

Condition 83**Trenchless Technologies**

Implementation of trenchless technologies shall be considered as a feasible option for the installation of conveyance pipelines within and adjacent to areas containing wetlands, streams, and riparian vegetation. Trenchless technologies that are feasible for all Proposed Projects include microtunneling and horizontal directional drilling (HDD) within all areas along the proposed conveyance routes, and pipe suspension at areas supporting existing bridge crossings along the proposed conveyance routes (at the Los Osos Creek crossing).

Microtunneling and HDD entrance and exit locations shall be set back as far away from wetlands, streams, and riparian vegetation as feasible and consistent with the setback requirements of the CZLUO and Estero Area Plan. Implementation of microtunneling and HDD methodologies shall incorporate a frac-out contingency plan and all relevant Best Management Practices during construction.

Maintenance activities associated with pipe suspension that may result in activity within the streambed of Los Osos Creek shall be restricted to periods when the streambed is dry and does not support any flowing water or pooling water in the proposed maintenance area.

Evidence of compliance:

The plans and project specifications (Contract Documents) for the Los Osos Wastewater Project allow the use of trenchless technologies anywhere in Los Osos during construction and also provide specific direction for certain areas of the wastewater project that need to be constructed using trenchless technologies to avoid impacts to sensitive areas.

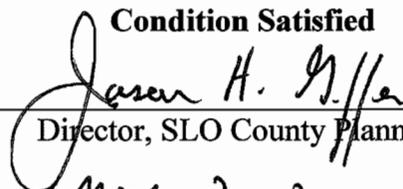
Specific portions of the gravity sewer that need to be constructed by trenchless methods on Clelland Ave., Pismo Ave., Ramona Ave., and Los Osos Valley Road and are shown on plan sheets C-PP-146, D-PP-114, D-PP-117, C-PP-363-364, and C-PP-409-410 which are attached hereto for reference. In addition to the gravity sewer line, 2,184 linear feet of recycled water line located in El Morro Ave. will be constructed using horizontal directional drilling. Plan sheets A-PP-390, A-PP-391 and A-PP-392, also attached, show this portion of recycled water line to be constructed using horizontal directional drilling.

Of the lines being directionally drilled, only one (Pismo Ave.) is in proximity to a wetland. The other trenchless lines are to avoid coastal scrub habitat or cultural resource sites. Bore pits at Pismo Ave. will be located in the improved roadway within the sewer line alignment outside the wetland area. Wetlands are located along both sides of Pismo Avenue; therefore, setbacks from wetlands are not feasible. No direct wetland impacts will occur as a result of directional drilling.

Along with the plan sheets noted above, Sections 02151 and 02158 of the project specifications are attached and outline the requirements for bore/jack and horizontal directional drilling.

The attached typical SWPPP sheet identifies erosion control materials that will be onsite throughout construction. No directional drilling is proposed in areas of standing or flowing water, eliminating the possibility of substantial frac-out impacts.

Condition Satisfied



Director, SLO County Planning

MAY 2, 2012

Date

SECTION 02151

JACKING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, supplies and incidentals required and install casing pipe and carrier pipe by jacking at the location(s) shown on the Drawings and as specified herein.
- B. Boring and jacking in areas with groundwater shall not proceed until the groundwater is removed in an approved manner in accordance with Specification Section 02140. Boring and jacking equipment shall be equipped with provisions to address flowing or loose sands and other unstable materials, and shall be performed with jacking heads with closeable doors or other means ("closed heading" boring machines) to prevent the uncontrolled entry of material into the head, loss of ground and surface settlement.
- C. Work shall be done in strict accordance with the details shown on the Drawings and as specified herein and in accordance with all State and local laws, regulations and requirements. Work shall also comply with the requirements of public agencies, and owners of public utilities, or other facilities for the safeguarding of traffic and improvements that might be endangered by the boring and jacking operations. Approach trenches in public streets will not be permitted to remain open for extended periods of time.
- D. The work shall include, but not be limited to, the following: steel casing pipe, skids, casing seals, coatings, location markers and miscellaneous appurtenances as required to complete the installation.
- E. Furnish the services of a licensed professional engineer registered in the State of California, to prepare jacking designs and submittals.

1.02 RELATED WORK

- A. Site Preparation is included in Section 02100.
- B. Dewatering and Drainage is included in Section 02140.
- C. Earthwork is included in Section 02200.
- D. Erosion and Sedimentation Control is included in Section 02270.
- E. Settlement Monitoring is included in Section 02445
- F. Ductile Iron Pipe is included in Section 02616.
- G. High Density Polyethylene Pipe and Fittings are included in Section 02623.
- H. Polyvinyl Chloride (PVC) Pressure Pipe and Fittings are included in Section 02622.
- I. Revegetation is included in Section 02930.

- J. Concrete work is included in Division 3.
- K. Surface Preparation and Shop Prime Painting are included in Section 09901.

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, complete shop drawings and product data for casing pipe, carrier pipe, fittings and related appurtenances. Submit a lay schedule showing stationing, elevations, pipe classes and class coding.
- B. Jacking system designs shall be prepared by a licensed professional engineer, registered in the State of California, having a minimum of 5 years of professional experience in the design and construction of jacking systems. Submit an original and three copies of the licensed professional engineer's certification, on the PE form specified in Section 01300, stating that the jacking system designs have been prepared by the professional engineer and that the professional engineer will be responsible for their execution. Do not submit jacking designs or drawings unless requested in writing.
- C. At least 30 days prior to the scheduled start of any jacking operations, submit in accordance with Section 01300 the proposed methods of jacking. Review will be for information only. Remain responsible for adequacy and safety of construction means, methods and techniques. Submittals shall consist of design drawings, calculations and related supplemental information describing in detail the design concept for all jacking operations. Submittals shall be prepared by a licensed professional engineer, registered in the State of California, having a minimum of 5 years of professional experience in the design and construction of jacking systems. Submittals shall include as a minimum the following:
 - 1. Shop drawings showing size, location and design calculations for reaction blocks and jacking pits.
 - 2. Number and capacities of jacks.
 - 3. Size, arrangement and installation of soil stabilization and dewatering equipment with details of locations where groundwater will be directed during construction.
 - 4. Detailed descriptions of equipment, materials, sequence and procedures for jacking steel sleeve with shield including provisions for standby and backup equipment.
 - 5. Revisions to shop drawings, as necessary, to accommodate field conditions and/or compliance as specified herein.

1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

3. ASTM A139 - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4-in and over).
 4. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
 5. ASTM C150 - Standard Specification for Portland Cement.
 6. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- B. American Water Works Association (AWWA)
1. AWWA C200 - Steel Water Pipe - 6-in (150 mm) and Larger.
 2. AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied.
 3. AWWA C206 - Field Welding of Steel Water Pipe.
- C. American Railway Engineering and Maintenance of Right-of-Way Association (AREMA)
1. AREMA Manual for Railroad Engineering, Volume 1: Track Chapter 1, Roadway and Ballast.
- D. American Welding Society (AWS)
- E. Where reference is made to one the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

- A. Steel casing pipe shall be the product of a single domestic manufacturer. Pipe shall be tested and inspected at the foundry as required by the standard specifications to which the material is manufactured. Submit in accordance with Section 01300 sworn certificates of such tests, results and satisfactory approvals.
- B. All pipe to be installed under this Contract may be inspected at the site of manufacture for compliance with this Section by an independent laboratory selected by the OWNER. The manufacturer's cooperation shall be required in these inspections. The cost of any inspection requested by the OWNER of all pipe approved for this Contract shall be borne by the OWNER. The cost of inspection of any disapproved pipe shall be borne by the CONTRACTOR.
- C. Welders shall be certified in accordance with standards of the AWS. Submit current certifications prior to the start of field work.

