The Contractor will supply all power, oil, grease, and auxiliaries required for this final test operation. The District will supply water and operating personnel. On certain items of equipment, the final adjustments and inspections shall be made by factory-trained service personnel other than sales representatives, who shall also supervise the test operation.

This requirement will be stated under the Detailed Specifications for the particular piece or pieces of equipment in these Specifications. The District shall provide the service of factory-trained service personnel for equipment furnished by it; however, the Contractor shall be responsible for the coordination of all equipment testing and total system testing. Each manufacturer who furnishes any piece of equipment calling for factory trained service personnel shall supply, and the Contractor shall include in his bid allowance for, factory-trained service personnel as described above to adjust all of the said equipment supplied by him until this equipment has been tested by the Contractor and the results of these tests have been approved by the District.

The Contractor shall not install any item of machinery or process equipment until he has delivered to the District a copy of the manufacturer's installation instructions. This includes equipment furnished by the District. Prior to final acceptance, the Contractor shall furnish to the District six complete bound sets of Operating Instructions, Maintenance Instructions, and Parts Lists for all such equipment.

After all acceptance tests have been completed by the Contractor and District, including existing equipment and equipment furnished by the District, but prior to final acceptance, the Contractor shall recheck all equipment for proper alignment and adjustment, check oil levels, relubricate all bearings and wearing points, and in general, assure that all equipment is in proper condition for regular continuous operation.

F-33. INSPECTION AND TESTING OF MATERIALS

A. Accepted Standards. All materials and equipment used in construction of the project shall be subject to inspection and testing in accordance with these contract documents. The laboratory or inspection agency shall be selected by the District. The District will pay for all laboratory inspection service direct and not as a part of the Contract.

B. Inspection. All materials furnished and all work done under these specifications shall be subject to inspection. Work done in the absence of prescribed inspection may be required to be torn out and replaced under the proper inspection, and the entire cost of tearing out and replacement, including the cost of all materials furnished by the District and used in the work torn out, shall be borne by the Contractor, whether the work torn out is found to be defective or not.

F-34. DEFECTIVE WORK OR MATERIAL

The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract as herein prescribed. If the work, or any part thereof, shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good such defect without compensation in a manner satisfactory to the District.

If any materials furnished and brought to the work site by the Contractor for use in the work or selected for the same by him, are not in conformity with the specifications, the Contractor shall remove them from the job site.

If the Contractor shall fail or neglect to make ordered repairs of defective work or to remove unsuitable materials from the work within ten (10) days after service by the District of any order to do such repair work or remove such materials, the District may make the ordered repairs or remove the unsuitable materials and deduct the cost thereof from any monies due the Contractor.

The District may accept defective Work instead of requiring its correction or removal and replacement. In such case, if acceptance occurs prior to the making of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents, including appropriate reduction in the Contract Price covering the value of such accepted defective Work and the additional costs the District may incur on account of such defective Work.

F-35. ACCESS TO WORK

The District shall at all times and for any purpose have access to the work and the premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefore. The District shall, at all times, have access to all places of manufacture where machinery or materials are being manufactured, produced, or fabricated for use under these specifications. The Contractor shall, whenever so requested, give the District access to the proper invoices, bills of lading, etc., and shall provide scales and assistance for weighing, or assistance for measuring any of the materials.

PAYMENT TO CONTRACTOR

F-37. QUANTITIES OF ESTIMATE

A. The estimated quantities of work to be done and materials to be furnished under this Contract shown in any of the documents including the Proposal, are given only for use in comparing bids and to indicate approximately the total amount of the Contract. The right is reserved except as herein otherwise specifically limited to increase or decrease the estimated quantities as may be deemed reasonably necessary or desirable by the District to complete the Work. Any such increase or decrease shall not give cause for claims or liability for damages.

The Contractor shall furnish an itemized breakdown of the Contract price of all lump sum bid items for the District's approval. The breakdown shall include quantities, unit prices and any other information required, in sufficient detail, to enable it to be used by the District in preparing monthly progress estimates.

Unit prices for pipelines may be broken down as allowed by the specification section for the installation of the pipeline. All other costs not specifically shown by an item shall be prorated among the applicable items listed. No progress payments will be made until this breakdown is submitted by the Contractor pursuant to section titled Construction Schedule and Periodic Estimates and approved by the District. EN-29, Breakdown of Contract Price or Schedule of Values (from Section 01026), whichever is required, shall be submitted by the Contractor and approved by the District by the tenth (10th) of the month to allow processing of the monthly pay estimate. Submittal and approval of EN-29 or Schedule of Values beyond the tenth (10th) of the month will result in the pay estimate being processed the following month. Payment for pipe delivery shall be based on submitted verifiable invoices for the pipe from the pipe manufacturer.

B. No Payment for Temporary Works. Compensation for all temporary works and/or services, facilities, equipment, or material necessary or required to execute the work in accordance with the provisions of the Contract shall be considered as having been included in the prices stipulated for the appropriate items of work.

F-47. COMPLETION AND ACCEPTANCE

The Work will be inspected by the District for acceptance upon receipt of the Contractor's written representation that the Work has been completed.

If, in the District's judgment, the Work has been completed and is ready for acceptance, it will so certify the completion of the work.

All work shall be guaranteed by the Contractor against defective workmanship and materials furnished by the Contractor for a period of 1 year from the date the Work was completed. The Contractor shall replace or repair any such defective work in a manner satisfactory to the District, after notice to do so from the District, and within the time specified in the notice. If the Contractor fails to make such replacement or repairs within the time specified in the notice, the District may perform this work and the Contractor's sureties shall be liable for the cost thereof.

F-50. SUBSTANTIAL COMPLETION

At the discretion of the District, part or all of the project may be placed into operation prior to full completion of the work. If applicable, the District may not assess liquidated damages to that portion of the work, after the date of substantial completion.

PERSONNEL

F-56. ACCIDENT PREVENTION - PUBLIC SAFETY

Precaution shall be exercised at all times for the protection of persons (including employees) and property, and hazardous conditions shall be guarded against or eliminated. The Contractor shall make adequate provisions, subject to the approval of the District, to protect the project and the Contractor's facilities from fire, flooding, theft, and vandalism, and the public from exposure to injury.

During the performance of the Work the Contractor shall erect and maintain temporary fences, bridges, railings, and barriers and shall take all other necessary precautions and place proper guards for the prevention of accidents; shall put up and keep suitable and sufficient lights and other signals. The Contractor shall indemnify and save harmless the District from all damages and costs to which it may be put by reason of injury to person or property resulting from the Contractor's negligence or carelessness in the performance of the work, or in guarding the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the Contractor or his agents.

Nothing in this section shall be construed to impose tort liability on the District.

End of Section F

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EASTERN MUNICIPAL WATER DISTRICT
Clinton Keith Road Extension
Warm Springs Creek Bridge 14" Water Pipeline Improvements

SECTION SC - SPECIAL CONDITIONS
SPECIAL PROVISIONS

SC-01. **Section F – General Conditions .** This project is being bid and administered by the County of Riverside, Transportation Department. Any reference to the word **DISTRICT** in Section F – General Conditions of these specifications shall mean **County of Riverside, Transportation Department**. Eastern Municipal Water District **shall not be considered the OWNER** of this project during the bidding and construction phases.

SC-02. **Specification Precedence .** All the requirements contained within the main bid specification and within County of Riverside, Transportation Department Standards and Specifications shall supersede all requirements within EMWD Section F, with the exception of language that pertains to EMWD's water and recycled water facilities and appurtenances.

SC-03. **Safety. Safety of all activities in connection with the work is of paramount and overriding importance. See Section 01000 - General Safety Requirements for details.**

A preconstruction safety conference shall be scheduled prior to the preconstruction conference to review the respective safety requirements and to discuss implementation of all health and safety provisions related to this project. The Contractor and District representatives shall be present.

Please note that the District reserves the right to suspend the work wholly or in part, for any time period as the District representative deems necessary, due to unresolved safety disputes. See Section 01000 - 1.04.

No additional compensation or contract time will be allowed for the period the work is wholly or in part suspended.

Should the contractor continue with the disputed work after having received a written notice of suspension, any work performed by the Contractor during the suspension shall be considered as having been done by the Contractor at the Contractor's own risk as a volunteer, and shall not entitle the Contractor to compensation or any other rights under the contract.

The Contractor shall submit an Injury and Illness Prevention Program and a Project Specific Safety Plan to the District at the pre-construction conference. The Contractor shall not begin work until the above referenced documents have been

accepted by the District.

SC-04. Scope of Work . Under these Specifications the Contractor shall furnish, install and perform all construction of 14-inch diameter CML&C potable water pipeline through the bridge including all necessary appurtenances such other items or details, not mentioned above, in the area of County of Riverside that are required by the contract drawings, Standard Specifications or the Special Provisions. All work shall be performed in accordance with these specifications and contract drawings

SC-05. Location of Contract Work Site. The contract work site is located in the County of Riverside. The project is located in a new segment of Clinton Keith Road extending from Meadowlark Avenue to Trois Valley Street. Refer to vicinity map and location map on title sheet of contract drawings.

SC-06. Construction Water. For work under this specification, the Contractor shall arrange for and pay for construction water. The contractor shall make arrangements for metering its use from Eastern Municipal Water District (EMWD). The contractor shall coordinate with the EMWD inspector for the location of closed EMWD facilities within the project limit for the availability of EMWD water.

Contractor shall provide all necessary piping and appurtenances, including pumps, to convey water to the work site. Arrangements for water from sources other than EMWD shall be the sole responsibility of the Contractor, and no additional compensation will be allowed.

SC-07. Preconstruction Conference. The Contractor shall schedule a Preconstruction Conference with Eastern Municipal Water District (EMWD) prior to the start of any work within EMWD facilities. Please contact Michele Burris @ (951) 928-3777 extension 4830 to schedule the preconstruction conference. City of San Jacinto representative, the Contractor and sub-contractor for EMWD facilities construction items to attend.

The following items shall be presented at the preconstruction conference by the Contractor:

(1) Set of signed, approved EMWD plans for water

(2) A copy of materials list stating the manufacturer and model number

(3) Copy of cost breakdown

(4) Three (3) copies of submittals on pipe used with size and cover letter

(5) Copy of Recorded Easement, if any is required

(6) Copy of Contractor's license (A or C-34 only)

(7) Subcontractors list. *Note:* Each contractor must be licensed according to work performed.

(8) Construction Schedule with start date, milestones and finish date

(9) Copy of Annual Trench Shoring/Excavation Permit

(10) Insurance certificate naming EMWD as additional insured

(11) Injury and Illness Prevention Program

(12) EN-84: Specific Operating Safety Procedures (see section 01000)

SC-08. Or Equal Substitutions. Products of manufacturers listed as equals to those specified must be submitted for review and approval by the District not later than the tenth (10th) day preceding the date for receipt of bids.

SC-09. Control Density Fill (CDF). The Contractor will be required to use CDF, in accordance with Section 02252 as backfill in areas under and around existing mainline utilities, and all utility crossings of the proposed underground piping and appurtenances. CDF shall be placed from the bottom of the excavation to the center grade of the utility, and shall extend five feet each side of the existing facility. All costs associated with furnishing and placing CDF shall be included in the respective bid item.

SC-10. Reference to District's Standard Drawings and Detailed Provisions. Any and all referenced Standard Drawings and Detailed Provisions shall be considered part of the contract drawings and specifications. All referenced Standard Drawings and Detailed Provisions of the District are available from the District upon request. The Contractor shall not be entitled to any compensation due to referenced documents not included in the Specifications and Contract Drawings.

SC-11 . Construction Survey and Soils Tests. Upon Contractor's request, RCTMLA will provide construction survey and soil/compaction testing for the project. However, any cost of re-staking or re-compaction due to the Contractor's negligence will be at the Contractor's expense. A 48-hour notice is required for survey and soil services.

SC-12. Locator Wire. Location wire is to be placed over all pipelines to be installed on this project as specified in Detail Provision Section 02718 and Standard Drawing B-656. After all trench backfill operations are complete, the District shall pay for and conduct the locatability test to confirm that the wire is continuous. The Contractor shall be responsible for all costs to confirm, locate and repair any breaks in the location wire identified in the locatability test. In addition, the Contractor shall reimburse the District for all costs to retest repaired sections of the wire. The Contractor is advised to use care in the installation and backfilling operations to prevent damage to the wire.

SC-13. **Provisions for Securing of Trenches**. Before making any excavation or trench 5' or more in depth, Contractor shall submit to the District completed Trench Shoring Submittal form EN-57 in accordance with Detailed Provision Section 02201 1.03D.

Trenches in the unpaved street must be backfilled and compacted to 95% relative compaction minimum at the end of each word day an in accordance with the jurisdictional agencies encroachment permit. The Contractor shall provide complete unobstructed access to each driveway at all times. Cost associated with securing of trenches shall be included in the bid and no additional compensation will be allowed.

SC-14. **Records of Construction.** Contractor shall keep and maintain, at the job site, one record set of Construction Drawings as specified in the General Conditions, Section F-Labor and Construction, F-08 "Reports, Records, and Data".

SC-15. **Additional Insured.** The Contractor shall include Eastern Municipal Water District (EMWD) as additional insured as part of this contract.

SC-16. **Sequence of Construction.** The proposed sequence of construction is:

A. Construct rough grade for road per the County of Riverside approved street improvement plans.
B. Install pipeline per these EMWD approved plans and specs.
C. Construct road finished grade per approved County of Riverside street improvement plans.

SC-17. **Fugitive Dust and Overspray.** The Contractor shall comply with all requirements of the South Coast Air Quality Management District (SCAQMD) Rule 403. Contractor is responsible for and shall employ an approved method for dust control monitoring on the job site and shall comply with Part 3.02A, "Dust Abatement" of Section 02201-7, "Construction Method & Earthwork" of these specification.

SC-18. **Disposal of Excess Excavated or Removed Material.** All excess excavation or removed material shall be the property of the Contractor and shall be removed and disposed away from the project site to an approved disposal area through the County or City. In no instance shall these soils become a public nuisance or threat to public safety.

All cost associated with disposal of excess excavated or removed material shall be included in the bid and no additional compensation will be allowed.

SC-19. **Protection of Buried Metal Appurtenances.** Besides epoxy coated valves or fittings, all metal appurtenances, including restraint fittings, shall be wax taped. The wax-tape coating shall conform to AWWA C217, and shall consist of three parts: surface prime, wax-tape and outer covering:

1. The prime shall be a blend of petrolatum, plasticizer and corrosion inhibitors having a paste like consistency such as Trenton wax-tape prime, or equal.

2. The wax-tape shall be a plastic-fiber felt tape, 50 to 70 mils thick, and saturated with a blend of petrolatum, plasticizer and corrosion inhibitors that is easily formed over irregular surfaces such as Trenton #1 wax-tape, or equal.

3. The outer covering shall be plastic wrapper consisting of three 50 gauge, clear polyvinylidene chloride, high cling membranes wound together as a single sheet such as Trenton poly-ply, or equal.

4. Fusion bonded epoxy coated valves and fittings shall be closely inspected prior to installation. Any scratches or damages shall be recoated to manufacturer's standards or 3-part wax tape system.

In addition to the above, alkalized backfill shall be used within the pipe zone and above/around all steel appurtenances (including restraints), and it shall consist of 50 LBS of hydrated lime per cubic yard of sand.

SC-20. **Local Conditions.** Contractor shall assess, by personal investigation, local conditions affecting the work. Neither the information contained in this section nor that derived from any maps or plats, or from District employees shall act to relieve the Contractor from any responsibility herein or from fulfilling any and all the terms and requirements of this Contract.

Nuisance water, such as rainfall, irrigation water, or local surface runoff may occur within the construction areas during the period of construction under this contract. The Contractor, by submitting his bid, will be held to have investigated the risks arising from such conditions and shall take all due measures to prevent delays in progress of the work caused by such conditions.

SC-21. **Casing Spacers and Casing End Seal.** Factory manufactured casing spacers shall be installed on the 14-inch CML&C carrier pipe as it passes through a casing pipe at each end of the bridge. Wooden skids will NOT be allowed as an alternative. Casing spacers shall be Model S18 or SIM as designed and manufactured by Advance Products & Systems, Inc., Lafayette, LA or Model CSC as manufactured by CCI Pipeline Systems, Inc., Baton Rouge, LA.

Casing spacers shall be bolt-on style with a shell made of at least two halves. The band material shall be manufactured of a minimum 14 gauge hot rolled, pickled and oiled steel and 10 gauge risers when needed. The band and risers shall have a copolymer-based thermoplastic coating with a finish of at least 10-15 mil thickness. The runners shall be at least 7 inches long for S18 and SIM models and shall be manufactured of high abrasion resistant and low co-efficient of friction, glass filled polymer.

The casing spacers shall have a flexible EPDM liner having a minimum thickness of 0.090" with a hardness of Durometer "A" 85-90. The liner shall have a rating of no less than 60,000 VPM and water absorption of 1% maximum. All hardware is to be electro-plated steel.

A casing end seal shall be installed at each casing. The end seal shall be of a "wraparound" style and be manufactured of 1/8-inch thick neoprene rubber, for chemical resistance and resiliency. Stainless steel bandings shall be provided with 100% non-magnetic worm gear mechanism. The end seal shall have butyl mastic strips to seal edges, and be designed to facilitate installation when the carrier line has already been installed in the casing. Each model shall be made of 60 durometer synthetic rubber and be similar or equal to Advance Products & Systems (APS) Inc. Standard Model AW Wraparound casing end seal or CCI Pipeline Systems Model ESW End Seal.

SC-22. **Steel Casing for Pipeline thru Bridge Abutment.** Furnish and install steel casing pipe for conveying water pipeline under the proposed approach slab. Casing shall be of the size and length indicated on the drawings and installed as shown on the drawings. The steel casing shall be Epoxy Coated per specifications section 09940 for corrosion protection.

SC-23. **CML&C and CML&P Pipe.** Install CML&C steel pipe through the pipe casing and bridge abutments to the flexible expansion joints. Install CML&P steel pipe between each of flexible expansion joints as shown in the Construction Drawings per AWWA and District standards. The Contractor shall submit a coating plan to the District, prior to any field work, which will demonstrate the full coating of the CML&P steel pipe as intended per specification section 09900. Where access will be limited in the future (i.e. bent openings and where the vertical clearance in the bridge cell is less than 36"-inches), besides the protective coating applied per specification section 09900, the CML&P steel pipe shall be wax taped. The wax tape system shall conform with SC-19.

SC-24. **Stainless Steel Pipe Hangers.** Stainless steel pipe hangers for the Warm Springs Creek bridge crossing shall be designed to support the load of 14-inch DIP with water inside. These hangers shall be similar and equal to Cooper B-Line, model B3102-14, for ductile iron pipe, and shall be furnished with cross bolt sleeve.

SC-25. **Hydrostatic Test Pressure.** The air release valves shall be isolated during the pressure test. When the pressure test is complete, the air release valves may be reconnected to the system for normal service.

Full compensation for conforming to the requirements of this special condition, not otherwise provided for, shall be considered as included in the prices paid for the various contract items of work involved, and no additional compensation will be allowed therefore.

End of Section SC

EASTERN MUNICIPAL WATER DISTRICT

Clinton Keith Road Extension
Warm Springs Creek Bridge 14" Water Pipeline Improvements

SECTION P - CONTRACT DRAWINGS

P-01. General. The location of the work, its general nature and extent, the outline of the land owned or controlled by the District and the form and general dimensions of the facilities (i.e. pipelines, appurtenances, etc.) are as shown on the drawings attached and made a part of this Specification as listed below.

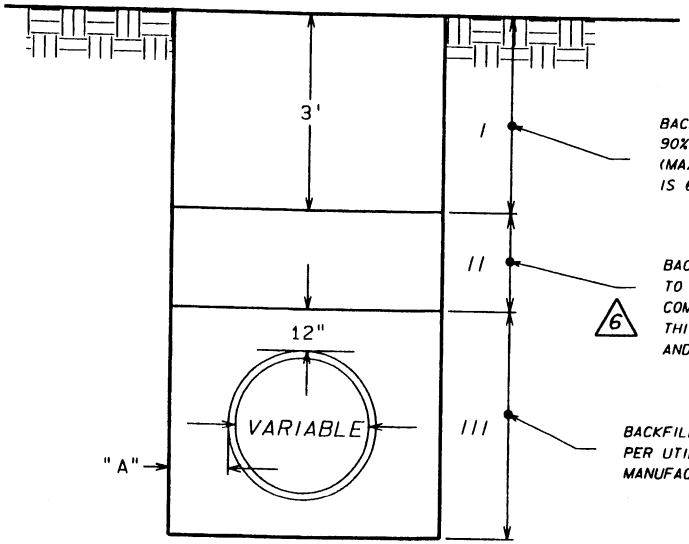
P-02. Standard Drawings.

Drawing Number	Drawing Title
B-286B	Trench Backfill
B-408	Water Pipe Installation
B-563	Steel Pipeline Pipe Pad or Coupling for Cast Iron Fittings
B-575	Steel Pipe Casing Water Pipeline
B-656	Locator Wire Installation
B-659	Air Test Details
B-660	Test Stations: Insulated Joint and Insulated Joint at Valve
B-662	Test Stations: Insulated Joint and Insulated Joint at Valve

P-03. Construction Drawings.

Drawing Number	Drawing Title
D-37363	Title Sheet
D-37364	Location & Vicinity Map, Notes, Legend & Notes
D-37371 A	Plan & Profile STA. 299+46.69 to STA 303+82.68

UNSURFACED MEDIANS, ROADSIDE STRIPS, & EASEMENTS

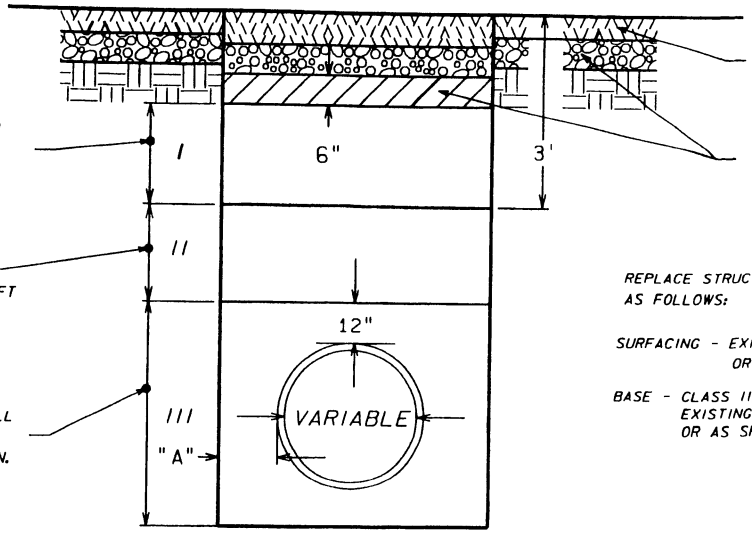


BACKFILL COMPACTED TO 90% RELATIVE COMPACTION (MAXIMUM LIFT THICKNESS IS 6 INCHES).

BACKFILL COMPACTED TO 90% RELATIVE COMPACTION. MAXIMUM LIFT THICKNESS WHEN PONDING AND JETTING IS 2 FEET. (6)

BACKFILL AND UTILITY BACKFILL PER UTILITY COMPANY OR MANUFACTURER'S SPECIFICATION.

UNSURFACED ROADWAYS, AND SURFACED STREETS & EASEMENTS



SURFACING (EXCLUDING GRAVEL ROADS).

BASE MATERIAL AND SUB-GRADE, COMPACTED TO 95% RELATIVE COMPACTION.

REPLACE STRUCTURAL SECTION AS FOLLOWS:

SURFACING - EXISTING THICKNESS PLUS 1" OR 3" MINIMUM

BASE - CLASS II, THICKNESS SHALL EQUAL EXISTING BASE MATERIAL, 4" MIN. OR AS SPECIFIED

CLEARANCE "A"

1. PIPE SIZES THROUGH 12" : "A" = 6" - 9"
2. PIPE SIZES OVER 12" : "A" = 1' - 0" MIN.

I. STRUCTURAL ZONE
II. INTERMEDIATE ZONE
III. PIPE AND UTILITY ZONE

NOTE: WHEN A FIRM FOUNDATION IS NOT ENCOUNTERED, DUE TO SOFT, SPONGY, OR OTHER UNSUITABLE MATERIAL, SUCH MATERIAL SHALL BE REMOVED TO THE LIMITS DIRECTED BY THE ENGINEER, AND THE RESULTING EXCAVATION BACKFILLED WITH PIPE BEDDING MATERIAL COMPACTED TO 90% RELATIVE COMPACTION.

