Appendix E

Drainage and Water Quality Report

Conceptual Drainage and SUSMP (Water Quality) Report for Portuguese Bend Zone 2 Landslide Moratorium Ordinance Revisions EIR

City of Rancho Palos Verdes
County of Los Angeles

Hunsaker Project No: 0159-001-001
May 6, 2011
Revised ~~April 2013~~June 2014

Prepared for:

Rancho Palos Verdes
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

Prepared by:

Hunsaker and Associates, LA Inc.
26074 Avenue Hall, Suite 23
Valencia, CA 91355
Telephone: (661) 294-2211
Fax: (661) 294-9890

Wai Lan Lee

Under the supervision of:



Jason H. Fukumitsu RCE 40695 Exp. 3/31/15

TABLE OF CONTENTS

1. INTRODUCTION 1
   - 1.1 Report Summary
   - 1.2 Project Description

2. METHODOLOGY 4

3. DESIGN CRITERIA 5

4. MODIFIED RATIONAL HYDROLOGY / FLOOD 6

5. INTERIM PEAK FLOW ANALYSIS / LOW IMPACT DEVELOPMENT (LID) 7

6. STANDARD URBAN STORMWATER MITIGATION PLAN 8

7. CONCLUSION AND RECOMMENDATIONS 9

8. REFERENCES 18

9. APPENDICES

   A. Hydrology Calculations and Summary Tables

      1. Capital Storm Hydrologic Summary Table
      2. TC Calculations
      3. SUSMP Calculations
      4. 2-year, 2-year (burn), 5-year, 10-year, 25-year, 50-year and 50-year (burn) Storm Modified Rational Hydrology Results and Hydrographs

   B. Hydrologic Reference Graphs & Table
      1. 50-Year, 24-Hour Isohyet (LACDPW)
      2. Runoff Coefficient Curves for Soil Types 2 and 4
      3. Los Angeles County Proportion Impervious Data Table
      4. Los Angeles County Debris Production Rates for Los Angeles Basin
      5. Los Angeles County Peak Bulking Factors for Los Angeles Basin

   C. Reference Plans:
      1. FEMA FIRM Panel 06037C2025F, Effective September 26, 2008
      2. FEMA FIRM Panel 06037C2026F, Effective September 26, 2008
      3. PD 407
      4. PD 1382
      5. PD 1403
      6. PD 1703
      7. State RWQCB Clarification Letter to LACDPW

   D. Conceptual Drainage and SUSMP (Water Quality) Map

1.0 INTRODUCTION

1.1 REPORT SUMMARY

The purpose of this report is to present the Conceptual Drainage and Standard Urban Stormwater Mitigation Plan (SUSMP) analysis for the EIR for the "Zone 2 Landslide Moratorium Ordinance." The report analyzes pre and post-development conditions for the SUSMP, 2–year, 5-year, 10-year, 25-year, 50-year, and Capital Storms, as well as total debris load.

Drainage (flood) and water quality related impacts and mitigation are addressed consistent with City of Rancho Palos Verdes ordinances and policies. All calculations are based upon the procedures outlined in the County of Los Angeles 2006 Hydrology Manual, 2002 SUSMP Manual, and 2006 Sedimentation Manual.

This report identifies the pre and post-development runoff from the project. Since each lot would have to acquire permits individually, it would be the responsibility of the owner to adhere to the policies in place at the time permits are pulled. Since this EIR addresses the lots cumulatively, the project exceeds the threshold for mitigation and treatment. The individual homeowners will need to provide mitigation onsite prior to outletting runoff from their property.

Our analysis has determined that there would be an increase in runoff from the 2-year, 5-year, 10-year, 25-year and 50-year storm events. Treatment is required for the SUSMP event. See section 6.0 Standard Urban Stormwater Mitigation Plan for a definition of the SUSMP event.). Additionally, the lots may be required to employ Low Impact Development (LID) principles as well as hydromodification mitigation to minimize impacts to the natural water courses. See Section 7.0: Summary and Recommendations for a more detailed analysis.

This report is divided into several sections. Section 1 contains the introduction; Section 2 discusses the methodology used in the hydrologic analysis; Section 3 summarizes the design criteria used; Section 4 is a description of the hydrologic model and brief description of the watershed and its land uses; Section 5 summarizes the analysis for the Interim Peak Flow Runoff Criteria and LID analysis; Section 6 describes the Standard Urban Stormwater Mitigation Plan (SUSMP); Section 7 includes the conclusions and recommendations of this report; and Section 8 includes a list of the references used in the preparation of this report.

1.2 PROJECT DESCRIPTION

"Zone 2 Landslide Moratorium Ordinance" area (referred to as "project") is located north of the intersection of Palos Verdes Drive South and Narcissa Drive in the Portuguese Bend area of the Palos Verdes Peninsula, City of Rancho Palos Verdes, and County of Los Angeles, California. This area, located on the hills above the south-central coastline of the City, is within the City's larger Landslide Moratorium Area (LMA). Zone 2 consists of 111 individual lots. Of these, 64 are developed with residences and 47 are either undeveloped or underdeveloped. For the purposes of this drainage analysis, the "Project Site" is considered to be the entire Portuguese Bend development, while the "Project" is the 47 lots that are the focus of this EIR.

The project site is part of an 855± acre watershed that includes developed and undeveloped land uses. Offsite areas to the north of the project site include existing Tracts 27789, 31617 and 31714, as well as natural hillside and canyon open space areas. Palos Verdes Drive and the Pacific Ocean abut the southerly edge of the project site. Altamira Canyon is the main natural drainage course that drains the project site and offsite tributary areas. Altamira Canyon has and continues to experience erosion due to runoff from the existing on and off site developments.

The pre and post development drainage watersheds have identical limits and drainage patterns. The pre-development watershed within the project site boundary consists of 64 developed lots totaling 81 acres, and 47 undeveloped lots totaling 43 acres. The post – development condition includes development of the 47 undeveloped lots as single story, ranch-style residences with attached or detached three-car garages, with maximum 40% net lot coverage. ~~Since the existing drainage system was designed for the entire Portuguese Bend development, including the 47 undeveloped lots, each lot is assumed to have a proportional share of the existing drainage capacity provided for the Portuguese Bend development. Regardless of when the lots are constructed, each lot is allowed to drain into the existing drainage system based upon the size of the lot. Any deficiencies in the drainage system should be mitigated by the entire Portuguese Bend development rather than the last 47 lots to be constructed.~~ The existing drainage system in the project area is a private system originally permitted by the County. The system utilizes culverts, storm drains, open drainage courses, and the roads to convey runoff. Testimony and video provided by residents indicates that some culverts and roads are inadequate to convey existing runoff. However, since the existing drainage system was designed for the entire Portuguese Bend development, including the 47 undeveloped lots, each lot is allowed to drain into the existing drainage system

Existing storm drains (PD 407, 1382, 1403 and 1703) discharge from the existing offsite areas into the undeveloped canyon areas north of the project site. Runoff drains through the project site in a generally north to south direction, crosses Palos Verdes Drive South, and discharges into the Pacific Ocean.

Within the project site runoff is conveyed within existing drainage courses, storm drains, and culverts that traverse the site. The project site is divided into two major drainage watersheds by Cinnamon Lane. The area east of Cinnamon Lane drains a total of 637 acres, of which approximately 82 acres are located in the Zone 2. Drainage in the easterly watershed is conveyed by Altamira Canyon southwesterly to Narsissa Drive. The area west of Cinnamon Lane drains a total of 115 acres, of which approximately 42 acres are located in the Zone 2.

Drainage in the westerly watershed is conveyed by a combination of an existing subsurface storm drain system and surface flow in a southeasterly direction along Figtree Road to the cul-de-sac at the end of Figtree Road. The storm drain continues southeasterly in private lots to a junction with Altamira Canyon (the easterly watershed) approximately 400 feet north of Narcissa Drive. From the junction, the storm drain drains southwesterly across Narsissa Drive and Palos Verdes Drive South and outlets into the lower reaches of Altamira Canyon. Altamira Canyon drains directly into the Pacific Ocean from Palos Verdes Drive South.

The majority of the project area is located within FEMA Flood Zone "X," and the canyon area is clarified as FEMA Flood Zone "D" on the FEMA FIRM Panel 06037C2025F and 06037C2026F, effective September 28, 2008. Flood Zone "X" is defined as an area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone "X" is the area determined to be outside the 500-year flood and protected by levee from 100-year flood. Flood Zone "D" is defined as an area with possible but undetermined flood hazards. No flood hazard analysis has been conducted.

2. METHODOLOGY

The analysis performed for this project was prepared at a programmatic level to determine the overall hydrological impact of the proposed project. Each of the individual property owners would need to prepare a detailed hydrologic analysis to demonstrate compliance with the mitigation measures listed below. The mitigation measures address individual site development impacts due to flooding and erosion. Although the project area currently experiences flooding and erosion, resolving existing conditions is not a part of the mitigation required for the proposed project's impacts. While it may be desirable to resolve the site flooding and erosion in Altamira Canyon and other natural drainage courses, it is an existing condition affecting the larger area and therefor is not addressed in in this analysis.

A detailed field survey was not conducted to determine the exact size and location of every drainage facility located on the site. The existing drainage facilities were based upon record data provided by the City and supplemented by a visual field inspection of the roads and areas immediately adjacent to the roads. Since the proposed project is the development of individual lots located within a developed neighborhood and no changes are proposed to the existing roads, culverts, storm drains, and open drainage conveyances (natural and constructed) at this time, a detailed survey and analysis was determined to be unnecessary at this time.

Reference plans and design calculations were not available for confirmation of the capacity of the existing drains. A detailed hydrologic and hydraulic analysis of the existing drainage system, including culverts, streets, and open drainage courses was not prepared as a part of this analysis. The impacts are described quantitatively for the overll project as increases in runoff rates and volumes, and mitigation is required to attenuate the increase in runoff so that no net change occurs. As such, regardless of the localized flooding that may occur in existing conditions, if no net change occurs due to the development of the 47 undeveloped lots, detailing the existing flooding is not required to determine project related impacts.

The project site is located within one watershed which, including offsite areas, covers a total of 855± acres. The drainage watershed was delineated based on existing topography and improvement plans, the existing City Master Plan of Drainage, Los Angeles County Drainage Watershed Maps, and a site visit. Two hydrologic methods were used for the drainage analysis - the Rational and Modified Rational Methods are included in Section 7.2 and 7.3 of the 2006 Los Angeles County Hydrology Manual, respectively. The SUSMP is based upon the Los Angeles County SUSMP Manual dated September 2002.

A 24-Hour storm analysis based upon the Los Angeles County Rational and Modified Rational Method of Hydrology was used for clear, burned, and burned and bulked conditions for the watershed(s).

The time of concentration (T_c) for each subarea was computed using the Los Angeles County approved Time of Concentration calculator based upon the Rational Method. The calculator evaluates several hydrologic parameters such as soil type, land use, imperviousness, storm frequency, length and slope of each reach to calculate a time of concentration. This data was used with the Los Angeles County approved LAR04 software application to determine peak flow rates for all storm events.

Using the times of concentrations for each subarea, the Modified Rational Method was then used to calculate the 50-Year, 24-Hour peak runoff flow for each subarea. The undeveloped tributary areas were analyzed using a burned coefficient to calculate peak runoff rates. Unburned coefficients were used for all developed conditions as well as undeveloped conditions for storms other than the 50-year Capital Storm event.

The project's land use and imperviousness was determined from the Land Use and Imperviousness Table provided in the Los Angeles County Hydrology Manual (see Appendix 9.B.3). Soil types and rainfall corresponding to each subarea were obtained from the Hydrologic Maps in the Los Angeles County Hydrology Manual. The maps used were maps 1-H1.3 and 1-H1.4 (see Appendix 9.B.1).

The project is located within the Coast Watershed and the undeveloped areas were analyzed for debris potential, as well as peak burned and bulked runoff rates utilizing the County's charts for the Los Angeles Basin. The watershed lies within Debris Potential Zone DPA-6. DPA6- has a debris potential of 48,000 cubic yards (cy) / mi^2 for areas less than or equal to 0.1 mi^2. Debris volumes were calculated for each undeveloped subarea based on this debris production rate. Bulking is the increase in flow rates that occur when debris is included in the runoff rates. Within the Los Angeles Basin, DPA-6 has a bulking factor of 1.61 for areas less than or equal to 0.1 mi^2. The burned and bulked peak runoff rates were calculated by factoring the peak burned runoff rates by the bulking factor.

A summary of the project's Q_{50} burned and bulk flows and debris volume can be found in Table 5: Debris and Burn & Bulked Flow Summary Table.

3. DESIGN CRITERIA

Los Angeles County requires that several design criteria be followed when using the Rational and Modified Rational Method of Hydrology to determine capital flood flow.

The 50-year, 24-hour rainfall isohyets used in the hydrologic calculations were obtained from the Los Angeles County Hydrology Manual's Hydrologic Maps. Watershed has 4.9" isohyet. Other storm events were determined by factoring the 50-year isohyets.

The soil types within the project site were determined to be 2 and 4 from the hydrologic maps.

The project was assumed to have 42 % imperviousness in single-family residential areas, 2% for base vacant undifferentiated (onsite undeveloped lots), 1% for offsite vacant areas and 40% for proposed residences. A weighted imperviousness was used for areas consisting of two or more land use types.

The project watershed falls in a debris potential area in the Los Angeles Basin, DPA-6. The respective debris and bulking rate factor are 48,000 cy / mi^2 and 1.61.

The design criteria used is summarized below:

Hydrology Method:	Los Angeles County Flood Control District Rational Method and Modified Rational Method.
Hydrology Modeling Software:	LAR04
Design Storm:	SUSMP, 2-Year, 5-Year, 10-Year, 25-Year, 50-Year, Capital Storm
50-Year Isohyet:	4.9"
Soil Types:	2 and 4
Land Use and Imperviousness:	Existing Single-Family (42 %) Proposed Single-Family (40 %) Base vacant undifferentiated – Onsite Undeveloped lots (2 %) Offsite vacant area (1%)
Debris Potential Zone:	DPA-6 - 48,000 cy / mi^2 for area $\leq$ 0.1 mi^2
Peak Bulking Rate:	DPA-6 - 1.61 – for area $\leq$ 0.1 mi^2

4. MODIFIED RATIONAL HYDROLOGY / FLOOD CONTROL

The hydrology analysis was based upon Los Angeles County design criteria for the Modified Rational Method, utilizing the LAR04 program. Drainage areas were determined and the corresponding sub-areas delineated based on the existing topography and existing improvements on the project site. Post-development conditions were identical to the pre-development conditions, with the exception that the 47 lots are assumed to be developed under post-development conditions.

The level of flood protection required ranges from a 10-year to a Capital Storm event depending upon the facility impacted. According to the Policy on Levels of Protection (Chapter 4, Hydrology Manual of Los Angeles County), public storm drains must at least carry flow from the 10-year storm event, the street or highway must carry the balance of the 25-year storm event. The capital flood level of protection applies to all facilities constructed to drain natural depressions or sumps, as well as natural drainage courses. In addition, all building pads must be a minimum of 1 foot above the maximum ponding level during the Capital Storm event. The Capital Storm event is defined as the burned and bulked runoff from a 50-year storm event with a 100% burn factor applied to all undeveloped areas within the watershed.

For the project site, a 10-year level of protection with the pads maintaining 1 foot of freeboard above the Capital Storm event is required. In sump conditions a 25-year level of protection is required.

5. INTERIM PEAK FLOW ANALYSIS / LOW IMPACT DEVELOPMENT (LID)

The Los Angeles County Interim Peak Flow Runoff Standard involves the analysis of the 2-Year, 24-Hour storm event for both existing and proposed conditions. The purpose of the analysis is to determine that the flow from the 2-Year, 24-Hour storm would not exceed the existing peak flow, burned, provided the proposed peak flow rates equals or exceeds five cubic feet per second. The Standard also requires the proposed runoff from the 50-Year Capital Storm shall not exceed the predevelopment peak flow rate, burned and bulked, from the 50-Year Capital Storm.

In order to verify compliance with the Interim Peak Flow Standard requirement for this site, both the 50-year, 24-Hour storm as well as the 2-year, 24-Hour storm events were analyzed for all of the subareas per the County's procedures. To comply with the current LID and Hydromodification requirements, the 5, 10, and 25 year storms were also calculated.

The hydromodification analysis specifically addresses all of the characteristics that may lead to drainage impacts to natural water courses, including changes in flow rates and volume, as well as flow velocity, depth of flow, frequency and duration of runoff, and limits of inundation.

The analysis is based upon the County of Los Angeles Low Impact Development Standards, dated January 2009. While the manual has not been adopted by the City of Rancho Palos Verdes, the procedures for the analysis are valid, and serve as the basis for this report. While the current Los Angeles County MS4 permit does not specifically require addressing hydromodification effects and Low Impact Development (LID) principles, an interim clarification letter sent in 2006 to the County of Los Angeles and its co-permittees specifically discussed shortcomings in the current MS4 Permit that required attention. The County of Los Angeles and City of Los Angeles have since adopted ordinances or policies that specifically address LID and hydromodification requirements. The County's Low Impact Development Ordinance adopted in January 2009 requires that impacts due to development be treated at the source.

Future MS4 permits will ~~most~~ likely incorporate these requirements specifically. All future construction on the site would need to comply with the ordinances and policies in place at the time the construction permits are applied for. We have provided the changes in runoff rates, treatment volumes, and treatment flow rates for the range of storm events currently in place. These rates can be prorated and utilized as the basis for mitigation for individual sites, or a new analysis prepared by the applicant.

Any post-development runoff rates that exceed existing runoff rates will require drainage acceptance letters and / or mitigation. Any hydromodification effects will need to be addressed onsite for areas tributary to natural watercourses subject to erosion.

6. STANDARD URBAN STORMWATER MITIGATION PLAN

The objective of implementing a Standard Urban Stormwater Mitigation Plan (SUSMP) is to effectively control or treat the pollutants from urban activities prior to outletting into receiving waters. The SUSMP requires that runoff volume or flow be treated and / or mitigated based upon one of the following criteria:

a. Runoff from the 85^{th} percentile 24-hour runoff event.
b. Capture of 80% or more of the annual runoff.
c. 0.75 inch 24-hour storm event.

For this analysis, the 0.75 inch event was used.

Each of the individual sub-areas was analyzed to determine the peak mitigated flow rate, Q_{PM}, as well as the peak mitigated volume, V_M, from the new development based on the Rational Method. This was achieved by using the Los Angeles County approved Time of Concentration calculator developed for the SUSMP analysis (using a rainfall of 0.75 inches).

The SUSMP event was calculated for the entire watershed for the hydromodifcation / LID analysis. For treatment of runoff from the development, a treatment rate and volume was developed as a unit rate on a per acre basis, assuming 40% imperviousness for the 47 lots proposed to be developed.

The peak mitigated flow rate and volume would provide support for the design of the post construction Best Management Practices (BMPs) proposed for the development onsite, or at water quality basins located within the project site. Each individual lot can use the analysis as the basis for their design.

7. CONCLUSIONS & RECOMMENDATIONS

The Flood (Hydrology) / Water Quality (SUSMP) analysis was prepared for the range of design storms required by the City of Rancho Palos Verdes, and described in the sections above. The results are shown below for the range of storm events and compares pre and post-development runoff for the watershed, project site, and median lot.

The following tables identify the pre and post-development runoff from the Watershed (Table 1); the Project Site (Table 2); and the Median Lot (Table 3). Table 1 – the watershed data provides the cumulative impacts for the development. Table 2 - the project site table provides the project specific impacts. Table 3 – the median lot table provides the impacts and changes specific to a typical lot. The actual mitigation will vary by the size and extent of improvements on a specific lot.

The analysis for the Flood and Water Quality impacts are presented separately below.

Flood (Hydrology)

Flood / Hydrology impacts would be considered significant if the proposed project would:

- *Substantially alter the existing drainage pattern of the area such that substantial erosion or siltation occurs.*
- *Substantially alter existing drainage pattern or substantially increase the rate or volume of surface runoff in a manner that results in flooding.*
- *Create or contribute runoff water which would exceed the capacity of existing or planned storm drain storm water drainage systems.*
- *Increase infiltration which could affect the stability of existing landslides in the project vicinity.*

Changes to the peak runoff rates for the design storm events (SUSMP, 2, 5, 10, 25, 50-year, and Capital Storm) were analyzed to determine the project impacts.

The hydrologic analysis determined that the post-development condition c~~w~~ould result in an increase in runoff to the existing lots and natural watercourses. The increase in runoff would be~~is~~ due to an increase in impervious area that would occur when the 47 lots are developed. The combined impacts resulting from the development of the 47 lots is deemed to be insignificant for the following reasons:

- The existing ~~(natural)~~ drainage patterns are maintained~~. and the combination of the natural and constructed drainage conveyances and surface flow has the capacity to convey the runoff from the project site~~.
- The existing drainage system for the Portuguese Bend development was designed for the entire development, including the 47 undeveloped lots. ~~Therefore, the lots have on a proportional basis, a share of the capacity of the existing drainage system.~~ Should any deficiencies exist, it is a regional issue and should be addressed accordingly.

- Changes to the peak runoff rates for the design storm events (SUSMP, 2, 5, 10, 25, 50-year, and Capital Storm) are minimal and insignificant. They range in between 0.5% and 1% for the entire watershed, and 2.9% - 4.5% for the project site. Since, the entire watershed drains through the project development, flood impacts are based upon changes relative to the entire watershed.
- The addition of impervious area will reduce the total infiltration from the site. Due to the low permeability of the existing soils (clays) and steepness of the natural canyons, infiltration in the natural areas is likely to be low. For a given storm event, the total infiltration will not exceed the existing condition.

However, on an individual lot basis, localized flood impacts may occur and may be considered significant. The analysis shows that increases in runoff from an individual lot ranges between 9.8% and 15.1%. Since each lot would acquire permits individually; it would be the responsibility of the owner to adhere to the policies and procedures in place at the time permits are pulled for all flood and water quality related impacts.

To identify and mitigate potential localized flood impacts to adjacent properties and facilities to a level not considered significant the project applicants must do the following:

- *A detailed Hydrology Study shall be prepared by a Licensed Civil Engineer and approved by the City. The study shall address impacts to the proposed building site, as well as upstream and downstream properties. The analysis will include the SUSMP. 2,5, 10, 25, 50-yeear, and Capital Storms to determine impacts. The analysis will follow the methodology outlined in the Los Angeles County Hydrology and Sedimentation Manual (latest edition), the Los Angeles County Low Impact Development Manual, and Los Angeles County Stormwater Best Management Practices Design and Maintenance Manual for preparation of the design calculations. Improvements will be based upon the policies and codes of the City.*
- ~~Prepare a hydrology consistent with City policies at the time the project is permitted that demonstrates that significant increases in runoff or impacts do not occur.~~
- The limits of the analysis should be to the point flow is either normalized or attenuated adequately to demonstrate no significant impacts will occur, or to the point the runoff has reached an acceptable conveyance such as a storm drain, channel, or natural drainage course. All runoff should be directed to an acceptable conveyance and not be allowed to drain to localized sumps or catchment areas with no outlet. *An acceptable conveyance is defined as one that is adequate to convey any increases in runoff without causing additional impacts such as flooding and erosion.*
- Maintain existing drainage patterns and outlet at historical outlet points.
- Minimize changes to the character of the runoff at property lines. Changes in character include *obstructing or diverting existing runoff entering the site, changing the depth and frequency of flooding,* concentration of flow outletting onto adjacent properties, ~~or~~ and increasing the frequency or duration of runoff outletting onto adjacent properties.
- Reduce significant increases in runoff *rates and volume* in localized areas by low impact development principles *such as, but not limited to, infiltration trenches, cisterns, bio-retention areas, or permeable pavement.* ~~identified in the County's LID manual.~~

- Provide onsite detention facilities*, infiltration facilities,* or conveyance to acceptable off-lot conveyance devices *to eliminate impacts from increases in runoff rates and volumes*.
- *The project shall address impacts to the immediate vicinity as well as downstream facilities, including culverts, roads, open drainage courses, and Altamira Canyon, or demonstrate there is no change from existing conditions.*
- Secure drainage acceptance letters from affected properties if mitigation cannot be achieved.
- Temporary impacts during construction can be minimized by performing grading during the dry season, or implement an erosion control plan that directs runoff away from exposed grading and property lines, or provides soil stabilization and desilting measures.
- Avoid watering graded soils during construction, use of soil blinders or other measure to minimize impact.
- Minimize "Dry Weather": runoff which could add to the total infiltration from the project.

Water Quality (SUSMP)

Changes to the runoff rates and volumes for the SUSMP and water quality treatment events 2, 5, 10, 25, and 50-year Storms were analyzed to determine the project impacts. The SUSMP event is used for stormwater pollutant treatment. The remaining events are utilized to determine hydromodification impacts.

Changes in water quality are considered significant and mitigation is required. Since, the entire watershed drains through the project development, erosion impacts are based upon changes relative to the entire watershed. Changes to the peak runoff rates for the design storm events (2, 5, 10, 25, 50-year and capital storm) are minimal and insignificant. They range in between 0.5% and 2.0% for the entire watershed. Changes to the total volume of runoff range between 2.8% and 5.3% and may be considered significant.

Water Quality impacts would be considered significant if the proposed project would:

- *Violate any water quality standards or water discharge requirements.*
- *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the groundwater table level.*
- *Substantially alter the existing drainage pattern of the area such that substantial erosion or siltation occurs.*
- *Create or contribute runoff water which would provide substantial additional sources of polluted runoff.*

Current Los Angeles County ordinances require that water quality treatment occur for single-family hillside homes with development of one acre or more of surface area, or when developing ten or more unit homes, including single family homes, multifamily homes, condominiums and apartments. Since this EIR addresses the lots cumulatively, the project exceeds the threshold for mitigation and treatment. The individual homeowners would need to provide treatment onsite prior to outletting runoff from their property. Runoff from the SUSMP event or other acceptable criteria available at the time the permits are pulled will be utilized to size the onsite facilities.

Additional clarification to the current MS4 permit requires that Low Impact Development (LID) and hydromodification principles be incorporated into the project water quality management plans.

Hydromodification addresses increases in runoff that may change the characteristics of the natural watercourses, such as depth of flow, velocity, as well long term erosion in the watercourse due to an increase in the frequency and quantity of runoff during storm and dry weather conditions.

Mitigation measures related to Water Quality include the following:

- Prepare a SUSMP (Standard Urban Stormwater Management Plan) consistent with City policies at the time the project is permitted that demonstrates that water quality impacts are mitigated.

- Provide stormwater treatment measures that may include the use of bio-filters, filter strips, sand filters, roof drain filters, planter box filters, and other acceptable Best Management Practices (BMPs).
- Onsite treatment on a lot by lot basis meets the intent of Low Impact Development (LID) principles.
- Provide mitigation for hydromodification to local natural drainage courses though flow – duration control methods. Use of onsite detention facilities, cisterns, or underground storage devices may be used.
- Infiltrate on-lot, where feasible, runoff from the SUSMP event. However, the area is subject to geotechnical hazards and any mitigation utilizing infiltration will need the approval of a geotechnical engineer. Infiltration may be allowed on a lot by lot basis, or consistent with existing conditions if no hazard is determined to exist.
- If the SUSMP event cannot be infiltrated, a combination of detention and infiltration of the change in runoff volume will mitigate some of the impacts due to hydromodification.

Table 1 - Watershed (Cumulative) Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	37.4	40.1	2.70	6.7%
	q (cfs/ac)	0.044	0.047	0.003	6.7%
	Vol (ac-ft)	12.0	12.9	0.90	7.0%
	vol (ac-ft/ac)	0.014	0.015	0.001	7.0%
2-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	276.7	282.5	5.78	2.0%
	q (cfs/ac)	0.324	0.331	0.007	2.0%
	Vol (ac-ft)	53.4	55.4	2.00	3.6%
	vol (ac-ft/ac)	0.062	0.065	0.002	3.6%
2-year (Burn)	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	312.0	317.3	5.3	1.7%
	q (cfs/ac)	0.365	0.371	0.006	1.7%
	Vol (ac-ft)	65.2	68.2	3.0	4.4%
	vol (ac-ft/ac)	0.076	0.080	0.004	4.4%
5-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	579.62	587.37	7.75	1.3%
	q (cfs/ac)	0.678	0.687	0.009	1.3%
	Vol (ac-ft)	91.44	96.56	5.12	5.3%
	vol (ac-ft/ac)	0.107	0.113	0.006	5.3%
10-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	876.86	885.38	8.52	1.0%
	q (cfs/ac)	1.026	1.036	0.010	1.0%
	Vol (ac-ft)	121.6	126.68	5.08	4.0%
	vol (ac-ft/ac)	0.142	0.148	0.006	4.0%

Table 1 - Watershed (Cumulative) Drainage Runoff Summary (continuous)

Year		Pre-development	Post-development	Delta	% change
25-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	1230.7	1237.3	6.63	0.5%
	q (cfs/ac)	1.440	1.448	0.008	0.5%
	Vol (ac-ft)	164.78	170.7	5.92	3.5%
	vol (ac-ft/ac)	0.193	0.200	0.007	3.5%
50-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	1505.4	1515.53	10.13	0.7%
	q (cfs/ac)	1.761	1.773	0.012	0.7%
	Vol (ac-ft)	197.98	204.58	6.60	3.2%
	vol (ac-ft/ac)	0.232	0.239	0.008	3.2%
Capital	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	2116.30	2128.40	12.10	0.6%
	q (cfs/ac)	2.476	2.490	0.014	0.6%
	Flow Vol (ac-ft)	228.3	234.91	6.61	2.8%
	Debris Vol (ac-ft)	20.3	20.3	0.00	0.0%
	total Vol (ac-ft)	230.8	237.4	6.62	2.8%
	vol (ac-ft/ac)	0.270	0.278	0.008	2.8%

Table 2 – Project Site (Zone 2) Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	9.7	12.0	2.30	19.2%
	q (cfs/ac)	0.067	0.082	0.016	19.2%
	Vol (ac-ft)	3.1	3.8	0.70	18.4%
	vol (ac-ft/ac)	0.021	0.026	0.005	18.4%
2-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	62.4	70.8	8.40	11.9%
	q (cfs/ac)	0.428	0.486	0.058	11.9%
	Vol (ac-ft)	9.7	12.7	3.00	23.6%
	vol (ac-ft/ac)	0.067	0.087	0.02	23.6%
5-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	129.3	138.9	9.60	6.9%
	q (cfs/ac)	0.887	0.953	0.066	6.9%
	Vol (ac-ft)	16.3	21.4	5.10	23.8%
	vol (ac-ft/ac)	0.112	0.147	0.03	23.8%
10-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	187.9	196.7	8.80	4.5%
	q (cfs/ac)	1.289	1.349	0.060	4.5%
	Vol (ac-ft)	21.2	26.2	5.00	19.1%
	vol (ac-ft/ac)	0.145	0.180	0.03	19.1%
25-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	263.2	271.1	7.87	2.9%
	q (cfs/ac)	1.805	1.859	0.054	2.9%
	Vol (ac-ft)	27.8	33.9	6.10	18.0%
	vol (ac-ft/ac)	0.191	0.233	0.04	18.0%
50-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	314.3	324.45	10.15	3.1%
	q (cfs/ac)	2.156	2.225	0.070	3.1%
	Vol (ac-ft)	35.9	39.8	3.90	9.8%
	vol (ac-ft/ac)	0.246	0.273	0.03	9.8%

Table 3 – Median Lot Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.02	0.06	0.04	64.8%
	q (cfs/ac)	0.03	0.08	0.053	64.8%
	Vol (ac-ft)	0.01	0.02	0.01	62.3%
	vol (ac-ft/ac)	0.01	0.03	0.016	62.3%
2-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.22	0.36	0.14	40.1%
	q (cfs/ac)	0.29	0.49	0.195	40.1%
	Vol (ac-ft)	0.01	0.06	0.05	79.9%
	vol (ac-ft/ac)	0.02	0.09	0.07	79.9%
5-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.54	0.70	0.16	23.4%
	q (cfs/ac)	0.73	0.95	0.223	23.4%
	Vol (ac-ft)	0.02	0.11	0.09	80.6%
	vol (ac-ft/ac)	0.03	0.15	0.12	80.6%
10-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.85	1.00	0.15	15.1%
	q (cfs/ac)	1.14	1.35	0.204	15.1%
	Vol (ac-ft)	0.05	0.13	0.09	64.6%
	vol (ac-ft/ac)	0.06	0.18	0.12	64.6%
25-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	1.24	1.38	0.14	9.8%
	q (cfs/ac)	1.68	1.86	0.183	9.8%
	Vol (ac-ft)	0.07	0.17	0.10	60.9%
	vol (ac-ft/ac)	0.09	0.23	0.14	60.9%
50-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	1.47	1.65	0.17	10.6%
	q (cfs/ac)	1.99	2.23	0.235	10.6%
	Vol (ac-ft)	0.14	0.20	0.07	33.1%
	vol (ac-ft/ac)	0.18	0.27	0.09	33.1%

Table 4 - Debris Summary Table

SUB AREA	AREA (Ac)	QB (cfs) (Burned flow rate)	Capital (cfs) (Burned and Bulked flow rate)	DEBRIS (CY)
125A	60.0	156.8	252.4	4,500
132B	68.7	200.0	321.9	5,153
141C	61.2	154.4	248.6	4,590
142C	23.3	91.6	147.4	1,748
143C	48.3	121.8	196.1	3,623
151B	21.6	53.9	84.5	1,588
154B	7.7	22.8	47.9	566
156B	64.9	180.6	283.2	4,770
162A	11.5	27.1	43.7	863

Table 5- Imperious Area Summary Table

Pre-development Imp. Area (ac)	115
Post-development Imp. Area (ac)	122.1
∆ Imp. Area (ac) (∆%)	7.1 (6.2%)
Overall Watershed Area (ac)	854.7
Pre-development % Imp in Overall Watershed	13.46%
Post-development % Imp in Overall Watershed	14.29%
∆ % Imp. in Overall Watershed	0.83%

8. REFERENCES

i. Los Angeles County Department of Public Works Hydrology Manual, January 2006

ii. Los Angeles County Department of Public Works Sedimentation Manual, March 2006

iii. Interim Peak Flow Runoff Criteria for New Development, January 31, 2005

iv. County of Los Angeles Low Impact Development (LID) Standard Manual, January 2009

v. Los Angeles County Department of Public Works SUSMP Manual, September 2002

9. APPENDICES

A. Capital Storm Hydrologic Summary Table

1. Capital Storm Hydrologic Summary Table
2. TC Calculations
3. SUSMP Calculations
4. 2-year, 2-year (burn), 5-year, 10-year, 25-year, 50-year and 50-year (burn) Storm Modified Rational of Hydrology Result and Hydrograph

9.A.1. Capital Storm Hydrologic Summary Table

SUB AREA	NODE	AREA (Ac)	Sub-total Area (Ac)	% IMPERVIOUSNESS (Existing Condition)	% IMPERVIOUSNESS (Proposed Condition)	SOIL TYPE	ISOHYET	50-YR TC (min)	QB (cfs) (Pre-development)	Capital (cfs) (Pre-development)	QB (cfs) (Post-development)	Capital (cfs) (Post-development)	DEBRIS (CY)
108A		8.1		21	21	002	4.9	13		18.9		18.9	
	109A												
110A		46.7		2	2	002	4.9	18		91.3		91.3	
	111A												
112B		16.2		21	21	004	4.9	18		28.1		28.1	
	113AB												
114B		23.8		42	42	004	4.9	18		43.6		43.6	
	115AB												
116A		27.9		21	21	004	4.9	21		44.2		44.2	
117B		8.8		42	42	004	4.9	22		14.1		14.1	
	118AB												
119A		7.0		21	21	004	4.9	6		21.2		21.2	
	120A												
121B		3.5		21	21	004	4.9	6		10.6		10.6	
	122B												
	123AB		**142.0**							**170.0**		**170.0**	
	124A												
125A		60.0		1	1	004	4.9	9	156.8	252.4	156.8	252.4	4500.0
	126A												
127B		14.5		42	42	004	4.9	9		37.0		37.0	
	128B												
129C		53.3		42	42	004	4.9	13		112.4		112.4	
	130C												
	131BC		**67.8**							**147.5**		**147.5**	
132B		68.7		1	1	002	4.9	9	200.0	321.9	200.0	321.9	5152.5
	133AB		**338.5**						**598.8**	**737.7**	**598.8**	**737.7**	
	134A												
135B		15.8		42	42	004	4.9	17		29.0		29.0	
	136B												
137C		1.3		21	21	004	4.9	5		4.4		4.4	
	138BC		**17.1**							**32.7**		**32.7**	
139B		59.1		2	2	004	4.9	12	132.8	213.8	132.8	213.8	4432.5
140B		16.5		38	40	002	4.9	9					
141C		61.2		1	1	002	4.9	12	154.4	248.6	154.4	248.6	4590.0
142C		23.3		1	1	002	4.9	5	91.6	147.4	91.6	147.4	1747.5
143C		48.3		5	5	002	4.9	12	121.8	196.1	121.8	196.1	3622.5
	144BC		**225.5**						**499.2**	**723.9**	**499.2**	**723.9**	
	145B												
146A		31.6		13	23	002	4.9	7					
	147AB		**595.6**						**1076.0**	**1464.0**	**1076.3**	**1464.4**	
148A		16.2		22	40	004	4.9	8					
	149A												
150B		13.9		26	40	004	4.9	7					
151B		21.6		2	2	005	4.9	10	53.9	84.5	53.9	84.5	1587.6
152A		12.5		18	40	004	4.9	7					
	153AB		**659.8**						**1102.7**	**1483.7**	**1165.7**	**1568.4**	
154B		7.7		2	2	004	4.9	7	22.8	36.7	51.9	47.9	566.0
155B		21.3		13	40	005	4.9	7					
156B		64.9		2	2	002	4.9	10	180.6	283.2	180.6	283.2	4770.2

9.A.1. Capital Storm Hydrologic Summary Table

SUB AREA	NODE	AREA (Ac)	Sub-total Area (Ac)	% IMPERVIOUSNESS (Existing Condition)	% IMPERVIOUSNESS (Proposed Condition)	SOIL TYPE	ISOHYET	50-YR TC (min)	QB (cfs) (Pre-development)	Capital (cfs) (Pre-development)	QB (cfs) (Post-development)	Capital (cfs) (Post-development)	DEBRIS (CY)
	157B												
158B		33.8		16	20	004	4.9	12					
	159B												
160B		33.8		36	36	004	4.9	11					
	161B												
162A		11.5		2	2	004	4.9	11	27.1	43.7	27.1	43.7	862.5
	163AB		932.8						1541.5	**2025.2**	1585.9	**2083.5**	
	164A												
165A		21.9		42	42	004	4.9	11					
	166A		854.6						1577.2	**2092.5**	1586.3	**2128.4**	

9.A.2. TC Calculations

– Pre-development

- SUSMP
- 2-year
- 5-year
- 10-year
- 25-year
- 50-year

Portuguese Bend: Tc Calculator (SUSMP- Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	SUSMP	2	1360	0.02	0.75	30	0.19	0.26	0.39	0.6
HPB	110A	46.7	0.02	SUSMP	2	2500	0.05	0.75	30	0.19	0.26	0.27	2.4
HPB	112B	16.2	0.21	SUSMP	4	1860	0.04	0.75	30	0.19	0.1	0.27	0.83
HPB	114B	23.8	0.42	SUSMP	4	2220	0.05	0.75	30	0.19	0.1	0.44	1.99
HPB	116A	27.9	0.21	SUSMP	4	1880	0.02	0.75	30	0.19	0.1	0.27	1.43
HPB	117B	8.8	0.42	SUSMP	4	2000	0.01	0.75	30	0.19	0.1	0.44	0.74
HPB	119A	7	0.21	SUSMP	4	540	0.11	0.75	30	0.19	0.1	0.27	0.36
HPB	121B	3.5	0.21	SUSMP	4	425	0.08	0.75	30	0.19	0.1	0.27	0.18
HPB	125A	60	0.01	SUSMP	4	1260	0.40	0.75	30	0.19	0.1	0.11	1.25
HPB	127B	14.5	0.42	SUSMP	4	780	0.04	0.75	30	0.19	0.1	0.44	1.21
HPB	129C	53.3	0.42	SUSMP	4	1570	0.07	0.75	30	0.19	0.1	0.44	4.46
HPB	132B	68.7	0.01	SUSMP	2	1580	0.33	0.75	30	0.19	0.26	0.27	3.52
HPB	135B	15.8	0.42	SUSMP	4	2120	0.05	0.75	30	0.19	0.1	0.44	1.32
HPB	137C	1.3	0.21	SUSMP	4	290	0.05	0.75	30	0.19	0.1	0.27	0.07
HPB	139B	59.1	0.02	SUSMP	4	1922	0.32	0.75	30	0.19	0.1	0.12	1.35
HPB	140B	16.5	0.38	SUSMP	2	1350	0.16	0.75	30	0.19	0.26	0.52	1.63
HPB	141C	61.2	0.01	SUSMP	2	2170	0.19	0.75	30	0.19	0.26	0.27	3.14
HPB	142C	23.3	0.01	SUSMP	2	630	0.27	0.75	30	0.19	0.26	0.27	1.2
HPB	143C	48.3	0.05	SUSMP	2	2020	0.18	0.75	30	0.19	0.26	0.29	2.66
HPB	146A	31.6	0.13	SUSMP	2	920	0.30	0.75	30	0.19	0.26	0.29	1.74
HPB	148A	16.2	0.22	SUSMP	4	590	0.04	0.75	30	0.19	0.1	0.28	0.86
HPB	150B	13.9	0.26	SUSMP	4	760	0.20	0.75	30	0.19	0.1	0.31	0.82
HPB	151B	21.6	0.02	SUSMP	4	1140	0.20	0.75	30	0.19	0.1	0.12	0.49
HPB	152A	12.5	0.18	SUSMP	4	750	0.14	0.75	30	0.19	0.1	0.24	0.57
HPB	154B	7.7	0.02	SUSMP	4	700	0.26	0.75	30	0.19	0.1	0.12	0.18
HPB	155B	21.3	0.13	SUSMP	4	750	0.13	0.75	30	0.19	0.1	0.2	0.81
HPB	156B	64.9	0.02	SUSMP	2	1680	0.26	0.75	30	0.19	0.26	0.27	3.33
HPB	158B	33.8	0.16	SUSMP	4	1000	0.03	0.75	30	0.19	0.1	0.23	1.48
HPB	160B	33.8	0.36	SUSMP	4	1185	0.09	0.75	30	0.19	0.1	0.39	2.5
HPB	162A	11.5	0.02	SUSMP	4	1220	0.15	0.75	30	0.19	0.1	0.12	0.26
HPB	165A	21.9	0.42	SUSMP	4	1170	0.06	0.75	30	0.19	0.1	0.44	1.83

Portuguese Bend: Tc Calculator (2-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	2	2	1360	0.02	1.9	30	0.49	0.56	0.63	2.5
HPB	110A	46.7	0.02	2	2	2500	0.05	1.9	30	0.49	0.56	0.57	13.04
HPB	112B	16.2	0.21	2	4	1860	0.04	1.9	30	0.49	0.2	0.35	2.78
HPB	114B	23.8	0.42	2	4	2220	0.05	1.9	30	0.49	0.2	0.49	5.71
HPB	116A	27.9	0.21	2	4	1880	0.02	1.9	30	0.49	0.2	0.35	4.78
HPB	117B	8.8	0.42	2	4	2000	0.01	1.9	30	0.49	0.2	0.49	2.11
HPB	119A	7	0.21	2	4	540	0.11	1.9	16	0.66	0.35	0.47	2.17
HPB	121B	3.5	0.21	2	4	425	0.08	1.9	15	0.68	0.36	0.47	1.12
HPB	125A	60	0.01	2	4	1260	0.40	1.9	30	0.49	0.2	0.21	6.17
HPB	127B	14.5	0.42	2	4	780	0.04	1.9	22	0.56	0.27	0.53	4.3
HPB	129C	53.3	0.42	2	4	1570	0.07	1.9	30	0.49	0.2	0.49	12.8
HPB	132B	68.7	0.01	2	2	1580	0.33	1.9	23	0.55	0.58	0.58	21.92
HPB	135B	15.8	0.42	2	4	2120	0.05	1.9	30	0.49	0.2	0.49	3.79
HPB	137C	1.3	0.21	2	4	290	0.05	1.9	12	0.75	0.41	0.51	0.5
HPB	139B	59.1	0.02	2	4	1922	0.32	1.9	30	0.49	0.2	0.21	6.08
HPB	140B	16.5	0.38	2	2	1350	0.16	1.9	20	0.59	0.59	0.71	6.91
HPB	141C	61.2	0.01	2	2	2170	0.19	1.9	30	0.49	0.56	0.56	16.79
HPB	142C	23.3	0.01	2	2	630	0.27	1.9	12	0.75	0.65	0.65	11.36
HPB	143C	48.3	0.05	2	2	2020	0.18	1.9	29	0.5	0.56	0.58	14.01
HPB	146A	31.6	0.13	2	2	920	0.30	1.9	16	0.66	0.61	0.62	12.93
HPB	148A	16.2	0.22	2	4	590	0.04	1.9	22	0.56	0.27	0.41	3.72
HPB	150B	13.9	0.26	2	4	760	0.20	1.9	18	0.62	0.31	0.46	3.96
HPB	151B	21.6	0.02	2	4	1140	0.20	1.9	30	0.49	0.2	0.21	2.22
HPB	152A	12.5	0.18	2	4	750	0.14	1.9	22	0.56	0.27	0.38	2.66
HPB	154B	7.7	0.02	2	4	700	0.26	1.9	25	0.53	0.25	0.26	1.06
HPB	155B	21.3	0.13	2	4	750	0.13	1.9	25	0.53	0.24	0.33	3.73
HPB	156B	64.9	0.02	2	2	1680	0.26	1.9	25	0.53	0.57	0.58	19.95
HPB	158B	33.8	0.16	2	4	1000	0.03	1.9	30	0.49	0.2	0.31	5.13
HPB	160B	33.8	0.36	2	4	1185	0.09	1.9	28	0.5	0.22	0.46	7.77
HPB	162A	11.5	0.02	2	4	1220	0.15	1.9	30	0.49	0.2	0.21	1.18
HPB	165A	21.9	0.42	2	4	1170	0.06	1.9	28	0.5	0.22	0.51	5.58

Portuguese Bend: Tc Calculator (5-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	5	2	1360	0.02	2.5	24	0.71	0.63	0.69	3.97
HPB	110A	46.7	0.02	5	2	2500	0.05	2.5	30	0.64	0.61	0.62	18.53
HPB	112B	16.2	0.21	5	4	1860	0.04	2.5	30	0.64	0.33	0.45	4.67
HPB	114B	23.8	0.42	5	4	2220	0.05	2.5	30	0.64	0.33	0.57	8.68
HPB	116A	27.9	0.21	5	4	1880	0.02	2.5	30	0.64	0.33	0.45	8.04
HPB	117B	8.8	0.42	5	4	2000	0.01	2.5	30	0.64	0.33	0.57	3.21
HPB	119A	7	0.21	5	4	540	0.11	2.5	12	0.99	0.49	0.58	4.02
HPB	121B	3.5	0.21	5	4	425	0.08	2.5	11	1.03	0.5	0.58	2.09
HPB	125A	60	0.01	5	4	1260	0.40	2.5	20	0.78	0.42	0.42	19.66
HPB	127B	14.5	0.42	5	4	780	0.04	2.5	16	0.86	0.45	0.64	7.98
HPB	129C	53.3	0.42	5	4	1570	0.07	2.5	24	0.71	0.38	0.6	22.71
HPB	132B	68.7	0.01	5	2	1580	0.33	2.5	17	0.84	0.68	0.68	39.24
HPB	135B	15.8	0.42	5	4	2120	0.05	2.5	30	0.64	0.33	0.57	5.76
HPB	137C	1.3	0.21	5	4	290	0.05	2.5	9	1.13	0.52	0.6	0.88
HPB	139B	59.1	0.02	5	4	1922	0.32	2.5	30	0.64	0.33	0.34	12.86
HPB	140B	16.5	0.38	5	2	1350	0.16	2.5	16	0.86	0.68	0.76	10.78
HPB	141C	61.2	0.01	5	2	2170	0.19	2.5	24	0.71	0.63	0.63	27.37
HPB	142C	23.3	0.01	5	2	630	0.27	2.5	9	1.13	0.75	0.75	19.75
HPB	143C	48.3	0.05	5	2	2020	0.18	2.5	23	0.73	0.64	0.65	22.92
HPB	146A	31.6	0.13	5	2	920	0.30	2.5	12	0.99	0.73	0.74	23.15
HPB	148A	16.2	0.22	5	4	590	0.04	2.5	15	0.89	0.46	0.56	8.07
HPB	150B	13.9	0.26	5	4	760	0.20	2.5	12	0.99	0.49	0.6	8.26
HPB	151B	21.6	0.02	5	4	1140	0.20	2.5	21	0.76	0.41	0.42	6.89
HPB	152A	12.5	0.18	5	4	750	0.14	2.5	14	0.92	0.47	0.55	6.33
HPB	154B	7.7	0.02	5	4	700	0.26	2.5	13	0.95	0.48	0.49	3.58
HPB	155B	21.3	0.13	5	4	750	0.13	2.5	15	0.89	0.46	0.52	9.86
HPB	156B	64.9	0.02	5	2	1680	0.26	2.5	19	0.8	0.66	0.66	34.27
HPB	158B	33.8	0.16	5	4	1000	0.03	2.5	26	0.69	0.37	0.45	10.49
HPB	160B	33.8	0.36	5	4	1185	0.09	2.5	19	0.8	0.42	0.59	15.95
HPB	162A	11.5	0.02	5	4	1220	0.15	2.5	23	0.73	0.4	0.41	3.44
HPB	165A	21.9	0.42	5	4	1170	0.06	2.5	20	0.78	0.42	0.62	10.59

