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February 19, 2009

371322.DI.DR

DOCKET
08-AFC-10
DATE FEB 19 2009
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Mr. Rod Jones
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Lodi Energy Center (08-AFC-10)
Data Response Set 1B, Responses to CEC Staff Data Requests 13 and 37

Dear Mr. Jones:

Attached please find one original and 12 copies of Northern California Power Agency's. responses to California Energy Commission Staff Data Requests 13 and 37 for the Application for Certification for the Lodi Energy Center (08-AFC-10). Due to size, five hard copies and one electronic copy of Attachment DR37-1, Drainage Erosion Sediment Control Plan / Stormwater Pollution Prevention Plan, have been provided to the CEC. Additional copies will be provided upon request.

If you have any questions about this matter, please contact me at (916) 286-0249 or Andrea Grenier at (916) 780-1171.

Sincerely,

CH2M HILL

Sarah Madams
AFC Project Manager

Attachment

cc: A. Grenier
E. Warner/NCPA

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *Lodi Energy Center*

DOCKET NO. 08-AFC-10

PROOF OF SERVICE
(Revised 2/17/09)

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DECLARATION OF SERVICE

I, Mary Finn, declare that on February 19, 2009, I served and filed copies of the attached Data Response Set 1B. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[www.energy.ca.gov/sitingcases/lodi]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

___ sent electronically to all email addresses on the Proof of Service list;

__X__ by personal delivery or by depositing in the United States mail at Sacramento, CA with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

_X__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-10
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Mary Finn

Application for Certification

Data Response Set 1B

(Responses to Data Requests 13 and 37)

Lodi Energy Center

February 2009

EY062008001SAC

Submitted by

NCPA
NORTHERN CALIFORNIA POWER AGENCY

Submitted to

California Energy Commission

With Technical Assistance by

CH2MHILL

Lodi Energy Center Project
(08-AFC-10)

Data Responses, Set 1B
(Response to Data Requests 13 and 37)

Submitted to
California Energy Commission

Submitted by
Northern California Power Agency

With Assistance from

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

February 2009

Contents

Attachments

Introduction

Attached are Northern California Power Agency's (NCPA) responses to the California Energy Commission (CEC) Data Request Set 1B (numbers 13 and 37) regarding the Lodi Energy Center Project's (LEC) (08-AFC-10) Application for Certification (AFC).

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as the CEC presented them and are keyed to the Data Request numbers. New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 36 would be numbered Table DR36-1. The first figure used in response to Data Request 42 would be Figure DR42-1, and so on.

Additional tables, figures, or documents submitted in response to a data request or workshop query (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Cultural Resources (13)

Background

The "Construction Impacts" subsection of the AFC's discussion of cultural resources notes the "extensive disturbance" of the project site due to the construction of the existing STIG plant, and the unlikelihood of encountering buried cultural resources except for "limited potential" below the "plow zone." Paleontological and soils investigations in the AFC describe soils in the project area consisting of the Mokelumne River alluvial fan deposits, and alluvial silty clay, sand, and gravel, all of which could have covered prehistoric archaeological sites. Prior to historic leveling of the area for agriculture, many of the prehistoric archaeological sites in the Delta were on low mounds possibly associated with the alluvial fan deposits and late Pleistocene-age dunes. Archaeologists have observed that some of the mounds extend below the current ground level and some are buried entirely with no surface evidence, making the consideration of the potential presence of buried archaeological deposits relevant. Staff needs additional information to evaluate the potential for encountering buried archaeological deposits during the construction and operation of the project.

Data Request

13. Please provide a discussion of the historical geomorphology of the project site that evidences consideration of the potential there for buried archaeological deposits. The discussion should include information on the development of Delta sand deposits during and subsequent to the Late Pleistocene era, particularly sands of the Piper series. The primary bases for the discussion should be data on the geomorphology, sedimentology, pedology, and stratigraphy of the project area or the near vicinity during the Late Quaternary period. The sources of these data may be a combination, as necessary, of extant literature or primary field research.

Response: A discussion regarding the geomorphology of the project area is provided as Attachment DR13-1.

ATTACHMENT DR13-1

Geomorphology at the LEC Site

Historical Geomorphology of the Lodi Energy Center Project Site

PREPARED FOR:	Ed Warner / NCPA Scott Galati / GalatiBlek Andrea Grenier / Grenier & Assoc
PREPARED BY:	W. Geoffrey Spaulding, Ph. D.
COPIES:	Sarah Madams / CH2M HILL
DATE:	February 12, 2009
PROJECT NUMBER:	371322.DI.DR

Introduction

As part of the Application for Certification process for the Northern California Power Agency's (NCPA) Lodi Energy Center (LEC) project (08-AFC-10), the California Energy Commission (CEC) requested further information on the historical geomorphology of the proposed project site. This technical memorandum is a response to CEC Data Request No. 13:

> *"Please provide a discussion of the historical geomorphology of the project site that evidences consideration of the potential there for buried archaeological deposits. The discussion should include information on the development of Delta sand deposits during and subsequent to the Late Pleistocene era, particularly sands of the Piper series. The primary bases for the discussion should be data on the geomorphology, sedimentology, pedology, and stratigraphy of the project area or the near vicinity during the Late Quaternary period. The sources of these data may be a combination, as necessary, of extant literature or primary field research."*

Context

Soils and Sediments

The Natural Resource Conservation Service (NRCS) (1998) defines the Piper series as very deep, poorly drained soils that formed in alluvium from granitic rock sources. Piper soils are on natural levees and flood plains, typically on sloping natural levees 15 feet below to 5 feet above sea level or at elevation of up to 300 feet. They formed in sandy or coarse-loamy alluvium mostly from granitic sources along streams in low basins and in the Sacramento-San Joaquin Delta. Geographically associated soils are the Kingile, Shima, and Sacramento soils. Kingile and Shima soils are organic soils. Diagnostic horizon recognized in the Piper Series pedon is an ochric epipedon present from the surface to a depth of 10 inches (A1, A2 zones) (NRCS, 1998). Soils in the vicinity of the project site and the natural gas pipeline right-of-way are classified as Devries sandy loam, a soil of historic flood-basins and basin rims (NRCS, 1992).

Geomorphology and Topography

The trunk streams of the Great Valley converge with each other and the Mokelumne River at the Sacramento-San Joaquin Delta. Prior to the middle 19th century the delta possessed all the features of a classical delta with anastomosing channels, low levees, broad flood basins, and many channel segments both abandoned and submerged. The LEC project area lies on the eastern margin of the delta, at the toe of the delta-fan of the Mokelumne River less than a mile east of the high water limit of the historic autumnal tides (Marchand and Atwater, 1979).

The overarching control of sedimentation in the delta, including in the vicinity of the project area, has been the interplay between glacio-eustatic sea-level fluctuations and glacial outwash borne by Sierra Nevada streams (Lettis and Unruh, 1991; Shlemon, 1971; Shlemon and Begg, 1975). Episodic sea level declines during Middle and Late Quaternary glaciations led to fluvial down-cutting and westward migration of the delta-fan system[1], while subsequent deglacial sea-level rise led to eastward migration of the estuarine and delta-fan system, and aggradation within the current limits of the Sacramento-San Joaquin Delta. The last period of deglaciation and sea-level rise, followed by encroachment of estuarine habitats and accretion of the current Mokelumne River fan-delta, began approximately 15,000 years ago (B.P.; Bloom, 1983). Marine/estuarine environments entered San Francisco Bay by 10,000 B.P. and prograded eastward occupying most of the current delta by about 6,000 B.P. (Atwater et al., 1977; Shlemon and Begg, 1975).

Soil survey classifications are generally for agronomic purposes and the designations are seldom employed to great extent in geomorphological or geological investigations. The nuance here is that a soil, as used in these studies, is a suite of chemical and physical characteristics developed by weathering of the parent sediment after it is laid down. Therefore, one might encounter a suite of soil characteristics (such as color, alteration of physical properties with depth, vertical distribution of clays and elements such as iron, aluminum, and calcium) developed to a very similar degree on two sediments of different origin, for example, a fluvial sand and an eolian (dune) sand. In the vicinity of the project area, Marchand and Atwater (1979) have identified limited relict dunes about a mile north of the project site, with a more extensive dune field approximately 4 miles to the north-northeast. In their (Marchand and Atwater, 1979) stratigraphic inventory they note that, according to the USDA. soil survey of San Joaquin County in preparation at the time, these dune sands support (among other soils) the Piper series.

The relict dune area about a mile north of the project site is characterized by about 3.5 feet of loose sand overlying compact sandy silt and silty sand (Atwater, 1982). It possesses minimal topographic relief (Thornton and Lodi South 7.5′ topographic series, U.S. Geological Survey), although its relative height was no doubt greater prior to intensive farming in the area. These sands mantle the Modesto Formation and represent its uppermost stratum in this area (Atwater, 1982). The Modesto Formation is typically assigned to the Late Pleistocene (ca. 78,000 to 10,000 B.P.; Atwater, 1982; Marchand and Allwardt, 1979), although there is no *a priori* reason that this sand might not also date to the early Holocene (10,000 – 7,000 B.P.) period of maximum aridity in western California (e.g., Davis, 1999;

[1] During glacial-maximum times the mouth of the Sacramento River lay west of the Farallon Islands, some 30 miles west of the current coastline. The consequent reduction of maritime influence on the local climate led to increased aridity (see Thompson et al., 1993).

Anderson, 1990; Davis and Moratto, 1988). Relict dunes and sand sheets along coastal California and in areas such as the Sacramento-San Joaquin Delta have usually been related to a more arid (albeit cold) Late Pleistocene climate when the sea had retreated far to the west due to glacio-eustatic sea-level decline (Dupré et al., 1991). The climate was more arid and, at the same time, rivers issuing from the glaciated Sierra Nevada were discharging enormous sediment loads that would have been a ubiquitous source of wind-blown sand in the lowlands of the Great Valley and Delta (Atwater and Marchand, 1980; Lettis and Unruh, 1991). With more recent paleoclimatic reconstructions indicating aridity well into to the middle Holocene (Davis, 1999; Malamud-Roam et al., 2006), it is reasonable to suggest that the uppermost, eolian facies of the Modesto Formation may in some places post-date the Pleistocene.

It also should be noted that another enormous sediment-discharge pulse took place in the late 19th and early 20th century in response to placer mining in the Sierra Nevada. The radical downstream geomorphic adjustments that resulted were noted early in the last century (e.g., Bryan, 1923), and the stratigraphic impact of this has been discussed recently by Florsheim and Mount (2003). Although not possessing an ochric epipedon, a reddish-brown sediment layer overlying late Holocene basin deposits is widespread in the area of the confluence of the Cosumnes and Mokelumne rivers, about 10 miles north, and likely elsewhere. Its thickness ranges from about a half-meter to more than 2.5 meters (1.6 to 8.2 feet). This red-brown sandy-silt has been termed the "anthropogenic layer" by Marchand and Atwater (1979). However, its character and color should be distinguishable from the deep oxidation profile of the eolian sands described by Atwater (1982; Atwater and Marchand, 1980).

Analysis

A brief review of the archaeological literature of the Sacramento-San Joaquin Delta area and the subdued topography of the fan toes of the Mokelumne and Cosumnes Rivers indicates that major archaeological sites were located on topographic (or paleotopographic) highs. The relative elevation of village mounds and other sites of intense habitation would have increased from simple accretion of anthropogenic debris, but natural levees and other natural topographic highs commonly hosted prehistoric sites (Beardsley, 1948). However, this does not hold true for the oldest sites, which are actually found below adjacent terrain, frequently in marshlands some distance from current river courses and within indurated alluvium (Moratto, 1984). Some prehistoric sites were recorded as occurring on "clay mounds," which might be erosional remnants of flood-basin deposits. Many older sites are in alluvium that is "well-indurated" with carbonate deposition, suggesting relatively rapid rates of soil formation (that is, considerably less than 7,000 years to form a well-developed carbonate [CCa] soil horizon). It should be noted as well that at least one previous analysis does not appear to support the relationship between topographic highs and archaeological sites (e.g., West and Welch, 1996), but this is due more to a lack of geomorphological rigor in the use of "landform codes" than a reflection of what may actually be the case[2].

[2] Table 1 in West and Welch (1996) lumps sediment descriptors such as "peats and muds," "organic soils," and "valley fill" with topographic descriptors such as "alluvial fans," "low terraces," and "basins and basin rims" (*sic*) confounding any attempt to understand the relationship between site occurrence and topography alone.

The study of lowland sedimentation processes during the late Holocene and historic periods in the Sacramento-San Joaquin Delta by Florsheim and Mount (2003) is germane to this discussion. Their study area lies only 11 miles north of the LEC project area, and is in an area that hosts a number of important sites near the confluence of the Cosumnes River, Mokelumne River, and Dry Creek (Figure 4.6 in Moratto, 1984). Florsheim and Mount (2003) describe the geological facies changes in the delta-fan subsurface in terms of habitats and energy regimes of a low-gradient riverine system entering a prograding delta. Chief among these processes in prehistoric and early historic (pre-20th century) times were the seasonal overbank flows of the perennial rivers (the Mokelumne, Sacramento, and Cosumnes rivers in this area) creating floodplain lakes and seasonal marshes that slowly drained through multiple channels in the flood basin. Relatively coarse-grained sands were suspended in the energetic channel flows and deposited on the levees or as splay deposits adjacent to levee breaches. Finer clays and silts were carried farther into the basins and deposited in relatively less energetic habitats as flood-basin sediments. Flood-basin deposits generally are clay-rich sediment derived from overbank flood flows trapped between natural levees and the edges of fans (Bryan, 1923; Florsheim and Mount, 2003).

Conclusions

Atwater (1982) and Marchand and Atwater (1979) have identified relict dunes and sand sheets on the eastern periphery of the Sacramento-San Joaquin Delta. The closest that have been mapped lie about a mile north of the project site, with a more extensive dune field approximately 4 miles to the north-northeast. In their stratigraphic inventory, Marchand and Atwater (1979) note that, according to the USDA soil survey of San Joaquin County in preparation at the time, these dune sands support (among other soils) the Piper series. Many relict dune systems in western California have been assigned a Pleistocene age, although clarification of the degree of early- to middle Holocene drought in western California raises the question of whether some might be younger than 10,000 B.P. Some eolian landforms may therefore post-date the beginning of the PaleoIndian Period (ca. 12,000 B.P.). Dunes offered windbreaks in what otherwise was a generally flat landscape, and later in the Holocene would have offered topographically elevated sites in a seasonally waterlogged region. Thus, an archaeological record at depth can be expected from these features absent significant historic disturbance. The most intriguing strata for investigation would be those displaying the contact between overlying eolian sand and underlying Modesto Formation alluvium. Younger archaeological materials atop older eolian strata, which would occur if a dune provided well-drained ground for later Holocene occupation, could be evinced by organic rich and finer-grained (silts and clays) strata overlying the older sands.

It is doubtful, however, that circumstances will arise in the course of this project that will allow for a test of any of these hypotheses. Neither Atwater (1982) nor Marchand and Atwater (1979) map relict dunes or other eolian landforms within a mile of the project site or the natural gas pipeline route. Other sands are present at depth, but the deeply oxidized ochric horizon characteristic of the Piper series was not noted in prior geotechnical studies (Carlton Engineering, 2008; Kleinfelder, 1993). Silty sands to sandy silty clays extend to a depth of 2 to 8 feet below the surface of the project area. The range of horizontally bedded sediments encountered below that depth, alternating from fluvial sands to silty clays, is consistent with the facies changes described by Florsheim and Mount (2003) for the fluvially dominated sedimentation of the delta-fan area not far to the north. Therefore, no immediate evidence is available from the vicinity of the project site or the natural gas pipeline right-of-way to suggest substantive subsurface archaeological potential.

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Soil and Water Resources (37)

Background

In Response 17 of the LEC's Supplement B – Data Adequacy Responses, NCPA has submitted both a draft construction Storm Water Pollution Prevention Plan (SWPPP) and a Preliminary Drainage Study (Attachments DA 5.15-1 and DA 5.17-7). Both documents only cover the 4.4 acres of the LEC plant footprint and provide no delineation or description of the 9.8 acres of proposed construction and laydown areas or the 2.5-mile natural gas pipeline. The information provided by NCPA is incomplete and does not provide sufficient information for a CEQA analysis.

In Response 17, NCPA proposes to submit a Construction Drainage, Erosion, and Sediment Control Plan (DESCP)/SWPPP prior to site mobilization. A draft DESCP/SWPPP is required to properly delineate the entire LEC Project and to provide a discussion of potential impacts and proposed mitigation measures for protection of soil and water resources during construction of the LEC.

Data Request

37. Please provide a draft DESCP/SWPPP containing elements A through I below outlining site management activities and erosion/sediment control best management practices (BMPs) to be implemented during site excavation, elevation, construction, and post-construction activities. The level of detail in the draft DESCP/SWPPP should be commensurate with the current level of planning for site elevation, grading, and drainage. Please provide all conceptual storm water pollution and erosion control information for those phases of construction and post-construction that have been developed or provide a statement when such information will be available.

    A. Vicinity Map – A map(s) at a minimum scale 1"=100' shall be provided indicating the location of all project elements (construction site, laydown areas, pipelines, etc.) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

    B. Site Delineation – All areas subject to soil disturbance for the LEC (project site, laydown area, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities. The Site Delineation shall be at a minimum scale 1"=100'.

    C. Watercourses and Critical Areas – On the Site Delineation, the location of all nearby watercourses including swales, storm drains, and drainage ditches shall be shown. Indicate the proximity of those features to the LEC construction, laydown, landscape areas, and all transmission and pipeline construction corridors.

    D. Drainage Map – The DESCP/SWPPP shall provide a topographic site map(s) at a minimum scale 1"=100' showing all existing, interim and proposed drainage systems, and drainage area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

E. Drainage of Project Site Narrative – The DESCP/SWPPP shall include a narrative of the drainage measures to be taken to protect the site, downstream facilities and watercourses. The narrative shall include the summary pages from the hydrologic and hydraulic analyses prepared by a professional engineer or erosion control specialist. The narrative shall state the watershed size(s) in acres used in the calculation of drainage control measures and text included that justifies their selection. The hydrologic and hydraulic analyses should be used to support the selection of BMPs and structural controls to divert off site and on-site drainage around or through the LEC construction and laydown areas.

F. Clearing and Grading Plans – The DESCP/SWPPP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections or other means. The on-site locations of any disposal areas, fills, or other special features shall also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography.

G. Clearing and Grading Narrative – The DESCP/SWPPP shall include a table with the quantities of material excavated or filled for the site and all project elements of the LEC (project site, lay down area, transmission corridors, and pipeline corridors) whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. Best Management Practices Plan – The DESCP/SWPPP shall identify on a water pollution control drawing (WPCD) the location of the site specific BMPs to be employed during each phase of construction (initial elevation, grading, linear excavation and construction, and final grading/stabilization). Treatment control BMPs used during construction should enable testing of storm water runoff prior to discharge to the storm water system. BMPs shall include measures designed to prevent wind and water erosion in areas with existing soil contamination.

I. Best Management Practices Narrative – The DESCP/SWPPP shall show the location (as identified on the WPCD), timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, site elevation, and all project excavation and construction. Text with supporting calculation shall be included for each project specific BMP proposed for use prior to initial site elevation, grading, and project excavation and construction. Text with supporting calculation shall be included for each project specific BMP.

Response: A DESCP/SWPPP has been provided as Attachment DR37-1. Due to size, five hard copies and one electronic copy of the Drainage Erosion Sediment Control Plan / Stormwater Pollution Prevention Plan have been provided to the CEC. Additional copies will be provided upon request.

ATTACHMENT DR37-1

Drainage Erosion Sediment Control Plan / Stormwater Pollution Prevention Plan

Drainage, Erosion, and Sedimentation Control Plan for the Lodi Energy Center Project

Prepared for

Northern California Power Agency

February 2009

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Drainage, Erosion, and Sedimentation Control Plan for the Lodi Energy Center Project

Submitted to

Northern California Power Agency

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Contents

Acronyms and Abbreviations

BMPs	best management practices
cfs	cubic feet per second
Delta	Sacramento-San Joaquin River Delta
DESCP	Drainage, Erosion and Sedimentation Control Plan
DTSC	Department of Toxic Substances Control
EPA	U.S. Environment Protection Agency
LEC	Lodi Energy Center
MW	megawatts
NCPA	Northern California Power Agency
OES	Office of Emergency Services
PG&E	Pacific Gas and Electric Company
RWQCB	Regional Water Quality Control Board
SWPPP	Stormwater Pollution Prevention Plan
UIW	underground injection well
WPCF	Water Pollution Control Facility
yd^3	cubic yards

Lodi Energy Center Project Drainage, Erosion, and Sedimentation Control Plan

Northern California Power Agency (NCPA) is currently developing and plans to construct the Lodi Energy Center (LEC) project. The LEC is a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 255 megawatts (MW).[1] The LEC facility and its associated features will be constructed, owned, and operated by NCPA. However, the proposed 2.5-mile natural gas line will be constructed, owned, and operated by Pacific Gas and Electric Company (PG&E), and, therefore, is not addressed in this document.

NCPA has prepared this Drainage, Erosion and Sedimentation Control Plan (DESCP) for the LEC project to demonstrate that construction activities associated with the project will not result in an increase in offsite flooding potential or sedimentation and that the project will meet all local, state, and federal regulatory requirements associated with the protection of water quality and soil resources. The DESCP includes the following elements:

- A vicinity map showing the location of all project elements with depictions of all significant geographic features including swales, storm drains, and sensitive areas
- A site delineation that includes the boundary lines of all construction areas and the location of existing and proposed structures, pipelines, roads, and drainage facilities
- Topographic site maps showing water courses, critical areas, and existing/proposed drainage systems
- A description of the drainage measures to be taken to protect the site and downstream facilities, including a discussion of compliance with the Regional Water Quality Control Board (RWQCB) discharge order
- A delineation of all areas to be cleared of vegetation and areas to be preserved
- Identification of the quantities of material excavated or filled for the site and all project elements, including those materials removed from the site due to contamination
- An illustration of existing topography and site-specific best management practices (BMPs) to be implemented during construction, as well as a schedule of the timing and implementation of erosion and sediment control measures
- Erosion control drawings and erosion and sedimentation control notes

[1] Maximum peak generating capacity at 61 degrees Fahrenheit is 285 MW.