1.06 SYSTEM DESCRIPTION

- A. The completed installation shall be suitable in all respects for transporting waste water without affecting the stability and integrity of the overlying roadways or railroads.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe or coatings. Pipe shall not be dropped. Any damage to the pipe coatings shall be repaired in accordance with the procedures specified in Section 09901.
- B. All pipe shall be subjected to a careful inspection prior to being installed. If any pipe fails to meet the requirements specified herein, it shall be removed and replaced with satisfactory pipe.

1.08 PROJECT/SITE REQUIREMENTS

- A. Discharge from dewatering operations shall be directed as specified in Section 02140.
- B. Furnish all maintenance of traffic and establish and maintain all safety procedures on adjacent highways during the jacking operation.
- C. Inspect the locations where jacking operations will be conducted and the casing pipe is to be installed, verify the conditions under which the work will be performed, and provide all necessary details, whether shown or specified on the Drawings or not, for the orderly prosecution of the work.
- D. CONTRACTOR shall be prepared to work at night and on weekends, if required, to complete the work. Request and obtain written authorization in accordance with these Specifications prior to working nights and weekends.
- E. Jacking operations shall not result in measurable settlement, movement, or cracking of roadways, railroads or adjacent structures. If any movement or settlement occurs which causes or might cause damage to roadways or structures over, along, or adjacent to the work, jacking operations shall stop immediately except for those activities which will assist in making the work secure and prevent further movement, settlement, or damage. Jacking operations may resume only after all necessary precautions have been taken to prevent further movement, settlement, or damage.
- F. Roadways, railroads and structures damaged by jacking operations shall be repaired or replaced as necessary to restore them to their condition prior to beginning jacking operations.
- G. CONTRACTOR shall obtain all permits as required by Section 01060 – Regulatory Agency and Utility Requirements.

1.09 DEFINITIONS

- A. Casing pipe shall mean the outer sleeve that is installed by the bore and jack method.
- B. Carrier pipe shall mean the pipe inserted within the casing pipe and which acts as the conveyor of liquid.
- C. Jacking pit shall mean the pit in which the boring and jacking equipment is installed and from which both the casing pipe and carrier pipe are launched.
- D. Exit pit or receiving pit shall mean the pit located at the end of the casing pipe remote from the jacking pit at the point where the carrier pipe emerges from the casing pipe.

PART 2 PRODUCTS

2.01 GENERAL

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

2.02 MATERIALS

A. Steel Casing Pipe

1. Steel casings shall be of leakproof construction and shall conform to the requirements of ASTM A53 (ASTM A139 Grade "B") and shall be protected inside and outside by a black bituminous coating a minimum of 5 mils thick. Steel casing pipe shall have a minimum yield strength of 35,000 psi, shall be equipped with grout holes as specified herein, and shall be designed to withstand H-20 traffic or Coopers E-80 Railroad loading depending on the crossing.
2. Casing pipes shall have the inside diameter, minimum nominal diameters and wall thicknesses as shown on the Drawings.

B. Carrier Pipe

1. All carrier pipe joints within the casing pipe shall be restrained or harnessed.
2. Ductile iron pipe and fittings shall be as shown on the Drawings and as specified in Section 02616.
3. Polyvinyl Chloride (PVC) pressure pipe, including Fusible PVC, and fittings shall be as shown on the Drawings and as specified in Section 02622.
4. High density polyethylene pipe shall be as shown on the Drawings and as specified in Section 02623.

2.03 MIXES

- A. Sand fill shall be of such sizes that when dry, 100 percent by weight shall pass a No. 20 sieve and not over 5 percent by weight shall pass a No. 100 sieve.
- B. Mortar shall consist of 1 part cement, 1/4 part lime and 2 parts sand. Sand shall comply with ASTM C144. Lime shall comply with ASTM C207, Type S. Cement shall comply with ASTM C150, Type II.
- C. Cement grout shall consist of a mixture of about 1 part cement to 6 parts sand. The amount of cement may be increased or decreased as necessary and as permitted to provide good flowing characteristics.

2.04 SURFACE PREPARATION AND SHOP COATINGS

- A. Surface preparation of steel casing pipe shall be in accordance with Section 09901.

- B. Steel casing pipe shall be protected inside and outside by a black bituminous coating with a minimum thickness of 5 mils.

PART 3 EXECUTION

3.01 PREPARATION

- A. Notify ENGINEER as appropriate at least 7 days in advance of the planned start of work within the road or railroad right-of-way.
- B. Jacking pit subgrades shall be kept continuously free from ground and surface waters during jacking operations. Additional groundwater controls may be ordered on short notice and shall be implemented as directed. Observed water levels prior to construction are to be below the invert elevation of the jacking pits. Groundwater control along and at the face of the jacking casing shall include chemical grout stabilization as required.

3.02 INSTALLATION

- A. Dimensions of jacking and receiving pits shall be determined by the CONTRACTOR, subject to the approval of the ENGINEER.
- B. Excavate jacking pit and provide excavation supports as required. Excavation support shall extend a sufficient depth below the invert of the steel casing pipe to resist any pressure developed by the soil outside the jacking pit. Excavation support shall extend at least 3-ft-6-in above existing grade.
- C. Furnish a level concrete slab at the bottom of the jacking pit. Steel rails or beams shall be embedded in the concrete slab for placement and alignment of each piece of casing pipe or carrier pipe during installation operations.
- D. Furnish, install and remove, to the extent required, thrust blocks or such other provisions as may be required in driving the casing pipe or carrier pipe forward.
- E. Maintain proper alignment and elevation of the casing pipe consistently throughout the jacking operation.
- F. Tolerances for installation of the casing pipe shall be as follows:
 - 1. Elevation: to grade or a maximum of 9-in below grade.
 - 2. Plan Location: plus or minus 1-ft.
- G. Jacking operations for the casing pipe shall be continuous and precautions shall be taken to avoid interruptions which might cause the pipe to "freeze" in place.
- H. Carrier pipe shall be supported within the casing pipe so that pipe bells do not rest directly on the casing. The load of the carrier pipe shall be distributed along the casing by the method of support as shown on the Drawings and as specified herein.
- I. Dewatering through the casing pipe during construction will not be permitted.

- J. Steel casing pipe sections shall have beveled ends with a single v-groove and shall be full penetration butt welded on the outside of the casing in accordance with the applicable portions of AWWA C206 and AWS D7.0 for field welded water pipe joints. All joints of the steel casing shall be butt welded prior to being subjected to the jacking operation. The welded joints shall be wire brushed and painted with bitumastic enamel coating in accordance with AWWA C203.
- K. Jacking shall be performed in a manner to prevent voids from developing outside the jacking sleeve. A jacking shield shall be used to minimize the amount of voids produced during excavating in the forward end of the jacking sleeve. Voids which occur shall be filled with cement grout.
- L. Furnish and install, and later remove to the extent required, thrust blocks or other provisions for backing up the jacks employed in driving the casing pipe forward.
- M. Immediately following the jacking operation, pressure grout the jacked section to fill all voids existing outside of the jacked casing. Grouting shall be from the interior of the casing through the grouting holes.
- N. After the casing pipe has been completely installed, thoroughly clean the interior of the casing pipe and remove all excess material leaving a smooth interior throughout.
- O. The exit pit shall be excavated up to the casing pipe. Excavation support shall be provided as required. Sufficient room shall be provided to continue installation of carrier pipe, fittings and all necessary connections to the system.
- P. The carrier pipe shall be installed within the casing using skids as specified above. Carrier pipe shall be installed from the jacking pit end of the casing. Each joint shall be thoroughly checked prior to being inserted into the casing.
- Q. Upon completion of installation of the carrier pipe inside the casing pipe, provide suitable restrained caps or plugs at each joint outside the end of the casing pipe and hydrostatically test the carrier pipe in accordance with Section 02622 for 30 minutes. There shall be no allowable leakage. Remove the carrier pipe from the casing and remake leaking joints. Repeat hydrostatic test until there are no leaks in the carrier pipe within the casing.
- R. Construct an 8-in thick brick bulkhead after the carrier pipe has been installed and successfully hydrostatically tested. The portion of the carrier pipe passing through the brick bulkhead shall be wrapped with three layers of 15 lb asphalt impregnated felt before the bulkhead is constructed.
- S. Fill void between casing pipe and carrier pipe completely with sand in one continuous uninterrupted operation in a manner to prevent the occurrence of any voids between the casing pipe and the carrier pipe.
- T. Furnish concrete markers installed flush with grade at each end of the casing pipe showing size of casing pipe, depth from grade to top of casing pipe and located on the center line of the casing.

