

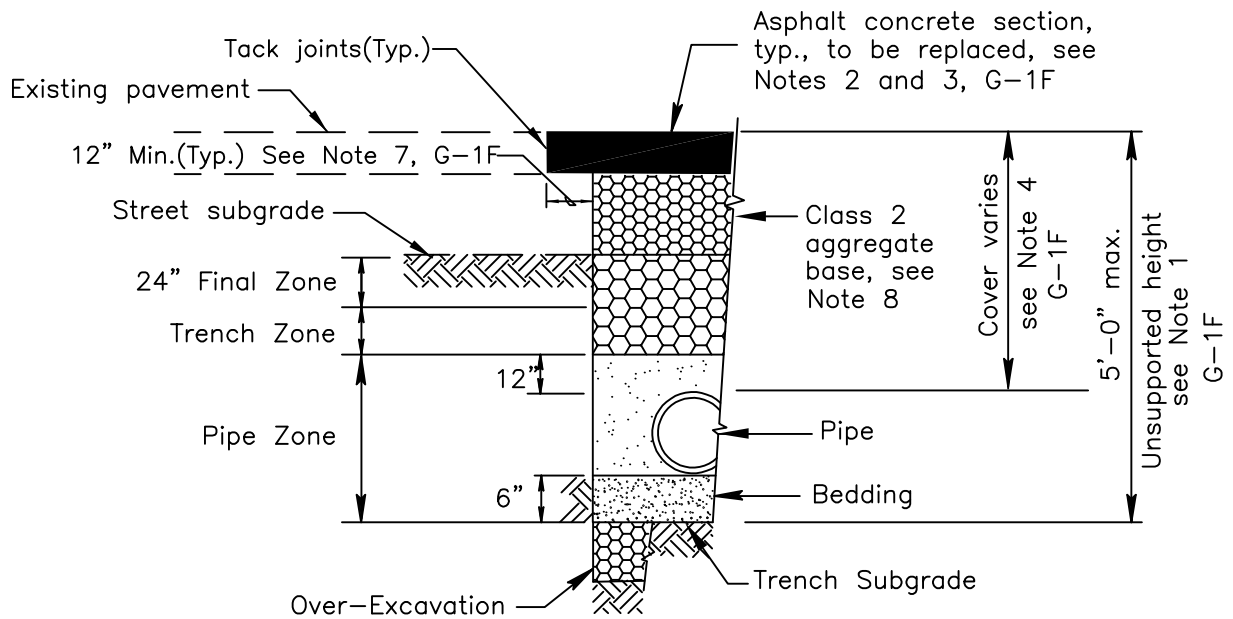
**CITY  
OF  
LIVERMORE**

**STANDARD DETAILS**

**TABLE OF CONTENTS**

**GENERAL - G**

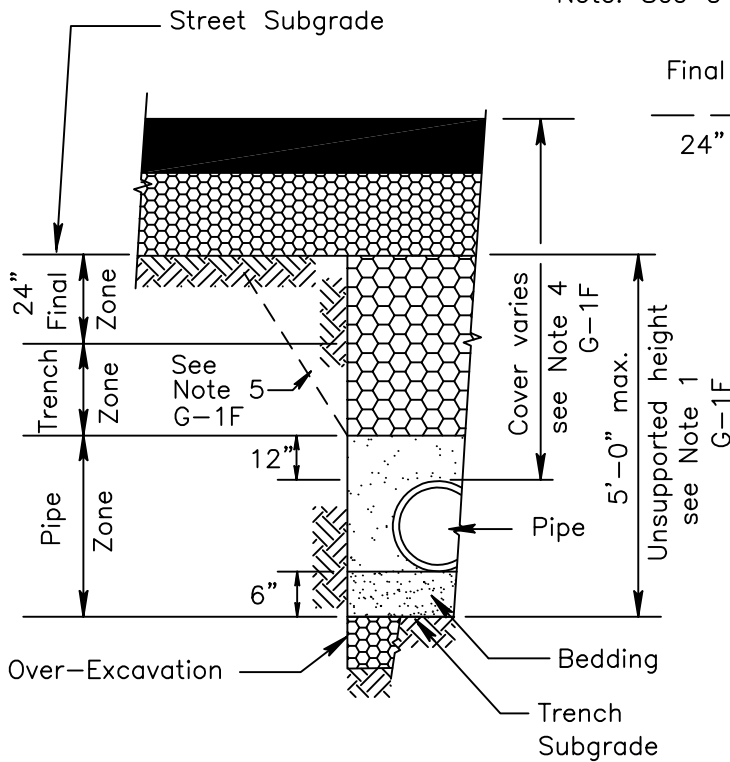
<b>DETAIL NO.</b>	<b>TITLE</b>
G-1	TRENCH SECTION; SOIL BORING AND SMALL EXCAVATION IN THE STREET SECTION
G-2	REQUIRED SEPARATION BETWEEN WATER, SEWER, AND RECLAIMED WATER PIPELINES
G-3	STANDARD SYMBOLS
G-4	SCHEDULE OF ACCEPTABLE PIPE MATERIALS
G-5	CONCRETE CLASS USE TABLE
G-6	ABBREVIATIONS



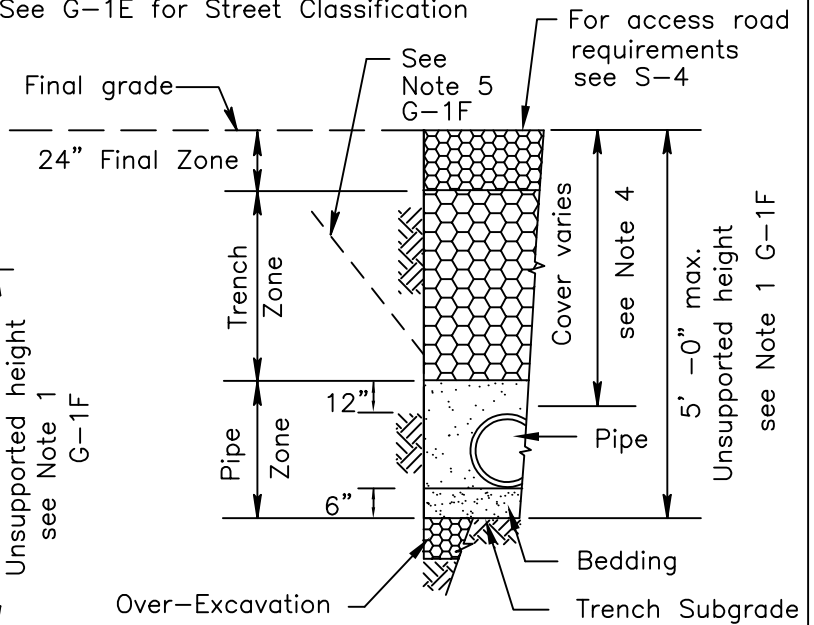
**EXISTING STREET**

(NON-ARTERIAL OR COLLECTOR)