A. Vicinity Map

The LEC project site is in rural San Joaquin County, within the city limits of Lodi, southwest of the intersection of Highway 12 and Interstate 5, at the end of North Cord Road (Figure 1; all figures are provided at the end of this report). Primary access to the site will be provided via North Thornton Road off Interstate 5. The LEC is proposed for a 4.6-acre site on an approximately 162-acre parcel (Assessor's Parcel Number 055-130-16, City of Lodi) adjacent to the City of Lodi's White Slough Water Pollution Control Facility (WPCF) to the east, treatment and holding ponds associated with the White Slough WPCF to the north, the existing 49-MW NCPA Combustion Turbine Project #2 (STIG plant[2]) to the west, and the San Joaquin County Mosquito and Vector Control facility to the south. The project site is on land owned and incorporated by the City of Lodi, and is approximately 6 miles west of Lodi. The city of Stockton is approximately 2 miles to the south. The project site is currently undeveloped and is used for equipment storage during upgrades to the White Slough WPCF. The LEC project site is found within the southwest portion of Section 24, Township 3 North, Range 5 East, Mount Diablo Base and Meridian. In addition, 9.8 acres within the existing site boundaries of the White Slough WPCF on City-owned property will be used for construction laydown and parking areas. Figures 2a, 2b, and 2c show a vicinity map of the project site and construction laydown areas.

B. Site Delineation

Figure 3 shows a detailed site plan of the LEC project. Figures 4a and 4b show the detailed site plan of the construction laydown areas.

The project site contains the LEC facility (power plant equipment, two industrial buildings, and cooling tower) other associated features, and an access road. Construction access will generally be from North Cord Road. Materials and equipment will be delivered by truck. During construction, four parcels (Areas A-D) totaling 9.8 acres will be used for construction laydown areas (Figure 3). Area A is approximately 3.1 acres, Area B is approximately 2.2 acres, Area C is approximately 1.6 acres, and Area D is approximately 2.9 acres. These areas will be located to the east of the project site within the existing boundaries of the White Slough WPCF. Once the project design is finalized and prior to any soil disturbance, NCPA will update this DESCP and the Stormwater Pollution Prevention Plan (SWPPP) to reflect design changes.

Construction of the LEC project is scheduled to last 24 months. During construction of the LEC project, water will be required primarily for dust suppression (12 hours per day for approximately 24 months depending on weather conditions). Construction activities would require a relatively limited amount of water (an average of approximately 50 gallons per minute and approximately 200 gallons per minute for 1 hour for dust control and soil compaction, at peak use). The construction water supply will come from the White Slough WPCF. The average daily water use for construction would be 36,000 gallons per day and daily maximum water use would be 144,000 gallons per day.

[2] "STIG plant" refers to the NCPA Combustion Turbine Project, which is a steam turbine injected gas turbine (STIG) plant

The LEC facility will dispose of process wastewater using a new Class I underground injection well (UIW), with the existing Class I UIW at the STIG plant used for backup. The plant washwater from the equipment drains will pass through an oil/water separator and wastewater sump before it is discharged to the atmosphere through evaporation in the cooling tower. The oil and sludge removed from the washwater will be disposed of off site. Wastewater from the safety showers and eye wash will also be discharged to the atmosphere through evaporation in the cooling tower. Sanitary wastewater will be minimal and will be discharged to the White Slough WPCF.

Natural gas to the fuel plant will be delivered via a new 2.5-mile-long natural gas pipeline that will connect into PG&E's Line #108 east of the project site. PG&E has confirmed that its system has enough capacity to supply the LEC from this location. This natural gas pipeline will be constructed, owned, and operated by PG&E, and therefore is not addressed in this document. The LEC will link to the power grid through the existing STIG plant's 230-kilovolt (kV) switchyard substation by a three-phase 230-kV tie line. The proposed 230-kV route will not leave NCPA's lease. There will be approximately 520 feet of line tying the plant to the existing STIG plant 230-kV switchyard.

A description of the soils in the project area was developed using the online and published Soil Survey of San Joaquin County, California (USDA-Natural Resources Conservation Service [USDA-NRCS], 1992; 2008). Descriptions of the soil mapping units were developed from the soil survey and the online soil series descriptions (Soil Survey Staff, 2008). Soil map unit characteristics for the area potentially affected by project construction are summarized in Table 1.

TABLE 1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description	
149	**Devries sandy loam, drained, 0 to 2 percent slopes:**	
	The entire LEC project site and all four laydown areas.	
	Formation:	On basin rims of the San Joaquin delta in alluvium derived from mixed rock sources
	Typical profile:	Sandy loam, fine sandy loam, or loam surface (13± inches thick) and upper subsoil (15± inches thick) over indurated hardpan (to a depth of 80± inches)
	Shrink-swell capacity:	Low (surface and upper subsoil; not given for lower subsoil)
	Depth and drainage:	Moderately deep above hardpan; Somewhat poorly drained; may be hydric, especially above hardpan
	Permeability:	Moderately rapid
	Runoff:	Slow
	Water Erosion:	Slight
	Wind Erosion:	Moderate
	Farmland Class:	Not a Prime Farmland
	Storie Index:	18 (Grade 5), very poorly suited to agriculture; limited by drainage and rare flooding
	Capability class:	IVw-8 (irrigated and non irrigated), severe limitations due to low available water capacity because root zone less than 40 inches over a hardpan
	Taxonomic class:	Coarse-loamy, mixed, superactive, thermic Typic Duriaquolls

TABLE 1
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description	
169	**Guard clay loam, drained, 0 to 2 percent slopes:** The LEC project site and two laydown areas (B and C) are immediately north of this soil unit. Although not directly affected by proposed LEC facilities, they are close enough that these soil characteristics may be present.	
	Formation:	On basin rims of the San Joaquin delta in alluvium derived from mixed rock sources
	Typical profile:	Mottled clay loam surface (15+ inches thick) and subsoil (67+ inches thick). Soil is calcareous throughout and weakly cemented below 15 inches.
	Shrink-swell capacity:	Moderate (surface and substratum)
	Depth and drainage:	Very deep; Poorly drained
	Permeability:	Slow
	Runoff:	Slow
	Water Erosion:	Slight
	Wind Erosion:	Very slight
	Farmland Class:	Prime Farmland, if irrigated. Drainage system may be required.
	Storie Index:	45 (Grade 3), fairly well suited to agriculture; limited by drainage and rare flooding
	Capability class:	IIIw-2 (irrigated) and IVw-2 (non irrigated), severe limitations due to wetness caused by poor drainage or flooding
	Taxonomic class:	Fine-loamy, mixed, superactive, calcareous, thermic Duric Endoaquolls

C. Watercourses and Critical Areas

The LEC project site is located southwest of Lodi at an elevation of approximately 5 feet above mean sea level. Average rainfall ranges from 8 inches per year south of the city of Tracy to 17 inches per year in Lodi. Most of the precipitation occurs between December and April. The rainfall for a 100-year 24-hour event is 3.6 inches, and 2 inches for a 6-hour event; a 10-year 24-hour event is 2.6 inches, and 1.5 inches for a 6-hour event (NOAA Atlas 2).

The LEC project site is on the eastern edge of the Sacramento-San Joaquin River Delta (Delta). In the Delta, the Sacramento and San Joaquin rivers combine with tidal action to produce a biologically-rich estuarine environment. The southern portion of the LEC project area is bordered by a drainage ditch that discharges to Dredger Cut, which drains into White Slough. White Slough is west of the project site and ultimately drains to the Delta (Figure 5).

The existing LEC site is a basin-like area moderately covered with seasonal grass and there is a natural swale along the southwest corner of the site (Carlton Engineering, 2008). A culvert is in place in the southern portion of the site to convey drainage runoff from the swale off site. Currently, drainage from the LEC site is indirectly discharged to White Slough, Dredger Cut, and Bishop Cut via a drainage ditch bordering the southern portion of the project site (Carlton Engineering, 2008). The adjacent drainage ditch provides suitable habitat for giant garter snake, which is a federally listed threatened species. A buffer of 25 to 30 feet shall be maintained between construction activities and edge of the drainage ditch to contain construction materials and activities, as well as to exclude snakes from the work area.

For the final developed condition, the LEC site will be graded such that all runoff will be collected for discharge to the White Slough WPCF. Runoff will increase for the post-development condition due to an increase in impermeable surfaces. However, paving will improve both the air and water quality due to the minimization of dust during the dry season and sedimentation of runoff during rain events.

The construction laydown areas range in level of disturbance, but generally are at least partially covered in open annual grassland and a few trees (valley oaks, Scotch pine, Australian pine, bluegum, and Fremont's cottonwood). The majority of laydown area D has been leveled and is highly disturbed. For example, the east side of this laydown area is currently a gravel parking area and most of the western side contains soil stockpiles and miscellaneous debris.

Surface water impacts, if any, are anticipated to be a by-product of short-term construction activity and consist of increased turbidity due to erosion of newly excavated or placed soils. Activities such as grading can potentially increase rates of erosion during construction. In addition, construction materials could contaminate runoff or groundwater if not properly stored and used. Compliance with engineering and construction specifications, following approved grading and drainage plans, and adhering to proper material handling procedures will ensure effective mitigation of these short-term impacts. Construction activities associated with the LEC do not discharge directly to a water body listed as impaired for sedimentation/siltation or turbidity under the Clean Water Act Section 303(d).

D. Drainage Map

Figures 6 and 7 show all existing, interim, and proposed drainage systems and drainage area boundaries.

E. Drainage Narrative

During construction, approximately 4.6 acres of land associated with the LEC project will be graded. The project will increase stormwater runoff at the site due to the conversion of the existing pervious open area to impervious surface. An onsite underground storm drain detention system will be used to prevent impacts to the downstream drainage system. The detention system includes oversized storm drain pipe to provide storage capacity and flow control manholes with emergency weir and orifice to limit the runoff exiting the site to pre-development levels.

The stormwater management system was designed in accordance with the U.S. Environment Protection Agency's (EPA) guidance document entitled *Storm Water Management for Construction Activities—Developing Pollution Prevention Plans And Best Management Practices* (EPA 832-R-92-005, September 1992), the *California Storm Water Best Management Practices Handbook*, and the Central Valley Regional Water Quality Control Board Order No. R2-2003-002.

Under the National Pollutant Discharge Elimination System *General Permits for Storm Water Discharges from Construction Sites,* it is necessary to estimate the runoff coefficient of the site before and after construction is complete. A preliminary drainage study was prepared, and is included as Appendix A.

Relevant attachments to the preliminary drainage study include:

- Runoff Calculations – Land Pre-development
- Runoff Calculations – Land Post-development
- City of Lodi Standard Plan 606
- Volume Design Calculation
- Drainage Shed Map Exhibits
- Erosion & Sediment Control Guidelines for Developing Areas of the Sierras (High Sierra RC&D Council, 1981).

A summary of the project site preliminary drainage study is presented in Table 2.

TABLE 2
Summary of the Preliminary Drainage Study

Construction site area	Approximately 4.6 acres
Percentage impervious area before construction	6 %
Runoff coefficient before construction	0.28
Percentage impervious area after construction	40 %
Runoff coefficient after construction	0.70
Anticipated stormwater run-on for 10-year 6-hour storm	None

Stormwater runoff at the site is predominantly from north to south, eventually discharging at the existing low point on the site located at the southwest corner of the project site where stormwater runoff exits the site via an existing culvert. Currently, drainage from the LEC site is indirectly discharged to White Slough, Dredger Cut, and Bishop Cut via a drainage ditch bordering the southern portion of the project site (Carlton Engineering, 2008). Proposed improvements to the site include removal of a portion of the existing concrete pavement area (to be replaced with new asphalt or crushed stone gravel), relocation of various equipment and underground utilities, construction of a new underground storm drain system that discharges directly to the White Slough WPCF, and construction of concrete foundations for the new plant equipment.

To protect the main equipment foundation from stormwater runoff, two series of drain inlets and pipes are planned on each side of the foundation. Runoff will flow to the proposed drain inlets along the top of the compacted sub-base under the crushed stone gravel. The grates of the drain inlets are set at 6 inches below the gravel-finished pavement elevation to collect the runoff from the foundation sub-base. The proposed drive aisle along the west side the main equipment foundation is designed to drain toward the west into the existing drainage system. The edge of the pavement between the asphaltic concrete pavement and the crushed stone gravel acts as a grade break. This design is consistent with the existing drainage pattern on site.

The area surrounding the water treatment building is proposed to be paved with asphaltic concrete pavement and designed to drain north to the existing storm drain system consistent with the existing drainage pattern on site. The existing underground stormwater system will be modified to accommodate new construction and routed to discharge directly to the White Slough WPCF.

The proposed drainage system surrounding the cooling tower pad consists of a crushed stone gravel section and drain inlet grates set at 6 inches below the finished grade elevation of the gravel section to drain runoff at the sub-base level. Two sand/oil interceptors will connect to the proposed stormwater system and will be located on both ends of the cooling tower pad. A storm drain detention system, including an oversize underground storm drain pipe and a concrete manhole with weir and orifice, is proposed along the south face of the cooling tower.

The stormwater system will be designed per the City of Lodi Design Standards to convey a 2-year storm event with the water surface elevation contained within all pipes. As a result, the system will be capable of conveying the maximum peak flow for the given design storm (2 year). The time of concentration is 10 minutes for both pre- and post-construction conditions. Table 3 shows the summary of peak flows for the 2-year and 10-year storm. A preliminary estimate of the required detention volume is determined to be 1,240 cubic feet, which is equivalent to 253 linear feet of 30-inch storm drain pipe. The detailed design and calculation for detention storage volume and the flow control device will be performed during the construction document phase.

TABLE 3
Summary of Peak Flows

	2-year Storm Runoff (cfs)	10-year Storm Runoff (cfs)
Pre-construction	1.61	2.84
Post-construction	4.14	7.31

Source: Carlton Engineering, 2008 (Appendix A)
cfs = cubic feet per second

The areas of the site used in the calculation of pre- and post-construction runoff summaries are shown in Figures 6 and 7.

The runoff calculations used to support the selection and sizing of the onsite underground storm drain system that will be employed to divert offsite drainage were based on the Rational Method (as set forth in the City of Lodi Design Standards) and Rainfall Intensity data from the City of Lodi Standard Plan 606. The Rational Method provides specific guidelines to estimate the peak runoff flows from land pre- and post-development. The Rational Method is expressed by equations and tables using the known runoff coefficient, average rainfall intensity, and drainage area. Average rainfall intensity of the 2-year storm event can be obtained from the City of Lodi's Rainfall Intensity data, with known time of concentration. The Rational Method calculations and Rainfall Intensity sheet are provided in Appendix A.

F. Clearing and Grading Plans

Rough grading plans are not available at this stage of the project. Prior to the start of construction, these plans and the DESCP will be updated with final design information.

G. Clearing and Grading Narrative

The information provided in this section is preliminary and will be updated and expanded upon once the clearing and grading plans are completed and prior to the start of construction.

The project site will require earthwork to construct the LEC and associated facilities. Soil-disturbing activities will include grubbing and clearing, rough grading, excavating, filling, and final grading. For all areas where earthwork will be executed, materials suitable for compaction will be stockpiled in designated onsite locations. Materials not suitable for compaction will be stored in separate stockpiles and reused on the site, as appropriate. Any contaminated materials encountered during excavation will be disposed of in accordance with applicable laws, ordinances, regulations, and standards. Only licensed, commercial fill will be used and there will not be a borrow or disposal site for the project.

The construction contractor will perform clearing and grubbing of the construction areas using scrapers or the equivalent. Clearing and grubbing will start on the 4.6-acre project site and last approximately three months. Areas cleared and grubbed will be smoothed by earthwork equipment, possibly a grader or similar piece of equipment, and compacted by vibrating rollers. Concrete, mechanical and electrical works will be performed over a period of 24 months, with the aid of graders, rollers, front loaders, dump trucks, trenching machines, concrete mixer and pump trucks, cranes, and pick-ups. Table 4 presents a sample clearing and grading table. The final table outlining the amount of cut and fill planned for specific components of the project will updated pending final design drawings.

TABLE 4
Clearing and Grading

Description	Stockpile (yd^3)	Total Cut (yd^3)	Total Fill (yd^3)
To be determined.			
Total			

yd^3 = cubic yards

The following subsections provide a discussion of clearing and grading associated with each of the major construction elements of the project.

LEC Project Site

Earthwork will consist of removal of topsoil, vegetation, and debris; excavation and compaction of earth to create the plant grade; and excavation for foundations and underground systems. Approximately 8,747 yd^3 of fill will be required to provide a level pad for the LEC facility. The estimated volume of soil that will be over-excavated and recompacted is 19,656 yd^3.

Construction Laydown and Parking Areas

A total of 9.8 acres to the east of the project site will be used for construction laydown and parking areas. The construction laydown and parking areas may be graded and covered in gravel.

H. Best Management Practices

Figures 8 and 9 show the placement and details of the BMPs that will be utilized during project construction. Figures 10A and 10B show placement of BMPs to be employed at the construction laydown areas. Currently, these BMP maps do not show all BMPs to be utilized at the site; instead they show initial containment BMPs that will contain any potential stormwater and non-stormwater pollutants from leaving the site. A description of the potential BMPs to be used on the site during construction activities is provided in Section I, Best Management Practices Narrative. Updated BMP maps shall be provided once the SWPPP is complete. As part of the SWPPP, a current version of the BMP drawings are maintained in the project construction trailer and updated regularly to reflect modified or new BMPs that are being implemented and maintained on site.

I. Best Management Practices Narrative

The project construction schedule is provided in Table 5. An implementation and maintenance schedule for the drainage, erosion, and sediment control methods and practices that will be implemented at the LEC project site are included in Table 6.

TABLE 5
Key Construction Events

Event Description	Expected Dates
Date of Certification by CEC	TBD
Start of Rainy Season	October 15 (Typical) *Project site and linears must have SWPPP protection measures implemented prior to first rain and these measures must remain in effect for years 2010 through 2012.*
End of Rainy Season	May 1 (Typical)
Clearing and Grubbing	First quarter 2010
Rough Grading	First quarter 2010
Construction of Storm Drain Improvements	Third quarter 2010
Final Grade	First quarter 2012
Building Construction	Second quarter 2010
Paving	First quarter 2012
Completion of Construction	First Quarter 2012
Start of Operation	First Quarter 2012

TABLE 6
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
Silt fence	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace torn sections, repair up-rooted sections, clean out collected soils when greater the 1/3 height of fence
Straw wattle dikes	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace crushed sections, replace rotted sections, clean out collected soil when greater than 1/3 height of roll
Coir logs (rolls)	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace crushed sections, replace rotted sections, clean out collected soil when greater than 1/3 height of roll
Erosion control blankets (geotextiles)	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace/repair as necessary
Straw bales	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events) and once a week during dry periods	Clean out collected soil when greater than 1/3 height of roll
Sandbags	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Repair, reshape, replace bags as necessary, replace bags exposed to sunlight every 2 to 3 months, clean out collected soil when greater than 1/3 height of bag
Gravelbags	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Repair, reshape, replace bags as necessary, replace bags exposed to sunlight every 2 to 3 months, clean out collected soil when greater than 1/3 height of bag

TABLE 6
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
Hydraulic mulch	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible; maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked
Straw, wood, organic mulch	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Reapply mulch when bare earth becomes visible
Seeding	As soon possible after disturbance has permanently or temporarily ceased, but in no case more than 14 days after the construction activity in an area has ceased (Except when construction activity will resume on that portion of the site within 21 days)	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season (Monitored every May for the first three years following project completion)	Areas that do not meet revegetation criteria will be reseeded
Hydroseeding	Two weeks prior to construction (avoid use of hydroseeding in areas where the BMP would be incompatible with future earthwork activities and would have to be removed)	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during non-rainy season	Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible; where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates

TABLE 6
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
Permanent revegetation	As soon possible after disturbance has permanently or temporarily ceased, but in no case more than 14 days after the construction activity in an area has ceased (Except when construction activity will resume on that portion of the site within 21 days)	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season (Monitored every May for the first three years following project completion or until the site has been successfully revegetated to 75 percent coverage)	Areas that do not meet revegetation criteria will be reseeded
Aggregate surfacing	Two weeks prior to construction	Once a week during rainy season and bi-weekly during dry season	Keep all temporary roadway ditches clear, periodically apply additional aggregate on gravel roads, active dirt construction roads are commonly watered three or more times per day during the dry season.
Stockpile management	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Repair and/or replace perimeter controls and covers as needed to keep them functioning properly
Stabilized construction entrance/exit	Two weeks prior to construction	Once a week during rainy season and bi-weekly during dry season	Inspect local roads adjacent to the site daily, remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment, keep all temporary roadway ditches clear, check for damage and repair as needed, replace gravel material when surface voids are visible, remove all sediment deposited on paved roadways within 24 hours, remove gravel and filter fabric at completion of construction

TABLE 6
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
Street sweeping, vacuuming	Once construction commences	Inspect before and after storm events (and once each 24-hour period during extended storm events), when actively in use, points of ingress and egress must be inspected daily, otherwise once a week	When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily; after sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite

The following describes the BMPs that will be implemented at the LEC project site and the four construction laydown areas as necessary during the pre-construction, construction, and post-construction phases of the project as required by the City of Lodi's Minimum Construction Site Storm Water Management Practices.

Scheduling. Construction shall be scheduled to minimize construction activities in high-risk areas and the amount of active disturbed soil areas during the rainy season (October 15 – May 1). High-risk areas include those areas within 50 feet of USGS watercourses, 100-year floodplains, regulated wetlands, and where slopes exceed 16 percent. Unless specifically authorized by the City's onsite representative, during the rainy season the contractor shall not schedule construction activities in high-risk areas or schedule to have more than 5 acres of active disturbed soil area. Where permanent stormwater devices are to be constructed, these devices should, when feasible, be constructed as an early work item.

Preservation of Natural Features. Prior to the commencement of soil-disturbing activities, areas of existing vegetation that are to remain and environmentally sensitive areas shall be fenced for protection. In general, site designs shall preserve existing vegetation to the maximum extent possible. During construction, existing vegetation shall be preserved and protected by fencing for as long as possible to minimize erosion.

Stormwater run-on and Concentrated Flows. Existing watercourses shall be protected. To the extent feasible, all concentrated water flows shall be channeled away from disturbed soil areas and stockpiles. Concentrated water flows shall be conveyed in a non-eroding fashion. Erosion in areas of concentrated flow paths shall be controlled by applying erosion control blankets, erosion control seeding, and lining of swales.