3.03 SITE RESTORATION

- A. At the conclusion of all jacking operations, remove excavation support systems for jacking pits. If withdrawal should damage or disturb the roadway subgrade, leave supports in place and cut off 36-in below finished grade.
- B. Following pipe installation and backfill operations, restore the profile of the right-of-way to its original condition. Construct sidewalks and fencing, if applicable, to match existing. Install sodding or seeding to match existing, as required.
- C. Remove all equipment, supplies, excess excavation materials and miscellaneous items associated with the jacking operation and leave the site in a clean and tidy condition.
- D. If required by the owner of the right-of-way, coordinate and schedule a final inspection of the work by the owner of the right-of-way.

END OF SECTION

SECTION 02158

HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Provide all materials, equipment and incidentals necessary for the construction of new recycled effluent water piping by horizontal directional drilling as shown on the Drawings and as specified herein. Horizontal Directional Drilling (HDD) is meant as a method of trenchless pipe installation using a steerable drilling operation which directly installs a pipe along a linear alignment (not necessarily horizontal) without an open hole or open face.
- B. Furnish all survey including layout, inspection and record-keeping incidental to the drilling and pipe installation.
- C. Drilling shall be conducted at the locations shown on the Drawings.
- D. Drilling shall either be conducted from a pit or as a sacrificial tangent curve to intersect the alignment. Should a pit be used, all work to construct and maintain the pit will be part of this work.

1.02 RELATED WORK

- A. Earthwork is included in Section 02200.
- B. PVC pipe is included in Section 02622
- C. High density polyethylene pipe is included in Section 02623.

1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, letters, shop drawings and product data showing materials of construction, installation equipment and details of installation for the HDD operation including:
 - 1. Qualifications of the HDD CONTRACTOR
 - a. Name, business, address and telephone number of the CONTRACTOR.
 - b. Experience in successfully constructing directional drilling operations.
 - c. List of similar projects performed over the last two years including the name of contact person and telephone number.
 - d. Certification of workman training.
 - e. Name(s) of all supervisory personnel to be directly involved with the project.

- f. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel for the HDD operations will be directly involved with this project.

2. Construction Procedures

- a. Written descriptions of the construction method and equipment to be used, and access pit sizes and locations required for equipment and material access.
- b. Grouting techniques to be used for overexcavation if any, including equipment, pumping procedures, grout types, and mixtures.
- c. Description of line and grade control.
- d. Proposed procedures, materials and equipment for lubricating the exterior of the pipe during pulling.
- e. Details of spoil removal system, including equipment type, number and disposal location.
- f. Proposed methods, materials and equipment for removing and clearing obstructions so that the HDD can advance forward.
- g. Procedures for locating and controlling the direction of the drilling operation.

1.04 QUALIFICATIONS

A. HDD CONTRACTOR

1. The HDD CONTRACTOR shall be trained and certified to operate the Horizontal Directional Drilling equipment with at least 5 years experience in directional drilling obtained over the last five years. Perform HDD operations under the constant direction of a drilling supervisor who shall remain on site and be in responsible charge throughout the drilling operation. The supervisor shall have performed or supervised directional drilling of a minimum of 5,000 linear feet of pipe.

1.05 PERMITS

- A. Obtain all permits required by Section 01060 – Regulatory Agency and Utility Requirements.

1.06 PROJECT/SITE REQUIREMENTS

- A. Geotechnical memoranda are available on request. The geotechnical technical memoranda are made available to the CONTRACTOR for his information to be used at his own risk. The CONTRACTOR is responsible for any conclusions to be drawn from the boring including the character of the materials to be encountered and the degree of difficulty to be expected in the performance of the work. The CONTRACTOR is encouraged to perform his own subsurface investigation.

- B. Do not assume that materials other than those disclosed by the borings will not be encountered or that the proportions and character of the various materials will not vary from those indicated in the boring logs.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Carrier pipe shall be 6-inch interior diameter high density polyethylene or fusible PVC pipe with the dimension ratios as shown on the drawings and as specified in Section 02622 and Section 02623.
- B. Cement grout shall consist of a mixture of 1 part cement to 6 parts sand. The amount of cement may be increased or decreased as necessary and as permitted by the ENGINEER to provide good flowing characteristics.
- C. Lubricant shall be bentonite or polymer based slurry.

2.02 EQUIPMENT

- A. The drill rig and associated equipment shall be in good condition and capable of completing the project without significant delays.
- B. The drill bit and reamers shall have a closed face and shall be capable of supporting the excavated area (face) during excavation and shutdown. The bit shall be full directional in both the horizontal and vertical directions from the drill rig so that the alignment can be maintained during the entire drilling operation.
- C. The drill bit shall be capable of drilling through all materials encountered including sand, gravel, cobbles, organics and marine clay.

PART 3 EXECUTION

3.01 ACCESS PITS/PREPARATION

- A. Excavation, trenching, dewatering, sheeting, shoring and bracing shall comply with all applicable requirements of OSHA and these Specifications.
- B. Locate and protect existing utilities as required. Coordinate utility protection with the respective utility companies.

3.02 HDD OPERATIONS

- A. Though the installation process may be licensed or proprietary in nature, the CONTRACTOR shall not change any material, thickness, design, values or procedural matters stated in the submittals, without the prior knowledge and approval of the ENGINEER. The CONTRACTOR shall submit, in writing, full details about component materials, their properties and installation procedures and abide by them fully during the entire course of the work.
- B. Ream the pilot hole to a diameter which is sufficiently sized to reduce forces applied to the pipe during pull back. Intermediate temporary pipes may be used as required to install final pipe.

- C. If pulling equipment is not capable of monitoring pulling forces imposed upon the pipe, a weak link shall be between the pipe and the molehead/reamer in order not to exceed the safe pulling strength as prescribed by the pipe manufacturer.
- D. Install a swivel between the molehead/reamer and pipe connection to minimize torsional stresses imposed on the pipe.
- E. Pressure grout the annular space around the final pipe if the final ream produces a theoretical annular space of more than 0.02 cu ft per linear foot of pipe.
- F. Directly install the recycled effluent water line in locations shown on the Drawings by making either a single or multiple passes with a directional drill to the lines and grades indicated.
- G. Install the pipe with no interruption in traffic.
- H. Install the pipe from either a pit that allows the pipe installation along the proposed grade directly or by drilling an initial sacrificial tangent section outside the limits of the alignment that is then excavated and cut-off or turned down to make the pipe connection at the grades indicated.
- I. Provide remote sensing at the drill rig to maintain alignment of the drilling operation and provide a profile and plan locations of the as-installed pipe.
- J. Install final pipe as one continuous fused string. Install final pipe in a continuous operation without allowing the pipe to set in the ground unmoved.
- K. Pull pipe into place without damaging the pipe joints or pipe sections. Replace any pipe damaged during installation at no additional cost to the OWNER.
- L. Maintain proper lubrication during pipe installation to reduce the exterior friction and possibility of the pipe seizing in place.
- M. Submit a written record of each drive for daily review by the ENGINEER.