Note: See G-1E for Street Classification



**NEW STREET**



**UNIMPROVED AREAS**

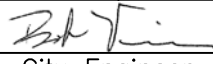
User note:  
 These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

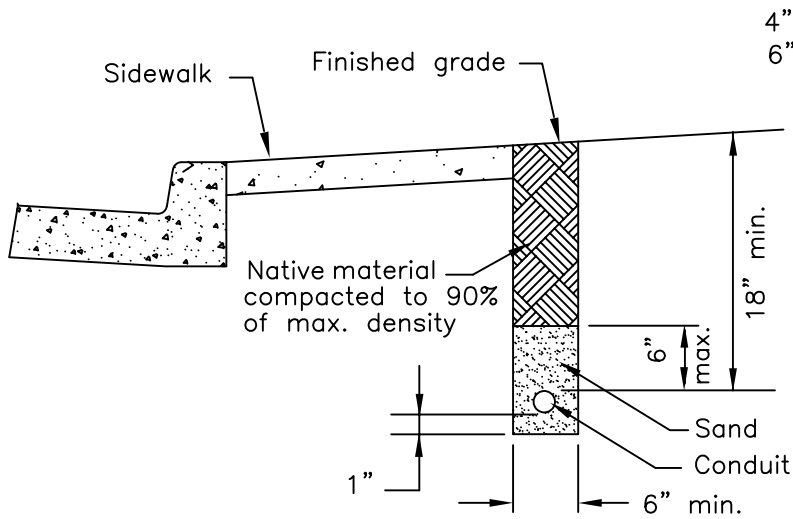
G01A.DWG

Date:	By:	Rev:

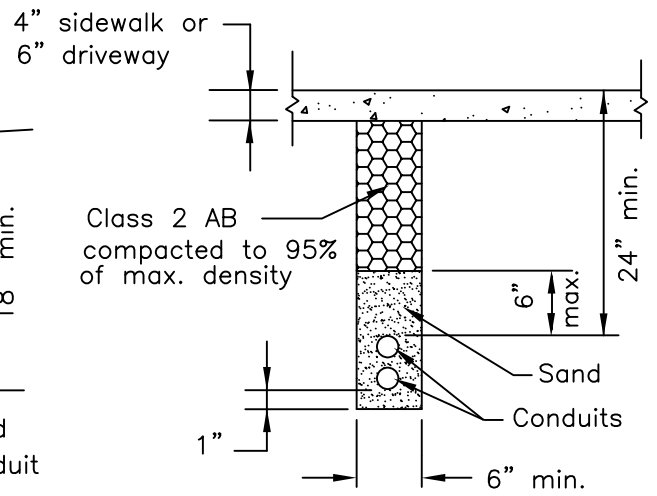
**TRENCH SECTION**

**CITY OF LIVERMORE  
 STANDARD DETAIL**

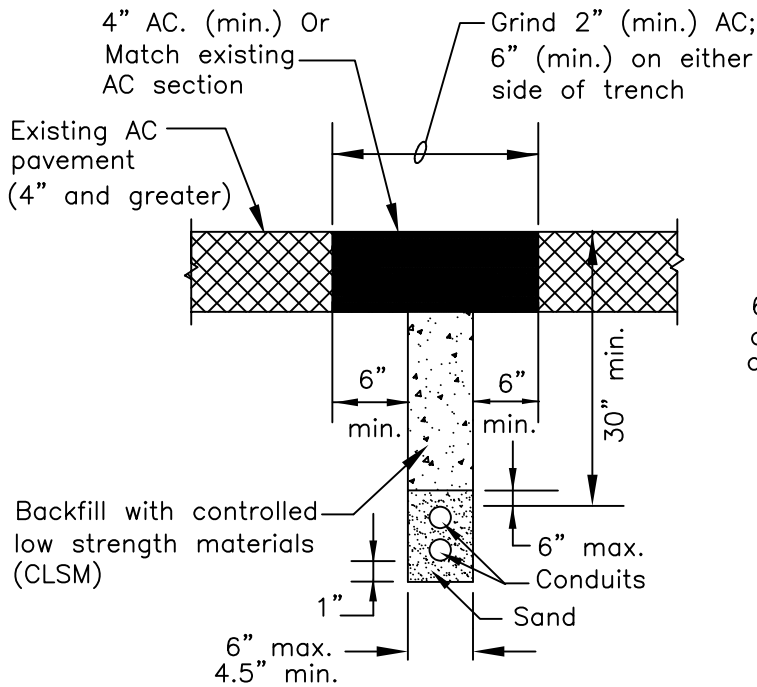
Dwn: KY/HI	Date: April-23	No.
Ckd: Spec. Committee	Scale: None	G-1A
 City Engineer		



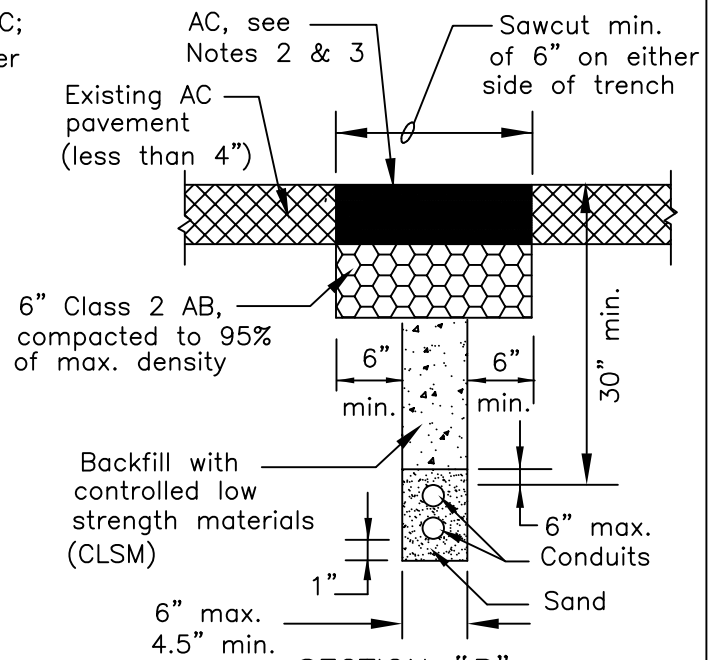
STREET LIGHT CONDUIT TRENCH SECTION  
(WHEN NOT IN JOINT TRENCH)



