



# **Status Report No. 1, Retrofit Pilot Program, Caltrans District 11**

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## Table of Contents

1.0	Introduction.....	1
1.1	Background and Purpose.....	1
1.2	Report Organization and Content.....	1
2.0	BMP Retrofit Pilot Program Siting.....	3
2.1	Background.....	3
2.2	Objectives of the Retrofit Pilot Program.....	4
2.3	Siting Process.....	4
2.4	Siting Problems and Solutions.....	5
2.4.1	<i>Wet Basin</i> .....	5
2.4.2	<i>Extended Detention Basins</i> .....	6
2.4.3	<i>Infiltration Basins</i> .....	7
2.4.4	<i>Infiltration Trenches</i> .....	7
2.4.5	<i>Biofilters</i> .....	8
2.4.6	<i>Media Filters</i> .....	8
3.0	BMP Pilot Program Siting Costs.....	8
4.0	Conclusions.....	9
4.1	Siting.....	9
5.0	BMP Retrofit Pilot Program Design.....	9
5.1	Background.....	9
5.2	Objectives.....	10
5.3	Design Process.....	10
5.4	Construction Plans.....	11
5.5	Basis of Design.....	11
5.6	Consultation with Experts and Regulatory Agencies on Special Issues.....	12
5.7	Conclusions.....	12

### Appendix

Appendix A.1	BMP Pilot Design Information
Appendix A.2	Geotechnical Reports
Appendix A.3	Construction Plans
Appendix A.4	Site Listings

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## Status Report #1 BMP Retrofit Pilot Program District 11

### 1.0 Introduction

#### 1.1 *Background and Purpose*

Periodic status reports and meetings are specified in the District 11 *Scoping Study* as a vehicle to update the Plaintiffs on the progress of the BMP Retrofit Pilot Program and receive input as to appropriate changes or modifications to the program. The status meetings have been scheduled on a regular basis to coincide with general project milestones and periods of significant activity. Scheduled dates for the periodic status meetings are given in the *Scoping Study*.

The *Scoping Study* also requires the preparation of status reports for each meeting to provide a background for the meeting discussion. The status reports will be prepared two weeks in advance of the status meeting to allow for adequate review time.

The scope of the status reports includes the activities of the program that precede the status meetings. Status reports will include information regarding the Pilot Program siting, design, operation and maintenance program, monitoring reports, program costs and correspondence with special consultants. Each of these topics will be addressed as the information becomes available over the scheduled course of the program. The program Master Schedule is contained in the *Scoping Study*.

#### 1.2 *Report Organization and Content*

The BMP Retrofit Pilot Program was formally initiated in the fall of 1997. Since that time, siting of the pilot projects has been substantially completed and significant progress has been made in design of the Pilots. Consequently, this status report contains information relative to siting and design of the BMP Retrofit Pilot Program in District 11.

The report is organized into two primary sections with an Appendix. The first section discusses the siting process, the problems encountered during siting of the Pilots and solutions developed for the identified problems. Cost information is also provided for the siting phase of the program.

The second report section provides information relative to the design phase of the program. Currently, design is only partially complete. A complete discussion of the designs, and design assumptions will be provided in a Basis of Design Report to be

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published per the detailed project design schedule contained in the Appendix. A discussion of design costs will be included in the next status report.

The Appendix is divided into five sections. Appendix A.1 contains a synopsis of information relative to the design of each Retrofit Pilot Project. The data is formatted as 'information sheets' for each pilot site, and contains the basic design information and design references in support of the construction plans.

Appendix A.2 contains the geotechnical report. A geotechnical evaluation was prepared for each site to provide an assessment as to the suitability of the site for the construction of the selected BMP as well as to screen the site for potential construction problems.

Appendix A.3 contains the construction plans for each pilot project. The construction plans are considered 90% complete, requiring Caltrans review and approval.

Appendix A.4 contains spreadsheets describing the pilot projects. The spreadsheets list each pilot project as well as its location and estimated construction cost (preliminary).

Appendix A.5 contains project schedules. A detailed project schedule is provided indicating significant project dates through the end of the year. The project Staging Plan is also provided in this Appendix, indicating the decision points and criteria to be used to determine whether pilot projects will proceed according to the master project primary or contingency schedule.

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## 2.0 BMP Retrofit Pilot Program Siting

### 2.1 Background

As a result of litigation between Caltrans, the US EPA, San Diego Baykeeper and the National Resources Defense Council (NRDC), a Consent Decree was reached outlining, among other requirements, the development of a Best Management Practice (BMP) Retrofit Pilot Program in Caltrans District 11. The Retrofit Pilot Program includes the design, construction and monitoring of 5 BMP pilot projects. The District 11 Consent Decree requires the construction cost of the BMP Retrofit Pilot Program total \$2.5 million. The types of devices proposed for siting of pilot projects identified in the *Scoping Study* include biofiltration strips, biofiltration swales, infiltration basins, infiltration trenches, media filters, extended detention basins, wet basins.

The various retrofit pilot projects have been sited so that retrofit options permit observations pertaining to technical feasibility, costs of retrofitting and benefits. Sites were originally selected based on their being common or typical along Caltrans' right-of-way, including interchanges, park and rides and maintenance facilities. Each site for a retrofit pilot project has been selected to be appropriate to the type of best management practice to be evaluated and without pre-judgment about the outcome of the associated retrofit pilot study.

Sites have been considered along Caltrans freeways and highways, maintenance stations and park and ride lots within District 11. The specific retrofit BMPs, and location are given in the Appendix (A.4).

The siting process was scheduled to occur from October 16, 1997 through January 16, 1998. Siting proceeded with field reconnaissance and visits in October 1997 and November 1997, January 22, 1998 and with the development of individual siting reports in December of 1997 for review by the Plaintiff. The siting process culminated in February 1998 with the publication of the Composite Siting Study (dated February 26, 1998).

Twelve sites have been selected for the 5 projects required by the Consent Decree. Some of the sites contain multiple BMPs (such as the Carlsbad Maintenance Station with an infiltration trench and a biofilter) and some of the BMPs were not sited that were originally contemplated (an oil/water separator). Difficulty was encountered in siting the infiltration BMP devices. Two infiltration basins and one infiltration trench that were originally planned were not sited due to lack of locations with suitable infiltration. The oil/water separator pilot was not sited due to lack of sites with sufficiently high concentrations of free oil and grease in the runoff. Detention basins were substituted for the unsited infiltration basin and trench pilots. A complete listing of the BMP Pilot sites is contained in the Appendix (A.4).

## 2.2 *Objectives of the Retrofit Pilot Program*

The pilot projects have been sited to support the overall objectives of the Retrofit Pilot Program which are to:

1. Determine the feasibility of design, construction and maintenance of the selected BMPs;
2. Evaluate the performance of the selected BMPs in removing constituents of concern in highway stormwater runoff; and
3. Evaluate the frequency and magnitude of operational problems associated with maintenance of the structures, including the projected design life of the structure (extrapolated from the operational period) and maintenance and safety concerns specific to transportation facilities and determine solutions to such problems that may be encountered.

The objective of the siting process was to select sites that were suitable for each of the selected types of BMPs, and through this process note the issues and constraints with the siting of each type of device.

## 2.3 *Siting Process*

Specific siting criteria for each BMP is described in detail in the report entitled, *BMP Retrofit Pilot Program, Composite Siting Study, District 11*, dated February 26, 1998.

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The site selection process involved a multi-disciplinary approach to evaluating potential sites for suitability for the pilot projects. After preliminary reconnaissance, siting was focused initially on the more difficult pilot projects to locate. The first pilot projects to be sited were the oil/water separator projects which required monitoring of oil and grease in stormwater runoff before a final decision on whether or not to construct and operate such pilot projects could be made. Monitoring of the selected location was completed from October 1997 through January 1998. Siting of Oil/Water separator location was followed by Infiltration BMPs and Media Filters. The infiltration BMPs were difficult to site since they must meet space, safety, distance to existing structures and maintenance access requirements as well as soil infiltration criteria. Media filters require an existing storm drain system. Lastly, Detention Basins, Wet Basins and Biofilters were sited. Detention basins and wet basins have most of the criteria associated with infiltration basins relative to space and maintenance access requirements. Biofilters have fewer space and access criteria providing relatively greater opportunities for siting.

By following a tiered approach siting the most difficult BMPs (those with the most stringent criteria) first followed by those that are progressively easier to site, the selected sites received the type of BMP most suited to each location.

Individual siting reports were published for each type of BMP as siting was completed. Seven individual siting reports were published. These individual siting reports were subsequently published as a *Composite Siting Study* (Op. Cit.) which included the associated background information relative to siting criteria and preliminary and detailed geotechnical investigations. The siting process had a nominal duration of 3 months.

## 2.4 *Siting Problems and Solutions*

Several problems were encountered in siting the various BMPs. A methodical criteria-based approach was used for each type of device. The site selection criteria was used to screen sites for suitability. Siting problems, and the solutions to the problems are discussed for each type of BMP in the following paragraphs.

### 2.4.1 *Wet Basin*

The primary problem in siting the wet basin was finding a location with a suitable base flow to sustain a permanent basin pool. A site could not be located that had sufficient right-of-way available as well as a perennial base flow in the storm drain system. This problem was overcome by locating the basin where a shallow ground water table could be intersected. Normally wet basins operate using base flow from the tributary watershed, thereby requiring a substantial watershed area. This method of operation also ensures a constant exchange of water within the basin, eliminating stagnate conditions. It will be an integral part of the selected basin site to evaluate whether a wet basin sustained

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with ground water can operate as a viable BMP. Operation and maintenance of the basin will require periodic draining of the pond to ensure adequate circulation of water.

In general siting of this BMP would be inappropriate where a perennial water source is not present. The monitoring portion of this program will define the maintenance issues surrounding the vegetation, and if application of the wet basin concept is valid for a groundwater supplied system.

#### *2.4.2 Extended Detention Basins*

Extended detention basins were identified in the Stipulation as appropriately located along Caltrans freeways and highways. Siting problems encountered with this BMP focused on 1) available right-of-way, 2) tributary area and 3) maintenance access. Field review of potential extended detention basin sites in District 11 showed existing right-of-way is available for the construction of the pilot detention basins. However, the number of viable sites were limited primarily by the total available area and the area tributary to the site. Extended detention basins typically require about 1 to 2 percent of the tributary area (FHWA, 1996), however this 'rule of thumb' appears to significantly under estimate the space requirements in practical application where space requirements were as high as 50%.

Two issues were responsible for the apparent increase in space requirements as compared to published data. First, many of the sites were located in areas with extremely low relief. The difference in elevation between the basin inlet and outlet was generally very small. This required a relatively shallow detention depth in the basin to avoid a backwater condition on the site storm drain. Secondly, Caltrans requires a 30' clear recovery zone from the edge of traveled way to the basin. The clear recovery zone is a standard design practice when locating horizontal obstructions adjacent to the right-of-way.

Area tributary to the basin site was also a primary limiting criteria. Available right-of-way must also be located in a watershed low point to collect site runoff. Much of the available right-of-way is in locations where site storm drain nor highway runoff is tributary. Maintenance access is also an important criteria. Safe maintenance access from the freeway/highway must be available.

The general siting of this BMP must account for a clear recovery zone when located adjacent to the highway, and must be located in an area where highway runoff is tributary. Since, Caltrans generally does not maintain surplus right-of-way along the mainline portions of roadways, application of this BMP appears to be most suitable in interchanges.

### 2.4.3 *Infiltration Basins*

Infiltration basins were identified in the Stipulation as appropriately located along Caltrans freeways and highways. Siting problems encountered with this BMP focused on 1) available right-of-way, 2) tributary area 3) maintenance access and 4) soil infiltration capacity. Field review of potential infiltration basin sites in District 11 showed existing right-of-way is available for the construction of the pilot infiltration basin. However, the number of viable sites were limited primarily by the infiltration capacity of soils. Much of the soil in District 11 has varying levels of clay content which are not suitable for an infiltration BMP. Further, a high ground water table was encountered in many areas where soil infiltration rates were apparently suitable. Requirements relative to safety setback, right-of-way, and tributary area previously discussed for extended detention basins also apply here. Further, application of this BMP was also excluded where the basin was located within 100 feet of a bridge column or abutment due to structural considerations.

Solutions to the problems noted above, other than incorporating them as siting constraints, were not determined. The lack of suitable soil conditions and the presence of a high ground water table appears to be the primary constraint associated with siting this BMP. Soils that do not possess adequate drainage result in basin drain times that exceed an acceptable time limit (a maximum of 72 hours).

### 2.4.4 *Infiltration Trenches*

Infiltration trenches were identified in the Stipulation as appropriately located in Caltrans Maintenance Yards. The primary siting constraints associated with infiltration trenches were the required 100 foot structural setback and suitable soil infiltration rate. Many Caltrans maintenance facilities are located beneath existing highway bridges. Locating an infiltration device within 100 feet of a bridge column or abutment was a significant constraint that limited the applicability of this BMP. Applicability was further limited by the generally low incidence of soils with a suitable infiltration rate, as discussed for infiltration basins. Infiltration trenches are effective in collecting surface flow and do not require a site storm drain; this characteristic made them more suitable for application at maintenance stations.

There were no solutions identified to the problems described for siting infiltration trenches other than establishing the problems as identified siting constraints. Site infiltration testing would be a mandatory step due to the heterogeneous nature of the soils throughout each District and within each site.

#### 2.4.5 *Biofilters*

Biofilters were identified in the Stipulation as appropriately sited at either Caltrans Maintenance Stations or along freeways and highways. The primary siting constraint for biofilters was right-of-way availability. Generally biofilters were found to be not suitable in urban areas where the edge of shoulder was often contained by a sound wall or some other adjacent structure. Biofilters are also generally not suitable in fill situations where a fill slope occurs at or near the edge of shoulder. Questions relative to the requirement for irrigation and the availability of irrigation were also an issue with this BMP.

Solutions were determined for irrigation and maintenance concerns as a part of the siting process. Vegetation that does not require irrigation was specified as well as vegetation that does not require mowing. Mowing adds a significant maintenance expense and if the clippings are left in place, would tend to increase organic nitrogen load to the receiving waters.

#### 2.4.6 *Media Filters*

Media filters were identified in the Stipulation as appropriately placed at Caltrans Maintenance Stations and Park and Ride lots. The use of media filters requires a site storm drain, a constraint similar to that identified for catch basin inserts. Media filters may be constructed either above or below grade. Many of the maintenance stations and park and ride lots did not have surplus area to construct an above ground filter. This constrain was overcome by constructing a below grade (Delaware) type media filter. Media filters also require about 3 feet of head to operate. Where sufficient head was not available to operate the filter, the site was considered infeasible. Two possible solutions were identified for this constraint. The site storm drain in some cases could be rebuilt to provide additional head at the selected location. The second solution specified a pump at the filter outlet to lift the discharge to the required outlet elevation.

### 3.0 **BMP Pilot Program Siting Costs**

Siting for the Pilot Program was carried out via site reconnaissance of Caltrans facilities, and through a refinement process wherein siting criteria was applied successively for sites suitable for given types of BMPs. Consequently, it is not practical to develop siting costs for individual sites but rather a generalized cost developed through a pro rata basis can be estimated.

Infiltration BMPs require substantially more investigation and siting resources as compared to the other types of BMPs. Site screening for infiltration basins and trenches first must apply criteria relative to space, maintenance and drainage. Next the site must be investigated for a suitable infiltration rate. It is apparent that a site boring must be taken followed by an in-drill hole permeability test to determine soil permeability rates.

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Laboratory permeability rates were shown to vary by as much as a factor of 100 compared to in-drill hole rates, and soil heterogeneity even within a site is a significant variable.

The average siting cost for non-infiltration BMPs is \$ 4,700 per site. The average siting cost of infiltration BMPs is \$ 25,300 per site. The total cost for siting of all projects required by the Stipulation and as modified herein was \$ 97,600. These costs include Consultant staff time and expenses only.

#### **4.0 Conclusions**

##### *4.1 Siting*

The siting phase of the Retrofit Pilot Program is complete. A Composite Siting Study has been published. The Study was submitted for approval to Plaintiffs for approval on February 26, 1998.

No further documentation of the siting process is anticipated. The final report for the BMP Retrofit Pilot Program will include this status report describing the siting process, as well as the Composite Siting Study as an Appendix.

#### **5.0 BMP Retrofit Pilot Program Design**

##### *5.1 Background*

Design of the pilot projects followed the siting phase. The design phase is scheduled to occur from January 16, 1998 through May 30, 1998. Project bidding and construction will be completed using two different pathways, a procurement system and a standard Caltrans bid-build process. Some of the BMP Pilot Projects are proprietary devices or contain proprietary materials. It is difficult for the State to bid projects with proprietary materials since State procedures require alternate materials and suppliers. To avoid this problem, a direct purchase of these materials and the construction services to install them will be made.

Plans completed under the Caltrans design-bid-build process will be bid through a public process using Caltrans procedures. Projects build using this model (referred to as 'PS&E' for plans, specifications and estimates), require a more formalized plan package. Each of the plan packages, both direct procurement and PS&E will be checked by the local Caltrans District for conformance with State standards and criteria prior to construction.

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The Retrofit Pilot Projects were designed using the guidance provided in the document entitled, *Scoping Study, Retrofit Pilot Program, Caltrans District 11* dated February 26, 1998. Further design guidance is referenced to the Caltrans Planning and Design Staff Guide, dated September 1997.

### 5.2 Objectives

The objectives of the design process are to develop plans, specifications and estimates packages for the Retrofit Pilot Projects using Caltrans design practices and design guidance manuals while maintaining state-of-the-art design practices. State-of-the-art design practices includes using the most recent published guidance on the design of structural BMPs. One of the objectives of the Scoping Study was to define the design references to be used for the Retrofit projects. The literature consulted in the development of the design guidance for the Retrofit projects is contained in the Scoping Study Bibliography. The primary design references used are the *Caltrans Planning and Design Staff Guide*, the FHWA publication, *Evaluation and Management of Highway Runoff Water Quality*, and several design guidance manuals from the City of Austin, Texas, City of Portland, Oregon, King County, Washington, Washington State Department of Transportation and the Denver Urban Drainage and Flood Control District.

### 5.3 Design Process

Design (PS&E and procurement) packages have been completed and submitted for review for all of the projects in District 11. The plan packages for District are provided in the Appendix (A.3) for information. The submittal and review schedule for each of the plan packages is provided in the Appendix (A.5).

The design process completed to date included several phases. The initial phase consisted of obtaining topographic information for each site. Topographic information was compiled using site survey techniques. Topographic information was also obtained using aerial photography where this approach was cost-justified. Site topography was collected in digital format and used as base design information. All design is being completed in CADD using a Microstation Intergraph System.

Following compilation of the topographic base information to CADD format, hydrology studies were completed to compute both water quality and design storm discharges for the subject storm drain systems. Development of the PS & E package includes the following elements:

- Standard plans list

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- Construction staking and survey information
  - Contour grading and drainage plan
  - Drainage profiles, details and quantities
  - Traffic handling plan
  - Miscellaneous quantities
  - Drainage cross sections

Specifications and an Engineer's Estimate are also a part of the PS&E package. The Engineer's Estimate is completed based on Caltrans Cost Data and the quantities estimated from the construction drawings. Specialty items not in the Caltrans Cost data base are priced using manufacturer's information and construction cost data from other projects.

#### 5.4 *Construction Plans*

The construction plans completed to date are included in the Appendix (A.3) for information. The plans have defined approval process that must be maintained to ensure that the subsequent bid and construction schedules are met. The review dates are given in the Appendix (A.5).

The plans will be revised as appropriate to reflect review comments received from Caltrans and the Plaintiff. Once the plans have been approved by the District, they will be signed by the Engineer and forwarded to Caltrans Headquarters for finalization of the bid package and the bid listing process for formal solicitation of construction bids. Once plans have been bid, changes to the plans must be made through an addendum process which can be cumbersome. Once a final bidder is selected, further changes if necessary must be made through a change order process. Plans may not be changed without the approval of the Engineer of Record.

#### 5.5 *Basis of Design*

Basis of Design Reports will be completed for each Pilot project following approval of the plans. This will be a documentation process whereby the design guidance, assumptions and exceptions to standard criteria or design will be noted. Outlines of these basis of design reports have been prepared and are provided in the Appendix (A.1). The design basis outlines provide most of the information that will be used to develop the Basis of Design Reports. Changes may be required to this information as the Pilot projects move through and complete the design phase. These changes, as appropriate, will be made when the information is incorporated into the Basis of Design Reports. The Basis of Design Reports will be submitted to the Plaintiffs in a staged fashion during the

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month of June. The formal submittal dates are identified on the project calendar given in the Appendix (A.5).

#### *5.6 Consultation with Experts and Regulatory Agencies on Special Issues*

Vector and mosquito control have emerged as significant issues relative to the design and operation of the Pilot Projects. An expert in the field of mosquito and vector control (Dr. Bill Walton) has been retained to advise Caltrans on control and abatement issues. Dr. Walton has provided input relative to design of the pilots to minimize mosquito problems and abatement requirements. Some of Dr. Walton's suggestions for the design phase of the project include:

- Limit growth of aquatic plants and standing water. Concrete lining may be used for detention basins.
- Maintain the width of ponds to a maximum of 100' to allow for the application of abatement practices such as bacteria and insect growth regulators (IGRs).

A meeting has been scheduled (April 1, 1998) with the regional vector control districts to discuss issues relative to control and abatement. The Plaintiffs are invited to attend this meeting to participate in the discussion.

#### *5.7 Conclusions*

The design process is about 70% complete. Procurement projects are staged to be finalized about 1 month behind PS&E packages. Significant further information will be obtained as the design packages move through the plan check process.

## Appendix

**Appendix A.1**  
**BMP Pilot Project Design Information**

# **BMP Retrofit Pilot Program**

## **Pilot Project Design Information Summary**

### **General – Project 1, Site 1**

**Project Location:** Caltrans District 11. Basin bounded by the SR 78 on the north, the I-15 on the east and the I-15 north connector to the SR78 east, on the south-west. Basin site is located at the toe of slope, within Caltrans right of way.

**Project Type:** Extended Detention Basin (EDB)

#### **Design References:**

- Caltrans Storm Water Quality Handbook, Planning and Design Staff Guide
- Caltrans BMP Retrofit Pilot Program, Composite Siting Study, District 11
- Scoping Study, Retrofit Pilot Program, Caltrans District 11

**General Description:** The pilot is an in-line, concrete lined, extended detention basin with a tributary area that includes mainline freeway, a collector and some adjacent slope areas for a total tributary area of 11.0 acres. Inflow to the basin occurs at a single point, the total water quality design volume is 1.24 acre-feet. Flow is discharged through an orifice cut into the wall of the riser outlet. A debris screen ( $\frac{1}{4}$ " openings) protects the orifice from clogging as well as providing a 300mm wide, 180° clear zone flow path. The rim of the riser has been set at the 1-year, 24-hour storage elevation. Less frequent storms will discharge through the top of the riser. An additional riser was designed for the 25-year storm recurrence interval to pass higher flows. The surrounding watershed area has been stabilized to reduce erosion potential using a hydroseed mix as indicated in the project specifications.

Maintenance access is provided at the perimeter of the basin. Storm water samples will be taken using automated equipment at both the basin inflow and outflow points. The discharge within the basin outlets onto a grouted riprap pad, which reduces the outlet velocity and spreads the flow. The basin geometry is a L:W ratio of 10:1.

### **Design Data**

**Water Quality Discharge:** 9.0 cfs

**Tributary Area:** 11 acres

**Design Rainfall or Volume:** The 1-year, 24-hour rainfall. 1.24 Acre-ft.

**Design Average Detention Time or Residence Time:** Average detention time for the extended detention basin is 24 hours, the maximum drawdown time is 72 hours.

## **Design Discussion**

The basin was designed as an inline facility to capture the tributary watershed for water quality monitoring purposes. In addition, the basin will accommodate less frequent storm events. A canal gate at the basin invert is provided to drain the basin should clogging of the orifice occur. A 30-foot clear zone setback was maintained adjacent to the basin. An AC pullout was provided to access the maintenance road located at the perimeter of the basin.

Basin side slopes are 1:4, however, the basin is concrete lined.

# **BMP Retrofit Pilot Program**

## **Pilot Project Design Information Summary**

### **General – Project 1, Site 2**

**Project Location:** Caltrans District 11. Area created by the northbound cloverleaf offramp from I-5 at Manchester Avenue. Area is north of Manchester Avenue and east of the I-5.

**Project Type:** Extended Detention Basin (EDB)

#### **Design References:**

- Caltrans Storm Water Quality Handbook, Planning and Design Staff Guide
- Caltrans BMP Retrofit Pilot Program, Composite Siting Study, District 11
- Scoping Study, Retrofit Pilot Program, Caltrans District 11

**General Description:** The pilot is an in-line, concrete lined, extended detention basin with a tributary area that includes mainline freeway, an off ramp and some adjacent slope areas for a total tributary area of 7 acres. Inflow to the basin occurs at a single point, the total water quality design volume is 0.26 acre-feet. Flow is discharged through an orifice cut into the wall of the riser outlet. A debris screen (1/4" openings) protects the orifice from clogging as well as providing a 300mm wide, 180° clear zone flow path. The rim of the riser has been set at the 1-year, 24-hour storage elevation. Less frequent storms will discharge through the top of the riser. A spillway designed for the 25-year storm recurrence interval has been incorporated to pass higher flows. The surrounding watershed area has been stabilized to reduce erosion potential using a hydroseed mix as indicated in the project specifications.

Maintenance access is provided at the perimeter of the basin. Storm water samples will be taken using automated equipment at both the basin inflow and outflow points. The discharge within the basin outlets onto a grouted riprap pad, which reduces the outlet velocity and spreads the flow. Storm frequencies less than 25-years discharge to an existing storm drain. The spillway discharges through a riprap pad into an existing sump. The basin side slopes are concrete lined and the perimeter slope areas are stabilized with the seed mix shown in the specifications. The basin geometry is a L:W ratio of 2.9:1.

### **Design Data**

**Water Quality Discharge:** 5.2 cfs

**Tributary Area:** 7 acres

**Design Rainfall or Volume:** The 1-year, 24-hour rainfall. 0.24 Acre-ft.

**Design Average Detention Time or Residence Time:** Average detention time for the extended detention basin is 24 hours, the maximum drawdown time is 72 hours.

## **Design Discussion**

The basin was designed as an online facility to capture the tributary watershed for water quality monitoring purposes. In addition, the basin will accommodate less frequent storm events. The inflow and outflow elevations restricted the location and orientation of the extended detention basin. The inflow system diverges from the ground surface and the outflow confluences with an existing storm drain system. A canal gate at the basin invert is provided to drain the basin should clogging of the orifice occur. A 30-foot clear zone setback was maintained adjacent to the basin. A driveway was provided to access the maintenance road located at the perimeter of the basin.

Basin side slopes are 1:4, however, the basin was concrete lined due to the high ground water elevation at this site.

# **BMP Retrofit Pilot Program Pilot Project Design Information**

## **General – Project 1, Site 3**

**Project Location:** Located adjacent to Interstate 5 approximately 300 meters near the Palomar Airport Drive off-ramp

**Project Type:** Bio-filter Swale BMP

**Design Reference:** Caltrans' Planning and Design Staff Guide, Scoping Study, Siting Study

**General Description:** The proposed BMP consists of a bio-filter swale that runs adjacent to the southbound lanes of the Interstate 5 freeway. The tributary area, which totals approximately 1.0 acre, is comprised of the southbound side of the Interstate 5 freeway mainline. Design inflow to the BMP swale is conveyed through the proposed concrete V-ditch. The computed design storm flow for the 1-year storm event is approximately 1.0 cfs. The bio-filter swale is a trapezoidal-shaped channel with 2:1 side slopes. The channel will be lined with grass using hydroseed mix as indicated in the Specifications. Storm water samples will be taken using automated equipment at both the BMP inflow and outflow points.

Access to the BMP site will be through the proposed pullout located adjacent to Interstate 5.

### **Design Data**

**Water Quality Flow:** 1.0 cfs

**Tributary Area:** 2.32 acres

**Design Rainfall/Volume:** 1-year/24-hour rainfall value

**Residence Time:** 4.1 minutes

### **Design Discussion**

Since the proposed BMP site is located adjacent to Interstate 5, design of the bio-filter swale was designed in such a manner that it will not pose any significant hazard to the driving public. The BMP swale and the concrete V-ditch were designed with a maximum depth of 97.5mm (4") and side slopes of 10:1.

Due to the existing physical restrictions of the site, the following design exceptions were implemented:

- Channel Shape - The narrow shoulder necessitated the use of the V-shaped channel instead of the recommended trapezoidal-shaped channel.
- Residence Time - Due to limited grade differential between the headwork and the outlet elevations (which restricted the length of the bio-filter swale), the target residence time of 5 minutes was not achieved.

# **BMP Retrofit Pilot Program Pilot Project Design Information**

## **General – Project 2, Sites 1 and 2**

**Project Location:** Located in the Carlsbad Maintenance Station on Paseo Del Norte, near Interstate 5

**Project Type:** Infiltration Trench and Bio-filter Strip BMP

**Design Reference:** Caltrans' Planning and Design Staff Guide Handbook, Scoping Study, Siting Study

**General Description:** The proposed BMP consists of a dual system comprising an infiltration trench and a bio-filter strip. The tributary areas for the infiltration trench and the bio-filter strip are 1.72 acres and 0.66 acres, respectively. The design storm runoff of approximately 1.60 for the infiltration trench is conveyed by the proposed concrete swale and routed through the BMP trench. The infiltration trench BMP is sized to contain the total design storm volume of 83.3 m<sup>3</sup>.

The storm runoff tributary to the bio-filter strip sheet flows directly onto the BMP strip and flows through the proposed grass lined swale. The computed storm flow tributary to the bio-filter strip is approximately 0.60 cfs.

A concrete-lined swale is proposed to provide outlet for the tributary storm flows in excess of the 1-year storm event.

Storm water monitoring and sampling will be performed using automated equipment at the inflow point of the infiltration trench BMP and the outlet point of the bio-filter swale. A monitoring well is proposed near the lower terminus of the infiltration trench for water quality sampling.

Access to the BMP site is through the maintenance station.

### **Design Data**

**Water Quality Discharges/Volumes:** 83.3 m<sup>3</sup> for the Infiltration Trench BMP  
1.60 cfs for the Infiltration Trench BMP  
0.60 cfs for the Bio-filter Strip BMP

**Tributary Area:** 1.72 acres for the Infiltration Trench BMP  
0.66 acres for the Bio-filter Strip BMP

**Design Rainfall/Volume:** Riverside Region per the Planning and Design Staff Guide Handbook based on 100% impervious area

**Residence Time:** Drains in 72 hours max.

**Design Discussion:** The site chosen for this BMP is currently used for parking which necessitated the design for a new parking area located northwest of this BMP site.

A portion of the access area just north of the BMP site is proposed to be reconstructed in order to provide a uniform grade necessary to induce sheet flow condition for storm flows tributary to the bio-filter strip.

# **BMP Retrofit Pilot Program Pilot Project Design Information**

## **General – Project 2, Site 3**

**Project Location:** Located on the south side of SR78 adjacent to the Melrose Drive off ramp

**Project Type:** Bio-filter Swale BMP

**Design Reference:** Caltrans' Planning and Design Staff Guide, Scoping Study, Siting Study

**General Description:** The proposed BMP consists of a bio-filter swale that runs adjacent to the eastbound side of the SR 78 freeway. The tributary area, which totals 2.30 acres, is comprised of the eastbound side of the SR78 freeway mainline. BMP design flows will be intercepted via two overside drains located on each side of the existing inlet. The computed design storm flow based upon the 1-year storm event is approximately 4.0 cfs. The bio-filter swale BMP is a trapezoidal-shaped channel with 2:1 side slopes. The channel will be lined with grass using hydroseed mix as indicated in the Specifications. The design storm flows will be sampled and monitored using automated equipment.

Access to the BMP site is provided at Hacienda Drive.

### **Design Data**

**Water Quality Flow:** 4.0 cfs

**Tributary Area:** 2.30 acres

**Design Rainfall/Volume:** 1-year/24-hour rainfall value

**Residence Time:** 4.2 minutes

### **Design Discussion**

The existing right-of-way and elevation change between the inflow and outflow points controlled the design of the bio-filter swale BMP. The swale was sized to prevent the undercutting of the freeway shoulder and to minimize flow velocities.

Due to the above mentioned restrictions, the following design exceptions were implemented:

- Width - In order to reduce the flow velocity, a channel width of 6 meters was used, which exceeds the maximum recommended width of 4.8 meters.
- Residence Time - Due to channel length restriction, the resulting hydraulic residence time is 4.2 minutes, which is lower than the target value of 5 minutes.

# **BMP Retrofit Pilot Program**

## **Pilot Project Design Information Summary**

### **General – Project 3, Site 1**

**Project Location:** Caltrans District 11, San Diego, California. Area located just off of the SR-56 eastbound/I-5 southbound connector. Site may be accessed via Carmel Valley Road, just off the I-5 freeway.

**Project Type:** Extended Detention Basin (EDB)

#### **Design References:**

- Caltrans Storm Water Quality Handbook, Planning and Design Staff Guide
- Caltrans BMP Retrofit Pilot Program, Composite Siting Study, District 11
- Scoping Study, Retrofit Pilot Program, Caltrans District 11

**General Description:** The pilot is an in-line, earthen, extended detention basin with a tributary area that includes mainline freeway, a collector ramp and some adjacent slope areas for a total tributary area of 4.3 acres. Inflow to the basin occurs at a single point, the total water quality design volume is 0.22 acre-feet. Flow is discharged through an orifice cut into the wall of the riser outlet. A debris screen ( $\frac{1}{4}$ " openings) protects the orifice from clogging as well as providing a 300mm wide, 180° clear zone flow path. The rim of the riser has been set at the 1-year, 24-hour storage elevation. Less frequent storms will discharge through the top of the riser. A spillway designed for the 25-year storm recurrence interval has been incorporated to pass higher flows. The surrounding watershed area has been stabilized to reduce erosion potential using a hydroseed mix as indicated in the project specifications.

Maintenance access is provided at the perimeter of the basin. Storm water samples will be taken using automated equipment at both the basin inflow and outflow points. The discharge within the basin outlets onto a riprap pad, which reduces the outlet velocity thereby protecting the invert of the basin as well as dispersing the flow. Storm frequencies less than 25-years discharge to an existing riprap pad, located within an easement, at a sump adjacent to Sorrento Valley Road. The basin side slopes are stabilized with the seed mix shown in the specifications. The basin flowpath geometry is a L:W ratio of approximately 6:1.

#### **Design Data**

**Water Quality Discharge:** 4.6 cfs

**Tributary Area:** 4.3 acres

**Design Rainfall or Volume:** The 1-year, 24-hour rainfall. 0.22 Acre-ft.

**Design Average Detention Time or Residence Time:** Average detention time for the extended detention basin is 24 hours, the maximum drawdown time is 72 hours.

### **Design Discussion**

The basin was designed as an online facility to capture the tributary watershed for water quality monitoring purposes. In addition, the basin will accommodate less frequent storm events. The site geometry requires a riprap deflection berm to prevent short circuiting the basin. A canal gate at the basin invert is provided to drain the basin should clogging of the orifice occur. An AC maintenance road is located above the basin.

# **BMP Retrofit Pilot Program**

## **Pilot Project Design Information Summary**

### **General – Project 3, Site 2**

**Project Location:** Caltrans District 11. Area can be accessed from the I-5 southbound mainline. The basin is located on the west side of I-5 just north of the I-5 southbound offramp. It is bounded on the east by the I-5. It is bounded on the north by a gas station at the La Costa exit going west. The basin is bounded on the south by the Bataquitos lagoon. A steep vegetated hillside leading to non-industrial commercial buildings bounds the basin on the west.

**Project Type:** Infiltration Basin (IB)

#### **Design References:**

- Caltrans Storm Water Quality Handbook, Planning and Design Staff Guide
- Caltrans BMP Retrofit Pilot Program, Composite Siting Study, District 7, 11
- Scoping Study, Retrofit Pilot Program, Caltrans District 7, 11

**General Description:** The pilot is an off-line, infiltration basin with a tributary area that includes mainline freeway, an off ramp and some adjacent slope areas for a total tributary area of 5.5 acres. Inflow to the basin occurs at a single point, the total water quality design volume is 0.33 acre-feet. Flow percolates into the ground through permeable soils. The rim of the basin has been set at the 1-year, 24-hour storage elevation. Less frequent storms will overtop the basin and sheet flow towards the Bataquitos Lagoon, maintaining the existing flowpath. The surrounding watershed area has been stabilized to reduce erosion potential using a hydroseed mix as indicated in the project specifications.

Maintenance access is provided at the perimeter of the basin. Storm water samples will be obtained using automated equipment at a well located downstream from the infiltration basin. The discharge within the basin outlets onto a riprap pad. The basin side slopes are stabilized with the seed mix shown in the specifications.

#### **Design Data**

**Water Quality Discharge:** 4.6 cfs

**Tributary Area:** 5.5 acres

**Design Rainfall or Volume:** The 1-year, 24-hour rainfall. 0.33 Acre-ft.

**Design Average Detention Time or Residence Time:** A maximum drain time of 72 hrs.

## **Design Discussion**

The basin was designed as an offline facility to capture the tributary watershed for water quality monitoring purposes. The existing inlets located at the southbound edge of shoulder will be replaced to accommodate the one-year storm water quality flow. The existing outflow pipes were reconnected to the proposed inlet at the existing invert elevation. A flow restrictor plate was used to reduce diversion of less frequent storm events. The depth of the infiltration basin was restricted by the intercept elevation location of the ground water table. A 30-foot clear zone setback was maintained adjacent to the basin. A driveway was provided to access the maintenance road located at the perimeter of the basin.

# **BMP Retrofit Pilot Program**

## **Pilot Project Design Information Summary**

### **General – Project 4, Site 1**

**Project Location:** Caltrans District 11, San Diego, California. Area created by the southbound cloverleaf onramp from I-5 at Manchester Avenue. Area is north of Manchester Avenue and west of the I-5.

**Project Type:** Wet Basin (WB)

#### **Design References:**

- Caltrans Storm Water Quality Handbook, Planning and Design Staff Guide
- Caltrans BMP Retrofit Pilot Program, Composite Siting Study, District 11
- Scoping Study, Retrofit Pilot Program, Caltrans District 11

**General Description:** The pilot is an in-line, wet basin with a tributary area that includes mainline freeway, an on ramp and some adjacent slope areas for a total tributary area of 4 acres. Inflow to the basin occurs at a single point, the total water quality design volume is 0.22 acre-feet. Flow is discharged through an orifice cut into the wall of the riser outlet. A debris screen ( $\frac{1}{4}$ " openings) protects the orifice from clogging as well as providing a 300mm wide, 180° clear zone flow path. The rim of the riser has been set at the 1-year, 24-hour storage elevation. Less frequent storms will discharge through the top of the riser. A spillway designed for the 25-year storm recurrence interval has been incorporated to pass higher flows. The surrounding watershed area has been stabilized to reduce erosion potential using a hydroseed mix as indicated in the project specifications.

Maintenance access is provided at the perimeter of the basin. Storm water samples will be taken using automated equipment at both the basin inflow and outflow points. The discharge within the basin outlets into the permanent ground water pool. The invert of the basin immediately adjacent to the inflow is riprap lined. Storm frequencies less than 25-years discharge to an existing storm drain. The spillway discharges through a riprap pad into a sump. The basin side slopes are stabilized with the seed mix shown in the specifications. The basin geometry is a L:W ratio of approximately 5:1.

### **Design Data**

**Water Quality Discharge:** 3.5 cfs

**Tributary Area:** 4 acres

**Design Rainfall or Volume:** The 1-year, 24-hour rainfall. 0.22 Acre-ft.

**Design Average Detention Time or Residence Time:** Average detention time for the wet basin is 24 hours, the maximum drawdown time is 48 hours.

## **Design Discussion**

The basin was designed as an online facility to capture the tributary watershed for water quality monitoring purposes. In addition, the basin will accommodate less frequent storm events. The location and orientation of the wet basin was restricted by the intercept elevation location of the ground water table. The ground water provides a permanent pool for the proper function of the wet basin. A canal gate at the basin invert is provided to drain the basin should clogging of the orifice occur. A 30-foot clear zone setback was maintained adjacent to the basin. A driveway was provided to access the maintenance road located at the perimeter of the basin.

# **BMP Retrofit Pilot Program Pilot Project Design Information**

## **General – Project 5, Site 1**

**Project Location:** Located in the Escondido Maintenance Station on Mission Road, adjacent to State Route 78

**Project Type:** Sand Filter BMP

**Design Reference:** Caltrans' Planning and Design Staff Guide, Scoping Study, Siting Study, Delaware Design Paper

**General Description:** The proposed BMP consists of a sand filter structure located within the Escondido maintenance station. The tributary area, which totals 0.82 acres, is comprised of the northwest paved area of the maintenance station. The computed 1-year storm flow is 2.2 cfs. This storm flow will be intercepted using the proposed grate inlet and conveyed via underground drains through the BMP structure, discharging it into the existing 900mm RCP located on-site. The design storm flow will be monitored and sampled using automated equipment at both the inflow and outflow points of the proposed BMP system.

Access to the BMP site is through the maintenance station.

## **Design Data**

**Water Quality Discharge:** 2.2 cfs

**Tributary Area:** 0.82 acres

**Design Rainfall/Volume:** Modified 1-year/24-hour rainfall value

**Residence Time:** 24 hours

## **Design Discussion:**

Site constraints include lack of allowable grade differential between the drainage pickup and discharge points, and adverse impact to the current operation of the maintenance station. It was in consideration of both of these constraints that the Delaware type sand filter (lower storage volume requirement and underground structure) was chosen over the Austin type sand filter.

The Delaware design paper requires a total surface area within the filter structure to be equal to 720 square feet per acre of tributary area. Additionally, the design guidance requires that the first chamber volume be set to 540 cubic feet per acre of tributary area. The proposed BMP system is designed to meet these requirements.

# **BMP Retrofit Pilot Program Pilot Project Design Information**

## **General – Project 5, Site 2**

**Project Location:** Located in the Interstate 5/State Route 78 Park and Ride facility on Moreno Street, adjacent to Interstate 5

**Project Type:** Sand Filter BMP

**Design Reference:** Caltrans' Planning and Design Staff Guide, Scoping Study, Siting Study, City of Austin Design Guide

**General Description:** The proposed BMP is a sand filter structure located within the future expansion area of the I-5/SR78 Park and Ride facility. The tributary area totals approximately 0.78 acres. The total design storm flow is 1.6 cfs. The tributary storm runoff sheet flows into the proposed grate inlets located within the existing Park and Ride area. Storm water samples will be taken using automated equipment at both the inflow and outflow points of the BMP system.

Access to the BMP site is through the park and ride facility and the proposed pullout on Vista Way exit ramp.

## **Design Data**

**Water Quality Discharge:** 2.3 cfs

**Tributary Area:** 2.78 acres

**Design Rainfall:** Modified 1-year/24-hour rainfall value

**Residence Time:** 24 hours

## **Design Discussion:**

The proposed BMP site is a heavily used park and ride facility and therefore, intrusion into the parking area was kept to a minimum. For this reason the BMP structure was placed outside of the existing parking area and onto a fully landscaped area adjacent to the park and ride facility. This landscaped area will serve as the future park and ride expansion area.

The design flow will be intercepted at the two existing sump locations near the northeast side of the park and ride area. The existing GMP inlets will be replaced by grate inlets. These new grate inlets will have dual outlet pipes in order to route storm flows in excess of the 1-year storm event through the existing freeway drainage system.

# **BMP Retrofit Pilot Program Pilot Project Design Information**

## **General – Project 5, Site 3**

**Project Location:** Located in the La Costa Park and Ride facility on La Costa Avenue, adjacent to Interstate 5

**Project Type:** Sand Filter BMP

**Design Reference:** Caltrans' Planning and Design Staff Guide, Scoping Study, Siting Study  
City of Austin Design Guide

**General Description:** The proposed BMP consists of a sand filter structure located within the La Costa Park and Ride area. Approximately 2.78 acres of paved area drains into the proposed BMP system. The total design flow for the 1-year storm event is 2.3 cfs. Storm water samples will be taken using automated equipment at both the inflow and outflow points of the proposed BMP system.

Access to the BMP site is through the park and ride facility.

## **Design Data**

**Water Quality Discharge:** 2.3 cfs

**Tributary Area:** 2.78 acres

**Design Rainfall/Volume:** 1-year/24-hour rainfall value

**Residence Time:** 24 hours

## **Design Discussion:**

The design of the BMP system was developed with consideration of the following design constraints:

- Available space between the existing park and ride parking/driveway area
- The existing lagoon access road
- Existing right-of-way
- Impact to the Bataquitos Lagoon

In order to avoid construction within the Bataquitos Lagoon, an inlet channel was designed to intercept and convey the design storm flows. Storm flows greater than the 1-year storm event will flow into the proposed overflow channel and will be discharged into the existing drainage culvert.

In order to provide positive drainage towards the proposed inlet channel, pavement reconstruction will be performed immediately adjacent to the BMP site.

# **BMP Retrofit Pilot Program**

## **Pilot Project Design Information Summary**

### **General – Project 5, Site 4**

**Project Location:** Located in the Kearny Mesa Maintenance Station on Opportunity Road, adjacent to Interstate 805

**Project Type:** Compost Filter BMP

**Design Reference:** Caltrans' Planning and Design Staff Guide, Scoping Study, Siting Study, Compost Filter Design Guide

**General Description:** The proposed BMP consists of three (3) compost filter vaults located along the south side of the Kearny Mesa maintenance station. This BMP site is currently used as a storage area for small equipment and light construction materials. Approximately 0.75 acres of asphalt surface area is tributary to the proposed BMP system. The design 1-year storm flows of 2.6 cfs are conveyed through the existing concrete swale and discharged into the proposed drainage inlet. These flows are routed through a system of small underground pipes and three compost filter vaults, outletting them into the existing 900mm RCP located on-site. The design storm flows will be monitored and sampled using automated equipment at both the inflow and outflow points of the BMP system.

Access to the BMP site is through the maintenance station.

### **Design Data**

**Water Quality Discharge:** 2.6 cfs

**Tributary Area:** 0.75 acres

**Design Rainfall/Volume:** 1-year/24-hour rainfall value

**Residence Time:** Not Applicable

### **Design Discussion:**

The size of the proposed facility is based upon by the manufacturer's design criteria of 78 compost canisters per one cfs of storm runoff, requiring three 2.438m (8') x 5.486m (18') vaults. The layout of the system is controlled by the required vault sizes and the minimum hydraulic head differential of 0.71m (2.3') between the inlet and outlet elevations of the compost filter structures.

**Appendix A.2**  
**Geotechnical Information**



**GEOTECHNICAL ENGINEERING SERVICES**  
LKR Project No. 97-1019D  
March 18, 1998

**PRE-CONSTRUCTION  
GEOTECHNICAL  
EVALUATION REPORT**

**Caltrans Storm Water Runoff Study  
Retrofit Facilities, District 11,  
San Diego County  
California**

**Prepared for:**

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14725 Alton Parkway  
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**Prepared By:**

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**Robert Bein, William Frost and Associates**  
14725 Alton Parkway  
Irvine, CA 92618-2069

March 18, 1998  
97-1019D

Attention: Mr. Scott Taylor

Subject: **GEOTECHNICAL PRE-CONSTRUCTION REPORT**  
**Caltrans Storm Water Runoff Retrofit Study**  
**San Diego County, California**

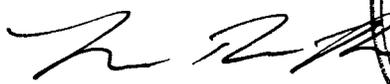
Mr. Taylor:

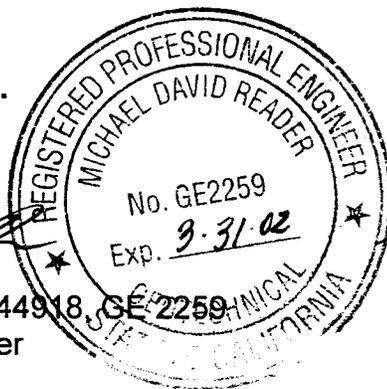
The L.K.R. Group, Inc. (LKR) is herewith submitting a pre-construction Geotechnical Evaluation Report for the subject sites. The authorized scope of services included site reconnaissance, determination of possible geotechnical constraints that could inhibit construction or change the design of the proposed devices, engineering and geological analysis, the preparation of this report. This report includes site description and general conclusions and recommendations to help assist in the design and bidding process of the storm water retrofit facilities.

We appreciate the opportunity to provide geotechnical services for this project. If you have any questions pertaining to this report, or if we can be of further service, please do not hesitate to contact The LKR Group.

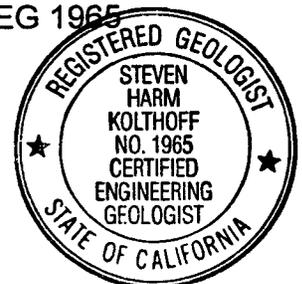
Respectfully submitted,

**THE L.K.R. GROUP, INC.**

  
Michael D. Reader, RCE 44918, GE 2259  
President, Project Manager



  
Steven H. Kolthoff CEG 1965  
Project Geologist



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## Table of Contents

Section	Page No.
1.0 INTRODUCTION .....	1
2.0 SITE EVALUATION .....	2
2.1 Carlsbad Maintenance Station.....	2
2.1.1 Conclusions and Recommendations .....	2
2.2 Kearny Mesa Maintenance Station.....	4
2.2.1 Conclusions and Recommendations .....	5
2.3 Escondido Maintenance Station .....	6
2.3.1 Conclusions and Recommendations .....	7
2.4 La Costa Park and Ride.....	8
2.4.1 Conclusions and Recommendations .....	9
2.5 SR-78 / I-5 Park and Ride.....	10
2.5.1 Conclusions and Recommendations .....	10
2.6 South I-5 / Palomar Airport Road.....	12
2.6.1 Conclusions and Recommendations .....	12
2.7 I-5 South / La Costa Avenue.....	14
2.7.1 Conclusions and Recommendations .....	14
2.8 South I-5 / Manchester Avenue East.....	16
2.8.1 Conclusions and Recommendations .....	17
2.9 South I-5 / Manchester Avenue West.....	18
2.9.1 Conclusions and Recommendations .....	19
2.10 South I-5 / SR-56 Interchange.....	21
2.10.1 Conclusions and Recommendations .....	21
2.11 I-15 / SR-78 Interchange .....	23
2.11.1 Conclusions and Recommendations .....	24
2.12 West SR-78 / Melrose Drive .....	26
2.12.1 Conclusions and Recommendations .....	26
3.0 CLOSURE .....	28
4.0 FIGURES.....	29

## 1.0 INTRODUCTION

This report presents the conclusions and recommendations for the geotechnical portion for the Storm Water Runoff Study performed for selected sites by **THE L.K.R. GROUP, INC. (LKR)** for proposed Caltrans Retrofit Facilities in San Diego County, California. Site location map and selected site plans that were available at the time of this report are depicted as figures in the back of this report. The site plans that are not included with this report will be submitted upon completion.

To improve the potential quality of storm water runoff from Caltrans facilities, several types of storm water controls have been designed by RBF as part of the Best Management Practice (BMP) in the San Diego County area.

As part of the BMP, the 12 sites were selected for the Facilities Retrofit Pilot Study after an evaluation by RBF. A site reconnaissance was performed by both LKR and RBF to evaluate constructibility of the proposed storm water runoff retrofit structures.

The following sites are part of this study:

**Table 1: Retrofit Pilot Study Sites**

Carlsbad M. S.	SR-78 / I-5 P & R	S I-5 / Manchester Ave. W.
Kearny Mesa M.S.	S I-5 / Palomar Airport Road	SR-56 / I-5 Interchange
Escondido M.S.	S I-5 / La Costa Ave. W.	SR-78 / I-15 Interchange
La Costa P & R	S I-5 / Manchester Ave. E.	E. SR-78 / Melrose Dr.

M. S. = Maintenance Station

P & R = Park and Ride

Refer to **Figure 1, Vicinity Map**, for a generalized description of the location of the sites.

## 2.0 SITE EVALUATION

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The following sites are arranged in the order of Maintenance Stations, Park and Rides and others that were visited during the site evaluation reconnaissance on February 10, 1998. The sites were evaluated by conducting limited field exploration, literature searches and/or site visits.

### 2.1 Carlsbad Maintenance Station

The Carlsbad Maintenance Station is located at 6050 Paseo Del Norte near the south east intersection of Palomar Airport Road and Paseo Del Norte in the City of Carlsbad. At the Carlsbad yard, infiltration trench is proposed along the south side of an asphalt parking area near a cut/fill slope ranging 4 to 6 feet (1.2 to 1.8 m) in height.

Based on geologic maps, this site is on the lowest Pleistocene on-shore marine terrace. Asphalt pavement encountered on site during the exploration phase, was 3-inches (7.6 cm) thick on top of 6-inches (15.4 cm) of aggregate base. Below the aggregate base, a light brown silty fine- to medium-grained sandstone unit of the Eocene Santiago Formation was encountered throughout the total depth to 15 feet (4.6 m). No ground water was encountered in the exploration boring.

The proposed BMP facility will consist of an Infiltration Trench (IT) and a Biofiltration Strip (BSt). Values of the in-drill hole permeability test performed in the exploration boring for the feasibility study were  $2.8 \times 10^{-5}$  ft/s or  $8.7 \times 10^{-4}$  cm/s. *Figure 2 & 3* contain a depiction of the proposed facility and the adjacent cut/fill slope.

#### 2.1.1 Conclusions and Recommendations

Based on the feasibility study and site visit, it was concluded that this site is feasible for the construction of an IT facility in conjunction with a BSt. During construction of the IT, isolated hard cemented zones or isolated lenses of gravels, cobbles and bedded conditions could be encountered. Ground water should not be a problem during construction except after or during a rain storm. Groundwater was not encountered in the exploration boring. With the lack of cementation and the presents of possible thin beds of clay along bedding, the bedrock materials if excavated could be subject to excavation failures and collapses.

Since the proposed storm water retrofit facility is within a bedrock unit of good permeability properties and the geologic conditions suggests that the water table may be greater than 50 feet, a ground water monitoring well is not recommended at this time.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the IT, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This would include shoring of the excavation and setting up areas of exit before a worker enters.

Large cobble size material may not be common but if encountered could inhibit excavating with standard earthwork equipment.

To protect the present southern slope from water seeps or failure due to saturation from the IT, the top 4 feet to 6 feet (1.2 to 1.8 m) of the IT shall be sealed off.

Root barriers should be installed to prevent nearby trees from invading into the IT.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the IT in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the IT or plugged to prevent drainage.

Prior to placing the filtering media into the excavation, a geofabric should be installed along the excavation walls and bottom to prevent natural materials from migrating into the filtering media and reducing the performance of the IT. After installing the geofabric, the filtering media can be placed.

No material greater than 3-inches (7.6 cm) in diameter shall be used as backfill.

All backfill, except for the bedding, filter media and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

A swale freeboard shall be installed to prevent organics (leaves, trash, etc.) from entering the BSt.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## **2.2 Kearny Mesa Maintenance Station**

The Kearny Mesa Maintenance Station is located at 7179 Opportunity Road adjacent to the north I-805 in the City of San Diego. At the Kearny Mesa yard, the retrofit facility is proposed in an asphalt parking area along the north I-805 near where the yard drains along a swale to storm drain inlet structure. This site is on a possible terrace of unknown age or origin based on field observations made by the engineer. The asphalt pavement encountered during the exploration phase was 3-inches (7.6 cm) thick on top of 6-inches (15.4 cm) of aggregate base. Below the aggregate base, the bedrock material consisted of a hard moist to dry reddish brown silty fine- to medium-grained sandstone. This material was encountered throughout the total depth to 15 feet (15.4 m). No ground water was encountered.

The proposed BMP facility will consist of constructing a vault and filling the open space with a Compost Media Filter (CMF). **Figure 4** contains a depiction of the proposed facility.

## 2.2.1 Conclusions and Recommendations

Based on limited feasibility study and a site visit, it was concluded that this site is feasible for the construction of a CMF facility. During construction of the CMF excavation, dense sandstone and bedded conditions could be encountered. Fracturing and bedding within the bedrock could cause localized blocky cavings. Ground water should not be a problem except after or during a rain storm.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the approval the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the CMF, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This would include shoring of the excavation and setting up areas of exit before a worker enters.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

The dense nature of the on site bedrock could inhibit excavating with standard earthwork equipment.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Revaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the CMF in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the excavation and plugged to prevent drainage of the CMF.

All backfill, except for the bedding, media filter and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

No material greater than 3-inches (7.6 cm) in diameter shall be used as backfill.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

### **2.3 Escondido Maintenance Station**

The Escondido Maintenance Station is located at 1780 West Mission Avenue adjacent to the SR-78 in the City of Escondido. At the Escondido yard, the retrofit facility is proposed along the western end of an asphalt parking area. At the proposed location, a large open culvert and head wall structure is present.