3.03 MONITORING

- A. Surface Settlement Monitoring
 - 1. Make a visual inspection of the roadway from the each shoulder to look for signs of settlement on a hourly basis during the time of active drilling.
 - 2. Establish surface settlement monitoring points on the shoulders of the roadway and at any intermediate points which may be accessible or as directed by San Luis Obispo County. Establish surface settlement monitoring points along the centerline of the pipe. Install additional monitoring points at locations deemed necessary.
 - 3. Record location of settlement monitoring points with respect to construction baselines and elevations. Record elevations to an accuracy of 0.01 feet for each monitoring point location. Establish monitoring points at locations and by methods that protect them from damage by construction operations, tampering, or other external influences.

4. Monitor ground settlement directly above and 10-ft before and after any utility or pipeline intersection.

B. Reporting Frequency

1. Submit records of readings daily from the various surface settlement monitoring points and visual observations of the creek along the centerline of the pipe.
2. Report any loss of ground, roadway cracking, depression or settlement or other unusual activities immediately.

C. HDD operations shall limit vibrations transmitted to surrounding structures so as not to cause damage.

D. Disposal of Wastes and Groundwater

1. The CONTRACTOR shall dispose of all waste soils, slurries and other wastes in accordance with applicable regulations. No waste shall be left on-site following completion of the work.
2. The CONTRACTOR shall dispose of all groundwater generated by dewatering operations and any surface water entering access pits in accordance with Section 02140.

3.04 GROUND SURFACE MOVEMENTS AND TOLERANCES

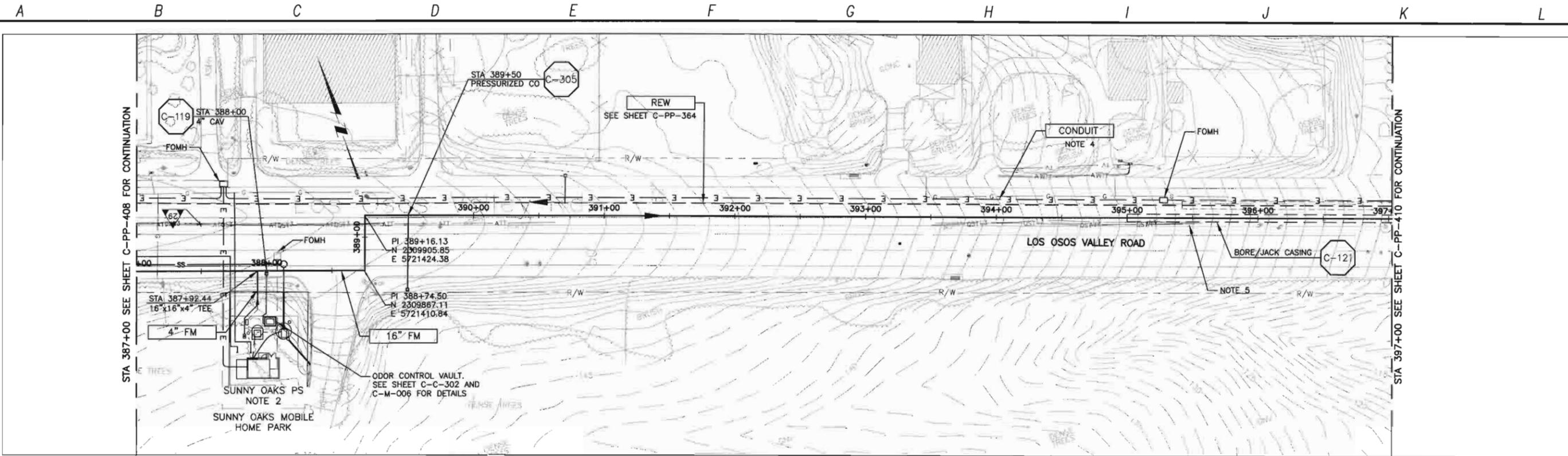
A. Ground Surface Movement. Settlement or heave of the ground surface along the HDD alignment shall not exceed 0.5-in.

B. Tolerances.

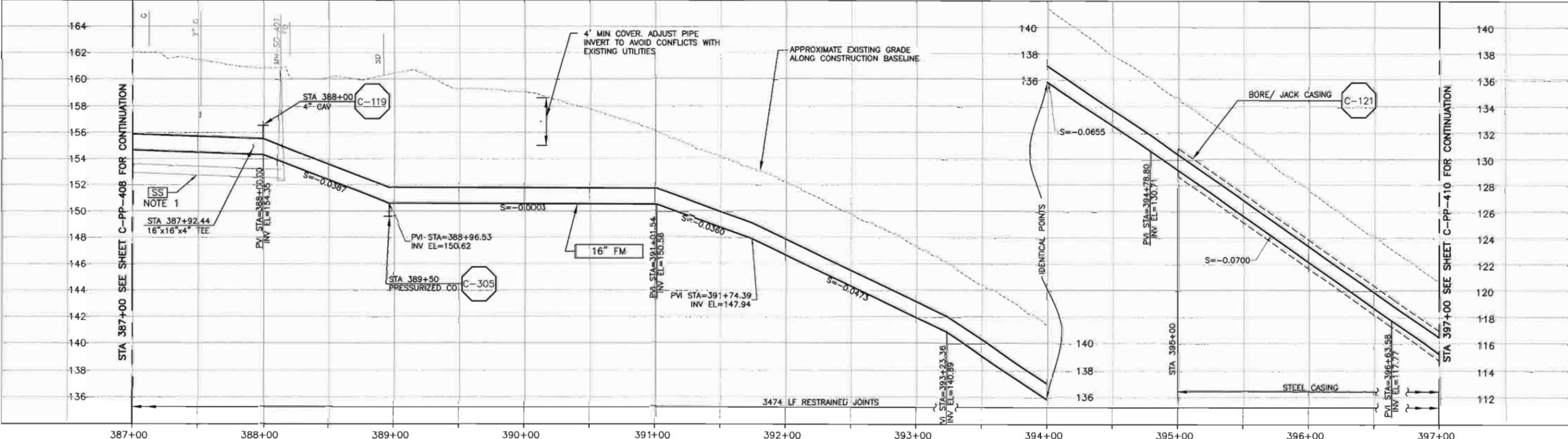
1. No more than 3-in horizontal and 3-in vertical deviation from design location shall be permitted in the position of the carrier pipe.
2. When the initial bore deviates from the design line or grade by amounts greater than that specified, return the pipe to design line or grade plus or minus the specified tolerance at a rate of not more than 1-in per 25 feet.
3. If either pipe is off design line or grade by an amount that requires redesign of the pipeline or associated structures, the CONTRACTOR shall do so at no additional cost to the OWNER.

END OF SECTION

#2012 CDM SMITH ALL RIGHTS RESERVED. PROJECT NO. 42502-B3120. PLAN AND PROFILE - FM LOS OSOS VALLEY ROAD. STA 387+00 TO STA 397+00. DATE: APRIL 2012. DRAWN BY: BJC. CHECKED BY: KS, RLA. SCALE: 1"=40' HORIZONTAL, 1"=4' VERTICAL.