TRAFFIC SIGNAL CONDUIT TRENCH SECTION UNDER SIDEWALKS/DRIVEWAYS



SECTION "A"  
FOR EXISTING ASPHALT CONCRETE SECTIONS 4" AND GREATER



SECTION "B"  
FOR EXISTING ASPHALT CONCRETE SECTIONS LESS THAN 4"

User note:  
These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

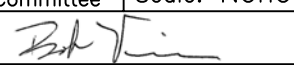
TELECOMMUNICATIONS CONDUIT TRENCH SECTIONS  
(ELECTRICAL, TRAFFIC SIGNAL CONDUITS, STREET LIGHT CONDUIT CROSSINGS, TELEPHONE, CABLE TV / COMMUNICATION CONDUITS)

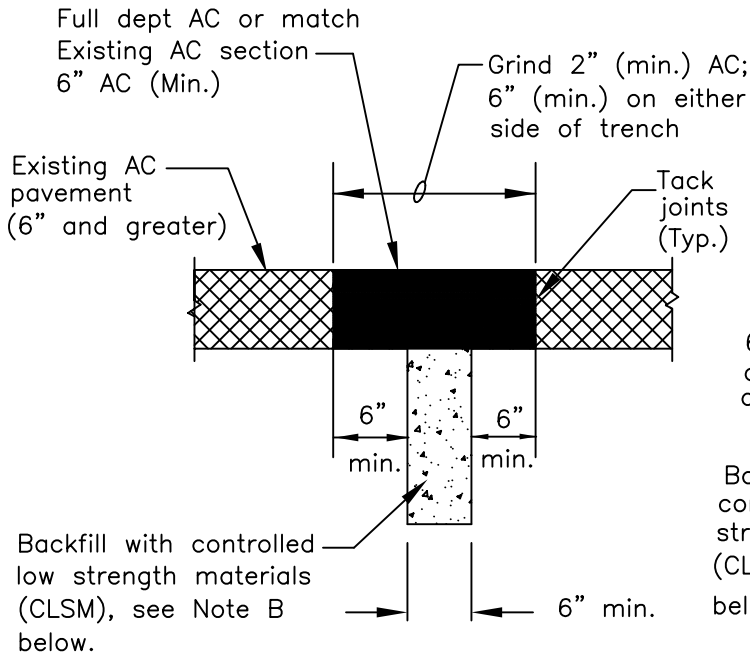
G01B.DWG

Date	By	Rev.

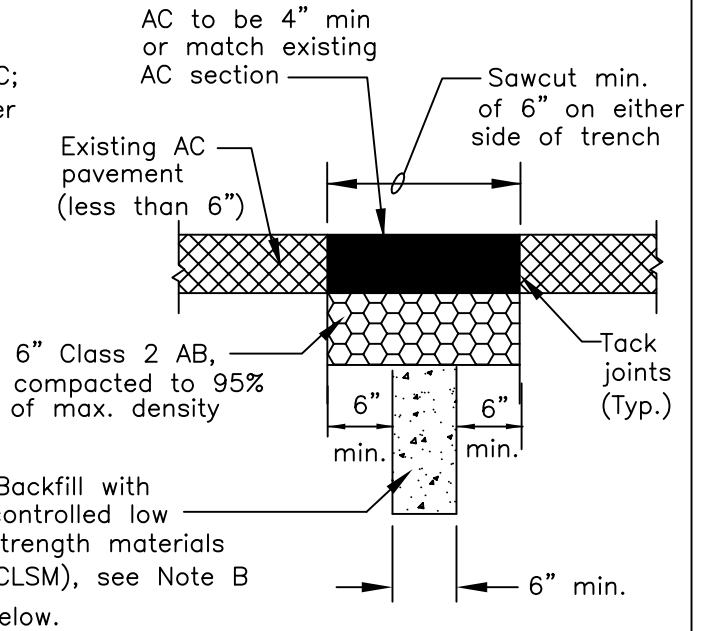
TRENCH SECTION

CITY OF LIVERMORE  
STANDARD DETAIL

Dwn: KY/HI	Date: Feb-23	No. G-1B
Ckd: Spec. Committee	Scale: None	
 City Engineer		



SECTION "A"  
FOR EXISTING ASPHALT CONCRETE  
SECTIONS 6" AND GREATER



SECTION "B"  
FOR EXISTING ASPHALT CONCRETE  
SECTIONS LESS THAN 6"

NOTES

- A. PRIOR TO TRENCHING, CONTACT USA 1-800-227-2600
- B. CONTROLLED LOW STRENGTH MATERIALS (CLSM) SHALL BE A FLOWABLE, HAND-EXCAVATABLE MIXTURE OF CEMENT, POZZOLAN, COARSE AND FINE AGGREGATE, ADMIXTURES AND WATER WHICH HAS BEEN MIXED IN ACCORDANCE WITH ASTM C 94. ALL PROPERTIES, COMPOSITIONS AND INSTALLATION REQUIREMENTS SHALL BE PER SPECIFICATION SECTION 312323. (CLSM) SHALL NOT COME IN CONTACT WITH UTILITIES. MAINTAIN A CLEARANCE OF 6" MINIMUM BETWEEN CLSM AND UTILITIES FOR BACKFILL.
- C. ANY EXCAVATIONS LARGER THAN 3'x3' SHALL COMPLY WITH CITY STD DETAIL G-1B.

