impervious Surfaces

Return to Fact Sheet index

You are responsible to keep floors and impervious surfaces free of contaminates that are generated or accumulated there (process areas, kitchens and food preparation areas, parking lots, sidewalks, dumpster areas, etc.)	
WHY IS PROPER MAINTENANCE & CLEANING SO IMPORTANT?	
Contaminants from your facility can contribute to polluted runoff when floors and outside impervious areas are not maintained or cleaned properly.	
WHAT CAN I DO?	PREVENT POLLUTED RUNOFF BY:
	• Implementing Best Management Practices (BMPs) as listed below • Training employees on BMPs, good housekeeping practices & spill response
BEST MANAGEMENT PRACTICES	• Practice good housekeeping. • Keep outside areas (dumpsters, parking lots, etc.) free of trash and debris, and regularly clean them to prevent pollutant buildup. • Use absorbent for liquid spills and sweeping and mopping to clean outside areas. • Regularly inspect and clean out grease traps. • Avoid spilling onto floors or other surfaces through good housekeeping. • Control litter by sweeping and picking up trash on a regular basis. • Never dispose of wastewater to the storm drain. • Use "dry" cleaning methods (sweeping, vacuuming, etc.) on sidewalks and parking lots and dispose of waste properly. • Use a damp mop to clean floors, and contain the wastewater for proper disposal (sewer, on-site treatment, etc.) • Clean up spills immediately to minimize safety hazards and prevent discharge to the storm drain system. • Train all employees. Your success depends on a well-trained staff.

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Tuesday, July 17, 2007

Ventura Countywide Stormwater Quality Management Program

Ventura Countywide Stormwater Quality Management Program

Fact Sheet - Vehicle & Equipment Washing & Cleaning

Return to Fact Sheet index

You are responsible to wash or clean vehicles and equipment (machinery, air filters, grease traps, etc.) properly to avoid contributing pollutants to runoff.	
WHY IS WASHING AND CLEANING A CONCERN?	
Your facility can contribute contaminants to runoff if waste water from equipment and vehicle cleaning is rinsed onto parking lots or into gutters or storm drains. Improperly stored contaminated rags may also result in an illegal discharge.	
WHAT CAN I DO?	PREVENT POLLUTED RUNOFF BY:
	• Implementing Best Management Practices (BMPs) as listed below • Training employees on BMPs, good housekeeping practices & spill response
BEST MANAGEMENT PRACTICES	• If possible use off-site commercial washing and steam cleaning. • Use designated wash areas, preferably covered, to prevent contact with stormwater. berm wash areas or use other measures to contain waste water. • Use alternative washing and cleaning methods to reduce the potential for non-stormwater discharges. If possible, use "dry" cleaning methods, such as wiping down, rather than hosing vehicles or equipment. • Never discharge wastewater to the storm drain. Discharge it to the sanitary sewer after contacting your local sewering agency to find out if pre-treatment is required. • Properly contain and dispose of cleanup materials (rags, towels, absorbent materials, etc.) • Clean up spills immediately to minimize safety hazards and prevent discharge to the storm drain system. • Train all employees. Your success depends on a well-trained staff.

Ventura Countywide Stormwater Quality Management Program

Fact Sheet - Waste Management & Disposal

Return to Fact Sheet index

You are responsible for properly managing all areas where solid, liquid or hazardous wastes are handled, stored or disposed of to prevent pollutants from contaminating stormwater runoff..	
WHY IS WASTE MANAGEMENT & DISPOSAL A CONCERN?	
Your facility can contribute contaminants to stormwater runoff if wastes are not managed and disposed of properly. Poor waste management may result in an illegal discharge.	
WHAT CAN I DO?	PREVENT POLLUTED RUNOFF BY:
	• Implementing Best Management Practices (BMPs) as listed below • Training employees on BMPs, good housekeeping practices & spill response
BEST MANAGEMENT PRACTICES	• Cover and berm waste storage areas. • Keep outside areas (dumpsters, parking lots, etc.) free of trash and debris. • Store wastes indoors when possible. • Keep waste containers covered. • Regularly inspect and clean grease traps. • Use non-toxic substitute for chemicals when possible. • Recycle food grease, cleaning solutions, oil, antifreeze, batteries and fluids. • Sweep parking lots or other surfaces to remove debris blown on-site. • Store liquids in a designated area on a paved impervious surface within a covered secondary containment. Keep outdoor storage containers in good condition. • Regularly inspect and clean storm drains. • Regularly control litter by sweeping and picking up trash and litter. • Clean up spills immediately to minimize safety hazards and prevent discharge to the storm drain system. • Train all employees. Your success depends on a well-trained staff.

Ventura Countywide Stormwater Quality Management Program

Fact Sheet - Waste Recycling & Disposal

Return to Fact Sheet index

You are responsible to implement measures to detect, correct and enforce against illegal dumping of pollutants on streets, into water and the storm drain system.	
WHY IS PROPER DISPOSAL SO IMPORTANT?	
Properly dispose of wastes, and recycle when possible, to eliminate illegal discharges. Reduce, reuse and recycle hazardous and non-hazardous wastes when possible, to lower your disposal costs and the amount of waste entering our landfills. Participate in waste exchange opportunities to decrease the waste you generate and to save money and resources.	
WHAT CAN I DO?	PREVENT POLLUTED RUNOFF BY:
	• Implementing Best Management Practices (BMPs) as listed below • Training employees on BMPs, good housekeeping practices & spill response
WHO CAN I CALL TO GET INFORMATION?	For general information on Ventura County recycling & disposal programs visit: **www.wasteless.org** **NON-HAZARDOUS WASTE RECYCLING** Call the Ventura County 24 hr. Recycling Hotline at 805.654.3935 or visit their website at **www.wasteless.org/recycleguide/recyclgde.html** **HOUSEHOLD HAZARDOUS WASTE:** Disposal, Recycling & Substitutes Visit **www.wasteless.org/index2.html#HHWRDF** for information on upcoming collection events or to find a list of recycling and reuse facilities throughout Ventura County **VC MAX MATERIALS EXCHANGE** Call 805.654.2477 or visit **www.vcmax.org** for more information on the free countywide service designed to keep viable, reusable goods out of local landfills. This program promotes reuse and waste reduction; helps to reduce participant's disposal costs; and provides residents, non-profits, and local businesses with an opportunity to "reuse" items that others no longer want or need. **RECYCLING & WASTE REDUCTION ASSISTANCE FOR BUSINESSES** Call 805.654.3506 or visit **www.wasteless.org/buswst.html** for more information on this **FREE** consultation service provided by the Ventura County Solid Waste Management Department to businesses in the unincorporated areas of Ventura County. Businesses located within city limits should contact their city recycling offices for assistance. **WASTEWATER AWARDS PROGRAM FOR BUSINESSES** Call 805.654.3506 or visit **www.wasteless.org/awards.html** for more information on this countywide program designed to acknowledge businesses and non-profit organizations that are reducing waste.

MAINTENANCE PLAN

APPENDIX C – INSPECTION FORMS

I.5 Infiltration BMP Inspection and Maintenance Checklist

Date: _____ Work Order # _____

Type of Inspection: □ post-storm □ annual □ routine □ post-wet season □ pre-wet season

Facility: _____ Inspector(s): _____

Defect	Conditions When Maintenance Is Needed	Inspection Result (0,1, or 2) †	Date Maintenance Performed	Comments or Action(s) Taken to Resolve Issue
Appearance, vegetative health	Mowing and trimming vegetation is needed to prevent establishment of woody vegetation, and for aesthetic and vector reasons.			
Vegetation	Poisonous or nuisance vegetation or noxious weeds.			
	Excessive loss of turf or ground cover (if applicable).			
Trash & Debris	Trash and debris > 5 cf/1,000 sf (one standard size garbage can).			
Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.			
Erosion	Undercut or eroded areas at inlet or outlet structures.			
Sediment and Debris	Accumulation of sediment, debris, and oil/grease on surface, inflow, outlet or overflow structures.			
Sediment and Debris	Accumulation of sediment and debris, in sediment forebay and pretreatment devices.			
Water drainage rate	Standing water, or by visual inspection of wells (if available), indicates design drain times are not being achieved (i.e., within 72 hours).			
Media clogging surface layer	Lift surface layer (and filter fabric if installed) and check for media clogging with sediment (function may be able to be restored by replacing surface aggregate/filter cloth).			

Defect	Conditions When Maintenance Is Needed	Inspection Result (0,1, or 2) †	Date Maintenance Performed	Comments or Action(s) Taken to Resolve Issue
Media clogging	Lift surface layer (and filter fabric if installed) and check for media clogging with sediment (partial or complete clogging which may require full replacement).			

†Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed and include WO#. Enter 2 if maintenance was performed same day.

MAINTENANCE PLAN

APPENDIX D – AMENDMENT LOG

AMENDMENT LOG

Amendment No.	Date	Brief Description of Amendment	Prepared and Approved By

PCSMP

APPENDIX E – SOILS INFORMATION

gravels and have a high rate of water transmission. Ventura County soil numbers 6 and 7 are Group A soils.

- Group B soils are typically silty loams or loams. They have a moderate infiltration rate when thoroughly wetted and consist chiefly of moderately deep to deep and moderately well to well drained soils with moderately fine to moderately coarse texture. Ventura County soil numbers 4 and 5 are Group B soils.

- Group C soils are typically sandy clay loams. They have low infiltration rates when thoroughly wetted, consist chiefly of soils with a layer that impedes downward movement of water, and/or have moderately fine to fine soil structure. Ventura County soil numbers 2 and 3 are Group C soils.

- Group D soils are typically clay loams, silty clay loams, sandy clays, silty clays, or clays. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with high swelling potential, permanent high water table, claypan or clay layer at or near the surface, and/or shallow soils over nearly impervious material. Ventura County soil number 1 is a Group D soil.

Infiltration-based BMPs should be feasible in areas mapped with Ventura County Soil Numbers 4 through 7. If site-specific data is available, then soils with infiltration rates of 0.5 in/hr or greater are considered feasible for infiltration. Infiltration-based BMPs should not be designed for sites mapped with Ventura County Soil Numbers 1 through 3 (unless site specific testing is performed and shows an infiltration rate greater than 0.5 in/hr) or with site-specific infiltration rates less than 0.5 in/hr.

Locations where soils are mapped with Ventura Hydrology Manual Soil Number 3, or where a site-specific analyses show that the soils have an infiltration rate of 0.3 to 0.5 inches per hour, and no other infiltration-related infeasibility criteria apply, shall use a Bioinfiltration BMP (or Rainwater Harvesting). Bioinfiltration is an adaption of the Bioretention with an Underdrain BMP in which the underdrain is raised above the gravel storage layer in order to promote infiltration but allow release of biotreated runoff to the storm drain when infiltration capacity is reached.

Early identification of soil types throughout the project footprint can reduce the number of test pit investigations and infiltration tests needed. Early identification reduces the number of potential test sites to locations with those that are most likely to be amenable to infiltration. Guidance for conducting test pit investigations and infiltration tests is provided in Appendix C.

Project applicants should review available geologic or geotechnical reports on local geology to identify relevant features such as depth to bedrock, rock type, lithology, faults, and hydrostratigraphic or confining units. These geologic investigations may also identify shallow water tables and past groundwater issues that are important for BMP design (see below).

OBJECTID	official_name	well_name	data_source	report_no	site_name	site_id	bh_data_class	operator	job_number	longitude	latitude	ref_elevation	total_depth	remarks
6338	000052_00073_34119B1	IPD329B15	City of Camarillo	IPD329	Technicolor Facility on Parcel 1		SPT	Earth Systems Consultants	SS21900V1	-119.0279287	34.21992273	153	51	No GW encountered

GEOTECHNICAL ENGINEERING REPORT

FOR IMPROVEMENTS TO EXISTING BUILDING AT

3233 MISSION OAKS BOULDEVARD

CAMARILLO CALIFORNIA

VT-24745-02

MAY 19, 2017

PREPARED FOR

REXFORD INDUSTRIAL

BY

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Project No.: VT-24745-02
Report No.: 17-5-43

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Project: 3233 Mission Oaks Boulevard
Camarillo, California
Subject: Geotechnical Engineering Report

Earth Systems Southern California (Earth Systems) has performed a Geotechnical Engineering study for proposed improvements to the northern end of the existing building located at 3233 Mission Oaks Boulevard in Camarillo, California. This study was authorized by Rexford Industrial (Bruce Herbkersman) on February 7, 2017 based on Earth Systems Proposal VP17-043 dated February 6, 2017. The accompanying Geotechnical Engineering Report presents the results of our field and laboratory testing programs, our review of available maps and documents relevant to the site geology, seismic setting, and geotechnical conditions, as well as our conclusions and recommendations pertaining to geotechnical aspects of project design.

Earth Systems has appreciated the opportunity to be of service to you on this project. Please call if you have any questions, or if we can be of further service.

Respectfully submitted,

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INTRODUCTION

Project Description

This report presents results of a Geotechnical Engineering study that Earth Systems performed for the proposed one-story construction of improvement to the northern portion of an existing building located at 3233 Mission Oaks Boulevard in Camarillo, California. The proposed improvements include additions, loading docks, paving, and storm water infiltration systems.

From April 1999 to June 1999, Earth Systems Consultants • Southern California prepared geotechnical engineering reports (see References) for the previous Technicolor buildings located west of the subject building. These other buildings are located within about 200 to 700 feet of the proposed construction. Earth Systems also prepared geotechnical reports (see References) for the southern portion of the subject building. We have reviewed these reports and are in general agreement with the analyses and recommendations, therefore, some of that data will be used within this report.

It is assumed that the proposed construction will be a mix of wood-framed and/or masonry/concrete construction supported on conventional foundations with raised and/or structural slab-on-grade floors. Subterranean construction is not anticipated. Structural considerations for building column loads of up to 70 kips with maximum wall loads of 3 kips per lineal foot were used as a basis for the recommendations of this report. If actual loads vary significantly from these assumed loads, Earth Systems should be notified since reevaluation of the recommendations contained in this report may be required.

Infiltration for stormwater discharge was performed and analyzed in general accordance with the Ventura County Technical Guidance Manual for Stormwater Quality Control Measures (2010) to determine infiltration rates.

Purpose and Scope of Work

The purpose of the geologic and geotechnical study that led to this report was to evaluate the near surface geologic and soil conditions of the site with respect to the proposed construction amd to provide geotechnical recommendations. These conditions include surface and subsurface soil types, expansion potential, bearing capacity, the presence or absence of subsurface water, and liquefaction potential.

The scope of our work included:

- Performing a reconnaissance of the site and reviewing past site-specific geotechnical reports and regional geology maps.
- Drilling, sampling, and logging 4 exploratory geotechnical borings to study bedrock, soil, and groundwater conditions.
- Drilling and logging 4 boring for infiltration testing for storm water management.
- Laboratory testing soil samples obtained from the subsurface exploration to determine their physical and engineering properties.
- Analyzing the geotechnical data obtained.
- Consulting with owner representatives.
- Preparing this report.

Contained in this report are:

- Descriptions and results of field and laboratory tests that were performed.
- Discussions pertaining to the local geologic, soil, and groundwater conditions.
- Conclusions and recommendations pertaining to site grading and structural design.

Site Setting

The site of the proposed improvements is located at 3233 Mission Oaks Boulevard in Camarillo, California (see Vicinity Map and Site Plan in Appendix A). The site is currently occupied by two existing buildings with associated hardscaping and landscaping areas. Site access is from Mission Oaks Boulevard. The site is bounded by Mission Oaks Boulevard to the south and existing industrial/commercial developments in the other directions. The geographic coordinates of the subject lot are about Latitude 34.2201° North and Longitude 119.0264° West. The relative elevation of the site is about 150 feet above mean sea level. The site is relatively flat with surface drainage to the southwest.

GENERAL GEOLOGY

The site is located in the Pleasant Valley area of the western portion of the Transverse Ranges geologic province. Numerous east-west trending folds and reverse faults indicative of active north-south transpressional tectonics characterize the region. The ongoing regional compression

produces east-west trending faults that deform early Pleistocene to Tertiary aged marine and non-marine sedimentary bedrock units. The ongoing regional compression has locally resulted in the southeast-northwest trending Camarillo fault which is located approximately 500 feet south of the proposed construction areas, based on mapping by T.W. Dibblee Jr. and the SCAMP CGS/USGS [see attached Regional Geologic Maps by T.W. Dibblee, Jr. (Geologic Map of the Camarillo and Newbury Park Quadrangles, 1990) and SCAMP CGS/USGS (Geologic Map of the Camarillo 7.5' Quadrangle, 2004) in Appendix A]. The site does not lie within any study zones for fault rupture hazard or landslides, and no faults were encountered during our field studies.

The site is mapped by T.W. Dibblee, Jr. and the USGS as underlain by Holocene alluvial deposits, which was encountered during our field study of the project site.

SUBSURFACE CONDITIONS

Based on our borings (B-22 thru B-25), the site is underlain by alluvium (silty sands and sandy silts) from the ground surface to the maximum depth of borings, which is about 16.5 feet below ground surface. More detailed descriptions of the encountered subsurface soil conditions are included in the boring logs. The Site Plan in Appendix A indicates the approximate locations of the borings drilled by Earth Systems.

Expansion index tests were performed on samples of the near-surface soils. Results indicated that expansion indices of 34 ("Low" expansion range) and 17 ("Very Low" expansion range) were measured from samples of B-22@1'-5' and B-25@1'-5', respectively. The version of this classification of soil expansion are provided in Table 1809.7 Minimum Foundation Design which is included in Appendix B of this report.

Groundwater was not encountered in borings B-22 thru B-25 to a maximum depth of about 16.5 feet below the existing ground surface. No groundwater was encountered in boring B-15 (ESCSC, 1999) to a maximum depth of about 51 feet below the existing ground surface. According to the CDMG Seismic Hazard Zone Report for the Camarillo 7.5-Minute Quadrangle, Ventura County, California, the historical high groundwater was mapped to be at least 50 feet. It should also be noted that fluctuations in the groundwater levels and soil moisture conditions do occur due to change in seasons, variations in rainfall, irrigation practices, construction impacts, and other factors.

SEISMICITY AND SEISMIC DESIGN

Although the site is not within a State-designated "fault rupture hazard zone", it is located in an active seismic region where large numbers of earthquakes are recorded each year. Historically, major earthquakes felt in the vicinity of the project site have originated from faults outside the area. These include the December 21, 1812 "Santa Barbara Region" earthquake, that was presumably centered in the Santa Barbara Channel, the 1857 Fort Tejon earthquake, the 1872 Owens Valley earthquake, and the 1952 Arvin-Tehachapi earthquake.

It is assumed that the 2016 CBC and ASCE 7-10 guidelines will apply for the seismic design parameters. The 2016 CBC includes several seismic design parameters that are influenced by the geographic site location with respect to active and potentially active faults, and with respect to subsurface soil or rock conditions. The seismic design parameters presented herein were determined by the U.S. Seismic Design Maps "risk-targeted" calculator on the USGS website for the jobsite coordinates (34.2201˚ North Latitude and 119.0264° West Longitude). The calculator adjusts for Soil Site Class D, and for Occupancy (Risk) Category I/II/III.

The calculated 2016 California Building Code (CBC) and ASCE 7-10 seismic parameters typically used for structural design are included in Appendix D and summarized in the table below.

Summary of Seismic Parameters – 2016 CBC

Site Class (Table 20.3-1 of ASCE 7-10 with 2013 update)	D
Occupancy (Risk) Category	I/II/III
Maximum Considered Earthquake (MCE) Ground Motion	
Spectral Response Acceleration, Short Period – S_s	2.178 g
Spectral Response Acceleration at 1 sec. – S_1	0.828 g
Site Coefficient – F_a	1.00
Site Coefficient – F_v	1.50
Site-Modified Spectral Response Acceleration, Short Period – S_{MS}	2.178 g
Site-Modified Spectral Response Acceleration at 1 sec. – S_{M1}	1.242 g
Design Earthquake Ground Motion	
Short Period Spectral Response – S_{DS}	1.452 g
One Second Spectral Response – S_{D1}	0.828 g
Reference: USGS, 2017 Latitude: 34.2201 N degrees Longitude: 119.0264 W degrees	

The values presented in the table above are appropriate for a 2 percent probability of exceedance in 50 years. A listing of the calculated 2016 CBC and ASCE 7-10 seismic parameters is attached. The site peak ground acceleration (PGA) per Section 1803.5.12 of the 2016 CBC and Section 11.8.3 of ASCE 7-10 is 0.834 g.

The Fault Parameters table in Appendix C lists the significant "active" and "potentially active" faults within a 33-mile (52-kilometer) radius of the project site. The distance between the site and the nearest portion of each fault is shown, as well as the respective estimated maximum earthquake magnitudes, and the deterministic mean site peak ground accelerations.