During the feasibility phase of this project, drilling by the engineer determined that the existing asphalt pavement was 3-inches (7.6 cm) thick on top of 6-inches (15.4) of aggregate base. The natural materials consisted of a moist to wet gray to dark brown silty to clayey fine-grained micaceous sand to gravelly to cobbly sand alluvium material. This material was encountered to a total depth of 20 feet (6.1 m). Ground water was encountered during drilling at approximately 8 feet (2.4 m) from the surface.

The proposed BMP facility will consist of a Sand Media Filter (SMF). **Figure 5** contains a depiction of the proposed facility.

### **2.3.1 Conclusions and Recommendations**

Based on a feasibility study and site visit, it was concluded that this site is feasible for the construction of a SMF facility. During construction, it is understood that there will be minimal excavating and earthwork. Excavating will exist of removing asphalt concrete and excavating a shallow pit. Shallow ground water could cause problems during construction. Ground water was found to be at approximately 3 feet (.9 m) from the surface. With the presents of shallow ground water and the lack of cementation within the on site alluvial materials, excavations could be subject to caving. Since the facility will be confined to a vault SMF, no ground water monitoring wells are recommended.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the approval the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

Since the proposed storm water retrofit device may be below ground water, the site may need to be dewatered prior to and/or during the construction of any excavation.

During construction of the SMF, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This should include shoring if needed.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Revaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the SMF in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the SMF.

All backfill, except for the bedding and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## **2.4 La Costa Park and Ride**

The La Costa Park and Ride is located just east of southbound I-5 and south of La Costa Avenue in the City of Carlsbad. At the La Costa parking area, the retrofit facility is proposed in a grassy area along an approximately 15 foot (4.6 m) high 2:1 horizontal to vertical slope adjacent to the Batiquitos Lagoon by an existing catch basin. This site is on a possible fill brought up to grade to construct the parking area.

The proposed BMP facility will consist of constructing a vault and filling the open space with a Sand Media Filter (SMF). No geotechnical exploration or testing was performed for this project. *Figure 6* contains a depiction of the proposed facility.

## 2.4.1 Conclusions and Recommendations

Based on a site visit, it was concluded that this site is feasible for the construction of a SMF facility. During construction, there will be minimal excavating. Excavating is expected to consist of brushing existing vegetation and excavating a small pit. Shallow ground water may not be a problem during construction except after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop. The excavations could be subject to caving.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the SMF, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This should include shoring if needed.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the SMF in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the SMF.

All backfill, except for the bedding and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## **2.5 SR-78 / I-5 Park and Ride**

The SR-78 / I-5 Park and Ride is located at the west terminus of SR-78 just west of southbound I-5 in the City of Oceanside. At the SR-78 / I-5 parking area, the retrofit facility is proposed in a asphalt concrete parking area along an approximately 5 foot (1.5 m) high 2:1 horizontal to vertical slope adjacent to the south bound I-5 by an existing catch basin. This site is on a possible cut/fill brought to grade to construct the parking area and I-5 freeway.

The proposed BMP facility will consist of constructing a vault and filling the open space with a Sand Media Filter (SMF). No geotechnical exploration or testing was performed for this project. **Figure 7** contains a depiction of the proposed facility.

### **2.5.1 Conclusions and Recommendations**

Based on a site visit, it was concluded that this site is feasible for the construction of a SMF facility. During construction, there will be minimal excavating. Excavating should consist of brushing existing vegetation and excavating a small pit. Shallow ground water may not be a problem during construction except after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop. The excavations could be subject to caving.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the SMF, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This should include shoring if needed.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Revaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the SMF in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the SMF or plugged to prevent drainage.

All backfill, except for the bedding and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## **2.6 South I-5 / Palomar Airport Road**

The south I-5 / Palomar Airport Road site is located along the southbound I-5 shoulder approximately 200 to 300 feet (61 to 91 m) south prior to the Palomar Airport Road offramp up to the offramp to Palomar Airport Road in the City of Carlsbad. This site seems to be on an undetermined thickness of fill brought to grade to construct the I-5 freeway and offramp.

The proposed BMP facility will consist of constructing a Biofiltration Swale (BSw). No geotechnical exploration or testing was performed for this project. **Figure 8** contains a depiction of the proposed facility.

### **2.6.1 Conclusions and Recommendations**

Based on a site visit, it was concluded that this site is feasible for the construction of a BSw facility. During construction, there will be minimal excavating. Excavating may consist of brushing existing vegetation and minimal excavating. Shallow ground water should not be a problem during construction except after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

For lane closure, Caltrans Standard Plans Traffic Control System for Lane Closure on Freeways and Expressways shall be followed.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the BSw, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This should include shoring if needed.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the BSw in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the BSw.

All backfill, except for the bedding and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

In areas of new construction, where topsoil is of good quality, it should be stockpiled during construction and respread during the final stages of construction per Caltrans Highway Design Manual Topic 706.2.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## 2.7 I-5 South / La Costa Avenue

The south I-5 / La Costa Avenue site is located along the southbound I-5 approximately 200 feet south from the start of the I-5 / La Costa Avenue offramp exit in the City of Leucadia. The proposed basin is bound to the east by the south I-5 / La Costa Avenue offramp, the south by a Chevron gas station at the La Costa Avenue exit. The Batiquitos Lagoon defines the north boundary and the west by a steep vegetated slope ascending to a residential or non-industrial commercial area for an estimated 20 to 30 feet (6.1 to 9.1 m). To the south of the nearby gas station on the slope, a small earthen failure was noticed.

During the feasibility phase of this project, drilling by the engineer determined that approximately 5 feet (1.5 m) of fill was present. Below the fill a fine-grained to silty sands derived from the nearby lagoon was encountered.

Ground water was measured from two open hole exploration borings on December 14, 1997 to be approximately 8 feet (2.4 m) from the surface. On February 10, 1998 after a series of rain storms, the water level was re-measured in the now monitoring well. At that time, the water level was approximately 3 feet (.9 m) from the surface. The ground was saturated and ponded water was observed on the surface.

The proposed BMP facility will consist of an Infiltration Basin (IB). Values of the in-drill hole permeability test performed in the exploration boring for the feasibility study were  $2.0 \times 10^{-5}$  ft/s or  $6.2 \times 10^{-4}$  cm/s.

### 2.7.1 Conclusions and Recommendations

Based on a feasibility study and site visit, it was concluded that this site is feasible for the construction of an IB facility. During construction of the IB, shallow ground water may be a problem especially after or during a period of rain storms or seasonal high tides. With the saturated conditions of the on site alluvial and fill materials, excavations could be subject to sloughing.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

For lane closure, Caltrans Standard Plans Traffic Control System for Lane Closure on Freeways and Expressways shall be followed.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the IB, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This would include shoring of the excavation and setting up areas of exit before a worker enters.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

All fill shall be removed from the proposed basin site. Prior to replacing the fill with a Caltrans Standard Permeable Backfill per 68-1.025 type class 1A, a geogrid should be installed along the excavation bottom to prevent equipment from bogging down and help support the imported filtering media. After installing the geogrid, the filtering media can be placed.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the IB in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the IB or plugged to prevent drainage.

No material greater than 3-inches (7.6 cm) in diameter shall be used as backfill.

In areas of new construction, where topsoil is of good quality, it should be stockpiled during construction and respread during the final stages of construction per Caltrans Highway Design Manual Topic 706.2.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

Since the proposed storm water retrofit facility will utilize natural on-site and imported fill materials as an infiltration media, and after major rain storms ground water was approximately 3 feet (.9 m) from the surface and the northern boundary being close to the Batiquitos lagoon. It is highly advised that ground water monitoring wells be installed.

Installation of a ground water monitoring well should be constructed following California Well Standards. The well casing and screened sections shall be constructed out of 4-inch diameter schedule 40 PVC or better. The screen section shall have .020-inch slots or smaller with a filter pack per design.

The monitoring well shall be installed down gradient from the IB into the water table for not more than 15 feet. Care should be taken to prevent drilling through aquicludes or into other aquifers below the upper most water table. The well will need to be developed to achieve low turbidity and help set the filter pack.

Sampling waters from the monitoring well should be taken prior to constructing the IB for an initial screening. After the infiltration facility is constructed, a sampling schedule should be assigned for periodic sampling prior to and after the rainy season.

## **2.8 South I-5 / Manchester Avenue East**

The north I-5 / Manchester Avenue East site is located within the cloverleaf created by the north bound I-5 offramp to Manchester Avenue in the City of Encinitas. The San Elijo Lagoon is south of Manchester Avenue. At the south east corner of the proposed site, a sewer pump station is present.

During the feasibility phase of this project, drilling by the engineer determined that approximately 5 foot (1.5 m) of thick fill was present. Below the fill was a fine-grained to silty sands derived from the nearby lagoon. Ground water was measured to be approximately 3.75 (1.1 m) feet from the surface on December 15, 1997. On February 10, 1998, the ground was saturated and ponded water was observed on the surface. During heavy rain storms, the sewer pump station has overflowed into the proposed site.

The proposed BMP facility will consist of an Extended Detention Basin (EDB) and a small basin to detain sewage from the sewer pump station overflow. Minor geotechnical exploration and testing was conducted at this site.

### **2.8.1 Conclusions and Recommendations**

Based on a site visit and nearby feasibility studies, it was concluded that this site is feasible for the construction of an EDB facility. During construction, there will be minimal excavating. Excavating may consist of brushing existing vegetation and removal of the existing fill sough in the upper few feet of existing material. There should be minimal impact to the existing freeway connector fills. Ground water was found to be from approximately 3.75 feet (1.1 m) from the surface. Shallow ground water could be a problem during construction and after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop. With the lack of abundant clays or cementation within the on site fill and alluvium materials matrix, any excavation could be subject to caving.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All fill stockpiles shall be removed from the area of the proposed EDB. All other deleterious material must be removed from the proposed area prior to construction.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the EDB, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

All cut or fill slopes shall not be greater than 2:1 horizontal to vertical or greater than 20 feet (6.1 m) in height.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the EDB in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the EDB and plugged to prevent drainage.

Fill to be placed on slopes should be benched into competent fills or native soils.

All backfill, except for the bedding and six (6) inches of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

In areas of new construction, where topsoil is of good quality, it should be stockpiled during construction and respread during the final stages of construction per Caltrans Highway Design Manual Topic 706.2.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## **2.9 South I-5 / Manchester Avenue West**

The south I-5 / Manchester Avenue West site is located within the cloverleaf created by the south bound I-5 onramp from Manchester Avenue in the City of Encinitas. The San Elijo Lagoon is south of Manchester Avenue.

The proposed site consists of an approximately 5 foot (1.5 m) thick fill brought to grade to construct the I-5 freeway and the Manchester Avenue onramp. Below the fill was a fine-grained to silty sands derived from the nearby lagoon. Ground water was measured to be approximately 2.35 feet (.71 m) from the surface on December 15, 1997. On February 10, 1998, the ground was saturated. No ponded water was observed on the surface.

The proposed BMP facility will consist of a Wet Basin (WB). Minor geotechnical exploration and testing was conducted at this site.

### **2.9.1 Conclusions and Recommendations**

Based on a site visit and nearby feasibility studies, it was concluded that this site is feasible for the construction of a WB facility. During construction, there should be minimal excavating. Excavating should consist of brushing existing vegetation and removal of the existing fill sough in the upper few feet of existing material. There should be minimal impact to the existing connector fills. Ground water was found to be from approximately 2.35 feet (.71 m) from the surface. Shallow ground water could be a problem during construction and after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop. With the lack of abundant clays or cementation within the on site fill and alluvium materials matrix, any excavation could be subject to caving.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All fill stockpiles shall be removed from the area of the proposed WB. All other deleterious material must be removed from the proposed area prior to construction.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the WB, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

All cut or fill slopes shall not be greater than 2:1 horizontal to vertical or greater than 20 feet (6.1 m) in height.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the WB in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the WB and plugged to prevent drainage.

Fill to be placed on slopes should be benched into competent fills or native soils.

All backfill, except for the bedding and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

In areas of new construction, where topsoil is of good quality, it should be stockpiled during construction and respread during the final stages of construction per Caltrans Highway Design Manual Topic 706.2.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

Since the proposed storm water retrofit facility maybe subject to infiltration into natural on site materials and the ground water was found to be approximately 2.35 feet (.71 cm) from the surface, it is advisable that a ground water monitoring well be installed.

Installation of a ground water monitoring well shall be constructed following California Well Standards. The well casing and screened sections shall be constructed out of 4-inch diameter schedule 40 PVC or better. The screen section shall have .020-inch slots or smaller with a filter pack per design.

The monitoring well shall be installed down gradient from the WB into the water table for not more than 15 feet (4.6 m). Care should be taken to prevent drilling through aquicludes or into aquifers below the upper most water table. The well will need to be developed to achieve low turbidity and help set the filter pack.

Sampling waters from the monitoring well should be taken prior to constructing the WB for an initial screening. After the infiltration facility is constructed, a sampling schedule should be assigned for periodic sampling prior to and after the rainy season.

## **2.10 South I-5 / SR-56 Interchange**

The south I-5 / SR-56 Interchange site is located west of the SR-56 onramp to the I-5 south in the City of San Diego. The Soledad Creek and the Carmel Valley Road Park and Ride is north of the proposed project.

The proposed site was visited on February 15, 1998, It was noticed that an existing Detention Basin perched on a fill bench was approximately 2/3 the way down from the interchange. This existing basin was estimated to be approximately 30 feet (9.1 m) wide and 60 feet (18.3 m) long and filled with water approximately 1 foot (.31 m) deep maximum. A culvert inlet structure with a head wall was present at the basin level. For the west a spill way lined with 1 foot (3.1 m) diameter rip rap acts as an overflow structure to an asphalt concrete roadway. West of the roadway to the west was a marshy wetlands of the Soledad Creek delta is present. The spill way and fill supporting the detention basin was saturated with minor seeps noticed along the lower section of the spill way and fill toe. Piping and erosion was noticed around the inlet structure.

Ground water is estimated to be approximately 10 feet (3.1 m) or less below the level of the wetlands adjacent to the asphalt roadway.

It is proposed to increase the size of the existing detention basin for the construction of an Extended Detention Basin (EDB). To construct the EDB, the upper fill slope between the freeway interchange and detention basin will have to be graded. No geotechnical exploration or testing was conducted at this site.

### **2.10.1 Conclusions and Recommendations**

Based on a site visit, it was concluded that this site is feasible for the construction of an EDB facility. During construction, there should be major earthwork. Excavating should consist of removing existing fills and expanding the existing detention basin. This could impact existing connector fills. Shallow ground water could be a problem during construction in the winter months when the existing detention basin is full and after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop. With the presents of saturated fills, any excavation may be subject to caving.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All fill stockpiles shall be removed from the area of the proposed EDB. All other deleterious material must be removed from the proposed area prior to construction.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the EDB, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

All cut or fill slopes shall not be greater than 2:1 horizontal to vertical or greater than 20 feet (6.1 m) in height.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the EDB in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the EDB and plugged to prevent drainage.

Fill to be placed on slopes should be benched into competent fills or native soils.

All backfill, except for the bedding and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

In areas of new construction, where topsoil is of good quality, it should be stockpiled during construction and respread during the final stages of construction per Caltrans Highway Design Manual Topic 706.2.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## **2.11 I-15 / SR-78 Interchange**

The I-15 / SR-56 Interchange site is located between the east SR-78 onramp to the I-15 south and the east SR-78 onramp to the I-15 north in the City of Escondido.

The proposed site is at an existing Basin that is connected with a culvert inlet and outlet structure within a large fill constructed for the freeway interchange. The existing basin is approximately 20 feet (6.1 m) wide and 40 feet (12.2 m) long. Reeds, tall grass and bamboo is common plant growth within the basin. The embankments forming the basin consists of fill materials.

At the I-15 and SR-78 interchange between the SR-78 east bound to I-15 north and south off-ramps a feasibility exploration boring was drilled 6 to 8 feet (1.8 to 2.4 m) above a small basin. The first 6 feet (1.8 m) of drilling encountered large gravel to boulder size rip rap fill material with a clayey to silty sand matrix. Below the fill, natural material encountered consisted of a moist to wet dark gray clayey to silty fine- to coarse-grained sand alluvium to a total depth of 25 feet (7.6 m). At 25 feet (7.6 m), weathered granitic rock was encountered to 30 feet (9.1 m). Ground water and fresh granitic rock was encountered at 30 feet (9.1 m).

After drilling the exploration boring and prior to installing the 4-inch PVC well, bentonite chips were placed in the bottom of the exploration boring. From 10 to 20 feet (3.1 to 6.1 m) a .040-inch slot screened section was installed and gravel packed with medium aquarium filter pack. A blank section of PVC was installed and sealed with medium bentonite chips from the surface to 10 feet (3.1 m). The well was pre-saturated with potable water to hydrate the bentonite chips sealing off and saturating the gravel packed zone and side wall test interval prior to performing in-drill hole permeability tests. Values of the in-drill hole permeability test performed in the exploration boring for the feasibility study were  $7.5 \times 10^{-7}$  feet/s or  $2.4 \times 10^{-5}$  cm/s.

It is proposed to increase the size of the existing detention basin for the construction of an Extended Detention Basin (EDB). To construct the EDB, fill between the freeway interchange and detention basin and the inlet structure will have to be removed. Minimal geotechnical exploration and testing was conducted at this site. *Figure 10* contains a depiction of the proposed facility.

### **2.11.1 Conclusions and Recommendations**

Based on a site visit and a limited feasibility study, it was concluded that this site is feasible for the construction of an EDB facility. During construction, there will be major earthwork. Excavating may consist of removing existing fills and expanding the existing detention basin. This could impact existing connector fills. Shallow ground water should be a problem during construction except after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop. With the presents of saturated soils on site, any excavation could be subject to caving.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All fill stockpiles shall be removed from the area of the proposed EDB. All other deleterious material must be removed from the proposed area prior to construction.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the EDB, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

All cut or fill slopes shall not be greater than 2:1 horizontal to vertical or greater than 20 feet (6.1 m) in height.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the EDB in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the EDB and plugged to prevent drainage.

Fill to be placed on slopes should be benched into competent fills or native soils.

All backfill, except for the bedding and six (6) inches of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

In areas of new construction, where topsoil is of good quality, it should be stockpiled during construction and respread during the final stages of construction per Caltrans Highway Design Manual Topic 706.2.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

## **2.12 West SR-78 / Melrose Drive**

The west SR-78 / Melrose Drive site is located along the eastbound SR-78 shoulder where the Buena Vista Creek flows through a box structure under Hacienda Drive in the City of Vista. This site is approximately 10 feet above the creek bottom. The proposed facility is designed to flow along the freeway shoulder then cascade over an existing creek bank to the creek below. The creek had approximately 6-inches (15.4 cm) of sheet flow into the box structure. Ground water at this site should be at the creek bed elevation or approximately 10 feet ( 3.1 m) from grade.

The proposed BMP facility will consist of constructing a Biofiltration Swale (BSw). No geotechnical exploration or testing was performed for this project. **Figure 11** contains a depiction of the proposed facility.

### **2.12.1 Conclusions and Recommendations**

Based on a site visit, it was concluded that this site is feasible for the construction of a BSw facility. During construction, there should be minimal excavating. Excavating will consist of brushing existing vegetation and minimal excavating and constructing erosional devices along the proposed outflow or spillway into the creek. Shallow ground water should not be a problem except at the creek bed level, in the creek channel and after or during a rain storm where ponding on the surface and saturation of the sub-grade could develop.

The following is recommended.

The grading contractor is responsible for notifying the appropriate governmental agency and the engineer of a pre-grading meeting, prior to the start of site cleanup, grading operations and anytime that grading operations are resumed after an interruption. Each step of the operations described below must be approved in a specific area by the engineer and, where required, by the appropriate governmental agency or agencies before proceeding with subsequent work. Where such approval is not obtained, the contractor, at his own expense, will re-do the work at the discretion of the engineering geologist/geotechnical engineer.

All site cleanup and grading will be subject to the approval of the engineer and must conform to the requirements of the pertinent governmental agencies and the following recommendations.

For lane closure, Caltrans Standard Plans Traffic Control System for Lane Closure on Freeways and Expressways shall be followed.

Prior to the start of grading, all trash, asphalt concrete and debris, shall be removed and disposed of or hauled off-site. If possible the deleterious material should be recycled.

During construction of the BSw, all excavations, trenches and earthwork shall follow the California Code of Regulations Title 8, Construction Safety Orders Sections 1504, 1539 – 1543. This should include shoring if needed.

Unless otherwise specified, all earthwork and grading will be performed under the continuous observation of the engineer.

If during the course of the grading, conditions are encountered which, in the opinion of the engineer, differ significantly from those described in the geotechnical report, work shall be stopped and the condition(s) evaluated. Reevaluation might include further investigations.

If, in the opinion of the engineer, contractor or owner, an unsafe condition is created or encountered during grading, all work in the area will be stopped until measures can be taken to mitigate the unsafe condition. An unsafe condition shall be considered any condition that creates a danger to workers, on-site structures or construction, or any off-site properties or persons.

Erosional features such as piping, downcutting and rilling can develop where the storm water runoff exits the BSw over the creek bank. This could erode both the existing creek bank and nearby box structure. Where the BSw exits into the creek, the area shall be protected from erosion by constructing a rip rap and gunite, concrete ramp, culvert system or any of the combination of from the top of the slope to the creek channel bottom.

Existing active or abandoned underground utilities or other structures should be removed, destroyed, decommissioned or rerouted from the BSw in accordance with requirements of the appropriate governing agencies. Any concrete or tile lines should be removed or rerouted away from the BSw or plugged to prevent drainage.

All backfill, except for the bedding and six (6) inches (15.4 cm) of cover, should be compacted to at least 90 percent of maximum density as determined by ASTM D1557-91.

In areas of new construction, where topsoil is of good quality, it should be stockpiled during construction and respread during the final stages of construction per Caltrans Highway Design Manual Topic 706.2.

All excess excavated material if found to be within Caltrans standards can be recycled for other Caltrans Projects. If Caltrans decides not to use the excavated material or the material is found to be sub-standard, the spoils can be hauled off site to an appropriate refuse or landfill location.

### **3.0 CLOSURE**

The findings and recommendations contained in this report are based upon specific limited field exploration, literature searches and/or site visits. The materials immediately adjacent to or beneath those observed may have different characteristics and no representations are made as to the quality or extent of materials not observed.

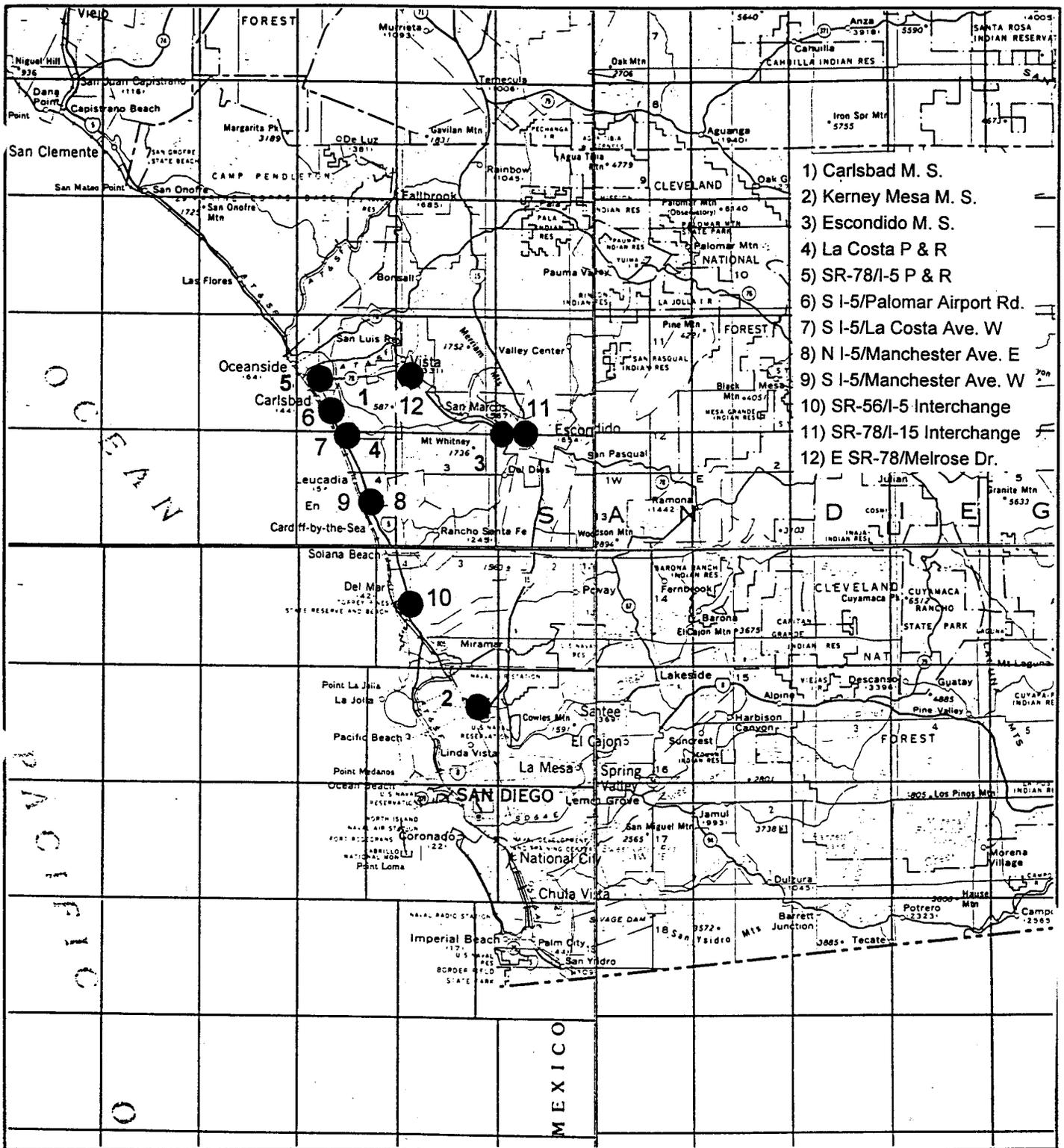
This report has not been prepared for use by parties or projects other than those named or described above. It may not contain sufficient information for other parties or other purposes. It has been prepared in accordance with generally accepted geotechnical practice and makes no other warranties, either expressed or implied, as to the professional advice or data included in it.

Evaluation of the sites where plans were not available during the preparation of this report were based on verbal and written descriptions, and the analysis during a site visit and/or limited field exploration programs.

## 4.0 FIGURES

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The following **Figures 1 through 11** consist of a site Vicinity Map and selected site Plans. At the time that this report was submitted, not all of the site Plans were complete. The Plans within this report are what was completed at the time of submittal.



- 1) Carlsbad M. S.
- 2) Kerney Mesa M. S.
- 3) Escondido M. S.
- 4) La Costa P & R
- 5) SR-78/I-5 P & R
- 6) S I-5/Palomar Airport Rd.
- 7) S I-5/La Costa Ave. W
- 8) N I-5/Manchester Ave. E
- 9) S I-5/Manchester Ave. W
- 10) SR-56/I-5 Interchange
- 11) SR-78/I-15 Interchange
- 12) E SR-78/Melrose Dr.

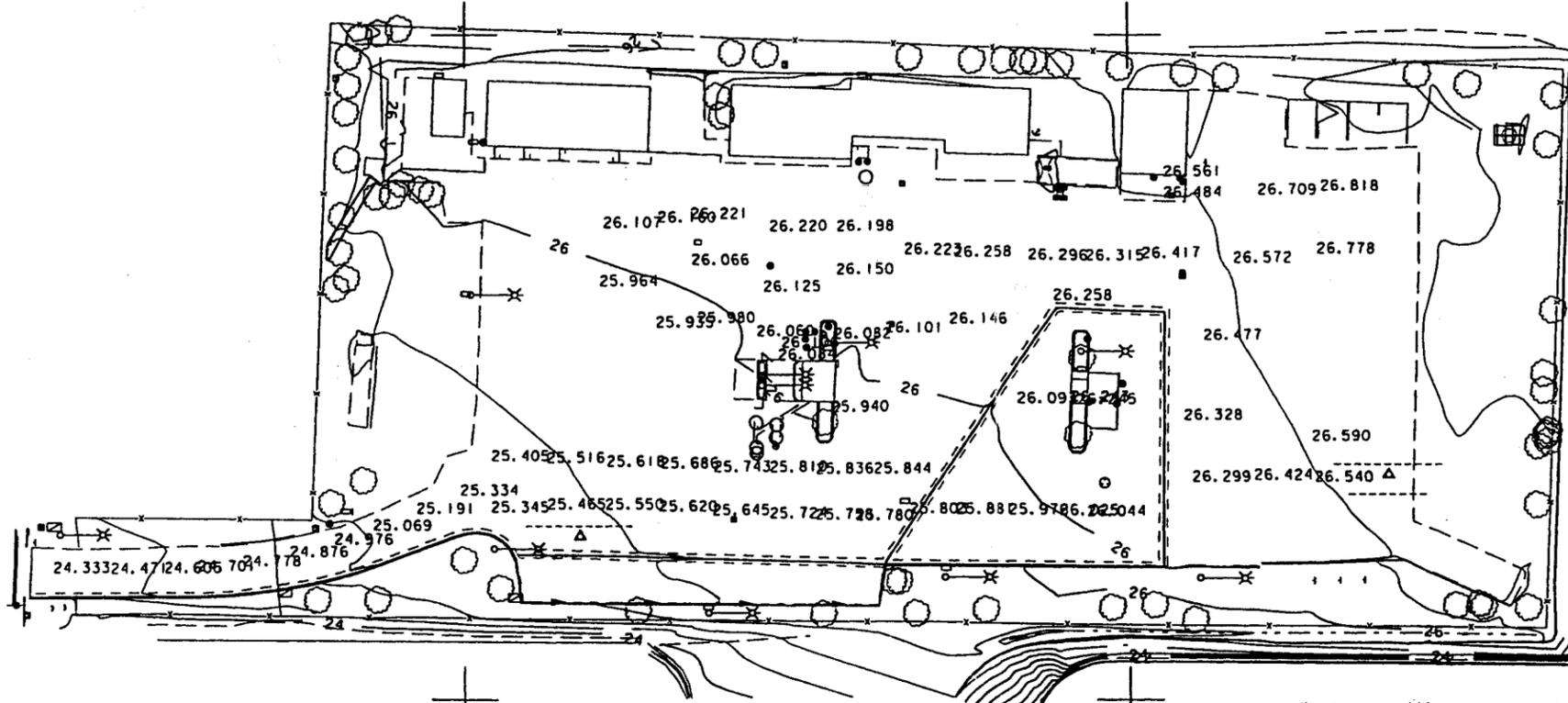
### VICINITY MAP

Reference: U.S.G.S. Index to California Topographic Maps

The L.K.R. Group, Inc.

Project Number: 97-1019D  
 Project Name: RBF-Caltrans Storm Water Runoff Study  
 Date: 02/24/98

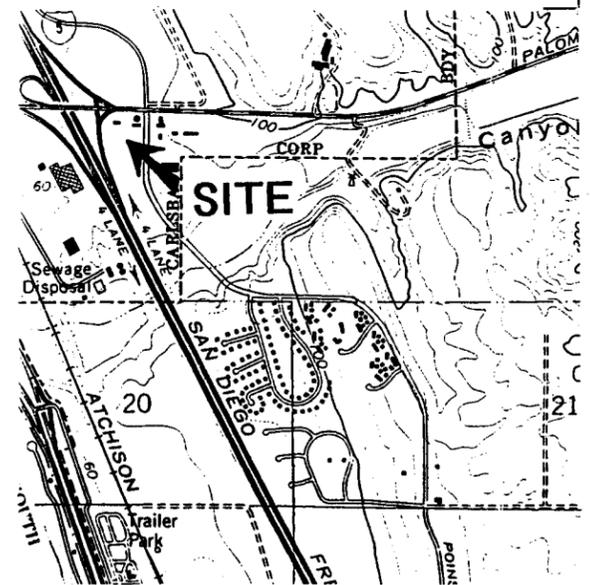
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Geotechnical Engineers  
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Torrance, CA 90501  
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**CARLSBAD MAINTENANCE YARD**

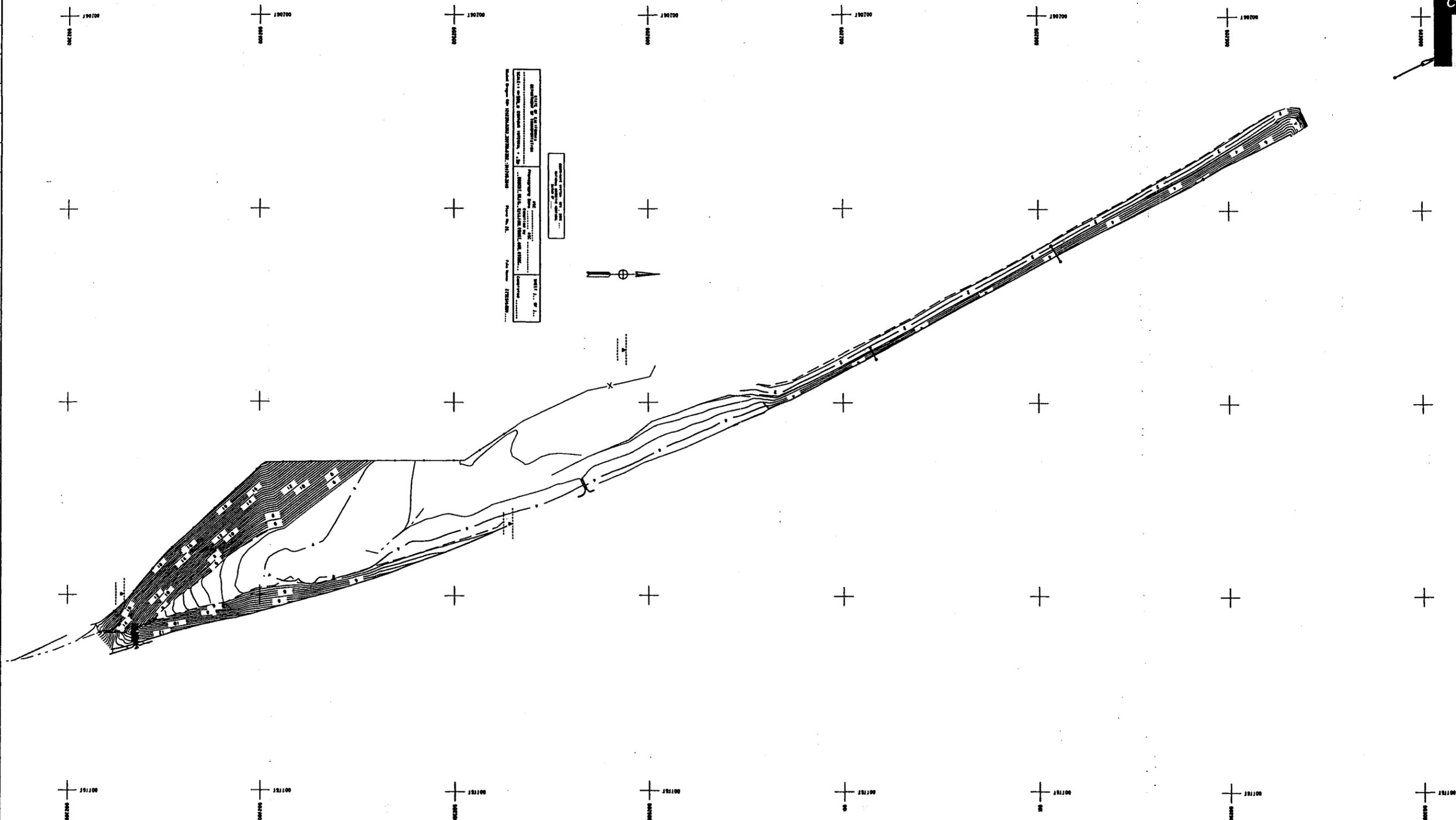
**RF**  
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FIGURE 2



DATE	REVISOR	REVISION

DATE	REVISOR	REVISION



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**CARLSBAD MAINTENANCE YARD**

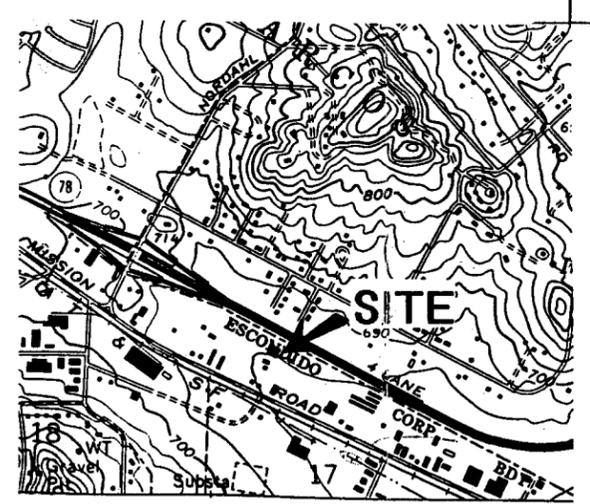
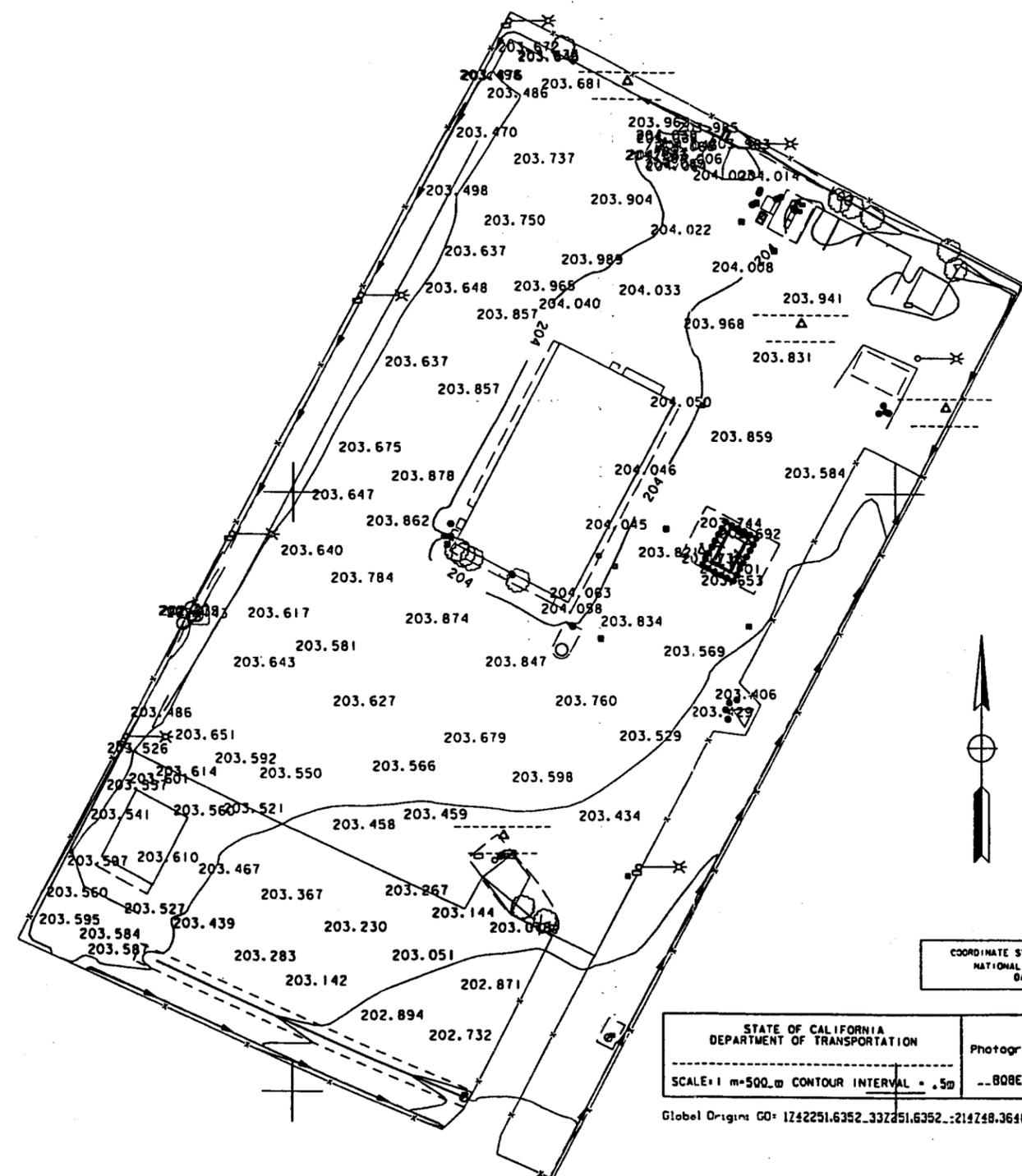
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 1741 472-3505

**FIGURE 3**



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**ESCONDIDO  
MAINTENANCE STATION**

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**FIGURE 5**



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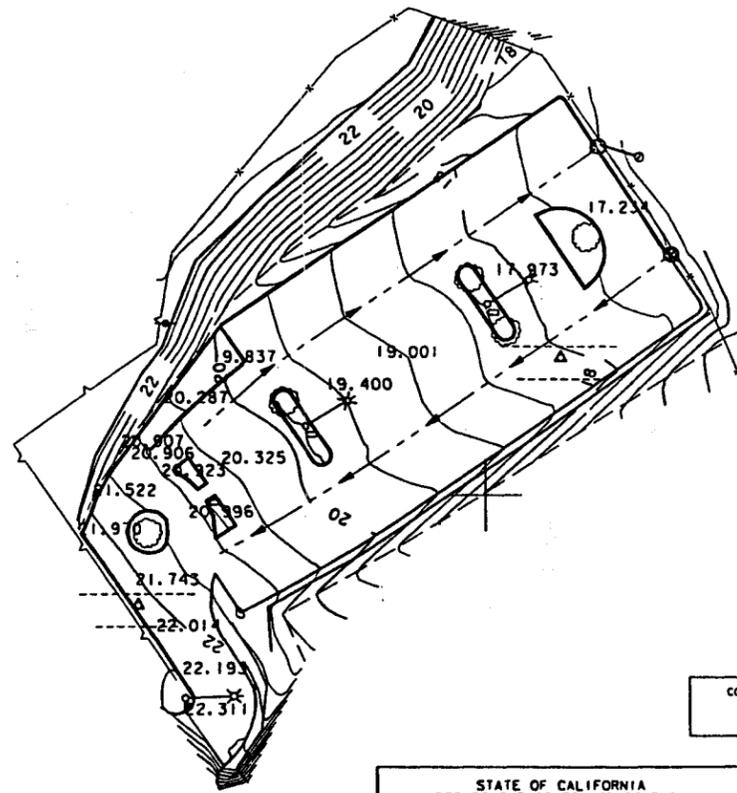
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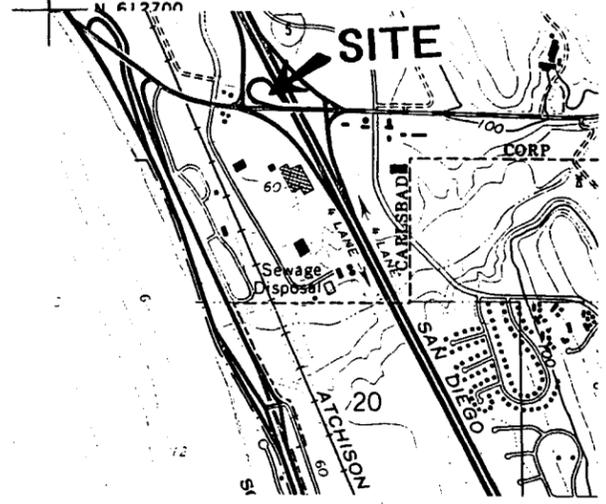
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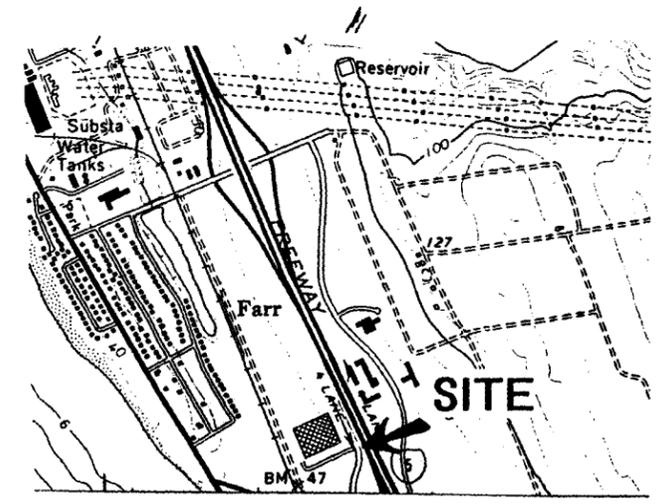
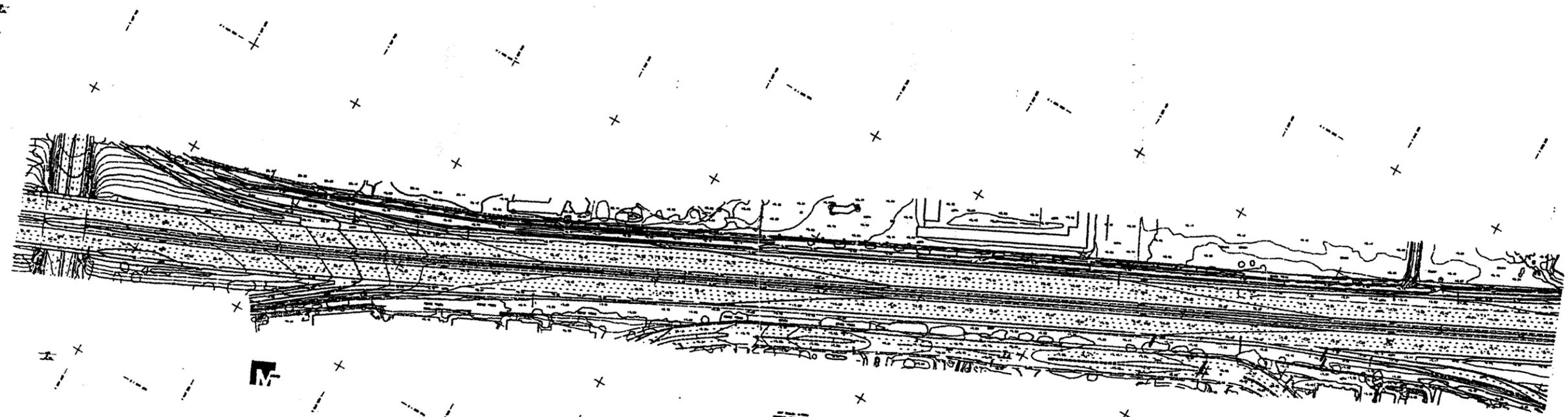
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**ROUTE 78 & I-5 PARK & RIDE**

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(714) 472-3505

**FIGURE 7**

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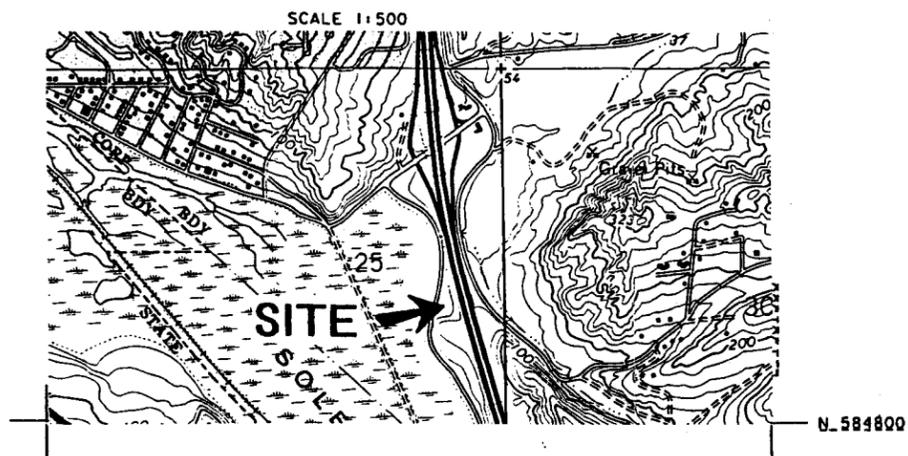
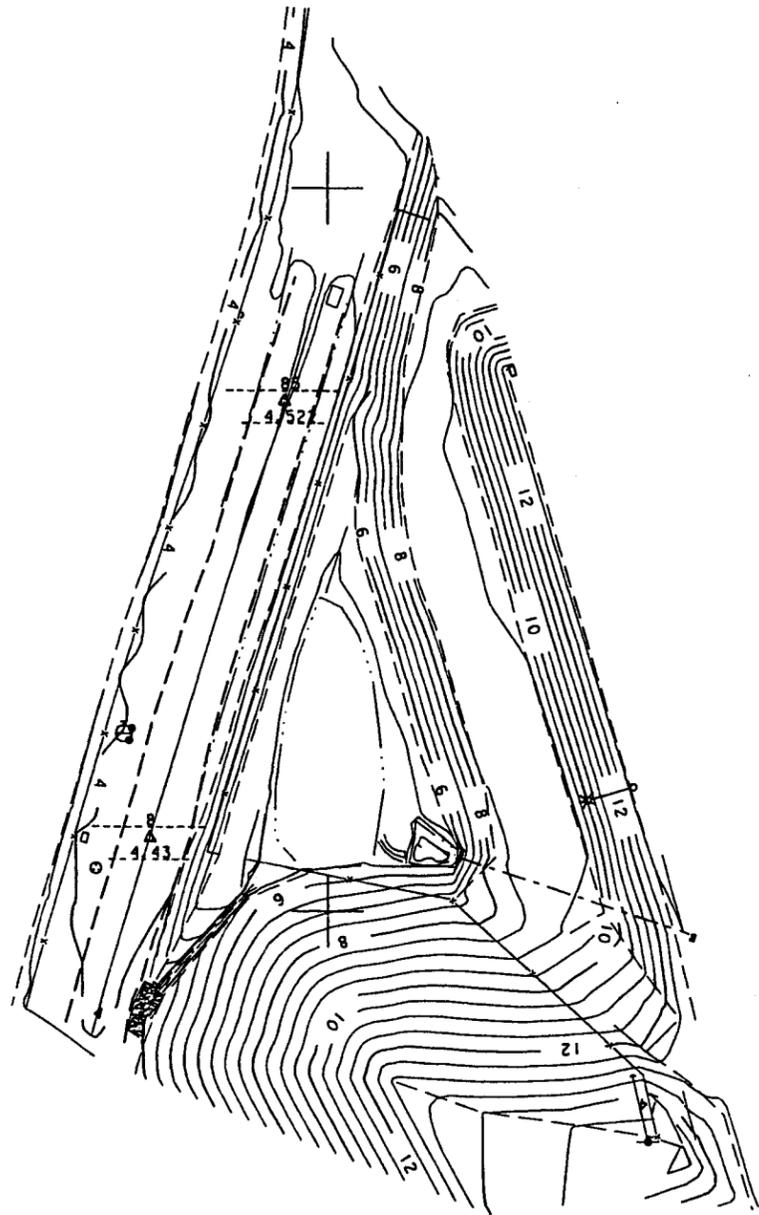
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 Torrance, CA 90501  
 Phone 310/320-5100

**FIGURE 8**

**PALOMAR AIRPORT RD.**

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PART OF DESIGN



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E. 1907300  
N. 584700

E. 1907500  
N. 584700

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Torrance, CA 90501  
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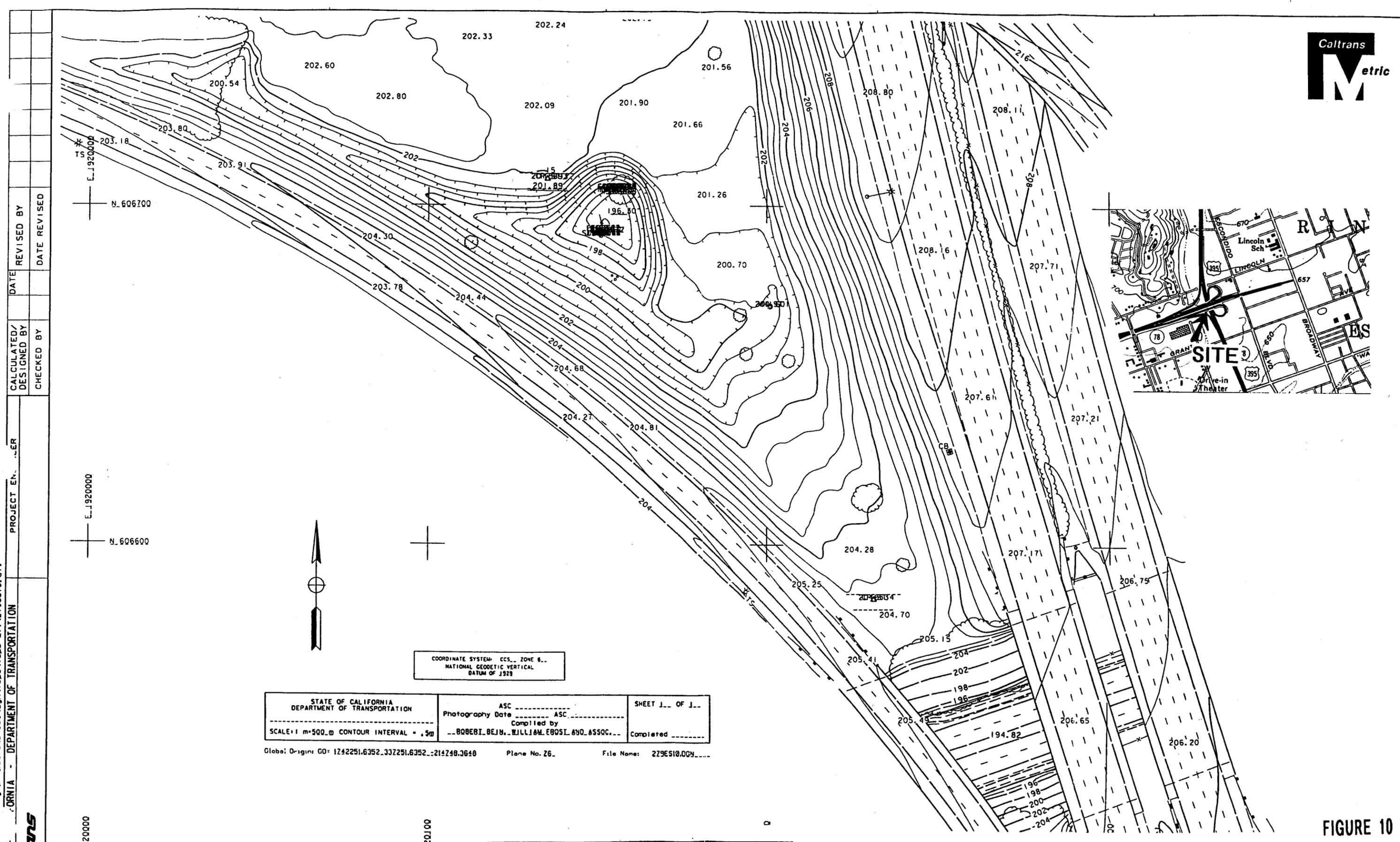
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**1-5 / SR-56**

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1740 472-3505

**FIGURE 9**





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 Robert Bein, William Frost & Associates  
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 Completed \_\_\_\_\_  
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FIGURE 10