Portuguese Bend: Tc Calculator (10-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	10	2	1360	0.02	3.5	18	1.14	0.75	0.78	7.2
HPB	110A	46.7	0.02	10	2	2500	0.05	3.5	24	1	0.73	0.73	34.09
HPB	112B	16.2	0.21	10	4	1860	0.04	3.5	24	1	0.49	0.58	9.4
HPB	114B	23.8	0.42	10	4	2220	0.05	3.5	24	1	0.49	0.66	15.71
HPB	116A	27.9	0.21	10	4	1880	0.02	3.5	29	0.91	0.46	0.55	13.96
HPB	117B	8.8	0.42	10	4	2000	0.01	3.5	30	0.9	0.46	0.64	5.07
HPB	119A	7	0.21	10	4	540	0.11	3.5	8	1.67	0.61	0.67	7.83
HPB	121B	3.5	0.21	10	4	425	0.08	3.5	8	1.67	0.61	0.67	3.92
HPB	125A	60	0.01	10	4	1260	0.40	3.5	13	1.33	0.55	0.55	43.89
HPB	127B	14.5	0.42	10	4	780	0.04	3.5	12	1.38	0.56	0.7	14.01
HPB	129C	53.3	0.42	10	4	1570	0.07	3.5	18	1.14	0.52	0.68	41.32
HPB	132B	68.7	0.01	10	2	1580	0.33	3.5	12	1.38	0.77	0.77	73
HPB	135B	15.8	0.42	10	4	2120	0.05	3.5	23	1.02	0.5	0.67	10.8
HPB	137C	1.3	0.21	10	4	290	0.05	3.5	6	1.92	0.65	0.7	1.75
HPB	139B	59.1	0.02	10	4	1922	0.32	3.5	18	1.14	0.52	0.53	35.71
HPB	140B	16.5	0.38	10	2	1350	0.16	3.5	12	1.38	0.77	0.82	18.67
HPB	141C	61.2	0.01	10	2	2170	0.19	3.5	17	1.17	0.75	0.75	53.7
HPB	142C	23.3	0.01	10	2	630	0.27	3.5	7	1.78	0.82	0.82	34.01
HPB	143C	48.3	0.05	10	2	2020	0.18	3.5	16	1.21	0.75	0.76	44.42
HPB	146A	31.6	0.13	10	2	920	0.30	3.5	9	1.58	0.79	0.8	39.94
HPB	148A	16.2	0.22	10	4	590	0.04	3.5	11	1.44	0.57	0.64	14.93
HPB	150B	13.9	0.26	10	4	760	0.20	3.5	9	1.58	0.58	0.66	14.49
HPB	151B	21.6	0.02	10	4	1140	0.20	3.5	14	1.29	0.54	0.55	15.33
HPB	152A	12.5	0.18	10	4	750	0.14	3.5	10	1.51	0.58	0.64	12.08
HPB	154B	7.7	0.02	10	4	700	0.26	3.5	9	1.58	0.59	0.6	7.3
HPB	155B	21.3	0.13	10	4	750	0.13	3.5	11	1.44	0.57	0.61	18.71
HPB	156B	64.9	0.02	10	2	1680	0.26	3.5	13	1.33	0.77	0.77	66.46
HPB	158B	33.8	0.16	10	4	1000	0.03	3.5	18	1.14	0.52	0.58	22.35
HPB	160B	33.8	0.36	10	4	1185	0.09	3.5	14	1.29	0.54	0.67	29.21
HPB	162A	11.5	0.02	10	4	1220	0.15	3.5	15	1.25	0.54	0.55	7.91
HPB	165A	21.9	0.42	10	4	1170	0.06	3.5	15	1.25	0.54	0.69	18.89

Portuguese Bend: Tc Calculator (25-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	25	2	1360	0.02	4.3	15	1.53	0.79	0.81	10.04
HPB	110A	46.7	0.02	25	2	2500	0.05	4.3	20	1.34	0.77	0.77	48.19
HPB	112B	16.2	0.21	25	4	1860	0.04	4.3	20	1.34	0.55	0.62	13.46
HPB	114B	23.8	0.42	25	4	2220	0.05	4.3	20	1.34	0.55	0.7	22.32
HPB	116A	27.9	0.21	25	4	1880	0.02	4.3	23	1.25	0.54	0.62	21.62
HPB	117B	8.8	0.42	25	4	2000	0.01	4.3	25	1.2	0.53	0.69	7.29
HPB	119A	7	0.21	25	4	540	0.11	4.3	7	2.19	0.68	0.73	11.19
HPB	121B	3.5	0.21	25	4	425	0.08	4.3	6	2.35	0.69	0.73	6
HPB	125A	60	0.01	25	4	1260	0.40	4.3	10	1.85	0.64	0.64	71.04
HPB	127B	14.5	0.42	25	4	780	0.04	4.3	10	1.85	0.64	0.75	20.12
HPB	129C	53.3	0.42	25	4	1570	0.07	4.3	15	1.53	0.59	0.72	58.72
HPB	132B	68.7	0.01	25	2	1580	0.33	4.3	10	1.85	0.82	0.82	104.22
HPB	135B	15.8	0.42	25	4	2120	0.05	4.3	19	1.37	0.56	0.7	15.15
HPB	137C	1.3	0.21	25	4	290	0.05	4.3	5	2.57	0.7	0.74	2.47
HPB	139B	59.1	0.02	25	4	1922	0.32	4.3	14	1.58	0.59	0.6	56.03
HPB	140B	16.5	0.38	25	2	1350	0.16	4.3	10	1.85	0.82	0.85	25.95
HPB	141C	61.2	0.01	25	2	2170	0.19	4.3	14	1.58	0.79	0.79	76.39
HPB	142C	23.3	0.01	25	2	630	0.27	4.3	6	2.35	0.85	0.85	46.54
HPB	143C	48.3	0.05	25	2	2020	0.18	4.3	13	1.64	0.8	0.81	64.16
HPB	146A	31.6	0.13	25	2	920	0.30	4.3	7	2.19	0.85	0.85	58.82
HPB	148A	16.2	0.22	25	4	590	0.04	4.3	9	1.95	0.66	0.71	22.43
HPB	150B	13.9	0.26	25	4	760	0.20	4.3	8	2.06	0.67	0.73	20.9
HPB	151B	21.6	0.02	25	4	1140	0.20	4.3	11	1.77	0.63	0.64	24.47
HPB	152A	12.5	0.18	25	4	750	0.14	4.3	8	2.06	0.67	0.71	18.28
HPB	154B	7.7	0.02	25	4	700	0.26	4.3	7	2.19	0.68	0.68	11.47
HPB	155B	21.3	0.13	25	4	750	0.13	4.3	9	1.95	0.66	0.69	28.66
HPB	156B	64.9	0.02	25	2	1680	0.26	4.3	11	1.77	0.81	0.81	93.05
HPB	158B	33.8	0.16	25	4	1000	0.03	4.3	14	1.58	0.59	0.64	34.18
HPB	160B	33.8	0.36	25	4	1185	0.09	4.3	12	1.7	0.61	0.71	40.8
HPB	162A	11.5	0.02	25	4	1220	0.15	4.3	12	1.7	0.61	0.62	12.12
HPB	165A	21.9	0.42	25	4	1170	0.06	4.3	12	1.7	0.61	0.73	27.18

Portuguese Bend: Tc Calculator (50-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	50	2	1360	0.02	4.9	13	1.87	0.83	0.84	12.72
HPB	110A	46.7	0.02	50	2	2500	0.05	4.9	18	1.6	0.8	0.8	59.78
HPB	112B	16.2	0.21	50	4	1860	0.04	4.9	18	1.6	0.6	0.66	17.11
HPB	114B	23.8	0.42	50	4	2220	0.05	4.9	18	1.6	0.6	0.73	27.8
HPB	116A	27.9	0.21	50	4	1880	0.02	4.9	21	1.49	0.58	0.65	27.02
HPB	117B	8.8	0.42	50	4	2000	0.01	4.9	22	1.46	0.57	0.71	9.12
HPB	119A	7	0.21	50	4	540	0.11	4.9	6	2.68	0.71	0.75	14.07
HPB	121B	3.5	0.21	50	4	425	0.08	4.9	6	2.68	0.71	0.75	7.04
HPB	125A	60	0.01	50	4	1260	0.40	4.9	9	2.22	0.68	0.68	90.58
HPB	127B	14.5	0.42	50	4	780	0.04	4.9	9	2.22	0.68	0.77	24.79
HPB	129C	53.3	0.42	50	4	1570	0.07	4.9	13	1.87	0.64	0.75	74.75
HPB	132B	68.7	0.01	50	2	1580	0.33	4.9	9	2.22	0.85	0.85	129.64
HPB	135B	15.8	0.42	50	4	2120	0.05	4.9	17	1.64	0.6	0.73	18.92
HPB	137C	1.3	0.21	50	4	290	0.05	4.9	5	2.92	0.73	0.77	2.92
HPB	139B	59.1	0.02	50	4	1922	0.32	4.9	12	1.94	0.66	0.66	75.67
HPB	140B	16.5	0.38	50	2	1350	0.16	4.9	9	2.22	0.85	0.87	31.87
HPB	141C	61.2	0.01	50	2	2170	0.19	4.9	12	1.94	0.83	0.83	98.54
HPB	142C	23.3	0.01	50	2	630	0.27	4.9	5	2.92	0.88	0.88	59.87
HPB	143C	48.3	0.05	50	2	2020	0.18	4.9	12	1.94	0.83	0.83	77.77
HPB	146A	31.6	0.13	50	2	920	0.30	4.9	7	2.5	0.86	0.86	67.94
HPB	148A	16.2	0.22	50	4	590	0.04	4.9	8	2.34	0.69	0.74	28.05
HPB	150B	13.9	0.26	50	4	760	0.20	4.9	7	2.5	0.7	0.75	26.06
HPB	151B	21.6	0.02	50	4	1140	0.20	4.9	10	2.11	0.67	0.67	30.54
HPB	152A	12.5	0.18	50	4	750	0.14	4.9	7	2.5	0.7	0.78	24.38
HPB	154B	7.7	0.02	50	4	700	0.26	4.9	7	2.5	0.7	0.7	13.48
HPB	155B	21.3	0.13	50	4	750	0.13	4.9	8	2.34	0.69	0.72	35.89
HPB	156B	64.9	0.02	50	2	1680	0.26	4.9	10	2.11	0.84	0.84	115.03
HPB	158B	33.8	0.16	50	4	1000	0.03	4.9	12	1.94	0.66	0.7	45.9
HPB	160B	33.8	0.36	50	4	1185	0.09	4.9	11	2.02	0.67	0.75	51.21
HPB	162A	11.5	0.02	50	4	1220	0.15	4.9	11	2.02	0.67	0.67	15.56
HPB	165A	21.9	0.42	50	4	1170	0.06	4.9	11	2.02	0.67	0.77	34.06

9.A.2. TC Calculations

– Post-development

- SUSMP
- 2-year
- 5-year
- 10-year
- 25-year
- 50-year

Portuguese Bend: Tc Calculator (SUSMP-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	SUSMP	2	1360	0.02	0.75	30	0.19	0.26	0.39	0.6
HPB	110A	46.7	0.02	SUSMP	2	2500	0.05	0.75	30	0.19	0.26	0.27	2.4
HPB	112B	16.2	0.21	SUSMP	4	1860	0.04	0.75	30	0.19	0.1	0.27	0.83
HPB	114B	23.8	0.42	SUSMP	4	2220	0.05	0.75	30	0.19	0.1	0.44	1.99
HPB	116A	27.9	0.21	SUSMP	4	1880	0.02	0.75	30	0.19	0.1	0.27	1.43
HPB	117B	8.8	0.42	SUSMP	4	2000	0.01	0.75	30	0.19	0.1	0.44	0.74
HPB	119A	7	0.21	SUSMP	4	540	0.11	0.75	30	0.19	0.1	0.27	0.36
HPB	121B	3.5	0.21	SUSMP	4	425	0.08	0.75	30	0.19	0.1	0.27	0.18
HPB	125A	60	0.01	SUSMP	4	1260	0.40	0.75	30	0.19	0.1	0.11	1.25
HPB	127B	14.5	0.42	SUSMP	4	780	0.04	0.75	30	0.19	0.1	0.44	1.21
HPB	129C	53.3	0.42	SUSMP	4	1570	0.07	0.75	30	0.19	0.1	0.44	4.46
HPB	132B	68.7	0.01	SUSMP	2	1580	0.33	0.75	30	0.19	0.26	0.27	3.52
HPB	135B	15.8	0.42	SUSMP	4	2120	0.05	0.75	30	0.19	0.1	0.44	1.32
HPB	137C	1.3	0.21	SUSMP	4	290	0.05	0.75	30	0.19	0.1	0.27	0.07
HPB	139B	59.1	0.02	SUSMP	4	1922	0.32	0.75	30	0.19	0.1	0.12	1.35
HPB	140B	16.5	0.4	SUSMP	2	1350	0.16	0.75	30	0.19	0.26	0.52	1.63
HPB	141C	61.2	0.01	SUSMP	2	2170	0.19	0.75	30	0.19	0.26	0.27	3.14
HPB	142C	23.3	0.01	SUSMP	2	630	0.27	0.75	30	0.19	0.26	0.27	1.2
HPB	143C	48.3	0.05	SUSMP	2	2020	0.18	0.75	30	0.19	0.26	0.29	2.66
HPB	146A	31.6	0.23	SUSMP	2	920	0.30	0.75	30	0.19	0.26	0.29	1.74
HPB	148A	16.2	0.4	SUSMP	4	590	0.04	0.75	30	0.19	0.1	0.28	0.86
HPB	150B	13.9	0.4	SUSMP	4	760	0.20	0.75	30	0.19	0.1	0.43	1.14
HPB	151B	21.6	0.02	SUSMP	4	1140	0.20	0.75	30	0.19	0.1	0.12	0.49
HPB	152A	12.5	0.4	SUSMP	4	750	0.14	0.75	30	0.19	0.1	0.43	1.02
HPB	154B	7.7	0.02	SUSMP	4	700	0.26	0.75	30	0.19	0.1	0.12	0.18
HPB	155B	21.3	0.4	SUSMP	4	750	0.13	0.75	30	0.19	0.1	0.43	1.74
HPB	156B	64.9	0.02	SUSMP	2	1680	0.26	0.75	30	0.19	0.26	0.27	3.33
HPB	158B	33.8	0.2	SUSMP	4	1000	0.03	0.75	30	0.19	0.1	0.23	1.48
HPB	160B	33.8	0.36	SUSMP	4	1185	0.09	0.75	30	0.19	0.1	0.39	2.5
HPB	162A	11.5	0.02	SUSMP	4	1220	0.15	0.75	30	0.19	0.1	0.12	0.26
HPB	165A	21.9	0.42	SUSMP	4	1170	0.06	0.75	30	0.19	0.1	0.44	1.83

Portuguese Bend: Tc Calculator (02-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	2	2	1360	0.02	1.9	30	0.49	0.56	0.63	2.5
HPB	110A	46.7	0.02	2	2	2500	0.05	1.9	30	0.49	0.56	0.57	13.04
HPB	112B	16.2	0.21	2	4	1860	0.04	1.9	30	0.49	0.2	0.35	2.78
HPB	114B	23.8	0.42	2	4	2220	0.05	1.9	30	0.49	0.2	0.49	5.71
HPB	116A	27.9	0.21	2	4	1880	0.02	1.9	30	0.49	0.2	0.35	4.78
HPB	117B	8.8	0.42	2	4	2000	0.01	1.9	30	0.49	0.2	0.49	2.11
HPB	119A	7	0.21	2	4	540	0.11	1.9	16	0.66	0.35	0.47	2.17
HPB	121B	3.5	0.21	2	4	425	0.08	1.9	15	0.68	0.36	0.47	1.12
HPB	125A	60	0.01	2	4	1260	0.40	1.9	30	0.49	0.2	0.21	6.17
HPB	127B	14.5	0.42	2	4	780	0.04	1.9	22	0.56	0.27	0.53	4.3
HPB	129C	53.3	0.42	2	4	1570	0.07	1.9	30	0.49	0.2	0.49	12.8
HPB	132B	68.7	0.01	2	2	1580	0.33	1.9	23	0.55	0.58	0.58	21.92
HPB	135B	15.8	0.42	2	4	2120	0.05	1.9	30	0.49	0.2	0.49	3.79
HPB	137C	1.3	0.21	2	4	290	0.05	1.9	12	0.75	0.41	0.51	0.5
HPB	139B	59.1	0.02	2	4	1922	0.32	1.9	30	0.49	0.2	0.21	6.08
HPB	140B	16.5	0.4	2	2	1350	0.16	1.9	20	0.59	0.59	0.72	7.01
HPB	141C	61.2	0.01	2	2	2170	0.19	1.9	30	0.49	0.56	0.56	16.79
HPB	142C	23.3	0.01	2	2	630	0.27	1.9	12	0.75	0.65	0.65	11.36
HPB	143C	48.3	0.05	2	2	2020	0.18	1.9	29	0.5	0.56	0.58	14.01
HPB	146A	31.6	0.23	2	2	920	0.30	1.9	16	0.66	0.61	0.62	12.93
HPB	148A	16.2	0.4	2	4	590	0.04	1.9	22	0.56	0.27	0.41	3.72
HPB	150B	13.9	0.4	2	4	760	0.20	1.9	15	0.68	0.36	0.58	5.48
HPB	151B	21.6	0.02	2	4	1140	0.20	1.9	30	0.49	0.2	0.21	2.22
HPB	152A	12.5	0.4	2	4	750	0.14	1.9	17	0.64	0.33	0.56	4.48
HPB	154B	7.7	0.02	2	4	700	0.26	1.9	25	0.53	0.25	0.26	1.06
HPB	155B	21.3	0.4	2	4	750	0.13	1.9	17	0.64	0.33	0.56	7.63
HPB	156B	64.9	0.02	2	2	1680	0.26	1.9	25	0.53	0.57	0.58	19.95
HPB	158B	33.8	0.2	2	4	1000	0.03	1.9	30	0.49	0.2	0.31	5.13
HPB	160B	33.8	0.36	2	4	1185	0.09	1.9	28	0.5	0.22	0.46	7.77
HPB	162A	11.5	0.02	2	4	1220	0.15	1.9	30	0.49	0.2	0.21	1.18
HPB	165A	21.9	0.42	2	4	1170	0.06	1.9	28	0.5	0.22	0.51	5.58

Portuguese Bend: Tc Calculator (05-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	5	2	1360	0.02	2.5	24	0.71	0.63	0.69	3.97
HPB	110A	46.7	0.02	5	2	2500	0.05	2.5	30	0.64	0.61	0.62	18.53
HPB	112B	16.2	0.21	5	4	1860	0.04	2.5	30	0.64	0.33	0.45	4.67
HPB	114B	23.8	0.42	5	4	2220	0.05	2.5	30	0.64	0.33	0.57	8.68
HPB	116A	27.9	0.21	5	4	1880	0.02	2.5	30	0.64	0.33	0.45	8.04
HPB	117B	8.8	0.42	5	4	2000	0.01	2.5	30	0.64	0.33	0.57	3.21
HPB	119A	7	0.21	5	4	540	0.11	2.5	12	0.99	0.49	0.58	4.02
HPB	121B	3.5	0.21	5	4	425	0.08	2.5	11	1.03	0.5	0.58	2.09
HPB	125A	60	0.01	5	4	1260	0.40	2.5	20	0.78	0.42	0.42	19.66
HPB	127B	14.5	0.42	5	4	780	0.04	2.5	16	0.86	0.45	0.64	7.98
HPB	129C	53.3	0.42	5	4	1570	0.07	2.5	24	0.71	0.38	0.6	22.71
HPB	132B	68.7	0.01	5	2	1580	0.33	2.5	17	0.84	0.68	0.68	39.24
HPB	135B	15.8	0.42	5	4	2120	0.05	2.5	30	0.64	0.33	0.57	5.76
HPB	137C	1.3	0.21	5	4	290	0.05	2.5	9	1.13	0.52	0.6	0.88
HPB	139B	59.1	0.02	5	4	1922	0.32	2.5	30	0.64	0.33	0.34	12.86
HPB	140B	16.5	0.4	5	2	1350	0.16	2.5	16	0.86	0.68	0.77	10.93
HPB	141C	61.2	0.01	5	2	2170	0.19	2.5	24	0.71	0.63	0.63	27.37
HPB	142C	23.3	0.01	5	2	630	0.27	2.5	9	1.13	0.75	0.75	19.75
HPB	143C	48.3	0.05	5	2	2020	0.18	2.5	23	0.73	0.64	0.65	22.92
HPB	146A	31.6	0.23	5	2	920	0.30	2.5	12	0.99	0.73	0.74	23.15
HPB	148A	16.2	0.4	5	4	590	0.04	2.5	15	0.89	0.46	0.56	8.07
HPB	150B	13.9	0.4	5	4	760	0.20	2.5	12	0.99	0.49	0.66	9.08
HPB	151B	21.6	0.02	5	4	1140	0.20	2.5	21	0.76	0.41	0.42	6.89
HPB	152A	12.5	0.4	5	4	750	0.14	2.5	12	0.99	0.49	0.66	8.17
HPB	154B	7.7	0.02	5	4	700	0.26	2.5	13	0.95	0.48	0.49	3.58
HPB	155B	21.3	0.4	5	4	750	0.13	2.5	13	0.95	0.48	0.65	13.15
HPB	156B	64.9	0.02	5	2	1680	0.26	2.5	19	0.8	0.66	0.66	34.27
HPB	158B	33.8	0.2	5	4	1000	0.03	2.5	26	0.69	0.37	0.45	10.49
HPB	160B	33.8	0.36	5	4	1185	0.09	2.5	19	0.8	0.42	0.59	15.95
HPB	162A	11.5	0.02	5	4	1220	0.15	2.5	23	0.73	0.4	0.41	3.44
HPB	165A	21.9	0.42	5	4	1170	0.06	2.5	20	0.78	0.42	0.62	10.59

Portuguese Bend: Tc Calculator (10-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	10	2	1360	0.02	3.5	18	1.14	0.75	0.78	7.2
HPB	110A	46.7	0.02	10	2	2500	0.05	3.5	24	1	0.73	0.73	34.09
HPB	112B	16.2	0.21	10	4	1860	0.04	3.5	24	1	0.49	0.58	9.4
HPB	114B	23.8	0.42	10	4	2220	0.05	3.5	24	1	0.49	0.66	15.71
HPB	116A	27.9	0.21	10	4	1880	0.02	3.5	29	0.91	0.46	0.55	13.96
HPB	117B	8.8	0.42	10	4	2000	0.01	3.5	30	0.9	0.46	0.64	5.07
HPB	119A	7	0.21	10	4	540	0.11	3.5	8	1.67	0.61	0.67	7.83
HPB	121B	3.5	0.21	10	4	425	0.08	3.5	8	1.67	0.61	0.67	3.92
HPB	125A	60	0.01	10	4	1260	0.40	3.5	13	1.33	0.55	0.55	43.89
HPB	127B	14.5	0.42	10	4	780	0.04	3.5	12	1.38	0.56	0.7	14.01
HPB	129C	53.3	0.42	10	4	1570	0.07	3.5	18	1.14	0.52	0.68	41.32
HPB	132B	68.7	0.01	10	2	1580	0.33	3.5	12	1.38	0.77	0.77	73
HPB	135B	15.8	0.42	10	4	2120	0.05	3.5	23	1.02	0.5	0.67	10.8
HPB	137C	1.3	0.21	10	4	290	0.05	3.5	6	1.92	0.65	0.7	1.75
HPB	139B	59.1	0.02	10	4	1922	0.32	3.5	18	1.14	0.52	0.53	35.71
HPB	140B	16.5	0.4	10	2	1350	0.16	3.5	12	1.38	0.77	0.82	18.67
HPB	141C	61.2	0.01	10	2	2170	0.19	3.5	17	1.17	0.75	0.75	53.7
HPB	142C	23.3	0.01	10	2	630	0.27	3.5	7	1.78	0.82	0.82	34.01
HPB	143C	48.3	0.05	10	2	2020	0.18	3.5	16	1.21	0.75	0.76	44.42
HPB	146A	31.6	0.23	10	2	920	0.30	3.5	9	1.58	0.79	0.8	39.94
HPB	148A	16.2	0.4	10	4	590	0.04	3.5	11	1.44	0.57	0.64	14.93
HPB	150B	13.9	0.4	10	4	760	0.20	3.5	9	1.58	0.59	0.72	15.81
HPB	151B	21.6	0.02	10	4	1140	0.20	3.5	14	1.29	0.54	0.55	15.33
HPB	152A	12.5	0.4	10	4	750	0.14	3.5	10	1.51	0.58	0.71	13.4
HPB	154B	7.7	0.02	10	4	700	0.26	3.5	9	1.58	0.59	0.6	7.3
HPB	155B	21.3	0.4	10	4	750	0.13	3.5	10	1.51	0.58	0.71	22.84
HPB	156B	64.9	0.02	10	2	1680	0.26	3.5	13	1.33	0.77	0.77	66.46
HPB	158B	33.8	0.2	10	4	1000	0.03	3.5	18	1.14	0.52	0.58	22.35
HPB	160B	33.8	0.36	10	4	1185	0.09	3.5	14	1.29	0.54	0.67	29.21
HPB	162A	11.5	0.02	10	4	1220	0.15	3.5	15	1.25	0.54	0.55	7.91
HPB	165A	21.9	0.42	10	4	1170	0.06	3.5	15	1.25	0.54	0.69	18.89

Portuguese Bend: Tc Calculator (25-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	25	2	1360	0.02	4.3	15	1.53	0.79	0.81	10.04
HPB	110A	46.7	0.02	25	2	2500	0.05	4.3	20	1.34	0.77	0.77	48.19
HPB	112B	16.2	0.21	25	4	1860	0.04	4.3	20	1.34	0.55	0.62	13.46
HPB	114B	23.8	0.42	25	4	2220	0.05	4.3	20	1.34	0.55	0.7	22.32
HPB	116A	27.9	0.21	25	4	1880	0.02	4.3	23	1.25	0.54	0.62	21.62
HPB	117B	8.8	0.42	25	4	2000	0.01	4.3	25	1.2	0.53	0.69	7.29
HPB	119A	7	0.21	25	4	540	0.11	4.3	7	2.19	0.68	0.73	11.19
HPB	121B	3.5	0.21	25	4	425	0.08	4.3	6	2.35	0.69	0.73	6
HPB	125A	60	0.01	25	4	1260	0.40	4.3	10	1.85	0.64	0.64	71.04
HPB	127B	14.5	0.42	25	4	780	0.04	4.3	10	1.85	0.64	0.75	20.12
HPB	129C	53.3	0.42	25	4	1570	0.07	4.3	15	1.53	0.59	0.72	58.72
HPB	132B	68.7	0.01	25	2	1580	0.33	4.3	10	1.85	0.82	0.82	104.22
HPB	135B	15.8	0.42	25	4	2120	0.05	4.3	19	1.37	0.56	0.7	15.15
HPB	137C	1.3	0.21	25	4	290	0.05	4.3	5	2.57	0.7	0.74	2.47
HPB	139B	59.1	0.02	25	4	1922	0.32	4.3	14	1.58	0.59	0.6	56.03
HPB	140B	16.5	0.4	25	2	1350	0.16	4.3	10	1.85	0.82	0.85	25.95
HPB	141C	61.2	0.01	25	2	2170	0.19	4.3	14	1.58	0.79	0.79	76.39
HPB	142C	23.3	0.01	25	2	630	0.27	4.3	6	2.35	0.85	0.85	46.54
HPB	143C	48.3	0.05	25	2	2020	0.18	4.3	13	1.64	0.8	0.81	64.16
HPB	146A	31.6	0.23	25	2	920	0.30	4.3	7	2.19	0.85	0.85	58.82
HPB	148A	16.2	0.4	25	4	590	0.04	4.3	9	1.95	0.66	0.71	22.43
HPB	150B	13.9	0.4	25	4	760	0.20	4.3	7	2.19	0.68	0.77	23.44
HPB	151B	21.6	0.02	25	4	1140	0.20	4.3	11	1.77	0.63	0.64	24.47
HPB	152A	12.5	0.4	25	4	750	0.14	4.3	8	2.06	0.67	0.76	19.57
HPB	154B	7.7	0.02	25	4	700	0.26	4.3	7	2.19	0.68	0.68	11.47
HPB	155B	21.3	0.4	25	4	750	0.13	4.3	8	2.06	0.67	0.76	33.35
HPB	156B	64.9	0.02	25	2	1680	0.26	4.3	11	1.77	0.81	0.81	93.05
HPB	158B	33.8	0.2	25	4	1000	0.03	4.3	14	1.58	0.59	0.64	34.18
HPB	160B	33.8	0.36	25	4	1185	0.09	4.3	12	1.7	0.61	0.71	40.8
HPB	162A	11.5	0.02	25	4	1220	0.15	4.3	12	1.7	0.61	0.62	12.12
HPB	165A	21.9	0.42	25	4	1170	0.06	4.3	12	1.7	0.61	0.73	27.18

Portuguese Bend: Tc Calculator (50-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	50	2	1360	0.02	4.9	13	1.87	0.83	0.84	12.72
HPB	110A	46.7	0.02	50	2	2500	0.05	4.9	18	1.6	0.8	0.8	59.78
HPB	112B	16.2	0.21	50	4	1860	0.04	4.9	18	1.6	0.6	0.66	17.11
HPB	114B	23.8	0.42	50	4	2220	0.05	4.9	18	1.6	0.6	0.73	27.8
HPB	116A	27.9	0.21	50	4	1880	0.02	4.9	21	1.49	0.58	0.65	27.02
HPB	117B	8.8	0.42	50	4	2000	0.01	4.9	22	1.46	0.57	0.71	9.12
HPB	119A	7	0.21	50	4	540	0.11	4.9	6	2.68	0.71	0.75	14.07
HPB	121B	3.5	0.21	50	4	425	0.08	4.9	6	2.68	0.71	0.75	7.04
HPB	125A	60	0.01	50	4	1260	0.40	4.9	9	2.22	0.68	0.68	90.58
HPB	127B	14.5	0.42	50	4	780	0.04	4.9	9	2.22	0.68	0.77	24.79
HPB	129C	53.3	0.42	50	4	1570	0.07	4.9	13	1.87	0.64	0.75	74.75
HPB	132B	68.7	0.01	50	2	1580	0.33	4.9	9	2.22	0.85	0.85	129.64
HPB	135B	15.8	0.42	50	4	2120	0.05	4.9	17	1.64	0.6	0.73	18.92
HPB	137C	1.3	0.21	50	4	290	0.05	4.9	5	2.92	0.73	0.77	2.92
HPB	139B	59.1	0.02	50	4	1922	0.32	4.9	12	1.94	0.66	0.66	75.67
HPB	140B	16.5	0.4	50	2	1350	0.16	4.9	9	2.22	0.85	0.87	31.87
HPB	141C	61.2	0.01	50	2	2170	0.19	4.9	12	1.94	0.83	0.83	98.54
HPB	142C	23.3	0.01	50	2	630	0.27	4.9	5	2.92	0.88	0.88	59.87
HPB	143C	48.3	0.05	50	2	2020	0.18	4.9	12	1.94	0.83	0.83	77.77
HPB	146A	31.6	0.23	50	2	920	0.30	4.9	7	2.5	0.86	0.86	67.94
HPB	148A	16.2	0.4	50	4	590	0.04	4.9	8	2.34	0.69	0.74	28.05
HPB	150B	13.9	0.4	50	4	760	0.20	4.9	7	2.5	0.7	0.78	27.11
HPB	151B	21.6	0.02	50	4	1140	0.20	4.9	10	2.11	0.67	0.67	30.54
HPB	152A	12.5	0.4	50	4	750	0.14	4.9	7	2.5	0.7	0.78	24.38
HPB	154B	7.7	0.02	50	4	700	0.26	4.9	7	2.5	0.7	0.7	13.48
HPB	155B	21.3	0.4	50	4	750	0.13	4.9	7	2.5	0.7	0.78	41.54
HPB	156B	64.9	0.02	50	2	1680	0.26	4.9	10	2.11	0.84	0.84	115.03
HPB	158B	33.8	0.2	50	4	1000	0.03	4.9	12	1.94	0.66	0.7	45.9
HPB	160B	33.8	0.36	50	4	1185	0.09	4.9	11	2.02	0.67	0.75	51.21
HPB	162A	11.5	0.02	50	4	1220	0.15	4.9	11	2.02	0.67	0.67	15.56
HPB	165A	21.9	0.42	50	4	1170	0.06	4.9	11	2.02	0.67	0.77	34.06

9.A.2. SUSMP Calculations

– Pre-development
– Post-development

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigration Peak Flowrate and Volume Calculations (Pre-development-Project Site)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
140B	16.5	0.38	5.9	9.6	1.0	0.357	2	1350	0.16	0.75	30	0.193	1.100	1.029	0.200	3.30	46,206	1.06
146A	31.6	0.13	4.1	27.5	0.0	0.130	2	920	0.30	0.75	30	0.193	0.100	0.204	0.040	1.25	17,550	0.40
148A	16.2	0.22	3.6	12.6	0.0	0.220	4	590	0.04	0.75	30	0.193	0.100	0.276	0.054	0.87	12,173	0.28
150B	13.9	0.26	3.6	10.3	0.0	0.260	4	760	0.20	0.75	30	0.193	0.100	0.308	0.060	0.83	11,656	0.27
152A	12.5	0.18	2.3	10.3	0.0	0.180	4	750	0.14	0.75	30	0.193	0.100	0.244	0.047	0.59	8,304	0.19
155B	21.3	0.13	2.8	18.5	0.0	0.130	4	750	0.13	0.75	30	0.193	0.100	0.204	0.040	0.85	11,830	0.27
158B	33.8	0.16	5.4	28.4	0.0	0.160	4	1000	0.03	0.75	30	0.193	0.100	0.228	0.044	1.50	20,981	0.48

∑A (ac)	145.8
∑Qpm (cfs)	9.2
∑VM (ft3)	128,699
∑VM (ac-ft)	3.0

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigation Peak Flowrate and Volume Calculations (Pre-development)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
108A	8.1	0.21	1.7	6.4	0.0	0.210	2	1360	0.02	0.75	30	0.193	0.100	0.268	0.052	0.42	5,910	0.14
110A	46.7	0.02	0.9	45.8	0.0	0.020	2	2500	0.05	0.75	30	0.193	0.100	0.116	0.023	1.05	14,748	0.34
112B	16.2	0.21	3.4	12.8	0.0	0.210	4	1860	0.04	0.75	30	0.193	0.100	0.268	0.052	0.84	11,820	0.27
114B	23.8	0.42	10.0	13.8	0.0	0.420	4	2220	0.05	0.75	30	0.193	0.100	0.436	0.085	2.02	28,251	0.65
116A	27.9	0.21	5.9	22.0	0.0	0.210	4	1880	0.02	0.75	30	0.193	0.100	0.268	0.052	1.46	20,357	0.47
117B	8.8	0.42	3.7	5.1	0.0	0.420	4	2000	0.01	0.75	30	0.193	0.100	0.436	0.085	0.75	10,446	0.24
119A	7	0.21	1.5	5.5	0.0	0.210	4	540	0.11	0.75	30	0.193	0.100	0.268	0.052	0.37	5,107	0.12
121B	3.5	0.21	0.7	2.8	0.0	0.210	4	425	0.08	0.75	30	0.193	0.100	0.268	0.052	0.18	2,554	0.06
125A	60	0.01	0.6	59.4	0.0	0.010	4	1260	0.40	0.75	30	0.193	0.100	0.108	0.021	1.26	17,642	0.41
127B	14.5	0.42	6.1	8.4	0.0	0.420	4	780	0.04	0.75	30	0.193	0.100	0.436	0.085	1.23	17,212	0.40
129C	53.3	0.42	22.4	30.9	0.0	0.420	4	1570	0.07	0.75	30	0.193	0.100	0.436	0.085	4.52	63,268	1.45
132B	68.7	0.01	0.7	68.0	0.0	0.010	2	1580	0.33	0.75	30	0.193	0.100	0.108	0.021	1.44	20,200	0.46
135B	15.8	0.42	6.6	9.2	0.0	0.420	4	2120	0.05	0.75	30	0.193	0.100	0.436	0.085	1.34	18,755	0.43
137C	1.3	0.21	0.3	1.0	0.0	0.210	4	290	0.05	0.75	30	0.193	0.100	0.268	0.052	0.07	949	0.02
139B	59.1	0.02	1.2	57.9	0.0	0.020	4	1922	0.32	0.75	30	0.193	0.100	0.116	0.023	1.33	18,664	0.43
140B	16.5	0.38	5.9	9.6	1.0	0.357	2	1350	0.16	0.75	30	0.193	1.100	1.029	0.200	3.30	46,206	1.06
141C	61.2	0.01	0.6	60.6	0.0	0.010	2	2170	0.19	0.75	30	0.193	0.100	0.108	0.021	1.29	17,995	0.41
142C	23.3	0.01	0.2	23.1	0.0	0.010	2	630	0.27	0.75	30	0.193	0.100	0.108	0.021	0.49	6,851	0.16
143C	48.3	0.05	2.4	45.9	0.0	0.050	2	2020	0.18	0.75	30	0.193	0.100	0.140	0.027	1.32	18,410	0.42
146A	31.6	0.13	4.1	27.5	0.0	0.130	2	920	0.30	0.75	30	0.193	0.100	0.204	0.040	1.25	17,550	0.40
148A	16.2	0.22	3.6	12.6	0.0	0.220	4	590	0.04	0.75	30	0.193	0.100	0.276	0.054	0.87	12,173	0.28
150B	13.9	0.26	3.6	10.3	0.0	0.260	4	760	0.20	0.75	30	0.193	0.100	0.308	0.060	0.83	11,656	0.27
151B	21.6	0.02	0.4	21.2	0.0	0.020	4	1140	0.20	0.75	30	0.193	0.100	0.116	0.023	0.49	6,821	0.16
152A	12.5	0.18	2.3	10.3	0.0	0.180	4	750	0.14	0.75	30	0.193	0.100	0.244	0.047	0.59	8,304	0.19
154B	7.7	0.02	0.2	7.5	0.0	0.020	4	700	0.26	0.75	30	0.193	0.100	0.116	0.023	0.17	2,432	0.06
155B	21.3	0.13	2.8	18.5	0.0	0.130	4	750	0.13	0.75	30	0.193	0.100	0.204	0.040	0.85	11,830	0.27
156B	64.9	0.02	1.3	63.6	0.0	0.020	2	1680	0.26	0.75	30	0.193	0.100	0.116	0.023	1.47	20,496	0.47
158B	33.8	0.16	5.4	28.4	0.0	0.160	4	1000	0.03	0.75	30	0.193	0.100	0.228	0.044	1.50	20,981	0.48
160B	33.8	0.36	12.2	21.6	0.0	0.360	4	1185	0.09	0.75	30	0.193	0.100	0.388	0.076	2.55	35,704	0.82
162A	11.5	0.02	0.23	11.27	0	0.02	4	1220	0.15	0.75	30	0.193	0.1	0.116	0.023	0.26	3,632	0.08
165A	21.9	0.42	9.198	12.702	0	0.42	4	1170	0.06	0.75	30	0.193	0.1	0.436	0.085	1.86	25,996	0.60

∑A (ac)	854.7
∑Qpm (cfs)	37.4
∑VM (ft3)	522,916
∑VM (ac-ft)	12.0

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigration Peak Flowrate and Volume Calculations (Post-Development-Project Site)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
140B	16.5	0.400	6.2	9.3	1.0	0.376	2	1350	0.16	0.75	30	0.193	1.100	1.025	0.199	3.29	46,037	1.06
146A	31.6	0.230	7.3	24.3	0.0	0.230	2	920	0.30	0.75	30	0.193	0.100	0.284	0.055	1.75	24,433	0.56
148A	16.2	0.400	6.5	9.7	0.0	0.400	4	590	0.04	0.75	30	0.193	0.100	0.420	0.082	1.32	18,524	0.43
150B	13.9	0.400	5.6	8.3	0.0	0.400	4	760	0.20	0.75	30	0.193	0.100	0.420	0.082	1.14	15,894	0.36
152A	12.5	0.400	5.0	7.5	0.0	0.400	4	750	0.14	0.75	30	0.193	0.100	0.420	0.082	1.02	14,293	0.33
155B	21.3	0.400	8.5	12.8	0.0	0.400	4	750	0.13	0.75	30	0.193	0.100	0.420	0.082	1.74	24,355	0.56
158B	33.8	0.200	6.8	27.0	0.0	0.200	4	1000	0.03	0.75	30	0.193	0.100	0.260	0.051	1.71	23,925	0.55

∑A (ac)	145.8
∑Qpm (cfs)	12.0
∑VM (ft3)	167,462
∑VM (ac-ft)	3.8

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigration Peak Flowrate and Volume Calculations (Post-Development)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
108A	8.1	0.210	1.7	6.4	0.0	0.210	2	1360	0.02	0.75	30	0.193	0.100	0.268	0.052	0.42	5,910	0.14
110A	46.7	0.020	0.9	45.8	0.0	0.020	2	2500	0.05	0.75	30	0.193	0.100	0.116	0.023	1.05	14,748	0.34
112B	16.2	0.210	3.4	12.8	0.0	0.210	4	1860	0.04	0.75	30	0.193	0.100	0.268	0.052	0.84	11,820	0.27
114B	23.8	0.420	10.0	13.8	0.0	0.420	4	2220	0.05	0.75	30	0.193	0.100	0.436	0.085	2.02	28,251	0.65
116A	27.9	0.210	5.9	22.0	0.0	0.210	4	1880	0.02	0.75	30	0.193	0.100	0.268	0.052	1.46	20,357	0.47
117B	8.8	0.420	3.7	5.1	0.0	0.420	4	2000	0.01	0.75	30	0.193	0.100	0.436	0.085	0.75	10,446	0.24
119A	7	0.210	1.5	5.5	0.0	0.210	4	540	0.11	0.75	30	0.193	0.100	0.268	0.052	0.37	5,107	0.12
121B	3.5	0.210	0.7	2.8	0.0	0.210	4	425	0.08	0.75	30	0.193	0.100	0.268	0.052	0.18	2,554	0.06
125A	60	0.010	0.6	59.4	0.0	0.010	4	1260	0.40	0.75	30	0.193	0.100	0.108	0.021	1.26	17,642	0.41
127B	14.5	0.420	6.1	8.4	0.0	0.420	4	780	0.04	0.75	30	0.193	0.100	0.436	0.085	1.23	17,212	0.40
129C	53.3	0.420	22.4	30.9	0.0	0.420	4	1570	0.07	0.75	30	0.193	0.100	0.436	0.085	4.52	63,268	1.45
132B	68.7	0.010	0.7	68.0	0.0	0.010	2	1580	0.33	0.75	30	0.193	0.100	0.108	0.021	1.44	20,200	0.46
135B	15.8	0.420	6.6	9.2	0.0	0.420	4	2120	0.05	0.75	30	0.193	0.100	0.436	0.085	1.34	18,755	0.43
137C	1.3	0.210	0.3	1.0	0.0	0.210	4	290	0.05	0.75	30	0.193	0.100	0.268	0.052	0.07	949	0.02
139B	59.1	0.020	1.2	57.9	0.0	0.020	4	1922	0.32	0.75	30	0.193	0.100	0.116	0.023	1.33	18,664	0.43
140B	16.5	0.400	6.2	9.3	1.0	0.376	2	1350	0.16	0.75	30	0.193	1.100	1.025	0.199	3.29	46,037	1.06
141C	61.2	0.010	0.6	60.6	0.0	0.010	2	2170	0.19	0.75	30	0.193	0.100	0.108	0.021	1.29	17,995	0.41
142C	23.3	0.010	0.2	23.1	0.0	0.010	2	630	0.27	0.75	30	0.193	0.100	0.108	0.021	0.49	6,851	0.16
143C	48.3	0.050	2.4	45.9	0.0	0.050	2	2020	0.18	0.75	30	0.193	0.100	0.140	0.027	1.32	18,410	0.42
146A	31.6	0.230	7.3	24.3	0.0	0.230	2	920	0.30	0.75	30	0.193	0.100	0.284	0.055	1.75	24,433	0.56
148A	16.2	0.400	6.5	9.7	0.0	0.400	4	590	0.04	0.75	30	0.193	0.100	0.420	0.082	1.32	18,524	0.43
150B	13.9	0.400	5.6	8.3	0.0	0.400	4	760	0.20	0.75	30	0.193	0.100	0.420	0.082	1.14	15,894	0.36
151B	21.6	0.020	0.4	21.2	0.0	0.020	4	1140	0.20	0.75	30	0.193	0.100	0.116	0.023	0.49	6,821	0.16
152A	12.5	0.400	5.0	7.5	0.0	0.400	4	750	0.14	0.75	30	0.193	0.100	0.420	0.082	1.02	14,293	0.33
154B	7.7	0.020	0.2	7.5	0.0	0.020	4	700	0.26	0.75	30	0.193	0.100	0.116	0.023	0.17	2,432	0.06
155B	21.3	0.400	8.5	12.8	0.0	0.400	4	750	0.13	0.75	30	0.193	0.100	0.420	0.082	1.74	24,355	0.56
156B	64.9	0.020	1.3	63.6	0.0	0.020	2	1680	0.26	0.75	30	0.193	0.100	0.116	0.023	1.47	20,496	0.47
158B	33.8	0.200	6.8	27.0	0.0	0.200	4	1000	0.03	0.75	30	0.193	0.100	0.260	0.051	1.71	23,925	0.55
160B	33.8	0.360	12.2	21.6	0.0	0.360	4	1185	0.09	0.75	30	0.193	0.100	0.388	0.076	2.55	35,704	0.82
162A	11.5	0.020	0.2	11.3	0.0	0.020	4	1220	0.15	0.75	30	0.193	0.100	0.116	0.023	0.26	3,632	0.08
165A	21.9	0.420	9.2	12.7	0.0	0.420	4	1170	0.06	0.75	30	0.193	0.100	0.436	0.085	1.86	25,996	0.60

∑A (ac)	854.7
∑Qpm (cfs)	40.1
∑VM (ft3)	561,679
∑VM (ac-ft)	12.9

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

9.A.4. 2-year, 2-year (burn), 5-year, 10-year, 25-year, 50-year and 50-year (burn) Storm Modified Rational of Hydrology Result and Hydrograph

– Pre-development
– Post-development

Pre-development

(Watershed)

2-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159	109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159	120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159	122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19

159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	15.60	202.0	48.95	0	0.	.00000	.00	.00	0.	4	30	A35	.01
159	126A	.0	.00	202.0	48.95	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159	128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159	130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12

159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	37.14	136.5	60.05	0	0.	.00000	.00	.00	0.	2	23	A35	.01
159	133AB	136.5	60.05	338.5	108.52	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	108.52	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1160 QB	6.49 QBC	7.25 QC	.76	159 138C TC 1157 QC	.82 QCB	7.26 QB	6.44							
159 138BC TBC 1158 QBC	7.28 QB	6.47 QC	.81											
159 138BC	1.3	.82	17.1	7.28	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	15.58	76.2	22.06	1	1880.	.09600	.00	.00	0.	4	30	A35	.02
159 140B	16.5	10.77	92.7	28.13	0	0.	.00000	.00	.00	0.	2	20	A35	.38
159 141C	61.2	28.24	61.2	28.24	0	0.	.00000	.00	.00	0.	2	30	A35	.01
159 142C	23.3	18.56	84.5	46.44	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 143C	48.3	23.10	132.8	69.38	0	0.	.00000	.00	.00	0.	2	29	A35	.05
CONFLUENCE Q'S														
159 144B TB 1168 QB	28.13 QBC	78.57 QC	50.43	159 144C TC 1156 QC	69.38 QCB	86.26 QB	16.88							
159 144BC TBC 1160 QBC	89.41 QB	22.20 QC	67.21											
159 144BC	132.8	69.38	225.5	89.41	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	89.41	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	21.97	370.1	111.06	0	0.	.00000	.00	.00	0.	2	16	A35	.13
CONFLUENCE Q'S														
159 147A TA 1167 QA	111.06 QAB	190.41 QB	79.36	159 147B TB 1160 QB	89.41 QBA	182.24 QA	92.84							
159 147AB TAB 1166 QAB	190.67 QA	110.42 QB	80.25											
159 147AB	225.5	89.41	595.6	190.67	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	6.90	611.8	196.07	0	0.	.00000	.00	.00	0.	4	22	A35	.22
159 149A	.0	.00	611.8	196.07	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	7.03	13.9	7.03	0	0.	.00000	.00	.00	0.	4	18	A35	.26
159 151B	21.6	5.70	35.5	12.66	0	0.	.00000	.00	.00	0.	4	30	A35	.02
159 152A	12.5	5.13	624.3	198.48	0	0.	.00000	.00	.00	0.	4	22	A35	.18
CONFLUENCE Q'S														
159 153A TA 1170 QA	198.48 QAB	204.96 QB	6.47	159 153B TB 1157 QB	12.66 QBA	152.42 QA	139.76							
159 153AB TAB 1168 QAB	205.87 QA	197.39 QB	8.48											
159 153AB	35.5	12.66	659.8	205.87	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	2.41	7.7	2.41	0	0.	.00000	.00	.00	0.	4	25	A35	.02
159 155B	21.3	7.55	29.0	9.96	4	1470.	.03400	3.00	.00	0.	4	25	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	156B	64.9	33.57	93.9	43.05	4	520.	.05800	3.00	.00	0.	2	25	A35	.02
159	157B	.0	.00	93.9	43.02	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	10.66	127.7	53.07	0	0.	.00000	.00	.00	0.	4	30	A35	.16
159	159B	.0	.00	127.7	53.07	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	13.83	161.5	66.19	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159	161B	.0	.00	161.5	66.19	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	3.03	671.3	207.49	0	0.	.00000	.00	.00	0.	4	30	A35	.02

****

* CONFLUENCE Q'S *

* 159 163A TA 1171 QA 207.49 QAB 267.83 QB 60.34 159 163B TB 1164 QB 66.19 QBA 252.17 QA 185.98 *

* 159 163AB TAB 1169 QAB 268.82 QA 205.96 QB 62.86 *

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	66.19	832.8	268.82	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	268.81	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	9.45	854.7	276.73	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159	166A	.0	.00	854.7	276.70	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	11.02	200	11.32	300	11.88	400	12.53
500	13.30	600	14.25	700	15.48	800	17.12	900	19.47
1000	25.46	1050	33.91	1100	48.88	1110	53.04	1120	59.60
1130	69.98	1131	71.18	1132	72.40	1133	73.67	1134	74.97
1135	76.34	1136	77.73	1137	79.19	1138	80.71	1139	82.27
1140	83.89	1141	85.60	1142	87.39	1143	89.27	1144	91.23
1145	93.36	1146	95.67	1147	98.32	1148	101.45	1149	105.88
1150	111.58	1151	118.24	1152	126.22	1153	135.51	1154	145.21
1155	155.23	1156	166.07	1157	177.87	1158	190.41	1159	203.84
1160	216.80	1161	228.45	1162	238.82	1163	247.68	1164	255.40
1165	261.63	1166	266.98	1167	271.04	1168	274.19	1169	275.99
1170	276.70	1171	276.33	1172	275.08	1173	272.82	1174	269.75
1175	265.96	1176	261.48	1177	255.55	1178	248.15	1179	240.63
1180	232.48	1181	223.96	1182	215.23	1183	206.83	1184	198.62
1185	190.70	1186	182.87	1187	174.88	1188	166.81	1189	159.09
1190	151.60	1191	144.53	1192	137.89	1193	131.80	1194	126.27
1195	121.24	1196	116.36	1197	111.89	1198	107.56	1199	103.66
1200	99.87	1201	96.38	1202	93.04	1203	89.91	1204	86.87
1205	84.01	1206	81.28	1207	78.71	1208	76.28	1209	74.01
1210	71.92	1211	69.96	1212	68.18	1213	66.51	1214	64.88
1215	63.40	1216	62.01	1217	60.73	1218	59.52	1219	58.43
1220	57.42	1221	56.45	1222	55.55	1223	54.71	1224	53.92
1225	53.17	1226	52.46	1227	51.79	1228	51.14	1229	50.52
1230	49.92	1231	49.32	1232	48.72	1233	48.14	1234	47.54
1235	46.95	1236	46.37	1237	45.78	1238	45.21	1239	44.62
1240	44.04	1241	43.46	1242	42.89	1243	42.33	1244	41.78
1245	41.23	1246	40.67	1247	40.13	1248	39.58	1249	39.03
1250	38.49	1251	37.96	1252	37.44	1253	36.93	1254	36.43
1255	35.94	1256	35.45	1257	34.97	1258	34.49	1259	34.04
1260	33.62	1261	33.18	1262	32.77	1263	32.35	1264	31.95
1265	31.56	1266	31.18	1267	30.82	1268	30.47	1269	30.13
1270	29.80	1271	29.48	1272	29.15	1273	28.83	1274	28.52
1275	28.21	1276	27.90	1277	27.60	1278	27.29	1279	26.99
1280	26.70	1281	26.42	1282	26.14	1283	25.86	1284	25.59
1285	25.35	1286	25.10	1287	24.85	1288	24.61	1289	24.37
1290	24.14	1291	23.92	1292	23.70	1293	23.49	1294	23.29
1295	23.10	1296	22.92	1297	22.74	1298	22.57	1299	22.39
1300	22.22	1310	20.57	1320	19.15	1330	17.99	1340	17.05
1350	16.22	1360	15.49	1370	14.92	1380	14.37	1390	13.91
1400	13.48	1420	12.79	1440	12.21	1460	11.02	1500	11.02