Stockpile Management. Stockpiles shall be managed according to the type of material being stockpiled and the season, as follows:

- Soil stockpiles shall be covered or protected with soil stabilization measures and perimeter sediment barriers during the rainy season and covered or protected with perimeter sediment barriers during the non-rainy season.
- Concrete/asphalt rubble, rock, and aggregate base and sub-base stockpiles shall be covered or protected with perimeter sediment barriers year-round.

- Cold mix asphalt stockpiles shall be covered year-round.

Disturbed Soil Area Management. Disturbed soil areas shall be protected with an effective combination of measures including soil stabilization, sediment barriers, and basins/traps.

- Soil Stabilization – Hydraulic mulch; hydroseeding; suitably stabilized, non-polluting straw/wood/organic mulch; geotextiles; stabilized construction roadways.
- Sediment Barriers – Silt fences; sand and gravel bag barriers; straw bale barriers; fiber rolls.
- Basin/Traps – sediment traps.

Temporary erosion control shall be applied to remaining active and non-active areas as needed. Temporary erosion control measures shall be implemented prior to the start of the rainy season (defined as October 15 to May 1). Vegetative stabilization shall occur as soon as possible after disturbance has permanently or temporarily ceased, but in no case more than 14 days after the construction activity in an area has ceased. An exception to this requirement is for when construction activity will resume on that portion of the site within 21 days.

A range of seedbed preparation methods shall be used. The seedbed preparation method used for any individual site shall depend on various factors including size of the area, slope, and potential for erosion. The seedbed shall be prepared to a depth of 3 to 4 inches, where possible, by harrowing, disking, or mechanical raking. Seed shall be dispersed by dry broadcasting where slopes are less than 2:1. Manually operated cyclone type spreaders will be employed to uniformly broadcast the seed. After broadcasting, the seed shall be manually raked, on contour, into the top 3/8 inch of soil.

Disturbed areas will be provided with permanent vegetative cover once construction in that area is complete. A successfully revegetated site must achieve 75 percent coverage Seeding operations will take place after areas have received final grading.

Permanent erosion control for the construction laydown area and temporary access roads will consist of revegetation with a native erosion control seed mix to be determined by the project biologist.

Structural Practices. Proposed drainage improvements to the project site include removal of a portion of the existing concrete pavement area (to be replaced with new asphalt or crushed stone gravel), modification of the existing underground stormwater system, and construction of a new underground storm drain system that discharges directly to the White Slough WPCF. A preliminary estimate of the required detention volume is determined to be 1,240 cubic feet, which is equivalent to 253 linear feet of 30-inch storm drain pipe. The detailed design and calculation for detention storage volume and the flow control device will be performed during the construction document phase.

Two series of drain inlets and pipes are planned on each side of the main equipment foundation. Runoff will flow to the proposed drain inlets along the top of the compacted sub-base under the crushed stone gravel. The grates of the drain inlets are set at 6 inches below the gravel-finished pavement elevation to collect the runoff from the foundation sub-base. The proposed drainage system surrounding the cooling tower pad consists of a crushed stone gravel section and drain inlet grates set at 6 inches below the finished grade elevation of the gravel section to drain runoff at the sub-base level. Two sand/oil interceptors will connect to the proposed stormwater system and will be located on both ends of the cooling tower pad. A storm drain detention system, including an oversize underground storm drain pipe and a concrete manhole with weir and orifice, is proposed along the south face of the cooling tower.

Offsite Sediment Tracking. The construction entrance off of North Cord Road will be constructed and maintained to reduce tracking of sediments onto public streets. Excess material tracked onto public streets will be removed as necessary using a street sweeper with a water supply. Dump trucks hauling material from the site will be covered with tarpaulin. These BMPs will be implemented during the rainy and non-rainy seasons as needed.

Petroleum Products. Construction equipment will require use of diesel fuel and oil on a regular basis. While a potential exists for spills or leaks, all onsite vehicles will be monitored for leaks and receive regular preventive maintenance to ensure proper operation and reduce the chance of leakage. No "topping off' of fuel tanks will be allowed to further reduce the possibility of spills.

Petroleum products will be stored in clearly labeled and tightly sealed containers or tanks. Any asphalt used on site will be applied according to the manufacturer's recommendations. Any soil impacted by fuel or oil spills will be removed and disposed of by the contractor at an approved disposal site. It will be the contractor's responsibility to ensure that secondary containment around fuel/oil tanks (stationary or mobile) will meet the minimum requirements of EPA 40 CFR Part 112 with regard to secondary containment or more stringent state requirements, if applicable. Any spills will be contained and cleaned up immediately.

Sanitary Wastes. A licensed sanitary waste management contractor will collect all construction or temporary sanitary wastes from the portable units. The units will be maintained on a regular basis. Portable units shall be placed on a flat area at least 50 feet from streets or drain inlets. Portable units shall be anchored to prevent blowing or tipping over and all leaks or spills shall be reported immediately (sampling may be required).

Hazardous Wastes. Potentially hazardous waste associated with construction of the project will be limited to small quantities of liquids and solids such as lubricating oils, acids for equipment cleanup, concrete curing compounds, and waste paint. These wastes are typical of industrial construction activities and will be placed in containers on site and disposed of in accordance with applicable laws, regulations, regulations, and standards and with the manufacturer's recommendations. Hazardous wastes will be either recycled or disposed of in a licensed Class I disposal facility, as appropriate. Waste oil and used oil filters will be recycled if the maintenance activities will take place on site. Waste generated during each chemical cleaning operation will be temporarily stored on site in portable tanks and disposed of off site by the chemical cleaning contractor at an appropriate disposal facility. Site personnel will be instructed of these procedures and the contractor's site manager will be responsible for implementing these practices.

To prevent contact of hazardous wastes with stormwater runoff, secondary containment will be provided, such as curbs and berms. As much as possible, all materials will be kept in a dry covered area.

Paints. All containers will be tightly sealed and properly stored to prevent leaks or spills. Excess paint will not be discharged to the stormwater system. Unused paints will be disposed of in labeled original containers according to applicable local, state, and federal laws and regulations. Spray painting will not occur on windy or rainy days, and a drop cloth will be used to collect and dispose of drips associated with painting activities. All paints will be mixed indoors, in a containment area. If using water-based paints, equipment will be cleaned in a sink that is connected to the sanitary sewer.

Concrete Trucks. Concrete trucks will not be allowed to discharge surplus concrete and drum wash at the site, unless these materials are fully contained in an engineered structure that can contain all free liquid until dry. Dried concrete shall then be removed and disposed of at an offsite location. Alternatively, concrete washout will be taken off site for disposal by the concrete contractor. No surplus concrete or drum wash water will be disposed of onto the ground surface.

Waste Materials. All construction waste material, trash, and construction debris will be collected and stored in a metal dumpster, leased from a licensed solid waste management contractor. The dumpster will meet all local and state solid waste management regulations. The dumpster will be emptied a minimum of twice per week or more often if necessary, and the trash will be hauled to the local dump. No construction waste will be buried on site. All site personnel will be instructed regarding the correct procedure for waste disposal. The site manager will be responsible for seeing that these procedures are followed. All dumpsters will be covered, where possible.

Allowable Non-stormwater Discharges. The following sources of non-stormwater discharges may be combined with stormwater discharges from project construction activities:

- Pavement wash waters and dust control water not containing toxic or hazardous substances
- Uncontaminated dewatering discharges
- Firefighting waters
- Vegetation watering
- Potable or spring water discharges

Good Housekeeping. Good housekeeping practices are designed to maintain a clean and orderly work environment. The good housekeeping practices listed below will be followed to reduce the risk of potential pollutants entering stormwater discharges. All construction personnel will be responsible for monitoring and maintaining housekeeping tasks and reporting potential problems to the contractor’s site manager:

- Store only enough products required for doing the job.

- Store all materials in a neat and orderly manner in the appropriate containers. Materials that may adversely impact stormwater, such as paint, oils, greases, sealers, etc., will be stored in covered areas such as temporary/permanent buildings or trailers, in accordance with the SWPPP.
- Keep products in the original container with the original manufacturer's label.
- Do not mix products unless recommended by the manufacturer.
- Use all of a product before disposing of the container.
- Use and dispose of products according to the contractor's site manager's direction or manufacturer's recommendations.
- Perform regular inspections of the stormwater system and the material storage areas.
- When and where appropriate, use posters, bulletin boards, or meetings to remind and inform construction personnel of required procedures.
- Preventive maintenance includes regular inspection and maintenance of structural stormwater controls (catch basins, oil/water separators, etc.) as well as other facility equipment and systems.

Storage areas for hazardous materials such as oils, greases, paints, fuels, and chemicals will be provided with secondary containment to ensure that spills in these areas do not reach stormwater. All hazardous chemical storage areas will be surrounded by curbs or dikes to contain the chemicals in the event of leaks or spills. The Contractor shall establish contingencies for the proper disposal of contaminated soils (use of licensed hauler, approved landfill) early in the construction period. Secondary containment will be designed to hold the entire contents of the largest single storage container plus rainfall from a 50-year, 24-hour storm for all outdoor storage areas. Curbs and dikes will be provided around all chemical storage areas, hazardous waste products, areas with possibility of oil spill, and washout areas.

Spills and leaks are one of the largest potential sources of stormwater pollutants at industrial facilities. Chemicals will be stored in chemical storage facilities appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors in aboveground storage tanks. Other chemicals will be stored and used in their delivery containers. All hazardous chemical storage areas will be surrounded by curbs or dikes to contain the chemicals in the event of leaks or spills. Secondary containment will be sized to hold the entire contents of the largest single storage tank. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains. Containment areas for bulk storage tanks will not be drained. Any chemical spills in these areas will be removed with portable equipment and reused or disposed of properly. It is anticipated that all substances will be applied/dispensed at manufacturer's recommendations.

In addition to the housekeeping and hazardous materials storage procedures described, spill prevention and cleanup practices will be as follows:

- NCPA's site manager or appointee is responsible for informing construction personnel of the manufacturer's recommended spill cleanup methods, and the location of that information and cleanup supplies.
- Materials and equipment for the cleanup of a relatively small spill will be kept in the materials storage area. These facilities may include brooms, rags, gloves, shovels, goggles, sand, sawdust, absorbent, plastic or metal trash containers, and protective clothing.
- All containers will be labeled, tightly sealed, and stacked or stored neatly and securely.

Spill response procedures will be as follows:

- Step 1: Upon discovery of a spill, stop the source of the spill.
- Step 2: Cease all spill material transfer until the release is stopped and waste removed from the spill site.
- Step 3: Initiate containment to prevent spill from reaching State waters.
- Step 4: Notify supervisor and NCPA's site manager of the spill.
- Step 5: NCPA's site manager will immediately notify the NCPA emergency coordinator, and coordinate further cleanup activities
- Step 6: Any significant spill of hazardous material will be reported to the appropriate state and/or local agencies by NCPA personnel or qualified contractors. Table 7 lists the project's environmental emergency contacts.
- Step 7: Review the construction SWPPP and amend, if needed. Record a description of the spill, cause, and cleanup measures taken.

Inspection, Maintenance, and Recordkeeping Procedures. Site inspection and facility maintenance are important features of an effective stormwater management system. The Contractor's qualified personnel will inspect disturbed areas of the site that have not been stabilized, storage areas exposed to precipitation, all control measures, and site access areas to determine if the control measures and stormwater management system are effective in preventing significant impacts to receiving waters.

Inspections will be performed during the non-rainy season once every 2 weeks. Maintenance shall be performed as necessary.

TABLE 7
Environmental Emergency Telephone List

Company/Organization	Telephone Numbers
Northern California Power Company (During Construction)	
Primary Facility Emergency Coordinator: Ed Warner, Manager	(209) 333-6370
24-Hour Telephone Number: NCPA Dispatch	(916) 786-3518
Alternate Facility Emergency Coordinator: Michael DeBortoli, Principal Engineer	(209) 333-6370
NCPA Environmental Specialist: Andrea Grenier NCPA Media Representative: Ed Warner NCPA Headquarters Telephone Operator	(916) 780-1171 (209) 333-6370 (916) 781-3636
Northern California Power Company (During Operation)	
Primary Facility Emergency Coordinator: Ed Warner, Manager	(209) 333-6370
24-Hour Telephone Number: NCPA Dispatch	(209) 333-6373
Alternate Facility Emergency Coordinator: Jeremy Lawson, O&M Supervisor	(209) 333-6370
NCPA Environmental Specialist: Onsite Employee NCPA Media Representative: Ed Warner NCPA Headquarters Telephone Operator	(209) 333-6370 (209) 333-6370 (916) 781-3636
Other Resources	
3E Company (MSDS by FAX): Chemtrec (emergency chemical information): Poison Control Center:	(800) 451-8346 (800) 424-9300 (800) 662-9886
Federal Agency	
U.S. Coast Guard/National Response Center:	(800) 424-8802
State Agencies	
California Office of Emergency Services (OES): California Department of Toxic Substances Control (DTSC)*: California Department of Fish and Game*: California State Lands Commission: Regional Water Quality Control Board*:	(800) 852-7550 (800) 852-7550 (800) 852-7550 (562) 590-5201 (800) 852-7550
Local Contacts	
Administering Agency – San Joaquin Environmental Health Department: Fire – Woodbridge Fire District: Sheriff – Lodi Police Department: Hospital – Lodi Memorial Hospital: Ambulance/Paramedics:	(209) 468-3420 911 or (209) 369-1945 911 or (209) 333-6727 911 or (209) 334-3411 911

* DTSC, RWQCB and California Department of Fish and Game have requested that emergency notifications to these offices be made through the OES 800 number.

Inspections will be performed before and after storm events and once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or design changes as soon as feasible depending on field conditions. The discharger will complete an inspection checklist, which will include the following information:

- Inspection date
- Weather conditions
- A description of any inadequate BMPs
- List of observations of all BMPs
- Corrective actions required, including any changes to the DESCP
- Inspector name, title, and signature

Erosion and Sediment Controls. The following procedures will be used to maintain erosion and sedimentation controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- Sediment will be removed from the silt barriers when it has reached one-third of the height of the barrier.
- Silt barriers will be inspected for depth of accumulated sediment, tears, attachment to posts, and stability on a weekly basis.
- Aggregate-covered areas will be inspected for bare spots and washouts.
- The NCPA site manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from NCPA's site manager to properly inspect and maintain the controls in good working order.
- An inspection form will be completed after each inspection.
- The completed inspection forms will be retained on site.

Non-stormwater Controls. The following procedures will be used to maintain the non-stormwater controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- The designated inspector will visually observe all drainage areas for the presence of unauthorized non-stormwater discharges and their sources.
- If a spill occurs that cannot be cleaned up before the next rain event, or under other circumstances warranting sample collection, the designated inspector will collect

stormwater samples during the first two hours (including weekends or holidays) of discharge. Similarly, if it appears that BMPs have failed or been damaged to the extent that they could result in discharge of pollutants in stormwater, and are discharging potentially impacted water, samples should be collected. Sampling will also be performed in cases where stormwater comes in contact with exposed materials that could potentially contaminate stormwater runoff. The samples should be analyzed for visible and non-visible compounds with the analytical testing suite determined from the specific materials spilled or not contained properly, and for any constituents in the spill that occur in high enough concentrations to cause an impact to water quality.

- The NCPA site manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from NCPA's Site Manager to properly inspect and maintain the controls in good working order.
- An inspection form will be completed after each inspection.
- The completed inspection forms will be retained on site.

Recordkeeping. Two inspection forms will be completed demonstrating that inspections and maintenance of the control measures are implemented: Erosion and Sedimentation Controls, and Non-stormwater Source Controls. All disturbed areas and materials storage areas require inspection at least daily before and after storm events and once each 24-hour period during extended storm events. After each inspection, the inspector will complete an inspection report and retain a copy of the report. Any maintenance required will be initiated within 24 hours of the inspection.

A copy of this DESCP and any supporting materials must be maintained at the construction site from the date of CEC approval to the date of final stabilization. All records and supporting documents will be compiled in an orderly manner and maintained on site until final site stabilization is completed.

The generation of reports, as part of the construction process and inspection or amendment procedures, provides accurate records, which can be used to evaluate the effectiveness of this DESCP and document compliance. Changes in design or construction of the stormwater management system are documented and included with the DESCP to facilitate review or evaluation.

Post-construction Stormwater Management. Final erosion and sediment control measures for final stabilization or exposed soil will be in place prior to final sign-off of improvements. The following post-construction erosion and sediment control measures will be used at the site once all construction is complete:

- Seeding
- Hydroseeding
- Mulching
- Removal of debris from drain inlet bags
- Removal of temporary erosion sediment control measures
- Permanent turf on all unprotected soil surface
- Removal of temporary erosion and sediment control measures (if necessary)

J. References

Carlton Engineering. 2008. Preliminary Stormwater Pollution Prevention Plan (SWPPP) for NCPA Lodi Energy Center. Revised October 2008.

High Sierra RC&D Council. 1981. Erosion & Sediment Control Guidelines for Developing Areas of the Sierras

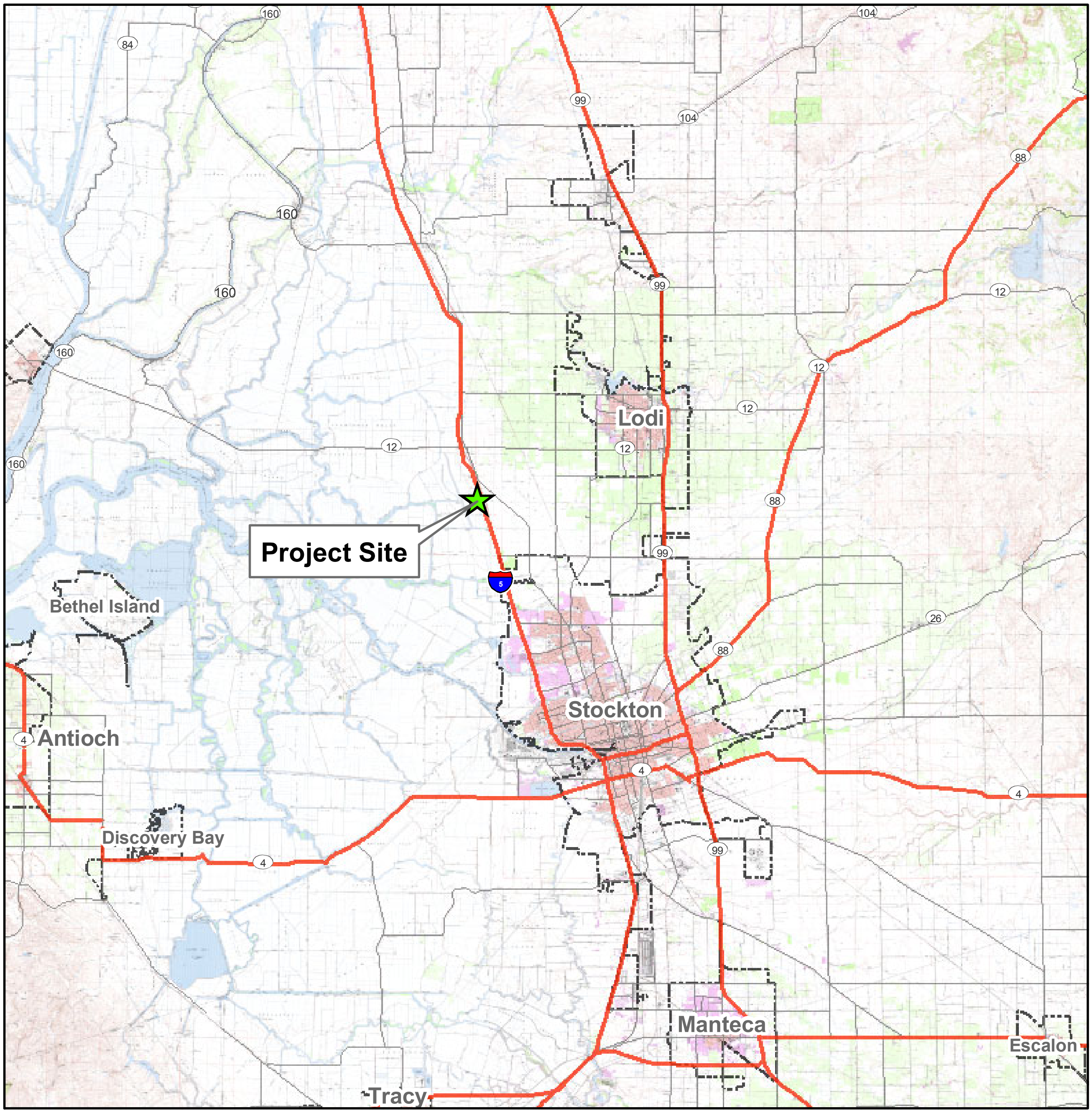
National Oceanic Atmospheric Administration (NOAA). Precipitation-Frequency Atlas of the Western (NOAA Atlas 2). Volume XI, California.

Soil Survey Staff. 2008. Official Soil Series Descriptions (Online). Available at http://soils.usda.gov/technical/classification/osd/index.html (verified June 17, 2008).

USDA-NRCS. 1992. Soil Survey of San Joaquin County, California. In cooperation with the Regents of the University of California (Agricultural Experiment Station) and the California Department of Conservation. October.

USDA-NRCS. 2008. Soil Survey Geographic (SSURGO) database for San Joaquin County, California [Online]. Available at http://soildatamart.nrcs.usda.gov (verified May 29, 2008).