LIQUEFACTION AND CYCLIC SOFTENING

Earthquake-induced cyclic loading can be the cause of several significant phenomena, including liquefaction in fine sands and silty sands and cyclic softening in clays. Liquefaction in sands can result in a complete loss of strength and can cause structures to settle or even overturn if it occurs in the bearing zone. Cyclic softening in clays during earthquakes has resulted in buildings experiencing foundation failure and ground surface deformation similar to that resultant from liquefaction. If liquefaction or cyclic softening occurs beneath sloping ground, a phenomenon known as lateral spreading can occur. Liquefaction and cyclic softening is typically limited to the upper 50 feet of the subsurface soils. There are a number of conditions that need to be satisfied for liquefaction or cyclic softening to be a potential. Of primary importance is that groundwater, perched or otherwise, usually must be within the upper 50 feet of soils.

To help analyze liquefaction potential, we relied upon groundwater data from a boring located approximately 160 feet west of the site. Groundwater was not encountered in a nearby boring (B-15) from the adjacent property to the west (see reference ESCSC 1999; and log B-15 attached in Appendix B of this report). Historical high groundwater is mapped deeper than 50 feet based on mapping of historic high groundwater levels in the subject area contained in the Seismic Hazard Zone Report for the Camarillo 7.5-Minute Quadrangle (2002). Groundwater is not anticipated to be located in the upper 50 feet, therefore, liquefaction is not considered a potential hazard at the proposed construction site.

SEISMIC INDUCED SETTLEMENT OF DRY SAND

Sands tend to settle and densify when subjected to earthquake shaking. The amount of settlement is a function of relative density, cyclic shear strain magnitude, and the number of strain cycles. A procedure to evaluate this type of settlement was developed by Seed and Silver (1972) and later modified by Pyke, et al (1975).). Tokimatsu and Seed (1987) presented a simplified procedure that has been reduced to a series of equations by Pradel (1998).

The boring data from the previously discussed boring B-15 (from adjacent site to the west) was used to determine the potential for seismically induced settlement at the site. The results of this analysis indicate that the potential of seismically induced settlement of the dry sands above the water table appears to pose a potential minor hazard at this site. Based on the attached liquefaction analyses calculation sheet (see Appendix D), the total dry sand settlement could potentially range up to about 0.8 inch. About half this amount could be differential settlement.

HYDROCONSOLIDATION

Hydroconsolidation is a phenomenon in which naturally occurring soil deposits, or non-engineered fill soils, collapse when wetted. Natural soils that are susceptible to this phenomenon are typically aeolian, debris flow, alluvial, or colluvial deposits with high apparent strength when dry. The dry strength is attributed to salts, clays, silts, and in some cases, capillary tension, "bonding" larger soil grains together. So long as these soils remain dry, their strength and resistance to compression are retained. However, when wetted, the salt, clay, or silt bonding agent is weakened or dissolved, or capillary tension reduced, eventually leading to collapse. Soils susceptible to this phenomenon are found throughout the southwestern United States.

Methods to analyze hydroconsolidation include double oedometer tests proposed by Jennings and Knight (1956), and a modified version of the Jennings and Knight procedure presented by Houston, et. al. (1988) involving a single oedometer test on a soil sample. The hydroconsolidation results from the referenced boring B-15 used the latter procedure.

The boring data from the previously discussed boring B-15 (from adjacent site to the west) was used to determine the potential for hydroconsolidation at the site. The results of this analysis indicate that the hydroconsolidation potential is estimated to be about 1.2 inches. The

hydroconsolidation laboratory test results are included in Appendix B – Selected Laboratory Testing (ESCSC, 1999).

FAULT RUPTURE HAZARD

A fault is a break in the earth's crust upon which movement has occurred in the recent geologic past and future movement is expected. A summary of nearby active faults is presented in the Appendix C under Table 1 Fault Parameters.

The proposed construction does not lie within a State of California designated active fault hazard zone. The activity of faults is classified by the State of California based on the Alquist-Priolo Earthquake Fault Zoning Act (1972). An active fault has had surface rupture with Holocene time (the past 11,000 years). A potentially active fault shows evidence of surface displacement during Quaternary time (last 1.6 million years). An inactive fault has no evidence of movement within the Quaternary time.

As previously discussed in the Regional Geology section of this report, the ongoing regional compression has locally resulted in the southeast-northwest trending Camarillo fault which is located approximately 500 feet south of the proposed construction areas, based on mapping by T.W. Dibblee Jr. and the SCAMP CGS/USGS [see attached Regional Geologic Maps by T.W. Dibblee, Jr. (Geologic Map of the Camarillo and Newbury Park Quadrangles, 1990) and SCAMP CGS/USGS (Geologic Map of the Camarillo 7.5' Quadrangle, 2004) in Appendix A]. The site does not lie within a special study zones for fault rupture hazard (State of California, City of Camarillo). Therefore, the potential for fault rupture hazard at the proposed construction is considered low.

LANDSLIDES

Landsliding is the process where a distinct mass of rock or soil moves downslope due to gravity. No landslides are mapped on the subject site by Dibblee or SCAMP CGS/USGS (see Regional Geology Maps in Appendix A). Because there are no identified landslides either on or trending into the proposed construction site, hazards associated with these phenomena should be considered low.

ROCKFALL

Loose boulder-sized rocks and/or weathering bedrock outcrops located upslope from construction can lead to a rockfall hazard. Because of the site's location in a relatively flat alluvial plain, the potential for rockfall onto the proposed construction site appears to be low.

SEISMICALLY-INDUCED FLOODING

Earthquake-induced flooding types include tsunamis, seiches, and reservoir failure. Because of the subject sites relative position away from any the Pacific Ocean and any reservoirs, the potential for Tsunami, seiche, or reservoir failure should be considered low.

INFILTRATION TESTING

On May 1, 2017, four approximately 6-inch diameter infiltration borings (IT-1 thru IT-4) were drilled to depths of about 15, 5, 15, and 5 feet, respectively, below the ground surface to determine the soil profile and allow installation of plastic casing for infiltration testing (see Site Plan in Appendix A for infiltration boring locations).

After drilling was completed, 2-inch diameter slotted PVC casings were lowered into the boreholes. The annuli between the casings and boring walls were then filled with pea gravel. On May 2, 2017, the infiltration tests were run according to a procedure consistent with the referenced Ventura County Technical Guidance Manual for Stormwater Quality Control Measures. The procedure used, falling-head borehole infiltration test, is typically accepted by the City of Camarillo. About 2 feet of water was added to the bottom of each of the holes to start the tests and the drop in the water surface monitored by taking periodic measurements. Multiple readings were taken at certain frequency within the test interval depending on the infiltration rate. After each of these intervals, water was added to return the original refill depth above the hole bottom for the next test interval. The tests were run until the infiltration rate became reasonably stable, see Infiltration Test Results in Appendix D.

Based on the testing, the recommended test infiltration rates for the depth tested and boring locations are:

Boring	Boring Depth (feet)	Infiltration Rate (inch/hour)	Infiltration Rate (cm/s)
IT-1	15	18.00	0.0127
IT-2	5	0.48	0.0003
IT-3	15	0.50	0.0004
IT-4	5	0.15	0.0001

Percolation test rates were corrected to infiltration rates by a method provided in the Los Angeles County Low Impact Development, Best Management Practices GS200.1 manual. The correction factor is from the Los Angeles County guideline for infiltration testing in boreholes and its purpose is to correct a simple three dimensional percolation rate to a one dimensional infiltration rate (a variation of the Porchet equation). The formula is reproduced below:

Reduction Factor (R_f) = $R_f = \left(\frac{2d_1 - \Delta d}{DIA}\right) + 1$

With:
d_1 = Initial Water Depth (in.)
Δd = Water Level Drop of the Final Period or Stabilized Rate (in.)
DIA = Diameter of the boring (in.)

There are many factors that influence the infiltration rate. Clear water was used in our tests, whereas deleterious material will likely be contained in the storm water. Variations in soil conditions within the limits of the proposed infiltration system will likely affect infiltration characteristics. The designer who utilizes the infiltration results should consider these factors, as well as apply a factor-of-safety to the infiltration rate to account for future disposal bed siltation.

CONCLUSIONS AND RECOMMENDATIONS

Based on our findings, it is our professional opinion that the site is geotechnically suitable for the proposed improvements provided the geotechnical recommendations contained herein are incorporated into the project design. Earth Systems should be given the opportunity to review final project plans prior to construction.

Grading

1. Pre-Construction Considerations
   a. Plans and specifications should be provided to Earth Systems prior to grading. Plans should include the grading plans, foundation plans, and foundation details.
   b. Draining systems should be designed so that water is not discharged into bearing soils or near the building. Final site grade could be such that all water is diverted away from the building toward either hardscapes or drain inlets, and is not allowed to pond. In landscape areas adjacent to residences, the 2016 California Building Code requires a minimum gradient of 5 percent away from the edge of the building foundation for a minimum of 10 feet.
   c. Improvements below ground level should be waterproofed and drained in accordance with the Project Architect's recommendations.
   d. It is recommended that Earth Systems Southern California be retained to provide Geotechnical Engineering services during site development and grading, and foundation construction phases of the work to observe compliance with the design concepts, specifications and recommendations, and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.
   e. The fill materials should be sampled and tested for pH, soluble chloride, soluble sulfate, and resistivity. The results of the testing should be provided to the project designers for their interpretations pertaining to the corrosivity or reactivity of various construction materials (such as concrete and piping) with the soils

2. Rough Grading/Areas of Development
   a. Grading at a minimum should conform to Appendix J in the 2016 California Building Code (CBC), and with the recommendations of the Geotechnical Engineer during construction. Where the recommendations of this report and the cited section of the 2016 CBC are in conflict, the Owner should request clarification from the Geotechnical Engineer.
   b. To control settlement and provide a more uniform bearing condition, foundations should bear completely onto compacted engineered fill. The soils should be overexcavated throughout the proposed construction footprint to the deeper depth of either: 1) 3.5 feet below the bottom of footings, or 2) 5 feet

below existing grade, and to a distance of 5 feet beyond the perimeter of the foundation edges. The resulting surface should then be scarified to a depth of about 6 inches, moisture conditioned and recompacted to at least 90 percent of maximum density. Then the removed soils can be placed as fill in approximately 6-inch lifts compacted to a minimum of 90 percent of maximum density. The intent of these recommendations is that is footings are to be bottomed on recompacted soils, there should be a minimum of 4 feet of compacted soils below them.

c. Areas outside of the building area to receive fill, exterior slabs-on-grade, sidewalks, or paving should be overexcavated 2 feet. The resulting surfaces should then be scarified an additional 6 inches, moisture conditioned, and recompacted.

d. Grading performed adjacent to the existing buildings should be done with the ABC slotting method. The width of any slot cut should not exceed 8 feet. The complete construction and backfill of the 'A' slot must be performed prior to excavation of the 'B' slot, and likewise the 'C' slot. After the cut for each slot is made, bracing and possibly shoring of the near vertical cut slope may be required for continued temporary stability of slot excavation and safety of personnel.

e. The existing ground surface should be initially prepared for grading by removing all vegetation, trees, large roots, debris, other organic material and non-complying fill. Organics and debris should be stockpiled away from areas to be graded, and ultimately removed from the site to prevent their inclusion in fills. Voids created by removal of such material should be properly backfilled and compacted. No compacted fill should be placed unless the underlying soil has been observed by the Geotechnical Engineer.

f. The bottoms of all excavations should be observed by a representative of this firm prior to processing or placing fill.

g. On-site soils may be used for fill once they are cleaned of all organic material, rock, debris, and irreducible material larger than 8 inches.

h. Fill and backfill placed at near optimum moisture in layers with loose thickness not greater than 8 inches should be compacted to a minimum of 90 percent of the maximum dry density obtainable by the ASTM D 1557 test method.

i. Import soils used to raise site grade should be equal to, or better than, on-site soils in strength, expansion, and compressibility characteristics. Import soil can be evaluated, but will not be prequalified by the Geotechnical Engineer. Final

comments on the characteristics of the import will be given after the material is at the project site.

j. At the conclusion of grading, the pad subgrade should be sampled and tested for expansion index and corrosion potential.

Structural Design

1. Foundations

a. Expansion index tests were performed, the results indicated the "Very Low" to "Low" range. The project foundation specifications should at a minimum conform to the Table 1809.7 (included in Appendix B). However, a final expansion index will not be available until the conclusion of grading and result may affect foundation and slab design. Hence, we recommend that the "Low" expansion range be considered during design.

b. Conventional continuous footings and/or isolated pad footings may be used to support the proposed construction. For bearings soils in the "very low" expansion potential range, perimeter and interior footings should have a minimum embedment depth of 24 inches for a one-story structure.

c. Footings should bear into engineered fill as recommended elsewhere in this report. Foundation excavations should be observed by a representative of this firm after excavation, but prior to placing of reinforcing steel or concrete, to verify bearing conditions.

d. Conventional continuous footing may be designed based on an allowable bearing value of 2,000 psf. This value has a factor of safety greater than 3. The above bearing value can be increased by 250 psf per each additional foot of depth up to a maximum of 3,500 psf.

e. Allowable bearing values are net (weight of footing and soil surcharge may be neglected) and are applicable for dead plus reasonable live loads.

f. Bearing values may be increased by one-third when transient loads such as wind and/or seismicity are included.

g. Lateral loads may be resisted by soil friction on floor slabs and foundations and by passive resistance of the soils acting on foundation stem walls. Lateral capacity is based on the assumption that any required backfill adjacent to foundations and grade beams is properly compacted.

h. Conventional continuous footings for buildings where the ground surface slopes at 10:1 (horizontal to vertical) or steeper should be level or should be stepped so that both the top and the bottom are level.

i. The information that follows regarding reinforcement and premoistening for footings is the same as that given in the attached Table 1809.7 Minimum Foundation Design table for the "Low" expansion range. Actual footing designs should be provided by the Structural Engineer, but the dimensions and reinforcement he recommends should not be less than the criteria set forth in the Table 1809.7 Minimum Foundation Design table for the appropriate expansion range.

j. Continuous footings bottomed in soils in the "Low" expansion range should be reinforced, at a minimum, with one No. 4 bar along the bottom and one No. 4 bar along the top. However, the actual reinforcement should be determined by the Structural Engineer.

k. Bearing soils in the “Low” expansion range should be premoistened to 120 percent of optimum moisture content to a depth of 21 inches below lowest footing bottom. Premoistening should be confirmed by testing.

2. <u>Slabs-on-Grade</u>

a. Concrete slabs should be supported by firm recompacted fills as recommended elsewhere in this report.

b. It is recommended that perimeter slabs (walks, patios, etc.) be designed relatively independent of footing stems (i.e. free floating) so foundation adjustment will be less likely to cause cracking.

c. The slab design should be provided by the project Structural Engineer.

d. Slabs bottomed on soils in the “Low” expansion range should be underlain with a minimum of 4 inches of sand. Areas where floor wetness would be undesirable should be underlaid with a vapor retarder (as specified by the Project Architect or Civil Engineer) to reduce moisture transmission from the subgrade soils to the slab. The retarder/barrier should be placed per the recommendations of the project Architect or Manufacturer.

e. Slabs bottomed on soils in the “Low” expansion range should at a minimum be reinforced at mid-slab with No. 3 bars on 24-inch centers, each way.

f. Soils underlying slabs that are in the "Low" expansion range should be premoistened to 120 percent of optimum moisture content to a depth of 21 inches below lowest adjacent grade.

3. Frictional and Lateral Coefficients
   a. Resistance to lateral loading may be provided by friction acting on the base of foundations. A coefficient of friction of 0.58 may be applied to dead load forces. This value does not include a factor of safety.
   b. Passive resistance acting on the sides of foundation stems equal to 320 pcf of equivalent fluid weight may be included for resistance to lateral load. This value does not include a factor of safety.
   c. Passive resistance may be combined with frictional resistance provided that a one-third reduction in the coefficient of friction is used.

4. Retaining Wall Backfill
   a. Conventional cantilever retaining walls can be backfilled with compacted on-site soils or non-expansive import soil. An active pressure of 35 pcf of equivalent fluid weight for well-drained, level backfill may be used.
   b. For cantilever and restrained retaining walls the corresponding increment of seismic force per foot of retaining wall can be determined as $2H^2$ and $8.5H^2$, respectively. The determined forces will have approximately triangular pressure distributions with their centroids of pressure located 0.33H above the base of the retaining walls (Al Atik and Sitar, 2010).
   c. The pressures listed above were based on the assumption that backfill soils will be compacted to 90 percent of maximum dry density as determined by the ASTM D 1557 Test Method.
   d. The lateral earth pressure to be resisted by the retaining walls or similar structures should also be increased to allow for any other applicable surcharge loads. The surcharges considered should include forces generated by any structures or temporary loads that would influence the wall design.
   e. A system of backfill drainage should be incorporated into retaining wall designs. Backfill comprising the drainage system immediately behind retaining structures should be free-draining granular material with a filter fabric between it and the rest of the backfill soils. As an alternative, the backs of walls could be lined with geodrain systems. The backdrains should extend from the bottoms of the walls

to about 18 inches from finished backfill grade. Waterproofing may aid in reducing the potential for efflorescence on the faces of retaining walls.

f. Compaction on the uphill sides of walls within a horizontal distance equal to one wall height should be performed by hand-operated or other lightweight compaction equipment. This is intended to reduce potential "locked-in" lateral pressures caused by compaction with heavy grading equipment.

g. Water should not be allowed to pond near the tops of retaining walls. To accomplish this, final backfill site grades should be such that all water is diverted away from retaining walls.

5. Settlement Considerations

a. Maximum total settlements of about one-half inch are anticipated for foundations and floor slabs supported into firm native soil or on compacted fill and designed as recommended. Differential settlement between adjacent load bearing members should be less than one-half the total settlement.

b. Settlement from hydroconsolidation is estimated to be about 1.2 inches. Differential settlement between adjacent load bearing members could be about one-half the total settlement.

c. Seismic induced dry sand settlement is estimated to be less than 1 inch as previously discussed on page 6 of this report. Differential settlement between adjacent load bearing members could be about two-thirds the total settlement.

ADDITIONAL SERVICES

This report is based on the assumption that an adequate program of monitoring and testing will be performed by Earth Systems Southern California during construction to check compliance with the recommendations given in this report. The recommended tests and observations include, but are not necessarily limited to the following:

1. Review of the building and grading plans during the design phase of the project.
2. Observation and testing during site preparation, grading, placing of engineered fill, and foundation construction.
3. Consultation as required during construction.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The analysis and recommendations submitted in this report are based in part upon the data obtained from the 4 borings drilled on-site by Earth Systems, and 1 referenced boring drilled approximately 160 feet west of the site by Earth Systems Consultants • Southern California. The nature and extent of variations between and beyond the borings may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

The scope of services did not include any environmental assessment or investigation for the presence or absence of wetlands, hazardous or toxic materials in the soil, surface water, groundwater or air, on, below, or around this site. Any statements in this report or on the soil boring logs regarding odors noted, unusual or suspicious items or conditions observed, are strictly for the information of the client.

Findings of this report are valid as of this date; however, changes in conditions of a property can occur with passage of time whether they are due to natural processes or works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur whether they result from legislation or broadening of knowledge. Accordingly, findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of 1 year.

In the event that any changes in the nature, design, or location of the buildings or other improvements are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

This report is issued with the understanding that it is the responsibility of the Owner, or of his representative to insure that the information and recommendations contained herein are called to the attention of the Architect and Engineers for the project and incorporated into the plan and that the necessary steps are taken to see that the Contractor and Subcontractors carry out such recommendations in the field.

As the Geotechnical Engineers for this project, Earth Systems Southern California has striven to provide services in accordance with generally accepted geotechnical engineering practices in this

community at this time. No warranty or guarantee is expressed or implied. This report was prepared for the exclusive use of the Client for the purposes stated in this document for the referenced project only. No third party may use or rely on this report without express written authorization from Earth Systems Southern California for such use or reliance.

It is recommended that Earth Systems Southern California be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design and specifications. If Earth Systems Southern California is not accorded the privilege of making this recommended review, it can assume no responsibility for misinterpretation of the recommendations contained herein.