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SR-78 / I-15 INTERCHANGE

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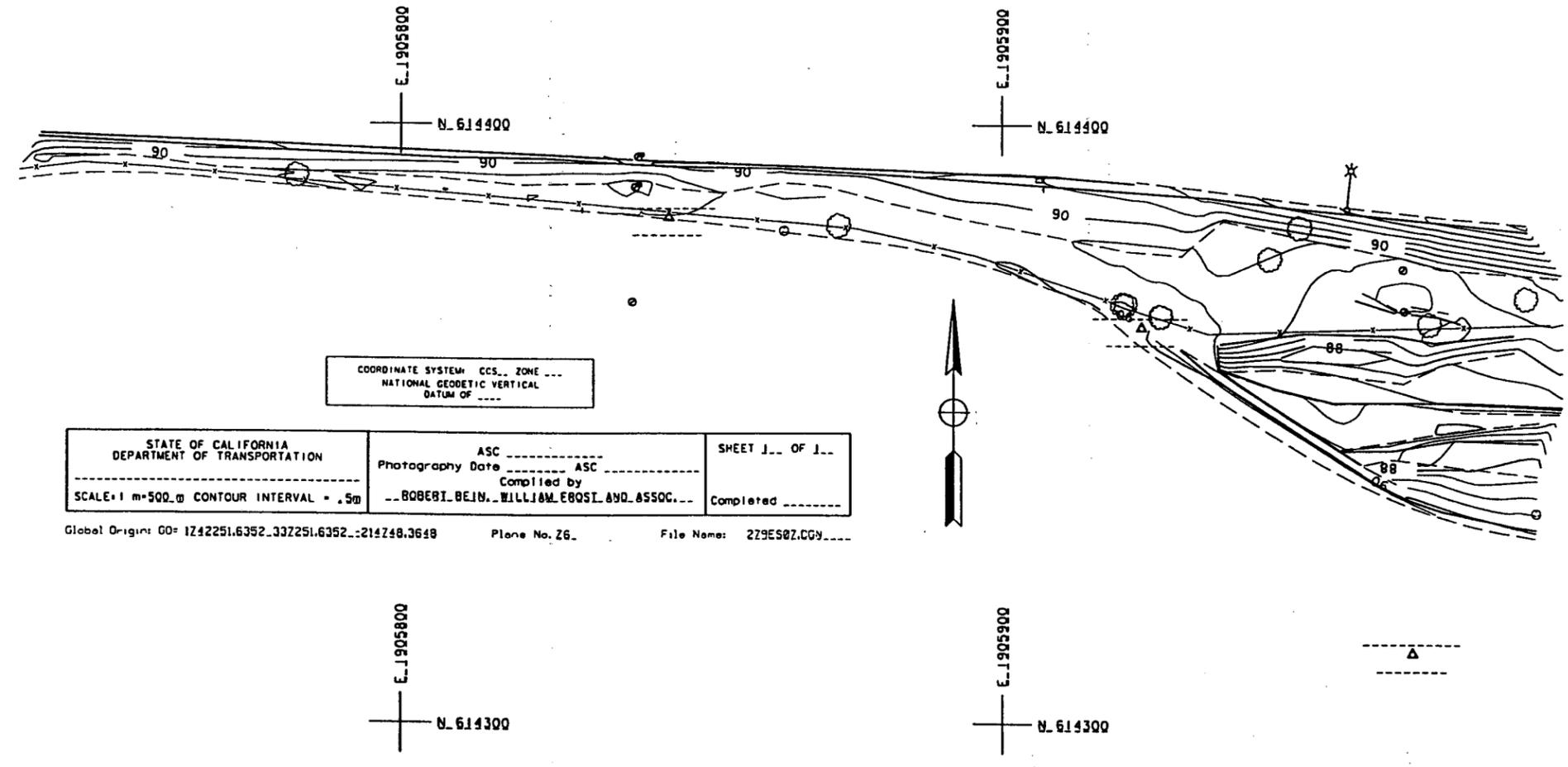
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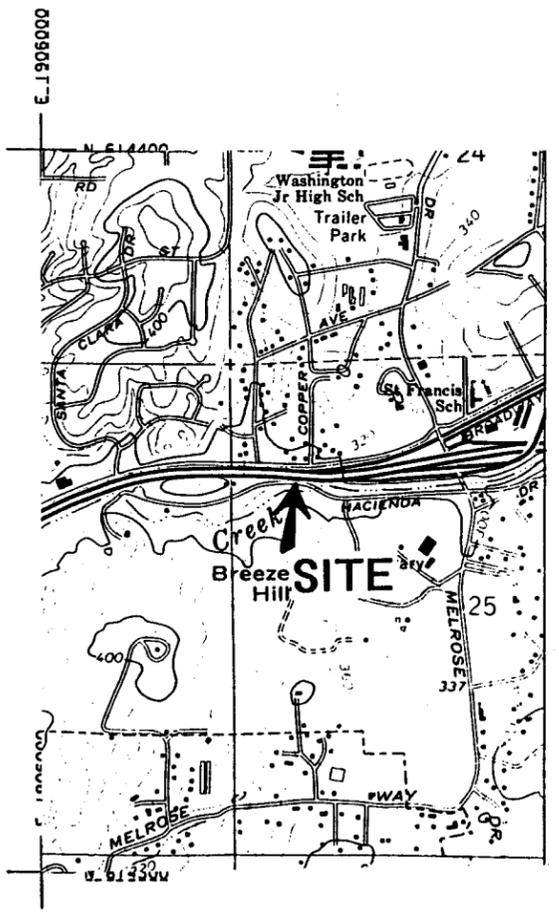
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E. 1905700  
N. 614300



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**MELROSE DR5. / SR-78**

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**FIGURE 11**

**Appendix A.3**  
**Construction Plans**

## **Procurement Projects**



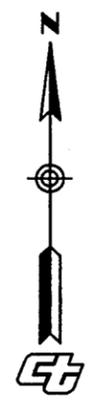
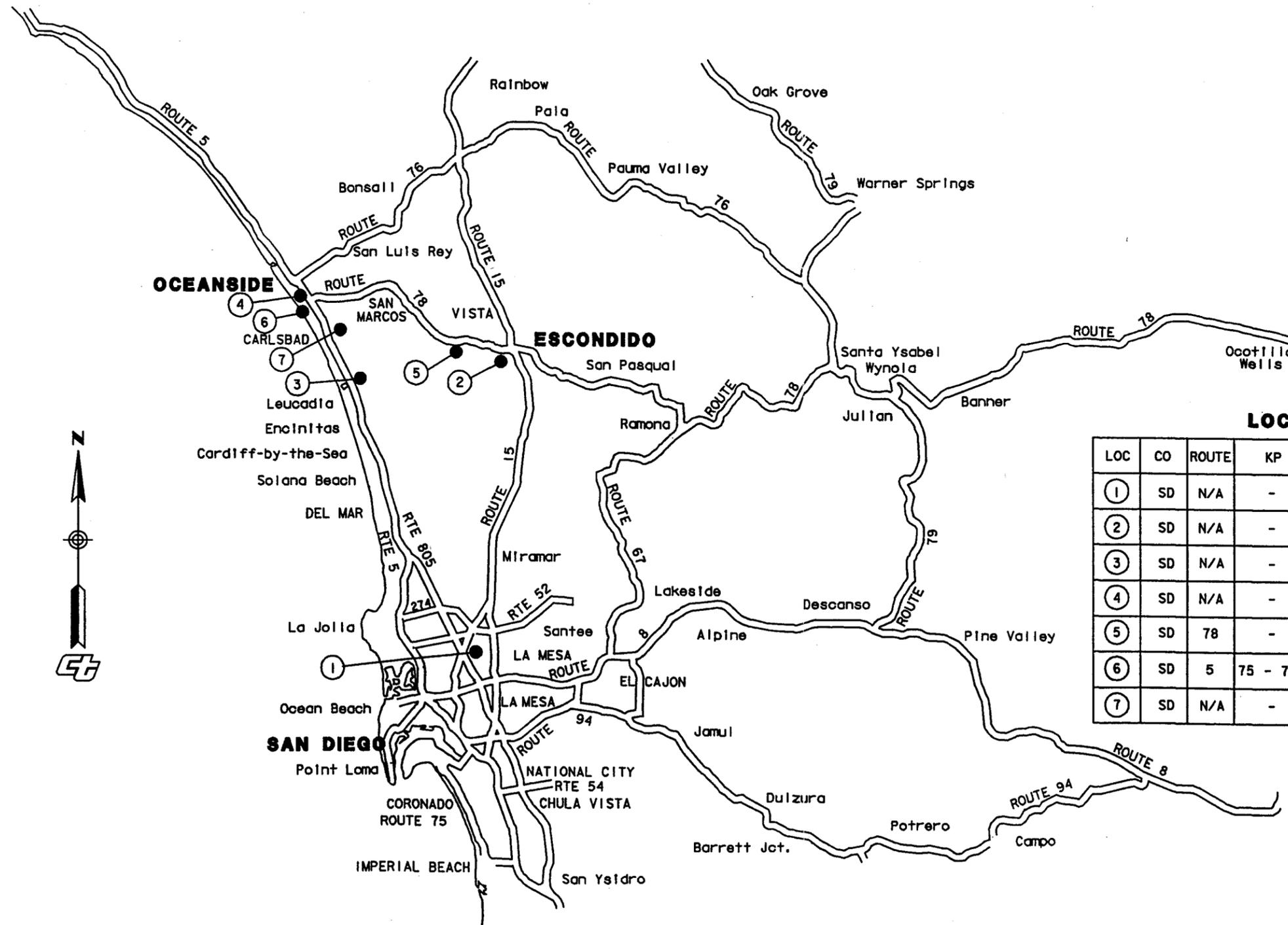
**STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
PROJECT PLANS FOR CONSTRUCTION ON  
STATE HIGHWAY  
IN SAN DIEGO COUNTY  
AT VARIOUS LOCATIONS**

To be supplemented by Standard Plans dated July, 1997

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	5, 78	Var	1	-



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**LOCATION OF CONSTRUCTION**

LOC	CO	ROUTE	KP	PM	DESCRIPTION
①	SD	N/A	-	-	KEARY MESA MAINTENANCE STATION
②	SD	N/A	-	-	ESCONDIDO MAINTENANCE STATION
③	SD	N/A	-	-	LA COSTA AVENUE PARK AND RIDE
④	SD	N/A	-	-	SR-78 / I-5 PARK AND RIDE
⑤	SD	78	-	-	SR-78 WEST OF MELROSE DRIVE INTERCHANGE
⑥	SD	5	75 - 75.5	46 - 46.9	I-5 NORTH OF PALOMAR AIRPORT ROAD INTERCHANGE
⑦	SD	N/A	-	-	CARLSBAD MAINTENANCE STATION



Project Engineer \_\_\_\_\_ Date \_\_\_\_\_  
Registered Civil Engineer

Plans Approval Date \_\_\_\_\_

Contract No. \_\_\_\_\_

The Contractor shall possess the Class (or classes) of license as specified in the "Notice to Contractors".

PROJECT ENGINEER [DATE] PROJECT MANAGER [DATE]

TIME PLOTTED -> \*\*\*\*\*

GENERAL ROAD WORK

MISCELLANEOUS

- AIOA Abbreviations
- AIOB Symbols
- A20A Pavement Markers and Traffic Lines, Typical Details
- A20B Pavement Markers and Traffic Lines, Typical Details
- A20C Pavement Markers and Traffic Lines, Typical Details
- A20D Pavement Markers and Traffic Lines, Typical Details
- A24A Pavement Markings- Arrows
- A24B Pavement Markings- Arrows
- A24C Pavement Markings- Symbols and Numerals
- A24D Pavement Markings- Words
- A24E Pavement Markings- Words and Crosswalks
- A35A Portland Cement Concrete Paving Details
- A40 Rumble Strip Details
- A62A Excavation and Backfill- Miscellaneous Details
- A62B Limits of Payment for Excavation and Backfill Bridge- Surcharge and Wall
- A62C Limits of Payment for Excavation and Backfill- Bridge
- A62D Excavation and Backfill- Concrete Pipe Culverts
- A62E Excavation and Backfill- Cast-in-Place Reinforced Concrete Box and Arch Culverts
- A62F Excavation and Backfill- Metal and Plastic Culverts
- A73A Object Markers
- A73B Markers
- A73C Delineators, Channellizers and Barricades
- A74 Survey Monuments
- A75A Concrete Barrier Type 50
- A75B Concrete Barrier Type 50E
- A75D Concrete Headlight Glare Screen
- RSP A76A CONCRETE BARRIER TYPE 60
- A76B Concrete Barrier Type 60
- A76C Concrete Barrier Type 60E
- A76D Concrete Barrier Type 60G
- A76E Concrete Barrier Type 60G
- A76F Concrete Barrier Type 60GE
- RSP A76G CONCRETE BARRIER TYPE 60S
- A76H Concrete Barrier Type 60S
- A76I Concrete Barrier Type 60SE
- A77A Metal Beam Guard Railing
- A77B Metal Beam Guard Railing- Standard Hardware
- RSP A77C METAL BEAM GUARD RAILING - POST AND BLOCKS
- A77D Guard Railing Flares
- A77E Guard Railing Flares
- A77F Metal Beam Guard Railing- Miscellaneous Details
- A77G Guard Railing End Anchors (Breakaway)
- A77GA Anchor Assembly (Breakaway, Type M)-Hardware and Post Details
- A77H Guard Railing End Anchors- Breakaway Hardware
- A77I Barrier and Guard Railing End Anchors
- A77J Guard Railing Connections to Bridge Railings, Retaining Walls and Abutments
- A77K Guard Railing Connections to Bridge Sidewalks and Curbs
- A78A Thrie Beam Barrier
- A78B Thrie Beam Barrier
- A78C Thrie Beam Barrier- Standard Hardware
- A78D Thrie Beam Barrier- Miscellaneous Details
- A78E Thrie Beam Barrier- End Anchors
- A78F Thrie Beam Barrier Connections to Bridge Railing
- A78G Thrie Beam Barrier Connections to Bridge Curbs, Retaining Walls and Abutments
- A78H Thrie Beam Barrier Connections to Concrete Barrier Type 50
- A78I Thrie Beam Barrier Connections to Concrete Barrier Type 60
- A81 Crash Cushion, Sand Filled
- A83 Portable Scale Pad and Approach Slab Details
- A85 Chain Link Fence
- A86 Barbed Wire and Wire Mesh Fences
- A87 Curbs, Dikes and Driveways
- A88 Curb Ramp Details
- A90 Accessible Parking

CRIB WALLS

- C7A Reinforced Concrete Crib Wall- Battered Wall- Types A,B and C
- C7B Reinforced Concrete Crib Wall- Battered Wall- Types D,E and F
- C7C Reinforced Concrete Crib Wall- Vertical Wall- Types A,B and C
- C7D Reinforced Concrete Crib Wall- Vertical Wall- Types D,E and F

- RSP C7E REINFORCED CONCRETE CRIB WALL- TYPES A,B,C,D,E AND F-HEADER AND STRECHER DETAILS
- RSP C7F DESIGN DATA FOR REINFORCED CONCRETE CRIB WALL FOUNDATION PRESSURE- BATTERED WALL
- RSP C7G REINFORCED CONCRETE CRIB WALL FOUNDATION PRESSURE- VERTICAL WALL
- C8A Steel Crib Wall- Construction Details
- C8B Steel Crib Wall- Design Data
- RSP C8C STEEL CRIB WALL- DESIGN DATA
- C9A Timber Crib Wall- Types A,B,C and D
- RSP C9B TIMBER CRIB WALL- TYPES A,B,C AND D-DESIGN DATA

DRAINAGE

- D72 Drainage Inlets
- D73 Drainage Inlets
- D74A Drainage Inlets
- D74B Drainage Inlets
- D74C Drainage Inlet Details
- D75 IS DELETED AND REPLACED WITH NSP D75A, NSP D75B AND NSP D75C
- RSP D77A Grate Details
- D77B Bicycle Proof Grate Details
- D77C Alternative Hinged Cover for Type OL and OS Inlets and Trash Rack for Type OCP Inlet
- D78 Gutter Depressions
- D79 Precast Reinforced Concrete Pipe- Direct Design Method
- D80 Cast-in-Place Reinforced Concrete Single Box Culvert
- D81 Cast-in-Place Reinforced Concrete Double Box Culvert
- D82 Cast-in-Place Reinforced Concrete Box Culvert Miscellaneous Details
- D84 Box Culvert Wingwalls- Types A,B and C
- RSP D85 BOX CULVERT WINGWALLS- TYPES D AND E
- D86A Box Culvert Warped Wingwalls
- D86B Pipe Culvert Headwalls, Endwalls and Warped Wingwalls
- D86C Arch Culvert Headwalls, Endwalls and Warped Wingwalls
- D87A Overside Drains
- D87B Overside Drains
- D87C Underdrains
- D88 Construction Loads on Culverts
- D88A Strut Details for Structural Steel Plate Pipes, Arches, and Vehicular Undercrossings
- D89 Pipe Headwalls
- D90 Pipe Culvert Headwalls, Endwalls and Wingwalls-Types A,B and C
- D93A Pipe Riser Connections
- D93B Drainage Inlet Riser Connections
- D93C Pipe Riser with Debris Rack Cage
- D94A Metal and Plastic Flared End Sections
- D94B Concrete Flared End Sections
- D95 Concrete Arch Culverts
- D97A Corrugated Metal Pipe Coupling Details No. 1- Annular Coupling Band Bar and Strap and Angle Connectors
- D97B Corrugated Metal Pipe Coupling Details No. 2- Hat Band Coupler and Flange Details
- D97C Corrugated Metal Pipe Coupling Details No. 3- Helical and Universal Couplers
- D97D Corrugated Metal Pipe Coupling Details No. 4- Hugger Coupling Bands
- D97E Corrugated Metal Pipe Coupling Details No. 5- Standard Joint
- D97F Corrugated Metal Pipe Coupling Details No. 6- Positive Joint
- D97G Corrugated Metal Pipe Coupling Details No. 7- Positive Joints and Downdrains
- D97H Reinforced Concrete Pipe or Non-Reinforced Concrete Pipe Standard and Positive Joints
- D98A Slotted Corrugated Steel Pipe Drain Details
- D98B Slotted Corrugated Steel Pipe Drain Details
- D99A Structural Section Drainage System Details
- D99B Edge Drain Outlet and Vent Details
- D99C Edge Drain Cleanout and Vent Details
- D99D Cross Drain Interceptor Details

HIGHWAY PLANTING

- H1 Planting and Irrigation- Abbreviations
- RSP H2 PLANTING AND IRRIGATION- SYMBOLS
- H3 Planting and Irrigation- Details
- H4 Planting and Irrigation- Details
- H5 Planting and Irrigation- Details
- H6 Planting and Irrigation- Details
- H7 Planting and Irrigation- Details



DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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To accompany plans dated \_\_\_\_\_

- H8 Planting and Irrigation- Details

TEMPORARY FACILITIES

- T1 Temporary Crash Cushion, Sand Filled
- T2 Temporary Crash Cushion, Sand Filled
- T3 Temporary Railing (Type K)
- T4 Temporary Traffic Screen
- T5 Temporary Terminal Section (Type K)
- T7 Construction Project Funding Identification Signs
- T10 Traffic Control System for Lane Closure on Freeways and Expressways
- T10A Traffic Control System for Lane and Complete Closures on Freeways and Expressways
- T11 Traffic Control System for Lane Closure on Multilane Conventional Highways
- T12 Traffic Control System for Lane Closure on Multilane Conventional Highways
- T13 Traffic Control System for Lane Closure on Two Lane Conventional Highways
- T14 Traffic Control System for Ramp Closures
- T15 Traffic Control System for Moving Lane Closure on Multilane Highways
- T16 Traffic Control System for Moving Lane Closure on Multilane Highways
- T17 Traffic Control System for Moving Lane Closure on Two Lane Highways

BRIDGE

- B0-1 Bridge Details
- B0-3 Bridge Details
- B0-5 Bridge Details
- B0-13 Bridge Details
- B2-3 400 mm Cast-in-Drilled-Hole Concrete Pile
- B2-5 Pile Details- Class 400 and Class 625
- B2-6 Pile Details- Class 400C and Class 625C
- B2-8 Pile Details- Class 900 and Class 900C
- B2-9 Load Test Pile Details (1)
- B2-10 Load Test Pile Details (2)
- B2-11 Load Test Pile Details (3)
- RSP B3-1 RETAINING WALL TYPE 1- H=1200 THROUGH 9100 mm
- B3-2 Retaining Wall Type 1- H=9700 Through 10 900 mm
- RSP B3-3 RETAINING WALL- TYPE 1A
- B3-4 Retaining Wall- Type 2
- B3-5 Counterfort Retaining Wall- Type 3
- B3-6 Counterfort Retaining Wall- Type 4
- RSP B3-7 RETAINING WALL- TYPE 5
- RSP B3-8 RETAINING WALL DETAILS No. 1
- B3-9 Retaining Wall Details No. 2
- B3-11 Retaining Wall Type 6- 1829 mm Maximum
- B6-1 T-Beam Details
- B6-10 Utility Openings, T-Beam
- B6-21 Joint Seals (Maximum Movement Rating = 50 mm)
- B7-1 Box Girder Details
- B7-5 Deck Drains
- B7-6 Deck Drains- Type D-land D-2
- B7-10 Utility Opening- Box Girder
- B7-11 Utility Details
- B8-5 Cast-in-Place Prestressed Girder Details
- B11-7 Chain Link Railing
- B11-47 Cable Railing
- B11-51 Tubular Hand Railing
- B11-52 Chain Link Railing Type 7
- B11-53 Concrete Barrier Type 25
- B11-54 Concrete Barrier Type 26

SHEET 1 OF 2  
STANDARD PLANS LIST  
(July, 1997 Edition)  
REVISED DECEMBER 4, 1997

- B13-1 Slope Protection Details
- B14-1 Structural Steel Plate Vehicular Undercrossing
- B14-3 Communication and Sprinkler Control Conduit (Conduit less than size 103)
- B14-4 Water Supply Line (Bridge) (Pipe less than NPS 4)
- B14-5 Water Supply Line (Details) (Pipe less than NPS 4)

**ROADSIDE SIGNS**

- RS1 Roadside Signs, Typical Installation Details No. 1
- RS2 Roadside Signs, Wood Post, Typical Installation Details No. 2
- RS3 Roadside Signs, Laminated Wood Box Post, Typical Installation Details No. 3
- RS4 Roadside Signs, Typical Installation Details No. 4

**OVERHEAD SIGNS**

**OVERHEAD SIGNS-TRUSS**

- S1 Overhead Signs- Truss, Instructions and Examples
- S2 Overhead Signs- Truss, Single Post Type, Post Types II thru VII
- S3 Overhead Signs- Truss, Two Post Type, Post Types I-S thru VII-S
- RSP S4 OVERHEAD SIGNS- TRUSS, SINGLE POST TYPE, STRUCTURAL FRAME MEMBERS
- S5 Overhead Signs- Truss, Two Post Type, Structural Frame Members
- S6 Overhead Signs- Truss, Structural Frame Details
- S7 Overhead Signs- Truss, Frame Junction Details
- S8A Overhead Signs- Steel Frame Removable Sign Panel Frames
- S8B Overhead Signs- Removable Sign Panel Frames, Overhead Formed Panel Mounting Details
- S8C Overhead Signs- Truss, Sign Panel Mounting Details, Laminated Panel- Type A
- S8D Overhead Signs- Truss, Removable Sign Panel Frames 2.794 m and 3.048 m Sign Panels
- S9 Overhead Signs- Walkway Details No. 1
- S10 Overhead Signs- Walkway Details No. 2
- S11 Overhead Signs- Walkway Safety Railing Details
- S13 Overhead Signs- Truss Pile Foundation

**OVERHEAD SIGNS-LIGHTWEIGHT**

- S14A Overhead Signs- Lightweight Balanced-Single Steel Post Connection and Mounting Details
- S14B Overhead Signs- Lightweight Balanced-Single Steel Post Details
- S15 Overhead Signs- Lightweight, Type A, Connection Details
- S16 Overhead Signs- Lightweight, Type B, Connection Details
- S17 Overhead Signs- Lightweight, Type C, Connection Details
- S18A Overhead Signs- Lightweight, Sign Panel Mounting Details, Laminated Panel- Type A
- S18B Overhead Signs- Lightweight, Light Fixture Mounting Details
- S20A Overhead Signs- Lightweight Post Details
- S20B Overhead Signs- Lightweight Foundation Details

**OVERHEAD SIGNS-BOX BEAM CLOSED TRUSS ALTERNATIVE**

- S39 Overhead Signs- Box Beam Closed Truss, Foundation Details
- S40A Overhead Signs- Box Beam Closed Truss, Two Post Type Frame Members
- S40B Overhead Signs- Box Beam Closed Truss, Single and Two Post Type, General Frame Details
- S40C Overhead Signs- Box Beam Closed Truss, Ribbed Sheet Metal Details
- S40D Overhead Signs- Box Beam Closed Truss, Two Post Type, Frame Details
- S40E Overhead Signs- Box Beam Closed Truss, Two Post Type, Frame Junction Details
- S40F Overhead Signs- Box Beam Closed Truss, Two Post Type, Post Details
- S40G Overhead Signs- Box Beam Closed Truss, Single Post Type, Frame Members
- S40H Overhead Signs- Box Beam Closed Truss, Single Post Cantilever, Frame Details
- S40I Overhead Signs- Box Beam Closed Truss, Single Post Cantilever, Frame Junction Details
- S40J Overhead Signs- Box Beam Closed Truss, Single Post Cantilever, Post Details
- S40K Overhead Signs- Box Beam Closed Truss, Single Post Butterfly, Frame Details
- S40L Overhead Signs- Box Beam Closed Truss, Single Post Butterfly, Frame Junction Details

- S40M Overhead Signs- Box Beam Closed Truss, Single Post Butterfly, Post Details

**OVERHEAD SIGNS-TUBULAR**

- S40N Overhead Signs- Tubular, Instructions and Examples
- S40P Overhead Signs- Tubular, Single Post Type, Layout and Pipe Selection
- S40Q Overhead Signs- Tubular, Two Post Type, Layout and Pipe Selection
- S40R Overhead Signs- Tubular, Structural Frame Details No. 1
- S40S Overhead Signs- Tubular, Structural Frame Details No. 2
- S40T Overhead Signs- Tubular, Foundation Details

**SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS**

- ES-1A Signal, Lighting and Electrical Systems- Symbols and Abbreviations
- ES-1B Signal, Lighting and Electrical Systems- Symbols and Abbreviations
- ES-2A Signal, Lighting and Electrical Systems- Service Equipment
- ES-2B Signal, Lighting and Electrical Systems- Service Equipment
- ES-2C Signal, Lighting and Electrical Systems- Service Equipment Notes
- ES-2D Signal, Lighting and Electrical Systems- Service Equipment and Typical Wiring Diagram, Type A
- ES-2E Signal, Lighting and Electrical Systems- Service Equipment and Typical Wiring Diagram, Type B
- ES-2F Signal, Lighting and Electrical Systems- Service Equipment and Typical Wiring Diagram, Type C
- ES-3A Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3B Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3C Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3D Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3E Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-4A Signal, Lighting and Electrical Systems- Controller Cabinet Details
- ES-4B Signal, Lighting and Electrical Systems- Controller Cabinet Details
- ES-4C Signal, Lighting and Electrical Systems- Controller Cabinet Details
- ES-4D Irrigation Controller Enclosure Cabinet
- ES-5A Signal, Lighting and Electrical Systems- Detectors
- ES-5B Signal, Lighting and Electrical Systems- Detectors
- ES-5C Signal, Lighting and Electrical Systems- Detectors
- ES-5D Signal, Lighting and Electrical Systems- Detectors
- ES-5E Signal, Lighting and Electrical Systems- Detectors
- ES-5F Signal, Lighting and Electrical Systems- Pedestrian Barricades
- ES-6A Signal and Lighting Standards- Type I Standards and Equipment Numbering
- ES-6AA Signal Standards- Push Button Posts
- ES-6B Lighting Standards- Types 15, 21 and 22
- ES-6C Lighting Standards- 24.4 m to 48.8 m High Mast Light Pole, Foundation Details
- ES-6D Lighting Standards- Types 30 and 31
- ES-6DA Lighting Standards- Type 32
- ES-6E Lighting Standards- Types 30 and 31, Base Details
- ES-6F Lighting Standards- 10 Degree Type
- ES-6H Lighting Standards- 10 Degree Type, Details
- RSP ES-6J SIGNAL AND LIGHTING STANDARDS- CASE 1 ARM LOADING, WIND VELOCITY = 113 km/h, ARM LENGTHS 4.6 m TO 9.1m
- ES-6K Signal and Lighting Standards- Case 2 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 6.1m to 9.1m
- ES-6L Signal and Lighting Standards- Case 3 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 4.6 m to 13.7 m
- ES-6M Signal and Lighting Standards- Case 4 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 7.6 m to 13.7 m
- ES-6MA Signal and Lighting Standards- Case 5 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 15.2 m to 16.8 m
- ES-6N Signal and Lighting Standards- Type 40-0-129
- ES-6O Signal and Lighting Standards- Case 1 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 7.6 m to 9.1m
- ES-6P Signal and Lighting Standards- Case 2 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 6.1m to 9.1m
- ES-6Q Signal and Lighting Standards- Case 3 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 6.1m to 13.7 m



DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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To accompany plans dated \_\_\_\_\_

- RSP ES-6R SIGNAL AND LIGHTING STANDARDS- CASE 4 ARM LOADING, WIND VELOCITY = 129 km/h, ARM LENGTHS 7.6 m TO 13.7 m
- ES-6RA Signal and Lighting Standards- Case 5 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 15.2 m to 16.8 m
- ES-6RB Signal and Lighting Standards- Case 5 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 18.2 m to 19.8 m
- ES-6S Signal and Lighting Standards- Details No. 1
- ES-6T Signal and Lighting Standards- Details No. 2
- ES-6TA Signal and Lighting Standards- Pole and Mast Arm Alternatives
- ES-6U Lighting Standards- Type 15 Slip Base Insert
- ES-6V Signal and Sign Standards- Type 33 Left Turn
- ES-7A Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7B Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7C Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7D Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7E Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7F Signal, Lighting and Electrical Systems- Flush Soffit Luminaire Modification Details, Structure Installations
- ES-8 Signal, Lighting and Electrical Systems- Pull Box Details
- ES-9A Signal, Lighting and Electrical Systems- Cantilever Flashing Beacon, Types 9, 9A and 9B
- ES-9B Signal, Lighting and Electrical Systems- Cantilever Flashing Beacon, Types 9, 9A and 9B
- ES-10 Signal, Lighting and Electrical Systems- Isolux Diagrams
- ES-11 Signal, Lighting and Electrical Systems- Foundation Installations
- ES-12 Signal, Lighting and Electrical Systems- Pedestrian Undercrossing Fluorescent Lighting Fixture
- ES-13 Signal, Lighting and Electrical Systems- Splicing Details
- ES-14 Signal, Lighting and Electrical Systems- Wiring Details and Fuse Ratings
- ES-15 Signal, Lighting and Electrical Systems- Pedestrian Overcrossing Fluorescent Lighting Fixture
- ES-27A Signal, Lighting and Electrical Systems- Extinguishable Message Sign, 250 mm Letters
- ES-27B Signal, Lighting and Electrical Systems- Extinguishable Message Sign, 250 mm Letters
- ES-28 Signal, Lighting and Electrical Systems- Extinguishable Message Sign and Flashing Beacons

**SIGN ILLUMINATION**

- ES-29 Sign Illumination- Mercury Sign Illumination Equipment
- ES-30 Sign Illumination- 915 mm Fluorescent Sign Illumination Equipment
- ES-32A Sign Illumination- Sign Illumination Equipment
- ES-32B Sign Illumination- Sign Illumination Control
- ES-33 Sign Illumination- Internally Illuminated Street Name Sign

**CLOSED CIRCUIT TELEVISION**

- RSP ES-34A CLOSED CIRCUIT TELEVISION- POLE DETAILS
- ES-34B Closed Circuit Television- Pole Details- Overhead Sign Mounted

**NEW STANDARD PLANS**

- NSP D75A PIPE INLETS
- NSP D75B PIPE INLETS
- NSP D75C PIPE INLETS- LADDER, STEP AND TRASH RACK DETAILS

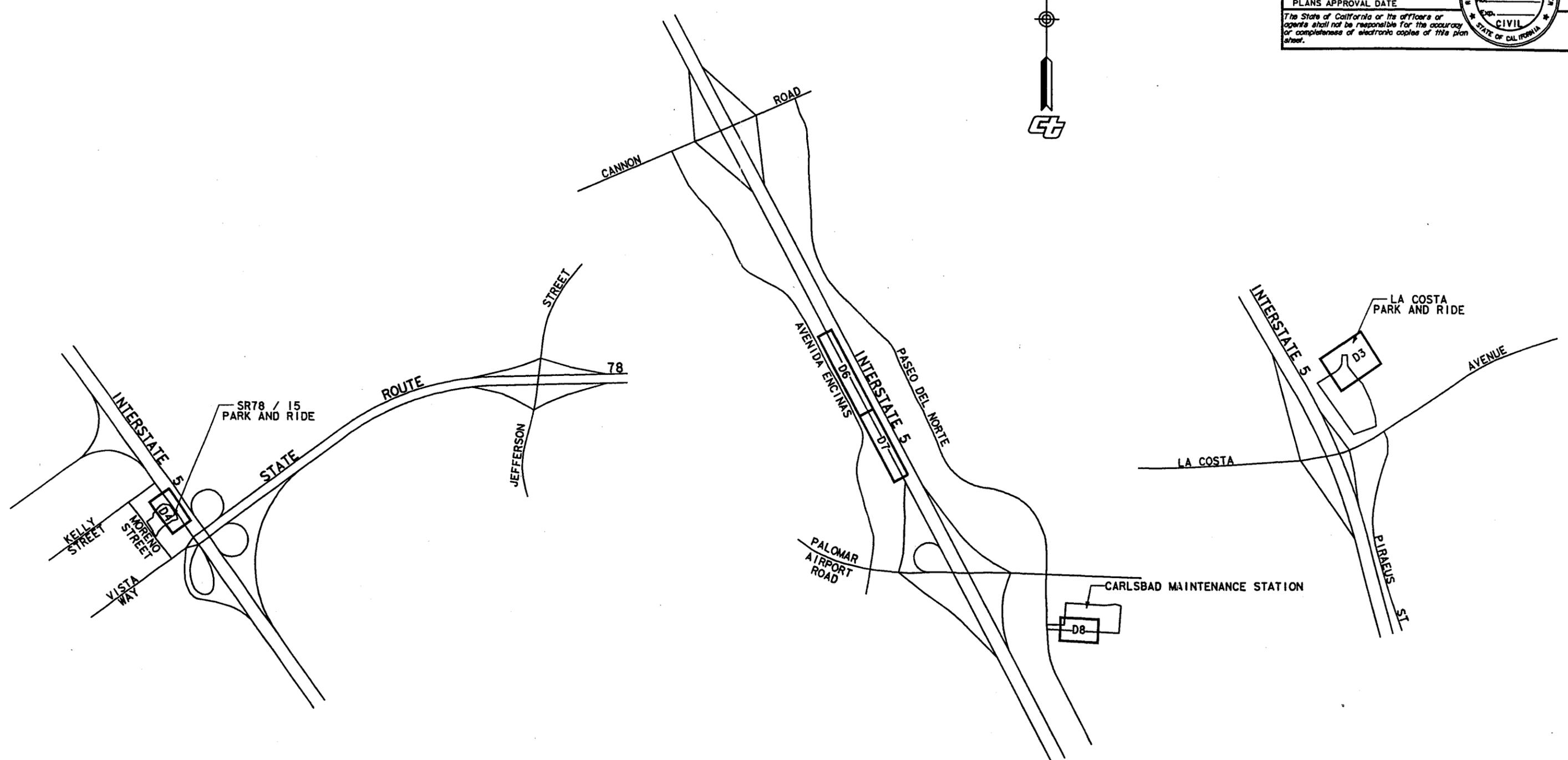
SHEET 2 OF 2  
STANDARD PLANS LIST  
(July, 1997 Edition)  
REVISED DECEMBER 4, 1997

The Standard Plan sheets applicable to this contract include, but are not limited to those indicated by a marked box. The Revised Standard Plans (RSP) and New Standard Plans (NSP) which apply to this contract are included as individual sheets of the project plans.

USERNAME => #USER  
RCN FILE => #PROJECT

CONTRACT NO.

©DATE: \_\_\_\_\_ ©FILES: \_\_\_\_\_  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
**Caltrans**  
 PROJECT ENGINEER: \_\_\_\_\_  
 CALCULATED/DESIGNED BY: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 REVISOR: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 REVISION: \_\_\_\_\_  
 DATE: \_\_\_\_\_



DIST	COUNTY	ROUTE	TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER \_\_\_\_\_  
 PLANS APPROVAL DATE \_\_\_\_\_  
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**KEY MAP**  
 NO SCALE

K-1

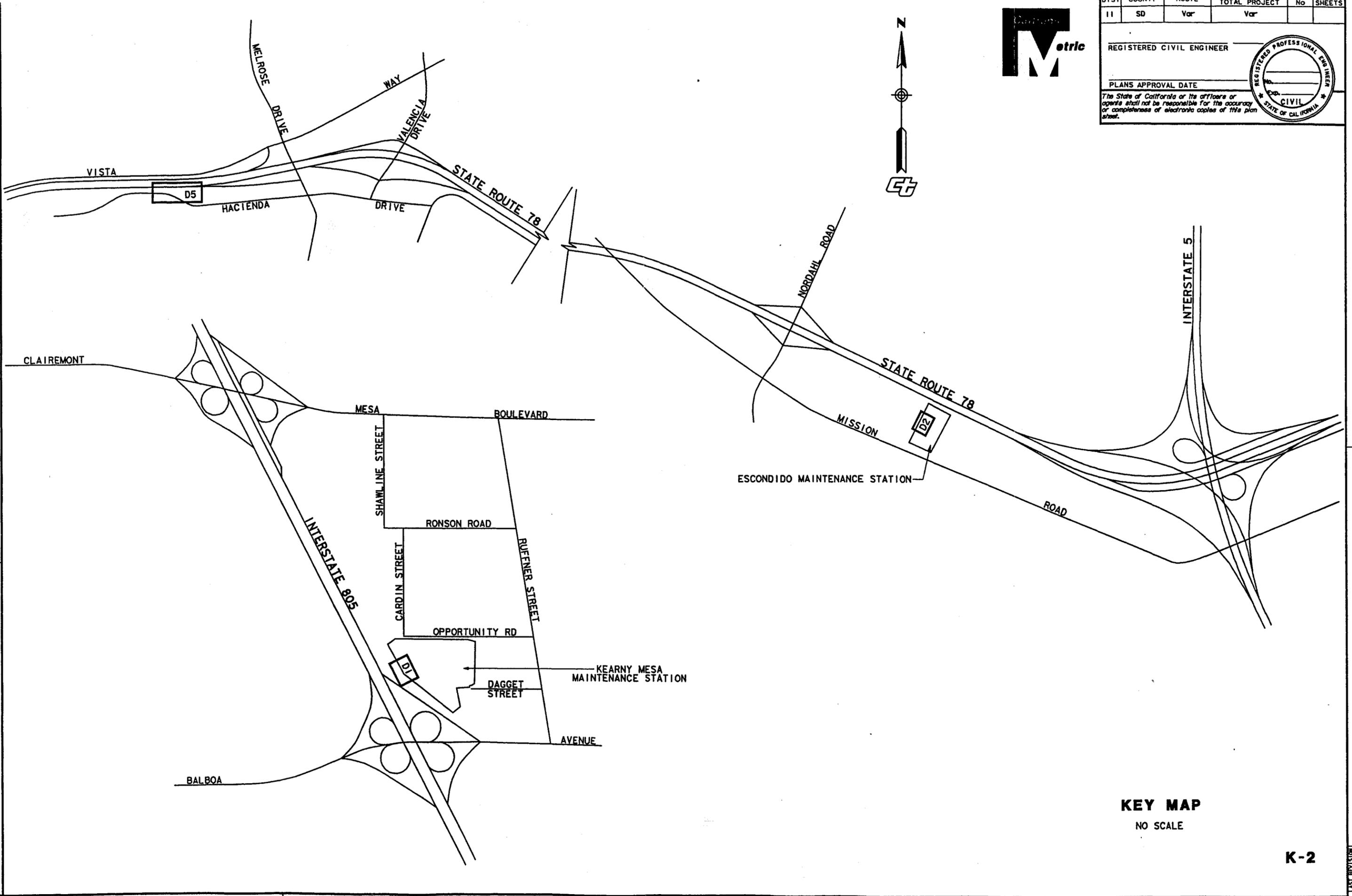
FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS  
 0 20 40 60 80

USERNAME -> USER  
 DGN FILE -> REQUEST

CU 0000

EA 00000

DATE	FILE	STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	PROJECT ENGINEER	CALCULATED/DESIGNED BY	CHECKED BY	DATE	REVISED BY	DATE	REVISED BY	DATE



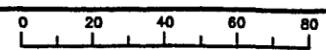
DIST	COUNTY	ROUTE	TOTAL PROJECT	PROJECT No	TOTAL SHEETS
11	SD	Var	Var		
REGISTERED CIVIL ENGINEER					
PLANS APPROVAL DATE					
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.					



**KEY MAP**  
NO SCALE

**K-2**

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS



USERNAME -> USER  
DGN FILE -> REQUEST

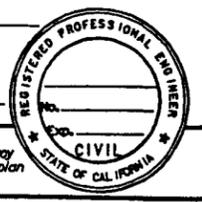
CU 00000

EA 000000

15 MAR 98 11:24 qt:\57704\34358\dgn\div\case01.dwg  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 PROJECT ENGINEER  
 CHECKED BY  
 CALCULATED/DESIGNED BY  
 DATE REVISIED BY  
 DATE REVISIED



DIST	COUNTY	ROUTE	TOTAL PROJECT	NO SHEETS
11	SD	Var	Var	
REGISTERED CIVIL ENGINEER				
PLANS APPROVAL DATE				
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BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYTEM OF 1983 (1991.35), ZONE 6, BASED LOCALLY UPON THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY AND TRANSFORMED TO THE 1991.35 EPOCH USING THE HTDP MODEL VERSION 2.1.

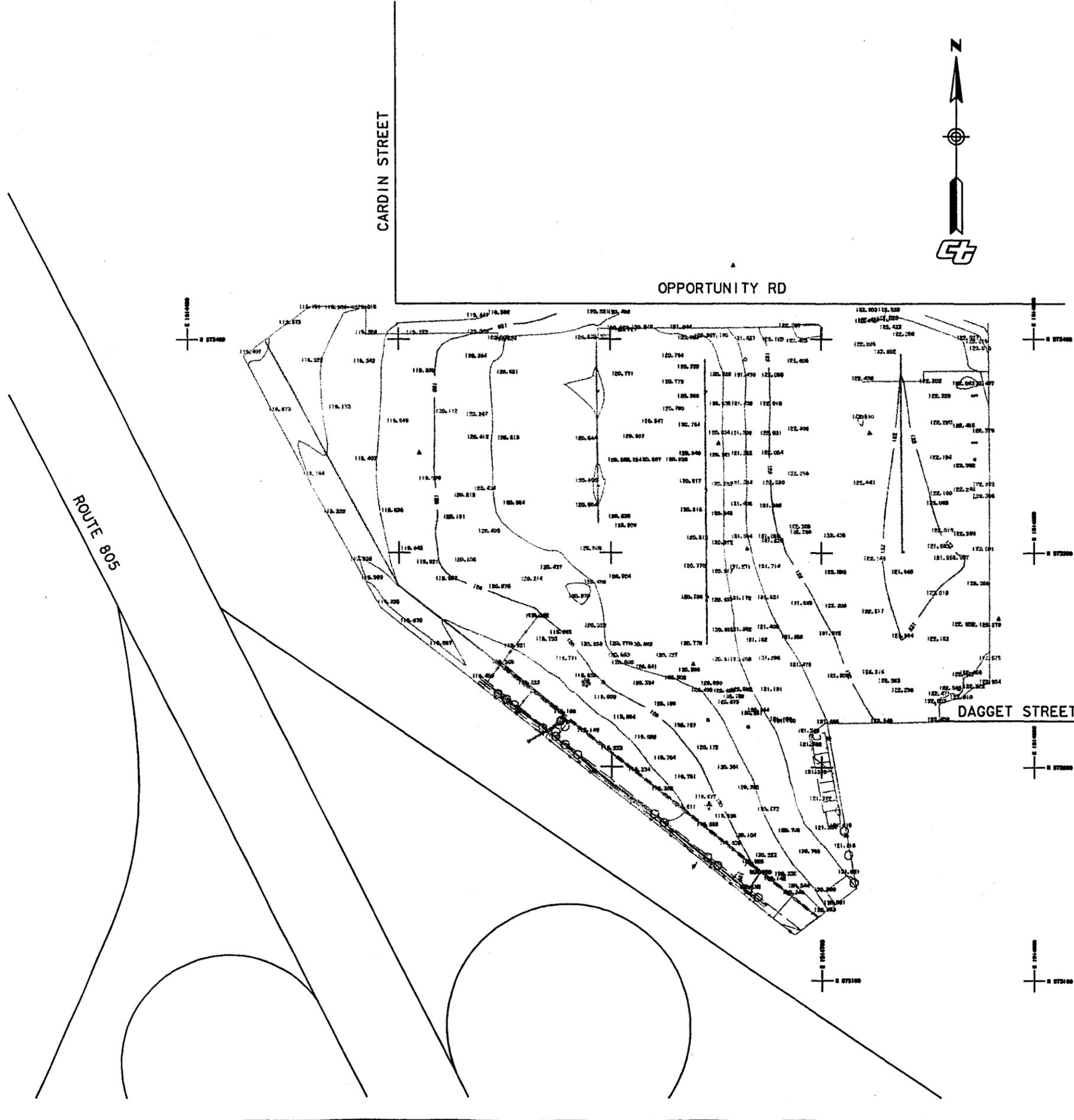
STATION	NORTHING (Y)	EASTING (X)
MONP	580,447.164	1,983,875.722
S103	577,862.412	1,906,370.402
TRAK	662,023.898	1,855,858.790

BENCHMARK  
 ELEVATIONS AS SHOWN HEREON ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 BASED LOCALLY UPON THE FOLLOWING BENCHMARKS.

BENCHMARK	NAVD88 ELEV.	SOURCE
TRAK	151.604	COUNTY OF ORANGE
DASH	462.113	NGS
F 1415	75.015	NGS

PROJECT CONTROL

STA NAME	NORTHING (Y) METERS	EASTING (X) METERS	EPOCH DATE	ELEVATION METERS	DESCRIPTION
19	573,351.215	1,914,651.032	1991.35	120.922	PK NAIL & SHINER IN A/C
20	573,247.966	1,914,638.691	1991.35	120.676	PK NAIL & SHINER IN A/C

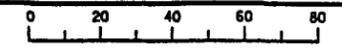


CONSTRUCTION STAKING SURVEY CONTROL DATA

SCALE: 1:1000

CSS-1

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS



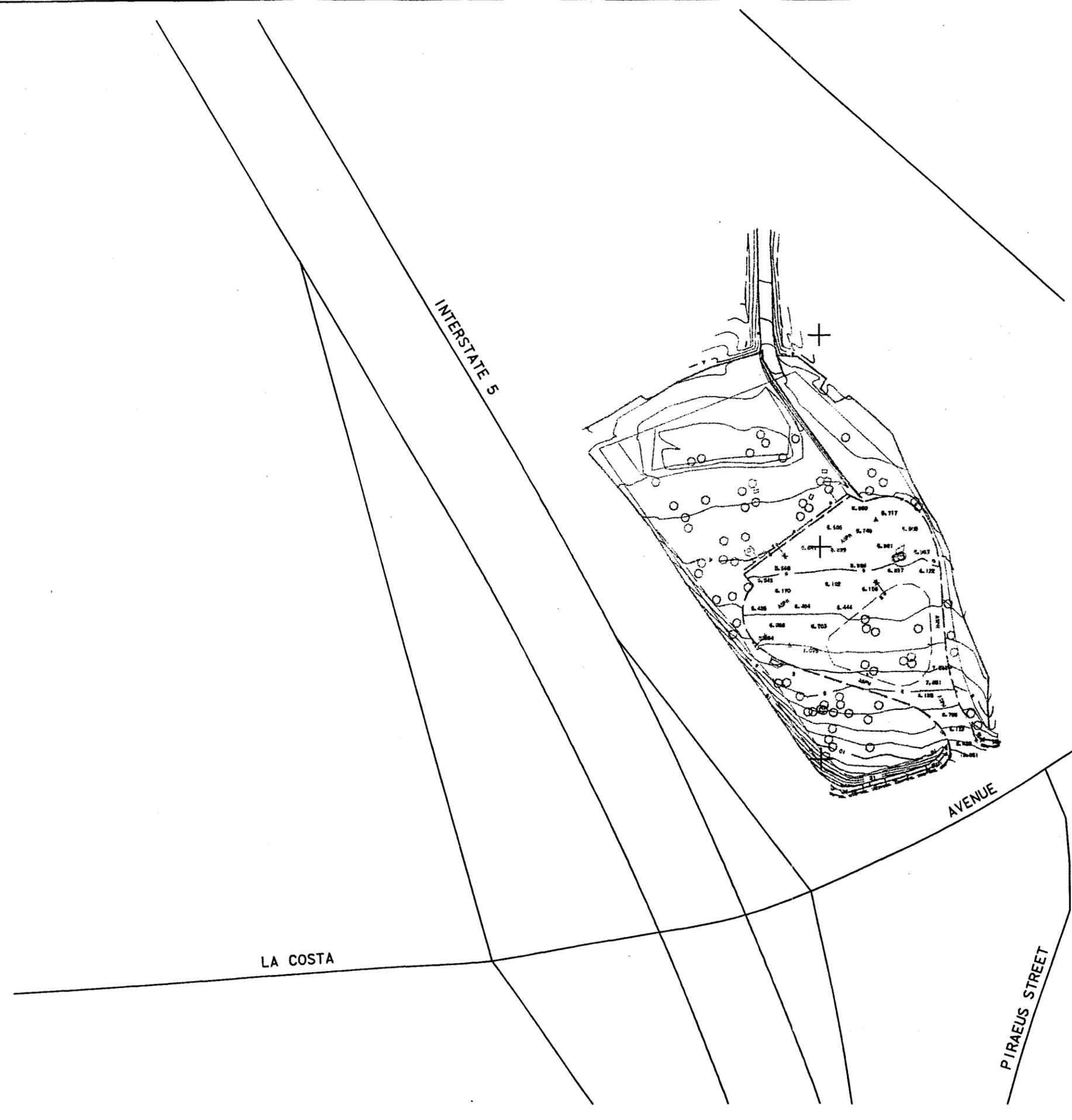
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EA 00000



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 PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 DATE  
 REVISED BY  
 DATE REVISED



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

*The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.*

**BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF**

BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYSTEM OF 1983 (EPOCH 1995.50). ZONE 6, BASED LOCALLY UPON THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY.

STATION	NORTHING (Y)	EASTING (X)
MONP	580,447.284	1,983,875.610
S103	577,862.544	1,906,370.297
TRAK	662,024.000	1,855,858.672

**BENCHMARK**

ELEVATIONS AS SHOWN HEREON ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 BASED LOCALLY UPON THE FOLLOWING CALIFORNIA DEPARTMENT OF TRANSPORTATION BENCHMARK.

BM 5-44.11      14.361      (NAVD88-GPS 2ND ORDER)  
 2" BRASS DISC STAMPED "CAL DEPT. TRANS." BM 5-44.11 1997",  
 LOCATED AT THE NORTHEAST BRIDGE RETURN AT I-5 & LA COSTA AVE.

**PROJECT CONTROL**

STA NAME	NORTHING (Y) METERS	EASTING (X) METERS	EPOCH DATE	ELEVATION METERS	DESCRIPTION
5	593,995.410	1,905,121.982	1995.50	4.444	1x2 & TACK-SOUTHSIDE OF MANCHESTER
6	594,109.694	1,905,326.472	1995.50	4.070	1x2 & TACK-NORTHSIDE OF MANCHESTER

**CONSTRUCTION STAKING SURVEY CONTROL DATA**

SCALE: 1:1000

**CSS-3**

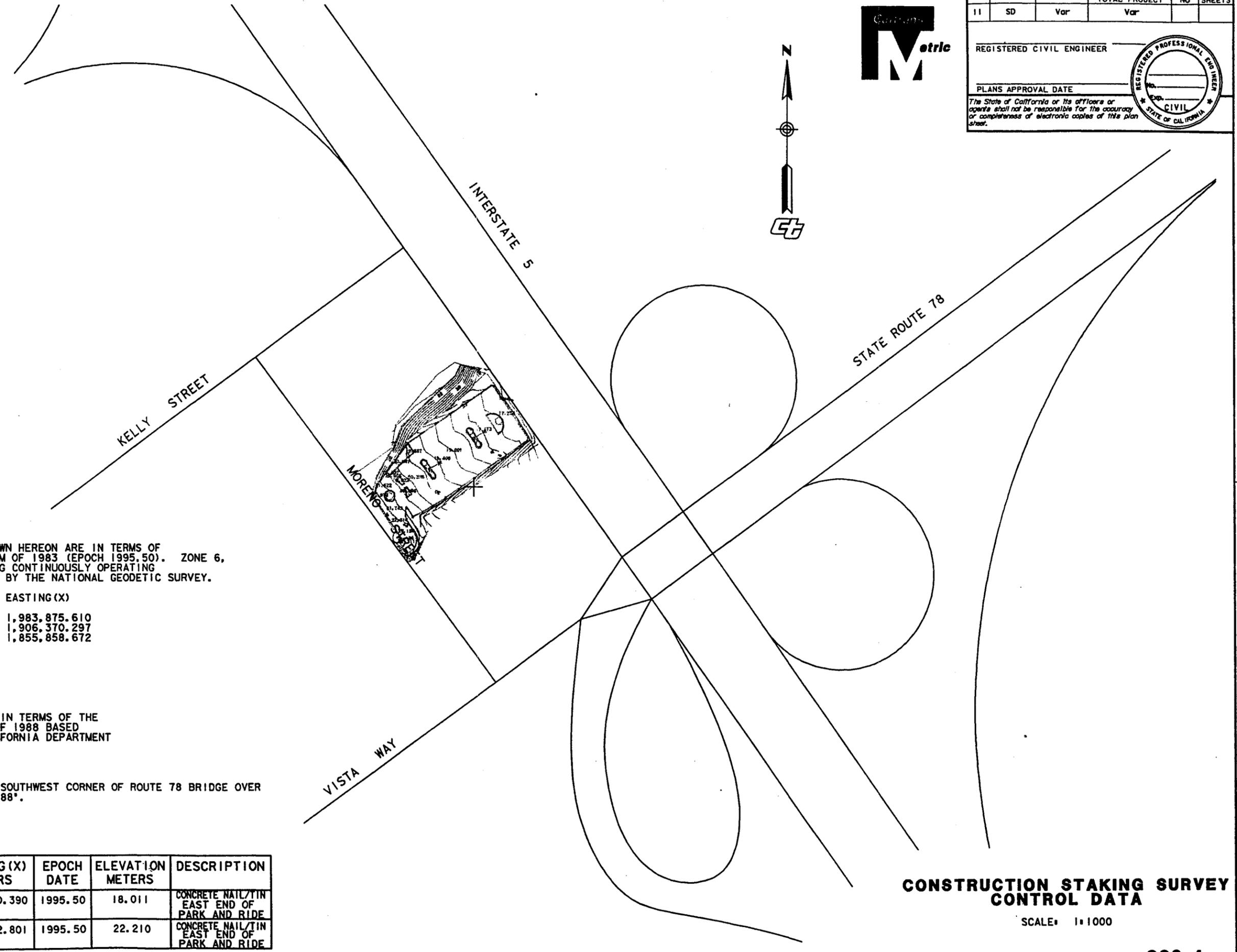
FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

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 DGN FILE -> REQUEST

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 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
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 DATE REVISED



DIST	COUNTY	ROUTE	TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYSTEM OF 1983 (EPOCH 1995.50). ZONE 6. BASED LOCALLY UPON THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY.

STATION	NORTHING (Y)	EASTING (X)
MONP	580,447.284	1,983,875.610
S103	577,862.544	1,906,370.297
TRAK	662,024.000	1,855,858.672

**BENCHMARK**

ELEVATIONS AS SHOWN HEREON ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 BASED LOCALLY UPON THE FOLLOWING CALIFORNIA DEPARTMENT OF TRANSPORTATION BENCHMARK.

BM 78-0.0 22.796 (NAVD88)

THE MONUMENT IS LOCATED IN THE SOUTHWEST CORNER OF ROUTE 78 BRIDGE OVER ROUTE 5, AND STAMPED "78-0.0 1988".

**PROJECT CONTROL**

STA NAME	NORTHING (Y) METERS	EASTING (X) METERS	EPOCH DATE	ELEVATION METERS	DESCRIPTION
1	612,619.042	1,897,210.390	1995.50	18.011	CONCRETE NAIL/TIN EAST END OF PARK AND RIDE
2	612,584.695	1,897,152.801	1995.50	22.210	CONCRETE NAIL/TIN EAST END OF PARK AND RIDE

**CONSTRUCTION STAKING SURVEY CONTROL DATA**

SCALE: 1:1000

**CSS-4**

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

USERNAME => USER  
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BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYTEM OF 1983 (1991.35), ZONE 6, BASED LOCALLY UPON THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY AND TRANSFORMED TO THE 1991.35 EPOCH USING THE HTDP MODEL VERSION 2.1.