Figures



LEGEND

Project Site

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Miles

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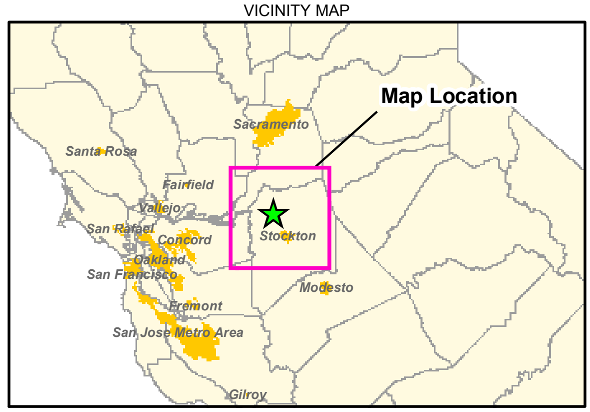
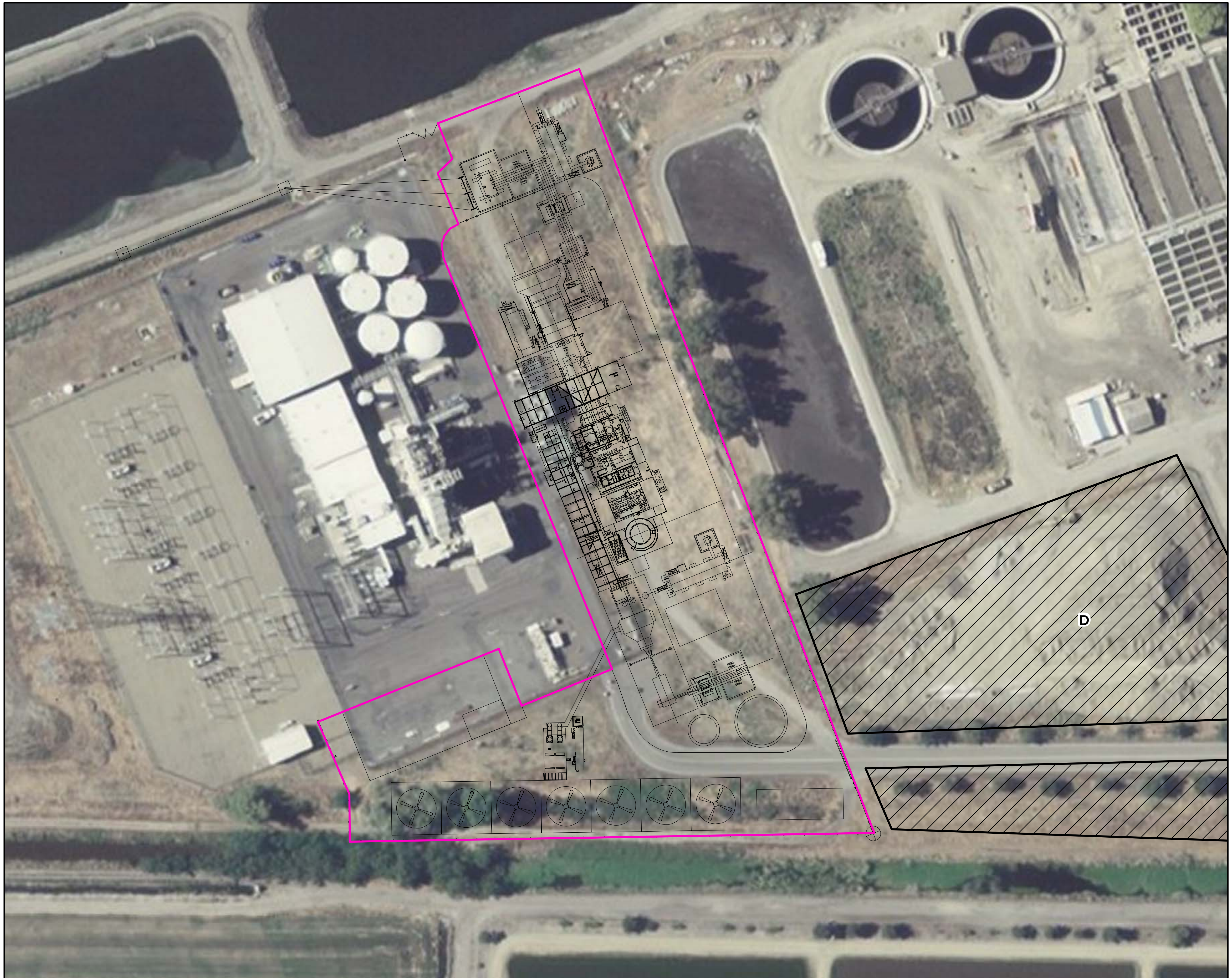
VICINITY MAP



This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 1
LOCATION MAP
LODI ENERGY CENTER
LODI, CALIFORNIA



LEGEND
General Layout
Proposed Laydown and/or Parking Areas
Proposed Plant Site

N

0 50 100
Feet

FIGURE 2A
VICINITY MAP
LODI ENERGY CENTER
LODI, CALIFORNIA

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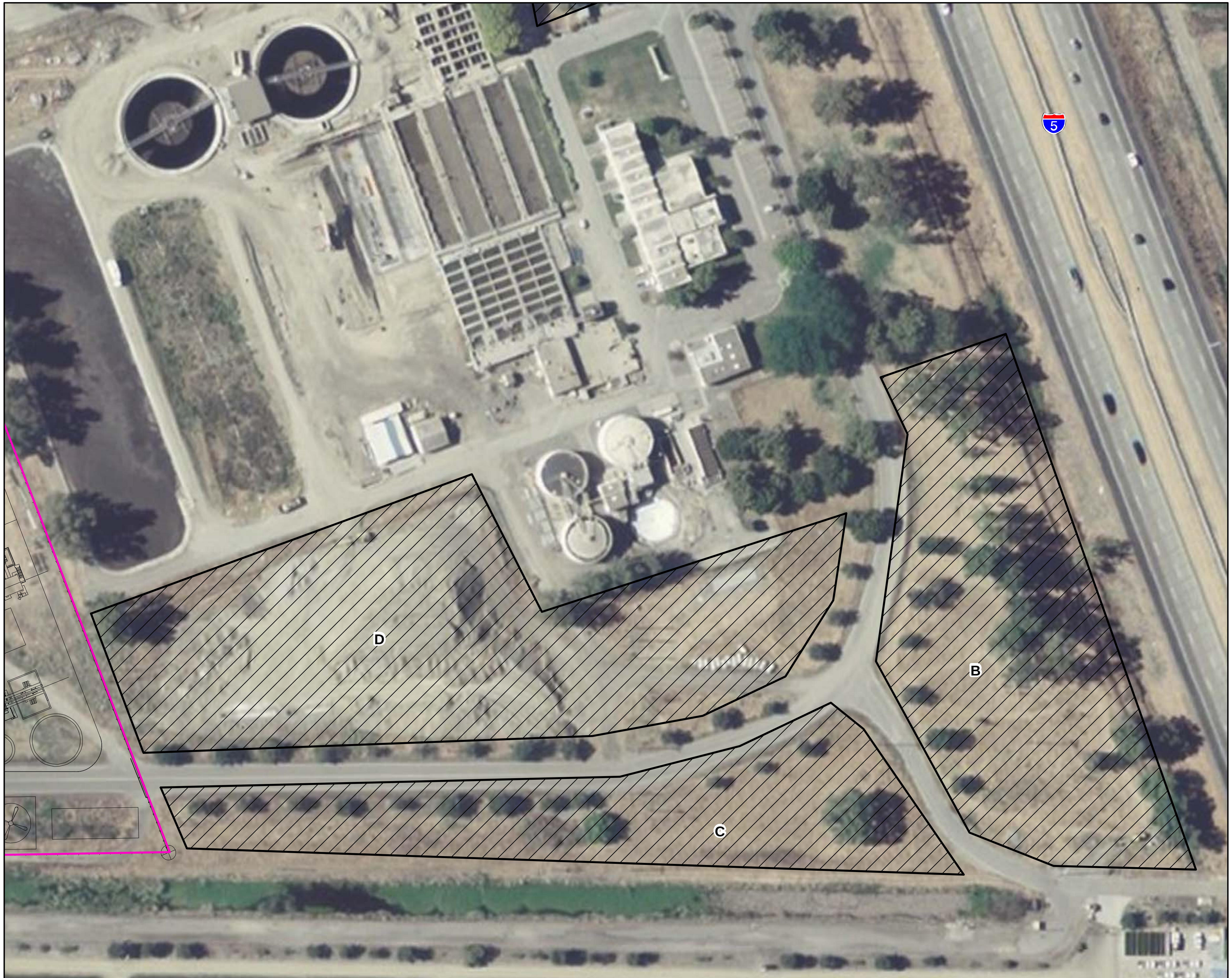

LEGEND

General Layout

Proposed Laydown and/or Parking Areas

Proposed Plant Site

FIGURE 2B
VICINITY MAP
LODI ENERGY CENTER
LODI, CALIFORNIA

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LEGEND

General Layout

Proposed Laydown and/or Parking Areas

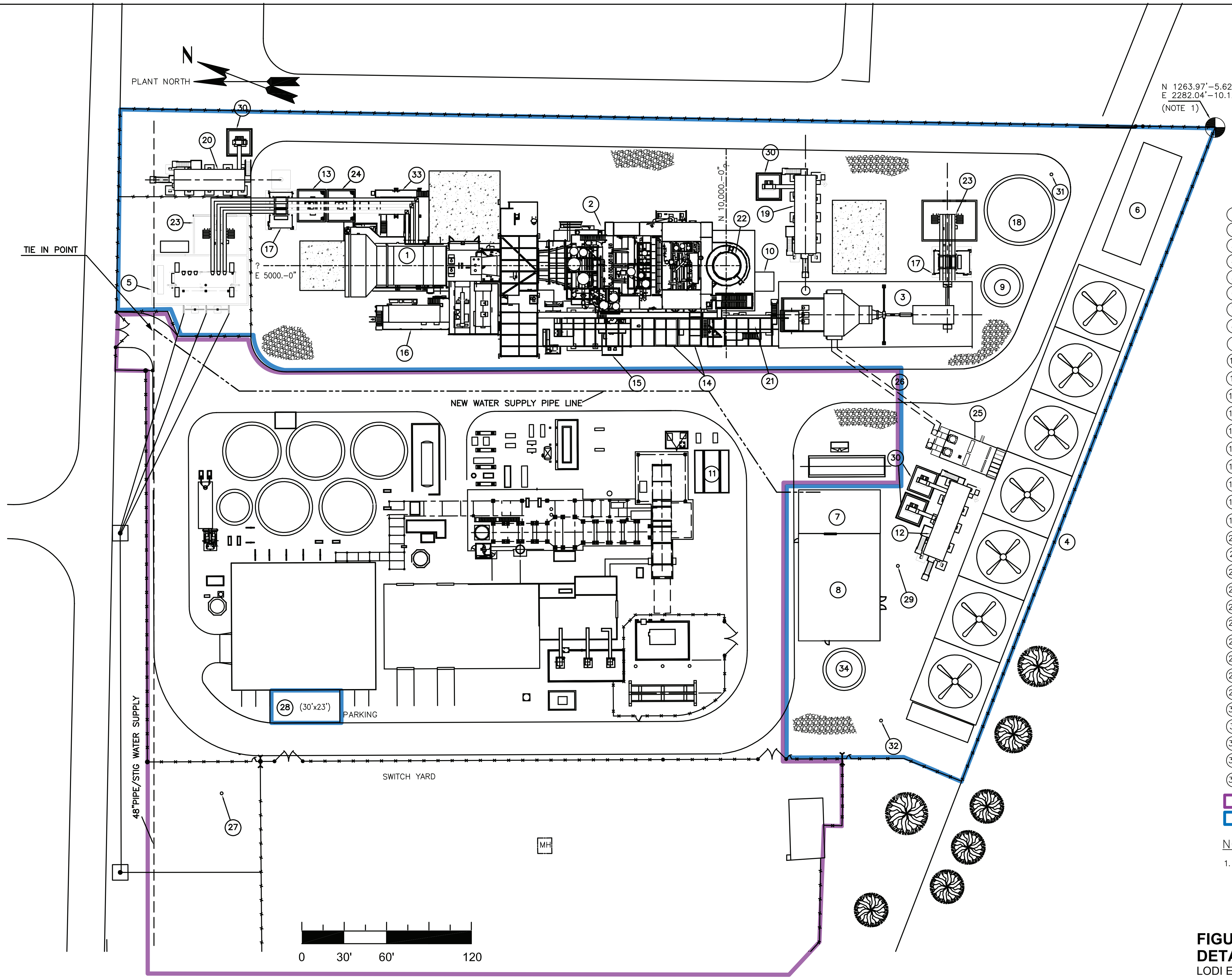
Proposed Plant Site

N

0 50 100

Feet

FIGURE 2C
VICINITY MAP
LODI ENERGY CENTER
LODI, CALIFORNIA



LEGEND:

1. COMBUSTION TURBINE/ GENERATOR
2. HRSG
3. STEAM TURBINE/ GENERATOR
4. COOLING TOWER
5. GSUT
6. GAS COMPRESSOR/METERING AREA
7. WATER TREATMENT BUILDING
8. COOLING TOWER CHEMICAL BLDG.
9. DEMIN. WATER TANK
10. CEMS
11. STIG PLANT COOLING TOWER
12. WT/CTWR PDC
13. LCI ISOLATION TRANSFORMER
14. BFP'S
15. BOILER BLOWDOWN TANK
16. PEECC
17. GEN. CIRCUIT BREAKER
18. FIRE/ RAW WATER TANK
19. STG PDC
20. CTG PDC
21. HRSG PDC
22. STACK
23. UNIT AUX. TRANSFORMER
24. EXCITATION TRANSFORMER
25. COOLING WATER PUMP STRUCTURE
26. U/G COOLING WATER PIPING
27. EXISTING INJECTION WELL
28. NCPA WAREHOUSE
29. POTABLE WATER WELL
30. SUS TRANSFORMER
31. REPLACEMENT WELL (FUTURE)
32. INJECTION WELL HEAD
33. LCI/GENERATOR EXCITMENT COMPARTMENT
34. WASTE WATER STORAGE TANK

EXISTING STIG PLANT AND SWITCHYARD

LEC PROJECT

NOTES

1. COORDINATES DEPICTED REFLECT STACK CENTERLINE.

FIGURE 3
DETAILED SITE PLAN
LODI ENERGY CENTER
LODI, CALIFORNIA

Source: Worley Parsons LTD, Drawing LODI-0-SK-111-007-001C, 08-28-08

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LEGEND

Proposed Lay Down and/or Parking

Notes:
1. Area of interest subject to change.

0 50 100
Feet

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FIGURE 4A
DETAILED SITE PLAN - LAYDOWN AREAS
LODI ENERGY CENTER
LODI, CALIFORINA

LEGEND

Proposed Lay Down and/or Parking

Notes:
1. Area of interest subject to change.

N

0 50 100
Feet

FIGURE 4B
DETAILED SITE PLAN - LAYDOWN AREAS
LODI ENERGY CENTER
LODI, CALIFORINA

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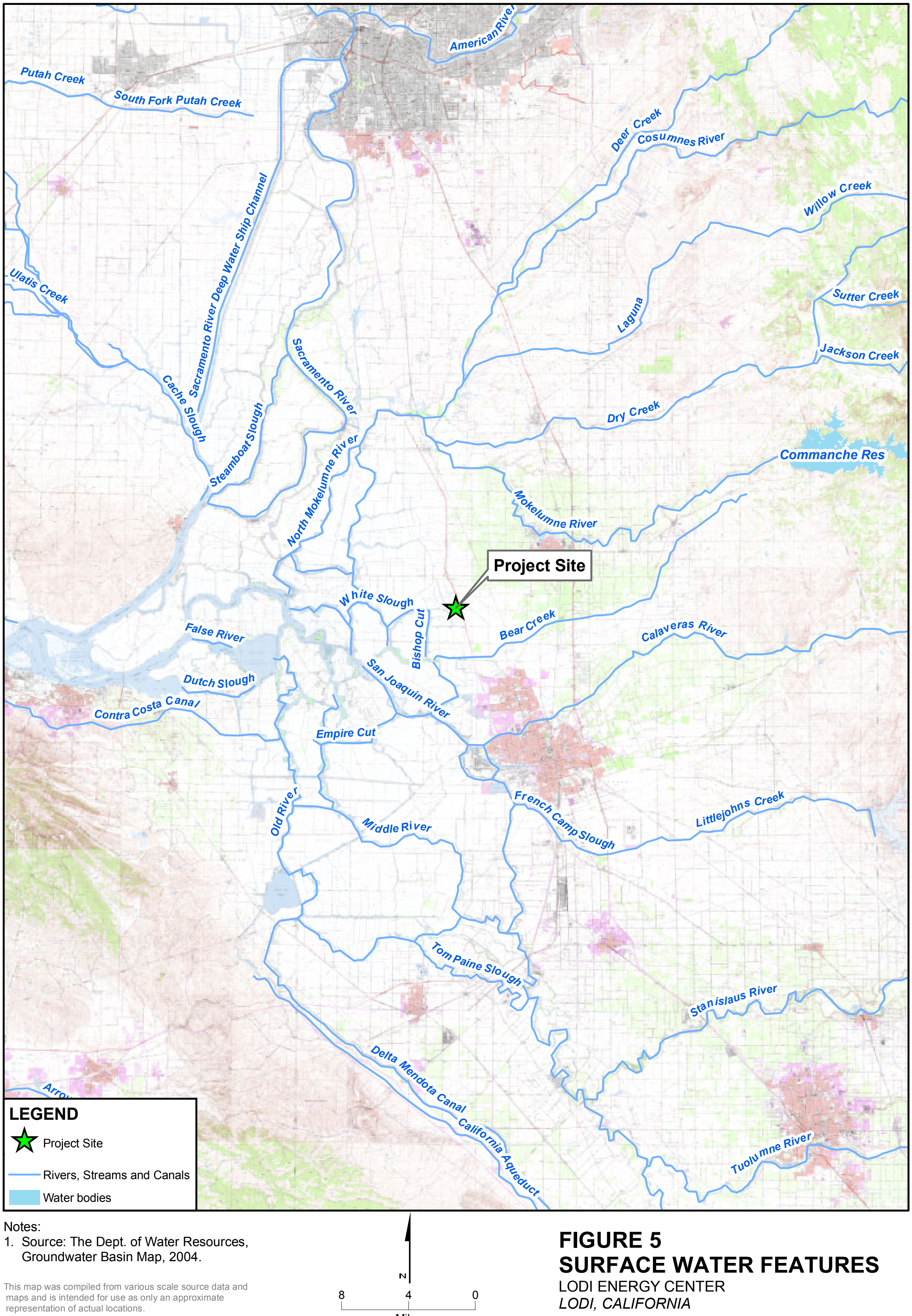

Notes:

1. Source: The Dept. of Water Resources, Groundwater Basin Map, 2004.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 5
SURFACE WATER FEATURES
LODI ENERGY CENTER
LODI, CALIFORNIA