TOTAL VOLUME THIS HYDROGRAPH = 52.35(Ac.Ft)

2-YEAR

(BURN)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159	109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159	120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159	122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19

159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	22.01	202.0	55.21	0	0.	.00000	.00	.00	0.	204	30	A35	.01
159	126A	.0	.00	202.0	55.21	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159	127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159	128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159	130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12

159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	41.44	136.5	64.16	0	0.	.00000	.00	.00	0.	202	23	A35	.01
159	133AB	136.5	64.16	338.5	118.86	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	118.86	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1160 QB	6.49 QBC	7.25 QC	.76	159 138C TC 1157 QC	.82 QCB	7.26 QB	6.44							
159 138BC TBC 1158 QBC	7.28 QB	6.47 QC	.81											
159 138BC	1.3	.82	17.1	7.28	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	21.84	76.2	28.28	1	1880.	.09600	.00	.00	0.	204	30	A35	.02
159 140B	16.5	10.77	92.7	34.96	0	0.	.00000	.00	.00	0.	2	20	A35	.38
159 141C	61.2	31.75	61.2	31.75	0	0.	.00000	.00	.00	0.	202	30	A35	.01
159 142C	23.3	20.25	84.5	51.62	0	0.	.00000	.00	.00	0.	202	12	A35	.01
159 143C	48.3	25.78	132.8	77.23	0	0.	.00000	.00	.00	0.	202	29	A35	.05
CONFLUENCE Q'S														
159 144B TB 1168 QB	34.96 QBC	92.03 QC	57.08	159 144C TC 1156 QC	77.23 QCB	100.31 QB	23.08							
159 144BC TBC 1160 QBC	104.49 QB	29.50 QC	74.98											
159 144BC	132.8	77.23	225.5	104.49	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	104.49	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	21.97	370.1	122.39	0	0.	.00000	.00	.00	0.	2	16	A35	.13
CONFLUENCE Q'S														
159 147A TA 1167 QA	122.39 QAB	215.42 QB	93.03	159 147B TB 1160 QB	104.49 QBA	208.90 QA	104.41							
159 147AB TAB 1164 QAB	216.75 QA	119.17 QB	97.58											
159 147AB	225.5	104.49	595.6	216.75	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	6.90	611.8	222.03	0	0.	.00000	.00	.00	0.	4	22	A35	.22
159 149A	.0	.00	611.8	222.03	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	7.03	13.9	7.03	0	0.	.00000	.00	.00	0.	4	18	A35	.26
159 151B	21.6	7.98	35.5	14.94	0	0.	.00000	.00	.00	0.	204	30	A35	.02
159 152A	12.5	5.13	624.3	224.43	0	0.	.00000	.00	.00	0.	4	22	A35	.18
CONFLUENCE Q'S														
159 153A TA 1169 QA	224.43 QAB	234.06 QB	9.64	159 153B TB 1157 QB	14.94 QBA	177.09 QA	162.15							
159 153AB TAB 1168 QAB	234.67 QA	223.99 QB	10.68											
159 153AB	35.5	14.94	659.8	234.67	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	3.27	7.7	3.27	0	0.	.00000	.00	.00	0.	204	25	A35	.02
159 155B	21.3	7.55	29.0	10.82	4	1470.	.03400	3.00	.00	0.	4	25	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 156B	64.9	37.48	93.9	47.82	4	520.	.05800	3.00	.00	0.	202	25	A35	.02
159 157B	.0	.00	93.9	47.80	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	10.66	127.7	57.69	0	0.	.00000	.00	.00	0.	4	30	A35	.16
159 159B	.0	.00	127.7	57.69	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159 160B	33.8	13.83	161.5	70.81	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159 161B	.0	.00	161.5	70.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 162A	11.5	4.25	671.3	237.37	0	0.	.00000	.00	.00	0.	204	30	A35	.02

****

CONFLUENCE Q'S

159 163A TA 1170 QA 237.37 QAB 303.82 QB 66.46 159 163B TB 1164 QB 70.81 QBA 286.95 QA 216.14

159 163AB TAB 1169 QAB 304.23 QA 236.56 QB 67.67

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 163AB	161.5	70.81	832.8	304.23	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159 164A	.0	.00	832.8	304.01	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159 165A	21.9	9.45	854.7	312.02	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159 166A	.0	.00	854.7	312.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	14.60	200	15.03	300	15.81	400	16.69
500	17.75	600	19.04	700	20.72	800	22.94	900	26.18
1000	33.55	1050	43.63	1100	61.23	1110	66.11	1120	73.92
1130	86.01	1131	87.40	1132	88.77	1133	90.20	1134	91.68
1135	93.20	1136	94.81	1137	96.50	1138	98.26	1139	100.07
1140	101.95	1141	103.93	1142	106.03	1143	108.24	1144	110.56
1145	113.06	1146	115.76	1147	118.80	1148	122.35	1149	127.48
1150	133.86	1151	141.53	1152	150.07	1153	159.93	1154	170.36
1155	181.44	1156	193.43	1157	206.78	1158	220.71	1159	234.64
1160	248.26	1161	260.95	1162	271.79	1163	281.50	1164	289.60
1165	296.63	1166	302.24	1167	306.74	1168	309.84	1169	311.64
1170	312.00	1171	311.28	1172	309.47	1173	306.68	1174	302.96
1175	298.51	1176	293.31	1177	286.63	1178	278.40	1179	269.94
1180	261.03	1181	251.38	1182	241.80	1183	232.25	1184	222.97
1185	213.67	1186	204.57	1187	195.58	1188	186.84	1189	178.23
1190	169.99	1191	162.23	1192	155.06	1193	148.36	1194	142.12
1195	136.32	1196	130.95	1197	126.02	1198	121.60	1199	117.26
1200	112.90	1201	108.99	1202	105.14	1203	101.60	1204	98.18
1205	95.03	1206	92.05	1207	89.26	1208	86.61	1209	84.14
1210	81.86	1211	79.73	1212	77.75	1213	75.91	1214	74.19
1215	72.61	1216	71.13	1217	69.73	1218	68.45	1219	67.26
1220	66.16	1221	65.18	1222	64.30	1223	63.40	1224	62.54
1225	61.73	1226	60.94	1227	60.20	1228	59.49	1229	58.79
1230	58.13	1231	57.46	1232	56.80	1233	56.13	1234	55.46
1235	54.81	1236	54.17	1237	53.53	1238	52.88	1239	52.22
1240	51.57	1241	50.91	1242	50.25	1243	49.59	1244	48.95
1245	48.30	1246	47.67	1247	47.05	1248	46.44	1249	45.83
1250	45.23	1251	44.65	1252	44.09	1253	43.54	1254	43.00
1255	42.46	1256	41.94	1257	41.43	1258	40.93	1259	40.46
1260	39.99	1261	39.56	1262	39.14	1263	38.73	1264	38.31
1265	37.90	1266	37.49	1267	37.08	1268	36.68	1269	36.28
1270	35.88	1271	35.49	1272	35.11	1273	34.74	1274	34.39
1275	34.03	1276	33.69	1277	33.37	1278	33.03	1279	32.71
1280	32.40	1281	32.10	1282	31.80	1283	31.50	1284	31.23
1285	30.97	1286	30.73	1287	30.48	1288	30.24	1289	29.99
1290	29.74	1291	29.51	1292	29.27	1293	29.04	1294	28.80
1295	28.57	1296	28.35	1297	28.13	1298	27.92	1299	27.71
1300	27.51	1310	25.67	1320	24.15	1330	22.84	1340	21.75
1350	20.80	1360	19.95	1370	19.21	1380	18.57	1390	18.00
1400	17.47	1420	16.63	1440	15.92	1460	14.60	1500	14.60

TOTAL VOLUME THIS HYDROGRAPH = 65.18(Ac.Ft)

5-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	7.45	8.1	7.45	0	0.	.00000	.00	.00	0.	2	24	A35	.21
159	109A	.0	.00	8.1	7.45	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	36.48	54.8	43.93	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	43.59	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	10.05	16.2	10.05	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	10.05	71.0	38.51	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	16.80	23.8	16.80	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	16.80	94.8	42.84	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	17.30	122.7	54.58	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	6.21	8.8	6.21	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	6.21	131.5	60.43	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	7.65	138.5	64.45	1	210.	.54200	.00	.00	0.	4	12	A35	.21
159	120A	.0	.00	138.5	64.36	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	4.04	3.5	4.04	0	0.	.00000	.00	.00	0.	4	11	A35	.21
159	122B	.0	.00	3.5	4.04	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1161 QA 64.34 QAB 67.75 QB 3.41 159 123B TB 1157 QB 3.98 QBA 65.93 QA 61.95

159 123AB TAB 1161 QAB 67.75 QA 64.34 QB 3.41

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	3.98	142.0	67.75	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	67.75	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	43.28	202.0	105.69	0	0.	.00000	.00	.00	0.	4	20	A35	.01
159	126A	.0	.00	202.0	105.69	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	14.73	14.5	14.73	4	570.	.07000	2.00	.00	0.	4	16	A35	.42
159	128B	.0	.00	14.5	14.71	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	42.97	53.3	42.97	4	1260.	.03000	3.25	.00	0.	4	24	A35	.42
159	130C	.0	.00	53.3	42.89	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1156 QB 14.71 QBC 56.38 QC 41.68 159 131C TC 1159 QC 42.89 QCB 57.20 QB 14.31

159 131BC TBC 1158 QBC 57.31 QB 14.51 QC 42.80

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	42.89	67.8	57.31	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	74.00	136.5	119.28	0	0.	.00000	.00	.00	0.	2	17	A35	.01
159	133AB	136.5	119.28	338.5	224.03	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	224.03	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	11.16	15.8	11.16	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	11.15	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	1.68	1.3	1.68	1	320.	.53100	.00	.00	0.	4	9	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
					CONFLUENCE Q'S									
159 138B	TB 1160 QB	11.15 QBC	12.37 QC	1.22	159 138C	TC 1156 QC	1.65 QCB	12.65 QB	11.00					
			159 138BC	TBC 1157 QBC	12.70 QB	11.08 QC	1.62							
159 138BC	1.3	1.65	17.1	12.70	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	32.07	76.2	43.97	1	1880.	.09600	.00	.00	0.	4	30	A35	.02
159 140B	16.5	19.37	92.7	55.73	0	0.	.00000	.00	.00	0.	2	16	A35	.38
159 141C	61.2	54.31	61.2	54.31	0	0.	.00000	.00	.00	0.	2	24	A35	.01
159 142C	23.3	35.52	84.5	89.01	0	0.	.00000	.00	.00	0.	2	9	A35	.01
159 143C	48.3	44.21	132.8	133.06	0	0.	.00000	.00	.00	0.	2	23	A35	.05
					CONFLUENCE Q'S									
159 144B	TB 1164 QB	55.73 QBC	155.25 QC	99.53	159 144C	TC 1155 QC	133.06 QCB	172.21 QB	39.15					
			159 144BC	TBC 1157 QBC	175.75 QB	44.39 QC	131.36							
159 144BC	132.8	133.06	225.5	175.75	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	175.75	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	41.82	370.1	231.55	0	0.	.00000	.00	.00	0.	2	12	A35	.13
					CONFLUENCE Q'S									
159 147A	TA 1164 QA	231.55 QAB	386.81 QB	155.25	159 147B	TB 1157 QB	175.75 QBA	369.09 QA	193.35					
			159 147AB	TAB 1160 QAB	389.02 QA	221.42 QB	167.60							
159 147AB	225.5	175.75	595.6	389.02	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	15.65	611.8	401.89	0	0.	.00000	.00	.00	0.	4	15	A35	.22
159 149A	.0	.00	611.8	401.89	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	15.51	13.9	15.51	0	0.	.00000	.00	.00	0.	4	12	A35	.26
159 151B	21.6	15.16	35.5	30.61	0	0.	.00000	.00	.00	0.	4	21	A35	.02
159 152A	12.5	12.32	624.3	405.25	0	0.	.00000	.00	.00	0.	4	14	A35	.18
					CONFLUENCE Q'S									
159 153A	TA 1164 QA	405.25 QAB	424.31 QB	19.06	159 153B	TB 1155 QB	30.61 QBA	306.46 QA	275.85					
			159 153AB	TAB 1163 QAB	424.53 QA	403.20 QB	21.33							
159 153AB	35.5	30.61	659.8	424.53	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	7.37	7.7	7.37	0	0.	.00000	.00	.00	0.	4	13	A35	.02
159 155B	21.3	19.74	29.0	27.11	4	1470.	.03400	3.00	.00	0.	4	15	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159 156B	64.9	65.77	93.9	91.86	4	520.	.05800	3.00	.00	0.	2	19	A35	.02
159 157B	.0	.00	93.9	91.77	4	1760.	.04100	2.75	.00	0.	2	99	A35	.00
159 158B	33.8	22.38	127.7	113.18	0	0.	.00000	.00	.00	0.	4	26	A35	.16
159 159B	.0	.00	127.7	113.18	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159 160B	33.8	30.28	161.5	141.41	0	0.	.00000	.00	.00	0.	4	19	A35	.36
159 161B	.0	.00	161.5	141.41	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 162A	11.5	7.57	671.3	429.39	0	0.	.00000	.00	.00	0.	4	23	A35	.02

****

CONFLUENCE Q'S

159 163A TA 1166 QA 429.39 QAB 560.14 QB 130.75 159 163B TB 1161 QB 141.41 QBA 535.43 QA 394.02

159 163AB TAB 1165 QAB 563.31 QA 429.13 QB 134.18

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 163AB	161.5	141.41	832.8	563.31	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159 164A	.0	.00	832.8	563.26	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159 165A	21.9	19.62	854.7	579.77	4	180.	.16700	9.50	.00	0.	4	20	A35	.42
159 166A	.0	.00	854.7	579.62	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	16.63	200	17.12	300	17.98	400	19.01
500	20.25	600	22.03	700	25.49	800	30.72	900	38.08
1000	50.31	1050	64.59	1100	89.75	1110	97.70	1120	111.64
1130	136.04	1131	139.18	1132	142.21	1133	145.38	1134	148.70
1135	152.16	1136	155.80	1137	159.64	1138	163.76	1139	168.13
1140	172.77	1141	177.74	1142	183.06	1143	188.73	1144	194.83
1145	201.78	1146	209.42	1147	217.69	1148	226.74	1149	238.33
1150	252.91	1151	269.91	1152	289.80	1153	313.15	1154	338.75
1155	366.79	1156	397.49	1157	429.29	1158	462.03	1159	491.91
1160	518.36	1161	539.73	1162	556.83	1163	569.18	1164	576.94
1165	579.62	1166	578.49	1167	573.96	1168	566.21	1169	554.08
1170	539.73	1171	523.59	1172	504.96	1173	484.52	1174	464.55
1175	444.96	1176	424.77	1177	404.59	1178	384.25	1179	364.44
1180	344.75	1181	325.18	1182	307.12	1183	290.46	1184	275.48
1185	262.02	1186	250.32	1187	239.80	1188	230.59	1189	222.19
1190	214.62	1191	207.41	1192	200.67	1193	194.15	1194	187.95
1195	181.76	1196	175.62	1197	169.59	1198	163.77	1199	158.16
1200	152.75	1201	147.55	1202	142.63	1203	137.98	1204	133.82
1205	129.96	1206	126.25	1207	122.81	1208	119.67	1209	116.73
1210	114.03	1211	111.52	1212	109.28	1213	107.12	1214	105.16
1215	103.33	1216	101.68	1217	100.09	1218	98.61	1219	97.20
1220	95.87	1221	94.57	1222	93.34	1223	92.10	1224	90.85
1225	89.60	1226	88.38	1227	87.19	1228	86.00	1229	84.83
1230	83.65	1231	82.45	1232	81.24	1233	80.05	1234	78.88
1235	77.70	1236	76.54	1237	75.36	1238	74.20	1239	73.02
1240	71.86	1241	70.69	1242	69.55	1243	68.44	1244	67.38
1245	66.32	1246	65.25	1247	64.23	1248	63.33	1249	62.39
1250	61.43	1251	60.54	1252	59.66	1253	58.82	1254	58.03
1255	57.26	1256	56.46	1257	55.69	1258	54.91	1259	54.16
1260	53.41	1261	52.69	1262	51.98	1263	51.28	1264	50.59
1265	49.92	1266	49.27	1267	48.61	1268	48.00	1269	47.41
1270	46.82	1271	46.27	1272	45.77	1273	45.29	1274	44.79
1275	44.31	1276	43.84	1277	43.38	1278	42.90	1279	42.42
1280	41.96	1281	41.47	1282	41.00	1283	40.54	1284	40.10
1285	39.68	1286	39.26	1287	38.85	1288	38.46	1289	38.06
1290	37.69	1291	37.32	1292	36.94	1293	36.59	1294	36.23
1295	35.90	1296	35.58	1297	35.27	1298	35.00	1299	34.70
1300	34.40	1310	31.56	1320	29.17	1330	27.24	1340	25.68
1350	24.43	1360	23.41	1370	22.53	1380	21.76	1390	21.02
1400	20.36	1420	19.27	1440	18.28	1460	16.63	1500	16.63

TOTAL VOLUME THIS HYDROGRAPH = 91.44(Ac.Ft)

10-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	10.98	8.1	10.98	0	0.	.00000	.00	.00	0.	2	18	A35	.21
159	109A	.0	.00	8.1	10.98	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	52.86	54.8	63.83	2	735.	.01400	.00	.00	0.	2	24	A35	.02
159	111A	.0	.00	54.8	63.12	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	15.16	16.2	15.16	4	270.	.01900	2.75	.00	0.	4	24	A35	.21
159	113AB	16.2	15.16	71.0	52.75	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	24.46	23.8	24.46	0	0.	.00000	.00	.00	0.	4	24	A35	.42
159	115AB	23.8	24.46	94.8	58.25	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	23.27	122.7	78.26	4	560.	.02300	3.50	.00	0.	4	29	A35	.21
159	117B	8.8	7.97	8.8	7.97	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	7.97	131.5	85.93	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	12.24	138.5	89.37	1	210.	.54200	.00	.00	0.	4	8	A35	.21
159	120A	.0	.00	138.5	89.22	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	6.12	3.5	6.12	0	0.	.00000	.00	.00	0.	4	8	A35	.21
159	122B	.0	.00	3.5	6.12	1	510.	.43100	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 123A TA 1157 QA 89.19 QAB 95.08 QB 5.89 159 123B TB 1156 QB 6.02 QBA 94.50 QA 88.48

159 123AB TAB 1157 QAB 95.08 QA 89.19 QB 5.89

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	6.02	142.0	95.08	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	95.08	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	74.92	202.0	158.90	0	0.	.00000	.00	.00	0.	4	13	A35	.01
159	126A	.0	.00	202.0	158.90	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	21.76	14.5	21.76	4	570.	.07000	2.00	.00	0.	4	12	A35	.42
159	128B	.0	.00	14.5	21.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	64.30	53.3	64.30	4	1260.	.03000	3.25	.00	0.	4	18	A35	.42
159	130C	.0	.00	53.3	64.02	0	0.	.00000	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 131B TB 1155 QB 21.75 QBC 83.13 QC 61.39 159 131C TC 1158 QC 64.02 QCB 84.89 QB 20.87

159 131BC TBC 1157 QBC 85.35 QB 21.41 QC 63.94

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	64.02	67.8	85.35	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	113.21	136.5	174.42	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159	133AB	136.5	174.42	338.5	332.93	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	332.93	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	16.62	15.8	16.62	2	165.	.09100	2.00	.00	0.	4	23	A35	.42
159	136B	.0	.00	15.8	16.62	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	2.67	1.3	2.67	1	320.	.53100	.00	.00	0.	4	6	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
					CONFLUENCE Q'S									
159 138B TB 1157 QB	16.62 QBC	18.65 QC	2.03	159 138C TC 1155 QC	2.59 QCB	19.01 QB	16.42							
			159 138BC TBC 1155 QBC	19.01 QB	16.42 QC	2.59								
159 138BC	1.3	2.59	17.1	19.01	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	60.67	76.2	77.06	1	1880.	.09600	.00	.00	0.	4	18	A35	.02
159 140B	16.5	27.94	92.7	91.66	0	0.	.00000	.00	.00	0.	2	12	A35	.38
159 141C	61.2	83.70	61.2	83.70	0	0.	.00000	.00	.00	0.	2	17	A35	.01
159 142C	23.3	50.67	84.5	133.93	0	0.	.00000	.00	.00	0.	2	7	A35	.01
159 143C	48.3	68.67	132.8	202.11	0	0.	.00000	.00	.00	0.	2	16	A35	.05
					CONFLUENCE Q'S									
159 144B TB 1160 QB	91.66 QBC	250.04 QC	158.38	159 144C TC 1154 QC	202.11 QCB	267.17 QB	65.06							
			159 144BC TBC 1155 QBC	272.32 QB	70.24 QC	202.08								
159 144BC	132.8	202.11	225.5	272.32	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	272.32	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	61.04	370.1	340.00	0	0.	.00000	.00	.00	0.	2	9	A35	.13
					CONFLUENCE Q'S									
159 147A TA 1161 QA	340.00 QAB	583.62 QB	243.61	159 147B TB 1155 QB	272.32 QBA	545.78 QA	273.46							
			159 147AB TAB 1159 QAB	588.85 QA	331.82 QB	257.03								
159 147AB	225.5	272.32	595.6	588.85	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	24.02	611.8	607.51	0	0.	.00000	.00	.00	0.	4	11	A35	.22
159 149A	.0	.00	611.8	607.51	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	23.24	13.9	23.24	0	0.	.00000	.00	.00	0.	4	9	A35	.26
159 151B	21.6	25.92	35.5	49.17	0	0.	.00000	.00	.00	0.	4	14	A35	.02
159 152A	12.5	19.42	624.3	609.51	0	0.	.00000	.00	.00	0.	4	10	A35	.18
					CONFLUENCE Q'S									
159 153A TA 1162 QA	609.51 QAB	636.60 QB	27.08	159 153B TB 1154 QB	49.17 QBA	459.21 QA	410.04							
			159 153AB TAB 1161 QAB	640.01 QA	608.82 QB	31.19								
159 153AB	35.5	49.17	659.8	640.01	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	12.00	7.7	12.00	0	0.	.00000	.00	.00	0.	4	9	A35	.02
159 155B	21.3	30.68	29.0	42.68	4	1470.	.03400	3.00	.00	0.	4	11	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	102.56	93.9	143.04	4	520.	.05800	3.00	.00	0.	2	13	A35	.02
159	157B	.0	.00	93.9	142.67	4	1760.	.04100	3.00	.00	0.	2	99	A35	.00
159	158B	33.8	36.82	127.7	175.73	0	0.	.00000	.00	.00	0.	4	18	A35	.16
159	159B	.0	.00	127.7	175.73	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	45.84	161.5	216.55	0	0.	.00000	.00	.00	0.	4	14	A35	.36
159	161B	.0	.00	161.5	216.55	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	13.27	671.3	647.29	0	0.	.00000	.00	.00	0.	4	15	A35	.02

****

CONFLUENCE Q'S

159 163A TA 1163 QA 647.29 QAB 847.93 QB 200.65 159 163B TB 1160 QB 216.55 QBA 834.81 QA 618.25

159 163AB TAB 1162 QAB 855.59 QA 645.20 QB 210.39

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	216.55	832.8	855.59	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	852.63	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	29.27	854.7	877.16	4	180.	.16700	9.50	.00	0.	4	15	A35	.42
159	166A	.0	.00	854.7	876.86	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	20.44	200	21.05	300	22.60	400	25.02
500	27.98	600	31.73	700	36.51	800	42.92	900	52.11
1000	67.54	1050	86.17	1100	117.41	1110	132.55	1120	163.03
1130	204.50	1131	209.25	1132	213.92	1133	218.86	1134	224.10
1135	229.60	1136	235.30	1137	241.33	1138	247.82	1139	254.79
1140	261.95	1141	269.95	1142	278.58	1143	288.04	1144	298.14
1145	309.49	1146	321.88	1147	335.69	1148	350.59	1149	369.90
1150	394.97	1151	424.23	1152	460.36	1153	502.34	1154	549.20
1155	600.40	1156	654.26	1157	705.87	1158	760.43	1159	812.62
1160	846.51	1161	866.97	1162	876.86	1163	875.75	1164	860.84
1165	836.55	1166	807.01	1167	772.58	1168	737.72	1169	701.45
1170	664.25	1171	623.17	1172	583.39	1173	544.62	1174	507.82
1175	474.10	1176	443.54	1177	417.14	1178	393.81	1179	373.12
1180	354.60	1181	337.78	1182	322.53	1183	308.68	1184	295.63
1185	283.48	1186	272.29	1187	261.91	1188	252.26	1189	243.33
1190	234.79	1191	226.82	1192	219.30	1193	212.19	1194	205.48
1195	199.27	1196	193.34	1197	187.59	1198	182.19	1199	177.08
1200	172.23	1201	167.59	1202	163.15	1203	158.99	1204	155.16
1205	151.60	1206	148.41	1207	145.43	1208	142.74	1209	140.22
1210	137.90	1211	135.70	1212	133.58	1213	131.53	1214	129.58
1215	127.64	1216	125.67	1217	123.77	1218	121.83	1219	119.90
1220	117.99	1221	116.20	1222	114.37	1223	112.51	1224	110.58
1225	108.67	1226	106.81	1227	105.02	1228	103.32	1229	101.68
1230	99.99	1231	98.30	1232	96.64	1233	95.00	1234	93.37
1235	91.79	1236	90.24	1237	88.74	1238	87.32	1239	85.95
1240	84.59	1241	83.24	1242	81.95	1243	80.72	1244	79.57
1245	78.50	1246	77.46	1247	76.43	1248	75.36	1249	74.33
1250	73.32	1251	72.31	1252	71.36	1253	70.40	1254	69.49
1255	68.59	1256	67.70	1257	66.86	1258	66.09	1259	65.27
1260	64.48	1261	63.78	1262	63.06	1263	62.40	1264	61.77
1265	61.11	1266	60.47	1267	59.85	1268	59.24	1269	58.60
1270	57.98	1271	57.40	1272	56.85	1273	56.31	1274	55.79
1275	55.26	1276	54.71	1277	54.18	1278	53.66	1279	53.14
1280	52.63	1281	52.12	1282	51.59	1283	51.09	1284	50.63
1285	50.23	1286	49.81	1287	49.39	1288	48.99	1289	48.58
1290	48.20	1291	47.82	1292	47.44	1293	47.09	1294	46.71
1295	46.32	1296	45.96	1297	45.61	1298	45.27	1299	44.90
1300	44.56	1310	41.46	1320	38.86	1330	36.68	1340	34.74
1350	32.99	1360	31.20	1370	29.66	1380	28.29	1390	27.01
1400	25.77	1420	23.97	1440	22.70	1460	20.44	1500	20.44

TOTAL VOLUME THIS HYDROGRAPH = 121.62(Ac.Ft)

25-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	15.26	8.1	15.26	0	0.	.00000	.00	.00	0.	2	15	A35	.21
159	109A	.0	.00	8.1	15.26	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	74.46	54.8	89.64	2	735.	.01400	.00	.00	0.	2	20	A35	.02
159	111A	.0	.00	54.8	88.40	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	21.93	16.2	21.93	4	270.	.01900	2.75	.00	0.	4	20	A35	.21
159	113AB	16.2	21.90	71.0	73.77	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	34.53	23.8	34.53	0	0.	.00000	.00	.00	0.	4	20	A35	.42
159	115AB	23.8	34.53	94.8	79.89	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	34.80	122.7	112.07	4	560.	.02300	3.50	.00	0.	4	23	A35	.21
159	117B	8.8	11.30	8.8	11.30	4	350.	.06600	2.00	.00	0.	4	25	A35	.42
159	118AB	8.8	11.30	131.5	122.94	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	16.75	138.5	128.49	1	210.	.54200	.00	.00	0.	4	7	A35	.21
159	120A	.0	.00	138.5	128.47	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	9.13	3.5	9.13	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	9.13	1	510.	.43100	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 123A TA 1157 QA 128.33 QAB 135.59 QB 7.26 159 123B TB 1155 QB 8.87 QBA 135.11 QA 126.24

159 123AB TAB 1156 QAB 136.60 QA 128.26 QB 8.34

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	8.87	142.0	136.60	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	136.60	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	114.49	202.0	232.11	0	0.	.00000	.00	.00	0.	4	10	A35	.01
159	126A	.0	.00	202.0	232.11	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	30.53	14.5	30.53	4	570.	.07000	2.00	.00	0.	4	10	A35	.42
159	128B	.0	.00	14.5	30.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	90.39	53.3	90.39	4	1260.	.03000	3.25	.00	0.	4	15	A35	.42
159	130C	.0	.00	53.3	89.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 131B TB 1155 QB 30.35 QBC 117.22 QC 86.87 159 131C TC 1157 QC 89.75 QCB 118.83 QB 29.07

159 131BC TBC 1156 QBC 119.06 QB 29.85 QC 89.21

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	89.75	67.8	119.06	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	158.81	136.5	241.55	0	0.	.00000	.00	.00	0.	2	10	A35	.01
159	133AB	136.5	241.55	338.5	471.43	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	471.43	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	23.54	15.8	23.54	2	165.	.09100	2.00	.00	0.	4	19	A35	.42
159	136B	.0	.00	15.8	23.54	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	3.79	1.3	3.79	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1156 QB	23.51 QBC	26.38 QC	2.87	159 138C TC 1154 QC	3.52 QCB	26.33 QB	22.81							
159 138BC TBC 1155 QBC	26.74 QB	23.38 QC	3.36											
159 138BC	1.3	3.52	17.1	26.74	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	92.49	76.2	114.45	1	1880.	.09600	.00	.00	0.	4	14	A35	.02
159 140B	16.5	38.59	92.7	132.35	0	0.	.00000	.00	.00	0.	2	10	A35	.38
159 141C	61.2	117.89	61.2	117.89	0	0.	.00000	.00	.00	0.	2	14	A35	.01
159 142C	23.3	69.28	84.5	187.17	0	0.	.00000	.00	.00	0.	2	6	A35	.01
159 143C	48.3	96.81	132.8	283.98	0	0.	.00000	.00	.00	0.	2	13	A35	.05
CONFLUENCE Q'S														
159 144B TB 1159 QB	132.35 QBC	351.29 QC	218.94	159 144C TC 1154 QC	283.98 QCB	384.01 QB	100.03							
159 144BC TBC 1154 QBC	384.01 QB	100.03 QC	283.98											
159 144BC	132.8	283.98	225.5	384.01	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	384.01	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	86.62	370.1	475.09	0	0.	.00000	.00	.00	0.	2	7	A35	.13
CONFLUENCE Q'S														
159 147A TA 1161 QA	475.09 QAB	804.67 QB	329.59	159 147B TB 1154 QB	384.01 QBA	760.99 QA	376.98							
159 147AB TAB 1158 QAB	832.53 QA	465.11 QB	367.43											
159 147AB	225.5	384.01	595.6	832.53	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	34.18	611.8	854.71	0	0.	.00000	.00	.00	0.	4	9	A35	.22
159 149A	.0	.00	611.8	854.71	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	31.35	13.9	31.35	0	0.	.00000	.00	.00	0.	4	8	A35	.26
159 151B	21.6	38.90	35.5	70.25	0	0.	.00000	.00	.00	0.	4	11	A35	.02
159 152A	12.5	27.71	624.3	857.40	0	0.	.00000	.00	.00	0.	4	8	A35	.18
CONFLUENCE Q'S														
159 153A TA 1160 QA	857.40 QAB	899.37 QB	41.97	159 153B TB 1154 QB	70.25 QBA	685.85 QA	615.60							
159 153AB TAB 1159 QAB	901.21 QA	850.04 QB	51.17											
159 153AB	35.5	70.25	659.8	901.21	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	17.72	7.7	17.72	0	0.	.00000	.00	.00	0.	4	7	A35	.02
159 155B	21.3	44.02	29.0	61.74	4	1470.	.03400	3.00	.00	0.	4	9	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 156B	64.9	142.12	93.9	200.60	4	520.	.05800	3.00	.00	0.	2	11	A35	.02
159 157B	.0	.00	93.9	199.49	4	1760.	.04100	3.50	.00	0.	2	99	A35	.00
159 158B	33.8	55.13	127.7	249.37	0	0.	.00000	.00	.00	0.	4	14	A35	.16
159 159B	.0	.00	127.7	249.37	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159 160B	33.8	63.25	161.5	305.02	0	0.	.00000	.00	.00	0.	4	12	A35	.36
159 161B	.0	.00	161.5	305.02	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 162A	11.5	19.65	671.3	910.47	0	0.	.00000	.00	.00	0.	4	12	A35	.02

****

CONFLUENCE Q'S

159 163A TA 1161 QA 910.47 QAB 1197.74 QB 287.28 159 163B TB 1159 QB 305.02 QBA 1185.26 QA 880.24
159 163AB TAB 1160 QAB 1204.69 QA 903.89 QB 300.80

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 163AB	161.5	305.02	832.8	1204.69	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159 164A	.0	.00	832.8	1202.31	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159 165A	21.9	41.61	854.7	1231.21	4	180.	.16700	9.50	.00	0.	4	12	A35	.42
159 166A	.0	.00	854.7	1230.66	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	28.76	200	30.36	300	33.11	400	36.19
500	39.96	600	44.54	700	50.50	800	58.38	900	70.27
1000	90.29	1050	113.69	1100	166.73	1110	195.71	1120	242.49
1130	300.17	1131	306.79	1132	313.47	1133	320.23	1134	327.34
1135	334.75	1136	342.59	1137	350.83	1138	359.91	1139	369.55
1140	380.14	1141	391.54	1142	404.30	1143	417.69	1144	432.29
1145	448.39	1146	466.40	1147	486.11	1148	507.66	1149	536.07
1150	572.95	1151	617.98	1152	672.23	1153	734.66	1154	820.92
1155	912.37	1156	998.82	1157	1083.27	1158	1153.53	1159	1203.38
1160	1229.95	1161	1230.66	1162	1212.34	1163	1174.36	1164	1125.73
1165	1065.95	1166	1006.36	1167	946.25	1168	884.67	1169	824.78
1170	768.12	1171	720.22	1172	672.13	1173	622.07	1174	583.72
1175	548.24	1176	518.67	1177	491.25	1178	466.81	1179	444.38
1180	423.89	1181	405.09	1182	387.37	1183	370.64	1184	355.38
1185	340.66	1186	327.30	1187	314.63	1188	302.76	1189	291.17
1190	280.52	1191	270.30	1192	260.97	1193	252.19	1194	244.17
1195	236.73	1196	229.75	1197	223.49	1198	217.84	1199	212.79
1200	208.19	1201	204.01	1202	199.95	1203	196.13	1204	192.52
1205	189.18	1206	185.78	1207	182.45	1208	179.20	1209	175.94
1210	172.73	1211	169.62	1212	166.61	1213	163.64	1214	160.65
1215	157.68	1216	154.71	1217	151.82	1218	149.03	1219	146.42
1220	143.80	1221	141.22	1222	138.64	1223	136.10	1224	133.55
1225	131.07	1226	128.70	1227	126.34	1228	124.11	1229	121.98
1230	119.95	1231	117.90	1232	115.91	1233	113.95	1234	112.15
1235	110.37	1236	108.78	1237	107.17	1238	105.64	1239	104.14
1240	102.73	1241	101.32	1242	99.94	1243	98.60	1244	97.28
1245	95.94	1246	94.63	1247	93.39	1248	92.15	1249	90.97
1250	89.84	1251	88.76	1252	87.67	1253	86.62	1254	85.64
1255	84.71	1256	83.80	1257	82.91	1258	82.07	1259	81.17
1260	80.30	1261	79.51	1262	78.70	1263	77.91	1264	77.16
1265	76.41	1266	75.64	1267	74.87	1268	74.17	1269	73.51
1270	72.85	1271	72.22	1272	71.62	1273	71.00	1274	70.40
1275	69.86	1276	69.36	1277	68.81	1278	68.19	1279	67.57
1280	66.98	1281	66.43	1282	65.91	1283	65.42	1284	64.94
1285	64.47	1286	63.96	1287	63.48	1288	63.03	1289	62.55
1290	62.13	1291	61.71	1292	61.24	1293	60.79	1294	60.36
1295	59.98	1296	59.60	1297	59.19	1298	58.83	1299	58.45
1300	58.07	1310	54.53	1320	51.54	1330	49.10	1340	46.90
1350	44.78	1360	42.65	1370	40.86	1380	39.24	1390	37.70
1400	36.20	1420	34.06	1440	32.08	1460	28.76	1500	28.76

TOTAL VOLUME THIS HYDROGRAPH = 164.78(Ac.Ft)

50-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159	109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159	111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159	113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159	115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159	117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159	118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159	120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 123A TA 1156 QA 157.44 QAB 167.07 QB 9.63 159 123B TB 1155 QB 10.29 QBA 166.72 QA 156.43

159 123AB TAB 1156 QAB 167.07 QA 157.44 QB 9.63

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	141.02	202.0	286.64	0	0.	.00000	.00	.00	0.	4	9	A35	.01
159	126A	.0	.00	202.0	286.64	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159	128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159	130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

****

CONFLUENCE Q'S

159 131B TB 1155 QB 36.81 QBC 145.84 QC 109.02 159 131C TC 1157 QC 111.74 QCB 146.85 QB 35.11

159 131BC TBC 1156 QBC 147.51 QB 36.08 QC 111.43

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	192.09	136.5	293.77	0	0.	.00000	.00	.00	0.	2	9	A35	.01
159	133AB	136.5	293.77	338.5	575.64	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	575.64	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159	136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
					CONFLUENCE Q'S									
159 138B TB 1156 QB	28.94 QBC	32.23 QC	3.30	159 138C TC 1154 QC	4.09 QCB	32.37 QB	28.28							
159 138BC TBC 1155 QBC	32.72 QB	28.85 QC	3.87											
159 138BC	1.3	4.09	17.1	32.72	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	118.59	76.2	145.31	1	1880.	.09600	.00	.00	0.	4	12	A35	.02
159 140B	16.5	46.36	92.7	165.18	0	0.	.00000	.00	.00	0.	2	9	A35	.38
159 141C	61.2	147.74	61.2	147.74	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 142C	23.3	88.65	84.5	234.31	0	0.	.00000	.00	.00	0.	2	5	A35	.01
159 143C	48.3	116.73	132.8	349.39	0	0.	.00000	.00	.00	0.	2	12	A35	.05
					CONFLUENCE Q'S									
159 144B TB 1159 QB	165.18 QBC	424.51 QC	259.34	159 144C TC 1153 QC	349.39 QCB	467.00 QB	117.61							
159 144BC TBC 1154 QBC	471.06 QB	128.37 QC	342.69											
159 144BC	132.8	349.39	225.5	471.06	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	471.06	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	99.76	370.1	588.89	0	0.	.00000	.00	.00	0.	2	7	A35	.13
					CONFLUENCE Q'S									
159 147A TA 1159 QA	588.89 QAB	1013.41 QB	424.51	159 147B TB 1154 QB	471.06 QBA	940.50 QA	469.43							
159 147AB TAB 1157 QAB	1022.04 QA	566.67 QB	455.37											
159 147AB	225.5	471.06	595.6	1022.04	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	42.06	611.8	1048.64	0	0.	.00000	.00	.00	0.	4	8	A35	.22
159 149A	.0	.00	611.8	1048.64	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	38.92	13.9	38.92	0	0.	.00000	.00	.00	0.	4	7	A35	.26
159 151B	21.6	48.40	35.5	87.32	0	0.	.00000	.00	.00	0.	4	10	A35	.02
159 152A	12.5	34.51	624.3	1050.71	0	0.	.00000	.00	.00	0.	4	7	A35	.18
					CONFLUENCE Q'S									
159 153A TA 1160 QA	1050.71 QAB	1092.19 QB	41.47	159 153B TB 1154 QB	87.32 QBA	866.93 QA	779.60							
159 153AB TAB 1159 QAB	1102.70 QA	1049.42 QB	53.27											
159 153AB	35.5	87.32	659.8	1102.70	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	20.66	7.7	20.66	0	0.	.00000	.00	.00	0.	4	7	A35	.02
159 155B	21.3	54.36	29.0	75.02	4	1470.	.03400	3.00	.00	0.	4	8	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	173.32	93.9	242.34	4	520.	.05800	3.00	.00	0.	2	10	A35	.02
159	157B	.0	.00	93.9	241.52	4	1760.	.04100	3.75	.00	0.	2	99	A35	.00
159	158B	33.8	70.11	127.7	303.81	0	0.	.00000	.00	.00	0.	4	12	A35	.16
159	159B	.0	.00	127.7	303.81	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	76.98	161.5	371.07	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159	161B	.0	.00	161.5	371.07	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	24.30	671.3	1112.77	0	0.	.00000	.00	.00	0.	4	11	A35	.02

****

CONFLUENCE Q'S

159 163A TA 1160 QA 1112.77 QAB 1469.48 QB 356.71 159 163B TB 1158 QB 371.07 QBA 1428.52 QA 1057.45

159 163AB TAB 1160 QAB 1469.48 QA 1112.77 QB 356.71

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	371.07	832.8	1469.48	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1469.22	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	50.51	854.7	1505.69	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159	166A	.0	.00	854.7	1505.43	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	36.01	200	37.88	300	41.03	400	44.55
500	48.86	600	54.08	700	60.86	800	70.39	900	84.46
1000	107.32	1050	135.20	1100	208.15	1110	246.67	1120	303.81
1130	373.13	1131	381.18	1132	388.68	1133	396.82	1134	405.01
1135	413.88	1136	423.09	1137	433.54	1138	444.74	1139	456.90
1140	469.74	1141	484.09	1142	499.47	1143	516.03	1144	533.52
1145	553.14	1146	575.37	1147	599.78	1148	626.27	1149	661.63
1150	706.50	1151	764.99	1152	847.08	1153	941.62	1154	1044.52
1155	1157.75	1156	1269.17	1157	1368.93	1158	1445.64	1159	1494.85
1160	1505.43	1161	1488.79	1162	1443.38	1163	1380.06	1164	1302.03
1165	1220.82	1166	1138.95	1167	1056.27	1168	978.57	1169	904.39
1170	838.72	1171	781.16	1172	734.82	1173	690.56	1174	648.63
1175	612.63	1176	580.29	1177	551.57	1178	525.66	1179	501.15
1180	478.68	1181	457.54	1182	437.69	1183	418.86	1184	401.63
1185	384.88	1186	369.14	1187	354.62	1188	340.79	1189	328.24
1190	316.62	1191	306.02	1192	296.29	1193	287.55	1194	279.42
1195	272.16	1196	265.53	1197	259.56	1198	254.04	1199	248.75
1200	243.67	1201	238.62	1202	233.72	1203	228.93	1204	224.31
1205	219.81	1206	215.46	1207	211.18	1208	206.85	1209	202.53
1210	198.18	1211	193.91	1212	189.83	1213	185.94	1214	182.20
1215	178.58	1216	174.98	1217	171.40	1218	167.95	1219	164.55
1220	161.26	1221	158.12	1222	155.12	1223	152.19	1224	149.31
1225	146.56	1226	143.88	1227	141.36	1228	139.01	1229	136.78
1230	134.65	1231	132.60	1232	130.41	1233	128.36	1234	126.43
1235	124.72	1236	123.12	1237	121.44	1238	119.80	1239	118.15
1240	116.57	1241	115.00	1242	113.54	1243	112.08	1244	110.63
1245	109.28	1246	107.89	1247	106.59	1248	105.34	1249	104.09
1250	102.95	1251	101.84	1252	100.77	1253	99.71	1254	98.71
1255	97.71	1256	96.69	1257	95.74	1258	94.73	1259	93.76
1260	92.83	1261	91.94	1262	91.08	1263	90.26	1264	89.45
1265	88.58	1266	87.73	1267	86.94	1268	86.21	1269	85.53
1270	84.82	1271	84.14	1272	83.45	1273	82.79	1274	82.17
1275	81.56	1276	80.95	1277	80.31	1278	79.60	1279	78.88
1280	78.20	1281	77.61	1282	76.99	1283	76.37	1284	75.81
1285	75.26	1286	74.71	1287	74.16	1288	73.66	1289	73.16
1290	72.67	1291	72.18	1292	71.67	1293	71.24	1294	70.80
1295	70.34	1296	69.94	1297	69.54	1298	69.14	1299	68.68
1300	68.31	1310	64.42	1320	61.02	1330	58.42	1340	56.01
1350	53.65	1360	51.25	1370	49.27	1380	47.48	1390	45.73
1400	44.04	1420	41.74	1440	39.50	1460	36.01	1500	36.01

TOTAL VOLUME THIS HYDROGRAPH = 197.98(Ac.Ft)

50-YEAR

(BURN)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159 109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159 111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159 113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159 115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159 117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159 118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159 120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159 122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1156 QA 157.44 QAB 167.07 QB 9.63 159 123B TB 1155 QB 10.29 QBA 166.72 QA 156.43

159 123AB TAB 1156 QAB 167.07 QA 157.44 QB 9.63

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	156.79	202.0	301.78	0	0.	.00000	.00	.00	0.	204	9	A35	.01
159 126A	.0	.00	202.0	301.78	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159 127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159 128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159 130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 36.81 QBC 145.84 QC 109.02 159 131C TC 1157 QC 111.74 QCB 146.85 QB 35.11

159 131BC TBC 1156 QBC 147.51 QB 36.08 QC 111.43

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	199.95	136.5	301.46	0	0.	.00000	.00	.00	0.	202	9	A35	.01
159 133AB	136.5	301.46	338.5	598.81	0	0.	.00000	.00	.00	0.	202	0	A35	.00
159 134A	.0	.00	338.5	598.81	1	1955.	.08700	.00	.00	0.	202	99	A35	.00
159 135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159 136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1156 QB	28.94 QBC	32.23 QC	3.30	159 138C TC 1154 QC	4.09 QCB	32.37 QB	28.28							
159 138BC TBC 1155 QBC	32.72 QB	28.85 QC	3.87											
159 138BC	1.3	4.09	17.1	32.72	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	30.8	76.76	47.9	101.40	1	1880.	.09600	.00	.00	0.	204	10	A35	.01
159 140B	44.8	118.33	92.7	195.38	0	0.	.00000	.00	.00	0.	202	11	A35	.01
159 141C	61.2	154.41	61.2	154.41	0	0.	.00000	.00	.00	0.	202	12	A35	.01
159 142C	23.3	91.55	84.5	243.84	0	0.	.00000	.00	.00	0.	202	5	A35	.01
159 143C	48.3	121.78	132.8	363.96	0	0.	.00000	.00	.00	0.	202	12	A35	.05
CONFLUENCE Q'S														
159 144B TB 1159 QB	195.38 QBC	467.78 QC	272.40	159 144C TC 1153 QC	363.96 QCB	528.51 QB	164.55							
159 144BC TBC 1154 QBC	529.86 QB	172.64 QC	357.21											
159 144BC	132.8	363.96	225.5	529.86	0	0.	.00000	.00	.00	0.	202	0	A35	.00
159 145B	.0	.00	225.5	529.86	0	0.	.00000	.00	.00	0.	202	99	A35	.00
159 146A	31.6	103.32	370.1	615.48	0	0.	.00000	.00	.00	0.	202	7	A35	.05
CONFLUENCE Q'S														
159 147A TA 1159 QA	615.48 QAB	1083.27 QB	467.78	159 147B TB 1154 QB	529.86 QBA	1025.27 QA	495.42							
159 147AB TAB 1157 QAB	1093.13 QA	594.62 QB	498.52											
159 147AB	225.5	529.86	595.6	1093.13	1	590.	.08500	.00	.00	0.	202	0	A35	.00
159 148A	16.2	45.51	611.8	1124.42	0	0.	.00000	.00	.00	0.	204	8	A35	.22
159 149A	.0	.00	611.8	1124.42	1	1180.	.05100	.00	.00	0.	204	99	A35	.00
159 150B	13.9	38.92	13.9	38.92	0	0.	.00000	.00	.00	0.	4	7	A35	.26
159 151B	21.6	53.88	35.5	92.80	0	0.	.00000	.00	.00	0.	204	10	A35	.02
159 152A	12.5	34.51	624.3	1129.57	0	0.	.00000	.00	.00	0.	4	7	A35	.18
CONFLUENCE Q'S														
159 153A TA 1159 QA	1129.57 QAB	1187.67 QB	58.10	159 153B TB 1154 QB	92.80 QBA	957.52 QA	864.71							
159 153AB TAB 1158 QAB	1189.06 QA	1118.69 QB	70.37											
159 153AB	35.5	92.80	659.8	1189.06	1	990.	.06100	.00	.00	0.	204	0	A35	.00
159 154B	7.7	22.80	7.7	22.80	0	0.	.00000	.00	.00	0.	204	7	A35	.02
159 155B	21.3	54.36	29.0	77.16	4	1470.	.03400	3.00	.00	0.	4	8	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	180.58	93.9	251.71	4	520.	.05800	3.00	.00	0.	202	10	A35	.02
159	157B	.0	.00	93.9	250.91	4	1760.	.04100	3.75	.00	0.	202	99	A35	.00
159	158B	33.8	70.11	127.7	312.70	0	0.	.00000	.00	.00	0.	4	12	A35	.16
159	159B	.0	.00	127.7	312.70	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	76.98	161.5	378.42	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159	161B	.0	.00	161.5	378.42	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	27.14	671.3	1203.88	0	0.	.00000	.00	.00	0.	204	11	A35	.02

CONFLUENCE Q'S

159 163A TA 1160 QA 1203.88 QAB 1570.59 QB 366.71 159 163B TB 1158 QB 378.42 QBA 1537.75 QA 1159.33
159 163AB TAB 1159 QAB 1572.49 QA 1194.47 QB 378.02