PLAN ON LOS OSOS VALLEY ROAD



PROFILE ON LOS OSOS VALLEY ROAD

- CONSTRUCTION BASELINE STATION
- NOTES:
- GRAVITY SEWER (SS) PIPE OUT OF SECTION. SS SHOWN FOR REFERENCE ONLY.
 - SEE SHEET C-C-302 DETAILS.
 - NOMINAL FORCEMAIN PIPE SIZE CALLOUT IS FOR PVC PIPE MATERIAL. IF HDPE IS UTILIZED, NOMINAL PIPE SIZE SHALL BE 18".
 - REFER TO SHEET C-G-010 FOR REQUIREMENTS OF ELECTRICAL CONDUITS AND MANHOLES ALONG THE PIPE LINE. MAINTAIN 2' VERTICAL AND HORIZONTAL SEPARATION FROM THE AT&T CONDUIT AND MANHOLE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KS, RLA
 DRAWN BY: RU
 CHECKED BY: BJC
 DATE: APRIL 2012

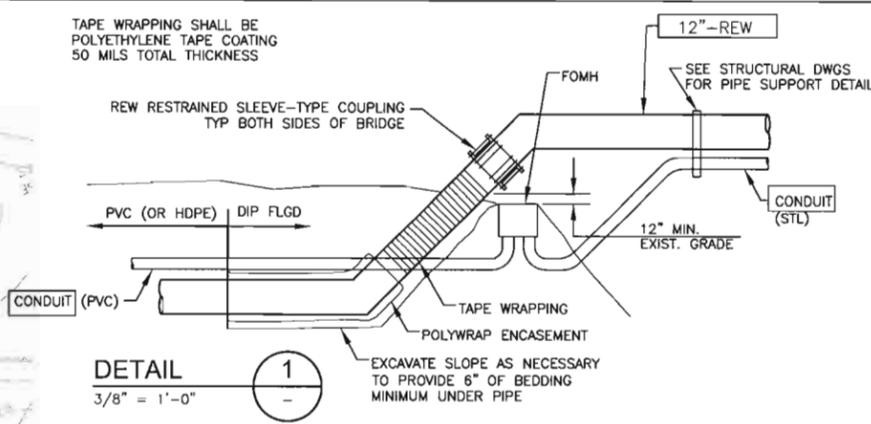
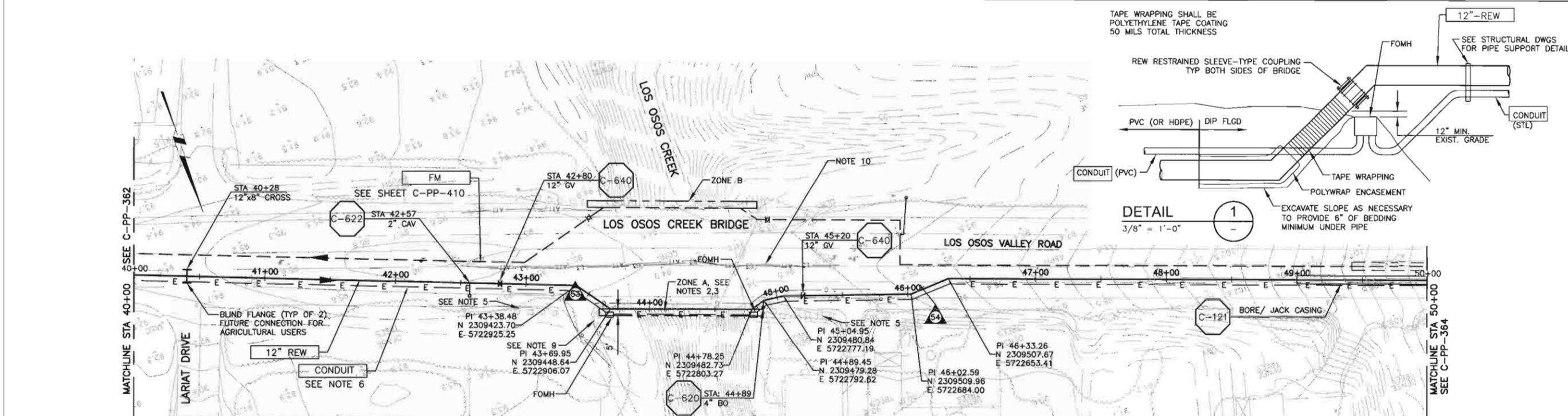
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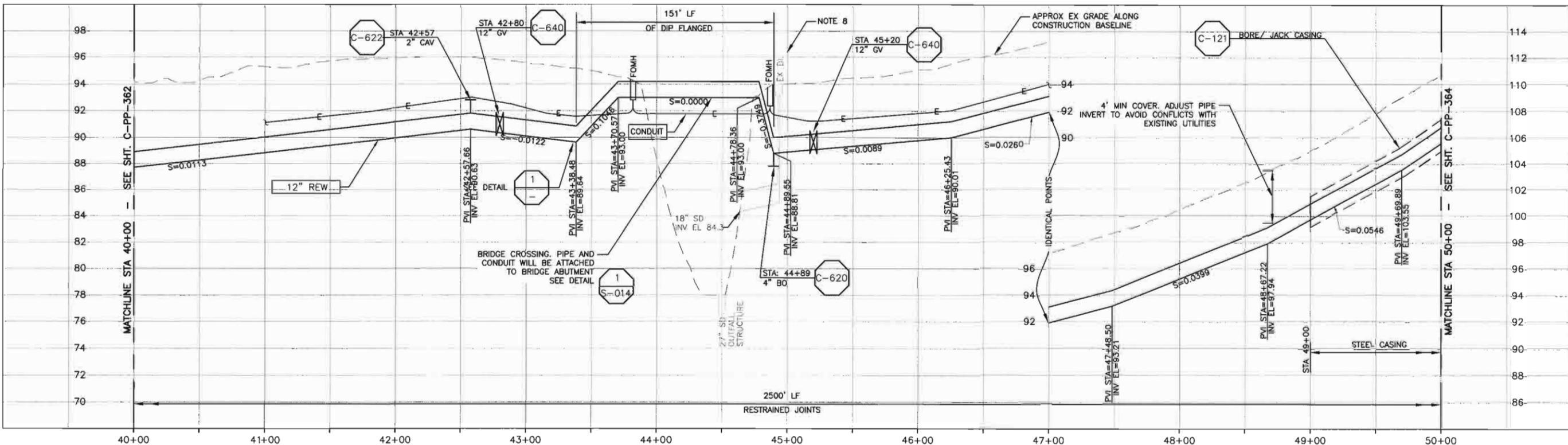
LOS OSOS WASTEWATER COLLECTION SYSTEM
 PLAN AND PROFILE - FM
 LOS OSOS VALLEY ROAD
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PROJECT NO. 42502-B3120
 FILE NAME: C-PP-409
 SHEET NO. C-PP-409

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PLAN ON LOS OSOS VALLEY ROAD



PROFILE ON LOS OSOS VALLEY ROAD

- CONSTRUCTION BASELINE STATION**
- NOTES**
- NOMINAL REW FORCE MAIN PIPE SIZE CALLOUT IS FOR PVC PIPE MATERIAL. IF HDPE IS UTILIZED, NOMINAL PIPE SIZE SHALL BE 14".
 - TRIM TREE BRANCHES TO PROVIDE 5-FOOT CLEARANCE FROM EDGE OF BRIDGE DECK.
 - DISTURBANCE ZONE A IS 140-FOOT LONG BY 5-FOOT WIDE.
 - DISTURBANCE ZONE B IS 120-FOOT LONG BY 5-FOOT WIDE.
 - PROTECT GUARD RAIL AND POSTS.
 - REFER TO SHEET C-G-010 FOR REQUIREMENTS OF ELECTRICAL CONDUITS AND MANHOLES ALONG THE PIPELINE.
 - NOT USED.
 - CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND REPLACEMENT AS NEEDED TO ACCOMMODATE CONSTRUCTION OF REW.
 - REPLACE EXISTING METAL GUARD RAILING, POSTS, AND CABLE ANCHOR ASSEMBLIES IN TYPE AND KIND AS NEEDED TO ACCOMMODATE CONSTRUCTION OF REW.
 - MAINTAIN 2' VERTICAL AND HORIZONTAL SEPARATION FROM THE AT&T CONDUIT AND MANHOLES.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: KS, RLA
 DRAWN BY: RKU
 CHECKED BY: BJC
 DATE: APRIL 2012