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APPENDIX A

Field Study
Vicinity Map
Regional Geologic Map 1 (Dibblee)
Regional Geologic Map 2 (SCAMP CGS/USGS)
Seismic Hazards Zones Map
Site Plan
Logs of Borings (B-22 through B-25, Earth Systems, 2017)
Log of Boring (B-15, Earth Systems Consultants Southern California, 1999)
Symbols Commonly Used on Boring Logs
Unified Soil Classification

FIELD STUDY

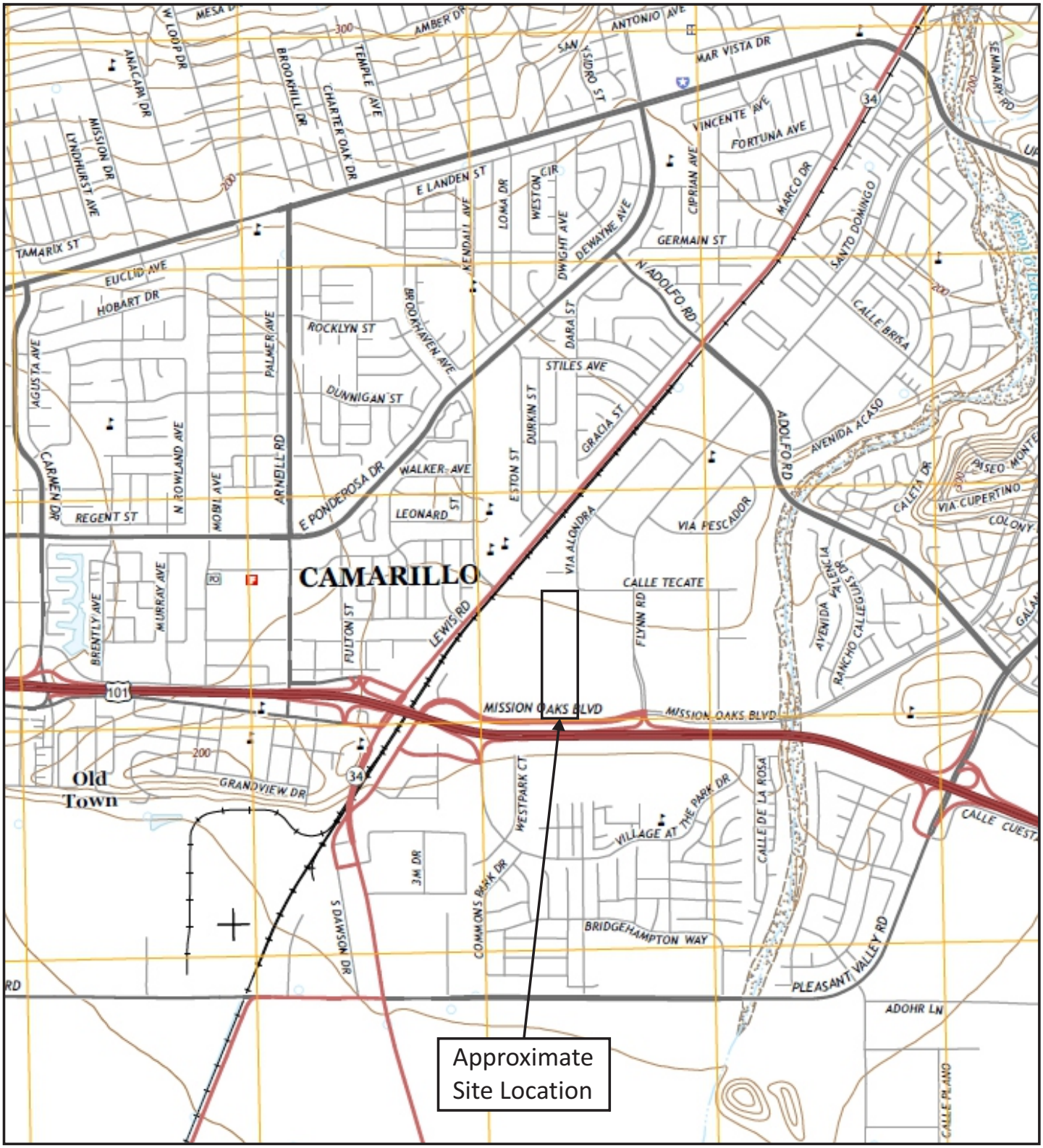
A. On May 1, 2017, four exploratory test borings (B-22 through B-25) were drilled for geotechnical testing to depths of about 16.5 feet below the existing ground surface at the subject site. The borings were drilled utilizing the hollow-stem auger drilling method. The approximate locations of the test borings were determined in the field by pacing and sighting, and are shown on the Site Plan in this Appendix. The borings were backfilled by tamping the auger cuttings back in the holes in 2 to 3 foot vertical intervals with an auger attachment.

B. On May 1, 2017, four exploratory borings were drilled (IT-1 through IT-4) for infiltration testing to depths of about 5 and 15 feet, respectively, below the ground surface (see attached Site Plan for infiltration boring locations). After drilling was completed, 2-inch diameter slotted PVC casings were lowered into each of the boring holes. The testing procedure and results are described in the Infiltration Testing section of this report.

C. Relatively undisturbed samples ("ring samples") were obtained within the test borings with a Modified California (MC) ring sampler (ASTM D 3550 with shoe similar to ASTM D 1586). The MC sampler has a 3-inch outside diameter and a 2.37-inch inside diameter. A 140-pound hammer falling approximately 30 inches (ASTM D 1586) drove the sampler. The hammer was operated by an automatic trip mechanism. The number of blows required to drive the sampler 18 inches was recorded in 6-inch increments and recorded on the boring logs. Recovered ring samples were sealed in plastic containers and transported to the Earth Systems Southern California's laboratory for further classification and testing.

D. Bulk samples of the auger cuttings was collected between depths ranging from about 1 to 5 feet from borings B-22 and B-25. These samples were secured for classification and testing purposes and represents a mixture of soils within the noted depths.

E. The final logs of the test borings represent our interpretation of the contents of the field logs and the results of laboratory testing performed on the samples obtained during the subsurface investigation. The final logs are included in this Appendix.



*Taken from USGS Topo Map, Camarillo Quadrangle, California, 2015.

Approximate Scale: 1" = 2,000'

0 2,000' 4,000'

N

VICINITY MAP

3233 Mission Oaks Boulevard
Camarillo, California

Earth Systems
Southern California

May 2017	VT-24745-02

*Taken from Dibblee, Jr., Geologic Map of the Camarillo and Newbury Park Quadrangles, Ventura County, California, 1990, DF-28.

GEOLOGIC SYMBOLS

not all symbols shown on each map

FORMATION CONTACT dashed where inferred or indefinite dotted where concealed

MEMBER CONTACT between units of a formation ····· Prominent bed

CONTACT BETWEEN SURFICIAL SEDIMENTS located only approximately in places

FAULT: Dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful. Parallel arrows indicate inferred relative lateral movement. Relative vertical movement is shown by U/D (U=upthrown side, D=downthrown side). Short arrow indicates dip of fault plane. Sawteeth are on upper plate of low angle thrust fault.

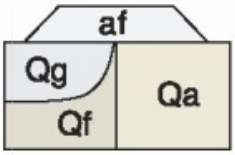
FOLDS: overturned — **ANTICLINE** — **SYNCLINE**

arrow on axial trace of fold indicates direction of plunge; dotted where concealed by surficial sediments

Strike and dip of sedimentary rocks: inclined (18); inclined (approximate) (20); overturned (80); horizontal; vertical

Strike and dip of metamorphic or igneous rock foliation or flow banding or compositional layers: inclined (75); inclined (approximate); vertical; overturned (80)

OTHER SYMBOLS: Direction of landslide movement; outline of water bodies shown on map; water well; oil well; springs



SURFICIAL SEDIMENTS

af *Artificial fill*
Qg *Stream channel sand and gravel*
Qf *Alluvial fan gravel and sand, locally slightly indurated*
Qa *Alluvium: gravel, sand and clay of flatlands*

Approximate Scale: 1" = 2,000'

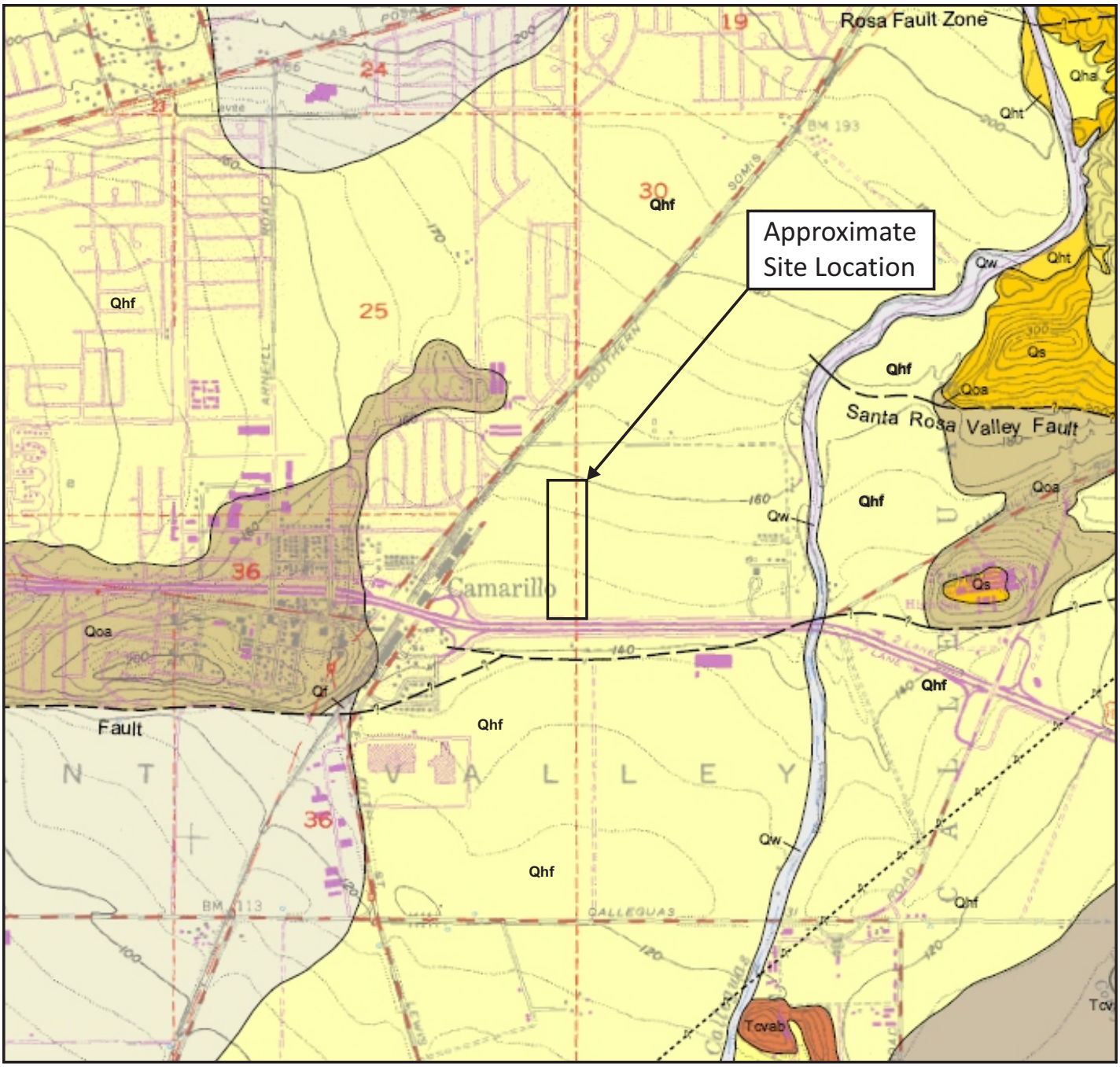
0 2,000' 4,000'

REGIONAL GEOLOGIC MAP 1

3233 Mission Oaks Boulevard
Camarillo, California

Earth Systems
Southern California

May 2017	VT-24745-02



*Taken from USGS, SCAMP Geologic Map of the Camarillo 7.5' Quadrangle, Ventura County, California, 2004.

————————	Contact between map units - Generally approximately located or inferred, dotted where concealed.
- - - - - - - -	Contact between similar map units of different relative age - Recognized by scour and incised channelling features. Generally approximately located.
—— — — —?—	Fault - Generally approximately located or inferred, dotted where concealed, queried where location is uncertain.
	Axis of anticline
	Axis of syncline
25	Strike and dip of bedding.
	Landslide - Arrows indicate principal direction of movement, queried where existence is questionable (some geologic features are drawn within questionable landslides); hachured where headscarp is mappable.

Qhf: Alluvial fan deposits (Holocene) - Includes active fan deposits, deposited by streams emanating from mountain canyons to the north onto the alluvial valley floor; deposits originate as debris flows, hyperconcentrated mudflows or braided stream flows; composed of moderately to poorly sorted and moderately to poorly bedded sandy clay with some silt and gravel.

N

Approximate Scale: 1" = 2,000'

0 2,000' 4,000'

REGIONAL GEOLOGIC MAP 2

3233 Mission Oaks Boulevard
Camarillo, California

Earth Systems
Southern California

May 2017	VT-24745-02

MAP EXPLANATION

Zones of Required Investigation:

Liquefaction

Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

NOTE: Seismic Hazard Zones identified on this map may include developed land where delineated hazards have already been mitigated to city or county standards. Check with your local building/planning department for information regarding the location of such mitigated areas.

Approximate Scale: 1" = 2,000'

0 2,000' 4,000'

STATE OF CALIFORNIA

SEISMIC HAZARD ZONES

Delineated in compliance with
Chapter 7.8, Division 2 of the California Public Resources Code
(Seismic Hazards Mapping Act)

CAMARILLO QUADRANGLE

OFFICIAL MAP

Released: February 7, 2002

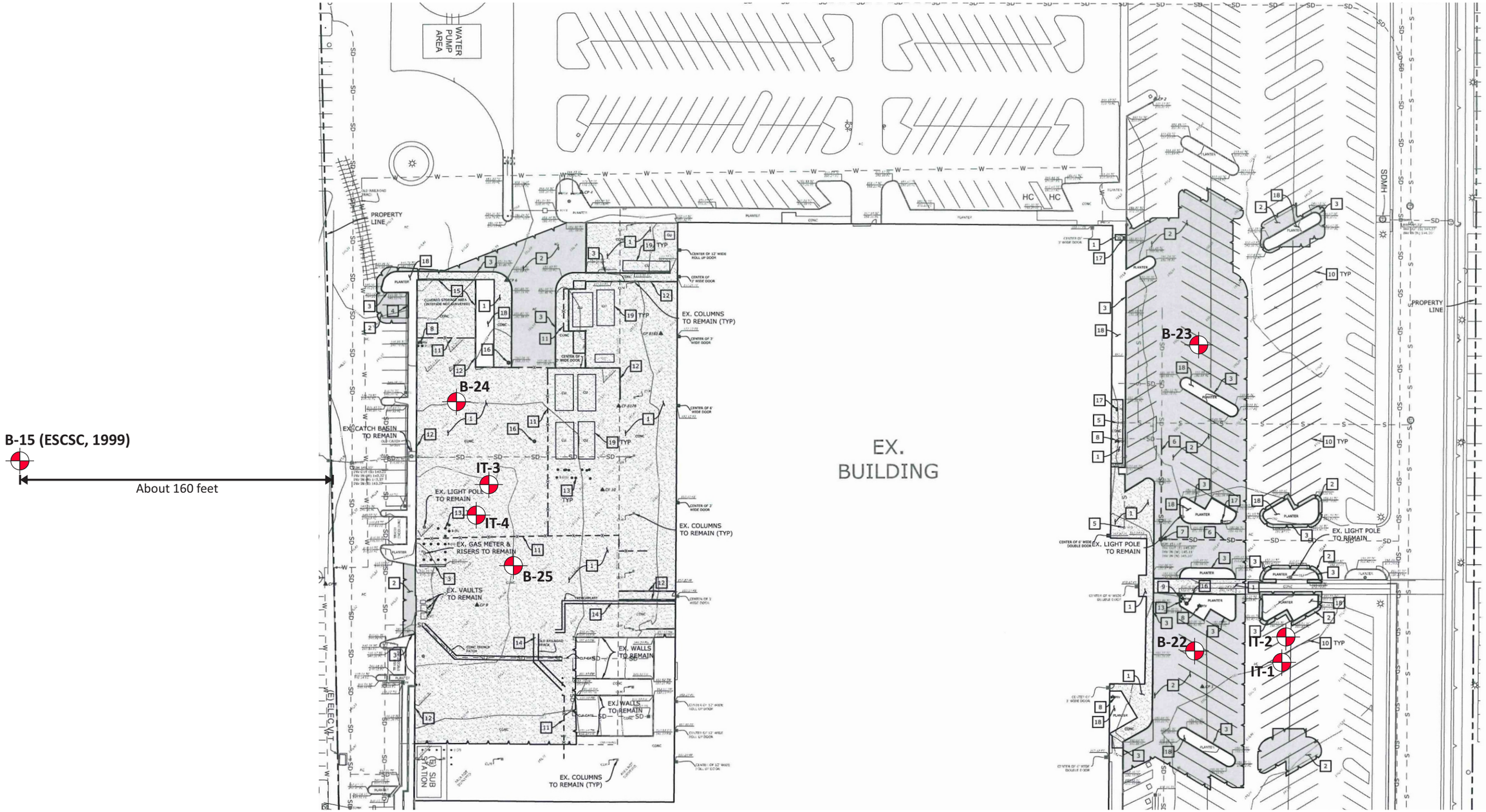
N

SEISMIC HAZARD ZONES MAP

3233 Mission Oaks Boulevard
Camarillo, California

Earth Systems
Southern California

May 2017	VT-24745-02



Approximate Boring Location

N

Scale 1"=50'

SITE PLAN	
3233 Mission Oaks Boulevard Camarillo, California	
Earth Systems Southern California	
May 2017	VT-24745-02

Logs of Borings (B-22 thru B-25 and IT-1 thru IT-4, Earth Systems, 2017)

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: B-22
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Asphalt: 3.0" Base Material: 5.0"
						SM			**ALLUVIUM:** Olive brown silty sand; minor clay; loose; damp to moist.
				4/5/7		SM	108.7	10.1	
5				4/6/7		SM	103.1	6.7	**ALLUVIUM:** Interbedded pale yellowish brown silty sand; minor caliche; loose; damp.
10				4/8/10		ML	103.0	10.7	**ALLUVIUM:** Interbedded pale yellowish brown sandy silt; minor caliche; loose; damp.
15				5/11/17		SM	111.5	7.8	**ALLUVIUM:** Interbedded pale yellowish brown silty sand; minor caliche; loose; damp.
20									Total Depth: 16.5 feet. No Groundwater Encountered.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: B-23
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Asphalt: 3.0" Base Material: 5.0"
						SM			
	X			4/9/10		SM	110.7	9.8	**ALLUVIUM:** Olive brown silty sand; medium dense; moist.
5				2/5/7		ML	89.1	26.6	**ALLUVIUM:** Interbedded pale yellowish brown sandy silt; minor caliche; loose; moist.
10				3/4/6		SM	108.9	12.8	**ALLUVIUM:** Olive brown silty sand; fine grained; loose; moist.
15				5/7/10		SM	110.6	6.7	**ALLUVIUM:** Pale olive brown silty sand; fine grained; medium dense; moist.
20									Total Depth: 16.5 feet. No Groundwater Encountered.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: B-24
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Concrete: 4.0" Base Material: 5.0"
						SM			**ALLUVIUM:** Olive brown silty sand; loose; moist.
			■	4/4/8		SM	103.3	19.1	**ALLUVIUM:** Interbedded pale yellowish brown silty sand; loose; moist.
5			■	4/4/5		SM	102.0	3.5	**ALLUVIUM:** Interbedded pale yellowish brown silty sand; minor caliche; loose; moist.
10			■	3/6/8		SM	99.2	21.8	Same as above.
15			■	4/5/8		SM	111.8	11.1	**ALLUVIUM:** Pale olive brown silty sand; fine grained; loose; moist.
20									Total Depth: 16.5 feet. No Groundwater Encountered.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: B-25
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Concrete: 5.0" Base Material: 5.0"
						SM			**ALLUVIUM:** Olive brown silty sand; loose; moist.
				3/4/8		SM	110.9	14.9	**ALLUVIUM:** Interbedded pale yellowish brown silty sand; loose; moist.
5				3/3/6		ML	83.5	29.5	**ALLUVIUM:** Interbedded pale yellowish brown sandy silt; minor caliche; loose; moist.
10				5/5/5		SM	96.3	19.8	**ALLUVIUM:** Olive brown silty sand; fine grained; loose; moist.
15				4/7/7		ML	92.3	22.2	**ALLUVIUM:** Interbedded pale yellowish brown sandy silt; loose; moist.
20									Total Depth: 16.5 feet. No Groundwater Encountered.