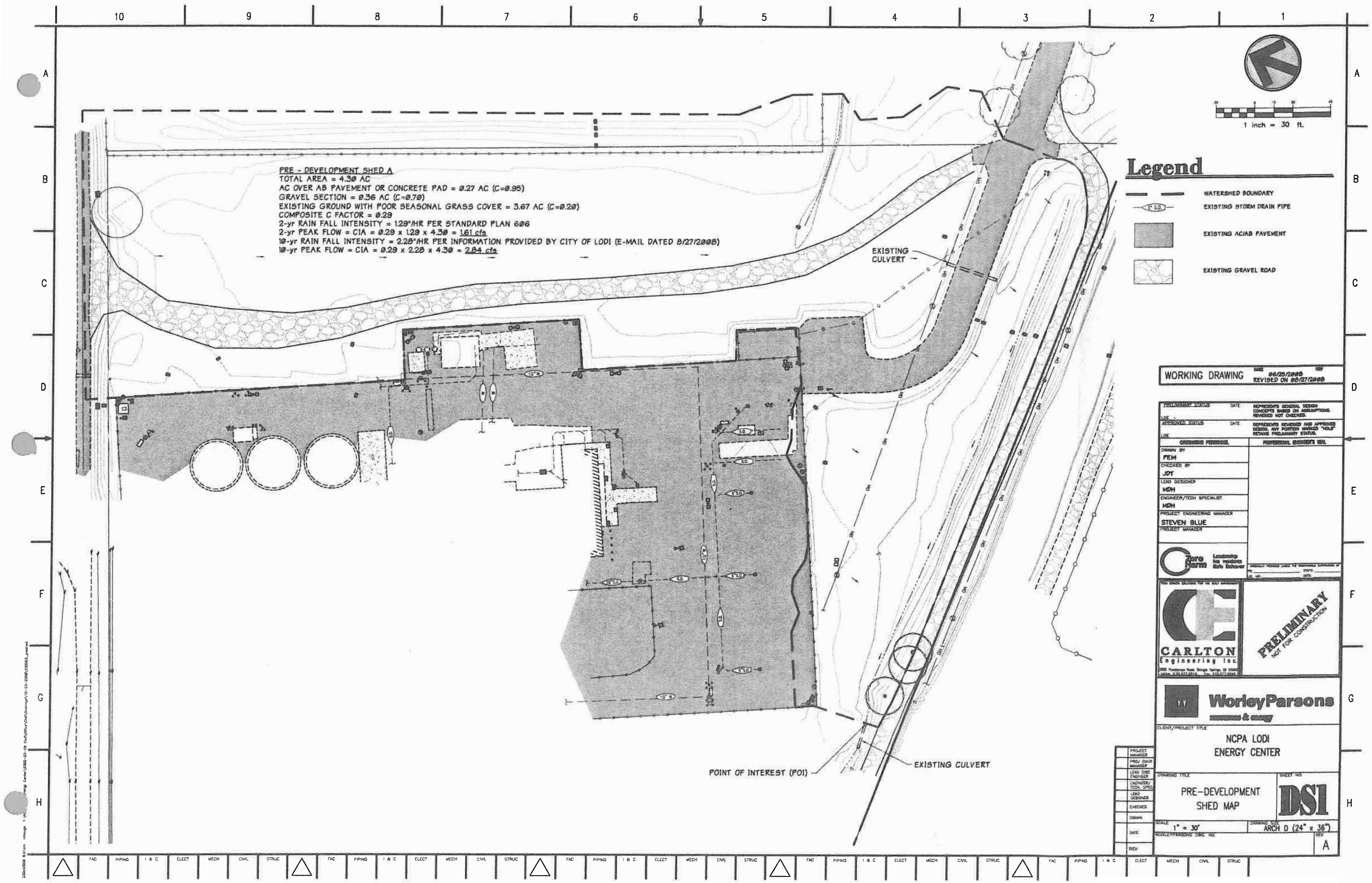

FIGURE 6
PRE-DEVELOPMENT SHED MAP
LODI ENERGY CENTER
LODI, CALIFORNIA

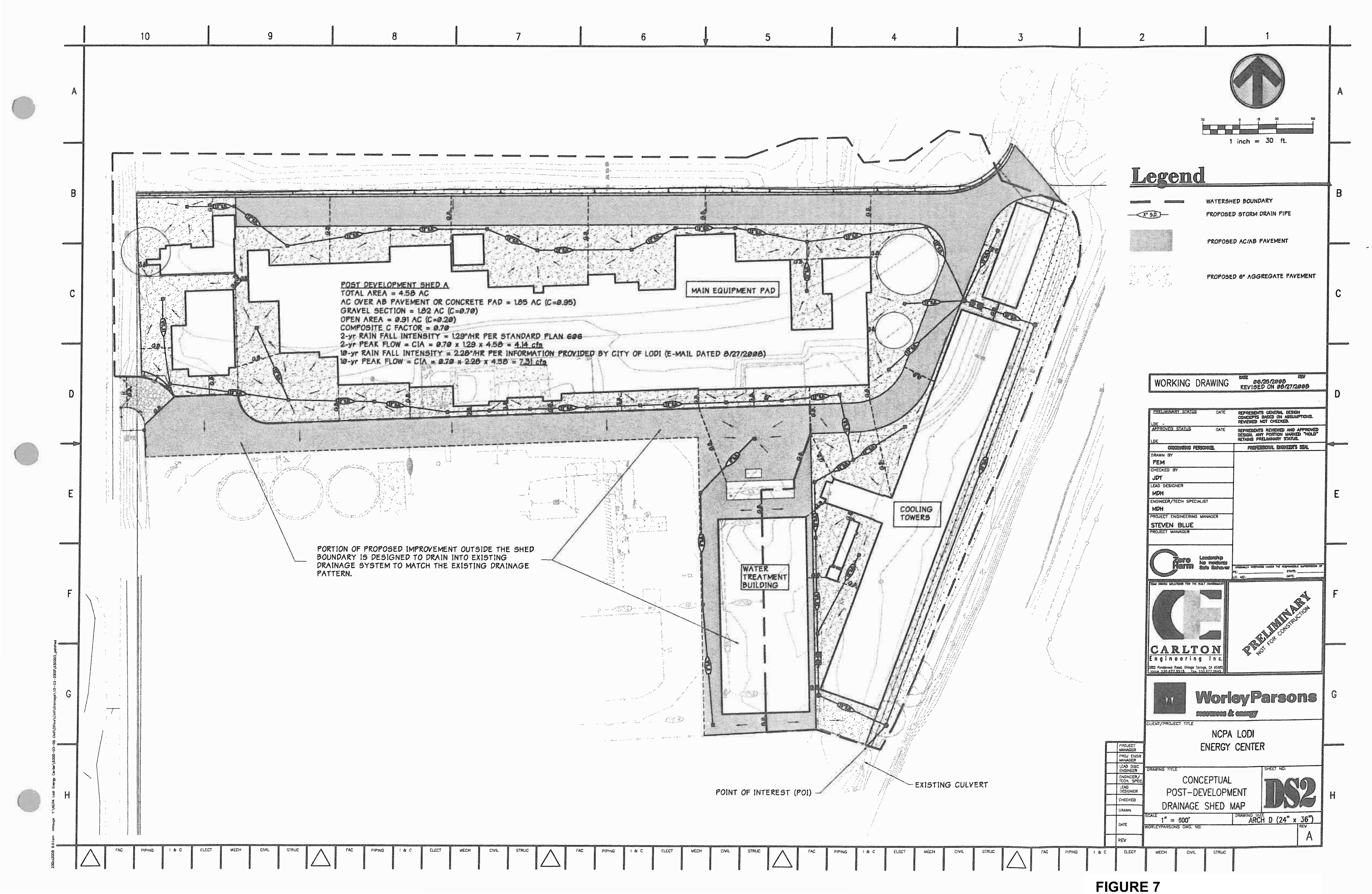

FIGURE 7
CONCEPTUAL POST-DEVELOPMENT DRAINAGE SHED MAP
LODI ENERGY CENTER
LODI, CALIFORNIA

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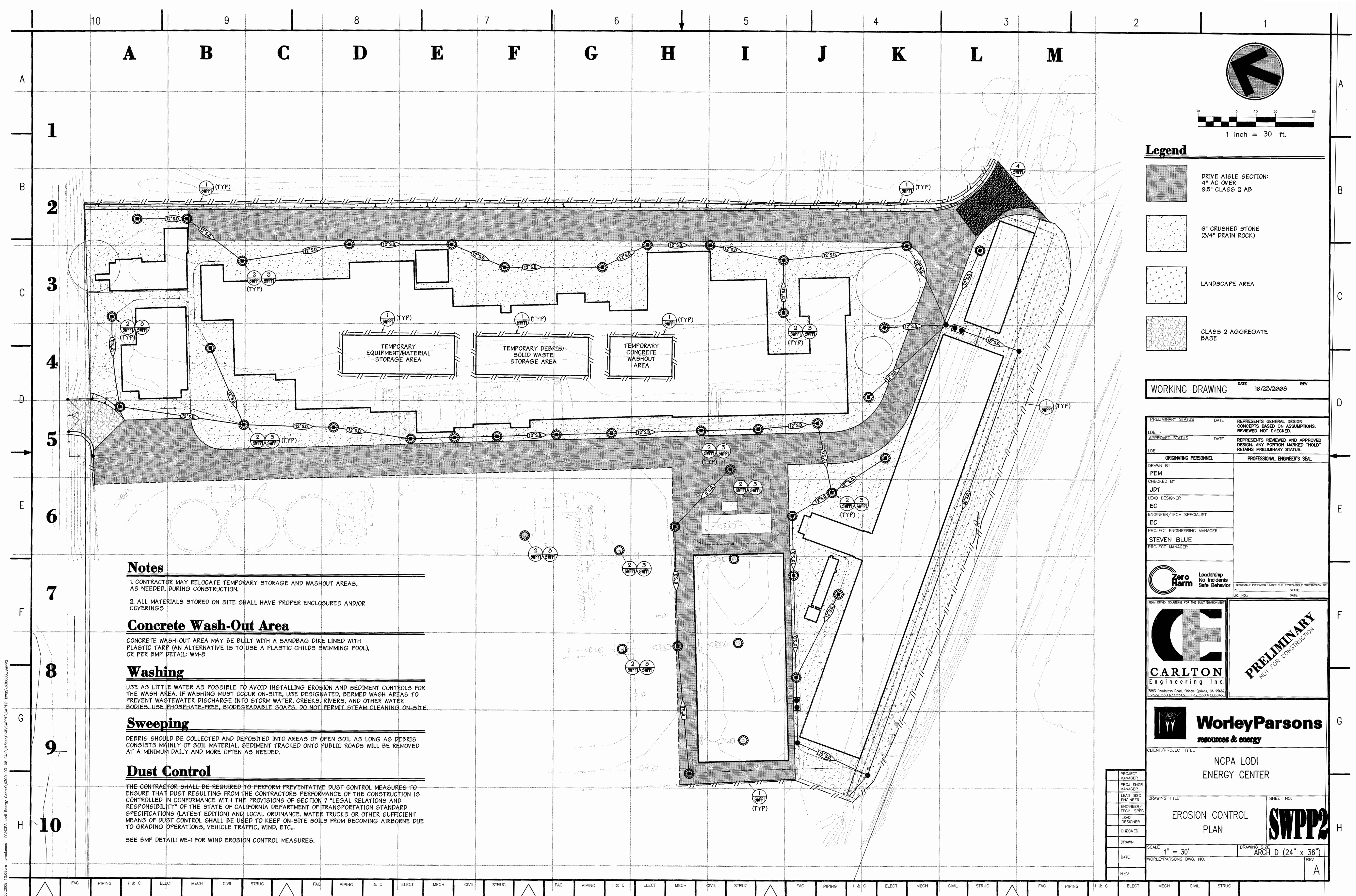


FIGURE 8
EROSION CONTROL PLAN
LODI ENERGY CENTER
LODI, CALIFORNIA

Erosion Control Requirements and Specifications

1. MINIMUM CONSTRUCTION SITE STORM WATER MANAGEMENT PRACTICES

THE STORM WATER MANAGEMENT PRACTICES DESCRIBED BELOW ARE THE MINIMUM, REQUIRED WATER QUALITY PROTECTION MEASURES APPLICABLE TO ALL CONSTRUCTION SITES WITHIN CITY OF LODI. THIS LISTING DOES NOT INCLUDE THE VARIOUS INSPECTION, RECORD KEEPING, TRAINING AND REPORTING REQUIREMENTS. ADDITIONALLY, THERE WILL BE INSTANCES WHERE PROJECT AND SITE CONDITIONS REQUIRE SUPPLEMENTING OR DEVIATING FROM THESE MINIMUM PROTECTION REQUIREMENTS. THE CONTRACTOR IS EXPECTED TO DEPLOY MEASURES SUFFICIENT TO ACHIEVE COMPLIANCE WITH THE CITY'S GRADING ORDINANCE: AND, AS APPLICABLE (PROJECTS WHICH INVOLVE ONE ACRE OR MORE OF DISTURBED SOIL OR ARE PART OF A LARGER COMMON PLAN OF DEVELOPMENT THAT ENCOMPASSES ONE ACRE OR MORE OF DISTURBED SOIL), WITH THE STATE WATER RESOURCES CONTROL BOARD'S (SWRCB) NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY.

A. SCHEDULING

CONSTRUCTION SHALL BE SCHEDULED TO MINIMIZE CONSTRUCTION ACTIVITIES IN "HIGH-RISK AREAS" AND THE AMOUNT OF ACTIVE DISTURBED SOIL AREAS, DURING THE RAINY SEASON (OCT. 15th TO MAY 1st). "HIGH-RISK AREAS" INCLUDE THOSE AREAS WITHIN 50 FEET OF USGS WATERCOURSES, 100-YEAR FLOOD PLAINS, REGULATED WETLANDS, AND WHERE SLOPES EXCEED 16%.

UNLESS SPECIFICALLY AUTHORIZED BY THE CITY'S ON-SITE REPRESENTATIVE, DURING THE RAINY SEASON THE CONTRACTOR SHALL NOT SCHEDULE CONSTRUCTION ACTIVITIES IN "HIGH RISK AREAS" OR SCHEDULE TO HAVE MORE THAN 5 ACRES OF ACTIVE DISTURBED SOIL AREA. WHERE PERMANENT STORM WATER TREATMENT DEVICES ARE TO BE CONSTRUCTED, THESE DEVICES SHOULD, WHENEVER FEASIBLE, BE CONSTRUCTED AS AN EARLY WORK ITEM.

B. PRESERVATION OF NATURAL FEATURES

PRIOR TO THE COMMENCEMENT OF SOIL-DISTURBING ACTIVITIES, AREAS OF EXISTING VEGETATION THAT ARE TO REMAIN AND ENVIRONMENTALLY SENSITIVE AREAS (I.E. WETLANDS, PROTECTED HABITATS, ETC) SHALL BE FENCED FOR PROTECTION. IN GENERAL, SITE DESIGNS SHALL PRESERVE EXISTING VEGETATION TO THE MAXIMUM EXTENT POSSIBLE: AND DURING CONSTRUCTION, EXISTING VEGETATION SHALL BE PRESERVED (AND PROTECTED BY FENCING) FOR AS LONG AS POSSIBLE TO MINIMIZE EROSION.

C. STORM WATER RUN-ON AND CONCENTRATED FLOWS

EXISTING WATERCOURSES SHALL BE PROTECTED: AND IF DIVERTED, HANDLED IN A NON-ERODING FASHION. TO THE EXTENT FEASIBLE, ALL CONCENTRATED WATER FLOWS SHALL BE CHANNELED AWAY FROM DISTURBED SOIL AREAS / STOCKPILES. CONCENTRATED WATER FLOWS SHALL BE CONVEYED IN A NON-ERODING FASHION.

D. STOCKPILE MANAGEMENT

STOCKPILES SHALL BE MANAGED AS FOLLOWS:

1. SOIL STOCKPILES
   RAINY SEASON:
   - COVERED, OR PROTECTED WITH SOIL STABILIZATION MEASURES & PERIMETER SEDIMENT BARRIERS.
   NON-RAINY SEASON:
   - COVERED OR PROTECTED WITH PERIMETER SEDIMENT BARRIERS.
2. CONCRETE / ASPHALT RUBBLE, ROCK AND AGGREGATE BASE / SUB-BASE
   - COVERED OR PROTECTED WITH PERIMETER SEDIMENT BARRIERS
3. "COLD MIX" ASPHALT
   - COVERED

E. SEDIMENT TRACKING CONTROL

APPROPRIATE MEASURES SHALL BE DEPLOYED TO MINIMIZE THE TRACKING OF SEDIMENT OFF-SITE BY VEHICLES AND/OR EQUIPMENT. THESE MEASURES INCLUDE STABILIZED CONSTRUCTION ENTRANCES/EXITS & ROADWAYS, AND TIRE WASHING. WHERE TRACKING OCCURS, STREETS SHALL BE SWEPT USING A PICKUP SWEEPER WITH WATER SUPPLY.

F. NON-STORM WATER MANAGEMENT

NON-STORM WATER DISCHARGES SHALL BE MINIMIZED TO THE EXTENT FEASIBLE. SEDIMENT-LADEN NON-STORM WATER IS REQUIRED TO BE FILTERED (OR EQUIVALENT TREATMENT) PRIOR TO DISCHARGING. MEASURES REQUIRED TO MANAGE NON-STORM WATER DISCHARGES INCLUDE: WATER CONSERVATION PRACTICES, DUST CONTROL, MATERIAL STORAGE PRACTICES, VEHICLE/EQUIPMENT OPERATION AND MAINTENANCE REQUIREMENTS, WASTE MANAGEMENT PRACTICES, AND SPILL PREVENTION / CONTROL MEASURES.

G. DISTURBED SOIL AREA MANAGEMENT

DISTURBED SOIL AREAS (DSA) SHALL BE PROTECTED WITH AN "EFFECTIVE COMBINATION" OF MEASURES INCLUDING SOIL STABILIZATION, SEDIMENT BARRIERS AND BASINS / TRAPS. THERE MAY BE SITUATIONS WHERE "SEDIMENT BASINS" OR "TREATMENT" ARE ABLE TO SUBSTITUTE AS ALTERNATIVE CONTROL MEASURES TO THE NORMALLY REQUIRED "EFFECTIVE COMBINATION" OF SOIL STABILIZATION, SEDIMENT BARRIERS AND BASINS / TRAPS. HOWEVER, WHEN SUBSTITUTING THESE MEASURES, THE CONTRACTOR MUST BE PREPARED TO DEMONSTRATE THAT THE SEDIMENT LOAD WITHIN STORM WATER DISCHARGES FROM THE CONSTRUCTION SITE DOES NOT EXCEED NATURAL OR PRE-CONSTRUCTION LEVELS.

1. SOIL STABILIZATION MEASURES INCLUDE:
   - HYDRAULIC MULCH (REF. CASQA BMP # EC-3)
   - HYDROSEEDING (REF. CASQA BMP # EC-4)
   - SUITABLY STABILIZED, NON-POLLUTING STRAW / WOOD / ORGANIC MULCH (REF. CASQA BMP #'s EC-6 & EC-8)
   - GEOTEXTILES, MATS, PLASTIC COVERS AND EROSION CONTROL BLANKETS (REF. CASQA BMP # EC-7)
   - STABILIZED CONSTRUCTION ROADWAYS (REF. CASQA BMP # TC-2)
2. SEDIMENT BARRIERS INCLUDE:
   - SILT FENCES (REF. CASQA BMP # SE-1)
   - SAND / GRAVEL BAG BARRIERS (REF. CASQA BMP #'S SE-6 & SE-8)
   - STRAW BALE BARRIERS (REF. CASQA BMP # SE-9)
   - FIBER ROLLS (REF. CASQA BMP # SE-5)
3. BASIN / TRAPS INCLUDE:
   - DESILTING BASINS (REF. CALTRANS BMPS)
   - SEDIMENT TRAPS (REF. CALTRANS BMPS)
4. ON DSAs WITH SLOPE LENGTHS GREATER THAN 10 FEET, THE FOLLOWING MEASURES SHALL BE DEPLOYED:
   a. RAINY SEASON (OCT. 15TH TO MAY 1ST):
   - NON-ACTIVE AREAS (NO SOIL DISTURBING ACTIVITIES FOR 21 OR MORE DAYS)
     * ON SLOPES EQUAL TO OR FLATTER THAN 1:20 (V/H), SOIL STABILIZATION
     * ON SLOPES STEEPER THAN 1:20 (V/H), SOIL STABILIZATION AND SEDIMENT BARRIERS
   - ACTIVE AREAS
     * ON SLOPES STEEPER THAN 1:20 (V/H), SEDIMENT BARRIERS
     * ON SLOPES STEEPER THAN 1:2 (V/H) WITH SLOPE LENGTHS GREATER THAN 50 FEET: SOIL STABILIZATION: SEDIMENT BARRIERS: AND WHERE FEASIBLE, BASINS / TRAPS

   b. NON-RAINY SEASON:
   - NON-ACTIVE AREAS (NO SOIL DISTURBING ACTIVITIES FOR 21 OR MORE DAYS)
     * ON SLOPES STEEPER THAN 1:2 (V/H), SEDIMENT BARRIERS.
5. GENERAL:

PROTECTION SHALL BE DEPLOYED ON NON-ACTIVE DSAs WITHIN 14 DAYS FROM THE CESSATION OF SOIL-DISTURBING ACTIVITIES OR ONE DAY PRIOR TO THE PREDICTED (40% OR MORE CHANCE) ONSET OF SIGNIFICANT PRECIPITATION, WHICHEVER OCCURS FIRST. PROTECTION SHALL BE DEPLOYED ON ACTIVE DSAs PRIOR TO THE PREDICTED (40% OR MORE CHANCE) ONSET OF SIGNIFICANT PRECIPITATION.

"TERRACES." FOR CUT SLOPES UP TO 60 FEET IN HEIGHT, TERRACES AT LEAST 8 FEET (2.4 METERS) IN WIDTH SHALL BE ESTABLISHED AT NOT MORE THAN 30-FOOT (9.1 METERS) VERTICAL INTERVALS ON ALL CUT SLOPES TO CONTROL SURFACE DRAINAGE AND DEBRIS EXCEPT THAT WHERE ONLY ONE TERRACE IS REQUIRED, IT SHALL BE AT MIDHEIGHT. FOR CUT SLOPES GREATER THAN 60 FEET (18 METERS) AND UP TO 120 FEET (37 METERS) IN VERTICAL HEIGHT, ONE ADDITIONAL TERRACE AT APPROXIMATELY MIDHEIGHT SHALL BE 12 FEET (3.6 METERS) IN WIDTH. TERRACES SHALL SLOPE A MINIMUM OF 5 PERCENT GRADIENT TOWARD THE HILLSIDE. TERRACE WIDTHS AND SPACING FOR CUT SLOPES GREATER THAN 120 FEET (36 METERS) IN HEIGHT SHALL BE DESIGNED BY THE CIVIL ENGINEER AND APPROVED BY THE DIRECTOR. SUITABLE ACCESS SHALL BE PROVIDED TO PERMIT PROPER CLEANING AND MAINTENANCE.

"SEDIMENT BASIN:" A BASIN WITH A CAPACITY EQUIVALENT TO AT LEAST 3600 CUBIC FEET OF STORAGE (AS MEASURED FROM THE BOTTOM OF THE BASIN TO THE PRINCIPAL OUTLET) PER ACRE DRAINING INTO THE BASIN. THE LENGTH OF THE BASIN SHALL BE MORE THAN TWICE THE BASIN'S WIDTH (LENGTH IS DETERMINED BY MEASURING THE DISTANCE BETWEEN THE INLET AND THE OUTLET). THE DEPTH OF THE BASIN MUST NOT BE LESS THAN THREE FEET NOR GREATER THAN FIVE FEET.

"TREATMENT": A COMBINATION OF BASIN AND TREATMENT ENGINEERED TO CAPTURE AND TREAT (TO REMOVE 0.01 MM SIZED PARTICLES AND LARGER) THE 10-YEAR, 6-HOUR RAIN EVENT USING $Q=CxIxA$ WHERE $C=0.5$ AND I RANGES FROM 0.14 TO 1.29.

DETAILED REFERENCES:

1. CALIFORNIA STORM WATER QUALITY ASSOCIATION (CASQA) "CONSTRUCTION HANDBOOK", JANUARY 2003. ERRATA SEPTEMBER 2004. AVAILABLE ON-LINE AT: HTTP://WWW.CABMPHANDBOOKS.COM/
2. CALTRANS "STATEWIDE STORM WATER QUALITY PRACTICE GUIDELINES", APRIL 2003. AVAILABLE ON-LINE AT: HTTP://WWW.DOT.CA.GOV/HQ/ENV/STORMWATER/SPECIAL/NEWSETUP/INDEX.HTM

CRITICAL AREA PLANTING CONSTRUCTION SPECIFICATIONS (JANUARY 2006)

A. SCOPE
ESTABLISHING VEGETATION ON SEVERELY ERODING AREAS OR AREAS WITH AN EROSION POTENTIAL. ITS PURPOSE IS TO STABILIZE THE SOIL, MINIMIZE OR PREVENT DAMAGE FROM SEDIMENT AND RUNOFF TO DOWNSTREAM AREAS, PROTECT WILDLIFE HABITAT, AND MAINTAIN AESTHETIC QUALITIES.

B. AREAS TO BE SEEDED, TIMING OF SEEDING
COMPLETE REVEGITATION AND STABILIZATION OF ALL DISTURBED SOILS, BOTH WITHIN AND OUTSIDE COUNTY RIGHT-OF-WAY, WILL BE ACCOMPLISHED WITH SPECIFIED AMOUNTS AND TYPES OF VEGETATIVE SPECIES, MULCH, AND FERTILIZER MATERIAL. SEE MAJOR LAND RESOURCE AREA EXHIBITS MLRA 18 OR 22.

ALL EROSION AND SEDIMENT CONTROL PRACTICES PERFORMED AFTER OCTOBER 15, SHALL FOLLOW "RAINY SEASON" SPECIFICATION CONTAINED IN THE STORM WATER MANAGEMENT PRACTICES.

C. MATERIAL

1. SEED - ALL SEED SHALL BE DELIVERED TO THE SITE TAGGED AND LABELED IN ACCORDANCE WITH THE CALIFORNIA AGRICULTURAL CODE AND SHALL BE ACCEPTABLE TO THE COUNTY AGRICULTURAL COMMISSIONER.