User note:

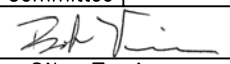
These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

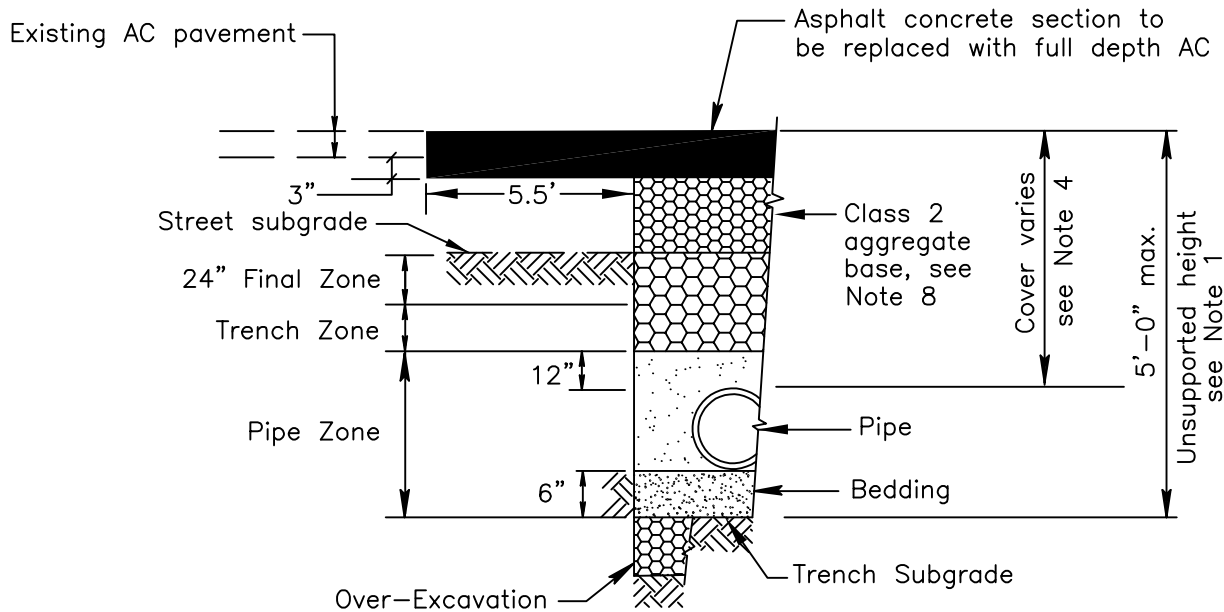
G01C.DWG

Date:	By:	Rev:

SOIL BORING AND  
SMALL EXCAVATION IN STREET  
SECTION

CITY OF LIVERMORE  
STANDARD DETAIL

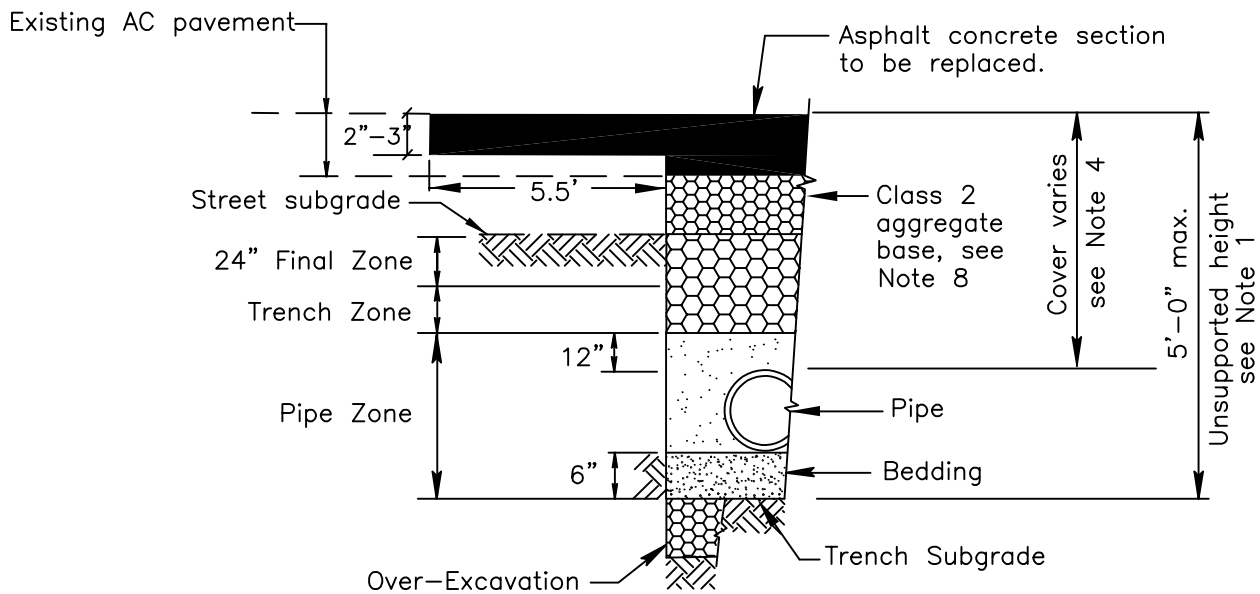
Dwn: MAP/HI	Date: Feb-23	No.  G-1C
Ckd: Spec. Committee	Scale: None	
 City Engineer		



PAVEMENT LESS THAN 6"

\*More than 50% grind weakens remaining base lift

\*\*Caltrans Sec. 39.304 Pave HMA in Max 0.25 foot thick compacted layers



PAVEMENT GREATER THAN 6"

User note:

These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

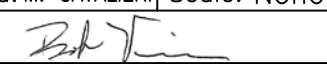
Note: Refer to City Standard Detail No. G-1F for applicable street classification.

