APPENDIX I

Drainage Master Plan for Cordova Hills

Drainage Master Plan
For

County of Sacramento, CA

Control #2008-00142

PREPARED FOR:
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PREPARED ON MAY 31, 2011
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(Elevations noted are based on North American Vertical Datum of 1988 (NAVD 88))

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1.0 Executive Summary

The Cordova Hills Special Planning Area (the Project) is a proposed 2,668+/- acre mixed-use community located within the Sacramento County Grant Line East Planning Area. The Project consists of low to high-density single-family residential, multi-family residential units, retail, mixed-use areas, schools (including the proposed private University of Sacramento campus), parks, open spaces, and community facilities.

The Project is located generally between Grant Line Road and Scott/Stonehouse Road, south of White Rock Road and north of Jackson Road in northeastern Sacramento County. Refer to **Exhibit A: Vicinity Map** to see the location of the Project. The Project site is bounded by Grant Line Road and the City of Rancho Cordova City limits on the west. The eastern boundary is contiguous with the County of Sacramento Urban Services Boundary. Glory Lane constitutes the Project's the northern boundary, while the southern and southwestern boundaries are adjacent to undeveloped County of Sacramento property, the County of Sacramento Urban Services Boundary and the Kiefer Landfill. The Drainage Master Plan for the Project is based on the proposed land use plan dated March 8, 2011, as prepared by WHA. Refer to **Exhibit B: Land Use Plan** to see the Project land uses.

This Drainage Master Plan for the Project analyzes drainage impacts resulting from development of the proposed land uses depicted in **Exhibit B**. The analysis defines how the proposed development can occur in a responsible and safe manner consistent with all applicable standards and regulations and how potential impacts on existing receiving waters including the Upper Laguna Creek Tributary, an un-named Deer Creek Tributary, and Carson Creek can be fully mitigated to existing or better than existing conditions. The analysis is being incorporated into an Environmental Impact Report being prepared by the County of Sacramento, acting as the Lead Agency under the requirements of the California Environmental Quality Act (CEQA). The document will support the U.S. Clean Water Act, Section 401 and 404 permitting processes.

The Project can develop as proposed by constructing on-site combination Flood and Flow Duration Control Detention Basins that mitigate for the developments impacts. These detention basins include a wet water quality basin below the discharge elevation of the detention and flow duration control discharge structures. Summer nuisance flows will be handled through general evaporation and percolation into the ground through a combination of LID measures, specially designed and constructed percolation boxes connected by small drainage pipes to pre-determined drainage inlets, and percolation trenches incorporated into the bottom of detention basins. In combination with the wet water quality basins, summer nuisance flows will thus be prevented from entering the receiving waters.

Potential impacts due to hydromodification on the Upper Laguna, Deer, and Carson Creek watersheds are managed and mitigated through a flow duration control approach. The proposed detention/water quality basins have been modified through the incorporation of flow duration control structures to control discharge into receiving waters that would otherwise increase channel erosion above an existing or natural condition. These flows have been found to range from approximately 25% of the 2-year storm up to and including the 10-year storm.

Flood control via the Flow Duration Control Basins reduces the Project developed stormwater runoff rates calculated by the Sacramento Method for the 10-year 24-hour storm and the 100-year 24-hour storms to less than the pre-development peak flow rates for the same design storms.

With the implementation of the drainage facilities identified in this report, the Project can develop in a responsible and safe manner consistent with all applicable standards and regulations without negatively impacting the pre-development runoff volume, stage, water quality, and hydromodification of the Upper Laguna Creek Tributary, un-named Deer Creek Tributary, and Carson Creek watersheds.

2.0 Introduction

2.1 Overview

The Project is a proposed 2,668+/- acre mixed-use community located within the Sacramento County Grant Line East Planning Area. The Project consists of low to high-density single-family residential, multi-family residential units, retail, mixed-use areas, schools (including the proposed private University of Sacramento campus), parks, open spaces, and community facilities. The Project site is bounded by Grant Line Road and the City of Rancho Cordova City limits on the west. The eastern boundary is contiguous with the County of Sacramento Urban Services Boundary. Glory Lane constitutes the Project's northern boundary, while the southern and southwestern boundaries are adjacent to undeveloped County of Sacramento property and the County of Sacramento Urban Services Boundary and the Kiefer Landfill.

The Project area consists of undeveloped land with poor agricultural soils. The area has been used primarily for cattle grazing. The site contains two distinct types of terrain: on the west side adjacent to Grant Line Road, site elevations range from 210± feet in the south to 258± feet along the ridge of the Upper Laguna Creek watershed. This portion of the site is gently rolling with no deeply incised drainage channels; this Upper Laguna Creek Tributary may be described as a broad, shallow swale.

The central and eastern portions of the site are located within the Deer and Carson Creek watersheds, respectively. This portion of the site consists of more steeply sloping topography, being a system of north south main ridges and east-west spur ridges with deeply incised swales. The primary drainage feature in the center of the Project is an unnamed tributary to Deer Creek that extends through the site, while Carson Creek, also a tributary to Deer Creek, flows along the eastern boundary. The site elevations range from 128± feet in the south to 254± feet along the highest ridge.

This Drainage Master Plan (Cordova Hills DMP) for the Cordova Hills Special Planning Area analyzes the onsite Upper Laguna Creek Tributary to just upstream of the convergence with the Upper Laguna Creek main branch located just west of Grant Line Road, the unnamed Deer Creek Tributary to a location south of the Project, and the small onsite sub-sheds of Carson Creek. Refer to **Exhibit C: Drainage Study Area Map** to see the limits of this drainage study.

2.2 Purpose

The Cordova Hills SPA Drainage Master Plan analyzes drainage impacts resulting from development of the proposed land uses depicted in Exhibit B. The analysis defines how the proposed development can occur in a responsible and safe manner consistent with all applicable standards and regulations and how potential impacts on existing receiving waters can be fully mitigated to existing or better than existing conditions. The analysis is being incorporated into an Environmental Impact Report being prepared by the County of Sacramento, acting as the Lead Agency under the requirements of the California

Environmental Quality Act (CEQA). The document will support the U.S. Clean Water Act, Section 401 and 404 permitting processes.

This study adheres to specific requirements for the planning and analysis of drainage facilities as set forth in:

1. the Storm Drain Design Standards of the Municipal Services Agency of Sacramento County Department of Water Resources,
2. the Sacramento County Water Agency Drainage Ordinance,
3. the Sacramento City/County Drainage Manual Volume 2: Hydrology Standards,
4. the Sacramento County Water Agency Code Titles 1 and 2,
5. the Sacramento County Floodplain Management Ordinance,
6. the Stormwater Quality Design Manual for the Sacramento and South Placer Regions, and
7. the Department of Water Resources Plan Submittal Take-In Check List.

The study was prepared under the responsible supervision of Ken Giberson, a State of California registered Civil Engineer.

2.3 Federal Emergency Management Agency (FEMA) Information

The most recent FEMA Flood Insurance Study (FIS) Flood Insurance Rate Map (FIRM), revised September 30, 1988, identifies the Project as being located in the un-shaded Zone X classification.

The eastern boundary of the project is coterminous with the shaded Zone A 100-year floodplain of Carson Creek. The effective floodplain model for Carson Creek is not available at this time. Unlike Carson Creek, FEMA has not mapped the existing floodplains of the Upper Laguna Creek or the unnamed Deer Creek tributaries within the Project. Refer to **Exhibit D: Existing Conditions Floodplain Map** and **Exhibit E: Developed Conditions Floodplain Map** to see the existing and post development floodplain conditions. In keeping with Federal and State requirements, as well as the County of Sacramento Floodplain Management Ordinance, the existing and proposed conditions floodplain within and adjacent to the project must be mapped with a FEMA approved LOMR. FEMA submittals and approval must be secured prior to recordation of any final maps located within the respective sub-sheds. The hydrologic and hydraulic analyses contained within this report will eventually form the basis of the required floodplain mapping for FEMA submittals.

2.4 South Sacramento Habitat Conservation Plan (SSHCP)

The purpose of the draft South Sacramento Habitat Conservation Plan (SSHCP) is to consolidate environmental efforts to protect and enhance wetlands (primarily vernal pools) and upland habitats to provide ecologically viable conservation areas. Its goals are to minimize regulatory hurdles and streamline the environmental permitting process for development projects. The SSHCP will be an agreement between state/federal wildlife and wetland regulators and local jurisdictions, which will allow land owners to engage in the "incidental take" of listed species (i.e., to destroy or degrade habitat) in return for conservation commitments from local jurisdictions.

The Cordova Hills SPA is located within the geographic scope of the SSHCP, which includes U.S. Highway 50 to the north, Interstate 5 to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and San Joaquin County to the south. Sacramento County is partnering with the incorporated cities of Rancho Cordova, Galt, and Elk Grove as well as the Sacramento Regional County Sanitation District and Sacramento County Water Agency to further advance the regional planning goals of the SSHCP.

Based on the SSHCP promises of a number of stakeholder benefits, including streamlined regulatory compliance, reduced overall, planning, analysis, and mitigation costs, as well as unlisted species protection through a coordinated regional approach, Cordova Hills' proposed habitat preservation and mitigation plan is consistent with the known aspects the draft SSHCP identifies for the Project area. Nonetheless, as it is impossible to project the processing time line of the draft SSHCP and the ultimate final contents and mitigation requirements of the SSHCP, the developers of the Cordova Hills SPA have filed and are processing an individual Section 404 permit application under the U.S. Clean Water Act with the U.S. Army Corps of Engineers and will apply for a Clean Water Act Section 401 water quality certification from the Central Valley Regional Water Quality Control Board. In addition, they will also seek any necessary streambed alteration agreement with the California Department of Fish and Game.

2.5 Previous Studies

The onsite drainages traversing the Project have not previously been studied. However, the un-named Upper Laguna Creek Tributary traversing the plateau area of the Project just east of Grant Line Road does combine with the main branch of Upper Laguna Creek a short distance downstream and west of Grant Line Road.

The "Draft Regional Master Drainage Study for the SunCreek Specific Plan" dated December 2008, prepared by MacKay & Somps analyses the undeveloped existing Upper Laguna Creek watershed. The SunCreek study utilized the following drainage studies as a reference:

- "Final Master Drainage Study, Sunrise-Douglas Community Plan Area, Sacramento California" dated October 16, 1998 prepared by the Spink Corporation.

- "Drainage Study Montelena, Including Sections for Anatolia 1 & 2 Updated Ultimate Conditions and As-Built Facilities Summary" (Montelena Drainage Study) dated September 2007.

- "Summary of Sunrise Boulevard Flood Protection Study" dated February 5, 2010 prepared by West Yost Associates.

Triangle Rock Regional Detention Issue

The County proposes to construct a regional detention facility downstream of the project on Laguna Creek near the intersection of Jackson Road and Sunrise Blvd. This facility will be constructed in a surface mining pit currently used to generate rock and sand for building materials. This facility is needed to attenuate the peak runoff in Laguna Creek to relieve flooding problems further downstream.

This regional facility will, however, provide little or no benefit to the upstream areas within the Laguna Creek watershed. While the western most 725+/- acres of the Cordova Hills site lies within the Laguna Creek watershed, regulatory requirements to attenuate peak flows leaving the project site to existing levels and to mitigate hydromodification impacts of development of the Cordova Hills site effectively result in this project not contributing to the downstream flooding problem. Accordingly, there is no nexus between development of the project area and the need for the regional detention facility.

Sunrise/Jackson Flooding Problem

Likewise, development of the Cordova Hills site will not contribute to the local flooding problems that exist in the vicinity of the Jackson Road/Sunrise Blvd. intersection just upstream of the proposed regional detention facility. The regulatory requirements to attenuate peak flows leaving the project site to existing levels and to mitigate hydromodification impacts of development of the Cordova Hills site effectively result in this project not contributing to the localized flooding problem at this intersection. Accordingly, there is no nexus between development of the project area and the need for the flood improvements in the vicinity of this intersection.

No previous studies were found for the unnamed Deer Creek Tributary or the segment of Carson Creek located in the Project's vicinity.

2.6 Existing Conditions

The Project lies within the Upper Laguna, Deer, and Carson Creek watersheds. The majority of the existing land within the Drainage Study Area is undeveloped property primarily used as cattle grazing land. The Drainage Study Area can be characterized as having two distinct types of terrain:

On the west side adjacent to Grant Line Road, site elevations range from 130± feet in the south to 280± feet along the ridge of the Upper Laguna Creek watershed, north of the project. This portion of the site is gently rolling with no deeply incised drainage channels; this Upper Laguna Creek tributary may be described as a broad, shallow swale that flows under Grant Line Road at the southern extremity.

The central and eastern portion of the site falls within the Deer and Carson Creek watersheds. This portion of the site consists of more steeply sloping topography, being a system of north south main ridges and east-west spur ridges with deeply incised swales. The primary drainage feature in the center of the Project is an unnamed tributary of Deer Creek that extends through the site. The eastern portion of the project slopes toward Carson Creek, the approximate 100-year floodplain boundary of which constitutes the County's Urban Services Boundary along the eastern edge of the Project. The site elevations range from 128± feet in the south to 300± feet along the boundary of the unnamed Deer Creek Tributary, north of the project.

The existing main branch of Upper Laguna Creek originates approximately 8,475+/- feet north of the Project. It traverses the northwest corner of the Project for about 50 feet, before flowing through dual 50-inch diameter CMP pipes under Grant Line Road. It then flows in a southerly direction along the west side of Grant Line Road across the SunRidge and SunCreek projects.

The eastern un-named Upper Laguna Creek Tributary that bisects the Project originates approximately 1,300 feet north of Glory Lane and the Project. It traverses the western half of the project through a number of connected, yet poorly defined, shallow swales, before flowing through dual 62-inch diameter CMP pipes crossing under Grant Line Road at the Project's southwest corner. The tributary then combines with the main branch of Upper Laguna Creek approximately 830' west thereof. Upper Laguna Creek continues in a southerly direction towards State Route 16, alternatively known as Jackson Road or Jackson Highway.

The existing unnamed Deer Creek Tributary commences approximately 9,200-feet north of the Project and, upon leaving the Project, flows southwest for approximately 3,200 feet across undeveloped pasture land before reentering the Project for approximately 1,200-feet. South of the Project, the tributary meanders in a southerly direction for approximately 9,400-feet across undeveloped grass lands, before flowing into Deer Creek north of Kiefer Boulevard.

The small sub-sheds of the Carson Creek watershed that are contained within the project flow directly into Carson Creek along the Project's eastern boundary. The cumulative onsite watershed area for Carson Creek is approximately 609-acres.

The above described watersheds are depicted in **Exhibit F: Pre-Development Watershed Map**.

2.7 Soils Information

The soil type classification for each drainage sub shed was determined by using the soils survey of California, Sacramento County. Image files from the U.S. Department of Agriculture were downloaded from their web site and referenced into the drainage exhibits for both pre and post development conditions. The image files were scaled into the overall watershed plats to allow establishment of the various soil type areas (A, B, C, D, E, or F, respectively) within each shed. These areas are used in the Sac Calc model to derive the hydrology. The overall shed is predominately type D soil conditions, with types A, B, and C primarily isolated within the proposed Natural Preserve areas of the Project. Refer to **Exhibit G: Pre-Development Soils Analysis (SCS)** and **Exhibit H: Post-Development Soils Analysis (SCS)** to see the soil classifications within the Project with the existing and developed conditions water shed boundaries superimposed thereon.

2.8 Hydrology and Hydraulic Models

In accordance with the current Sacramento City/County Drainage Manual – Volume 2 (Hydrology Standards), runoff hydrographs for existing and developed conditions needed for input into the HEC-RAS model have been calculated using a Windows based application called the Sacramento Calculator (SacCalc) with what is commonly referred to as "the Sacramento Method". The Cordova Hills SPA watershed is located in Rainfall Zone 2 of the Sacramento Method rainfall zone designations.

Hydraulic analyses for water surface elevation assessment purposes have been performed using version 4.1 of the US Army Corps of Engineers HEC-RAS program, using the unsteady state routines. Modeling software used to analyze potential hydromodification on the receiving waters is being discussed in the following section.

2.9 Hydromodification Assessment

The Cordova Hills DMP incorporates a hydromodification assessment and mitigation plan for the hydromodification impacts due to development of the Project. The hydromodification assessment assesses the hydrologic and geomorphic impact of the Project relative to existing conditions on the study segments of the Upper Laguna Creek, the unnamed Deer Creek, and Carson Creek watersheds.

Continuous simulation is emerging as the standard approach for assessing hydromodification, because it takes into account the cumulative effect of geomorphically-significant smaller and medium sized events. A continuous simulation

model in HEC-HMS with a 49-year 1-hour interval precipitation record was utilized for this analysis to determine an annualized hydrograph. The range of flows that in aggregate is responsible for most channel erosion has been found to be flows that fall between some fraction of the 2-year storm and the 10-year storm. To determine the total amount of work (erosive forces) that existing and proposed conditions runoff does on the receiving waters, the annualized hydrograph was then processed using Mike11 modeling software and the geo-referenced cross sections out of the HEC-RAS model. The total work resulting from post-development runoff hydrographs was then compared to that resulting from the existing conditions hydrographs in order to determine mitigation requirements.

Flow duration control, low impact development (LID), and in-stream approaches are generally used to mitigate the impacts on hydromodification within a water course. Based on the proposed preservation of the receiving waters within and adjacent to the Project area, in-stream approaches were not considered in this study. The LID approach requires a home builder to select materials and implement various techniques which improve the storm runoff water quality and reduces the storm runoff volumes at the source. Since the current entitlement level does not include small-lot tentative map approvals (and as such, detailed subdivision layouts) and as the Project is several years from the start of home construction, the specific LID techniques cannot be determined at this time. The current analysis has therefore been prepared without accounting for the numerical benefit of LID measures. Potential future LID measures are further detailed in the following section.

2.10 Low Impact Development

LID emphasizes the conservation and use of available on-site natural resources to protect the environment – especially water. Small-scale LID projects dispersed throughout the watershed combine with point-of-discharge flood control and water quality treatment basins to manage post-development stormwater runoff and maintain or restore pre-development watershed conditions.

LID replaces the traditional development approach of conveying runoff through miles of costly pipes to acres of expansive detention ponds with an approach that mimics nature, using natural vegetation and small-scale treatment systems to retard, treat, and infiltrate stormwater runoff close to where it originates. Reducing the amount of runoff at the source in the first place not only reduces the need for point-of-discharge facilities (detention and water quality basins), but reduces impacts on receiving waters carrying stormwater.

The LID toolbox provides for a variety of environmentally sound and cost-effective techniques including green infrastructure, conservation design, and sustainable stormwater management practices. New development will typically be able to maximize the benefit of advanced stormwater management through the implementation of a number of these tools in combination to replicate the predevelopment hydrology of the site.

Where applicable, LID Techniques may include:

- Preservation of the natural hydrology;
- Stormwater management at the source (close to where rain falls);
- Preservation of natural drainage features and patterns, where possible;
- Retention of existing vegetation, especially when native;
- Creation of a hydrologically rough landscape to slow down stormwater runoff;
- Clustering development;
- Integration of stormwater controls into development design as amenities though a multi-disciplinary design approach at the initial phases of a project;
- Reduction of impervious surfaces;
- Pervious concrete;
- Porous asphalt;
- Permeable pavers;
- Reduction of effective impervious surfaces;
- Rain Gardens;
- Bioretention systems;
- Bio-swales;
- Landscaping with native plants;
- Water conservation and xeriscaping;
- Mulching of landscaped areas;
- Compost amended soils;
- Enhancement of disturbed soils to increase their storage and infiltration potential;
- Green roofs;
- LID education of homeowners and maintenance staff;

As Cordova Hills is not currently seeking small-lot entitlements, final development project layouts are not known at this time. As such, the numerical benefits of actual BMP's and LID features specific to land use and site layout have not been considered in the analysis of point-of-discharge detention and water quality basins required to fully mitigate the development impacts of this project on receiving waters. It is projected that these benefits will be calculated and accounted for prior to actual design of the downstream detention and water quality treatment basins. By presenting the various tools available in the LID tool box to a future developer, provides the groundwork for innovative and site-appropriate stormwater treatment methods that will satisfy current and emerging governmental requirements at the local, State, and Federal level.

Cordova Hills has been utilizing a multi-disciplinary approach that has included planners, engineers, and landscape architects since project inception to incorporate appropriate BMP's and LID features into every facet of the project. From the initial land use plan concepts sensitive to existing terrain and drainage patterns, to engineered street sections incorporating LID swales and a site-appropriate drought-tolerant landscape palette that is nonetheless aesthetically pleasing, this master plan will ensure implementation of an environmentally sound and sustainable community.

Refer to **Exhibit I: Cordova Hills LID Master Plan Concepts** to see a variety of environmentally sound LID features, which may be implemented throughout the Project.

3.0 Hydrologic & Hydraulic Modeling

The Cordova Hills DMP analyzes the Existing and Developed Conditions (pre- and post-development conditions) for the Upper Laguna Creek Tributary, the unnamed Deer Creek Tributaries, and the onsite watersheds tributary to Carson Creek. This study utilizes topography that is based on the North American Vertical Datum of 1988 (NAVD 88).

In the first step of the analysis, runoff hydrographs from the various sub-sheds are determined for pre- and post development conditions using the Sacramento Method. Flood control mitigation to reduce post-development peak runoff rates to pre-development levels is then incorporated into the SacCalc models to establish appropriate flood detention volumes.

For the Upper Laguna Creek and Deer Creek Tributaries, the hydrographs derived from Sac Calc were then incorporated into a HEC-RAS "unsteady state" analysis of the receiving waters in order to determine peak stages and the hydraulic grade line resulting from the various design storm events. For this purpose, alignments of the receiving waters and locations of cross sections spaced in accordance with the County's requirements are determined in AutoCAD. Surveyed cross section data is utilized in both scenarios (existing and proposed conditions) to define the hydraulic cross section of the existing channel. The software augments the cross sections and overbank terrain based on the terrain model of the Project Area's topography. The program then exports geospatial data sets that are input into HEC RAS to define the conveyance geometry. The modeler then enters parameters for in-stream structures such as berms and culverts, before running the model. Model output files in GIS format are then imported into ArcMap's HEC GeoRAS extension. Using the channel geometry and computed water surface profiles, inundation depth, and floodplain boundary data sets are then created through HEC GeoRAS.

As the on-site sheds tributary to Carson Creek located adjacent to the Project in aggregate constitute only a very small portion of the much larger overall Carson Creek basin, it was deemed impracticable to prepare detailed hydraulic models of Carson Creek for this general level of entitlements. For these sheds, only SacCalc models for pre- and post-development conditions were run to establish peak runoff rates and associated detention and water quality volumes required for mitigation. It should be noted that these sub-sheds constitute the last development phase of a projected 20-year+/- buildout horizon. It is impossible today to definitively identify final development proposals that may evolve for this area over the projected buildout horizon. Associated drainage impacts may thus very well change along with these evolving development proposals. Only when detailed small-lot development proposals emerge for this area will it be possible to analyze potential Carson Creek floodplain impacts, if any, associated with these proposals.

3.1 Existing Condition Models

The "Existing Conditions" of the Drainage Study Area were analyzed in order to obtain a basis for comparison with the "Developed Conditions" model also prepared as part of this analysis. The Existing Conditions are defined by the current land uses and topography within the 4,495± acre Drainage Study Area.

Exhibit F depicts the existing conditions watershed map used as the basis for developing the Existing Conditions Model.

The offsite main branch of Upper Laguna Creek barely crosses the northwest corner of the Project, before crossing under Grant Line Road through dual 50-inch CMP pipes and flowing directly into the future SunRidge area. During major storm events, water currently ponds along the east side of Grant Line Road at a few of the CMP pipe locations before eventually cresting Grant Line Road during peak flow events.

As described in Chapter 2 of this study, the onsite Upper Laguna Creek Tributary originates just north of the project, bisects the western half of the project as it flows southward across the plateau area through a series of connected, shallow swales, and eventually crosses under Grant Line Road through dual 62-inch diameter CMP pipes at the project's southwest corner.

The Unnamed Deer Creek Tributary watershed affected by the proposed Project originates roughly 9,200 feet north of the project. Runoff from the shed collects in an existing, sharply incised, natural, cobble-strewn channel. The analysis determined existing 2-, 10-, and 100-year water surface profiles for this channel based on surveyed cross section thereof (on-site) as well as digitally generated cross sections based on LiDAR topography for off-site reaches of the channel.

The onsite Carson Creek sub-sheds either sheet-flow directly into Carson Creek or are tributary to small drainages that in turn flow directly into Carson Creek. The limits of the approximate 100-yr floodplain for Carson Creek as depicted on FEMA FIRM 060262 0250 C were used in the 1993 General Plan to establish the County's Urban Services Boundary (USB) in this area. That boundary also defines the eastern limits of proposed urbanizing areas of the Cordova Hills SPA. Lands beyond the USB up to the Project limits are proposed to remain undeveloped in perpetuity.

Existing Conditions floodplains have been analyzed and mapped as part of this drainage master plan for the Upper Laguna Tributary and the unnamed Deer Creek Tributary (see **Exhibit D: Existing Conditions Floodplains**). Results of the Existing Conditions HEC-RAS analyses for the 10-year 24-hour, 100-year 24-hour, and 100-year 10-day design storm events for the unnamed Upper Laguna Creek and Deer Creek Tributaries are depicted in **Appendices C** and **D**.

3.2 Developed Conditions Model

The Developed Conditions Models are based on a fully developed Project. These models utilize the existing conditions models as a starting point and then overlay the proposed land uses of the Project. The remainder portions of the watersheds beyond the Project limits are modeled the same as the existing conditions model (undeveloped), with the exception of the upstream sub-sheds of the unnamed Deer Creek Tributary which was analyzed both under existing and developed conditions for the reasons detailed later in this section.

Refer to **Exhibit J – Post-Development Watershed Map (Study Area)** for a depiction of the sub-shed parameters (including basin locations) used as the basis for determining the Developed Conditions Models. The models include detention basins that were initially sized such that the flow rates within the receiving waters exiting the Project boundary do not exceed the existing conditions flow rates. The detention basins were analyzed for the 10-year 24-hour, 100-year 24-hour, and the 100-year 10-day storms. The 100-year 24-hour storm generated larger detention volume requirements with the exception of basins B8, B14, and B17, in which the 100-year 10-day storm generated the larger detention volume requirements. Therefore, the detention basins are all sized based on the largest determined volume requirement. As described further in Section 3.3: Hydromodification Model, upon incorporation of a Flow Duration Control (FDC) structure to manage hydromodification impacts, the overall basin volume had to be increased by 20% due to the low flow attenuation required for the hydromod. impact mitigation. The modeling of the basins located within the un-named Deer Creek Tributary watershed was then once again revised to incorporate the FDC structures and additional volume requirements as per the hydromodification management recommendations of cbec's analysis included in Appendix A of this study.

To mitigate the impacts the proposed land uses will have on the quality of the storm water runoff, the project proposes to implement wet water quality basins as part of the overall detention and flow duration control basins. The required water quality volumes were determined based on the standards outlined in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions. The calculated volumes as reported in **Table 4** are proposed to be stacked with the detention and hydromodification management volume by excavating each basin below the outlet works designed for flood control and flow duration control purposes. The practical feasibility of this proposal has been analyzed for each of the proposed basins. Design parameters for the various basins are reported in **Tables 2, 3, & 4**.

The off-site main branch of Upper Laguna Creek will be bypassed around the northwest corner of the project to continue to drain directly into the future SunRidge area, mimicking how this area drains during existing conditions storm events. A proposed 4' tall by 8' wide reinforced concrete box culvert will be required to convey this 100-yr runoff combined with the existing conditions runoff from sub-shed L6 beneath Grant Line Road.

The onsite Upper Laguna Creek Tributary east of the main branch discussed above continues to flow through the dual 62-inch diameter CMP pipes beneath Grant Line

Road and into the future SunCreek area, where it converges with the main branch of Upper Laguna Creek.

Unnamed Deer Creek Tributary Upstream Shed Development

To assess the impacts of future upstream development within the un-named Deer Creek Tributary watershed on the practicability of the proposed basins within the Project's portion of said watershed, in addition to the existing conditions model for the entire watershed, 2 developed conditions scenarios were modeled – one that considers Cordova Hills as a "stand alone" developed conditions project with flood control and hydromod. mitigation, with the upstream shed remaining in an existing pre-development condition and one hypothetical scenario that in addition to the Cordova Hills project developed with flood control and hydromod. mitigation also has the upstream tributary shed build out at 50 percent impervious cover. Hypothetical flood control detention basins were then incorporated into the upstream shed to mitigate post-development peak runoff rates for the 10- and 100-yr design storm events back to existing condition flow rates at the Project's upstream boundary. As depicted in **Table 1: Deer Creek Tributary Modeling Scenario Comparison,** under both scenarios, mitigated peak runoff rates are less than existing conditions peak runoff rates for the same 10- and 100-yr design storm events.

Refer to **Appendix E** and **F** for the Developed Conditions HEC-RAS Results (10-year 24-hour, 100-year 24-hour, and 100-year 10-day) for the Upper Laguna Creek and Unnamed Deer Creek Tributaries.

The hydrology of the onsite sub-sheds tributary to Carson creek were analyzed for both existing and developed conditions. Flood control mitigation in the form of detention was then added to the SacCalc model to reduce the peak runoff volumes to existing conditions. The required basins are designed to function in the same way the basins within the Upper Laguna and Deer Creek Tributary sheds are designed to function in that water quality treatment volumes (wet basins) and flow duration control structures with their associated 20% basin volume increases to manage projected hydromodification have been included in the overall basin design and resulting foot print thereof. Required basin parameters are detailed in **Tables 2, 3** and **4**.

Table 1
Deer Creek Tributary Peak Flow Rates Modeling Scenario Comparison

Scenario		1	2	3
Creek	**100 yr - 24 hr**	Existing	Developed Condition with detention	Developed Condition with detention
Station		Condition	and upstream existing	(entire watershed)
0+10.31	Downstream end	974.88	968.14	926.69
Creek	**10 yr - 24 hr**	Existing	Developed Condition with	Developed Condition with detention
Station		Condition	upstream existing	(entire watershed)
0+10.31	Downstream end	519.54	494.87	510.6
Creek	**2 yr - 24 hr**	Existing	Developed Condition with	Developed Condition with detention
Station		Condition	upstream existing	(entire watershed)*
0+10.31	Downstream end	255.45	226.96	287.49

Notes: Creek station 0+10.31 is the downstream limit of the study.
all flows shown in cubic feet per second (cfs)
*2-yr peak flows expected to be reduced at the downstream study limits upon hydromodification mitigation implementation concurrent with future development within the watershed upstream of Cordova Hills

Table 2:
Cordova Hills Developed Conditions Detention Basin Volume

Basin No.	Det. Bottom Elev. (foot)	Top Elev. [3] (foot)	Basin Side Slope	Flood Control Storage (AF)	Hydromod Storage (AF)	Total Active Storage (AF)	Basin Area (acre)	Basin w/ Buffer [4] (acre)
Upper Laguna Creek (Main Branch)								
B1	236	243	3:1	9.358	1.9	11.2	1.876	2.25
B2	226	234	3:1	6.254	1.3	7.5	1.173	1.41
Upper Laguna Creek tributary								
B3	214	224	3:1	7.508	1.5	9.0	1.21	
B4	228	238	3:1	28.19	5.6	33.8	4.33	
B5	216	225	3:1	17.07	3.4	20.5	1.93	
Unnamed Deer Creek tributary**								
B8*	170	180	3:1			25.3	3.13	
B9	168	175	3:1			9.1	1.50	
B10	164.5	173.2	3:1			4.3	0.69	
B11	162	170	3:1			7.6	1.19	
B12	159	167.4	3:1			3.1	0.70	
B13	152	165	3:1			8.2	1.27	
B14*	152	160.7	3:1			21.9	3.17	
B15a	186	194.4	3:1			10.2	1.62	
B15b	182	190.3	3:1			6.9	1.08	
B16	174	182.7	3:1			14.8	2.17	
B17*	170	178.8	3:1			29.0	5.08	
B18	160	168.7	3:1			11.6	1.73	
B19	129	138	3:1			34.1	4.76	2.00
B32	140	148	3:1			6.8	1.07	
Carson Creek								
B23	222	232	3:1	1.04	0.2	1.3	0.32	0.39
B24	148	156	3:1	3.95	0.8	4.7	0.73	0.88
B25	146	156	3:1	2.02	0.4	2.4	0.54	0.65
B26	146	156	3:1	1.20	0.2	1.4	0.30	0.36
B28	157	170	3:1	6.78	1.4	8.1	1.10	
B29	152	160	3:1	2.02	0.4	2.4	0.47	
B30	142	150	3:1	7.68	1.5	9.2	1.38	1.66

Notes:

[1] The volume and 100-yr water surface are controlled by the 100-year 24-hour storm, unless noted.

*Denotes that the volume and 100-yr water surface are controlled by the 100-year 10-day storm.

[2] Water Quality Volumes were determined using the Stormwater Quality Design Manual, May 2007, for Wet Bas

[3] 100-Yr Water Surface Elevation is located 1' beneath Top of Basin Elevation noted.

[4] When basins are located in passive recreation (R-2) open space areas, the "basin buffer" area will be seamlessly incorporated into the openspace landscaping and has thus not been noted.

** Basins within un-named Deer Creek Tributary watershed were modeled with the FDC structures and associated basin volume/footprint increases incorporated into the model

The basin volumes listed on the previous page reflect allowances for hydromodification mitigation determined as part of the analysis by cbec (see Section 3.3). Their analysis determined that the overall basin volumes would have to be increased by approximately 20% to account for the storage required for flow duration control of storm events up to the 10-yr recurrence interval. This volume increase then results in an increase of the overall basin foot print by approximately 18%. As described below, the FDC structures and increased basin volumes (footprints) were incorporated into the Sac Calc model for the un-named Deer Creek Tributary to confirm that peak flow rates for the 2-, 10-, and 100-year design storm events at the downstream compliance point could be mitigated to less than or equal to those under existing conditions. The increased volumes and footprints of all basins have been reflected in **Exhibit M: Grading Concept & Basin Location Plan.**

Each detention basin includes a flow duration control (FDC) outlet structure designed as described in the next paragraph. Once through the FDC, runoff from up to the 10-yr storm event drops down into the detention basin discharge pipes. The detention basin discharge pipe outlet structures terminate into energy dissipation structures, which reestablish sheet flow discharge into the open space. The discharge may then be directed into an LID swale, as determined by an environmental consultant. Runoff resulting from storm events greater than the 10-yr event will be allowed to spill out of the basins at calibrated rates across armored spillways of a specified width that are set at specific heights to where the cumulative discharge rates modeled in HEC RAS at the downstream end of the project are no greater than the existing conditions peak flow rates for the 10- and the 100-yr design storm events. A prototypical basin and outlet structure configuration are depicted in **Exhibits K** and **L**.

Each flood control outlet was preliminarily sized using the software system Civil Tools Version 2.4. As described in Appendix A, cbec then utilized the SacCalc hydrology and through an analysis of 49 years of rainfall data synthesized annualized hydrographs for use in a continuous simulation model. After comparing work curves resulting from pre- and post-development runoff within the receiving water (the un-named Deer Creek Tributary), cbec developed stage/discharge curves for each of the proposed flow duration control structures being incorporated into the detention basins to allow a throttling of discharge rates resulting from storms up to the 10-yr event to levels where the total amount of resulting work in the stream (through Q10) matched that existing prior to development. These stage/discharge curves that were simulated via V-notch orifices were then incorporated into the original SacCalc models, replacing the simple flood control orifices used in the first modeling steps. 2-, 10-, and 100-yr design storm events were then modeled for post-development conditions, the resulting hydrographs under detained (mitigated) conditions imported into HEC RAS and the resultant peak runoff rates at the downstream compliance points compared to existing conditions. Basin volumes were then adjusted by increasing their footprints (to increase the attenuation) until the peak flow rates at the compliance points under developed conditions matched or were less than those under existing conditions.

Refer to **Table 3: Cordova Hills Developed Conditions Detention Basins Discharge Flow Rates** for the various basin outlet structure orifice size and outlet pipe

configurations, and the maximum detention basin discharge velocities for the basins within the Laguna Creek Tributary and Carson Creek watersheds. For the basins located within the un-named Deer Creek Tributary watershed, i.e. for those basins that were modeled in SacCalc with the FDC structures calibrated via the continuous simulation in place, **Table 3** provides the stage/discharge curves of the FDC orifices included in the model.

It should be noted that sub-sheds D9 OR and D19 OR within the unnamed Deer Creek Tributary shed area will be discharging peak storm drainage runoff in excess of pipe design capacity (i.e. "Nolte Flows") directly into the unnamed Deer Creek Tributary rather than into detention basins. An overland release path will be provided for this excess runoff to be drained directly into the receiving water. Only runoff from events less than or equal to the design capacity of the underground pipe system ("Nolte flows") will be conveyed to basins B8 and B18, respectively, to allow for water quality treatment and appropriate flow duration control. The potential impacts of this direct discharge into the receiving waters has been accounted for in adjacent detention basins so as to not increase downstream peak flows for the 10- and 100-yr events above existing conditions. Potential impacts of hydromodification within the receiving water due to these sub-sheds are being mitigated in adjacent basins in a similar fashion through additional flow duration control.

Table 3:
Cordova Hills Developed Conditions Detention Basin Discharge Flow Rates

Table 3 - Cordova Hills Developed Conditions Detention Basin Discharge Flow Rates

Basin No.	Orifice		Outlet Pipes [1] [2]		
	Quantity	Diameter (inches)	Quantity	Diameter (inches)	Velocity (fps)
Upper Laguna Creek (main branch)					
B1	1	18	1	30	6.7
B2	1	18	1	30	7.6
Upper Laguna Creek Tributary					
B3	1	15	1	30	6.9
B4	1	21	1	36	8.4
B5	1	18	1	36	9.0
Carson Creek					
B23	1	21	1	30	8.1
B24	2	24	1	42	10.3
B25	4	12	1	36	8.1
B26	3	18	1	42	10.2
B28	5	18	1	54	12
B29	6	18	1	48	11.3
B30	8	18	1	54	12.2

Notes:
[1] Presumes a pipe slope of 1%
[2] Velocity (feet per second - fps) based on 100-year

un-named Deer Creek Tributary Basin Stage/Discharge Curves							
8		10, B12		B16, B18		B9, B11, B13, B14, B15a, B15b, B17, B19, B32	
Depth	Discharge	Depth	Discharge	Depth	Discharge	Depth	Discharge
[feet]	[cfs	[feet]	[cfs	[feet]	[cfs	[feet]	[cfs
0	0	0	0	0	0	0	0
1	0.13	1	0.15	1	0.13	1	0.13
2	0.44	2	0.84	2	0.44	2	0.44
3	1.22	3	2.65	3	1.22	3	1.22
4	2.61	4	5.91	4	2.61	4	2.61
5	4.73	5	10.9	5	4.73	5	4.73
6	7.66	6	17.84	6	7.66	6	7.66
7	9.8	7	21.63	7	9.8	7	9.8
8	14.08	8*	115.22	8*	40	8*	102.45
9*	102.45						

* Denotes discharge occuring over basin spillway.

The water quality treatment volumes based on wet basin design parameters identified in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions is designed as 'dead storage' located below the flow line of the outlet works of each basin and as such is additive to the flood control and hydromodification volume requirements – see **Table 4: Cordova Hills Water Quality Treatment Volume Requirements**.

Table 4: Cordova Hills Water Quality Treatment Volume Requirements

BASIN	SHED	AREA (AC)	WT. PI (%)	"C"	STORAGE* (IN)	STORAGE (FT)	WQV DRY (AC-FT)	WQV WET (AC-FT)
B23	C6b	25.19	40.3	0.28	0.30	0.0250	0.63	0.79
B24	C7d	92.30	39.8	0.28	0.3	0.0250	2.31	2.88
B25	C8d	42.82	33.6	0.24	0.27	0.0225	0.96	1.20
B26	C9e	47.91	37.2	0.26	0.28	0.0233	1.12	1.40
B28	C10l	169.79	46.4	0.32	0.34	0.0283	4.81	6.01
B29	C11e	79.02	53.6	0.36	0.38	0.0317	2.50	3.13
B30	C12j	169.14	41.0	0.29	0.32	0.0267	4.51	5.64
B8	D12e	147.76	54.7	0.37	0.40	0.0333	4.93	6.16
B9	D14c	33.57	40.2	0.28	0.30	0.0250	0.84	1.05
B10	D16d	47.81	54.9	0.37	0.40	0.0333	1.59	1.99
B11	D18b	19.70	47.4	0.32	0.35	0.0292	0.57	0.72
B12	D20d	43.01	66.1	0.46	0.49	0.0408	1.76	2.20
B13	D23b	19.44	41.3	0.29	0.31	0.0258	0.50	0.63
B14	D25j	129.89	71.4	0.51	0.55	0.0458	5.95	7.44
B15a	D11b	40.91	55.5	0.38	0.41	0.0342	1.40	1.75
B15b	D11d	60.37	45.8	0.31	0.33	0.0275	1.66	2.08
B16	D13d	64.69	56.7	0.38	0.42	0.0350	2.26	2.83
B17	D15i	131.80	54.7	0.37	0.40	0.0333	4.39	5.49
B18	D19f	64.01	56.5	0.38	0.42	0.0350	2.24	2.80
B19	D31i	157.51	46.3	0.32	0.34	0.0283	4.46	5.58
B31	D32	95.02	5.9	0.08	0.08	0.0067	0.63	0.79
B1	L6g	58.3	87.6	0.70	0.74	0.0617	3.60	4.49
B2	L7b	63.5	89.4	0.72	0.76	0.0633	4.02	5.03
B4	L4h	171.6	65.0	0.45	0.47	0.0392	6.72	8.40
B5	L3d	98.4	60.2	0.41	0.44	0.0367	3.61	4.51
B6	L9e	62.8	27.3	0.21	0.23	0.0192	1.20	1.50

*See Figure E-3, Appendix E, Page 9 of the Stormwater Quality for the Sacramento and South Placer Regions, Dated May 2007.

3.3 Hydromodification Model

cbec, Inc. (cbec) conducted a hydromodification assessment of the potential hydromodification impacts of the Project on the Upper Laguna Creek Tributary, unnamed Deer Creek Tributary, and Carson Creek. cbec also prepared a geomorphic assessment to analyze and document the present channel condition, interpret the historical channel changes, and predict how the proposed development might affect hydromodification, preserve status, and channel preservation given the current geomorphic context of the creeks. Complete copies of these cbec assessments are provided in **Appendix A** and **B** of this Study. The following section of the Cordova Hills DMP briefly discusses the cbec hydromodification assessment, findings, and mitigation recommendations.

The County of Sacramento is in the process of renewing their MS 4 Permit with the Regional Water Quality Control Board (RWQCB). The RWQCB has been requiring jurisdictions seeking renewal of their MS 4 Permit to include hydro-modification mitigation as a requirement for receiving a renewed MS 4 Permit. Anticipating this new requirement by RWQCB and Sacramento County, the Cordova Hills DMP includes hydromodification mitigation measures.

The County of Sacramento has not yet adopted standards for determining impacts due to hydromodification. Thus, the criteria and standards employed in cbec's analysis generally refer to FDC techniques for managing and mitigating hydromodification impacts using flow duration curve matching or similar approaches.

The approached proposed by the Project to mitigate hydromodification impacts on the affected receiving waters is to employ off-line Flow Duration Control structures as depicted in **Exhibit L** incorporated into the various sub-shed detention basins. The detention basins will feature outlet structures that slowly meter out stormwater runoff at rates that meet the objective standards developed to mitigate for hydromodification impacts. In simplistic terms, the Flow Duration Control structure retains all the stormwater runoff generated up to a 10-year event and slowly releases the runoff through a calibrated V-notch or orifice plate set above a very small outlet. The Flow Duration Control structure generally consists of a weir set above the detention basin bottom. The weir has specially calibrated V-notch set 6 inches above a 2-inch outlet pipe set at the bottom of the detention basin. They are connected to a discharge pipe sized to convey the maximum calibrated discharge rate of the Flow Duration Control orifice/V-notch to the receiving water. The V-notch and 2-inch outlet pipe allows for the water behind the weir to accumulate in the detention basin and drain out over an extended period of time (Flow Duration Control). The top of the weir is set at 6 feet above the basin floor and approximately equal to the 10-yr water surface elevation calculated based on the continuous simulation modeling. Storms greater than the 10-yr event (based on an annualized hydrograph derived from 49 years of rainfall data) will be allowed to spill across the FDC weir and out of the basin across an armored spillway of a specified width. The height and width of the spillways are calibrated to adjust the 100-yr storm event attenuation within the basin and associated depth of flow spilling across

the weir so that cumulative peak runoff rates at downstream compliance points do not exceed existing conditions peak flow rates.

The hydromodification component in the detention basin below the V-notch drains very slowly through the 2-inch orifice at the bottom of the basin and is therefore largely ineffective in providing flood attenuation. 3:1 side slopes, total basin depths, basin discharge flow lines (and thus overall detention depth) employed in the flood mitigation design portion of the basins have been maintained throughout the flow duration control structure and basin analysis. Based on the hydromodification requirements to attenuate runoff up to the 10-yr event for longer durations and release flows at lower rates, the basin footprint determined via the flood control analysis had to expand to accommodate the additional volume required. The final SacCalc analyses and resulting hydrographs for the un-named Deer Creek Tributary incorporate the FDC structures and associated basin discharge curves determined through the continuous simulation hydromodification mitigation analysis into the model. The resulting hydrographs were then incorporated into the HEC RAS model to determine flow rates and stages within the receiving water, i.e. the un-named Deer Creek Tributary.

Based on the recommendations of the hydromodification management analysis completed by cbec, Inc. (reference **Appendix A, Section 7**), the volume of the basins within the un-named Laguna Creek Tributary and Carson Creek watersheds was increased by 20% while maintaining their flow line and overall depth. The resulting expanded basin footprint and all associated parameters are reflected in **Table 2** and on **Exhibit M: Concept Grading & Basin Location Plan**.

3.4 Summer Nuisance Runoff

Another potential impact due to development the Cordova Hills SPA seeks to mitigate is that of runoff occurring during otherwise dry summer months, a phenomenon termed "summer nuisance runoff". Summer nuisance runoff occurs during the dry (summer) season and is mostly generated from a development's residents by over-irrigation of landscaping, washing of vehicles, and other domestic uses that result in water running off of the development. Ephemeral drainages that did not typically receive water runoff during the summer months could become perennial drainages due to summer nuisance runoff. Environmental regulators, including the US Army Corps of Engineers have expressed concern over this potential, desiring instead to prevent an existing ephemeral drainage from becoming a perennial drainage due to development occurring in the watershed.

Of particular concern is the introduction of urban runoff pollutants into the ephemeral tributaries that traverse the project area and, indirectly, into the aquifer (Mehrten formation) that underlies the project area. Winter time discharge to these natural drainage courses will first be treated in the water quality treatment feature located in each of the project detention basins. These winter time flows will undergo treatment for removal of pollutants prior to discharge. Further, summer nuisance flows, which typically contain high nutrient concentrations, will be captured and retained on site and not discharged to the natural surface drainage courses. Accordingly, the likelihood of urban runoff pollutants infiltrating into the aquifer will be minimized.

In addition to storm water quality treatment features in each detention basin, Cordova Hills proposes to retain summer time nuisance flows on-site through the use of on-site percolation features. The objective of retaining summer time flows on-site is to minimize the chance of ephemeral to perennial conversion of natural drainage courses and minimize the likelihood of urban runoff pollutants entering the Mehrten formation that underlies the project area.

Strategies to accomplish on-site percolation will include one or more of the following approaches:

1. Installation of drainage facilities in areas of the project that don't have high groundwater recharge potential,
2. Installation of percolation trenches in project detention basins,
3. Installation of percolation chambers disbursed throughout the drainage collection system, and
4. The use of LID measures to capture and retain runoff throughout the project.

As part of the ongoing General Plan Update process, the County has identified the streambed of the tributary to Deer Creek that runs through the project area in a north-south direction as a "high groundwater recharge" zone. Except for the three roadway and one bike trail crossings of this stream, the development of Cordova Hills, and all drainage facilities associated therewith, do not encroach into this area.

Percolation within the project detention basins is also proposed. These basins will contain specially designed percolation trenches that will capture and infiltrate summer nuisance flows generated within each of the drainage watersheds of the project. **Table 5: Percolation Trenches** contains an evaluation of the number of percolation trenches that will be required for the project.

Table 5: Percolation Trenches

Watershed	*equation*	Upper Laguna Creek	Unnamed Deer Creek	Carson Creek
Total Shed Area (acre)	*a*	637.0	1,366.3	664.7
Natural Preserve Area (acre)	*b*	311.2	134.3	36.0
Recreation 2 Area (acre)	*c*	0.0	83.6	19.3
Net Developable Area (acre)	*d = a - (b + c)*	325.8	1,148.4	609.4
No. of Basins	*e*	5	15	7
Average Development Area per Basin (acre)	*f = d / e*	65.2	76.6	87.1
Dry Season Flow per Average Basin (gpd)	*g = f * 0.001525 [1] * 43,560 * 7.48*	32,377.3	38,041.8	43,257.7
No. of Percolation Trenches Required	*h = g / 8,976*	4	5	5

Notes:
[1] Stormwater Quality Design Manual for the Sacramento and South Placer Regions, dated May 2007, Table DB-2 Dry Weather Design Flows, Residential Basins 34, 63, 69, 132, average flow, page DB-8.
[2] Assume Percolation Rate below hardpan layer of 1-inch per hour (24 inches per day) - (personal conversation on 03/10/11 with Dennis Nakamoto, Senior Hydrologist, Wallace Kuhl & Associates).
[3] Assume three foot wide by 200-foot long Percolation Trench
[4] Percolation Volume / trench / day = (3-ft * 200-ft * 24-inches per day / 12-inches per ft) * 7.48 gallons per cubic foot = 8,976 gpd

Key:
gpm = gallon per minute
ft = foot

Table 5 demonstrates the average number of percolation trenches within each project detention basin so that summer nuisance flows can be mitigated. During the design of future small lot tentative maps and non-residential development applications more detailed calculations will be developed to demonstrate the ability of percolation trenches within project detention basins to capture and retain summer nuisance flows.

Refer to **Exhibit K: Conceptual Extended Duration Detention Basin Plan** to review a plan view of the typical Project detention basin. Refer to **Exhibit L: Conceptual Extended Duration Detention Basin Cross-Section** to review a cross section view of a typical Project detention basin.

Another, perhaps alternative, strategy that is being proposed is to install percolation chambers with each drainage inlet built in the development areas within the project. These chambers would be designed to capture summer nuisance flows that enter each drainage basin and infiltrate them instead of allow these flows to be discharged into the drainage collection system leading to the project detention basins. The design of these chambers would be included with the design of future small lot tentative maps and non-residential development applications.

Further, as the County perfects its LID design standards, various LID features will be incorporated into the on-site design of the project, as applicable, when small lot tentative maps and non-residential development applications are submitted for review and approval by the County. Design of applicable LID features will be included in the design of future small lot tentative maps and non-residential development applications.

3.5 Trunk Drainage Pipe System

The County of Sacramento Department of Water Resources defines trunk drainage facilities, incl. pipe systems as those facilities designed to convey runoff from a tributary shed area equal to or greater than 30 acres. Pipe systems are designed based on "Nolte flows", where "Nolte flows" equate to runoff equal to approximately 0.3 cubic feet per second /acre of residential development and 0.5 cubic feet/acre of commercial development.

Public utilities, including public storm drainage pipe systems are required to be accessible for maintenance purposes and as such, to be located within the public right-of-way. When they have to be aligned outside the public right-of-way, they have to be located within public storm drainage easements. The current entitlements being sought for the Cordova Hills SPA does not include small-lot tentative subdivision maps and associated subdivision street layouts. The smaller diameter collection pipe system that will collect and convey runoff within individual subdivisions towards the trunk drainage system is therefore not a part of this master plan level of analysis and will therefore have to be studied in detail as part of the small-lot subdivision map entitlement process. The larger trunk drainage pipes that collect and convey the runoff from the smaller collection system toward the detention basins and onward into the open receiving waters has been schematically aligned within the major streets depicted on the current land use plan. The resulting layout is depicted on **Exhibit R: Trunk Drainage Pipe System**. The "Nolte flows" runoff and hydraulic design calculations the trunk drainage pipe system is based on are located **in Appendix K: Trunk Drainage Pipe System – Hydraulic Analysis**.

4.0 Conclusion

The 2,668+/- acre Cordova Hills SPA is a proposed mixed-use community located within the Sacramento County Grant Line East Planning Area. The Project consists of low to high-density single-family residential, multi-family residential units, retail, mixed-use areas, schools (including the proposed private University of Sacramento campus), parks, open spaces, and community facilities.

This Drainage Master Plan for the Project analyzes drainage impacts resulting from development of the proposed land uses depicted in Exhibit B. The analysis defines how the proposed development can occur in a responsible and safe manner consistent with all applicable standards and regulations and how potential impacts on existing receiving waters can be fully mitigated to existing or better than existing conditions.

The Project can develop as proposed by constructing on-site combination flood and flow duration control basins that mitigate for the developments impacts. These basins include a wet water quality basin below the discharge elevation of the detention and flow duration control discharge structures. Summer nuisance flows will be percolated into the ground through specially designed and constructed percolation boxes connected by small drainage pipes to pre-determined drainage inlets and/or through percolation trenches constructed in the bottom of the water quality basins. In combination with the wet water quality basin attenuation, summer nuisance flows will be prevented from entering the receiving waters. The impacts on the Upper Laguna, Deer, and Carson Creek watersheds due to hydromodification are mitigated through the incorporation of flow duration control into the proposed detention/water quality basins to meter out stormwater runoff to match undeveloped runoff rates for storms ranging from 25% of the 2-year storm up to and including the 10-year storm. Flood control via the detention basins reduces the developed Project's calculated stormwater runoff rates for the 10-year 24-hour storm and the 100-year 24-hour storms to less than the pre-development peak flow rates for the same design storms.

With the implementation of the drainage facilities identified in this report, the Project can develop without negatively impacting the pre-development runoff volume, stage, water quality, and hydromodification of the Upper Laguna, Deer, and Carson Creek watersheds.

5.0 References

County of Sacramento, "Hydrology Standards Volume 2 of the Sacramento City/ County Drainage Manual," December 1996.

County of Sacramento, "Stormwater Quality Design Manual for the Sacramento and South Placer Regions," May 2007,

MacKay & Somps Civil Engineers, Inc., "DRAFT Regional Master Drainage Study for Sun Creek Specific Plan," December 2008

Spink Corporation, "Final Master Drainage Study, Sunrise Douglas Community Plan Area, Sacramento, California," October 16, 1998, (SDCPA Study).

Wood Rodgers, Inc., "Drainage Study Montelena Including Sections for Anatolia 1 & 2 Updated Ultimate Conditions and As-Built Facilities Summary," September 2007.

Geosyntec Consultants, "A Technical Study of Hydrology, Geomorphology & Water Quality in the Laguna Creek Watershed," November 2007.

6.0 Exhibits

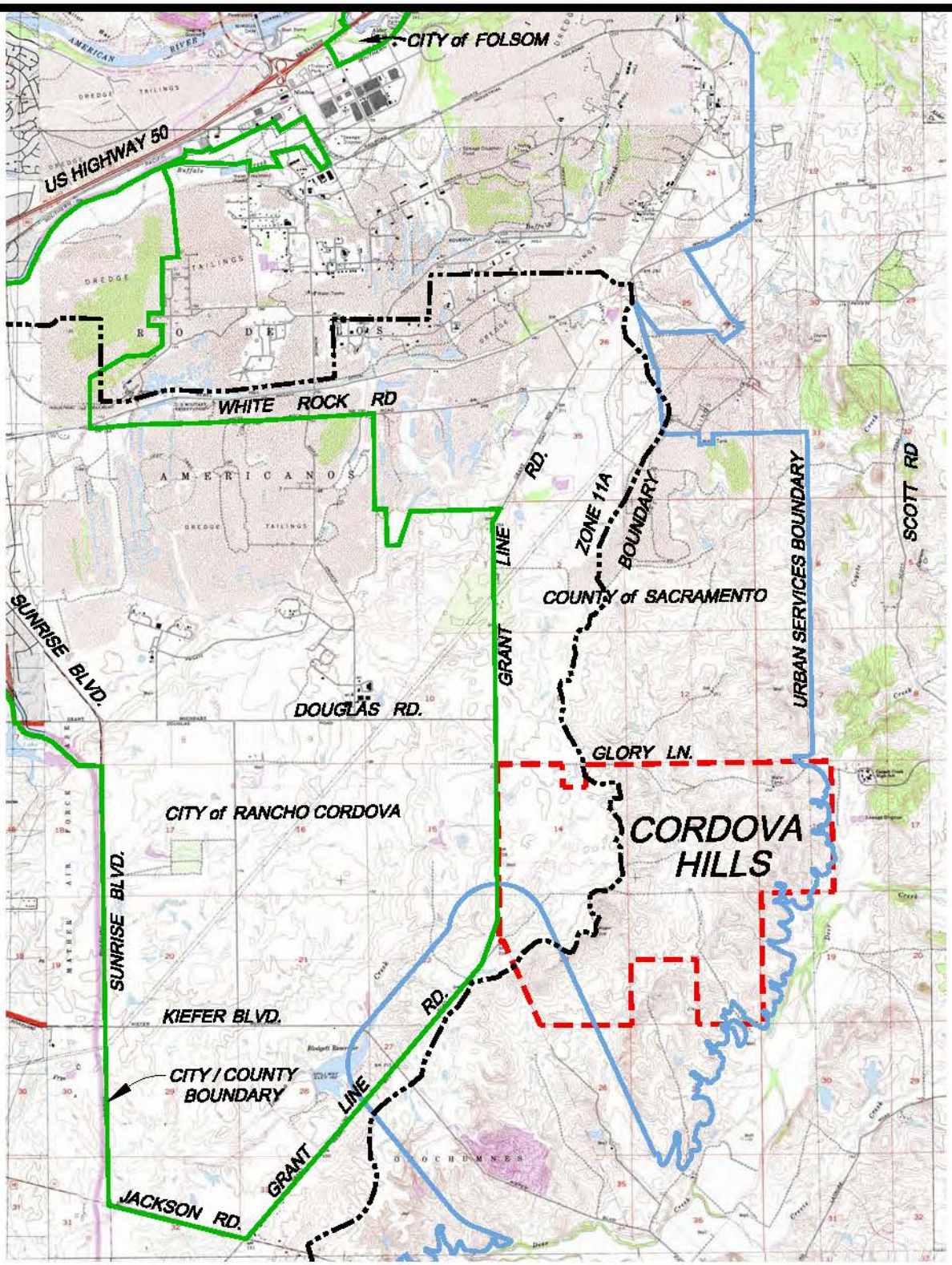

EXHIBIT A
Vicinity Map

Cordova Hills SPA

County of Sacramento, California
Scale: N.T.S. March, 2011

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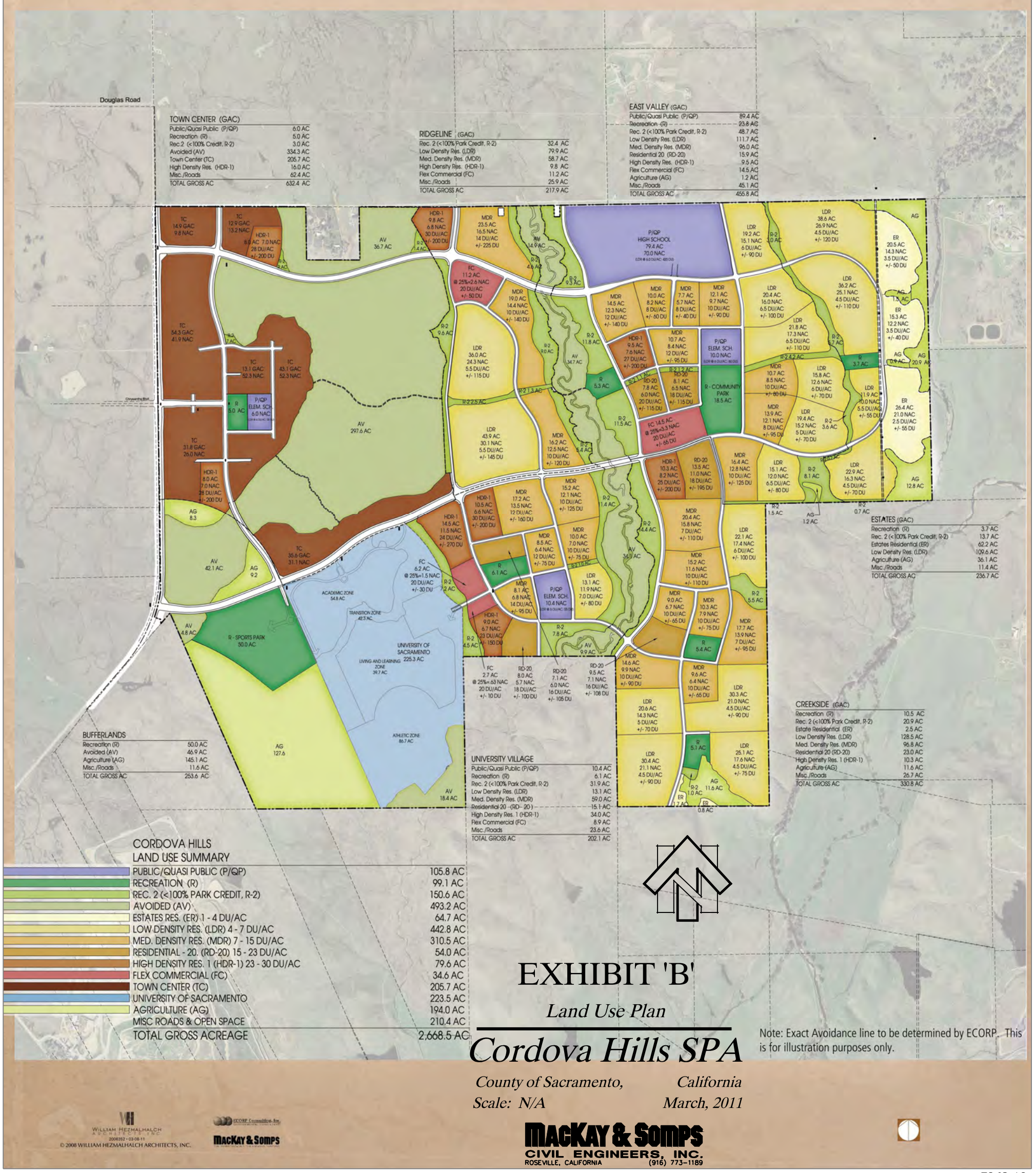
There are no xreferences in this drawing.

Cordova Hills

LAND USE PLAN



CORDOVA HILLS
LAND USE SUMMARY

PUBLIC/QUASI PUBLIC (P/QP)	105.8 AC
RECREATION (R)	99.1 AC
REC. 2 (<100% PARK CREDIT, R-2)	150.6 AC
AVOIDED (AV)	493.2 AC
ESTATES RES. (ER) 1 - 4 DU/AC	64.7 AC
LOW DENSITY RES. (LDR) 4 - 7 DU/AC	442.8 AC
MED. DENSITY RES. (MDR) 7 - 15 DU/AC	310.5 AC
RESIDENTIAL - 20. (RD-20) 15 - 23 DU/AC	54.0 AC
HIGH DENSITY RES. 1 (HDR-1) 23 - 30 DU/AC	79.6 AC
FLEX COMMERCIAL (FC)	34.6 AC
TOWN CENTER (TC)	205.7 AC
UNIVERSITY OF SACRAMENTO	223.5 AC
AGRICULTURE (AG)	194.0 AC
MISC ROADS & OPEN SPACE	210.4 AC
TOTAL GROSS ACREAGE	2,668.5 AC

EXHIBIT 'B'

Land Use Plan

Cordova Hills SPA

County of Sacramento, California

Scale: N/A *March, 2011*

Note: Exact Avoidance line to be determined by ECORP. This is for illustration purposes only.

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ECORP Consulting, Inc.

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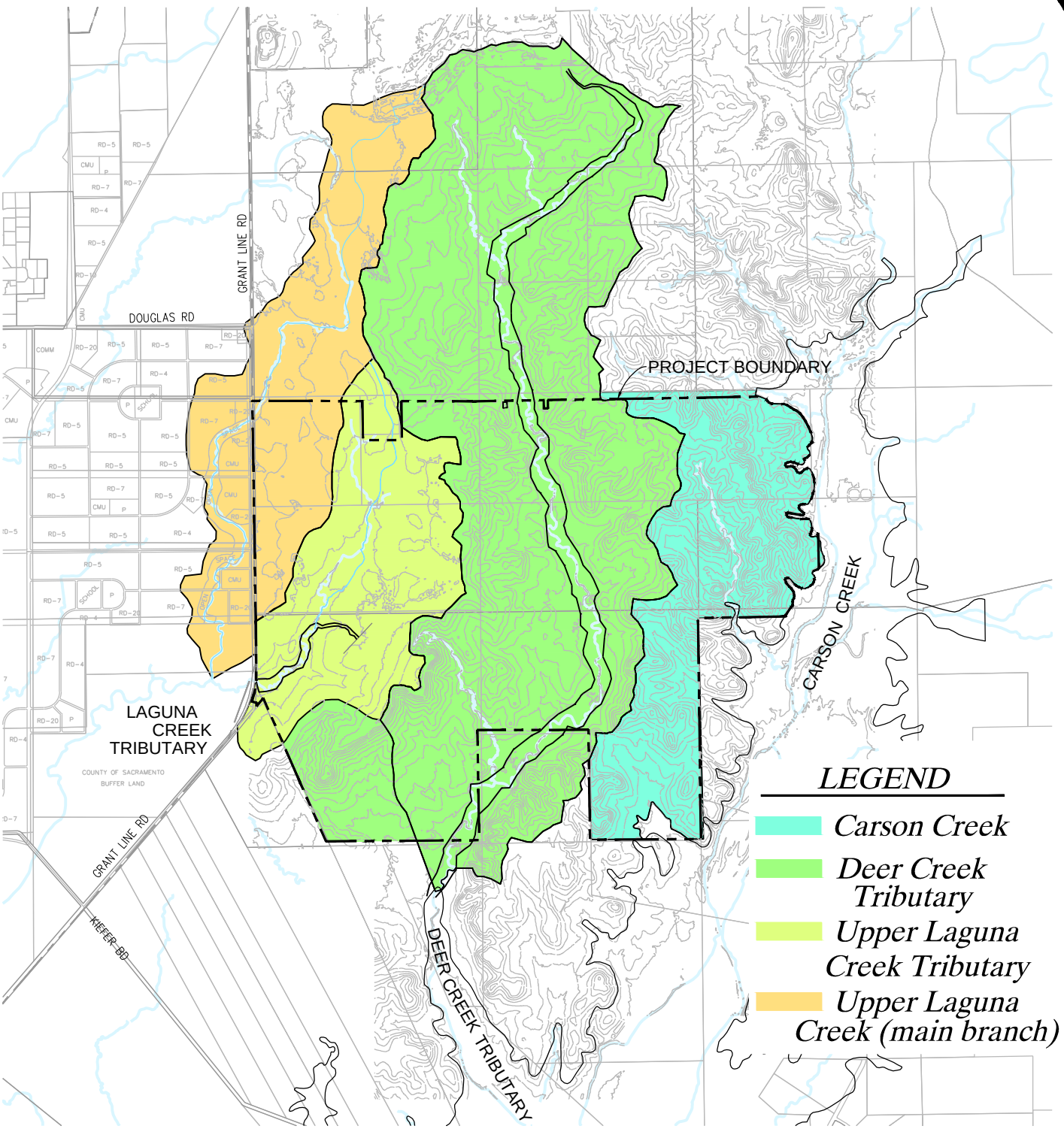

EXHIBIT C

Drainage Study Area Map

Cordova Hills SPA

County of Sacramento, California

Scale: N.T.S. May, 2011

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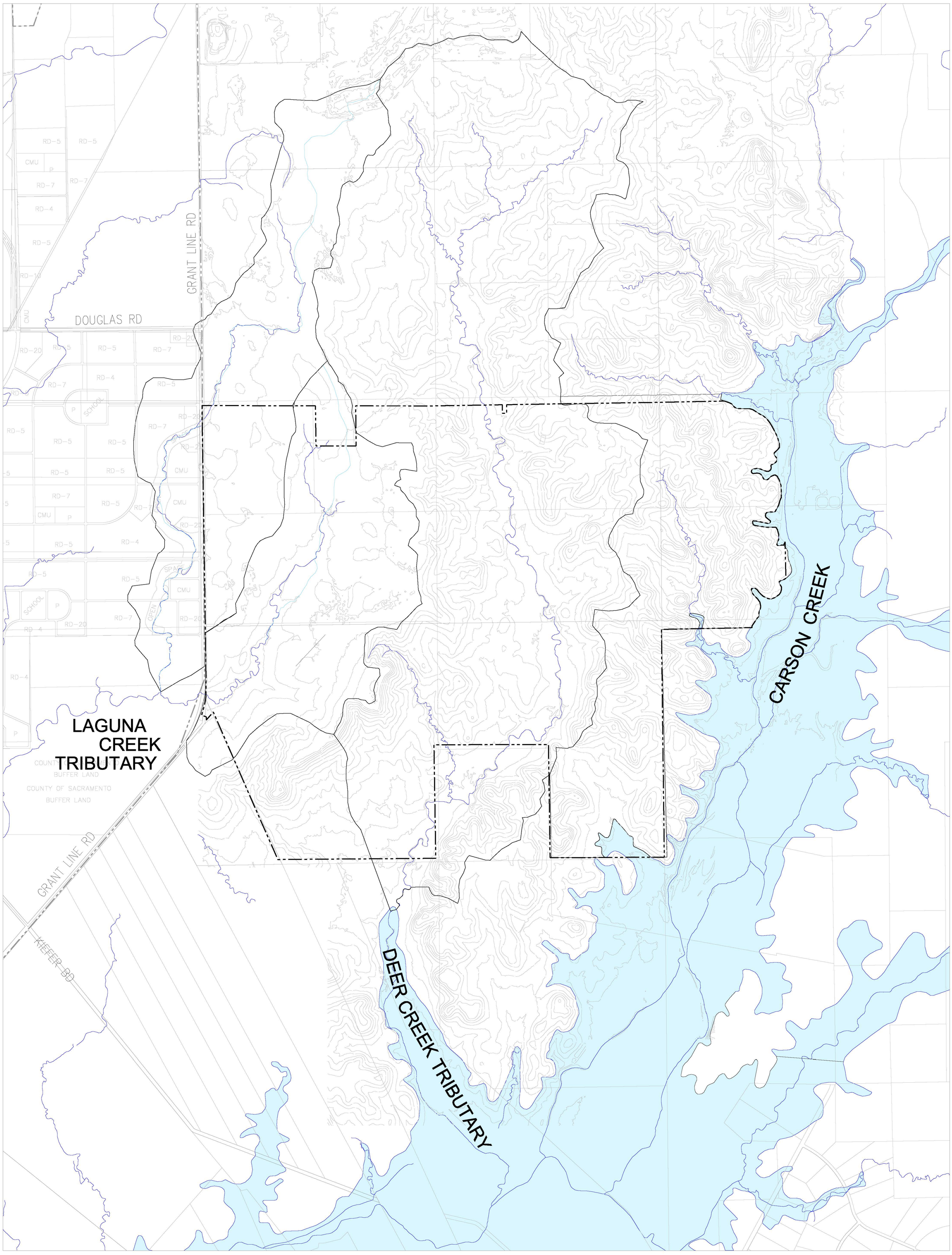

0 500 1000 2000
SCALE:1"=1000'

100-Year Flood Plain

Carson Creek (Zone A)
(FIRM Panel Number: 060262 0250 C)

EXHIBIT D
CARSON CREEK
Extent of FEMA Mapped
Existing Condition Flood Plain

Cordova Hills SPA

County of Sacramento, California
Scale: 1" = 1000' *March, 2011*

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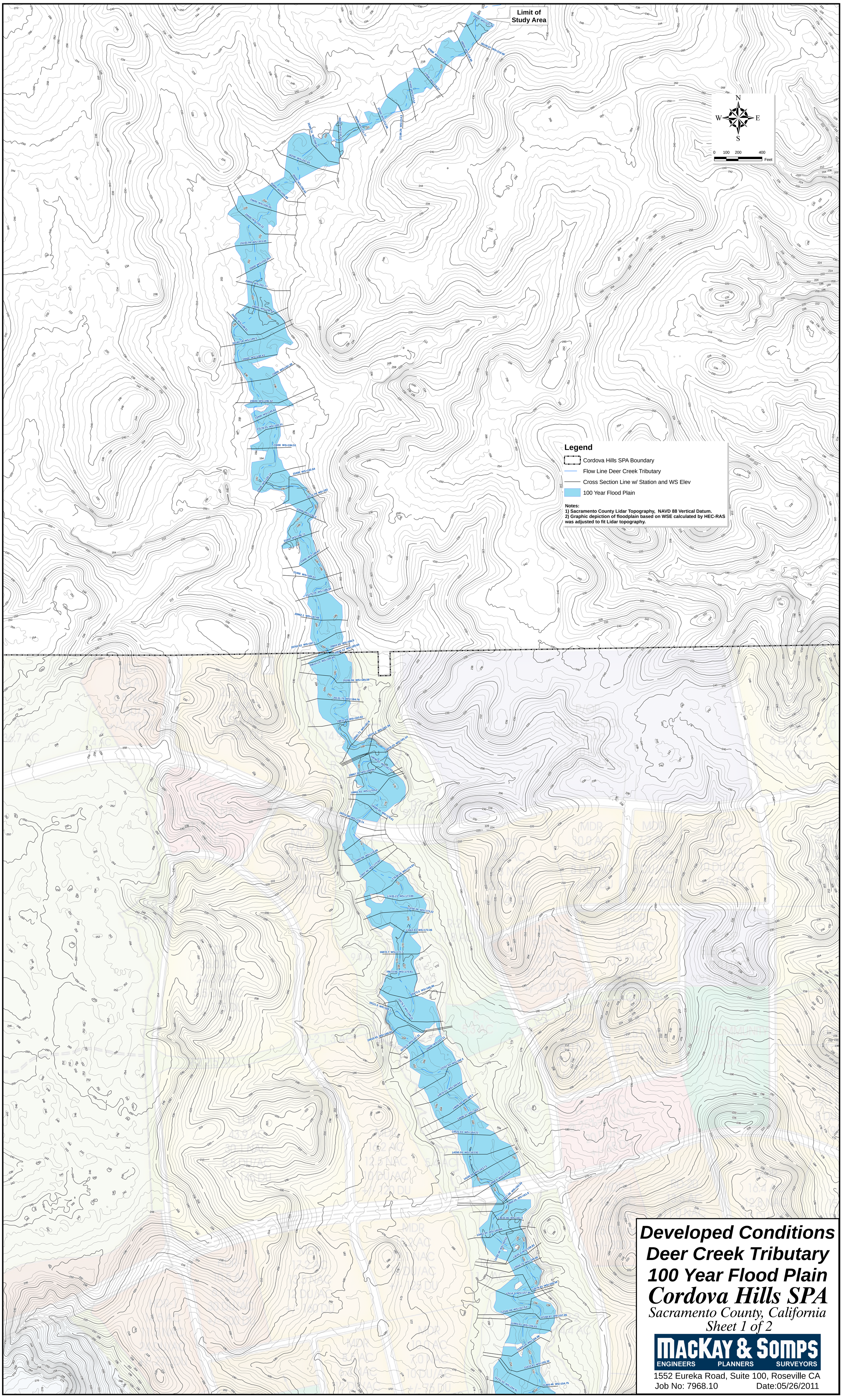


Developed Conditions
Deer Creek Tributary
100 Year Flood Plain
Cordova Hills SPA

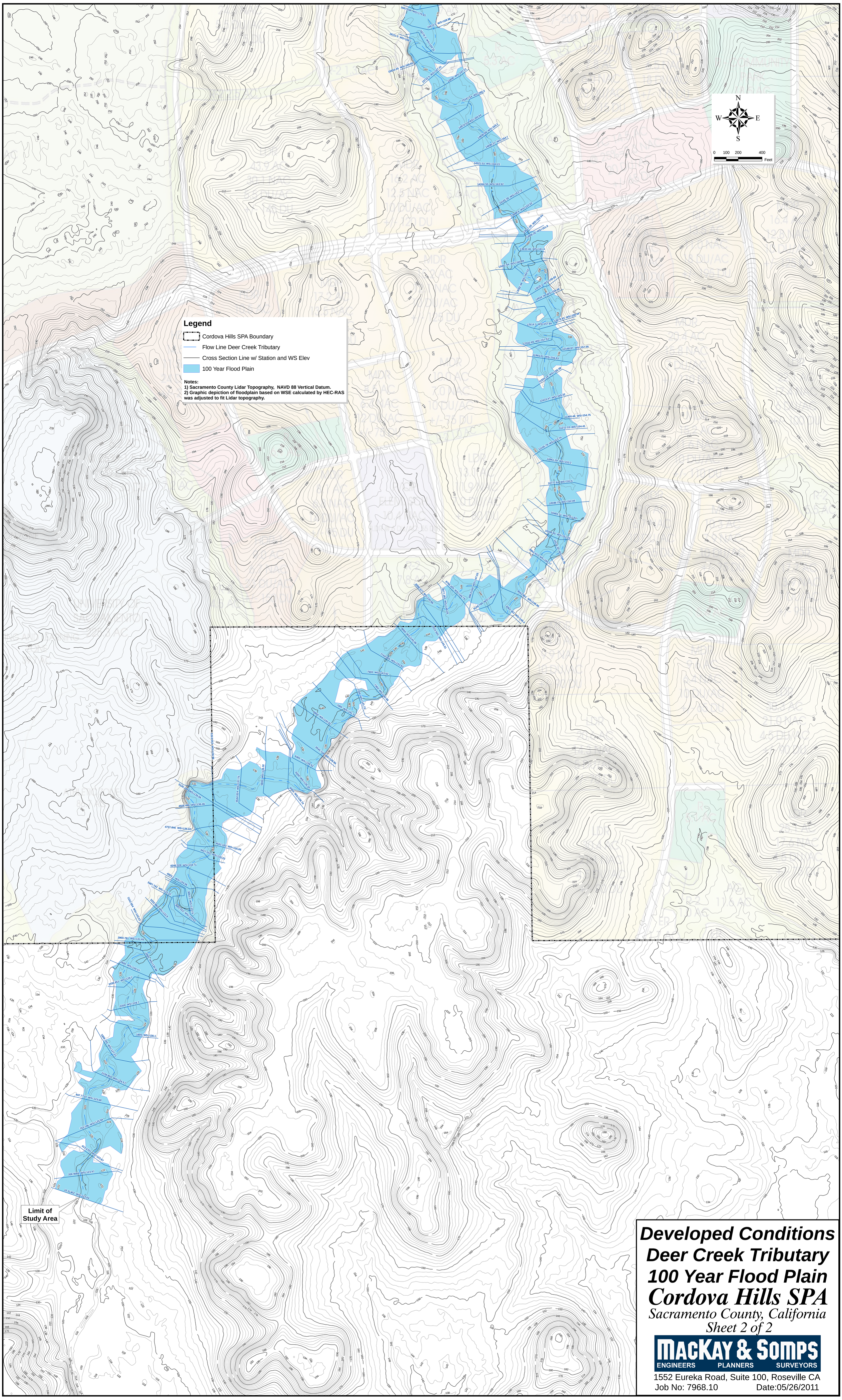
Sacramento County, California

Sheet 1 of 2

MacKay & Somps
ENGINEERS PLANNERS SURVEYORS

1552 Eureka Road, Suite 100, Roseville CA

Job No: 7968.10 Date:05/26/2011



Developed Conditions Deer Creek Tributary 100 Year Flood Plain

Cordova Hills SPA

Sacramento County, California

Sheet 2 of 2

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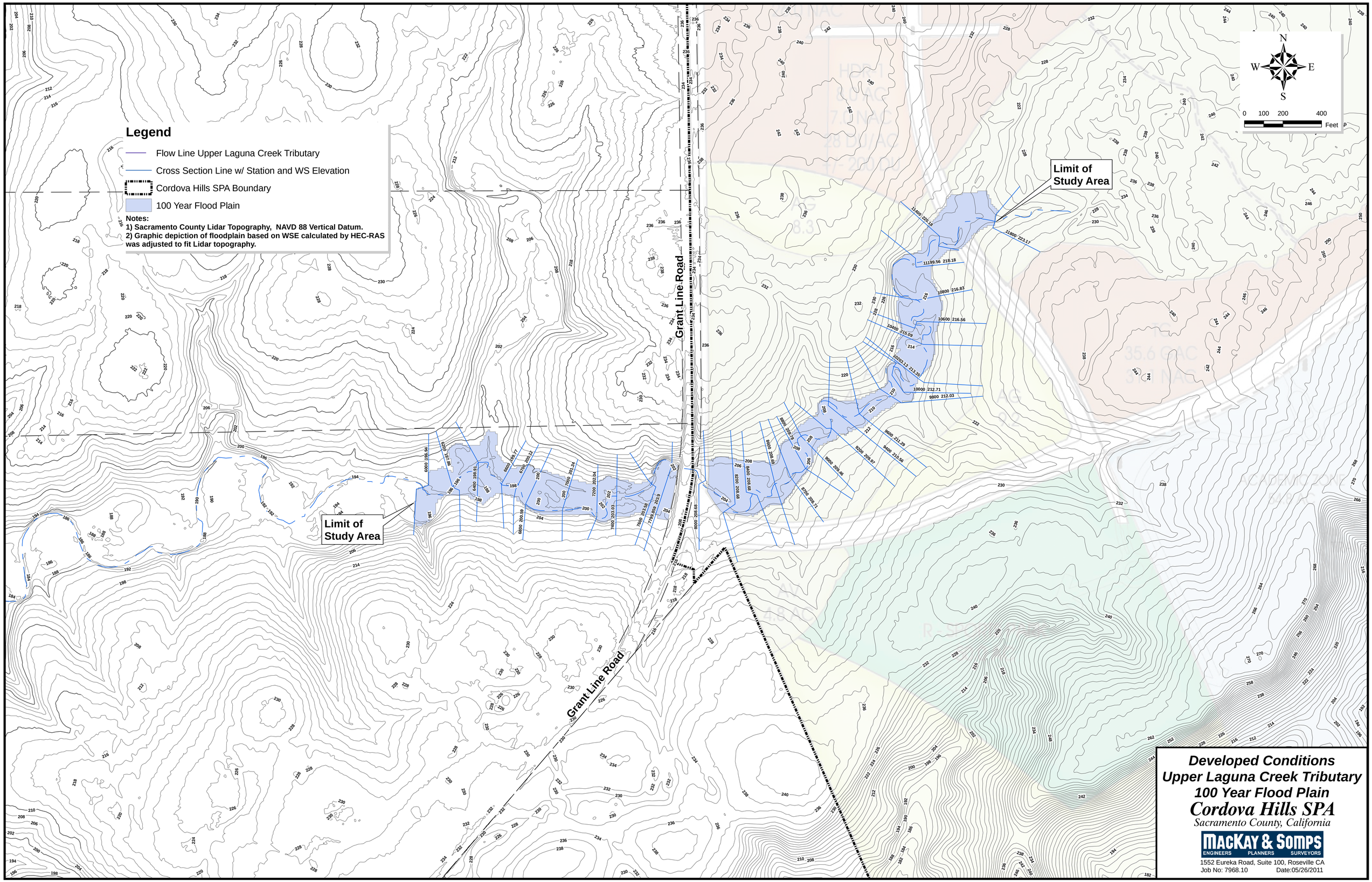
ENGINEERS PLANNERS SURVEYORS

1552 Eureka Road, Suite 100, Roseville CA

Job No: 7968.10 Date:05/26/2011


Legend
Flow Line Upper Laguna Creek Tributary
Cross Section Line w/ Station and WS Elevation
Cordova Hills SPA Boundary
100 Year Flood Plain
Notes:
1) Sacramento County Lidar Topography, NAVD 88 Vertical Datum.
2) Graphic depiction of floodplain based on WSE calculated by HEC-RAS was adjusted to fit Lidar topography.
N
W
E
S
0 100 200 400
Feet
Limit of Study Area
Limit of Study Area
Grant Line Road
Grant Line Road
Developed Conditions
Upper Laguna Creek Tributary
100 Year Flood Plain
Cordova Hills SPA
Sacramento County, California
MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville CA
Job No: 7968.10
Date:05/26/2011

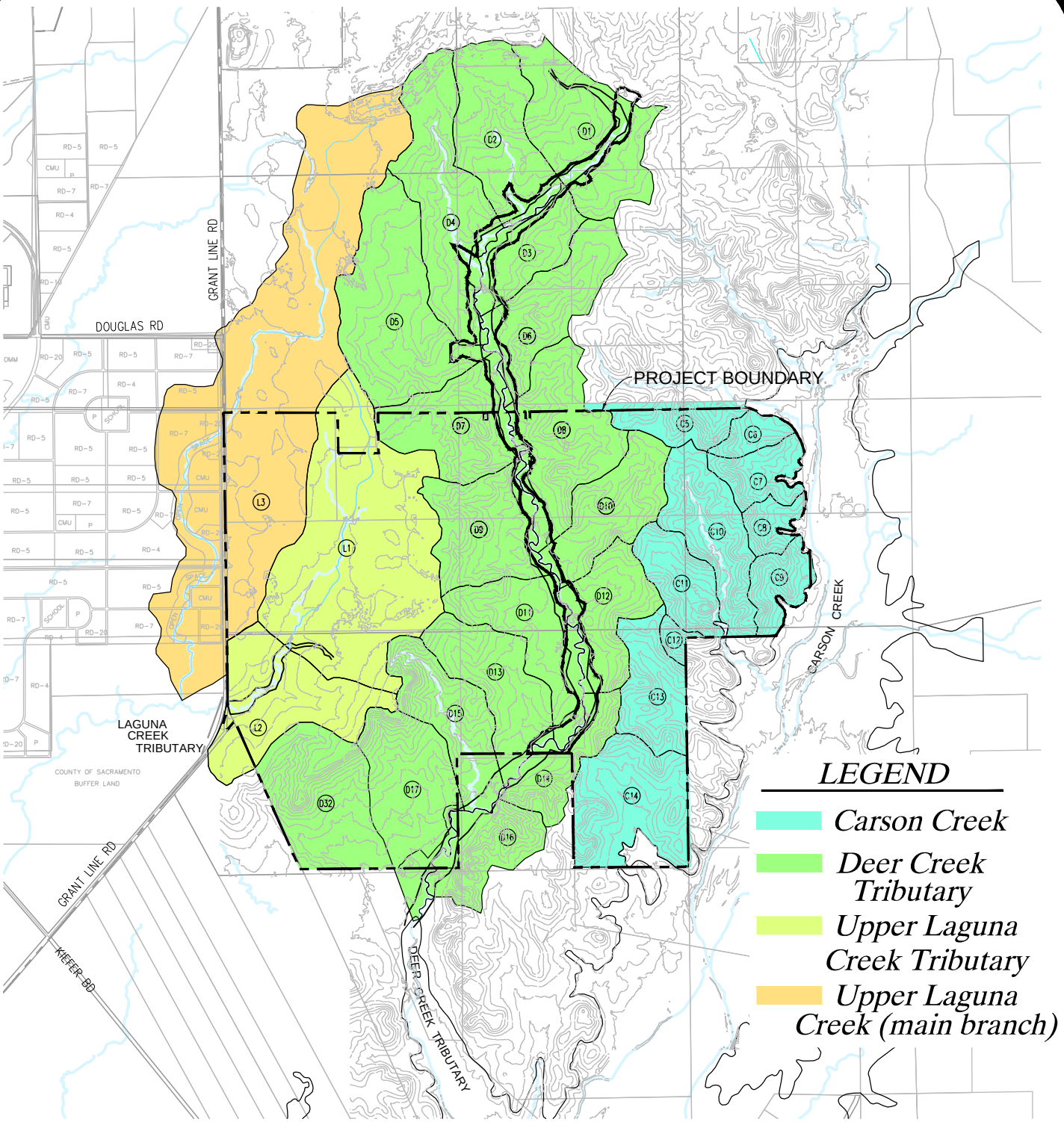


EXHIBIT F
Pre-Development
Watershed Map

Cordova Hills SPA

County of Sacramento, California

Scale: N.T.S. March, 2011

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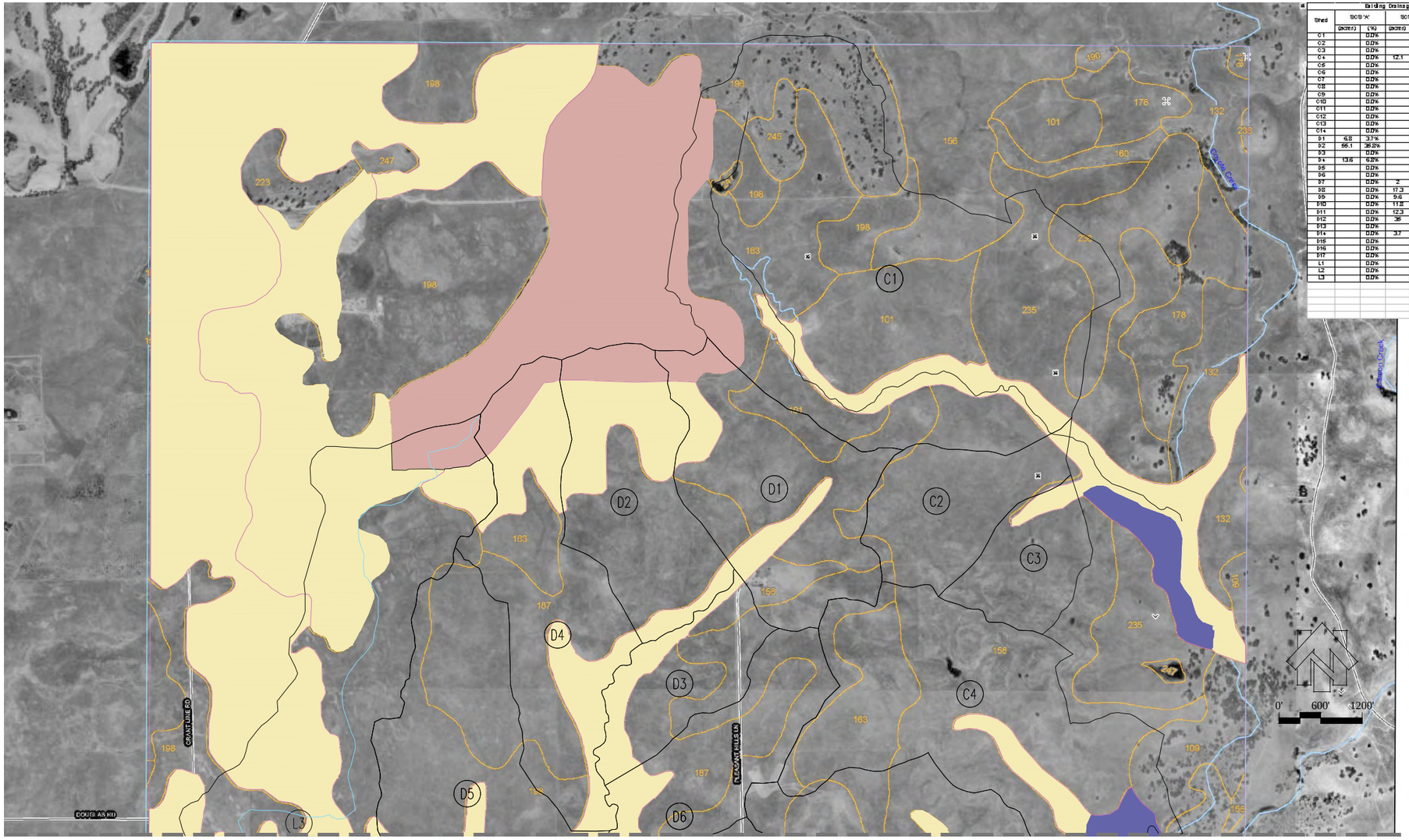

Existing Drainage Shed c- Composite SCS Analysis									
Shed	SCS "A"		SCS "B"		SCS "C"		SCS "D"		Total Acres
	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)
C1		0.0%		0.0%	19	22.8%	64.4	77.2%	83.4
C2		0.0%		0.0%	6	5.9%	96.5	94.1%	101.5
C3		0.0%		0.0%	13.9	19.9%	56.9	80.1%	69.8
C4		0.0%	12.1	4.2%	19	6.6%	257.3	89.2%	288.4
C5		0.0%		0.0%	26	10.3%	226.4	89.7%	252.4
C6		0.0%		0.0%		0.0%	30	100.0%	30
C7		0.0%		0.0%		0.0%	52.7	100.0%	52.7
C8		0.0%		0.0%		0.0%	31	100.0%	31
C9		0.0%		0.0%		0.0%	49.7	100.0%	49.7
C10		0.0%		0.0%		0.0%	118.6	100.0%	118.6
C11		0.0%		0.0%		0.0%	72.3	100.0%	72.3
C12		0.0%		0.0%		0.0%	12.2	100.0%	12.2
C13		0.0%		0.0%	12	9.8%	110.4	90.2%	122.4
C14		0.0%		0.0%		0.0%	189.9	100.0%	189.9
D1	6.8	3.7%		0.0%	23.7	12.9%	152.6	83.3%	183.1
D2	56.1	35.8%		0.0%	60.6	38.4%	38.3	24.5%	156
D3		0.0%		0.0%	18.8	23.8%	62.9	77.2%	81.7
D4	13.6	6.8%		0.0%	48.4	24.3%	137.2	68.8%	199.2
D5		0.0%		0.0%	42.1	18.5%	185.3	81.5%	227.4
D6		0.0%		0.0%	21.3	16.7%	106.5	83.3%	127.8
D7		0.0%	2	1.5%	48.8	36.6%	82.5	61.9%	133.4
D8		0.0%	17.3	10.6%	16.9	9.3%	129.7	79.6%	162.9
D9		0.0%	9.6	7.2%	1.6	1.2%	122.6	91.6%	133.7
D10		0.0%	11.8	10.4%	8.6	7.6%	93.6	82.1%	114
D11		0.0%	12.3	9.8%	9.7	7.8%	103	82.4%	125
D12		0.0%	36	33.6%		0.0%	69.3	66.4%	104.3
D13		0.0%		0.0%	21.3	17.1%	103.3	82.9%	124.6
D14		0.0%	3.7	4.8%	8.3	10.8%	65.2	84.5%	77.2
D15		0.0%		0.0%	9.5	8.1%	108.2	91.9%	117.7
D16		0.0%		0.0%	7.4	8.1%	83.6	91.9%	90.9
D17		0.0%		0.0%	4.6	2.9%	156	97.1%	160.6
L1		0.0%		0.0%	177.8	40.8%	258.2	59.2%	436
L2		0.0%		0.0%		0.0%	110	100.0%	110
L3		0.0%		0.0%	355.4	46.2%	414.13	53.8%	769.5

MATCH LINE SEE SHEET 1

LEGEND:

- TYPE A SOIL
- TYPE B SOIL
- TYPE C SOIL
- TYPE D SOIL

EXHIBIT G

PRE-DEVELOPMENT SOILS ANALYSIS (SCS)

Cordova Hills SPA

County of Sacramento, California

March, 2011

Sheet 2 of 2

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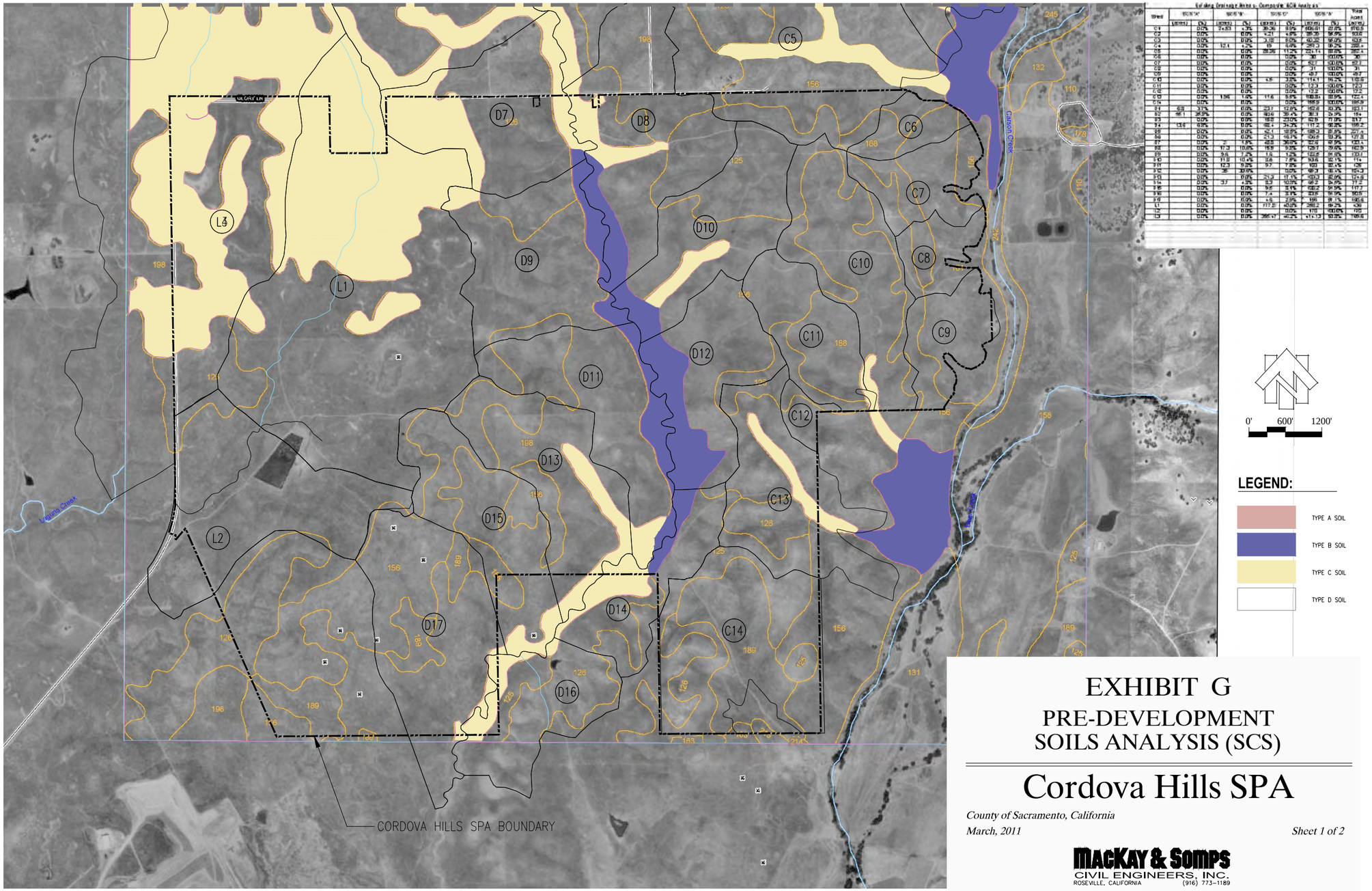

EXHIBIT G

PRE-DEVELOPMENT SOILS ANALYSIS (SCS)

Cordova Hills SPA

County of Sacramento, California

March, 2011

Sheet 1 of 2

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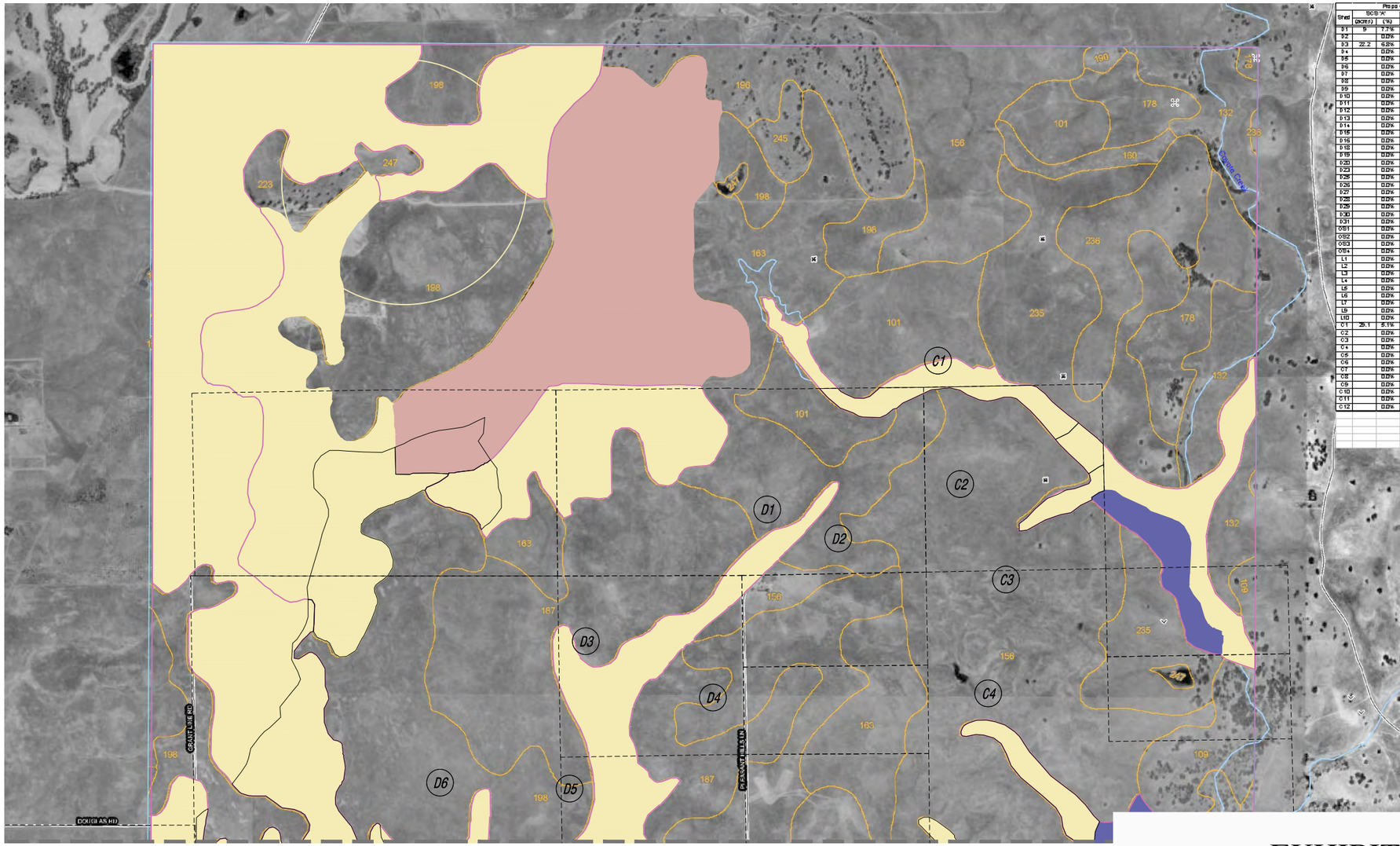

MATCH LINE SEE SHEET 1

Proposed Drainage Shed c. Composite SCS Analysis									
Shed	SCS "A"		SCS "B"		SCS "C"		SCS "D"		Total Acres
	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)
D1	9	7.7%	3.7	3.1%	27.2	23.1%	77.6	66.0%	117.5
D2		0.0%	3.3	2.1%	11.8	7.6%	141.1	90.3%	156.2
D3	22.2	6.8%		0.0%	108.2	33.3%	194.7	59.9%	325.1
D4		0.0%		0.0%	36.6	24.8%	108.2	75.2%	143.8
D5		0.0%		0.0%	13.9	33.7%	27.3	66.3%	41.2
D6		0.0%		0.0%	31.4	15.2%	175.2	84.8%	206.6
D7		0.0%		0.0%	18.8	32.4%	39.2	67.6%	58
D8		0.0%		0.0%	7.5	8.2%	77.5	91.8%	85
D9		0.0%		0.0%	5.96	23.8%	17.77	76.2%	23.73
D10		0.0%	1	2.4%	5.49	13.2%	36.09	84.4%	41.58
D11		0.0%	1.29	1.5%	9.22	9.9%	82.62	88.6%	93.13
D12		0.0%	1.18	1.6%	2.82	2.1%	71.58	96.3%	75.19
D13		0.0%	2.06	2.7%		0.0%	75.03	97.3%	77.09
D14		0.0%		0.0%	1.24	3.6%	34.21	96.4%	35.45
D15		0.0%	9.81	7.8%	8.72	7.0%	106.76	85.2%	125.28
D16		0.0%	0.68	1.2%		0.0%	44.62	98.8%	45.17
D18		0.0%	2.21	5.4%	0.01	0.0%	38.49	94.6%	40.71
D19		0.0%	10.91	38.8%	4.81	17.1%	11.7	42.1%	27.42
D21		0.0%	0.12	0.4%		0.0%	27.3	99.6%	27.42
D23		0.0%	0.31	1.6%	5.63	28.5%	13.84	70.0%	19.78
D25		0.0%	0.03	0.0%	5.61	4.5%	119.25	95.5%	124.89
D26		0.0%	0.04	0.1%	15.32	29.1%	37.22	70.8%	52.64
D27		0.0%		0.0%		0.0%	60.88	100.0%	60.88
D28		0.0%		0.0%	24.94	18.2%	112.02	81.8%	136.96
D29		0.0%		0.0%		0.0%	31.42	100.0%	31.42
D30		0.0%		0.0%		0.0%	32.98	100.0%	32.98
D31		0.0%		0.0%		0.0%	64.31	100.0%	64.31
D51		0.0%	3.9	26.4%	10.66	72.1%	0.22	1.5%	14.77
D52		0.0%	29.59	77.0%		0.0%	8.88	23.0%	38.47
D53		0.0%	27.53	81.0%		0.0%	6.45	19.0%	33.98
D54		0.0%	1.18	12.4%	7.85	82.7%	0.47	4.9%	9.54
L1		0.0%		0.0%	67.82	100.0%	0	0.0%	67.82
L2		0.0%		0.0%	106.42	36.2%	187.92	63.8%	294.34
L3		0.0%		0.0%		0.0%	380.06	100.0%	380.06
L4		0.0%		0.0%	28.88	23.9%	88.64	76.1%	117.52
L5		0.0%	16.9	4.7%	212	59.0%	130.4	36.3%	359.3
L6		0.0%		0.0%	33.34	61.4%	20.92	38.6%	54.26
L7		0.0%		0.0%	53.36	61.0%	34.09	39.0%	87.45
L8		0.0%		0.0%		0.0%	126.13	100.0%	126.13
L10		0.0%		0.0%	82.28	37.9%	135.02	62.1%	217.3
C1	25.1	5.1%		0.0%	38.5	6.8%	501.8	88.1%	569.5
C2		0.0%		0.0%	4.4	5.9%	70	94.1%	74.4
C3		0.0%		0.0%	5.7	9.0%	57.8	91.0%	63.5
C4		0.0%	14.8	9.2%	18.7	7.9%	204.2	88.9%	237.7
C5		0.0%	0.6	0.3%	21.2	10.3%	184.5	89.4%	206.3
C6		0.0%		0.0%		0.0%	61.76	100.0%	61.76
C7		0.0%		0.0%		0.0%	53.19	100.0%	53.19
C8		0.0%		0.0%		0.0%	32.97	100.0%	32.97
C9		0.0%		0.0%		0.0%	47.46	100.0%	47.46
C10		0.0%		0.0%	4	2.3%	170.5	97.7%	174.5
C11		0.0%		0.0%	8.86	10.5%	76.47	89.5%	85.23
C12		0.0%		0.0%		0.0%	154.14	100.0%	154.14

LEGEND:

- TYPE A SOIL
- TYPE B SOIL
- TYPE C SOIL
- TYPE D SOIL

0' 600' 1200'

EXHIBIT H

POST-DEVELOPMENT SOILS ANALYSIS (SCS)

Cordova Hills SPA

County of Sacramento, California

March, 2011

Sheet 2 of 2

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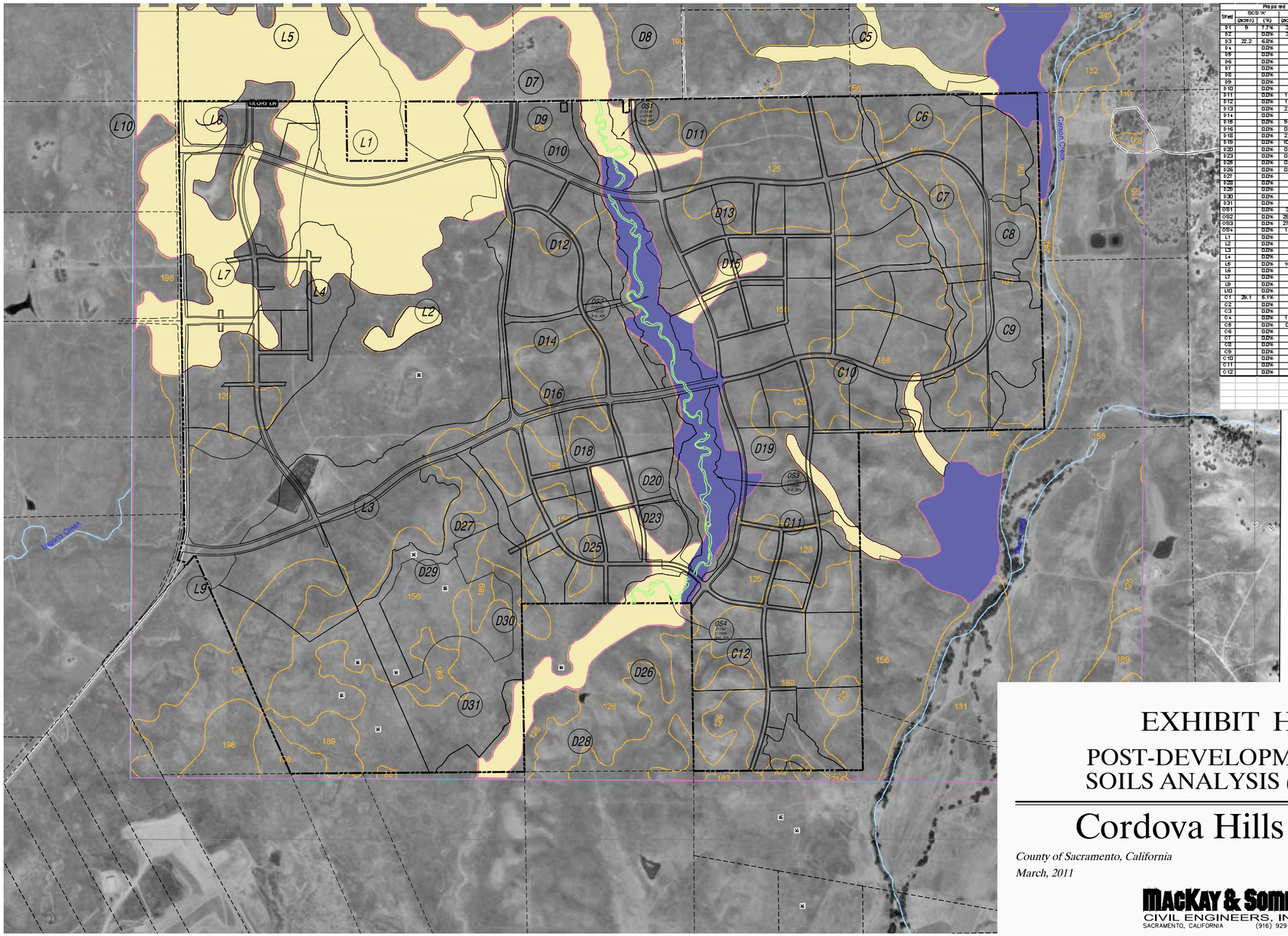

Sheet	SCS "A" (acres)	SCS "A" (%)	SCS "B" (acres)	SCS "B" (%)	SCS "C" (acres)	SCS "C" (%)	SCS "D" (acres)	SCS "D" (%)	Total Acres (acres)
D1	9	7.7%	3.7	3.1%	27.2	23.1%	77.6	66.0%	117.5
D2		0.0%	3.3	2.1%	11.8	7.6%	141.1	90.3%	156.2
D3	22.2	6.8%		0.0%	108.2	33.3%	194.7	59.9%	325.1
D4		0.0%		0.0%	36.6	24.8%	108.2	75.2%	143.8
D5		0.0%		0.0%	13.5	33.7%	27.3	66.3%	41.2
D6		0.0%		0.0%	31.4	15.2%	175.2	84.8%	206.6
D7		0.0%		0.0%	18.8	32.4%	39.2	67.6%	58
D8		0.0%		0.0%	7.5	8.8%	77.5	91.2%	85
D9		0.0%		0.0%	5.66	23.8%	17.77	74.2%	23.93
D10		0.0%	1	2.4%	5.49	13.2%	35.09	84.4%	41.58
D11		0.0%	1.39	1.6%	9.22	9.9%	82.52	88.5%	93.13
D12		0.0%	1.18	1.6%	2.02	2.7%	71.89	95.7%	75.19
D13		0.0%	2.05	2.7%		0.0%	75.03	97.3%	77.09
D14		0.0%		0.0%	1.24	3.5%	34.21	96.5%	35.45
D15		0.0%	9.21	7.3%	8.72	7.0%	108.75	86.2%	125.68
D16		0.0%	0.55	1.2%		0.0%	44.62	98.8%	45.17
D18		0.0%	2.21	5.4%	0.01	0.0%	38.49	94.5%	40.71
D19		0.0%	10.51	38.2%	4.81	17.5%	11.7	42.7%	27.42
D20		0.0%	0.12	0.4%		0.0%	27.3	99.6%	27.42
D23		0.0%	0.31	1.6%	5.63	29.5%	13.34	70.0%	19.12
D25		0.0%	0.03	0.0%	5.61	4.5%	119.25	95.5%	124.89
D26		0.0%	0.04	0.1%	15.32	29.1%	37.28	70.8%	52.64
D27		0.0%		0.0%		0.0%	60.85	100.0%	60.85
D28		0.0%		0.0%	24.84	18.2%	112.02	81.8%	136.86
D29		0.0%		0.0%		0.0%	31.42	100.0%	31.42
D30		0.0%		0.0%		0.0%	32.98	100.0%	32.98
D31		0.0%		0.0%		0.0%	64.31	100.0%	64.31
OS1		0.0%	3.9	26.4%	10.65	72.1%	0.22	1.5%	14.77
OS2		0.0%	29.99	77.0%		0.0%	8.96	23.0%	38.97
OS3		0.0%	27.53	81.0%		0.0%	6.45	19.0%	33.98
OS4		0.0%	1.18	12.4%	7.85	82.7%	0.47	4.9%	9.54
L1		0.0%		0.0%	67.22	100.0%	0	0.0%	67.22
L2		0.0%		0.0%	106.42	35.8%	190.92	64.2%	297.34
L3		0.0%		0.0%		0.0%	38.06	100.0%	38.06
L4		0.0%		0.0%	28.18	23.9%	89.54	76.1%	117.72
L5		0.0%	16.9	4.7%	212	59.0%	130.4	36.3%	359.3
L6		0.0%		0.0%	33.4	61.4%	21.92	38.6%	54.26
L7		0.0%		0.0%	53.36	61.0%	34.09	39.0%	87.45
L9		0.0%		0.0%		0.0%	126.13	100.0%	126.13
L10		0.0%		0.0%	82.28	37.9%	135.02	62.1%	217.3
C1	25.1	5.1%		0.0%	38.8	6.8%	540.2	88.1%	568.5
C2		0.0%		0.0%	4.4	5.9%	70	94.1%	74.4
C3		0.0%		0.0%	5.7	9.0%	57.3	91.0%	63.0
C4		0.0%	14.2	6.2%	18.7	7.9%	203.2	85.9%	236.1
C5		0.0%	0.6	0.3%	21.2	10.3%	184.5	89.4%	206.3
C6		0.0%		0.0%		0.0%	61.76	100.0%	61.76
C7		0.0%		0.0%		0.0%	53.19	100.0%	53.19
C8		0.0%		0.0%		0.0%	32.97	100.0%	32.97
C9		0.0%		0.0%		0.0%	47.45	100.0%	47.45
C10		0.0%		0.0%	4	2.3%	170.5	97.7%	174.5
C11		0.0%		0.0%	8.66	10.9%	70.61	89.1%	79.27
C12		0.0%		0.0%		0.0%	154.14	100.0%	154.14

LEGEND:

- TYPE A SOIL
- TYPE B SOIL
- TYPE C SOIL
- TYPE D SOIL

0' 600' 1200'

EXHIBIT H

POST-DEVELOPMENT SOILS ANALYSIS (SCS)

Cordova Hills SPA

County of Sacramento, California

March, 2011

Sheet 1 of 2

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 929-6092

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03-11-2011 3:59pm Mike Jones P:\7968\MASTER PLANS\CH-SDMP\EXHIBITS\EXHIBIT H - POST DEVELOPMENT SOILS ANALYSIS.DWG

Vegetated bio-swales in street medians intercept stormwater runoff, removing pollutants, increasing evaporation, and retarding flows prior to discharge.

Curb cuts direct runoff into bioswales and natural openspace for treatment, increased evaporation, and flow retardation.

Lush vegetated swales with native vegetation and trees intercept runoff, allowing for increased evaporation and treatment to remove pollutants prior to discharge into natural waters; permeable walkways promote infiltration, thereby reducing runoff.

Bioretention systems and raingardens capture stormwater runoff from the public right-of-way and provide water quality treatment via vegetation and bacteria in the soil medium, before discharging to subdrains.

Cordova Hills

Conceptual LID Master Plan
Streets and Landscape Corridors

Trees, green ways with native vegetation, water conservation, xeriscaping, and pervious concrete walkways intercept stormwater at the source, allowing for an increased level of evaporation and infiltration, thereby lowering runoff volumes.

Residential raingardens and native landscape vegetation retain runoff for infiltration and treatment prior to discharge.