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: IT-1
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Asphalt: 3.0" Base Material: 5.0"
						SM			**ALLUVIUM:** Olive brown silty sand; minor clay; loose; damp to moist.
						SM			
5						SM/ ML			**ALLUVIUM:** Interbedded pale yellowish brown silty sand and olive brown sandy silts; minor caliche; loose; damp.
10						SM/ ML			**ALLUVIUM:** Interbedded pale yellowish brown silty sand and olive brown sandy silts; minor caliche; loose; damp.
15									Total Depth: 15.0 feet. No Groundwater Encountered. Installed 15.0 feet of 2.0" slotted PVC pipe and gravel pack.
20									

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: IT-2
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Asphalt: 3.0" Base Material: 5.0"
						SM			**ALLUVIUM:** Olive brown silty sand; minor clay; loose; damp to moist.
						SM/ ML			**ALLUVIUM:** Interbedded pale yellowish brown silty sand and olive brown sandy silts; minor caliche; loose; damp.
5									
									Total Depth: 5.0 feet.
									No Groundwater Encountered.
									Installed 5.0 feet of 2.0" slotted PVC pipe and gravel pack.
10									
15									
20									

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: IT-3
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Concrete: 5.0" Base Material: 5.0"
						SM			**ALLUVIUM:** Olive brown silty sand; loose; moist.
									ALLUVIUM: Interbedded pale yellowish brown silty sand and olive brown sandy silts; loose; moist.
5						SM/ ML			**ALLUVIUM:** Interbedded pale yellowish brown silty sand and olive brown sandy silts; minor caliche; loose; moist.
10						SM			**ALLUVIUM:** Olive brown silty sand; fine grained; loose; moist.
						SM/ ML			**ALLUVIUM:** Interbedded pale yellowish brown silty sand and olive brown sandy silts; loose; moist.
15									Total Depth: 15.0 feet. No Groundwater Encountered. Installed 15.0 feet of 2.0" slotted PVC pipe and gravel pack.
20									

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Earth Systems Southern California
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: IT-4
PROJECT NAME: 3233 Mission Oaks Boulevard
PROJECT NUMBER: VT-24745-02
BORING LOCATION: Per Plan

DRILLING DATE: May 1, 2017
DRILLING METHOD: 6.0" Hollow Stem Auger
DRILL: Mobile B-61
LOGGED BY: SC

Vertical Depth	Sample Type: Bulk	Sample Type: SPT	Sample Type: Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									Concrete: 5.0" Base Material: 5.0"
						SM			**ALLUVIUM:** Olive brown silty sand; loose; moist.
						SM/ ML			**ALLUVIUM:** Interbedded pale yellowish brown silty sand and olive brown sandy silts; loose; moist.
5									Total Depth: 5.0 feet.
									No Groundwater Encountered.
									Installed 5.0 feet of 2.0" slotted PVC pipe and gravel pack.
10									
15									
20									

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

Log of Boring (B-15, Earth Systems Consultants Southern California, 1999)

Earth Systems Consultants So. Calif.
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: 15
PROJECT NAME: Technicolor Facility on Parcel No. 1
PROJECT NUMBER: SS-21900-V1
BORING LOCATION: Per Plan

DRILLING DATE: 4-15-99
DRILLING METHOD: 6 " Hollow Stem Auger
DRILL: Mobil B-80
LOGGED BY: P.H.

VERTICAL DEPTH (feet)	SAMPLE TYPE: Bulk	SPT	Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
0									
5			■	10/12		SM	100.1	6.0	ALLUVIAL DEPOSITS: Slightly clayey silty fine sand, medium dense, moderate yellowish brown (%gravel=0.1, %sand=60.4, %silt=27.9, %clay=11.6).
10			■	17/15		CL/ML	96.3	21.3	ALLUVIAL DEPOSITS: Interbedded fine sandy silty clay to fine sandy clayey silt, medium stiff, dark yellowish brown (%gravel=0 %sand=31.8, %silt=28.6, %clay=39.6)
15			■	8/7		ML	106.7	12.5	ALLUVIAL DEPOSITS: Slightly clayey fine sandy silt, loose to medium dense, light grayish brown .
20			■	8/9		ML	81.7	11.7	ALLUVIAL DEPOSITS: Same as above.
25			■	15/17		ML	103.4	10.9	ALLUVIAL DEPOSITS: Same as above.
30			■	9/11		CL	85.7	34.6	ALLUVIAL DEPOSITS: Fine sandy clayey silt, medium dense, moderate yellowish brown (%gravel=0, %sand=21.1, %silt=48.1, %clay=30.8).
35			■	12/15		ML	96.5	17.1	ALLUVIAL DEPOSITS: Slightly clayey fine sandy silt, medium dense, moderate yellowish brown (%gravel=0, %sand=59.5, %silt=20.3, %clay=20.2).
40			■	13/18		SP	74.8	6.4	ALLUVIAL DEPOSITS: Slightly silty fine sand, medium dense (%gravel=0, %sand=82.6, %silt=17.4, %clay=0.

Note: The stratification lines shown represent the approximate boundary between soil and/or rock types and the transition may be gradual.

Earth Systems Consultants So. Calif.
1731-A Walter Street, Ventura, California 93003
PHONE: (805) 642-6727 FAX: (805) 642-1325

BORING NO: 15 (continued)
PROJECT NAME: Technicolor Facility on Parcel No. 1
PROJECT NUMBER: SS-21900-V1
BORING LOCATION: Per Plan

DRILLING DATE: 4-15-99
DRILLING METHOD: 6 " Hollow Stem Auger
DRILL: Mobil B-80
LOGGED BY: PH

VERTICAL DEPTH (feet)	SAMPLE TYPE: Bulk	SPT	Mod. Calif.	PENETRATION RESISTANCE (BLOWS/6")	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
40						SP	--	--	ALLUVIAL DEPOSITS: Slightly silty fine sand, medium dense, light grayish brown.
45				20/33		SW	--	--	ALLUVIAL DEPOSITS: Fine to coarse sand with minor gravel, dense, moderate yellowish brown (%gravel=5.4, %sand=88.7, %silt=4.1, %clay=1.8).
50				13/26		SW	108.5	3.5	ALLUVIAL DEPOSITS: Same as above.
55									Total Depth = 51.0 feet No Groundwater Encountered.
60									
65									
70									
75									
80									

Note: The stratification lines shown represent the approximate boundary between soil and/or rock types and the transition may be gradual.

SYMBOLS COMMONLY USED ON BORING LOGS

Modified California Split Barrel Sampler

Modified California Split Barrel Sampler - No Recovery

Standard Penetration Test (SPT) Sampler

Standard Penetration Test (SPT) Sampler - No Recovery

Perched Water Level

Water Level First Encountered

Water Level After Drilling

Pocket Penetrometer (tsf)

Vane Shear (ksf)

1. The location of borings were approximately determined by pacing and/or siting from visible features. Elevations of borings are approximately determined by interpolating between plan contours. The location and elevation of the borings should be considered

2. The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

3. Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. This data has been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, tides, temperature, and other factors at the time measurements were made.

BORING LOG SYMBOLS

Earth Systems
Southern California

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

UNIFIED SOIL CLASSIFICATION SYSTEM

Earth Systems
Southern California

APPENDIX B

Laboratory Testing
Tabulated Laboratory Test Results
Individual Laboratory Test Results
Selected Laboratory Testing (ESCSC, 1999)
Table 1809.7 Minimum Foundation Design

LABORATORY TESTING

A. Samples were reviewed along with field logs to determine which would be analyzed further. Those chosen for laboratory analysis were considered representative of soils that would be exposed and/or used during grading, and those deemed to be within the influence of proposed construction. Test results are presented in graphic and tabular form in this Appendix.

B. In-situ Moisture Content and Unit Dry Weight for the ring samples were determined in general accordance with ASTM D 2937.

C. The relative strength characteristics of site soils was determined from the results of direct shear tests on remolded samples. Specimens were placed in contact with water at least 24 hours before testing, and were then sheared under normal loads ranging from 1 to 3 ksf in general accordance with ASTM D 3080.

D. Maximum density tests were performed to estimate the moisture-density relationship of typical soil materials. The tests were performed in accordance with ASTM D 1557.

E. Expansion index tests were performed on bulk soil samples in accordance with ASTM D 4829. The samples were surcharged under 144 pounds per square foot at moisture content of near 50% saturation. The samples were then submerged in water for 24 hours and the amount of expansion was recorded with a dial indicator.

F. A Resistance ("R") Value test was conducted on a bulk sample secured during the field study. The test was performed in accordance with California Method 301. Three specimens at different moisture contents were tested, and the R-Value at 300 psi exudation pressure was determined from the plotted results.

TABULATED LABORATORY TEST RESULTS

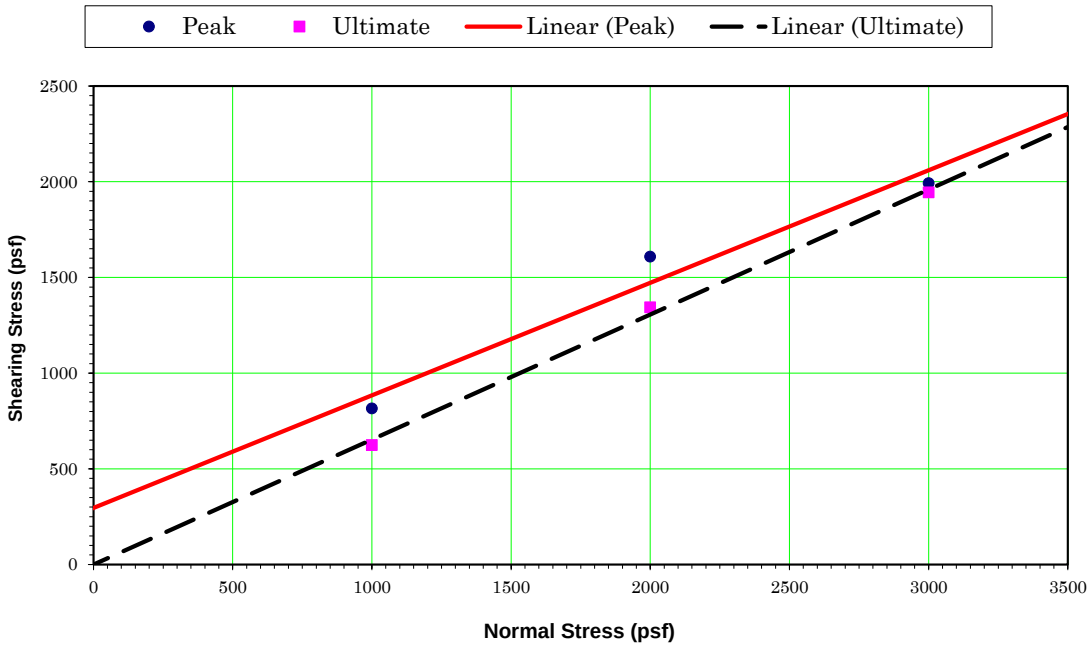
REMOLDED SAMPLES

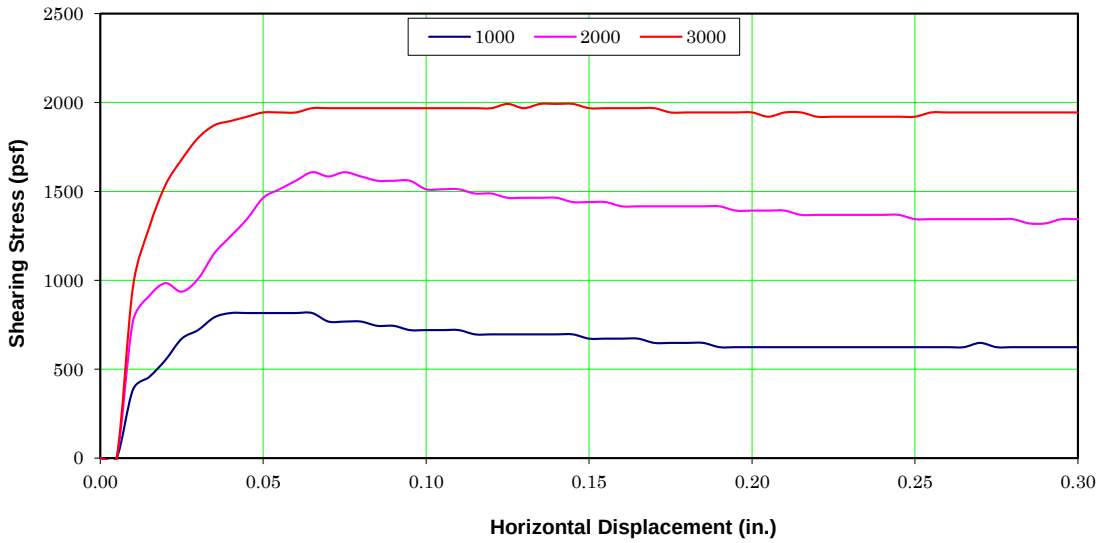
BORING AND DEPTH	B-22 @ 1'-5'	B-25 @ 1'-5'	B-23 @ 1'-3'
SOIL/BEDROCK TYPE	Alluvium	Alluvium	Alluvium
USCS	SM	SM	SM
MAXIMUM DENSITY (pcf)	125.0	124.5	- -
OPTIMUM MOISTURE (%)	10.0	10.5	- -
PEAK COHESION (psf)	290	240	- -
PEAK FRICTION ANGLE	30°	34°	- -
ULTIMATE COHESION (psf)	0	30	- -
ULTIMATE FRICTION ANGLE	33°	33°	- -
EXPANSION INDEX	34	17	- -
R-VALUE@300 PSI EXUDATION	- -	- -	13

IN-PLACE DENSITIES

Boring & Depth	Dry Density (pcf)	% Moisture
B-22@2'	108.7	10.1
B-22@5'	103.1	6.7
B-22@10'	103.0	10.7
B-22@15'	111.5	7.8
B-23@2'	110.7	9.8
B-23@5'	89.1	26.6
B-23@10'	108.9	12.8
B-23@15'	110.6	6.7
B-24@2'	103.3	19.1
B-24@5'	102.0	3.5
B-24@10'	99.2	21.8
B-24@15'	111.8	11.1
B-25@2'	110.9	14.9
B-25@5'	83.5	29.5
B-25@10'	96.3	19.8
B-25@15'	92.3	22.2

Individual Laboratory Test Results





DIRECT SHEAR DATA*

Sample Location: B 22 @ 1'-5'
Sample Description: Silty Sand
Dry Density (pcf): 112.1
Intial % Moisture: 10.2
Average Degree of Saturation: 90.8
Shear Rate (in/min): 0.0124 in/min

Normal stress (psf)	1000	2000	3000
Peak stress (psf)	816	1608	1992
Ultimate stress (psf)	624	1344	1944

	Peak	Ultimate
ϕ Angle of Friction (degrees):	30	33
c Cohesive Strength (psf):	290	0

Test Type: Peak & Ultimate

* Test Method: ASTM D-3080

DIRECT SHEAR TEST

3233 Mission Oaks Blvd

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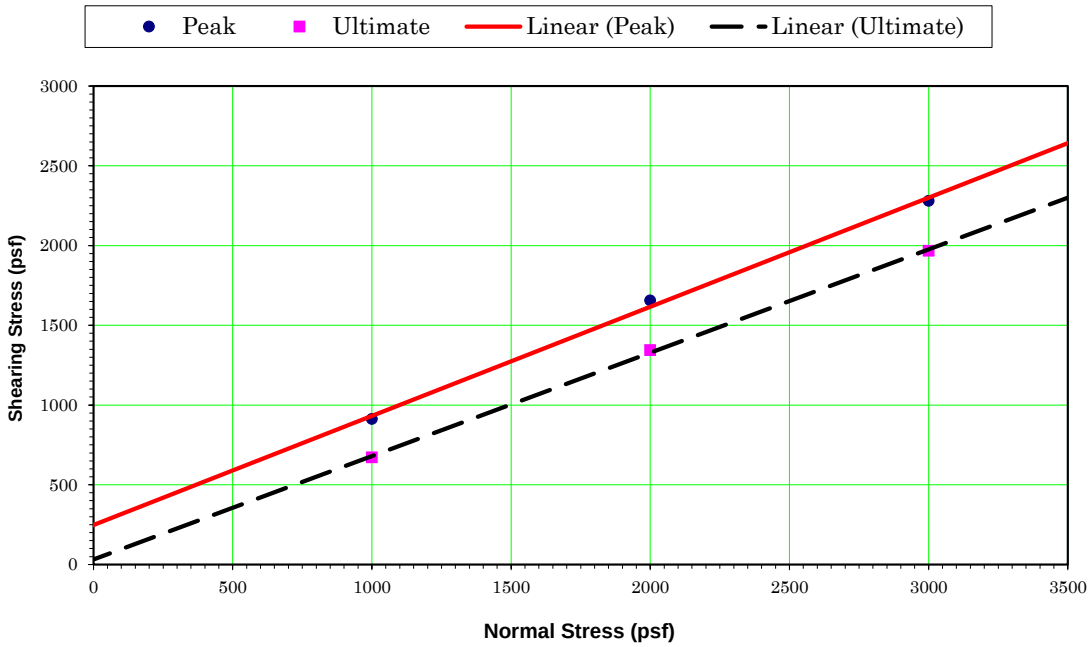
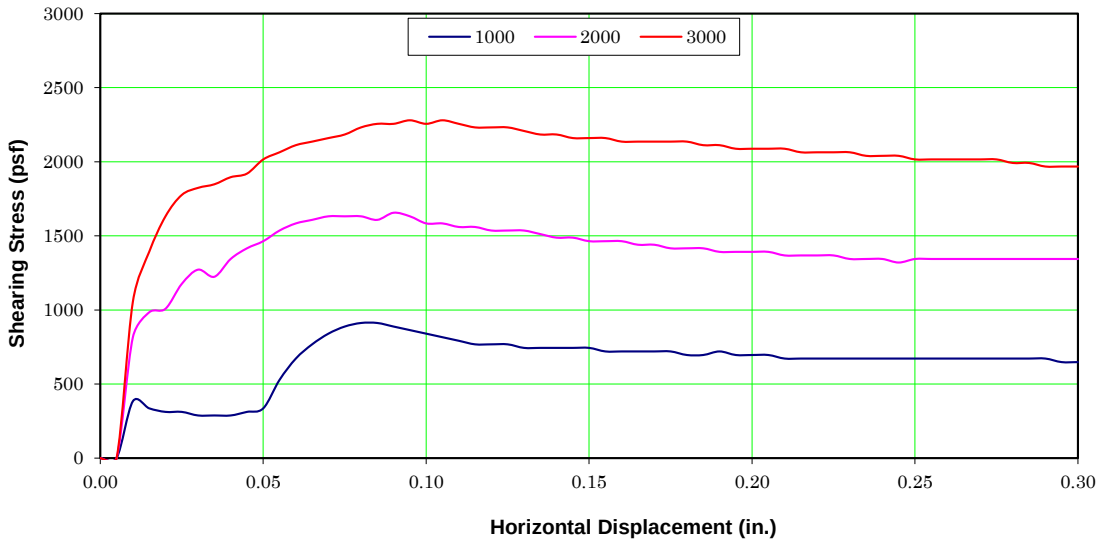
5/18/2017 | VT-24745-02





DIRECT SHEAR DATA*

Sample Location: B 25 @ 1'-5'
Sample Description: Silty Sand
Dry Density (pcf): 111.3
Intial % Moisture: 10.5
Average Degree of Saturation: 85.2
Shear Rate (in/min): 0.0097 in/min

Normal stress (psf)	1000	2000	3000
Peak stress (psf)	912	1656	2280
Ultimate stress (psf)	672	1344	1968

	Peak	Ultimate
ϕ Angle of Friction (degrees):	34	33
c Cohesive Strength (psf):	240	30

Test Type: Peak & Ultimate

* Test Method: ASTM D-3080

DIRECT SHEAR TEST

3233 Mission Oaks Blvd

Earth Systems
Southern California

5/18/2017 | VT-24745-02

File Number: VT-24245-02 Lab Number: 097403

MAXIMUM DENSITY / OPTIMUM MOISTURE

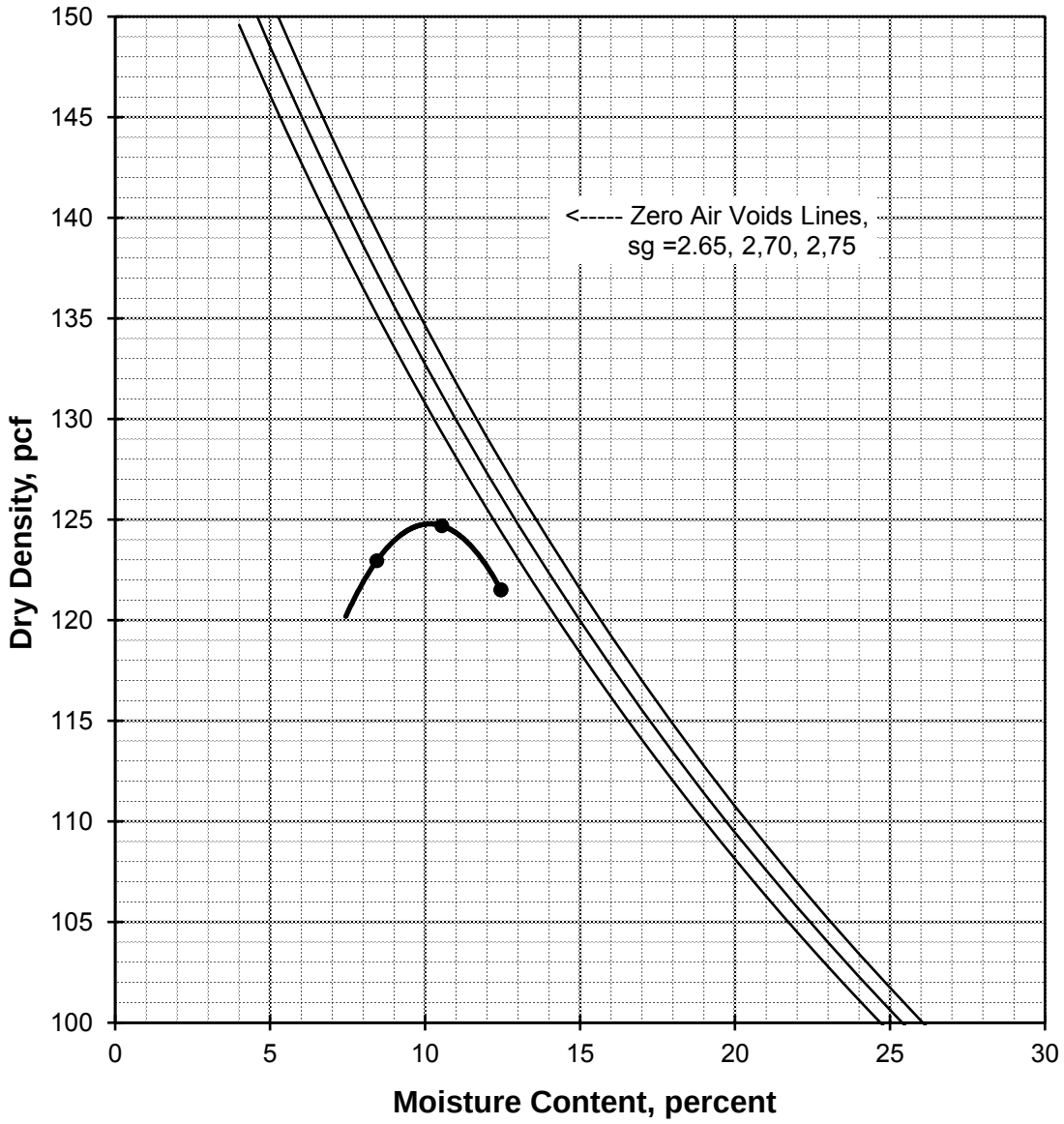
ASTM D 1557-07 (Modified)