REVISIONS

NO.	DATE	INITIAL	DESCRIPTION	APP'D	DATE
5	7/9/98	KER	REVISED TO INCLUDE ALL PREVIOUS REVISIONS		
6	9/25/03	CM	REVISED COMPACTION REQUIREMENT		10/15/03

APPROVALS

	INITIAL	DATE
DESIGN	JJW	12/29/94
CONSTRUCTION		
INSPECTION	JCW	12/30/94
OPERATIONS		
SUBMITTED		

EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT
STANDARD DRAWING

TRENCH BACKFILL

REFERENCES: REFERENCE SA-40B
FILE I.D.: \\niagra api\eng\std drgs\b286b.dgn

SCALE: NTS
DRAWN BY JJW

RECOMMENDED Joseph D. Van Sickle 12/29/94
DIRECTOR OF ENGINEERING DATE

APPROVED G. Hoosito Rugge 12/30/94
ASST. GENERAL MANAGER, ENGINEERING DATE

B-286B (6)

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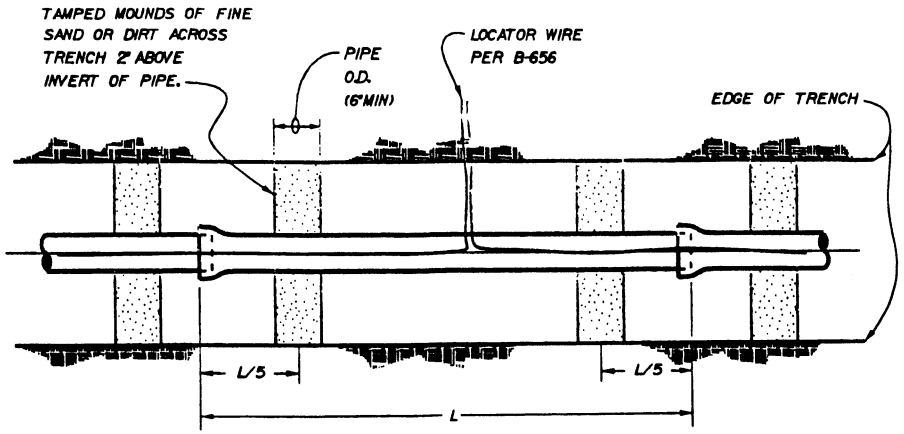
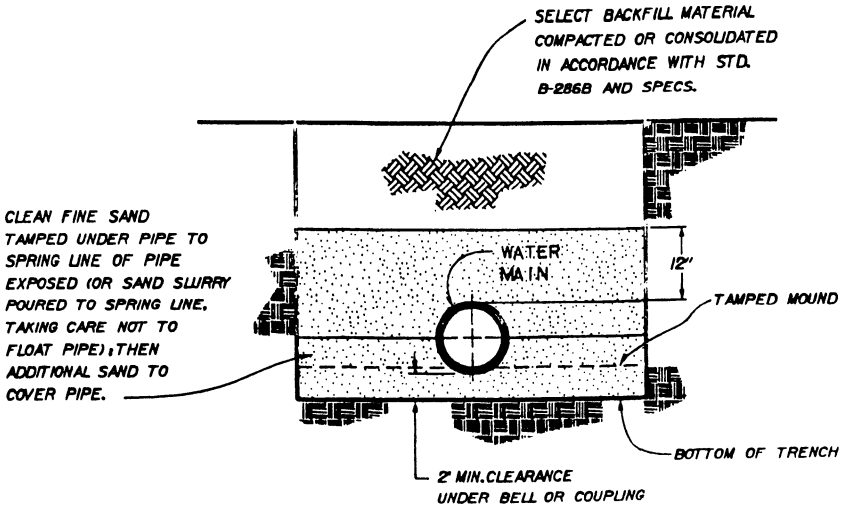
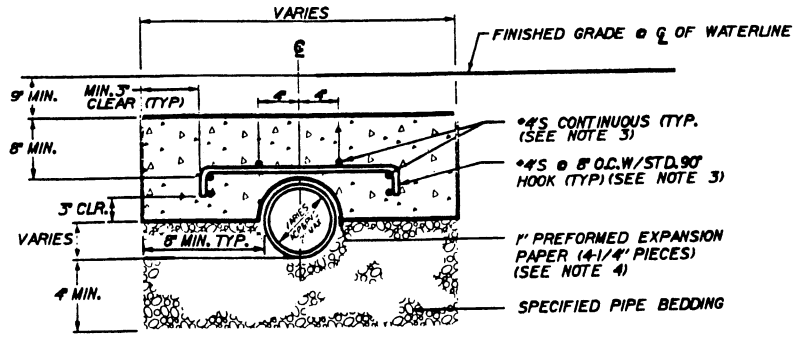


PLAN VIEW
TYPICAL PIPE INSTALLATION



TYPICAL TRENCH SECTION



CONCRETE CAP DETAIL

NOTES:

PIPE ZONE BACKFILL

2 1. THE BACKFILL MATERIAL IN THE PIPE ZONE MAY CONSIST OF MATERIAL FROM THE EXCAVATION WHERE THAT MATERIAL IS A UNIFORMLY GRADED SUITABLE SOIL FREE FROM STONES OR LUMPS EXCEEDING 3/4 INCHES IN GREATEST DIMENSION, VEGETABLE MATTER, OR OTHER UNSATISFACTORY MATERIAL AS APPROVED BY THE ENGINEER, HAVING A SAND EQUIVALENT VALUE OF 20 OR BETTER AND COMPACTED TO A RELATIVE COMPACTION AS RECOMMENDED BY THE MANUFACTURER OF THE PIPE.

CONCRETE CAP (FOR SHALLOW WATERLINE WHEN APPROVED BY ENGINEER)

2. CAP SHALL BE OF CLASS 'A' CONCRETE
3. REBAR SHALL HAVE A YIELD STRENGTH = 60 KSI
4. PREFORMED EXPANSION PAPER PER ASTM 1751

REVISIONS				
NO.	DATE	INITIAL	DESCRIPTION	APP'D	DATE
1	11/21/95	KER	REDRAWN W/CAD ON MYLAR		
2	5/20/02	JLG	REVISED NOTE 1	VJB	5/24/02

APPROVALS		
	INITIAL	DATE
DESIGN	VJB	5/8/96
CONSTRUCTION		
INSPECTION	JCW	6/11/96
OPERATIONS	ML	5/9/96
SUBMITTED		

EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT
STANDARD DRAWING

WATER PIPE INSTALLATION FOR A.C.P., P.V.C., & D.I.P.

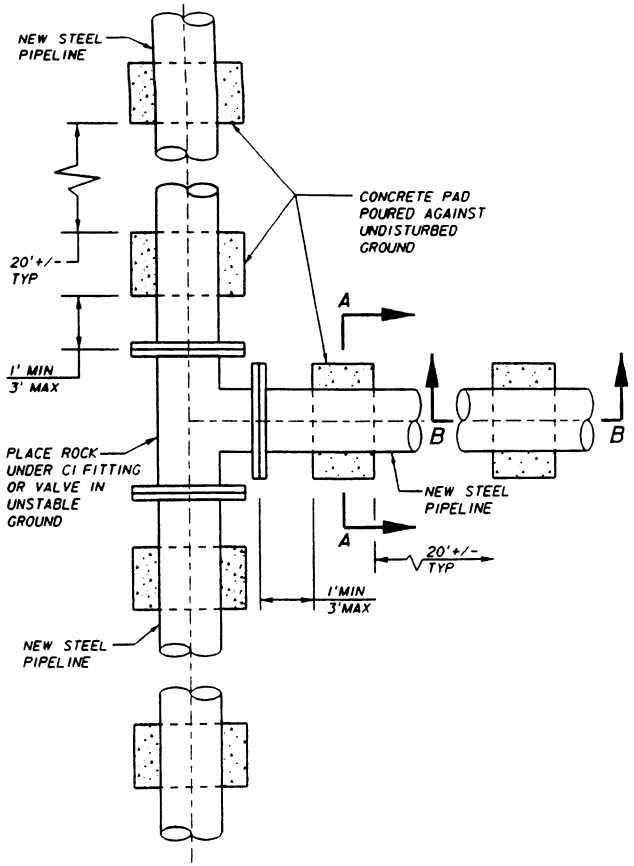
REFERENCES: SUPERCEDES A-537
FILE I.D.: STNDRDS/B408.DGN

SCALE: NONE
DRAWN BY K.E.R.

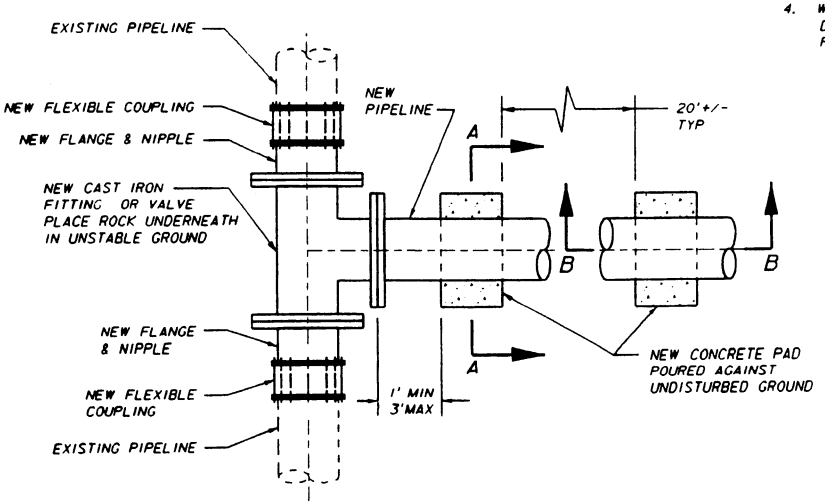
RECOMMENDED Charles J. Bachmann 6/11/96
DIRECTOR OF ENGINEERING DATE

APPROVED G. Hoolis Ruggo 6/11/96
GENERAL MANAGER DATE

B-408 2



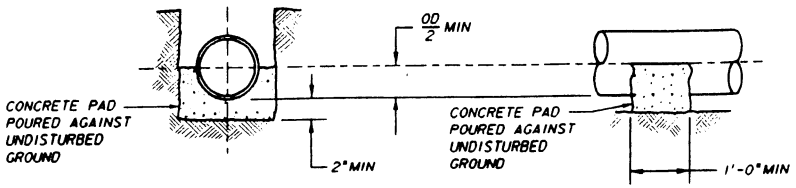
NEW STEEL PIPELINE INSTALLATION



CONNECTION TO EXISTING STEEL PIPELINE

NOTES

1. CLASS "C" CONCRETE PAD TO BE POURED AGAINST UNDISTURBED TRENCH WALL AFTER PIPE IS INSTALLED & FLANGE CONNECTION IS MADE TO CI FITTING OR VALVE.
2. PAD SHALL BE POURED TO AVOID INTERFERENCE WITH CONNECTIONS OR SPECIAL FITTINGS.
3. VALVES 12" & SMALLER SHALL BE SUPORTED AS SHOWN HEREON. REFER TO DWGS B-255 & DWG B-279 FOR ADDITIONAL SUPPORTS FOR VALVES 14" & LARGER.
4. WHERE VALVES ARE CALLED OUT ON CONSTRUCTION DRAWINGS BOLT VALVES TO CI FITTINGS & THEN PROCEED WITH SUPPORT ASSEMBLY AS SHOWN.



SECTION A-A

SECTION B-B

REVISIONS					APPROVALS		
NO.	DATE	INITIAL	DESCRIPTION	APP'D / DATE		INITIAL	DATE
1	11/18/98	GR	REDRAWN W/CADD ON MYLAR	WJB 4/27/99	DESIGN	JVS	
					CONSTRUCTION	RKM	
					INSPECTION		
					OPERATIONS	CAG	
					SUBMITTED	LAM	3/18/77

EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT
STANDARD DRAWING

STEEL PIPELINE PIPE PAD OR COUPLING FOR CAST IRON FITTINGS

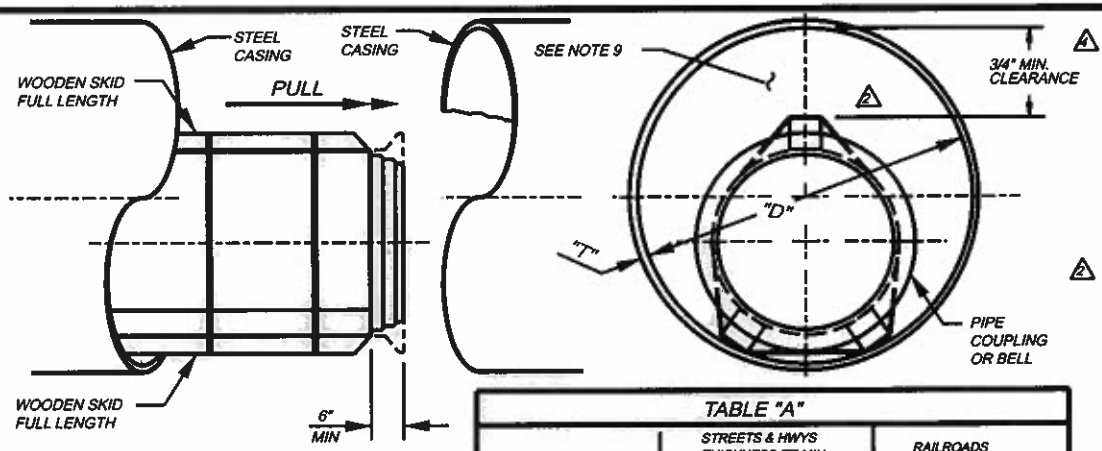
REFERENCES:
FILE I.D.: d_standards: b563.dgn

SCALE: NONE
DRAWN BY: MCA

RECOMMENDED _____ DIRECTOR OF ENGINEERING DATE

APPROVED Doyle F. Boen 3/18/77 GENERAL MANAGER-CHIEF ENGINEER DATE

B-563 1



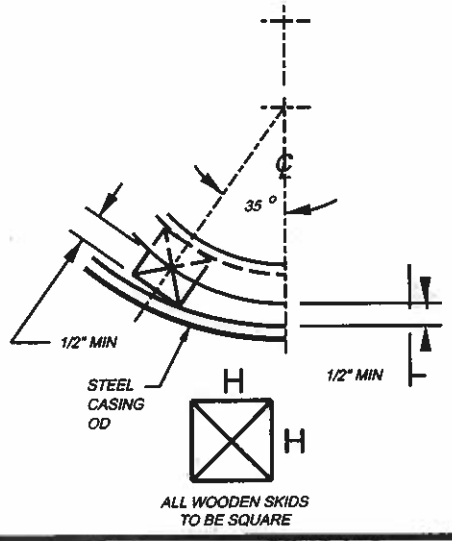


TABLE "A"

	STREETS & HWYS THICKNESS "T" MIN		RAILROADS
DIAMETER "D" (INCHES)	UP TO 150' LENGTH	OVER 150' LENGTH	THICKNESS "T" (MINIMUM)
4'-10" ID	1/4"	1/4"	4"-12":1/4"
12"-16" OD	1/4"	1/4"	14"-16":9/32"
18"-20" OD	1/4"	1/4"	18":5/16" 20":11/32"
22" OD	1/4"	1/4"	3/8"
24" OD	1/4"	1/4"	13/32"
26" OD	1/4"	1/4"	7/16"
28" OD	1/4"	1/4"	15/32"
30" OD	3/8"	1/2"	15/32"
32" OD	3/8"	1/2"	1/2"
34"-36" OD	3/8"	1/2"	17/32"
38" OD	3/8"	1/2"	9/16"
40" OD	1/2"	3/4"	9/16"
42" OD	1/2"	3/4"	9/16"
48"-60" OD	1/2"	3/4"	AS REQUIRED
62"-72" OD	3/4"	3/4"	AS REQUIRED

GENERAL NOTES

1. THE STEEL CASING SHALL BE INSTALLED BY MEANS OF JACKING OR DRY BORING, EXCEPT WHERE SPECIFICALLY NOTED ON THE PLANS TO BE INSTALLED BY OPEN TRENCH CONSTRUCTION.
2. CASING DIAMETER SHALL BE A MINIMUM OF 4 INCHES GREATER THAN THE OUTSIDE BELL DIAMETER.
3. MINIMUM CASING THICKNESS SPECIFIED IN "TABLE A" IS REQUIRED FOR CASING IN PLACE, AND DOES NOT ACCOUNT FOR CONSTRUCTION LOADS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE STRUCTURAL SUFFICIENCY OF THE CASING DURING CONSTRUCTION, AND ALSO THE METHOD OF INSTALLATION.
4. PRESSURE PIPELINES SHALL BE SUPPORTED ON PIPE SKIDS SUBJECT TO APPROVAL OF THE ENGINEER. CML&C PRESSURE PIPE MAY REST ON THE BOTTOM OF THE CASING, BUT SHALL NOT BE DRAGGED INTO POSITION WITHOUT PIPE SKIDS.
5. ALL SKIDS ARE TO BE SQUARE IN CROSS SECTION AND MAY BE MADE FROM REDWOOD, #2 OR BETTER DOUGLAS FIR, SOUND MATERIAL, TO BE WALMANIZED OR CREOSOTED (REDWOOD NEED NOT BE TREATED).
6. SKIDS SHALL BE ATTACHED TO PIPE BY STRAPPING WITH A STANDARD STRAPPING MACHINE TO HOLD SKIDS IN PLACE DURING PULLING OPERATIONS. USE STAINLESS BAND, OR METHOD OF "CLEATING" SKIDS TOGETHER, AS APPROVED.
7. FLEXIBLE PIPE (PVC, ABS, ETC.) SHALL HAVE SPACER GUIDE ALONG THE TOP TO PREVENT PIPE FROM FLOATING. PIPE WITHIN CASING TO BE BONDED TOGETHER AT THE JOINTS FOR AN INTEGRAL UNIT PER MANUFACTURER'S RECOMMENDATONS. TWO APPROVED FLEXIBLE COUPLINGS SHALL BE USED AT BOTH ENDS OF CASING.
8. NOTICE AS REQUIRED BY THE DISTRICT SHALL BE GIVEN PRIOR TO CONSTRUCTION, FOR THE DISTRICT INSPECTION OF CASING PIPE AND CARRIER PIPE INSTALLATION. THE AS BUILT LOCATION AND GRADE OF CASING PIPE SHALL BE APPROVED BY THE DISTRICT PRIOR TO INSTALLATION OF THE CARRIER PIPE. DEPARTURES FROM PLANNED LOCATION OR GRADE OF THE CASING PIPE SHALL REQUIRE A FIELD SURVEY OF CARRIER PIPE REDESIGN IF FEASIBLE, OR ABANDONMENT IN FAVOR OF A NEW INSTALLATION.
9. TOTAL ANNULAR SPACE SHALL BE GROUTED PER EMWD SPECS, SECTION 03604 UNLESS SPECIFIED ON CONSTRUCTION DRAWINGS.
10. ALL JOINTS ON STEEL CASING SHALL BE FULL WELD DOUBLE PASS

REVISIONS

NO.	DATE	INITIAL	DESCRIPTION	APP'D	DATE
1	11/20/98	GR	REDRAWN W/CADD ON MYLAR	VB	12/2/98
2	9/04/03	CM	REVISE NOTES & ADDED TOP SKID	JW	2/8/06
3	2/08/06	JJW	ADDED NOTE	SMM	04/14/10
4	4/14/10	RE	REVISED NOTE		

APPROVALS

	INITIAL	DATE
DESIGN	JWS	
CONSTRUCTION	BLM	
INSPECTION		
OPERATIONS	CAG	
SUBMITTED	LAM	6/20/72

EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT STANDARD DRAWING

STEEL PIPE CASING WATER PIPELINE

REFERENCES: ORIGINAL B-575 DRAWN 3/21/72

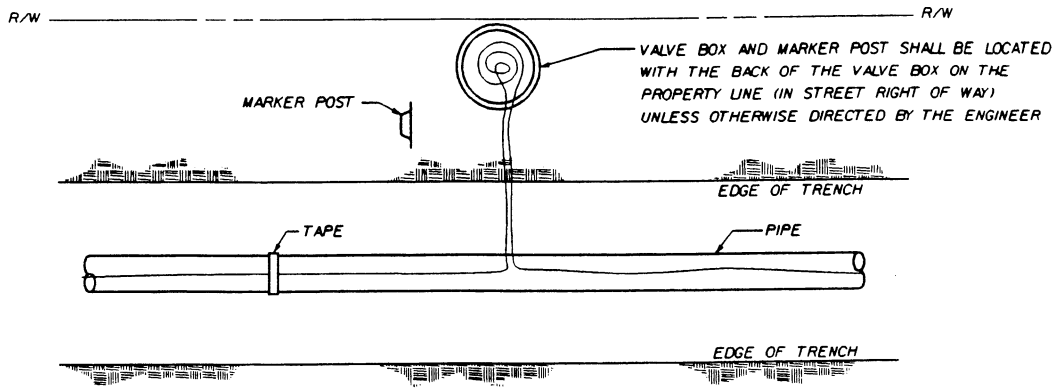
FILE I.D.: \kaua\lang\std dwgs\b575.dgn

SCALE: NONE

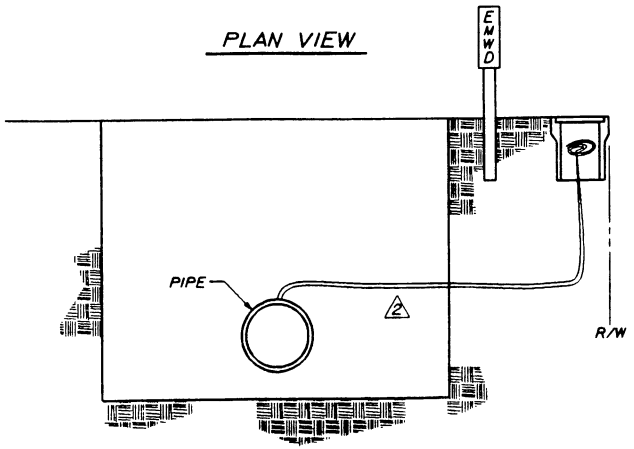
DRAWN BY McM

APPROVED _____ (DISTRICT ENGINEER AND CHIEF, ENGINEERING DIVISION) DATE _____

B-575 4



PLAN VIEW



TYPICAL TRENCH SECTION

NOTES:

1. LOCATOR WIRE TO BE 14 GAUGE SOLID COPPER WIRE UF, THWN, OR THHN.
2. LOCATOR WIRE SHALL BE BROUGHT TO THE SURFACE AT 660 FT OC MAX BY FIRE HYDRANTS OR INSTALL EMWD MARKER POSTS (B-665). GIVE STATIONS AT VALVE BOXES. (FOR TRACT CONSTRUCTION CHISEL "LW" IN FACE OF CURB IN LIEU OF MARKER POSTS).
3. LOOP 2 FEET OF WIRE IN VALVE BOX WITHIN 2 FEET OF FIRE HYDRANT OR EMWD MARKER POST.
4. WIRE TO BE CONTINUOUS STRAND.
5. LOCATOR WIRE SHALL BE INSTALLED OVER ALL WATERLINES. RECLAIMED WATERLINES AND FORCE MAINS WHETHER OR NOT TELEMETRY WIRE IS BURIED WITH THE PIPE.
6. USE CAST IRON COVER LABELED WATER, SEWER, OR RECLAIMED (RECLAIMED TO BE PAINTED LAVENDER).
7. FOR PIPE DEPTHS GREATER THAN 8 FT LOCATOR WIRE SHALL BE PLACED ABOVE PIPE AT MAX 8 FT DEPTH. MARKER TAPE SHALL BE PLACED 1 FT ABOVE THE LOCATOR WIRE.
8. (3) A LOCATIBILITY TEST IS TO BE PERFORMED ON ALL LOCATOR WIRES.
9. SPLICES TO BE DONE WITH A CRIMPABLE BUTT CONNECTOR.

REVISIONS					APPROVALS		
NO.	DATE	INITIAL	DESCRIPTION	APP'D / DATE		INITIAL	DATE
1	5/6/96	KER	REDRAWN W/CAD ON MYLAR	VJB 5/8/96	DESIGN	VJB	8/90
2	8/5/96	KER	REVISED WIRE LOCATION	VJB 8/6/96	CONSTRUCTION		
3	5/4/99	GR	REVISED NOTE 8	VJB 5/6/99	INSPECTION		
					OPERATIONS	MWA	8/90
					SUBMITTED		

REFERENCES: ORIGINAL B-656 CREATED 7/18/90 (JJW)
FILE I.D.: /USR/KARL/STNDRDS/B656.DGN

SCALE: NONE
DRAWN BY K.E.R.