SEED SHALL BE OF A QUALITY WHICH HAS A MINIMUM PURE LIVE SEED CONTENT OF 80% (% PURITY X % GERMINATION) AND WEED SEED SHALL NOT EXCEED 0.5% OF THE AGGREGATE OF PURE LIVE SEED AND OTHER MATERIALS. LEGUME SEED SHALL BE INOCULATED WITH INOCULATE SPECIFIC TO ITS NEEDS WITHIN TWO HOURS PRIOR TO SEEDING. INOCULANTS SHALL NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER OR AS OTHERWISE SPECIFIED. ALL INOCULATED SEED SHALL BE LABELED TO SHOW WEIGHT OF SEED, THE DATE OF INOCULATION, AND THE WEIGHT AND SOURCE OF INOCULANT MATERIALS.

2. FERTILIZER - A COMMERCIAL FERTILIZER SHALL BE AMMONIUM PHOSPHATE AND CONTAIN A MINIMUM OF 16% NITROGEN, 20% PHOSPHORUS, AND 0% POTASH, UNIFORM IN COMPOSITION, DRY AND FREE FLOWING, PELLETED OR GRANULAR.

ALL FERTILIZER SHALL BE DELIVERED IN UNBROKEN OR UNOPENED CONTAINERS, LABELED IN ACCORDANCE WITH APPLICABLE STATE REGULATIONS AND BEARING THE WARRANTY OF THE PRODUCER FOR THE GRADE FURNISHED.

3. MULCH - MULCH SHALL BE ONE OF THE FOLLOWING MATERIALS AS APPROVED BY THE GOVERNMENT REPRESENTATIVE.

4. STRAW - STRAW SHALL BE NEW STRAW DERIVED FROM RICE, WHEAT, OATS, OR BARLEY, AND BE FREE OF MOLD AND NOXIOUS WEED SEED. STRAW SHALL BE FURNISHED IN AIR DRY BALES. EVIDENCE SHALL BE FURNISHED THAT CLEARANCE HAS BEEN OBTAINED FROM THE COUNTY AGRICULTURAL COMMISSIONER, AS REQUIRED BY LAW, BEFORE STRAW OBTAINED FROM OUTSIDE THE COUNTY IN WHICH IT IS TO BE USED IS DELIVERED TO THE SITE OF THE WORK.

5. WOOD FIBER MULCH - WOOD FIBER MULCH IS A WOOD CELLULOSE FIBER THAT CONTAINS NO GERMINATION OR GROWTH INHIBITING FACTORS. IT IS COLORED WITH A NON-TOXIC, WATER SOLUBLE, GREEN DYE TO PROVIDE A PROPER GAUGE FOR METERING OVER GROUND SURFACES. IT HAS THE PROPERTY TO BE EVENLY DISPERSED AND SUSPENDED WHEN AGITATED IN WATER.

D. SEEDING REQUIREMENTS

1. GENERAL - ALL SEEDING, FERTILIZER AND MULCHING OPERATIONS SHALL BEGIN WHEN APPROVAL IS GIVEN BY THE APPROPRIATE COUNTY ENGINEER OR CONSERVATION DISTRICT REPRESENTATIVE.

2. SEEDBED PREPARATION - THE ENTIRE AREA TO BE SEEDED SHALL BE REASONABLY SMOOTH AND CONFORM TO THE DESIRED SHAPE BEFORE ACTUAL SEEDBED PREPARATION IS BEGUN. ANY DEBRIS WHICH WOULD INTERFERE WITH SEEDING OPERATIONS GROWTH OR MAINTENANCE OF THE VEGETATIVE COVER WILL BE REMOVED. THE AREA TO BE SEEDED SHALL HAVE A FIRM SEEDBED WHICH HAS PREVIOUSLY BEEN ROUGHENED BY SCARIFYING, DISKING, HARROWING, CHISELING, OR OTHERWISE WORKED TO A DEPTH OF TWO TO FOUR INCHES (2" - 4"). NO IMPLEMENT SHALL BE USED THAT WILL CREATE AN EXCESSIVE AMOUNT OF DOWNWARD MOVEMENT OF SOIL OR CLODS OF SLOPING AREAS. SEEDBED MAY BE PREPARED AT TIME OF COMPLETION OF EARTH-MOVING WORK.

3. FERTILIZING - FERTILIZER SHALL BE DISTRIBUTED UNIFORMLY OVER THE SEEDBED AT THE RATE OF 300 POUNDS PER ACRE, AND SHALL BE IN SUCH PHYSICAL CONDITION TO INSURE UNIFORM APPLICATION OVER THE AREA TO BE FERTILIZED. FERTILIZER MAY BE APPLIED IN ANY WAY THAT WILL RESULT IN UNIFORM DISTRIBUTION. THE FERTILIZER SHALL BE INCORPORATED INTO THE SOIL.

4. SEEDING - SEED SHALL BE BROADCAST BY HAND, MECHANICAL HAND SEEDER, POWER OPERATED SEEDER, HYDROSEEDER OR OTHER APPROVED EQUIPMENT. SEED SHALL HAVE A SOIL COVER OF NOT MORE THAN ONE-HALF INCH. SEEDING WILL BE CARRIED OUT USING EITHER OF THE FOLLOWING METHODS:

METHOD 1 THE SEED MAY BE DRILLED, NOT TO EXCEED ONE-HALF (1/2) INCH DEEP AND CULTIPACKED OR ROLLED ONCE OVER WITH A CORRUGATED ROLLER ON ALL AREAS WHERE EQUIPMENT CAN BE OPERATED SAFELY. SEED OPERATIONS WILL BE ACROSS THE SLOPE.

METHOD 2 THE SEED MAY BE APPLIED IN A SLURRY MIX OF WOOD CELLULOSE FIBER DISTRIBUTED UNIFORMLY AT THE PRESCRIBED RATE. THE APPLICATION UNIT USED FOR "HYDRO MULCH" SHALL BE EQUIPPED WITH AN AGITATOR TO MAINTAIN THE SEED AND MULCH IN SUSPENSION WITHIN THE UNIT'S TANK PRIOR TO AND DURING APPLICATION.

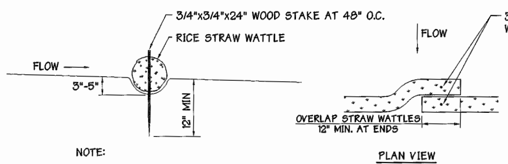
METHOD 3 WHERE EMERGENCY TREATMENT OF EXPOSED SOILS EXTENDS BEYOND OCTOBER 15, EMERGENCY MULCHING WITHOUT SEED WILL BE PRESCRIBED IN ACCORDANCE WITH "SOIL STABILIZATION MEASURES" DESCRIBED PREVIOUSLY.

SPECIAL NOTE: A MINIMUM 70% SEED GERMINATION WITH AT LEAST 1" GROWTH MUST BE OBTAINED BY DECEMBER 1ST, OR AREA MUST BE COVERED WITH STRAW MULCH.

SEED MIX

TIME PERIOD / MULCH TYPE	METHOD	TYPE OF SEED	AMOUNT/TYPE PER ACRE	PER 1000 SqFt
15 SEP - 15 OCT STRAW OR WOOD FIBER	HYDROSEED	BLANDO BROME AND EITHER WIMERRA '62' OR ANNUAL RYE GRASS	12 lbs/acre 9 lbs/acre	0.3 lbs/1000 SqFt 0.2 lbs/1000 SqFt
15 SEP - 15 OCT STRAW OR WOOD FIBER	BROADCASTED	BLANDO BROME AND ROSE CLOVER	12 lbs/acre 9 lbs/acre	0.3 lbs/1000 SqFt 0.2 lbs/1000 SqFt
16 OCT - 14 SEP STRAW ONLY	HYDROSEED	BLANDO BROME AND EITHER WIMERRA '62' OR ANNUAL RYE GRASS	24 lbs/acre 18 lbs/acre	0.6 lbs/1000 SqFt 0.4 lbs/1000 SqFt
16 OCT - 14 SEP STRAW ONLY	BROADCASTED	BLANDO BROME AND ROSE CLOVER	24 lbs/acre 18 lbs/acre	0.6 lbs/1000 SqFt 0.4 lbs/1000 SqFt

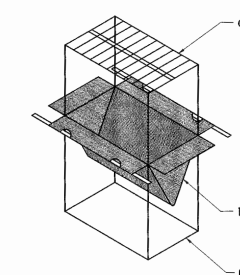
A MULCH COVERING SHALL BE APPLIED OVER THE SURFACE OF THE SEEDED AREA. MULCHING SHALL FOLLOW IMMEDIATELY AFTER SEEDING UNLESS OTHERWISE DIRECTED. MULCH WILL BE OF MATERIAL INDICATED.



NOTE:

STRAW WATTLES SHALL BE MANUFACTURED FROM RICE STRAW AND BE WRAPPED IN A TUBULAR BLACK PLASTIC NETTING. THE NETTING SHALL HAVE A STRAND THICKNESS OF 0.30 INCH, AND A KNOT THICKNESS OF 0.055 AND A WEIGHT OF 0.35 OUNCE PER FOOT (EACH ± 10%) AND SHALL BE MADE FROM 85% HIGH DENSITY POLYETHYLENE, 14% ETHYL VINYL ACETATE AND 1% COLOR FOR UV INHIBITION. STRAW WATTLE SHALL BE NINE INCHES IN DIAMETER (± 1"), BE TWENTY-FIVE FEET LONG (± 6") AND WEIGH APPROX 30 POUNDS (± 3LBS)

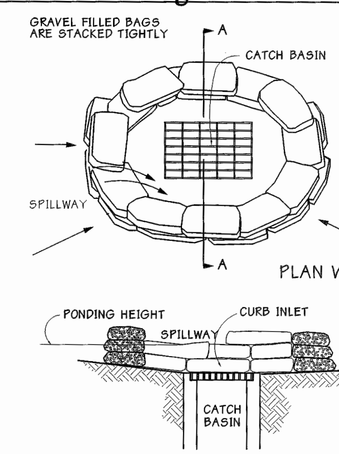
Straw Wattle Detail NTS 1



NOTES:

1. REMOVE DRAIN GRATE.
2. INSERT CATCH BASIN FILTER (DANDY BAG II BY DANDY PRODUCTS OR EQUAL) INTO BASIN LEAVING 3" FLAP EXPOSED.
3. REPLACE GRATE TO BASIN THEREBY PINCHING FABRIC BETWEEN GRATE AND CATCH BASIN AND HOLDING FILTER IN PLACE.
4. CONTRACTOR RESPONSIBLE TO INSPECT FILTERS WEEKLY AND AFTER EACH RAIN EVENT. EMPTY CATCH BASIN FILTERS WHEN HALF FULL. DISPOSE OF TRAPPED SEDIMENT IN ACCORDANCE WITH LOCAL REQUIREMENTS. CLEAN AND REUSE FILTERS IF POSSIBLE, DISCARD AND REPLACE AS NECESSARY.

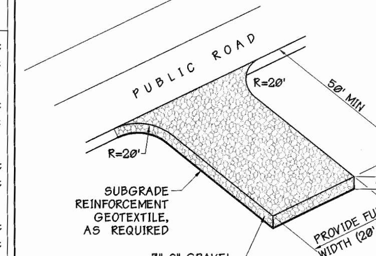
Inlet Filterbag NTS 2



SECTION A - A

1. PLACE CURB TYPE SEDIMENT BARRIERS ON GENTLY SLOPING STREET SEGMENTS WHERE WATER CAN POND AND ALLOW SEDIMENT TO SEPARATE FROM RUNOFF.
2. BAGS, OF EITHER BURLAP OR WOVEN GEOTEXTILE FABRIC, ARE FILLED WITH GRAVEL, LAYERED AND PACKED TIGHTLY.
3. LEAVE ONE SANDBAG GAP IN THE TOP ROW TO PROVIDE A SPILLWAY FOR OVERFLOW.
4. INSPECT BARRIERS AND REMOVE SEDIMENT AFTER EACH STORM EVENT. SEDIMENT AND GRAVEL MUST BE REMOVED FROM THE TRAVELED WAY IMMEDIATELY.

Bags At Drainage Inlets NTS 3



1. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE USED AT ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS.
2. THE ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.
3. CONSTRUCT ENTRANCE ON LEVEL GROUND
4. PERIODIC TOP DRESSING WITH ADDITIONAL ROCK SHALL BE PROVIDED TO INSURE THE INTEGRITY OF THE ENTRANCE DURING CONSTRUCTION.
5. THE ENTRANCE SHALL BE INSPECTED MONTHLY AND AFTER EACH RAINFALL.
6. REPLACE ROCK MATERIAL WHEN SURFACE VOIDS ARE VISIBLE.
7. ALL SEDIMENT DEPOSITS ON PAVED ROADWAYS SHALL BE REMOVED WITHIN 24 HOURS
8. THE FRACTURED ROCK AND GEOTEXTILE SHALL BE REMOVED AT COMPLETION OF CONSTRUCTION.

Stabalized Constuction Entrance NTS 4

WORKING DRAWING DATE 10/23/2008 REV

PRELIMINARY STATUS DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
LDE

APPROVED STATUS DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE

ORIGINATING PERSONNEL	
DRAWN BY	PEM
CHECKED BY	JDT
LEAD DESIGNER	EC
ENGINEER/TECH SPECIALIST	EC
PROJECT ENGINEERING MANAGER	STEVEN BLUE
PROJECT MANAGER	

PROFESSIONAL ENGINEER'S SEAL

Zero Harm — Leadership, No Incidents, Safe Behavior

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: STATE:
LIC. NO.: DATE:

TEAM DRIVEN SOLUTIONS FOR THE BUILT ENVIRONMENT
CARLTON Engineering Inc.
3883 Ponderosa Road, Shingle Springs, CA 95682
Voice 530.677.5515 Fax 530.677.6645

PRELIMINARY
NOT FOR CONSTRUCTION

WorleyParsons
resources & energy

CLIENT/PROJECT TITLE: NCPA LODI ENERGY CENTER

DRAWING TITLE: EROSION CONTROL NOTES AND DETAILS

SHEET NO: SWPPI

SCALE: N/A
DRAWING SIZE: ARCH D (24" x 36")
WORLEYPARSONS DWG. NO.
REV: A

PROJECT MANAGER | PROJ ENGR MANAGER | LEAD DISC ENGINEER | ENGINEER/TECH. SPEC | LEAD DESIGNER | CHECKED | DRAWN | DATE | REV

FAC | PIPING | I & C | ELECT | MECH | CIVIL | STRUC

23Oct2008 10:08am pmckenna Y:\NCPA Lodi Energy Center\6300-03-08 Civil\Office\Civil\SWPPP\SWPPP DWGS\630003_SWPP1

FIGURE 9
EROSION CONTROL NOTES AND DETAILS
LODI ENERGY CENTER
LODI, CALIFORNIA

LEGEND

General Layout

Proposed Laydown and/or Parking Areas

Construction Containment BMPs

Straw Wattle

Tracking Control

Post-Construction BMPs

Hydroseed

N

0 50 100

Feet

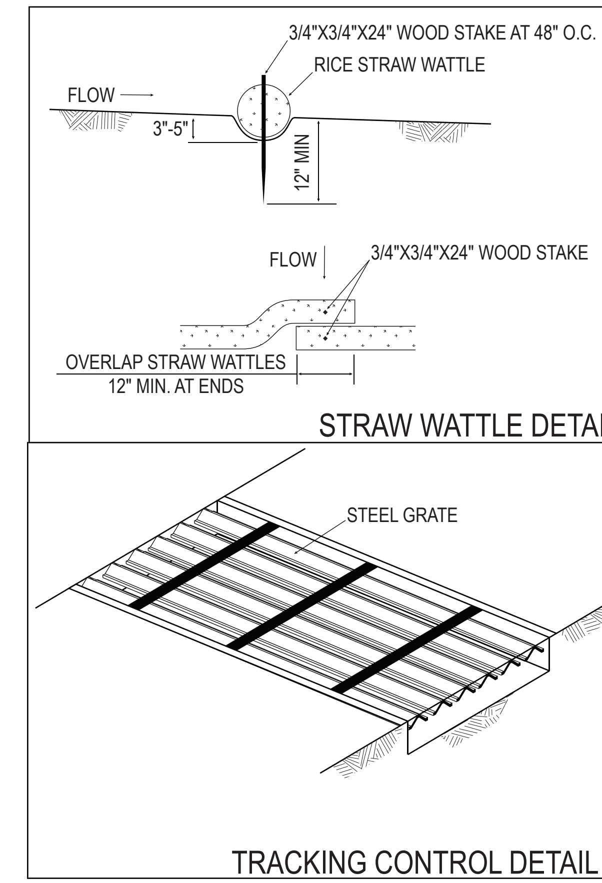


FIGURE 10A
LAYDOWN BMP MAP
DESCP
LODI ENERGY CENTER
LODI, CALIFORNIA

CH2MHILL

LEGEND

- General Layout
- Proposed Laydown and/or Parking Areas
- Proposed Plant

Construction Containment BMPs

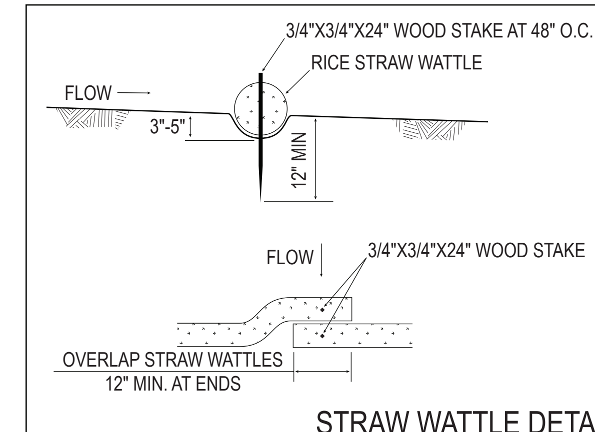
- Straw Wattle
- Tracking Control
- Silt Fence

Post-Construction BMPs

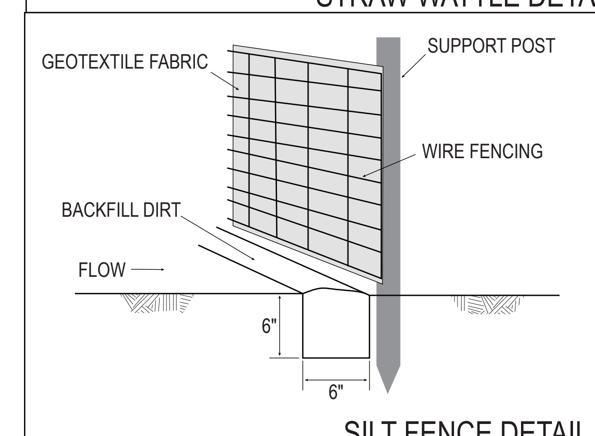
- Hydroseed

N

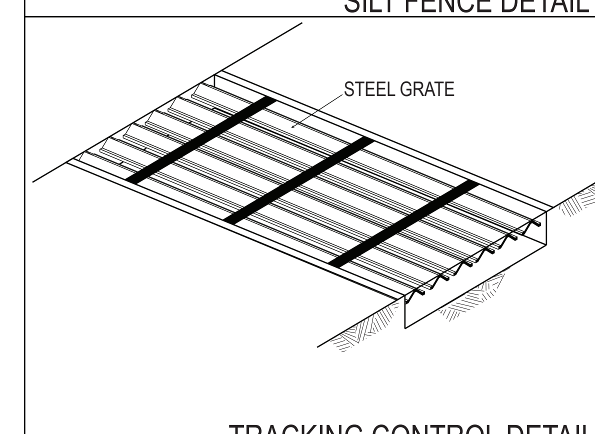
0 50 100
Feet



STRAW WATTLE DETAIL



SILT FENCE DETAIL



TRACKING CONTROL DETAIL

FIGURE 10B
LAYDOWN BMP MAP
DESCP
LODI ENERGY CENTER
LODI, CALIFORNIA

CH2MHILL

Appendix
Preliminary Drainage Study

PRELIMINARY DRAINAGE STUDY

For the proposed
NCPA – Lodi Energy Center
Lodi, CA

Project No. 6300-03-08
June 2008
Revised October 2008

Prepared for:
WorleyParsons
2330 East Bidwell
Folsom, CA 95630

CARLTON
Engineering Inc.

I. PROJECT INTRODUCTION

The project site is located on 12751 North Thornton Road, west of Highway 5 in Lodi, CA (see Appendix for Vicinity Map). The property has no frontage along North Thornton Road. A private dirt road extending from North Thornton Road provides access to the site (under Highway 5). The project site is bounded by the existing White Slough Water Pollution Control Plan to the north, south and east, and the existing Phase I development of NCPA Lodi Energy Center facility to the west.

The proposed development is located at the southern portion of the parcel, APN 055-130-16 in San Joaquin County. Of the 162-acre parcel, only approximately five acres will be affected by the proposed project improvements.

The existing buildings and majority of the equipment for the Phase I development are to remain. A portion of the existing equipment and underground utilities serving the existing facility will be relocated. New building and equipment will be constructed on the site. The improvements will include a variety of above ground equipment, cooling towers, associated roadway for access, underground utilities and at least one building that will be used for water treatment.

II. OBJECTIVE

This report outlines the existing and proposed hydraulic and hydrologic conditions associated with the proposed improvements. The information and calculations presented in this report follow the requirements of the City of Lodi through use of the rational method outlined in the "City of Lodi Design Standards – City of Lodi Department of Public Works," May 1991. Pre-development and Post-development drainage peak flows are to be determined and compared to establish whether onsite drainage detention is necessary according to the City's requirements.

III. HYDROLOGY

The hydrologic analysis was performed and analyzed with rational method as set forth in the Section 3 of the City of Lodi Design Standards. The runoff coefficient, C, for the pavement and open area are based on the recommendation from the City's Design Standards. A runoff coefficient for the crushed stone gravel is assumed to be 0.70. Rainfall intensity, "I," which is associated with the time of concentration, "T_c", was obtained from the City of Lodi Standard Plan 606 (see Appendix).

Runoff from the project site is primarily drained via a proposed underground storm drain system. Components of the drainage system include drain inlets, storm drain pipes, oversize storm drain pipe for detention and concrete storm drain manhole with weir and orifice used as a flow control structure. The proposed storm system is designed to connect to the existing culvert at the southwest corner of the project site (point of interest – see Shed Map DS-1 and DS-2 in Appendix). The design of each component takes into account the worst-case scenario, including pipe slope and runoff velocity.