STATION	NORTHING (Y)	EASTING (X)
MONP	580,447.164	1,983,875.722
SI03	577,862.412	1,906,370.402
TRAK	662,023.898	1,855,858.790

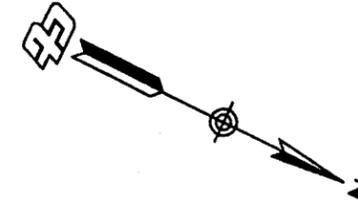
**BENCHMARK**

ELEVATIONS AS SHOWN HEREON ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 BASED LOCALLY UPON THE FOLLOWING BENCHMARKS.

BENCHMARK	NAVD88 ELEV.	SOURCE
TRAK	151.604	COUNTY OF ORANGE
DASH	462.113	NGS
F 1415	75.015	NGS

**PROJECT CONTROL**

STA NAME	NORTHING (Y) METERS	EASTING (X) METERS	EPOCH DATE	ELEVATION METERS	DESCRIPTION
109	606,962.349	1,899,666.702	1991.35	16.879	PK NAIL & SHINER IN A/C
110	606,679.714	1,899,725.545	1991.35	18.421	PK NAIL & SHINER IN A/C



DIST	COUNTY	ROUTE	ALUMINUM POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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PALOMAR AIRPORT ROAD

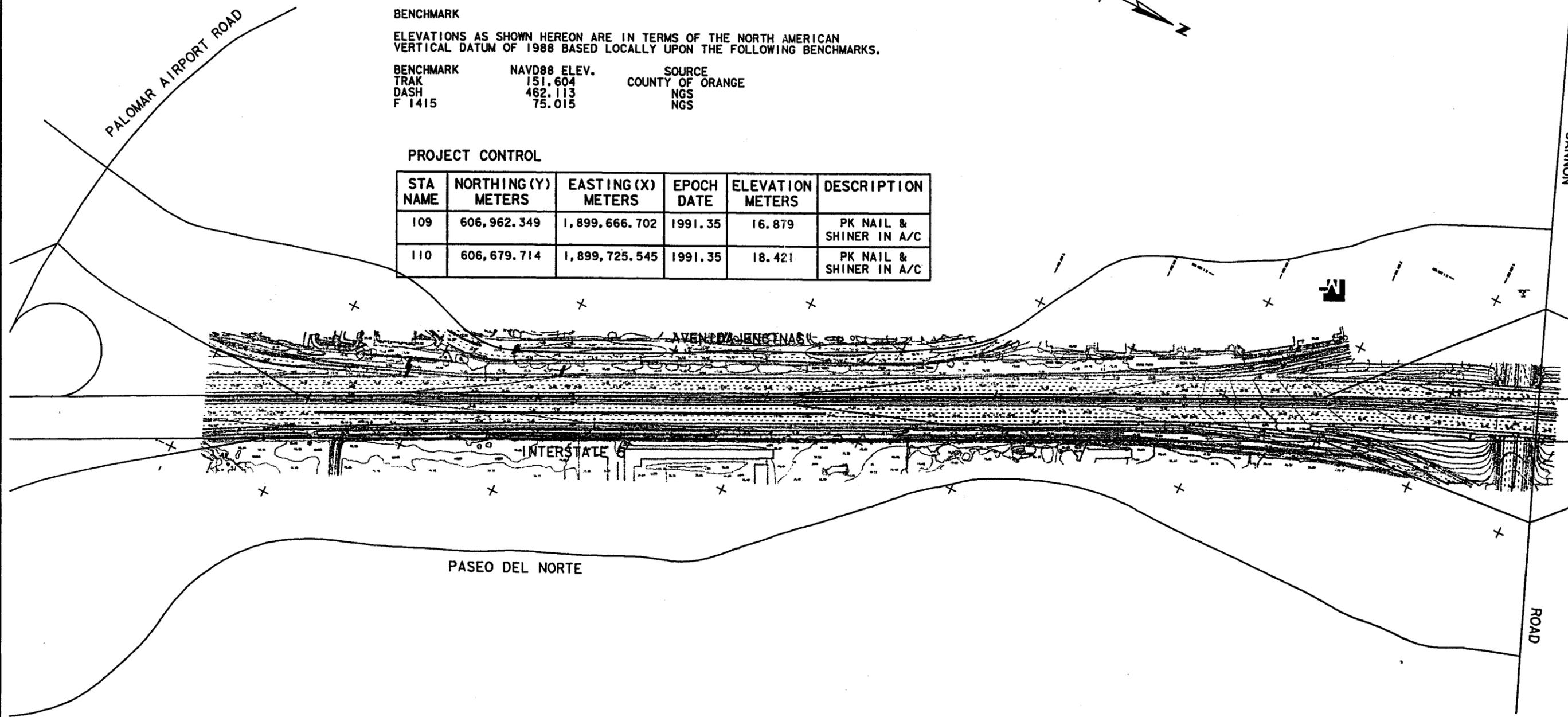
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PASEO DEL NORTE

INTERSTATE 6

AVENIDA JENEFENAS



**CONSTRUCTION STAKING SURVEY CONTROL DATA**

SCALE: 1:2000

**CSS-6**

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PROJECT ENGINEER

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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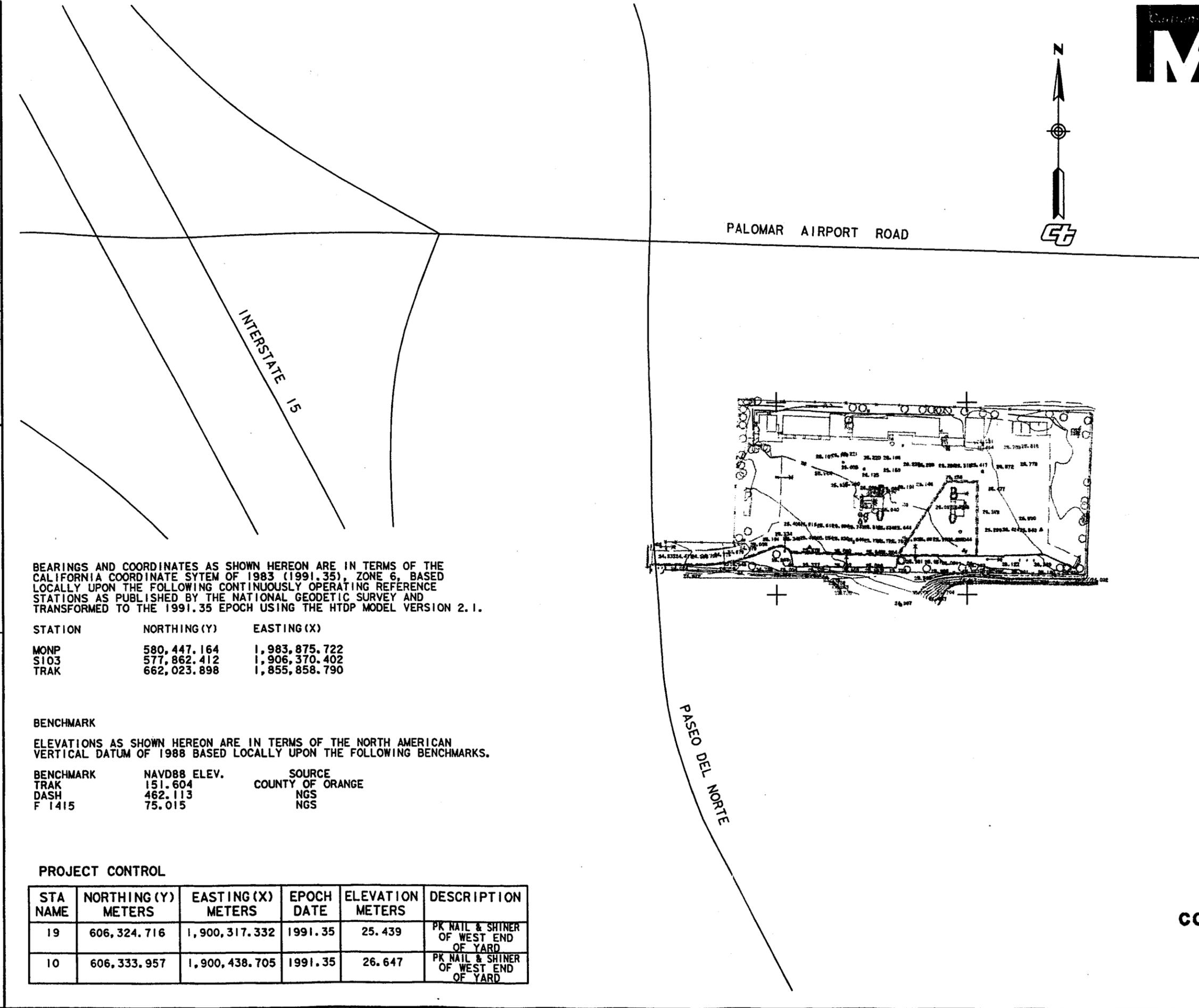
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DATE

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 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 PROJECT ENGINEER



11	SD	Var	Var	TOTAL PROJECT	No	SHEETS
REGISTERED CIVIL ENGINEER						
PLANS APPROVAL DATE						
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BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYTEM OF 1983 (1991.35), ZONE 6, BASED LOCALLY UPON THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY AND TRANSFORMED TO THE 1991.35 EPOCH USING THE HTDP MODEL VERSION 2.1.

STATION	NORTHING (Y)	EASTING (X)
MONP	580,447.164	1,983,875.722
S103	577,862.412	1,906,370.402
TRAK	662,023.898	1,855,858.790

**BENCHMARK**

ELEVATIONS AS SHOWN HEREON ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 BASED LOCALLY UPON THE FOLLOWING BENCHMARKS.

BENCHMARK	NAVD88 ELEV.	SOURCE
TRAK	151.604	COUNTY OF ORANGE
DASH	462.113	NGS
F 1415	75.015	NGS

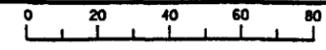
**PROJECT CONTROL**

STA NAME	NORTHING (Y) METERS	EASTING (X) METERS	EPOCH DATE	ELEVATION METERS	DESCRIPTION
19	606,324.716	1,900,317.332	1991.35	25.439	PK NAIL & SHINER OF WEST END OF YARD
10	606,333.957	1,900,438.705	1991.35	26.647	PK NAIL & SHINER OF WEST END OF YARD

**CONSTRUCTION STAKING SURVEY CONTROL DATA**  
 SCALE: 1=1000

CSS-7

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS



USERNAME -> USER  
 DGN FILE -> REQUEST

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DATE: \_\_\_\_\_ FILE: \_\_\_\_\_

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

PROJECT ENGINEER: \_\_\_\_\_

CALCULATED/DESIGNED BY: \_\_\_\_\_ CHECKED BY: \_\_\_\_\_

REVISOR: \_\_\_\_\_ DATE: \_\_\_\_\_

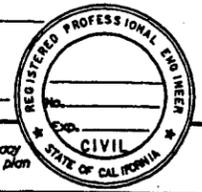


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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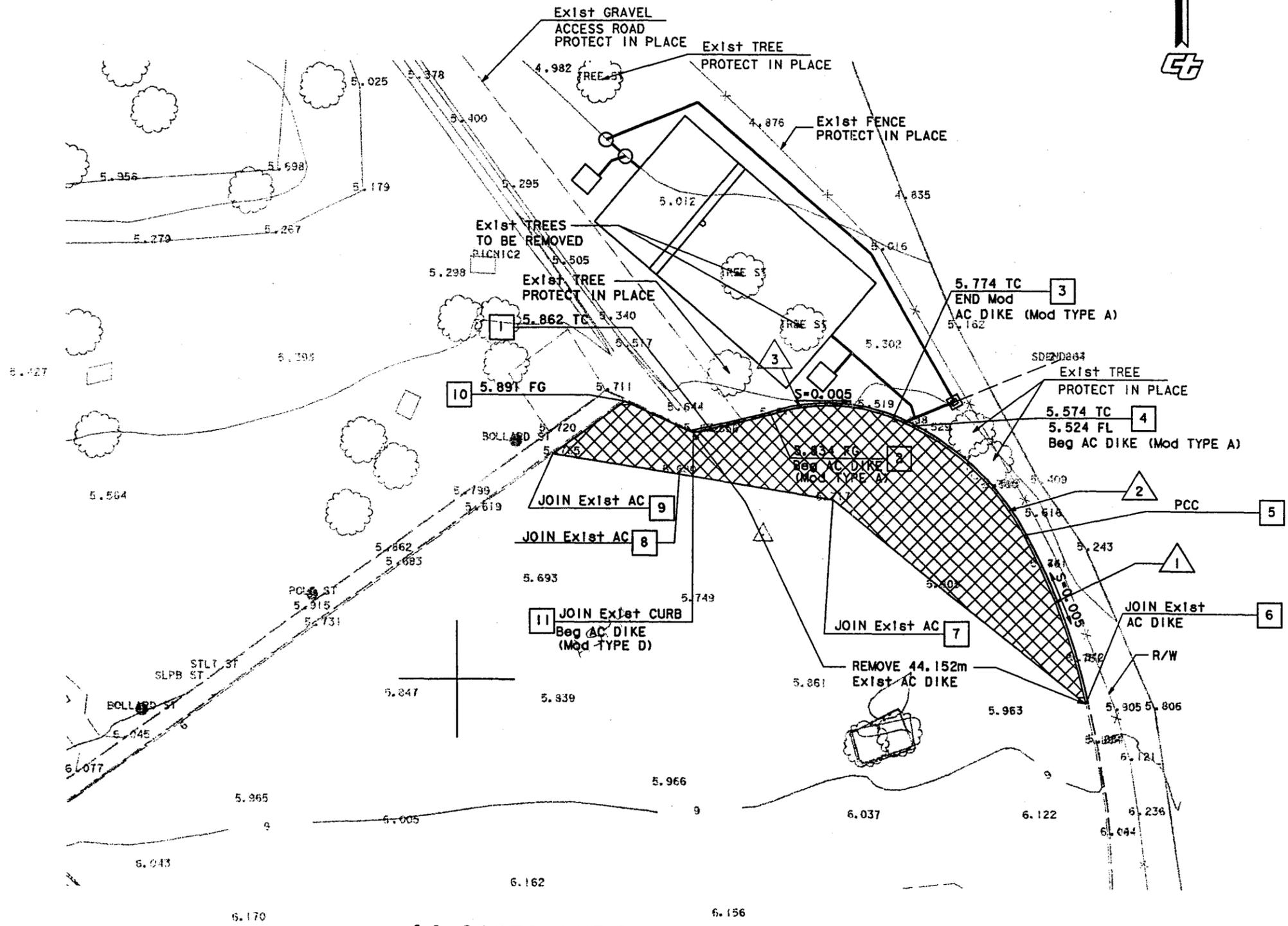


**CONSTRUCTION LEGEND**

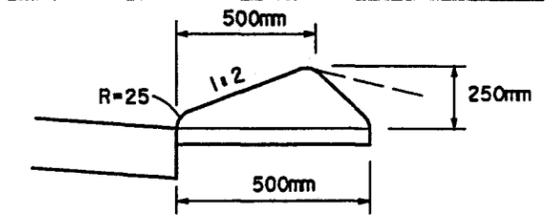
RECONSTRUCT 75 mm AC (TYPE B) / 150 mm AB

**CURVE DATA**

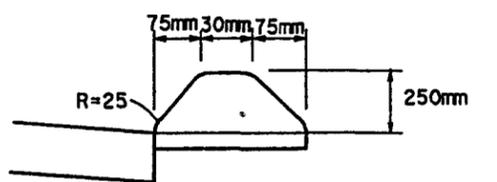
CURVE	R	Δ	T	L
1	55.579m	16°00'08"	7.821m	15.523m
2	22.148m	36°26'30"	7.077m	13.700m
3	16.203m	40°22'12"	5.957m	11.416m



COORDINATE POINT	NORTHING	EASTING
1	602421.3816	1902221.7990
2	602422.8187	1902227.2159
3	602422.5308	1902238.3937
4	602421.9652	1902239.6575
5	602412.5964	1902249.3535
6	602398.0887	1902254.7313
7	602415.5793	1902232.7567
8	602417.8398	1902219.2692
9	602419.4007	1902208.3546
10	602423.9504	1902214.6137
11	602421.2681	1902220.4984



**Mod TYPE D DIKE**  
NO SCALE



**Mod TYPE A DIKE**  
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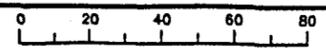


**DRAINAGE DETAILS**

SCALE 1 : 200

**LA COSTA AVE PARK AND RIDE**

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS



USERNAME -> USER  
DGN FILE -> REQUEST

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NOTE:  
 1. FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT-11 OFFICE.

**CONSTRUCTION LEGEND**

-  RECONSTRUCT 75mm AC (TYPE B) / 150mm AB
-  REMOVE AC AND CONO GUTTER
-  REMOVE AC DIKE AND CONSTRUCT CURB (TYPE A1-120)
-  75 mm AC (TYPE B) / 150 mm AB (CI 2)



DIST	COUNTY	ROUTE	PROJECT TOTAL	SHEET NO	TOTAL SHEETS
11	SD	Var	Var		

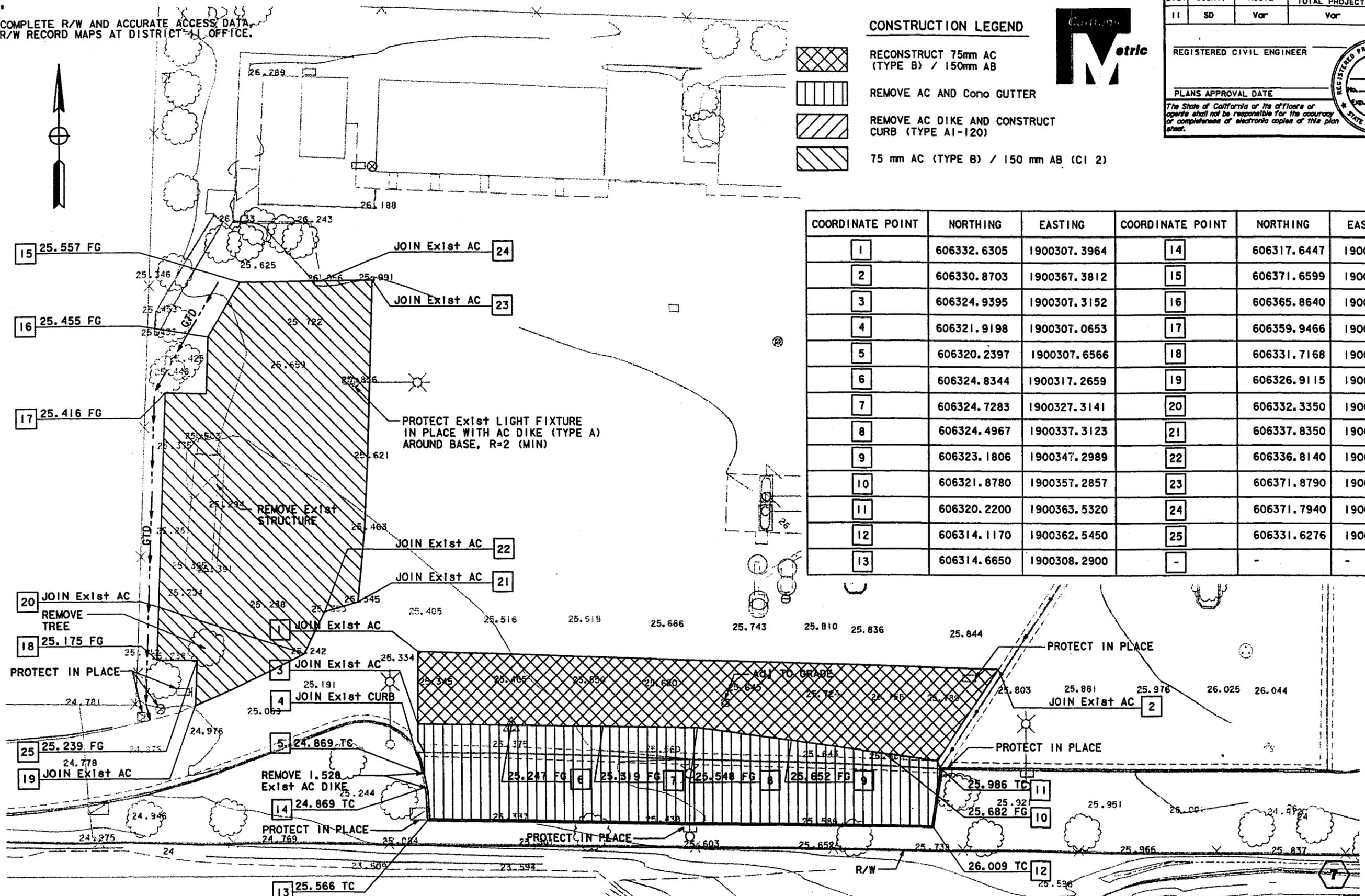
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
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COORDINATE POINT	NORTHING	EASTING	COORDINATE POINT	NORTHING	EASTING
1	606332.6305	1900307.3964	14	606317.6447	1900308.1657
2	606330.8703	1900367.3812	15	606371.6599	1900288.6320
3	606324.9395	1900307.3152	16	606365.8640	1900285.1780
4	606321.9198	1900307.0653	17	606359.9466	1900280.5087
5	606320.2397	1900307.6566	18	606331.7168	1900279.4348
6	606324.8344	1900317.2659	19	606326.9115	1900283.6505
7	606324.7283	1900327.3141	20	606332.3350	1900295.2740
8	606324.4967	1900337.3123	21	606337.8350	1900301.0640
9	606323.1806	1900347.2989	22	606336.8140	1900297.4900
10	606321.8780	1900357.2857	23	606371.8790	1900302.7880
11	606320.2200	1900363.5320	24	606371.7940	1900297.2980
12	606314.1170	1900362.5450	25	606331.6276	1900283.8612
13	606314.6650	1900308.2900	-	-	-

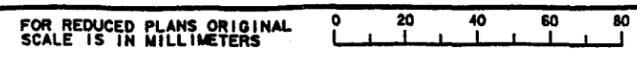
**CARLSBAD MAINTENANCE STATION**

**DRAINAGE DETAILS**

SCALE 1 : 200

THIS PLAN ACCURATE FOR DRAINAGE ONLY

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



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 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
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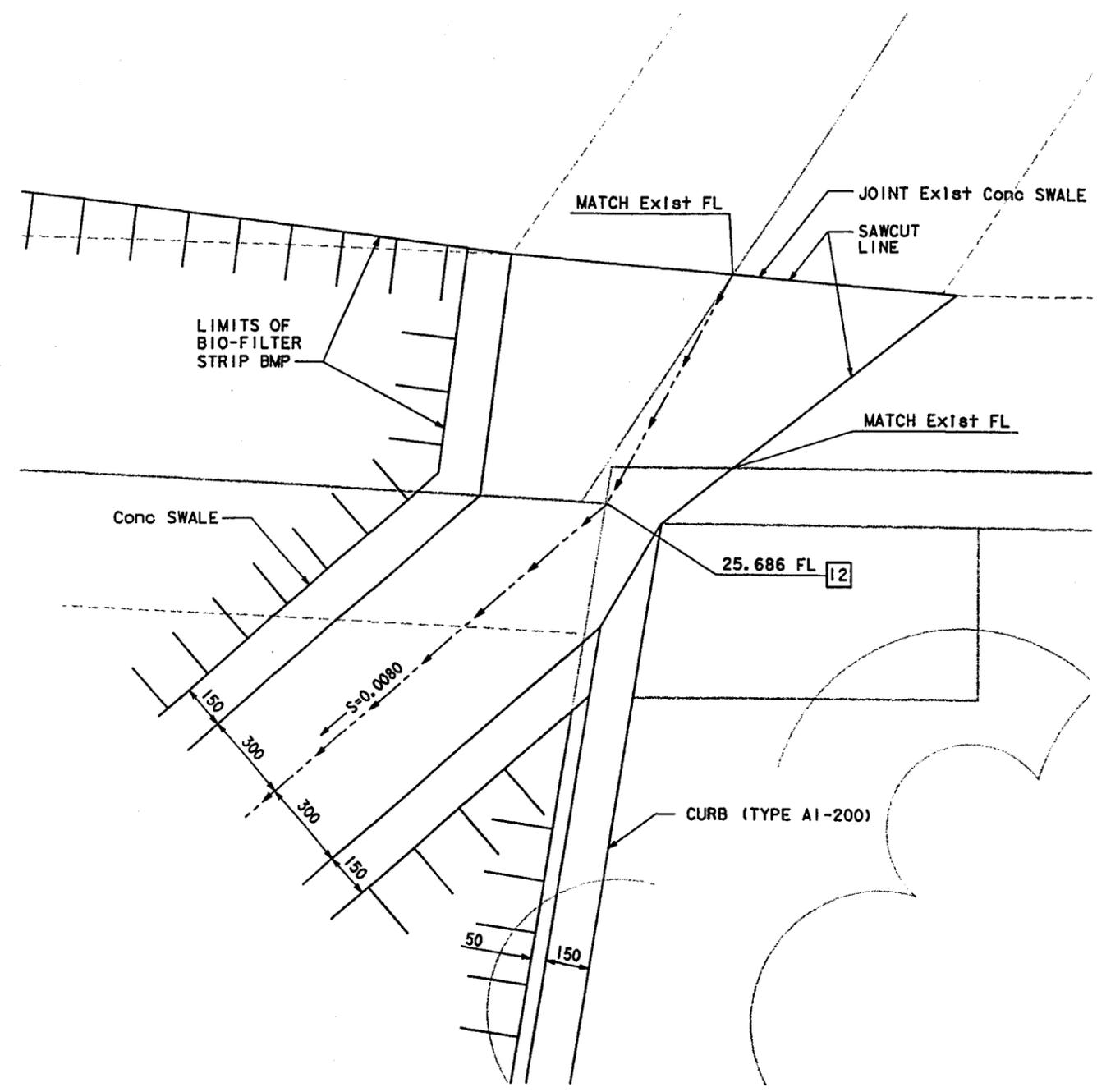


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

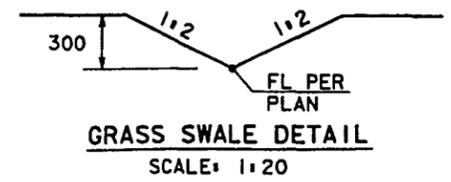
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

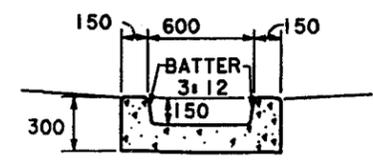
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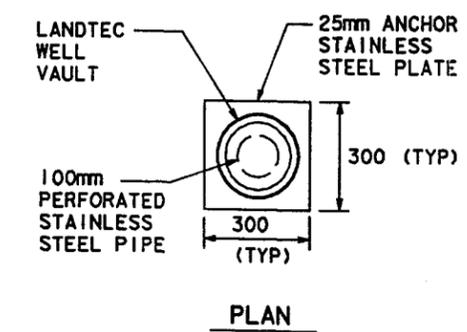
**CONCRETE INLET SWALE DETAIL**  
SCALE: 1:10



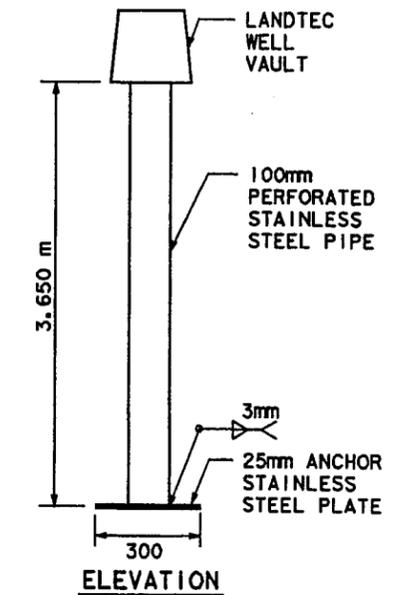
**GRASS SWALE DETAIL**  
SCALE: 1:20



**CONCRETE SWALE**  
SCALE: 1:20

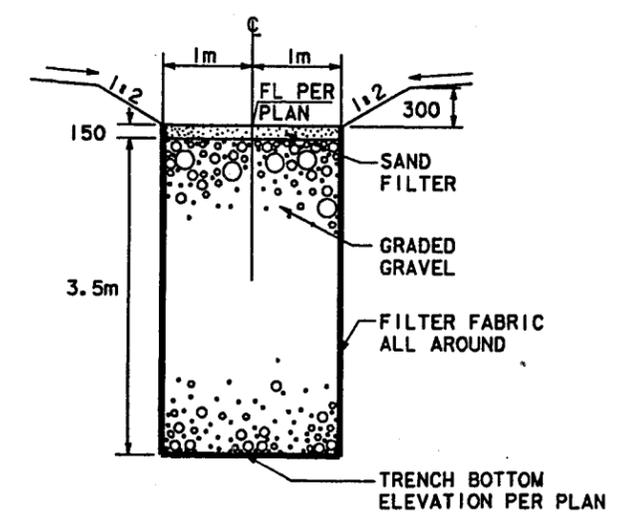


**PLAN**



**ELEVATION**

**OUTFLOW MONITORING WELL DETAIL**  
NO SCALE



**INFILTRATION TRENCH BMP DETAIL**  
NO SCALE

**DRAINAGE DETAILS**  
SCALE AS SHOWN

7

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

D-14

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USERNAME -> USER  
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DATE: FILE: STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION PROJECT ENGINEER: REVISION: 3 4



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER

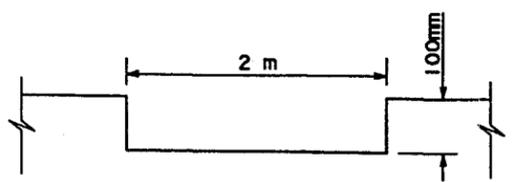
PLANS APPROVAL DATE

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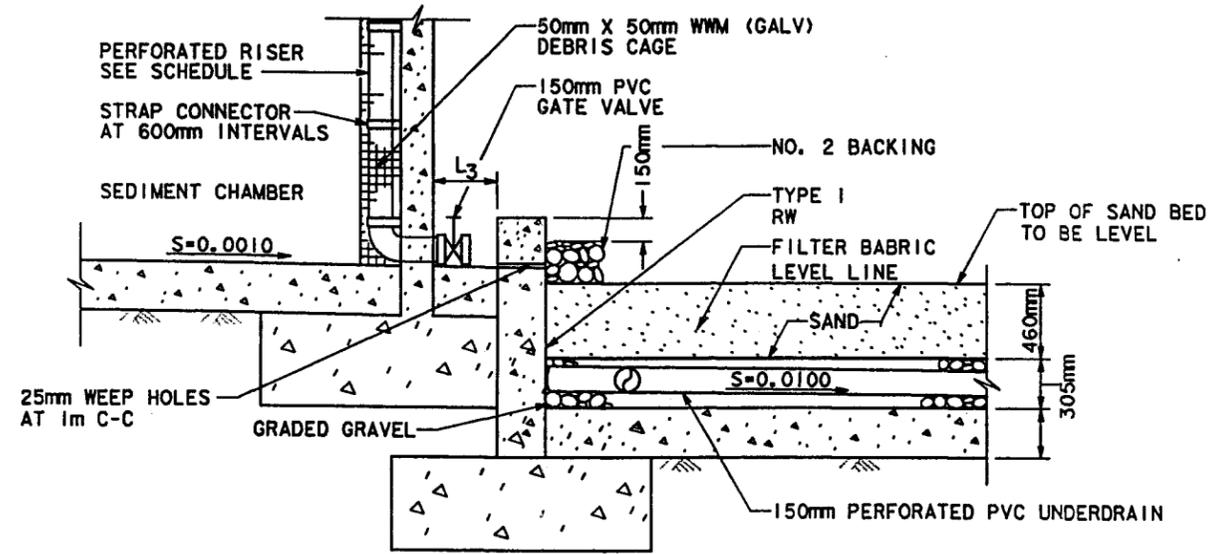
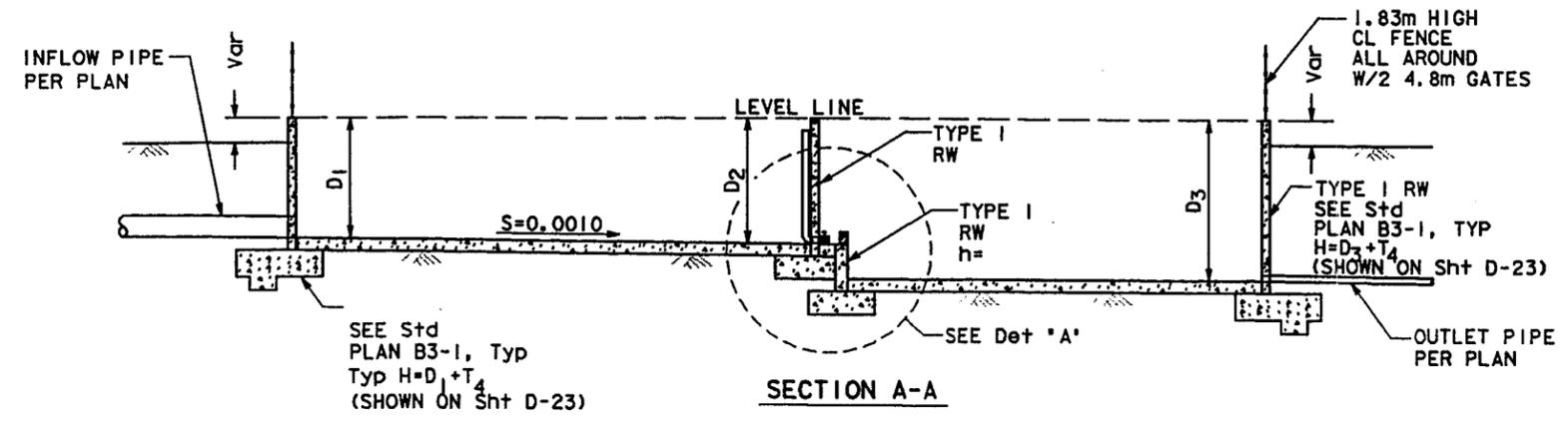


DIMENSION TABLE

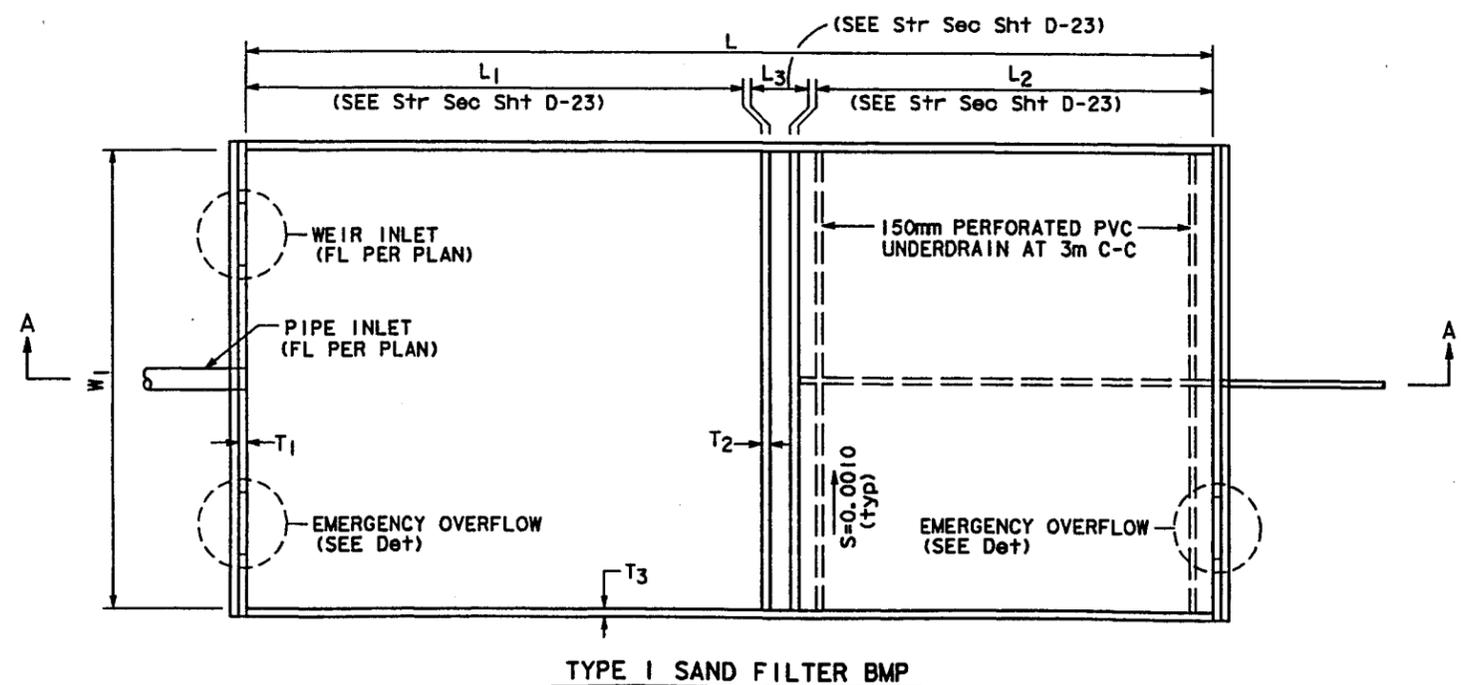
No	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	L	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	T <sub>1</sub>	T <sub>2</sub>	W <sub>1</sub>	INLET TYPE
3	1.763	1.778	2.623	21.240	15	6	0.240	SEE STD PLAN B3-1	0.412	3.657	WEIR
4	3.000	3.008	3.848	12.740	8	4.5	0.240	SEE STD PLAN B3-1	0.412	2.134	PIPE



EMERGENCY OVERFLOW



DETAIL 'A'

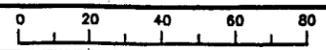


TYPE I SAND FILTER BMP

PERFORATED RISER SCHEDULE	
PIPE Dia	150 mm
VERT HOLE SPACING	64 mm
PERFORATIONS PER ROW	9
Dia OF PERFORATION	25 mm

3 4  
DRAINAGE DETAILS  
NO SCALE

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USERNAME -> USER  
DGN FILE -> DREQUEST

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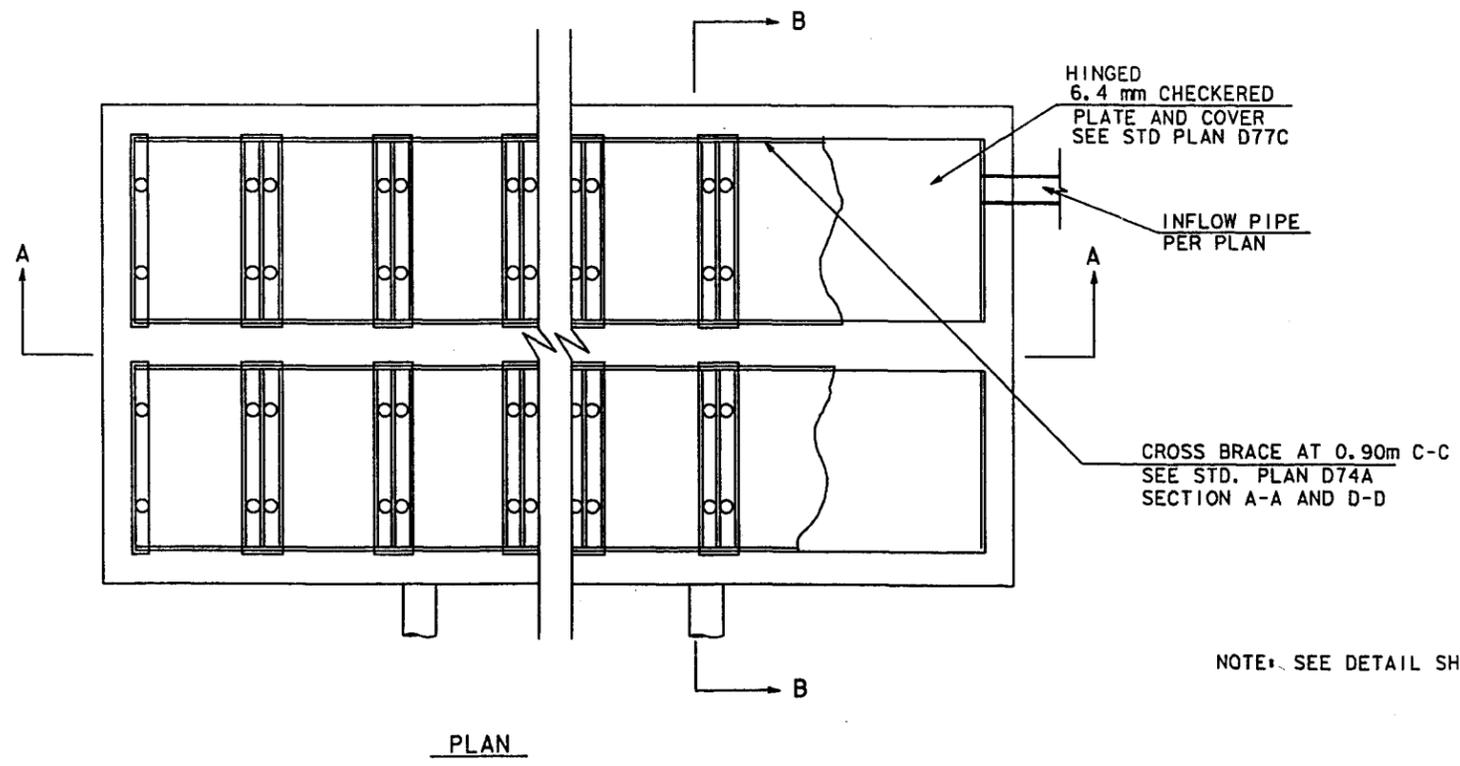
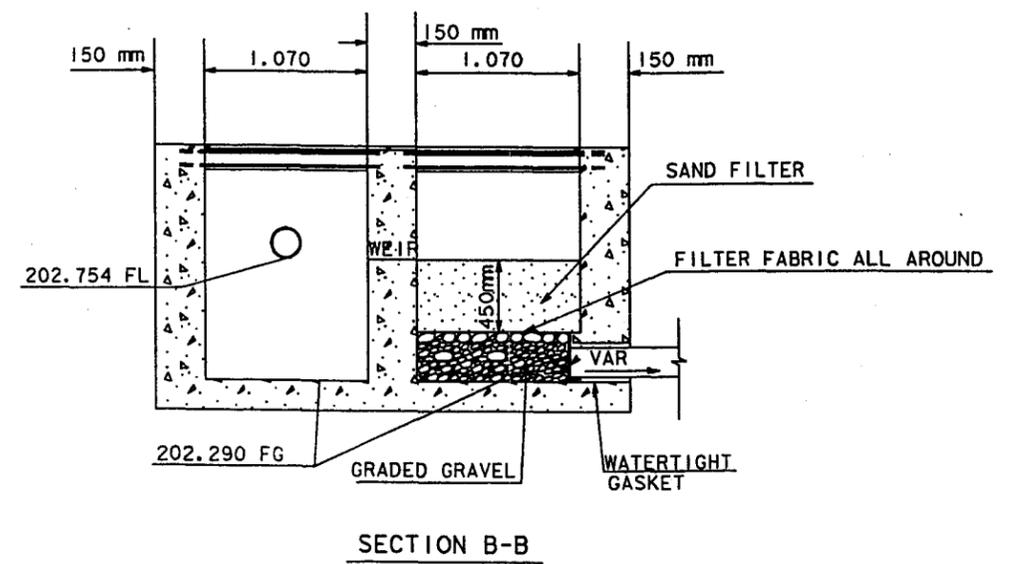
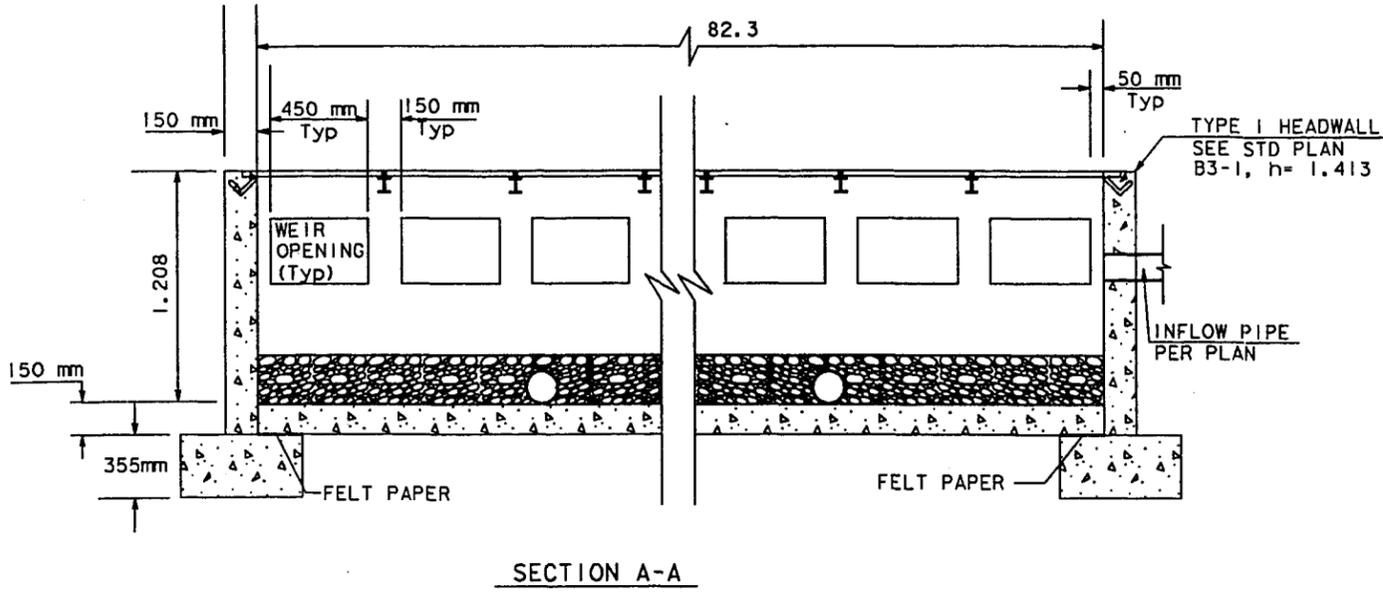


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER \_\_\_\_\_

PLANS APPROVAL DATE \_\_\_\_\_

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NOTE: SEE DETAIL SHEET D-23 FOR SIDE WALL REINFORCING AND JOINT DETAILS

2

**DRAINAGE DETAILS**

NO SCALE

**TYPE II SAND FILTER BMP**

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

D-16

DATE	REVISOR	DATE	REVISOR

PROJECT ENGINEER

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

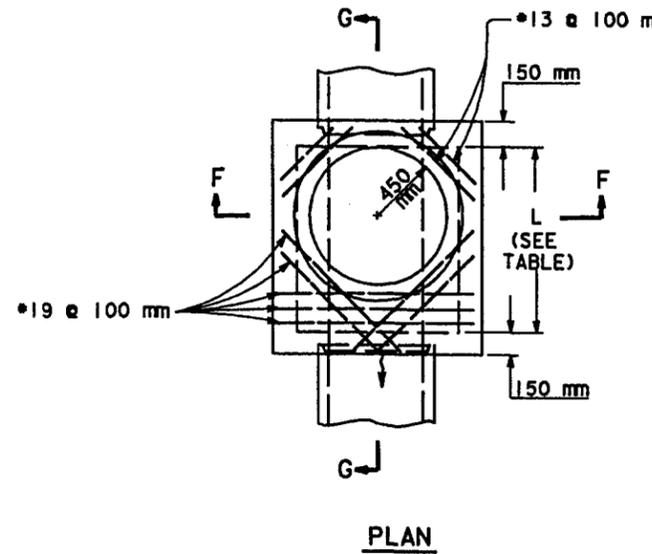
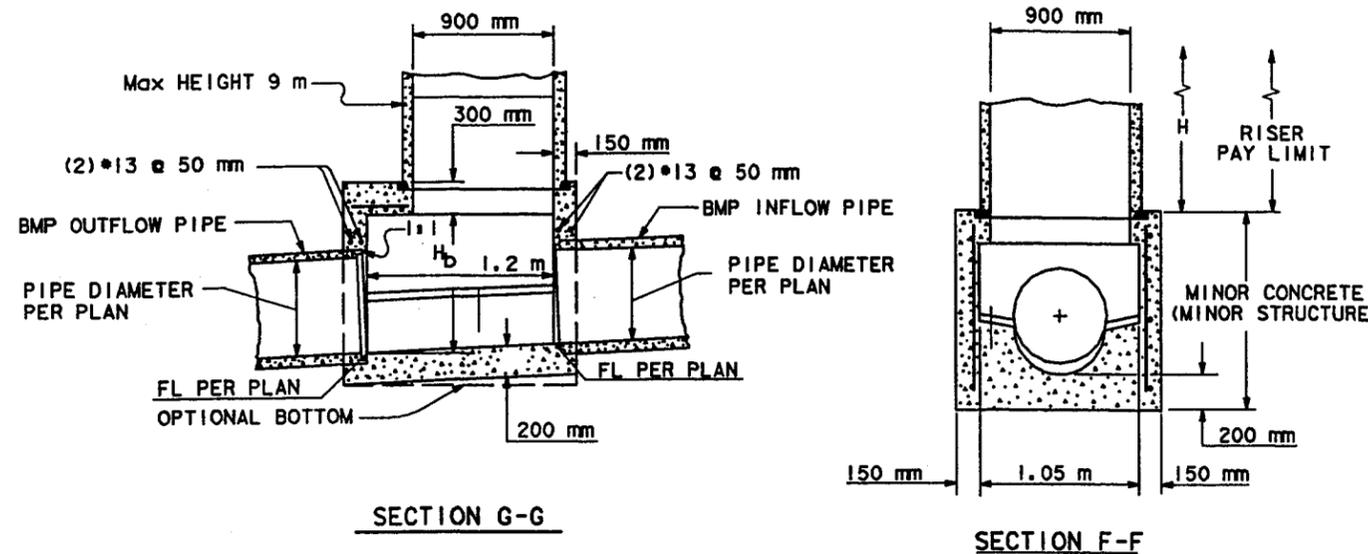


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
II	SD	Var	Var		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

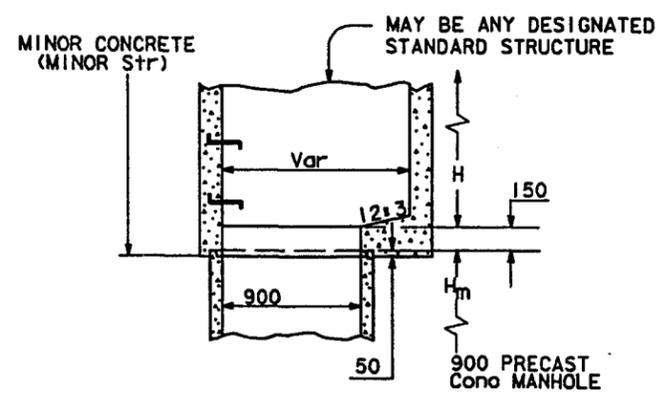
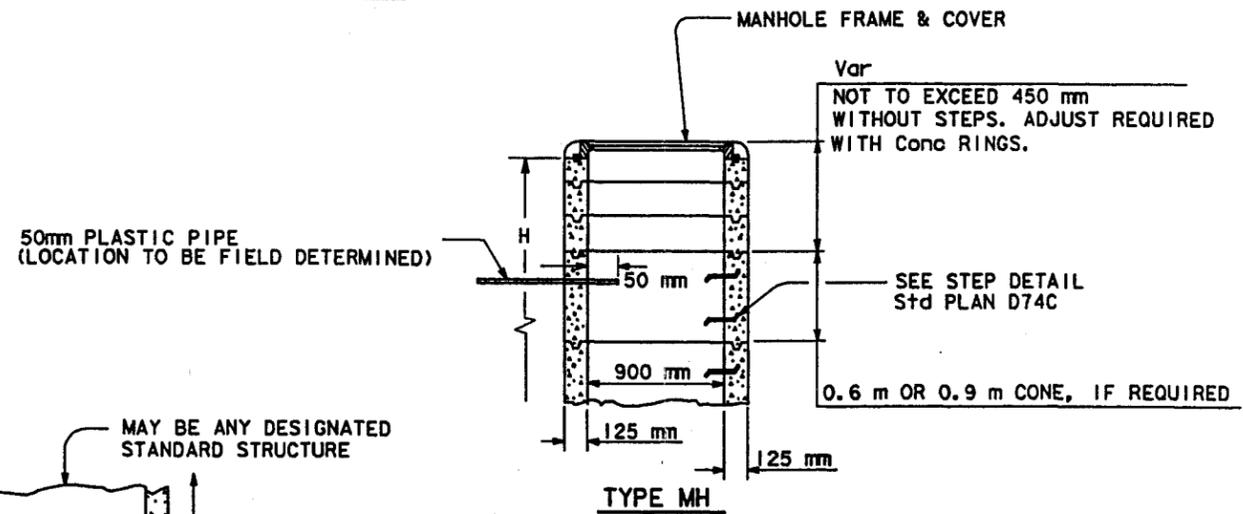
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**MONITORING MANHOLE**

**GENERAL NOTES**

1. RISERS MAY BE MADE UP OF 150 mm, 200 mm, 450 mm, 600 mm, OR 1200 mm SECTIONS.
2. EACH RISER SHALL HAVE A LADDER, AS DETAILED ON STANDARD PLAN D74C, WHICH SHALL BE SUSPENDED INTO BASE STRUCTURE.
3. ALL PRECAST COMPONENTS FOR UPPER PORTION TYPE MH SHALL BE REINFORCED WITH 6 mm DIAMETER STEEL WOUND SPIRALLY @ 100 mm CENTERS.
4. BOTTOMS SHALL HAVE A WOOD TROWEL FINISH.
5. H AND H<sub>b</sub> SHALL BE AS SPECIFIED ON PLANS.
6. REINFORCING STEEL SHALL BE #13 BARS @ 450 mm CENTERS PLACED 40 mm CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN.
7. PIPE(S) MAY BE PLACED IN ANY WALL.
8. NO DEDUCTION IN STRUCTURE CONCRETE QUANTITIES WILL BE MADE FOR PIPE OPENINGS.
9. DESIGN UNIT STRESSES: F<sub>s</sub> = 140 MPa, n = 10, F<sub>c</sub> = 10 MPa.
10. UPPER PORTION OF TYPE MH WILL BE PAID FOR AS 900 mm RISER.
11. CENTER OF RISER SHALL BE LOCATED OVER THE CENTERLINE OF MAIN STORM DRAIN.
12. THICKNESS OF DECK SHALL VARY WHEN NECESSARY TO PROVIDE LEVEL MANHOLE SEAT.