CDM Smith
 2295 Gateway Oaks Drive, Suite 240
 Sacramento, CA 95833
 Tel: (916) 567-9900



IF THIS BAR DOES NOT MEASURE 1" THEN ADJUST SCALE ACCORDINGLY



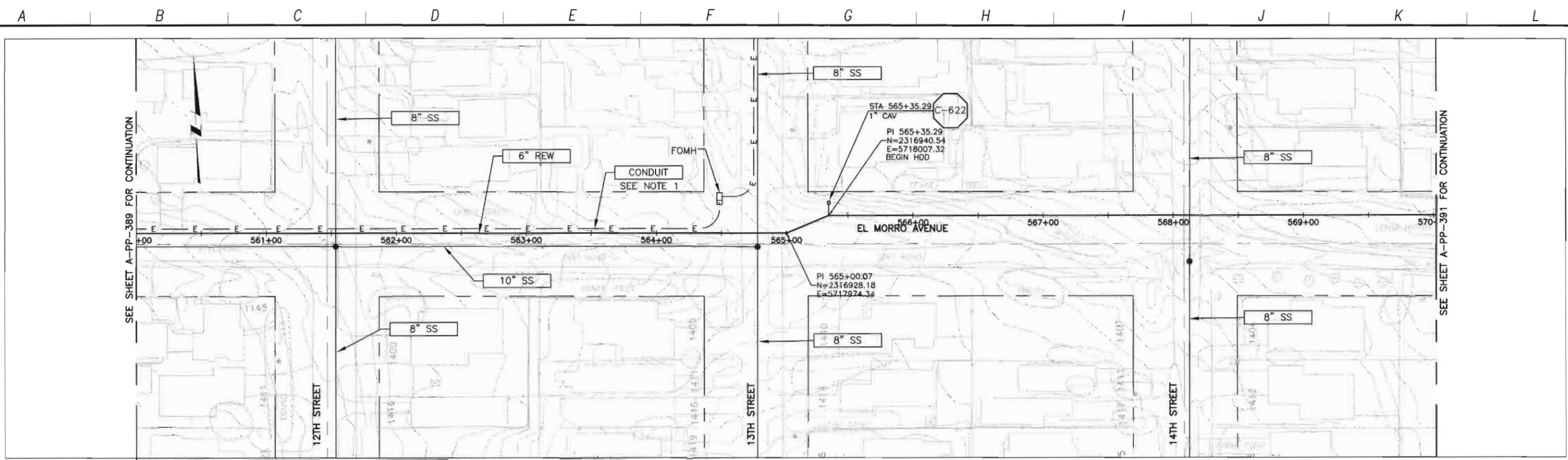
REGISTERED PROFESSIONAL ENGINEER
 C 051414
 EXP. 05/30/12
 CIVIL
 STATE OF CALIFORNIA



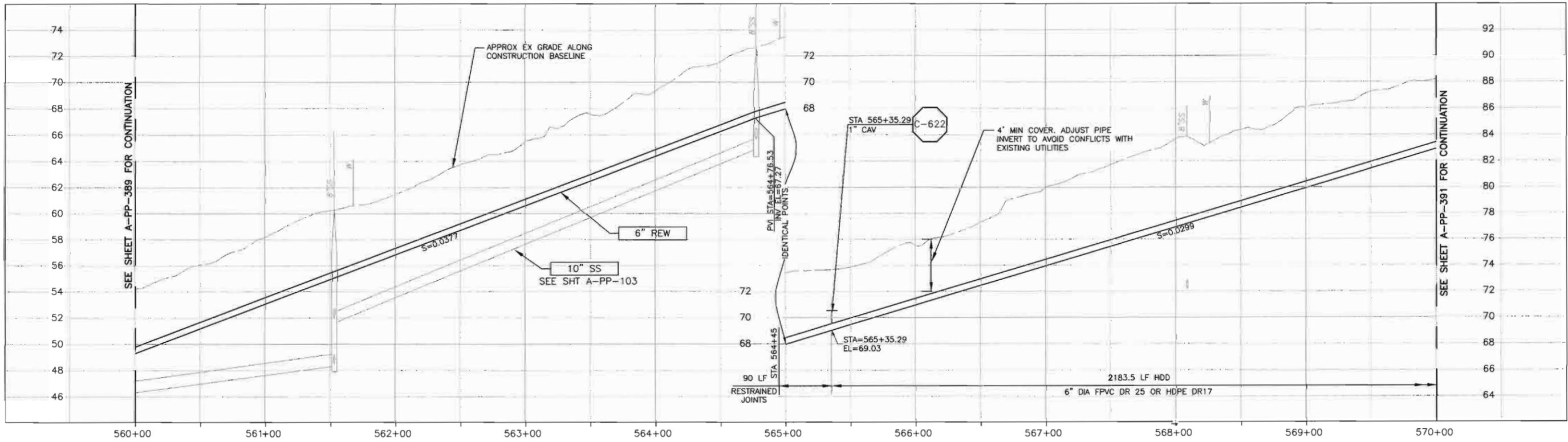
LOS OSOS WASTEWATER COLLECTION SYSTEM
 PLAN AND PROFILE - REW
 LOS OSOS VALLEY ROAD
 STA 40+00 TO STA 50+00

PROJECT NO. 42502-83120
 FILE NAME: C-PP-363
 SHEET NO. C-PP-363

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PLAN ON EL MORRO AVENUE



PROFILE ON EL MORRO AVENUE

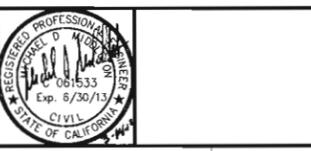
CONSTRUCTION BASELINE STATION

NOTES:
 1. REFER TO SHEET A-G-010 FOR REQUIREMENTS OF ELECTRICAL CONDUITS AND MANHOLES ALONG PIPELINE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: APS
 DRAWN BY: RKU
 CHECKED BY: MDM
 DATE: MARCH 2012

CDM Smith
 2295 Gateway Oaks Drive, Suite 240
 Sacramento, CA 95833
 Tel. (916) 567-9900