RECOMMENDED Joseph Van Sichle 8/28/90
DIRECTOR OF ENGINEERING DATE

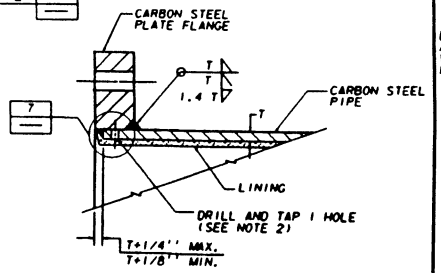
EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT
STANDARD DRAWING

LOCATOR WIRE INSTALLATION

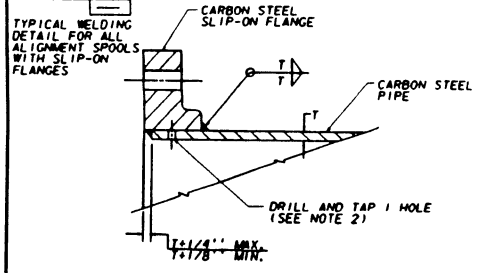
APPROVED William P. Plummer 8/31/90 B-656 (3)
CHIEF ENGINEER DATE

DETAIL 1

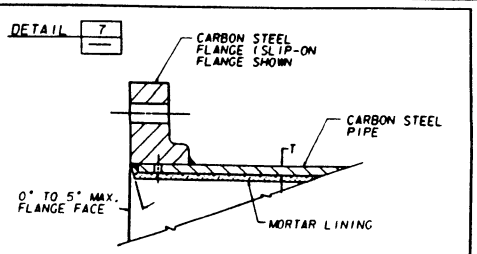


DETAIL 4

TYPICAL WELDING DETAIL FOR ALL ALIGNMENT SPOOLS WITH SLIP-ON FLANGES



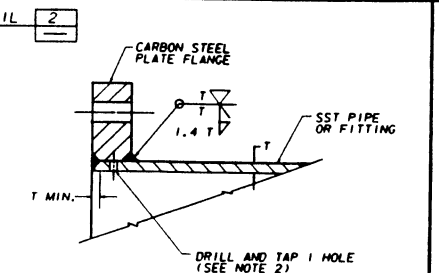
DETAIL 7



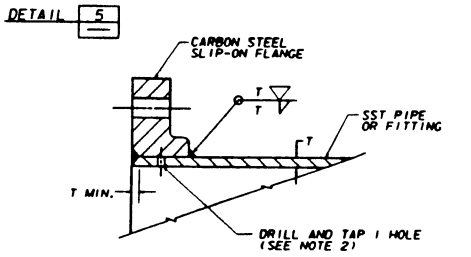
NOTES:

1. "T" INDICATES THE THICKNESS OF THE STEEL PIPE WHERE THE TYPICAL DETAIL IS CALLED OUT.
2. BEFORE WELDING, DRILL AND TAP NUMBER OF HOLES AS NOTED FOR 1/4" PIPE. CONTRACTOR TO PLUG WELD HOLES ON COMPLETION OF JOINT TEST.
3. DETAIL APPLIES TO EITHER COLLAR OR WRAPPER

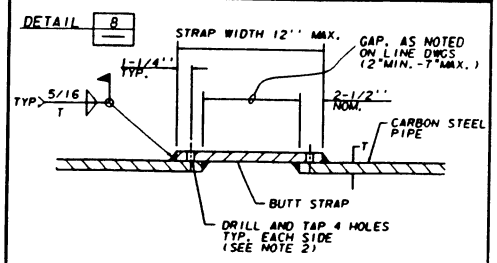
DETAIL 2



DETAIL 5

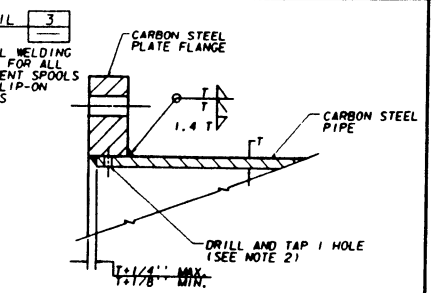


DETAIL 8

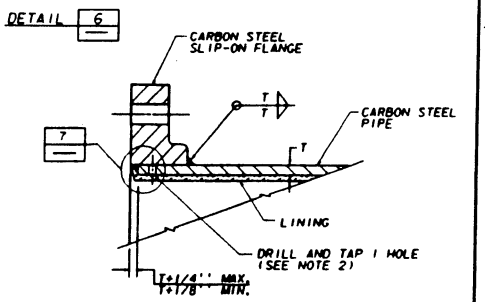


DETAIL 3

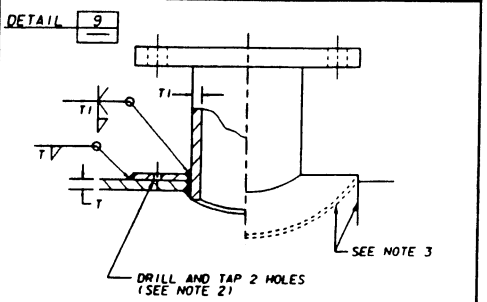
TYPICAL WELDING DETAIL FOR ALL ALIGNMENT SPOOLS WITH SLIP-ON FLANGES



DETAIL 6



DETAIL 9



REVISIONS				
NO.	DATE	DESCRIPTION	APP'D	DATE

APPROVALS		
	INITIAL	DATE
DESIGN	K.E.R.	1/18/96
CONSTRUCTION		
INSPECTION	R.P.K	1/18/96
OPERATIONS		
SUBMITTED	HJB	1/18/96

EASTERN MUNICIPAL WATER DISTRICT
STANDARD DRAWING

AIR TEST DETAILS

REFERENCES:

SCALE: NO SCALE

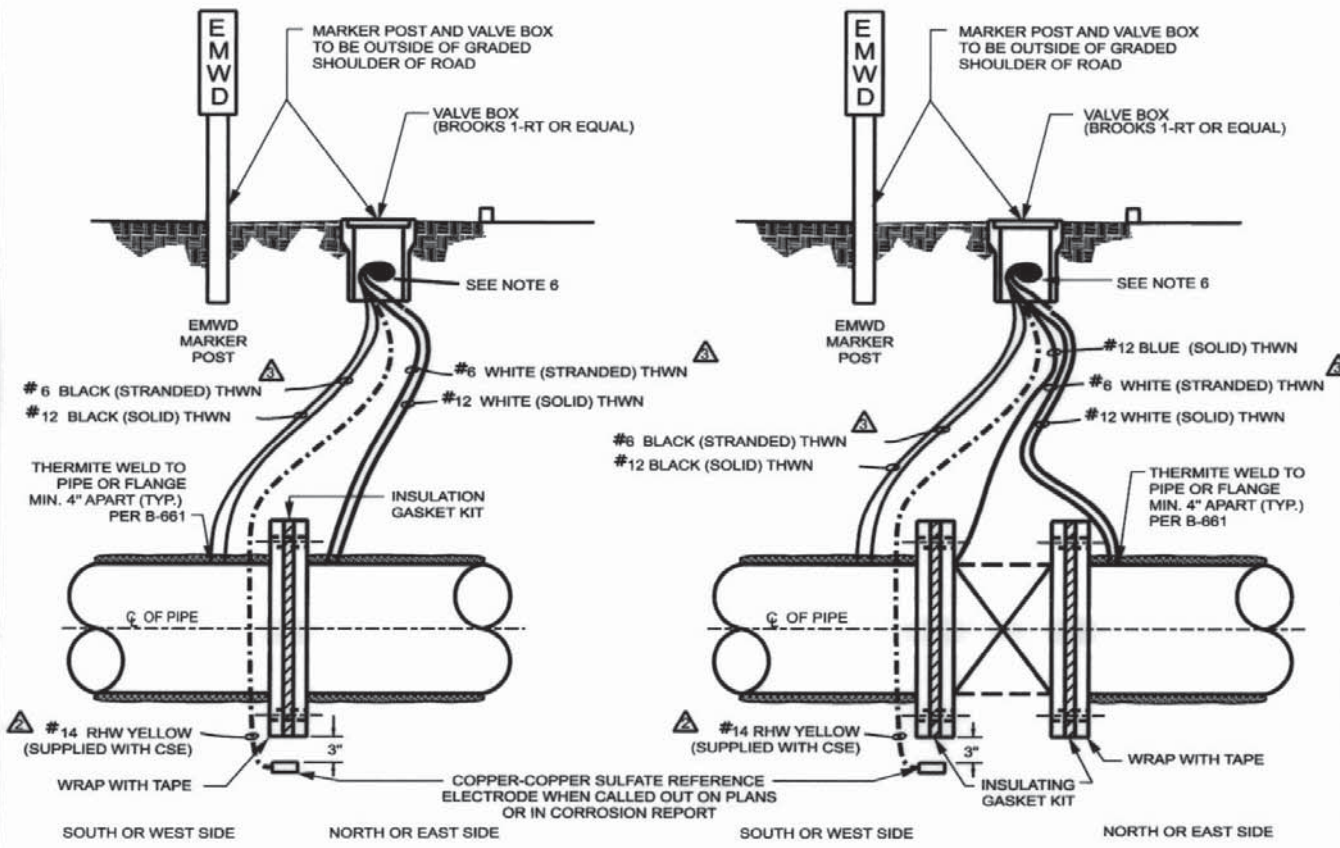
DRAWN BY: K.E.R.

RECOMMENDED Chad Bagley 1/19/96
DIRECTOR OF ENGINEERING — DATE

APPROVED [signature] 1/25/96
CHIEF ENGINEER — DATE

B-659

FILE ID: /USR/KARL/STANDARD/B659.DGN

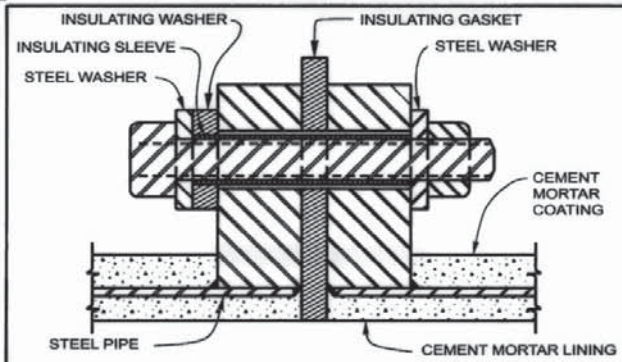


INSULATED JOINT TEST STATION

INSULATED JOINT AT VALVE TEST STATION

NOTES:

1. LEAD WIRES SHALL BE 3 FT DEEP THROUGH ROAD SHOULDER.
2. THE VALVE BOX SHALL BE LOCATED JUST OUTSIDE THE PROPERTY LINE (IN STREET R/W) EXCEPT AS OTHERWISE DIRECTED BY THE ENGINEER.
3. WHITE WIRES TO BE PLACED ON THE NORTH AND EAST SIDE OF INSULATED FLANGE OR VALVE.
4. PIPELINE SHALL BE ASSEMBLED IN TRENCH PRIOR TO THERMITE WELDING.
5. WIRE AND BONDED CONNECTIONS SHALL BE PROTECTED DURING FIELD MORTARING OF PIPE JOINTS.
6. TERMINATE ALL WIRES A MINIMUM OF ONE FOOT ABOVE GROUND LEVEL AND COIL EXCESS WIRE IN BOX.
7. SEE EMWD STANDARD SPECIFICATION SECTION 9810 "TAPE WRAP FOR INSULATED JOINTS" FOR MATERIALS AND INSTALLATION.
8. HMWPE WIRE INSULATION TO BE UL LISTED FOR U.S.E.
9. FOR WIRES ABOVE GROUND, TAG INDIVIDUAL WIRES FOR IDENTIFICATION PURPOSES, FOR BURIED WIRES, PLACE MARKER TAPE.



1. IF ANODES ARE INSTALLED, PLACE NON-INSULATED SIDE OF BOLT TOWARD ANODE.
2. DO NOT APPLY METALLIC OR OTHER NON-INSULATING PAINTS TO INSULATING PARTS OR OUTER EDGES OF FLANGES.
3. INSULATING SLEEVE TO BE 0.015" SHORTER THAN DISTANCE BETWEEN STEEL WASHERS WHEN BOLT IS FULLY TIGHTENED.
4. FOR PIPE 24" & LARGER, INSULATING WASHER TO BE "PYROX" OR OF EQUAL STRENGTH.
5. FLANGE INSULATION KIT MUST BE EMWD APPROVED AND MUST INCLUDE AN O-RING SEALING ELEMENT MANUFACTURED AS PART OF THE INSULATING GASKET.
6. FOR DISTRICT CONTRACT WORK: INSULATED FLANGED JOINT TO BE FACTORY ASSEMBLED WITHIN A PIPE SECTION AND TESTED, UNLESS OTHERWISE SPECIFIED.

INSULATED FLANGED JOINT DETAIL

REVISIONS					
NO.	DATE	INITIAL	DESCRIPTION	APP'D	DATE
1	12/11/96	KER	SUPERCEDES B-379 AND B-363	VJB	4/28/97
2	5/4/99	GR	REVISED #14 RHW COLOR	VJB	5/6/99
3	1/12/04	CM	REV. #6 BLACK & WHITE WIRE INSUL. TO THWN	VJB	1/12/04
4	8/31/07	RE	ADDED NOTE # 9	XML	12/18/07

APPROVALS		
	INITIAL	DATE
DESIGN	GLJ	1/23/97
CONSTRUCTION		
INSPECTION	JEW	4/23/97
OPERATIONS	LMc	1/28/97
SUBMITTED		

EASTERN MUNICIPAL WATER DISTRICT

REFERENCES: B-363, B-379 & B-661
FILE I.D.: \kaua\eng\std dwg\b660.dgn
SCALE: NONE
DRAWN BY K.E.R.

RECOMMENDED Michael G. Meyerpeter 1/24/97
PROJECT ENGINEER

APPROVED Charles J. Bachmann 4/25/97
ASST. GENERAL MANAGER OF ENGINEERING DATE

EASTERN MUNICIPAL WATER DISTRICT
STANDARD DRAWING

TEST STATIONS: INSULATED JOINT AND INSULATED JOINT AT VALVE

B-660 4

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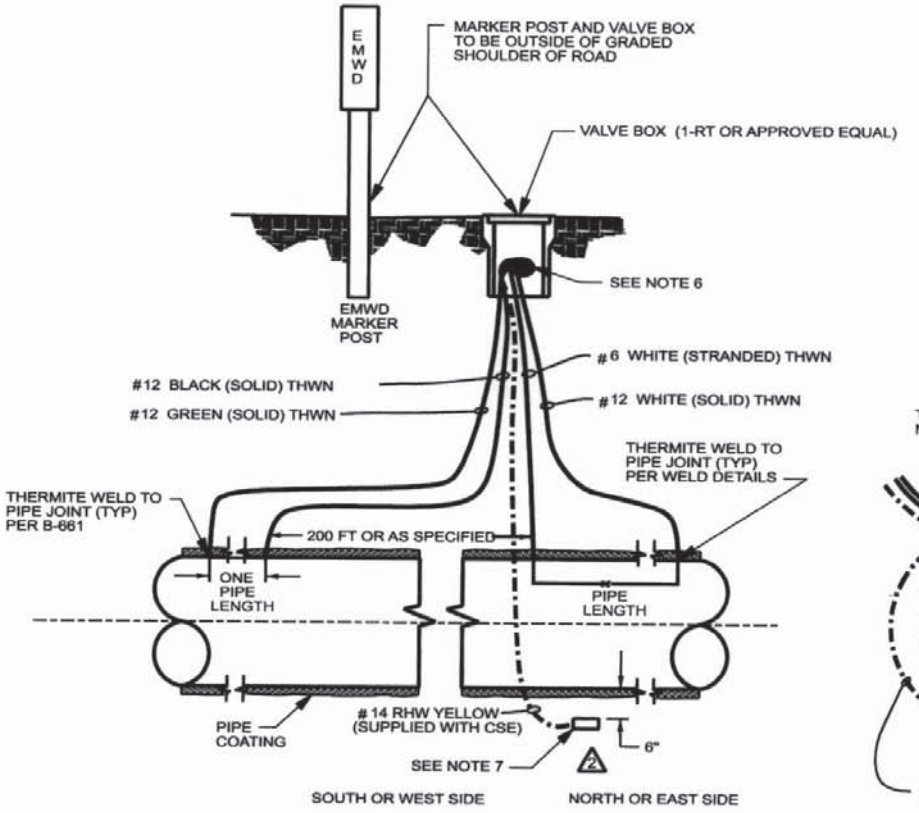
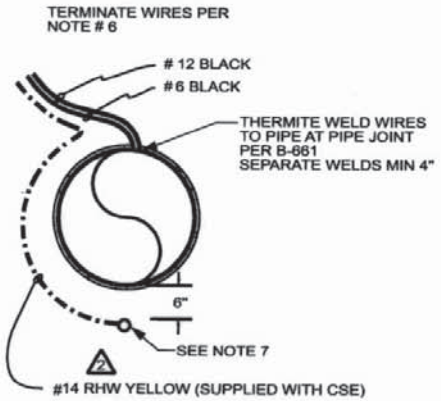
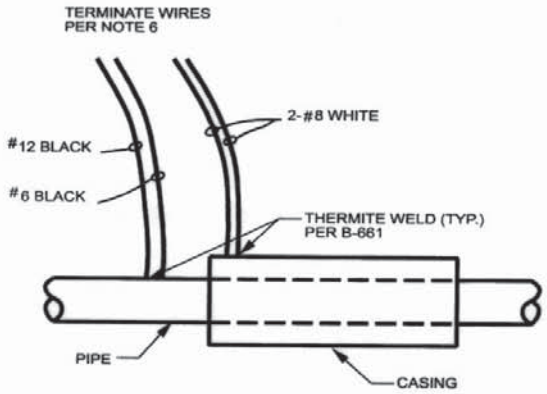


LINE CURRENT TEST STATION



BASIC TEST STATION



PIPE W/CASING TEST STATION

NOTES:

1. LEAD WIRES SHALL BE 36" DEEP THROUGH ROAD SHOULDER AND 24" OTHERWISE.
2. THE VALVE BOX SHALL BE LOCATED JUST OUTSIDE THE PROPERTY LINE (IN STREET R/W) EXCEPT AS OTHERWISE DIRECTED BY THE ENGINEER.
3. WHITE WIRES SHALL ALWAYS BE PLACED BELOW AND ON THE NORTH AND EAST SIDE OF THE TEST STATION.
4. PIPELINE SHALL BE ASSEMBLED IN TRENCH PRIOR TO THERMITE WELDING.
5. WIRE AND BONDED CONNECTIONS SHALL BE PROTECTED DURING FIELD MORTARING OF PIPE JOINTS.
6. TERMINATE ALL WIRES A MINIMUM OF 1 FT ABOVE GROUND LEVEL AND COIL EXCESS WIRE IN BOX.
7. COPPER-COPPER SULFATE ELECTRODE (CSE) INSTALLED ONLY WHEN SPECIFIED ON PLANS.
3. 8. FOR WIRES ABOVE GROUND, TAG INDIVIDUAL WIRES FOR IDENTIFICATION PURPOSES, FOR BURIED WIRES, PLACE MARKER TAPE.

REVISIONS

NO.	DATE	INITIAL	DESCRIPTION	APP'D	DATE
1	5/4/99	GR	SUPERCEDES B-582	VJB	5/6/99
2	5/4/99	GR	REVISED #14 RHW COLOR	VJB	5/6/99
3	10/29/07	RE	ADDED NOTE # 8	[illegible]	12/18/07

APPROVALS

	INITIAL	DATE
DESIGN	GLJ	1/23/97
CONSTRUCTION		
INSPECTION	JEW	4/23/97
OPERATIONS	LMc	1/28/97
SUBMITTED		

REFERENCES: B-661
FILE I.D.: \kaual\eng\std dwg\B662.dgn
SCALE: NONE
DRAWN BY KER

EASTERN MUNICIPAL WATER DISTRICT

EASTERN MUNICIPAL WATER DISTRICT STANDARD DRAWING

TEST STATIONS: LINE CURRENT, BASIC AND PIPE WITH CASING

RECOMMENDED Michael G. Meyerpeter 1/24/97
PROJECT MANAGER DATE

APPROVED Charles J. Bachmann 4/25/97
DIRECTOR OF ENGINEERING DATE

B-662

3

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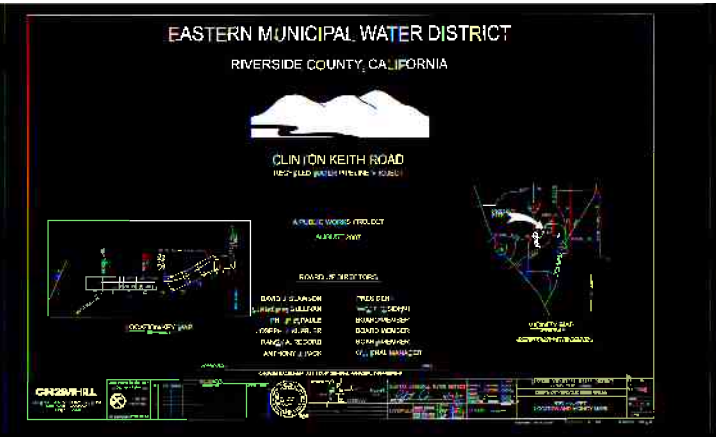
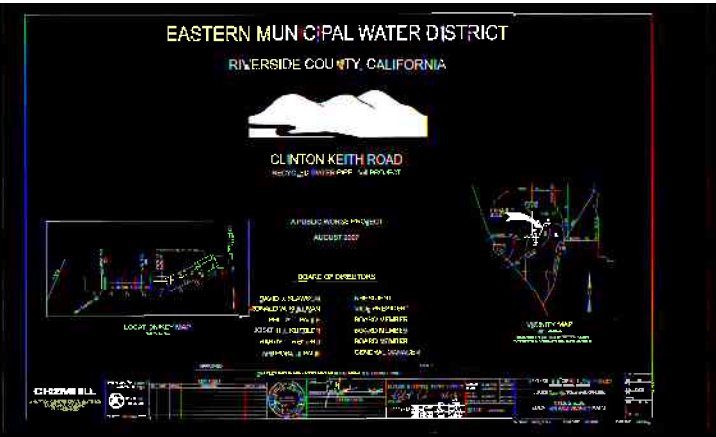
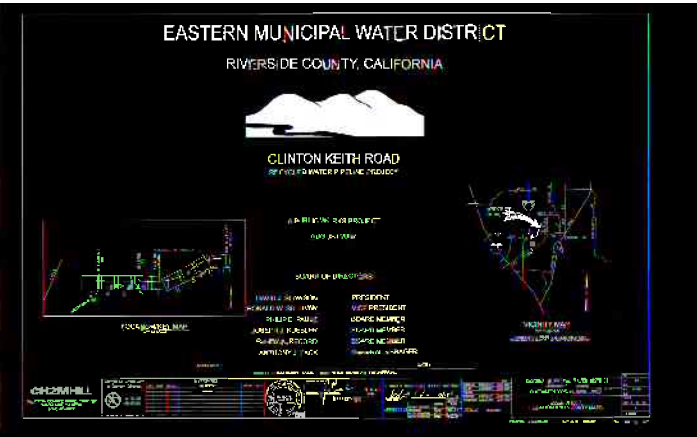
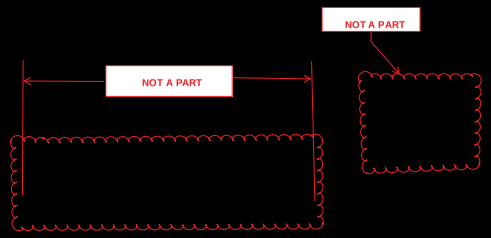








EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
CLINTON KEITH ROAD
A PUBLIC WORKS PROJECT
AUGUST 2007
BOARD OF DIRECTORS
PRESIDENT
VICE PRESIDENT
BOARD MEMBER
GENERAL MANAGER
LOCATION/KEY MAP
VICINITY MAP
CH2MHILL
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
CLINTON KEITH ROAD
A PUBLIC WORKS PROJECT
AUGUST 2007
BOARD OF DIRECTORS
LOCATION/KEY MAP
VICINITY MAP
CH2MHILL
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA
CLINTON KEITH ROAD
BOARD OF DIRECTORS
PRESIDENT
VICE PRESIDENT
BOARD MEMBER
VICINITY MAP
CH2MHILL
POTABLE
NOT A PART
NOT A PART
POTABLE

EMWD WATER NOTES

1. WATER PIPELINE AND APPURTENANT CONSTRUCTON SHALL BE IN ACCORDANCE WITH EMWD STANDARDS AND SPECIFICATIONS.
2. WATER SYSTEM PROFILE ELEVATIONS ARE TO CENTERLINE (CENTER GRADE) OF PIPE.
3. INSTALL LOCATOR WIRE OVER WATER MAIN PER STD. DWG. B-656
4. ALL STEEL CYLINDER PIPES SHALL BE BONDED AT RUBBER GASKET JOINTS IN ACCORDANCE WITH STD. DWG. B-638
5. ALL DESIGNATED PIPELINE WELDS SHALL BE FULL WELD DOUBLE PASSES AT EACH PIPE JOINT WITHIN DESIGNATED WELD LENGTH LIMITS.
6. SHOP DRAWINGS FOR CML&C SHALL BE SUBMITTED AND APPROVED BY EMWD PRIOR TO FABRICATION.
7. ALL CML&C STEEL PIPE SHALL BE CLASS 150 EXCEPT WHERE NOTED OTHERWISE. PIPE SHALL CONFIRM TO AWWA SPECIFICATIONS.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM 1983, ZONE6 (IMPERIAL), VERTICAL DATUM NAVD-88, BASED TOTALLY ON GPS CONTROL STATION "METZ" AND "ROSA" , EPOCH 1992.9.

BENCH MARK

RIVERSIDE COUNTY DESIGNATION (GPS 2002 RIV79 PM R7.60)
CHARACTER OF MARK (SET PK NAIL AND CALTRANS TAG (WASHER), FLUSH WITH PAVEMENT, LOCATED APPROXIMATELY ON CL RIV 79 IN THE CENTER OF A DOUBLE YELLOW STRIPED ISLAND, 35 m SOUTH OF BENTON RD.)
PT 1014 N2180099.27, E6295130.10, ELEV. 1343.41

NOTIFICATIONS

1. AT LEAST 48 HOURS PROIR TO COMMENCING CONSTRUCTION, CONTRACTOR SHALL NOTIFY:
   A. EASTERN MUNICIPAL WATER DISTRICT, (951) 928-3777, EXT. 4830
   B. UNDERGROUND SERVICE ALERT (USA), 1-800-227-2600
   C. ALL OTHER PERMIT AGENCIES
   D. ALL OTHER AFFECTED UTILITIES;
      1. RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT (951) 955-8885
   E. ANY OTHER CONFLICTING UTILITIES NOT USING USA

SYMBOLS LEGEND

W	EXISTING WATER PER D-XXXX
S	EXISTING SEWER PER D-XXXX
G	EXISTING GAS LINE
OHE	EXISTING OVERHEAD POWER
E	EXISTING POWER
FO	EXISTING FIBER OPTIC LINE

XX / NN — DETAIL NUMBER / SHEET NUMBER RW PIPELINE

B-XX / U-X — DETAIL NUMBER / SHEET NUMBER PER 2006 CALTRANS STANDARD PLANS

RECYCYLED WATER LEGEND

- RESILENT SEAT GATE VALVE FxF
- RESILENT SEAT GATE VALVE FxH
- EXISTING OR PROPOSED WATERLINE (BY OTHERS)
- FxH ADAPTOR
- B.O. (PA-1) HUB OR FLG ENDS PER CALLOUTS
- BLIND FLANGE
- HXH ECCENTRIC REDUCER
- RECYCLED OR POTABLE WATERLINE
- 2" AIR VAC/ AIR RELEASE ASSEMBLY (PB-9)

HOT TAPS

IF EXIST. W/L IS A.C.P. D.I.P. OR P.V.C.

HOT TAP EXISTING " W/L WITH " x " TAPPING SLEEVE WITH " FxF R.S.G.V. BY DISTRICT APPROVED SUB-CONTRACTOR AT CONTRACTOR'S EXPENSE. INSTALL FxH ADAPTOR, 1" CORP. STOP RESTRAIN (P.V.C. OR D.I.) OR WELD JOINTS (STEEL) AS REQUIRED.