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	378.42	832.8	1572.49	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1570.77	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	50.51	854.7	1608.47	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159	166A	.0	.00	854.7	1608.33	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	46.07	200	48.40	300	52.24	400	56.49
500	61.69	600	68.00	700	76.22	800	87.56	900	104.31
1000	131.45	1050	164.87	1100	243.13	1110	284.55	1120	346.38
1130	419.73	1131	427.92	1132	436.07	1133	444.35	1134	453.17
1135	462.34	1136	472.24	1137	483.02	1138	494.89	1139	507.54
1140	521.09	1141	536.02	1142	552.23	1143	569.76	1144	588.48
1145	609.25	1146	632.68	1147	658.33	1148	686.17	1149	721.20
1150	773.64	1151	845.32	1152	923.94	1153	1022.21	1154	1135.04
1155	1255.77	1156	1375.77	1157	1479.40	1158	1556.38	1159	1601.87
1160	1608.33	1161	1587.73	1162	1535.83	1163	1465.25	1164	1378.20
1165	1287.80	1166	1194.54	1167	1101.34	1168	1012.84	1169	931.31
1170	858.68	1171	797.37	1172	749.11	1173	708.80	1174	669.26
1175	632.57	1176	602.62	1177	574.80	1178	549.89	1179	526.74
1180	504.57	1181	484.13	1182	464.33	1183	445.85	1184	428.19
1185	411.89	1186	396.22	1187	381.53	1188	367.88	1189	355.29
1190	343.45	1191	332.89	1192	322.83	1193	313.98	1194	306.03
1195	299.02	1196	292.50	1197	286.36	1198	280.57	1199	275.05
1200	269.67	1201	264.48	1202	259.41	1203	254.53	1204	249.90
1205	245.35	1206	240.85	1207	236.27	1208	231.57	1209	226.83
1210	222.27	1211	217.99	1212	213.91	1213	209.90	1214	205.82
1215	201.85	1216	197.93	1217	194.08	1218	190.38	1219	186.76
1220	183.28	1221	180.00	1222	176.87	1223	173.82	1224	170.79
1225	167.88	1226	165.06	1227	162.45	1228	160.04	1229	157.71
1230	155.52	1231	153.32	1232	151.13	1233	149.00	1234	146.92
1235	144.97	1236	143.12	1237	141.23	1238	139.42	1239	137.62
1240	135.89	1241	134.16	1242	132.56	1243	131.00	1244	129.58
1245	128.14	1246	126.71	1247	125.37	1248	124.10	1249	122.83
1250	121.63	1251	120.41	1252	119.19	1253	117.96	1254	116.81
1255	115.67	1256	114.53	1257	113.46	1258	112.34	1259	111.28
1260	110.26	1261	109.30	1262	108.37	1263	107.48	1264	106.59
1265	105.65	1266	104.73	1267	103.89	1268	103.11	1269	102.39
1270	101.64	1271	100.94	1272	100.23	1273	99.53	1274	98.86
1275	98.16	1276	97.45	1277	96.69	1278	95.85	1279	95.02
1280	94.24	1281	93.56	1282	92.86	1283	92.17	1284	91.55
1285	90.95	1286	90.33	1287	89.71	1288	89.14	1289	88.57
1290	88.03	1291	87.49	1292	86.94	1293	86.47	1294	85.99
1295	85.48	1296	85.01	1297	84.55	1298	84.11	1299	83.60
1300	83.17	1310	78.61	1320	74.74	1330	71.83	1340	69.04
1350	66.27	1360	63.45	1370	61.10	1380	59.10	1390	56.98
1400	54.99	1420	52.39	1440	49.78	1460	46.07	1500	46.07

TOTAL VOLUME THIS HYDROGRAPH = 232.77(Ac.Ft)

Post-development

(Watershed)

2-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159	109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159	120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159	122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

****

* CONFLUENCE Q'S *

* 159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19 *

* 159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63 *

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	15.60	202.0	48.95	0	0.	.00000	.00	.00	0.	4	30	A35	.01
159	126A	.0	.00	202.0	48.95	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159	128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159	130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

****

* CONFLUENCE Q'S *

* 159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12 *

* 159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84 *

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	37.14	136.5	60.05	0	0.	.00000	.00	.00	0.	2	23	A35	.01
159	133AB	136.5	60.05	338.5	108.52	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	108.52	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1160 QB	6.49 QBC	7.25 QC	.76	159 138C TC 1157 QC	.82 QCB	7.26 QB	6.44							
159 138BC TBC 1158 QBC	7.28 QB	6.47 QC	.81											
159 138BC	1.3	.82	17.1	7.28	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	15.58	76.2	22.06	1	1880.	.09600	.00	.00	0.	4	30	A35	.02
159 140B	16.5	10.82	92.7	28.19	0	0.	.00000	.00	.00	0.	2	20	A35	.40
159 141C	61.2	28.24	61.2	28.24	0	0.	.00000	.00	.00	0.	2	30	A35	.01
159 142C	23.3	18.56	84.5	46.44	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 143C	48.3	23.10	132.8	69.38	0	0.	.00000	.00	.00	0.	2	29	A35	.05
CONFLUENCE Q'S														
159 144B TB 1168 QB	28.19 QBC	78.62 QC	50.43	159 144C TC 1156 QC	69.38 QCB	86.32 QB	16.93							
159 144BC TBC 1160 QBC	89.46 QB	22.26 QC	67.21											
159 144BC	132.8	69.38	225.5	89.46	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	89.46	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	22.50	370.1	111.55	0	0.	.00000	.00	.00	0.	2	16	A35	.23
CONFLUENCE Q'S														
159 147A TA 1167 QA	111.55 QAB	190.96 QB	79.41	159 147B TB 1160 QB	89.46 QBA	182.83 QA	93.37							
159 147AB TAB 1166 QAB	191.23 QA	110.93 QB	80.30											
159 147AB	225.5	89.46	595.6	191.23	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	8.01	611.8	197.74	0	0.	.00000	.00	.00	0.	4	22	A35	.40
159 149A	.0	.00	611.8	197.74	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	8.72	13.9	8.72	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159 151B	21.6	5.70	35.5	14.29	0	0.	.00000	.00	.00	0.	4	30	A35	.02
159 152A	12.5	7.25	624.3	198.53	0	0.	.00000	.00	.00	0.	4	17	A35	.40
CONFLUENCE Q'S														
159 153A TA 1170 QA	198.53 QAB	205.00 QB	6.47	159 153B TB 1155 QB	14.29 QBA	136.95 QA	122.66							
159 153AB TAB 1168 QAB	205.45 QA	198.36 QB	7.09											
159 153AB	35.5	14.29	659.8	205.45	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	2.41	7.7	2.41	0	0.	.00000	.00	.00	0.	4	25	A35	.02
159 155B	21.3	12.35	29.0	14.75	4	1470.	.03400	3.00	.00	0.	4	17	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	33.57	93.9	47.90	4	520.	.05800	3.00	.00	0.	2	25	A35	.02
159	157B	.0	.00	93.9	47.88	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	11.16	127.7	58.20	0	0.	.00000	.00	.00	0.	4	30	A35	.20
159	159B	.0	.00	127.7	58.20	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	13.83	161.5	71.33	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159	161B	.0	.00	161.5	71.33	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	3.03	671.3	207.43	0	0.	.00000	.00	.00	0.	4	30	A35	.02

CONFLUENCE Q'S

159 163A TA 1171 QA 207.43 QAB 271.78 QB 64.35 159 163B TB 1164 QB 71.33 QBA 262.12 QA 190.78
159 163AB TAB 1168 QAB 274.47 QA 205.67 QB 68.79

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	71.33	832.8	274.47	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	274.33	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	9.45	854.7	282.51	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159	166A	.0	.00	854.7	282.48	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	11.91	200	12.25	300	12.86	400	13.56
500	14.39	600	15.43	700	16.76	800	18.52	900	21.10
1000	27.37	1050	36.23	1100	51.77	1110	56.15	1120	63.09
1130	74.26	1131	75.44	1132	76.71	1133	78.05	1134	79.38
1135	80.79	1136	82.23	1137	83.75	1138	85.33	1139	86.97
1140	88.66	1141	90.46	1142	92.34	1143	94.32	1144	96.42
1145	98.74	1146	101.25	1147	104.11	1148	107.48	1149	112.12
1150	118.01	1151	125.02	1152	133.53	1153	143.19	1154	153.46
1155	164.04	1156	175.62	1157	187.82	1158	201.20	1159	214.66
1160	227.54	1161	239.29	1162	249.59	1163	258.37	1164	265.52
1165	271.60	1166	276.28	1167	279.77	1168	281.80	1169	282.48
1170	282.08	1171	280.86	1172	278.99	1173	276.40	1174	273.03
1175	268.94	1176	264.08	1177	257.70	1178	249.84	1179	241.95
1180	233.61	1181	224.98	1182	216.25	1183	207.91	1184	199.81
1185	192.08	1186	184.24	1187	176.51	1188	168.58	1189	160.85
1190	153.47	1191	146.44	1192	139.92	1193	133.84	1194	128.32
1195	123.25	1196	118.54	1197	114.03	1198	109.71	1199	105.76
1200	101.97	1201	98.45	1202	95.09	1203	91.94	1204	88.92
1205	86.04	1206	83.30	1207	80.71	1208	78.27	1209	75.98
1210	73.87	1211	71.94	1212	70.09	1213	68.34	1214	66.73
1215	65.24	1216	63.85	1217	62.54	1218	61.46	1219	60.36
1220	59.26	1221	58.31	1222	57.38	1223	56.54	1224	55.73
1225	54.99	1226	54.27	1227	53.59	1228	52.93	1229	52.29
1230	51.67	1231	51.06	1232	50.44	1233	49.84	1234	49.23
1235	48.64	1236	48.06	1237	47.46	1238	46.87	1239	46.27
1240	45.68	1241	45.09	1242	44.53	1243	43.96	1244	43.39
1245	42.83	1246	42.26	1247	41.70	1248	41.14	1249	40.58
1250	40.03	1251	39.49	1252	38.96	1253	38.44	1254	37.93
1255	37.43	1256	36.93	1257	36.45	1258	35.97	1259	35.51
1260	35.06	1261	34.61	1262	34.19	1263	33.77	1264	33.35
1265	32.96	1266	32.59	1267	32.23	1268	31.89	1269	31.55
1270	31.21	1271	30.87	1272	30.53	1273	30.20	1274	29.88
1275	29.55	1276	29.24	1277	28.93	1278	28.62	1279	28.31
1280	28.02	1281	27.73	1282	27.44	1283	27.20	1284	26.91
1285	26.65	1286	26.39	1287	26.14	1288	25.90	1289	25.65
1290	25.42	1291	25.20	1292	24.98	1293	24.79	1294	24.59
1295	24.39	1296	24.20	1297	24.01	1298	23.82	1299	23.64
1300	23.46	1310	21.76	1320	20.31	1330	19.14	1340	18.16
1350	17.31	1360	16.55	1370	15.90	1380	15.34	1390	14.89
1400	14.41	1420	13.73	1440	13.09	1460	11.91	1500	11.91

TOTAL VOLUME THIS HYDROGRAPH = 55.35(Ac.Ft))

2-YEAR

(BURN)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159 109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159 111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159 113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159 115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159 117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159 118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159 120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159 122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19

159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	22.01	202.0	55.21	0	0.	.00000	.00	.00	0.	204	30	A35	.01
159 126A	.0	.00	202.0	55.21	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159 127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159 128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159 130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12

159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	41.44	136.5	64.16	0	0.	.00000	.00	.00	0.	202	23	A35	.01
159 133AB	136.5	64.16	338.5	118.86	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	118.86	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159 136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1160 QB	6.49 QBC	7.25 QC	.76	159 138C TC 1157 QC	.82 QCB	7.26 QB	6.44							
159 138BC TBC 1158 QBC	7.28 QB	6.47 QC	.81											
159 138BC	1.3	.82	17.1	7.28	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	21.84	76.2	28.28	1	1880.	.09600	.00	.00	0.	204	30	A35	.02
159 140B	16.5	10.82	92.7	35.01	0	0.	.00000	.00	.00	0.	2	20	A35	.40
159 141C	61.2	31.75	61.2	31.75	0	0.	.00000	.00	.00	0.	202	30	A35	.01
159 142C	23.3	20.25	84.5	51.62	0	0.	.00000	.00	.00	0.	202	12	A35	.01
159 143C	48.3	25.78	132.8	77.23	0	0.	.00000	.00	.00	0.	202	29	A35	.05
CONFLUENCE Q'S														
159 144B TB 1168 QB	35.01 QBC	92.09 QC	57.08	159 144C TC 1156 QC	77.23 QCB	100.37 QB	23.14							
159 144BC TBC 1160 QBC	104.54 QB	29.56 QC	74.98											
159 144BC	132.8	77.23	225.5	104.54	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	104.54	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	22.50	370.1	122.89	0	0.	.00000	.00	.00	0.	2	16	A35	.23
CONFLUENCE Q'S														
159 147A TA 1167 QA	122.89 QAB	215.97 QB	93.08	159 147B TB 1160 QB	104.54 QBA	209.49 QA	104.94							
159 147AB TAB 1164 QAB	217.34 QA	119.71 QB	97.64											
159 147AB	225.5	104.54	595.6	217.34	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	8.01	611.8	223.70	0	0.	.00000	.00	.00	0.	4	22	A35	.40
159 149A	.0	.00	611.8	223.70	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	8.72	13.9	8.72	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159 151B	21.6	7.98	35.5	16.56	0	0.	.00000	.00	.00	0.	204	30	A35	.02
159 152A	12.5	7.25	624.3	224.95	0	0.	.00000	.00	.00	0.	4	17	A35	.40
CONFLUENCE Q'S														
159 153A TA 1168 QA	224.95 QAB	234.24 QB	9.28	159 153B TB 1155 QB	16.56 QBA	160.01 QA	143.44							
159 153AB TAB 1167 QAB	234.39 QA	224.33 QB	10.06											
159 153AB	35.5	16.56	659.8	234.39	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	3.27	7.7	3.27	0	0.	.00000	.00	.00	0.	204	25	A35	.02
159 155B	21.3	12.35	29.0	15.61	4	1470.	.03400	3.00	.00	0.	4	17	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	37.48	93.9	52.68	4	520.	.05800	3.00	.00	0.	202	25	A35	.02
159	157B	.0	.00	93.9	52.66	4	1760.	.04100	2.25	.00	0.	2	99	A35	.00
159	158B	33.8	11.16	127.7	63.29	0	0.	.00000	.00	.00	0.	4	30	A35	.20
159	159B	.0	.00	127.7	63.29	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	13.83	161.5	76.53	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159	161B	.0	.00	161.5	76.53	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	4.25	671.3	237.47	0	0.	.00000	.00	.00	0.	204	30	A35	.02

CONFLUENCE Q'S

159 163A TA 1170 QA 237.47 QAB 307.40 QB 69.93 159 163B TB 1163 QB 76.53 QBA 290.52 QA 213.99
159 163AB TAB 1168 QAB 309.33 QA 236.39 QB 72.94

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	76.53	832.8	309.33	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	309.11	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	9.45	854.7	317.26	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159	166A	.0	.00	854.7	317.25	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	15.49	200	15.96	300	16.78	400	17.72
500	18.84	600	20.22	700	21.99	800	24.36	900	27.79
1000	35.49	1050	45.94	1100	64.10	1110	69.31	1120	77.48
1130	90.16	1131	91.57	1132	92.99	1133	94.51	1134	96.05
1135	97.66	1136	99.33	1137	101.09	1138	102.93	1139	104.86
1140	106.84	1141	108.93	1142	111.11	1143	113.39	1144	115.80
1145	118.41	1146	121.27	1147	124.62	1148	128.52	1149	133.94
1150	140.64	1151	148.26	1152	157.23	1153	167.65	1154	178.85
1155	190.56	1156	203.80	1157	217.75	1158	232.10	1159	246.57
1160	260.60	1161	272.74	1162	283.63	1163	292.64	1164	300.44
1165	306.68	1166	311.66	1167	315.01	1168	316.95	1169	317.25
1170	316.52	1171	314.78	1172	312.39	1173	309.20	1174	305.24
1175	300.54	1176	295.05	1177	288.00	1178	279.41	1179	270.66
1180	261.61	1181	251.98	1182	242.49	1183	233.19	1184	224.01
1185	215.01	1186	206.06	1187	197.24	1188	188.49	1189	180.26
1190	171.99	1191	164.22	1192	157.11	1193	150.41	1194	144.26
1195	138.44	1196	133.07	1197	128.08	1198	123.70	1199	119.39
1200	115.10	1201	111.12	1202	107.30	1203	103.71	1204	100.30
1205	97.10	1206	94.10	1207	91.30	1208	88.65	1209	86.16
1210	83.86	1211	81.71	1212	79.71	1213	77.85	1214	76.09
1215	74.48	1216	72.97	1217	71.57	1218	70.27	1219	69.09
1220	68.00	1221	66.99	1222	66.03	1223	65.11	1224	64.25
1225	63.44	1226	62.74	1227	61.99	1228	61.27	1229	60.58
1230	59.89	1231	59.22	1232	58.53	1233	57.86	1234	57.18
1235	56.53	1236	55.88	1237	55.23	1238	54.56	1239	53.89
1240	53.22	1241	52.54	1242	51.88	1243	51.21	1244	50.55
1245	49.90	1246	49.25	1247	48.63	1248	48.00	1249	47.38
1250	46.78	1251	46.19	1252	45.62	1253	45.05	1254	44.50
1255	43.97	1256	43.43	1257	42.92	1258	42.41	1259	41.94
1260	41.48	1261	41.05	1262	40.62	1263	40.19	1264	39.76
1265	39.34	1266	38.92	1267	38.51	1268	38.09	1269	37.69
1270	37.28	1271	36.89	1272	36.50	1273	36.12	1274	35.76
1275	35.40	1276	35.05	1277	34.71	1278	34.37	1279	34.04
1280	33.73	1281	33.43	1282	33.12	1283	32.83	1284	32.56
1285	32.30	1286	32.05	1287	31.79	1288	31.54	1289	31.29
1290	31.04	1291	30.79	1292	30.55	1293	30.31	1294	30.07
1295	29.83	1296	29.61	1297	29.38	1298	29.17	1299	28.95
1300	28.75	1310	26.88	1320	25.31	1330	23.98	1340	22.85
1350	21.89	1360	20.99	1370	20.24	1380	19.57	1390	18.99
1400	18.43	1420	17.57	1440	16.82	1460	15.49	1500	15.49

TOTAL VOLUME THIS HYDROGRAPH = 68.18(Ac.Ft)

5-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 108A	8.1	7.45	8.1	7.45	0	0.	.00000	.00	.00	0.	2	24	A35	.21
159 109A	.0	.00	8.1	7.45	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	36.48	54.8	43.93	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159 111A	.0	.00	54.8	43.59	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	10.05	16.2	10.05	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159 113AB	16.2	10.05	71.0	38.51	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	16.80	23.8	16.80	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159 115AB	23.8	16.80	94.8	42.84	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	17.30	122.7	54.58	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159 117B	8.8	6.21	8.8	6.21	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159 118AB	8.8	6.21	131.5	60.43	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	7.65	138.5	64.45	1	210.	.54200	.00	.00	0.	4	12	A35	.21
159 120A	.0	.00	138.5	64.36	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	4.04	3.5	4.04	0	0.	.00000	.00	.00	0.	4	11	A35	.21
159 122B	.0	.00	3.5	4.04	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1161 QA 64.34 QAB 67.75 QB 3.41 159 123B TB 1157 QB 3.98 QBA 65.93 QA 61.95

159 123AB TAB 1161 QAB 67.75 QA 64.34 QB 3.41

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	3.98	142.0	67.75	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	67.75	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	43.28	202.0	105.69	0	0.	.00000	.00	.00	0.	4	20	A35	.01
159 126A	.0	.00	202.0	105.69	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159 127B	14.5	14.73	14.5	14.73	4	570.	.07000	2.00	.00	0.	4	16	A35	.42
159 128B	.0	.00	14.5	14.71	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	42.97	53.3	42.97	4	1260.	.03000	3.25	.00	0.	4	24	A35	.42
159 130C	.0	.00	53.3	42.89	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1156 QB 14.71 QBC 56.38 QC 41.68 159 131C TC 1159 QC 42.89 QCB 57.20 QB 14.31

159 131BC TBC 1158 QBC 57.31 QB 14.51 QC 42.80

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	42.89	67.8	57.31	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	74.00	136.5	119.28	0	0.	.00000	.00	.00	0.	2	17	A35	.01
159 133AB	136.5	119.28	338.5	224.03	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	224.03	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	11.16	15.8	11.16	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159 136B	.0	.00	15.8	11.15	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	1.68	1.3	1.68	1	320.	.53100	.00	.00	0.	4	9	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1160 QB	11.15 QBC	12.37 QC	1.22	159 138C TC 1156 QC	1.65 QCB	12.65 QB	11.00							
159 138BC TBC 1157 QBC	12.70 QB	11.08 QC	1.62											
159 138BC	1.3	1.65	17.1	12.70	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	32.07	76.2	43.97	1	1880.	.09600	.00	.00	0.	4	30	A35	.02
159 140B	16.5	19.42	92.7	55.78	0	0.	.00000	.00	.00	0.	2	16	A35	.40
159 141C	61.2	54.31	61.2	54.31	0	0.	.00000	.00	.00	0.	2	24	A35	.01
159 142C	23.3	35.52	84.5	89.01	0	0.	.00000	.00	.00	0.	2	9	A35	.01
159 143C	48.3	44.21	132.8	133.06	0	0.	.00000	.00	.00	0.	2	23	A35	.05
CONFLUENCE Q'S														
159 144B TB 1164 QB	55.78 QBC	155.31 QC	99.53	159 144C TC 1155 QC	133.06 QCB	172.26 QB	39.20							
159 144BC TBC 1157 QBC	175.80 QB	44.44 QC	131.36											
159 144BC	132.8	133.06	225.5	175.80	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	175.80	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	42.27	370.1	232.09	0	0.	.00000	.00	.00	0.	2	12	A35	.23
CONFLUENCE Q'S														
159 147A TA 1164 QA	232.09 QAB	387.39 QB	155.31	159 147B TB 1157 QB	175.80 QBA	369.61 QA	193.81							
159 147AB TAB 1161 QAB	389.57 QA	226.29 QB	163.28											
159 147AB	225.5	175.80	595.6	389.57	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	16.94	611.8	403.69	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159 149A	.0	.00	611.8	403.69	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	16.38	13.9	16.38	0	0.	.00000	.00	.00	0.	4	12	A35	.40
159 151B	21.6	15.16	35.5	31.49	0	0.	.00000	.00	.00	0.	4	21	A35	.02
159 152A	12.5	14.73	624.3	405.69	0	0.	.00000	.00	.00	0.	4	12	A35	.40
CONFLUENCE Q'S														
159 153A TA 1164 QA	405.69 QAB	425.49 QB	19.79	159 153B TB 1155 QB	31.49 QBA	311.77 QA	280.28							
159 153AB TAB 1163 QAB	426.00 QA	403.89 QB	22.10											
159 153AB	35.5	31.49	659.8	426.00	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	7.37	7.7	7.37	0	0.	.00000	.00	.00	0.	4	13	A35	.02
159 155B	21.3	24.01	29.0	31.38	4	1470.	.03400	3.00	.00	0.	4	13	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	65.77	93.9	96.24	4	520.	.05800	3.00	.00	0.	2	19	A35	.02
159	157B	.0	.00	93.9	96.13	4	1760.	.04100	2.75	.00	0.	2	99	A35	.00
159	158B	33.8	24.34	127.7	119.45	0	0.	.00000	.00	.00	0.	4	26	A35	.30
159	159B	.0	.00	127.7	119.45	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	30.28	161.5	147.69	0	0.	.00000	.00	.00	0.	4	19	A35	.36
159	161B	.0	.00	161.5	147.69	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	7.57	671.3	430.80	0	0.	.00000	.00	.00	0.	4	23	A35	.02

CONFLUENCE Q'S

159 163A TA 1165 QA 430.80 QAB 570.51 QB 139.71 159 163B TB 1161 QB 147.69 QBA 546.49 QA 398.81
159 163AB TAB 1164 QAB 571.06 QA 428.13 QB 142.93

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	147.69	832.8	571.06	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	570.60	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	19.62	854.7	587.42	4	180.	.16700	9.50	.00	0.	4	20	A35	.42
159	166A	.0	.00	854.7	587.37	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	18.22	200	18.77	300	19.72	400	20.85
500	22.21	600	24.13	700	27.77	800	33.21	900	40.90
1000	53.68	1050	68.62	1100	94.87	1110	103.29	1120	118.12
1130	143.32	1131	146.33	1132	149.42	1133	152.61	1134	155.98
1135	159.45	1136	163.16	1137	167.08	1138	171.27	1139	175.66
1140	180.31	1141	185.26	1142	190.59	1143	196.42	1144	202.75
1145	209.72	1146	217.38	1147	225.70	1148	234.84	1149	246.59
1150	261.55	1151	278.53	1152	298.98	1153	322.49	1154	349.07
1155	377.50	1156	408.47	1157	440.95	1158	473.61	1159	503.51
1160	529.76	1161	550.95	1162	567.78	1163	579.33	1164	585.86
1165	587.37	1166	585.45	1167	580.17	1168	571.77	1169	559.34
1170	544.55	1171	528.06	1172	509.08	1173	488.49	1174	468.57
1175	449.10	1176	429.16	1177	408.98	1178	388.93	1179	369.18
1180	349.25	1181	330.06	1182	311.83	1183	295.52	1184	280.26
1185	266.80	1186	254.92	1187	244.43	1188	235.20	1189	226.70
1190	219.10	1191	211.81	1192	204.97	1193	198.34	1194	192.01
1195	185.81	1196	179.70	1197	173.59	1198	167.71	1199	162.02
1200	156.58	1201	151.36	1202	146.39	1203	141.75	1204	137.54
1205	133.50	1206	129.78	1207	126.35	1208	123.17	1209	120.21
1210	117.50	1211	115.09	1212	112.72	1213	110.58	1214	108.55
1215	106.73	1216	105.04	1217	103.46	1218	101.94	1219	100.50
1220	99.12	1221	97.79	1222	96.51	1223	95.24	1224	93.96
1225	92.71	1226	91.47	1227	90.26	1228	89.05	1229	87.85
1230	86.64	1231	85.41	1232	84.19	1233	83.00	1234	81.82
1235	80.60	1236	79.40	1237	78.20	1238	77.01	1239	75.82
1240	74.64	1241	73.46	1242	72.30	1243	71.18	1244	70.09
1245	69.02	1246	67.95	1247	67.02	1248	66.01	1249	65.00
1250	64.06	1251	63.16	1252	62.29	1253	61.44	1254	60.66
1255	59.85	1256	59.04	1257	58.24	1258	57.45	1259	56.68
1260	55.92	1261	55.19	1262	54.46	1263	53.75	1264	53.05
1265	52.38	1266	51.73	1267	51.07	1268	50.45	1269	49.86
1270	49.27	1271	48.72	1272	48.22	1273	47.72	1274	47.21
1275	46.71	1276	46.23	1277	45.76	1278	45.27	1279	44.78
1280	44.30	1281	43.81	1282	43.33	1283	42.86	1284	42.42
1285	41.99	1286	41.56	1287	41.14	1288	40.74	1289	40.33
1290	39.95	1291	39.58	1292	39.19	1293	38.83	1294	38.47
1295	38.14	1296	37.83	1297	37.51	1298	37.23	1299	36.92
1300	36.61	1310	33.66	1320	31.20	1330	29.26	1340	27.66
1350	26.40	1360	25.29	1370	24.38	1380	23.55	1390	22.79
1400	22.06	1420	20.94	1440	19.89	1460	18.22	1500	18.22

TOTAL VOLUME THIS HYDROGRAPH = 96.56(Ac.Ft)

10-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	10.98	8.1	10.98	0	0.	.00000	.00	.00	0.	2	18	A35	.21
159	109A	.0	.00	8.1	10.98	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	52.86	54.8	63.83	2	735.	.01400	.00	.00	0.	2	24	A35	.02
159	111A	.0	.00	54.8	63.12	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	15.16	16.2	15.16	4	270.	.01900	2.75	.00	0.	4	24	A35	.21
159	113AB	16.2	15.16	71.0	52.75	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	24.46	23.8	24.46	0	0.	.00000	.00	.00	0.	4	24	A35	.42
159	115AB	23.8	24.46	94.8	58.25	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	23.27	122.7	78.26	4	560.	.02300	3.50	.00	0.	4	29	A35	.21
159	117B	8.8	7.97	8.8	7.97	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	7.97	131.5	85.93	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	12.24	138.5	89.37	1	210.	.54200	.00	.00	0.	4	8	A35	.21
159	120A	.0	.00	138.5	89.22	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	6.12	3.5	6.12	0	0.	.00000	.00	.00	0.	4	8	A35	.21
159	122B	.0	.00	3.5	6.12	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1157 QA 89.19 QAB 95.08 QB 5.89 159 123B TB 1156 QB 6.02 QBA 94.50 QA 88.48

159 123AB TAB 1157 QAB 95.08 QA 89.19 QB 5.89

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	6.02	142.0	95.08	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	95.08	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	74.92	202.0	158.90	0	0.	.00000	.00	.00	0.	4	13	A35	.01
159	126A	.0	.00	202.0	158.90	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	21.76	14.5	21.76	4	570.	.07000	2.00	.00	0.	4	12	A35	.42
159	128B	.0	.00	14.5	21.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	64.30	53.3	64.30	4	1260.	.03000	3.25	.00	0.	4	18	A35	.42
159	130C	.0	.00	53.3	64.02	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 21.75 QBC 83.13 QC 61.39 159 131C TC 1158 QC 64.02 QCB 84.89 QB 20.87

159 131BC TBC 1157 QBC 85.35 QB 21.41 QC 63.94

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	64.02	67.8	85.35	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	113.21	136.5	174.42	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159	133AB	136.5	174.42	338.5	332.93	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	332.93	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	16.62	15.8	16.62	2	165.	.09100	2.00	.00	0.	4	23	A35	.42
159	136B	.0	.00	15.8	16.62	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	2.67	1.3	2.67	1	320.	.53100	.00	.00	0.	4	6	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1157 QB	16.62 QBC	18.65 QC	2.03	159 138C TC 1155 QC	2.59 QCB	19.01 QB	16.42	159 138BC TBC 1155 QBC	19.01 QB	16.42 QC	2.59			
159 138BC	1.3	2.59	17.1	19.01	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	60.67	76.2	77.06	1	1880.	.09600	.00	.00	0.	4	18	A35	.02
159 140B	16.5	27.99	92.7	91.70	0	0.	.00000	.00	.00	0.	2	12	A35	.40
159 141C	61.2	83.70	61.2	83.70	0	0.	.00000	.00	.00	0.	2	17	A35	.01
159 142C	23.3	50.67	84.5	133.93	0	0.	.00000	.00	.00	0.	2	7	A35	.01
159 143C	48.3	68.67	132.8	202.11	0	0.	.00000	.00	.00	0.	2	16	A35	.05
CONFLUENCE Q'S														
159 144B TB 1160 QB	91.70 QBC	250.08 QC	158.38	159 144C TC 1154 QC	202.11 QCB	267.21 QB	65.10	159 144BC TBC 1155 QBC	272.36 QB	70.29 QC	202.08			
159 144BC	132.8	202.11	225.5	272.36	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	272.36	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	61.37	370.1	340.53	0	0.	.00000	.00	.00	0.	2	9	A35	.23
CONFLUENCE Q'S														
159 147A TA 1161 QA	340.53 QAB	584.19 QB	243.66	159 147B TB 1155 QB	272.36 QBA	546.16 QA	273.80	159 147AB TAB 1159 QAB	589.34 QA	332.27 QB	257.07			
159 147AB	225.5	272.36	595.6	589.34	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	25.38	611.8	609.30	0	0.	.00000	.00	.00	0.	4	11	A35	.40
159 149A	.0	.00	611.8	609.30	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	24.16	13.9	24.16	0	0.	.00000	.00	.00	0.	4	9	A35	.40
159 151B	21.6	25.92	35.5	50.09	0	0.	.00000	.00	.00	0.	4	14	A35	.02
159 152A	12.5	20.71	624.3	612.43	0	0.	.00000	.00	.00	0.	4	10	A35	.40
CONFLUENCE Q'S														
159 153A TA 1162 QA	612.43 QAB	640.26 QB	27.82	159 153B TB 1154 QB	50.09 QBA	463.44 QA	413.35	159 153AB TAB 1161 QAB	643.79 QA	611.80 QB	31.99			
159 153AB	35.5	50.09	659.8	643.79	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	12.00	7.7	12.00	0	0.	.00000	.00	.00	0.	4	9	A35	.02
159 155B	21.3	35.30	29.0	47.30	4	1470.	.03400	3.00	.00	0.	4	10	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	102.56	93.9	147.55	4	520.	.05800	3.00	.00	0.	2	13	A35	.02
159	157B	.0	.00	93.9	147.06	4	1760.	.04100	3.25	.00	0.	2	99	A35	.00
159	158B	33.8	37.43	127.7	181.88	0	0.	.00000	.00	.00	0.	4	18	A35	.20
159	159B	.0	.00	127.7	181.88	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	45.84	161.5	223.39	0	0.	.00000	.00	.00	0.	4	14	A35	.36
159	161B	.0	.00	161.5	223.39	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	13.27	671.3	651.05	0	0.	.00000	.00	.00	0.	4	15	A35	.02

CONFLUENCE Q'S

159 163A TA 1163 QA 651.05 QAB 853.74 QB 202.70 159 163B TB 1159 QB 223.39 QBA 819.57 QA 596.18
159 163AB TAB 1162 QAB 862.90 QA 649.09 QB 213.82

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	223.39	832.8	862.90	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	862.13	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	29.27	854.7	885.64	4	180.	.16700	9.50	.00	0.	4	15	A35	.42
159	166A	.0	.00	854.7	885.38	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	22.08	200	22.75	300	24.39	400	26.90
500	29.97	600	33.85	700	38.80	800	45.44	900	54.94
1000	70.91	1050	90.23	1100	122.52	1110	138.16	1120	168.98
1130	210.83	1131	215.41	1132	220.15	1133	225.10	1134	230.38
1135	235.88	1136	241.58	1137	247.59	1138	254.23	1139	261.00
1140	268.35	1141	276.29	1142	285.12	1143	294.57	1144	304.77
1145	316.08	1146	328.69	1147	342.61	1148	357.59	1149	377.14
1150	402.18	1151	431.91	1152	468.14	1153	510.58	1154	557.93
1155	610.07	1156	664.79	1157	715.45	1158	774.61	1159	826.52
1160	856.88	1161	877.02	1162	885.38	1163	882.29	1164	866.02
1165	840.50	1166	809.26	1167	774.62	1168	738.62	1169	705.47
1170	668.91	1171	626.04	1172	587.52	1173	548.34	1174	512.33
1175	478.40	1176	448.08	1177	421.61	1178	398.33	1179	377.67
1180	359.09	1181	342.35	1182	326.99	1183	313.23	1184	300.21
1185	288.06	1186	276.80	1187	266.39	1188	256.67	1189	247.59
1190	239.16	1191	230.99	1192	223.52	1193	216.28	1194	209.59
1195	203.29	1196	197.26	1197	191.46	1198	186.05	1199	180.86
1200	175.98	1201	171.26	1202	166.81	1203	162.65	1204	158.75
1205	155.17	1206	151.96	1207	148.96	1208	146.26	1209	143.72
1210	141.37	1211	139.12	1212	136.97	1213	134.90	1214	132.83
1215	130.84	1216	128.87	1217	126.93	1218	124.98	1219	123.04
1220	121.23	1221	119.38	1222	117.55	1223	115.62	1224	113.69
1225	111.74	1226	109.89	1227	108.10	1228	106.38	1229	104.69
1230	102.98	1231	101.26	1232	99.57	1233	97.91	1234	96.26
1235	94.66	1236	93.09	1237	91.58	1238	90.15	1239	88.75
1240	87.38	1241	86.01	1242	84.71	1243	83.47	1244	82.34
1245	81.26	1246	80.20	1247	79.14	1248	78.05	1249	76.99
1250	75.96	1251	74.94	1252	73.97	1253	73.00	1254	72.08
1255	71.17	1256	70.29	1257	69.47	1258	68.62	1259	67.78
1260	66.99	1261	66.29	1262	65.58	1263	64.91	1264	64.26
1265	63.59	1266	62.94	1267	62.31	1268	61.68	1269	61.04
1270	60.40	1271	59.82	1272	59.26	1273	58.71	1274	58.17
1275	57.62	1276	57.06	1277	56.52	1278	55.99	1279	55.46
1280	54.94	1281	54.42	1282	53.90	1283	53.38	1284	52.92
1285	52.51	1286	52.09	1287	51.67	1288	51.27	1289	50.85
1290	50.46	1291	50.08	1292	49.69	1293	49.33	1294	48.94
1295	48.54	1296	48.17	1297	47.82	1298	47.48	1299	47.10
1300	46.76	1310	43.59	1320	40.93	1330	38.71	1340	36.74
1350	34.94	1360	33.09	1370	31.51	1380	30.11	1390	28.79
1400	27.51	1420	25.69	1440	24.37	1460	22.08	1500	22.08

TOTAL VOLUME THIS HYDROGRAPH = 126.68(Ac.Ft)

25-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	15.26	8.1	15.26	0	0.	.00000	.00	.00	0.	2	15	A35	.21
159	109A	.0	.00	8.1	15.26	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	74.46	54.8	89.64	2	735.	.01400	.00	.00	0.	2	20	A35	.02
159	111A	.0	.00	54.8	88.40	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	21.93	16.2	21.93	4	270.	.01900	2.75	.00	0.	4	20	A35	.21
159	113AB	16.2	21.90	71.0	73.77	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	34.53	23.8	34.53	0	0.	.00000	.00	.00	0.	4	20	A35	.42
159	115AB	23.8	34.53	94.8	79.89	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	34.80	122.7	112.07	4	560.	.02300	3.50	.00	0.	4	23	A35	.21
159	117B	8.8	11.30	8.8	11.30	4	350.	.06600	2.00	.00	0.	4	25	A35	.42
159	118AB	8.8	11.30	131.5	122.94	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	16.75	138.5	128.49	1	210.	.54200	.00	.00	0.	4	7	A35	.21
159	120A	.0	.00	138.5	128.47	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	9.13	3.5	9.13	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	9.13	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1157 QA 128.33 QAB 135.59 QB 7.26 159 123B TB 1155 QB 8.87 QBA 135.11 QA 126.24
159 123AB TAB 1156 QAB 136.60 QA 128.26 QB 8.34

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	8.87	142.0	136.60	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	136.60	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	114.49	202.0	232.11	0	0.	.00000	.00	.00	0.	4	10	A35	.01
159	126A	.0	.00	202.0	232.11	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	30.53	14.5	30.53	4	570.	.07000	2.00	.00	0.	4	10	A35	.42
159	128B	.0	.00	14.5	30.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	90.39	53.3	90.39	4	1260.	.03000	3.25	.00	0.	4	15	A35	.42
159	130C	.0	.00	53.3	89.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 30.35 QBC 117.22 QC 86.87 159 131C TC 1157 QC 89.75 QCB 118.83 QB 29.07
159 131BC TBC 1156 QBC 119.06 QB 29.85 QC 89.21

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	89.75	67.8	119.06	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	158.81	136.5	241.55	0	0.	.00000	.00	.00	0.	2	10	A35	.01
159	133AB	136.5	241.55	338.5	471.43	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	471.43	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	23.54	15.8	23.54	2	165.	.09100	2.00	.00	0.	4	19	A35	.42
159	136B	.0	.00	15.8	23.54	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	3.79	1.3	3.79	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1156 QB	23.51 QBC	26.38 QC	2.87	159 138C TC 1154 QC	3.52 QCB	26.33 QB	22.81							
159 138BC TBC 1155 QBC	26.74 QB	23.38 QC	3.36											
159 138BC	1.3	3.52	17.1	26.74	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	92.49	76.2	114.45	1	1880.	.09600	.00	.00	0.	4	14	A35	.02
159 140B	16.5	38.62	92.7	132.38	0	0.	.00000	.00	.00	0.	2	10	A35	.40
159 141C	61.2	117.89	61.2	117.89	0	0.	.00000	.00	.00	0.	2	14	A35	.01
159 142C	23.3	69.28	84.5	187.17	0	0.	.00000	.00	.00	0.	2	6	A35	.01
159 143C	48.3	96.81	132.8	283.98	0	0.	.00000	.00	.00	0.	2	13	A35	.05
CONFLUENCE Q'S														
159 144B TB 1159 QB	132.38 QBC	351.32 QC	218.94	159 144C TC 1154 QC	283.98 QCB	384.04 QB	100.05							
159 144BC TBC 1154 QBC	384.04 QB	100.05 QC	283.98											
159 144BC	132.8	283.98	225.5	384.04	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	384.04	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	86.75	370.1	475.62	0	0.	.00000	.00	.00	0.	2	7	A35	.23
CONFLUENCE Q'S														
159 147A TA 1161 QA	475.62 QAB	805.25 QB	329.64	159 147B TB 1154 QB	384.04 QBA	761.15 QA	377.11							
159 147AB TAB 1158 QAB	832.97 QA	465.51 QB	367.46											
159 147AB	225.5	384.04	595.6	832.97	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	35.59	611.8	856.46	0	0.	.00000	.00	.00	0.	4	9	A35	.40
159 149A	.0	.00	611.8	856.46	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	34.55	13.9	34.55	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159 151B	21.6	38.90	35.5	73.45	0	0.	.00000	.00	.00	0.	4	11	A35	.02
159 152A	12.5	29.04	624.3	860.35	0	0.	.00000	.00	.00	0.	4	8	A35	.40
CONFLUENCE Q'S														
159 153A TA 1160 QA	860.35 QAB	899.26 QB	38.91	159 153B TB 1154 QB	73.45 QBA	692.29 QA	618.84							
159 153AB TAB 1159 QAB	901.70 QA	853.00 QB	48.69											
159 153AB	35.5	73.45	659.8	901.70	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	17.72	7.7	17.72	0	0.	.00000	.00	.00	0.	4	7	A35	.02
159 155B	21.3	49.48	29.0	67.20	4	1470.	.03400	3.00	.00	0.	4	8	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	142.12	93.9	206.20	4	520.	.05800	3.00	.00	0.	2	11	A35	.02
159	157B	.0	.00	93.9	205.01	4	1760.	.04100	3.50	.00	0.	2	99	A35	.00
159	158B	33.8	55.77	127.7	255.43	0	0.	.00000	.00	.00	0.	4	14	A35	.20
159	159B	.0	.00	127.7	255.43	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	63.25	161.5	310.93	0	0.	.00000	.00	.00	0.	4	12	A35	.36
159	161B	.0	.00	161.5	310.93	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	19.65	671.3	911.00	0	0.	.00000	.00	.00	0.	4	12	A35	.02

CONFLUENCE Q'S

159 163A TA 1161 QA 911.00 QAB 1203.12 QB 292.12 159 163B TB 1159 QB 310.93 QBA 1192.96 QA 882.03
159 163AB TAB 1160 QAB 1211.42 QA 904.90 QB 306.52

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	310.93	832.8	1211.42	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1209.17	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	41.61	854.7	1237.97	4	180.	.16700	9.50	.00	0.	4	12	A35	.42
159	166A	.0	.00	854.7	1237.29	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	30.74	200	32.41	300	35.26	400	38.45
500	42.36	600	47.09	700	53.25	800	61.41	900	73.70
1000	94.37	1050	118.62	1100	172.41	1110	201.64	1120	248.64
1130	306.45	1131	313.04	1132	319.75	1133	326.54	1134	333.83
1135	341.17	1136	349.03	1137	357.39	1138	366.53	1139	376.40
1140	386.94	1141	398.55	1142	411.27	1143	424.92	1144	439.56
1145	455.78	1146	473.83	1147	493.67	1148	515.32	1149	543.92
1150	581.03	1151	626.35	1152	681.06	1153	745.49	1154	832.95
1155	923.57	1156	1010.91	1157	1094.69	1158	1163.09	1159	1211.61
1160	1236.77	1161	1237.29	1162	1217.10	1163	1179.09	1164	1129.88
1165	1069.30	1166	1009.23	1167	949.08	1168	887.66	1169	828.19
1170	772.21	1171	724.03	1172	675.45	1173	626.58	1174	588.48
1175	552.90	1176	523.50	1177	496.04	1178	471.73	1179	449.27
1180	428.80	1181	409.92	1182	392.30	1183	375.60	1184	360.31
1185	345.73	1186	332.23	1187	319.47	1188	307.69	1189	296.10
1190	285.36	1191	275.19	1192	265.79	1193	257.03	1194	248.93
1195	241.51	1196	234.40	1197	228.18	1198	222.42	1199	217.38
1200	212.71	1201	208.51	1202	204.38	1203	200.54	1204	196.91
1205	193.44	1206	189.99	1207	186.64	1208	183.33	1209	180.05
1210	176.81	1211	173.68	1212	170.63	1213	167.64	1214	164.57
1215	161.55	1216	158.56	1217	155.64	1218	152.87	1219	150.23
1220	147.56	1221	144.93	1222	142.31	1223	139.73	1224	137.17
1225	134.66	1226	132.27	1227	129.89	1228	127.64	1229	125.49
1230	123.44	1231	121.36	1232	119.35	1233	117.46	1234	115.60
1235	113.82	1236	112.18	1237	110.59	1238	109.04	1239	107.54
1240	106.09	1241	104.66	1242	103.26	1243	101.91	1244	100.56
1245	99.20	1246	97.87	1247	96.62	1248	95.37	1249	94.17
1250	93.02	1251	91.94	1252	90.83	1253	89.77	1254	88.78
1255	87.86	1256	86.93	1257	86.03	1258	85.16	1259	84.25
1260	83.36	1261	82.55	1262	81.73	1263	80.92	1264	80.16
1265	79.40	1266	78.62	1267	77.84	1268	77.14	1269	76.47
1270	75.81	1271	75.16	1272	74.56	1273	73.91	1274	73.31
1275	72.77	1276	72.22	1277	71.65	1278	71.02	1279	70.39
1280	69.80	1281	69.24	1282	68.72	1283	68.21	1284	67.72
1285	67.23	1286	66.71	1287	66.22	1288	65.77	1289	65.28
1290	64.85	1291	64.43	1292	63.94	1293	63.48	1294	63.05
1295	62.66	1296	62.28	1297	61.85	1298	61.49	1299	61.11
1300	60.74	1310	57.09	1320	54.04	1330	51.53	1340	49.29
1350	47.09	1360	44.90	1370	43.07	1380	41.44	1390	39.85
1400	38.30	1420	36.13	1440	34.08	1460	30.74	1500	30.74

TOTAL VOLUME THIS HYDROGRAPH = 170.73(Ac.Ft)

50-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159	109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159	111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159	113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159	115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159	117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159	118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159	120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1156 QA 157.44 QAB 167.07 QB 9.63 159 123B TB 1155 QB 10.29 QBA 166.72 QA 156.43

159 123AB TAB 1156 QAB 167.07 QA 157.44 QB 9.63

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	141.02	202.0	286.64	0	0.	.00000	.00	.00	0.	4	9	A35	.01
159	126A	.0	.00	202.0	286.64	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159	128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159	130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 36.81 QBC 145.84 QC 109.02 159 131C TC 1157 QC 111.74 QCB 146.85 QB 35.11

159 131BC TBC 1156 QBC 147.51 QB 36.08 QC 111.43

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	192.09	136.5	293.77	0	0.	.00000	.00	.00	0.	2	9	A35	.01
159	133AB	136.5	293.77	338.5	575.64	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	575.64	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159	136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1156 QB	28.94 QBC	32.23 QC	3.30	159 138C TC 1154 QC	4.09 QCB	32.37 QB	28.28							
159 138BC TBC 1155 QBC	32.72 QB	28.85 QC	3.87											
159 138BC	1.3	4.09	17.1	32.72	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	118.59	76.2	145.31	1	1880.	.09600	.00	.00	0.	4	12	A35	.02
159 140B	16.5	46.37	92.7	165.21	0	0.	.00000	.00	.00	0.	2	9	A35	.40
159 141C	61.2	147.74	61.2	147.74	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 142C	23.3	88.65	84.5	234.31	0	0.	.00000	.00	.00	0.	2	5	A35	.01
159 143C	48.3	116.73	132.8	349.39	0	0.	.00000	.00	.00	0.	2	12	A35	.05
CONFLUENCE Q'S														
159 144B TB 1159 QB	165.21 QBC	424.55 QC	259.34	159 144C TC 1153 QC	349.39 QCB	467.01 QB	117.62							
159 144BC TBC 1154 QBC	471.07 QB	128.38 QC	342.69											
159 144BC	132.8	349.39	225.5	471.07	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	471.07	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	99.78	370.1	589.34	0	0.	.00000	.00	.00	0.	2	7	A35	.23
CONFLUENCE Q'S														
159 147A TA 1159 QA	589.34 QAB	1013.88 QB	424.55	159 147B TB 1154 QB	471.07 QBA	940.53 QA	469.45							
159 147AB TAB 1157 QAB	1022.30 QA	566.92 QB	455.39											
159 147AB	225.5	471.07	595.6	1022.30	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	43.48	611.8	1050.32	0	0.	.00000	.00	.00	0.	4	8	A35	.40
159 149A	.0	.00	611.8	1050.32	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	39.88	13.9	39.88	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159 151B	21.6	48.40	35.5	88.28	0	0.	.00000	.00	.00	0.	4	10	A35	.02
159 152A	12.5	35.86	624.3	1053.55	0	0.	.00000	.00	.00	0.	4	7	A35	.40
CONFLUENCE Q'S														
159 153A TA 1160 QA	1053.55 QAB	1095.85 QB	42.29	159 153B TB 1154 QB	88.28 QBA	871.03 QA	782.76							
159 153AB TAB 1159 QAB	1106.44 QA	1052.29 QB	54.15											
159 153AB	35.5	88.28	659.8	1106.44	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	20.66	7.7	20.66	0	0.	.00000	.00	.00	0.	4	7	A35	.02
159 155B	21.3	61.11	29.0	81.76	4	1470.	.03400	3.00	.00	0.	4	7	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	173.32	93.9	248.98	4	520.	.05800	3.00	.00	0.	2	10	A35	.02
159	157B	.0	.00	93.9	248.10	4	1760.	.04100	3.75	.00	0.	2	99	A35	.00
159	158B	33.8	70.76	127.7	310.57	0	0.	.00000	.00	.00	0.	4	12	A35	.20
159	159B	.0	.00	127.7	310.57	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	76.98	161.5	376.90	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159	161B	.0	.00	161.5	376.90	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	24.30	671.3	1116.56	0	0.	.00000	.00	.00	0.	4	11	A35	.02