Disconnected roof drains allow runoff to be conveyed across landscaped areas into private raingardens for treatment and infiltration.

Vegetated swales for water retention and conveyance capture lot and street runoff, allowing for infiltration and treatment prior to discharge.

Cordova Hills

Conceptual LID Master Plan
Residential Areas
(ER, LDR, MDR, incl. TC- Residential)

Vegetated and rocked swales convey stormwater runoff in naturalized systems, promoting infiltration, water quality treatment, and retardation of runoff prior to discharge.

Permeable pavements and pavers allow stormwater infiltration, thus reducing runoff.

Bio-retention systems capture and treat stormwater runoff from impermeable surfaces, retarding the runoff in the process.

Green roofs capture rainfall at the source, promoting evaporation, treating for water quality and retarding stormwater runoff.

Cordova Hills

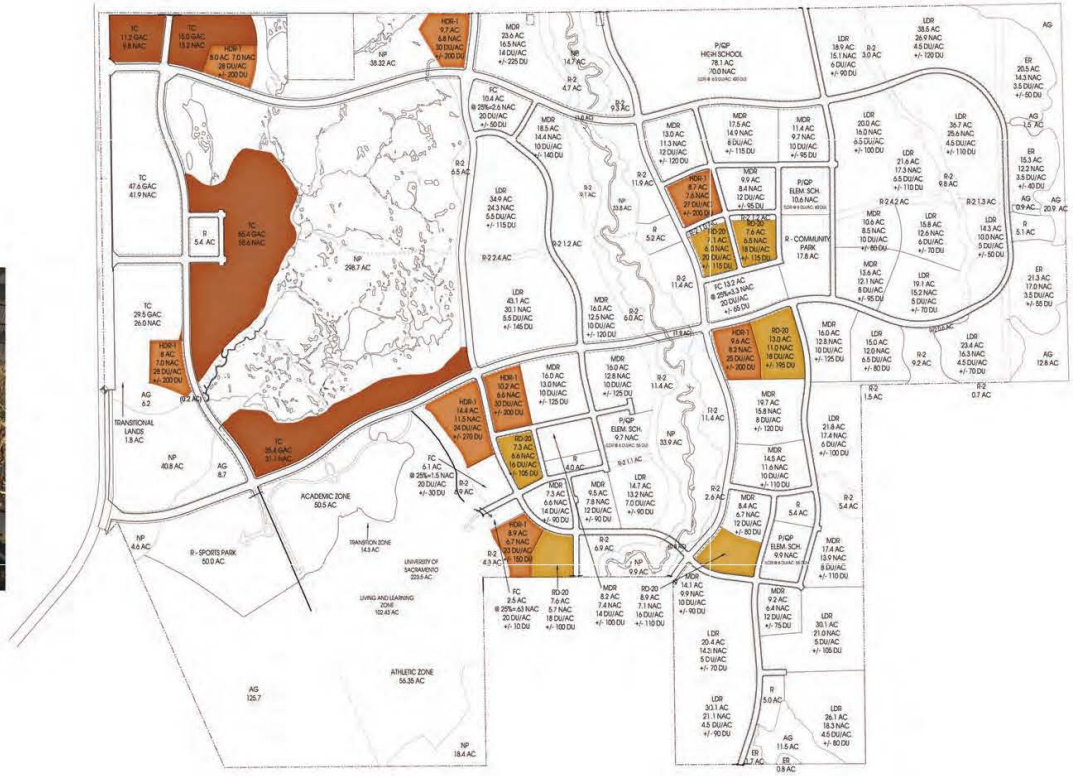
Conceptual LID Master Plan
Commercial and Employment Centers
(incl. TC- Non-redidential)

Bioswales with native vegetation capture stormwater from buildings and parking lots, retarding runoff, increasing infiltration, and treating for water quality prior to discharge.

Porous asphalt promotes infiltration of stormwater, thereby reducing runoff.

Native, drought-tolerant vegetation, xeriscaping, mulching of vegetated surfaces, and preservation of existing terrain and drainage patterns help conserve resources and minimize impacts to the watershed.

Curb breaks direct surface runoff into drainage swales and raingardens, helping reduce velocities and promoting infiltration and treatment of stormwater.



Cordova Hills

Conceptual LID Master Plan
Residential Areas
(MHDR, HDR, incl. TC- Residential)

Pervious surfaces not only enhance the character and aesthetics of active play areas, but also play an important role in enhancing stromwater infiltration at the source, thereby reducing runoff volumes; native vegetation is drought tolerant, disease resistant, and requires minimal maintenance, while providing ecological benefit and increasing rain water infiltration and flow retardation.

Densly vegetated biofiltration swales convey stormwater runoff around active recreation areas, while at the same time providing stormwater quality treatment through plant uptake and sediment settlement, increased infiltration, and overall flow retardation.

Biofiltration swales capture and convey local stormwater runoff through dense native vegetation at the edge of recreation areas, thereby providing water quality treatment, increased infiltration and evaporation, and flow retardation, without sacrificing park usability and aesthetics.

Pervious walkway surfaces allow for increased stormwater infiltration, while natural low-maintenance vegetation is drought tolerant and desease resistant, providing water quality treatment and increased infiltration and evaporation.

Cordova Hills

Conceptual LID Master Plan
Parks

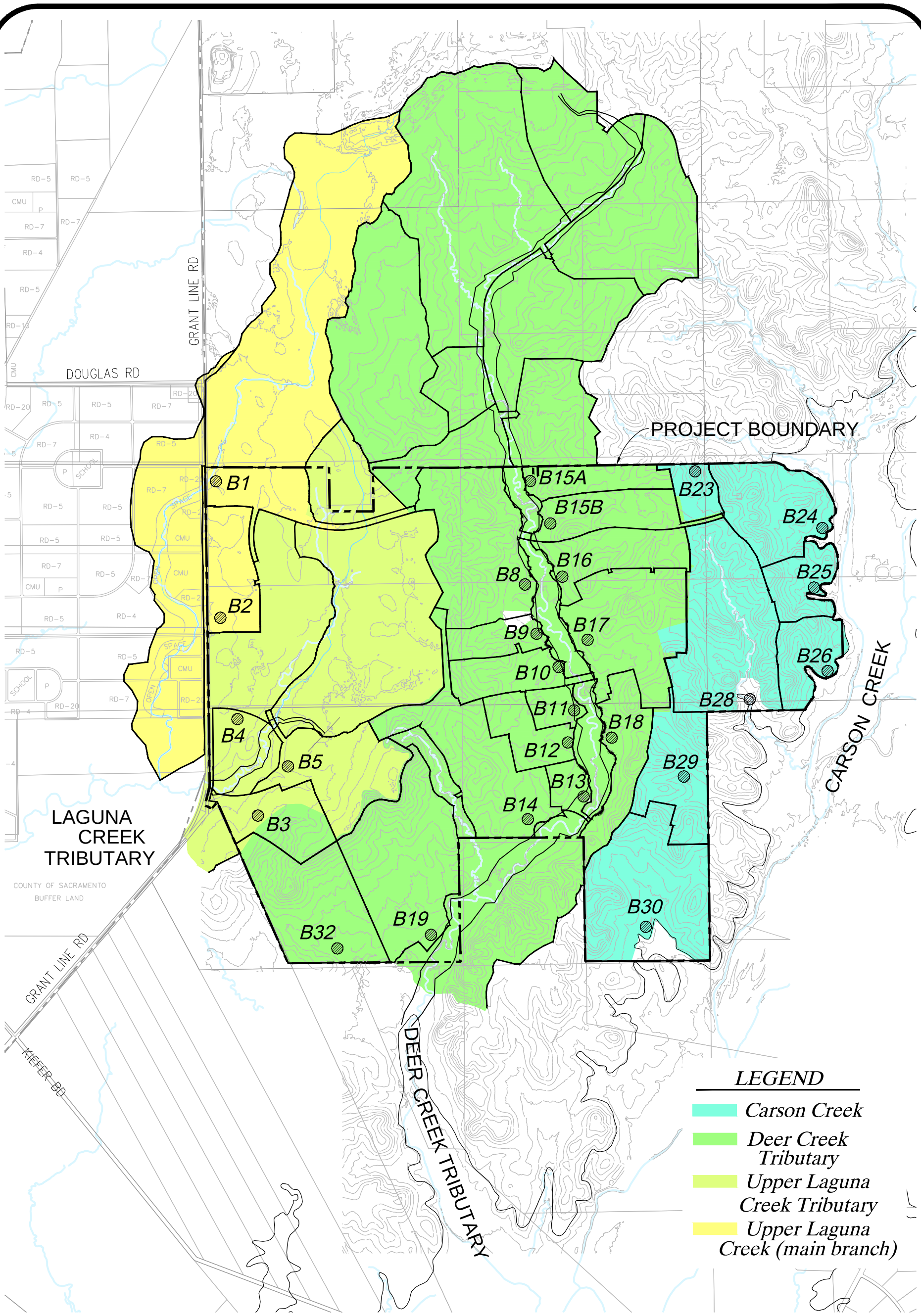


EXHIBIT J

Post-Development Watershed Map

Cordova Hills SPA

County of Sacramento, California

Scale: N.T.S. March, 2011

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MACKAY & SOMPS
CIVIL ENGINEERS, INC.
ROSEVILLE, CALIFORNIA (916) 773-1189

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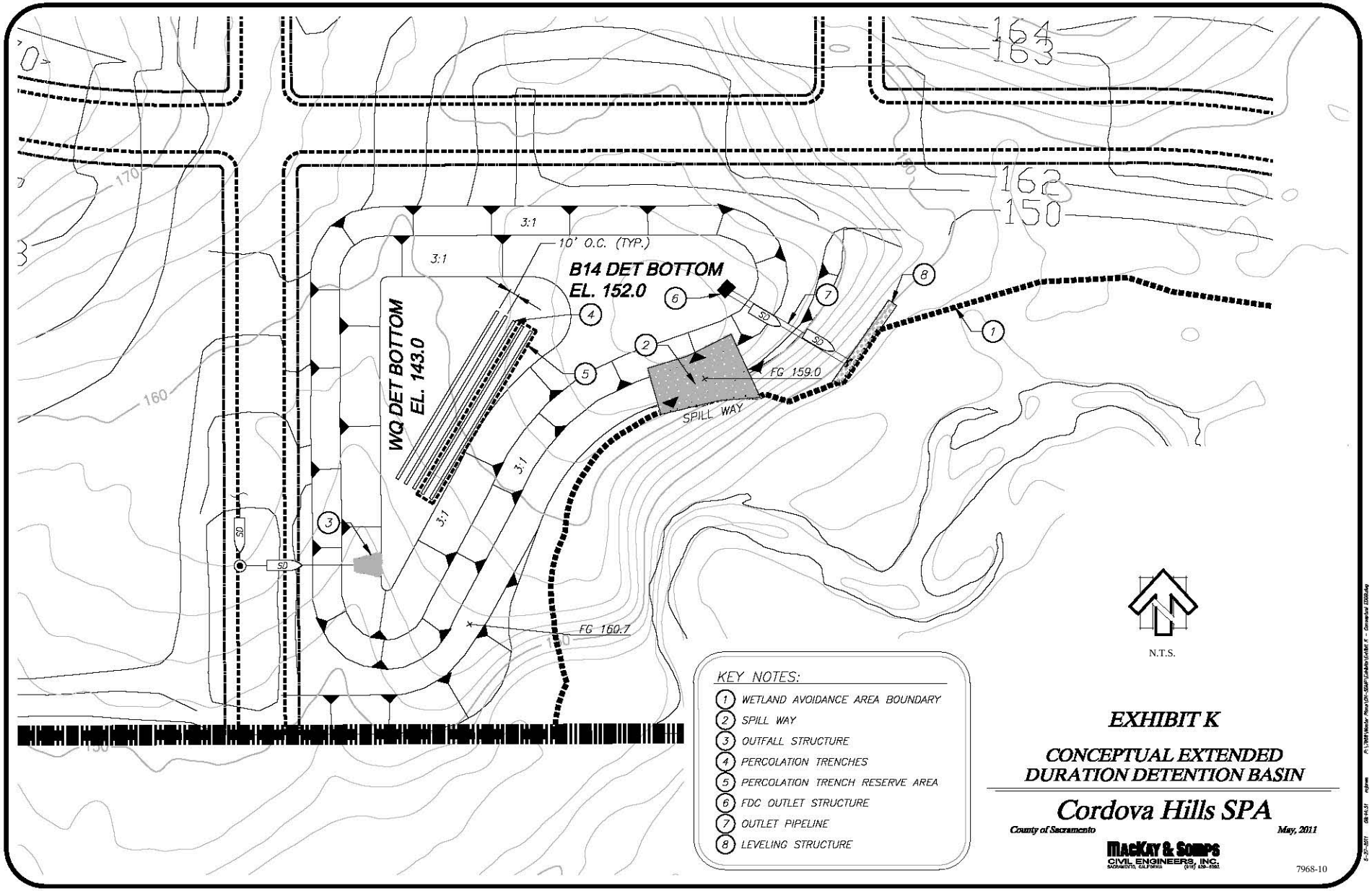

EXHIBIT K

CONCEPTUAL EXTENDED DURATION DETENTION BASIN

Cordova Hills SPA

County of Sacramento

May, 2011

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CIVIL ENGINEERS, INC.
SACRAMENTO, CALIFORNIA (916) 639-8582

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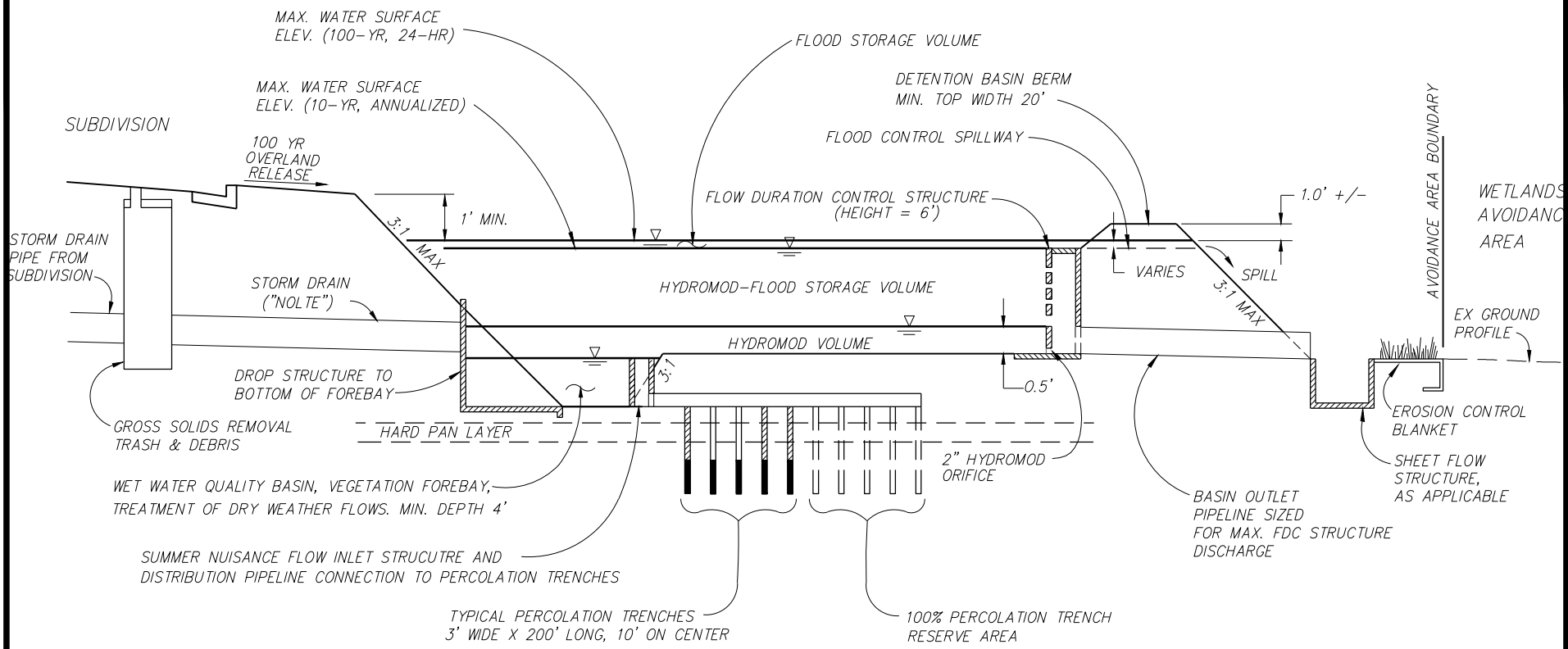

EXHIBIT L

TYPICAL HYDRO-MODIFICATION DETENTION BASIN CROSS-SECTION

Cordova Hills SPA

County of Sacramento, California *MAY, 2011*

Scale: N.T.S.

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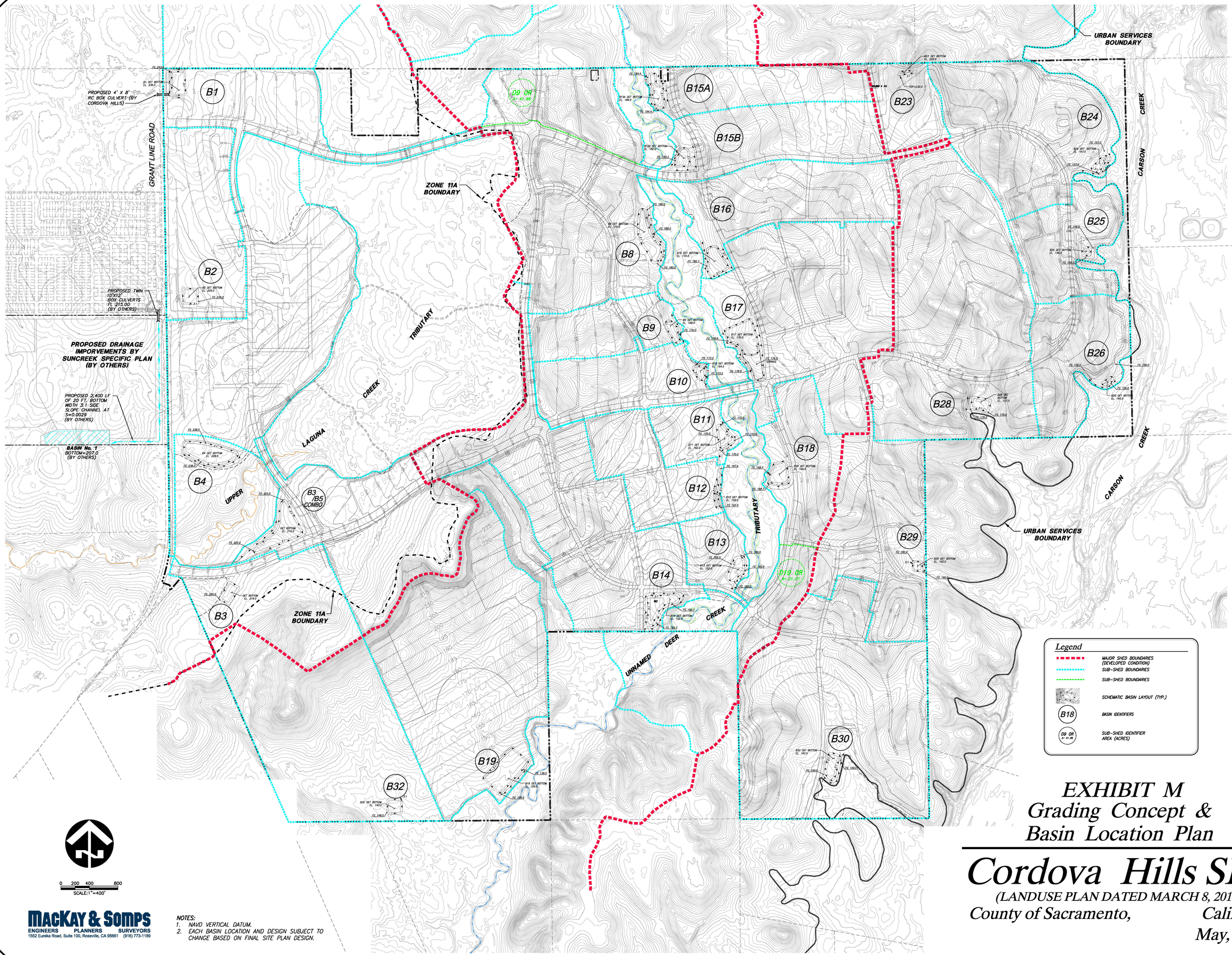


EXHIBIT M
Grading Concept & Basin Location Plan

Cordova Hills SPA

(LANDUSE PLAN DATED MARCH 8, 2011)

County of Sacramento, California

May, 2011

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

NOTES:
1. NAVD VERTICAL DATUM.
2. EACH BASIN LOCATION AND DESIGN SUBJECT TO CHANGE BASED ON FINAL SITE PLAN DESIGN.

7968-10

TOWN CENTER (GAC)

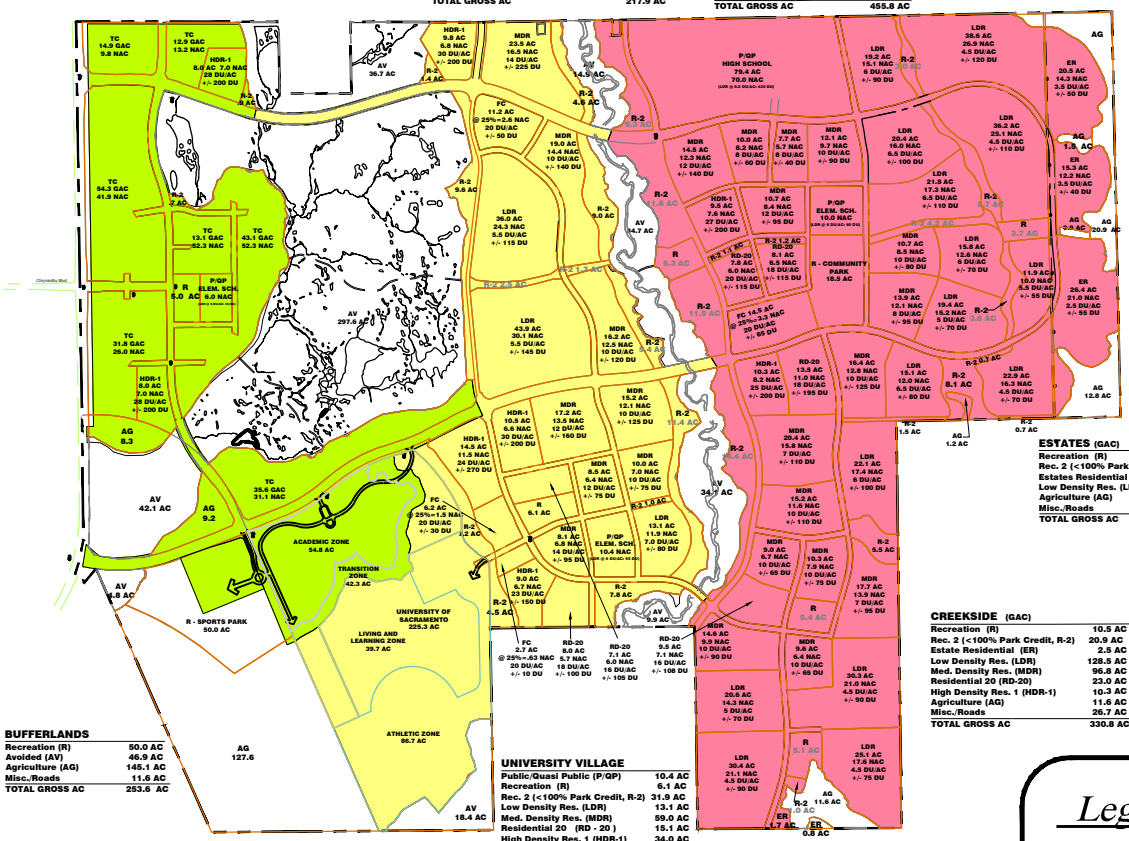
Public/Quasi Public (P/QP)	6.0 AC
Recreation (R)	5.0 AC
Rec.2 (<100% Credit, R-2)	3.0 AC
Avoided (AV)	334.3 AC
Town Center (TC)	205.7 AC
High Density Res. (HDR-1)	16.0 AC
Misc./Roads	62.4 AC
TOTAL GROSS AC	632.4 AC

RIDGELINE (GAC)

Rec. 2 (<100% Park Credit, R-2)	32.4 AC
Low Density Res. (LDR)	79.9 AC
Med. Density Res. (MDR)	58.7 AC
High Density Res. (HDR-1)	9.8 AC
Flex Commercial (FC)	11.2 AC
Misc./Roads	25.9 AC
TOTAL GROSS AC	217.9 AC

EAST VALLEY (GAC)

Public/Quasi Public (P/QP)	89.4 AC
Recreation (R)	23.8 AC
Rec. 2 (<100% Park Credit, R-2)	48.7 AC
Low Density Res. (LDR)	111.7 AC
Med. Density Res. (MDR)	96.0 AC
Residential 20 (RD-20)	15.9 AC
High Density Res. (HDR-1)	9.5 AC
Flex Commercial (FC)	14.5 AC
Agriculture (AG)	1.2 AC
Misc./Roads	45.1 AC
TOTAL GROSS AC	455.8 AC



ESTATES (GAC)

Recreation (R)	3.7 AC
Rec. 2 (<100% Park Credit, R-2)	13.7 AC
Estates Residential (ER)	62.2 AC
Low Density Res. (LDR)	109.6 AC
Agriculture (AG)	36.1 AC
Misc./Roads	11.4 AC
TOTAL GROSS AC	236.7 AC

CREEKSIDE (GAC)

Recreation (R)	10.5 AC
Rec. 2 (<100% Park Credit, R-2)	20.9 AC
Estate Residential (ER)	2.5 AC
Low Density Res. (LDR)	128.5 AC
Med. Density Res. (MDR)	96.8 AC
Residential 20 (RD-20)	23.0 AC
High Density Res. 1 (HDR-1)	10.3 AC
Agriculture (AG)	11.6 AC
Misc./Roads	26.7 AC
TOTAL GROSS AC	330.8 AC

BUFFERLANDS

Recreation (R)	50.0 AC
Avoided (AV)	46.9 AC
Agriculture (AG)	145.1 AC
Misc./Roads	11.6 AC
TOTAL GROSS AC	253.6 AC

UNIVERSITY VILLAGE

Public/Quasi Public (P/QP)	10.4 AC
Recreation (R)	6.1 AC
Rec. 2 (<100% Park Credit, R-2)	31.9 AC
Low Density Res. (LDR)	13.1 AC
Med. Density Res. (MDR)	59.0 AC
Residential 20 (RD - 20)	15.1 AC
High Density Res. 1 (HDR-1)	34.0 AC
Flex Commercial (FC)	8.9 AC
Misc./Roads	23.6 AC
TOTAL GROSS AC	202.1 AC

CORDOVA HILLS
LAND USE SUMMARY

PUBLIC/QUASI PUBLIC (P/QP)	105.8 AC
RECREATION (R)	99.1 AC
REC. 2 (<100% PARK CREDIT, R-2)	150.6 AC
AVOIDED (AV)	493.2 AC
ESTATES RES. (ER) 1 - 4 DU/AC	64.7 AC
LOW DENSITY RES. (LDR) 4 - 7 DU/AC	442.8 AC
MED. DENSITY RES. (MDR) 7 - 15 DU/AC	310.5 AC
RESIDENTIAL - 20. (RD-20) 15 - 23 DU/AC	54.0 AC
HIGH DENSITY RES. 1 (HDR-1) 23 - 30 DU/AC	79.6 AC
FLEX COMMERCIAL (FC)	34.6 AC
TOWN CENTER (TC)	205.7 AC
UNIVERSITY OF SACRAMENTO	223.5 AC
AGRICULTURE (AG)	194.0 AC
MISC ROADS & OPEN SPACE	210.4 AC
TOTAL GROSS ACREAGE	**2,668.5 AC**

Legend

Phase 1

Phase 2

Phase 3

NOTE: All facilities associated with each Phase shall be built in total, no interim facilities are anticipated.

0 2500 5000

SCALE: 1"=2500'

MACKAY & SOMPS
CIVIL ENGINEERS, INC.
ROSEVILLE, CALIFORNIA (916) 773-1189

EXHIBIT N
Development Phasing

Cordova Hills SPA

(Land Use Plan Dated March 8, 2011)
Sacramento County, California
May, 2011

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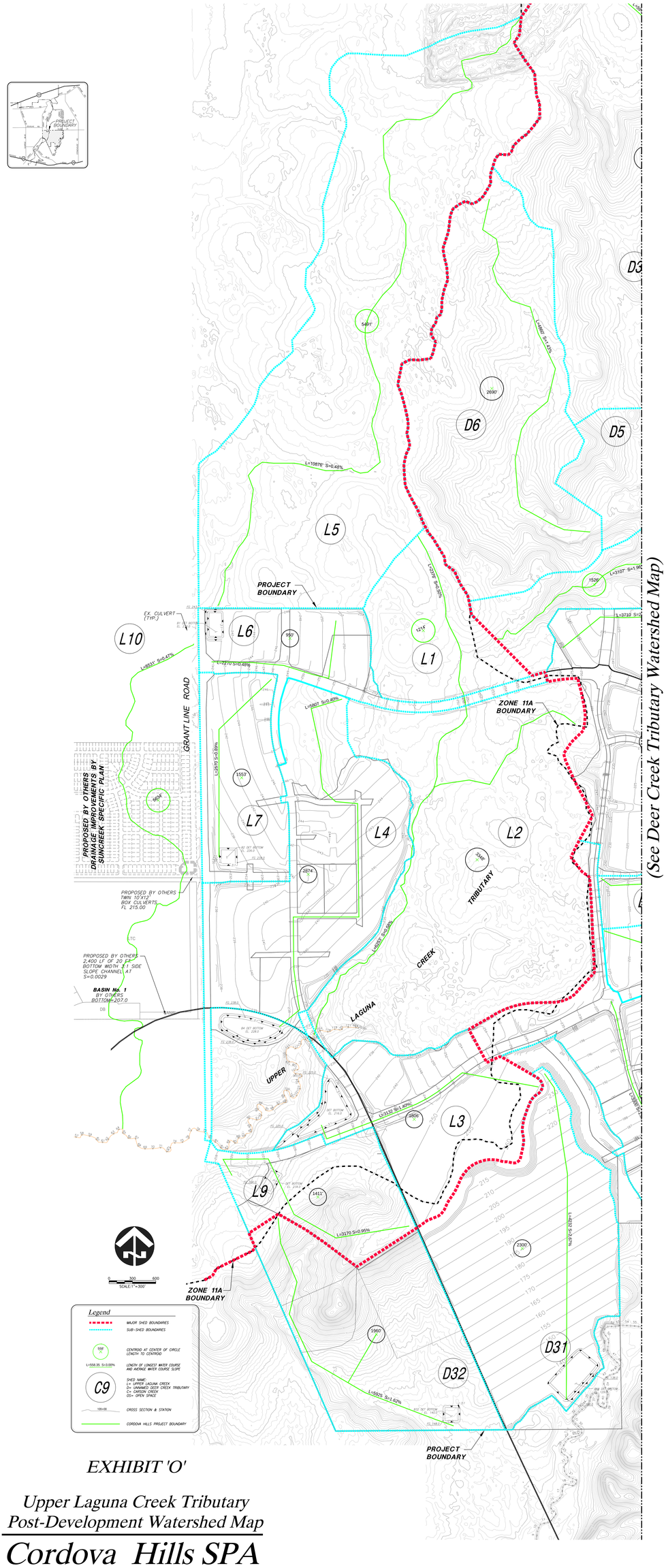

(See Deer Creek Tributary Watershed Map)

EXHIBIT 'O'

Upper Laguna Creek Tributary
Post-Development Watershed Map

Cordova Hills SPA

County of Sacramento, California
Scale: 1"=300' May, 2011

MacKay & Somps
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

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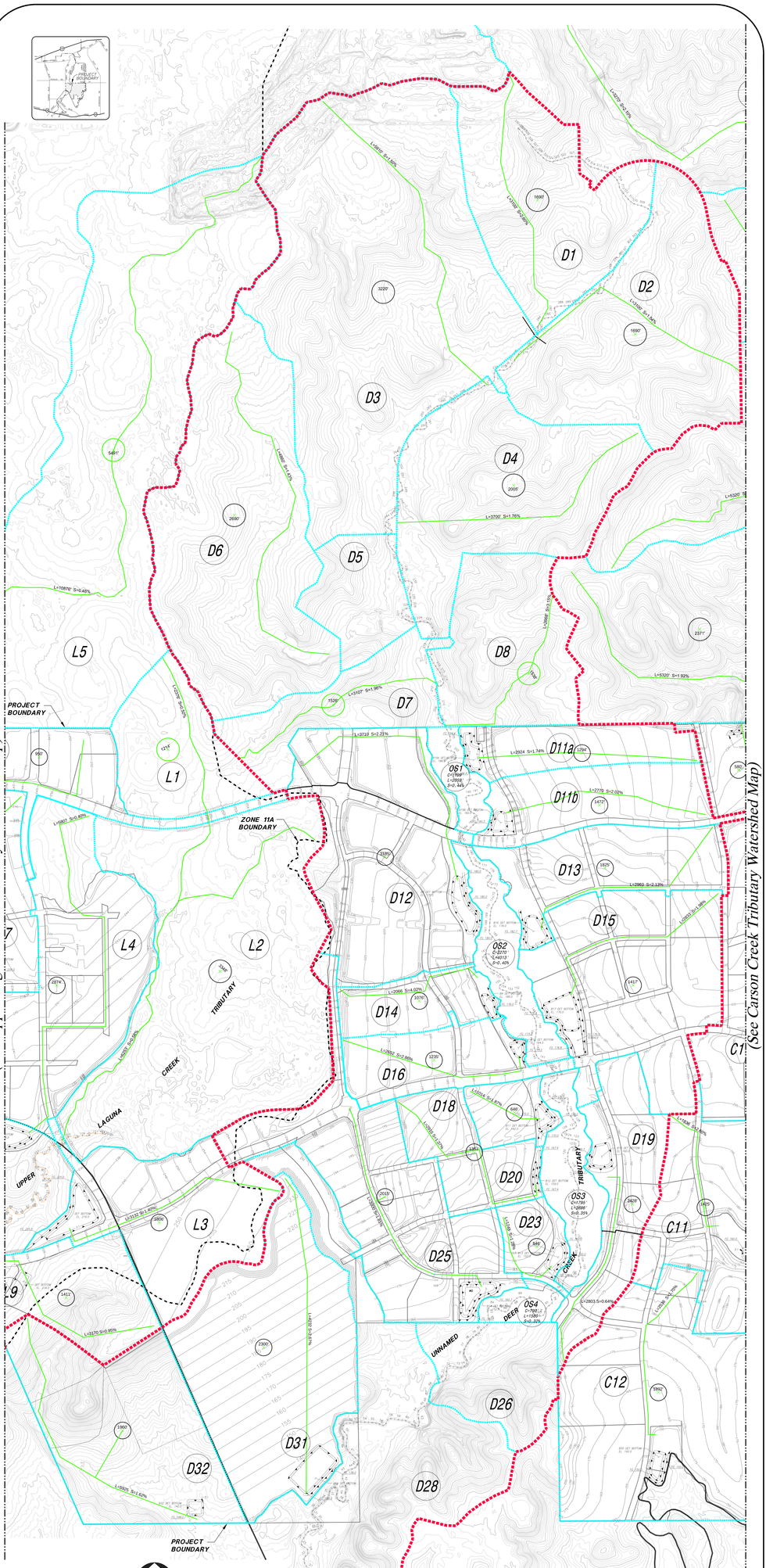

EXHIBIT 'P'

Deer Creek Tributary
Post-Development Watershed Map

Cordova Hills SPA

County of Sacramento, California
Scale: 1"=300' May, 2011

MacKay & Somps
ENGINEERS PLANNERS SURVEYORS
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(See Deer Creek Tributary Watershed Map)

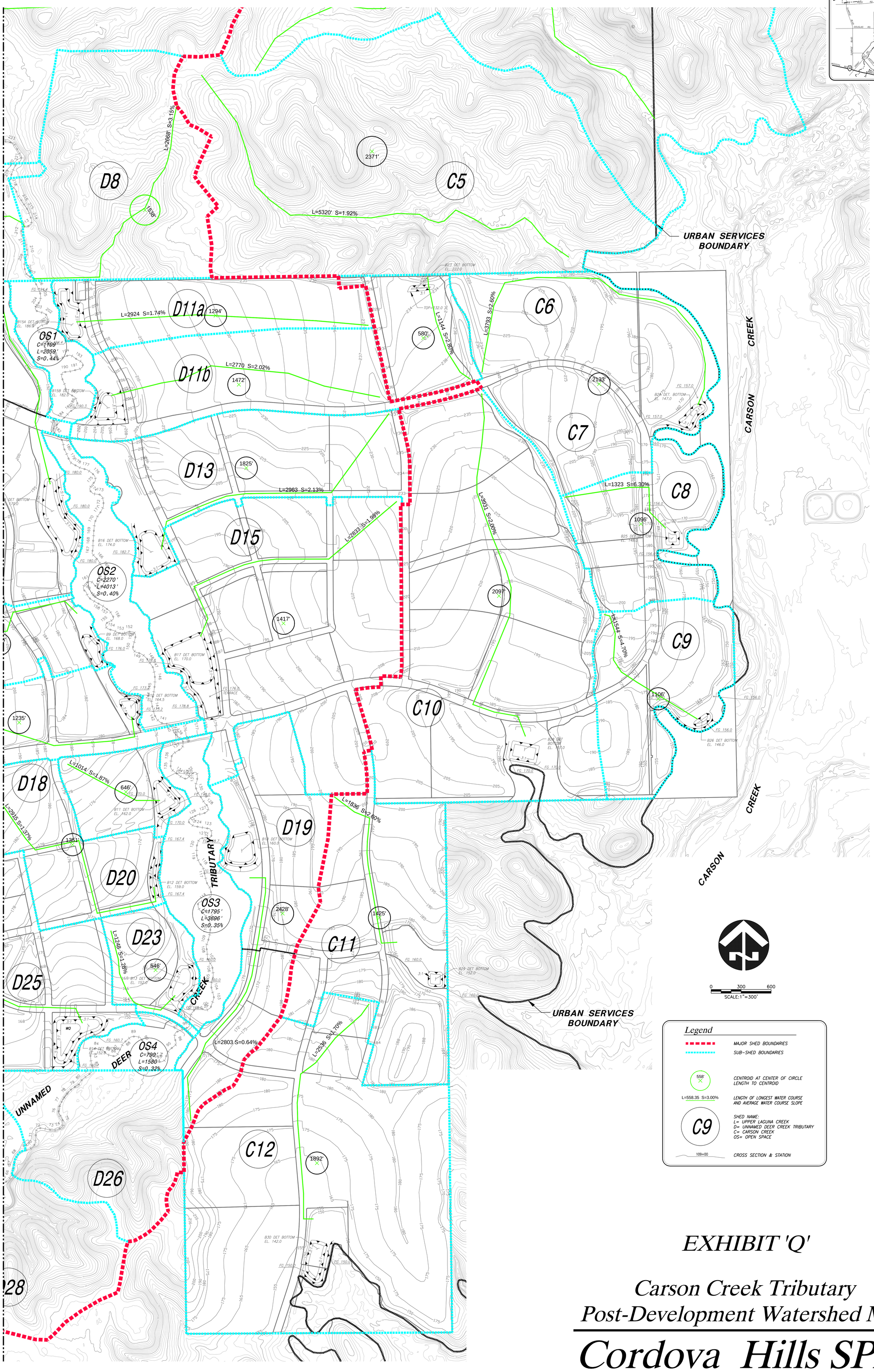

EXHIBIT 'Q'

Carson Creek Tributary Post-Development Watershed Map

Cordova Hills SPA

County of Sacramento, California

Scale: 1"=300' May, 2011

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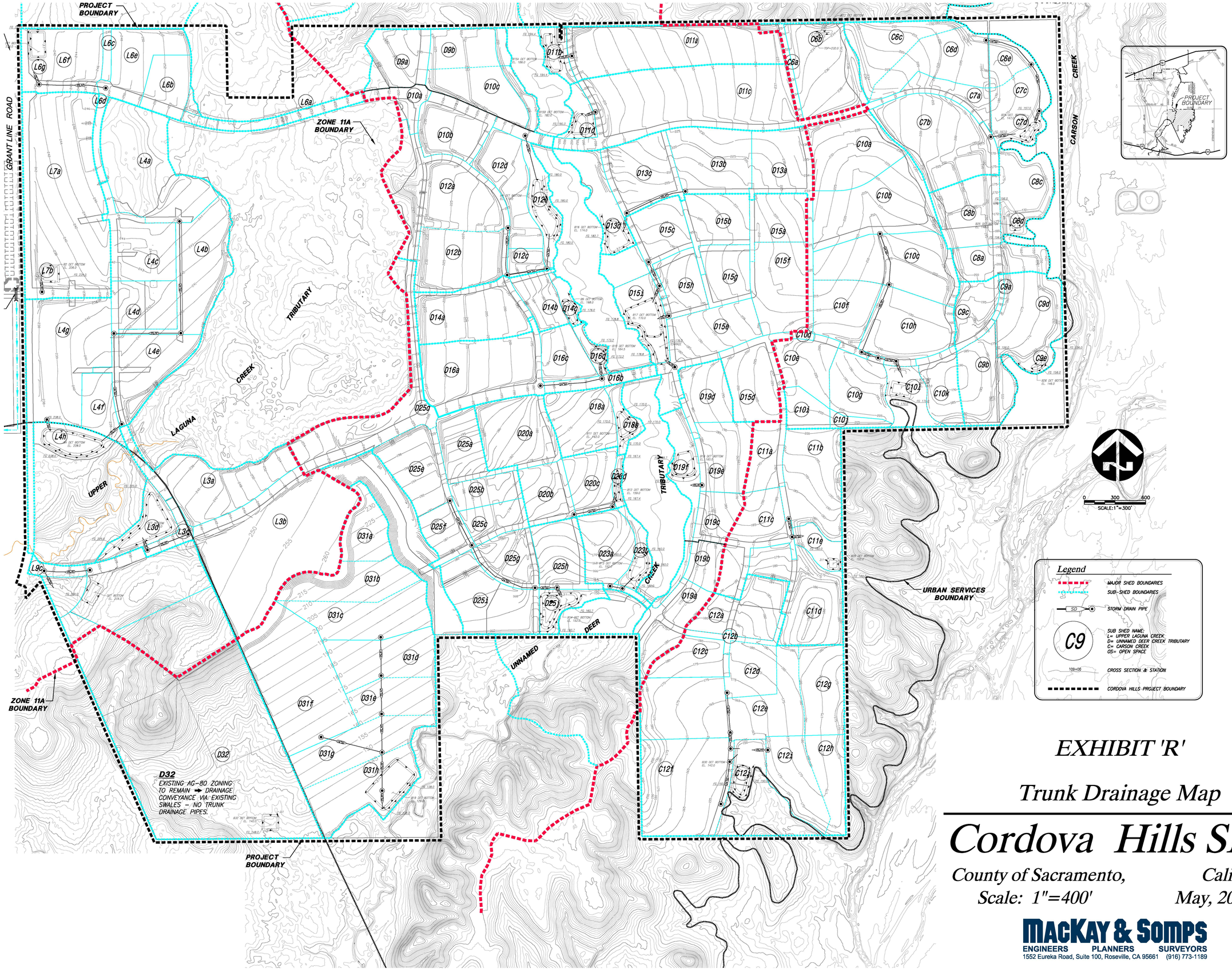


EXHIBIT 'R'

Trunk Drainage Map

Cordova Hills SPA

County of Sacramento, California

Scale: 1"=400' May, 2011

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

7.0 Appendix

7.1 Appendix A: cbec Hydromodification Assessment Planning for the Cordova Hills SPA

MEMORANDUM

Date:	April 6, 2010
To:	Holger Fuerst
From:	Chris Campbell, Christopher Cuhaciyan, Chris Bowles
Project:	09-1002 – Cordova Hills Hydromodification Assessment
Subject:	Hydromodification Assessment Planning for Cordova Hills

1 INTRODUCTION

On behalf of Conwy LLC, MacKay & Somps (M&S) requested that cbec, inc. (cbec) perform hydromodification assessment and mitigation planning to address potential hydromodification impacts associated with the Cordova Hills master-planned community. This assessment and planning document was developed to provide input into the Cordova Hills Drainage Master Plan (DMP) to address potential impacts to reaches of Upper Laguna Creek, Deer Creek Tributary, and Carson Creek Tributaries. This document includes our understanding of the project, a description of methods, the results of our work, and a summary of our findings and recommendations. In the document's present state, our numerical assessment of potential hydromodification impacts was focused on the Deer Creek Tributary, which is the key drainage feature through the master-planned community. Based on the results obtained for the Deer Creek Tributary, potential hydromodification impacts and mitigation measures were inferred for Upper Laguna Creek and the Carson Creek Tributaries.

1.1 PROJECT UNDERSTANDING

Specific to each creek flowing through the Cordova Hills development, the following states our summary understanding of the proposed drainage plan for the project, which was then used to inform our assessment methods and outcomes. In addition to creek specific drainage planning, it is understood that LID may or may not be incorporated into the development to further reduce hydromodification impacts. For the purposes of this assessment, we have assumed that hydromodification mitigation will be achieved through flow control modification of the proposed stormwater detention basins proposed by M&S. Hydromodification mitigation using modification of the detention basins is achieved through adaptation of the outlet control structure to represent the required flow control release rate, and

through manipulation of the footprint of the detention basins to provide additional storage for hydromodification purposes.

1.1.1 Upper Laguna Creek

It is our understanding that the current plan for Upper Laguna Creek includes preservation of the vernal pool terrace as open space bounded by a town center to the west and south and low density residential to the east. The town center stormwater runoff will then be piped to detention basins that will then enter Upper Laguna Creek upstream of Grant Line Road. Upper Laguna Creek finally flows through double barrel culverts underneath Grant Line Road, after which it rejoins an offsite tributary to Upper Laguna Creek that will have been channelized as it skirts between the SunCreek Specific Plan area (M&S, 2008) and Grant Line Road.

1.1.2 Deer Creek Tributary

It is our understanding that the current plan for Deer Creek Tributary, which forms the largest creek corridor for the development, includes no modification of the creek since it will be contained within a relatively wide preserve corridor with an approximate width equal to the 100-year floodplain. Bounding this preserve corridor will be two recreational trails on either side. In addition, storm detention/flow duration control/water quality basins will be incorporated into the buffer zone on either side of the creek corridor. At road crossings the creek corridor generally narrows to approximately 200 feet wide. The road crossings will span the creek using bottomless conspan arch culverts, or similar. The current concept proposal is to allow the Deer Creek Tributary to meander through this corridor. Vernal pool complexes exist in the corridor and the current concept proposal is to retain and preserve the integrity of these complexes.

It is also our understanding that current plans include measures to infiltrate and evaporate summer nuisance flows generated by urban developed condition. Deer Creek Tributary is currently an ephemeral channel. Typically, ephemeral channels become perennial after development due to summer nuisance flows. Percolation trenches and/or vegetated detention basins may be used divert nuisance flows away from creeks.

Finally, it is our understanding that all tributary channels to Deer Creek Tributary will be converted to storm pipes or other storm drainage channels. They will continue to be tributary to Deer Creek Tributary, but will first outfall into detention basins designed for flow duration control.

1.1.3 Carson Creek Tributaries

It is our understanding that the current plan for the Carson Creek Tributaries includes piped or channelized runoff conveyed to multiple detention basins. The detention basins will then release the runoff directly to their respective tributary before rejoining Carson Creek.

1.2 HYDROMODIFICATION STANDARDS AND OBJECTIVE CRITERIA

In developing the hydromodification plan for the Cordova Hills development, and in the absence of specific guidance from Sacramento County DWR on interim hydromodification standards, the following approaches for hydromodification mitigation and Objective Standards (or Hydromodification Criteria) have been developed to provide methods by which to assess the results of this study.

1.2.1 TYPICAL APPROACHES FOR MANAGEMENT AND MITIGATION OF HYDROMODIFICATION

Typically, three broad approaches are used to manage and mitigate the impacts of hydromodification:

1. Flow Control Approach - the use of modified storm detention basins (often called Flow Duration Control Basins or FDCs) or infiltration facilities (e.g., swales with underdrains) to control discharge into receiving waters that would otherwise increase channel erosion above an existing or natural condition. In other parts of Northern California, these flows have been found to lie between some fraction of the Q2 (2-year return period event) up to the Q10 (10-year return period event). Flows in this range are managed so that the pre- and post-development flow duration curves match within a predefined tolerance.

2. Landscape Approach - often referred to as Low Impact Development (LID), or source control approaches, in which impervious areas drain to a series of highly pervious landscaping areas that act as dispersed infiltration facilities. These infiltration facilities are sized based on pre-determined ratios (typically around 5% of the developed area) that have been found to infiltrate the excess runoff within the range of erosive flows.

3. In-stream Approach - the use of stream restoration approaches to stabilize and restore existing anthropogenically impacted receiving waters to better withstand potential future impacts of hydromodification (e.g., reducing channel slope by increasing sinuosity, installing engineered energy dissipation structures, or protecting stream banks using biotechnical bank stabilization).

We understand that primarily approach 1 will be used to mitigate hydromodification impacts for this project, although it is highly likely that some degree of approach 2 will also be used. Approach 3 will not be relied upon to provide hydromodification mitigation for this project.

1.2.2 APPROACH AND OBJECTIVE CRITERIA

Based on our understanding of the project as described in Section 1.1, we did not focus on LID and in-stream approaches. Rather, the criteria and standards developed here generally refer to FDC techniques for managing and mitigating hydromodification impacts using flow duration curve matching or similar approaches. Specifically, the criteria and standards implemented include:

1. Event-based existing and proposed conditions hydrology (to satisfy flood control criteria) was developed by M&S using SacCalc. SacCalc is the Sacramento City and County preprocessor for the hydrologic model HEC-1 and is the accepted standard in Sacramento County.

2. To assess the long-term hydrologic conditions in the watershed, and to take account of antecedent conditions appropriate for hydromodification planning, a long-term, continuous hydrologic simulation using a 49-year precipitation record was used. Long-term continuous simulation has become the standard for comparing existing and post-development flow duration characteristics within the range of geomorphically-significant flows. For this purpose, the soil moisture accounting (SMA) algorithm in HEC-HMS (HMS) was used.

3. The long-term hydrology developed using HMS was used to provide the boundary conditions for the hydrodynamic model to assess the hydraulic and geomorphic impacts of the Cordova Hills development. For reasons explained later, the hydraulic model will be MIKE 11, not HEC-RAS (RAS).

4. The hydrodynamic model output was used to calculate the erosive forces within each creek for each modeled condition. In the absence of standards stating otherwise, and as a guide, runoff should be controlled in the range between 25% of Q2 up to Q10. In other areas that have recently developed HMP standards, a range of values from as low as 10% of Q2 have been used as the lower threshold. However, these thresholds were based on field measurements of bed and bank shear resistance for watersheds that have different topographic and soil properties from Laguna Creek. In a recent study in the neighboring Laguna Creek watershed (Geosyntec, 2007), it was concluded through an assessment of cumulative sediment transport that 95% of the total erosion and sediment transport in the creek was accomplished by flows less than Q10. This study also concluded through field measurements of critical shear stress and modeling that erosion does not commence until flows are approximately 25% of Q2; hence our recommendation of this as the lower threshold.

5. For the flow range specified (25% of Q2 through Q10), the proposed condition discharge rates and durations should not deviate above the existing condition discharge rates and durations by more than 10% over more than 10% of the length of the flow duration curve. The flow duration curve relates to the percentage of time of the total period of record that a particular flow is equaled or exceeded. It does not refer to the duration of that particular flow event. Thus, the flow duration technique gives an indication of how the average flows are hydromodified between a specific flow range (area under the curve). Flow duration curves are the most commonly accepted method of analyzing the response of watersheds to perturbations; hence, we recommend them for this application.

6. For the flow range specified, the proposed condition peak flows should not exceed existing condition peak flows by more than 10%.

7. In terms of possible erosive forces experienced by the receiving waters as a result of hydromodification, a preliminary standard could be based on the erosion potential methodology as proposed by a recent study in the Laguna Creek watershed (Geosyntec, 2007). In this study, an objective standard was stated that stormwater discharges from development projects shall not cause an increase in the erosion potential in the receiving channels by more than 20%. Based on field data collected and hydraulic modeling conducted in this study, the objective standard may be modified subsequently. However, it is initially recommended that this is a reasonable objective standard. A note of caution, if the development results in decreased sediment loads and size, it may be necessary to assess the implications of (up to) a 20% increase in erosion potential, and whether this increase will be detrimental (will there be less "resisting forces" for the development-related flow increase?). Generally, the objective is to determine the range of flows over a long period of record that does not exceed (or significantly alter) the existing equilibrium of supply and transport of sediment.

8. The FDC curve matching and erosion potential approach will be used iteratively in an effort to manage and mitigate hydromodification impacts. However, based on the size of FDC basins predicted (if too large to be accommodated in current plans) it may be necessary to resort to other methods of management and mitigation, such as landscape or in-stream approaches, in conjunction with FDCs. The primary goal is to use FDCs. Coordination with cbec, M&S and the Owners will be required through this decision making process.

9. When the impacts of hydromodification have been mitigated through FDC the proposed improvements to the stormwater plan will be checked for stormwater detention purposes. The resulting plan will constitute the proposed plan.

10. Design concepts will be derived to minimize perennial "nuisance" flows from entering the creeks. These flows typically occur in the summer months and are entirely caused by irrigation runoff from lawns and other planted areas that are frequently irrigated. This runoff is typically nutrient laden with nitrates and phosphates and could cause unfavorable conditions in the creeks. In an effort to mitigate for these flows, concepts will be derived that can be incorporated into the FDC basins which may include complete retention of summer low flows, bioaccumulation and evapotranspiration using wetland vegetation, deep well percolation and other hydraulic control devices, as appropriate.

2 ASSESSEMENT METHODS

As stated in Section 1.2.2, a combination of SacCalc, HMS, RAS, and MIKE 11 shall be used to inform our assessment methods and results. The first two (2) models were used to formulate the hydrologic modeling component of the assessment. The latter two (2) models were used to formulate the hydrodynamic modeling component of the assessment, using hydrologic model outputs as inputs, to include calculations of erosive forces (or work) in the Deer Creek Tributary.

2.1 HYDROLOGIC MODEL DEVELOPMENT

Continuous HMS models were created by cbec from event-based SacCalc models developed by M&S. For this study, HMS models were developed for **existing (E)**, **proposed without detention (P)**, **proposed with detention (PD)**, and **proposed with detention modified with HMP measures (PDM)** conditions. Initially, the SacCalc models were exported to the HEC-1 format before being imported into HMS to assess hydromodification.

The loss method used in SacCalc was changed from "initial and constant" to the SMA algorithm. Canopy and surface storage were set to 0.08 and 0.3 inches, respectively, per the values in the calibrated HMS model for neighboring Upper Laguna Creek as developed by Geosyntec (2007). The groundwater coefficient (200 hr) was also adopted from the Geosyntec model. Soil parameters, including soil and groundwater storage, maximum infiltration rates, and soil and groundwater percolation rates were computed from the soil survey. The project subwatersheds, as provided by M&S, were used to calculate composite values of the soil characteristics.

The runoff transformation method (USBR dimensionless urban unit hydrograph method) was retained in HMS from SacCalc. The linear reservoir option was used to model baseflow using values consistent with the calibrated Geosyntec HMS model as shown in Table 1:

Table 1. Linear reservoir parameters

Initial Type	GW 1 Initial (cfs/mi^2)	GW 1 Coeff. (hr)	GW 1 Reservoirs
Discharge/Unit Area	0	1450	1

The 49-year hourly rainfall record for Eagles Nest was imported into HMS from the Upper Laguna Creek HMS model and applied to each subwatershed along with monthly evapotranspiration rates.

2.2 HYDROLOGIC MODEL CALIBRATION

Preliminary calibration of the HMS model parameters was performed for the January 3-5, 2008 storm event per the following data:

1. Observed rainfall data from the Eagles Nest ALERT station was used to adequately "warmup" the HMS model to the antecedent moisture conditions for a period of 5 months leading up to the storm event.
2. Water level data as measured by ECORP Consulting, Inc. (ECORP) relative to a staff gage they installed in the Deer Creek Tributary. During the peak of the runoff, ECORP recorded a stage of 3.1 feet. The staff gage, which sustained cattle damage, was approximately surveyed to NAVD88 in December 2009 by cbec.
3. The RAS model developed by M&S for the Deer Creek Tributary was used for the preliminary hydraulic calculations.

4. Detailed cross section data collected by cbec in December 2009 bounding the staff gage (and to represent the high channel bed downstream of the gage) were used to augment the RAS model.

2.3 HYDRODYNAMIC MODEL DEVELOPMENT

The hydrodynamic model MIKE 11 was used to route the hydrologic model outputs through the Deer Creek Tributary for each modeled condition (i.e., E, P, PD, and PDM). The RAS model geometry developed by M&S was converted to MIKE 11 using a DHI conversion utility. MIKE 11 was selected in lieu of RAS due to 1) the inability of RAS to perform long-term modeling due to output storage limitations, and 2) instability issues often encountered by RAS during unsteady simulations of very low flows (often zero in the summer). While minimum flows can be implemented in RAS to overcome instability issues, minimum flows could mask lower flows generated by the HMS models and inappropriately skew the results.

2.4 FLOW DURATION CONTROL AND TOTAL WORK DONE

The MIKE 11 model outputs were then used to calculate the total work done and an erosion potential index to assess the hydromodification impacts of the master-planned community on the Deer Creek Tributary. Total work done was calculated based on integrating effective stream power as:

$$W = \sum_{i=1}^{n} (\tau_i - \tau_c) \cdot V_i \cdot \Delta t_i$$

where W is the total work done (ft-lbf/ft^2), τ is the average channel shear stress, τ_c is the critical shear stress to initiate erosion, V is the velocity (ft/sec), and Δt is the numerical time step (sec). The critical shear stress values were estimated from the soil survey and Fischenich (2001) for the reach of the Deer Creek Tributary running through the property. The values selected were based on the bank material (since the creek is either armored or already downcut to the restrictive layer) and were found to range from 0.12 lbf/ft^2 to 0.17 lbf/ft^2 (which are consistent with prior studies).

The erosion potential (EP) index was calculated as the ratio of W_P / W_E. The target index was initially 1 ± 20%, based on the criteria and standards stated in Section 1.4. To converge on this target guidance, flow duration control was combined with flood control to create a modified outlet control structure for each basin. The design of the modified outlet control structures, further described in Section 3.2, were designed to bring the EP ratios within 20% of existing conditions.

3 ASSESSMENT RESULTS

The following addresses hydrologic model (HMS) calibration and hydrodynamic model (MIKE 11) results as focused on the Deer Creek Tributary, as they pertain to flow duration control and total work calculations.

3.1 HYDROLOGIC MODEL CALIBRATION

Calibration of the HMS model was performed using the data described in Section 2.3 and by modifying the following SMA parameters:

1. **Soil moisture storage available for both gravity drainage and evapotranspiration:** composite values were derived from the soil survey considering the soil types and their depths above either a hardpan or weathered bedrock.
2. **Maximum infiltration rate at the soil surface:** composite values were derived from the soil survey.
3. **Percolation rate between the near surface and shallow subsurface (i.e., groundwater) layers:** composite values were derived from the soil survey based on saturated hydraulic conductivity. The transition between the near surface and shallow subsurface soil layers was selected based on a significant change in soil saturated hydraulic conductivity in the profile above the restrictive layer.
4. **Percolation rate at the interface with a restrictive layer (i.e., hardpan or weathered bedrock):** a uniform value was chosen based on soil survey data, which approached zero due to the highly restrictive nature of the materials.

Table 2 below shows the range of the SMA parameter values used for this study relative to the Upper Laguna Creek HMS model. Composite storage values for each subwatershed were used as calculated from the soil survey. Composite infiltration and percolation rates for each subwatershed, as part of the preliminary calibration process, were typically maximized for each subwatershed to achieve the desired water level of 3.1 ± 0.1 feet at the ECORP staff gage.

Table 2. Preliminary calibration of SMA parameters

	Soil Storage (in)	Tension Storage (in)	Max Infil Rate (in/hr)	Soil Perc Rate (in/hr)	GW1 Storage (in)	GW1 Perc Rate (in/hr)
ULC Model[1]	6.0	4.8	0.08	0.08	10.0	0.08
This Study[2]	2.18-6.33	1.74-5.06	0.08-0.54	0.02-0.15	1.78-8.52	0.0001

[1] Calibrated continuous HMS model for neighboring Upper Laguna Creek (Geosyntec, 2007)
[2] As derived from the soil survey

In addition to these parameters, no other data or parameters were changed in the HMS and RAS models apart from the addition of cross section data collected by cbec in December 2009 to augment the

channel geometry in the RAS model adjacent to the staff gage established by ECORP. The RAS model did use Manning's n-values for the channel of 0.040, as originally prescribed by M&S; we found this value to be reasonable considering the form roughness associated with the high level of in-channel variability.

The calibrated water level at the staff gage equated to 210 cfs at the staff gage and 240 cfs at the downstream property boundary. For comparison, and using normal depth calculations, ECORP estimated that the peak water level observed during the storm event equated to 215 to 240 cfs at the staff gage. Given the similarity in ECORP's independent calculations, we have further confidence that the calibrated HMS model were reasonably parameterized.

3.2 FLOW DURATION CONTROL AND TOTAL WORK DONE

Flow duration and total work curves were analyzed for each proposed condition (i.e., P, PD, PDM) relative to existing conditions (E) for each cross section within the property limits. For each proposed condition, the following was assumed:

1. P – buildout with no traditional flood detention to demonstrate an unmitigated worse case;
2. PD – buildout with traditional flood detention per the basin designs implemented by M&S and as shown in Tables 1 and 2 of the DMP (January 2010);
3. PDM – buildout with traditional flood detention per the PD condition with modifications to achieve a satisfactory level of mitigation per criteria and objectives stated in Section 1.4.

After four iterations, typical modifications to the traditional flood detention basins for the PDM condition included the following:

1. Basin storage was increased on average by 20% and basin area was increased on average by 18% compared to the values reported in Table 1 of the DMP (January 2010) at a relative elevation of 7 feet with 3:1 side slopes;
2. The outlet control structures (per Table 2) were modified with the use of a V-notch weir (primary flow control) and low flow orifice (secondary drainage);
3. The V-notch weir, starting 0.5 feet above the basin floor with angled openings specific to each basin, was used to control flows up to the 10-year event at a relative elevation of 6 feet; the weir was used as a means to quickly generate a stage-discharge rating curve, which could alternatively be represented by a series of orifices on a specially designed orifice plate specific to each basin;
4. Above a relative elevation of 6 feet, up to 7 feet (coincident with the 100-year elevation), releases were limited to the rating curves of the original outlet control structures;
5. A 2-inch low flow orifice was used to drain the 0.5 feet of storage behind the weir;
6. Alternative outlet configurations could be developed during the final design process, such as a combination of different types of weirs and orifice plates. However, the arrangement described above was used for the purposes of this analysis.

Figure 1 shows typical flow duration curves for all four (4) modeled conditions. While the PD curve demonstrates flow matching for the infrequent flows (for which the basins were originally designed), the more frequent flows for the PD condition (in the range of 10 to 100 cfs in this figure) very much replicate an unmitigated (P) condition. The P condition frequent flows represent an extra volume of developed runoff that is being slowed by the basins, but prematurely released through the single size outlet control structures (which were designed to mitigate the 100-year peak flow). Per the criteria and objectives stated in Section 1.2.2, it is necessary to control these frequent flows to minimize geomorphic impacts to the creek. As such, the PDM curve, via the modified outlet control structure, attempts to further detain the extra volume of developed runoff and release it in the range of very frequently occurring flows (below 10 cfs in this figure), which do little to no geomorphic work on the creek.

Figure 2 shows typical work curves for all four (4) modeled conditions (at the same location as Figure 1). As demonstrated by this figure, the total work done during the frequent flows (in the range of 10 to 100 cfs in this figure) is significantly reduced from the PD condition to the PDM condition via modification of the outlet control structure to further mitigate the extra volume of developed runoff.

Taking Figure 2 one step further, erosion potential (EP) ratios were calculated for each cross section within the property by comparing the total work for each proposed condition to the total work for existing conditions (e.g., $EP_{PD}=W_P/W_E$ for PD conditions). Figure 3 shows the results of this analysis and demonstrates that:

1. The P and PD condition EP ratios generally increase in the downstream direction (see comment below);
2. The PD condition, compared to the P condition, does very little to mitigate the erosive effects of development on the creek;
3. The PDM condition significantly reduces the erosive effects of development on the creek by converging on EP ratios less than 1.5;
4. The EP ratios for the PDM condition are 1.12 on average, but upwards of 25% of the cross sections still exceed an EP ratio of 1.2.

Figure 3 also includes the cumulative watershed area curves for existing and proposed conditions. Due to detention basin placement and watershed bisection, the cumulative watershed area for proposed conditions is greater than existing conditions for the entirety of the creek running through the property. This may partially explain why the outlet control structures were modified as heavily as they were to additionally combat increases in flow due to the modified landscape.

4 SUMMARY AND RECOMMENDATIONS

The following summary and recommendations are provided for Deer Creek Tributary, and inferred for Upper Laguna Creek and the Carson Creek Tributaries, from the detailed Deer Creek Tributary analyses.

4.1 DEER CREEK TRIBUARY

1. cbec assessed the geomorphic condition of the Deer Creek Tributary (and its tributaries) and found the creek to be in a degraded condition. The creek shows signs of significant bank erosion and channel incision and the creek bed is either armored (e.g., cobbles left behind as the bank soils washed away) or downcut to the hardpan. While perhaps in a state of maximum degradation under the current land use practice of grazing, the creek will still be susceptible to further degradation if hydromodified flows and inadequately designed structures go unchecked.
2. cbec also observed the many tributaries feeding the Deer Creek Tributary and found that these smaller tributaries and swales are extremely incised with active headcutting and will continue to degrade under their current geomorphic trajectory.
3. cbec assessed the potential hydromodification impacts of the master-planned community on the creek and determined that a reasonable level of flow duration control by itself was inadequate to meet the criteria and objectives stated in Section 1.4. The EP ratios for the PDM condition are 1.12 on average, but upwards of 25% of the cross sections still exceed an EP ratio of 1.2 and approach values higher than 1.5.
4. As such, it is our recommendation that rigorous HMP measures should be implemented to include increasing basin sizes (up to 20% larger) and using modified outlet control structures with specially designed orifice plates in conjunction with LID. The flow duration control and LID measures will complement each other to minimize geomorphic impacts to the degraded Deer Creek Tributary and its tributaries.

4.2 UPPER LAGUNA CREEK AND CARSON CREEK TRIBUTARIES

As it pertains to Upper Laguna Creek and Carson Creek Tributaries, even though detailed HMP analyses were not performed, the following summary and recommendations are offered based on the DMP, cbec's geomorphic assessment, and this focused analysis for the Deer Creek Tributary:

4.2.1 Upper Laguna Creek

1. cbec assessed the geomorphic condition of Upper Laguna Creek from Grant Line Road upstream through the vernal pool terrace and found the creek to be in relatively good condition. Compared to the other tributaries with similar soils, the relatively low relief and high surface storage of the terrace contribute to the stability of the creek (or lack of incision) in the presence of grazing.

2. The double barrel culverts under Grant Line Road may act as base level control for Upper Laguna Creek upstream of the road since the culverts are elevated relative to the creek/pool level. The presence of this structure may have contributed to the stability of the system, so careful consideration should be exercised with respect to the integrity of the creek and vernal pool terrace features if this structure were to be modified.
3. While the town center is shown for the most part to border the a seasonal wetland swale / intermittent drainage with an approximate 50-foot buffer, it would appear from aerials and County linework that approximately 1,900 feet of this swale / drainage is actually impacted by the proposed master-planned footprint (see Figure 4). To mitigate this impact, it is our understanding that flow would be redirected down a proposed swale parallel to the preserve and through a vernal pool complex and smaller swale /drainage (pers. comm., Holger Fuerst). Careful design should be exercised to ensure that the added flows down the smaller swale / drainage do not initiate the processes of channel incision and headcutting. If the town center footprint proceeds as planned, then some level of enhancement may be necessary to prepare the smaller swale / drainage for the increase in flows (e.g., augment the smaller swale with inline pools to provide storage and dissipate flow energy). While it is recognized that the town center footprint will reduce flows to the impacted reach of swale / drainage by paving it over and shunting flows further downstream via Basin #4, this act does not diminish our concerns because the flow redirection occurs upstream of a majority of the pave over.
4. The recreational buffer along the eastern perimeter of the vernal pool terrace (or open space) occurs along the drainage divide between Upper Laguna Creek and the Deer Creek Tributary. Adjacent to this recreational buffer is a north-south trending road with low-density residential land uses to the east of the road within the steeply sloped Deer Creek Tributary watershed. Careful consideration of the local geology needs to be exercised when project layouts are being finalized for the road and low density residences so as to not impact the hydrologic function of the vernal pool terrace by inadvertently dewatering the headwater pools via eastward drainage.
5. Given the relatively good geomorphic condition of Upper Laguna Creek and the vernal pool terrace, but also their heightened sensitivity to anthropogenic impacts when interwoven within the fabric of the master-planned community, it is cbec's recommendation that 1) rigorous HMP measures should be implemented (similar to those proposed for Deer Creek Tributary) to include increasing basin sizes (up to 20% larger) and using modified outlet control structures with specially designed orifice plates in conjunction with LID, and 2) more detailed hydrologic and geologic analyses should be performed when defining project layouts to ensure that this natural center piece remains in decent ecological condition.

4.2.2 Carson Creek Tributaries

1. cbec assessed the geomorphic condition of one of the more significant Carson Creek tributaries (which is associated with Basin #28) and found it to be similar to the many tributaries feeding the Deer Creek Tributary. As observed, these smaller tributaries and swales are extremely incised with active headcutting and will continue to degrade under their current geomorphic trajectory.

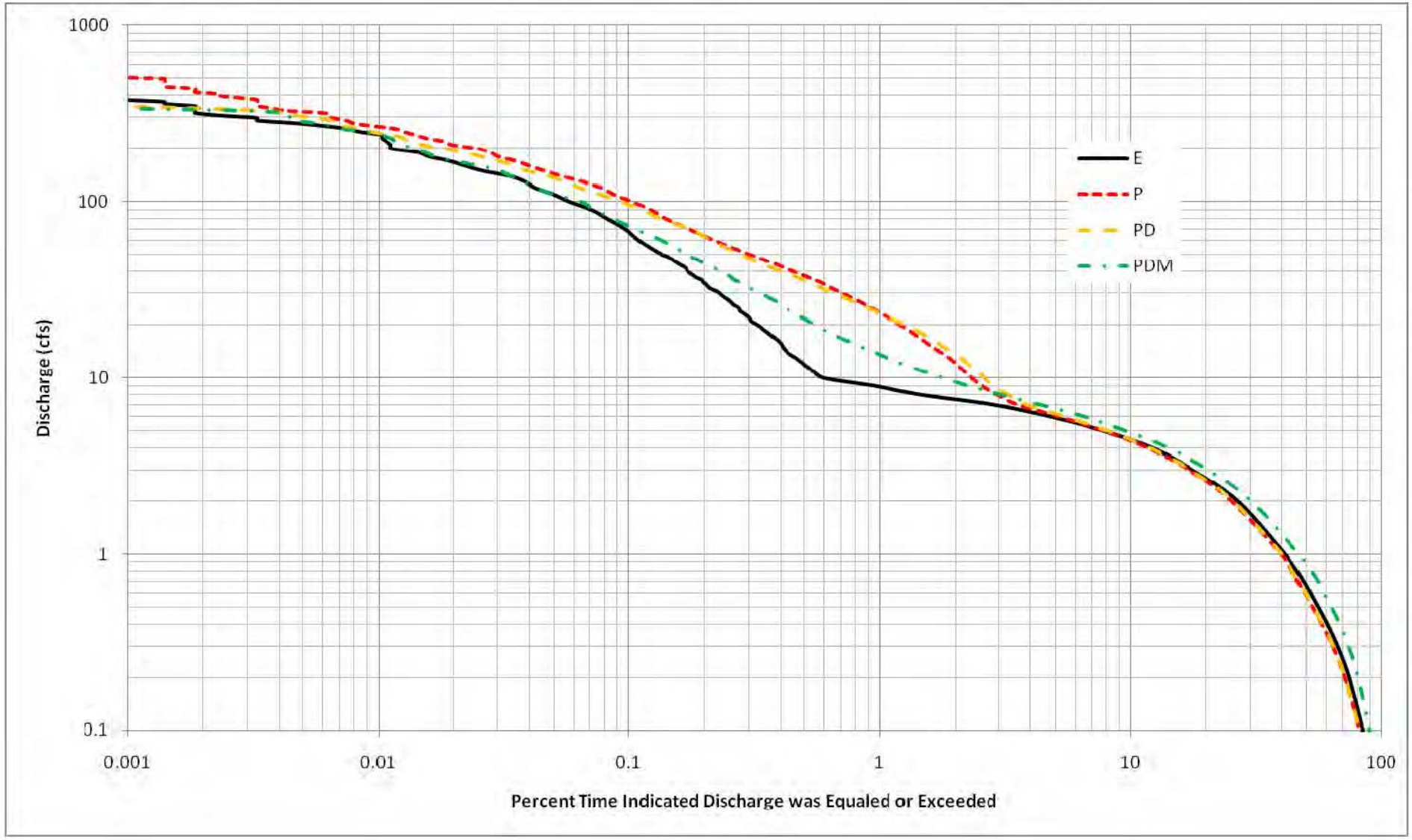
2. cbec did not assess the geomorphic condition of every tributary to Carson Creek to be impacted by the proposed master-planned community (i.e., Basins #23 to #26 and #29 to #30). However, it is assumed that the statements in (1) above are applicable.
3. As such, it is our recommendation that rigorous HMP measures should be implemented (similar to those proposed for Deer Creek Tributary) to include increasing basin sizes (up to 20% larger) and using modified outlet control structures with specially designed orifice plates in conjunction with LID. The flow duration control and LID measures will complement each other to minimize geomorphic impacts to the already active Carson Creek Tributaries.

5 REFERENCES

Fischenich, C. 2001. Stability Thresholds for Stream Restoration Materials, EMRRP Technical Notes Collection (ERDC TNEMRRP-SR-29). US Army Engineer Research and Development Center, Vicksburg, MS.

Geosyntec. 2007. A Technical Study of Hydrology, Geomorphology, and Water Quality in the Laguna Creek Watershed. Final Report, November 15, 2007.

M&S. 2008. Regional Master Drainage Study for SunCreek Specific Plan. Prepared for Sacramento County Water Agency.



Notes:

Cordova Hills Hydromodification Assessment

Typical flow duration curves

Project No. 09-1002	Created By: CRC	**Figure 1**

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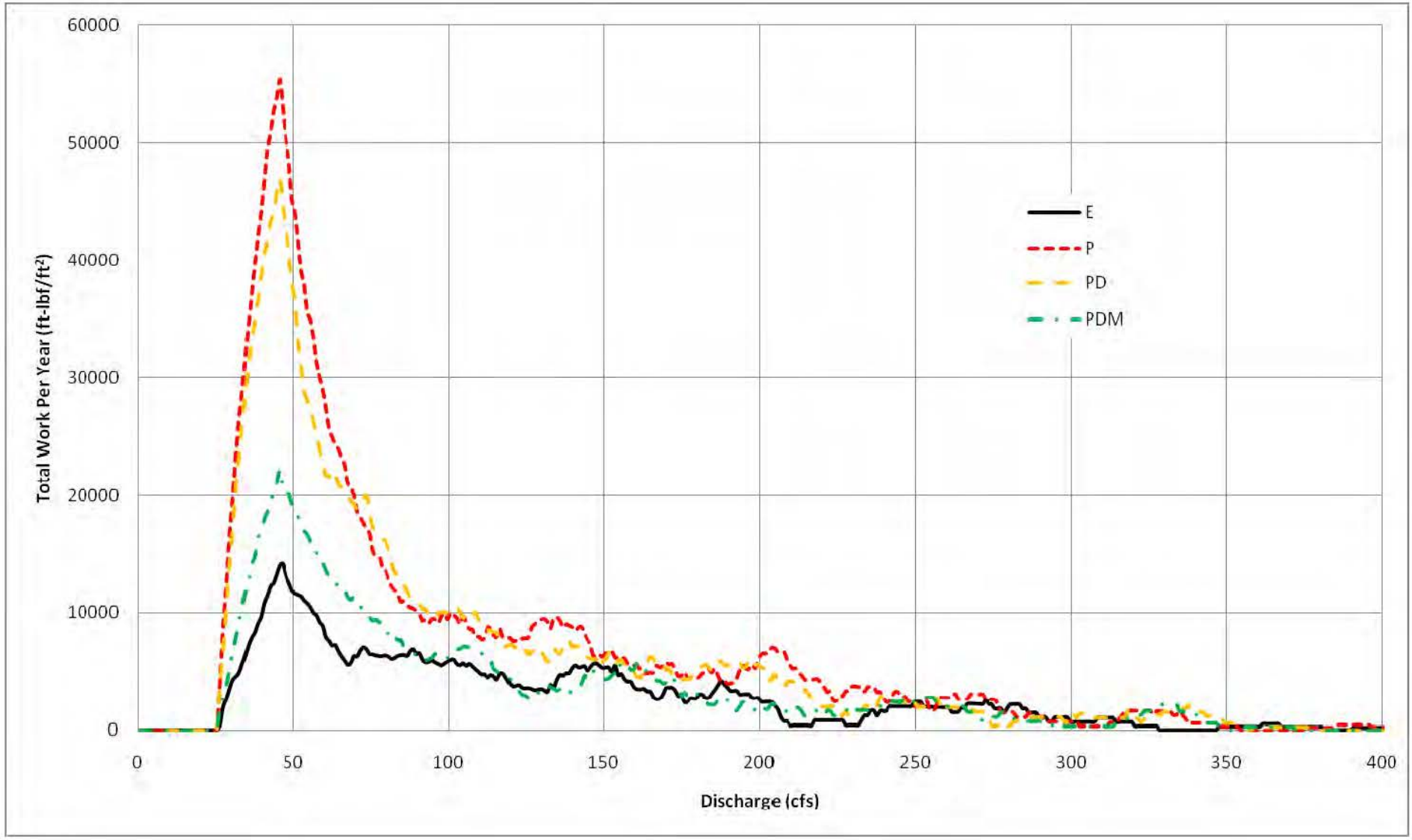
4/4/2010



Notes:

Cordova Hills Hydromodification Assessment

Typical total work curves

Project No. 09-1002	Created By: CRC	**Figure 2**

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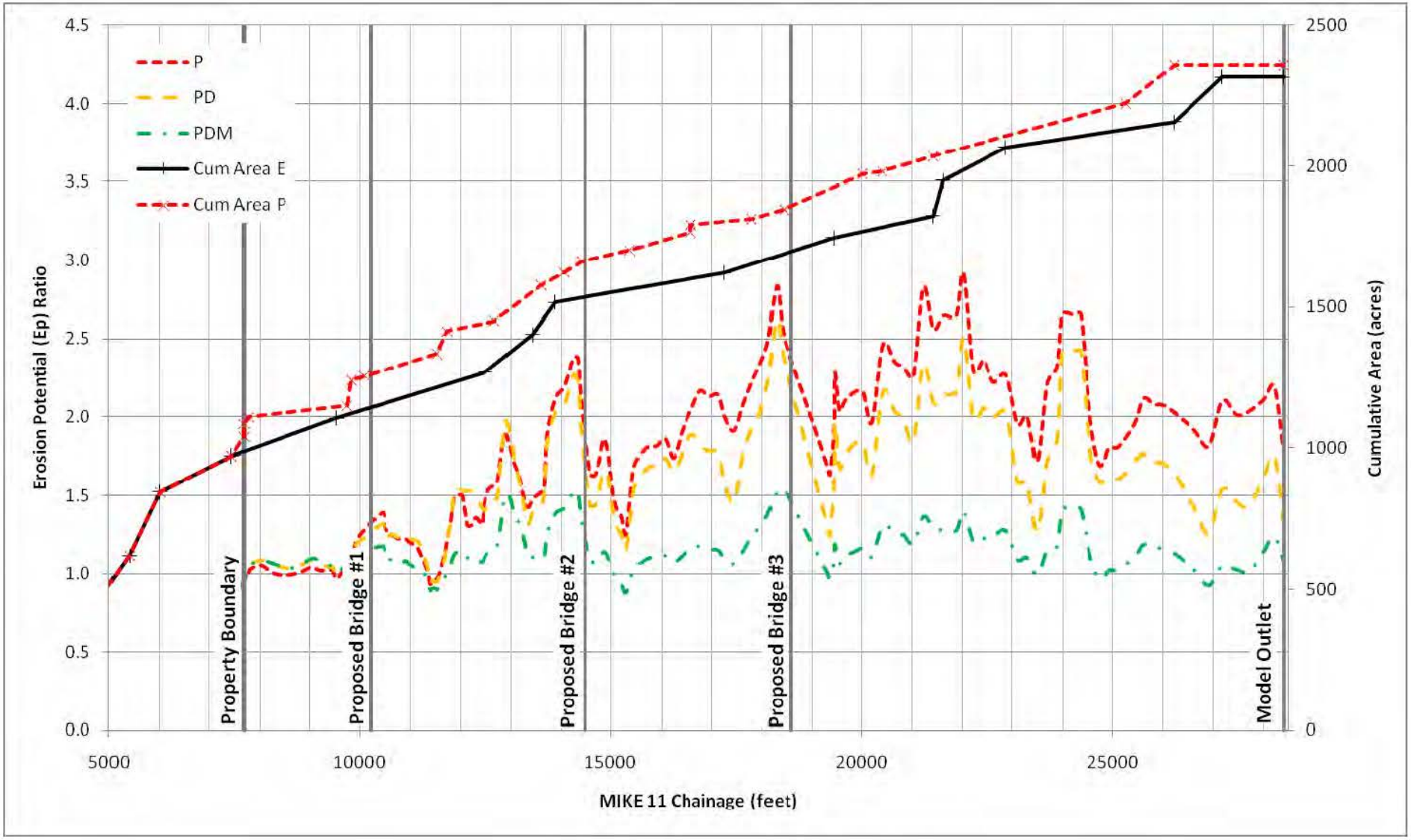
4/4/2010



Notes:

Cordova Hills Hydromodification Assessment

Erosion potential ratios

Project No. 09-1002	Created By: CRC	**Figure 3**

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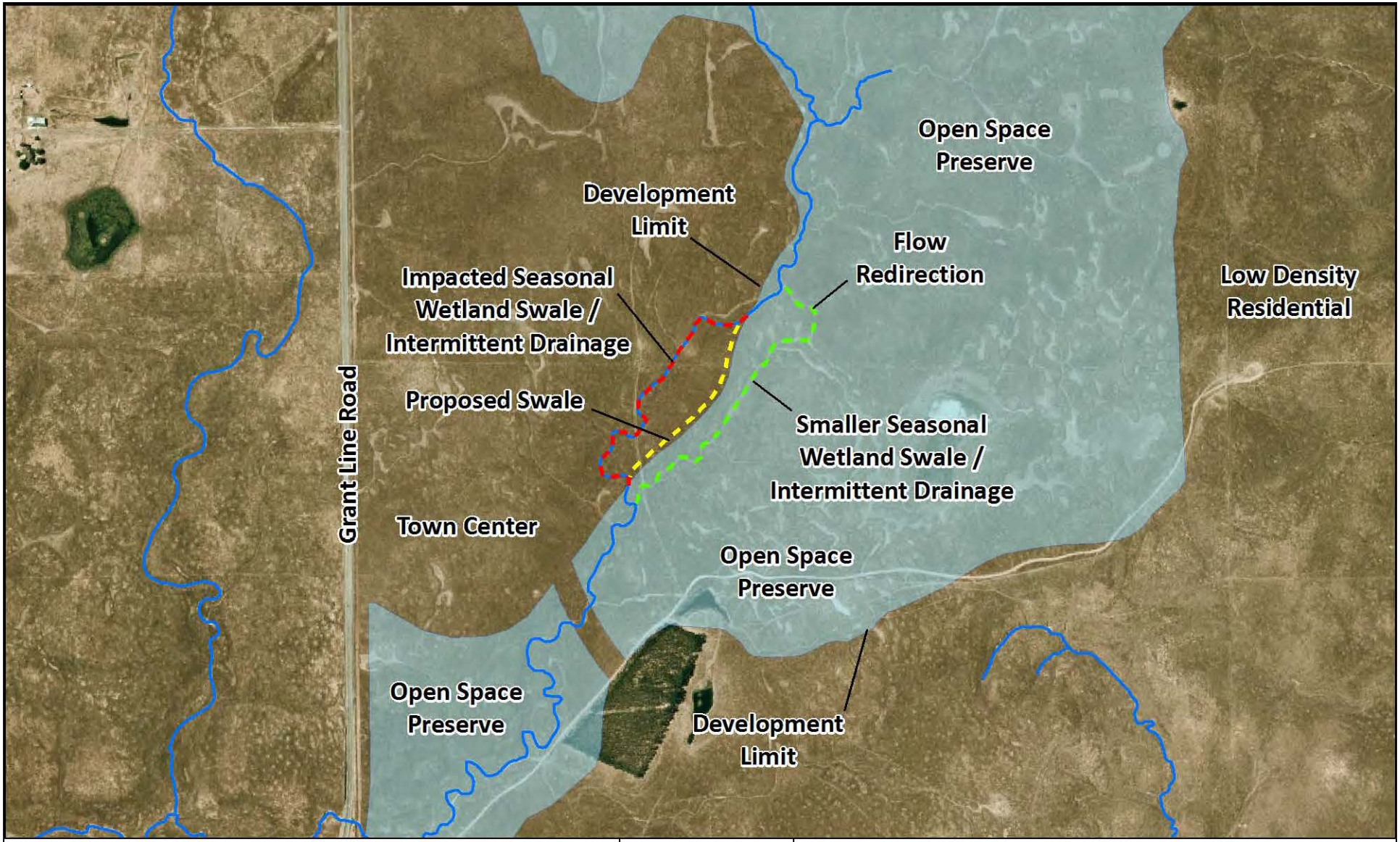

Cordova Hills Hydromodification Assessment

Upper Laguna Creek development impacts

Project No. 09-1002	Created By: CRC	**Figure 4**

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4/6/2010

7.2 Appendix B: cbec Field Reconnaissance and Geomorphic Assessment for the Cordova Hills SPA

MEMORANDUM

Date:	December 15, 2009
To:	Holger Fuerst
From:	Christopher Cuhaciyan, Chris Campbell, Chris Bowles
Project:	09-1002 - Cordova Hills Hydromodification Assessment
Subject:	Field Reconnaissance and Geomorphic Assessment

1 INTRODUCTION

cbec inc., (cbec) has been requested to undertake a qualitative geomorphic assessment of Upper Laguna Creek (north), a tributary to Deer Creek, and a tributary to Carson Creek for MacKay & Somps Civil Engineers, Inc (M&S). This report, intended to benefit the planning of, and to provide input into, the Cordova Hills Drainage Master Plan, includes an introduction, a description of methods, the results of our work, conclusions, and limited recommendations. This study is a geomorphic assessment based upon a field investigation of the three main creeks of Cordova Hills. cbec has developed this report to anticipate and help address environmental assessments and other planning efforts. This study was undertaken with two specific goals in mind: 1) observe the present channel condition and interpret historic channel changes, and 2) predict how hydromodification, preserve status, and channel rehabilitation will affect the creeks given the current geomorphic context of the project creeks.

Cordova Hills is located approximately 16 miles due east of downtown Sacramento, near the eastern limits of Sacramento County (Figure 1.1). The area is mostly rolling grasslands with narrow to moderately wide valley bottoms. Natural Resource Conservation Service (NRCS) soils maps indicate that the soils in the area (Figure 1.2) are generally loamy with some tendency either towards gravels, sands, or clays depending on location. The soils near creeks tend to be loams, sandy loams, or gravelly loams. Underlying the soils is typically an indurated layer (often referred to as “hardpan”) according to NRCS data; however, weathered bedrock is indicated in some locations.

1.1 GEOMORPHIC CONTEXT

Hydromodification, or the alteration of existing hydrologic regimes, is a typical result of land-use change. Physical changes to the land surface will result in changes to water storage and the paths that water may use to get from the land surface to the stream channel. Typically, we are more concerned when the

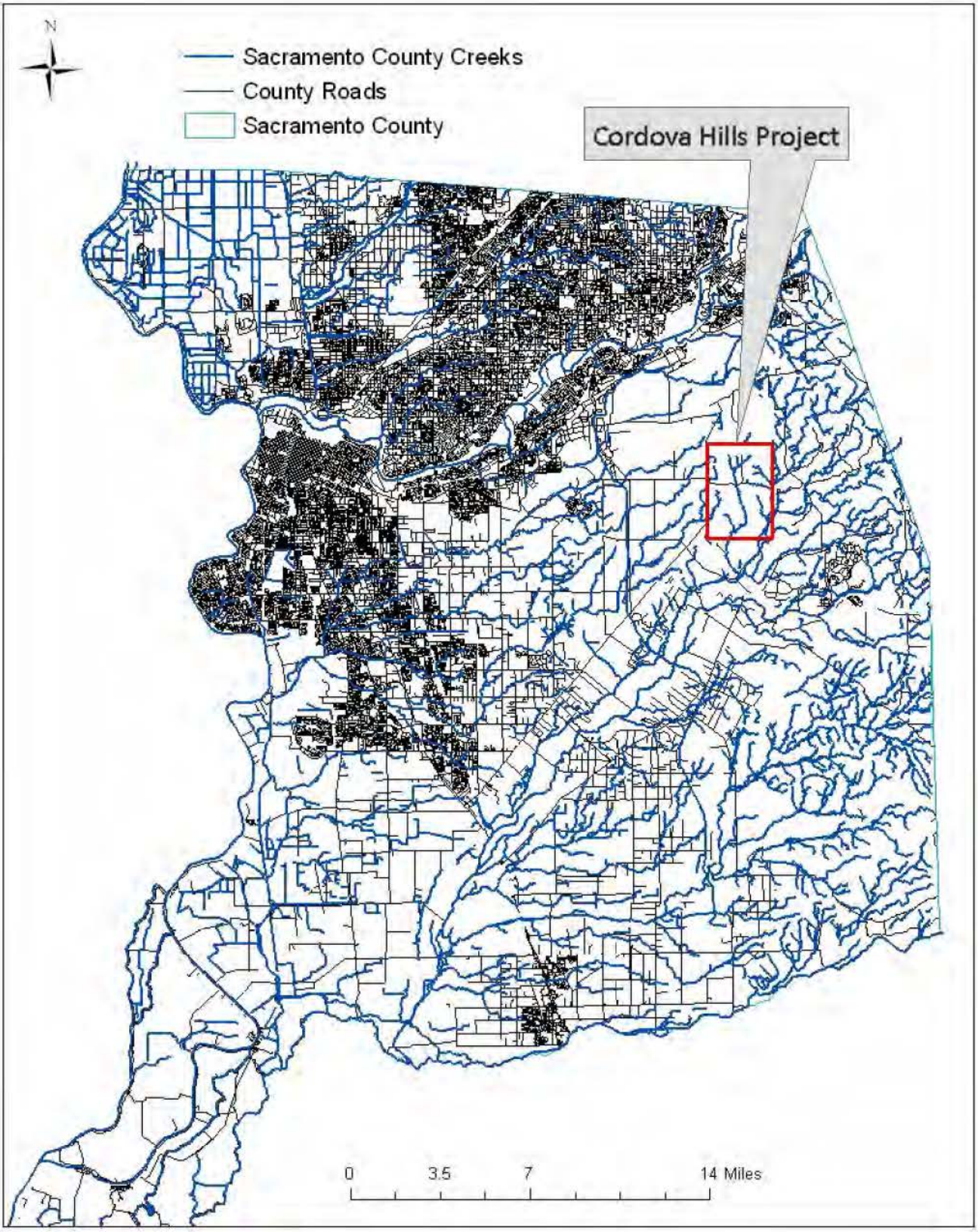
land use change is from a more natural to a more urban setting. In such cases, the result is that precipitation, which under the natural conditions mostly infiltrates into the soil before percolating into the stream, with some surface runoff when the soils become saturated, will follow surface routes across roofs, driveways, streets, and finally into drainage pipes or ditches before flowing into the stream. This surface route results in increased connectivity with substantially more water entering the stream in a shorter amount of time than would have occurred under more natural conditions. The end result is often substantially higher peak flows that occur more often and with more power to do geomorphic work on the channel.

Stream channels naturally attain a dynamic equilibrium that is partially a result of patterns and amounts of precipitation, geologic materials, and vegetation. When these independent variables change, the stream channel will also change in response so as to return a new dynamic equilibrium. Land use change, and the ensuing hydromodification, will result in forces on the stream that cause the stream channel to seek a new dynamic equilibrium. Attempts to store and slow the travel time of water can effectively be used to reduce the impacts of hydromodification and lessen the forces that would otherwise be attempting to change the geomorphic character of the stream.

The imbalance, which leads to the forces that cause change, can be understood better through Lane's Balance (1955), as shown by Figure 1.3. Lane's Balance states that Q (water discharge) and S (slope) are together proportional to both Q_s (sediment discharge) and D_{50} (the median size of the sediment being discharged). This "balance" suggests that if either Q or S increases the sediment transported and/or the size of the sediment transported must also increase proportionally. A typical result of hydromodification is that water discharge is increased, and since slope usually can't decrease, the sediment supply must increase to maintain the balance, resulting in incision of the channel. The imbalance in channel stability as a result of urbanization is often exacerbated by the corresponding reduction in sediment supply from the watershed as a result of paving over of previously pervious surfaces. Channel incision will often become more extreme with downstream distance, creating a situation where the slope of the channel will also begin to increase. This incision-induced increase in slope will result in further increases in Q_s and/or D_{50} which will bring about even more intense channel incision. The initiation of channel incision begins a process known as channel evolution.

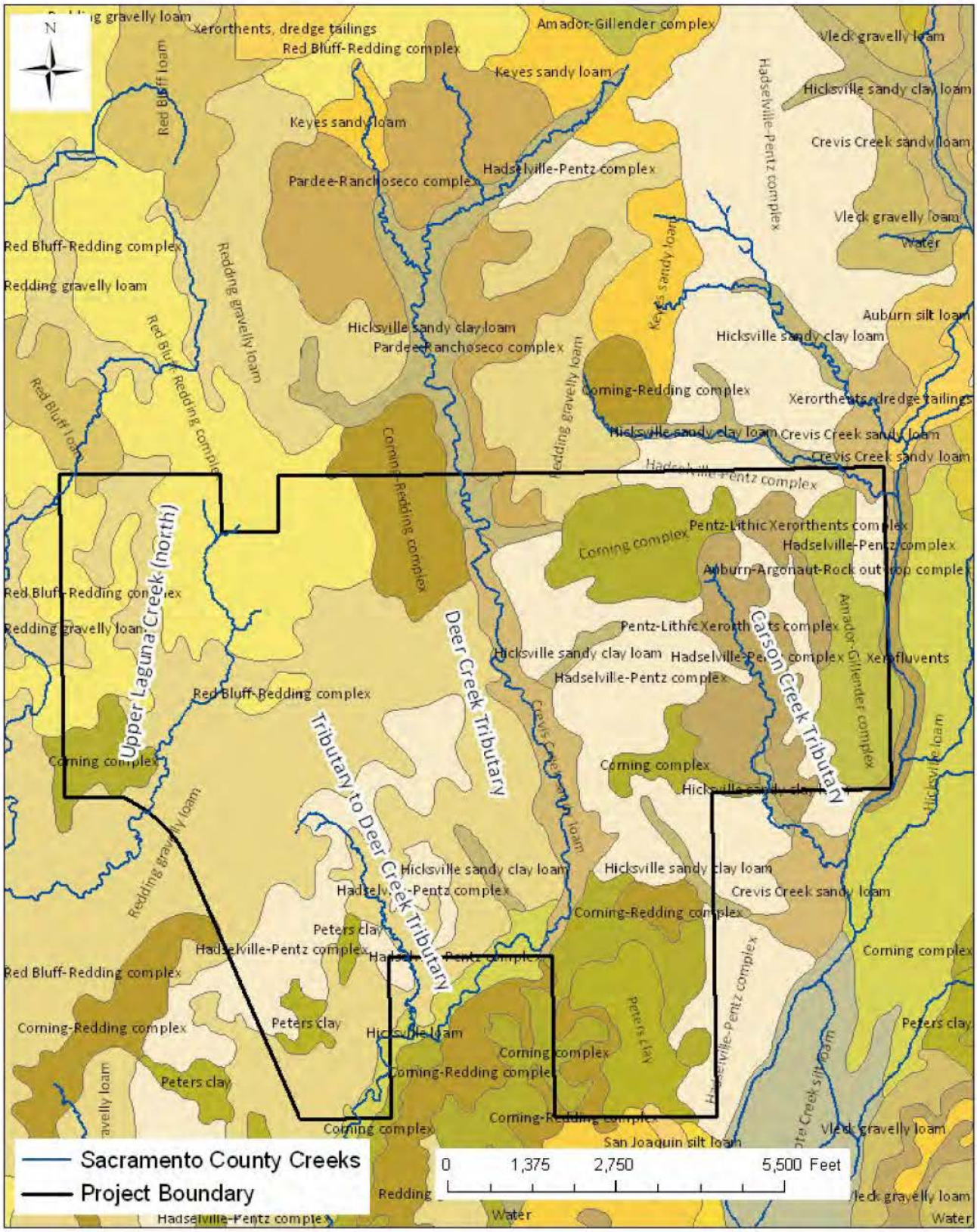
Channel evolution models (Figure 1.4, e.g., Schumm 1977, Schumm et al. 1984, Simon and Hupp 1986, Simon 1989, Rosgen 1996) describe the general process by which rivers with increasing discharges may begin to incise down (phase II, phase I is dynamic equilibrium channel) into the streambed until such a time is reached when the stream banks become over-steepened and collapse into the channel. This bank failure results in a widening process (phase III). During phases II and III discharges that would normally result in floodplain inundation (flows slightly less than the 2-yr return interval discharge on up) become increasingly contained within the channel. The excessively high shear stresses applied under these conditions help to erode the channel until such time when the channel reaches a size where a new floodplain, at a lower elevation than the original, develops (phase IV). As the new channel and floodplain develop, vegetation returns, and the stream again establishes a dynamic equilibrium. In phase V flows nearing the 2-yr discharge event will spill into the new floodplain which works to minimize excessive channel erosion.

These types of geomorphic processes are qualitatively considered in this study as they relate to the proposed hydromodification within Cordova Hills.



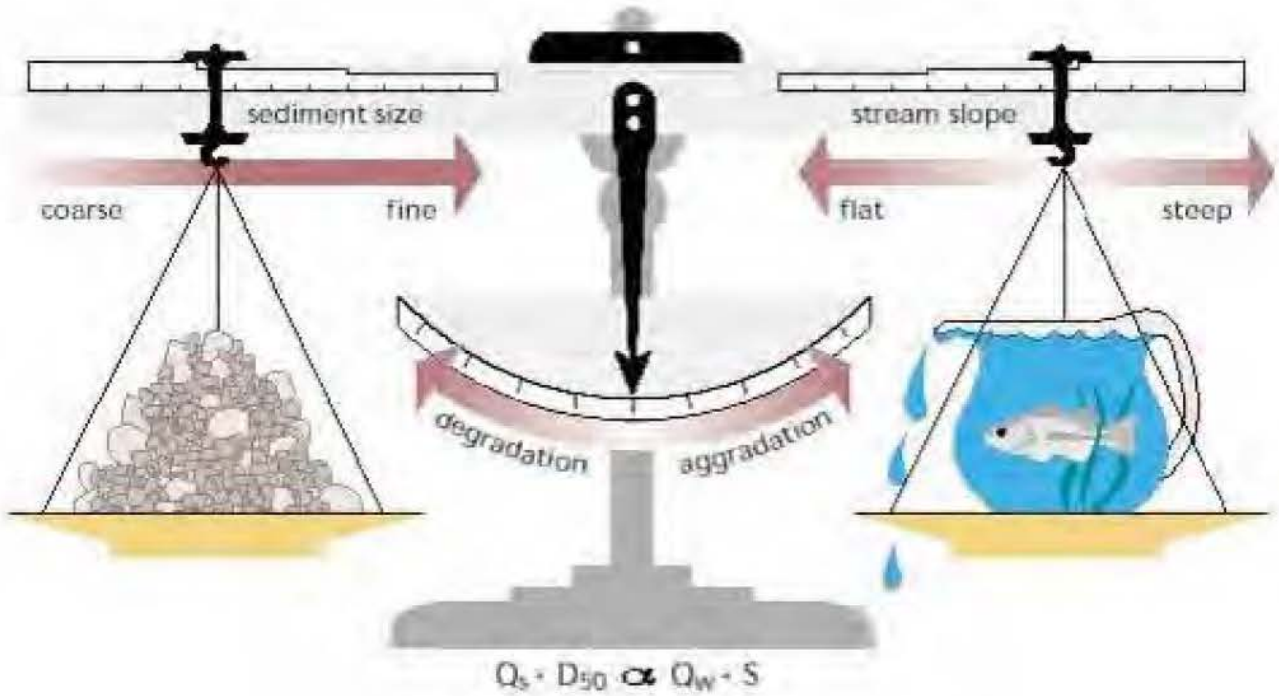
Notes:	cbec eco engineering	Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*		
		Cordova Hills project location		
		Project No. 09-1002	Created By: COC	**Figure 1.1**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure1.1 project location.docx
12/15/2009



Notes: Source: NRCS SURGGO database	cbec eco engineering	Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*		
		Soils of Cordova Hills		
		Project No. 09-1002	Created By: COC	**Figure 1.2**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure1.2 NRCS soils.docx
12/15/2009



Notes: Figure created by Rosgen, 1996, after Gilbert 1917, Lane 1955, Schumm 1971

cbec eco engineering

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Lane's Balance

Project No. 09-1002	Created By: COC	**Figure 1.3**

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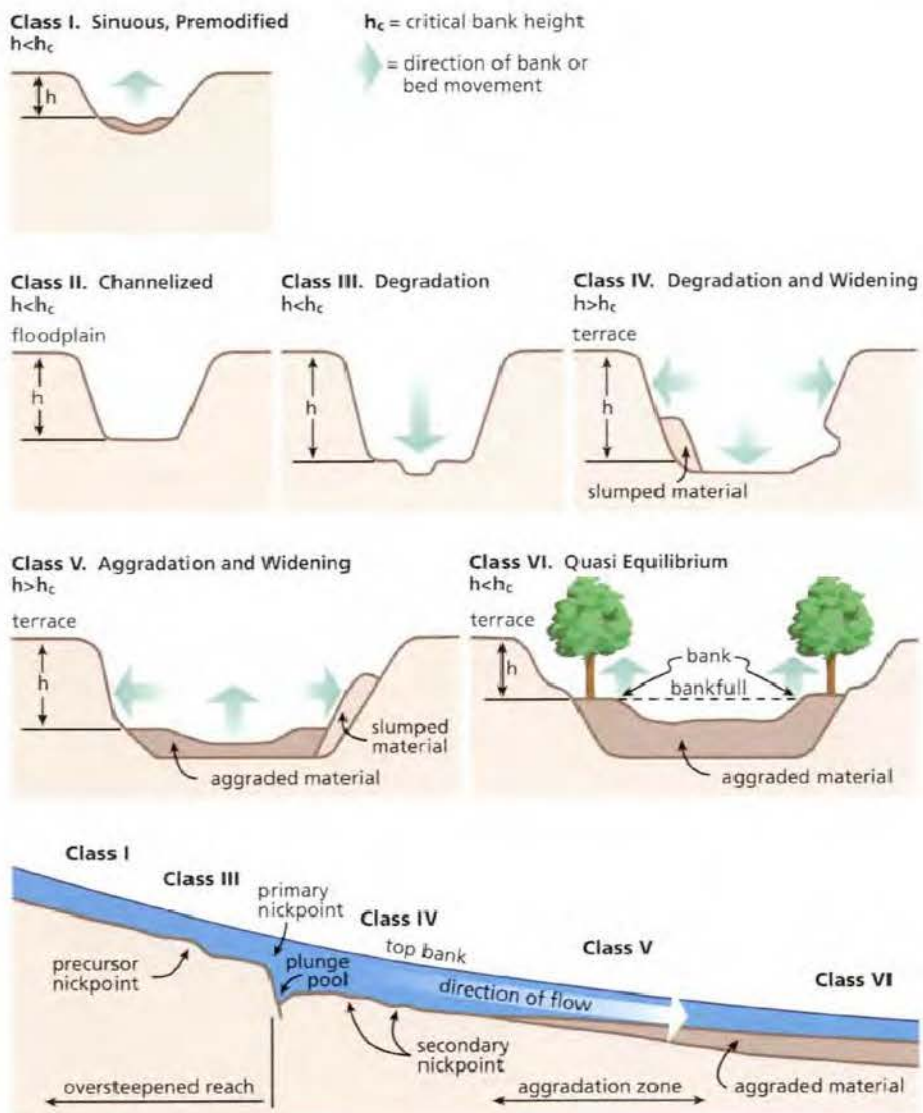
12/15/2009



Notes: Figure created by Simon, 1989 based upon Schumm, 1977	cbec eco engineering	Cordova Hills Hydromodification Assessment*: Geomorphic Assessment* **Schumm's Channel Evolution Model**		
		Project No. 09-1002	Created By: COC	**Figure 1.4**

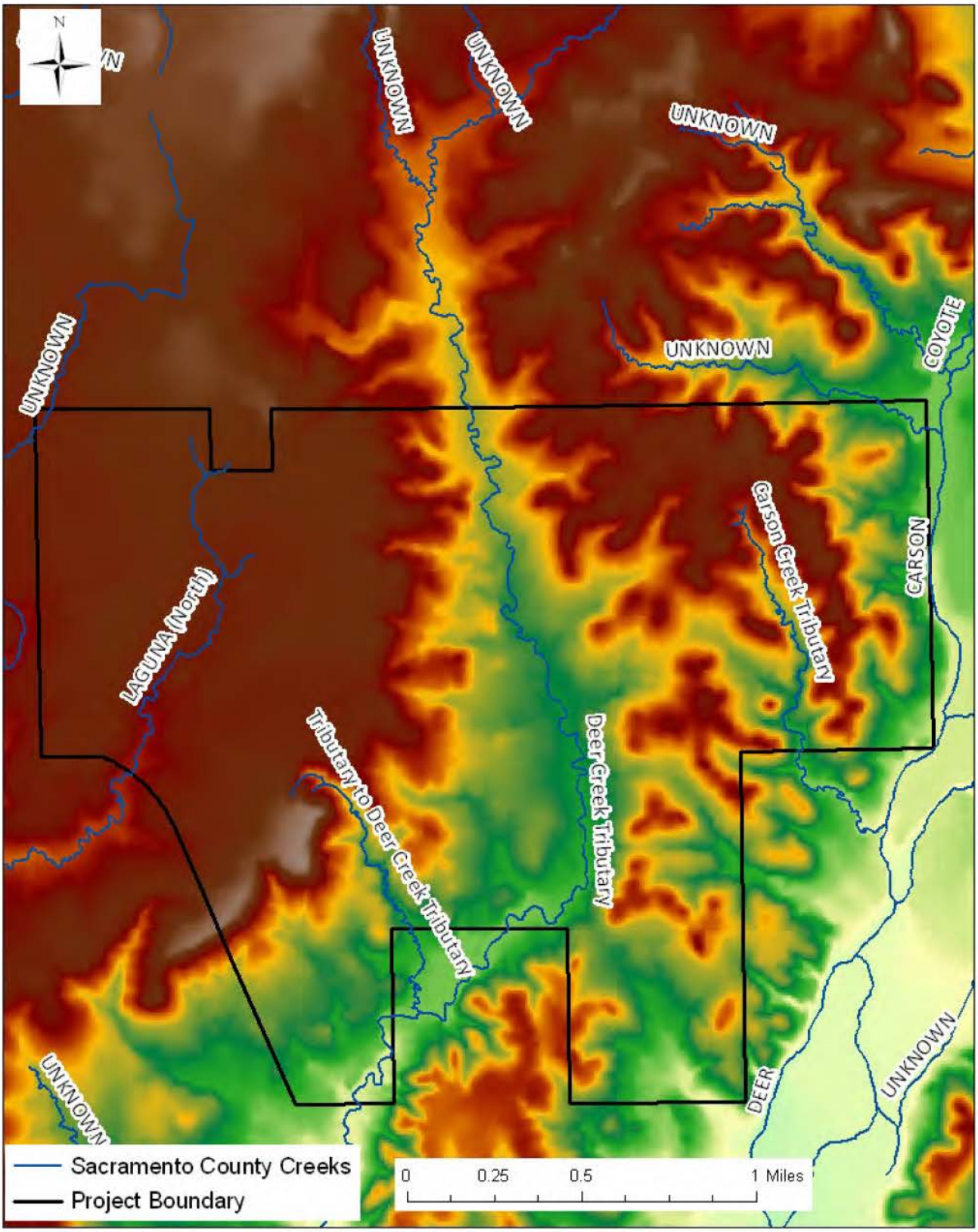
2 METHODS

2.1 FIELD RECONNAISSANCE

The mainstem of Upper Laguna Creek (north), Deer Creek Tributary, a tributary to Deer Creek Tributary, and Carson Creek Tributary (Figure 2.1) were walked in November 2009. The geomorphic forms were noted using qualitative Rapid Geomorphic Assessment techniques and visual observations. A total of 9.6 miles of creek were observed, most of which were within the project boundary. Our field assessment focused on the existing level of channel degradation. This assessment is preliminary and a more detailed assessment may be required in future phases.

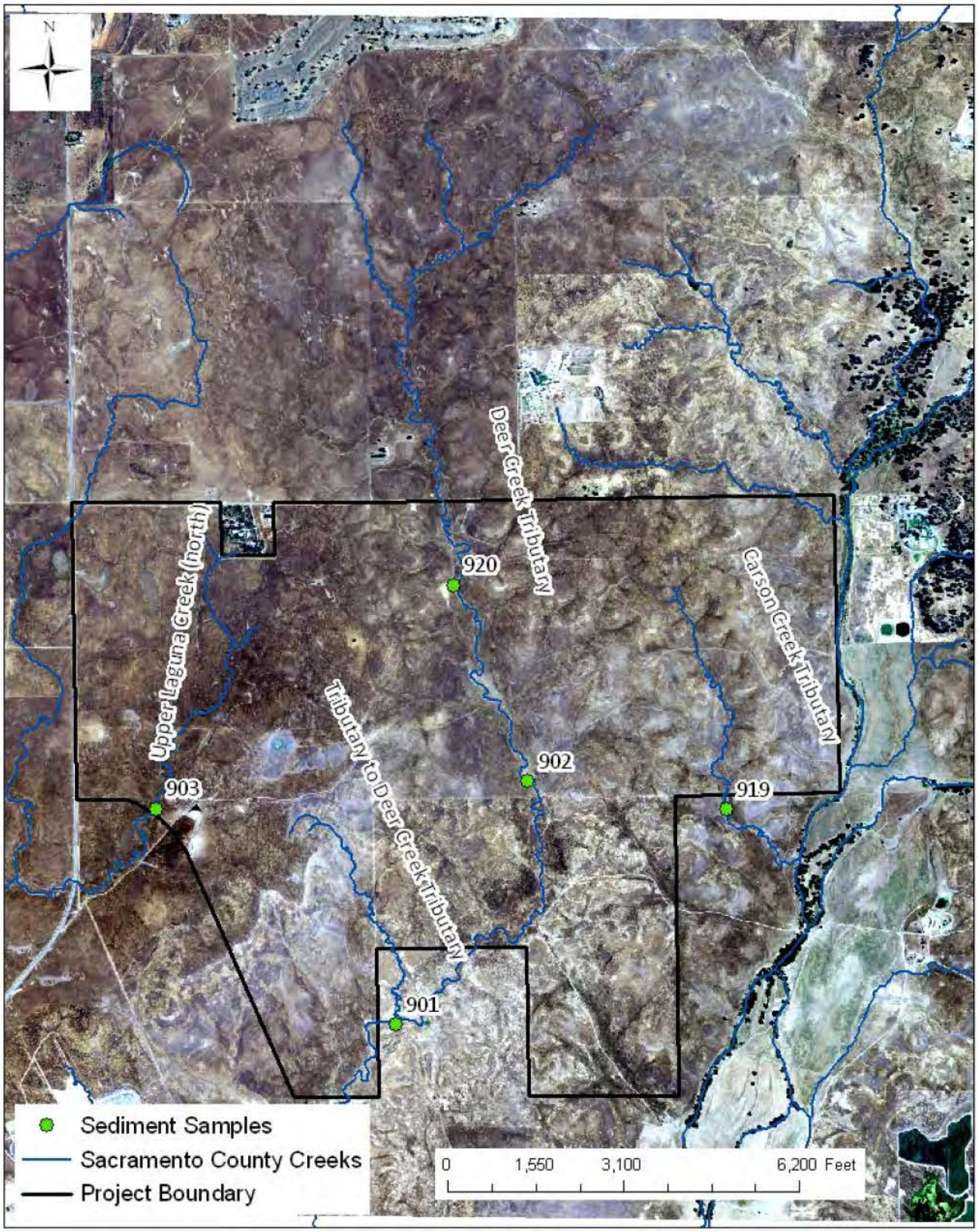
During the field reconnaissance, locations with current, historic, and potential future geomorphic change (including channel incision and bank failure) were noted (with hand-held GPS waypoints recorded). Although a bank erosion hazard index was not formally applied in the field, characteristics of unstable banks were noted when they were present. These include excessive bank height, over-steepened (high slope) banks, bank material composition, bank stratigraphy, and characteristics of bank vegetation. Channel width, vegetative cover, soil types and typical size class, woody debris, and bed forms were also observed as well as other signs of degradation, aggregation, widening, and planform changes.

Bed and bank material samples were collected at five locations (Figure 2.2) to determine the distribution of grains sizes present. Determining the median grain size will allow us to determine the erosion potential ratios (E_P) of the creeks to test the ability of the proposed conditions to move sediment relative to the existing condition.



Notes:	cbec eco engineering	Cordova Hills Hydromodification Assessment: *Geomorphic Assessment* **Creeks of Cordova Hills**		
		Project No. 09-1002	Created By: COC	**Figure 2.1**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure2.1 creek map.docx
12/15/2009



Notes:	cbec eco engineering	Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*		
		Sediment Sample Locations		
		Project No. 09-1002	Created By: COC	**Figure 2.2**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure2.2 sediment sample locations.docx
12/15/2009

3 RESULTS

3.1 FIELD RECONNAISSANCE

Figure 3.1 shows the extent of the study area and the waypoints taken at locations of geomorphic interest. Table A.1 is a comprehensive list of the waypoints taken including the geomorphic concern or interest for each location. The waypoints typically represent concerns observed at that immediate location, but often include the bounding reach if it is in similar condition, except where noted. Relatively stable reaches, those generally not of concern, are not specifically noted and were not observed except in Upper Laguna Creek. However, changes to discharges, especially increases in peak discharges, and the duration of these discharges, equal or greater to the threshold for geomorphic change may cause the stable reaches to become unstable in the future.

3.1.1 Deer Creek Tributary

Deer Creek Tributary is the largest creek within the Cordova Hills project boundary. It runs from the north to south, briefly flowing out of the project boundary (near the south end) before briefly flowing within bounds again. The observed reach is 4.5 miles long with an average slope of 0.32%. The basin is void of riparian vegetation and only a few small trees exist (see waypoint 873 and 874).

Deer Creek Tributary shows signs of degradation along the entire reach observed in this study. It is moderately to substantially incised in most locations and over-widened throughout much of its length. Incision, phase II of the Channel evolution model, has already occurred and is not likely the current phase of the creek. The soils along the creek, which are generally 2 to 6 feet of gravelly loams (with some cobbles) over indurant (hardpan), are a highly erodible soil type. The sand, silts, and clays are quickly eroded and transported down the channel leaving the larger gravels and cobbles, which the stream cannot easily transport, as an armor layer which protects the deeper soils from erosion. Once this armor layer is sufficiently present the creek has a reduced ability to incise and phase II is essentially finished. Phase III of the channel evolution model then dominates and the channel becomes increasingly wider. There were no indications that new, lower elevation floodplains were being developed along the creek (i.e., the creek has not yet advanced to phase IV).

At waypoint 842, the channel is 24 feet wide with banks that range from 2 to 3 feet tall (Figure 3.2). The bed consists of fines (sands and smaller) up to small cobbles and is well vegetated (Figure 3.3). The cross-section is rectangular in form with vertical banks. Although the channel gets smaller with distance upstream, the vertical banks and rectangular form are common throughout most of the creek. The most common exception is at meander bends which often have asymmetric cross-sections with a pool towards the outside of the bend which results in a steeper outside bank (Figure 3.4, waypoint 844). The outside banks can reach 15-20 feet tall (e.g., waypoints 845, 846, 865, and 869) and typically are nearly vertical with exposed hardpan (Figure 3.5, waypoint 845).

Bulldozer tracks are evident between waypoints 851 and 856 (Figure 3.6, waypoint 853). It is our assumption that the bulldozer was used to enhance the creeks ability to function as a fire break during a recent grass fire that moved through the area. The turning over of the local bed material has exposed fines that previously armored by the gravels and cobbles. These fines will likely be eroded easily causing the creek bed to further incise until a new, sufficient armor layer develops. However, it is unlikely that the depth of further incision will be substantial as the larger particle sizes are abundant.