ABBREVIATIONS

AV/AR	AIR VACUUM / AIR RELEASE VALVE	HXH	HUB BY HUB
ARV	AIR RELEASE VALVE	INV	INVERT
AC	ANIMAL CROSSING	LT	LEFT
BC	BEGIN CURVE	MH	MANHOLE
B.F.	BLIND FLANGE	MIN	MINIMUM
B.O.	BLOW-OFF	MAX	MAXIMUM
BOT	BOTTOM	N	NORTH
BV	BUTTERFLY VALVE	OHE	OVERHEAD ELECTRICAL
C.G.	CENTER GRADE	OD	OUTSIDE DIAMETER
CL	CLASS	OG	ORIGINAL GRADE
C	CENTER LINE	PVC	POLYVINYL CHLORIDE
DIA	DIAMETER	RW	RECYCLED WATER
DR	DIMENSION RATIO	R/W	RIGHT OF WAY
DIP	DUCTILE IRON PIPE	RSGV	RESILIENT SEAT GATE VALVE
E	EAST	S, SWR	SEWER
EC	END CURVE	SCG	SOUTHERN CALIFORNIA GAS
ECC	ECCENTRIC	S	SOUTH
ELEC	ELECTRICAL	SD	STORM DRAIN
EMWD	EASTER MUNICIPAL WATER DISTRICT	SPECS	SPECIFICATIONS
EXST	EXISTING	STA	STATION
FG	FINISHED GRADE	ST	STREET
FXF	FLANGE BY FLANGE	STD	STANDARD
FXH	FLANGE BY HUB	TYP	TYPICAL
FLG'D	FLANGED	VAR	VARIABLE
FO	FIBER OPTIC	VPI	VERTICAL POINT OF INTERSECTION
GALV	GALVANIZED	WTR	WATER
GB	GRADE BREAK	W	WEST
		XING	CROSSING

CH2MHILL
3 HUTTON CENTRE DRIVE, SUITE 200
SANTA ANA, CA 92707
(714) 429-2000

Underground Service Alert of Southern California
Call= TOLL FREE 1-800-227-2600
TWO WORKING DAYS BEFORE YOU DIG

REVISIONS

NO.	DATE	INITIAL	DESCRIPTION	APP'VD / DATE

REGISTERED PROFESSIONAL ENGINEER — No. C061862 — CIVIL — STATE OF CALIFORNIA — SIGNED 9/11/07

APPROVED BY DIRECTOR OF ENGINEERING 1-7-08 DATE

REFERENCES

EASTERN MUNICIPAL WATER DISTRICT

CIVIL ENG. DATE

APPROVALS

	INITIAL	DATE
PROJECT ENGINEER		
INSPECTION		
WATER OPERATIONS		
SEWER OPERATIONS		

		DATE
DESIGNED	G NGUYEN	AUG 2007
DRAWN	A GORDEN	AUG 2007
TRACED		
CHECKED	B CARLEY	AUG 2007
SUBMITTED	G NGUYEN	AUG 2007

SCALE: AS SHOWN

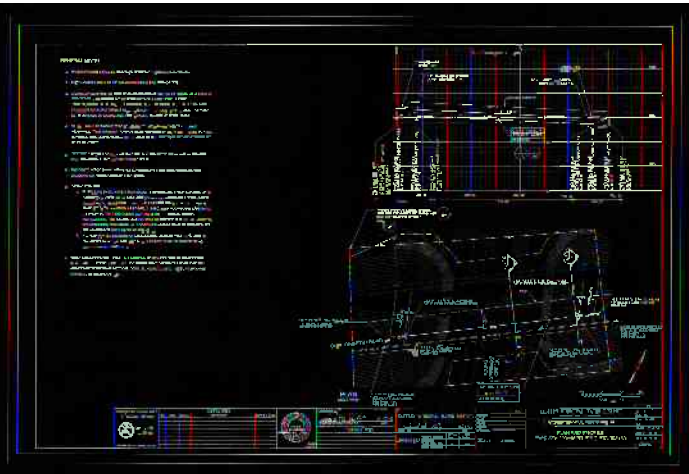
EASTERN MUNICIPAL WATER DISTRICT
RIVERSIDE COUNTY, CALIFORNIA

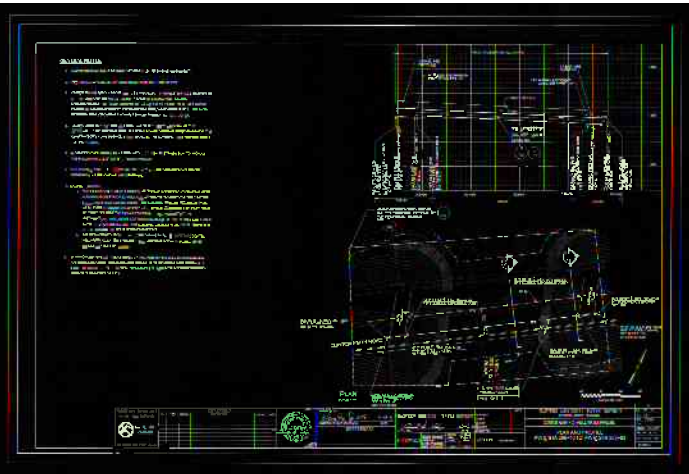
CLINTON KEITH POTABLE WATER PIPELINE

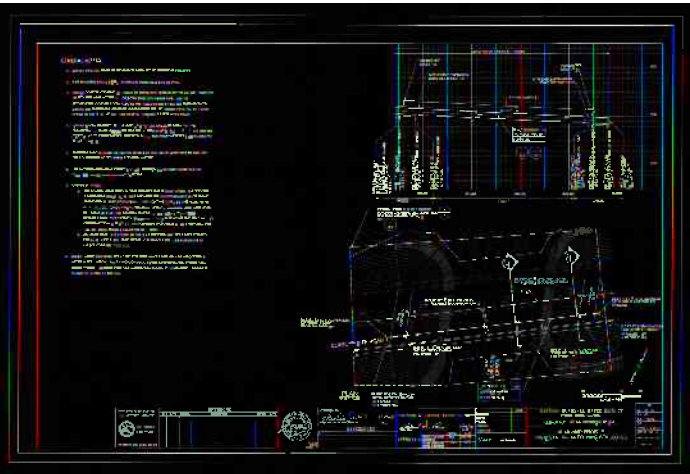
DRAWING INDEX, LEGEND AND NOTES

PZ	
I.D.	98
S.A.	
W.O.	11349
C.O.	
COORD.	
SHT. 2 OF 14	
SHT 194 OF 195	
D-37364	

FILENAME: 34313_02.DLV PLOT DATE: 11/20/2007 PLOT TIME: 10:05:16 AM







SPECIFICATIONS - DETAILED PROVISIONS
Section 01000 - General Safety Requirements

C O N T E N T S

SECTION 01000
GENERAL SAFETY REQUIREMENTS

1.01 RESPONSIBILITY

The contractor is responsible for ensuring that all activities in connection with the work including, but not limited to, labor, materials, and equipment, conform fully with the standards referenced herein. This requirement applies to all activities performed, operated, maintained or constructed by the contractor, sub-contractor, supplier, or any other agent of the contractor performing work. Further, the contractor, his subcontractor, suppliers, and any other agents shall not require any employee, or other worker in connection with the performance of the contract, to engage in work under conditions which are unsanitary, hazardous, dangerous to an employee's health or safety or otherwise in violation of any applicable federal, state, or local law or regulation in regard to occupational safety.

1.01A SAFETY AND HEALTH

The Contractor shall conform to all applicable occupational safety and health standards, rules, regulations and orders established by local agencies, State of California, and California Division of Occupational Safety and Health Construction Safety Regulations (Cal OSHA), including obtaining permits required by California Code of Regulations, Title 8, Section 341 and 341 (a).

§1527. Washing Facilities, Food Handling, and Temporary Sleeping Quarters.

WASHING FACILITIES

A. GENERAL. Washing facilities shall be provided as follows: A minimum of one washing station shall be provided for each twenty employees or fraction thereof. Washing stations provided to comply with this requirement shall at all times:

1. Be maintained in a clean and sanitary condition;

2. Have an adequate supply of water for effective washing;

3. Have a readily available supply of soap or other suitable cleansing agent;

4. Have a readily available supply of single-use towels or a warm-air blower;

5. Be located and arranged so that any time a toilet is used, the user can readily wash;

6. When provided in association with a nonwater carriage toilet facility in accordance with Section 1526(c),

7. Provide a sign or equivalent method of notice indicating that the water is intended for washing; and

8. Be located outside of the toilet facility and not attached to it.

B. EXCEPTION to subsection (a)(1)(F)(2.): Where there are less than 5 employees, and only one toilet facility is provided, the required washing facility may be located inside of the toilet facility.

C. EXCEPTION to subsection (a)(1):Mobile crews having readily available transportation to a nearby toilet and washing facility.

D. WASHING FACILITIES FOR HAZARDOUS SUBSTANCES. Where employees are engaging in the application of paints, or coatings, or in other operations involving substances which may be harmful to the employees, washing facilities shall be provided in near proximity to the worksite and shall be so equipped as to enable employees to remove such substances**.** Facilities provided to comply with this requirement shall at all times:

1. Be maintained in a clean and sanitary condition;

2. Have an adequate supply of water sufficient for effective removal of the hazardous substance from skin surfaces; and

3. Have a readily available supply of soap, and where necessary to effect removal, special cleansing compounds designed specifically for removal of the hazardous substance from skin surfaces; and

4. Have a readily available supply of single use towels or a warm-air blower.

1.02 OTHER CODES AND STATUTES

In addition to the standards and requirements detailed herein, contractors and subcontractors shall comply with applicable provisions of Federal, State, and municipal safety, health, and sanitation statutes and codes. In the event there is a conflict between the provisions of the Safety and Health Regulations for Construction promulgated by the U.S. Department of Labor in Title 29 CFR Part 1926, Occupational Safety and Health Act (OSHA), or the California Occupational Safety and Health Act regulations in the California Labor Code Section 6300 et seq. (Cal. OSHA), the more stringent provision shall prevail.

1.03 SUBCONTRACTS

Contractors shall include provisions for compliance with the health and safety requirements, as referenced in this Section 01000, in the terms and conditions of all contracts, subcontracts, supply contracts, and all other contractor arrangements for performance of the work.

1.04 DIFFERING OPINIONS

Differing opinions between the contractor and District on adequacy of existing or proposed protective measures, equipment, procedures, or devices shall be resolved as follows:

A. Upon receipt of a written notice from the District regarding an issue in question, (see Standard Form Exhibit "A"), the contractor shall not start or continue the measure, procedure, equipment, or devices, or expose employees to associated hazards until the differences have been resolved.

B. Upon resolution of the differing opinions, either with or without input from an independent professional safety engineer, Certified Safety Professional (CSP), or other safety expert, the questionable measure, procedure, equipment, or device shall be brought into conformance with the written agreed-upon solution. Only personnel required to complete remedial work shall be exposed to the associated hazard, and then only in a manner conforming to all safety requirements.

C. Obtaining engineering data or retaining the services of an independent professional engineer to assist in resolving the issue(s) remains a contractor responsibility.

1.05 PRECONSTRUCTION SAFETY MEETING

Representatives of the contractor shall meet with the District prior to the start of construction to review the respective safety requirements and to discuss implementation of all health and safety provisions pertinent to the work under contract, including safety training status of equipment operators, etc. The contractor shall be prepared to discuss, in detail, the measures he intends to take to control the possible hazards incident to the major phases of the work under contract and to comply with contractual obligations. This meeting will be devoted to discussing the manner in which the contractor intends to administer his health and safety program and delegate the responsibilities for implementing the program.

A Specific Operating Safety Procedure (EN-84) and an Injury & Illness Prevention Program must be submitted to the District at the Pre-Construction conference for acceptance by the District prior to the start of construction. The Contractor shall identify any safety organization, safety team, or safety person within the Contractor's organization, complete with contact name and telephone number. For assistance in preparing your Injury and Illness Prevention Program, go to http://www.dir.ca.gov/dosh/etools/09-031/index.htm

The Injury & Illness Prevention Program shall be submitted in Electronic Format as follows: Provide all information on a CD in searchable PDF format; PC compatible using Windows XP operating system. All information provided shall be consolidated to one portable document file (PDF) in the latest version of Adobe Acrobat, with a Table of Contents and Bookmarks for each major section.

1.06 SAFETY PROGRAMS

The prime contractor shall prepare a comprehensive written safety program covering all aspects of onsite construction operations and activities associated with each respective contract. Further, unless adequately covered in the original plan, a supplementary detailed plan will be submitted prior to start of each major phase of work or when requested by the District.

In no case will onsite work commence until the program or appropriate supplementary submittals have been approved by the District. Initial and supplementary submittals shall include a timetable for completing the required, detailed, and specific operating procedures with hazard analysis. Approval by the District of initial and supplementary programs submitted by contractor only signifies that the submittals generally conform to the requirements contained and referenced herein, and shall not constitute any acceptance or other obligation of the District for the contractor's responsibilities for said programs. Said approval does not relieve the contractor of the responsibility of providing employees with a safe and healthful work environment, or complying fully with all the above requirements. For a project- specific safety plan outline for Contractor's use, see Exhibit "B" (Specific Operating Procedure - including Hazard Analysis).

1.07 SAFETY PROGRAM REVIEW

Following the above preconstruction safety meeting and development of the Safety Program, a second meeting shall be held to review the contractor's written safety program. The contractor's principal onsite representative, the general superintendent, and his safety representative shall attend this meeting.

1.08 JOINT SAFETY POLICY MEETING

The District, the contractor's principal onsite representative, and designated staff members shall participate in scheduled monthly safety meetings. These meetings shall be used to review the effectiveness of the contractor's safety effort, to resolve health and safety problems relating to current operations, and to provide a forum for planning safe future construction activities. Meeting minutes shall be prepared by the Contractor and maintained in a manner prescribed by the District.

1.09 SAFETY PERSONNEL

When the contract does not require the services of a full-time safety engineer, the contractor shall designate a competent and dependable supervisory employee, acceptable to the District, to administer this safety program. However, should the contractor's safety effort be considered inadequate, the District has the option to require the contractor to employ a full-time qualified safety engineer in lieu of a safety representative. The hiring of a full-time safety engineer shall be at the sole cost and expense of contractor and said hiring shall not entitle contractor to additional compensation.

1.10 SAFETY INSPECTION

The contractor shall provide for weekly safety inspections of the worksites, materials, and equipment by competent employees. Detailed written inspection records shall be maintained and available for review by the District.

Prior to the use of any gauges which monitor atmospheric hazards, the contractor's competent person will verify that the gauge is in current calibration. This will be documented on the District's resident inspector's daily report form.

1.11 ACCIDENT/INJURY/ILLNESS INVESTIGATION AND REPORTING

DEFINITIONS:

A. Serious Accidents/Incidents
Any occurrence of a job-related nature including, but not limited to, suicide or homicide attempts, heart attacks, and occupational injuries or diseases which result in:

1. An employee or agent of District, contractor, subcontractor, or supplier suffering death, permanent total disability, complete and/or permanent loss of an eye, hand, foot, or major organ.

2. Hospitalization for five or more days of an employee or agent of District and/or contractor, subcontractor, or supplier, or one or more employees in critical condition.

3. Fires or property damage resulting in a loss of $25,000 or more.

4. Third party injuries, death, or substantial property losses that result or could result in claims against the District.

B. Nonserious Accidents/Incidents
All other personal and/or property damage accidents/incidents except first aid cases and property damage losses below $2,500.

C. Potential Serious Accidents/Incidents
Accidental occurrences or near misses with the potential to be a serious accident/incident such as major equipment failures, contact with high voltage lines, spills of or personal contacts with excessive amounts of toxic or hazardous materials, slides, cave-ins, etc.

1.12 INVESTIGATION/REPORTING

A. Serious accident/incidents shall be reported immediately to the District and appropriate contractor field supervisor. Providing or obtaining appropriate medical and emergency assistance and notification of coroner, safety, and law enforcement agencies, and family members remain a contractor responsibility. Except for rescue and emergency measures, the scene of the accident/incident shall not be disturbed or the operation resumed until authorized by District. The contractor shall assist and cooperate fully with the District in conducting the investigations of the accident/incident and assure availability of all information, personnel, and data pertinent to the investigation. The contractor shall, when ordered by the District, conduct or have conducted a separate and complete independent investigation of the accident/incident, and submit a comprehensive report of findings and recommendations to the District.

   The contractor shall arrange and be financially responsible for the independent investigation and any equipment or material inspections or tests, or diagnostic studies required by the District or contractor investigators. Further, Contractor's Report of Recordable Injury/Illness (See Exhibit "C") shall be completed and submitted to the District for each injured person.

B. Nonserious accident/incidents will be reported immediately to the contractor's supervisor delegated authority to arrange for medical assistance and/or investigate the accident/incidents. Immediately following arrangements for required medical assistance, the responsible supervisor will investigate the accident/incident. Within three working days following the accident/incident, the contractor will submit to the District, a completed Contractor's Report of Recordable Injury/Illness (see Exhibit "C") for all personal injuries, and a comprehensive narrative report for property damage accidents.

C. Potentially serious accident/incidents shall be reported immediately to the District. The contractor's involved equipment and/or worksite shall remain secured until the contractor has completed an acceptable comprehensive investigation. Within five days following the investigation, a detailed written investigation report will be submitted to the District.

1.13 MONTHLY ACCIDENT STATISTICAL REPORT

The contractor shall submit by the first day of each month a completed standard form entitled Contractor Monthly Summary of Occupational Injuries/Illnesses Experience (See Exhibit "D") or equivalent form acceptable to the District. Statistical cutoff dates can coincide with pay periods as long as the ending date of the current report is the beginning date of the following report.

1.14 HOUSEKEEPING

Good housekeeping, including provision and facilities for routine scrap removal, shall be maintained in all areas within the contractor's scope of operation.

1.15 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

The Contractor shall supply a Safety Data Sheet (SDS) for each chemical to be used in or during construction.

Handling, storage, use, and disposal of toxic materials of any nature shall be carried out in a manner so as not to contaminate or pollute water supplies, rivers, lakes, reservoirs, streams, or the atmosphere. Handling, storage, use and disposal of all such materials, including waste, garbage, and sewage, shall comply with Federal, State, and local regulations.

1.16 GENERAL

Intoxicating beverages and narcotics shall not be permitted or used on construction sites. Persons under the influence of alcohol of narcotics shall not be permitted on the site. Firearms shall not be permitted on the construction site without prior approval of the District.

1.17 CERTIFICATION

Design of major critical facilities, equipment, support structures, or systems, embankments, shoring systems, formwork (falsework) built or provided by the contractor for his use shall be certified as structurally suitable for the use intended under the specifications. This certification shall be made in writing by the manufacturer or a registered professional engineer competent in these fields and shall be submitted to the District prior to erection or use of such facilities, equipment or support systems.

1.18 EMWD LOCKOUT/TAGOUT PROCEDURE

The Contractor shall make himself familiar with the District's lockout/tagout procedure to isolate energy sources (mechanical, pneumatic, electrical, hydraulic, physical or chemical). The Contractor **MUST** coordinate through a qualified District representative (Inspector) a minimum of forty-eight (48) hours prior to requiring a lockout/tagout. The District Representative (Inspector) will arrange to have any energy source as described above locked out by an authorized employee in accordance with the District's procedure. In case there is any violation of the District's lockout/tagout procedure the Contractor will be directed to cease operations related to the unsafe condition, measure, procedure, equipment or device and will be issued a Notice of Unsafe Condition.

1.19 EXPERIENCE MODIFICATION RATING

The Contractor shall, prior to the Pre-Construction Safety Meeting, submit a current copy of the Experience Modification Rating for himself and any listed sub-contractor. This information will be reviewed at the Pre-Construction Safety Meeting.

1.20 WORKERS COMPENSATION RECORDS

The Contractor shall submit Workers Compensation Records for the past 2 years (Log and Summary of Occupational Injuries and Illnesses). This information will be reviewed at the Pre-Construction Safety Meeting.

1.21 CONFINED SPACE ENTRY REQUIREMENTS

When working in, or connecting to existing systems in operation, the required safety provisions for work in an operating system will be enforced, including provisions for working in confined air spaces. Contractor shall comply with EMWD's Confined space Entry Policy attached hereto (see Exhibit E).

END OF SECTION 01000

ATTACHMENTS

- EXHIBIT "A" – (EN-87) NOTICE OF UNSAFE CONDITION
- EXHIBIT "B" – (EN-84) SPECIFIC OPERATING SAFETY PROCEDURE
- EXHIBIT "C" – (EN-85) REPORT OF INJURY
- EXHIBIT "D" – (EN-89) CONTRACTOR MONTHLY SUMMARY OF OCCUPATIONAL INJURIES/ILLNESSES EXPENSE
- EXHIBIT "E" – EMWD CONFINED SPACE ENTRY POLICY

Exhibit "A"

NOTICE OF UNSAFE CONDITION

TO CONTRACTOR OF EMWD PROJECT: _____ _____
Spec. Number C.O. Number

As set forth in Section 01000 - General Safety Requirements, Eastern Municipal Water District standards require compliance with all applicable laws, ordinances and regulations, including orders pertaining to safety.

Your attention is directed to the unsafe condition prevailing at the following described site and your responsibility to utilize procedures in accordance with the applicable federal and state Construction Safety Orders, laws, and regulations.

Site and/or condition:

☐	**You are again directed to comply with all safety orders by making an immediate and proper response or correction.**
☐	**You are directed to immediately cease o perations related to the unsafe condition, measure, procedure, equipment or device(s). Furthermore, you shall not expose employees to associated hazards until a solution to these safety issues has been agreed upon (see Section 01000-1.04).**

Issued by: _____ Date: _____
Name and Title

Time: _____

cc: Construction Administrator
Project File

Exhibit "B"

SPECIFIC OPERATING SAFETY PROCEDURE
(INCLUDING HAZARD ANALYSIS)

PROJECT:		SPEC. NO.			
SPECIFIC OPERATING PROCEDURE NO.					
OPERATION:		PAGE		OF	
GENERAL INSTRUCTIONS:					
DATE:		PERSONNEL REQUIRED:			
NOTE: SEE REVERSE SIDE FOR ADDITIONAL INFORMATION					
SAFETY EQUIPMENT AND APPAREL:					
PROCEDURE DEVELOPED BY:		APPOVED BY:			

OPERATION SEQUENCE	ASSOCIATED HAZARD	EQUIPMENT, TOOLS OR FACILITIES	SPECIAL INSTRUCTIONS OR LIMITATIONS	REFERENCE

1. **GENERAL:** Specific operating procedures (SOP) are designed as a planning tool. They are most effective when developed jointly by the supervisor and employees engaged in the specific activity and/or operation. They provide excellent reference material for toolbox meetings and for instructing new employees on respective assignments and responsibility.

   Their effectiveness in reducing accidents and improving job performance is directly related to the efforts expended in their development and timely revision.

2. **ASSOCIATED HAZARDS:** For each job step, ask yourself what accidents could happen to the person doing the job step. You can get the answer by (1) observing the job, (2) discussing it with the operator, (3) recalling past accidents, or (4) a combination of the three. Ask yourself: can he be struck by or contacted by anything? can he strike against or come in contact with anything? can he be caught in, on, or between anything? can he fall? can he overexert? is he exposed to anything injurious, such as gas, radiation, welding rays, etc? (for example, acid, burns, fumes, dust).

3. **EQUIPMENT, TOOLS, AIDS, OR FACILITIES:** List type and number of tools and materials to be used, i.e., two jack hammers, one compressor, two 2" diameter hoses, 100 feet in length, etc.

4. **SPECIFIC INSTRUCTIONS OR LIMITATIONS:** For each potential accident or hazard, ask yourself how should the worker do the job step to avoid the potential accident, or what should he do or not do to avoid the accident. You can get your answers by (1) observing the job for leads, (2) discussing precautions with experienced job operators, (3) drawing on your experience, or (4) a combination of the three. Be sure to describe specifically the precautions a man must take. Don't leave out important details. Number each separate recommended precaution with the same number you gave the potential accident (see appropriate column) that the precaution seeks to avoid. Use simple do or don't statements to explain recommended precautions as if you were talking to the person.

   For example: Only wirecore lifelines shall be used in highscaling operations. Block cable supported crane booms before removing section pins. Avoid such generalities as "Be careful," "Be alert," "Take caution," etc.

5. **REFERENCES:** Reference specific material i.e., a SOP on highscaling should reference "Safety Belts and Hardware," and "Lifelines," describe how to use a "Scaler's Hitch," etc.

6. **SAFETY EQUIPMENT AND APPAREL:** Specifically required safety equipment, devices, and apparel need to be listed, i.e., hard hat, eye and face protection, respirator protection, safety shoes, wearing apparel, hoist safety devices, air hose safety devices, etc.

SAMPLE OF PIPELINE SPECIFIC OPERATING SAFETY PROCEDURE

SPECIFIC OPERATING SAFETY PROCEDURE (INCLUDING HAZARD ANALYSIS)					
PROJECT:	**(Project Title)**			SPEC. NO.	**XXX**
SPECIFIC OPERATING PROCEDURE NO.	**(Specify)**				
OPERATION:	**(Specify)**		PAGE		OF
GENERAL INSTRUCTIONS:	**(Contractor's Name) will supervise and be responsible for preventing contact with raw**				
Sewer or any other hazardous material and will also monitor and confirm minimum required trench slopes per OSHA					
Requirements. All soil types and trench slopes will be decided by our field foreman who is onsite competent person.					
DATE:	**(Today's Date)**	PERSONNEL REQUIRED:	**(Specify Here)**		
NOTE: SEE REVERSE SIDE FOR ADDITIONAL INFORMATION					
SAFETY EQUIPMENT AND APPAREL: **(Specify)**					
PROCEDURE DEVELOPED BY:	**(Signature)**	ARRPOVED BY:	**(Signature)**		

SAMPLE OF PIPELINE SPECIFIC OPERATING SAFETY PROCEDURE

OPERATION SEQUENCE	ASSOCIATED HAZARD	EQUIPMENT, TOOLS OR FACILITIES	SPECIAL INSTRUCTIONS OR LIMITATIONS	REFERENCE
1.Excavation,Pipe Installation, backfill & compact	Potential unstable existing soil conditions	Trenches will be sloped or shored per OSHA requirements	Hard hats must be utilized by all field personnel. Access ladders placed per OSHA requirements for access in and out of trenches. Trenches blocked and/or barricades as needed for public safety.	
2. Mortaring & Bitchmastic Coatings	Possible skin contact	Safety Equipment to be utilized per requirements to meet field conditions.	SDS will be available on site to review exposure effects and follow first aid instruction.	
3. Traffic Control and lane closures	Public & Employee Safety	Arrow boards, Fencing, Traffic plates, proper construction signage.	Per requirements of OSHA and Cal-Trans traffic manual. Safety vests/orange shirts to be worn in all traffic areas.	
4. Remove Concrete	Flying concrete debris during demolition	Hard Hats, safety goggles and dust mask.	Proper ventilation must be maintained during saw cutting existing concrete.	
5. Hydrostatic Pressure Testing	High pressure testing equipment	Safety equipment to be utilized per requirements to meet field conditions.	SDS will be available on site to review exposure effects and follow first aid instruction.	