****

CONFLUENCE Q'S

159 163A TA 1160 QA 1116.56 QAB 1479.48 QB 362.92 159 163B TB 1158 QB 376.90 QBA 1438.34 QA 1061.44

159 163AB TAB 1160 QAB 1479.48 QA 1116.56 QB 362.92

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	376.90	832.8	1479.48	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1479.24	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	50.51	854.7	1515.79	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159	166A	.0	.00	854.7	1515.53	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	38.23	200	40.18	300	43.45	400	47.10
500	51.55	600	56.95	700	63.97	800	73.81	900	88.34
1000	111.91	1050	140.81	1100	214.01	1110	252.72	1120	310.11
1130	379.61	1131	387.61	1132	395.19	1133	403.35	1134	411.58
1135	420.45	1136	429.86	1137	440.26	1138	451.49	1139	463.71
1140	476.62	1141	491.09	1142	506.57	1143	523.24	1144	540.81
1145	560.49	1146	582.86	1147	607.25	1148	633.87	1149	669.14
1150	713.84	1151	774.06	1152	856.76	1153	950.30	1154	1054.28
1155	1167.57	1156	1279.23	1157	1378.83	1158	1455.60	1159	1504.81
1160	1515.53	1161	1498.11	1162	1450.76	1163	1385.07	1164	1305.50
1165	1223.24	1166	1141.37	1167	1059.02	1168	982.00	1169	908.15
1170	842.89	1171	785.54	1172	738.59	1173	695.32	1174	654.44
1175	617.34	1176	585.62	1177	556.47	1178	530.92	1179	506.26
1180	483.82	1181	462.68	1182	442.81	1183	424.01	1184	406.68
1185	390.11	1186	374.31	1187	359.72	1188	345.94	1189	333.36
1190	321.77	1191	311.15	1192	301.48	1193	292.70	1194	284.56
1195	277.29	1196	270.66	1197	264.68	1198	259.12	1199	253.78
1200	248.68	1201	243.57	1202	238.66	1203	233.80	1204	229.15
1205	224.59	1206	220.23	1207	215.88	1208	211.53	1209	207.16
1210	202.72	1211	198.43	1212	194.31	1213	190.40	1214	186.64
1215	182.98	1216	179.33	1217	175.73	1218	172.25	1219	168.82
1220	165.49	1221	162.31	1222	159.28	1223	156.33	1224	153.43
1225	150.66	1226	147.95	1227	145.40	1228	143.03	1229	140.78
1230	138.71	1231	136.50	1232	134.31	1233	132.25	1234	130.34
1235	128.63	1236	127.00	1237	125.27	1238	123.59	1239	121.91
1240	120.32	1241	118.72	1242	117.23	1243	115.74	1244	114.27
1245	112.88	1246	111.49	1247	110.20	1248	108.93	1249	107.67
1250	106.52	1251	105.40	1252	104.32	1253	103.24	1254	102.22
1255	101.20	1256	100.16	1257	99.20	1258	98.17	1259	97.18
1260	96.23	1261	95.33	1262	94.46	1263	93.62	1264	92.80
1265	91.92	1266	91.06	1267	90.28	1268	89.54	1269	88.86
1270	88.15	1271	87.46	1272	86.76	1273	86.08	1274	85.45
1275	84.82	1276	84.20	1277	83.55	1278	82.82	1279	82.08
1280	81.39	1281	80.79	1282	80.15	1283	79.52	1284	78.95
1285	78.39	1286	77.83	1287	77.27	1288	76.76	1289	76.26
1290	75.76	1291	75.26	1292	74.73	1293	74.29	1294	73.85
1295	73.38	1296	72.97	1297	72.53	1298	72.13	1299	71.66
1300	71.28	1310	67.28	1320	63.80	1330	61.22	1340	58.70
1350	56.28	1360	53.77	1370	51.77	1380	49.93	1390	48.12
1400	46.38	1420	44.07	1440	41.75	1460	38.23	1500	38.23

TOTAL VOLUME THIS HYDROGRAPH = 204.58(Ac.Ft)

50-YEAR

(BURN)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159	109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159	111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159	113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159	115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159	117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159	118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159	120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1156 QA 157.44 QAB 167.07 QB 9.63 159 123B TB 1155 QB 10.29 QBA 166.72 QA 156.43

159 123AB TAB 1156 QAB 167.07 QA 157.44 QB 9.63

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	156.79	202.0	301.78	0	0.	.00000	.00	.00	0.	204	9	A35	.01
159	126A	.0	.00	202.0	301.78	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159	127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159	128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159	130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 36.81 QBC 145.84 QC 109.02 159 131C TC 1157 QC 111.74 QCB 146.85 QB 35.11

159 131BC TBC 1156 QBC 147.51 QB 36.08 QC 111.43

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	199.95	136.5	301.46	0	0.	.00000	.00	.00	0.	202	9	A35	.01
159	133AB	136.5	301.46	338.5	598.81	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	598.81	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159	136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
CONFLUENCE Q'S														
159 138B TB 1156 QB	28.94 QBC	32.23 QC	3.30	159 138C TC 1154 QC	4.09 QCB	32.37 QB	28.28							
159 138BC TBC 1155 QBC	32.72 QB	28.85 QC	3.87											
159 138BC	1.3	4.09	17.1	32.72	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	132.81	76.2	159.47	1	1880.	.09600	.00	.00	0.	204	12	A35	.02
159 140B	16.5	46.37	92.7	180.21	0	0.	.00000	.00	.00	0.	2	9	A35	.40
159 141C	61.2	154.41	61.2	154.41	0	0.	.00000	.00	.00	0.	202	12	A35	.01
159 142C	23.3	91.55	84.5	243.84	0	0.	.00000	.00	.00	0.	202	5	A35	.01
159 143C	48.3	121.78	132.8	363.96	0	0.	.00000	.00	.00	0.	202	12	A35	.05
CONFLUENCE Q'S														
159 144B TB 1159 QB	180.21 QBC	452.61 QC	272.40	159 144C TC 1153 QC	363.96 QCB	493.96 QB	130.01							
159 144BC TBC 1155 QBC	499.21 QB	154.72 QC	344.49											
159 144BC	132.8	363.96	225.5	499.21	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	499.21	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	99.78	370.1	613.56	0	0.	.00000	.00	.00	0.	2	7	A35	.23
CONFLUENCE Q'S														
159 147A TA 1159 QA	613.56 QAB	1066.17 QB	452.61	159 147B TB 1155 QB	499.21 QBA	1036.56 QA	537.35							
159 147AB TAB 1157 QAB	1076.27 QA	591.84 QB	484.43											
159 147AB	225.5	499.21	595.6	1076.27	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	43.48	611.8	1104.14	0	0.	.00000	.00	.00	0.	4	8	A35	.40
159 149A	.0	.00	611.8	1104.14	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	39.88	13.9	39.88	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159 151B	21.6	53.88	35.5	93.76	0	0.	.00000	.00	.00	0.	204	10	A35	.02
159 152A	12.5	35.86	624.3	1107.37	0	0.	.00000	.00	.00	0.	4	7	A35	.40
CONFLUENCE Q'S														
159 153A TA 1160 QA	1107.37 QAB	1154.09 QB	46.72	159 153B TB 1154 QB	93.76 QBA	923.38 QA	829.62							
159 153AB TAB 1159 QAB	1165.70 QA	1106.72 QB	58.98											
159 153AB	35.5	93.76	659.8	1165.70	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	22.80	7.7	22.80	0	0.	.00000	.00	.00	0.	204	7	A35	.02
159 155B	21.3	61.11	29.0	83.91	4	1470.	.03400	3.00	.00	0.	4	7	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	156B	64.9	180.58	93.9	258.34	4	520.	.05800	3.00	.00	0.	202	10	A35	.02
159	157B	.0	.00	93.9	257.48	4	1760.	.04100	3.75	.00	0.	2	99	A35	.00
159	158B	33.8	70.76	127.7	319.28	0	0.	.00000	.00	.00	0.	4	12	A35	.20
159	159B	.0	.00	127.7	319.28	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	76.98	161.5	383.05	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159	161B	.0	.00	161.5	383.05	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	27.14	671.3	1178.56	0	0.	.00000	.00	.00	0.	204	11	A35	.02

CONFLUENCE Q'S

159 163A TA 1160 QA 1178.56 QAB 1550.99 QB 372.42 159 163B TB 1159 QB 383.05 QBA 1546.44 QA 1163.39
159 163AB TAB 1160 QAB 1550.99 QA 1178.56 QB 372.42

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	383.05	832.8	1550.99	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1548.02	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	50.51	854.7	1586.65	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159	166A	.0	.00	854.7	1586.33	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	47.78	200	50.09	300	53.87	400	58.08
500	63.21	600	69.45	700	77.56	800	88.77	900	105.20
1000	131.96	1050	164.65	1100	242.22	1110	283.01	1120	343.70
1130	416.42	1131	424.53	1132	432.70	1133	440.99	1134	449.73
1135	458.83	1136	468.57	1137	479.22	1138	490.96	1139	503.55
1140	517.01	1141	531.88	1142	547.99	1143	565.28	1144	583.77
1145	604.13	1146	626.97	1147	652.27	1148	679.45	1149	715.05
1150	763.97	1151	833.78	1152	913.08	1153	1007.91	1154	1116.53
1155	1231.53	1156	1345.86	1157	1445.65	1158	1523.19	1159	1573.52
1160	1586.33	1161	1571.67	1162	1524.17	1163	1453.30	1164	1367.71
1165	1281.17	1166	1194.98	1167	1108.76	1168	1027.58	1169	950.82
1170	881.87	1171	821.16	1172	771.45	1173	727.65	1174	689.06
1175	649.75	1176	616.20	1177	586.61	1178	559.01	1179	534.70
1180	511.04	1181	489.59	1182	468.94	1183	449.77	1184	431.59
1185	414.71	1186	398.79	1187	383.69	1188	369.84	1189	357.05
1190	345.17	1191	334.48	1192	324.49	1193	315.50	1194	307.35
1195	300.16	1196	293.61	1197	287.52	1198	281.70	1199	276.19
1200	270.77	1201	265.55	1202	260.40	1203	255.40	1204	250.63
1205	246.03	1206	241.49	1207	236.94	1208	232.23	1209	227.50
1210	222.87	1211	218.53	1212	214.41	1213	210.45	1214	206.40
1215	202.45	1216	198.55	1217	194.75	1218	191.09	1219	187.50
1220	184.03	1221	180.74	1222	177.62	1223	174.59	1224	171.59
1225	168.72	1226	165.90	1227	163.27	1228	160.87	1229	158.52
1230	156.25	1231	154.01	1232	151.84	1233	149.80	1234	147.78
1235	145.89	1236	144.05	1237	142.16	1238	140.35	1239	138.57
1240	136.88	1241	135.18	1242	133.60	1243	132.03	1244	130.61
1245	129.17	1246	127.74	1247	126.36	1248	125.10	1249	123.83
1250	122.66	1251	121.46	1252	120.26	1253	119.05	1254	117.92
1255	116.80	1256	115.66	1257	114.61	1258	113.50	1259	112.45
1260	111.43	1261	110.47	1262	109.55	1263	108.67	1264	107.79
1265	106.87	1266	105.96	1267	105.13	1268	104.35	1269	103.63
1270	102.87	1271	102.14	1272	101.40	1273	100.70	1274	100.03
1275	99.34	1276	98.63	1277	97.87	1278	97.03	1279	96.21
1280	95.45	1281	94.80	1282	94.12	1283	93.45	1284	92.85
1285	92.27	1286	91.66	1287	91.06	1288	90.51	1289	89.95
1290	89.40	1291	88.86	1292	88.30	1293	87.83	1294	87.36
1295	86.85	1296	86.38	1297	85.92	1298	85.49	1299	85.00
1300	84.57	1310	80.06	1320	76.20	1330	73.30	1340	70.54
1350	67.80	1360	65.02	1370	62.71	1380	60.72	1390	58.60
1400	56.65	1420	54.08	1440	51.44	1460	47.78	1500	47.78

TOTAL VOLUME THIS HYDROGRAPH = 234.91(Ac.Ft)

Pre-development

(Project Site)

2-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	140B	16.5	10.77	16.5	10.77	0	0.	.00000	.00	.00	0.	2	20	A35	.38
159	141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	145B	.0	.00	16.5	10.77	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	146A	31.6	21.97	31.6	21.97	0	0.	.00000	.00	.00	0.	2	16	A35	.13

CONFLUENCE Q'S

159 147A TA 1155 QA 21.97 QAB 32.72 QB 10.75 159 147B TB 1156 QB 10.77 QBA 32.70 QA 21.93
159 147AB TAB 1155 QAB 32.72 QA 21.97 QB 10.75

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	147AB	16.5	10.77	48.1	32.72	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159	148A	16.2	6.90	64.3	39.20	0	0.	.00000	.00	.00	0.	4	22	A35	.22
159	149A	.0	.00	64.3	39.20	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159	150B	13.9	7.03	13.9	7.03	0	0.	.00000	.00	.00	0.	4	18	A35	.26
159	151B	.0	.00	13.9	7.03	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	152A	12.5	5.13	76.8	41.44	0	0.	.00000	.00	.00	0.	4	22	A35	.18

CONFLUENCE Q'S

159 153A TA 1165 QA 41.44 QAB 46.94 QB 5.50 159 153B TB 1155 QB 7.03 QBA 29.85 QA 22.82
159 153AB TAB 1164 QAB 46.95 QA 41.16 QB 5.79

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	153AB	13.9	7.03	90.7	46.95	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159	154B	.0	.00	.0	7.03	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	155B	21.3	7.55	21.3	7.55	4	1470.	.03400	3.00	.00	0.	4	25	A35	.13
159	156B	.0	.00	21.3	7.43	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	157B	.0	.00	21.3	7.43	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	10.66	55.1	17.39	0	0.	.00000	.00	.00	0.	4	30	A35	.16

CONFLUENCE Q'S

159 159A TA 1169 QA 45.82 QAB 62.30 QB 16.48 159 159B TB 1164 QB 17.39 QBA 57.59 QA 40.20
159 159AB TAB 1168 QAB 62.40 QA 45.62 QB 16.77

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	159AB	55.1	17.39	145.8	62.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	160A	.0	.00	145.8	62.40	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	2.26	200	2.33	300	2.45	400	2.59
500	2.75	600	2.95	700	3.21	800	3.56	900	4.05
1000	5.08	1050	6.50	1100	8.97	1110	9.68	1120	10.81
1130	12.66	1131	12.88	1132	13.10	1133	13.33	1134	13.57
1135	13.81	1136	14.07	1137	14.35	1138	14.63	1139	14.93
1140	15.23	1141	15.56	1142	15.89	1143	16.22	1144	16.57
1145	16.98	1146	17.40	1147	17.84	1148	18.70	1149	20.67
1150	22.47	1151	24.26	1152	26.29	1153	28.65	1154	30.54
1155	32.68	1156	35.12	1157	37.74	1158	40.45	1159	43.26
1160	46.24	1161	49.26	1162	52.29	1163	55.10	1164	57.59
1165	59.59	1166	61.05	1167	61.97	1168	62.40	1169	62.30
1170	61.66	1171	60.49	1172	58.96	1173	57.10	1174	55.03
1175	52.59	1176	50.00	1177	47.34	1178	44.63	1179	40.87
1180	37.35	1181	34.62	1182	31.92	1183	29.33	1184	27.13
1185	25.15	1186	23.36	1187	21.77	1188	20.33	1189	19.06
1190	17.92	1191	16.89	1192	15.96	1193	15.13	1194	14.38
1195	13.70	1196	13.09	1197	12.54	1198	12.04	1199	11.60
1200	11.18	1201	10.79	1202	10.43	1203	10.11	1204	9.82
1205	9.54	1206	9.28	1207	9.04	1208	8.82	1209	8.61
1210	8.42	1211	8.23	1212	8.06	1213	7.88	1214	7.72
1215	7.57	1216	7.42	1217	7.28	1218	7.14	1219	7.00
1220	6.87	1221	6.76	1222	6.64	1223	6.53	1224	6.42
1225	6.32	1226	6.22	1227	6.14	1228	6.05	1229	5.97
1230	5.89	1231	5.80	1232	5.73	1233	5.66	1234	5.58
1235	5.51	1236	5.44	1237	5.37	1238	5.30	1239	5.23
1240	5.17	1241	5.11	1242	5.05	1243	4.99	1244	4.94
1245	4.88	1246	4.82	1247	4.78	1248	4.73	1249	4.68
1250	4.64	1251	4.58	1252	4.54	1253	4.49	1254	4.46
1255	4.42	1256	4.38	1257	4.34	1258	4.30	1259	4.26
1260	4.23	1261	4.21	1262	4.17	1263	4.14	1264	4.11
1265	4.08	1266	4.05	1267	4.03	1268	4.00	1269	3.98
1270	3.95	1271	3.93	1272	3.90	1273	3.88	1274	3.86
1275	3.84	1276	3.83	1277	3.80	1278	3.78	1279	3.76
1280	3.74	1281	3.72	1282	3.70	1283	3.69	1284	3.67
1285	3.65	1286	3.63	1287	3.62	1288	3.60	1289	3.58
1290	3.57	1291	3.55	1292	3.53	1293	3.52	1294	3.50
1295	3.49	1296	3.47	1297	3.46	1298	3.45	1299	3.43
1300	3.42	1310	3.28	1320	3.17	1330	3.06	1340	2.98
1350	2.89	1360	2.81	1370	2.74	1380	2.67	1390	2.61
1400	2.54	1420	2.45	1440	2.36	1460	1.94	1500	1.79

TOTAL VOLUME THIS HYDROGRAPH = 9.70(Ac.Ft)

5-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	19.37	16.5	19.37	0	0.	.00000	.00	.00	0.	2	16	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	19.37	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	41.82	31.6	41.82	0	0.	.00000	.00	.00	0.	2	12	A35	.13

****

* CONFLUENCE Q'S *

* 159 147A TA 1155 QA 41.82 QAB 61.19 QB 19.37 159 147B TB 1155 QB 19.37 QBA 61.19 QA 41.82 *

* 159 147AB TAB 1155 QAB 61.19 QA 41.82 QB 19.37 *

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	19.37	48.1	61.19	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	15.65	64.3	75.99	0	0.	.00000	.00	.00	0.	4	15	A35	.22
159 149A	.0	.00	64.3	75.99	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	15.51	13.9	15.51	0	0.	.00000	.00	.00	0.	4	12	A35	.26
159 151B	.0	.00	13.9	15.51	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	12.32	76.8	81.66	0	0.	.00000	.00	.00	0.	4	14	A35	.18

****

* CONFLUENCE Q'S *

* 159 153A TA 1162 QA 81.66 QAB 91.12 QB 9.46 159 153B TB 1155 QB 15.51 QBA 68.54 QA 53.03 *

* 159 153AB TAB 1160 QAB 92.38 QA 79.06 QB 13.32 *

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	15.51	90.7	92.38	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	15.51	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	19.74	21.3	19.74	4	1470.	.03400	3.00	.00	0.	4	15	A35	.13
159 156B	.0	.00	21.3	19.31	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	19.31	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	22.38	55.1	40.72	0	0.	.00000	.00	.00	0.	4	26	A35	.16

****

* CONFLUENCE Q'S *

* 159 159A TA 1164 QA 89.61 QAB 129.30 QB 39.69 159 159B TB 1161 QB 40.72 QBA 121.60 QA 80.88 *

* 159 159AB TAB 1164 QAB 129.30 QA 89.61 QB 39.69 *

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	40.72	145.8	129.30	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	129.30	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	3.41	200	3.52	300	3.71	400	3.91
500	4.16	600	4.50	700	5.06	800	5.89	900	7.06
1000	9.00	1050	11.31	1100	15.30	1110	16.63	1120	18.96
1130	24.28	1131	25.07	1132	25.87	1133	26.72	1134	27.59
1135	28.46	1136	29.41	1137	30.39	1138	31.44	1139	32.48
1140	33.60	1141	34.87	1142	36.19	1143	37.56	1144	39.02
1145	40.82	1146	42.69	1147	44.61	1148	46.73	1149	50.41
1150	54.31	1151	58.62	1152	63.83	1153	70.05	1154	75.74
1155	82.15	1156	88.93	1157	95.68	1158	102.55	1159	109.38
1160	115.91	1161	121.60	1162	126.03	1163	128.63	1164	129.30
1165	128.18	1166	125.44	1167	121.29	1168	116.23	1169	110.40
1170	104.07	1171	97.16	1172	90.14	1173	83.12	1174	76.43
1175	68.75	1176	61.50	1177	54.79	1178	48.51	1179	42.21
1180	38.68	1181	35.72	1182	33.14	1183	30.88	1184	28.90
1185	27.16	1186	25.63	1187	24.29	1188	23.11	1189	22.06
1190	21.09	1191	20.21	1192	19.42	1193	18.70	1194	18.06
1195	17.49	1196	16.94	1197	16.45	1198	15.99	1199	15.59
1200	15.20	1201	14.83	1202	14.49	1203	14.19	1204	13.89
1205	13.61	1206	13.33	1207	13.05	1208	12.81	1209	12.56
1210	12.34	1211	12.12	1212	11.92	1213	11.71	1214	11.51
1215	11.34	1216	11.16	1217	10.99	1218	10.84	1219	10.69
1220	10.55	1221	10.42	1222	10.29	1223	10.15	1224	10.00
1225	9.88	1226	9.76	1227	9.65	1228	9.54	1229	9.43
1230	9.32	1231	9.21	1232	9.10	1233	9.01	1234	8.91
1235	8.83	1236	8.74	1237	8.65	1238	8.57	1239	8.49
1240	8.41	1241	8.32	1242	8.26	1243	8.18	1244	8.11
1245	8.03	1246	7.96	1247	7.88	1248	7.81	1249	7.74
1250	7.69	1251	7.62	1252	7.55	1253	7.48	1254	7.43
1255	7.36	1256	7.30	1257	7.25	1258	7.19	1259	7.13
1260	7.08	1261	7.03	1262	6.97	1263	6.92	1264	6.87
1265	6.83	1266	6.78	1267	6.74	1268	6.69	1269	6.65
1270	6.59	1271	6.55	1272	6.51	1273	6.46	1274	6.42
1275	6.38	1276	6.33	1277	6.29	1278	6.25	1279	6.21
1280	6.16	1281	6.13	1282	6.08	1283	6.05	1284	6.02
1285	5.98	1286	5.94	1287	5.90	1288	5.87	1289	5.83
1290	5.80	1291	5.77	1292	5.73	1293	5.70	1294	5.66
1295	5.63	1296	5.61	1297	5.57	1298	5.54	1299	5.50
1300	5.47	1310	5.17	1320	4.92	1330	4.69	1340	4.50
1350	4.33	1360	4.19	1370	4.08	1380	3.98	1390	3.88
1400	3.80	1420	3.66	1440	3.53	1460	2.86	1500	2.70

TOTAL VOLUME THIS HYDROGRAPH = 16.27(Ac.Ft)

10-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	27.94	16.5	27.94	0	0.	.00000	.00	.00	0.	2	12	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	27.94	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	61.04	31.6	61.04	0	0.	.00000	.00	.00	0.	2	9	A35	.13

****

CONFLUENCE Q'S

159 147A TA 1154 QA 61.04 QAB 88.99 QB 27.94 159 147B TB 1154 QB 27.94 QBA 88.99 QA 61.04
159 147AB TAB 1154 QAB 88.99 QA 61.04 QB 27.94

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	27.94	48.1	88.99	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	24.02	64.3	111.11	0	0.	.00000	.00	.00	0.	4	11	A35	.22
159 149A	.0	.00	64.3	111.11	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	23.24	13.9	23.24	0	0.	.00000	.00	.00	0.	4	9	A35	.26
159 151B	.0	.00	13.9	23.24	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	19.42	76.8	115.45	0	0.	.00000	.00	.00	0.	4	10	A35	.18

****

CONFLUENCE Q'S

159 153A TA 1160 QA 115.45 QAB 127.69 QB 12.24 159 153B TB 1154 QB 23.24 QBA 98.02 QA 74.78
159 153AB TAB 1159 QAB 130.03 QA 114.75 QB 15.28

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	23.24	90.7	130.03	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	23.24	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	30.68	21.3	30.68	4	1470.	.03400	3.00	.00	0.	4	11	A35	.13
159 156B	.0	.00	21.3	29.94	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	29.94	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	36.82	55.1	64.04	0	0.	.00000	.00	.00	0.	4	18	A35	.16

****

CONFLUENCE Q'S

159 159A TA 1162 QA 125.76 QAB 187.88 QB 62.11 159 159B TB 1160 QB 64.04 QBA 183.73 QA 119.69
159 159AB TAB 1162 QAB 187.88 QA 125.76 QB 62.11

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	64.04	145.8	187.88	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	187.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	4.16	200	4.31	300	4.59	400	4.97
500	5.44	600	6.03	700	6.78	800	7.79	900	9.23
1000	11.65	1050	14.61	1100	19.56	1110	22.66	1120	30.03
1130	39.12	1131	40.15	1132	41.19	1133	42.29	1134	43.41
1135	44.54	1136	45.79	1137	47.14	1138	48.59	1139	49.90
1140	51.36	1141	53.11	1142	54.96	1143	56.92	1144	59.01
1145	61.70	1146	64.53	1147	67.61	1148	71.01	1149	77.14
1150	83.61	1151	90.96	1152	100.13	1153	111.02	1154	120.93
1155	131.98	1156	143.44	1157	154.83	1158	166.04	1159	176.09
1160	183.73	1161	187.66	1162	187.88	1163	184.13	1164	177.27
1165	168.11	1166	157.66	1167	143.90	1168	129.72	1169	115.58
1170	101.87	1171	88.92	1172	79.46	1173	71.25	1174	64.22
1175	58.06	1176	52.55	1177	47.88	1178	43.96	1179	40.74
1180	37.92	1181	35.49	1182	33.37	1183	31.52	1184	29.84
1185	28.36	1186	27.03	1187	25.93	1188	24.90	1189	23.97
1190	23.11	1191	22.35	1192	21.66	1193	21.03	1194	20.47
1195	19.93	1196	19.43	1197	18.96	1198	18.56	1199	18.16
1200	17.80	1201	17.43	1202	17.08	1203	16.76	1204	16.45
1205	16.16	1206	15.87	1207	15.58	1208	15.32	1209	15.07
1210	14.84	1211	14.61	1212	14.39	1213	14.18	1214	13.99
1215	13.83	1216	13.63	1217	13.45	1218	13.27	1219	13.09
1220	12.94	1221	12.80	1222	12.64	1223	12.48	1224	12.30
1225	12.18	1226	12.03	1227	11.91	1228	11.77	1229	11.65
1230	11.52	1231	11.40	1232	11.30	1233	11.19	1234	11.07
1235	10.98	1236	10.88	1237	10.77	1238	10.69	1239	10.56
1240	10.48	1241	10.38	1242	10.31	1243	10.21	1244	10.13
1245	10.04	1246	9.94	1247	9.87	1248	9.78	1249	9.71
1250	9.64	1251	9.56	1252	9.49	1253	9.41	1254	9.35
1255	9.29	1256	9.21	1257	9.15	1258	9.07	1259	9.02
1260	8.95	1261	8.91	1262	8.84	1263	8.79	1264	8.73
1265	8.66	1266	8.62	1267	8.57	1268	8.50	1269	8.45
1270	8.39	1271	8.34	1272	8.28	1273	8.24	1274	8.20
1275	8.15	1276	8.09	1277	8.05	1278	7.99	1279	7.93
1280	7.89	1281	7.85	1282	7.79	1283	7.75	1284	7.72
1285	7.68	1286	7.63	1287	7.59	1288	7.57	1289	7.52
1290	7.48	1291	7.44	1292	7.38	1293	7.35	1294	7.29
1295	7.25	1296	7.24	1297	7.19	1298	7.15	1299	7.10
1300	7.08	1310	6.73	1320	6.42	1330	6.16	1340	5.92
1350	5.71	1360	5.50	1370	5.30	1380	5.11	1390	4.92
1400	4.77	1420	4.52	1440	4.31	1460	3.30	1500	3.30

TOTAL VOLUME THIS HYDROGRAPH = 21.17(Ac.Ft)

25-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	140B	16.5	38.59	16.5	38.59	0	0.	.00000	.00	.00	0.	2	10	A35	.38
159	141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	145B	.0	.00	16.5	38.59	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	146A	31.6	86.62	31.6	86.62	0	0.	.00000	.00	.00	0.	2	7	A35	.13

****

* CONFLUENCE Q'S *

* 159 147A TA 1154 QA 86.62 QAB 125.21 QB 38.59 159 147B TB 1154 QB 38.59 QBA 125.21 QA 86.62 *

* 159 147AB TAB 1154 QAB 125.21 QA 86.62 QB 38.59 *

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	147AB	16.5	38.59	48.1	125.21	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159	148A	16.2	34.18	64.3	155.97	0	0.	.00000	.00	.00	0.	4	9	A35	.22
159	149A	.0	.00	64.3	155.97	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159	150B	13.9	31.35	13.9	31.35	0	0.	.00000	.00	.00	0.	4	8	A35	.26
159	151B	.0	.00	13.9	31.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	152A	12.5	27.71	76.8	159.15	0	0.	.00000	.00	.00	0.	4	8	A35	.18

****

* CONFLUENCE Q'S *

* 159 153A TA 1159 QA 159.15 QAB 176.30 QB 17.15 159 153B TB 1153 QB 31.35 QBA 129.88 QA 98.53 *

* 159 153AB TAB 1158 QAB 179.68 QA 158.23 QB 21.46 *

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	153AB	13.9	31.35	90.7	179.68	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159	154B	.0	.00	.0	31.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	155B	21.3	44.02	21.3	44.02	4	1470.	.03400	3.00	.00	0.	4	9	A35	.13
159	156B	.0	.00	21.3	42.72	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	157B	.0	.00	21.3	42.72	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	55.13	55.1	92.49	0	0.	.00000	.00	.00	0.	4	14	A35	.16

****

* CONFLUENCE Q'S *

* 159 159A TA 1161 QA 173.32 QAB 261.34 QB 88.02 159 159B TB 1158 QB 92.49 QBA 247.55 QA 155.06 *

* 159 159AB TAB 1160 QAB 263.23 QA 172.27 QB 90.95 *

****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	159AB	55.1	92.49	145.8	263.23	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	160A	.0	.00	145.8	263.23	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	5.51	200	5.78	300	6.22	400	6.70
500	7.29	600	8.01	700	8.94	800	10.18	900	12.02
1000	15.10	1050	18.81	1100	28.35	1110	34.93	1120	44.68
1130	56.48	1131	57.84	1132	59.21	1133	60.70	1134	62.21
1135	63.54	1136	65.03	1137	66.68	1138	68.52	1139	70.39
1140	72.53	1141	75.11	1142	77.79	1143	80.70	1144	83.86
1145	87.82	1146	91.99	1147	96.39	1148	101.26	1149	110.61
1150	120.66	1151	132.28	1152	146.71	1153	163.96	1154	179.55
1155	196.36	1156	213.82	1157	231.41	1158	247.55	1159	258.31
1160	263.23	1161	261.34	1162	252.62	1163	234.26	1164	213.05
1165	190.99	1166	168.51	1167	146.61	1168	130.05	1169	115.64
1170	103.36	1171	92.74	1172	83.71	1173	75.96	1174	69.32
1175	63.72	1176	58.73	1177	54.47	1178	50.68	1179	47.37
1180	44.35	1181	41.71	1182	39.04	1183	37.07	1184	35.20
1185	33.62	1186	32.16	1187	30.91	1188	29.78	1189	28.73
1190	27.78	1191	26.89	1192	26.11	1193	25.41	1194	24.78
1195	24.16	1196	23.60	1197	23.05	1198	22.58	1199	22.11
1200	21.65	1201	21.23	1202	20.80	1203	20.43	1204	20.07
1205	19.75	1206	19.42	1207	19.11	1208	18.81	1209	18.54
1210	18.30	1211	18.05	1212	17.81	1213	17.57	1214	17.35
1215	17.15	1216	16.96	1217	16.73	1218	16.52	1219	16.31
1220	16.11	1221	15.97	1222	15.77	1223	15.61	1224	15.40
1225	15.25	1226	15.09	1227	14.95	1228	14.81	1229	14.65
1230	14.53	1231	14.38	1232	14.26	1233	14.14	1234	14.00
1235	13.85	1236	13.74	1237	13.61	1238	13.54	1239	13.40
1240	13.30	1241	13.16	1242	13.06	1243	12.93	1244	12.84
1245	12.75	1246	12.63	1247	12.54	1248	12.45	1249	12.34
1250	12.25	1251	12.17	1252	12.06	1253	11.98	1254	11.90
1255	11.83	1256	11.73	1257	11.65	1258	11.56	1259	11.50
1260	11.43	1261	11.36	1262	11.29	1263	11.22	1264	11.12
1265	11.06	1266	11.00	1267	10.94	1268	10.85	1269	10.79
1270	10.71	1271	10.66	1272	10.61	1273	10.55	1274	10.49
1275	10.40	1276	10.34	1277	10.28	1278	10.21	1279	10.16
1280	10.12	1281	10.07	1282	10.00	1283	9.97	1284	9.95
1285	9.91	1286	9.83	1287	9.78	1288	9.72	1289	9.64
1290	9.59	1291	9.55	1292	9.50	1293	9.46	1294	9.39
1295	9.35	1296	9.34	1297	9.27	1298	9.23	1299	9.16
1300	9.15	1310	8.71	1320	8.36	1330	8.05	1340	7.78
1350	7.52	1360	7.25	1370	7.01	1380	6.78	1390	6.55
1400	6.37	1420	6.07	1440	5.79	1460	4.44	1500	4.44

TOTAL VOLUME THIS HYDROGRAPH = 27.99(Ac.Ft)

50-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	46.36	16.5	46.36	0	0.	.00000	.00	.00	0.	2	9	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	46.36	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	99.76	31.6	99.76	0	0.	.00000	.00	.00	0.	2	7	A35	.13

CONFLUENCE Q'S

159 147A TA 1154 QA 99.76 QAB 146.11 QB 46.36 159 147B TB 1153 QB 46.36 QBA 146.11 QA 99.76
159 147AB TAB 1154 QAB 146.11 QA 99.76 QB 46.36

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	46.36	48.1	146.11	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	42.06	64.3	184.92	0	0.	.00000	.00	.00	0.	4	8	A35	.22
159 149A	.0	.00	64.3	184.92	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	38.92	13.9	38.92	0	0.	.00000	.00	.00	0.	4	7	A35	.26
159 151B	.0	.00	13.9	38.92	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	34.51	76.8	187.36	0	0.	.00000	.00	.00	0.	4	7	A35	.18

CONFLUENCE Q'S

159 153A TA 1158 QA 187.36 QAB 209.34 QB 21.97 159 153B TB 1154 QB 38.92 QBA 175.71 QA 136.78
159 153AB TAB 1158 QAB 209.34 QA 187.36 QB 21.97

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	38.92	90.7	209.34	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	38.92	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	54.36	21.3	54.36	4	1470.	.03400	3.00	.00	0.	4	8	A35	.13
159 156B	.0	.00	21.3	52.98	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	52.98	4	1760.	.04100	2.25	.00	0.	2	99	A35	.00
159 158B	33.8	70.11	55.1	115.35	0	0.	.00000	.00	.00	0.	4	12	A35	.16

CONFLUENCE Q'S

159 159A TA 1160 QA 203.66 QAB 314.29 QB 110.62 159 159B TB 1158 QB 115.35 QBA 306.26 QA 190.91
159 159AB TAB 1160 QAB 314.29 QA 203.66 QB 110.62

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	115.35	145.8	314.29	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	314.29	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	6.63	200	6.94	300	7.44	400	7.99
500	8.66	600	9.48	700	10.54	800	12.01	900	14.16
1000	17.68	1050	22.04	1100	36.00	1110	44.44	1120	55.61
1130	69.30	1131	70.95	1132	72.59	1133	74.12	1134	75.69
1135	77.33	1136	79.20	1137	81.29	1138	83.66	1139	86.09
1140	88.86	1141	92.18	1142	95.65	1143	99.12	1144	102.95
1145	107.89	1146	113.03	1147	118.59	1148	124.67	1149	136.73
1150	149.54	1151	165.01	1152	184.35	1153	206.88	1154	227.10
1155	249.19	1156	271.86	1157	291.52	1158	306.26	1159	314.18
1160	314.29	1161	299.66	1162	278.11	1163	252.90	1164	225.77
1165	197.90	1166	175.99	1167	156.22	1168	139.05	1169	123.95
1170	110.97	1171	100.03	1172	90.73	1173	82.81	1174	76.13
1175	70.49	1176	65.47	1177	61.24	1178	57.51	1179	54.26
1180	51.18	1181	48.66	1182	46.19	1183	44.14	1184	41.90
1185	40.10	1186	38.33	1187	36.70	1188	35.29	1189	33.94
1190	32.65	1191	31.60	1192	30.66	1193	29.74	1194	28.94
1195	28.12	1196	27.38	1197	26.70	1198	26.10	1199	25.50
1200	24.93	1201	24.41	1202	23.90	1203	23.48	1204	23.06
1205	22.68	1206	22.29	1207	21.93	1208	21.62	1209	21.31
1210	21.01	1211	20.72	1212	20.47	1213	20.20	1214	19.97
1215	19.74	1216	19.48	1217	19.22	1218	18.97	1219	18.78
1220	18.54	1221	18.39	1222	18.17	1223	17.99	1224	17.74
1225	17.59	1226	17.44	1227	17.25	1228	17.10	1229	16.96
1230	16.83	1231	16.65	1232	16.51	1233	16.33	1234	16.17
1235	16.05	1236	15.97	1237	15.81	1238	15.69	1239	15.53
1240	15.41	1241	15.26	1242	15.15	1243	15.04	1244	14.93
1245	14.79	1246	14.69	1247	14.60	1248	14.47	1249	14.37
1250	14.28	1251	14.19	1252	14.06	1253	13.97	1254	13.89
1255	13.81	1256	13.68	1257	13.61	1258	13.53	1259	13.42
1260	13.34	1261	13.30	1262	13.18	1263	13.10	1264	13.03
1265	12.96	1266	12.85	1267	12.78	1268	12.72	1269	12.66
1270	12.56	1271	12.50	1272	12.43	1273	12.32	1274	12.24
1275	12.17	1276	12.11	1277	12.05	1278	11.95	1279	11.90
1280	11.85	1281	11.81	1282	11.77	1283	11.71	1284	11.66
1285	11.60	1286	11.50	1287	11.42	1288	11.36	1289	11.26
1290	11.25	1291	11.19	1292	11.10	1293	11.05	1294	11.01
1295	10.96	1296	10.92	1297	10.83	1298	10.82	1299	10.73
1300	10.69	1310	10.23	1320	9.83	1330	9.48	1340	9.17
1350	8.88	1360	8.56	1370	8.30	1380	8.03	1390	7.78
1400	7.57	1420	7.24	1440	6.92	1460	5.41	1500	5.41

TOTAL VOLUME THIS HYDROGRAPH = 33.22(Ac.Ft)

Post-development

(Project Site)

2-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	140B	16.5	10.82	16.5	10.82	0	0.	.00000	.00	.00	0.	2	20	A35	.40
159	141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	145B	.0	.00	16.5	10.82	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	146A	31.6	22.50	31.6	22.50	0	0.	.00000	.00	.00	0.	2	16	A35	.23

CONFLUENCE Q'S

159 147A TA 1155 QA 22.50 QAB 33.31 QB 10.80 159 147B TB 1156 QB 10.82 QBA 33.28 QA 22.46
159 147AB TAB 1155 QAB 33.31 QA 22.50 QB 10.80

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	147AB	16.5	10.82	48.1	33.31	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159	148A	16.2	8.01	64.3	40.91	0	0.	.00000	.00	.00	0.	4	22	A35	.40
159	149A	.0	.00	64.3	40.91	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159	150B	13.9	8.72	13.9	8.72	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159	151B	.0	.00	13.9	8.72	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	152A	12.5	7.25	76.8	44.42	0	0.	.00000	.00	.00	0.	4	17	A35	.40

CONFLUENCE Q'S

159 153A TA 1165 QA 44.42 QAB 49.35 QB 4.93 159 153B TB 1155 QB 8.72 QBA 35.57 QA 26.85
159 153AB TAB 1163 QAB 50.87 QA 43.88 QB 6.99

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	153AB	13.9	8.72	90.7	50.87	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159	154B	.0	.00	.0	8.72	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	155B	21.3	12.35	21.3	12.35	4	1470.	.03400	3.00	.00	0.	4	17	A35	.40
159	156B	.0	.00	21.3	12.12	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	157B	.0	.00	21.3	12.12	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	11.16	55.1	22.75	0	0.	.00000	.00	.00	0.	4	30	A35	.20

CONFLUENCE Q'S

159 159A TA 1167 QA 49.16 QAB 70.75 QB 21.59 159 159B TB 1162 QB 22.75 QBA 64.01 QA 41.27
159 159AB TAB 1167 QAB 70.75 QA 49.16 QB 21.59

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	159AB	55.1	22.75	145.8	70.75	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	160A	.0	.00	145.8	70.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	3.15	200	3.25	300	3.43	400	3.62
500	3.84	600	4.13	700	4.49	800	4.97	900	5.67
1000	7.02	1050	8.80	1100	11.85	1110	12.79	1120	14.34
1130	16.76	1131	17.04	1132	17.33	1133	17.62	1134	17.91
1135	18.22	1136	18.55	1137	18.90	1138	19.27	1139	19.65
1140	20.05	1141	20.46	1142	20.89	1143	21.33	1144	21.78
1145	22.31	1146	22.88	1147	23.50	1148	24.59	1149	26.81
1150	28.90	1151	31.02	1152	33.48	1153	36.41	1154	39.06
1155	42.08	1156	45.40	1157	48.78	1158	52.04	1159	55.17
1160	58.25	1161	61.20	1162	64.01	1163	66.48	1164	68.49
1165	69.96	1166	70.74	1167	70.75	1168	70.07	1169	68.67
1170	66.73	1171	64.34	1172	61.79	1173	59.13	1174	56.48
1175	53.68	1176	50.88	1177	48.09	1178	45.33	1179	41.57
1180	38.11	1181	35.48	1182	32.94	1183	30.55	1184	28.55
1185	26.75	1186	25.10	1187	23.61	1188	22.26	1189	21.05
1190	19.94	1191	18.95	1192	18.06	1193	17.25	1194	16.52
1195	15.87	1196	15.26	1197	14.71	1198	14.20	1199	13.73
1200	13.30	1201	12.91	1202	12.53	1203	12.19	1204	11.88
1205	11.59	1206	11.32	1207	11.07	1208	10.83	1209	10.60
1210	10.39	1211	10.18	1212	9.99	1213	9.80	1214	9.62
1215	9.45	1216	9.29	1217	9.13	1218	8.98	1219	8.83
1220	8.69	1221	8.57	1222	8.44	1223	8.33	1224	8.21
1225	8.10	1226	8.00	1227	7.90	1228	7.79	1229	7.70
1230	7.60	1231	7.50	1232	7.42	1233	7.33	1234	7.24
1235	7.16	1236	7.08	1237	7.00	1238	6.92	1239	6.85
1240	6.77	1241	6.71	1242	6.64	1243	6.58	1244	6.52
1245	6.45	1246	6.39	1247	6.34	1248	6.28	1249	6.22
1250	6.17	1251	6.11	1252	6.06	1253	6.01	1254	5.97
1255	5.93	1256	5.88	1257	5.83	1258	5.79	1259	5.75
1260	5.71	1261	5.68	1262	5.64	1263	5.60	1264	5.57
1265	5.53	1266	5.50	1267	5.47	1268	5.44	1269	5.41
1270	5.38	1271	5.35	1272	5.32	1273	5.30	1274	5.27
1275	5.25	1276	5.22	1277	5.19	1278	5.16	1279	5.14
1280	5.11	1281	5.09	1282	5.07	1283	5.05	1284	5.02
1285	5.00	1286	4.97	1287	4.95	1288	4.93	1289	4.91
1290	4.89	1291	4.86	1292	4.84	1293	4.82	1294	4.80
1295	4.78	1296	4.77	1297	4.75	1298	4.73	1299	4.71
1300	4.70	1310	4.51	1320	4.36	1330	4.22	1340	4.11
1350	3.99	1360	3.88	1370	3.78	1380	3.69	1390	3.60
1400	3.52	1420	3.40	1440	3.28	1460	2.79	1500	2.61

TOTAL VOLUME THIS HYDROGRAPH = 12.69(Ac.Ft)

5-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	19.42	16.5	19.42	0	0.	.00000	.00	.00	0.	2	16	A35	.40
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	19.42	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	42.27	31.6	42.27	0	0.	.00000	.00	.00	0.	2	12	A35	.23

****

* CONFLUENCE Q'S *

* 159 147A TA 1155 QA 42.27 QAB 61.69 QB 19.42 159 147B TB 1155 QB 19.42 QBA 61.69 QA 42.27 *

* 159 147AB TAB 1155 QAB 61.69 QA 42.27 QB 19.42 *

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	19.42	48.1	61.69	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	16.94	64.3	77.78	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159 149A	.0	.00	64.3	77.78	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	16.38	13.9	16.38	0	0.	.00000	.00	.00	0.	4	12	A35	.40
159 151B	.0	.00	13.9	16.38	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	14.73	76.8	83.37	0	0.	.00000	.00	.00	0.	4	12	A35	.40

****

* CONFLUENCE Q'S *

* 159 153A TA 1161 QA 83.37 QAB 95.60 QB 12.23 159 153B TB 1155 QB 16.38 QBA 74.00 QA 57.62 *

* 159 153AB TAB 1160 QAB 97.00 QA 82.83 QB 14.17 *

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	16.38	90.7	97.00	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	16.38	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	24.01	21.3	24.01	4	1470.	.03400	3.00	.00	0.	4	13	A35	.40
159 156B	.0	.00	21.3	23.60	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	23.60	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	24.34	55.1	46.97	0	0.	.00000	.00	.00	0.	4	26	A35	.30

****

* CONFLUENCE Q'S *

* 159 159A TA 1164 QA 93.14 QAB 138.34 QB 45.20 159 159B TB 1161 QB 46.97 QBA 133.33 QA 86.35 *

* 159 159AB TAB 1163 QAB 138.91 QA 92.83 QB 46.09 *

****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	46.97	145.8	138.91	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	138.91	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	5.00	200	5.18	300	5.45	400	5.75
500	6.12	600	6.60	700	7.34	800	8.39	900	9.88
1000	12.35	1050	15.36	1100	20.40	1110	22.23	1120	25.45
1130	31.50	1131	32.33	1132	33.16	1133	34.05	1134	34.95
1135	35.88	1136	36.88	1137	37.89	1138	38.96	1139	40.02
1140	41.15	1141	42.46	1142	43.82	1143	45.27	1144	46.83
1145	48.75	1146	50.75	1147	52.79	1148	55.02	1149	58.88
1150	62.98	1151	67.56	1152	73.14	1153	79.85	1154	86.14
1155	93.23	1156	100.62	1157	107.82	1158	114.92	1159	121.73
1160	128.01	1161	133.33	1162	137.21	1163	138.91	1164	138.34
1165	135.93	1166	131.89	1167	126.39	1168	120.34	1169	114.02
1170	107.49	1171	100.50	1172	93.59	1173	86.84	1174	80.44
1175	72.95	1176	65.88	1177	59.27	1178	53.08	1179	46.97
1180	43.44	1181	40.45	1182	37.82	1183	35.52	1184	33.48
1185	31.71	1186	30.14	1187	28.77	1188	27.52	1189	26.40
1190	25.38	1191	24.45	1192	23.64	1193	22.90	1194	22.22
1195	21.59	1196	21.00	1197	20.47	1198	19.98	1199	19.53
1200	19.10	1201	18.70	1202	18.31	1203	17.96	1204	17.63
1205	17.30	1206	16.98	1207	16.67	1208	16.39	1209	16.10
1210	15.85	1211	15.59	1212	15.36	1213	15.13	1214	14.90
1215	14.71	1216	14.51	1217	14.33	1218	14.13	1219	13.97
1220	13.78	1221	13.63	1222	13.47	1223	13.32	1224	13.14
1225	12.99	1226	12.85	1227	12.71	1228	12.59	1229	12.46
1230	12.33	1231	12.19	1232	12.06	1233	11.96	1234	11.84
1235	11.75	1236	11.65	1237	11.54	1238	11.44	1239	11.33
1240	11.25	1241	11.14	1242	11.06	1243	10.96	1244	10.88
1245	10.79	1246	10.69	1247	10.60	1248	10.52	1249	10.43
1250	10.37	1251	10.29	1252	10.20	1253	10.12	1254	10.05
1255	9.98	1256	9.90	1257	9.84	1258	9.76	1259	9.69
1260	9.63	1261	9.58	1262	9.51	1263	9.46	1264	9.39
1265	9.33	1266	9.27	1267	9.22	1268	9.16	1269	9.11
1270	9.04	1271	8.99	1272	8.94	1273	8.88	1274	8.84
1275	8.79	1276	8.73	1277	8.68	1278	8.62	1279	8.57
1280	8.51	1281	8.47	1282	8.42	1283	8.37	1284	8.33
1285	8.29	1286	8.24	1287	8.19	1288	8.15	1289	8.10
1290	8.07	1291	8.03	1292	7.98	1293	7.95	1294	7.89
1295	7.86	1296	7.84	1297	7.79	1298	7.75	1299	7.70
1300	7.67	1310	7.29	1320	6.98	1330	6.71	1340	6.48
1350	6.27	1360	6.08	1370	5.92	1380	5.79	1390	5.65
1400	5.52	1420	5.34	1440	5.15	1460	4.18	1500	3.94

TOTAL VOLUME THIS HYDROGRAPH = 21.36(Ac.Ft)

10-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM RAIN ZONE	DAY 4 PCT IMPV
159	139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	140B	16.5	27.99	16.5	27.99	0	0.	.00000	.00	.00	0.	2	12	A35	.40
159	141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	145B	.0	.00	16.5	27.99	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	146A	31.6	61.37	31.6	61.37	0	0.	.00000	.00	.00	0.	2	9	A35	.23

CONFLUENCE Q'S

159 147A TA 1154 QA 61.37 QAB 89.36 QB 27.99 159 147B TB 1154 QB 27.99 QBA 89.36 QA 61.37
159 147AB TAB 1154 QAB 89.36 QA 61.37 QB 27.99

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	147AB	16.5	27.99	48.1	89.36	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159	148A	16.2	25.38	64.3	112.85	0	0.	.00000	.00	.00	0.	4	11	A35	.40
159	149A	.0	.00	64.3	112.85	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159	150B	13.9	24.16	13.9	24.16	0	0.	.00000	.00	.00	0.	4	9	A35	.40
159	151B	.0	.00	13.9	24.16	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	152A	12.5	20.71	76.8	118.60	0	0.	.00000	.00	.00	0.	4	10	A35	.40

CONFLUENCE Q'S

159 153A TA 1160 QA 118.60 QAB 131.68 QB 13.08 159 153B TB 1154 QB 24.16 QBA 102.45 QA 78.29
159 153AB TAB 1159 QAB 134.18 QA 118.03 QB 16.15

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	153AB	13.9	24.16	90.7	134.18	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159	154B	.0	.00	.0	24.16	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	155B	21.3	35.30	21.3	35.30	4	1470.	.03400	3.00	.00	0.	4	10	A35	.40
159	156B	.0	.00	21.3	34.20	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	157B	.0	.00	21.3	34.20	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	37.43	55.1	68.96	0	0.	.00000	.00	.00	0.	4	18	A35	.20

CONFLUENCE Q'S

159 159A TA 1162 QA 129.99 QAB 196.12 QB 66.13 159 159B TB 1159 QB 68.96 QBA 185.92 QA 116.96
159 159AB TAB 1161 QAB 196.69 QA 128.79 QB 67.90