A. PRE-CONSTRUCTION (EXISTING) CONDITIONS

The project site is currently a mainly open dirt area covered with moderate amount of seasonal grass and weed. The pre-construction high point of the site is located along the northern project boundary with an elevation of approximately 12.0 feet along the existing dirt road. The site then gradually flows towards the south into a depressed area with an approximate elevation of 5.0 feet. The depressed area is bisected by an existing paved access road for the existing facility. An existing culvert allows the runoff from the northern depressed area flow to the southern depressed area into a natural drainage swale along the southern project boundary (at approximate elevation of 3.5 feet to 4.0 feet). The low point of the site is located at an approximate elevation of 3.5 feet at the existing culvert at the southwest corner of the project site. Storm water runoff is assumed to exit the site via the existing culvert at the southwest corner of the project site (Point of Interest, as indicated on DS1).

The existing watershed area is depicted on "Pre-Development Drainage Shed Map - DS1" in Appendix. A composite runoff coefficient was computed with the assumption of a runoff coefficient of 0.7 for the crushed stone gravel area, 0.95 for asphaltic concrete pavement/concrete pad area and 0.20 for open area per recommendation from the City of Lodi Design Standards. The total peak runoff generated by the pre-development shed area is determined to be 1.41cfs, and the calculation is demonstrated on Shed Map - DS-1.

B. POST-CONSTRUCTION CONDITIONS

Proposed improvements to the site during construction includes removal of a portion of the existing asphaltic concrete pavement area and replace it with new asphalt pavement or crushed stone gravel, relocation of various equipment and underground utilities, construction of a new underground storm drain system and construction of concrete foundations for the new plant equipment.

The post-construction high point of the site is planned to be along the northern project boundary at an elevation of approximately 8.75 feet. The average site elevation after construction of the new facility is completed will be approximately 8.0 feet. In general, storm drain runoff is designed to drain from north to south.

Two series of drain inlets and pipes are planned on both sides of the main equipment foundation. The rainwater runoff will flow to the proposed drain inlets along the top of the compacted sub-base under the crush stone gravel. The grate of the drain inlets are set at 6" below the gravel finished pavement elevation to collect the runoff from the foundation sub-base. The proposed drive aisle along the west side of the main equipment foundation is designed to drain towards west into the existing drainage system. The edge of pavement between the asphaltic concrete pavement and the crushed stone gravel acts as a grade break. It is designed to be consistent with the existing drainage pattern.

The area surrounding the water treatment building is proposed to be paved with asphaltic concrete pavement and designed to drain north into the existing storm drain system to match the existing condition. The existing underground storm drain system will be slightly modified to accommodate the proposed new construction.

A crushed stone gravel section surrounding the cooling towers pad is also proposed. Drain inlet grates are set at 6" below the gravel section finished grade elevation to drain runoff at the sub-base level. Two sand-oil interceptors are designed to connect to the proposed storm drain systems to provide water quality measure. These interceptors are located on both ends of the cooling tower.

An oversize underground storm drain pipe and a concrete manhole with weir and orifice are also proposed along the south face of the cooling tower as a storm drain detention system. The post-construction storm drain runoff is designed to exit the project site via the existing culvert at the (Point of Interest, see Shed Map DS-1 and DS-2 in Appendix) to match with the existing drainage pattern.

Proposed watershed area is depicted on "Post-Development Drainage Shed Map – DS2" in Appendix. A composite runoff coefficient is computed with the same criteria as stated in the "Pre-construction (Existing) Conditions" section above. The total peak runoff generated by the post-construction shed area is determined to be 4.14cfs, and the calculation is demonstrated on DS-2.

IV. HYDRAULICS

A. DESIGN STORM FREQUENCY

Per the City of Lodi Design Standards, the drainage system will be designed to convey a 2-year storm with the water surface elevation contained within all pipes.

B. DESIGN STORM DURATION

The goal in storm drain design is to convey the maximum peak flow for a given design storm. In this case, the time of concentration is assumed to be 10 minutes for both pre- and post-construction conditions per the City of Lodi Design Standards minimum allowed time of concentration.

C. MINOR LOSSES

A Manning's "n" value of 0.013 is used for the proposed pipes per City of Lodi Design Standard. The minor losses for the transitions, junctions, bends, entrances and exits have not been considered as no new drainage pipes are being proposed.

V. SUMMARY

The total Pre- and Post-construction storm water runoff capacity exiting the site has been calculated and is summarized in Table 1. Locations of storm drain pipe ands inlet structures are shown on the conceptual grading and drainage plans attached in the Appendix.

Table 1: Summary of Peak Flows

	2-Year Storm Runoff (cfs)	10-Year Storm Runoff (cfs)
Pre-Construction	**1.61**	**2.84**
Post-Construction	**4.14**	**7.31**

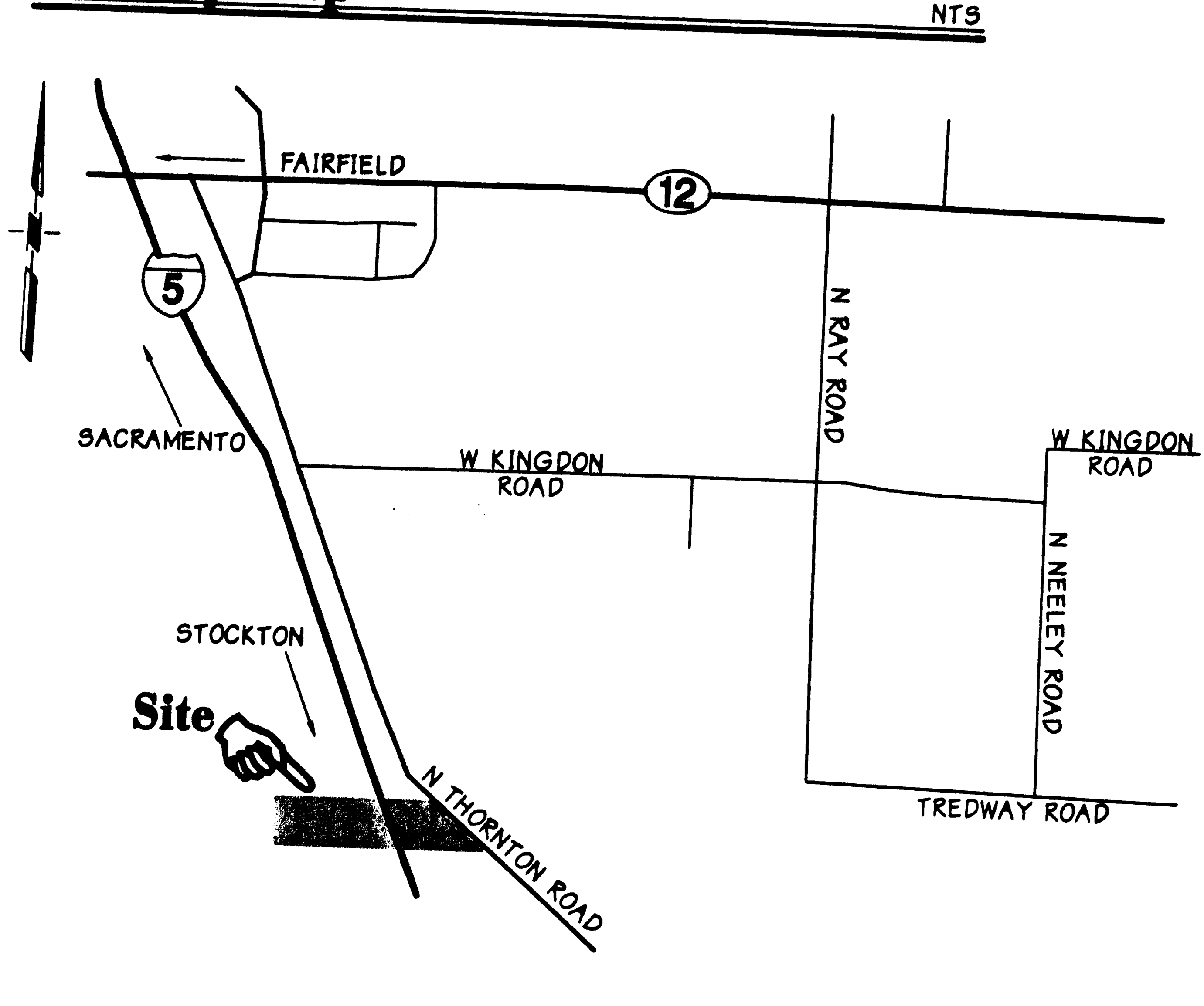
As stated in Table 1 above, the proposed improvement will increase storm drain runoff due to the conversion of the existing pervious open area to the impervious cover. In order to ensure the downstream drainage system is not impacted by the proposed improvement, an onsite underground storm drain detention system is introduced. Such a detention system consists of an oversize storm drain pipe to provide storage capacity and a flow control manhole with emergency weir and orifice limit the runoff to pre-development level prior to exiting the site. A preliminary estimate of the required detention volume is determined to be 1240 cubic feet (equivalent to 253 linear feet of 30" storm drain pipe) according to the method provided by Erosion & Sediment Control Guidelines for Developing Areas of the Sierras prepared by the High Sierra RC&D Council (see Appendix). The detail designs and calculation for detention storage volume and the flow control device will be performed during construction document phase.

Since the post-development runoff is designed to stay at the pre-construction level prior to exiting the site, the downstream system should be of adequate capacity to handle the post-construction site runoff.

VI. APPENDIX

A. Vicinity Map
B. City of Lodi Standard Plan 606
C. Volume Design Calculation
D. Drainage Shed Map Exhibits DS1 and DS2
E. Erosion & Sediment Control Guidelines for Developing Areas of the Sierra by High Sierra RC&D Council, dated November 1981.

Vicinity Map



CITY OF LODI

PUBLIC WORKS DEPARTMENT

Rainfall Intensity

Tc = Time of Concentration in minutes (See Design Stds §3.200)
I = Rainfall Intensity in inches per hour, 2±yr storm
I = 5.51*(Tc)^(-0.63)

10YR I= 9.71*(Tc)^(-0.63)

Tc	I	Tc	I	Tc	I	Tc	I
10	1.29	40	0.54	90	0.32	240	0.17
11	1.22	41	0.53	95	0.31	245	0.17
12	1.15	42	0.52	100	0.30	250	0.17
13	1.09	43	0.52	105	0.29	255	0.17
14	1.04	44	0.51	110	0.29	260	0.17
15	1.00	45	0.50	115	0.28	265	0.16
16	0.96	46	0.49	120	0.27	270	0.16
17	0.92	47	0.49	125	0.26	275	0.16
18	0.89	48	0.48	130	0.26	280	0.16
19	0.86	49	0.47	135	0.25	285	0.16
20	0.83	50	0.47	140	0.24	290	0.15
21	0.81	51	0.46	145	0.24	295	0.15
22	0.79	52	0.46	150	0.23	300	0.15
23	0.76	53	0.45	155	0.23	305	0.15
24	0.74	54	0.45	160	0.23	310	0.15
25	0.73	55	0.44	165	0.22	315	0.15
26	0.71	56	0.44	170	0.22	320	0.15
27	0.69	57	0.43	175	0.21	325	0.14
28	0.68	58	0.43	180	0.21	330	0.14
29	0.66	59	0.42	185	0.21	335	0.14
30	0.65	60	0.42	190	0.20	340	0.14
31	0.63	61	0.41	195	0.20	345	0.14
32	0.62	62	0.41	200	0.20	350	0.14
33	0.61	63	0.41	205	0.19	355	0.14
34	0.60	64	0.40	210	0.19	360	0.14
35	0.59	65	0.40	215	0.19	365	0.13
36	0.58	70	0.38	220	0.18	370	0.13
37	0.57	75	0.36	225	0.18	375	0.13
38	0.56	80	0.35	230	0.18	380	0.13
39	0.55	85	0.34	235	0.18	385	0.13

Dr. KT	No.	Date	Revision	Appr.	Approved By:	STD PLAN
Ch. WS					F. Wally Sandelin, City Engineer, R.C.E. 39895 — 12/28/00 Date	606
Date 12/00						

Mike Hauge

From: Chris Boyer [cboyer@lodi.gov] FROM CITY OF LODI
Sent: Wednesday, August 27, 2008 8:58 AM
To: Ernest Chan
Subject: FW: Rainfall Intensity Formula
Attachments: return Period Intensity.xls

This should help. Let me know if you need anything else.

Chris Boyer

From: Lyman M Chang
Sent: Wednesday, August 27, 2008 8:55 AM
To: Chris Boyer
Cc: Sharon Welch
Subject: Rainfall Intensity Formula

The I values shown on Standard Plan 606 for different storms are as follow:

5-year storm: I = 8.13 *(Tc)^(-0.63)
10-year storm: I = 9.71 *(Tc)^(-0.63) ←

Design Storm Volume – Per Erosion & Sediment control Guidelines for Developing Areas of the Sierras by High Sierra RC&D Council, November 1981

T_c = Time of Concentration (in hour)
T_p = Time of Peak = $0.6T_c$
T_b = Time Base = $2.67T_p$
$V_d = 1800 (Q_d \times T_b)$ = Design Storm Volume (ft^3)

Pre-Construction

Shed A (See Pre-Development Shed Map DS-1 in Appendix)

$\mathbf{V_{d\,(2\text{-}Yr)}} = 1800 \times 1.61 \text{ cfs} \times 2.67T_p = 1800 \times 1.61 \text{ cfs} \times 2.67 \times 0.6T_c$
$= 1800 \times 1.61 \text{ cfs} \times 2.67 \times 0.6 \times 0.17 \text{ hr} = \mathbf{789\ ft^3}$
$\mathbf{V_{d\,(10\text{-}Yr)}} = 1800 \times 2.84 \text{ cfs} \times 2.67T_p = 1800 \times 2.84\text{cfs} \times 2.67 \times 0.6T_c$
$= 1800 \times 2.84 \text{ cfs} \times 2.67 \times 0.6 \times 0.17 \text{ hr} = \mathbf{1392\ ft^3}$

Post-Construction

Shed A (See Post-Development Shed Map DS-2 in Appendix)

$\mathbf{V_{d(2\text{-}Yr)}} = 1800 \times 4.14 \text{ cfs} \times 2.67T_p = 1800 \times 4.14 \text{ cfs} \times 2.67 \times 0.6T_c$
$= 1800 \times 4.14 \text{ cfs} \times 2.67 \times 0.6 \times 0.17 \text{ hr} = \mathbf{2029\ ft^3}$
$\mathbf{V_{d(10\text{-}Yr)}} = 1800 \times 7.31 \text{ cfs} \times 2.67T_p = 1800 \times 7.31 \text{ cfs} \times 2.67 \times 0.6T_c$
$= 1800 \times 7.31 \text{ cfs} \times 2.67 \times 0.6 \times 0.17 \text{ hr} = \mathbf{3583\ ft^3}$

2-Yr Volume of Detention:

Southwest Outlet (Point of Interest) = (Post Development Design Volume – Pre Development Design Volume) = 2029 ft^3 – 789 ft^3 = **1240 ft^3**, equivalent to **253LF 30" SD pipe**.

Erosion & Sediment Control Guidelines for Developing Areas of the Sierras

Prepared by the High Sierra RC&D Council

November 1981

APPENDICES

A. Calculations for Peak Storm Runoff and Storm Runoff Volume

For sizing the components of various erosion control practices it is necessary to determine the peak runoff flow and the storm runoff volume. The Rational Method is used for calculating the peak storm runoff rate. An estimate of the runoff volume from the peak storm is made using the Triangular Hydrograph Method.

The rational method and the triangular hydrograph method are widely used and provide acceptable design flows for a large variety of applications.

The use of these methods should be limited to small watershed areas. It is anticipated that these methods will be used for watersheds less than one square mile in area. For areas greater than one square mile use SCS methods given in Appendix B.

<u>Storm Runoff Rate by Rational Method</u>

The basic equation in the rational formula is:

$$Q = C\ I\ A$$

Where
- Q = Peak Discharge, cubic feet per second
- C = Coefficient of runoff
- I = Average rainfall intensity, inches per hour for a given frequency and for a duration equal to the time of concentration (T_c)
- A = Drainage Area, acres

<u>Peak Storm Runoff</u>-The following procedure is used to calculate the peak storm runoff rate.

1. Using Figure 1 locate the project site with a section township and range description. Find the mean annual precipitation from the closest isohyetal contour.
2. Calculate the time of concentration (T_c)

   Using the following equation:(1)

   $$Tc = \left(\frac{11.9\ L}{H}\right)^{0.385}$$

   Where
   - Tc = time of concentration in hours
   - L = length of longest watercourse through watershed, in miles
   - H = elevation difference along longest watercourse, in feet
3. Enter Figure 2(2) at T_c calculated above, go vertically to desired storm frequency curve (10 yr., 25 yr., 100 yr.), then go horizontally to the mean annual precipitation determined in 1 above, read the intensity (I).

(1) "California Culvert Practice," California Highways and Public Works.
(2) "Loomis Basin Hydraulic Investigation Study."

4. Determine the area (A) of the watershed.

5. From Table 1, estimate the value of the coefficient of runoff (C). An example for determining "C" for improved and unimproved areas is given.

6. With "C", "I" and "A" calculate the peak storm runoff rate, (Q_p) in cubic feet per second (cfs).

$$Q = C\ I\ A$$

Design Storm Volume - The following procedure is used to calculate the design storm volume.

1. Determine mean annual precipitation, see step 1 for peak storm runoff.

2. Using design storm duration (D), enter Figure 2, go vertically to desired storm frequency curve (10-yr, 25-yr, 100-yr), then go horizontally to the mean annual precipitation determined in above 1, read the intensity (I).

3. Determine the area (A) of the watershed.

4. From Table 1 estimate the value of the coefficient of runoff (C).

5. With "C", "I", and "A" claculate the design storm peak flow rate (Q_D) in cubic feet per second.

$$Q = C\ I\ A$$

6. Calculate the time in hours from start of hydrograph rise to peak rate (T_p).

$$T_p = 0.5\ D = 0.6\ T_c \quad (3)$$

"D" and "T_c" have been determined above.

7. Calculate time base of hydrograph (T_b).

$$T_b = 2.67\ T_p \qquad (3)$$

8. Determine design storm volume (V_D) in cubic feet

$$V_D = 1800\ (Q_D \times T_b)$$

Figure 3 gives a graphical representation of the relationship between T_p, T_b, Q_D and V_D. The area enclosed by the triangle represents the design storm volume.

(3) "Design of Small Dams", US. Bureau of Reclamation.

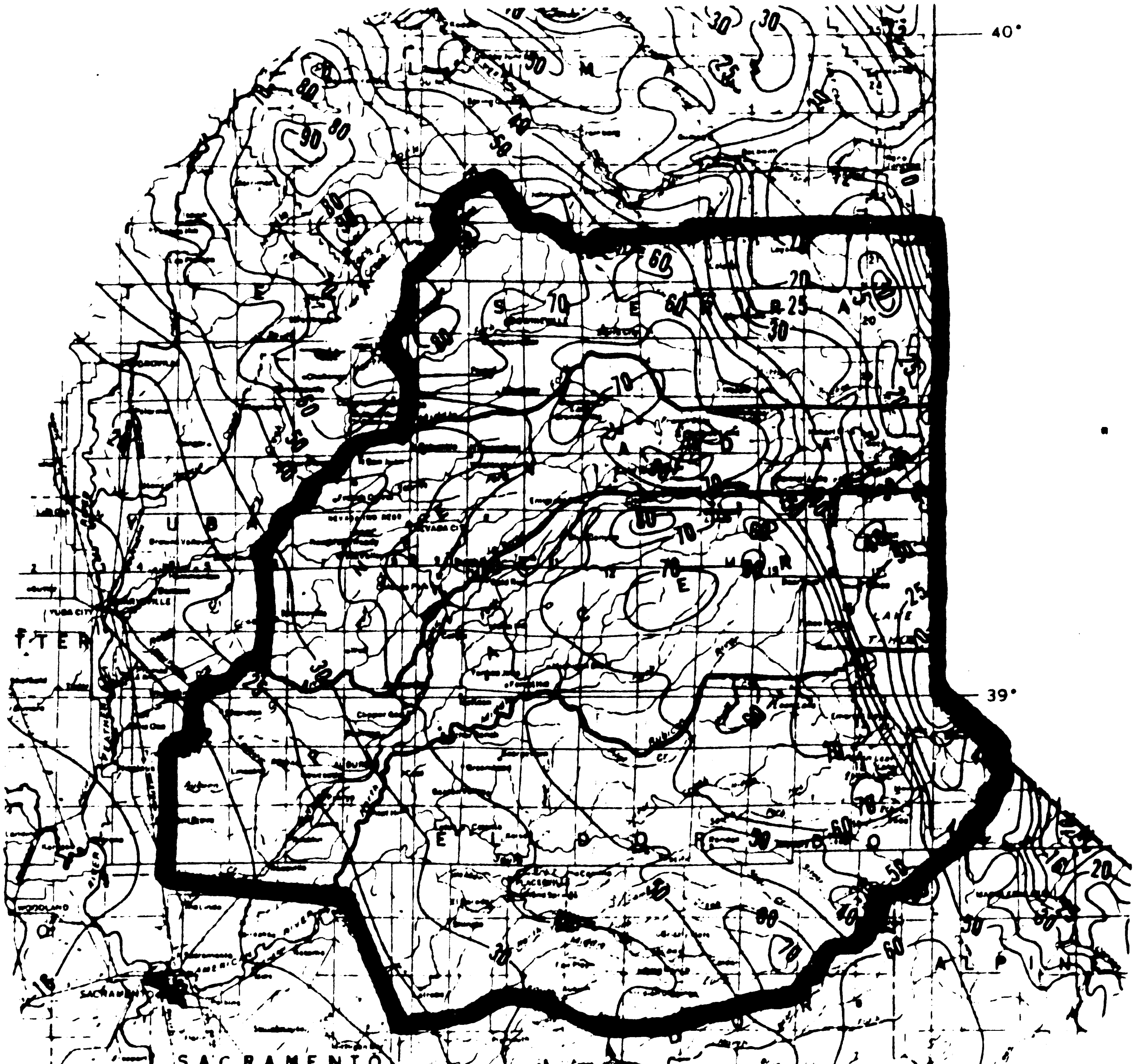


Figure 1 - Isohyetal Map of Four-County Area

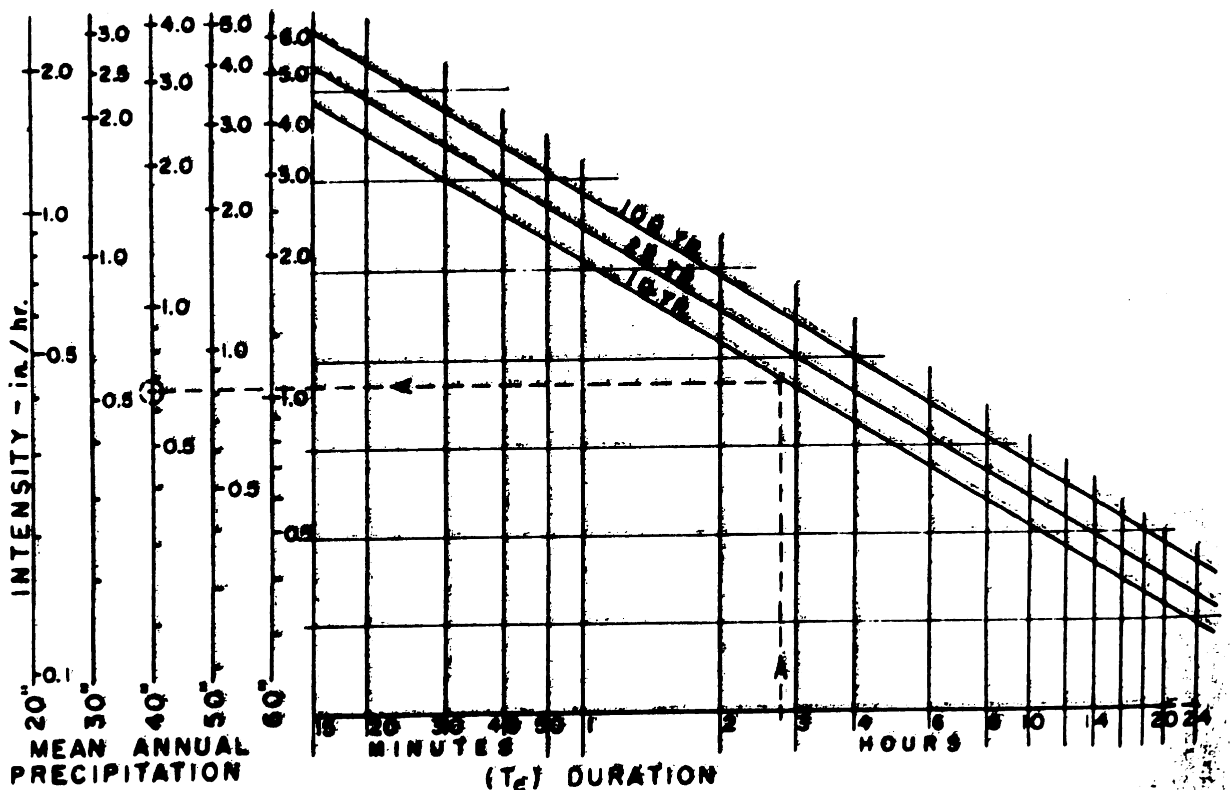


FIGURE 2 - TIME OF CONCENTRATION (Tc) VS. RAINFALL INTENSITY (I)