Job Name: 3233 Mission Oaks Blvd
Sample ID: B 22 @ 1'-5'
Location:
Description: Brown Clayey Silty Sand

Procedure Used: A
Prep. Method: Moist
Rammer Type: Automatic

Maximum Density: **125 pcf**
Optimum Moisture: **10%**

Sieve Size	% Retained
3/4"	0.0
3/8"	0.0
#4	0.6



File Number: VT-24245-02 Lab Number: 097403

MAXIMUM DENSITY / OPTIMUM MOISTURE

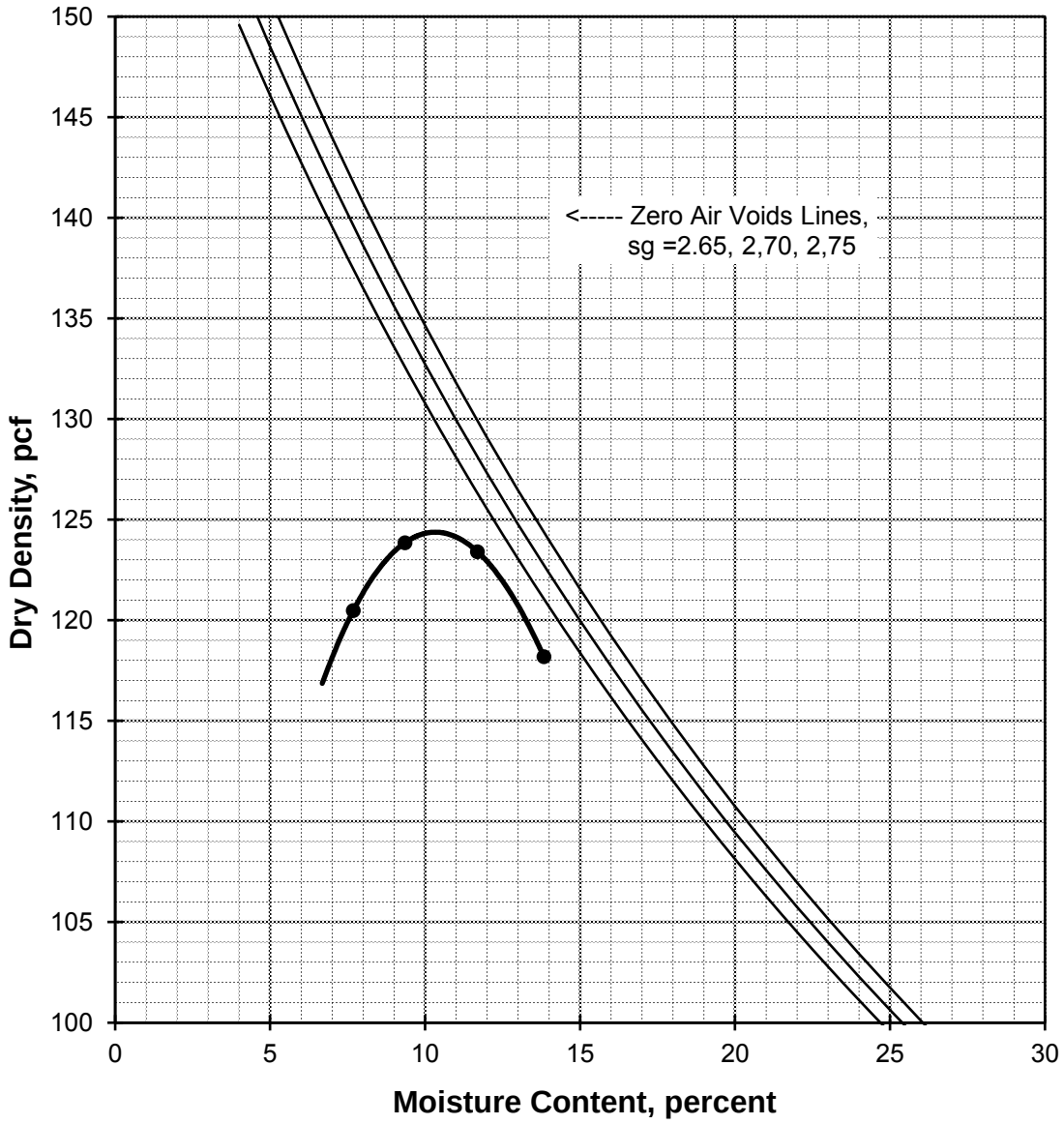
ASTM D 1557-07 (Modified)

Job Name: 3233 Mission Oaks Blvd
Sample ID: B 25 @ 1'-5'
Location:
Description: Light Olive Brown Clayey Silty Sand

Procedure Used: A
Prep. Method: Moist
Rammer Type: Automatic

Maximum Density: **124.5 pcf**
Optimum Moisture: **10.5%**

Sieve Size	% Retained
3/4"	0.0
3/8"	0.0
#4	0.9



File No.: VT-24745-02 May 18, 2017

EXPANSION INDEX

ASTM D-4829, UBC 18-2

Job Name: 3233 M ission Oaks Blvd
Sample ID: B 22 @ 1'-5'
Soil Description: SM

Initial Moisture, %:	9.0
Initial Compacted Dry Density, pcf:	113.3
Initial Saturation, %:	50
Final Moisture, %:	18.9
Volumetric Swell, %:	3.4
Expansion Index:	**34** **Low**

EI	UBC Classification
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
130+	Very High

File No.: VT-24745-02 May 18, 2017

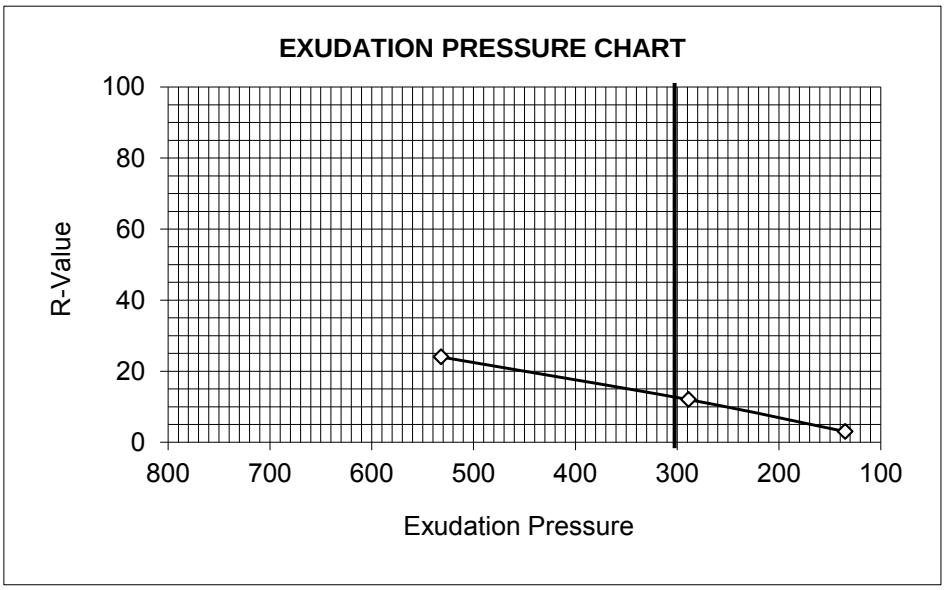
EXPANSION INDEX

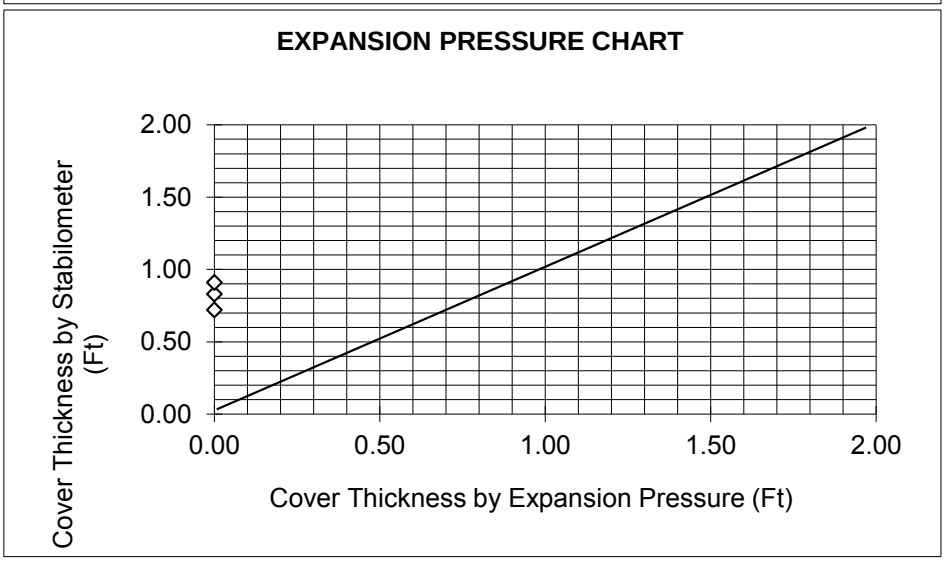
ASTM D-4829, UBC 18-2

Job Name: 3233 M ission Oaks Blvd
Sample ID: B 25 @ 1'-5'
Soil Description: SM

Initial Moisture, %:	9.0
Initial Compacted Dry Density, pcf:	114.0
Initial Saturation, %:	51
Final Moisture, %:	17.8
Volumetric Swell, %:	1.7
Expansion Index:	**17** **Very Low**

EI	UBC Classification
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
130+	Very High





JOB NAME: 3233 Mission Oaks Blvd
SAMPLE I. D.: Boring 23 @1-3'
SOIL DESCRIPTION: Gray Brown Silty Sand (SM)

SPECIMEN NUMBER	A	B	C
EXUDATION PRESSURE	532	289	135
RESISTANCE VALUE	24	12	3
EXPANSION DIAL(0.0001")	0	0	0
EXPANSION PRESSURE (PSF)	0.0	0.0	0.0
% MOISTURE AT TEST	13.1	14.3	16.1
DRY DENSITY AT TEST	121.5	120.4	106.4

R-VALUE @ 300 PSI EXUDATION	**13**
R-VALUE by Expansion Pressure*	**100**

**Based on a Traffic Index of 5.0 and a Gravel Factor of 1.70*

Selected Laboratory Testing (ESCSC, 1999)

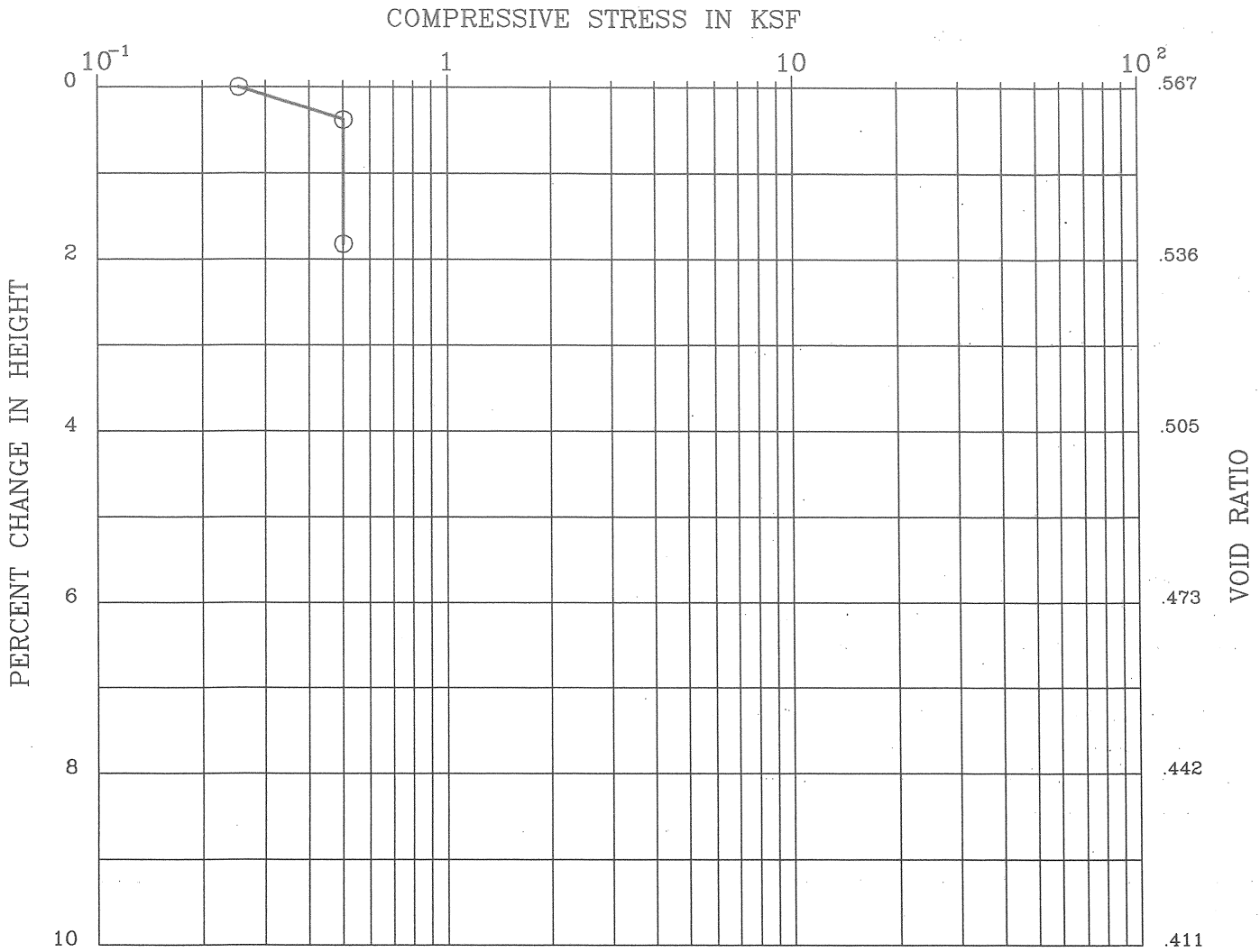
TABULATED TEST RESULTS

GRAIN SIZE DISTRIBUTION (%)

BORING AND DEPTH	15 @ 5'	15 @ 10'	15 @ 30'	15 @ 35'	15 @ 40'
GRAVEL	0.1	0	0	0	0
SAND	60.4	31.8	21.1	47.8	82.6
SILT	27.9	28.6	48.1	46.3	17.4
CLAY	11.6	39.6	30.8	6.0	0

BORING AND DEPTH	15 @ 45'	16 @ 10'	16 @ 15'	16 @ 20'	16 @ 25'
GRAVEL	5.4	0	0	0	0
SAND	88.7	48.3	47.4	22.3	35.5
SILT	4.1	21.6	37.6	30.6	54.5
CLAY	1.8	30.1	15.0	47.1	10.0

BORING AND DEPTH	16 @ 30'	16 @ 35'	16 @ 50'
GRAVEL	0	0.1	5.2
SAND	22.3	93.9	91.3
SILT	67.8	5.2	3.5
CLAY	9.9	0.8	0

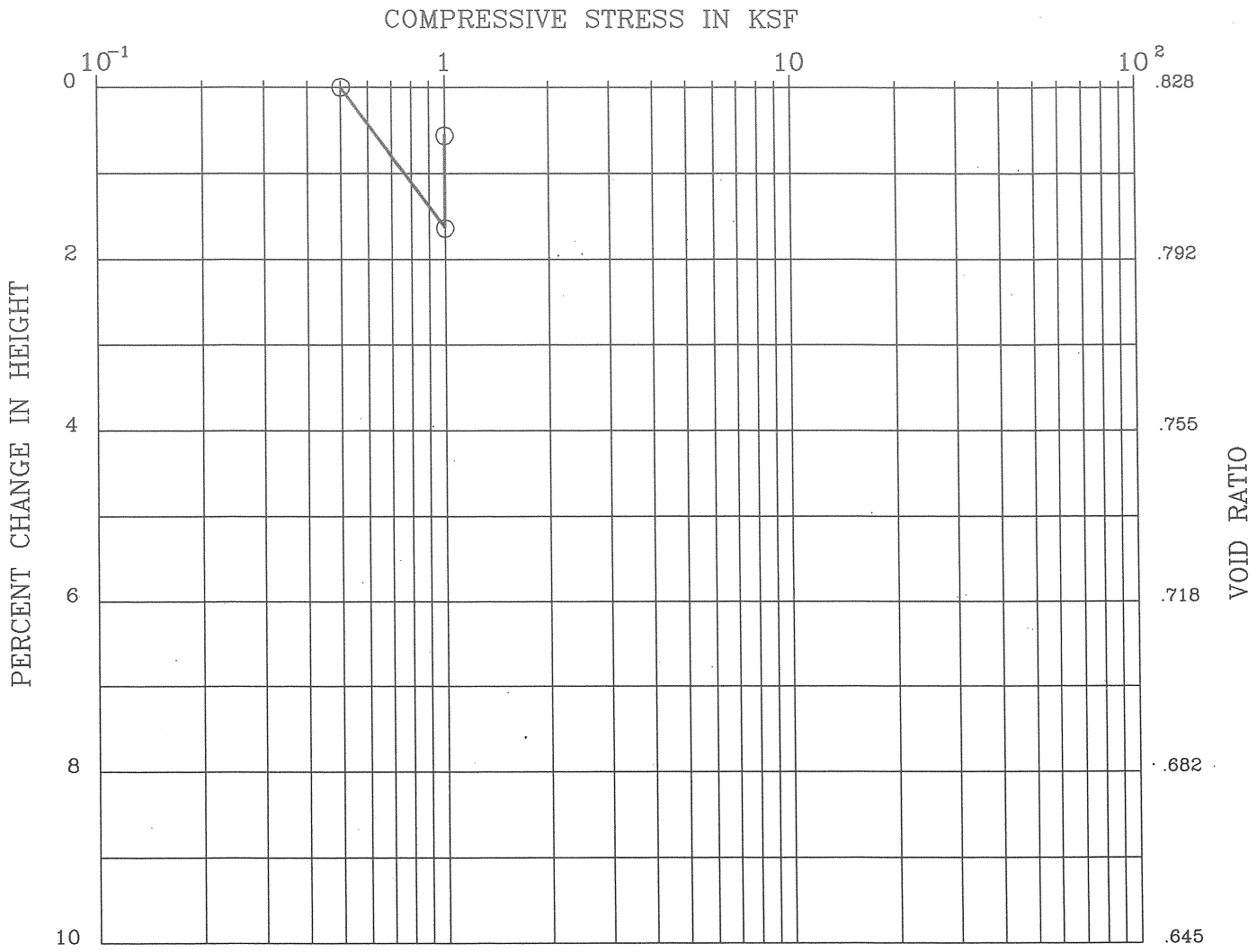


BORING	: **15**	DESCRIPTION	:
DEPTH (ft)	: 5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.38	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	8.8	94.7	37	.567
FINAL	22.6	96.5	100	.538

Remark :

