CITY OF LAKEPORT

DESIGN AND CONSTRUCTION STANDARDS

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CITY OF LAKEPORT

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CITY OF LAKEPORT

STANDARD SPECIFICATIONS AND STANDARD PLANS

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A.1 - State Standard Specifications

SECTION 1: DEFINITIONS AND TERMS

1-1.01 GENERAL

1-1.01A Referenced Specifications

Public improvements within the City of Lakeport shall be constructed in accordance with the most recent version of the Standard Specifications of the State of California, Department of Transportation, Division of Highways, which specifications are hereinafter referred to as the State Standard Specifications, and in accordance with the following modifications and revisions, and City of Lakeport Standard Plans.

Whenever in the State Standard Specifications the terms State of California, Department of Transportation, Director, Division of Highways or Engineer are used, the following terms shall be understood and interpreted to mean and refer to such substituted terms as follows:

For State of California substitute City of Lakeport.

For Department--The Public Works Department of the City of Lakeport.

For Director--The City Engineer of the City of Lakeport.

For Division of Highways--The Public Works Department of the City of Lakeport.

For Engineer--The City Engineer, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

In the event of discrepancy between contract documents, the order of precedence from highest to lowest shall be as follows: (1) Contract Change Order, (2) Permits from other agencies, as may be required by law, (3) Special Provisions, (4) Plans, (5) Standard Plans, (6) The modifications and revisions contained herein, and (7) State Standard Specifications.

Specifications pertaining to the administration of City contracts will be contained in the Special Provisions for the contract.

City Standards shall mean City of Lakeport Standard Specifications and Standard Plans. ASTM shall mean American Society for Testing and Materials latest edition of the specifications. Standard Specifications for Public Works Construction (commonly called the "Green Book"), shall mean the latest edition of the Standard Specifications written and promulgated by the Southern California Chapter, American Public Works Association and the Southern California District, Association General Contractors of California, a Joint Cooperation Committee.

SECTION 4: SCOPE OF WORK

4-1.13 FINAL CLEANING UP
Attention is directed to Section 4-1.13 of the State Standard Specifications.

Before final inspection of the work, the Contractor shall clean the construction site and all ground occupied by him in connection with the work, of all rubbish, excess materials, false work, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition.

Nothing herein shall require the Contractor to remove warning, regulatory, and guide signs prior to formal acceptance by the Engineer.

4-1.08 CONSTRUCTION LIMITATIONS
The contractor will be expected to conduct his operations in a manner that causes minimum damage to the natural vegetation and landscape. Ingress and egress for all off road work shall be via the existing driveways. Care shall be exercised to avoid hazards that may cause injury to persons, animals or property either during working hours or after work hours, which will include dust control, noise control, signage and striping, backfilling trenches immediately following pipe laying and temporary fencing as required.

Prior to working in the City right-of-way, the Contractor shall obtain an encroachment permit from the City. Work by City contract does not require an encroachment permit. A copy of the permit shall be kept on site at all times.

The Contractor will be responsible for obtaining permission from the property owners for any construction outside of the work site or easements as shown on the plans. Equipment will be restricted to the immediate area of construction. Pipe trenches will be backfilled as soon as possible.

Receptacles for construction residue, including oil, cleaning fluids and litter will be covered. Such residues will be disposed of in a proper manner.

Dust control and prohibition of burning of waste construction materials or vegetation will be enforced for all construction activity.

All construction activity, except for emergency situations, will be confined to Monday through Friday, between the hours of 7 a.m. and 7 p.m., to minimize nuisances to local businesses or residences, unless approved otherwise by the City Engineer.

Mufflers and/or baffles will be required on all construction equipment.

Construction activity within the existing right-of-way will be scheduled to minimize traffic inconvenience and safety hazards to motorists, pedestrians and cyclists.

SECTION 5: CONTROL OF WORK

5-1.02 CONTRACT COMPONENTS

When shop drawings or other drawings are required by the Plans and Specifications, or requested by the Engineer, they shall be prepared in accordance with current Engineering practice and at the Contractor's expense. Drawings shall be of a size and scale to clearly show necessary details and shall be transmitted by letter to the Engineer for approval or correction within at least fifteen (15) days of the Contract award.

Materials shall not be furnished or fabricated, nor any work done for which drawings are required before approval of the drawings.

When first submitted by the Contractor, each drawing shall be a good quality transparency accompanied by two prints. If approved without change or correction, three approved copies on paper will be furnished to the Contractor. If extensive additions or corrections are required, the Engineer will return one marked up copy together with a transparency to the Contractor for correction and resubmission. Approved transparencies will be retained by the Engineer. Approval of drawings by the Engineer shall not relieve the Contractor of the responsibility for errors or omissions in the drawings or from deviation from the contract documents, unless such deviations were those specifically called to the attention of the Engineer, and in the letter of transmittal submitted with the drawings. The Contractor shall be responsible for the correctness of the drawings for shop fits and fuel connections and for the results obtained by use of such drawings.

Drawings required for conventional stock pumps, motors and all other manufactured equipment may be brochures or catalogue sheets submitted in quadruplicate and shall show all necessary dimensions required for the proper location and installation of tie down bolts, brackets, plumbing and other appurtenant detail.

When required by the Special Provisions, assembly drawings, parts lists, nomenclature lists or diagrams shall be furnished.

5-1.02A Excavation Safety Plans

In accordance with the latest requirements of the California Occupational Safety and Health Act (Cal-OSHA) and all such similar legislation, the Contractor shall submit to the Engineer for reference in advance of excavation a Cal-OSHA approved detailed plan showing the design, shoring, bracing, sloping or other provision to be made for work or protection from the hazard of caving ground during the excavation of such trench or trenches located in the public right-of-way. If such plan varies from the shoring system standards, the plan shall be prepared by a Registered Civil or Structural Engineer.

The plan shall be kept on the job site at all times. The Contractor shall have a competent person, conversant with the plan on site at all times.

Nothing in this section shall be deemed to allow the use of shoring, sloping or protective system less effective than that required by the Cal-OSHA.

Nothing in this section shall be constructed to impose tort liability on the City or Engineer.

5-1.36 PRESERVATION OF PROPERTY

The Contractor shall notify Underground Service Alert (USA) for marking the locations of existing underground facilities.

The existing underground facilities in the area of work may include telephone, television and electrical cables, gas mains, water mains, sewer pipe and drainage pipe. The various utility companies shall be notified before trenching begins and at such other times as required to protect their facilities. Underground facilities shall be located and exposed ahead of trenching to prevent damage to the facilities, and to determine the depth and character of all facilities that cross or infringe on the trench prism. The Contractor shall immediately notify the City Engineer in writing of any facilities found to differ from those shown on the drawings. If damage should occur to the existing facilities, the utility company and the City shall be notified immediately in writing and repairs acceptable to the utility company shall be made at the Contractor's expense.

The locations of the existing facilities are typically compiled from the best information available during design. However, the locations of the underground facilities shown on the drawing are approximate only and should not be taken as final or all inclusive. The Contractor is cautioned that the drawings may be incomplete and the Contractor shall repair all damage done to existing facilities at his own expense.

Existing facilities shall not be intentionally disturbed and shall be supported and protected against injury and maintained in good operating condition at the expense of the Contractor for the entire duration of the contract. Any proposed disruption of the existing facilities shall be approved by and coordinated with the Engineer.

SECTION 6: CONTROL OF MATERIALS

6-3.01 GENERAL
California Test 231 (Nuclear Gage Determination of In-Place Density) is amended as follows:

In-place density and relative compaction may be determined on the basis of individual test sites in lieu of the area concept, at the discretion of the Engineer.

6-3.01A Relative Compaction (Field Density)
ASTM D 6938-10 amended as follows:

A. Gage calibration will be based on the six California Transportation Laboratory Master Standard Density Blocks (CTLMSDB), located in Sacramento, California. These blocks are the Standard Reference blocks for the California Department of Transportation.
B. Percent Relative compaction shall be calculated using lab curves for each individual test location unless otherwise permitted by the Engineer. If permitted by the Engineer, composite samples may be taken for certain manufactured or otherwise uniform materials according to California test method 231 - Part II "METHODS OF APPLYING THE AREA CONCEPT AND DETERMINING PERCENT RELATIVE COMPACTION".

The use of sand cone methods (such as ASTM 1556 or CT 216) for determining field densities will not be allowed as a substitute.

6-3.01B Statistical Testing
Statistical means will not be used for determination of specification compliance. Whenever both individual test results and moving average requirements are specified in these specifications, the moving average requirements shall apply to the individual test results.

SECTION 12: TEMPORARY TRAFFIC CONTROL

12-1.01 GENERAL

The site of the work shall be enclosed by suitable barricades, signs and lights to warn and protect vehicle, bicycle and pedestrian traffic effectively and shall be in accordance with those procedures as set by the latest version of the State of California Department of Transportation Manual on Uniform Traffic Control Devices (California MUTCD). The Contractor shall submit to the Engineer for review and approval traffic control plans prior to beginning construction. The Contractor shall have a copy of the approved traffic control plans on site at all times.

Excavation shall be backfilled before leaving the work for the night. All trenching in the travel-way shall be plated with non-skid plates or paved (temporary or permanent) before leaving the work for the night. Flasher barricades or illuminated cones shall be placed adjacent to the trench plates if required by the Engineer.

All detours and traffic control shall be between 8:00 a.m. and 5:00 p.m.; unobstructed two-way traffic shall be maintained daily between 5:00 p.m. and 8:00 a.m. Any work within Caltrans right-of-way will require a separate encroachment permit from Caltrans.

Adequate traffic control, flag persons, signing and barricades shall be provided by the Contractor at all times as approved by the Engineer.

If at any time, work continues for more than one working day, advance warning signs affixed to 4" x 4" wooden posts anchored to the ground shall be used. At no time shall construction signs be attached in any way to power or light poles.

The Contractor shall be responsible for keeping the police, fire department and the local schools informed of obstructions to either private or public roads caused by reason of his operations. The Contractor shall make provisions for the safe passage of pedestrians around the area of work at all times.

SECTION 16: CLEARING AND GRUBBING

16-1.01 DESCRIPTION
The following shall apply in lieu of Section 16-1.01 of the State Standard Specifications: This work shall consist of removing all objectionable material within the limits shown on the plans and as directed by the Engineer. Clearing and grubbing shall be performed in advance of grading operations and in accordance with the requirements of these specifications.

16-1.02 PRESERVATION OF PROPERTY
All existing street designation and traffic control signs and posts within the aforementioned limits of work shall be carefully removed, cleaned of excess earth and delivered to the City Corporation Yard, except those required for traffic control as determined by the Engineer.

16-1.03 CONSTRUCTION
The area to be cleared and grubbed shall be the area shown on the plans, unless otherwise specified in the Special Provisions.

All stumps, large roots and other objectionable material shall be removed to a depth of three feet below finished grade in the area between the curbs, and to a depth of 12 inches below finished grade in the area between curb and property line. The resulting spaces shall be backfilled with suitable material placed and compacted in accordance with the applicable provisions of Section 19-6.02 of the State Standard Specifications.

16-1.04 REMOVAL AND DISPOSAL OF MATERIALS
Burning within the limits of the project will not be allowed. Combustible debris shall be disposed of away from the site of the work.

16-1.05 TREE PRESERVATION
The Contractor shall comply with all requirements of the tree preservation plan if one is included as part of the Improvement Plans.

All trees to be removed shall be marked in the field. A representative of the City must field review the trees to be removed prior to removal.

16-1.06 SITE DEVELOPMENT
The Contractor shall comply with all Site Development Regulations of the City of Lakeport, Title 17 – Zoning, as contained in the Land Use & Development Code, anytime there is grading work conducted.

SECTION 17: WATERING

17-1.01 DESCRIPTION
The Contractor shall be responsible for providing all water necessary for construction and testing.

SECTION 19: EARTHWORK

19-1.01 GENERAL

Earthwork shall conform to the provisions of Section 19 of the State Standard Specifications.

19-1.02 PRESERVATION OF PROPERTY

When it is necessary to excavate adjacent to existing trees, shrubs or hedges, the Contractor shall use all possible case to avoid injury to the trees, shrubs or hedges and their roots. Roots or limbs two (2) inches or larger in diameter shall not be cut without the express approval of the Engineer. All roots two (2) inches in diameter and larger left in place shall be wrapped with burlap to prevent scarring and excessive drying. When it is necessary to cut limbs and branches of trees to provide clearance for equipment used in construction, the Contractor shall make pruning cuts just beyond the branch bark ridge. All cuts through ½-inch or larger roots and limbs shall be hand-trimmed and cleanly cut before being repaired.

19-1.03 GRADE TOLERANCE

Immediately prior to placing subsequent layers of material thereon, the grading plane shall conform to one of the following.

A. When aggregate subbase or aggregate base is to be placed on the grading plane, the grading plane shall not vary more than 0.05' above or 0.1' below the grade established by the Engineer.

B. When hot mix asphalt is to be placed on the grading plane, the grading plane shall not vary more than 0.05' above or below the grade established by the Engineer.

19-1.05 TRENCH EXCAVATION

The Contractor shall perform all excavations of every description and all substances encountered to the depth indicated on the drawings. During excavation, that material suitable for backfilling shall be deposited in an orderly manner a sufficient distance from the banks for the trench to avoid overloading and to prevent slides or cave-ins. All excavated material not required or suitable for backfill shall be removed and disposed of outside the streets right-of-way. The Contractor shall first obtain a written permit from the property owner on whose property the disposal is to be made and he shall file with the City Engineer said permit, together with a written release from the property owner absolving the City from any and all responsibility in connection with the disposal of material on said property. Material shall not be disposed of within any floodway in the City of Lakeport or County of Lake, or within the normal channel of any river, creek, stream, ditch, canal, swale or other watercourse and within portions of same as required to efficiently carry the flood flow as determined by the Engineer.

Trenches shall be the necessary width for proper laying of the pipe, and the banks shall be as nearly vertical as practicable. The bottoms of the trenches shall be accurately graded to provide uniform bearing and support for each section of pipe on the prepared pipe bedding at every point along its entire length. Trenches shall be excavated to the depth indicated on the drawings and care shall be taken not to excavate beyond the depth indicated or required, unless directed otherwise by the Engineer.

The Contractor shall at all times furnish, install and maintain sufficient bracing and shoring in trenches to ensure the safety of workmen and to protect and facilitate the work. All such bracing and shoring shall be removed from the trench as backfilling proceeds.

The Contractor shall furnish, install and operate such pumps or other devices as may be necessary for removing water from the trenches during construction.

19-1.06 SAMPLES FOR APPROVAL

Representative samples of all material to be imported shall be provided sufficiently in advance of installation operations for testing and approval of the Engineer. All costs associated with testing shall be paid by the Contractor. Imported material shall not be installed until it has been so approved.

Tests will be made in accordance with the following standards:

1. Grading--ASTM C114 and C136
2. Plasticity Index--ASTM D4318
3. Sand Equivalent Value--Test Method No. Calif. 217 (CALTRANS)

19-2 ROADWAY EXCAVATION

19-2.01 GENERAL

Roadway excavation shall conform to the applicable provisions of Section 19 of the State Standard Specifications and City Street Design Standards. Roadway excavation shall include all excavation, embankment construction, disposal of excess material, and other work as specified herein.

Removal of existing bituminous pavement and base materials will be paid for as roadway excavation and no additional allowance made therefor.

Excess materials from the excavation shall become the property of the Contractor and shall be disposed of by him, at his expense.

19-2.02 UNSUITABLE MATERIAL

Material below the natural ground surface in embankment areas and basement material below the grading plane in excavation areas that is determined by the Engineer to be unsuitable for the planned use shall be excavated and disposed of or stabilized as directed or approved by the Engineer.

When unsuitable material is removed and disposed of, the resulting space shall be filled with material suitable for the planned use. Such suitable material shall be placed and compacted in layers as hereinafter specified for constructing embankments.

Stabilization of unsuitable material shall comply with the following provisions:

A. Unsuitable material may be processed in place, may be excavated and placed on the grade or other locations suitable for further processing, or may be partially excavated and partially processed in place.

B. Processing may consist of drying to provide a stable replacement material or mixing with hydrated lime or granular quicklime.

C. Stabilized material shall be placed and compacted in layers as hereinafter specified for constructing embankments.

19-2.02A Subgrade Stabilization

Unsuitable material shall be stabilized per Section 19-1.03B of the Standard Specifications with the following additions:

In the event that the subgrade material is unstable and cannot be made stable by drying the top 6 inches as determined by the Engineer, then the Contractor shall excavate an additional 6 inches, install soil stabilization fabric and install 6 inches of Class 4 aggregate sub-base.

Prior to placement of soil stabilization fabric, the Contractor shall remove all loose dirt as left from excavation operations.

Soil stabilization fabric shall be installed per manufacturer's recommendations and shall meet or exceed the following specifications:

Grab Tensile Strength	290 lb.
Mullin Burst Strength	500 psi
Trapezoid Tear Strength	120 lb.
Modulus (Load at 10% Elongation)	120 lb.
Equivalent Opening Size	40-70 Sieve
Water Permeability Coefficient(K)	.003 cm/sec.

Soil stabilization fabric shall be Mirafi 600-X, Supac 6WS, Fibretex TEN-5, or equal.

Aggregate sub-base shall be Class 4 with a minimum sand equivalent value of 21, a minimum R-value of 50 and shall conform to the following gradings:

Sieve Size	Percent Passing
2"	100
1-1 ½"	90-100
3/4"	50-85
#4	25-45
#200	2-11

The material contained on the #4 screen shall consist of 100 percent (100%) crushed particles.

Aggregate sub-base shall be end-dumped on the soil stabilization fabric without disrupting fabric or basement soil as directed by the Engineer. Rolling shall commence immediately after spreading of the damp material and before the material has dried sufficiently to allow separation between the fine and coarse particles. Compactor shall be a non-vibratory type and compaction shall be to 92 percent (92%) R.C.

19-2.03B SURPLUS MATERIAL

Excess trench material shall be removed promptly and disposed of elsewhere by the Contractor at his own expense. The Contractor shall not dump material on any private property without the permission of the owner thereof.

19-3 STRUCTURE EXCAVATION AND BACKFILL

19-3.01 GENERAL

A trench is defined as an excavation in which the depth is greater than the width of the bottom of the excavation.

Excavations for appurtenant structures including, but not limited to, manholes, transition structures, junction structures, vaults, valve boxes, catch basins, thrust blocks, and boring pits shall also be considered trench excavation and subject to the requirements of this section.

Excavation shall include the removal of all water and materials of any nature, which interfere with the construction work. Placement of spoil materials on adjacent asphalt pavement shall not be allowed without a valid City of Lakeport Encroachment Permit or written permission of the City Engineer. Such permissions shall not be granted unless, in the opinion of the City Engineer, no other reasonable option exists. In no instance (including subdivisions under construction) shall stockpiling or material storage be permitted over City sidewalks, curbs or gutters.

Excavation for the installation of conduit or pipes shall be by open trench methods unless otherwise specified or shown on the drawings. Tunneling or boring and jacking shall be allowed only with the prior written approve of the City Engineer.

19-3.02 MATERIALS

19-3.02A(1) Maximum Length of Open Trench

The maximum length of open trench at any given time shall be the distance in which pipe can be completely installed in a single day. Installed shall be defined as pipe laying, appurtenance construction, backfilling and compacting, and temporary paving, complete in place. Installation of underground pipes and conduits shall be performed in one continuous operation. In no instance shall the length of open trench exceed 300 linear feet. The use of steel plates as open trench covers shall not be allowed without prior approval of the City Engineer. If steel plates are approved, they shall not remain for a period longer than 2 weeks. During this time the contractor is required to maintain the plates in a safe manner with temporary conforms of road mixed asphalt surfacing.

The requirements of this Section shall not apply to new construction sites which are closed to the public in a manner acceptable to the City Engineer.

19-3.02A(2) Maximum and Minimum Width of Trench

The maximum clear width of the trench at the top of the pipe shall not be more than the outside diameter of the pipe at any point plus 2 feet. Greater width of trench at the top of the pipe shall be permitted only on written approval by the City Engineer. In no case shall the free working space on each side of the pipe be less than 6 inches.

If the maximum trench width is exceeded, the contractor shall provide additional bedding, backfill, another type of bedding, and/or a higher strength of pipe than that shown on the plans. Any such deviation shall be subject to the approval of the City Engineer.

19-3.02E CULVERT BEDDING

Bedding shall be defined as that material supporting and surrounding the pipe. Bedding shall be placed as shown in the City of Lakeport Standard Plans.

If soft, spongy, unstable, or similar other material is encountered upon which the bedding material or pipe is to be placed, this unsuitable material shall be removed to a depth ordered by the Engineer and replaced with bedding material suitably densified.

Bedding material shall first be placed and compacted so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of 40 percent of the outside diameter of the barrel. The remainder of the bedding shall be carefully placed to the proper depth.

Where pipe is to be installed in a new embankment (fill area), the embankment shall first be constructed and compacted to subgrade, after which the trench shall be excavated with sides nearly vertical and the pipe installed.

When water is encountered, the trench shall be kept dry until laying and jointing of the pipe and placing of the bedding material has been completed, inspected, and approved. The contractor shall over-excavate and place a minimum of 6 inches of permeable material or de-water the trench in a manner which has received prior approval of the City Engineer.

Pipe bedding for slopes less than or equal to 8% shall have a minimum sand equivalent value of 30 and shall conform to the following gradation:

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	65-100
#4	30-100
#200	0-15

Pipe bedding for slopes greater than 8% shall have a minimum sand equivalent of 30 and shall conform to the following grading:

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	65-100
#4	30-100
#30	10-100
#200	0-15

19-3.02F CONTROLLED LOW-STRENGTH MATERIAL
Slurry cement backfill shall be a mixture of Portland cement, sand and 1" maximum coarse aggregate, air entraining agent and water, batched by a ready-mixed concrete plant and delivered to the jobsite by means of transit mixing trucks. Slurry cement backfill may also contain Class F pozzolan (fly ash). Slurry cement backfill shall be free of asphaltic material.

19-3.02F(1) Materials
Cement shall meet the standards as set forth in ASTM C-150, Type II cement.

Fly ash shall meet the standards as set forth in ASTM C-618, for Class F pozzolans. The fly ash shall not inhibit the entrainment of air.

Aggregate size: 1" maximum

Sand Equivalent: 30 minimum

19-3.02F(2) Mix Proportions
The mix proportions shall be determined by the producer of the slurry cement backfill to produce a flowable fill mixture which will not segregate. Each yard shall contain not less than 50 pounds of Portland cement and not less than a total of 100 pounds of cementitious material. The Contractor shall supply a mix design two weeks prior to any use of slurry cement backfill.

19-3.02F(3) Mixture Properties
Compressive Strength: 75 – 200 psi at 28 days
Slump: 3 – 9 inches

The consistency of slurry cement backfill shall be such that all trench voids are filled with minimum rodding or vibrating but not so wet as to cause excessive shrinkage.

19-3.02F(4) Paving
Permanent pavement may be placed directly upon the slurry cement backfill as soon as it has consolidated for the surface to withstand the process of paving without displacement. The surface of the slurry cement backfill shall be firm and unyielding. Any visible movement vertically or horizontally of the slurry cement backfill under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the slurry cement backfill does not meet this requirement. The Contractor shall provide trench plates to allow traffic flow for all locations until slurry cement backfill is ready to be paved.

19-3.03E STRUCTURE BACKFILL
Except for structure backfill placed at specific locations described and enumerated in Sec. 19-3.06 of the State Standard Specifications, structure backfill material specifications and compaction requirements shall be as follows:

Structure backfill shall have a Sand Equivalent of not less than 30 and shall conform to the following grading:

Sieve Size	Percentage Passing
3"	100
No. 4	40-100

Structure backfill shall be compacted to not less than 90 percent relative compaction, except that when placed under any roadbed, relative compaction shall not be less than 95 percent within three feet of finished grade, as determined by California Tests 216 and 231.

19-3.03L Trench Backfill

Trench backfill shall be defined as that material which lies above the pipe bedding or conduit bedding and below the street section or ground surface.

Trench backfill, for all underground pipes and conduits within roadways shall be Controlled Low-Strength Material in accordance with Section 19-3.02F of these Specifications and the State Standard Specifications. Class 2 aggregate base or native material may be used in non-roadway areas with the approval of the City Engineer.

Except where the pipe must remain exposed for force main leakage tests and subject to the provisions herein, the contractor shall proceed as soon as possible with backfilling operations. Care shall be exercised so that the pipe or conduit will not be damaged or displaced.

The Contractor shall not place trench backfill against or over the top of any concrete structures for a period of seven days after concrete has been poured. After the seven day period backfill may be placed provided that two suitable samples have been laboratory tested to a minimum of 3000 psi or 90 percent of the specified 28 day strength, whichever is greater.

Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, the voids remaining after the removal of the buried objects shall be excavated vertically to the ground surface, backfilled, and compacted with Controlled Low-Strength Material as specified herein, or as otherwise approved by the City Engineer.

All trenches shall be backfilled that same day. In paved areas temporary pavement shall be installed. Permanent paving must be installed within one month of trench excavation.

19-3.03M Drain Rock

Drain rock shall be washed coarse aggregate conforming to one of the following gradings:

1-1/2 Inch Grading:

Sieve Size	Percent Passing
2"	100
1-1/2"	90-100
1"	20-55
3/4"	0-15

3/4 Inch Grading:

Sieve Size	Percent Passing
1"	100
3/4"	90-100
1/2"	60-85
3/8"	20-55

19-4 DITCH EXCAVATION

Ditch excavation shall conform to the applicable provisions of Section 19 of the Standard Specifications.

19-4.01 DESCRIPTION

Ditches shall be constructed in conformance to the details and at the locations as shown on the plans, as directed by the Engineer, and as specified herein.

19-5.03 RELATIVE COMPACTION (95 PERCENT)

The following shall apply in lieu of Section 19-5.03B of the State Standard Specifications.

Relative compaction of not less than 95 percent shall be obtained for a minimum depth of 0.5-foot below the grading plane for the full width of the planned structural section, whether in excavation or embankment.

Any area of the subgrade determined by the Engineer to be unstable, as evidenced by excessive deflection under the movement of equipment, shall be brought to satisfactory stability by additional rolling, reworking, removal and replacement of unsuitable material, or stabilization with lime, as directed by the Engineer.

Lime-treated materials shall be compacted to not less than 95 percent relative compaction in accordance with the provisions of Section 24, except when lime is used to stabilize unsuitable material as specified in Sec. 19-2.02 of these Specifications.

Relative compaction of not less than 95 percent shall be obtained for embankment under bridge and retaining wall footings without pile foundations within the limits established by incline planes sloping 1.5:1 out and down from lines one foot outside the bottom edges of the footing.

19-5.04 RELATIVE COMPACTION (90 PERCENT)

The following shall apply in lieu of Section 19-5.03C of the State Standard Specifications.

Relative compaction of not less than 90 percent shall be obtained in all materials in embankment except as specified herein to be 95 percent. Material placed in accordance with the provisions of Section 19-2.02, "Unsuitable Materials," of these Specifications shall be compacted to not less than 90 percent relative compaction.

19-7.02 IMPORT BORROW

Imported borrow shall be free of any regulated hazardous materials.

SECTION 24: LIME STABILIZATION

24-2.01 DESCRIPTION

The following shall apply in lieu of Sec. 24-2.01A of the State Standard Specifications.

This work consists of stabilizing basement soil, mixing in place material, lime and water, and spreading and compacting the mixture to the lines, grades and dimensions shown on the plans and as specified in these Specifications and the Special Provisions.

Where designated by the Engineer, basement soil below the planned lime-treated subgrade shall be stabilized in the following manner:

The material shall be excavated to the lines and grades specified by the Engineer and spread in a uniform layer over another portion of the grade.

Dry lime in the amount specified by the Engineer shall be spread and mixed into the material as provided in Sec. 24-2.01D(4), "Mixing" of the State Standards. The material shall then be used to backfill the original excavation in 6" compacted layers. Each layer below a plane 12" below the grading plane shall be compacted to not less than 90 percent relative compaction. Each successive 6" layer up to the bottom of the planned lime-treated subgrade shall be compacted to not less than 92 percent relative compaction.

24-2.02 MATERIALS

When permitted by the Engineer in writing, and when accompanied by an adequate safety program to be proposed by the Contractor, granular quicklime conforming to the specifications of ATSM Designation C51 may be used in lieu of commercial hydrated lime. Hydrated lime shall be used only when permitted by the Engineer in writing.

When sampled by the Engineer at the point of delivery, the sample of quicklime shall contain not less than 90 percent calcium oxide (CaO), as determined by ATSM C25-11.

When granular quicklime is used, initial mixing shall continue until the quicklime is uniformly distributed throughout the material. Water shall be added as required to provide sufficient moisture for hydration. The mixture shall be cured for not less than 16 hours prior to final mixing.

The Contractor shall provide a grade checker to ensure mixing to the full depth as specified. Water shall be added during the final mixing operations until the water content of the mixture is approximately two percent above the test optimum moisture content.

24-2.03E COMPACTION

Lime-treated material shall be compacted to not less than 95 percent, as determined by Test Method No. California 216 and 231. The sample of lime-treated soil used for determining the maximum wet density shall be obtained from the test site at the time of testing.

24-2.03G CURING

The curing seal requirement may be waived at the discretion of the Engineer when it can be shown that placement of a subsequent layer of aggregate base or HMA can proceed within 24 hours after the completion of final rolling.

SECTION 25: AGGREGATE SUBBASES

25-1.01 DESCRIPTION

Aggregate Subbase shall be Class 4.

25-1.02 MATERIALS

Aggregate Subbase--Class 4 shall have a minimum sand equivalent of 21, a minimum R value of 50 and shall conform to the following grading:

Sieve Size	Percent Passing
3"	100
1½"	90-100
3/4"	50-90
#4	25-55
#200	2-11

The material retained on the #4 screen shall consist of 100% crushed particles.

Representative samples of all material to be imported shall be supplied sufficiently in advance of installation operations for testing and approval of the Engineer. All costs associated with testing shall be paid by the Contractor. Tests for sieve analysis, R-value, sand equivalent and relative compaction shall be per Caltrans Standards.

25-1.03 CONSTRUCTION

25-1.03C Grade Tolerance

The subgrade to receive aggregate subbase, immediately prior to spreading, shall not vary more than 0.05-foot above or 0.10-foot below the grade established by the Engineer.

25-1.03D5 Compacting

The surface of finished aggregate subbase shall be firm and unyielding. Any visible movement vertically or horizontally of the aggregate subbase under the action of construction equipment or other maximum legal axle loads shall considered as evidence that the aggregate subbase does not meet this requirement.

SECTION 26: AGGREGATE BASES

26-1.01 DESCRIPTION

Aggregate Base shall be Class 2, and the combined aggregate shall conform to either of the grading specified in Sec. 26-1.02B of the State Standard Specifications, "Class 2 Aggregate Base."

26-1.02 MATERIALS

26-1.02A Class 2 Aggregate Base

Quality Requirements: The minimum sand equivalent value shall be not less than 30 for any individual test. The resistance (R-value) shall not be less than 78 for any individual test. The durability index shall not be less than 35 for any individual test unless specifically approved by the City Engineer.

Aggregate may include or consist of material processed from reclaimed asphalt concrete, portland cement concrete, lean concrete base, cement treated base, glass or a combination of any of these materials. Aggregate base incorporating reclaimed glass shall not be placed at locations where surfacing will not be placed over the aggregate base. The top 6-inches of aggregate base to remain exposed shall have a dry unit weight of not less than 120 lbs/cf.

26-1.03 CONSTRUCTION

26-103B Subgrade

Subgrade shall be smooth and uniform, and true to the required grade cross-section, and shall be within the tolerance specified in these Specifications or as shown on the plans. The Contractor shall repair at his expense any damage to a prepared subgrade caused by his operations or by use of public traffic. No material shall be placed upon the prepared subgrade until the subgrade is in the condition meeting the requirements specified.

Subgrade that does not conform to the above requirements shall be reshaped to conform to the specified tolerances and recompacted, all at the Contractor's expense.

26-1.03D Compacting

The surface of the finished aggregate base shall be firm and unyielding. Any visible movement vertically or horizontally of the aggregate base under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the aggregate base does not meet this requirement.

26-1.04 SHOULDER BACKING

This work shall consist of constructing shoulder backing adjacent to the edge of the new surfacing in accordance with the details shown on the plans and these special provisions.

The material for shoulder backing shall consist of material of which at least 60% by weight shall be crushed particles as determined by California Test 205 and shall conform to the following grading:

SIEVE SIZES	PERCENTAGE PASSING
1”	100
3/4"	87-100
#4	30-74
#200	7-23

Shoulder backing shall meet all quality requirements as mentioned in Section 26-1.02 of these Specifications.

The areas where shoulder backing is to be constructed shall be cleared of all weeds, grass and debris. Removed weeds and grass shall be disposed of outside the highway right-of-way in accordance with the provisions in Section 5-1.36 of the State Standard Specifications.

Shoulder backing material shall be watered and rolled to form a smooth, firmly compacted surface. Watering shall conform to the provisions in Section 17, "Watering," of the State Standard Specifications.

Shoulder backing material shall not be deposited on the new surfacing prior to placing it in final position, nor shall it be bladed onto the new surfacing during mixing, watering and blading operations.

Shoulder backing construction shall be completed along the edges of any potion of new surfacing within five days after completion of that portion of the new surfacing. Until such time as the Contractor is able to complete shoulder backing along any portion of new surfacing, he shall furnish and place portable delineators and C31a "No Shoulder" signs off of and adjacent to the new surfacing. A portable delineator and a C31A sign shall be placed at the beginning of the drop-off in the direction of travel on the adjacent lane, and at the following maximum intervals along the drop-off:

C31A signs--2,000 feet
Portable Delineators:
on tangents--500 feet
on curves--200 feet

The portable delineators and C31A signs shall be maintained in place at each location until shoulder backing operations are completed at that location. Portable delineators and signs shall conform to the requirements in Section 12, "Temporary Traffic Control," of the State Standard Specifications, except that the base material for the signs shall not be plywood and the signs may be set on temporary portable supports or in barricades.

SECTION 39: HOT MIX ASPHALT

39-1.01 GENERAL
HMA shall be provided in accordance with the Standard HMA construction process and conform to the latest Caltrans Section 39 of the Standard Specifications and as detailed in this specification.

39-1.02 MATERIALS
Tack Coat shall be Grade PG 64-16, conforming to the provisions of Sections 39 and 92 of the Standard Specifications and shall be used between layers of each lift of HMA, and on curbs, gutters and construction joints.

Asphalt binder shall be Grade PG 64-16, conforming to the provisions of Sections 39 and 92 of the Standard Specifications.

Aggregate shall be clean and free from deleterious substances and shall meet the gradation and quality for 3/4-inch HMA Type A or Type B.

Hot Mix Asphalt shall be 3/4-inch HMA Type A or Type B and conform to the latest provisions of Section 39 of the Standard Specifications.

HMA batch plant shall be Department-qualified under the Department's Materials Plant Quality Program of the Standard Specifications.

Reclaimed asphalt pavement shall be acceptable in accordance with the Standard Specifications not exceeding 15.0 percent of the aggregate blend.

39-2.02 CONTRACTOR QUALITY CONTROL
Contractor shall establish, implement and maintain a Quality Control Plan (QCP) to ensure materials and work comply with the specifications and the corrective actions required to control the quality of work. The QCP shall comply with these specifications and Section 39-2 "Standard" of the Caltrans Standard Specifications.

Contractor shall attend a pre-paving conference with the Engineer to discuss methods of performing the production and paving work and how quality control will be performed throughout.

Contractor must identify the HMA sampling locations in their QCP. During production, take samples under California Test Method (CT) 125 except if requested in writing with Engineer approval, you may sample HMA from:

1. The plant
2. The truck
3. The paver hopper
4. The mat behind the paver

A minimum of one sample for Rice Specific Gravity shall be taken each day at the plant during placement of HMA. The Rice Specific Gravity test shall be in accordance with ASTM D 2041. The results shall be submitted to the Engineer within one working day of receiving them from the testing laboratory. Any change shall be noted and the Contractor shall take necessary measures to correct JMF or resubmit a new JMF for approval prior to continuing work.

In place density tests per CT 375 Nuclear Gage field test shall be performed during HMA operations to meet compaction requirements per Standard Specifications. The frequency of testing shall be in accordance with CT 375.

Qualifications of workers: Provide sufficient skilled workers and supervisors who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

Codes and standards:

1. Wherever a test method is referenced in this section, it shall be made in accordance with the most current test method in use by the California Department of Transportation (Caltrans) in the State Standard Specifications, latest edition.

2. For references made to the Standard Specifications, reference shall mean State of California, Business and Transportation Agency, Department of Transportation (Caltrans), Standard Specifications, latest edition, excluding measurement and payment items.

39-2.02A(1) Submittals

The Contractor shall provide the Engineer with the following information a minimum of 10 days prior to commencing the Work:

1. Hot mix asphalt job mix formula (JMF) in accordance with Caltrans Standard Specifications.

    a. Proposed JMF on Form CEM-3511: Include percentage of reclaimed asphalt pavement (RAP)
    b. Mix design documentation, data and aggregate quality on Form CEM-3512 dated within 12 months of submittal.
    c. JMF verification on Form CEM-3513, if applicable
    d. JMF renewal on Form CEM-3514, if applicable
    e. Materials Safety Data Sheets (MSDS) for:
        1) Asphalt binder
        2) Supplemental fine aggregate except fines from dust collectors
        3) Antistrip additives

2. Written confirmation from the supplier that the JMF to be supplied meets all specified requirements.

    Tack Coat: Contractor shall submit asphalt binder tack coat and asphaltic emulsion tack coat.

    The Contractor shall develop and submit a Quality Control Plan for the project. This shall, at a minimum, cover the areas or subjects contained in Appendix A of this section and Section 39-2 of the Standard Specifications. The Contractor shall not begin hot mix asphalt production or placement without written approval from the Engineer of the QCP and an approved JMF. Approval of the QCP and JMF by the Engineer does not relieve the contractor of responsibility for quality control or work methods.

1. Test Reports:

    a. Submit reports of tentative paving material design and testing.
    b. Submit reports of testing and inspection during the course of the Project.
    1) Submit all laboratory test reports for daily Rice Specific Gravity and Nuclear Gage field tests immediately upon receipt from the testing laboratory.

2) Submit daily field summary reports for all testing activities.
3) Submit all laboratory test reports at the end of the Project.
4) Submit current certificates from all laboratories immediately upon receipt from the testing laboratory. Certificates shall not be expired or more than 1 year old.
5) Submit current certificates for mixes, materials and products immediately upon receipt from the testing laboratory or product supplier. Certificates shall not be expired for more than 1 year, and must reflect materials actually used on the project. JMF shall have no changes in aggregate, asphalt, or other materials from what was provided in current certificates.

39-2.03 ACCEPTANCE CRITERIA

In addition to the Quality Control Plan, the Contractor shall provide an independent quality control to perform independent sampling and acceptance testing in accordance with Section 39-1.05 and Section 39-2.03 of the Standard Specifications. Sampling shall be performed under California Test 125. Testing shall be performed as specified in this Section.

Start-up evaluation will be performed in accordance with Section 39-1.07 of the Standard Specifications. Sampling and testing shall occur at a minimum for the following:

1. Aggregate
2. Asphalt binder
3. RAP
4. HMA

Quality control sampling and acceptance testing shall be performed by the Contractor's Independent Assurance Tester in accordance with the following schedule:

Quality Characteristic	**Test Method**	**Minimum Sampling and Testing Frequency**	**Location of Sampling**	**Maximum Reporting Time Allowance**
Aggregate Gradation	CT 202	1 per 750 tons	Plant	24 hours
Reclaimed Asphalt Pavement Gradation	LP-9	Daily	RAP System	24 hours
Asphalt Binder Content	CT 379 or CT 382	1 per 750 tons	Loose Mix Behind Paver	24 hours
Percent of Maximum Theoretical Density	CT 308	1 per 750 tons	Loose Mix Behind Paver	24 hours
Maximum Theoretical Density	CT 309	Per CT 375	Loose Mix Behind Paver	24 hours
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants	CT 226 or CT 370	2 per day during production	Stock-piles or Cold Feed Belts	24 hours
Sand Equivalent (minimum)	CT 217	1 per 750 tons	Plant	24 hours
HMA Moisture Content (maximum)	CT 370	1 per 2,500 tons but not less than 1 per paving day	Loose Mix Behind Paver	24 hours
Stabilometer Value (minimum) No. 4 and 3/8" gradings 1/2" and	CT 366	1 per 4,000 tons or 2 per five business	Loose Mix Behind Paver	48 hours

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Location of Sampling	Maximum Reporting Time Allowance
3/4” gradings		days, whichever is greater		
Air Voids Content (%)	CT 367	1 per 4,000 tons or 2 per five business days, whichever is greater	Loose Mix Behind Paver	48 hours
Percent of crushed particles coarse aggregate (% minimum) One fractured face Two fractured faces Fine aggregate (% minimum) (Passing No. 4 sieve and retained on No. 8 sieve)	CT 205	1 every 6,000 tons	Plant	48 hours
Los Angeles Rattler (% maximum) Loss at 100 revolutions Loss at 500 revolutions	CT 211	1 every 6,000 tons	Plant	48 hours
Fine aggregate angularity (% minimum)	AASHTO T-304, Method A	1 every 6,000 tons	Plant	48 hours
Flat and elongated particle (% maximum at 5:1)	ASTM D 4791	1 every 6,000 tons	Plant	48 hours
Voids in mineral aggregate (% minimum)	LP-2	1 every 6,000 tons	Loose Mix Behind Paver	48 hours
Voids filled with asphalt (%)	LP-3	1 every 6,000 tons	None Calculation	48 hours
Dust proportion	LP-4	1 every 6,000 tons	None Calculation	48 hours
Moisture Sensitivity	CT-371	1 every 5,000 tons	Loose Mix Behind Paver	NA

A minimum of one sample for Rice Specific Gravity shall be taken by Independent Assurance Tester each day at the plant during placement of HMA. The Rice Specific Gravity test shall be in accordance with ASTM D 2041. The results shall be submitted to the Engineer within one working day of receiving them from the testing laboratory. Any change shall be noted and the Contractor shall take necessary measures to correct JMF or resubmit a new JMF for approval prior to continuing work.

In place density tests per CT 375 Nuclear Gage field test shall be performed during HMA operations by Independent Assurance Tester to meet compaction requirements per Standard Specifications. The frequency of testing shall be in accordance with CT 375.

Should any test specified in this Section fail to meet density requirements, Independent Assurance Tester shall take density core samples every 500 feet of paved roadway per Section 39-2.03 of Standard Specifications to verify density results.

39-2.04 TRANSPORTING, SPREADING, AND COMPACTING

During the entire construction period, the Contractor shall take care to protect existing pavement

and concrete surfaces. Surfaces scarred by cleanup or equipment shall be repaired in a manner satisfactory to the Engineer. Any and all damage caused by the Contractor's operations to existing roads and streets shall be repaired by the Contractor to at least the original condition and to the satisfaction of the Engineer, at no additional cost to the City.
If pavement is damaged (excessive loading, grouser marking, scarring/scraping of pavement, etc.) outside the limits of the work, a full lane width grinding and overlay will be required as directed by the Engineer at no additional compensation to the Contractor.
Ensure the area is clean and dry. All material accumulations which would interfere with the adhesion of the tack coat or with the placing and performance of the HMA shall be removed, including dust, loose aggregate, soil, leaves, and pieces or lumps of other foreign material deposited on the surface.

Tack Coat
A tack coat shall be applied to existing pavement including planed surfaces, between HMA layers, and to vertical surfaces of curbs, gutters and construction joints at the minimum residual rates specified in Section 39-1.09C "Tack Coat" of the Standard Specifications.

Before placing HMA, a tack coat shall be furnished and applied uniformly to contact surfaces of all cold pavement joints, curbs, gutters, pavement reinforcing fabric and all existing pavement to be surfaced in conformance with Section 39 of the Standard Specifications.

Tack coat shall be applied to any course in advance of spreading the next course unless the surface temperature is at least 140 °F.

Hot mix asphalt shall not be placed until tack coat has cured.

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not track tack coat onto pavement surfaces beyond the job site.

Spreading and Compacting
HMA surfacing shall conform to the provisions of Section 39 of the Standard Specifications. Placing HMA shall be done under suitable weather conditions for such operations. Rain, snow or other inclement weather will be cause for discontinuing paving Work. The Engineer shall have the authority for determining whether weather conditions are sufficient cause to postpone work.

Spreading and compacting shall be performed in accordance with Section 39-1.10 and Section 39-1.11 of the Standard Specifications.

The minimum HMA lift thickness shall be 0.13 ft and the maximum HMA lift thickness shall be 0.25 ft.

HMA shall be transferred from the trucks into the hopper of the paving machine by means of a shoulder machine equipped with a conveyor belt. Any equipment used to transfer HMA to the paving machine shall not exceed the load capacity of any surface it is driven over and, therefore, shall not produce rutting or pumping of the existing roadway surface or newly placed HMA at any time. No trucks or other rubber tired construction equipment are allowed on the subgrade at any time except when proofrolling in the presence of the Engineer. No trucks or other rubber tired construction equipment are allowed on newly placed HMA until the day after the HMA is placed.

Longitudinal joints in the top layer must match specified lane edges shown on the striping plans. Longitudinal joints in lower HMA layers shall be offset at least 0.5 feet from each side of the

specified lane edges.

Finish rolling shall be completed before pavement surface temperature is below 150 degrees F.

If performing half-width paving, at the end of each day's work the distance between the ends of adjacent surfaced lanes must not be greater than can be completed in the following day of normal paving

Do not leave a vertical joint more than 0.15 foot high between adjacent lanes open to public traffic.

Traffic shall not be allowed on HMA until mid-depth temperature is below 160 degrees F and the pavement surface temperature is below 140 degrees F.

The completed surfacing shall be true to grade and cross section, of uniform smoothness and texture, compacted firmly and free from depressions, humps or irregularities.

Dikes shall be shaped and compacted with equipment capable of shaping and compacting the material to the required cross section.

Where shown on the plans a fog seal coat of asphaltic emulsion shall be applied uniformly to the surface of the HMA.

HMA finished surface must be:

1. Textured uniformly;
2. Compacted firmly;
3. Without depressions, humps, and irregularities; and
4. Compliant with the 12-foot straightedge specifications in Section 39-1.12, "Smoothness," of the Standard Specifications.

Widening

If widening existing pavement to new lip of gutter, construct new structural section on both sides of the existing pavement to match the elevation of the existing pavement's edge for the project's entire length before placing HMA over the existing pavement.

Conform Tapers

Place shoulder conform tapers concurrently with the adjacent lane's paving.

Place additional HMA along the pavement's edge to conform to road connections and private drives. Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

Smoothness

The ground surface shall be tested with a 12-foot ± 2½ inch (3.5 m ± 0.06 m) long straightedge laid on the pavement. The surface shall not vary by more than 0.25 inches from the lower edge of the straightedge.

39-9 ROADWAY REHABILITATION

39-9.01 GENERAL

Roadway rehabilitation shall consist of removing and disposal of existing hot mix asphalt, and base if necessary, to the specified depth by cold planing or other approved methods.

Digouts on roadways designated to be milled shall be performed after the cold planing operation is completed. Depth of the digouts shall then be based on the remaining thickness of HMA after cold planing.

39-9.02 CONSTRUCTION

Hot Mix Asphalt Digouts and Remove and Replace Areas

The pavement areas designated to be replaced shall be removed to a uniform depth as specified, and may be removed either by cold planing or by full depth sawcutting and mechanical removal. Sawcutting is not necessary if the pavement is removed by cold planing. Any broken or damaged pavement edges shall be re-cut prior to paving. All removed material shall be cleared from the site.

The excavated areas shall be graded as shown on the plans as necessary to provide a uniform pavement thickness. The base rock or native soil shall be compacted to 95% relative compaction. All segregated or loose material shall be removed.

On areas where the underlying material appears to be wet or soft or where it deflects under wheel loads, the Contractor shall employ excavation and work techniques that do not worsen the subgrade condition.

Prior to placing aggregate base or HMA, each pavement replacement area shall be proof-rolled with a loaded construction vehicle, preferably a ten cubic yard dump truck or equivalent. The compacted surface shall not visibly yield or deflect. Soft, yielding, unstable, or unsuitable areas shall be removed and replaced with base rock or HMA. If the areas were caused or significantly worsened by the Contractor’s operations, these areas shall be replaced at the Contractor’s expense.

In the event that the underlying material is soft, yielding, unstable, or unsuitable, it shall be excavated to a depth of 0.5 feet below the depth required above and disposed of in accordance with City of Lakeport Standards. The limits of removal shall be designated by the Engineer. The resulting space shall be filled with a single lift of HMA.

Unsuitable material is defined as material the Engineer determines to be:

A. Of such unstable nature as to be incapable of being compacted to specified density using ordinary methods at optimum moisture content, or
B. Too wet to be properly compacted and circumstances prevent in-place drying prior to incorporation into the work, or
C. Otherwise unsuitable for the planned use.

After compaction of the subgrade, aggregate base shall be placed and compacted to 95% relative compaction. All vertical edges of existing pavement or concrete shall receive a tack coat immediately prior to paving. Additional tack may be necessary between HMA courses. No prime coat shall be required. A tack coat between layers of HMA shall be required if not paved on the same day or if the surface has been contaminated or soiled. Any contamination or soiling shall be thoroughly cleaned and a tack coat placed between layers immediately prior to paving.

Care shall be taken to assure compaction of the inside corners of the first lift. Ramping shall not be allowed on the course placed immediately prior to the surface course.

A minimum of two lifts shall be used for each replacement area or digout with a depth greater than three inches. The surface course shall be 1/2 inches maximum thickness.

The repaired areas shall conform with the level of the surrounding pavement so that no elevation variation is evident. The surface shall have a maximum variation from high to low of 0.01 feet maximum when measured with a twelve-foot level. Variation at the edges shall not exceed 0.01 feet maximum. When matching existing pavement, the finished surface shall not inhibit drainage. The upslope edge of the digout or replacement shall be 0.00 feet high to 0.01 feet low. On the downslope edge of the digout or replacement, the finished surface shall be 0.01 feet high to 0.00 feet low. Any resulting variations shall be corrected to the satisfaction of the Engineer.

39-9.03 SIDE STREET CONFORMS

Side street conforms shall conform to the requirements of City Standard 216, “Side Street and End of Overlay Conform” of the City of Lakeport Standard Plans, with the following modifications: The side street structural section shall be 3 inches of HMA between the limits of the main street and the conform line. Beyond the conform line the existing asphalt shall be removed and replaced as directed by the Engineer to provide a smooth transition.

SECTION 39A: HOT MIX ASPHALT TRENCH PAVING

39A-1.01 DESCRIPTION

Hot mix asphalt placement shall conform to the requirements of the Standard Specifications and Section 39 of the City Specifications.

39A-2.01 ASPHALTS

Asphalt thickness for final asphalt surfacing shall conform to City Standard 222, "Standard Trench Detail" of the City of Lakeport Standard Plans, or as shown on the plans.

For temporary paving, use ½-inch maximum, medium grade aggregate and SC 3000 asphalt for use the same day, or SC 250 for use over a one week period.

The amount of asphalt binder to be mixed with the aggregate will be specified by the Engineer at the time of paving. A different asphalt binder content may be specified for each lift and each location.

39A-5.01 SPREADING EQUIPMENT

When trench width is three feet or less, the HMA used for trench paving may be deposited directly from the haul vehicle into the trench. The asphalt shall then be raked smooth prior to compaction.

39A-6 SPREADING AND COMPACTING

39A-6.01 GENERAL REQUIREMENTS

The contractor shall provide compaction of backfill and base material as the job progresses, each day. Temporary paving (2 inches minimum) will be placed each day over the work, leaving not more than 25 feet unpaved. The balance of the trench shall be covered with steel plates, capable of sustaining normal traffic loads. Temporary HMA paving shall be used around all edges of steel plates.

Finished HMA trench paving shall be even, smooth riding and have an appearance that is compatible to the surrounding surface.

Upon placement of the last lift of backfill material as shown for on City Standard 222, "Standard Trench Detail" of the City of Lakeport Standard Plans, the Contractor shall cut the edges of pavement in a neat manner to the locations shown on said City Standard 222.

SECTION 51: CONCRETE STRUCTURES

51-1.02A Curb Inlets
Curb inlets to be installed shall be in conformance with the City of Lakeport Standard Plans and the details shown on the plans and as directed by the City Engineer.

51-1.02B Storm Drain Manholes
Storm drain manholes shall consist of a precast unit or a cast-in-place unit in conformance with Section 51-4 of the State Standard Specifications, City Standards, or a combination thereof.

Manholes shall be fitted with either an eccentric cone or a flat "reducer" slab. Manholes shall be adjusted to match the finished grade with no less than two precast grade rings fitted with a cast iron frame and cover not less than 24" in diameter.

The inside diameter of the manhole shall be of such size that it accommodates the outside diameter of the largest adjoining pipe, however, in no case shall the inside diameter of any manhole be less than 48 inches. All pipe ends shall be rounded and all joints grouted. No pipe ends shall extend into the barrel of the manhole.

When the flowline of the manhole is over seven (7) feet below the top of the cover the inside of the manhole will be no less than 60 inches in any direction.

SECTION 64: PLASTIC PIPE

64-1.01 DESCRIPTION
Plastic storm drain pipe (ADS N-12) shall conform to the provisions of Section 64, "Plastic Pipe" of the State Standard Specifications. Plastic pipe shall be Type S corrugated polyethylene pipe with a smooth inner lining and corrugated outer wall.

64-1.03B EARTHWORK
Excavation and backfill shall be as shown on City Standard 222, “Backfill and Resurfacing in Paved Areas” of the City of Lakeport Standard Plans.

64-1.03C LAYING PIPE
No pipe shall be laid which is damaged or which, in the opinion of the Engineer, is unsuitable for use.

64-1.03D VIDEO INSPECTION
The Contractor shall hire an independent television inspection service to perform a closed-circuit television inspection of all newly constructed storm sewers. A video tape of the television inspection shall be produced and delivered to the City in color DVD format on a compact disc, together with a typed log of their inspection.

The following Conditions shall exist prior to the television inspection:

A. All storm sewer lines shall be installed, backfilled and compacted;
B. All structures shall be in place, all channeling complete and all pipelines accessible from structures;
C. All other underground facilities, utility piping and conduit within two feet of the storm sewer main, shall be installed;
D. All compaction required shall be completed;
E. Immediately before the television inspection, run fresh water into the storm sewer until it passes through the downstream manhole.
F. No more than 1” deep water will be present at all times during video inspection.

When the above work has been completed, the Contractor shall notify the City 48 hours in advance of the date for television inspection. During this inspection, the Contractor or his authorized representative shall be present to observe the video pictures as provided by the television camera. Cameras shall be pointed upstream and all video inspections shall run upstream.

The following video tape observations shall be considered defects in the construction of the storm sewer pipelines and will require corrections prior to acceptance:

A. Off grade – 0.08 foot, or over, deviation from grade.
B. Joint separations – over ¾”;
C. Offset joints;
D. Chips in pipe ends – none more than ¼” deep;

E. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, root, etc.);
F. Infiltration;
G. Debris or other foreign objects;
H. Other obvious deficiencies when compared to Approved Plans and Specifications, these Standards and Standard Drawings.

The Contractor shall be notified in writing of any deficiencies revealed by the television inspection that will require repair, following which the Contractor shall excavate and make the necessary repairs and request a television re-inspection. Television re-inspection shall be at the Contractor's expense.

SECTION 65: REINFORCED CONCRETE PIPE

65-1.01 DESCRIPTION
Reinforced concrete pipe shall be either Class III, Class IV, or Class V, as shown on the plans and shall conform to the provisions of ASTM C-76.

65-2.03B EARTHWORK
Excavation and backfill shall be as shown on City Standard 222, "Standard Trench Detail" of the City of Lakeport Standard Plans.

65-2.03C STRUCTURES
Storm drain manholes shall be standard four or five foot diameter precast manholes as detailed in the Standard Plans. Storm drain manholes barrels and taper sections shall be precast concrete sections using Type II Portland Cement complying with ASTM C-150.

Catch basins shall be constructed as shown in the Standard Plans. Concrete for cast-in-place catch basins shall be Class B. Bar reinforcing steel shall conform to and be placed in accordance with the provisions of Section 52 of the State Standard Specifications.

Connections to existing storm drain structures shall be made with care to avoid unnecessary damage to any existing curb and gutter or sidewalk. Any damaged section to be removed and replaced in accordance with City Standards and as approved by the Engineer. Pipe connections to the existing structures shall be sealed with cement mortar.

65-2.03D LAYING PIPE
No pipe shall be laid which is cracked, checked, spalled, or damaged and which in the opinion of the Engineer is unsuitable for use.

65-2.03E VIDEO INSPECTION
A closed-circuit television inspection of all newly constructed storm sewers shall be conducted in accordance with Section 64-1.03D of these Specifications.

SECTION 66: CORRUGATED METAL PIPE

66-1.01 DESCRIPTION
Corrugated metal pipe shall conform to the provisions of Section 66-1.02E, "Corrugated Steel Pipe" of the State Standard Specifications. Corrugated metal pipe shall not be used in the street right-of-way.

66-1.03 CONSTRUCTION
Excavation and backfill shall be as shown on City Standard 222, "Standard Trench Detail" of the City of Lakeport Standard Plans.

No pipe shall be laid which is damaged or which, in the opinion of the Engineer is unsuitable for use.

63-1.08 VIDEO INSPECTION
A closed-circuit television inspection of all newly constructed storm sewers shall be conducted in accordance with Section 64-1.03D of these Specifications.

SECTION 71: SEWERS

71-1.01 MATERIALS
Sewer pipe shall be polyvinyl chloride pipe or ductile iron pipe.

71-1.01A Polyvinyl Chloride (PVC) Pipe
PVC solid wall sewer pipe and fittings for gravity sewers shall be made of all new, rigid, un-plasticized polyvinyl chloride in accordance with ASTM Standard Specifications D3034 and F-679 and shall have a wall thickness of at least SDR 35. Joints shall consist of an integral thickened bell gasket joints and shall conform to ASTM D3212. Rubber gaskets shall be factory installed and conform to ASTM F477. Joints shall be assembled using only manufacturers recommended lubricant.

All pipe shall have a home mark to indicate full penetration of the spigot when the joint is made.

All PVC pipe entering or leaving a concrete structure shall have a standard manhole gasket, as supplied by the pipe manufacturer, firmly clamped around the pipe exterior and cast into the structure base or near the structure wall center as a water-stop.

After pipe installation and placement and compaction of backfill, but prior to placement of pavement, all pipe shall be cleaned and then tested with a mandrel to measure for obstructions. Obstructions shall include, but not be limited to deflections, joints offsets and lateral pipe intrusions. A rigid mandrel, with an effective circular cross section having a diameter of at least 95% of the specified base inside diameter shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be equal to the nominal diameter of the pipe. All obstructions encountered by the mandrel shall be corrected by the Contractor.

Obstructions due to deflection shall be corrected by replacement of the over-deflected pipe, not by re-rounding in place.

If a section of pipe fails to meet the mandrel test and is reinstalled and fails the second time, said section(s) of pipe shall be replaced with an approved rigid pipe material.

The manufacturer shall furnish to the City a 5% deflection mandrel and proving ring as shown on the District Standards for the City's retention and use.

The average inside diameter for PVC Solid Wall Sewer Pipe shall be the "Average Outside Diameter" (see ASTM D3034 and F679 minus 2.12 time the "Minimum Wall Thickness" (see ASTM D3034.

The Contractor shall retest the solid wall pipe using a mandrel with an effective circular cross section having a diameter of at least 95% of the specified average inside diameter eleven (11) months after recordation of Notice of Completion of a City contract or after the acceptance by the City Council of a subdivision. Any pipe which fails to pass the mandrel test shall be replaced at the expense of the Contractor. The City reserves the right to determine the longitudinal limits of any pipe that is required to be replaced. Pipe replacement shall be guaranteed by the project

maintenance bond.
Lateral wyes added after pipe installation shall be solvent welded saddles, not mechanically connected wyes.

71-1.01B Ductile Iron Pipe (DIP)
Ductile iron pipe shall be cement lined, new pipe conforming to ANSI A21.51-1976 or most recent issue, if any, as sponsored by the American Water Works Association for thickness class 50 Ductile Iron Pipe. The pipe shall be furnished with bell and spigot ends, "Tyton Joints", or mechanical joints except where specifically specified on the plans.

All ductile iron pipe buried underground shall be encased in polyethylene film in the tube form. Polyethylene material and installation procedure for the encasement shall conform to ANSI/AWWA C105/A21.5-10 or most recent issue, if any. Installation Method "A" as described in aforementioned specification shall apply.

Couplings for connection to the sewer main shall be of a type approved by the City.

71-1.02 EXCAVATION AND BACKFILL
Excavation and backfill shall be as shown on Std. Dwg. 222, "Standard Trench Detail" of the City of Lakeport Standard Drawings.

All stumps and large roots encountered during trenching operations shall be removed to the satisfaction of the City. The trench shall be opened sufficiently ahead of the pipe laying operations to reveal obstructions. Trench crossings shall be provided as necessary to accommodate public travel and to provide convenient access to adjacent properties. Flow shall be maintained in any sanitary sewers, storm drains, water lines or water courses encountered in trenching.

All cutting, handling and disposal of asbestos cement pipe shall be done in accordance with the Contractor's State Licensing Law and all applicable laws and regulations.

71-1.03 EXISTING MANHOLES
Existing manholes and cleanouts located within the street right of way shall be adjusted to conform to finished pavement grades in accordance with the details shown on the plans.

Prior to the removal of an existing manhole frame, a platform shall be constructed in the manhole above the top of the sewer to prevent any dirt or debris from falling into the sewer. The platform shall remain in place until all work on the manhole has been completed and the HMA has been placed around the manhole. Prior to the removal of the platform from the manhole, all dirt and debris shall be removed.

Lowering of the manhole ring and cover shall be accomplished by the removal of existing concrete grade rings below the manhole ring or by removing the upper section of manhole barrel and substituting therefore a shorter section of barrel.

At the Contractor's option, in lieu of removing and replacing barrel sections as above provided, the top of the existing upper barrel section may be trimmed and the taper section replaced on

such trimmed surface provided, however, that such trimming shall not crack or otherwise damage the remaining portion of the barrel section.
In the event that the portion of barrel section to remain is cracked or damaged or otherwise made unsuitable for use by such trimming, the entire section shall be removed and replaced with a new section of barrel. Trimming of taper sections will not be permitted.

All sections of the manhole shall be set in cement mortar or in approved gasket material. Trim excess gasket material and plaster inside joints smoothly, Manhole sections set in cement mortar shall be smoothly plastered inside and out.

After placing the surface course of HMA, all manholes and cleanouts shall be located and marked with white paint before the close of that work day.

Within two working days of paving, all manholes and cleanouts shall be adjusted to grade and inspected.

71-1.04 PIPE LAYING

Where ground water occurs, pumping shall continue until backfilling has progressed to a sufficient height to prevent floatation of the pipe. Water shall be disposed of in such a manner as to cause no property damage or not be a hazard to public health or the environment.

Where projects consist of construction or new mains or extensions of existing mains, contractor must make provisions to keep flow from entering the sewer collections system. This shall include the installation of a positive sealing plug on the outlet of the new mains closest manhole to the existing main. Additionally, if any new laterals enter the new main between the existing main and the closest manhole on the new main, each lateral shall be individually plugged with a positive sealing plug. The Contractor shall be held responsible to periodically check that all plugs are holding tight. The Contractor shall ensure that the water contained in the new main is not contaminated with human or hazardous waste, prior to removal of any plugs. The Contractor shall make provisions to dewater the new mains without disposal into the sewer collection system and without cause of property damage or hazard to the public health or environment. Failure to comply may result in penalties.

Where construction consists of construction a new main or extension of an existing main, the downstream end of the new main shall be securely closed with a tight fitting plug until the construction is accepted by the City.

If the new sewer main is connection to an existing main at a location other than an existing manhole, the Contractor shall pothole the existing sewer main to verify invert grades and locations.

Sewer pipe shall be installed on the alignment and grade as shown on the plans and in accordance with the Standard Specifications, or as directed by the Engineer. Existing sewer laterals shall be removed and replaced at the locations shown on the plans, or as directed by the Engineer. Gravity sewer pipe shall be laid true to line and grade and in such a manner as to form watertight joints. Pipe bore shall be cleared of all dirt and debris as work progresses.

Sewer pipe shall be laid in straight lines and on uniform rates of grade between points where changes in alignment or grade are shown on the plans. The interior of the pipe shall be free of foreign matter before lowering into the trench.
Manufacturer's recommendations shall be followed for pipe joining including thoroughly cleaning all mating surfaces and not exceeding maximum deflection of joints in curved alignments. Pipe shall be handled with such care as to prevent structural damage to it. The Trench shall not be backfilled until authorized by the Engineer. Pipe laying shall proceed upgrade with the spigots pointing in direction of flow.

Electro-optical grade setting devices must be used and shall be operated by a person proficient in its operation.

Any section of pipe found to be defective or which has had grade or joints disturbed shall be re-laid by the Contractor at his expense.

Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and efficient execution of the work. All pipe, fittings and accessories shall be carefully lowered into the trench by means of derrick, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. The pipe and accessories shall be inspected for visible defects prior to lowering into trench. Any visibly defective or unsound pipe shall be replaced.

The line and grade of existing utilities shall not be altered. Any leakage caused in existing utilities by reason of the Contractor's operations shall be immediately repaired at the Contractor's expense.

Any vertical misalignment which results in reversed flow-line grade sufficient to retain fluid to a depth of 1" in 4" – 8" lines or 1 ½" in 10" and larger lines shall be unacceptable.

Existing storm drains shall be supported or removed and replaced at the Contractor's option. In any case, the Contractor shall be responsible for maintaining the existing line and grade of the storm drain.

Existing water lines shall be supported in place with service maintained during construction. The Contractor shall be responsible for any damage resulting from improper backfilling.

Existing Sewer lines shall be supported in place with service maintained during construction. The Contractor may, at his option, remove and replace any sewer laterals which are not in use during construction. The Contractor shall be responsible for damage to sewer lines during construction and any damage resulting from improper backfilling.

71-1.05 SEWER LATERALS AND SERVICES
Sewer lateral inverts shall be set above the midpoint of the sewer main.

71-1.05A Grades and Alignment
Service sewers shall be run in practical alignment at a uniform slope of not less than ¼ inch per

foot toward the main sewer; provided that where it is impractical due to the depth of the main sewer or to the structural features or the arrangement of any building or structure, to obtain a slope of ¼ inch per foot, any such piping may have a slope of not less than 1/8 inch per foot when approved by the Engineer.

71-1.05B Pipe Cover and Clearance

Lateral sewer shall be installed at sufficient depth to serve the parcel involved, but in no case less than 24 inches clear cover at the property line.

Building sewers shall have a clear cover of eighteen (18) inches minimum from finished grade. Where clear cover is less than eighteen (18) inches, cast iron pipe shall be used. Where building sewers are located in or cross driveways, ductile iron pipe shall be used.

The minimum depth of cover on sewer main lines shall be 3' -6." Sewer main lines having a depth of cover less than 3” -6" shall be class 50 ductile iron or be encased in schedule 40 steel pipe.

The top of laterals shall be a minimum of 24 inches below the flow line of the gutter at the point where the laterals intersect the gutter.

Sewer service lateral connections 6 inches and larger in size shall be made with a manhole.

The minimum permissible slope on sewer main lines shall be 0.40% for 6 inch, 0.30% for 8 inch and 0.25% for 10 inch. The maximum slope permitted on sewer main lines shall be 15%.