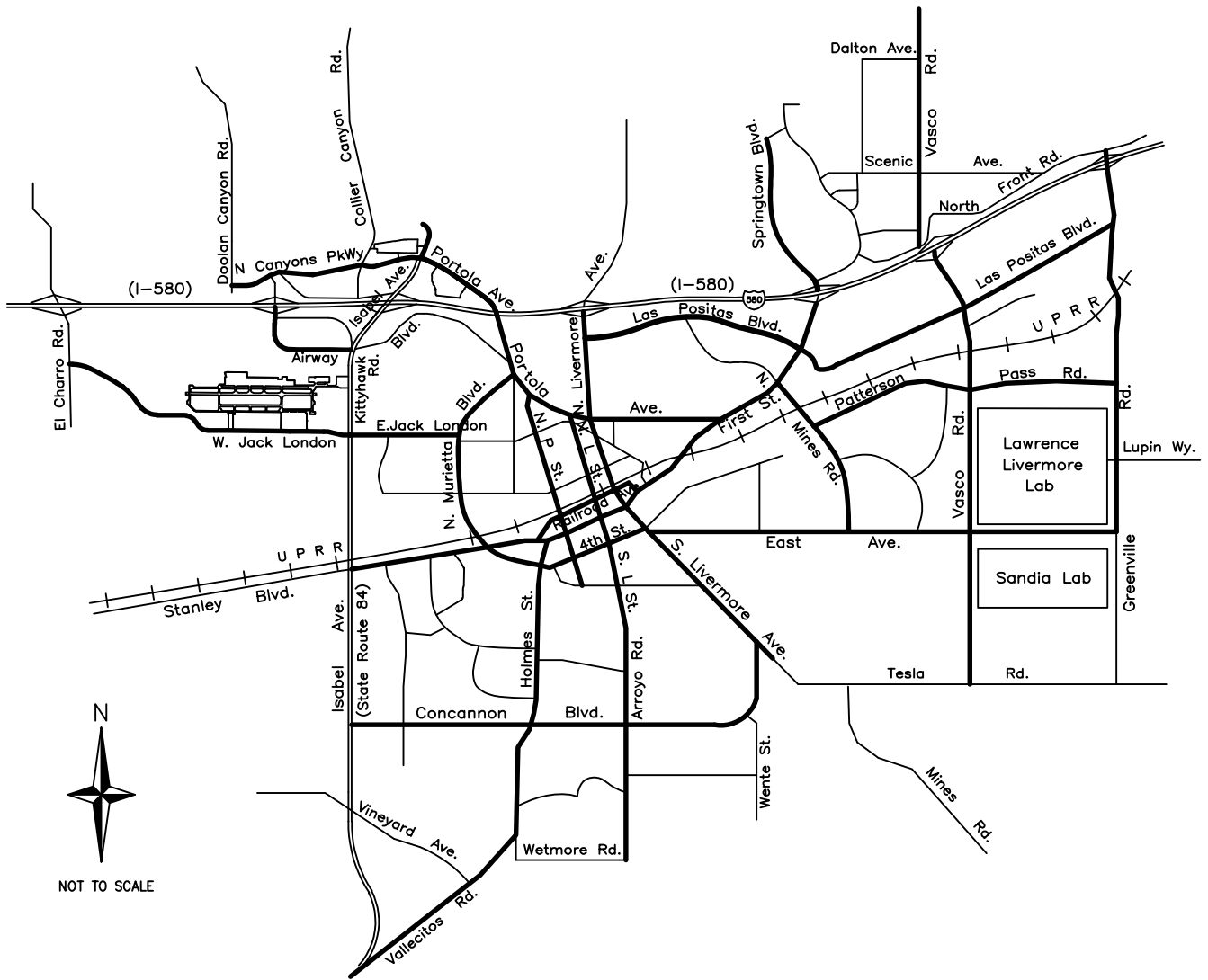
G01E.DWG

Date:	By:	Rev:

TRENCH PAVEMENT REPAIR  
ARTERIALS AND COLLECTORS

CITY OF LIVERMORE  
STANDARD DETAIL

Dwn: M. IRBY/HI	Date: Feb-23	No.
Ckd: M. CAVALIERI	Scale: None	G-1D
 City Engineer		



NOT TO SCALE

- ARTERIALS
- COLLECTORS

User note:  
 These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

G01E.DWG

Date:	By:	Rev:

## TRENCH PAVEMENT REPAIR ARTERIALS AND COLLECTORS LOCATION MAP

### CITY OF LIVERMORE STANDARD DETAIL

Dwn: MM-HI	Date: Feb-23	No.
Ckd: Spec Comm	Scale: None	G-1E
Acting City Engineer		

NOTES:

1. Trenching shall conform to the "Construction Safety Orders of the State of California" and Section 6705 of the California Labor Code.
2. In existing streets, the total asphalt concrete thickness replaced shall not be less than 6" (4" in residential streets), or match the existing asphalt concrete section, whichever is greater.
3. In existing streets the asphalt concrete bottom lift(s) shall not be less than 4" (2" in residential streets), and the asphalt concrete top lift shall not be less than 2".
4. Where adequate compaction cannot be achieved due to obstruction or other conditions, replace pipe zone and/or trench zone fill with Controlled Low Strength Material (CLSM) as directed by the ENGINEER.
5. Sloping trench sections, above pipe zone, can only be used where stable compact soil conditions exist, where approved by the ENGINEER, or where shown on the drawing or specifications. Sloping trench sections will not be allowed in existing streets.
6. Prior to trenching, contact USA 1-800-227-2600
7. Before pavement section is replaced, the existing pavement shall be sawcut at least 12 inches back from trench excavation along neat, straight, parallel lines. [Where the existing asphalt concrete is 6" or more in thickness or where the repaving is less than 15 square feet in area, sawcut may be the edge of the trench excavation.] Expect for Arterial and Collector Street (See G-1D). Where wall of trench excavation is within 18" of the lip of gutter replace AC from trench wall to lip of gutter. All AC and concrete areas shall be tack coat prior to paving.
8. In existing streets the total aggregate base shall be the greater of the existing street aggregate base section or the following minimum aggregate base:
  - a) Local, loops, cul-de-sac, and private residential streets: 12" AB (min.)
  - b) Collector, frontage, major, and industrial/commercial streets: 18" AB (min.)
9. See the "Utility Earthwork" section of the City standard specifications 31.2300 for compaction requirements, metric specifications and additional information.
10. Edge sealing, the application of asphalt material along the edges of a patch. This ensures water cannot penetrate the patch seam.

User note:  
 These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

G01C.DWG

TRENCH SECTION			CITY OF LIVERMORE				
			STANDARD DETAIL				
			Dwn: M-W/KY/HI	Date: Jan-23			No.
			Ckd: <sup>Spec.</sup> Committee	Scale: None			G-1F
			 City Engineer				
Date	By	Rev.					