At waypoint 861, the channel has been graded during the re-construction of a cattle fence (Figure 3.7). Like the previously mentioned bulldozed reach, the fines will likely be winnowed away causing further incision and lowering of the creek bed.

At waypoint 870, Glory Lane crosses Deer Creek Tributary (Figure 3.8). Five culverts are visible under the road: one is concrete, two are very old non-corrugated and two are larger corrugated pipe. The channel just downstream of the culverts is over 30 feet wide with 2 foot tall banks. The extreme width may be due to the orientation of the culverts, which may have directed flow into the right bank causing it to erode.

A common feature along the smaller tributaries to this creek is active incision (e.g., waypoints 855, 864, 867, and 875). As the main channel has incised, a relatively large headcut is created where the tributaries enter. Headcuts were present near the confluences of all the major tributaries and are as much as 3 feet tall (Figure 3.9). These headcuts will continue upstream into the tributaries, causing further channel incision, over-steepened banks, and increased erosion. Careful consideration should be given to the location of detention basin outlet works so as not to exacerbate this problem.

There are several locations along the creek that indicate that lateral migration of the channel may happen rapidly, perhaps in as little as one high flow event. For instance, at waypoint 854 there is a meander cutoff (Figure 3.10). At waypoint 857, the channel is wide with divided low flow channels (Figure 3.11). At waypoint 866, an oxbow is present (Figure 3.12). In each of these cases, the channel appears to have made a relatively quick planform adjustment as opposed to slowly migrating over time by eroding a bank on one side and depositing material on the other. This maybe the result of an abundance of gravels and cobbles, which tend to armor the channel and restrict slow, continuous migration. Instead, overland flow, perhaps from water going over the banks, erodes the fine loamy soils to quickly cut a new channel until the new channel is also armored. Similar channel migrations were observed on the lower Carson Creek tributary (see section 3.1.4).

3.1.2 Tributary to Deer Creek Tributary

The tributary to Deer Creek Tributary is 1.37 miles long and enters the southern reaches of Deer Creek Tributary just outside of the project boundary. The headwaters are relatively high in elevation giving an average slope of 1.5% with much steeper local reaches. The headwaters are highly incised, steep (Figure 3.13), and headcuts are common features (Figure 3.14, waypoint 891). Exposed hardpan is typical with a mostly vegetated soil and gravel bottom. The banks are steep and up to 8 feet tall and the channel

varies from 6 to 20 feet wide. With distance downstream, the creek becomes increasingly sinuous until the confluence is reached. Headcuts are still common, but less frequent further downstream, but incision and steep, exposed soil banks are still common, especially along (but not limited to) the outside banks of meander bends.

3.1.3 Upper Laguna Creek (north)

Upper Laguna Creek ("north" as appended on Sacramento County hydrologic line maps) is a swale along the western edge of the project boundary that leaves the project area via two culverts under Grant Line Road (Figure 3.15). This headwater area is low relief and the creek has an average slope of 0.5% over its 1.59 mile length. The creek is generally in excellent condition with little to no incision and minimal areas of exposed soils (waypoint 866 is an exception as it has exposed banks). Because the vegetation and soils here are very similar to other degraded reaches in the project, we believe that the condition of the creek can be attributed to its low slope (and therefore low stream power and low ability to do work (erosion) on the channel bed and banks), high surface storage capacity (the area is a vernal pool terrace) and the culverts at Grant Line Road, which may be acting as a base level control that reduces the ability of the creek to become over-steepened and begin incising.

The creek, or swale, flows through and among vernal pools which are common on the area (Figure 3.16, waypoint 890). The channel is 6 inches to 3 feet deep and is from 2 to 30 feet wide. While the channel generally becomes larger with distance downstream, there is a significant amount of variability along its length which benefits energy dissipation and provides complex habitat. The bed and banks are well vegetated loamy soils with gravels and cobbles present. Unlike most creeks within the project bounds, which have gravel and cobble armored beds, Upper Laguna Creek has sparse gravels and cobbles (Figure 3.17) present on the surface as limited erosion has not transported the finer soils out of the system.

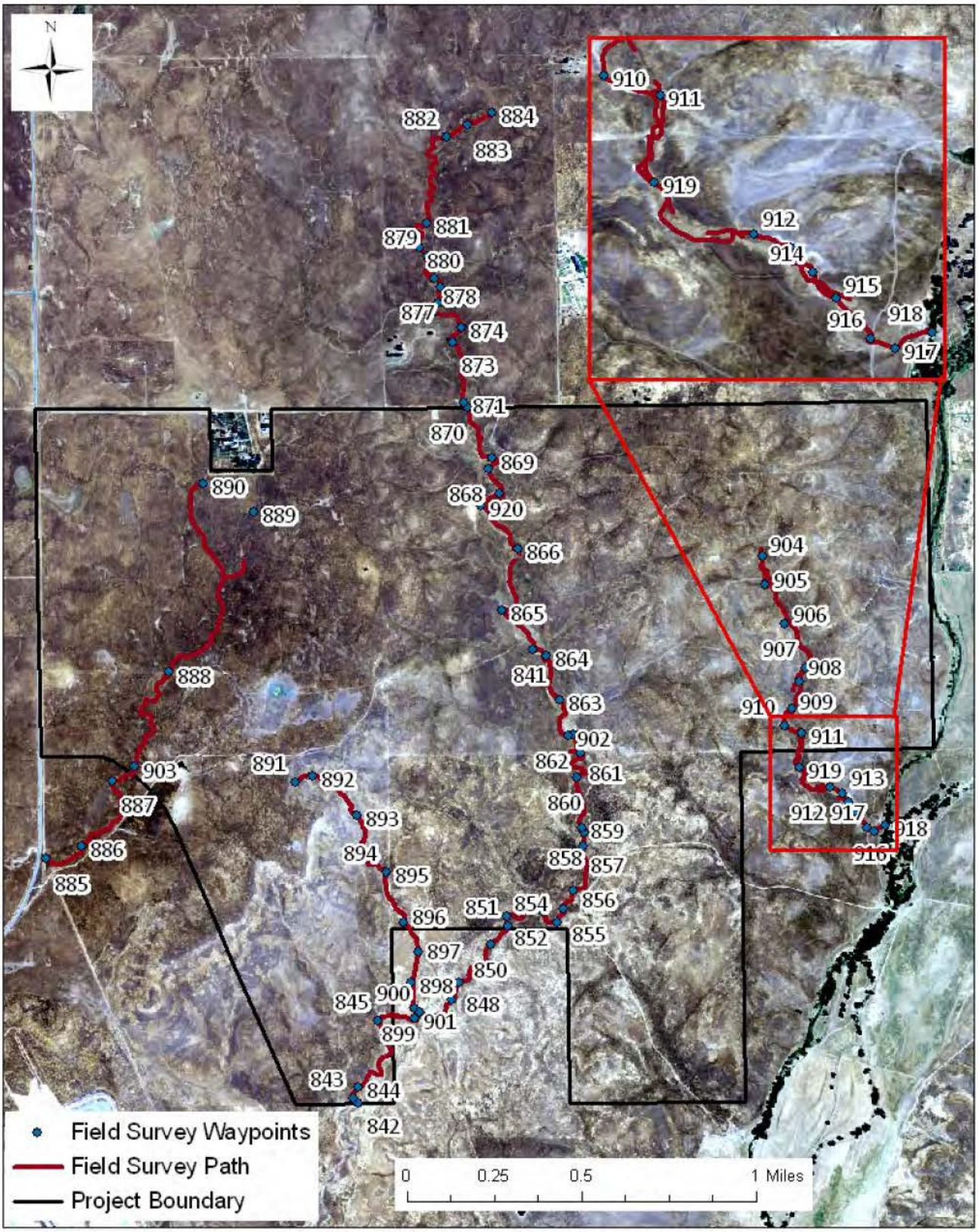
3.1.4 Carson Creek Tributary

Carson Creek Tributary is a short, steep creek (1.65 miles long with an average slope of 0.97%) with relatively high elevation headwaters. The headwaters are generally steep swales (Figure 3.18, waypoint 904) with sections of actively eroding stream banks (Figure 3.19, waypoint 904). Just below the dirt road (near waypoint 905) that crosses the creek in the headwaters, the creek is substantially degraded. Approximately 80 feet below the road the channel is incised with exposed stream banks and bed materials. Most notable are numerous headcuts on the main creek, from 6 inches to 2 feet tall. These headcuts will continue to move upstream during storm events, eventually crossing the road and potentially making it impassable.

Headcuts are common below this point as are exposed and eroding banks (Figure 3.20, waypoint 905). In many locations the incision has reached the hardpan, which is also commonly exposed in the banks (Figure 3.21, waypoint 908). The outside banks of meander bends are up to 10 feet tall (Figure 3.22, waypoint 907) and often nearly vertical.

The lowest reaches of Carson Creek Tributary indicate that the channel is actively eroding and has migrated at least 20 feet leaving abandoned channels. At waypoint 912, the channel has moved from left to right and bed elevation has dropped roughly 2 feet compared to the abandoned channel (Figure 3.23). The banks are a heavily graveled loam over 2 feet tall and vertical. This location suggests that channel migration can be significant and may happen in as little as one storm event. At waypoint 914, there is another abandoned meander. The new channel (Figure 3.24) has 18-inch to 2-foot vertical banks of loamy-cobble soil and gravel bed. The old channel is a swale with a 1 foot depression that is 12-15 feet wide and well vegetated.

Waypoint 916 marks a double culvert under a dirt access road near the confluence with Carson Creek (Figure 3.25). Although not obvious in the photograph, the bed sediment just upstream of the culvert opening is nearly 1 foot higher than culvert. This sediment deposit is likely due to high sediment loads coming down the tributary (a result of the current incision and bank erosion) that are not easily transport across this lower gradient reach. The culverts may, however, be preventing large headcuts from migrating further up the channel. Immediately below the culverts (waypoint 917), the channel is extremely incised. The left bank is nearly vertical and 9 feet tall with a 10 foot wide channel. There is a headcut present that is 3 feet tall (Figure 3.26). The extreme incision has cut down to hardpan in some locations and is continuous downstream until the confluence with Carson Creek (Figure 3.27).



Notes:	cbec eco engineering	Cordova Hills Hydromodification Assessment*: Geomorphic Assessment* **Geomorphic Field Reconnaissance Waypoints**		
		Project No. 09-1002	Created By: COC	**Figure 3.1**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.1 waypoints.docx
12/15/2009

Notes: Downstream most observation on Deer Creek Tributary.

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 842

Project No. 09-1002	Created By: COC	**Figure 3.2**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.2 waypoint 842.docx
12/15/2009

Notes: Mix of gravel and cobbles armoring stream bottom. Sparse vegetation common.

cbec eco engineering

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 842

Project No. 09-1002	Created By: COC	**Figure 3.3**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.3 waypoint 842 bed.docx
12/15/2009

Notes: Outside bank of meander bend with eroding banks and deep pool.

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 844

Project No. 09-1002	Created By: COC	**Figure 3.4**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.4 waypoint 844 pool.docx
12/15/2009

Notes:

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 845

Project No. 09-1002	Created By: COC	**Figure 3.5**

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12/15/2009

Notes:	cbec eco engineering	Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*		
		Bulldozer Tracks at Waypoint 853		
		Project No. 09-1002	Created By: COC	**Figure 3.6**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.6 waypoint 853 bulldozer.docx
12/15/2009

Notes: Exposed fines and lack of gravel and cobble armoring.

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 861

Project No. 09-1002	Created By: COC	**Figure 3.7**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.7 waypoint 861 fence grading.docx
12/15/2009

Notes: Culverts at Glory Road

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 870

Project No. 09-1002	Created By: COC	**Figure 3.8**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.8 waypoint 870 Glory Road.docx
12/15/2009

Notes: two headcuts at small tributary confluence

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 855

Project No. 09-1002	Created By: COC	**Figure 3.9**

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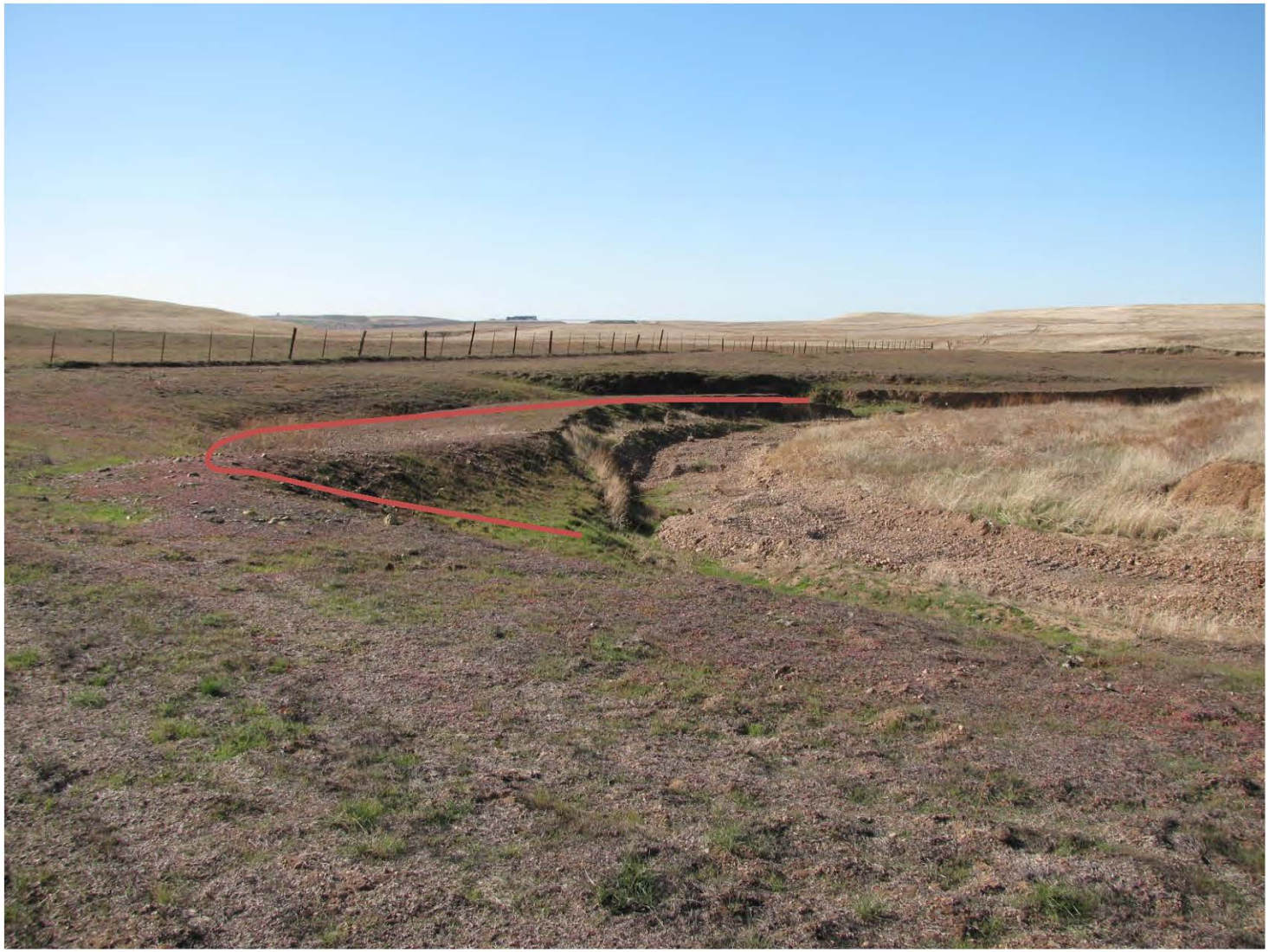
12/15/2009



Notes: red line indicates historic path of channel

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 854

Project No. 09-1002	Created By: COC	**Figure 3.10**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.10 waypoint 854 meander cutoff.docx
12/15/2009

Notes: black lines indicate the two paths taken at the flow split.

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 857

Project No. 09-1002	Created By: COC	**Figure 3.11**

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12/15/2009

Notes: black line marks the location of the oxbow.

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 866

Project No. 09-1002	Created By: COC	**Figure 3.12**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.12 waypoint 866 oxbow.docx
12/15/2009

Notes: steep head water channel of the tributary to Deer Creek Tributary

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 891

Project No. 09-1002	Created By: COC	**Figure 3.13**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.13 waypoint 891 steep headwaters.docx
12/15/2009

Notes: Large headcut in hardpan. Headcuts observed are typically in the more erodible surface soils, which have already been eroded here.

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 891

Project No. 09-1002	Created By: COC	**Figure 3.14**

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12/15/2009

Notes:		Cordova Hills Hydromodification Assessment*: Geomorphic Assessment* **Waypoint 885**		
		Project No. 09-1002	Created By: COC	**Figure 3.15**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.15 waypoint 885 Grant line culverts.docx
12/15/2009

Notes:

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 890

Project No. 09-1002	Created By: COC	**Figure 3.16**

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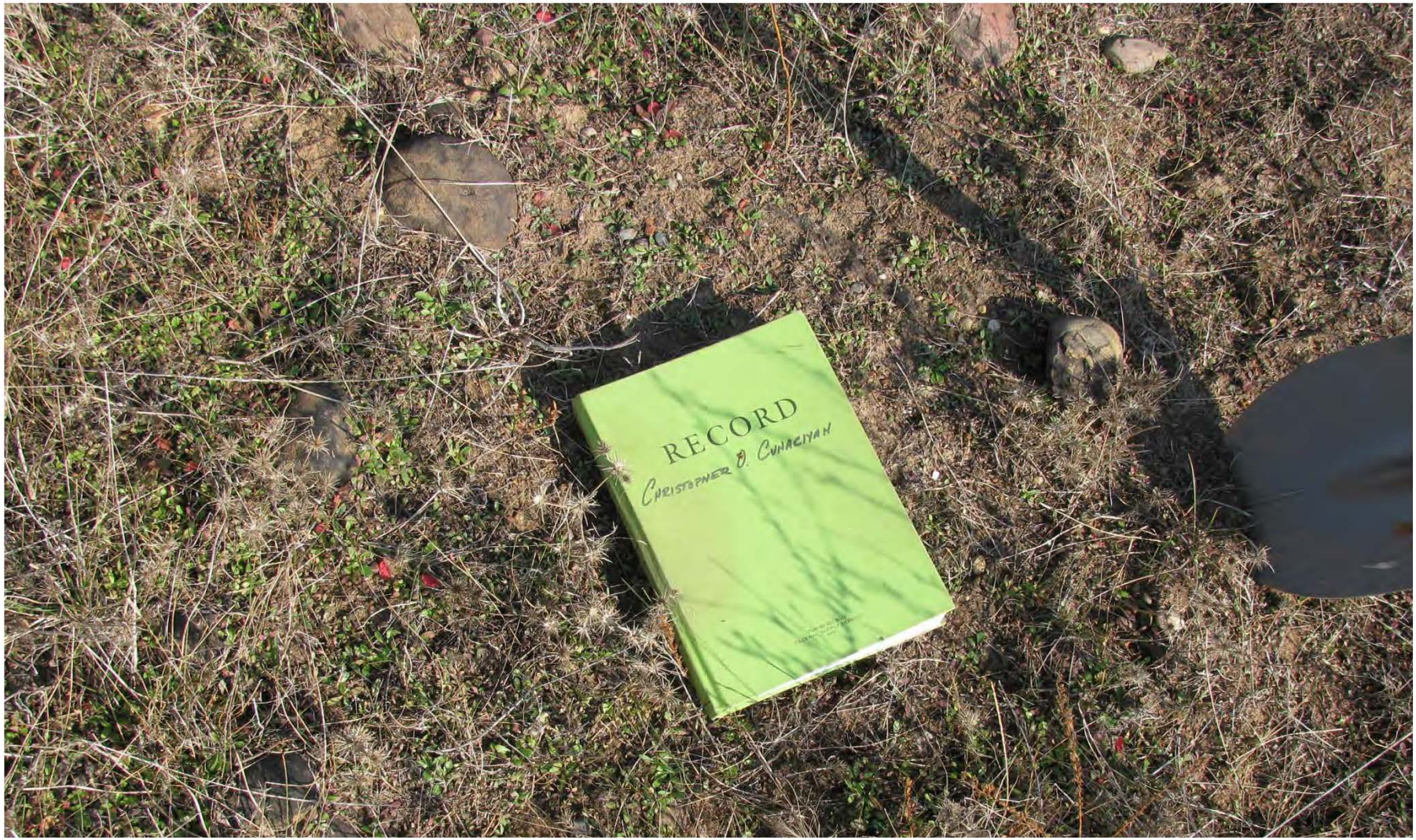
12/15/2009



Notes: Few gravels and cobbles present on bed surface

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Soil Sample Location in Upper Laguna Creek

Project No. 09-1002	Created By: COC	**Figure 3.17**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.17 ULC bed.docx
12/15/2009

Notes: Steep swale in upper Carson Creek Tributary

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 904

Project No. 09-1002	Created By: COC	**Figure 3.18**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.18 waypoint 904 steep swales.docx
12/15/2009

Notes: Eroding bank on outside of meander bend

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 904

Project No. 09-1002	Created By: COC	**Figure 3.19**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.19 waypoint 904 eroding banks.docx
12/15/2009

Notes: Headcuts below road crossing on Carson Creek Tributary

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 905

Project No. 09-1002	Created By: COC	**Figure 3.20**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.20 waypoint 905 headcuts.docx
12/15/2009

Notes: Exposed hardpan creek bottom

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 908

Project No. 09-1002	Created By: COC	**Figure 3.21**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.21 waypoint 908 hardpan bed.docx
12/15/2009

Notes: Exposed , vertical banks up to 10 feet tall

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 907

Project No. 09-1002	Created By: COC	**Figure 3.22**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.22 waypoint 907 tall vert banks.docx
12/15/2009

Notes: Historic channel (black line) and new channel (red line)

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 912

Project No. 09-1002	Created By: COC	**Figure 3.23**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.23 waypoint 912 channel adjustment.docx
12/15/2009

Notes: Historic channel (black line) and new channel (red line)

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 914

Project No. 09-1002	Created By: COC	**Figure 3.24**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.24 waypoint 914 abandoned meander.docx
12/15/2009

Notes: Sediment in foreground is nearly 1 foot higher than culvert openings.

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Waypoint 916

Project No. 09-1002	Created By: COC	**Figure 3.25**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.25 waypoint 916 culverts near Carson Ck.docx
12/15/2009

Notes:	cbec eco engineering	Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*		
		Three Foot Headcut at Waypoint 917		
		Project No. 09-1002	Created By: COC	**Figure 3.26**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.26 waypoint 916 headcut.docx
12/15/2009

Notes:

Cordova Hills Hydromodification Assessment*: Geomorphic Assessment*

Carson Creek Tributary Incision at Waypoint 918

Project No. 09-1002	Created By: COC	**Figure 3.27**

C:\Work\Projects\09-1002_Cordova_Hills\Task_3_Geomorph\Reporting\Figure3.27 waypoint 918 incised to hardpan at Carson Ck.docx
12/15/2009

4 CONCLUSIONS AND RECOMMENDATIONS

This section provides an overview of the conclusions based on field reconnaissance and recommendations for potential incorporation into the design and further studies.

4.1 GENERAL CONCLUSIONS

The creeks within the Cordova Hills project boundary are typically degraded and lack channel complexity, well connected floodplains (meaning the floodplains likely won't be inundated by a 2 year discharge event) and riparian zones. Further, there is little to no aquatic or riparian habitat. Reasons for the currently degraded condition may include, but are not limited to, the ephemeral nature of the creek, removal of riparian vegetation (especially trees, including Valley Oaks), grazing, and incision which tends to lower the local groundwater elevation in the banks and reduce flooding, road construction and climate change. We have also observed numerous headcuts at the confluences of tributaries indicating that incision is actively occurring throughout the basin on the smaller tributaries.

Deer Creek Tributary is degraded but may be reaching a maximum in that condition. The large range of particle sizes allows for incision and bank erosion but as the erosion occurs the larger grain sizes are left behind to armor the channel. The creek bed is generally well armored, which limits incision. Should further incision occur, it will be limited by the underlying hardpan. The low channel gradient also makes it difficult for the armor layer to be transported as stream transport capacity is limited, in part, by the gradient. However, changes to the gradient, such as downstream incision that moves upstream (headcuts), poorly designed culverts, or other local gradient changes, could result in further incision. Increased flows of high enough magnitude to do work on the channel could also further degrade the channel.

Observations along tributaries to Deer Creek Tributary and Carson Creek Tributary indicate that degradation is continuing (they are geomorphically unstable). These smaller creeks are extremely incised relative to their size and will continue to incise as headcuts migrate upstream. The banks are typically vertical, tall, and eroding which will continue into the future. The steep channel gradients further support continued channel degradation. Under the current geomorphic trajectory, the tributaries to Deer Creek and Carson Creek Tributaries will continue to degrade and remain unstable, meandering across their floodplain over time.

An exception to the above assessment is Upper Laguna Creek, which is not incised, has a complex form, is well connected to the floodplain, and is associated with local vernal pool habitats. Given the similarity in soils and vegetation between Upper Laguna Creek and other creeks within the project, we believe that Upper Laguna Creek could be relatively sensitive to disturbance, which could initiate channel degradation in the future unless careful protection from modified flows is implemented.

4.1.1 Central Creek Corridor Design Plans

It is our understanding that the current plan for Deer Creek Tributary includes no modification of the creek corridor (within a preserved area which varies from 200 to 700 feet wide). (Holger Fuerst, M&S, pers. comm.) This creek corridor generally and approximately represents the 100-year floodplain, and forms the main central drainage passing through the proposed development. Bounding this corridor will be two recreational trails on either side of the corridor. In addition, storm detention/flow duration control/water quality basins will be incorporated into the buffer zone on either side of the creek corridor. At road crossings the creek corridor generally narrows to approximately 200 feet wide. The road crossings will span the creek using open bottom "conspan" open arch culverts, or similar. The current concept proposal is to allow the Deer Creek Tributary to meander through this corridor. Vernal pools complexes also currently exist in this corridor and the current concept proposal is to retain and preserve the integrity of these complexes.

It is also our understanding that current plans include measures to infiltrate and evaporate summer "nuisance" irrigation runoff under developed conditions. This could occur through percolation trenches and/or vegetation included in the detention basins. The Deer Creek Tributary is currently an ephemeral channel. Typically, ephemeral channels have become perennial channels under developed conditions regionally, due to summer irrigation flows. Invariably, this has caused further degradation of stream channels through increased nutrient supply (as a result of urban fertilizers), and non-native species invasion.

Finally, it is our understanding that all other tributary channels to the central creek corridor will be converted to storm pipes or other storm drainage channels and will continue to be tributary to the central creek corridor, but will outfall first into the detention basins that bound the central creek corridor.

Typically, we would recommend that creeks already heavily degraded through anthropogenic effects, such as those described in this report, should be rehabilitated through the development process, to maximize resiliency to future development impacts. However, since corridor buffer widths of up to 700 feet are proposed for large areas of the creek corridor, and the creek channel will be allowed to equilibrate over time within this corridor through meander migration and further downcutting and/or widening, this may not be necessary.

4.1.2 Recommendations

To augment the current proposals for the central creek corridor we recommend the following:

- The current trajectory of geomorphic degradation will likely be exacerbated under future developed conditions unless hydromodification management planning (HMP) mitigation is implemented rigorously and effectively. Even with rigorous implementation of HMP, the geomorphic degradation and equilibration process will be ongoing. In addition, channel meandering is a natural process and should be expected and anticipated within the creek corridor. Therefore, it is recommended that in areas of sensitive vernal pool complexes, the

channel should be prevented from degrading the existing vernal pools via minimization of migration through biotechnical bank stabilization methods.

- Consideration of increasing the clear span of road crossings should be given. The road crossings as currently proposed represent not only a hydraulic constriction that could exacerbate degradation of the creek (through reduction in cross sectional area for flow and hence an increase of flow velocity), but also represent a potential barrier to corridor habitat connectivity. Erosion management methods at road crossing abutments should be considered carefully, preferably using biotechnical stabilization methods, or other environmentally preferable techniques.
- Protection of vernal pool complexes from summer "nuisance" irrigation flows should be maximized. While current plans include attempts to minimize summer irrigation flows, conservative approaches should be assumed to divert potential summer irrigation flows around sensitive vernal pool complexes toward the main creek using a system of vegetated swales.
- Consideration should be given to establishing riparian zones, fringes or buffers to the creek within the corridor. While the existing hydrology under non-developed conditions would likely not support a complex mosaic of riparian species, it is likely that it could support species such as Valley Oak. However, future hydrologic changes (or hydromodification) under developed conditions should be expected and anticipated. Riparian ecologists should be consulted to recommend a vegetation planting palette appropriate for the revised hydrologic conditions under development. The riparian zones will represent further conservative approaches to protecting the creek from future anthropogenic impacts, through polishing water quality treatment function (primary water quality treatment functions will be provided outside the creek corridor) and will enhance habitat diversity within the corridor.
- Careful hydromodification management planning and mitigation studies should be conducted (currently underway) in order to minimize hydrologic and geomorphic impacts to the creek as a result of development.

4.2 MONITORING AND ADAPTIVE MANAGEMENT

Baseline monitoring is important to establish existing hydrology and sediment transport conditions at the site during storm events. Post-project monitoring is essential in order to ascertain the performance of the implemented project and to identify maintenance issues in the future.

4.2.1 Recommendations

- Baseline monitoring of hydrologic and sediment transport parameters should be established as soon as possible, in order to characterize the existing conditions. These should typically include stage and flow monitoring and measurement of bed load and suspended load sediment transport parameters.
- A post project monitoring and adaptive management and maintenance plan should be developed to minimize the impacts to preserved vernal pool/swale complexes within the central

creek corridor, to assess the success of riparian enhancement, and implement adaptive approaches, if necessary.

5 REFERENCES

1. Fischenich, C. Stability Thresholds for Stream Restoration Materials. May 2001.
2. Simon, A., and Hupp, C.R., 1986. Channel Evolution in Modified Tennessee Streams. In: Proceedings of the 4th Federal Interagency Sedimentation Conference, Las Vegas, Nevada. US Government Printing Office, Washington, DC, 5.71-5.82.
3. Simon, Andrew, 1989. A Model of Channel Response in Disturbed Alluvial Channels. Earth Surface Processes and Landforms: 14, 11-26.
4. Schumm, S.A., Harvey, M.D. and Watson, C.C., 1984. Incised Channels: Morphology, Dynamics and Control, Water Resources Publications, Littleton, Colorado, USA.
5. Lane, E.W., 1955. Design of Stable Channels. Transactions of the American Society of Civil Engineers, 120, 1234-1279.

6 LIST OF PREPARERS

This project was completed with the assistance of Christopher Cuhaciyan, Chris Bowles, and Chris Campbell.

7 ACKNOWLEDGEMENTS

We would like to know acknowledge the assistance of the following individuals who helped by providing data and answering questions regarding the Cordova Hills Drainage Master Plan: Ken Cooper and Holger Fuerst (M&S).

8 APPENDICES

Table A.1 Points of geomorphic concern or interest along the creeks of Cordova Hills.

Waypoint	Concern
842	Banks 2 to 3 feet tall, 24 feet wide, fines to small cobbles, lots of vegetation on the bed
843	Pool, 6 to 7 foot tall right bank, gravel and cobble armor, actively eroding right bank
844	Pool with cobbles cleaned out, 5 foot left bank, 25 feet wide, loamy soils in pool
845	20 foot right bank, actively eroding, mudstone type hardpan outcrop, loams to cobbles and vegetation
846	10 to 20 foot left the bank, hardpan
847	12-20 foot tall left bank of erodible soil with sands, bottom of armored gravel and vegetation
848	Picture of right bank
849	7 to 9 foot left bank, actively eroding, some exposed hardpan stream bottom, gravels and small cobbles in left bank, hardpan near toe
850	Exposed sand bottom with little to no gravel. It appears as though gravels and cobbles are not present below 5 to 10 feet, depending on location. Typical channel is 2-5 feet deep and 15 to 20 feet wide with nearly vertical banks, gravel cobble and vegetation armored bottom
851	Recent fire on left bank, bulldozer tracks in channel, gravel armored bottom
852	No gravels present 6 feet and below in right bank, below is hardpan
853	Stream gage, 2-3 foot banks, 22 feet wide
854	Possible meander cutoff
855	Headcut on tributary on left bank 3 feet tall
856	End of bulldozed section
857	Channel is wide with divided low flow channels, well vegetated
858	6 foot tall left bank, no gravels were cobbles below 5 feet
859	Exposed hardpan on right bank 6 feet tall, surface water present
860	Gravel and cobble piles and hardpan, very distinct dividing line
861	Streambed has been re-graded at fence line, fines will likely be winnowed away lowering bed elevation
862	10-12 foot tall left bank, cows frequent creek, hardpan under layer of soil gravel and larger size material
863	20 feet wide, 2 foot vertical banks, gravel and vegetated bottom. Typical form of reach.
864	Small tributary coming in from left bank. It is incised, 2 to 3 foot banks, vegetated and gravel bottom. Main channel typical. Left bank of Main indicates only top 2 feet of soil contains gravel. Hardpan below. 18 inch headcut on tributary.
865	15 to 20 foot right bank, hardpan, overhanging
866	3 to 4 foot banks, 10 to 20 feet wide, gravels with cobbles. Oxbow present.
867	3 to 4 foot banks, tributary from left bank is incised, gravel and cobble bottom with sparse vegetation. Some localized shallow (1 foot) areas in channel, usually armored
868	7 to 8 foot tall right bank, stratified, gravels and cobbles. Meander bends are typically heavily and actively eroding

869	12 to 15 foot left bank, iron in soils, heavy bovine activity, willows and poplars growing in expose soil in the bed of channel. The channel is becoming noticeably smaller but appears to be incised and overwidened still
870	Road crossing. Five visible culverts, one cement, two are very old and non-corrugated. Surface water present. 30 feet wide with2 foot banks.
871	Upstream of road, channel is much smaller here, 12 feet wide 2 foot banks, gravel and small cobbles in bed plus vegetation
872	6 foot tall left bank, actively eroding. Some cobbles are 9 inches immediate in diameter. Some, but very little exposed hardpan. Upstream bed and banks well vegetated.
873	Poplars in channel. 3 foot tall vertical right bank.
874	Single Poplar, 10 foot left bank mostly hardpan.
875	Tributary junction from right. 2 foot tall banks. Gravels and cobbles present.
876	2 feet of soil with gravel over exposed hardpan. Maximum 8 to 9 inch cobbles in area, 4 foot tall banks
877	Channel becoming much and smaller. 2 foot tall 8 to 12 feet wide
878	Tributary from left large relative to mainstem
879	Channel getting smaller, 18”- 2 foot tall banks, 6 to 10 feet wide. Usually somewhat swale like except on outside of bends which have vertical banks. Few cobbles present.
880	6 to 8 foot tall right bank in hardpan, creek bed with patches of gravels, more heavily vegetated than downstream reaches.
881	1 to 2 foot tall banks, 6-12 feet wide, large cobbles patches on streambed
882	Channel condition very similar to downstream reaches but much smaller. 6 inches to 1 foot deep, 4 to 7 feet wide, gravel and cobble and vegetated bottom, mostly vegetated banks, some local bare soils.
883	2 foot banks, 12 feet wide, gravel and cobble bed
884	Upstream most extents of field observations at tributary junction Both with banks 3 feet tall typical loam with gravel in banks. Vegetated streambed with some small cobbles. 3 to 6 feet wide.
885	Upper Laguna Creek. One double culvert under Grant line. Channel is grass lined with cobbles and gravels present. 6"-2' deep, 20 feet wide.
886	Some deeper pools, 2 to 3 feet deep, 10-30 feet wide, grass lined with gravels and cobbles
887	Large hill on right bank. Channel varies from 6 to 20 feet wide and 6 inches to 2 feet deep, well vegetated.
888	Channel is small and difficult to discern from tributaries. Swale, 4 to 10 feet wide, up to 1 foot deep, well vegetated,loams with gravels and cobbles.
889	On a tributary. Very small swale. 6 inches deep. 2 feet wide. Low relief area
890	Creek very small swale. Some very wide sections. 6 inches deep. 2 to 20 feet wide and well vegetated

891	Tributary to Dear Creek tributary. Highly incised, steep channel, exposed hardpan, mostly vegetated, soil and gravel bottom, up to 8 feet deep, 6 to 20 feet wide. Headcuts present.
892	2 headcuts, 12 to 18 inches tall
893	Channel becoming sinuous, exposed banks at meander bends, headcuts are very common, 6 to 18 inches tall, bottom well vegetated, some gravels and cobbles. Banks 6"-3' tall, 6 to 15 feet wide.
894	Exposed hardpan. Headcuts still prevalent but channel smaller, 6 to 18 inches deep and 4 to 10 feet wide
896	Channel very sinuous since waypoint 894. Incised and mostly well vegetated. 3 to 6 feet wide and 1 to 2 feet deep. Some exposed banks soils.
897	Deep pool with headcut in otherwise well vegetated and non-incised area. Loamy soils with gravels and small cobbles.
898	Flow perpendicular to 7-8' right bank, 5' wide. Channel moderately incised, some exposed banks to 3' tall.
899	Highly sinuous, incised channels. Banks 2-3', 3-6' wide. Gravel and vegetated bottom, exposed loamy banks common.
900	Tributary confluence.
901	Downstream most sediment sample on Dear Creek Trib. One in left bank and one in lower 1/3 of the lower 1/3 of bar.
902	Sediment sample. One in left bank and one in lower 1/3 of the lower 1/3 of bar.
903	Sediment sample. One in left bank and one in stream bottom.
904	Tributary to Carson Creek. Steep swales with small pockets of eroding soils. Generally well vegetated and only a few feet across.
905	Many headcuts just below road. Typically 6"-2' drops, incision below and exposed banks, 2"+ tall.
906	Incised down to hardpan with gravels and cobbles. Channel sinuous with heavy erosion in meander bends, headcuts are common.
907	Increasing incision downstream, banks to 6' tall, 6-10' wide, exposed banks, locally exposed bed, loamy with gravels and cobbles. Many of the banks are hardpan, but more erodible soils present as well.
908	Channel over hardpan banks, 3-4' tall and 4-6' wide. Little possibility for further downcutting. Banks actively eroding.
909	Confluence with small tributary which is also incised. Gravel and cobble beds common with vegetated sections. 6"-2' headcuts also common. Banks either loamy with gravel and cobbles or hardpan with very thin (a few inches) soil layer.
910	Another confluence, headcut 1' tall, 2' bank, channel cutting to hardpan.
911	1 foot headcut just below stable swale

912	Channel has moved from left to right and bed elevation has dropped about 2'. 2' banks of heavily graveled loam. This section suggests that channel migration can be significant. Here the thalweg has moved over 20' and quickly incised, perhaps in as little as one event.
913	easily friable and erodible left bank parent material
914	Abandon meander. New channel has 18"-2' vertical banks of loamy-cobble soil and gravel bed. Old is a swale with a 1' depression, 12-15' wide and well vegetated.
915	Highly sinuous and incised channel. 2-3' vertical banks, gravel and cobble and vegetated bed. Typical to this lowest reach.
916	Double culvert. Nearby (upstream) sediment is nearly 1' higher than culvert.
917	Channel greatly incised, 9' right bank, 10' wide, 3' headcut. Continuous downstream through terrace until floodplain is reached. Bed and banks heavily graveled (some cobbles).
918	Confluence with Carson Creek
919	Sediment sample below fence line. 1 bank and 1 center of channel.
920	Sediment sample. One in right bank and one in stream bottom.

7.3 APPENDIX C: SACCALC INPUT & OUTPUT FILES: UPPER LAGUNA CREEK TRIBUTARY

Sacramento Hydrologic Calculator Report

May 25, 2011 10:54

Project Title: Upper Laguna Creek Tributary
Method: Sacramento County HEC-1 method
Comments: Upper Laguna Creek - Proposed conditions - L sheds with detention. Rev3 Size detention basins to optimum size
Date: 3/3/2011
Prepared by: KEC

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Mean Elevation (ft)	Lag Times		Basin "n"		Loss Rates		Percent Impervious	
			Method	Lag Time (min)	Method	Basin "n"	Method	Loss Rate (in/hr)	Method	Impervious Area (%)
L001	63.41	252	Basin "n"	-	Computed	-	Computed	-	Computed	-
L002	260.72	238	Basin "n"	-	Computed	-	Computed	-	Computed	-
L003	98.4	250	Basin "n"	-	Specified	0.039504363	Computed	-	Computed	-
L009	62.8	225	Basin "n"	-	Specified	0.055787042	Computed	-	Computed	-
L005	359.3	264	Basin "n"	-	Computed	-	Computed	-	Computed	-
L006	58.3	248	Basin "n"	-	Specified	0.032028881	Computed	-	Computed	-
L004	171.6	239.5	Basin "n"	-	Specified	0.041533316	Computed	-	Computed	-
L007	63.5	242	Basin "n"	-	Specified	0.031	Computed	-	Computed	-
L010	217.3	228	Basin "n"	-	Computed	-	Computed	-	Computed	-

Basin "n" Method Data for Lag Time Computation

Watershed	Channel Length (ft)	Centroid Length (ft)	Slope (ft/ft)	Channelization	Land Use Impervious Area Percent (% or acres)																	
					95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
L001	2376	1214	.0051	Undeveloped																100		
				Developed																0		
L002	6253	3348	0.0058	Undeveloped																100		
				Developed																0		
L003	3132	1806	0.0140	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L009	3170	1411	0.0095	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L005	10876	5491	.0048	Undeveloped																100		
				Developed																0		
L006	5421	3238	0.0042	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L004	5807	2874	0.0040	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L007	2570	1553	0.0089	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L010	9769	5634	.0055	Undeveloped																100		
				Developed																0		

Refer to the Drainage manual for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Infiltration Loss Rate Data

Watershed	Soil Cover Group	Land Use Impervious Area Percent (% or acres)																	
		95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
L001	B																		
	C																		
	D																63.41		
L002	B																		
	C																106.42		
	D																154.3		
L003	B																		
	C																		
	D	11.78	23						54.46								9.2		
L009	B																		
	C																		
	D	5.57							22.32								34.89		
L005	B																16.9		
	C																212		
	D																130.4		
L006	B																		
	C	6.65	15.106		6.47														
	D	13.96	12.694		1.53											1.9			
L004	B																		
	C		17.37														12.08		
	D	22.69	70.627		8				6							14	20.856		
L007	B																		
	C		36.72																
	D	9.16	16.58													1			
L010	B																		
	C																82.28		
	D																135.02		

Refer to the help file for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Hydrograph Routing – Muskingum–Cunge (Standard)

Routing ID	Route From	Route To	Channel Type	Length (ft)	Slope (ft/ft)	Width or Diameter (ft)	Side Slope (H:V)	Mannings "n"
CHA001	L001	JNC001	Trapezoidal	5224	0.0053	40	20:1	.04
CHA006	JNC001	JNC005	Trapezoidal	400	0.02	20		0.04
CHA004	JNC005	JNC006	Trapezoidal	3500	0.0055	20		0.04
CHA005	JNC006	JNC007	Trapezoidal	2150	0.0037	20	20:1	0.04
CHA007	L005	JNC002	Trapezoidal	1723	0.0023	20	20:1	0.04
CHA002	JNC002	JNC003	Trapezoidal	2970	0.0027	20	20:1	0.04
CHA003	JNC003	JNC008	Trapezoidal	4433	0.0063	20	20:1	0.04

Detention Basin Data

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET0B4	Elevation (ft)	228	Elevation (ft)	228	229	230	231	232	233	234	235	237	238	228.625	1.227	.61	0.5
			Volume (ac-ft)	0	2.395	4.88	7.457	10.127	12.891	15.752	18.711	24.929	28.192	236.5	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET0B5	Elevation (ft)	216	Elevation (ft)	216	217	218	219	220	221	222	223	224	225	216.500	1.57	.61	0.5
			Volume (ac-ft)	0	1.588	3.249	4.986	6.799	8.69	10.661	12.713	14.849	17.07	224.5	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET0B1	Elevation (ft)	236	Elevation (ft)	236	237	238	239	240	241	242	243			236.625	1.227	.61	0.5
			Volume (ac-ft)	0	1.142	2.346	3.614	4.947	6.348	7.818	9.358			242.5	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET0B2	Elevation (ft)	226	Elevation (ft)	226	227	228	229	230	231	232	233	234		226.875	2.405	.61	0.5
			Volume (ac-ft)	0	0.61	1.266	1.969	2.722	3.525	4.38	5.289	6.254		233.5	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
	Elevation	214	Elevation (ft)	214	215	216	217	218	219	220	221	223	224	214.62500	1.227	.61	0.5

DET0B3	(ft)		Volume (ac-ft)	0	0.538	1.118	1.743	2.415	3.134	3.903	4.724	6.524	7.508	223.5	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													

View HEC-1 output

Sacramento method results
(Project: Upper Laguna Creek Tributary)
(100-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L004	236.	12:25	.27			
DET0B4	94.	13:13	.27	237.	25.	
L003	193.	12:13	.15			
DET0B5	21.	14:02	.15	224.	14.	
L002	173.	13:14	.41			
L001	65.	12:39	.10			
CHA001	64.	13:15	.10			
JNC001	237.	13:15	.51			
CHA006	237.	13:15	.51			
JNC005	351.	13:14	.93			
CHA004	351.	13:21	.93			
L009	100.	12:19	.10			
DET0B3	17.	13:50	.10	223.	6.6	.00
JNC006	368.	13:21	1.03			
CHA005	365.	13:31	1.03			
L010	116.	13:44	.34			
L007	146.	12:09	.10			
DET0B2	30.	12:58	.10	233.	5.8	.00
L005	181.	13:49	.56			
CHA007	180.	14:01	.56			
L006	94.	12:19	.09			
DET0B1	14.	14:29	.09	242.	8.3	.00
JNC002	194.	14:01	.65			
CHA002	193.	14:20	.65			
JNC003	220.	14:19	.75			
CHA003	219.	14:38	.75			
JNC008	305.	14:29	1.09			
JNC007	601.	13:38	2.12			

(10-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L004	143.	12:25	.27			
DET0B4	15.	16:07	.27	236.	20.	
L003	115.	12:13	.15			

DET0B5	16.	13:47	.15	221.	8.5	
L002	104.	13:15	.41			
L001	39.	12:39	.10			
CHA001	38.	13:21	.10			
JNC001	142.	13:18	.51			
CHA006	142.	13:19	.51			
JNC005	172.	13:19	.93			
CHA004	172.	13:27	.93			
L009	60.	12:19	.10			
DET0B3	13.	13:36	.10	220.	3.7	
JNC006	185.	13:27	1.03			
CHA005	184.	13:40	1.03			
L010	70.	13:45	.34			
L007	87.	12:09	.10			
DET0B2	24.	12:50	.10	231.	3.5	.00
L005	107.	13:50	.56			
CHA007	106.	14:03	.56			
L006	57.	12:19	.09			
DET0B1	11.	14:01	.09	240.	5.2	
JNC002	118.	14:03	.65			
CHA002	117.	14:24	.65			
JNC003	136.	14:22	.75			
CHA003	136.	14:45	.75			
JNC008	184.	14:35	1.09			
JNC007	332.	13:49	2.12			

(2-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L004	70.	12:25	.27			
DET0B4	12.	15:29	.27	233.	12.	
L003	54.	12:13	.15			
DET0B5	12.	13:41	.15	219.	4.8	.00
L002	50.	13:17	.41			
L001	18.	12:39	.10			
CHA001	18.	13:30	.10			
JNC001	67.	13:25	.51			
CHA006	67.	13:26	.51			
JNC005	90.	13:26	.93			
CHA004	90.	13:37	.93			
L009	28.	12:19	.10			

DET0B3	9.6	13:28	.10	217.	1.9	
JNC006	99.	13:37	1.03			
CHA005	99.	13:51	1.03			
L010	34.	13:47	.34			
L007	40.	12:09	.10			
DET0B2	16.	13:03	.10	229.	1.9	.00
L005	52.	13:52	.56			
CHA007	51.	14:08	.56			
L006	28.	12:19	.09			
DET0B1	8.3	13:52	.09	239.	3.1	.00
JNC002	60.	14:08	.65			
CHA002	59.	14:33	.65			
JNC003	70.	14:29	.75			
CHA003	70.	14:55	.75			
JNC008	94.	14:44	1.09			
JNC007	178.	14:10	2.12			

(100-year, 10-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L004	110.	153:06	.27			
DET0B4	108.	153:15	.27	237.	25.	
L003	68.	153:01	.15			
DET0B5	20.	154:18	.15	223.	13.	.00
L002	112.	153:48	.41			
L001	34.	153:16	.10			
CHA001	34.	153:59	.10			
JNC001	146.	153:52	.51			
CHA006	146.	153:52	.51			
JNC005	257.	153:28	.93			
CHA004	257.	153:35	.93			
L009	40.	153:03	.10			
DET0B3	16.	154:20	.10	222.	5.4	.00
JNC006	272.	153:35	1.03			
CHA005	271.	153:46	1.03			
L010	83.	154:15	.34			
L007	46.	153:00	.10			
DET0B2	26.	153:34	.10	232.	4.2	.00
L005	130.	154:19	.56			
CHA007	129.	154:32	.56			
L006	40.	153:03	.09			

DET0B1	14.	154:26	.09	242.	7.9	.00
JNC002	143.	154:32	.65			
CHA002	143.	154:52	.65			
JNC003	165.	154:48	.75			
CHA003	165.	155:09	.75			
JNC008	234.	154:52	1.09			
JNC007	477.	154:18	2.12			

Sacramento Hydrologic Calculator Report

May 25, 2011 10:47

Project Title: Upper Laguna Creek - Existing Conditions

Comments: Upper Laguna Creek - Existing conditions L sheds 10 yr and 100 yr 24 hr 100 yr 10 day

Prepared by: KEC

Method: Sacramento County HEC-1 method

Date: 11/5/2007

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Mean Elevation (ft)	Lag Times		Basin "n"		Loss Rates		Percent Impervious	
			Method	Lag Time (min)	Method	Basin "n"	Method	Loss Rate (in/hr)	Method	Impervious Area (%)
L001	436	240	Basin "n"	-	Computed	-	Computed	-	Computed	-
L002	170	239	Basin "n"	-	Computed	-	Computed	-	Computed	-
L003	769.6	239	Basin "n"	-	Computed	-	Computed	-	Computed	-

Basin "n" Method Data for Lag Time Computation

Watershed	Channel Length (ft)	Centroid Length (ft)	Slope (ft/ft)	Channelization	Land Use Impervious Area Percent (% or acres)																	
					95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
L001	7507	3456	.0059	Undeveloped																100		
				Developed																0		
L002	4448	1243	.018	Undeveloped																100		
				Developed																0		
L003	20022	10145	.0046	Undeveloped																100		
				Developed																0		

Refer to the Drainage manual for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Infiltration Loss Rate Data

Watershed	Soil Cover Group	Land Use Impervious Area Percent (% or acres)																	
		95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
L001	B																		
	C																177.8		
	D																258.2		
L002	B																		
	C																		
	D																100		
L003	B																		
	C																355.47		
	D																414.13		

Refer to the help file for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Hydrograph Routing – Muskingum–Cunge (Standard)

Routing ID	Route From	Route To	Channel Type	Length (ft)	Slope (ft/ft)	Width or Diameter (ft)	Side Slope (H:V)	Mannings "n"
CHA001	L001	JNC001	Trapezoidal	2420	0.0058	150	20:1	.060
CHA002	JNC001	JNC002	Trapezoidal	1100	0.0058	150	20:1	.060

View HEC-1 output

Sacramento method results
(Project: Upper Laguna Creek - Existing Conditions)
(100-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L003	293.	14:45	1.20			
L002	174.	12:39	.27			
L001	277.	13:20	.68			
CHA001	276.	13:36	.68			
JNC001	354.	13:30	.95			
CHA002	353.	13:37	.95			
JNC002	563.	13:50	2.15			

(10-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L003	174.	14:46	1.20			
L002	105.	12:39	.27			
L001	166.	13:20	.68			
CHA001	166.	13:40	.68			
JNC001	212.	13:34	.95			
CHA002	212.	13:42	.95			
JNC002	341.	13:56	2.15			

(2-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L003	87.	14:48	1.20			
L002	49.	12:39	.27			
L001	81.	13:22	.68			
CHA001	81.	13:47	.68			
JNC001	107.	13:37	.95			
CHA002	107.	13:47	.95			
JNC002	175.	14:05	2.15			

(100-year, 10-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
L003	231.	155:09	1.20			

L002	92.	153:16	.27
L001	183.	153:53	.68
CHA001	183.	154:12	.68
JNC001	247.	154:01	.95
CHA002	247.	154:09	.95
JNC002	452.	154:27	2.15

7.4 APPENDIX D: SACCALC INPUT & OUTPUT FILES: DEER CREEK TRIBUTARY

Sacramento Hydrologic Calculator Report

May 25, 2011 10:52

Project Title: Deer Creek Tributary
Comments: Deer Creektributary - Proposed conditions with detention
Prepared by: KEC
Method: Sacramento County HEC-1 method
Date: 5/21/2011

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Mean Elevation (ft)	Lag Times		Basin "n"		Loss Rates		Percent Impervious	
			Method	Lag Time (min)	Method	Basin "n"	Method	Loss Rate (in/hr)	Method	Impervious Area (%)
D001	183.11	260	Basin "n"	-	Computed	-	Computed	-	Computed	-
D002	154	254.5	Basin "n"	-	Computed	-	Computed	-	Computed	-
D003	81.7	228	Basin "n"	-	Computed	-	Computed	-	Computed	-
D004	199.2	247	Basin "n"	-	Computed	-	Computed	-	Computed	-
D005	227.4	231	Basin "n"	-	Computed	-	Computed	-	Computed	-
D006	127.8	224	Basin "n"	-	Computed	-	Computed	-	Computed	-
D007	58.8	216.5	Basin "n"	-	Computed	-	Computed	-	Computed	-
D008	46.1	217	Basin "n"	-	Computed	-	Computed	-	Computed	-
D011B	40.908	230	Basin "n"	-	Specified	0.042802997	Computed	-	Computed	-
D012	147.764	213	Basin "n"	-	Specified	0.041358247	Computed	-	Computed	-
D013	64.687	205.5	Basin "n"	-	Specified	0.040297278	Computed	-	Computed	-
D014	33.574	203.5	Basin "n"	-	Specified	0.043623935	Computed	-	Computed	-
D015	131.3	205	Basin "n"	-	Specified	0.043354976	Computed	-	Computed	-
D016	47.806	200	Basin "n"	-	Specified	0.038892587	Computed	-	Computed	-
D018	19.7	171.5	Basin "n"	-	Specified	0.042624365	Computed	-	Computed	-
D019	64.014	171	Basin "n"	-	Specified	0.040741072	Computed	-	Computed	-
D020	43.011	180	Basin "n"	-	Specified	0.036662714	Computed	-	Computed	-
D023	19.441	164	Basin "n"	-	Specified	0.045849751	Computed	-	Computed	-
D025	129.89	190	Basin "n"	-	Specified	0.037	Computed	-	Computed	-
OS05	52.64	179	Basin "n"	-	Computed	-	Computed	-	Computed	-
OS01	14.77	179.5	Basin "n"	-	Computed	-	Computed	-	Computed	-
OS02	38.97	167	Basin "n"	-	Computed	-	Computed	-	Computed	-
OS03	33.98	152.5	Basin "n"	-	Computed	-	Computed	-	Computed	-
OS06	184.58	168	Basin "n"	-	Computed	-	Computed	-	Computed	-
OS04	9.54	143.5	Basin "n"	-	Computed	-	Computed	-	Computed	-
D011A	60.366	230	Basin "n"	-	Specified	0.039969685	Computed	-	Computed	-
D31	157.51	183.5	Basin "n"	-	Specified	0.040476157	Computed	-	Computed	-
D032	95.02	187	Basin "n"	-	Specified	0.064642166	Computed	-	Computed	-

Basin "n" Method Data for Lag Time Computation

Watershed	Channel Length (ft)	Centroid Length (ft)	Slope (ft/ft)	Channelization	Land Use Impervious Area Percent (% or acres)																	
					95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
D001	5752	1592	.0139	Undeveloped								0										
				Developed								100										
D002	5340	2973	.0178	Undeveloped								0										
				Developed								100										
D003	4279	3290	.0150	Undeveloped								0										
				Developed								100										
D004	8082	4373	.0141	Undeveloped								0										
				Developed								100										
D005	6775	3419	.0121	Undeveloped								0										
				Developed								100										
D006	6833	3951	.0117	Undeveloped								0										
				Developed								100										
D007	3107	1270	.0196	Undeveloped								0										
				Developed								58.8										
D008	2668	1538	.0315	Undeveloped								0										
				Developed								46.1										
D011B	2770	1472	0.0202	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D012	3710	3185	0.0221	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D013	2963	1825	0.0213	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D014	2066	1076	0.0402	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D015	2833	1417	0.0198	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D016	2653	1235	0.0615	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D018	1014	646	0.0187	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D019	2803	2428	0.0064	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D020	2915	1351	0.0137	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D023	1248	546	0.0128	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D025	5400	3386	0.0181	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OS05	2095	1026	.0372	Undeveloped																100		
				Developed																0		
OS01	2059	1109	.0044	Undeveloped																14.77		
				Developed																0		
OS02	4013	2270	.004	Undeveloped														0		33.95		
				Developed														5.02		0		
OS03	3696	1795	.0035	Undeveloped																33.98		
				Developed																0		
OS06	5799	4364	.0152	Undeveloped																184.58		
				Developed																0		
OS04	1580	790	.0032	Undeveloped																9.54		
				Developed																0		
D011A	2924	1294	0.0174	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D31	4232	2300	0.0267	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D032	4196	1960	0.0224	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Refer to the Drainage manual for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Infiltration Loss Rate Data

Watershed	Soil Cover Group	Land Use Impervious Area Percent (% or acres)																	
		95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
D001	B								3.7										
	C								6.3										
	D								90										
D002	B								8.2										
	C								30.7										
	D								61.1										
D003	B																		
	C								23.1										
	D								76.9										
D004	B								6.8										
	C								34.4										
	D								58.8										
D005	B																		
	C								18.5										
	D								81.5										
D006	B																		
	C								16.7										
	D								83.3										
D007	B																		
	C								18.8										
	D								40										
D008	B																		
	C								1.23										
	D								44.87										
D011B	B																		
	C								3							1.9			
	D	1.23							31.6							3.18			
D012	B															1.6			
	C				5.6											4.95			
	D	19.4	11.2		4.2		23.5	19		36						22.31			
D013	B															2.1			
	C																		
	D	8.39					13.9	30.6								9.7			
D014	B															1.24			
	C																		
	D	1.17						6.98		19.76						4.42			
D015	B															5.24			
	C				1.82		3.46									1.82			
	D	17.34	14.5		7.68		36.14		10							33.3			
D016	B																		
	C																		
	D	11.47						9.22		24.14						2.98			
D018	B															2.2			
	C																		
	D							15.2								2.3			
D019	B							0.4	1							7.44			
	C																		
	D	8.22			10.3		4.96	15.74	11.75							4.2			
D020	B															1			
	C						4.3												
	D	4.51					21.4	10								1.8			
D023	B															0.31			
	C								2.4							1.93			
	D	1.28							10.7							2.82			
D025	B																		
	C								2.45							1.7			
	D	24.39	21.5		42.1		15.1		7.95							14.7			
OS05	B																0.04		
	C																15.32		
	D																37.28		
	B																3.9		

OS01	C																10.65		
	D																0.22		
OS02	B																29.99		
	C																		
	D														5.02		3.96		
OS03	B																27.53		
	C																		
	D																6.45		
OS06	B																		
	C																24.94		
	D																159.64		
OS04	B																1.18		
	C																7.89		
	D																0.47		
D011A	B																		
	C															3.5			
	D	12.05							43.57							1.25			
D31	B																		
	C																		
	D								154.51							3			
D032	B																		
	C																		
	D		1													94.02			

Refer to the help file for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Detention Basin Data

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET01F	Elevation (ft)	228	Elevation (ft)	228	229	230	231	232	233	234	235	236		228.75	8.835	.61	0.5
			Volume (ac-ft)	0	1.588	3.249	4.986	6.799	8.69	10.661	12.713	14.849		233.5	120	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET02F	Elevation (ft)	232	Elevation (ft)	232	233	234	235	236	237	238	239	240		232.75	7.068	.61	0.5
			Volume (ac-ft)	0	1.142	2.346	3.614	4.947	6.348	7.818	9.358	10.97		238	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET03F	Elevation (ft)	202	Elevation (ft)	202	203	204	205	206	207	208	209	210		202.625	3.681	.61	0.5
			Volume (ac-ft)	0	0.538	1.118	1.743	2.415	3.134	3.903	4.724	5.597		208	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET04F	Elevation (ft)	206	Elevation (ft)	206	207	208	209	210	211	213	214			206.50	7.85	.61	0.5
			Volume (ac-ft)	0	1.588	3.249	4.986	6.799	8.69	10.661	14.849			211.5	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
	Elevation	192	Elevation (ft)	192	193	194	195	196	197	198	199	200		193	9.426	.61	0.5

DET05F	(ft)		Volume (ac-ft)	0	1.971	4.024	6.159	8.38	10.687	13.082	15.567	18.144		198	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET07F	Elevation (ft)	197	Elevation (ft)	197	198	199	200	201	202	203	204	205		197.75	3.534	.61	0.5
			Volume (ac-ft)	0	0.348	0.73	1.148	1.605	2.101	2.639	3.219	3.845		203	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET08F	Elevation (ft)	194	Elevation (ft)	194	195	196	197	198	199	200	201	202		194.75	3.534	.61	0.5
			Volume (ac-ft)	0	0.199	0.424	0.677	0.96	1.275	1.622	2.005	2.423		200	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET0B8	Volume (ac-ft)	0	Volume (ac-ft)	0	2.002	4.117	6.347	8.691	11.152	13.731	16.429	22.188	25.252	-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	14.08	102.45	-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET0B9	Volume (ac-ft)	0	Volume (ac-ft)	0	0.834	1.752	2.756	3.846	5.025	6.292	7.65	9.1		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns													

			On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation										Outlet Data				
													Elev. (ft)	Area (sq ft)	Q Coef.	Exponent	
DETB10	Volume (ac-ft)	0	Volume (ac-ft)	0	0.398	0.831	1.303	1.814	2.365	2.957	3.586	4.25	-	-	-	-	
			Discharge (cfs)	0	0.15	0.84	2.65	5.91	10.9	17.84	21.63	115.22	-	-	-	-	
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3	Pump 4		Pump 5		
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation										Outlet Data				
													Elev. (ft)	Area (sq ft)	Q Coef.	Exponent	
DETB11	Volume (ac-ft)	0	Volume (ac-ft)	0	0.749	1.552	2.411	3.326	4.299	5.332	6.425	7.58	-	-	-	-	
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45	-	-	-	-	
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3	Pump 4		Pump 5		
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation										Outlet Data				
													Elev. (ft)	Area (sq ft)	Q Coef.	Exponent	
DETB12	Volume (ac-ft)	0	Volume (ac-ft)	0	0.143	0.346	0.615	0.956	1.371	1.864	2.437	3.091	-	-	-	-	
			Discharge (cfs)	0	0.15	0.84	2.65	5.91	10.9	17.84	21.63	115.22	-	-	-	-	
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3	Pump 4		Pump 5		
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation										Outlet Data				
													Elev. (ft)	Area (sq ft)	Q Coef.	Exponent	
DETB13	Volume (ac-ft)	0	Volume (ac-ft)	0	0.826	1.707	2.645	3.64	4.693	5.807	6.983	8.221	-	-	-	-	
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45	-	-	-	-	
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3	Pump 4		Pump 5		
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation										Outlet Data				
													Elev. (ft)	Area (sq ft)	Q Coef.	Exponent	
			Volume	0	0.684	1.416	2.199	3.033	3.919	4.86	5.856	6.908	-	-	-	-	

DET15B	Volume (ac-ft)	0	(ac-ft)														
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB16	Volume (ac-ft)	0	Volume (ac-ft)	0	1.578	3.23	4.957	6.761	8.643	10.605	12.647	14.771		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	40		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB17	Volume (ac-ft)	0	Volume (ac-ft)	0	2.929	5.961	9.096	12.336	15.682	19.136	23.983	28.983		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB18	Volume (ac-ft)	0	Volume (ac-ft)	0	1.231	2.523	3.878	5.298	6.784	8.337	9.958	11.648		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	40		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB19	Volume (ac-ft)	0	Volume (ac-ft)	0	3.848	7.813	11.896	16.098	20.421	24.867	29.436	34.129		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													

			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET06F	Elevation (ft)	192	Elevation (ft)	192	193	194	195	196	197	198	199	200		192.75	5.301	.61	0.5
			Volume (ac-ft)	0	0.946	1.949	3.011	4.132	5.315	6.562	7.873	9.251		198	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DET15A	Volume (ac-ft)	0	Volume (ac-ft)	0	0.989	2.058	3.208	4.44	5.755	7.155	8.641	10.215		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB32	Volume (ac-ft)	0	Volume (ac-ft)	0	0.667	1.383	2.147	2.963	3.832	4.755	5.734	6.77		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB14	Volume (ac-ft)	0	Volume (ac-ft)	0	2.372	4.846	7.424	10.108	12.898	15.796	18.804	21.922		-	-	-	-
			Discharge (cfs)	0	0.13	0.44	1.22	2.61	4.73	7.66	9.8	102.45		-	-	-	-
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

View HEC-1 output

Sacramento method results
(Project: Deer Creek Tributary)
(100-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
OS05	70.	12:25	.08			
OS02	28.	12:56	.06			
OS03	25.	12:55	.05			
OS06	132.	13:07	.29			
D001	277.	12:21	.29			
DET01F	155.	12:43	.29	234.	10.	.00
D002	213.	12:24	.24			
DET02F	120.	12:50	.24	238.	8.2	
D003	114.	12:24	.13			
DET03F	70.	12:46	.13	208.	4.1	.00
D004	228.	12:34	.31			
DET04F	168.	12:52	.31	212.	9.6	
D005	281.	12:30	.36			
DET05F	156.	13:01	.36	198.	14.	
D007	108.	12:14	.09			
DET07F	62.	12:30	.09	203.	2.7	.00
D008	88.	12:13	.07			
DET08F	57.	12:26	.07	200.	1.7	
D012	256.	12:16	.23			
DV001	225.	12:12	.23			.28
DET0B8	68.	13:11	.23	200.	24.	
D014	80.	12:08	.05			
DET0B9	6.5	13:48	.05	200.	5.8	
D016	118.	12:07	.07			
DETB10	79.	12:16	.07	200.	4.0	
D018	54.	12:05	.03			
DETB11	3.2	15:05	.03	200.	3.6	
D020	94.	12:10	.07			
DETB12	65.	12:19	.07	200.	2.7	
D023	50.	12:07	.03			
DETB13	2.7	15:10	.03	200.	3.6	
D011B	84.	12:11	.06			
DET15B	23.	12:50	.06	200.	6.0	
D013	131.	12:12	.10			
DETB16	12.	15:10	.10	200.	13.	

D015	268.	12:11	.21			
DETB17	33.	13:40	.21	200.	25.	
D019	110.	12:16	.10			
DV002	95.	12:12	.10			.16
DETB18	22.	13:29	.10	200.	11.	
D31	291.	12:14	.25			
DETB19	33.	14:03	.25	200.	31.	
D006	153.	12:32	.20			
DET06F	93.	12:59	.20	198.	6.9	.00
D011A	129.	12:10	.09			
DET15A	43.	12:40	.09	198.	9.2	
D032	132.	12:23	.15			
DETB32	111.	12:32	.15	198.	6.9	
OS01	15.	12:37	.02			
RTV001	31.	12:16	.00			
J0S1SP	39.	12:16	.02			
OS04	11.	12:32	.01			
RTV002	15.	12:16	.00			
J0S4SP	23.	12:17	.01			
D025	218.	12:18	.20			
DETB14	84.	12:53	.20	198.	21.	

(10-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
OS05	40.	12:25	.08			
OS02	16.	12:56	.06			
OS03	14.	12:55	.05			
OS06	78.	13:08	.29			
D001	184.	12:16	.29			
DET01F	77.	12:49	.29	232.	6.8	.00
D002	143.	12:18	.24			
DET02F	64.	12:52	.24	236.	5.2	.00
D003	77.	12:18	.13			
DET03F	34.	12:52	.13	206.	2.6	.00
D004	155.	12:25	.31			
DET04F	72.	13:10	.31	210.	6.8	
D005	191.	12:23	.36			
DET05F	85.	13:05	.36	196.	9.3	
D007	71.	12:10	.09			
DET07F	31.	12:33	.09	201.	1.7	

D008	57.	12:10	.07			
DET08F	30.	12:26	.07	198.	1.0	.00
D012	147.	12:16	.23			
DV001	147.	12:16	.23			.00
DET0B8	12.	15:36	.23	198.	19.	
D014	45.	12:08	.05			
DET0B9	2.9	15:10	.05	198.	3.9	
D016	66.	12:07	.07			
DETB10	20.	12:39	.07	198.	3.4	
D018	30.	12:05	.03			
DETB11	1.3	15:17	.03	198.	2.5	
D020	53.	12:10	.07			
DETB12	20.	12:39	.07	198.	2.2	
D023	28.	12:07	.03			
DETB13	1.1	15:58	.03	198.	2.4	
D011B	47.	12:11	.06			
DET15B	6.2	13:43	.06	198.	4.4	
D013	74.	12:12	.10			
DETB16	5.0	15:36	.10	198.	8.8	
D015	152.	12:12	.21			
DETB17	7.6	18:13	.21	198.	19.	
D019	63.	12:16	.10			
DV002	63.	12:16	.10			.00
DETB18	6.9	15:08	.10	198.	7.9	
D31	166.	12:14	.25			
DETB19	6.4	18:28	.25	198.	23.	
D006	104.	12:24	.20			
DET06F	49.	13:05	.20	196.	4.5	.00
D011A	73.	12:10	.09			
DET15A	7.8	13:58	.09	196.	7.3	
D032	75.	12:23	.15			
DETB32	38.	12:57	.15	196.	6.0	
OS01	8.3	12:37	.02			
RTV001	.0	0:00	.00			
J0S1SP	8.3	12:37	.02			
OS04	6.1	12:32	.01			
RTV002	.0	0:00	.00			
J0S4SP	6.1	12:32	.01			
D025	126.	12:18	.20			
DETB14	15.	15:17	.20	196.	19.	

(5-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
OS05	30.	12:25	.08			
OS02	12.	12:56	.06			
OS03	10.	12:55	.05			
OS06	61.	13:09	.29			
D001	141.	12:16	.29			
DET01F	66.	12:47	.29	231.	5.3	.00
D002	110.	12:18	.24			
DET02F	55.	12:50	.24	235.	4.0	.00
D003	59.	12:18	.13			
DET03F	30.	12:49	.13	205.	1.9	.00
D004	120.	12:25	.31			
DET04F	62.	13:11	.31	209.	5.2	
D005	148.	12:22	.36			
DET05F	73.	13:06	.36	196.	7.4	
D007	54.	12:10	.09			
DET07F	27.	12:29	.09	200.	1.2	
D008	44.	12:10	.07			
DET08F	26.	12:23	.07	197.	.7	
D012	113.	12:16	.23			
DV001	113.	12:16	.23			.00
DET0B8	9.6	15:36	.23	197.	16.	
D014	34.	12:08	.05			
DET0B9	1.9	15:14	.05	197.	3.3	
D016	50.	12:07	.07			
DETB10	16.	12:41	.07	197.	2.9	
D018	23.	12:05	.03			
DETB11	.9	15:32	.03	197.	2.1	
D020	41.	12:10	.07			
DETB12	17.	12:37	.07	197.	1.8	
D023	21.	12:07	.03			
DETB13	.7	18:06	.03	197.	2.0	
D011B	36.	12:11	.06			
DET15B	4.3	13:53	.06	197.	3.7	
D013	57.	12:12	.10			
DETB16	3.4	18:07	.10	197.	7.5	
D015	116.	12:12	.21			
DETB17	5.1	18:20	.21	197.	16.	
D019	49.	12:16	.10			
DV002	49.	12:16	.10			.00

DETB18	4.6	15:21	.10	197.	6.8	
D31	127.	12:14	.25			
DETB19	4.1	19:03	.25	197.	19.	
D006	80.	12:24	.20			
DET06F	42.	13:06	.20	195.	3.5	.00
D011A	56.	12:10	.09			
DET15A	5.6	15:02	.09	195.	6.2	
D032	58.	12:23	.15			
DETB32	18.	13:36	.15	195.	5.8	
OS01	6.3	12:37	.02			
RTV001	.0	0:00	.00			
J0S1SP	6.3	12:37	.02			
OS04	4.6	12:31	.01			
RTV002	.0	0:00	.00			
J0S4SP	4.6	12:31	.01			
D025	98.	12:18	.20			
DETB14	8.2	18:14	.20	195.	17.	

(2-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
OS05	18.	12:25	.08			
OS02	6.2	12:57	.06			
OS03	5.3	12:55	.05			
OS06	38.	13:10	.29			
D001	84.	12:16	.29			
DET01F	49.	12:37	.29	230.	3.4	.00
D002	65.	12:18	.24			
DET02F	40.	12:41	.24	234.	2.5	.00
D003	35.	12:18	.13			
DET03F	22.	12:41	.13	204.	1.1	.00
D004	73.	12:25	.31			
DET04F	46.	13:12	.31	208.	3.2	
D005	89.	12:22	.36			
DET05F	55.	13:08	.36	194.	5.0	
D007	32.	12:10	.09			
DET07F	19.	12:25	.09	199.	.7	
D008	26.	12:10	.07			
DET08F	19.	12:19	.07	196.	.4	.00
D012	68.	12:16	.23			
DV001	68.	12:16	.23			.00

DET0B8	5.8	15:50	.23	196.	12.	
D014	20.	12:08	.05			
DET0B9	.9	15:39	.05	196.	2.4	
D016	30.	12:07	.07			
DETB10	9.9	13:08	.07	196.	2.3	
D018	13.	12:05	.03			
DETB11	.4	18:30	.03	196.	1.6	
D020	24.	12:10	.07			
DETB12	11.	13:05	.07	196.	1.4	
D023	12.	12:07	.03			
DETB13	.3	18:35	.03	196.	1.5	
D011B	21.	12:11	.06			
DET15B	2.3	15:08	.06	196.	2.8	
D013	34.	12:12	.10			
DETB16	1.8	18:22	.10	196.	5.7	
D015	69.	12:11	.21			
DETB17	2.6	24:08	.21	196.	12.	
D019	29.	12:16	.10			
DV002	29.	12:16	.10			.00
DETB18	2.5	16:00	.10	196.	5.2	
D31	76.	12:14	.25			
DETB19	2.1	24:16	.25	196.	15.	
D006	49.	12:24	.20			
DET06F	31.	13:08	.20	194.	2.2	
D011A	33.	12:10	.09			
DET15A	3.1	15:16	.09	194.	4.8	
D032	34.	12:23	.15			
DETB32	5.8	14:22	.15	194.	4.2	
OS01	3.5	12:37	.02			
RTV001	.0	0:00	.00			
J0S1SP	3.5	12:37	.02			
OS04	2.6	12:31	.01			
RTV002	.0	0:00	.00			
J0S4SP	2.6	12:31	.01			
D025	60.	12:18	.20			
DETB14	4.7	18:28	.20	194.	13.	

(100-year, 10-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
OS05	31.	153:06	.08			

OS02	16.	153:31	.06			
OS03	14.	153:30	.05			
OS06	84.	153:42	.29			
D001	118.	153:04	.29			
DET01F	82.	153:36	.29	232.	7.6	
D002	96.	153:06	.24			
DET02F	68.	153:39	.24	237.	5.8	.00
D003	52.	153:06	.13			
DET03F	37.	153:39	.13	207.	2.9	.00
D004	117.	153:12	.31			
DET04F	79.	154:06	.31	211.	8.3	.00
D005	138.	153:10	.36			
DET05F	93.	153:59	.36	197.	11.	.00
D007	39.	153:01	.09			
DET07F	31.	153:18	.09	201.	1.6	
D008	31.	153:01	.07			
DET08F	27.	153:13	.07	197.	.8	
D012	99.	153:02	.23			
DV001	99.	153:02	.23			.00
DET0B8	91.	153:14	.23	197.	25.	
D014	23.	153:00	.05			
DET0B9	8.4	154:09	.05	197.	6.8	
D016	34.	153:00	.07			
DETB10	31.	153:07	.07	197.	3.7	
D018	14.	152:57	.03			
DETB11	4.9	154:06	.03	197.	4.4	
D020	30.	153:00	.07			
DETB12	25.	153:12	.07	197.	2.4	.00
D023	13.	153:00	.03			
DETB13	4.4	154:08	.03	197.	4.5	
D011B	28.	153:01	.06			
DET15B	25.	153:11	.06	197.	6.1	
D013	45.	153:01	.10			
DETB16	29.	153:25	.10	197.	14.	
D015	90.	153:01	.21			
DETB17	77.	153:13	.21	197.	28.	
D019	43.	153:02	.10			
DV002	43.	153:02	.10			.00
DETB18	33.	153:22	.10	197.	11.	
D31	106.	153:01	.25			
DETB19	92.	153:15	.25	197.	34.	

D006	77.	153:11	.20			
DET06F	53.	153:58	.20	197.	5.3	.00
D011A	42.	153:00	.09			
DET15A	41.	153:06	.09	197.	9.1	
D032	58.	153:05	.15			
DETB32	57.	153:12	.15	197.	6.3	
OS01	7.4	153:14	.02			
RTV001	.0	0:00	.00			
J0S1SP	7.4	153:14	.02			
OS04	5.1	153:11	.01			
RTV002	.0	0:00	.00			
J0S4SP	5.1	153:11	.01			
D025	88.	153:02	.20			
DETB14	82.	153:15	.20	197.	21.	

Sacramento Hydrologic Calculator Report

May 25, 2011 10:44

Project Title: Deer Creek- Existing Conditions
Method: Sacramento County HEC-1 method
Comments: Deer Creek - Existing conditions - D sheds 10 yr and 100 yr 24 hr 100 yr 10 day
Date: 2/22/2011
Prepared by: KEC

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Mean Elevation (ft)	Lag Times		Basin "n"		Loss Rates		Percent Impervious	
			Method	Lag Time (min)	Method	Basin "n"	Method	Loss Rate (in/hr)	Method	Impervious Area (%)
D001	183.1	251	Basin "n"	-	Computed	-	Computed	-	Computed	-
D002	154	254.5	Basin "n"	-	Computed	-	Computed	-	Computed	-
D003	81.7	228	Basin "n"	-	Computed	-	Computed	-	Computed	-
D004	199.2	247	Basin "n"	-	Computed	-	Computed	-	Computed	-
D005	227.4	231	Basin "n"	-	Computed	-	Computed	-	Computed	-
D006	127.8	224	Basin "n"	-	Computed	-	Computed	-	Computed	-
D007	133.4	223	Basin "n"	-	Computed	-	Computed	-	Computed	-
D008	162.9	211	Basin "n"	-	Computed	-	Computed	-	Computed	-
D009	133.7	209	Basin "n"	-	Computed	-	Computed	-	Computed	-
D010	114	203	Basin "n"	-	Computed	-	Computed	-	Computed	-
D011	125	197	Basin "n"	-	Computed	-	Computed	-	Computed	-
D012	104.3	169	Basin "n"	-	Computed	-	Computed	-	Computed	-
D013	124.6	195	Basin "n"	-	Computed	-	Computed	-	Computed	-
D014	77.2	172	Basin "n"	-	Computed	-	Computed	-	Computed	-
D015	117.7	192	Basin "n"	-	Computed	-	Computed	-	Computed	-
D017	160.6	206	Basin "n"	-	Computed	-	Computed	-	Computed	-
D016	90.9	170	Basin "n"	-	Computed	-	Computed	-	Computed	-
D07E	58.8	216.5	Basin "n"	-	Computed	-	Computed	-	Computed	-
D08E	85	217	Basin "n"	-	Computed	-	Computed	-	Computed	-
D032	95.02	187	Basin "n"	-	Specified	0.12	Computed	-	Computed	-

Basin "n" Method Data for Lag Time Computation

Watershed	Channel Length (ft)	Centroid Length (ft)	Slope (ft/ft)	Channelization	Land Use Impervious Area Percent (% or acres)																	
					95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
D001	5752	1592	.0139	Undeveloped																100		
				Developed																0		
D002	5340	2973	.0178	Undeveloped																100		
				Developed																0		
D003	4279	3290	.0150	Undeveloped																100		
				Developed																0		
D004	8082	4373	.0141	Undeveloped																100		
				Developed																0		
D005	6775	3419	.0121	Undeveloped																100		
				Developed																0		
D006	6833	3951	.0117	Undeveloped																100		
				Developed																0		
D007	2560	1408	.03520	Undeveloped																100		
				Developed																0		
D008	2460	1353	.0365	Undeveloped																100		
				Developed																0		
D009	2290	1260	.0393	Undeveloped																100		
				Developed																0		
D010	4110	2261	.020	Undeveloped																100		
				Developed																0		
D011	3410	1876	.0264	Undeveloped																100		
				Developed																0		
D012	1980	1089	0.025	Undeveloped																100		
				Developed																0		
D013	3560	1958	.031	Undeveloped																100		
				Developed																0		
D014	1310	721	.052	Undeveloped																100		
				Developed																0		
D015	3970	2184	0.0282	Undeveloped																100		
				Developed																0		
D017	3730	2052	0.0386	Undeveloped																100		
				Developed																0		
D016	1409	775	.051	Undeveloped																100		
				Developed																0		
D07E	3107	1270	0.0196	Undeveloped																100		
				Developed																0		
D08E	2668	1538	0.0315	Undeveloped																100		
				Developed																0		
D032	4196	1960	0.0224	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Refer to the Drainage manual for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Infiltration Loss Rate Data

Watershed	Soil Cover Group	Land Use Impervious Area Percent (% or acres)																	
		95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
D001	B																3.7		
	C																6.3		
	D																90		
D002	B																8.2		
	C																30.7		
	D																61.1		
D003	B																		
	C																23.1		
	D																76.9		
D004	B																6.8		
	C																34.4		
	D																58.8		
D005	B																		
	C																18.5		
	D																81.5		
D006	B																		
	C																16.7		
	D																83.3		
D007	B																1.5		
	C																36.6		
	D																61.9		
D008	B																10.6		
	C																9.8		
	D																79.6		
D009	B																7.2		
	C																1.2		
	D																91.6		
D010	B																10.4		
	C																7.5		
	D																82.1		
D011	B																9.8		
	C																7.8		
	D																82.4		
D012	B																33.6		
	C																		
	D																66.4		
D013	B																		
	C																17.1		
	D																82.9		
D014	B																4.8		
	C																10.8		
	D																84.5		
D015	B																		
	C																8.1		
	D																91.9		
D017	B																		
	C																2.9		
	D																97.1		
D016	B																		
	C																8.1		
	D																91.9		
D07E	B																		
	C																18.8		
	D																40		
D08E	B																		
	C																1.23		
	D																83.77		
D032	B																		
	C																		
	D																95.02		

Refer to the help file for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Hydrograph Routing – Muskingum–Cunge (Standard)

Routing ID	Route From	Route To	Channel Type	Length (ft)	Slope (ft/ft)	Width or Diameter (ft)	Side Slope (H:V)	Mannings "n"
CHA001	D001	JNC001	Trapezoidal	1599	0.0066	150	20:1	.06
CHA002	JNC001	JNC002	Trapezoidal	2989	.0046	110	20:1	0.06
CHA003	JNC002	JNC003	Trapezoidal	773	0.0054	70	20:1	0.06
CHA004	JNC003	JNC004	Trapezoidal	785	.0042	50	20:1	0.06
CHA005	JNC004	JNC005	Trapezoidal	1133	.0028	250	20:1	0.06
CHA006	JNC005	JNC006	Trapezoidal	1999	0.00375	165	20:1	0.06
CHA007	JNC006	JNC007	Trapezoidal	1716	.0046	150	20:1	0.06
CHA008	JNC007	JNC008	Trapezoidal	1604	.0037	270	20:1	0.06
CHA009	JNC008	JNC009	Trapezoidal	546	0.0052	150	20:1	0.06
CHA010	JNC009	JNC010	Trapezoidal	2956	0.0031	150	20:1	0.060
CHA011	JNC010	JNC011	Trapezoidal	2433	0.0028	150	20:1	0.06
CHA012	JNC011	JNC012	Trapezoidal	2013	0.0028	150	20:1	0.06
CHA013	JNC012	JNC013	Trapezoidal	397	0.0042	150	20:1	0.06
CHA014	JNC013	JNC014	Trapezoidal	1127	0.0035	150	20:1	0.06
CHA015	JNC014	JNC015	Trapezoidal	3182	0.00218	150	20:1	0.06

View HEC-1 output

Sacramento method results
(Project: Deer Creek- Existing Conditions)
(100-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
D017	166.	12:38	.25			
D015	114.	12:42	.18			
D014	126.	12:17	.12			
D013	128.	12:38	.19			
D011	127.	12:38	.20			
D012	131.	12:27	.16			
D010	104.	12:46	.18			
D002	122.	12:56	.24			
D001	162.	12:48	.29			
CHA001	161.	13:01	.29			
JNC001	282.	12:59	.53			
CHA002	277.	13:20	.53			
D003	66.	12:55	.13			
JNC002	328.	13:19	.65			
CHA003	327.	13:24	.65			
D004	128.	13:16	.31			
JNC003	454.	13:22	.97			
CHA004	452.	13:27	.97			
D005	161.	13:08	.36			
JNC004	595.	13:24	1.32			
CHA005	589.	13:33	1.32			
D006	87.	13:12	.20			
JNC005	665.	13:31	1.52			
CHA006	660.	13:43	1.52			
D007	159.	12:30	.21			
JNC006	705.	13:42	1.73			
CHA007	701.	13:52	1.73			
D008	198.	12:29	.25			
JNC007	750.	13:51	1.98			
CHA008	746.	14:01	1.98			
D009	169.	12:27	.21			
JNC008	782.	14:00	2.19			
CHA009	781.	14:03	2.19			
JNC009	819.	14:02	2.37			
CHA010	809.	14:20	2.37			

JNC010	829.	14:20	2.53
CHA011	820.	14:35	2.53
JNC011	850.	14:35	2.73
CHA012	843.	14:47	2.73
JNC012	871.	14:47	2.92
CHA013	871.	14:49	2.92
JNC013	882.	14:49	3.04
CHA014	880.	14:55	3.04
JNC014	907.	14:55	3.23
CHA015	893.	15:15	3.23
D016	145.	12:18	.14
JNC015	938.	15:14	3.62
D07E	65.	12:34	.09
D08E	98.	12:32	.13
D032	89.	12:45	.15

(10-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
D017	96.	12:38	.25			
D015	66.	12:42	.18			
D014	71.	12:17	.12			
D013	74.	12:39	.19			
D011	73.	12:38	.20			
D012	73.	12:27	.16			
D010	60.	12:46	.18			
D002	70.	12:56	.24			
D001	94.	12:49	.29			
CHA001	93.	13:04	.29			
JNC001	163.	13:01	.53			
CHA002	160.	13:26	.53			
D003	39.	12:56	.13			
JNC002	189.	13:25	.65			
CHA003	188.	13:30	.65			
D004	75.	13:17	.31			
JNC003	259.	13:28	.97			
CHA004	258.	13:34	.97			
D005	95.	13:09	.36			
JNC004	338.	13:31	1.32			
CHA005	335.	13:41	1.32			
D006	51.	13:13	.20			

JNC005	377.	13:40	1.52
CHA006	375.	13:54	1.52
D007	90.	12:30	.21
JNC006	399.	13:53	1.73
CHA007	398.	14:04	1.73
D008	112.	12:29	.25
JNC007	422.	14:03	1.98
CHA008	421.	14:15	1.98
D009	96.	12:27	.21
JNC008	438.	14:14	2.19
CHA009	438.	14:18	2.19
JNC009	458.	14:17	2.37
CHA010	453.	14:38	2.37
JNC010	461.	14:37	2.53
CHA011	456.	14:56	2.53
JNC011	470.	14:55	2.73
CHA012	467.	15:10	2.73
JNC012	481.	15:10	2.92
CHA013	480.	15:12	2.92
JNC013	485.	15:12	3.04
CHA014	484.	15:19	3.04
JNC014	497.	15:19	3.23
CHA015	489.	15:44	3.23
D016	81.	12:18	.14
JNC015	506.	15:43	3.62
D07E	37.	12:34	.09
D08E	56.	12:32	.13
D032	52.	12:45	.15

(2-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
D017	44.	12:38	.25			
D015	30.	12:42	.18			
D014	31.	12:17	.12			
D013	33.	12:38	.19			
D011	33.	12:38	.20			
D012	31.	12:26	.16			
D010	27.	12:46	.18			
D002	32.	12:58	.24			
D001	43.	12:49	.29			

CHA001	43.	13:08	.29
JNC001	74.	13:04	.53
CHA002	73.	13:37	.53
D003	18.	12:58	.13
JNC002	88.	13:36	.65
CHA003	88.	13:43	.65
D004	35.	13:20	.31
JNC003	120.	13:41	.97
CHA004	119.	13:47	.97
D005	46.	13:11	.36
JNC004	157.	13:45	1.32
CHA005	156.	13:58	1.32
D006	25.	13:15	.20
JNC005	177.	13:56	1.52
CHA006	176.	14:14	1.52
D007	40.	12:30	.21
JNC006	185.	14:12	1.73
CHA007	184.	14:26	1.73
D008	49.	12:29	.25
JNC007	192.	14:24	1.98
CHA008	192.	14:40	1.98
D009	43.	12:27	.21
JNC008	198.	14:39	2.19
CHA009	198.	14:43	2.19
JNC009	205.	14:42	2.37
CHA010	204.	15:09	2.37
JNC010	205.	15:08	2.53
CHA011	204.	15:32	2.53
JNC011	208.	15:31	2.73
CHA012	207.	15:50	2.73
JNC012	210.	15:49	2.92
CHA013	210.	15:52	2.92
JNC013	211.	15:52	3.04
CHA014	210.	16:02	3.04
JNC014	213.	16:01	3.23
CHA015	211.	16:34	3.23
D016	36.	12:18	.14
JNC015	213.	16:34	3.62
D07E	16.	12:34	.09
D08E	26.	12:32	.13
D032	24.	12:45	.15

(100-year, 10-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
D017	87.	153:16	.25			
D015	62.	153:19	.18			
D014	48.	153:02	.12			
D013	67.	153:16	.19			
D011	66.	153:16	.20			
D012	58.	153:07	.16			
D010	57.	153:22	.18			
D002	72.	153:31	.24			
D001	92.	153:24	.29			
CHA001	92.	153:39	.29			
JNC001	164.	153:36	.53			
CHA002	163.	154:01	.53			
D003	39.	153:31	.13			
JNC002	198.	153:56	.65			
CHA003	198.	154:01	.65			
D004	84.	153:50	.31			
JNC003	281.	153:58	.97			
CHA004	280.	154:04	.97			
D005	102.	153:42	.36			
JNC004	378.	153:59	1.32			
CHA005	377.	154:09	1.32			
D006	57.	153:46	.20			
JNC005	431.	154:06	1.52			
CHA006	429.	154:20	1.52			
D007	75.	153:10	.21			
JNC006	471.	154:16	1.73			
CHA007	470.	154:26	1.73			
D008	92.	153:09	.25			
JNC007	515.	154:21	1.98			
CHA008	513.	154:32	1.98			
D009	78.	153:08	.21			
JNC008	544.	154:25	2.19			
CHA009	544.	154:29	2.19			
JNC009	580.	154:26	2.37			
CHA010	578.	154:45	2.37			
JNC010	591.	154:41	2.53			
CHA011	590.	154:56	2.53			
JNC011	617.	154:22	2.73			

CHA012	616.	154:37	2.73
JNC012	652.	154:27	2.92
CHA013	652.	154:30	2.92
JNC013	663.	154:23	3.04
CHA014	663.	154:31	3.04
JNC014	700.	154:26	3.23
CHA015	694.	154:51	3.23
D016	57.	153:03	.14
JNC015	734.	154:42	3.62
D07E	32.	153:13	.09
D08E	48.	153:11	.13
D032	49.	153:21	.15

7.5 APPENDIX E: SACCALC INPUT & OUTPUT FILES: CARSON CREEK

Sacramento Hydrologic Calculator Report

May 25, 2011 10:49

Project Title: Carson Tributary Creek
Comments: Developed conditions C sheds 10 yr and 100 yr 24 hour with detention
Prepared by: KEC

Method: Sacramento County HEC-1 method
Date: 3/3/2011

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Mean Elevation (ft)	Lag Times		Basin "n"		Loss Rates		Percent Impervious	
			Method	Lag Time (min)	Method	Basin "n"	Method	Loss Rate (in/hr)	Method	Impervious Area (%)
C006	25.2	236	Basin "n"	-	Specified	0.043152661	Computed	-	Computed	-
C007	92.3	191	Basin "n"	-	Specified	0.042186429	Computed	-	Computed	-
C008	42.8	183.5	Basin "n"	-	Specified	0.046073682	Computed	-	Computed	-
C009	47.9	178.5	Basin "n"	-	Specified	0.043594686	Computed	-	Computed	-
C010	169.8	201	Basin "n"	-	Specified	0.04198434	Computed	-	Computed	-
C011	79	176	Basin "n"	-	Specified	0.039833772	Computed	-	Computed	-
C012	169.1	163	Basin "n"	-	Specified	0.043301861	Computed	-	Computed	-

Basin "n" Method Data for Lag Time Computation

Watershed	Channel Length (ft)	Centroid Length (ft)	Slope (ft/ft)	Channelization	Land Use Impervious Area Percent (% or acres)																	
					95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
C006	1144	580	0.028	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C007	3793	2133	0.026	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C008	1323	1096	0.063	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C009	1544	1106	0.047	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C010	3931	2097	0.020	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C011	1836	1425	0.026	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C012	2536	1892	0.017	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Refer to the Drainage manual for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Infiltration Loss Rate Data

Watershed	Soil Cover Group	Land Use Impervious Area Percent (% or acres)																	
		95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
C006	B																		
	C																		
	D	2.1							0.6	19.2						3.3			
C007	B																		
	C																		
	D	4.8								65.4	19.8					1.6		0.7	
C008	B																		
	C																		
	D	2.4								14.7	19.9					5.4		0.4	
C009	B																		
	C																		
	D	2.4								22.9	21					1.2		0.5	
C010	B																		
	C															2.4	0.9		
	D	8.2						40.7	57.3	42.3						17.7	0.3		
C011	B																		
	C								5.8							2.3			
	D	7.7						18.4	41.6							3.2			
C012	B																		
	C																		
	D	8.33						28.7		106.5	2.5					11.5	11.6		

Refer to the help file for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Detention Basin Data

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB23	Elevation (ft)	210	Elevation (ft)	210	211	212	213	214	215	216	217	218		210.875	2.405	.61	0.5
			Volume (ac-ft)	0	0.065	0.145	0.242	0.358	0.494	0.653	0.835	1.042		217.0	90	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB24	Elevation (ft)	147	Elevation (ft)	147	148	149	150	151	152	153	154	155	157	148.00	6.282	.61	0.5
			Volume (ac-ft)	0	0.244	0.517	0.821	1.157	1.527	1.934	2.377	2.86	3.95	154.9	147	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB25	Elevation (ft)	148	Elevation (ft)	148	149	150	151	152	153	154	155	156		148.5	3.14	.61	0.5
			Volume (ac-ft)	0	0.158	0.34	0.548	0.782	1.045	1.339	1.664	2.023		154.9	110	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB26	Elevation (ft)	146	Elevation (ft)	146	147	148	149	150	151	152	153	154	156	146.75	5.31	.61	0.5
			Volume (ac-ft)	0	0.043	0.098	0.168	0.253	0.357	0.479	0.623	0.789	1.195	154.4	100	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
			Pump Discharge (cfs)														
			Elevation at which Pump Turns On (ft)														
			Elevation at which Pump Turns Off (ft)														

Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
	Elevation	157	Elevation (ft)	157	158	159	160	161	162	163	164	169	170	157.75	8.83	.61	0.5

DETB28	(ft)		Volume (ac-ft)	0	0.293	0.619	0.978	1.372	1.803	2.272	2.782	5.993	6.779	168.8	200	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB29	Elevation (ft)	152	Elevation (ft)	152	153	154	155	156	157	158	159	160		152.75	10.62	.61	0.5
			Volume (ac-ft)	0	0.158	0.34	0.548	0.782	1.045	1.339	1.664	2.023		158.2	130	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													
Detention Basin	Initial Condition		Pond Storage Relation											Outlet Data			
														Elev. (ft)	Area (sq ft)	Q Coef.	Exponent
DETB30	Elevation (ft)	142	Elevation (ft)	142	143	144	145	146	147	148	149	150		142.75	14.136	.61	0.5
			Volume (ac-ft)	0	0.769	1.589	2.462	3.39	4.374	5.416	6.517	7.679		148.3	280	2.6	1.5
	Pump Data																
	Pump Hydrograph Name							Pump 1		Pump 2		Pump 3		Pump 4		Pump 5	
				Pump Discharge (cfs)													
				Elevation at which Pump Turns On (ft)													
				Elevation at which Pump Turns Off (ft)													

View HEC-1 output

Sacramento method results
(Project: Carson Tributary Creek)
(100-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
C006	71.	12:05	.04			
DETB23	40.	12:14	.04	217.	.8	
C007	172.	12:14	.14			
DETB24	118.	12:25	.14	155.	3.0	.00
C008	110.	12:06	.07			
DETB25	57.	12:18	.07	155.	1.7	.00
C009	121.	12:07	.07			
DETB26	89.	12:13	.07	155.	.9	
C010	308.	12:15	.27			
DETB28	183.	12:30	.27	169.	6.0	
C011	187.	12:08	.12			
DETB29	141.	12:15	.12	158.	1.4	.00
C012	328.	12:13	.26			
DETB30	205.	12:26	.26	148.	5.9	
JNC001	719.	12:25	.98			

(10-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
C006	41.	12:05	.04			
DETB23	22.	12:16	.04	214.	.4	
C007	102.	12:14	.14			
DETB24	64.	12:29	.14	152.	1.6	.00
C008	64.	12:06	.07			
DETB25	31.	12:21	.07	153.	.9	
C009	71.	12:07	.07			
DETB26	53.	12:13	.07	151.	.4	
C010	184.	12:15	.27			
DETB28	110.	12:32	.27	164.	3.0	.00
C011	110.	12:08	.12			
DETB29	86.	12:15	.12	156.	.7	.00
C012	194.	12:13	.26			
DETB30	120.	12:27	.26	146.	3.3	
JNC001	464.	12:21	.98			

(2-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
C006	20.	12:05	.04			
DETB23	15.	12:11	.04	213.	.2	.00
C007	51.	12:14	.14			
DETB24	40.	12:23	.14	150.	.7	
C008	31.	12:06	.07			
DETB25	21.	12:15	.07	150.	.4	.00
C009	35.	12:07	.07			
DETB26	30.	12:11	.07	148.	.1	
C010	92.	12:15	.27			
DETB28	69.	12:26	.27	160.	1.1	.00
C011	54.	12:08	.12			
DETB29	52.	12:11	.12	154.	.3	.00
C012	97.	12:13	.26			
DETB30	74.	12:22	.26	144.	1.6	
JNC001	276.	12:17	.98			

(100-year, 10-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
C006	18.	152:56	.04			
DETB23	17.	153:03	.04	213.	.2	.00
C007	62.	153:01	.14			
DETB24	56.	153:12	.14	151.	1.3	.00
C008	29.	153:00	.07			
DETB25	26.	153:07	.07	152.	.7	.00
C009	33.	153:00	.07			
DETB26	33.	153:02	.07	148.	.1	
C010	114.	153:01	.27			
DETB28	101.	153:14	.27	163.	2.5	
C011	55.	153:00	.12			
DETB29	55.	153:01	.12	154.	.3	.00
C012	114.	153:01	.26			
DETB30	105.	153:11	.26	145.	2.6	.00
JNC001	390.	153:06	.98			

Sacramento Hydrologic Calculator Report

May 25, 2011 10:42

Project Title: Carson Creek Tributary - Existing Conditions
Method: Sacramento County HEC-1 method
Comments: Carson Creek Tributary - Existing conditions C sheds 10 yr and 100 yr 24 hour, 100 yr 10 day
Date: 2/13/2011
Prepared by: KEC

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Mean Elevation (ft)	Lag Times		Basin "n"		Loss Rates		Percent Impervious	
			Method	Lag Time (min)	Method	Basin "n"	Method	Loss Rate (in/hr)	Method	Impervious Area (%)
C006	30	205	Basin "n"	-	Computed	-	Computed	-	Computed	-
C007	52.7	200	Basin "n"	-	Computed	-	Computed	-	Computed	-
C008	31	196	Basin "n"	-	Computed	-	Computed	-	Computed	-
C009	49.7	194	Basin "n"	-	Computed	-	Computed	-	Computed	-
C010	118.6	204	Basin "n"	-	Computed	-	Computed	-	Computed	-
C011	72.3	198	Basin "n"	-	Computed	-	Computed	-	Computed	-
C012	12.2	200	Basin "n"	-	Computed	-	Computed	-	Computed	-
C013	122.4	192	Basin "n"	-	Computed	-	Computed	-	Computed	-
C014	155.9	180	Basin "n"	-	Computed	-	Computed	-	Computed	-
C05	25.2	236	Basin "n"	-	Specified	0.12	Computed	-	Computed	-

Basin "n" Method Data for Lag Time Computation

Watershed	Channel Length (ft)	Centroid Length (ft)	Slope (ft/ft)	Channelization	Land Use Impervious Area Percent (% or acres)																	
					95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
C006	1720	946	.0523	Undeveloped																100		
				Developed																0		
C007	1920	1056	.0497	Undeveloped																100		
				Developed																0		
C008	1130	622	.085	Undeveloped																100		
				Developed																0		
C009	1140	627	.0737	Undeveloped																100		
				Developed																0		
C010	4210	2316	.0228	Undeveloped																100		
				Developed																0		
C011	2780	1518	.0357	Undeveloped																100		
				Developed																0		
C012	850	468	.0706	Undeveloped																100		
				Developed																0		
C013	2650	1458	.0272	Undeveloped																100		
				Developed																0		
C014	2110	1161	.0379	Undeveloped																100		
				Developed																0		
C05	1144	580	.023	Undeveloped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Developed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Refer to the Drainage manual for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Infiltration Loss Rate Data

Watershed	Soil Cover Group	Land Use Impervious Area Percent (% or acres)																	
		95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
C006	B																		
	C																		
	D																100		
C007	B																		
	C																		
	D																100		
C008	B																		
	C																		
	D																100		
C009	B																		
	C																		
	D																100		
C010	B																		
	C																3.8		
	D																96.2		
C011	B																		
	C																		
	D																100		
C012	B																		
	C																		
	D																100		
C013	B																1.6		
	C																9.5		
	D																88.9		
C014	B																		
	C																		
	D																100		
C05	B																		
	C																		
	D																100		

Refer to the help file for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

View HEC-1 output

Sacramento method results
(Project: Carson Creek Tributary - Existing Conditions)
(100-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
C008	57.	12:14	.05			
C009	89.	12:14	.08			
C014	205.	12:26	.24			
C010	110.	12:45	.19			
C011	85.	12:32	.11			
JNC002	183.	12:38	.30			
C012	24.	12:12	.02			
C013	141.	12:32	.19			
JNC003	152.	12:31	.21			
C006	44.	12:21	.05			
C007	74.	12:23	.08			
JNC001	118.	12:22	.13			
C05	40.	12:18	.04			
JNC004	753.	12:25	1.05			

(10-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
C008	33.	12:14	.05			
C009	53.	12:15	.08			
C014	122.	12:26	.24			
C010	67.	12:46	.19			
C011	51.	12:32	.11			
JNC002	111.	12:38	.30			
C012	14.	12:12	.02			
C013	84.	12:32	.19			
JNC003	91.	12:32	.21			
C006	26.	12:21	.05			
C007	44.	12:23	.08			
JNC001	70.	12:22	.13			
C05	24.	12:18	.04			
JNC004	452.	12:26	1.05			

(2-year, 1-day rainfall)

	Peak	Time of	Basin	Peak	Peak

ID	flow (cfs)	peak (hours)	area (sq. mi)	stage (feet)	storage (ac-ft)	Diversion volume (ac-ft)
C008	16.	12:14	.05			
C009	25.	12:15	.08			
C014	60.	12:26	.24			
C010	33.	12:46	.19			
C011	25.	12:32	.11			
JNC002	56.	12:38	.30			
C012	6.9	12:12	.02			
C013	41.	12:32	.19			
JNC003	45.	12:31	.21			
C006	13.	12:21	.05			
C007	22.	12:23	.08			
JNC001	34.	12:22	.13			
C05	12.	12:18	.04			
JNC004	225.	12:26	1.05			

(100-year, 10-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
C008	20.	153:01	.05			
C009	32.	153:01	.08			
C014	93.	153:07	.24			
C010	61.	153:22	.19			
C011	41.	153:11	.11			
JNC002	102.	153:16	.30			
C012	7.9	153:01	.02			
C013	69.	153:11	.19			
JNC003	76.	153:07	.21			
C006	18.	153:04	.05			
C007	32.	153:05	.08			
JNC001	50.	153:04	.13			
C05	16.	153:03	.04			
JNC004	385.	153:06	1.05			

7.6 Appendix F: HEC-RAS Inflow Data Work Sheets

Cordova Hills - Existing Inflow Job 7968.010 Date: May 26, 2011

Shed(s)	HEC-RAS Inflow Station	HEC-RAS Sta Inflow Applied	Subshed Peak Flow	100yr Peak Flow In Creek	
L1	11800	11800	276.78	276.78	
L2	11600	11400	174.07	280.12	Uniform lateral inflow to station 80+00
L3	6600	6400	293.15	564.47	
D1	28400	28400	161.93	161.93	
D2	28139.07	28069.5	122.17	167.01	Uniform lateral inflow to station 266+00
D3	28000	27900	66.21	182.11	Uniform lateral inflow to station 228+00
D4	26385.3	26292.6	128.36	311.07	Uniform lateral inflow to station 230+00
D5	23600	23400	161.26	473.79	Uniform lateral inflow to station 226+00
D6	22600	22400	87.36	687.58	Uniform lateral inflow to station 224+00
D7	22400	22175.79	158.70	690.40	Uniform lateral inflow to station 188+67.36
D8	20761.52	20712	197.55	708.21	Uniform lateral inflow to station 159+10.45
D9	18661.93	18573.2	161.35	756.25	Uniform lateral inflow to station 149+70.01
D10	15722.5	15661.2	99.94	796.93	Uniform lateral inflow to station 145+21.03
D11	14800.08	14745.2	83.92	824.82	Uniform lateral inflow to station 89+63.549
D12	14350.55	14165.39	125.34	836.95	Uniform lateral inflow to station 111+46.79
D14	10961.29	10777.64	60.56	864.86	Uniform lateral inflow to station 68+00
D13	8963.55	8766.44	119.71	877.71	Uniform lateral inflow to station 70+00
D15	6800	6545.72	103.83	941.15	Uniform lateral inflow to station 65+45.718
D16	6545.72	6400	88.72	938.01	Uniform lateral inflow to station 22+00
D17	5310.35	5126.19	131.12	939.81	Uniform lateral inflow to station 12+38.804
C5 [1]	N/A		N/A	N/A	
C6 [1]	N/A		N/A	N/A	
C7 [1]	N/A		N/A	N/A	
C8 [1]	N/A		N/A	N/A	
C9 [1]	N/A		N/A	N/A	
C10 [1]	N/A		N/A	N/A	
C11 [1]	N/A		N/A	N/A	
C12 [1]	N/A		N/A	N/A	
C13 [1]	N/A		N/A	N/A	
C14 [1]	N/A		N/A	N/A	

L - Laguna Creek tributary
D - Deer Creek tributary
C - Carson Creek tributary

Cordova Hills - Developed Job 7968.010 Date: Maych 26, 2011

Shed(s)	HEC-RAS Inflow Station	HEC-RAS Sta Inflow Applied	Subshed Peak Flow	100yr Peak Flow In Creek	
L1, L2	11800	11698.2	335.77	335.77	
L4	11199.56	11000	235.80	454.84	
L3	10400	10203.13	192.81	503.33	
L9	8800	8700	100.30	515.58	
L10 L6 L7 L5	6600	6400	295.51	637.60	
D1	28400	28400	276.80	276.80	
D2	28139.07	28069.5	212.73	413.15	
D3	25800	25700	114.12	544.68	
D4	25600	25500	228.08	767.41	
D5	23000	22600	281.17	920.01	
D6	22000	21900	152.66	1010.46	
D7	20962.1	20921.9	107.94	1032.77	
D8	20761.52	20712	88.08	1054.35	
OS01	20662.66	20642.13	14.95	1053.50	Uniform lateral inflow to station 183+13.08
D11a	19831.49	19561.71	128.59	1076.88	
D11b	18661.93	18573.2	83.54	965.52	
OS02	17964.88	17929	28.48	812.68	Uniform lateral inflow to station 139+88.90
D12	16872.7	16822.9	255.68	886.04	
D13	16472.5	16374.4	131.00	917.19	
D14	15340.5	15254	80.29	927.71	
D16	14350.55	14165.39	118.05	889.68	
D15	14165.39	14077.1	267.54	921.10	
OS03	13800.26	13716.8	25.00	904.63	Uniform lateral inflow to station 99+62.423
D18	12934.78	12679.83	54.24	913.27	
D20	11820.19	11633.47	93.76	933.21	
D19	11633.47	11460.48	109.97	962.82	
D23	10294.85	10111.02	49.93	948.52	
OS04	9553.91	9362.452	10.78	909.88	Uniform lateral inflow to station 80+00
D25	8223.925	8000	218.00	965.92	
OS05	8000	7744.065	70.40	971.49	Uniform lateral inflow to station 68+00
OS06	6545.718	6400	132.04	991.47	Uniform lateral inflow to station 22+00
D31	3332.982	3152.554	290.57	1110.43	
C5 [1]	N/A		N/A	N/A	
C6 [1]	N/A		N/A	N/A	
C7 [1]	N/A		N/A	N/A	
C8 [1]	N/A		N/A	N/A	
C9 [1]	N/A		N/A	N/A	
C10 [1]	N/A		N/A	N/A	
C11 [1]	N/A		N/A	N/A	
C12 [1]	N/A		N/A	N/A	
C13 [1]	N/A		N/A	N/A	
C14 [1]	N/A		N/A	N/A	

L - Laguna Creek tributary
D - Deer Creek tributary
C - Carson Creek tributary

Cordova Hills - Developed with Detention Inflow Job 7968.010 Date: May 26, 2011

Shed(s)	HEC-RAS Inflow Station	HEC-RAS Sta Inflow Applied	Subshed Peak Flow	100yr Peak Flow In Creek	
L1, L2	11800	11800	237.22	237.22	
DETB4	11199.56	11000	93.89	328.73	
DET0B5	10400	10203.13	20.85	345.4	
DET0B3	8800	8700	17.11	353.47	
L5, L6, L7, L10	6600	6400	304.67	559.19	
DET01F	28400	28400	155.21	155.21	
DET02F	28139.07	28069.5	119.61	270.33	
DET03F	25800	25700	69.50	309.46	
DET04F	25600	25500	168.00	454.82	
DET05F	23000	22600	156.01	574.23	
DET06F	22000	21900	93.45	642.42	
DET07F	20962.1	20921.9	62.17	672.43	
DET08F	20761.52	20712	56.83	699.80	
J0S1SP*	20662.66	20642.13	39.04	699.26	Uniform lateral inflow to station 183+13.08
DET15a	19831.49	19561.71	42.69	709.40	
DET15b	18661.93	18573.2	22.84	716.21	
OS02	17964.88	17929	28.48	710.54	Uniform lateral inflow to station 139+88.90
DET0B8	16872.7	16822.9	67.93	763.64	
DETB16	16472.5	16374.4	11.53	773.42	
DETB09	15340.5	15254	6.52	777.28	
DETB10	14350.55	14165.39	78.58	780.82	
DETB17	14165.39	14077.1	33.28	808.18	
OS03	13800.26	13716.8	25.00	806.23	Uniform lateral inflow to station 99+62.423
DETB11	12934.78	12679.83	3.21	807.92	
DETB12	11820.19	11633.47	64.91	822.05	
DETB18	11633.47	11460.48	22.17	838.79	
DETB13	10294.85	10111.02	2.66	840.80	
J0S4SP*	9553.91	9362.452	22.66	837.06	Uniform lateral inflow to station 80+00
DETB14	8223.925	8000	83.96	864.67	
OS05	8000	7744.065	70.40	866.09	Uniform lateral inflow to station 68+00
OS06	6545.718	6400	132.04	871.00	Uniform lateral inflow to station 22+00
DETB19	3332.982	3152.554	33.28	925.18	
C5 [1]	N/A		N/A	N/A	
C6 [1]	N/A		N/A	N/A	
C7 [1]	N/A		N/A	N/A	
C8 [1]	N/A		N/A	N/A	
C9 [1]	N/A		N/A	N/A	
C10 [1]	N/A		N/A	N/A	
C11 [1]	N/A		N/A	N/A	
C12 [1]	N/A		N/A	N/A	
C13 [1]	N/A		N/A	N/A	
C14 [1]	N/A		N/A	N/A	

L - Laguna Creek tributary
D - Deer Creek tributary
C - Carson Creek tributary
*J0S1SP includes portion of 100 yr spill from subarea D012. All other recurrences are OS01
*J0S4SP includes portion of 100 yr spill from subarea D019. All other recurrences are OS04

7.7 Appendix G: Upper Laguna Creek Tributary Existing Conditions HEC-RAS Results

HEC-RAS River: LC Reach: LCr1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	11800	Max WS	100yrExist	276.78	222.00	223.20
LCr1	11800	Max WS	10yrExist	166.26	222.00	223.00
LCr1	11800	Max WS	2yrExist	80.86	222.00	222.71
LCr1	11600	Max WS	100yrExist	276.67	218.27	219.98
LCr1	11600	Max WS	10yrExist	166.14	218.27	219.66
LCr1	11600	Max WS	2yrExist	80.82	218.27	219.34
LCr1	11400	Max WS	100yrExist	280.12	218.00	219.53
LCr1	11400	Max WS	10yrExist	168.15	218.00	219.27
LCr1	11400	Max WS	2yrExist	82.04	218.00	218.97
LCr1	11199.56	Max WS	100yrExist	284.51	217.17	218.36
LCr1	11199.56	Max WS	10yrExist	170.77	217.17	218.12
LCr1	11199.56	Max WS	2yrExist	83.60	217.17	217.83
LCr1	11000	Max WS	100yrExist	290.53	216.00	217.28
LCr1	11000	Max WS	10yrExist	174.38	216.00	217.02
LCr1	11000	Max WS	2yrExist	85.68	216.00	216.75
LCr1	10800	Max WS	100yrExist	293.63	215.87	216.78
LCr1	10800	Max WS	10yrExist	176.56	215.87	216.56
LCr1	10800	Max WS	2yrExist	86.96	215.87	216.41
LCr1	10600	Max WS	100yrExist	298.44	213.84	216.52
LCr1	10600	Max WS	10yrExist	179.75	213.84	216.30
LCr1	10600	Max WS	2yrExist	60.07	213.84	216.24
LCr1	10400	Max WS	100yrExist	301.44	213.96	215.04
LCr1	10400	Max WS	10yrExist	181.66	213.96	214.76
LCr1	10400	Max WS	2yrExist	90.23	213.96	214.55
LCr1	10203.13	Max WS	100yrExist	307.05	212.00	213.29
LCr1	10203.13	Max WS	10yrExist	185.14	212.00	212.96
LCr1	10203.13	Max WS	2yrExist	30.83	212.00	212.86
LCr1	10000	Max WS	100yrExist	307.87	211.37	212.63
LCr1	10000	Max WS	10yrExist	185.70	211.37	212.29
LCr1	10000	Max WS	2yrExist	92.81	211.37	212.02
LCr1	9800	Max WS	100yrExist	309.76	210.08	211.96
LCr1	9800	Max WS	10yrExist	186.80	210.08	211.64
LCr1	9800	Max WS	2yrExist	93.50	210.08	211.24
LCr1	9600	Max WS	100yrExist	318.96	209.75	211.24
LCr1	9600	Max WS	10yrExist	192.43	209.75	210.96
LCr1	9600	Max WS	2yrExist	36.30	209.75	210.72
LCr1	9400	Max WS	100yrExist	321.86	209.25	210.52
LCr1	9400	Max WS	10yrExist	194.19	209.25	210.17
LCr1	9400	Max WS	2yrExist	98.06	209.25	209.92