Sewer main lines shall be extended along the full length of the street frontage of the property to be served unless the line is planned to terminate at the last property served.

The minimum vertical clearance at crossings between the outer dimensions of sewer main lines and potable water lines shall be 12 inches. The minimum clearance at crossings of other utility lines shall be 6 inches.

71-1.06 SEWER STRUCTURES

Manholes shall be constructed of cylindrical precast reinforced concrete sections(s), conical reinforced concrete section and adjustment rings (s) manufactured in accordance with ASTM standard C478 and cast iron frame and cover as detailed in City of Lakeport Std. Drawing 301. Mains larger than 18” in diameter or deeper than eight feet require 60” diameter manholes. Manholes shall not be spaced at more than 400 feet apart.

Manhole bases may be poured-in-place concrete on undisturbed earth. The bases shall be poured full thickness against the side of the manhole excavation or to dimensions shown on the plans; the manhole excavation site shall be dewatered before pouring.

Precast manhole bases, conforming to City Standard in dimensions and the requirements outlined below for materials may be used. Such pre-cast bases shall be placed on a minimum 12-inch thick cushion of drain rock. The drain rock shall extend a minimum of 6 inches beyond the outside edges of the base.

Concrete for manhole bases shall be 6 sack Portland cement concrete conforming to the

applicable requirements. The Portland Cement shall be Type V conforming to ASTM Standard C 150 or low-alkali-Type II cements meeting the requirement for Type V cement.

Where steel reinforcement is required in manhole base construction, such reinforcement shall be furnished and placed as shown on the plans and in accordance with the applicable provisions.
The base slab and initial riser section shall be connected with integrally poured concrete to create a watertight joint. Flow channels shall be constructed as shown on the plans. Changes in size or grade shall be made gradually and changes in direction by smooth curves. All finished surfaces shall be smoothly troweled with a steel trowel. All manhole barrels and taper section shall be precast concrete sections using Type V Portland cement complying with ASTM Designation: C 150 or low-alkali Type II cement meeting the requirements for Type V cement.

The 48-inch and 60-inch diameter barrels and taper sections shall be constructed in accordance with the applicable provisions of ASTM Standard C478 and shall be inspected by the City to determine that the interior surfaces are smooth and free of pockets or depressions. The inside face of all barrels, tapers and rings shall be aligned with and flush to adjacent sections.

Manhole frames and covers shall be Pamrex, or approved equal, in accordance with City Std. Dwg. 303.

At locations where sewer is to be installed into or out of existing manholes, the manhole wall and base shall be shipped to accept the new size of pipe and to form a flow channel in the manhole base. The Contractor shall dry pack around the pipe between the pipe and the chipped out opening. The Contractor shall also backfill the area around the pipe with concrete to insure a watertight connection.

Mainline cleanouts shall be installed per Std. Dwg. 307 at the locations shown on the Plans.

All joints in manholes shall be sealed by means of placing a pre-formed, flexible butyl rubber mastic sealant evenly, without elongation, to the two horizontal surfaces of the tongue and groove joint; Install the manhole riser or cone section taking care to not dislodge the sealant material or contaminate it with any foreign matter self-bonding, self-sealing plastic gasket, such as “Ram-Nek”, manufactured by the K.T. Snyder Company, Houston, Texas, or approved equal. Joints seals shall be installed in full compliance with the manufacture’s current recommendations. All manholes shall be water tight prior to grouting.

The bottoms of manholes shall be neatly shaped to provide channels conforming to the size of their respective pipes and troweled to a smooth finish. The channels shall be open at the top to the diameter of the pipe to within 2 inches of the manhole wall.

After placing the surface course of HMA, all manholes and cleanouts shall be located and marked with white paint before the close of that work day.

Within 48 hours of paving, all manholes and cleanouts shall be adjusted to grade and inspected.

71-1.07 TESTING OF SEWERS
All costs for testing and inspection shall be borne by the Contractor or Owner.

Testing of all portions of the sewer including manholes is required. For either exfiltration or infiltration test, the maximum leakage shall not exceed 250 gallons per inch of pipe diameter per mile per 24 hours as measured over a period of 30 minutes minimum. Should the leakage exceed the maximum allowable rate, the contractor shall repair, overhaul, or rebuild the defective portion of the sewer line to the satisfaction of the Utility Superintendent at no additional cost to the City. After repairs have been completed by the Contractor, the line shall be retested as specified above, all at no cost to the City.

Manholes shall be filled with water to the rim of the frame casting and shall lose no more than 2 inches over a period of 30 minutes. The test shall be performed after the line has been laid and all backfill placed and compacted. The Contractor, at his option, may test the line at any time during construction. However, the final test for acceptance shall be made only after all backfill is in place and compacted. In the event that the exfiltration test prescribed above is impractical due to wet trench conditions, these portions of the sewer line where such conditions are encountered will be tested for infiltration. The Utility Superintendent shall determine whether the exfiltration or infiltration test will be used.

Even though the test for leakage is within the prescribed limits, the Contractor shall repair any obvious leaks.

If water testing is not required by the Utility Director or designee, low pressure air testing maybe used as an option of the contractor. The following procedure shall be used for air testing:

1. Clean pipe to be tested by propelling a snug fitting inflated rubber ball through the pipe with water. Remove any debris.
2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
3. If the pipe to be tested is submerged in ground water, insert a pipe probe, by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
4. Add air slowly to the portion of the pipe installation under test until the internal pressure is raised to 5.0 psig.
5. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
6. After an internal pressure of 5.0 psig. is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
7. After the two minute period, disconnect the air supply and start stopwatch. The pressure of 5.0 psig. shall be maintained for 5 minutes.
8. As an alternate, the contractor may request the air testing procedure as presented in Section 306-1.4.4 of the 1997 edition of the “Greenbook” Standard Specifications.

After pipe installation and placement and compaction of backfill, but prior to placement of pavement, all PVC pipe shall be cleaned and then mandrel tested for obstructions, such as, but not limited to, deflections, joint offsets and lateral pipe intrusions. A rigid mandrel shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall

be equal to the nominal diameter of the pipe. All obstructions encountered by the mandrel shall be corrected by the Contractor. Obstructions due to deflection shall be corrected by replacement of the over deflected pipe. Mechanical re-rounding is not permitted. If a section of pipe fails to meet the mandrel test and is reinstalled and fails the second time, said section(s) of pipe shall be replaced with an approved rigid pipe material. The contractor shall furnish mandrel, which shall be inspected and approved for use by the City.
The Contractor shall retest PVC pipe using a mandrel eleven (11) months after recordation of Notice of Completion of a Public Works Sewer Contract or after the acceptance by the City Council of a subdivision. Any pipe which fails to pass the mandrel test shall be replaced at the expense of the Contractor. The City reserves the right to determine the longitudinal limits of any pipe that is required to be replaced. Pipe replacement shall be guaranteed by the project maintenance bond.

The Contractor shall hire an independent television inspection service or the City to perform a closed-circuit television inspection of all newly constructed sewers including laterals from the main to the cleanout. A video recording of the television inspection shall be produced and delivered to the Utility Superintendent in color DVD format, together with a typed log of the inspection. The following conditions shall exist prior to the television inspection:

1. All sewer lines shall be in installed, backfilled and compacted.
2. All structures shall be in place, all channeling complete and all pipelines accessible from structures.
3. All other underground facilities, utility piping and conduit within two feet of the sewer main, shall be installed.
4. All compaction required shall be completed.
5. Pipelines to be inspected shall be balled, flushed and mandrel tested.
6. The final air or water test shall have been completed.
7. Immediately before the television inspection, run fresh water into the sewer until it passes through the downstream manhole.

When the above work has been completed, the Contractor shall notify the Engineer 48 hours in advance of the date for television inspection. During this inspection, the Contractor or his authorized representative shall be present to observe the video pictures as provided by the television camera. The following video tape observations shall be considered defects in the construction of the sewer pipelines and will require corrections prior to acceptance:

1. Off grade - 0.08 foot, or over, deviation from grade.
2. Separations over 2" in pipe joints using couplers.
3. Joint separations over 3/4".
4. Offset joints.
5. Standing water due to misaligned pipes.
6. Chips in pipe ends - none more than 1/4" deep.
7. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, roots, etc.).
8. Infiltration.
9. Debris or other foreign objects.

10. Other obvious deficiencies when compared to Approved Plans and Specifications, these Standards and Standard Drawings. The contractor shall be notified in writing of any deficiencies revealed by the television inspection that will require repair, following which the Contractor shall excavate and make the necessary repairs, clean pipe by propelling a snug fitting inflated rubber ball through the pipe with water to remove any debris, and request a television re-inspection. Television re-inspection shall be at the contractor's expense.

71-1.08 TRENCH RESURFACING

Trench resurfacing shall be as shown on Std. Dwg. 222 “Standard Trench Detail”.

SECTION 73. CONCRETE CURB, GUTTER AND SIDEWALK

73-1.01 DESCRIPTION
Concrete curb, gutter and sidewalks shall conform to Section 73 of the State Standard Specifications. The following shall apply in lieu of Section 73-1.01 of the State Standard Specifications.

This work shall consist of constructing curbs, sidewalks, gutter, depressions, island paving, and driveways of the form and dimensions shown on the plans, and as specified in these specifications and the Special Provisions. The concrete shall attain a minimum compressive strength of 3000 psi at 28 days, and shall contain not less than six (6) sacks of cement per cubic yard. Maximum slump of the concrete shall be 4 inches, as determined in accordance with ASTM Standard C-143.

All miscellaneous concrete shall meet the above criteria unless directed otherwise by the City Engineer.

A pedestrian ramp shall be constructed in all curb returns in accordance with City Standard 209, "Pedestrian Ramp Details", of the City of Lakeport Standard Plans.

Reinforcement shall conform to the provisions in Section 52, "Reinforcement" of the State Standard Specifications.

73-1.03B SUBGRADE PREPARATION
The subgrade shall be constructed true to grade and cross section, as shown in the plans or directed by the Engineer. It shall be watered and thoroughly compacted, and unsuitable material removed and replaced, to provide a stable grade with above optimum moisture content for a minimum depth of 0.5-foot.

Base material under curb and gutter and sidewalk shall comply with the provisions of Section 26, "Aggregate Bases" of these Standard Specifications and shall be a minimum of 4 inches in compacted thickness.

Sidewalks constructed across driveways, and driveway ramps constructed between curb and edge of sidewalk, shall be six inches thick.

The completed subgrade shall be tested for grade and cross section by means of a template supported on the side forms, and shall not project into the planned concrete cross section at any point. The subgrade and forms shall be wet immediately in advance of placing concrete.

73-2.03 CURB CONSTRUCTION
Attention is directed to City Standard 205, "Curb, Gutter and Sidewalk", of the City of Lakeport Standard Plans.

Weakened plane joints shall be constructed at 15-foot intervals, except that when Portland Cement concrete pavement is adjacent thereto, the joints shall coincide with the weakened plane

joints in the adjacent pavement. The joints shall be constructed to a minimum depth of 1½ inches by scoring with a tool which will leave the corners rounded with a ¼ inch radius and insure a free movement of the concrete at the joint.

Expansion joint filler strips shall have the top edge placed and securely held ¼ inch below the surface. Expansion joints shall be edged with an edging tool having a radius of ¼ inch.

The finished surface of the top of the curb shall not vary more than 0.01 foot above or below the staked grade.

73-3.03 SIDEWALK, GUTTER DEPRESSION, ISLAND PAVING, CURB RAMP (WHEELCHAIR RAMP) AND DRIVEWAY CONSTRUCTION

The surface of sidewalks shall be marked into rectangles per City Standard 205, "Curb, Gutter and Sidewalk" of the City of Lakeport Standard Plans.

Weakened plane joints shall be constructed to a minimum depth of one inch with a tool which will leave the corners rounded with a ¼ inch radius and insure a free movement of concrete at the joint.

Expansion joint filler strips shall have the top edge placed and securely held ¼ inch below the surface. Expansion joints shall be edged with an edging tool having a radius of ¼ inch. Scoring lines shall be made with jointer tools having a radius of ¼ inch.

SECTION 81: MONUMENTS

81-1.01 DESCRIPTION

The following shall apply in lieu of Section 81 of the State Standard Specifications.

This work shall consist of furnishing and installing cast-in-place survey monuments at the locations shown on the plans and in accordance with City Standard. 219, "City Monument" of the City of Lakeport Standard Plans.

The exact location of the monuments will be established by the City Engineer for City contracts and by the sub divider's Engineer for subdivisions, and upon completion, the monuments will be checked and the center point stamped by the City Engineer of the sub divider's Engineer/Surveyor.

Standard City brass markers shall be furnished by the Contractor. They shall be placed in survey monuments before the concrete block has acquired its initial set and shall be firmly bedded in the concrete. The concrete block shall be so located that when the marker is installed, the reference point will fall within a one-inch circle in the center of the marker.

SECTION 99: WATER MAIN CONSTRUCTION

99-1.01 DESCRIPTION

All water mains and related appurtenances shall be constructed in accordance with the City of Lakeport Water System Design Standards.

99-1.02 PIPE

The pipe, except where otherwise specified on the plans, can either be Ductile Iron or Polyvinyl Chloride (PVC), all in accordance with the following:

A. Ductile Iron Pipe shall be cement lined, new pipe conforming to ANSI A 21.51 most recent issue, in any, as sponsored by the American Water Works Association for thickness Class 50 Ductile Iron Pipe. The pipe shall be furnished with either Bell and Spigot ends, "Tyton Joints" or mechanical joints with "Megalug" joint restraints, or approved equal except where otherwise specified on the plans.

B. Polyvinyl Chloride (PVC) Pipe 4-inch shall be minimum class 150, or as shown on the plans and conforming to the requirements of AWWA C900 "Standard for Polyvinyl Chloride Pressure Pipe, 4-inch through 12-inch for Water" and shall be furnished with either bell ends or couplings designed to effect an elastomeric pressure seal. All joints shall be restrained with "Megalug" or approved equal. PVC pipe greater than 12-inch shall be Class 235 (DR18) unplasticized polyvinyl conforming to AWWA C905 and ASTM D2241.

Each and every length of pipe and coupling shall be marked with the manufacturer's name, lot number and the date the pipe was tested. The pipe shall be tested in accordance with the most recent American Water Works Standard Specifications and amendments thereto for the pipe furnished. The testing shall be performed in a State licensed materials testing laboratory where the testing standards meet or exceed State of California testing standards.

Accompany or preceding each load of pipe delivered, a certificate shall be furnished to the City certifying that the pipe which is (to be) delivered has been tested and meets the requirements of the American Water Works Association Standard Specifications. The certificate shall identify the pipe by manufacturer's name, lot number and date tested by a Stare certified materials testing laboratory.

A number 10 insulated copper wire shall be laid on top of and long the entire length of all non-metallic service laterals and mains and shall be extended to the surface at all valve, blow-off and meter box locations sufficiently for locator equipment to be attached.

99-1.03 SERVICES

All water service tubing shall be Polyvinyl Chloride (PVC) C200 conforming to the latest AWWA standards as described in ANSI/AWWA or the latest revision and with ASTM D2241.

All components shall be Copper Tubing Size (CTS); saddle as manufactured by Ford 5-91, Jones J996 or approved equal.
Tubing shall be Polyethylene for operating at 200 psi.

Corporation stop shall be constructed of bronze and have a full-bore passageway as manufactured by *Ford FIIOO-x,* or approved equal.

Angle curb stop shall be constructed of bronze equipped with padlock wings as follows: for single service 5/8" x ¾" and ¾" *Ford BA43-332w,* or approved equal; 1" *Ford BA43-*444W, or approved equal, 1 ½ "*-Ford FU43-666w,*or approved equal, 2" *Ford* FU43-777W, or approved equal; Double Service 5/8 x ¾" *Ford UU43-32W,* or approved equal. Valve

99-1.04 METER BOX

1. Single Service
    1} 5/8x3/4"
    Christy B9X, w/B9XG lid
    Cook BO.75
    2} ¾"
    Christy Bl2, w/B12G lid
    Cook
    3} 1"
    Christy BI6, w/BJ6G lid
    Cook B1.0
    4} l ½"
    Christy B30, w/B30G lid
    Cook B1.5
    5} 2"
    Christy B36, wB36G lid
    Cook B2.0
    6> Double Service
    1} 5/8x3/4"
    Christy B24, w/B24G lid

2. Installation
    a: Trench
        1> Excavation
        2> Compaction
        3> Bedding
            1) Material
            2) Depth
    b: Control
        1> Line
        2> Grade
    c: Tracer Wire
        1> Below Pipe
        2> Splice w/Split Bolt
    d: Valve Box/Riser

1> Plumb
2> Centered

e: Service
1> Size
2> Location
1) Vertical
2) Horizontal

f: Hydrant
1> Thrust Restraint
2> Drainage

g: Blow-off

h: Disinfection

99-1.05 FITTINGS

All fittings shall be new grey iron or ductile iron fittings conforming to ASNI/AWWA C110/C153 or latest revision and shall have the proper type of ends to match the type of pipe used. Gray iron fittings shall be coated inside and outside with a petroleum asphaltic coating conforming to AWWA C110 and shall meet or exceed the pressure rating of the pipe to be installed.

Ductile iron fittings shall be cement mortar lined in accordance with AWWA C104 or latest revision and shall have a petroleum asphaltic coating conforming to AWWA C110. Ductile iron fittings shall have a minimum pressure rating of 250 psi and shall otherwise meet or exceed the pressure rating of the pipe to be installed and shall have a minimum Class 53 thickness rating.

99-1.06 GATE VALVES

Gate valves shall conform to AWWA Standard C504 or latest revision and shall be the resilient seat type with non-rising stem, opening counter-clockwise with O-ring stem seal and suitable ends for connections to type of pipe or fitting used. The working pressure rating of gate valves shall meet or exceed the pressure rating of the pipe specified on the plans. External bolts and nuts shall be 304 stainless or poly wrapped.

99-1.07 BUTTERFLY VALVES

Butterfly valves shall conform to AWWA Standard C504 or latest revision and shall be of the rubber seat type. Valve discs shall Valve discs shall rotate 90 degrees for the full open position to the tight shut position. The valve seat shall provide a tight shutoff at a pressure differential of 150 psi upstream and 0 psi downstream in either direction. The valve operator shall be the traveling nut type. Valve shall open with a counter-clockwise rotation of the operating nut.

99-1.08 VALVE BOXES

Each gate valve shall be covered by a precast 8” valve box set flush with street surface with cast iron ring and cover marked “WATER”. The valve boxes are to be Christy G5, VG8, or approved equal.

99-1.09 FIRE HYDRANT AND LATERAL ASSEMBLY

At the location(s) shown on the plans, the Contractor shall provide and install a fire hydrant and lateral assembly per Std. Dwg. 502.

Tracer Wire shall be #10 solid, soft-drawn insulated copper.

No bends will be allowed in fire hydrant laterals without approval of the City Engineer. Fire hydrants shall by dry barrel type with two 2 1/2-inch hose nozzles and one 4 1/2-inch steamer nozzle with chain-tethered caps; one-inch pentagonal operating nut; open counterclockwise, 42-inch bury with automatically operated stop and drain and shall conform to the list of approved fire hydrants shown on the Engineer's Approved List.

All hydrants shall be painted in accordance with the specifications shown on Std. Dwg. 502.

All hydrants shall be installed plumb.

After placement, the fire hydrant shall be covered with a bag until accepted into service. Before a fire hydrant may be placed in service, a high velocity flushing of the hydrant lateral shall be witnessed and approved by City personnel.

99-1.10 ASBESTOS CEMENT PIPE

The installation of asbestos cement pipe is prohibited. All cutting, handling and disposal of asbestos cement pipe shall be done in compliance with the Contractor's State Licensing Law and all applicable laws and regulations.

99-1.11 EXCAVATION AND BACKFILL

Excavation and Backfill of the water pipe shall be as shown on Std. Dwg. 222.

Excess Materials from excavation shall become the property of the Contractor and shall be disposed of to the satisfaction of the City Engineer.

Prior to disposal of any materials or operation of any equipment on sites provided by the Contractor for disposal of excess trench excavation owned by him, the Contractor shall submit to the City Engineer written authorization for such disposal of materials and entry permission signed by the owners of the disposal site and the required permits.

99-1.12 LAYING AND HANDLING PIPE MATERIALS

Proper implements, tools and facilities satisfactory to the City Engineer shall be provided and used by the Contractor for safe, convenient and workmanlike prosecution of the work. All pipe fittings and valves shall be carefully lowered into the trench in such a manner as to prevent damage to pipe coatings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. Before lowering and while suspended, the pipe shall be inspected for defects and the cast iron pipe rung with a light hammer to detect cracks. Any defective, damaged or unsound pipe shall be rejected and sound material furnished. Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to pipe. All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter.

Whenever it is necessary, either in the vertical or horizontal plane, to avoid obstructions, or when long radius curves are permitted, the amount of deflection shall not exceed the maximum

recommended by the pipe manufacturer or that required for satisfactory jointing.

Each length of pipe shall be free of any visible evidence of contamination, dirt and foreign material before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying of pipe. At times when pipe laying is not in progress, the open ends of any pipe which have been laid shall be closed by approved means to prevent the entrance of small animals or foreign material. Trench water shall not be permitted to enter the pipe.

99-1.13 LAYING PVC PIPE

Individual pieces of pipe, valves and fittings shall be joined by placing the rubber rings on the machined ends of the pipe and pulling the couplings, calves or fittings in accordance with the manufacturer's recommendations. The rings shall be checked to be sure they are in the proper position after the coupling is in place. Care shall be taken to insure proper seating of the rings, and adapters shall be utilized for connections as required by the manufacturer.

Fittings for PVC pipe shall be either the mechanical joint type or the push-on type.

PVC pipe shall be as specified in and installed per AWWA C900 or latest revision and in accordance with the manufacturer's recommendations.

99-1.14 LAYING OF DUCTILE IRON PIPE (DIP)

The flame cutting of pipe by means of oxyacetylene torch shall not be allowed.

Ductile iron pipe shall be as specified in and installed per AWWA C600 or latest revision and in accordance with the manufacturer's recommendations.

99-1.15 THRUST BACKING

All tees, bends and plugs shall be provided with thrust backing and/or harness as shown on the plans or in accordance with Std. Dwg's. 519 and 520.

99-1.16 HYDROSTATIC TESTING

1. Test shall be performed after water system has been laid, backfilled and compacted.
2. Pressure testing against valves is not allowed unless authorized by the Utility Superintendent.
3. The contractor shall slowly fill piping with water.
4. All pipe testing apparatus shall be furnished by the Contractor (Pump, pipe connection, gauge, and measuring devices etc.)
5. Contractor shall make the taps into the pipe and furnish all necessary assistance for conducting the tests.
6. All air shall be expelled from the pipe before applying the test pressure. Taps may need to be made at high points and plugged afterwards.
7. Piping shall be subjected to a hydrostatic pressure of not less than 50 psi above working pressure and not less than 150 psi at any point on the pipe.
8. The duration of each pressure test shall be sixty minutes.

- No pipe installation will be accepted until or unless this leakage is less than 40 U.S. gallons per 24 hours, per mile of pipe, per inch nominal diameter of pipe. Should any test of combined or individual sections of pipe disclose leakage greater than the specified limit, the contractor shall, at his own expense, locate the cause and repair the defect until the leakage is within the specified allowance.
- The Contractor shall repair any obvious leaks even though the hydrostatic test results are within the prescribed limits.

99-1.17 CHLORINATION OF PIPELINE

Chlorine may be applied by any of the standard methods indicated in AWWA Standard C561, subject to the approval of the Utility Superintendent. The point of application of the chlorination agent shall be at the beginning of the pipe extension, or any valved section of it, and through a corporation stop inserted in the newly laid pipe.

Water from the existing distribution system shall be controlled to flow very slowly in the newly laid pipe during the application of chlorine. Precautions shall be taken to prevent back pressure causing a reversal of flow into the pipe being treated. In the process of chlorinating, all valves and other appurtenances on the new pipe shall be operated in such a way as to provide that the chlorine mixture shall be fully distributed to all parts of the new water system. Valves on existing pipes in service shall be operated only by City forces.

The rate of chlorine feed shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe shall be at least 100 ppm. The chlorine mixture shall be retained in the pipe for a period of twenty-four hours. After the chlorine mixture has been retained for the required time, the chlorine residual at the pipe extremities and at representative points shall be at least 5 ppm. Following chlorination, all chlorine mixture shall be thoroughly flushed from the new pipe. Chlorinated water used to disinfect the pipe is the property of the Contractor and its disposal is the responsibility of the Contractor. Chlorinated water used to disinfect the pipe shall be disposed of in accordance with all laws and regulations.

The following criteria must be met prior to disposal of chlorinated water to storm sewers or other inland waterways:

1. Water to be disposed of must contain no chlorine residual.
2. pH must be between 6.5 and 7.5.

Discharges not meeting the above criteria may be allowed to be disposed of into the sanitary sewer system, but must first meet the following requirements:

1. The Contractor must obtain permission from the Utility Superintendent, prior to the discharge being disposed of in the sanitary sewer system. The payment of any fees required will be the responsibility of the Contractor.
2. The pH of the water must be between 6.0 and 9.5.

Should the initial treatment, in the opinion of the Utility Superintendent, prove ineffective, the chlorination procedure shall be repeated until confirmed tests show that the water sampled from the newly laid pipe conforms to the above requirements.

The initial bacteria samples will be taken by the City of Lakeport and sent to a State of California

certified laboratory at the Contractors expense. There shall be a 24 hour waiting period after blowing off the pipe prior to taking bacteria samples. If the initial bacteria test fails, two consecutive passing bacteria tests must be obtained prior to making the tie-in. In extreme cases, at the discretion of the Utility Superintendent or City Engineer it may be necessary to require, at the contractor's expense, a complete Title 22 potable water test prior to tie-in.

Bacteria tests are valid for 30 days. If there is more than a 30 day lapse between a bacteria test and the applicable tie-in, the bacteria test must be repeated prior to performing the tie-in.

99-1.18 WATER MAIN TIE INS

Water main tie-ins are not permitted on Fridays or days preceding a holiday except as authorized by the City Engineer.

The Contractor shall notify the Engineer 24 hours prior to individual mainline shutdowns required to facilitate his tie-in operations. Tie-ins will not be scheduled until a written passing bacteria test has been received by the Engineer. All shutdowns and valve turning operations shall be performed by City personnel only. A City inspector must be present during all tie-in operations. No tie-ins shall be performed without prior authorization of the Engineer.

Pipe and fittings furnished for tie-ins shall be no smaller than the existing water main to which each tie-in is made.

Contractor or parties who fail to keep field appointments may be billed for scheduled City personnel waiting or standby time which was used and the Contractor shall bear the costs incurred by the City for re-notification of its customer.

Interruption of service to commercial customers shall, as much as practical, be coordinated with the customer's needs. The Contractor will contact the customer, consider the customer's interest and inform the City accordingly.

After hours work or weekend work is to be avoided whenever possible and any overtime cost shall be borne by the contractor requesting such afterhours work. Normal working hours are: 8 a.m. to 5 p.m. Monday through Friday.

Contractors or parties requiring work on any kind by the City shall request such services a minimum of 24 hours in advance of the time such services are desired. Work requests, which will involve City personnel for more than 8 hours and/or extensive number of City supplied parts, including installation of new meters, shall be requested a minimum of 7 calendar days in advance.

If it is necessary to terminate service to any customer, the contractor shall make the request for such work an additional 72 hours (three additional working days for total of five working days advance notice) in advance of the time such services are desired, to allow the customers affected to have a minimum of 72 hours' notice.

During the work, the Contractor shall exercise all necessary precautions to prevent the entrance of trench water or any other foreign material into the water main and shall conduct all operations in accordance with the most stringent sanitation practices. The interior of all appurtenances being

installed shall be thoroughly swabbed with a strong HTH solution prior to installation.

99-1.19 WATER SYSTEM COMPONENT REPORTING

The Contractor shall submit the material type, manufacture and model number of all water system components to the City prior to final testing.

99-1.20 CONSTRUCTION WATER

Construction water shall be obtained from the City only at the point(s) designated by the City.

Hydrant meters shall only be connected to hydrants which have been accepted by the City.

A refundable deposit for each meter will be required.

Contractors are prohibited from operating gate valves or fire hydrants on the City system. Acquisition of water through appropriation at un-metered fire hydrants or other facilities is a violation of City Ordinances and State Law. Use of construction water from sources other than the City Water System must be approved by the City.

SECTION 124: MATERIAL RECYCLING

124-1.01 DESCRIPTION

In accordance with Lakeport Municipal Code Section 8.16 “Construction Demolition and Recycling” the Contractor shall dispose of all Portland Cement Concrete and HMA, generated from removal or demolition activities on the project, at a recycler for these materials. The Contractor shall provide receipts verifying delivery and approximate quantity (in tons) of the material delivered to a material recycler.

All other excess materials from the project shall become the property of the Contractor and shall be disposed of by him, at his expense.

A.2 - City of Lakeport Standards

A.2 - Street Design Standards (SD)

STREET DESIGN STANDARDS

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STREET DESIGN STANDARDS

I. DEFINITIONS

"Alley" means any unnamed street contained in the public right-of-way twenty-four feet or less in width, used primarily for vehicular service access to the back or side of properties.

“All weather surface” means any surface that provides unobstructed access to conventional drive vehicles, including sedans and fire engines, is capable of supporting a 40,000 pound load during wet weather conditions. The surface treatment must be either concrete or paving unless otherwise approved by the city engineer and the Lakeport Fire Protection District.

"Arterial street" shall mean a street whose primary purpose is to carry through traffic and means a fast or heavy street of considerable continuity which is used primarily as a traffic way to facilitate movement of heavy traffic between major residential areas or major residential areas and commercial areas.

"Bike lane" means those on-street bikeways that are part of the normal street section and provide marked bike lanes that delineate the separate rights-of-way assigned to bicyclists and motorists.

"Bike path" means a separate, off-street bike path or trail that is not part of the normal street section.

"Collector street” shall have the primary purpose of intercepting traffic from intersecting minor streets and handling traffic to the nearest arterial street or intercepting traffic from one collector street and handling traffic to another collector street. It shall serve as an access to abutting properties.

"Cul-de-sac street" shall have the primary purpose of serving abutting land use and connecting to the nearest minor street or collector street. It is not intended to pass traffic through to another street and is a local street with only one outlet.

"Curb cut" shall mean an opening or depression in the street curb installed and intended for pedestrian or vehicular use. Curb cuts shall be measured across the "flat bottom" width of the opening or depression.

“Dead end road” means any road that has only one point of vehicular ingress/egress. Dead end roads shall include Cul-de-sacs.

"Development" means and includes, but is not limited to, the subdivision of land into two or more parcels, the construction of new structures or buildings, and changes in or renovations to existing structures or buildings and the attendant construction of improvements, either of public or private nature, for which approval by the City of Lakeport is required prior to commencement.

"Driveway" for the purposes of single family detached housing, "driveway" means a way or place in private ownership for vehicular traffic providing access to two or fewer residential units or buildings less than 50 feet from a public roadway over a common parcel or easements(s), primarily by the owners or occupants of the common parcel or easement(s), and necessary service and emergency vehicles, but from which the general public may be excluded, and which are not maintained by a public agency. Driveways shall meet all provisions, as adopted, of the Uniform Fire Code with respect to Fire Department access. Access to driveways shall be via a curb cut per City Standard 210.

"Fire Department access road" means an access road reserved for emergency vehicles and the conduct of fire fighting or rescue operations, or as designated by the fire department, and posted in accordance with Vehicle Code section 22500.1.

"Hillside" shall mean properties or portions of properties that have an average cross-slope of 10 percent or greater.

Properties or portions of properties to which this definition applies or which have other demonstrated hillside characteristics qualify for consideration for use of hillside design standards. Determination of the appropriateness of use of such standards shall rest with the City Engineer.

"Industrial street" shall have the primary purpose of handling industrial and manufacturing type business traffic. It is a street that provides access to or through an industrial zone, commercial zone, or an area of high truck and other large vehicle traffic.

"Minor street" shall have the primary purpose of serving abutting land use and handling traffic to the nearest collector street.

"Pathway (equestrian)" shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians and horses.

"Pathway (mixed use)" shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians, horses, and bicycles.

"Pathway (pedestrian)" shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians.

"Private road or street" means a way for vehicular traffic providing access to lots or units over a common parcel, primarily by the owners or occupants of the common parcel, and necessary service and emergency vehicles, but from which the general public may be excluded, and which is not maintained by a public agency.

Such roads or streets may be designed and constructed to different standards than public streets in the following areas: width, pavement, street lighting, signing and entry islands. Private streets should not connect two or more public streets (except when necessary for internal circulation or emergency vehicle access) and shall be designed and constructed to the standards of private roads or streets as defined within these standards in terms of minimum width, structural section,

curb, gutter, sidewalk, and all other aspects not specifically referenced above or in this section. No City enforcement of "no parking" signs or other such regulatory signs shall be provided for such streets.

"Public street" means a way for vehicular traffic, whether designated as a minor street, collector street, arterial thoroughfare, freeway, or other designation, which is improved to City standards, dedicated for general public use, and maintained by a public agency. The term "street" shall include alleys as defined above.

"Public way" shall mean any street, channel, viaduct, subway, tunnel, bridge, easement, right-of-way, or other way in which a public agency has a right of use.

"Sidewalk" shall mean a Portland Cement Concrete (PCC) surfaced area for pedestrian usage located within the public or private street right-of-way or sidewalk easement and included as a standard element of a street section.

"Street right-of-way" width shall mean the shortest distance between the lines delineating the right-of-way of a street.

"Street width" means the distance between the curb faces of a street or edge of pavement where a curb face may be omitted by approval of the City Engineer.

"Turnout" means a widening on a roadway to allow vehicles to pass. All turnouts shall be per city standard and shall be intervisible.

II. GENERAL

A. For purposes of street layout and design, streets shall be classified as:

1. Arterial Streets
2. Industrial Streets
3. Collector Streets
4. Minor Streets
5. Cul-de-sac Streets
6. Alleys
7. Driveways

B. Street design standards shall be used for the design and construction of all private and public streets and for flatland streets and hillside streets.

C. Deviations from these standards may be granted by approval of the City Engineer.

D. The standards are considered minimum and do not preclude the City use to a higher standard.

III. REQUIREMENTS FOR SUBMITTAL OF IMPROVEMENT PLANS

The City has requirements for submittal of Improvement Plans and Parcel Maps/Final Maps. Submittal forms shown in Figures A and B contain minimum submittal requirements. Submittal forms, which have been filled out and signed by the engineer or surveyor, must be included with all submittals. Current submittal forms may be obtained from the City of Lakeport.

IV. STREET DESIGN

A. Geometric Standard Cross Sections

ITEM	MINIMUM WIDTH	STREET CLASSIFICATION
Travel lane	14 feet	Industrial
	12 feet	Arterial, Collector
	10 feet	Minor, Cul-de-sac, Alley
Parking lane or shoulder	8 feet	Collector streets
Parking lane or shoulder	7 feet	Minor streets
Curb lane (no parking)	2 feet increase face of curb	All streets
Bike lane	6 feet against curb	When required
	6 feet against parking	Anterialstreets
Curb radius for Cul-de-sac	60 feet Residential 75 feet Commercial (see Std. #212)	Cul-de-sac
One-way loop, hillside street	20 feet width	Minor - 100 ft ℄ radius
One-way loop, flatland street	20 feet width	Minor - 200 ft ℄ radius
Maximum length of cul-de-sac street measured from projected curb or edge of pavement line of intersecting street to center of turnaround.	600 feet (or as approved by City Engineer)	Cul-de-sac
Length of streets allowed with no Cul-de-sac	150 feet from the projected curb or edge of pavement line of the cross street to end of dead end street	All Streets
Sidewalk	5 feet	All Streets (widen at obstructing locations to provide 4-foot minimum clear sidewalk)
Sidewalk - meandering (where permitted by Std.)	5 feet	Where applicable

ITEM	MINIMUM WIDTH	STREET CLASSIFICATION
Sidewalk easement	To back of sidewalk	All streets where required
Public utility easement	5 feet in back of property line or as required	All streets where required
Double left turn lane	Two 12-foot lanes	All streets where required
Single left turn lane	12 feet	All streets
2-Way left turn lane	14 feet	All streets
Right turn lanes	12 feet	All streets

B. Access to Public Right-of-Way - Curb Cuts

1. Each vehicular passageway to any parking or loading facility to or across a public right-of-way shall comply with the following requirements:

   a. Curb cuts shall be a maximum of 40 feet in width for non-residential uses. The width is not to exceed 35 percent of each lot frontage, except as otherwise approved. Min. width of 20 feet for each legal lot of record.
   b. Driveway widths, within residential areas, shall be a minimum of 12 feet in width for single driveways, a minimum of 16 feet for double or triple driveways up to a maximum of 24 feet, except as otherwise approved.
   c. Wherever feasible, curb cuts serving adjacent uses shall be combined to minimize the number of entrances onto a public right-of-way on any block. No curb island is allowed when it is less than 10 feet between uses.
   d. Only one curb cut may be installed for any parking or loading facility, except that one or more additional curb cuts may be allowed if the City Engineer determines that each such additional curb cut is necessary for the efficient operation of the facility and will not significantly reduce street capacity and traffic safety. Twenty (20) feet top to top on the curb island is required between driveways on a single parcel.
   e. Any curb cut in a residential area on a corner lot shall be located at the farthest point possible from the curb return and outside of the sight vision triangle. Curb cuts shall be located a minimum of 10 feet from curb returns, except as otherwise approved by the City Engineer.
   f. In commercial/industrial area, a minimum of 200 feet required separation between driveway and the intersection of two arterial,

industrial and/or collector streets except as otherwise approved by the City Engineer. At no time shall a curb cut be located closer than 20 feet from a curb return or 30 feet from a crosswalk whichever distance is greater.

g. Except as otherwise approved by the City Engineer, curb cuts for any circular or "through" residential driveway must meet the following requirements:
   1). The curb cuts for such driveway shall be at least twenty feet apart top to top and a minimum of 10 feet from the side property line.
   2). Property frontage of 50' or less shall be limited to one driveway with not more than two driveways to be provided to any single property frontage.

V. STREET ALIGNMENT

A. Streets shall be aligned with adjacent existing streets by continuations of the centerlines thereof, or by adjustment by curves, and shall be laid out for the most advantageous development of the entire area.

1. Minimum centerline horizontal curve radii shall be as follows:

a.	Arterial Streets	500 feet
b.	Collector & Industrial Streets	300 feet
c.	Minor Streets (flatland)	200 feet
d.	Cul-de-sac Streets	200 feet
e.	Minor Streets (hillside)	100 feet

2. Lesser radii may be used only when sufficient evidence is presented to the City Engineer to show that the radii described above are not practicable. Any deviations require specific City Engineer's approval.
3. Super elevations are required on curves for the design of all arterial streets and for any other street with a design speed above 25 miles per hour, except as otherwise approved by the City Engineer.

B. Where necessary to give access to or permit satisfactory future subdivision of adjoining land, streets shall extend to the boundary of the property and resulting dead-end streets greater than 150 feet (measured from the projected curb or edge of pavement line of the cross street) shall have a temporary turnaround. Design of turnarounds other than the standard temporary turnarounds in the standard drawings requires specific approval by the City Engineer.

VI. STREET GRADES

A. All street grades shown on the improvement plans shall refer to City of Lakeport benchmarks as established in the City of Lakeport. Assumed benchmark elevations will not be allowed.

1. All arterial and industrial streets shall have no grade rate in excess of 7 percent.
2. Collector, minor, and Cul-de-sac streets in the flatland shall have no grade rate in excess of 10 percent, except as specifically approved by the City Engineer.
3. Collector, minor, and Cul-de-sac streets in the hillside shall have no grade rate in excess of 15 percent unless specifically approved by the City Engineer.
4. Minimum grade rate for all streets shall be 0.5 percent.
5. Minimum valley gutter slope shall be 0.5 percent.
6. The grade of the pavement surface across an intersection shall not be more than 7 percent, except as approved by the City Engineer.
7. The gradient of each street entering an intersection shall not be more than 7 percent within a distance of 25 feet from the near curb line of the crossing street, except as approved by the City Engineer.
8. Vertical parabolic curves shall be used to connect grade profiles where the algebraic difference in grade rates exceeds one percent. The length of vertical curve required shall be determined by the following:

	Minimum Stopping Sight Distance	**Minimum Length of Curve**
Arterial and Industrial Streets	350 feet	200 feet
Collector Streets	200 feet	100 feet
Minor Streets	100 feet	100 feet
Cul-de-sac	100 feet	100 feet

9. Minimum cross-slopes for all streets shall be 2 percent. Maximum cross-slopes shall be 5 percent.
10. Maximum cross slopes in Cul-de-sac bulbs shall be 5 percent in flatland and 8 percent in hillside.
11. Driveway, private road, and fire department access road grades shall conform to the requirements of minor streets.
12. Exceptions to this section require specific approval by the City Engineer.

VII. INTERSECTIONS

A. All streets entering upon any given street shall have their centerlines directly opposite each other or separated by at least 200 feet, except as otherwise authorized by the City Engineer.

B. All streets shall intersect at right angles, or along radial lines when the intersection is within a curve, and shall have at least 50 feet of centerline tangent adjacent to the intersection, except as specifically approved by the City Engineer.

C. Curb return radius:

Arterial/Industrial/Commercial	35 feet
Collector	30 feet
Residential	20 feet

At all intersections, the curb return radius to be utilized will be determined by the highest street classification (e.g., a minor-arterial street intersection will require 35-foot radius).

VIII. TYPICAL SECTIONS

A. Typical sections for the improvement of streets and alleys shall be shown on the Improvement Plans. Curb and gutter sections, curb return radii, parking strip widths, and sidewalk widths may be modified where these improvements have been constructed in a portion of a block to other than the sections shown. However, any modifications require the specific approval of the Engineer.

IX. PAVEMENT DESIGN

Design of the structural section for all streets shall be in accordance with the following criteria:

A. Traffic Index

1. Street classification shall be determined by the City Engineer.
2. Within subdivisions for residential and residential collector streets, use Standard Drawing No. 201, "Traffic Index Chart for Flexible Pavements". For all other streets, the T.I. will be determined by the City Engineer.
3. In no instance will the T.I. be less than the following:
   (1) Arterial & Industrial Streets a minimum T.I. of 7.0
   (2) Collector Streets a minimum T.I. of 5.5
   (3) Minor & Cul-de-sac Streets a minimum T.I. of 4.5
4. For all street design use Standard Drawing No. 202, "Structural Design Chart for Flexible Pavements" and these "Street Standard Specifications and Design Standards".

B. Soils Reports

1. Resistance "R" Values

   a. A qualified Soils Engineer shall obtain sufficient soil samples within the proposed street right-of-way to permit the determination of the R-Value of the various materials that lie immediately under the planned structural section. The cost of sampling and testing shall be at the Owner's expense.
   b. The basement soil shall be tested according to California Test 301 "Method for Determination of the Resistance "R" Value of Treated and Untreated Bases, Subbases, and Basement Soils by the Stabilometer" in use by the California Department of Transportation, Transportation Laboratory. Design of the structural section for a particular street will normally be based on the lowest R-Value material encountered.
   c. If the Engineer elects to utilize an "R" Value of 5, then R-Value tests will not be required.

d. The Owner's Soils Engineer shall submit to the City a Materials Report showing the location and elevation of sampling points and R-Value data. The Owner's Soils Engineer may be required to make a field survey of soil conditions when rough sub grade has been cut to verify data presented in the Materials Report. The cost of any additional sampling and testing shall be at the Owner's expense.

2. Material Testing

a. A minimum of one sample of asphalt shall be tested for all developments installing public street improvements to ensure that the asphalt is meeting with city specifications. If developments are installing in excess of 500 tons of asphalt, one test shall be required for every 500 tons used.

C. Gravel Equivalents

1. Structural sections are to be determined using the following formula applied to determine the G.E. of the cover required over the basement soil and intermediate structural section layers.

GE = 0.0032 (TI)(100-R)

where:

GE = gravel equivalent in feet
TI = traffic index
R = R-Value of the material to be covered.

2. Structural sections using aggregate base shall have the gravel equivalent of the HMA layer increased by 0.20 feet.
3. In no instance shall a structural section be less than as follows:

Arterial & Industrial Streets:	0.37 feet HMA 1.00 feet Class 2 aggregate base
Collector Streets:	0.27 feet HMA 0.80 feet Class 2 aggregate base
Minor & Cul-de-Sac Streets:	0.25 feet HMA 0.50 feet Class 2 aggregate base

D. Gravel Equivalent Factors & R-Values

1. The gravel equivalent factor for HMA surface courses shall be obtained from the following equation: $G_f = 2.5\ (5.14/T.I.)^{0.5}$

In no case shall the gravel equivalent factor exceed 2.5.

2. Gravel factors and R-Values for design shall be as follows:

Materials	Gravel Equivalent	R-Value
Class 2 A.B.	1.1	78
Class 4 A.S.B.	1.0	50

E. Improvement Plan Notation

1. All Improvement Plans shall include the design "R" Value and the Traffic Index. This information shall be included in the typical section or in a note or table on the same sheet as the typical sections.

X. REQUIREMENTS FOR EMERGENCY ACCESS DURING CONSTRUCTION

A. Sub grade Conditions

	Good	Poor
Summer April 1 - Sept. 30	Excavated & Drained Sub grade	Excavated & Drained Sub grade
Winter October 1 - March 31	6 inches rock	6 inches rock & fabric

1. For structures with a ridge line of at least 35 feet above adjacent rough fire access grade, or for structures with three or more stories, 1½ inches of asphalt base over 4 inches of aggregate base shall be provided in all proposed and approved fire access areas from the structure out 150 feet.
2. Winter conditions shall take effect and be enforced by the City Engineer on October 1. The City Engineer shall have the authority to move this date up as early as September 1, depending on the particular season's rainfall and projections.
3. Sub grade defined as native soil at bottom of street section (base and paving), excavated to the approximate lines and grades shown on the project grading plan, and provided with a discharge for collected water, as approved by the City Engineer.
4. Base shall be Class 2 aggregate base or alternative recommended by Soils Engineer and approved by the City Engineer.
5. Poor sub grade defined as R-Value 10 or less.
6. Base shall be placed only on an unyielding excavated and drained sub grade, and to be compacted to at least 90 percent relative compaction.
7. Fabric to be a ground stabilization fabric such as Mirafi 600X or equivalent.

XI. REQUIREMENTS FOR DRIVEWAYS, PRIVATE ROADS, AND FIRE DEPARTMENT ACCESS ROADS

A. Private driveways shall be in conformance with City Standard 209 with a maximum length of 150 feet from a public road and serve a maximum of two residential buildings. The width of driveways serving one residential building shall be a minimum of 12 feet and a maximum of 24 feet. Driveways serving two residential buildings shall have a minimum width of 24 feet.

B. Private driveways serving one residential building that has a distance greater than 150 feet from a public road shall be considered a Fire Department Access Road and shall have a minimum width of 24 feet.

C. Any driveway or access road serving more than 2 residential buildings shall be considered a private road.

D. The structural section of all private roads, driveways, and fire department access roads shall be constructed in conformance with City Standards and shall have a minimum designed live-load capacity of HS 20.

E. Any private road serving more than one parcel shall be required to be named.

F. Fire Department Access Roads shall have an all weather access road surface width of not less than 20 feet and an unobstructed vertical clearance of not less than 15 feet. The widths and clearances required by this section shall be increased when the fire chief or city engineer determines that such widths and clearances are not adequate under the particular circumstances to provide fire apparatus access.

G. The turning radius of either a Fire Department Access Road or private road shall be a minimum of 25 feet.

H. All private roads and fire department access roads shall have intervisible turnouts.

I. No private road, fire department access road, or driveway shall have a maximum grade in excess of twenty percent (20%).

J. No fire department access road or private road shall have a vertical curve whose length is less than one hundred (100) feet.

K. No private road, driveway, or fire department access road shall have a horizontal inside radius of curvature of less than fifty (50) feet.

L. When a bridge is required to be used as access for a private driveway, private road, or fire department access road, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and the Standard Specifications for Highway Bridges, and using designed live loading sufficient to carry the imposed loads of fire apparatus. The minimum designed live load capacity shall be HS 20, as defined by the American Association of State Highway and Transportation Officials. All bridges shall have appropriate signing identifying bridge capability, including weight and vertical clearance limits.

M. The required roadway width of a fire department access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times. No owner, lessee, or other person in charge or control of any premises shall, after receiving notice thereof, permit or allow any activity, practice, or condition to occur or exist on the premises which lessens, obstructs, or impairs the access required under this section.

N. When required, approved signs or other approved notices shall be provided and maintained for fire department access roads to identify such roads and prohibit the obstruction thereof or both. When used, “NO PARKING” signs shall comply with the provisions of the California Vehicle Code. Where curbs exist adjacent to hydrants located along the roadway of a fire department access road, the curbs shall be painted red or otherwise appropriately marked by the owner, lessee, or other person in charge or control of the premises to prohibit parking for a distance of fifteen (15) feet in either direction from any such hydrant.

O. Parking of vehicles on a fire department access road may be prohibited when the fire chief determines that it is necessary to keep the roadway clear and unobstructed. In such case, the chief may require the owner, lessee, or other person in charge or control of the premises to paint the curbs red or install signs or other appropriate notice to the effect that parking is prohibited by order of the fire department. It shall be the property owners’ responsibility to maintain in good condition the signs or paint. When a fire department access road is marked or signed as provided herein, no person shall park or leave standing any vehicle on the roadway.

FIGURE A CHECK LIST

CITY OF LAKEPORT IMPROVEMENT PLANS

PROJECT ADDRESS	APN	FILE NO.
PROJECT NAME	NO. OF PROPOSED LOTS	RELATED FILES
APPLICANT'S NAME	ADDRESS	PHONE
PROPERTY OWNER'S NAME (PRINT)	ADDRESS	PHONE
ENGINEER & LICENSE NO.	MAILING ADDRESS	PHONE
Improvement Plans must be prepared by a California Registered Civil Engineer. All submitted plans and calculations must be signed and stamped. Incomplete submittals will not be accepted.		

SUBMITTAL REQUIREMENTS

____ FINAL MAP (Associated with these plans)
____ PARCEL MAP (Associated with these plans)
____ NO MAP (Associated with these plans)
If a rezoning or zoning permit is associated with these Improvement plans, has that rezoning been approved by the City?
____ Yes ____ No

NUMBER OF COPIES

( ) Eight blue-line or black-line copies (24" x 36"). (DO NOT SUBMIT ORIGINAL DOCUMENTS UNTIL REQUESTED BY THE CITY ENGINEER).

GENERAL

( ) 1. North arrow (to be upward facing if practical) and sheet number (all sheets).
( ) 2. Scale, written and graphic (all sheets).
( ) 3. Location Map
( ) 4. Benchmark (established City, or County USGS benchmark).
( ) 5. Symbols Legend.
( ) 6. Abbreviation legend.
( ) 7. Index to drawings including reference to sheet numbers.
( ) 8. General Notes with reference to City Standard 100.
( ) 9. City Engineer approval block.
( ) 10. Title block (all sheets):
  ( ) A. Name of Engineering firm.
  ( ) A. R.C.E. seal, signature, and expiration date.
  ( ) C. Date prepared.
  ( ) D. Title of project.
( ) 11. Clear and distinct delineation of project boundaries.
( ) 12. Nature and dimension of existing and proposed easements.
( ) 13. Typical section of all streets.
  ( ) A. Width of street, right-of-way, easements, curb, gutter, sidewalk and landscape parcels (if required).
  ( ) B. Crown and centerline location.
  ( ) C. Pavement and base type and thickness, traffic index and R-value.
  ( ) D. Cut and fill slopes (maximum & minimum and limits).
  ( ) E. Saw cut line 1' minimum into existing paving.
( ) 14. City Standards applicable to construction.

STREETS

Plan View:
( ) 15. Centerline data (submit calculations).
( ) 16. Street names, widths (including right-of-way widths).
( ) 17. Property lines and lot numbers.
( ) 18. Centerline stationing:
  ( ) A. Conform to existing stationing if previously set.
  ( ) B. All B.C.'s, E.C.'s and grade breaks, driveways, etc.
( ) 19. Gutter slopes and flow arrows showing magnitude and direction between grade breaks and around curb returns, cul-de-sacs and knuckles.
( ) 20. Flow arrows showing slope and direction from roadway crown or center of intersection to ¼ points of curb returns, cul-de-sacs and knuckles.
( ) 21. Direction of flow arrows.
( ) 22. Top of curb elevations and stationing at curve points, grade breaks, and lot lines.

( ) 23. Required sidewalk and handicap ramps.
( ) 24. Monument location at all E.C.'s, B.C.'S and street intersections
( ) 25. Existing improvements (shown in dashed lines).
( ) 26. Length and location of all transitions in curb and gutter.
( ) 27. Redwood headers and barricades.
( ) 28. Radius, length and delta of all curb returns, centerline curves and curves at face of curb.
( ) 29. Driveway gradients.
( ) 30. Striping, Signing and Lighting Plan. (Shown on a separate sheet from street and utility improvements).

Profile View:

( ) 31. Existing ground surface at centerline of streets (100' each direction beyond improvements, 200' for major streets).
( ) 32. Profile of improvement:
- ( ) A. Stationing and elevation at all grade breaks.
- ( ) B. Vertical curve data.

( ) 33. Cross sections every 25 feet for all half streets with future x-sections, see 31 above.
- ( ) A. Stationing.
- ( ) B. Existing and proposed elevations.
- ( ) C. Existing and proposed cross-slopes.
- ( ) D. Centerline, existing edge of pavement (conform) and top of curb elevations.
- ( ) E. Scale - vertical - maximum of 1" = 5'; horizontal - maximum of 1" = 50'.

( ) 34. Street centerline slope.

STORM DRAINAGE

Plan View:

( ) 35. Direction of flow arrows.
( ) 36. Stationing of all drainage structures within streets.
( ) 37. Specified size/type for all drainage structures.
( ) 38. Inlet and manhole numbers corresponding to profile view.
( ) 39. Pipe diameter and length (radius for curved section).
( ) 40. Pipe material (may be specified instead in general note or shown on profile) and class of pipe.
( ) 41. Open channels or swales:
- ( ) A. Flowline elevation at the beginning, end and all grade breaks.
- ( ) B. Slope of swale.
- ( ) C. Typical section.
- ( ) D. Existing and proposed improvements clearly delineated as such.

Profile View:

( ) 42. Invert grades/flowlines at all drainage structures.
( ) 43. Inlet/manhole numbers corresponding to plan view.
( ) 44. Existing ground surface and finished grade.
( ) 45. Pipe diameter and length.
( ) 46. Pipe slopes.
( ) 47. Utility crossings (show with clearance).
( ) 48. Profile open channels.

UTILITIES

( ) 49. Existing and proposed utilities (sewer, water, street lighting, etc.).
- ( ) A. Location.
- ( ) B. Type, size, length, class, and slope.
- ( ) C. Material (can specify in General Note).
- ( ) D. Clear delineation between public and private utilities.

SEWER

( ) 50. Plan:
- ( ) A. Manhole/cleanout numbers corresponding to profile view.
- ( ) B. Stationing of structures within street right-of-way.
- ( ) C. Direction of flow arrows.
- ( ) D. Lateral locations (include invert at upstream end of lateral for other than 2% slope or where cover is critical).

( ) 51. Profile:
- ( ) A. Existing and finished grade over the line.
- ( ) B. Invert elevations (in and out) and slopes.
- ( ) C. Manhole cleanout numbers corresponding to plan review.

WATER

( ) 52. Plan View: (Profile only necessary when conflicts occur).

- ( ) A. Applicable City standards (500 series) & depth of pipe note.
- ( ) B. Value size and locations, valve boxes.
- ( ) C. Fire hydrants and service lateral information.

STREET LIGHTING

( ) 53. Plan:
- ( ) A. Compliance with City Standards.
- ( ) B. Light locations, stationing and standard.
- ( ) C. Pull box location and standard when not located adjacent to light pole.
- ( ) D. conduit location; size and type.
- ( ) E. service point location.

( ) 54. Exact horizontal & vertical location of all existing high pressure gas line(s) shown every 100 ft.

GRADING

( ) 55. Existing and finished contours (and grade elevations at all grade breaks).
( ) 56. Existing and proposed (if known or required) structures (i.e., houses, wells, septic systems, etc.).
( ) 57. Flow arrows, drainage plan.
( ) 58. Existing trees noted as to whether to be saved or removed (base elevations for trees to be saved).
( ) 59. Typical cross-section and conform grades at all property lines.
( ) 60. Erosion and sediment control measures proposed (show on separate plan for grading).
( ) 61. Creek cross-sections to establish setback per City ordinance.
( ) 62. Provisions for lot drainage, lot-to-lot drainage is not allowed.
( ) 63. Provisions for accepting off-site drainage.
( ) 64. Top of curb elevation and stationing of property lines.
( ) 65. Slope rounding details for top of cuts.
( ) 66. Retaining wall details and engineering calculations (2 copies if applicable).
( ) 67. Specify soils engineer's control of grading in compliance with Chapter 70 U.B.C. and soil's investigation (note on grading plan).
( ) 68. Provisions for pad drainage when exterior grades are higher.
( ) 69. Existing structures and dimensions from new lot lines to structures to be saved.
( ) 70. Typical lot drainage details.
( ) 71. Quantities of cut and fill.
( ) 73. Elevation of pads, including property corners.
( ) 1. Sidewalk drains (minimum 1 per lot).

SUPPORTING DATA

( ) 2 copies of the Resolution of Approval.
( ) 2 copies of the Soils Report
( ) 2 copies of the Engineer's Estimate
( ) 2 copies of the design calculations (structural sections, walls, etc.).
( ) 1 copy of fire flow calculations.
( ) 1 copy of sewer demand calculations.
( ) 1 copy of house fire sprinkler and water service demand calculations for water meter sizing.
( ) 1 copy curb and centerline calculations of all streets.
( ) 1 copy of any necessary off-site letters of permission.
( ) 2 copies of on-site easements/rights-of-way deeds and plats (if map is not included).
( ) 2 copies of all required off-site easements/rights-of-way deeds and plats.
( ) 2 copies of Arborist's Report.
( ) 4 sets of Site Lighting Plans (if applicable).
( ) 4 sets of Site Parking and Signing Plans (if applicable).
( ) Copies of transmittal letters to:

- ( ) A. County of Lake
- ( ) B. P G & E.
- ( ) C. Pacific Bell / AT&T.
- ( ) D. Corps of Engineers (as necessary).
- ( ) E. Caltrans (as necessary).
- ( ) F. Other

I HAVE READ THE FOREGOING AND HAVE SUPPLIED ALL OF THE INFORMATION REQUESTED (OR HAVE PROVIDED A WRITTEN EXPLANATION WHICH ACCOMPANIES THIS CHECKLIST WHICH EXPLAINS ANY OMISSIONS) AND HAVE SIGNED AND STAMPED ALL SUBMITTALS OTHER THAN NORMAL CORRESPONDENCE.

SIGNATURE AND STAMP OF ENGINEER_____ **DATE**

FIGURE B

CITY OF LAKEPORT

CHECK LIST
PARCEL MAP/FINAL MAP

PROJECT ADDRESS	APN	FILE NO.
NAME OF PROPOSED PROJECT	NO. OF PROPOSED LOTS	RELATED FILES
APPLICANT'S NAME	ADDRESS	PHONE
PROPERTY OWNER'S NAME (PRINT)	ADDRESS	PHONE
SURVEYOR/ENGINEER & LICENSE NO.	MAILING ADDRESS	PHONE
NOTE: Final Maps and Parcel Maps must be prepared by a person licensed in California to perform land surveying. All submittals must be signed and stamped. Incomplete submittals will not be accepted.		

SUBMITTAL REQUIREMENTS
Number of Copies

( ) Five (5) blue-line or black-line copies (18" x 26") showing the proposed division clearly and legibly with accurate dimensions and including the following information (check, or mark as not applicable): **DO NOT SUBMIT ORIGINAL DOCUMENTS UNTIL REQUESTED BY THE CITY ENGINEER.**

CERTIFICATES AND ACKNOWLEDGEMENTS
(Required on the first sheet or sheets)

( ) 1. Owner's certificate and acknowledgement (individual/partnership/corporate).
( ) 2. City Clerk's Certificate.
( ) 3. Trustee (if such exists) certificate and acknowledgement.
( ) 4. Engineer's or Surveyor's statement and seal.
( ) 5. Owner's of interest certificate (if applicable).
( ) 6. City Engineer's statement.
( ) 7. City Treasurer's certificate
( ) 8. County Tax Collector's certificate.
( ) 9. County Clerk's certificate.
( ) 10. Public Utility Easement Statement.
( ) 11. Improvement certificate.
( ) 12. County Recorder's certificate.
( ) 13. Planning Commission certificate

Note: All certificates shall be in accordance with state law and in the format kept on file in the offices of the City Engineer.

TITLE BLOCK

Required on all sheets:
( ) 14. Title block located in lower right hand corner of drawing.
( ) 15. Assessor's parcel number(s).
( ) 16. Name of project or parcel map number.
( ) 17. Total number of lots.
( ) 18. Total number of common parcels (if applicable).
( ) 19. Total project acreage (to the nearest 0.01 acre).
( ) 20. Date prepared.
( ) 21. Sheet number and number of sheets (if more than one sheet is required).
( ) 22. Name of party (company) responsible for preparing the map.

GENERAL INFORMATION

Required on all sheets:
( ) 2. Sheet size 18" x 26" (outside dimensions).
( ) 24. 1" blank margin all around the edge of the sheet.
( ) 25. No use of ditto marks.

Required on Specific Sheets:

( ) 26. Key map (if more than two map sheets are required).
( ) 27. Location map (to be located on the first map sheet or the key map, if one is required, and to be oriented in the same direction as the parcel/final map).
( ) 28. Title company name, located inside the border in the lower left corner of the first sheet only.

MAP REQUIREMENTS

General Requirements (Required on all Map sheets):

( ) 29. North arrow (to be upward facing, if practical).
( ) 30. Scale (written and graphic).
( ) 31. Symbols legend.
( ) 32. Basis of bearings with tie shown to the subdivision.
( ) 33. The exterior boundary of the subdivision designated by a distinctive border.
( ) 34. Reference to adjoining tracts or lots (record data).
( ) 35. Reference to adjoining map sheets (if more than one map sheet is required).
( ) 36. Reference to adjoining railroads and highways.
( ) 37. Existing easements (on-site and off-site):
  ( ) A. Locations and dimensions.
  ( ) B. Noted with deed reference.
  ( ) C. Purpose and nature (public or private).
( ) 38. Proposed easements.
  ( ) A. Locations and dimensions.
  ( ) B. Noted with deed reference.
  ( ) C. Purpose and nature (public or private).
( ) 39. Each lot shown entirely on one sheet.
( ) 40. All dimensions in feet and hundredths.
( ) 41. Pertinent record data shown in parenthesis or per legend designation (next to measure data).
( ) 42. Existing monuments shown along with relevant information (found, set, retagged, or removed).
( ) 43. Monuments to be set shown and labeled with relevant information (size, location, type and tag).
( ) 44. Reference to additional map sheets.

Street Requirements:

( ) 45. Approved names.
( ) 46. Existing and proposed street widths.
( ) 47. Distance from centerline to edge of right-of-way.
( ) 48. Centerline monuments.
( ) 49. Distance between centerline monuments.
( ) 50. Centerline bearing.
( ) 51. Centerline curve data (delta, radius, and length).
( ) 52. Right-of-way curve data.
( ) 53. Private streets designated as such.

Lot Requirements:

( ) 54. Lots numbered (beginning with number 1 or letter A and continuing consecutively without duplication or omission. No circles or other figures shall be placed around lot numbers except for the last number where such placement shall be optional).
( ) 55. Lot line dimensions.
( ) 56. Lot line bearings.
( ) 57. Lot line curve data (delta, radius, and length).
( ) 58. Survey tie to boundary (for planned unit developments or condominium "footprints").

"Designated Remainder" and "Remaining Lands":

( ) 59. "Designated remainder" - Government Code Sections 66424.6 and 66434(e) shall be treated as follows:
  ( ) A. If greater than or equal to 5 acres in size, shown by deed reference.
  ( ) B. If less than 5 acres in size, shown as part of the survey.
( ) 60. "Remaining Lands" (future phases) labeled with a document number, and if less than 5 acres in size, shown as part of the survey.

Additional Map sheet:

( ) 61. Net acreage to the nearest square foot (0.01 acre for lots over 1 acre in size).
( ) 62. Soils report notation.
( ) 63. Area(s) subject to inundation identified as such.
( ) 64. Building setback lines.
( ) 65. Building envelope with survey tie to lot line or boundary (if applicable).
( ) 66. Vehicular access restriction notation (if applicable).
( ) 67. Seismic setback lines (if applicable).
( ) 68. Archaeological sites (if applicable).
( ) 1. Creek setback lines (if applicable).

SUPPORTING DATA

( ) 70. One (1) Copy of Tentative Map.

( ) 71. One (1) Copy of Resolution of Approval.

( ) 72. One (1) copy of Preliminary Title Report (issued within the most recent three months).

( ) 73. Two (2) copies of computer printout documenting survey closure calculations for the following:

- ( ) A. Blocks
- ( ) B. Lots
- ( ) C. Street centerlines
- ( ) D. Survey ties
- ( ) E. Proposed easements (when not parallel to property lines)

( ) 74. One (1) copy of records referenced and used to prepare the survey (Examples: record of survey, filed maps, recorded deeds, and easements, etc.).

( ) 75. Two (2) copies of the legal descriptions and plats for all dedications performed by separate instrument(on-site and off-site).

( ) 76. Two (2) copies of project conditions, covenants, and restrictions.

( ) 2. Additional submittals involving condominium and townhouse projects:

- ( ) A. Two (2) copies of condominium and townhouse plans.
- ( ) B. One (1) copy of architectural drawings.
- ( ) C. One (1) copy of computer printout establishing the location of the building footprint(s) within the subdivision.

A.2 – Sanitary Sewer Design Standards (SSD)

SANITARY SEWER DESIGN STANDARDS

TABLE OF CONTENTS

SANITARY SEWER DESIGN STANDARDS

I. CONNECTION TO AN EXISTING PUBLIC SEWER

A. A proposed sewer design must show a point of connection to an existing public sewer main. It is common for a project on one property to require the construction of sewer on an adjacent property before it can connect to the public sewer. Sewer system designs shall incorporate the design of any off-site sewer that is required for the connection to the public main. Appropriate portions of the City approved designs shall be included in the plans unless the mains have been accepted for maintenance by the City.

II. MATERIALS

A. Gravity sewer mains shall be Polyvinyl Chloride (PVC) SDR 26 or SDR 35 with City Engineers approval, or Ductile Iron Pipe.
B. Large diameter gravity mains may be concrete cylinder pipe or reinforced concrete pipe with City Engineer approval.
C. If a gravity sewer main is installed outside of a paved roadway, Ductile Iron Pipe is required.
D. All Ductile Iron Pipe shall be polyethylene encased.
E. Use of Asbestos Cement Pipe is not allowed under **any** circumstance.
F. Sewer force mains shall conform to the materials requirements for water mains. Non-metallic pipes require No. 10 tracer wire in accordance with Std. Dwg. 500.