BASIC SEPARATION STANDARDS:

1. Parallel construction: The horizontal clear distance between pressure domestic water and reclaimed water mains and sewer lines shall be at least 10 feet clear.
2. Perpendicular construction (Crossing): Pressure water mains shall be at least one (1) foot clear above sanitary sewer and reclaimed water lines where these lines must cross.
3. The basic separation standard are applicable under normal conditions for sewer lines and water distribution lines. More stringent requirements as determined by the State Health Department may be necessary if conditions, such as, high ground water exist.
4. Special Provisions: Alternative construction criteria where the basic separation standards cannot be attained are shown below and on G-2B:

SPECIAL PROVISIONS GENERAL NOTES (SEE G-2B):

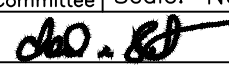
1. No pipe joints shall be permitted within Zones C and D.
2. All DIP must have hot DIP bituminous coating and all Class 200 PVC must meet DR-14 per AWWA C900 or equivalent.
3. Sewer force mains shall not be permitted in Zones A through D.
4. This criteria does not apply for a reclaimed water line crossing another reclaimed water line.
5. The construction criteria should apply to the house laterals that cross above a pressure water main but not to those house laterals that cross below a pressure water main.
6. Construction for sewer and domestic water or reclaimed water lines 24" diameter or larger will not be allowed without the approval of the Engineer and the State Health Department.
7. See G-2B for applicable situations.

User note:  
 These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

G2A.DWG

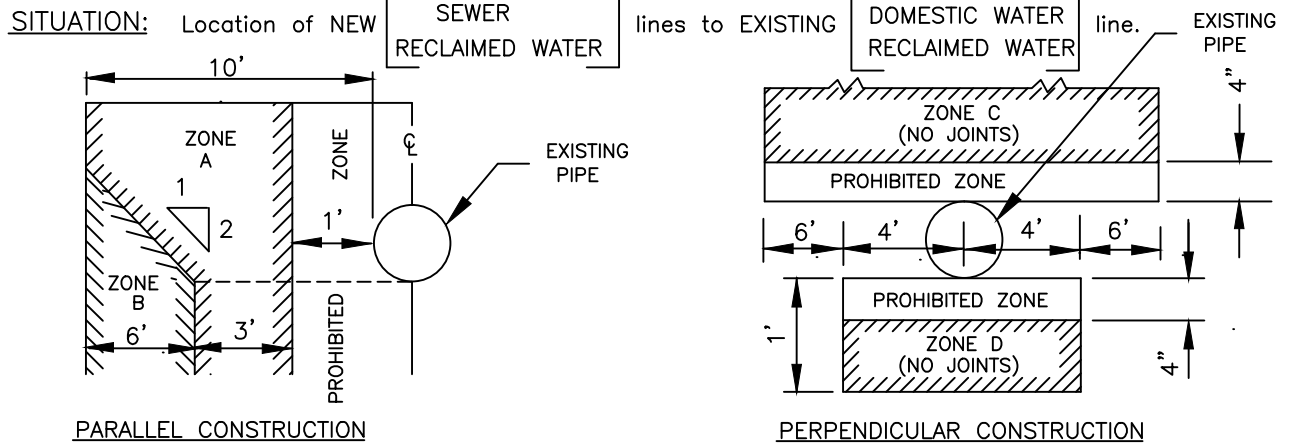
REQUIRED SEPARATION  
 BETWEEN WATER, SEWER  
 AND RECLAIMED WATER  
 PIPELINES

CITY OF LIVERMORE  
 STANDARD DETAIL

Dwn: KY	Date: May-13	No.
Ckd: <sup>Spec.</sup> Committee	Scale: None	G-2A
 City Engineer		

Date:	By:	Rev:





If any sewer or reclaimed water pipelines are to be constructed within any of the above indicated Zones, special construction shall be required as described below.

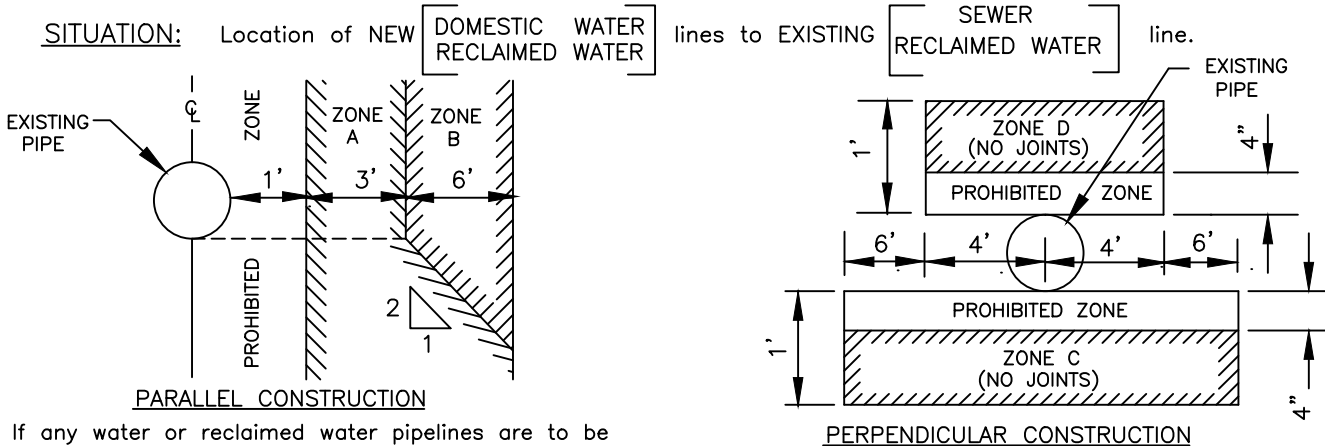
**Construction Requirements**

**ZONE NEW SEWER:**

- A Do not locate any parallel sewer lines in this area without State and Local Health Department Approval.
- B Use VCP, PVC sewer pipe with rubber ring joints, or DIP with compression joints.
- C Use DIP with mechanical joints or PVC Class 200 – AWWA C900
- D Use DIP or PVC Class 200 – AWWA C900

**ZONE NEW RECLAIMED WATER:**

- A Do not locate any parallel reclaimed water line in this area without State and Local Health Department Approval.
- B Use DIP or PVC Class 200 – AWWA C900
- C Use DIP or PVC Class 200 – AWWA C900
- D Use DIP or PVC Class 200 – AWWA C900



If any water or reclaimed water pipelines are to be constructed within any of the above indicated Zones, special construction shall be required as described below.