HEC-RAS River: LC Reach: LCr1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	9200	Max WS	100yrExist	328.80	208.08	209.96
LCr1	9200	Max WS	10yrExist	198.24	208.08	209.60
LCr1	9200	Max WS	2yrExist	100.61	208.08	209.25
LCr1	9000	Max WS	100yrExist	308.38	207.92	209.41
LCr1	9000	Max WS	10yrExist	201.13	207.92	209.23
LCr1	9000	Max WS	2yrExist	102.33	207.92	208.77
LCr1	8800	Max WS	100yrExist	269.50	206.56	209.11
LCr1	8800	Max WS	10yrExist	202.33	206.56	208.21
LCr1	8800	Max WS	2yrExist	103.04	206.56	207.90
LCr1	8700.*	Max WS	100yrExist	269.74	206.27	209.07
LCr1	8700.*	Max WS	10yrExist	183.15	206.27	207.73
LCr1	8700.*	Max WS	2yrExist	104.24	206.27	207.25
LCr1	8600	Max WS	100yrExist	270.23	205.99	209.06
LCr1	8600	Max WS	10yrExist	178.16	205.99	207.61
LCr1	8600	Max WS	2yrExist	103.23	205.99	206.67
LCr1	8400	Max WS	100yrExist	272.52	204.73	209.06
LCr1	8400	Max WS	10yrExist	177.96	204.73	207.57
LCr1	8400	Max WS	2yrExist	95.81	204.73	206.28
LCr1	8200	Max WS	100yrExist	275.57	204.47	209.06
LCr1	8200	Max WS	10yrExist	179.58	204.47	207.57
LCr1	8200	Max WS	2yrExist	96.42	204.47	206.24
LCr1	8000	Max WS	100yrExist	279.13	204.00	209.05
LCr1	8000	Max WS	10yrExist	181.44	204.00	207.56
LCr1	8000	Max WS	2yrExist	97.68	204.00	206.22
LCr1	7913.41	Max WS	100yrExist	279.10	202.87	208.95
LCr1	7913.41	Max WS	10yrExist	181.32	202.87	207.45
LCr1	7913.41	Max WS	2yrExist	97.65	202.87	206.11
LCr1	7876.59			Culvert		
LCr1	7839.77	Max WS	100yrExist	279.08	202.72	204.82
LCr1	7839.77	Max WS	10yrExist	181.31	202.72	204.43
LCr1	7839.77	Max WS	2yrExist	97.63	202.72	203.99
LCr1	7799.859	Max WS	100yrExist	279.02	202.16	203.96
LCr1	7799.859	Max WS	10yrExist	181.27	202.16	203.72
LCr1	7799.859	Max WS	2yrExist	97.59	202.16	203.39
LCr1	7600	Max WS	100yrExist	278.96	202.00	203.64
LCr1	7600	Max WS	10yrExist	181.16	202.00	203.40
LCr1	7600	Max WS	2yrExist	97.54	202.00	203.15

HEC-RAS River: LC Reach: LCr1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	7400	Max WS	100yrExist	278.92	202.00	203.07
LCr1	7400	Max WS	10yrExist	181.13	202.00	202.88
LCr1	7400	Max WS	2yrExist	97.50	202.00	202.67
LCr1	7200	Max WS	100yrExist	278.90	200.92	202.08
LCr1	7200	Max WS	10yrExist	181.13	200.92	201.90
LCr1	7200	Max WS	2yrExist	97.50	200.92	201.67
LCr1	7000	Max WS	100yrExist	278.87	200.00	201.28
LCr1	7000	Max WS	10yrExist	181.04	200.00	201.13
LCr1	7000	Max WS	2yrExist	97.44	200.00	200.83
LCr1	6900.*	Max WS	2yrExist	97.41	199.74	200.59
LCr1	6800	Max WS	100yrExist	278.83	199.47	200.63
LCr1	6800	Max WS	10yrExist	180.99	199.47	200.45
LCr1	6800	Max WS	2yrExist	97.39	199.47	200.23
LCr1	6700.*	Max WS	100yrExist	278.38	198.74	200.17
LCr1	6700.*	Max WS	10yrExist	180.94	198.74	199.94
LCr1	6700.*	Max WS	2yrExist	97.25	198.74	199.73
LCr1	6600	Max WS	100yrExist	276.17	198.00	199.79
LCr1	6600	Max WS	10yrExist	180.41	198.00	199.60
LCr1	6600	Max WS	2yrExist	21.28	198.00	199.49
LCr1	6400	Max WS	100yrExist	564.47	198.00	198.91
LCr1	6400	Max WS	10yrExist	347.86	198.00	198.63
LCr1	6400	Max WS	2yrExist	179.64	198.00	198.38
LCr1	6200	Max WS	100yrExist	564.43	196.00	197.87
LCr1	6200	Max WS	10yrExist	347.83	196.00	197.55
LCr1	6200	Max WS	2yrExist	179.62	196.00	197.27
LCr1	6000	Max WS	100yrExist	564.39	196.00	196.94
LCr1	6000	Max WS	10yrExist	347.80	196.00	196.71
LCr1	6000	Max WS	2yrExist	179.60	196.00	196.54

Upper Laguna Creek Tributary

Existing Conditions Model:

10-Year 24-Hour Storm

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: LagunaCreek
Project File : LagunaCreek_Dev.prj
Run Date and Time: 5/23/2011 11:39:19 AM

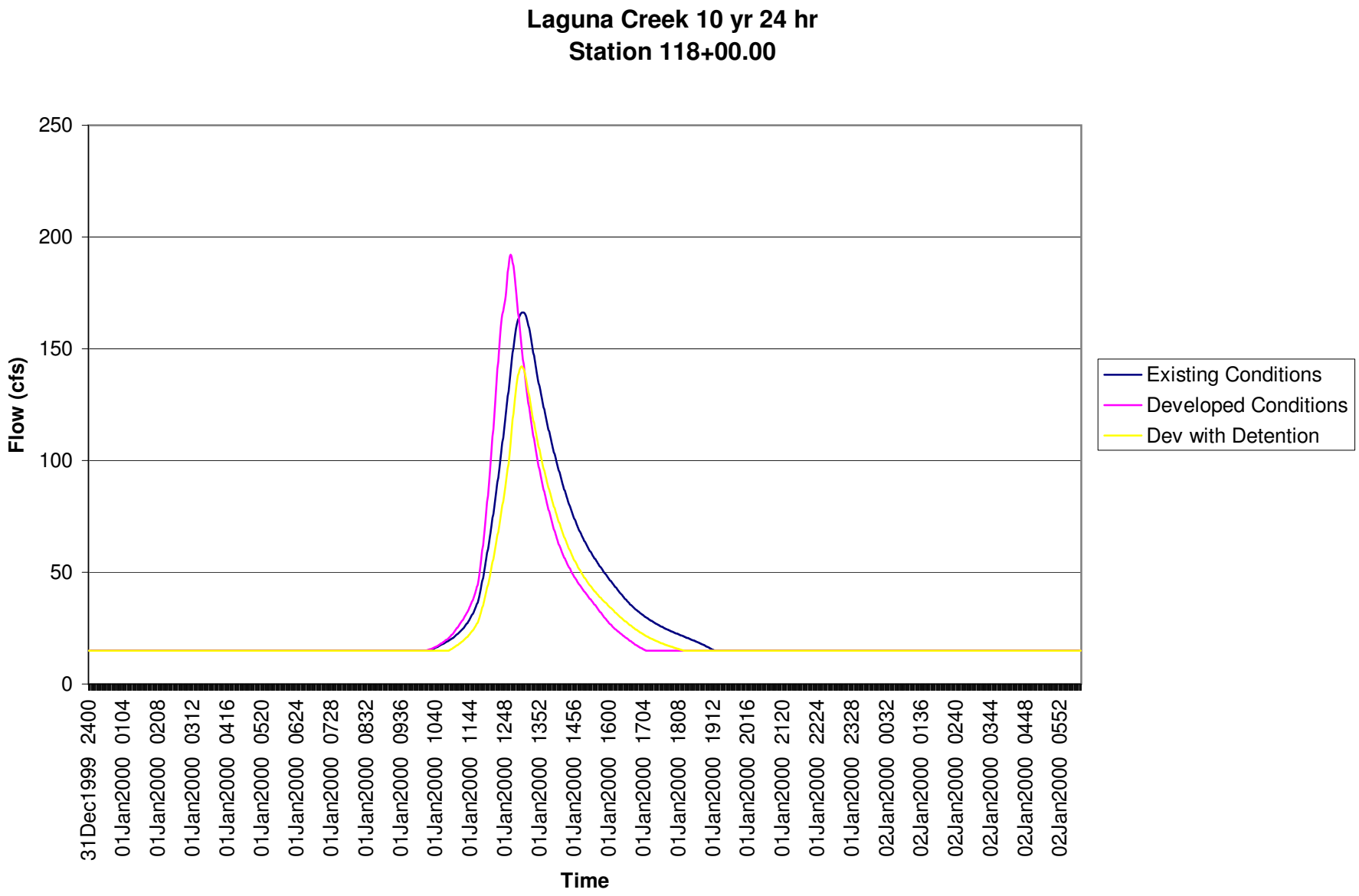
Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and
100 yr 24 hour storms
Plan: LagunaCreek Existing 10 Yr - Existing Conditions With 10 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	166.26	222.00	223.00	223.01	223.28	0.031769	4.23	39.30	76.93	1.04
LCr1	11600	Max WS	166.14	218.27	219.66		219.72	0.003393	1.84	90.54	115.87	0.37
LCr1	11400	Max WS	168.15	218.00	219.27		219.30	0.001321	1.22	138.39	162.02	0.23
LCr1	11199.56	Max WS	170.77	217.17	218.12		218.23	0.016419	2.63	64.84	157.56	0.72
LCr1	11000	Max WS	174.38	216.00	217.02		217.05	0.002155	1.37	127.14	179.19	0.29
LCr1	10800	Max WS	176.56	215.87	216.56		216.59	0.003652	1.52	116.04	207.92	0.36
LCr1	10600	Max WS	179.75	213.84	216.30		216.30	0.000057	0.42	430.37	235.45	0.05
LCr1	10400	Max WS	181.66	213.96	214.76	214.75	214.98	0.029726	3.73	48.72	109.65	0.99
LCr1	10203.13	Max WS	185.14	212.00	212.96		213.04	0.005918	2.17	85.32	128.92	0.47
LCr1	10000	Max WS	185.70	211.37	212.29		212.33	0.005235	1.65	112.88	235.69	0.42
LCr1	9800	Max WS	186.80	210.08	211.64		211.71	0.004251	2.08	89.85	112.88	0.41
LCr1	9600	Max WS	192.43	209.75	210.96		211.01	0.003586	1.82	105.70	142.67	0.37
LCr1	9400	Max WS	194.19	209.25	210.17		210.25	0.013756	2.28	85.15	224.79	0.65
LCr1	9200	Max WS	198.24	208.08	209.60		209.63	0.001617	1.40	141.18	154.87	0.26

LCr1	9000	Max WS	201.13	207.92	209.23		209.27	0.002569	1.63	123.68	154.04	0.32
LCr1	8800	Max WS	202.33	206.56	208.21		208.30	0.008141	2.40	84.24	138.80	0.54
LCr1	8700.*	Max WS	183.15	206.27	207.73		207.77	0.002940	1.63	112.66	155.31	0.34
LCr1	8600	Max WS	178.16	205.99	207.61		207.62	0.000437	0.84	213.05	190.59	0.14
LCr1	8400	Max WS	177.96	204.73	207.57		207.58	0.000044	0.36	498.69	285.27	0.05
LCr1	8200	Max WS	179.58	204.47	207.57		207.57	0.000024	0.29	610.42	295.27	0.04
LCr1	8000	Max WS	181.44	204.00	207.56		207.57	0.000019	0.26	701.47	345.81	0.03
LCr1	7913.41	Max WS	181.32	202.87	207.45		207.66	0.001501	3.68	49.29	27.30	0.31
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	181.31	202.72	204.43	204.80	205.95	0.036603	9.90	18.31	303.69	1.36
LCr1	7799.859	Max WS	181.27	202.16	203.72		203.73	0.001071	1.00	180.82	241.38	0.20
LCr1	7600	Max WS	181.16	202.00	203.40		203.44	0.002522	1.54	117.55	156.52	0.31
LCr1	7400	Max WS	181.13	202.00	202.88		202.92	0.005658	1.77	102.34	202.96	0.44
LCr1	7200	Max WS	181.13	200.92	201.90		201.97	0.007008	2.09	86.69	157.36	0.50
LCr1	7000	Max WS	181.04	200.00	201.13		201.16	0.001794	1.30	139.51	186.24	0.26
LCr1	6800	Max WS	180.99	199.47	200.45		200.50	0.005212	1.71	105.91	208.15	0.42
LCr1	6700.*	Max WS	180.94	198.74	199.94		200.00	0.006734	2.02	89.39	165.17	0.48
LCr1	6600	Max WS	180.41	198.00	199.60		199.63	0.002362	1.56	115.64	143.90	0.31
LCr1	6400	Max WS	347.86	198.00	198.63		198.70	0.007544	2.14	162.65	301.36	0.51
LCr1	6200	Max WS	347.83	196.00	197.55		197.64	0.004614	2.44	142.73	150.34	0.44
LCr1	6000	Max WS	347.80	196.00	196.71	196.48	196.78	0.006302	2.02	172.56	305.35	0.47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150
100
50
0
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01Jan2000 0312
01Jan2000 0416
01Jan2000 0520
01Jan2000 0624
01Jan2000 0728
01Jan2000 0832
01Jan2000 0936
01Jan2000 1040
01Jan2000 1144
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01Jan2000 1352
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01Jan2000 2224
01Jan2000 2328
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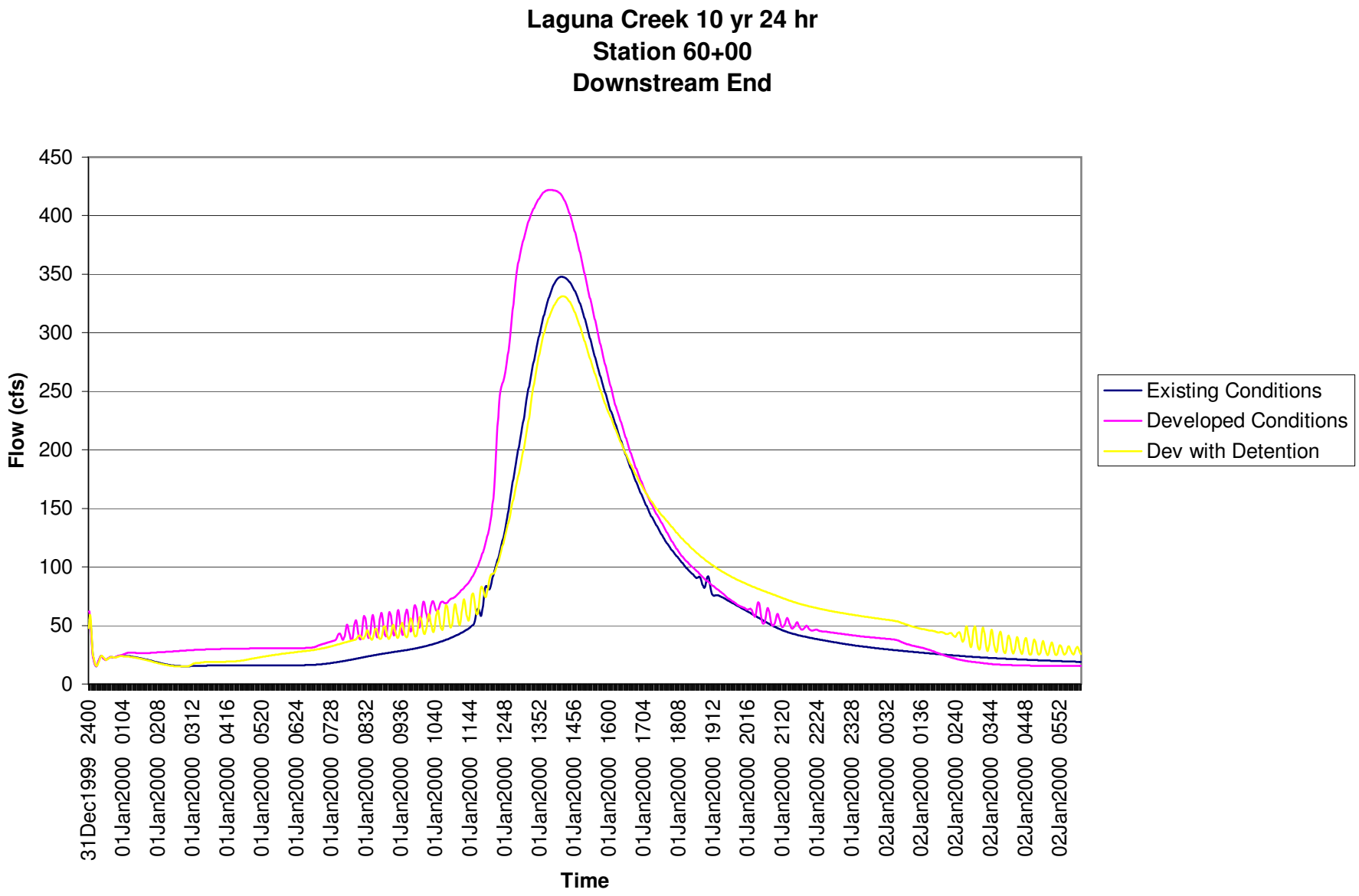
Time
Existing Conditions
Developed Conditions
Dev with Detention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Time
Existing Conditions
Developed Conditions
Dev with Detention

Upper Laguna Creek Tributary

Existing Conditions Model:

100-Year 24-Hour Storm

```
                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


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PROJECT DATA
Project Title: LagunaCreek
Project File : LagunaCreek_Dev.prj
Run Date and Time: 3/9/2011 4:50:41 PM

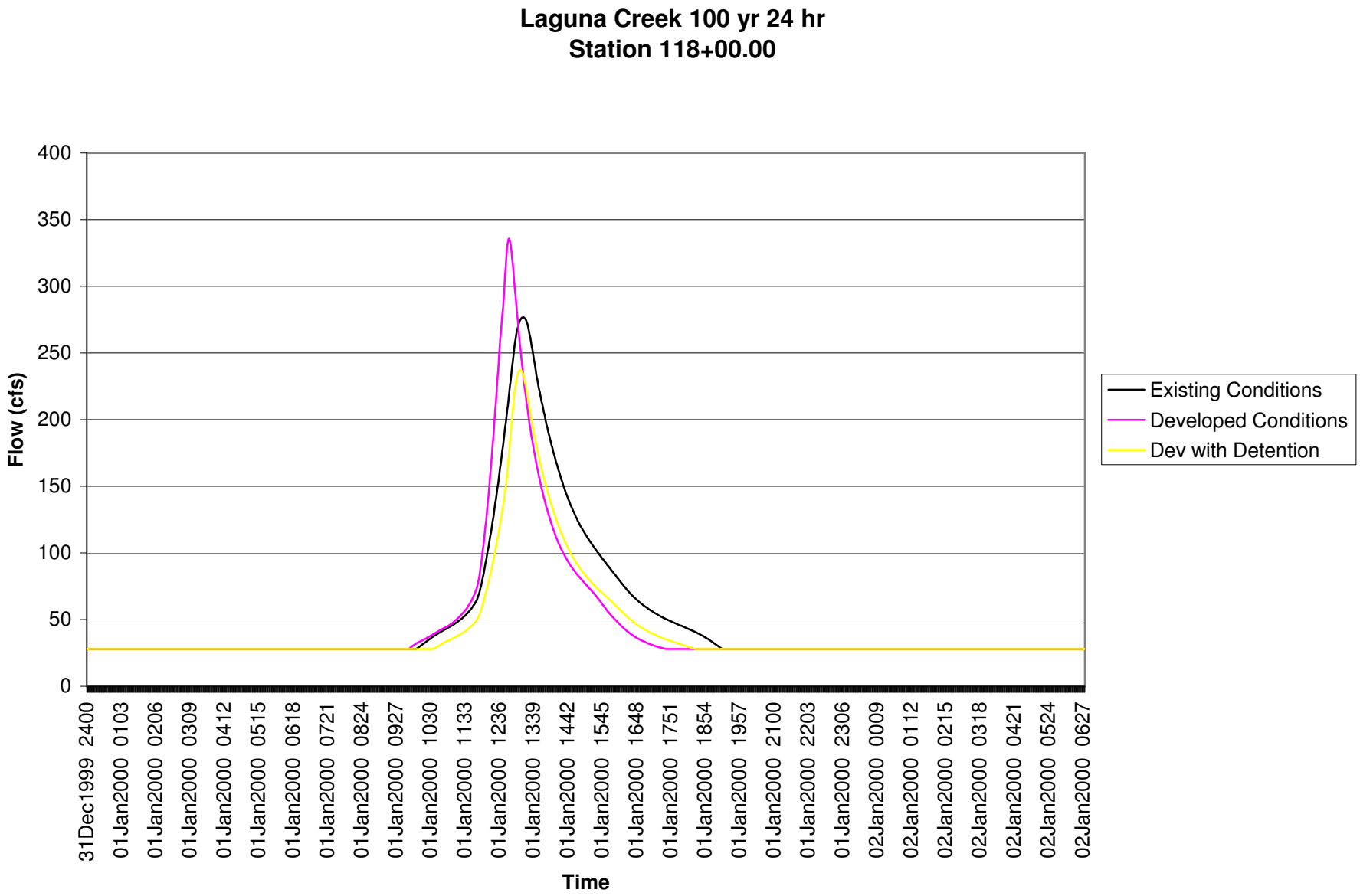
Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and
100 yr 24 hour storms
Plan: LagunaCreek Existing 100 Yr - Existing Conditions
With 100 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	276.78	222.00	223.20	223.24	223.59	0.032573	5.01	55.24	85.47	1.10
LCr1	11600	Max WS	276.67	218.27	219.98		220.05	0.003494	2.12	130.68	137.99	0.38
LCr1	11400	Max WS	280.12	218.00	219.53		219.56	0.001649	1.55	181.09	174.32	0.27
LCr1	11199.56	Max WS	284.51	217.17	218.36		218.47	0.010547	2.64	107.85	187.53	0.61
LCr1	11000	Max WS	290.53	216.00	217.28		217.32	0.002224	1.67	174.23	187.51	0.30
LCr1	10800	Max WS	293.63	215.87	216.78		216.83	0.003459	1.81	162.64	216.47	0.37
LCr1	10600	Max WS	298.44	213.84	216.52		216.52	0.000110	0.62	482.29	241.31	0.08
LCr1	10400	Max WS	301.44	213.96	215.04		215.24	0.019130	3.59	83.87	143.29	0.83
LCr1	10203.13	Max WS	307.05	212.00	213.29		213.38	0.004755	2.33	131.99	152.45	0.44
LCr1	10000	Max WS	307.87	211.37	212.63		212.67	0.002475	1.58	195.02	246.92	0.31
LCr1	9800	Max WS	309.76	210.08	211.96		212.05	0.004333	2.40	128.81	132.00	0.43
LCr1	9600	Max WS	318.96	209.75	211.24		211.31	0.003646	2.17	146.83	153.98	0.39
LCr1	9400	Max WS	321.86	209.25	210.52		210.58	0.004486	1.94	165.63	239.89	0.41

LCr1	9200	Max WS	328.80	208.08	209.96		210.00	0.001696	1.63	201.19	182.16	0.27
LCr1	9000	Max WS	308.38	207.92	209.41		209.48	0.003271	2.02	152.31	163.66	0.37
LCr1	8800	Max WS	269.50	206.56	209.11		209.13	0.000750	1.16	231.54	189.09	0.19
LCr1	8700.*	Max WS	269.74	206.27	209.07		209.08	0.000205	0.73	368.16	227.40	0.10
LCr1	8600	Max WS	270.23	205.99	209.06		209.07	0.000068	0.50	545.28	264.63	0.06
LCr1	8400	Max WS	272.52	204.73	209.06		209.06	0.000014	0.29	956.11	328.77	0.03
LCr1	8200	Max WS	275.57	204.47	209.06		209.06	0.000010	0.24	1151.86	406.05	0.03
LCr1	8000	Max WS	279.13	204.00	209.05		209.05	0.000008	0.22	1254.16	400.80	0.02
LCr1	7913.41	Max WS	279.10	202.87	208.95		209.22	0.001315	4.20	66.43	214.83	0.31
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	279.08	202.72	204.82	205.47	207.18	0.042926	12.34	22.61	316.72	1.53
LCr1	7799.859	Max WS	279.02	202.16	203.96		203.98	0.001146	1.15	242.99	278.33	0.22
LCr1	7600	Max WS	278.96	202.00	203.64		203.69	0.002668	1.76	158.71	181.00	0.33
LCr1	7400	Max WS	278.92	202.00	203.07		203.13	0.004516	1.95	142.94	206.80	0.41
LCr1	7200	Max WS	278.90	200.92	202.08		202.17	0.007179	2.39	116.81	176.77	0.52
LCr1	7000	Max WS	278.87	200.00	201.28		201.32	0.002420	1.66	167.77	193.33	0.31
LCr1	6800	Max WS	278.83	199.47	200.63		200.69	0.004585	1.93	144.37	214.50	0.41
LCr1	6700.*	Max WS	278.38	198.74	200.17		200.24	0.005337	2.11	131.85	192.10	0.45
LCr1	6600	Max WS	276.17	198.00	199.79		199.85	0.003018	1.90	145.47	162.09	0.35
LCr1	6400	Max WS	564.47	198.00	198.91		198.99	0.004965	2.25	250.37	313.17	0.44
LCr1	6200	Max WS	564.43	196.00	197.87		198.00	0.005164	2.93	192.50	167.17	0.48
LCr1	6000	Max WS	564.39	196.00	196.94	196.61	197.03	0.005576	2.31	243.85	319.83	0.47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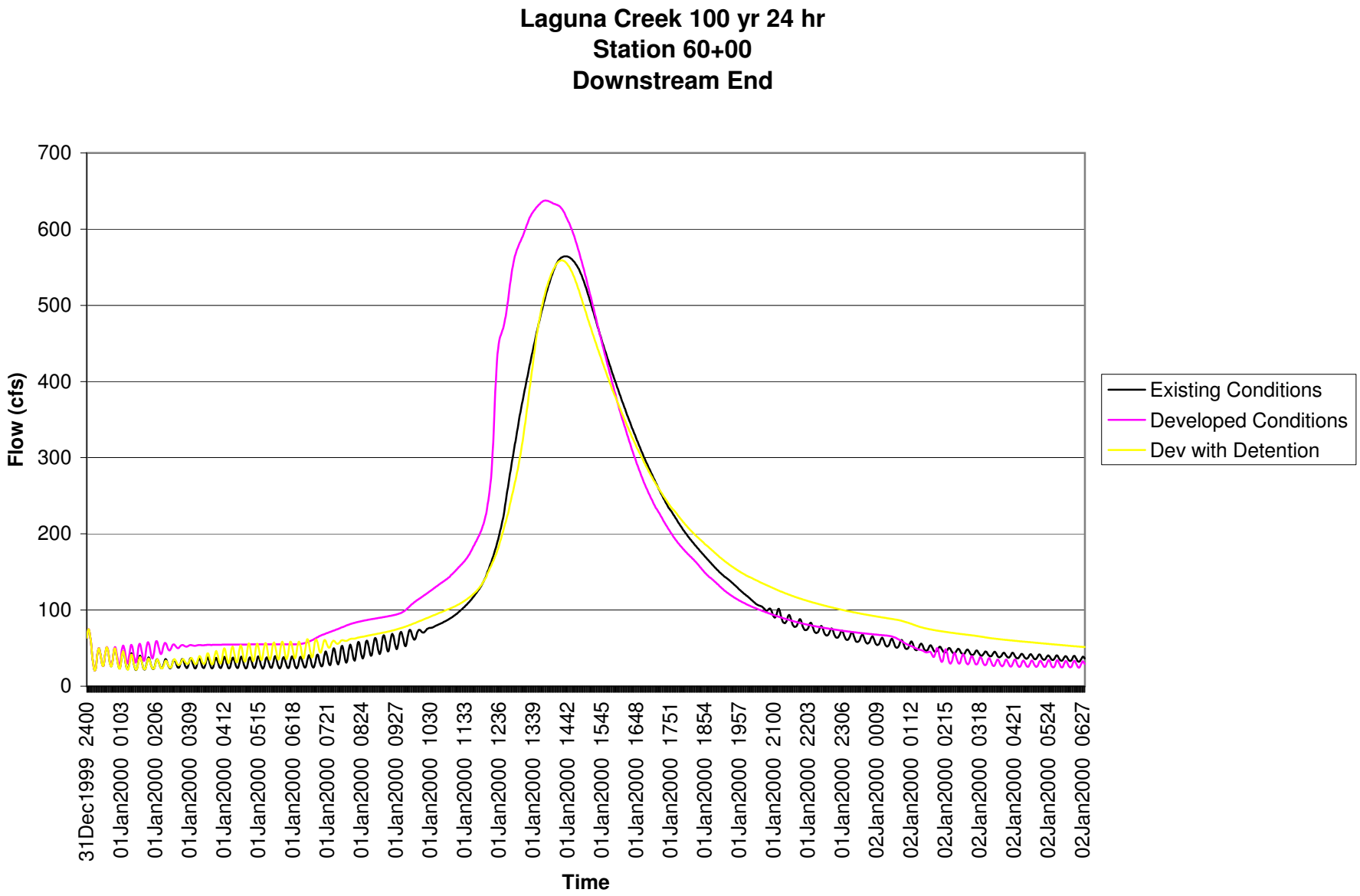
Time
Existing Conditions
Developed Conditions
Dev with Detention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Station 60+00
Downstream End
Flow (cfs)
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600
500
400
300
200
100
0
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01Jan2000 2306
02Jan2000 0009
02Jan2000 0112
02Jan2000 0215
02Jan2000 0318
02Jan2000 0421
02Jan2000 0524
02Jan2000 0627
Time
Existing Conditions
Developed Conditions
Dev with Detention

Upper Laguna Creek Tributary

Existing Conditions Model:

2-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


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PROJECT DATA
Project Title: LagunaCreek
Project File : LagunaCreek_Dev.prj
Run Date and Time: 3/8/2011 3:42:24 PM

Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and
100 yr 24 hour storms
Plan: LagunaCreek Existing 2 Yr - Existing Conditions With 2 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	80.86	222.00	222.71	222.76	222.97	0.048316	4.09	19.79	55.91	1.21
LCr1	11600	Max WS	80.82	218.27	219.34		219.37	0.002924	1.44	56.24	92.89	0.33
LCr1	11400	Max WS	82.04	218.00	218.97		218.98	0.001091	0.90	91.62	146.91	0.20
LCr1	11199.56	Max WS	83.60	217.17	217.83		217.93	0.016193	2.52	33.24	85.62	0.71
LCr1	11000	Max WS	85.68	216.00	216.75		216.77	0.002273	1.07	80.08	170.46	0.28
LCr1	10800	Max WS	86.96	215.87	216.41		216.43	0.002313	1.01	86.26	203.51	0.27
LCr1	10600	Max WS	60.07	213.84	216.24		216.24	0.000007	0.14	415.51	233.75	0.02
LCr1	10400	Max WS	90.23	213.96	214.55	214.54	214.71	0.030307	3.14	28.71	84.73	0.95
LCr1	10203.13	Max WS	30.83	212.00	212.86		212.86	0.000261	0.43	72.35	120.85	0.10
LCr1	10000	Max WS	92.81	211.37	212.02		212.07	0.016686	1.81	51.32	221.83	0.66
LCr1	9800	Max WS	93.50	210.08	211.24		211.30	0.005910	1.91	49.02	89.73	0.45
LCr1	9600	Max WS	36.30	209.75	210.72		210.73	0.000382	0.50	72.69	127.50	0.12
LCr1	9400	Max WS	98.06	209.25	209.92	209.92	210.05	0.037661	2.88	34.03	134.65	1.01
LCr1	9200	Max WS	100.61	208.08	209.25		209.27	0.001387	1.09	91.99	130.85	0.23

LCr1	9000	Max WS	102.33	207.92	208.77		208.82	0.004169	1.63	62.86	112.39	0.38
LCr1	8800	Max WS	103.04	206.56	207.90		207.97	0.005035	2.08	49.45	70.29	0.44
LCr1	8700.*	Max WS	104.24	206.27	207.25		207.32	0.008887	2.14	48.80	102.43	0.55
LCr1	8600	Max WS	103.23	205.99	206.67		206.72	0.005505	1.70	60.59	124.66	0.43
LCr1	8400	Max WS	95.81	204.73	206.28		206.28	0.000449	0.60	159.34	238.26	0.13
LCr1	8200	Max WS	96.42	204.47	206.24		206.24	0.000111	0.39	247.68	248.92	0.07
LCr1	8000	Max WS	97.68	204.00	206.22		206.22	0.000097	0.36	275.06	288.06	0.06
LCr1	7913.41	Max WS	97.65	202.87	206.11		206.23	0.001513	2.88	33.92	20.51	0.29
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	97.63	202.72	203.99	204.12	204.81	0.029724	7.26	13.44	60.08	1.16
LCr1	7799.859	Max WS	97.59	202.16	203.39		203.41	0.001182	0.89	110.13	190.39	0.21
LCr1	7600	Max WS	97.54	202.00	203.15		203.17	0.001977	1.20	81.28	131.22	0.27
LCr1	7400	Max WS	97.50	202.00	202.67		202.71	0.007811	1.58	61.57	183.77	0.48
LCr1	7200	Max WS	97.50	200.92	201.67		201.73	0.009251	1.87	52.23	138.29	0.54
LCr1	7000	Max WS	97.44	200.00	200.83		200.85	0.002308	1.13	86.48	172.35	0.28
LCr1	6900.*	Max WS	97.41	199.74	200.59		200.62	0.003545	1.24	78.30	185.60	0.34
LCr1	6800	Max WS	97.39	199.47	200.23		200.27	0.009386	1.62	60.28	200.35	0.52
LCr1	6700.*	Max WS	97.25	198.74	199.73		199.77	0.005623	1.65	58.93	129.22	0.43
LCr1	6600	Max WS	21.28	198.00	199.49		199.49	0.000047	0.21	101.16	134.18	0.04
LCr1	6400	Max WS	179.64	198.00	198.38		198.44	0.014243	2.01	89.27	291.88	0.64
LCr1	6200	Max WS	179.62	196.00	197.27		197.32	0.003180	1.74	102.95	135.41	0.35
LCr1	6000	Max WS	179.60	196.00	196.54	196.34	196.57	0.005306	1.50	119.86	290.82	0.41

7.8 Appendix H: Unnamed Deer Creek Tributary Existing Conditions HEC-RAS Results

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	28400	Max WS	100yrExist	161.88	220.00	221.36
1	28400	Max WS	10yrExist	93.89	220.00	221.12
1	28400	Max WS	2yrExist	43.44	220.00	220.89
1	28313.0*	Max WS	100yrExist	161.80	219.58	220.92
1	28313.0*	Max WS	10yrExist	93.84	219.58	220.68
1	28313.0*	Max WS	2yrExist	43.40	219.58	220.47
1	28226.0*	Max WS	100yrExist	161.71	219.15	220.42
1	28226.0*	Max WS	10yrExist	93.81	219.15	220.25
1	28226.0*	Max WS	2yrExist	43.38	219.15	219.98
1	28139.07	Max WS	100yrExist	161.63	218.73	219.96
1	28139.07	Max WS	10yrExist	93.77	218.73	219.77
1	28139.07	Max WS	2yrExist	43.31	218.73	219.53
1	28069.5*	Max WS	100yrExist	167.01	218.22	219.48
1	28069.5*	Max WS	10yrExist	96.89	218.22	219.29
1	28069.5*	Max WS	2yrExist	44.76	218.22	219.08
1	28000	Max WS	100yrExist	172.44	217.71	218.96
1	28000	Max WS	10yrExist	99.99	217.71	218.78
1	28000	Max WS	2yrExist	46.20	217.71	218.57
1	27900.*	Max WS	100yrExist	182.11	216.97	217.97
1	27900.*	Max WS	10yrExist	105.60	216.97	217.76
1	27900.*	Max WS	2yrExist	48.79	216.97	217.54
1	27800	Max WS	100yrExist	191.69	216.23	217.36
1	27800	Max WS	10yrExist	111.11	216.23	217.08
1	27800	Max WS	2yrExist	51.32	216.23	216.78
1	27700.*	Max WS	100yrExist	201.43	215.51	217.08
1	27700.*	Max WS	10yrExist	116.82	215.51	216.84
1	27700.*	Max WS	2yrExist	53.91	215.51	216.57
1	27600	Max WS	100yrExist	211.35	214.80	216.57
1	27600	Max WS	10yrExist	122.50	214.80	216.38
1	27600	Max WS	2yrExist	56.50	214.80	216.12
1	27500.*	Max WS	100yrExist	222.48	214.08	215.69
1	27500.*	Max WS	10yrExist	128.91	214.08	215.47
1	27500.*	Max WS	2yrExist	59.46	214.08	215.22
1	27400	Max WS	100yrExist	233.49	213.35	215.14
1	27400	Max WS	10yrExist	135.27	213.35	214.85
1	27400	Max WS	2yrExist	62.39	213.35	214.53
1	27329.7*	Max WS	100yrExist	238.66	212.84	214.93
1	27329.7*	Max WS	10yrExist	138.21	212.84	214.63
1	27329.7*	Max WS	2yrExist	63.10	212.84	214.27

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	27259.5*	Max WS	100yrExist	243.86	212.32	214.68
1	27259.5*	Max WS	10yrExist	141.02	212.32	214.34
1	27259.5*	Max WS	2yrExist	64.20	212.32	213.93
1	27189.29	Max WS	100yrExist	249.08	211.81	214.30
1	27189.29	Max WS	10yrExist	143.94	211.81	213.93
1	27189.29	Max WS	2yrExist	66.73	211.81	213.45
1	27094.6*	Max WS	100yrExist	257.58	211.10	213.53
1	27094.6*	Max WS	10yrExist	148.83	211.10	213.15
1	27094.6*	Max WS	2yrExist	69.02	211.10	212.64
1	27000	Max WS	100yrExist	266.22	210.39	212.90
1	27000	Max WS	10yrExist	153.82	210.39	212.52
1	27000	Max WS	2yrExist	71.29	210.39	212.04
1	26900.*	Max WS	100yrExist	275.82	209.64	212.35
1	26900.*	Max WS	10yrExist	159.40	209.64	212.01
1	26900.*	Max WS	2yrExist	73.86	209.64	211.63
1	26800	Max WS	100yrExist	275.51	208.88	211.74
1	26800	Max WS	10yrExist	164.95	208.88	211.38
1	26800	Max WS	2yrExist	76.41	208.88	210.94
1	26700.*	Max WS	100yrExist	294.44	208.12	210.98
1	26700.*	Max WS	10yrExist	170.06	208.12	210.64
1	26700.*	Max WS	2yrExist	78.74	208.12	210.11
1	26600	Max WS	100yrExist	303.11	207.37	210.45
1	26600	Max WS	10yrExist	174.62	207.37	210.19
1	26600	Max WS	2yrExist	80.96	207.37	209.60
1	26528.4*	Max WS	100yrExist	304.09	206.83	210.21
1	26528.4*	Max WS	10yrExist	175.16	206.83	209.95
1	26528.4*	Max WS	2yrExist	81.24	206.83	209.34
1	26456.8*	Max WS	100yrExist	284.86	206.29	210.03
1	26456.8*	Max WS	10yrExist	163.25	206.29	209.68
1	26456.8*	Max WS	2yrExist	81.43	206.29	209.03
1	26385.31	Max WS	100yrExist	306.16	205.75	209.51
1	26385.31	Max WS	10yrExist	175.99	205.75	209.16
1	26385.31	Max WS	2yrExist	81.72	205.75	208.45
1	26292.6*	Max WS	100yrExist	311.07	205.40	208.51
1	26292.6*	Max WS	10yrExist	178.93	205.40	208.16
1	26292.6*	Max WS	2yrExist	83.12	205.40	207.50
1	26200	Max WS	100yrExist	315.93	205.06	207.65
1	26200	Max WS	10yrExist	181.97	205.06	207.28

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	26200	Max WS	2yrExist	84.54	205.06	206.78
1	26100.*	Max WS	100yrExist	320.77	204.69	207.03
1	26100.*	Max WS	10yrExist	184.79	204.69	206.65
1	26100.*	Max WS	2yrExist	85.86	204.69	206.19
1	26000	Max WS	100yrExist	325.41	204.32	206.65
1	26000	Max WS	10yrExist	187.54	204.32	206.26
1	26000	Max WS	2yrExist	87.14	204.32	205.79
1	25900.*	Max WS	100yrExist	330.14	203.95	206.29
1	25900.*	Max WS	10yrExist	190.53	203.95	205.92
1	25900.*	Max WS	2yrExist	88.47	203.95	205.46
1	25800	Max WS	100yrExist	335.25	203.57	205.88
1	25800	Max WS	10yrExist	193.47	203.57	205.55
1	25800	Max WS	2yrExist	89.88	203.57	205.13
1	25700.*	Max WS	100yrExist	340.15	203.20	205.41
1	25700.*	Max WS	10yrExist	196.42	203.20	205.11
1	25700.*	Max WS	2yrExist	91.26	203.20	204.77
1	25600	Max WS	100yrExist	345.16	202.83	205.05
1	25600	Max WS	10yrExist	199.31	202.83	204.76
1	25600	Max WS	2yrExist	92.50	202.83	204.46
1	25500.*	Max WS	100yrExist	349.44	202.46	204.64
1	25500.*	Max WS	10yrExist	201.99	202.46	204.37
1	25500.*	Max WS	2yrExist	93.65	202.46	204.04
1	25400	Max WS	100yrExist	354.25	202.09	204.32
1	25400	Max WS	10yrExist	204.70	202.09	204.06
1	25400	Max WS	2yrExist	94.67	202.09	203.77
1	25358.8*	Max WS	100yrExist	355.89	202.00	204.20
1	25358.8*	Max WS	10yrExist	205.82	202.00	203.94
1	25358.8*	Max WS	2yrExist	95.20	202.00	203.69
1	25317.6*	Max WS	100yrExist	357.87	201.92	204.04
1	25317.6*	Max WS	10yrExist	206.88	201.92	203.79
1	25317.6*	Max WS	2yrExist	95.59	201.92	203.61
1	25276.3*	Max WS	100yrExist	359.82	201.83	203.86
1	25276.3*	Max WS	10yrExist	208.05	201.83	203.61
1	25276.3*	Max WS	2yrExist	96.11	201.83	203.54
1	25235.1*	Max WS	100yrExist	361.75	201.75	203.67
1	25235.1*	Max WS	10yrExist	99.61	201.75	203.52
1	25235.1*	Max WS	2yrExist	96.56	201.75	203.51
1	25193.99	Max WS	100yrExist	363.66	201.66	203.49

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	25193.99	Max WS	10yrExist	210.39	201.66	203.24
1	25193.99	Max WS	2yrExist	97.11	201.66	203.10
1	25145.4*	Max WS	100yrExist	366.15	201.36	203.19
1	25145.4*	Max WS	10yrExist	211.88	201.36	202.95
1	25145.4*	Max WS	2yrExist	97.81	201.36	202.61
1	25097.*	Max WS	100yrExist	368.73	201.05	202.79
1	25097.*	Max WS	10yrExist	213.33	201.05	202.52
1	25097.*	Max WS	2yrExist	98.52	201.05	202.16
1	25048.5*	Max WS	100yrExist	370.98	200.75	202.48
1	25048.5*	Max WS	10yrExist	214.66	200.75	202.15
1	25048.5*	Max WS	2yrExist	99.19	200.75	201.76
1	25000	Max WS	100yrExist	373.48	200.45	202.35
1	25000	Max WS	10yrExist	216.16	200.45	201.98
1	25000	Max WS	2yrExist	99.90	200.45	201.56
1	24900.*	Max WS	100yrExist	377.94	200.04	202.14
1	24900.*	Max WS	10yrExist	218.81	200.04	201.75
1	24900.*	Max WS	2yrExist	101.19	200.04	201.31
1	24800	Max WS	100yrExist	382.76	199.63	201.77
1	24800	Max WS	10yrExist	221.68	199.63	201.39
1	24800	Max WS	2yrExist	102.49	199.63	200.99
1	24700.*	Max WS	100yrExist	387.90	199.20	201.19
1	24700.*	Max WS	10yrExist	224.60	199.20	200.95
1	24700.*	Max WS	2yrExist	103.95	199.20	200.58
1	24600	Max WS	100yrExist	393.03	198.77	200.54
1	24600	Max WS	10yrExist	227.62	198.77	200.31
1	24600	Max WS	2yrExist	105.37	198.77	200.01
1	24500.*	Max WS	100yrExist	398.27	198.34	200.02
1	24500.*	Max WS	10yrExist	191.86	198.34	199.81
1	24500.*	Max WS	2yrExist	104.03	198.34	199.59
1	24400	Max WS	100yrExist	403.69	197.91	199.81
1	24400	Max WS	10yrExist	186.54	197.91	199.72
1	24400	Max WS	2yrExist	104.61	197.91	199.49
1	24328.0*	Max WS	100yrExist	406.89	197.60	199.76
1	24328.0*	Max WS	10yrExist	181.33	197.60	199.71
1	24328.0*	Max WS	2yrExist	105.39	197.60	199.48
1	24256.1*	Max WS	100yrExist	177.32	197.29	199.69
1	24256.1*	Max WS	10yrExist	175.66	197.29	199.69
1	24256.1*	Max WS	2yrExist	106.15	197.29	199.40

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	24184.18	Max WS	100yrExist	413.48	196.98	199.30
1	24184.18	Max WS	10yrExist	279.16	196.98	199.20
1	24184.18	Max WS	2yrExist	106.95	196.98	198.87
1	24092.0*	Max WS	100yrExist	417.78	196.51	198.90
1	24092.0*	Max WS	10yrExist	242.22	196.51	198.56
1	24092.0*	Max WS	2yrExist	108.10	196.51	198.31
1	24000	Max WS	100yrExist	422.13	196.03	198.42
1	24000	Max WS	10yrExist	244.95	196.03	198.11
1	24000	Max WS	2yrExist	109.29	196.03	197.78
1	23900.*	Max WS	100yrExist	427.00	195.51	197.91
1	23900.*	Max WS	10yrExist	247.74	195.51	197.63
1	23900.*	Max WS	2yrExist	110.31	195.51	197.28
1	23800	Max WS	100yrExist	431.75	194.99	197.45
1	23800	Max WS	10yrExist	250.50	194.99	197.17
1	23800	Max WS	2yrExist	111.28	194.99	196.85
1	23700.*	Max WS	100yrExist	435.70	194.47	197.03
1	23700.*	Max WS	10yrExist	252.84	194.47	196.82
1	23700.*	Max WS	2yrExist	112.38	194.47	196.52
1	23600	Max WS	100yrExist	439.08	193.95	196.54
1	23600	Max WS	10yrExist	255.07	193.95	196.25
1	23600	Max WS	2yrExist	121.02	193.95	195.89
1	23400	Max WS	100yrExist	473.79	192.92	196.00
1	23400	Max WS	10yrExist	274.90	192.92	195.56
1	23400	Max WS	2yrExist	124.33	192.92	195.01
1	23178.25	Max WS	100yrExist	510.21	191.76	195.37
1	23178.25	Max WS	10yrExist	295.86	191.76	194.97
1	23178.25	Max WS	2yrExist	133.26	191.76	194.23
1	23000	Max WS	100yrExist	546.39	191.25	194.51
1	23000	Max WS	10yrExist	316.70	191.25	194.08
1	23000	Max WS	2yrExist	142.47	191.25	193.34
1	22600	Max WS	100yrExist	605.57	190.00	193.13
1	22600	Max WS	10yrExist	349.22	190.00	192.69
1	22600	Max WS	2yrExist	157.71	190.00	192.02
1	22400	Max WS	100yrExist	687.34	189.54	192.83
1	22400	Max WS	10yrExist	395.15	189.54	192.46
1	22400	Max WS	2yrExist	178.46	189.54	191.76
1	22175.79	Max WS	100yrExist	690.40	188.90	192.00
1	22175.79	Max WS	10yrExist	397.10	188.90	191.51
1	22175.79	Max WS	2yrExist	179.38	188.90	190.94

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	22000	Max WS	100yrExist	692.50	188.07	191.20
1	22000	Max WS	10yrExist	398.44	188.07	190.69
1	22000	Max WS	2yrExist	180.00	188.07	190.06
1	21900.*	Max WS	100yrExist	693.26	187.59	190.88
1	21900.*	Max WS	10yrExist	399.00	187.59	190.36
1	21900.*	Max WS	2yrExist	180.31	187.59	189.70
1	21800	Max WS	100yrExist	694.47	187.11	190.68
1	21800	Max WS	10yrExist	399.82	187.11	190.14
1	21800	Max WS	2yrExist	180.66	187.11	189.42
1	21600	Max WS	100yrExist	696.84	186.14	189.70
1	21600	Max WS	10yrExist	401.06	186.14	189.14
1	21600	Max WS	2yrExist	181.28	186.14	188.44
1	21400	Max WS	100yrExist	699.51	185.21	189.09
1	21400	Max WS	10yrExist	402.41	185.21	188.54
1	21400	Max WS	2yrExist	181.91	185.21	187.83
1	21176.29	Max WS	100yrExist	702.02	184.07	188.62
1	21176.29	Max WS	10yrExist	403.39	184.07	188.18
1	21176.29	Max WS	2yrExist	182.45	184.07	187.50
1	20962.10	Max WS	100yrExist	704.53	184.10	187.69
1	20962.10	Max WS	10yrExist	404.56	184.10	187.21
1	20962.10	Max WS	2yrExist	183.20	184.10	186.70
1	20895.2*	Max WS	100yrExist	704.89	183.95	187.50
1	20895.2*	Max WS	10yrExist	404.71	183.95	187.02
1	20895.2*	Max WS	2yrExist	183.40	183.95	186.51
1	20828.3*	Max WS	100yrExist	705.87	183.80	187.34
1	20828.3*	Max WS	10yrExist	404.71	183.80	186.88
1	20828.3*	Max WS	2yrExist	177.29	183.80	186.40
1	20761.52	Max WS	100yrExist	706.80	183.65	187.07
1	20761.52	Max WS	10yrExist	404.60	183.65	186.61
1	20761.52	Max WS	2yrExist	183.91	183.65	185.92
1	20712.0*	Max WS	100yrExist	708.21	182.57	186.71
1	20712.0*	Max WS	10yrExist	404.74	182.57	186.19
1	20712.0*	Max WS	2yrExist	184.01	182.57	185.39
1	20662.66	Max WS	100yrExist	709.28	181.49	186.37
1	20662.66	Max WS	10yrExist	405.92	181.49	185.94
1	20662.66	Max WS	2yrExist	184.14	181.49	185.24
1	20642.13	Max WS	100yrExist	709.85	181.53	186.20
1	20642.13	Max WS	10yrExist	405.87	181.53	185.83

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	20642.13	Max WS	2yrExist	184.00	181.53	185.13
1	20614.23	Max WS	100yrExist	710.83	180.88	186.13
1	20614.23	Max WS	10yrExist	407.94	180.88	185.72
1	20614.23	Max WS	2yrExist	184.47	180.88	185.16
1	20399.06	Max WS	100yrExist	688.48	181.78	185.61
1	20399.06	Max WS	10yrExist	407.25	181.78	185.34
1	20399.06	Max WS	2yrExist	185.02	181.78	184.78
1	20131.75	Max WS	100yrExist	717.32	180.89	184.82
1	20131.75	Max WS	10yrExist	410.44	180.89	184.14
1	20131.75	Max WS	2yrExist	186.28	180.89	183.35
1	19831.49	Max WS	100yrExist	788.58	179.01	183.11
1	19831.49	Max WS	10yrExist	413.19	179.01	182.19
1	19831.49	Max WS	2yrExist	187.66	179.01	181.36
1	19561.71	Max WS	100yrExist	772.33	176.06	181.97
1	19561.71	Max WS	10yrExist	413.14	176.06	181.34
1	19561.71	Max WS	2yrExist	188.49	176.06	180.60
1	19375.20	Max WS	100yrExist	764.69	173.23	181.79
1	19375.20	Max WS	10yrExist	415.39	173.23	181.24
1	19375.20	Max WS	2yrExist	189.36	173.23	180.56
1	19216.24	Max WS	100yrExist	762.74	176.81	181.64
1	19216.24	Max WS	10yrExist	415.53	176.81	181.12
1	19216.24	Max WS	2yrExist	190.00	176.81	180.43
1	19040.62	Max WS	100yrExist	758.12	176.76	181.25
1	19040.62	Max WS	10yrExist	416.02	176.76	180.75
1	19040.62	Max WS	2yrExist	190.79	176.76	179.93
1	18953.9*	Max WS	100yrExist	756.51	176.83	180.99
1	18953.9*	Max WS	10yrExist	416.88	176.83	180.48
1	18953.9*	Max WS	2yrExist	191.13	176.83	179.70
1	18867.36	Max WS	100yrExist	757.73	176.91	180.50
1	18867.36	Max WS	10yrExist	417.76	176.91	180.01
1	18867.36	Max WS	2yrExist	191.49	176.91	179.41
1	18661.93	Max WS	100yrExist	755.06	175.46	179.65
1	18661.93	Max WS	10yrExist	418.10	175.46	179.12
1	18661.93	Max WS	2yrExist	191.91	175.46	178.35
1	18573.2*	Max WS	100yrExist	756.25	174.86	179.40
1	18573.2*	Max WS	10yrExist	418.85	174.86	178.78
1	18573.2*	Max WS	2yrExist	192.35	174.86	177.79
1	18484.66	Max WS	100yrExist	755.82	174.25	178.90

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	18484.66	Max WS	10yrExist	419.89	174.25	178.28
1	18484.66	Max WS	2yrExist	192.77	174.25	177.37
1	18313.08	Max WS	100yrExist	759.60	174.93	178.05
1	18313.08	Max WS	10yrExist	421.85	174.93	177.61
1	18313.08	Max WS	2yrExist	193.59	174.93	177.00
1	18134.08	Max WS	100yrExist	762.12	174.22	177.49
1	18134.08	Max WS	10yrExist	422.71	174.22	177.01
1	18134.08	Max WS	2yrExist	194.18	174.22	176.32
1	17964.88	Max WS	100yrExist	764.88	172.77	176.54
1	17964.88	Max WS	10yrExist	424.53	172.77	176.10
1	17964.88	Max WS	2yrExist	194.95	172.77	175.45
1	17929.0*	Max WS	100yrExist	765.60	172.49	176.35
1	17929.0*	Max WS	10yrExist	424.82	172.49	175.93
1	17929.0*	Max WS	2yrExist	195.10	172.49	175.37
1	17893.2*	Max WS	100yrExist	766.29	172.22	176.18
1	17893.2*	Max WS	10yrExist	425.22	172.22	175.79
1	17893.2*	Max WS	2yrExist	195.26	172.22	175.27
1	17857.44	Max WS	100yrExist	766.95	171.94	176.00
1	17857.44	Max WS	10yrExist	425.60	171.94	175.65
1	17857.44	Max WS	2yrExist	195.42	171.94	175.14
1	17784.4*	Max WS	100yrExist	768.02	171.95	175.52
1	17784.4*	Max WS	10yrExist	426.35	171.95	175.18
1	17784.4*	Max WS	2yrExist	195.74	171.95	174.77
1	17711.5*	Max WS	100yrExist	769.40	171.97	175.15
1	17711.5*	Max WS	10yrExist	427.01	171.97	174.80
1	17711.5*	Max WS	2yrExist	196.00	171.97	174.38
1	17638.59	Max WS	100yrExist	770.28	171.98	174.91
1	17638.59	Max WS	10yrExist	427.57	171.98	174.57
1	17638.59	Max WS	2yrExist	196.24	171.98	174.13
1	17570.8*	Max WS	100yrExist	771.66	171.69	174.69
1	17570.8*	Max WS	10yrExist	428.06	171.69	174.36
1	17570.8*	Max WS	2yrExist	196.51	171.69	173.88
1	17503.0*	Max WS	100yrExist	772.39	171.40	174.39
1	17503.0*	Max WS	10yrExist	428.52	171.40	173.99
1	17503.0*	Max WS	2yrExist	196.77	171.40	173.54
1	17435.23	Max WS	100yrExist	773.77	171.11	174.13
1	17435.23	Max WS	10yrExist	428.90	171.11	173.73
1	17435.23	Max WS	2yrExist	197.01	171.11	173.28

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	17347.3*	Max WS	100yrExist	775.57	170.31	173.92
1	17347.3*	Max WS	10yrExist	429.75	170.31	173.53
1	17347.3*	Max WS	2yrExist	197.34	170.31	172.93
1	17259.39	Max WS	100yrExist	777.21	169.51	173.37
1	17259.39	Max WS	10yrExist	430.57	169.51	172.99
1	17259.39	Max WS	2yrExist	197.69	169.51	172.33
1	17161.6*	Max WS	100yrExist	778.39	169.43	172.88
1	17161.6*	Max WS	10yrExist	431.26	169.43	172.43
1	17161.6*	Max WS	2yrExist	198.06	169.43	171.70
1	17063.83	Max WS	100yrExist	779.34	169.35	172.51
1	17063.83	Max WS	10yrExist	431.98	169.35	171.93
1	17063.83	Max WS	2yrExist	198.42	169.35	171.21
1	17016.0*	Max WS	100yrExist	780.32	168.83	172.31
1	17016.0*	Max WS	10yrExist	432.50	168.83	171.72
1	17016.0*	Max WS	2yrExist	198.63	168.83	171.03
1	16968.2*	Max WS	100yrExist	781.27	168.30	172.15
1	16968.2*	Max WS	10yrExist	433.01	168.30	171.56
1	16968.2*	Max WS	2yrExist	198.84	168.30	170.90
1	16920.4*	Max WS	100yrExist	782.23	167.78	171.99
1	16920.4*	Max WS	10yrExist	433.49	167.78	171.42
1	16920.4*	Max WS	2yrExist	199.04	167.78	170.79
1	16872.70	Max WS	100yrExist	782.85	167.26	171.72
1	16872.70	Max WS	10yrExist	433.88	167.26	171.19
1	16872.70	Max WS	2yrExist	199.23	167.26	170.60
1	16822.9*	Max WS	100yrExist	783.90	167.36	171.49
1	16822.9*	Max WS	10yrExist	434.38	167.36	171.01
1	16822.9*	Max WS	2yrExist	199.43	167.36	170.49
1	16773.1*	Max WS	100yrExist	784.91	167.46	171.33
1	16773.1*	Max WS	10yrExist	434.86	167.46	170.86
1	16773.1*	Max WS	2yrExist	199.62	167.46	170.38
1	16723.4*	Max WS	100yrExist	785.89	167.57	171.14
1	16723.4*	Max WS	10yrExist	435.33	167.57	170.71
1	16723.4*	Max WS	2yrExist	199.80	167.57	170.27
1	16673.66	Max WS	100yrExist	786.85	167.67	170.96
1	16673.66	Max WS	10yrExist	435.70	167.67	170.55
1	16673.66	Max WS	2yrExist	199.99	167.67	170.13
1	16606.6*	Max WS	100yrExist	787.76	167.56	170.71
1	16606.6*	Max WS	10yrExist	436.33	167.56	170.31
1	16606.6*	Max WS	2yrExist	200.24	167.56	169.86

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	16539.5*	Max WS	100yrExist	788.95	167.45	170.44
1	16539.5*	Max WS	10yrExist	436.79	167.45	170.01
1	16539.5*	Max WS	2yrExist	200.48	167.45	169.57
1	16472.50	Max WS	100yrExist	789.57	167.34	170.20
1	16472.50	Max WS	10yrExist	437.40	167.34	169.77
1	16472.50	Max WS	2yrExist	200.71	167.34	169.35
1	16374.4*	Max WS	100yrExist	790.70	166.82	169.79
1	16374.4*	Max WS	10yrExist	438.09	166.82	169.37
1	16374.4*	Max WS	2yrExist	201.07	166.82	168.93
1	16276.30	Max WS	100yrExist	792.38	166.31	169.39
1	16276.30	Max WS	10yrExist	438.73	166.31	169.05
1	16276.30	Max WS	2yrExist	201.37	166.31	168.58
1	16193.9*	Max WS	100yrExist	791.44	165.53	169.16
1	16193.9*	Max WS	10yrExist	438.88	165.53	168.69
1	16193.9*	Max WS	2yrExist	201.49	165.53	168.22
1	16111.50	Max WS	100yrExist	792.05	164.75	169.05
1	16111.50	Max WS	10yrExist	438.94	164.75	168.48
1	16111.50	Max WS	2yrExist	201.64	164.75	167.85
1	16044.4*	Max WS	100yrExist	791.57	164.60	168.97
1	16044.4*	Max WS	10yrExist	438.96	164.60	168.37
1	16044.4*	Max WS	2yrExist	201.77	164.60	167.68
1	15977.4*	Max WS	100yrExist	792.33	164.46	168.87
1	15977.4*	Max WS	10yrExist	439.29	164.46	168.24
1	15977.4*	Max WS	2yrExist	201.93	164.46	167.46
1	15910.45	Max WS	100yrExist	793.02	164.31	168.76
1	15910.45	Max WS	10yrExist	439.60	164.31	168.05
1	15910.45	Max WS	2yrExist	202.09	164.31	167.17
1	15816.4*	Max WS	100yrExist	793.56	163.77	168.35
1	15816.4*	Max WS	10yrExist	439.87	163.77	167.64
1	15816.4*	Max WS	2yrExist	202.25	163.77	166.83
1	15722.50	Max WS	100yrExist	793.99	163.23	167.43
1	15722.50	Max WS	10yrExist	440.09	163.23	166.90
1	15722.50	Max WS	2yrExist	202.41	163.23	166.25
1	15661.2*	Max WS	100yrExist	796.17	163.03	167.24
1	15661.2*	Max WS	10yrExist	441.19	163.03	166.72
1	15661.2*	Max WS	2yrExist	202.99	163.03	166.07
1	15600	Max WS	100yrExist	799.04	162.83	167.18
1	15600	Max WS	10yrExist	442.61	162.83	166.65

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	15600	Max WS	2yrExist	203.54	162.83	165.98
1	15513.5*	Max WS	100yrExist	800.69	162.55	167.09
1	15513.5*	Max WS	10yrExist	443.86	162.55	166.56
1	15513.5*	Max WS	2yrExist	204.09	162.55	165.85
1	15427.0*	Max WS	100yrExist	803.35	162.26	167.00
1	15427.0*	Max WS	10yrExist	444.80	162.26	166.47
1	15427.0*	Max WS	2yrExist	204.57	162.26	165.69
1	15340.5*	Max WS	100yrExist	805.93	161.98	166.90
1	15340.5*	Max WS	10yrExist	446.05	161.98	166.36
1	15340.5*	Max WS	2yrExist	205.11	161.98	165.51
1	15254.0*	Max WS	100yrExist	808.44	161.69	166.79
1	15254.0*	Max WS	10yrExist	447.24	161.69	166.21
1	15254.0*	Max WS	2yrExist	205.60	161.69	165.29
1	15167.54	Max WS	100yrExist	810.44	161.41	166.50
1	15167.54	Max WS	10yrExist	448.34	161.41	165.92
1	15167.54	Max WS	2yrExist	206.14	161.41	165.08
1	15068.7*	Max WS	100yrExist	813.99	161.32	166.22
1	15068.7*	Max WS	10yrExist	450.11	161.32	165.67
1	15068.7*	Max WS	2yrExist	206.87	161.32	164.94
1	14970.01	Max WS	100yrExist	817.26	161.22	165.72
1	14970.01	Max WS	10yrExist	451.79	161.22	165.24
1	14970.01	Max WS	2yrExist	207.62	161.22	164.58
1	14800.08	Max WS	100yrExist	822.28	160.07	165.12
1	14800.08	Max WS	10yrExist	454.32	160.07	164.62
1	14800.08	Max WS	2yrExist	208.77	160.07	163.79
1	14745.2*	Max WS	100yrExist	824.74	160.00	164.96
1	14745.2*	Max WS	10yrExist	455.50	160.00	164.45
1	14745.2*	Max WS	2yrExist	209.30	160.00	163.67
1	14690.37	Max WS	100yrExist	827.14	159.93	164.76
1	14690.37	Max WS	10yrExist	456.61	159.93	164.25
1	14690.37	Max WS	2yrExist	209.83	159.93	163.54
1	14521.03	Max WS	100yrExist	833.55	159.74	164.23
1	14521.03	Max WS	10yrExist	459.87	159.74	163.78
1	14521.03	Max WS	2yrExist	211.37	159.74	163.17
1	14350.55	Max WS	100yrExist	834.84	158.30	163.80
1	14350.55	Max WS	10yrExist	460.29	158.30	163.34
1	14350.55	Max WS	2yrExist	211.65	158.30	162.70
1	14165.39	Max WS	100yrExist	836.67	159.11	163.14

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	14165.39	Max WS	10yrExist	461.11	159.11	162.61
1	14165.39	Max WS	2yrExist	212.13	159.11	161.91
1	14077.1*	Max WS	100yrExist	837.82	158.60	162.83
1	14077.1*	Max WS	10yrExist	461.69	158.60	162.31
1	14077.1*	Max WS	2yrExist	212.37	158.60	161.67
1	13988.90	Max WS	100yrExist	838.67	158.09	162.57
1	13988.90	Max WS	10yrExist	462.23	158.09	162.04
1	13988.90	Max WS	2yrExist	212.61	158.09	161.44
1	13902.9*	Max WS	100yrExist	839.22	158.18	162.37
1	13902.9*	Max WS	10yrExist	462.43	158.18	161.79
1	13902.9*	Max WS	2yrExist	212.70	158.18	161.15
1	13817.08	Max WS	100yrExist	839.76	158.27	162.03
1	13817.08	Max WS	10yrExist	462.68	158.27	161.45
1	13817.08	Max WS	2yrExist	212.81	158.27	160.78
1	13800.26	Max WS	100yrExist	839.69	157.92	161.89
1	13800.26	Max WS	10yrExist	462.68	157.92	161.30
1	13800.26	Max WS	2yrExist	212.86	157.92	160.66
1	13716.8*	Max WS	100yrExist	840.71	157.68	161.48
1	13716.8*	Max WS	10yrExist	462.90	157.68	160.96
1	13716.8*	Max WS	2yrExist	213.05	157.68	160.33
1	13633.46	Max WS	100yrExist	841.11	157.45	161.40
1	13633.46	Max WS	10yrExist	463.36	157.45	160.86
1	13633.46	Max WS	2yrExist	213.22	157.45	160.21
1	13548.2*	Max WS	100yrExist	842.34	156.91	161.17
1	13548.2*	Max WS	10yrExist	463.89	156.91	160.65
1	13548.2*	Max WS	2yrExist	213.45	156.91	159.98
1	13462.94	Max WS	100yrExist	842.91	156.37	160.90
1	13462.94	Max WS	10yrExist	464.29	156.37	160.42
1	13462.94	Max WS	2yrExist	213.67	156.37	159.75
1	13372.7*	Max WS	100yrExist	843.37	155.87	160.68
1	13372.7*	Max WS	10yrExist	464.61	155.87	160.19
1	13372.7*	Max WS	2yrExist	213.84	155.87	159.48
1	13282.48	Max WS	100yrExist	843.61	155.37	160.45
1	13282.48	Max WS	10yrExist	464.89	155.37	159.88
1	13282.48	Max WS	2yrExist	214.07	155.37	159.20
1	13196.7*	Max WS	100yrExist	844.68	155.42	160.29
1	13196.7*	Max WS	10yrExist	465.36	155.42	159.72
1	13196.7*	Max WS	2yrExist	214.25	155.42	159.05

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	13110.9*	Max WS	100yrExist	845.69	155.48	160.09
1	13110.9*	Max WS	10yrExist	465.73	155.48	159.54
1	13110.9*	Max WS	2yrExist	214.46	155.48	158.89
1	13025.20	Max WS	100yrExist	846.44	155.53	159.77
1	13025.20	Max WS	10yrExist	466.27	155.53	159.31
1	13025.20	Max WS	2yrExist	208.88	155.53	158.65
1	12934.78	Max WS	100yrExist	847.74	155.67	159.45
1	12934.78	Max WS	10yrExist	466.79	155.67	159.06
1	12934.78	Max WS	2yrExist	208.76	155.67	158.44
1	12679.83	Max WS	100yrExist	850.00	154.84	158.52
1	12679.83	Max WS	10yrExist	468.22	154.84	158.09
1	12679.83	Max WS	2yrExist	218.55	154.84	157.44
1	12514.10	Max WS	100yrExist	850.82	153.08	157.98
1	12514.10	Max WS	10yrExist	468.83	153.08	157.45
1	12514.10	Max WS	2yrExist	215.80	153.08	156.83
1	12342.49	Max WS	100yrExist	852.45	153.74	157.56
1	12342.49	Max WS	10yrExist	469.70	153.74	157.07
1	12342.49	Max WS	2yrExist	216.17	153.74	156.43
1	12168.87	Max WS	100yrExist	853.96	152.62	157.14
1	12168.87	Max WS	10yrExist	469.76	152.62	156.58
1	12168.87	Max WS	2yrExist	216.54	152.62	155.71
1	11993.01	Max WS	100yrExist	855.00	152.46	156.70
1	11993.01	Max WS	10yrExist	469.68	152.46	156.02
1	11993.01	Max WS	2yrExist	216.84	152.46	155.00
1	11820.19	Max WS	100yrExist	855.66	150.12	156.24
1	11820.19	Max WS	10yrExist	470.32	150.12	155.57
1	11820.19	Max WS	2yrExist	217.22	150.12	154.43
1	11633.47	Max WS	100yrExist	858.24	151.10	155.34
1	11633.47	Max WS	10yrExist	471.45	151.10	154.79
1	11633.47	Max WS	2yrExist	217.68	151.10	153.64
1	11460.48	Max WS	100yrExist	839.41	149.67	154.71
1	11460.48	Max WS	10yrExist	471.80	149.67	154.06
1	11460.48	Max WS	2yrExist	218.06	149.67	152.88
1	11271.33	Max WS	100yrExist	822.70	147.60	154.38
1	11271.33	Max WS	10yrExist	472.33	147.60	153.56
1	11271.33	Max WS	2yrExist	218.39	147.60	152.45
1	11146.79	Max WS	100yrExist	861.67	147.72	153.91
1	11146.79	Max WS	10yrExist	472.78	147.72	153.11
1	11146.79	Max WS	2yrExist	218.69	147.72	152.14

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	10961.29	Max WS	100yrExist	862.58	149.08	153.26
1	10961.29	Max WS	10yrExist	472.69	149.08	152.58
1	10961.29	Max WS	2yrExist	219.01	149.08	151.53
1	10777.64	Max WS	100yrExist	864.59	147.95	152.61
1	10777.64	Max WS	10yrExist	473.58	147.95	152.09
1	10777.64	Max WS	2yrExist	219.56	147.95	151.10
1	10599.75	Max WS	100yrExist	866.19	147.94	151.89
1	10599.75	Max WS	10yrExist	474.13	147.94	151.37
1	10599.75	Max WS	2yrExist	220.08	147.94	150.68
1	10484.71	Max WS	100yrExist	866.87	147.53	151.54
1	10484.71	Max WS	10yrExist	473.96	147.53	151.02
1	10484.71	Max WS	2yrExist	220.41	147.53	150.40
1	10294.85	Max WS	100yrExist	867.48	146.18	151.19
1	10294.85	Max WS	10yrExist	474.04	146.18	150.64
1	10294.85	Max WS	2yrExist	220.96	146.18	149.86
1	10111.02	Max WS	100yrExist	868.27	146.70	150.81
1	10111.02	Max WS	10yrExist	473.88	146.70	150.15
1	10111.02	Max WS	2yrExist	221.40	146.70	149.14
1	9962.423	Max WS	100yrExist	868.96	144.81	150.33
1	9962.423	Max WS	10yrExist	474.26	144.81	149.64
1	9962.423	Max WS	2yrExist	221.79	144.81	148.55
1	9810.025	Max WS	100yrExist	869.90	145.21	149.67
1	9810.025	Max WS	10yrExist	473.74	145.21	149.13
1	9810.025	Max WS	2yrExist	222.20	145.21	148.02
1	9553.901	Max WS	100yrExist	871.05	143.12	148.95
1	9553.901	Max WS	10yrExist	468.91	143.12	148.32
1	9553.901	Max WS	2yrExist	222.86	143.12	147.14
1	9362.452	Max WS	100yrExist	871.22	143.70	148.40
1	9362.452	Max WS	10yrExist	481.81	143.70	147.65
1	9362.452	Max WS	2yrExist	223.33	143.70	146.57
1	9149.788	Max WS	100yrExist	872.94	141.77	148.09
1	9149.788	Max WS	10yrExist	481.33	141.77	147.38
1	9149.788	Max WS	2yrExist	223.99	141.77	146.31
1	8963.549	Max WS	100yrExist	874.27	141.24	147.55
1	8963.549	Max WS	10yrExist	480.92	141.24	146.82
1	8963.549	Max WS	2yrExist	224.44	141.24	145.96
1	8766.435	Max WS	100yrExist	877.45	142.65	146.79
1	8766.435	Max WS	10yrExist	481.92	142.65	146.11

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	8766.435	Max WS	2yrExist	225.30	142.65	145.25
1	8577.282	Max WS	100yrExist	878.67	141.02	146.27
1	8577.282	Max WS	10yrExist	483.12	141.02	145.57
1	8577.282	Max WS	2yrExist	226.15	141.02	144.67
1	8398.577	Max WS	100yrExist	881.33	141.01	145.99
1	8398.577	Max WS	10yrExist	484.38	141.01	145.27
1	8398.577	Max WS	2yrExist	226.99	141.01	144.26
1	8223.925	Max WS	100yrExist	884.42	139.79	145.52
1	8223.925	Max WS	10yrExist	485.50	139.79	144.82
1	8223.925	Max WS	2yrExist	227.87	139.79	143.80
1	8000	Max WS	100yrExist	887.82	139.29	145.11
1	8000	Max WS	10yrExist	486.94	139.29	144.41
1	8000	Max WS	2yrExist	228.86	139.29	143.42
1	7744.065	Max WS	100yrExist	862.27	138.71	143.99
1	7744.065	Max WS	10yrExist	488.90	138.71	143.32
1	7744.065	Max WS	2yrExist	230.11	138.71	142.51
1	7600	Max WS	100yrExist	857.68	138.31	143.65
1	7600	Max WS	10yrExist	489.66	138.31	142.91
1	7600	Max WS	2yrExist	230.78	138.31	142.01
1	7400	Max WS	100yrExist	992.78	137.76	142.72
1	7400	Max WS	10yrExist	490.77	137.76	141.93
1	7400	Max WS	2yrExist	231.56	137.76	141.02
1	7200	Max WS	100yrExist	943.24	137.20	141.77
1	7200	Max WS	10yrExist	491.69	137.20	141.13
1	7200	Max WS	2yrExist	232.42	137.20	140.26
1	7000	Max WS	100yrExist	931.47	136.65	141.16
1	7000	Max WS	10yrExist	492.18	136.65	140.74
1	7000	Max WS	2yrExist	233.16	136.65	139.87
1	6800	Max WS	100yrExist	920.62	136.09	140.84
1	6800	Max WS	10yrExist	492.40	136.09	140.56
1	6800	Max WS	2yrExist	227.44	136.09	139.59
1	6545.718	Max WS	100yrExist	938.23	134.93	139.98
1	6545.718	Max WS	10yrExist	505.13	134.93	139.41
1	6545.718	Max WS	2yrExist	242.70	134.93	138.73
1	6400	Max WS	100yrExist	934.98	135.02	139.54
1	6400	Max WS	10yrExist	505.28	135.02	138.96
1	6400	Max WS	2yrExist	242.99	135.02	138.32
1	6200	Max WS	100yrExist	935.61	134.52	139.16

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	6200	Max WS	10yrExist	505.41	134.52	138.55
1	6200	Max WS	2yrExist	243.26	134.52	137.88
1	6000	Max WS	100yrExist	935.96	134.02	138.76
1	6000	Max WS	10yrExist	505.52	134.02	138.15
1	6000	Max WS	2yrExist	243.48	134.02	137.46
1	5800	Max WS	100yrExist	937.02	133.53	138.33
1	5800	Max WS	10yrExist	505.91	133.53	137.82
1	5800	Max WS	2yrExist	244.00	133.53	137.18
1	5544.024	Max WS	100yrExist	937.98	132.89	137.77
1	5544.024	Max WS	10yrExist	505.94	132.89	137.05
1	5544.024	Max WS	2yrExist	244.30	132.89	136.26
1	5310.353	Max WS	100yrExist	936.71	130.81	136.98
1	5310.353	Max WS	10yrExist	505.45	130.81	136.31
1	5310.353	Max WS	2yrExist	244.51	130.81	135.58
1	5126.186	Max WS	100yrExist	939.02	131.42	136.68
1	5126.186	Max WS	10yrExist	505.98	131.42	136.03
1	5126.186	Max WS	2yrExist	245.86	131.42	135.38
1	4928.496	Max WS	100yrExist	940.84	131.24	136.48
1	4928.496	Max WS	10yrExist	506.73	131.24	135.83
1	4928.496	Max WS	2yrExist	246.80	131.24	135.21
1	4737.846	Max WS	100yrExist	943.49	130.80	136.04
1	4737.846	Max WS	10yrExist	507.85	130.80	135.46
1	4737.846	Max WS	2yrExist	247.95	130.80	134.94
1	4542.183	Max WS	100yrExist	946.16	130.20	135.68
1	4542.183	Max WS	10yrExist	508.95	130.20	135.18
1	4542.183	Max WS	2yrExist	249.05	130.20	134.77
1	4437.102	Max WS	100yrExist	947.34	131.50	135.35
1	4437.102	Max WS	10yrExist	509.48	131.50	134.86
1	4437.102	Max WS	2yrExist	249.61	131.50	134.39
1	4246.329	Max WS	100yrExist	949.68	129.78	134.75
1	4246.329	Max WS	10yrExist	510.06	129.78	134.18
1	4246.329	Max WS	2yrExist	250.31	129.78	133.42
1	4063.200	Max WS	100yrExist	951.64	129.05	134.21
1	4063.200	Max WS	10yrExist	510.92	129.05	133.72
1	4063.200	Max WS	2yrExist	246.87	129.05	132.96
1	3863.200	Max WS	100yrExist	953.92	128.43	133.97
1	3863.200	Max WS	10yrExist	511.57	128.43	133.55
1	3863.200	Max WS	2yrExist	247.04	128.43	132.82

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	3682.022	Max WS	100yrExist	956.14	127.89	133.88
1	3682.022	Max WS	10yrExist	512.57	127.89	133.49
1	3682.022	Max WS	2yrExist	247.70	127.89	132.71
1	3487.742	Max WS	100yrExist	958.83	128.90	133.35
1	3487.742	Max WS	10yrExist	513.56	128.90	132.90
1	3487.742	Max WS	2yrExist	248.58	128.90	132.16
1	3332.982	Max WS	100yrExist	960.93	129.37	132.92
1	3332.982	Max WS	10yrExist	513.86	129.37	132.38
1	3332.982	Max WS	2yrExist	249.23	129.37	131.65
1	3152.554	Max WS	100yrExist	962.86	127.27	132.21
1	3152.554	Max WS	10yrExist	514.60	127.27	131.71
1	3152.554	Max WS	2yrExist	249.87	127.27	130.93
1	2960.781	Max WS	100yrExist	964.84	128.00	131.45
1	2960.781	Max WS	10yrExist	515.43	128.00	130.96
1	2960.781	Max WS	2yrExist	250.64	128.00	130.50
1	2800	Max WS	100yrExist	966.71	127.75	130.97
1	2800	Max WS	10yrExist	516.20	127.75	130.43
1	2800	Max WS	2yrExist	251.33	127.75	129.99
1	2600	Max WS	100yrExist	968.73	127.22	130.55
1	2600	Max WS	10yrExist	516.92	127.22	129.92
1	2600	Max WS	2yrExist	251.99	127.22	129.27
1	2436.651	Max WS	100yrExist	970.36	126.76	129.71
1	2436.651	Max WS	10yrExist	517.54	126.76	129.10
1	2436.651	Max WS	2yrExist	252.54	126.76	128.41
1	2200	Max WS	100yrExist	972.73	125.72	128.71
1	2200	Max WS	10yrExist	518.45	125.72	128.05
1	2200	Max WS	2yrExist	253.43	125.72	127.39
1	1800	Max WS	100yrExist	974.70	123.94	128.10
1	1800	Max WS	10yrExist	518.97	123.94	127.35
1	1800	Max WS	2yrExist	254.11	123.94	126.54
1	1508.765	Max WS	100yrExist	976.48	122.64	127.24
1	1508.765	Max WS	10yrExist	519.61	122.64	126.55
1	1508.765	Max WS	2yrExist	254.86	122.64	125.81
1	1238.804	Max WS	100yrExist	978.11	122.00	126.58
1	1238.804	Max WS	10yrExist	520.22	122.00	125.92
1	1238.804	Max WS	2yrExist	255.53	122.00	125.29
1	947.7714	Max WS	100yrExist	977.42	122.00	125.68
1	947.7714	Max WS	10yrExist	520.14	122.00	125.15
1	947.7714	Max WS	2yrExist	255.51	122.00	124.73

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	703.7460	Max WS	100yrExist	975.88	122.00	125.04
1	703.7460	Max WS	10yrExist	519.89	122.00	124.38
1	703.7460	Max WS	2yrExist	255.49	122.00	123.82
1	413.4701	Max WS	100yrExist	975.44	120.00	123.99
1	413.4701	Max WS	10yrExist	519.71	120.00	123.33
1	413.4701	Max WS	2yrExist	255.48	120.00	122.73
1	200.9584	Max WS	100yrExist	975.05	120.00	123.48
1	200.9584	Max WS	10yrExist	519.59	120.00	122.91
1	200.9584	Max WS	2yrExist	255.46	120.00	122.40
1	10.31402	Max WS	100yrExist	974.88	120.00	123.04
1	10.31402	Max WS	10yrExist	519.54	120.00	122.50
1	10.31402	Max WS	2yrExist	255.45	120.00	122.00

Unnamed Deer Creek Tributary

Existing Conditions Model:

10-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 9:51:49 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms

Plan: 10 yr existing - Existing Conditions 10 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	93.89	220.00	221.12		221.19	0.005827	2.09	46.34	124.16	0.46
1	28313.0*	Max WS	93.84	219.58	220.68		220.75	0.006519	2.10	48.70	105.89	0.48
1	28226.0*	Max WS	93.81	219.15	220.25		220.30	0.006182	1.97	55.36	124.51	0.47
1	28139.07	Max WS	93.77	218.73	219.77		219.82	0.007148	1.91	58.83	141.90	0.49
1	28069.5*	Max WS	96.89	218.22	219.29		219.36	0.008966	2.21	49.01	127.34	0.55
1	28000	Max WS	99.99	217.71	218.78		218.86	0.009517	2.30	43.71	157.04	0.57
1	27900.*	Max WS	105.60	216.97	217.76		217.86	0.012374	2.46	42.88	93.16	0.64
1	27800	Max WS	111.11	216.23	217.08		217.11	0.002590	1.39	79.86	126.45	0.31
1	27700.*	Max WS	116.82	215.51	216.84		216.88	0.002142	1.48	78.89	98.61	0.29
1	27600	Max WS	122.50	214.80	216.38		216.48	0.006534	2.89	72.63	198.85	0.52
1	27500.*	Max WS	128.91	214.08	215.47		215.60	0.010275	3.27	61.81	168.42	0.64
1	27400	Max WS	135.27	213.35	214.85		214.88	0.002284	1.67	130.09	213.26	0.31
1	27329.7*	Max WS	138.21	212.84	214.63		214.70	0.004137	2.43	86.08	153.31	0.42

1	27259.5*	Max WS	141.02	212.32	214.34		214.44	0.004818	2.78	74.69	167.41	0.46
1	27189.29	Max WS	143.94	211.81	213.93		214.14	0.010141	3.64	39.50	40.14	0.65
1	27094.6*	Max WS	148.83	211.10	213.15		213.35	0.009968	3.54	42.02	45.03	0.64
1	27000	Max WS	153.82	210.39	212.52		212.64	0.005702	2.81	55.46	65.18	0.49
1	26900.*	Max WS	159.40	209.64	212.01		212.11	0.005419	2.61	61.10	67.85	0.47
1	26800	Max WS	164.95	208.88	211.38		211.50	0.007517	2.81	58.90	74.73	0.55
1	26700.*	Max WS	170.06	208.12	210.64		210.79	0.007078	3.12	54.76	59.47	0.55
1	26600	Max WS	174.62	207.37	210.19		210.30	0.003559	2.78	90.33	265.07	0.41
1	26528.4*	Max WS	175.16	206.83	209.95		210.06	0.003696	2.75	90.55	290.24	0.41
1	26456.8*	Max WS	163.25	206.29	209.68		209.78	0.003798	2.64	85.04	271.52	0.41
1	26385.31	Max WS	175.99	205.75	209.16		209.41	0.010354	3.99	44.09	159.39	0.66
1	26292.6*	Max WS	178.93	205.40	208.16		208.40	0.012287	4.08	50.79	90.86	0.72
1	26200	Max WS	181.97	205.06	207.28		207.46	0.007873	3.37	54.55	81.96	0.58
1	26100.*	Max WS	184.79	204.69	206.65		206.77	0.006045	2.78	66.56	70.45	0.50
1	26000	Max WS	187.54	204.32	206.26		206.33	0.003283	2.06	90.84	136.89	0.37
1	25900.*	Max WS	190.53	203.95	205.92		205.99	0.003713	2.16	88.12	94.26	0.39
1	25800	Max WS	193.47	203.57	205.55		205.62	0.003836	2.12	91.16	102.79	0.40
1	25700.*	Max WS	196.42	203.20	205.11		205.22	0.005771	2.76	79.95	218.54	0.49
1	25600	Max WS	199.31	202.83	204.76		204.81	0.003649	2.71	158.17	258.77	0.41
1	25500.*	Max WS	201.99	202.46	204.37		204.46	0.005595	3.15	123.43	273.80	0.50
1	25400	Max WS	204.70	202.09	204.06		204.09	0.002504	2.03	165.25	274.59	0.33
1	25358.8*	Max WS	205.82	202.00	203.94		204.00	0.003579	2.41	145.69	324.12	0.40
1	25317.6*	Max WS	206.88	201.92	203.79		203.86	0.004552	2.60	134.58	286.59	0.45
1	25276.3*	Max WS	208.05	201.83	203.61		203.68	0.005150	2.54	130.40	251.90	0.46
1	25235.1*	Max WS	99.61	201.75	203.52		203.53	0.000743	0.92	157.51	238.51	0.17
1	25193.99	Max WS	210.39	201.66	203.24	203.25	203.76	0.045852	5.75	36.61	217.63	1.29
1	25145.4*	Max WS	211.88	201.36	202.95		203.01	0.006612	2.32	117.92	205.38	0.50
1	25097.*	Max WS	213.33	201.05	202.52		202.64	0.009742	2.82	84.22	170.86	0.61
1	25048.5*	Max WS	214.66	200.75	202.15		202.24	0.006686	2.39	89.91	128.98	0.50
1	25000	Max WS	216.16	200.45	201.98		202.02	0.002193	1.53	141.07	184.40	0.30
1	24900.*	Max WS	218.81	200.04	201.75		201.80	0.002458	1.80	126.56	160.03	0.32
1	24800	Max WS	221.68	199.63	201.39		201.49	0.004370	2.51	97.94	125.89	0.43
1	24700.*	Max WS	224.60	199.20	200.95		201.07	0.005907	2.91	98.23	166.70	0.51
1	24600	Max WS	227.62	198.77	200.31		200.43	0.009056	3.49	117.68	272.19	0.62
1	24500.*	Max WS	191.86	198.34	199.81		199.84	0.002659	1.64	172.34	293.59	0.32
1	24400	Max WS	186.54	197.91	199.72		199.73	0.000265	0.61	422.55	454.09	0.11
1	24328.0*	Max WS	181.33	197.60	199.71		199.71	0.000223	0.55	443.92	453.45	0.10
1	24256.1*	Max WS	175.66	197.29	199.69		199.74	0.002387	1.81	97.50	446.74	0.32
1	24184.18	Max WS	279.16	196.98	199.20	199.25	199.63	0.030674	5.27	52.94	355.71	1.08
1	24092.0*	Max WS	242.22	196.51	198.56		198.62	0.005322	2.45	161.48	313.91	0.47
1	24000	Max WS	244.95	196.03	198.11		198.30	0.010705	3.68	96.66	351.89	0.67
1	23900.*	Max WS	247.74	195.51	197.63		197.70	0.005519	2.64	144.69	265.94	0.48
1	23800	Max WS	250.50	194.99	197.17		197.24	0.004947	2.49	153.65	261.81	0.45
1	23700.*	Max WS	252.84	194.47	196.82		196.87	0.002755	2.12	188.44	278.19	0.35
1	23600	Max WS	255.07	193.95	196.25		196.42	0.008387	3.77	124.08	367.46	0.61
1	23400	Max WS	274.90	192.92	195.56		195.59	0.000786	1.56	243.53	219.33	0.20
1	23178.25	Max WS	295.86	191.76	194.97		195.15	0.004504	3.93	130.99	192.47	0.48
1	23000	Max WS	316.70	191.25	194.08		194.26	0.005479	3.37	102.16	212.25	0.51
1	22600	Max WS	349.22	190.00	192.69		192.77	0.001962	2.42	166.57	263.33	0.32
1	22400	Max WS	395.15	189.54	192.46		192.49	0.000733	1.45	316.34	271.07	0.19
1	22175.79	Max WS	397.10	188.90	191.51		191.76	0.007073	4.16	127.54	200.60	0.59
1	22000	Max WS	398.44	188.07	190.69		190.84	0.003837	3.17	141.32	133.68	0.44
1	21900.*	Max WS	399.00	187.59	190.36		190.49	0.003290	2.84	150.66	152.29	0.40

1	21800	Max WS	399.82	187.11	190.14	190.23	0.002220	2.37	183.80	250.22	0.33
1	21600	Max WS	401.06	186.14	189.14	189.40	0.007044	4.16	105.69	95.74	0.59
1	21400	Max WS	402.41	185.21	188.54	188.59	0.001042	1.81	232.03	160.27	0.23
1	21176.29	Max WS	403.39	184.07	188.18	188.31	0.002513	3.05	187.45	264.09	0.37
1	20962.10	Max WS	404.56	184.10	187.21	187.42	0.006750	3.69	127.68	241.50	0.56
1	20895.2*	Max WS	404.71	183.95	187.02	187.10	0.002222	2.45	239.10	238.24	0.33
1	20828.3*	Max WS	404.71	183.80	186.88	186.96	0.002073	2.60	235.64	227.55	0.33
1	20761.52	Max WS	404.60	183.65	186.61	186.75	0.005051	3.62	179.27	207.28	0.49
1	20712.0*	Max WS	404.74	182.57	186.19	186.47	0.007464	4.38	115.96	179.41	0.61
1	20662.66	Max WS	405.92	181.49	185.94	186.15	0.004881	3.69	109.99	66.66	0.49
1	20642.13	Max WS	405.87	181.53	185.83	186.11	0.006896	4.24	95.75	57.06	0.58
1	20614.23	Max WS	407.94	180.88	185.72	185.79	0.001266	2.23	183.03	237.55	0.26
1	20399.06	Max WS	407.25	181.78	185.34	185.42	0.002473	2.47	253.47	413.95	0.35
1	20131.75	Max WS	410.44	180.89	184.14	184.39	0.006060	4.14	139.21	340.46	0.55
1	19831.49	Max WS	413.19	179.01	182.19	182.53	0.006915	4.73	87.44	86.70	0.59
1	19561.71	Max WS	413.14	176.06	181.34	181.41	0.001157	2.20	188.13	81.24	0.25
1	19375.20	Max WS	415.39	173.23	181.24	181.28	0.000243	1.56	267.32	221.16	0.13
1	19216.24	Max WS	415.53	176.81	181.12	181.18	0.001395	2.65	324.14	292.30	0.28
1	19040.62	Max WS	416.02	176.76	180.75	180.87	0.002413	3.09	210.00	477.14	0.36
1	18953.9*	Max WS	416.88	176.83	180.48	180.65	0.003091	3.40	142.62	383.77	0.41
1	18867.36	Max WS	417.76	176.91	180.01	180.27	0.006179	4.15	100.59	333.66	0.56
1	18661.93	Max WS	418.10	175.46	179.12	179.28	0.003835	3.53	191.60	348.76	0.45
1	18573.2*	Max WS	418.85	174.86	178.78	178.96	0.003551	3.76	184.83	284.18	0.44
1	18484.66	Max WS	419.89	174.25	178.28	178.63	0.005657	4.89	109.20	182.32	0.56
1	18313.08	Max WS	421.85	174.93	177.61	177.79	0.003817	3.44	122.83	258.73	0.45
1	18134.08	Max WS	422.71	174.22	177.01	177.14	0.003819	3.00	194.96	344.87	0.43
1	17964.88	Max WS	424.53	172.77	176.10	176.43	0.006678	4.74	121.61	241.67	0.59
1	17929.0*	Max WS	424.82	172.49	175.93	176.18	0.005277	4.09	136.21	236.30	0.52
1	17893.2*	Max WS	425.22	172.22	175.79	175.99	0.004851	3.71	149.94	254.49	0.50
1	17857.44	Max WS	425.60	171.94	175.65	175.82	0.005112	3.52	163.27	298.28	0.50
1	17784.4*	Max WS	426.35	171.95	175.18	175.41	0.007811	4.06	147.91	334.66	0.61
1	17711.5*	Max WS	427.01	171.97	174.80	174.93	0.005531	3.40	210.62	407.86	0.51
1	17638.59	Max WS	427.57	171.98	174.57	174.64	0.002648	2.58	298.64	453.35	0.36
1	17570.8*	Max WS	428.06	171.69	174.36	174.45	0.003295	2.88	269.45	462.64	0.40
1	17503.0*	Max WS	428.52	171.40	173.99	174.18	0.006095	3.77	168.11	311.66	0.54
1	17435.23	Max WS	428.90	171.11	173.73	173.83	0.003434	2.94	225.32	294.68	0.41
1	17347.3*	Max WS	429.75	170.31	173.53	173.58	0.001923	2.33	352.08	509.54	0.31
1	17259.39	Max WS	430.57	169.51	172.99	173.27	0.009408	4.71	131.51	474.01	0.67
1	17161.6*	Max WS	431.26	169.43	172.43	172.57	0.005375	3.31	189.53	360.79	0.50
1	17063.83	Max WS	431.98	169.35	171.93	172.07	0.005317	2.99	144.41	124.19	0.49
1	17016.0*	Max WS	432.50	168.83	171.72	171.86	0.003970	2.93	153.88	147.52	0.44
1	16968.2*	Max WS	433.01	168.30	171.56	171.69	0.003078	2.98	166.91	183.00	0.40
1	16920.4*	Max WS	433.49	167.78	171.42	171.56	0.002747	3.19	181.22	177.41	0.39
1	16872.70	Max WS	433.88	167.26	171.19	171.43	0.004320	4.37	154.04	164.88	0.49
1	16822.9*	Max WS	434.38	167.36	171.01	171.21	0.003916	4.02	164.14	169.51	0.46
1	16773.1*	Max WS	434.86	167.46	170.86	171.02	0.003414	3.60	194.66	219.09	0.43
1	16723.4*	Max WS	435.33	167.57	170.71	170.85	0.003418	3.39	205.13	233.07	0.42
1	16673.66	Max WS	435.70	167.67	170.55	170.67	0.003657	3.24	218.15	259.14	0.43
1	16606.6*	Max WS	436.33	167.56	170.31	170.42	0.004179	3.34	232.62	333.77	0.46
1	16539.5*	Max WS	436.79	167.45	170.01	170.14	0.005035	3.55	202.41	404.94	0.50
1	16472.50	Max WS	437.40	167.34	169.77	169.85	0.003320	3.07	256.18	286.19	0.41
1	16374.4*	Max WS	438.09	166.82	169.37	169.48	0.004691	3.33	217.03	387.52	0.48
1	16276.30	Max WS	438.73	166.31	169.05	169.10	0.002877	2.44	268.63	483.45	0.37

1	16193.9*	Max WS	438.88	165.53	168.69		168.89	0.007842	4.03	169.39	464.19	0.61
1	16111.50	Max WS	438.94	164.75	168.48		168.56	0.002830	2.89	294.17	460.44	0.38
1	16044.4*	Max WS	438.96	164.60	168.37		168.43	0.002015	2.56	294.65	395.02	0.32
1	15977.4*	Max WS	439.29	164.46	168.24		168.36	0.002841	3.17	232.15	381.87	0.39
1	15910.45	Max WS	439.60	164.31	168.05		168.25	0.003917	3.84	152.90	261.92	0.46
1	15816.4*	Max WS	439.87	163.77	167.64		167.91	0.004360	4.28	120.81	88.53	0.49
1	15722.50	Max WS	440.09	163.23	166.90		167.39	0.009271	5.76	94.06	90.77	0.69
1	15661.2*	Max WS	441.19	163.03	166.72		166.86	0.003157	3.22	177.52	156.51	0.41
1	15600	Max WS	442.61	162.83	166.65		166.70	0.001292	2.03	300.73	285.14	0.26
1	15513.5*	Max WS	443.86	162.55	166.56		166.61	0.001239	1.98	309.38	323.85	0.25
1	15427.0*	Max WS	444.80	162.26	166.47		166.52	0.001282	1.96	308.71	344.46	0.26
1	15340.5*	Max WS	446.05	161.98	166.36		166.41	0.001493	2.01	289.97	364.59	0.27
1	15254.0*	Max WS	447.24	161.69	166.21		166.28	0.001938	2.15	241.92	366.57	0.31
1	15167.54	Max WS	448.34	161.41	165.92		166.04	0.003986	2.76	162.20	199.69	0.43
1	15068.7*	Max WS	450.11	161.32	165.67		165.76	0.001948	2.52	185.81	295.35	0.32
1	14970.01	Max WS	451.79	161.22	165.24		165.47	0.004964	4.05	145.12	261.50	0.51
1	14800.08	Max WS	454.32	160.07	164.62		164.73	0.003934	3.09	222.89	323.09	0.43
1	14745.2*	Max WS	455.50	160.00	164.45		164.58	0.002092	3.07	241.51	307.63	0.34
1	14690.37	Max WS	456.61	159.93	164.25		164.49	0.002991	4.30	193.64	295.91	0.41
1	14521.03	Max WS	459.87	159.74	163.78		163.89	0.003609	2.69	182.30	288.15	0.41
1	14350.55	Max WS	460.29	158.30	163.34		163.42	0.002043	2.63	282.45	369.08	0.33
1	14165.39	Max WS	461.11	159.11	162.61		162.84	0.005414	4.09	155.97	323.18	0.53
1	14077.1*	Max WS	461.69	158.60	162.31		162.48	0.002868	3.39	177.63	282.70	0.40
1	13988.90	Max WS	462.23	158.09	162.04		162.22	0.003785	3.56	172.22	331.71	0.44
1	13902.9*	Max WS	462.43	158.18	161.79		161.97	0.003833	3.64	183.51	235.23	0.45
1	13817.08	Max WS	462.68	158.27	161.45		161.70	0.005199	4.24	147.49	163.76	0.52
1	13800.26	Max WS	462.68	157.92	161.30		161.61	0.007482	4.75	132.73	156.87	0.61
1	13716.8*	Max WS	462.90	157.68	160.96		161.15	0.003914	3.67	153.05	148.95	0.46
1	13633.46	Max WS	463.36	157.45	160.86		160.92	0.001333	2.20	324.04	300.39	0.27
1	13548.2*	Max WS	463.89	156.91	160.65		160.79	0.003095	3.10	206.34	273.15	0.40
1	13462.94	Max WS	464.29	156.37	160.42		160.54	0.003108	3.05	203.56	217.31	0.40
1	13372.7*	Max WS	464.61	155.87	160.19		160.29	0.002537	2.92	246.45	289.39	0.36
1	13282.48	Max WS	464.89	155.37	159.88		160.09	0.003940	3.77	160.56	397.57	0.45
1	13196.7*	Max WS	465.36	155.42	159.72		159.82	0.002262	2.81	260.22	338.95	0.35
1	13110.9*	Max WS	465.73	155.48	159.54		159.66	0.002700	2.90	230.09	304.72	0.37
1	13025.20	Max WS	466.27	155.53	159.31		159.46	0.004239	3.29	185.63	269.88	0.46
1	12934.78	Max WS	466.79	155.67	159.06		159.19	0.002585	3.27	244.91	294.72	0.38
1	12679.83	Max WS	468.22	154.84	158.09	157.57	158.37	0.006026	4.41	149.43	468.78	0.56
1	12514.10	Max WS	468.83	153.08	157.45		157.59	0.002966	3.57	216.91	294.87	0.40
1	12342.49	Max WS	469.70	153.74	157.07		157.15	0.002563	2.87	276.95	315.59	0.37
1	12168.87	Max WS	469.76	152.62	156.58		156.72	0.003244	3.50	241.39	358.18	0.42
1	11993.01	Max WS	469.68	152.46	156.02		156.16	0.003680	3.07	153.17	257.12	0.42
1	11820.19	Max WS	470.32	150.12	155.57		155.67	0.002076	2.51	188.95	193.77	0.33
1	11633.47	Max WS	471.45	151.10	154.79		155.00	0.005136	3.66	129.54	191.19	0.50
1	11460.48	Max WS	471.80	149.67	154.06		154.21	0.004480	3.09	156.46	227.66	0.46
1	11271.33	Max WS	472.33	147.60	153.56		153.66	0.001602	2.55	192.77	143.93	0.29
1	11146.79	Max WS	472.78	147.72	153.11		153.35	0.003525	3.93	120.45	149.22	0.43
1	10961.29	Max WS	472.69	149.08	152.58		152.73	0.003359	3.26	200.07	266.30	0.42
1	10777.64	Max WS	473.58	147.95	152.09		152.24	0.002091	3.13	153.81	236.52	0.34
1	10599.75	Max WS	474.13	147.94	151.37		151.61	0.005948	3.96	144.28	212.16	0.54
1	10484.71	Max WS	473.96	147.53	151.02		151.10	0.002560	2.76	265.26	312.55	0.36
1	10294.85	Max WS	474.04	146.18	150.64		150.71	0.001709	2.47	303.61	356.68	0.30
1	10111.02	Max WS	473.88	146.70	150.15		150.32	0.003466	3.32	157.19	410.75	0.43

1	9962.423	Max WS	474.26	144.81	149.64		149.83	0.003942	3.69	156.05	356.92	0.45
1	9810.025	Max WS	473.74	145.21	149.13		149.30	0.003362	3.30	151.33	327.30	0.42
1	9553.901	Max WS	468.91	143.12	148.32		148.50	0.002919	3.46	140.18	313.04	0.40
1	9362.452	Max WS	481.81	143.70	147.65		147.92	0.003848	4.20	114.84	45.44	0.47
1	9149.788	Max WS	481.33	141.77	147.38		147.41	0.000427	1.38	362.97	244.85	0.15
1	8963.549	Max WS	480.92	141.24	146.82		147.06	0.004236	3.96	137.50	143.19	0.47
1	8766.435	Max WS	481.92	142.65	146.11		146.28	0.003603	3.35	143.98	136.31	0.43
1	8577.282	Max WS	483.12	141.02	145.57		145.72	0.002387	3.09	161.32	96.66	0.36
1	8398.577	Max WS	484.38	141.01	145.27		145.37	0.001903	2.90	252.77	231.21	0.33
1	8223.925	Max WS	485.50	139.79	144.82		144.99	0.002934	3.63	194.29	161.37	0.40
1	8000	Max WS	486.94	139.29	144.41		144.49	0.001522	2.43	246.42	256.72	0.29
1	7744.065	Max WS	488.90	138.71	143.32		143.63	0.005993	4.48	111.63	85.19	0.56
1	7600	Max WS	489.66	138.31	142.91		143.02	0.002626	2.79	209.69	428.54	0.37
1	7400	Max WS	490.77	137.76	141.93		142.28	0.006408	4.70	104.55	53.99	0.58
1	7200	Max WS	491.69	137.20	141.13		141.30	0.003529	3.42	159.89	115.84	0.43
1	7000	Max WS	492.18	136.65	140.74		140.83	0.001505	2.51	224.69	162.89	0.29
1	6800	Max WS	492.40	136.09	140.56		140.61	0.000876	1.83	363.93	393.51	0.22
1	6545.718	Max WS	505.13	134.93	139.41		139.79	0.007159	5.50	168.15	279.51	0.60
1	6400	Max WS	505.28	135.02	138.96		139.07	0.002203	3.10	259.08	242.52	0.35
1	6200	Max WS	505.41	134.52	138.55		138.67	0.002923	3.16	277.48	355.46	0.39
1	6000	Max WS	505.52	134.02	138.15		138.26	0.002653	2.61	205.75	220.21	0.36
1	5800	Max WS	505.91	133.53	137.82		137.88	0.001324	2.16	292.79	207.69	0.27
1	5544.024	Max WS	505.94	132.89	137.05		137.26	0.004364	4.04	194.90	294.21	0.48
1	5310.353	Max WS	505.45	130.81	136.31		136.49	0.002669	3.41	148.06	300.41	0.38
1	5126.186	Max WS	505.98	131.42	136.03		136.14	0.001757	3.08	339.75	554.52	0.31
1	4928.496	Max WS	506.73	131.24	135.83		135.91	0.001265	2.34	318.69	364.85	0.27
1	4737.846	Max WS	507.85	130.80	135.46		135.58	0.002624	3.11	237.29	236.80	0.37
1	4542.183	Max WS	508.95	130.20	135.18		135.26	0.000783	2.35	316.07	315.01	0.22
1	4437.102	Max WS	509.48	131.50	134.86		135.03	0.004790	3.71	218.75	282.52	0.49
1	4246.329	Max WS	510.06	129.78	134.18		134.33	0.003039	3.63	272.91	376.17	0.40
1	4063.200	Max WS	510.92	129.05	133.72		133.85	0.002086	2.97	215.13	304.95	0.34
1	3863.200	Max WS	511.57	128.43	133.55		133.57	0.000415	1.43	637.71	487.56	0.15
1	3682.022	Max WS	512.57	127.89	133.49		133.50	0.000324	1.30	828.39	671.21	0.14
1	3487.742	Max WS	513.56	128.90	132.90		133.11	0.005612	4.02	213.64	518.11	0.53
1	3332.982	Max WS	513.86	129.37	132.38		132.48	0.002827	2.84	293.56	446.47	0.38
1	3152.554	Max WS	514.60	127.27	131.71	130.75	132.05	0.006062	4.70	117.23	406.34	0.56
1	2960.781	Max WS	515.43	128.00	130.96		131.12	0.003706	3.19	176.43	391.10	0.43
1	2800	Max WS	516.20	127.75	130.43		130.54	0.003958	3.05	266.75	347.71	0.44
1	2600	Max WS	516.92	127.22	129.92		129.99	0.002047	2.13	277.30	270.37	0.31
1	2436.651	Max WS	517.54	126.76	129.10		129.34	0.006797	3.93	134.78	202.69	0.57
1	2200	Max WS	518.45	125.72	128.05		128.18	0.003166	2.90	192.59	218.90	0.40
1	1800	Max WS	518.97	123.94	127.35		127.39	0.000940	1.69	330.04	243.74	0.22
1	1508.765	Max WS	519.61	122.64	126.55		126.81	0.003709	4.42	166.89	258.71	0.46
1	1238.804	Max WS	520.22	122.00	125.92		126.00	0.002131	2.24	232.09	154.93	0.32
1	947.7714	Max WS	520.14	122.00	125.15		125.29	0.002969	3.37	229.55	210.08	0.40
1	703.7460	Max WS	519.89	122.00	124.38		124.48	0.003706	2.78	249.08	367.37	0.42
1	413.4701	Max WS	519.71	120.00	123.33		123.51	0.003342	3.40	160.82	126.85	0.42
1	200.9584	Max WS	519.59	120.00	122.91		122.99	0.001559	2.53	306.22	286.30	0.30
1	10.31402	Max WS	519.54	120.00	122.50	121.90	122.61	0.002727	3.05	279.31	334.92	0.38

Unnamed Deer Creek Tributary

Existing Conditions Model:

100-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 9:40:29 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms
Plan: 100 yr existing - Existing Conditions 100 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	161.88	220.00	221.36		221.43	0.004746	2.32	93.88	225.40	0.44
1	28313.0*	Max WS	161.80	219.58	220.92		221.00	0.005986	2.45	75.45	122.85	0.49
1	28226.0*	Max WS	161.71	219.15	220.42		220.50	0.007003	2.46	77.76	134.50	0.52
1	28139.07	Max WS	161.63	218.73	219.96		220.03	0.006676	2.27	86.19	151.36	0.50
1	28069.5*	Max WS	167.01	218.22	219.48		219.57	0.008205	2.59	75.02	150.25	0.56
1	28000	Max WS	172.44	217.71	218.96		219.05	0.008272	2.59	81.83	180.69	0.56
1	27900.*	Max WS	182.11	216.97	217.97		218.10	0.011600	2.84	64.05	106.86	0.65
1	27800	Max WS	191.69	216.23	217.36		217.40	0.002503	1.63	117.62	143.18	0.32
1	27700.*	Max WS	201.43	215.51	217.08		217.14	0.002830	1.94	106.27	154.81	0.35
1	27600	Max WS	211.35	214.80	216.57		216.69	0.006903	3.36	112.60	215.38	0.55
1	27500.*	Max WS	222.48	214.08	215.69		215.83	0.009184	3.63	102.38	196.61	0.63
1	27400	Max WS	233.49	213.35	215.14		215.17	0.002121	1.93	194.31	231.80	0.31
1	27329.7*	Max WS	238.66	212.84	214.93		215.01	0.004035	2.76	134.48	177.11	0.43

1	27259.5*	Max WS	243.86	212.32	214.68		214.78	0.003862	2.90	137.88	198.85	0.43
1	27189.29	Max WS	249.08	211.81	214.30		214.48	0.007407	3.79	101.70	209.10	0.58
1	27094.6*	Max WS	257.58	211.10	213.53		213.78	0.009244	4.17	74.70	135.17	0.65
1	27000	Max WS	266.22	210.39	212.90		213.07	0.005692	3.44	85.44	95.44	0.52
1	26900.*	Max WS	275.82	209.64	212.35		212.51	0.005492	3.24	91.12	105.00	0.50
1	26800	Max WS	275.51	208.88	211.74		211.90	0.006288	3.19	89.90	103.71	0.53
1	26700.*	Max WS	294.44	208.12	210.98		211.21	0.008040	3.92	82.52	120.15	0.61
1	26600	Max WS	303.11	207.37	210.45		210.57	0.003850	3.23	170.91	306.77	0.44
1	26528.4*	Max WS	304.09	206.83	210.21		210.30	0.003405	2.95	188.28	304.51	0.41
1	26456.8*	Max WS	284.86	206.29	210.03		210.08	0.002171	2.34	222.26	314.49	0.32
1	26385.31	Max WS	306.16	205.75	209.51		209.77	0.010775	4.41	100.25	291.46	0.69
1	26292.6*	Max WS	311.07	205.40	208.51		208.77	0.012397	4.46	97.38	213.23	0.74
1	26200	Max WS	315.93	205.06	207.65		207.85	0.007417	3.85	108.19	171.68	0.59
1	26100.*	Max WS	320.77	204.69	207.03		207.19	0.006084	3.25	111.54	155.75	0.52
1	26000	Max WS	325.41	204.32	206.65		206.73	0.003018	2.36	159.16	190.89	0.37
1	25900.*	Max WS	330.14	203.95	206.29		206.39	0.003936	2.56	138.61	187.64	0.42
1	25800	Max WS	335.25	203.57	205.88		205.99	0.004638	2.61	128.56	122.73	0.45
1	25700.*	Max WS	340.15	203.20	205.41		205.54	0.005142	3.12	155.36	270.37	0.49
1	25600	Max WS	345.16	202.83	205.05		205.10	0.003611	3.07	237.66	294.20	0.42
1	25500.*	Max WS	349.44	202.46	204.64		204.74	0.005148	3.46	204.49	317.84	0.50
1	25400	Max WS	354.25	202.09	204.32		204.37	0.002724	2.43	257.75	388.34	0.36
1	25358.8*	Max WS	355.89	202.00	204.20		204.27	0.003539	2.76	235.46	362.27	0.41
1	25317.6*	Max WS	357.87	201.92	204.04		204.13	0.004516	2.99	213.13	331.14	0.46
1	25276.3*	Max WS	359.82	201.83	203.86		203.94	0.005225	3.00	197.31	290.16	0.49
1	25235.1*	Max WS	361.75	201.75	203.67		203.74	0.005432	2.76	193.31	255.37	0.48
1	25193.99	Max WS	363.66	201.66	203.49		203.54	0.004752	2.28	205.61	237.17	0.44
1	25145.4*	Max WS	366.15	201.36	203.19		203.28	0.006397	2.80	171.30	229.45	0.52
1	25097.*	Max WS	368.73	201.05	202.79		202.93	0.008451	3.16	137.72	214.01	0.59
1	25048.5*	Max WS	370.98	200.75	202.48		202.59	0.005596	2.68	146.72	213.64	0.49
1	25000	Max WS	373.48	200.45	202.35		202.40	0.001832	1.79	221.21	231.90	0.29
1	24900.*	Max WS	377.94	200.04	202.14		202.20	0.002319	2.11	199.96	214.59	0.33
1	24800	Max WS	382.76	199.63	201.77		201.90	0.004502	2.96	152.10	161.68	0.46
1	24700.*	Max WS	387.90	199.20	201.19		201.37	0.007300	3.70	144.53	209.64	0.58
1	24600	Max WS	393.03	198.77	200.54		200.68	0.008492	3.89	183.65	295.99	0.62
1	24500.*	Max WS	398.27	198.34	200.02		200.08	0.004528	2.49	233.88	306.13	0.44
1	24400	Max WS	403.69	197.91	199.81		199.82	0.000939	1.21	463.23	465.20	0.20
1	24328.0*	Max WS	406.89	197.60	199.76		199.77	0.000970	1.18	465.43	458.09	0.20
1	24256.1*	Max WS	177.32	197.29	199.69		199.74	0.002412	1.82	97.79	447.00	0.32
1	24184.18	Max WS	413.48	196.98	199.30	199.49	200.02	0.046079	6.80	60.81	373.00	1.34
1	24092.0*	Max WS	417.78	196.51	198.90		198.95	0.003874	2.36	282.87	393.30	0.41
1	24000	Max WS	422.13	196.03	198.42		198.55	0.006652	3.47	207.02	364.94	0.55
1	23900.*	Max WS	427.00	195.51	197.91		198.00	0.005201	2.98	223.40	296.92	0.48
1	23800	Max WS	431.75	194.99	197.45		197.52	0.004966	2.81	228.82	283.23	0.47
1	23700.*	Max WS	435.70	194.47	197.03		197.11	0.003787	2.78	249.83	299.63	0.42
1	23600	Max WS	439.08	193.95	196.54		196.66	0.005841	3.65	234.34	381.26	0.53
1	23400	Max WS	473.79	192.92	196.00		196.05	0.000962	1.99	348.86	260.25	0.23
1	23178.25	Max WS	510.21	191.76	195.37		195.56	0.004717	4.50	207.24	203.64	0.50
1	23000	Max WS	546.39	191.25	194.51		194.71	0.004842	3.80	199.82	240.06	0.50
1	22600	Max WS	605.57	190.00	193.13		193.27	0.002483	3.15	246.05	367.24	0.37
1	22400	Max WS	687.34	189.54	192.83		192.89	0.001050	1.98	429.59	326.67	0.24
1	22175.79	Max WS	690.40	188.90	192.00		192.25	0.005919	4.56	233.62	239.74	0.56
1	22000	Max WS	692.50	188.07	191.20		191.42	0.004127	3.94	222.33	194.16	0.48
1	21900.*	Max WS	693.26	187.59	190.88		191.05	0.003233	3.41	255.62	236.58	0.42

1	21800	Max WS	694.47	187.11	190.68	190.79	0.002008	2.74	322.63	262.18	0.33
1	21600	Max WS	696.84	186.14	189.70	190.06	0.007490	5.00	175.27	186.14	0.63
1	21400	Max WS	699.51	185.21	189.09	189.17	0.001264	2.35	331.56	205.72	0.27
1	21176.29	Max WS	702.02	184.07	188.62	188.78	0.002851	3.67	305.56	274.19	0.40
1	20962.10	Max WS	704.53	184.10	187.69	187.89	0.005718	3.94	250.40	276.96	0.53
1	20895.2*	Max WS	704.89	183.95	187.50	187.60	0.002312	2.90	360.13	265.52	0.35
1	20828.3*	Max WS	705.87	183.80	187.34	187.45	0.002359	3.17	345.96	251.43	0.36
1	20761.52	Max WS	706.80	183.65	187.07	187.24	0.004747	4.12	280.01	231.77	0.50
1	20712.0*	Max WS	708.21	182.57	186.71	187.00	0.006275	4.81	219.00	225.36	0.58
1	20662.66	Max WS	709.28	181.49	186.37	186.68	0.005880	4.68	209.15	357.15	0.56
1	20642.13	Max WS	709.85	181.53	186.20	186.62	0.009289	5.47	189.13	365.47	0.69
1	20614.23	Max WS	710.83	180.88	186.13	186.27	0.001994	3.09	285.06	359.58	0.34
1	20399.06	Max WS	688.48	181.78	185.61	185.72	0.003009	3.04	368.40	423.70	0.39
1	20131.75	Max WS	717.32	180.89	184.82	184.94	0.002689	3.42	382.00	380.37	0.39
1	19831.49	Max WS	788.58	179.01	183.11	183.63	0.008942	5.77	136.57	234.66	0.69
1	19561.71	Max WS	772.33	176.06	181.97	182.12	0.002014	3.17	250.89	123.83	0.34
1	19375.20	Max WS	764.69	173.23	181.79	181.89	0.000568	2.57	304.10	298.51	0.20
1	19216.24	Max WS	762.74	176.81	181.64	181.72	0.001683	3.27	490.46	343.61	0.32
1	19040.62	Max WS	758.12	176.76	181.25	181.37	0.002401	3.52	442.54	523.35	0.37
1	18953.9*	Max WS	756.51	176.83	180.99	181.18	0.003222	4.00	340.90	427.76	0.43
1	18867.36	Max WS	757.73	176.91	180.50	180.84	0.006875	4.97	234.99	376.12	0.61
1	18661.93	Max WS	755.06	175.46	179.65	179.78	0.003104	3.73	401.64	449.78	0.42
1	18573.2*	Max WS	756.25	174.86	179.40	179.54	0.002648	3.82	387.74	360.26	0.40
1	18484.66	Max WS	755.82	174.25	178.90	179.28	0.005518	5.64	237.45	276.57	0.57
1	18313.08	Max WS	759.60	174.93	178.05	178.33	0.004947	4.51	235.69	295.47	0.53
1	18134.08	Max WS	762.12	174.22	177.49	177.61	0.003147	3.27	365.23	365.88	0.41
1	17964.88	Max WS	764.88	172.77	176.54	176.90	0.007086	5.56	249.96	346.34	0.63
1	17929.0*	Max WS	765.60	172.49	176.35	176.66	0.006113	5.02	263.72	366.75	0.58
1	17893.2*	Max WS	766.29	172.22	176.18	176.44	0.005675	4.59	277.47	374.85	0.56
1	17857.44	Max WS	766.95	171.94	176.00	176.23	0.005947	4.36	282.23	371.48	0.56
1	17784.4*	Max WS	768.02	171.95	175.52	175.77	0.007797	4.69	275.08	394.06	0.63
1	17711.5*	Max WS	769.40	171.97	175.15	175.29	0.005068	3.79	357.99	428.64	0.51
1	17638.59	Max WS	770.28	171.98	174.91	175.00	0.002824	3.04	456.31	459.94	0.39
1	17570.8*	Max WS	771.66	171.69	174.69	174.80	0.003448	3.35	424.24	470.69	0.43
1	17503.0*	Max WS	772.39	171.40	174.39	174.55	0.004747	3.90	372.59	519.88	0.50
1	17435.23	Max WS	773.77	171.11	174.13	174.26	0.003674	3.53	386.00	570.09	0.44
1	17347.3*	Max WS	775.57	170.31	173.92	173.97	0.001925	2.67	555.07	536.21	0.32
1	17259.39	Max WS	777.21	169.51	173.37	173.60	0.008664	4.89	301.35	499.48	0.66
1	17161.6*	Max WS	778.39	169.43	172.88	173.00	0.004140	3.37	375.05	440.23	0.46
1	17063.83	Max WS	779.34	169.35	172.51	172.65	0.003519	3.14	323.60	360.66	0.42
1	17016.0*	Max WS	780.32	168.83	172.31	172.48	0.003491	3.47	280.68	272.59	0.43
1	16968.2*	Max WS	781.27	168.30	172.15	172.33	0.003063	3.61	288.51	230.34	0.42
1	16920.4*	Max WS	782.23	167.78	171.99	172.18	0.003088	3.97	291.44	209.55	0.43
1	16872.70	Max WS	782.85	167.26	171.72	172.03	0.005072	5.38	247.13	187.03	0.54
1	16822.9*	Max WS	783.90	167.36	171.49	171.78	0.004927	5.12	268.83	242.35	0.54
1	16773.1*	Max WS	784.91	167.46	171.33	171.53	0.004059	4.46	302.97	250.78	0.48
1	16723.4*	Max WS	785.89	167.57	171.14	171.33	0.004082	4.22	314.61	270.98	0.48
1	16673.66	Max WS	786.85	167.67	170.96	171.12	0.004241	4.00	325.61	274.79	0.48
1	16606.6*	Max WS	787.76	167.56	170.71	170.84	0.004170	3.86	370.15	355.98	0.47
1	16539.5*	Max WS	788.95	167.45	170.44	170.57	0.004323	3.86	386.69	445.88	0.48
1	16472.50	Max WS	789.57	167.34	170.20	170.30	0.003482	3.54	390.36	493.24	0.43
1	16374.4*	Max WS	790.70	166.82	169.79	169.92	0.004817	3.78	344.05	481.44	0.50
1	16276.30	Max WS	792.38	166.31	169.39	169.49	0.003903	3.17	365.80	524.44	0.44

1	16193.9*	Max WS	791.44	165.53	169.16		169.29	0.004482	3.72	398.56	499.41	0.48
1	16111.50	Max WS	792.05	164.75	169.05		169.10	0.001728	2.71	587.36	533.30	0.31
1	16044.4*	Max WS	791.57	164.60	168.97		169.03	0.001587	2.71	566.67	475.18	0.30
1	15977.4*	Max WS	792.33	164.46	168.87		168.95	0.001881	3.05	508.33	446.73	0.33
1	15910.45	Max WS	793.02	164.31	168.76		168.88	0.002262	3.42	451.38	432.15	0.36
1	15816.4*	Max WS	793.56	163.77	168.35		168.72	0.004710	5.30	246.95	296.40	0.53
1	15722.50	Max WS	793.99	163.23	167.43		168.17	0.011807	7.51	151.65	127.46	0.80
1	15661.2*	Max WS	796.17	163.03	167.24		167.46	0.003847	4.17	272.71	228.99	0.47
1	15600	Max WS	799.04	162.83	167.18		167.25	0.001456	2.54	469.13	334.76	0.29
1	15513.5*	Max WS	800.69	162.55	167.09		167.15	0.001334	2.42	490.10	356.46	0.28
1	15427.0*	Max WS	803.35	162.26	167.00		167.06	0.001304	2.35	502.14	380.50	0.27
1	15340.5*	Max WS	805.93	161.98	166.90		166.97	0.001366	2.32	502.02	405.47	0.27
1	15254.0*	Max WS	808.44	161.69	166.79		166.86	0.001586	2.38	479.99	431.57	0.29
1	15167.54	Max WS	810.44	161.41	166.50		166.68	0.004119	3.38	257.98	445.92	0.45
1	15068.7*	Max WS	813.99	161.32	166.22		166.37	0.002394	3.24	325.04	401.86	0.37
1	14970.01	Max WS	817.26	161.22	165.72		166.05	0.006116	5.15	229.70	350.97	0.58
1	14800.08	Max WS	822.28	160.07	165.12		165.24	0.003207	3.35	394.43	354.25	0.41
1	14745.2*	Max WS	824.74	160.00	164.96		165.10	0.002327	3.66	404.99	338.67	0.37
1	14690.37	Max WS	827.14	159.93	164.76		165.01	0.003362	5.01	357.13	345.72	0.45
1	14521.03	Max WS	833.55	159.74	164.23		164.38	0.003544	3.24	337.11	384.49	0.43
1	14350.55	Max WS	834.84	158.30	163.80		163.90	0.002203	3.14	464.07	422.15	0.35
1	14165.39	Max WS	836.67	159.11	163.14		163.35	0.004502	4.41	344.06	381.89	0.50
1	14077.1*	Max WS	837.82	158.60	162.83		163.03	0.003137	4.07	354.55	381.80	0.43
1	13988.90	Max WS	838.67	158.09	162.57		162.76	0.003423	3.96	369.35	409.43	0.44
1	13902.9*	Max WS	839.22	158.18	162.37		162.57	0.003599	4.17	337.24	299.17	0.45
1	13817.08	Max WS	839.76	158.27	162.03		162.35	0.005344	5.09	262.61	263.31	0.55
1	13800.26	Max WS	839.69	157.92	161.89		162.25	0.006964	5.50	237.60	203.82	0.62
1	13716.8*	Max WS	840.71	157.68	161.48		161.79	0.004855	4.77	242.06	188.79	0.53
1	13633.46	Max WS	841.11	157.45	161.40		161.48	0.001478	2.70	492.66	325.03	0.29
1	13548.2*	Max WS	842.34	156.91	161.17		161.32	0.003060	3.63	367.86	331.16	0.42
1	13462.94	Max WS	842.91	156.37	160.90		161.08	0.003597	3.84	326.77	287.64	0.44
1	13372.7*	Max WS	843.37	155.87	160.68		160.81	0.002783	3.54	412.39	398.27	0.39
1	13282.48	Max WS	843.61	155.37	160.45		160.60	0.002782	3.70	471.50	592.17	0.39
1	13196.7*	Max WS	844.68	155.42	160.29		160.39	0.002001	3.11	474.08	405.96	0.34
1	13110.9*	Max WS	845.69	155.48	160.09		160.21	0.002490	3.27	419.43	375.20	0.37
1	13025.20	Max WS	846.44	155.53	159.77		159.96	0.004518	3.89	325.91	337.13	0.49
1	12934.78	Max WS	847.74	155.67	159.45		159.64	0.003589	4.27	369.63	348.95	0.46
1	12679.83	Max WS	850.00	154.84	158.52		158.76	0.005167	4.68	357.61	491.00	0.54
1	12514.10	Max WS	850.82	153.08	157.98		158.14	0.003160	4.18	403.27	396.20	0.43
1	12342.49	Max WS	852.45	153.74	157.56		157.65	0.002733	3.13	443.75	362.16	0.38
1	12168.87	Max WS	853.96	152.62	157.14		157.26	0.002592	3.64	454.64	403.45	0.39
1	11993.01	Max WS	855.00	152.46	156.70		156.83	0.002980	3.14	372.88	375.19	0.39
1	11820.19	Max WS	855.66	150.12	156.24		156.39	0.002344	3.19	328.90	465.75	0.36
1	11633.47	Max WS	858.24	151.10	155.34		155.66	0.006381	4.66	232.77	357.70	0.58
1	11460.48	Max WS	839.41	149.67	154.71		154.84	0.002673	3.07	398.94	427.69	0.38
1	11271.33	Max WS	822.70	147.60	154.38		154.48	0.001525	2.81	440.39	539.89	0.30
1	11146.79	Max WS	861.67	147.72	153.91	152.68	154.36	0.004785	5.37	177.80	343.40	0.52
1	10961.29	Max WS	862.58	149.08	153.26		153.37	0.002366	3.17	456.03	414.83	0.36
1	10777.64	Max WS	864.59	147.95	152.61		152.91	0.003484	4.53	252.39	335.16	0.46
1	10599.75	Max WS	866.19	147.94	151.89		152.14	0.005411	4.51	308.05	370.13	0.54
1	10484.71	Max WS	866.87	147.53	151.54		151.65	0.002479	3.23	441.10	353.26	0.37
1	10294.85	Max WS	867.48	146.18	151.19		151.27	0.001714	2.82	506.33	379.38	0.31
1	10111.02	Max WS	868.27	146.70	150.81		150.96	0.002625	3.52	420.30	473.40	0.39

1	9962.423	Max WS	868.96	144.81	150.33		150.56	0.003691	4.33	359.98	456.05	0.46
1	9810.025	Max WS	869.90	145.21	149.67	148.81	149.97	0.005266	4.51	218.58	442.32	0.54
1	9553.901	Max WS	871.05	143.12	148.95		149.06	0.001978	3.32	480.63	429.49	0.34
1	9362.452	Max WS	871.22	143.70	148.40		148.69	0.003790	4.75	327.76	457.83	0.48
1	9149.788	Max WS	872.94	141.77	148.09		148.13	0.000558	1.78	632.64	536.23	0.18
1	8963.549	Max WS	874.27	141.24	147.55		147.83	0.003993	4.60	274.80	230.69	0.48
1	8766.435	Max WS	877.45	142.65	146.79		147.06	0.004177	4.28	240.08	240.94	0.48
1	8577.282	Max WS	878.67	141.02	146.27		146.46	0.002523	3.75	369.57	487.36	0.39
1	8398.577	Max WS	881.33	141.01	145.99		146.12	0.001957	3.45	471.45	422.28	0.34
1	8223.925	Max WS	884.42	139.79	145.52		145.72	0.003204	4.33	336.04	258.48	0.43
1	8000	Max WS	887.82	139.29	145.11		145.21	0.001431	2.83	459.37	327.67	0.29
1	7744.065	Max WS	862.27	138.71	143.99		144.39	0.005938	5.36	236.21	371.09	0.58
1	7600	Max WS	857.68	138.31	143.65		143.74	0.001614	2.70	525.48	524.61	0.30
1	7400	Max WS	992.78	137.76	142.72		143.35	0.008224	6.47	177.68	464.56	0.69
1	7200	Max WS	943.24	137.20	141.77		142.08	0.004483	4.66	249.63	166.13	0.51
1	7000	Max WS	931.47	136.65	141.16		141.37	0.002813	3.84	315.65	257.98	0.41
1	6800	Max WS	920.62	136.09	140.84		140.94	0.001724	2.78	476.29	410.05	0.31
1	6545.718	Max WS	938.23	134.93	139.98		140.28	0.005985	5.74	353.64	369.27	0.57
1	6400	Max WS	934.98	135.02	139.54		139.70	0.002517	3.84	416.10	296.42	0.39
1	6200	Max WS	935.61	134.52	139.16		139.26	0.002306	3.27	506.41	391.36	0.36
1	6000	Max WS	935.96	134.02	138.76		138.91	0.002638	3.23	353.55	266.00	0.38
1	5800	Max WS	937.02	133.53	138.33		138.44	0.001852	2.91	436.73	331.85	0.33
1	5544.024	Max WS	937.98	132.89	137.77		137.93	0.002968	4.03	455.78	433.68	0.42
1	5310.353	Max WS	936.71	130.81	136.98		137.24	0.003332	4.31	330.54	387.83	0.44
1	5126.186	Max WS	939.02	131.42	136.68		136.75	0.001237	2.93	702.75	565.71	0.27
1	4928.496	Max WS	940.84	131.24	136.48		136.56	0.001202	2.65	622.98	502.83	0.27
1	4737.846	Max WS	943.49	130.80	136.04		136.23	0.003285	4.07	383.60	343.92	0.43
1	4542.183	Max WS	946.16	130.20	135.68		135.81	0.001292	3.30	480.69	347.56	0.29
1	4437.102	Max WS	947.34	131.50	135.35		135.54	0.004771	4.35	365.73	317.52	0.51
1	4246.329	Max WS	949.68	129.78	134.75		134.88	0.002615	3.86	492.59	394.24	0.39
1	4063.200	Max WS	951.64	129.05	134.21		134.41	0.002855	3.94	377.42	358.27	0.41
1	3863.200	Max WS	953.92	128.43	133.97		134.01	0.000680	2.02	848.39	528.45	0.20
1	3682.022	Max WS	956.14	127.89	133.88		133.90	0.000506	1.78	1090.70	683.66	0.17
1	3487.742	Max WS	958.83	128.90	133.35		133.52	0.004387	4.13	449.09	528.46	0.49
1	3332.982	Max WS	960.93	129.37	132.92		133.01	0.002271	3.04	537.08	458.32	0.35
1	3152.554	Max WS	962.86	127.27	132.21		132.54	0.005835	5.27	352.19	497.14	0.57
1	2960.781	Max WS	964.84	128.00	131.45		131.64	0.003894	3.87	393.42	523.18	0.46
1	2800	Max WS	966.71	127.75	130.97		131.08	0.003219	3.38	466.86	392.21	0.42
1	2600	Max WS	968.73	127.22	130.55		130.64	0.001826	2.56	461.35	323.14	0.32
1	2436.651	Max WS	970.36	126.76	129.71		130.04	0.007112	4.78	249.61	297.45	0.61
1	2200	Max WS	972.73	125.72	128.71		128.87	0.002920	3.48	355.13	278.78	0.41
1	1800	Max WS	974.70	123.94	128.10		128.17	0.000933	2.13	540.06	311.30	0.23
1	1508.765	Max WS	976.48	122.64	127.24		127.57	0.004246	5.41	315.37	331.33	0.51
1	1238.804	Max WS	978.11	122.00	126.58		126.69	0.002103	2.70	418.75	350.42	0.34
1	947.7714	Max WS	977.42	122.00	125.68		125.89	0.003734	4.37	353.60	257.75	0.47
1	703.7460	Max WS	975.88	122.00	125.04		125.13	0.002242	2.82	510.46	423.25	0.35
1	413.4701	Max WS	975.44	120.00	123.99		124.29	0.004407	4.53	252.65	264.96	0.50
1	200.9584	Max WS	975.05	120.00	123.48		123.60	0.001941	3.28	489.90	381.21	0.34
1	10.31402	Max WS	974.88	120.00	123.04	122.47	123.17	0.002708	3.58	472.81	376.76	0.40

Unnamed Deer Creek Tributary

Existing Conditions Model:

2-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 10:02:10 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms
Plan: 2 yr existing - Existing Conditions 2 Year 24 hour storm
Plan:

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	43.44	220.00	220.89		220.93	0.004758	1.50	29.03	68.57	0.39
1	28313.0*	Max WS	43.40	219.58	220.47		220.51	0.005746	1.56	28.28	75.32	0.43
1	28226.0*	Max WS	43.38	219.15	219.98		220.03	0.009908	1.86	24.95	85.36	0.55
1	28139.07	Max WS	43.31	218.73	219.53		219.58	0.011716	1.84	27.33	103.46	0.58
1	28069.5*	Max WS	44.76	218.22	219.08		219.13	0.008979	1.75	26.40	85.91	0.52
1	28000	Max WS	46.20	217.71	218.57		218.62	0.008563	1.76	26.22	76.02	0.51
1	27900.*	Max WS	48.79	216.97	217.54		217.61	0.015288	2.05	23.84	80.18	0.66
1	27800	Max WS	51.32	216.23	216.78		216.80	0.003167	1.15	44.68	109.69	0.32
1	27700.*	Max WS	53.91	215.51	216.57		216.59	0.001291	0.99	54.22	84.29	0.22
1	27600	Max WS	56.50	214.80	216.12		216.21	0.007067	2.43	26.43	114.98	0.52
1	27500.*	Max WS	59.46	214.08	215.22		215.33	0.011291	2.68	26.27	87.52	0.63
1	27400	Max WS	62.39	213.35	214.53		214.55	0.003133	1.46	66.65	177.97	0.34
1	27329.7*	Max WS	63.10	212.84	214.27		214.34	0.004533	2.12	38.25	104.61	0.42

1	27259.5*	Max WS	64.20	212.32	213.93		214.01	0.005189	2.30	27.89	34.63	0.45
1	27189.29	Max WS	66.73	211.81	213.45		213.57	0.008344	2.83	23.60	30.30	0.56
1	27094.6*	Max WS	69.02	211.10	212.64		212.78	0.009892	2.96	23.31	32.26	0.61
1	27000	Max WS	71.29	210.39	212.04		212.12	0.004855	2.26	31.52	38.46	0.44
1	26900.*	Max WS	73.86	209.64	211.63		211.68	0.004073	1.92	38.52	52.55	0.39
1	26800	Max WS	76.41	208.88	210.94		211.04	0.010170	2.49	30.64	55.46	0.59
1	26700.*	Max WS	78.74	208.12	210.11		210.22	0.007521	2.65	29.69	39.28	0.54
1	26600	Max WS	80.96	207.37	209.60		209.68	0.003416	2.33	34.67	30.76	0.39
1	26528.4*	Max WS	81.24	206.83	209.34		209.43	0.003777	2.38	34.12	31.37	0.40
1	26456.8*	Max WS	81.43	206.29	209.03		209.13	0.004563	2.57	31.74	49.72	0.44
1	26385.31	Max WS	81.72	205.75	208.45		208.65	0.009220	3.54	23.07	33.89	0.60
1	26292.6*	Max WS	83.12	205.40	207.50		207.73	0.010317	3.82	21.74	20.64	0.66
1	26200	Max WS	84.54	205.06	206.78		206.90	0.007120	2.70	31.29	38.90	0.53
1	26100.*	Max WS	85.86	204.69	206.19		206.27	0.005652	2.24	38.31	53.14	0.47
1	26000	Max WS	87.14	204.32	205.79		205.83	0.003199	1.69	51.71	71.76	0.35
1	25900.*	Max WS	88.47	203.95	205.46		205.50	0.003560	1.76	50.22	70.75	0.37
1	25800	Max WS	89.88	203.57	205.13		205.18	0.003391	1.68	53.42	77.80	0.36
1	25700.*	Max WS	91.26	203.20	204.77		204.83	0.004118	1.95	46.73	62.92	0.40
1	25600	Max WS	92.50	202.83	204.46		204.50	0.004021	2.40	85.13	221.27	0.41
1	25500.*	Max WS	93.65	202.46	204.04		204.13	0.006085	2.68	49.46	109.88	0.50
1	25400	Max WS	94.67	202.09	203.77		203.79	0.001670	1.42	104.09	180.58	0.26
1	25358.8*	Max WS	95.20	202.00	203.69		203.73	0.002180	1.63	83.85	156.12	0.30
1	25317.6*	Max WS	95.59	201.92	203.61		203.64	0.002439	1.69	86.21	235.62	0.32
1	25276.3*	Max WS	96.11	201.83	203.54		203.56	0.001559	1.33	113.81	241.93	0.25
1	25235.1*	Max WS	96.56	201.75	203.51		203.52	0.000727	0.90	155.27	237.46	0.17
1	25193.99	Max WS	97.11	201.66	203.10		203.28	0.016653	3.37	28.80	199.09	0.77
1	25145.4*	Max WS	97.81	201.36	202.61		202.68	0.007790	2.26	57.16	150.12	0.53
1	25097.*	Max WS	98.52	201.05	202.16		202.25	0.010057	2.48	39.71	73.01	0.59
1	25048.5*	Max WS	99.19	200.75	201.76		201.83	0.007667	2.11	47.07	90.26	0.51
1	25000	Max WS	99.90	200.45	201.56		201.58	0.002410	1.30	76.90	127.89	0.30
1	24900.*	Max WS	101.19	200.04	201.31		201.34	0.002616	1.45	69.69	104.29	0.31
1	24800	Max WS	102.49	199.63	200.99		201.05	0.004056	1.92	54.80	88.10	0.40
1	24700.*	Max WS	103.95	199.20	200.58		200.65	0.005334	2.25	50.42	97.41	0.46
1	24600	Max WS	105.37	198.77	200.01	200.05	200.20	0.016189	3.64	39.48	198.77	0.78
1	24500.*	Max WS	104.03	198.34	199.59		199.61	0.002787	1.39	109.00	263.30	0.32
1	24400	Max WS	104.61	197.91	199.49		199.50	0.000191	0.43	321.99	425.77	0.09
1	24328.0*	Max WS	105.39	197.60	199.48		199.51	0.001624	1.28	83.15	426.75	0.25
1	24256.1*	Max WS	106.15	197.29	199.40		199.43	0.001939	1.49	71.36	383.65	0.28
1	24184.18	Max WS	106.95	196.98	198.87		199.03	0.013050	3.23	33.08	293.47	0.69
1	24092.0*	Max WS	108.10	196.51	198.31		198.36	0.003836	1.91	91.36	249.17	0.39
1	24000	Max WS	109.29	196.03	197.78		197.89	0.007159	2.70	40.41	50.49	0.53
1	23900.*	Max WS	110.31	195.51	197.28		197.36	0.007140	2.41	61.46	194.40	0.52
1	23800	Max WS	111.28	194.99	196.85		196.91	0.005541	2.22	73.51	236.76	0.46
1	23700.*	Max WS	112.38	194.47	196.52		196.55	0.002141	1.60	111.31	243.92	0.30
1	23600	Max WS	121.02	193.95	195.89		196.07	0.009686	3.36	35.99	121.49	0.63
1	23400	Max WS	124.33	192.92	195.01		195.02	0.000675	1.13	135.87	160.90	0.18
1	23178.25	Max WS	133.26	191.76	194.23		194.42	0.005918	3.57	41.18	96.49	0.52
1	23000	Max WS	142.47	191.25	193.34		193.46	0.004787	2.75	51.81	46.60	0.46
1	22600	Max WS	157.71	190.00	192.02		192.08	0.002075	1.82	86.64	118.80	0.30
1	22400	Max WS	178.46	189.54	191.76		191.78	0.000848	1.17	157.79	183.65	0.19
1	22175.79	Max WS	179.38	188.90	190.94		191.10	0.007163	3.27	54.88	51.45	0.56
1	22000	Max WS	180.00	188.07	190.06		190.15	0.004354	2.43	74.12	79.88	0.43
1	21900.*	Max WS	180.31	187.59	189.70		189.77	0.003759	2.26	79.65	80.25	0.40

1	21800	Max WS	180.66	187.11	189.42		189.48	0.002428	1.91	94.66	88.75	0.33
1	21600	Max WS	181.28	186.14	188.44		188.61	0.007835	3.36	53.90	52.48	0.58
1	21400	Max WS	181.91	185.21	187.83		187.86	0.000925	1.32	137.64	108.50	0.21
1	21176.29	Max WS	182.45	184.07	187.50		187.58	0.002072	2.24	81.38	64.76	0.32
1	20962.10	Max WS	183.20	184.10	186.70		186.81	0.005509	2.68	68.41	179.37	0.48
1	20895.2*	Max WS	183.40	183.95	186.51		186.56	0.001938	1.88	127.48	180.14	0.30
1	20828.3*	Max WS	177.29	183.80	186.40		186.45	0.001491	1.84	132.07	205.09	0.27
1	20761.52	Max WS	183.91	183.65	185.92	185.67	186.19	0.013698	4.23	48.58	139.02	0.75
1	20712.0*	Max WS	184.01	182.57	185.39		185.62	0.009346	3.88	47.42	41.61	0.64
1	20662.66	Max WS	184.14	181.49	185.24		185.34	0.002182	2.48	74.38	42.51	0.33
1	20642.13	Max WS	184.00	181.53	185.13		185.27	0.004394	3.01	61.04	42.76	0.44
1	20614.23	Max WS	184.47	180.88	185.16		185.19	0.000523	1.31	140.63	77.20	0.16
1	20399.06	Max WS	185.02	181.78	184.78		184.85	0.002754	2.12	87.47	324.93	0.35
1	20131.75	Max WS	186.28	180.89	183.35		183.54	0.007263	3.54	52.65	77.03	0.56
1	19831.49	Max WS	187.66	179.01	181.36		181.55	0.006120	3.50	53.60	39.21	0.53
1	19561.71	Max WS	188.49	176.06	180.60		180.63	0.000515	1.39	135.19	62.81	0.17
1	19375.20	Max WS	189.36	173.23	180.56		180.57	0.000079	0.83	228.08	133.37	0.07
1	19216.24	Max WS	190.00	176.81	180.43		180.50	0.001777	2.47	145.17	224.33	0.30
1	19040.62	Max WS	190.79	176.76	179.93		180.06	0.003541	2.85	69.86	265.40	0.41
1	18953.9*	Max WS	191.13	176.83	179.70		179.80	0.002504	2.54	75.37	121.05	0.35
1	18867.36	Max WS	191.49	176.91	179.41		179.53	0.003664	2.79	68.54	48.82	0.42
1	18661.93	Max WS	191.91	175.46	178.35		178.52	0.006279	3.28	64.10	100.67	0.53
1	18573.2*	Max WS	192.35	174.86	177.79		178.00	0.005429	3.65	52.75	33.66	0.51
1	18484.66	Max WS	192.77	174.25	177.37		177.57	0.003918	3.61	53.44	26.52	0.45
1	18313.08	Max WS	193.59	174.93	177.00		177.07	0.001833	2.22	87.02	179.10	0.30
1	18134.08	Max WS	194.18	174.22	176.32		176.44	0.005261	2.77	70.20	243.14	0.48
1	17964.88	Max WS	194.95	172.77	175.45		175.63	0.004439	3.33	58.51	36.22	0.46
1	17929.0*	Max WS	195.10	172.49	175.37		175.49	0.003319	2.79	69.84	46.12	0.40
1	17893.2*	Max WS	195.26	172.22	175.27		175.37	0.003247	2.58	75.79	112.07	0.39
1	17857.44	Max WS	195.42	171.94	175.14		175.24	0.004092	2.60	75.15	144.27	0.43
1	17784.4*	Max WS	195.74	171.95	174.77		174.90	0.005689	2.89	67.77	168.93	0.50
1	17711.5*	Max WS	196.00	171.97	174.38		174.53	0.006195	3.05	64.29	194.61	0.52
1	17638.59	Max WS	196.24	171.98	174.13		174.22	0.002592	2.48	116.69	401.18	0.35
1	17570.8*	Max WS	196.51	171.69	173.88		173.99	0.004295	2.68	84.47	215.63	0.44
1	17503.0*	Max WS	196.77	171.40	173.54		173.67	0.005563	2.87	68.85	155.12	0.49
1	17435.23	Max WS	197.01	171.11	173.28		173.36	0.003678	2.45	102.77	241.71	0.40
1	17347.3*	Max WS	197.34	170.31	172.93		173.04	0.004090	2.68	94.55	196.52	0.43
1	17259.39	Max WS	197.69	169.51	172.33	171.87	172.60	0.008489	4.19	47.30	293.43	0.62
1	17161.6*	Max WS	198.06	169.43	171.70		171.85	0.005844	3.11	63.73	55.34	0.51
1	17063.83	Max WS	198.42	169.35	171.21		171.32	0.004994	2.67	74.42	72.49	0.46
1	17016.0*	Max WS	198.63	168.83	171.03		171.12	0.003352	2.38	83.36	71.25	0.39
1	16968.2*	Max WS	198.84	168.30	170.90		170.98	0.002638	2.25	88.56	74.84	0.35
1	16920.4*	Max WS	199.04	167.78	170.79		170.87	0.002311	2.33	90.89	86.43	0.33
1	16872.70	Max WS	199.23	167.26	170.60		170.75	0.003183	3.14	72.73	112.99	0.40
1	16822.9*	Max WS	199.43	167.36	170.49		170.60	0.002668	2.81	85.00	134.17	0.37
1	16773.1*	Max WS	199.62	167.46	170.38		170.48	0.002558	2.63	97.04	182.18	0.36
1	16723.4*	Max WS	199.80	167.57	170.27		170.35	0.002511	2.45	112.55	188.44	0.35
1	16673.66	Max WS	199.99	167.67	170.13		170.22	0.003165	2.51	112.56	243.06	0.38
1	16606.6*	Max WS	200.24	167.56	169.86		169.98	0.004915	2.96	92.69	298.50	0.47
1	16539.5*	Max WS	200.48	167.45	169.57		169.68	0.004673	3.01	104.96	209.15	0.47
1	16472.50	Max WS	200.71	167.34	169.35		169.43	0.002932	2.53	141.95	263.53	0.37
1	16374.4*	Max WS	201.07	166.82	168.93		169.05	0.005209	2.92	102.79	252.54	0.48
1	16276.30	Max WS	201.37	166.31	168.58		168.63	0.003006	2.05	150.35	381.99	0.36

1	16193.9*	Max WS	201.49	165.53	168.22	168.38	0.006471	3.27	73.47	309.67	0.54
1	16111.50	Max WS	201.64	164.75	167.85	168.00	0.006076	3.21	79.48	163.47	0.51
1	16044.4*	Max WS	201.77	164.60	167.68	167.75	0.002823	2.32	124.94	156.18	0.36
1	15977.4*	Max WS	201.93	164.46	167.46	167.60	0.004686	3.08	77.34	137.28	0.46
1	15910.45	Max WS	202.09	164.31	167.17	167.33	0.005023	3.23	62.84	52.07	0.48
1	15816.4*	Max WS	202.25	163.77	166.83	166.98	0.003490	3.11	65.17	44.22	0.42
1	15722.50	Max WS	202.41	163.23	166.25	166.50	0.007078	4.02	51.51	43.27	0.57
1	15661.2*	Max WS	202.99	163.03	166.07	166.17	0.003231	2.51	89.90	110.21	0.39
1	15600	Max WS	203.54	162.83	165.98	166.01	0.001503	1.64	146.96	151.01	0.26
1	15513.5*	Max WS	204.09	162.55	165.85	165.89	0.001647	1.70	135.49	164.04	0.27
1	15427.0*	Max WS	204.57	162.26	165.69	165.75	0.001961	1.81	113.22	158.56	0.30
1	15340.5*	Max WS	205.11	161.98	165.51	165.57	0.002285	1.95	105.42	90.80	0.32
1	15254.0*	Max WS	205.60	161.69	165.29	165.37	0.002435	2.17	95.05	76.71	0.33
1	15167.54	Max WS	206.14	161.41	165.08	165.17	0.002150	2.35	87.76	63.69	0.32
1	15068.7*	Max WS	206.87	161.32	164.94	164.99	0.001358	1.79	115.81	116.61	0.26
1	14970.01	Max WS	207.62	161.22	164.58	164.72	0.004411	3.05	68.02	160.24	0.45
1	14800.08	Max WS	208.77	160.07	163.79	163.96	0.004847	3.30	63.20	41.61	0.47
1	14745.2*	Max WS	209.30	160.00	163.67	163.77	0.002141	2.49	85.28	65.37	0.33
1	14690.37	Max WS	209.83	159.93	163.54	163.67	0.001879	2.92	82.16	64.26	0.32
1	14521.03	Max WS	211.37	159.74	163.17	163.24	0.003219	2.13	99.43	96.86	0.37
1	14350.55	Max WS	211.65	158.30	162.70	162.78	0.002516	2.27	98.24	239.10	0.34
1	14165.39	Max WS	212.13	159.11	161.91	162.08	0.005303	3.32	63.98	46.10	0.50
1	14077.1*	Max WS	212.37	158.60	161.67	161.75	0.002021	2.31	92.25	63.38	0.32
1	13988.90	Max WS	212.61	158.09	161.44	161.54	0.002993	2.51	87.81	99.38	0.37
1	13902.9*	Max WS	212.70	158.18	161.15	161.27	0.003730	2.81	78.88	85.77	0.42
1	13817.08	Max WS	212.81	158.27	160.78	160.94	0.005024	3.24	67.04	61.64	0.48
1	13800.26	Max WS	212.86	157.92	160.66	160.88	0.008073	3.81	55.88	46.20	0.60
1	13716.8*	Max WS	213.05	157.68	160.33	160.44	0.003136	2.61	81.67	59.83	0.39
1	13633.46	Max WS	213.22	157.45	160.21	160.26	0.001728	1.95	137.63	264.95	0.29
1	13548.2*	Max WS	213.45	156.91	159.98	160.08	0.003665	2.52	86.30	92.71	0.41
1	13462.94	Max WS	213.67	156.37	159.75	159.84	0.003405	2.53	92.02	113.77	0.39
1	13372.7*	Max WS	213.84	155.87	159.48	159.58	0.003449	2.62	88.66	110.11	0.40
1	13282.48	Max WS	214.07	155.37	159.20	159.32	0.003304	2.70	79.89	182.86	0.39
1	13196.7*	Max WS	214.25	155.42	159.05	159.13	0.002206	2.33	99.34	138.15	0.33
1	13110.9*	Max WS	214.46	155.48	158.89	158.97	0.002393	2.30	93.63	93.44	0.34
1	13025.20	Max WS	208.88	155.53	158.65	158.75	0.003773	2.59	80.76	66.15	0.41
1	12934.78	Max WS	208.76	155.67	158.44	158.54	0.002013	2.55	96.48	153.44	0.32
1	12679.83	Max WS	218.55	154.84	157.44	157.61	0.005890	3.34	65.42	51.19	0.52
1	12514.10	Max WS	215.80	153.08	156.83	156.94	0.002718	2.87	103.78	156.38	0.37
1	12342.49	Max WS	216.17	153.74	156.43	156.53	0.003048	2.69	112.85	218.87	0.39
1	12168.87	Max WS	216.54	152.62	155.71	155.89	0.005554	3.48	64.79	61.59	0.51
1	11993.01	Max WS	216.84	152.46	155.00	155.12	0.003842	2.81	77.20	55.51	0.42
1	11820.19	Max WS	217.22	150.12	154.43	154.52	0.003370	2.48	87.59	68.69	0.39
1	11633.47	Max WS	217.68	151.10	153.64	153.83	0.003954	3.49	62.40	33.31	0.45
1	11460.48	Max WS	218.06	149.67	152.88	153.05	0.004694	3.24	67.30	45.92	0.47
1	11271.33	Max WS	218.39	147.60	152.45	152.51	0.000944	1.94	112.29	47.28	0.22
1	11146.79	Max WS	218.69	147.72	152.14	152.26	0.002992	2.86	76.54	62.15	0.38
1	10961.29	Max WS	219.01	149.08	151.53	151.67	0.003365	3.02	72.48	42.80	0.41
1	10777.64	Max WS	219.56	147.95	151.10	151.18	0.001927	2.31	94.99	54.84	0.31
1	10599.75	Max WS	220.08	147.94	150.68	150.81	0.002310	2.86	76.96	37.84	0.35
1	10484.71	Max WS	220.41	147.53	150.40	150.48	0.003481	2.48	118.41	168.23	0.40
1	10294.85	Max WS	220.96	146.18	149.86	149.94	0.002305	2.31	95.85	63.83	0.33
1	10111.02	Max WS	221.40	146.70	149.14	149.29	0.005299	3.12	70.98	56.62	0.49

1	9962.423	Max WS	221.79	144.81	148.55		148.71	0.002997	3.21	69.91	127.01	0.39
1	9810.025	Max WS	222.20	145.21	148.02		148.17	0.004161	3.06	72.67	71.73	0.44
1	9553.901	Max WS	222.86	143.12	147.14		147.28	0.002905	2.94	75.92	41.02	0.38
1	9362.452	Max WS	223.33	143.70	146.57		146.72	0.003044	3.14	71.05	36.54	0.40
1	9149.788	Max WS	223.99	141.77	146.31		146.33	0.000364	1.05	213.06	113.30	0.14
1	8963.549	Max WS	224.44	141.24	145.96		146.09	0.002300	2.92	76.80	34.48	0.35
1	8766.435	Max WS	225.30	142.65	145.25		145.37	0.004954	2.79	80.72	71.23	0.46
1	8577.282	Max WS	226.15	141.02	144.67		144.75	0.001690	2.27	99.54	53.30	0.29
1	8398.577	Max WS	226.99	141.01	144.26		144.38	0.003416	2.86	84.44	96.47	0.41
1	8223.925	Max WS	227.87	139.79	143.80		143.95	0.002205	3.12	78.20	61.93	0.34
1	8000	Max WS	228.86	139.29	143.42		143.49	0.001867	2.12	107.92	70.36	0.30
1	7744.065	Max WS	230.11	138.71	142.51		142.69	0.004537	3.36	68.55	42.43	0.47
1	7600	Max WS	230.78	138.31	142.01		142.12	0.003745	2.66	87.09	261.99	0.41
1	7400	Max WS	231.56	137.76	141.02		141.24	0.005851	3.75	61.77	40.17	0.53
1	7200	Max WS	232.42	137.20	140.26		140.38	0.003124	2.78	84.75	62.91	0.39
1	7000	Max WS	233.16	136.65	139.87		139.94	0.001668	1.99	117.27	77.82	0.29
1	6800	Max WS	227.44	136.09	139.59		139.64	0.001445	1.69	134.65	102.47	0.26
1	6545.718	Max WS	242.70	134.93	138.73		139.04	0.006392	4.47	54.62	40.12	0.55
1	6400	Max WS	242.99	135.02	138.32		138.42	0.002333	2.60	119.49	196.66	0.35
1	6200	Max WS	243.26	134.52	137.88		138.02	0.003918	3.09	86.20	88.18	0.44
1	6000	Max WS	243.48	134.02	137.46		137.53	0.002184	2.07	117.69	90.15	0.32
1	5800	Max WS	244.00	133.53	137.18		137.22	0.001007	1.64	172.26	170.58	0.23
1	5544.024	Max WS	244.30	132.89	136.26		136.46	0.006056	3.58	72.34	83.61	0.53
1	5310.353	Max WS	244.51	130.81	135.58		135.66	0.001309	2.26	108.30	47.88	0.26
1	5126.186	Max WS	245.86	131.42	135.38		135.47	0.001380	2.38	139.05	201.50	0.27
1	4928.496	Max WS	246.80	131.24	135.21		135.26	0.001007	1.76	149.84	163.30	0.23
1	4737.846	Max WS	247.95	130.80	134.94		135.02	0.002198	2.40	118.28	220.71	0.33
1	4542.183	Max WS	249.05	130.20	134.77		134.80	0.000343	1.43	193.49	289.59	0.14
1	4437.102	Max WS	249.61	131.50	134.39		134.54	0.005467	3.22	93.40	248.20	0.50
1	4246.329	Max WS	250.31	129.78	133.42		133.61	0.004622	3.55	83.17	132.80	0.47
1	4063.200	Max WS	246.87	129.05	132.96		133.03	0.001281	2.14	115.57	202.20	0.26
1	3863.200	Max WS	247.04	128.43	132.82		132.84	0.000564	1.35	294.69	467.38	0.17
1	3682.022	Max WS	247.70	127.89	132.71		132.74	0.000763	1.67	313.81	609.90	0.20
1	3487.742	Max WS	248.58	128.90	132.16		132.35	0.003857	3.53	70.32	158.90	0.44
1	3332.982	Max WS	249.23	129.37	131.65		131.77	0.003135	2.81	88.65	128.79	0.39
1	3152.554	Max WS	249.87	127.27	130.93		131.11	0.003897	3.36	74.26	64.36	0.44
1	2960.781	Max WS	250.64	128.00	130.50		130.57	0.001696	2.10	119.46	257.53	0.29
1	2800	Max WS	251.33	127.75	129.99		130.09	0.004576	2.61	124.52	244.90	0.45
1	2600	Max WS	251.99	127.22	129.27		129.33	0.003345	2.00	126.08	213.89	0.37
1	2436.651	Max WS	252.54	126.76	128.41		128.57	0.006082	3.15	80.11	103.81	0.52
1	2200	Max WS	253.43	125.72	127.39		127.47	0.003231	2.33	108.80	93.82	0.38
1	1800	Max WS	254.11	123.94	126.54		126.58	0.001224	1.48	171.21	140.07	0.24
1	1508.765	Max WS	254.86	122.64	125.81		125.99	0.003009	3.35	76.26	42.61	0.40
1	1238.804	Max WS	255.53	122.00	125.29		125.34	0.001831	1.78	143.52	120.70	0.29
1	947.7714	Max WS	255.51	122.00	124.73		124.81	0.001950	2.36	149.45	172.43	0.32
1	703.7460	Max WS	255.49	122.00	123.82		123.92	0.005471	2.60	98.12	106.25	0.48
1	413.4701	Max WS	255.48	120.00	122.73		122.81	0.002275	2.38	107.14	68.19	0.34
1	200.9584	Max WS	255.46	120.00	122.40		122.45	0.001215	1.88	175.06	223.76	0.25
1	10.31402	Max WS	255.45	120.00	122.00	121.26	122.10	0.002884	2.59	121.95	173.64	0.37

7.9 Appendix I: Upper Laguna Creek Tributary Developed Conditions HEC-RAS Results

HEC-RAS River: LC Reach: LCr1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	11800	Max WS	100yrProposed	335.77	222.00	223.30
LCr1	11800	Max WS	10yrProposed	192.16	222.00	223.04
LCr1	11800	Max WS	2yrProposed	84.00	222.00	222.72
LCr1	11600	Max WS	100yrProposed	334.74	218.27	220.07
LCr1	11600	Max WS	10yrProposed	191.27	218.27	219.72
LCr1	11600	Max WS	2yrProposed	83.78	218.27	219.32
LCr1	11400	Max WS	100yrProposed	332.73	218.00	219.47
LCr1	11400	Max WS	10yrProposed	189.44	218.00	219.26
LCr1	11400	Max WS	2yrProposed	83.16	218.00	218.86
LCr1	11199.56	Max WS	100yrProposed	332.28	217.17	218.48
LCr1	11199.56	Max WS	10yrProposed	188.99	217.17	218.24
LCr1	11199.56	Max WS	2yrProposed	83.11	217.17	217.86
LCr1	11000	Max WS	100yrProposed	454.67	216.00	217.57
LCr1	11000	Max WS	10yrProposed	261.85	216.00	217.24
LCr1	11000	Max WS	2yrProposed	125.28	216.00	216.92
LCr1	10800	Max WS	100yrProposed	453.58	215.87	217.03
LCr1	10800	Max WS	10yrProposed	261.59	215.87	216.66
LCr1	10800	Max WS	2yrProposed	127.52	215.87	216.45
LCr1	10600	Max WS	100yrProposed	450.94	213.84	216.74
LCr1	10600	Max WS	10yrProposed	247.29	213.84	216.33
LCr1	10600	Max WS	2yrProposed	67.77	213.84	216.20
LCr1	10400	Max WS	100yrProposed	451.69	213.96	215.30
LCr1	10400	Max WS	10yrProposed	261.47	213.96	214.98
LCr1	10400	Max WS	2yrProposed	128.85	213.96	214.65
LCr1	10203.13	Max WS	100yrProposed	503.20	212.00	213.59
LCr1	10203.13	Max WS	10yrProposed	312.02	212.00	213.30
LCr1	10203.13	Max WS	2yrProposed	155.98	212.00	212.88
LCr1	10000	Max WS	100yrProposed	502.93	211.37	213.03
LCr1	10000	Max WS	10yrProposed	311.36	211.37	212.64
LCr1	10000	Max WS	2yrProposed	155.83	211.37	212.22
LCr1	9800	Max WS	100yrProposed	502.52	210.08	212.35
LCr1	9800	Max WS	10yrProposed	311.11	210.08	211.95
LCr1	9800	Max WS	2yrProposed	155.68	210.08	211.53
LCr1	9600	Max WS	100yrProposed	497.60	209.75	211.47
LCr1	9600	Max WS	10yrProposed	310.91	209.75	211.22
LCr1	9600	Max WS	2yrProposed	155.58	209.75	210.86
LCr1	9400	Max WS	100yrProposed	418.17	209.25	210.83
LCr1	9400	Max WS	10yrProposed	310.39	209.25	210.48
LCr1	9400	Max WS	2yrProposed	155.48	209.25	210.06

HEC-RAS River: LC Reach: LCr1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	9200	Max WS	100yrProposed	362.95	208.08	210.63
LCr1	9200	Max WS	10yrProposed	310.11	208.08	209.91
LCr1	9200	Max WS	2yrProposed	155.38	208.08	209.46
LCr1	9000	Max WS	100yrProposed	349.37	207.92	210.56
LCr1	9000	Max WS	10yrProposed	295.31	207.92	209.35