III. ALIGNMENT

A. Follow the State of California, Department of Health Services, “Criteria for the Separation of Water and Sanitary Sewer Main”.
B. Public sewer mains outside the public street shall be kept to a minimum.
C. Horizontal separation from storm drains shall be a minimum five feet clear.
D. Horizontal separation from other utilities, such as gas, underground electric, underground television cable, etc., shall be a minimum of four feet clear between the pipes.
E. Horizontal and vertical curves in gravity sewer mains will not be allowed unless specifically authorized by the City Engineer.
F. In general, public sewer mains run parallel to and located near, the street centerline.
G. The minimum size of a sewer main line shall be 6 inches in diameter.

IV. MANHOLE AND CLEANOUTS

A. A manhole is required at every horizontal or vertical change in alignment.
B. Maximum distance between manholes is 400 feet.
C. A manhole is required at the end of every main.

D. Cleanouts may be installed in lieu of manholes at the end of a sewer main where the distance is less than 300 feet to the nearest manhole and the main size is 8" or less.
E. End-of-line cleanouts may be permitted when the depth from the finish grade to invert of the main is less than 4'6", or when the line terminates within 100 feet of a manhole AND the line has potential to be extended.
F. Minimize the number of manholes.
G. 60" diameter manholes are required for mains larger than 18" in diameter or deeper then 8' (indicate manhole diameter on plans).
H. Private sewer mains must connect to the public main at a manhole.
I. Provide sufficient drop through the manhole to compensate for energy loss caused by changes of alignment. A minimum drop of 0.10 foot is required for deflection angles greater than 30°.
J. When pipe size increases, set inlet crown at least as high as the outlet crown.
K. All joints in manholes shall be sealed by means of placing a pre-formed, flexible butyl rubber mastic sealant evenly, without elongation, to the two horizontal surfaces of the tongue and groove joint; Install the manhole riser or cone section taking care to not dislodge the sealant material or contaminate it with any foreign matter self-bonding, self-sealing plastic gasket, such as "Ram-Nek", manufactured by the K.T. Snyder Company, Houston, Texas, or approved equal. Joints seals shall be installed in full compliance with the manufacture's current recommendations. All manholes shall be water tight prior to grouting.

V. DROP MANHOLES

A. Minimize the number of manholes.
B. Standard drop manhole installations are required when the drop in the manhole is greater than 2 feet.

VI. ACCESSIBILITY

A. All-weather vehicle access is required to every manhole.
B. Sewer easements are to be a minimum of 15' in width.
C. All access roads must be a minimum 12' in width.
D. Acceptable types of access roads are:

    1. 6" blue shale for slopes up to 10%.
    2. 2" of AC on 6" of aggregate base for slopes in excess of 10%.

E. All access roads longer than 100' must have an approved turn-around.

VII. SIZE

A. Mains shall be sized to provide adequate capacity and a minimum 2 feet per second velocity.
B. The minimum public main is 8" in diameter.
C. The minimum private main is 6" in diameter.

VIII. COVER

A. Minimum cover for all gravity sewers is 24".
B. Where cover is less than 36", class 50 Ductile Iron Pipe must be used or must be encased in schedule 40 steel pipe.
C. Definition of cover: distance from the top of the pipe to finished grade.

IX. SLOPE

A. Design all gravity sewers to achieve a minimum velocity of 2 feet per second. Use n=0.013 for new pipe and n=0.015 for existing systems.
B. The minimum permissible slope on sewer main lines shall be 0.40% for 6 inch, 0.30 % for 8 inch and 0.25% for 10 inch.
C. Maximum slope for gravity sewers is 15% or 15' per 100'.

X. SEWER LATERALS

A. Each lot should be served by one lateral.
B. When more than one residential or commercial lot is served by a single lateral, the lateral must meet the private main standards.
C. All laterals must connect to the main with a wye connection, see Detail310.
D. Minimum slope of sewer laterals is 2% or ¼" per foot, unless otherwise approved by the City Engineer.

XI. LIFT STATIONS

General Requirements:

E. Pressure reducing valves are installed to maintain overall system balance.

1. Lift stations will not be allowed where an alternative gravity route exists.
2. Design the lift station to serve the entire tributary at build-out densities conforming to the General Plan (Submit flow calculations).
3. Lift stations must be of the wet-well, above ground lift station type. Submersible pump lift stations may not be used.
4. Lift stations are not allowed within the street right-of-way.
5. Provide a paved access road to allow service vehicles to be parked off the street and clear of the sidewalks. Turn-around may be required for stations constructed along heavily traveled streets. Provide service vehicle access to wet-well.
6. Provide a reinforced concrete base slab sized adequately to counteract buoyancy. Provide supporting design calculations.
7. Wet-well to be a minimum of 60" diameter. Provide resilient seat gate valve on-line into we-well.
8. Provide a wet-well vent system. Venting through a grated sewer manhole cover will not be allowed.
9. Provide water service with reduced pressure backflow preventer.

10. Provide a spare air release valve prior to acceptance.
11. Provide calculations to determine the need for hydrogen sulfide suppression in force main.

F. Pumping Equipment.

1. Lift station standard is 6'x 6' diameter, above underground lift station by Gorman-Rupp.
2. All pumps, motors, internal valves and piping, level indicators, control switches, ladders, alarms, blower and dehumidifier shall be manufactured and assembled as a package. Supply and warranty shall be through one company.
3. The pumps shall be self-priming, horizontal, centrifugal, sewage pumps. Pumps shall pass a maximum solid, 2 ½" diameter sphere.
4. Provide two pumps and controls to alternate lead and lag pump.
5. Provide a spare rotation mechanism to replace either pump.
6. Provide one set of routine service replacement parts for the pumps.
7. Provide calculations used to determine the capacity of the wet-well and specifications for the pump.
8. Provide hour meters for each pump.
9. Provide an echo processing liquid level control system wired into the Gorman-Rupp control panel at the factory. Level control standard is Milltronics Hydro-Ranger 1.
10. Provide for automatic pump alternation.
11. Provide an automatic dialing remote monitoring system. City Standard is RACO Verbatis VSS-4C, 4-channel auto dialer wired at the factory into the control panel.
12. Provide the following:

    a. Alarm horn
    b. Alarm light
    c. Station light
    d. Pump sequence selector switch
    e. Hand-off-auto switch
    f. High pump temperature protection
    g. Pump run lights
    h. Elapsed time indicator
    i. Duplex ground fault interrupting receptacle
    j. Motor overload re-setter
    k. Ventilator fan

13. Provide a 10-year warranty for the pump enclosure.
14. Provide a 5-year warranty for all pumps, equipment, apparatus and parts.

G. Electrical Service.

1. Provide electrical service required by the pump station manufacturer.

2. All electrical circuitry shall be designed and installed in accordance with the Uniform Electrical Code and National Electric Code.
3. Provide a telephone service for the auto-dialer.

H. Details Required on Improvement Plans.

1. Site Plan: Location of power pole, wet-well, ground slab, driveway, fencing, water service.
2. Wet-well: influent piping (standard inside drop manhole); suction piping (min. 6” off bottom of manhole; emergency suction line; water/alarm levels (pump on, pump off, low level, high level), redundant high water float switch.
3. Force Main Discharge Manhole: Inverts, channelization.

A.2 - Storm Drain Design Standards (SDD)

STORM DRAIN DESIGN STANDARDS

TABLE OF CONTENTS

STORM DRAIN DESIGN STANDARDS

I. GENERAL

A. These standards provide design criteria and the methodology used to estimate peak flows for drainages within the City of Lakeport.

B. These Standards are based on information provided by the National Weather Service, the USDA Natural Resources Conservation Service, the California Department of Water Resources, and the California Department of Transportation.

C. These standards are minimum standards and do not preclude the use of a higher standard.

II. HYDROLOGIC DESIGN

1. Hydrology Design: These Standards provide design criteria and the methodology used to estimate peak flows for drainage within Lake County. These Standards are the Lake County Hydrologic Design Standards, and are based on information provided by the National Weather Service, the USDA Natural Resources Conservation Service, the California Department of Water Resources, and the California Department of Transportation.

It is the intent that these Standards be utilized for estimating flows in minor waterways (drainage areas less than one square mile) with time of concentrations of less than two hours. For larger drainage areas, we recommend the use of more detailed calculations and/or models, such as TR20, TR-55, HEC-1 and HEC-HMS.

A. Waterway Design Criteria

A "waterway" is defined as being a natural or artificial channel or depression in the surface of the earth or an underground conduit system that conveys storm water runoff.

For the purposes of design criteria contained herein, waterways are divided into three classifications:

1. Major Waterways: having a tributary drainage area of four square miles or more; shall require a design frequency of re-occurrence of one in 100 years. This frequency would only apply to design in urban and suburban areas and not, for instance, agricultural channel designs.
2. Secondary Waterways: having a tributary drainage area of between one and four square miles; shall require a design frequency of re-occurrence of once in 25 years.
3. Minor Waterways: having a tributary drainage area less than one square mile; shall require a design frequency of re-occurrence of once in 10 years.

Commercial sites, industrial sites, residential subdivisions, and manufactured home parks or subdivisions shall be designed to carry the 10-year storm in the storm drain system, and the 100-year storm within the confines of the streets. Secondary and major waterways passing through the site shall be designed to their respective design flows. All new building pads

should be designed such that they are not inundated by a 100-year flood event from local drainage facilities. Flooding from regional sources will be considered on a case-by-case basis.

Best Management Practices (BMP's), such as filter strips and sedimentation basins, and are usually designed for the 2-year event. BMP's designed for the 2-year event will properly treat over 90% of the flow during its life. See Section 9. Design criteria, such as included in the California Storm Water Quality Association (CASQA) Best Management Practice Handbooks should be used.

Open channels should be designed with a minimum of six inches of freeboard at the design flow. Closed conduit systems should be designed with no surcharging at the design flow. Culvert inlets may be surcharged to efficiently use the culvert. To reduce routine maintenance, facilities should be designed with a self-cleansing velocity of 3 feet per second. Erosive velocities in unlined channels and culvert outlets should be minimized, or erosion resistant lining provided. Refer to Table 4 for recommended maximum ditch flow velocity for various soil types.

B). Roadway Design Criteria

Roadway drainage design is a matter of properly balancing technical principles and data with the environment giving due consideration to other factors such as safety and economics. Drainage features to remove runoff from the roadway and to convey surface and stream waters originating upstream of the roadway to the downstream side should be designed to accomplish these functions without causing objectionable backwater, excessive velocities or unduly affecting traffic safety. Chapters 800 to 890 of the CALTRANS Highway Design Manual should be used for drainage design of public roadways within Lake County. The following minimum design standards apply to Lake County:

Bridges/Major Culverts: Design in conformance with Chapter 820 of the Highway Design Manual. For Major Waterways and streams that are included in the Flood Insurance Study (FIS), a 100-year flood should be used for design purposes. Bridges over streams included in the FIS may not increase the base flood elevation more than one foot. If a floodway is present, the bridge may not encroach on the floodway or must be designed with no increase in the base flood elevation.

Arterial and Collector Roadways: Cross culverts should be designed for a 25-year flood event with headwater six inches below the edge of the traveled way. A 100-year event should be used if the drainage is defined as a Major Waterway.

Drainage along the roadway, i.e. gutter flow, should be designed for a 25-year event with flow contained within the shoulder or parking lane. Roadside ditches should be designed for a 25-year flood event with six inches of freeboard. The 100-year event should be contained within the roadway.

Local Roadways: Cross culverts must be designed for a 10-year flood event with headwater six inches below the edge of the traveled way. Secondary and Major Waterways should be designed for the corresponding recurrence interval.

Drainage along the roadway, i.e. gutter flow, should be designed for a 10-year event with flow contained within the shoulder or parking lane. Roadside ditches should be designed for a 10-year flood event with six inches of freeboard. The 100-year event should be contained within the roadway.

In the event of sheet flooding occurring in the area of a bridge or culvert, exceptions to the above standards will be considered on a case-by-case basis.

C) Hydrologic Design

Estimation of flood flows from minor waterways and for drainage areas that have significant areas of urban development should be through use of the Rational Formula. Secondary and major waterways should have the flood flows estimated from detailed calculations and/or models. Design shall be based on the assumption that all upstream areas are fully developed, consistent with zoning at the time of project approval.

Rational Formula

Design discharge for minor waterways and urban areas shall be determined by use of the rational formula:

$Q = C\ I\ A\ K$

Where:
Q = design discharge in cubic feet per second, cfs
C = runoff coefficient based on full development
I = rainfall intensity in inches per hour
A = drainage area in acres
K = coefficient of intensity

Runoff Coefficient:

The runoff coefficient for undeveloped areas is selected from Table 1. For developed areas, the runoff coefficient is calculated based on the runoff coefficient from Table 1 and the percentage of area that is covered by impermeable surfaces. Table 2 provides some typical ranges for the area covered by impermeable surfaces for different levels of development. Table 3 provides some typical runoff coefficients for different types of development. The runoff coefficient is calculated as follows:

$$Ct = (Ap/At)(Cp) + (Av/At)(Cv)$$

Where:
Ap = area covered by impermeable surfaces, such as paving and buildings
Av = area planted or vegetated

At = total area
Cp = coefficient of runoff of paved area, usually 0.95
Cv = coefficient of runoff for planted or vegetated areas, from Table 1
Ct = coefficient adjusted for vegetated area

Rainfall Intensity:

Rainfall Duration-Intensity Curves are included in Figure 1. Proper determination of the time of concentration has the greatest effect on the rainfall intensity. The time of concentration is the time required for water from the most remote point of the drainage area to travel to the point of interest. Because the flow velocity is dependent on the characteristics of the flow route, the route should be divided into segments where the route characteristics change (i.e. roughness, slope, wetted perimeter, channel slope, etc.) and the individual times added together to get the time of concentration. Figure 2 provides a relationship of slope, cover type and overland flow velocity.

The flow velocities for natural channels can be estimated using Manning's equation. Because the depth of flow increases with higher intensity rainfall, the time of concentration will decrease as the storm intensity increases. Add 10 minutes initial time of concentration to the calculated time of travel to obtain the total time of concentration for the design rainfall intensity.

K: The "K" factor is used to adjust for variations in rainfall intensities throughout the County. "K" is determined by obtaining the mean annual precipitation for the drainage basin from Figure 3, and dividing it by 35 inches per year.

General:

The Rational Method is based on the following assumptions:

1. All areas of the drainage basin contribute to the peak flow.
2. Rainfall falls at a uniform rate over the entire drainage basin.
3. The runoff coefficient is the same for storms of various frequencies.
4. The runoff coefficient is the same for all storms in a given watershed.
5. The frequency of peak discharge is the same as that of the rainfall intensity for the given time of concentration.
6. The base flow is negligible compared to the flood flow.

Because of these assumptions, use of the Rational Formula should be limited to small, simple watersheds, generally less than 640 acres. Diverse watersheds should be divided into homogenous sub-areas and the resultant flows accumulated based on the entire watershed's time of concentration. If a large amount of storage exists within the basin, development of a hydrograph and flood routing may be required.

Table 1: Runoff Coefficients For Undeveloped Areas

	Watershed Types			
	Extreme	**High**	**Normal**	**Low**
Relief	0.28-0.35 Steep Rugged terrain with average slopes above 30%	0.20-0.28 Hilly, with average slopes of 10 to 30%	0.14-0.20 Rolling with average slopes of 5 to 10%	0.08-0.14 Relatively flat land, with average slopes of 0 to 5%
Soil infiltration	0.12-0.16 No effective soil cover, either rock or thin soil mantle of negligible infiltration capacity	0.08-0.12 Slow to take up water, clay or shallow loam soils of low soil infiltration capacity, imperfectly or poorly drained	0.06-0.08 Normal, well drained light or medium textured soils, sandy loams, silt and silt loams	0.04-0.06 High, deep sand or other soil that takes up water readily, very light well drained soils
Vegetal Cover	0.12-0.16 No effective plant cover, bare or very sparse cover	0.08-0.12 Poor to fair; clean cultivation crops, or poor natural cover, less than 20% of drainage area over good cover	0.06-0.08 Fair to good; about 50% of area in good grassland or woodland, not more than 50% of area in cultivated crops	0.04-0.06 Good to excellent; about 90% of drainage area in good grassland, woodland or equivalent cover
Surface Storage	0.10-0.12 Negligible surface storage, depressions few and shallow; drainageways steep and small, no marshes	0.08-0.10 Low; well defined system of small drainageways; no ponds or marshes	0.06-0.08 Normal; considerable surface depression storage; lakes and pond marshes	0.04-0.06 High; surface storage high; drainage system not sharply defined; large floodplain storage or large number of ponds and marshes
Given: An undeveloped watershed consisting of 1) rolling terrain with average slopes of 5%, 2) clay type soils, 3) good grassland area, and 4) normal surface depressions Find: The runoff coefficient, C, for the above watershed			Solution: Relief 0.14 Soil Infiltration 0.08 Vegetal Cover 0.04 Surface Storage 0.06 C = 0.32	

Table 2: Typical Ranges of Impermeable Area

Development Type	Low, %	High, %
Suburban Residential (SR)	5	15
Single-Family Residential (R1)	45	65
Two-Family Residential (R2)	50	70
Multi-Family Residential (R3)	50	75
Commercial	50	100

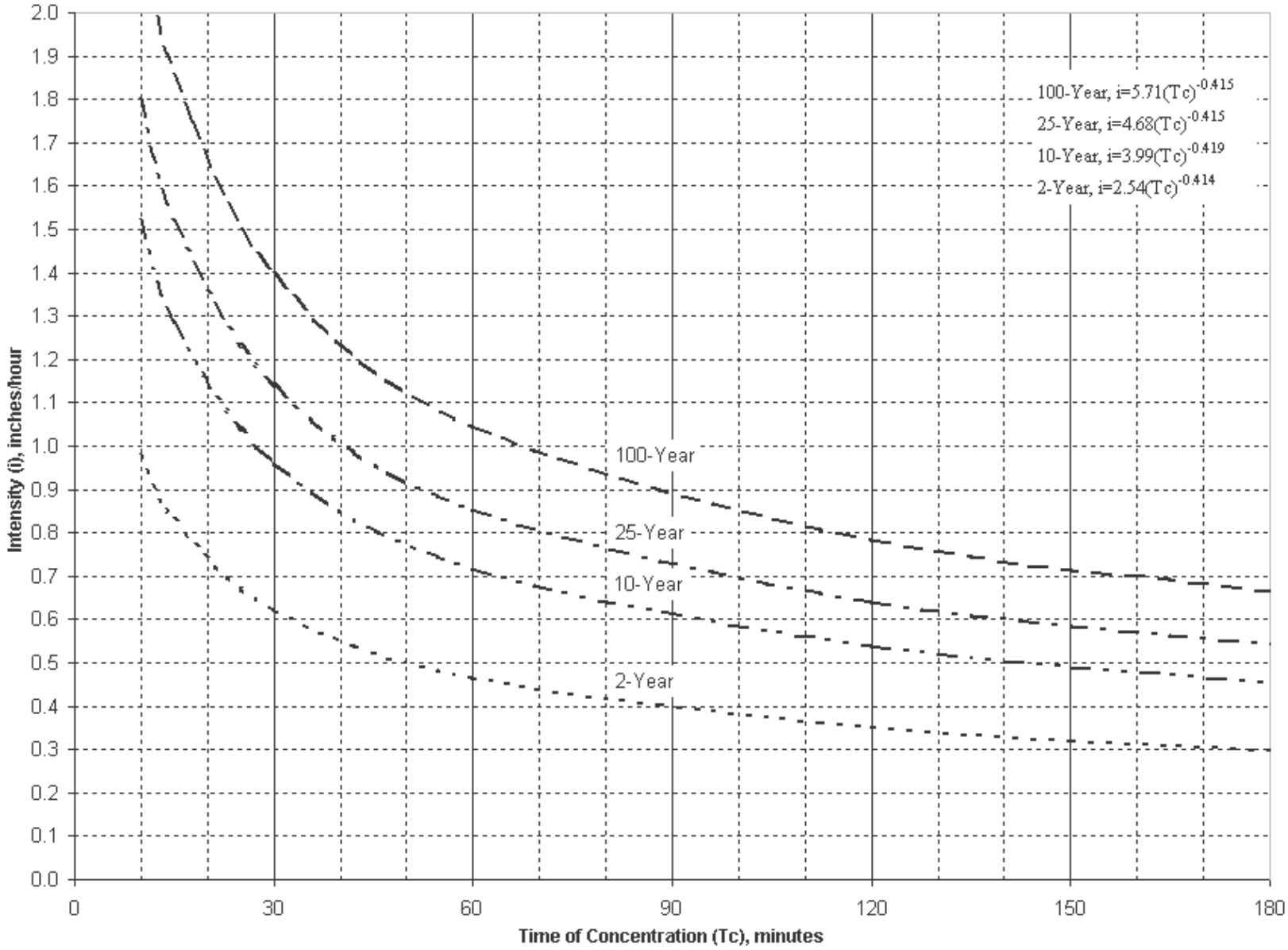
Table 3: Typical Runoff Coefficients for Developed Areas

Type of Drainage Area	Runoff Coefficient	Type of Drainage Area	Runoff Coefficient
Business:		Residential	
Downtown Areas	0.70-0.95	Single Family Areas	0.30-0.50
Neighborhood Areas	0.50-0.70	Multi-units, detached	0.40-0.60
Industrial		Multi-units, attached	0.60-0.75
Light industrial areas	0.50-0.80	Suburban	0.25-0.40
Heavy industrial areas	0.60-0.90	Apartment dwelling areas	0.50-0.70
Parks, cemeteries	0.10-0.25	Playgrounds	0.20-0.40

Table 4: Recommended Maximum Ditch Flow Velocity for Various Soil Type*

Soil Type	Maximum velocity (ft/sec)
Sand and sandy loam	2.5
Silt loam	3.0
Sandy clay loam	3.5
Clay Loam	4.0
Clay, fine gravel, and graded loam to gravel	5.0
Graded silt to cobbles	5.5
Shale, hardpan, and coarse gravels	6.0

*Source: (McCullah 1992)



"Figure 1: Rainfall Duration-Intensity Curves"

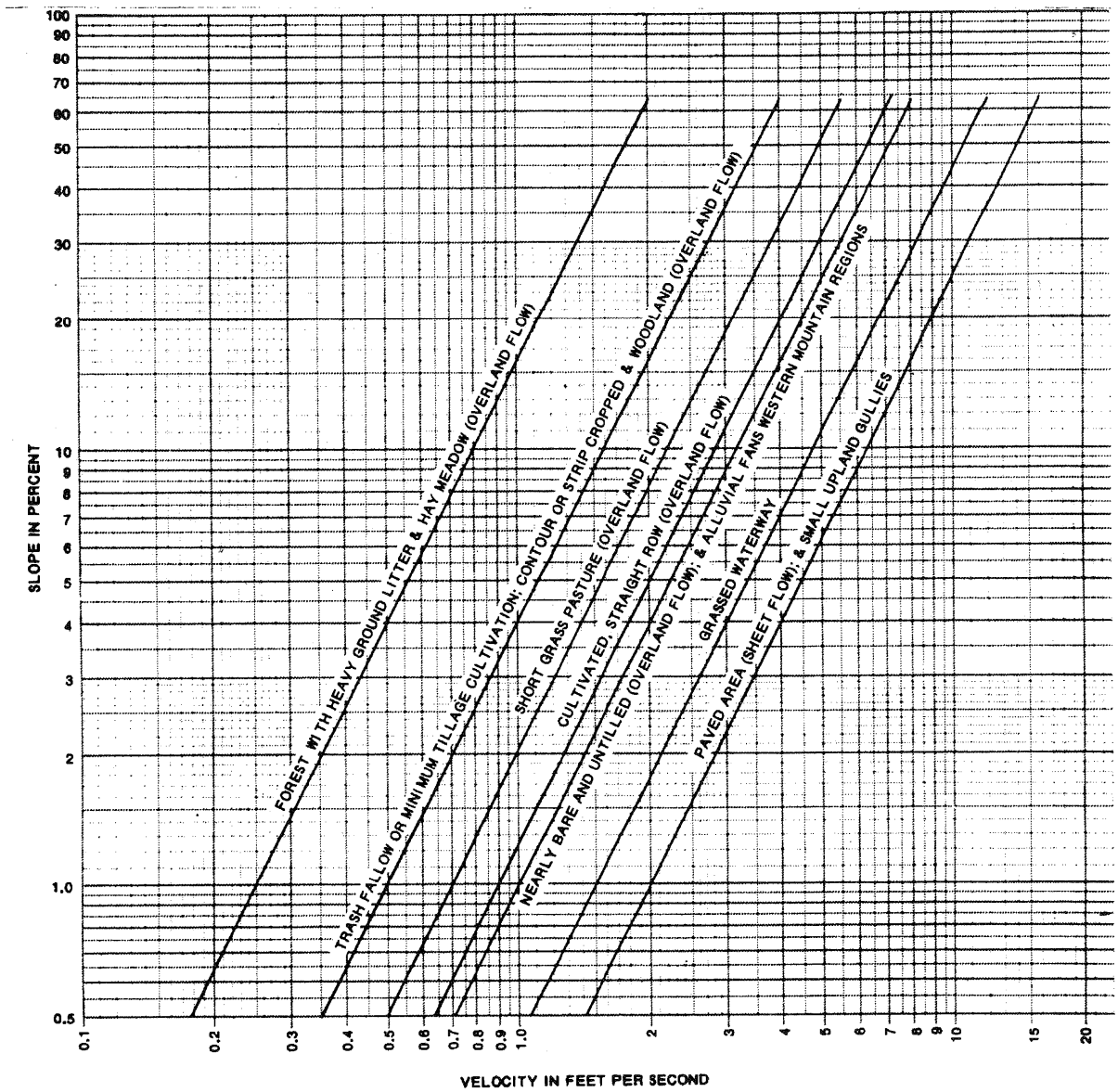


Figure 2: Overland Flow Velocities

From: USDA Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, March 1985, p. 15-8

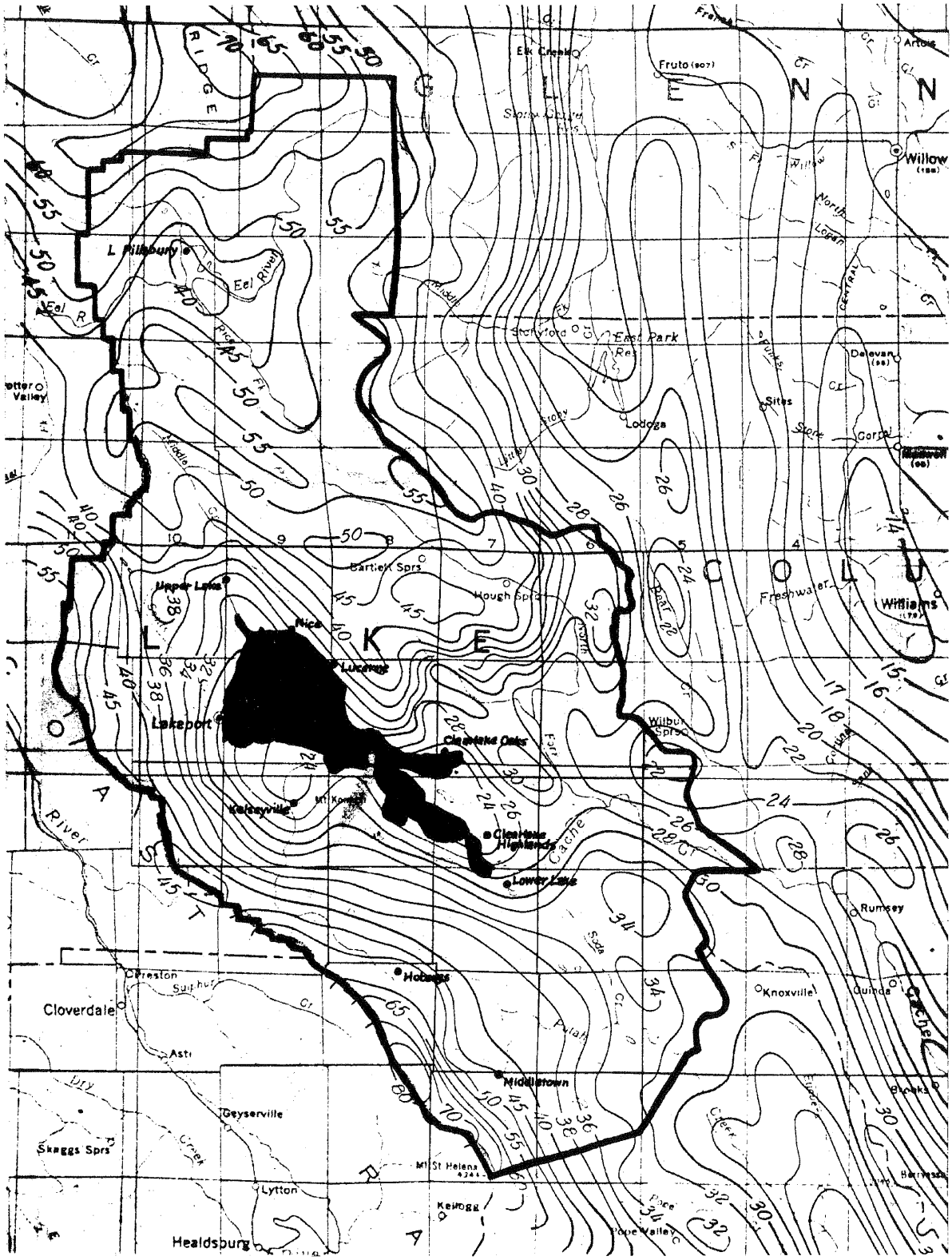


Figure 3: Average Annual Precipitation for Lake County

From: Calif. Department of Water Resources, Lines of Average Yearly Precipitation in the Central Valley, April 1966

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1. California Department of Water Resources, Lines of Average Yearly Precipitation in the Central Valley North Half, April 1966

2. California Department of Water Resources, Rainfall Depth-Duration-Frequency for California, November 1982

3. California Department of Transportation, Highway Design Manual, Fifth Edition, July 1995

4. Stormwater Quality Task Force, California Strom Water Best Management Practice Handbooks, March 1993

5. USDA Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, March 1985

III. HYDRAULIC DESIGN CRITERIA

A. For hydraulic design the design engineer shall provide specific references, model study reports, or prototype test results, as necessary to confirm the hydraulic design. Design engineers shall submit design calculations for all public storm drain facilities. As a minimum, the submittal shall include the items listed in Part XVIII of this specification and the Improvements Plan Checklist.

B. Secondary waterways discharging into major downstream waterways shall be designed to operate while discharging into a 25-year flow in the major downstream waterways. Minor waterways discharging into secondary downstream waterways shall be designed to operate while discharging into a 10-year flow in the secondary downstream waterways. In such cases, the ground elevation along the secondary or minor system shall be above the 100-year water surface elevation in the major or secondary downstream waterway.

C. If a closed conduit (i.e., pipe or culvert) is used as a secondary or minor waterway, sufficient additional surface routes for flood flows shall be made available to carry the added flow increment up to the 100-year design flow with no more than nuisance damage to improvements or proposed improvements and with no flooding of finished floor of present and proposed future buildings. If such surface routes cannot be made available, the secondary or minor conduit shall be designed to carry the 100-year design flow.

D. Storm drains shall be designed for a minimum velocity of 2.5 feet per second at design flow rates unless otherwise specifically authorized by the City Engineer.

E. If the Manning Equation is used for hydraulic design of storm drainage facilities, the following Manning roughness coefficient "n" shall be used:

Table 3: Manning Roughness Coefficients

Material	***n***
Plastic pipes, smooth wall	0.012
Concrete, steel troweled or smooth-form finish	0.013
Concrete pipe, precast or cast-in-place	0.014
Concrete, wood float or broomed finish, pneumatically applied mortar	0.017
Asphaltic concrete	0.017
Corrugated metal pipe (non-spiral)	0.024
Sack concrete riprap	0.030
Grouted rock riprap	0.030

Table 3: Manning Roughness Coefficients

Material	***n***
Loose rock riprap	0.035
Grassed channels	0.035
Constructed Natural Waterways	0.050 (Minimum)

F. For materials other than those stated above, "n" values shall be those presented in the latest edition of the *Handbook of Hydraulics* by King and Brater, or other hydraulic design reference manual approved by the City Engineer. The use of n= 0.012 may be allowed for smooth walled high-density polyethylene pipe (HDPE) design purposes when the construction drawings clearly indicate the pipe material shall be HDPE and there is no suitable substitute.

G. Open Channels:

Constructed open channels and waterways shall be designed to carry the quantity of flow determined as set forth above with minimum freeboard between design water surface and the top of bank of 1.50 feet or 0.2 of the specific energy, whichever is greater. Where this minimum freeboard does not provide the necessary differential head to allow adequate gravity drainage for projected development of the tributary areas, the design water surface shall be lowered sufficiently to allow such areas to drain to the channel by gravity, except where levees are permitted. Levees are generally unacceptable; specific exception to allow levees may be granted in tidal areas or in other situations of extreme difficulty only after a specific determination by the City Engineer that the proposed levee is the only feasible method of providing adequate flood protection.

For natural waterways and constructed natural waterways design flow may be allowed in an overflow area above the defined banks provided, however, the flow must be contained within a defined overflow area and freeboard provided as specified above between the water surface and adjacent ground elevation or finished grade elevation within lots or areas in which improvements are to be constructed. Less than 1.50-feet of freeboard may be considered for small natural swales and creeks through open space such as parks and golf courses. In any event, freeboard shall be adequate to provide for reduced capacity due to weed growth and 100-year flow within the right-of-way.

For computing the required freeboard, superelevation of the water surface on curves shall be determined with references noted and the design water surface adjusted therefor. Open channels shall not be designed with a slope in the range of plus or minus 20% of critical slope unless added freeboard for instability waves is provided. Channels designed for supercritical flow shall have their sequent depth below top of bank.

Channels shall be designed taking into account the energy losses due to existing and projected road crossings or other obstructions to be placed within the channel. Energy losses for bridge piers, interior walls in multiple box culverts, or other obstructions within the channel, shall be predicated upon the entrance obstruction width plus 2.0-feet of debris allowance on each side of each obstruction. For bridge piers or multiple box culverts, in lieu of the 2.0-feet of debris allowance on

the full height of the pier or interior walls, such piers or walls may be extended upstream on a 2:1 downward slope to the channel invert. A debris width of 2.0-feet on each side of the downward sloping wall shall be considered for the upper quarter of the bridge or culvert depth except that the minimum height of debris shall be 2.0-feet. In lieu of debris allowance at small pipes and groups of small pipes, a flared entrance section or a debris trap must be used.

Bridges, culverts, and utility crossings which span major and secondary open channels and which are existing, planned or projected at the time of channel design shall have a minimum clearance from soffit to design water surface of 1.0-foot and shall cause no encroachment on the specified minimum freeboard in the upstream channel or waterway. Channels shall be designed with proper allowances for hydraulic losses for all such planned or projected future crossings to maintain clearance and freeboard as specified above. In the case that a crossing is proposed over an existing channel where the hydraulic effect of the crossing was not considered in design of the channel, minor encroachment on freeboard may be permitted provided that it can be shown that such encroachment would not adversely affect gravity drainage of adjacent tributary areas. Modification of the existing channel and special attention to the design of piers or other obstructions placed in the channel may be required to keep any encroachment on freeboard at an acceptable magnitude.

The water surface profile shall be computed and plotted through all crossing structures. Culverts of all types providing crossings of minor waterways shall be designed hydraulically in accordance with entrance criteria contained in Section H for minor waterway closed conduit systems.

Constructed natural waterways shall be excavated as required to pass the design discharge under interim and ultimate conditions of natural plant and tree growth and of other natural channel characteristics. Trees and other plants and grass shall be planted as a part of initial construction to promote and encourage ultimate natural appearance. Willows and other phreatophytes shall be planted along the low flow water line as a part of initial construction.

The ultimate constructed natural waterway shall satisfy the freeboard requirements in this Chapter. The constructed natural waterway may be utilized in any situation where right-of-way space can be provided and temporary unvegetated appearance can be tolerated prior to growth and generation of natural amenities.

The gradients for constructed open unlined channels in secondary waterways shall not exceed 4.0% and shall be a minimum of 1.0%. The gradient for lined or paved ditches shall not be less than 0.5%.

H. Closed Conduits:

Major and secondary waterways placed within a closed conduit system shall have a minimum 1-foot clearance between the design water surface and the soffit of the conduit. The design depth in circular conduits shall not exceed 0.80 of the diameter of the conduit for major and secondary waterways. Minor waterways placed in closed conduit systems may be designed for full conduit capacity and, if necessary, pressure flow. The hydraulic entrance condition at a closed conduit

minor waterway shall be such that the 10-year discharge will have the specified freeboard in the upstream channel or waterway and that the 100-year discharge will be contained within the banks of the upstream waterway or within drainage easements. The entrance to the closed conduit minor waterway may be submerged provided that the above criteria are satisfied. At inlets and non-pressure-type manholes within a closed conduit system, a hydraulic gradeline shall be not less than 1-foot below the gutter or inlet surface elevation or such that free weir flow will be assured at inlets. At locations where conduits are stubbed out for future extension, the design hydraulic gradeline shall be low enough to allow proper drainage of the tributary area, with a minimum of 1.5-feet below general existing ground level. For conduits designed for supercritical flow, the energy gradeline shall not be above ground level at inlets and non-pressure- type manholes.

Energy losses due to debris load caused by splitting flow at entrance to or within a closed conduit system shall be computed in the same manner as obstruction losses in open channels. In addition to normal friction losses, energy losses due to entrance and exit conditions, bends and transitions shall be computed and considered.

Velocities in conduits shall be a minimum of 2.5 feet per second at the design flow to give a self-cleaning action to prevent siltation.

Entrance and exit losses shall be calculated using the loss coefficients in Table 4.

Table 4. Box Width in Feet

PIPE DIAMETER	Kx/Ke	1.0’	1.5’	2.0’	2.5’	3.0’	4.0’	5.0’	6.0’
	8”-12”	0.23/0.16	0.59/0.41	0.76/0.53	0.84/0.59	0.89/0.62	0.94/0.65	0.96/0.67	0.97/0.68
	15”	0.03/0.02	0.40/0.23	0.63/0.44	0.76/0.53	0.83/0.58	0.90/0.63	0.94/0.63	0.96/0.67
	18”		0.23/0.16	0.50/0.35	0.66/0.46	0.76/0.53	0.86/0.60	0.91/0.64	0.94/0.65
	24”			0.23/0.16	0.44/0.31	0.59/0.41	0.76/0.59	0.84/0.59	0.89/0.62
	30”				0.23/0.16	0.40/0.28	0.63/0.44	0.76/0.53	0.83/0.58
	36”				0.06/0.04	0.23/0.16	0.50/0.35	0.66/0.46	0.76/0.53
	42”					0.08/0.06	0.36/0.25	0.55/0.39	0.68/0.47
	48”						0.23/0.16	0.44/0.31	0.59/0.41
	54”						0.11/0.08	0.33/0.23	0.50/0.35
	60”						0.03/0.02	0.23/0.16	0.40/0.28
	66”							0.13/0.09	0.13/0.22
	72”							0.06/0.04	0.23/0.16

Definitions:

Kx = Exit Loss coefficient
Exit loss for an outlet into a creek = 1.0

Ke = Entrance Loss coefficient
Loss coefficients are to be applied to the velocity head to determine the minor loss.

IV. DETENTION BASINS

The California Stormwater Quality Association's (CASQA) New Development and Redevelopment Handbook, most recently updated on March 28, 2009 shall be used as a Guideline for detention basin design.

V. CONNECTION TO THE EXISTING STORM DRAIN SYSTEM

A. New storm drain systems must connect to an existing City of Lakeport or County of Lake storm drain facility, a channel or creek maintained by the County of Lake, or an approved natural waterway. Storm drain designs shall incorporate the design of any off-site storm drain improvements required to accommodate flow from the storm drain system for the proposed development. A structure must be installed at each connection (i.e., no "blind" connections) except as otherwise approved by the City Engineer.

B. Where public storm drains must traverse private property, inlets necessary to drain the private property are permitted to connect to the public storm drain. These inlets and connecting pipes shall be clearly delineated as private on the improvement plans.

C. Sump pumps for non-residential or mixed land uses shall not discharge to gutters or sidewalk drains. Sump pumps shall discharge into closed conduit systems or open channels, if permitted by the North Coast Regional Water Quality Control Board. Sump pumps for non-residential land uses shall discharge at a structure (i.e., no blind connections). Sump pumps which may discharge liquids other than uncontaminated water (e.g., oil, grease, solvents, etc.) shall discharge to sanitary sewers, if approved by the City Engineer; industrial pretreatment of these discharges may be required. Sump pumps for single-family residences shall be allowed to discharge to sidewalk drains or gutters by gravity flow only (For instance, by pumping to a box and then allowing the water to gravity flow through curb into the gutter.).

D. Concentrated drainage flows in pipe systems from private property shall not flow over public sidewalks. Sidewalk drains or other means of collection and conveyance to a proper discharge location shall be provided.

VI. MATERIALS

A. Storm drain pipes 15-inches in diameter or larger shall be reinforced concrete pipe (RCP), cast-in-place concrete pipe (CIPP) or annular high density polyethylene (HDPE) pipe, as required by the Engineer and shown on the approved plans.

B. RCP shall be Class III, IV, or V as specified in Part A.1 State Standard Specifications, Section 65, "Reinforced Concrete Pipe," of these standards. Typical total effective loads on buried pipe, expressed in pounds per linear foot of pipe, are shown in Table 5. The design engineer shall determine the D-load for the depth and diameter of pipe from the table and select the class of RCP with a D-load rating equal to or greater than the value in Table 5. The design engineer shall interpolate between the values in Table 5 for conditions not presented in the table.

C. Designers see Section 63, "Cast-In-Place-Concrete Pipe," of these standards, and

Section 63 of the Standard Specifications for Special Inspections for use with CIPP.

D. HDPE pipe shall be smooth interior, corrugated exterior pipe with bell-and-spigot joints, Type S, per AASHTO Designation M294. HDPE pipe shall only be used in sizes of 36-inch or smaller diameter with cover of less than 30 feet. The design engineer shall determine flotation restraint per manufacturer's recommendations. Minimum cover over pipe shall be 12 inches from the outside top of pipe to subgrade. HDPE pipe shall only be used under pavement areas.

E. Storm drain laterals shall be PVC, SDR35, HDPE or RCP as approved by the Engineer.

Table 5. Loads on Buried Pipes (pounds per linear foot)																			
in feet	**15**	**18**	**21**	**24**	**27**	**30**	**36**	**42**	**48**	**54**	**60**	**66**	**72**	**78**	**84**	**90**	**96**	**102**	**108**
1	*	*	*	*	*	*	*	*	*	2919	2310	2475	2310	2169	2048	1944	1852	1778	1705
2	1632	1592	1549	1516	1491	1471	1474	1289	1148	1039	952	881	822	772	729	692	659	633	607
3	931	893	859	834	814	798	827	814	797	784	731	688	652	622	596	573	553	540	524
4	857	816	780	753	733	716	760	742	723	709	699	691	685	658	636	616	599	589	576
5	878	832	794	766	744	726	784	763	742	726	715	706	699	693	687	683	667	660	647
6	921	874	833	803	780	762	835	812	789	771	759	749	741	735	729	724	719	727	720
7	974	924	883	852	828	809	897	872	848	829	816	806	798	790	784	779	775	782	778
8	1029	978	935	904	880	861	964	939	913	893	880	869	861	853	847	842	837	846	842
9	1087	1036	993	961	937	918	1037	1011	985	964	951	940	932	924	918	913	908	918	914
10	1141	1090	1047	1015	992	973	1108	1082	1055	1034	1021	1011	1002	995	989	984	979	991	987
11	1191	1141	1098	1067	1043	1026	1177	1151	1123	1103	1090	1080	1072	1065	1059	1054	1050	1063	1059
12	1236	1187	1145	1115	1092	1075	1242	1217	1190	1170	1157	1148	1140	1134	1128	1124	1120	1135	1131
14	1315	1269	1229	1201	1181	1166	1365	1343	1317	1297	1287	1279	1272	1267	1263	1260	1257	1275	1272
16	1380	1338	1301	1276	1259	1247	1477	1458	1434	1417	1409	1403	1398	1395	1393	1391	1389	1411	1409
18	1433	1396	1363	1341	1327	1318	1578	1564	1543	1528	1523	1519	1517	1516	1516	1516	1516	1542	1542
20	1477	1445	1415	1397	1386	1380	1670	1661	1643	1631	1629	1629	1630	1631	1633	1635	1637	1668	1669
24	1542	1519	1496	1485	1482	1483	1828	1830	1820	1816	1821	1828	1835	1842	1850	1857	1863	1903	1908
28	1585	1570	1554	1550	1553	1560	1955	1969	1969	1973	1987	2002	2016	2030	2043	2056	2068	2118	2126
32	1613	1605	1595	1597	1606	1619	2058	2085	2094	2107	2130	2153	2175	2196	2216	2235	2253	2313	2326
36	1632	1629	1624	1631	1646	1664	2141	2180	2198	2220	2253	2285	2315	2343	2371	2396	2420	2490	2509
40	1644	1645	1644	1656	1675	1698	2208	2258	2286	2317	2359	2399	2437	2474	2508	2540	2571	2651	2675

Allowable Loads:

Class III 1,350 pounds/linear foot
Class IV 2,000 pounds/linear foot
Class V 3,000 pounds/linear foot

The area within the heavy black line indicates situation where Class III RCP is acceptable.
* Exceeds the capacity of Class V RCP. Special design required to be submitted to City Engineer.
Reference: Ameron Reinforced Concrete Pressure Pipe, 1971, for covers of 2 feet or greater. Loads are interpolated for covers of 1 foot.

VII. SIZE

A. Storm drain pipe diameters within the public right-of-way, including driveway culverts, shall be 15 inches or larger, except sidewalk drains shall be per City Standard 409.

B. In new portions of the storm drain system, pipe sizes shall not decrease in the downstream direction.

VIII. ALIGNMENT

A. Storm drains shall be located within public streets unless otherwise authorized by the City Engineer.

B. Storm drains traversing private property shall be straight between manholes (i.e., no horizontal curves) except when installed in a private street parallel to the centerline of the private street.

C. In general, storm drains shall be installed parallel to the centerline of the street or right-of-way.

D. Horizontal separation of storm drain line from sanitary sewer shall be a minimum of 5-feet clear (i.e., outside of pipe to outside of pipe), except at pipe crossings.

E. Horizontal separation from water mains and other utilities, gas, underground electric, underground television cable, etc., shall be a minimum of 4-feet clear.

F. Vertical curves are not allowed unless specifically authorized by the City Engineer.

G. Horizontal curves with a minimum radius of 300-feet for RCP and CIPP shall be provided at catch basins installed at curbs and gutters so as to locate as much of storm drain as possible under asphaltic concrete paving rather than concrete curbs and gutters.

H. Horizontal curves concentric with public or private street centerlines may be permitted with RCP provided the radius is 300-feet or greater. The minimum allowable radius used with 20 foot sections of HPDE pipe is 765 feet.

I. Horizontal curves can be installed in RCP by pulling pipe joints if the resulting deflections are not greater than the pipe manufacturer's recommendations. The design engineer shall use the following equation in designing horizontal curves for RCP with a diameter over 48-inches:

$$R = \frac{L}{2 \cdot \tan\left(\frac{1}{2} \cdot \frac{\Delta}{N}\right)}$$

Where:

R = radius of curvature of the centerline of the pipeline in feet
L = laying length of pipe section in feet, measured along centerline
Δ = total deflection angle of curve in degrees
N = number of pipe sections with pulled joints
Δ/N = deflection angle of each pipe in degrees

IX. SLOPE

A. Maximum slope for storm drains shall be 15% or 15-feet per 100-feet.

X. COVER

A. Minimum cover over storm drains shall be 12 inches (Class III RCP, HDPE and CIPP). Cover is defined as the distance from the outside top of the pipe to the final subgrade (bottom of the structural section) in paved areas or finished grade in unpaved areas. See Table 5.

XI. MANHOLES AND STRUCTURES

A. Manholes shall be constructed of cylindrical precast reinforced concrete sections(s), conical reinforced concrete section and adjustment rings (s) manufactured in accordance with ASTM standard C478 and cast iron frame and cover as detailed in City of Lakeport Std. Dwg. 400.
B. A manhole is required at every horizontal or vertical change in alignment and at every change in pipe size.
B. Maximum distance between manholes and/or accessible structures is 400-feet.
C. A manhole is required at the end of every main.
D. Sufficient drop shall be provided through manholes and accessible structures to compensate for energy loss caused by change of alignment.
E. Minimize the number of manholes.
F. Manholes shall be 48-inches in diameter with storm drain pipes of 36- inches diameter or less, and shall be 60-inches in diameter with storm drain pipes larger than 36-inches in diameter or manholes deeper than 7-feet (indicate manhole diameter on plans). Manholes shall be designed to be large enough to accommodate all pipes connected to manhole with a minimum of 3-inches of manhole wall on both sides of all pipes.
G. When pipe size increases, set inlet crown at least as high as the outlet crown.
H. An accessible structure shall be provided to connect private storm drains to the public storm drains (i.e., no blind connections) except as otherwise approved by the City Engineer. Structures shall be installed on the private side of the property line to distinguish the public system from the private system. Public and private storm drain facilities shall be clearly identified on the improvement plans. For residential land uses only, no structure is necessary for sump pump connections to public storm drain systems. Accessible structures are required for sump pump connections from nonresidential land uses.
I. Headwalls or structures shall be provided where open ditches, channels, and creeks discharge into closed pipe conduits. Refer to Caltrans Standard Plans.

XII. CATCH BASINS

A. Catch basins shall be the curb opening type (Standard 404 and 405) except as listed below or as otherwise approved by the City Engineer. Galleries per Standard 406 may be used on the upstream side of a catch basin to increase inlet

interception capacity or if their use reduces the number of catch basins requiring maintenance.

B. Catch basins shall be installed at the following locations:

- Such that gutter flows do not cross intersections except where valley gutters are allowed.
- Upstream of bridge abutments.
- The beginning of every roadway superelevation that reverses the cross-slope of the pavement.
- The sags (i.e., bottoms) of vertical curves
- The low points of downhill cul-de-sacs
- As required so that water depth in gutter does not exceed 0.4 feet during the design storm event.
- As required to maintain the following number of 8-foot-wide traffic lanes unimpeded by flowing or standing water during a design storm:
  - Two lanes for all regional streets.
  - One lane for transitional and industrial streets. This lane may be in the middle of the road, spanning the crown. This requirement does not apply to local streets.
  - One lane in each direction for transitional streets that are divided roads or roads with a median strip.
- As required so that carry over flows (bypassing catch basins) shall not exceed 2 cubic feet per second.
- At a maximum spacing of 400-feet from another catch basin or manhole.

C. Catch basin size and spacing shall be computed by the methods in Drainage of Highway Pavements, Federal Highway Administration, Hydraulic Engineering Circular No. 12, March 1984.

XIII. EASEMENTS

A. An easement must be provided over any public storm drain when it is installed outside a public right-of-way.

B. The easement must be a minimum of 15' wide if it only contains a publicly maintained storm drain or 20' wide (or wider) if it contains another facility, such as water, sewer, or other utility. The easement will be dedicated as a "public drainage easement" if it contains storm drain only. It will be dedicated as a "public utilities easement" if it contains other facilities as well.

C. Easements must be configured to encompass all publicly-maintained appurtenances and will be generally centered over the facility. Separate access easements may be required depending on site conditions. When storm drains are to be installed along a property line the easement will be wholly contained on one parcel.

D. All property restrictions placed as a result of dedication of easements will be so noted on the supplemental sheet of the Subdivision Map, or on the Easement Deed if the easement is not dedicated as part of a subdivision. Typical required notes as applicable are:

1. No structures may encroach on, above, or below the surface of the ground in any public easement. This includes footings of foundations, eaves from the roof of any adjacent structure, pools, ponds or outbuildings on slabs or foundations.
2. No trees may be planted in a public storm drain easement without first obtaining approval of the Director of Public Works. Trees may be allowed to the extent that damage to the drainage system does not occur from root intrusion and adequate access can be provided for maintenance and repair vehicles.
3. The Public Works Department will take due caution when performing maintenance or repair of drainage systems in easements, but will not be responsible for repairs or replacement of trees, landscaping or structures not specifically approved by the Director of Public Works.

XIV. ACCESS ROADS

A. Clear access must be provided and maintained to all pubic structures on the drainage system.

B. All-weather vehicle access roads are required to every structure on the storm drain system. Access roads must be a minimum of 12-feet in width and must be provided with turnarounds per City Standard 210 when the back-up distance for any maintenance vehicle exceeds 100-feet.

C. The design of access roads must be included with the drainage system design plans. Include adequate drainage measures in the design to prevent damage to the access roads from storm water.

D. Gates must be provided for access through any fence crossing a public storm drain easement. Where vehicular access is required for maintenance, minimum 4-foot wide gates must be provided with sliding gates preferred. Where vehicular access is not required, 4-foot wide gates for pedestrian access must be provided and will be located to permit visual access between storm drain structures.

E. The maximum grade allowed at any point on an access road is 15%. The maximum cross-slope for any access is 5%.

XV. MAINTENANCE

A. Storm drains that convey public water, are designed and constructed to City Standards, and are in a dedicated public easement or right-of-way accepted by the City shall be maintained for hydraulic capacity by the City. All other storm drains, including driveway culverts, shall be privately maintained.

B. Sidewalk drains shall be privately maintained by the owners of the frontage property.

XVI. WATER QUALITY REQUIREMENTS

A. Source controls designed or constructed to reduce the discharge of pollutants from the storm water conveyance system should be designed and maintained in accordance with the CASQA Best Management Practice Handbooks.

XVII. OTHER REQUIREMENTS

A. Discharge of drainage waters are subject to State Water Quality Control Board (SWQCB) standards, which include project, and regional discharge permits (such as NPDES) which must be adhered to. Furthermore, alterations to drainage courses both in stream and upland are regulated by the California Department of Fish & Game (CDF&G).

B. Installation of Drainage Structures are regulated by CDF&G and the National Oceanic and Atmospheric Administration (NOAA Fisheries), in some instances, through 1600 agreements and Army Corps of Engineers 404 permits respective. CDF&G publishes “California Salmonid Stream Habitat Restoration Manual” and NOAA Fisheries publishes “Guidelines for Salmonid Passage at Stream Crossings”.

C. Sanitary sewer laterals and industrial process or waste pipelines shall not be connected to storm drains or allowed to discharge to waterways. Sanitary sewer laterals and industrial waste pipelines shall be connected to sanitary sewers in conformance with the latest edition of the City's Sewer Standards; pretreatment of industrial wastes may be required.

D. Driveway culverts shall be designed under the direction of a civil engineer to convey anticipated flow from future development and ensure hydraulic adequacy.

XVIII. SUBMITTAL REQUIREMENTS

A. Drainage Report:
For the purpose of review by the City, hydrology, hydraulic (closed conduit backwater and open channel backwater), and gutter and inlet capacity calculations will be required. The calculations must be signed and stamped by a California Registered Civil Engineer.

B. Assumptions:
Assumptions used in preparing calculations shall be itemized.

C. Design Aids and References:
The design aids and references which are used in support of the calculations for design of drainage improvements shall be listed. Supply the City with copies of reference data. If computers are used, the input and output sheets provided shall be sufficient to allow easy checking.

D. Hydrology Maps:
Hydrology map(s) shall be provided for both on and off-site drainage areas. The maps shall be of sufficient scale and detail to show drainage areas. Drainage areas shall be numbered and outlined to facilitate checking and with arrows to show drainage problems. The area of each drainage area shall be shown on the hydrology map. A separate 100 year flood map delineating the escape-route shall be provided.

E. Calculations:
Hydrologic and hydraulic calculations showing beginning hydraulic gradeline, energy losses at junctions, bends, structures, friction slopes, etc. shall be submitted.

F. Hydraulic and Energy Gradeline:

In addition to the calculations, the hydraulic gradeline, and the energy gradeline shall be shown for all open or closed drainage improvements except gutters.

F. Plans:
Plan views, profiles, cross-sections, and details of all drainage facilities including a lot grading plan showing how each lot will drain shall be submitted.

G. Inlets and Gutters:
Entrance capacity and gutter depth calculations shall be submitted for all drainage inlets.

H. Storm water Treatment Facilities:
Filtration of runoff before discharge to a water body may be required pursuant to the standards and conditions established by the appropriate agency(ies). Exact specifications for storm water treatment facilities are beyond the scope of these road standards.

I. Additional information may be required as determined by the City Engineer.

XIX. TESTING AND ACCEPTANCE

A. All storm drain lines shall be cleaned of construction debris and sediment before final inspection.

B. Prior to acceptance by the City, all storm drain lines shall be videotaped as required in Part A.1 Section 64 of the City Standards.

A.2 – Water System Design Standards (WSD)

WATER SYSTEM DESIGN STANDARDS

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WATER SYSTEM DESIGN STANDARDS

I. MATERIALS

A. Service laterals shall be Polyvinyl Chloride (PVC) C200, SDWR, CTS SDR#9.
B. 8" and 12" water mains shall be Polyvinyl Chloride (PVC) C900, Class 150, minimum, or Ductile Iron Pipe, C151, Class 50, minimum.
C. 14", 16", 18" diameter water mains shall be Ductile Iron Pipe or PVC C905, 165 psi or as shown on plans and specifications.
D. 20" and larger water mains shall be Concrete Cylinder pipe, Wrapped Steel pipe, or Ductile Iron Pipe.
E. Asbestos Cement Pipe shall not be allowed under <u>any</u> circumstance.
F. If Ductile Iron Pipe needs to be encased with polyethylene tubing and have cathodic protection, the City Engineer will determine if applicable on a case by case situation.
G. Mains outside of paved roadway or crossing a delineated fault zone (see Section XII-B) must be Ductile Iron Pipe unless the City Engineer approves an alternative.
H. Where the normal mainline static pressure exceeds 100 psi, Ductile Iron Pipe or Class 200 PVC must be used.

II. ALIGNMENT

A. Public water mains outside the public street are not allowed without special permission from the City Engineer.
B. Minimum allowable radius for 8" diameter water mains is 250 feet and for 12" diameter water mains is 350 feet.
C. New mains must match the grade and centerline offset of existing water mains when and where possible.
D. Maintain a constant distance from centerline wherever possible.
E. Conform to the State of California Department of Health Services "Criteria for the Separation of Water Main and Sewers".
F. Install felt expansion material between pipes with 1" or less vertical clearance.
G. Minimum horizontal separation from existing gas, electrical, and telephone lines shall be 3 feet between pipes.
H. Minimum clear horizontal separation from a metallic pipe line with an induced current shall be 5 feet.
I. Minimum clear horizontal separation from a storm drain shall be 5 feet.

III. SIZE

A. Water mains must be sized to meet minimum Fire Code requirements. (See Section VIII)
B. For residential/commercial installations, public and private mains shall be 8" minimum.

C. For industrial installations, looped system shall be a minimum 8” in diameter, and a dead end system requires a minimum of 12” diameter pipe.
D. The minimum main size for all new projects is 8”.
E. Water mains must be sized to meet minimum Fire Code requirements.

IV. COVER

A. Definition: Cover is the distance from the top of the pipe to finished grade.
B. Standard installation shall be in accordance with Standard No. 500 Note 3.
C. Where cover is greater than 32”, but less than standard cover, Class 50 Ductile Iron Pipe is required.
D. Where cover exceeds 8’, special permission from the City Engineer is required.
E. Service laterals must have minimum cover in accordance with the approved standards.

V. CONNECTION TO AN EXISTING MAIN

A. In most major streets, or in new streets, the new water main must be bored and jacked into place. Conditions should be verified with the City Engineer.
B. For connection 2” diameter pipes and smaller, use a hot tap.
C. For connections pipes 4”- 12” in diameter, a hot tap or a cut-in tee may be done in conformance with the provisions of Standard 500, Note 26.
D. Cut-in tee must be used if additional valves are required on the existing main. If the new lateral is larger than the existing main, the tee shall be the size of the new lateral and reduced to size of the existing main.
E. Size-on-size taps are allowed up to 8” in accordance with the approved standards.
F. 12” size-on-size taps are allowed only under emergency situations and with the specific approval of the City Engineer.
G. A mechanical joint tapping sleeve must be used in accordance with approved City Standards.

VI. VALVING

A. Valving at intersections shall be in accordance with the following:

Tee- 3 valves
Cross- 4 valves

B. Main line valves within 250’ of an intersection may be considered as part of the intersection.
C. All hydrants must be on separately valve sections of the public main.

VII. SERVICE LATERALS AND WATER METERS

A. Size of water meter shall be determined by the Designer using the current AWWA guidelines.
B. Maintain a minimum 5’ separation from the sewer lateral.

C. All meter must be located within public right-of-way. Meters (including backflow detection meters) can only be installed outside of the right-of-way upon approval by the City Engineer.

D. Residential (single unit)

1. One meter per lot.
2. Individual 1” services, 1” meter/
3. Rubber seated check valves shall be required to separate the domestic and the fire systems on the site.

E. Apartments (2-6 units)

1. May be master metered with the size based on the total demand.
2. Individual meters must be clustered and located within the public right-of-way.

F. Apartments (7 or more units) and Mobile Home Parks.

1. Must be master metered with the size based on the total demand.
2. Separate irrigation meters are required.
3. This may require a combination water service.
4. Mobile Home Park owners my sub-meter to the tenants at their own expense.

G. Condominiums

1. Shall be individually metered.
2. Individual meters must be clustered and located within the public right-of-way.
3. A maximum of six meters per manifold.
4. Separate irrigation meters for common areas are required.
5. Combination of water services may be required.

H. Commercial

1. Size of the meter and service are based on calculations by the Designer in accordance with AWWA standards.
2. A separate irrigation meter may be required.
3. A minimum 1” service shall be required for office use.
4. A minimum 2” service lateral for a shell building or light industrial if the lot is greater than ½ acre.
5. A minimum 8” service for industrial lots and shopping centers on lots of 12 acres or larger.
6. Most commercial installations will require backflow prevention. (See Section IX).

I. Combination Services

1. 8” laterals are the minimum required for most installations.

2. Combination services are required in commercial subdivisions per Std. Drawing 513.

J. Irrigation

1. Separate irrigation meters may be required for commercial users, master metered condominiums, P.U.D.s, apartment complexes and mobile home parks.
2. All irrigation services must have reduced pressure backflow devices.
3. Irrigation meter size shall be determined by the maximum flow required at any one control valve.
4. Sizing of irrigation meters shall be coordinated with the City Engineer.
5. Backflow devices specified on the current USC Approved List of Devices.

K. Private Fire Systems.

1. Private fire systems must be installed per NFPA 24.
2. Before combustible materials may be stored or constructed on site, the Fire District must approve fire flow and access. Before a fire hydrant may be placed in service, a high velocity flush of the fire hydrant shall be witnessed and approved by City Personnel.
3. Lateral size must be the same or larger than the size required for the sprinkler system or the private hydrant system.
4. All private fire systems require backflow prevention assemblies in accordance with City Standards.
5. Reduced pressure backflow assemblies are required if fire systems are used with chemical additives such as:

    a. Antifreeze
    b. Auxiliary water supply (well) exists on site.
    c. A health hazard exists on site.

6. On residential systems, rubber seated check valve assemblies approved by the Fire District must be installed where fire system connection to the domestic water system.
7. Fire Department connection location must be approved by the Fire District or at a location approved by the Fire Chief.
8. A fire hydrant shall be installed within 50’ of a Fire Department connection or at a location approved by the Fire Chief.
9. The maximum length of a fire hydrant lateral from a private main to the hydrant bury is 40’.
10. Private fire line installation must keep joints exposed until after inspection and pressure testing is complete.

VIII. FIRE HYDRANTS

A. Before combustible materials may be stored or constructed on site, the Fire Department must approve fire flow and access. Before a fire hydrant may be placed

in service, a high velocity flush of the fire hydrant shall be witnessed and approved by City Personnel.

B. Location of fire hydrants must be approved by the Fire Department.
C. Each hydrant must be on a separate valved main line section.
D. Whenever possible, locate hydrants at street intersections.
E. If it's not possible to locate at an intersection, locate the hydrant near a property line or where it will minimize interference with property use.
F. Locate hydrants a minimum of 10' from roll down of driveways.
G. Residential areas-

1. Space fire hydrants every 500' or as approved by the Fire Chief.
2. Evenly distribute hydrants throughout the project.
3. No building may be more than 250' from the nearest hydrant.

H. Commercial and Industrial Areas-

1. General hydrant spacing shall be every 500'.
2. Evenly distribute hydrants throughout the project.
3. No building may be more than 250' from the nearest hydrant.

I. Minimum fire flow required at all fire hydrants shall be per the requirements as specified in the Fire Code or per the following, whichever is greater.

1. Residential and commercial areas- 1,000 gallons per minute with a 20 psi residual.
2. Commercial areas 2,000 gallons per minute with a 20 psi residual.
3. Industrial areas- 3,000 gallons per minute with a 20 psi residual.

J. Requires water analysis study unless otherwise specified by the City Engineer.

IX BACKFLOW DEVICES

A. Backflow devices are required to be installed by State of California Title 17.
B. All backflow devices that are installed must be on the approved USC list.
C. Backflow assemblies must be installed as near as possible to the water main.
D. Where residential fire sprinklers are installed, rubber sealed check valve devices are required where the fire service connects to the domestic service. The backflow preventer must be accessible for testing and maintenance.
E. Properties with private sewer lift stations must have reduced pressure backflow assemblies on their water systems.
F. All irrigation services require reduced pressure backflow assemblies.
G. Parcels with two or more water service laterals must have double check valves installed on each service.
H. Properties using a well for irrigation must have a reduced pressure backflow preventer on the domestic service.

X. PRESSURE

A. Maximum allowable main line pressure is 150 psi measured at a fire hydrant.

B. Maximum allowable static service pressure measured at a faucet is 80 psi.
C. Minimum service pressure measured at the meter is 40 psi.
D. If the service pressure exceeds the maximum of 80 psi, an individual pressure regulator will be required on the service line.
I. Fire flows must be calculated for all projects.
J. For calculation pressures in all water zones, calculate the minimum pressure using the elevation of the reservoir at one-half full.

XI. SPECIALTY ITEMS

A. Air / Vacuum relief valves.

1. Air/ Vacuum relief valves are required at locations in the system that are one pipe diameter or more, higher than the remainder of the system, such as over a hilltop. A fire hydrant may be used in place of an air relief valve at the discretion of the City Engineer.
2. Air/ Vacuum relief valves are not required in residential areas if services are installed at or near the crown within one pipe diameter vertically of the high point.
3. Air/ Vacuum relief valves shall be 1" size designed for operating at 300 psig and have a cast iron body, stainless steel float and float guides, bushings and level pin of stainless steel or bronze as manufactured by *APeD, Crispin,*or approved equal.

B. Pressure reducing valves are installed to maintain overall system balance.
C. Surge or pressure relief valves are installed where pressure could potentially reach above the maximum allowable.

XII. SPECIAL CONDITIONS

A. The need for cathodic protection will be determined by the City Engineer for each project. This may require soils reports or other additional information.
B. Delineated fault zones

1. Ductile Iron Pipe must be installed in delineated fault zones and extended to 100’ outside each side of the delineated fault zone.
2. Pumper connections or fire hydrants shall be installed approximately 50’ outside each side of the delineated fault zone.
3. Flextend assembly, as manufactured by EBAA Iron, Inc. of Eastland, Texas, or approved alternative, with valve must be installed adjacent to and on the fault side of the pumper connection or fire hydrant.
4. A valve must be located between the Flextend assembly and the fire hydrant.

C. Abandon water mains and services.

1. For water lines 1” or smaller, expose lateral at the main, close the corporation stop, disconnect the lateral and plug or cap the corporation stop.