OPERATION SEQUENCE	ASSOCIATED HAZARD	EQUIPMENT, TOOLS OR FACILITIES	SPECIAL INSTRUCTIONS OR LIMITATIONS	REFERENCE
6. Chlorination	Possible skin contact	Safety equipment to be utilized per requirements to meet field conditions.	SDS will be available on site to review exposure effects and follow first aid instruction. Maintain adequate ventilation.	
7. Asphalt Paving	Burns	Safety equipment to be utilized per requirements to meet field conditions.	SDS will be available on site to review exposure effects and follow first aid instruction. Monitor all paving activities and implement safety requirement per field conditions for both employees and public safety.	
8. Concrete repair	Possible skin contact & air borne concrete while chipping	Safety equipment to be utilized per requirements to meet field conditions.	SDS will be on site to review exposure effects and follow first aid instruction. Maintain adequate ventilation.	
9. Dust control & saw cutting	Vision Impaired	Hoses & cords kept to a minimum length. Wear dust masks and safety glasses.	SDS will be available on site to review exposure effects and follow first aid instruction. Maintain adequate ventilation.	
10. Cutting torches	Explosive/Gases/Fire	Fire Extinguisher	Fire watch/Laborer	
11. Site Cleanness	Tripping	Keep tools organized and concentrated	End of work day pick up everything	

OPERATION SEQUENCE	ASSOCIATED HAZARD	EQUIPMENT, TOOLS OR FACILITIES	SPECIAL INSTRUCTIONS OR LIMITATIONS	REFERENCE
12. Emergency Vehicles	Getting to locations	Notify emergency services prior to construction	Instruct all employees on procedures for emergency traffic.	

Exhibit "C"

REPORT OF INJURY

CONTRACTOR'S REPORT OF RECORDABLE INJURY/ILLNESS

Each work related fatality, injury/illness, first aid cases accepted, shall be reported on this form. The completed form will be submitted to the District within 3 working days from the date of the incident or onset of illness. Responsibility for completion and submission of this form for all onsite injury/illness to contractor, subcontractor, or supplier forces rests with the general contractor. All form terms are as defined on the reverse side.

CONTRACT SPECIFICATION (Number and Title)			DATE OF THIS REPORT
EMPLOYER			
EMWD Resident Inspector			
INJURED EMPLOYEE'S NAME		OCCUPATION	
AGE	DATE EMPLOYED	DATES OF PREVIOUS INJURIES	
DESCRIBE INJURY/ILLNESS			
DATE OF INJURY	TIME	ATTENDING PHYSICIAN	INJURY CLASSIFICATION
STARTED LOSING TIME (Never Date of Injury)		DID INJURY RESULT IN DEATH OR PROBABLY PERMANENT DISABILITY?	
RETURN TO WORK (Date)*		DATE OF DEATH	
WORKDAYS LOST TIME*		DAYS OF RESTRICTED WORK OR TRANSFER TO OTHER JOB	
* Estimate date of return to full duty to avoid delay in submitting report (See reverse side for estimating instructions).			
DESCRIBE ACCIDENT (Include Who, What, Where, & How)			
SUPERVISORY OPINION	HOW COULD ACCIDENT HAVE BEEN PREVENTED?		
		(Signature) FOREMAN OR IMMEDIATE SUPERVISOR	

NOTE: Information in this report is to be used for the prevention of accidents and is not intended as a basis for injury claims. Recordable injuries/illnesses and workdays lost and injury classification shall be as defined on reverse side of this form. **Information in this report shall also be recorded on CAL-OSHA form 200.**

DEFINITION OF TERMS

Work-related Injury/Illness: All injuries/illnesses to contractor, subcontractor, or supplier employees that result from an event or exposure on any contractor controlled worksite associated with the respective contract.

Medical Cases: Injuries/illnesses are defined as medical cases if: (1) they can be treated only by a physician or licensed medical personnel, (2) they result in damage or harm to physical structure of a nonsuperficial nature (e.g., hairline fractures), (3) they impair bodily functions (i.e., normal use of senses, limbs, etc.), (4) they involve complications requiring follow-up medical treatment.

The following are generally considered medical treatment:

- Treatment of **INFECTION**
- Application of **ANTISEPTICS** during second or subsequent visits to medical personnel
- Treatment of **SECOND OR THIRD DEGREE BURN(S)**
- Application of **BUTTERFLY ADHESIVE DRESSING(S) or STERISTRIPS** in lieu of sutures
- Application of **SUTURES** (stitches)
- Removal of **FOREIGN BODIES EMBEDDED IN EYE**
- Removal of **FOREIGN BODIES** from wound; if procedure is **COMPLICATED** because of depth of embedment, size, or location
- Use of **PRESCRIPTION MEDICATIONS** (except a single dose administered on first visit for minor injury or discomfort)
- Use of hot or cold **SOAKING THERAPY** during second or subsequent visit to medical personnel
- Application of hot or cold **COMPRESS(ES)** during second or subsequent visit to medical personnel
- **CUTTING AWAY DEAD SKIN** (surgical debridement)
- Application of **HEAT THERAPY** during second or subsequent visit of medical personnel
- Use of **WHIRLPOOL BATH THERAPY** during second or subsequent visit of medical personnel
- **POSITIVE X-RAY DIAGNOSIS** (fractures, broken bones, etc.)

ADMISSION TO A HOSPITAL or equivalent medical facility for treatment or prolonged observation

First Aid Cases: Cases (1) limited to one-time treatment and subsequent observation and (2) involve treatment of only minor injuries, not emergency treatment of serious injuries. Further, any one-time treatment and follow up visit for the sole purpose of observation of minor scratches, cuts, burns, splinters and so forth which do not ordinarily require medical care are classified as first aid treatment. Such one-time treatment and follow up visit for the purpose of observation is considered first aid even though provided by a physician or registered professional personnel. Visits to a doctor for an examination or other diagnostic procedure to determine whether the employee has an injury is classified as a first aid case if no injury is discovered or medical treatment is rendered. Conversely, if treatment is described and medical care is provided even by someone other than a physician or registered medical personnel, injury is classified as medical. Other examples of first aid cases not requiring reporting unless they result in loss of consciousness, restriction of work, or motion, or transfer to another job are:

- Application of **ANTISEPTICS** during first visit to medical personnel
- Treatment of **FIRST DEGREE BURN(S)**
- Application of **BANDAGE(S)** during first visit to medical personnel
- Use of **ELASTIC BANDAGES** during first visit to medical personnel
- Removal **of FOREIGN BODIES NOT EMBEDDED IN EYE** if only irrigation is required
- Removal of **FOREIGN BODIES** from wound, if procedure is **UNCOMPLICATED**, and is, for example, by tweezers or other simple technique
- Use of **NONPRESCRIPTION MEDICATIONS AND** administration of single dose of **PRESCRIPTION MEDICATION** on first visit for minor injury or discomfort
- **SOAKING THERAPY ON INITIAL VISIT** to medical personnel or removal of bandages by **SOAKING**
- Application of hot or cold **COMPRESS(ES)** during first visit to medical personnel
- Application of **OINTMENTS** to abrasions to prevent drying or cracking
- Application of **HEAT THERAPY** during first visit to medical personnel
- Use of **WHIRLPOOL BATH THERAPY** during first visit to medical personnel
- **NEGATIVE X-RAY DIAGNOSIS**
- **BRIEF OBSERVATION** of injury during visit to medical personnel

Note: The administration of a **TETANUS SHOT** or **BOOSTER**, by itself, is not considered medical treatment. However, these shot are often given in

conjunction with the more serious injuries. Therefore, injuries requiring tetanus shots may be reportable for other reasons.

Illness Cases: Occupational illness of an employee is any abnormal condition or disorder, other than one resulting from an occupational injury caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or direct contact.

Some conditions may be classified as either an injury or illness (but not both), depending upon the nature of the event that produced the condition. For example, a loss of hearing resulting from an explosion (an instantaneous event) is classified as an injury; the same condition arising from exposure to industrial noise over a period of time would be classified as an occupational illness. Similarly, irritation of the throat from exposure to chlorine fumes would be classified as an injury if it resulted from a ruptured tank and an illness if the exposure occurred over a period of time. The determination of illness or injury is based on the original event. Adverse reaction to a tetanus shot given for a laceration would be classified as an injury. Back cases should always be recorded as an injury. It should be noted that all occupational illnesses are reportable and recordable incidents regardless of the type of treatment provided.

Fatalities: Work-related fatalities are reportable and recordable regardless of the time between the injury and the death or the length of the illness. Lost workdays attributable to the incident are not counted and any charged should be removed from the record.

Lost Workdays: Lost workdays are defined as the number of workdays (consecutive or not), beyond the day of injury or onset of illness, the employee was away from work or limited to restricted work activity. The number of days away from work or days of restricted work activity does not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work, e.g., vacation days, days off, or holidays are not counted. Termination of employment may stop the count of lost workdays if unrelated to the employee's injury or illness. If termination is related to injury/illness, an estimate of actual workdays lost shall be made. Retirements unrelated to injury or illness stop the count of lost workdays. Otherwise days lost are estimated. Lost workday counts cease when injury or illness is determined as totally disabling. Lost workday count stops when position employee was in when injured is abolished due to work completion, e.g., a dozer operator lost workdays count would not continue beyond last day of dozer operations on the project even if the operator still could not perform the operator functions.

Restricted work: The number of workdays on which because of injury or illness: (1) the employee was assigned to another job on a temporary basis; or (2) the employee worked at a permanent job less than full time; Or (3) the employee worked at a permanently assigned job but could not perform all duties normally connected with it. Lost workday count stops when employee is permanently transferred to another permanently established position.

Contractor Controlled Worksite Associated with the Contract. The following and similar locations are considered contractor controlled worksites:

All areas within the boundaries of the construction site including shops, plants, storage areas, haul roads, borrow and fill areas.

All offsite locations (plants, shops, rock quarries, borrow areas, erection sites, etc.) used exclusively for supporting construction activities. All roads where traffic control is a contractor responsibility.

Exhibit "D"

CONTRACTOR MONTHLY SUMMARY OF OCCUPATIONAL INJURIES/ILLNESSES EXPENSE

The contractor will submit this completed form to the District by the first day of each month. Included on the form will be the contractors, subcontractors, and suppliers onsite injury/illness experience for the previous reporting period. Reporting period cut off dates can coincide with appropriate pay periods as long as the ending date of this current report is the beginning date of the next report. All form terms are defined on the back of this form.

REPORTING PERIOD	STARTING ENDING									
CONTRACTOR SUBCONTRACTOR SUPPLIER – SPEC. NO	TYPE OF CONSTRUCTION	NO. EMPLOYEES	MAN-HOURS EXPOSURE	LOST WORKDAYS	RECORDABLE CASES			INCIDENT RATES		
					TOTAL	DEATHS	LOST WORKDAY CASES	TOTAL CASES	DEATH AND LOST WORKDAY CASES	LOST WORKDAY
1	2	3	4	5	6	7	8	9	10	11
GENERAL CONTRACTOR NAME SPEC. NO. SUBCONTRACTORS SUPPLIERS										
TOTAL										
CUMMULATIVE TOTAL										

Column 1. Name of General Contractor and General Specification No. only. Combine all subcontractor and/or supplier data under respective headings. Cumulative totals start from first day of onsite work under the specification.

Column 2. Major classification or type of work for contractor (Water pipeline, sewer pipeline, pump station, treatment plant, lift station, etc.). Minor classification for supplier or subcontractor (concrete work, earthwork, repair work, etc.).

Column 3. Average number of employees during reporting period. Include only onsite personnel. Number of subcontractor or supplier employees can be estimated by dividing number of estimated man-hours by 8 x number days of reporting period.

$$\frac{\text{(Number of man-hours)}}{\text{(8 x number days of reporting period)}}$$

Column 4. Actual man-hours of onsite exposure. Do not include vacation time, holidays, down periods, etc.

Column 5. Lost workdays include actual days from work, restricted work days and days worked in another assigned position. (For detailed explanation of lost workdays and restricted work, see back of Exhibit “C”).

Column 6. Total of fatalities, lost workday cases, restricted work cases or transfer to other job cases, and medical cases reported on all forms “Contractor’s Report of Recordable Injury/Illness,” submitted during the reporting period covered by this form.

Column 7. Fatalities are charged to date of injury or onset of illness regardless of date of death.

Column 8. Includes all cases submitted during this reporting period of form “Contractors Report of Recordable Injury/Illness,” that show figures under headings entitled, “lost time, or restricted work or transfer to other job.” (see back of Exhibit “C”).

Columns 9, 10, 11 Incident rates are define as the number of injuries/illnesses or lost workdays related to a common exposure base-100 full-time workers or 200,000 man-hours (100 workmen x 40 hrs/week x 50 weeks/year = 200,000). These rates are calculated as follows:

$$\text{Total Cases (column 9)} = \frac{\text{Total cases (column 6) x 200,000}}{\text{Man-hours of Exposure (column 4)}}$$

$$\text{Death and lost workday cases (column 10)} = \frac{\text{Deaths (column 7) and lost workday cases (column 8) x 200,000}}{\text{Man-hours of Exposure (column 4)}}$$

$$\text{Lost workdays} = \frac{\text{Lost workdays (column 5) x 200,000}}{\text{Man workdays of exposure (column 4)}}$$

EXHIBIT E

EMWD CONFINED SPACE ENTRY POLICY

Eastern Municipal Water District
2270 Trumble Road
P.O. Box 8300
Perris, CA 92572-8300

Revision: June 2009

EASTERN MUNICIPAL WATER DISTRICT
HUMAN RESOURCE MANAGEMENT

POLICIES AND PROCEDURES

SECTION:	DATE: 07/01/08	PREPARED BY: Rick West
PAGE: 1 of 30	REVISION DATE: 06/12/09	APPROVED BY: EMWD Safety / Risk Management

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CONFINED SPACE PROGRAM OVERVIEW

1.0 PURPOSE

To establish a safe working procedure for District employees that meets or exceeds federal, state, or local rules and regulations. This program was developed in accordance to Cal\OSHA VPP Best Practices philosophy.

This Program is based on the regulatory requirements of the California Occupational Safety and Health Administration Title 8 California Code of Regulations (CCR) Article 108, Confined Space. The focus is to protect workers from exposure to hazards in confined spaces.

This policy shall be reviewed annually by the EMWD Safety Management Department.

NOTE: This EMWD policy meets and exceeds the requirements of Title 8 General Industry Safety Orders (GISO) and those of Title 8 Construction Safety Orders regarding Confined Spaces.

2.0 SCOPE AND APPLICATION

2.1 This policy contains specific requirements for practices and procedures to protect employees from those hazards of entry into and work within a confined space. This policy establishes that all confined spaces must be evaluated to determine whether it is permit or non-permit required prior to every entry.

3.0 DEFINITIONS

ATTENDANT

An individual stationed outside the confined space who is trained as required by this policy and who monitors the authorized entrants inside the permit required confined space. An attendant may monitor not more entrants nor more permit spaces than the entry permit specifically authorizes.

AUTHORIZED ENTRANT

An employee who is authorized by the District to enter a confined space to perform an assigned task. Authorized entrants may rotate duties, serving as attendants. Only trained persons may enter the confined space during the term of the permit.

BLANKING OR BLINDING

The absolute closure of a pipe, line or duct, by fastening across its bore a solid plate or "cap" which completely covers the bore; which extends at least to the outer edge of the flange at which it is attached; and which is capable of withstanding the maximum upstream pressure.

BUMP TEST

Testing an atmospheric monitoring device with a known concentration of gases that the monitor is intended to test. The test is used to verify that the monitor is within calibration parameters.

CALIBRATION

A manual or electronic adjustment of an atmospheric monitoring device that does not pass the testing parameter requirements of the manufacturer.

CONFINED SPACE

A location must have all three of the following definitions to be a “Confined Space”.

1. Is large enough and so configured that an employee can bodily enter and perform assigned work; and
2. Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
3. Is not designed for continuous employee occupancy.

DOUBLE BLOCK AND BLEED

The closure of a line, duct or pipe by locking and tagging a drain or vent which is open to the atmosphere in the line between two locked-closed valves.

EMERGENCY

Any occurrence, including a failure of monitoring device or hazard control, internal or external to the confined space, which could endanger the entrant or other employees.

ENGULFMENT

The surrounding and effective capture of a person by a liquid or finely divided solid substance.

ENTRY

An act by which a person intentionally passes through an opening into a confined space. The entrant is considered to have entered as soon as any part of the entrant's body breaks the plane of an opening into the space.

ENTRY PERMIT

A document established by the District, the content of which is based on the District's hazard identification and evaluation for a confined space and is the instrument by which the District can verify that all precautions have been met prior to entry

ENTRY PERMIT SYSTEM

The written or printed document established by EMWD. The permit will be signed by the Entry Supervisor and posted at the entrance to the confined space.

The entry permit will include the name of the Attendant, the authorized Entrants, the work to be performed, the tools and equipment being taken into the confined space, the specific types of personal protective equipment to be used by the Entrants, air monitoring readings, the date of entry, time of entry, time the permit is canceled and time the permit is scheduled to be canceled. Other information that the Attendant and/or Entry Supervisor deems to be necessary will be written on the permit.

ENTRY SUPERVISOR

An appropriately trained employee who has been assigned the responsibility of insuring a safe confined space entry. An entry supervisor shall not enter the confined space as an entrant to perform work.

EVACUATION

An unaided emergency exit out of a confined space. This action may result from the entrant’s own decision or by a command from outside the space by the attendant.

FALL ARREST/RESCUE DEVICE

A winch type device that will quickly arrest an employee's fall and absorb much of the free fall energy. The fallen employee may then be winched to safety using the hand crank system of the device. The cable from this device will attach to the safety harness. The type(s) of fall protection equipment, including personnel winches, will be determined by the attendant and Entry Supervisor. The entrants will use the fall protection equipment when there is an exposure of a worker falling during entry or while exiting the confined space.

HAZARDOUS ATMOSPHERE

An atmosphere which exposes employees to a risk of death, incapacitation, injury or acute illness from one or more of the following causes:

- A flammable gas, vapor, or mist excess of ten percent of its lower explosive limit (LEL);
- An airborne combustible dust at a concentration that obscures vision at a distance of five feet (1.52m) or less.
- An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

- Carbon Monoxide in excess of 25 PPM;

- An atmospheric concentration of any substance for which a permissible exposure limit is published in subpart Z of 29 CFR Part 1910 or Title 8, Section 5155 and could result in employee exposure in excess of its permissible limit(s). When an air contaminant for which OSHA or CAL-OSHA has not determined a permissible exposure limit which may be present in the permit space atmosphere, the District shall consult other sources of information, such as Safety Data Sheets which comply with the Hazard Communication Standard Title 8, Section 5192 for guidance in establishing the acceptable environmental conditions for entry by their employees.

- Any atmospheric condition recognized as immediately dangerous to life or health.

HOT WORK PERMIT

The District's written authorization to perform operations which could provide a source of ignition, such as riveting, welding, cutting, burning or heating.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH

Immediately dangerous to life or health (IDLH) means any condition which poses an immediate threat of loss of life; may result in irreversible injury immediate-severe health effects; may result in eye damage; irritation or other conditions which could impair escape from the permit space.

IMMEDIATE-SEVERE HEALTH EFFECTS

Any acute clinical sign(s) of a serious, exposure-related reaction manifested within 72 hours after exposure.

NON-ENTRY CONDITION

Any condition or set of conditions whose hazard potential exceeds the limits stated in the entry permit.

NON-ENTRY RESCUE TEAM

A group of two or more employees designated and trained to perform non-entry rescues at confined spaces within the District.

NON-PERMIT CONFINED SPACE (NPCS)

A confined space that does not contain or, with respect to atmospheric hazards, would not normally contain any hazard capable of causing death or physical harm, and where all other serious hazards have been controlled.

Before declaring a confined space a NPCS, the confined space is to be treated as a Permit Required Confined Space, including testing of the atmosphere in the confined space.

OXYGEN DEFICIENT ATMOSPHERE

An atmosphere containing less than 19.5 percent oxygen by volume.

OXYGEN ENRICHED ATMOSPHERE

An atmosphere containing more than 23.5 percent oxygen by volume.

PERMISSIBLE EXPOSURE LIMIT (PEL)

PEL's are the allowable air contaminant level established by the U. S. Department of Labor, Occupational Safety and Health Administration; and the Cal/OSHA regulations.

PERMIT REQUIRED CONFINED SPACE (PRCS)

A confined space which must include one or more of the following conditions:

- Contains or has a known potential to contain a hazardous atmosphere.
- Contains a material with the potential for engulfment of an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor, which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard.

RETRIEVAL

Aided assistance in exiting the confined space not requiring entry.

RETRIEVAL LINE

An approved line or rope secured at one end of the worker by a full-body harness, and with its other end secured to either a lifting (or other retrieval) device, or to an anchor point located outside the entry portal.

SAFETY LINE

A line secured at one end of the worker by a full-body harness with the other end secured to a “fall arrest” device. The main function is to prevent injury in the event of a fall.

SHALL

Denotes a mandatory requirement.

SHOULD

A recommendation that is a sound safety and health practice; it does not denote a mandatory requirement.

SUPERVISOR

An individual who has the job title as an EMWD Manager or Supervisor. Or, an individual who is assigned to work with the Attendant during a confined space entry and has the authority to authorize a confined space entry or terminate a confined space entry.

THRESHOLD LIMIT VALUES (TLV)

TLV’s are the recommended worker exposure levels of chemical and physical agents that are recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). The TLV’s are based on an 8 hour Time Weight Average (TWA).

TOXIC ATMOSPHERE

An atmosphere containing a concentration of a substance above the published or otherwise known safe levels.

VERTICAL RESCUE

Methodology to move the entrant to safety while all or a portion of the entrant’s weight is supported by life-safety rope or wire. This methodology would include Diagonal Rescue where a portion of the entrant’s weight is supported by a surface within the space.

WARNING BARRIERS

A physical system that prevents or provides adequate notice that entry into area is prohibited by non-authorized employees or members of the public. Acceptable barriers include cones, saw horses, delineators, temporary fencing, etc.

4.0 PROGRAM REQUIREMENTS

4.1 PRE-ENTRY EVALUATION TO DETERMINE CONFINED SPACE STATUS

Entry Supervisor shall evaluate permanent substructures and openings that meet confined space criteria, and identify and record the potential hazards associated with each one prior to all entry operations. This information will be made available to affected employees, their representatives and supervisors. Please see Appendix B for the Confined Space Evaluation Form.

4.2 HAZARDS IDENTIFICATION AND BASIC REQUIREMENTS

The District has established an entry permit program to ensure that entrants are protected from confined space hazards. Under the entry permit program, each department that issues entry permits shall:

- Hazard Identification
  Identify and evaluate each hazard of the permit space(s), including determination of severity.
- Hazard Control
  Implement the means, procedures and practices by which the confined spaces can be entered safely according to this policy.
- Employee Training
  Ensure that employees attend required training prior to performing confined space entries.
- Equipment
  Provide, maintain, and ensure the proper use of the equipment necessary for safe entry, including testing, monitoring, communication and personnel protective equipment.
- Non-Entry Rescue
  Ensure that the procedures and equipment necessary to perform non-entry rescues from confined spaces are implemented and provided.
- Protection From External Hazards
  Ensure that all pedestrians, vehicles or other barriers necessary to protect entrants from external hazards are provided.

4.3 PERMIT SYSTEM

The District shall prepare a permit(s) in a standardized form through which the user department identifies all conditions that must be evaluated to ensure safe entry into any confined space. Departments who authorize entry into a permit space shall include the following information on the checklist portion of the permit:

- Hazards of permit space.
- Measures for isolation, lock-out/block-out, purging, blocking or blinding, inerting, ventilating and flushing to remove or control hazards.
- Maintenance of acceptable environmental conditions by the person in charge of entry through verifying testing and monitoring equipment and procedures.
- Non-Entry Rescue equipment to be provided on-site which includes: communication procedures and equipment, and personnel protective equipment such as harness', safety lines and retrieval line.

- The identity of permit space, location, purpose and date of entry and duration.
- A list of authorized entrant, eligible attendants, and individuals eligible to be in charge of entry along with in entry supervisor's signature, verifying that all actions or condition for safe entry have been met.
- Upon completion of the entry covered by the permit, and after all entrants have exited, the permit space and all work has been performed, the permit shall be canceled.
- All hot work will require a pre-job with Safety and Risk Management before an entry permit is issued.

4.4 DEPARTMENT REQUIRMENTS

- Each affected Department shall be required to become familiar with this policy and ensure all aspects of the policy are implemented and followed by their employees. The following items are found in the District's policy and should be implemented by the individual departments to fit each specific application.
- Evaluation of each facility within the department's jurisdiction for the purpose of establishing its confined space designation prior to every entry.
- Document each pre-entry evaluation. Documentation should include a site description, location, configuration, initial gas detector readings, and initial classification. (i.e., permit required or non-permit required confined space). Please see Appendix B for the Pre-Entry Confined Space Evaluation Form.
- Prepare site/type specific confined space entry and rescue procedures for each type of confined space without regard to confined space classification.
- Ensure that each employee required to work within the policy is thoroughly trained as required.

4.5 ENTERING AND INSPECTION OF CONFINED SPACES

These precautions must be reviewed by employees working in confined spaces to ensure safe entry.

- Always test atmosphere with gas detector prior to opening or removing access cover. Refer to **CONFINED SPACE PRE-ENTRY PROCEDURE section 2.2** for instruction.
- Use appropriate tools or hoist when removing access covers to confined spaces.
- Access covers are heavy, awkward, and of different shapes.
- Prevent injuries by following written procedures.
- Eye protection would be required of all employees exposed to flying debris.
- Always clean sand and dirt from the edge of access cover rim.
- Before entering a confined space, always visually inspect the condition of the steps or rungs.
- Set up tripod.