**Construction Requirements**

**ZONE NEW DOMESTIC OR RECLAIMED WATER:**


- A Do not locate any parallel domestic water or reclaimed water main in this area without State and Local Health Department Approval.
- B Use DIP or PVC Class 200 – AWWA C900
- C Use DIP or PVC Class 200 – AWWA C900
- D Use DIP or PVC Class 200 – AWWA C900

**User note:**

These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

REQUIRED SEPARATION BETWEEN WATER, SEWER AND RECLAIMED WATER PIPELINES

CITY OF LIVERMORE STANDARD DETAIL

Dwn: KY	Date: May-13	No.
Kcd: Spec. Committee	Scale: None	G-2B
 City Engineer		

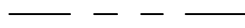
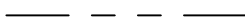
Date:	By:	Rev:

04/20/13

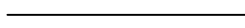
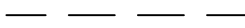
EXISTING

PROPOSED

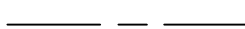
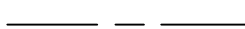
DESCRIPTION



PROPERTY LINE



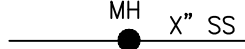
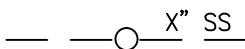
SIDEWALK, CURB @ GUTTER



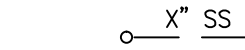
CENTERLINE



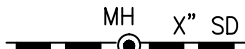
EDGE OF PAVEMENT



SANITARY SEWER & MAINTENANCE HOLE



SANITARY SEWER & RISER



STORM SEWER & MAINTENANCE HOLE



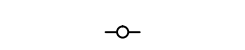
STORM SEWER & INLET



WATER MAIN



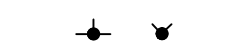
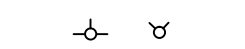
MONUMENT LINE & MONUMENT



UTILITY POLE



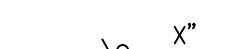
TRAFFIC SIGN



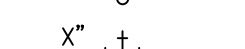
FIRE HYDRANT - commercial  
 - residential



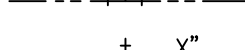
WATER MAIN & VALVE



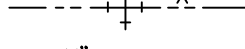
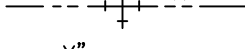
WATER MAIN & BLOW-OFF



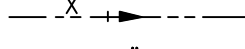
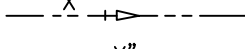
WATER MAIN & TEE



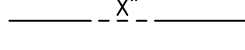
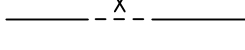
WATER MAIN & CROSS



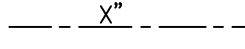
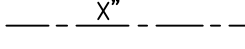
WATER MAIN & REDUCER



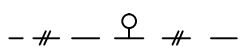
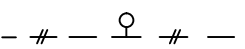
GAS MAIN



TELEPHONE CONDUIT



ELECTROLIER & CONDUIT



X" = indicate size in inches

G03.DWG

Date	By	Rev.

STANDARD  
SYMBOLS

CITY OF LIVERMORE  
STANDARD DETAIL

Dwn: KY	Date: May-13	NO.  G-3
Ckd: Spec. Committee	Scale: NONE	
 City Engineer		

<u>PIPE TYPE IDENTIFICATION</u>	<u>PIPE TYPE USAGE</u>	<u>APPROVED PIPE MATERIALS (1)</u>	<u>REFERENCE TO NOTES</u>	<u>SPEC. SECTION</u>
STORM DRAIN (SD)	Mains and Laterals	ABS/PVCsdnpp	4, 7	333104
		HDPE	7	334100
		RCP	7	334102
		CIPCP	2	033050
		DIP		055900
	Force Main	PVCpp		331102
		DIP		055900
SANITARY SEWER (SS)	Trunk Main (Major) 30" and larger	RCP(PVCL)	7	333100
	Trunk Main (Minor) Larger than 15" and less than 30"	VCP/PVCsdnpp	4, 7	333106/ 333104
	Force Main	PVCpp		331102
		DIP		055900
	Street Main, Up to 15"	ABS/PVC Composite	7	333102
		ABS/PVCsdnpp	7	333104
		VCP	7	333106
		DIP	7	055900
	Service Lateral	ABS/PVC Composite		333102
		ABS/PVCsdnpp		333104
		VCP		333106
DIP			055900	
WATER (W)	Distribution Main, Up to 12"	PVCpp		331102
		DIP		055900
	Transmission Main, Larger than 12"	PVCpp		331102
		MLCSP	2	331104
		DIP	2	055900
	1" Residential Domestic/ Fire Service Lateral	PE		331200
	1", 1-1/2", & 2" Service Lateral	PE		331200
	4" and larger Industrial/Commercial Fire Service Lateral	PVCpp		331102
		DIP	2	055900
	Fire Hydrant Lateral	PVCpp	3	331102
MLCSP		2	331104	
	DIP		055900	

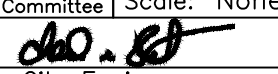
SEE G-4B

User note:  
These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

Date:	By:	Rev:

SCHEDULE OF ACCEPTABLE PIPE MATERIALS

CITY OF LIVERMORE STANDARD DETAIL

Dwn: M-W	Date: May-13	No.
Ckd: <small>Spec. Committee</small>	Scale: None	G-4A
 City Engineer		

G04A.DWG

<u>PIPE TYPE IDENTIFICATION</u>	<u>PIPE TYPE USAGE</u>	<u>APPROVED PIPE MATERIALS</u> (1 & 6)	<u>REFERENCE TO NOTES</u>	<u>SPEC. SECTION</u>
---------------------------------	------------------------	---	---------------------------	----------------------

RECLAIMED WATER	Distribution Main, Up to 12"	PVCpp DIP		331102 055900
	Transmission Main, Larger than 12"	PVCpp DIP	2	331102 055900
	Fire Hydrant Lateral	PVCpp DIP		331102 055900
	Irrigation	PVCpp PVCpp		331102 328000

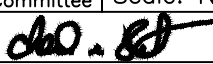
Notes:

1. Pipe material types shall be selected according to the service and function listed. Services or functions not identified or pipe types not listed require specific written approval of the ENGINEER. Pipe materials shall be in strict accordance with the City Standard Specifications.
2. Use of pipe material type requires written approval of the ENGINEER.
3. In City of Livermore water service area, where water main is MLCSP and when required by the ENGINEER, Fire Hydrant Laterals shall be MLCSP.
4. All PVCsdnpp for Storm Drain mains and Sanitary Sewer Trunk Mains (Minor) greater than 15" shall have a maximum SDR of 26 and a minimum pipe stiffness of 115 psi.
5. In areas of corrosive soils, high ground water tables and other adverse conditions, the pipe material shall be as specified by the ENGINEER.
6. See the City's latest "Guidelines for the use of Reclaimed Water" for information and requirements for connection to the City's reclaimed water system.
7. See City's latest Development Plan Check and Procedures Manual for City Pipe Design Criteria. A registered Civil Engineer shall provide deflection/load calculations for all Storm Drain and Sewer Main pipes in accordance with the City's Pipe Design Criteria.