SS-21900-V1	Technicolor
EARTH SYSTEMS	CONSOLIDATION TEST

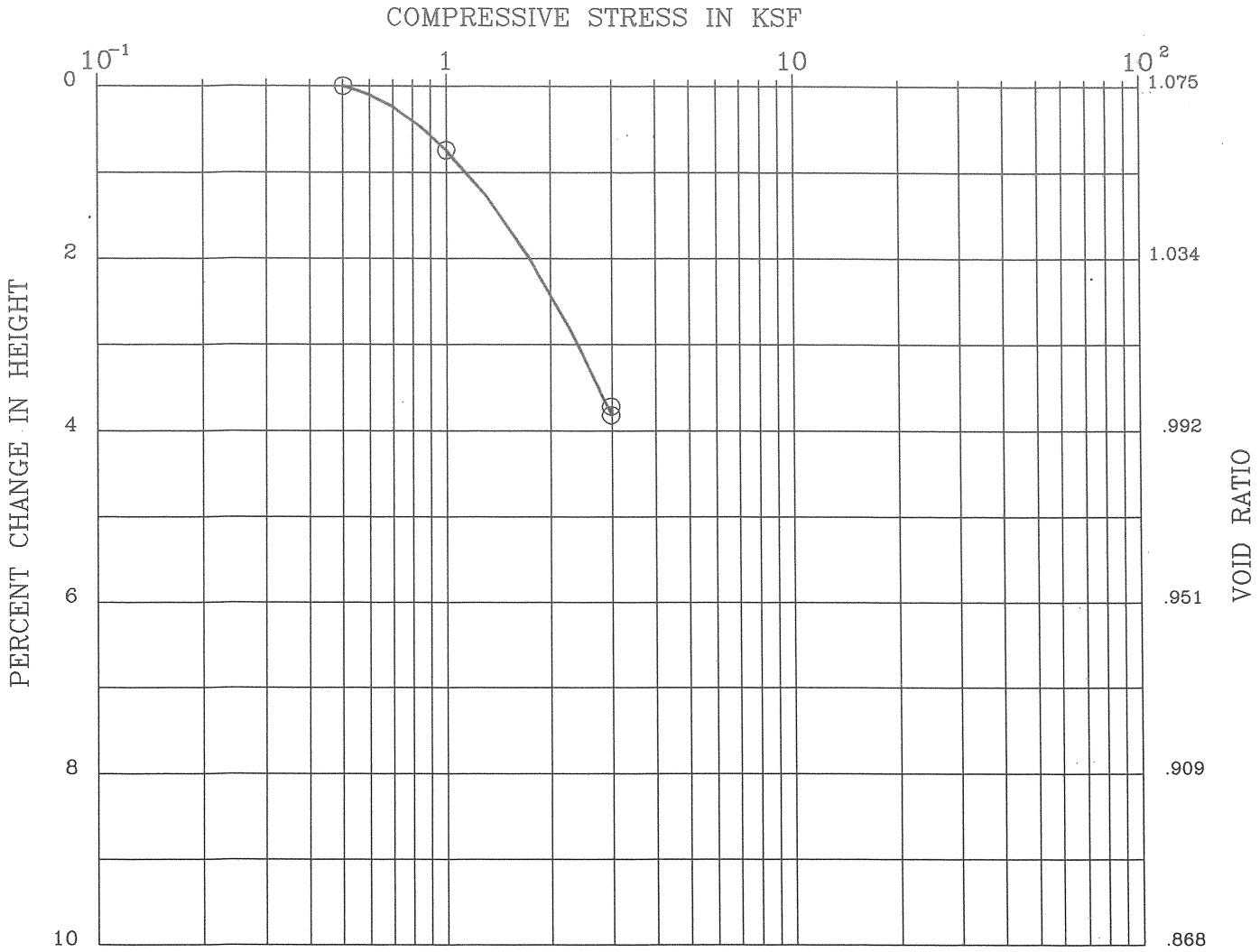


BORING	: **15**	DESCRIPTION	:
DEPTH (ft)	: 10	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.72	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	26.2	93.0	86	.828
FINAL	30.0	93.5	100	.817

Remark :

SS-21900-V1	Technicolor
EARTH SYSTEMS	CONSOLIDATION TEST

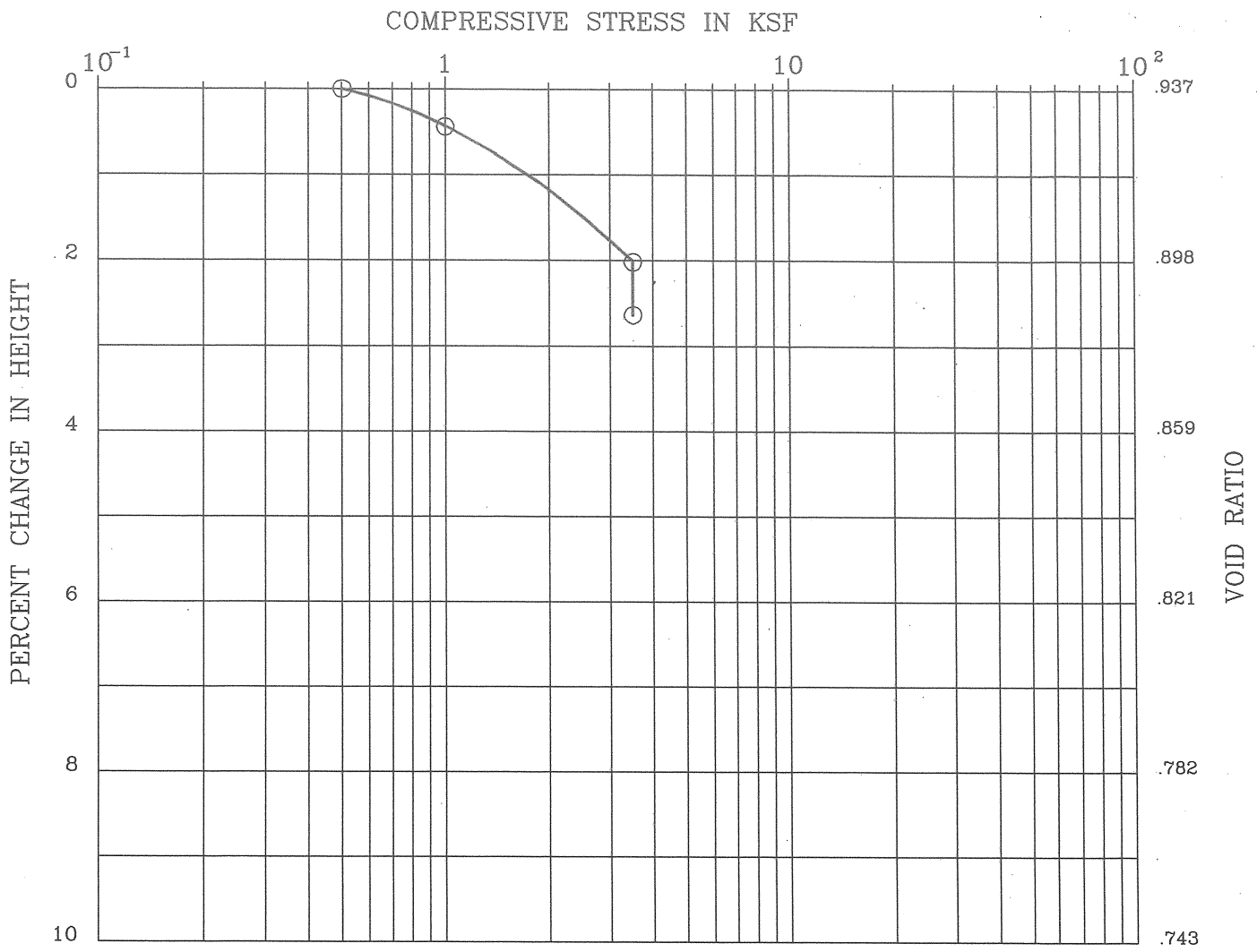


BORING	: **15**	DESCRIPTION	:
DEPTH (ft)	: 30	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.88	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	35.7	86.6	96	1.075
FINAL	34.6	90.0	100	.996

Remark :

SS-21900-V1	Technicolor
EARTH SYSTEMS	CONSOLIDATION TEST

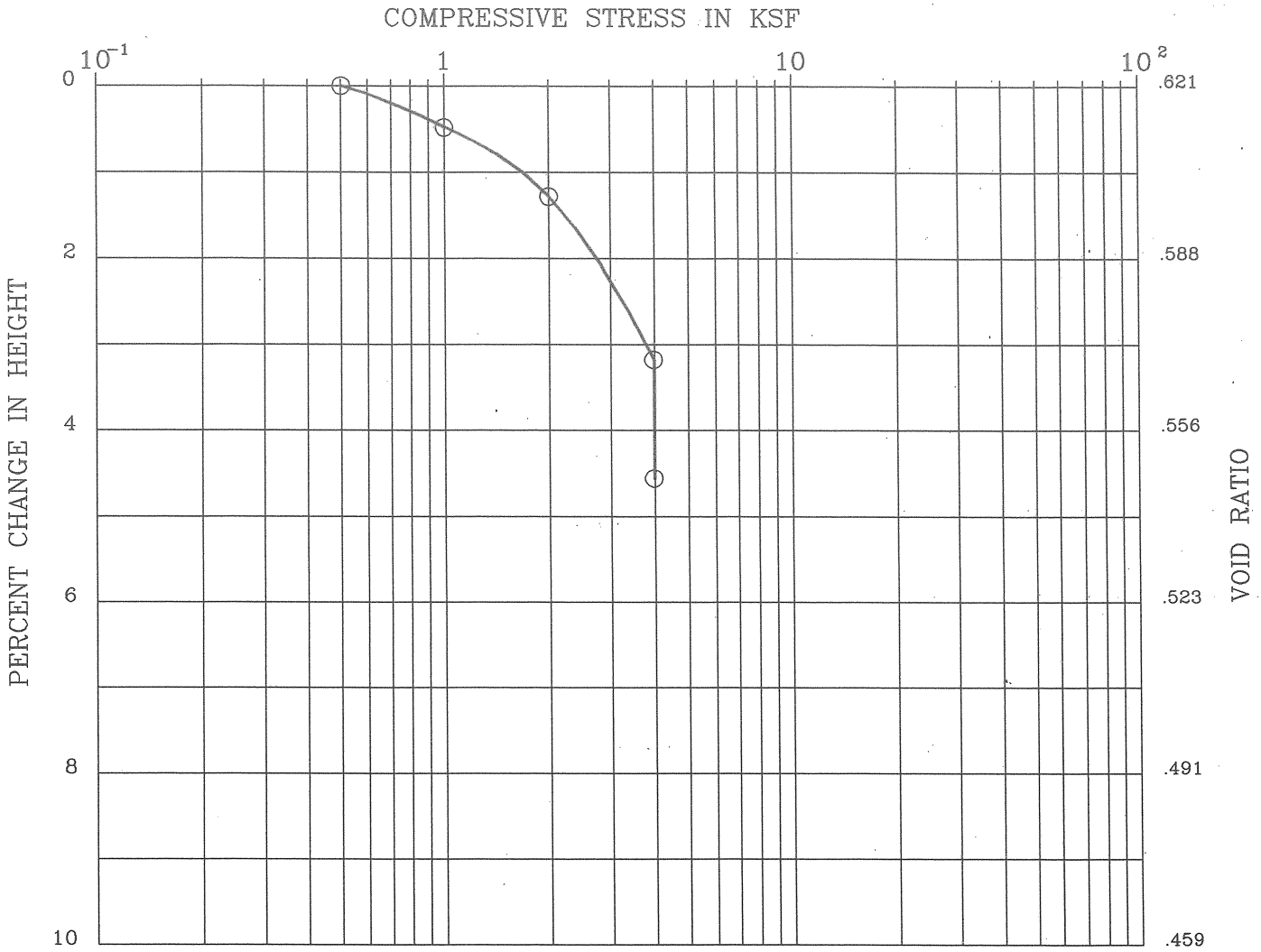


BORING	: **15**	DESCRIPTION	:
DEPTH (ft)	: 35	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.84	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	24.3	91.6	74	.937
FINAL	31.1	94.1	100	.884

Remark :

SS-21900-V1	Technicolor
EARTH SYSTEMS	CONSOLIDATION TEST



BORING	: **15**	DESCRIPTION	:
DEPTH (ft)	: 40	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.09	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	7.2	80.6	24	.621
FINAL	26.0	84.5	100	.546

Remark :

SS-21900-V1	Technicolor
EARTH SYSTEMS	CONSOLIDATION TEST

Table 1809.7 Minimum Foundation Design

TABLE 1809.7
PRESCRIPTIVE FOOTINGS FOR SUPPORTING WALLS OF LIGHT FRAME CONSTRUCTION*

WEIGHTED EXPANSION INDEX (13)	FOUNDATION FOR SLAB & RAISED FLOOR SYSTEM (4) (8)							CONCRETE SLABS (8) (12)		PREMOISTENING OF SOILS UNDER FOOTINGS, PIERS AND SLABS (4) (5)	RESTRICTION ON PIERS UNDER RAISED FLOORS
	NUMBER OF STORIES	STEM THICKNESS	FOOTING WIDTH	FOOTING THICKNESS	ALL PERIMETER FOOTINGS (5)	INTERIOR FOOTINGS FOR SLAB AND RAISED FLOORS (5)	REINFORCEMENT FOR CONTINUOUS FOUNDATIONS (2) (6)	3-1/2" MINIMUM THICKNESS			
					DEPTH BELOW NATURAL SURFACE OF GROUND AND FINISH GRADE			REINFORCEMENT (3)	TOTAL THICKNESS OF SAND (10)		
		(INCHES)									
0 - 20 Very Low (non-expansive)	1 2 3	6 8 10	12 15 18	6 6 8	12 18 24	12 18 24	1-#4 top and bottom	#4 @ 48" o.c. each way, or #3 @ 36" o.c. each way	2"	Moistening of ground recommended prior to placing concrete	Piers allowed for single floor loads only
21-50 Low	1 2 3	6 8 10	12 15 18	6 6 8	15 18 24	12 18 24	1-#4 top and bottom	#4 @ 48" o.c. each way, or #3 @ 36" o.c. each way	4"	120% of optimum moisture required to a depth of 21" below lowest adjacent grade. Testing required.	Piers allowed for single floor loads only
51-90 Medium	1 2	6 8	12 15	6 6	21 21	12 18	1-#4 top and bottom	#3 @ 24" o.c. each way	4"	130% of optimum moisture required to a depth of 27" below lowest adjacent grade. Testing required	Piers not allowed
	3	10	18	8	24	24	#3 bars @ 24" in ext. footing Bend 3' into slab (7)				
91-130 High	1 2	6 8	12 15	6 6	27 27	12 18	2-#4 Top and Bottom	#3 @ 24" o.c. each way	4"	140% of optimum moisture required to a depth of 33" below lowest adjacent grade. Testing required.	Piers not allowed
	3	10	18	8	27	24	#3 bars @ 24" in ext. footing Bend 3' into slab (7)				
Above 130 Very High	Special design by licensed engineer/architect										

*Refer to next page for footnotes (1) through (14).

FOOTNOTES TO TABLE 1809.7

1. Premoistening is required where specified in Table 1809.7 in order to achieve maximum and uniform expansion of the soil prior to construction and thus limit structural distress caused by uneven expansion and shrinkage. Other systems which do not include premoistening may be approved by the Building Official when such alternatives are shown to provide equivalent safeguards against the adverse effects of expansive soil.

2. Reinforcement for continuous foundations shall be placed not less than 3" above the bottom of the footing and not less than 3" below the top of the stem.

3. Reinforcement shall be placed at mid-depth of slab.

4. After premoistening, the specified moisture content of soils shall be maintained until concrete is placed. Required moisture content shall be verified by an approved testing laboratory not more than 24 hours prior to placement of concrete.

5. Crawl spaces under raised floors need not be pre-moistened except under interior footings. Interior footings which are not enclosed by a continuous perimeter foundation system or equivalent concrete or masonry moisture barrier complying with Footnote # 12 of Table 1809.7 shall be designed and constructed as specified for perimeter footings in Table 1809.7.

6. Foundation stem walls which exceed a height of three times the stem thickness above lowest adjacent grade shall be reinforced in accordance with Chapter 21 and Section 1914 in the IBC, or as required by engineering design, whichever is more restrictive.

7. Bent reinforcing bars between exterior footing and slab shall be omitted when floor is designed as an independent, "floating' slab.

8. Where frost conditions or unusual conditions beyond the scope of this table are found, design shall be in accordance with recommendations of a foundation investigation. Concrete slabs shall have a minimum thickness of 4 inches when the expansion index exceeds 50.

9. The ground under a raised floor system may be excavated to the elevation of the top of the perimeter footing, except where otherwise required by engineering design or to mitigate groundwater conditions.

10. GRADE BEAM, GARAGE OPENING. A grade beam not less than 12" x 12" in cross section, or 12" x depth required by Table 1809.7, whichever is deeper, reinforced as specified for continuous foundations in Table 1809.7, shall be provided at garage door openings..

11. Where a post-tensioning slab system is used, the width and depth of the perimeter footings shall meet the requirements of this table.

12. An approved vapor barrier shall be installed below concrete slab-on-grade floors of all residential occupancies in such a manner as to form an effective barrier against the migration of moisture into the slab. When sheet plastic material is employed for this purpose it shall be not less than 6 mils (.006 inch) in thickness. The installation of a vapor barrier shall not impair the effectiveness of required anchor bolts or other structural parts of a building. Foundations at the perimeter of concrete floor slabs shall form a continuous moisture barrier of Portland cement concrete or solid grouted masonry to the depths required by Table 1809.7.

13. When buildings are located on expansive soil having an expansion index greater than 50, gutters, downspouts, piping, and/or other non-erosive devices shall be provided to collect and conduct rainwater to a street, storm drain, or other approved watercourse or disposal area.

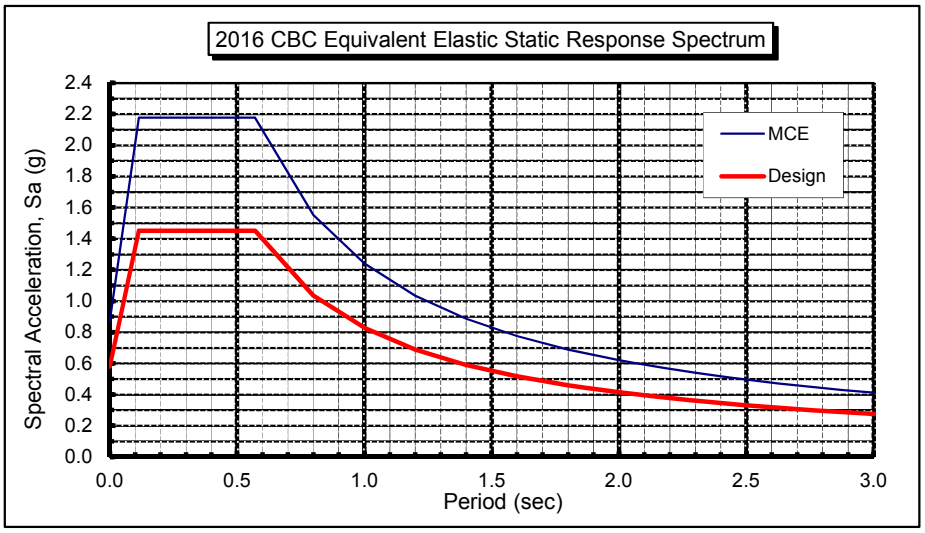
14. Fireplace footings shall be reinforced with a horizontal grid located 3" above the bottom of the footing and consisting of not less than No. 4 Bars at 12" on center each way. Vertical chimney reinforcing bars shall be hooked under the grid. Depth of fireplace chimney footings shall be no less than that required by Table 1809.7.