2. For lines 1 ½" or larger, remove the valve and plug the main.
3. Valve boxes for abandoned valves must be removed.
4. Abandoned mains, valves and risers located within the street structural section must be removed.
5. All Water mains 12" and larger, within the public right-of-way must be broken every 50' and filled with sand slurry.

D. Private water mains vs. Public water mains

1. Public water mains may not be constructed outside the street right-of-way without specific approval of the City Engineer.
2. Fire hydrants required on site to serve one lot would be private systems.
3. Water mains and fire hydrants located on site shall be private systems.
4. Normally, where the water mains are publicly maintained, the sewer mains should also be publicly maintained.
5. Fire mains must be installed per NFPA 24.

XIII. ENGINEER'S APPROVED LIST

(Separate attachment to be added)

A.2 – Street Light Design Standards (SLD)

STREET LIGHT DESIGN STANDARDS

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STREET LIGHT DESIGN STANDARDS

I. DEFINITIONS AND ABBREVIATIONS

"Arterial Street" shall mean a street whose primary purpose is to carry through traffic and means a fast or heavy street of considerable continuity, which is used primarily as a traffic way to facilitate movement of heavy traffic between major residential areas or major residential areas and commercial areas.

"Average Maintained Foot-candles" is the average level of horizontal Illumination on the roadway pavement when the output of the lamp and luminaire is diminished by the maintenance factors; expressed in average foot-candles for the pavement area.

"California Standard Plans" shall mean the latest edition of the Standard Plans adopted by the California Department of Transportation.

"California Standard Specifications" shall mean the latest edition of the Standard Specifications adopted by the California Department of Transportation.

"Candela" is the unit of luminous intensity. Formerly the term "candle" was used.

"Collector Street" shall have the primary purpose of intercepting traffic from intersecting minor streets and handling traffic to the nearest major street or intercepting traffic from one collector street and handling traffic to another collector street. It shall serve as an access to abutting properties.

"Cul-de-sac Street" shall have the primary purpose of serving abutting land use and connecting to the nearest minor street or collector street. It is not intended to pass traffic through to another street and is a local street with only one outlet.

"Electrolier" is the complete street light assembly consisting of street light pole, luminaire, ballast, and lamp.

"Foot-candle" is the Illumination on a surface one square foot in area on which there is uniformly distributed a light flux of one lumen.

"Illumination" is the density of the luminous flux incident on a surface; it is the quotient of the luminous flux divided by the area of the surface when the latter is uniformly illuminated.

"Lateral Light Distribution" is a pattern of light distributed upon a series of longitudinal and transverse roadway lines, based on the location of the luminaire as related to the area to be lighted.

"Luminaire" is a complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply.

"Minor Street" shall have the primary purpose of serving abutting land use and handling traffic to the nearest Collector Street.

"Public Works Department" shall mean the Public Works Department of the City of Lakeport.

"Street Light Standard Plan" shall mean a typical standard of the Street Light Standards of the City of Lakeport.

Uniformity Ratio" is the ratio of average foot-candles of illumination on the pavement area, to the foot-candles at the point of minimum illumination on the pavement.

ASTM American Society for Testing and Materials

AWG American Wire Gauge

HID High Intensity Discharge

IESNA Illuminating Engineering Society of North America

NEC National Electrical Code (NFPA 70)

NEMA National Electrical Manufacturer's Association

PG&E Pacific Gas & Electric Company

PVC Polyvinyl Chloride Conduit

RGS Rigid Galvanized Steel Conduit

UL Underwriter's Laboratories, Inc.

U/R Uniformity Rating

II. GENERAL

A. These Street Light Standards shall be used for all street lights on public streets in the City of Lakeport.

B. These standards shall apply as of the date of adoption and are not considered retroactive.

C. Deviations from these standards shall require specific approval of the City Engineer.

D. These standards are minimum standards and do not preclude the use of a higher standard.

E. The purpose of the standards and specifications contained herein is to establish uniform standards for street lights on public streets in the City of Lakeport, installed after the date of adoption of these standards. This document is not intended or designed as, nor does it establish, a legal standard for lighting.

F. Encroachment onto any City street, right-of-way, or public utility easement shall require an encroachment permit issued by the City of Lakeport.

G. Street light spacing shall be staggered and located at edges of streets when possible. Street light designs utilizing one side, median, or opposite configurations shall require specific approval of the City Engineer.

H. Electrical street lighting service shall conform to the requirements of Standard Plan 603.

I. All street lighting projects are subject to approval by the City Engineer. Design shall conform to these requirements except as otherwise approved by the City Engineer.

J. The City Engineer shall only authorize energizing after City acceptance of the installation.

K. The following additional requirements apply to street light systems installed by private developers:

1. The developer/engineer shall make arrangements with PG&E for service points. Service points shall be shown on the improvement plans. The developer shall be responsible for all costs associated therewith which shall be paid directly to PG&E. The contractor shall verify the street light service point location(s) with PG&E prior to installation. The City will request energizing from PG&E.
2. The developer shall install the following in accordance with the Street Light Standard Plans: concrete foundations, galvanized steel poles, mast arms of the appropriate lengths, wiring, and standard luminaire.
3. All street light systems utilizing street lamps up to, and including, 150 watts shall be designed for 120-Volt or 120/240-Volt service unless connecting to an existing system. In the latter case, the design shall conform to the system being connected to and must be specifically approved by the City Engineer. Street light systems utilizing street light lamps above 150 watts shall require 240-volt service.

III. ROADWAY ILLUMINATION REQUIREMENTS

A. Design Conformity

The design of all street light systems shall conform to the average maintained foot-candle and uniformity ratio requirements of these specifications.

B. Area Classifications

1. Area classifications shall be used when determining the required Illumination levels for street lighting systems. The area classification selected for designing the street light system shall be determined by the City Engineer.

a. "Commercial" shall mean that portion of the City in a business development where ordinarily there are large numbers of pedestrians and a heavy demand for parking space during periods of peak traffic or a sustained high pedestrian volume and a continuously heavy demand for off-street parking space during business hours. This definition applies to densely developed business area outside of, as

well as those that are within, the central part of the City.

b. "Intermediate" shall mean that portion of the City which is outside of a downtown area but generally within the zone of influence of a business or industrial development, often characterized by a moderately heavy nighttime pedestrian traffic and a somewhat lower parking turnover than is found in a commercial area. This definition includes densely developed apartment area, hospitals, public libraries, and neighborhood recreational centers.

c. "Residential" shall mean a residential development, or a mixture of residential and commercial establishments, characterized by few pedestrians and a low parking demand or turnover at night. This definition includes areas with single-family homes, townhouses, and/or small apartments. Regional parks, cemeteries, and vacant lands are also included.

C. Average Maintained Foot-Candle Requirements

1. The design of all street lighting systems shall conform to these illumination requirements. Evidence which demonstrates that the street lighting system conforms with these requirements shall be submitted to the City with the proposed design.
2. The below-listed chart shall be used for determining the average maintained foot-candle (Avg. Maint. FC) and Uniformity Ratio (U/R) requirements for the specific roadway and area types:

Roadway Classification	Area Classification	Avg. Maint. FC	U/R
Major	Commercial	.1.00	3:1
	Intermediate	.60	3:1
	Residential	.50	4:1
Collector	Commercial	.75	4:1
	Intermediate	.40	4:1
	Residential	.30	5:1
Local	Intermediate	.30	6:1
	Residential	.20	6:1

D. Lateral Light Distribution

1. Lateral light distribution patterns shall conform to Illuminating Engineering Society of North America (IESNA) lateral light distribution patterns.

a. Street lights mounted along Collector and Major streets: Type 3.
b. Street lights mounted along Local streets: Type 2.
c. Street lights mounted at the terminus of a cul-de-sac: I.E.S. Type 4.
d. Street lights mounted along centerline of street: Type 1.

2. Design shall conform to these requirements except as specifically approved by the City Engineer.

IV. STREET LIGHTS

A. Cobra Style Street Lights

1. The luminaire shall be an American Electric Series 113, Hubbell RM-150, General Electric M250R2, or an approved equal.
2. Street light poles and mast arms shall be galvanized steel.
3. The street light poles shall be an Ameron Series PL, Landmark Lighting S3508, Pacific Union Metal LA 10120, or an approved equal.
4. Street light pole heights shall conform to Street Light Standards 601. Alternate pole heights shall require specific approval of the City Engineer.
5. Street light mast arm lengths shall conform to Street Light Standard 601. Alternate mast arm lengths shall require specific approval of the City Engineer.
6. Concrete pole-base footings shall conform to the requirements of Street Light Standard Plan 602 or pole/luminaire manufacturer's requirements, whichever is more stringent. In case of conflicting requirements, the street light designer shall provide City with structural calculations, sealed by a licensed California Structural Engineer, verifying the adequacy of the intended concrete pole-base footing design.
7. The wiring for the electrolier shall conform to the requirements of Street Light Standard Plan 604.
8. Cut off lenses and devices shall require specific approval of the City Engineer.

B. Architectural Street Lights

1. The luminaire shall be a Sternberg 1130A LED Ripon Series, or an approved equal. Architectural street lights in residential areas shall include a house-side shield to restrict light spread into adjacent residential properties.
2. The street light poles shall be Sternberg "Oxford" or an approved equal.
3. Mast arms shall be limited to the double-luminaire type, and shall be installed such that the mast arm is oriented perpendicular to the flow of street traffic. Alternate mast arm installations shall require specific approval of the City Engineer.
4. Concrete pole-base footings shall conform to the pole/luminaire manufacturer's requirements. In case of conflicting requirements, the street light designer shall provide City with structural calculations, sealed by a licensed California Structural Engineer, verifying the adequacy of the intended concrete pole-base footing design.
5. The wiring for the electrolier shall conform to the requirements of Street Light Standard Plan 604.

V. PARKING AREAS

A. Luminaires within parking areas shall conform to the requirements for street lights with the following exceptions:

1. Poles for Cobra style parking area lights shall be 27’-6” in length.
2. Poles for Architectural style parking area lights shall be 14 feet in length.
3. Illuminance measured at the parking area surface shall not be less than 0.10 foot-candles at any point within the parking area.
4. Illuminance measured at the parking area surface shall not exceed 1.0 foot-candles at any point within the parking area.
5. Concrete footings in parking areas shall protrude above the surrounding finish grade by 30 inches. Embedded depth of concrete pole base footings shall be adjusted to compensate. Provide City with structural calculations, sealed by a licensed California Structural Engineer, verifying the adequacy of the intended concrete pole-base footing design.

VI. WIRING

A. Except as noted, all wiring methods and equipment construction shall conform to the National Electric Code (NEC) and applicable sections of the California Standard Specifications.

B. All splices shall be made with solderless and waterproof connectors.

C. Unless authorized otherwise, all wiring shall be XHHW AWG stranded, copper only. Unless otherwise specified on the Street Light Standard Plans, all wiring shall be of the following sizes:

1. Field wiring: #8 AWG minimum.
2. Pull box to electrolier: #10 AWG minimum.
3. Wire in pole: #10 AWG minimum.
4. All wiring shall meet the sizing requirements of NEC article 310.

VII. PHOTOCELLS

A. The photocell shall be Type IV consisting of a photoelectric unit, which plugs into an EEI-NEMA twist lock receptacle integral with the luminaire and shall conform to the provisions of the California Standard Specifications. The photoelectric controls shall be operable within a minimum voltage range between 105 and 280 volts. All photoelectric controls shall be oriented to the north.

VIII. CONDUIT

A. All conduit to be used shall be a minimum of 2-inch diameter, schedule 80 PVC, except from each street light to the adjacent pull box which may be 1-inch trade-size RGS and shall have a 2-foot minimum cover from the top of conduit to the finished grade of the sidewalk, parkway, or roadway.

B. All steel conduit and other metal parts, including bonding bushing, shall be NEC approved parts and shall be continuously bonded and grounded per NEC

requirements.

C. All bends and/or offsets shall be made with factory sections using approved couplers per NEC requirements. All 90 degree elbows used as stub-ups shall be PVC-coats RGS conduit.

D. All empty conduits shall have a 1/4-inch polypropylene pull rope provided inside and sealed with a duct seal, approved by the City Engineer, on both ends of the conduit.

E. The ends of all conduits installed shall be sealed with a duct seal approved by the City Engineer. Conduits stubbed for future extension shall be capped.

F. All conduit shall be encased in unreinforced 3000 psi concrete.

G. All buried conduit shall be marked with metal “detectable” underground warning tape, installed no more than 15 inches above the conduit. Warning tape shall be polyethylene film, detectable, magnetic tape with a metalized foil core, 4-6 inches wide, ANSI standard Z53.1 safety red color and imprinted in black with the words “CAUTION BURIED ELECTRICAL LINE BELOW”.

IX. PULL BOXES

A. Unless otherwise approved by the City Engineer, a No. 5 concrete pull box conforming to California State Standard Plan ES-8 shall be installed within 5 feet of the base of all street light poles.

B. All pull boxes shall be installed per Street Light Standard Plan 607.

C. Pull boxes shall not be more than 250-feet apart on long runs.

D. Pull boxes shall not be placed where they will be subject to vehicular traffic. Exceptions shall require specific approval of the City Engineer.

E. All pull box covers shall be inscribed with "Street Lighting" and be secured with 3/8-inch bolts, capscrews, or studs, and nuts which meet the provisions of the California Standard Specifications.

A.2 – Traffic Control Standards (TC)

TRAFFIC CONTROL STANDARDS

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TRAFFIC CONTROL STANDARDS

I. DEFINITIONS

"Public Works Department" shall mean the Public Works Department of the City of Lakeport.

"Rural District" for the purpose of sign installations, shall mean an area where streets have unimproved shoulders without curb, gutter, sidewalks, or improved pedestrian facilities.

"Street" shall include avenues, highways, lanes, alleys, courts, crossings or intersections which have been dedicated and accepted according to the law or which have been in common and undisputed use by the public for a period of not less than five years next preceding, or which have been dedicated to a semi-public use.

"Street Standard Plan" shall mean a typical street standard of the Street Design and Construction Standards of the City of Lakeport.

"Traffic Standard Plan" shall mean a typical traffic standard of the Traffic Control Standards of the City of Lakeport.

"Traveled Way" means a way or place of whatever nature publicly maintained and open to the use of the public for purposes of vehicular travel.

"Urban District" for the purpose of sign installations, shall mean an area where streets have improved shoulders with curb, gutter, and sidewalk.

Refer also to Street Standard Specifications for additional definitions.

II. GENERAL

A. The following Traffic Standards are for use in the City of Lakeport and are in substantial conformance with the latest version of the California Manual on Uniform Traffic Control Devices (California MUTCD), the State of California Standard Specifications, and the State of California Standard Plans, as adopted by the City of Lakeport, and are to be used in conjunction with the named references for any project within the public right-of-way.

B. Deviations from these standards shall be granted only upon specific approval by the City Engineer.

C. These standards are considered minimum and do not preclude the use of a higher standard as approved by the City Engineer.

D. Encroachment onto any City street or right-of-way shall require an encroachment permit issued by the City of Lakeport.

III. TRAFFIC SIGNS

A. General

1. The base metal of all signs shall conform to ASTM designation B209, of either 5052-H38 or 6061-T6 alloy, and shall conform to all other applicable current Caltrans specifications for sign material.
2. Unless otherwise specified by the City Engineer, the thickness of all signs shall be 0.080 inches, except for overhead mounted signs which shall be 0.125 inches.
3. Unless otherwise specified by the City Traffic Engineer, all regulatory and warning signs shall be constructed to the standard size and specifications of the State of California, Department of Transportation.
4. Signs larger than the standard sign may be required or may be granted approval by the City Engineer.
5. The following signs shall be constructed using High Intensity encapsulated lens sheeting and lettering: stop signs (R1), yield signs (R1-2), keep right signs (R7), no u-turn signs (R34), stop ahead signs (W17), chevron signs (W81), mast-arm mounted street name signs, advance street name signs, street name signs, and Type N markers. This sheeting and lettering shall hold a minimum warranty of 10 years. Other traffic signs may require high intensity sheeting and lettering as specified by the City Engineer.
6. Standard abbreviations shall conform to the latest version of the California MUTCD.
7. Advance street name signs shall be placed on all arterial streets and those collector streets as required by the City Engineer. Advance street name signs shall be installed in advance of the street per California latest version of the guidelines for advance placement of warning signs, condition A. No advance street name signs shall be placed where the distance between side streets curb to curb is less than 200 feet.
8. Where a median island exists and there are two or more lanes in the same direction, an advance street name sign shall be installed in the island if the width of the island will allow it. Signs in the median area shall be placed midway between curbs. These signs shall be mounted no closer than six inches to, and no farther than six feet from, the edge of the traveled way which the sign faces.

B. Traffic Sign Installation – Urban Areas

1. Signs shall be installed as per these specifications and facing traffic in the lane adjacent to which the sign is installed. "No Parking" signs shall be installed at a 30° angle toward the traveled way. All other signs shall be installed at an angle toward the traveled way per the sign manufacturer's reflective requirements.
2. Typical installations shall conform to the requirements of City Standard No. 701, or as specifically approved by the City Engineer.

3. The minimum mounting height for signs in urban areas shall be 7-feet measured from the bottom of the sign to the near edge of the pavement, except as otherwise noted below, or as specifically approved by the City Engineer.
4. The height to the bottom of a secondary sign mounted below a primary sign shall be a minimum of 7-feet measured from the bottom of the sign to the near edge of the pavement.
5. In areas not subject to pedestrian traffic, the Chevron (W81) and ONE WAY (R10) signs shall be mounted at a height of three feet, measured from the bottom of the sign to the near edge of the pavement.

C. Traffic Sign Installation - Rural Areas

1. Signs shall be installed as per these specifications and facing traffic in the lane adjacent to which the sign is installed. "No Parking" signs shall be installed at a 30° angle toward the traveled way. All other signs shall be installed per the sign manufacturer's reflective requirements.
2. Typical installations shall conform to the requirements of City Standard No. 702, or as specifically approved by the City Engineer.
3. The minimum mounting height for signs in rural areas shall be five feet, measured from the bottom of the sign to the horizontal extension of the near edge of the pavement, except as otherwise noted below, or as specifically approved by the City Engineer.
4. The height to the bottom of a secondary sign mounted below a primary sign shall be a minimum of four feet, measured from the bottom of the sign to the horizontal extension of near edge of the pavement.
5. The CHEVRON (W81) and ONE WAY (R10) sign shall be mounted at a height of three feet, measured from the bottom of the sign to the horizontal extension of the near edge of the pavement.

D. Standard Street Name Sign

1. Standard street name signs shall conform to the requirements of City Standard No. 704.
2. Street name signs installed at signalized intersections shall conform to the following requirements:

    a. Street name signs mounted to the traffic signal standard shall be by the use of a heavy-duty arm bracket for electrical mounting.
    b. Street name signs mounted to the traffic signal mast arm shall be by the use of a double-hinged adjustable bracket.
    c. Two sets of street name signs shall be mounted at each signalized intersection.

3. The mounting location at unsignalized intersections shall conform to Traffic Standard No. 703.

E. Pole Standard Installation

1. All poles shall be 2-inch I.D. galvanized steel, in conformance with the most current Caltrans specification for sign poles. Both ends shall be threaded.
2. In concrete or other finished surfaces, a 2½-inch diameter hole shall be rock drilled to a minimum depth of 18 inches. Upon installation, the pole shall be set using sand and cement.
3. In rural districts, an 8-inch diameter hole shall be dug to a minimum depth of 18 inches. Upon installation, the pole shall be set using concrete mix.
4. For the bolting of signs directly to the pole, 5/16-inch x 3 inch long Grade 3 bolts with a flat washer shall be used.

IV. PAVEMENT MARKERS AND MARKINGS

A. Raised Pavement Markers

1. Raised pavement markers shall conform to the shape, types and dimensions of State of California Standard Plan A-20A.
2. Except as indicated below, raised pavement markers shall conform to the requirements and applicable provisions of Section 85 of the State of California Standard Specifications. The following specifications shall be added to the applicable provisions:

   A hot melt bitumen adhesive may be used to cement the markers to the pavement, instead of the Rapid Set Type or Standard Set Type adhesive. The bitumen adhesive material, if used, shall conform to the following:

Specification	**ASTM Test Method**	**Requirement**
Flash point, CCC, °F	D 92	550 Min.
Softening Point, °F	D 36	200 Min.
Brookfield Viscosity, 400°F	D 2196	7,500 cP, Max
Penetration, 100g 5 sec. 77°F	D 5	10-20 dmm
Specification	**ASTM Test Method**	**Requirement**
Filler Content, % by weight (insoluble in 1,1,1 Trichlorethane)	D 23711	50-75

   Filler material shall be calcium carbonate and shall conform to the following fineness:

Sieve Size	Percent Passing
No. 100	100
No. 200	95
No. 325	75

Bitumen adhesive shall be indirectly heated in an applicator with continuous agitation. The adhesive shall be applied at a temperature between 400° F and 425° F. Markers shall be placed immediately after application of the adhesive.

Placement of markers using bitumen adhesive shall conform to the requirements for placing markers in Section 85-1.06 of the State of California Standard Specifications,
except as follows:

a. Markers shall not be placed when the pavement or air temperature is 50° F or less.
b. Blast cleaning of clean, new HMA surfaces will not be required.

3. For application of the raised pavement marker to the pavement surface, the adhesive shall completely surround the perimeter of the marker after the marker has been pressed into place.
4. The configuration to be used in the placement of raised pavement markers shall conform to City Standard No. 705, or as specifically authorized by the City Engineer.
5. Lane widths as shown on design documents shall be measured from centerline to centerline of adjacent striping patterns, or, from face of curb to the centerline of the striping pattern.

B. Bike Lane Markings

1. Bike lane markings shall conform to the requirements of City Standard No. 707.
2. Bike lane markings shall be used on all streets designated for Class II bike lanes.
3. The standard pavement markings shall be the bike lane symbol (Caltrans Standard Plan A24C) with an arrow showing the direction of travel, placed in the center of the bicycle lane.
4. The solid 6-inch bike lane line shall be dropped 96 feet in advance of the intersection, and a broken line carried to the intersection.
5. There shall be a minimum of 4-feet from the lip of the gutter to the center of the 6-inch bike lane line.
6. Bike loop detector markings (California MUTCD Figure 9C-7 and Caltrans Standard Plan A24C) shall be installed at signalized intersections at all approaches that have detection as directed by the City Engineer.

7. Design shall conform to these requirements except as otherwise approved by the City Engineer.

C. Durable Pavement Markings (Tape)

1. At the discretion of the City Engineer, pavement markings may be required to be composed of durable pavement tape of one of two types:

   a. General purpose high durability retro-reflective pliant polymer film, or
   b. Durable retro-reflective pavement marking film.

2. General purpose high durability retro-reflective pliant polymer film shall be used for preformed longitudinal, transverse and word/symbol markings subjected to high traffic volumes and severe wear conditions such as repeated shear action from crossover or encroachment on edge and channelization lines, and stop, start, or turn movements, or where required by the City Engineer.
3. Durable retro-reflective pavement marking film shall be used for preformed markings subjected to moderate, well-channelized, free rolling traffic volumes, less severe wear, and where there is a need for higher reflectivity or where required by the City Engineer.
4. The preformed markings shall consist of white or yellow films with pigments selected and blended to conform to standard highway colors through the expected life of the film. Glass beads shall be incorporated to provide immediate and continuing retro-reflection.
5. The size, quality and refractive index of the glass beads shall be such that the performance requirements for the markings shall be met and the bead adhesion shall be such that beads are not easily removed.
6. Preformed words and symbols, and traffic striping, shall conform to the applicable shapes, sizes, and colors as outlined in the latest version of the California MUTCD, or as required by the City Engineer.
7. The preformed markings shall be capable of being adhered to HMA or Portland cement by a pre-coated pressure sensitive adhesive. A primer may be used to precondition the pavement surface. The preformed marking film shall mold itself to pavement contours by the action of traffic. The pavement marking films also shall be capable of application on new, dense and open graded HMA wearing courses during the paving operation. After application, the markings shall be immediately ready for traffic. All solvents and/or primers (where necessary), equipment necessary for application, and recommendations for application that will assure the materials shall be suitable for use shall be identified to the City Engineer.
8. The general purpose high durability retro-reflective pliant polymer film, when applied according to the recommendations of the manufacturer, shall provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface remains stable. The film shall be

weather resistant and, through normal traffic wear, shall show no fading, lifting or shrinkage which will significantly impair the intended usage of the marking throughout its useful life and shall show no significant tearing, roll back or other signs of poor adhesion.

9. The durable retro-reflective pavement marking film, when applied according to the recommendations of the manufacturer, shall provide a neat, durable making that will not flow or distort due to temperature if the pavement surface remains stable. The film shall be weather resistant and, through normal traffic wear, shall show no fading, lifting or shrinkage which will significantly impair the intended usage of the marking throughout its useful life and shall show no significant tearing, roll back or other signs of poor adhesion.

D. Pavement Marking Paint

1. Traffic striping shall conform to the applicable provisions of Section 84 of the California Standard Specifications and as directed by the City Engineer.
2. The paint shall be lead free commercial quality, solvent or water borne paint and be applied in 2-coats to achieve the designed coverage.
3. The type of paint to be used (solvent borne or water borne) shall be determined by the City Engineer.
4. Glass beads used for reflective pavement markings shall conform to the modified California State Specification No. 8010-51j-22 (Type II).
5. Thinner shall not be mixed with paint. Paint shall dry "track free" in not less than thirty (30) minutes and not more than ninety (90) minutes.
6. All painted pavement markings shall be clean and sharp as to dimensions. Ragged ends of segments, fogginess along the sides, or objectionable dribbling along the unpainted portions of the pavement marking shall not be permitted.
7. The painted pavement marking shall have an opaque, well-painted appearance with no black or discolorations showing through.
8. Words, symbols and traffic striping shall conform to the applicable shape, sizes and colors as outlined in the latest version of the California MUTCD or as required by the City Engineer.

E. Thermoplastic Pavement Markings

1. At the discretion of the City Engineer, pavement markings may be required to be composed of thermoplastic pavement marking material. In private developments, this requirement shall be noted on the improvement plans.
2. The furnishing and applying of thermoplastic pavement marking material shall conform to the requirements of the modified California State Specification No. 8-10-41G-21.
3. Glass beads applied to the surface of the molten thermoplastic material shall conform to the requirements of the modified California State

Specification No. 8010-51J-22 (Type II).

F. Eradication of Pavement Markings

1. Pavement marking paint and thermoplastic shall be removed by sand blasting.
2. Painting over as a means of pavement marking eradication shall not be permitted.

G. Temporary Pavement Markings

1. When pavement markings have been obliterated or damaged in construction work zones, temporary pavement markings shall be installed in accordance with these specifications.
2. At the end of each day's work, temporary pavement markings shall be in place on each paving lift that is open to normal traffic flow.
3. Temporary pavement marking materials shall be approved by the City Engineer prior to installation.
4. Temporary pavement marking configurations shall be in accordance with the latest version of the California MUTCD, or as specified by the City Engineer.
5. The temporary pavement markings shall be maintained and replaced by the Contractor until they are covered with the next paving course or are replaced with durable pavement markings applied on the final wearing course.
6. Temporary pavement markings shall be applied to clean, dry surfaces in accordance with the manufacturer's recommendations or a method approved by the City Engineer.

V. CONSTRUCTION AREA TRAFFIC CONTROL

A. General

1. All contractors, permit holders or agencies doing work in public streets or public right-of-way shall:

a. Obtain all necessary permits.
b. Install and maintain required traffic control devices.
c. Provide flaggers when required.
d. Provide adequate safeguards for workers and the general public.
e. Assure that survey crews and other employees working in or adjacent to a traveled roadway wear flagging garments as required for flaggers.
f. Patrol the construction site as required to insure that all devices are in place and operating at all times.
g. Remove traffic control devices when they are no longer needed.

2. A traffic control and pedestrian routing plan **shall be required** and submitted for review and approval for all requested road closures, detours, land closures or other work within the public right-of-way. Exceptions to the requirement of a traffic control plan shall require the specific approval of the City Engineer. Such plans shall include delineator placement, type and location of all signs (construction signs, detour signs, street name plates, etc.), barricade placement, flaggers, temporary pavement markings, and any other pertinent information.
3. The latest version of the California MUTCD shall be used as references for determining appropriate signing. Consideration shall be given to such items as bus routes and locations of bus stops, school walking routes and school crossings, and work hour restrictions such as not allowing work during peak commute hours.
4. A temporary traffic control plan may be referenced to a typical application in the latest version of the California MUTCD if the work zone conditions are identical to those of the Typical Application. If more than one Typical Application is referenced, the temporary traffic control plan shall consist of a description of each work zone condition and when each of the Typical Applications shall be used. If any deviation from the Typical Application is necessary, a site specific design shall be prepared by a person knowledgeable (trained and/or certified) about the fundamental principles of Temporary Traffic Controls and the work activities to be performed, and shall be approved by the City Engineer.
5. Compliance with appropriate temporary traffic controls used in work zones shall be required when the normal operation of any City street or sidewalk is impacted by any construction and/or maintenance operation.
6. Flagging against a functioning traffic indication is prohibited.

VI. TRAFFIC SIGNALS

A. General

1. Traffic signal and safety lighting equipment shall comply with the requirements of the applicable provisions of the latest version of the California MUTCD, Section 86 of the California State Specifications, Standard Plans, these traffic control standards, and as required by the City Engineer.
2. Foundations for traffic signal standards shall be constructed per the applicable California State Standard Plans and as required by the City Engineer.
3. All traffic signals shall be equipped with a Fire Department approved Opticom device, and installed and tested to the satisfaction of the Fire Marshall.

B. Traffic Signal Poles, Steel Pedestals and Posts

1. Traffic signal poles, arms, and related appurtenances shall be installed per the requirements of the California State Standard Plans and as required by the City Engineer.
2. The chase outlet shown on the California State Standard Plans in the mast arm mounting plate, and in the mast arm mounting plate on the pole, shall be 1½ inch minimum diameter and shall be smoothed after galvanizing to facilitate installation of conductors without damaging the insulation.
3. Each pole shall be provided with one No. 5 pull box for wiring, located within one foot of the base and on the same side of the pole as the mast arm.
4. Design shall conform to these requirements except as otherwise approved by the City Engineer.

C. Model 170 Traffic Signal Controller

1. The controller assembly shall be a Type 170E and conform with the latest edition of Caltrans “Traffic Signal Control Equipment Specifications” and all addenda. If specified by the City Engineer, a Type 2070 controller may be required which shall conform with the latest edition of Caltrans "Traffic Signal Control Equipment Specifications" and all addenda.
2. Design shall conform to these requirements except as otherwise approved by the City Engineer.

D. Traffic Signal Controller Cabinet

1. The controller cabinet shall be Type 332 as specified by the City Engineer.
2. The controller cabinet shall be located no closer than 4-feet from the service cabinet, but no further than 10-feet.
3. The foundation for the Type 332 cabinet shall conform with the Caltrans Standard Plan ES-3C.
4. Design shall conform to these requirements except as otherwise approved by the City Engineer.

E. Traffic Signal Service Cabinet

1. The traffic signal service cabinet shall be a Type III-AF, per Caltrans Standard Plan ES-2D.
2. The service cabinet shall have a provision for reading the service meter through a window without opening any doors.
3. The cabinet shall be watertight with a weatherproof door and window.
4. The service cabinet foundation shall be Type III-A per Caltrans Standard Plan ES-2D.
5. The cabinet shall be located no closer than 6-feet from the distribution pole and no closer than 4-feet from the controller cabinet.
6. Design shall conform to these requirements except as otherwise approved by the City Engineer.

F. Conduit

1. Conduit requirements shall conform to the following:

    a. Service run conduit shall be 2-inch minimum diameter.
    b. Conduit under any street shall be 3-inch minimum diameter and shall have a minimum of 24-inches of cover.
    c. Conduit under sidewalk or planter area shall have a minimum of 24-inches of cover.
    d. No native material shall be used as trench backfill.
    e. Trench backfill and surfacing for trenches shall conform to City Standard No. 222.
    f. Conduit from the main pull box to the controller shall be two (2) 3-inch diameter conduits.
    g. Any signal run and interconnect conduit shall be 2-inch minimum diameter.

2. All conduits shall be Schedule 80 PVC, except 90-degree elbows, pole risers and stub-ups which shall be PVC coated ridged galvanized steel (RGS).
3. All underground conduits and metal parts shall be continuously bonded and grounded.
4. All bends and/or offsets shall be made with factory manufactured sections.
5. All empty conduit shall have a flat, woven, lubricated soft fiber polypropylene rope provided inside along its entire length and extending 36-inches out of each end.
6. After conduits, wire and rope have been installed, the ends of all conduits terminating in pull boxes shall be sealed with an approved type of sealing compound. Conduits stubbed for future extension shall be capped.
7. Design shall conform to these requirements except as otherwise approved by the City Engineer.

G. Pull Boxes

1. All pull boxes shall be #5 concrete (Caltrans Standard Plan ES-8) except the main pull box which shall be 30 inch x 48 inch minimum size concrete pull box and shall have double covers. Covers shall be marked "Traffic Signal".
2. Traffic signal interconnect conduit shall be installed in separate concrete pull boxes and their covers shall be marked "I.C.".
3. Utility service conduit shall be installed in separate concrete pull boxes and their covers shall be marked “Electrical”.
4. Pull boxes subjected to vehicular travel shall be traffic rated and installed with one-quarter inch steel plate covers (galvanized after fabrication) with a diamond-type cover surface.
5. All pull box covers shall be bolted.
6. Pull box requirements shall conform to City Standard No. 607.

7. Bottoms of pull boxes shall be grouted prior to the installation of conductors. A layer of roofing paper shall be placed between the grout and the crushed rock sump. A one inch drain hole shall be provided in the center of the pull box through the grout and the roofing paper.
8. Design shall conform to these requirements except as otherwise approved by the City Engineer.

H. Conductors

1. All conductors for traffic signal or street lighting systems shall conform to the requirements of Section 86 of the California State Specifications, or as specified herein.
2. All conductors shall be cooper and be rated for 600-volt operation.
3. All conductors shall conform to the latest requirements of the National Electric Code (NEC) and be labeled by Underwriter's Laboratories, Inc.
4. Colored stripes on conductor insulation to identify each phase of vehicle signals, pedestrian signals, pedestrian push buttons, and detectors shall be required.
5. All conductors shall be pulled by hand and shall be installed in conduit runs in one operation. The use of winches or other power actuated equipment shall not be permitted.
6. The maximum number of wires in the conduit shall conform to the specifications of the National Electric Code.
7. #14 AWG conductors shall be used for the following:

    a. Each traffic signal lamp on each phase.
    b. Each pedestrian signal indication on each phase.
    c. Each pedestrian push button and pedestrian push button common installed into the controller.
    d. Three for spares under each street.
    e. 12-pair (branches) or 50-pair (main run), or as determined by the City Engineer, for interconnect.

8. #8 AWG conductors shall be used for the following:

    a. Two for each safety light 120/240V.
    b. One for equipment ground.
    c. One neutral for traffic signal.

9. #4 AWG conductors shall be used from the utility service point to service cabinet for traffic signals and safety lights.

I. Wiring

1. No splices of traffic signal lights, pedestrian signal lights, or pedestrian push button wires shall be allowed in any pull box. Ground wires may be spliced in pull boxes.

2. Straight splices in signal neutral and multiple lighting conductors shall be insulated in conformance with Method "A" as shown on the Caltrans Standard Plans.
3. Conductors shall be permanently identified as to function. Identification shall be placed on each conductor or each group of conductors comprising a signal phase in each pull box and near the end of conductor termination.
4. Identification shall be by tags or bands fastened to the conductors using nylon wire ties in such a manner that they will not move along the conductors. Conductors comprising a single signal phase may be grouped together and tagged with a single band provided the band is designed to tie conductors together as well as tag them.
5. Marking on tags shall be by mechanical methods (scribing, etc.) and shall be permanent.
6. Design shall conform to these requirements except as otherwise approved by the City Engineer.

J. Loop Detector Wiring

1. Traffic signal loop detector wiring shall conform to the requirements of the Caltrans Standard Plans.
2. All head loops shall be Type D and all other loops shall be Type A in accordance with Caltrans Standard Plan ES-5B unless otherwise noted, and shall be installed in accordance with the details shown on the California State Standard Plans.
3. Each lane shall have one shielded cable pair lead-in continuous to controller.
4. No splicing of shielded cable pair lead-in shall be permitted.
5. Loop wire shall be #12 AWG stranded conductor with USEXLP insulation.
6. Detector lead-in cable shall be Type B per California State Specifications.
7. Detector lead-in cables shall be permanently and clearly marked at cabinet and pull boxes.
8. All advance loop detectors shall have their own detector lead-in cable per approach lane.
9. At the discretion of the City Engineer and when indicated on the improvement plans, sensor units shall be provided for inductive loop traffic counting equipment.
10. Detector hand holes shall be installed per Caltrans Standard Plan ES-5D.
11. Design shall comply with these requirements except as otherwise approved by the City Engineer.

K. Detector Loop Wire Sealant

1. The encapsulated shall be one-part elastomeric compound requiring no mixing, measuring or application of heat prior to or during its installation.
2. The elastomeric sealant shall be a polyurethane material of a composition that will, within its stated shelf life, cure only in the presence of moisture. Sealant shall be suitable for use in both HMA and Portland cement

concrete. The cured sealant shall have the following performance characteristics:

Property Results	**Measuring Standards & Conditions**
Hardness (indentation) 65-85	ASTM D 2240 Rex. Type A, Model 1700 77°F. (25°C) 50% relative humidity
Tensile strength-- 500 psi minimum	ASTM D 412 Die C, pulled at 20 IPM
Elongation-- 400% minimum	ASTM D 412 Die C, pulled at 20 IPM
Flex at -40°F.-- No cracks	25 mil Free Film Bend (180°) over ½ inch mandrel
Weathering Resistance-- (slight chalking)	ASTM D 822 Weatherometer 350 hours. Cured 7 days at 77°F. (25°C.) 50% relative humidity
Salt Spray Resistance-- 500 psi, minimum tensile; 400%, minimum elongation	ASTM D 117 28 days at 100°F. (38°C.) 5% NaC1, Die C, pulled at 20 IPM
Dielectric Constant-- less than 25% change over a temperature range of -30°C. to 50°C.	ASTM D 150

3. Specifications shall conform to these requirements except as otherwise approved by the City Engineer.

L. Wireless Vehicle Detector System

1. Each wireless vehicle detector system (WVDS) shall consist of one or more vehicle sensor node(s) (VSN), installed in the roadway; wireless repeater(s) (RP), as needed, mounted on standards along the roadway; one or more access points (AP), mounted on standard(s) within the roadway, and all other equipment required for a complete and operational system.
2. Each WVDS component must be new and conform to the manufacturer's recommendations. The date of manufacture, as shown by date codes or serial numbers of electronic circuit assemblies, must not be more than 6 months from the date of the installation.
3. Each VSN must consist of a magnetometer sensor, a microprocessor with firmware in non-volatile memory, a wireless transceiver and a battery

within a single housing.

4. The VSN must automatically recalibrate in the event of a detector lock within 5 minutes.
5. Each VSN must be individually addressable with a unique identifier, and capable of transmitting to the AP. Each VSN must also be capable of receiving detector parameters, microprocessor firmware and other commands from the AP without loss of data.
6. Each VSN must have the following programmable detection parameters:
   a. Onset sensitivity and delay
   b. Off sensitivity
   c. Holdover time
   d. Adaptable orientation
   e. Auto-recalibration timeout
7 The housing must be fully encapsulated to provide a minimum of 8 years of operation, over a temperature range of -37 ºC to +74 ºC. The housing must be capable of being installed in a cylindrical hole that is no larger than 4.00 inches in diameter and 3.00 inches high.
8. The sealant for the installation of the wireless detector sensor units must be a two component, 100 percent solids, polyurea based joint sealant and approved by the manufacturer of the wireless detector sensor. It must be a self-leveling joint sealant and will be applied at a minimum temperature of 0 ºC. The surface to be bonded must be free of debris, moisture and anything else that will interfere with the sealant bond.
9. If required for proper operation, each wireless repeater (RP) and its battery shall be housed in a NEMA 4 enclosure. The enclosure with RP and battery shall be 5 inches tall by 6 inches wide by 2.5 inches deep, with a maximum weight of 5 pounds. The RP must operate continuously over a temperature range of –37ºC to +74ºC. The battery must have a minimum life of 8 years and field-replaceable with the use of common hand tools only. Each RP must be capable of communicating with and retransmitting data from a minimum of 16 VSN.
10. Each access point (AP) must be housed in a NEMA 4X enclosure. The enclosure with AP shall be 5 inches tall by 6 inches wide by 2.5 inches deep, with a maximum weight of 5 pounds.
11. Each AP shall operate using Power over Ethernet, at a maximum of 1.5 W.
12. The AP must operate continuously over a temperature range of –37ºC to +74ºC.
13. Each AP must be capable of communicating with and collecting data from a minimum of 64 VSN, either directly or via RP.
14. The supplier shall provide a limited two-year warranty on the detection system. During the warranty period, technical support shall be available from the supplier via telephone within 24 hours of the time a call is made by a user, and this support shall be available from factory-authorized personnel or factory-authorized installers. During the warranty period, standard updates to the software shall be available from the supplier without charge.
15. The supplier shall maintain a sufficient inventory of parts to provide

support and maintenance of the system. These parts shall be available for delivery within 30 days of receipt of a purchase order by the supplier at the supplier's then current pricing and terms of sale.

16. The supplier shall maintain an ongoing program for customer support for the system. This support shall be via telephone, email or personnel sent to the installation upon receipt of an purchase order at the suppliers then current pricing and terms of sale for technical support services.
17. Installation and/or training support shall be provided by a factory authorized representative.
18. All documentation shall be provided in the English language.
19. Sensys Networks, Inc. detection systems are known to meet the above minimum standards. An approved equal comparable product may be submitted for consideration.

M. Electrical Service

1. Electrical service shall be underground service and shall conform to the requirements of City Standard No. 708. Overhead service requires the specific approval of the City Engineer and shall conform to the requirements of City Standard No. 709.
2. Design shall conform to these requirements except as specifically approved by the City Engineer.

N. Pedestrian Signals

1. Pedestrian signals shall be in accordance with Caltrans Standard Specifications Section 86-4.
2. Pedestrian signal heads shall be "count-down hand-man" and shall conform to Section 4E.07 of the latest version of the California MUTCD. Countdown pedestrian signals shall use the international hand and walking person symbols, illuminated by LEDs to form a solid filled shape. The numbers shall be illuminated by a double row of LEDs to create a block or bold shape. The hand and walking person symbols shall be the overlaid configuration.
3. All signal head sections shall be constructed of metal, not plastic.
4. Design shall conform to these requirements except as otherwise approved by the City Engineer.

O. In-Roadway Lights

1. In-roadway lights shall be manufactured by Lightguard, Inc., or approved equivalent, and installed in accordance with the manufacturer's specifications and in conformance with the latest version of the California MUTCD.

A.2 – Erosion Control (EC)

EROSION CONTROL STANDARDS

For erosion control best management practices, refer to the California Stormwater Quality Association (CASQA) Construction BMPs Handbook.

B – Subdivision General Notes (100 Series)

SUBDIVISION GENERAL NOTES

DESCRIPTION

100 SERIES - SUBDIVISIONS

100	Subdivision General Notes

CITY OF LAKEPORT
SUBDIVISION GENERAL NOTES
(REQUIRED ON ALL PUBLIC IMPROVEMENT PLANS)

1. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION SHALL CONFORM TO THE CITY OF LAKEPORT STANDARD DESIGN AND CONSTRUCTION STANDARDS.

2. THE LOCATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS ARE BASED ON THE BEST INFORMATION AVAILABLE; HOWEVER, THE CITY OF LAKEPORT AND THE ENGINEER ASSUME NO RESPONSIBILITY FOR THE ACCURACY OF THE INFORMATION SHOWN, OR FOR THE INADVERTENT OMISSION OF ANY SUCH INFORMATION. THE CONTRACTOR SHALL COOPERATE WITH ALL UTILITY COMPANIES AND OTHER CONTRACTORS WORKING WITHIN THE LIMITS OF THIS PROJECT.

3. STREET SIGNS SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR AT LOCATIONS TO BE ESTABLISHED BY THE CITY ENGINEER.

4. ALL NEW SEWER MAINS ARE TO BE PLUGGED AT THE EXISTING SEWER CONNECTION UNTIL THE NEW SEWER MAINS HAVE BEEN ACCEPTED BY THE CITY OF LAKEPORT.

5. THE CONTRACTOR SHALL SECURE ALL ENCROACHMENT PERMITS FROM THE CITY OF LAKEPORT, COUNTY OF LAKE, AND ANY OTHER APPLICABLE AGENCIES.

6. THE CONTRACTOR SHALL SECURE A TRENCH PERMIT FROM THE CALIFORNIA DIVISION OF INDUSTRIAL SAFETY PRIOR TO EXCAVATION OF ANY TRENCH OVER FIVE FEET IN DEPTH.

7. ALL STREET LIGHTING SHALL BE CONSTRUCTED IN SUCH A MANNER AND AT THE COST OF THE DEVELOPER TO PROVIDE FOR THE LS-2A FEE SCHEDULE TO THE CITY.

8. NO CONSTRUCTION SHALL COMMENCE WITHOUT PRIOR APPROVAL OF THE CITY ENGINEER.

9. UNDERGROUND SERVICE ALERT (USA) CALL TOLL FREE 800-227-2600 AT LEAST 48 HOURS PRIOR TO EXCAVATION.

10. CONTRACTOR SHALL COORDINATE UNDERGROUNDING OF ALL UTILITIES SUCH AS CABLE TV, TELEPHONE, AND ELECTRICITY WITH THE APPROPRIATE UTILITY COMPANY.

	SUBDIVISION GENERAL NOTES	STD. NO. **100**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

B – Street Standard Plans (200 Series)

STREET STANDARD PLANS

DESCRIPTION

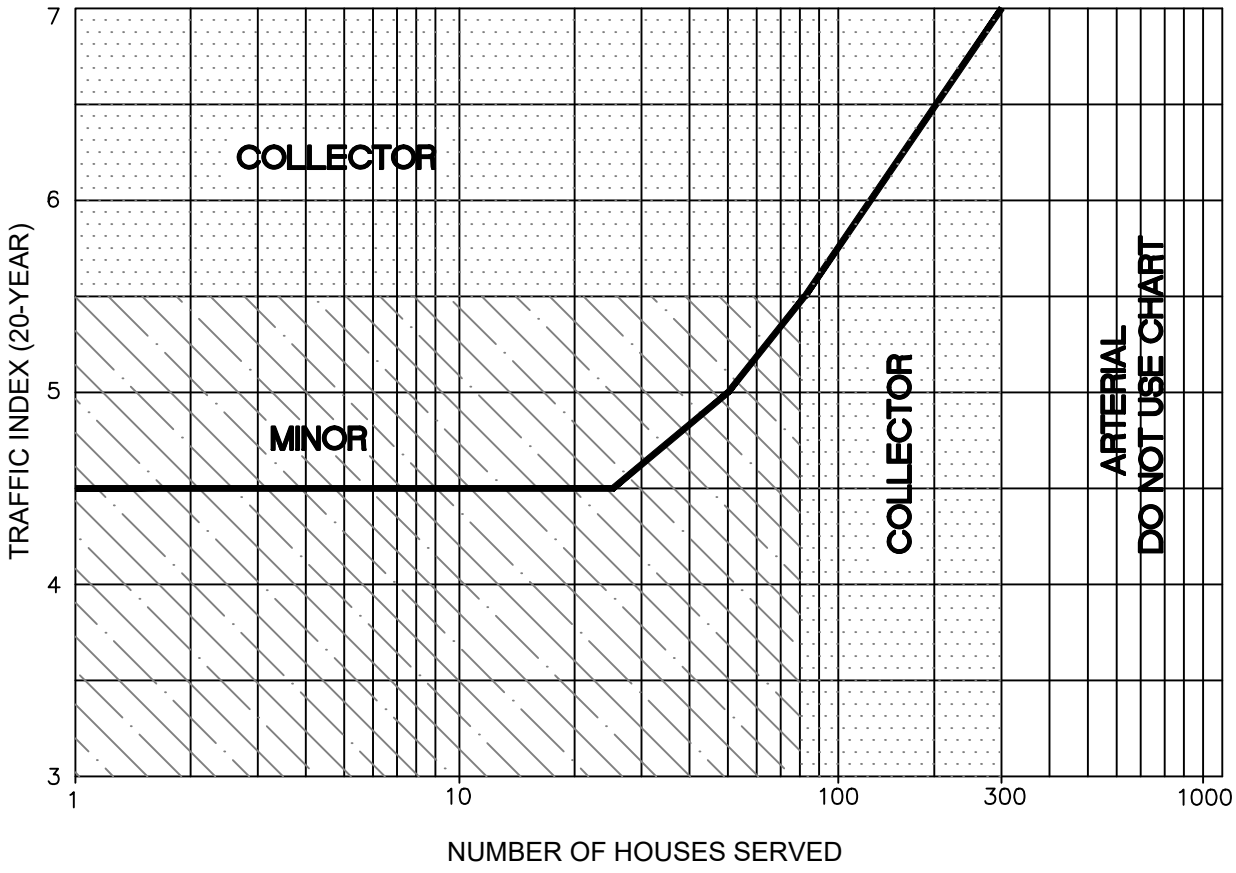
200 SERIES - STREETS

201	Traffic Index Chart for Flexible Pavements
202	Structural Design Chart for Flexible Pavements
203	Street Layout
204	Street Sections
205	Curb, Gutter and Sidewalk
206	Curb and Gutter Near Tree Details
207	Curb Return, Sidewalk Warp and Corner Bulb out Retrofit
208	Visibility Requirements
209	Concrete Construction Notes & Jointing Details
210	Driveway Details
211	Bus Turnout Details
212	Residential Cul-de-Sac
213	Hammerhead Turn Around Residential Private Streets and Access Ways
214	Standard Street Knuckle Residential and Minor Streets
215	Street Widening/Paveout Detail
216	Side Street and End of Overlay Conform
217	Edge Grinding at Lip of Gutter for Overlay
218	Standard P.C.C. Cross Gutter
219	City Monument
220	Lot Corner Reference Monument at Street Frontage

221	Standard Barricade
222	Standard Trench Notes & Bentonite Trench Dam Detail

CHART FOR ESTIMATION OF TRAFFIC INDEX

USING A HOUSE COUNT



$T.I. = 2.472\ (HOUSES)^{0.1825}$

MIN. T.I. = 4.5

NOTES:

1. FOR USE WITHIN SUBDIVISIONS, RESIDENTIAL AND RESIDENTIAL COLLECTOR STREETS.
2. FOR ALL OTHER STREETS, THE T.I. WILL BE DETERMINED BY THE CITY ENGINEER.
3. CHART IS BASED ON A 20 YEAR DESIGN LIFE.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**TRAFFIC INDEX CHART FOR FLEXIBLE PAVEMENTS**	STD. NO. **201**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012

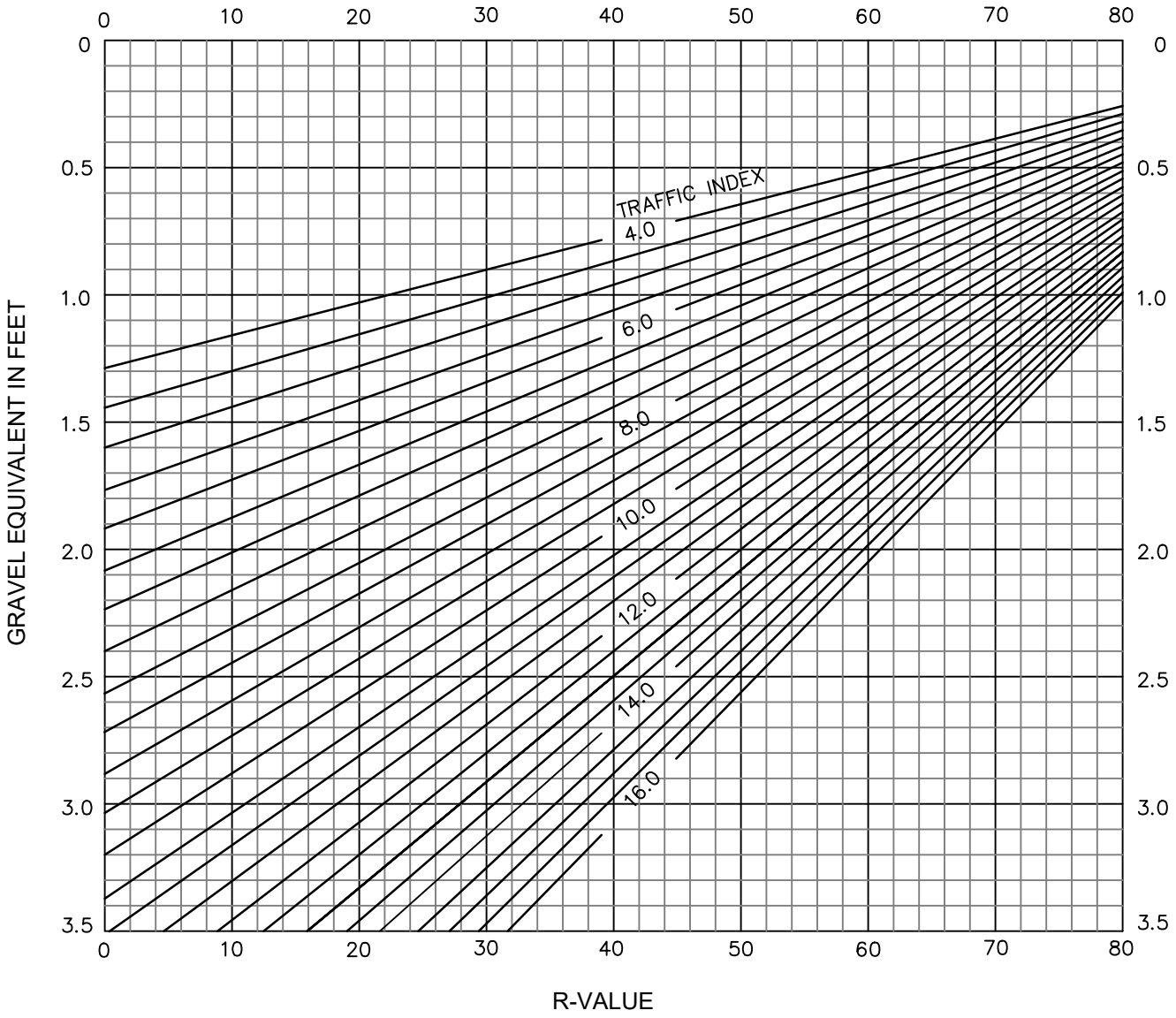
STRUCTURAL DESIGN CHART
FOR FLEXIBLE PAVEMENTS

EQUATION:

$$G.E. = 0.0032\ (T.I.)(100-R)$$

WHERE:

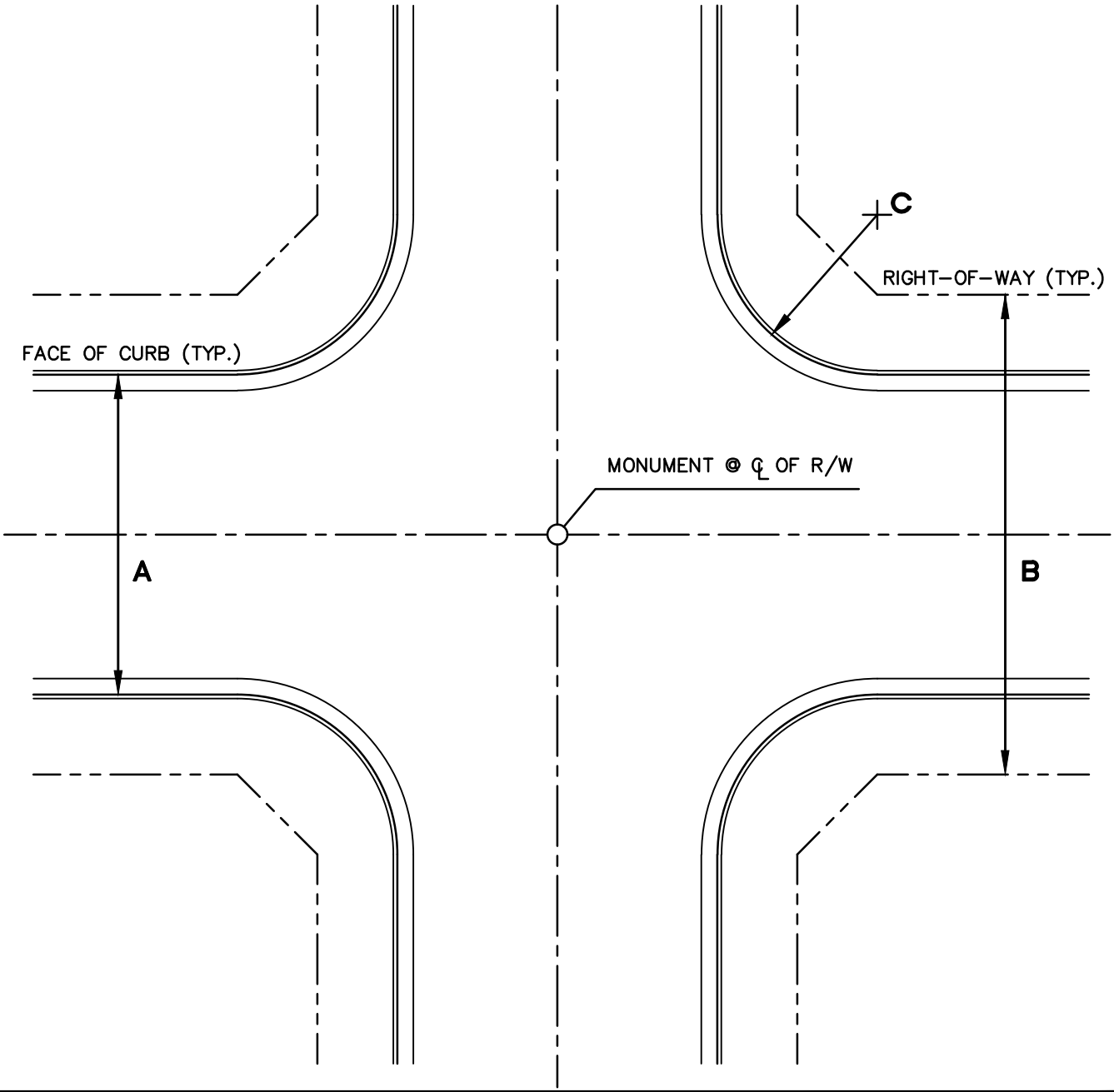
G.E. = GRAVEL EQUIVALENT
T.I. = TRAFFIC INDEX
R = RESISTANCE VALUE



CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STRUCTURAL DESIGN CHART FOR FLEXIBLE PAVEMENTS**				STD. NO. **202**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012

STREET TYPE	A CURB TO CURB WIDTH	B RIGHT-OF-WAY WIDTH	C CURB RETURN RADIUS
ARTERIAL	70' – 84'	88' – 102' * **	35'
COLLECTOR	36'	56' *	30'
INDUSTRIAL/COMMERCIAL	40'	60' **	35'
RESIDENTIAL/MINOR	34'	56' **	20'

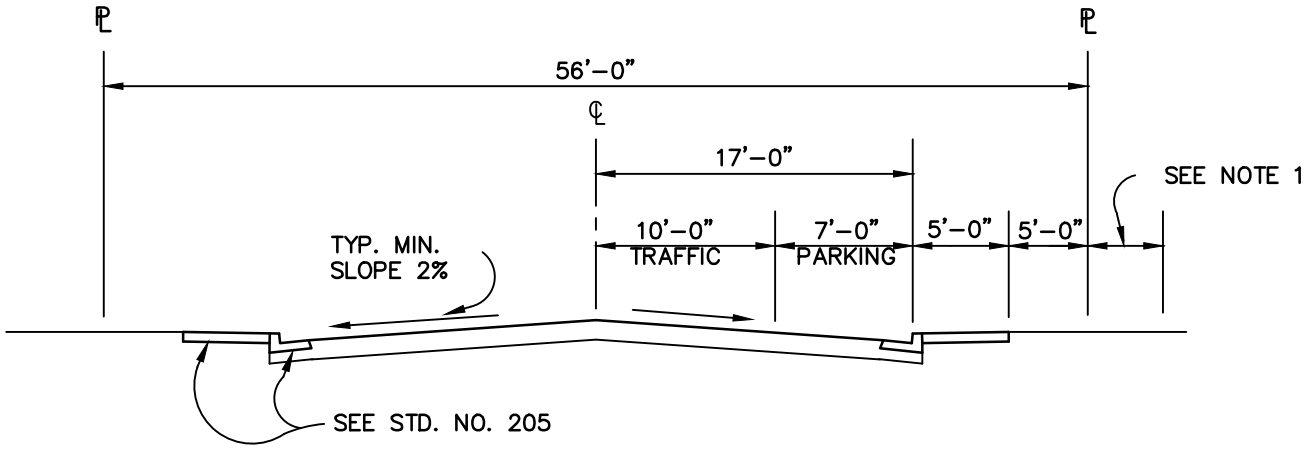
* ADDITIONAL LANDSCAPE PARCELS & PUBLIC UTILITY EASEMENTS MAY BE REQUIRED PER ZONING CODE.
** ADDITIONAL PUBLIC UTILITY EASEMENTS MAY BE REQUIRED ON BOTH SIDES OF RIGHT-OF-WAY.