**TYPICAL UPPER STRUCTURE AND MANHOLE JUNCTION**  
**UPPER STRUCTURE**

**TYPE MH**  
FOR USE WITH EITHER TYPE X OR TYPE Y BASE STRUCTURES  
**UPPER STRUCTURE**



**DRAINAGE DETAIL**  
NO SCALE

15 MAR 98 1 39 01 \57704\34358\dgn\div\div17.dwg  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 DATE  
 REVISOR  
 DATE REVISOR

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED ELECTRICAL ENGINEER	
PLANS APPROVAL DATE	
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LOAD SCHEDULE													
PANEL PPA IN NEMA 3R ENCL. 120/208 VOLTS 1 PH 3 WIRE 10 KAIC													
LOCATION OUTDOOR 125 AMPS BUS 40AT, 2P MAIN SURFACE MOUNTED													
REMARKS	LOAD (WATTS)		OUTLETS			CIR NO	ALL BREAKERS 20 AMPERES EXCEPT AS NOTED	CIR NO	OUTLETS			LOAD (WATTS)	REMARKS
	L1	L2	OTHER	REC	L TG				LTG	REC	OTHER		
ONFLOW MON.	1800					1		2					SPARE
INFLOW MON.		1800				3		4					SPARE
	1800	1800											
TOTAL CONNECTED LOAD						1800VA (L1)			1800VA (L2)			= 3600VA @120/208V, 1Ø = 17.3AMPS	

**NOTES:**

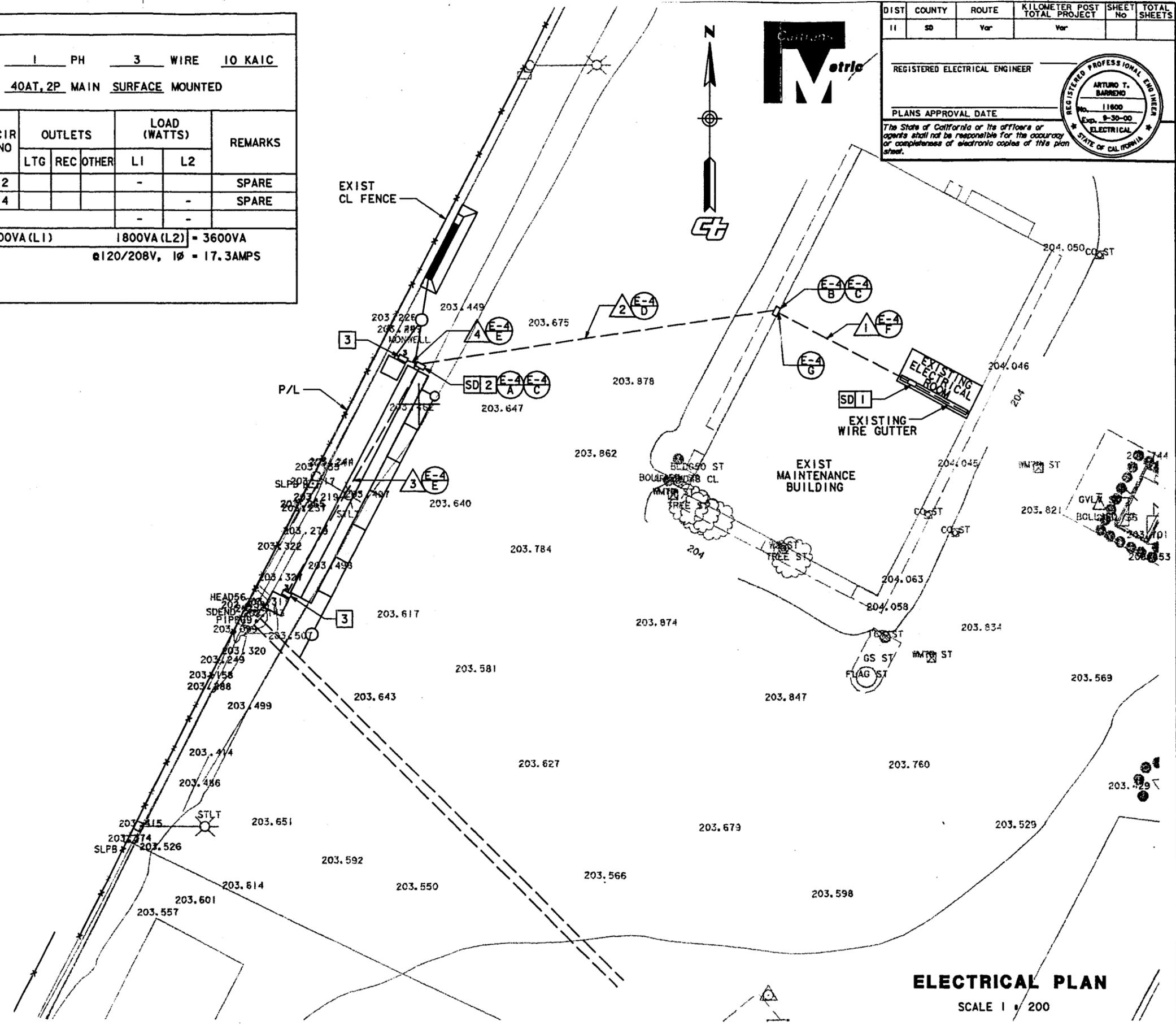
- EXISTING PANEL BOARD A, 100A, 120/208V, 3Ø, 4W  
 MAIN: 100A, 3P CB  
 BRANCHES: (1) 3P-40A CB  
 (19) 1P-20A CB  
 (5) 1P-15A CB  
 ADD: (1) 2P-40A CB, CKT 27, 29 (FOR PNL PPA)  
 (FOR SINGLE LINE DIAGRAM, PANEL ELEVATION, SEE DWG. E-5)
- INSTALL PANEL BOARD PPA IN NEMA 3R ENCLOSURE  
 (1) 2P-40A CB (MAIN)  
 (1) 1P-20A CB (ONFLOW MONITORING)  
 (1) 1P-20A CB (INFLOW MONITORING)  
 (2) 1P-20A CB (SPARE)
- INSTALL PULL BOX NO. 3/2 (FOR DETAIL SEE STD. PLAN ES-8)

**CONDUIT & WIRE NOTES:**

- 4RSC, 3Ø8 THW CU & 1Ø10 GRD  
 L=50m (164') VD=2.08%
- 4PVC, 3Ø8 THW CU & 1Ø10 GRD  
 L=50m (164') VD=2.08%
- 4RSC, 2Ø10 THW CU & 1Ø10 GRD  
 L=25m (82') VD=2.48%
- 4PVC, 2Ø12 THW CU & 1Ø12 GRD

**ABBREVIATIONS:**

- RSC - RIGID STEEL CONDUIT
- PVC - POLYVINYL CHLORIDE
- (E) - EXISTING
- CB - CIRCUIT BREAKER
- ECB - ENCLOSED CIRCUIT BREAKER
- CU - COPPER
- L - LENGTH
- VD - VOLTAGE DROP
- GRD - GROUND
- AT - AMPERE TRIP



**ELECTRICAL PLAN**  
 SCALE 1/200

**ESCONDIDO MAINTENANCE STATION**

**E-1**

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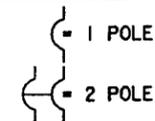
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 REVISIONS: \_\_\_\_\_  
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 REVISIONS: \_\_\_\_\_ DATE REVISIONED: \_\_\_\_\_

LOAD SCHEDULE													
PANEL PPA IN NEMA 3R ENCL. 120/240 VOLTS 1 PH 3 WIRE 10KAIC													
LOCATION OUTDOOR 125 AMPS BUS 40AT, 2P MAIN SURFACE MOUNTED													
REMARKS	LOAD (WATTS)		OUTLETS			CIR NO	ALL BREAKERS 20 AMPERES EXCEPT AS NOTED	CIR NO	OUTLETS			LOAD (WATTS)	REMARKS
	L1	L2	OTHER	REC	LTG				LTG	REC	OTHER		
ONFLOW MON.	1800					1		2				-	SPARE
INFLOW MON.		1800				3		4				-	SPARE
	1800	1800										-	
TOTAL CONNECTED LOAD						1800VA (L1)			1800VA (L2)			= 3600VA	
@120/240V, IØ = 15.0AMPS													

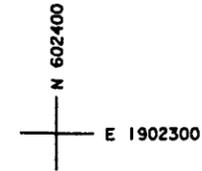
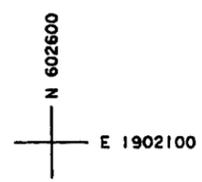
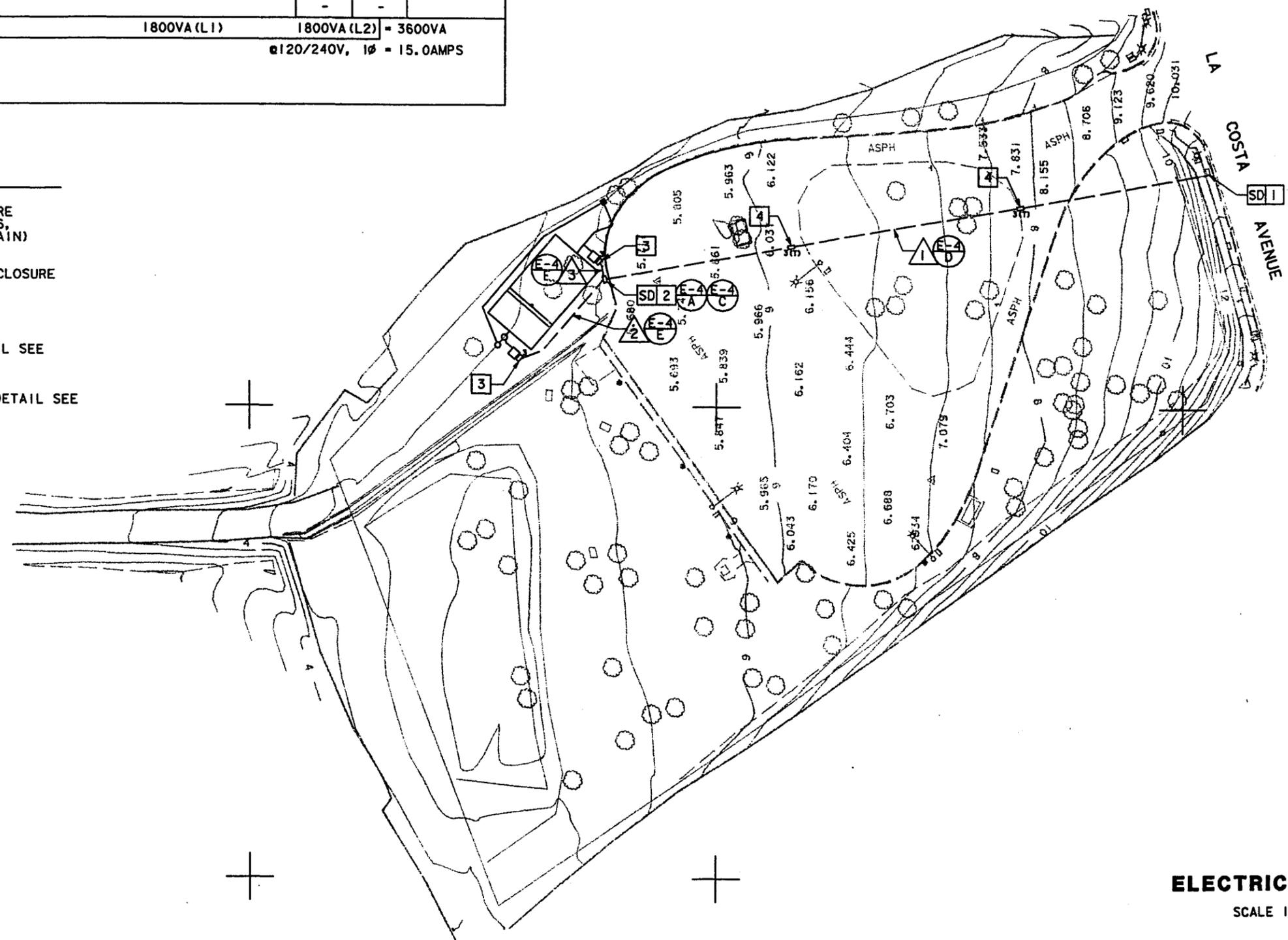


**NOTES:**

- 1 EXISTING TYPE III SERVICE ENCLOSURE CABINET S. D. G. & E. METER NO. 510146, 120/240V, IØ WITH: 2P-100A CB (MAIN) ADD: 2P-40A CB (FOR PNL PPA)
- 2 NEW PANEL BOARD PPA IN NEMA 3R ENCLOSURE  
 (1) 2P-40A CB (MAIN)  
 (1) 1P-20A CB (ONFLOW MONITORING)  
 (1) 1P-20A CB (INFLOW MONITORING)  
 (2) 1P-20A CB (SPARE)
- 3 INSTALL PULL BOX NO. 3/2 (FOR DETAIL SEE STD. PLAN ES-8)
- 4 INSTALL PULL BOX NO. 3/2 (T) (FOR DETAIL SEE STD. PLAN ES-8)

**CONDUIT & WIRE NOTES:**

- 1 40PVC, 3\*6 THW CU & 1\*10 GRD L=130m (426') VD=2.61%
- 2 40PVC, 2\*10 THW CU & 1\*10 GRD L=25m (82') VD=2.4%
- 3 40PVC, 2\*12 THW CU & 1\*12 GRD



DISI	COUNTY	ROUTE	TOTAL PROJECT	PREP No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED ELECTRICAL ENGINEER

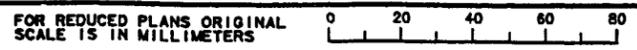
PLANS APPROVAL DATE

ARTURO T. BARRERO  
 No. 11800  
 Exp. 9-30-00  
 ELECTRICAL  
 STATE OF CALIFORNIA

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**ELECTRICAL PLAN**  
 SCALE 1 : 500

**LA COSTA AVE PARK AND RIDE**



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PROJECT ENGINEER

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DATE

REVISOR BY

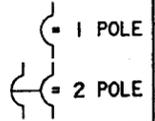
DATE REVISED

### LOAD SCHEDULE

PANEL PPA IN NEMA 3R ENCL 120/208 VOLTS 1 PH 3 WIRE 10KAIC  
 LOCATION OUTDOOR 125 AMPS BUS 40AT, 2P MAIN SURFACE MOUNTED

REMARKS	LOAD (WATTS)		OUTLETS			CIR NO	ALL BREAKERS 20 AMPERES EXCEPT AS NOTED	CIR NO	OUTLETS			LOAD (WATTS)		REMARKS
	L1	L2	OTHER	REC	LTG				LTG	REC	OTHER	L1	L2	
ONFLOW MON.	1800					1		2				-	-	SPARE
INFLOW MON.		1800				3		4				-	-	SPARE
	1800	1800												

TOTAL CONNECTED LOAD 1800VA (L1) 1800VA (L2) = 3600VA  
 @120/208V, I<sub>φ</sub> = 17.3AMPS



### NOTES:

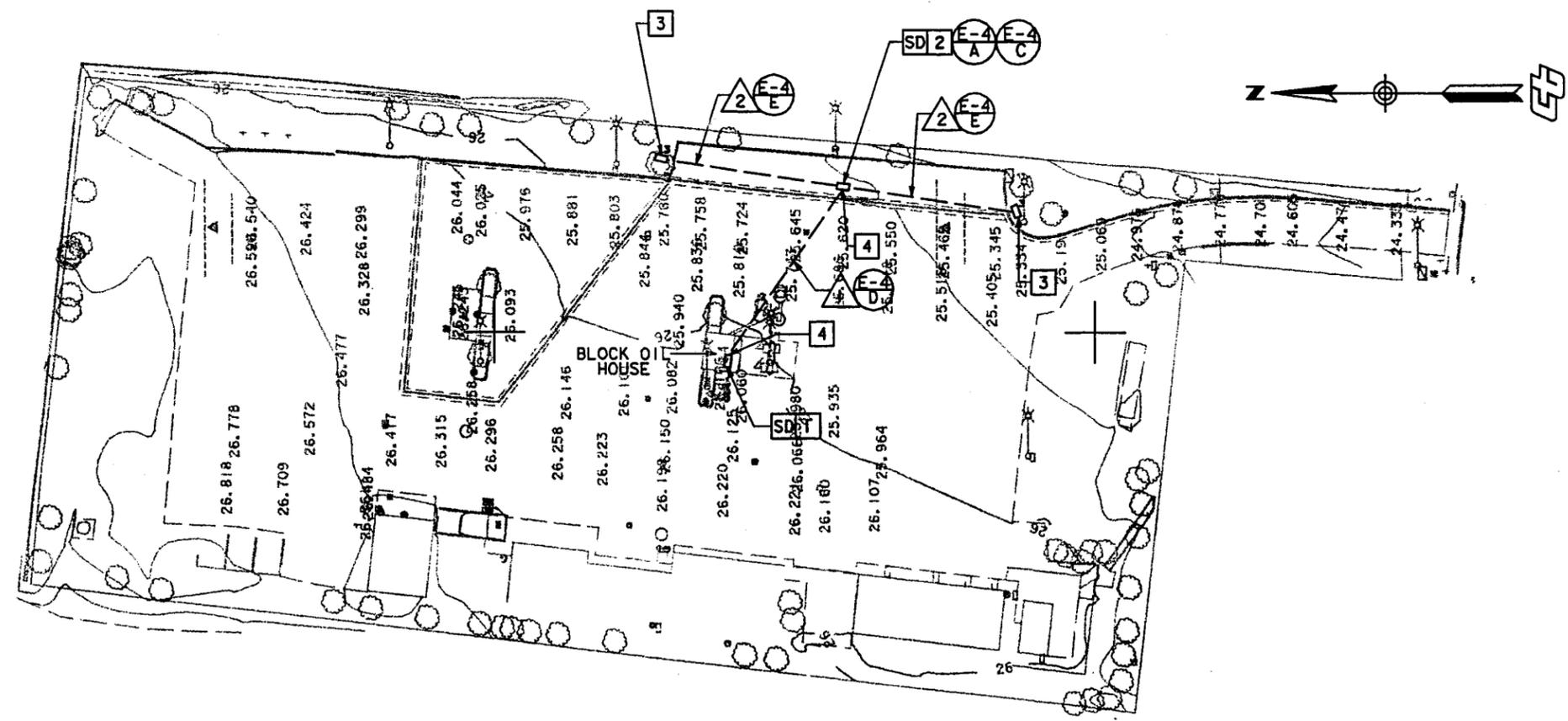
- EXISTING PANEL @ BLOCK OIL HOUSE  
ADD 1-40A, 2P 208V CB
- NEW PANEL BOARD PPA IN NEMA 3R ENCLOSURE  
(1) 2P-40A CB (MAIN)  
(1) 1P-20A CB (ONFLOW MONITORING)  
(1) 1P-20A CB (INFLOW MONITORING)  
(2) 1P-20A CB (SPARE)
- INSTALL PULL BOX NO. 3/2 (FOR DETAIL SEE STD. PLAN ES- 8)
- PROVIDE SEAL OFFS AT CONDUIT ENTRIES TO PANELS.

### CONDUIT & WIRE NOTES:

- 41RSC, 3\*8 THW & 1\*10 GRD  
L=35m (115') VD=1.49%
  - 40PVC, 2\*8 THW & 1\*10 GRD  
L=30m (98') VD=1.9%
- WHERE: L=LENGTH OF WIRE  
VD=VOLTAGE DROP



11	SD	Var	Var	TOTAL PROJECT	NO	SHEETS
REGISTERED ELECTRICAL ENGINEER						
PLANS APPROVAL DATE						
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## CARLSBAD MAINTENANCE STATION

## ELECTRICAL PLAN

SCALE 1 : 500

E-3

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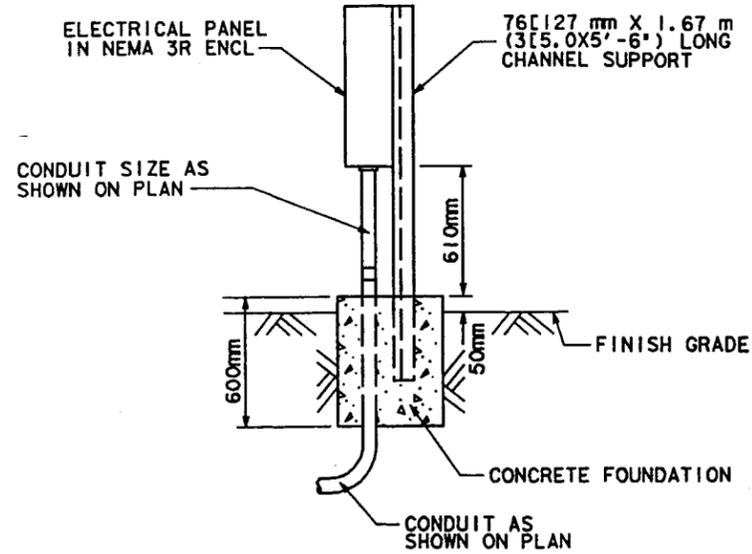
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 CALCULATED/DESIGNED BY  
 CHECKED BY  
 DATE REVISOR BY  
 DATE REVISOR BY



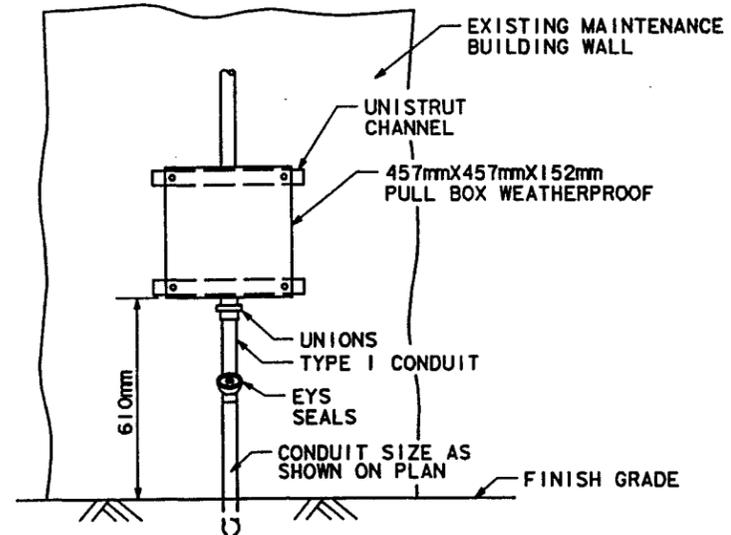
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED ELECTRICAL ENGINEER  
 ARTURO T. BARRERO  
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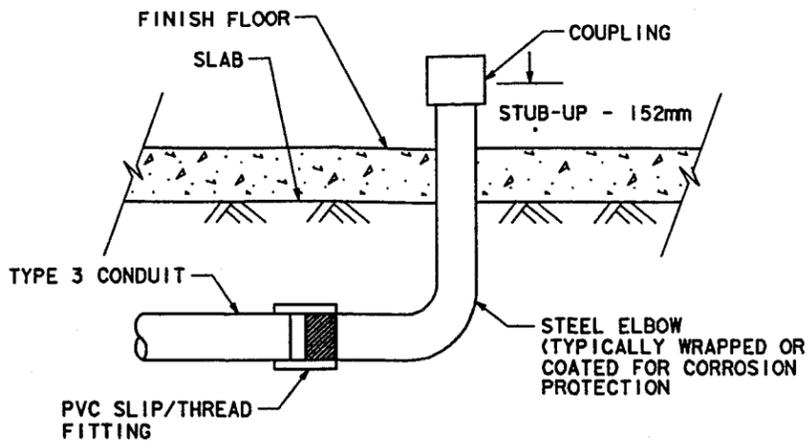
**A** ELECTRICAL PANEL MOUNTING SUPPORT  
 NOT TO SCALE



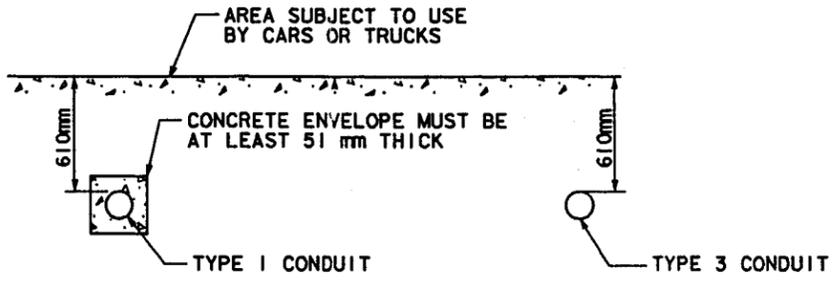
**B** PULL BOX MOUNTING DETAIL  
 NOT TO SCALE

**PULL BOX NOTES:**

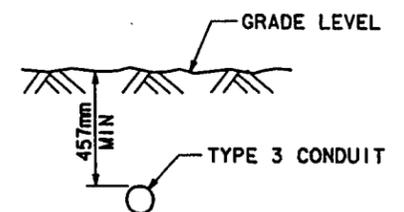
1. EQUIP METAL PULL BOX EXPOSED TO WEATHER WITH WEATHER PROOF REMOVABLE COVER.
2. USE THREADED WATERTIGHT HUBS FOR TOP ENTRY.
3. USE KNOCKOUT FOR BOTTOM ENTRY ONLY.



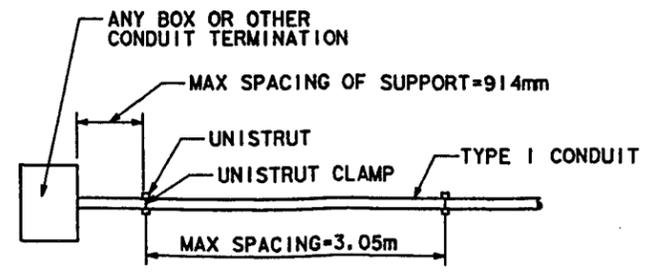
**C** STEEL ELBOW THRU FLOOR DETAIL  
 NOT TO SCALE



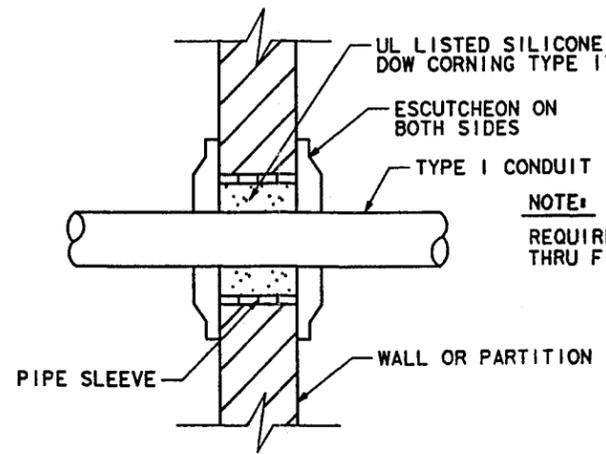
**D** TYPICAL UNDERGROUND CONDUIT INSTALLATION  
 NOT TO SCALE



**E** TYPICAL UNDERGROUND CONDUIT INSTALLATION (UNPAVED AREA)  
 NOT TO SCALE



**F** SUPPORT SPACING TO STRUCTURAL MEMBERS  
 NOT TO SCALE



**G** FIRE STOP DETAIL  
 NOT TO SCALE

**NOTE:**  
 REQUIRED FOR ALL PENETRATION THRU FIRE RATED WALLS

**ELECTRICAL DETAILS**  
 NOT TO SCALE

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DIST	COUNTY	ROUTE	TOTAL PROJECT	SHEET No	TOTAL SHEETS

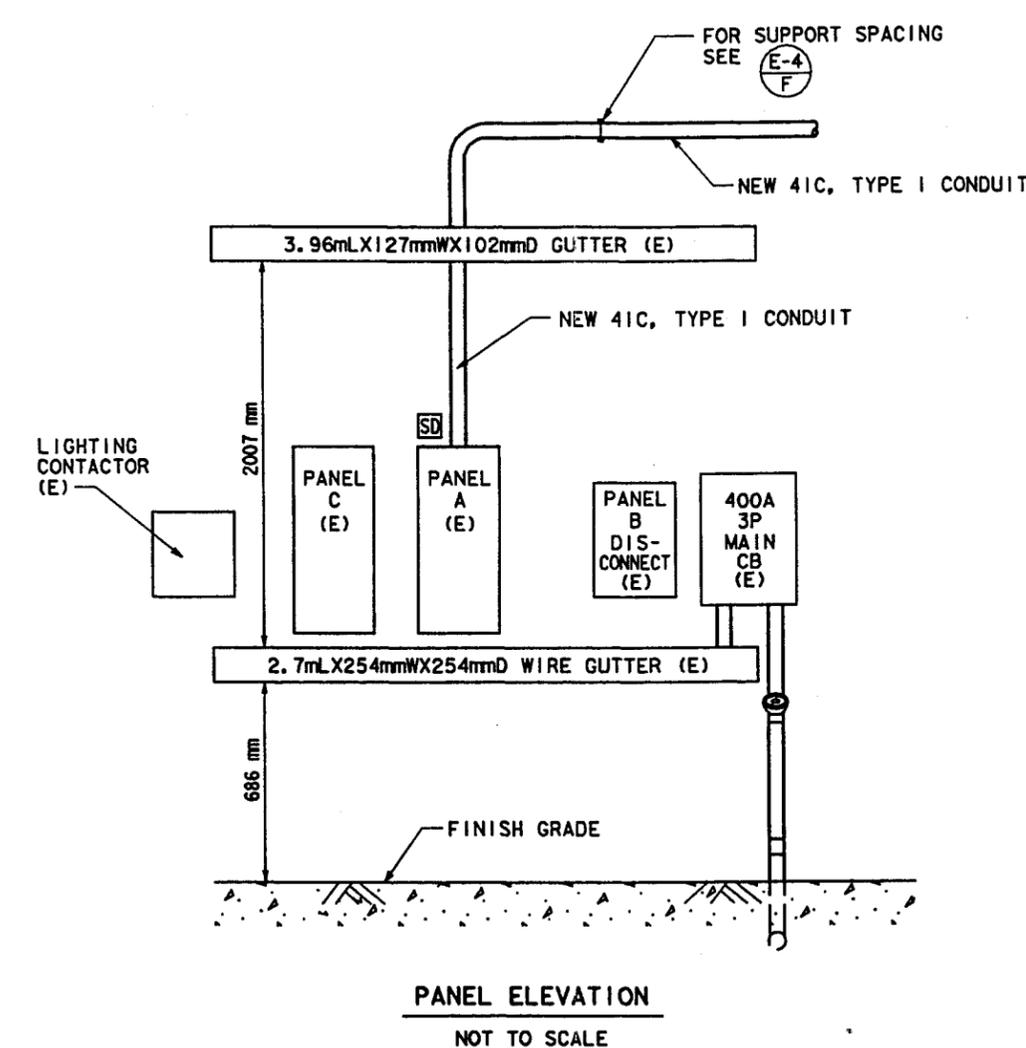
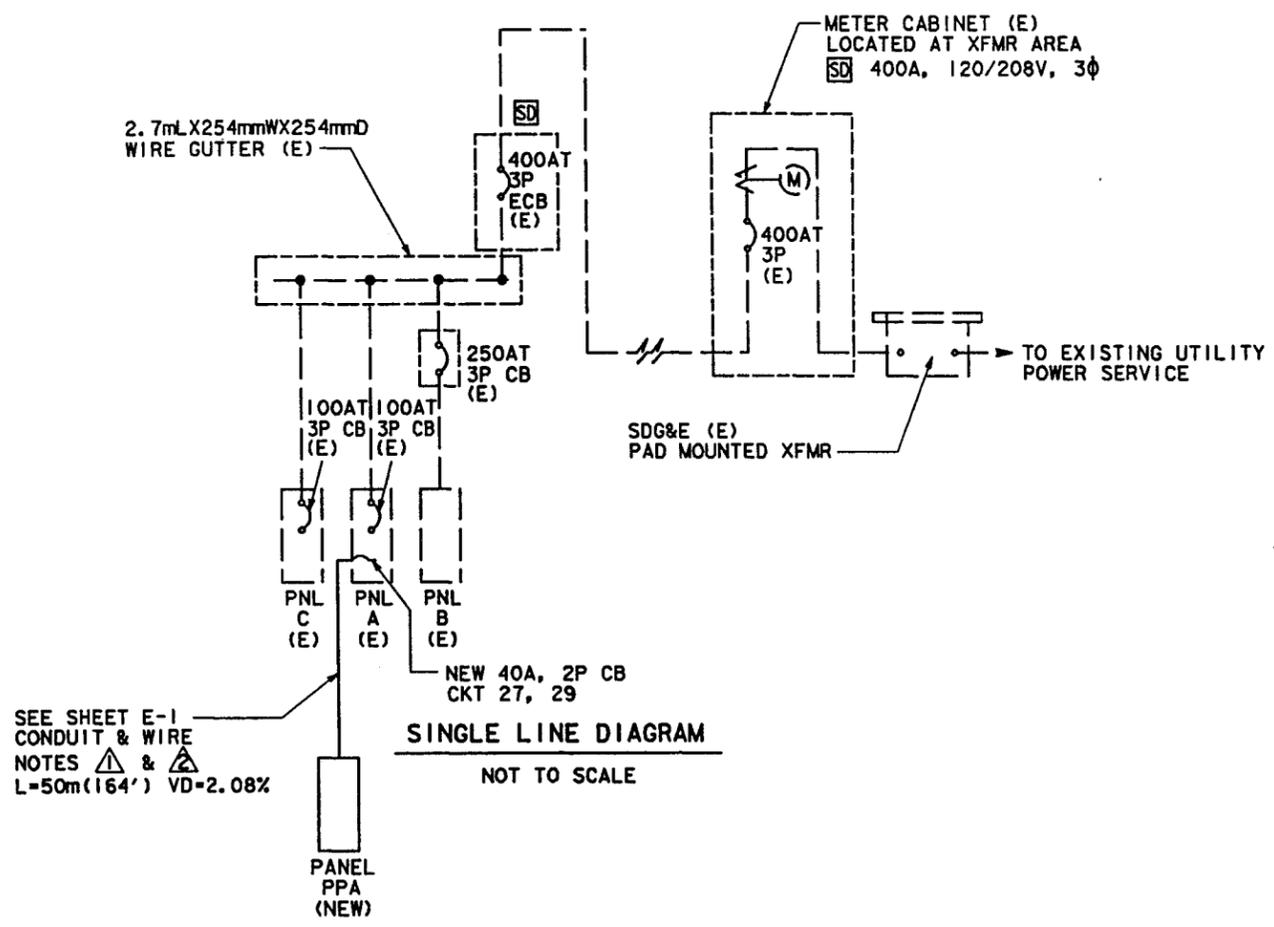
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PLANS APPROVAL DATE

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No. 11800  
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**SINGLE LINE DIAGRAM, PANEL ELEVATION & LOAD SCHEDULE**  
NOT TO SCALE



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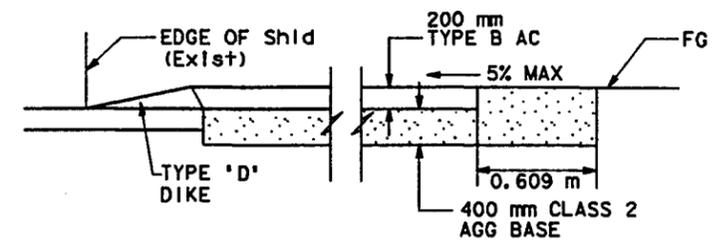


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

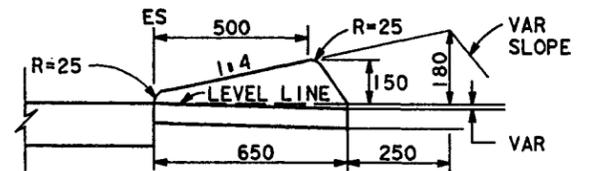
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PLANS APPROVAL DATE

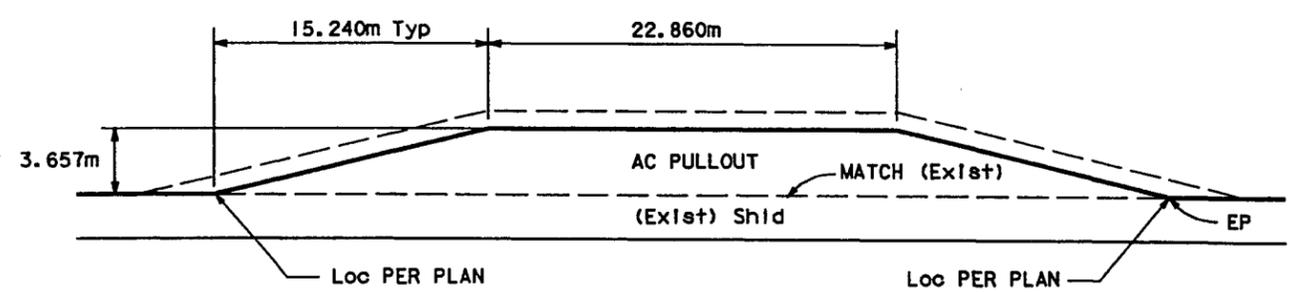
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TYPICAL SECTION WITH DIKE  
NO SCALE

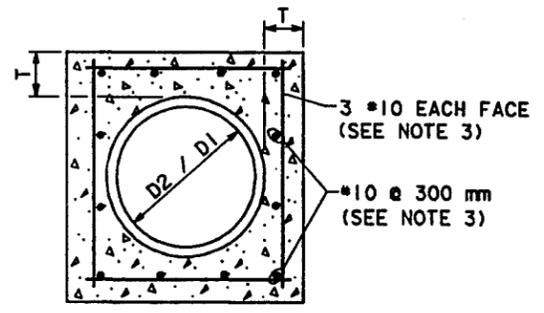
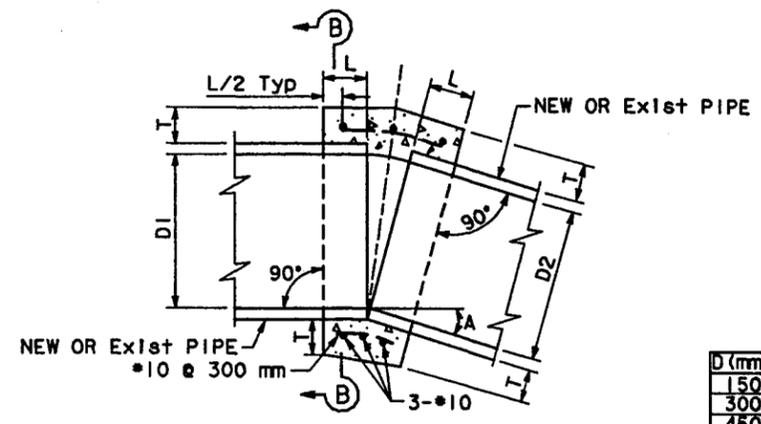


TYPE 'D'  
MOUNTABLE DIKE  
NO SCALE



TYPICAL PULLOUT DETAIL  
NO SCALE

TYPICAL B PULLOUT



SECTION B-B  
FOR D ≤ 1800 mm

D (mm)	L (mm)	T (mm)
150	300	100
300	300	100
450	300	130
600	300	150
900	450	200
1200	450	250
1350	450	250
1500	550	280
1650	550	280
1800	600	300

NOTES:

- WHERE PIPES OF DIFFERENT DIAMETERS ARE JOINED WITH A CONCRETE COLLAR, 'L' AND 'T' SHALL BE THOSE OF THE LARGER PIPE. D=D1 OR D2, WHICHEVER IS GREATER.
- FOR PIPE SIZE NOT LISTED USE NEXT SIZE LARGER.
- OMIT REINFORCING ON PIPES 600 mm AND LESS IN DIAMETER AND ON ALL PIPES WHERE ANGLE A IS LESS THAN 10°. REINFORCING SHALL BE PLACED 40 mm CLEAR FROM OUTSIDE DIAMETER OF PIPE.
- JOIN PIPES AT INVERTS.
- INSIDE LAYER OF REINFORCEMENT SHALL BE PLACED 40 mm CLEAR FROM OUTSIDE DIAMETER OF PIPE. PLACE OUTSIDE LAYER OF REINFORCEMENT 200 mm FROM INSIDE LAYER OF REINFORCEMENT.

CONCRETE COLLAR

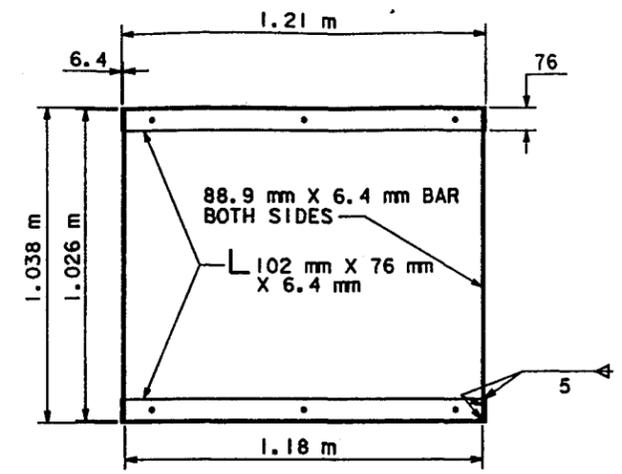


DRAINAGE DETAILS

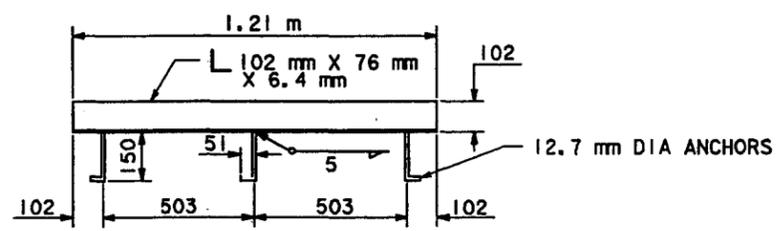
NO SCALE



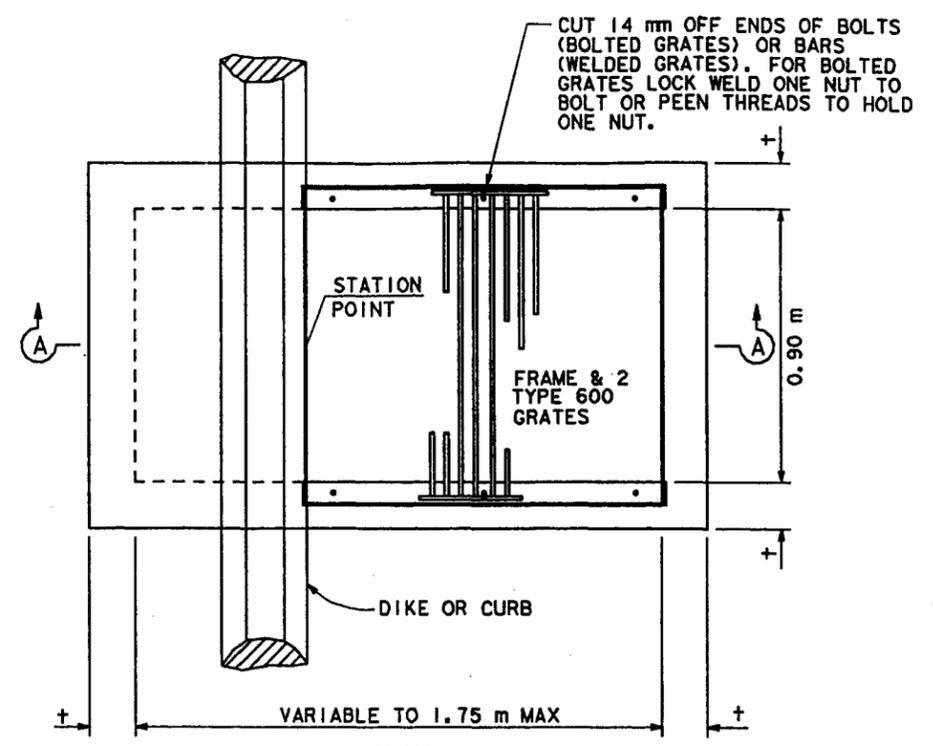
DIST	COUNTY	ROUTE	TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	Var	Var		
REGISTERED CIVIL ENGINEER					
PLANS APPROVAL DATE					
<small>The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.</small>					



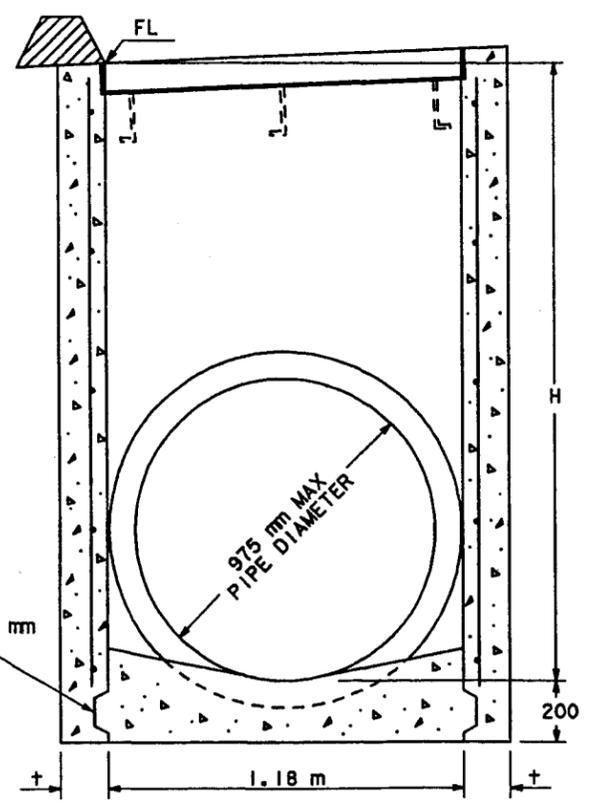
GRATE FRAME DETAIL



ANCHOR PLACEMENT DETAIL



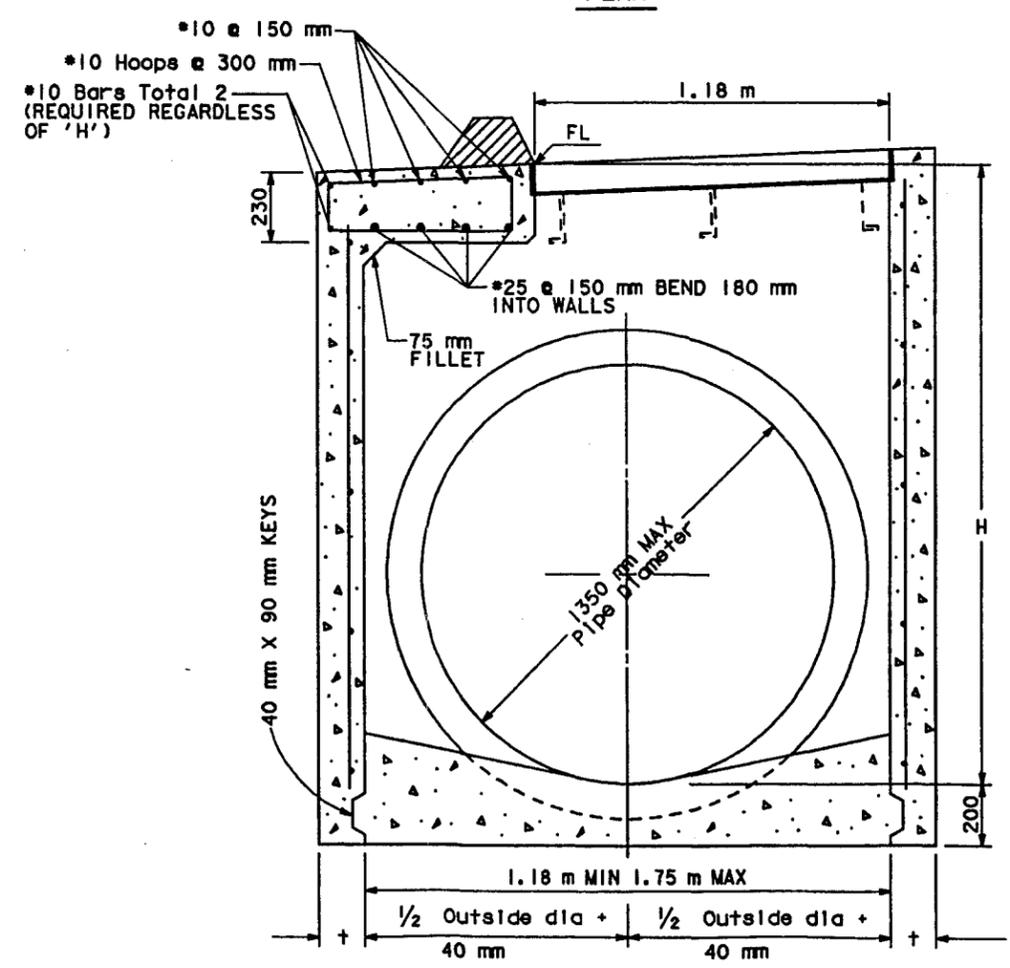
PLAN



SECTION A-A

(FOR PIPE DIAMETERS 975 mm OR LESS)

GD-1



SECTION A-A

GD-2

NOTES

- 'H' is the difference in elevation between the outlet pipe flow line and the flow line of the grates.
- Steps - None required when 'H' is 1.05 m or less. Install one step 400 mm above floor when 'H' is more than 1.05 m and less than 1.50 m. Where 'H' is more than 1.50 m steps shall be evenly spaced @ 300 mm intervals from 400 mm above floor to within 300 mm of the top of the box. Place steps in wall without pipe openings. See Standard Plan D74C for step detail.
- Pipe(s) can be placed in any wall.
- Reinforcing steel not required in walls when 'H' = 1.80 m or less.
- Reinforcing steel in walls shall be #10 bars @ 300 mm centers placed 40 mm clear to inside of box.
- GRATE TYPE SHALL BE 600-12 UNLESS OTHERWISE SHOWN ON DRAINAGE PLAN.

MISCELLANEOUS IRON & STEEL

Inlet Type	Grate Type	Weight (kg)
GD-1 & GD-2	600 - 12	283
GD-1 & GD-2	600 - 10C	173
GD-1 & GD-2	600 - 10S	197
GD-1 & GD-2	600 - 12X	206
GD-1 & GD-2	600 - 13	160

H	+
2.50 m or less	150
2.51 m to 6.00 m	200
6.01 m to 7.00 m	250

DRAINAGE DETAILS

NO SCALE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 PROJECT ENGINEER  
 CHECKED BY  
 CALCULATED/DESIGNED BY  
 DATE REVISIED BY  
 DATE REVISIED BY

15 MAR 98 2: 05 pm \\57704\34358\dgn\dlv\d21.dwg  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 California

DATE	REVISOR	DATE	REVISOR

PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
 CHECKED BY

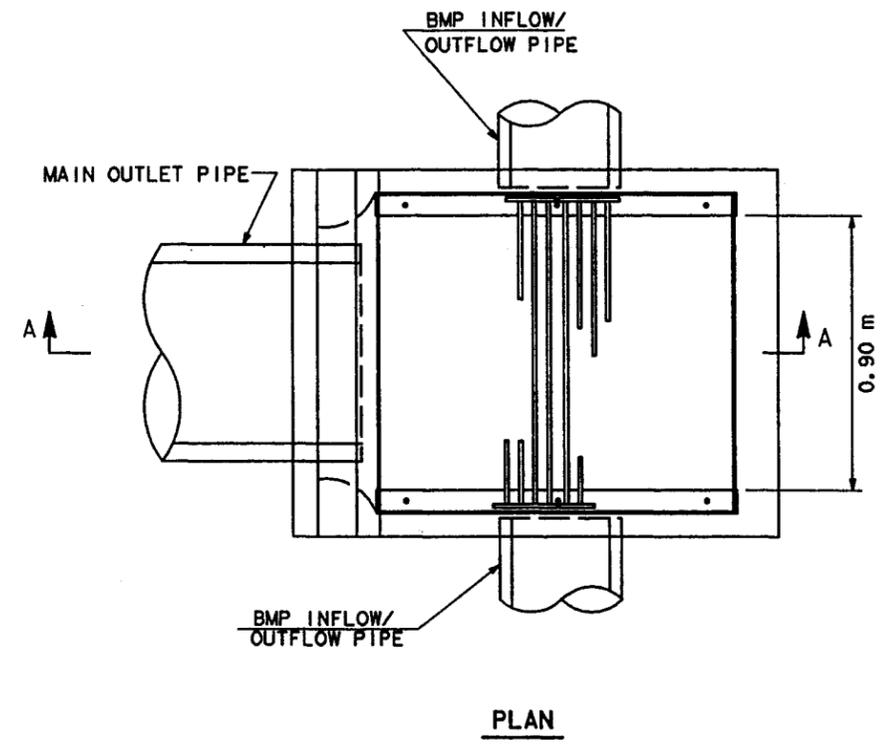


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11	SD	Var	Var		

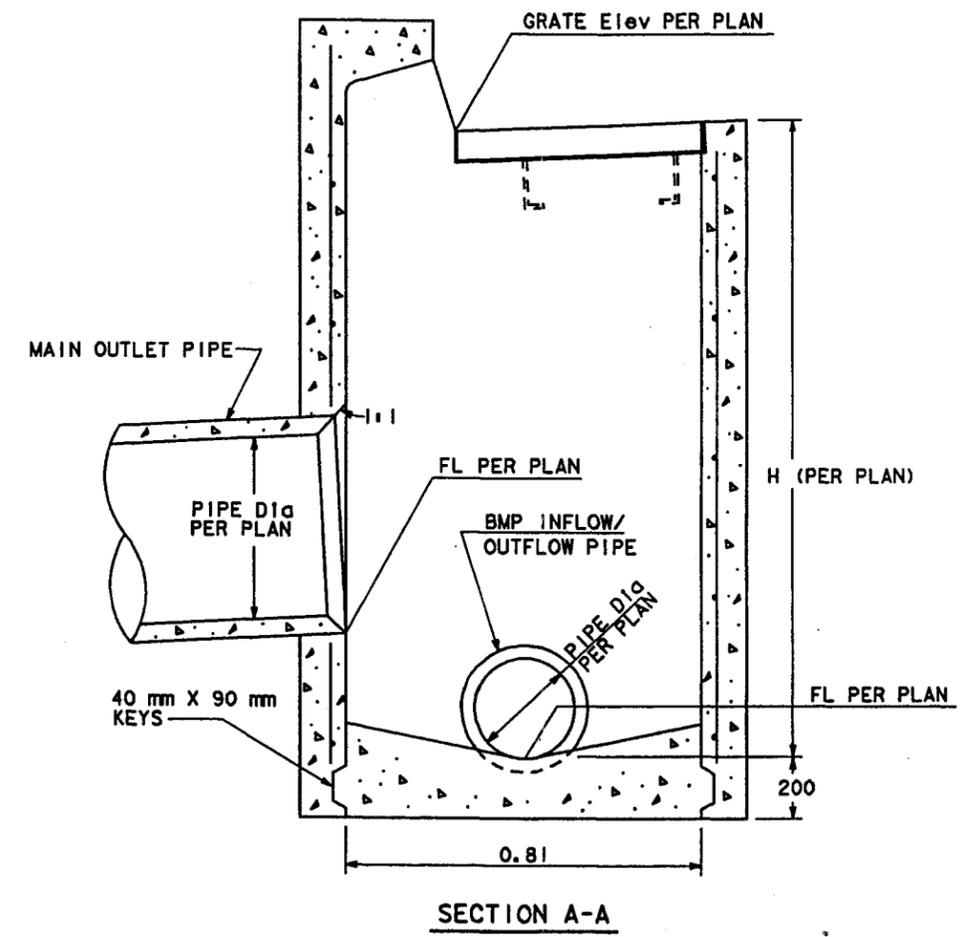
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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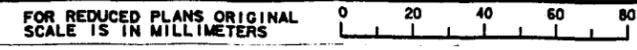
**TYPE GO INLET DETAIL**



**4**  
**DRAINAGE DETAILS**  
 NO SCALE

D-21

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



USERNAME -> USER  
 DGN FILE -> REQUEST

CU 0000

EA 00000

DATE	FILE	STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	PROJECT ENGINEER	CALCULATED/DESIGNED BY	DATE	REVISOR	DATE
		<b>Caltrans</b>		CHECKED BY			

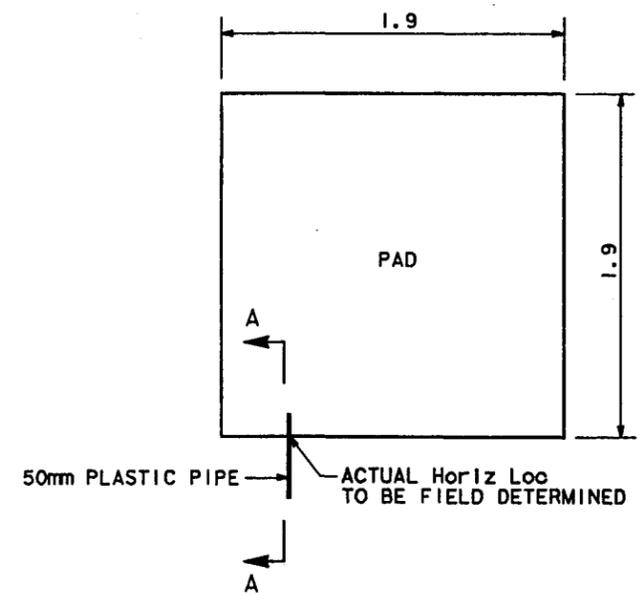


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

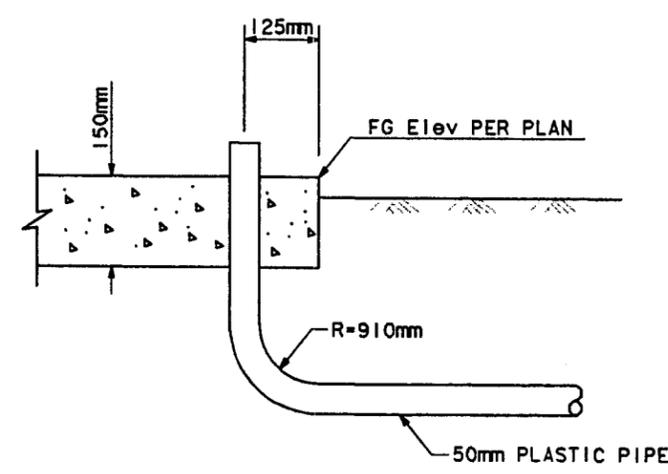
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

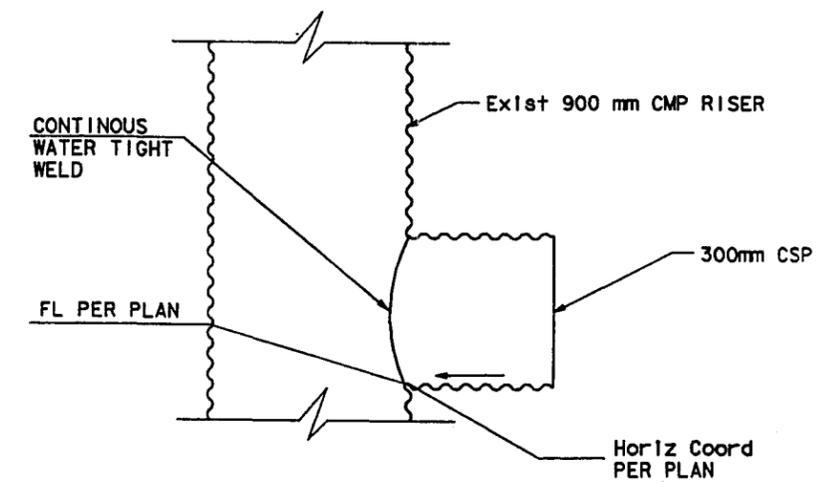
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PLAN



SECTION A - A



JS No 2

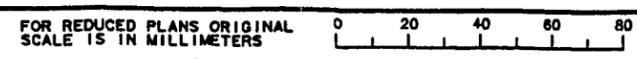
1.9m X 1.9m CONCRETE PAD DETAILS

- 1
- 2
- 3
- 4
- 5
- 6
- 7

**DRAINAGE DETAILS**

NO SCALE

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



USERNAME -> USER  
DGN FILE -> REQUEST

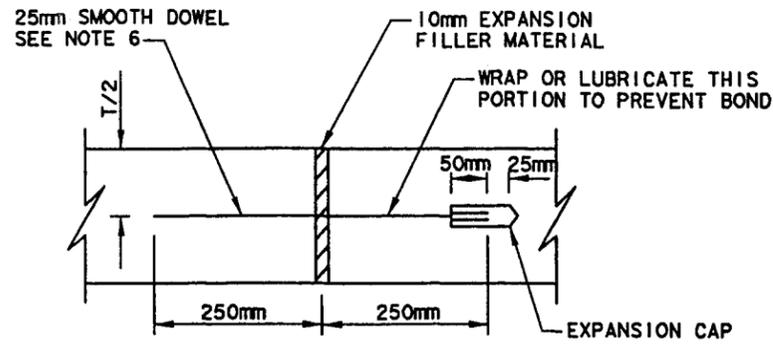
CU 00000

EA 00000

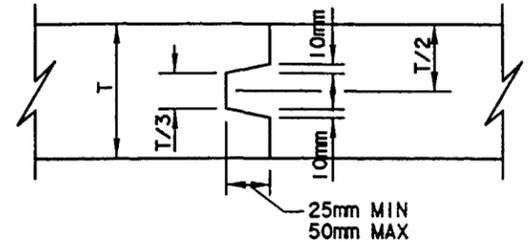
**STRUCTURAL NOTES**

- STRUCTURAL CONCRETE SHALL BE CLASS 'A'.
- ALL LONGITUDINAL BARS SHALL BE AS SHOWN. PLACE BARS IN BOTTOM SLAB SYMMETRICALLY ABOUT CENTERLINE. PLACE BARS IN WALLS STARTING AT TOP WITH 50mm OF CLEAR COVER.
- CLEAR COVER FOR STEEL SHALL BE 50mm FOR WALLS AND 75mm EACH FACE FOR BOTTOM SLAB.
- STEEL IS DIMENSIONED TO BACK OF BAR BEND.
- FOR CONSTRUCTION ON CURVES, STRAIGHT TRANSVERSE BARS SHALL BE ALIGNED RADIALLY WITH SPACING MEASURED AT FACE OF WALL. FOR L-BARS IN WALLS, SPACING SHALL BE MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
- ALL TRANSVERSE CONSTRUCTION JOINTS SHALL BE IN A VERTICAL PLANE NORMAL TO THE CENTERLINE AND THE SPACING THEREOF SHALL NOT EXCEED 15 METERS OR BE LESS THAN 3 METERS. CONTINUOUS KEYWAYS SHALL BE CONSTRUCTED AS SHOWN IN DETAIL A. A COMPLETE CURTAIN OF TRANSVERSE STEEL SHALL BE PLACED 75mm FROM EACH FACE OF THE JOINTS AND LONGITUDINAL STEEL WILL NOT BE CONTINUOUS THROUGH THE JOINTS. IN ADDITION, EXPANSION JOINTS SHALL BE CONSTRUCTED BETWEEN REINFORCED CONCRETE CHANNEL AND REINFORCED CONCRETE BOX SECTIONS AS SHOWN IN DETAIL B. DOWELS SHALL BE PLACED AT 300mm SPACING CENTERED IN THE MIDDLE THIRD OF THE BOTTOM SLAB AND THE TOP THIRD OF SIDE WALLS. A MINIMUM OF 3 DOWELS PER SLAB AND WALLS SHALL BE PLACED.
- ALL QUANTITIES SHOWN ARE APPROXIMATE.
- ALL SPLICES ARE SUBJECT TO APPROVAL BY THE RESIDENT ENGINEER.
- THE BAR LENGTH SHALL VARY UNIFORMLY THROUGHOUT THE TRANSITIONS.