LCr1	9000	Max WS	2yrProposed	154.91	207.92	209.07
LCr1	8800	Max WS	100yrProposed	345.11	206.56	210.53
LCr1	8800	Max WS	10yrProposed	253.51	206.56	208.81
LCr1	8800	Max WS	2yrProposed	151.14	206.56	208.13
LCr1	8700.*	Max WS	100yrProposed	365.64	206.27	210.53
LCr1	8700.*	Max WS	10yrProposed	260.53	206.27	208.75
LCr1	8700.*	Max WS	2yrProposed	162.83	206.27	207.46
LCr1	8600	Max WS	100yrProposed	365.30	205.99	210.52
LCr1	8600	Max WS	10yrProposed	258.40	205.99	208.73
LCr1	8600	Max WS	2yrProposed	151.40	205.99	207.15
LCr1	8400	Max WS	100yrProposed	362.22	204.73	210.52
LCr1	8400	Max WS	10yrProposed	258.29	204.73	208.72
LCr1	8400	Max WS	2yrProposed	146.70	204.73	207.04
LCr1	8200	Max WS	100yrProposed	363.52	204.47	210.52
LCr1	8200	Max WS	10yrProposed	258.08	204.47	208.72
LCr1	8200	Max WS	2yrProposed	146.44	204.47	207.03
LCr1	8000	Max WS	100yrProposed	362.19	204.00	210.52
LCr1	8000	Max WS	10yrProposed	257.84	204.00	208.72
LCr1	8000	Max WS	2yrProposed	146.08	204.00	207.02
LCr1	7913.41	Max WS	100yrProposed	362.18	202.87	209.83
LCr1	7913.41	Max WS	10yrProposed	257.79	202.87	208.61
LCr1	7913.41	Max WS	2yrProposed	145.99	202.87	206.91
LCr1	7876.59			Culvert		
LCr1	7839.77	Max WS	100yrProposed	362.18	202.72	205.09
LCr1	7839.77	Max WS	10yrProposed	257.79	202.72	204.74
LCr1	7839.77	Max WS	2yrProposed	145.99	202.72	204.27
LCr1	7799.859	Max WS	100yrProposed	361.98	202.16	204.16
LCr1	7799.859	Max WS	10yrProposed	257.71	202.16	203.91
LCr1	7799.859	Max WS	2yrProposed	145.95	202.16	203.63
LCr1	7600	Max WS	100yrProposed	361.92	202.00	203.84
LCr1	7600	Max WS	10yrProposed	257.64	202.00	203.59
LCr1	7600	Max WS	2yrProposed	145.91	202.00	203.31

HEC-RAS River: LC Reach: LCr1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	7400	Max WS	100yrProposed	361.83	202.00	203.24
LCr1	7400	Max WS	10yrProposed	257.60	202.00	203.03
LCr1	7400	Max WS	2yrProposed	145.86	202.00	202.80
LCr1	7200	Max WS	100yrProposed	361.75	200.92	202.24
LCr1	7200	Max WS	10yrProposed	257.58	200.92	202.04
LCr1	7200	Max WS	2yrProposed	145.83	200.92	201.83
LCr1	7000	Max WS	100yrProposed	361.68	200.00	201.43
LCr1	7000	Max WS	10yrProposed	257.55	200.00	201.25
LCr1	7000	Max WS	2yrProposed	145.74	200.00	201.02
LCr1	6800	Max WS	100yrProposed	361.64	199.47	200.76
LCr1	6800	Max WS	10yrProposed	257.52	199.47	200.59
LCr1	6800	Max WS	2yrProposed	145.72	199.47	200.36
LCr1	6700.*	Max WS	100yrProposed	361.59	198.74	200.32
LCr1	6700.*	Max WS	10yrProposed	257.50	198.74	200.11
LCr1	6700.*	Max WS	2yrProposed	145.66	198.74	199.85
LCr1	6600	Max WS	100yrProposed	359.90	198.00	199.91
LCr1	6600	Max WS	10yrProposed	257.41	198.00	199.70
LCr1	6600	Max WS	2yrProposed	145.45	198.00	199.53
LCr1	6400	Max WS	100yrProposed	637.60	198.00	198.99
LCr1	6400	Max WS	10yrProposed	421.94	198.00	198.72
LCr1	6400	Max WS	2yrProposed	230.12	198.00	198.49
LCr1	6200	Max WS	100yrProposed	637.55	196.00	197.95
LCr1	6200	Max WS	10yrProposed	421.93	196.00	197.66
LCr1	6200	Max WS	2yrProposed	230.09	196.00	197.36
LCr1	6000	Max WS	100yrProposed	637.51	196.00	197.02
LCr1	6000	Max WS	10yrProposed	421.91	196.00	196.79
LCr1	6000	Max WS	2yrProposed	230.06	196.00	196.59

HEC-RAS River: LC Reach: LCr1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	11800	Max WS	100yrDetention	237.22	222.00	223.17
LCr1	11800	Max WS	10yrDetention	142.01	222.00	222.91
LCr1	11800	Max WS	2yrDetention	66.76	222.00	222.64
LCr1	11698.20	Max WS	100yrDetention	236.56	218.97	222.00
LCr1	11698.20	Max WS	10yrDetention	141.95	218.97	220.93
LCr1	11698.20	Max WS	2yrDetention	66.74	218.97	220.48
LCr1	11591	Max WS	100yrDetention	236.54	218.81	221.50
LCr1	11591	Max WS	10yrDetention	141.93	218.81	220.47
LCr1	11591	Max WS	2yrDetention	66.73	218.81	219.89
LCr1	11497			Culvert		
LCr1	11400	Max WS	100yrDetention	236.54	218.00	220.18
LCr1	11400	Max WS	10yrDetention	141.93	218.00	219.71
LCr1	11400	Max WS	2yrDetention	66.73	218.00	219.28
LCr1	11199.56	Max WS	100yrDetention	236.38	217.17	218.18
LCr1	11199.56	Max WS	10yrDetention	141.82	217.17	217.90
LCr1	11199.56	Max WS	2yrDetention	66.70	217.17	217.74
LCr1	11000	Max WS	100yrDetention	328.60	216.00	217.33
LCr1	11000	Max WS	10yrDetention	155.73	216.00	216.95
LCr1	11000	Max WS	2yrDetention	77.33	216.00	216.72
LCr1	10800	Max WS	100yrDetention	326.59	215.87	216.83
LCr1	10800	Max WS	10yrDetention	155.56	215.87	216.50
LCr1	10800	Max WS	2yrDetention	77.18	215.87	216.38
LCr1	10600	Max WS	100yrDetention	325.50	213.84	216.56
LCr1	10600	Max WS	10yrDetention	155.47	213.84	216.21
LCr1	10600	Max WS	2yrDetention	60.40	213.84	216.18
LCr1	10400	Max WS	100yrDetention	325.02	213.96	215.09
LCr1	10400	Max WS	10yrDetention	155.50	213.96	214.71
LCr1	10400	Max WS	2yrDetention	77.61	213.96	214.53
LCr1	10203.13	Max WS	100yrDetention	345.40	212.00	213.35
LCr1	10203.13	Max WS	10yrDetention	171.63	212.00	212.92
LCr1	10203.13	Max WS	2yrDetention	30.45	212.00	212.86
LCr1	10000	Max WS	100yrDetention	344.42	211.37	212.71
LCr1	10000	Max WS	10yrDetention	171.31	211.37	212.26
LCr1	10000	Max WS	2yrDetention	89.73	211.37	212.01
LCr1	9800	Max WS	100yrDetention	343.95	210.08	212.03
LCr1	9800	Max WS	10yrDetention	170.99	210.08	211.58
LCr1	9800	Max WS	2yrDetention	89.68	210.08	211.21
LCr1	9600	Max WS	100yrDetention	343.50	209.75	211.29

HEC-RAS River: LC Reach: LCr1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	9600	Max WS	10yrDetention	170.84	209.75	210.91
LCr1	9600	Max WS	2yrDetention	35.47	209.75	210.72
LCr1	9400	Max WS	100yrDetention	342.63	209.25	210.56
LCr1	9400	Max WS	10yrDetention	170.57	209.25	210.10
LCr1	9400	Max WS	2yrDetention	89.83	209.25	209.90
LCr1	9200	Max WS	100yrDetention	341.55	208.08	209.98
LCr1	9200	Max WS	10yrDetention	170.14	208.08	209.50
LCr1	9200	Max WS	2yrDetention	89.65	208.08	209.19
LCr1	9000	Max WS	100yrDetention	341.18	207.92	209.49
LCr1	9000	Max WS	10yrDetention	169.17	207.92	209.13
LCr1	9000	Max WS	2yrDetention	89.50	207.92	208.71
LCr1	8800	Max WS	100yrDetention	254.44	206.56	208.63
LCr1	8800	Max WS	10yrDetention	169.37	206.56	208.17
LCr1	8800	Max WS	2yrDetention	89.42	206.56	207.81
LCr1	8700.*	Max WS	100yrDetention	245.84	206.27	208.53
LCr1	8700.*	Max WS	10yrDetention	166.46	206.27	207.44
LCr1	8700.*	Max WS	2yrDetention	89.38	206.27	207.18
LCr1	8600	Max WS	100yrDetention	243.86	205.99	208.50
LCr1	8600	Max WS	10yrDetention	144.73	205.99	207.05
LCr1	8600	Max WS	2yrDetention	89.33	205.99	206.60
LCr1	8400	Max WS	100yrDetention	243.63	204.73	208.49
LCr1	8400	Max WS	10yrDetention	137.15	204.73	206.90
LCr1	8400	Max WS	2yrDetention	80.85	204.73	206.02
LCr1	8200	Max WS	100yrDetention	243.25	204.47	208.49
LCr1	8200	Max WS	10yrDetention	137.03	204.47	206.88
LCr1	8200	Max WS	2yrDetention	79.70	204.47	205.92
LCr1	8000	Max WS	100yrDetention	242.84	204.00	208.49
LCr1	8000	Max WS	10yrDetention	136.84	204.00	206.88
LCr1	8000	Max WS	2yrDetention	79.64	204.00	205.89
LCr1	7913.41	Max WS	100yrDetention	242.75	202.87	208.37
LCr1	7913.41	Max WS	10yrDetention	136.80	202.87	206.76
LCr1	7913.41	Max WS	2yrDetention	79.62	202.87	205.78
LCr1	7876.59			Culvert		
LCr1	7839.77	Max WS	100yrDetention	242.74	202.72	204.69
LCr1	7839.77	Max WS	10yrDetention	136.80	202.72	204.23
LCr1	7839.77	Max WS	2yrDetention	79.61	202.72	203.85
LCr1	7799.859	Max WS	100yrDetention	242.69	202.16	203.87
LCr1	7799.859	Max WS	10yrDetention	136.79	202.16	203.60

HEC-RAS River: LC Reach: LCr1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
LCr1	7799.859	Max WS	2yrDetention	79.59	202.16	203.28
LCr1	7600	Max WS	100yrDetention	242.61	202.00	203.55
LCr1	7600	Max WS	10yrDetention	136.75	202.00	203.29
LCr1	7600	Max WS	2yrDetention	79.57	202.00	203.08
LCr1	7400	Max WS	100yrDetention	242.57	202.00	203.00
LCr1	7400	Max WS	10yrDetention	136.71	202.00	202.77
LCr1	7400	Max WS	2yrDetention	79.56	202.00	202.63
LCr1	7200	Max WS	100yrDetention	242.54	200.92	202.02
LCr1	7200	Max WS	10yrDetention	136.67	200.92	201.80
LCr1	7200	Max WS	2yrDetention	79.55	200.92	201.61
LCr1	7000	Max WS	100yrDetention	242.51	200.00	201.23
LCr1	7000	Max WS	10yrDetention	136.62	200.00	201.00
LCr1	7000	Max WS	2yrDetention	30.51	200.00	200.96
LCr1	6800	Max WS	100yrDetention	242.49	199.47	200.56
LCr1	6800	Max WS	10yrDetention	136.58	199.47	200.33
LCr1	6800	Max WS	2yrDetention	79.55	199.47	200.15
LCr1	6700.*	Max WS	100yrDetention	242.39	198.74	200.09
LCr1	6700.*	Max WS	10yrDetention	136.55	198.74	199.84
LCr1	6700.*	Max WS	2yrDetention	79.46	198.74	199.65
LCr1	6600	Max WS	100yrDetention	242.21	198.00	199.75
LCr1	6600	Max WS	10yrDetention	136.41	198.00	199.54
LCr1	6600	Max WS	2yrDetention	20.66	198.00	199.49
LCr1	6400	Max WS	100yrDetention	546.44	198.00	198.89
LCr1	6400	Max WS	10yrDetention	319.47	198.00	198.59
LCr1	6400	Max WS	2yrDetention	172.23	198.00	198.36
LCr1	6200	Max WS	100yrDetention	546.35	196.00	197.84
LCr1	6200	Max WS	10yrDetention	319.42	196.00	197.51
LCr1	6200	Max WS	2yrDetention	172.22	196.00	197.26
LCr1	6000	Max WS	100yrDetention	546.29	196.00	196.92
LCr1	6000	Max WS	10yrDetention	319.38	196.00	196.68
LCr1	6000	Max WS	2yrDetention	172.20	196.00	196.53

Upper Laguna Creek Tributary

Developed Conditions Model:

10-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
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PROJECT DATA
Project Title: LagunaCreek
Project File : LagunaCreek_Dev.prj
Run Date and Time: 5/24/2011 5:35:55 PM

Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and 100 yr 24 hour storms

Plan: LagunaCreek Proposed 10 Yr - Proposed Conditions With No Detention Basins 10 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	192.16	222.00	223.04	223.06	223.36	0.032759	4.48	42.88	78.75	1.07
LCr1	11600	Max WS	191.28	218.27	219.72		219.78	0.003708	1.97	97.23	119.84	0.38
LCr1	11400	Max WS	189.45	218.00	219.26		219.29	0.001780	1.40	135.52	160.84	0.27
LCr1	11199.56	Max WS	188.99	217.17	218.24		218.32	0.009527	2.20	85.90	181.70	0.56
LCr1	11000	Max WS	261.85	216.00	217.24		217.27	0.002089	1.57	166.33	186.14	0.29
LCr1	10800	Max WS	261.60	215.87	216.66		216.72	0.004649	1.90	137.63	211.66	0.42
LCr1	10600	Max WS	247.29	213.84	216.33		216.34	0.000101	0.56	438.17	236.34	0.07
LCr1	10400	Max WS	261.47	213.96	214.98		215.16	0.019212	3.47	75.28	135.84	0.82
LCr1	10203.13	Max WS	312.02	212.00	213.30		213.39	0.004796	2.34	133.08	152.92	0.44
LCr1	10000	Max WS	311.36	211.37	212.64		212.68	0.002472	1.58	196.47	247.12	0.31
LCr1	9800	Max WS	311.12	210.08	211.95		212.05	0.004486	2.44	127.63	131.50	0.44
LCr1	9600	Max WS	310.91	209.75	211.22		211.29	0.003702	2.16	143.65	153.21	0.39
LCr1	9400	Max WS	310.39	209.25	210.48		210.54	0.005013	1.99	156.31	238.19	0.43

LCr1	9200	Max WS	310.11	208.08	209.91		209.95	0.001710	1.61	192.19	178.48	0.27
LCr1	9000	Max WS	295.31	207.92	209.35		209.42	0.003696	2.08	142.13	161.02	0.39
LCr1	8800	Max WS	253.50	206.56	208.81		208.84	0.001398	1.42	178.58	172.72	0.25
LCr1	8700.*	Max WS	260.53	206.27	208.75		208.76	0.000351	0.88	296.91	209.75	0.13
LCr1	8600	Max WS	258.40	205.99	208.73		208.74	0.000102	0.56	459.59	251.24	0.07
LCr1	8400	Max WS	258.29	204.73	208.72		208.72	0.000018	0.30	847.75	319.57	0.03
LCr1	8200	Max WS	258.08	204.47	208.72		208.72	0.000013	0.25	1017.91	393.92	0.03
LCr1	8000	Max WS	257.84	204.00	208.72		208.72	0.000009	0.23	1122.73	383.16	0.02
LCr1	7913.41	Max WS	257.79	202.87	208.61		208.87	0.001371	4.12	62.56	194.46	0.31
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	257.79	202.72	204.74	205.33	206.92	0.041410	11.83	21.79	314.24	1.49
LCr1	7799.859	Max WS	257.71	202.16	203.91		203.93	0.001128	1.13	228.74	266.30	0.21
LCr1	7600	Max WS	257.64	202.00	203.59		203.64	0.002673	1.72	149.48	175.81	0.33
LCr1	7400	Max WS	257.60	202.00	203.03		203.09	0.004742	1.92	134.09	205.97	0.42
LCr1	7200	Max WS	257.57	200.92	202.04		202.13	0.007394	2.34	109.90	174.84	0.52
LCr1	7000	Max WS	257.56	200.00	201.25		201.29	0.002314	1.59	161.59	191.80	0.31
LCr1	6800	Max WS	257.53	199.47	200.59		200.65	0.004757	1.90	135.77	213.10	0.42
LCr1	6700.*	Max WS	257.50	198.74	200.11		200.18	0.006117	2.15	119.86	188.48	0.47
LCr1	6600	Max WS	257.41	198.00	199.70		199.76	0.003471	1.97	130.83	153.43	0.38
LCr1	6400	Max WS	421.94	198.00	198.72		198.79	0.006662	2.22	190.44	304.87	0.49
LCr1	6200	Max WS	421.93	196.00	197.66		197.77	0.004904	2.64	159.84	156.33	0.46
LCr1	6000	Max WS	421.92	196.00	196.79	196.53	196.86	0.006168	2.15	196.57	311.41	0.48

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                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


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PROJECT DATA
Project Title: LagunaCreek
Project File : LagunaCreek_Dev.prj
Run Date and Time: 5/24/2011 5:40:05 PM

Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and 100 yr 24 hour storms
Plan: LagunaCreek Proposed w/ Detent 10 Yr - Proposed Conditions With Detention Basins 10 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	142.01	222.00	222.91	222.95	223.20	0.038917	4.34	32.75	71.91	1.13
LCr1	11698.20	Max WS	141.95	218.97	220.93		220.99	0.005352	2.10	67.56	99.16	0.45
LCr1	11591	Max WS	141.93	218.81	220.47		221.21	0.020699	6.90	20.58	189.19	1.00
LCr1	11497		Culvert									
LCr1	11400	Max WS	141.93	218.00	219.71		220.29	0.013538	6.08	23.35	191.51	0.83
LCr1	11199.56	Max WS	141.82	217.17	217.90	217.89	218.10	0.029981	3.63	39.02	91.87	0.98
LCr1	11000	Max WS	155.73	216.00	216.95		216.98	0.002378	1.36	114.77	176.94	0.30
LCr1	10800	Max WS	155.56	215.87	216.50		216.54	0.003993	1.49	104.31	205.95	0.37
LCr1	10600	Max WS	155.47	213.84	216.21		216.21	0.000049	0.38	409.59	233.07	0.05
LCr1	10400	Max WS	155.50	213.96	214.71	214.70	214.91	0.030266	3.61	43.09	103.25	0.98
LCr1	10203.13	Max WS	171.63	212.00	212.92		212.99	0.006039	2.14	80.25	125.83	0.47
LCr1	10000	Max WS	171.31	211.37	212.26		212.30	0.005663	1.63	104.79	234.30	0.43
LCr1	9800	Max WS	170.99	210.08	211.58		211.65	0.004486	2.07	82.67	108.98	0.42

LCr1	9600	Max WS	170.84	209.75	210.91		210.95	0.003590	1.75	97.69	140.20	0.37
LCr1	9400	Max WS	170.57	209.25	210.10		210.20	0.020593	2.46	69.41	221.72	0.77
LCr1	9200	Max WS	170.14	208.08	209.50		209.53	0.001600	1.34	126.72	147.48	0.26
LCr1	9000	Max WS	169.17	207.92	209.13		209.17	0.002599	1.57	108.06	143.76	0.32
LCr1	8800	Max WS	169.37	206.56	208.17		208.24	0.007057	2.16	78.50	136.47	0.50
LCr1	8700.*	Max WS	166.46	206.27	207.44		207.52	0.008706	2.36	70.43	125.07	0.55
LCr1	8600	Max WS	144.73	205.99	207.05		207.08	0.001755	1.26	114.65	156.90	0.26
LCr1	8400	Max WS	137.15	204.73	206.90		206.90	0.000108	0.44	313.93	260.53	0.07
LCr1	8200	Max WS	137.03	204.47	206.88		206.89	0.000044	0.33	416.46	271.80	0.05
LCr1	8000	Max WS	136.84	204.00	206.88		206.88	0.000035	0.29	473.85	317.01	0.04
LCr1	7913.41	Max WS	136.80	202.87	206.76		206.93	0.001525	3.30	41.43	23.83	0.31
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	136.80	202.72	204.23	204.45	205.35	0.032308	8.52	16.05	296.85	1.25
LCr1	7799.859	Max WS	136.79	202.16	203.60		203.62	0.000954	0.89	154.08	226.14	0.19
LCr1	7600	Max WS	136.75	202.00	203.29		203.31	0.002189	1.36	100.54	145.21	0.29
LCr1	7400	Max WS	136.71	202.00	202.77		202.82	0.006818	1.68	81.42	200.99	0.46
LCr1	7200	Max WS	136.67	200.92	201.80		201.86	0.007147	1.92	71.22	149.11	0.49
LCr1	7000	Max WS	136.62	200.00	201.00		201.02	0.001835	1.18	115.45	179.98	0.26
LCr1	6800	Max WS	136.58	199.47	200.33		200.37	0.007194	1.70	80.53	203.85	0.48
LCr1	6700.*	Max WS	136.55	198.74	199.84		199.89	0.006214	1.84	74.04	148.09	0.46
LCr1	6600	Max WS	136.41	198.00	199.54		199.57	0.001610	1.26	108.18	138.98	0.25
LCr1	6400	Max WS	319.47	198.00	198.59		198.66	0.007804	2.09	152.73	300.10	0.52
LCr1	6200	Max WS	319.42	196.00	197.51		197.59	0.004459	2.35	136.15	147.98	0.43
LCr1	6000	Max WS	319.38	196.00	196.68	196.46	196.74	0.006297	1.95	163.47	302.89	0.47

Upper Laguna Creek Tributary

Developed Conditions Model:

100-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


           X     X  XXXXXX    XXXX        XXXX       XX      XXXX
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PROJECT DATA
Project Title: LagunaCreek
Project File : LagunaCreek_Dev.prj
Run Date and Time: 5/25/2011 2:51:29 PM

Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and
100 yr 24 hour storms

Plan: LagunaCreek Proposed 100 Yr - Proposed Conditions With No Detention Basins 100 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	335.77	222.00	223.30	223.34	223.72	0.031216	5.22	64.35	90.71	1.09
LCr1	11600	Max WS	334.75	218.27	220.07		220.15	0.004553	2.33	143.49	159.77	0.43
LCr1	11400	Max WS	332.73	218.00	219.47		219.53	0.002783	1.95	170.72	172.09	0.34
LCr1	11199.56	Max WS	332.29	217.17	218.48		218.58	0.008193	2.57	129.18	193.02	0.55
LCr1	11000	Max WS	454.68	216.00	217.57		217.63	0.002288	1.97	230.52	197.00	0.32
LCr1	10800	Max WS	453.59	215.87	217.03		217.10	0.003272	2.08	218.57	226.39	0.37
LCr1	10600	Max WS	450.94	213.84	216.74		216.75	0.000183	0.84	536.12	247.24	0.10
LCr1	10400	Max WS	451.71	213.96	215.30		215.50	0.014782	3.61	125.01	174.62	0.75
LCr1	10203.13	Max WS	503.20	212.00	213.59		213.71	0.005281	2.78	180.83	172.72	0.48
LCr1	10000	Max WS	502.94	211.37	213.03		213.07	0.001773	1.70	295.39	260.00	0.28
LCr1	9800	Max WS	502.52	210.08	212.35		212.45	0.004748	2.54	197.91	200.20	0.45
LCr1	9600	Max WS	497.60	209.75	211.47		211.59	0.004510	2.71	183.88	162.65	0.45
LCr1	9400	Max WS	418.17	209.25	210.83		210.88	0.002294	1.72	242.60	254.32	0.31

LCr1	9200	Max WS	358.29	208.08	210.63		210.65	0.000456	1.06	337.37	217.72	0.15
LCr1	9000	Max WS	349.36	207.92	210.56		210.58	0.000303	0.95	365.85	203.85	0.13
LCr1	8800	Max WS	345.11	206.56	210.53		210.54	0.000100	0.62	553.88	254.77	0.07
LCr1	8700.*	Max WS	365.63	206.27	210.53		210.53	0.000050	0.49	745.78	290.40	0.05
LCr1	8600	Max WS	365.30	205.99	210.52		210.53	0.000023	0.38	970.53	317.48	0.04
LCr1	8400	Max WS	362.22	204.73	210.52		210.52	0.000007	0.25	1470.29	374.66	0.02
LCr1	8200	Max WS	362.20	204.47	210.52		210.52	0.000005	0.20	1784.46	455.49	0.02
LCr1	8000	Max WS	362.42	204.00	210.52		210.52	0.000004	0.19	1897.85	470.90	0.02
LCr1	7913.41	Max WS	362.18	202.87	209.83		210.18	0.001380	4.73	76.56	268.12	0.32
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	362.18	202.72	205.09	205.98	208.18	0.047225	14.10	25.69	326.06	1.63
LCr1	7799.859	Max WS	361.98	202.16	204.16		204.18	0.001046	1.19	304.03	307.90	0.21
LCr1	7600	Max WS	361.92	202.00	203.84		203.89	0.002552	1.85	195.93	200.59	0.33
LCr1	7400	Max WS	361.83	202.00	203.24		203.30	0.003789	2.04	177.23	210.01	0.39
LCr1	7200	Max WS	361.75	200.92	202.24		202.34	0.006261	2.50	144.67	184.33	0.50
LCr1	7000	Max WS	361.69	200.00	201.43		201.48	0.002511	1.84	196.72	200.34	0.33
LCr1	6800	Max WS	361.64	199.47	200.76		200.83	0.004479	2.11	171.30	218.84	0.42
LCr1	6700.*	Max WS	361.52	198.74	200.32		200.40	0.004876	2.25	160.70	198.94	0.44
LCr1	6600	Max WS	359.91	198.00	199.91		199.98	0.003644	2.17	165.49	173.23	0.39
LCr1	6400	Max WS	637.60	198.00	198.99		199.08	0.004624	2.31	276.45	316.84	0.44
LCr1	6200	Max WS	637.55	196.00	197.95		198.10	0.005383	3.08	206.71	171.67	0.50
LCr1	6000	Max WS	637.51	196.00	197.02	196.66	197.11	0.005249	2.37	268.57	324.14	0.46

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PROJECT DATA
Project Title: LagunaCreek
Project File : LagunaCreek_Dev.prj
Run Date and Time: 5/24/2011 5:38:14 PM

Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and 100 yr 24 hour storms
Plan: 100 Yr - Proposed Conditions With Detention Basins 100 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	237.22	222.00	223.17	223.16	223.48	0.026630	4.46	53.21	84.31	0.99
LCr1	11698.20	Max WS	236.56	218.97	222.00		222.02	0.000665	1.10	215.23	174.82	0.17
LCr1	11591	Max WS	236.54	218.81	221.50		222.21	0.009726	6.75	35.07	250.88	0.75
LCr1	11497		Culvert									
LCr1	11400	Max WS	236.54	218.00	220.18	220.11	221.15	0.016591	7.93	29.85	201.89	0.96
LCr1	11199.56	Max WS	236.38	217.17	218.18		218.34	0.024163	3.20	73.76	178.40	0.88
LCr1	11000	Max WS	328.60	216.00	217.33		217.38	0.002370	1.78	184.76	189.32	0.32
LCr1	10800	Max WS	326.59	215.87	216.83		216.89	0.003462	1.88	173.97	218.52	0.37
LCr1	10600	Max WS	325.50	213.84	216.56		216.57	0.000123	0.66	493.15	242.52	0.08
LCr1	10400	Max WS	325.02	213.96	215.09		215.29	0.017293	3.53	92.14	150.12	0.79
LCr1	10203.13	Max WS	345.40	212.00	213.35		213.45	0.004952	2.44	141.39	156.46	0.45
LCr1	10000	Max WS	344.42	211.37	212.71		212.75	0.002246	1.60	215.70	249.67	0.30
LCr1	9800	Max WS	343.95	210.08	212.03		212.12	0.004503	2.50	137.49	136.65	0.44

LCr1	9600	Max WS	343.50	209.75	211.29		211.37	0.003644	2.23	154.24	155.75	0.39
LCr1	9400	Max WS	342.63	209.25	210.56		210.62	0.004334	1.97	174.20	241.44	0.41
LCr1	9200	Max WS	341.55	208.08	209.98		210.02	0.001738	1.67	204.97	183.61	0.28
LCr1	9000	Max WS	341.18	207.92	209.49		209.56	0.003136	2.07	165.19	166.93	0.37
LCr1	8800	Max WS	254.44	206.56	208.63		208.68	0.002400	1.71	148.59	162.71	0.32
LCr1	8700.*	Max WS	245.84	206.27	208.53		208.54	0.000497	0.98	251.96	197.03	0.15
LCr1	8600	Max WS	243.86	205.99	208.50		208.51	0.000131	0.60	403.83	238.67	0.08
LCr1	8400	Max WS	243.63	204.73	208.49		208.49	0.000021	0.31	774.93	313.61	0.04
LCr1	8200	Max WS	243.25	204.47	208.49		208.49	0.000015	0.26	928.07	385.57	0.03
LCr1	8000	Max WS	242.84	204.00	208.49		208.49	0.000010	0.23	1035.67	372.44	0.02
LCr1	7913.41	Max WS	242.75	202.87	208.37		208.63	0.001405	4.05	59.90	180.44	0.31
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	242.74	202.72	204.69	205.23	206.73	0.040315	11.46	21.19	312.42	1.46
LCr1	7799.859	Max WS	242.69	202.16	203.87		203.89	0.001129	1.11	218.90	261.29	0.21
LCr1	7600	Max WS	242.61	202.00	203.55		203.60	0.002667	1.70	143.07	172.11	0.33
LCr1	7400	Max WS	242.57	202.00	203.00		203.06	0.004913	1.90	127.82	205.37	0.42
LCr1	7200	Max WS	242.54	200.92	202.02		202.10	0.007530	2.31	105.10	173.47	0.52
LCr1	7000	Max WS	242.51	200.00	201.23		201.26	0.002218	1.54	157.51	190.79	0.30
LCr1	6800	Max WS	242.49	199.47	200.56		200.62	0.004875	1.87	129.75	212.11	0.42
LCr1	6700.*	Max WS	242.39	198.74	200.09		200.16	0.005750	2.06	117.58	187.78	0.46
LCr1	6600	Max WS	242.21	198.00	199.75		199.80	0.002624	1.74	138.89	158.26	0.33
LCr1	6400	Max WS	546.44	198.00	198.89		198.97	0.005141	2.25	242.65	312.07	0.45
LCr1	6200	Max WS	546.35	196.00	197.84		197.97	0.005134	2.90	188.52	165.88	0.48
LCr1	6000	Max WS	546.29	196.00	196.92	196.61	197.01	0.005658	2.30	237.75	318.75	0.47

Upper Laguna Creek Tributary

Developed Conditions Model:

2-Year 24-Hour Storm

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                           Davis, California


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PROJECT DATA
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Project File : LagunaCreek_Dev.prj
Run Date and Time: 5/24/2011 5:36:27 PM

Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and
100 yr 24 hour storms

Plan: LagunaCreek Proposed 2 Yr - Proposed Conditions With No Detention Basins 2 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	10.00	222.00	223.35		223.35	0.000022	0.14	69.51	93.70	0.03
LCr1	11600	Max WS	4.20	218.27	219.04		219.04	0.000037	0.13	32.13	72.52	0.03
LCr1	11400	Max WS	-42.29	218.00	218.72		218.73	0.001256	-0.75	56.49	131.68	0.20
LCr1	11199.56	Max WS	-284.27	217.17	219.12		219.14	0.000680	-1.07	264.89	226.97	0.18
LCr1	11000	Max WS	158.10	216.00	216.85		216.89	0.004110	1.62	97.57	173.76	0.38
LCr1	10800	Max WS	31.49	215.87	216.28		216.28	0.001060	0.53	58.95	200.86	0.17
LCr1	10600	Max WS	26.22	213.84	215.90		215.90	0.000002	0.08	339.59	222.05	0.01
LCr1	10400	Max WS	276.73	213.96	215.16		215.27	0.009654	2.72	101.60	157.56	0.60
LCr1	10203.13	Max WS	10.13	212.00	212.85		212.85	0.000029	0.14	71.79	120.49	0.03
LCr1	10000	Max WS	-39.97	211.37	212.28		212.28	0.000259	-0.36	110.66	235.38	0.09
LCr1	9800	Max WS	6.95	210.08	211.16		211.17	0.000050	0.16	42.49	86.58	0.04
LCr1	9600	Max WS	21.86	209.75	210.64		210.64	0.000212	0.35	62.36	119.48	0.09
LCr1	9400	Max WS	287.83	209.25	210.69		210.72	0.001781	1.39	206.85	247.27	0.27

LCr1	9200	Max WS	115.33	208.08	209.45		209.47	0.000870	0.97	119.32	143.92	0.19
LCr1	9000	Max WS	104.56	207.92	208.49		208.63	0.023353	3.03	34.47	88.20	0.86
LCr1	8800	Max WS	49.73	206.56	208.94		208.94	0.000038	0.25	201.65	180.05	0.04
LCr1	8700.*	Max WS	52.74	206.27	207.21		207.23	0.002838	1.18	44.86	97.97	0.31
LCr1	8600	Max WS	-0.14	205.99	206.63		206.63	0.000000	0.00	55.56	121.23	0.00
LCr1	8400	Max WS	-23.62	204.73	206.15		206.15	0.000053	-0.18	128.46	230.40	0.04
LCr1	8200	Max WS	26.52	204.47	205.16		205.17	0.004238	0.95	28.03	114.49	0.34
LCr1	8000	Max WS	-287.13	204.00	205.16		205.41	0.016313	-4.05	70.89	89.81	0.80
LCr1	7913.41	Max WS	-965.82	202.87	211.14		211.23	0.002963	-2.45	394.71	325.98	0.37
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	-5.57	202.72	205.20		205.20	0.000010	-0.21	26.85	329.56	0.02
LCr1	7799.859	Max WS	-5.41	202.16	203.18		203.18	0.000011	-0.07	73.58	154.04	0.02
LCr1	7600	Max WS	0.57	202.00	202.78		202.78	0.000000	0.01	39.76	93.38	0.00
LCr1	7400	Max WS	10.88	202.00	203.02		203.02	0.000009	0.08	132.86	205.85	0.02
LCr1	7200	Max WS	79.27	200.92	201.59		201.65	0.012473	1.92	41.36	131.71	0.60
LCr1	7000	Max WS	9.81	200.00	201.10		201.10	0.000006	0.07	133.44	184.68	0.02
LCr1	6800	Max WS	25.00	199.47	200.05		200.06	0.005650	0.90	27.76	151.61	0.37
LCr1	6700.*	Max WS	5.47	198.74	199.75		199.75	0.000016	0.09	61.77	132.93	0.02
LCr1	6600	Max WS	38.51	198.00	199.45		199.46	0.000175	0.40	96.17	130.66	0.08
LCr1	6400	Max WS	15.93	198.00	198.36		198.36	0.000143	0.19	82.76	290.94	0.06
LCr1	6200	Max WS	-3.16	196.00	196.83		196.83	0.000009	-0.07	48.41	105.60	0.02
LCr1	6000	Max WS	52.55	196.00	196.18	196.21	196.27	0.100314	2.39	22.00	240.60	1.39

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PROJECT DATA
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Project File : LagunaCreek_Dev.prj
Run Date and Time: 5/24/2011 5:41:57 PM

Project in English units

Project Description:
Laguna Creek Tributary - Existing and Developed conditions - 2 yr 10 yr and
100 yr 24 hour storms
Plan: LagunaCreek Proposed w/ Detent 2
Yr - Proposed Conditions With Detention Basins 2 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
LCr1	11800	Max WS	66.76	222.00	222.64	222.71	222.90	0.054491	4.07	16.39	50.87	1.26
LCr1	11698.20	Max WS	66.74	218.97	220.48		220.56	0.010151	2.19	30.50	68.00	0.58
LCr1	11591	Max WS	66.73	218.81	219.89		220.34	0.024503	5.36	12.44	146.04	1.00
LCr1	11497		Culvert									
LCr1	11400	Max WS	66.73	218.00	219.28		219.51	0.008179	3.86	17.27	178.01	0.61
LCr1	11199.56	Max WS	66.70	217.17	217.74		217.84	0.021701	2.63	25.39	76.33	0.80
LCr1	11000	Max WS	77.33	216.00	216.72		216.73	0.002396	1.05	73.91	169.29	0.28
LCr1	10800	Max WS	77.18	215.87	216.38		216.40	0.002366	0.97	79.66	202.87	0.27
LCr1	10600	Max WS	60.40	213.84	216.18		216.18	0.000008	0.15	401.68	232.15	0.02
LCr1	10400	Max WS	77.61	213.96	214.53		214.66	0.027285	2.91	26.69	81.78	0.90
LCr1	10203.13	Max WS	30.45	212.00	212.86		212.86	0.000254	0.42	72.37	120.86	0.10
LCr1	10000	Max WS	89.73	211.37	212.01		212.06	0.018009	1.83	49.09	221.04	0.68
LCr1	9800	Max WS	89.68	210.08	211.21		211.27	0.006401	1.93	46.42	88.49	0.47
LCr1	9600	Max WS	35.47	209.75	210.72		210.72	0.000366	0.49	72.63	127.45	0.11

LCr1	9400	Max WS	89.83	209.25	209.90	209.89	210.03	0.036187	2.92	30.82	116.28	1.00
LCr1	9200	Max WS	89.65	208.08	209.19		209.21	0.001450	1.07	83.47	126.15	0.23
LCr1	9000	Max WS	89.50	207.92	208.71		208.75	0.004511	1.61	55.47	106.62	0.39
LCr1	8800	Max WS	89.42	206.56	207.81		207.88	0.005442	2.07	43.22	65.83	0.45
LCr1	8700.*	Max WS	89.38	206.27	207.18		207.25	0.009342	2.10	42.59	95.30	0.55
LCr1	8600	Max WS	89.33	205.99	206.60		206.64	0.006598	1.73	51.55	118.42	0.46
LCr1	8400	Max WS	80.85	204.73	206.02		206.03	0.001302	0.81	100.14	213.95	0.21
LCr1	8200	Max WS	79.70	204.47	205.92		205.92	0.000237	0.47	170.95	231.99	0.10
LCr1	8000	Max WS	79.64	204.00	205.89		205.90	0.000203	0.43	184.08	248.64	0.09
LCr1	7913.41	Max WS	79.62	202.87	205.78		205.89	0.001489	2.64	30.16	19.01	0.29
LCr1	7876.59		Culvert									
LCr1	7839.77	Max WS	79.61	202.72	203.85	203.95	204.55	0.029846	6.70	11.88	53.90	1.14
LCr1	7799.859	Max WS	79.59	202.16	203.28		203.29	0.001334	0.88	90.11	171.48	0.21
LCr1	7600	Max WS	79.57	202.00	203.08		203.09	0.001811	1.10	72.21	124.09	0.25
LCr1	7400	Max WS	79.56	202.00	202.63		202.66	0.007528	1.48	53.60	171.45	0.47
LCr1	7200	Max WS	79.55	200.92	201.61		201.66	0.010311	1.80	44.10	133.39	0.55
LCr1	7000	Max WS	30.51	200.00	200.96		200.96	0.000113	0.28	107.74	177.93	0.06
LCr1	6800	Max WS	79.55	199.47	200.15		200.20	0.014621	1.77	44.95	181.71	0.63
LCr1	6700.*	Max WS	79.46	198.74	199.65		199.69	0.005911	1.62	49.19	115.60	0.44
LCr1	6600	Max WS	20.66	198.00	199.49		199.49	0.000044	0.20	101.20	134.21	0.04
LCr1	6400	Max WS	172.23	198.00	198.36		198.43	0.015736	2.04	84.39	291.17	0.67
LCr1	6200	Max WS	172.22	196.00	197.26		197.31	0.003080	1.70	101.13	134.68	0.35
LCr1	6000	Max WS	172.20	196.00	196.53	196.34	196.56	0.005183	1.46	117.60	290.18	0.41

7.10 Appendix J: Unnamed Deer Creek Tributary Developed Conditions HEC-RAS Results

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	28400	Max WS	10yrwDetU.S.EX	93.89	220.00	221.12
1	28400	Max WS	100yrwDetU.S.EX	161.88	220.00	221.36
1	28400	Max WS	2yrwDetU.S.EX	43.44	220.00	220.89
1	28313.0*	Max WS	10yrwDetU.S.EX	93.84	219.58	220.68
1	28313.0*	Max WS	100yrwDetU.S.EX	161.80	219.58	220.92
1	28313.0*	Max WS	2yrwDetU.S.EX	43.40	219.58	220.47
1	28226.0*	Max WS	10yrwDetU.S.EX	93.81	219.15	220.25
1	28226.0*	Max WS	100yrwDetU.S.EX	161.71	219.15	220.42
1	28226.0*	Max WS	2yrwDetU.S.EX	43.38	219.15	219.98
1	28139.07	Max WS	10yrwDetU.S.EX	93.77	218.73	219.77
1	28139.07	Max WS	100yrwDetU.S.EX	161.63	218.73	219.96
1	28139.07	Max WS	2yrwDetU.S.EX	43.31	218.73	219.53
1	28069.5*	Max WS	10yrwDetU.S.EX	96.89	218.22	219.29
1	28069.5*	Max WS	100yrwDetU.S.EX	167.01	218.22	219.48
1	28069.5*	Max WS	2yrwDetU.S.EX	44.76	218.22	219.08
1	28000	Max WS	10yrwDetU.S.EX	99.99	217.71	218.78
1	28000	Max WS	100yrwDetU.S.EX	172.44	217.71	218.96
1	28000	Max WS	2yrwDetU.S.EX	46.20	217.71	218.57
1	27900.*	Max WS	10yrwDetU.S.EX	105.60	216.97	217.76
1	27900.*	Max WS	100yrwDetU.S.EX	182.11	216.97	217.97
1	27900.*	Max WS	2yrwDetU.S.EX	48.79	216.97	217.54
1	27800	Max WS	10yrwDetU.S.EX	111.11	216.23	217.08
1	27800	Max WS	100yrwDetU.S.EX	191.69	216.23	217.36
1	27800	Max WS	2yrwDetU.S.EX	51.32	216.23	216.78
1	27700.*	Max WS	10yrwDetU.S.EX	116.83	215.51	216.84
1	27700.*	Max WS	100yrwDetU.S.EX	201.43	215.51	217.08
1	27700.*	Max WS	2yrwDetU.S.EX	53.90	215.51	216.57
1	27600	Max WS	10yrwDetU.S.EX	122.51	214.80	216.38
1	27600	Max WS	100yrwDetU.S.EX	211.35	214.80	216.57
1	27600	Max WS	2yrwDetU.S.EX	56.49	214.80	216.13
1	27500.*	Max WS	10yrwDetU.S.EX	128.92	214.08	215.47
1	27500.*	Max WS	100yrwDetU.S.EX	222.48	214.08	215.69
1	27500.*	Max WS	2yrwDetU.S.EX	59.45	214.08	215.22
1	27400	Max WS	10yrwDetU.S.EX	135.25	213.35	214.85
1	27400	Max WS	100yrwDetU.S.EX	233.49	213.35	215.14
1	27400	Max WS	2yrwDetU.S.EX	62.30	213.35	214.53
1	27329.7*	Max WS	10yrwDetU.S.EX	138.19	212.84	214.63
1	27329.7*	Max WS	100yrwDetU.S.EX	238.66	212.84	214.93
1	27329.7*	Max WS	2yrwDetU.S.EX	63.68	212.84	214.28

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	27259.5*	Max WS	10yrwDetU.S.EX	141.18	212.32	214.35
1	27259.5*	Max WS	100yrwDetU.S.EX	243.85	212.32	214.68
1	27259.5*	Max WS	2yrwDetU.S.EX	65.04	212.32	213.94
1	27189.29	Max WS	10yrwDetU.S.EX	144.09	211.81	213.95
1	27189.29	Max WS	100yrwDetU.S.EX	249.06	211.81	214.30
1	27189.29	Max WS	2yrwDetU.S.EX	66.42	211.81	213.45
1	27094.6*	Max WS	10yrwDetU.S.EX	149.06	211.10	213.15
1	27094.6*	Max WS	100yrwDetU.S.EX	257.58	211.10	213.52
1	27094.6*	Max WS	2yrwDetU.S.EX	68.70	211.10	212.64
1	27000	Max WS	10yrwDetU.S.EX	154.01	210.39	212.52
1	27000	Max WS	100yrwDetU.S.EX	266.22	210.39	212.89
1	27000	Max WS	2yrwDetU.S.EX	70.97	210.39	212.04
1	26900.*	Max WS	10yrwDetU.S.EX	159.63	209.64	212.01
1	26900.*	Max WS	100yrwDetU.S.EX	275.81	209.64	212.35
1	26900.*	Max WS	2yrwDetU.S.EX	73.52	209.64	211.63
1	26800	Max WS	10yrwDetU.S.EX	165.21	208.88	211.38
1	26800	Max WS	100yrwDetU.S.EX	285.56	208.88	211.77
1	26800	Max WS	2yrwDetU.S.EX	76.07	208.88	210.94
1	26700.*	Max WS	10yrwDetU.S.EX	170.27	208.12	210.64
1	26700.*	Max WS	100yrwDetU.S.EX	294.43	208.12	210.94
1	26700.*	Max WS	2yrwDetU.S.EX	78.38	208.12	210.11
1	26600	Max WS	10yrwDetU.S.EX	174.58	207.37	210.20
1	26600	Max WS	100yrwDetU.S.EX	303.11	207.37	210.45
1	26600	Max WS	2yrwDetU.S.EX	80.64	207.37	209.59
1	26528.4*	Max WS	10yrwDetU.S.EX	174.72	206.83	209.97
1	26528.4*	Max WS	100yrwDetU.S.EX	304.22	206.83	210.21
1	26528.4*	Max WS	2yrwDetU.S.EX	80.94	206.83	209.34
1	26456.8*	Max WS	10yrwDetU.S.EX	174.95	206.29	209.74
1	26456.8*	Max WS	100yrwDetU.S.EX	292.02	206.29	210.02
1	26456.8*	Max WS	2yrwDetU.S.EX	81.17	206.29	209.03
1	26385.31	Max WS	10yrwDetU.S.EX	175.50	205.75	209.17
1	26385.31	Max WS	100yrwDetU.S.EX	306.58	205.75	209.51
1	26385.31	Max WS	2yrwDetU.S.EX	81.46	205.75	208.45
1	26292.6*	Max WS	10yrwDetU.S.EX	178.40	205.40	208.15
1	26292.6*	Max WS	100yrwDetU.S.EX	311.57	205.40	208.50
1	26292.6*	Max WS	2yrwDetU.S.EX	82.89	205.40	207.50
1	26200	Max WS	10yrwDetU.S.EX	181.33	205.06	207.27
1	26200	Max WS	100yrwDetU.S.EX	316.48	205.06	207.65

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	26200	Max WS	2yrwDetU.S.EX	84.31	205.06	206.78
1	26100.*	Max WS	10yrwDetU.S.EX	184.23	204.69	206.65
1	26100.*	Max WS	100yrwDetU.S.EX	321.11	204.69	207.03
1	26100.*	Max WS	2yrwDetU.S.EX	85.65	204.69	206.19
1	26000	Max WS	10yrwDetU.S.EX	186.98	204.32	206.26
1	26000	Max WS	100yrwDetU.S.EX	325.64	204.32	206.65
1	26000	Max WS	2yrwDetU.S.EX	86.96	204.32	205.79
1	25900.*	Max WS	10yrwDetU.S.EX	189.79	203.95	205.91
1	25900.*	Max WS	100yrwDetU.S.EX	330.61	203.95	206.30
1	25900.*	Max WS	2yrwDetU.S.EX	88.36	203.95	205.46
1	25800	Max WS	10yrwDetU.S.EX	192.78	203.57	205.55
1	25800	Max WS	100yrwDetU.S.EX	335.53	203.57	205.88
1	25800	Max WS	2yrwDetU.S.EX	89.73	203.57	205.13
1	25700.*	Max WS	10yrwDetU.S.EX	195.67	203.20	205.11
1	25700.*	Max WS	100yrwDetU.S.EX	340.52	203.20	205.41
1	25700.*	Max WS	2yrwDetU.S.EX	91.11	203.20	204.77
1	25600	Max WS	10yrwDetU.S.EX	198.51	202.83	204.76
1	25600	Max WS	100yrwDetU.S.EX	345.39	202.83	205.05
1	25600	Max WS	2yrwDetU.S.EX	92.44	202.83	204.46
1	25500.*	Max WS	10yrwDetU.S.EX	201.15	202.46	204.36
1	25500.*	Max WS	100yrwDetU.S.EX	349.89	202.46	204.64
1	25500.*	Max WS	2yrwDetU.S.EX	93.62	202.46	204.04
1	25400	Max WS	10yrwDetU.S.EX	203.82	202.09	204.05
1	25400	Max WS	100yrwDetU.S.EX	354.31	202.09	204.32
1	25400	Max WS	2yrwDetU.S.EX	94.65	202.09	203.77
1	25358.8*	Max WS	10yrwDetU.S.EX	204.97	202.00	203.94
1	25358.8*	Max WS	100yrwDetU.S.EX	356.22	202.00	204.20
1	25358.8*	Max WS	2yrwDetU.S.EX	95.03	202.00	203.70
1	25317.6*	Max WS	10yrwDetU.S.EX	206.10	201.92	203.79
1	25317.6*	Max WS	100yrwDetU.S.EX	357.84	201.92	204.04
1	25317.6*	Max WS	2yrwDetU.S.EX	95.56	201.92	203.61
1	25276.3*	Max WS	10yrwDetU.S.EX	207.24	201.83	203.61
1	25276.3*	Max WS	100yrwDetU.S.EX	359.83	201.83	203.86
1	25276.3*	Max WS	2yrwDetU.S.EX	95.96	201.83	203.55
1	25235.1*	Max WS	10yrwDetU.S.EX	103.18	201.75	203.54
1	25235.1*	Max WS	100yrwDetU.S.EX	361.80	201.75	203.67
1	25235.1*	Max WS	2yrwDetU.S.EX	96.50	201.75	203.52
1	25193.99	Max WS	10yrwDetU.S.EX	209.52	201.66	203.24

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	25193.99	Max WS	100yrwDetU.S.EX	363.74	201.66	203.49
1	25193.99	Max WS	2yrwDetU.S.EX	97.02	201.66	203.09
1	25145.4*	Max WS	10yrwDetU.S.EX	211.03	201.36	202.95
1	25145.4*	Max WS	100yrwDetU.S.EX	366.27	201.36	203.19
1	25145.4*	Max WS	2yrwDetU.S.EX	97.72	201.36	202.61
1	25097.*	Max WS	10yrwDetU.S.EX	212.51	201.05	202.52
1	25097.*	Max WS	100yrwDetU.S.EX	368.71	201.05	202.79
1	25097.*	Max WS	2yrwDetU.S.EX	98.43	201.05	202.16
1	25048.5*	Max WS	10yrwDetU.S.EX	213.91	200.75	202.15
1	25048.5*	Max WS	100yrwDetU.S.EX	370.80	200.75	202.48
1	25048.5*	Max WS	2yrwDetU.S.EX	99.12	200.75	201.76
1	25000	Max WS	10yrwDetU.S.EX	215.18	200.45	201.98
1	25000	Max WS	100yrwDetU.S.EX	373.35	200.45	202.35
1	25000	Max WS	2yrwDetU.S.EX	99.77	200.45	201.56
1	24900.*	Max WS	10yrwDetU.S.EX	218.01	200.04	201.74
1	24900.*	Max WS	100yrwDetU.S.EX	378.06	200.04	202.14
1	24900.*	Max WS	2yrwDetU.S.EX	101.11	200.04	201.31
1	24800	Max WS	10yrwDetU.S.EX	220.81	199.63	201.39
1	24800	Max WS	100yrwDetU.S.EX	382.63	199.63	201.77
1	24800	Max WS	2yrwDetU.S.EX	102.42	199.63	200.99
1	24700.*	Max WS	10yrwDetU.S.EX	223.74	199.20	200.94
1	24700.*	Max WS	100yrwDetU.S.EX	387.85	199.20	201.19
1	24700.*	Max WS	2yrwDetU.S.EX	103.86	199.20	200.58
1	24600	Max WS	10yrwDetU.S.EX	226.68	198.77	200.32
1	24600	Max WS	100yrwDetU.S.EX	392.87	198.77	200.54
1	24600	Max WS	2yrwDetU.S.EX	105.29	198.77	200.01
1	24500.*	Max WS	10yrwDetU.S.EX	229.80	198.34	199.86
1	24500.*	Max WS	100yrwDetU.S.EX	398.27	198.34	200.02
1	24500.*	Max WS	2yrwDetU.S.EX	104.07	198.34	199.59
1	24400	Max WS	10yrwDetU.S.EX	205.00	197.91	199.75
1	24400	Max WS	100yrwDetU.S.EX	403.60	197.91	199.81
1	24400	Max WS	2yrwDetU.S.EX	104.62	197.91	199.49
1	24328.0*	Max WS	10yrwDetU.S.EX	206.37	197.60	199.73
1	24328.0*	Max WS	100yrwDetU.S.EX	406.78	197.60	199.76
1	24328.0*	Max WS	2yrwDetU.S.EX	105.37	197.60	199.48
1	24256.1*	Max WS	10yrwDetU.S.EX	178.91	197.29	199.71
1	24256.1*	Max WS	100yrwDetU.S.EX	209.47	197.29	199.71
1	24256.1*	Max WS	2yrwDetU.S.EX	106.04	197.29	199.40

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	24184.18	Max WS	10yrwDetU.S.EX	239.33	196.98	199.17
1	24184.18	Max WS	100yrwDetU.S.EX	413.51	196.98	199.30
1	24184.18	Max WS	2yrwDetU.S.EX	106.89	196.98	198.87
1	24092.0*	Max WS	10yrwDetU.S.EX	241.94	196.51	198.56
1	24092.0*	Max WS	100yrwDetU.S.EX	418.06	196.51	198.90
1	24092.0*	Max WS	2yrwDetU.S.EX	108.05	196.51	198.32
1	24000	Max WS	10yrwDetU.S.EX	244.61	196.03	198.16
1	24000	Max WS	100yrwDetU.S.EX	422.50	196.03	198.43
1	24000	Max WS	2yrwDetU.S.EX	109.26	196.03	197.81
1	23900.*	Max WS	10yrwDetU.S.EX	247.49	195.51	197.55
1	23900.*	Max WS	100yrwDetU.S.EX	427.21	195.51	197.82
1	23900.*	Max WS	2yrwDetU.S.EX	110.55	195.51	197.20
1	23800	Max WS	10yrwDetU.S.EX	250.26	194.99	197.09
1	23800	Max WS	100yrwDetU.S.EX	432.10	194.99	197.39
1	23800	Max WS	2yrwDetU.S.EX	111.74	194.99	196.77
1	23700.*	Max WS	10yrwDetU.S.EX	252.50	194.47	196.74
1	23700.*	Max WS	100yrwDetU.S.EX	435.95	194.47	196.96
1	23700.*	Max WS	2yrwDetU.S.EX	112.65	194.47	196.53
1	23600	Max WS	10yrwDetU.S.EX	254.70	193.95	196.13
1	23600	Max WS	100yrwDetU.S.EX	439.62	193.95	196.42
1	23600	Max WS	2yrwDetU.S.EX	113.56	193.95	195.85
1	23400	Max WS	10yrwDetU.S.EX	274.54	192.92	195.39
1	23400	Max WS	100yrwDetU.S.EX	474.24	192.92	195.82
1	23400	Max WS	2yrwDetU.S.EX	122.19	192.92	194.97
1	23178.25	Max WS	10yrwDetU.S.EX	295.66	191.76	194.92
1	23178.25	Max WS	100yrwDetU.S.EX	511.17	191.76	195.31
1	23178.25	Max WS	2yrwDetU.S.EX	131.35	191.76	194.22
1	23000	Max WS	10yrwDetU.S.EX	316.29	191.25	194.08
1	23000	Max WS	100yrwDetU.S.EX	547.73	191.25	194.51
1	23000	Max WS	2yrwDetU.S.EX	140.62	191.25	193.33
1	22600	Max WS	10yrwDetU.S.EX	348.56	190.00	192.71
1	22600	Max WS	100yrwDetU.S.EX	606.97	190.00	193.14
1	22600	Max WS	2yrwDetU.S.EX	156.23	190.00	192.07
1	22400	Max WS	10yrwDetU.S.EX	394.65	189.54	192.50
1	22400	Max WS	100yrwDetU.S.EX	689.76	189.54	192.84
1	22400	Max WS	2yrwDetU.S.EX	177.86	189.54	191.85
1	22175.79	Max WS	10yrwDetU.S.EX	410.46	188.90	191.54
1	22175.79	Max WS	100yrwDetU.S.EX	692.20	188.90	192.00
1	22175.79	Max WS	2yrwDetU.S.EX	185.23	188.90	190.94

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	22000	Max WS	10yrwDetU.S.EX	410.05	188.07	190.71
1	22000	Max WS	100yrwDetU.S.EX	694.14	188.07	191.20
1	22000	Max WS	2yrwDetU.S.EX	185.19	188.07	190.08
1	21900.*	Max WS	10yrwDetU.S.EX	409.59	187.59	190.39
1	21900.*	Max WS	100yrwDetU.S.EX	695.48	187.59	190.90
1	21900.*	Max WS	2yrwDetU.S.EX	185.17	187.59	189.72
1	21800	Max WS	10yrwDetU.S.EX	409.51	187.11	190.17
1	21800	Max WS	100yrwDetU.S.EX	696.66	187.11	190.71
1	21800	Max WS	2yrwDetU.S.EX	185.13	187.11	189.44
1	21600	Max WS	10yrwDetU.S.EX	409.14	186.14	189.15
1	21600	Max WS	100yrwDetU.S.EX	698.58	186.14	189.67
1	21600	Max WS	2yrwDetU.S.EX	185.04	186.14	188.46
1	21400	Max WS	10yrwDetU.S.EX	408.34	185.21	188.53
1	21400	Max WS	100yrwDetU.S.EX	700.89	185.21	189.03
1	21400	Max WS	2yrwDetU.S.EX	184.81	185.21	187.86
1	21176.29	Max WS	10yrwDetU.S.EX	335.49	184.07	188.08
1	21176.29	Max WS	100yrwDetU.S.EX	702.82	184.07	188.34
1	21176.29	Max WS	2yrwDetU.S.EX	184.69	184.07	187.55
1	20962.10	Max WS	10yrwDetU.S.EX	407.90	184.10	187.19
1	20962.10	Max WS	100yrwDetU.S.EX	705.10	184.10	187.68
1	20962.10	Max WS	2yrwDetU.S.EX	184.63	184.10	186.67
1	20921.9*	Max WS	10yrwDetU.S.EX	407.88	184.01	187.08
1	20921.9*	Max WS	100yrwDetU.S.EX	705.61	184.01	187.57
1	20921.9*	Max WS	2yrwDetU.S.EX	184.62	184.01	186.56
1	20881.8*	Max WS	10yrwDetU.S.EX	407.85	183.92	186.99
1	20881.8*	Max WS	100yrwDetU.S.EX	706.12	183.92	187.47
1	20881.8*	Max WS	2yrwDetU.S.EX	184.62	183.92	186.48
1	20841.7*	Max WS	10yrwDetU.S.EX	407.80	183.83	186.90
1	20841.7*	Max WS	100yrwDetU.S.EX	706.63	183.83	187.37
1	20841.7*	Max WS	2yrwDetU.S.EX	184.59	183.83	186.41
1	20801.6*	Max WS	10yrwDetU.S.EX	407.75	183.74	186.80
1	20801.6*	Max WS	100yrwDetU.S.EX	707.14	183.74	187.27
1	20801.6*	Max WS	2yrwDetU.S.EX	174.62	183.74	186.35
1	20761.52	Max WS	10yrwDetU.S.EX	407.71	183.65	186.64
1	20761.52	Max WS	100yrwDetU.S.EX	707.66	183.65	187.10
1	20761.52	Max WS	2yrwDetU.S.EX	184.60	183.65	185.94
1	20712.0*	Max WS	10yrwDetU.S.EX	418.13	182.57	186.16
1	20712.0*	Max WS	100yrwDetU.S.EX	726.19	182.57	186.73

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	20712.0*	Max WS	2yrwDetU.S.EX	189.23	182.57	185.44
1	20662.66	Max WS	10yrwDetU.S.EX	428.57	181.49	185.83
1	20662.66	Max WS	100yrwDetU.S.EX	744.65	181.49	186.50
1	20662.66	Max WS	2yrwDetU.S.EX	193.66	181.49	185.29
1	20655.8*	Max WS	10yrwDetU.S.EX	428.58	181.50	185.76
1	20655.8*	Max WS	100yrwDetU.S.EX	744.63	181.50	186.46
1	20655.8*	Max WS	2yrwDetU.S.EX	193.67	181.50	185.26
1	20648.9*	Max WS	10yrwDetU.S.EX	428.58	181.52	185.65
1	20648.9*	Max WS	100yrwDetU.S.EX	744.62	181.52	186.40
1	20648.9*	Max WS	2yrwDetU.S.EX	193.41	181.52	185.23
1	20642.13	Max WS	10yrwDetU.S.EX	428.41	181.53	185.38
1	20642.13	Max WS	100yrwDetU.S.EX	742.29	181.53	185.65
1	20642.13	Max WS	2yrwDetU.S.EX	193.41	181.53	185.18
1	20614.23	Max WS	10yrwDetU.S.EX	428.46	180.88	185.51
1	20614.23	Max WS	100yrwDetU.S.EX	743.72	180.88	185.89
1	20614.23	Max WS	2yrwDetU.S.EX	193.42	180.88	185.21
1	20399.06	Max WS	10yrwDetU.S.EX	382.74	181.78	185.13
1	20399.06	Max WS	100yrwDetU.S.EX	741.38	181.78	185.39
1	20399.06	Max WS	2yrwDetU.S.EX	192.58	181.78	184.83
1	20131.75	Max WS	10yrwDetU.S.EX	428.81	180.89	184.08
1	20131.75	Max WS	100yrwDetU.S.EX	736.78	180.89	184.78
1	20131.75	Max WS	2yrwDetU.S.EX	192.66	180.89	183.38
1	19831.49	Max WS	10yrwDetU.S.EX	428.14	179.01	182.23
1	19831.49	Max WS	100yrwDetU.S.EX	736.18	179.01	183.02
1	19831.49	Max WS	2yrwDetU.S.EX	192.59	179.01	181.38
1	19561.71	Max WS	10yrwDetU.S.EX	435.92	176.06	181.36
1	19561.71	Max WS	100yrwDetU.S.EX	753.32	176.06	181.80
1	19561.71	Max WS	2yrwDetU.S.EX	194.92	176.06	180.62
1	19375.20	Max WS	10yrwDetU.S.EX	435.57	173.23	181.26
1	19375.20	Max WS	100yrwDetU.S.EX	753.56	173.23	181.59
1	19375.20	Max WS	2yrwDetU.S.EX	194.95	173.23	180.58
1	19216.24	Max WS	10yrwDetU.S.EX	432.96	176.81	181.13
1	19216.24	Max WS	100yrwDetU.S.EX	752.99	176.81	181.34
1	19216.24	Max WS	2yrwDetU.S.EX	194.76	176.81	180.45
1	19040.62	Max WS	10yrwDetU.S.EX	444.29	176.76	180.71
1	19040.62	Max WS	100yrwDetU.S.EX	752.42	176.76	181.02
1	19040.62	Max WS	2yrwDetU.S.EX	194.63	176.76	179.93
1	18997.3*	Max WS	10yrwDetU.S.EX	443.93	176.80	180.49

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	18997.3*	Max WS	100yrwDetU.S.EX	752.43	176.80	180.96
1	18997.3*	Max WS	2yrwDetU.S.EX	194.62	176.80	179.80
1	18953.9*	Max WS	10yrwDetU.S.EX	443.73	176.83	180.47
1	18953.9*	Max WS	100yrwDetU.S.EX	752.42	176.83	180.87
1	18953.9*	Max WS	2yrwDetU.S.EX	194.62	176.83	179.69
1	18910.6*	Max WS	10yrwDetU.S.EX	443.50	176.87	180.36
1	18910.6*	Max WS	100yrwDetU.S.EX	752.40	176.87	180.77
1	18910.6*	Max WS	2yrwDetU.S.EX	194.58	176.87	179.58
1	18867.36	Max WS	10yrwDetU.S.EX	442.38	176.91	180.03
1	18867.36	Max WS	100yrwDetU.S.EX	752.20	176.91	180.46
1	18867.36	Max WS	2yrwDetU.S.EX	194.48	176.91	179.42
1	18661.93	Max WS	10yrwDetU.S.EX	440.89	175.46	179.15
1	18661.93	Max WS	100yrwDetU.S.EX	749.94	175.46	179.62
1	18661.93	Max WS	2yrwDetU.S.EX	194.63	175.46	178.37
1	18573.2*	Max WS	10yrwDetU.S.EX	446.06	174.86	178.81
1	18573.2*	Max WS	100yrwDetU.S.EX	758.87	174.86	179.34
1	18573.2*	Max WS	2yrwDetU.S.EX	196.91	174.86	177.76
1	18484.66	Max WS	10yrwDetU.S.EX	427.55	174.25	178.26
1	18484.66	Max WS	100yrwDetU.S.EX	756.01	174.25	179.01
1	18484.66	Max WS	2yrwDetU.S.EX	196.94	174.25	177.29
1	18313.08	Max WS	10yrwDetU.S.EX	444.17	174.93	177.66
1	18313.08	Max WS	100yrwDetU.S.EX	755.86	174.93	178.74
1	18313.08	Max WS	2yrwDetU.S.EX	196.97	174.93	176.44
1	18226	Max WS	10yrwDetU.S.EX	443.78	173.87	177.32
1	18226	Max WS	100yrwDetU.S.EX	755.62	173.87	178.35
1	18226	Max WS	2yrwDetU.S.EX	196.96	173.87	176.17
1	18175			Culvert		
1	18123	Max WS	10yrwDetU.S.EX	434.64	173.46	176.92
1	18123	Max WS	100yrwDetU.S.EX	755.42	173.46	177.16
1	18123	Max WS	2yrwDetU.S.EX	196.97	173.46	175.99
1	17964.88	Max WS	10yrwDetU.S.EX	443.37	172.77	176.04
1	17964.88	Max WS	100yrwDetU.S.EX	755.39	172.77	176.49
1	17964.88	Max WS	2yrwDetU.S.EX	196.94	172.77	175.40
1	17929.0*	Max WS	10yrwDetU.S.EX	443.32	172.49	175.88
1	17929.0*	Max WS	100yrwDetU.S.EX	755.50	172.49	176.29
1	17929.0*	Max WS	2yrwDetU.S.EX	196.96	172.49	175.29
1	17893.2*	Max WS	10yrwDetU.S.EX	443.27	172.22	175.73
1	17893.2*	Max WS	100yrwDetU.S.EX	755.60	172.22	176.10

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	17893.2*	Max WS	2yrwDetU.S.EX	196.98	172.22	175.16
1	17857.44	Max WS	10yrwDetU.S.EX	443.23	171.94	175.47
1	17857.44	Max WS	100yrwDetU.S.EX	755.70	171.94	175.82
1	17857.44	Max WS	2yrwDetU.S.EX	196.96	171.94	174.95
1	17638.59	Max WS	10yrwDetU.S.EX	441.98	171.98	174.52
1	17638.59	Max WS	100yrwDetU.S.EX	756.01	171.98	174.83
1	17638.59	Max WS	2yrwDetU.S.EX	196.95	171.98	174.11
1	17570.8*	Max WS	10yrwDetU.S.EX	441.43	171.69	174.25
1	17570.8*	Max WS	100yrwDetU.S.EX	756.10	171.69	174.59
1	17570.8*	Max WS	2yrwDetU.S.EX	196.83	171.69	173.82
1	17503.0*	Max WS	10yrwDetU.S.EX	441.40	171.40	173.82
1	17503.0*	Max WS	100yrwDetU.S.EX	756.01	171.40	174.16
1	17503.0*	Max WS	2yrwDetU.S.EX	197.00	171.40	173.39
1	17435.23	Max WS	10yrwDetU.S.EX	441.38	171.11	173.58
1	17435.23	Max WS	100yrwDetU.S.EX	756.21	171.11	173.89
1	17435.23	Max WS	2yrwDetU.S.EX	196.98	171.11	173.16
1	17347.3*	Max WS	10yrwDetU.S.EX	371.46	170.31	173.40
1	17347.3*	Max WS	100yrwDetU.S.EX	756.18	170.31	173.53
1	17347.3*	Max WS	2yrwDetU.S.EX	196.95	170.31	172.92
1	17259.39	Max WS	10yrwDetU.S.EX	441.42	169.51	172.92
1	17259.39	Max WS	100yrwDetU.S.EX	756.41	169.51	173.22
1	17259.39	Max WS	2yrwDetU.S.EX	196.93	169.51	172.29
1	17161.6*	Max WS	10yrwDetU.S.EX	440.71	169.43	172.44
1	17161.6*	Max WS	100yrwDetU.S.EX	756.35	169.43	172.85
1	17161.6*	Max WS	2yrwDetU.S.EX	196.97	169.43	171.69
1	17063.83	Max WS	10yrwDetU.S.EX	440.67	169.35	171.93
1	17063.83	Max WS	100yrwDetU.S.EX	756.25	169.35	172.46
1	17063.83	Max WS	2yrwDetU.S.EX	196.99	169.35	171.18
1	17016.0*	Max WS	10yrwDetU.S.EX	440.39	168.83	171.70
1	17016.0*	Max WS	100yrwDetU.S.EX	756.41	168.83	172.25
1	17016.0*	Max WS	2yrwDetU.S.EX	196.96	168.83	170.98
1	16968.2*	Max WS	10yrwDetU.S.EX	440.44	168.30	171.52
1	16968.2*	Max WS	100yrwDetU.S.EX	756.59	168.30	172.08
1	16968.2*	Max WS	2yrwDetU.S.EX	196.99	168.30	170.84
1	16920.4*	Max WS	10yrwDetU.S.EX	440.47	167.78	171.35
1	16920.4*	Max WS	100yrwDetU.S.EX	756.61	167.78	171.91
1	16920.4*	Max WS	2yrwDetU.S.EX	197.02	167.78	170.71
1	16872.70	Max WS	10yrwDetU.S.EX	440.46	167.26	171.14

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	16872.70	Max WS	100yrwDetU.S.EX	756.75	167.26	171.70
1	16872.70	Max WS	2yrwDetU.S.EX	197.04	167.26	170.54
1	16822.9*	Max WS	10yrwDetU.S.EX	451.73	167.36	170.92
1	16822.9*	Max WS	100yrwDetU.S.EX	806.62	167.36	171.40
1	16822.9*	Max WS	2yrwDetU.S.EX	202.35	167.36	170.39
1	16773.1*	Max WS	10yrwDetU.S.EX	451.78	167.46	170.73
1	16773.1*	Max WS	100yrwDetU.S.EX	806.79	167.46	171.19
1	16773.1*	Max WS	2yrwDetU.S.EX	202.35	167.46	170.24
1	16723.4*	Max WS	10yrwDetU.S.EX	451.80	167.57	170.56
1	16723.4*	Max WS	100yrwDetU.S.EX	806.94	167.57	170.98
1	16723.4*	Max WS	2yrwDetU.S.EX	202.37	167.57	170.12
1	16673.66	Max WS	10yrwDetU.S.EX	451.79	167.67	170.42
1	16673.66	Max WS	100yrwDetU.S.EX	807.07	167.67	170.81
1	16673.66	Max WS	2yrwDetU.S.EX	202.38	167.67	170.02
1	16606.6*	Max WS	10yrwDetU.S.EX	451.63	167.56	170.14
1	16606.6*	Max WS	100yrwDetU.S.EX	807.01	167.56	170.53
1	16606.6*	Max WS	2yrwDetU.S.EX	202.38	167.56	169.71
1	16539.5*	Max WS	10yrwDetU.S.EX	451.31	167.45	169.76
1	16539.5*	Max WS	100yrwDetU.S.EX	807.15	167.45	170.21
1	16539.5*	Max WS	2yrwDetU.S.EX	202.41	167.45	169.31
1	16472.50	Max WS	10yrwDetU.S.EX	451.35	167.34	169.54
1	16472.50	Max WS	100yrwDetU.S.EX	806.92	167.34	169.98
1	16472.50	Max WS	2yrwDetU.S.EX	202.41	167.34	169.08
1	16374.4*	Max WS	10yrwDetU.S.EX	455.68	166.82	169.29
1	16374.4*	Max WS	100yrwDetU.S.EX	816.38	166.82	169.73
1	16374.4*	Max WS	2yrwDetU.S.EX	203.91	166.82	168.86
1	16276.30	Max WS	10yrwDetU.S.EX	332.20	166.31	168.91
1	16276.30	Max WS	100yrwDetU.S.EX	816.01	166.31	169.31
1	16276.30	Max WS	2yrwDetU.S.EX	203.91	166.31	168.59
1	16193.9*	Max WS	10yrwDetU.S.EX	454.01	165.53	168.63
1	16193.9*	Max WS	100yrwDetU.S.EX	815.36	165.53	169.17
1	16193.9*	Max WS	2yrwDetU.S.EX	203.89	165.53	168.04
1	16111.50	Max WS	10yrwDetU.S.EX	453.91	164.75	168.51
1	16111.50	Max WS	100yrwDetU.S.EX	815.44	164.75	169.10
1	16111.50	Max WS	2yrwDetU.S.EX	203.86	164.75	167.83
1	16044.4*	Max WS	10yrwDetU.S.EX	453.12	164.60	168.42
1	16044.4*	Max WS	100yrwDetU.S.EX	815.49	164.60	169.03
1	16044.4*	Max WS	2yrwDetU.S.EX	203.88	164.60	167.69

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	15977.4*	Max WS	10yrwDetU.S.EX	453.09	164.46	168.31
1	15977.4*	Max WS	100yrwDetU.S.EX	815.52	164.46	168.95
1	15977.4*	Max WS	2yrwDetU.S.EX	203.88	164.46	167.47
1	15910.45	Max WS	10yrwDetU.S.EX	453.04	164.31	168.14
1	15910.45	Max WS	100yrwDetU.S.EX	815.52	164.31	168.85
1	15910.45	Max WS	2yrwDetU.S.EX	203.88	164.31	167.18
1	15816.4*	Max WS	10yrwDetU.S.EX	453.05	163.77	167.77
1	15816.4*	Max WS	100yrwDetU.S.EX	815.45	163.77	168.52
1	15816.4*	Max WS	2yrwDetU.S.EX	203.91	163.77	166.84
1	15722.50	Max WS	10yrwDetU.S.EX	452.72	163.23	166.82
1	15722.50	Max WS	100yrwDetU.S.EX	815.41	163.23	167.31
1	15722.50	Max WS	2yrwDetU.S.EX	203.91	163.23	166.23
1	15661.2*	Max WS	10yrwDetU.S.EX	452.20	163.03	166.69
1	15661.2*	Max WS	100yrwDetU.S.EX	815.56	163.03	167.18
1	15661.2*	Max WS	2yrwDetU.S.EX	203.87	163.03	166.04
1	15600	Max WS	10yrwDetU.S.EX	452.21	162.83	166.62
1	15600	Max WS	100yrwDetU.S.EX	815.65	162.83	167.11
1	15600	Max WS	2yrwDetU.S.EX	203.79	162.83	165.95
1	15513.5*	Max WS	10yrwDetU.S.EX	451.60	162.55	166.53
1	15513.5*	Max WS	100yrwDetU.S.EX	815.38	162.55	167.01
1	15513.5*	Max WS	2yrwDetU.S.EX	203.79	162.55	165.83
1	15427.0*	Max WS	10yrwDetU.S.EX	451.56	162.26	166.44
1	15427.0*	Max WS	100yrwDetU.S.EX	815.51	162.26	166.90
1	15427.0*	Max WS	2yrwDetU.S.EX	203.71	162.26	165.68
1	15340.5*	Max WS	10yrwDetU.S.EX	451.05	161.98	166.33
1	15340.5*	Max WS	100yrwDetU.S.EX	815.61	161.98	166.79
1	15340.5*	Max WS	2yrwDetU.S.EX	203.70	161.98	165.48
1	15254.0*	Max WS	10yrwDetU.S.EX	453.82	161.69	166.18
1	15254.0*	Max WS	100yrwDetU.S.EX	822.18	161.69	166.65
1	15254.0*	Max WS	2yrwDetU.S.EX	204.56	161.69	165.26
1	15167.54	Max WS	10yrwDetU.S.EX	453.51	161.41	165.86
1	15167.54	Max WS	100yrwDetU.S.EX	822.12	161.41	166.30
1	15167.54	Max WS	2yrwDetU.S.EX	204.59	161.41	165.05
1	15068.7*	Max WS	10yrwDetU.S.EX	453.51	161.32	165.53
1	15068.7*	Max WS	100yrwDetU.S.EX	822.30	161.32	165.97
1	15068.7*	Max WS	2yrwDetU.S.EX	204.60	161.32	164.90
1	14970.01	Max WS	10yrwDetU.S.EX	453.31	161.22	165.20
1	14970.01	Max WS	100yrwDetU.S.EX	822.26	161.22	165.64
1	14970.01	Max WS	2yrwDetU.S.EX	204.48	161.22	164.54

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	14800.08	Max WS	10yrwDetU.S.EX	452.64	160.07	164.59
1	14800.08	Max WS	100yrwDetU.S.EX	822.20	160.07	165.10
1	14800.08	Max WS	2yrwDetU.S.EX	204.46	160.07	163.76
1	14745.2*	Max WS	10yrwDetU.S.EX	452.28	160.00	164.41
1	14745.2*	Max WS	100yrwDetU.S.EX	822.28	160.00	164.93
1	14745.2*	Max WS	2yrwDetU.S.EX	204.40	160.00	163.65
1	14690.37	Max WS	10yrwDetU.S.EX	452.30	159.93	164.18
1	14690.37	Max WS	100yrwDetU.S.EX	821.23	159.93	164.70
1	14690.37	Max WS	2yrwDetU.S.EX	204.42	159.93	163.51
1	14521.03	Max WS	10yrwDetU.S.EX	452.39	159.74	163.67
1	14521.03	Max WS	100yrwDetU.S.EX	810.77	159.74	164.22
1	14521.03	Max WS	2yrwDetU.S.EX	204.27	159.74	163.16
1	14350.55	Max WS	10yrwDetU.S.EX	451.70	158.30	163.24
1	14350.55	Max WS	100yrwDetU.S.EX	805.77	158.30	163.92
1	14350.55	Max WS	2yrwDetU.S.EX	204.23	158.30	162.71
1	14165.39	Max WS	10yrwDetU.S.EX	462.55	159.11	162.64
1	14165.39	Max WS	100yrwDetU.S.EX	819.04	159.11	163.73
1	14165.39	Max WS	2yrwDetU.S.EX	210.25	159.11	161.81
1	14077.1*	Max WS	10yrwDetU.S.EX	469.20	158.60	162.38
1	14077.1*	Max WS	100yrwDetU.S.EX	848.35	158.60	163.66
1	14077.1*	Max WS	2yrwDetU.S.EX	212.39	158.60	161.48
1	13988.90	Max WS	10yrwDetU.S.EX	469.02	158.09	162.20
1	13988.90	Max WS	100yrwDetU.S.EX	847.95	158.09	163.62
1	13988.90	Max WS	2yrwDetU.S.EX	212.42	158.09	161.12
1	13971	Max WS	10yrwDetU.S.EX	468.99	158.18	162.07
1	13971	Max WS	100yrwDetU.S.EX	847.87	158.18	163.41
1	13971	Max WS	2yrwDetU.S.EX	212.42	158.18	161.15
1	13920			Culvert		
1	13869	Max WS	10yrwDetU.S.EX	468.99	158.18	161.56
1	13869	Max WS	100yrwDetU.S.EX	846.60	158.18	161.83
1	13869	Max WS	2yrwDetU.S.EX	212.42	158.18	160.99
1	13817.08	Max WS	10yrwDetU.S.EX	468.95	158.27	161.45
1	13817.08	Max WS	100yrwDetU.S.EX	847.87	158.27	162.04
1	13817.08	Max WS	2yrwDetU.S.EX	212.40	158.27	160.78
1	13800.26	Max WS	10yrwDetU.S.EX	468.70	157.92	161.31
1	13800.26	Max WS	100yrwDetU.S.EX	847.75	157.92	161.90
1	13800.26	Max WS	2yrwDetU.S.EX	212.40	157.92	160.64

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	13716.8*	Max WS	10yrwDetU.S.EX	468.35	157.68	160.95
1	13716.8*	Max WS	100yrwDetU.S.EX	847.56	157.68	161.48
1	13716.8*	Max WS	2yrwDetU.S.EX	212.36	157.68	160.33
1	13633.46	Max WS	10yrwDetU.S.EX	468.33	157.45	160.85
1	13633.46	Max WS	100yrwDetU.S.EX	847.66	157.45	161.40
1	13633.46	Max WS	2yrwDetU.S.EX	212.31	157.45	160.20
1	13548.2*	Max WS	10yrwDetU.S.EX	467.93	156.91	160.63
1	13548.2*	Max WS	100yrwDetU.S.EX	847.42	156.91	161.16
1	13548.2*	Max WS	2yrwDetU.S.EX	212.33	156.91	159.98
1	13462.94	Max WS	10yrwDetU.S.EX	467.56	156.37	160.38
1	13462.94	Max WS	100yrwDetU.S.EX	847.08	156.37	160.89
1	13462.94	Max WS	2yrwDetU.S.EX	212.29	156.37	159.74
1	13372.7*	Max WS	10yrwDetU.S.EX	467.09	155.87	160.11
1	13372.7*	Max WS	100yrwDetU.S.EX	846.63	155.87	160.65
1	13372.7*	Max WS	2yrwDetU.S.EX	211.97	155.87	159.48
1	13282.48	Max WS	10yrwDetU.S.EX	466.44	155.37	159.93
1	13282.48	Max WS	100yrwDetU.S.EX	846.68	155.37	160.52
1	13282.48	Max WS	2yrwDetU.S.EX	211.84	155.37	159.21
1	13196.7*	Max WS	10yrwDetU.S.EX	465.83	155.42	159.79
1	13196.7*	Max WS	100yrwDetU.S.EX	846.33	155.42	160.38
1	13196.7*	Max WS	2yrwDetU.S.EX	211.72	155.42	159.06
1	13110.9*	Max WS	10yrwDetU.S.EX	465.37	155.48	159.66
1	13110.9*	Max WS	100yrwDetU.S.EX	846.45	155.48	160.24
1	13110.9*	Max WS	2yrwDetU.S.EX	211.73	155.48	158.91
1	13025.20	Max WS	10yrwDetU.S.EX	465.41	155.53	159.42
1	13025.20	Max WS	100yrwDetU.S.EX	846.58	155.53	159.83
1	13025.20	Max WS	2yrwDetU.S.EX	211.66	155.53	158.68
1	12934.78	Max WS	10yrwDetU.S.EX	465.11	155.67	159.23
1	12934.78	Max WS	100yrwDetU.S.EX	846.72	155.67	159.48
1	12934.78	Max WS	2yrwDetU.S.EX	211.58	155.67	158.47
1	12679.83	Max WS	10yrwDetU.S.EX	466.33	154.84	158.00
1	12679.83	Max WS	100yrwDetU.S.EX	849.79	154.84	158.49
1	12679.83	Max WS	2yrwDetU.S.EX	211.95	154.84	157.36
1	12514.10	Max WS	10yrwDetU.S.EX	466.08	153.08	157.41
1	12514.10	Max WS	100yrwDetU.S.EX	849.71	153.08	157.94
1	12514.10	Max WS	2yrwDetU.S.EX	211.74	153.08	156.77
1	12342.49	Max WS	10yrwDetU.S.EX	465.85	153.74	157.05
1	12342.49	Max WS	100yrwDetU.S.EX	849.63	153.74	157.53
1	12342.49	Max WS	2yrwDetU.S.EX	211.65	153.74	156.39

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	12168.87	Max WS	10yrwDetU.S.EX	465.70	152.62	156.55
1	12168.87	Max WS	100yrwDetU.S.EX	849.56	152.62	157.05
1	12168.87	Max WS	2yrwDetU.S.EX	211.61	152.62	155.68
1	11993.01	Max WS	10yrwDetU.S.EX	464.15	152.46	156.01
1	11993.01	Max WS	100yrwDetU.S.EX	849.46	152.46	156.63
1	11993.01	Max WS	2yrwDetU.S.EX	211.54	152.46	154.97
1	11820.19	Max WS	10yrwDetU.S.EX	464.06	150.12	155.57
1	11820.19	Max WS	100yrwDetU.S.EX	849.59	150.12	156.08
1	11820.19	Max WS	2yrwDetU.S.EX	211.50	150.12	154.42
1	11633.47	Max WS	10yrwDetU.S.EX	472.44	151.10	154.80
1	11633.47	Max WS	100yrwDetU.S.EX	863.00	151.10	155.32
1	11633.47	Max WS	2yrwDetU.S.EX	216.57	151.10	153.65
1	11460.48	Max WS	10yrwDetU.S.EX	478.42	149.67	154.07
1	11460.48	Max WS	100yrwDetU.S.EX	879.45	149.67	154.75
1	11460.48	Max WS	2yrwDetU.S.EX	218.94	149.67	152.89
1	11271.33	Max WS	10yrwDetU.S.EX	477.98	147.60	153.58
1	11271.33	Max WS	100yrwDetU.S.EX	855.30	147.60	154.41
1	11271.33	Max WS	2yrwDetU.S.EX	218.91	147.60	152.45
1	11146.79	Max WS	10yrwDetU.S.EX	477.62	147.72	153.12
1	11146.79	Max WS	100yrwDetU.S.EX	880.51	147.72	153.74
1	11146.79	Max WS	2yrwDetU.S.EX	218.93	147.72	152.13
1	10961.29	Max WS	10yrwDetU.S.EX	476.66	149.08	152.58
1	10961.29	Max WS	100yrwDetU.S.EX	880.42	149.08	153.20
1	10961.29	Max WS	2yrwDetU.S.EX	218.93	149.08	151.52
1	10777.64	Max WS	10yrwDetU.S.EX	476.56	147.95	152.09
1	10777.64	Max WS	100yrwDetU.S.EX	880.04	147.95	152.60
1	10777.64	Max WS	2yrwDetU.S.EX	218.92	147.95	151.09
1	10599.75	Max WS	10yrwDetU.S.EX	475.76	147.94	151.42
1	10599.75	Max WS	100yrwDetU.S.EX	879.87	147.94	152.06
1	10599.75	Max WS	2yrwDetU.S.EX	218.96	147.94	150.67
1	10484.71	Max WS	10yrwDetU.S.EX	474.79	147.53	151.14
1	10484.71	Max WS	100yrwDetU.S.EX	879.65	147.53	151.82
1	10484.71	Max WS	2yrwDetU.S.EX	218.87	147.53	150.39
1	10294.85	Max WS	10yrwDetU.S.EX	474.43	146.18	150.68
1	10294.85	Max WS	100yrwDetU.S.EX	879.61	146.18	151.23
1	10294.85	Max WS	2yrwDetU.S.EX	218.86	146.18	149.84
1	10111.02	Max WS	10yrwDetU.S.EX	474.06	146.70	150.12
1	10111.02	Max WS	100yrwDetU.S.EX	881.28	146.70	150.78

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	10111.02	Max WS	2yrwDetU.S.EX	219.21	146.70	149.10
1	9962.423	Max WS	10yrwDetU.S.EX	472.71	144.81	149.11
1	9962.423	Max WS	100yrwDetU.S.EX	880.69	144.81	150.17
1	9962.423	Max WS	2yrwDetU.S.EX	219.22	144.81	147.82
1	9876	Max WS	10yrwDetU.S.EX	470.26	144.29	148.94
1	9876	Max WS	100yrwDetU.S.EX	880.46	144.29	149.76
1	9876	Max WS	2yrwDetU.S.EX	219.18	144.29	147.63
1	9825.00			Culvert		
1	9774	Max WS	10yrwDetU.S.EX	472.44	143.93	148.76
1	9774	Max WS	100yrwDetU.S.EX	880.32	143.93	149.14
1	9774	Max WS	2yrwDetU.S.EX	219.18	143.93	147.55
1	9553.901	Max WS	10yrwDetU.S.EX	473.07	143.12	148.33
1	9553.901	Max WS	100yrwDetU.S.EX	879.77	143.12	148.96
1	9553.901	Max WS	2yrwDetU.S.EX	219.12	143.12	147.12
1	9362.452	Max WS	10yrwDetU.S.EX	472.58	143.70	147.63
1	9362.452	Max WS	100yrwDetU.S.EX	878.68	143.70	148.41
1	9362.452	Max WS	2yrwDetU.S.EX	219.08	143.70	146.54
1	9149.788	Max WS	10yrwDetU.S.EX	472.06	141.77	147.36
1	9149.788	Max WS	100yrwDetU.S.EX	877.67	141.77	148.09
1	9149.788	Max WS	2yrwDetU.S.EX	219.08	141.77	146.28
1	8963.549	Max WS	10yrwDetU.S.EX	471.75	141.24	146.79
1	8963.549	Max WS	100yrwDetU.S.EX	877.74	141.24	147.55
1	8963.549	Max WS	2yrwDetU.S.EX	219.03	141.24	145.95
1	8766.435	Max WS	10yrwDetU.S.EX	471.23	142.65	146.08
1	8766.435	Max WS	100yrwDetU.S.EX	877.29	142.65	146.78
1	8766.435	Max WS	2yrwDetU.S.EX	219.05	142.65	145.22
1	8577.282	Max WS	10yrwDetU.S.EX	470.90	141.02	145.54
1	8577.282	Max WS	100yrwDetU.S.EX	876.12	141.02	146.26
1	8577.282	Max WS	2yrwDetU.S.EX	218.92	141.02	144.62
1	8398.577	Max WS	10yrwDetU.S.EX	470.45	141.01	145.24
1	8398.577	Max WS	100yrwDetU.S.EX	875.52	141.01	145.98
1	8398.577	Max WS	2yrwDetU.S.EX	218.83	141.01	144.21
1	8223.925	Max WS	10yrwDetU.S.EX	469.54	139.79	144.82
1	8223.925	Max WS	100yrwDetU.S.EX	875.17	139.79	145.51
1	8223.925	Max WS	2yrwDetU.S.EX	218.76	139.79	143.76
1	8000	Max WS	10yrwDetU.S.EX	483.98	139.29	144.42
1	8000	Max WS	100yrwDetU.S.EX	905.06	139.29	145.09
1	8000	Max WS	2yrwDetU.S.EX	223.06	139.29	143.38

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	7744.065	Max WS	10yrwDetU.S.EX	484.40	138.71	143.25
1	7744.065	Max WS	100yrwDetU.S.EX	906.65	138.71	143.93
1	7744.065	Max WS	2yrwDetU.S.EX	223.28	138.71	142.47
1	7600	Max WS	10yrwDetU.S.EX	483.91	138.31	142.86
1	7600	Max WS	100yrwDetU.S.EX	902.40	138.31	143.62
1	7600	Max WS	2yrwDetU.S.EX	223.37	138.31	141.97
1	7400	Max WS	10yrwDetU.S.EX	484.01	137.76	141.91
1	7400	Max WS	100yrwDetU.S.EX	909.47	137.76	142.66
1	7400	Max WS	2yrwDetU.S.EX	223.48	137.76	140.99
1	7200	Max WS	10yrwDetU.S.EX	483.34	137.20	141.09
1	7200	Max WS	100yrwDetU.S.EX	910.63	137.20	141.73
1	7200	Max WS	2yrwDetU.S.EX	223.59	137.20	140.23
1	7000	Max WS	10yrwDetU.S.EX	482.57	136.65	140.68
1	7000	Max WS	100yrwDetU.S.EX	911.65	136.65	141.14
1	7000	Max WS	2yrwDetU.S.EX	223.67	136.65	139.86
1	6800	Max WS	10yrwDetU.S.EX	482.87	136.09	140.49
1	6800	Max WS	100yrwDetU.S.EX	913.03	136.09	140.81
1	6800	Max WS	2yrwDetU.S.EX	223.75	136.09	139.59
1	6545.718	Max WS	10yrwDetU.S.EX	482.52	134.93	139.37
1	6545.718	Max WS	100yrwDetU.S.EX	912.05	134.93	139.96
1	6545.718	Max WS	2yrwDetU.S.EX	223.66	134.93	138.63
1	6400	Max WS	10yrwDetU.S.EX	483.20	135.02	138.93
1	6400	Max WS	100yrwDetU.S.EX	913.24	135.02	139.52
1	6400	Max WS	2yrwDetU.S.EX	223.97	135.02	138.25
1	6200	Max WS	10yrwDetU.S.EX	483.67	134.52	138.52
1	6200	Max WS	100yrwDetU.S.EX	914.84	134.52	139.14
1	6200	Max WS	2yrwDetU.S.EX	224.18	134.52	137.80
1	6000	Max WS	10yrwDetU.S.EX	483.72	134.02	138.11
1	6000	Max WS	100yrwDetU.S.EX	915.83	134.02	138.74
1	6000	Max WS	2yrwDetU.S.EX	224.39	134.02	137.37
1	5800	Max WS	10yrwDetU.S.EX	485.07	133.53	137.79
1	5800	Max WS	100yrwDetU.S.EX	918.59	133.53	138.32
1	5800	Max WS	2yrwDetU.S.EX	224.91	133.53	137.08
1	5544.024	Max WS	10yrwDetU.S.EX	485.59	132.89	137.01
1	5544.024	Max WS	100yrwDetU.S.EX	920.88	132.89	137.75
1	5544.024	Max WS	2yrwDetU.S.EX	225.21	132.89	136.14
1	5310.353	Max WS	10yrwDetU.S.EX	485.81	130.81	136.28
1	5310.353	Max WS	100yrwDetU.S.EX	921.26	130.81	136.96

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	5310.353	Max WS	2yrwDetU.S.EX	225.46	130.81	135.47
1	5126.186	Max WS	10yrwDetU.S.EX	485.88	131.42	136.00
1	5126.186	Max WS	100yrwDetU.S.EX	922.59	131.42	136.66
1	5126.186	Max WS	2yrwDetU.S.EX	225.74	131.42	135.28
1	4928.496	Max WS	10yrwDetU.S.EX	486.34	131.24	135.80
1	4928.496	Max WS	100yrwDetU.S.EX	923.63	131.24	136.46
1	4928.496	Max WS	2yrwDetU.S.EX	225.84	131.24	135.11
1	4737.846	Max WS	10yrwDetU.S.EX	487.20	130.80	135.42
1	4737.846	Max WS	100yrwDetU.S.EX	925.40	130.80	136.02
1	4737.846	Max WS	2yrwDetU.S.EX	225.99	130.80	134.84
1	4542.183	Max WS	10yrwDetU.S.EX	488.09	130.20	135.15
1	4542.183	Max WS	100yrwDetU.S.EX	927.27	130.20	135.66
1	4542.183	Max WS	2yrwDetU.S.EX	226.27	130.20	134.67
1	4437.102	Max WS	10yrwDetU.S.EX	488.35	131.50	134.82
1	4437.102	Max WS	100yrwDetU.S.EX	928.12	131.50	135.33
1	4437.102	Max WS	2yrwDetU.S.EX	226.39	131.50	134.27
1	4246.329	Max WS	10yrwDetU.S.EX	488.38	129.78	134.06
1	4246.329	Max WS	100yrwDetU.S.EX	929.44	129.78	134.71
1	4246.329	Max WS	2yrwDetU.S.EX	226.04	129.78	133.25
1	4063.200	Max WS	10yrwDetU.S.EX	488.00	129.05	133.52
1	4063.200	Max WS	100yrwDetU.S.EX	930.58	129.05	134.06
1	4063.200	Max WS	2yrwDetU.S.EX	224.41	129.05	132.80
1	3863.200	Max WS	10yrwDetU.S.EX	487.81	128.43	133.30
1	3863.200	Max WS	100yrwDetU.S.EX	932.10	128.43	133.75
1	3863.200	Max WS	2yrwDetU.S.EX	223.68	128.43	132.65
1	3682.022	Max WS	10yrwDetU.S.EX	488.14	127.89	133.19
1	3682.022	Max WS	100yrwDetU.S.EX	933.55	127.89	133.61
1	3682.022	Max WS	2yrwDetU.S.EX	223.74	127.89	132.46
1	3487.742	Max WS	10yrwDetU.S.EX	488.56	128.90	132.75
1	3487.742	Max WS	100yrwDetU.S.EX	935.62	128.90	133.22
1	3487.742	Max WS	2yrwDetU.S.EX	224.04	128.90	131.94
1	3332.982	Max WS	10yrwDetU.S.EX	489.04	129.37	132.36
1	3332.982	Max WS	100yrwDetU.S.EX	937.08	129.37	132.90
1	3332.982	Max WS	2yrwDetU.S.EX	224.30	129.37	131.50
1	3152.554	Max WS	10yrwDetU.S.EX	495.05	127.27	131.64
1	3152.554	Max WS	100yrwDetU.S.EX	966.78	127.27	132.22
1	3152.554	Max WS	2yrwDetU.S.EX	226.29	127.27	130.82
1	2960.781	Max WS	10yrwDetU.S.EX	495.72	128.00	130.93

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	2960.781	Max WS	100yrwDetU.S.EX	968.26	128.00	131.45
1	2960.781	Max WS	2yrwDetU.S.EX	226.56	128.00	130.42
1	2800	Max WS	10yrwDetU.S.EX	496.13	127.75	130.40
1	2800	Max WS	100yrwDetU.S.EX	969.61	127.75	130.98
1	2800	Max WS	2yrwDetU.S.EX	226.81	127.75	129.92
1	2600	Max WS	10yrwDetU.S.EX	496.58	127.22	129.89
1	2600	Max WS	100yrwDetU.S.EX	971.15	127.22	130.57
1	2600	Max WS	2yrwDetU.S.EX	227.03	127.22	129.19
1	2436.651	Max WS	10yrwDetU.S.EX	497.03	126.76	129.06
1	2436.651	Max WS	100yrwDetU.S.EX	972.19	126.76	129.70
1	2436.651	Max WS	2yrwDetU.S.EX	227.25	126.76	128.33
1	2200	Max WS	10yrwDetU.S.EX	497.38	125.72	128.01
1	2200	Max WS	100yrwDetU.S.EX	973.91	125.72	128.70
1	2200	Max WS	2yrwDetU.S.EX	227.54	125.72	127.28
1	1800	Max WS	10yrwDetU.S.EX	496.66	123.94	127.30
1	1800	Max WS	100yrwDetU.S.EX	973.28	123.94	128.10
1	1800	Max WS	2yrwDetU.S.EX	227.33	123.94	126.39
1	1508.765	Max WS	10yrwDetU.S.EX	496.17	122.64	126.49
1	1508.765	Max WS	100yrwDetU.S.EX	972.34	122.64	127.23
1	1508.765	Max WS	2yrwDetU.S.EX	227.26	122.64	125.69
1	1238.804	Max WS	10yrwDetU.S.EX	495.97	122.00	125.87
1	1238.804	Max WS	100yrwDetU.S.EX	971.72	122.00	126.57
1	1238.804	Max WS	2yrwDetU.S.EX	227.21	122.00	125.19
1	947.7714	Max WS	10yrwDetU.S.EX	495.85	122.00	125.12
1	947.7714	Max WS	100yrwDetU.S.EX	970.93	122.00	125.68
1	947.7714	Max WS	2yrwDetU.S.EX	227.16	122.00	124.65
1	703.7460	Max WS	10yrwDetU.S.EX	495.37	122.00	124.33
1	703.7460	Max WS	100yrwDetU.S.EX	969.77	122.00	125.04
1	703.7460	Max WS	2yrwDetU.S.EX	227.11	122.00	123.71
1	413.4701	Max WS	10yrwDetU.S.EX	495.21	120.00	123.29
1	413.4701	Max WS	100yrwDetU.S.EX	968.82	120.00	123.97
1	413.4701	Max WS	2yrwDetU.S.EX	227.05	120.00	122.63
1	200.9584	Max WS	10yrwDetU.S.EX	494.90	120.00	122.88
1	200.9584	Max WS	100yrwDetU.S.EX	968.35	120.00	123.47
1	200.9584	Max WS	2yrwDetU.S.EX	227.00	120.00	122.32
1	10.31402	Max WS	10yrwDetU.S.EX	494.87	120.00	122.47
1	10.31402	Max WS	100yrwDetU.S.EX	968.14	120.00	123.04
1	10.31402	Max WS	2yrwDetU.S.EX	226.96	120.00	121.93

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	28400	Max WS	100yrWithDet	155.13	220.00	221.34
1	28400	Max WS	10yrWithDet	76.95	220.00	221.05
1	28400	Max WS	2yrWithDet	48.79	220.00	220.93
1	28313.0*	Max WS	100yrWithDet	154.81	219.58	220.89
1	28313.0*	Max WS	10yrWithDet	76.94	219.58	220.63
1	28313.0*	Max WS	2yrWithDet	48.78	219.58	220.51
1	28226.0*	Max WS	100yrWithDet	153.83	219.15	220.43
1	28226.0*	Max WS	10yrWithDet	76.94	219.15	220.17
1	28226.0*	Max WS	2yrWithDet	48.77	219.15	220.04
1	28139.07	Max WS	100yrWithDet	151.62	218.73	220.15
1	28139.07	Max WS	10yrWithDet	76.93	218.73	219.85
1	28139.07	Max WS	2yrWithDet	48.76	218.73	219.69
1	28069.5*	Max WS	100yrWithDet	270.33	218.22	219.67
1	28069.5*	Max WS	10yrWithDet	141.00	218.22	219.41
1	28069.5*	Max WS	2yrWithDet	88.70	218.22	219.25
1	28000	Max WS	100yrWithDet	269.90	217.71	219.15
1	28000	Max WS	10yrWithDet	141.00	217.71	218.89
1	28000	Max WS	2yrWithDet	88.69	217.71	218.73
1	27900.*	Max WS	100yrWithDet	269.67	216.97	218.14
1	27900.*	Max WS	10yrWithDet	140.99	216.97	217.85
1	27900.*	Max WS	2yrWithDet	88.69	216.97	217.69
1	27800	Max WS	100yrWithDet	269.01	216.23	217.52
1	27800	Max WS	10yrWithDet	140.97	216.23	217.17
1	27800	Max WS	2yrWithDet	88.66	216.23	216.97
1	27700.*	Max WS	100yrWithDet	267.98	215.51	217.21
1	27700.*	Max WS	10yrWithDet	140.95	215.51	216.91
1	27700.*	Max WS	2yrWithDet	88.66	215.51	216.73
1	27600	Max WS	100yrWithDet	267.57	214.80	216.68
1	27600	Max WS	10yrWithDet	140.94	214.80	216.43
1	27600	Max WS	2yrWithDet	88.64	214.80	216.28
1	27500.*	Max WS	100yrWithDet	267.02	214.08	215.76
1	27500.*	Max WS	10yrWithDet	140.93	214.08	215.49
1	27500.*	Max WS	2yrWithDet	88.63	214.08	215.34
1	27400	Max WS	100yrWithDet	266.08	213.35	215.20
1	27400	Max WS	10yrWithDet	140.90	213.35	214.86
1	27400	Max WS	2yrWithDet	88.60	213.35	214.65
1	27329.7*	Max WS	100yrWithDet	265.52	212.84	214.97
1	27329.7*	Max WS	10yrWithDet	140.89	212.84	214.64
1	27329.7*	Max WS	2yrWithDet	88.59	212.84	214.40

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	27259.5*	Max WS	100yrWithDet	265.50	212.32	214.71
1	27259.5*	Max WS	10yrWithDet	140.89	212.32	214.31
1	27259.5*	Max WS	2yrWithDet	88.57	212.32	214.09
1	27189.29	Max WS	100yrWithDet	264.84	211.81	214.33
1	27189.29	Max WS	10yrWithDet	140.87	211.81	213.89
1	27189.29	Max WS	2yrWithDet	88.57	211.81	213.60
1	27094.6*	Max WS	100yrWithDet	264.67	211.10	213.52
1	27094.6*	Max WS	10yrWithDet	140.87	211.10	213.09
1	27094.6*	Max WS	2yrWithDet	88.56	211.10	212.79
1	27000	Max WS	100yrWithDet	264.11	210.39	212.86
1	27000	Max WS	10yrWithDet	140.86	210.39	212.44
1	27000	Max WS	2yrWithDet	88.55	210.39	212.16
1	26900.*	Max WS	100yrWithDet	264.00	209.64	212.29
1	26900.*	Max WS	10yrWithDet	140.85	209.64	211.93
1	26900.*	Max WS	2yrWithDet	88.55	209.64	211.71
1	26800	Max WS	100yrWithDet	263.41	208.88	211.68
1	26800	Max WS	10yrWithDet	140.85	208.88	211.26
1	26800	Max WS	2yrWithDet	88.54	208.88	211.01
1	26700.*	Max WS	100yrWithDet	263.37	208.12	210.87
1	26700.*	Max WS	10yrWithDet	140.84	208.12	210.53
1	26700.*	Max WS	2yrWithDet	88.52	208.12	210.18
1	26600	Max WS	100yrWithDet	262.54	207.37	210.38
1	26600	Max WS	10yrWithDet	140.73	207.37	210.07
1	26600	Max WS	2yrWithDet	88.50	207.37	209.68
1	26528.4*	Max WS	100yrWithDet	261.49	206.83	210.15
1	26528.4*	Max WS	10yrWithDet	140.68	206.83	209.84
1	26528.4*	Max WS	2yrWithDet	88.47	206.83	209.42
1	26456.8*	Max WS	100yrWithDet	260.99	206.29	209.97
1	26456.8*	Max WS	10yrWithDet	140.57	206.29	209.56
1	26456.8*	Max WS	2yrWithDet	88.47	206.29	209.11
1	26385.31	Max WS	100yrWithDet	260.24	205.75	209.44
1	26385.31	Max WS	10yrWithDet	140.56	205.75	208.98
1	26385.31	Max WS	2yrWithDet	88.45	205.75	208.53
1	26292.6*	Max WS	100yrWithDet	259.70	205.40	208.40
1	26292.6*	Max WS	10yrWithDet	140.55	205.40	207.96
1	26292.6*	Max WS	2yrWithDet	88.45	205.40	207.54
1	26200	Max WS	100yrWithDet	259.38	205.06	207.51
1	26200	Max WS	10yrWithDet	140.54	205.06	207.10

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	26200	Max WS	2yrWithDet	88.44	205.06	206.80
1	26100.*	Max WS	100yrWithDet	258.95	204.69	206.87
1	26100.*	Max WS	10yrWithDet	140.53	204.69	206.47
1	26100.*	Max WS	2yrWithDet	88.44	204.69	206.20
1	26000	Max WS	100yrWithDet	258.20	204.32	206.47
1	26000	Max WS	10yrWithDet	140.52	204.32	206.06
1	26000	Max WS	2yrWithDet	88.42	204.32	205.80
1	25900.*	Max WS	100yrWithDet	257.79	203.95	206.13
1	25900.*	Max WS	10yrWithDet	140.51	203.95	205.74
1	25900.*	Max WS	2yrWithDet	88.40	203.95	205.49
1	25800	Max WS	100yrWithDet	257.52	203.57	205.82
1	25800	Max WS	10yrWithDet	140.47	203.57	205.47
1	25800	Max WS	2yrWithDet	88.40	203.57	205.24
1	25700.*	Max WS	100yrWithDet	309.46	203.20	205.40
1	25700.*	Max WS	10yrWithDet	174.33	203.20	205.08
1	25700.*	Max WS	2yrWithDet	109.66	203.20	204.88
1	25600	Max WS	100yrWithDet	308.16	202.83	205.16
1	25600	Max WS	10yrWithDet	174.28	202.83	204.83
1	25600	Max WS	2yrWithDet	109.61	202.83	204.64
1	25500.*	Max WS	100yrWithDet	454.30	202.46	204.78
1	25500.*	Max WS	10yrWithDet	245.75	202.46	204.45
1	25500.*	Max WS	2yrWithDet	155.57	202.46	204.25
1	25400	Max WS	100yrWithDet	453.87	202.09	204.46
1	25400	Max WS	10yrWithDet	245.70	202.09	204.13
1	25400	Max WS	2yrWithDet	155.56	202.09	203.94
1	25358.8*	Max WS	100yrWithDet	453.14	202.00	204.33
1	25358.8*	Max WS	10yrWithDet	245.69	202.00	204.01
1	25358.8*	Max WS	2yrWithDet	155.55	202.00	203.83
1	25317.6*	Max WS	100yrWithDet	453.07	201.92	204.17
1	25317.6*	Max WS	10yrWithDet	245.68	201.92	203.85
1	25317.6*	Max WS	2yrWithDet	155.55	201.92	203.68
1	25276.3*	Max WS	100yrWithDet	452.95	201.83	203.99
1	25276.3*	Max WS	10yrWithDet	245.67	201.83	203.67
1	25276.3*	Max WS	2yrWithDet	101.23	201.83	203.56
1	25235.1*	Max WS	100yrWithDet	452.80	201.75	203.79
1	25235.1*	Max WS	10yrWithDet	102.29	201.75	203.54
1	25235.1*	Max WS	2yrWithDet	100.06	201.75	203.52
1	25193.99	Max WS	100yrWithDet	452.64	201.66	203.60

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	25193.99	Max WS	10yrWithDet	245.67	201.66	203.30
1	25193.99	Max WS	2yrWithDet	155.55	201.66	203.17
1	25145.4*	Max WS	100yrWithDet	452.33	201.36	203.30
1	25145.4*	Max WS	10yrWithDet	245.66	201.36	203.01
1	25145.4*	Max WS	2yrWithDet	155.54	201.36	202.81
1	25097.*	Max WS	100yrWithDet	452.25	201.05	202.90
1	25097.*	Max WS	10yrWithDet	245.65	201.05	202.59
1	25097.*	Max WS	2yrWithDet	155.54	201.05	202.36
1	25048.5*	Max WS	100yrWithDet	451.47	200.75	202.60
1	25048.5*	Max WS	10yrWithDet	245.62	200.75	202.22
1	25048.5*	Max WS	2yrWithDet	155.53	200.75	201.97
1	25000	Max WS	100yrWithDet	451.32	200.45	202.48
1	25000	Max WS	10yrWithDet	245.61	200.45	202.06
1	25000	Max WS	2yrWithDet	155.53	200.45	201.79
1	24900.*	Max WS	100yrWithDet	450.84	200.04	202.26
1	24900.*	Max WS	10yrWithDet	245.56	200.04	201.82
1	24900.*	Max WS	2yrWithDet	155.51	200.04	201.54
1	24800	Max WS	100yrWithDet	450.32	199.63	201.89
1	24800	Max WS	10yrWithDet	245.55	199.63	201.45
1	24800	Max WS	2yrWithDet	155.47	199.63	201.22
1	24700.*	Max WS	100yrWithDet	450.18	199.20	201.27
1	24700.*	Max WS	10yrWithDet	245.52	199.20	201.00
1	24700.*	Max WS	2yrWithDet	155.47	199.20	200.76
1	24600	Max WS	100yrWithDet	449.64	198.77	200.61
1	24600	Max WS	10yrWithDet	245.49	198.77	200.35
1	24600	Max WS	2yrWithDet	155.35	198.77	200.14
1	24500.*	Max WS	100yrWithDet	449.32	198.34	200.07
1	24500.*	Max WS	10yrWithDet	198.52	198.34	199.82
1	24500.*	Max WS	2yrWithDet	154.75	198.34	199.73
1	24400	Max WS	100yrWithDet	448.88	197.91	199.84
1	24400	Max WS	10yrWithDet	191.08	197.91	199.73
1	24400	Max WS	2yrWithDet	154.52	197.91	199.64
1	24328.0*	Max WS	100yrWithDet	448.76	197.60	199.78
1	24328.0*	Max WS	10yrWithDet	184.84	197.60	199.71
1	24328.0*	Max WS	2yrWithDet	154.50	197.60	199.63
1	24256.1*	Max WS	100yrWithDet	180.41	197.29	199.71
1	24256.1*	Max WS	10yrWithDet	178.23	197.29	199.70
1	24256.1*	Max WS	2yrWithDet	154.47	197.29	199.60

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	24184.18	Max WS	100yrWithDet	448.50	196.98	199.33
1	24184.18	Max WS	10yrWithDet	282.21	196.98	199.20
1	24184.18	Max WS	2yrWithDet	154.45	196.98	199.06
1	24092.0*	Max WS	100yrWithDet	447.69	196.51	198.95
1	24092.0*	Max WS	10yrWithDet	245.45	196.51	198.56
1	24092.0*	Max WS	2yrWithDet	154.43	196.51	198.39
1	24000	Max WS	100yrWithDet	447.44	196.03	198.46
1	24000	Max WS	10yrWithDet	245.43	196.03	198.16
1	24000	Max WS	2yrWithDet	154.41	196.03	197.93
1	23900.*	Max WS	100yrWithDet	446.90	195.51	197.84
1	23900.*	Max WS	10yrWithDet	245.41	195.51	197.55
1	23900.*	Max WS	2yrWithDet	154.40	195.51	197.32
1	23800	Max WS	100yrWithDet	446.27	194.99	197.41
1	23800	Max WS	10yrWithDet	245.39	194.99	197.08
1	23800	Max WS	2yrWithDet	154.38	194.99	196.88
1	23700.*	Max WS	100yrWithDet	446.17	194.47	196.97
1	23700.*	Max WS	10yrWithDet	245.37	194.47	196.74
1	23700.*	Max WS	2yrWithDet	126.35	194.47	196.60
1	23600	Max WS	100yrWithDet	445.44	193.95	196.39
1	23600	Max WS	10yrWithDet	245.35	193.95	196.09
1	23600	Max WS	2yrWithDet	154.38	193.95	195.94
1	23400	Max WS	100yrWithDet	443.91	192.92	195.71
1	23400	Max WS	10yrWithDet	245.32	192.92	195.31
1	23400	Max WS	2yrWithDet	154.08	192.92	195.15
1	23178.25	Max WS	100yrWithDet	443.09	191.76	195.14
1	23178.25	Max WS	10yrWithDet	245.24	191.76	194.70
1	23178.25	Max WS	2yrWithDet	154.04	191.76	194.31
1	23000	Max WS	100yrWithDet	442.77	191.25	194.40
1	23000	Max WS	10yrWithDet	245.20	191.25	193.91
1	23000	Max WS	2yrWithDet	153.92	191.25	193.47
1	22600	Max WS	100yrWithDet	573.52	190.00	192.98
1	22600	Max WS	10yrWithDet	327.50	190.00	192.52
1	22600	Max WS	2yrWithDet	206.67	190.00	192.15
1	22400	Max WS	100yrWithDet	572.43	189.54	192.67
1	22400	Max WS	10yrWithDet	327.33	189.54	192.25
1	22400	Max WS	2yrWithDet	206.47	189.54	191.87
1	22175.79	Max WS	100yrWithDet	571.53	188.90	191.83
1	22175.79	Max WS	10yrWithDet	327.25	188.90	191.35
1	22175.79	Max WS	2yrWithDet	206.42	188.90	191.01

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	22000	Max WS	100yrWithDet	571.21	188.07	191.15
1	22000	Max WS	10yrWithDet	327.20	188.07	190.64
1	22000	Max WS	2yrWithDet	206.25	188.07	190.27
1	21900.*	Max WS	100yrWithDet	641.84	187.59	190.81
1	21900.*	Max WS	10yrWithDet	374.23	187.59	190.30
1	21900.*	Max WS	2yrWithDet	235.98	187.59	189.92
1	21800	Max WS	100yrWithDet	641.77	187.11	190.62
1	21800	Max WS	10yrWithDet	374.14	187.11	190.07
1	21800	Max WS	2yrWithDet	235.91	187.11	189.66
1	21600	Max WS	100yrWithDet	641.02	186.14	189.58
1	21600	Max WS	10yrWithDet	374.11	186.14	189.07
1	21600	Max WS	2yrWithDet	235.90	186.14	188.71
1	21400	Max WS	100yrWithDet	639.97	185.21	188.93
1	21400	Max WS	10yrWithDet	374.08	185.21	188.47
1	21400	Max WS	2yrWithDet	235.51	185.21	188.13
1	21176.29	Max WS	100yrWithDet	638.28	184.07	188.26
1	21176.29	Max WS	10yrWithDet	284.83	184.07	187.93
1	21176.29	Max WS	2yrWithDet	235.37	184.07	187.75
1	20962.10	Max WS	100yrWithDet	637.76	184.10	187.64
1	20962.10	Max WS	10yrWithDet	373.47	184.10	187.16
1	20962.10	Max WS	2yrWithDet	235.23	184.10	186.83
1	20921.9*	Max WS	100yrWithDet	672.12	184.01	187.52
1	20921.9*	Max WS	10yrWithDet	395.37	184.01	187.04
1	20921.9*	Max WS	2yrWithDet	245.38	184.01	186.72
1	20881.8*	Max WS	100yrWithDet	672.10	183.92	187.43
1	20881.8*	Max WS	10yrWithDet	395.35	183.92	186.94
1	20881.8*	Max WS	2yrWithDet	245.37	183.92	186.64
1	20841.7*	Max WS	100yrWithDet	672.06	183.83	187.33
1	20841.7*	Max WS	10yrWithDet	395.34	183.83	186.85
1	20841.7*	Max WS	2yrWithDet	245.31	183.83	186.56
1	20801.6*	Max WS	100yrWithDet	672.02	183.74	187.23
1	20801.6*	Max WS	10yrWithDet	395.23	183.74	186.74
1	20801.6*	Max WS	2yrWithDet	245.20	183.74	186.47
1	20761.52	Max WS	100yrWithDet	672.00	183.65	187.07
1	20761.52	Max WS	10yrWithDet	394.78	183.65	186.51
1	20761.52	Max WS	2yrWithDet	244.40	183.65	186.18
1	20712.0*	Max WS	100yrWithDet	699.80	182.57	186.67
1	20712.0*	Max WS	10yrWithDet	407.64	182.57	186.07

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	20712.0*	Max WS	2yrWithDet	250.79	182.57	185.60
1	20662.66	Max WS	100yrWithDet	699.15	181.49	186.42
1	20662.66	Max WS	10yrWithDet	407.63	181.49	185.69
1	20662.66	Max WS	2yrWithDet	221.83	181.49	185.40
1	20655.8*	Max WS	100yrWithDet	699.15	181.50	186.37
1	20655.8*	Max WS	10yrWithDet	407.64	181.50	185.65
1	20655.8*	Max WS	2yrWithDet	221.77	181.50	185.37
1	20648.9*	Max WS	100yrWithDet	699.16	181.52	186.32
1	20648.9*	Max WS	10yrWithDet	407.65	181.52	185.60
1	20648.9*	Max WS	2yrWithDet	221.71	181.52	185.33
1	20642.13	Max WS	100yrWithDet	698.38	181.53	185.60
1	20642.13	Max WS	10yrWithDet	407.66	181.53	185.40
1	20642.13	Max WS	2yrWithDet	221.65	181.53	185.28
1	20614.23	Max WS	100yrWithDet	698.47	180.88	185.84
1	20614.23	Max WS	10yrWithDet	407.72	180.88	185.48
1	20614.23	Max WS	2yrWithDet	220.96	180.88	185.31
1	20399.06	Max WS	100yrWithDet	696.24	181.78	185.33
1	20399.06	Max WS	10yrWithDet	346.84	181.78	185.12
1	20399.06	Max WS	2yrWithDet	250.75	181.78	184.97
1	20131.75	Max WS	100yrWithDet	691.09	180.89	184.68
1	20131.75	Max WS	10yrWithDet	408.41	180.89	184.04
1	20131.75	Max WS	2yrWithDet	251.00	180.89	183.65
1	19831.49	Max WS	100yrWithDet	690.28	179.01	182.91
1	19831.49	Max WS	10yrWithDet	408.46	179.01	182.18
1	19831.49	Max WS	2yrWithDet	250.90	179.01	181.62
1	19561.71	Max WS	100yrWithDet	709.20	176.06	181.73
1	19561.71	Max WS	10yrWithDet	415.91	176.06	181.32
1	19561.71	Max WS	2yrWithDet	252.93	176.06	180.87
1	19375.20	Max WS	100yrWithDet	708.69	173.23	181.53
1	19375.20	Max WS	10yrWithDet	415.86	173.23	181.23
1	19375.20	Max WS	2yrWithDet	252.98	173.23	180.82
1	19216.24	Max WS	100yrWithDet	708.11	176.81	181.29
1	19216.24	Max WS	10yrWithDet	415.82	176.81	181.10
1	19216.24	Max WS	2yrWithDet	252.70	176.81	180.67
1	19040.62	Max WS	100yrWithDet	707.47	176.76	180.97
1	19040.62	Max WS	10yrWithDet	415.82	176.76	180.64
1	19040.62	Max WS	2yrWithDet	252.41	176.76	180.19
1	18997.3*	Max WS	100yrWithDet	707.47	176.80	180.91

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	18997.3*	Max WS	10yrWithDet	415.75	176.80	180.45
1	18997.3*	Max WS	2yrWithDet	252.40	176.80	180.06
1	18953.9*	Max WS	100yrWithDet	707.46	176.83	180.82
1	18953.9*	Max WS	10yrWithDet	415.78	176.83	180.41
1	18953.9*	Max WS	2yrWithDet	252.33	176.83	179.93
1	18910.6*	Max WS	100yrWithDet	707.45	176.87	180.72
1	18910.6*	Max WS	10yrWithDet	415.79	176.87	180.30
1	18910.6*	Max WS	2yrWithDet	252.38	176.87	179.79
1	18867.36	Max WS	100yrWithDet	707.10	176.91	180.42
1	18867.36	Max WS	10yrWithDet	415.78	176.91	179.98
1	18867.36	Max WS	2yrWithDet	252.38	176.91	179.60
1	18661.93	Max WS	100yrWithDet	705.43	175.46	179.56
1	18661.93	Max WS	10yrWithDet	415.56	175.46	179.11
1	18661.93	Max WS	2yrWithDet	238.29	175.46	178.60
1	18573.2*	Max WS	100yrWithDet	713.67	174.86	179.26
1	18573.2*	Max WS	10yrWithDet	421.73	174.86	178.76
1	18573.2*	Max WS	2yrWithDet	254.65	174.86	178.07
1	18484.66	Max WS	100yrWithDet	712.06	174.25	178.88
1	18484.66	Max WS	10yrWithDet	421.48	174.25	178.26
1	18484.66	Max WS	2yrWithDet	254.68	174.25	177.55
1	18313.08	Max WS	100yrWithDet	710.70	174.93	178.57
1	18313.08	Max WS	10yrWithDet	421.61	174.93	177.53
1	18313.08	Max WS	2yrWithDet	254.69	174.93	176.76
1	18226	Max WS	100yrWithDet	710.62	173.87	178.18
1	18226	Max WS	10yrWithDet	421.57	173.87	177.20
1	18226	Max WS	2yrWithDet	254.67	173.87	176.51
1	18175			Culvert		
1	18123	Max WS	100yrWithDet	710.06	173.46	177.13
1	18123	Max WS	10yrWithDet	421.57	173.46	176.80
1	18123	Max WS	2yrWithDet	254.66	173.46	176.29
1	17964.88	Max WS	100yrWithDet	710.48	172.77	176.44
1	17964.88	Max WS	10yrWithDet	421.54	172.77	176.04
1	17964.88	Max WS	2yrWithDet	254.65	172.77	175.62
1	17929.0*	Max WS	100yrWithDet	710.54	172.49	176.24
1	17929.0*	Max WS	10yrWithDet	421.61	172.49	175.85
1	17929.0*	Max WS	2yrWithDet	254.69	172.49	175.49
1	17893.2*	Max WS	100yrWithDet	710.49	172.22	176.05
1	17893.2*	Max WS	10yrWithDet	421.65	172.22	175.69

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	17893.2*	Max WS	2yrWithDet	254.71	172.22	175.35
1	17857.44	Max WS	100yrWithDet	710.62	171.94	175.77
1	17857.44	Max WS	10yrWithDet	421.72	171.94	175.44
1	17857.44	Max WS	2yrWithDet	254.72	171.94	175.14
1	17638.59	Max WS	100yrWithDet	710.93	171.98	174.80
1	17638.59	Max WS	10yrWithDet	422.03	171.98	174.50
1	17638.59	Max WS	2yrWithDet	254.40	171.98	174.25
1	17570.8*	Max WS	100yrWithDet	711.09	171.69	174.56
1	17570.8*	Max WS	10yrWithDet	422.11	171.69	174.22
1	17570.8*	Max WS	2yrWithDet	254.44	171.69	173.94
1	17503.0*	Max WS	100yrWithDet	711.10	171.40	174.12
1	17503.0*	Max WS	10yrWithDet	422.22	171.40	173.79
1	17503.0*	Max WS	2yrWithDet	254.41	171.40	173.52
1	17435.23	Max WS	100yrWithDet	711.20	171.11	173.85
1	17435.23	Max WS	10yrWithDet	422.33	171.11	173.56
1	17435.23	Max WS	2yrWithDet	254.36	171.11	173.30
1	17347.3*	Max WS	100yrWithDet	711.23	170.31	173.49
1	17347.3*	Max WS	10yrWithDet	359.84	170.31	173.38
1	17347.3*	Max WS	2yrWithDet	254.29	170.31	173.09
1	17259.39	Max WS	100yrWithDet	711.17	169.51	173.18
1	17259.39	Max WS	10yrWithDet	422.70	169.51	172.90
1	17259.39	Max WS	2yrWithDet	254.22	169.51	172.52
1	17161.6*	Max WS	100yrWithDet	710.99	169.43	172.80
1	17161.6*	Max WS	10yrWithDet	422.77	169.43	172.40
1	17161.6*	Max WS	2yrWithDet	254.23	169.43	171.91
1	17063.83	Max WS	100yrWithDet	711.20	169.35	172.40
1	17063.83	Max WS	10yrWithDet	422.92	169.35	171.90
1	17063.83	Max WS	2yrWithDet	254.28	169.35	171.42
1	17016.0*	Max WS	100yrWithDet	711.27	168.83	172.19
1	17016.0*	Max WS	10yrWithDet	422.97	168.83	171.67
1	17016.0*	Max WS	2yrWithDet	254.30	168.83	171.21
1	16968.2*	Max WS	100yrWithDet	711.37	168.30	172.02
1	16968.2*	Max WS	10yrWithDet	423.07	168.30	171.49
1	16968.2*	Max WS	2yrWithDet	254.33	168.30	171.05
1	16920.4*	Max WS	100yrWithDet	711.50	167.78	171.85
1	16920.4*	Max WS	10yrWithDet	423.15	167.78	171.32
1	16920.4*	Max WS	2yrWithDet	254.36	167.78	170.89
1	16872.70	Max WS	100yrWithDet	711.12	167.26	171.65

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	16872.70	Max WS	10yrWithDet	423.24	167.26	171.11
1	16872.70	Max WS	2yrWithDet	254.36	167.26	170.71
1	16822.9*	Max WS	100yrWithDet	763.64	167.36	171.35
1	16822.9*	Max WS	10yrWithDet	434.74	167.36	170.89
1	16822.9*	Max WS	2yrWithDet	259.53	167.36	170.54
1	16773.1*	Max WS	100yrWithDet	763.73	167.46	171.14
1	16773.1*	Max WS	10yrWithDet	434.82	167.46	170.70
1	16773.1*	Max WS	2yrWithDet	259.56	167.46	170.37
1	16723.4*	Max WS	100yrWithDet	763.69	167.57	170.94
1	16723.4*	Max WS	10yrWithDet	434.91	167.57	170.54
1	16723.4*	Max WS	2yrWithDet	259.56	167.57	170.24
1	16673.66	Max WS	100yrWithDet	763.86	167.67	170.77
1	16673.66	Max WS	10yrWithDet	434.99	167.67	170.40
1	16673.66	Max WS	2yrWithDet	259.59	167.67	170.13
1	16606.6*	Max WS	100yrWithDet	764.02	167.56	170.49
1	16606.6*	Max WS	10yrWithDet	435.07	167.56	170.12
1	16606.6*	Max WS	2yrWithDet	259.63	167.56	169.83
1	16539.5*	Max WS	100yrWithDet	763.84	167.45	170.16
1	16539.5*	Max WS	10yrWithDet	435.13	167.45	169.74
1	16539.5*	Max WS	2yrWithDet	259.64	167.45	169.43
1	16472.50	Max WS	100yrWithDet	763.47	167.34	169.94
1	16472.50	Max WS	10yrWithDet	435.23	167.34	169.51
1	16472.50	Max WS	2yrWithDet	259.63	167.34	169.20
1	16374.4*	Max WS	100yrWithDet	772.74	166.82	169.68
1	16374.4*	Max WS	10yrWithDet	439.91	166.82	169.27
1	16374.4*	Max WS	2yrWithDet	261.08	166.82	168.98
1	16276.30	Max WS	100yrWithDet	772.06	166.31	169.27
1	16276.30	Max WS	10yrWithDet	320.81	166.31	168.90
1	16276.30	Max WS	2yrWithDet	261.12	166.31	168.73
1	16193.9*	Max WS	100yrWithDet	771.10	165.53	169.12
1	16193.9*	Max WS	10yrWithDet	440.02	165.53	168.59
1	16193.9*	Max WS	2yrWithDet	259.38	165.53	168.22
1	16111.50	Max WS	100yrWithDet	771.10	164.75	169.05
1	16111.50	Max WS	10yrWithDet	439.94	164.75	168.47
1	16111.50	Max WS	2yrWithDet	258.97	164.75	168.02
1	16044.4*	Max WS	100yrWithDet	771.03	164.60	168.97
1	16044.4*	Max WS	10yrWithDet	439.99	164.60	168.37
1	16044.4*	Max WS	2yrWithDet	258.50	164.60	167.91

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	15977.4*	Max WS	100yrWithDet	770.38	164.46	168.88
1	15977.4*	Max WS	10yrWithDet	440.02	164.46	168.24
1	15977.4*	Max WS	2yrWithDet	258.17	164.46	167.74
1	15910.45	Max WS	100yrWithDet	770.47	164.31	168.79
1	15910.45	Max WS	10yrWithDet	440.02	164.31	168.04
1	15910.45	Max WS	2yrWithDet	263.83	164.31	167.47
1	15816.4*	Max WS	100yrWithDet	770.67	163.77	168.44
1	15816.4*	Max WS	10yrWithDet	429.65	163.77	167.64
1	15816.4*	Max WS	2yrWithDet	263.44	163.77	167.10
1	15722.50	Max WS	100yrWithDet	770.69	163.23	167.26
1	15722.50	Max WS	10yrWithDet	440.27	163.23	166.89
1	15722.50	Max WS	2yrWithDet	262.97	163.23	166.42
1	15661.2*	Max WS	100yrWithDet	770.29	163.03	167.13
1	15661.2*	Max WS	10yrWithDet	440.19	163.03	166.67
1	15661.2*	Max WS	2yrWithDet	261.31	163.03	166.24
1	15600	Max WS	100yrWithDet	770.48	162.83	167.06
1	15600	Max WS	10yrWithDet	440.12	162.83	166.60
1	15600	Max WS	2yrWithDet	261.25	162.83	166.16
1	15513.5*	Max WS	100yrWithDet	770.61	162.55	166.96
1	15513.5*	Max WS	10yrWithDet	440.19	162.55	166.51
1	15513.5*	Max WS	2yrWithDet	261.18	162.55	166.06
1	15427.0*	Max WS	100yrWithDet	770.70	162.26	166.86
1	15427.0*	Max WS	10yrWithDet	440.12	162.26	166.42
1	15427.0*	Max WS	2yrWithDet	261.20	162.26	165.94
1	15340.5*	Max WS	100yrWithDet	770.76	161.98	166.75
1	15340.5*	Max WS	10yrWithDet	440.19	161.98	166.31
1	15340.5*	Max WS	2yrWithDet	261.14	161.98	165.78
1	15254.0*	Max WS	100yrWithDet	777.14	161.69	166.61
1	15254.0*	Max WS	10yrWithDet	443.03	161.69	166.16
1	15254.0*	Max WS	2yrWithDet	261.95	161.69	165.56
1	15167.54	Max WS	100yrWithDet	777.28	161.41	166.26
1	15167.54	Max WS	10yrWithDet	443.03	161.41	165.84
1	15167.54	Max WS	2yrWithDet	261.98	161.41	165.28
1	15068.7*	Max WS	100yrWithDet	777.43	161.32	165.94
1	15068.7*	Max WS	10yrWithDet	443.07	161.32	165.51
1	15068.7*	Max WS	2yrWithDet	261.96	161.32	165.08
1	14970.01	Max WS	100yrWithDet	777.44	161.22	165.59
1	14970.01	Max WS	10yrWithDet	443.18	161.22	165.18
1	14970.01	Max WS	2yrWithDet	261.93	161.22	164.79

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	14800.08	Max WS	100yrWithDet	776.78	160.07	165.05
1	14800.08	Max WS	10yrWithDet	443.18	160.07	164.57
1	14800.08	Max WS	2yrWithDet	261.93	160.07	164.06
1	14745.2*	Max WS	100yrWithDet	776.91	160.00	164.88
1	14745.2*	Max WS	10yrWithDet	443.15	160.00	164.39
1	14745.2*	Max WS	2yrWithDet	261.91	160.00	163.89
1	14690.37	Max WS	100yrWithDet	776.27	159.93	164.65
1	14690.37	Max WS	10yrWithDet	443.22	159.93	164.17
1	14690.37	Max WS	2yrWithDet	261.93	159.93	163.74
1	14521.03	Max WS	100yrWithDet	768.76	159.74	164.14
1	14521.03	Max WS	10yrWithDet	443.44	159.74	163.66
1	14521.03	Max WS	2yrWithDet	261.96	159.74	163.32
1	14350.55	Max WS	100yrWithDet	764.18	158.30	163.81
1	14350.55	Max WS	10yrWithDet	441.38	158.30	163.23
1	14350.55	Max WS	2yrWithDet	261.85	158.30	162.91
1	14165.39	Max WS	100yrWithDet	776.10	159.11	163.59
1	14165.39	Max WS	10yrWithDet	455.06	159.11	162.63
1	14165.39	Max WS	2yrWithDet	268.29	159.11	162.10
1	14077.1*	Max WS	100yrWithDet	806.19	158.60	163.50
1	14077.1*	Max WS	10yrWithDet	461.76	158.60	162.36
1	14077.1*	Max WS	2yrWithDet	270.38	158.60	161.80
1	13988.90	Max WS	100yrWithDet	806.21	158.09	163.46
1	13988.90	Max WS	10yrWithDet	461.79	158.09	162.17
1	13988.90	Max WS	2yrWithDet	270.38	158.09	161.42
1	13971	Max WS	100yrWithDet	806.19	158.18	163.24
1	13971	Max WS	10yrWithDet	461.77	158.18	162.05
1	13971	Max WS	2yrWithDet	270.38	158.18	161.42
1	13920			Culvert		
1	13869	Max WS	100yrWithDet	805.85	158.18	161.82
1	13869	Max WS	10yrWithDet	461.74	158.18	161.55
1	13869	Max WS	2yrWithDet	270.38	158.18	161.20
1	13817.08	Max WS	100yrWithDet	806.18	158.27	161.99
1	13817.08	Max WS	10yrWithDet	461.74	158.27	161.44
1	13817.08	Max WS	2yrWithDet	270.34	158.27	160.97
1	13800.26	Max WS	100yrWithDet	806.16	157.92	161.84
1	13800.26	Max WS	10yrWithDet	461.67	157.92	161.30
1	13800.26	Max WS	2yrWithDet	270.34	157.92	160.85

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	13716.8*	Max WS	100yrWithDet	806.06	157.68	161.43
1	13716.8*	Max WS	10yrWithDet	461.62	157.68	160.94
1	13716.8*	Max WS	2yrWithDet	270.27	157.68	160.53
1	13633.46	Max WS	100yrWithDet	806.14	157.45	161.35
1	13633.46	Max WS	10yrWithDet	461.66	157.45	160.84
1	13633.46	Max WS	2yrWithDet	270.27	157.45	160.41
1	13548.2*	Max WS	100yrWithDet	805.91	156.91	161.11
1	13548.2*	Max WS	10yrWithDet	461.60	156.91	160.62
1	13548.2*	Max WS	2yrWithDet	270.19	156.91	160.16
1	13462.94	Max WS	100yrWithDet	805.59	156.37	160.84
1	13462.94	Max WS	10yrWithDet	461.56	156.37	160.36
1	13462.94	Max WS	2yrWithDet	270.09	156.37	159.93
1	13372.7*	Max WS	100yrWithDet	805.13	155.87	160.60
1	13372.7*	Max WS	10yrWithDet	461.50	155.87	160.09
1	13372.7*	Max WS	2yrWithDet	269.95	155.87	159.72
1	13282.48	Max WS	100yrWithDet	804.62	155.37	160.46
1	13282.48	Max WS	10yrWithDet	461.55	155.37	159.91
1	13282.48	Max WS	2yrWithDet	269.81	155.37	159.45
1	13196.7*	Max WS	100yrWithDet	804.73	155.42	160.33
1	13196.7*	Max WS	10yrWithDet	461.49	155.42	159.76
1	13196.7*	Max WS	2yrWithDet	269.72	155.42	159.30
1	13110.9*	Max WS	100yrWithDet	804.79	155.48	160.18
1	13110.9*	Max WS	10yrWithDet	461.55	155.48	159.62
1	13110.9*	Max WS	2yrWithDet	269.74	155.48	159.13
1	13025.20	Max WS	100yrWithDet	804.88	155.53	159.78
1	13025.20	Max WS	10yrWithDet	461.57	155.53	159.35
1	13025.20	Max WS	2yrWithDet	269.76	155.53	158.82
1	12934.78	Max WS	100yrWithDet	805.05	155.67	159.44
1	12934.78	Max WS	10yrWithDet	461.26	155.67	159.10
1	12934.78	Max WS	2yrWithDet	269.74	155.67	158.56
1	12679.83	Max WS	100yrWithDet	807.75	154.84	158.45
1	12679.83	Max WS	10yrWithDet	463.02	154.84	158.07
1	12679.83	Max WS	2yrWithDet	270.12	154.84	157.59
1	12514.10	Max WS	100yrWithDet	807.61	153.08	157.89
1	12514.10	Max WS	10yrWithDet	462.92	153.08	157.40
1	12514.10	Max WS	2yrWithDet	270.06	153.08	156.99
1	12342.49	Max WS	100yrWithDet	807.56	153.74	157.48
1	12342.49	Max WS	10yrWithDet	463.03	153.74	157.05
1	12342.49	Max WS	2yrWithDet	269.87	153.74	156.63

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	12168.87	Max WS	100yrWithDet	807.52	152.62	157.00
1	12168.87	Max WS	10yrWithDet	463.07	152.62	156.55
1	12168.87	Max WS	2yrWithDet	269.82	152.62	155.97
1	11993.01	Max WS	100yrWithDet	807.66	152.46	156.58
1	11993.01	Max WS	10yrWithDet	462.63	152.46	156.00
1	11993.01	Max WS	2yrWithDet	269.80	152.46	155.30
1	11820.19	Max WS	100yrWithDet	806.09	150.12	156.05
1	11820.19	Max WS	10yrWithDet	462.71	150.12	155.57
1	11820.19	Max WS	2yrWithDet	269.78	150.12	154.81
1	11633.47	Max WS	100yrWithDet	821.99	151.10	155.29
1	11633.47	Max WS	10yrWithDet	471.84	151.10	154.80
1	11633.47	Max WS	2yrWithDet	275.16	151.10	154.02
1	11460.48	Max WS	100yrWithDet	838.76	149.67	154.73
1	11460.48	Max WS	10yrWithDet	478.38	149.67	154.07
1	11460.48	Max WS	2yrWithDet	277.43	149.67	153.24
1	11271.33	Max WS	100yrWithDet	838.11	147.60	154.40
1	11271.33	Max WS	10yrWithDet	478.25	147.60	153.58
1	11271.33	Max WS	2yrWithDet	277.39	147.60	152.79
1	11146.79	Max WS	100yrWithDet	840.17	147.72	153.69
1	11146.79	Max WS	10yrWithDet	477.97	147.72	153.13
1	11146.79	Max WS	2yrWithDet	277.40	147.72	152.46
1	10961.29	Max WS	100yrWithDet	839.56	149.08	153.15
1	10961.29	Max WS	10yrWithDet	477.82	149.08	152.59
1	10961.29	Max WS	2yrWithDet	277.31	149.08	151.86
1	10777.64	Max WS	100yrWithDet	839.21	147.95	152.56
1	10777.64	Max WS	10yrWithDet	477.83	147.95	152.09
1	10777.64	Max WS	2yrWithDet	277.29	147.95	151.43
1	10599.75	Max WS	100yrWithDet	838.71	147.94	152.00
1	10599.75	Max WS	10yrWithDet	476.36	147.94	151.43
1	10599.75	Max WS	2yrWithDet	277.33	147.94	150.89
1	10484.71	Max WS	100yrWithDet	838.25	147.53	151.76
1	10484.71	Max WS	10yrWithDet	475.57	147.53	151.14
1	10484.71	Max WS	2yrWithDet	277.30	147.53	150.59
1	10294.85	Max WS	100yrWithDet	838.50	146.18	151.18
1	10294.85	Max WS	10yrWithDet	474.80	146.18	150.67
1	10294.85	Max WS	2yrWithDet	277.30	146.18	150.11
1	10111.02	Max WS	100yrWithDet	840.29	146.70	150.72
1	10111.02	Max WS	10yrWithDet	475.06	146.70	150.10

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	10111.02	Max WS	2yrWithDet	277.62	146.70	149.36
1	9962.423	Max WS	100yrWithDet	838.85	144.81	150.05
1	9962.423	Max WS	10yrWithDet	473.67	144.81	149.13
1	9962.423	Max WS	2yrWithDet	277.54	144.81	148.17
1	9876	Max WS	100yrWithDet	838.88	144.29	149.66
1	9876	Max WS	10yrWithDet	471.90	144.29	148.94
1	9876	Max WS	2yrWithDet	277.54	144.29	148.01
1	9825.00			Culvert		
1	9774	Max WS	100yrWithDet	838.76	143.93	149.09
1	9774	Max WS	10yrWithDet	470.10	143.93	148.77
1	9774	Max WS	2yrWithDet	277.47	143.93	147.92
1	9553.901	Max WS	100yrWithDet	838.14	143.12	148.91
1	9553.901	Max WS	10yrWithDet	468.76	143.12	148.32
1	9553.901	Max WS	2yrWithDet	277.38	143.12	147.47
1	9362.452	Max WS	100yrWithDet	836.16	143.70	148.35
1	9362.452	Max WS	10yrWithDet	481.92	143.70	147.65
1	9362.452	Max WS	2yrWithDet	277.30	143.70	146.88
1	9149.788	Max WS	100yrWithDet	835.35	141.77	148.03
1	9149.788	Max WS	10yrWithDet	479.91	141.77	147.37
1	9149.788	Max WS	2yrWithDet	277.17	141.77	146.64
1	8963.549	Max WS	100yrWithDet	835.05	141.24	147.49
1	8963.549	Max WS	10yrWithDet	476.54	141.24	146.80
1	8963.549	Max WS	2yrWithDet	277.14	141.24	146.18
1	8766.435	Max WS	100yrWithDet	834.91	142.65	146.74
1	8766.435	Max WS	10yrWithDet	476.29	142.65	146.09
1	8766.435	Max WS	2yrWithDet	277.14	142.65	145.47
1	8577.282	Max WS	100yrWithDet	833.55	141.02	146.20
1	8577.282	Max WS	10yrWithDet	475.50	141.02	145.56
1	8577.282	Max WS	2yrWithDet	277.12	141.02	144.95
1	8398.577	Max WS	100yrWithDet	833.16	141.01	145.92
1	8398.577	Max WS	10yrWithDet	475.36	141.01	145.25
1	8398.577	Max WS	2yrWithDet	276.75	141.01	144.56
1	8223.925	Max WS	100yrWithDet	833.29	139.79	145.46
1	8223.925	Max WS	10yrWithDet	475.13	139.79	144.82
1	8223.925	Max WS	2yrWithDet	276.66	139.79	144.09