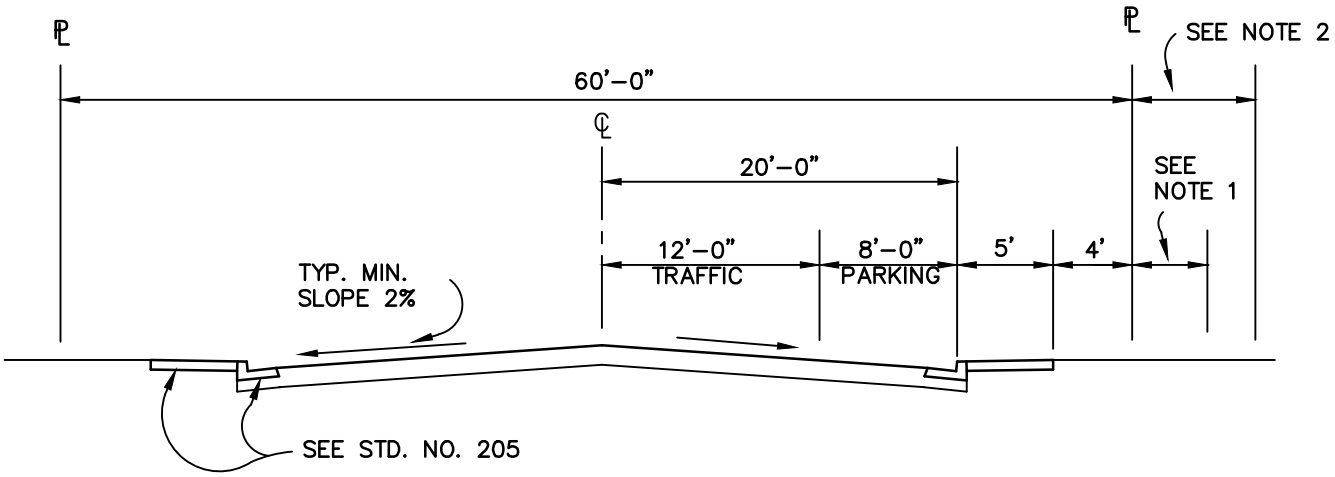
STREET LAYOUT

STD. NO. 203

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012



MINOR

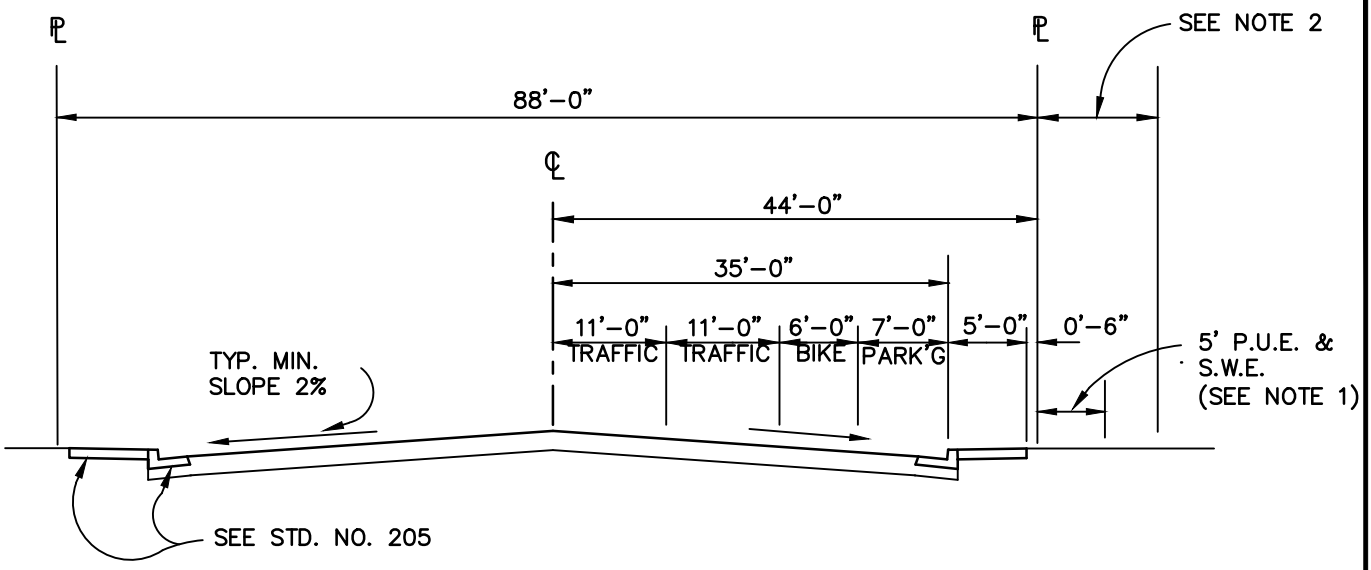


COLLECTOR

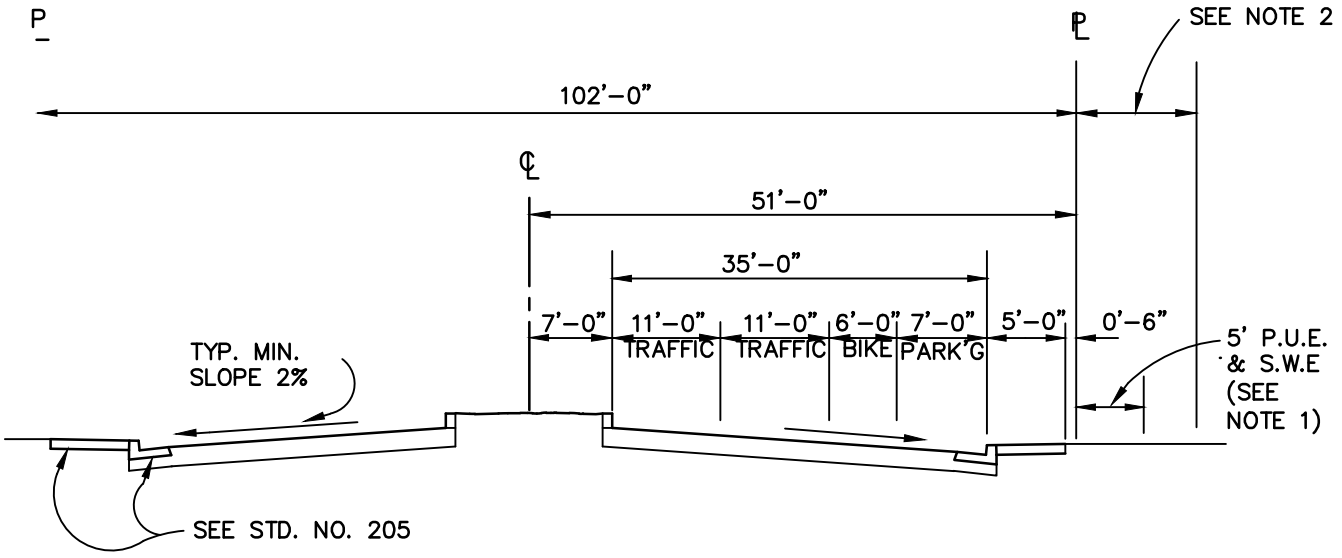
NOTES:

1. ADDITIONAL P.U.E.'S IF REQUIRED BY UTILITY COMPANIES.
2. ADDITIONAL LANDSCAPE PARCELS IF REQUIRED BY ZONING CODE.
3. WHEN BIKE LANES ARE REQUIRED, ADD 10' TOTAL TO PAVEMENT SECTION AND RIGHT–OF–WAY.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**MINOR AND COLLECTOR STREET LAYOUT**	STD. NO. **204**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012



UNDIVIDED

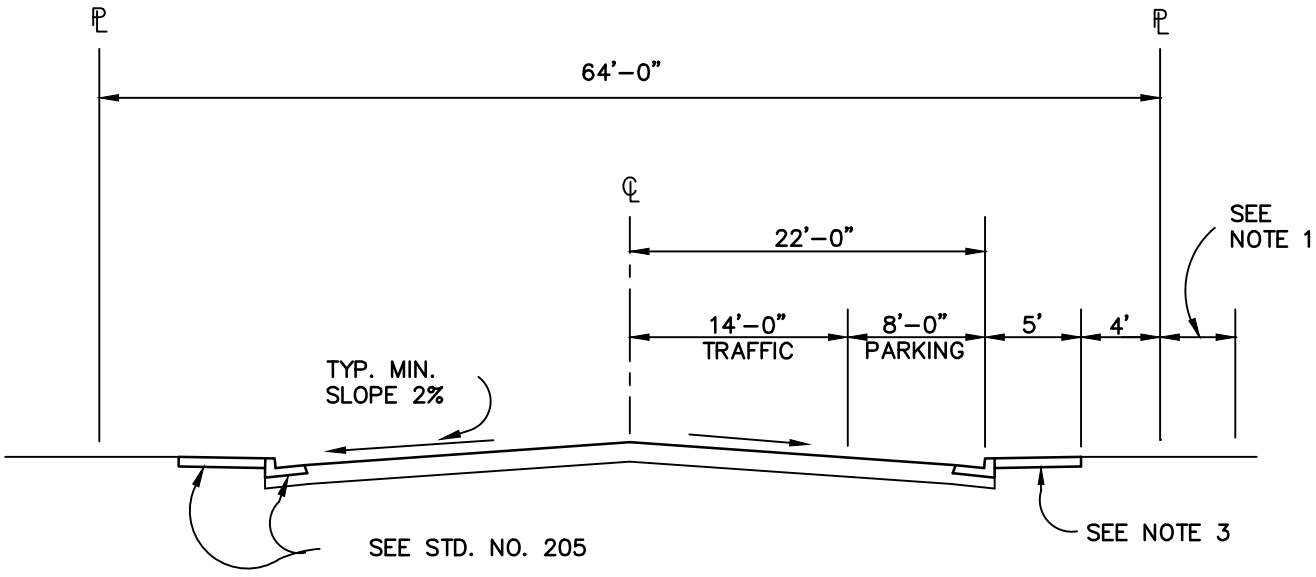


DIVIDED

NOTES:

1. ADDITIONAL P.U.E.'S IF REQUIRED BY UTILITY COMPANIES.
2. ADDITIONAL LANDSCAPE PARCELS IF REQUIRED BY ZONING CODE.
3. WHEN BIKE LANES ARE REQUIRED, ADD 12' TOTAL TO PAVEMENT SECTION AND RIGHT–OF–WAY.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**ARTERIAL STREET SECTION**	STD. NO. **204**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012



NOTES:

1. ADDITIONAL P.U.E.'S IF REQUIRED BY UTILITY COMPANIES.
2. WHEN BIKE LANES ARE REQUIRED, ADD 10' TOTAL TO PAVEMENT SECTION AND RIGHT–OF–WAY.
3. CONSTRUCTION OF SIDEWALKS SHALL BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**INDUSTRIAL/COMMERCIAL STREET SECTION**	STD. NO. **204**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

Images: Lakeport-Logo.jpg; Xrefs: TBLOCK-TEMPLATE.dwg
Path: C:\Wasden Technical Services\Projects\Lakeport Standards\UPDATED PLANS\FINAL UPDATED SET\Lakeport_Standard_205.dwg Layout Name: 205 (1) Plot Date: Feb 07, 2018 at 08:45

SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD:

CURB, GUTTER & SIDEWALK

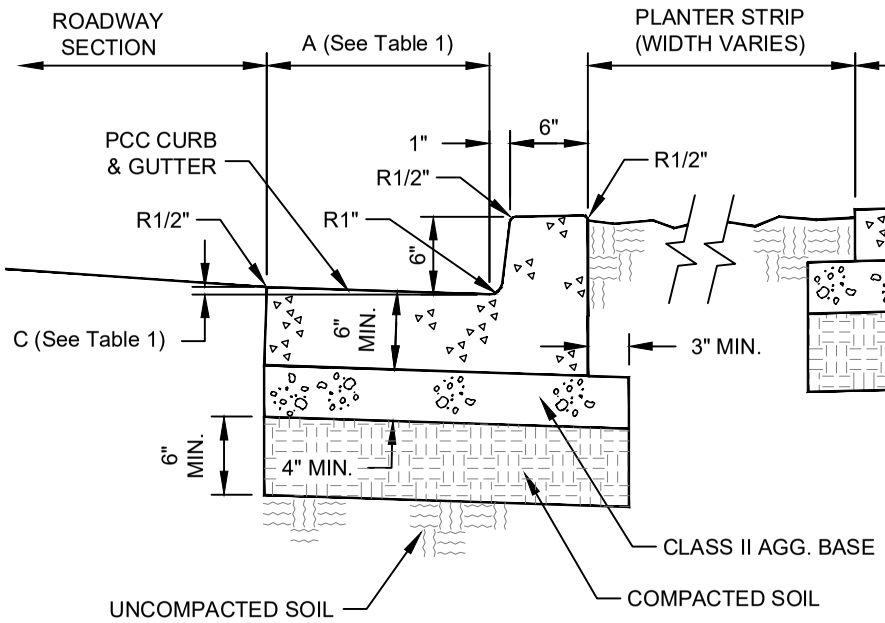
STD. NO. 205

DATE: FEB 2018

SHEET 1 OF 2

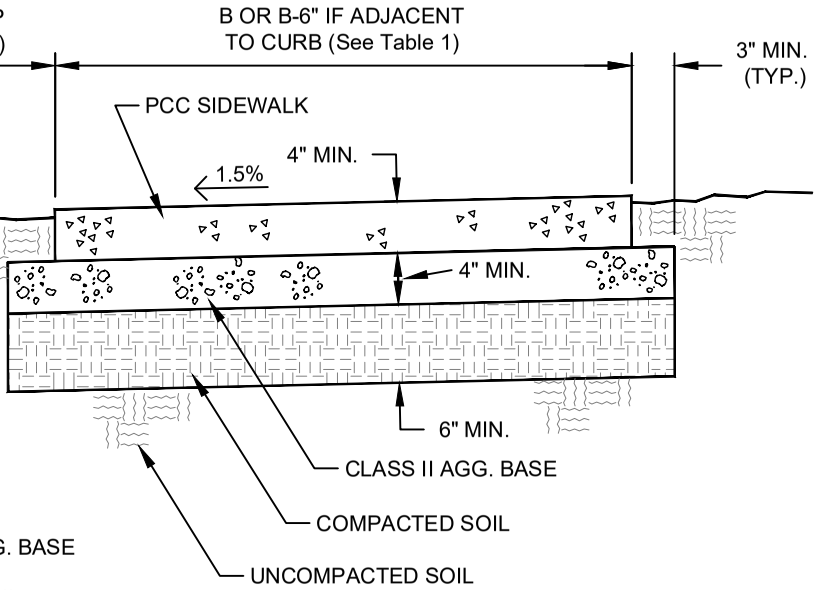
TABLE NO. 1

DIMENSION	EXISTING	RESIDENTIAL	ALL OTHERS
A	MATCH	18"	24"
B	MATCH	5' (60")	8' (96") MINIMUM
C	MATCH	1-1/4" MIN / 1-3/8" MAX.	1-5/8" MIN / 1-3/4" MAX.



STANDARD CURB & GUTTER

NTS



STANDARD SIDEWALK

NTS

Images: Lakeport-Logo.jpg; Xrefs: TBLOCK-TEMPLATE.dwg
Path: C:\Wasden Technical Services\Projects\Lakeport Standards\UPDATED PLANS\FINAL UPDATED SET\Lakeport_Standard_205.dwg Layout Name: 205 (2) Plot Date: Feb 07, 2018 at 08:45

SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD:

CURB, GUTTER & SIDEWALK

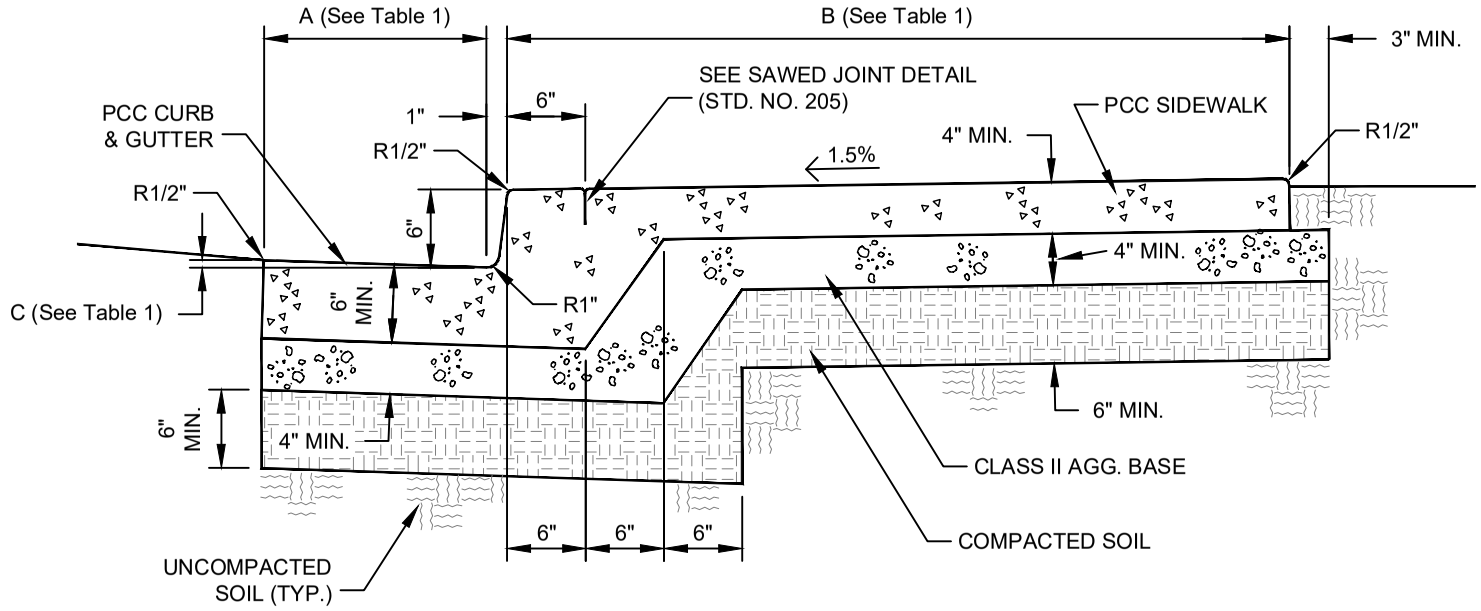
STD. NO. 205

DATE: FEB 2018

SHEET 2 OF 2

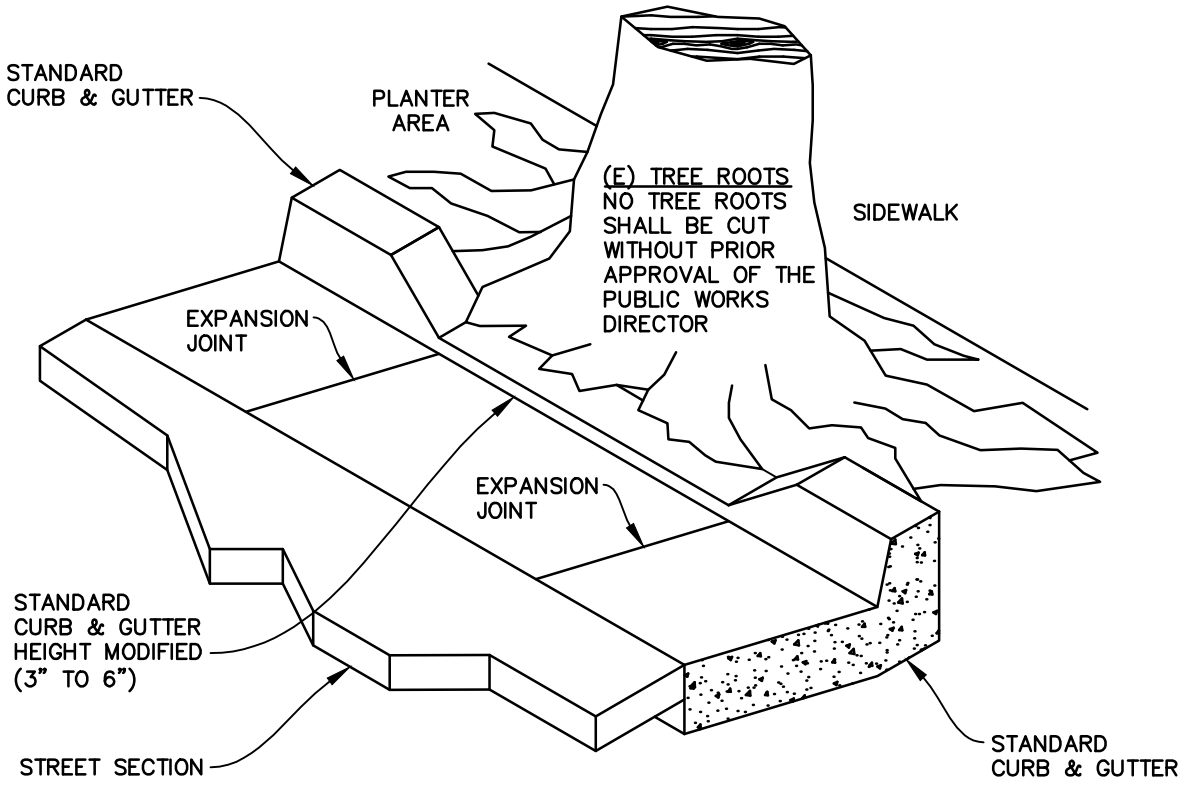
TABLE NO. 1

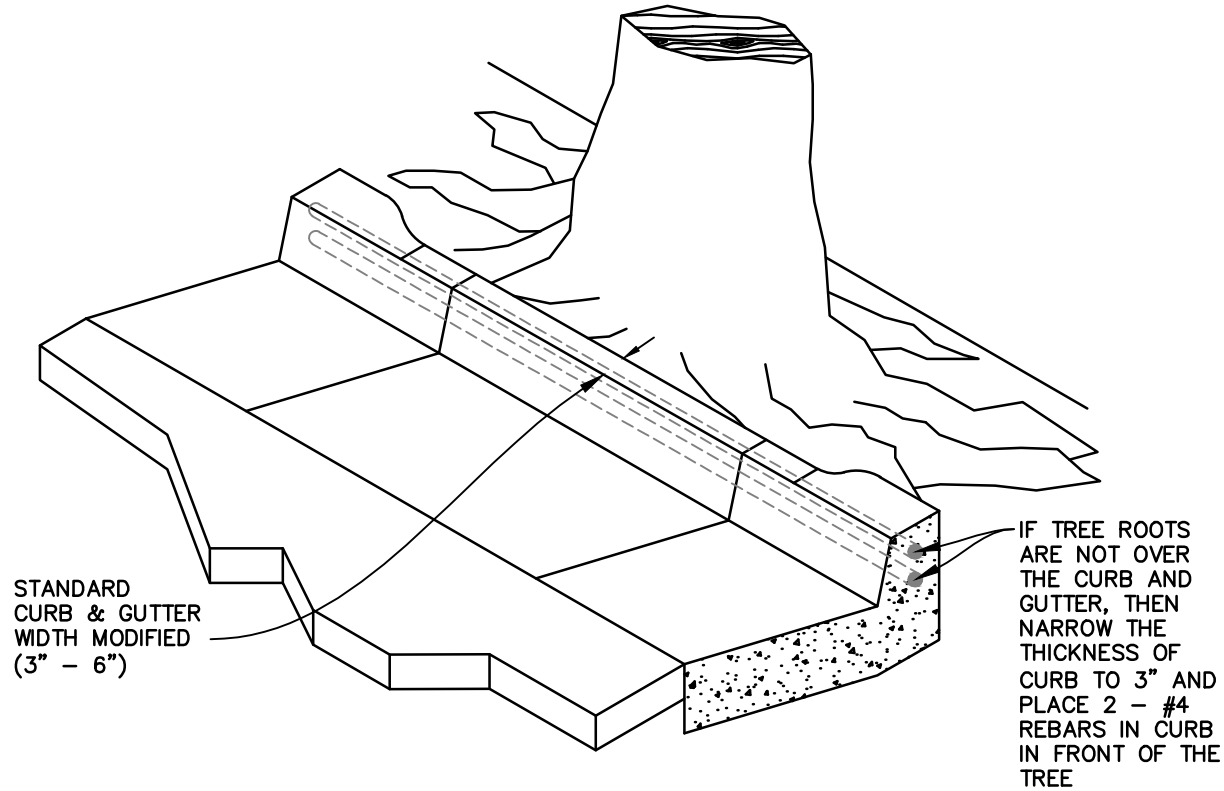
DIMENSION	EXISTING	RESIDENTIAL	ALL OTHERS
A	MATCH	18"	24"
B	MATCH	5' (60")	8' (96") MINIMUM
C	MATCH	1-1/4" MIN / 1-3/8" MAX.	1-5/8" MIN / 1-3/4" MAX.



INTEGRAL CURB, GUTTER & SIDEWALK DETAIL

NTS





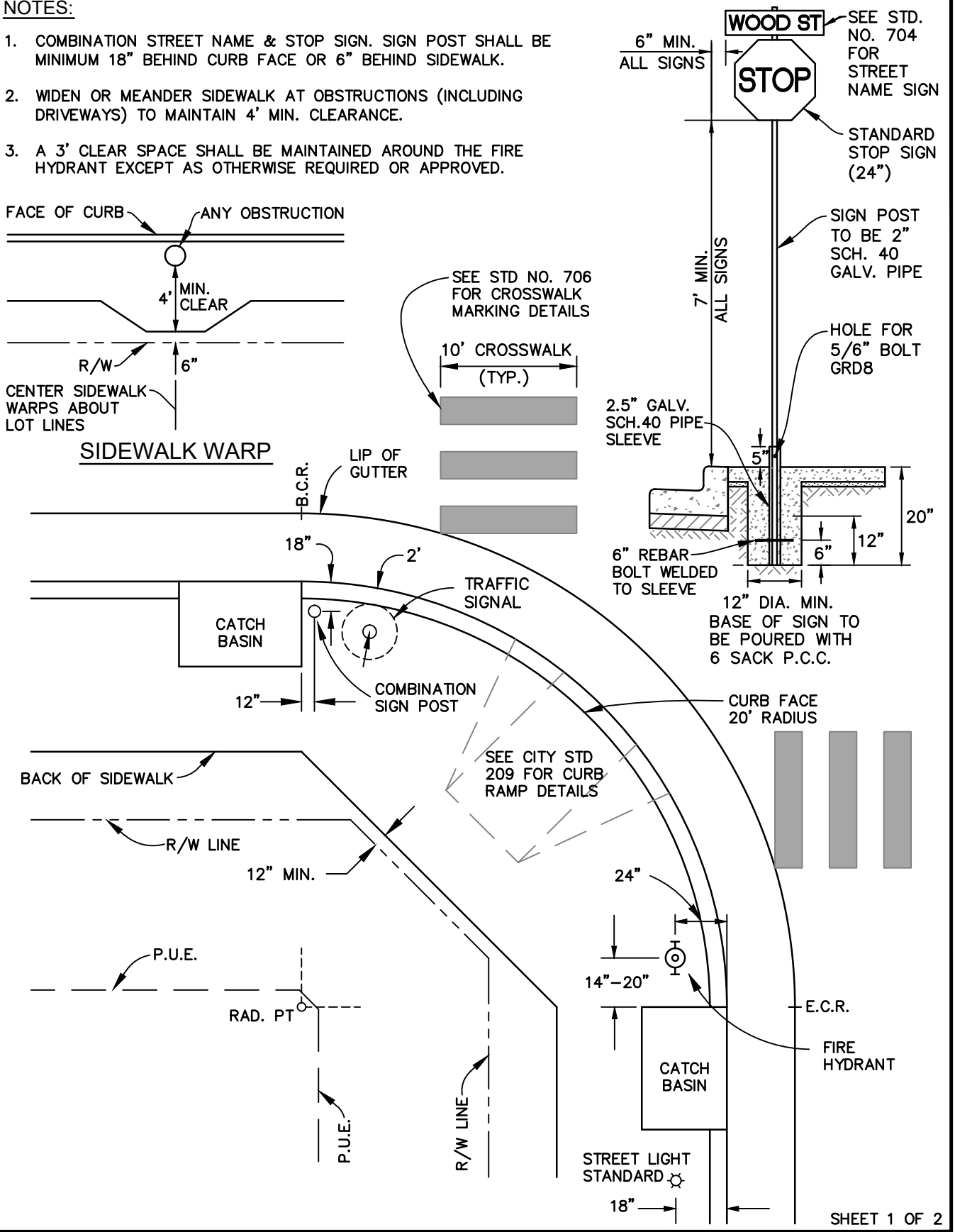
CURB AND GUTTER NEAR TREE DETAILS

STD. NO. 206

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

NOTES:

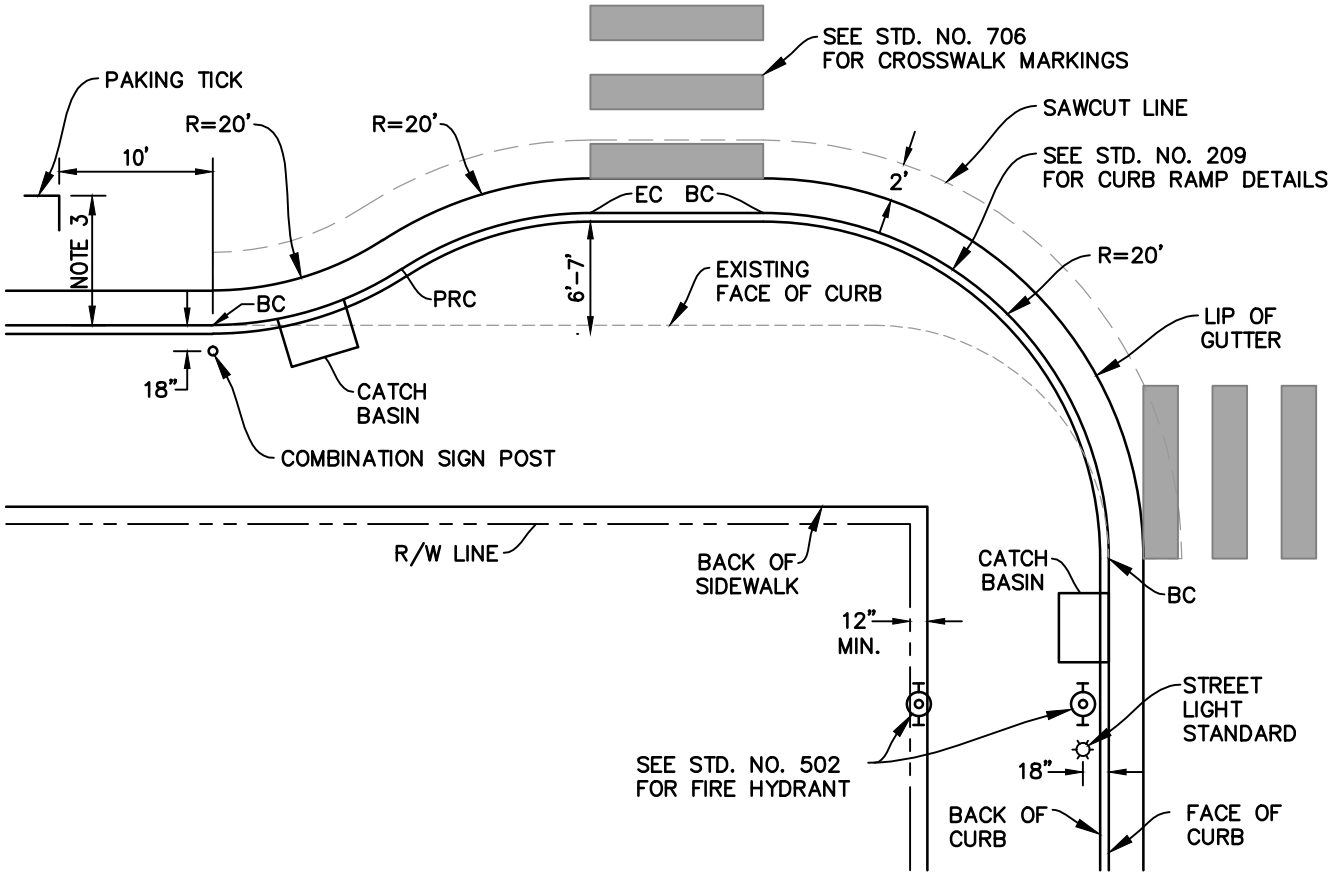
1. COMBINATION STREET NAME & STOP SIGN. SIGN POST SHALL BE MINIMUM 18" BEHIND CURB FACE OR 6" BEHIND SIDEWALK.
2. WIDEN OR MEANDER SIDEWALK AT OBSTRUCTIONS (INCLUDING DRIVEWAYS) TO MAINTAIN 4' MIN. CLEARANCE.
3. A 3' CLEAR SPACE SHALL BE MAINTAINED AROUND THE FIRE HYDRANT EXCEPT AS OTHERWISE REQUIRED OR APPROVED.



CURB RETURN, SIDEWALK WARP AND CORNER BULBOUT RETROFIT

STD. NO. 207

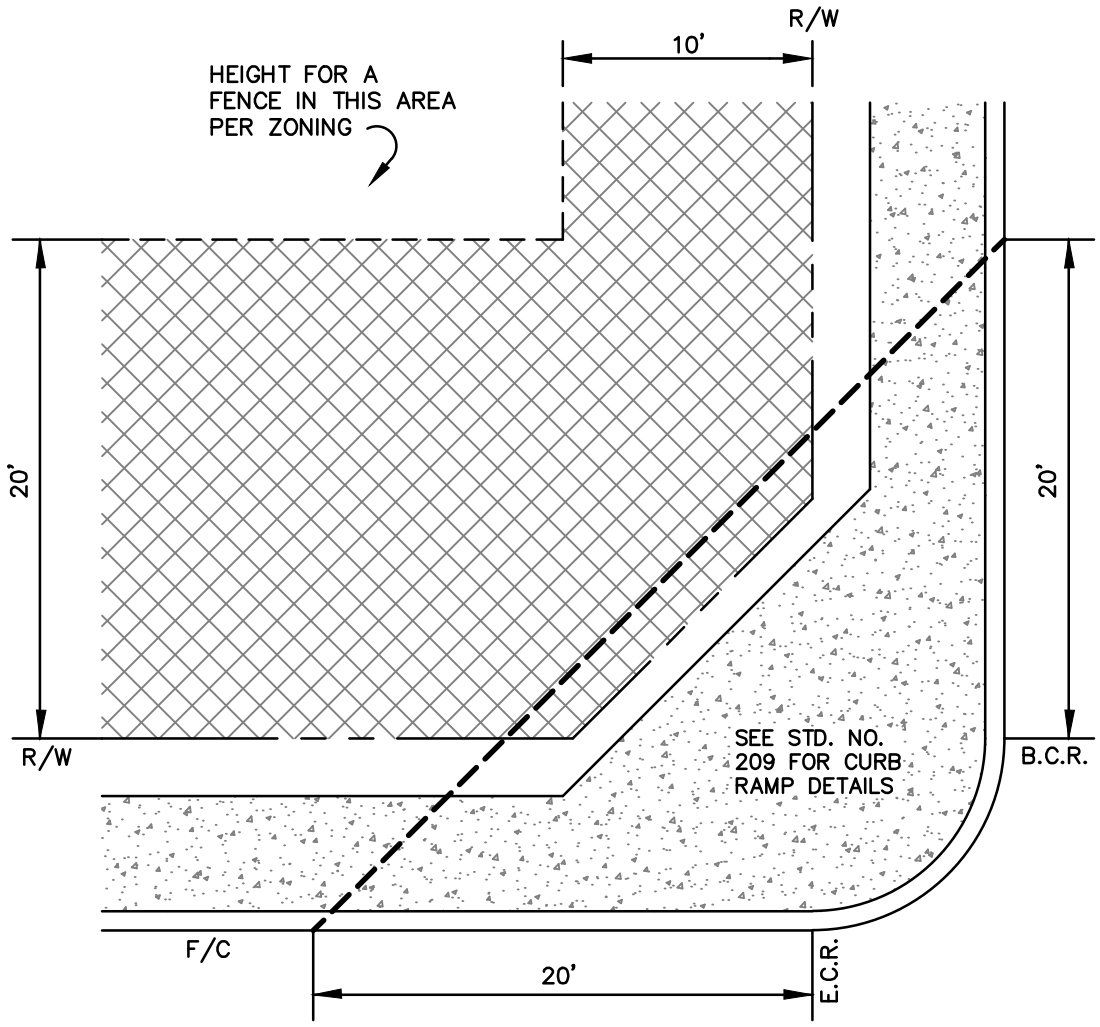
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTES:

1. COMBINATION STREET NAME & STOP SIGN. SIGN POST SHALL BE MINIMUM 18" BEHIND CURB FACE OR 6" BEHIND SIDEWALK
2. WIDEN OR MEANDER SIDEWALK AT OBSTRUCTIONS (INCLUDING DRIVEWAYS) TO MAINTAIN 5' MIN. CLEARANCE.
3. MATCH PARKING WIDTH.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**CURB RETURN, SIDEWALK WARP AND CORNER BULBOUT RETROFIT**	STD. NO. **207**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012



INTERSECTION

LEGEND:

WITHIN THIS AREA ALL SHRUBS, BUSHES, FENCES, AND OTHER IMPROVEMENTS SHALL BE RESTRICTED TO A 24" MAXIMUM HEIGHT, AND TREES MAINTAINED TO A CLEARANCE OF 7'-0" ABOVE GROUND (MIN.)

VISIBILITY REQUIREMENTS

STD. NO.
208

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

CONCRETE CONSTRUCTION NOTES:

1. These notes are applicable to all concrete construction including curb; curb & gutter; sidewalks (Std. Plan 205); driveways (Std Plan 210) cross gutters (Std Plan 218); bus pads (Std. Plan 211) or other miscellaneous surface concrete improvements in the City right of way.

2. All concrete shall be jointed per Standard Plan 209. Deepening of joints by saw cutting shall be performed after the concrete has sufficiently set to prevent damage by prior to 24 hours after placement. Concrete which has uncontrolled cracking (within 1 year of installation) due to failure to comply with jointing requirements shall be removed and replaced at the contractor's expense.

3. Concrete shall conform to Section 90 of the latest edition of the Caltrans Standard Specifications and as follows:

<table>
<tr><th>Facility Type</th><th>Max. Aggregate Size</th><th>Concrete Strength (PSI)</th><th>Fibermesh Rate</th><th>Min. Cementitious Material (lbs)</th><th>Max. Slump (inches)</th></tr>
<tr><td>Sidewalk</td><td rowspan="5">1"</td><td rowspan="2">2500</td><td rowspan="2">1.5 lbs/yd (0.01%)</td><td rowspan="2">470</td><td>5</td></tr>
<tr><td>Curb/Curb & Gutter</td><td rowspan="3">4</td></tr>
<tr><td>Driveway</td><td rowspan="3">3000</td><td rowspan="3">3.0 lbs/yd (0.02%)</td><td rowspan="3">564</td></tr>
<tr><td>Cross Gutter</td></tr>
<tr><td>Bus Stop</td><td>3</td></tr>
</table>

4. Steel reinforcement shall conform to Section 52 of the latest edition of the Caltrans Standard Specifications, Grade 40 or 60.

5. Fibermesh shall be polypropylene fibers or equivalent, 3/4" minimum length, and thoroughly mixed into the concrete.

6. Unless otherwise approved in writing by the City Engineer or Building Official, concrete surfaces shall receive a uniform medium broom finish.

7. Rebar dowels are required at all cold joint or ties to existing concrete facilities. 18" x 1/2" deformed bar dowels. Dowels may be wet set into concrete between placements or shall be embedded a minimum 8 inches into the existing concrete sidewalks, curbs, gutter, cross gutters, bus stops, etc. The dowel shall be fully inserted and cemented in place with 2 part epoxy (Simpson SET Epoxy Adhesive) or equivalent. Dowels shall have a maximum spacing of 18 inches with 2 minimum per location required.

8. Expansion joints consisting of 1/4 inch thick preformed joint filler. Finish concrete adjacent to expansion joints with an edger tool. Expansion joints shall be placed at curb returns, interior corners of islands, and every 40 lineal feet. Shape filler to match concrete surface.

9. Subgrade preparation shall consist of scarifying: moisture conditioning to +/− 2% of optimum, and compacting the top 6 inches of native material to 90% to 95% relative compaction.

NOTES CONTINUE ON SHEET 2

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	CONCRETE CONSTRUCTION NOTES & JOINTING DETAILS				STD. NO. 209
SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD:		DATE: FEB 2018

CONCRETE CONSTRUCTION NOTES (Continued):

10. Aggregate base shall be placed to the depth indicated on the applicable Standard Plan. Aggregate base shall be Class 2 aggregate base per Caltrans Standard Specification Section 26. The aggregate base shall be moisture conditioned to optimum or above and compacted to 90% to 95% relative compaction. Compaction shall be per ASTM D1557 or CT 216 laboratory density and CT 231 or ASTM D6938.

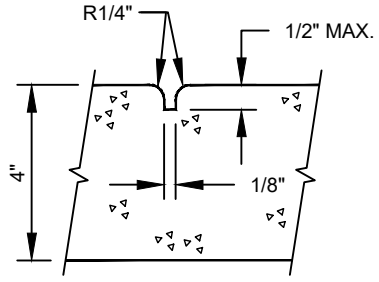
11. All curb ramps shall comply with most current California accessibility requirements and Caltrans Standard Plan requirements. Truncated domes shall be Armor–Tile brick red color unless an equal product is approved in writing by the City Engineer or Building Official.

12. The gap between the subgrade and bottom of the form boards shall not exceed 2 inches. Mushroom concrete excreted under the forms shall be removed prior to backfilling.

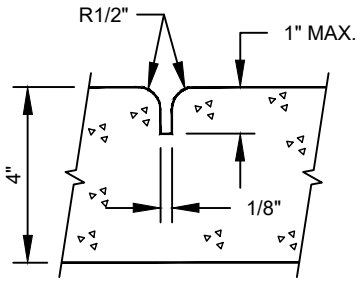
13. At trees or other obstructions, a minimum width of 42 inches shall be maintained between the edge of the sidewalk and the obstruction. If the obstruction is wider than 12 inches, the minimum width shall be 48 inches.

14. Where the sidewalk is being replaced due to tree root damage, special construction is required. Concrete elevation adjustments shall be approved by the City Engineer or Building Official prior to the work being performed. Aggregate base shall be replaced with coarse sand. No. 3 longitudinal reinforcement shall be placed on 16 inch centers. The reinforcement shall be extended to a minimum of 15 feet to each side of the tree. In addition, fibermesh shall be used in the concrete. The maximum longitudinal sidewalk slope shall be 4.5%. Expansion joints shall be centered on the trees with the rebar extending through the expansion joint material.

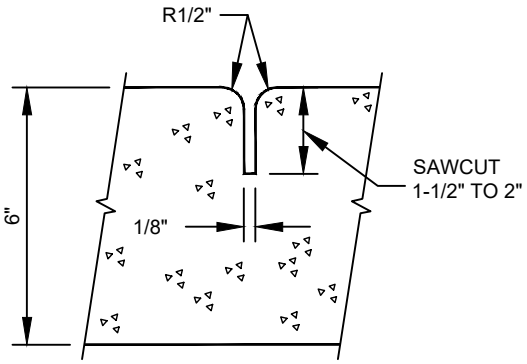
	CONCRETE CONSTRUCTION NOTES & JOINTING DETAILS	STD. NO. 209
SCALE: NONE	DRAWN: MPW | CHK: PRC | APPVD:	DATE: FEB 2018



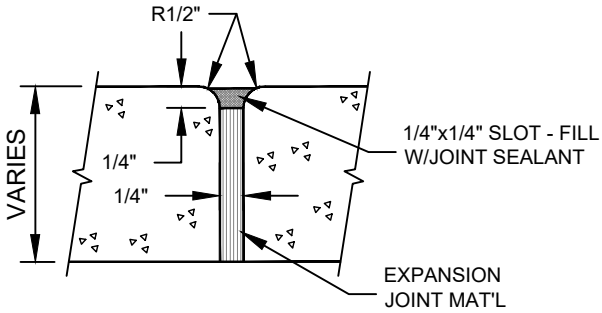
SIDEWALK SCOREMARK (SM)



CONTROL JOINT - 4" SIDEWALK (CJ-4)



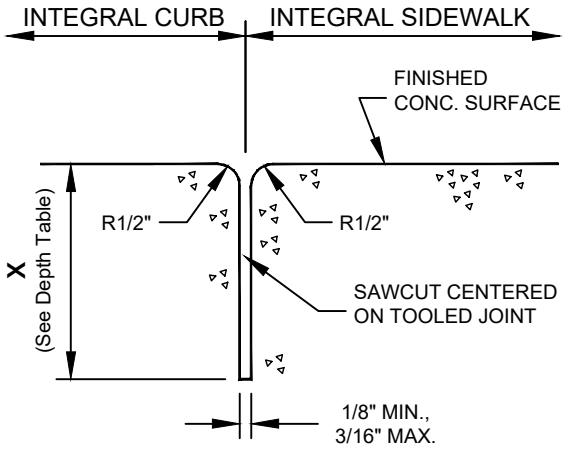
CONTROL JOINT - DRIVEWAYS,
CURB & GUTTER, CROSS-GUTTERS (CJ-6)



EXPANSION JOINT - 4" SIDEWALK (EJ)

"X" DEPTH TABLE

LOCATION	MIN.	MAX.
INTEGRAL CURB @ SIDEWALK	2-3/4"	3"
GUTTER, CROSS-GUTTER, DRIVEWAY	1-1/2"	2"



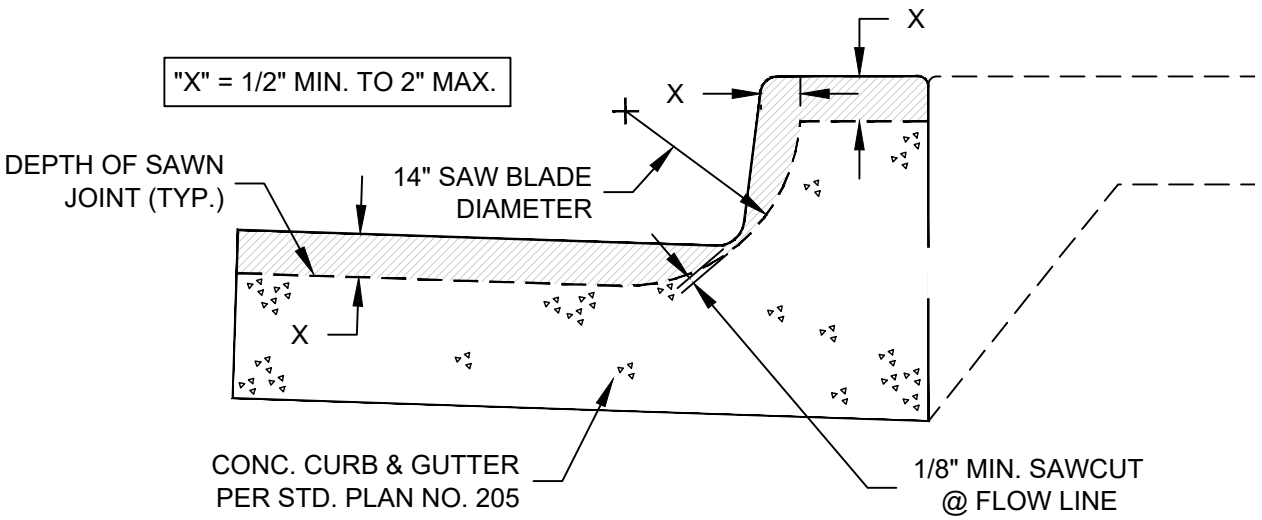
SAWN JOINT DETAIL

CONTROL SCOREMARKS / CONTROL JOINTS

NTS

SHEET 3 OF 5

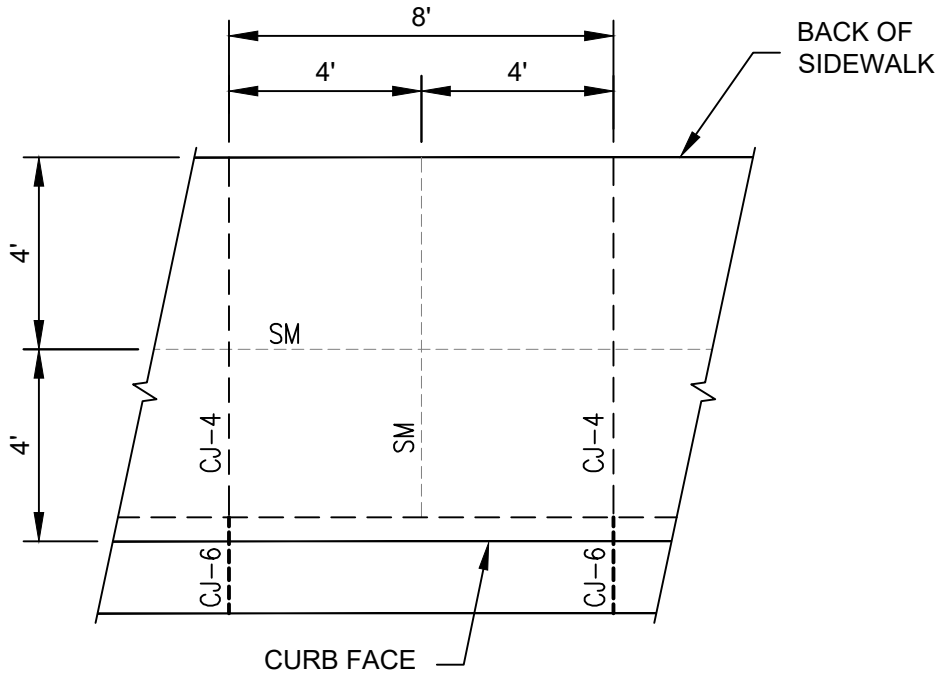
	CONCRETE CONSTRUCTION NOTES & JOINTING DETAILS				STD. NO. 209
	SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD:	DATE: FEB 2018



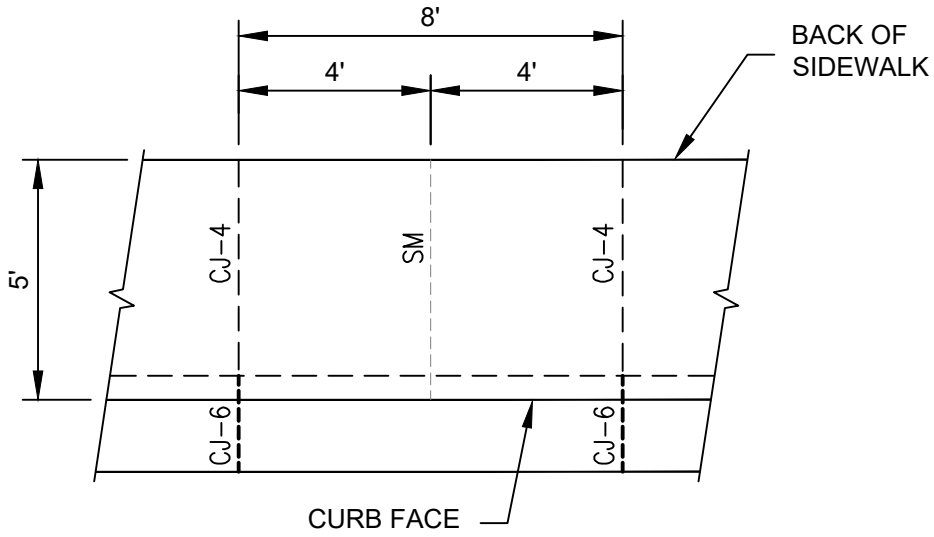
SAWN CONTROL JOINT @ GUTTER DETAIL

NTS

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	CONCRETE CONSTRUCTION NOTES & JOINTING DETAILS				STD. NO. 209
	SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD:	DATE: FEB 2018



COMMERCIAL/INDUSTRIAL JOINT SPACING



RESIDENTIAL JOINT SPACING

KEY

— — — — CJ-4 = CONTROL JOINT (4" DEPTH)
– – – – – – – – CJ-6 = CONTROL JOINT (6" DEPTH)
- - - - - - - - SM = SCORE MARK

NOTE: SEE STANDARD PLAN 209, SHEET NOS. 3 & 4
FOR JOINTING DEPTH DETAILS.

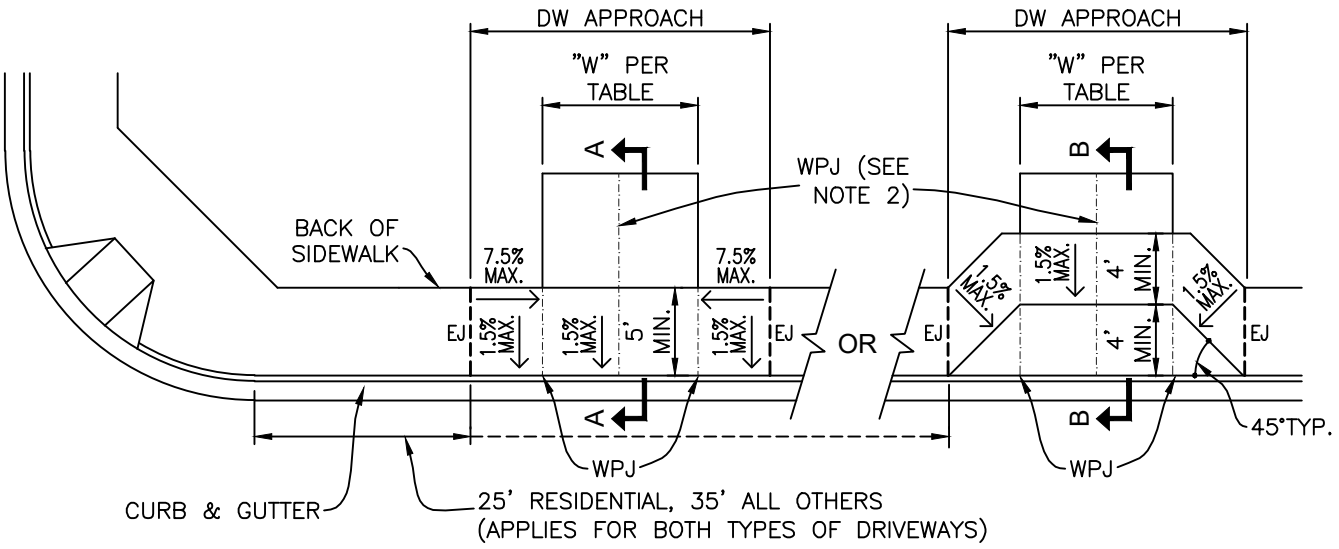
CONCRETE CONSTRUCTION NOTES & JOINTING DETAILS

STD. NO. 209

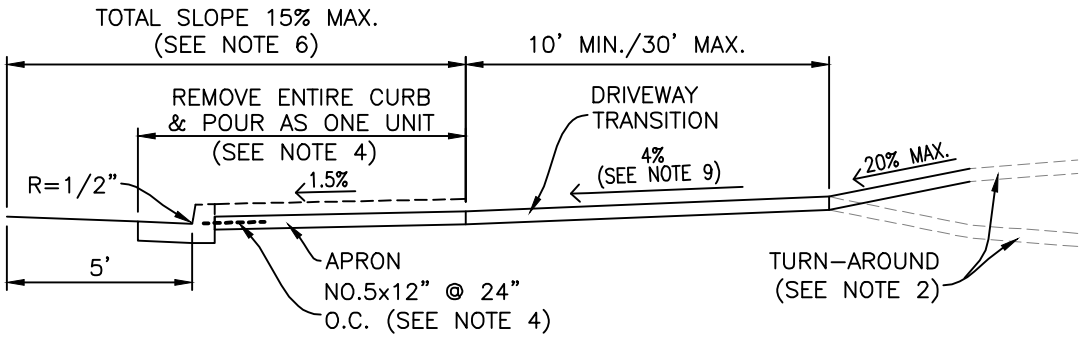
SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD: | DATE: FEB 2018

TABLE 1: DRIVEWAY WIDTH			
USE	TYPE	"W" MIN.	"W" MAX.
RESIDENTIAL	SINGLE	10'	14'
	DOUBLE	20'	24'
COMMERCIAL	SINGLE	12'	14'
	DOUBLE	24'	28'

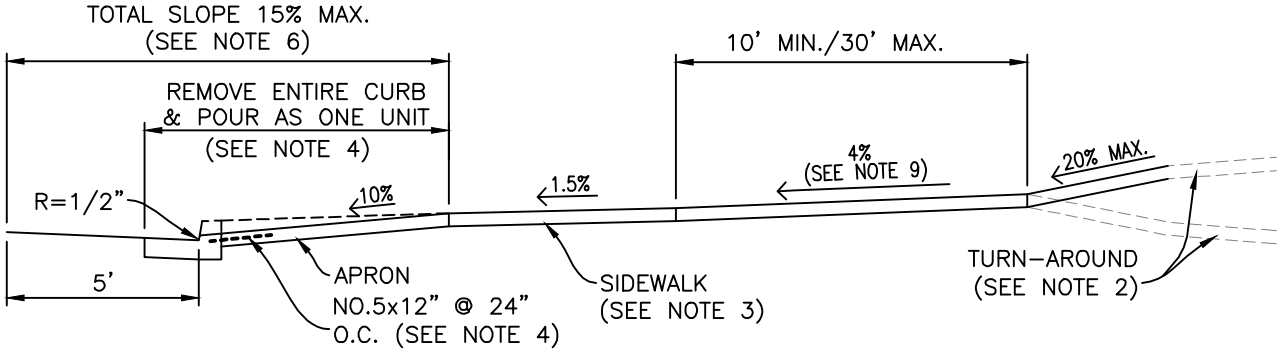
ABBREVIATIONS:
EJ = EXPANSION JOINT
WPJ = WEAKENED PLANE JOINT



PLAN



SECTION A-A



SECTION B-B

SEE DRIVEWAY NOTES ON SHEET 2

DRIVEWAY DETAILS

STD. NO. 210

SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD: | DATE: MAR 2017

DRIVEWAY NOTES:

1. ALL CONCRETE WORK SHALL CONFORM TO CITY OF LAKEPORT STANDARD PLAN NO. 209.

2. PROVIDE TURN–AROUND IN ACCORDANCE WITH FIRE DEPARTMENT REQUIREMENTS.

3. SIDEWALKS BEHIND DRIVEWAY APPROACHES SHALL HAVE THE SAME AGGREGATE BASE AND CONCRETE THICKNESS AS THE REQUIRED DRIVEWAY APPROACH THICKNESS.

4. IF CURB AND GUTTER ARE PLACED INDEPENDENT OF DRIVEWAY APPROACH, THE CURB SHALL BE DOWELLED AT 24 INCH CENTERS USING A 5/8"X12" REBAR DOWEL. THE DOWEL SHALL EXTEND 3 INCHES INTO THE CURB AND 9 INCHES INTO THE DRIVEWAY APPROACH CONCRETE. THE DOWEL SHALL BE PLACED AT THE MIDPOINT OF THE REQUIRED CONCRETE THICKNESS BUT IN NO CASE CLOSER THAN 2 INCHES TO THE TOP OF THE CURB.

5. BUILDING ADDRESS SHALL BE CAST IN FACE OF CURB (3" TALL DIGITS) IN ALL NEW AND RECONSTRUCTED RESIDENTIAL AND COMMERCIAL DRIVEWAY. THE ADDRESS SHALL BE LOCATED AT THE INTERSECTION OF THE FULL CURB FACE WITH THE APRON TAPER.

6. AT THE CENTERLINE OF THE DRIVEWAY, THE SLOPE BETWEEN THE ROADWAY SURFACE AT A POINT 5 FEET FROM THE GUTTER FLOWLINE TO A POINT 10 FEET FROM THE SAME POINT IN THE GUTTER FLOWLINE INTO THE DRIVEWAY APPROACH, SIDEWALK OR DRIVEWAY APRON SHALL NOT EXCEED 15%.

7. WIDEN OR MEANDER SIDEWALK AT OBSTRUCTIONS (INCLUDING DRIVEWAYS) TO MAINTAIN 5 FOOT MINIMUM CLEARANCE TO ANY PEDESTRIAN OBSTRUCTION SUCH AS A SIGN, FIRE HYDRANT, UTILITY POLE OR OTHER VERTICAL CONSTRUCTION.

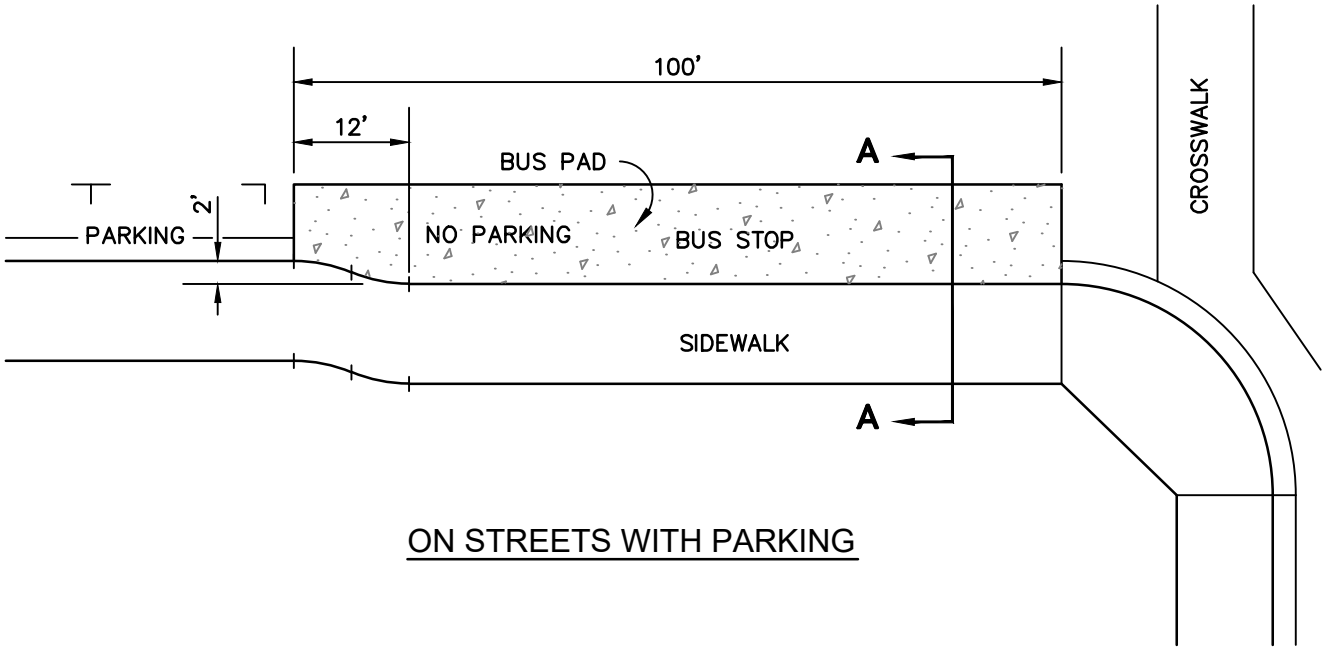
8. DRIVEWAY CONCRETE THICKNESS & REINFORCEMENT SHALL CONFORM TO TABLES 2 & 3 BELOW:

TABLE 2: DRIVEWAY APPROACH CONCRETE THICKNESS			
TYPE	PCC THICK.	REINFORCEMENT *SEE TABLE 3*	AB THICK.
RESIDENTIAL	5"	A	4"
COMMERCIAL	6"	B	6"
INDUSTRIAL	7"	C	6"

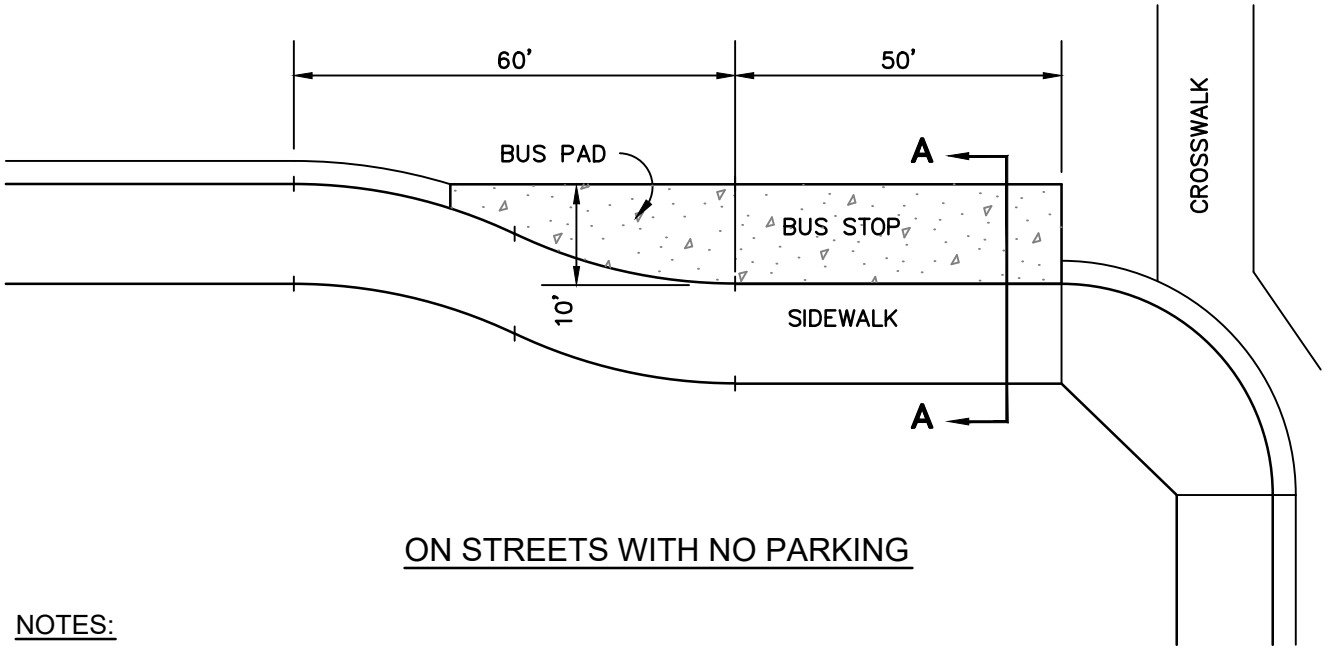
TABLE 3: DRIVEWAY REINFORCEMENT	
TYPE	SIZE & SPACING
A	FIBERMESH (SEE NOTE 11)
B	#4 BARS @ 12" O.C. MAX. EACH WAY
C	#5 BARS @ 12" O.C. MAX. EACH WAY

9. ON RECONSTRUCTION PROJECTS SLOPE MAY BE UP TO 10%.

	DRIVEWAY NOTES	STD. NO. 210
SCALE: NONE	DRAWN: MPW | CHK: PRC | APPVD:	DATE: MAR 2017



ON STREETS WITH PARKING



ON STREETS WITH NO PARKING

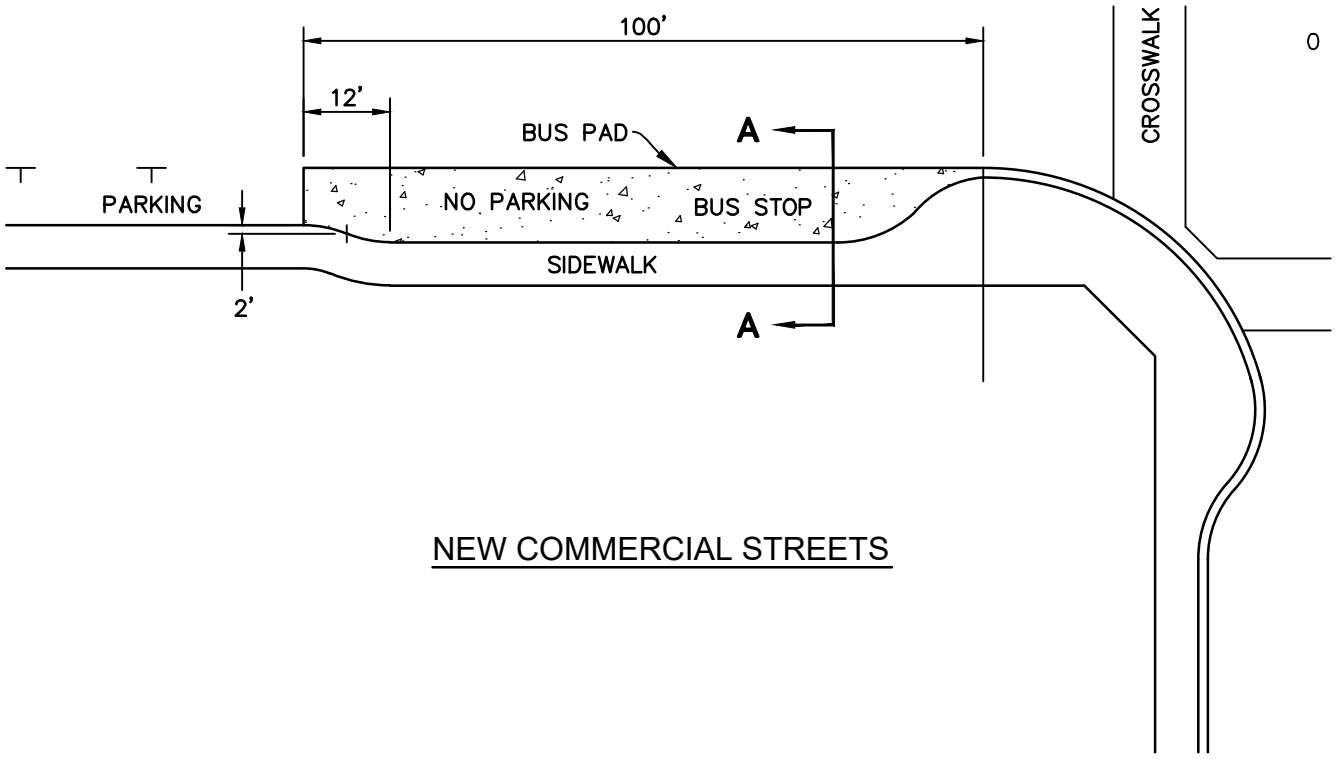
NOTES:

1. SEE SECTION A–A, SHEET 4.

2. BUS BENCHES AND SHELTER SHALL BE LOCATED BEHIND THE SIDEWALK OR IN SUCH A MANNER THAT A MINIMUM 5' CLEAR SIDEWALK IS PROVIDED.

3. DESIGN SHALL CONFORM TO THESE REQUIREMENTS, EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**BUS STOP AT INTERSECTION**	STD. NO. **211**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012



NEW COMMERCIAL STREETS

NOTES:

1. SEE SECTION A–A, SHEET 4.

2. BUS BENCHES AND SHELTER SHALL BE LOCATED BEHIND THE SIDEWALK OR IN SUCH A MANNER THAT A MINIMUM 5' CLEAR SIDEWALK IS PROVIDED.