User note:  
These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

SCHEDULE OF ACCEPTABLE  
PIPE MATERIALS  
NOTES

CITY OF LIVERMORE  
STANDARD DETAIL

Dwn: M-W	Date: May-13	No.
Spec. Ckd: Committee	Scale: None	G-4B
 City Engineer		

Date:	By:	Rev:
-------	-----	------

G04B.DWG

CONCRETE CLASS USE TABLE		
TYPE OF CONSTRUCTION	CONCRETE CLASS	Maximum Slump ± 1 Inch
<b>Street Surface Improvements (See Note 1)</b>		
Curb, Gutter, Sidewalk, Driveways	3	4
Commercial/Industrial Driveways, Bus Turnouts, Valley Gutter	Minor Concrete	4
Extruded Curb	1	2
<b>Sewer &amp; Storm Drain Facilities</b>		
Pipe Collars, Beam Support of Pipe, Pre-Cast Maintenance Hole Base, Storm Water Inlets	2	4
V-Ditches	3	4
Cast-In-Place Pipe	1	2
<b>Reinforced Structures</b>		
Retaining Walls Channels and Boxes	2	4
<b>Water System Facilities</b>		
Thrust Blocks, Valve Supports	2	4
<b>Miscellaneous</b>		
Street Light and Traffic Signal Foundations	2	4
Survey Monuments, Fence and Guardrail Post Foundations	4	4

Class 1 concrete shall contain not less than 675 pounds of Portland Cement per cubic yard  
 Class 2 concrete shall contain not less than 590 pounds of Portland Cement per cubic yard  
 Class 3 concrete shall contain not less than 505 pounds of Portland Cement per cubic yard  
 Class 4 concrete shall contain not less than 420 pounds of Portland Cement per cubic yard  
 Minor concrete shall contain not less than 550 pounds of Portland Cement per cubic yard  
 unless otherwise specified in the specifications or the special provisions.

**NOTE:**

1. For surface improvements, use 3/4 lb. lamp black per cubic yard
2. Fly Ash 15% max per CT Sec 90 sewer only

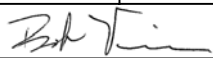
User note:

These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

Date	By	Rev.

CONCRETE CLASS  
USE TABLE

CITY OF LIVERMORE  
STANDARD DETAIL

Dwn: MM	Date: Nov-22	NO.  G-5
Ckd: Spec. Committee	Scale: NONE	
 City Engineer		

ABBREVIATIONS

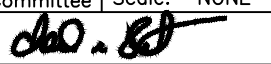
AB = aggregate base  
 ABS = Acrylonitrile-Butadiene-Styrene pipe  
 AC = asphalt concrete  
 AWWA = American Water Works Association  
 Caltrans = State of California, Department of Transportation  
 CF = cubic foot (feet)  
 cl. = clear  
 CLSM = Controlled low strength materials  
 conc. = concrete  
 const. = construction  
 CIP = cast-in-place  
 CIPCP = cast-in-place concrete pipe  
 CVC = California Vehicle Code  
 C&G = curb & gutter  
 $\text{CL}$  = centerline  
 Detail x = Caltrans striping designation  
 DF = douglas fir  
 dia. = diameter  
 DIP = ductile iron pipe  
 dist. = distance  
 DWY = driveway  
 elev. = elevation  
 E.P. = edge of pavement  
 exist. = existing  
 FC = face of curb  
 $\text{FL}$  = flow line  
 galv. = galvanized  
 HDPE = corrugated high density polyethylene nonpressure pipe  
 HPS = high pressure sodium  
 I.D. = inside diameter  
 i.p. = iron pipe  
 LCC = Livermore City Code  
 LPD = Livermore Police Department  
 LS = registered land surveyor  
 LSE = landscape easement  
 max. = maximum  
 mech = mechanical  
 MH = maintenance hole  
 min. = minimum  
 MLCSP = mortar-lined and mortar-coated steel pipe  
 mph = miles per hour  
 O.C. = on center

O.D. = outside diameter  
 PCC = portland cement concrete  
 PE = polyethylene plastic pipe  
 $\text{PL}$  = property line  
 pt. = point  
 PUE = public utilities easement  
 PVC = polyvinyl chloride pipe  
 PVCpp = PVC pressure pipe  
 PVCsdnpp = PVC storm drain nonpressure pipe  
 R = radius  
 RCE = registered civil engineer  
 RCP = reinforced concrete pipe  
 RCPP = reinforce concrete pressure pipe  
 RCP(PVCL) = reinforced concrete pipe (PVC lined)  
 req'd = required  
 (rt) = right  
 R/W = right of way  
 "s" = slope  
 SD = storm drain  
 Sch. = schedule  
 sq. = square  
 SS = sanitary sewer  
 std. = standard  
 SW = sidewalk  
 SWE = sidewalk easement  
 T = telephone  
 TC = top of curb  
 T.V. = television  
 typ. = typical  
 T&B = top & bottom  
 VCP = vitrified clay pipe  
 W = water  
 WRD = Water Resources Division  
 w/ = with  
 $\text{Ø}$  = diameter  
 (lt) = left

User note:  
 These details shall be used in conjunction with all the City standard details and specifications. Refer to the City standard specifications for the materials, installation, testing, protective coatings, and other requirements.

ABBREVIATIONS

CITY OF LIVERMORE  
 STANDARD DETAIL

Dwn: KY	Date: May-13	NO.  G-6
Ckd: Spec. Committee	Scale: NONE	
 City Engineer		

G07.DWG

Date	By	Rev.