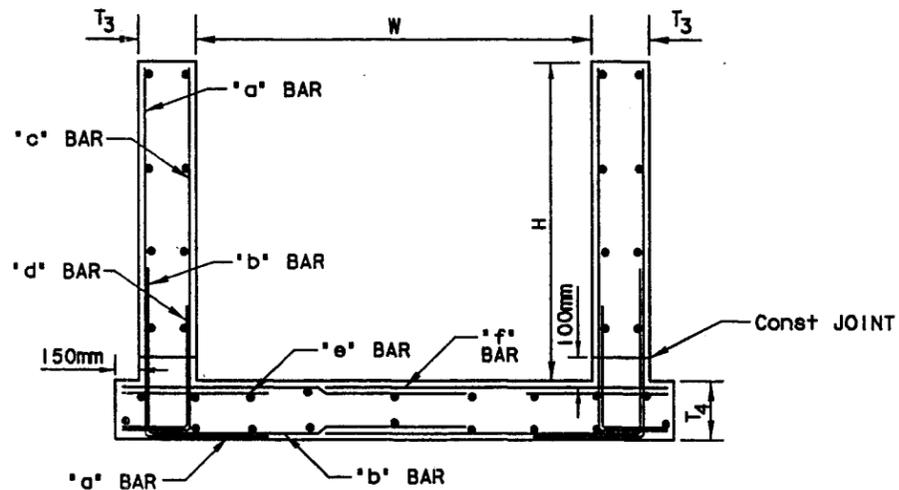
	DATA	TYPE I		TYPE II
		③	④	②
Conc	W (m)	3.657	2.134	1.070
	MAX H (m)	2.623	3.848	1.201
	WALL T <sub>3</sub> (mm)	230	305	205
	BOTTOM SLAB T <sub>4</sub> (mm)	255	355	205
ReInf	LONGITUDINAL BAR	10@360	10@280	10@360
	'a' BAR	15@210	15@150	15@420
	HORIZ L (mm)	2290	1880	990
	VERT L (mm)	2740	4090	1300
	'b' BAR	20@210	25@200	15@420
	HORIZ L (mm)	1220	1370	990
	VERT L (mm)	1520	1520	760
	'c' BAR	10@240	15@200	10@320
	HORIZ L (mm)	280	380	280
	VERT L (mm)	2740	4090	1300
	'd' BAR	10@240	15@140	NOT REQUIRED
	HORIZ L (mm)	280	380	-
	VERT L (mm)	2740	960	-
	'e' BAR	10@240	15@140	10@320
	HORIZ L (mm)	2180	1520	990
	'f' BAR	15@310	15@200	NOT REQUIRED
HORIZ L (mm)	2180	1520	-	
QUANTITY	CONCRETE (m <sup>3</sup> /m)	2.33	3.44	0.85
	REINFORCEMENT (kg/m)	239	463	63



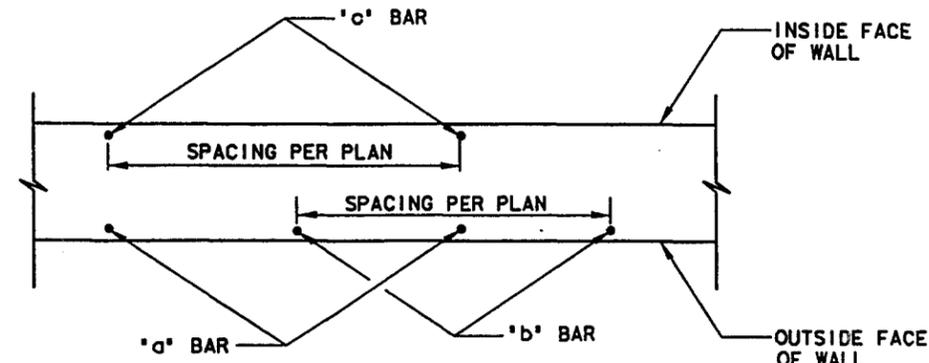
**TRANSVERSE EXPANSION JOINT  
DETAIL B**



**TRANSVERSE CONSTRUCTION JOINT  
DETAIL A**



**TYPICAL SECTION**



**WALL SECTION**

**DESIGN DATA :**  
 LIVE LOAD = 7.26 TONNE  
 SOIL DENSITY = 1.76 TONNE/m<sup>3</sup>  
 ALLOWABLE STRESSES :  
 f<sub>o</sub> = 28 MPa  
 f<sub>c</sub> = 12 MPa  
 f<sub>y</sub> = 414 MPa  
 f<sub>s</sub> = 165 MPa

**Min LAP :**  
 'a' BARS = 450 mm  
 'b' BARS = 775 mm  
 'c' BARS = 400 mm



**DRAINAGE DETAILS**

NO SCALE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 PROJECT ENGINEER  
 CHECKED BY  
 DESIGNED BY  
 CALCULATED BY  
 DATE REVISOR BY  
 DATE REVISOR BY

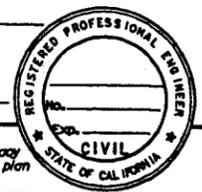


DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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PROJECT ENGINEER

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CHECKED BY

DATE REVISOR BY  
DATE REVISOR

DRAINAGE SYSTEM No	DESCRIPTION	NORTHING/EASTING (OR STATION)	DRAINAGE PLAN SHEET No	DRAINAGE SYSTEM No	DRAINAGE UNIT	QUANTITIES	
						EA	KG
EA	REMOVE DRAINAGE FACILITY						
EA	REMOVE PIPE						
LS	REMOVE CONCRETE GUTTER						
EA	REMOVE ASPHALT CONCRETE DIKE						
EA	REMOVE ASPHALT CONCRETE						
EA	REMOVE TREE						
EA	DITCH EXCAVATION						
EA	RESET UTILITY						
EA	RESET DRAINAGE FACILITY						
EA	ASPHALT CONCRETE DIKE						
EA	TYPE A1-150 CURB						
TONN	AGGREGATE BASE (CLASS 11)						
TONN	ASPHALT CONCRETE (TYPE B)						
EA	PLACE AC (MISC AREA)						
EA	MINOR CONCRETE (MINOR STRUCTURE)						
EA	MINOR CONCRETE (MISC CONST)						
EA	TYPE I SAND FILTER BMP						
EA	TYPE II SAND FILTER BMP						
KG	MISCELLANEOUS IRON AND STEEL						
EA	MH FRAME AND COVER						
EA	CHECKERED PLATE						
EA	TYPE 600-12						
EA	TYPE 900R						
EA	FLARED END SECTION (AP)						
EA	TRAPEZOIDAL FLUME						
EA	PARSHALL FLUME						
EA	XXXXX						
EA	XXXXX						
EA	COMPOST FILTER BMP						
EA	OCF MONITORING MANHOLE						
EA	MONITORING MANHOLE						
EA	STAINLESS STEEL MONITORING WELL						
EA	INFILTRATION TRENCH BMP						
EA	CL. GATE						
EA	50 mm PLASTIC CONDUIT						
EA	150 mm						
EA	200 mm						
EA	250 mm						
EA	300 mm						
EA	450 mm						
EA	300 mm DIP						
EA	BIO-FILTER SWALE BMP						
EA	BIO-FILTER STRIP BMP						
EA	ELBOW						
EA	TEE						
EA	PIPE JOINT CLASSIFICATION						
EA	HEIGHT OF INLET 'H' OR 'V'						
EA	MAXIMUM COVER						
	INLET Chnl	602423.7233 / 902239.6352					
	PARSHALL FLUME	602426.398 / 902231.8584					
	PLASTIC PIPE	602426.398 / 902231.8584					
	Conc PAD	602426.398 / 902231.8584					
	REMOVE Exist INLET	602422.807 / 902238.5408					
	TYPE I SAND FILTER BMP	602425.358 / 902228.7453					
	150mm AP	602443.9890 / 902215.9155					
	PLASTIC PIPE	602445.0343 / 902214.6919					
	Conc PAD	602443.0688 / 902211.2963					
	150mm AP	602445.0343 / 902214.6919					
	OCF WITH NO OPENING	602446.4755 / 902213.0050					
	150mm PIPE	602446.4755 / 902213.0050					
	Conc COLLAR	602449.6844 / 902220.9488					
	GCP MONITORING MH	602445.0343 / 902214.6919					
	150mm PIPE	602449.6844 / 902220.9488					
	Conc PIPE	602436.6930 / 902236.1549					
	150mm PIPE	602436.6930 / 902236.1549					
	G2 INLET WITH DEPRESSED APRON	602424.049 / 902243.4550					
	OVERFLOW Chnl	602424.049 / 902243.4550					



DIST COUNTY ROUTE KILOMETER POST SHEET TOTAL  
11 SD Var Var No SHEETS

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

AGUILAR ENGINEERING INCORPORATED  
937 SOUTH VIA LATA  
SUITE 500  
COLTON, CA 92324

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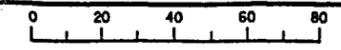


DESCRIPTION

NORTHING/EASTING (OR STATION)

DRAINAGE PLAN SHEET No  
DRAINAGE SYSTEM No  
DRAINAGE UNIT

SHEET TOTAL





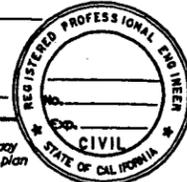






DIST	COUNTY	ROUTE	KILDMETER TOTAL PROJECT	POST No	SHEET No	TOTAL SHEETS
11	SD	Var	Var			

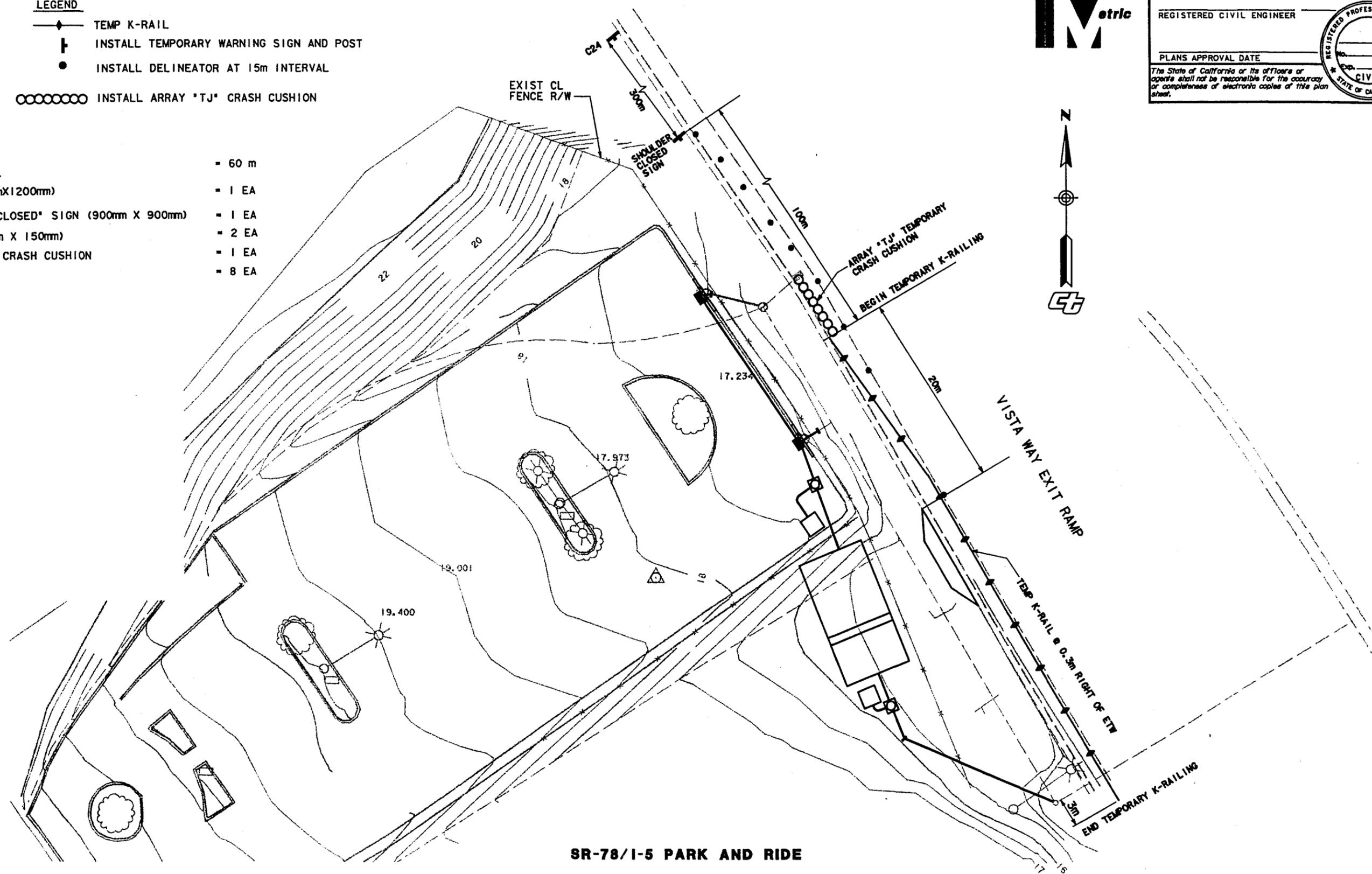
REGISTERED CIVIL ENGINEER	
PLANS APPROVAL DATE	

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- LEGEND**
- ◆ TEMP K-RAIL
  - ⊥ INSTALL TEMPORARY WARNING SIGN AND POST
  - INSTALL DELINEATOR AT 15m INTERVAL
  - INSTALL ARRAY 'TJ' CRASH CUSHION

- QUANTITY**
- TEMP K-RAIL = 60 m
  - C24 (1200mmX1200mm) = 1 EA
  - 'SHOULDER CLOSED' SIGN (900mm X 900mm) = 1 EA
  - POST (150mm X 150mm) = 2 EA
  - ARRAY 'TJ' CRASH CUSHION = 1 EA
  - DELINEATOR = 8 EA



**SR-78/I-5 PARK AND RIDE**

**TRAFFIC HANDLING PLAN  
LOCATION 4**

SCALE 1 : 200

**TH-1**

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 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  


PROJECT ENGINEER	CALCULATED/DESIGNED BY	DATE	REVISOR	DATE

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS

USERNAME -> USER  
DGN FILE -> REQUEST

CU 0000 EA 00000

LAST REVISION



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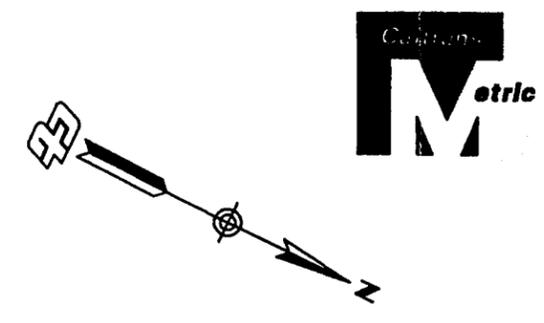
PROJECT ENGINEER  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 DATE REVISOR  
 DATE REVISOR

**LEGEND**

- ◆ TEMP K-RAIL
- ⊥ INSTALL TEMPORARY WARNING SIGN AND POST

**QUANTITY**

- TEMP K-RAIL = 293 m
- C22-B (900mmX9100mm) = 1 EA
- POST (150 mm X 150 mm) = 1 EA

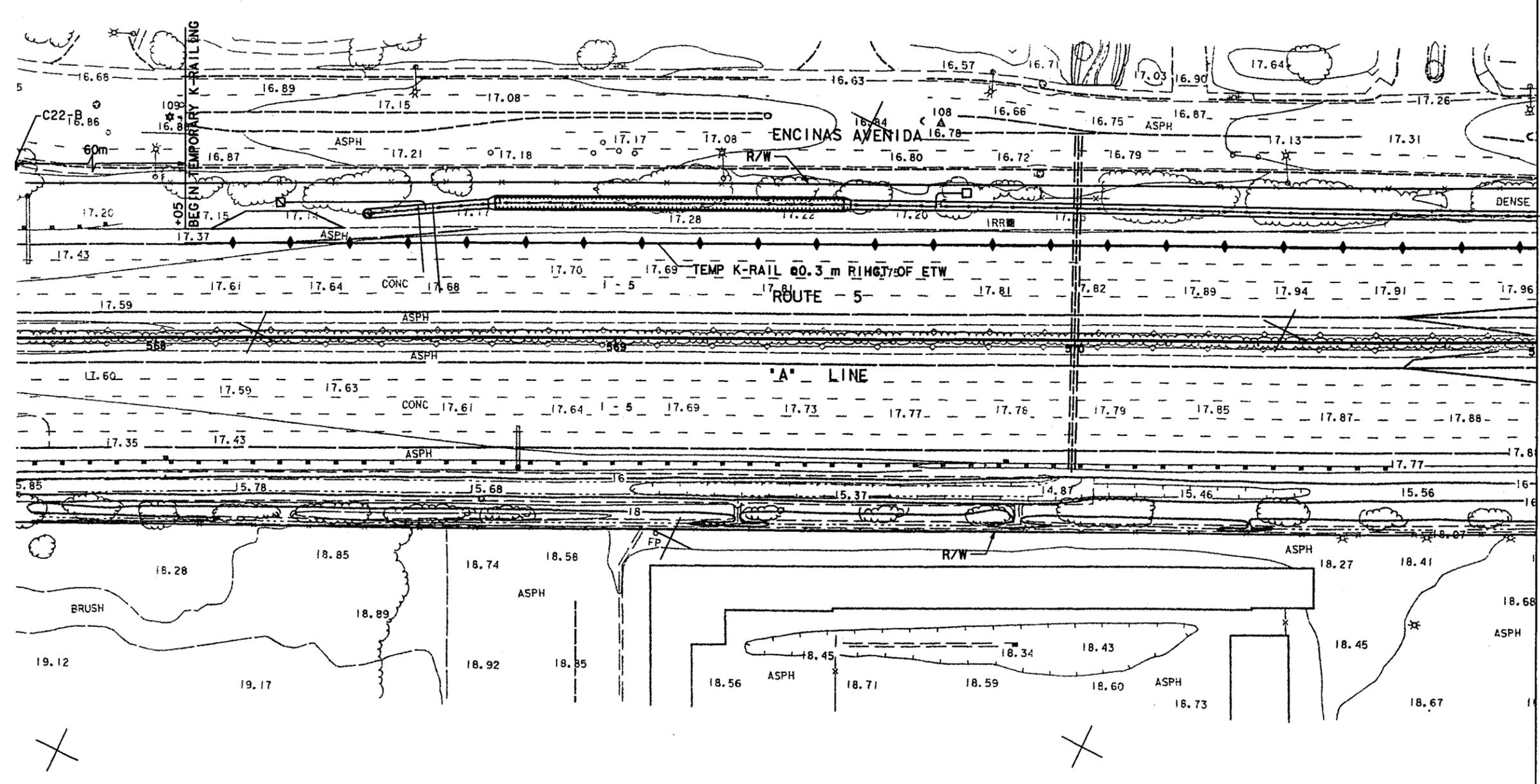


DIST	COUNTY	ROUTE	KILOMETER TOTAL PROJECT	POST PROJECT	SHEET No	TOTAL SHEETS
11	SD	Var	Var			

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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MATCHLINE SEE SHEET TH-4

**TRAFFIC HANDLING PLAN  
 LOCATION 6**  
 SCALE 1 : 500

TH-3

DATE PLOTTED  
 TIME PLOTTED  
 DATE REVISION  
 TIME REVISION



## **PSE Projects**

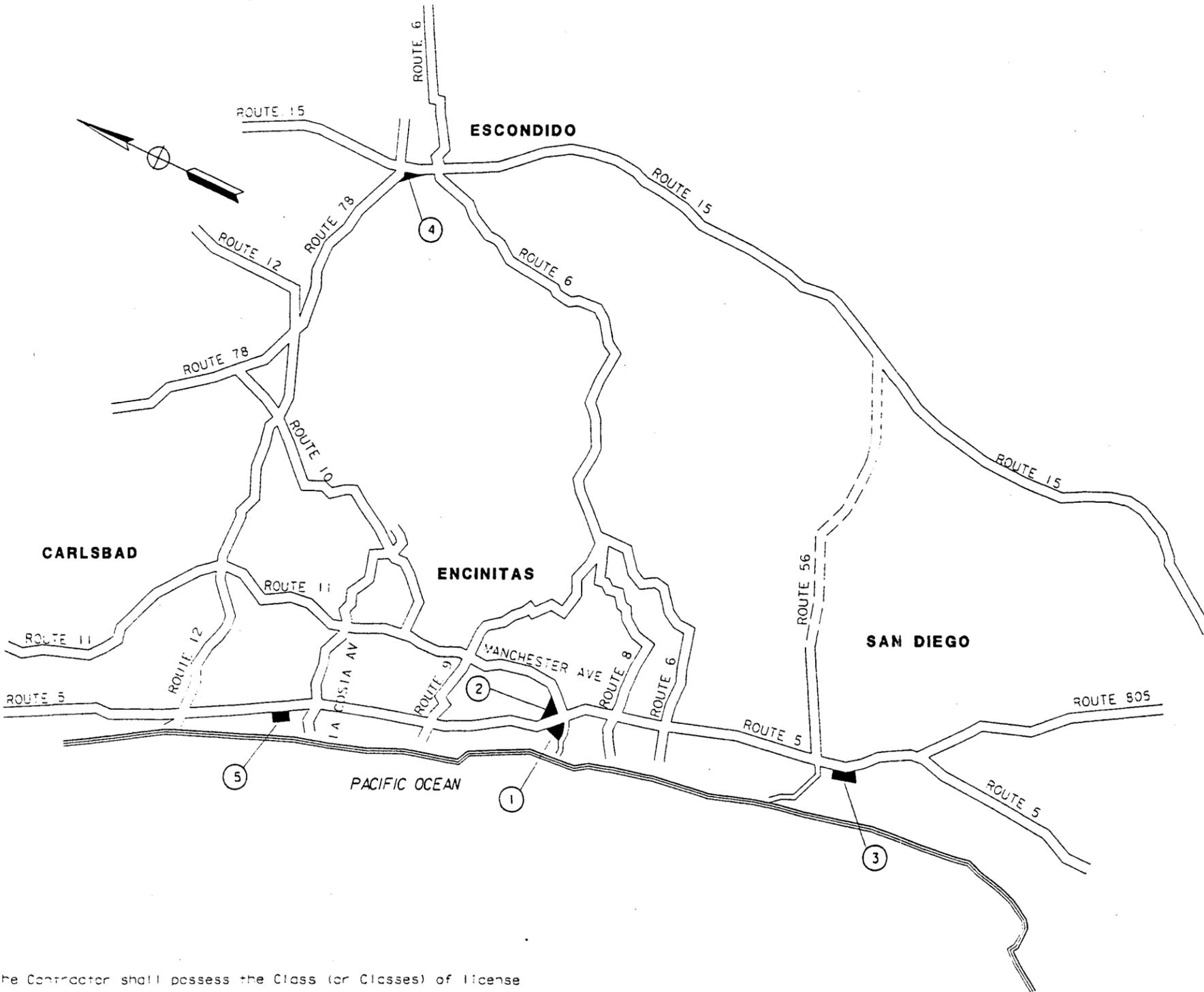
INDEX OF SHEETS

SHEET NO	DESCRIPTION
	TITLE AND LOCATION MAP
	STANDARD PLANS LIST
	CONSTRUCTION STAKING AND SURVEY
	KEY MAP AND LINE INDEX
	CONTOUR GRADING AND DRAINAGE
	DRAINAGE PROFILES, DETAILS AND QUANTITIES
	TRAFFIC HANDLING
	SUMMARY OF MISCELLANEOUS QUANTITIES
	DRAINAGE CROSS SECTIONS

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ADJACENT TO  
STATE HIGHWAY  
IN SAN DIEGO COUNTY  
AT VARIOUS LOCATIONS

To be supplemented by Standard Plans dated July, 1997



DIST	COUNTY	ROUTE	KILOMETER POST MILE PROJECT	SHEET NO	TOTAL SHEETS
11	SD	5, 15 56, 78	Var		

LOCATION MAP

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LOCATION OF CONSTRUCTION

LOC	ROUTE	KP	PM	DESCRIPTION
①	5	52.5	32.6	MANCHESTER AVE SB LOOP ON RAMP
②	5	52.5	32.6	MANCHESTER AVE NB LOOP OFF RAMP
③	5/56	52.9	32.9	I-5/SR-56 JCT WS CONNECTOR
④	78/15	26.6	16.54	SR-78/I-5 JCT ES CONNECTOR
⑤	5	70.9	44.1	NORTH OF LA COSTA AVE SB EXIT RAMP

MAR 98 14:46:06 g:\gpi\p001034358\gpi\div\01r116.dwg  
 PROJECT MANAGER DATE  
 PROJECT ENGINEER DATE  
 REGISTERED CIVIL ENGINEER DATE

*Mike Chesney* 03/98  
Project Engineer Octs  
Registered Civil Engineer



Plans Approved Date

The Contractor shall possess the Class (or Classes) of license as specified in the "Notice to Contractors".



**ROADSIDE SIGNS**

- RS1 Roadside Signs, Typical Installation Details No. 1
- RS2 Roadside Signs, Wood Post, Typical Installation Details No. 2
- RS3 Roadside Signs, Laminated Wood Box Post, Typical Installation Details No. 3
- RS4 Roadside Signs, Typical Installation Details No. 4

**OVERHEAD SIGNS**

**OVERHEAD SIGNS-TRUSS**

- S1 Overhead Signs- Truss, Instructions and Examples
- S2 Overhead Signs- Truss, Single Post Type, Post Types II thru VII
- S3 Overhead Signs- Truss, Two Post Type, Post Types I-S thru VII-S
- S4 Overhead Signs- Truss, Single Post Type, Structural Frame Members
- S5 Overhead Signs- Truss, Two Post Type, Structural Frame Members
- S6 Overhead Signs- Truss, Structural Frame Details
- S7 Overhead Signs- Truss, Frame Juncture Details
- S8A Overhead Signs- Steel Frame Removable Sign Panel Frames
- S8B Overhead Signs- Removable Sign Panel Frames, Overhead Formed Panel Mounting Details
- S8C Overhead Signs- Truss, Sign Panel Mounting Details, Laminated Panel- Type A
- S8D Overhead Signs- Truss, Removable Sign Panel Frames 2.794 m and 3.048 m Sign Panels
- S9 Overhead Signs- Walkway Details No. 1
- S10 Overhead Signs- Walkway Details No. 2
- S11 Overhead Signs- Walkway Safety Railing Details
- S13 Overhead Signs- Truss Pile Foundation

**OVERHEAD SIGNS-LIGHTWEIGHT**

- S14A Overhead Signs- Lightweight Balanced-Single Steel Post Connection and Mounting Details
- S14B Overhead Signs- Lightweight Balanced-Single Steel Post Details
- S15 Overhead Signs- Lightweight, Type A, Connection Details
- S16 Overhead Signs- Lightweight, Type B, Connection Details
- S17 Overhead Signs- Lightweight, Type C, Connection Details
- S18A Overhead Signs- Lightweight, Sign Panel Mounting Details, Laminated Panel- Type A
- S18B Overhead Signs- Lightweight, Light Fixture Mounting Details
- S20A Overhead Signs- Lightweight Post Details
- S20B Overhead Signs- Lightweight Foundation

**OVERHEAD SIGNS-BOX BEAM CLOSED TRUSS ALTERNATIVE**

- S39 Overhead Signs- Box Beam, Closed Truss Foundation
- S40A Overhead Signs- Box Beam, Closed Truss, Two Post Type Frame Members
- S40B Overhead Signs- Box Beam, Closed Truss, Single and Two Post Type General Frame Details
- S40C Overhead Signs- Box Beam, Closed Truss, Ribbed Sheet Metal Details
- S40D Overhead Signs- Box Beam, Closed Truss, Two Post Type Frame Details
- S40E Overhead Signs- Box Beam, Closed Truss, Two Post Type Frame Juncture Details
- S40F Overhead Signs- Box Beam, Closed Truss, Two Post Type Post Details
- S40G Overhead Signs- Box Beam, Closed Truss, Single Post Type Frame Members
- S40H Overhead Signs- Box Beam, Closed Truss, Single Post Cantilever Frame Details
- S40I Overhead Signs- Box Beam, Closed Truss, Single Post Cantilever Frame Juncture Details
- S40J Overhead Signs- Box Beam, Closed Truss, Single Post Cantilever Post Details
- S40K Overhead Signs- Box Beam, Closed Truss, Single Post Butterfly Frame Details
- S40L Overhead Signs- Box Beam, Closed Truss, Single Post Butterfly Frame Juncture Details
- S40M Overhead Signs- Box Beam, Closed Truss, Single Post Butterfly Post Details

**OVERHEAD SIGNS-TUBULAR**

- S40N Overhead Signs- Tubular, Instructions and Examples
- S40P Overhead Signs- Tubular, Single Post Type Layout and Pipe Selection
- S40Q Overhead Signs- Tubular, Two Post Type Layout and Pipe Selection

- S40R Overhead Signs- Tubular, Structural Frame Details No. 1
- S40S Overhead Signs- Tubular, Structural Frame Details No. 2
- S40T Overhead Signs- Tubular Foundation Details

**SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS**

- ES-1A Signal, Lighting and Electrical Systems- Symbols and Abbreviations
- ES-1B Signal, Lighting and Electrical Systems- Symbols and Abbreviations
- ES-2A Signal, Lighting and Electrical Systems- Service Equipment
- ES-2B Signal, Lighting and Electrical Systems- Service Equipment
- ES-2C Signal, Lighting and Electrical Systems- Service Equipment Notes
- ES-2D Signal, Lighting and Electrical Systems- Service Equipment and Typical Wiring Diagram, Type A
- ES-2E Signal, Lighting and Electrical Systems- Service Equipment and Typical Wiring Diagram, Type B
- ES-2F Signal, Lighting and Electrical Systems- Service Equipment and Typical Wiring Diagram, Type C
- ES-3A Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3B Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3C Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3D Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-3E Signal, Lighting and Electrical Systems- Signal Heads and Mountings
- ES-4A Signal, Lighting and Electrical Systems- Controller Cabinet Details
- ES-4B Signal, Lighting and Electrical Systems- Controller Cabinet Details
- ES-4C Signal, Lighting and Electrical Systems- Controller Cabinet Details
- ES-4D Irrigation Controller Enclosure Cabinet
- ES-4E Signal, Lighting and Electrical Systems- Telephone Demarcation Cabinet Details
- ES-4F Signal, Lighting and Electrical Systems- Telephone Demarcation Cabinet Details
- ES-5A Signal, Lighting and Electrical Systems- Detectors
- ES-5B Signal, Lighting and Electrical Systems- Detectors
- ES-5C Signal, Lighting and Electrical Systems- Detectors
- ES-5D Signal, Lighting and Electrical Systems- Detectors
- ES-5E Signal, Lighting and Electrical Systems- Detectors
- ES-5F Signal, Lighting and Electrical Systems- Pedestrian Barricades
- ES-6A Signal and Lighting Standards- Type I Standards and Equipment Numbering
- ES-6AA Signal Standards- Push Button Posts
- ES-6B Lighting Standards- Types 15, 21 and 22
- ES-6C Lighting Standards- 24.4 m to 48.8 m High Mast Light Pole, Foundation Details
- ES-6D Lighting Standards- Types 30 and 31
- ES-6DA Lighting Standards- Type 32
- ES-6E Lighting Standards- Types 30 and 31, Slip Base Details
- ES-6F Lighting Standards- 10 Degree Type
- ES-6H Lighting Standards- 10 Degree Type, Details
- ES-6J Signal and Lighting Standards- Case 1 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 4.5 m to 9.1 m
- ES-6K Signal and Lighting Standards- Case 2 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 6.1 m to 9.1 m
- ES-6L Signal and Lighting Standards- Case 3 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 4.5 m to 13.7 m
- ES-6M Signal and Lighting Standards- Case 4 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 7.6 m to 13.7 m
- ES-6MA Signal and Lighting Standards- Case 5 Arm Loading, Wind Velocity = 113 km/h, Arm Lengths 15.2 m to 16.8 m
- ES-6N Signal and Lighting Standards- Type 40-0-129
- ES-6O Signal and Lighting Standards- Case 1 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 7.6 m to 9.1 m
- ES-6P Signal and Lighting Standards- Case 2 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 6.1 m to 9.1 m
- ES-6Q Signal and Lighting Standards- Case 3 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 6.1 m to 13.7 m
- ES-6R Signal and Lighting Standards- Case 4 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 7.6 m to 13.7 m
- ES-6RA Signal and Lighting Standards- Case 5 Arm Loading, Wind Velocity = 129 km/h, Arm Lengths 15.2 m to 16.8 m



DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	VAR	VAR		

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To accompany plans dated \_\_\_\_\_

- ES-6S Signal and Lighting Standards- Details No. 1
- ES-6T Signal and Lighting Standards- Details No. 2
- ES-6TA Signal and Lighting Standards- Pole and Mast Arm Alternatives
- ES-6U Lighting Standards- Types 10 and 15 Slip Base Insert
- ES-6V Signal and Sign Standards- Type 33 Left Turn
- ES-7A Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7B Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7C Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7D Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7E Signal, Lighting and Electrical Systems- Electrical Details, Structure Installations
- ES-7F Signal, Lighting and Electrical Systems- Flush Soffit Luminaire Modification Details, Structure Installation
- ES-8 Signal, Lighting and Electrical Systems- Pull Box Details
- ES-9A Signal, Lighting and Electrical Systems- Cantilever Flashing Beacon, Types 9, 9A and 9B
- ES-9B Signal, Lighting and Electrical Systems- Cantilever Flashing Beacon, Types 9, 9A and 9B
- ES-10 Signal, Lighting and Electrical Systems- Isolux Diagrams
- ES-11 Signal, Lighting and Electrical Systems- Foundation Installations
- ES-12 Signal, Lighting and Electrical Systems- Pedestrian Undercrossing Fluorescent Lighting Fixture
- ES-13 Signal, Lighting and Electrical Systems- Splicing Details
- ES-14 Signal, Lighting and Electrical Systems- Wiring Details and Fuse Ratings
- ES-15 Signal, Lighting and Electrical Systems- Pedestrian Overcrossing Fluorescent Lighting Fixture
- ES-27A Signal, Lighting and Electrical Systems- Extinguishable Message Sign, 250 mm Letters
- ES-27B Signal, Lighting and Electrical Systems- Extinguishable Message Sign, 250 mm Letters
- ES-28 Signal, Lighting and Electrical Systems- Extinguishable Message Sign and Flashing Beacons

**SIGN ILLUMINATION**

- ES-29 Sign Illumination- Mercury Sign Illumination Equipment
- ES-30 Sign Illumination- 915 mm Fluorescent Sign Illumination Equipment
- ES-32A Sign Illumination- Sign Illumination Equipment
- ES-32B Sign Illumination- Sign Illumination Control
- ES-33 Sign Illumination- Internally Illuminated Street Name Sign





**BASIS OF BEARING AND COORDINATES**

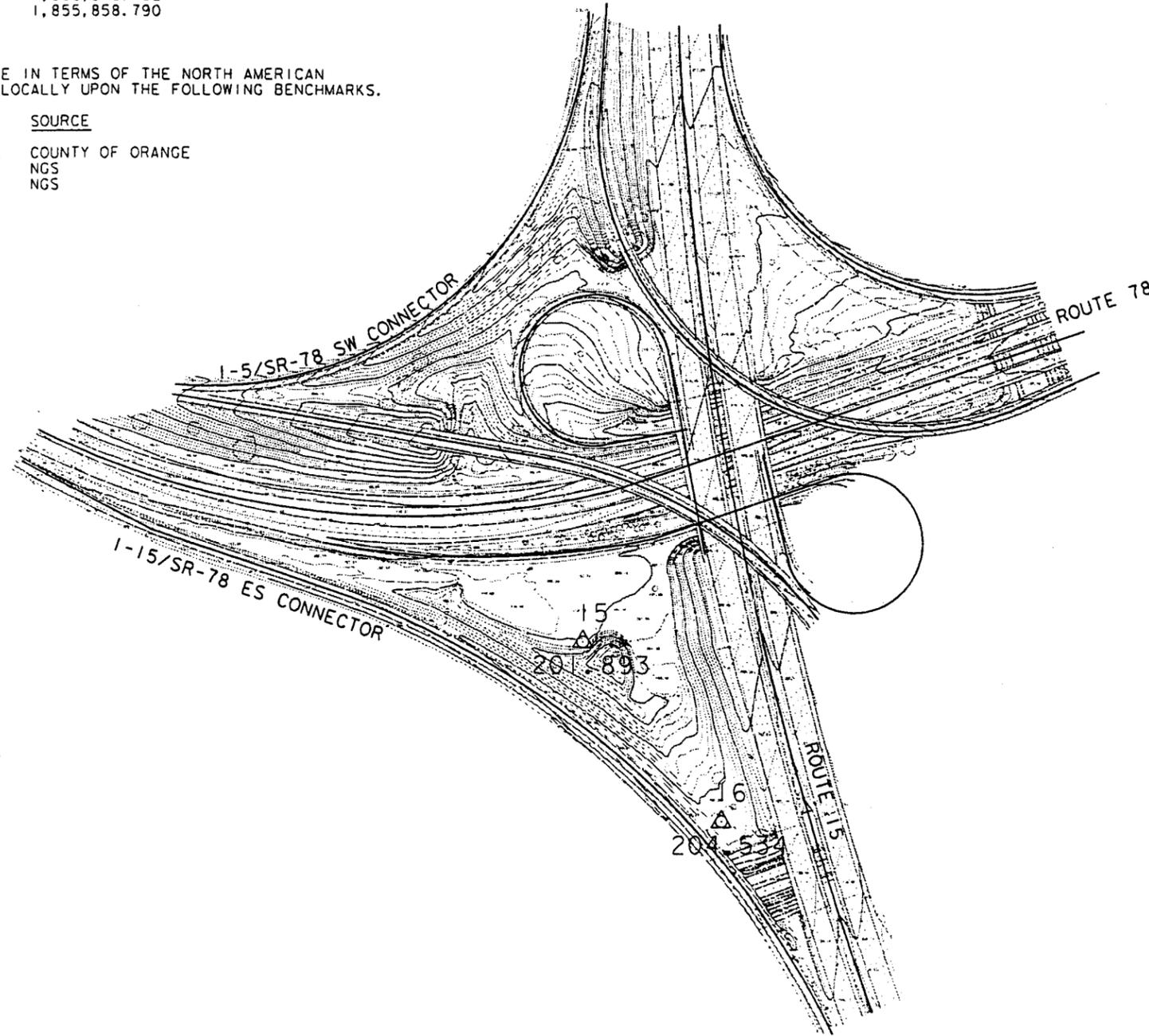
BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYSTEM OF 1983 (1991.35), ZONE 6, BASED LOCALLY UPON THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY AND TRANSFORMED TO THE 1991.35 EPOCH USING THE HTDP MODEL VERSION 2.1.

STATION	NORTHING (X)	EASTING (Y)
MONP	580,447.164	1,983,875.722
S103	577,862.412	1,906,370.402
TRAK	662,023.898	1,855,858.790

**BENCHMARK**

ELEVATIONS AS SHOWN HEREON ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 BASED LOCALLY UPON THE FOLLOWING BENCHMARKS.

BENCHMARK	NAVD88 ELEV	SOURCE
TRAK	151.604	COUNTY OF ORANGE
DASH	462.113	NGS
F1415	75.015	NGS



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	78/15	26.6		

REGISTERED CIVIL ENGINEER  
 MIKE CHESNEY  
 No. 48913  
 Exp. 9-30-00  
 CIVIL  
 STATE OF CALIFORNIA

PLANS APPROVAL DATE

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618

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**PROJECT CONTROL**

STA NAME	NORTHING (Y) METERS	EASTING (X) METERS	EPOCH DATE	ELEVATION METERS	DESCRIPTION
15	606,707.769	1,920,134.709	1991.35	201.893	1" IP W/ NAIL & SHINER I-5/SR78
16	606,584.176	1,920,231.693	1991.35	204.534	1" IP W/ NAIL & SHINER I-5/SR78

**CONSTRUCTION STAKING SURVEY CONTROL DATA (LOCATION 4) I-5/SR-78**

SCALE: 1:2000

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



DESIGN OVERSIGHT

CALCULATED/DESIGNED BY  
CHECKED BY

CY MC

DATE REVISED BY  
DATE REVISED

**BASIS OF BEARING AND COORDINATES**

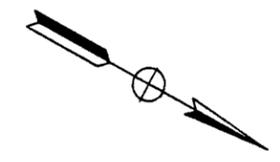
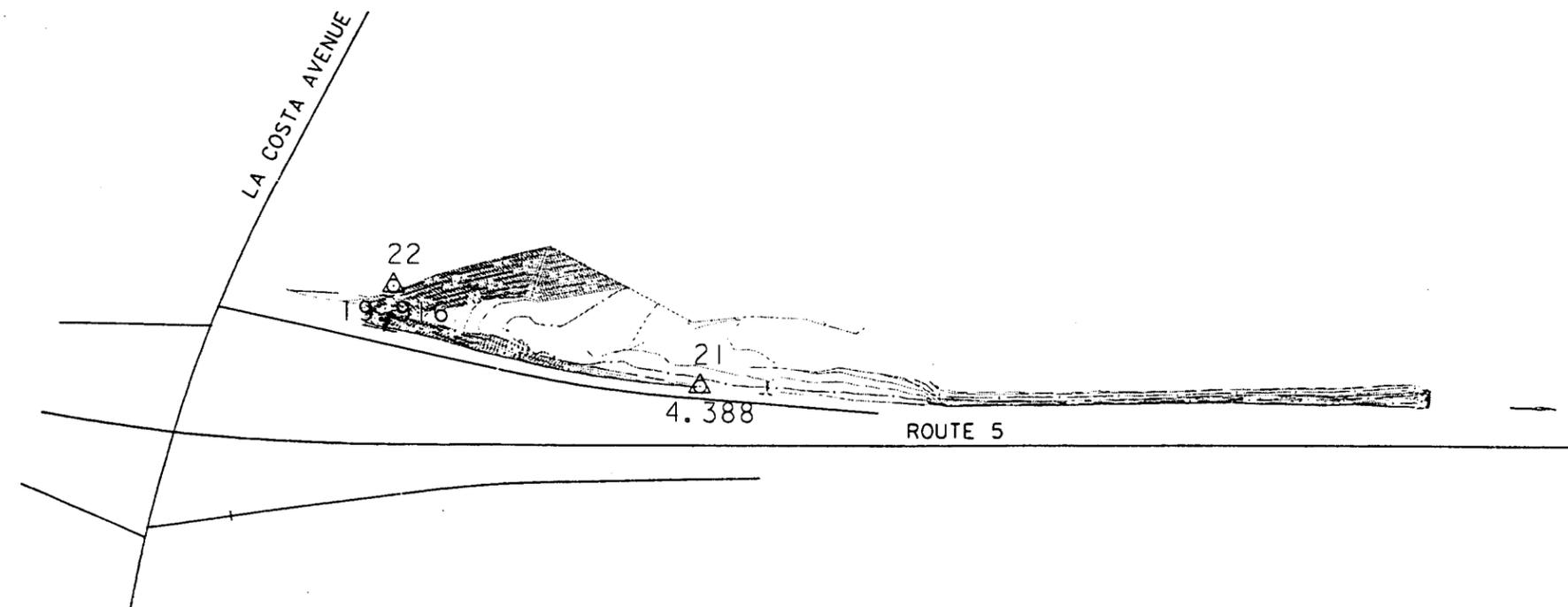
BEARINGS AND COORDINATES AS SHOWN HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYSTEM OF 1983 (1991.35), ZONE 6, BASED LOCALLY UPON THE FOLLOWING CONTINUOUSLY OPERATING REFERENCE STATIONS AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY AND TRANSFORMED TO THE 1991.35 EPOCH USING THE HTDP MODEL VERSION 2.1.

STATION	NORTHING (Y)	EASTING (X)
MONP	580,447.164	1,983,875.722
S103	577,862.412	1,906,370.402
TRAK	662,023.898	1,855,858.790

**BENCHMARK**

ELEVATIONS AS SHOWN HEREON ARE IN TERMS OF THE NORTH AMERICAN VERTICAL DATUM OF 1988 BASED LOCALLY UPON THE FOLLOWING BENCHMARKS.