- Enter the confined space slowly and cautiously.
- Test each step or rung with a gradual application of weight.
- Do not carry tools or other objects when entering or exiting a confined space.
- Always be careful not to look up.
- Never drop tools and supplies into a confined space. Pass by hand if possible or tie object to a hand line or place in a bucket. Use half hitches to prevent objects from falling from bucket.
- Never clutter access area to prevent objects from falling, bouncing, being pushed, or dragged into opening.

4.6 CONTRACTORS ENTRY INTO CONFINED SPACES

When contractor employees (not under the District's direct supervision) enter PRCS, ensure the following:

- Inform the contractor that the workplace contains confined spaces and that confined space entry must be in compliance with EMWD Confined space Entry Policy.
- Apprise the contractor of the elements of the confined space, including the known hazards and any experiences with the space.
- Coordinate entry operations with the contractor, when both District personnel and contractor personnel will be working in or near a confined space (the contractor shall have procedures for coordinating such entry operations, to prevent endangerment of the employees of any other employer);
- Debrief the contractor at the conclusion of the entry operations regarding any hazards confronted or created in the confined space during entry operations.

4.7 RECORDKEEPING

- A written record must be made of the results of each atmospheric test performed. Utilize Appendix D.
- Pre-Entry Confined Space Evaluation form shall be kept at the site for the duration of the work, and made accessible to affected employees and their representatives.
- A copy of the Confined Spaces Entry Permit must be posted on the job during confined space operations.
- The above documentation must be kept on file by respective departments for a minimum of three years.

4.8 TRAINING

- Employees who enter into or work inside a confined space (including both the initial entrants and standby employees) must receive training in the appropriate procedures and requirements described in this program. No person shall enter a confined space unless trained and qualified to do so.

- Supervisors shall also be trained in the following:
    - The possible toxics, flammable conditions, and oxygen deficiencies in potential confined spaces into which personnel must enter
    - Be knowledgeable of the type of operations employees will be performing in a confined space and of their impact on air quality, flammability, and/or availability of oxygen, and ensure that employees take appropriate precautions;
    - Provide appropriate approved equipment;
    - Ensure necessary forms are available to record the confined space activities; review completed records; ensure the records are filed; and provide affected employees and/or their representatives access to review them and record testing results.

4.9 JOINT USE FACILITIES

Prior to entry by District personnel into confined spaces, such as manholes which may be jointly owned or shared with another entity, the entry supervisor shall coordinate entry operations with other affected users or owners so that employees or operations of one employer do not endanger other employer's personnel.

CONFINED SPACE PRE-ENTRY PROCEDURE

1.0 PURPOSE

This Procedure establishes steps to identify and evaluate potential hazards prior to entry into any of the categories of confined spaces.

Note: Additional guidelines regarding PRCS entry are contained in the section titled Permit-Required Confined Space Entry Procedure.

2.0 PRE-ENTRY INSTRUCTIONS

When operations are to be conducted in a PRCS, or when operations that may impact air quality (such as welding, spray coating, abrasive blasting or use of solvents) are to be conducted, then safe entry conditions, hazard control, and personal protective equipment must be considered during the planning phase of such operations.
***NOTE**: Supervisors may contact Risk Management during the planning phase of such operations to provide guidance on safe entry conditions, hazard control, and personal protective equipment.*

2.1 Supervisor Review

Before the start of work the supervisor must:

- Review the work assignment with employees, indicating any potential hazards involving the confined space(s).
- Describe the scope of work, equipment and materials needed, and any operating instructions required to complete the job. Identify any potential health and physical hazards or conditions, such as the history of spills, fall hazard, the use of solvents, welding operations or flooding within the work area, and methods to control those hazards.
- Coordinate confined space entry activities with other employers, such as contractors or sub-contractors so that no employees of any employer will be endangered during confined space operations.

NOTE: Examples of methods to control hazards are lockout and blockout points, clearance points, fall protection or ventilation.

2.2 Employee Review

The employee is responsible for:

- Understanding the nature of all potential hazards that will be reviewed at this time. If anything is not clearly understood, the employee should ask questions.
- Inspecting the safety equipment for confined space entry to ensure that it is in operational condition.
- Ensure that the atmospheric monitoring instruments (e.g., carbon monoxide, hydrogen sulfide, chlorine) are maintained in an operational status. Instruments shall be tested / calibrated according to the manufacturer's specifications.

- When the space is located such that work may encroach upon a public street or highway, establish a safe work area by erecting barricades, cones, warning signs and wearing appropriate reflective clothing.
- The communication system between the Attendant and the facility and between the Attendant and the authorized Entrants must be checked prior to entry.
- Energy sources (except for those necessary to perform the work at hand) that could present a hazard to those in a confined space shall be locked out and blocked out in accordance with the EMWD Lockout/Blockout Procedure. Additionally, the space shall be isolated to prevent dangerous gases or chemical substances from entering the confined space.
- All non-permit required, and permit-required confined spaces shall be considered unsuitable to support life until proven safe by atmospheric testing.

2.2 Atmospheric Testing

- Prior to any confined space entry, the atmosphere shall be tested with an appropriate, tested /calibrated direct reading instrument, for the following conditions in the order given:
    - Oxygen content;
    - Flammable gases & vapors;
    - Potential toxic air contaminants

- Test Atmosphere from Top to Bottom of Space:
    - Testing of the confirmed or potential confined spaces shall be conducted throughout the entire portion of the space to be occupied.

- Testing of Manholes
    - Prior to opening the manhole cover, insert the probe into the hole (if available) in the cover, and draw a sample of the atmosphere into the meter, allowing sufficient time to obtain a representative sample.
    - If the cover has no hole, crack open the cover only enough to insert a non-sparking item, such as a piece of wood or brass, then insert the probe.
    - If atmospheric conditions are acceptable, then remove the cover.

2.4 Guarding the Opening

When covers are removed, a railing, temporary cover, or temporary barrier that will prevent an accidental fall through the opening and protect each employee working in the space from foreign objects entering the space shall guard the opening.

2.5 Sampling

- For testing, insert the probe into the top of the confirmed, potential or non-permit confined space, and draw a sample of the atmosphere into the meter allowing sufficient time to obtain a representative sample. Sample collection procedures shall follow the manufacturers recommended procedure.

- When monitoring for entries involving a descent into atmospheres which may be stratified, the atmospheric envelope should be tested a distance of approximately four (4) feet in the direction of travel and to each side.
- If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

2.6 Acceptable Atmosphere

If testing indicates an acceptable atmosphere, continuous ventilation is required prior to, and during any entry. Be sure to place the blower where fresh uncontaminated air is drawn into the structure. The ventilation shall remain in operation during the complete entry.

2.7 Unacceptable Atmosphere

If, after any needed ventilation, testing continues to indicate atmospheric contaminants outside of acceptable entry levels, the space shall not be entered. Refer to Permit Required Confined Space Entry Procedure section for additional information.

2.8 Safe Entry Into A Confined Space

If test results do not indicate an atmospheric hazard, the space can be entered, provided the following instructions are followed:

- Monitor the atmosphere periodically at fifteen minute intervals to ensure that no hazardous atmosphere exists and record the results; see appendix D
- Continuously ventilate;
- Lockout and isolate any equipment, pipes or lines located within the space (except for those necessary to perform the work at hand) which are not accessible before entry;

2.9 Safe Work in the Confined Space

The attendant will notify the entrant to exit the space when:

- The attendant recognizes any warning sign or symptom of exposure to a dangerous situation.
- The attendant detects a prohibited condition.
- An order to evacuate is given by the Attendant or the Entry Supervisor;
- An evacuation alarm is activated.
- The Entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
- The Entrant detects a prohibited condition.
- The Attendant detects a situation outside the space that could endanger the authorized Entrants

All entrants will exit from the permit space as quickly as p ossible whenever ordered to do so.

PERMIT-REQUIRED CONFINED SPACE ENTRY PROCEDURE

1.0 PURPOSE

This Policy establishes steps to evaluate identify and control potential hazards before and during an entry into a Permit Required Confined Space (PRCS). All requirements of this policy must be complied with to insure a safe confined space operation. This policy complies with the requirements of Title 8, Article 108, Confined Space.

NOTE: This EMWD policy meets and exceeds the requirements of Title 8 General Industry Safety Orders (GISO) and those of Title 8 Construction Safety Orders regarding Confined Spaces.

2.0 ENTRY INSTRUCTIONS

- When operations are to be conducted which may impact air quality (such as welding, spray coating, abrasive blasting or use of solvents) additional precautions are to be taken. Consideration should be given to safe entry conditions, hazard control and personal protective equipment during the planning phase of such operations.

- Prior to any entry into a PRCS, the entry supervisor shall assure that all provisions of a Confined Space Entry Permit (Appendix C) have been completed and the following specific provisions have been met:

    - *Supervisor Review of Hazards*
    - *Equipment Inspection*
    - *Instrument Calibration*
    - *Work Area Preparation*
    - *Lockout and Isolation*
    - *Atmospheric Testing*
    - *Ventilation*
    - Check List of Requirements" Appendix A

    NOTE: *The supervisor of the employees may be the entry supervisor, or the responsibility of the entry supervisor may be delegated.*

- Assemble and test the retrieval equipment before entry into a PRCS.

- The *entry supervisor* is to check that the appropriate entries have been made on the Permit, and that the Permit specified tests have been conducted and the specified procedures and equipment are in place before endorsing the Permit and allowing entry to begin.

- When the Permit is signed, the authorized entrant(s) may enter(s) the PRCS.
    NOTE: Following the information specified in the Entry Permit, the attendant continuously maintains an accurate count of authorized entrants in the confined space.

- If the PRCS poses no actual or potential atmospheric hazards and if all serious safety and health hazards within the space are eliminated without entry into the space, the Permit Required Confined Space (PRCS) may be re-classified as a Non-Permit Confined Space (NPCS) for as long as the hazards remain eliminated.

  NOTE: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards. For example, carbon monoxide may still be generated in a space while being controlled by ventilation.

- The entry supervisor shall document the basis for determining that all hazards in a permit space have been eliminated, through a certification on the permit that contains the date, the location of the space, and the signature of the person making the determination. The permit will then remain posted for the duration of the entry.

- If hazards arise within a PRCS that has been re-classified as a NPCS, each employee in the space shall exit the space. The entry supervisor shall then re-classify the entry as a PRCS and a new permit will be required.

3.0 SAFE ENTRY INTO THE PERMIT SPACE

The types of permit spaces generally encountered in the District, include but are not limited too, sewer manholes, sewer lines, stilling wells, junction structures, valve vaults, meter vaults, pumping plant wet wells, vats, pits and various types of storage tanks.

- If test results do not indicate an atmospheric hazard, the space can be entered, provided the following instructions are followed:
  Monitor the atmosphere continuously to ensure that no hazardous atmosphere exists; see section 6
  - Continuously ventilate; see section 7;
  - Lockout and isolate any equipment, pipes, or lines located within the space (except for that necessary to perform the work at hand) which are not accessible before entry.

- The Attendant communicates with authorized Entrants as necessary to monitor Entrant status and to alert Entrants of the need to evacuate the space.

- The Attendant monitors activities inside and outside the space to determine if it is safe for Entrants to remain in the space.

- The Attendant orders the authorized Entrants to evacuate the permit space immediately under any of the following conditions:
  - If the Attendant detects a prohibited condition;
  - If the Attendant detects the behavioral effects of hazard exposure in an authorized Entrant;
  - If the Attendant detects a situation outside the space that could endanger the authorized Entrants;

- If the attendant cannot effectively and safely perform all the duties required under Section 5.0 DUTIES.

- The entrant will alert the attendant whenever:
  - The Entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
  - The Entrant detects a prohibited condition.

- All Entrants will exit from the permit space as quickly as possible whenever:
  - An order to evacuate is given by the Attendant or the Entry Supervisor.
  - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
  - The entrant detects a prohibited condition.
  - An evacuation alarm is activated.

- The attendant will summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.

- The entry supervisor verifies, before operations commence, that rescue services are available and that the means for summoning them are operable.

- The attendant performs non-entry rescues as determined during pre-job planning.

4.0 REMOVAL OF UNAUTHORIZED ENTRANTS

- The attendant takes the following actions when unauthorized persons approach or enters a permit space while entry is underway:
  - Warn the unauthorized persons that they must stay away from the permit space;
  - Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and,
  - Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.
  - Remove authorized entrant from confined space if attendant cannot maintain communications.

- The entry supervisor removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

- The entry supervisor has the authority to cancel the entry and cancel the permit.

- The entry supervisor determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

5.0 DUTIES

5.1 DUTIES OF THE AUTHORIZED ENTRANTS

The authorized entrants are required to:

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.
- Properly inspect and use equipment as required by the permit.
- Follow responsibilities identified in entry instructions.
- Maintain communications with the attendant.
- Alert the attendant whenever:
  A. The entrant recognizes any warning sign or symptom of exposure.
  B. A prohibited condition is detected.
  C. Exits the permit space whenever:
  D. An order to evacuate is given by the attendant.
  E. Recognition of a warning sign or symptom of exposure.
  F. A prohibited condition is detected.
  G. An alarm is activated.

5.2 DUTIES OF ATTENDANTS:

The attendants are required to:

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Be aware of possible behavioral effects of hazard exposure on authorized entrants
- Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the permit accurately identifies who is in the permit space;
- Remain outside the permit space during entry operations until relieved by another attendant;
- Communicate with authorized entrants as necessary to monitor entrant status and alert entrants of the need to evacuate the space;
- Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under any of the following conditions:
  - If the attendant detects a prohibited condition;
  - If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
  - If the attendant detects a situation outside the space that could endanger the authorized entrants; or
  - If the attendant cannot effectively and safely perform all the duties required under the permit;

- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
  - Perform non-entry rescues as determined during pre-job planning; and,
  - Perform no duties that might interfere with the Attendant's primary duty to monitor and protect the authorized entrants.

5.3 DUTIES OF ENTRY SUPERVISORS

The entry supervisors are required to:

- Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
- Determine when to terminate the entry and cancel the permit;
- Determine, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained;
- Verify, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
- Verify that rescue services are available and that the means for summoning them are operable; and,
- Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

5.4 RESCUE DUTIES

Departments are responsible to insure that these procedures are utilized by an employee working in confined space.

- Recognition of emergency situation.
- Notify EMS and/or Central Control/IOC of situation.
- May request additional employees if needed. NOTE: Employees may come from any department.
- Proper use of safety equipment.
- Required 1st-aid/CPR training.
- Non-Entry Rescue Procedures

6.0 ATMOSPHERIC MONITORING EQUIPMENT

Monitoring is a <u>primary requirement</u> when opening, entering and working in a permit space to insure the safety of those employees involved in permit entry. All monitors purchased by the District are required to be a full direct meter reading detector or instrument.

6.0 MONITORING REQUIREMENTS & RECORD KEEPING

- An initial test shall be made of the atmosphere within the permit space utilizing a 4 gas, gas detector to insure that the permit space can be safely opened.
- Turn detector on and allow a two minute warm-up period.
- For manholes or other covers that may have pry holes, insert probe into cover approximately twelve inches.
- Record combustible gas level on gas log. (see appendix D.)

NOTE: If a combustible gas reading of 20% L.E.L. (alarm should sound) or more is found, a verbal report must be made to your supervisor immediately.

- If a combustible level of 80% is found, do not open manhole, even if L.E.L. drops to less than 20%. Call supervisor to site immediately.
- For covers without holes test around seam, and monitor while slowly opening. Use an inert wedge (wood or brass) to prop lid open.
- Upon opening cover, a test shall be taken immediately and recorded on the log sheet.
- A record log shall be used to record the test results obtained with the detector. See Appendix D, "Record of Gas Analysis".
- A second test of the atmosphere within the permit space shall be made before entering the permit space and recorded in the logbook.
- Probes or personnel monitors to be at approximate level as entrant. If alarms sound, no entry is authorized until the cause is found and corrected.
- The monitor shall stay on continuously and an attendant or supervisor, at not more than **fifteen-minute intervals**, shall take readings as long as an entrant is within a permit space.
- A recording to that effect shall be made in the log. Refer to Appendix D.
- In hot environments please refer to EMWD Heat Illness policy and implement proper procedures to protect entrants from over exposure.

6.1 CALIBRATION REQUIREMENTS

Each department shall be responsible for complying with the requirements of this section.

- The manufacturer's requirements for calibration and testing shall be complied with.
    - Annual certification shall be performed by the manufacturer or by certified staff personnel.
    - Monitors shall be tested each day prior to use for proper calibration and operation using known concentration calibrating gases and recorded on the (record of gas analysis), (a bump test or calibration).
    - Records shall be maintained and turned in to Safety and Risk Management for record keeping on a yearly basis.

7.0 VENTILATION REQUIREMENTS

Ventilation is one of the most important rules of safety concerning confined space entry. Though ventilation can insure good quality air, it cannot reduce other hazards that are associated with permit space(s). The ventilation requirements that must be met prior to entry are as follows.

7.1 PRE-ENTRY REQUIREMENTS

- Various sizes of permit spaces are located through the District.
- When initial air sampling determines that the oxygen level is below 19.5% and/or the levels of contaminants are at or above the Permissible Exposure Limits (PEL's) or Threshold Limit Values (TLV's), the confined space must

have 10 complete air changes before sampling the air inside the confined space again.

To determine how long it will take to achieve 10 complete air changes in the confined space, the following information must be known:

- the cubic feet of space inside the confined space
- the cubic feet per minute (cfm) the ventilator is rated for

Note: multiple bends in the ventilation hose will reduce the actual cfm capacity of the ventilating blower (each 90 degree bend reduces the rated CFM capacity of a ventilation blower by 50%).

To determine the cubic feet of space inside the confined space for square or rectangular spaces:

Multiply the Length x Width x Height. EXAMPLE: A confined space is 20' by 15' by 30'.

20' x 15' x 30' = 9,000 cubic feet.

The rating of the ventilator shows the cubic feet of air the blower will discharge. For this example let's assume the ventilator has a rating of 1,500 cubic feet per minute (cfm).

To find out how long it will take to make one complete air change inside the confined space, divide 9,000 cubic feet by 1,500 cfm. The answer is 6. Therefore it will take six minutes to make one complete air change inside the confined space.

Ten (10) air changes are required. Multiply 6 minutes by 10 the required number of air changes in the confined space:

10 x 6 = 60. It will take 60 minutes to achieve
10 complete air changes.

If the confined space is round, multiply Pi (3.14) times the Radius squared times the length of the cylinder. The radius is 1/2 of the diameter. The diameter is the vertical distance between two points of a circle.

Example: Pi (3.14) x radius squared x length of cylinder (pipe, tunnel, etc.) = cubic feet of space.

Assume a pipe has a 3' diameter and 30 feet long. One-half of 3' is 1.5 feet. The radius is 1.5 feet. 1.5 feet squared (1.5 x 1.5) = 2.25 square feet.

To simplify

3.14 x 2.25 = 7.07 square feet (the actual number is 7.0686 but we rounded up).

square feet x 30' (the length of the cylinder) = 212 cubic feet.

To find out how long it will take to make one complete air change inside the confined space, divide 212 cubic feet by 1,500 cfm.

The answer is .14 minutes for one complete air change.

Ten complete air changes are required. Therefore 10 air changes x .14 minute per air change = 1.4 minutes.

Round up and let the ventilator push fresh air into the confined space for 2 minutes before testing the atmosphere inside the confined space again.

To achieve a greater efficiency of air exchanges, when it is possible, move the end of the hose around by using a rope. Pull the end to the hose up into the upper corners of the confined space. Also move the end of the hose around near the bottom of the confined space to move the gases or air around so it will be diluted or exhausted out of the confined space.

After 10 complete (or near complete) air changes have been made, lower the hose on the air monitor into the confined space and sample the air at different levels. The end of the air monitor hose should be lowered 2 to 4 feet each time to sample the air at different levels inside the confined space.

Continuous supply of fresh air shall be provided while entrant(s) is/are in the confined space.

7.2 WORK IN PROGRESS

- Continuous supply of fresh air shall be provided while entrant(s) is/are in the confined space.
- Entrant must exit permit space if blower stops.
- All blowers shall be a minimum of 1500 C.F.M.
- 10 Air exchanges per hour for a permit space is required.

7.3 RECORD KEEPING

- The entry supervisor shall document the time that the blower was started and when the blower was shut-off on the permit.

8.0 SAFETY EQUIPMENT

No employee shall perform or order to be performed any work in a permit space unless all the necessary safety equipment is available and all proper safety procedures are followed. Requirements for safety equipment and use are as follows:

8.1 FALL / RETRIEVAL DEVICE AND APPROVED SUPPORT DEVICE

- A fall/retrieval device and tripod shall be required for all top-opening covers for entry into a permit space.

    - Tripod
        - The tripod shall be capable of set-up on surfaces that are not level.
        - The tripod shall be capable of locking in place with safety chains attached to base of legs.
        - Non-slip feet on legs of tripod.
        - It is recommended that tripods are adjustable up to 9' (feet) tall.

    - Fall/Retrieval Device
        - Fall/retrieval device shall be of manual winch type.
        - Fall/retrieval device may have a "fall-arrest" capability.
        - Additional block to tackle hoist may be added for retrieval purposes.

8.2 PERSONAL PROTECTIVE EQUIPMENT

- Approved type safety harness with a 3/4 inch diameter manila safety line (a cable, or other approved safety rope may be substituted) connected to the harness shall be worn when entering, working in and exiting a confined space.
- A hard hat shall be worn at all times in a confined space.
- To provide as much body protection as possible, coverall or uniforms should be worn when working in a confined space.
- Special safety equipment such as boots, waders, dry suit, gloves, safety goggles/glasses and ear protection shall be worn as needed.
- A fall/retrieval device or other approved devices shall be provided for lifting employee(s) out of top opening confined spaces.
- A full body harness will be required with this program. This harness must meet ANSI Standard A10.14.
- Intrinsically safe electrical equipment is required for confined spaces.

8.3 EQUIPMENT INSPECTION

- All equipment needed for working in a permit space should be periodically inspected and repaired or replaced if necessary. It must also be inspected prior to each entry into a confined space by both the Entry Supervisor and the Entrant(s).

- If a necessary piece of equipment is in questionable condition, work shall halt until the equipment is repaired or replaced.
- Manufacturer recommendations shall be followed for all equipment.

9.0 PERMIT CLASSIFICATION SYSTEM

The "permit classification system" is based on existing or potential hazards relative to the confined space. The classification is based upon the characteristics of the space, oxygen level, flammability and toxicity. The classification shall be determined by the most hazardous condition of entering, working in, and exiting a confined space. Refer to check list of requirements for entry.

9.1 PERMIT REQUIRED CONFINED SPACE Permit Required Confined Space (PRCS) is one that presents a situation that may be immediately dangerous to life or health (IDLH).

- These include, but are not limited to, oxygen deficiency, explosive or flammable atmospheres, and/or concentrations of toxic substances.
- Special requirements for PRCS are as follows:
  - Two (2) attendants required outside PRCS at all times
  - One (1) attendant must maintain communication with entrant at all times; i.e. at manhole, hatch, opening, etc.,
  - Second attendant must remain on site.
  - Entrant shall utilize approved safety harness and lifeline/retrieval device.
  - Common types of PRCS are sewer manholes, sewer lines, stilling wells, junction structures, valve vaults, meter vaults, pumping plant wet wells, vats, pits and various types of storage tanks. Situations may arise that make Non - Permit Confined Space (NPCS) a PRCS.

9.2 NON- PERMIT REQUIRED CONFINED SPACE

A Non- Permit required confined space (low hazard) is one in which the potential hazard would not require any special modification of the work procedure except for the following:

- If no attendant is used, Central Control will be notified of location, entry time, estimated working time, and interval for safety checks. They will also be notified when work is completed.
- Entrant will have constant and reliable communications with Central Control (via hand held radio).
- Entrant will have safe a stable means of entry and exit (ladder, etc).
- Atmospheric testing, monitoring and ventilation are required (See Sections 6 & 7).

9.3 SPECIAL CONSIDERATION SPACES

- Any below grade facility or area with restricted access and is ventilated full time has the potential to become a confined space. Facilities with full time ventilation requirements will be equipped with alarm systems that activate upon loss of ventilation. This alarm shall be visible from outside the building. Any facility that is in alarm status will be considered a confined space.

- Trenches and other earthworks are normally not considered confined spaces. Situations can arise though, that would make these structures confined spaces. A broken gas main, force main or sewer main may need to be classified as a confined space if a determination has been made that atmospheric hazardous are present.

- **Any confined space that cannot be entered according to the strict provisions and procedures of this policy can only be entered once a site specific written procedure has been developed. This procedure shall include the development of a JSA and must identify all hazards and the alternative measures of personal protection that will be utilized to protect the entrants in the confined space. The written procedure must be reviewed and approved by the Safety and Risk Management Department prior to entry operations.**

APPENDIX A
CHECKLIST OF REQUIREMENTS FOR ENTRY,
WORKING IN AND EXITING CONFINED SPACES

CHECK	PRCS	NPCS
PRE-ENTRY EVALUATION	X	X
PERMIT	X	O
ATMOSPHERIC MONITORING	X	X
MONITORING	X	X
TRAINING OF PERSONNEL	X	X
LABELING AND POSTING	X	X
ISOLATE/LOCK-OUT	X	O
PURGE/VENTILATE	X	X
CLEANING PROCESSES	O	O
SPECIAL EQUIPMENT/TOOLS	X	O
INITIAL PLAN	X	X
ATTENDANT	X	O
COMMUNICATIONS/OBSERVATION	X	X
NON-ENTRY RESCUE PLAN	X	X
HEAD PROTECTION	X	X
HEARING PROTECTION	O	O
HAND PROTECTION	O	O
FOOT PROTECTION	O	O
BODY PROTECTION	O	O
RESPIRATORY PROTECTION	O	NA
TRIPOD	X	O
HARNESS	X	O
LIFELINE	X	O
RESCUE EQUIPMENT	X	O
RECORD KEEPING	X	X

X = REQUIRED

O = OPTIONAL- Determination to be made based on entry requirements.