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	159AB	55.1	68.96	145.8	196.69	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	160A	.0	.00	145.8	196.69	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	5.81	200	6.01	300	6.38	400	6.85
500	7.43	600	8.14	700	9.06	800	10.29	900	12.06
1000	15.02	1050	18.65	1100	24.67	1110	28.25	1120	36.10
1130	45.39	1131	46.43	1132	47.47	1133	48.59	1134	49.72
1135	50.87	1136	52.12	1137	53.46	1138	54.93	1139	56.27
1140	57.77	1141	59.60	1142	61.53	1143	63.57	1144	65.75
1145	68.52	1146	71.42	1147	74.56	1148	78.05	1149	84.28
1150	90.89	1151	98.48	1152	108.01	1153	119.37	1154	129.78
1155	141.28	1156	153.11	1157	164.76	1158	176.04	1159	185.92
1160	193.25	1161	196.69	1162	196.12	1163	191.28	1164	183.26
1165	173.12	1166	161.90	1167	147.59	1168	133.20	1169	119.08
1170	105.52	1171	92.70	1172	83.34	1173	75.26	1174	68.32
1175	62.23	1176	56.76	1177	52.09	1178	48.23	1179	45.05
1180	42.26	1181	39.87	1182	37.75	1183	35.90	1184	34.21
1185	32.71	1186	31.40	1187	30.26	1188	29.17	1189	28.21
1190	27.31	1191	26.53	1192	25.81	1193	25.12	1194	24.51
1195	23.93	1196	23.40	1197	22.91	1198	22.47	1199	22.02
1200	21.61	1201	21.20	1202	20.81	1203	20.46	1204	20.12
1205	19.79	1206	19.47	1207	19.14	1208	18.85	1209	18.58
1210	18.31	1211	18.06	1212	17.83	1213	17.60	1214	17.37
1215	17.17	1216	16.94	1217	16.73	1218	16.53	1219	16.33
1220	16.16	1221	15.99	1222	15.80	1223	15.62	1224	15.42
1225	15.27	1226	15.11	1227	14.97	1228	14.81	1229	14.67
1230	14.53	1231	14.39	1232	14.27	1233	14.14	1234	14.01
1235	13.89	1236	13.78	1237	13.65	1238	13.55	1239	13.40
1240	13.31	1241	13.19	1242	13.11	1243	12.99	1244	12.90
1245	12.79	1246	12.68	1247	12.59	1248	12.49	1249	12.41
1250	12.33	1251	12.23	1252	12.15	1253	12.05	1254	11.98
1255	11.91	1256	11.82	1257	11.75	1258	11.66	1259	11.60
1260	11.51	1261	11.47	1262	11.38	1263	11.32	1264	11.25
1265	11.17	1266	11.12	1267	11.06	1268	10.98	1269	10.92
1270	10.85	1271	10.80	1272	10.73	1273	10.68	1274	10.62
1275	10.56	1276	10.50	1277	10.44	1278	10.37	1279	10.29
1280	10.24	1281	10.20	1282	10.13	1283	10.08	1284	10.05
1285	10.01	1286	9.94	1287	9.90	1288	9.87	1289	9.81
1290	9.76	1291	9.71	1292	9.64	1293	9.60	1294	9.53
1295	9.49	1296	9.47	1297	9.41	1298	9.37	1299	9.31
1300	9.29	1310	8.87	1320	8.49	1330	8.19	1340	7.92
1350	7.65	1360	7.38	1370	7.14	1380	6.93	1390	6.70
1400	6.51	1420	6.23	1440	5.97	1460	4.82	1500	4.82

TOTAL VOLUME THIS HYDROGRAPH = 26.22(Ac.Ft)

25-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	140B	16.5	38.62	16.5	38.62	0	0.	.00000	.00	.00	0.	2	10	A35	.40
159	141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	145B	.0	.00	16.5	38.62	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	146A	31.6	86.75	31.6	86.75	0	0.	.00000	.00	.00	0.	2	7	A35	.23

CONFLUENCE Q'S

159 147A TA 1154 QA 86.75 QAB 125.37 QB 38.62 159 147B TB 1154 QB 38.62 QBA 125.37 QA 86.75
159 147AB TAB 1154 QAB 125.37 QA 86.75 QB 38.62

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	147AB	16.5	38.62	48.1	125.37	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159	148A	16.2	35.59	64.3	157.56	0	0.	.00000	.00	.00	0.	4	9	A35	.40
159	149A	.0	.00	64.3	157.56	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159	150B	13.9	34.55	13.9	34.55	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159	151B	.0	.00	13.9	34.55	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	152A	12.5	29.04	76.8	162.16	0	0.	.00000	.00	.00	0.	4	8	A35	.40

CONFLUENCE Q'S

159 153A TA 1159 QA 162.16 QAB 176.84 QB 14.68 159 153B TB 1154 QB 34.55 QBA 148.25 QA 113.70
159 153AB TAB 1158 QAB 181.10 QA 161.40 QB 19.69

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	153AB	13.9	34.55	90.7	181.10	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159	154B	.0	.00	.0	34.55	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	155B	21.3	49.48	21.3	49.48	4	1470.	.03400	3.00	.00	0.	4	8	A35	.40
159	156B	.0	.00	21.3	48.17	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	157B	.0	.00	21.3	48.17	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	55.77	55.1	98.09	0	0.	.00000	.00	.00	0.	4	14	A35	.20

CONFLUENCE Q'S

159 159A TA 1161 QA 174.80 QAB 267.21 QB 92.41 159 159B TB 1158 QB 98.09 QBA 258.45 QA 160.36
159 159AB TAB 1160 QAB 271.05 QA 174.79 QB 96.25

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	159AB	55.1	98.09	145.8	271.05	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	160A	.0	.00	145.8	271.05	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	7.49	200	7.83	300	8.37	400	8.96
500	9.68	600	10.55	700	11.69	800	13.21	900	15.44
1000	19.17	1050	23.74	1100	34.03	1110	40.86	1120	50.91
1130	62.83	1131	64.21	1132	65.60	1133	67.11	1134	68.65
1135	70.03	1136	71.57	1137	73.29	1138	75.20	1139	77.17
1140	79.41	1141	82.08	1142	84.86	1143	87.86	1144	91.16
1145	95.26	1146	99.54	1147	104.06	1148	109.12	1149	118.68
1150	128.96	1151	141.00	1152	156.16	1153	174.33	1154	190.88
1155	208.48	1156	226.41	1157	243.65	1158	258.45	1159	267.63
1160	271.05	1161	267.21	1162	256.53	1163	237.16	1164	215.48
1165	193.14	1166	170.78	1167	149.27	1168	133.17	1169	119.14
1170	107.19	1171	96.72	1172	87.87	1173	80.19	1174	73.62
1175	68.10	1176	63.19	1177	58.99	1178	55.24	1179	51.97
1180	48.98	1181	46.37	1182	43.77	1183	41.83	1184	39.98
1185	38.42	1186	36.97	1187	35.76	1188	34.61	1189	33.55
1190	32.60	1191	31.70	1192	30.93	1193	30.20	1194	29.54
1195	28.87	1196	28.28	1197	27.69	1198	27.18	1199	26.66
1200	26.16	1201	25.70	1202	25.23	1203	24.82	1204	24.42
1205	24.07	1206	23.70	1207	23.35	1208	23.03	1209	22.73
1210	22.46	1211	22.17	1212	21.89	1213	21.62	1214	21.35
1215	21.12	1216	20.90	1217	20.65	1218	20.40	1219	20.17
1220	19.94	1221	19.78	1222	19.55	1223	19.36	1224	19.12
1225	18.96	1226	18.77	1227	18.62	1228	18.46	1229	18.28
1230	18.14	1231	17.96	1232	17.81	1233	17.67	1234	17.50
1235	17.34	1236	17.21	1237	17.06	1238	16.97	1239	16.81
1240	16.69	1241	16.53	1242	16.41	1243	16.27	1244	16.16
1245	16.05	1246	15.91	1247	15.81	1248	15.71	1249	15.58
1250	15.48	1251	15.38	1252	15.25	1253	15.16	1254	15.07
1255	14.99	1256	14.87	1257	14.78	1258	14.67	1259	14.59
1260	14.51	1261	14.43	1262	14.34	1263	14.26	1264	14.15
1265	14.07	1266	14.00	1267	13.93	1268	13.83	1269	13.77
1270	13.68	1271	13.62	1272	13.56	1273	13.49	1274	13.41
1275	13.30	1276	13.23	1277	13.16	1278	13.06	1279	13.00
1280	12.95	1281	12.91	1282	12.83	1283	12.78	1284	12.76
1285	12.71	1286	12.61	1287	12.54	1288	12.48	1289	12.38
1290	12.33	1291	12.27	1292	12.22	1293	12.17	1294	12.09
1295	12.05	1296	12.04	1297	11.95	1298	11.91	1299	11.82
1300	11.81	1310	11.29	1320	10.87	1330	10.50	1340	10.19
1350	9.87	1360	9.53	1370	9.24	1380	8.97	1390	8.70
1400	8.47	1420	8.13	1440	7.79	1460	6.27	1500	6.28

TOTAL VOLUME THIS HYDROGRAPH = 33.93(Ac.Ft)

50-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
159	139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	140B	16.5	46.37	16.5	46.37	0	0.	.00000	.00	.00	0.	2	9	A35	.40
159	141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	145B	.0	.00	16.5	46.37	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	146A	31.6	99.78	31.6	99.78	0	0.	.00000	.00	.00	0.	2	7	A35	.23

CONFLUENCE Q'S

159 147A TA 1154 QA 99.78 QAB 146.15 QB 46.37 159 147B TB 1153 QB 46.37 QBA 146.15 QA 99.78
159 147AB TAB 1154 QAB 146.15 QA 99.78 QB 46.37

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	147AB	16.5	46.37	48.1	146.15	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159	148A	16.2	43.48	64.3	186.39	0	0.	.00000	.00	.00	0.	4	8	A35	.40
159	149A	.0	.00	64.3	186.39	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159	150B	13.9	39.88	13.9	39.88	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159	151B	.0	.00	13.9	39.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	152A	12.5	35.86	76.8	190.39	0	0.	.00000	.00	.00	0.	4	7	A35	.40

CONFLUENCE Q'S

159 153A TA 1158 QA 190.39 QAB 213.28 QB 22.89 159 153B TB 1154 QB 39.88 QBA 180.22 QA 140.34
159 153AB TAB 1157 QAB 213.43 QA 185.06 QB 28.37

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	153AB	13.9	39.88	90.7	213.43	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159	154B	.0	.00	.0	39.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	155B	21.3	61.11	21.3	61.11	4	1470.	.03400	3.00	.00	0.	4	7	A35	.40
159	156B	.0	.00	21.3	59.68	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	157B	.0	.00	21.3	59.68	4	1760.	.04100	2.25	.00	0.	2	99	A35	.00
159	158B	33.8	70.76	55.1	122.06	0	0.	.00000	.00	.00	0.	4	12	A35	.20

CONFLUENCE Q'S

159 159A TA 1160 QA 207.81 QAB 322.52 QB 114.70 159 159B TB 1158 QB 122.06 QBA 317.66 QA 195.60
159 159AB TAB 1159 QAB 324.45 QA 204.56 QB 119.89

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	159AB	55.1	122.06	145.8	324.45	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	160A	.0	.00	145.8	324.45	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

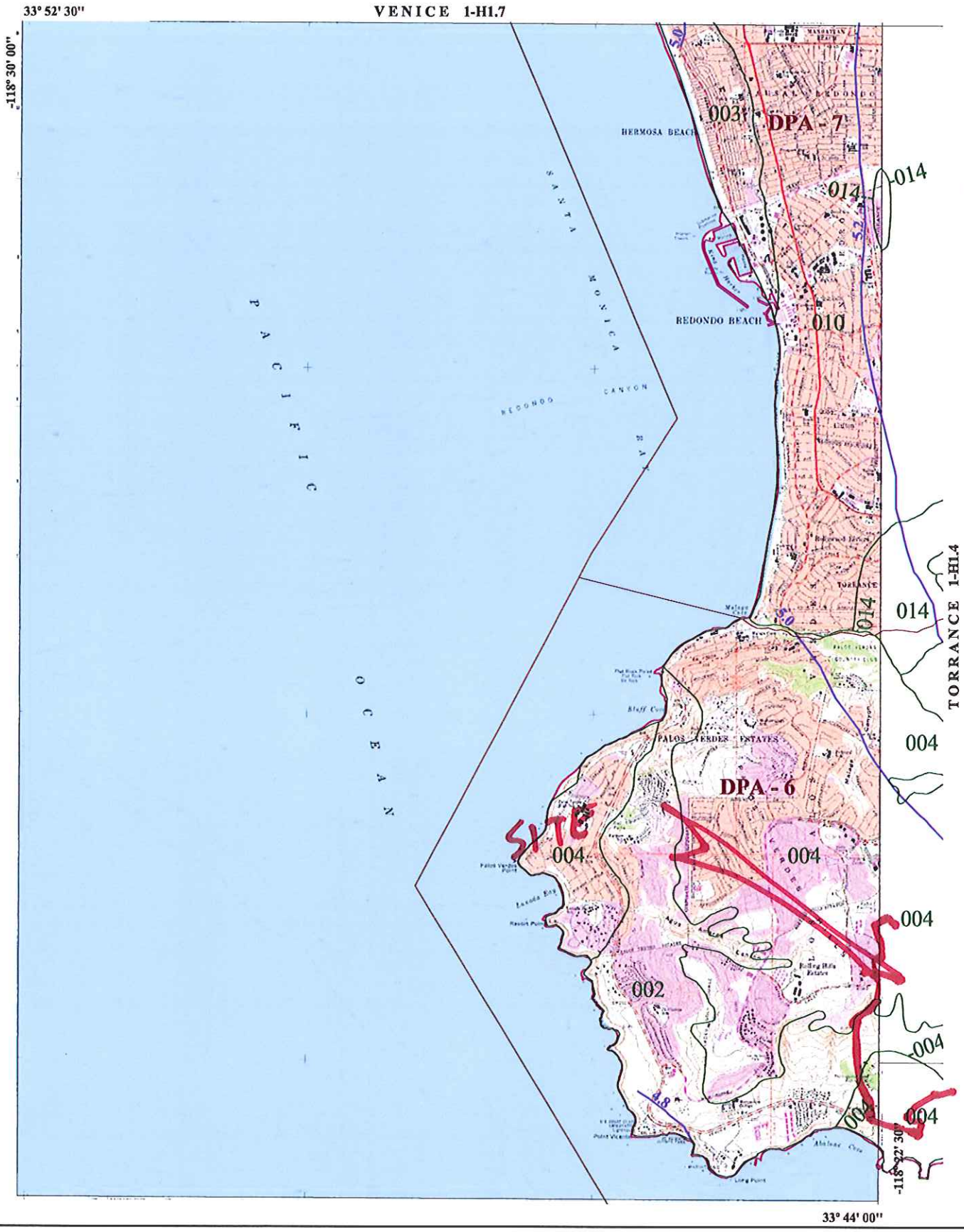
HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	8.85	200	9.25	300	9.86	400	10.53
500	11.35	600	12.35	700	13.64	800	15.42	900	18.02
1000	22.29	1050	27.59	1100	41.93	1110	50.51	1120	62.00
1130	75.80	1131	77.45	1132	79.11	1133	80.66	1134	82.26
1135	83.94	1136	85.85	1137	88.01	1138	90.48	1139	93.03
1140	95.93	1141	99.38	1142	102.94	1143	106.48	1144	110.39
1145	115.41	1146	120.65	1147	126.32	1148	132.50	1149	144.71
1150	157.76	1151	173.57	1152	193.38	1153	216.59	1154	237.60
1155	260.33	1156	283.35	1157	303.16	1158	317.66	1159	324.45
1160	322.52	1161	305.69	1162	282.28	1163	255.78	1164	228.05
1165	200.19	1166	178.75	1167	159.50	1168	142.74	1169	127.94
1170	115.22	1171	104.42	1172	95.29	1173	87.44	1174	80.82
1175	75.24	1176	70.25	1177	66.05	1178	62.34	1179	59.11
1180	56.07	1181	53.61	1182	51.15	1183	49.11	1184	46.88
1185	45.12	1186	43.38	1187	41.72	1188	40.30	1189	38.94
1190	37.69	1191	36.63	1192	35.68	1193	34.75	1194	33.96
1195	33.14	1196	32.41	1197	31.72	1198	31.12	1199	30.51
1200	29.92	1201	29.38	1202	28.83	1203	28.39	1204	27.93
1205	27.52	1206	27.10	1207	26.72	1208	26.39	1209	26.03
1210	25.68	1211	25.34	1212	25.06	1213	24.74	1214	24.48
1215	24.22	1216	23.92	1217	23.62	1218	23.34	1219	23.11
1220	22.84	1221	22.67	1222	22.41	1223	22.20	1224	21.92
1225	21.75	1226	21.58	1227	21.36	1228	21.19	1229	21.02
1230	20.86	1231	20.65	1232	20.48	1233	20.28	1234	20.09
1235	19.95	1236	19.86	1237	19.67	1238	19.53	1239	19.35
1240	19.21	1241	19.04	1242	18.91	1243	18.78	1244	18.66
1245	18.50	1246	18.39	1247	18.28	1248	18.12	1249	18.01
1250	17.90	1251	17.80	1252	17.65	1253	17.55	1254	17.45
1255	17.35	1256	17.21	1257	17.11	1258	17.02	1259	16.89
1260	16.80	1261	16.75	1262	16.61	1263	16.52	1264	16.43
1265	16.34	1266	16.22	1267	16.14	1268	16.07	1269	16.00
1270	15.89	1271	15.82	1272	15.74	1273	15.61	1274	15.52
1275	15.43	1276	15.35	1277	15.27	1278	15.16	1279	15.10
1280	15.04	1281	14.99	1282	14.94	1283	14.88	1284	14.81
1285	14.74	1286	14.62	1287	14.53	1288	14.45	1289	14.34
1290	14.32	1291	14.26	1292	14.16	1293	14.11	1294	14.06
1295	14.00	1296	13.94	1297	13.85	1298	13.83	1299	13.73
1300	13.68	1310	13.12	1320	12.64	1330	12.24	1340	11.88
1350	11.51	1360	11.12	1370	10.80	1380	10.50	1390	10.19
1400	9.93	1420	9.56	1440	9.17	1460	7.46	1500	7.47

TOTAL VOLUME THIS HYDROGRAPH = 39.81(Ac.Ft)

9.B. Hydrologic Reference Graphs & Table

1. 50-Year, 24-Hour Isohyet (LACDPW)
2. Runoff Coefficient Curves for Soil Types 2 and 4
3. Los Angeles County Proportion Impervious Data Table
4. Los Angeles County Debris Production Rates for Los Angeles Basin
5. Los Angeles County Peak Bulking Factors for Los Angeles Basin



N
W E
S

016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

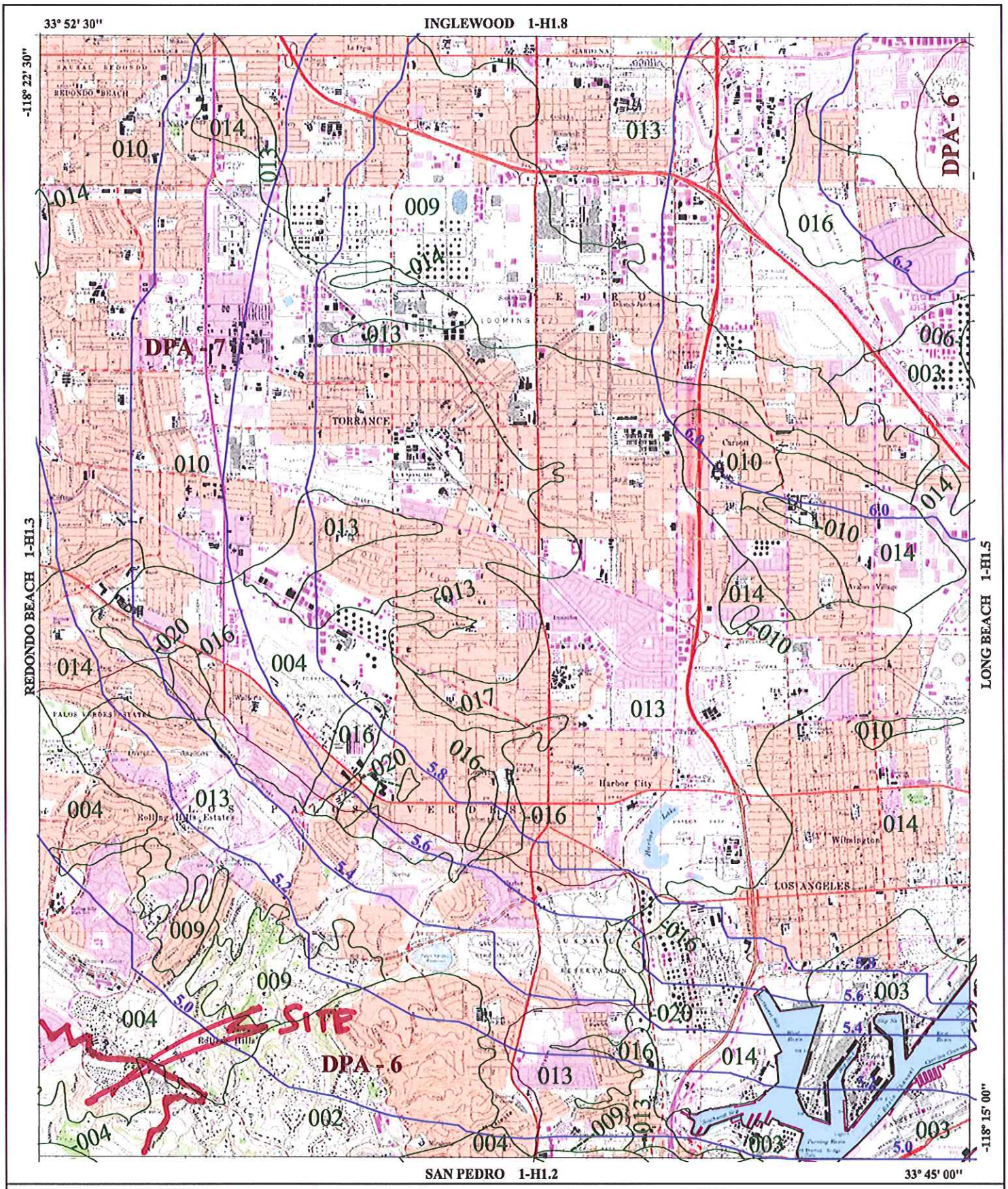
1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

REDONDO BEACH
50-YEAR 24-HOUR ISOHYET

1-H1.3

LOS ANGELES COUNTY PUBLIC WORKS
Public Service That Works

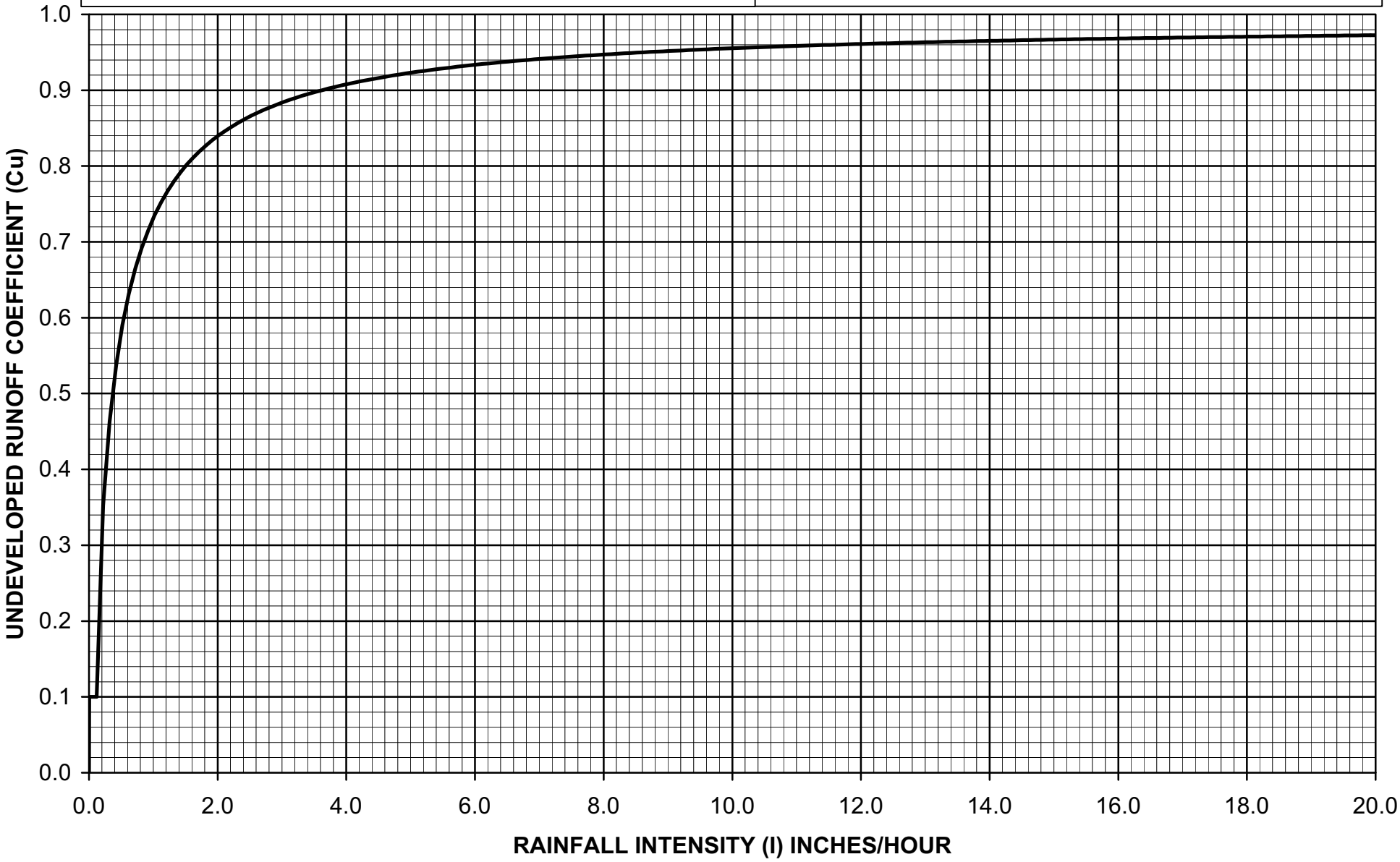

33° 52' 30"
INGLEWOOD 1-H1.8
-118° 22' 30"
REDONDO BEACH 1-H1.3
LONG BEACH 1-H1.5
-118° 15' 00"
SAN PEDRO 1-H1.2
33° 45' 00"
DPA - 6
DPA - 7
SITE
DPA - 6
TORRANCE
Carson
Harbor City
Wilmington
LOS ANGELES
Rolling Hills Estates
PALOS VERDES
016
SOIL CLASSIFICATION AREA
7.2
INCHES OF RAINFALL
DPA - 6
DEBRIS POTENTIAL AREA
N
W
E
S
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
TORRANCE
50-YEAR 24-HOUR ISOHYET
1-H1.4
LOS ANGELES COUNTY PUBLIC WORKS
Public Service That Works

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 002

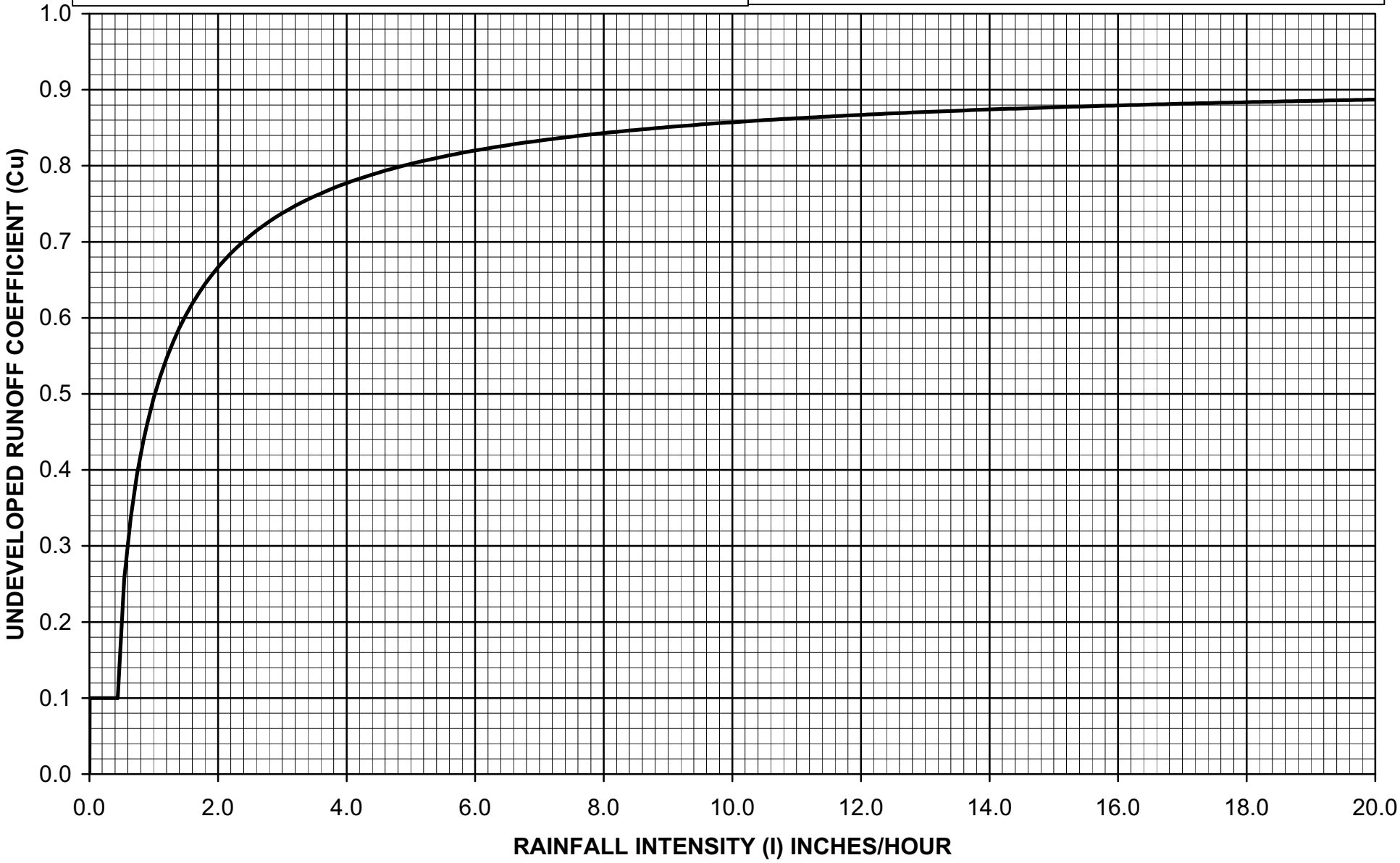


$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 004



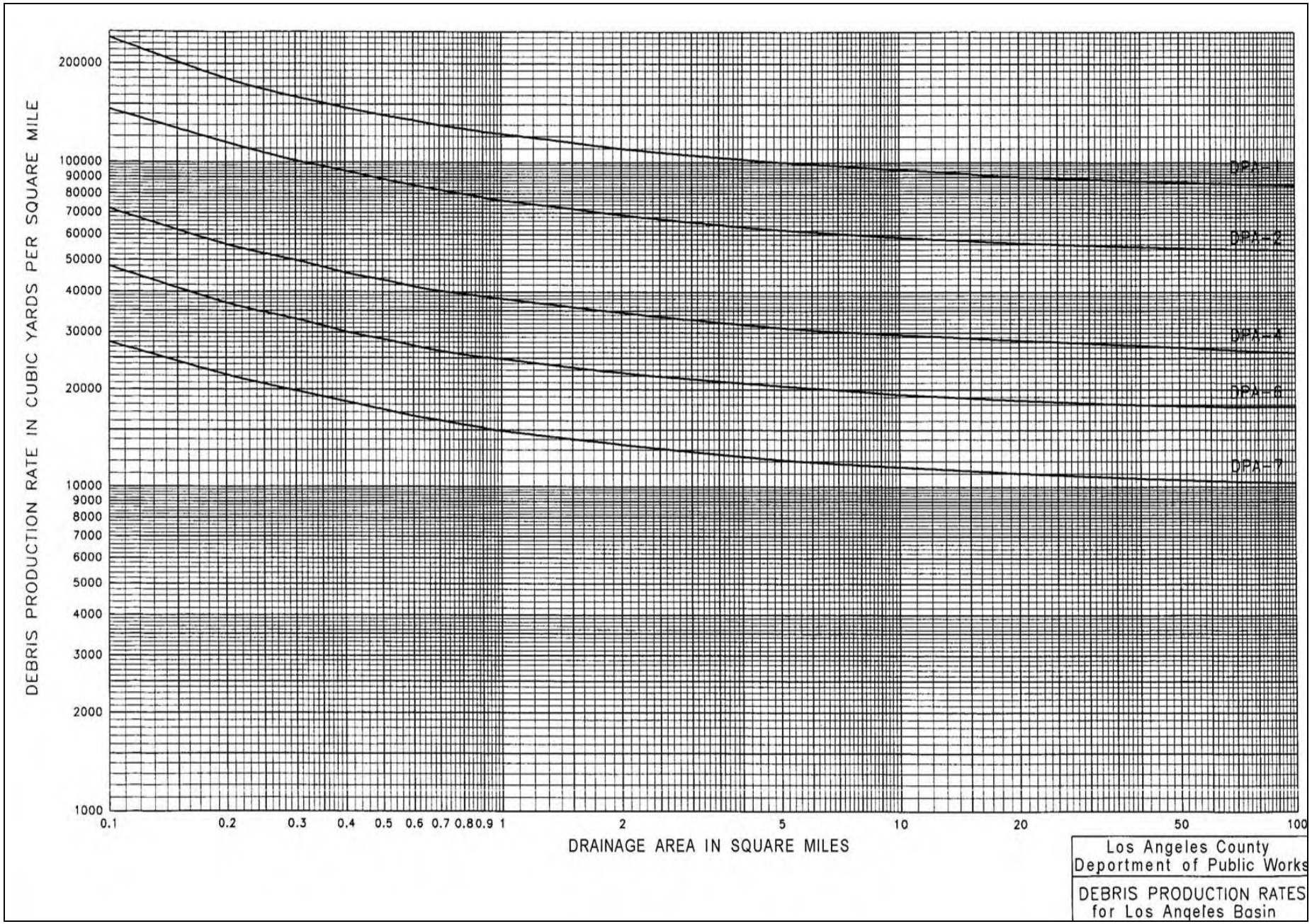
Proportion Impervious Data

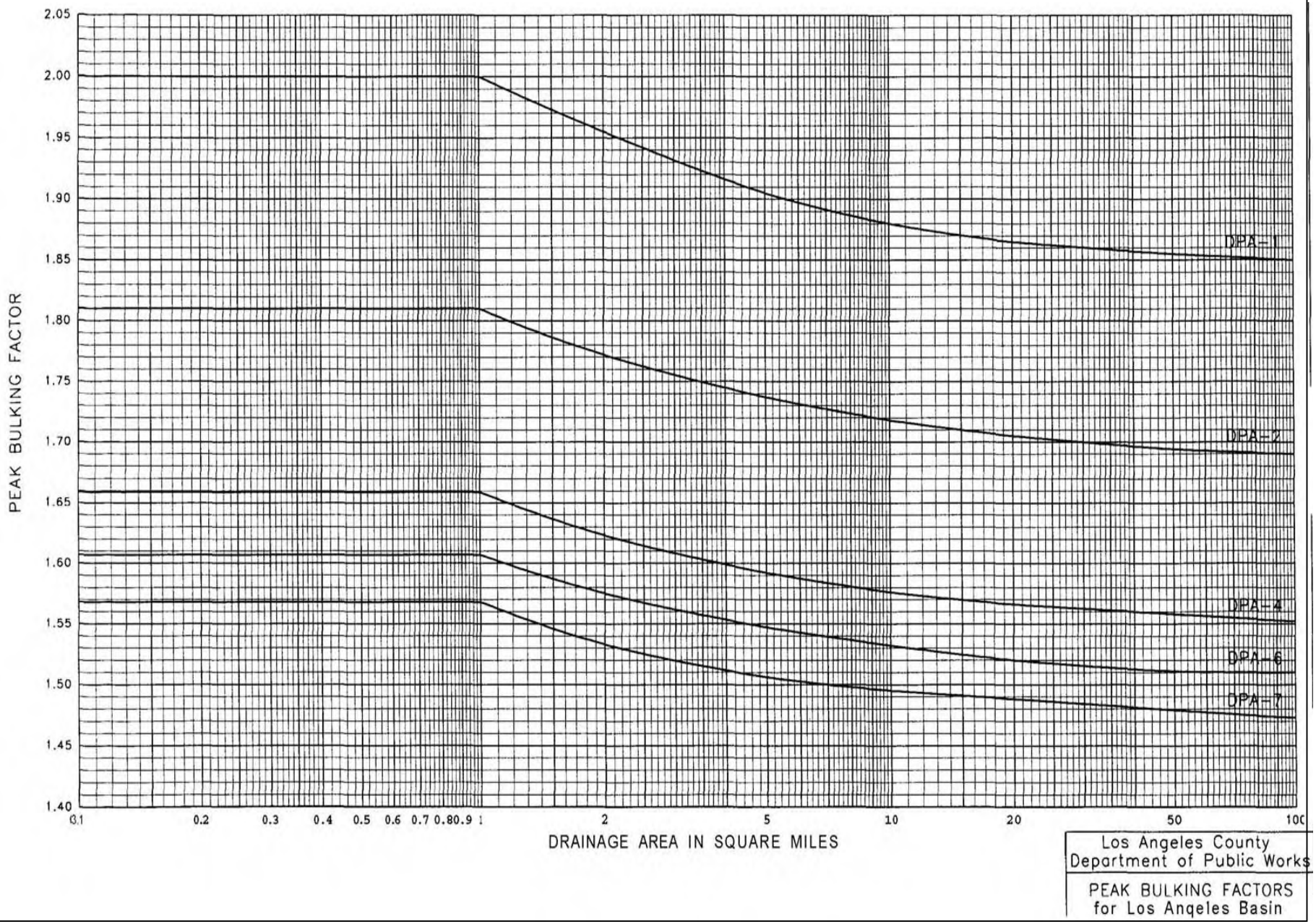
Code	Land Use Description	% Impervious
1111	High-Density Single Family Residential	42
1112	Low-Density Single Family Residential	21
1121	Mixed Multi-Family Residential	74
1122	Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	55
1123	Low-Rise Apartments, Condominiums, and Townhouses	86
1124	Medium-Rise Apartments and Condominiums	86
1125	High-Rise Apartments and Condominiums	90
1131	Trailer Parks and Mobile Home Courts, High-Density	91
1132	Mobile Home Courts and Subdivisions, Low-Density	42
1140	Mixed Residential	59
1151	Rural Residential, High-Density	15
1152	Rural Residential, Low-Density	10
1211	Low- and Medium-Rise Major Office Use	91
1212	High-Rise Major Office Use	91
1213	Skyscrapers	91
1221	Regional Shopping Center	95
1222	Retail Centers (Non-Strip With Contiguous Interconnected Off-Street	96
1223	Modern Strip Development	96
1224	Older Strip Development	97
1231	Commercial Storage	90
1232	Commercial Recreation	90
1233	Hotels and Motels	96
1234	Attended Pay Public Parking Facilities	91
1241	Government Offices	91
1242	Police and Sheriff Stations	91
1243	Fire Stations	91
1244	Major Medical Health Care Facilities	74
1245	Religious Facilities	82
1246	Other Public Facilities	91
1247	Non-Attended Public Parking Facilities	91
1251	Correctional Facilities	91
1252	Special Care Facilities	74
1253	Other Special Use Facilities	86
1261	Pre-Schools/Day Care Centers	68
1262	Elementary Schools	82
1263	Junior or Intermediate High Schools	82
1264	Senior High Schools	82
1265	Colleges and Universities	47
1266	Trade Schools and Professional Training Facilities	91
1271	Base (Built-up Area)	65
1271.01	Base High-Density Single Family Residential	42
1271.02	Base Duplexes, Triplexes and 2-or 3-Unit Condominiums and T	55

Code	Land Use Description	% Impervious
1271.03	Base Government Offices	91
1271.04	Base Fire Stations	91
1271.05	Base Non-Attended Public Parking Facilities	91
1271.06	Base Air Field	45
1271.07	Base Petroleum Refining and Processing	91
1271.08	Base Mineral Extraction - Oil and Gas	10
1271.09	Base Harbor Facilities	91
1271.10	Base Navigation Aids	47
1271.11	Base Developed Local Parks and Recreation	10
1271.12	Base Vacant Undifferentiated	1
1272	Vacant Area	2
1273	Air Field	45
1274	Former Base (Built-up Area)	65
1275	Former Base Vacant Area	2
1276	Former Base Air Field	91
1311	Manufacturing, Assembly, and Industrial Services	91
1312	Motion Picture and Television Studio Lots	82
1313	Packing Houses and Grain Elevators	96
1314	Research and Development	91
1321	Manufacturing	91
1322	Petroleum Refining and Processing	91
1323	Open Storage	66
1324	Major Metal Processing	91
1325	Chemical Processing	91
1331	Mineral Extraction - Other Than Oil and Gas	10
1332	Mineral Extraction - Oil and Gas	10
1340	Wholesaling and Warehousing	91
1411	Airports	91
1411.01	Airstrip	10
1412	Railroads	15
1412.01	Railroads-Attended Pay Public Parking Facilities	91
1412.02	Railroads-Non-Attended Public Parking Facilities	91
1412.03	Railroads-Manufacturing, Assembly, and Industrial Services	91
1412.04	Railroads-Petroleum Refining and Processing	91
1412.05	Railroads-Open Storage	66
1412.06	Railroads-Truck Terminals	91
1413	Freeways and Major Roads	91
1414	Park-and-Ride Lots	91
1415	Bus Terminals and Yards	91
1416	Truck Terminals	91
1417	Harbor Facilities	91
1418	Navigation Aids	47
1420	Communication Facilities	82
1420.01	Communication Facilities-Antenna	2

Code	Land Use Description	% Impervious
1431	Electrical Power Facilities	47
1431.01	Electrical Power Facilities-Powerlines (Urban)	2
1431.02	Electrical Power Facilities-Powerlines (Rural)	1
1432	Solid Waste Disposal Facilities	15
1433	Liquid Waste Disposal Facilities	96
1434	Water Storage Facilities	91
1435	Natural Gas and Petroleum Facilities	91
1435.01	Natural Gas and Petroleum Facilities-Manufacturing, Assembly, and In	91
1435.02	Natural Gas and Petroleum Facilities-Petroleum Refining and Processing	91
1435.03	Natural Gas and Petroleum Facilities-Mineral Extraction – Oil and Gas	10
1435.04	Natural Gas and Petroleum Facilities-Vacant Undifferentiated	1
1436	Water Transfer Facilities	96
1437	Improved Flood Waterways and Structures	100
1440	Maintenance Yards	91
1450	Mixed Transportation	90
1460	Mixed Transportation and Utility	91
1460.01	Mixed Utility and Transportation-Improved Flood Waterways and Structures	100
1460.02	Mixed Utility and Transportation-Railroads	15
1460.03	Mixed Utility and Transportation-Freeways and Major Roads	91
1500	Mixed Commercial and Industrial	91
1600	Mixed Urban	89
1700	Under Construction (Use appropriate value)	91
1810	Golf Courses	3
1821	Developed Local Parks and Recreation	10
1822	Undeveloped Local Parks and Recreation	2
1831	Developed Regional Parks and Recreation	2
1832	Undeveloped Regional Parks and Recreation	1
1840	Cemeteries	10
1850	Wildlife Preserves and Sanctuaries	2
1850.01	Wildlife-Commercial Recreation	90
1850.02	Wildlife-Other Special Use Facilities	86
1850.03	Wildlife-Developed Local Parks and Recreation	10
1860	Specimen Gardens and Arboreta	15
1870	Beach Parks	10
1880	Other Open Space and Recreation	10
2110	Irrigated Cropland and Improved Pasture Land	2
2120	Non-Irrigated Cropland and Improved Pasture Land	2
2200	Orchards and Vineyards	2
2300	Nurseries	15
2400	Dairy, Intensive Livestock, and Associated Facilities	42
2500	Poultry Operations	62
2600	Other Agriculture	42
2700	Horse Ranches	42

Code	Land Use Description	% Impervious
3100	Vacant Undifferentiated	1
3200	Abandoned Orchards and Vineyards	2
3300	Vacant With Limited Improvements (Use appropriate value)	42
3400	Beaches (Vacant)	1
4100	Water, Undifferentiated	100
4200	Harbor Water Facilities	100
4300	Marina Water Facilities	100
4400	Water Within a Military Installation	100


DEBRIS PRODUCTION RATE IN CUBIC YARDS PER SQUARE MILE
200000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
DPA-1
DPA-2
DPA-4
DPA-6
DPA-7
Los Angeles County
Department of Public Works
DEBRIS PRODUCTION RATES
for Los Angeles Basin


PEAK BULKING FACTOR
2.05
2.00
1.95
1.90
1.85
1.80
1.75
1.70
1.65
1.60
1.55
1.50
1.45
1.40
DPA-1
DPA-2
DPA-4
DPA-6
DPA-7
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
Los Angeles County
Department of Public Works
PEAK BULKING FACTORS
for Los Angeles Basin

9.C. Reference Plans:

1. FEMA FIRM Panel 06037C2025F, Effective September 26, 2008
2. FEMA FIRM Panel 06037C2026F, Effective September 26, 2008
3. PD 407
4. PD 1382
5. PD 1403
6. PD 1703
7. State RWQCB Clarification Letter to LACDPW

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

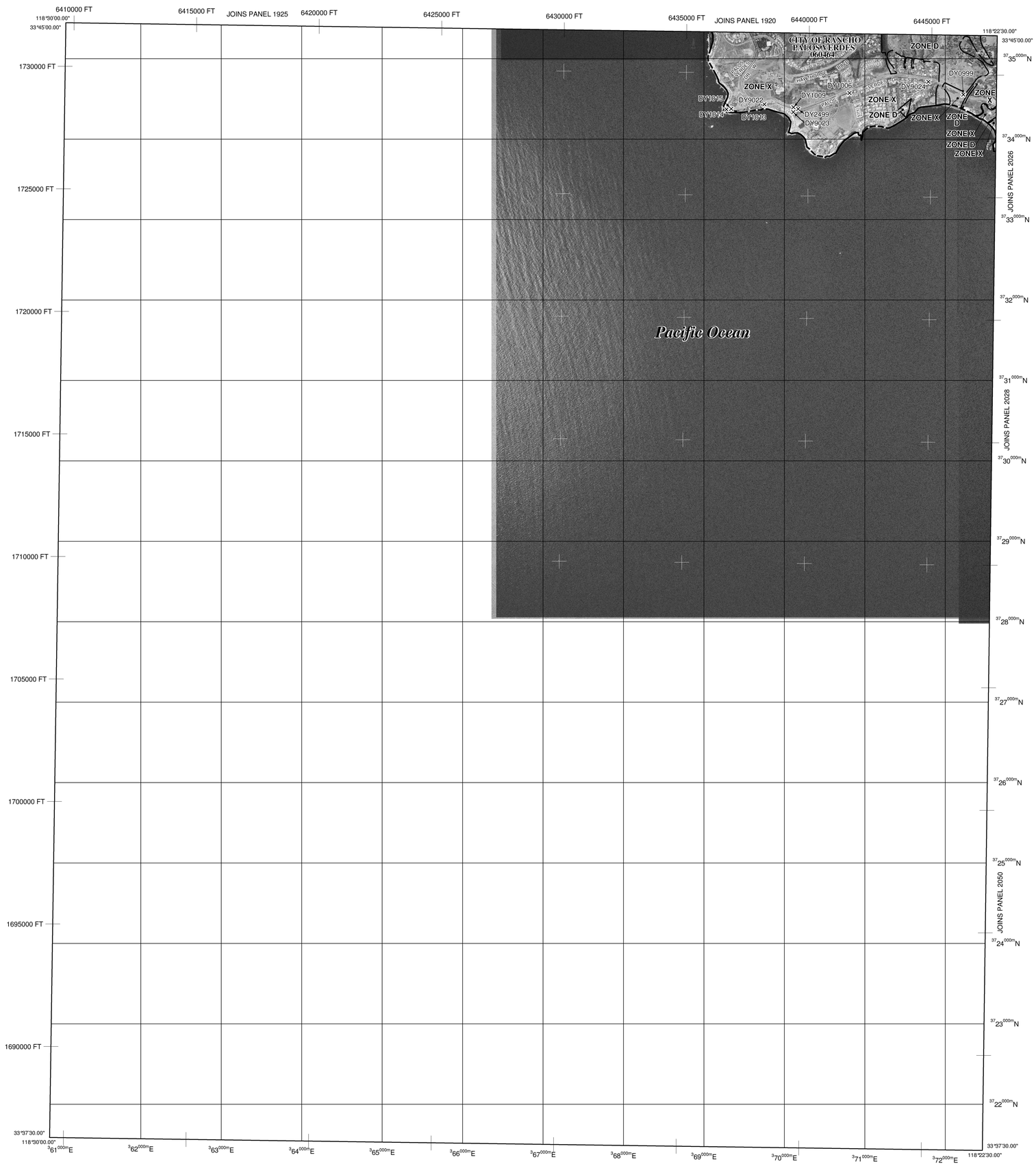
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN — 1000-meter Universal Transverse Mercator grid values, zone 11
- 6000000 FT — 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2025F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 2025 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RANCHO PALOS VERDES, CITY OF	060464	2025	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C2025F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole–foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC–3, #9202
1315 East–West Highway
Silver Spring, MD 20910–3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713–3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

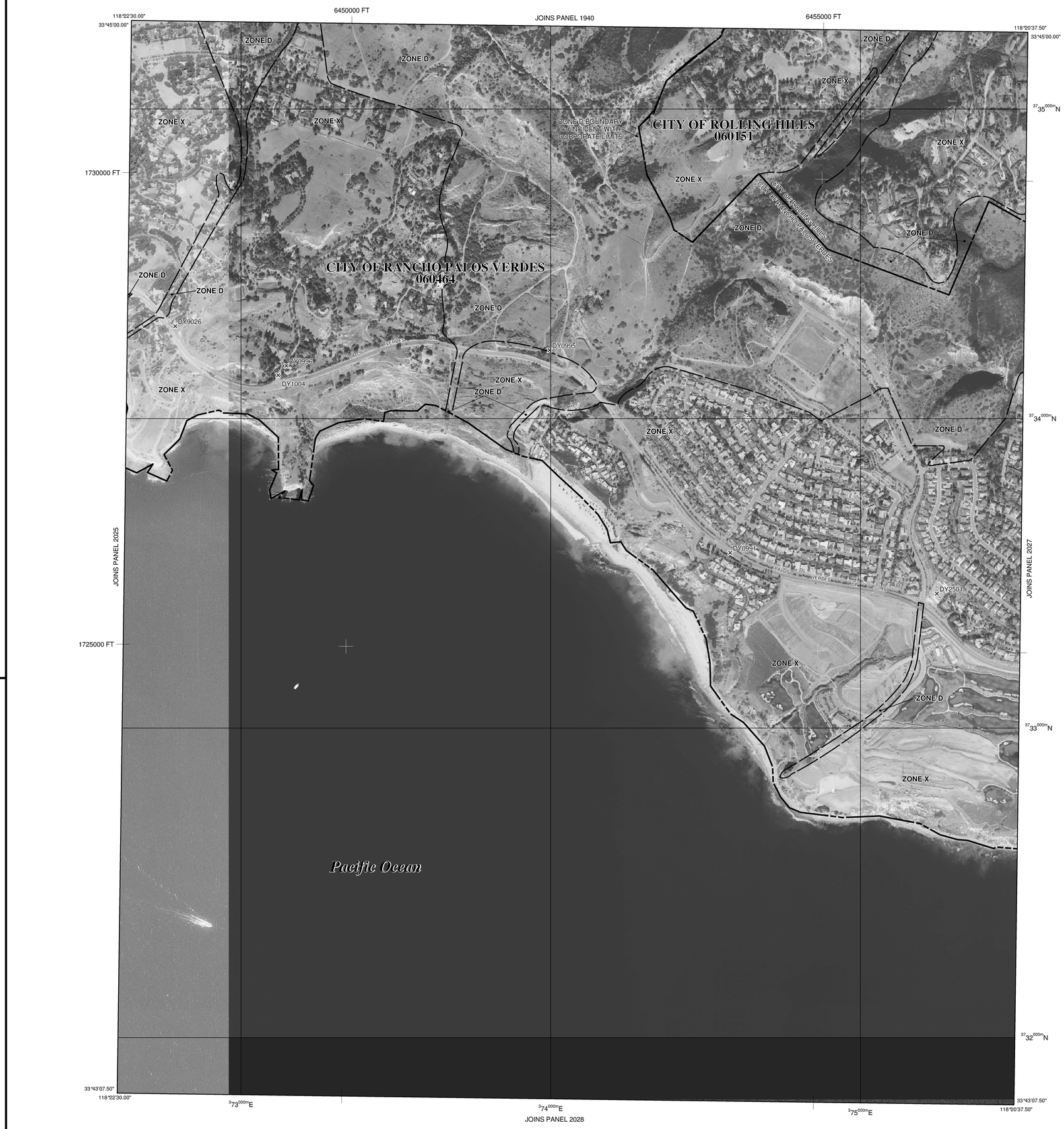
This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1–877–FEMA MAP** (1–877–336–2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A — Cross section line