BENCHMARK	NAVD88 ELEV	SOURCE
TRAK	151.604	COUNTY OF ORANGE
DASH	462.113	NGS
F1415	75.015	NGS



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	70.9		

REGISTERED CIVIL ENGINEER  
  
 REGISTERED PROFESSIONAL ENGINEER  
 MIKE CHESNEY  
 No. 48913  
 Exp. 9-30-00  
 CIVIL  
 STATE OF CALIFORNIA

PLANS APPROVAL DATE

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618

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**PROJECT CONTROL**

STA NAME	NORTHING (Y) METERS	EASTING (X) METERS	EPOCH DATE	ELEVATION METERS	DESCRIPTION
21	602,528.296	1,901,962.817	1991.35	4.388	1" IP I-5/LA COSTA
22	602,328.233	1,901,999.802	1991.35	19.916	ALUMINUM CAP I-5/LA COSTA

**CONSTRUCTION STAKING SURVEY  
 CONTROL DATA  
 (LOCATION 5)  
 I-5/LA COSTA AVE**  
 SCALE: 1:2000



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 DESIGN OVERSIGHT  
 Caltrans

DATE	REVISER	DATE	REVISER
3/98	NW	3/98	MC



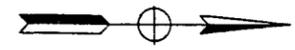
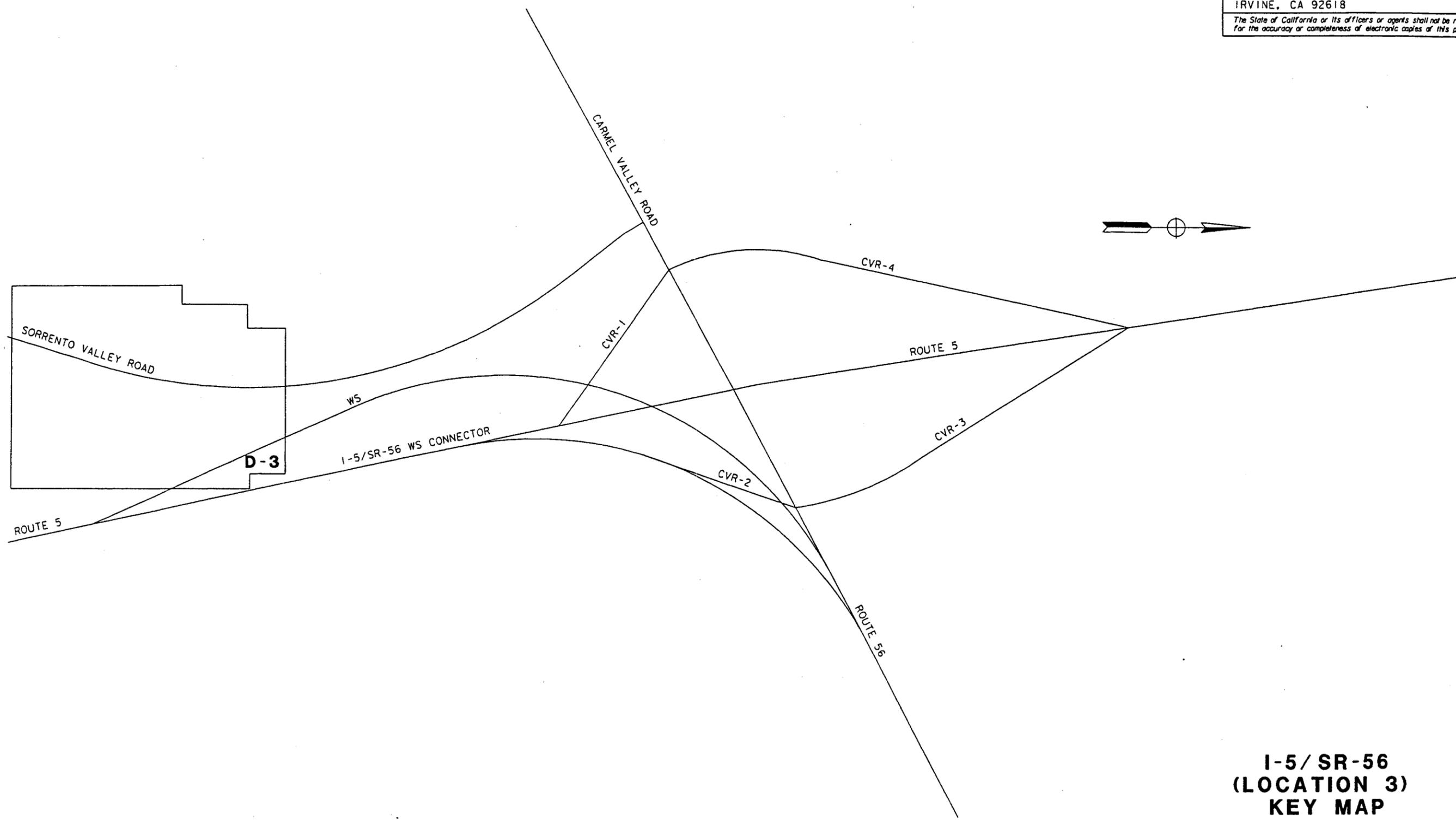
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5/56	52.9		

  
 REGISTERED CIVIL ENGINEER  
 MIKE CHESNEY  
 No. 48913  
 Exp. 9-30-00  
 CIVIL  
 STATE OF CALIFORNIA

PLANS APPROVAL DATE \_\_\_\_\_

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618

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**I-5/SR-56  
 (LOCATION 3)  
 KEY MAP**  
 NO SCALE

DESIGN OVERSIGHT

CALCULATED/  
DESIGNED BY

DATE

REVISOR

DATE

REVISOR

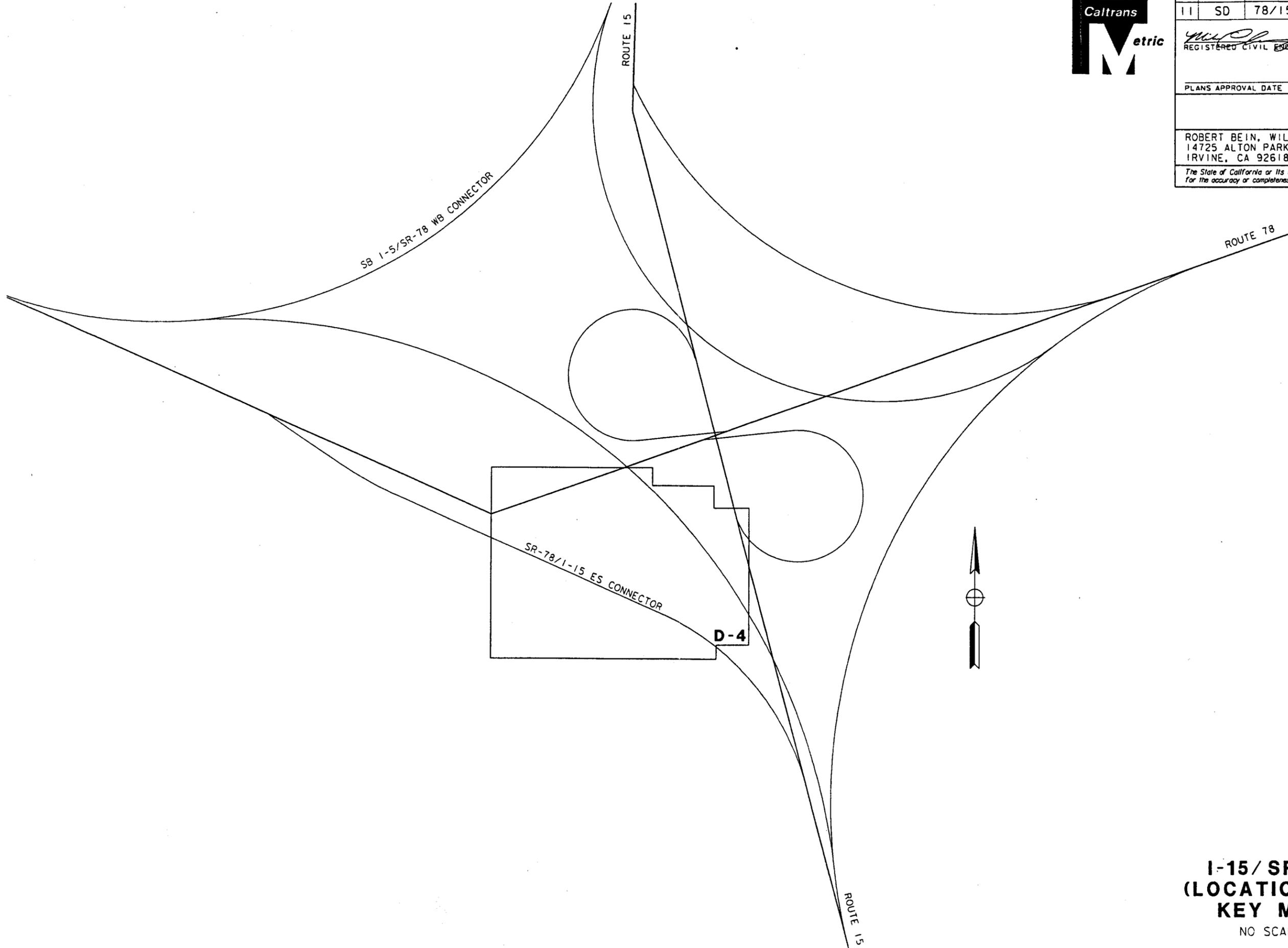
DATE

REVISOR

DATE

REVISOR

DATE



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET TOTAL NO. SHEETS
11	SD	78/15	26.6	

  
 REGISTERED CIVIL ENGINEER  
 MIKE CHESNEY  
 No. 48913  
 Exp. 9-30-00  
 CIVIL  
 STATE OF CALIFORNIA

PLANS APPROVAL DATE \_\_\_\_\_  
 ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618  
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**I-15/ SR-78  
 (LOCATION 4)  
 KEY MAP**  
 NO SCALE

CALCULATED/ DESIGNED BY	DATE	REVISED BY
CHECKED BY	DATE	DATE
NW	3/98	
MC	3/98	



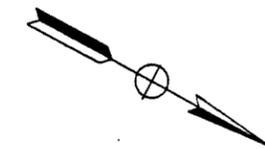
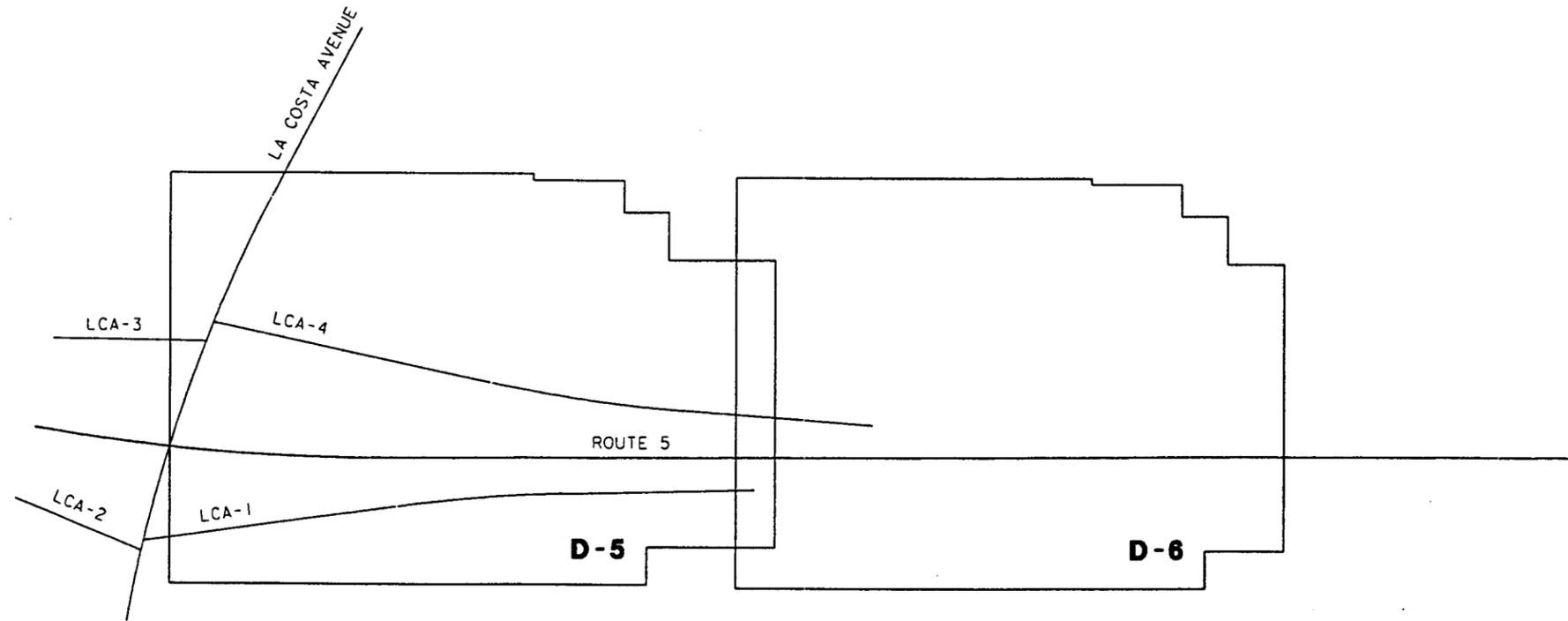
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	70.9		

  
 REGISTERED CIVIL ENGINEER  
 MIKE CHESNEY  
 No. 48913  
 Exp. 9-30-00  
 CIVIL  
 STATE OF CALIFORNIA

PLANS APPROVAL DATE \_\_\_\_\_

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618

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**I-5/LA COSTA AVE  
 (LOCATION 5)  
 KEY MAP**  
 NO SCALE

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 STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION  
 DESIGN OVERSIGHT  
 CALCULATED/DESIGNED BY AMW 3/98  
 CHECKED BY SMT 3/98  
 DATE REVISED BY  
 DATE REVISED  
 Station  
 Exc

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



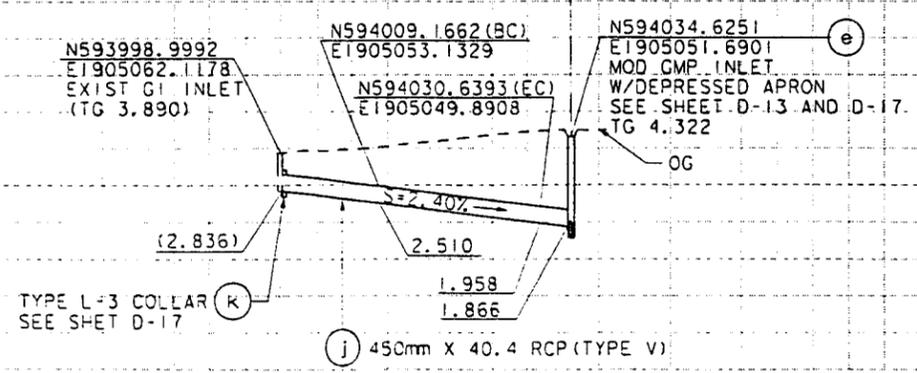
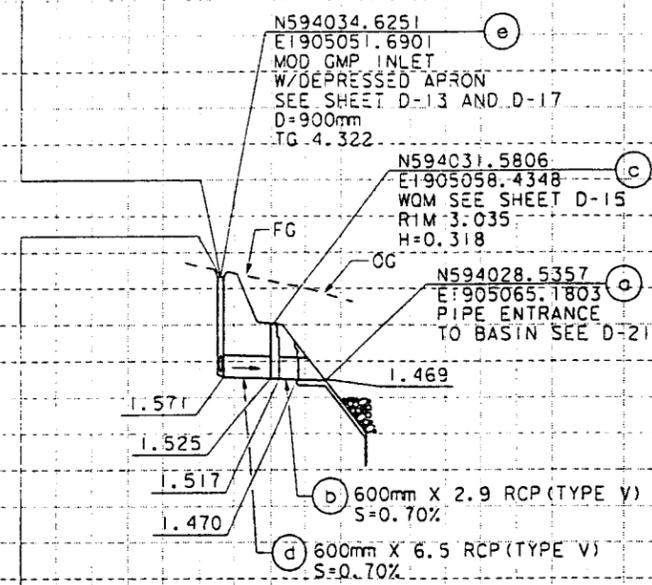
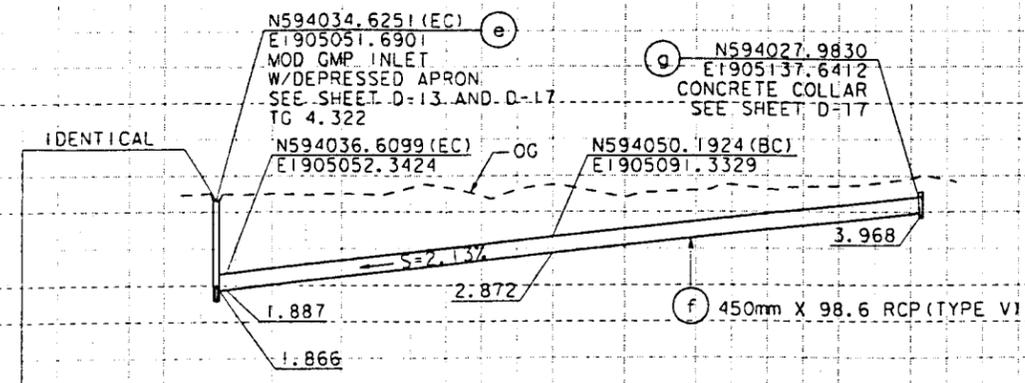
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	52.5		

REGISTERED CIVIL ENGINEER  
 A.M. WALKER  
 No. 57716  
 Exp. 12-31-01  
 CIVIL  
 STATE OF CALIFORNIA

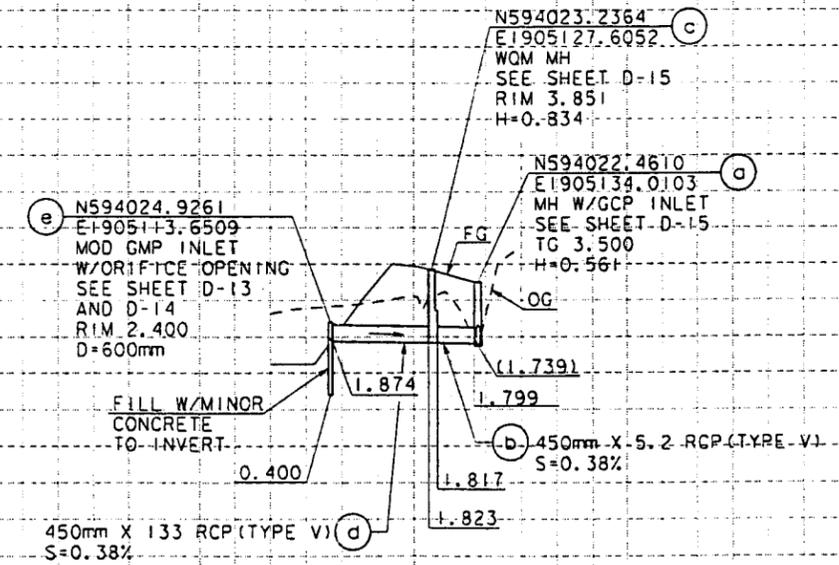
PLANS APPROVAL DATE

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618

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DRAINAGE SYSTEM NO 1



DRAINAGE SYSTEM NO 2

DRAINAGE PROFILES

SCALE: HORIZ 1:500  
 VERT 1:100



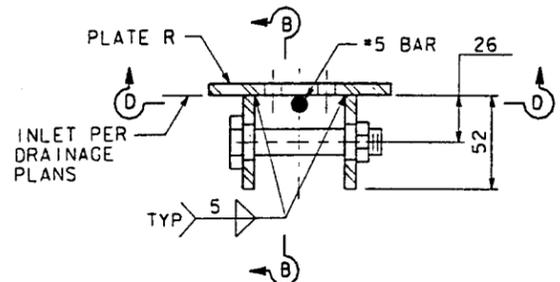




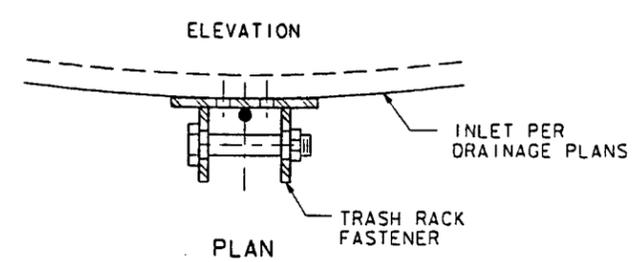
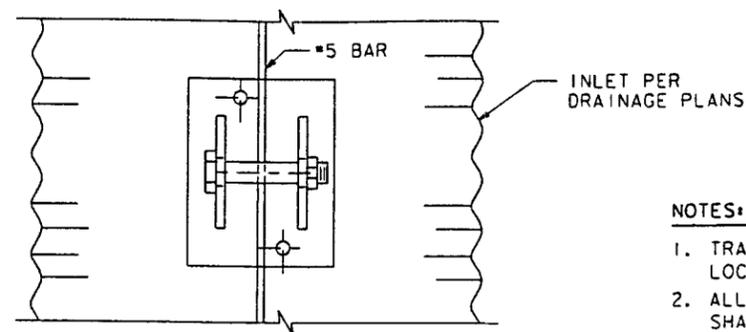


SYS NO	UNIT	D (mm)	ELEV A	ELEV B
2*	e	42.9	2.000	N/A
20	a	38.1	3.473	N/A
30	a	44.5	6.386	6.395
41	a	44.5	195.94	N/A

\* WRAP STAINLESS STEEL WIRE FABRIC AROUND BOTTOM OF FRAME



**TRASH RACK FASTENER**



**DETAIL 1**

- NOTES:**
1. TRASH RACK FASTENERS SHALL BE BOLTED TO INLET AT LOCATIONS SHOWN.
  2. ALL HARDWARE AND FABRICATION MATERIALS SHALL BE STAINLESS STEEL.
  3. ALL BARS SHALL BE STAINLESS STEEL.



DIST	COUNTY	ROUTE	KILOMETER TOTAL PROJECT	POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	VAR	VAR	VAR		

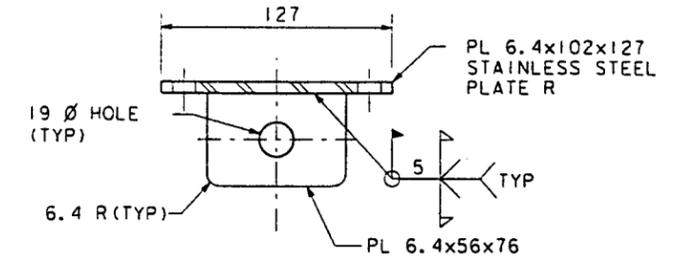
REGISTERED CIVIL ENGINEER

**A.M. WALKER**  
No. 57716  
Exp. 12-31-07  
CIVIL  
STATE OF CALIFORNIA

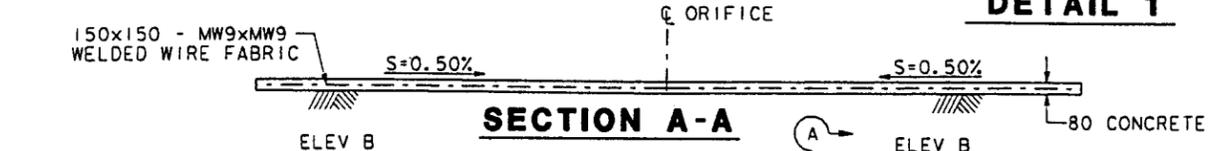
PLANS APPROVAL DATE

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14725 ALTON PARKWAY  
IRVINE, CA 92618

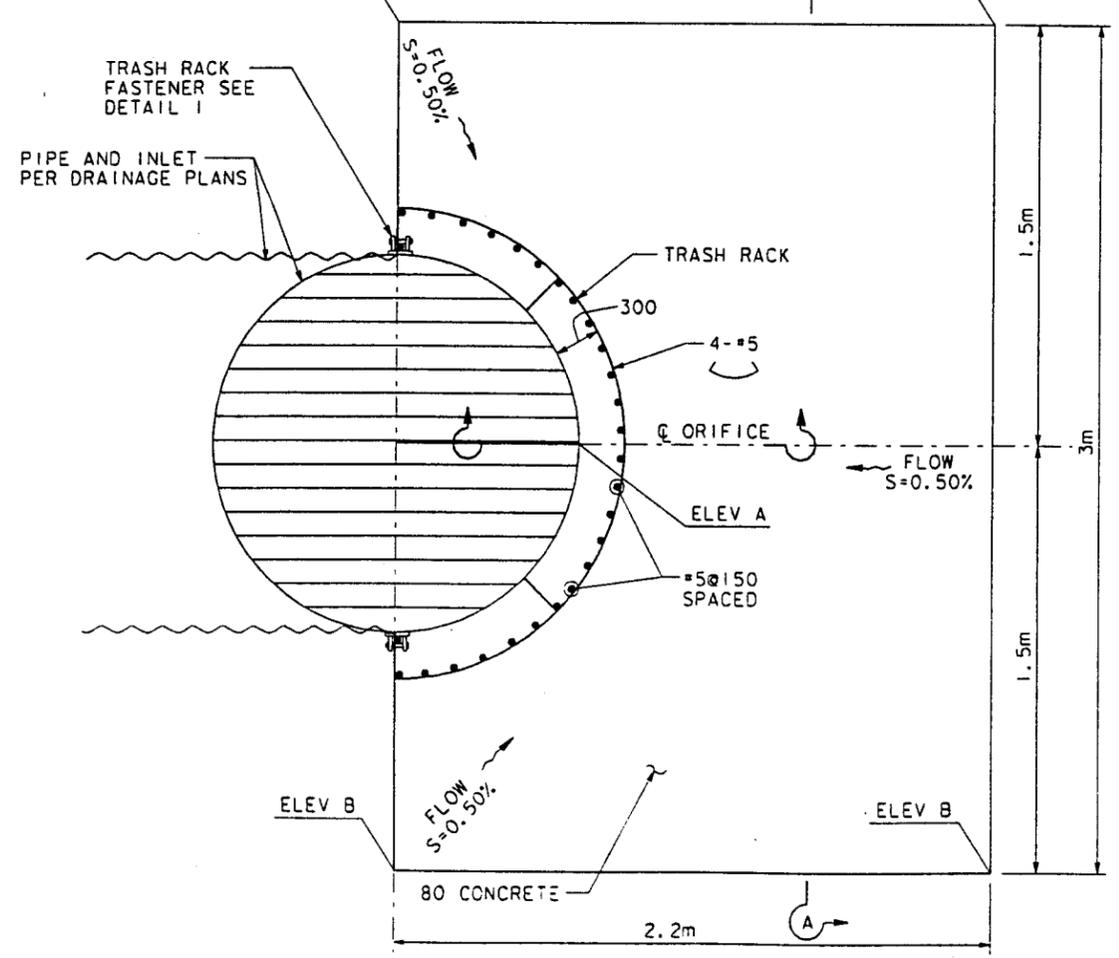
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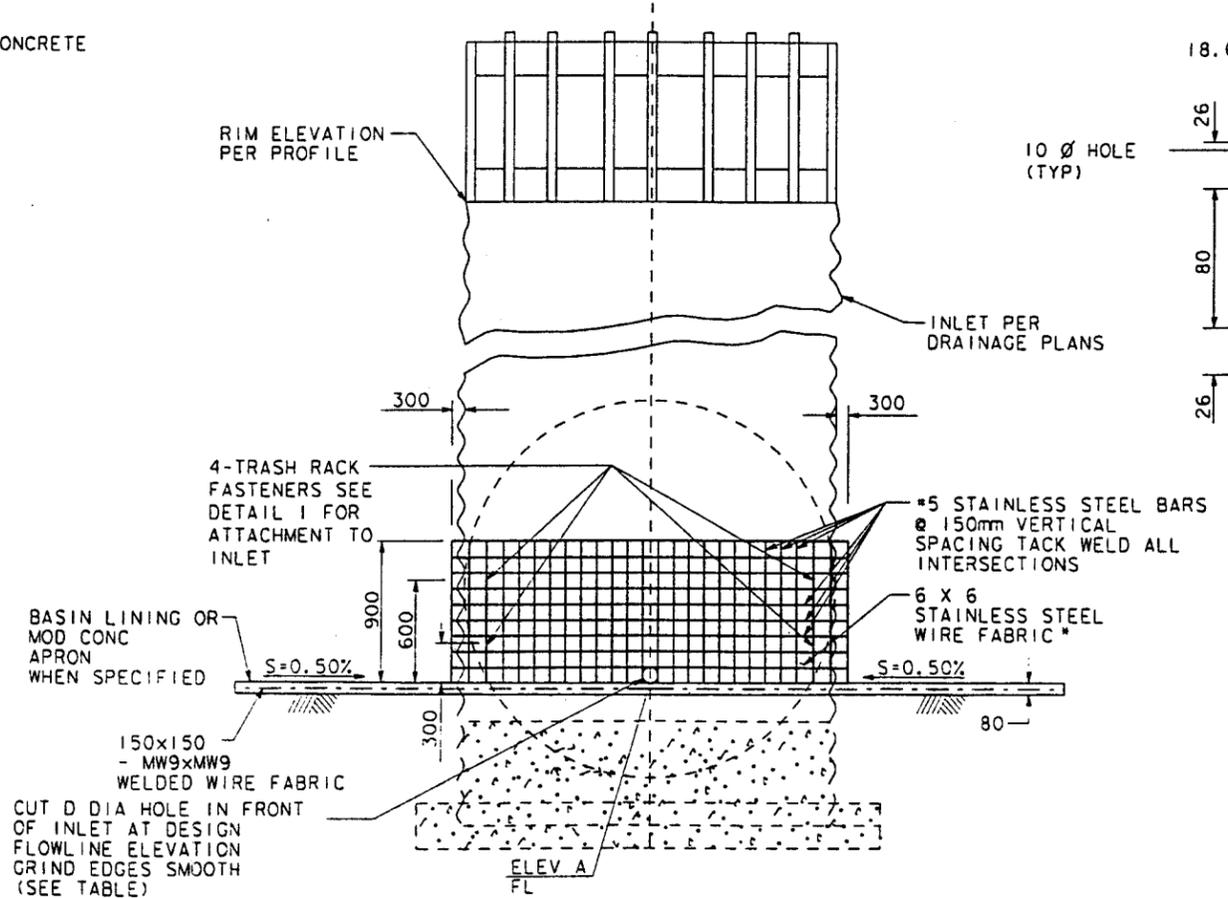
**SECTION B-B**



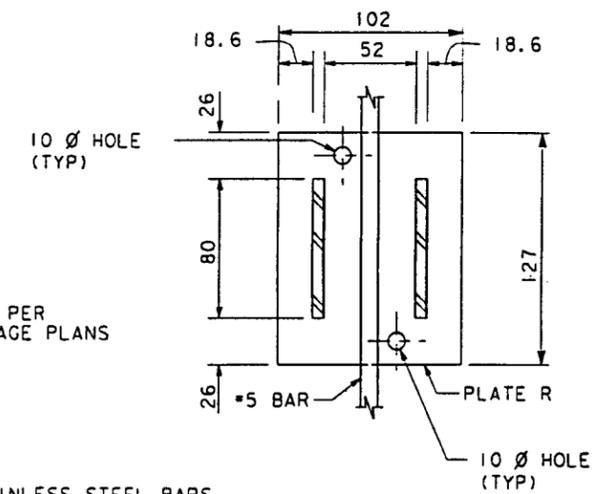
**SECTION A-A**



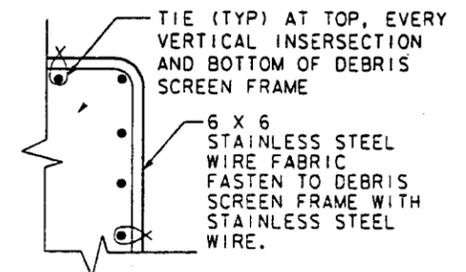
**MODIFIED CONCRETE APRON**  
SHOWN WITH TRASH RACK PLAN



**ORIFICE OPENING AND DEBRIS SCREEN FRAME**



**SECTION D-D**



**SECTION A-A**

**DRAINAGE DETAILS**

NO SCALE

DATE: 3/98  
 REVISIONS:  
 DESIGNED BY: AMW  
 CHECKED BY: SMT  
 DESIGN OVERSIGHT:  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 Caltrans

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



DIST	COUNTY	ROUTE	KILOMETER TOTAL PROJECT	POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	VAR	VAR			

REGISTERED CIVIL ENGINEER

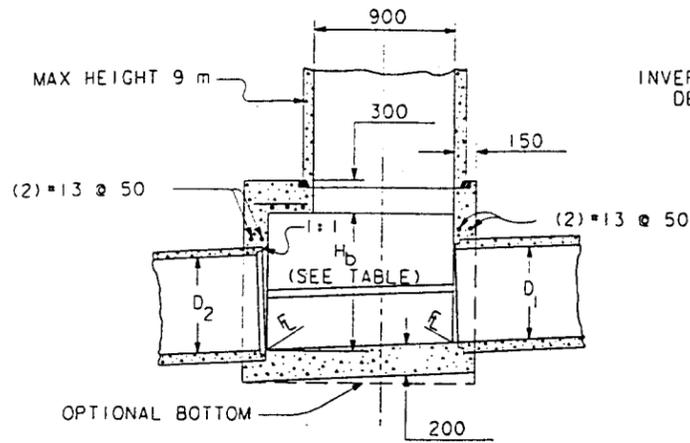
PLANS APPROVAL DATE

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

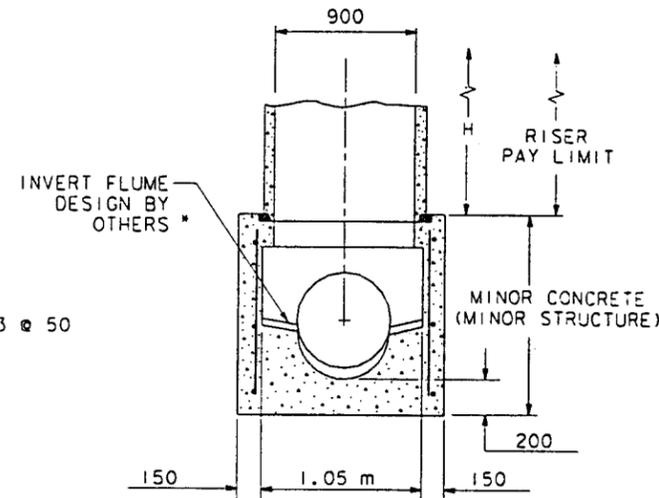
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D <sub>2</sub>	H <sub>b</sub>	L
675mm OR LESS	0.9 m	1.2 m
750mm TO 975mm INCLUSIVE	1.2 m	1.2 m

EXCEPTIONS TO BE NOTED ON PLANS.



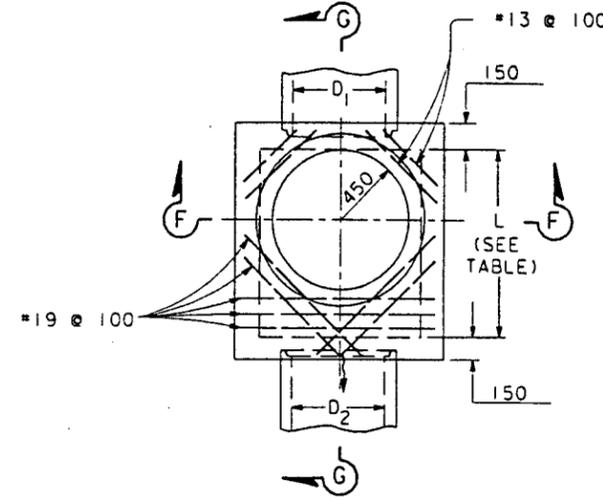
SECTION G-G



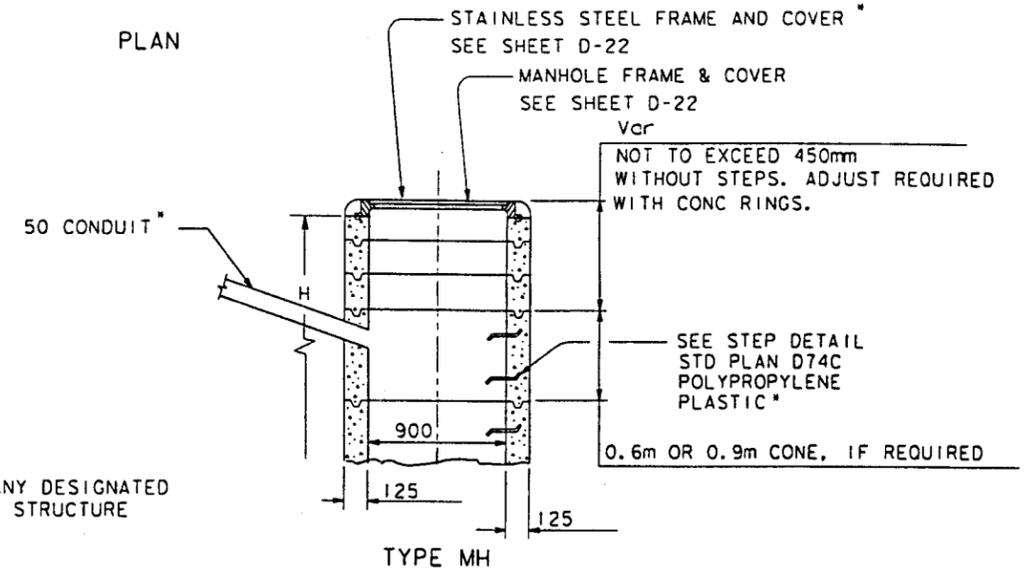
SECTION F-F

FOR USE WHEN D<sub>2</sub> (OUTLET PIPE DIA) IS 975mm OR LESS

**STORM DRAIN & MANHOLE STRUCTURE (TYPE X BASE)**



PLAN



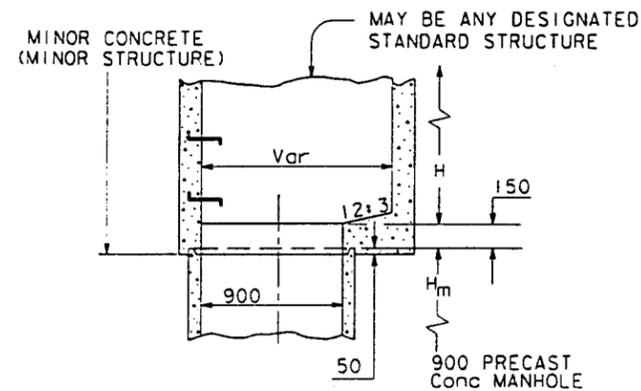
TYPE MH

FOR USE WITH EITHER TYPE X OR TYPE Y BASE STRUCTURES

**UPPER STRUCTURE**

WATER QUALITY MONITORING MANHOLE LOCATIONS

SYSTEM	UNIT	DESCRIPTION
1	c	INFLOW
2	c	OUTFLOW
20	d	OUTFLOW
21	f	INFLOW
30	c	OUTFLOW
31	d	INFLOW
40	d	INFLOW
41	c	OUTFLOW



TYPICAL UPPER STRUCTURE AND MANHOLE JUNCTION

**UPPER STRUCTURE**

**NOTES:**

- RISERS MAY BE MADE UP OF 150mm, 200mm, 450mm, 600mm, OR 1200mm SECTIONS.
- EACH RISER SHALL HAVE A LADDER, AS DETAILED ON STANDARD PLAN D74C. THE LADDER SHALL BE SUSPENDED INTO BASE STRUCTURE.
- ALL PRECAST COMPONENTS FOR UPPER PORTION TYPE MH SHALL BE REINFORCED WITH 6 DIAMETER STEEL WOUND SPIRALLY @ 100mm CENTERS.
- H AND H<sub>b</sub> SHALL BE AS SPECIFIED ON PLANS.
- REINFORCING STEEL SHALL BE #13 BARS @ 450mm CENTERS PLACED 40 CLEAR TO INSIDE OF BOX UNLESS OTHERWISE SHOWN.
- PIPE(S) MAY BE PLACED IN ANY WALL.
- DESIGN UNIT STRESSES: F<sub>s</sub> = 140 MPa, n = 10, F<sub>c</sub> = 10 MPa.
- CENTER OF RISER SHALL BE LOCATED OVER THE CENTERLINE OF MAIN STORM DRAIN.
- THICKNESS OF DECK SHALL VARY WHEN NECESSARY TO PROVIDE LEVEL MANHOLE SEAT.
- INSTALLED AT WATER QUALITY MONITORING MANHOLE LOCATIONS ONLY.

**DRAINAGE DETAILS**

NO SCALE

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 Caltrans  
 DESIGN OVERSIGHT  
 CALCULATED/DESIGNED BY AMW 3/98  
 CHECKED BY SMT 3/98  
 DATE REVISIED BY  
 DATE REVISIED

CULVERT DIAMETER  
SEE TABLE BELOW

ALL DIMENSIONS ARE IN  
MILLIMETERS UNLESS  
OTHERWISE SHOWN



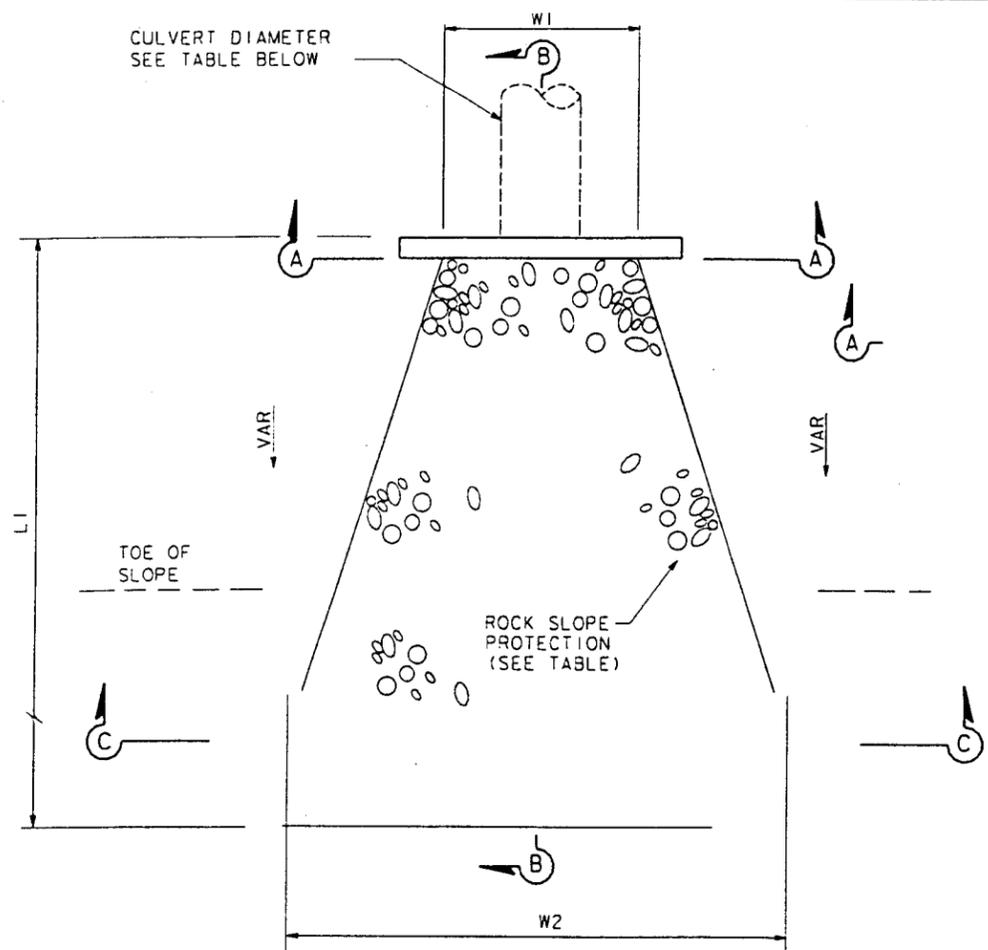
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11	SD	VAR	VAR		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

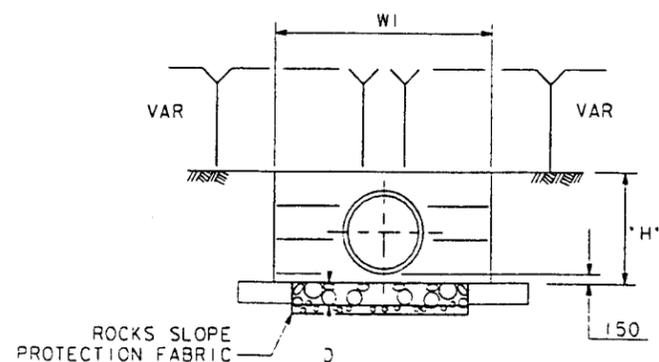
ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

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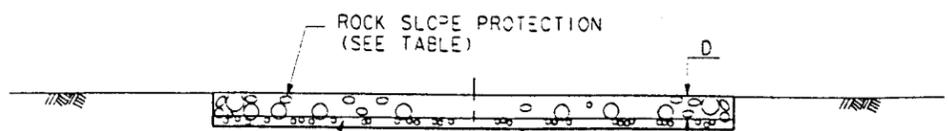


**PLAN**

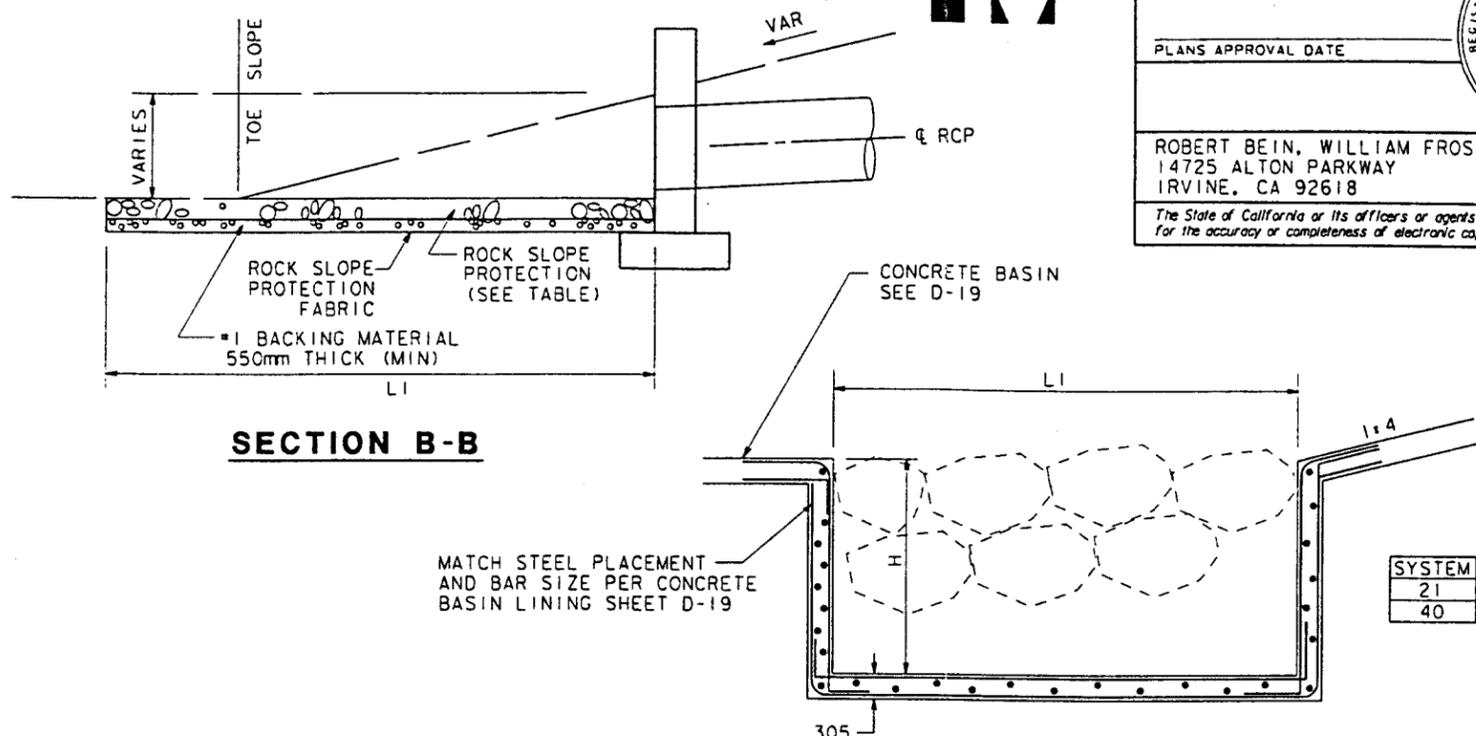
NOTE:  
FILTER FABRIC TO BE PLACED UNDER ALL  
ROCK SLOPE PROTECTION.



**SECTION A-A**



**SECTION C-C**



**SECTION B-B**

**GROUTED ROCK SLOPE PROTECTION**

**ROCK SLOPE PROTECTION (METHOD B)**

SYSTEM	CULVERT DIAMETER	WIDTH *W1*	WIDTH *W2*	LENGTH *LI*	TYPE	(THICKNESS) *D*
1a	600	SEE D-21	SEE D-21	20 m	1/4 TONNE	SEE D-21
21a	450	3 m	3 m	3 m	FACING	GROUTED
21k	N/A	3 m	7 m	16 m	1/4 TONNE	1.5 m
31a	600	4 m	4 m	4 m	1/4 TONNE	1.5 m
31i	N/A	SEE D-18	SEE D-18	30 m	FACING	SEE D-18
40a	750	3 m	10 m	8 m	FACING	GROUTED
50a	600	SEE D-21	SEE D-21	20 m	1/4 TONNE	SEE D-21

**ROCK SLOPE PROTECTION**

**DRAINAGE DETAILS**

NO SCALE

MAR 98 16:12:28 \\prj\p001\34358\sgn\div\01\016.dwg  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 DESIGN OVERSIGHT  
 CALCULATED/ DESIGNED BY AMW  
 CHECKED BY SMT  
 DATE REVISID BY 3/98  
 DATE REVISID 3/98

MAR 98 15:42:04  
 STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION  
 Caltrans  
 DESIGN OVERSIGHT  
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 CHECKED BY SMT  
 DATE 3/98  
 REVISIONS:  
 1. DATE 3/98 REVISED BY ANW  
 2. DATE 3/98 REVISED BY SMT

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II	SD	VAR	VAR	VAR		

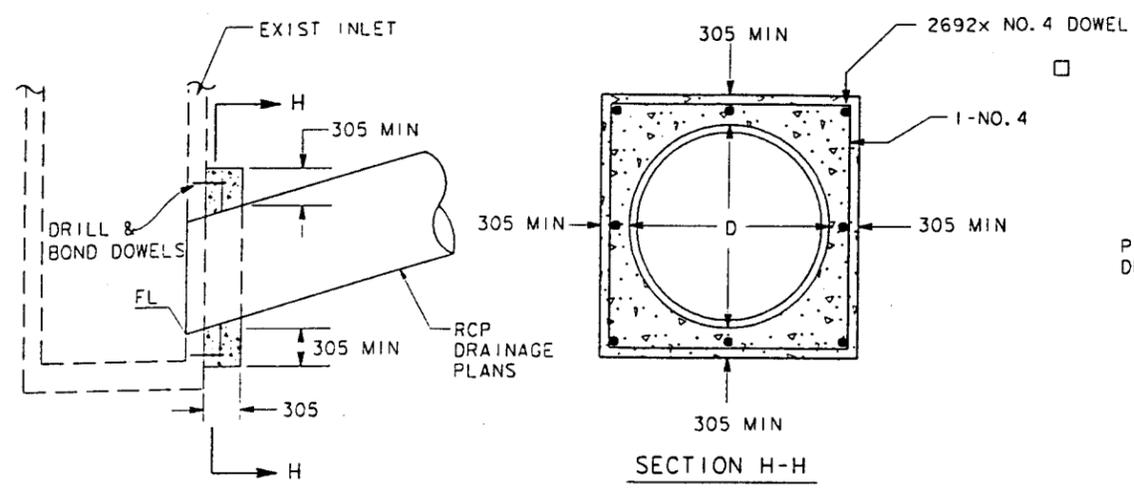
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 A.M. WALKER  
 No. 57716  
 Exp. 12-31-01  
 CIVIL  
 STATE OF CALIFORNIA

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618

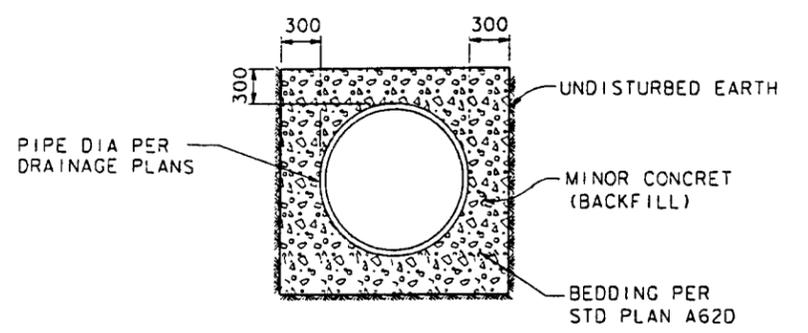
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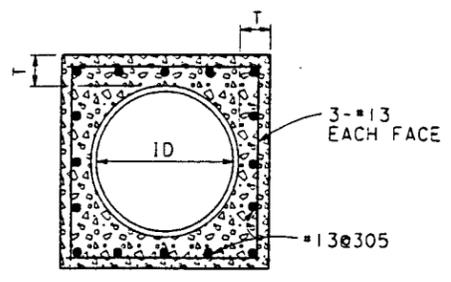
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



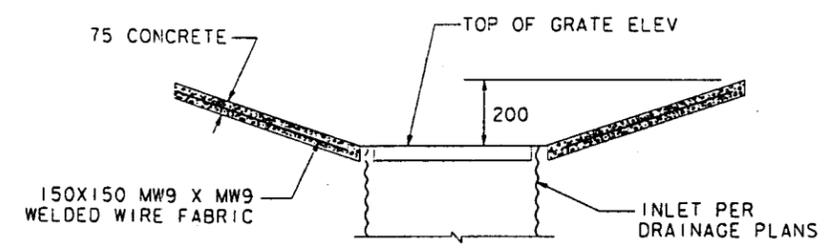
**TYPE L-3 COLLAR**



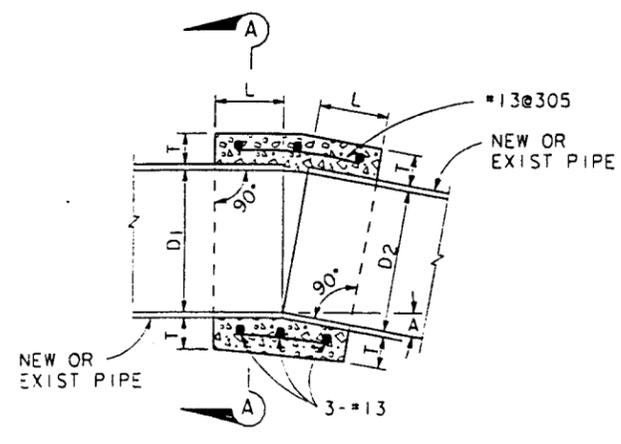
**MINOR CONCRETE (BACKFILL) DETAIL**



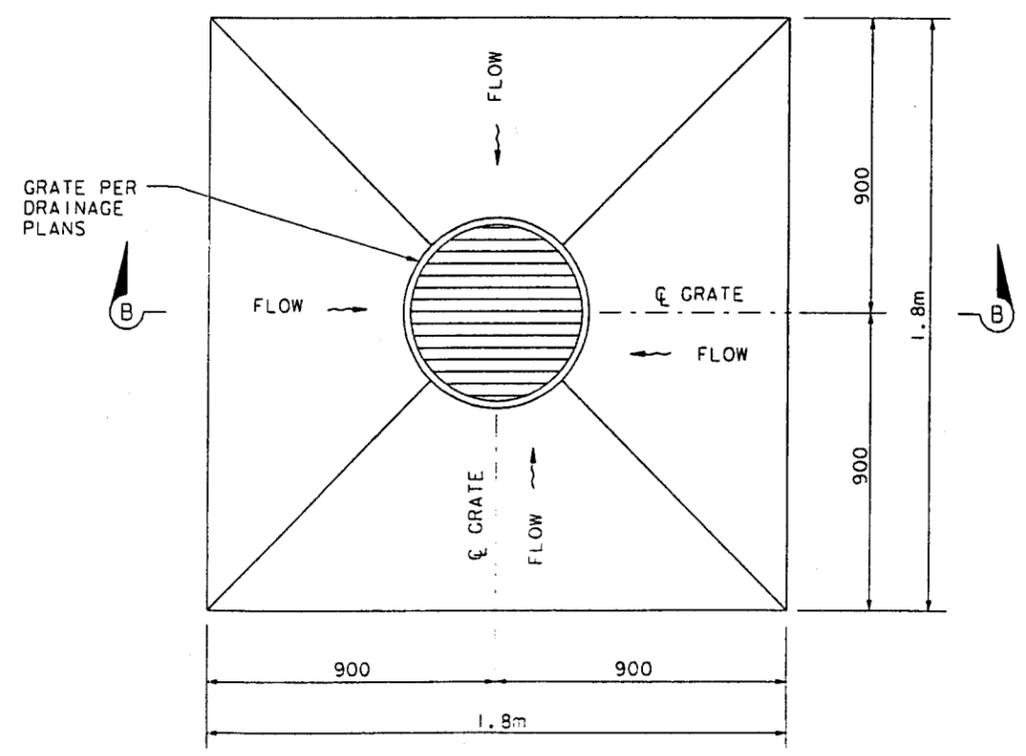
**SECTION A-A**



**SECTION B-B**



**L-2 COLLAR**



**DEPRESSED APRON**

- NOTES (CONCRETE COLLAR)
- WHERE PIPES OF DIFFERENT DIAMETER ARE JOIN WITH A CONCRETE COLLAR. D SHALL BE THE DIAMETER OF LARGER PIPE.
  - FOR PIPE SIZE NOT LISTED, USE NEXT SIZE LARGER.
  - OMIT REINFORCING ON P PIPES 600mm AND LESS IN DIAMETER AND ON ALL PIPES WHERE ANGLE A IS LESS THAN 10°
  - REINFORCEMENT SHALL BE PLACED 40mm CLEAR FROM OUTSIDE DIAMETER OF PIPE.