3. DESIGN SHALL CONFORM TO THESE REQUIREMENTS, EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

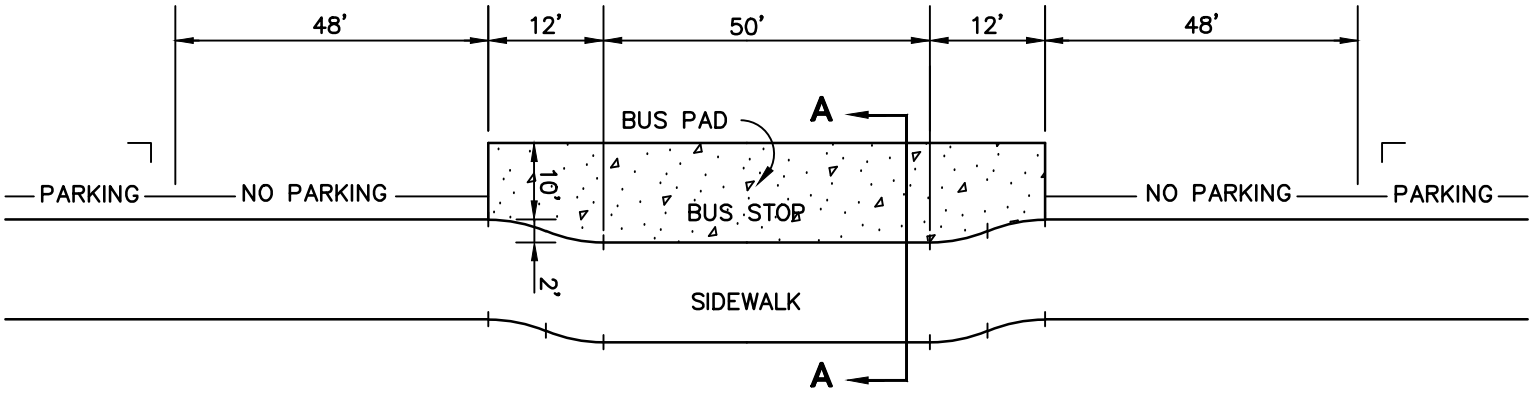
	BUS STOP AT INTERSECTION	STD. NO. **211**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

MID BLOCK BUS STOP

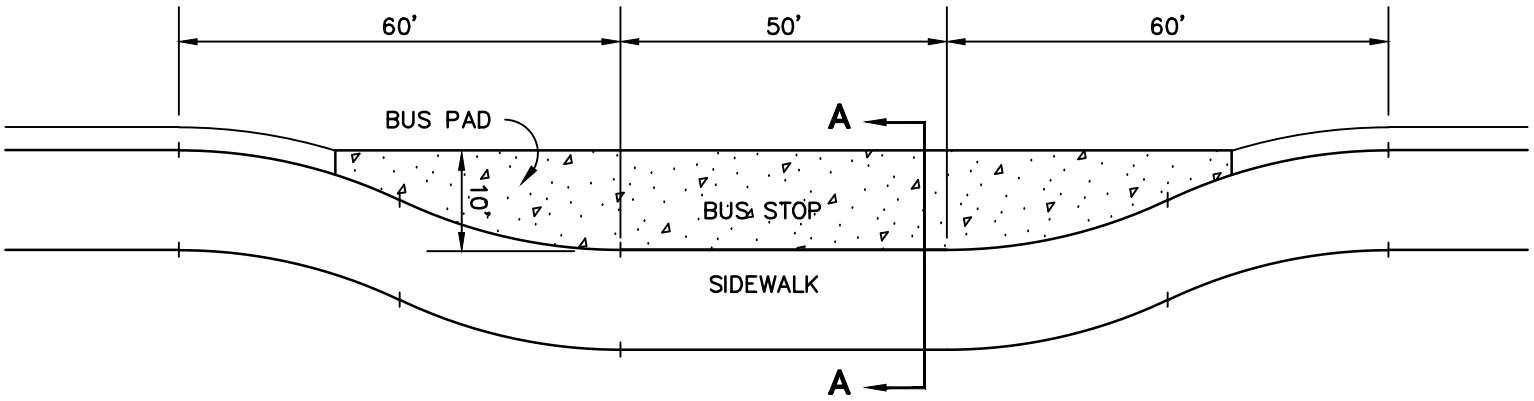
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 211

SHEET 3 OF 4



ON STREETS WITH PARKING



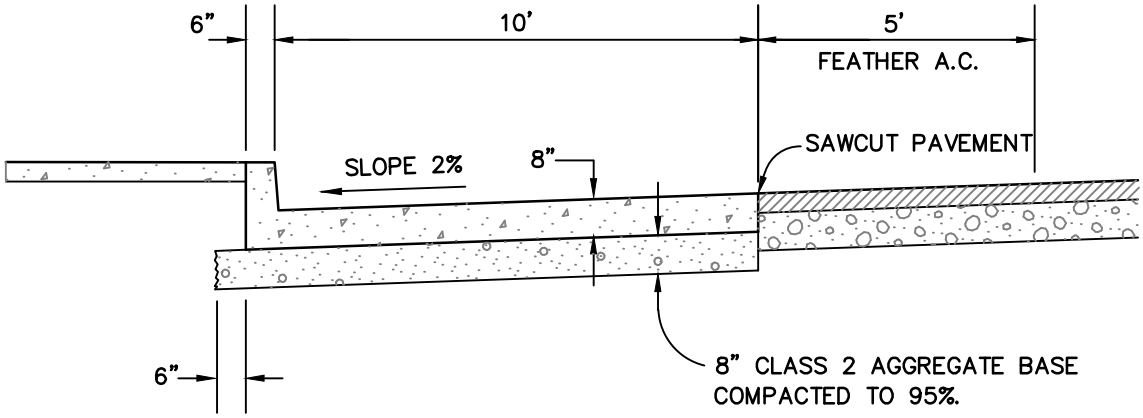
ON STREETS WITH NO PARKING

NOTES:

1. SEE SECTION A–A, SHEET 3.

2. BUS BENCHES AND SHELTER SHALL BE LOCATED BEHIND THE SIDEWALK OR IN SUCH A MANNER THAT A MINIMUM 5' CLEAR SIDEWALK IS PROVIDED.

3. DESIGN SHALL CONFORM TO THESE REQUIREMENTS, EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

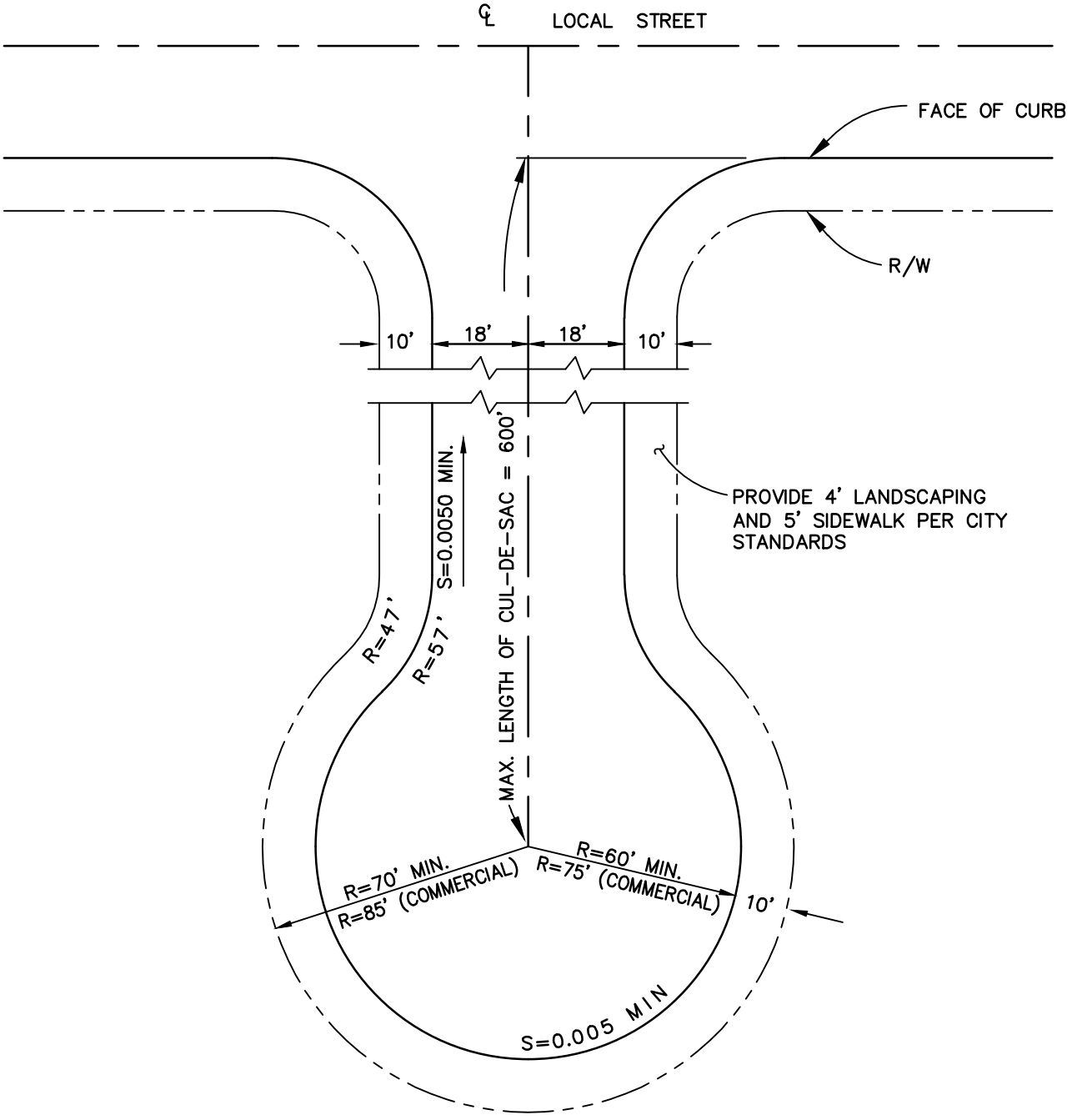


SECTION A-A

NOTES:

1. EXPANSION JOINTS & SCORE MARKS TO MATCH EXISTING CURB, GUTTER, & SIDEWALK.
2. USE NOT LESS THAN 6 SACKS OF CEMENT PER CUBIC YARD.
3. CONSTRUCT SUBDRAINS WHEN REQUIRED BY CITY ENGINEER.
4. REINFORCING STEEL REQUIRED IN CONC. #4 @ 12" O.C. EACH WAY, OR #5 @ 16" O.C. EACH WAY.
5. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**CONCRETE BUS PAD DETAIL**	STD. NO. **211**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012

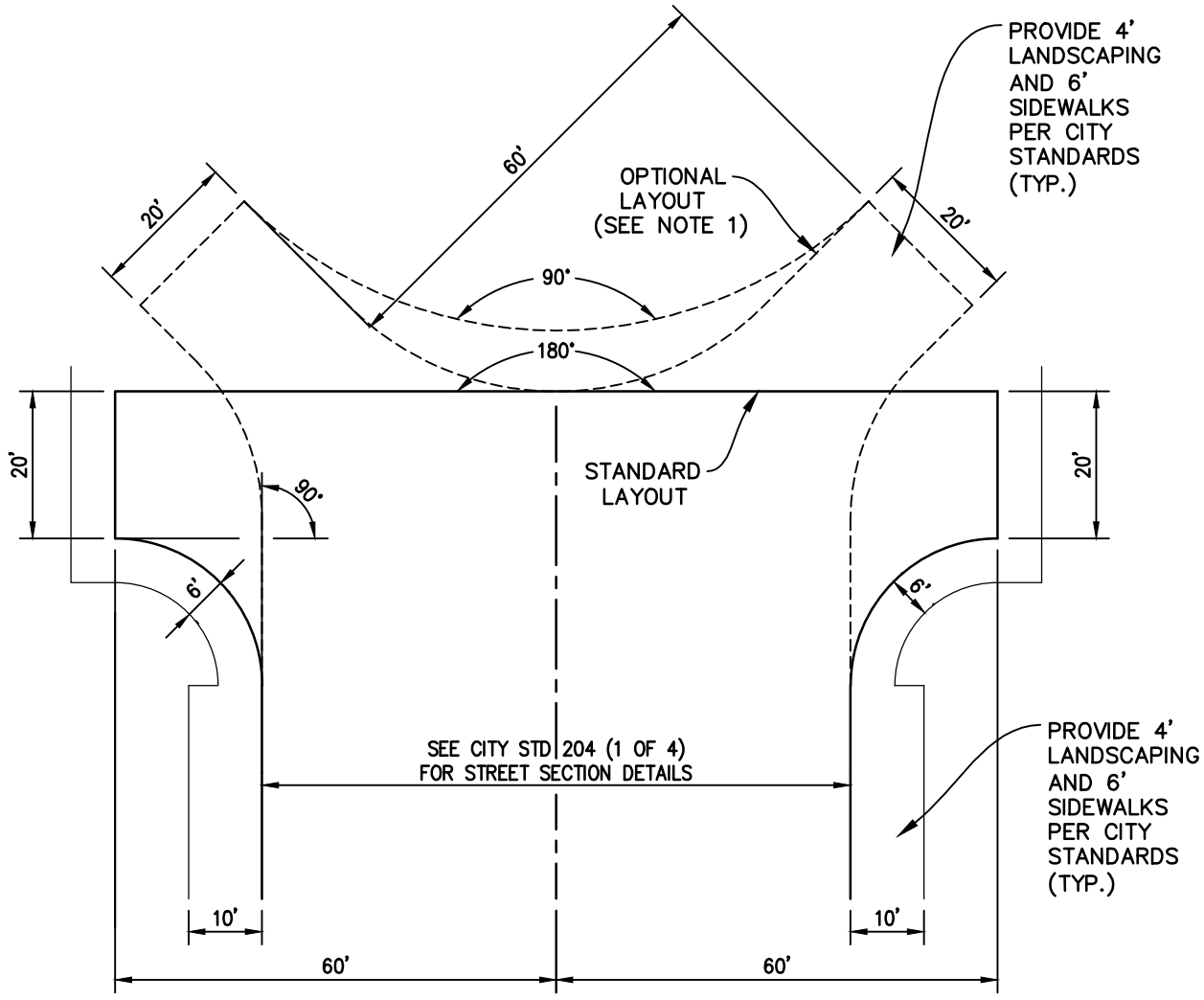


CROSS SLOPE IN BULB AREA
SHALL BE MIN 2%.

RESIDENTIAL CUL-DE-SAC

STD. NO. 212

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



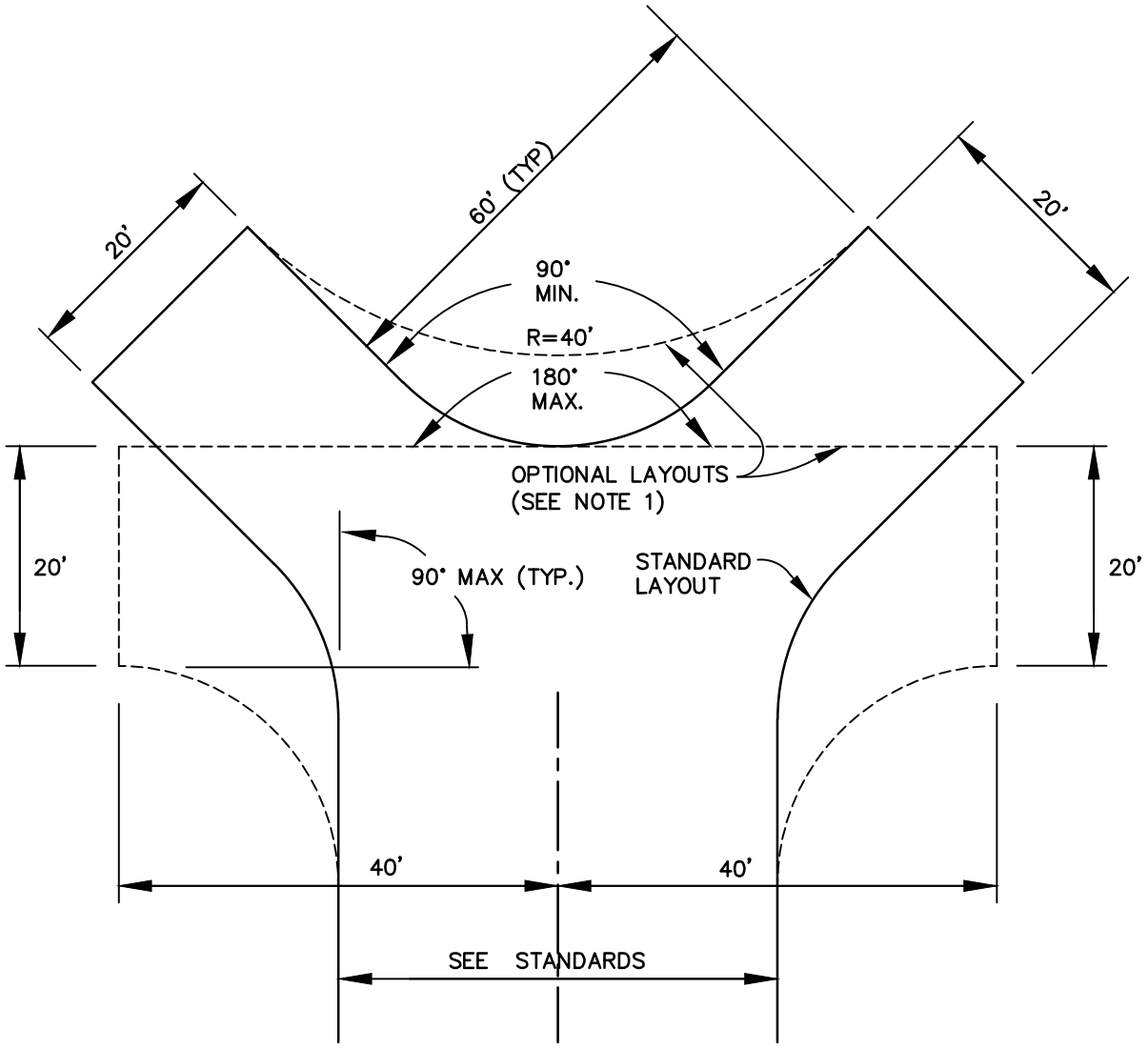
NOTES:

1. FOR RESIDENTIAL AND PRIVATE STREETS. SEE CITY STD. 204 (1 OF 4) FOR STREET SECTION DETAILS.
2. TO BE USED ONLY WHEN SPECIFICALLY AUTHORIZED BY THE CITY ENGINEER AND FIRE PROTECTION DISTRICT.
3. ALL RADII 20' EXCEPT AS NOTED.
4. SINGLE-SIDED TURNAROUNDS OF EQUIVALENT DIMENSIONS MAY BE USED.

HAMMERHEAD TURN-AROUND

STD. NO. 212

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



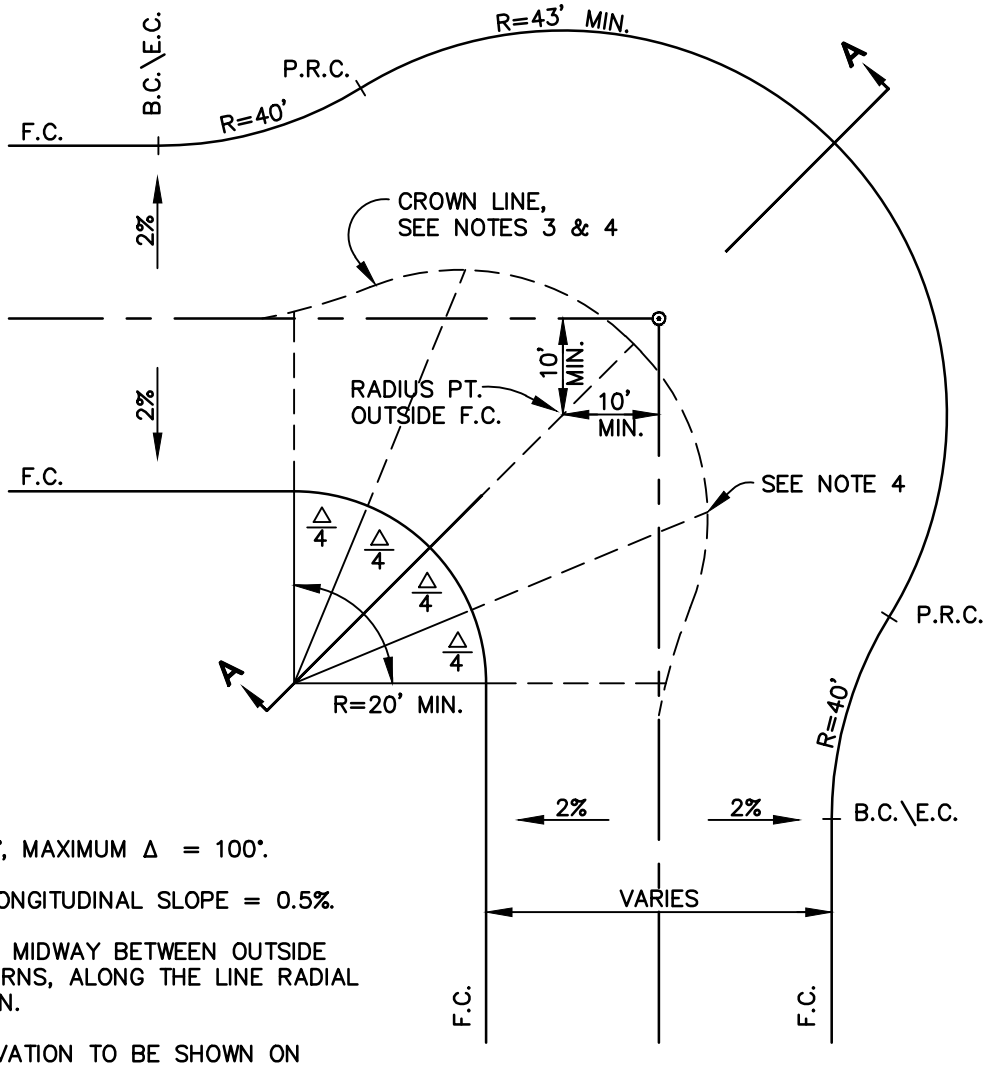
NOTES:

1. TO BE USED ONLY WHEN SPECIFICALLY AUTHORIZED BY THE DIRECTOR OF PUBLIC WORKS AND FIRE PROTECTION DISTRICT.
2. ALL RADII 20', EXCEPT AS NOTED.
3. SINGLE SIDED TURNAROUNDS OF EQUIVELENT DIMENSIONS MAY BE USED.

HAMMERHEAD TURN AROUND RESIDENTIAL PRIVATE STREETS AND ACCESS WAYS

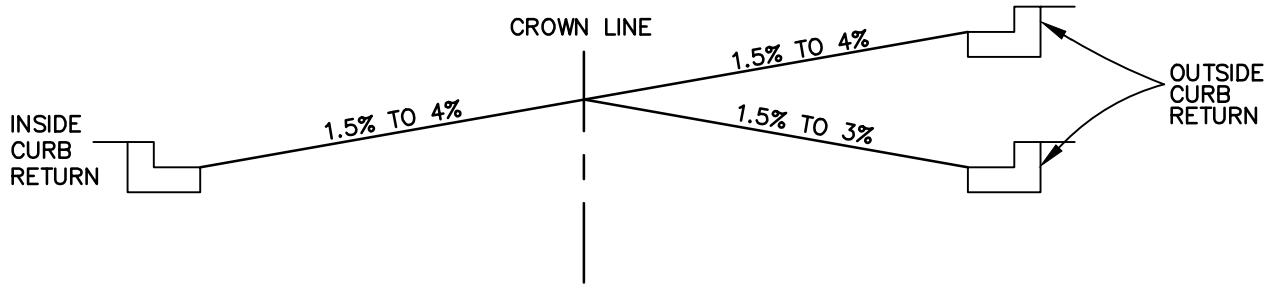
STD. NO. 213

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTES:

1. MINIMUM Δ = 60°, MAXIMUM Δ = 100°.
2. MINIMUM CURB LONGITUDINAL SLOPE = 0.5%.
3. CROWN LINE LIES MIDWAY BETWEEN OUTSIDE AND INSIDE RETURNS, ALONG THE LINE RADIAL TO INSIDE RETURN.
4. CROWN LINE ELEVATION TO BE SHOWN ON THE PLANS AT Δ/4 POINTS.
5. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.



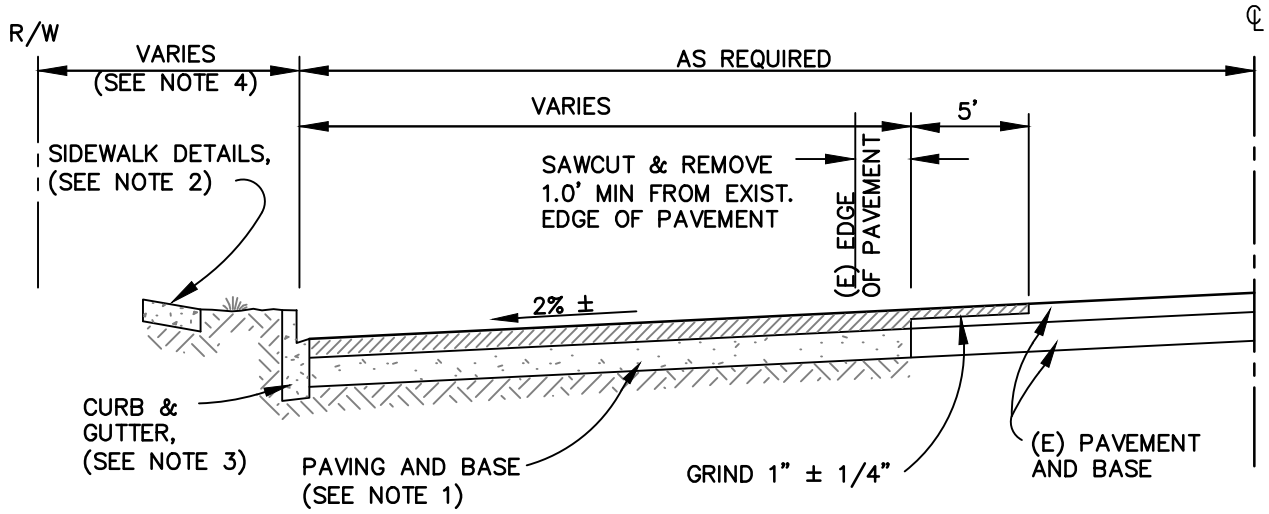
SECTION A-A

MAXIMUM & MINIMUM CROSS SLOPES

STANDARD STREET KNUCKLE RESIDENTIAL AND MINOR STREETS

STD. NO. 214

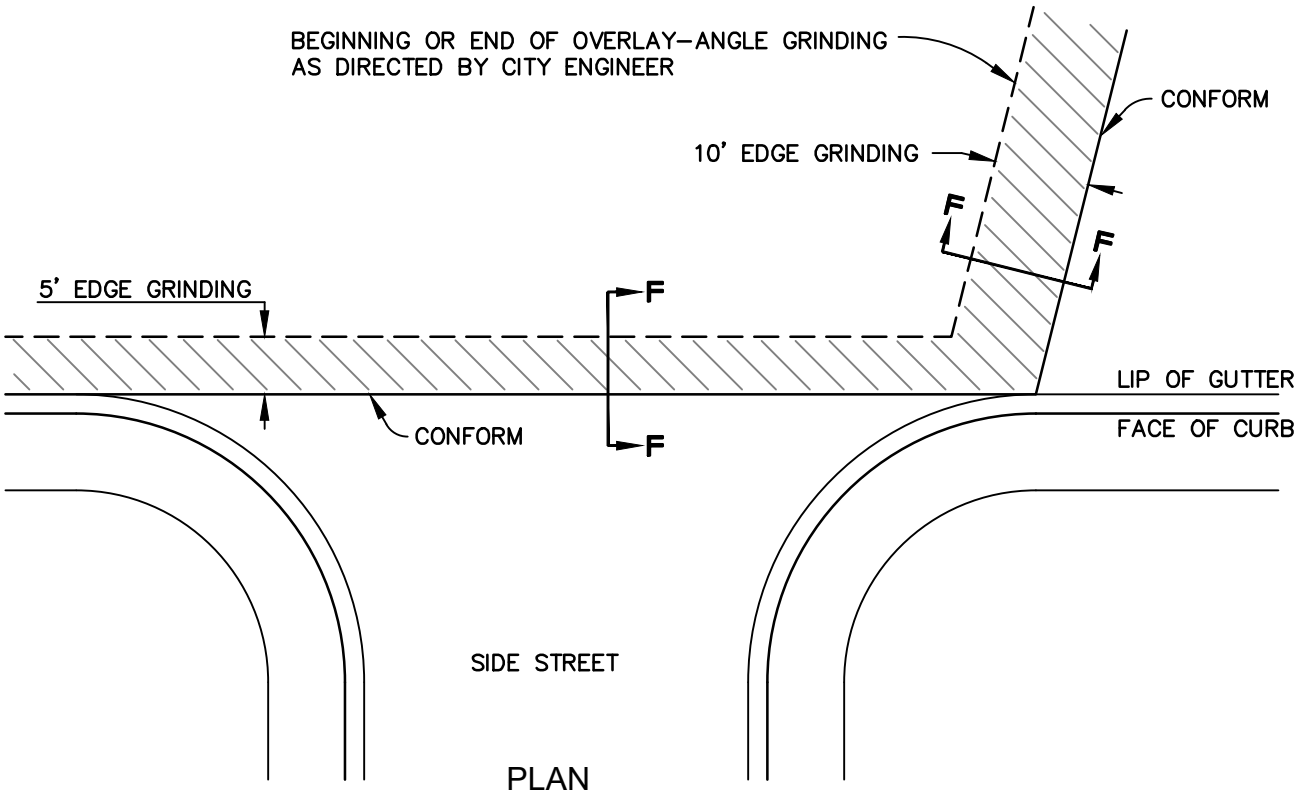
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



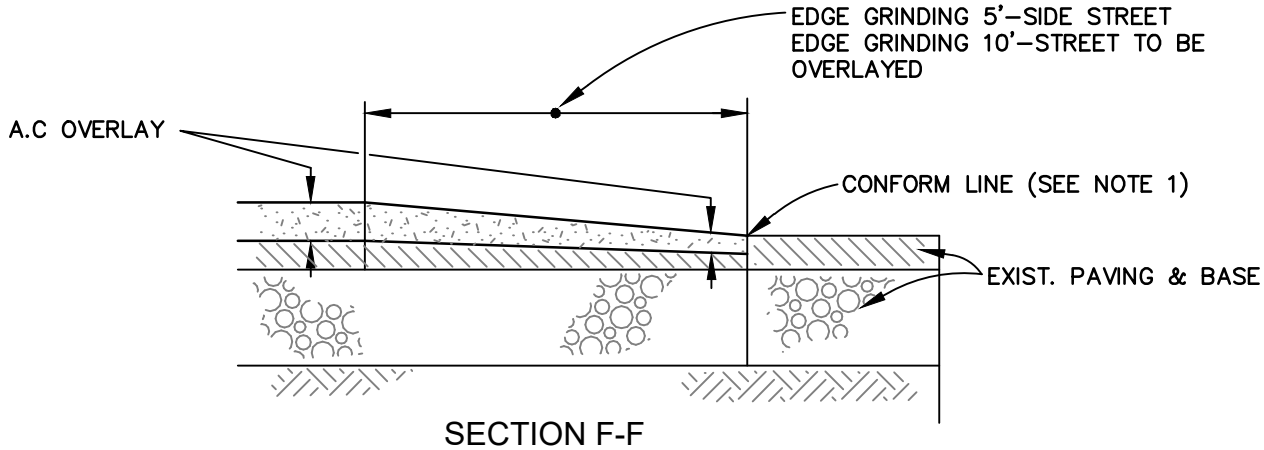
NOTES:

1. PAVING AND BASE THICKNESS TO BE DETERMINED USING CITY PAVEMENT DESIGN STANDARDS. MINIMUM PAVEMENT THICKNESS TO BE 0.25'.
2. SEE STD. 205 FOR SIDEWALK DETAILS.
3. SEE STD. 205 FOR CURB & GUTTER DETAILS.
4. DISTANCE BETWEEN FACE OF CURB AND RIGHT-OF-WAY TO BE PER STDS. 203 AND 204.

	STREET WIDENING/PAVEOUT DETAIL	STD. NO. **215**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012



PLAN

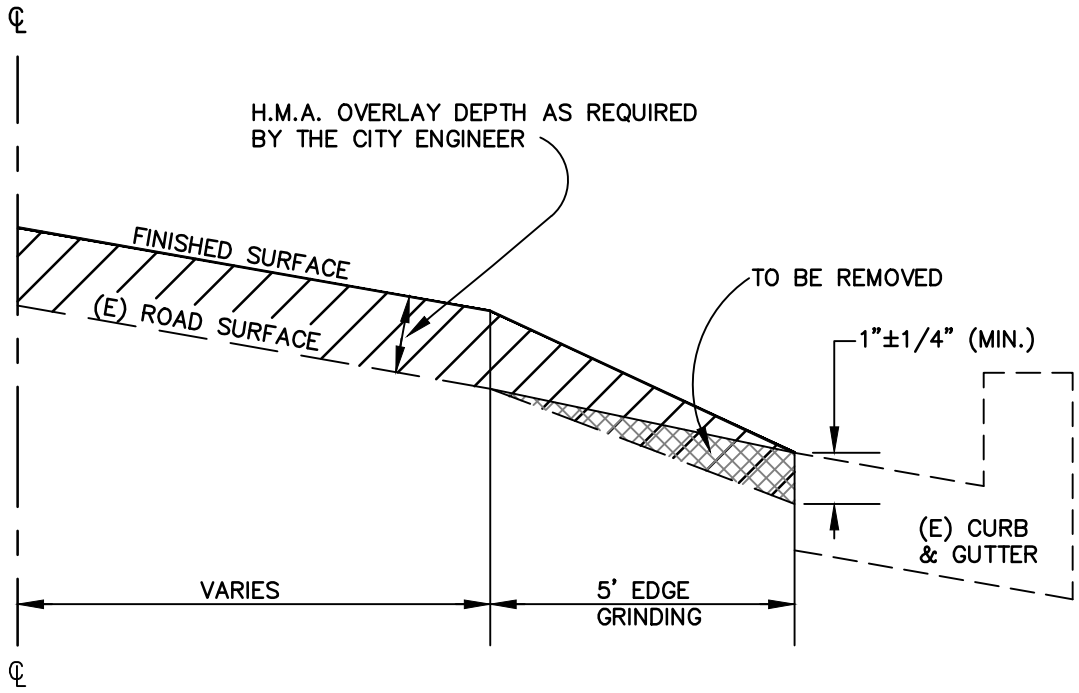


SECTION F-F

NOTES:

1. EDGE GRINDING SHALL BE 1"±1/4".
2. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

	SIDE STREET AND END OF OVERLAY CONFORM	STD. NO. **216**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012



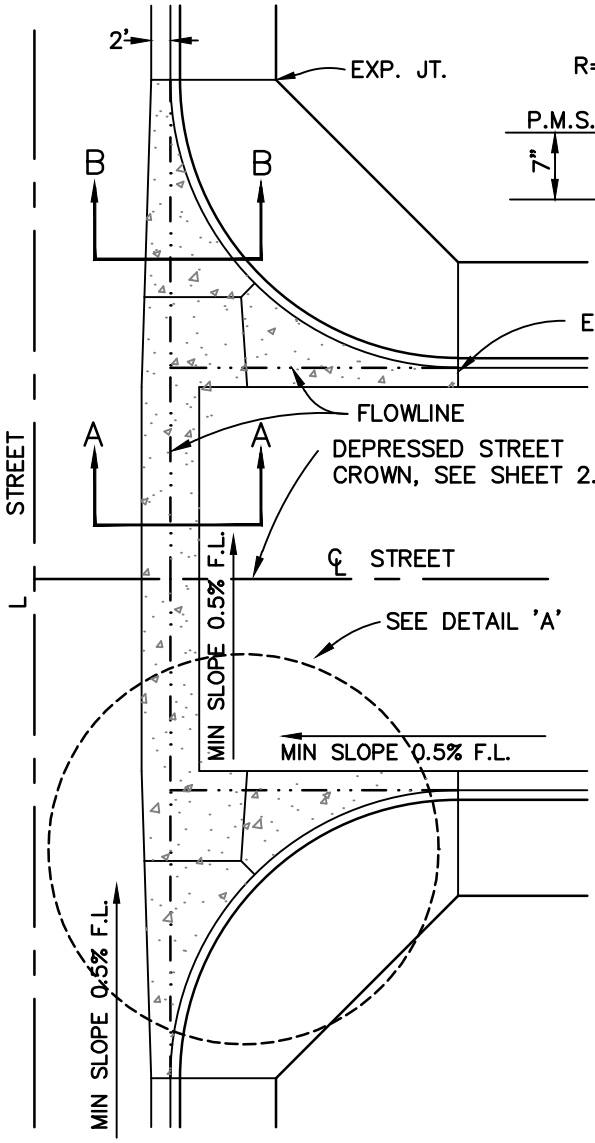
NOTES:

1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

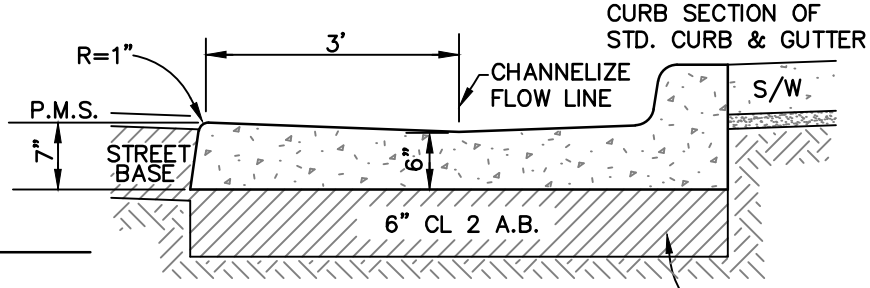
EDGE GRINDING AT LIP OF GUTTER FOR OVERLAY

STD. NO. 217

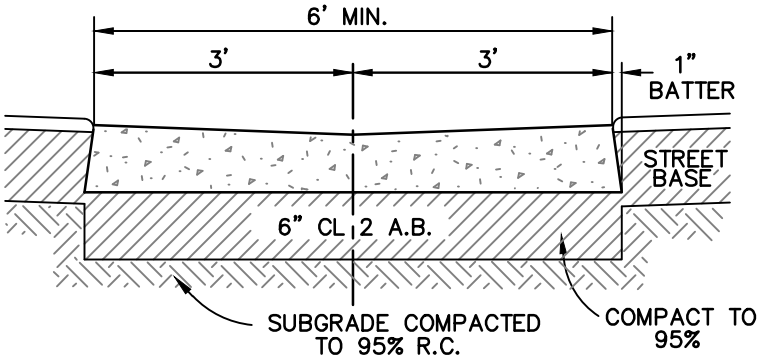
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



TYP. CROSS-GUTTER PLAN

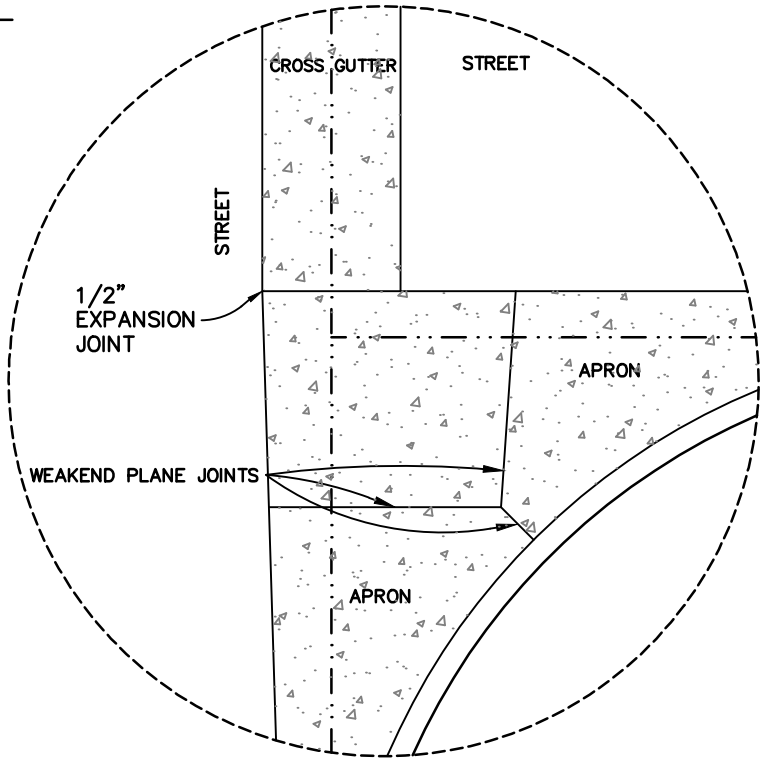


SECTION B-B



SECTION A-A

SEE DETAIL 'A'



DETAIL "A"

TYPICAL BOTH SIDES

NOTE:

ALL CONCRETE TO HAVE A MINIMUM OF 6 SACK PER CUBIC YARD.

LEGEND:

EXP. JOINT — 1/2" EXPANSION JOINT

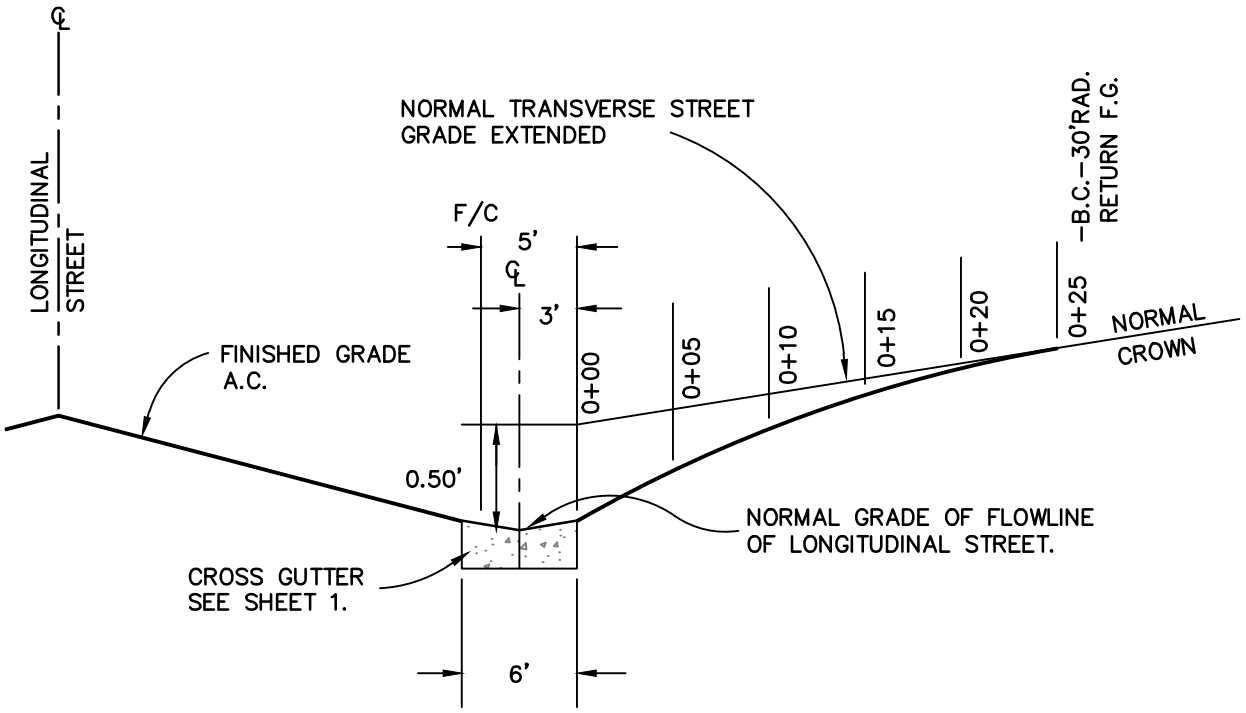
AREA OF APRON & CROSS GUTTER

SHEET 1 OF 2

STANDARD P.C.C. CROSS GUTTER

STD. NO. 218

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



PROFILE ALONG ℄ TRANSVERSE STREET

NOTES:

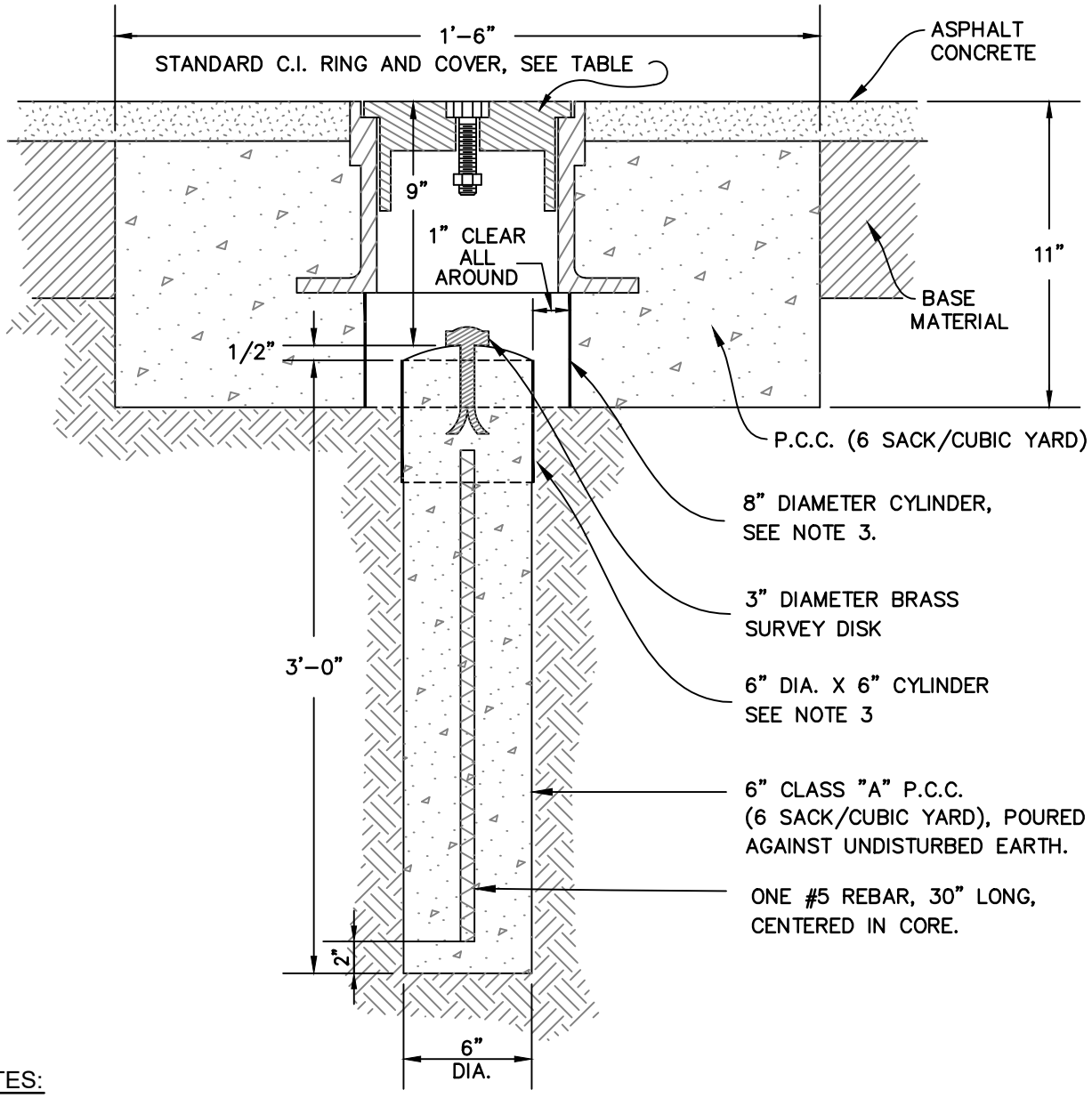
ORDINATES, IN DECIMAL PARTS OF A FOOT, ESTABLISH THE DISTANCE OF THE PAVEMENT SURFACE OF THE TRANSVERSE STREET BELOW THE NORMAL STREET GRADE, FROM STA 0+00 TO 0+25.

A.C. SURFACING						
STA	0+00	0+05	0+10	0+15	0+20	0+25
ORDIN	0.42	0.31	0.20	0.09	0.02	0.00

STANDARD STREET PROFILE AT P.C.C. CROSS GUTTER

STD. NO. 218

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012



NOTES:

1. SURVEYOR OR ENGINEER SETTING THE MONUMENT SHALL INDICATE EXACT POINT BY MAKING A CROSS ON THE CAP AND SHALL STAMP YEAR SET AND HIS/HER LICENSE TYPE AND NUMBER.
2. THE DEPTH OF THE MONUMENT POST SHALL BE LENGTHENED OR SHORTENED AS DICTATED BY THE GROUND CONDITIONS OR AS APPROVED BY THE CITY ENGINEER. IN SOFT GROUND OR FILL ARE AS THE MONUMENT POST SHALL BE LENGTHENED TO BED IT ON A STABLE BASE.
3. CYLINDER MATERIAL SHALL BE THINWALL A.B.S. OR P.V.C. PLASTIC PIPE.
4. TOP OF MONUMENT CORE SHALL BE FINISHED SMOOTH AND ROUNDED WITH NO CONCRETE ABOVE EDGE OF BRASS SURVEY MARKER.
5. ASTM CLASS 30 IRON CASTINGS DIPPED IN ASPHALT PAINT

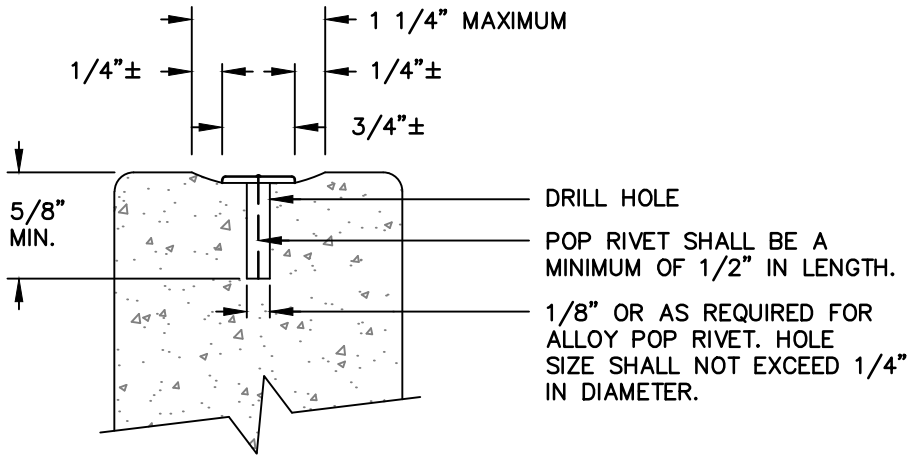
APPROVED MONUMENT COVERS:

1. SOUTH BAY FOUNDRY SBF 1201
2. "VISCO NO. 129"
3. "AMERICAN BRASS AND IRON FOUNDARY MODEL 5020-21"
4. ARTMARK PROD. CO. APC-51
5. SANTA ROSA CAST PRODUCTS SP-51

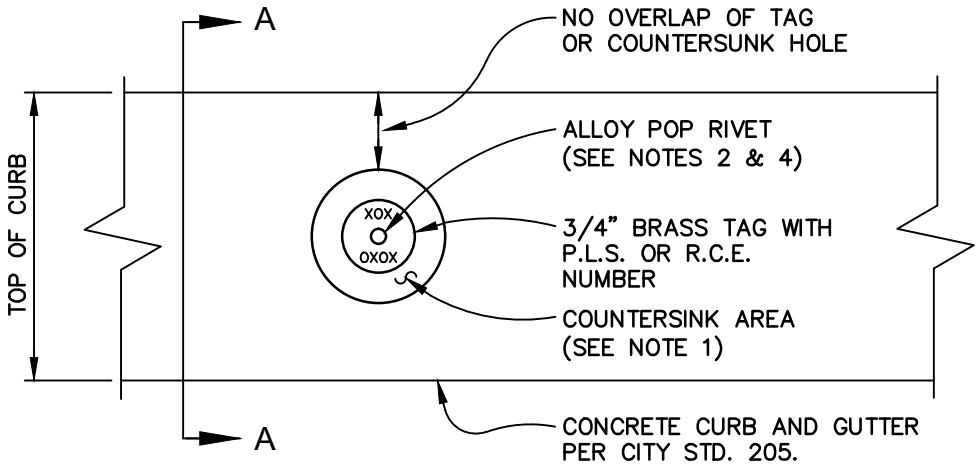
CITY MONUMENT

STD. NO. 219

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



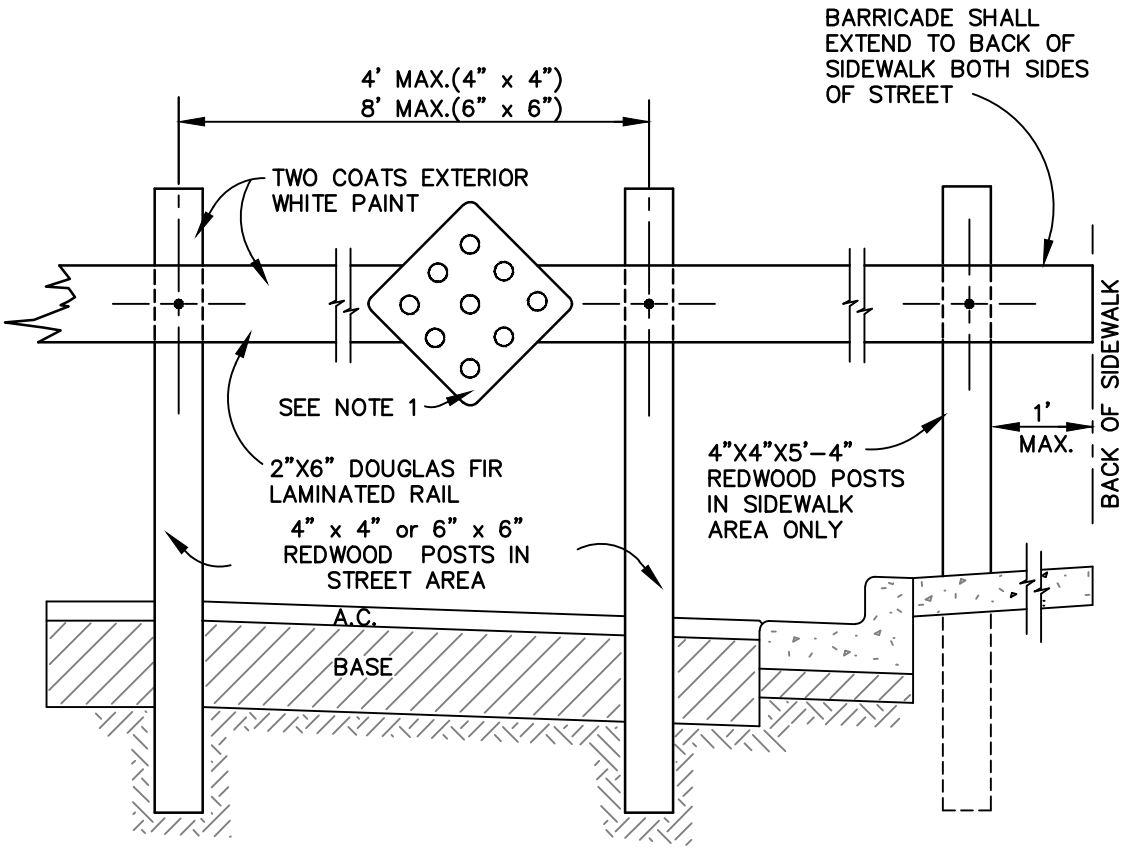
SECTION A-A

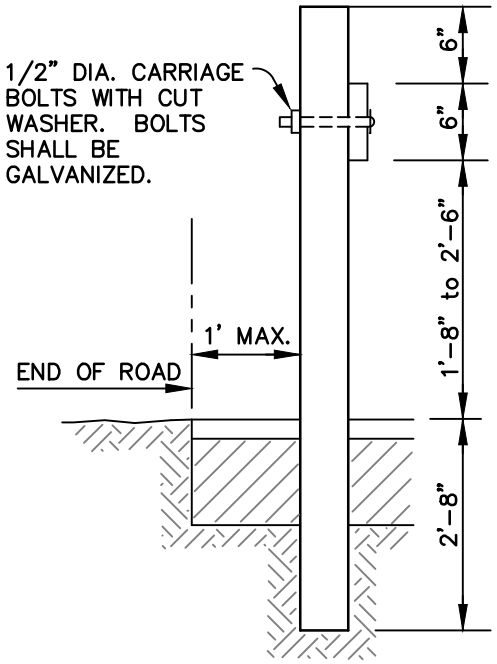


NOTES:

1. BRASS TAG SHALL BE COUNTERSUNK SO THAT TOP OF TAG AND RIVET IS AT OR BELOW THE SURFACE OF THE TOP OF CURB. BRASS TAG SHALL BE SET TO ENSURE A PERMANENTLY PLACED MONUMENT. EPOXY RESIN MAY BE USED IN ADDITION TO ABOVE METHODS.
2. DRILL HOLE SHALL BE DRILLED ONLY. AN ALLOY POP RIVET SHALL BE USED TO ATTACH BRASS TAG TO TOP OF CURB.
3. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.
4. IMPACT FASTENERS ARE NOT ALLOWED.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**LOT CORNER REFERENCE MONUMENT AT STREET FRONTAGE**	STD. NO. **220**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012





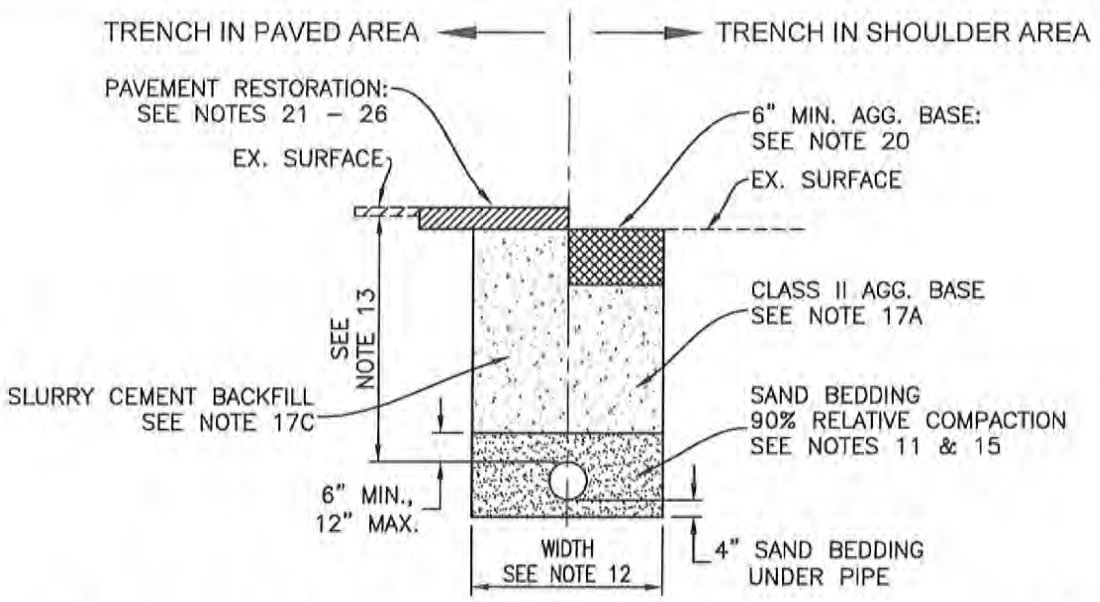
NOTES:

1. INSTALL 18" X 18" ALUMINUM TYPE N-2 REFLECTOR, NO MORE THAN 8' O.C., MINIMUM 3
2. SIDEWALKS ONLY – INSTALL 4" YELLOW REFLECTORS.

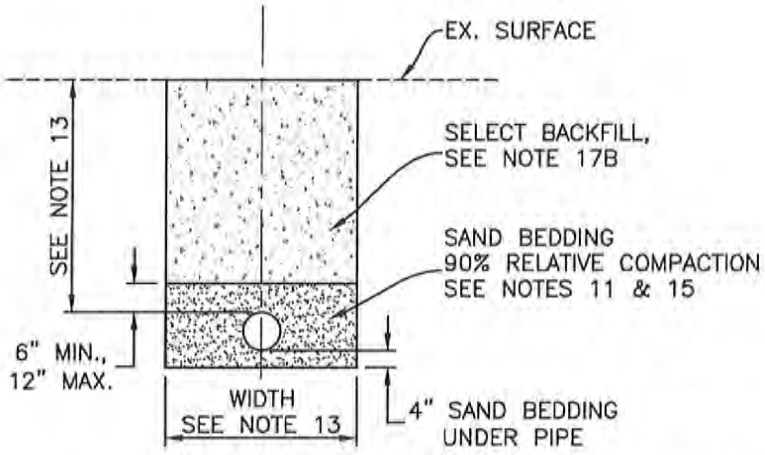
STANDARD BARRICADE

STD. NO. 221

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



DETAIL 'A': TRENCH IN ROADWAY, SHOULDER OR DRIVEWAY AREAS



DETAIL 'B': TRENCH OUTSIDE ROADWAY, SHOULDER OR DRIVEWAY AREAS

TRENCH MATERIAL REQUIREMENTS

1. SAND SLURRY OR CONTROLLED LOW STRENCHT MATERIALS (CLSM)
   - A. CONTAINS A MINIMUM OF 94 LBS AND MAXIMUM OF 188 LBS OF CEMENTATEOUS MATERIAL
   - B. COMPRESSIVE STRENGTH BETWEEN 75 AND 150 PSI AT 28 DAYS
   - C. AIR ENTRAINMENT ADDITIVES FOR WORKABILITY
   - D. PROVIDE MIX DESIGN WITH TEST RESULTS

2. AGGREGATE BASE
   - A. INCH CLASS 2 AGGREGATE BASE PER CALTRANS SECTION 39, LATEST VERSION
   - B. MINIMUM DRY UNIT WEIGHT BASED ON ASTM D1557 OF 125 PCF.
   - C. PROVIDE CERTIFICATE OF COMPLIANCE WITH TEST RESULTS

(Continued on Sheet 2)

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	STANDARD TRENCH DETAIL TRENCH BACKFILL				STD. NO. 222
	SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD:	DATE: NOV 2018

3. SAND BEDDING
   A. FREE FROM CLAY OR ORGANIC MATERIAL
   B. MEET THE FOLLOWING GRADING REQUIREMENT:

SIEVE SIZE	PERCENT PASSING
1/2"	100
NO. 4	90 – 100
NO. 200	0 – 5

   C. PROVIDE CERTIFICATE OF COMPLIANCE

4. SELECT BACKFILL
   A. FREE OF CONTAMINANTS, ORGANICS AND OTHER DELETERIOUS MATERIAL
   B. NO ROCKS GREATER THAN 6 INCHES
   C. PRIOR APPROVAL BY CITY ENGINEER TO ASSURE PROPOSE BACKFILL FIT FOR PURPOSE. OBTAIN WRITTEN APPROVAL PRIOR TO USE.

5. HOT MIX ASPHALT (HMA)
   A. COMPLY WITH CALTRANS STANDARD SPECIFICATIONS, SECTION 39, 2010 RO 2015.
   B. ½ INCH TYPE A GRADING FOR ALL LIFTS
   C. PG 64–16 BINDER
   D. PROVIDE JOB MIX FORMULA ON CEM 3511 AND 3512 FORMS

6. CONCRETE (PCC)
   A. 4000 PSI AT 28 DAYS
   B. 3 INCH MAXIMUM SLUMP
   C. 1 INCH MAXIMUM COMBINED GRADATION
   D. COMPLY WITH CALTRANS STANDARD SPECIFICATIONS SECTION 90 FOR MATERIALS QUALITY, EITHER 2010 OR 2015 EDITION.
   E. PROVIDE MIX DESIGN WITH TEST RESULTS

TRENCH CONSTRUCTION REQUIREMENTS

7. CONTRACTOR RESPONSIBLE FOR COORDINGATION WITH PRIVATE SOILS ENGINEER AND CITY INSPECTOR 48 HOURS PRIOR TO EXCAVATION AND SUBSEQUENT WORK.
8. ALL TRENCH EDGES SHALL EITHER BE SAWCUT OR COLD PLANED.
9. DAMAGED EDGES SHALL BE RESAWCUT TO PROVIDE SQUARE EDGES AND LAYOUT IMMEDIATELY PRIOR TO PAVING.
10. NO SOLID BLOCKING PERMISSIBLE BENEATH PIPE.
11. SAND BEDDING SHALL BE PLACED, COMPACTED AND SHAPED PRIOR TO PLACING PIPE. FOR SAND BEDDING USED ON HDPE PIPE, SAND SHALL BE HAND TAMPED INTO CORRIGATION VOIDS USING A SHOVEL HANDLE OR OTHER IMPLEMENT
12. MINIMUM TRENCH WIDTHS SHALL BE AS FOLLOWS WITH PIPES CENTERED IN TRENCH:

PIPE TYPE & USE	BACKFILL TYPE	TRENCH WIDTH (MINIMUM)
Miscellaneous electrical, irrigation, communication & PVC pipe (excludes HDPE) 6" or less inside diameter	Sand Slurry /CLSM	Outside of pipe or conduit plus 6", 12" minimum.
Water lines, sanitary sewer, and storm drain pipes 6" to 24" diameter	Sand Slurry /CLSM	Outside of pipe or conduit plus 12"; plus 18" minimum for HDPE
Water lines, sanitary sewer, and storm drain pipes greater than 24" up to 48" diameter	Sand Slurry /CLSM	Outside of pipe plus 24" for all pipe types
	Aggregate Base	Outside of pipe plus 36" for all pipe types
	Native Soils	Outside of pipe plus 48" for all pipe types
Sanitary sewer and storm drain pipes greater than 48" diameter	Sand Slurry /CLSM	Outside of pipe plus 24" for all pipe types
	Aggregate Base	Outside of pipe plus 24" for all pipe types
	Native Soils	Outside of pipe plus 24" for all pipe types

(Continued on Sheet 3)

STANDARD TRENCH NOTES

STD. NO. 222

SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD: | DATE: NOV 2018

13. MINIMUM DEPTHS TO TOP OF PIPE FROM SURFACE:

PIPE TYPE & USE	MINIMUM DEPTH
Communication conduits and sleeves with 24 volts or less, irrigation water, sewer and other pipes or conduits.	24 INCHES
Communication conduits and sleeves with voltages greater than 24 volts	30 INCHES
All water line mains and services	36 INCHES

14. SAND SLURRY OR OTHER CITY ENGINEER PRE-APPROVED MATERIAL CUT OFF DAMS SHALL BE PLACED IN PERMEABLE BACKFILL TO PREVENT WATER MIGRATION. SAND SLURRY DAMS SHALL BE CONSTRUCTED SUCH THAT THERE IS A MINIMUM OF 12 INCHES (MAXIMUM OF 30 INCHES) OF SAND SLURRY DIVIDING THE SAND BEDDING. CUT OFF DAMS SHALL BE PLACED EVERY 100 FEET FOR TRENCH SLOPES OF 2 % TO 5% AND EVERY 50 FEET FOR TRENCH SLOPES ABOVE 5%. TRENCH SLOPES LESS THAN 2% DO NOT REQUIRE CUT OFF DAMS.

BACKFILL COMPACTION AND TESTING REQUIREMENTS

15. SAND BEDDING SHALL BE COMPACTED USING A VIBRAPLATE TYPE COMPACTOR. SAND BEDDING SHALL BE FULLY WETTED BUT NOT FLOODED PRIOR TO COMPACTION. 90% RELATIVE COMPACTION REQUIRED.

16. NO JETTING ALLOWED FOR ANY BACKFILL OR BEDDING TYPE.

17. COMPACTION TESTING REQUIREMENTS:
    A. UNDER UNPAVED SHOULDERS: 95% RELATIVE COMPACTION FROM BEDDING TO SURFACE FOR ALL MATERIAL TYPES.
    B. UNIMPROVED AREAS: 90% RELATIVE COMPACTION TO WITHIN 12 INCHES OF SURFACE. 85% RELATIVE COMPACTION IN TOP 12 INCHES OF LANDSCAPE AREAS, 90% FOR OTHER AREAS.
    C. UNDER ROADWAY AREAS: SAND SLURRY REQUIRES CONSOLIDATION BUT NOT COMPACTION. NO COMPACTION TESTING REQUIRED.

18. AGGREGATE BASE AND SELECT BACKFILL REQUIRES CONTINUOUS MONITORING AND TESTING BY A SOILS ENGINEER HIRED BY THE DEVELOPER OR CONTRACTOR.

19. TRENCH COMPACTION TESTING DETAILS
    A. LABORATORY DENSITY: ASTM D1557 (DRY) OR CTM216G (WET)
    B. FIELD DENSITY: ASTM D6398
    C. ONE TEST FOR EACH 200 LINEAL FEET OF TRENCH FOR EACH VERTICAL 12 INCHES OF TRENCH DEPTH OR PORTION THEREOF. 3 TEST LOCATIONS PER LIFT MINIMUM.
    D. PROVIDE TEST RESULTS PRIOR TO HMA PAVING.

PAVEMENT RESTORATION

20. UNPAVED SHOULDERS SHALL HAVE AN AGGREGATE BASE MINIMUM THICKNESS OF 6 INCHES.

21. CONCRETE STREETS SHALL BE REPLACED TO MATCH THE EXISTING THICKNESS PLUS 1 INCH. CONCRETE SHALL BE 4000 PSI. PLACE 18 INCH LONG X 5/8 INCH DIAMETER REBAR DOWELS AT 24 INCH ON CENTER ALONG ALL EDGES. PROTECT CONCRETE AFTER PLACEMENT WITH 1 INCH MINIMUM STEEL PLATES FOR A MINIMUM OF 10 CALENDAR DAYS. PROVIDE COARSE BROOM FINISH PERPENDICULAR TO TRAFFIC.