APPENDIX C

2016 CBC & ASCE 7-10 Seismic Parameters
Fault Parameters
USGS Seismic Design Maps Reports

2016 California Building Code (CBC) (ASCE 7-10) Seismic Design Parameters

			CBC Reference	ASCE 7-10 Reference
Seismic Design Category		**E**	Table 1613.5.6	Table 11.6-2
Site Class		**D**	Table 1613.5.2	Table 20.3-1
Latitude:		34.220 N		
Longitude:		-119.026 W		
Maximum Considered Earthquake (MCE) Ground Motion				
Short Period Spectral Reponse	S_S	**2.178 g**	Figure 1613.5	Figure 22-3
1 second Spectral Response	S_1	**0.828 g**	Figure 1613.5	Figure 22.4
Site Coefficient	F_a	1.00	Table 1613.5.3(1)	Table 11.4-1
Site Coefficient	F_v	1.50	Table 1613.5.3(2)	Table 11-4.2
	S_{MS}	2.178 g	$= F_a*S_S$	
	S_{M1}	1.242 g	$= F_v*S_1$	
Design Earthquake Ground Motion				
Short Period Spectral Reponse	S_{DS}	**1.452 g**	$= 2/3*S_{MS}$	
1 second Spectral Response	S_{D1}	**0.828 g**	$= 2/3*S_{M1}$	
	To	0.11 sec	$= 0.2*S_{D1}/S_{DS}$	
	Ts	0.57 sec	$= S_{D1}/S_{DS}$	
Seismic Importance Factor	I	1.00	Table 1604.5	Table 11.5-1
	F_{PGA}	1.00		

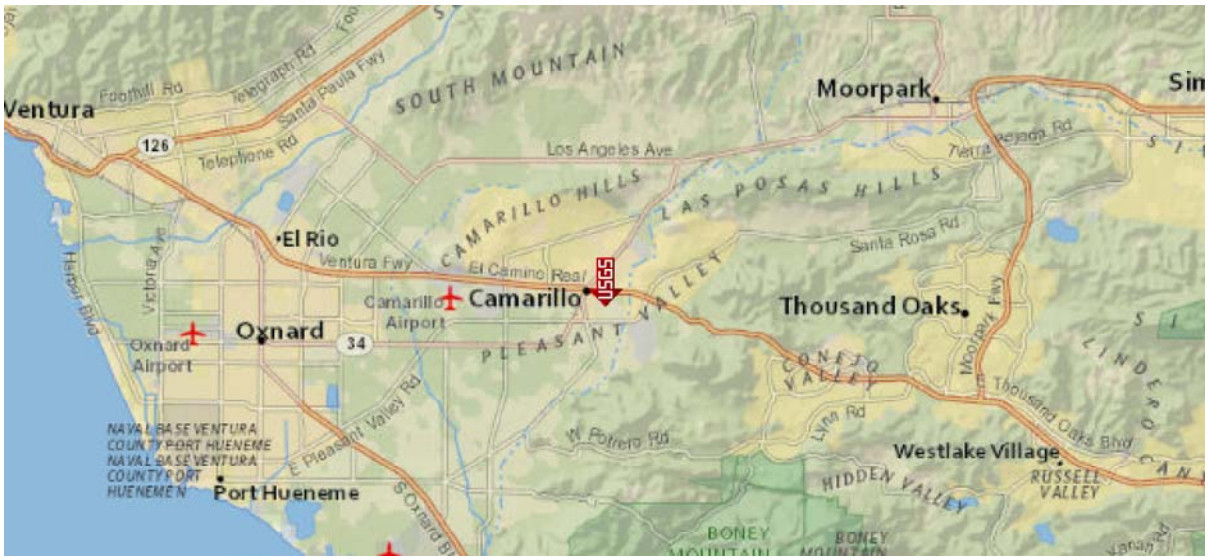


Period T (sec)	Design Sa (g)
0.00	0.581
0.05	0.963
0.11	1.452
0.57	1.452
0.80	1.035
1.00	0.828
1.20	0.690
1.40	0.591
1.60	0.518
1.80	0.460
2.00	0.414
2.20	0.376
2.40	0.345
2.60	0.318
2.80	0.296
3.00	0.276

USGS Design Maps Summary Report

User–Specified Input

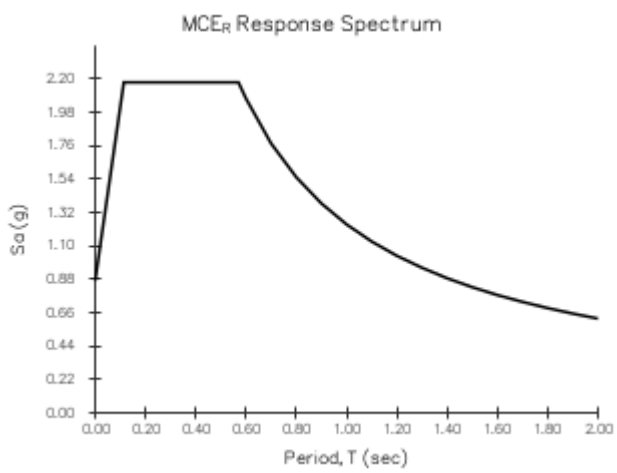
Report Title	3233 Mission Oaks Boulevard Wed May 17, 2017 14:13:44 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	34.2201°N, 119.0264°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

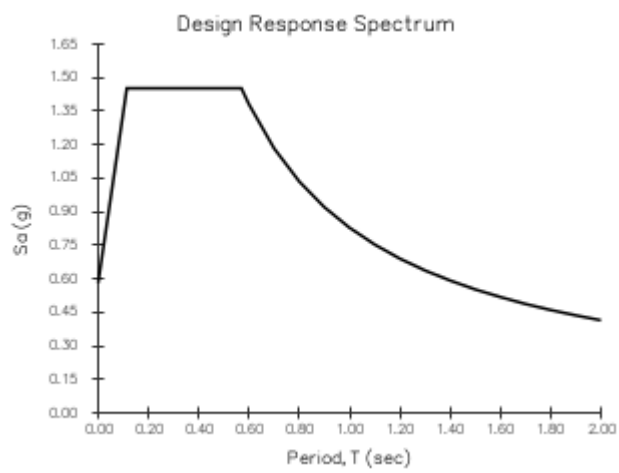


USGS–Provided Output

S_S =	2.178 g	S_{MS} =	2.178 g	S_{DS} =	1.452 g
S_1 =	0.828 g	S_{M1} =	1.242 g	S_{D1} =	0.828 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (34.2201°N, 119.0264°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1] S_S = 2.178 g

From Figure 22-2 [2] S_1 = 0.828 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\bar{v}_s$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content w ≥ 40%, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 2.178 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.828 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.178 = 2.178$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.828 = 1.242$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

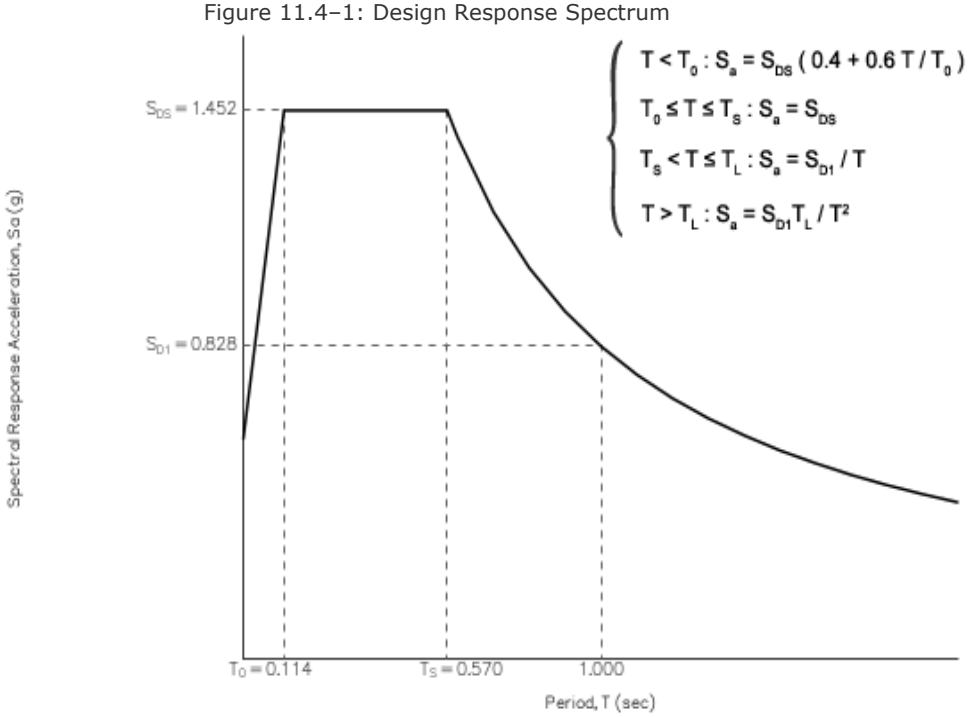
Equation (11.4–3): $S_{DS} = ⅔\ S_{MS} = ⅔ \times 2.178 = 1.452$ g

Equation (11.4–4): $S_{D1} = ⅔\ S_{M1} = ⅔ \times 1.242 = 0.828$ g

Section 11.4.5 — Design Response Spectrum

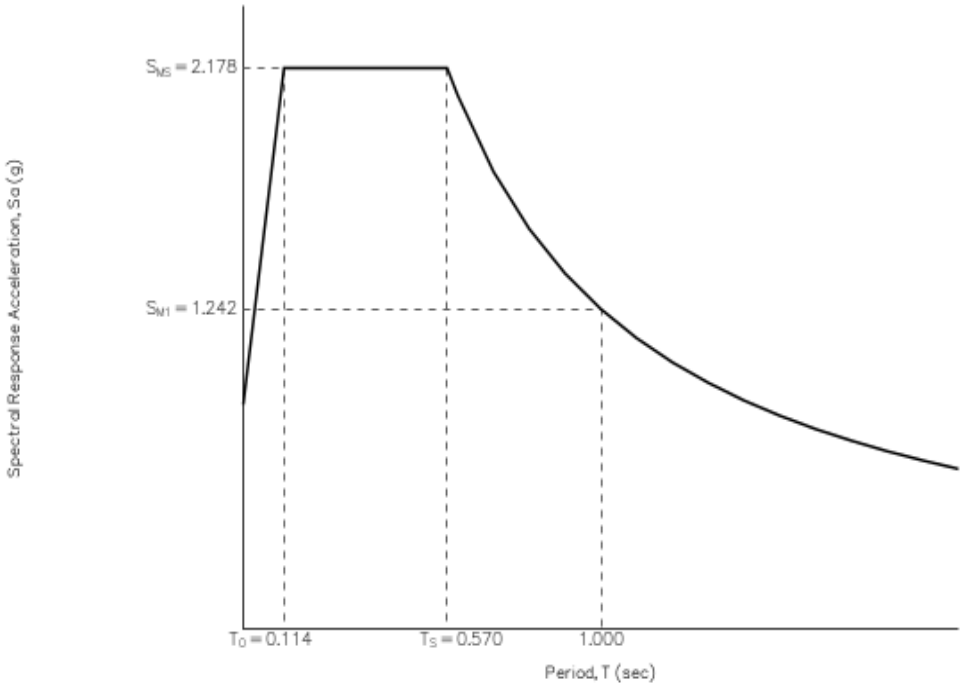
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.834

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.834 = 0.834$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.834 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.949

From Figure 22-18 [6] C_{R1} = 0.956

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.452 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.828 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

Table 1
Fault Parameters

Fault Section Name	Distance (miles)	Distance (km)	Avg Dip Angle (deg.)	Avg Dip Direction (deg.)	Avg Rake (deg.)	Trace Length (km)	Fault Type	**Mean Mag**	Mean Return Interval (years)	Slip Rate (mm/yr)
Simi-Santa Rosa	1.3	2.1	60	346	30	39	B	**6.8**		1
Oak Ridge (Onshore)	7.6	12.3	65	159	90	49	B	**7.2**		4
Ventura-Pitas Point	10.7	17.3	64	353	60	44	B	**6.9**		1
Malibu Coast (Extension), alt 1	11.4	18.3	74	4	30	35	B'	**6.5**		
Malibu Coast (Extension), alt 2	11.4	18.3	74	4	30	35	B'	**6.9**		
Malibu Coast, alt 1	13.1	21.1	75	3	30	38	B	**6.6**		0.3
Malibu Coast, alt 2	13.1	21.1	74	3	30	38	B	**6.9**		0.3
San Cayetano	14.0	22.5	42	3	90	42	B	**7.2**		6
Oak Ridge (Offshore)	14.2	22.9	32	180	90	38	B	**6.9**		3
Sisar	15.1	24.4	29	168	na	20	B'	**7.0**		
Anacapa-Dume, alt 1	17.2	27.8	45	354	60	51	B	**7.2**		3
Anacapa-Dume, alt 2	17.2	27.8	41	352	60	65	B	**7.2**		3
Santa Susana, alt 1	17.6	28.4	55	9	90	27	B	**6.8**		5
Red Mountain	17.8	28.7	56	2	90	101	B	**7.4**		2
Santa Susana, alt 2	17.9	28.9	53	10	90	43	B'	**6.8**		
Mission Ridge-Arroyo Parida-Santa Ana	18.8	30.2	70	176	90	69	B	**6.8**		0.4
Channel Islands Thrust	19.0	30.7	20	354	90	59	B	**7.3**		1.5
Northridge Hills	19.1	30.8	31	19	90	25	B'	**7.0**		
Santa Cruz Island	21.1	34.0	90	188	30	69	B	**7.1**		1
Del Valle	21.3	34.2	73	195	90	9	B'	**6.3**		
Holser, alt 1	21.7	34.9	58	187	90	20	B	**6.7**		0.4
Holser, alt 2	21.7	34.9	58	182	90	17	B'	**6.7**		
Shelf (Projection)	21.9	35.3	17	21	na	70	B'	**7.8**		
Northridge	22.5	36.2	35	201	90	33	B	**6.8**		1.5
Santa Ynez (East)	22.7	36.6	70	172	0	68	B	**7.2**		2
San Pedro Basin	23.3	37.5	88	51	na	69	B'	**7.0**		
North Channel	23.7	38.2	26	10	90	51	B	**6.7**		1
Channel Islands Western Deep Ramp	24.1	38.8	21	204	90	62	B'	**7.3**		
Santa Monica Bay	24.7	39.8	20	44	na	17	B'	**7.0**		
Pine Mtn	24.8	39.9	45	5	na	62	B'	**7.3**		
Pitas Point (Lower)-Montalvo	26.0	41.8	16	359	90	30	B	**7.3**		2.5
Compton	27.5	44.2	20	34	90	65	B'	**7.5**		
Santa Cruz Catalina Ridge	29.8	47.9	90	38	na	137	B'	**7.3**		
San Gabriel	29.8	47.9	61	39	180	71	B	**7.3**		1
Santa Monica, alt 1	29.9	48.2	75	343	30	14	B	**6.5**		1
San Pedro Escarpment	30.4	48.9	17	38	na	27	B'	**7.3**		
Santa Monica, alt 2	30.4	49.0	50	338	30	28	B	**6.7**		1
Sierra Madre (San Fernando)	31.8	51.2	45	9	90	18	B	**6.6**		2
Palos Verdes	31.9	51.4	90	53	180	99	B	**7.3**		3
Pitas Point (Upper)	32.5	52.3	42	15	90	35	B	**6.8**		1

Reference: USGS OFR 2007-1437 (CGS SP 203) Based on Site Coordinates of 34.2201 Latitude, -119.0264 Longitude

Mean Magnitude for Type A Faults based on 0.1 weight for unsegmented section, 0.9 weight for segmented model (weighted by probability of each scenario with section listed as given on Table 3 of Appendix G in OFR 2007-1437). Mean magntude is average of Ellworths-B and Hanks & Bakun moment area relationship.

APPENDIX D

Results of Liquefaction and Dry Sand Settlement Analyses (data from referenced B-15)
Infiltration Test Results

LIQUEFY-v 2.3.XLS - A SPREADSHEET FOR EMPIRICAL ANALYSIS OF LIQUEFACTION POTENTIAL AND INDUCED GROUND SUBSIDENCE

Developed 2006 by Shelton L. Stringer, PE, GE, PG - Earth Systems Southwest

Project: 3233 Mission Oaks Boulevard
Job No: VT-24745-02
Date: 5/19/2017
Boring: B-15 Data Set: 1

Methods: **Liquefaction Analysis using 1996 & 1998 NCEER workshop method (Youd & Idriss, editors)**
Journal of Geotechnical and Enviromental Engineering (JGEE), October 2001, Vol 127, No. 10, ASCE
Settlement Analysis from Tokimatsu and Seed (1987), JGEE,Vol 113, No.8, ASCE
Modified by Pradel, JGEE, Vol 124, No. 4, ASCE

EARTHQUAKE INFORMATION:

Magnitude:	7.2	7.5
PGA, g:	0.83	0.75
MSF:	1.11	
GWT:	52.0	feet
Calc GWT:	52.0	feet
Remediate to:	6.0	feet

SPT N VALUE CORRECTIONS:

Energy Correction to N60 (C_E):	1.33	Automatic Hammer
Drive Rod Corr. (C_R):	1	Default
Rod Length above ground (feet):	3.0	
Borehole Dia. Corr. (C_B):	1.00	
Sampler Liner Correction for SPT?:	1	Yes
Cal Mod/ SPT Ratio:	0.63	

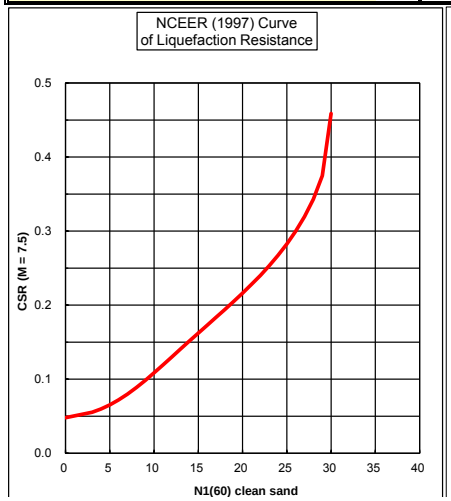
Total (ft) Liquefied Thickness	Total (in.) Induced Subsidence
0	0.8

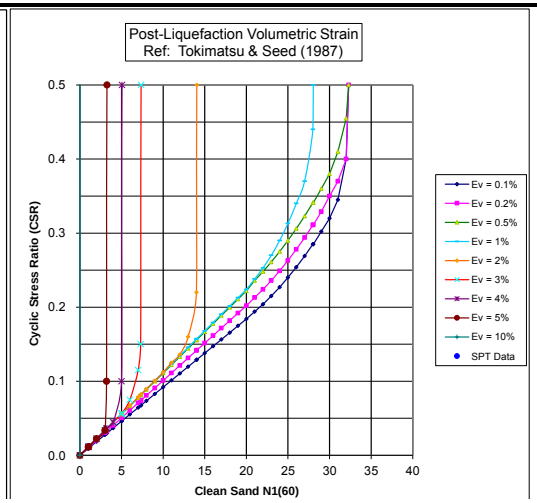
Required SF: 1.25
Threshold Acceler., g: #N/A **Minimum Calculated SF:** #N/A

SETTLEMENT (SUBSIDENCE) OF DRY SANDS

Nc = 12.5

Base Depth (feet)	Cal Mod N	SPT N	Liquef. Suscept. (0 or 1)	Total Unit Wt. (pcf)	Fines Content (%)	Depth of SPT (feet)	Rod Length (feet)	Tot.Stress at SPT po (tsf)	Eff.Stress at SPT p'o (tsf)	rd	C_N	C_R	C_S	$N_{1(60)}$	Rel. Dens. Dr (%)	Trigger FC Adj. $\Delta N_{1(60)}$	Equiv. Sand $N_{1(60)CS}$	$K\sigma$	M = 7.5 Available CRR	M =7.5 Induced CSR*	Liquefac. Safety Factor	Post FC Adj. $\Delta N_{1(60)}$	$N_{1(60)CS}$	Volumetric Strain (%)	Induced Subsidence (in.)	p (tsf)	G_{max} (tsf)	τ_{av} (tsf)	tav/Gmax	a	b	Shear Strain γ	Strain E_{15}	Strain Enc	Dry Sand Subsidence (in.)
0.0				0				0.000																											
6.0	22	50	1	106	35	5.0	8.0	0.265	0.265	0.99	1.70	0.75	1.00	85.0	###	10.0	95.0	1.00	1.400	0.484	Non-Liq.	10.0	95.0	0.01	0.00	0.178	860	0.095	0.0001	0.131	18,044	1.9E-04	2.9E-05	2.7E-05	0.00
11.0	32	20	1	117	70	10.0	13.0	0.552	0.552	0.98	1.38	0.76	1.00	28.2	63	10.0	38.2	1.00	1.400	0.478	Non-Liq.	10.0	38.2	0.04	0.03	0.370	915	0.195	0.0002	0.138	11,625	5.0E-04	2.3E-04	2.1E-04	0.03
16.0	15	9	1	120	55	15.0	18.0	0.850	0.850	0.97	1.12	0.86	1.00	12.1	42	7.4	19.6	1.00	0.211	0.473	Non-Liq.	7.4	19.6	0.20	0.12	0.570	909	0.298	0.0003	0.146	8,969	1.1E-03	1.1E-03	1.0E-03	0.12
21.0	17	11	1	91	55	20.0	23.0	1.093	1.093	0.96	0.98	0.93	1.00	13.1	43	7.6	20.7	0.99	0.225	0.470	Non-Liq.	7.6	20.7	0.19	0.11	0.732	1,051	0.378	0.0004	0.152	7,716	1.1E-03	1.0E-03	9.5E-04	0.11
26.0	32	20	1	115	55	25.0	28.0	1.368	1.368	0.94	0.88	0.98	1.00	23.2	58	9.6	32.9	0.93	1.400	0.497	Non-Liq.	9.6	32.9	0.08	0.05	0.917	1,371	0.466	0.0003	0.160	6,744	7.5E-04	4.2E-04	3.8E-04	0.05
31.0	20	13	1	115	70	30.0	33.0	1.656	1.656	0.92	0.80	1.00	1.00	13.4	44	7.7	21.1	0.91	0.229	0.492	Non-Liq.	7.7	21.1	0.20	0.12	1.109	1,301	0.551	0.0004	0.167	6,013	1.1E-03	1.1E-03	9.8E-04	0.12
36.0	27	17	1	113	55	35.0	38.0	1.940	1.940	0.89	0.74	1.00	1.00	16.8	49	8.4	25.1	0.89	0.284	0.491	Non-Liq.	8.4	25.1	0.14	0.08	1.300	1,492	0.624	0.0004	0.175	5,469	9.7E-04	7.4E-04	6.8E-04	0.08
41.0	31	20	1	80	5	40.0	43.0	2.155	2.155	0.85	0.70	1.00	1.00	18.2	51	0.0	18.2	0.81	0.197	0.515	Non-Liq.	0.0	18.2	0.24	0.15	1.444	1,414	0.663	0.0005	0.180	5,134	1.2E-03	1.3E-03	1.2E-03	0.15
46.0	53	33	1	96	5	45.0	48.0	2.387	2.387	0.80	0.67	1.00	1.00	29.6	65	0.0	29.6	0.78	0.411	0.501	Non-Liq.	0.0	29.6	0.09	0.05	1.600	1,750	0.693	0.0004	0.186	4,828	7.6E-04	4.7E-04	4.3E-04	0.05
51.0	39	25	1	112	5	50.0	53.0	2.660	2.660	0.75	0.63	1.00	1.00	20.7	54	0.0	20.7	0.76	0.224	0.485	Non-Liq.	0.0	20.7	0.16	0.10	1.782	1,638	0.724	0.0004	0.193	4,525	9.0E-04	8.6E-04	8.0E-04	0.10