23 — 23 — Transect line

97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4275000mN — 1000-meter Universal Transverse Mercator grid values, zone 11

6000000 FT — 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in 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.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2026F

FIRM

FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 2026 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

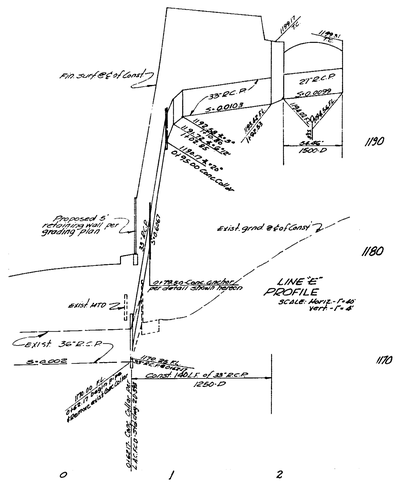
COMMUNITY	NUMBER	PANEL	SUFFIX
RANCHO PALOS VERDES, CITY OF	060464	2026	F
ROLLING HILLS, CITY OF	060151	2026	F

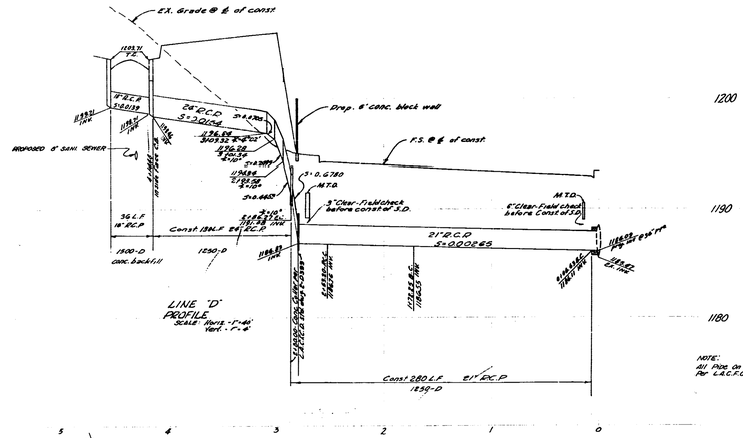
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C2026F

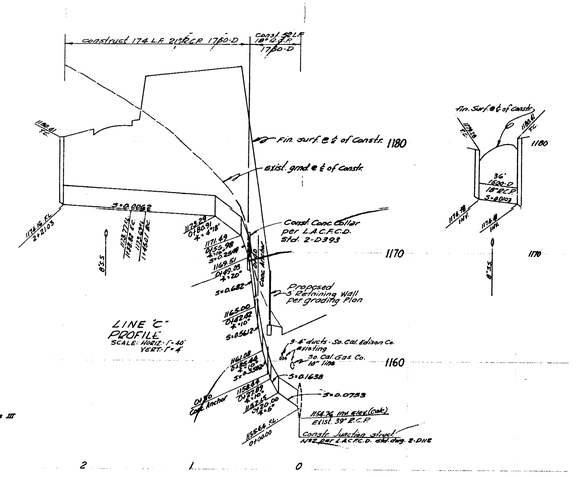
EFFECTIVE DATE
SEPTEMBER 26, 2008

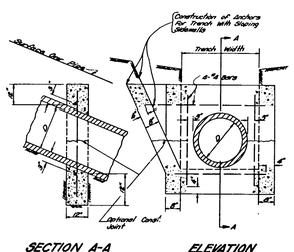
Federal Emergency Management Agency





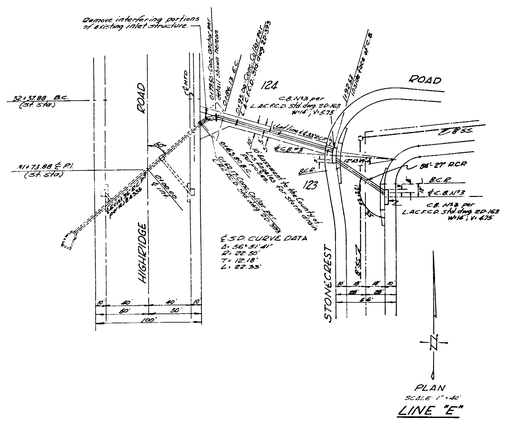
NOTE:
All Pipe On This Sheet To Be Backed Per L.A.C.F.C.D. Std. Dwg. B-0171 Class III

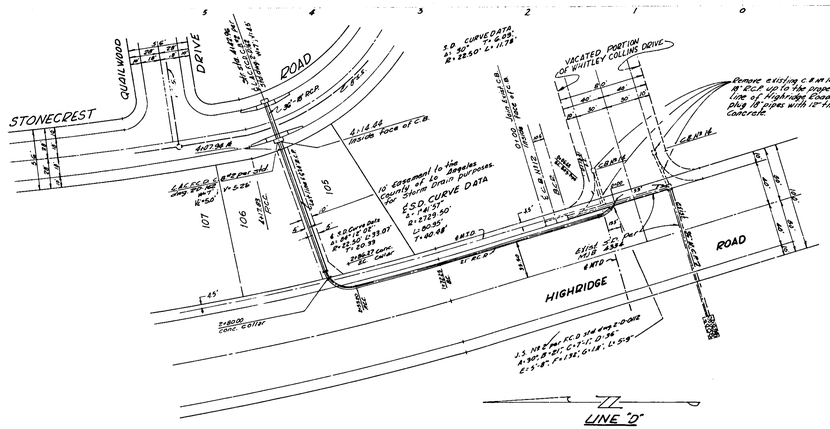


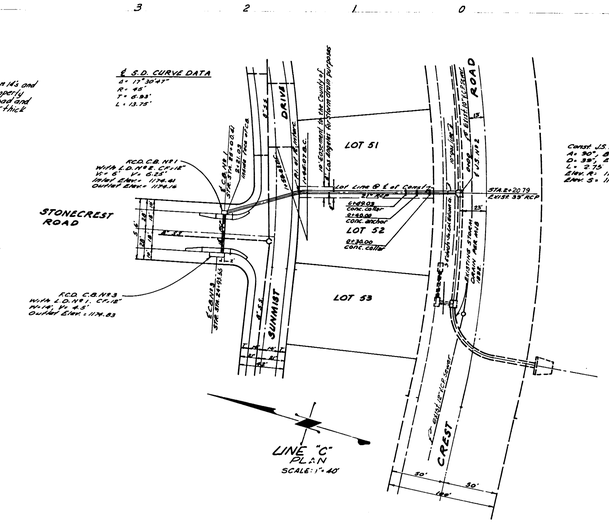


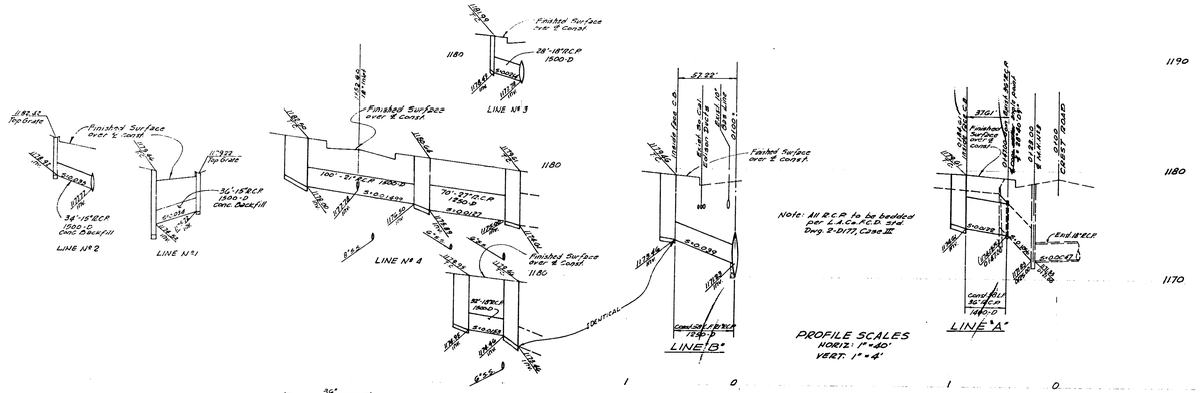
4078 – 27789
Sheets C, D, E

P.D. Nº 407
TRACT 27789
SHEET 2 OF 2 SHEETS

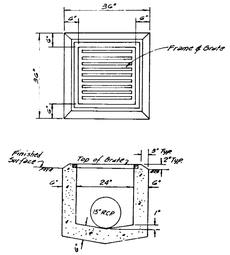




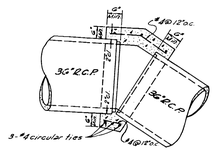

ESD CURVE DATA
Δ=17°30'47"
R=45'
T=6.94'
L=13.75'
Construct Conc. Collar per L.A.C.F.C.D. Std. 2-D393
Construct Junction Structure
Connect 36" R.C.P. to Junction Structure
Remove Interfering Portions of Existing Inlet



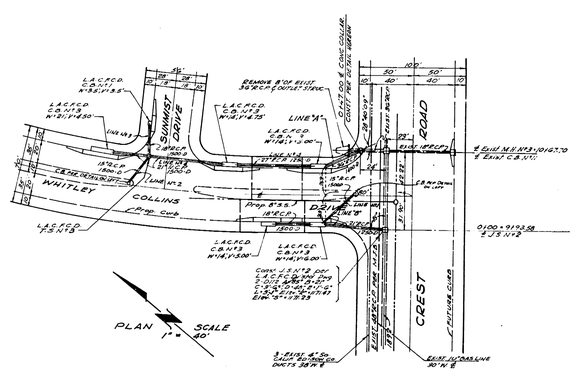
Note: All R.C.P. to be bedded per L.A.Co.P.W. std. Dwg. B-D177, Case III



CATCH BASIN DETAIL
No Scale



CONCRETE COLLAR DETAIL
NO SCALE



PLANS FOR STORM DRAIN
TRACT NO. 31617
PRIVATE DRAIN NO. 1382

PREPARED IN THE OFFICES OF

LANCO ENGINEERING

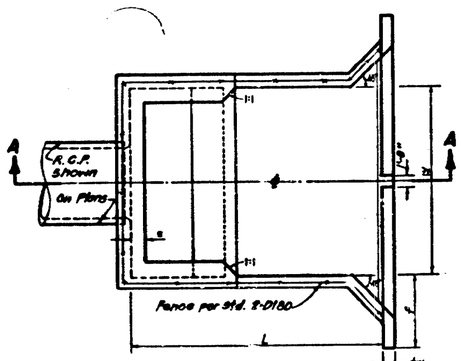
BY C M Leonard R.C.E. 13167

LIST OF STANDARD DRAWING OF LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

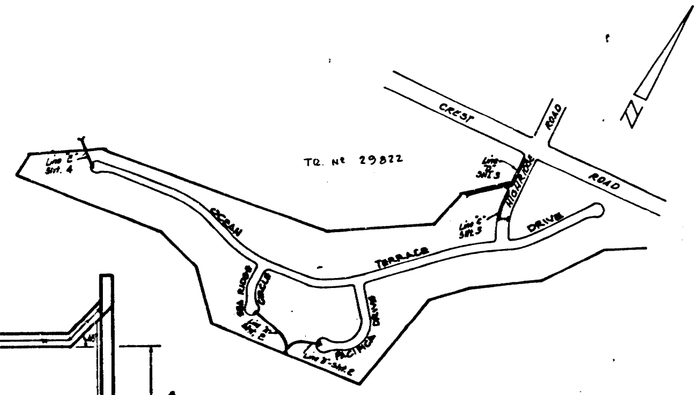
DESCRIPTION	DWG. NO.
JUNCTION STRUCTURE NO 2	2-D112
MANHOLE NO. 2	2-D184
CATCH BASIN NO. 2	2-D182
CATCH BASIN NO. 3	2-2163
MANHOLE FRAME AND COVER	2-D472
PROTECTION BARS FOR CATCH BASIN	2-D175
CATCH BASIN REINFORCEMENT	2-D172
CONNECTION TO C.B. FOR PIPE	2-D826
CATCH BASIN OPENING	2-D 898
MANHOLE FRAME & COVER FOR CATCH BASIN	2-D 156
CATCH BASIN REINFORCEMENT FOR ROUND C.B.	2-D 157
STANDARD DROP STEP	2-D 96
SPECIAL MANHOLE FRAME AND COVER	2-D 487
TRANSITION STRUCTURE NO 3	2-D188
CATCH BASIN NO 1	2-D160
FENCE	2-D180

LOS ANGELES COUNTY ENGINEER

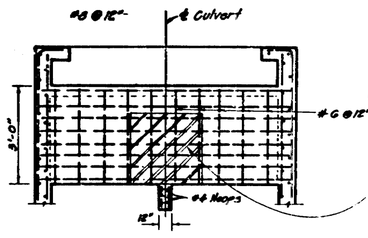
PIPE BEDDING	D-54
CONCRETE ANCHORS	D-72



Plan



INDEX MAP
SCALE 1"=400'



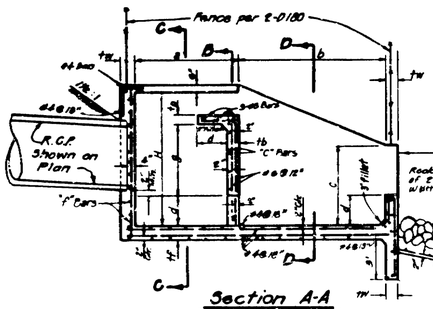
Section B-B

FOR "A" AND "E" PROVIDE ½" THICK STAINLESS STEEL PLATE ON UPSTREAM SIDE OF BAFFLEWALL, SAME WIDTH AS PIPE DIA. AND AS HIGH AS PIPE DIA. FITT. SECURE WITH ½" DIA. STAINLESS STEEL BOLTS 12" O.C. AROUND PERIMETER.

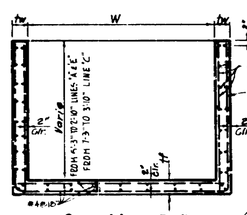
OUTLET STRUCTURE DIMENSIONS

	W	H	L	a	b	c	d	e	f	g	tw	ff	tb	tp	e Bars	c BARS
LINES "A" & "E"	6'-9"	5'-3"	9'-0"	5'-11"	5'-1"	2'-10"	1'-2"	6"	2'-0"	2'-6"	6"	6¾"	8"	8"	#6@12"	#5@12"
LINE "C"	9'-3"	7'-3"	12'-4"	5'-3"	7'-1"	3'-10"	1'-7"	8"	3'-0"	3'-6"	7"	7¾"	8"	8"	#6@12"	#8@12"

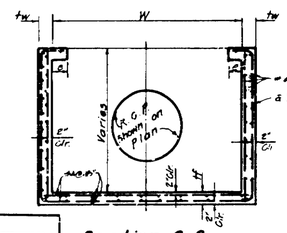
	F BARS
LINE "A" & "E"	#5@12"
LINE "C"	#7@12"



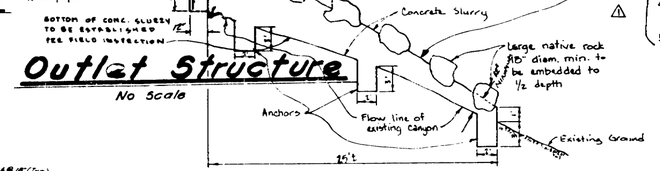
Section A-A



Section D-D



Section C-C



Outlet Structure
No Scale

Special Notes for Concrete Slurry

1. All loose material to be removed to rock and Soils Engineer to approve subgrade prior to pouring.
2. County Storm Drain Inspector to approve subgrade prior to pouring.
3. Anchors to be poured into rock at 12'± intervals.
4. Sides of slurry to slope up canyon sidewalls 2' min.
5. Bottom of slurry to be established per field inspection, per note #1 of these notes.

HYDRAULIC ELEMENT TABLE

Station From	Station To	Qes	Ø	Sf	V
		Line "A"			
1+00	1+16	38.9	84"R.C.P.	NOT FULL	27.6
1+16	1+48	38.9	72"R.C.P.	" "	39.2
1+48	2+11	38.9	24" "	" "	38.1
2+20	2+86	38.9	24" "	" "	24.6
2+86	3+97.30	38.9	24" "	" "	5.4
		Line "B"			
1+20.50	2+20	31.1	27"R.C.P.	NOT FULL	27.5
2+20	2+28	31.1	" "	" "	26.1
2+28	2+36	31.1	" "	" "	23.2
2+36	2+52	31.1	" "	" "	19.7
2+44	2+52	31.1	" "	" "	13.6
2+65	3+82.67	31.1	" "	0.0101	7.8
		Line "C"			
0+35	1+20	73.8	36" R.C.P.	NOT FULL	24.0
1+20	2+52.50	73.8	36"R.C.P.	NOT FULL	13.8
2+52.60	3+28.23	59.0	" "	" "	14.5
3+37.89	3+62.96	59.0	" "	" "	20.9
		Line "D"			
2+58.30	4+32.45	16.8	24"R.C.P.	NOT FULL	3.8
4+37.45	4+79.45	12.0	21"R.C.P.	" "	6.9
		Line "E"			
0+80	0+36	23.3	24" R.C.P.	NOT FULL	23.8
0+96	1+46	23.3	24"R.C.P.	NOT FULL	35.8
1+46	1+80	23.3	" "	" "	38.0
1+80	1+96	23.3	" "	" "	26.8
1+96	2+10	23.3	" "	" "	16.3

WHERE VELOCITY EXCEEDS 20'/SEC. PROVIDE AN EXTRA ½" OF CONCRETE OVER THE INVERT OF THE R.C.P.

GENERAL NOTES

1. ELEVATIONS ARE IN FEET ABOVE U.S.G.S. MEAN SEA LEVEL DATUM OF 1929.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1976 EDITION, INCLUDING ALL SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE CITY ENGINEER.
3. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION OR EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT.
4. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION SECTION BY TELEPHONE 974-7205, AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS CONTRACT.
5. THIS STORM DRAIN WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT UP TO GRADE, AND THE SYSTEM IS CLEANED TO THE SATISFACTION OF THE CITY ENGINEER.
6. ALL REINFORCED CONC. PIPE SHALL BE BEDDED IN ACCORDANCE WITH CASE A4 BEDDING PER D-54, UNLESS OTHERWISE SPECIFIED.
7. PERMITS SHALL BE OBTAINED FROM THE ROAD DEPARTMENT AND L.A.C.F.C.D. AND SHALL BE SUBMITTED TO THE INSPECTOR PRIOR TO COMMENCING CONSTRUCTION WITHIN THEIR RIGHT OF WAY.
8. ALL BACKFILL AND FILL AROUND CLOSED CONDUITS IN STREET RIGHTS OF WAY SHALL BE BROUGHT UP TO THE SUBGRADE OF THE ROAD OR TO 2 FEET ABOVE THE TOP OF CONDUIT, WHICHEVER IS LESS. THE ROAD DEPARTMENT SHALL INSPECT ALL BACKFILL AND FILL ABOVE THE AFOREMENTIONED LIMITS. APPLICATION FOR AN ENGINEER OR INSPECTOR IN CONNECTION WITH THE WORK SHALL BE MADE BY THE CONTRACTOR AT LEAST 24 HOURS BEFORE HIS SERVICE IS REQUIRED. CALL 974-6105.
9. ALL STATE AND LOCAL TRENCH SAFETY ORDERS WILL BE RIGIDLY ENFORCED.
10. ALL CATCH BASINS & CONNECTOR PIPES BETWEEN BASINS TO BE INSPECTED BY THE COUNTY ROAD DEPARTMENT.
11. ALL MANHOLE COVERS NOT IN STREET PAVING SHALL BE PROVIDED WITH ALLEN SOCKET SET SCREW LOCKING DEVICES. THE CONTRACTOR SHALL DRILL AND TAP TWO HOLES TO A DEPTH OF 1 INCH AT 90 DEGREES TO PICK HOLE AND INSTALL 3/4 INCH BY 3/4 ALLEN SOCKET SET SCREWS.
12. A SOIL ENGINEER SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF STREET R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE CITY.

CONCRETE NOTES

1. ALL STEEL SHOWN ADJACENT TO A FACE OF CONCRETE, SHALL END OR BE PLACED 2" FROM THE CONCRETE FACE UNLESS OTHERWISE SHOWN.
2. AT THE BEGINNING AND END OF ALL POURS A LAYER OF REINFORCEMENT SHALL BE PLACED WITHIN 3" OF THE TRANSVERSE CONSTRUCTION JOINTS.
3. UNLESS OTHERWISE SHOWN CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTERLINE OF CONSTRUCTION.
4. ALL CONCRETE WILL BE DESIGNED TO DEVELOP A 28 DAY STRENGTH OF AT LEAST 3,000 LBS. PER SQUARE INCH IN COMPRESSION, AND SHALL BE PORTLAND CEMENT CONCRETE.
5. CHAMFER ALL EXPOSED EDGES WITH 3/4" CHAMFER.
6. DIMENSIONS ARE FROM FACE OF CONCRETE TO CENTER OF REINFORCING BARS UNLESS OTHERWISE SPECIFIED.
7. ALL STEEL THAT IS TO BE CONTINUOUS SHALL BE LAPPED A MINIMUM OF 30 BAR DIAMETERS.
8. ALL PIPES SHALL BE EMBEDDED A MINIMUM OF 5 INCHES INTO HEADWALLS OR OTHER STRUCTURES.
9. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL AS PER A.S.T.M. A-615.

RIP-RAP NOTES

1. ROCKS FOR GROUTED RIP-RAP SHALL BE OF GOOD QUALITY BROKEN CONCRETE AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSION SHALL EXCEED 3" AND THE LARGEST DIMENSION SHALL NOT EXCEED 18". THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.
2. THERE SHALL BE A GROUT BED OF AT LEAST 3" BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2".
3. SURFACE ROCKS SHALL BE EMBEDDED AT LEAST ONE-HALF TO TWO-THIRDS THEIR MAXIMUM DIMENSION.

12. A SOILS ENGINEER, SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF STREET R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY.
13. LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL CONSTRUCTION JOINTS EXCEPT TRANSVERSE JOINTS IN RECTANGULAR CHANNELS AND AROUND ALL CORNERS UNLESS OTHERWISE SHOWN.
14. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES OR RADIAL TO CONDUIT CENTER LINE UNLESS OTHERWISE SHOWN.
15. UNLESS OTHERWISE SHOWN, TRANSVERSE JOINT KEYWAYS IN BOTH SLABS AND WALLS SHALL BE PLACED AT THE END OF EACH POUR, BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET NOR BE LESS THAN 10 FEET.
16. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.

PF515505

BENCH MARK: BY - 4396 ELEV. = 1175.863

FROM THE N.C.B. CREST RD. & ST. & E. CATCH BASIN OPENING 10 FT. S. & 800 FT. W. OF MONROE

PALOS VERDES QUAD 1970 ADJ.

NOTICE TO CONTRACTOR

The existence and location of any underground utility pipes or structures shown on these plans are obtained by a search of the available records. To the best of my knowledge there are no existing utilities except as shown on these plans.

The contractor is required to take due precautionary measures to protect the utility lines shown and any other lines not of record or not shown on these plans

C M Leonard 11/1/77
R.C.E. 13160

PREPARED FOR

TRACT Nº 31617
P.D. Nº 1382

PREPARED BY

C M Leonard
CLARK M. LEONARD R.C.E. 13167

CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER

ENVIRONMENTAL DEVELOPMENT DIVISION

APPROVED BY Carl J. Schmidt DIVISION ENGINEER DATE 4-10-78

CHECKED BY Kenneth Harvey OFFICE OF THE CITY ENGINEER R.C.E. 12557 DATE 4-10-78

		DATE
DRAWN		
TRACED		
CHECKED		

SHEET 1 OF 4 SHEETS

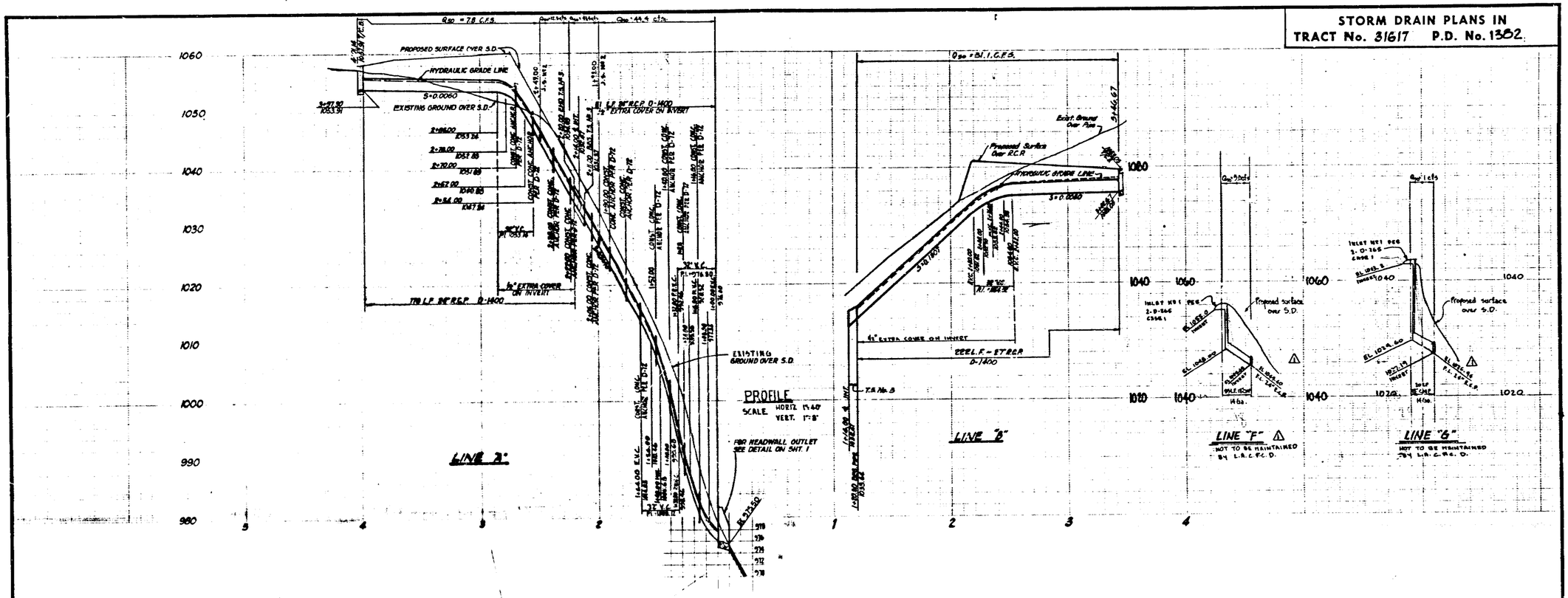
APPROVED: _____
CITY OF RANCHO PALOS VERDES

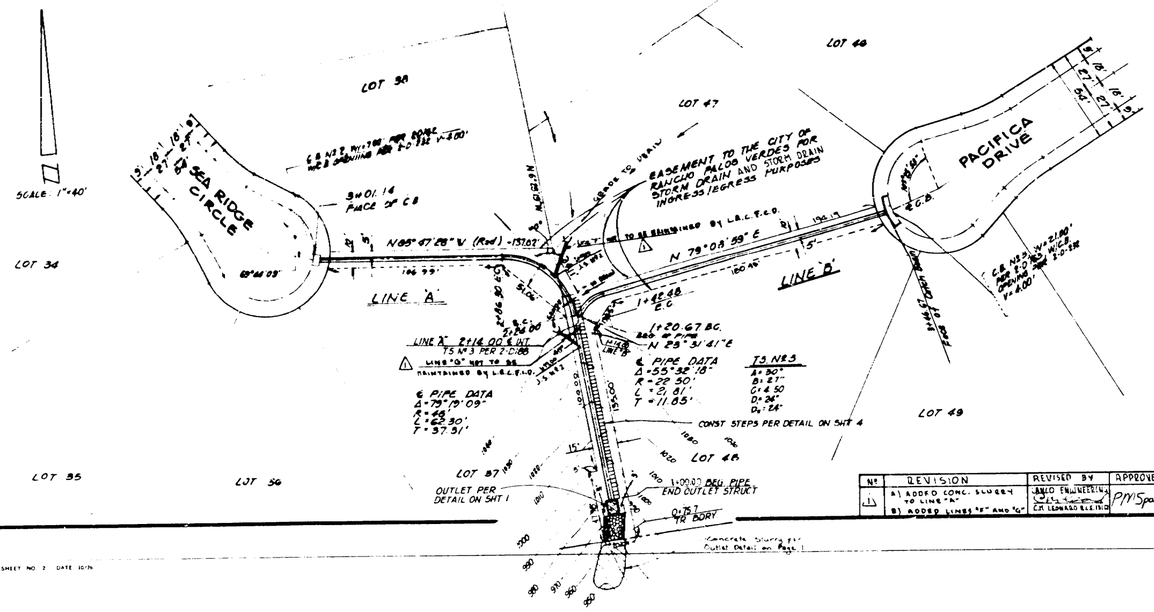
Reviewed By The Los Angeles County Road Department
By: Van R. Keener Date: 11-29-77

NO	REVISION	REVISED BY	APPROVED BY	DATE
1	A) LOCATE CONCRETE SLURRY TO LINE 'A' B) ADDED LINES "B" AND D	Lanco Engineering C M Leonard	P M Spandau	10/3/80

ATHENS SUPPLY CO. 3162947

STORM DRAIN PLANS IN TRACT No. 31617 P.D. No. 1382





PREPARED BY:
LANCO ENGINEERING
17439 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: _____ R.C.E. NO. 13167

CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. ROONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT
CHECKED BY: _____ R.C.E. NO. 12587 DATE: 4-10-78
OFFICE OF CITY ENGINEER

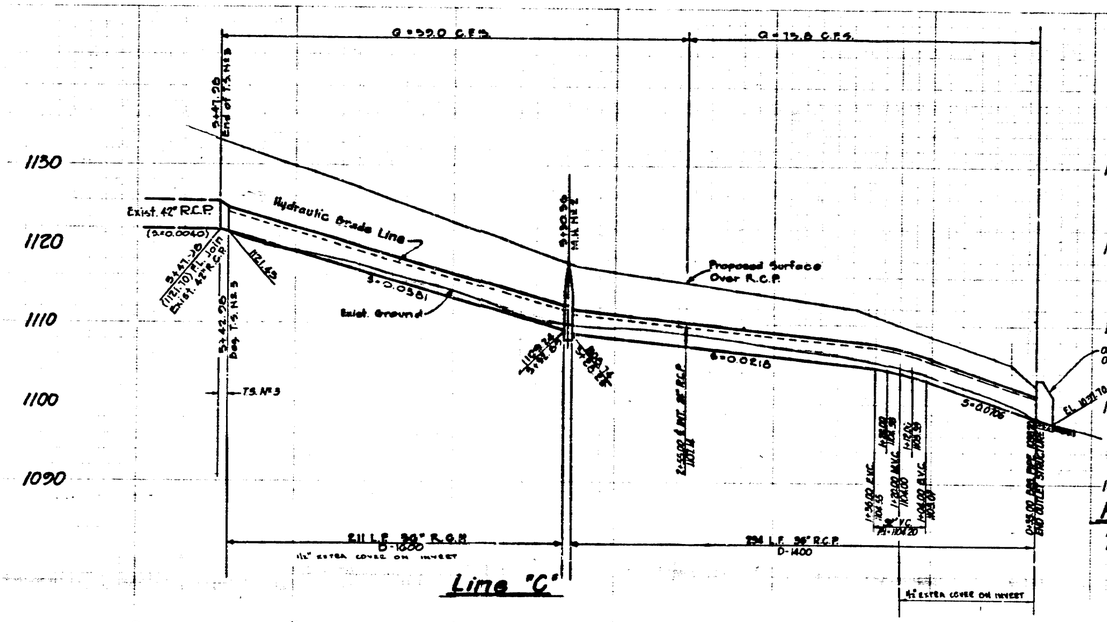
No	REVISION	REVISED BY	APPROVED BY	DATE
1	A) ADDED CONC. SLURRY TO LINE "A" B) ADDED LINES "F" AND "G"	LANCO ENGINEERING C.R. LEONARD R.C.E. 13167	PM Spandau	11/31/80

SHT 2 OF 4 SHTS

PF515506

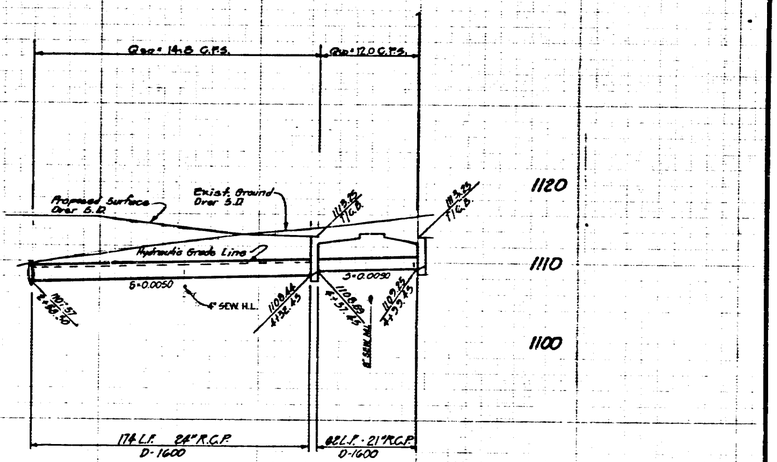
SOUTHERN CALIFORNIA BLUEPRINT CO. P.O. SHEET NO. 2 DATE 10/78

STORM DRAIN PLANS IN
TRACT No. 31617 P.D. No. 1302

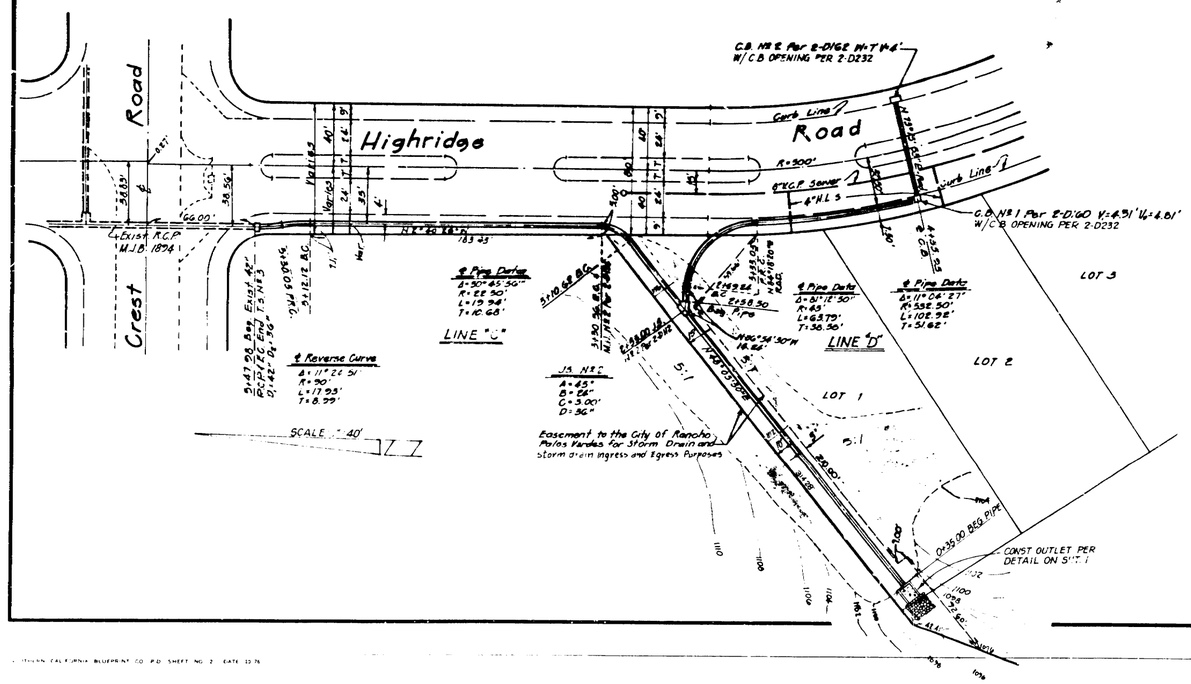


Line "C"

Profile Scale
Horizontal: 1"=40
Vertical: 1"=8'



Line "D"



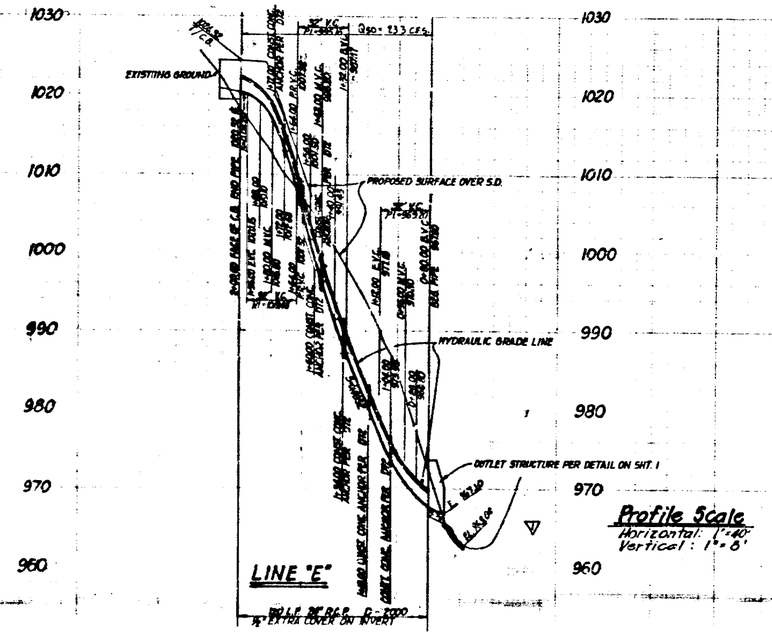
PF515507

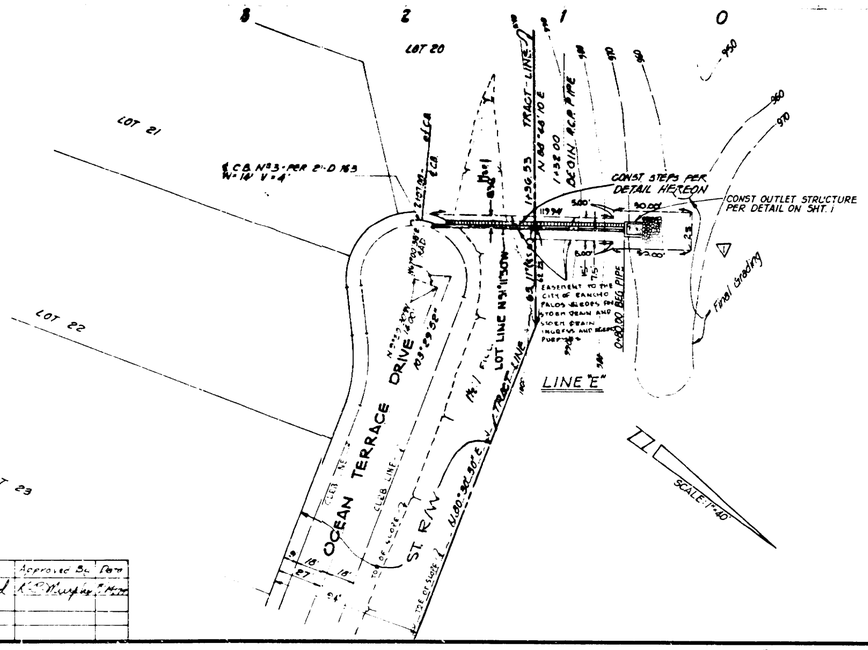
PREPARED BY:
LANCO ENGINEERING
17409 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: [signature] R.C.E. NO. 13162

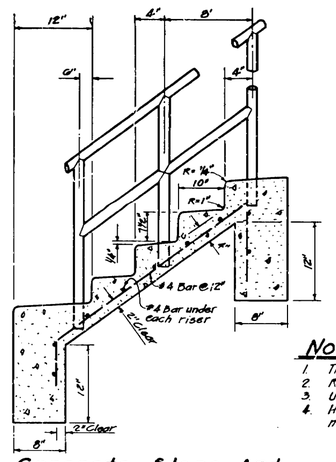
CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
CHECKED BY: Kenneth Nancy R.C.E. NO. 12587 DATE: 4-10-78
OFFICE OF CITY ENGINEER

SHT 3 OF 4 SHTS

STORM DRAIN PLANS IN
TRACT No. 31617 P.D. No. 1582







Concrete Steps And Handrail Detail
No Scale

Notes:
1. The Width of Stairway = 42"
2. Riser = 7½" Tread = 10"
3. Use handrails per L.A.C.Rd. Dept. Std. Plan 88-02
4. Handrail shall not reduce stairway width by more than 3-3/4"

No.	Revision	Revised By	Approved By	Date
1	Moved Retaining Wall From Tract 31617 to Tract 31617-1 Revise Contour	C.M. Lee	R.C. Murphy	4-10-78

PREPARED BY:
LANCO ENGINEERING
LYON NO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-5320 370-4865
SIGNATURE: C.M. Lee R.C.E. NO. 17167

CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
CHECKED BY: Kenneth Wong R.C.E. 12587 DATE: 4-10-78
OFFICE OF CITY ENGINEER

SHT 4 OF 4 SHTS

PF515508

THOMAS CALIFORNIA BLUEPRINT CO. P.D. SHEET NO. 2 DATE 10-76

STORM DRAIN PLANS IN TRACT No. 31714 P.D. No. 1403

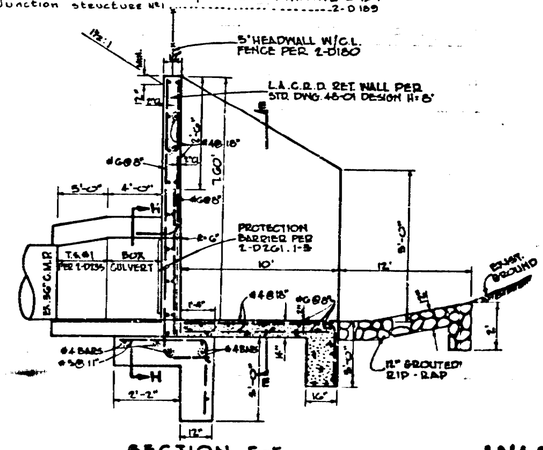
BENCH MARK: BY 4402

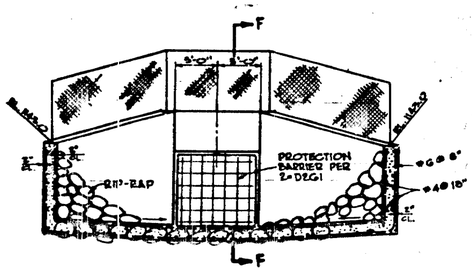
C.S. Mon. in 12" in. conc. post 4 in. above ground at N.E. cor. Crest Rd. & Crenshaw Blvd. 95 ft.± & 40ft.± N. & Int. mkd.

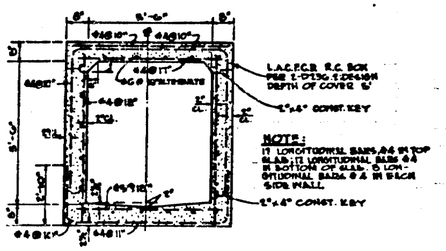
Palos Verdes Quad. 1970 Elev. 1201.455

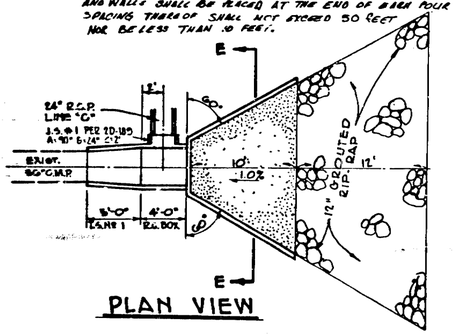
List of Standard Drawings of Los Angeles County Flood Control District

Description	Dwg. No.
Catch Basin No. 3	2-D163
Protection Bars for Catch Basin	2-D175
Catch Basin Reinforcement	2-D172
Catch Basin Opening	2-D232
Manhole Frame & Cover for Catch Basin	2-D156
Standard Drop Step	2-D 96
Connection to Catch Basin	2-D224
Headwall Fence	2-D180
Protection Barrier	2-D141.1 to 3
Transition Structure No.1	1-D135
Catch Basin Reinforcement for Round N.H.	2-D157
Junction Structure No1	2-D189



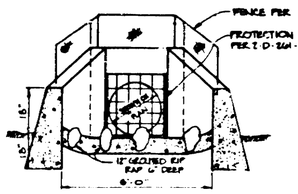


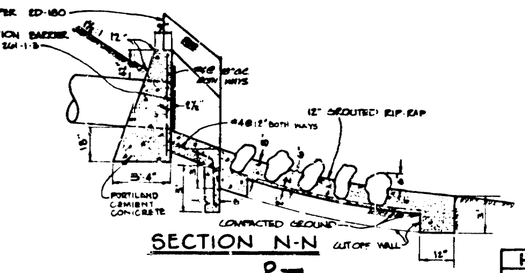


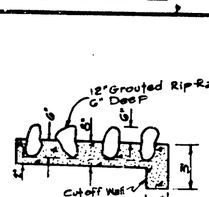


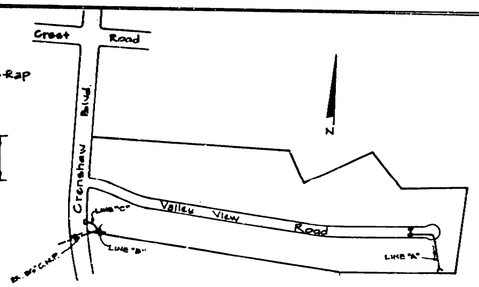
INLET STRUCTURE DETAILS

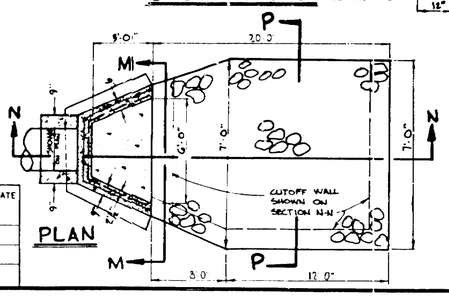
NO SCALE











OUTLET DETAIL "A"
NO SCALE

HYDRAULIC ELEMENT TABLE

STATION FROM	STATION TO	Qeo	ø	St	V
LINE "A"					
0+23.00	3+15.68	37.0	33" R.C.P.	0.0048	6.2
LINE "A-1"					
ALL	ALL	18.5	24" R.C.P.	NOT FULL	8.0'
LINE "C"					
ALL	ALL	50.0	24" R.C.P.	NOT FULL	3.20

GENERAL NOTES (Cont'd)

25. A SOILS ENGINEER SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF ST. R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE COUNTY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE CITY.
26. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7.16, 4.3 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS.
27. THE CONTRACTOR SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY ENGINEER STANDARD S-2.
28. ALL PIPE SHALL BE PLACED IN A TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE TOP OF PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS. ALL BACKFILL IN EASEMENTS SHALL BE COMPACTED TO THE DENSITY REQUIRED BY THE GRADING PLAN.
29. THE INSPECTOR MAY HAVE THE OPTION TO REQUIRE CONCRETE BACKFILL DURING CONSTRUCTION WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER AND IS SUBJECTED TO HEAVY EQUIPMENT TRAFFIC. THE CONCRETE BACKFILL SHALL CONSIST OF 1.5 SACK MIX CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM DEPTH OF 4 INCHES OVER TOP OF PIPE.
30. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.
31. AT THE BEGINNING AND END OF ALL POURS A LAYER OF REINFORCEMENT SHALL BE PLACED WITHIN 3 INCHES OF THE TRANSVERSE CONSTRUCTION JOINTS.
32. UNLESS OTHERWISE SHOWN, TRANSVERSE JOINT KEYWAYS IN BOTH SLABS AND WALLS SHALL BE PLACED AT THE END OF EACH POUR BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET NOR BE LESS THAN 10 FEET.