22. WHERE EXISTING STREET IS CONCRETE OVERLAID WITH ASPHALT, THE CONCRETE SECTION SHALL BE REPLACED TO MATCH THE EXISTING THICKNESS PLUS 1 INCH. CONCRETE SHALL BE 4000 PSI. PLACE 18 INCH LONG X 5/8 INCH DIAMETER REBAR DOWELS AT 24 INCH ON CENTER ALONG ALL EDGES. PROTECT CONCRETE AFTER PLACEMENT WITH 1 INCH MINIMUM STEEL PLATES FOR A MINIMUM OF 10 CALENDAR DAYS PRIOR TO PAVING. HMA PAVING THICKNESS SHALL MATCH EXISTING ASPHALT THICKNESS.

23. FINAL TRENCH PAVING IS REQUIRED TO BE EXPANDED TO A PAINTED LINE STRIPE, EXISTING PAVEMENT PATCH, LIP OF GURRER OR EDGE OF PAVEMENT WHERE SUCH STREAT FEATURE IS WITHIN 3 FEET OF THE FINAL SAWCUT.

(Continued on Sheet 4)

STANDARD TRENCH NOTES

STD. NO. 222

SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD: | DATE: NOV 2018

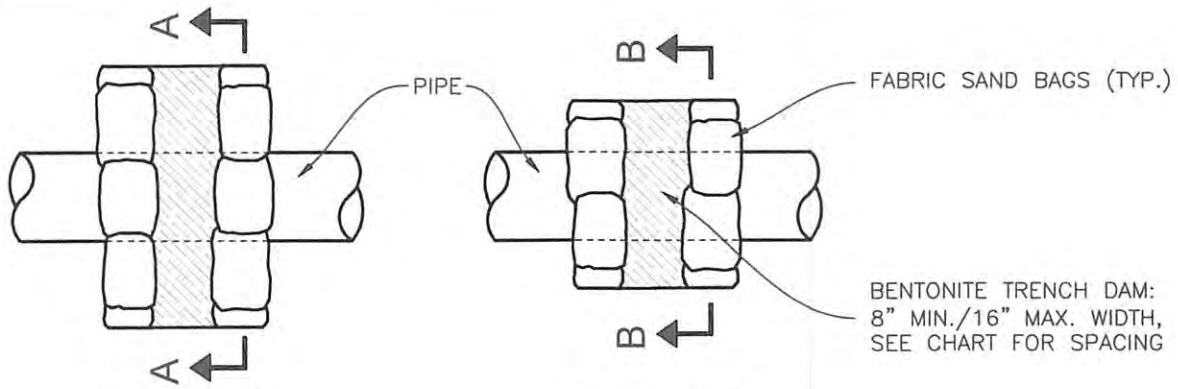
23. FINAL TRENCH PAVING IS REQUIRED TO BE EXPANDED TO A PAINTED LINE STRIPE, EXISTING PAVEMENT PATCH, LIP OF GUTTER OR EDGE OF PAVEMENT WHERE SUCH STREET FEATURE IS WITHIN 3 FEET OF THE FINAL SAWCUT.

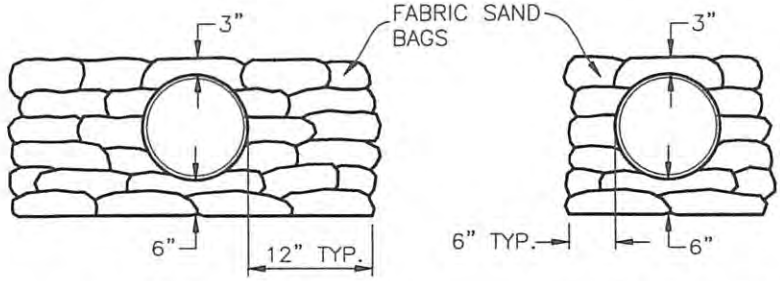
24. PERMANENT PAVING MUST BE COMPLETED WITHIN 30 DAYS. HMA OR CUTBACK (1 INCH MINIMUM THICKNESS) SHALL BE PLACED AS A TEMPORARY SURFACE IN ROADWAY AREAS AND SHALL BE MAINTAINED UNTIL PERMANENT PAVING IS COMPLETED. AT THE SOLE DISCRETION OF THE CITY ENGINEER, TRENCH PLATES MAY BE USED FOR UP TO 2 WEEKS. TRENCH PLATES SHALL HAVE A SKID RESISTANT SURFACE, SHALL BE PLACED SUCH THAT THERE IS NO ROCKING OR MOVEMENT, AND SECURED WITH 24-INCH WIDE TAPERED TEMPORARY PAVING ON ALL SIDES OF THE PLATE TO PROVIDE A SMOOTH TRANSITION. ALL TEMPORARY PAVING INCLUDING STEEL PLATE TRANSITIONS SHALL BE MAINTAINED DAILY, INCLUDING WEEKENDS AND HOLIDAYS.

25. PERMANENT HMA PAVING SHALL BE A MINIMUM OF 3 INCHES THICKNESS OR MATCH THE EXISTING PAVEMENT THICKNESS (WHICHEVER IS GREATER). HMA TO BE PLACE IN LIFTS NOT TO EXCEED 3 INCHES. INSTALL PER 2010 CALTRANS STANDARD SPECIFICATION SECTION 39 INCLUDING TACK COAT PROVISIONS.

26. COMPACT HMA TO MINIMUM OF 90% OF CTM 309. IF TOTAL SQUARE FOOTAGE IS OVER 2000 SF, PROVIDE CORE TEST RESULTS AND CTM 309 FOR EACH 750 SQUARE FEET OF SURFACE AREA PRIOR TO PROJECT ACCEPTANCE.

27. TRENCH DAMS, IF REQUIRED, SHALL CONFORM TO THE FOLLOWING REQUIREMENTS AND DETAIL. THE TRENCH DAM SHALL CONSIST OF A BENTONITE TYPE MATERIAL SUCH AS AQUABLOK POND SEAL OR EQUIVALENT.





SECTION A–A

METHOD 'A'

(W/BASE ROCK BACKFILL)

SECTION B–B

METHOD 'B'

(W/CLSM BACKFILL)

TRENCH DAM SPACING CHART	
PIPE SLOPE	MAX. DISTANCE
<2%	300 FT
2 – 4%	200 FT
4 – 8%	100 FT
>8%	50 FT

STANDARD TRENCH NOTES
BENTONITE TRENCH DAM DETAIL

STD. NO. 222

SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD: Paul O Hann | DATE: JAN 2019

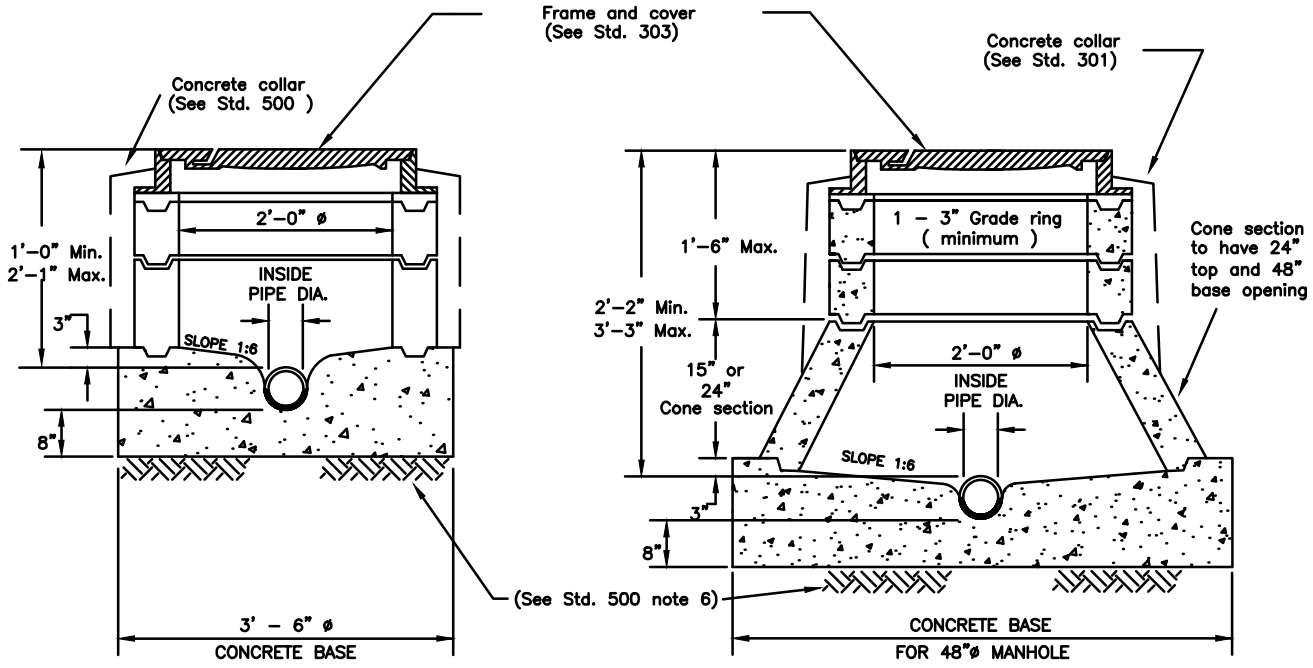
B – Sewer Standard Plans (300 Series)

SEWER STANDARD PLANS

DESCRIPTION

300 SERIES - SEWERS

300	Junction Structure for Multiple Laterals
301	Standard Precast Concrete Sanitary Sewer Manhole
302	Sanitary Manhole Retrofit
303	Manhole Frame and Cover
304	Inside Drop Inlet Manhole
305	Outside Drop Inlet Manhole
306	Standard Pre-cast Concrete Manhole Reducer Slabs
307	Rodding Inlet
308	Temporary Mainline Cleanout or Rodding Inlet
309	4” and 6” Sewer Service Lateral
310	Typical Sewer Service Connection Details
311	Discharge for Private Force Main
312	Abandoned Pipe Plug Detail
313	Abandoned Manhole Detail
314	Plastic Sewer Pipe Deflection Mandrell
315	Sewer-Water Main Crossing Details
316	Miscellaneous Pipe Installation Details
317	Precast Grease Interceptor
318	Sand and Grease Interceptor
319	Sampling Manhole Exterior Use
320	Sampling Box Building Interior
321	In Pavement Mainline Sewer Cleanout



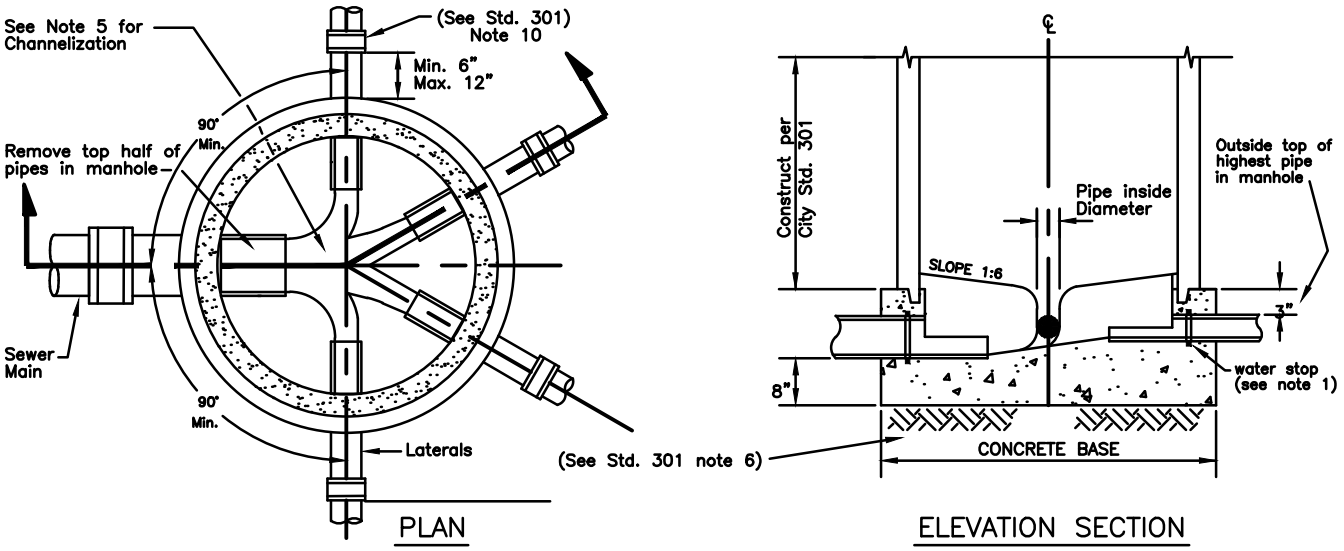
TYPE "A" MANHOLE

TYPE "B" MANHOLE

SHALLOW MANHOLE DETAILS

NOTE – See Std. 301 for typical construction details

NOTE – Type "A" Manhole to be installed only where specifically approved by the Director of Utilities.



PLAN

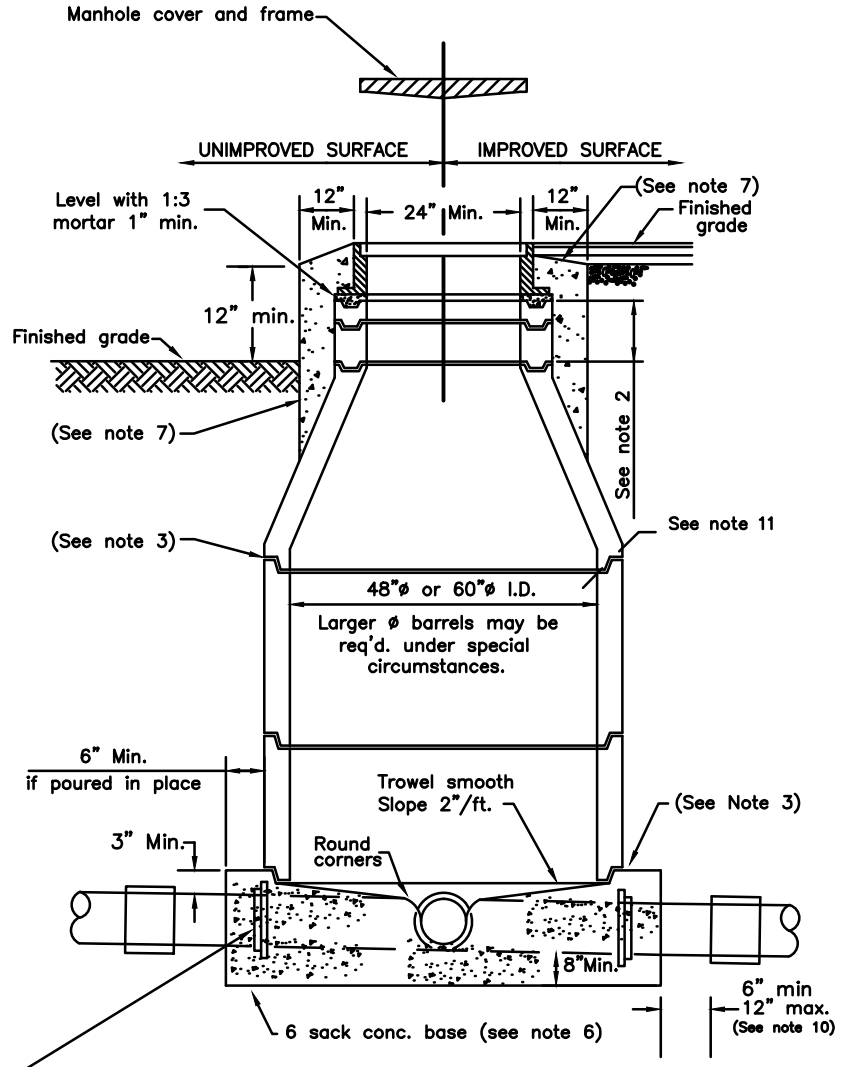
ELEVATION SECTION

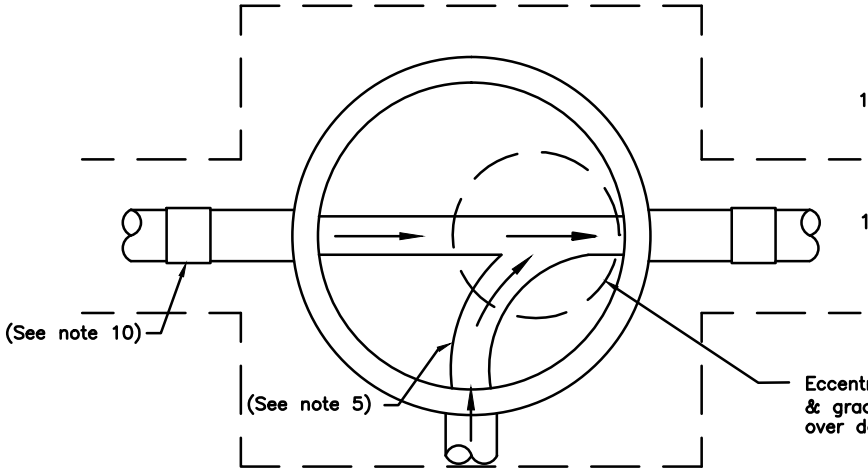
JUNCTION STRUCTURE FOR MULTIPLE LATERALS

NOTES:

1. An approved water stop shall be installed on all pipe entering or leaving a manhole and centered under manhole wall as shown.
2. Generally, the elevations of the top of all pipes entering the manhole base block shall be the same.
3. The maximum number of laterals to be connected to a manhole is (4) four.
4. See Std. 301 for manhole construction details.
5. The channels shall be formed to provide smooth flow through the manhole to the satisfaction of the City Engineer.
6. Channels and laterals through the exterior of the base shall be constructed radially.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**JUNCTION STRUCTURES FOR MULTIPLE LATERALS**				STD. NO. **300**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012





MANHOLE BASE

CHANNELIZATION PLAN AND LOCATION OF ECCENTRIC MANHOLE COVER

NOTES:

1. When manholes are installed in un-improved areas, the top of the cover shall be a min. of 1 foot above grade.
2. Min. of one 3" grade adjustment ring. Max. height of grade adjustment rings = 20". Alternately, contractor may cast grade adjustment rings in place.
3. Set all barrel sections & taper sections in plastic gasket, Ram-nek or approved alternate. Typical joint use (1) 3/4"x 2-1/2" Ram-nek seal, (2 seals in high water table areas).
4. Cone section (taper) must be concentric for 48"ø manhole or eccentric for 60"ø manhole unless otherwise specified and approved by the City
5. After lower ring section is set, break out top half of pipe flush with inside face of M.H. wall and construct shelf and u-shaped channel. Make elevation changes gradually and directional changes with smooth curves. Slope and size of channels shall match upstream and downstream pipes. Manhole channels with a horizontal change in direction of 30° or more shall have a minimum drop of 0.1' across the manhole or shall match the slope of the pipe, whichever is greater.
6. Poured-in-place base shall be poured full thickness on undisturbed soil. Precast base to be from City approved list and placed on 6" minimum of 3/4" drain rock installed against undisturbed earth.
7. 7 sack conc. collar shall be flush with finished grade.
8. Standard manhole barrel section per ASTM C478.
9. 48"ø I.D. M.H. to be used for sewer mains less than 18"ø. 60"ø I.D. M.H. to be used for all trunk and collector sewers 18"ø to 48"ø or where drop fittings are used.
10. Flexible pipe coupling is required on all pipe other than SDR 35 PVC pipe. Flex coupling to be installed in mainline trench and out of manhole excavation.
11. 60" Dia. Manholes are required for main lines 18" or larger in Dia.

STANDARD PRECAST CONCRETE SANITARY SEWER MANHOLE

STD. NO. 301

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

GENERAL NOTES

1. CONTRACTOR SHALL LET 12" 7 SACK CONCRETE COLLAR CURE FOR 24 HOURS PRIOR TO TRAFFIC LOADING. COVER MANHOLE WITH STEEL PLATE.

2. CONTRACTOR SHALL SUBMIT THE FOLLOWING IN ACCORDANCE WITH THE SPECIFICATIONS:

   A. WORK PLAN – INCLUDES SCHEDULE, EQUIPMENT LIST, DEMOLITION/CONSTRUCTION PROCEDURE, TRAFFIC CONTROL.

   B. HOT MIX ASPHALT PER SCSS CITY STANDARDS SECTION 39.

   C. PORTLAND CEMENT CONCRETE PER SCSS CITY STANDARDS SECTION 40.

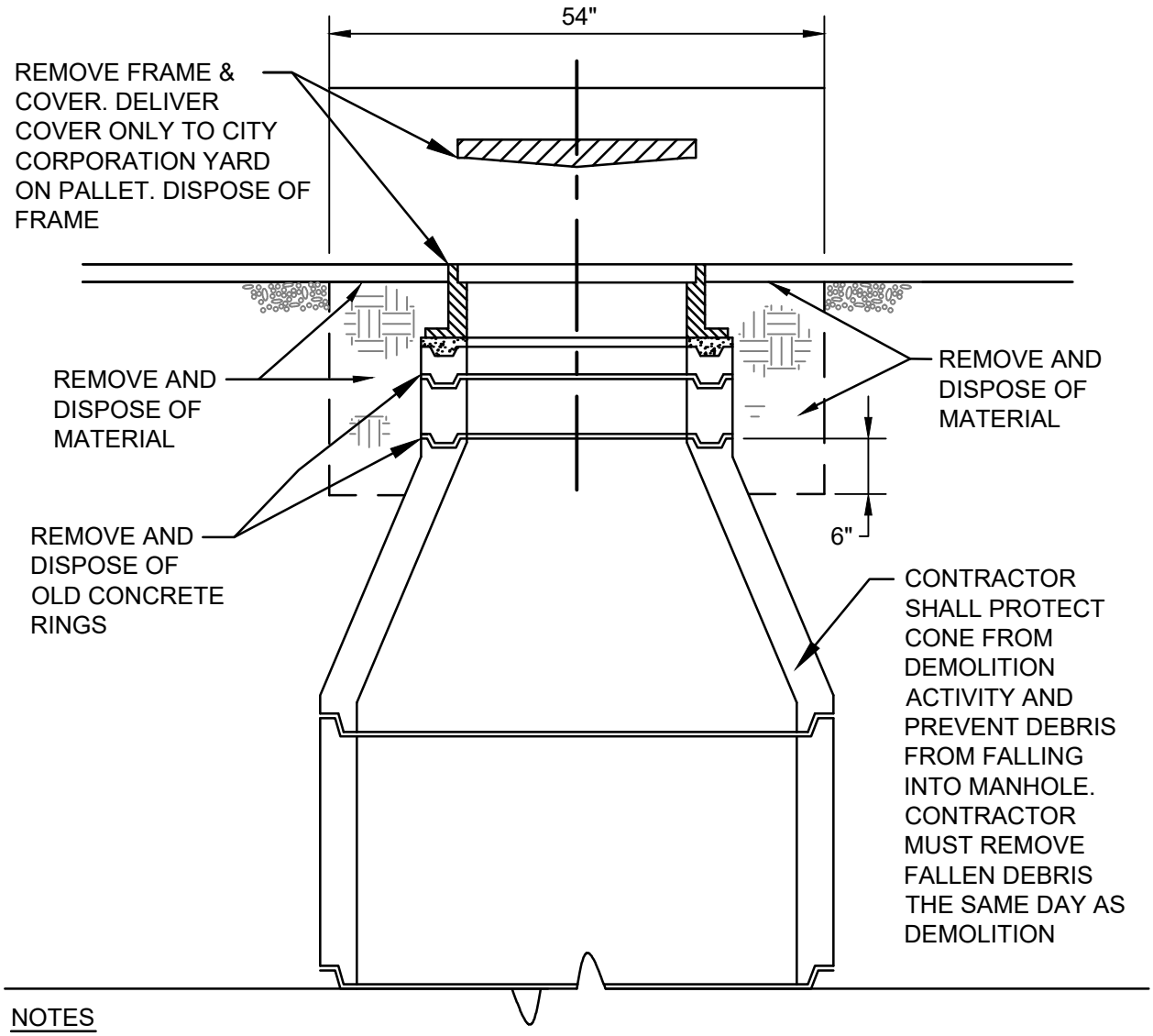
   D. HDPE RING CUT SHEET.

   E. TAPE PRODUCT DESCRIPTION.

   F. FOAM PRODUCT DESCRIPTION.

3. CONTRACTOR SHALL BE LIABLE FOR ALL FALLEN DEBRIS IN THE SEWER MANHOLE FROM THEIR DEMOLITION ACTIVITY. IF CLOGGING OF SEWER SYSTEM OCCURS DUE TO CONTRACTOR NEGLIGENCE, THE CONTRACTOR SHALL BE LIABLE TO ALL COSTS THAT OCCURRED AND SHALL BE HELD FULLY RESPONSIBLE FOR SEWER BACK-UPS SUBSEQUENT COSTS.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**SANITARY MANHOLE RETROFIT GENERAL NOTES**	STD. NO. 302
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012



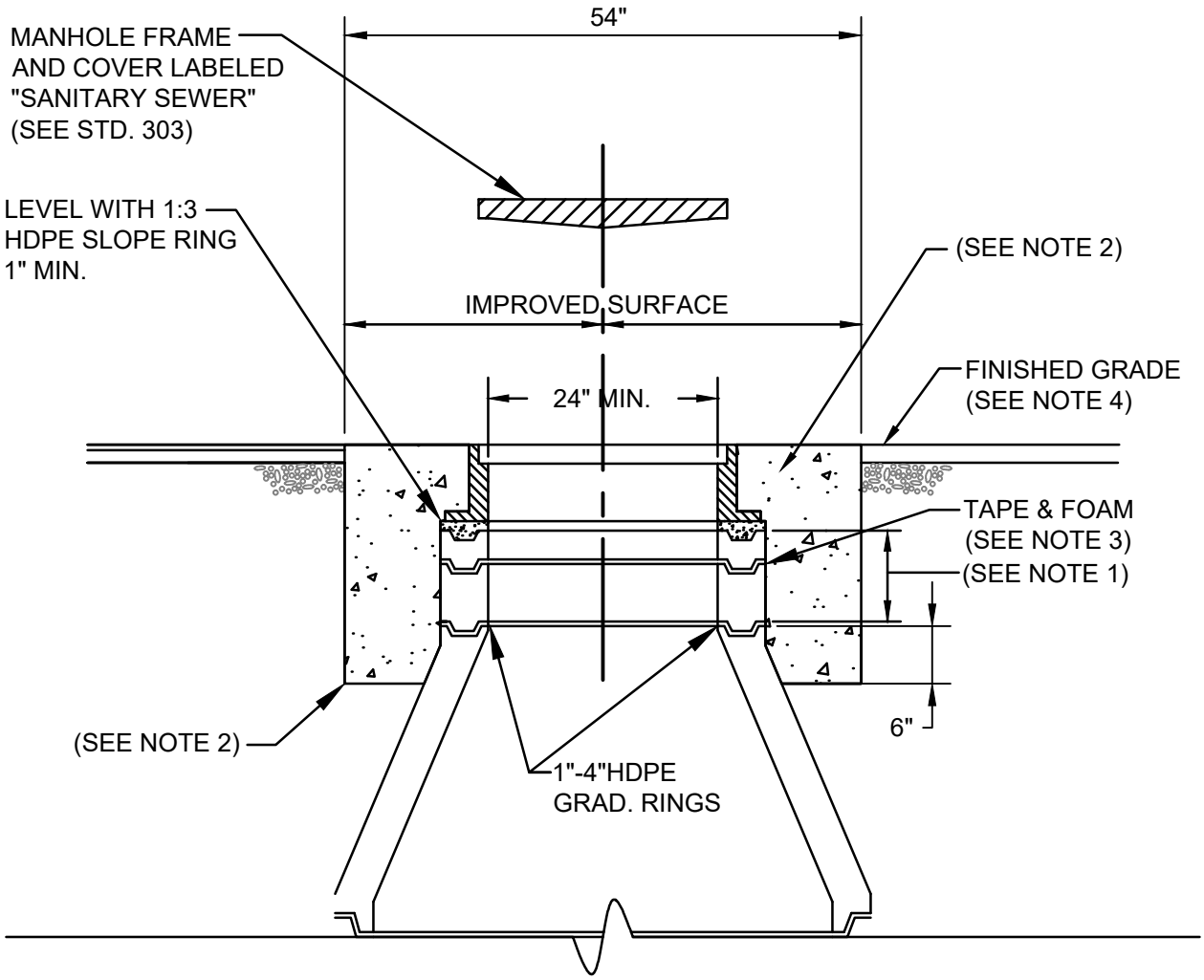
NOTES

1. PRECAUTIONS MUST BE TAKEN TO PREVENT DEBRIS FROM ENTERING THE MANHOLE DURING THE ENTIRE REMOVAL AND RECONSTRUCTION PROCESS.
   A TEMPORARY PROTECTIVE SHEET OR PLATFORM SHALL BE INSTALLED INSIDE THE EXISTING MANHOLE CONE SECTION TO PREVENT DEBRIS FROM DEMOLITION AND CONSTRUCTION FROM
2. CLOGGING THE MANHOLE AND SEWER MAINS. REMOVE DEBRIS AND SHEET AFTER COMPLETION OF WORK.
3. CUT AND REMOVE THE ASPHALT PAVEMENT AROUND THE EXISTING MANHOLE CASTING. DISPOSE OF THE ASPHALT.
   REMOVE ALL ADJUSTING RINGS TO THE TOP OF THE CONCRETE CONE. DISPOSE OF THIS MATERIAL.
4. REMOVE ALL AGGREGATE AROUND THE MANHOLE THAT HAS BEEN EXPOSED BY THE ASPHALT REMOVAL AND DISPOSE OF THIS AGGREGATE. THE AGGREGATE MUST BE REMOVED TO A MINIMUM OF 6" BELOW THE LEVEL OF THE TOP OF THE CONCRETE CONE.
5. CLEAN AND INSPECT THE TOP SURFACE OF THE CONCRETE CONE. THE SURFACE SHOULD BE SMOOTH AND FREE OF BUMPS AND PITS THAT MAY PREVENT A GOOD WATER TIGHT SEAL.
6. GRIND THE SURFACE AS NEEDED TO REMOVE PROTRUSIONS. UTILIZE COMPRESSED AIR TO BLOW DUST AND DEBRIS FROM THE SURFACE AFTER GRINDING. UTILIZE A HYDRAULIC CEMENT, ACCORDING TO MANUFACTURER'S RECOMMENDATIONS, TO FILL IN DEPRESSIONS.

SANITARY MANHOLE RETROFIT DEMOLITION

STD. NO. 302

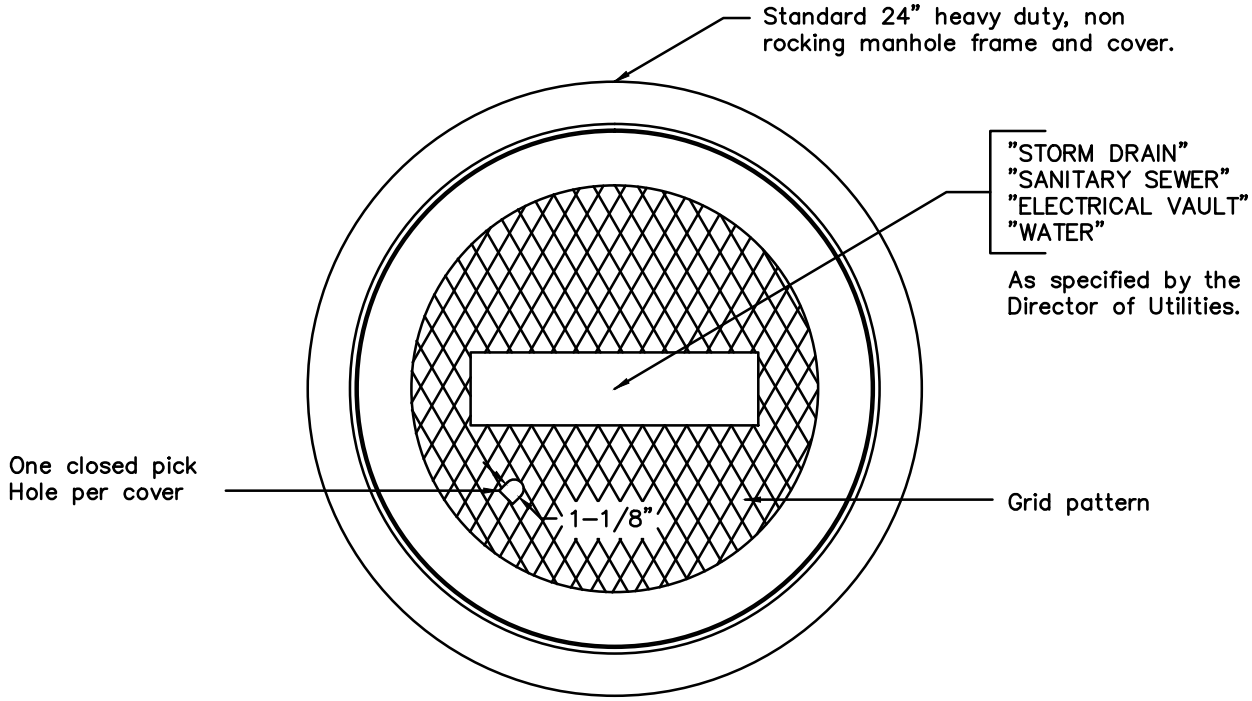
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

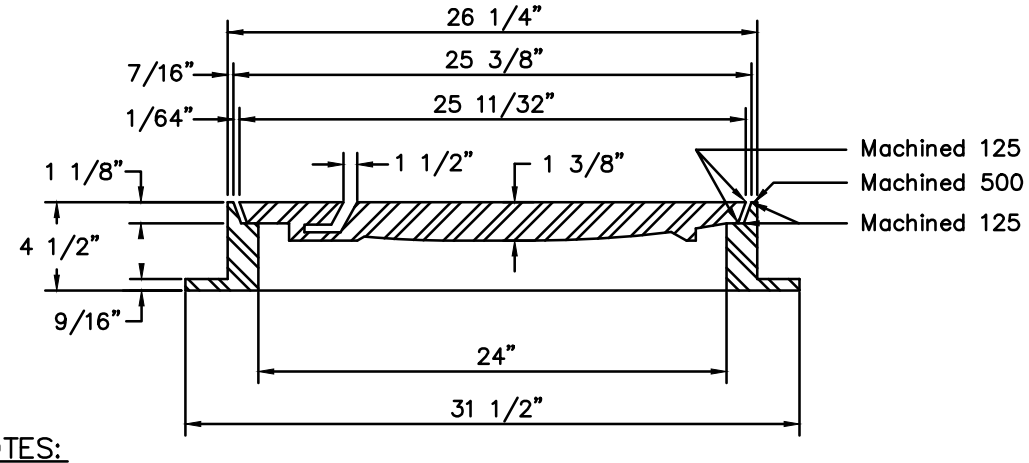


NOTES

1. MIN. OF ONE 3" GRADE ADJUSTMENT RING. DEPTH VARIES
2. 7 SACK CONCRETE COLLAR SHALL BE FLUSH WITH FINISHED GRADE.
3. INSTALL CONSTRUCTION FOAM BETWEEN THE BOTTOM HDPE RING AND THE CONE AND THE TOP HDPE RING AND THE MANHOLE FRAME. WRAP ALL HDPE RINGS WITH 50 MIL 6 INCH WIDE CORROSION TAPE. EXTEND CORROSION TAPE 3 INCHES BELOW THE LAST RING ONTO THE CONE.
4. COMPLETED HOT MIX ASPHALT SHOULD MAKE A SMOOTH TRANSITION FROM THE EXISTING PAVING TO THE CASTING IN ALL DIRECTIONS.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**SANITARY MANHOLE RETROFIT CONSTRUCTION**	STD. NO. **302**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012





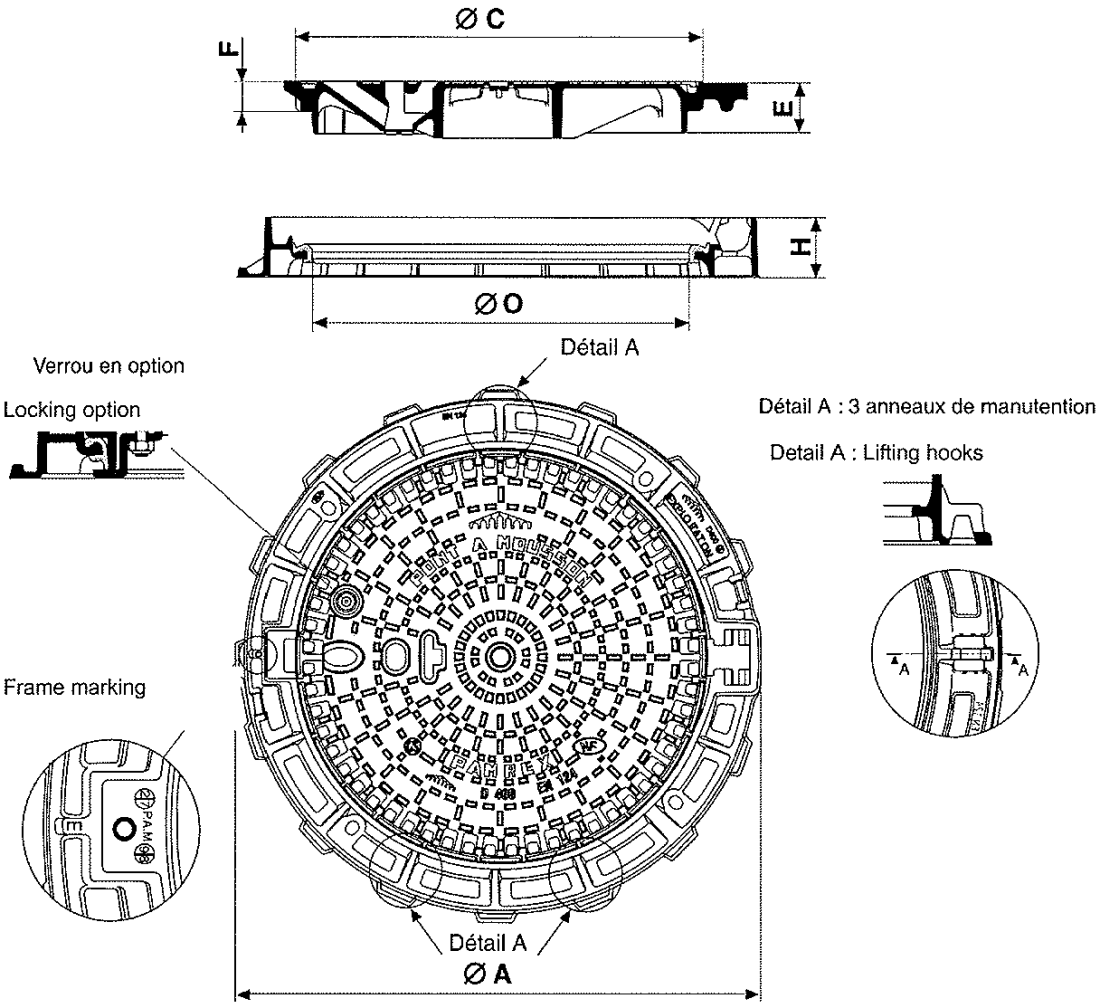
NOTES:

1. Specify sanitary sewer, storm drain, electrical vault, or water when ordering. All castings shall be dipped in approved ASPHALTUM or BITUMINOUS Paint.
2. All material used in manufacturing shall conform to A.S.T.M. designation A-48 Class 35 B, or of United States Government Specifications QQ1-652b.
3. Minimum weight components: Cover – 130 pounds
   Frame – 135 pounds
4. Bolt down or locking covers are required on all sewer mains located in easements, on school grounds, through parks, and on any trunk sewers larger than 12" in diameter. Coat the bolt threads on the final bolt up with "never cease" or teflon based pipe dope.
5. Manhole located in areas designated by the City Engineer as subject to inundation or infow shall be provided with hinged gasketed covers, as shown on sheet 2 of this standard detail.

APPROVED MANHOLE FRAME & COVER

See Engineer's Approved List. Hinged gasketed covers shall be PAMREX or approved equal.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**MANHOLE FRAME AND COVER**				STD. NO. **303**	
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012	



NOTES:

1. Specify sanitary sewer, storm drain, electrical vault, or water for labeling of cover when ordering. All castings shall be dipped in approved ASPHALTUM or BITUMINOUS Paint.

2. All material used in manufacturing shall conform to A.S.T.M. designation A–48 Class 35 B, or of United States Government Specifications QQ1–652b.

3. Minimum weight components: Cover – 122 pounds
   Frame – 73 pounds

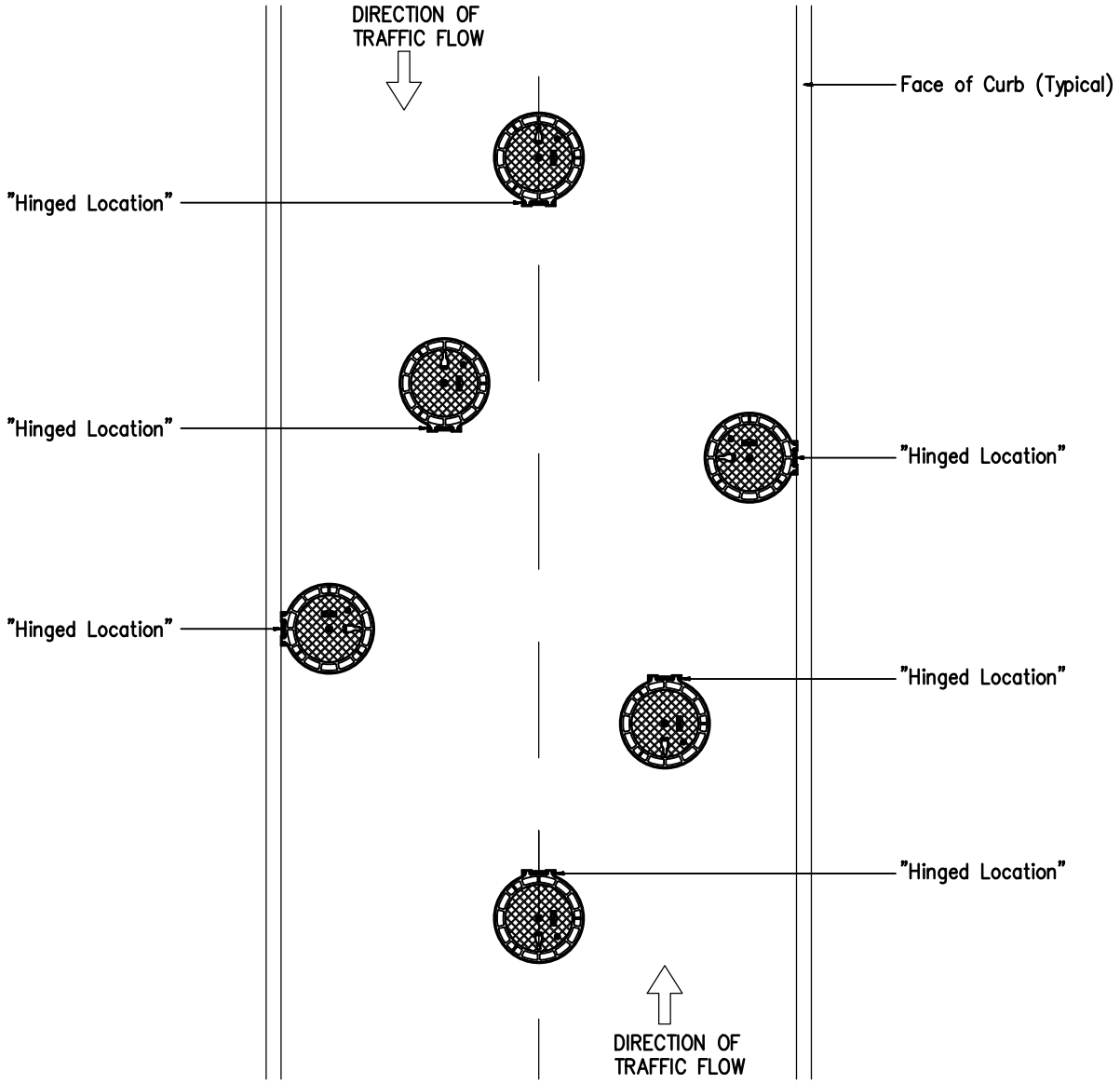
4. Lockable covers are required on all sewer mains located in easements, on school grounds, through parks, and on any trunk sewers larger than 12" in diameter. Coat threads on locking bolt with never cease or Teflon based pipe dope upon installation of lock.

5. Covers shall be one–man operable using standard tools.

APPROVED MANHOLE FRAME & COVER

See Engineer's Approved List.

	MANHOLE FRAME AND COVER				STD. NO. 303
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012



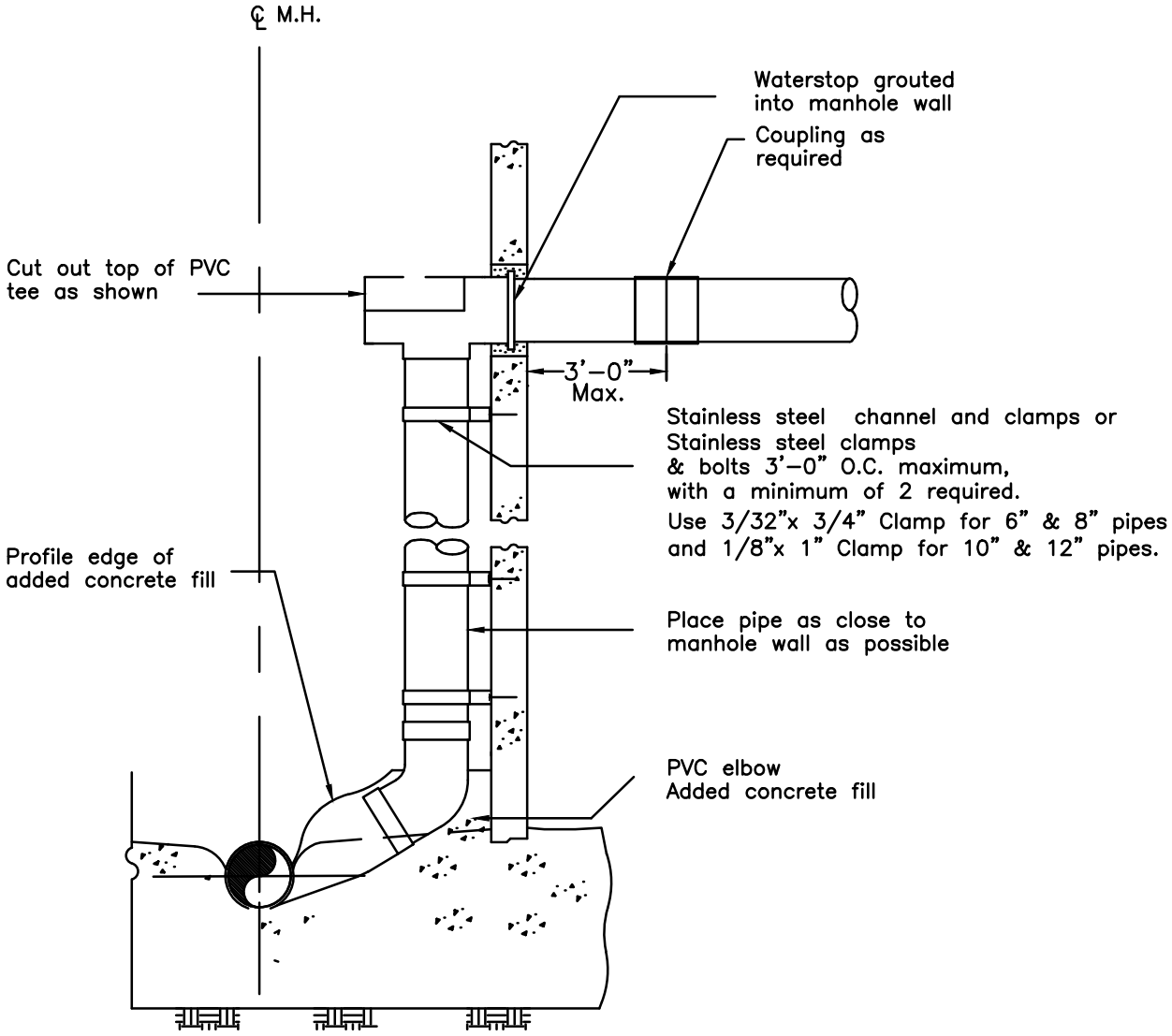
NOTES:

1. Specify sanitary sewer, storm drain, electrical vault, or water when ordering. All castings shall be dipped in approved ASPHALTUM or BITUMINOUS Paint.
2. All material used in manufacturing shall conform to A.S.T.M. designation A–48 Class 35 B, or of United States Government Specifications QQ1–652b.
3. Minimum weight components: Cover – 122 pounds
   Frame – 73 pounds
4. Lockable covers are required on all sewer mains. Locks will be required on all manholes not located in a paved City maintained street. Coat the lock bolt threads with never cease or Teflon based pipe dope upon installation of lock.
5. Covers shall be one–man operable using standard tools.

APPROVED MANHOLE FRAME & COVER

See Engineer's Approved List.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**MANHOLE FRAME AND COVER**				STD. NO. **303**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012



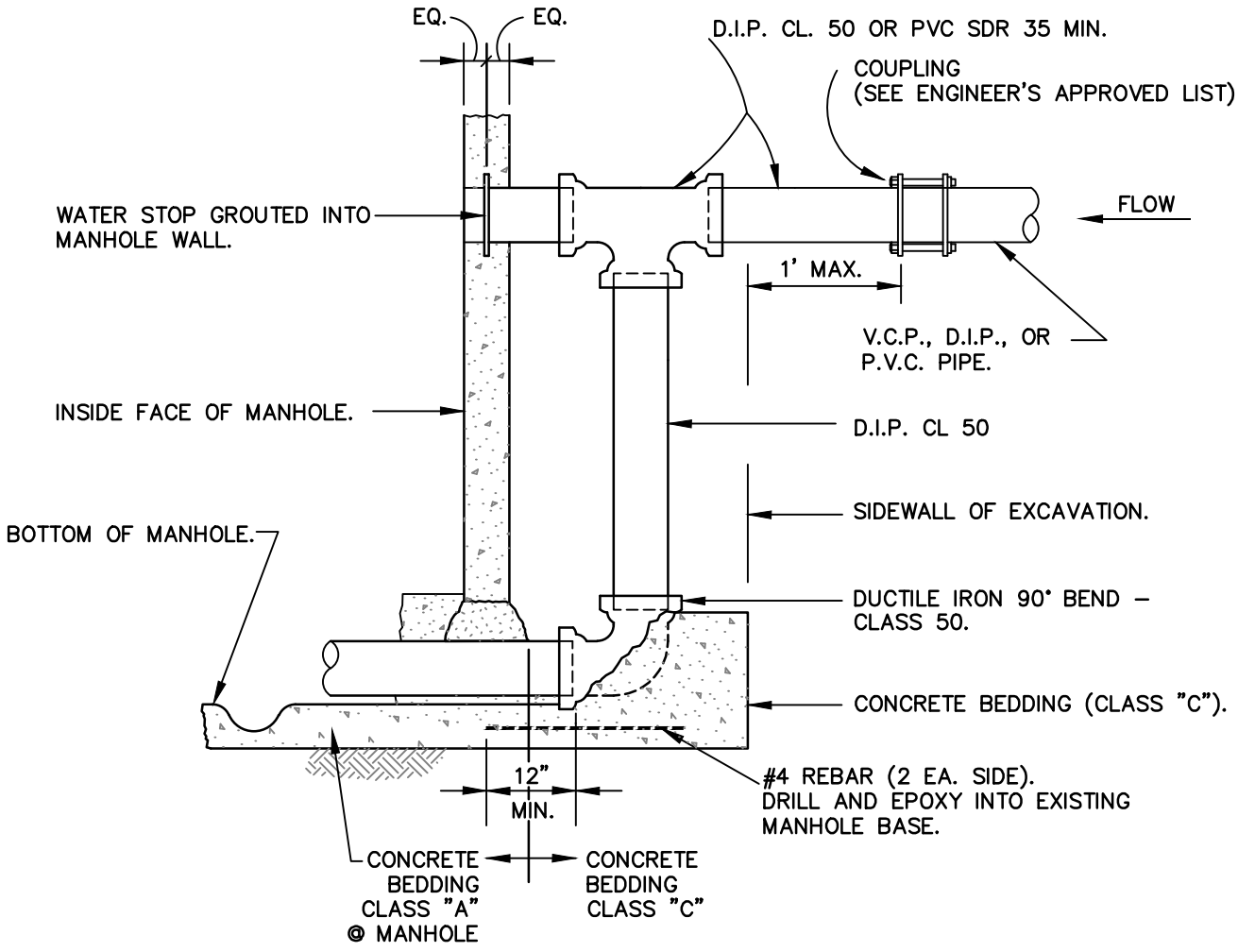
NOTES:

1. Manholes constructed using this standard shall be 60" in diameter and installed in conformance with City Standard. Use 72" MH where there are two drop connections.
2. Enclose elbow in concrete. Form smooth channel with sweep to manhole flowline.
3. Install waterstop in accordance with manufacturer's instructions as shown.
4. PVC pipe and fittings shall have same nominal size and SDR rating as incoming pipes.

INSIDE DROP MANHOLE

STD. NO. 304

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



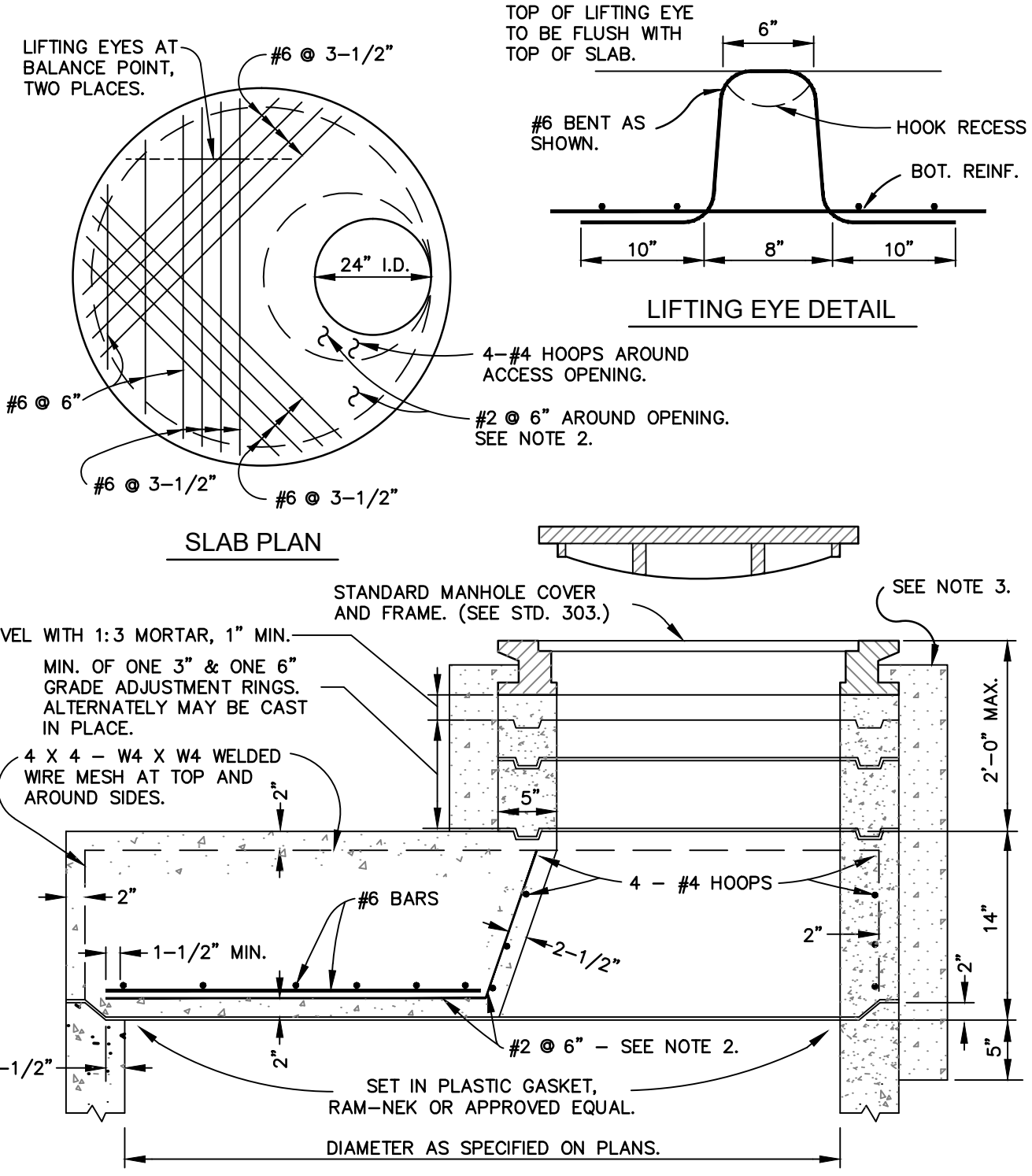
NOTES:

1. DUCTILE IRON PIPE AND FITTINGS SHALL BE CLASS 50 CONFORMING TO THE REQUIREMENTS OF ANSI A21.51.
2. PIPE AND FITTINGS SHALL BE FURNISHED WITH BELL AND SPIGOT ENDS, "TYTON JOINT" OR MECHANICAL JOINTS.
3. TO BE INSTALLED AT EXISTING 48" MANHOLES OR WHERE SPECIFICALLY APPROVED BY THE CITY ENGINEER.
4. DROP INLET PIPE AND FITTINGS SHALL BE THE SAME SIZE AS THE INCOMING SEWER MAIN.
5. SEE STANDARD 304 FOR STANDARD INSIDE DROP INSTALLATION.
6. INSTALL WATER STOP IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AS SHOWN.

DUCTILE IRON FITTINGS FOR OUTSIDE DROP INLET MANHOLE

STD. NO. 305

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTES:

1. FOR DETAILS AND SPECIFICATIONS OF BASE AND BARREL SECTIONS, SEE STD. 301.
2. #2 BARS BENT UP AND SPACED 6" O.C. AROUND 24" OPENING. HORIZONTAL LEGS TO FAN OUT EQUALLY SPACED, TO 2–1/2" CLEAR AT EDGE OF SLAB.
3. PROVIDE 7 SACK CONCRETE COLLAR.

STANDARD PRECAST CONCRETE SANITARY SEWER MANHOLE REDUCER SLAB

STD. NO. 306

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

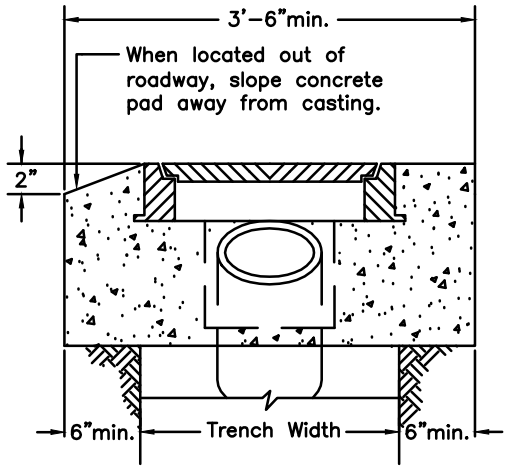
RODDING INLET

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

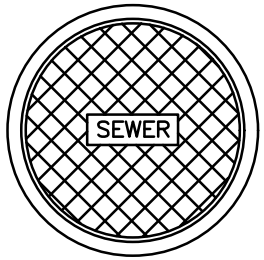
STD. NO. 307

APPROVED FRAME & COVER

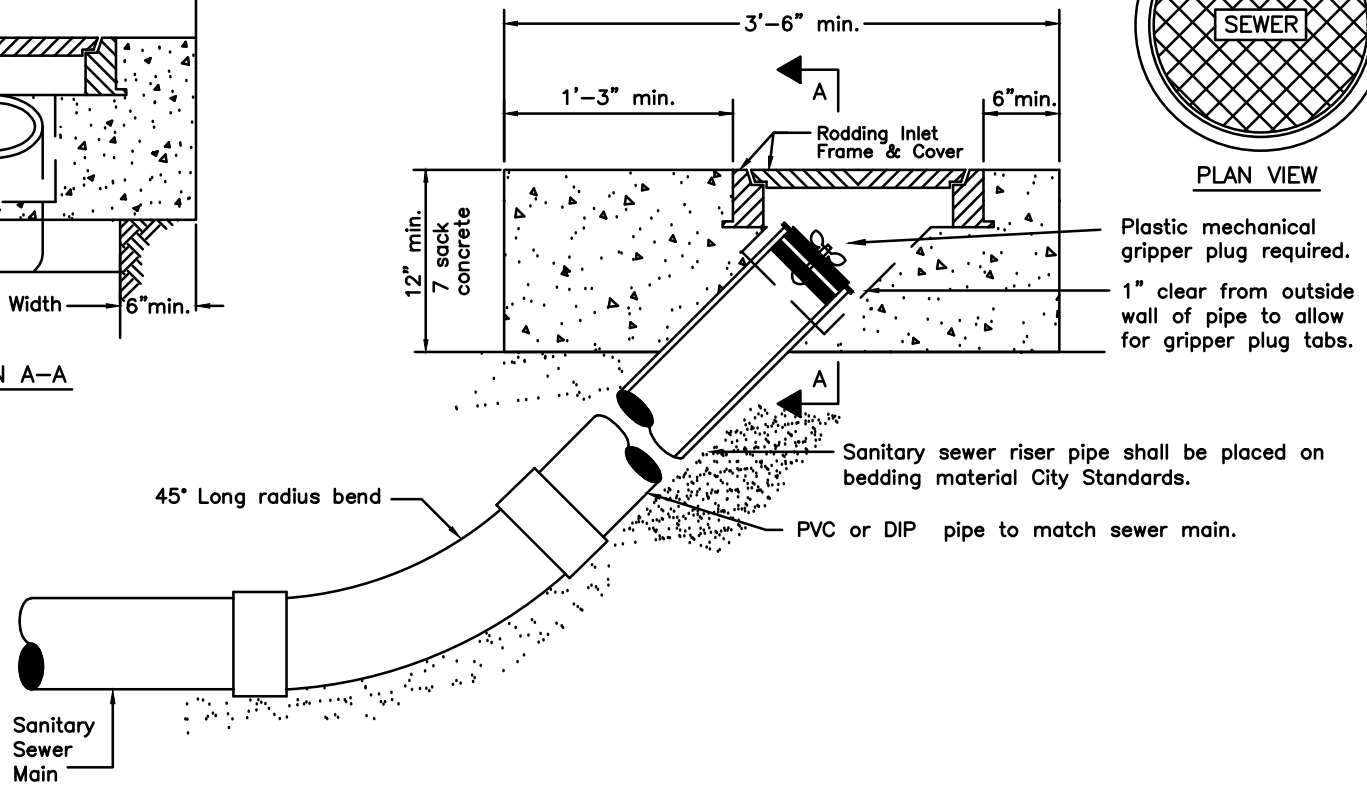
See City's Approved List



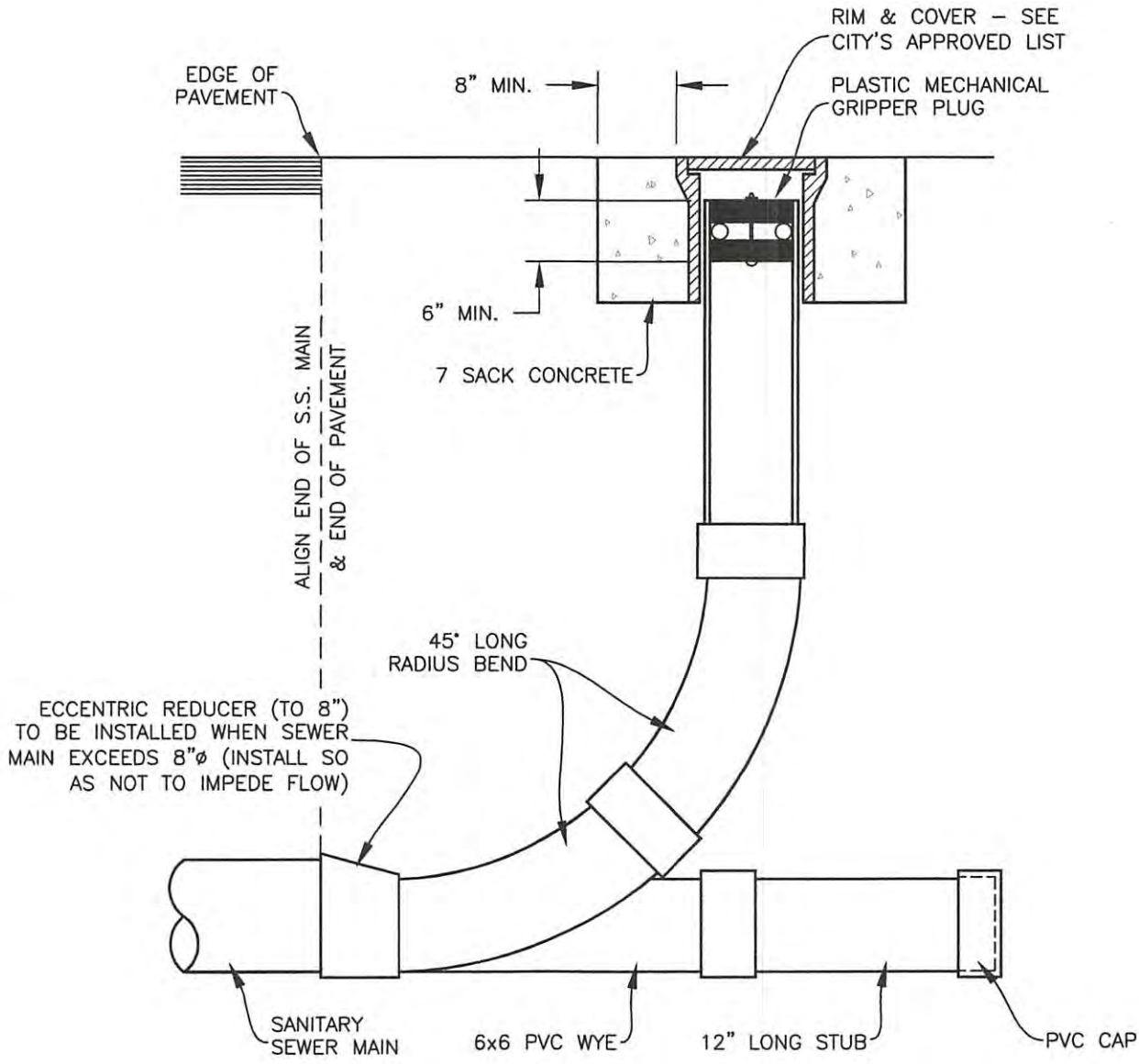
SECTION A–A



PLAN VIEW



Note: To be used for main sizes 6" only and where sewer main will not be extended.
Mains larger than 6" shall terminate at manholes.