1	8000	Max WS	100yrWithDet	864.48	139.29	145.03
1	8000	Max WS	10yrWithDet	489.72	139.29	144.42
1	8000	Max WS	2yrWithDet	280.90	139.29	143.69

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	7744.065	Max WS	100yrWithDet	865.09	138.71	143.89
1	7744.065	Max WS	10yrWithDet	490.37	138.71	143.27
1	7744.065	Max WS	2yrWithDet	281.23	138.71	142.73
1	7600	Max WS	100yrWithDet	865.47	138.31	143.60
1	7600	Max WS	10yrWithDet	490.25	138.31	142.86
1	7600	Max WS	2yrWithDet	281.37	138.31	142.24
1	7400	Max WS	100yrWithDet	866.62	137.76	142.60
1	7400	Max WS	10yrWithDet	490.65	137.76	141.93
1	7400	Max WS	2yrWithDet	281.54	137.76	141.24
1	7200	Max WS	100yrWithDet	867.70	137.20	141.68
1	7200	Max WS	10yrWithDet	490.66	137.20	141.11
1	7200	Max WS	2yrWithDet	281.66	137.20	140.46
1	7000	Max WS	100yrWithDet	868.96	136.65	141.10
1	7000	Max WS	10yrWithDet	490.50	136.65	140.70
1	7000	Max WS	2yrWithDet	281.75	136.65	140.03
1	6800	Max WS	100yrWithDet	870.24	136.09	140.77
1	6800	Max WS	10yrWithDet	490.94	136.09	140.51
1	6800	Max WS	2yrWithDet	281.71	136.09	139.76
1	6545.718	Max WS	100yrWithDet	869.34	134.93	139.90
1	6545.718	Max WS	10yrWithDet	490.73	134.93	139.39
1	6545.718	Max WS	2yrWithDet	281.60	134.93	138.87
1	6400	Max WS	100yrWithDet	870.90	135.02	139.47
1	6400	Max WS	10yrWithDet	491.49	135.02	138.94
1	6400	Max WS	2yrWithDet	281.94	135.02	138.46
1	6200	Max WS	100yrWithDet	872.56	134.52	139.09
1	6200	Max WS	10yrWithDet	492.31	134.52	138.53
1	6200	Max WS	2yrWithDet	282.37	134.52	138.03
1	6000	Max WS	100yrWithDet	873.59	134.02	138.69
1	6000	Max WS	10yrWithDet	492.98	134.02	138.13
1	6000	Max WS	2yrWithDet	282.68	134.02	137.62
1	5800	Max WS	100yrWithDet	876.07	133.53	138.27
1	5800	Max WS	10yrWithDet	494.31	133.53	137.80
1	5800	Max WS	2yrWithDet	283.39	133.53	137.32
1	5544.024	Max WS	100yrWithDet	878.39	132.89	137.72
1	5544.024	Max WS	10yrWithDet	495.36	132.89	137.03
1	5544.024	Max WS	2yrWithDet	283.93	132.89	136.44
1	5310.353	Max WS	100yrWithDet	879.06	130.81	136.91
1	5310.353	Max WS	10yrWithDet	496.14	130.81	136.30

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	5310.353	Max WS	2yrWithDet	284.32	130.81	135.74
1	5126.186	Max WS	100yrWithDet	880.49	131.42	136.61
1	5126.186	Max WS	10yrWithDet	496.73	131.42	136.02
1	5126.186	Max WS	2yrWithDet	284.75	131.42	135.53
1	4928.496	Max WS	100yrWithDet	881.59	131.24	136.41
1	4928.496	Max WS	10yrWithDet	497.40	131.24	135.82
1	4928.496	Max WS	2yrWithDet	285.17	131.24	135.34
1	4737.846	Max WS	100yrWithDet	883.38	130.80	135.97
1	4737.846	Max WS	10yrWithDet	498.39	130.80	135.44
1	4737.846	Max WS	2yrWithDet	285.56	130.80	135.03
1	4542.183	Max WS	100yrWithDet	885.10	130.20	135.62
1	4542.183	Max WS	10yrWithDet	499.31	130.20	135.17
1	4542.183	Max WS	2yrWithDet	285.84	130.20	134.84
1	4437.102	Max WS	100yrWithDet	886.10	131.50	135.29
1	4437.102	Max WS	10yrWithDet	499.75	131.50	134.84
1	4437.102	Max WS	2yrWithDet	286.08	131.50	134.46
1	4246.329	Max WS	100yrWithDet	887.51	129.78	134.66
1	4246.329	Max WS	10yrWithDet	500.30	129.78	134.09
1	4246.329	Max WS	2yrWithDet	283.47	129.78	133.55
1	4063.200	Max WS	100yrWithDet	888.70	129.05	134.02
1	4063.200	Max WS	10yrWithDet	500.42	129.05	133.54
1	4063.200	Max WS	2yrWithDet	283.25	129.05	133.13
1	3863.200	Max WS	100yrWithDet	890.24	128.43	133.72
1	3863.200	Max WS	10yrWithDet	500.87	128.43	133.32
1	3863.200	Max WS	2yrWithDet	280.10	128.43	133.00
1	3682.022	Max WS	100yrWithDet	891.69	127.89	133.57
1	3682.022	Max WS	10yrWithDet	501.73	127.89	133.22
1	3682.022	Max WS	2yrWithDet	274.16	127.89	132.92
1	3487.742	Max WS	100yrWithDet	893.69	128.90	133.18
1	3487.742	Max WS	10yrWithDet	501.81	128.90	132.75
1	3487.742	Max WS	2yrWithDet	288.99	128.90	132.42
1	3332.982	Max WS	100yrWithDet	895.11	129.37	132.87
1	3332.982	Max WS	10yrWithDet	502.06	129.37	132.32
1	3332.982	Max WS	2yrWithDet	288.55	129.37	131.86
1	3152.554	Max WS	100yrWithDet	925.10	127.27	132.18
1	3152.554	Max WS	10yrWithDet	508.57	127.27	131.70
1	3152.554	Max WS	2yrWithDet	289.82	127.27	131.07
1	2960.781	Max WS	100yrWithDet	926.57	128.00	131.42

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	2960.781	Max WS	10yrWithDet	509.35	128.00	130.95
1	2960.781	Max WS	2yrWithDet	289.89	128.00	130.58
1	2800	Max WS	100yrWithDet	927.89	127.75	130.94
1	2800	Max WS	10yrWithDet	509.98	127.75	130.42
1	2800	Max WS	2yrWithDet	289.94	127.75	130.06
1	2600	Max WS	100yrWithDet	929.33	127.22	130.53
1	2600	Max WS	10yrWithDet	510.64	127.22	129.91
1	2600	Max WS	2yrWithDet	289.91	127.22	129.37
1	2436.651	Max WS	100yrWithDet	930.50	126.76	129.66
1	2436.651	Max WS	10yrWithDet	511.22	126.76	129.09
1	2436.651	Max WS	2yrWithDet	290.04	126.76	128.52
1	2200	Max WS	100yrWithDet	931.89	125.72	128.65
1	2200	Max WS	10yrWithDet	511.87	125.72	128.04
1	2200	Max WS	2yrWithDet	289.99	125.72	127.49
1	1800	Max WS	100yrWithDet	930.76	123.94	128.04
1	1800	Max WS	10yrWithDet	511.51	123.94	127.33
1	1800	Max WS	2yrWithDet	288.85	123.94	126.68
1	1508.765	Max WS	100yrWithDet	930.21	122.64	127.18
1	1508.765	Max WS	10yrWithDet	511.26	122.64	126.53
1	1508.765	Max WS	2yrWithDet	288.52	122.64	125.94
1	1238.804	Max WS	100yrWithDet	929.51	122.00	126.52
1	1238.804	Max WS	10yrWithDet	511.16	122.00	125.90
1	1238.804	Max WS	2yrWithDet	288.29	122.00	125.38
1	947.7714	Max WS	100yrWithDet	928.85	122.00	125.63
1	947.7714	Max WS	10yrWithDet	511.09	122.00	125.14
1	947.7714	Max WS	2yrWithDet	288.29	122.00	124.82
1	703.7460	Max WS	100yrWithDet	927.96	122.00	124.99
1	703.7460	Max WS	10yrWithDet	510.84	122.00	124.36
1	703.7460	Max WS	2yrWithDet	288.10	122.00	123.92
1	413.4701	Max WS	100yrWithDet	927.21	120.00	123.92
1	413.4701	Max WS	10yrWithDet	510.77	120.00	123.32
1	413.4701	Max WS	2yrWithDet	287.85	120.00	122.82
1	200.9584	Max WS	100yrWithDet	926.83	120.00	123.43
1	200.9584	Max WS	10yrWithDet	510.67	120.00	122.90
1	200.9584	Max WS	2yrWithDet	287.54	120.00	122.48
1	10.31402	Max WS	100yrWithDet	926.69	120.00	122.99
1	10.31402	Max WS	10yrWithDet	510.60	120.00	122.49
1	10.31402	Max WS	2yrWithDet	287.49	120.00	122.08

HEC-RAS River: DEER CREEK Reach: 1 Profile: Max WS

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev
				(cfs)	(ft)	(ft)
1	28400	Max WS	2yrNoDet	84.25	220.00	221.08

Unnamed Deer Creek Tributary

Developed Conditions Model:

10-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 8:51:06 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms

Plan: 10 yr developed no det - Full Shed Developed without Detention 10 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	184.25	220.00	221.41		221.49	0.004806	2.42	104.77	227.94	0.45
1	28313.0*	Max WS	183.63	219.58	220.97		221.06	0.006132	2.58	81.88	128.30	0.50
1	28226.0*	Max WS	182.58	219.15	220.52		220.60	0.005588	2.37	91.80	140.59	0.47
1	28139.07	Max WS	181.08	218.73	220.25		220.28	0.002361	1.68	131.90	168.67	0.31
1	28069.5*	Max WS	323.23	218.22	219.75		219.89	0.009026	3.33	128.23	228.50	0.61
1	28000	Max WS	322.36	217.71	219.24		219.36	0.007495	3.05	133.86	191.93	0.56
1	27900.*	Max WS	321.77	216.97	218.24		218.42	0.011759	3.38	95.27	124.04	0.68
1	27800	Max WS	319.98	216.23	217.63		217.69	0.002989	2.02	158.50	159.86	0.36
1	27700.*	Max WS	319.06	215.51	217.29		217.38	0.003475	2.45	148.16	221.15	0.40
1	27600	Max WS	317.58	214.80	216.76		216.88	0.007088	3.76	152.96	230.53	0.58
1	27500.*	Max WS	315.91	214.08	215.85		216.00	0.009145	3.99	135.20	214.57	0.64
1	27400	Max WS	313.44	213.35	215.30		215.34	0.002309	2.19	231.15	241.66	0.33
1	27329.7*	Max WS	313.29	212.84	215.06		215.16	0.004551	3.13	158.16	191.78	0.47
1	27259.5*	Max WS	312.94	212.32	214.79		214.90	0.004536	3.27	158.83	207.27	0.47

1	27189.29	Max WS	311.37	211.81	214.44		214.61	0.006755	3.86	132.23	222.16	0.56
1	27094.6*	Max WS	310.75	211.10	213.64		213.92	0.009324	4.41	91.68	150.96	0.66
1	27000	Max WS	309.62	210.39	212.98		213.19	0.006172	3.73	93.78	102.25	0.55
1	26900.*	Max WS	309.11	209.64	212.41		212.59	0.005961	3.47	96.92	112.48	0.53
1	26800	Max WS	308.39	208.88	211.81		211.98	0.006383	3.35	97.61	113.58	0.54
1	26700.*	Max WS	307.87	208.12	210.95		211.22	0.009417	4.19	79.73	114.17	0.66
1	26600	Max WS	306.19	207.37	210.45		210.57	0.003884	3.25	171.83	306.91	0.44
1	26528.4*	Max WS	305.53	206.83	210.21		210.31	0.003362	2.94	190.08	304.83	0.41
1	26456.8*	Max WS	302.81	206.29	210.03		210.09	0.002445	2.48	222.58	314.57	0.34
1	26385.31	Max WS	305.63	205.75	209.51		209.77	0.010692	4.40	100.49	291.94	0.68
1	26292.6*	Max WS	304.23	205.40	208.49		208.76	0.012747	4.49	93.53	200.23	0.75
1	26200	Max WS	302.50	205.06	207.61		207.82	0.007743	3.87	101.19	169.05	0.60
1	26100.*	Max WS	300.26	204.69	206.97		207.12	0.006368	3.24	102.25	145.61	0.53
1	26000	Max WS	299.57	204.32	206.58		206.66	0.003106	2.33	146.11	182.57	0.38
1	25900.*	Max WS	297.83	203.95	206.23		206.32	0.003845	2.46	126.83	170.10	0.41
1	25800	Max WS	297.32	203.57	205.88		205.97	0.003639	2.31	128.67	122.78	0.40
1	25700.*	Max WS	351.11	203.20	205.46		205.58	0.004489	3.00	170.33	277.12	0.46
1	25600	Max WS	350.41	202.83	205.22		205.25	0.002199	2.56	288.10	314.62	0.34
1	25500.*	Max WS	489.42	202.46	204.83		204.93	0.005173	3.76	266.87	347.96	0.51
1	25400	Max WS	488.55	202.09	204.50		204.56	0.002848	2.70	329.33	411.79	0.38
1	25358.8*	Max WS	486.58	202.00	204.38		204.45	0.003517	2.98	302.51	389.05	0.42
1	25317.6*	Max WS	486.49	201.92	204.22		204.31	0.004429	3.22	274.29	362.77	0.47
1	25276.3*	Max WS	486.28	201.83	204.03		204.13	0.005294	3.31	251.32	330.19	0.50
1	25235.1*	Max WS	485.97	201.75	203.83		203.92	0.005634	3.11	237.58	282.45	0.50
1	25193.99	Max WS	485.65	201.66	203.65		203.71	0.005014	2.63	244.16	249.57	0.46
1	25145.4*	Max WS	485.20	201.36	203.34		203.45	0.006582	3.14	205.71	243.56	0.54
1	25097.*	Max WS	484.65	201.05	202.94		203.10	0.008188	3.45	170.68	231.11	0.60
1	25048.5*	Max WS	482.73	200.75	202.64		202.77	0.005283	2.90	183.31	227.62	0.48
1	25000	Max WS	482.47	200.45	202.53		202.59	0.001867	1.98	264.67	249.81	0.30
1	24900.*	Max WS	481.59	200.04	202.31		202.39	0.002323	2.30	239.32	226.18	0.34
1	24800	Max WS	480.42	199.63	201.93		202.08	0.004858	3.25	180.61	191.12	0.48
1	24700.*	Max WS	480.21	199.20	201.30		201.50	0.007712	4.02	168.75	224.93	0.61
1	24600	Max WS	478.95	198.77	200.65		200.79	0.008158	4.04	215.66	306.88	0.62
1	24500.*	Max WS	478.35	198.34	200.10		200.17	0.004743	2.69	260.12	315.81	0.46
1	24400	Max WS	477.30	197.91	199.87		199.88	0.001116	1.36	489.01	472.10	0.22
1	24328.0*	Max WS	477.04	197.60	199.80		199.82	0.001168	1.33	485.87	462.48	0.23
1	24256.1*	Max WS	217.57	197.29	199.72		199.79	0.003329	2.18	100.71	449.60	0.38
1	24184.18	Max WS	476.39	196.98	199.35	199.58	200.20	0.051382	7.40	64.36	379.43	1.43
1	24092.0*	Max WS	476.08	196.51	198.97		199.03	0.003808	2.41	311.55	399.50	0.41
1	24000	Max WS	475.13	196.03	198.50		198.62	0.006145	3.46	234.54	368.13	0.53
1	23900.*	Max WS	473.74	195.51	197.88		198.00	0.007129	3.44	214.64	293.65	0.57
1	23800	Max WS	473.28	194.99	197.44		197.49	0.003474	2.34	281.34	282.66	0.39
1	23700.*	Max WS	472.38	194.47	197.00		197.10	0.004933	3.12	240.72	297.30	0.48
1	23600	Max WS	470.88	193.95	196.42		196.54	0.006646	3.67	236.22	375.76	0.56
1	23400	Max WS	468.58	192.92	195.75		195.81	0.001404	2.22	300.17	237.09	0.28
1	23178.25	Max WS	466.65	191.76	195.18		195.32	0.004057	3.96	214.43	198.60	0.46
1	23000	Max WS	465.18	191.25	194.42		194.59	0.004444	3.52	178.74	235.22	0.48
1	22600	Max WS	573.20	190.00	192.98		193.13	0.002945	3.28	216.09	328.88	0.40
1	22400	Max WS	571.45	189.54	192.68		192.72	0.000982	1.82	379.34	314.85	0.23
1	22175.79	Max WS	570.01	188.90	191.82		192.07	0.006195	4.39	193.16	225.62	0.57
1	22000	Max WS	569.30	188.07	191.12		191.29	0.003204	3.39	208.37	182.72	0.42
1	21900.*	Max WS	628.88	187.59	190.79		190.95	0.003197	3.30	234.90	231.72	0.41
1	21800	Max WS	628.63	187.11	190.60		190.70	0.001945	2.63	300.95	260.37	0.32

1	21600	Max WS	627.50	186.14	189.56		189.91	0.007896	4.93	151.89	144.67	0.64
1	21400	Max WS	626.27	185.21	188.91		188.99	0.001341	2.30	296.46	188.71	0.27
1	21176.29	Max WS	623.93	184.07	188.23		188.48	0.004957	4.34	212.92	265.14	0.52
1	20962.10	Max WS	623.19	184.10	187.59		187.66	0.002828	2.69	326.90	269.45	0.37
1	20921.9*	Max WS	641.94	184.01	187.47		187.56	0.002548	2.80	332.36	264.59	0.36
1	20881.8*	Max WS	641.88	183.92	187.38		187.47	0.002269	2.86	334.27	257.20	0.35
1	20841.7*	Max WS	641.80	183.83	187.28		187.38	0.002261	3.00	327.84	248.45	0.35
1	20801.6*	Max WS	641.72	183.74	187.17		187.29	0.002698	3.30	307.82	239.34	0.39
1	20761.52	Max WS	641.64	183.65	187.01		187.16	0.004495	3.93	265.85	227.29	0.48
1	20712.0*	Max WS	655.88	182.57	186.61		186.91	0.006744	4.84	197.76	215.27	0.60
1	20662.66	Max WS	655.83	181.49	186.34		186.62	0.005352	4.43	201.35	344.84	0.54
1	20655.8*	Max WS	655.84	181.50	186.30		186.59	0.005649	4.52	211.12	354.75	0.55
1	20648.9*	Max WS	655.83	181.52	186.23		186.57	0.006938	4.86	191.61	352.96	0.60
1	20642.13	Max WS	654.84	181.53	185.56	185.72	186.57	0.027317	8.06	81.25	51.67	1.13
1	20614.23	Max WS	655.84	180.88	185.79		185.95	0.002650	3.28	244.50	259.13	0.38
1	20399.06	Max WS	653.67	181.78	185.28		185.35	0.003009	2.66	391.71	411.95	0.38
1	20131.75	Max WS	647.62	180.89	184.58		184.67	0.002489	3.08	376.55	363.62	0.37
1	19831.49	Max WS	645.18	179.01	182.81		183.27	0.008689	5.46	118.15	197.42	0.67
1	19561.71	Max WS	663.35	176.06	181.66		181.80	0.002050	3.08	216.42	98.28	0.34
1	19375.20	Max WS	662.50	173.23	181.48		181.56	0.000527	2.37	282.36	254.47	0.19
1	19216.24	Max WS	662.68	176.81	181.25		181.36	0.002720	3.81	361.38	304.54	0.39
1	19040.62	Max WS	661.72	176.76	180.93		180.97	0.001201	2.29	572.41	497.38	0.26
1	18997.3*	Max WS	660.96	176.80	180.85		180.91	0.001539	2.64	487.09	454.97	0.30
1	18953.9*	Max WS	661.02	176.83	180.77		180.86	0.001909	2.91	422.70	412.10	0.33
1	18910.6*	Max WS	661.09	176.87	180.67		180.78	0.002501	3.22	365.53	385.14	0.37
1	18867.36	Max WS	661.09	176.91	180.36		180.66	0.006672	4.67	205.80	286.14	0.59
1	18661.93	Max WS	660.15	175.46	179.49		179.63	0.003225	3.64	350.83	418.50	0.42
1	18573.2*	Max WS	669.91	174.86	179.18		179.36	0.003343	4.07	313.98	340.88	0.44
1	18484.66	Max WS	666.31	174.25	178.75		179.06	0.004869	5.12	234.02	267.13	0.53
1	18313.08	Max WS	665.55	174.93	178.40		178.45	0.000926	2.15	488.95	306.89	0.23
1	18226	Max WS	665.03	173.87	178.01		178.40	0.002738	5.02	132.61	57.07	0.43
1	18175		Culvert									
1	18123	Max WS	659.06	173.46	177.10		177.60	0.004126	5.65	116.62	53.87	0.52
1	17964.88	Max WS	664.77	172.77	176.38		176.76	0.007543	5.50	198.87	254.16	0.64
1	17929.0*	Max WS	664.82	172.49	176.19		176.49	0.006305	4.86	208.83	245.27	0.58
1	17893.2*	Max WS	664.85	172.22	176.00		176.26	0.006152	4.50	214.13	240.62	0.57
1	17857.44	Max WS	664.66	171.94	175.72		176.01	0.008550	4.70	192.86	226.68	0.65
1	17638.59	Max WS	664.64	171.98	174.76		174.81	0.002215	2.55	493.88	552.90	0.34
1	17570.8*	Max WS	664.81	171.69	174.53		174.63	0.003714	3.28	372.70	466.77	0.44
1	17503.0*	Max WS	664.60	171.40	174.08		174.30	0.007736	4.41	253.25	508.47	0.62
1	17435.23	Max WS	664.68	171.11	173.80		173.88	0.003145	2.89	342.09	312.90	0.40
1	17347.3*	Max WS	664.48	170.31	173.46		173.56	0.004377	3.42	356.09	506.71	0.47
1	17259.39	Max WS	664.59	169.51	173.14		173.20	0.003094	2.69	446.39	490.39	0.38
1	17161.6*	Max WS	664.24	169.43	172.75		172.88	0.004457	3.32	320.72	429.80	0.47
1	17063.83	Max WS	663.85	169.35	172.32		172.47	0.004234	3.18	256.99	339.79	0.46
1	17016.0*	Max WS	663.92	168.83	172.11		172.28	0.003870	3.40	228.97	239.16	0.45
1	16968.2*	Max WS	664.01	168.30	171.94		172.11	0.003299	3.51	241.36	212.61	0.42
1	16920.4*	Max WS	664.13	167.78	171.77		171.96	0.003250	3.85	247.24	196.25	0.43
1	16872.70	Max WS	663.71	167.26	171.57		171.81	0.004113	4.69	238.45	180.51	0.49
1	16822.9*	Max WS	704.52	167.36	171.27		171.58	0.005574	5.16	232.68	222.90	0.56
1	16773.1*	Max WS	704.59	167.46	171.07		171.30	0.004938	4.60	257.72	232.92	0.52
1	16723.4*	Max WS	704.63	167.57	170.88		171.05	0.004521	4.11	278.97	250.63	0.49
1	16673.66	Max WS	704.43	167.67	170.71		170.83	0.003820	3.50	315.35	265.22	0.45

1	16606.6*	Max WS	704.57	167.56	170.43		170.55	0.004759	3.75	334.24	341.83	0.49
1	16539.5*	Max WS	704.19	167.45	170.10		170.23	0.005576	3.88	320.66	415.69	0.53
1	16472.50	Max WS	704.33	167.34	169.88		169.94	0.002665	2.82	399.11	292.19	0.37
1	16374.4*	Max WS	718.36	166.82	169.62		169.68	0.002822	2.78	430.71	465.26	0.38
1	16276.30	Max WS	717.54	166.31	169.20		169.31	0.005109	3.42	310.37	507.97	0.50
1	16193.9*	Max WS	716.43	165.53	169.04		169.10	0.002788	2.80	466.03	491.02	0.38
1	16111.50	Max WS	716.39	164.75	168.97		169.00	0.001188	2.19	633.75	531.74	0.25
1	16044.4*	Max WS	716.29	164.60	168.89		168.95	0.001564	2.64	529.93	472.58	0.30
1	15977.4*	Max WS	715.50	164.46	168.79		168.87	0.001852	2.97	473.27	445.40	0.32
1	15910.45	Max WS	715.55	164.31	168.69		168.80	0.002199	3.32	418.67	431.02	0.35
1	15816.4*	Max WS	715.67	163.77	168.34		168.65	0.003910	4.82	243.93	296.00	0.48
1	15722.50	Max WS	715.60	163.23	167.20	167.30	168.03	0.014283	7.78	124.14	111.79	0.87
1	15661.2*	Max WS	715.71	163.03	167.07		167.29	0.004213	4.15	236.10	199.17	0.48
1	15600	Max WS	715.25	162.83	167.00		167.07	0.001523	2.47	422.93	326.69	0.29
1	15513.5*	Max WS	715.37	162.55	166.90		166.97	0.001420	2.37	440.22	347.09	0.28
1	15427.0*	Max WS	715.45	162.26	166.80		166.87	0.001427	2.32	447.34	370.97	0.28
1	15340.5*	Max WS	715.50	161.98	166.70		166.76	0.001560	2.33	440.53	396.46	0.29
1	15254.0*	Max WS	720.95	161.69	166.56		166.64	0.001967	2.45	412.54	420.05	0.32
1	15167.54	Max WS	720.88	161.41	166.21		166.41	0.005762	3.63	198.71	391.18	0.52
1	15068.7*	Max WS	721.06	161.32	165.89		166.03	0.002662	3.14	287.06	336.82	0.38
1	14970.01	Max WS	720.94	161.22	165.54		165.78	0.005179	4.52	232.45	312.56	0.53
1	14800.08	Max WS	720.62	160.07	164.98		165.09	0.003359	3.27	355.89	347.18	0.41
1	14745.2*	Max WS	720.16	160.00	164.81		164.95	0.002408	3.60	353.86	329.26	0.38
1	14690.37	Max WS	720.25	159.93	164.57		164.86	0.003715	5.10	294.65	327.58	0.47
1	14521.03	Max WS	717.44	159.74	164.04		164.17	0.003732	3.08	299.94	357.81	0.43
1	14350.55	Max WS	713.95	158.30	163.65		163.72	0.001640	2.60	471.22	405.33	0.30
1	14165.39	Max WS	718.02	159.11	163.37		163.44	0.001573	2.77	481.18	405.44	0.30
1	14077.1*	Max WS	741.13	158.60	163.26		163.33	0.001038	2.58	539.23	444.05	0.25
1	13988.90	Max WS	741.05	158.09	163.21		163.25	0.000711	2.10	675.34	503.86	0.21
1	13971	Max WS	741.02	158.18	162.99		163.35	0.002062	4.81	154.07	60.89	0.39
1	13920		Culvert									
1	13869	Max WS	741.02	158.18	161.78		162.42	0.005418	6.43	115.30	53.62	0.60
1	13817.08	Max WS	741.00	158.27	161.90		162.20	0.005346	4.91	231.93	213.33	0.55
1	13800.26	Max WS	740.98	157.92	161.76		162.10	0.007054	5.32	210.61	188.98	0.62
1	13716.8*	Max WS	740.83	157.68	161.36		161.64	0.004662	4.53	219.64	180.04	0.51
1	13633.46	Max WS	740.87	157.45	161.28		161.35	0.001435	2.57	452.90	319.39	0.29
1	13548.2*	Max WS	740.55	156.91	161.03		161.19	0.003199	3.57	322.88	325.74	0.42
1	13462.94	Max WS	740.07	156.37	160.75		160.93	0.003742	3.75	285.51	266.17	0.45
1	13372.7*	Max WS	739.39	155.87	160.51		160.65	0.003030	3.53	350.15	354.42	0.41
1	13282.48	Max WS	738.65	155.37	160.38		160.44	0.001466	2.63	571.13	588.63	0.29
1	13196.7*	Max WS	738.73	155.42	160.23		160.32	0.001716	2.84	452.37	402.25	0.31
1	13110.9*	Max WS	738.78	155.48	160.08		160.17	0.001953	2.88	414.70	374.22	0.33
1	13025.20	Max WS	738.86	155.53	159.71		159.94	0.005113	4.07	222.50	179.33	0.52
1	12934.78	Max WS	738.76	155.67	159.39		159.58	0.003525	4.17	288.93	233.68	0.45
1	12679.83	Max WS	740.59	154.84	158.37		158.66	0.006345	4.95	280.28	482.86	0.59
1	12514.10	Max WS	740.39	153.08	157.81		157.95	0.002956	3.88	351.23	338.24	0.41
1	12342.49	Max WS	740.51	153.74	157.41		157.50	0.002544	3.08	402.19	344.81	0.37
1	12168.87	Max WS	740.41	152.62	156.93		157.07	0.003125	3.80	373.71	386.90	0.42
1	11993.01	Max WS	740.43	152.46	156.51		156.61	0.002760	2.82	363.07	367.42	0.37
1	11820.19	Max WS	708.26	150.12	156.03		156.17	0.002269	2.95	262.38	411.33	0.35
1	11633.47	Max WS	747.28	151.10	155.20		155.39	0.004651	3.79	287.01	344.88	0.49
1	11460.48	Max WS	756.55	149.67	154.61		154.73	0.002804	3.04	354.03	417.35	0.38
1	11271.33	Max WS	755.82	147.60	154.25		154.37	0.001618	2.82	378.51	449.37	0.30

1	11146.79	Max WS	755.49	147.72	153.59	154.02	0.005302	5.27	144.06	200.14	0.54
1	10961.29	Max WS	755.22	149.08	153.05	153.18	0.002983	3.34	370.03	406.51	0.40
1	10777.64	Max WS	755.35	147.95	152.46	152.68	0.002838	3.96	274.43	327.37	0.41
1	10599.75	Max WS	754.87	147.94	151.88	152.08	0.004181	3.96	296.33	332.08	0.47
1	10484.71	Max WS	754.51	147.53	151.63	151.71	0.001666	2.71	433.33	286.97	0.31
1	10294.85	Max WS	754.61	146.18	151.10	151.30	0.003186	3.77	236.16	138.52	0.42
1	10111.02	Max WS	755.39	146.70	150.67	150.83	0.002758	3.48	355.85	470.20	0.40
1	9962.423	Max WS	755.87	144.81	149.81	150.20	0.007223	5.28	180.42	401.61	0.62
1	9876	Max WS	755.98	144.29	149.47	149.79	0.001682	4.56	165.80	63.06	0.35
1	9825.00		Culvert								
1	9774	Max WS	755.81	143.93	149.01	149.34	0.001797	4.65	162.46	62.46	0.36
1	9553.901	Max WS	755.65	143.12	148.82	148.93	0.001958	3.20	424.85	418.17	0.34
1	9362.452	Max WS	752.88	143.70	148.22	148.55	0.004254	4.83	244.63	443.70	0.50
1	9149.788	Max WS	751.86	141.77	147.90	147.94	0.000535	1.69	541.15	425.76	0.18
1	8963.549	Max WS	751.44	141.24	147.37	147.63	0.004001	4.41	234.86	205.05	0.47
1	8766.435	Max WS	751.03	142.65	146.63	146.87	0.003961	4.00	206.70	215.16	0.46
1	8577.282	Max WS	749.94	141.02	146.08	146.28	0.002677	3.70	279.68	474.11	0.39
1	8398.577	Max WS	749.90	141.01	145.80	145.92	0.001903	3.27	398.36	347.24	0.34
1	8223.925	Max WS	749.83	139.79	145.35	145.54	0.003029	4.06	295.60	229.90	0.41
1	8000	Max WS	769.34	139.29	144.95	145.04	0.001410	2.71	406.84	319.30	0.29
1	7744.065	Max WS	770.87	138.71	143.73	144.21	0.007513	5.65	161.92	171.68	0.64
1	7600	Max WS	770.69	138.31	143.41	143.45	0.001082	2.06	632.43	513.14	0.24
1	7400	Max WS	771.02	137.76	142.45	142.95	0.007496	5.75	147.10	381.21	0.65
1	7200	Max WS	771.74	137.20	141.54	141.80	0.004281	4.28	213.62	146.56	0.49
1	7000	Max WS	772.58	136.65	141.00	141.18	0.002492	3.47	276.15	227.38	0.38
1	6800	Max WS	773.47	136.09	140.69	140.78	0.001648	2.60	414.85	400.98	0.30
1	6545.718	Max WS	772.84	134.93	139.77	140.11	0.006656	5.79	279.15	336.12	0.59
1	6400	Max WS	773.74	135.02	139.34	139.48	0.002475	3.63	356.73	276.77	0.38
1	6200	Max WS	774.94	134.52	138.97	139.07	0.002416	3.17	431.69	380.15	0.37
1	6000	Max WS	775.62	134.02	138.56	138.70	0.002600	3.02	303.50	251.31	0.37
1	5800	Max WS	777.40	133.53	138.15	138.25	0.001758	2.69	377.69	314.75	0.31
1	5544.024	Max WS	777.57	132.89	137.56	137.72	0.003136	3.94	370.29	390.85	0.42
1	5310.353	Max WS	778.31	130.81	136.77	137.03	0.003380	4.15	251.72	363.85	0.44
1	5126.186	Max WS	778.50	131.42	136.48	136.56	0.001309	2.90	592.15	562.22	0.28
1	4928.496	Max WS	779.68	131.24	136.28	136.35	0.001246	2.58	519.03	496.16	0.27
1	4737.846	Max WS	780.91	130.80	135.84	135.99	0.002794	3.58	331.36	248.72	0.39
1	4542.183	Max WS	782.16	130.20	135.50	135.62	0.001133	3.00	421.83	336.14	0.27
1	4437.102	Max WS	782.72	131.50	135.18	135.36	0.004854	4.16	312.02	305.19	0.51
1	4246.329	Max WS	783.87	129.78	134.53	134.67	0.002897	3.87	406.94	387.29	0.40
1	4063.200	Max WS	784.67	129.05	133.90	134.13	0.003471	4.02	272.18	322.88	0.44
1	3863.200	Max WS	785.64	128.43	133.61	133.65	0.000871	2.10	666.03	489.19	0.22
1	3682.022	Max WS	786.51	127.89	133.47	133.50	0.000799	2.04	814.71	670.55	0.21
1	3487.742	Max WS	787.88	128.90	133.09	133.17	0.002878	3.08	485.06	521.84	0.39
1	3332.982	Max WS	788.60	129.37	132.78	132.84	0.001599	2.45	542.35	455.34	0.29
1	3152.554	Max WS	807.42	127.27	132.09	132.41	0.005805	5.09	289.99	494.79	0.56
1	2960.781	Max WS	808.31	128.00	131.30	131.49	0.003964	3.72	318.27	483.59	0.46
1	2800	Max WS	809.19	127.75	130.81	130.91	0.003335	3.25	403.38	378.66	0.42
1	2600	Max WS	810.11	127.22	130.38	130.46	0.001768	2.38	408.44	308.33	0.31
1	2436.651	Max WS	810.88	126.76	129.52	129.84	0.007345	4.56	198.70	273.45	0.61
1	2200	Max WS	811.86	125.72	128.50	128.66	0.002986	3.31	300.25	260.11	0.40
1	1800	Max WS	811.31	123.94	127.87	127.93	0.000917	1.98	470.53	292.72	0.23
1	1508.765	Max WS	810.69	122.64	127.03	127.35	0.004201	5.17	246.34	325.78	0.50
1	1238.804	Max WS	810.07	122.00	126.38	126.47	0.002165	2.55	352.84	326.10	0.34

1	947.7714	Max WS	809.78	122.00	125.50		125.68	0.003596	4.09	307.11	240.99	0.46
1	703.7460	Max WS	809.07	122.00	124.82		124.92	0.002535	2.78	421.25	405.04	0.36
1	413.4701	Max WS	808.55	120.00	123.77		124.03	0.004133	4.20	218.26	184.33	0.48
1	200.9584	Max WS	808.43	120.00	123.29		123.40	0.001828	3.04	422.91	333.81	0.33
1	10.31402	Max WS	808.23	120.00	122.86	122.35	122.98	0.002734	3.42	405.52	362.75	0.39

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 10:12:02 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms

10 yr developed with det, u/s exist - Cordova Hills Developed wit Detention and Existing Conditions upstream of Cordova Hills 10 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	93.89	220.00	221.12		221.19	0.005827	2.09	46.34	124.16	0.46
1	28313.0*	Max WS	93.84	219.58	220.68		220.75	0.006515	2.10	48.71	105.89	0.48
1	28226.0*	Max WS	93.81	219.15	220.25		220.30	0.006183	1.97	55.36	124.51	0.47
1	28139.07	Max WS	93.77	218.73	219.77		219.82	0.007143	1.91	58.84	141.91	0.49
1	28069.5*	Max WS	96.89	218.22	219.29		219.36	0.008973	2.21	48.99	127.33	0.55
1	28000	Max WS	99.99	217.71	218.78		218.86	0.009499	2.30	43.73	157.15	0.57
1	27900.*	Max WS	105.60	216.97	217.76		217.86	0.012382	2.46	42.87	93.15	0.64
1	27800	Max WS	111.11	216.23	217.08		217.11	0.002592	1.39	79.84	126.45	0.31
1	27700.*	Max WS	116.83	215.51	216.84		216.88	0.002143	1.48	78.87	98.60	0.29
1	27600	Max WS	122.51	214.80	216.38		216.48	0.006526	2.89	72.67	198.87	0.52
1	27500.*	Max WS	128.92	214.08	215.47		215.60	0.010288	3.27	61.78	168.40	0.64
1	27400	Max WS	135.25	213.35	214.85		214.88	0.002286	1.67	130.02	213.24	0.31

1	27329.7*	Max WS	138.19	212.84	214.63		214.70	0.004148	2.44	85.97	153.23	0.42
1	27259.5*	Max WS	141.18	212.32	214.35		214.45	0.004549	2.72	77.04	168.78	0.45
1	27189.29	Max WS	144.09	211.81	213.95		214.15	0.009902	3.60	39.97	41.56	0.64
1	27094.6*	Max WS	149.06	211.10	213.15		213.35	0.009985	3.55	42.04	45.06	0.64
1	27000	Max WS	154.01	210.39	212.52		212.65	0.005700	2.81	55.52	65.25	0.49
1	26900.*	Max WS	159.63	209.64	212.01		212.11	0.005424	2.61	61.14	67.90	0.48
1	26800	Max WS	165.21	208.88	211.38		211.50	0.007471	2.81	59.08	74.84	0.54
1	26700.*	Max WS	170.27	208.12	210.64		210.79	0.007108	3.12	54.72	59.41	0.55
1	26600	Max WS	174.58	207.37	210.20		210.31	0.003470	2.76	91.78	266.90	0.41
1	26528.4*	Max WS	174.72	206.83	209.97		210.07	0.003409	2.66	94.78	291.49	0.40
1	26456.8*	Max WS	174.95	206.29	209.74		209.83	0.003499	2.60	96.61	283.92	0.40
1	26385.31	Max WS	175.50	205.75	209.17		209.41	0.010152	3.95	44.44	163.77	0.65
1	26292.6*	Max WS	178.40	205.40	208.15		208.40	0.012486	4.11	50.08	89.54	0.72
1	26200	Max WS	181.33	205.06	207.27		207.45	0.007962	3.38	54.07	77.37	0.59
1	26100.*	Max WS	184.23	204.69	206.65		206.77	0.006050	2.78	66.39	70.35	0.50
1	26000	Max WS	186.98	204.32	206.26		206.32	0.003282	2.06	90.65	136.52	0.37
1	25900.*	Max WS	189.79	203.95	205.91		205.99	0.003708	2.16	87.91	94.14	0.39
1	25800	Max WS	192.78	203.57	205.55		205.62	0.003826	2.12	91.01	102.70	0.40
1	25700.*	Max WS	195.67	203.20	205.11		205.22	0.005774	2.76	79.51	216.52	0.49
1	25600	Max WS	198.51	202.83	204.76		204.81	0.003647	2.71	157.73	258.56	0.41
1	25500.*	Max WS	201.15	202.46	204.36		204.46	0.005599	3.15	122.91	273.50	0.50
1	25400	Max WS	203.82	202.09	204.05		204.09	0.002500	2.02	164.76	273.57	0.33
1	25358.8*	Max WS	204.97	202.00	203.94		204.00	0.003575	2.41	145.14	323.37	0.40
1	25317.6*	Max WS	206.10	201.92	203.79		203.86	0.004554	2.60	134.12	286.29	0.45
1	25276.3*	Max WS	207.24	201.83	203.61		203.68	0.005141	2.54	130.09	251.71	0.46
1	25235.1*	Max WS	103.18	201.75	203.54		203.55	0.000735	0.93	161.91	240.58	0.17
1	25193.99	Max WS	209.52	201.66	203.24	203.25	203.75	0.045681	5.73	36.54	217.46	1.29
1	25145.4*	Max WS	211.03	201.36	202.95		203.01	0.006595	2.31	117.70	205.30	0.50
1	25097.*	Max WS	212.51	201.05	202.52		202.63	0.009768	2.82	83.81	170.33	0.61
1	25048.5*	Max WS	213.91	200.75	202.15		202.23	0.006701	2.39	89.60	128.76	0.50
1	25000	Max WS	215.18	200.45	201.98		202.02	0.002194	1.53	140.59	181.37	0.30
1	24900.*	Max WS	218.01	200.04	201.74		201.79	0.002459	1.80	126.16	159.69	0.32
1	24800	Max WS	220.81	199.63	201.39		201.48	0.004363	2.50	97.69	125.71	0.43
1	24700.*	Max WS	223.74	199.20	200.94		201.06	0.005990	2.92	97.25	166.03	0.51
1	24600	Max WS	226.68	198.77	200.32		200.44	0.008541	3.41	120.08	273.09	0.60
1	24500.*	Max WS	229.80	198.34	199.86		199.89	0.003072	1.82	185.07	295.90	0.35
1	24400	Max WS	205.00	197.91	199.75		199.75	0.000295	0.65	434.08	457.26	0.11
1	24328.0*	Max WS	206.37	197.60	199.73		199.73	0.000269	0.61	454.15	455.66	0.11
1	24256.1*	Max WS	178.91	197.29	199.71		199.76	0.002325	1.81	99.61	448.63	0.32
1	24184.18	Max WS	239.33	196.98	199.17	199.15	199.51	0.024569	4.69	51.07	350.70	0.97
1	24092.0*	Max WS	241.94	196.51	198.56		198.62	0.005412	2.47	160.20	312.84	0.47
1	24000	Max WS	244.61	196.03	198.16		198.31	0.008366	3.35	111.97	353.73	0.60
1	23900.*	Max WS	247.49	195.51	197.55		197.66	0.007840	3.02	125.47	257.06	0.57
1	23800	Max WS	250.26	194.99	197.09		197.13	0.003112	1.90	188.70	255.90	0.36
1	23700.*	Max WS	252.50	194.47	196.74		196.80	0.003886	2.39	166.24	259.45	0.41
1	23600	Max WS	254.70	193.95	196.13		196.25	0.007682	3.36	129.17	362.14	0.58
1	23400	Max WS	274.54	192.92	195.39		195.43	0.001050	1.69	220.58	203.25	0.23
1	23178.25	Max WS	295.66	191.76	194.92		195.03	0.003384	3.36	157.05	191.07	0.41
1	23000	Max WS	316.29	191.25	194.08		194.25	0.005492	3.37	101.81	212.15	0.51
1	22600	Max WS	348.56	190.00	192.71		192.80	0.001848	2.37	170.70	269.08	0.31
1	22400	Max WS	394.65	189.54	192.50		192.53	0.000669	1.41	327.67	276.61	0.19
1	22175.79	Max WS	410.46	188.90	191.54		191.79	0.006927	4.17	133.47	202.99	0.59
1	22000	Max WS	410.05	188.07	190.71		190.87	0.003843	3.20	144.65	135.79	0.44

1	21900.*	Max WS	409.59	187.59	190.39	190.51	0.003279	2.86	154.36	156.08	0.40
1	21800	Max WS	409.51	187.11	190.17	190.25	0.002184	2.38	190.44	250.81	0.33
1	21600	Max WS	409.14	186.14	189.15	189.42	0.007228	4.23	106.34	96.17	0.60
1	21400	Max WS	408.34	185.21	188.53	188.58	0.001088	1.84	230.83	159.69	0.24
1	21176.29	Max WS	335.49	184.07	188.08	188.18	0.002047	2.67	173.88	261.94	0.33
1	20962.10	Max WS	407.90	184.10	187.19	187.26	0.003260	2.55	225.95	239.75	0.39
1	20921.9*	Max WS	407.88	184.01	187.08	187.16	0.002605	2.49	234.07	240.39	0.36
1	20881.8*	Max WS	407.85	183.92	186.99	187.06	0.002183	2.48	238.91	236.23	0.33
1	20841.7*	Max WS	407.80	183.83	186.90	186.98	0.002083	2.57	237.04	229.93	0.33
1	20801.6*	Max WS	407.75	183.74	186.80	186.90	0.002486	2.83	223.00	221.05	0.36
1	20761.52	Max WS	407.71	183.65	186.64	186.77	0.004691	3.53	185.63	208.50	0.48
1	20712.0*	Max WS	418.13	182.57	186.16	186.48	0.008665	4.67	110.40	177.32	0.65
1	20662.66	Max WS	428.57	181.49	185.83	186.10	0.006095	4.16	103.09	58.86	0.55
1	20655.8*	Max WS	428.58	181.50	185.76	186.06	0.006803	4.36	98.21	56.54	0.58
1	20648.9*	Max WS	428.58	181.52	185.65	186.00	0.008684	4.79	89.56	53.43	0.65
1	20642.13	Max WS	428.41	181.53	185.38	185.93	0.015679	5.92	72.37	48.07	0.85
1	20614.23	Max WS	428.46	180.88	185.51	185.61	0.001775	2.57	166.71	176.39	0.31
1	20399.06	Max WS	382.74	181.78	185.13	185.16	0.001685	1.86	329.81	405.18	0.28
1	20131.75	Max WS	428.81	180.89	184.08	184.24	0.004916	3.64	199.60	334.23	0.49
1	19831.49	Max WS	428.14	179.01	182.23	182.59	0.006964	4.79	89.42	91.38	0.60
1	19561.71	Max WS	435.92	176.06	181.36	181.44	0.001255	2.29	190.22	81.95	0.27
1	19375.20	Max WS	435.57	173.23	181.26	181.30	0.000264	1.63	268.42	223.71	0.13
1	19216.24	Max WS	432.96	176.81	181.13	181.19	0.001480	2.74	327.24	293.34	0.29
1	19040.62	Max WS	444.29	176.76	180.71	180.86	0.002991	3.41	201.89	471.22	0.40
1	18997.3*	Max WS	443.93	176.80	180.49	180.71	0.004104	3.91	144.60	410.63	0.47
1	18953.9*	Max WS	443.73	176.83	180.47	180.67	0.003576	3.65	141.34	383.32	0.44
1	18910.6*	Max WS	443.50	176.87	180.36	180.47	0.002632	3.00	248.04	375.42	0.37
1	18867.36	Max WS	442.38	176.91	180.03	180.32	0.006674	4.33	102.18	259.02	0.58
1	18661.93	Max WS	440.89	175.46	179.15	179.30	0.003603	3.46	219.98	354.40	0.43
1	18573.2*	Max WS	446.06	174.86	178.81	179.00	0.003708	3.87	195.07	288.13	0.45
1	18484.66	Max WS	427.55	174.25	178.26	178.61	0.005770	4.92	113.67	178.42	0.56
1	18313.08	Max WS	444.17	174.93	177.66	177.85	0.003883	3.53	126.32	266.98	0.45
1	18226	Max WS	443.78	173.87	177.32	177.57	0.002255	4.02	110.27	52.84	0.38
1	18175		Culvert								
1	18123	Max WS	434.64	173.46	176.92	177.16	0.002137	3.93	110.67	52.75	0.37
1	17964.88	Max WS	443.37	172.77	176.04	176.42	0.008098	5.10	117.67	212.50	0.64
1	17929.0*	Max WS	443.32	172.49	175.88	176.14	0.005972	4.27	139.19	211.63	0.55
1	17893.2*	Max WS	443.27	172.22	175.73	175.94	0.005417	3.83	154.03	211.81	0.52
1	17857.44	Max WS	443.23	171.94	175.47	175.70	0.007845	4.03	139.80	201.57	0.61
1	17638.59	Max WS	441.98	171.98	174.52	174.57	0.002303	2.36	362.47	549.66	0.33
1	17570.8*	Max WS	441.43	171.69	174.25	174.37	0.004565	3.24	243.78	459.94	0.47
1	17503.0*	Max WS	441.40	171.40	173.82	173.99	0.007151	3.76	163.76	249.54	0.58
1	17435.23	Max WS	441.38	171.11	173.58	173.64	0.002480	2.33	277.54	280.05	0.34
1	17347.3*	Max WS	371.46	170.31	173.40	173.44	0.001693	2.08	325.41	504.32	0.29
1	17259.39	Max WS	441.42	169.51	172.92	173.22	0.010321	4.96	129.85	462.37	0.70
1	17161.6*	Max WS	440.71	169.43	172.44	172.59	0.005409	3.33	194.14	365.25	0.50
1	17063.83	Max WS	440.67	169.35	171.93	172.08	0.005573	3.06	143.97	123.92	0.50
1	17016.0*	Max WS	440.39	168.83	171.70	171.85	0.004338	3.03	150.81	145.33	0.45
1	16968.2*	Max WS	440.44	168.30	171.52	171.67	0.003484	3.12	159.33	177.96	0.42
1	16920.4*	Max WS	440.47	167.78	171.35	171.51	0.003277	3.41	169.07	173.78	0.42
1	16872.70	Max WS	440.46	167.26	171.14	171.36	0.004146	4.23	165.37	163.23	0.48
1	16822.9*	Max WS	451.73	167.36	170.92	171.14	0.004495	4.20	164.88	164.91	0.49
1	16773.1*	Max WS	451.78	167.46	170.73	170.92	0.004518	3.97	181.98	209.79	0.49

1	16723.4*	Max WS	451.80	167.57	170.56	170.69	0.003936	3.45	205.60	216.49	0.45
1	16673.66	Max WS	451.79	167.67	170.42	170.50	0.003258	2.90	239.72	253.89	0.40
1	16606.6*	Max WS	451.63	167.56	170.14	170.25	0.004974	3.40	236.82	323.33	0.49
1	16539.5*	Max WS	451.31	167.45	169.76	169.89	0.006332	3.70	202.28	275.35	0.55
1	16472.50	Max WS	451.35	167.34	169.54	169.59	0.002403	2.45	303.44	273.20	0.34
1	16374.4*	Max WS	455.68	166.82	169.29	169.34	0.002749	2.48	294.25	351.60	0.36
1	16276.30	Max WS	332.20	166.31	168.91	168.96	0.002461	2.14	233.05	453.77	0.34
1	16193.9*	Max WS	454.01	165.53	168.63	168.71	0.004807	3.06	268.81	444.40	0.47
1	16111.50	Max WS	453.91	164.75	168.51	168.55	0.001268	1.96	401.46	466.68	0.25
1	16044.4*	Max WS	453.12	164.60	168.42	168.48	0.001858	2.50	317.08	412.76	0.31
1	15977.4*	Max WS	453.09	164.46	168.31	168.42	0.002559	3.07	261.63	433.07	0.37
1	15910.45	Max WS	453.04	164.31	168.14	168.32	0.003430	3.68	182.63	400.77	0.43
1	15816.4*	Max WS	453.05	163.77	167.77	168.02	0.003711	4.10	133.30	94.06	0.46
1	15722.50	Max WS	452.72	163.23	166.82	167.39	0.011364	6.22	87.20	84.58	0.76
1	15661.2*	Max WS	452.20	163.03	166.69	166.84	0.003522	3.37	173.15	155.29	0.43
1	15600	Max WS	452.21	162.83	166.62	166.67	0.001305	2.02	305.54	281.07	0.26
1	15513.5*	Max WS	451.60	162.55	166.53	166.58	0.001246	1.96	315.52	318.93	0.25
1	15427.0*	Max WS	451.56	162.26	166.44	166.49	0.001295	1.95	316.87	342.27	0.26
1	15340.5*	Max WS	451.05	161.98	166.33	166.39	0.001517	2.01	300.80	361.18	0.28
1	15254.0*	Max WS	453.82	161.69	166.18	166.26	0.002141	2.23	235.46	355.57	0.32
1	15167.54	Max WS	453.51	161.41	165.86	165.99	0.004629	2.94	154.15	190.48	0.46
1	15068.7*	Max WS	453.51	161.32	165.53	165.65	0.002459	2.73	165.95	258.66	0.36
1	14970.01	Max WS	453.31	161.22	165.20	165.36	0.004100	3.63	174.17	254.53	0.46
1	14800.08	Max WS	452.64	160.07	164.59	164.71	0.004235	3.18	214.96	320.52	0.45
1	14745.2*	Max WS	452.28	160.00	164.41	164.54	0.002277	3.17	228.59	305.04	0.36
1	14690.37	Max WS	452.30	159.93	164.18	164.46	0.003368	4.50	175.02	289.69	0.44
1	14521.03	Max WS	452.39	159.74	163.67	163.80	0.004594	2.88	157.47	274.12	0.46
1	14350.55	Max WS	451.70	158.30	163.24	163.30	0.001794	2.38	312.60	357.24	0.31
1	14165.39	Max WS	462.55	159.11	162.64	162.80	0.004064	3.60	213.58	330.62	0.46
1	14077.1*	Max WS	469.20	158.60	162.38	162.53	0.002522	3.25	205.79	310.71	0.38
1	13988.90	Max WS	469.02	158.09	162.20	162.32	0.002450	3.01	244.70	353.57	0.36
1	13971	Max WS	468.99	158.18	162.07	162.29	0.001684	3.77	124.43	55.33	0.34
1	13920		Culvert								
1	13869	Max WS	468.99	158.18	161.56	161.86	0.002675	4.33	108.30	52.31	0.41
1	13817.08	Max WS	468.95	158.27	161.45	161.71	0.005256	4.28	148.68	164.28	0.52
1	13800.26	Max WS	468.70	157.92	161.31	161.62	0.007646	4.80	133.00	156.99	0.62
1	13716.8*	Max WS	468.35	157.68	160.95	161.15	0.004046	3.73	152.32	148.56	0.46
1	13633.46	Max WS	468.33	157.45	160.85	160.91	0.001388	2.24	321.58	300.01	0.27
1	13548.2*	Max WS	467.93	156.91	160.63	160.77	0.003315	3.19	200.71	268.42	0.41
1	13462.94	Max WS	467.56	156.37	160.38	160.51	0.003459	3.17	195.17	211.68	0.42
1	13372.7*	Max WS	467.09	155.87	160.11	160.24	0.003103	3.15	225.04	278.56	0.40
1	13282.48	Max WS	466.44	155.37	159.93	160.01	0.001885	2.65	324.78	413.14	0.31
1	13196.7*	Max WS	465.83	155.42	159.79	159.88	0.001887	2.63	285.47	351.11	0.32
1	13110.9*	Max WS	465.37	155.48	159.66	159.75	0.002049	2.60	266.51	321.60	0.33
1	13025.20	Max WS	465.41	155.53	159.42	159.57	0.003714	3.18	171.43	175.70	0.43
1	12934.78	Max WS	465.11	155.67	159.23	159.34	0.001915	2.95	253.27	228.79	0.33
1	12679.83	Max WS	466.33	154.84	158.00	158.33	0.007389	4.72	117.34	136.76	0.62
1	12514.10	Max WS	466.08	153.08	157.41	157.53	0.002607	3.31	227.99	250.50	0.38
1	12342.49	Max WS	465.85	153.74	157.05	157.13	0.002393	2.77	285.24	314.53	0.35
1	12168.87	Max WS	465.70	152.62	156.55	156.71	0.003421	3.56	232.78	356.23	0.43
1	11993.01	Max WS	464.15	152.46	156.01	156.15	0.003649	3.05	152.15	251.97	0.42
1	11820.19	Max WS	464.06	150.12	155.57	155.67	0.002006	2.47	189.48	194.70	0.32
1	11633.47	Max WS	472.44	151.10	154.80	155.01	0.005090	3.65	130.33	192.80	0.50

1	11460.48	Max WS	478.42	149.67	154.07	154.22	0.004495	3.10	158.55	237.75	0.46
1	11271.33	Max WS	477.98	147.60	153.58	153.68	0.001621	2.57	194.55	146.59	0.30
1	11146.79	Max WS	477.62	147.72	153.12	153.37	0.003566	3.95	120.81	149.82	0.43
1	10961.29	Max WS	476.66	149.08	152.58	152.73	0.003406	3.29	200.66	267.52	0.42
1	10777.64	Max WS	476.56	147.95	152.09	152.24	0.002130	3.15	153.40	234.72	0.35
1	10599.75	Max WS	475.76	147.94	151.42	151.64	0.005306	3.81	156.34	253.52	0.51
1	10484.71	Max WS	474.79	147.53	151.14	151.21	0.001903	2.49	292.98	281.28	0.32
1	10294.85	Max WS	474.43	146.18	150.68	150.81	0.002458	3.00	178.80	134.72	0.36
1	10111.02	Max WS	474.06	146.70	150.12	150.29	0.003750	3.40	151.67	399.44	0.44
1	9962.423	Max WS	472.71	144.81	149.11	149.51	0.007884	5.13	102.40	232.62	0.63
1	9876	Max WS	470.26	144.29	148.94	149.09	0.000933	3.16	148.84	59.88	0.26
1	9825.00		Culvert								
1	9774	Max WS	472.44	143.93	148.76	148.91	0.000828	3.05	154.66	61.00	0.24
1	9553.901	Max WS	473.07	143.12	148.33	148.52	0.002913	3.47	141.43	316.18	0.40
1	9362.452	Max WS	472.58	143.70	147.63	147.89	0.003797	4.16	113.71	45.18	0.46
1	9149.788	Max WS	472.06	141.77	147.36	147.39	0.000421	1.37	358.33	238.38	0.15
1	8963.549	Max WS	471.75	141.24	146.79	147.03	0.004287	3.95	133.42	137.02	0.47
1	8766.435	Max WS	471.23	142.65	146.08	146.25	0.003633	3.33	141.49	131.07	0.43
1	8577.282	Max WS	470.90	141.02	145.54	145.69	0.002362	3.06	158.39	94.28	0.36
1	8398.577	Max WS	470.45	141.01	145.24	145.35	0.001882	2.86	246.92	227.69	0.32
1	8223.925	Max WS	469.54	139.79	144.82	144.98	0.002749	3.51	194.08	161.25	0.39
1	8000	Max WS	483.98	139.29	144.42	144.51	0.001457	2.38	250.71	259.85	0.28
1	7744.065	Max WS	484.40	138.71	143.25	143.58	0.006703	4.62	105.61	71.24	0.58
1	7600	Max WS	483.91	138.31	142.86	142.97	0.002795	2.85	202.08	160.54	0.38
1	7400	Max WS	484.01	137.76	141.91	142.25	0.006470	4.69	103.27	53.60	0.59
1	7200	Max WS	483.34	137.20	141.09	141.27	0.003671	3.44	155.40	113.00	0.44
1	7000	Max WS	482.57	136.65	140.68	140.78	0.001605	2.54	214.80	154.51	0.30
1	6800	Max WS	482.87	136.09	140.49	140.54	0.000993	1.90	334.46	389.17	0.23
1	6545.718	Max WS	482.52	134.93	139.37	139.76	0.007360	5.52	155.81	272.49	0.61
1	6400	Max WS	483.20	135.02	138.93	139.04	0.002134	3.03	252.54	240.57	0.35
1	6200	Max WS	483.67	134.52	138.52	138.63	0.002956	3.16	264.65	353.32	0.40
1	6000	Max WS	483.72	134.02	138.11	138.21	0.002649	2.57	197.48	217.32	0.36
1	5800	Max WS	485.07	133.53	137.79	137.85	0.001275	2.11	286.80	204.83	0.26
1	5544.024	Max WS	485.59	132.89	137.01	137.22	0.004430	4.02	183.32	286.19	0.48
1	5310.353	Max WS	485.81	130.81	136.28	136.45	0.002550	3.33	146.07	294.91	0.38
1	5126.186	Max WS	485.88	131.42	136.00	136.09	0.001548	2.87	320.44	377.40	0.30
1	4928.496	Max WS	486.34	131.24	135.80	135.87	0.001253	2.31	305.53	354.20	0.26
1	4737.846	Max WS	487.20	130.80	135.42	135.54	0.002602	3.06	229.47	235.78	0.37
1	4542.183	Max WS	488.09	130.20	135.15	135.22	0.000753	2.29	306.99	313.27	0.22
1	4437.102	Max WS	488.35	131.50	134.82	134.99	0.004972	3.72	207.17	279.57	0.50
1	4246.329	Max WS	488.38	129.78	134.06	134.26	0.003924	4.00	228.59	372.42	0.45
1	4063.200	Max WS	488.00	129.05	133.52	133.67	0.002699	3.20	165.33	282.31	0.38
1	3863.200	Max WS	487.81	128.43	133.30	133.33	0.000649	1.68	515.73	480.56	0.19
1	3682.022	Max WS	488.14	127.89	133.19	133.22	0.000626	1.69	629.68	661.62	0.19
1	3487.742	Max WS	488.56	128.90	132.75	132.84	0.003649	3.05	306.08	515.36	0.42
1	3332.982	Max WS	489.04	129.37	132.36	132.42	0.001950	2.34	351.80	446.03	0.31
1	3152.554	Max WS	495.05	127.27	131.64	131.98	0.006140	4.69	105.66	381.54	0.56
1	2960.781	Max WS	495.72	128.00	130.93	131.08	0.003644	3.14	170.03	380.46	0.43
1	2800	Max WS	496.13	127.75	130.40	130.51	0.003987	3.02	257.59	345.54	0.44
1	2600	Max WS	496.58	127.22	129.89	129.96	0.002054	2.10	268.84	268.60	0.31
1	2436.651	Max WS	497.03	126.76	129.06	129.29	0.006659	3.88	130.27	194.07	0.56
1	2200	Max WS	497.38	125.72	128.01	128.14	0.003203	2.86	183.63	215.11	0.40
1	1800	Max WS	496.66	123.94	127.30	127.34	0.000962	1.68	316.49	238.22	0.22

1	1508.765	Max WS	496.17	122.64	126.49		126.76	0.003709	4.37	158.88	245.87	0.46
1	1238.804	Max WS	495.97	122.00	125.87		125.95	0.002116	2.21	224.65	152.60	0.32
1	947.7714	Max WS	495.85	122.00	125.12		125.25	0.002887	3.29	223.06	207.28	0.40
1	703.7460	Max WS	495.37	122.00	124.33		124.44	0.003863	2.78	233.80	363.84	0.43
1	413.4701	Max WS	495.21	120.00	123.29		123.46	0.003255	3.32	156.01	119.81	0.42
1	200.9584	Max WS	494.90	120.00	122.88		122.96	0.001521	2.48	296.24	282.03	0.29
1	10.31402	Max WS	494.87	120.00	122.47	121.85	122.57	0.002704	3.01	268.33	332.39	0.38

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 9:19:49 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms
Plan: 10 yr
developed with det - Full Shed Developed with Detention 10 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	76.95	220.00	221.05		221.10	0.005907	1.96	39.87	110.16	0.46
1	28313.0*	Max WS	76.94	219.58	220.63		220.69	0.005803	1.89	43.81	103.62	0.45
1	28226.0*	Max WS	76.94	219.15	220.17		220.23	0.006936	1.91	46.18	120.18	0.48
1	28139.07	Max WS	76.93	218.73	219.85		219.87	0.002908	1.33	69.42	145.64	0.32
1	28069.5*	Max WS	141.00	218.22	219.41		219.50	0.008477	2.47	65.52	135.97	0.56
1	28000	Max WS	141.00	217.71	218.89		218.97	0.008374	2.44	69.61	177.94	0.55
1	27900.*	Max WS	140.99	216.97	217.85		217.97	0.013056	2.75	51.36	98.70	0.67
1	27800	Max WS	140.97	216.23	217.17		217.21	0.002738	1.53	92.11	131.79	0.32
1	27700.*	Max WS	140.95	215.51	216.91		216.95	0.002477	1.65	85.66	101.97	0.32
1	27600	Max WS	140.94	214.80	216.43		216.53	0.006515	2.98	82.40	203.24	0.53
1	27500.*	Max WS	140.93	214.08	215.49		215.63	0.010599	3.38	65.92	171.51	0.65
1	27400	Max WS	140.90	213.35	214.86		214.89	0.002384	1.72	131.84	213.79	0.31

1	27329.7*	Max WS	140.89	212.84	214.64		214.71	0.004227	2.46	86.72	153.76	0.43
1	27259.5*	Max WS	140.89	212.32	214.31		214.43	0.005399	2.91	70.22	164.78	0.49
1	27189.29	Max WS	140.87	211.81	213.89		214.11	0.010067	3.72	37.91	37.16	0.65
1	27094.6*	Max WS	140.87	211.10	213.09		213.29	0.010137	3.59	39.27	41.51	0.65
1	27000	Max WS	140.86	210.39	212.44		212.57	0.006106	2.79	50.68	58.79	0.51
1	26900.*	Max WS	140.85	209.64	211.93		212.03	0.005425	2.51	56.19	64.05	0.47
1	26800	Max WS	140.85	208.88	211.26		211.38	0.008642	2.79	50.56	69.78	0.57
1	26700.*	Max WS	140.84	208.12	210.53		210.66	0.006637	2.88	48.82	51.95	0.52
1	26600	Max WS	140.73	207.37	210.07		210.18	0.003618	2.64	64.82	213.15	0.41
1	26528.4*	Max WS	140.68	206.83	209.84		209.93	0.003683	2.58	67.40	223.30	0.41
1	26456.8*	Max WS	140.57	206.29	209.56		209.66	0.004169	2.67	64.01	214.72	0.43
1	26385.31	Max WS	140.56	205.75	208.98		209.20	0.009322	3.74	37.62	83.21	0.62
1	26292.6*	Max WS	140.55	205.40	207.96		208.21	0.012473	4.04	36.36	58.60	0.72
1	26200	Max WS	140.54	205.06	207.10		207.25	0.007743	3.14	44.80	47.40	0.57
1	26100.*	Max WS	140.53	204.69	206.47		206.57	0.005908	2.58	54.53	63.41	0.49
1	26000	Max WS	140.52	204.32	206.06		206.12	0.003276	1.92	73.26	85.25	0.36
1	25900.*	Max WS	140.51	203.95	205.74		205.80	0.003403	1.94	72.40	85.27	0.37
1	25800	Max WS	140.47	203.57	205.47		205.52	0.002584	1.69	83.08	97.95	0.32
1	25700.*	Max WS	174.33	203.20	205.08		205.18	0.005082	2.54	74.28	190.50	0.46
1	25600	Max WS	174.28	202.83	204.83		204.86	0.002101	2.13	175.60	266.94	0.32
1	25500.*	Max WS	245.75	202.46	204.45		204.55	0.005544	3.29	147.69	287.69	0.51
1	25400	Max WS	245.70	202.09	204.13		204.18	0.002658	2.18	188.30	318.71	0.35
1	25358.8*	Max WS	245.69	202.00	204.01		204.08	0.003648	2.54	170.58	337.81	0.41
1	25317.6*	Max WS	245.68	201.92	203.85		203.93	0.004699	2.75	153.99	298.86	0.46
1	25276.3*	Max WS	245.67	201.83	203.67		203.74	0.005510	2.73	144.43	260.39	0.48
1	25235.1*	Max WS	102.29	201.75	203.54		203.55	0.000725	0.92	161.74	240.50	0.17
1	25193.99	Max WS	245.67	201.66	203.30		203.33	0.004619	1.89	161.56	222.17	0.41
1	25145.4*	Max WS	245.66	201.36	203.01		203.08	0.006311	2.41	131.86	211.85	0.49
1	25097.*	Max WS	245.65	201.05	202.59		202.71	0.009624	2.88	96.65	185.39	0.61
1	25048.5*	Max WS	245.62	200.75	202.22		202.31	0.006736	2.48	99.71	146.83	0.51
1	25000	Max WS	245.61	200.45	202.06		202.10	0.002136	1.60	156.07	207.94	0.30
1	24900.*	Max WS	245.56	200.04	201.82		201.87	0.002490	1.88	138.11	169.57	0.33
1	24800	Max WS	245.55	199.63	201.45		201.55	0.004536	2.62	104.90	130.97	0.45
1	24700.*	Max WS	245.52	199.20	201.00		201.12	0.005978	3.00	106.94	185.14	0.51
1	24600	Max WS	245.49	198.77	200.35		200.47	0.008594	3.48	127.63	275.91	0.61
1	24500.*	Max WS	198.52	198.34	199.82		199.85	0.002717	1.67	175.01	294.06	0.33
1	24400	Max WS	191.08	197.91	199.73		199.73	0.000271	0.62	425.64	454.94	0.11
1	24328.0*	Max WS	184.84	197.60	199.71		199.72	0.000227	0.56	446.92	454.10	0.10
1	24256.1*	Max WS	178.23	197.29	199.70		199.75	0.002407	1.83	98.19	447.36	0.32
1	24184.18	Max WS	282.21	196.98	199.20	199.25	199.64	0.031206	5.32	53.04	355.98	1.09
1	24092.0*	Max WS	245.45	196.51	198.56		198.62	0.005496	2.49	161.11	313.59	0.47
1	24000	Max WS	245.43	196.03	198.16		198.31	0.008375	3.35	112.33	353.78	0.60
1	23900.*	Max WS	245.41	195.51	197.55		197.65	0.007928	3.03	124.04	256.39	0.57
1	23800	Max WS	245.39	194.99	197.08		197.12	0.003142	1.90	185.56	254.94	0.36
1	23700.*	Max WS	245.37	194.47	196.74		196.79	0.003699	2.33	165.78	259.20	0.40
1	23600	Max WS	245.35	193.95	196.09		196.22	0.008651	3.48	116.02	360.47	0.61
1	23400	Max WS	245.32	192.92	195.31		195.34	0.001027	1.61	203.78	195.37	0.23
1	23178.25	Max WS	245.24	191.76	194.70		194.85	0.004528	3.63	118.23	184.55	0.47
1	23000	Max WS	245.20	191.25	193.91		194.05	0.004657	3.00	81.65	63.06	0.47
1	22600	Max WS	327.50	190.00	192.52		192.62	0.002509	2.55	141.73	226.33	0.35
1	22400	Max WS	327.33	189.54	192.25		192.28	0.000807	1.40	263.11	243.04	0.20
1	22175.79	Max WS	327.25	188.90	191.35		191.60	0.008016	4.10	95.04	186.98	0.62
1	22000	Max WS	327.20	188.07	190.64		190.75	0.002899	2.70	134.84	129.49	0.38

1	21900.*	Max WS	374.23	187.59	190.30		190.42	0.003363	2.79	141.31	141.98	0.40
1	21800	Max WS	374.14	187.11	190.07		190.15	0.002304	2.34	166.35	224.91	0.34
1	21600	Max WS	374.11	186.14	189.07		189.32	0.007127	4.10	98.97	91.22	0.59
1	21400	Max WS	374.08	185.21	188.47		188.51	0.001033	1.75	220.48	154.62	0.23
1	21176.29	Max WS	284.83	184.07	187.93		188.03	0.002112	2.58	131.45	189.10	0.33
1	20962.10	Max WS	373.47	184.10	187.16		187.22	0.002980	2.41	218.70	237.48	0.37
1	20921.9*	Max WS	395.37	184.01	187.04		187.12	0.002745	2.51	224.00	237.77	0.36
1	20881.8*	Max WS	395.35	183.92	186.94		187.02	0.002313	2.51	227.80	233.66	0.34
1	20841.7*	Max WS	395.34	183.83	186.85		186.93	0.002237	2.62	224.56	227.27	0.34
1	20801.6*	Max WS	395.23	183.74	186.74		186.84	0.002742	2.91	208.94	218.21	0.38
1	20761.52	Max WS	394.78	183.65	186.51		186.69	0.006484	3.95	159.22	203.36	0.56
1	20712.0*	Max WS	407.64	182.57	186.07	185.72	186.44	0.010478	4.95	94.90	171.36	0.71
1	20662.66	Max WS	407.63	181.49	185.69		185.98	0.006232	4.27	95.46	53.13	0.56
1	20655.8*	Max WS	407.64	181.50	185.65		185.95	0.007006	4.43	92.09	52.97	0.59
1	20648.9*	Max WS	407.65	181.52	185.60		185.94	0.008419	4.69	86.91	52.18	0.64
1	20642.13	Max WS	407.66	181.53	185.40		185.88	0.013775	5.57	73.24	48.43	0.80
1	20614.23	Max WS	407.72	180.88	185.48		185.58	0.001669	2.48	164.43	168.67	0.30
1	20399.06	Max WS	346.84	181.78	185.12		185.15	0.001446	1.71	324.55	403.86	0.26
1	20131.75	Max WS	408.41	180.89	184.04		184.33	0.007540	4.44	107.26	324.94	0.61
1	19831.49	Max WS	408.46	179.01	182.18		182.52	0.006849	4.69	87.03	85.72	0.59
1	19561.71	Max WS	415.91	176.06	181.32		181.40	0.001188	2.22	187.06	80.91	0.26
1	19375.20	Max WS	415.86	173.23	181.23		181.26	0.000246	1.57	266.42	219.08	0.13
1	19216.24	Max WS	415.82	176.81	181.10		181.16	0.001459	2.70	318.40	290.36	0.29
1	19040.62	Max WS	415.82	176.76	180.64		180.78	0.003087	3.39	186.43	459.55	0.40
1	18997.3*	Max WS	415.75	176.80	180.45		180.65	0.003948	3.78	137.30	402.45	0.46
1	18953.9*	Max WS	415.78	176.83	180.41		180.60	0.003473	3.54	134.92	379.64	0.43
1	18910.6*	Max WS	415.79	176.87	180.30		180.49	0.003893	3.58	125.97	371.49	0.45
1	18867.36	Max WS	415.78	176.91	179.98		180.25	0.006393	4.20	98.89	72.30	0.57
1	18661.93	Max WS	415.56	175.46	179.11		179.25	0.003618	3.42	204.63	339.28	0.43
1	18573.2*	Max WS	421.73	174.86	178.76		178.95	0.003758	3.84	181.19	280.44	0.45
1	18484.66	Max WS	421.48	174.25	178.26		178.60	0.005563	4.84	114.18	179.34	0.55
1	18313.08	Max WS	421.61	174.93	177.53		177.73	0.004368	3.58	117.64	249.43	0.47
1	18226	Max WS	421.57	173.87	177.20		177.44	0.002281	3.96	106.55	52.14	0.38
1	18175		Culvert									
1	18123	Max WS	421.57	173.46	176.80		177.04	0.002257	3.94	106.90	52.04	0.38
1	17964.88	Max WS	421.54	172.77	176.04		176.38	0.007313	4.85	117.75	212.55	0.61
1	17929.0*	Max WS	421.61	172.49	175.85		176.10	0.005916	4.19	131.78	205.66	0.55
1	17893.2*	Max WS	421.65	172.22	175.69		175.89	0.005482	3.79	145.46	206.60	0.52
1	17857.44	Max WS	421.72	171.94	175.44		175.67	0.007887	3.98	133.16	198.21	0.61
1	17638.59	Max WS	422.03	171.98	174.50		174.55	0.002306	2.34	349.82	549.35	0.33
1	17570.8*	Max WS	422.11	171.69	174.22		174.34	0.004748	3.26	229.58	459.16	0.48
1	17503.0*	Max WS	422.22	171.40	173.79		173.96	0.007094	3.70	157.67	240.42	0.57
1	17435.23	Max WS	422.33	171.11	173.56		173.61	0.002408	2.28	271.82	278.06	0.34
1	17347.3*	Max WS	359.84	170.31	173.38		173.42	0.001695	2.06	316.39	503.61	0.29
1	17259.39	Max WS	422.70	169.51	172.90		173.19	0.009773	4.83	127.58	460.15	0.68
1	17161.6*	Max WS	422.77	169.43	172.40		172.56	0.005499	3.35	181.82	353.23	0.51
1	17063.83	Max WS	422.92	169.35	171.90		172.04	0.005501	3.03	139.81	121.27	0.50
1	17016.0*	Max WS	422.97	168.83	171.67		171.81	0.004371	2.99	145.82	141.73	0.45
1	16968.2*	Max WS	423.07	168.30	171.49		171.63	0.003475	3.07	153.27	167.25	0.42
1	16920.4*	Max WS	423.15	167.78	171.32		171.48	0.003239	3.36	163.50	172.24	0.42
1	16872.70	Max WS	423.24	167.26	171.11		171.32	0.004099	4.17	160.16	162.06	0.47
1	16822.9*	Max WS	434.74	167.36	170.89		171.10	0.004421	4.13	160.39	163.49	0.49
1	16773.1*	Max WS	434.82	167.46	170.70		170.88	0.004481	3.91	176.31	207.49	0.49

1	16723.4*	Max WS	434.91	167.57	170.54		170.66	0.003888	3.40	200.29	213.73	0.45
1	16673.66	Max WS	434.99	167.67	170.40		170.48	0.003213	2.85	234.04	253.01	0.40
1	16606.6*	Max WS	435.07	167.56	170.12		170.23	0.004999	3.37	229.78	322.07	0.49
1	16539.5*	Max WS	435.13	167.45	169.74		169.87	0.006358	3.69	195.63	271.13	0.55
1	16472.50	Max WS	435.23	167.34	169.51		169.56	0.002385	2.42	296.71	271.87	0.34
1	16374.4*	Max WS	439.91	166.82	169.27		169.32	0.002739	2.45	286.25	342.20	0.36
1	16276.30	Max WS	320.81	166.31	168.90		168.94	0.002413	2.11	228.91	450.30	0.33
1	16193.9*	Max WS	440.02	165.53	168.59		168.68	0.005253	3.14	252.68	429.72	0.49
1	16111.50	Max WS	439.94	164.75	168.47		168.50	0.001343	1.98	380.21	459.02	0.26
1	16044.4*	Max WS	439.99	164.60	168.37		168.43	0.002028	2.57	294.37	394.86	0.32
1	15977.4*	Max WS	440.02	164.46	168.24		168.36	0.002862	3.18	231.50	381.18	0.39
1	15910.45	Max WS	440.02	164.31	168.04		168.25	0.003949	3.85	152.10	257.14	0.46
1	15816.4*	Max WS	429.65	163.77	167.64		167.90	0.004130	4.17	121.19	88.71	0.48
1	15722.50	Max WS	440.27	163.23	166.89		167.38	0.009560	5.82	92.61	89.50	0.70
1	15661.2*	Max WS	440.19	163.03	166.67		166.82	0.003492	3.33	169.93	154.38	0.43
1	15600	Max WS	440.12	162.83	166.60		166.65	0.001292	2.00	299.78	278.01	0.26
1	15513.5*	Max WS	440.19	162.55	166.51		166.56	0.001239	1.94	309.09	315.22	0.25
1	15427.0*	Max WS	440.12	162.26	166.42		166.47	0.001294	1.93	309.90	340.56	0.26
1	15340.5*	Max WS	440.19	161.98	166.31		166.36	0.001530	2.00	293.10	358.47	0.28
1	15254.0*	Max WS	443.03	161.69	166.16		166.23	0.002152	2.22	230.55	347.11	0.32
1	15167.54	Max WS	443.03	161.41	165.84		165.97	0.004579	2.92	151.49	186.73	0.46
1	15068.7*	Max WS	443.07	161.32	165.51		165.63	0.002421	2.70	164.19	254.02	0.35
1	14970.01	Max WS	443.18	161.22	165.18		165.34	0.004063	3.59	171.48	251.75	0.46
1	14800.08	Max WS	443.18	160.07	164.57		164.70	0.004307	3.19	209.30	318.70	0.45
1	14745.2*	Max WS	443.15	160.00	164.39		164.52	0.002304	3.17	221.80	303.67	0.36
1	14690.37	Max WS	443.22	159.93	164.17		164.44	0.003366	4.49	169.65	287.88	0.44
1	14521.03	Max WS	443.44	159.74	163.66		163.79	0.004577	2.85	155.63	271.79	0.45
1	14350.55	Max WS	441.38	158.30	163.23		163.29	0.001760	2.35	309.04	356.09	0.30
1	14165.39	Max WS	455.06	159.11	162.63		162.79	0.004141	3.61	207.94	328.90	0.46
1	14077.1*	Max WS	461.76	158.60	162.36		162.51	0.002557	3.25	199.30	305.32	0.38
1	13988.90	Max WS	461.79	158.09	162.17		162.30	0.002541	3.04	235.42	349.62	0.37
1	13971	Max WS	461.77	158.18	162.05		162.26	0.001664	3.73	123.71	55.20	0.33
1	13920		Culvert									
1	13869	Max WS	461.74	158.18	161.55		161.84	0.002618	4.28	107.98	52.25	0.41
1	13817.08	Max WS	461.74	158.27	161.44		161.69	0.005232	4.25	146.72	163.42	0.52
1	13800.26	Max WS	461.67	157.92	161.30		161.61	0.007610	4.77	131.36	156.25	0.62
1	13716.8*	Max WS	461.62	157.68	160.94		161.14	0.004037	3.71	150.37	147.50	0.46
1	13633.46	Max WS	461.66	157.45	160.84		160.90	0.001395	2.23	317.33	299.36	0.27
1	13548.2*	Max WS	461.60	156.91	160.62		160.76	0.003353	3.19	196.57	264.90	0.42
1	13462.94	Max WS	461.56	156.37	160.36		160.50	0.003502	3.17	191.80	209.37	0.42
1	13372.7*	Max WS	461.50	155.87	160.09		160.22	0.003169	3.16	220.19	276.05	0.40
1	13282.48	Max WS	461.55	155.37	159.91		159.99	0.001959	2.68	315.21	405.69	0.32
1	13196.7*	Max WS	461.49	155.42	159.76		159.85	0.002003	2.68	274.53	345.93	0.33
1	13110.9*	Max WS	461.55	155.48	159.62		159.71	0.002228	2.68	252.85	315.37	0.34
1	13025.20	Max WS	461.57	155.53	159.35		159.51	0.004277	3.34	159.19	174.82	0.46
1	12934.78	Max WS	461.26	155.67	159.10		159.23	0.002500	3.26	223.75	224.66	0.37
1	12679.83	Max WS	463.02	154.84	158.07	157.55	158.36	0.006216	4.44	138.72	457.06	0.57
1	12514.10	Max WS	462.92	153.08	157.40		157.52	0.002598	3.30	226.77	248.01	0.38
1	12342.49	Max WS	463.03	153.74	157.05		157.13	0.002388	2.76	284.04	314.20	0.35
1	12168.87	Max WS	463.07	152.62	156.55		156.70	0.003414	3.56	231.64	355.97	0.43
1	11993.01	Max WS	462.63	152.46	156.00		156.15	0.003638	3.05	151.92	250.83	0.42
1	11820.19	Max WS	462.71	150.12	155.57		155.67	0.002001	2.47	189.26	194.31	0.32
1	11633.47	Max WS	471.84	151.10	154.80		155.01	0.005070	3.64	130.41	192.96	0.50

1	11460.48	Max WS	478.38	149.67	154.07		154.22	0.004471	3.10	159.00	239.31	0.46
1	11271.33	Max WS	478.25	147.60	153.58		153.68	0.001619	2.56	194.89	147.09	0.30
1	11146.79	Max WS	477.97	147.72	153.13		153.37	0.003561	3.95	120.93	150.03	0.43
1	10961.29	Max WS	477.82	149.08	152.59		152.74	0.003405	3.28	201.65	269.56	0.42
1	10777.64	Max WS	477.83	147.95	152.09		152.24	0.002134	3.16	153.62	235.70	0.35
1	10599.75	Max WS	476.36	147.94	151.43		151.64	0.005292	3.81	156.88	254.41	0.51
1	10484.71	Max WS	475.57	147.53	151.14		151.21	0.001915	2.50	292.58	281.26	0.32
1	10294.85	Max WS	474.80	146.18	150.67		150.81	0.002482	3.01	178.14	134.67	0.36
1	10111.02	Max WS	475.06	146.70	150.10		150.28	0.003869	3.44	149.81	396.20	0.45
1	9962.423	Max WS	473.67	144.81	149.13		149.52	0.007818	5.09	103.67	236.30	0.63
1	9876	Max WS	471.90	144.29	148.94		149.10	0.000935	3.17	149.05	59.92	0.26
1	9825.00		Culvert									
1	9774	Max WS	470.10	143.93	148.77		148.91	0.000818	3.04	154.72	61.01	0.24
1	9553.901	Max WS	468.76	143.12	148.32		148.50	0.002931	3.46	139.88	312.29	0.40
1	9362.452	Max WS	481.92	143.70	147.65		147.92	0.003869	4.20	114.62	45.39	0.47
1	9149.788	Max WS	479.91	141.77	147.37		147.40	0.000430	1.38	360.55	239.58	0.15
1	8963.549	Max WS	476.54	141.24	146.80		147.04	0.004273	3.96	135.29	139.88	0.47
1	8766.435	Max WS	476.29	142.65	146.09		146.26	0.003633	3.34	142.49	133.17	0.43
1	8577.282	Max WS	475.50	141.02	145.56		145.70	0.002371	3.07	159.51	95.20	0.36
1	8398.577	Max WS	475.36	141.01	145.25		145.36	0.001884	2.87	249.34	229.15	0.32
1	8223.925	Max WS	475.13	139.79	144.82		144.98	0.002788	3.54	195.11	161.83	0.39
1	8000	Max WS	489.72	139.29	144.42		144.51	0.001498	2.42	250.14	259.44	0.29
1	7744.065	Max WS	490.37	138.71	143.27		143.60	0.006626	4.63	107.16	75.08	0.58
1	7600	Max WS	490.25	138.31	142.86		142.98	0.002865	2.89	202.17	160.58	0.38
1	7400	Max WS	490.65	137.76	141.93		142.28	0.006428	4.71	104.43	53.95	0.58
1	7200	Max WS	490.66	137.20	141.11		141.29	0.003645	3.45	157.63	114.42	0.44
1	7000	Max WS	490.50	136.65	140.70		140.80	0.001592	2.55	218.62	156.12	0.30
1	6800	Max WS	490.94	136.09	140.51		140.56	0.000970	1.89	344.48	390.65	0.23
1	6545.718	Max WS	490.73	134.93	139.39		139.77	0.007255	5.50	160.74	275.32	0.60
1	6400	Max WS	491.49	135.02	138.94		139.05	0.002160	3.06	255.02	241.31	0.35
1	6200	Max WS	492.31	134.52	138.53		138.65	0.002931	3.15	270.31	354.27	0.39
1	6000	Max WS	492.98	134.02	138.13		138.23	0.002637	2.59	201.49	218.73	0.36
1	5800	Max WS	494.31	133.53	137.80		137.87	0.001292	2.13	290.03	206.71	0.26
1	5544.024	Max WS	495.36	132.89	137.03		137.24	0.004373	4.02	189.58	290.55	0.48
1	5310.353	Max WS	496.14	130.81	136.30		136.47	0.002612	3.37	147.14	297.88	0.38
1	5126.186	Max WS	496.73	131.42	136.02		136.13	0.001772	3.09	330.55	554.25	0.32
1	4928.496	Max WS	497.40	131.24	135.82		135.89	0.001261	2.33	312.57	359.93	0.27
1	4737.846	Max WS	498.39	130.80	135.44		135.56	0.002616	3.09	233.65	236.33	0.37
1	4542.183	Max WS	499.31	130.20	135.17		135.24	0.000770	2.32	311.75	314.19	0.22
1	4437.102	Max WS	499.75	131.50	134.84		135.01	0.004930	3.73	212.30	280.88	0.50
1	4246.329	Max WS	500.30	129.78	134.09		134.28	0.003796	3.96	238.92	373.30	0.45
1	4063.200	Max WS	500.42	129.05	133.54		133.70	0.002735	3.24	168.34	285.58	0.38
1	3863.200	Max WS	500.87	128.43	133.32		133.35	0.000652	1.69	526.12	481.08	0.19
1	3682.022	Max WS	501.73	127.89	133.22		133.24	0.000623	1.69	643.97	662.31	0.19
1	3487.742	Max WS	501.81	128.90	132.75		132.85	0.003754	3.10	309.33	515.52	0.43
1	3332.982	Max WS	502.06	129.37	132.32		132.39	0.002321	2.51	334.91	445.20	0.34
1	3152.554	Max WS	508.57	127.27	131.70	130.73	132.04	0.006014	4.67	113.71	403.72	0.56
1	2960.781	Max WS	509.35	128.00	130.95		131.11	0.003682	3.18	174.57	388.00	0.43
1	2800	Max WS	509.98	127.75	130.42		130.53	0.003970	3.04	263.83	347.02	0.44
1	2600	Max WS	510.64	127.22	129.91		129.98	0.002058	2.12	274.27	269.74	0.31
1	2436.651	Max WS	511.22	126.76	129.09		129.32	0.006754	3.92	133.43	200.72	0.57
1	2200	Max WS	511.87	125.72	128.04		128.17	0.003183	2.89	189.62	217.65	0.40
1	1800	Max WS	511.51	123.94	127.33		127.38	0.000948	1.69	325.38	241.86	0.22

1	1508.765	Max WS	511.26	122.64	126.53		126.79	0.003712	4.41	163.99	254.08	0.46
1	1238.804	Max WS	511.16	122.00	125.90		125.98	0.002125	2.23	229.34	154.07	0.32
1	947.7714	Max WS	511.09	122.00	125.14		125.27	0.002941	3.34	227.08	209.02	0.40
1	703.7460	Max WS	510.84	122.00	124.36		124.47	0.003759	2.78	243.54	366.09	0.42
1	413.4701	Max WS	510.77	120.00	123.32		123.49	0.003310	3.37	159.08	124.33	0.42
1	200.9584	Max WS	510.67	120.00	122.90		122.98	0.001546	2.51	302.59	284.75	0.29
1	10.31402	Max WS	510.60	120.00	122.49	121.88	122.59	0.002719	3.04	275.33	334.00	0.38

Unnamed Deer Creek Tributary

Developed Conditions Model:

100-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 9:00:51 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms
Plan: 100 yr developed no det - Full Shed Developed without Detention 100 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	276.60	220.00	221.61		221.69	0.004353	2.63	151.70	236.83	0.44
1	28313.0*	Max WS	275.41	219.58	221.16		221.29	0.006390	3.04	110.11	156.54	0.53
1	28226.0*	Max WS	273.36	219.15	220.74		220.84	0.005424	2.72	124.26	163.67	0.48
1	28139.07	Max WS	272.57	218.73	220.50		220.55	0.002437	1.99	182.03	243.42	0.33
1	28069.5*	Max WS	483.15	218.22	219.98		220.14	0.007933	3.57	183.63	242.49	0.59
1	28000	Max WS	482.72	217.71	219.46		219.61	0.007453	3.47	177.92	200.96	0.58
1	27900.*	Max WS	481.20	216.97	218.48		218.70	0.011227	3.81	129.91	179.34	0.69
1	27800	Max WS	480.57	216.23	217.90		217.99	0.003269	2.35	204.25	200.03	0.38
1	27700.*	Max WS	478.51	215.51	217.53		217.65	0.003711	2.87	205.22	244.32	0.42
1	27600	Max WS	478.13	214.80	216.97		217.12	0.007397	4.25	204.65	248.51	0.60
1	27500.*	Max WS	476.33	214.08	216.10		216.27	0.008358	4.33	191.88	241.19	0.64
1	27400	Max WS	473.73	213.35	215.59		215.64	0.002381	2.53	304.67	260.89	0.35
1	27329.7*	Max WS	473.39	212.84	215.34		215.46	0.004633	3.57	216.68	222.72	0.48

1	27259.5*	Max WS	472.75	212.32	215.06		215.19	0.004655	3.64	219.37	229.85	0.49
1	27189.29	Max WS	471.24	211.81	214.70		214.88	0.006530	4.21	193.01	246.10	0.57
1	27094.6*	Max WS	470.68	211.10	213.98		214.26	0.008063	4.67	147.93	181.29	0.64
1	27000	Max WS	469.21	210.39	213.31		213.58	0.006483	4.38	131.95	129.87	0.58
1	26900.*	Max WS	468.71	209.64	212.72		212.96	0.006229	4.08	140.19	161.97	0.56
1	26800	Max WS	467.10	208.88	212.11		212.34	0.006519	3.92	141.37	193.49	0.56
1	26700.*	Max WS	466.86	208.12	211.20		211.56	0.010634	5.01	120.50	212.00	0.72
1	26600	Max WS	465.05	207.37	210.68		210.81	0.004097	3.63	242.35	317.30	0.46
1	26528.4*	Max WS	464.54	206.83	210.41		210.52	0.004024	3.47	249.45	316.39	0.45
1	26456.8*	Max WS	463.70	206.29	210.13		210.23	0.004069	3.33	254.90	322.40	0.45
1	26385.31	Max WS	462.96	205.75	209.68		209.84	0.007712	4.04	208.71	341.95	0.59
1	26292.6*	Max WS	461.61	205.40	208.73		209.01	0.011549	4.85	153.69	334.78	0.73
1	26200	Max WS	461.15	205.06	207.90		208.13	0.007321	4.23	156.40	235.89	0.60
1	26100.*	Max WS	459.63	204.69	207.28		207.47	0.006304	3.63	157.61	213.43	0.55
1	26000	Max WS	457.62	204.32	206.89		206.99	0.003196	2.64	208.86	219.69	0.39
1	25900.*	Max WS	457.30	203.95	206.53		206.65	0.004027	2.81	188.99	244.75	0.43
1	25800	Max WS	456.89	203.57	206.17		206.28	0.003708	2.68	194.92	308.27	0.42
1	25700.*	Max WS	544.68	203.20	205.77		205.90	0.003991	3.25	261.67	313.33	0.45
1	25600	Max WS	543.50	202.83	205.54		205.58	0.002243	2.88	394.59	353.88	0.35
1	25500.*	Max WS	766.81	202.46	205.14		205.25	0.005018	4.15	384.29	403.70	0.52
1	25400	Max WS	763.67	202.09	204.82		204.89	0.002810	3.03	467.77	453.71	0.39
1	25358.8*	Max WS	763.44	202.00	204.70		204.78	0.003341	3.29	436.37	437.77	0.42
1	25317.6*	Max WS	763.03	201.92	204.56		204.65	0.003948	3.49	407.66	423.18	0.45
1	25276.3*	Max WS	762.48	201.83	204.39		204.50	0.004589	3.60	384.16	411.01	0.48
1	25235.1*	Max WS	760.68	201.75	204.21		204.32	0.005292	3.62	366.75	403.86	0.51
1	25193.99	Max WS	760.57	201.66	204.00		204.11	0.006214	3.58	359.76	417.42	0.54
1	25145.4*	Max WS	760.26	201.36	203.65		203.81	0.007239	3.90	292.38	336.86	0.59
1	25097.*	Max WS	758.29	201.05	203.26		203.46	0.007426	3.93	250.59	284.38	0.59
1	25048.5*	Max WS	758.10	200.75	203.01		203.16	0.004564	3.26	275.31	274.99	0.47
1	25000	Max WS	757.72	200.45	202.92		203.00	0.001868	2.34	364.19	264.60	0.31
1	24900.*	Max WS	756.79	200.04	202.69		202.80	0.002421	2.74	328.78	248.59	0.36
1	24800	Max WS	755.43	199.63	202.25		202.45	0.005438	3.90	247.91	222.68	0.53
1	24700.*	Max WS	755.15	199.20	201.59		201.85	0.008133	4.70	239.98	262.46	0.64
1	24600	Max WS	754.44	198.77	200.93		201.08	0.007712	4.46	305.72	334.05	0.62
1	24500.*	Max WS	753.30	198.34	200.34		200.44	0.005429	3.29	338.00	339.42	0.50
1	24400	Max WS	751.26	197.91	200.07		200.10	0.001561	1.80	589.45	492.21	0.27
1	24328.0*	Max WS	750.97	197.60	199.98		200.01	0.001770	1.82	569.95	478.77	0.29
1	24256.1*	Max WS	750.56	197.29	199.81		199.84	0.002366	1.92	519.67	457.72	0.32
1	24184.18	Max WS	749.20	196.98	199.56	199.85	200.89	0.063029	9.25	81.03	418.61	1.63
1	24092.0*	Max WS	748.65	196.51	199.20		199.27	0.004317	2.86	403.63	412.48	0.45
1	24000	Max WS	747.71	196.03	198.74		198.88	0.006208	3.88	326.95	378.61	0.55
1	23900.*	Max WS	746.59	195.51	198.19		198.33	0.006575	3.84	321.13	370.62	0.56
1	23800	Max WS	745.02	194.99	197.76		197.83	0.003591	2.81	375.57	306.81	0.42
1	23700.*	Max WS	744.43	194.47	197.26		197.39	0.005602	3.75	318.79	316.21	0.53
1	23600	Max WS	740.41	193.95	196.74		196.85	0.005265	3.77	358.84	391.21	0.52
1	23400	Max WS	737.26	192.92	196.17		196.25	0.001585	2.68	406.31	264.97	0.30
1	23178.25	Max WS	736.29	191.76	195.57		195.74	0.004272	4.51	293.94	208.44	0.48
1	23000	Max WS	735.40	191.25	194.75		194.97	0.004847	4.14	259.38	252.93	0.51
1	22600	Max WS	915.45	190.00	193.43		193.54	0.002223	3.24	479.61	438.21	0.36
1	22400	Max WS	910.44	189.54	193.13		193.19	0.001094	2.20	529.32	347.98	0.25
1	22175.79	Max WS	907.81	188.90	192.32		192.55	0.005002	4.62	313.28	255.65	0.53
1	22000	Max WS	907.15	188.07	191.64		191.85	0.003180	3.93	319.80	236.60	0.43
1	21900.*	Max WS	1010.14	187.59	191.33		191.51	0.002964	3.73	365.18	252.91	0.41

1	21800	Max WS	1010.09	187.11	191.15		191.27	0.001835	3.00	448.13	272.42	0.33
1	21600	Max WS	1008.73	186.14	190.08		190.49	0.007219	5.54	261.32	253.03	0.64
1	21400	Max WS	1006.94	185.21	189.40		189.53	0.001657	2.93	399.62	228.94	0.31
1	21176.29	Max WS	1004.72	184.07	188.72		188.97	0.004462	4.71	345.54	276.53	0.51
1	20962.10	Max WS	1002.13	184.10	188.08		188.19	0.002968	3.16	474.55	351.79	0.39
1	20921.9*	Max WS	1032.51	184.01	187.96		188.08	0.002716	3.33	471.52	323.89	0.39
1	20881.8*	Max WS	1032.26	183.92	187.86		187.98	0.002493	3.42	466.49	303.84	0.38
1	20841.7*	Max WS	1032.00	183.83	187.75		187.88	0.002557	3.62	452.61	289.78	0.39
1	20801.6*	Max WS	1031.72	183.74	187.63		187.78	0.003054	3.96	424.08	275.81	0.42
1	20761.52	Max WS	1031.46	183.65	187.45		187.64	0.004721	4.58	372.78	259.23	0.51
1	20712.0*	Max WS	1053.88	182.57	187.08		187.41	0.006249	5.35	316.93	328.92	0.60
1	20662.66	Max WS	1053.56	181.49	186.93		187.12	0.003342	4.12	437.17	375.12	0.44
1	20655.8*	Max WS	1053.54	181.50	186.91		187.10	0.003462	4.19	433.57	375.78	0.45
1	20648.9*	Max WS	1053.52	181.52	186.88		187.08	0.003626	4.24	432.76	378.78	0.46
1	20642.13	Max WS	1049.25	181.53	185.94	186.50	187.57	0.038941	10.26	104.43	154.88	1.38
1	20614.23	Max WS	1052.27	180.88	186.20		186.42	0.003373	4.08	349.12	369.60	0.44
1	20399.06	Max WS	1050.36	181.78	185.67		185.76	0.002757	2.97	556.86	425.95	0.38
1	20131.75	Max WS	1049.23	180.89	184.84		184.98	0.003570	3.97	472.41	384.48	0.45
1	19831.49	Max WS	1051.05	179.01	183.35		183.68	0.006511	5.24	300.86	248.91	0.60
1	19561.71	Max WS	1075.98	176.06	182.21		182.45	0.002989	3.98	295.95	221.01	0.42
1	19375.20	Max WS	1073.54	173.23	181.97		182.16	0.000997	3.48	317.31	323.57	0.26
1	19216.24	Max WS	1038.74	176.81	181.70		181.83	0.002834	4.29	509.61	349.04	0.41
1	19040.62	Max WS	843.45	176.76	181.49		181.51	0.000613	1.88	865.92	542.70	0.19
1	18997.3*	Max WS	831.93	176.80	181.46		181.49	0.000692	2.05	782.54	511.67	0.21
1	18953.9*	Max WS	821.30	176.83	181.43		181.47	0.000769	2.17	711.25	474.19	0.22
1	18910.6*	Max WS	821.26	176.87	181.39		181.44	0.000853	2.25	655.18	421.50	0.23
1	18867.36	Max WS	811.68	176.91	181.33		181.40	0.001281	2.68	487.28	299.60	0.28
1	18661.93	Max WS	802.95	175.46	181.22		181.23	0.000183	1.25	1193.00	509.50	0.11
1	18573.2*	Max WS	814.06	174.86	181.20		181.22	0.000177	1.37	1129.82	433.25	0.11
1	18484.66	Max WS	813.66	174.25	181.19		181.20	0.000187	1.51	1021.27	351.99	0.12
1	18313.08	Max WS	812.88	174.93	181.17		181.18	0.000060	0.88	1448.53	370.38	0.07
1	18226	Max WS	812.50	173.87	181.05		181.25	0.000654	3.54	229.81	69.08	0.23
1	18175		Culvert									
1	18123	Max WS	812.50	173.46	177.20		177.92	0.005751	6.79	119.70	54.44	0.62
1	17964.88	Max WS	812.50	172.77	176.56		176.94	0.007391	5.72	245.47	272.31	0.64
1	17929.0*	Max WS	812.68	172.49	176.36		176.68	0.006360	5.13	252.50	263.90	0.59
1	17893.2*	Max WS	812.86	172.22	176.17		176.45	0.006171	4.77	256.84	262.15	0.58
1	17857.44	Max WS	813.05	171.94	175.87		176.19	0.008659	5.02	228.06	242.97	0.67
1	17638.59	Max WS	814.15	171.98	174.88		174.94	0.002307	2.72	560.11	554.54	0.35
1	17570.8*	Max WS	814.51	171.69	174.64		174.75	0.003997	3.53	422.22	469.34	0.46
1	17503.0*	Max WS	814.86	171.40	174.22		174.43	0.007047	4.46	327.02	515.07	0.60
1	17435.23	Max WS	815.19	171.11	173.94		174.04	0.003408	3.18	388.31	352.16	0.42
1	17347.3*	Max WS	815.69	170.31	173.58		173.69	0.004384	3.59	419.28	511.60	0.47
1	17259.39	Max WS	816.16	169.51	173.27		173.33	0.003120	2.83	510.69	496.22	0.39
1	17161.6*	Max WS	816.39	169.43	172.91		173.04	0.004081	3.39	391.28	442.04	0.46
1	17063.83	Max WS	815.57	169.35	172.55		172.69	0.003504	3.18	337.31	364.81	0.42
1	17016.0*	Max WS	814.65	168.83	172.35		172.52	0.003541	3.53	290.40	278.38	0.44
1	16968.2*	Max WS	814.07	168.30	172.18		172.37	0.003153	3.69	295.37	232.84	0.42
1	16920.4*	Max WS	813.09	167.78	172.01		172.22	0.003222	4.08	296.01	211.58	0.44
1	16872.70	Max WS	809.95	167.26	171.81		172.06	0.004113	4.94	282.67	193.75	0.49
1	16822.9*	Max WS	886.00	167.36	171.49		171.82	0.005744	5.52	283.53	242.17	0.58
1	16773.1*	Max WS	886.34	167.46	171.27		171.52	0.005171	4.96	305.80	247.02	0.54
1	16723.4*	Max WS	886.66	167.57	171.06		171.26	0.004796	4.47	327.24	264.16	0.52

1	16673.66	Max WS	886.88	167.67	170.88		171.02	0.004154	3.87	361.74	271.93	0.47
1	16606.6*	Max WS	887.33	167.56	170.60		170.74	0.004776	3.99	393.44	351.11	0.50
1	16539.5*	Max WS	887.62	167.45	170.30		170.43	0.005016	3.97	405.71	437.23	0.51
1	16472.50	Max WS	887.87	167.34	170.09		170.16	0.002739	3.03	471.13	446.26	0.38
1	16374.4*	Max WS	916.29	166.82	169.83		169.90	0.002727	2.89	531.46	483.93	0.38
1	16276.30	Max WS	916.31	166.31	169.42		169.54	0.004968	3.60	372.19	526.30	0.50
1	16193.9*	Max WS	915.43	165.53	169.29		169.35	0.002294	2.78	589.60	503.59	0.35
1	16111.50	Max WS	915.65	164.75	169.23		169.26	0.001072	2.24	773.08	537.47	0.25
1	16044.4*	Max WS	915.84	164.60	169.16		169.21	0.001389	2.67	658.55	482.53	0.28
1	15977.4*	Max WS	915.99	164.46	169.08		169.15	0.001584	2.94	602.20	450.27	0.31
1	15910.45	Max WS	916.12	164.31	168.99		169.09	0.001828	3.24	549.67	435.71	0.33
1	15816.4*	Max WS	916.26	163.77	168.69		168.95	0.003249	4.72	350.42	307.68	0.45
1	15722.50	Max WS	916.50	163.23	167.42	167.65	168.42	0.015852	8.69	151.08	127.15	0.93
1	15661.2*	Max WS	916.87	163.03	167.28		167.56	0.004802	4.71	282.87	245.20	0.52
1	15600	Max WS	917.20	162.83	167.22		167.30	0.001686	2.77	494.55	336.49	0.31
1	15513.5*	Max WS	917.47	162.55	167.11		167.19	0.001577	2.65	513.16	357.36	0.30
1	15427.0*	Max WS	917.70	162.26	167.00		167.08	0.001581	2.59	521.48	380.71	0.30
1	15340.5*	Max WS	917.93	161.98	166.88		166.96	0.001712	2.59	516.01	404.76	0.31
1	15254.0*	Max WS	927.61	161.69	166.74		166.83	0.002141	2.72	488.36	428.99	0.34
1	15167.54	Max WS	927.89	161.41	166.39		166.66	0.006663	4.15	223.47	424.91	0.57
1	15068.7*	Max WS	928.07	161.32	166.06		166.24	0.003296	3.65	322.37	375.95	0.43
1	14970.01	Max WS	927.51	161.22	165.75		165.93	0.004022	4.21	393.08	353.93	0.47
1	14800.08	Max WS	875.06	160.07	165.29		165.39	0.002372	3.04	467.56	362.75	0.36
1	14745.2*	Max WS	873.15	160.00	165.17		165.28	0.001761	3.34	478.00	351.72	0.33
1	14690.37	Max WS	870.45	159.93	165.05		165.20	0.002154	4.21	461.50	374.07	0.36
1	14521.03	Max WS	869.19	159.74	164.85		164.90	0.000933	2.02	633.39	468.38	0.23
1	14350.55	Max WS	868.74	158.30	164.76		164.78	0.000323	1.50	1031.37	552.65	0.14
1	14165.39	Max WS	878.42	159.11	164.72		164.73	0.000246	1.44	1151.41	548.48	0.13
1	14077.1*	Max WS	904.30	158.60	164.70		164.71	0.000178	1.37	1320.47	608.64	0.11
1	13988.90	Max WS	904.48	158.09	164.69		164.70	0.000122	1.13	1563.32	653.30	0.09
1	13971	Max WS	904.47	158.18	164.56		164.86	0.001202	4.43	204.14	66.92	0.31
1	13920		Culvert									
1	13869	Max WS	879.68	158.18	161.84		162.72	0.007261	7.52	117.06	53.95	0.69
1	13817.08	Max WS	904.46	158.27	162.10		162.43	0.005469	5.23	282.10	309.03	0.56
1	13800.26	Max WS	904.41	157.92	161.97		162.34	0.007005	5.63	254.07	214.11	0.62
1	13716.8*	Max WS	904.44	157.68	161.55		161.87	0.005037	4.94	254.39	193.43	0.54
1	13633.46	Max WS	904.74	157.45	161.47		161.55	0.001525	2.78	514.04	328.02	0.30
1	13548.2*	Max WS	904.88	156.91	161.23		161.39	0.003097	3.72	388.68	334.01	0.42
1	13462.94	Max WS	905.11	156.37	160.95		161.14	0.003759	3.98	341.51	294.93	0.46
1	13372.7*	Max WS	905.34	155.87	160.71		160.86	0.002988	3.70	426.29	407.41	0.41
1	13282.48	Max WS	905.68	155.37	160.58		160.64	0.001345	2.65	693.95	598.05	0.28
1	13196.7*	Max WS	906.00	155.42	160.45		160.53	0.001660	2.95	540.68	416.61	0.31
1	13110.9*	Max WS	906.33	155.48	160.31		160.40	0.001845	2.98	501.76	391.82	0.33
1	13025.20	Max WS	906.63	155.53	159.89		160.16	0.005379	4.38	256.62	181.71	0.54
1	12934.78	Max WS	906.93	155.67	159.55		159.77	0.003922	4.57	326.51	238.72	0.48
1	12679.83	Max WS	913.25	154.84	158.56		158.81	0.005385	4.82	375.01	492.81	0.55
1	12514.10	Max WS	914.02	153.08	158.01		158.17	0.003101	4.17	420.72	356.82	0.43
1	12342.49	Max WS	914.88	153.74	157.60		157.69	0.002710	3.15	469.29	364.39	0.38
1	12168.87	Max WS	915.68	152.62	157.12		157.26	0.003107	3.97	447.04	401.93	0.42
1	11993.01	Max WS	916.37	152.46	156.71		156.81	0.002673	2.98	434.78	375.32	0.37
1	11820.19	Max WS	917.15	150.12	156.12		156.32	0.003249	3.63	286.20	442.09	0.42
1	11633.47	Max WS	933.02	151.10	155.38		155.58	0.004599	4.01	351.64	361.78	0.50
1	11460.48	Max WS	962.80	149.67	154.80		154.94	0.002855	3.27	438.09	436.51	0.39

1	11271.33	Max WS	863.87	147.60	154.41	154.52	0.001570	2.87	460.05	549.22	0.30
1	11146.79	Max WS	964.33	147.72	153.83	154.42	0.006583	6.19	163.65	282.19	0.61
1	10961.29	Max WS	930.08	149.08	153.32	153.43	0.002411	3.25	480.78	417.19	0.37
1	10777.64	Max WS	923.43	147.95	152.90	153.06	0.001956	3.61	422.34	350.81	0.35
1	10599.75	Max WS	915.24	147.94	152.69	152.76	0.001200	2.62	571.42	348.65	0.27
1	10484.71	Max WS	914.82	147.53	152.61	152.65	0.000556	1.97	718.42	297.67	0.19
1	10294.85	Max WS	910.51	146.18	152.44	152.53	0.000868	2.60	432.87	161.17	0.24
1	10111.02	Max WS	909.78	146.70	152.40	152.42	0.000194	1.32	1202.64	506.77	0.11
1	9962.423	Max WS	909.80	144.81	152.38	152.39	0.000145	1.24	1339.86	498.60	0.10
1	9876	Max WS	909.73	144.29	152.25	152.45	0.000580	3.57	255.00	78.26	0.22
1	9825.00		Culvert								
1	9774	Max WS	909.73	143.93	149.17	149.63	0.002342	5.42	167.71	63.45	0.42
1	9553.901	Max WS	909.72	143.12	148.99	149.11	0.001973	3.34	499.87	433.38	0.34
1	9362.452	Max WS	909.88	143.70	148.45	148.73	0.003703	4.75	350.74	461.66	0.47
1	9149.788	Max WS	910.11	141.77	148.13	148.18	0.000566	1.81	657.65	544.08	0.18
1	8963.549	Max WS	910.26	141.24	147.60	147.88	0.004026	4.67	285.36	238.42	0.48
1	8766.435	Max WS	910.43	142.65	146.82	147.10	0.004249	4.36	248.32	246.51	0.49
1	8577.282	Max WS	907.90	141.02	146.32	146.50	0.002445	3.73	392.95	490.75	0.38
1	8398.577	Max WS	907.82	141.01	146.04	146.17	0.001870	3.42	495.15	430.09	0.34
1	8223.925	Max WS	906.37	139.79	145.60	145.79	0.002907	4.20	359.71	293.15	0.41
1	8000	Max WS	965.80	139.29	145.19	145.30	0.001489	2.94	485.85	331.80	0.30
1	7744.065	Max WS	971.46	138.71	143.98	144.42	0.006825	5.74	269.49	362.06	0.62
1	7600	Max WS	974.54	138.31	143.66	143.70	0.001026	2.15	761.57	524.72	0.24
1	7400	Max WS	977.95	137.76	142.74	143.33	0.007806	6.32	179.47	472.01	0.68
1	7200	Max WS	981.62	137.20	141.81	142.13	0.004585	4.76	256.10	169.57	0.52
1	7000	Max WS	984.70	136.65	141.22	141.44	0.002888	3.94	330.26	268.41	0.42
1	6800	Max WS	988.13	136.09	140.88	140.99	0.001826	2.90	494.22	412.66	0.32
1	6545.718	Max WS	987.65	134.93	140.05	140.33	0.005663	5.66	377.97	372.32	0.55
1	6400	Max WS	991.34	135.02	139.62	139.77	0.002500	3.89	438.31	303.18	0.39
1	6200	Max WS	996.09	134.52	139.24	139.34	0.002227	3.28	537.43	395.92	0.36
1	6000	Max WS	999.22	134.02	138.84	138.99	0.002603	3.29	375.49	272.21	0.38
1	5800	Max WS	1006.11	133.53	138.41	138.52	0.001877	2.99	462.29	338.99	0.33
1	5544.024	Max WS	1011.97	132.89	137.84	138.00	0.003012	4.12	487.29	451.41	0.42
1	5310.353	Max WS	1016.91	130.81	137.08	137.33	0.003286	4.37	368.82	398.97	0.44
1	5126.186	Max WS	1021.29	131.42	136.78	136.85	0.001187	2.92	760.89	567.54	0.27
1	4928.496	Max WS	1025.41	131.24	136.59	136.67	0.001170	2.67	677.07	506.27	0.27
1	4737.846	Max WS	1030.30	130.80	136.14	136.33	0.003245	4.14	417.68	352.25	0.43
1	4542.183	Max WS	1034.86	130.20	135.76	135.90	0.001374	3.45	509.91	353.08	0.30
1	4437.102	Max WS	1037.11	131.50	135.43	135.63	0.004776	4.46	392.46	323.48	0.51
1	4246.329	Max WS	1041.46	129.78	134.83	134.96	0.002659	3.96	524.98	396.83	0.39
1	4063.200	Max WS	1045.53	129.05	134.18	134.43	0.003664	4.43	365.58	354.73	0.46
1	3863.200	Max WS	1049.90	128.43	133.86	133.91	0.000993	2.38	787.98	506.75	0.24
1	3682.022	Max WS	1054.00	127.89	133.70	133.74	0.000868	2.24	970.27	677.97	0.23
1	3487.742	Max WS	1058.82	128.90	133.32	133.40	0.002772	3.25	605.40	527.73	0.39
1	3332.982	Max WS	1061.91	129.37	133.00	133.07	0.001788	2.76	642.50	460.16	0.32
1	3152.554	Max WS	1110.43	127.27	132.34	132.64	0.005622	5.32	412.87	499.32	0.56
1	2960.781	Max WS	1114.09	128.00	131.59	131.78	0.003728	3.94	468.36	559.88	0.46
1	2800	Max WS	1117.61	127.75	131.12	131.23	0.003122	3.48	525.04	402.46	0.42
1	2600	Max WS	1120.98	127.22	130.69	130.79	0.001872	2.71	509.96	335.00	0.32
1	2436.651	Max WS	1123.78	126.76	129.85	130.20	0.007061	4.99	292.72	315.33	0.61
1	2200	Max WS	1128.25	125.72	128.87	129.05	0.002945	3.66	401.84	292.74	0.41
1	1800	Max WS	1127.57	123.94	128.26	128.33	0.001000	2.29	588.72	320.23	0.24
1	1508.765	Max WS	1126.92	122.64	127.40	127.73	0.004282	5.60	368.62	335.55	0.51

1	1238.804	Max WS	1126.47	122.00	126.74		126.86	0.002044	2.81	477.36	357.75	0.34
1	947.7714	Max WS	1125.80	122.00	125.84		126.06	0.003770	4.56	396.01	272.14	0.48
1	703.7460	Max WS	1125.51	122.00	125.23		125.32	0.001996	2.82	594.16	439.64	0.33
1	413.4701	Max WS	1124.63	120.00	124.15		124.49	0.004658	4.85	313.66	410.47	0.52
1	200.9584	Max WS	1124.17	120.00	123.63		123.76	0.002023	3.46	549.26	418.74	0.35
1	10.31402	Max WS	1124.00	120.00	123.18	122.57	123.32	0.002724	3.72	527.40	387.74	0.40

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 10:21:40 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms
100 yr developed with det, u/s exist - Cordova Hills Developed with Detention and Existing Conditions upstream of Cordova Hills 100 Year 24 hour storm
Plan:

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	161.88	220.00	221.36		221.43	0.004746	2.32	93.88	225.40	0.44
1	28313.0*	Max WS	161.80	219.58	220.92		221.00	0.005986	2.45	75.45	122.85	0.49
1	28226.0*	Max WS	161.71	219.15	220.42		220.50	0.007004	2.46	77.76	134.50	0.52
1	28139.07	Max WS	161.63	218.73	219.96		220.03	0.006673	2.27	86.20	151.37	0.50
1	28069.5*	Max WS	167.01	218.22	219.48		219.57	0.008214	2.59	74.99	150.19	0.56
1	28000	Max WS	172.44	217.71	218.96		219.05	0.008258	2.59	81.88	180.70	0.56
1	27900.*	Max WS	182.11	216.97	217.97		218.10	0.011616	2.84	64.01	106.84	0.65
1	27800	Max WS	191.69	216.23	217.36		217.40	0.002503	1.63	117.62	143.18	0.32
1	27700.*	Max WS	201.43	215.51	217.08		217.14	0.002830	1.94	106.27	154.81	0.35
1	27600	Max WS	211.35	214.80	216.57		216.69	0.006900	3.36	112.62	215.38	0.55
1	27500.*	Max WS	222.48	214.08	215.69		215.83	0.009184	3.63	102.38	196.61	0.63
1	27400	Max WS	233.49	213.35	215.14		215.17	0.002122	1.93	194.27	231.79	0.31

1	27329.7*	Max WS	238.66	212.84	214.93		215.01	0.004039	2.76	134.43	177.09	0.43
1	27259.5*	Max WS	243.85	212.32	214.68		214.77	0.003877	2.91	137.64	198.75	0.43
1	27189.29	Max WS	249.06	211.81	214.30		214.48	0.007275	3.76	102.64	209.52	0.58
1	27094.6*	Max WS	257.58	211.10	213.52		213.78	0.009310	4.18	74.39	134.59	0.65
1	27000	Max WS	266.22	210.39	212.89		213.07	0.005693	3.44	85.43	95.43	0.52
1	26900.*	Max WS	275.81	209.64	212.35		212.51	0.005576	3.26	90.54	104.39	0.51
1	26800	Max WS	285.56	208.88	211.77		211.93	0.006147	3.21	93.23	108.08	0.52
1	26700.*	Max WS	294.43	208.12	210.94		211.19	0.008861	4.04	78.63	111.61	0.64
1	26600	Max WS	303.11	207.37	210.45		210.57	0.003840	3.23	171.13	306.80	0.44
1	26528.4*	Max WS	304.22	206.83	210.21		210.30	0.003374	2.94	189.10	304.66	0.41
1	26456.8*	Max WS	292.02	206.29	210.02		210.08	0.002294	2.40	221.79	314.38	0.33
1	26385.31	Max WS	306.58	205.75	209.51		209.77	0.010633	4.39	101.17	293.28	0.68
1	26292.6*	Max WS	311.57	205.40	208.50		208.77	0.012520	4.48	97.02	212.17	0.74
1	26200	Max WS	316.48	205.06	207.65		207.85	0.007429	3.85	108.30	171.72	0.59
1	26100.*	Max WS	321.11	204.69	207.03		207.19	0.006087	3.25	111.64	155.85	0.53
1	26000	Max WS	325.64	204.32	206.65		206.73	0.003016	2.36	159.29	190.97	0.37
1	25900.*	Max WS	330.61	203.95	206.30		206.40	0.003940	2.56	138.74	187.79	0.42
1	25800	Max WS	335.53	203.57	205.88		205.99	0.004638	2.61	128.64	122.77	0.45
1	25700.*	Max WS	340.52	203.20	205.41		205.54	0.005149	3.12	155.41	270.39	0.49
1	25600	Max WS	345.39	202.83	205.05		205.10	0.003611	3.07	237.78	294.25	0.42
1	25500.*	Max WS	349.89	202.46	204.64		204.74	0.005155	3.47	204.58	317.89	0.50
1	25400	Max WS	354.31	202.09	204.32		204.37	0.002723	2.43	257.83	388.37	0.36
1	25358.8*	Max WS	356.22	202.00	204.20		204.27	0.003542	2.76	235.53	362.30	0.41
1	25317.6*	Max WS	357.84	201.92	204.04		204.13	0.004514	2.99	213.16	331.16	0.46
1	25276.3*	Max WS	359.83	201.83	203.86		203.94	0.005221	3.00	197.37	290.19	0.49
1	25235.1*	Max WS	361.80	201.75	203.67		203.74	0.005431	2.76	193.34	255.38	0.48
1	25193.99	Max WS	363.74	201.66	203.49		203.54	0.004750	2.28	205.66	237.19	0.44
1	25145.4*	Max WS	366.27	201.36	203.19		203.28	0.006394	2.80	171.37	229.48	0.52
1	25097.*	Max WS	368.71	201.05	202.79		202.93	0.008454	3.16	137.70	214.00	0.59
1	25048.5*	Max WS	370.80	200.75	202.48		202.59	0.005593	2.68	146.70	213.64	0.49
1	25000	Max WS	373.35	200.45	202.35		202.40	0.001831	1.79	221.21	231.90	0.29
1	24900.*	Max WS	378.06	200.04	202.14		202.20	0.002322	2.11	199.94	214.58	0.33
1	24800	Max WS	382.63	199.63	201.77		201.90	0.004499	2.96	152.10	161.68	0.46
1	24700.*	Max WS	387.85	199.20	201.19		201.37	0.007306	3.70	144.46	209.60	0.58
1	24600	Max WS	392.87	198.77	200.54		200.67	0.008489	3.89	183.62	295.98	0.62
1	24500.*	Max WS	398.27	198.34	200.02		200.08	0.004515	2.49	234.10	306.20	0.44
1	24400	Max WS	403.60	197.91	199.81		199.83	0.000935	1.21	463.83	465.36	0.20
1	24328.0*	Max WS	406.78	197.60	199.76		199.77	0.000965	1.18	466.07	458.23	0.20
1	24256.1*	Max WS	209.47	197.29	199.71		199.78	0.003176	2.11	99.72	448.73	0.37
1	24184.18	Max WS	413.51	196.98	199.30	199.49	200.02	0.046228	6.81	60.75	372.89	1.35
1	24092.0*	Max WS	418.06	196.51	198.90		198.95	0.003864	2.35	283.31	393.49	0.41
1	24000	Max WS	422.50	196.03	198.43		198.55	0.006487	3.43	209.28	365.21	0.54
1	23900.*	Max WS	427.21	195.51	197.82		197.94	0.007181	3.36	198.16	287.40	0.56
1	23800	Max WS	432.10	194.99	197.39		197.44	0.003352	2.25	267.83	278.95	0.38
1	23700.*	Max WS	435.95	194.47	196.96		197.05	0.004961	3.06	226.60	293.64	0.48
1	23600	Max WS	439.62	193.95	196.42		196.52	0.005817	3.43	235.84	375.72	0.52
1	23400	Max WS	474.24	192.92	195.82		195.88	0.001255	2.15	316.85	243.59	0.26
1	23178.25	Max WS	511.17	191.76	195.31		195.44	0.003609	3.87	239.89	202.32	0.44
1	23000	Max WS	547.73	191.25	194.51		194.71	0.004838	3.81	200.35	240.18	0.50
1	22600	Max WS	606.97	190.00	193.14		193.28	0.002481	3.16	246.69	368.01	0.37
1	22400	Max WS	689.76	189.54	192.84		192.89	0.001052	1.98	430.47	326.85	0.24
1	22175.79	Max WS	692.20	188.90	192.00		192.25	0.005900	4.56	234.49	240.04	0.56
1	22000	Max WS	694.14	188.07	191.20		191.42	0.004088	3.93	223.81	195.33	0.47

1	21900.*	Max WS	695.48	187.59	190.90		191.06	0.003147	3.39	259.51	237.48	0.41
1	21800	Max WS	696.66	187.11	190.71		190.81	0.001927	2.71	328.93	262.70	0.33
1	21600	Max WS	698.58	186.14	189.67		190.05	0.007944	5.11	170.42	179.68	0.65
1	21400	Max WS	700.89	185.21	189.03		189.12	0.001390	2.43	319.59	199.36	0.28
1	21176.29	Max WS	702.82	184.07	188.34		188.59	0.004795	4.42	244.03	267.76	0.51
1	20962.10	Max WS	705.10	184.10	187.68		187.76	0.002976	2.83	351.57	276.22	0.38
1	20921.9*	Max WS	705.61	184.01	187.57		187.66	0.002527	2.86	357.73	270.49	0.36
1	20881.8*	Max WS	706.12	183.92	187.47		187.56	0.002277	2.94	358.84	262.33	0.35
1	20841.7*	Max WS	706.63	183.83	187.37		187.48	0.002289	3.10	351.05	254.09	0.36
1	20801.6*	Max WS	707.14	183.74	187.27		187.39	0.002735	3.41	329.93	246.34	0.39
1	20761.52	Max WS	707.66	183.65	187.10		187.26	0.004457	4.03	286.95	233.94	0.48
1	20712.0*	Max WS	726.19	182.57	186.73		187.02	0.006220	4.83	224.87	228.07	0.58
1	20662.66	Max WS	744.65	181.49	186.50		186.74	0.004424	4.23	278.59	364.13	0.49
1	20655.8*	Max WS	744.63	181.50	186.46		186.71	0.004856	4.40	267.89	360.58	0.52
1	20648.9*	Max WS	744.62	181.52	186.40		186.68	0.005735	4.66	252.17	363.48	0.55
1	20642.13	Max WS	742.29	181.53	185.65	186.28	186.81	0.030389	8.63	85.98	53.49	1.20
1	20614.23	Max WS	743.72	180.88	185.89		186.07	0.002858	3.49	268.90	292.04	0.40
1	20399.06	Max WS	741.38	181.78	185.39		185.46	0.002827	2.70	436.29	415.77	0.37
1	20131.75	Max WS	736.78	180.89	184.78		184.86	0.002002	2.92	450.45	374.98	0.33
1	19831.49	Max WS	736.18	179.01	183.02		183.51	0.008971	5.64	130.50	228.35	0.69
1	19561.71	Max WS	753.32	176.06	181.80		181.97	0.002279	3.31	230.99	109.69	0.36
1	19375.20	Max WS	753.56	173.23	181.59		181.70	0.000632	2.64	289.82	270.02	0.21
1	19216.24	Max WS	752.99	176.81	181.34		181.46	0.002890	4.02	391.07	313.96	0.41
1	19040.62	Max WS	752.42	176.76	181.02		181.06	0.001242	2.39	620.73	505.12	0.26
1	18997.3*	Max WS	752.43	176.80	180.96		181.02	0.001557	2.73	535.89	464.88	0.30
1	18953.9*	Max WS	752.42	176.83	180.87		180.96	0.001964	3.03	463.86	421.00	0.34
1	18910.6*	Max WS	752.40	176.87	180.77		180.88	0.002537	3.33	403.67	386.91	0.38
1	18867.36	Max WS	752.20	176.91	180.46		180.77	0.006670	4.83	234.22	287.38	0.60
1	18661.93	Max WS	749.94	175.46	179.62		179.75	0.003073	3.68	403.52	443.09	0.41
1	18573.2*	Max WS	758.87	174.86	179.34		179.50	0.003016	4.01	368.04	355.07	0.42
1	18484.66	Max WS	756.01	174.25	179.01		179.24	0.003682	4.71	304.46	282.92	0.47
1	18313.08	Max WS	755.86	174.93	178.74		178.77	0.000694	2.01	594.12	317.82	0.21
1	18226	Max WS	755.62	173.87	178.35		178.78	0.002735	5.28	143.22	59.07	0.44
1	18175		Culvert									
1	18123	Max WS	755.42	173.46	177.16		177.79	0.005155	6.38	118.40	54.20	0.58
1	17964.88	Max WS	755.39	172.77	176.49		176.87	0.007485	5.65	227.35	266.14	0.64
1	17929.0*	Max WS	755.50	172.49	176.29		176.61	0.006373	5.04	235.68	259.73	0.59
1	17893.2*	Max WS	755.60	172.22	176.10		176.38	0.006134	4.66	240.66	250.28	0.57
1	17857.44	Max WS	755.70	171.94	175.82		176.12	0.008641	4.91	214.63	239.35	0.66
1	17638.59	Max WS	756.01	171.98	174.83		174.89	0.002286	2.66	534.06	553.90	0.34
1	17570.8*	Max WS	756.10	171.69	174.59		174.70	0.003933	3.45	401.92	468.29	0.45
1	17503.0*	Max WS	756.01	171.40	174.16		174.38	0.007364	4.46	297.93	512.84	0.61
1	17435.23	Max WS	756.21	171.11	173.89		173.98	0.003326	3.08	369.57	336.79	0.41
1	17347.3*	Max WS	756.18	170.31	173.53		173.64	0.004429	3.54	393.49	509.61	0.47
1	17259.39	Max WS	756.41	169.51	173.22		173.28	0.003144	2.78	484.74	494.42	0.39
1	17161.6*	Max WS	756.35	169.43	172.85		172.97	0.004279	3.38	362.04	438.78	0.46
1	17063.83	Max WS	756.25	169.35	172.46		172.60	0.003767	3.19	305.70	355.17	0.44
1	17016.0*	Max WS	756.41	168.83	172.25		172.43	0.003706	3.50	264.83	262.86	0.44
1	16968.2*	Max WS	756.59	168.30	172.08		172.26	0.003267	3.65	272.51	224.39	0.43
1	16920.4*	Max WS	756.61	167.78	171.91		172.11	0.003301	4.02	274.92	203.68	0.44
1	16872.70	Max WS	756.75	167.26	171.70		171.95	0.004257	4.91	262.26	185.79	0.50
1	16822.9*	Max WS	806.62	167.36	171.40		171.72	0.005706	5.39	261.74	236.71	0.57
1	16773.1*	Max WS	806.79	167.46	171.19		171.43	0.005061	4.81	285.58	241.28	0.54

1	16723.4*	Max WS	806.94	167.57	170.98		171.17	0.004700	4.33	306.19	258.80	0.51
1	16673.66	Max WS	807.07	167.67	170.81		170.94	0.004029	3.72	341.59	269.03	0.46
1	16606.6*	Max WS	807.01	167.56	170.53		170.66	0.004797	3.90	367.38	347.50	0.50
1	16539.5*	Max WS	807.15	167.45	170.21		170.34	0.005343	3.96	366.24	429.00	0.52
1	16472.50	Max WS	806.92	167.34	169.98		170.05	0.002809	2.97	430.78	298.22	0.38
1	16374.4*	Max WS	816.38	166.82	169.73		169.79	0.002787	2.83	481.89	476.74	0.38
1	16276.30	Max WS	816.01	166.31	169.31		169.43	0.004994	3.50	342.46	517.58	0.50
1	16193.9*	Max WS	815.36	165.53	169.17		169.23	0.002487	2.78	530.75	499.78	0.36
1	16111.50	Max WS	815.44	164.75	169.10		169.14	0.001114	2.21	706.56	534.50	0.25
1	16044.4*	Max WS	815.49	164.60	169.03		169.09	0.001455	2.64	596.99	476.93	0.29
1	15977.4*	Max WS	815.52	164.46	168.95		169.02	0.001676	2.93	542.11	448.00	0.31
1	15910.45	Max WS	815.52	164.31	168.85		168.95	0.001949	3.24	490.08	433.56	0.34
1	15816.4*	Max WS	815.45	163.77	168.52		168.80	0.003597	4.80	296.33	302.46	0.47
1	15722.50	Max WS	815.41	163.23	167.31	167.49	168.23	0.015159	8.26	137.44	119.63	0.90
1	15661.2*	Max WS	815.56	163.03	167.18		167.42	0.004496	4.43	258.93	214.34	0.50
1	15600	Max WS	815.65	162.83	167.11		167.19	0.001610	2.63	459.33	331.71	0.30
1	15513.5*	Max WS	815.38	162.55	167.01		167.08	0.001509	2.52	476.78	353.29	0.29
1	15427.0*	Max WS	815.51	162.26	166.90		166.97	0.001517	2.46	483.82	375.99	0.29
1	15340.5*	Max WS	815.61	161.98	166.79		166.86	0.001653	2.47	477.39	400.53	0.30
1	15254.0*	Max WS	822.18	161.69	166.65		166.73	0.002073	2.59	449.40	424.42	0.33
1	15167.54	Max WS	822.12	161.41	166.30		166.53	0.006257	3.90	210.63	407.34	0.55
1	15068.7*	Max WS	822.30	161.32	165.97		166.13	0.003019	3.42	303.30	354.79	0.41
1	14970.01	Max WS	822.26	161.22	165.64		165.91	0.005561	4.82	251.08	333.26	0.55
1	14800.08	Max WS	822.20	160.07	165.10		165.21	0.003248	3.35	397.91	353.12	0.41
1	14745.2*	Max WS	822.28	160.00	164.93		165.08	0.002467	3.75	393.78	336.62	0.38
1	14690.37	Max WS	821.23	159.93	164.70		164.98	0.003731	5.22	336.74	339.91	0.47
1	14521.03	Max WS	810.77	159.74	164.22		164.34	0.003008	2.97	367.21	382.70	0.39
1	14350.55	Max WS	805.77	158.30	163.92		163.98	0.001204	2.40	585.61	436.74	0.26
1	14165.39	Max WS	819.04	159.11	163.73		163.78	0.001021	2.43	634.32	442.50	0.25
1	14077.1*	Max WS	848.35	158.60	163.66		163.71	0.000696	2.29	730.38	512.85	0.21
1	13988.90	Max WS	847.95	158.09	163.62		163.65	0.000468	1.85	899.32	566.48	0.17
1	13971	Max WS	847.87	158.18	163.41		163.81	0.002046	5.06	167.42	63.39	0.39
1	13920		Culvert									
1	13869	Max WS	846.60	158.18	161.83		162.65	0.006747	7.24	116.94	53.93	0.67
1	13817.08	Max WS	847.87	158.27	162.04		162.35	0.005376	5.11	264.52	268.14	0.55
1	13800.26	Max WS	847.75	157.92	161.90		162.26	0.007048	5.54	238.40	204.33	0.62
1	13716.8*	Max WS	847.56	157.68	161.48		161.79	0.004934	4.81	242.08	188.80	0.53
1	13633.46	Max WS	847.66	157.45	161.40		161.48	0.001502	2.72	492.49	325.01	0.29
1	13548.2*	Max WS	847.42	156.91	161.16		161.32	0.003138	3.67	365.81	330.92	0.42
1	13462.94	Max WS	847.08	156.37	160.89		161.07	0.003756	3.90	321.90	285.19	0.45
1	13372.7*	Max WS	846.63	155.87	160.65		160.79	0.002990	3.64	400.17	390.05	0.41
1	13282.48	Max WS	846.68	155.37	160.52		160.57	0.001367	2.63	654.70	595.06	0.28
1	13196.7*	Max WS	846.33	155.42	160.38		160.47	0.001648	2.89	513.60	412.61	0.31
1	13110.9*	Max WS	846.45	155.48	160.24		160.33	0.001834	2.92	476.00	386.70	0.32
1	13025.20	Max WS	846.58	155.53	159.83		160.08	0.005284	4.27	244.90	180.90	0.53
1	12934.78	Max WS	846.72	155.67	159.48		159.70	0.003848	4.46	311.44	236.71	0.47
1	12679.83	Max WS	849.79	154.84	158.49		158.75	0.005634	4.84	343.10	489.48	0.56
1	12514.10	Max WS	849.71	153.08	157.94		158.09	0.003022	4.05	395.78	347.12	0.42
1	12342.49	Max WS	849.63	153.74	157.53		157.62	0.002705	3.12	443.37	358.64	0.38
1	12168.87	Max WS	849.56	152.62	157.05		157.19	0.003146	3.92	418.23	396.09	0.43
1	11993.01	Max WS	849.46	152.46	156.63		156.74	0.002746	2.94	405.70	372.14	0.38
1	11820.19	Max WS	849.59	150.12	156.08		156.26	0.003024	3.46	273.84	426.26	0.41
1	11633.47	Max WS	863.00	151.10	155.32		155.51	0.004608	3.93	328.17	355.76	0.49

1	11460.48	Max WS	879.45	149.67	154.75	154.88	0.002698	3.12	414.40	431.19	0.38
1	11271.33	Max WS	855.30	147.60	154.41	154.52	0.001555	2.85	456.98	547.79	0.30
1	11146.79	Max WS	880.51	147.72	153.74	154.27	0.006070	5.83	154.84	228.71	0.58
1	10961.29	Max WS	880.42	149.08	153.20	153.33	0.002854	3.42	429.48	412.28	0.40
1	10777.64	Max WS	880.04	147.95	152.60	152.84	0.002987	4.19	320.69	334.88	0.42
1	10599.75	Max WS	879.87	147.94	152.06	152.24	0.003785	3.97	354.68	338.55	0.46
1	10484.71	Max WS	879.65	147.53	151.82	151.90	0.001616	2.81	487.49	288.90	0.31
1	10294.85	Max WS	879.61	146.18	151.23	151.47	0.003561	4.10	254.92	139.74	0.45
1	10111.02	Max WS	881.28	146.70	150.78	150.95	0.002904	3.67	405.97	472.69	0.41
1	9962.423	Max WS	880.69	144.81	150.17	150.52	0.005679	5.15	284.58	452.40	0.56
1	9876	Max WS	880.46	144.29	149.76	150.16	0.001895	5.02	175.32	64.84	0.38
1	9825.00		Culvert								
1	9774	Max WS	880.32	143.93	149.14	149.57	0.002238	5.28	166.70	63.26	0.41
1	9553.901	Max WS	879.77	143.12	148.96	149.07	0.001985	3.33	484.15	430.20	0.34
1	9362.452	Max WS	878.68	143.70	148.41	148.70	0.003808	4.77	330.32	458.26	0.48
1	9149.788	Max WS	877.67	141.77	148.09	148.13	0.000561	1.79	634.73	536.89	0.18
1	8963.549	Max WS	877.74	141.24	147.55	147.83	0.004029	4.62	274.67	230.58	0.48
1	8766.435	Max WS	877.29	142.65	146.78	147.06	0.004208	4.29	238.95	240.17	0.48
1	8577.282	Max WS	876.12	141.02	146.26	146.45	0.002553	3.76	365.34	486.74	0.39
1	8398.577	Max WS	875.52	141.01	145.98	146.11	0.001959	3.45	467.58	418.73	0.34
1	8223.925	Max WS	875.17	139.79	145.51	145.72	0.003143	4.29	335.81	258.12	0.43
1	8000	Max WS	905.06	139.29	145.09	145.20	0.001532	2.92	453.42	326.73	0.30
1	7744.065	Max WS	906.65	138.71	143.93	144.35	0.006619	5.58	251.48	352.69	0.61
1	7600	Max WS	902.40	138.31	143.62	143.66	0.000939	2.04	744.59	523.61	0.23
1	7400	Max WS	909.47	137.76	142.66	143.22	0.007637	6.12	169.76	432.46	0.67
1	7200	Max WS	910.63	137.20	141.73	142.03	0.004411	4.58	243.69	162.89	0.51
1	7000	Max WS	911.65	136.65	141.14	141.35	0.002777	3.79	310.63	254.30	0.41
1	6800	Max WS	913.03	136.09	140.81	140.91	0.001805	2.82	463.16	408.13	0.32
1	6545.718	Max WS	912.05	134.93	139.96	140.26	0.005963	5.71	345.04	365.60	0.57
1	6400	Max WS	913.24	135.02	139.52	139.67	0.002499	3.80	409.13	294.32	0.39