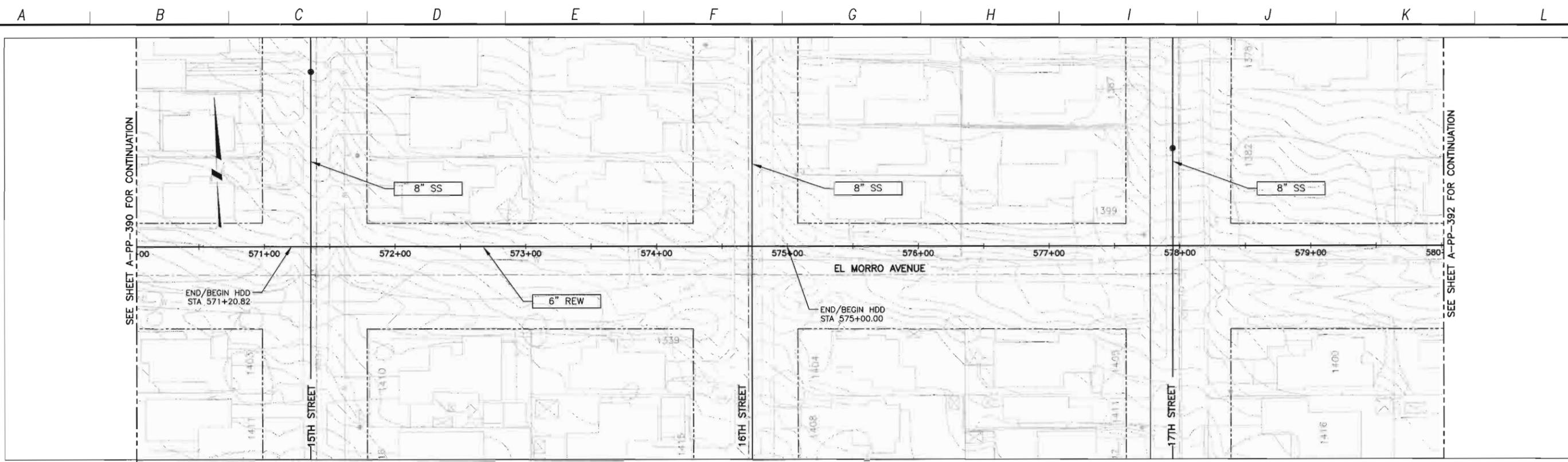


LOS OSOS WASTEWATER COLLECTION SYSTEM
 PLAN AND PROFILE - REW
 EL MORRO AVENUE
 STA 560+00 TO 570+00

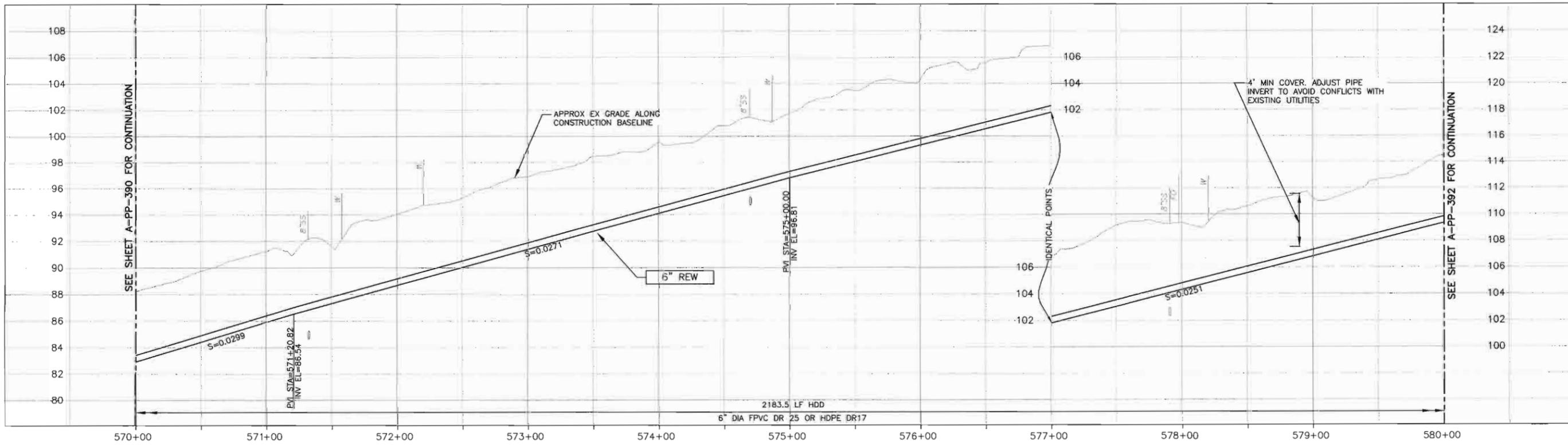
PROJECT NO. 42502-83120
 FILE NAME: A-PP-390
 SHEET NO.
A-PP-390

SCALE:
 HORIZ: 1"=40'
 VERT: 1"=4'

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PLAN ON EL MORRO AVENUE

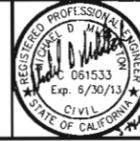


PROFILE ON EL MORRO AVENUE

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: APS
 DRAWN BY: RKL
 CHECKED BY: MDM
 DATE: MARCH 2012

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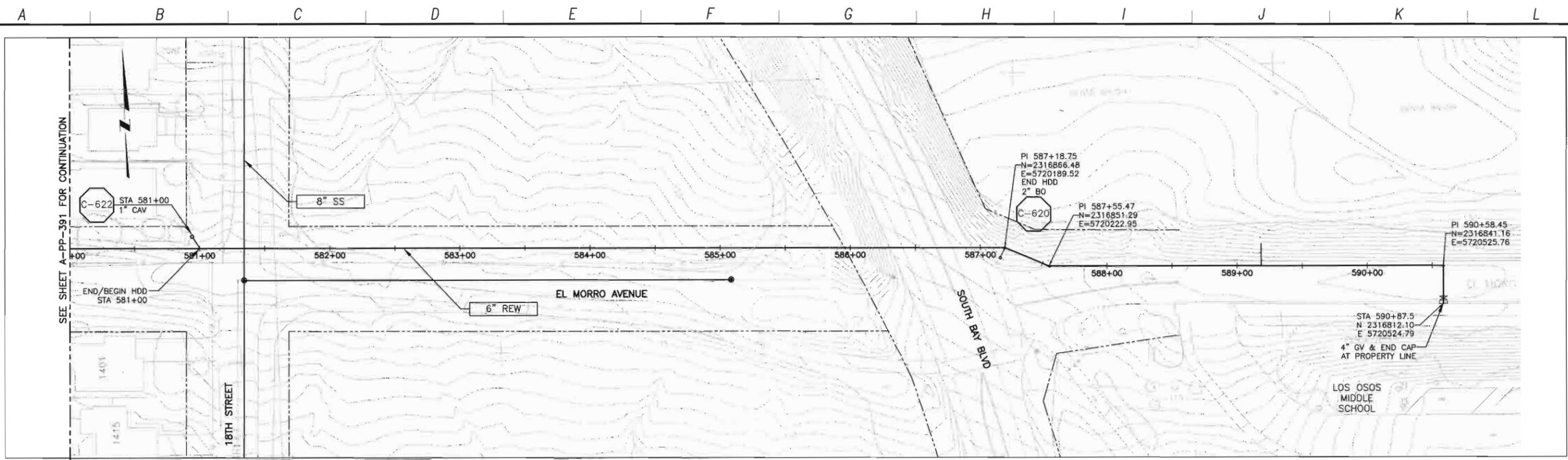


LOS OSOS WASTEWATER COLLECTION SYSTEM
 PLAN AND PROFILE - REW
 EL MORRO AVENUE
 STA 570+00 TO 580+00

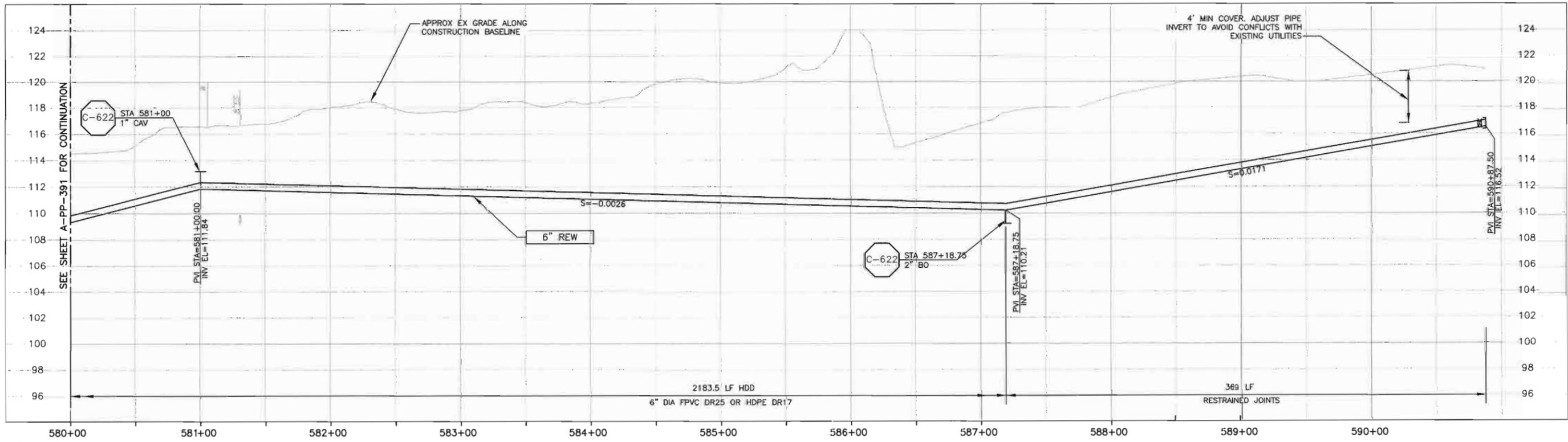
PROJECT NO. 42502-83120
 FILE NAME: A-PP-391
 SHEET NO.
A-PP-391