GENERAL NOTES:

1. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929. ALL WORK SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION 1976 EDITION," AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE CITY ENGINEER.
2. APPROVAL OF THIS PLAN BY THE CITY OF RANCHO PALOS VERDES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
3. THE CONTRACTOR SHALL NOTIFY THE ENVIRONMENTAL DEVELOPMENT DIV. BY TELEPHONE, 377-7288 AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS CONTRACT. THE CONTRACTOR SHALL SUBMIT A DEPOSIT FOR CONSTRUCTION INSPECTION TO THE COUNTY ENGINEER, 950 S. VERMONT AVE., LOS ANGELES, AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS CONTRACT.
4. ALL CONSTRUCTION JOINTS IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
5. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAS BEEN PLACED, INSPECTED AND APPROVED.
6. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
7. ALL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAYS COMPRESSIVE STRENGTH OF 3000 p.s.i.
8. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4" CHAMFER.
9. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2½" CLEARANCE UNLESS OTHERWISE SPECIFIED.
10. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL AS PER A.S.T.M. A-615.
11. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE".
12. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTERLINE OF STEEL UNLESS OTHERWISE NOTED.
13. ALL BACKFILLS AND FILLS: TO BE USED AS SUBGRADE SHALL BE COMPACTED TO A RELATIVE DENSITY OF 90% UNLESS OTHERWISE SPECIFIED.
14. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18", WHICHEVER IS GREATER.
15. ALL CATCH BASINS AND CONNECTOR PIPES BETWEEN CATCH BASINS TO BE INSPECTED BY THE COUNTY ROAD DEPARTMENT.
16. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING "NLET & HEADWALLS, UNLESS OTHERWISE SPECIFIED.
17. WHERE PIPE IS TO BE PLACED IN FILL, THE FILL SHALL BE COMPACTED TO A MINIMUM DEPTH OF 3 FEET ABOVE THE TOP OF PIPE PRIOR TO TRENCHING.
18. ALL BACKFILL AND FILL AROUND CLOSED CONDUIT IN STREET RIGHTS OF WAY SHALL BE BROUGHT UP TO SUBGRADE OF THE ROAD OR TO 2 FEET ABOVE THE TOP OF THE CONDUIT, WHICHEVER IS LESS. THE ROAD DEPARTMENT SHALL INSPECT ALL BACKFILL AND FILL ABOVE AFOREMENTIONED LIMITS. APPLICATION FOR AN ENGINEER OR INSPECTOR IN CONNECTION WITH THE WORK, SHALL BE MADE BY THE CONTRACTOR AT LEAST 24 HOURS BEFORE HIS SERVICE IS REQUIRED. CALL 226-8118.
19. A PERMIT SHALL BE OBTAINED FROM THE ROAD DEPARTMENT AND SHALL BE SUBMITTED TO THE INSPECTOR PRIOR TO COMMENCING CONSTRUCTION WITHIN THEIR RIGHTS OF WAY.
20. ALL REINFORCED CONCRETE PIPE SHALL BE BEDDED IN ACCORDANCE WITH LOS ANGELES COUNTY ENGINEER CASE Ad BEDDING PER STANDARD DRAWING D-54, UNLESS OTHERWISE NOTED.
21. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
22. THIS STORM DRAIN WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE, AND THE SYSTEM IS CLEANED TO THE SATISFACTION OF THE CITY ENGINEER.

RIPRAP NOTES

1. ROCKS FOR GROUTED RIPRAP SHALL BE GOOD QUALITY BROKEN CONCRETE AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSION SHALL EXCEED 12 INCHES AND THE LARGEST DIMENSION SHALL NOT EXCEED 18 INCHES. ~~THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.~~
2. THERE SHALL BE A GROUT BED OF AT LEAST 2 INCHES BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2 INCHES.
3. SURFACE ROCKS SHALL BE IMBEDDED FROM 1/2 TO 2/3 OF THEIR MAXIMUM DIMENSION.

NOTE: CONCRETE MAY BE SUBSTITUTED FOR THE GROUT.

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

D. M. Keener — REGISTERED CIVIL ENGINEER No. — 5/1/78 DATE

PF515529

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REVIEWED BY THE LOS ANGELES COUNTY ROAD DEPT.
BY: Dan R. Keener DATE: 5-28-78

PREPARED BY:
LANCO ENGINEERING
17438 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: C.M. Lanco R.C.E. NO. 13147

CITY OF RANCHO PALOS VERDES, CALIF.
STEPHEN J. KOONCE CITY ENGINEER

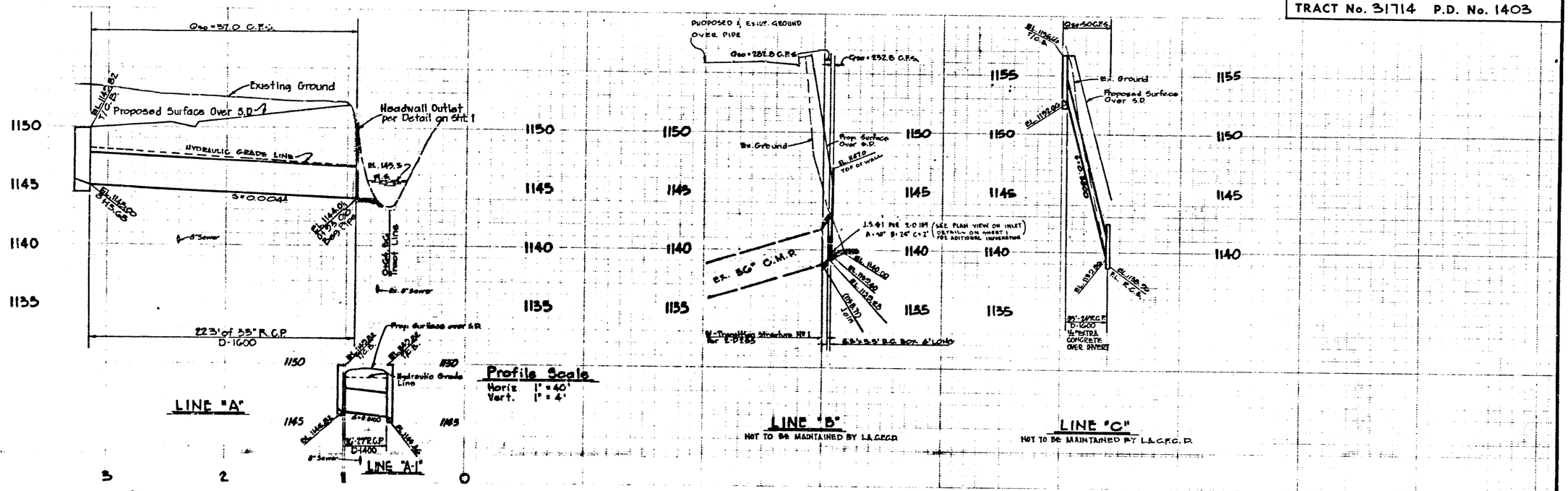
ENVIRONMENTAL DEVELOPMENT DIVISION
APPROVED BY: Carole Smith DIVISION ENGINEER DATE: 6/2/78

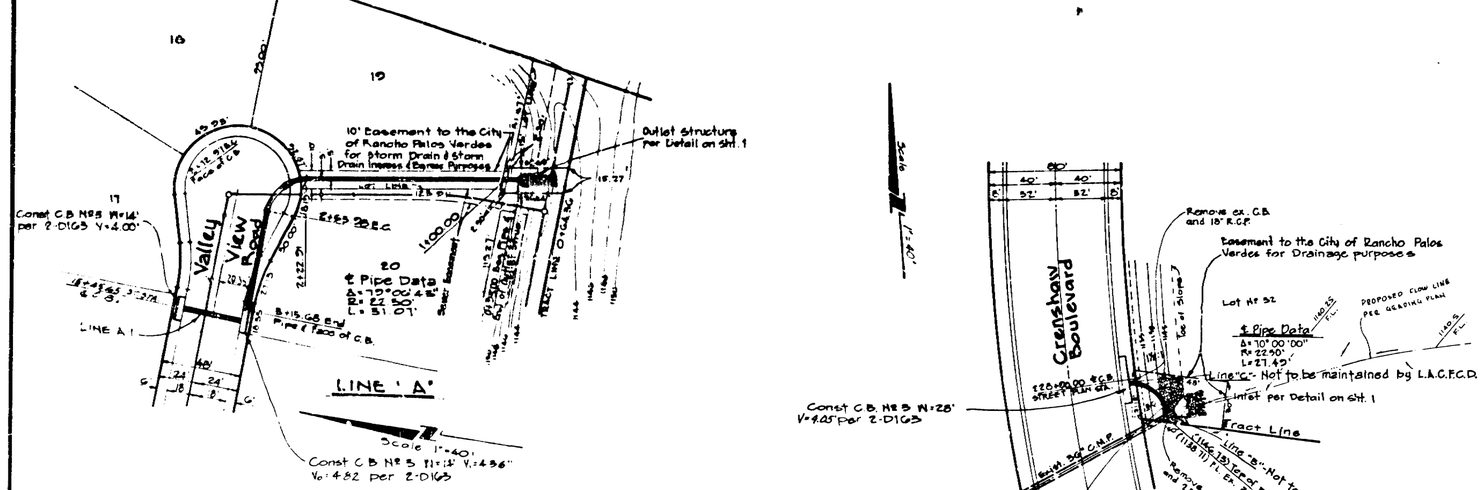
CHECKED BY: K Hanner R.C.E. NO. 12587 DATE: 6/2/78
OFFICE OF COUNTY ENGINEER

SHT 1 OF 2 SHTS

...CALIFORNIA BLUEPRINT CO. P.D. SHEET NO. 1 DATE 10-76

STORM DRAIN PLANS IN TRACT No. 31714 P.D. No. 1403





"PF515530"

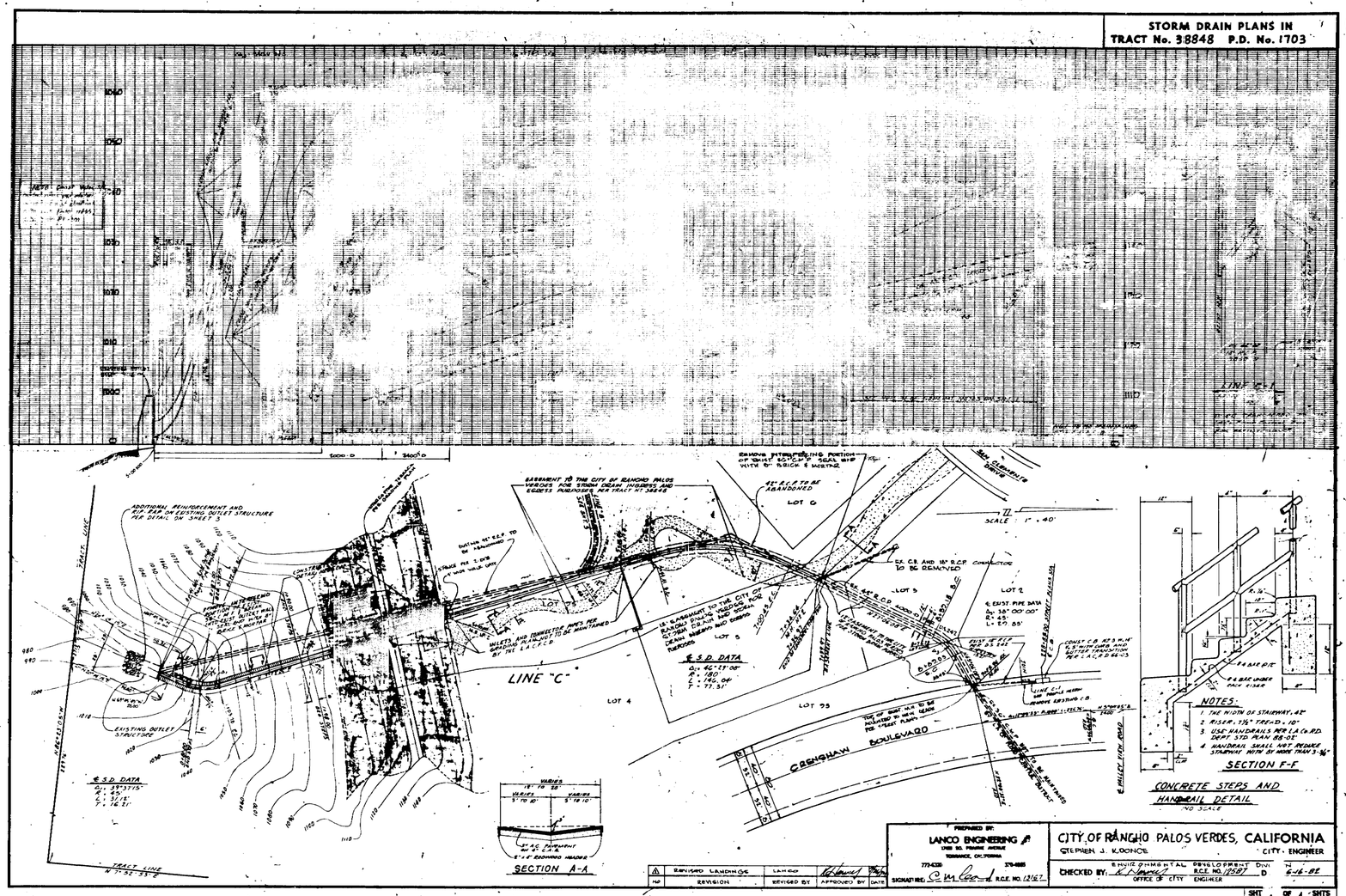
PREPARED BY:
LANCO ENGINEERING
17438 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: C M Leard R.C.E. NO. 13167

CITY OF RANCHO PALOS VERDES, CALIF.
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
CHECKED BY: R Daniels R.C.E. NO. 12597 DATE: 6/2/78
OFFICE OF COUNTY ENGINEER

SHT 2 OF 2 SHTS

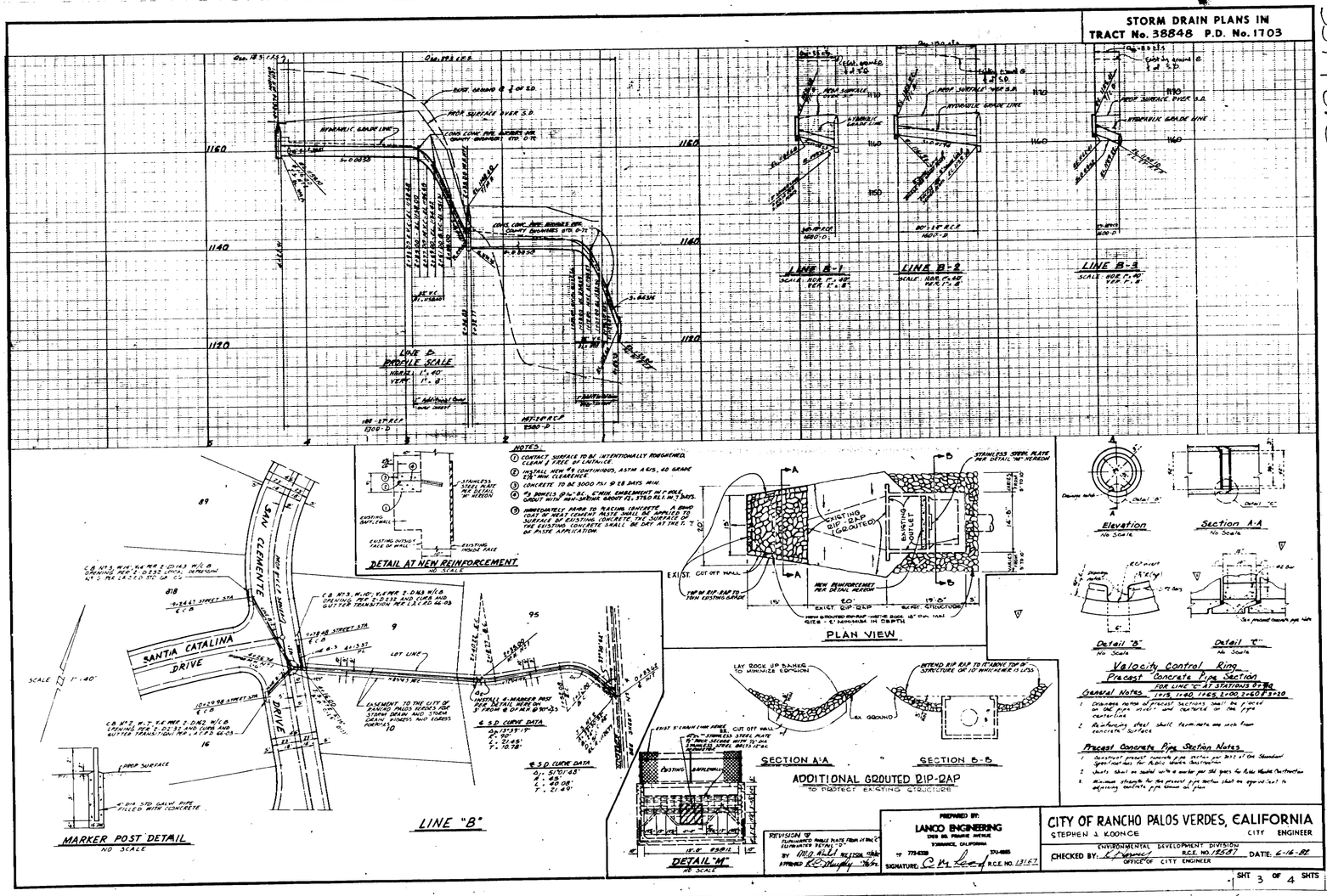
STORM DRAIN PLANS IN
TRACT No. 38848 P.D. No. 1703

357-F8.4



STORM DRAIN PLANS IN TRACT No. 38848 P.D. No. 1703

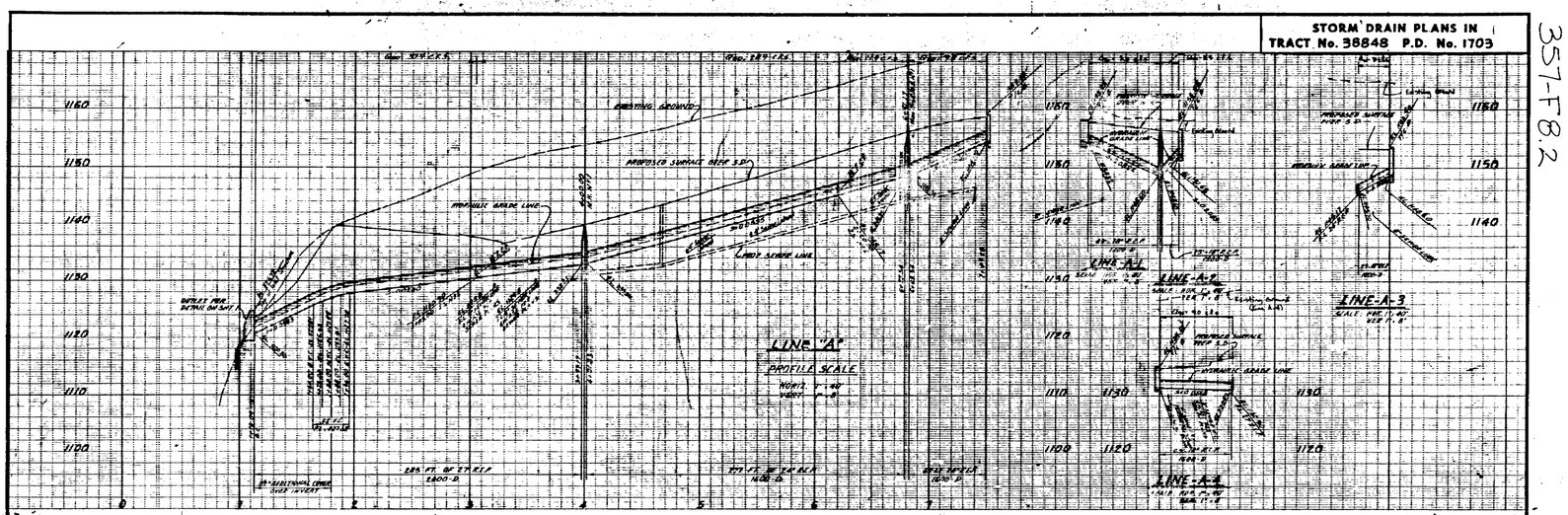
357-F8.3

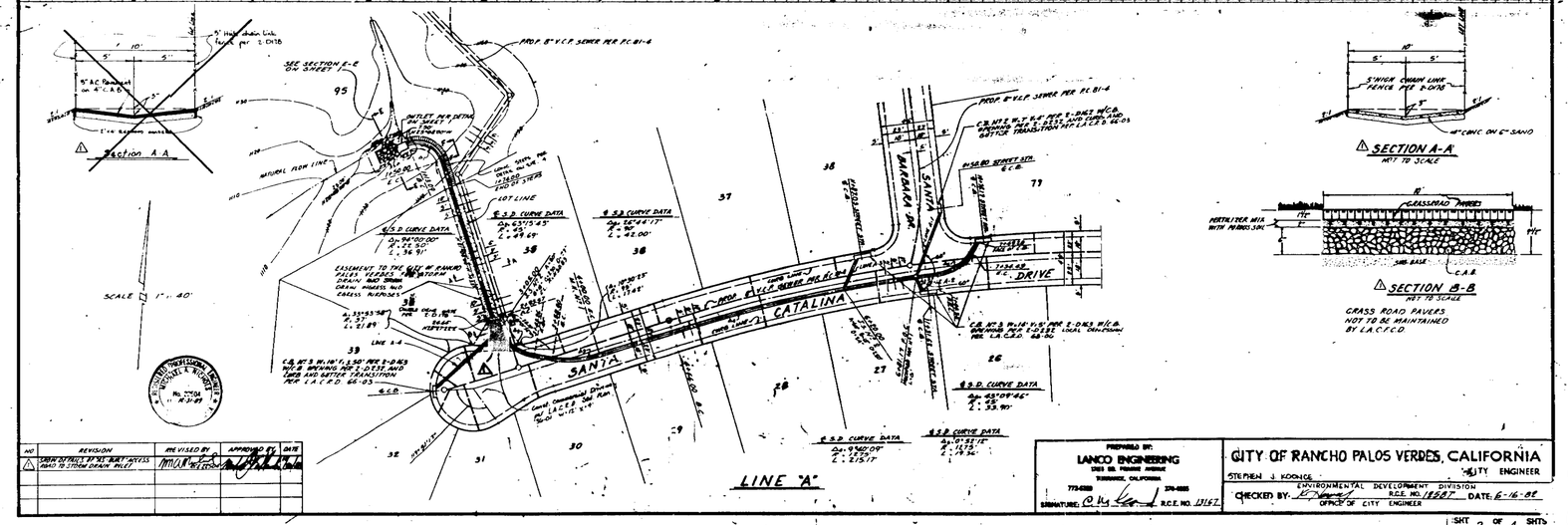


357-F8.3

PF516052

STORM DRAIN PLANS IN TRACT No. 38848 P.D. No. 1703




Section A-A
SECTION A-A
NOT TO SCALE
SECTION B-B
NOT TO SCALE
GRASS ROAD PAVERS
NOT TO BE MAINTAINED BY L.A.C.F.C.D.
SCALE 1" = 40'
LINE "A"
CATALINA
SANTA
MARGATE DR.
DRIVE
PROF. 8" V.C.P. SEWER PER P.C. 81-4
SEE SECTION E-E ON SHEET
OUTLET PER DETAIL ON SHEET
LOT LINE
EASEMENT TO THE CITY OF RANCHO PALOS VERDES FOR PUBLIC ROAD PURPOSES AND DRAINAGE AND DRAIN AND SEWER PURPOSES AND ACCESS PER 20253-OR
CABLE HOLD DOWN PER STD. 816 AT FIRE HYDRANT
C.B. #1 S. W. 10' E. 3.50' PER S-D-163 W/G-B BROWING PER S-D-132 AND TWO 45° BEVEL TRANSITION PER L.A.C.F.C.D. 66-03
C.B. #2 S. 89°46'45" W. 2.00' PER S-D-163 W/G-B BROWING PER S-D-132 AND TWO 45° BEVEL TRANSITION PER L.A.C.F.C.D. 66-03
C.B. #3 S. 89°46'45" W. 2.00' PER S-D-163 W/G-B BROWING PER S-D-132 AND TWO 45° BEVEL TRANSITION PER L.A.C.F.C.D. 66-03
C.B. #4 S. 89°46'45" W. 2.00' PER S-D-163 W/G-B BROWING PER S-D-132 LOCAL DEPRESSION PER L.A.C.F.C.D. 66-03
5' HIGH CHAIN LINK FENCE PER S-D-170
4" CONC. ON 6" SAND
GRASSROAD PAVERS
FERTILIZER MIX WITH PERMO SOIL
SAND BASE
C.A.B.
6" C.M.P.
4" S.D.R.
4" V.C.P.
4" C.I.P.
4" P.V.C.
4" A.C.P.
4" C.A.P.
4" C.M

STORM DRAIN PLANS IN TRACT No. 38848 P.D. No. 1703

357-F8:1-4

BENCH MARK: BY 6402
C.S. MON. IN 12 IN. CONC. POST 3 IN. ABOVE GROUND AT NE COR. FIRST FD 3 CHEMUNGAN BLVD. 93.7' E. & 1.40' S. OF C & G PT. MKD. (ELEV. 507 1956 R.E. 5849)

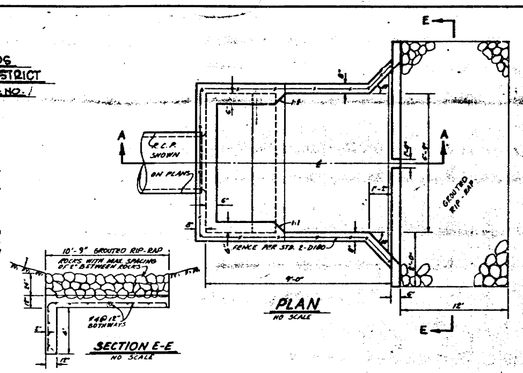
PALOS VERDES 1970 ELEV. 1201.339

LIST OF STANDARD DRAWINGS FOR LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

DESCRIPTION	DWG. NO.
JUNCTION STRUCTURE NO 1	2-D82
CATCH BASIN NO 2	2-D164
CATCH BASIN NO 3	2-D165
MANHOLE NO 2	2-D184
MANHOLE FRAME AND COVER	2-D672
PROTECTION RAIL FOR CATCH BASIN	2-D178
CATCH BASIN REINFORCEMENT	2-D172
CONNECTION TO CATCH BASIN FOR PIPE	2-D184
CATCH BASIN OPENING	2-D182
MANHOLE FRAME AND COVER FOR C.B.	2-D186
FENCE	2-D180
CATCH BASIN REINFORCEMENT FOR ROUND C.B.	2-D157
STANDARD DROP STEP	2-D76
SPECIAL MANHOLE FRAME AND COVER	2-D677
TRANSITION STRUCTURE NO 3	2-D188
JUNCTION STRUCTURE NO 4	2-D193
SHAFT SAFETY LEDGE	2-D690
CONCRETE COLLAR	2-D193
CONCRETE ENCASEMENT FOR CULVERTS, RIGHTS OF WAY	2-D116

LOS ANGELES COUNTY ENGINEER

PIPE BEDDING	D-54
CONCRETE ANCHORS	D-72



PLAN
NO SCALE

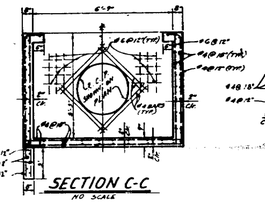
SECTION E-E
NO SCALE

HYDRAULIC ELEMENT TABLE

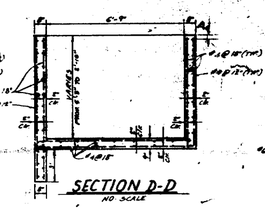
STATION FROM	STATION TO	Q_{des}	θ	S'	V
		LINE "A"			
1+15.09	1+80.00	37.9	22.6 C.F.F.	HOT FULL	22.6
1+80.00	5+05.00	37.9	67° "	"	13.6
5+05.00	6+00.00	28.9	67° "	"	12.9
6+00.00	6+10.00	28.9	54° "	"	13.1
6+10.00	6+31.19	7.9	54° "	"	16.1
6+81.13	7+49.28	7.9	54° "	"	12.4
LINE	A-1	5.8	18" R.C.P.	HOT FULL	11.9
LINE	A-2	8.5	"	"	19.5
LINE	A-3	7.0	"	"	15.6
LINE	A-4	9.0	"	"	5.9
		LINE "B"			
DIST. 0+00	0+90.00	12.8	54" R.C.P.	0.0100	7.33 **
0+90.00	1+12.80	12.5	54" "	NOT FULL	39.5 **
1+12.80	1+78.80	12.5	54" "	NOT FULL	96.4 **
1+78.80	Sta 1+94.80	12.5	54" "	0.0108	7.3
Sta 1+94.80	2+49.80	12.5	42" "	0.0095	7.6 **
2+49.80	Sta 2+68.80	12.1	42" "	ABT. FULL	34.0 **
Sta 2+68.80	2+71.80	12.1	42" "	NOT FULL	22.8 **
2+71.80	3+19.80	12.1	42" "	0.0065	7.6
3+19.80	4+16.16	12.5	42" "	0.0055	9.6
LINE	B-1	5.8	18" R.C.P.	0.0010	13
LINE	B-2	12.0	24" "	0.0024	6.8
LINE	B-3	11.0	18" "	0.0110	6.2
		LINE "C"			
Dist. 0+00	0+78.00	840.6	84" R.C.P.	NOT FULL	40.2 **
0+78.00	Sta 0+88.00	838.8	66" "	NOT FULL	44.0 **
Sta 0+88.00	4+77.22	836.9	66" "	0.0032	28.6 *
4+77.22	5+39.00	305.1	42" "	0.0320	21.5 *
5+39.00	5+60.00	304.7	42" "	0.0241	21.3 *
5+60.00	Tr 34+68	299.5	36" "	0.0215	24 *
Tr 34+68	37+53 Pc	299.1	(42" " ?)	(0.0283)	(21.2) EXISTING
LINE	C-1	19.1	18" R.C.P.	0.0231	18.8

* THIS PIPE REACH IS TO BE MANUFACTURED WITH 1½ INCH ADDITIONAL CONCRETE THICKNESS OVER THE INVERT STEEL

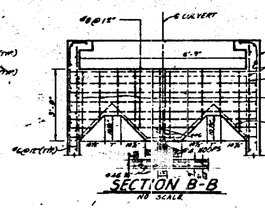
** THIS PIPE REACH IS TO BE MANUFACTURED WITH 1 INCH ADDITIONAL CONCRETE THICKNESS OVER THE INVERT STEEL



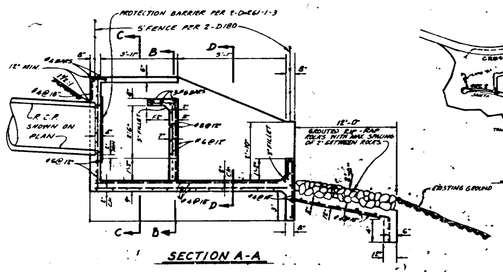
SECTION C-C
NO SCALE



SECTION D-D
NO SCALE



SECTION B-B
NO SCALE


PROTECTION BARRIER PER 1-D450-1-3
5'FENCE PER 2-D180
B
C
D
3'-11"
8"
12" MIN
#6 BARS
#6@18"
#6@12"
L.C.S.A. SHOWN ON PLAN
3'-11"
#6@12"
#6@12"
#6@12

California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzenegger
Governor

December 15, 2006

Mark Pestrella, Assistant Deputy Director
Department of Public Works
County of Los Angeles
700 South Fremont Ave.
Alhambra, CA 91803

Directors, Department of Public Works and
Directors, Department of Planning
Municipal Permittees within County of Los Angeles

CLARIFICATION TO PART 4.D. DEVELOPMENT PLANNING PROGRAM, THE LOS ANGELES COUNTY MUNICIPAL STORM WATER PERMIT, ORDER No. 01-182, NPDES PERMIT No. CAS004001

Dear Mr. Pestrella and Municipal Directors:

Thank you for requesting clarification on the Development Planning requirements of the Los Angeles County Municipal Storm Water Permit (L.A. County MS4 Permit).

This letter restates the compliance expectation of the California Regional Water Quality Control Board, Los Angeles Region (L.A. Water Board), when it adopted the requirements in 'Part 4 §D, Development Planning' of the L.A. County MS4 Permit. Part 4.D contains specific provisions that are fully enforceable, and which were also contained in the Development Planning Model Program submitted by the L.A. County Permitees, and which was approved in 2000.

Our evaluation of the implementation of the Development Planning and Standard Urban Stormwater Mitigation Plan (SUSMP) requirements on land development projects in Los Angeles County has revealed that many Permittees' planning and public works departments and their associated staff, including architects, planners and engineers have failed to integrate SUSMP implementation adequately with other storm water quality management strategies required in the L.A. County MS4 permit. The L.A. Water Board has identified several instances of inadequate or uncoordinated implementation by Permitttes for 'Part 4.D Development Planning'.

U.S. EPA Guidance

In areas undergoing new development or redevelopment, the most effective method of controlling impacts from storm water discharges is to limit the amount of rainfall that is converted to runoff. By utilizing design techniques that incorporate on-site storage and infiltration, and minimizing the amount of directly connected impervious surfaces, the amount of runoff generated from the site can be significantly reduced (*Preliminary Data Summary of Urban Storm Water Best Management Practices*, EPA 821-R-99-012, August 1999).

The three provisions in Part 4.D are consistent with guidance in Chapter 5 of *Preliminary Data Summary of Urban Storm Water Best Management Practices*. The U.S. EPA guidance states that in order to meet the goals of post-development peak discharge rate, volume and pollutant loading to receiving waters being the same as pre-development values, BMPs should be implemented to achieve three main objectives: flow control, pollutant removal and pollutant source reduction.

California BMP Manual

Similarly, Section 2.4 of the California Stormwater Quality Association (CASQA) BMP Handbook for Development and Redevelopment (2003), in its discussion on planning and design principles, reiterates the provisions in Part 4.D. These principles promote three basic strategies in the following order of preference based on effectiveness and costs: (1) reduce or eliminate post-project runoff; (2) control sources of pollutants; and (3) treat contaminated storm water runoff before discharging it to natural water bodies.

Groundwater Quality Protection Concern

Some Permittees have expressed a concern that infiltration of storm water may present risks to groundwater aquifers. Generally, the common pollutants in storm water are filtered or adsorbed by soil, and unlike hydrophobic solvents and salts, do not cause groundwater contamination. In any case, infiltration of 1-2 inches of rainfall in semi-arid areas like Southern California where there is a high rate of evapo-transpiration, presents minimal risks.

The Water Augmentation Study conducted by the Los Angeles and San Gabriel Rivers Watershed Council, in partnership with several agencies including water districts, municipalities, and the U.S. Bureau of Reclamation, indicates that the infiltration of storm water, with appropriate pretreatment, does not adversely impact groundwater quality (*Los Angeles Basin Water Augmentation Study, August 2005*). You may view the study at www.lasgrwc.org/WAS.htm

Infiltration of storm water discharges from heavy industrial areas is seldom appropriate. Where there is a real concern on the risk of groundwater contamination from preexisting soil contamination or heavy vehicular traffic when installing infiltration systems such as extended detention basins, the L.A. Water Board and the California Department of Transportation (Caltrans) developed guidance to ensure an adequate analysis for proper

siting. See, *Infiltration Basin -Site Selection Study, Volumes I, II, and III* June 2003, CTSW-RT-03-025**,** http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/index.htm

Caltrans research indicates that infiltration basins and biofiltration BMPs are technically feasible if site site-specific considerations are taken into account (Caltrans CTSW-RT-01-050, *BMP Retrofit Pilot Program, January 2004*).

Background of MS4 Development Planning Requirements

Standard Urban Storm Water Mitigation Plan

On March 8, 2000, the L.A. Water Board adopted the SUSMP, and required that municipalities incorporate into the planning and design phases post-construction storm water mitigation controls for specified development and redevelopment projects. Although the SUSMP action was petitioned by some municipalities to the State Water Resources Control Board (State Water Board), the State Water Board directed in Water Quality Order 2000-11 that, *"the Permittees shall amend codes, if necessary, not later than* ***January 15, 2001****, to give legal effect to the SUSMP requirements. The SUSMP requirements shall take effect not later than* ***February 15, 2001****."*

On November 7, 2003, the L.A. Water Board transmitted the Development Planning Program Review Report after auditing four Permittee Programs (the Planning Review Report). The Planning Review Report presented and described discernible permit violations, deficiencies, and notable elements observed during the audit. Notably, the MS4 Development Planning program contained in Board Order No. 01-182 is built upon programs already established in previous Board Orders (90-079 and 96-054), after undergoing a very long process of public hearings and meetings before permit adoption.

Nearly six years later after the SUSMP was adopted, most Permittees' implementation of SUSMPs is deficient, because Permittees have not focused nor emphasized water quality pollution mitigation to protect the beneficial uses of receiving waters.

Consequently, the L.A. Water Board provides the following clarification consistent with the L.A. Water Board's mission of protecting water quality and preserving water resources:

A. Essential Post Construction Control Requirements

1. The three provisions in Part 4.D are the essential requirements for compliance with the Development Planning requirements of the L.A. County MS4 Permit. The three provisions are to: (1) maximize the percentage of pervious surfaces to allow percolation of storm water into the ground; (2) minimize the quantity of storm water directed to impervious surfaces and the MS4; and (3) minimize pollution emanating from parking lots through the use of appropriate treatment control BMPs and good housekeeping practices.

The basic site design planning considerations for post-construction storm water BMP implementation are to:

a. Preserve the natural drainage system, protect slopes and provide controls for stream protection. These controls are achieved through the basic control measures that include infiltration, retention/detention, bioretention and biofilters;

b. Integrate fully the opportunities to maximize the percentage of pervious surfaces and minimize the volume of storm water runoff;

c. Utilize a BMP treatment-train that (i) captures and infiltrates using infiltration basins, infiltration trenches, retention and/or detention BMPs; and/or (ii) provide flow through treatment in the order of preference for the prescribed storm water quality runoff volume **(Q_{wv})** based on the numerical mitigation criteria in Part 4.D;

d. Identify the combination of BMP treatment trains that are to be sized, designed and constructed based on **Q_{wv}** required for water quality. Using **Q_P** from 10, 20, or 50-year return-period for flood management is inappropriate for water quality purposes and not cost effective. Capturing and treating a larger percentage of the annual storm water runoff volume greater than **Q_{wv}** provides only a small increase in additional removal of pollutants and considerably increases the sizing and cost of the structural and treatment storm water controls; and

e. Establish in addition, for downstream channel protection, instead of **Q_P** a flow control criteria (Q_{HMC}) which takes into consideration flow volume, duration, and frequency to maintain the predevelopment distribution of in-stream flows above the critical flow for streambed erosion, thus preserving the pre-development capacity to transport sediment, while not accelerating down stream erosion. An appropriate hydromodification flow duration control criteria might be to set the Q_{HMC} such that the post-construction discharge rates and duration match the ranges from 10 percent of the pre-development 2-year 24 hour peak flow up to the pre-development 10 year 24 hour peak flow, unless an alternative criterion can be demonstrated as equally protective using hydrodynamic modeling.

2. Measures and Approaches for Minimizing Impervious Surface Area

a. Permittees must minimize the percentage of impervious surfaces to support the percolation and infiltration of storm water into the ground and/or minimize pollutants emanating from impervious surfaces by reducing the percentage of effective impervious area to a generally accepted standard of 5 percent or less of total project area.

The U.S. EPA storm water technology fact sheet for bioretention recommends that sizing criterion should be 5 to 7 percent of the drainage area multiplied by the rational method runoff coefficient "C" determined for the site (*Storm Water Technology Fact Sheet, Bioretention*, U.S. EPA Document No. EPA 832-F-99-012, September 1999). However, a lower sizing criterion may be more appropriate for

Southern California. A recent study determined that physical degradation of stream channels in semi-arid climates such as in Southern California may be detectable with watershed impervious cover between 3 and 5 percent (*Effects of Increases in Peak Flows and Imperviousness on the Morphology of Southern California Stream,* SCCWRP, April 2005).

b. Permittees must also control pollution emanating from impervious surfaces such as roof-tops, parking lots, and roadways through the use of appropriate source controls such as the use of low impact development (LID) and integrated water resources management strategies that:

1. Emphasize conservation and the use of on-site natural features;
2. Integrate engineered small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. Small-scale hydrologic controls are BMPs that create green infrastructure and spaces such as park-like open space, rainwater collection barrels, planter boxes, and garden-like areas that promote community awareness and improve storm water quality; and
3. Implement primarily a source control and minimize the need for large sub-regional and regional treatment control BMPs.

B. Plan Preparation/ Review Procedures and Guidelines

1. Permittees must possess clear and adequate legal authority in municipal storm water ordinances to address post-construction requirements in the L.A. County MS4 Permit. The legal authority must direct land developers to review and mitigate the adverse storm water quality impacts in the Environmental Impact Report (EIR), and to ensure that adequate post-construction control measures are incorporated during the development project's site planning and design phases. In addition, clear instructions should be provided on how to illustrate on plans the BMPs selected, adequate sizing, and BMP siting;

2. The selection of the treatment train of BMPs must be conducted through a methodical selection process that matches the type of BMP with the type and nature of pollutants that are expected to be generated from the site. For example, vortex separation devices installed in high commerce areas for removing trash and gross solids are not suitable for removing pollutants in dissolved state or smaller size/lighter weight fractions from vehicular traffic areas;

3. Permittees should also prescribe guidelines for the submittal of standard final SUSMP plans so that relevant storm water BMP locations and specifications in design sheets are clearly identified. Separate SUSMP detail plan sheets will facilitate technical review.

   Delineation of drainage area and/or sub-areas, natural drainage systems, storm drains, and other relevant parameters at pre-development and post-development water flow paths, outfall (drainage) locations, BMP detail plans, and other relevant information should be presented. Simply inserting post-development plans within the grading plans, storm drain plans, or civil plans with unrelated detail drawings, numbers, and

construction notes makes it difficult to review and evaluate. Small-scale controls may be combined with the landscaping plans;

4. Plan view and sectional plans for small-scale hydrologic controls for a lot size and sub-drainage area of the sites should be prescribed; and

5. BMP design specifications must be incorporated in the SUSMP report together with hydrologic calculations for sizing BMPs. This report should support and show how criteria were adequately utilized in sizing BMPs (e.g., infiltration, retention/detention BMPs, bioretention facilities, etc.);

If you have any questions, please call Dr. Xavier Swamikannu at (213) 620-2094 or Carlos D. Santos at (213) 620-2093.

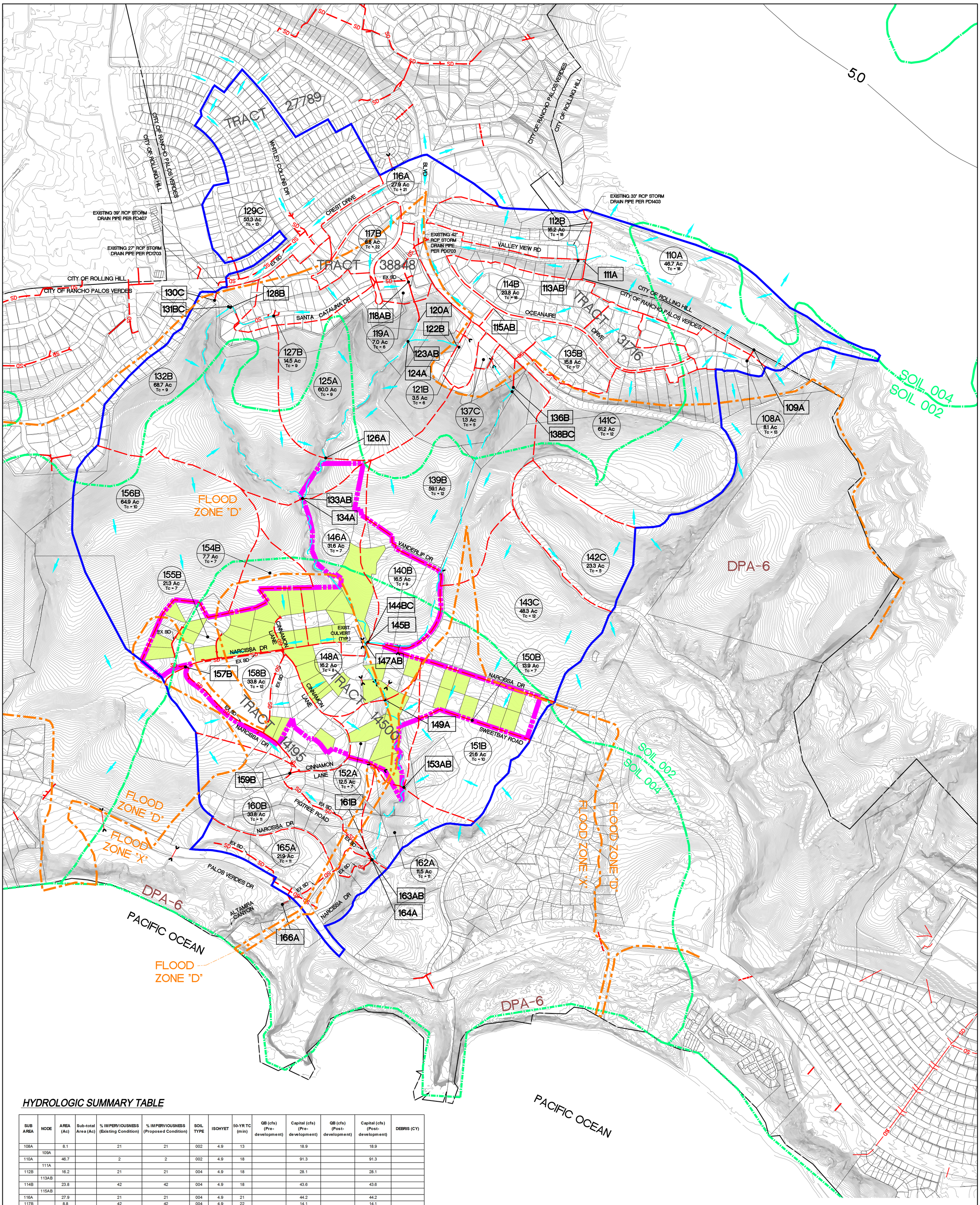
Sincerely,

Original Signed

Jonathan Bishop, P.E.
Executive Officer

cc: Michael Levy, Office of the Chief Counsel, State Water Board
Darrin Polhemus, Division of Water Quality, State Water Board
Bruce Fujimoto, Division of Water Quality, State Water Board

Conceptual Drainage and SUSMP (Water Quality) Map



HYDROLOGIC SUMMARY TABLE

SUB AREA	NODE	AREA (Ac)	Sub-total Area (Ac)	% IMPERVIOUSNESS (Existing Condition)	% IMPERVIOUSNESS (Proposed Condition)	SOIL TYPE	ISOHYET	50-YR TC (min)	QB (cfs) (Pre-development)	Capital (cfs) (Pre-development)	QB (cfs) (Post-development)	Capital (cfs) (Post-development)	DEBRIS (CY)
108A		8.1		21	21	002	4.9	13		18.9		18.9	
	109A												
110A		46.7		2	2	002	4.9	18		91.3		91.3	
	111A												
112B		16.2		21	21	004	4.9	18		28.1		28.1	
	113AB												
114B		23.8		42	42	004	4.9	18		43.6		43.6	
	115AB												
116A		27.9		21	21	004	4.9	21		44.2		44.2	
117B		8.8		42	42	004	4.9	22		14.1		14.1	
	118AB												
119A		7.0		21	21	004	4.9	6		21.2		21.2	
	120A												
121B		3.5		21	21	004	4.9	6		10.6		10.6	
	122B												
	123AB		**142.0**							**170.0**		**170.0**	
	124A												
125A		60.0		1	1	004	4.9	9	156.8	252.4	156.8	252.4	4500.0
	126A												
127B		14.5		42	42	004	4.9	9		37.0		37.0	
	128B												
129C		53.3		42	42	004	4.9	13		112.4		112.4	
	130C												
	131BC		**67.8**							**147.5**		**147.5**	
132B		68.7		1	1	002	4.9	9	200.0	321.9	200.0	321.9	5152.5
	133AB		**338.5**						**598.8**	**737.7**	**598.8**	**737.7**	
	134A												
135B		15.8		42	42	004	4.9	17		29.0		29.0	
	136B												
137C		1.3		21	21	004	4.9	5		4.4		4.4	
	138BC		**17.1**							**32.7**		**32.7**	
139B		59.1		2	2	004	4.9	12	132.8	213.8	132.8	213.8	4432.5
140B		16.5		38	40	002	4.9	9					
141C		61.2		1	1	002	4.9	12	154.4	248.6	154.4	248.6	4590.0
142C		23.3		1	1	002	4.9	5	91.6	147.4	91.6	147.4	1747.5
143C		48.3		5	5	002	4.9	12	121.8	196.1	121.8	196.1	3622.5
	144BC		**225.5**						**499.2**	**723.9**	**499.2**	**723.9**	
	145B												
146A		31.6		13	23	002	4.9	7					
	147AB		**595.6**						**1076.0**	**1464.0**	**1076.3**	**1464.4**	
148A		16.2		22	40	004	4.9	8					
	149A												
150B		13.9		26	40	004	4.9	7					
151B		21.6		2	2	005	4.9	10	53.9	84.5	53.9	84.5	1587.6
152A		12.5		18	40	004	4.9	7					
	153AB		**659.8**						**1102.7**	**1483.7**	**1165.7**	**1568.4**	
154B		7.7		2	2	004	4.9	7	22.8	36.7	51.9	47.9	566.0
155B		21.3		13	40	005	4.9	7					
156B		64.9		2	2	002	4.9	10	180.6	283.2	180.6	283.2	4770.2
	157B												
158B		33.8		16	20	004	4.9	12					
	159B												
160B		33.8		36	36	004	4.9	11					
	161B												
162A		11.5		2	2	004	4.9	11	27.1	43.7	27.1	43.7	862.5
	163AB		932.8						1541.5	**2025.2**	1585.9	**2083.5**	
	164A												
165A		21.9		42	42	004	4.9	11					
	166A		854.6						1577.2	**2092.5**	1586.3	**2128.4**	

LEGEND:

- 150B / 35.5 Ac / Tc = 16 — SUBAREA NODE; ACREAGE; TIME OF CONCENTRATION
- 153A — CONFLUENCE NODE
- VACANT OR DEVELOPED WITH STRUCTURES OTHER THAN RESIDENCES, POTENTIALLY DEVELOPMENT UNDER PROPOSED ORDINANCE REVISIONS
- DPA-6 — DEBRIS POTENTIAL AREA (DPA)
- SOIL 004 / SOIL 002 — SOIL CLASSIFICATION BOUNDARY
- FLOOD ZONE AREA
- 5.0 — ISOHYET
- CITY BOUNDARY
- PROJECT BOUNDARY
- WATERSHED BOUNDARY
- FLOW PATH
- EXISTING CULVERT
- SD — SD — EXISTING STORM DRAIN
- SUBAREA BOUNDARY
- MAIN CHANNEL

DRAINAGE DESIGN CRITERIA:

1. 50-YR, 24-HR ISOHYET: 4.9
2. SOIL TYPES: 2 & 4
3. DESIGN STORMS: 50-YR, 24-HR
4. PERCENT IMPERVIOUS VALUES:
   EXISTING RESIDENTIAL – 42%
   ONSITE UNDEVELOPED LOTS – 2%
   OFFSITE VACANT AREA – 1%
   PROPOSED RESIDENTIAL – 40%
5. DPA = 6, 48,000 CY PER SQ MI
6. BULK FACTOR = 1.61

300' 0 150' 300' 600' 1200'
1" ½" 0" 1" 2" 4"

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 Exp. 3-31-13 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
HUNSAKER & ASSOCIATES LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Ste 22 ▪ Valencia, CA 91355
PH: (661) 294-2211 ▪ FX: (661) 294-9890

PREPARED UNDER THE SUPERVISION OF:

JASON H. FUKUMITSU, DATE

CITY OF RANCHO PALOS VERDES

ZONE 2 LANDSLIDE MORATORIUM ORDINANCE REVISION EIR
CONCEPTUAL DRAINAGE AND SUSMP (WATER QUALITY) MAP

IN THE CITY OF RANCHO PALOS VERDES, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE 03/09/2011
SCALE 1"=300'
PROJECT NO. 0159-001-001
SHEET 1 OF 1 SHEET

G:\Portuguese Bend EIR 0159-001-001\Storm\Hydrology\VIP802-01.dwg Plotted on Dec 01, 2011-10:20am by wallonl