$N_{1(60)} = C_N*C_E*C_B*C_R*C_S*N$

C_R = 0.75 for Rod lengths < 3m, 1.0 for > 10m
= min(1,max(0.75,1.4666-2.556/(z(ft))$^{0.5}$))

$C_N = (1\ atm/p'o)^{0.5}$, max 1.7

C_S = max(1.1,min(1.3,1+$N_{1(60)}$/100)) for SPT without liners

MSF = $10^{2.24}/M^{2.56}$

z = Depth (m)

pa = 1 atm = 101 KPa = 1.058 tsf

p = 0.67*po

τ_{av} = 0.65*PGA*po*rd

G_{max} = 447*$N_{1(60)CS}^{(1/3)}$*$p^{0.5}$

a = 0.0389*(p/1)+0.124

b = 6400*$(p/1)^{(-0.5)}$

γ = [1+a*EXP(b*τ_{av}/G_{max})]/[(1+a)*τ_{av}/G_{max}]

E_{15} = γ*$(N_{1(60)CS}/20)^{-1.2}$

E_{nc} = $(Nc/15)^{0.45}$*E15

Nc = $(MAG-4)^{2.17}$

S = 2*H*E_{nc}

rd = (1-0.4113*z^0.5+0.04052*z+0.001753*z^1.5)/(1-0.4177*z^0.5+0.05729*z-0.006205*z^1.5+0.00121*z^2))

$\Delta N_{1(60)}$ = min(10,IF(FC<35,exp(1.76-(190/FC^2)),5)+IF(FC<=5,1,IF(FC<35,0.99+(FC^1.5/1000),1.2))*N1(60) - N1(60)

$N_{1(60)CS} = N_{1(60)CS} + \Delta N_{1(60)}$

$K\sigma$ = min of 1.0 or $(p'o/1.058)^{(IF(Dr>0.7,0.6,IF(Dr<0.5,0.8,0.7))-1)}$

Dr = $(N_{1(60)}/70)^{0.5}$

CSReq = 0.65*PGA*(po/p'o)*rd

CSR* = CSReq/MSF/$K\sigma$

$CRR_{7.5}$ = (0.048-0.004721*N+0.0006136*N^2-0.00001673*N^3)/(1-0.1248*N+0.009578*N^2-0.0003285*N^3+0.000003714*N^4))

N = $N_{1(60)CS}$

SF = $CRR_{7.5,1atm}$/CSR*

Infiltration Testing

Test Through Zone Near Bottom of Infiltration Device

Infiltration Testing Field Data

Date: 5/2/2017

Project Location:	3233 Mission Oaks Blvd.	Job Number:	VT-24745-02
Earth Description:	See Log	Tested By:	SC
Field Test in Boring	IT-1	Start Time:	1:16 PM
Boring Diameter (inches):	6.0	Total Pipe Length (feet):	15.0
Boring Depth (feet):	15.0	Pipe Stick-Up (inches):	0.0

Time of Day, t (hh:mm)	Delta Time, Δt (min.)	Delta Time, Δt (hr.)	Top of Pipe to Water, (ft.)	Water Depth, d (in.)	Water Depth, d (ft.)	Drop in Water Height, Δd (in.)	Drop in Water Height, Δd (ft.)	Perc Rate, (in/hr)	Corr. Factor, RF	Infilt. Rate (in/hr)
13:16		-	12.95	24.6	2.05					
13:17	1.0	0.02	13.59	16.9	1.41	7.68	0.64	460.80	7.92	58.18
13:17			13.59	16.9	1.41					
13:18	1.0	0.02	13.75	15.0	1.25	1.92	0.16	115.20	6.32	18.23
13:18			13.75	15.0	1.25					
13:19	1.0	0.02	13.90	13.2	1.10	1.80	0.15	108.00	5.70	18.95
13:19			13.90	13.2	1.10					
13:20	1.0	0.02	14.05	11.4	0.95	1.80	0.15	108.00	5.10	21.18
13:20			14.05	11.4	0.95					
13:21	1.0	0.02	14.28	8.6	0.72	2.76	0.23	165.60	4.34	38.16
13:21			14.28	8.6	0.72					
13:22	1.0	0.02	14.43	6.8	0.57	1.80	0.15	108.00	3.58	30.17
13:22			14.43	6.8	0.57					
13:23	1.0	0.02	14.58	5.0	0.42	1.80	0.15	108.00	2.98	36.24
13:23			14.58	5.0	0.42					
13:24	1.0	0.02	14.64	4.3	0.36	0.72	0.06	43.20	2.56	16.88
13:24			14.64	4.3	0.36					
13:25	1.0	0.02	14.70	3.6	0.30	0.72	0.06	43.20	2.32	18.62
13:25			14.70	3.6	0.30					
13:26	1.0	0.02	14.75	3.0	0.25	0.60	0.05	36.00	2.10	17.14
13:26			14.75	3.0	0.25					
13:27	1.0	0.02	14.80	2.4	0.20	0.60	0.05	36.00	1.90	18.95
13:43			13.00	24.0	2.00					
13:44	1.0	0.02	13.40	19.2	1.60	4.80	0.40	288.00	8.20	35.12
13:44			13.40	19.2	1.60					
13:45	1.0	0.02	13.60	16.8	1.40	2.40	0.20	144.00	7.00	20.57
13:45			13.60	16.8	1.40					
13:46	1.0	0.02	13.78	14.6	1.22	2.16	0.18	129.60	6.24	20.77
13:46			13.78	14.6	1.22					
13:47	1.0	0.02	14.10	10.8	0.90	3.84	0.32	230.40	5.24	43.97
13:47			14.10	10.8	0.90					
13:48	1.0	0.02	14.30	8.4	0.70	2.40	0.20	144.00	4.20	34.29
13:48			14.30	8.4	0.70					
13:49	1.0	0.02	14.41	7.1	0.59	1.32	0.11	79.20	3.58	22.12
13:49			14.41	7.1	0.59					
13:50	1.0	0.02	14.51	5.9	0.49	1.20	0.10	72.00	3.16	22.78
13:50			14.51	5.9	0.49					
13:51	1.0	0.02	14.62	4.6	0.38	1.32	0.11	79.20	2.74	28.91
13:51			14.62	4.6	0.38					
13:52	1.0	0.02	14.70	3.6	0.30	0.96	0.08	57.60	2.36	24.41

Project Location:	3233 Mission Oaks Blvd.	Job Number:	VT-24745-02
Earth Description:	See Log	Tested By:	SC
Field Test in Boring	IT-1	Start Time:	1:16 PM
Boring Diameter (inches):	6.0	Total Pipe Length (feet):	15.0
Boring Depth (feet):	15.0	Pipe Stick-Up (inches):	0.0

Time of Day, t (hh:mm)	Delta Time, Δt (min.)	Delta Time, Δt (hr.)	Top of Pipe to Water, (ft.)	Water Depth, d (in.)	Water Depth, d (ft.)	Drop in Water Height, Δd (in.)	Drop in Water Height, Δd (ft.)	Perc Rate, (in/hr)	Corr. Factor, RF	Infilt. Rate (in/hr)
13:52			14.70	3.6	0.30					
13:53	1.0	0.02	14.75	3.0	0.25	0.60	0.05	36.00	2.10	17.14
13:53			14.75	3.0	0.25					
13:54	1.0	0.02	14.80	2.4	0.20	0.60	0.05	36.00	1.90	18.95

Infiltration Testing

Test Through Zone Near Bottom of Infiltration Device

Infiltration Testing Field Data

Date: 5/2/2017

Project Location:	3233 Mission Oaks Blvd.	Job Number:	VT-24745-02
Earth Description:	See Log	Tested By:	SC
Field Test in Boring	IT-2	Start Time:	12:17 PM
Boring Diameter (inches):	6.0	Total Pipe Length (feet):	5.0
Boring Depth (feet):	5.0	Pipe Stick-Up (inches):	0.0

Time of Day, t (hh:mm)	Delta Time, Δt (min.)	Delta Time, Δt (hr.)	Top of Pipe to Water, (ft.)	Water Depth, d (in.)	Water Depth, d (ft.)	Drop in Water Height, Δd (in.)	Drop in Water Height, Δd (ft.)	Perc Rate, (in/hr)	Corr. Factor, RF	Infilt. Rate (in/hr)
12:17		-	2.85	25.8	2.15					
12:27	10.0	0.17	2.99	24.1	2.01	1.68	0.14	10.08	9.32	1.08
12:27			2.99	24.1	2.01					
12:37	10.0	0.17	3.08	23.0	1.92	1.08	0.09	6.48	8.86	0.73
12:37			3.08	23.0	1.92					
12:47	10.0	0.17	3.15	22.2	1.85	0.84	0.07	5.04	8.54	0.59
12:47			3.15	22.2	1.85					
12:57	10.0	0.17	3.22	21.4	1.78	0.84	0.07	5.04	8.26	0.61
12:57			3.22	21.4	1.78					
13:07	10.0	0.17	3.29	20.5	1.71	0.84	0.07	5.04	7.98	0.63
13:07			3.29	20.5	1.71					
13:17	10.0	0.17	3.35	19.8	1.65	0.72	0.06	4.32	7.72	0.56
13:17			3.35	19.8	1.65					
13:27	10.0	0.17	3.40	19.2	1.60	0.60	0.05	3.60	7.50	0.48
13:27			3.40	19.2	1.60					
13:37	10.0	0.17	3.46	18.5	1.54	0.72	0.06	4.32	7.28	0.59
13:37			3.46	18.5	1.5					
13:47	10.0	0.17	3.51	17.9	1.49	0.60	0.05	3.60	7.06	0.51
13:47			3.51	17.9	1.49					
13:57	10.0	0.17	3.57	17.2	1.43	0.72	0.06	4.32	6.84	0.63
13:57			3.57	17.2	1.4					
14:07	10.0	0.17	3.63	16.4	1.37	0.72	0.06	4.32	6.60	0.65
14:07			3.63	16.4	1.37					
14:17	10.0	0.17	3.68	15.8	1.32	0.60	0.05	3.60	6.38	0.56
14:17			3.68	15.8	1.3					
14:27	10.0	0.17	3.73	15.2	1.27	0.60	0.05	3.60	6.18	0.58
14:27			3.73	15.2	1.27					
14:37	10.0	0.17	3.80	14.4	1.20	0.84	0.07	5.04	5.94	0.85
14:37			3.80	14.4	1.20					
14:47	10.0	0.17	3.84	13.9	1.16	0.48	0.04	2.88	5.72	0.50
14:47			3.84	13.9	1.16					
14:57	10.0	0.17	3.90	13.2	1.10	0.72	0.06	4.32	5.52	0.78
14:57			3.90	13.2	1.1					
15:07	10.0	0.17	3.95	12.6	1.05	0.60	0.05	3.60	5.30	0.68
15:07			3.95	12.6	1.05					
15:17	10.0	0.17	4.01	11.9	0.99	0.72	0.06	4.32	5.08	0.85

Infiltration Testing

Test Through Zone Eleven Feet Below Bottom of Infiltration Device

Infiltration Testing Field Data

Date: 5/2/2017

Project Location:	3233 Mission Oaks Blvd.	Job Number:	VT-24745-02
Earth Description:	See Log	Tested By:	SC
Field Test in Boring	IT-3	Start Time:	8:31 AM
Boring Diameter (inches):	6.0	Total Pipe Length (feet):	15.0
Boring Depth (feet):	15.0	Pipe Stick-Up (inches):	0.0

Time of Day, t (hh:mm)	Delta Time, Δt (min.)	Delta Time, Δt (hr.)	Top of Pipe to Water, (ft.)	Water Depth, d (in.)	Water Depth, d (ft.)	Drop in Water Height, Δd (in.)	Drop in Water Height, Δd (ft.)	Perc Rate, (in/hr)	Corr. Factor, RF	Infilt. Rate (in/hr)
8:31		-	12.80	26.4	2.20					
8:41	10.0	0.17	12.87	25.6	2.13	0.84	0.07	5.04	9.66	0.52
8:41			12.87	25.6	2.13					
8:51	10.0	0.17	12.99	24.1	2.01	1.44	0.12	8.64	9.28	0.93
8:51			12.99	24.1	2.01					
9:01	10.0	0.17	13.06	23.3	1.94	0.84	0.07	5.04	8.90	0.57
9:01			13.06	23.3	1.94					
9:11	10.0	0.17	13.15	22.2	1.85	1.08	0.09	6.48	8.58	0.76
9:11			13.15	22.2	1.85					
9:21	10.0	0.17	13.23	21.2	1.77	0.96	0.08	5.76	8.24	0.70
9:21			13.23	21.2	1.77					
9:31	10.0	0.17	13.31	20.3	1.69	0.96	0.08	5.76	7.92	0.73
9:31			13.31	20.3	1.69					
9:41	10.0	0.17	13.38	19.4	1.62	0.84	0.07	5.04	7.62	0.66
9:41			13.38	19.4	1.62					
9:51	10.0	0.17	13.45	18.6	1.55	0.84	0.07	5.04	7.34	0.69
9:51			13.45	18.6	1.6					
10:01	10.0	0.17	13.53	17.6	1.47	0.96	0.08	5.76	7.04	0.82
10:01			13.53	17.6	1.47					
10:11	10.0	0.17	13.61	16.7	1.39	0.96	0.08	5.76	6.72	0.86
10:11			13.61	16.7	1.4					
10:21	10.0	0.17	13.72	15.4	1.28	1.32	0.11	7.92	6.34	1.25
10:21			13.72	15.4	1.28					
10:31	10.0	0.17	13.84	13.9	1.16	1.44	0.12	8.64	5.88	1.47
10:31			13.84	13.9	1.2					
10:41	10.0	0.17	13.98	12.2	1.02	1.68	0.14	10.08	5.36	1.88
10:41			13.98	12.2	1.02					
10:51	10.0	0.17	14.12	10.6	0.88	1.68	0.14	10.08	4.80	2.10
10:51			14.12	10.6	0.88					
11:01	10.0	0.17	14.27	8.8	0.73	1.80	0.15	10.80	4.22	2.56
11:01			14.27	8.8	0.73					
11:11	10.0	0.17	14.38	7.4	0.62	1.32	0.11	7.92	3.70	2.14
11:11			14.38	7.4	0.6					
11:21	10.0	0.17	14.48	6.2	0.52	1.20	0.10	7.20	3.28	2.20
11:21			14.48	6.2	0.52					
11:31	10.0	0.17	14.57	5.2	0.43	1.08	0.09	6.48	2.90	2.23
11:31			14.57	5.2	0.4					
11:41	10.0	0.17	14.67	4.0	0.33	1.20	0.10	7.20	2.52	2.86
11:41			14.67	4.0	0.33					
11:51	10.0	0.17	14.76	2.9	0.24	1.08	0.09	6.48	2.14	3.03

Project Location:	3233 Mission Oaks Blvd.	Job Number:	VT-24745-02
Earth Description:	See Log	Tested By:	SC
Field Test in Boring	IT-3	Start Time:	8:31 AM
Boring Diameter (inches):	6.0	Total Pipe Length (feet):	15.0
Boring Depth (feet):	15.0	Pipe Stick-Up (inches):	0.0

Time of Day, t (hh:mm)	Delta Time, Δt (min.)	Delta Time, Δt (hr.)	Top of Pipe to Water, (ft.)	Water Depth, d (in.)	Water Depth, d (ft.)	Drop in Water Height, Δd (in.)	Drop in Water Height, Δd (ft.)	Perc Rate, (in/hr)	Corr. Factor, RF	Infilt. Rate (in/hr)
11:51			14.76	2.9	0.2					
12:01	10.0	0.17	14.86	1.7	0.14	1.20	0.10	7.20	1.76	4.09
12:04			13.00	24.0	2.00					
12:14	10.0	0.17	13.09	22.9	1.91	1.08	0.09	6.48	8.82	0.73
12:14			13.09	22.9	1.9					
12:24	10.0	0.17	13.19	21.7	1.81	1.20	0.10	7.20	8.44	0.85
12:24			13.19	21.7	1.81					
12:34	10.0	0.17	13.28	20.6	1.72	1.08	0.09	6.48	8.06	0.80

Infiltration Testing

Test Through Zone Near Bottom of Infiltration Device

Infiltration Testing Field Data

Date: 5/2/2017

Project Location:	3233 Mission Oaks Blvd.	Job Number:	VT-24745-02
Earth Description:	See Log	Tested By:	SC
Field Test in Boring	IT-4	Start Time:	8:40 AM
Boring Diameter (inches):	6.0	Total Pipe Length (feet):	5.0
Boring Depth (feet):	5.0	Pipe Stick-Up (inches):	0.0

Time of Day, t (hh:mm)	Delta Time, Δt (min.)	Delta Time, Δt (hr.)	Top of Pipe to Water, (ft.)	Water Depth, d (in.)	Water Depth, d (ft.)	Drop in Water Height, Δd (in.)	Drop in Water Height, Δd (ft.)	Perc Rate, (in/hr)	Corr. Factor, RF	Infilt. Rate (in/hr)
8:40		-	2.86	25.7	2.14					
8:50	10.0	0.17	2.88	25.4	2.12	0.24	0.02	1.44	9.52	0.15
8:50			2.88	25.4	2.12					
9:00	10.0	0.17	2.90	25.2	2.10	0.24	0.02	1.44	9.44	0.15
9:00			2.90	25.2	2.10					
9:10	10.0	0.17	2.92	25.0	2.08	0.24	0.02	1.44	9.36	0.15
9:10			2.92	25.0	2.08					
9:20	10.0	0.17	2.93	24.8	2.07	0.12	0.01	0.72	9.30	0.08
9:20			2.93	24.8	2.07					
9:30	10.0	0.17	2.95	24.6	2.05	0.24	0.02	1.44	9.24	0.16
9:30			2.95	24.6	2.05					
9:40	10.0	0.17	2.98	24.2	2.02	0.36	0.03	2.16	9.14	0.24
9:40			2.98	24.2	2.02					
9:50	10.0	0.17	3.00	24.0	2.00	0.24	0.02	1.44	9.04	0.16
9:50			3.00	24.0	2.00					
10:00	10.0	0.17	3.04	23.5	1.96	0.48	0.04	2.88	8.92	0.32
10:00			3.04	23.5	2.0					
10:10	10.0	0.17	3.12	22.6	1.88	0.96	0.08	5.76	8.68	0.66
10:10			3.12	22.6	1.88					
10:20	10.0	0.17	3.17	22.0	1.83	0.60	0.05	3.60	8.42	0.43
10:20			3.17	22.0	1.8					
10:30	10.0	0.17	3.21	21.5	1.79	0.48	0.04	2.88	8.24	0.35
10:30			3.21	21.5	1.79					
10:40	10.0	0.17	3.25	21.0	1.75	0.48	0.04	2.88	8.08	0.36
10:40			3.25	21.0	1.8					
10:50	10.0	0.17	3.28	20.6	1.72	0.36	0.03	2.16	7.94	0.27
10:50			3.28	20.6	1.72					
11:00	10.0	0.17	3.31	20.3	1.69	0.36	0.03	2.16	7.82	0.28
11:00			3.31	20.3	1.69					
11:10	10.0	0.17	3.34	19.9	1.66	0.36	0.03	2.16	7.70	0.28
11:10			3.34	19.9	1.66					
11:20	10.0	0.17	3.37	19.6	1.63	0.36	0.03	2.16	7.58	0.28
11:20			3.37	19.6	1.6					
11:30	10.0	0.17	3.40	19.2	1.60	0.36	0.03	2.16	7.46	0.29
11:30			3.40	19.2	1.60					
11:40	10.0	0.17	3.43	18.8	1.57	0.36	0.03	2.16	7.34	0.29
11:40			3.43	18.8	1.6					
11:50	10.0	0.17	3.47	18.4	1.53	0.48	0.04	2.88	7.20	0.40
11:50			3.47	18.4	1.53					
12:00	10.0	0.17	3.50	18.0	1.50	0.36	0.03	2.16	7.06	0.31
12:00			3.50	18.0	1.5					
12:10	10.0	0.17	3.54	17.5	1.46	0.48	0.04	2.88	6.92	0.42
12:10			3.54	17.5	1.46					
12:20	10.0	0.17	3.59	16.9	1.41	0.60	0.05	3.60	6.74	0.53
12:20			3.59	16.9	1.4					
12:30	10.0	0.17	3.62	16.6	1.38	0.36	0.03	2.16	6.58	0.33
12:30			3.62	16.6	1.38					
12:40	10.0	0.17	3.65	16.2	1.35	0.36	0.03	2.16	6.46	0.33