SCALE:
 HORIZ: 1"=40'
 VERT: 1"=4'

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PLAN ON EL MORRO AVENUE



PROFILE ON EL MORRO AVENUE

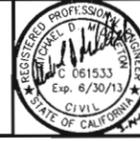
REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: APS
 DRAWN BY: RKU
 CHECKED BY: MDM
 DATE: MARCH 2012

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 Sacramento, CA 95833
 Tel: (916) 567-9900



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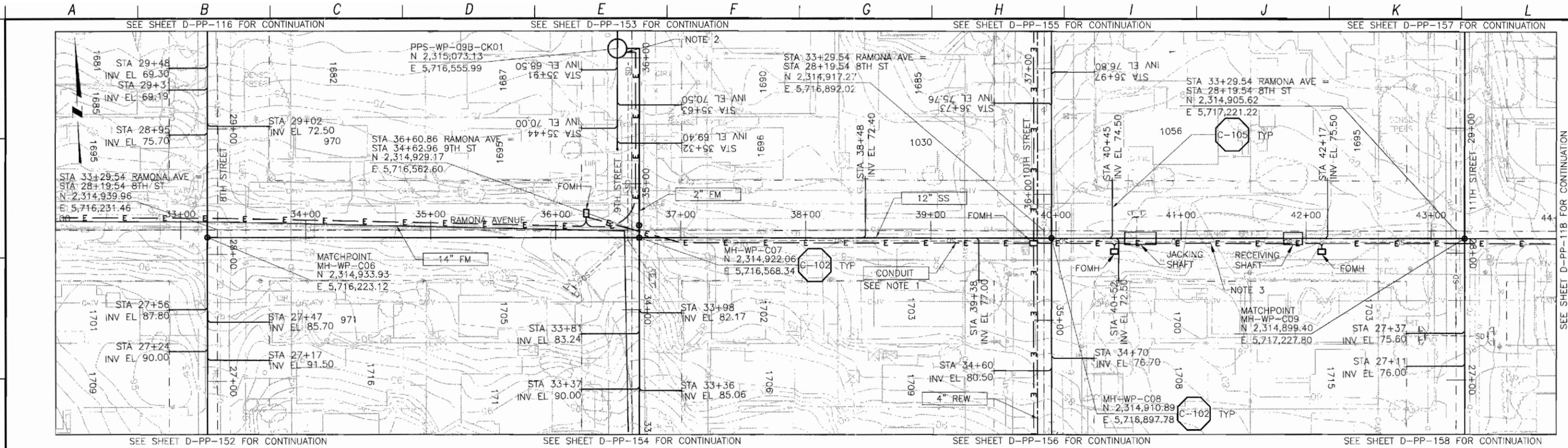


LOS OSOS WASTEWATER COLLECTION SYSTEM
 PLAN AND PROFILE - REW
 EL MORRO AVENUE
 STA 580+00 TO 590+88

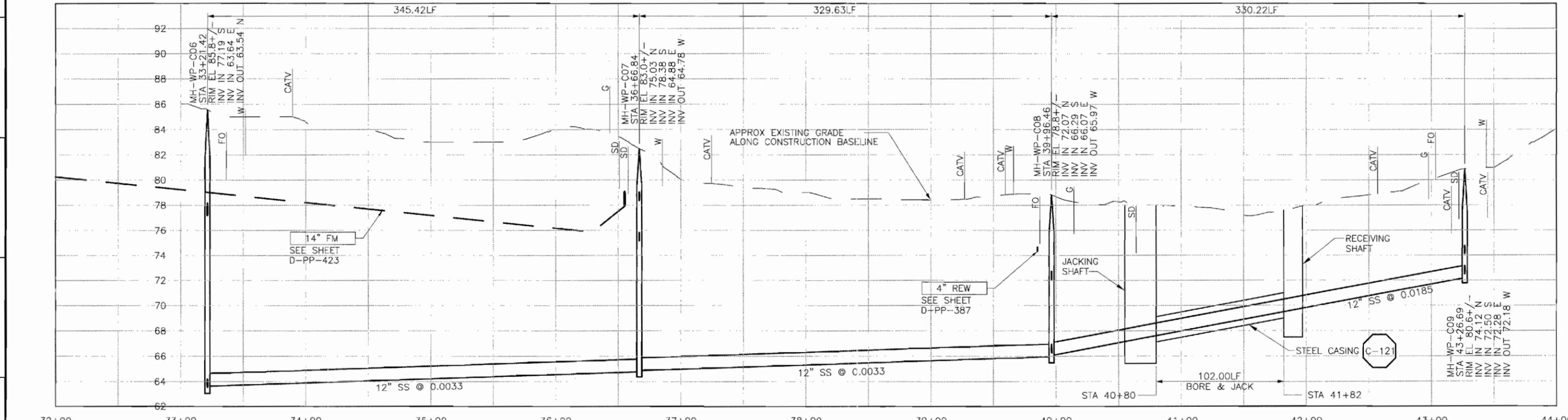
PROJECT NO. 42502-83120
 FILE NAME: A-PP-392
 SHEET NO.
A-PP-392

SCALE:
 HORIZ: 1"=40'
 VERT: 1"=4'

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PLAN ON RAMONA AVENUE



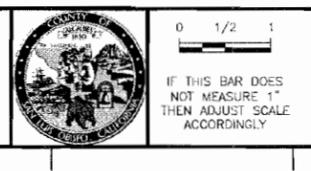
PROFILE ON RAMONA AVENUE

- 32+00 CONSTRUCTION BASELINE STATION
- NOTE:
- REFER TO SHEET D-G-010 FOR REQUIREMENTS OF ELECTRICAL CONDUIT AND MANHOLES ALONG PIPELINE.
 - TERMINATE CONDUIT AT LCP.
 - CONDUIT TO BE INSTALLED IN STEEL CASING WITH SEWER PIPE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: APS
 DRAWN BY: LLB
 CHECKED BY: MDM
 DATE: MARCH, 2012

CDM Smith
 2295 Gateway Oaks Drive, Suite 240
 Sacramento, CA 95833
 Tel: (916) 567-8900



SCALE:
 HORZ: 1"=40'
 VERT: 1"=4'
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 DIAL TOLL FREE: 1-800-642-2444
 AT LEAST TWO DAYS BEFORE YOU DIG
 UNDERGROUND SERVICE ALERT OF NORTHERN CALIFORNIA

LOS OSOS WASTEWATER COLLECTION SYSTEM
PLAN AND PROFILE
RAMONA AVE
 STA. 33+21.42 TO 43+26.69
 PROJECT NO. 42502-83120
 FILE NAME: D-PP-117
 SHEET NO.
D-PP-117