1	6200	Max WS	914.84	134.52	139.14	139.24	0.002313	3.25	497.42	390.03	0.36
1	6000	Max WS	915.83	134.02	138.74	138.88	0.002623	3.20	348.01	264.40	0.38
1	5800	Max WS	918.59	133.53	138.32	138.42	0.001835	2.88	430.81	330.18	0.32
1	5544.024	Max WS	920.88	132.89	137.75	137.91	0.002936	3.99	450.04	430.38	0.41
1	5310.353	Max WS	921.26	130.81	136.96	137.22	0.003347	4.30	322.65	385.50	0.44
1	5126.186	Max WS	922.59	131.42	136.66	136.73	0.001249	2.93	690.53	565.33	0.27
1	4928.496	Max WS	923.63	131.24	136.46	136.54	0.001210	2.65	611.42	502.10	0.27
1	4737.846	Max WS	925.40	130.80	136.02	136.21	0.003298	4.06	376.16	342.08	0.43
1	4542.183	Max WS	927.27	130.20	135.66	135.79	0.001275	3.27	474.04	346.29	0.29
1	4437.102	Max WS	928.12	131.50	135.33	135.52	0.004827	4.35	358.23	315.83	0.51
1	4246.329	Max WS	929.44	129.78	134.71	134.84	0.002768	3.93	474.02	392.74	0.40
1	4063.200	Max WS	930.58	129.05	134.06	134.31	0.003617	4.27	324.67	342.22	0.46
1	3863.200	Max WS	932.10	128.43	133.75	133.80	0.000938	2.26	735.54	493.18	0.23
1	3682.022	Max WS	933.55	127.89	133.61	133.64	0.000835	2.15	904.38	674.84	0.22
1	3487.742	Max WS	935.62	128.90	133.22	133.30	0.002836	3.19	551.02	525.08	0.39
1	3332.982	Max WS	937.08	129.37	132.90	132.96	0.001741	2.64	594.45	457.85	0.31
1	3152.554	Max WS	966.78	127.27	132.22	132.54	0.005838	5.27	353.57	497.19	0.57
1	2960.781	Max WS	968.26	128.00	131.45	131.65	0.003884	3.87	395.46	524.21	0.46
1	2800	Max WS	969.61	127.75	130.98	131.09	0.003176	3.36	470.27	392.93	0.41
1	2600	Max WS	971.15	127.22	130.57	130.65	0.001774	2.54	467.22	324.71	0.31
1	2436.651	Max WS	972.19	126.76	129.70	130.04	0.007194	4.80	248.54	296.99	0.61
1	2200	Max WS	973.91	125.72	128.70	128.87	0.002932	3.49	354.83	278.68	0.41
1	1800	Max WS	973.28	123.94	128.10	128.17	0.000933	2.13	539.34	311.17	0.23

1	1508.765	Max WS	972.34	122.64	127.23		127.56	0.004262	5.42	313.05	331.15	0.51
1	1238.804	Max WS	971.72	122.00	126.57		126.68	0.002107	2.70	416.09	350.09	0.34
1	947.7714	Max WS	970.93	122.00	125.68		125.88	0.003717	4.35	352.31	257.30	0.47
1	703.7460	Max WS	969.77	122.00	125.04		125.13	0.002204	2.79	511.30	423.41	0.35
1	413.4701	Max WS	968.82	120.00	123.97		124.27	0.004455	4.54	249.74	257.27	0.51
1	200.9584	Max WS	968.35	120.00	123.47		123.59	0.001937	3.27	487.32	379.49	0.34
1	10.31402	Max WS	968.14	120.00	123.04	122.47	123.16	0.002706	3.57	470.40	376.26	0.40

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
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            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 9:10:16 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100
yr 24 hour storms
Plan: 100 yr developed with det - Full Shed Developed with Detention 100 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	155.13	220.00	221.34		221.41	0.004849	2.30	89.35	223.66	0.44
1	28313.0*	Max WS	154.81	219.58	220.89		220.97	0.006229	2.44	72.11	120.00	0.49
1	28226.0*	Max WS	153.83	219.15	220.43		220.50	0.006114	2.31	78.75	134.94	0.48
1	28139.07	Max WS	151.62	218.73	220.15		220.19	0.002395	1.59	116.29	161.02	0.31
1	28069.5*	Max WS	270.33	218.22	219.67		219.80	0.009065	3.17	110.54	221.22	0.61
1	28000	Max WS	269.90	217.71	219.15		219.26	0.007621	2.90	117.28	188.42	0.56
1	27900.*	Max WS	269.67	216.97	218.14		218.31	0.012111	3.24	83.33	118.25	0.68
1	27800	Max WS	269.01	216.23	217.52		217.58	0.002872	1.89	142.18	153.43	0.35
1	27700.*	Max WS	267.98	215.51	217.21		217.28	0.003236	2.25	130.15	212.76	0.38
1	27600	Max WS	267.57	214.80	216.68		216.80	0.006972	3.58	134.99	223.94	0.57
1	27500.*	Max WS	267.02	214.08	215.76		215.91	0.009572	3.87	116.42	204.67	0.65
1	27400	Max WS	266.08	213.35	215.20		215.23	0.002287	2.07	207.13	235.28	0.32
1	27329.7*	Max WS	265.52	212.84	214.97		215.06	0.004363	2.93	141.57	181.23	0.45
1	27259.5*	Max WS	265.50	212.32	214.71		214.81	0.004187	3.05	143.17	201.01	0.45

1	27189.29	Max WS	264.84	211.81	214.33		214.52	0.007447	3.85	107.97	211.85	0.58
1	27094.6*	Max WS	264.67	211.10	213.52		213.79	0.010002	4.32	73.64	133.33	0.68
1	27000	Max WS	264.11	210.39	212.86		213.05	0.006119	3.51	82.36	92.80	0.54
1	26900.*	Max WS	264.00	209.64	212.29		212.46	0.005964	3.27	84.99	98.40	0.52
1	26800	Max WS	263.41	208.88	211.68		211.84	0.006850	3.22	84.25	95.98	0.54
1	26700.*	Max WS	263.37	208.12	210.87		211.10	0.008776	3.86	71.22	92.11	0.63
1	26600	Max WS	262.54	207.37	210.38		210.50	0.003749	3.11	150.16	303.72	0.43
1	26528.4*	Max WS	261.49	206.83	210.15		210.23	0.003187	2.79	169.62	301.13	0.39
1	26456.8*	Max WS	260.99	206.29	209.97		210.03	0.002203	2.30	205.69	309.57	0.32
1	26385.31	Max WS	260.24	205.75	209.44		209.67	0.009811	4.13	87.40	264.21	0.65
1	26292.6*	Max WS	259.70	205.40	208.40		208.65	0.012446	4.28	78.87	148.21	0.73
1	26200	Max WS	259.38	205.06	207.51		207.71	0.007829	3.74	84.78	157.89	0.60
1	26100.*	Max WS	258.95	204.69	206.87		207.01	0.006332	3.10	88.78	128.99	0.53
1	26000	Max WS	258.20	204.32	206.47		206.55	0.003168	2.24	126.93	167.86	0.37
1	25900.*	Max WS	257.79	203.95	206.13		206.22	0.003790	2.35	111.51	145.40	0.41
1	25800	Max WS	257.52	203.57	205.82		205.89	0.003249	2.14	120.49	118.71	0.37
1	25700.*	Max WS	309.46	203.20	205.40		205.51	0.004343	2.86	153.90	269.70	0.45
1	25600	Max WS	308.16	202.83	205.16		205.20	0.001998	2.39	271.60	308.09	0.32
1	25500.*	Max WS	454.30	202.46	204.78		204.88	0.005175	3.69	251.65	340.85	0.51
1	25400	Max WS	453.87	202.09	204.46		204.51	0.002844	2.64	310.65	405.80	0.37
1	25358.8*	Max WS	453.14	202.00	204.33		204.40	0.003563	2.94	284.62	382.06	0.42
1	25317.6*	Max WS	453.07	201.92	204.17		204.26	0.004493	3.18	257.83	354.61	0.47
1	25276.3*	Max WS	452.95	201.83	203.99		204.08	0.005330	3.24	236.30	319.73	0.50
1	25235.1*	Max WS	452.80	201.75	203.79		203.87	0.005507	2.99	225.42	270.12	0.50
1	25193.99	Max WS	452.64	201.66	203.60		203.67	0.004972	2.54	233.72	246.27	0.46
1	25145.4*	Max WS	452.33	201.36	203.30		203.41	0.006520	3.05	196.64	240.10	0.53
1	25097.*	Max WS	452.25	201.05	202.90		203.06	0.008257	3.37	161.65	228.32	0.59
1	25048.5*	Max WS	451.47	200.75	202.60		202.72	0.005403	2.85	172.75	222.73	0.49
1	25000	Max WS	451.32	200.45	202.48		202.54	0.001872	1.93	252.05	248.26	0.30
1	24900.*	Max WS	450.84	200.04	202.26		202.34	0.002328	2.25	227.75	223.23	0.33
1	24800	Max WS	450.32	199.63	201.89		202.03	0.004697	3.15	173.26	186.92	0.47
1	24700.*	Max WS	450.18	199.20	201.27		201.46	0.007514	3.91	161.67	220.57	0.60
1	24600	Max WS	449.64	198.77	200.61		200.75	0.008354	4.01	204.10	303.00	0.62
1	24500.*	Max WS	449.32	198.34	200.07		200.14	0.004716	2.63	249.95	311.96	0.45
1	24400	Max WS	448.88	197.91	199.84		199.86	0.001055	1.31	478.23	469.23	0.22
1	24328.0*	Max WS	448.76	197.60	199.78		199.80	0.001092	1.27	477.19	460.62	0.22
1	24256.1*	Max WS	180.41	197.29	199.71		199.76	0.002347	1.82	99.85	448.84	0.32
1	24184.18	Max WS	448.50	196.98	199.33	199.54	200.12	0.049081	7.14	62.81	376.63	1.39
1	24092.0*	Max WS	447.69	196.51	198.95		198.99	0.003776	2.36	299.87	397.83	0.41
1	24000	Max WS	447.44	196.03	198.46		198.59	0.006298	3.44	221.65	366.64	0.54
1	23900.*	Max WS	446.90	195.51	197.84		197.96	0.007247	3.41	204.25	289.73	0.57
1	23800	Max WS	446.27	194.99	197.41		197.46	0.003417	2.28	272.05	280.13	0.39
1	23700.*	Max WS	446.17	194.47	196.97		197.06	0.004860	3.06	232.19	295.09	0.47
1	23600	Max WS	445.44	193.95	196.39		196.50	0.006834	3.66	223.81	374.30	0.56
1	23400	Max WS	443.91	192.92	195.71		195.77	0.001363	2.16	290.93	233.41	0.27
1	23178.25	Max WS	443.09	191.76	195.14		195.28	0.004046	3.91	206.35	197.41	0.46
1	23000	Max WS	442.77	191.25	194.40		194.57	0.004250	3.42	174.07	233.84	0.46
1	22600	Max WS	573.52	190.00	192.98		193.13	0.002951	3.28	215.99	328.75	0.40
1	22400	Max WS	572.43	189.54	192.67		192.72	0.000990	1.82	378.65	314.32	0.23
1	22175.79	Max WS	571.53	188.90	191.83		192.07	0.006118	4.38	194.72	226.18	0.57
1	22000	Max WS	571.21	188.07	191.15		191.31	0.003079	3.35	212.93	186.53	0.41
1	21900.*	Max WS	641.84	187.59	190.81		190.97	0.003190	3.32	239.63	232.85	0.41
1	21800	Max WS	641.77	187.11	190.62		190.72	0.001943	2.65	306.32	260.82	0.33

1	21600	Max WS	641.02	186.14	189.58		189.94	0.007959	4.97	154.96	151.44	0.65
1	21400	Max WS	639.97	185.21	188.93		189.01	0.001355	2.33	300.30	190.27	0.27
1	21176.29	Max WS	638.28	184.07	188.26		188.50	0.004846	4.33	220.59	265.76	0.51
1	20962.10	Max WS	637.76	184.10	187.64		187.71	0.002645	2.64	340.93	273.33	0.36
1	20921.9*	Max WS	672.12	184.01	187.52		187.61	0.002518	2.82	345.48	267.66	0.36
1	20881.8*	Max WS	672.10	183.92	187.43		187.52	0.002249	2.88	347.30	259.93	0.35
1	20841.7*	Max WS	672.06	183.83	187.33		187.43	0.002245	3.03	340.52	250.98	0.35
1	20801.6*	Max WS	672.02	183.74	187.23		187.34	0.002663	3.33	320.48	243.21	0.38
1	20761.52	Max WS	672.00	183.65	187.07		187.22	0.004330	3.93	279.06	231.47	0.48
1	20712.0*	Max WS	699.80	182.57	186.67		186.97	0.006654	4.90	211.02	221.62	0.60
1	20662.66	Max WS	699.15	181.49	186.42		186.67	0.004820	4.30	247.88	361.96	0.51
1	20655.8*	Max WS	699.15	181.50	186.37		186.64	0.005345	4.49	236.47	357.37	0.54
1	20648.9*	Max WS	699.16	181.52	186.32		186.63	0.006243	4.75	223.08	358.96	0.58
1	20642.13	Max WS	698.38	181.53	185.60	185.84	186.69	0.029047	8.37	83.43	52.51	1.17
1	20614.23	Max WS	698.47	180.88	185.84		186.01	0.002758	3.39	256.22	273.44	0.39
1	20399.06	Max WS	696.24	181.78	185.33		185.40	0.002926	2.68	413.06	413.78	0.38
1	20131.75	Max WS	691.09	180.89	184.68		184.76	0.002228	3.00	412.58	369.20	0.35
1	19831.49	Max WS	690.28	179.01	182.91		183.39	0.008924	5.56	124.24	220.39	0.68
1	19561.71	Max WS	709.20	176.06	181.73		181.89	0.002170	3.20	223.51	103.87	0.35
1	19375.20	Max WS	708.69	173.23	181.53		181.63	0.000581	2.51	286.06	262.25	0.20
1	19216.24	Max WS	708.11	176.81	181.29		181.41	0.002824	3.93	375.58	309.08	0.40
1	19040.62	Max WS	707.47	176.76	180.97		181.02	0.001225	2.35	596.53	501.26	0.26
1	18997.3*	Max WS	707.47	176.80	180.91		180.97	0.001546	2.69	512.53	460.16	0.30
1	18953.9*	Max WS	707.46	176.83	180.82		180.91	0.001942	2.98	443.62	417.15	0.33
1	18910.6*	Max WS	707.45	176.87	180.72		180.83	0.002523	3.28	385.01	386.05	0.38
1	18867.36	Max WS	707.10	176.91	180.42		180.72	0.006635	4.75	221.04	286.80	0.59
1	18661.93	Max WS	705.43	175.46	179.56		179.69	0.003150	3.66	377.30	431.02	0.42
1	18573.2*	Max WS	713.67	174.86	179.26		179.43	0.003141	4.02	342.25	348.53	0.43
1	18484.66	Max WS	712.06	174.25	178.88		179.15	0.004213	4.90	269.55	275.21	0.50
1	18313.08	Max WS	710.70	174.93	178.57		178.61	0.000799	2.08	540.71	312.32	0.22
1	18226	Max WS	710.62	173.87	178.18		178.59	0.002749	5.16	137.83	58.05	0.44
1	18175		Culvert									
1	18123	Max WS	710.06	173.46	177.13		177.70	0.004679	6.05	117.45	54.02	0.56
1	17964.88	Max WS	710.48	172.77	176.44		176.82	0.007540	5.58	213.11	261.18	0.64
1	17929.0*	Max WS	710.54	172.49	176.24		176.55	0.006369	4.96	222.17	254.50	0.59
1	17893.2*	Max WS	710.49	172.22	176.05		176.32	0.006144	4.58	227.53	244.77	0.57
1	17857.44	Max WS	710.62	171.94	175.77		176.07	0.008619	4.81	203.74	234.08	0.66
1	17638.59	Max WS	710.93	171.98	174.80		174.85	0.002257	2.61	514.18	553.40	0.34
1	17570.8*	Max WS	711.09	171.69	174.56		174.67	0.003847	3.37	387.05	467.52	0.44
1	17503.0*	Max WS	711.10	171.40	174.12		174.34	0.007562	4.44	275.98	510.66	0.61
1	17435.23	Max WS	711.20	171.11	173.85		173.93	0.003245	2.99	355.87	325.10	0.40
1	17347.3*	Max WS	711.23	170.31	173.49		173.60	0.004421	3.49	374.92	508.17	0.47
1	17259.39	Max WS	711.17	169.51	173.18		173.24	0.003140	2.73	465.73	493.10	0.39
1	17161.6*	Max WS	710.99	169.43	172.80		172.92	0.004380	3.36	341.44	435.12	0.47
1	17063.83	Max WS	711.20	169.35	172.40		172.54	0.003960	3.18	282.75	348.01	0.44
1	17016.0*	Max WS	711.27	168.83	172.19		172.36	0.003750	3.44	248.31	252.34	0.44
1	16968.2*	Max WS	711.37	168.30	172.02		172.20	0.003252	3.57	258.43	219.02	0.42
1	16920.4*	Max WS	711.50	167.78	171.85		172.05	0.003237	3.92	262.97	200.49	0.43
1	16872.70	Max WS	711.12	167.26	171.65		171.89	0.004102	4.77	252.93	183.74	0.49
1	16822.9*	Max WS	763.64	167.36	171.35		171.66	0.005676	5.30	249.54	232.70	0.57
1	16773.1*	Max WS	763.73	167.46	171.14		171.37	0.005005	4.72	274.13	237.88	0.53
1	16723.4*	Max WS	763.69	167.57	170.94		171.12	0.004622	4.23	295.02	255.91	0.50
1	16673.66	Max WS	763.86	167.67	170.77		170.89	0.003935	3.62	331.02	267.50	0.45

1	16606.6*	Max WS	764.02	167.56	170.49		170.62	0.004758	3.83	354.38	345.57	0.50
1	16539.5*	Max WS	763.84	167.45	170.16		170.29	0.005415	3.92	347.86	423.67	0.53
1	16472.50	Max WS	763.47	167.34	169.94		170.01	0.002754	2.91	417.36	295.68	0.38
1	16374.4*	Max WS	772.74	166.82	169.68		169.74	0.002800	2.81	459.47	471.68	0.38
1	16276.30	Max WS	772.06	166.31	169.27		169.38	0.005016	3.46	328.89	513.55	0.49
1	16193.9*	Max WS	771.10	165.53	169.12		169.18	0.002584	2.78	504.02	496.99	0.37
1	16111.50	Max WS	771.10	164.75	169.05		169.08	0.001135	2.19	676.29	533.26	0.25
1	16044.4*	Max WS	771.03	164.60	168.97		169.03	0.001491	2.63	568.62	475.26	0.29
1	15977.4*	Max WS	770.38	164.46	168.88		168.96	0.001729	2.93	513.65	446.93	0.32
1	15910.45	Max WS	770.47	164.31	168.79		168.89	0.002024	3.25	461.37	432.51	0.34
1	15816.4*	Max WS	770.67	163.77	168.44		168.73	0.003754	4.82	272.28	299.62	0.48
1	15722.50	Max WS	770.69	163.23	167.26	167.41	168.15	0.014797	8.06	131.44	116.16	0.89
1	15661.2*	Max WS	770.29	163.03	167.13		167.36	0.004374	4.31	248.61	208.16	0.49
1	15600	Max WS	770.48	162.83	167.06		167.14	0.001572	2.56	443.17	329.49	0.30
1	15513.5*	Max WS	770.61	162.55	166.96		167.03	0.001471	2.45	460.55	350.55	0.29
1	15427.0*	Max WS	770.70	162.26	166.86		166.93	0.001479	2.40	467.63	373.77	0.29
1	15340.5*	Max WS	770.76	161.98	166.75		166.82	0.001613	2.40	461.09	398.74	0.29
1	15254.0*	Max WS	777.14	161.69	166.61		166.69	0.002030	2.53	433.01	422.49	0.32
1	15167.54	Max WS	777.28	161.41	166.26		166.48	0.006054	3.79	205.31	400.14	0.54
1	15068.7*	Max WS	777.43	161.32	165.94		166.08	0.002872	3.30	295.82	346.81	0.40
1	14970.01	Max WS	777.44	161.22	165.59		165.85	0.005394	4.69	243.02	324.41	0.54
1	14800.08	Max WS	776.78	160.07	165.05		165.16	0.003270	3.30	380.46	350.66	0.41
1	14745.2*	Max WS	776.91	160.00	164.88		165.03	0.002421	3.67	377.76	333.68	0.38
1	14690.37	Max WS	776.27	159.93	164.65		164.93	0.003678	5.14	320.33	335.16	0.47
1	14521.03	Max WS	768.76	159.74	164.14		164.27	0.003269	3.01	338.19	372.17	0.41
1	14350.55	Max WS	764.18	158.30	163.81		163.86	0.001358	2.47	535.68	423.32	0.28
1	14165.39	Max WS	776.10	159.11	163.59		163.64	0.001201	2.55	570.38	427.42	0.27
1	14077.1*	Max WS	806.19	158.60	163.50		163.56	0.000815	2.40	650.33	485.23	0.23
1	13988.90	Max WS	806.21	158.09	163.46		163.49	0.000550	1.94	807.07	541.57	0.19
1	13971	Max WS	806.19	158.18	163.24		163.63	0.002062	4.97	162.07	62.39	0.39
1	13920		Culvert									
1	13869	Max WS	805.85	158.18	161.82		162.56	0.006188	6.92	116.52	53.85	0.64
1	13817.08	Max WS	806.18	158.27	161.99		162.30	0.005309	5.02	252.52	224.81	0.55
1	13800.26	Max WS	806.16	157.92	161.84		162.20	0.007050	5.46	227.36	197.15	0.62
1	13716.8*	Max WS	806.06	157.68	161.43		161.73	0.004843	4.71	233.21	185.39	0.53
1	13633.46	Max WS	806.14	157.45	161.35		161.43	0.001480	2.66	476.95	322.81	0.29
1	13548.2*	Max WS	805.91	156.91	161.11		161.27	0.003166	3.63	349.12	328.76	0.42
1	13462.94	Max WS	805.59	156.37	160.84		161.02	0.003758	3.85	307.60	277.87	0.45
1	13372.7*	Max WS	805.13	155.87	160.60		160.74	0.003011	3.60	380.47	376.42	0.41
1	13282.48	Max WS	804.62	155.37	160.46		160.52	0.001401	2.63	623.05	592.63	0.28
1	13196.7*	Max WS	804.73	155.42	160.33		160.41	0.001669	2.87	490.61	408.59	0.31
1	13110.9*	Max WS	804.79	155.48	160.18		160.27	0.001881	2.91	452.09	381.88	0.33
1	13025.20	Max WS	804.88	155.53	159.78		160.03	0.005246	4.20	235.95	180.27	0.53
1	12934.78	Max WS	805.05	155.67	159.44		159.65	0.003765	4.37	301.66	235.40	0.47
1	12679.83	Max WS	807.75	154.84	158.45		158.72	0.005796	4.85	321.89	487.26	0.57
1	12514.10	Max WS	807.61	153.08	157.89		158.04	0.002984	3.98	379.81	343.96	0.41
1	12342.49	Max WS	807.56	153.74	157.48		157.57	0.002605	3.14	427.31	351.67	0.38
1	12168.87	Max WS	807.52	152.62	157.00		157.15	0.003152	3.88	400.64	392.48	0.42
1	11993.01	Max WS	807.66	152.46	156.58		156.69	0.002781	2.91	387.96	370.18	0.38
1	11820.19	Max WS	806.09	150.12	156.05		156.22	0.002857	3.33	266.63	416.89	0.39
1	11633.47	Max WS	821.99	151.10	155.29		155.47	0.004536	3.86	316.52	352.71	0.49
1	11460.48	Max WS	838.76	149.67	154.73		154.85	0.002574	3.03	405.58	429.20	0.37
1	11271.33	Max WS	838.11	147.60	154.40		154.51	0.001509	2.81	454.07	546.42	0.29

1	11146.79	Max WS	840.17	147.72	153.69	154.19	0.005810	5.65	151.39	220.30	0.57
1	10961.29	Max WS	839.56	149.08	153.15	153.28	0.002888	3.39	410.81	410.48	0.40
1	10777.64	Max WS	839.21	147.95	152.56	152.79	0.002959	4.13	304.94	332.34	0.42
1	10599.75	Max WS	838.71	147.94	152.00	152.19	0.003932	3.98	334.93	337.51	0.46
1	10484.71	Max WS	838.25	147.53	151.76	151.84	0.001637	2.78	469.34	288.25	0.31
1	10294.85	Max WS	838.50	146.18	151.18	151.41	0.003465	4.00	248.23	139.30	0.44
1	10111.02	Max WS	840.29	146.70	150.72	150.90	0.003012	3.69	380.00	471.41	0.41
1	9962.423	Max WS	838.85	144.81	150.05	150.48	0.006875	5.50	231.62	449.82	0.61
1	9876	Max WS	838.88	144.29	149.66	150.03	0.001832	4.88	172.02	64.22	0.37
1	9825.00		Culvert								
1	9774	Max WS	838.76	143.93	149.09	149.49	0.002092	5.08	165.23	62.98	0.39
1	9553.901	Max WS	838.14	143.12	148.91	149.02	0.001992	3.30	463.05	425.95	0.34
1	9362.452	Max WS	836.16	143.70	148.35	148.65	0.003930	4.78	303.41	453.74	0.48
1	9149.788	Max WS	835.35	141.77	148.03	148.08	0.000553	1.75	605.19	527.49	0.18
1	8963.549	Max WS	835.05	141.24	147.49	147.77	0.004014	4.55	261.27	220.37	0.48
1	8766.435	Max WS	834.91	142.65	146.74	147.00	0.004115	4.19	228.15	232.63	0.48
1	8577.282	Max WS	833.55	141.02	146.20	146.40	0.002605	3.75	336.70	482.55	0.39
1	8398.577	Max WS	833.16	141.01	145.92	146.04	0.001954	3.40	442.85	394.12	0.34
1	8223.925	Max WS	833.29	139.79	145.46	145.66	0.003145	4.24	321.62	246.29	0.43
1	8000	Max WS	864.48	139.29	145.03	145.14	0.001539	2.88	434.49	323.73	0.30
1	7744.065	Max WS	865.09	138.71	143.89	144.31	0.006521	5.49	238.56	345.80	0.60
1	7600	Max WS	865.47	138.31	143.60	143.63	0.000914	2.00	729.73	522.58	0.23
1	7400	Max WS	866.62	137.76	142.60	143.14	0.007497	5.99	163.83	414.54	0.66
1	7200	Max WS	867.70	137.20	141.68	141.96	0.004375	4.49	234.38	158.23	0.50
1	7000	Max WS	868.96	136.65	141.10	141.30	0.002703	3.70	299.48	245.91	0.40
1	6800	Max WS	870.24	136.09	140.77	140.87	0.001773	2.76	447.21	405.78	0.32
1	6545.718	Max WS	869.34	134.93	139.90	140.21	0.006176	5.74	324.42	356.63	0.57
1	6400	Max WS	870.90	135.02	139.47	139.61	0.002497	3.75	393.09	288.73	0.39
1	6200	Max WS	872.56	134.52	139.09	139.19	0.002344	3.23	477.69	387.09	0.37
1	6000	Max WS	873.59	134.02	138.69	138.83	0.002613	3.15	334.99	260.64	0.38
1	5800	Max WS	876.07	133.53	138.27	138.37	0.001803	2.82	416.27	326.03	0.32
1	5544.024	Max WS	878.39	132.89	137.72	137.87	0.002865	3.91	434.74	421.44	0.41
1	5310.353	Max WS	879.06	130.81	136.91	137.17	0.003332	4.25	304.09	379.95	0.44
1	5126.186	Max WS	880.49	131.42	136.61	136.68	0.001266	2.93	662.35	564.44	0.27
1	4928.496	Max WS	881.59	131.24	136.41	136.49	0.001220	2.63	585.11	500.41	0.27
1	4737.846	Max WS	883.38	130.80	135.97	136.13	0.002845	3.73	362.69	252.57	0.40
1	4542.183	Max WS	885.10	130.20	135.62	135.74	0.001232	3.19	460.00	343.60	0.28
1	4437.102	Max WS	886.10	131.50	135.29	135.48	0.004823	4.29	345.46	312.93	0.51
1	4246.329	Max WS	887.51	129.78	134.66	134.79	0.002803	3.91	455.12	391.21	0.40
1	4063.200	Max WS	888.70	129.05	134.02	134.26	0.003575	4.20	310.33	337.72	0.45
1	3863.200	Max WS	890.24	128.43	133.72	133.76	0.000914	2.21	717.75	492.16	0.23
1	3682.022	Max WS	891.69	127.89	133.57	133.60	0.000817	2.11	882.46	673.79	0.22
1	3487.742	Max WS	893.69	128.90	133.18	133.27	0.002829	3.15	534.02	524.25	0.39
1	3332.982	Max WS	895.11	129.37	132.87	132.93	0.001699	2.59	580.63	457.19	0.30
1	3152.554	Max WS	925.10	127.27	132.18	132.51	0.005867	5.24	336.64	496.58	0.57
1	2960.781	Max WS	926.57	128.00	131.42	131.61	0.003904	3.83	375.79	514.16	0.46
1	2800	Max WS	927.89	127.75	130.94	131.05	0.003172	3.32	455.33	389.79	0.41
1	2600	Max WS	929.33	127.22	130.53	130.61	0.001734	2.48	455.90	321.64	0.31
1	2436.651	Max WS	930.50	126.76	129.66	129.99	0.007186	4.73	236.82	291.94	0.61
1	2200	Max WS	931.89	125.72	128.65	128.82	0.002951	3.45	340.60	273.96	0.41
1	1800	Max WS	930.76	123.94	128.04	128.11	0.000929	2.09	521.88	307.90	0.23
1	1508.765	Max WS	930.21	122.64	127.18	127.51	0.004267	5.37	296.10	329.79	0.51
1	1238.804	Max WS	929.51	122.00	126.52	126.63	0.002119	2.66	399.27	347.95	0.34

1	947.7714	Max WS	928.85	122.00	125.63		125.83	0.003687	4.29	340.72	253.22	0.46
1	703.7460	Max WS	927.96	122.00	124.99		125.08	0.002269	2.79	488.94	418.93	0.35
1	413.4701	Max WS	927.21	120.00	123.92		124.21	0.004377	4.46	241.60	235.40	0.50
1	200.9584	Max WS	926.83	120.00	123.43		123.54	0.001912	3.21	470.46	368.08	0.34
1	10.31402	Max WS	926.69	120.00	122.99	122.44	123.12	0.002711	3.53	454.03	372.90	0.40

Unnamed Deer Creek Tributary

Developed Conditions Model:

2-Year 24-Hour Storm

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 8:41:16 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100
yr 24 hour storms
Plan: 2 yr developed no det - Full Shed Developed without Detention 2 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	84.25	220.00	221.08		221.14	0.005946	2.03	42.47	115.93	0.46
1	28313.0*	Max WS	84.05	219.58	220.66		220.72	0.005955	1.97	46.37	104.35	0.46
1	28226.0*	Max WS	83.73	219.15	220.19		220.25	0.007113	1.98	48.61	121.37	0.49
1	28139.07	Max WS	83.02	218.73	219.87		219.90	0.002930	1.37	72.83	146.82	0.32
1	28069.5*	Max WS	148.01	218.22	219.43		219.52	0.008561	2.52	67.60	136.94	0.56
1	28000	Max WS	147.57	217.71	218.90		218.99	0.008368	2.47	72.20	178.53	0.55
1	27900.*	Max WS	147.47	216.97	217.87		217.99	0.013091	2.79	52.93	99.71	0.67
1	27800	Max WS	146.65	216.23	217.19		217.23	0.002753	1.55	94.44	132.79	0.32
1	27700.*	Max WS	145.68	215.51	216.92		216.97	0.002531	1.67	87.05	102.65	0.32
1	27600	Max WS	145.39	214.80	216.44		216.54	0.006393	2.98	85.34	204.45	0.52
1	27500.*	Max WS	144.97	214.08	215.50		215.64	0.010725	3.42	67.21	172.46	0.66
1	27400	Max WS	143.38	213.35	214.87		214.89	0.002390	1.73	133.32	214.23	0.32
1	27329.7*	Max WS	143.23	212.84	214.64		214.71	0.004272	2.48	87.57	154.35	0.43
1	27259.5*	Max WS	142.59	212.32	214.32		214.43	0.005410	2.92	71.06	165.28	0.49

1	27189.29	Max WS	142.41	211.81	213.90		214.12	0.010237	3.73	38.16	37.65	0.65
1	27094.6*	Max WS	141.95	211.10	213.10		213.30	0.010196	3.59	39.49	41.79	0.65
1	27000	Max WS	141.80	210.39	212.45		212.57	0.006119	2.80	50.88	59.06	0.51
1	26900.*	Max WS	141.56	209.64	211.93		212.03	0.005428	2.51	56.37	64.15	0.47
1	26800	Max WS	141.27	208.88	211.26		211.38	0.008665	2.79	50.62	69.82	0.57
1	26700.*	Max WS	140.93	208.12	210.54		210.66	0.006561	2.87	49.06	52.09	0.52
1	26600	Max WS	139.58	207.37	210.06		210.16	0.003751	2.67	62.01	201.03	0.42
1	26528.4*	Max WS	136.75	206.83	209.81		209.91	0.003780	2.60	62.75	213.58	0.41
1	26456.8*	Max WS	135.59	206.29	209.52		209.63	0.004272	2.68	59.24	197.36	0.43
1	26385.31	Max WS	135.38	205.75	208.94		209.16	0.009391	3.73	36.33	79.55	0.62
1	26292.6*	Max WS	135.07	205.40	207.93		208.18	0.012405	4.03	34.55	52.91	0.72
1	26200	Max WS	135.01	205.06	207.07		207.22	0.007748	3.11	43.41	46.57	0.57
1	26100.*	Max WS	134.69	204.69	206.44		206.54	0.005959	2.56	52.65	62.31	0.49
1	26000	Max WS	134.54	204.32	206.03		206.09	0.003316	1.91	70.59	83.70	0.37
1	25900.*	Max WS	134.23	203.95	205.71		205.76	0.003462	1.93	69.49	83.50	0.37
1	25800	Max WS	134.02	203.57	205.43		205.47	0.002695	1.70	78.91	95.36	0.33
1	25700.*	Max WS	158.09	203.20	205.04		205.13	0.004998	2.44	66.53	157.61	0.45
1	25600	Max WS	157.85	202.83	204.78		204.80	0.002153	2.10	161.78	260.48	0.32
1	25500.*	Max WS	221.66	202.46	204.40		204.50	0.005638	3.23	133.84	279.85	0.51
1	25400	Max WS	221.09	202.09	204.08		204.13	0.002599	2.10	173.54	291.22	0.34
1	25358.8*	Max WS	220.94	202.00	203.96		204.03	0.003659	2.48	154.61	330.85	0.41
1	25317.6*	Max WS	220.68	201.92	203.81		203.89	0.004601	2.66	141.72	291.16	0.45
1	25276.3*	Max WS	220.66	201.83	203.63		203.70	0.005298	2.61	134.98	254.70	0.47
1	25235.1*	Max WS	101.73	201.75	203.53		203.54	0.000729	0.92	160.81	240.07	0.17
1	25193.99	Max WS	220.62	201.66	203.26		203.29	0.004416	1.79	152.92	219.10	0.40
1	25145.4*	Max WS	220.52	201.36	202.96		203.03	0.006613	2.35	121.05	206.79	0.50
1	25097.*	Max WS	220.38	201.05	202.53		202.65	0.009849	2.85	86.39	173.45	0.61
1	25048.5*	Max WS	220.00	200.75	202.15		202.24	0.006922	2.43	90.40	129.57	0.51
1	25000	Max WS	219.93	200.45	201.98		202.02	0.002282	1.56	140.81	182.77	0.30
1	24900.*	Max WS	219.43	200.04	201.74		201.79	0.002535	1.82	125.30	158.95	0.33
1	24800	Max WS	219.36	199.63	201.38		201.48	0.004452	2.52	96.37	124.71	0.44
1	24700.*	Max WS	218.99	199.20	200.93		201.05	0.006056	2.92	94.82	164.13	0.51
1	24600	Max WS	218.87	198.77	200.29		200.42	0.009614	3.54	111.26	269.76	0.64
1	24500.*	Max WS	202.75	198.34	199.83		199.85	0.002815	1.70	175.39	294.13	0.33
1	24400	Max WS	193.95	197.91	199.73		199.73	0.000282	0.63	424.64	454.66	0.11
1	24328.0*	Max WS	186.50	197.60	199.71		199.72	0.000233	0.56	445.78	453.85	0.10
1	24256.1*	Max WS	178.58	197.29	199.69		199.75	0.002439	1.83	97.88	447.08	0.32
1	24184.18	Max WS	281.48	196.98	199.20	199.25	199.64	0.031116	5.31	52.99	355.84	1.09
1	24092.0*	Max WS	254.67	196.51	198.55		198.62	0.006193	2.64	158.05	311.05	0.50
1	24000	Max WS	233.58	196.03	198.12		198.29	0.009102	3.42	100.85	352.40	0.62
1	23900.*	Max WS	228.68	195.51	197.50		197.62	0.008587	3.07	113.17	251.23	0.59
1	23800	Max WS	223.90	194.99	197.04		197.07	0.003140	1.86	174.24	251.46	0.36
1	23700.*	Max WS	222.63	194.47	196.69		196.75	0.003689	2.27	154.57	254.32	0.40
1	23600	Max WS	222.05	193.95	196.06		196.18	0.008185	3.30	103.82	303.88	0.59
1	23400	Max WS	219.86	192.92	195.30		195.33	0.000833	1.45	202.92	194.96	0.20
1	23178.25	Max WS	221.41	191.76	194.60		194.77	0.005056	3.71	101.75	181.03	0.49
1	23000	Max WS	220.50	191.25	193.77		193.91	0.004446	2.99	73.66	55.18	0.46
1	22600	Max WS	271.75	190.00	192.36		192.45	0.002491	2.38	121.69	192.74	0.35
1	22400	Max WS	270.71	189.54	192.09		192.11	0.000843	1.32	224.19	222.82	0.20
1	22175.79	Max WS	270.18	188.90	191.19		191.43	0.008671	3.94	69.02	89.21	0.63
1	22000	Max WS	269.75	188.07	190.46		190.56	0.003088	2.56	112.46	114.17	0.38
1	21900.*	Max WS	301.30	187.59	190.12		190.22	0.003408	2.58	118.50	113.29	0.40
1	21800	Max WS	301.28	187.11	189.87		189.95	0.002333	2.18	138.65	112.12	0.33

1	21600	Max WS	300.56	186.14	188.88	189.10	0.006966	3.81	82.90	79.39	0.57
1	21400	Max WS	298.94	185.21	188.29	188.32	0.000942	1.57	193.88	140.75	0.22
1	21176.29	Max WS	297.08	184.07	187.96	188.06	0.002167	2.64	135.36	193.70	0.33
1	20962.10	Max WS	296.56	184.10	186.97	187.15	0.006705	3.36	88.31	216.19	0.54
1	20921.9*	Max WS	310.19	184.01	186.88	186.95	0.002664	2.34	186.33	225.28	0.35
1	20881.8*	Max WS	310.09	183.92	186.78	186.85	0.002176	2.30	191.78	225.15	0.33
1	20841.7*	Max WS	309.97	183.83	186.70	186.77	0.002008	2.35	191.85	220.14	0.32
1	20801.6*	Max WS	309.69	183.74	186.61	186.69	0.002400	2.60	180.29	212.31	0.35
1	20761.52	Max WS	309.66	183.65	186.42	186.56	0.005388	3.46	140.80	199.69	0.50
1	20712.0*	Max WS	320.35	182.57	185.80	186.16	0.011650	4.83	66.31	49.38	0.73
1	20662.66	Max WS	320.33	181.49	185.55	185.75	0.004433	3.63	88.16	48.33	0.47
1	20655.8*	Max WS	320.34	181.50	185.50	185.72	0.005144	3.79	84.48	48.53	0.51
1	20648.9*	Max WS	320.34	181.52	185.42	185.68	0.006615	4.09	78.25	47.96	0.56
1	20642.13	Max WS	320.01	181.53	185.28	185.63	0.010469	4.75	67.38	45.92	0.69
1	20614.23	Max WS	320.04	180.88	185.35	185.41	0.001226	2.08	154.17	133.29	0.25
1	20399.06	Max WS	319.34	181.78	185.09	185.11	0.001359	1.63	312.59	400.82	0.25
1	20131.75	Max WS	317.75	180.89	183.87	184.11	0.006855	3.94	89.08	259.80	0.57
1	19831.49	Max WS	317.39	179.01	181.88	182.16	0.006142	4.26	74.54	54.68	0.55
1	19561.71	Max WS	327.55	176.06	181.09	181.15	0.000939	1.94	168.84	75.06	0.23
1	19375.20	Max WS	326.39	173.23	181.02	181.04	0.000174	1.29	254.04	191.11	0.11
1	19216.24	Max WS	325.34	176.81	180.88	180.94	0.001496	2.58	256.54	268.65	0.29
1	19040.62	Max WS	322.00	176.76	180.45	180.58	0.002833	3.07	150.47	430.58	0.38
1	18997.3*	Max WS	321.88	176.80	180.30	180.46	0.003087	3.21	117.46	361.58	0.40
1	18953.9*	Max WS	321.77	176.83	180.17	180.32	0.003204	3.19	109.28	331.07	0.41
1	18910.6*	Max WS	321.74	176.87	180.00	180.17	0.003791	3.31	100.09	294.11	0.44
1	18867.36	Max WS	317.72	176.91	179.76	179.97	0.005279	3.66	86.87	58.93	0.51
1	18661.93	Max WS	316.41	175.46	178.89	179.02	0.003606	3.15	146.60	207.63	0.42
1	18573.2*	Max WS	336.78	174.86	178.41	178.68	0.005685	4.23	96.69	193.50	0.54
1	18484.66	Max WS	331.78	174.25	177.89	178.24	0.006041	4.82	75.08	69.89	0.57
1	18313.08	Max WS	328.08	174.93	177.08	177.28	0.004524	3.58	91.53	188.92	0.48
1	18226	Max WS	327.93	173.87	176.80	176.99	0.002114	3.50	93.77	49.72	0.36
1	18175		Culvert								
1	18123	Max WS	328.07	173.46	176.51	176.68	0.001860	3.37	97.46	50.27	0.34
1	17964.88	Max WS	328.01	172.77	175.85	176.15	0.006826	4.43	78.29	108.42	0.58
1	17929.0*	Max WS	328.09	172.49	175.66	175.90	0.005696	3.89	87.30	133.73	0.53
1	17893.2*	Max WS	328.11	172.22	175.51	175.71	0.005816	3.65	92.61	171.27	0.53
1	17857.44	Max WS	328.11	171.94	175.28	175.51	0.008471	3.88	84.61	154.65	0.62
1	17638.59	Max WS	327.61	171.98	174.40	174.45	0.002100	2.17	289.33	542.16	0.32
1	17570.8*	Max WS	327.14	171.69	174.06	174.21	0.005725	3.31	157.39	454.66	0.51
1	17503.0*	Max WS	326.68	171.40	173.67	173.81	0.006358	3.28	131.95	188.86	0.53
1	17435.23	Max WS	326.41	171.11	173.47	173.51	0.001866	1.92	247.86	266.34	0.29
1	17347.3*	Max WS	325.82	170.31	173.31	173.35	0.001799	2.07	281.01	499.51	0.30
1	17259.39	Max WS	325.71	169.51	172.75	173.00	0.007883	4.42	104.33	424.69	0.61
1	17161.6*	Max WS	325.57	169.43	172.15	172.34	0.006145	3.49	107.11	225.97	0.54
1	17063.83	Max WS	325.51	169.35	171.66	171.79	0.005272	2.88	113.06	102.27	0.48
1	17016.0*	Max WS	325.55	168.83	171.45	171.57	0.004288	2.76	118.01	104.76	0.44
1	16968.2*	Max WS	325.59	168.30	171.27	171.39	0.003354	2.75	124.49	114.61	0.40
1	16920.4*	Max WS	325.64	167.78	171.12	171.25	0.002934	2.98	131.18	149.64	0.39
1	16872.70	Max WS	325.46	167.26	170.94	171.12	0.003508	3.68	133.63	156.13	0.43
1	16822.9*	Max WS	347.96	167.36	170.74	170.92	0.004015	3.76	136.02	156.48	0.46
1	16773.1*	Max WS	348.00	167.46	170.55	170.72	0.004176	3.60	147.34	195.14	0.46
1	16723.4*	Max WS	348.03	167.57	170.41	170.52	0.003554	3.09	173.12	200.40	0.42
1	16673.66	Max WS	348.05	167.67	170.28	170.35	0.002879	2.56	204.78	248.48	0.37

1	16606.6*	Max WS	348.03	167.56	169.99	170.10	0.005331	3.27	188.34	314.42	0.50
1	16539.5*	Max WS	348.05	167.45	169.60	169.73	0.006470	3.58	160.07	223.96	0.55
1	16472.50	Max WS	348.01	167.34	169.38	169.42	0.002231	2.23	260.35	264.80	0.33
1	16374.4*	Max WS	356.35	166.82	169.14	169.19	0.002605	2.28	247.38	295.94	0.35
1	16276.30	Max WS	317.70	166.31	168.89	168.94	0.002389	2.10	228.15	449.67	0.33
1	16193.9*	Max WS	356.21	165.53	168.45	168.72	0.010562	4.40	103.79	390.18	0.69
1	16111.50	Max WS	356.19	164.75	168.30	168.33	0.001407	1.90	303.94	430.40	0.26
1	16044.4*	Max WS	355.96	164.60	168.20	168.26	0.002092	2.45	229.85	354.12	0.32
1	15977.4*	Max WS	355.62	164.46	168.01	168.14	0.003263	3.17	158.82	207.76	0.41
1	15910.45	Max WS	355.65	164.31	167.80	168.00	0.004140	3.69	116.56	118.99	0.46
1	15816.4*	Max WS	355.70	163.77	167.41	167.64	0.004120	3.92	101.91	78.34	0.47
1	15722.50	Max WS	355.62	163.23	166.68	167.11	0.009196	5.34	76.03	73.40	0.67
1	15661.2*	Max WS	355.34	163.03	166.49	166.62	0.003398	3.08	143.37	143.73	0.41
1	15600	Max WS	355.34	162.83	166.42	166.46	0.001256	1.84	252.46	248.54	0.25
1	15513.5*	Max WS	354.99	162.55	166.33	166.37	0.001237	1.81	254.47	285.14	0.25
1	15427.0*	Max WS	354.99	162.26	166.23	166.28	0.001372	1.84	246.86	317.53	0.26
1	15340.5*	Max WS	354.94	161.98	166.11	166.16	0.001707	1.94	225.64	310.25	0.29
1	15254.0*	Max WS	357.39	161.69	165.93	166.00	0.002418	2.18	181.73	234.95	0.33
1	15167.54	Max WS	357.36	161.41	165.61	165.73	0.004167	2.81	127.07	148.87	0.43
1	15068.7*	Max WS	357.32	161.32	165.34	165.43	0.002114	2.41	148.48	212.79	0.33
1	14970.01	Max WS	357.11	161.22	165.05	165.18	0.003545	3.21	151.07	229.86	0.42
1	14800.08	Max WS	356.90	160.07	164.36	164.51	0.005207	3.39	149.30	296.70	0.49
1	14745.2*	Max WS	356.92	160.00	164.17	164.31	0.002521	3.11	156.73	290.24	0.37
1	14690.37	Max WS	356.92	159.93	163.98	164.20	0.002875	3.98	121.74	114.04	0.40
1	14521.03	Max WS	356.58	159.74	163.52	163.62	0.004264	2.59	137.52	234.45	0.43
1	14350.55	Max WS	356.10	158.30	163.12	163.17	0.001554	2.12	271.18	343.58	0.28
1	14165.39	Max WS	360.15	159.11	162.41	162.62	0.005284	3.77	120.15	257.25	0.51
1	14077.1*	Max WS	372.40	158.60	162.12	162.26	0.002612	3.05	143.64	160.68	0.37
1	13988.90	Max WS	372.44	158.09	161.81	161.98	0.004027	3.38	124.51	173.57	0.45
1	13971	Max WS	372.44	158.18	161.76	161.93	0.001397	3.25	114.61	53.49	0.30
1	13920		Culvert								
1	13869	Max WS	372.44	158.18	161.41	161.61	0.001963	3.60	103.48	51.40	0.35
1	13817.08	Max WS	372.37	158.27	161.28	161.50	0.004947	3.91	120.65	151.21	0.50
1	13800.26	Max WS	372.37	157.92	161.11	161.41	0.007929	4.54	103.48	140.07	0.62
1	13716.8*	Max WS	372.25	157.68	160.76	160.93	0.003808	3.38	125.43	132.33	0.44
1	13633.46	Max WS	372.27	157.45	160.65	160.71	0.001439	2.13	262.15	290.79	0.27
1	13548.2*	Max WS	372.13	156.91	160.41	160.55	0.003576	3.04	148.79	201.62	0.42
1	13462.94	Max WS	372.16	156.37	160.17	160.30	0.003671	3.01	154.61	182.34	0.42
1	13372.7*	Max WS	372.05	155.87	159.93	160.05	0.003171	2.98	177.18	256.38	0.40
1	13282.48	Max WS	371.86	155.37	159.74	159.90	0.003339	3.31	127.22	353.04	0.41
1	13196.7*	Max WS	371.65	155.42	159.57	159.66	0.002084	2.57	212.48	299.09	0.33
1	13110.9*	Max WS	371.61	155.48	159.40	159.50	0.002416	2.65	187.80	277.21	0.35
1	13025.20	Max WS	371.48	155.53	159.11	159.27	0.004534	3.23	122.00	132.50	0.47
1	12934.78	Max WS	371.38	155.67	158.86	159.00	0.002904	3.26	168.98	218.43	0.39
1	12679.83	Max WS	372.58	154.84	157.87	158.13	0.006275	4.14	101.08	115.08	0.56
1	12514.10	Max WS	372.49	153.08	157.23	157.33	0.002451	3.06	190.58	163.51	0.36
1	12342.49	Max WS	372.39	153.74	156.88	156.95	0.002329	2.63	233.93	274.28	0.35
1	12168.87	Max WS	371.85	152.62	156.31	156.50	0.004160	3.65	154.75	273.93	0.46
1	11993.01	Max WS	371.70	152.46	155.71	155.84	0.003678	2.95	125.89	146.92	0.42
1	11820.19	Max WS	371.58	150.12	155.26	155.34	0.002126	2.37	156.90	134.03	0.32
1	11633.47	Max WS	375.12	151.10	154.53	154.71	0.004742	3.44	109.13	144.84	0.48
1	11460.48	Max WS	380.64	149.67	153.76	153.91	0.004743	3.11	122.39	90.02	0.47
1	11271.33	Max WS	380.51	147.60	153.24	153.33	0.001485	2.37	160.44	71.83	0.28

1	11146.79	Max WS	380.38	147.72	152.86		153.05	0.003115	3.50	108.60	129.10	0.40
1	10961.29	Max WS	380.20	149.08	152.29		152.46	0.003239	3.30	136.08	181.78	0.41
1	10777.64	Max WS	380.13	147.95	151.86		151.98	0.001807	2.76	138.15	61.31	0.31
1	10599.75	Max WS	380.08	147.94	151.19		151.40	0.004890	3.63	113.73	133.83	0.49
1	10484.71	Max WS	379.73	147.53	150.89		150.97	0.002322	2.51	223.91	277.41	0.34
1	10294.85	Max WS	379.78	146.18	150.44		150.56	0.002387	2.77	147.30	132.58	0.35
1	10111.02	Max WS	380.81	146.70	149.77		149.95	0.004622	3.40	113.25	89.76	0.48
1	9962.423	Max WS	380.57	144.81	148.65		149.07	0.007669	5.25	74.11	141.80	0.63
1	9876	Max WS	380.54	144.29	148.54		148.67	0.000820	2.79	136.27	57.53	0.24
1	9825.00		Culvert									
1	9774	Max WS	380.37	143.93	148.41		148.52	0.000689	2.65	143.47	58.90	0.22
1	9553.901	Max WS	380.01	143.12	147.97		148.14	0.003140	3.30	115.30	224.95	0.40
1	9362.452	Max WS	379.85	143.70	147.33		147.55	0.003352	3.77	100.72	42.13	0.43
1	9149.788	Max WS	379.67	141.77	147.08		147.10	0.000375	1.24	306.82	131.22	0.14
1	8963.549	Max WS	379.59	141.24	146.53		146.74	0.004346	3.67	105.16	82.33	0.47
1	8766.435	Max WS	379.52	142.65	145.81		145.96	0.003802	3.12	121.56	74.17	0.43
1	8577.282	Max WS	379.42	141.02	145.28		145.40	0.002215	2.80	135.91	73.34	0.34
1	8398.577	Max WS	379.26	141.01	144.96		145.07	0.002109	2.81	188.36	192.86	0.34
1	8223.925	Max WS	379.22	139.79	144.53		144.69	0.002761	3.42	151.40	135.36	0.38
1	8000	Max WS	391.37	139.29	144.12		144.20	0.001732	2.35	180.40	202.43	0.30
1	7744.065	Max WS	391.80	138.71	143.11		143.36	0.005581	4.03	97.15	53.55	0.53
1	7600	Max WS	392.00	138.31	142.67		142.77	0.002615	2.65	173.09	149.61	0.36
1	7400	Max WS	392.35	137.76	141.66		141.95	0.006313	4.35	90.11	49.59	0.57
1	7200	Max WS	392.55	137.20	140.82		140.98	0.003642	3.31	127.36	92.71	0.43
1	7000	Max WS	392.49	136.65	140.38		140.48	0.001779	2.44	172.30	135.32	0.31
1	6800	Max WS	392.62	136.09	140.16		140.22	0.001331	1.97	220.91	290.50	0.26
1	6545.718	Max WS	392.49	134.93	139.17	138.52	139.61	0.008056	5.52	105.14	241.29	0.63
1	6400	Max WS	392.97	135.02	138.77		138.87	0.001987	2.79	216.04	229.36	0.33
1	6200	Max WS	393.61	134.52	138.33		138.46	0.003337	3.21	200.26	342.43	0.42
1	6000	Max WS	394.03	134.02	137.91		138.00	0.002657	2.42	162.89	114.37	0.36
1	5800	Max WS	395.01	133.53	137.59		137.64	0.001193	1.96	247.55	193.84	0.25
1	5544.024	Max WS	395.69	132.89	136.79		137.00	0.004694	3.86	133.02	154.76	0.49
1	5310.353	Max WS	396.39	130.81	136.10		136.23	0.002040	2.92	135.53	264.94	0.33
1	5126.186	Max WS	397.09	131.42	135.83		135.92	0.001480	2.72	259.84	338.88	0.29
1	4928.496	Max WS	397.62	131.24	135.64		135.70	0.001155	2.12	252.43	307.52	0.25
1	4737.846	Max WS	398.32	130.80	135.28		135.39	0.002452	2.83	195.44	231.30	0.35
1	4542.183	Max WS	398.96	130.20	135.03		135.09	0.000603	2.00	270.23	306.08	0.19
1	4437.102	Max WS	399.31	131.50	134.68		134.85	0.005089	3.56	169.66	269.33	0.50
1	4246.329	Max WS	399.82	129.78	133.87		134.05	0.003928	3.78	170.37	254.10	0.45
1	4063.200	Max WS	400.41	129.05	133.36		133.48	0.002178	2.85	147.70	258.79	0.34
1	3863.200	Max WS	400.89	128.43	133.16		133.19	0.000606	1.56	450.59	477.36	0.18
1	3682.022	Max WS	401.41	127.89	133.06		133.08	0.000629	1.63	541.11	657.30	0.18
1	3487.742	Max WS	401.86	128.90	132.61		132.90	0.007972	4.36	92.19	59.35	0.62
1	3332.982	Max WS	402.14	129.37	132.23		132.29	0.002059	2.28	291.61	443.04	0.32
1	3152.554	Max WS	412.60	127.27	131.47		131.74	0.005251	4.24	97.41	322.26	0.52
1	2960.781	Max WS	413.14	128.00	130.82		130.95	0.003146	2.83	148.27	347.14	0.40
1	2800	Max WS	413.62	127.75	130.28		130.38	0.004301	2.96	214.74	335.18	0.45
1	2600	Max WS	414.05	127.22	129.68		129.75	0.002581	2.13	212.99	255.93	0.34
1	2436.651	Max WS	414.45	126.76	128.85		129.07	0.006323	3.73	111.00	136.90	0.55
1	2200	Max WS	415.11	125.72	127.84		127.95	0.003217	2.70	153.90	120.08	0.39
1	1800	Max WS	414.96	123.94	127.09		127.13	0.001031	1.60	270.43	213.67	0.23
1	1508.765	Max WS	414.85	122.64	126.30		126.55	0.003611	4.14	131.60	194.77	0.45
1	1238.804	Max WS	414.79	122.00	125.70		125.77	0.002041	2.08	199.62	144.50	0.31

1	947.7714	Max WS	414.74	122.00	125.03		125.14	0.002472	2.95	204.75	199.18	0.36
1	703.7460	Max WS	414.72	122.00	124.20		124.31	0.004371	2.75	184.60	352.23	0.45
1	413.4701	Max WS	414.65	120.00	123.13		123.27	0.002969	3.04	139.73	96.62	0.39
1	200.9584	Max WS	414.60	120.00	122.74		122.81	0.001434	2.30	258.61	265.31	0.28
1	10.31402	Max WS	414.58	120.00	122.33	121.65	122.44	0.002777	2.90	224.26	322.02	0.38

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 10:31:52 AM

Project in English units

Project Description:

Plan:
2 yr developed with det, u/s exist - Cordova Hills Developed with Detention
and Existing Conditions upstream of Cordova Hills 2 Year 24 hour storm
Plan:

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	43.44	220.00	220.89		220.93	0.004758	1.50	29.03	68.57	0.39
1	28313.0*	Max WS	43.40	219.58	220.47		220.51	0.005746	1.56	28.28	75.32	0.43
1	28226.0*	Max WS	43.38	219.15	219.98		220.03	0.009908	1.86	24.95	85.36	0.55
1	28139.07	Max WS	43.31	218.73	219.53		219.58	0.011716	1.84	27.33	103.46	0.58
1	28069.5*	Max WS	44.76	218.22	219.08		219.13	0.008992	1.75	26.38	85.85	0.52
1	28000	Max WS	46.20	217.71	218.57		218.62	0.008545	1.76	26.24	76.13	0.51
1	27900.*	Max WS	48.79	216.97	217.54		217.61	0.015289	2.05	23.84	80.18	0.66
1	27800	Max WS	51.32	216.23	216.78		216.80	0.003188	1.15	44.58	109.64	0.32
1	27700.*	Max WS	53.90	215.51	216.57		216.58	0.001305	1.00	54.00	84.15	0.22
1	27600	Max WS	56.49	214.80	216.13		216.22	0.006896	2.41	26.74	115.63	0.51
1	27500.*	Max WS	59.45	214.08	215.22		215.32	0.011486	2.70	26.05	86.71	0.64
1	27400	Max WS	62.30	213.35	214.53		214.55	0.003099	1.46	66.85	178.11	0.33

1	27329.7*	Max WS	63.68	212.84	214.28		214.34	0.004524	2.12	38.67	105.22	0.42
1	27259.5*	Max WS	65.04	212.32	213.94		214.02	0.005256	2.31	28.11	34.99	0.45
1	27189.29	Max WS	66.42	211.81	213.45		213.57	0.008345	2.82	23.53	30.29	0.56
1	27094.6*	Max WS	68.70	211.10	212.64		212.78	0.009916	2.96	23.22	32.22	0.61
1	27000	Max WS	70.97	210.39	212.04		212.12	0.004846	2.26	31.42	38.33	0.44
1	26900.*	Max WS	73.52	209.64	211.63		211.68	0.004065	1.91	38.41	52.48	0.39
1	26800	Max WS	76.07	208.88	210.94		211.04	0.010183	2.49	30.52	55.36	0.59
1	26700.*	Max WS	78.38	208.12	210.11		210.22	0.007533	2.65	29.58	39.20	0.54
1	26600	Max WS	80.64	207.37	209.59		209.68	0.003415	2.33	34.58	30.72	0.39
1	26528.4*	Max WS	80.94	206.83	209.34		209.42	0.003775	2.38	34.02	31.32	0.40
1	26456.8*	Max WS	81.17	206.29	209.03		209.13	0.004560	2.56	31.66	49.30	0.44
1	26385.31	Max WS	81.46	205.75	208.45		208.64	0.009203	3.54	23.02	33.67	0.60
1	26292.6*	Max WS	82.89	205.40	207.50		207.72	0.010338	3.82	21.68	20.60	0.66
1	26200	Max WS	84.31	205.06	206.78		206.90	0.007117	2.70	31.24	38.86	0.53
1	26100.*	Max WS	85.65	204.69	206.19		206.27	0.005648	2.24	38.25	53.10	0.46
1	26000	Max WS	86.96	204.32	205.79		205.83	0.003197	1.68	51.64	71.71	0.35
1	25900.*	Max WS	88.36	203.95	205.46		205.50	0.003563	1.76	50.16	70.71	0.37
1	25800	Max WS	89.73	203.57	205.13		205.18	0.003390	1.68	53.36	77.75	0.36
1	25700.*	Max WS	91.11	203.20	204.77		204.83	0.004113	1.95	46.69	62.90	0.40
1	25600	Max WS	92.44	202.83	204.46		204.50	0.004026	2.40	85.04	221.22	0.42
1	25500.*	Max WS	93.62	202.46	204.04		204.13	0.006075	2.68	49.48	109.97	0.50
1	25400	Max WS	94.65	202.09	203.77		203.79	0.001658	1.42	104.38	180.88	0.26
1	25358.8*	Max WS	95.03	202.00	203.70		203.73	0.002152	1.63	84.23	156.91	0.30
1	25317.6*	Max WS	95.56	201.92	203.61		203.64	0.002396	1.68	87.06	237.28	0.31
1	25276.3*	Max WS	95.96	201.83	203.55		203.57	0.001514	1.32	115.00	242.61	0.25
1	25235.1*	Max WS	96.50	201.75	203.52		203.52	0.000708	0.89	156.63	238.10	0.17
1	25193.99	Max WS	97.02	201.66	203.09		203.27	0.016881	3.39	28.59	198.55	0.78
1	25145.4*	Max WS	97.72	201.36	202.61		202.68	0.007736	2.26	57.29	150.31	0.52
1	25097.*	Max WS	98.43	201.05	202.16		202.25	0.010089	2.48	39.63	72.91	0.59
1	25048.5*	Max WS	99.12	200.75	201.76		201.82	0.007671	2.11	47.04	90.22	0.51
1	25000	Max WS	99.77	200.45	201.56		201.58	0.002409	1.30	76.84	127.84	0.30
1	24900.*	Max WS	101.11	200.04	201.31		201.34	0.002617	1.45	69.64	104.25	0.31
1	24800	Max WS	102.42	199.63	200.99		201.05	0.004059	1.92	54.76	88.05	0.40
1	24700.*	Max WS	103.86	199.20	200.58		200.65	0.005327	2.25	50.41	97.40	0.46
1	24600	Max WS	105.29	198.77	200.01	200.05	200.20	0.016224	3.65	39.38	198.26	0.78
1	24500.*	Max WS	104.07	198.34	199.59		199.61	0.002785	1.39	109.06	263.37	0.32
1	24400	Max WS	104.62	197.91	199.49		199.50	0.000190	0.43	322.20	425.83	0.09
1	24328.0*	Max WS	105.37	197.60	199.48		199.51	0.001620	1.28	83.21	426.86	0.25
1	24256.1*	Max WS	106.04	197.29	199.40		199.43	0.001930	1.48	71.43	383.87	0.28
1	24184.18	Max WS	106.89	196.98	198.87		199.03	0.013096	3.24	33.01	293.18	0.70
1	24092.0*	Max WS	108.05	196.51	198.32		198.36	0.003774	1.90	92.03	249.87	0.38
1	24000	Max WS	109.26	196.03	197.81		197.92	0.006506	2.59	42.18	52.35	0.51
1	23900.*	Max WS	110.55	195.51	197.20		197.32	0.011576	2.93	46.72	148.34	0.65
1	23800	Max WS	111.74	194.99	196.77		196.80	0.002905	1.53	110.48	230.86	0.33
1	23700.*	Max WS	112.65	194.47	196.53		196.56	0.002083	1.58	112.82	244.29	0.29
1	23600	Max WS	113.56	193.95	195.85		196.02	0.009639	3.32	34.25	117.28	0.63
1	23400	Max WS	122.19	192.92	194.97		194.99	0.000613	1.06	144.36	159.10	0.17
1	23178.25	Max WS	131.35	191.76	194.22		194.40	0.005883	3.55	40.73	94.18	0.52
1	23000	Max WS	140.62	191.25	193.33		193.44	0.004838	2.75	51.11	46.30	0.46
1	22600	Max WS	156.23	190.00	192.07		192.12	0.001791	1.74	90.53	129.43	0.28
1	22400	Max WS	177.86	189.54	191.85		191.87	0.000652	1.07	175.19	196.43	0.17
1	22175.79	Max WS	185.23	188.90	190.94		191.12	0.007582	3.37	55.03	51.51	0.57
1	22000	Max WS	185.19	188.07	190.08		190.17	0.004340	2.46	75.56	81.47	0.43

1	21900.*	Max WS	185.17	187.59	189.72		189.80	0.003756	2.28	81.25	81.01	0.40
1	21800	Max WS	185.13	187.11	189.44		189.50	0.002423	1.92	96.40	89.40	0.33
1	21600	Max WS	185.04	186.14	188.46		188.64	0.007619	3.36	55.17	53.32	0.58
1	21400	Max WS	184.81	185.21	187.86		187.89	0.000893	1.31	141.28	110.17	0.20
1	21176.29	Max WS	184.69	184.07	187.55		187.62	0.002064	2.20	85.34	102.08	0.31
1	20962.10	Max WS	184.63	184.10	186.67		186.79	0.006167	2.79	66.24	177.04	0.50
1	20921.9*	Max WS	184.62	184.01	186.56		186.61	0.002392	1.97	123.29	176.13	0.33
1	20881.8*	Max WS	184.62	183.92	186.48		186.53	0.001876	1.88	128.06	186.22	0.29
1	20841.7*	Max WS	184.59	183.83	186.41		186.47	0.001648	1.90	130.83	200.79	0.28
1	20801.6*	Max WS	174.62	183.74	186.35		186.40	0.001681	1.96	126.09	200.67	0.28
1	20761.52	Max WS	184.60	183.65	185.94	185.68	186.20	0.012755	4.13	51.34	144.82	0.73
1	20712.0*	Max WS	189.23	182.57	185.44		185.66	0.008751	3.81	49.69	42.67	0.62
1	20662.66	Max WS	193.66	181.49	185.29		185.39	0.002279	2.54	76.25	43.35	0.34
1	20655.8*	Max WS	193.67	181.50	185.26		185.37	0.002540	2.62	73.85	43.36	0.35
1	20648.9*	Max WS	193.41	181.52	185.23		185.35	0.003125	2.78	69.52	43.19	0.39
1	20642.13	Max WS	193.41	181.53	185.18		185.33	0.004541	3.06	63.11	44.27	0.45
1	20614.23	Max WS	193.42	180.88	185.21		185.24	0.000537	1.34	144.17	91.84	0.17
1	20399.06	Max WS	192.58	181.78	184.83		184.90	0.002726	2.11	91.07	341.40	0.35
1	20131.75	Max WS	192.66	180.89	183.38		183.58	0.007283	3.56	54.14	87.19	0.57
1	19831.49	Max WS	192.59	179.01	181.38		181.57	0.006115	3.53	54.49	39.26	0.53
1	19561.71	Max WS	194.92	176.06	180.62		180.65	0.000540	1.43	136.43	63.31	0.17
1	19375.20	Max WS	194.95	173.23	180.58		180.59	0.000083	0.85	229.09	135.66	0.07
1	19216.24	Max WS	194.76	176.81	180.45		180.51	0.001775	2.48	148.87	225.94	0.30
1	19040.62	Max WS	194.63	176.76	179.93		180.06	0.003720	2.92	69.51	261.15	0.42
1	18997.3*	Max WS	194.62	176.80	179.80		179.92	0.003047	2.70	72.08	188.56	0.38
1	18953.9*	Max WS	194.62	176.83	179.69		179.80	0.002612	2.59	75.22	119.72	0.36
1	18910.6*	Max WS	194.58	176.87	179.58		179.68	0.002754	2.60	74.91	48.14	0.37
1	18867.36	Max WS	194.48	176.91	179.42		179.54	0.003703	2.82	69.05	48.98	0.42
1	18661.93	Max WS	194.63	175.46	178.37		178.53	0.006212	3.29	65.23	103.29	0.53
1	18573.2*	Max WS	196.91	174.86	177.76		177.99	0.005882	3.79	51.94	33.19	0.53
1	18484.66	Max WS	196.94	174.25	177.29		177.52	0.004614	3.84	51.22	26.13	0.48
1	18313.08	Max WS	196.97	174.93	176.44		176.61	0.006046	3.32	59.30	47.70	0.53
1	18226	Max WS	196.96	173.87	176.17		176.28	0.001716	2.68	73.52	45.90	0.31
1	18175		Culvert									
1	18123	Max WS	196.97	173.46	175.99		176.08	0.001244	2.43	80.97	47.18	0.27
1	17964.88	Max WS	196.94	172.77	175.40		175.59	0.005043	3.48	56.54	36.06	0.49
1	17929.0*	Max WS	196.96	172.49	175.29		175.43	0.003955	2.97	66.39	45.71	0.43
1	17893.2*	Max WS	196.98	172.22	175.16		175.28	0.004207	2.82	69.93	72.52	0.44
1	17857.44	Max WS	196.96	171.94	174.95		175.10	0.006436	3.10	63.62	93.41	0.53
1	17638.59	Max WS	196.95	171.98	174.11		174.18	0.002383	2.37	141.74	497.88	0.34
1	17570.8*	Max WS	196.83	171.69	173.82		173.95	0.005202	2.89	74.46	199.89	0.48
1	17503.0*	Max WS	197.00	171.40	173.39		173.56	0.008447	3.35	58.75	131.54	0.60
1	17435.23	Max WS	196.98	171.11	173.16		173.19	0.002074	1.71	169.45	237.09	0.30
1	17347.3*	Max WS	196.95	170.31	172.92		172.97	0.002717	2.17	132.17	195.15	0.35
1	17259.39	Max WS	196.93	169.51	172.29		172.58	0.009249	4.31	45.69	274.18	0.65
1	17161.6*	Max WS	196.97	169.43	171.69		171.84	0.005950	3.12	63.07	55.11	0.51
1	17063.83	Max WS	196.99	169.35	171.18		171.29	0.005303	2.74	71.87	70.26	0.48
1	17016.0*	Max WS	196.96	168.83	170.98		171.08	0.003636	2.47	79.69	68.53	0.40
1	16968.2*	Max WS	196.99	168.30	170.84		170.92	0.002838	2.34	84.09	67.71	0.36
1	16920.4*	Max WS	197.02	167.78	170.71		170.80	0.002701	2.45	84.36	78.35	0.36
1	16872.70	Max WS	197.04	167.26	170.54		170.67	0.003175	3.07	80.16	104.69	0.40
1	16822.9*	Max WS	202.35	167.36	170.39		170.51	0.003172	2.95	86.09	119.87	0.40
1	16773.1*	Max WS	202.35	167.46	170.24		170.35	0.003337	2.84	92.06	142.12	0.40

1	16723.4*	Max WS	202.37	167.57	170.12	170.20	0.002953	2.48	118.70	179.63	0.37
1	16673.66	Max WS	202.38	167.67	170.02	170.06	0.002254	1.99	142.76	184.65	0.32
1	16606.6*	Max WS	202.38	167.56	169.71	169.83	0.005739	3.07	107.30	266.03	0.51
1	16539.5*	Max WS	202.41	167.45	169.31	169.43	0.006836	3.28	101.30	196.99	0.55
1	16472.50	Max WS	202.41	167.34	169.08	169.11	0.002102	1.89	182.78	249.05	0.31
1	16374.4*	Max WS	203.91	166.82	168.86	168.89	0.002345	1.89	172.79	248.70	0.32
1	16276.30	Max WS	203.91	166.31	168.59	168.64	0.002975	2.05	152.36	383.80	0.36
1	16193.9*	Max WS	203.89	165.53	168.04	168.29	0.010258	4.08	52.01	180.55	0.67
1	16111.50	Max WS	203.86	164.75	167.83	167.86	0.001702	1.68	166.18	163.25	0.27
1	16044.4*	Max WS	203.88	164.60	167.69	167.76	0.002810	2.32	126.12	156.30	0.36
1	15977.4*	Max WS	203.88	164.46	167.47	167.61	0.004624	3.07	78.82	137.65	0.46
1	15910.45	Max WS	203.88	164.31	167.18	167.34	0.004968	3.23	63.49	53.36	0.48
1	15816.4*	Max WS	203.91	163.77	166.84	166.99	0.003455	3.11	65.89	45.97	0.41
1	15722.50	Max WS	203.91	163.23	166.23	166.49	0.007564	4.12	50.47	42.19	0.59
1	15661.2*	Max WS	203.87	163.03	166.04	166.14	0.003584	2.61	86.17	107.42	0.40
1	15600	Max WS	203.79	162.83	165.95	165.98	0.001407	1.57	154.86	150.06	0.25
1	15513.5*	Max WS	203.79	162.55	165.83	165.87	0.001519	1.62	147.26	163.37	0.26
1	15427.0*	Max WS	203.71	162.26	165.68	165.73	0.002040	1.83	111.45	156.10	0.30
1	15340.5*	Max WS	203.70	161.98	165.48	165.54	0.002356	1.97	103.22	89.06	0.32
1	15254.0*	Max WS	204.56	161.69	165.26	165.34	0.002503	2.20	92.80	71.73	0.34
1	15167.54	Max WS	204.59	161.41	165.05	165.14	0.002086	2.38	86.09	58.06	0.32
1	15068.7*	Max WS	204.60	161.32	164.90	164.95	0.001426	1.81	113.14	112.15	0.26
1	14970.01	Max WS	204.48	161.22	164.54	164.69	0.004508	3.08	66.42	153.79	0.46
1	14800.08	Max WS	204.46	160.07	163.76	163.93	0.004813	3.30	61.91	40.51	0.47
1	14745.2*	Max WS	204.40	160.00	163.65	163.74	0.002153	2.47	83.40	61.92	0.33
1	14690.37	Max WS	204.42	159.93	163.51	163.64	0.001855	2.88	80.37	62.31	0.31
1	14521.03	Max WS	204.27	159.74	163.16	163.22	0.003124	2.09	97.77	95.55	0.36
1	14350.55	Max WS	204.23	158.30	162.71	162.79	0.002276	2.17	100.05	245.93	0.33
1	14165.39	Max WS	210.25	159.11	161.81	162.00	0.006388	3.55	59.15	44.15	0.54
1	14077.1*	Max WS	212.39	158.60	161.48	161.59	0.002920	2.60	81.60	54.82	0.38
1	13988.90	Max WS	212.42	158.09	161.12	161.28	0.006169	3.25	65.31	54.47	0.52
1	13971	Max WS	212.42	158.18	161.15	161.22	0.000851	2.24	94.95	49.80	0.23
1	13920		Culvert								
1	13869	Max WS	212.42	158.18	160.99	161.07	0.001024	2.37	89.80	48.84	0.25
1	13817.08	Max WS	212.40	158.27	160.78	160.94	0.004997	3.23	67.08	61.69	0.48
1	13800.26	Max WS	212.40	157.92	160.64	160.87	0.008357	3.86	55.04	44.59	0.61
1	13716.8*	Max WS	212.36	157.68	160.33	160.43	0.003142	2.61	81.42	59.03	0.39
1	13633.46	Max WS	212.31	157.45	160.20	160.26	0.001738	1.95	136.44	264.65	0.29
1	13548.2*	Max WS	212.33	156.91	159.98	160.08	0.003661	2.52	85.92	92.06	0.41
1	13462.94	Max WS	212.29	156.37	159.74	159.84	0.003391	2.53	91.59	113.16	0.39
1	13372.7*	Max WS	211.97	155.87	159.48	159.58	0.003408	2.60	88.36	109.61	0.40
1	13282.48	Max WS	211.84	155.37	159.21	159.32	0.003212	2.67	80.11	184.06	0.39
1	13196.7*	Max WS	211.72	155.42	159.06	159.14	0.002113	2.29	100.73	140.75	0.32
1	13110.9*	Max WS	211.73	155.48	158.91	158.98	0.002243	2.24	95.51	102.04	0.33
1	13025.20	Max WS	211.66	155.53	158.68	158.78	0.003656	2.57	82.51	66.83	0.41
1	12934.78	Max WS	211.58	155.67	158.47	158.57	0.001963	2.55	95.29	134.73	0.32
1	12679.83	Max WS	211.95	154.84	157.36	157.55	0.006436	3.44	61.66	49.38	0.54
1	12514.10	Max WS	211.74	153.08	156.77	156.86	0.002391	2.64	118.57	155.47	0.35
1	12342.49	Max WS	211.65	153.74	156.39	156.49	0.002988	2.64	115.18	215.11	0.38
1	12168.87	Max WS	211.61	152.62	155.68	155.86	0.005683	3.48	63.02	61.04	0.52
1	11993.01	Max WS	211.54	152.46	154.97	155.10	0.003786	2.79	75.93	54.64	0.42
1	11820.19	Max WS	211.50	150.12	154.42	154.51	0.003205	2.42	87.23	68.13	0.38
1	11633.47	Max WS	216.57	151.10	153.65	153.83	0.003927	3.46	62.62	33.68	0.45

1	11460.48	Max WS	218.94	149.67	152.89	153.05	0.004719	3.25	67.37	45.94	0.47
1	11271.33	Max WS	218.91	147.60	152.45	152.51	0.000949	1.95	112.27	47.28	0.22
1	11146.79	Max WS	218.93	147.72	152.13	152.26	0.003007	2.86	76.47	62.06	0.38
1	10961.29	Max WS	218.93	149.08	151.52	151.67	0.003382	3.03	72.27	42.68	0.41
1	10777.64	Max WS	218.92	147.95	151.09	151.18	0.001940	2.31	94.62	54.81	0.31
1	10599.75	Max WS	218.96	147.94	150.67	150.80	0.002308	2.85	76.72	37.18	0.35
1	10484.71	Max WS	218.87	147.53	150.39	150.47	0.003549	2.49	116.78	168.00	0.40
1	10294.85	Max WS	218.86	146.18	149.84	149.92	0.002328	2.30	94.96	63.72	0.33
1	10111.02	Max WS	219.21	146.70	149.10	149.25	0.005556	3.19	68.62	54.72	0.50
1	9962.423	Max WS	219.22	144.81	147.82	148.18	0.009990	4.75	46.11	30.44	0.68
1	9876	Max WS	219.18	144.29	147.63	147.69	0.000612	2.05	106.86	52.02	0.20
1	9825.00		Culvert								
1	9774	Max WS	219.18	143.93	147.55	147.61	0.000466	1.89	115.89	53.73	0.18
1	9553.901	Max WS	219.12	143.12	147.12	147.25	0.002912	2.93	74.80	40.60	0.38
1	9362.452	Max WS	219.08	143.70	146.54	146.69	0.003052	3.13	70.04	36.37	0.40
1	9149.788	Max WS	219.08	141.77	146.28	146.30	0.000363	1.04	209.83	112.64	0.13
1	8963.549	Max WS	219.03	141.24	145.95	146.07	0.002209	2.87	76.23	34.04	0.34
1	8766.435	Max WS	219.05	142.65	145.22	145.34	0.005142	2.79	78.40	71.06	0.47
1	8577.282	Max WS	218.92	141.02	144.62	144.70	0.001696	2.26	96.80	52.31	0.29
1	8398.577	Max WS	218.83	141.01	144.21	144.33	0.003477	2.86	79.88	86.66	0.41
1	8223.925	Max WS	218.76	139.79	143.76	143.90	0.002093	3.04	76.05	57.03	0.33
1	8000	Max WS	223.06	139.29	143.38	143.45	0.001881	2.11	105.48	69.44	0.30
1	7744.065	Max WS	223.28	138.71	142.47	142.65	0.004511	3.33	67.00	41.74	0.46
1	7600	Max WS	223.37	138.31	141.97	142.08	0.003756	2.65	84.25	66.21	0.41
1	7400	Max WS	223.48	137.76	140.99	141.20	0.005806	3.71	60.25	39.58	0.53
1	7200	Max WS	223.59	137.20	140.23	140.35	0.003071	2.73	82.74	61.37	0.39
1	7000	Max WS	223.67	136.65	139.86	139.91	0.001587	1.93	115.82	77.32	0.28
1	6800	Max WS	223.75	136.09	139.59	139.63	0.001408	1.67	134.34	102.40	0.26
1	6545.718	Max WS	223.66	134.93	138.63	138.92	0.006336	4.34	51.55	25.77	0.54
1	6400	Max WS	223.97	135.02	138.25	138.35	0.002366	2.55	106.34	191.78	0.35
1	6200	Max WS	224.18	134.52	137.80	137.94	0.003888	3.03	79.33	80.60	0.43
1	6000	Max WS	224.39	134.02	137.37	137.44	0.002223	2.05	109.41	86.01	0.32
1	5800	Max WS	224.91	133.53	137.08	137.12	0.001040	1.63	156.37	165.29	0.23
1	5544.024	Max WS	225.21	132.89	136.14	136.35	0.006139	3.61	63.73	63.74	0.53
1	5310.353	Max WS	225.46	130.81	135.47	135.55	0.001234	2.18	103.39	46.03	0.26
1	5126.186	Max WS	225.74	131.42	135.28	135.36	0.001405	2.34	120.04	162.17	0.27
1	4928.496	Max WS	225.84	131.24	135.11	135.16	0.000999	1.71	135.48	126.04	0.23
1	4737.846	Max WS	225.99	130.80	134.84	134.92	0.002296	2.36	96.39	217.60	0.33
1	4542.183	Max WS	226.27	130.20	134.67	134.70	0.000317	1.35	179.96	282.66	0.14
1	4437.102	Max WS	226.39	131.50	134.27	134.44	0.006443	3.31	68.49	238.57	0.53
1	4246.329	Max WS	226.04	129.78	133.25	133.45	0.005034	3.63	65.18	78.39	0.49
1	4063.200	Max WS	224.41	129.05	132.80	132.87	0.001237	2.10	107.09	186.68	0.26
1	3863.200	Max WS	223.68	128.43	132.65	132.67	0.000750	1.47	240.05	459.38	0.19
1	3682.022	Max WS	223.74	127.89	132.46	132.52	0.001224	2.08	186.05	433.65	0.25
1	3487.742	Max WS	224.04	128.90	131.94	132.13	0.003170	3.52	63.71	27.52	0.41
1	3332.982	Max WS	224.30	129.37	131.50	131.62	0.003416	2.79	80.35	53.69	0.40
1	3152.554	Max WS	226.29	127.27	130.82	130.98	0.003753	3.24	69.75	38.62	0.43
1	2960.781	Max WS	226.56	128.00	130.42	130.48	0.001483	2.00	113.43	230.83	0.27
1	2800	Max WS	226.81	127.75	129.92	130.01	0.004555	2.56	109.64	175.41	0.44
1	2600	Max WS	227.03	127.22	129.19	129.25	0.003479	1.98	114.84	201.61	0.38
1	2436.651	Max WS	227.25	126.76	128.33	128.48	0.006170	3.04	74.66	96.81	0.51
1	2200	Max WS	227.54	125.72	127.28	127.36	0.003424	2.30	98.99	90.95	0.39
1	1800	Max WS	227.33	123.94	126.39	126.43	0.001344	1.51	150.76	129.17	0.25

1	1508.765	Max WS	227.26	122.64	125.69		125.85	0.002805	3.15	72.04	34.18	0.38
1	1238.804	Max WS	227.21	122.00	125.19		125.23	0.001741	1.72	131.87	112.18	0.28
1	947.7714	Max WS	227.16	122.00	124.65		124.72	0.001909	2.28	135.25	168.27	0.31
1	703.7460	Max WS	227.11	122.00	123.71		123.82	0.005734	2.60	87.44	98.43	0.49
1	413.4701	Max WS	227.05	120.00	122.63		122.71	0.002081	2.26	100.55	64.96	0.32
1	200.9584	Max WS	227.00	120.00	122.32		122.37	0.001162	1.79	158.45	214.54	0.24
1	10.31402	Max WS	226.96	120.00	121.93	121.18	122.02	0.002762	2.46	109.85	157.89	0.36

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                    HEC-RAS Version 4.0.0 March 2008
                      U.S. Army Corps of Engineers
                     Hydrologic Engineering Center
                           609 Second Street
                           Davis, California


            X     X  XXXXXX    XXXX        XXXX       XX      XXXX
            X     X  X        X    X       X   X     X  X    X
            X     X  X        X            X   X    X    X   X
            XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
            X     X  X        X            X  X     X    X        X
            X     X  X        X    X       X   X    X    X        X
            X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Deer Creek
Project File : DeerCreek_Dev1.prj
Run Date and Time: 5/25/2011 9:30:44 AM

Project in English units

Project Description:
Deer Creek Tributary - Existing and Developed conditions - 2yr 10 yr and 100 yr 24 hour storms
Plan: 2 yr developed with det - Full Shed Developed with Detention 2 Year 24 hour storm

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	28400	Max WS	48.79	220.00	220.93		220.96	0.004918	1.57	31.09	74.96	0.40
1	28313.0*	Max WS	48.78	219.58	220.51		220.55	0.005385	1.58	31.60	79.87	0.42
1	28226.0*	Max WS	48.77	219.15	220.04		220.09	0.008031	1.75	30.57	103.64	0.50
1	28139.07	Max WS	48.76	218.73	219.69		219.71	0.003682	1.22	47.61	137.83	0.34
1	28069.5*	Max WS	88.70	218.22	219.25		219.32	0.009621	2.19	44.79	124.99	0.57
1	28000	Max WS	88.69	217.71	218.73		218.81	0.010282	2.25	39.46	139.65	0.58
1	27900.*	Max WS	88.69	216.97	217.69		217.78	0.013769	2.41	36.75	89.18	0.66
1	27800	Max WS	88.66	216.23	216.97		216.99	0.002914	1.34	65.95	120.11	0.32
1	27700.*	Max WS	88.66	215.51	216.73		216.76	0.001824	1.29	68.49	92.86	0.27
1	27600	Max WS	88.64	214.80	216.28		216.40	0.007781	2.92	38.39	158.90	0.56
1	27500.*	Max WS	88.63	214.08	215.34		215.47	0.011592	3.09	41.01	151.27	0.66
1	27400	Max WS	88.60	213.35	214.65		214.68	0.002794	1.57	89.66	193.93	0.33
1	27329.7*	Max WS	88.59	212.84	214.40		214.47	0.004854	2.35	52.97	128.13	0.44
1	27259.5*	Max WS	88.57	212.32	214.09		214.19	0.005686	2.61	37.09	107.51	0.48

1	27189.29	Max WS	88.57	211.81	213.60		213.75	0.008415	3.13	28.32	31.43	0.58
1	27094.6*	Max WS	88.56	211.10	212.79		212.94	0.009485	3.15	28.10	34.30	0.61
1	27000	Max WS	88.55	210.39	212.16		212.25	0.005495	2.44	36.36	43.57	0.47
1	26900.*	Max WS	88.55	209.64	211.71		211.77	0.004433	2.07	42.78	55.47	0.42
1	26800	Max WS	88.54	208.88	211.01		211.11	0.009938	2.57	34.44	58.59	0.59
1	26700.*	Max WS	88.52	208.12	210.18		210.30	0.007386	2.71	32.62	41.12	0.54
1	26600	Max WS	88.50	207.37	209.68		209.76	0.003466	2.38	37.16	32.36	0.39
1	26528.4*	Max WS	88.47	206.83	209.42		209.51	0.003716	2.41	36.72	32.79	0.40
1	26456.8*	Max WS	88.47	206.29	209.11		209.22	0.004514	2.57	34.36	61.41	0.43
1	26385.31	Max WS	88.45	205.75	208.53		208.72	0.009390	3.57	24.75	40.84	0.61
1	26292.6*	Max WS	88.45	205.40	207.54		207.78	0.010931	3.92	22.57	21.58	0.68
1	26200	Max WS	88.44	205.06	206.80		206.92	0.007284	2.76	32.10	39.41	0.54
1	26100.*	Max WS	88.44	204.69	206.20		206.28	0.005780	2.28	38.84	53.51	0.47
1	26000	Max WS	88.42	204.32	205.80		205.84	0.003192	1.69	52.32	72.17	0.35
1	25900.*	Max WS	88.40	203.95	205.49		205.53	0.003165	1.69	52.46	72.34	0.35
1	25800	Max WS	88.40	203.57	205.24		205.27	0.002237	1.43	61.76	83.90	0.29
1	25700.*	Max WS	109.66	203.20	204.88		204.95	0.004025	2.03	54.09	67.69	0.40
1	25600	Max WS	109.61	202.83	204.64		204.66	0.002004	1.89	126.69	243.32	0.30
1	25500.*	Max WS	155.57	202.46	204.25		204.35	0.006043	3.06	91.93	255.05	0.52
1	25400	Max WS	155.56	202.09	203.94		203.98	0.002245	1.79	138.94	214.24	0.31
1	25358.8*	Max WS	155.55	202.00	203.83		203.88	0.003285	2.16	113.56	270.57	0.38
1	25317.6*	Max WS	155.55	201.92	203.68		203.75	0.004357	2.38	105.91	267.42	0.43
1	25276.3*	Max WS	101.23	201.83	203.56		203.58	0.001607	1.37	117.14	243.82	0.26
1	25235.1*	Max WS	100.06	201.75	203.52		203.53	0.000738	0.92	158.36	238.92	0.17
1	25193.99	Max WS	155.55	201.66	203.17	203.25	203.53	0.033568	4.82	32.25	207.65	1.10
1	25145.4*	Max WS	155.54	201.36	202.81		202.87	0.006881	2.25	91.12	186.80	0.50
1	25097.*	Max WS	155.54	201.05	202.36		202.47	0.010422	2.74	59.61	130.61	0.62
1	25048.5*	Max WS	155.53	200.75	201.97		202.05	0.007159	2.28	68.28	110.65	0.51
1	25000	Max WS	155.53	200.45	201.79		201.82	0.002274	1.42	109.45	152.29	0.30
1	24900.*	Max WS	155.51	200.04	201.54		201.58	0.002481	1.63	96.82	132.11	0.32
1	24800	Max WS	155.47	199.63	201.22		201.29	0.003764	2.14	78.04	110.08	0.40
1	24700.*	Max WS	155.47	199.20	200.76		200.86	0.005624	2.58	70.80	125.14	0.48
1	24600	Max WS	155.35	198.77	200.14		200.30	0.012718	3.65	72.58	260.44	0.71
1	24500.*	Max WS	154.75	198.34	199.73		199.75	0.002760	1.55	147.62	289.16	0.32
1	24400	Max WS	154.52	197.91	199.64		199.64	0.000239	0.55	385.64	443.86	0.10
1	24328.0*	Max WS	154.50	197.60	199.63		199.63	0.000211	0.51	407.47	445.06	0.09
1	24256.1*	Max WS	154.47	197.29	199.60		199.65	0.002196	1.74	89.01	430.39	0.31
1	24184.18	Max WS	154.45	196.98	199.06		199.25	0.014582	3.52	43.90	330.20	0.74
1	24092.0*	Max WS	154.43	196.51	198.39		198.44	0.005175	2.28	110.67	268.53	0.45
1	24000	Max WS	154.41	196.03	197.93		198.09	0.009648	3.18	48.52	59.43	0.62
1	23900.*	Max WS	154.40	195.51	197.32		197.45	0.011305	3.11	68.89	218.72	0.66
1	23800	Max WS	154.38	194.99	196.88		196.91	0.003070	1.68	135.82	239.26	0.34
1	23700.*	Max WS	126.35	194.47	196.60		196.63	0.001825	1.53	130.79	248.64	0.28
1	23600	Max WS	154.38	193.95	195.94		196.20	0.013802	4.07	37.97	127.00	0.75
1	23400	Max WS	154.08	192.92	195.15		195.16	0.000613	1.16	173.45	180.26	0.17
1	23178.25	Max WS	154.04	191.76	194.31		194.54	0.006864	3.88	44.89	121.41	0.56
1	23000	Max WS	153.92	191.25	193.47		193.58	0.004156	2.66	57.82	49.11	0.43
1	22600	Max WS	206.67	190.00	192.15		192.22	0.002502	2.15	98.16	146.57	0.34
1	22400	Max WS	206.47	189.54	191.87		191.89	0.000832	1.22	179.17	199.24	0.19
1	22175.79	Max WS	206.42	188.90	191.01		191.20	0.007889	3.51	58.75	53.10	0.59
1	22000	Max WS	206.25	188.07	190.27		190.35	0.002974	2.29	92.89	98.31	0.37
1	21900.*	Max WS	235.98	187.59	189.92		190.01	0.003596	2.39	98.75	89.12	0.40
1	21800	Max WS	235.91	187.11	189.66		189.72	0.002298	2.02	116.87	96.67	0.32

1	21600	Max WS	235.90	186.14	188.71	188.90	0.006360	3.42	70.58	68.95	0.54
1	21400	Max WS	235.51	185.21	188.13	188.16	0.000822	1.37	172.65	128.61	0.20
1	21176.29	Max WS	235.37	184.07	187.75	187.84	0.002133	2.43	107.40	152.23	0.33
1	20962.10	Max WS	235.23	184.10	186.83	186.97	0.006225	3.03	77.54	190.67	0.52
1	20921.9*	Max WS	245.38	184.01	186.72	186.78	0.002529	2.16	153.30	201.49	0.34
1	20881.8*	Max WS	245.37	183.92	186.64	186.70	0.002115	2.13	158.91	213.89	0.32
1	20841.7*	Max WS	245.31	183.83	186.56	186.62	0.001903	2.17	160.13	212.99	0.31
1	20801.6*	Max WS	245.20	183.74	186.47	186.54	0.002254	2.38	151.09	206.12	0.33
1	20761.52	Max WS	244.40	183.65	186.18	186.37	0.008107	3.80	94.74	190.21	0.60
1	20712.0*	Max WS	250.79	182.57	185.60	185.90	0.010927	4.43	56.62	45.78	0.70
1	20662.66	Max WS	221.83	181.49	185.40	185.51	0.002589	2.73	81.12	45.45	0.36
1	20655.8*	Max WS	221.77	181.50	185.37	185.49	0.002863	2.82	78.58	45.23	0.38
1	20648.9*	Max WS	221.71	181.52	185.33	185.47	0.003605	2.99	74.10	46.05	0.42
1	20642.13	Max WS	221.65	181.53	185.28	185.44	0.005023	3.29	67.38	45.92	0.48
1	20614.23	Max WS	220.96	180.88	185.31	185.34	0.000612	1.46	151.55	124.04	0.18
1	20399.06	Max WS	250.75	181.78	184.97	185.03	0.002394	2.05	154.90	384.61	0.33
1	20131.75	Max WS	251.00	180.89	183.65	183.87	0.007296	3.74	68.60	164.66	0.57
1	19831.49	Max WS	250.90	179.01	181.62	181.86	0.006164	3.91	64.18	41.75	0.54
1	19561.71	Max WS	252.93	176.06	180.87	180.91	0.000705	1.65	152.84	69.51	0.20
1	19375.20	Max WS	252.98	173.23	180.82	180.83	0.000119	1.05	242.31	165.33	0.09
1	19216.24	Max WS	252.70	176.81	180.67	180.73	0.001567	2.50	201.57	247.77	0.29
1	19040.62	Max WS	252.41	176.76	180.19	180.33	0.003261	3.03	106.39	390.58	0.40
1	18997.3*	Max WS	252.40	176.80	180.06	180.19	0.003063	2.96	91.60	315.25	0.39
1	18953.9*	Max WS	252.33	176.83	179.93	180.06	0.003063	2.91	88.51	244.09	0.39
1	18910.6*	Max WS	252.38	176.87	179.79	179.92	0.003228	2.95	85.53	71.96	0.40
1	18867.36	Max WS	252.38	176.91	179.60	179.76	0.004465	3.23	78.02	51.75	0.46
1	18661.93	Max WS	238.29	175.46	178.60	178.75	0.004784	3.23	89.01	151.26	0.47
1	18573.2*	Max WS	254.65	174.86	178.07	178.32	0.006517	4.01	63.79	47.40	0.56
1	18484.66	Max WS	254.68	174.25	177.55	177.85	0.005386	4.37	58.23	33.16	0.53
1	18313.08	Max WS	254.69	174.93	176.76	176.94	0.005012	3.41	74.74	151.70	0.49
1	18226	Max WS	254.67	173.87	176.51	176.65	0.001816	3.02	84.33	47.94	0.33
1	18175		Culvert								
1	18123	Max WS	254.66	173.46	176.29	176.42	0.001426	2.81	90.67	49.00	0.29
1	17964.88	Max WS	254.65	172.77	175.62	175.86	0.005607	3.95	64.48	51.28	0.53
1	17929.0*	Max WS	254.69	172.49	175.49	175.66	0.004502	3.38	75.43	76.64	0.47
1	17893.2*	Max WS	254.71	172.22	175.35	175.50	0.004697	3.17	80.44	105.98	0.47
1	17857.44	Max WS	254.72	171.94	175.14	175.31	0.006968	3.39	75.09	119.22	0.56
1	17638.59	Max WS	254.40	171.98	174.25	174.31	0.002331	2.29	212.62	519.33	0.33
1	17570.8*	Max WS	254.44	171.69	173.94	174.10	0.006165	3.27	93.22	232.00	0.53
1	17503.0*	Max WS	254.41	171.40	173.52	173.74	0.009983	3.81	66.93	149.49	0.66
1	17435.23	Max WS	254.36	171.11	173.30	173.33	0.002027	1.83	202.82	243.49	0.30
1	17347.3*	Max WS	254.29	170.31	173.09	173.15	0.002395	2.20	182.90	396.94	0.33
1	17259.39	Max WS	254.22	169.51	172.52	172.79	0.007875	4.33	76.34	365.22	0.61
1	17161.6*	Max WS	254.23	169.43	171.91	172.09	0.005903	3.35	75.94	59.44	0.52
1	17063.83	Max WS	254.28	169.35	171.42	171.54	0.005293	2.81	90.57	85.31	0.48
1	17016.0*	Max WS	254.30	168.83	171.21	171.32	0.003962	2.63	96.87	81.18	0.42
1	16968.2*	Max WS	254.33	168.30	171.05	171.15	0.003417	2.57	100.68	92.63	0.40
1	16920.4*	Max WS	254.36	167.78	170.89	171.01	0.002969	2.75	101.77	110.98	0.38
1	16872.70	Max WS	254.36	167.26	170.71	170.87	0.003615	3.47	99.73	127.10	0.43
1	16822.9*	Max WS	259.53	167.36	170.54	170.69	0.003630	3.34	105.64	141.52	0.43
1	16773.1*	Max WS	259.56	167.46	170.37	170.52	0.003868	3.23	113.15	181.83	0.44
1	16723.4*	Max WS	259.56	167.57	170.24	170.33	0.003224	2.74	141.43	186.74	0.39
1	16673.66	Max WS	259.59	167.67	170.13	170.18	0.002579	2.26	167.44	242.86	0.34

1	16606.6*	Max WS	259.63	167.56	169.83	169.95	0.005768	3.18	140.06	289.71	0.51
1	16539.5*	Max WS	259.64	167.45	169.43	169.55	0.006795	3.44	124.69	202.45	0.55
1	16472.50	Max WS	259.63	167.34	169.20	169.24	0.002188	2.05	214.22	255.55	0.32
1	16374.4*	Max WS	261.08	166.82	168.98	169.02	0.002393	2.03	203.92	255.01	0.33
1	16276.30	Max WS	261.12	166.31	168.73	168.78	0.002831	2.13	186.31	413.86	0.35
1	16193.9*	Max WS	259.38	165.53	168.22	168.49	0.010746	4.22	73.38	309.37	0.69
1	16111.50	Max WS	258.97	164.75	168.02	168.05	0.001586	1.79	202.76	285.12	0.27
1	16044.4*	Max WS	258.50	164.60	167.91	167.97	0.002292	2.31	161.20	159.99	0.33
1	15977.4*	Max WS	258.17	164.46	167.74	167.86	0.003381	2.94	117.75	147.13	0.41
1	15910.45	Max WS	263.83	164.31	167.47	167.65	0.004439	3.42	83.03	83.64	0.47
1	15816.4*	Max WS	263.44	163.77	167.10	167.29	0.003714	3.46	79.93	62.10	0.44
1	15722.50	Max WS	262.97	163.23	166.42	166.75	0.008469	4.68	59.32	52.45	0.63
1	15661.2*	Max WS	261.31	163.03	166.24	166.35	0.003452	2.79	109.21	124.18	0.41
1	15600	Max WS	261.25	162.83	166.16	166.19	0.001295	1.66	193.16	204.43	0.25
1	15513.5*	Max WS	261.18	162.55	166.06	166.10	0.001334	1.67	187.85	200.49	0.25
1	15427.0*	Max WS	261.20	162.26	165.94	165.98	0.001611	1.77	169.97	214.54	0.27
1	15340.5*	Max WS	261.14	161.98	165.78	165.84	0.002154	1.97	135.07	185.46	0.31
1	15254.0*	Max WS	261.95	161.69	165.56	165.63	0.002752	2.23	121.35	121.87	0.35
1	15167.54	Max WS	261.98	161.41	165.28	165.39	0.003128	2.63	99.68	93.73	0.38
1	15068.7*	Max WS	261.96	161.32	165.08	165.15	0.001670	2.06	127.23	135.33	0.29
1	14970.01	Max WS	261.93	161.22	164.79	164.91	0.003539	2.91	115.95	193.94	0.41
1	14800.08	Max WS	261.93	160.07	164.06	164.24	0.005754	3.45	79.36	146.61	0.51
1	14745.2*	Max WS	261.91	160.00	163.89	164.01	0.002291	2.75	101.67	96.39	0.34
1	14690.37	Max WS	261.93	159.93	163.74	163.90	0.002212	3.31	97.29	92.53	0.35
1	14521.03	Max WS	261.96	159.74	163.32	163.40	0.003553	2.28	114.67	108.66	0.39
1	14350.55	Max WS	261.85	158.30	162.91	162.96	0.001573	1.97	203.85	320.12	0.28
1	14165.39	Max WS	268.29	159.11	162.10	162.31	0.006026	3.65	77.38	153.75	0.53
1	14077.1*	Max WS	270.38	158.60	161.80	161.91	0.002565	2.72	101.90	85.98	0.36
1	13988.90	Max WS	270.38	158.09	161.42	161.58	0.005058	3.23	86.24	98.31	0.48
1	13971	Max WS	270.38	158.18	161.42	161.52	0.001031	2.61	103.59	51.42	0.26
1	13920		Culvert								
1	13869	Max WS	270.38	158.18	161.20	161.32	0.001294	2.79	96.75	50.14	0.28
1	13817.08	Max WS	270.34	158.27	160.97	161.17	0.005252	3.59	81.45	107.47	0.50
1	13800.26	Max WS	270.34	157.92	160.85	161.12	0.008195	4.13	71.03	113.01	0.61
1	13716.8*	Max WS	270.27	157.68	160.53	160.66	0.003309	2.88	98.01	104.14	0.40
1	13633.46	Max WS	270.27	157.45	160.41	160.46	0.001487	1.97	193.07	279.34	0.27
1	13548.2*	Max WS	270.19	156.91	160.16	160.27	0.003646	2.74	106.50	135.63	0.41
1	13462.94	Max WS	270.09	156.37	159.93	160.04	0.003556	2.71	115.56	142.96	0.41
1	13372.7*	Max WS	269.95	155.87	159.72	159.83	0.002996	2.67	127.42	215.88	0.38
1	13282.48	Max WS	269.81	155.37	159.45	159.57	0.003111	2.89	99.56	267.33	0.39
1	13196.7*	Max WS	269.72	155.42	159.30	159.38	0.002113	2.39	141.99	208.32	0.32
1	13110.9*	Max WS	269.74	155.48	159.13	159.22	0.002286	2.41	127.22	176.87	0.34
1	13025.20	Max WS	269.76	155.53	158.82	158.96	0.004315	2.91	92.75	70.51	0.45
1	12934.78	Max WS	269.74	155.67	158.56	158.70	0.002792	3.11	109.02	189.40	0.38
1	12679.83	Max WS	270.12	154.84	157.59	157.80	0.006316	3.68	74.81	78.40	0.55
1	12514.10	Max WS	270.06	153.08	156.99	157.08	0.002225	2.73	152.37	159.29	0.34
1	12342.49	Max WS	269.87	153.74	156.63	156.70	0.002434	2.53	168.61	243.66	0.35
1	12168.87	Max WS	269.82	152.62	155.97	156.17	0.004832	3.60	81.82	71.42	0.49
1	11993.01	Max WS	269.80	152.46	155.30	155.42	0.003705	2.82	95.57	66.61	0.42
1	11820.19	Max WS	269.78	150.12	154.81	154.89	0.002465	2.30	117.41	82.00	0.34
1	11633.47	Max WS	275.16	151.10	154.02	154.21	0.005332	3.47	79.37	74.15	0.50
1	11460.48	Max WS	277.43	149.67	153.24	153.40	0.004518	3.28	84.56	55.05	0.47
1	11271.33	Max WS	277.39	147.60	152.79	152.86	0.001266	2.14	129.78	59.81	0.26

1	11146.79	Max WS	277.40	147.72	152.46	152.60	0.002877	3.06	90.54	96.98	0.38
1	10961.29	Max WS	277.31	149.08	151.86	152.01	0.003566	3.16	87.88	50.77	0.42
1	10777.64	Max WS	277.29	147.95	151.43	151.53	0.001755	2.44	113.49	56.07	0.30
1	10599.75	Max WS	277.33	147.94	150.89	151.05	0.004115	3.23	87.19	65.05	0.45
1	10484.71	Max WS	277.30	147.53	150.59	150.67	0.003012	2.50	150.75	173.44	0.38
1	10294.85	Max WS	277.30	146.18	150.11	150.20	0.002313	2.47	112.53	71.93	0.34
1	10111.02	Max WS	277.62	146.70	149.36	149.53	0.005348	3.29	84.45	62.74	0.50
1	9962.423	Max WS	277.54	144.81	148.17	148.54	0.008456	4.88	56.83	78.07	0.64
1	9876	Max WS	277.54	144.29	148.01	148.09	0.000683	2.33	119.09	54.31	0.21
1	9825.00		Culvert								
1	9774	Max WS	277.47	143.93	147.92	147.99	0.000543	2.18	127.54	55.91	0.19
1	9553.901	Max WS	277.38	143.12	147.47	147.62	0.002955	3.08	90.06	45.91	0.39
1	9362.452	Max WS	277.30	143.70	146.88	147.05	0.003035	3.35	82.71	38.37	0.40
1	9149.788	Max WS	277.17	141.77	146.64	146.65	0.000350	1.10	251.06	120.88	0.14
1	8963.549	Max WS	277.14	141.24	146.18	146.34	0.003389	3.25	85.33	44.21	0.41
1	8766.435	Max WS	277.14	142.65	145.47	145.60	0.004203	2.87	96.67	72.38	0.44
1	8577.282	Max WS	277.12	141.02	144.95	145.04	0.001764	2.40	115.24	58.63	0.30
1	8398.577	Max WS	276.75	141.01	144.56	144.67	0.002632	2.76	121.24	139.37	0.36
1	8223.925	Max WS	276.66	139.79	144.09	144.25	0.002466	3.27	101.16	93.90	0.36
1	8000	Max WS	280.90	139.29	143.69	143.76	0.001860	2.20	127.79	78.79	0.30
1	7744.065	Max WS	281.23	138.71	142.73	142.93	0.004935	3.60	78.15	46.50	0.49
1	7600	Max WS	281.37	138.31	142.24	142.35	0.003363	2.69	113.35	123.93	0.40
1	7400	Max WS	281.54	137.76	141.24	141.49	0.006077	3.97	70.87	43.48	0.55
1	7200	Max WS	281.66	137.20	140.46	140.59	0.003272	2.97	97.94	72.83	0.41
1	7000	Max WS	281.75	136.65	140.03	140.10	0.001849	2.18	129.64	88.48	0.30
1	6800	Max WS	281.71	136.09	139.76	139.81	0.001564	1.86	151.82	106.46	0.27
1	6545.718	Max WS	281.60	134.93	138.87	139.23	0.007055	4.84	62.52	76.82	0.58
1	6400	Max WS	281.94	135.02	138.46	138.56	0.002168	2.64	148.33	206.97	0.34
1	6200	Max WS	282.37	134.52	138.03	138.19	0.004062	3.25	104.99	271.24	0.45
1	6000	Max WS	282.68	134.02	137.62	137.69	0.002227	2.14	132.18	97.76	0.32
1	5800	Max WS	283.39	133.53	137.32	137.36	0.001023	1.71	196.98	178.55	0.23
1	5544.024	Max WS	283.93	132.89	136.44	136.63	0.005338	3.62	88.71	101.98	0.51
1	5310.353	Max WS	284.32	130.81	135.74	135.83	0.001504	2.44	116.33	116.34	0.28
1	5126.186	Max WS	284.75	131.42	135.53	135.62	0.001393	2.47	172.22	248.80	0.27
1	4928.496	Max WS	285.17	131.24	135.34	135.39	0.001081	1.88	174.22	221.51	0.24
1	4737.846	Max WS	285.56	130.80	135.03	135.12	0.002318	2.54	139.06	223.61	0.34
1	4542.183	Max WS	285.84	130.20	134.84	134.88	0.000411	1.59	212.28	294.12	0.16
1	4437.102	Max WS	286.08	131.50	134.46	134.62	0.005633	3.38	110.81	252.82	0.51
1	4246.329	Max WS	283.47	129.78	133.55	133.74	0.004340	3.60	102.70	161.55	0.46
1	4063.200	Max WS	283.25	129.05	133.13	133.21	0.001385	2.26	127.48	225.25	0.27
1	3863.200	Max WS	280.10	128.43	133.00	133.02	0.000450	1.28	371.98	472.90	0.15
1	3682.022	Max WS	274.16	127.89	132.92	132.94	0.000454	1.34	451.28	646.81	0.16
1	3487.742	Max WS	288.99	128.90	132.42	132.62	0.005117	3.53	81.86	51.62	0.49
1	3332.982	Max WS	288.55	129.37	131.86	131.99	0.003513	2.84	101.43	67.57	0.41
1	3152.554	Max WS	289.82	127.27	131.07	131.27	0.004341	3.63	79.87	152.77	0.46
1	2960.781	Max WS	289.89	128.00	130.58	130.66	0.002078	2.31	125.46	281.41	0.32
1	2800	Max WS	289.94	127.75	130.06	130.17	0.005077	2.85	143.38	318.55	0.47
1	2600	Max WS	289.91	127.22	129.37	129.43	0.003317	2.07	140.24	227.89	0.37
1	2436.651	Max WS	290.04	126.76	128.52	128.69	0.006093	3.32	87.32	110.43	0.52
1	2200	Max WS	289.99	125.72	127.49	127.59	0.003272	2.44	118.98	96.74	0.39
1	1800	Max WS	288.85	123.94	126.68	126.71	0.001192	1.51	191.83	168.06	0.24
1	1508.765	Max WS	288.52	122.64	125.94	126.13	0.003236	3.58	83.48	76.34	0.42
1	1238.804	Max WS	288.29	122.00	125.38	125.44	0.001942	1.85	155.70	129.06	0.30

1	947.7714	Max WS	288.29	122.00	124.82		124.90	0.002006	2.47	163.93	179.82	0.32
1	703.7460	Max WS	288.10	122.00	123.92		124.03	0.005317	2.63	109.36	113.90	0.47
1	413.4701	Max WS	287.85	120.00	122.82		122.92	0.002485	2.53	113.93	71.98	0.35
1	200.9584	Max WS	287.54	120.00	122.48		122.54	0.001251	1.97	194.33	234.00	0.26
1	10.31402	Max WS	287.49	120.00	122.08	121.33	122.18	0.002856	2.67	146.55	302.89	0.38

7.11 Appendix K: Trunk Drainage Pipe System – Hydraulic Analysis

CORDOVA HILLS STORM DRAIN MASTER PLAN

C Shed Hydraulic Results - Trunk Drainage Based on Nolte Design

												Velocity (ft/s)		
U/S Node	***D/S Node***	**n-value**	**Rim/Grate**	**Inv. U/S (out of pipe)**	**Inv. D/S (in D/S pipe)**	**Pipe D (in)**	**Slope (ft/ft)**	**length (ft)**	**Drop in MH inv to inv (ft)**	***Q_{design} (cfs)***	***Approx. Depth of flow d***	***Approx. V***	***Approx. 75% of Vc***	***Approx. 125% of Vc***
Shed C7														
C-7b	C-7d	0.015	170	160	145.5	18	0.0448	324		10.14	0.71	10.68	4.72	7.86
C-6d	C-6e	0.015	160	155	151	18	0.0057	701		8.38	1.23	4.45	4.51	7.52
C-6e	C-7c	0.015	160	151	149	24	0.0032	630		10.32	1.35	3.91	4.57	7.61
C-7c	C-7d	0.015	160	149	145	24	0.0235	170		15.70	0.94	9.36	5.09	8.48
C-7d		0.015	148	142						33.16				
Shed C10														
C-10b	C-10c	0.015	205	196	193	24	0.0044	687		13.92	1.49	4.68	4.94	8.23
C-10c	C-10f	0.015	195	193	175	30	0.0189	950		26.22	1.20	9.81	5.63	9.38
C-10f	C-10g	0.015	185	176	172	30	0.0176	227		42.29	1.64	10.63	6.28	10.47
C-10g	C-10h	0.015	180	172	167	30	0.0207	241		52.35	1.79	11.77	6.50	10.83
C-10h	C-10l	0.015	178	167	162	36	0.0221	226		69.39	1.84	13.18	6.93	11.55
C-10l		0.015	168	162						85.91				
Shed C11														
C-11b	C-11c	0.015	180	170	163	18	0.0290	241		9.11	0.76	8.84	4.60	7.67
C-11c	C-11e	0.015	177	160	156	30	0.0261	153	3	26.40	1.10	11.07	5.64	9.39
C-11e		0.015	158	152						27.81				
Shed C12														
C-12d	C-12e	0.015	165	159	148	18	0.0212	520		11.69	0.98	8.26	4.86	8.10
C-12e	C-12j	0.015	159.5	148	142	30	0.0182	330		26.21	1.21	9.66	5.63	9.38
C-12f	C-12j	0.015	152	143	142	24	0.0031	321		8.98	1.24	3.79	4.40	7.34
C-12i	C-12j	0.015	160	153	145	24	0.0386	207		10.62	0.66	10.05	4.60	7.67
C-12j		0.015	148	142										

CORDOVA HILLS STORM DRAIN MASTER PLAN

C Shed Hydrology Results - Nolte Method

		Estates (3-4du/ac) 30% PI		LDR (4-6du/ac) 45% PI		LDR (6-8du/ac) 50% PI		MDR (8-10du/ac) 60% PI		MHDR 70% PI		Major Roads 95% PI		Park 5% PI		OS Ag 2% PI		NODE TOTAL (Prelim sizing)				Flow
U/S Node	*D/S Node*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*PI*	*Cum. Acres*	*PI AVG*	*Q nolte*
Shed C6a																						
C-6a	C-6b											2.11	2.11					2.74	0.85	2.74	0.85	1.34
C-6b				19.2	19.2								2.11	3.253	3.253			22.453	0.39	25.193	0.44	6.12
Shed C7																						
C-7a	C-7b			5.50	5.50							2.96	2.96					8.46	0.63	8.46	0.63	2.69
C-7b	C-7d			26.82	32.32							1.81	4.78	1.65	1.65			30.27	0.46	38.74	0.49	10.14
C-6c	C-6d			14.82	14.82													14.82	0.45	14.82	0.45	3.47
C-6d	C-6e			18.29	33.11													18.29	0.45	33.11	0.45	8.38
C-6e	C-7c	6.17	6.17		33.11													6.17	0.30	39.28	0.43	10.32
C-7c	C-7d	13.58	19.75		33.11													13.58	0.30	52.86	0.39	15.70
C-7d			19.75		65.43								4.78	0.70	2.35			0.70	0.05	92.30	0.43	33.16
Shed C8																						
C-8a	C-8b	5.00	5.00	5.30	5.30							0.76	0.76	0.29	0.29			11.35	0.41	11.35	0.41	2.63
C-8b	C-8d		5.00	9.38	14.68							1.67	2.43	5.12	5.41			16.17	0.38	27.52	0.39	6.76
C-8c	C-8d	14.86	14.86															14.86	0.30	14.86	0.30	3.48
C-8d			19.86		14.68								2.43	0.44	5.85			0.44	0.05	42.82	0.35	11.53
Shed C9																						
C-9a	C-9c											0.91	0.91					0.91	0.95	0.91	0.95	0.58
C-9b	C-9e			15.79	15.79									0.35	0.35			16.14	0.44	16.14	0.44	3.79
C-9c	C-9e			7.12	7.12							1.44	2.35	0.83	0.83			9.39	0.49	10.30	0.53	2.61
C-9d	C-9e	20.97	20.97															20.97	0.30	20.97	0.30	5.00
C-9e			20.97		22.91								2.35	0.50	1.68			0.50	0.05	47.91	0.39	13.40
Shed C10																						
C-10a	C-10b					20.40	20.40							0.94	0.94			21.34	0.48	21.34	0.48	5.10
C-10b	C-10c					21.80	42.20							6.13	7.07			27.93	0.40	49.27	0.44	13.92
C-10c	C-10f			15.80	15.80		42.20	10.70	10.70					1.54	8.61			28.04	0.49	77.31	0.45	26.22
C-10d	C-10e											3.34	3.34					3.34	0.95	3.34	0.95	1.87
C-10e	C-10f							11.08	11.08			0.80	4.14					11.89	0.62	15.22	0.70	5.57
C-10f	C-10g				15.80		42.20	13.60	35.38			1.10	5.24		8.61			14.70	0.63	107.23	0.51	42.29
C-10g	C-10h				15.80	13.37	55.57		35.38			0.46	5.70		8.61			13.83	0.51	121.06	0.51	52.35
C-10h	C-10l			19.40	35.20		55.57		35.38			0.80	6.50	0.91	9.52			21.12	0.45	142.18	0.50	69.39
C-10i	C-10j							5.32	5.32					0.57	0.57			5.89	0.55	5.89	0.55	1.55
C-10j	C-10l					1.73	1.73		5.32					0.88	1.45			2.61	0.35	8.50	0.49	1.96
C-10k	C-10l			7.11	7.11							1.66	1.66	1.05	1.05			9.82	0.49	9.82	0.49	2.27
C-10l					42.31		57.30		40.70				8.16	8.10	20.12	1.20	1.20	9.30	0.05	169.79	0.48	85.91
Shed C11																						
C-11a	C-11b					7.65	7.65					2.23	2.23					9.88	0.60	9.88	0.60	2.98
C-11b	C-11c					22.10	29.75					0.77	3.01					22.87	0.52	32.75	0.54	9.11
C-11c	C-11e						47.45	13.11	18.35			3.59	7.72					16.70	0.68	73.52	0.57	26.40
C-11d	C-11c					17.70	17.70	5.25	5.25			1.12	1.12					24.07	0.54	24.07	0.54	6.49
C-11e							47.45		18.35				7.72	5.50	5.50			5.50	0.05	79.02	0.54	27.81
Shed C12																						
C-12a	C-12b							9.59	9.59			0.77	0.77	5.40	5.40			15.76	0.43	15.76	0.43	3.70
C-12b	C-12c								9.59			2.89	3.67		5.40			2.89	0.95	18.65	0.51	4.53
C-12c	C-12d							9.56	19.14			0.54	4.21		5.40			10.10	0.62	28.75	0.55	7.98
C-12d	C-12e							9.60	28.74			0.46	4.67		5.40			10.06	0.62	38.81	0.57	11.69
C-12e	C-12j			35.88	35.88				28.74			1.50	6.17		5.40			37.39	0.47	76.20	0.52	26.21
C-12f	C-12j	2.50	2.50	30.40	30.40							2.18	2.18					35.08	0.47	35.08	0.47	8.98
C-12g	C-12h			15.02	15.02													15.02	0.45	15.02	0.45	3.52
C-12h	C-12i			10.76	25.78													10.76	0.45	25.78	0.45	6.28
C-12i	C-12j			14.39	40.17													14.39	0.45	40.17	0.45	10.62
C-12j			2.50		106.45				28.74				8.35	6.10	11.50	11.60	11.60	17.70	0.03	169.14	0.44	85.73

CORDOVA HILLS STORM DRAIN MASTER PLAN

D Shed Hydraulic Results - Trunk Drainage Based on Nolte Design

												Velocity (ft/s)		
U/S Node	***D/S Node***	**n-value**	**Rim/Grate**	**Inv. U/S (out of pipe)**	**Inv. D/S (in D/S pipe)**	**Pipe D (in)**	**Slope (ft/ft)**	**length (ft)**	**Drop in MH inv to inv (ft)**	***Q_{design} (cfs)***	***Approx. Depth of flow d***	***Approx. V***	***Approx. 75% of Vc***	***Approx. 125% of Vc***
Shed D11														
D-11a	D-11b	0.015	209.5	195	189	18	0.032432	185		9.5483175	0.7544357	9.3258751	4.6524185	7.7540308
D-11b		0.015		186						10.870207				
D-11c	D-11d	0.015	205	189	185	18	0.030534	131		19.543354	1.2361874	10.288161	5.1511952	8.5853254
D-11d		0.015		182						20.571158				
Shed D12														
D-10c	D-12e	0.015	200.5	190	175	24	0.0253	594		26.70	1.28	10.87	5.72	9.53
D-12a	D-12b	0.015	201	197.5	185	18	0.0203	617		8.50	0.81	7.59	4.53	7.54
D-12b	D-12c	0.015	191	185	174	24	0.0210	524		16.28	1.00	9.05	5.14	8.56
D-12c	D-12e	0.015	181.5	174	172	24	0.0044	458		18.05	1.86	4.59	5.27	8.78
D-12e		0.015	178	172						74.81				
Shed D13														
D-13b	D-13c	0.015	205	193.4	178.5	24	0.0182	820		11.93	0.87	7.91	4.74	7.91
D-13c	D-13d	0.015	198	178.5	174	24	0.0205	220		20.48	1.15	9.46	5.43	9.04
D-13d		0.015	180	174						22.67				
Shed D15														
D-15c	D-15i	0.015	184	176	174	24	0.0034	586		14.44	1.68	4.16	4.98	8.31
D-15e	D-15i	0.015	180	174.5	174	30	0.0031	161		15.93	1.53	4.37	4.94	8.24
D-15h	D-15i	0.015	186.5	174.7	174	24	0.0017	411		10.57	1.74	2.93	4.60	7.66
D-15i		0.015	180	174						61.26				
Shed D16														
D-16a	D-16b	0.015	181.5	169	167	24	0.0025	809		8.68	1.31	3.43	4.37	7.28
D-16b	D-16d	0.015	177	167	162	24	0.0272	184		11.55	0.76	9.08	4.70	7.84
D-16d		0.015	168	162						15.31				

CORDOVA HILLS STORM DRAIN MASTER PLAN

D Shed Hydraulic Results - Trunk Drainage Based on Nolte Design

												Velocity (ft/s)		
U/S Node	***D/S Node***	**n-value**	**Rim/Grate**	**Inv. U/S (out of pipe)**	**Inv. D/S (in D/S pipe)**	**Pipe D (in)**	**Slope (ft/ft)**	**length (ft)**	**Drop in MH inv to inv (ft)**	***Q_{design} (cfs)***	***Approx. Depth of flow d***	***Approx. V***	***Approx. 75% of Vc***	***Approx. 125% of Vc***
Shed D19														
D-19e	D-19f	0.015	176.5	162.3	162	36	0.0020	151		20.18	1.81	3.92	5.11	8.52
D-19f		0.015	168	162						22.36				
Shed D20														
D-20b	D-20c	0.015	171.7	163	160.7	24	0.0045	510	1	12.04	1.33	4.65	4.76	7.93
D-20c	D-20d	0.015	169.5	160.5	160	30	0.0028	176	0.2	15.49	1.55	4.19	4.91	8.18
D-20d		0.015	168	160						15.58				
Shed D25														
D-25e	D-25f	0.015	189	185	167.3	24	0.0274	647		18.97	1.01	10.39	5.33	8.89
D-25f	D-25g	0.015	185	165.3	158	24	0.0068	1066	2	23.47	1.97	5.47	5.58	9.31
D-25g	D-25h	0.015	163.5	155.5	150.5	30	0.0174	288	2.5	38.43	1.55	10.37	6.16	10.27
D-25h	D-25j	0.015	160	150.5	150	36	0.0039	129		44.93	2.51	5.81	6.29	10.49
D-25j		0.015	156	150						63.16				
Shed D31														
D-31c	D-31d	0.015	185	180	165	18	0.030	500		13.15	0.94	9.73	4.96	8.26
D-31d	D-31e	0.015	172	165	155	24	0.020	500		21.40	1.19	9.47	5.48	9.13
D-31e	D-31g	0.015	160	155	140	24	0.030	500		26.42	1.20	11.62	5.71	9.51
D-31f	D-31g	0.015	165	160	140	18	0.024	819		10.63	0.88	8.58	4.76	7.94
D-31g	D-31h	0.015	147	140	129.5	30	0.021	500		64.53	2.09	11.98	6.62	11.03
D-31h	D-31i	0.015	134	129.5	129	48	0.002	230		78.51	3.60	5.21	6.98	11.63
D-31i		0.015	133	127						80.41				

CORDOVA HILLS STORM DRAIN MASTER PLAN

D Shed Hydrology Results - Nolte Method

		LDR (4-6du/ac) 45% PI		LDR (6-8du/ac) 50% PI		MDR (8-10du/ac) 60% PI		MHDR 70% PI		HDR 80% PI		Commercial 90% PI		School 50% PI		Major Roads 95% PI		Park 5% PI		NODE TOTAL (Prelim sizing)				Flow
U/S Node	*D/S Node*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*PI*	*Cum. Acres*	PI_{AVG}	Q_{nolte}
Shed D11																								
D-11a	D-11b													34.60	34.60	1.23	1.23			35.83	52%	35.83	52%	9.55
D-11b															34.60		1.23	5.08	5.08	5.08	5%	40.91	46%	10.87
D-11c	D-11d													43.57	43.57	12.05	12.05			55.62	60%	55.62	60%	19.54
D-11d															43.57		12.05	4.75	4.75	4.75	5%	60.37	55%	20.57
Shed D12																								
D-9a	D-9b									9.80	9.80					2.19	2.19	1.40	1.40	13.39	75%	13.39	75%	5.36
D-9b	D-10c							10.23	10.23		9.80						2.19	4.60	6.00	14.83	50%	28.22	62%	9.04
D-10a	D-10b															4.21	4.21	1.57	1.57	5.78	71%	5.78	71%	2.17
D-10b	D-10c											11.20	11.20			3.73	7.95		1.57	14.93	91%	20.72	85%	9.79
D-10c	D-12e							13.27	23.50		9.80		11.20			3.06	13.20		7.57	16.33	75%	65.27	72%	26.70
D-12a	D-12b	17.36	17.36													5.10	5.10	11.06	11.06	33.52	39%	33.52	39%	8.50
D-12b	D-12c	18.64	36.00													1.11	6.21	0.75	11.80	20.49	46%	54.01	42%	16.28
D-12c	D-12e		36.00			3.21	3.21										6.21	0.49	12.29	3.70	53%	57.71	43%	18.05
D-12d	D-12e					15.79	15.79													15.79	60%	15.79	60%	4.77
D-12e			36.00				19.00		23.50		9.80		11.20				19.40	9.00	28.86	9.00	5%	147.76	55%	74.81
Shed D13																								
D-13a	D-13b					12.10	12.10									2.97	2.97			15.07	67%	15.07	67%	5.25
D-13b	D-13c					18.50	30.60									1.23	4.20			19.73	62%	34.80	64%	11.93
D-13c	D-13d						30.60	13.90	13.90							4.19	8.39			18.09	76%	52.89	68%	20.48
D-13d							30.60		13.90								8.39	11.80	11.80	11.80	5%	64.69	57%	22.67
Shed D14																								
D-14a	D-14c	19.76	19.76													1.17	1.17	1.76	1.76	22.69	44%	22.69	44%	5.45
D-14b	D-14c					6.98	6.98											0.89	0.89	7.87	54%	7.87	54%	2.02
D-14c			19.76				6.98										1.17	3.02	5.66	3.02	5%	33.57	43%	8.52
Shed D15																								
D-15a	D-15b													10.00	10.00	1.40	1.40			11.40	56%	11.40	56%	3.08
D-15b	D-15c							10.70	10.70						10.00	2.41	3.81			13.11	75%	24.51	66%	8.44
D-15c	D-15i								10.70	9.50	9.50				10.00	2.98	6.78			12.48	84%	36.98	72%	14.44
D-15d	D-15e							13.50	13.50							3.08	3.08			16.58	75%	16.58	75%	6.64
D-15e	D-15i								13.50			14.50	14.50			3.65	6.73	2.76	2.76	20.91	80%	37.49	77%	15.93
D-15f	D-15g															0.71	0.71	18.50	18.50	19.21	8%	19.21	8%	4.55
D-15g	D-15h							7.60	7.60							1.93	2.63	1.20	19.70	10.73	67%	29.93	29%	7.44
D-15h	D-15i							7.80	15.40							1.20	3.83	1.10	20.80	10.10	66%	40.03	39%	10.57
D-15i									39.60		9.50		14.50		10.00		17.34	16.80	40.36	16.80	5%	131.30	55%	61.26
Shed D16																								
D-16a	D-16b	24.14	24.14													6.42	6.42			30.56	56%	30.56	56%	8.68
D-16b	D-16d		24.14													5.05	11.47			5.05	95%	35.61	61%	11.55
D-16c	D-16d					9.22	9.22													9.22	60%	9.22	60%	2.77
D-16d			24.14				9.22										11.47	2.98	2.98	2.98	5%	47.81	57%	15.31
Shed D18																								
D-18a	D-18b					15.20	15.20													15.20	60%	15.20	60%	4.59
D-18b							15.20											4.50	4.50	4.50	5%	19.70	47%	4.68

CORDOVA HILLS STORM DRAIN MASTER PLAN

D Shed Hydrology Results - Nolte Method

		LDR (4-6du/ac) 45% PI		LDR (6-8du/ac) 50% PI		MDR (8-10du/ac) 60% PI		MHDR 70% PI		HDR 80% PI		Commercial 90% PI		School 50% PI		Major Roads 95% PI		Park 5% PI		NODE TOTAL (Prelim sizing)				Flow
U/S Node	*D/S Node*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*PI*	*Cum. Acres*	PI_{AVG}	Q_{nolte}
Shed D19																								
D-19a	D-19b					5.05	5.05	4.96	4.96							3.42	3.42			13.43	73%	13.43	73%	5.19
D-19b	D-19c					4.86	9.91		4.96							0.93	4.35			5.79	66%	19.22	71%	7.17
D-19c	D-19e					6.23	16.14		4.96							1.69	6.04			7.92	67%	27.14	70%	10.06
D-19d	D-19e									10.30	10.30					0.97	0.97			11.27	81%	11.27	81%	5.03
D-19e	D-19f			12.75	12.75		16.14		4.96		10.30					1.21	8.22			13.96	54%	52.37	68%	20.18
D-19f					12.75		16.14		4.96		10.30						8.22	11.64	11.64	11.64	5%	64.01	56%	22.36
Shed D20																								
D-20a	D-20b							17.20	17.20							2.31	2.31			19.51	73%	19.51	73%	7.60
D-20b	D-20c							8.50	25.70							2.20	4.51			10.70	75%	30.21	74%	12.04
D-20c	D-20d					10.00	10.00		25.70								4.51	0.96	0.96	10.96	55%	41.17	69%	15.49
D-20d							10.00		25.70								4.51	1.84	2.80	1.84	5%	43.01	66%	15.58
Shed D23																								
D-23a	D-23b			13.10	13.10											1.28	1.28			14.38	54%	14.38	54%	3.75
D-23b					13.10												1.28	5.06	5.06	5.06	5%	19.44	41%	4.61
Shed D25																								
D-25a	D-25b									10.50	10.50					1.35	1.35			11.85	82%	11.85	82%	5.32
D-25b	D-25c							7.10	7.10		10.50					0.52	1.86			7.62	72%	19.46	78%	8.21
D-25c	D-25g								7.10		10.50					1.72	3.59	6.10	6.10	7.82	25%	27.29	63%	8.89
D-25d	D-25e											12.60	12.60			9.98	9.98	4.08	4.08	26.66	79%	26.66	79%	11.46
D-25e	D-25f									14.50	14.50		12.60			1.75	11.73		4.08	16.25	82%	42.91	80%	18.97
D-25f	D-25g										14.50	6.20	18.80			2.31	14.05		4.08	8.51	91%	51.43	82%	23.47
D-25g	D-25h								7.10	8.10	33.10		18.80			3.19	20.82		10.18	11.29	84%	90.00	76%	38.43
D-25h	D-25j								7.10		33.10		18.80	10.40	10.40	2.58	23.39		10.18	12.98	59%	102.98	74%	44.93
D-25i	D-25j							8.00	8.00	9.00	9.00	2.70	2.70			1.00	1.00			20.70	78%	20.70	78%	8.78
D-25j									15.10		42.10		21.50		10.40		24.39	6.21	16.40	6.21	5%	129.89	71%	63.16
Shed D31																								
D-31a	D-31b													10.76	10.76					10.76	50%	10.76	50%	2.49
D-31b	D-31c													16.67	27.43					16.67	50%	27.43	50%	6.73
D-31c	D-31d													19.83	47.26					19.83	50%	47.26	50%	13.15
D-31d	D-31e													18.20	65.47					18.20	50%	65.47	50%	21.40
D-31e	D-31g													12.33	77.80					12.33	50%	77.80	50%	26.42
D-31f	D-31g													40.20	40.20					40.20	50%	40.20	50%	10.63
D-31g	D-31h													18.29	136.29					18.29	50%	136.29	50%	64.53
D-31h	D-31i													18.22	154.51					18.22	50%	154.51	50%	78.51
D-31i															154.51			3.00	3.00	3.00	5%	157.51	49%	80.41
Shed D32																								
D-32a	D-32b											1.00	1.00					92.02	92.02	93.02	6%	93.02	6%	33.54
D-32b													1.00					2.00	94.02	2.00	5%	95.02	6%	34.61

CORDOVA HILLS STORM DRAIN MASTER PLAN

L Shed Hydraulic Results - Trunk Drainage Based on Nolte Design

												Velocity (ft/s)		
U/S Node	***D/S Node***	**n-value**	**Rim/Grate**	**Inv. U/S (out of pipe)**	**Inv. D/S (in D/S pipe)**	**Pipe D (in)**	**Slope (ft/ft)**	**length (ft)**	**Drop in MH inv to inv (ft)**	***Q_{design} (cfs)***	***Approx. Depth of flow d***	***Approx. V***	***Approx. 75% of Vc***	***Approx. 125% of Vc***
Shed L3														
L-3b	L-3c	0.015	237.5	224	221	30	0.0053	570		33.52	2.16	5.98	5.98	9.96
L-3c	L-3d	0.015	232	221	216	30	0.0287	174		35.59	1.27	12.38	6.06	10.10
L-3d		0.015	224	216						39.00				
Shed L4														
L-4a	L-4b	0.015	244.75	237.5	234	24	0.0024	1457		8.78	1.33	3.39	4.38	7.30
L-4b	L-4d	0.015	239	234	232	30	0.0023	873		18.86	1.90	3.95	5.17	8.61
L-4d	L-4e	0.015	241.75	232	229	36	0.0025	1192		33.01	2.33	4.68	5.82	9.69
L-4e	L-4h	0.015	236	229	228	42	0.0029	345		45.83	2.43	5.47	6.19	10.32
L-4g	L-4h	0.015	238	228.5	228	24	0.0035	142		19.68	1.64	3.40	5.38	8.96
L-4h		0.015	236	228						94.31				
Shed L6														
L-6e	L-6f	0.015	248.75	239	234.5	24	0.0052	872		18.23	1.72	5.10	5.28	8.80
L-6f	L-6g	0.015	241.25	234.5	234	30	0.0028	177		27.61	2.40	4.20	5.70	9.50
L-6g		0.015	240	234						27.64				
Shed L7														
L-7a	L-7b	0.015	231	224.5	224	36	0.0023	219		29.99	2.25	4.44	5.67	9.46
L-7b		0.015	230	224						30.06				
Shed L9														
L-9b	L-9c	0.015	224.5	212	210.5	30	0.0025	598		14.97	1.58	3.96	4.86	8.11
L-9c	L-9e	0.015	219	210.5	210	30	0.0020	254		16.43	1.82	3.63	4.98	8.31
L-9e		0.015	218	210						20.27				

CORDOVA HILLS STORM DRAIN MASTER PLAN

L Shed Hydrology Results - Nolte Method

		Total	HDR 80% PI		Commercial 90% PI		School 50% PI		Major Roads 95% PI		Park 5% PI		OS Ag 2% PI		NODE TOTAL (Prelim sizing)				Flow
U/S Node	*D/S Node*	*Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*Cum. Acres*	*Acres*	*PI*	*Cum. Acres*	PI_{AVG}	Q_{nolte}
Shed L3																			
L-3a	L-3b	26.03			23.00	23.00			3.03	3.03					26.03	91%	26.03	0.91	13.16
L-3b	L-3c	59.52				23.00	54.46	54.46	5.07	8.10					59.53	54%	85.56	0.65	33.52
L-3c	L-3d	3.68				23.00		54.46	3.68	11.78					3.68	95%	89.24	0.66	35.59
L-3d		9.20				23.00		54.46		11.78			9.20	9.20	9.20	2%	98.44	0.60	39.00
Shed L4																			
L-4a	L-4b	34.45			8.51	8.51			1.24	1.24			24.70	24.70	34.45	27%	34.45	0.27	8.78
L-4b	L-4d	23.46			19.78	28.29			3.68	4.92				24.70	23.46	91%	57.91	0.53	18.86
L-4c	L-4d	17.81			13.10	13.10			4.01	4.01	0.70	0.70			17.81	88%	17.81	0.88	8.70
L-4d	L-4e	12.51				41.39	6.00	6.00	1.51	10.44	5.00	5.70		24.70	12.51	37%	88.22	0.58	33.01
L-4e	L-4h	19.97			14.81	56.20		6.00	5.16	15.60		5.70		24.70	19.97	91%	108.19	0.64	45.83
L-4f	L-4h	8.24	8.00	8.00									0.24	0.24	8.24	78%	8.24	0.78	3.49
L-4g	L-4h	38.90			31.80	31.80			7.10	7.10					38.90	91%	38.90	0.91	19.68
L-4h		8.00		8.00		88.00		6.00		22.69	8.30	14.00	8.00	32.94	16.30	4%	171.63	0.65	94.31
Shed L6																			
L-6a	L-6b	6.65							6.65	6.65					6.65	95%	6.65	0.95	3.63
L-6b	L-6e	10.85	8.00	8.00					1.95	8.60	0.90	0.90			10.85	76%	17.50	0.84	8.05
L-6c	L-6e	1.73							1.73	1.73					1.73	95%	1.73	0.95	1.02
L-6d	L-6e	2.77							2.77	2.77					2.77	95%	2.77	0.95	1.57
L-6e	L-6f	15.37		8.00	12.90	12.90			2.47	15.56		0.90			15.37	91%	37.36	0.88	18.23
L-6f	L-6g	19.95		8.00	14.90	27.80			5.05	20.61		0.90			19.95	91%	57.31	0.89	27.61
L-6g		1.00		8.00		27.80				20.61	1.00	1.90			1.00	5%	58.31	0.88	27.64
Shed L7																			
L-7a	L-7b	62.46			53.30	53.30			9.16	9.16					62.46	91%	62.46	0.91	29.99
L-7b		1.00				53.30				9.16	1.00	1.00			1.00	5%	63.46	0.89	30.06
Shed L9																			
L-9a	L-9b	22.32					22.32	22.32							22.32	50%	22.32	0.50	5.35
L-9b	L-9c	29.16						22.32	2.74	2.74			26.42	26.42	29.16	11%	51.48	0.28	14.97
L-9c	L-9e	2.83						22.32	2.83	5.57				26.42	2.83	95%	54.30	0.31	16.43
L-9d	L-9e	3.86											3.85	3.85	3.85	2%	3.85	0.02	0.88
L-9e		4.62						22.32		5.57			4.62	34.89	4.62	2%	62.77	0.27	20.27