TABLE 1

ESTIMATING "C" IN RATIONAL FORMULA

UNIMPROVED AREAS

CONDITION	EXTREME	HIGH	MODERATE	LOW
Slope	.32 Above 30%	.24 10% = 30%	.17 5 - 10%	.11 0 - 5%
Surface perme-ability.	.14 Bare rock or very thin soil.	.10 Impervious clays, shal-low soils.	.07 Well drained soils.	.05 Deep sand, volcanic ash.
Vegeta-tion	.14 None or very sparse.	.10 Less than 20% covered with substantial growth.	.07 About 50% covered with heavy growth.	.05 90% covered with heavy growth, deep humus layer.
Surface	.11 Smooth soil, slick rock, drainage flow con-tinuous.	.09 Roughened soil or rocks.	.07 Drainage flow interrupted, many ponds, lakes, marshes.	.05 Drainage flow arrested, large lakes, ponds, marshes

IMPROVED AREAS

Surface	C
Roof Surfaces	.90
Asphalt or Concrete Pavement, patios, driveways, streets, sidewalks	.85
Landscaped areas	.25
Gravel walks, roadways	.30

TABLE 1 (continued)

EXAMPLE 1: Unimproved

20% Slope	.24
Well drained soil	.07
Fair cover	.07
No ponds	.07
C =	.45

EXAMPLE 2: Improved

20 acre tract

3 arces roof	@	.90
10 acres A. C. Pave.	@	.85
7 acres landscaped	@	.25

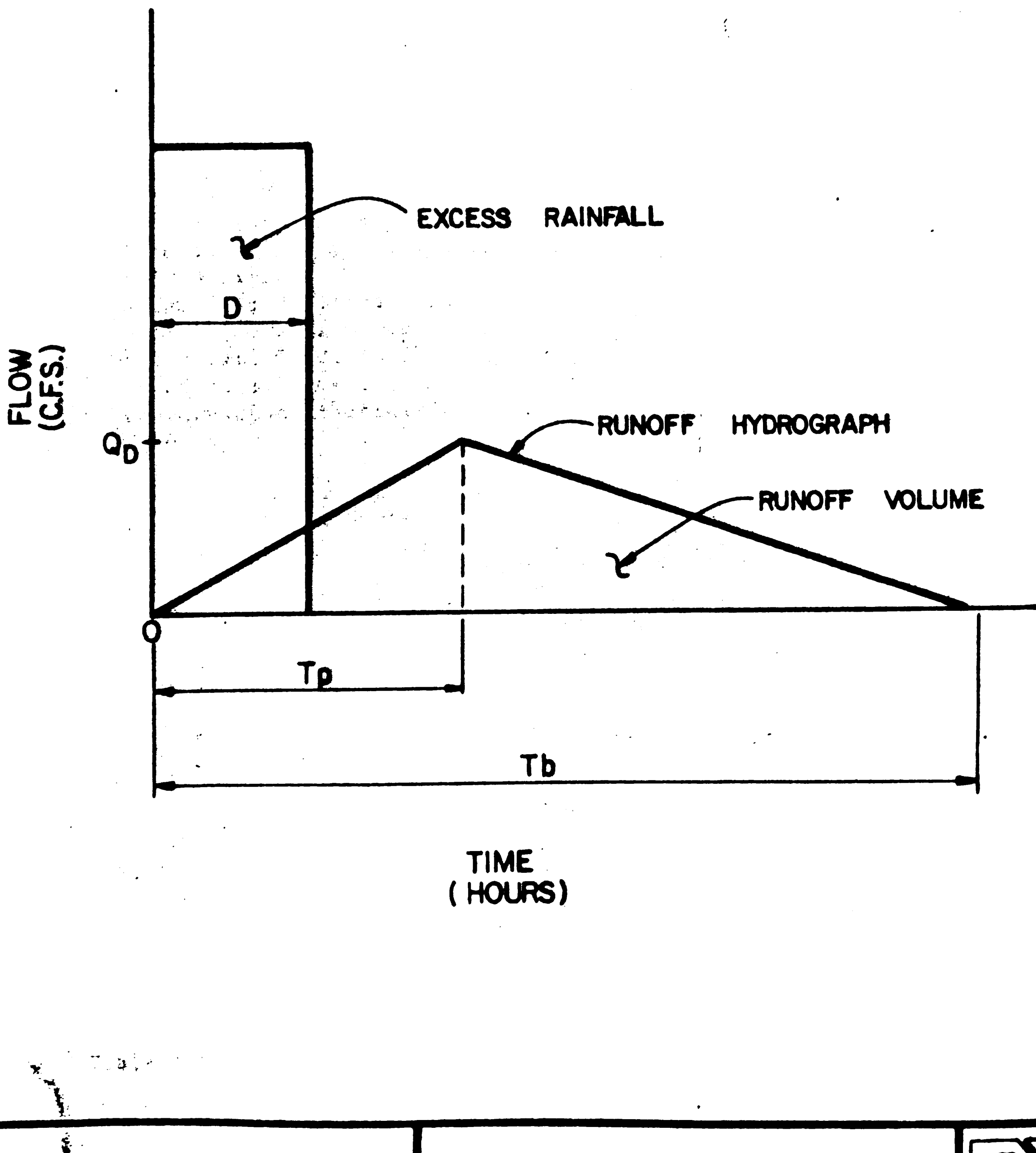
$$C = \frac{3 \times .90 + 10 \times .85 + 7 \times .25}{20} = 0.65$$

EXAMPLE 3: Combination

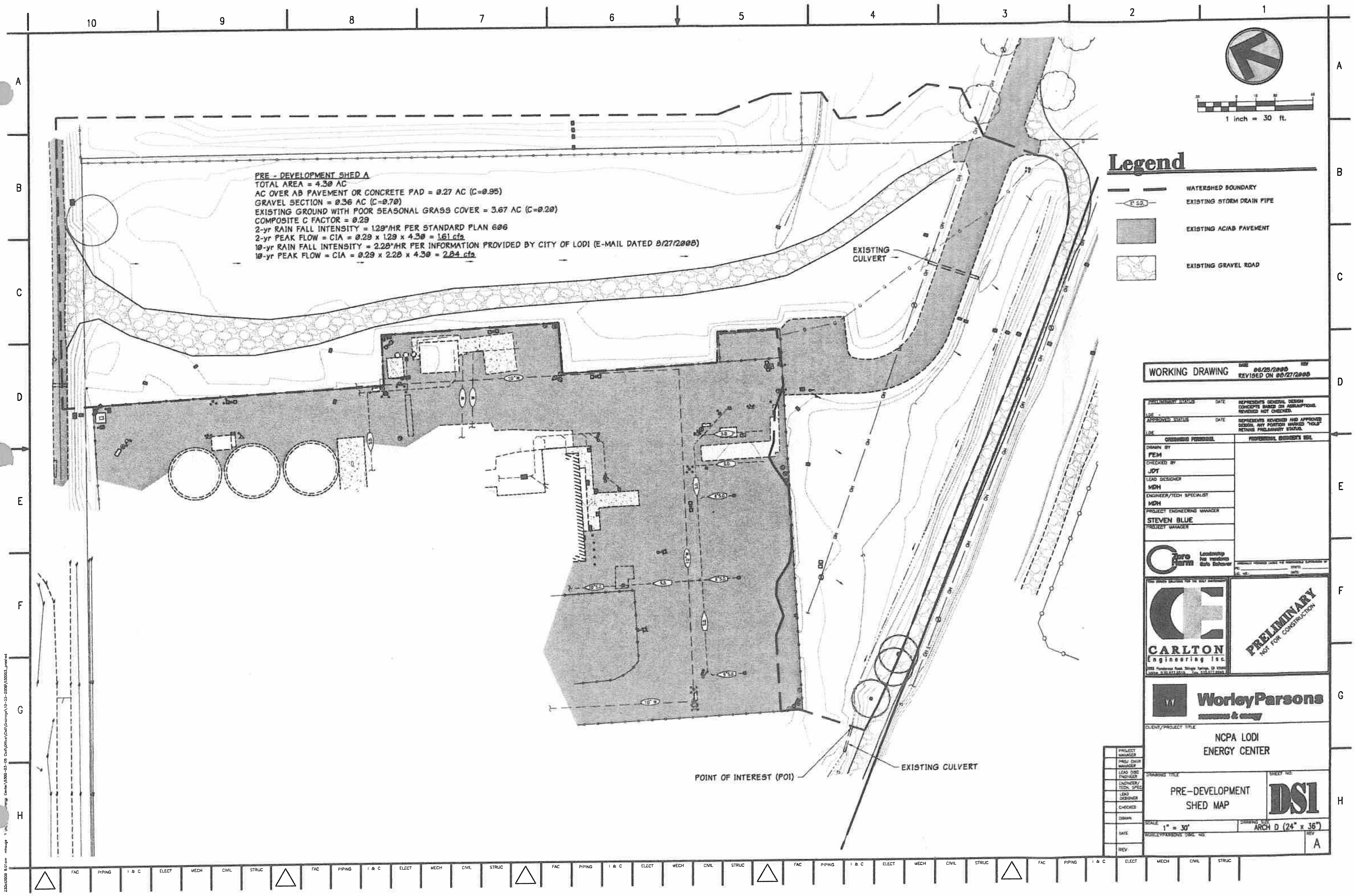
20 acre tract

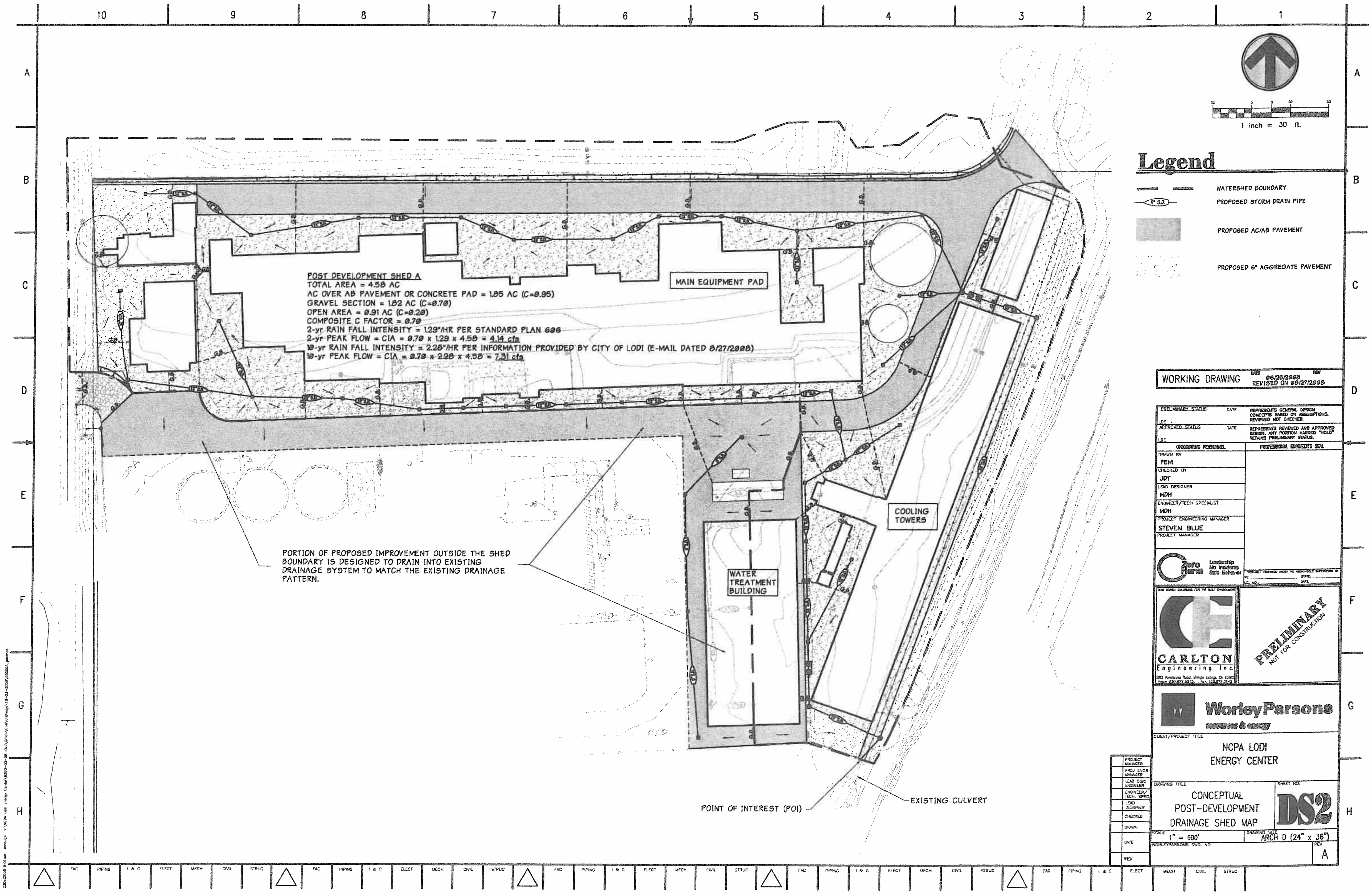
5 acres improved	@ 0.65
15 acres unimproved	@ 0.45

$$C = \frac{5 \times 0.65 + 15 \times 0.45}{20} = 0.50$$



EXAMPLE OF THE
TRIANGULAR HYDROGRAPH


PRE - DEVELOPMENT SHED A
TOTAL AREA = 4.30 AC
AC OVER AB PAVEMENT OR CONCRETE PAD = 0.27 AC (C=0.95)
GRAVEL SECTION = 0.36 AC (C=0.70)
EXISTING GROUND WITH POOR SEASONAL GRASS COVER = 3.67 AC (C=0.20)
COMPOSITE C FACTOR = 0.29
2-yr RAIN FALL INTENSITY = 1.29"/HR PER STANDARD PLAN 606
2-yr PEAK FLOW = CIA = 0.29 x 1.29 x 4.30 = 1.61 cfs
10-yr RAIN FALL INTENSITY = 2.28"/HR PER INFORMATION PROVIDED BY CITY OF LODI (E-MAIL DATED 8/27/2008)
10-yr PEAK FLOW = CIA = 0.29 x 2.28 x 4.30 = 2.84 cfs
EXISTING CULVERT
POINT OF INTEREST (POI)
EXISTING CULVERT
1 inch = 30 ft.
Legend
WATERSHED BOUNDARY
EXISTING STORM DRAIN PIPE
EXISTING AC/AB PAVEMENT
EXISTING GRAVEL ROAD
WORKING DRAWING
REVISED ON 08/27/2008
DRAWN BY
FEM
CHECKED BY
JDT
LEAD DESIGNER
MDH
ENGINEER/TECH SPECIALIST
MDH
PROJECT ENGINEERING MANAGER
STEVEN BLUE
PROJECT MANAGER
CARLTON
Engineering Inc.
PRELIMINARY
NOT FOR CONSTRUCTION
WorleyParsons
resources & energy
CLIENT/PROJECT TITLE
NCPA LODI
ENERGY CENTER
DRAWING TITLE
PRE-DEVELOPMENT
SHED MAP
SHEET NO.
DS1
SCALE
1" = 30'
DRAWING SIZE
ARCH D (24" x 36")
REV
A


1 inch = 30 ft.
Legend
WATERSHED BOUNDARY
PROPOSED STORM DRAIN PIPE
PROPOSED AC/AB PAVEMENT
PROPOSED 6" AGGREGATE PAVEMENT
POST DEVELOPMENT SHED A
TOTAL AREA = 4.58 AC
AC OVER AB PAVEMENT OR CONCRETE PAD = 1.85 AC (C=0.95)
GRAVEL SECTION = 1.82 AC (C=0.70)
OPEN AREA = 0.91 AC (C=0.20)
COMPOSITE C FACTOR = 0.70
2-yr RAIN FALL INTENSITY = 1.29"/HR PER STANDARD PLAN 606
2-yr PEAK FLOW = CIA = 0.70 x 1.29 x 4.58 = 4.14 cfs
10-yr RAIN FALL INTENSITY = 2.28"/HR PER INFORMATION PROVIDED BY CITY OF LODI (E-MAIL DATED 8/27/2008)
10-yr PEAK FLOW = CIA = 0.70 x 2.28 x 4.58 = 7.31 cfs
MAIN EQUIPMENT PAD
COOLING TOWERS
WATER TREATMENT BUILDING
PORTION OF PROPOSED IMPROVEMENT OUTSIDE THE SHED BOUNDARY IS DESIGNED TO DRAIN INTO EXISTING DRAINAGE SYSTEM TO MATCH THE EXISTING DRAINAGE PATTERN.
POINT OF INTEREST (POI)
EXISTING CULVERT
WORKING DRAWING
DATE 08/25/2008
REVISED ON 08/27/2008
PRELIMINARY STATUS
APPROVED STATUS
REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
ORIGINATING PERSONNEL
PROFESSIONAL ENGINEER'S SEAL
DRAWN BY PEM
CHECKED BY JDT
LEAD DESIGNER MDH
ENGINEER/TECH SPECIALIST MDH
PROJECT ENGINEERING MANAGER STEVEN BLUE
PROJECT MANAGER
Zero Harm
Leadership
No Incidents
Safe Behavior
CARLTON
Engineering Inc.
PRELIMINARY
NOT FOR CONSTRUCTION
WorleyParsons
resources & energy
CLIENT/PROJECT TITLE
NCPA LODI
ENERGY CENTER
DRAWING TITLE
CONCEPTUAL
POST-DEVELOPMENT
DRAINAGE SHED MAP
SHEET NO.
DS2
SCALE 1" = 600'
DRAWING SIZE ARCH D (24" x 36")
WORLEYPARSONS DWG. NO.
REV
A

Computation Sheet for Determining Runoff Coefficients

Total Limits of Work Site Area	=	4.60 Acres	(A)

Existing Site Conditions

Impervious Site Area [1]	=	0.27 Acres	(B)
Impervious Site Area Runoff Coefficient [2, 4]	=	0.95	(C)
Pervious Site Area [3]	=	4.03 Acres	(D)
Pervious Site Area Runoff Coefficient [4]	=	0.24	(E)
Existing Site Area Runoff Coefficient $\frac{(B \times C)+(D \times E)}{(A)}$	=	0.28	(F)

Proposed Site Conditions (after construction)

Impervious Site Area [1]	=	1.85 Acres	(G)
Impervious Site Area Runoff Coefficient [2, 4]	=	0.95	(H)
Pervious Site Area [3]	=	2.73 Acres	(I)
Pervious Site Area Runoff Coefficient [4]	=	0.53	(J)
Proposed Site Area Runoff Coefficient $\frac{(G \times H)+(I \times J)}{(A)}$	=	0.70	(K)

1. Includes paved areas, areas covered by buildings, and other impervious surfaces.
2. Use 0.95 unless lower or higher runoff coefficient can be verified.
3. Includes areas of vegetation, most unpaved or uncovered soil surfaces, and other pervious areas.
4. Refer to local Hydrology Manual for typical C values.

Computational Sheet for Determining Run-on Discharges

Existing Site Conditions

Area Runoff Coefficient		=	N/A	(A)
Area Rainfall Intensity		=	N/A in/hr	(B)
Drainage Area		=	N/A Acres	(C)
Site Area Run-on Discharge	(A) x (B) x (C)	=	N/A ft^3/sec	(D)