APPENDIX B
Confined Space Evaluation Form

Site description: _____

Site location: _____

Evaluator (name): _____

Date: _____

Method of entry	Number of entry/exit points	Existing ventilation? Y/N	Potential Atmospheric Hazards Y/N	Potential for Engulfment Y/N	Other IDLH Hazards Y/N
Steps					
Ladder					
Top-Opening					
Door way					
Stairway					
Side opening					

Is the only potential hazard atmospheric?
(Y) (N)

Will removing check valves, piping, pumps, blind flanges, or meters, create the potential for atmospheric or engulfment hazards? (Y) (N)

Atmospheric test results:

	Without ventilation:	**With ventilation:**
O2	_____	_____
Co	_____	_____
H2s	_____	_____
LEL	_____	_____

Evaluation results:

Not a Confined Space ☐

Permit Required Confined Space ☐

Non-Permit Required Confined Space ☐

Evaluation Results Determination

Is it a Confined Space? Answer Yes or No to questions 1 – 3.

1. Is the space large enough and so configured than an employee can bodily enter* and perform assigned work? **(Y) (N)**

2. Does the space have limited or restricted means of entry and exit (This includes doorways and other portals that might hinder escape in an emergency, hoisting equipment, ladders, stairs, etc.)? **(Y) (N)**

3. It is designed for continuous employee occupancy? **(Y) (N)**

If you answer YES to questions 1 and 2 and NO to question 3 it is a confined space! You must now determine if this space is a PERMIT-REQUIRED confined space.

Is it a Permit-Required Confined Space? Answer Yes or No to the following questions:

1. Does the space contain or have the potential to contain a hazardous atmosphere? **(Y) (N)**

   A. Atmospheric oxygen content below 19.5% or above 23.5%?
   B. Flammable gas, vapor or mist in excess of 10% Lower Explosive Limit (LEL) or Lower Flammable Limit (LFL)?
   C. Airborne combustible dust at a concentration that meets or exceeds its Lower Explosive Limit (LEL) or Lower Flammable Limit (LFL)?
   D. Atmospheric concentration of any substance for which an OSHA Permissible Exposure Limit (PEL)** exists, which could result in employee exposure in excess of the Permissible Exposure Limit (PEL).
   E. Any other atmospheric condition that is immediately dangerous to life and health (DLH)?

2. Contains a liquid or finely divided solid material that may surround and capture a person and can be aspirated to cause death by filling or plugging the respiratory system; or could exert enough force on the body to cause death by strangulation, constriction, or crushing (engulfment). **(Y) (N)**

3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section (examples: funnel or hopper). **(Y) (N)**

4. Contains any other recognized serious safety and/or health hazard (examples: sewage, extreme temperatures, moving parts, live electrical equipment, falling objects, etc.). **(Y) (N)**

If you meet any **ONE** of the above it is a **PERMIT-REQURIED** Confined Space!
You now have 3 choices:

1) Deny entry to all employees

2) Evaluate the space and develop a procedure for safe entry.

3) Reclassify the space to non-permit required confined space by removing the hazard as follows:

1. If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space.

2. If testing and inspection during entry demonstrate that the hazards within the permit space have been eliminated.

3. If hazards arise within a de-classified space, all employees within that space shall exit immediately and the space shall be reevaluated.

4. The entry supervisor shall document the basis for determining that all hazards in a permit-required space have been eliminated, through a certification that contains the date, location, and signature of the person making the determination. A copy of this certification shall be made available to each employee entering as de-classified space.

APPENDIX C
CONFINED SPACE PERMIT

LOCATION _____ DATE ISSUED _____

PURPOSE OF ENTRY _____ TIME _____

_____ COMPLETION DATE _____

DEPARTMENT _____ TIME _____

CREW MEMBERS	AUTHORIZED ENTRANT TIME IN	AUTHORIZED ENTRANT TIME OUT	AUTHORIZED ATTENDANT YES	AUTHORIZED ATTENDANT NO

SPECIAL REQUIREMENTS

	YES	NO		YES	NO
LOCK-OUT/BLOCKOUT			SAFETY HARNESS		
LINES BROKEN-CAPPED OR BLANKED			FALL/RETRIEVAL DEVICE		
LINES/SYSTEM PURGED AND VENTED			TRIPOD		
EXTERNAL BARRIERS			LIFELINES		
AREA SECURE			SELF-CONTAINED BREATHING DEVICE		
VENTILATION – FULL TIME			FIRE EXTINGUISHER		
MONITORING AND TESTING			PPE		
HOT WORK PERMIT/PRE-JOB			RECORD OF GAS ANALYSIS		
CHECKLIST OF REQUIREMENTS REVIEWED		YES ☐		NO ☐	

ATMOSPHERIC MONITORING INSTRUMENT

INSTRUMENT MANUFACTURER	TYPE OR MODEL - INCLUDE SERIAL NUMBER			
DAILY CALIBRATION/OPERATION CHECK	YES ☐	NO ☐		
VENTILATION BLOWER OPERATION TIME	START	:	STOP	:

SPECIAL CONSIDERATIONS

AUTHORIZED BY _____ ENTRY SUPERVISOR _____

DATE _____ DATE _____

TIME _____ TIME _____

NOTE: Signature by entry supervisor verifies that actions and conditions for safe confined space entry have been met.

APPENDIX D

RECORD OF GAS ANALYSIS

LOCATION	**TIME**	DATE	LEL	H2S	CO	O2	EMPLOYEE

APPENDIX E

Riverside County Fire Department Facilities with Confined Space Rescue Equipment and Training:

Station #91 –College Park
16110 Lasselle Street
Moreno Valley, CA 92553
(951) 924-2714

Station #6 -Towngate
22250 Eucalyptus Ave
Moreno Valley, CA 92553
(951) 242-3101

Hazardous Materials Station
Station #34 Winchester
32655 Haddock Street
Winchester, CA 92596
(951) 926-6430

Station #73 – Rancho California
27415 Enterprise Circle West
Temecula, CA 92590
(951) 699-0351

Station #76 – Menifee Lakes
29950 Menifee Road
Menifee, CA 92584
(951) 679-2241

Hazardous Materials Station
Station #20 – Beaumont
1550 E. 6th Street
Beaumont, CA 92223
(951) 845-2791

SPECIFICATIONS - DETAILED PROVISIONS
Section 02201 - Construction Methods & Earthwork

C O N T E N T S

SECTION 02201
CONSTRUCTION METHODS & EARTHWORK

PART1-GENERAL

1.01 REQUIREMENT

A. Verification of Existing Conditions
It shall be the responsibility of the Contractor to examine the site of the work and to make all investigation necessary, both surface and sub-surface, to determine the character of materials to be encountered and all other existing conditions affecting the work.

~~B. Site Grading~~

C. Lines, Grades and Measures
All lines and grades will be established by the Engineer, and the Contractor shall provide him with such assistance and materials as may be required. The Contractor shall carefully preserve all survey stakes and reference points. SHOULD ANY STAKES OR POINTS BE REMOVED OR DESTROYED BY ANY ACT OF THE CONTRACTOR OR HIS EMPLOYEES THEY MAY BE RESET AT THE CONTRACTOR'S EXPENSE.

All work shall conform to lines, elevations and grades shown on the construction plans. Three consecutive points set on the same slope shall be used together so that any variation from a straight grade can be detected. Any such variations shall be reported to the District Engineer or Inspector. In the absence of such report, the contractor shall be responsible for any error in the grade of the finished work.

D. Compliance with Regulations
The Contractor shall familiarize himself, and comply with all applicable federal, state, county and municipal rules and regulations pertaining to sanitation, fire protection, and safety.

E. Contractor's Equipment
The Contractor shall provide such modern plant and equipment as may be necessary in the opinion of the Engineer to perform in a satisfactory and acceptable manner, and in accordance with the specifications, all the work required of the Contractor.

~~F. Representatives for Emergencies~~

~~G. Power and Water Supply~~

D. Compliance with Regulations
The Contractor shall familiarize himself, and comply with all applicable federal, state, county and municipal rules and regulations pertaining to sanitation, fire protection, and safety.

E. Contractor's Equipment
The Contractor shall provide such modern plant and equipment as may be necessary in the opinion of the Engineer to perform in a satisfactory and acceptable manner, and in accordance with the specifications, all the work required of the Contractor.

~~F. Representatives for Emergencies~~

~~G. Power and Water Supply~~

1.02 STRUCTURE PROTECTION

A. Operation of Utilities
No District valves or appurtenances of other utility facilities shall be operated by the Contractor without approval and/or instruction from the District or the utility, as appropriate.

1.03 JOB CONDITIONS

~~A. Rights of Way~~

B. Safeguarding Excavations and Property
Excavations shall be adequately shored and braced so that the earth will not slide or settle and so that all existing improvements of any kind will be fully protected from damage. Any damage resulting from a lack of adequate shoring and bracing shall be the responsibility of the Contractor. The Contractor shall effect all necessary repairs or reconstructions at the Contractor's own expense as directed by the Engineer and shall bear all other expenses resulting from such damage.

1.04 GUARANTEE
The Contractor hereby guarantees that the entire work constructed by him under the contract will fully meet all the requirements thereof as to quality of workmanship, and of materials furnished by him. The Contractor hereby agrees to make at his own expense any repairs or replacements made necessary by defective materials or workmanship supplied by him which have become evident within one (1) year, or other guarantee period elsewhere specified, after date of notice of completion and acceptance of the work is filed, and to restore to full compliance with the requirements of these specifications including the test requirements, any part of the facilities or appurtenant works which during said guarantee period is found to be deficient with respect to any provision of this specification. Replacement of backfill where it has settled below the lines established by the Engineer shall be considered part of such repair work. The Contractor shall make all repairs and replacements promptly upon receipt of written orders for same from the Engineer. If the Contractor fails to make the repair and replacements promptly, the District may do the work, and the Contractor and his surety shall be liable to the District for the cost thereof.

PART2-PRODUCTS

2.01 MATERIALS

A. Select Backfill Material, and Special Bedding and Backfill

Select backfill material shall be selected from the excavated material or imported when not available from the excavated material. In either case, it shall be provided at the Contractor's expense, and shall be included in the costs proposed for pipeline installation on the bidding sheets.

Where called for on the plans or in these specifications, and not covered by a separate bid item, special bedding or backfill shall be included in pipeline construction costs on the bidding sheets.

Where required by the governing agency or by the District to meet compaction requirements of these specifications or requirements of these specifications for bedding or for select granular backfill, special bedding or imported backfill and disposal of excavated spoil shall be provided at the Contractor's expense.

The requirements for special bedding and backfill at the Contractor's expense as described herein as a part of the Special Conditions or as shown on the Contract Drawings shall supersede and take precedence over any and all other requirements for measurement and/or payment for special bedding or backfill found elsewhere in these specifications. Bedding is defined herein to include sand, rock or concrete base, cradle, or encasement. Backfill material is defined herein to include backfill for both trench backfill and pipe bedding (or pipe zone backfill).

Special bedding or backfill not called for on the plans or in these specifications, but required by the Engineer over and above the requirements of this specification shall be constructed at additional cost, at prices reflecting current material costs as evidenced by paid vouchers, plus 50% to cover all costs of installation and overhead.

The encounter of ground water not anticipated in engineering reports made available for this contract, and the required over-excavation and construction of a stable base as determined necessary by the Engineer shall be considered over and above the requirements of this specification, and the required base shall be paid for at the above stipulated prices.

PART3–EXECUTION

3.01 WEATHER LIMITATIONS

Excavating and grading shall be performed only when the weather conditions do not adversely affect the quality of the finished product. Any graded or excavated areas that are damaged by the effect of rain, or other weather conditions, during any phase of the construction, shall be re-excavated, regraded, and recompacted to conform to the herein specified requirements, without additional cost to the District.

3.02 PREPARATION

A. Control of Water

The Contractor shall acquire such permits and take such measures as may be required, and shall furnish, install, and operate such pumps or other devices as may be necessary to remove any seepage, storm water, or sewage that may be found or may accumulate in the excavations during the progress of the work. The Contractor shall keep all excavations entirely free from water at all times during the construction of the work and until the Engineer gives permission to cease pumping. He shall keep the complete work reasonably free from accumulations of water and sewage, and shall free it entirely at such times as may be required by the Engineer for inspection or other purposes. Any accumulated water or sewage thus pumped shall be disposed of in accordance with good practice and local ordinances.

The Contractor shall provide an adequate dewatering system for the control of surface and groundwater seepage into the excavations as may be required during the construction period. The proposed plan of this dewatering system shall be submitted to the Engineer for concept approval prior to the installation of the system.

3.03 CONSTRUCTION

~~A. Excavation~~

~~1. Seismic Investigation~~

2. Trench Excavation. Unless otherwise specified in the Special Conditions or on the Contract Drawings, pipeline trenches shall have a minimum clear distance: pipe sizes up through 12" - 6" to 9" min., sizes larger than 12",
12" minimum on each side of the pipe barrel when the pipe is properly placed and aligned in conformity with the Contract Drawings. The sides of the trench shall be parallel to and at equal distance on each side of the centerline of the pipe.

The maximum length of trench which shall be opened or partially opened at any one time shall be limited to 500' for sewer lines and one-half mile for water pipelines, except where governed by other agencies or approved by the Engineer. See Section 3.04. J, "Clean-up During Construction" for maximum trench length without restoration. Bell holes or depressions shall be dug by hand at the proper locations of sufficient size to adequately work the joints, but no larger than is required.

When the trench is excavated to the line and grade as shown on the drawings, and the bedding material encountered is rock, the trench shall be excavated an additional depth of at least 4" below the grade for the bottom of the pipe, and the bottom of the trench shall be refilled with approved material, moistened and compacted by tamping or by other approved method to the satisfaction of the Engineer.

Where ground water is encountered and the native material does not afford a solid foundation for pipe subgrade as specified above, the Contractor shall excavate to such depth below subgrade as determined necessary by the Engineer and shall construct a stable base by placing crushed rock bedding upon which subgrade can be prepared. Crushed rock for bedding shall be one and one-half inch (1 1/2") maximum size.

When the trench has been inadvertently excavated below the designed grade, at the Contractor's expense, the bottom of the trench shall be refilled with approved material, well compacted into place in an approved manner and to the satisfaction of the Engineer.

~~3. New Subdivision Construction. Where pipelines~~

4. Excavated Materials. Shall be piled neatly along the side of the trench and adjacent to manhole excavations in such a manner as to be of as little inconvenience as possible to the public traffic or the occupants of the adjacent property, and be in compliance with safety standards and soils report recommendations.

Through all cultivated areas, topsoil removed from excavations shall be replaced as backfill in the uppermost part of the excavation to a depth as it existed previous to excavation, not exceeding 18". Where topsoil replacement is required, excavated topsoil shall be stored separately from other materials and in general shall be replaced as backfill in the same parcel of land from which it came.

~~5. Manhole Excavations.~~

~~6. Blasting.~~

~~7. Cutting.~~

~~8. Disposal of Excavated Materials.~~

~~9. Bracing and Shoring.~~

~~10. Bridges.~~

B. Installation

1. Pipe. The pipe manufacturer shall send a field representative to answer any questions on installation procedures, within 48 hours of request, as coordinated by and through the Engineer.

2. Concrete Encasement. Where required on the Contract Drawings, concrete cradles and encasements shall be constructed in accordance with the requirements stated thereon.

   Whenever the maximum allowable width of trench as specified elsewhere in these specifications or in the construction plans or the standard drawings, is exceeded for any reason except as provided for in the plans or special conditions or by the written direction of the Engineer, and where the resulting effect of the exceeded trench width would place loads upon the pipeline exceeding the maximum loads recommended by the pipe manufacturer, the Engineer may require, at his discretion, that the Contractor, at his own expense for all labor and materials cradle the pipe in Class "C" concrete, as described in this specification.

C. Fill, Backfill and Grading

Fill, Backfill and Grading shall include all scarifying, moistening, compacting, and other manipulations of the soil necessary to obtain the required densities, cross sections, lines, grades and surface finish indicated or specified Backfill shall not be placed in trenches or excavations until the pipelines and structures in the particular section involved have been inspected and approved for backfilling by the Engineer.

Backfill shall be placed, insofar as practical, as the work progresses, allowing time for concrete (if used) to attain sufficient strength.

All excavations outside the completed pipelines and structures shall be backfilled with compacted material to the level of the original ground surface unless otherwise shown on the drawings or ordered by the Engineer. The materials used for backfill shall be imported, selected material, or approved selected excavated materials and shall be placed as directed by the Engineer. All materials placed within 6" of the pipe or structure shall be free from rocks or boulders larger than 1 1/2" maximum dimension, and from unbroken masses of earthy materials which might lodge and thereby cause unfilled pockets in the excavation.

Unsuitable material encountered at the surface upon which the bedding material is to be placed shall be removed to a depth as determined in the field by the Engineer. Unsuitable material shall be as determined by the Engineer. If not otherwise specified, removal of material and additional bedding so ordered over and above the amount required will be paid for in accordance with the specifications unless, however, the necessity for such additional bedding materials has been occasioned by an act or failure to act on the part of the Contractor, in which event the Contractor shall bear the expense of the additional excavation and backfill to the required depth. The Contractor's attention is called "dewatering" procedures to ensure that an otherwise stable foundation will not be rendered unfit due to accumulation of water in the trench excavation. However, the Contractor has the responsibility to reasonably ascertain the soil conditions prior to bid. The cost of removing the unsuitable materials should have been known prior to bid and be included in the bid price.

Imported materials (if any) required for fill or backfill shall be provided by the Contractor from areas outside the site at his own expense. Such material shall be as herein specified and must be approved by the District before delivery to the site.

1. Structure Backfill. The Contractor shall place all backfill about structures to the original ground level, or to the lines shown on the drawings or prescribed by the Engineer. Fill materials shall be of earth only, and be free from debris, vegetation, alkali, or other deleterious substances.

   All backfill about structures shall be placed in layers not more than 6" thick prior to compaction, which shall be obtained by moistening to optimum moisture content prior to placing and compacting to maximum compaction by use of suitable equipment approved by the Engineer.

   The Contractor shall take all necessary precautions to protect the structure and underground facilities during the placement, compacting or consolidating, and grading of backfill.

2. Pipeline Backfill. Except as otherwise required by the construction plans or the standard drawings, the material used in backfilling to 1' above the pipe shall be granular material approved by the Engineer and in accordance with the manufacturers requirements, sandy, or sandy gravel material obtained from required excavation or from approved borrow areas, as shown on the Contract Drawings or as directed by the Engineer.

This material shall be carefully placed and compacted to provide a firm continuous bedding and encasement for the pipe. Pipe shall be shaded the same day it is laid to protect it from possible damage and/or thermal expansion. Pipe zone backfill may be consolidated by careful flooding to saturation only if the soil has a Sand Equivalent of 30 or better and no more than 10% fines (particles passing the no. 200 sieve), otherwise mechanical compaction will be required or as specified elsewhere in these specifications.

Variations to the foregoing pipeline backfill requirement, when recommended by the pipe manufacturer or requested by the Contractor, shall be submitted for approval by the District prior to the commencement of such pipe installation. The method of compaction shall then be proven before backfilling more than the footage of pipe allowed by the contract specification. In lieu of a specific contract requirement, not more than 1000' of pipe shall be laid and backfilled prior to proving the method of compaction.

The remaining trench backfill shall consist of select backfill material from the excavation, when available, free from stones or lumps exceeding 3" in greatest dimension, and free from vegetable matter or other unsatisfactory material. This select material as defined herein and elsewhere in these specifications shall be placed in layers not exceeding 2' in depth, unless otherwise directed by the Engineer. Excavated soils that have excessive moisture must be dried, mixed, or replaced with suitable material that will meet the compaction requirements at no additional cost to EMWD. Each lift shall be consolidated in such a manner that the backfill will meet the requirements of these specifications. Care shall be taken not to disturb the backfill previously placed, and the Contractor shall at all times protect the pipe against flotation. Material placed between successful test and failed test shall be tested at one-fifth (1/5) the distance intervals until a passing test is achieved. All material from failed test to successful test shall be removed, recompacted and retested.

~~3. Sewer Line Backfill.~~

4. Water Line Backfill. Prior to backfilling, all pipe 30" in diameter and larger shall be either filled with water under pressure or braced with stulls sufficiently to prevent distortion while placing, consolidating and compacting back fill. Prior to backfilling, all trench supports shall be removed unless otherwise approved by the Engineer.

~~5. Gravel Fill.~~

6. Compacting and Surfacing. Except as otherwise specifically required by the encroachment permit or elsewhere in these specifications, the following requirements will apply:

The upper portion of the final lift will be backfilled with selected material from the excavation, moistened to optimum moisture content and compacted by mechanical tamping to meet the requirements of the District

standards. All backfill in public roads shall be consolidated and surfacing shall be placed to meet State of California and Riverside County requirements as stated in the respective permit, whether or not required by the inspector for that particular agency - unless otherwise approved by the Engineer.

Where backfill is in areas not within public roads, it shall be consolidated and tested to meet the requirements of these specifications, except as otherwise approved by the Engineer.

Minimum acceptable field densities specified in District standards shall be determined in accordance with the testing procedures set forth elsewhere in these specifications.

Where sand material of an approved grade is used for backfilling, mechanical compaction may be eliminated and compaction obtained by jetting.

Except as otherwise required by a specific permit, where pavement is being replaced, an approved plant mixed surfacing shall be placed to a minimum thickness of 3" when compacted. Surfacing in streets shall be maintained to original street grade after laying and any settlement filled with plant mix surfacing.

The edges of trenches which are broken down during the making of subgrade shall be removed and trimmed neatly before refilling or resurfacing. When the backfill is complete and excess material removed, the surface will be graded and a layer of approved decomposed granite will be placed with a minimum thickness of 4" when compacted at optimum moisture content by rolling and to a grade to conform to the original roadway section. All pavements outside the paylines damaged by the Contractor shall be trimmed and repaired.

D. ~~Paving~~

3.04 FIELD QUALITY CONTROL

A. Contractor's Responsibility for Safety
The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work. This requirement will apply continuously 24 hours a day every day until final acceptance of the work and shall not be limited to normal working hours.

B. Warnings and Barricades
The Contractor shall provide and maintain barricades, guards, temporary bridges and walkways, watchmen, night lights and danger signals illuminated from sunset to sunrise, and all other necessary appliances and safeguards to protect the work, life, property, the public, excavations, equipment, and materials. Barricades shall be of substantial construction and shall be painted such as to increase their visibility at night. Suitable warning signs shall be so placed and illuminated at night as to show in advance where construction, barricades, or detours exist. Guard rails shall be provided for bridges and walkways over or adjoining excavations, shafts, and other openings and locations where injury may occur.

C. Fire Prevention
The Contractor's Safety Officer shall inspect the entire work and site, including storage areas, at frequent intervals to verify that fire prevention measures are constantly enforced.

D. Fire Extinguishers and Hoses
The Contractor shall furnish and maintain fully charged fire extinguishers of the appropriate type, supplements with temporary fire hoses wherever an adequate water supply exists, at the places where burning, welding, or other operations that may cause a fire are being performed.

E. Flammable or Toxic Materials

Only a working supply of flammable or toxic materials shall be permitted on or on any of the permanent structures and improvements, and shall be removed therefrom at the end of each day's operations. The Contractor shall store flammable or toxic materials and waste separate from the work and stored materials for the work in a manner that prevents spontaneous combustion or dispersion, and none shall be placed in any sewer or drain piping nor buried on the site.

F. Safety Helmets, Clothing, and Equipment

The Contractor shall not permit any person for whom he is responsible or liable to enter or remain on the site of the work unless the person is equipped with and wearing a safety helmet and other protective clothing and safety equipment conforming to the requirements of the District or regulatory agencies, and shall discharge from the site all persons not so equipped. The Contractor shall post conspicuous signs at appropriate locations warning the public and persons engaged upon the work of this requirement. The Contractor shall furnish for their temporary use such safety helmets, protective clothing, and safety equipment as the Engineer may request of him.

G. Hazardous Areas

The Contractor shall not permit or allow any person or persons to enter any pipe or space containing hazardous or noxious substances or gases, or where there is an insufficient amount of oxygen to sustain life and consciousness, or any other hazardous area unless equipped with lawful and appropriate safety equipment and life-supporting apparatus, and unless those entering are continually monitored and guarded by and in communication with other persons outside the space or area who are equipped in the same way, can give an alarm to others for assistance, and initiate immediate rescue operations in the event of mishap.

H. Work During an Emergency

The Contractor shall perform any and all operations and shall furnish any materials and equipment necessary during an emergency endangering life or property and, in all cases, shall notify the District of the emergency as soon as practical, but shall not wait for instruction before proceeding to properly protect both life and property. Any additional compensation or extension of contract time claimed by the Contractor on account of an emergency shall be applied for as provided in the specifications.

I. Compaction Tests

All compaction tests required by either the governing agency having jurisdiction over the right-of-way or by the District shall be performed by the District or its agent at District expense. However, in the event these tests prove the compaction to be unacceptable to either the governing agency or the District, all subsequent tests required by the governing agency or the District shall be performed at the Contractor's expense.

Tests will be scheduled within 24 hours of the Contractor's request for tests, at locations to be selected by the District and/or the governing agency. However, tests shall not be scheduled until a minimum 4-hours work is available for the testing laboratory, as determined by the Engineer. Results of these tests shall then be available within 48 hours.

In-place soil densities shall be determined by the sand cone method of test in accordance with currently adopted ASTM Standard D-1556, or by the nuclear method of test in accordance with ASTM Standard D-2922.

Optimum soil moisture-compaction relations shall be determined by the method of test specified in ASTM Standard D-1557, except as otherwise specified in the Special Conditions.

Soils testing provided by EMWD to determine compliance with the requirements of this specification does not relieve the Contractor of his/her responsibility.

In accordance with provisions for guarantee of the work, the Contractor shall return at his expense to correct any backfill conditions subsequently found to be substandard by either failure or more extensive testing. The Contractor shall provide all labor and equipment necessary to prepare for all tests and to assist the soils engineer in taking the tests, as directed by the Engineer.