**DRAINAGE DETAILS**

NO SCALE



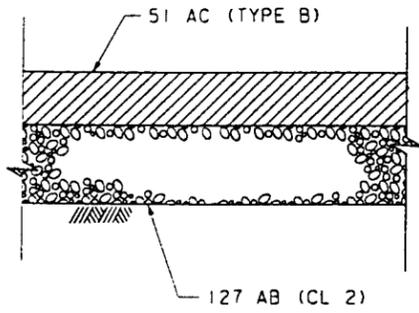
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 Et Caltrans

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CALCULATED/DESIGNED BY	CHECKED BY	DATE
REVISOR	REVISION	DATE

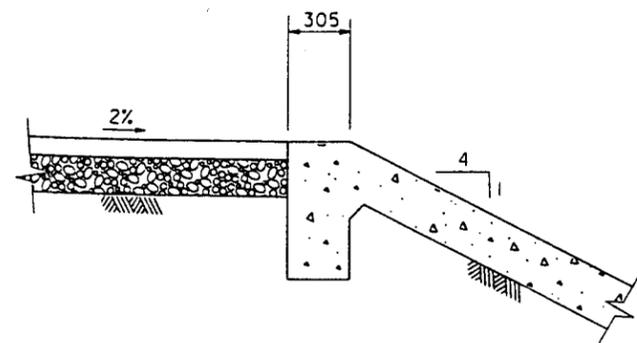
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



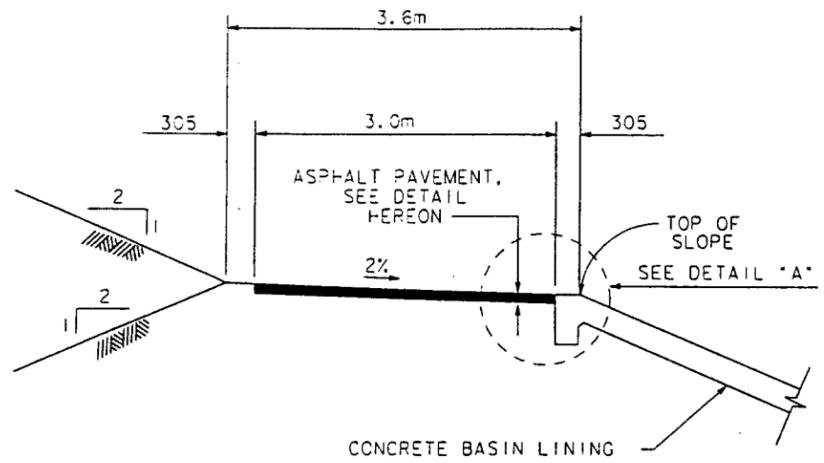
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II	SD	VAR	VAR			
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PLANS APPROVAL DATE: _____ ROBERT BEIN, WILLIAM FROST & ASSOCIATES 14725 ALTON PARKWAY IRVINE, CA 92618 <small>The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.</small>						



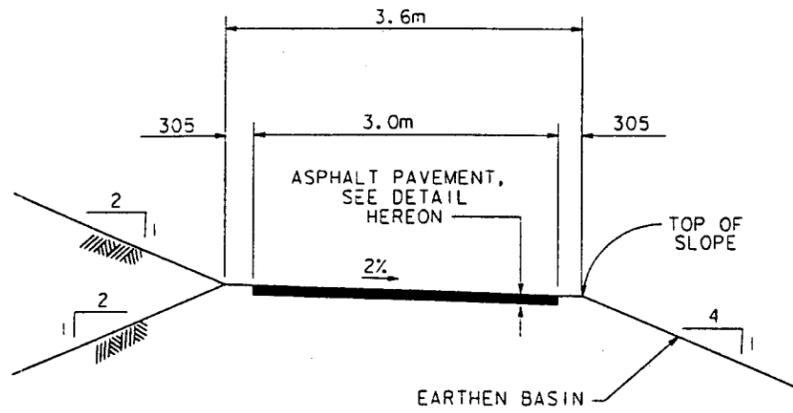
**ASPHALT PAVING DETAIL**



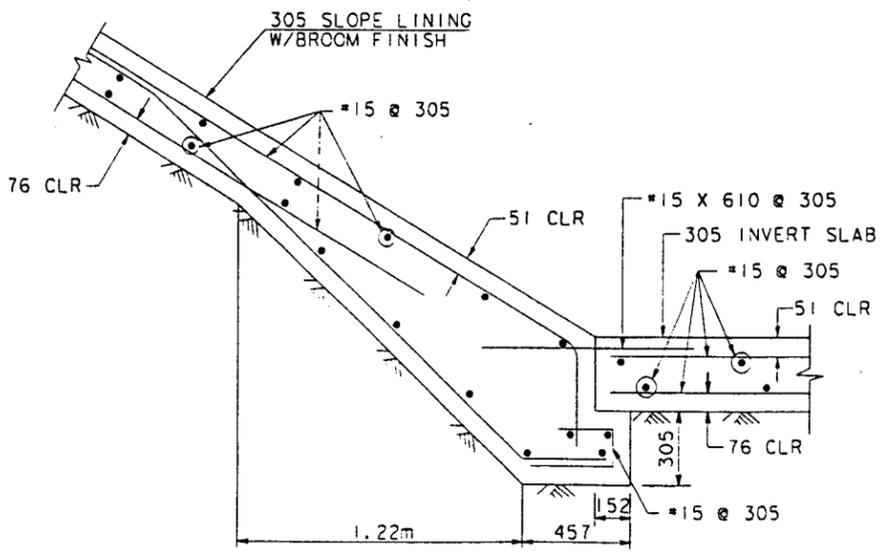
**DETAIL A**



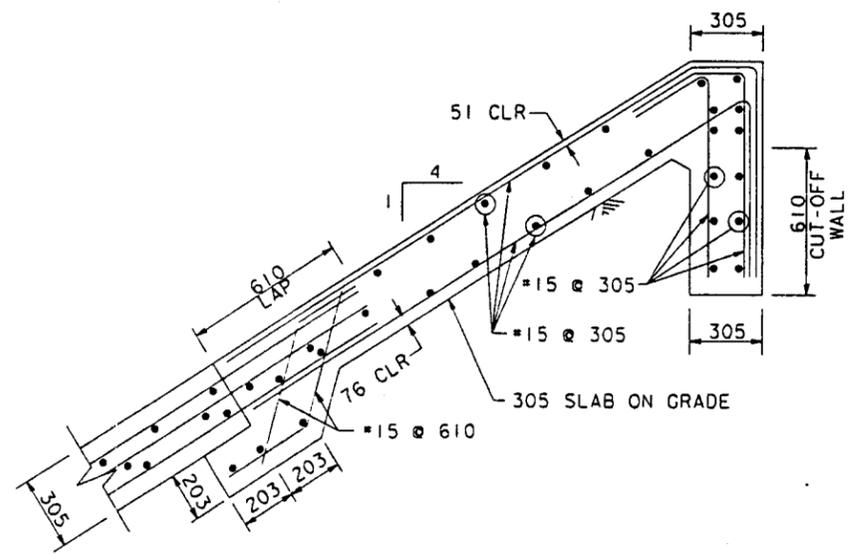
**ACCESS ROAD DETAIL ADJACENT TO CONCRETE BASIN LINING**



**ACCESS ROAD DETAIL ADJACENT TO EARTHEN BASIN**



**CONCRETE BASIN INVERT LINING**



**CONCRETE BASIN SLOPE LINING**

**DRAINAGE DETAILS**

NO SCALE

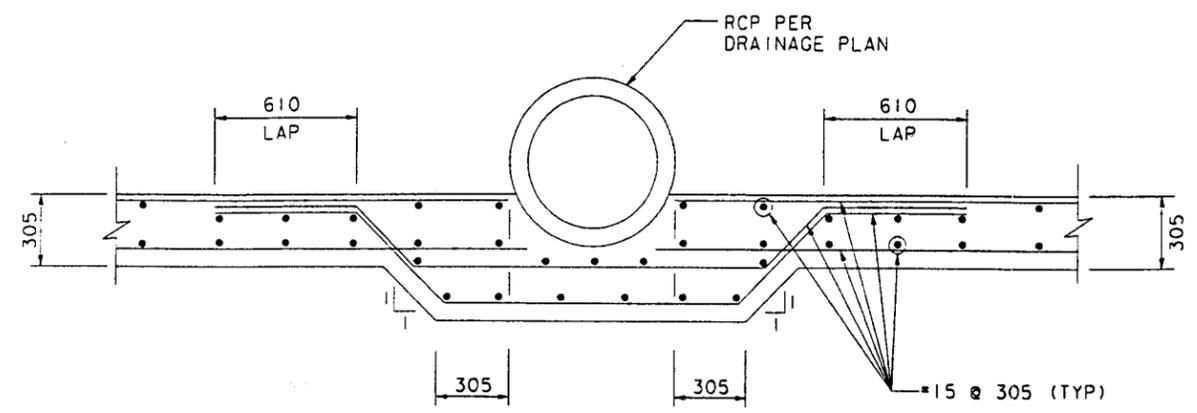
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



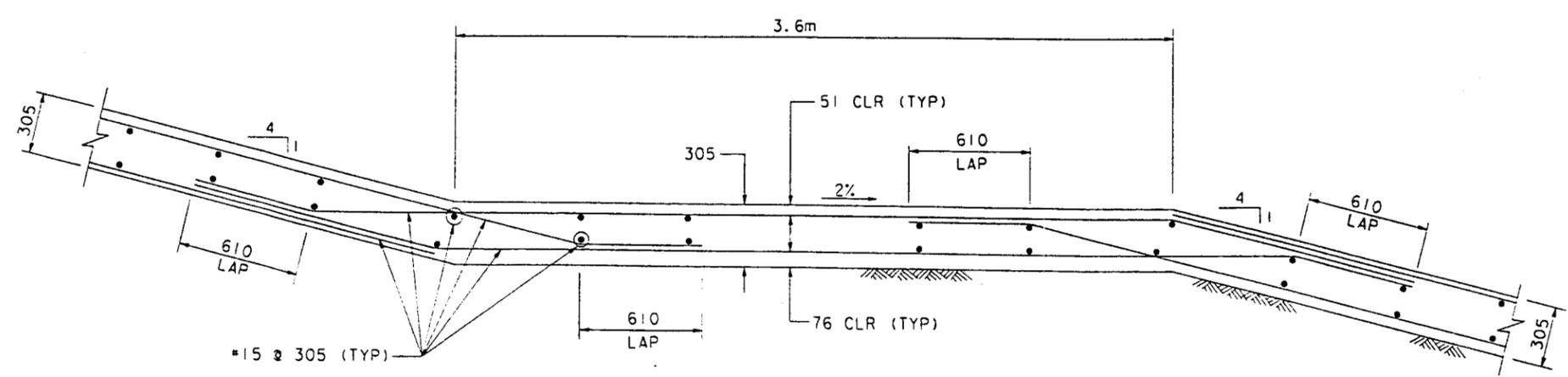
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11	SD	VAR	VAR			

 REGISTERED CIVIL ENGINEER		
PLANS APPROVAL DATE		
ROBERT BEIN, WILLIAM FROST & ASSOCIATES 14725 ALTON PARKWAY IRVINE, CA 92618		
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**EXPOSED PIPE ON BASIN INVERT LINING DETAIL**  
NO SCALE



**ACCESS RAMP DETAIL**  
NO SCALE

**DRAINAGE DETAILS**

NO SCALE

5 MAR 98 16:51:48 C:\ORP1\p000134358\drain\di\01.d20.d1v  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 DESIGN OVERSIGHT  
 CALCULATED/DESIGNED BY MC CHECKED BY SMT  
 DATE 3/98 DATE REVISED 3/98  
 REVISOR BY DATE REVISED



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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	VAR	VAR		

REGISTERED CIVIL ENGINEER

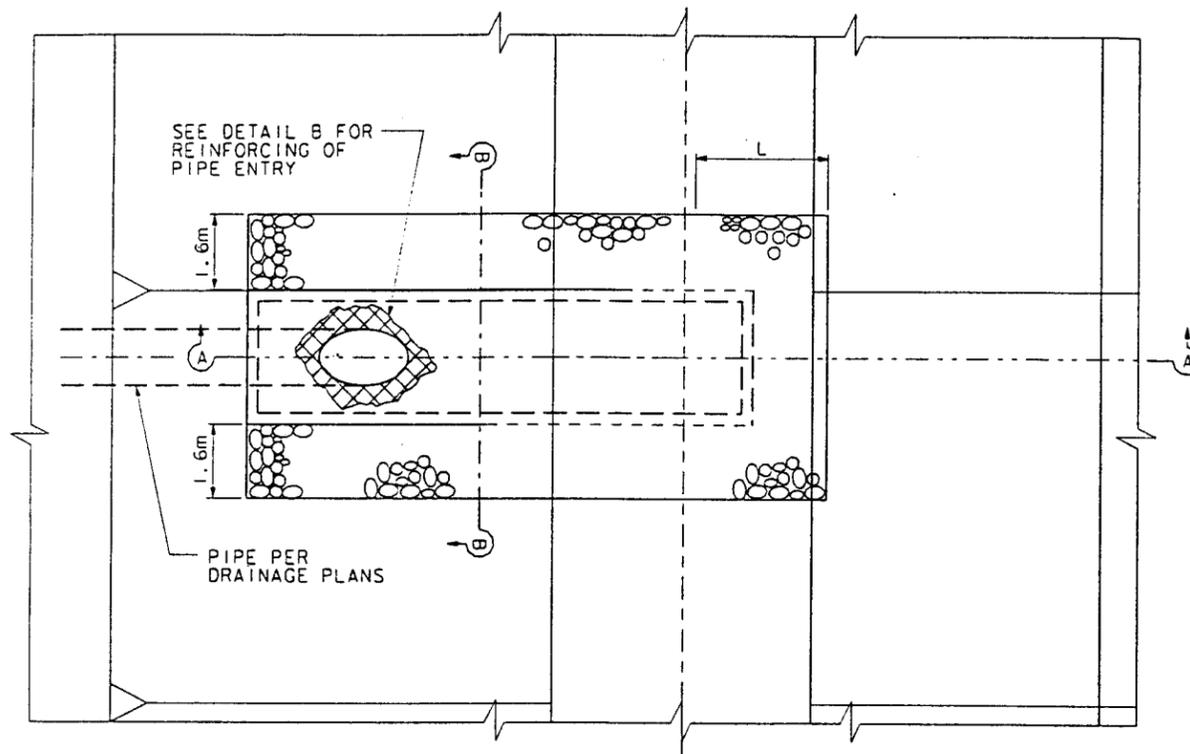
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER

A.M. WALKER  
No. 57716  
Exp. 12-31-01  
CIVIL  
STATE OF CALIFORNIA

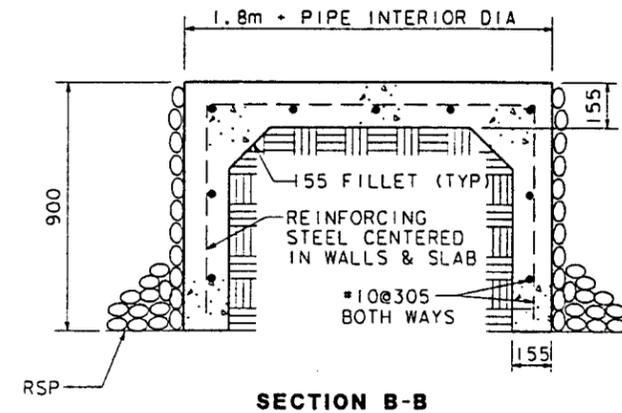
ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

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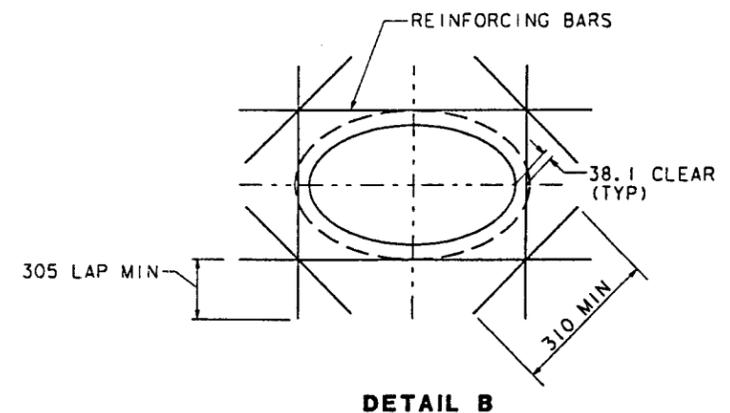


PLAN

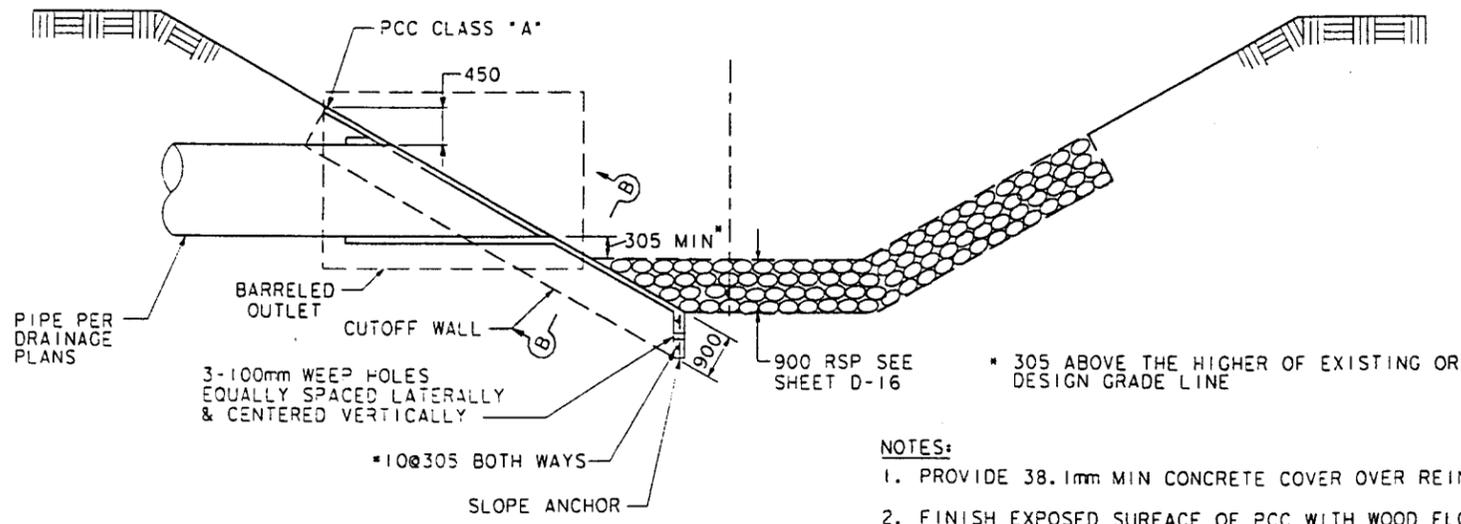
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31		10'



SECTION B-B



DETAIL B

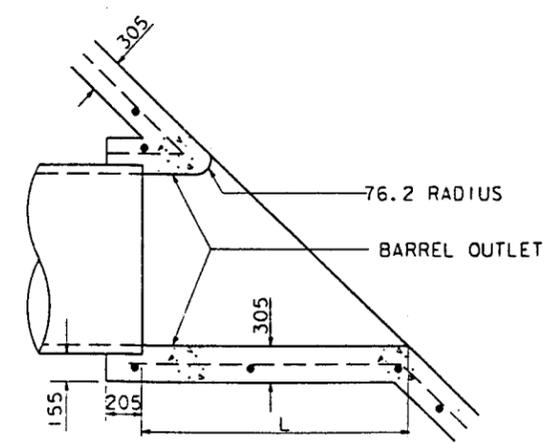


SECTION A-A

**PIPE ENTRANCE TO BASIN**

**NOTES:**

1. PROVIDE 38.1mm MIN CONCRETE COVER OVER REINFORCING.
2. FINISH EXPOSED SURFACE OF PCC WITH WOOD FLOAT.
3. LATERALS OF 600mm OR LESS MAY BE BEVELED PIPE, 675mm OR LARGER SHALL BE BARRELED OR DESIGNED STRUCTURE.



BARRELED OUTLET

**DRAINAGE DETAILS**

NO SCALE

15 MAR 98 16:54:50 g:\gpr\p0001a\34356\dgn\1\1\01d22.dwg  
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 DESIGN OVERSIGHT  
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 CHECKED BY SMT 3/98  
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 Caltrans

LITERATURE  
 STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
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 DATE 3/98  
 DATE 3/98  
 REVISED BY  
 DATE REVISED

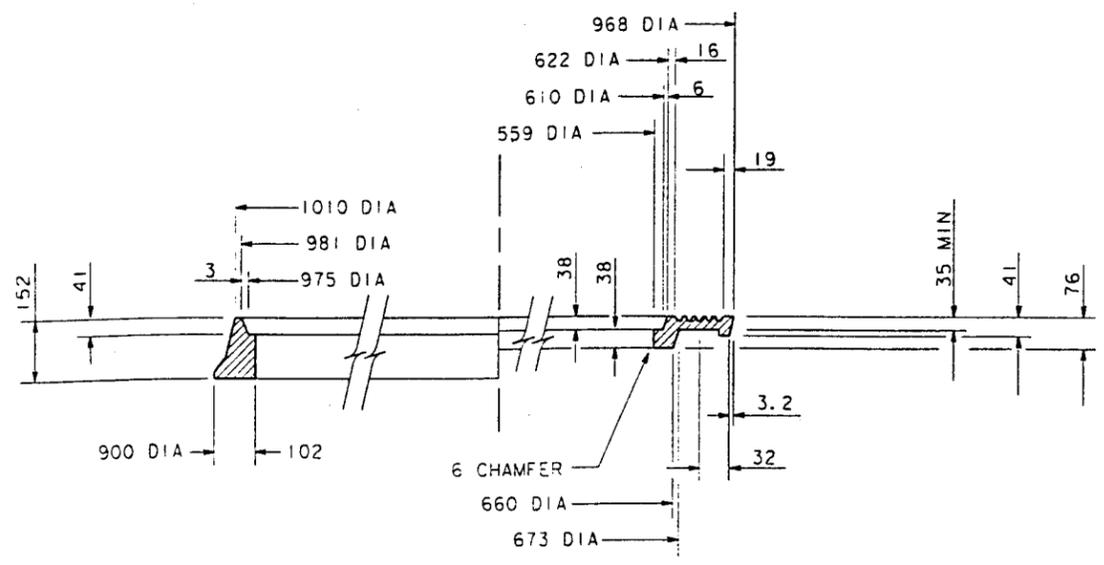
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN



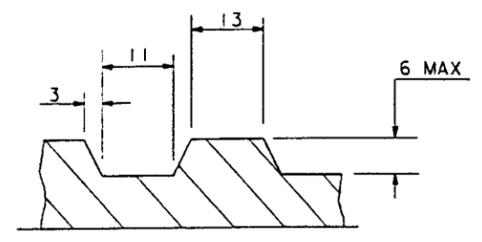
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11	SD	VAR	VAR	VAR		

REGISTERED CIVIL ENGINEER  
 A.M. WALKER  
 No. 57716  
 Exp. 12-31-01  
 CIVIL  
 STATE OF CALIFORNIA

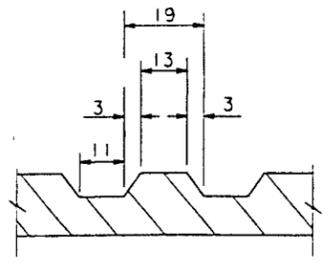
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 ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
 14725 ALTON PARKWAY  
 IRVINE, CA 92618  
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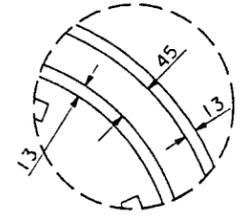
HALF SECTION FRAME AND COVER \*



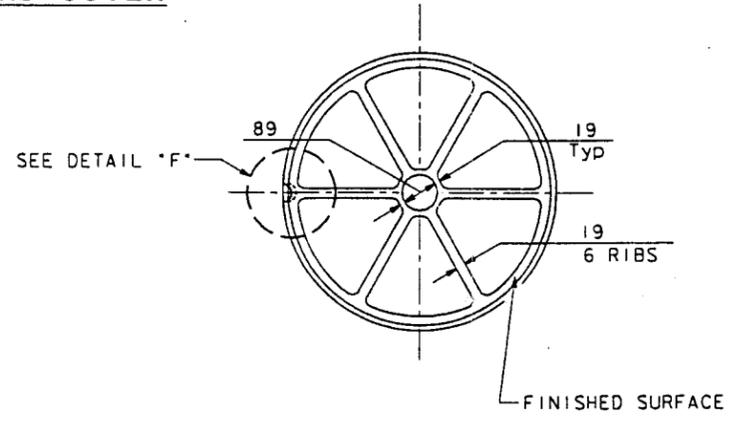
DETAIL A



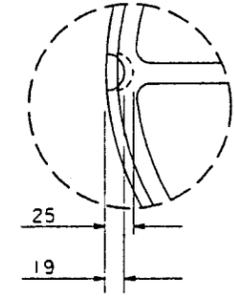
DETAIL B



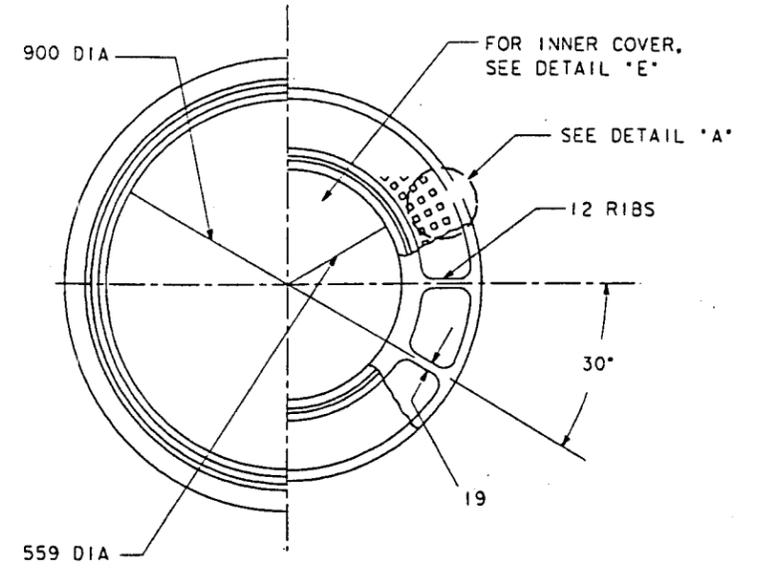
DETAIL C



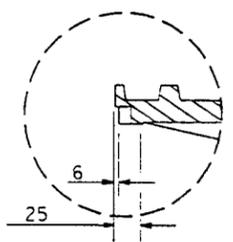
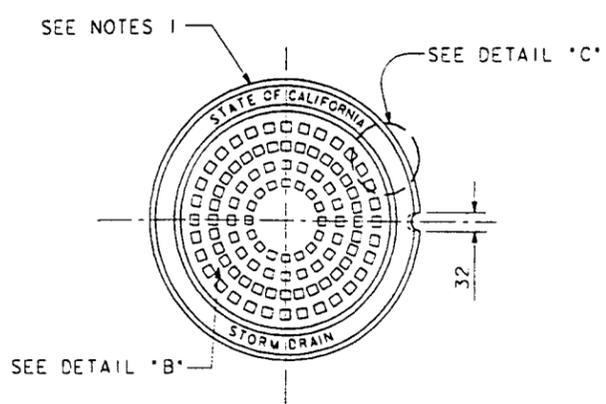
DETAIL E



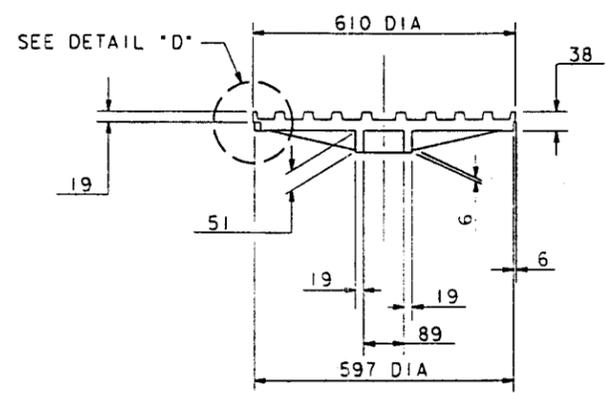
DETAIL F



HALF PLAN FRAME AND COVER \*



DETAIL D



- NOTES:
- COVER SHALL BE MARKED 'STATE OF CALIFORNIA' AND 'STORM DRAIN' FOR FRAME AND COVER.
  - \* STAINLESS STEEL AT WQM MH LOCATIONS SEE SHEET D-15

900MM MANHOLE FRAME AND TWO CONCENTRIC COVERS \*

DRAINAGE DETAILS

NO SCALE













ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



DIST	COUNTY	ROUTE	KILOMETER TOTAL PROJECT	POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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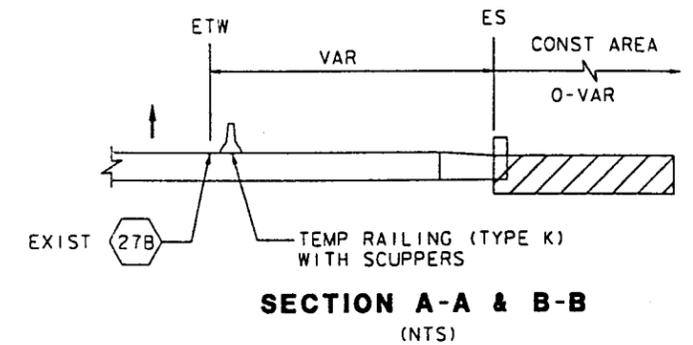
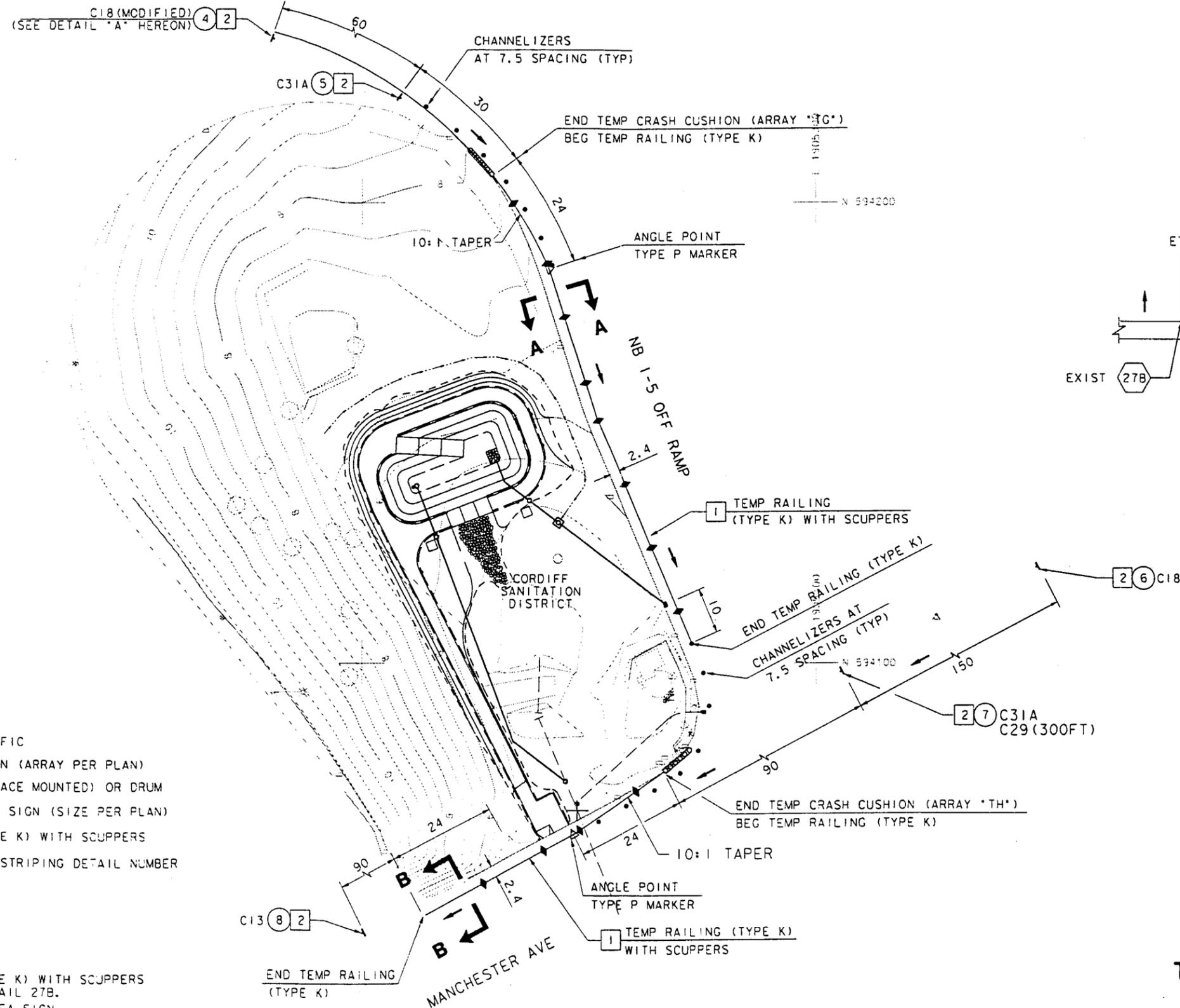
Hilbert William Dickson  
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

HILBERT W. DICKSON  
No. 19417  
Exp. 9-30-01  
CIVIL  
STATE OF CALIFORNIA

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

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DETAIL 'A'  
NO SCALE

LEGEND

- DIRECTION OF TRAFFIC
- TEMP CRASH CUSHION (ARRAY PER PLAN)
- CHANNELIZER (SURFACE MOUNTED) OR DRUM
- CONSTRUCTION AREA SIGN (SIZE PER PLAN)
- TEMP RAILING (TYPE K) WITH SCUPPERS
- EXISTING TRAFFIC STRIPING DETAIL NUMBER
- SIGN NUMBER

NOTES

- 1 - PLACE TEMP RAILING (TYPE K) WITH SCUPPERS AT EDGE OF STRIPING DETAIL 27B.
- 2 - INSTALL CONSTRUCTION AREA SIGN

TRAFFIC HANDLING PLAN  
(LOCATION 2)  
I-5/MANCHESTER AVE

SCALE: 1:500

TH-2

VAR 98 14143127 STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION DESIGN OVERSIGHT  
 CALCULATED/DESIGNED BY HWD CHECKED BY HWD DATE REVISED BY DATE REVISED  
 3/98 3/98

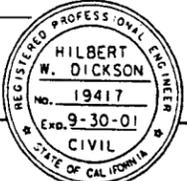


ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET TOTAL NO. SHEETS
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*Hilbert William Dickson*  
REGISTERED CIVIL ENGINEER



PLANS APPROVAL DATE

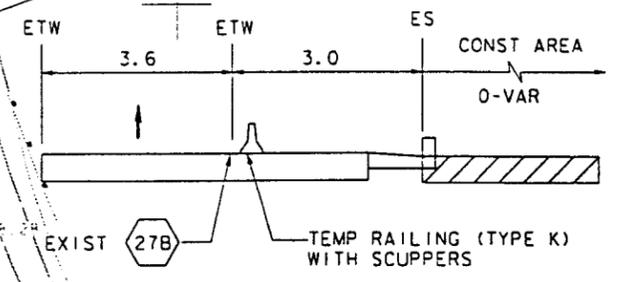
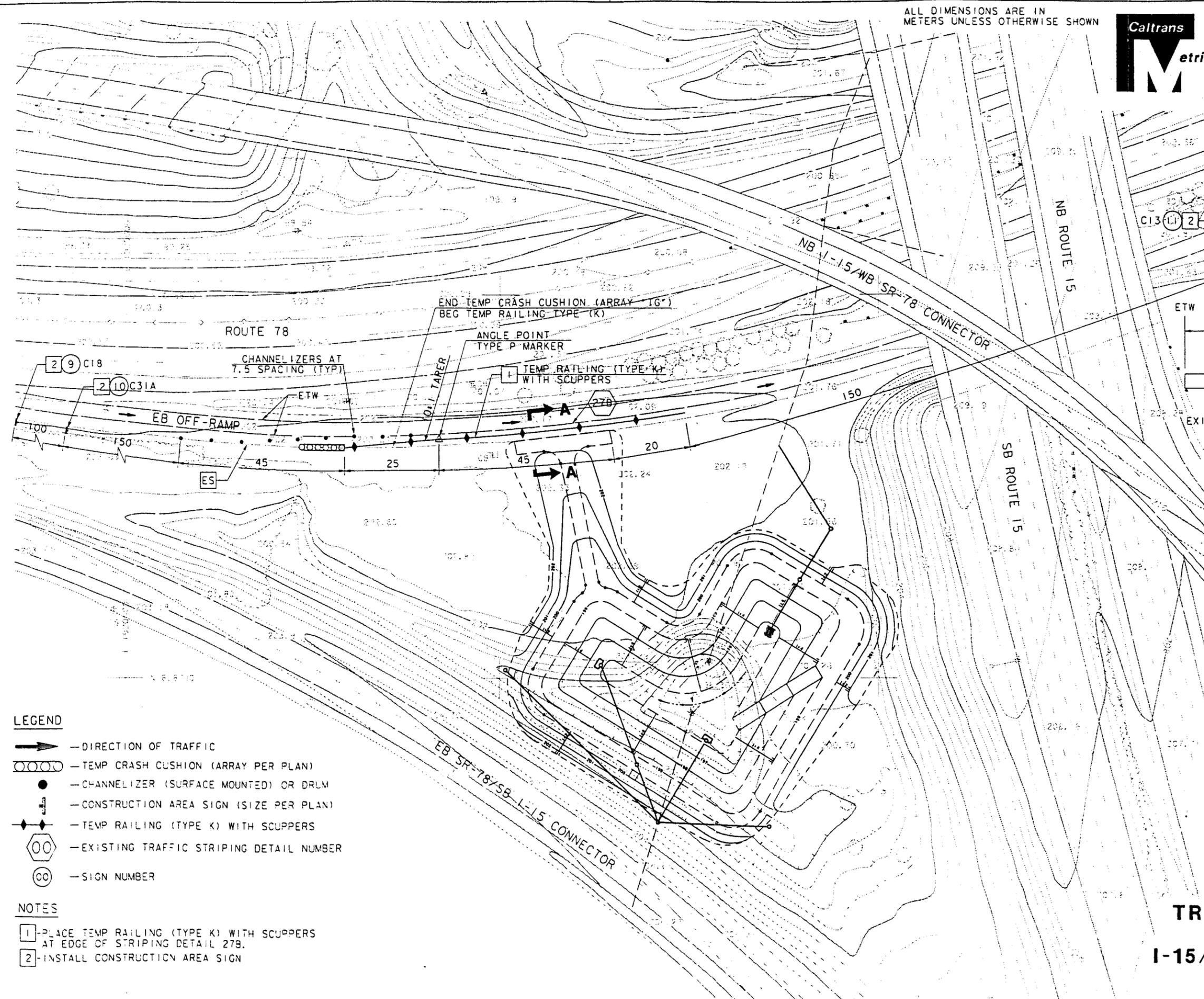
ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

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CHECKED BY	HWD	3/98	
	HWD	3/98	

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
Caltrans



SECTION A-A  
(NTS)

LEGEND

- DIRECTION OF TRAFFIC
- TEMP CRASH CUSHION (ARRAY PER PLAN)
- CHANNELIZER (SURFACE MOUNTED) OR DRUM
- CONSTRUCTION AREA SIGN (SIZE PER PLAN)
- TEMP RAILING (TYPE K) WITH SCUPPERS
- EXISTING TRAFFIC STRIPING DETAIL NUMBER
- SIGN NUMBER

NOTES

- 1 - PLACE TEMP RAILING (TYPE K) WITH SCUPPERS AT EDGE OF STRIPING DETAIL 278.
- 2 - INSTALL CONSTRUCTION AREA SIGN

TRAFFIC HANDLING PLAN  
(LOCATION 4)  
I-15/SR-78 ES CONNECTOR

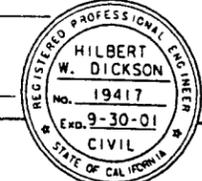
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ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	70.9		

*Hilbert William Dickson*  
REGISTERED CIVIL ENGINEER



PLANS APPROVAL DATE

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

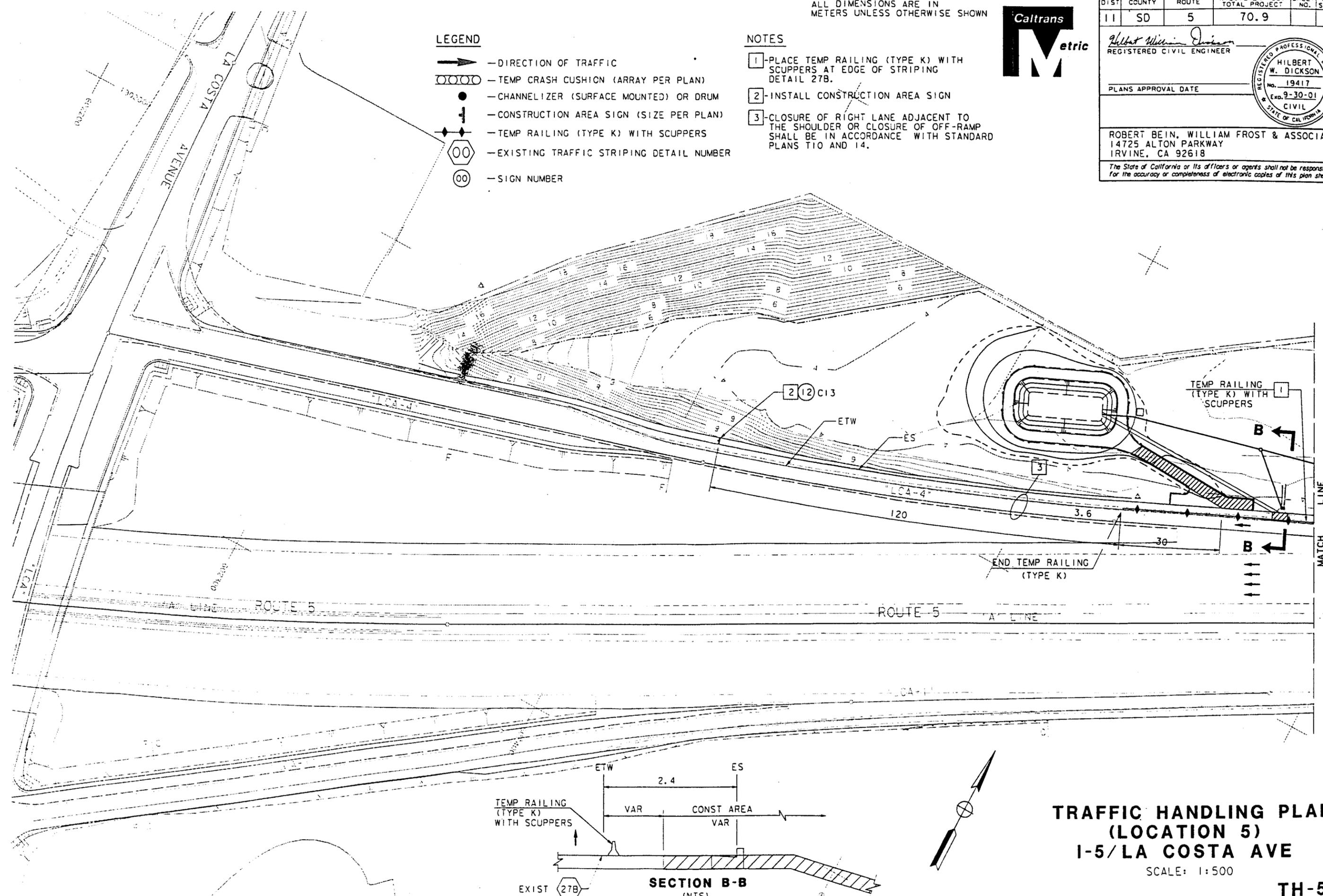
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

**LEGEND**

- ➔ - DIRECTION OF TRAFFIC
- - TEMP CRASH CUSHION (ARRAY PER PLAN)
- - CHANNELIZER (SURFACE MOUNTED) OR DRUM
- ⊥ - CONSTRUCTION AREA SIGN (SIZE PER PLAN)
- ⬄ - TEMP RAILING (TYPE K) WITH SCUPPERS
- ⬡ - EXISTING TRAFFIC STRIPING DETAIL NUMBER
- ⊙ - SIGN NUMBER

**NOTES**

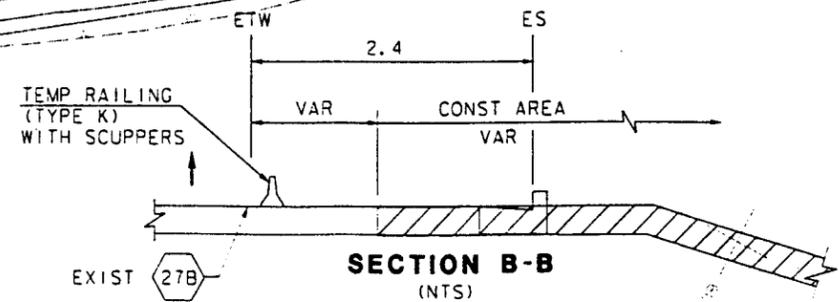
- 1 - PLACE TEMP RAILING (TYPE K) WITH SCUPPERS AT EDGE OF STRIPING DETAIL 27B.
- 2 - INSTALL CONSTRUCTION AREA SIGN
- 3 - CLOSURE OF RIGHT LANE ADJACENT TO THE SHOULDER OR CLOSURE OF OFF-RAMP SHALL BE IN ACCORDANCE WITH STANDARD PLANS T10 AND 14.



DATE	REVISOR	DATE	REVISOR
3/98	HWD	3/98	HWD

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



**TRAFFIC HANDLING PLAN  
(LOCATION 5)  
I-5/LA COSTA AVE**

SCALE: 1:500

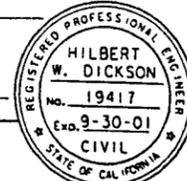
TH-5

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	70.9		

*Hilbert W. Dickson*  
REGISTERED CIVIL ENGINEER



PLANS APPROVAL DATE

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

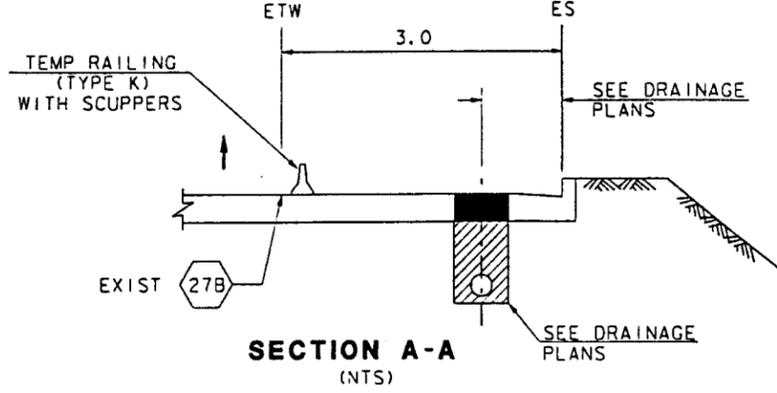
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**LEGEND**

- DIRECTION OF TRAFFIC
- TEMP CRASH CUSHION (ARRAY PER PLAN)
- CHANNELIZER (SURFACE MOUNTED) OR DRUM
- CONSTRUCTION AREA SIGN (SIZE PER PLAN)
- TEMP RAILING (TYPE K) WITH SCUppers
- EXISTING TRAFFIC STRIPING DETAIL NUMBER
- SIGN NUMBER

**NOTES**

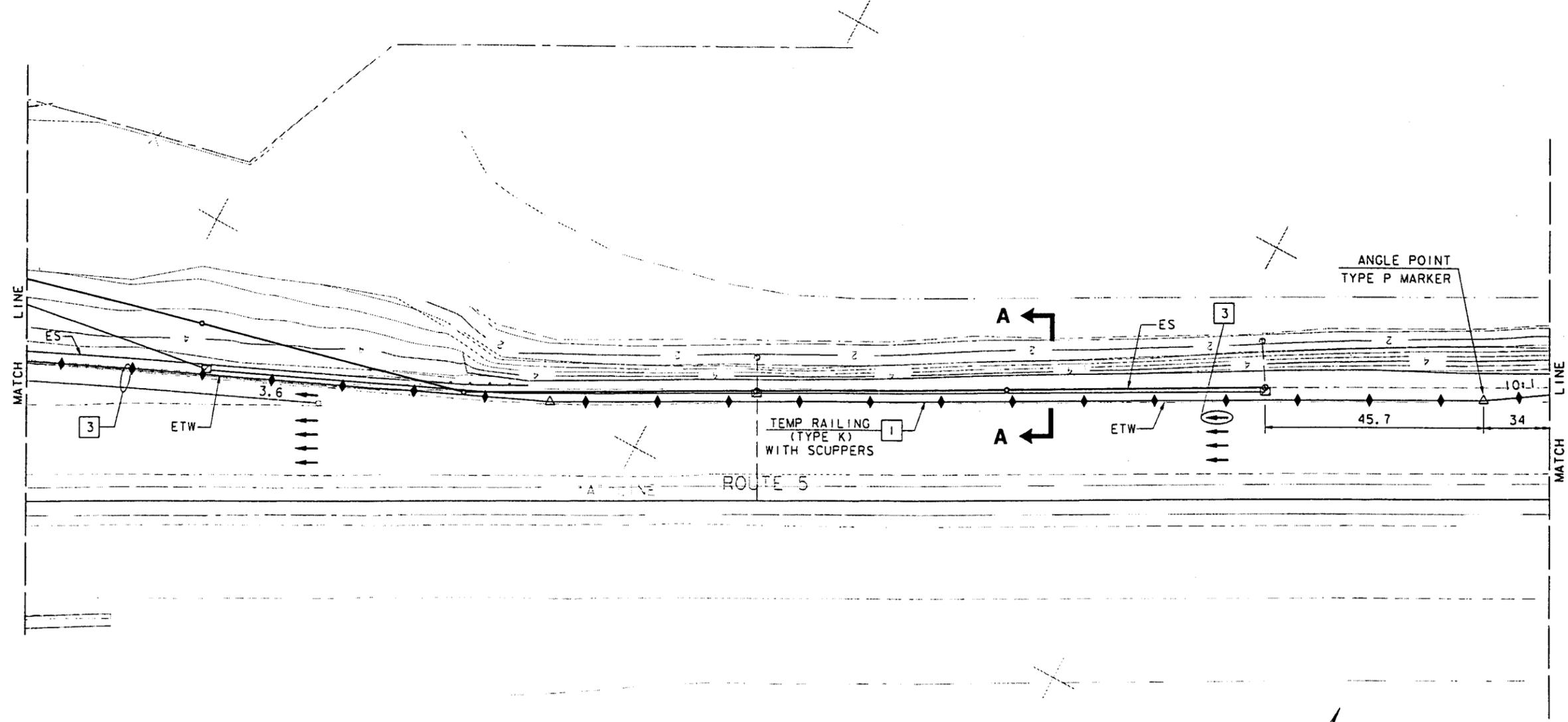
- 1 - PLACE TEMP RAILING (TYPE K) WITH SCUppers AT EDGE OF STRIPING DETAIL 27B.
- 2 - INSTALL CONSTRUCTION AREA SIGN
- 3 - CLOSURE OF RIGHT LANE ADJACENT TO THE SHOULDER OR CLOSURE OF OFF-RAMP SHALL BE IN ACCORDANCE WITH STANDARD PLANS T10 AND 14.



DATE	REVISOR	DATE	REVISOR
3/98	HWD	3/98	HWD

DESIGN OVERSIGHT  
CALCULATED/DESIGNED BY  
CHECKED BY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
Caltrans



**TRAFFIC HANDLING PLAN  
(LOCATION 5)  
I-5/LA COSTA AVE**  
SCALE: 1:500

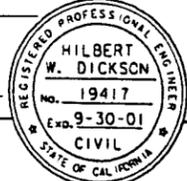
TH-6

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	70.9		

Hilbert William Dickinson  
REGISTERED CIVIL ENGINEER



PLANS APPROVAL DATE

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

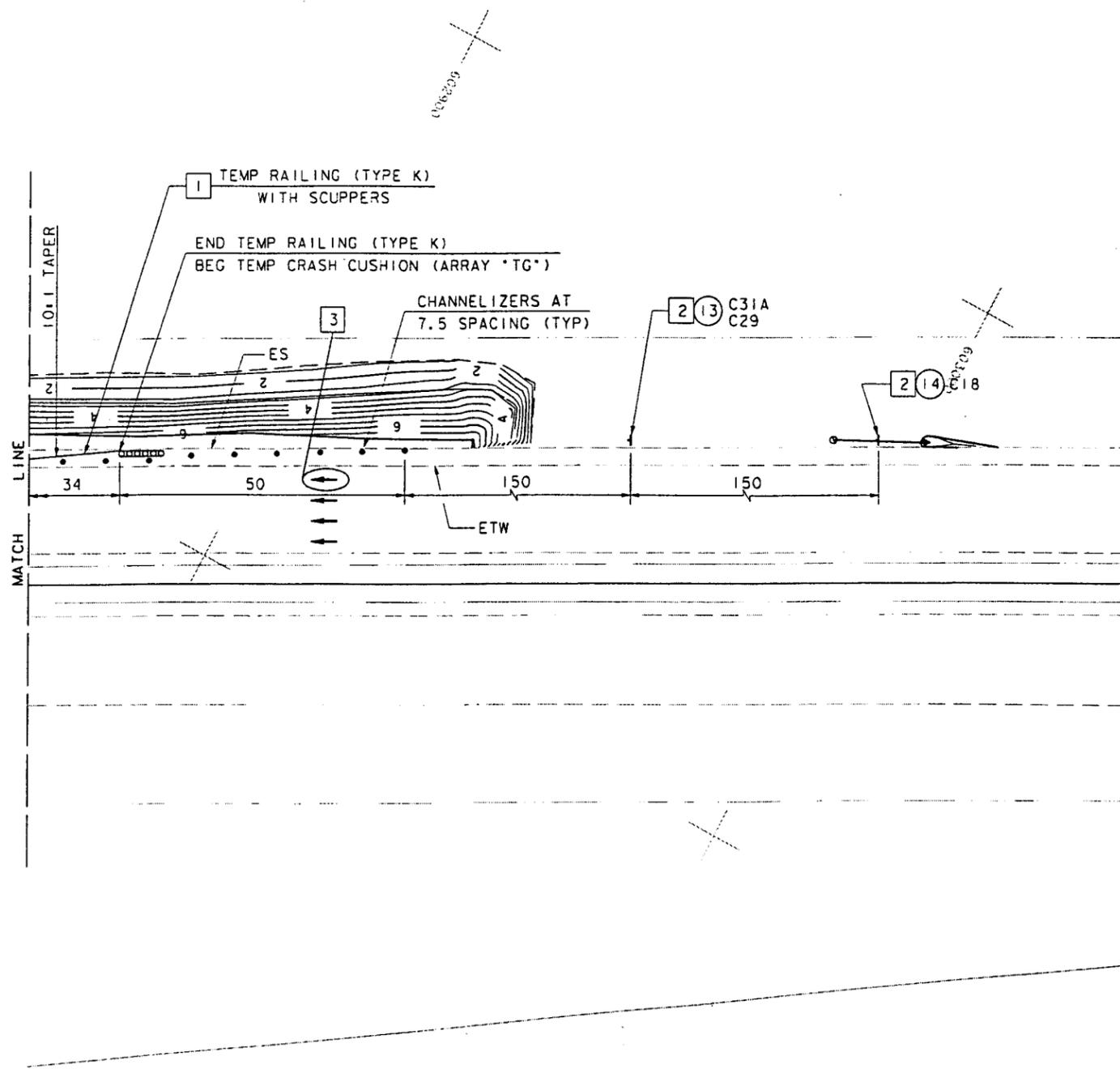
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**LEGEND**

- DIRECTION OF TRAFFIC
- TEMP CRASH CUSHION (ARRAY PER PLAN)
- CHANNELIZER (SURFACE MOUNTED) OR DRUM
- CONSTRUCTION AREA SIGN (SIZE PER PLAN)
- TEMP RAILING (TYPE K) WITH SCUPPERS
- EXISTING TRAFFIC STRIPING DETAIL NUMBER
- SIGN NUMBER

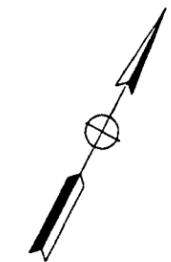
**NOTES**

- 1 - PLACE TEMP RAILING (TYPE K) WITH SCUPPERS AT EDGE OF STRIPING DETAIL 27B.
- 2 - INSTALL CONSTRUCTION AREA SIGN
- 3 - CONTRACTOR MAY CLOSE RIGHT LANE ADJACENT TO THE SHOULDER OR CLOSE OFF-RAMP BETWEEN HOURS OF 10:30 PM AND 4:00 AM THE FOLLOWING MORNING, MONDAY THROUGH THURSDAY FOR MATERIAL LOADING AND UNLOADING. CLOSURES SHALL BE IN ACCORDANCE TO STANDARD PLANS T10 AND 14.



1901760  
03/18/99

1901760  
03/18/99



**TRAFFIC HANDLING PLAN  
(LOCATION 5)  
I-5/LA COSTA AVE**

SCALE: 1:500

TH-7

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 Caltrans  
 DESIGN OVERSIGHT  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 HWD  
 HWD  
 DATE 3/98  
 DATE 3/98  
 REVISED BY  
 DATE REVISED

MAR 98 14:44:24 J:\p1\p0010\34358\p001\div\011\p07.dwg

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN



DIST	COUNTY	ROUTE	KILOMETER TOTAL PROJECT	POST VAR	SHEET NO.	TOTAL SHEETS
11	SD	VAR		VAR		

REGISTERED CIVIL ENGINEER

MIKE CHESNEY  
No. 48913  
Exp. 9-30-00  
CIVIL  
STATE OF CALIFORNIA

PLANS APPROVAL DATE \_\_\_\_\_

ROBERT BEIN, WILLIAM FROST & ASSOCIATES  
14725 ALTON PARKWAY  
IRVINE, CA 92618

*The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.*

DESIGN OVERSIGHT	DATE 3/98	REVISOR BY
	MC	MC
	MC	MC
	MC	MC

SHEET NO	TEMP RAILING (TYPE K)	CHANNELIZER (SURFACE MOUNTED)	TEMPORARY CRASH CUSHION MODULES		
			ARRAY		
			TG	TH	TJ
	WITH SCUPPERS	EA	EA	EA	EA
	M	EA	EA	EA	EA
TH-1	140	6			1
TH-2	172	16	1	1	
TH-3					
TH-4	115	11	1		
TH-5	57				
TH-6	323				
TH-7	16	9	1		
TOTAL	823	42	3	1	1

SHEET NO	SIGN NO	CODE	PANEL SIZE (mm)	NO OF WOOD POSTS PER SIGN	REMARKS
				89x140	
TH-1	1	C18	900x900	1	
TH-1	2	C31A	900x900	1	
TH-1	2	C29	500x180	1	*550 FT*
TH-1	3	C13	1200x450	1	
TH-2	4	C18 (MOD)	900x900	1	*RAMP CONSTRUCTION AHEAD*
TH-2	5	C31A	900x900	1	
TH-2	6	C18	900x900	1	
TH-2	7	C31A	900x900	1	
TH-2	7	C29	500x180	1	*300 FT*
TH-2	8	C13	1200x450	2	
TH-4	9	C18	900x900	1	
TH-4	10	C31A	900x900	1	
TH-4	11	C13	1200x450	2	
TH-5	12	C13	1200x450	2	
TH-7	13	C31A	900x900	1	
TH-7	13	C29	500x180	1	*650 FT*
TH-7	14	C18	1200x1200	2	
SUBTOTAL					

LOCATION & DESCRIPTION	ASPHALT CONC (TYPE B)	AGGREGATE BASE (CLASS 2)	PLACE AC DIKE (TYPE A)	150mm PCC DRIVEWAY	RECONSTRUCT CHAIN LINK FENCE	ROADWAY EXCAVATION
LOCATION	DESCRIPTION	m <sup>2</sup>	m <sup>2</sup>	m	m	m <sup>3</sup>
1	I-5/MANCHESTER WEST	770	770			4492
2	I-5/MANCHESTER EAST	610	610			1763
3	I-5/SR-56	450	450	125	55	
4	I-15/SR-78	982	982			5025
5	I-5/LA COSTA	281	281			2028
TOTAL		3093	3093	125	55	13808

SUMMARY OF QUANTITIES

MAR 98 14:43:09  
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
Caltrans



**Appendix A.4  
Pilot Project Listings  
Project Procurement/PSE Definitions**

Retrofit Pilot Program  
District 11 Sites

PACKAGE No. (Design)	PROJECT No. (District 11 Program)	District 7 Stipulation Site	DESCRIPTION	LOCATION	CONSTRUCTION COST	
					(PS&E - Package 1)	(Procurement - Package 2)
	1		Extended Detention Basins and Biofilter Site 1: Extended Detention Basin Site 2: Extended Detention Basin Site 3: Biofiltration Swale	I-15/SR78 Interchange I-5 NB at Manchester Avenue I-5 SB at Palomar Airport Road	282,000 282,000	75,000
	2		Infiltration Trench and Biofilters Site 1: Infiltration Trench Site 2: Biofiltration Strip Site 3: Biofiltration Swale	Carlsbad Maintenance Station Carlsbad Maintenance Station SR 78 EB at Melrose Place		50,000 105,000 75,000
	3		Extended Detention/Infiltration Basins Site 1: Extended Detention Basin Site 2: Infiltration Basin	I-5/SR 56 I-5 SB at La Costa Blvd.	282,000 355,000	
	4		Wet Basin Site 1: Wet Basin	I-5 SB at Manchester Avenue	355,000	
	5		Media Filters Site 1: Media Sand Filter Site 2: Media Sand Filter Site 3: Media Sand Filter Site 4: Compost Filter	Escondido Maintenance Station I-5 SB/SR 78 Park & Ride I-5 NB at La Costa Blvd. Park & Ride Kearny Mesa Maintenance Station		150,000 150,000 150,000 200,000
<b>TOTAL PACKAGE COST</b>					<b>1,556,000</b>	<b>955,000</b>