J. Clean-up During Construction

The Contractor shall keep the premises occupied by him in a neat and clean condition, and free from unsightly accumulation of rubbish. Upon completion of the work and before the final estimate is submitted, the Contractor shall, at his own cost and expense, satisfactorily dispose of or remove from the vicinity of the work all plants, buildings, rubbish, rock, unused and excavated materials belonging to him or used under his direction during the construction, and in the event of his failure to do so, the same may be removed and disposed of by the District at the Contractor's expense. Contractor's responsibility shall include satisfactory disposal of all debris or protective material resulting from material delivery such as plastic wrappings, pipe stulls, etc., whether or not the Contractor furnished such material.

The Contractor shall carry on his operations in such sequence and in such manner as to interfere as little as possible with other improvements. When the construction is adjacent to or on residential property or cultivated fields or orchards, disposal of material and backfill operations shall be performed in such manner as to restore the properties to their original condition as nearly as practical as determined by the Engineer. Topsoil shall be carefully removed, stockpiled, and replaced after the backfill is placed.

As a part of the clean-up operation on facilities in private right-of-way, the Contractor shall restore the soil the full width of the right-of-way to a mechanical condition equivalent to that which existed at the time of the construction operations on such areas, by thoroughly loosening the soil with subsoilers, or other acceptable means and by discing and leveling if necessary, any stones, gravel, or other deleterious material left in spoil banks. On such lands debris shall be removed by the Contractor before his final preparation of the soil and shall bedisposed of as required for excavated materials.

In unimproved areas the finish surfaces over pipelines shall be graded to drain surface water away from the center line of the actual trench and provide drainage away from all the structures. No ponding of surface water will be allowed within the construction right-of-way.

Contractor shall complete total trench restoration (original condition or better) within 1,320 feet of trench heading or within 10 working days of construction, whichever represents the least amount of time. Failure of the contractor to comply with the Engineer's cleanup orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

END OF SECTION 02201

SPECIFICATIONS - DETAILED PROVISIONS Section
02221 - Trenching, Backfilling, and Compacting

C O N T E N T S

SECTION 02221
TRENCHING, BACKFILLING, AND COMPACTING

PART1-GENERAL

1.01 SUMMARY

A. Trench, backfill, and compact as specified herein and as needed for installation of underground utilities associated with the work.

B. ~~Verification of Existing Conditions.~~

C. ~~Lines, Grades and Measures..~~

D. ~~Compliance with Regulations..~~

E. ~~Contractor's Equipment..~~

F. ~~Representatives for Emergencies..~~

G. ~~Water Supply.~~

1.02 ~~STRUCTURE PROTECTION~~

A. ~~Contract Drawings.~~

B. ~~Notification of Underground Service Alert of Southern California.~~

C. ~~Operation of Utilities.~~

1.03 ~~JOB CONDITIONS~~

A. ~~Safeguarding Excavations and Property.~~

B. ~~Safety Measures..~~

1.04 GUARANTEE

The Contractor hereby guarantees that the entire work constructed by him under the contract will fully meet all the requirements thereof as to quality of workmanship, and of materials furnished by him.

PART2-PRODUCTS

2.01 MATERIALS

A. Select Backfill Material, and Special Bedding and Backfill. Select backfill material shall be selected from the excavated material or imported when not available from the excavated material. In either case, it shall be provided at the Contractor's expense, and shall be included in the costs proposed for pipeline installation on the bidding sheets.

Provide soil materials free from organic matter and deleterious substances, containing no rocks over 3" in greatest dimension, and with no more than 15% of the rocks over 2" in their greatest dimension.

Where called for on the plans or in these specifications, and not covered by a separate bid item, special bedding or backfill shall be included in pipeline construction costs on the bidding sheets.

Where required by the governing agency or by the District to meet compaction requirements of these specifications, or requirements of these specifications for bedding or for select granular backfill, special bedding or imported backfill and disposal of excavated spoil shall be provided at the Contractor's expense.

The requirements for special bedding and backfill at the Contractor's expense as described herein as a part of the Special Conditions or as shown on the Contract Drawings shall supersede and take precedence over any and all other requirements for measurement and/or payment for special bedding or backfill found elsewhere in these specifications. Bedding is defined herein to include sand, rock or concrete base, cradle, or encasement. Backfill material is defined herein to include backfill for both trench backfill and pipe bedding (or pipe zone backfill).

Special bedding or backfill not called for on the plans or in these specifications, but required by the Engineer over and above the requirements of this specification, shall be constructed at additional cost, at prices reflecting current material costs as evidenced by paid vouchers, plus 50% to cover all costs of installation and overhead.

The encounter of ground water not anticipated in engineering reports made available for this contract, and the required over-excavation and construction of a stable base as determined necessary by the Engineer shall be considered over and above the requirements of this specification, and the required base shall be paid for at the above stipulated prices.

PART3-EXECUTION

3.01 WEATHER LIMITATIONS

Excavating and grading shall be performed only when the weather conditions do not adversely affect the quality of the finished product. Any graded or excavated areas that are damaged by the effect of rain, or other weather conditions, during any phase of the construction, shall be re-excavated, regraded, and recompacted to conform to the herein specified requirements, without additional cost to the District.

~~3.02 PREPARATION~~

~~A. Control of Water.~~

3.03 CONSTRUCTION

A. Excavation. The Contractor shall perform all excavation necessary or required for the construction of the facilities covered by these specifications. Excavations may be performed by either hand or machine methods and shall be of sufficient size to provide adequate space for working in accordance with safety regulations and practice and the Contract Drawings. Excavations shall include the removal and disposal of all materials of whatever nature and quantity including water, rock, decomposed granite, or any other type of soil or material, subsurface obstructions and also overhead obstructions which may interfere with the operation of equipment used on the work, for no additional compensation. Excavation for foundations shall be made only after construction of subgrade, as hereinafter described, has been completed. Over excavation for foundations shall be filled with concrete.

1. Trench Excavation. Unless otherwise specified in the Special Conditions or on the Contract Drawings, pipeline trenches shall have a minimum clear distance of 6" and a maximum of 9" on each side of the pipe barrel when the pipe is properly placed and aligned in conformity with the Contract Drawings.

When the trench is excavated to the line and grade as shown on the drawings, and the bedding material encountered is rock, the trench shall be excavated an additional depth of at least 4" below the grade for the bottom of the pipe, and the bottom of the trench shall be refilled with approved material, moistened and compacted by tamping or by other approved method to the satisfaction of the Engineer.

Where ground water is encountered and the native material does not afford a solid foundation for pipe subgrade as specified above, the Contractor shall excavate to such depth below subgrade as determined necessary by the Engineer and shall construct a stable base by placing crushed rock bedding upon which subgrade can be prepared. Crushed rock for bedding shall be one and one-half inch (1 1/2") maximum size.

When the trench has been inadvertently excavated below the designed grade, at the Contractor's expense, the bottom of the trench shall be refilled with approved material, well compacted into place in an approved manner and to the satisfaction of the Engineer.

Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining, as directed by the engineer but not less than 90% of maximum compaction. This work is to be done at no extra cost to owner.
Where trenching occurs in existing turf areas, remove turf in sections and keep roots damp. Replace turf upon completion of backfilling.

2. Cover. Provide minimum trench depth indicated below to maintain a minimum cover over the top of each listed utility, unless otherwise indicated in specifications or on the drawings.

   a) 1. Water lines: 48"
   b) 2. Gas lines: 24"
   c) 3. Electrical lines: 36"

3. Excavated Materials. Shall be piled neatly along the side of the trench and adjacent to manhole excavations in such a manner as to be of as little inconvenience as possible to the public traffic or the occupants of the adjacent property.

   Through all cultivated areas, topsoil removed from excavations shall be replaced as backfill in the uppermost part of the excavation to a depth as it existed previous to excavation, not exceeding 18". Where topsoil replacement is required, excavated topsoil shall be stored separately from other materials and in general shall be replaced as backfill in the same parcel of land from which it came.

4. Disposal of Excavated Materials. Insofar as space is available in the right-of-way, such space may be used for temporary storage of excavated material, to be used for backfill, provided that no material shall be stored or deposited in violation of any ordinance or regulation prohibiting the filling or obstructing of water courses in drainage channels. All materials removed from the excavations in excess of that stored temporarily as above specified shall be immediately hauled away and used in backfilling elsewhere, or, if not used, shall be disposed of by the Contractor. The disposal area shall be acquired by the Contractor.

   No materials shall be disposed of either temporarily or permanently on privately or publicly owned property unless the Contractor shall first obtain permission therefore from the owner or agency concerned. The Contractor shall furnish satisfactory evidence to the Engineer that such consent has been obtained and shall be responsible for all damages and claims that may arise in connection therewith.

5. ~~Bracing and Shoring.~~

B. Fill, Backfill and Grading shall include all scarifying, moistening, compacting, and other manipulations of the soil necessary to obtain the required densities, cross sections, lines, grades and surface finish indicated or specified.

Backfill shall not be placed in trenches or excavations until the pipelines and structures in the particular section involved have been inspected and approved for backfilling by the Engineer.

All excavations outside the completed pipelines and structures shall be backfilled with compacted material to the level of the original ground surface unless otherwise shown on the drawings or ordered by the Engineer. The materials used for backfill shall be imported, selected material, or approved selected excavated materials and shall be placed as directed by the Engineer. All materials placed within 6" of the pipe or structure shall be free from rocks or boulders larger than 1 1/2" maximum dimension, and from unbroken masses of earthy materials which might lodge and thereby cause unfilled pockets in the excavation.

Unsuitable material encountered at the surface upon which the bedding material is to be placed shall be removed to a depth as determined in the field by the Engineer. Unsuitable material shall be as determined by the Engineer. If not otherwise specified, removal of material and additional bedding so ordered over and above the amount required will be paid for in accordance with the specifications unless, however, the necessity for such additional bedding materials has been occasioned by an act or failure to act on the part of the Contractor, in which event the Contractor shall bear the expense of the additional excavation and backfill to the required depth. The Contractor's attention is called to “dewatering" procedures to ensure that an otherwise stable foundation will not be rendered unfit due to accumulation of water in the trench excavation.

Imported materials (if any) required for fill or backfill shall be provided by the Contractor from areas outside the site at his own expense. Such material shall be as herein specified and must be approved by the District before delivery to the site.

1. Structure Backfill. The Contractor shall place all backfill about structures to the original ground level, or to the lines shown on the drawings or prescribed by the Engineer. Fill materials shall be of earth only, and be free from debris, vegetation, alkali, or other deleterious substances.

   All backfill about structures shall be placed in layers not more than 6" thick prior to compaction, which shall be obtained by moistening to optimum moisture content prior to placing and compacting to maximum compaction by use of suitable equipment approved by the Engineer.

   The Contractor shall take all necessary precautions to protect the structure and underground facilities during the placement, compacting or consolidating, and grading of backfill.

2. Pipeline Backfill. Except as otherwise required by the construction plans or the standard drawings, the material used in backfilling to 1' above the pipe shall be cohesionless, sandy, or sandy gravel material obtained from required excavation or from approved borrow areas, as shown on the Contract Drawings or as directed by the Engineer. This material shall be carefully placed and compacted to provide a firm continuous bedding and encasement for the pipe. Pipe shall be shaded the same day it is laid to protect it from possible damage and/or thermal expansion. Pipe zone backfill shall be consolidated by mechanical tamping.

   Deposit approved backfill and bedding material, in the lower portion of the trench, in layers of 6" maximum thickness, and compact with suitable mechanical tampers to a density not less than 85%, or grade as specified in special conditions of contract, until there is a cover of not less than 24" for sewer lines and 12" over other utility lines. Care must be taken to not damage the pipe.

   The remaining trench backfill shall consist of select backfill material from the excavation, when available, free from stones or lumps exceeding 3" in greatest dimension, and free from vegetable matter or other unsatisfactory material. This select material as defined herein and elsewhere in these specifications, shall be placed in layers not exceeding 2’ in depth, unless otherwise directed by the Engineer. Each lift shall be consolidated in such a manner that the backfill will meet the requirements of compaction to 90% maximum density per ASTM D1557-09. Care shall be taken not to disturb the backfill previously placed, and the Contractor shall at all times protect the pipe against flotation. All material from failed test to successful test shall be removed, recompacted and retested.

3. Compacting and Surfacing. Except as otherwise specifically required by the encroachment permit or elsewhere in these specifications, the following requirements will apply:

   The upper portion of the final lift will be backfilled with selected material from the excavation, moistened to optimum moisture content and compacted by mechanical tamping to meet the requirements of the District standards, of 95% maximum compaction. All backfill in public roads shall be consolidated and surfacing shall be placed to meet State of California and Riverside County requirements as stated in the respective permit, whether or not required by the inspector for that particular agency - unless otherwise approved by the Engineer.

   Where backfill is in areas not within public roads, it shall be consolidated and tested to meet the requirements of these specifications, except as otherwise approved by the Engineer.

   Minimum acceptable field densities specified in District standards shall be determined in accordance with the testing procedures set forth elsewhere in these specifications.

   Where sand material of an approved grade is used for backfilling, mechanical compaction may be eliminated and compaction obtained by jetting.

   Except as otherwise directed by the Engineer, after a period of not less than 30 days or more than 60 days, any settlement shall be filled with decomposed granite.

3.04 FIELD QUALITY CONTROL

A. Contractor's Responsibility for Safety. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work. This requirement will apply continuously 24 hours a
day every day until final acceptance of the work and shall not be limited to normal working hours.

B. Warnings and Barricades. The Contractor shall provide and maintain barricades, guards, temporary bridges and walkways, watchmen, night lights and danger signals illuminated from sunset to sunrise, and all other necessary appliances
and safeguards to protect the work, life, property, the public, excavations, equipment, and materials. Barricades shall be of substantial construction and shall be painted such as to increase their visibility at night. Suitable warning signs shall be so placed and illuminated at night as to show in advance where construction, barricades, or detours exist. Guard rails shall be provided for bridges and walkways over or adjoining excavations, shafts, and other openings and locations where injury may occur.

C. Compaction Tests. All compaction tests required by either the governing agency having jurisdiction over the right-of-way or by the District shall be performed by the District or its agent at District expense. However, in the event these tests prove the compaction to be unacceptable to either the governing agency or the District, all subsequent tests required by the governing agency or the District shall be performed at the Contractor's expense.

Tests will be scheduled within 24 hours of the Contractor's request for tests, at locations to be selected by the District and/or the governing agency. However, tests shall not be scheduled until a minimum 4-hours work is available for the testing laboratory, as determined by the Engineer. Results of these tests shall then be available within 48 hours.

In-place soil densities shall be determined by the sand cone method of test in accordance with ASTM Standard D-1556-64, or by the nuclear method of test in accordance with ASTM Standard D-2922-071.

In accordance with provisions for guarantee of the work, the Contractor shall return at his expense to correct any backfill conditions subsequently found to be substandard by either failure or more extensive testing. The Contractor shall provide all labor and equipment necessary to prepare for all tests and to assist the soils engineer in taking the tests, as directed by the Engineer.

In unimproved areas the finish surfaces over pipelines shall be graded to drain surface water away from the center line of the actual trench and provide drainage away from all the structures. No ponding of surface water will be allowed within the construction right-of-way.

Contractor shall complete total trench restoration (original condition or better) within 1,320 feet of trench heading or within 10 working days of construction, whichever represents the least amount of time. Failure of the contractor to comply with the Engineer's cleanup orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

END OF SECTION 02221

SPECIFICATIONS - DETAILED PROVISIONS
Section 02252 - Control Density Fill

C O N T E N T S

SECTION 02252
CONTROL DENSITY FILL

PART 1 - GENERAL

1.01 DESCRIPTION

Control Density Fill (CDF) is used as a low strength, self consolidating fill material for confined spaces which can be easily excavatable at a later time. CDF is characterized by a high maximum slump of 8 inches. CDF is not a structural concrete and should not be used in such applications.

CDF may be used as a trench backfill, structural backfill, pipe bedding, or pipe filling for abandonment in place. CDF shall consist of Portland cement, aggregates, water and fly ash. Chemical admixtures and other mineral admixtures may be used.

The actual mix proportions and flow characteristics shall be determined by the producer of the CDF to meet site conditions. Mix designs and performance tests shall be submitted to the Engineer for approval.

1.02 UTILITY TRENCH CDF MIX DESIGN (PER CUBIC YARD)

A.	Cement	50 – max lbs
B.	Fly Ash (Type F)	50 - 150 lbs
C.	Total Mix Water	35 gallons Max.
D.	Stable Air Content	20 - 30%

CDF shall be hand excavatable and shall contain aggregate no larger than 3/8 inch and the 3/8 inch aggregate shall comprise no more than 20 percent of the total aggregate content.

PART 2 - PRODUCT

2.01 PORTLAND CEMENT

Portland cement shall conform to the requirements of Section 03300, Part 2.01 A of the EMWD Specifications.

2.02 AGGREGATES

Aggregates shall conform to the requirements of Section 03300, Part 2.01 B of the EMWD Specifications, except as follows. Aggregates shall be pretested in CDF mixtures similar to those anticipated for the work, confirming their ability to perform as required for the specific application. Aggregates not in conformance with Section 03300 may be used when approved by the Engineer, providing the material has a minimum sand equivalent of 20, the percentage passing the No. 200 sieve does not exceed 12 percent, and the fines are non-plastic.

2.03 WATER
Water shall be free of oils, acids, alkalies, organic matter or other deleterious substances.

2.04 ADMIXTURES
Admixtures shall conform to the requirements of Section 03300, Part 2.01 C of the EMWD Specifications.

2.05 FLY ASH
Fly ash shall conform to the requirements of ASTM C 618, Class F. Fly ash as a percent by weight of total cementitious material, shall not exceed 20 percent.

PART 3 - EXECUTION

3.01 MIXING
Mixing shall conform to the requirements of Section 03300, Part 2.03 of the EMWD Specifications, except for the one and one-half hour time limit specified in Paragraph B of Part 2.03. Unless otherwise specified, under conditions contributing to quick setting, the Engineer may specify a time limit, not to exceed two and one-half hours.

When CDF is used underneath a paved public right-of-way, the mixture shall contain a minimum of 25 pounds per cubic yard of cement when using washed concrete sand.

Adjustment of the mixture to achieve improved placement characteristics shall be through the use of chemical admixtures. No increase in water content or water to cement ratio will be allowed.

3.02 TESTING
CDF shall be tested for plastic unit weight. Plastic unit weight shall not deviate more than $\pm$10 percent of theoretical unit weight shown on the approved mix design. Unit weight shall be determined in accordance with ASTM C138.

CDF's consistency shall be tested by the slump method. The slump shall be measured in accordance with ASTM C143.

3.03 PLACEMENT
CDF may be placed by chutes, conveyors, buckets or pumps depending upon the application and accessibility.

For trench backfill, CDF shall be placed continuously. To contain CDF when filling long open trenches or open ended structures in stages, the end points shall be adequately bulkheaded to prevent movement. Methods may include bulkheading with sandbags, earth dams, forms or stiffer mixtures of CDF. CDF shall be placed from the centerline of mainline utilities to the bottom of the excavation.

For bedding, CDF shall be placed in a manner to prevent flotation or displacement of the embedded item. Methods of preventing flotation or displacement may include placement of CDF in lifts, faster setting CDF or lower slump CDF over the embedded item.

For backfilling of pipelines to be abandoned in place, CDF shall be pumped into the pipeline to be abandoned. It is intended that the disconnected ends of the pipeline shall be the primary means for injecting CDF into the pipeline. The Contractor may excavate for additional injection points along the pipeline. The pipeline shall be filled uniformly to within 90 percent of the pipe soffit. The lack of voids (other than the top 10 percent) shall be demonstrated to the Engineer by breaking out small sections of pipeline in various critical locations.

Pavement may be placed directly upon the CDF as soon as the surface will withstand the paving process without displacement or disruption. If the placement of the CDF is not completed in time to allow permanent paving to be completed the same day, the Contractor shall prevent traffic contact with the CDF until paving is completed.

END OF SECTION 02252

SPECIFICATIONS - DETAILED PROVISIONS
Section 02718 - Installation of Water Pipeline

C O N T E N T S

SECTION 02718
INSTALLATION OF WATER PIPELINE

PART 1 - GENERAL

1.01 DESCRIPTION

Under these specifications, the Contractor shall furnish all labor, material, equipment and tools required for the complete installation and testing of pipe and pipeline appurtenances and allied structures as stated on the Bidding Sheets, shown on the contract drawings or specified herein, and all within the contract time. The Contractor shall be responsible for all work specified herein and the orderly progress and completion of the work in accordance with an approved schedule of construction.

The work includes, but is not limited to, all excavation, backfill, disposal, resurfacing of roads and driveways, verification of utilities, installation of all pipe and pipeline fittings/specials such as crosses, tees, elbows, bends, joint restrainers, couplings, tapers, butt straps and all necessary cuts and welds. All anchorage for pipe, such as at the ends of lines, at crosses, tees, elbows, bends, etc., shall be sufficient to withstand all unbalanced forces. Unless otherwise approved by the Engineer, anchorage shall be provided by means of double pass, full welds of all steel pipe joints, restraint fittings for plastic (PVC) pipe, or ductile iron pipe, as required by the Contract Drawings and these specifications. The use of concrete anchorage in lieu of restrained joints will be considered on a case by case basis. All welding and restraint shall be included in the bid price for the installation of pipe.

It shall be the responsibility of the Contractor to furnish the District with accurate tie dimensions to all valves installed in the course of constructing this project.

Refer to Section 02201 of the District's standard specifications for requirements relating to Construction Methods and Earthwork and Section 02221 for requirements relating to Trenching, Backfilling and Compacting.

1.02 QUALITY ASSURANCE

Contractor shall be responsible for the quality of all work of his forces and that of his subcontractors, for adherence to all laws and regulations, and for all public relations regarding the contract work, as set forth elsewhere in the Contract Documents.

1.03 SUBMITTALS

Shop drawings for all pipe and appurtenances shall be submitted pursuant to the requirements of the Contract Documents for Submittals, and shall show the materials, dimensions, stations and all relevant details.

1.04 PRODUCT DELIVERY

A. Materials Furnished by the Contractor. Except as otherwise stated on the Bidding Sheet, all materials, including water pipe and appurtenances and service connections and appurtenances, shall be furnished in place by the Contractor, excepting service connection meters will not be furnished or installed by the Contractor. Materials to be furnished by the Contractor shall include that necessary for replacement of all obstructions, road surfacing, etc.

The Contractor shall furnish the Engineer, as soon as issued, duplicate copies of all orders placed outside the Contractor's plant for articles or materials to be furnished by the Contractor for incorporation in the work. The Contractor shall also furnish the Engineer with such additional information as reasonably may be required respecting the character of the material and progress of their procurement.

B. Materials Furnished by the District. ONLY WHERE SHOWN ON THE CONTRACT DRAWINGS OR ON THE BIDDING SHEETS, OR ORDERED BY THE ENGINEER, the District will furnish any or all of the following materials necessary for the completion of the work under these specifications:

1. Cement mortar lined pipe, asbestos-cement pipe, ductile iron pipe, or PVC pipe with rubber gasket joints and gasket rings. Pipe will be delivered to the job site by the Pipe Supplier. Pipe to be unloaded and strung along trench site by Installation Contractor. Approximately 5% of each size of pipe will be furnished in the standard short lengths manufactured by the pipe supplier, except as otherwise requested by the Contractor.

2. Valves, flanges, gaskets, valve risers and caps, bolts, crosses, tees, bends, elbows, tapers, fire hydrant assemblies complete with valve and pipe, or air valve assemblies complete with piping and valves, etc.

3. Joint materials except for cement mortar.

4. Locating wire required for asbestos-cement pipe and PVC pipe systems.

5. Telemetry wire where noted on the construction drawings.

The Contractor shall, within seven (7) days after execution of the contract, meet with the Engineer for approval of his proposed schedule of construction and shall furnish the Engineer a written statement of the Contractor's requirements for delivery of materials and equipment to be furnished by the District with the dates upon which delivery of each class of said materials and equipment will be necessary in order to conform to the Contractor's program of construction.

Materials to be furnished by the District, except for pipe, will be delivered to the Contractor f.o.b. the Contractor's trucks at the District yard or warehouse, and the Contractor will sign for these materials received. No direct payment will be made to the Contractor for hauling or handling materials or equipment furnished by the District, but payment for such handling and hauling will be included in the prices named for the contract items wherein the materials and equipment are used. The Contractor shall be responsible for coordinating the delivery and the actual placement of all pipe in accordance with his requirements and construction schedule, shall properly barricade the pipe and other materials, and shall be responsible for any damage to property as a result of the unloading or placement of the pipe or other materials.

If the delivery of any materials or equipment specified herein to be furnished by the District shall be delayed by strikes, acts of God, or other causes beyond the control or without the fault or negligence of the District, the Contractor shall have no claim against the District for such delay in delivery, but shall be entitled to so much additional time wherein to perform and complete the contract on his part as the Engineer shall certify in writing to be just.

C. Hauling and Handling Pipe. The Contractor shall protect all pipe from damage during hauling and handling. Dropping or bumping of pipe will not be permitted. Pipe will be handled with a two point pick-up with a six foot minimum spread. Slings or padded cable will be used so as not to damage exterior coating.

Pipe shall not be strung prior to blasting in those areas where blasting is required. Damaged pipe shall be replaced or repaired by the Contractor at his expense, and subject to approval by the Engineer.

1.05 JOB CONDITIONS

Water Furnished by District. The District will make water available for construction at the locations stated in the Special Provisions.

1.06 PAYMENT

A. Measurement for Payment. Quantities for installation of pipelines and appurtenances on District-administered projects shall be measured for payment as specified herein and described on the Bidding Sheet:

1. Pipelines. Will be measured in place along the horizontal axis of the pipe by the linear foot, on the basis of pipeline completely installed and tested including earthwork, special bedding included in the work, pipe, gaskets, fittings, polyethylene encasement, specials, welding, concrete and miscellaneous materials. The measurement will be continuous through all valves and fittings.