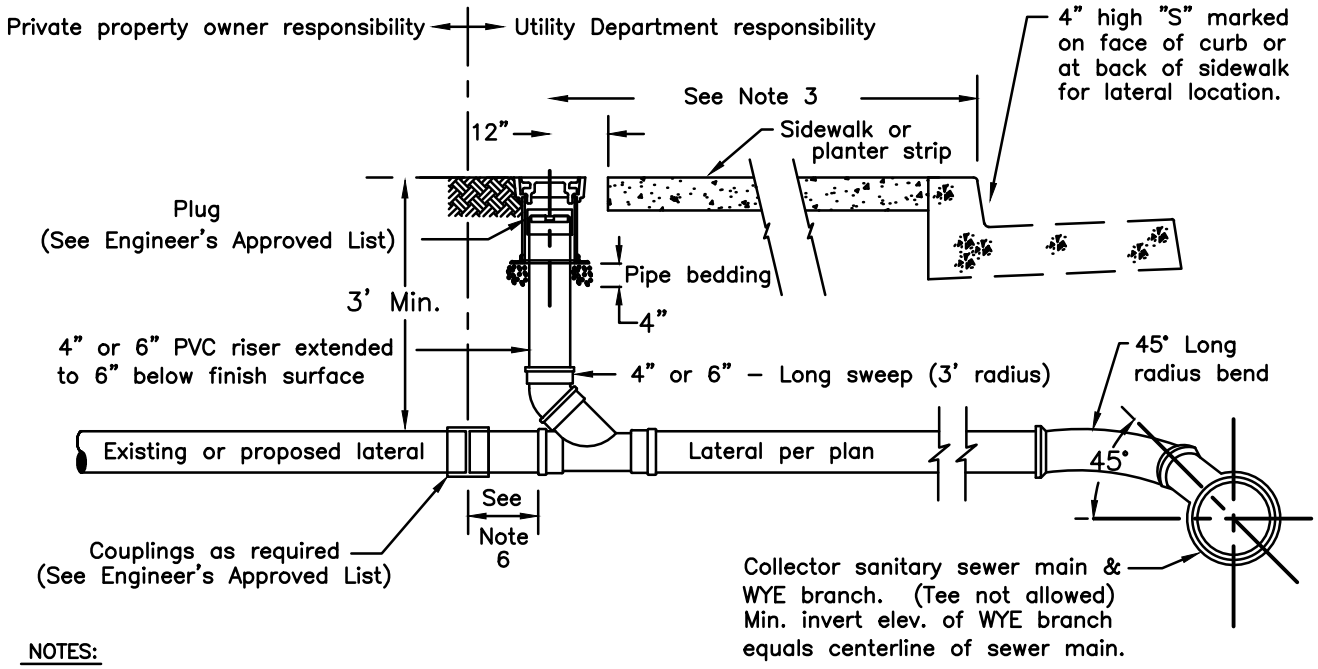
NOTES:

1. TO BE USED WHERE A STREET HAS BEEN STUBBED OUT FOR FUTURE EXTENSION.
2. TO BE USED ONLY WHEN SPECIFICALLY AUTHORIZED BY THE CITY ENGINEER.
3. VALVE BOX LID SHALL BE MARKED "SEWER".
4. EASEMENT ACQUISITION MAY BE REQ'D.
5. RODDING INLET CAN BE STD. #308 OR STD. #307 (USE MOST APPLICABLE).

TEMPORARY MAINLINE CLEANOUT OR RODDING INLET

STD. NO. 308

SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD:	DATE: JAN 2021



NOTES:

1. The sewer service lateral shall be of sufficient depth to adequately serve the building site, and in no case shall be less than 3 FT. deep at the cleanout unless otherwise authorized by the Director of Public Works.
2. Where problems are anticipated in providing sewer service to a given building site, the lateral invert at the cleanout shall be staked by the owner's engineer.
3. Cleanout must be installed within the Public Right of Way or P.U.E. Cleanout to be installed 18" from face of curb or 12" maximum behind sidewalk. Where service is in driveway, install cleanout 18" behind apron.
4. In cases where the cleanout installation conflicts with existing facilities, the contractor shall verify any alternate location with the Director of Public Works prior to installation.
5. Minimum 2% slope for 4" laterals and a min. 1% slope for 6" laterals are required unless a variance is specifically approved by the Director of Public Works.
6. A minimum of 12" when connecting to existing sewer lateral or extend to 1' behind P.U.E. or sidewalk for new construction.
7. For new construction, install gripper plug at end of service lateral.
8. Lateral material shall be PVC SDR 26 or SDR 35, Ductile Iron pipe.
9. Cleanout components shall be the same size as the lateral.
10. Tap fittings on mains smaller than 12" may only be used under the approval of the Director of Public Works.

LATERAL CONNECTIONS TO EXISTING MAINS:

Main Size & Material	Connection Type	Couplings
6–10" ACP, VCP	Cut in PVC wye w/12" spools each end	Rubber w/Steel shear bands
6–10" PVC	Cut in PVC wye w/12" spools each end	Rigid slip couplings
6–10" DIP	Cut in DIP wye w/12" spools each end	DIP couplings
12" and larger	Tap fitting see Engineer's approved list	NA

CLEANOUT BOX
(See Engineer's Approved List)

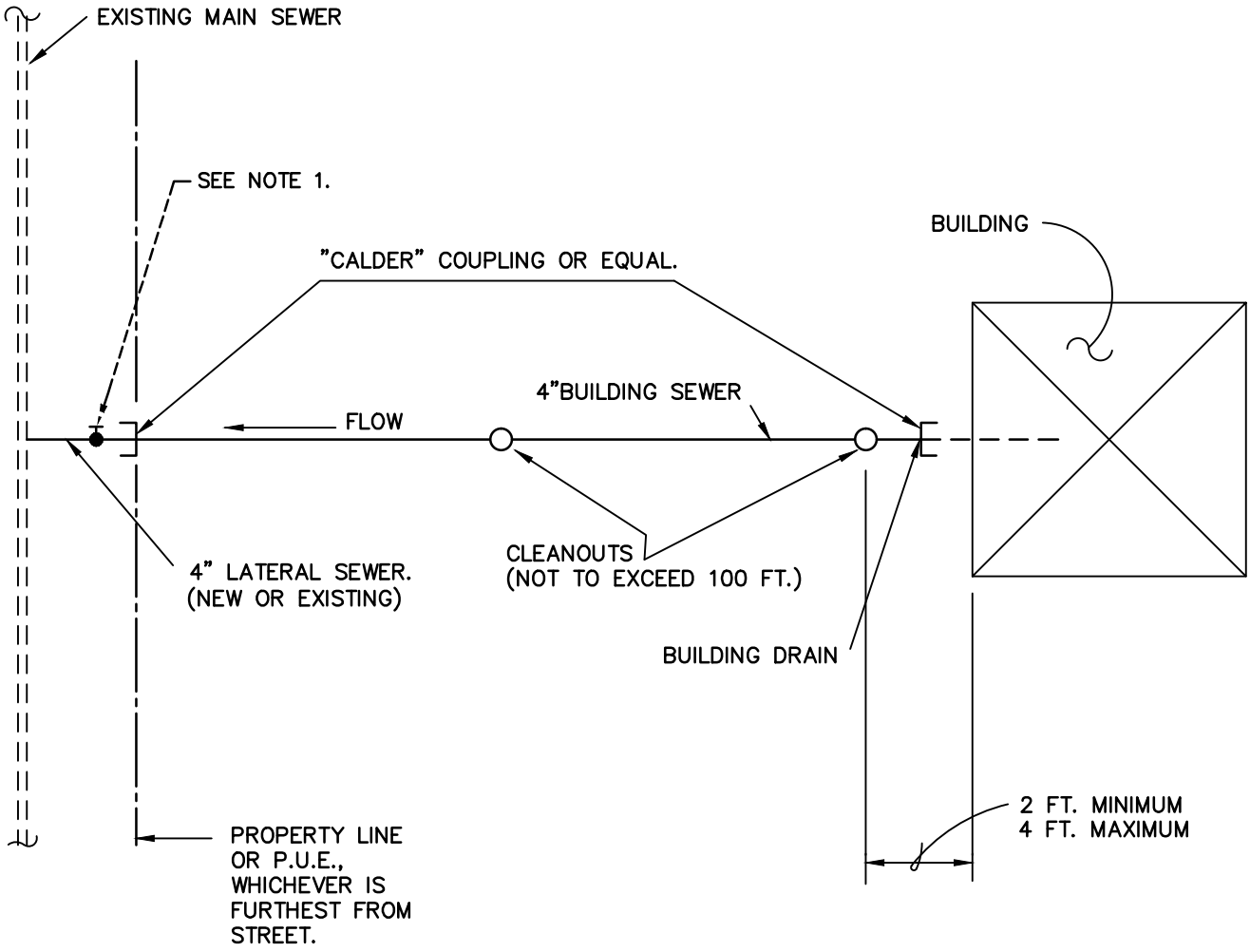
4" & 6" SEWER SERVICE LATERAL AND CLEANOUT

STD. NO. 309

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

NOTE:

WHERE BUILDING SEWERS ARE LOCATED UNDER DRIVEWAYS, CAST IRON OR DUCTILE IRON SEWER PIPE SHALL BE USED.



PLAN

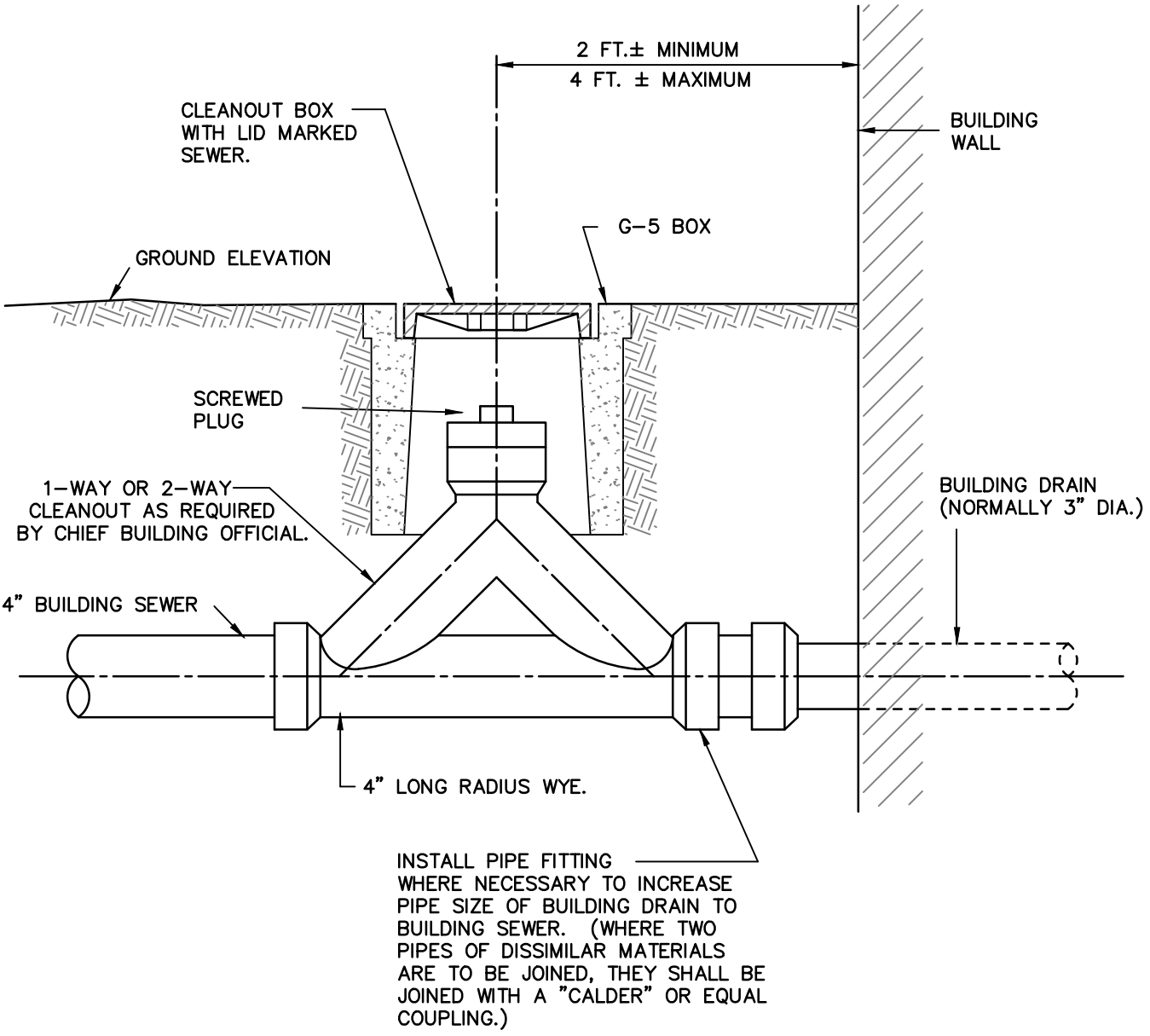
NOTES:

1. VALVE SHALL BE INSTALLED ON NON-RESIDENTIAL DEVELOPMENTS AT THE DISCRETION OF THE CITY ENGINEER. VALVES TO BE PER STD 501.

TYPICAL SEWER SERVICE CONNECTION DETAIL

STD. NO. 310

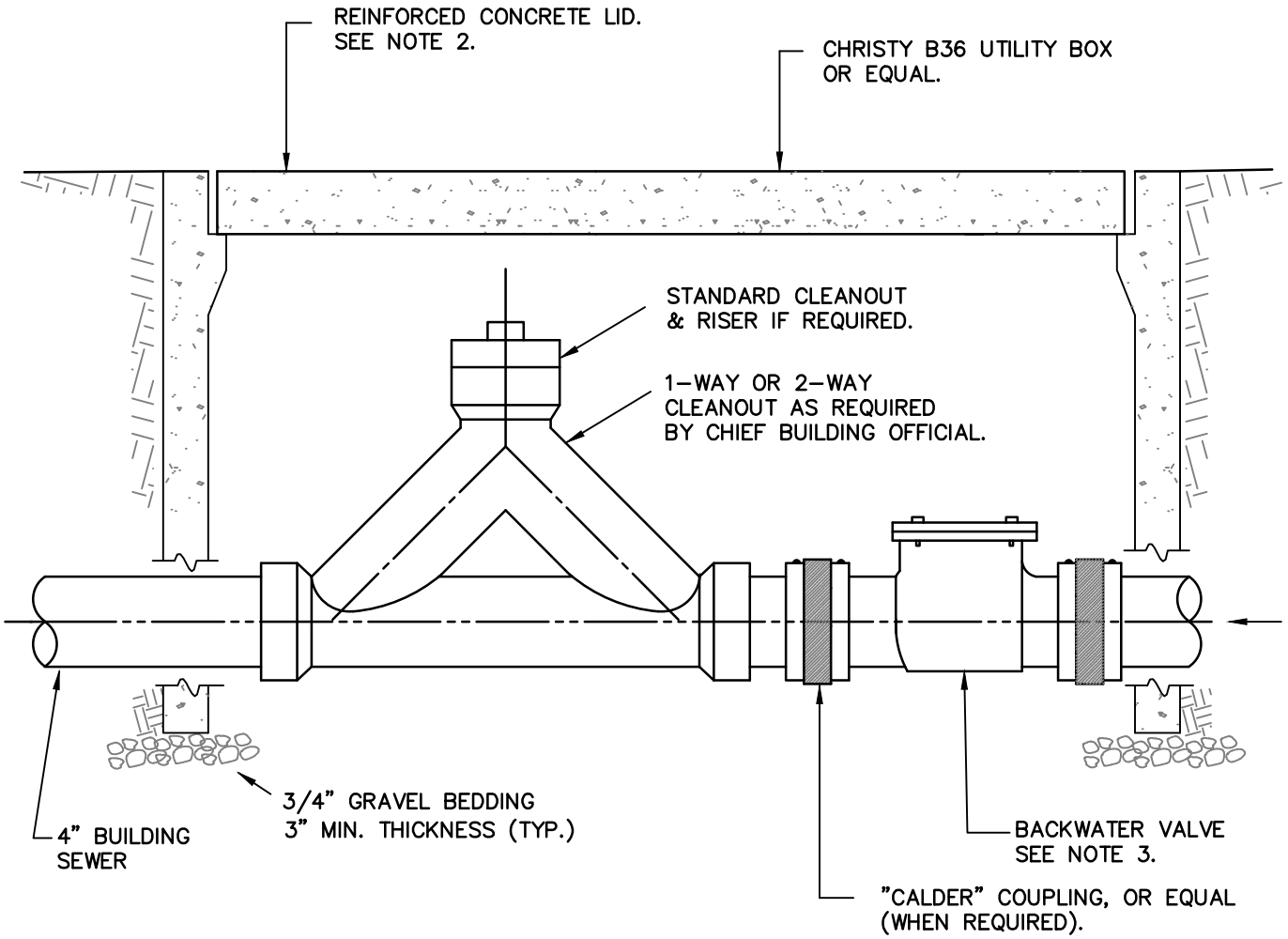
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



CLEANOUT DETAIL AT BUILDING

STD. NO. 310

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



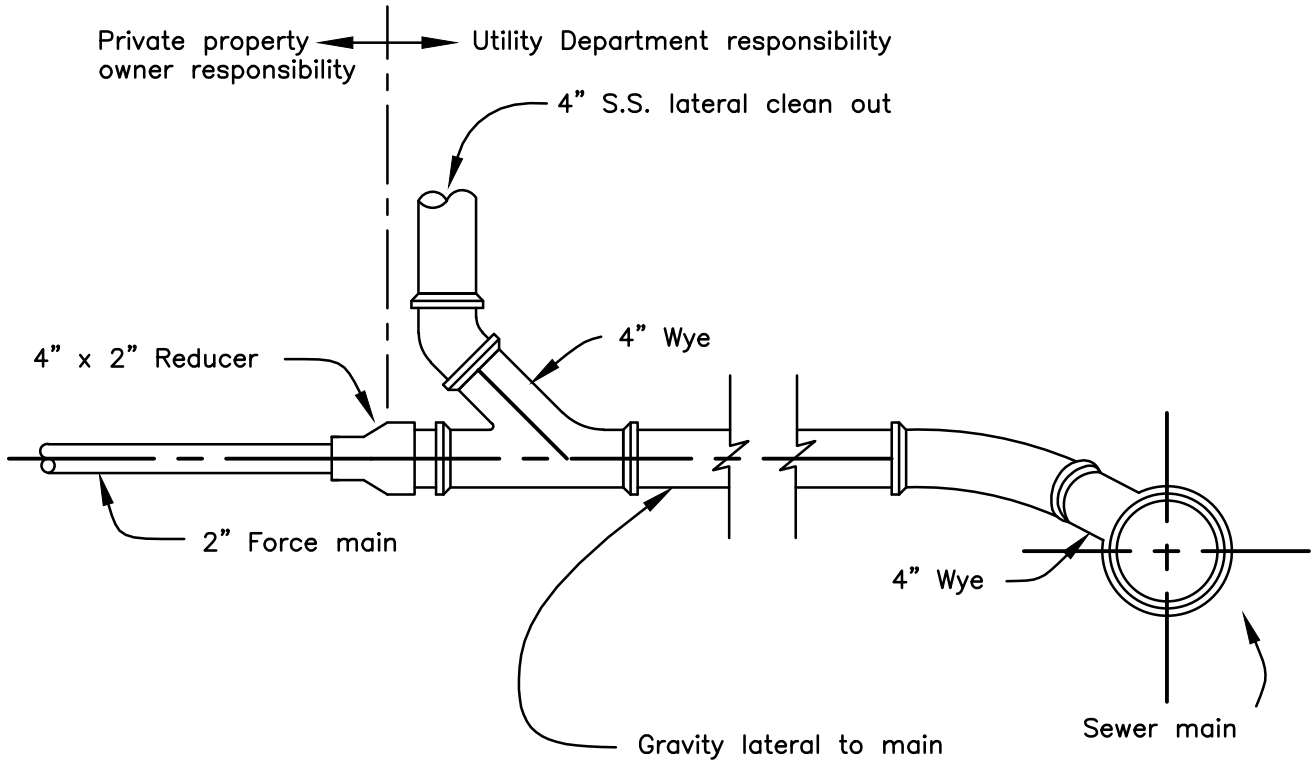
NOTES:

1. THIS INSTALLATION IS REQUIRED WHEREVER THE LOWEST FINISHED FLOOR ELEVATION IS TWELVE (12") INCHES, OR LESS ABOVE THE TOP ELEVATION OF THE NEAREST UPSTREAM MANHOLE OR CLEANOUT.
2. IF THE LID IS SUBJECT TO VEHICULAR TRAFFIC, USE LID DESIGNED FOR H–20 TRAFFIC LOADINGS.
3. BACKWATER VALVE SHALL BE CAST IRON OR CAST BRONZE. VALVE SHALL BE APPROVED BY THE CITY ENGINEER.

CLEANOUT DETAIL AT BUILDING

STD. NO. 310

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

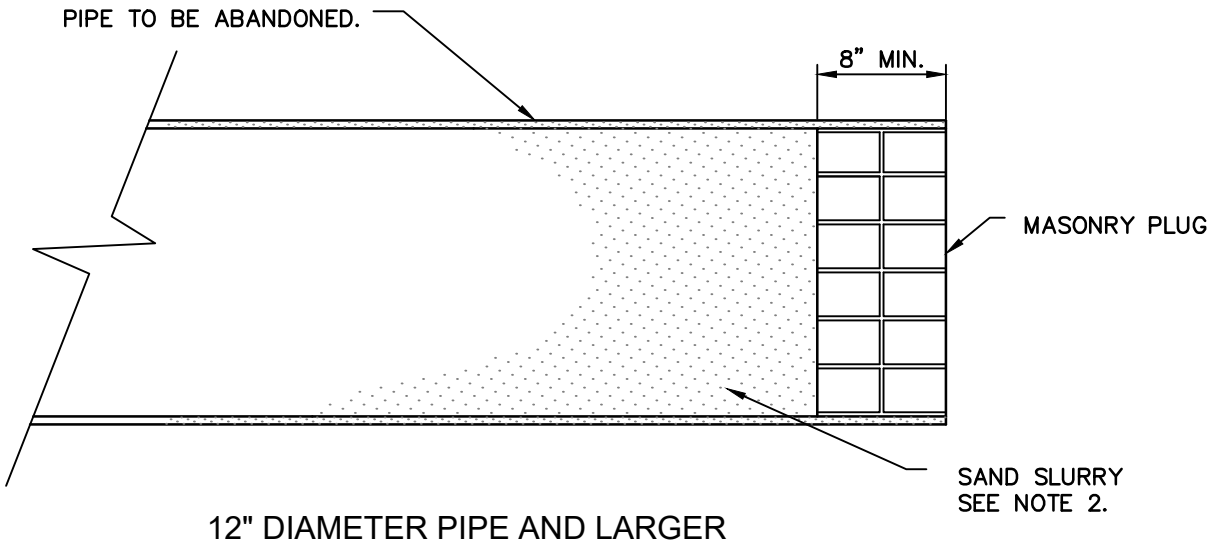


NOTES

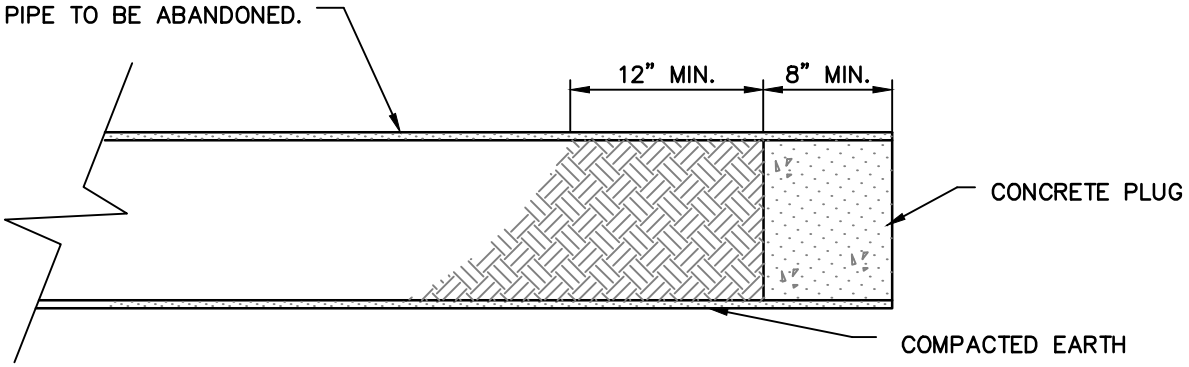
1. Must be used for all private sewage lift station discharges. No discharges may be made directly to the collector sewer, trunk sewer, or manhole.

2. Any alternate design must be approved by the City.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**DISCHARGE FOR PRIVATE FORCE MAIN**				STD. NO. **311**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012



12" DIAMETER PIPE AND LARGER



10" DIAMETER PIPE AND SMALLER

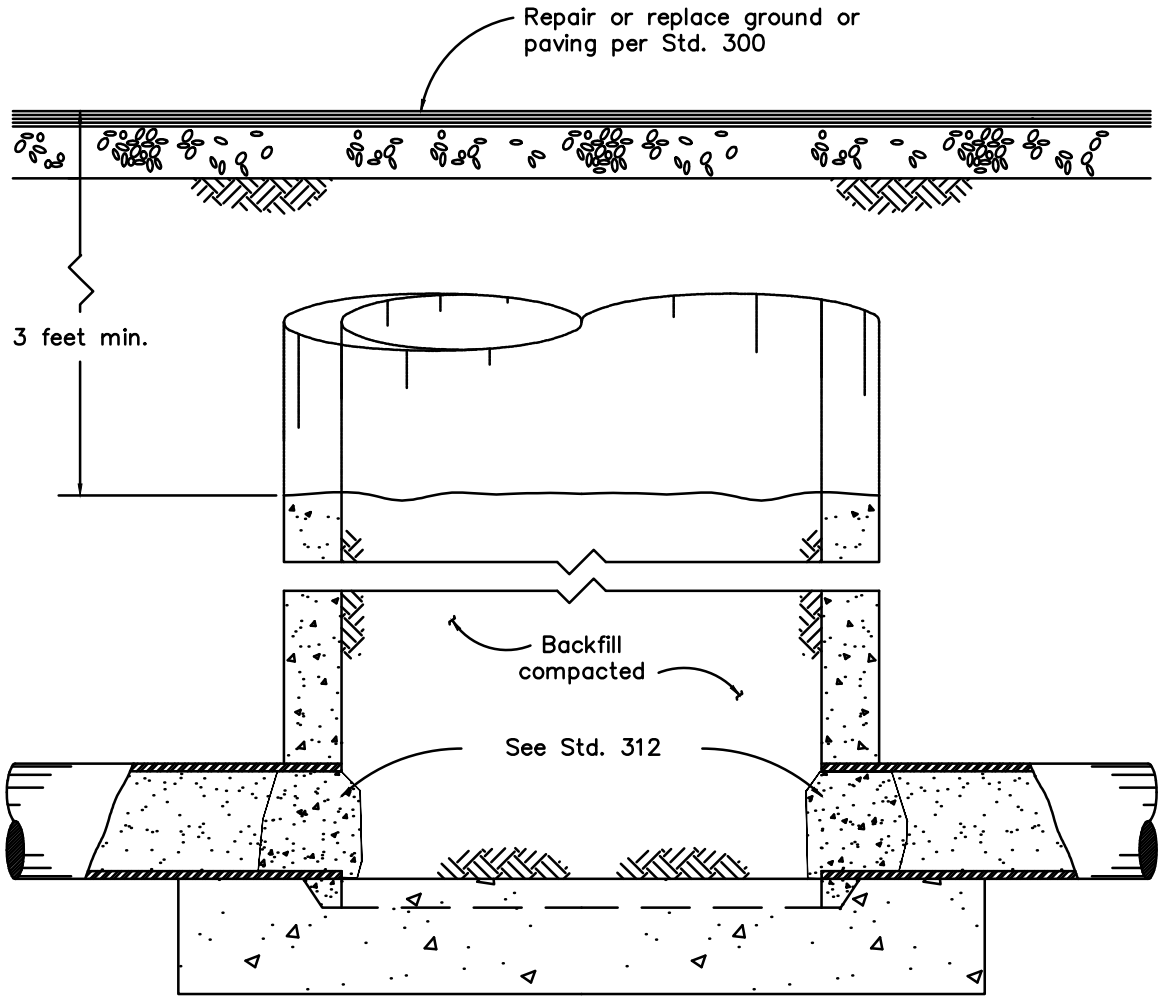
NOTES:

1. PIPE PLUGS SHALL BE INSTALLED TO THE SATISFACTION OF THE CITY ENGINEER.
2. ABANDONED PIPES, 12" AND LARGER, SHALL BE BROKEN INTO EVERY 50' AND SHALL BE FILLED COMPLETELY WITH SAND SLURRY.

ABANDONED PIPE PLUG DETAIL

STD. NO. 312

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



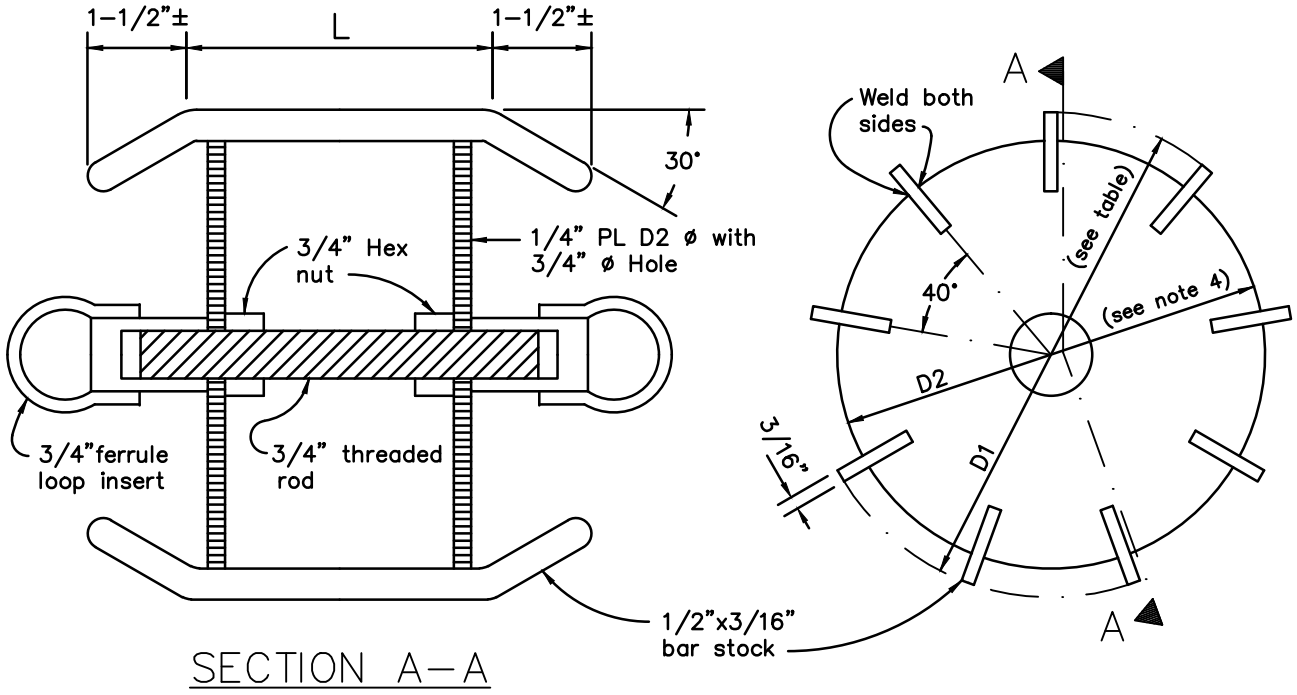
NOTES:

1. Remove frame, cover, taper and barrel sections as required to a minimum of 3' below finished grade.
2. After plugging all pipes in manhole, the remaining portion of the barrel section and all voids created by the removal off the upper portions of the manhole, shall be backfilled and compacted to 90% relative density. Use trench backfill or pipe bedding material per Std. 222.

ABANDONED MANHOLE

STD. NO. 313

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



SECTION A–A

Nom. Pipe Dia.	L	MANDREL DIAMETER (D–1) SEE NOTE 3 5% DEFLECTION SDR 35	MANDREL DIAMETER (D–1) SEE NOTE 3 5% DEFLECTION SDR 26
6	6"	5.619	5.503
8	8"	7.524	7.366
10	10"	9.405	9.207
12	12"	11.191	10.961
15	15"	13.849	13.559

NOTES:

1. Mark all materials with ASTM specification number, SDR number and deflection.

2. The 1/2" Bar Stock on edge provides clearance to pass small amounts of soil which may be in pipe.

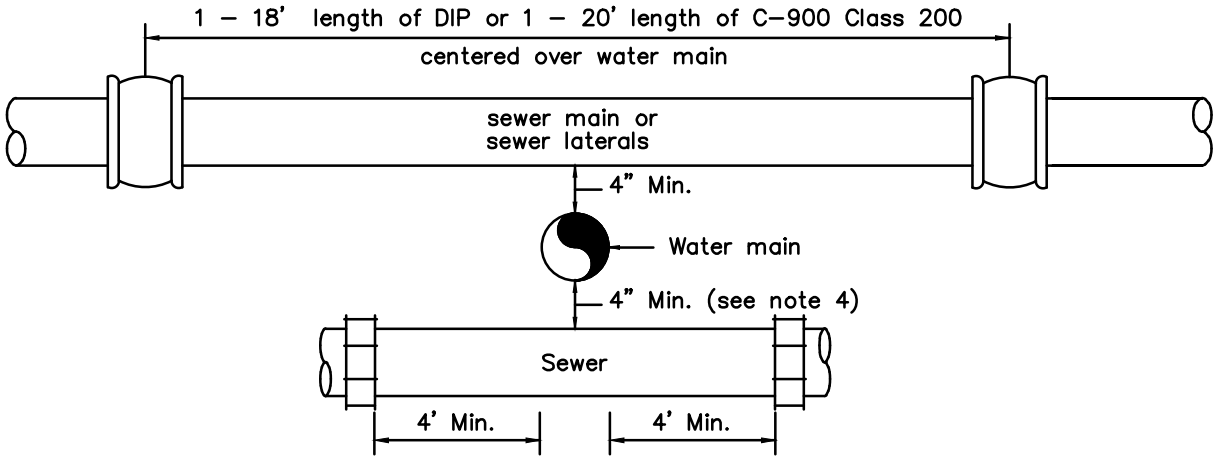
3. Mandrel diameter has been calculated based on section 306–1.2.12 of the "Greenbook" Standard Specifications for Public Works Construction and or dimensions given in Table 1 of ASTM Standard D3034.

4. Plate diameter shall be 1" less than the mandrel diameter.

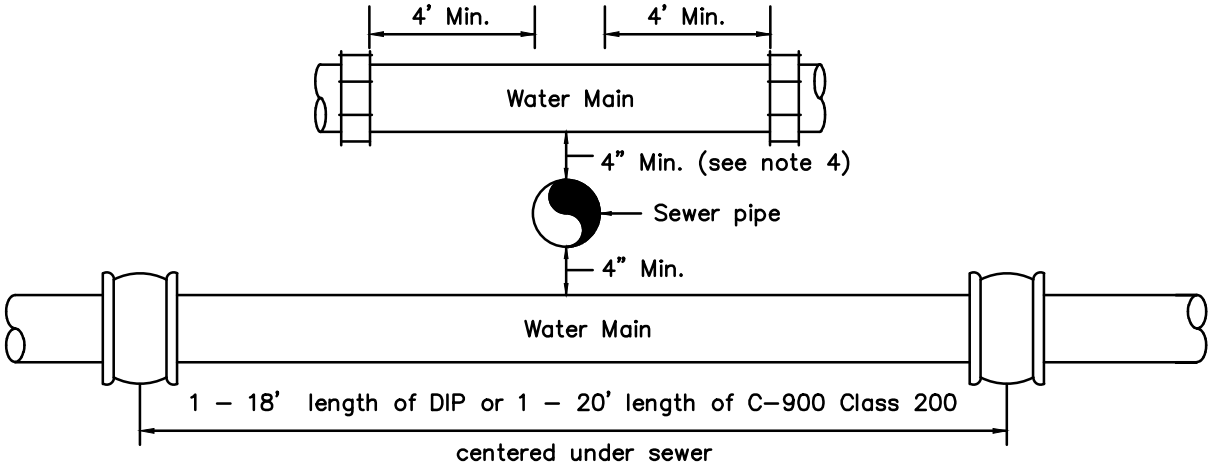
PVC SEWER PIPE DEFLECTION MANDRELL

STD. NO. 314

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012



SEWER OVER OR UNDER WATER



WATER OVER OR UNDER SEWER

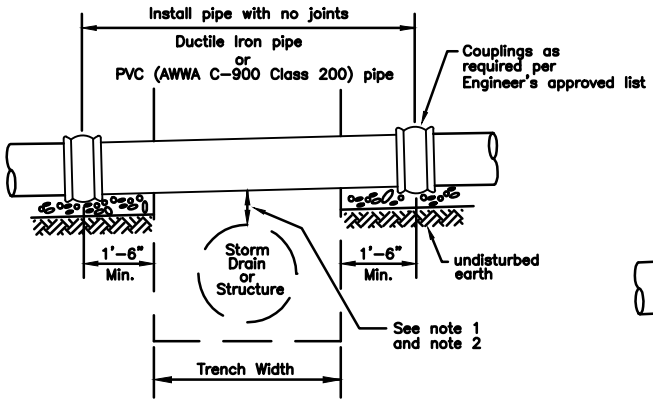
NOTES:

1. All installations shall conform to the State of California Dept. of Health Services "Criteria For The Separation of Water Mains & Sanitary Sewers".
2. This Standard applies to pipes less than 24" in diameter. All crossings of larger diameter shall be as approved by the Director of Utilities.
3. All new Ductile Iron shall be wrapped in polyethylene per City of Santa Rosa Construction Specifications.
4. Per State Std.'s, a min. 4" clearance is required where sewer crosses below a water main. Where there is 1' or more vertical clearance, no special installation is required.
5. Any pipe / pipe crossings with less than 6" vertical clearance shall be padded with styrofoam, felt expansion joint material, or other expansive materials between pipes as approved by the Director of Utilities.

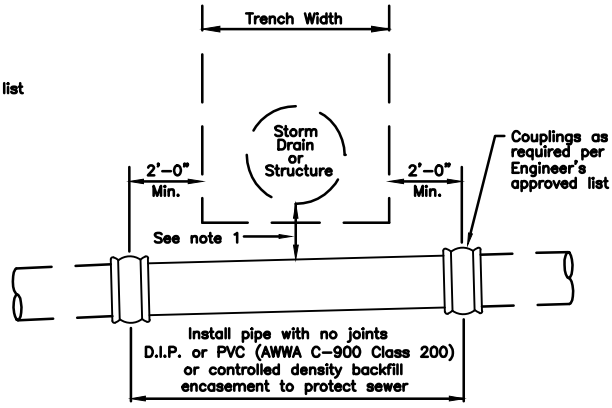
APPROVED COUPLINGS

See Engineer's Approved List

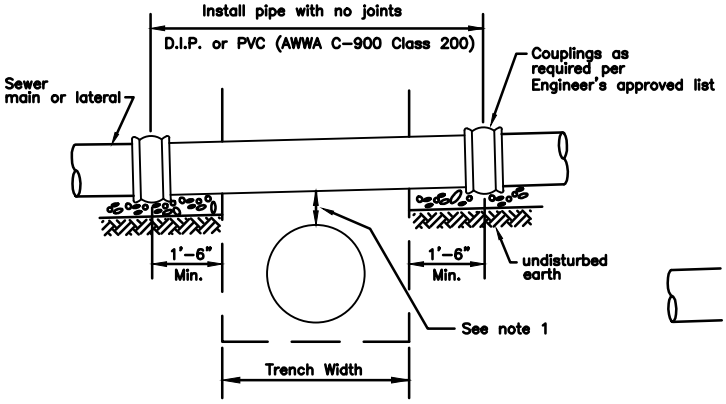
CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**SEWER–WATER MAIN CROSSING DETAILS**	STD. NO. **315**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012



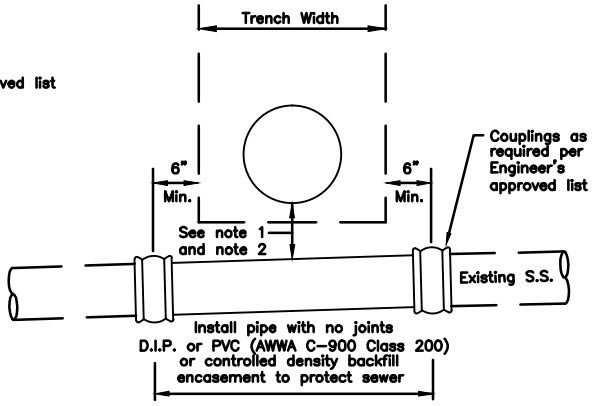
INSTALLATION OVER PIPE OR STRUCTURE



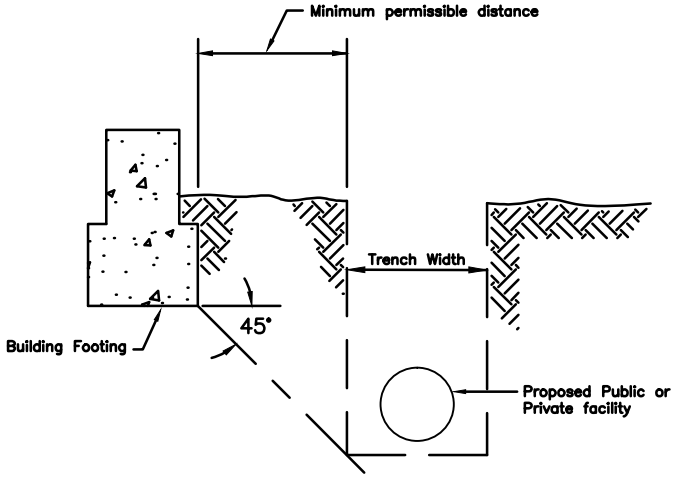
INSTALLATION UNDER PIPE OR STRUCTURE



INSTALLATION OF PIPE OR STRUCTURE UNDER SANITARY SEWER



INSTALLATION OF PIPE OR STRUCTURE OVER SANITARY SEWER



DETAIL OF BUILDING SETBACK FROM UNDERGROUND UTILITY

NOTES:

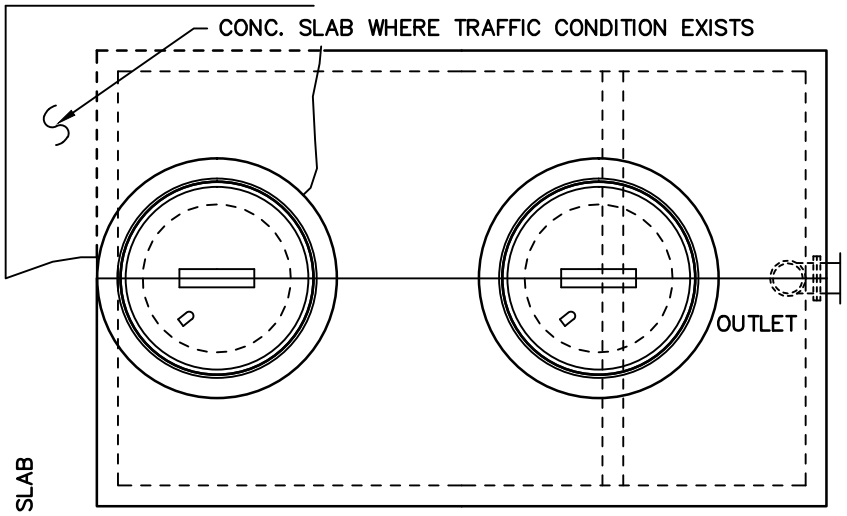
1. 1" minimum vertical clearance is required between pipes. Where clearance is less than 6", install felt expansion material or styrofoam between pipes.
2. This installation detail is required only if clearance is less than 1'.
3. Ductile Iron pipe shall be encased in polyethylene film per AWWA standards.

* NOTE: REQUIRED PER UNIFORM PLUMBING CODE SECTION 315.1

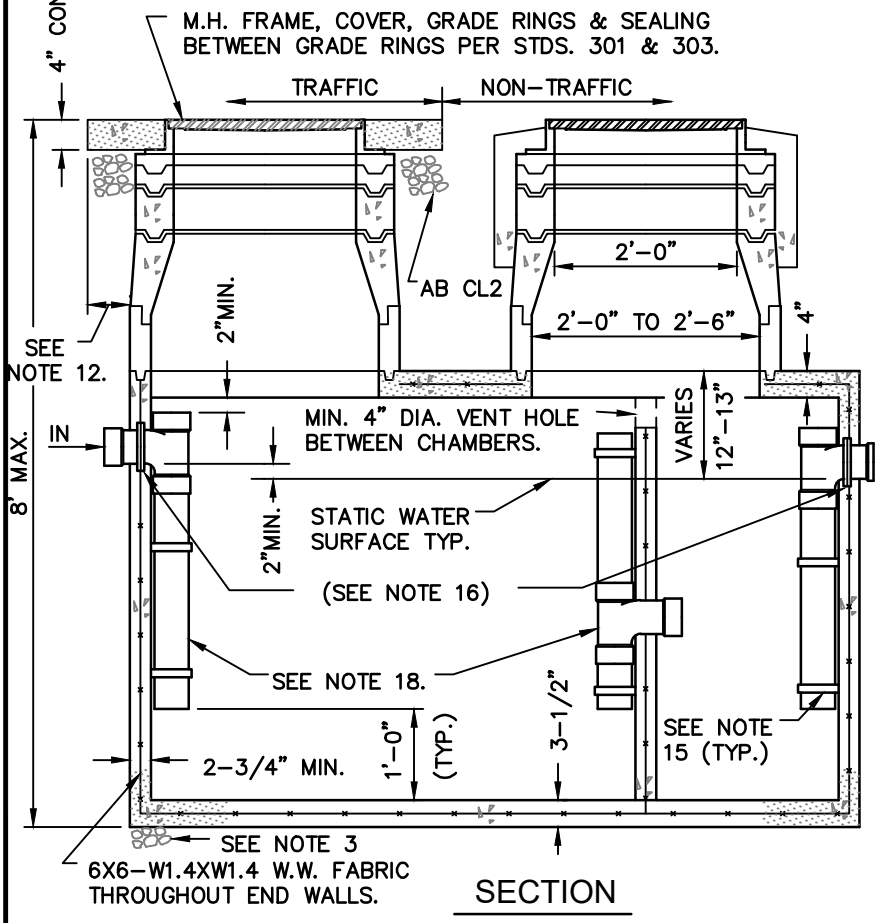
MISCELLANEOUS PIPE INSTALLATION DETAILS

STD. NO. 316

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



PLAN



SECTION

NOTES:

1. TANK TO BE PRECAST AS MANUFACTURED BY:
   M.C. NOTTINGHAM
   PACIFIC CONC. PRODUCTS
   SELVAGE CONC. PRODUCTS
   OR CITY APPROVED EQUAL.
2. POLYETHYLENE TANKS ACCEPTABLE IN NON-TRAFFIC AREAS UPON SPECIFIC APPROVAL OF THE CITY ENGINEER.
3. 3" MIN. BEDDING MAT'L PER CITY STD. 222.
4. ALL SURFACE WATER MUST DRAIN AWAY FROM MANHOLES.
5. PIPE SHALL BE 6" MAX. DIAMETER PER U.P.C.
6. CONCRETE MIN. COMPRESSIVE STRLENGTH OF 3000 PSI AT 28 DAYS.
7. ALL WYES SHALL BE ONE-WAY CLEANOUT WYES EXCEPT AS NOTED. TYPE PER U.P.C.
8. GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE OF BUILDINGS IN A LOCATION ACCESSIBLE TO WASTE HAULER PUMPER.
9. ALL GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE PUBLIC RIGHT-OF-WAY.
10. EXCAVATIONS SHALL BE NEAT LINE TYPICALLY ALL SIDES.
11. INTERCEPTOR TO BE USED IN CONJUNCTION WITH "SAMPLING MANHOLE" PER STD. 319.
12. SLAB TO EXTEND MIN. 24" BEYOND ALL SIDES OF TANK. (TRAFFIC AREA)
13. ALL WASTE MUST ENTER THROUGH INLET FITTING ONLY.
14. TANK TO BE STENCILED ON UPPER LEFT HAND CORNER OF INLET END IN WHITE.
15. STAINLESS STEEL CLAMP & BOLTS 3'-0" O.C. MAX. (TYP.) MIN. 2 REQ'D.
16. A WATER STOP CONSISTING OF A STD. MANHOLE ADAPTER GASKET AS SUPPLIED BY THE PIPE MANUFACTURER SHALL BE GROUTED INTO THE INTERCEPTOR WALL NEAR THE CENTER OF THE WALL.

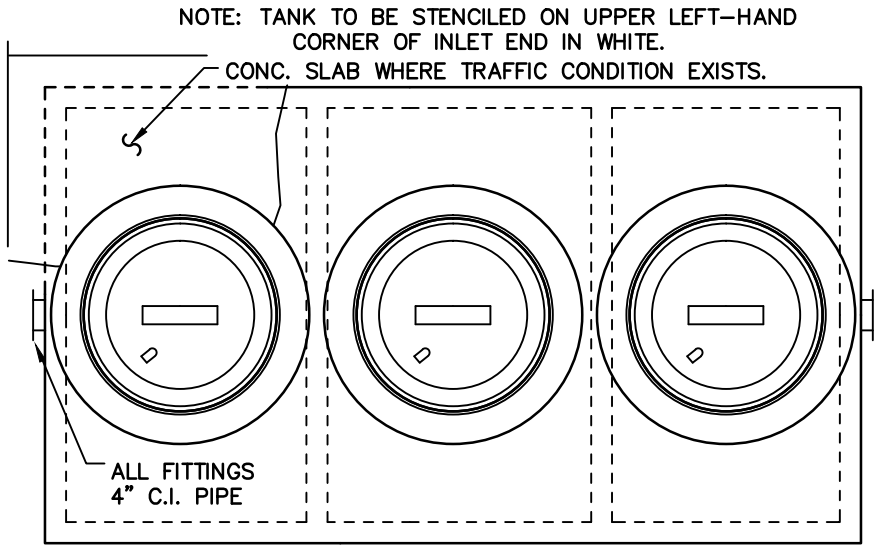
NOTES: (CONT.)

17. TANK CAPACITY TO BE DETERMINED AT THE TIME OF INDUSTRIAL WASTE PERMIT APPLICATION. SEE ENGINEERS APPROVED LIST.
18. PIPE & FITTINGS TO BE 4" SCH. 40 PVC.
19. REINFORCING BARS INTERMEDIATE GRADE ASTM A615-62T & A305-56T. REINFORCING WIRE FABRIC - ASTM A185-61T.
20. ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBSTITUTED FOR REVIEW BY THE CITY.

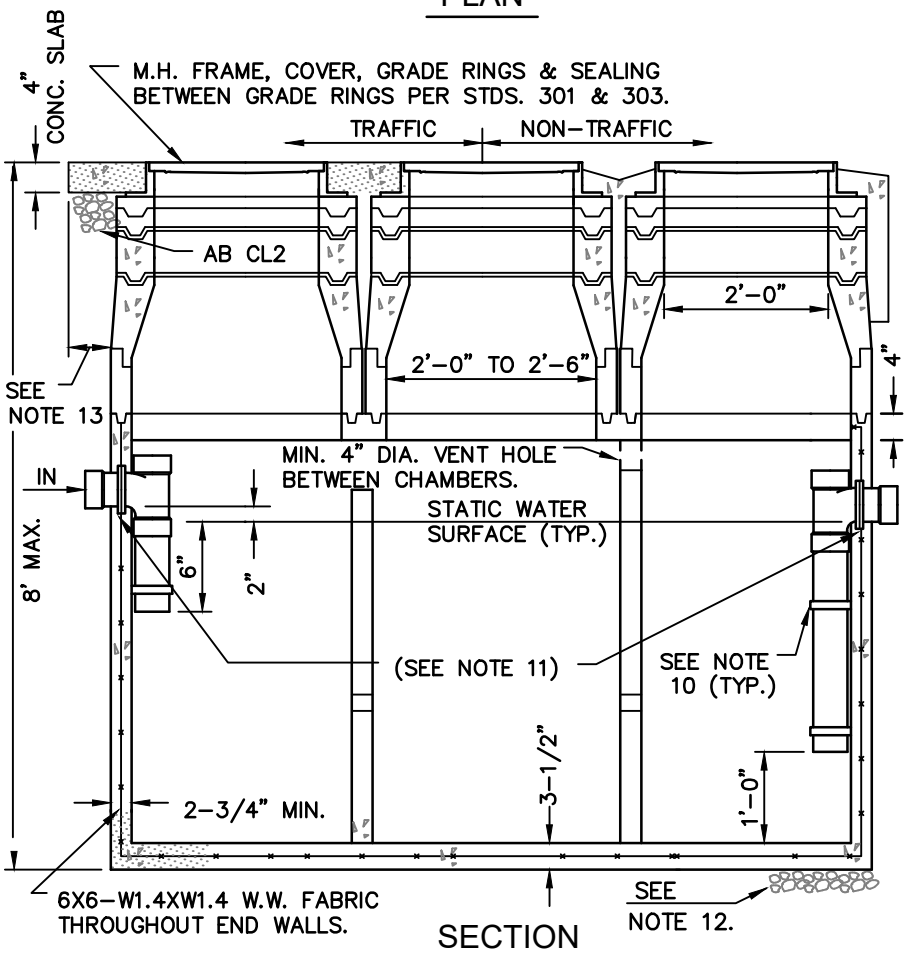
PRECAST GREASE INTERCEPTOR

STD. NO. 317

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



PLAN



SECTION

NOTES:

1. TANK TO BE PRECAST AS MANUFACTURED BY:
   M.C. NOTTINGHAM
   PACIFIC CONC. PRODUCTS
   SELVAGE CONC. PRODUCTS
   OR CITY APPROVED EQUAL.
2. ALL GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE PUBLIC R/W
3. GREASE INTERCEPTORS SHALL BE LOCATED OUTSIDE OF BUILDINGS IN A LOCATION ACCESSIBLE TO WASTE HAULER PUMPER.
4. ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBSTITUTED FOR REVIEW BY THE CITY.
5. PIPE SHALL BE 6" MAX. DIAMETER PER U.P.C.
6. EXCAVATIONS SHALL BE NEAT LINE TYPICALLY ALL SIDES.
7. HEIGHT OF TANK ABOVE FITTINGS VARIABLE. ONE FT. SECTIONS MAY BE ADDED TO REQUIRED F.G.
8. ALL WYES SHALL BE ONE-WAY CLEANOUT WYES EXCEPT AS NOTED. TYPE PER U.P.C.
9. INTERCEPTOR TO BE USED IN CONJUNCTION WITH "SAMPLING MANHOLE" PER STD. 319.
10. STAINLESS STEEL CLAMP & BOLTS 3'-0" O.C. MAX. (TYP.) MIN. 2 REQ'D.
11. A WATER STOP CONSISTING OF A STD. MANHOLE ADAPTER GASKET AS SUPPLIED BY THE PIPE MANUFACTURER SHALL BE GROUTED INTO THE INTERCEPTOR WALL NEAR THE CENTER OF THE WALL.
12. 3" MIN. BEDDING MAT'L PER CITY STD. 222.
13. SLAB TO EXTEND MIN. 24" BEYOND ALL SIDES OF TANK.(TRAFFIC AREA)
14. TANK CAPACITY TO BE DETERMINED AT THE TIME OF INDUSTRIAL WASTE PERMIT APPLICATION.
15. PIPE & FITTINGS TO BE 4" SCH.. 40 PVC.
16. CONCRETE MIN. COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
17. ALL WASTE MUST ENTER THROUGH INLET FITTING.

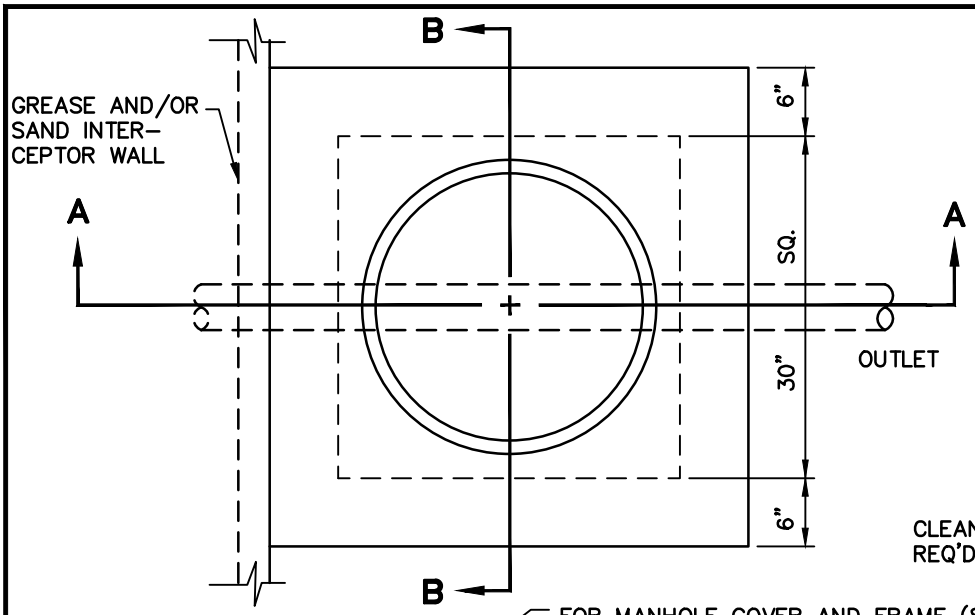
NOTES: (CONT.)

18. REINFORCING BAR INTERMEDIATE GRADE ASTM A615-62T & A305-56T.
19. REINFORCING WIRE FABRIC- ASTM A185-61T.

SAND AND GREASE INTERCEPTOR

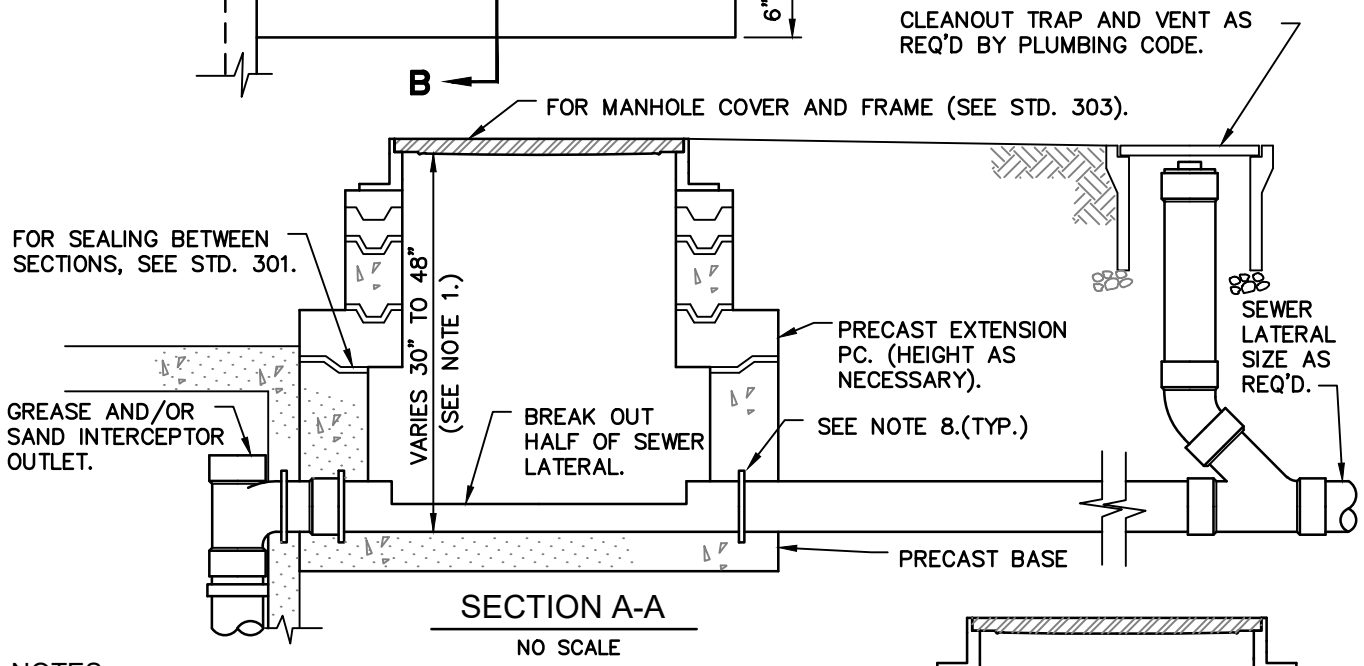
STD. NO. 318

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



PLAN

NO SCALE

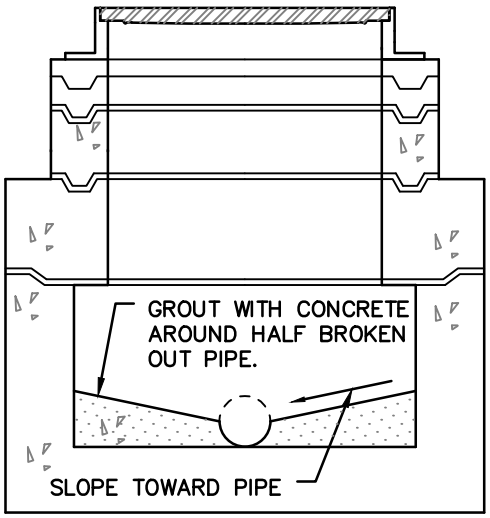


SECTION A-A

NO SCALE

NOTES:

1. IF LESS THAN 30" REVIEW WITH CITY FOR ADD'L VAULT REQ'MTS. IF GREATER THAN 48" INSTALL SAMPLING M.H. SIM. TO STD. 301 WITH FLOW-THROUGH CUT-AWAY PIPE AS PER THIS STD.
2. SAMPLING M.H. TO BE LOCATED OUTSIDE OF PUBLIC RIGHT-OF-WAY EXCEPT WITH WRITTEN APPROVAL OF THE PUBLIC WORKS ENCROACHMENT OFFICER.
3. AN ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBMITTED FOR REVIEW BY THE CITY.
4. LOCATION SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.
5. MANHOLE SHALL BE SCENTRAL PRECAST PRODUCTS PRECAST CONC. DROP INLET BOX #5K WITH #5K X 24" DIAMETER TRANSITION SLAB.
6. ALL SURFACE WATER MUST DRAIN AWAY FROM SAMPLING M.H.
7. SAMPLING M.H. TO BE USED IN CONJUNCTION WITH EITHER STDS.
8. A WATER STOP CONSISTING OF A STD. MANHOLE ADAPTER GASKET AS SUPPLIED BY THE PIPE MFR. TO BE GROUTED INTO THE BOX WALL NEAR THE CENTER OF THE WALL.



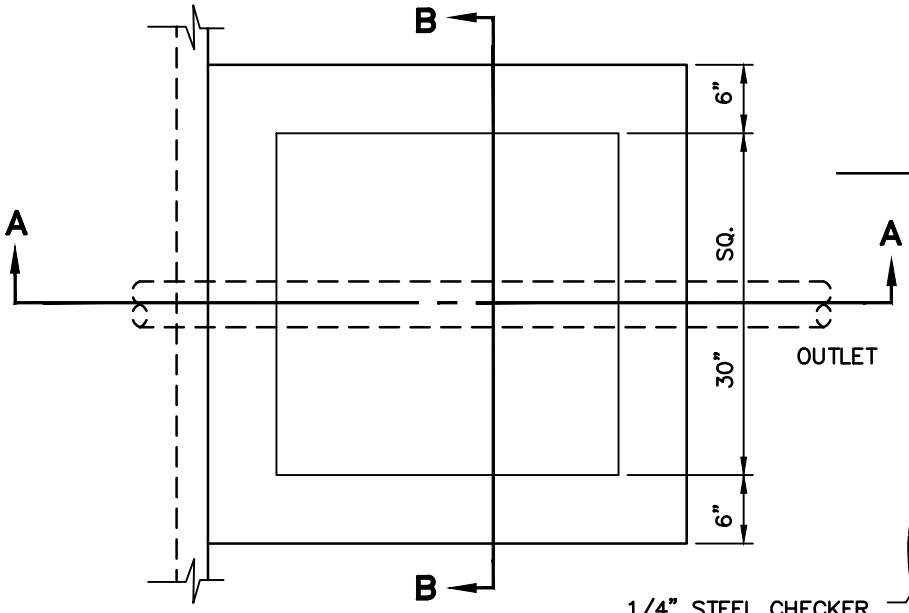
SECTION B-B

NO SCALE

SAMPLING MANHOLE EXTERIOR USE

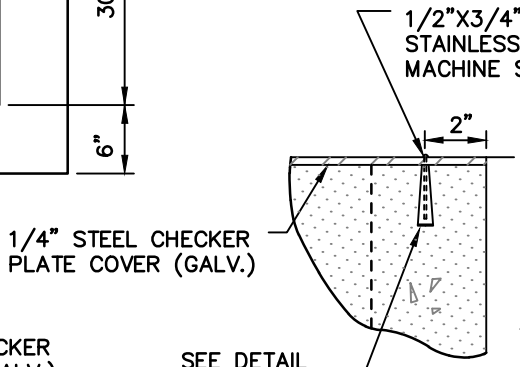
STD. NO. 319

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

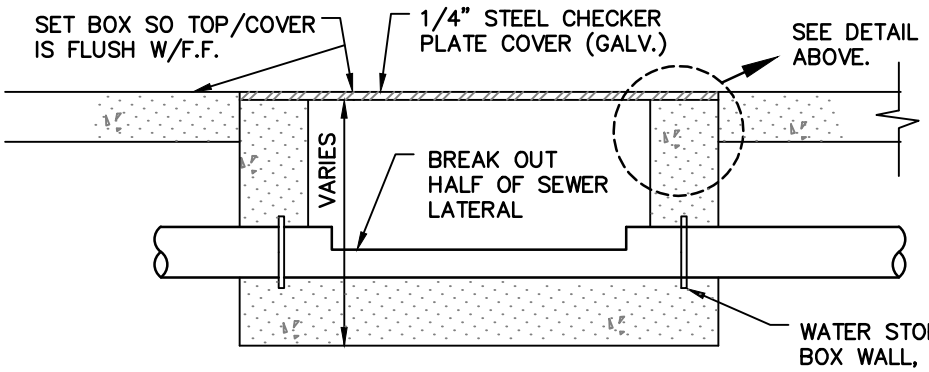


PLAN

NO SCALE



STEEL PLATE COVER FASTENER DETAIL

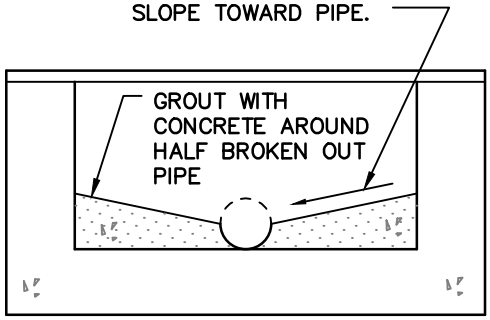


SECTION A - A

NO SCALE

NOTES:

1. TO BE USED IN THE INTERIOR OF BUILDINGS IN CONJUNCTION W/SAMPLING MANHOLE AND TO BE UPSTREAM OF THE SAMPLING MANHOLE.
2. LOCATION SUBJECT TO THE APPROVAL OF THE CITY ENGINEER.
3. TO BE USED ONLY WITH THE APPROVAL OF THE CITY ENGINEER.
4. ALTERNATE DESIGN BY A REGISTERED ENGINEER MAY BE SUBMITTED FOR REVIEW BY THE CITY.
5. BOX SHALL BE CENTRAL PRECAST PRODUCTS MODEL 5K OR APPROVED EQUAL.
6. ALL SURFACE WATER MUST DRAIN AWAY FROM SAMPLING BOX.
7. SAMPLING BOX TO BE USED IN CONJUNCTION WITH EITHER STDS. 317 OR 318.
8. A WATER STOP CONSISTING OF A STANDARD MANHOLE ADAPTER GASKET AS SUPPLIED BY THE PIPE MANUFACTURER SHALL BE GROUTED INTO THE BOX WALL NEAR THE CENTER OF THE WALL.



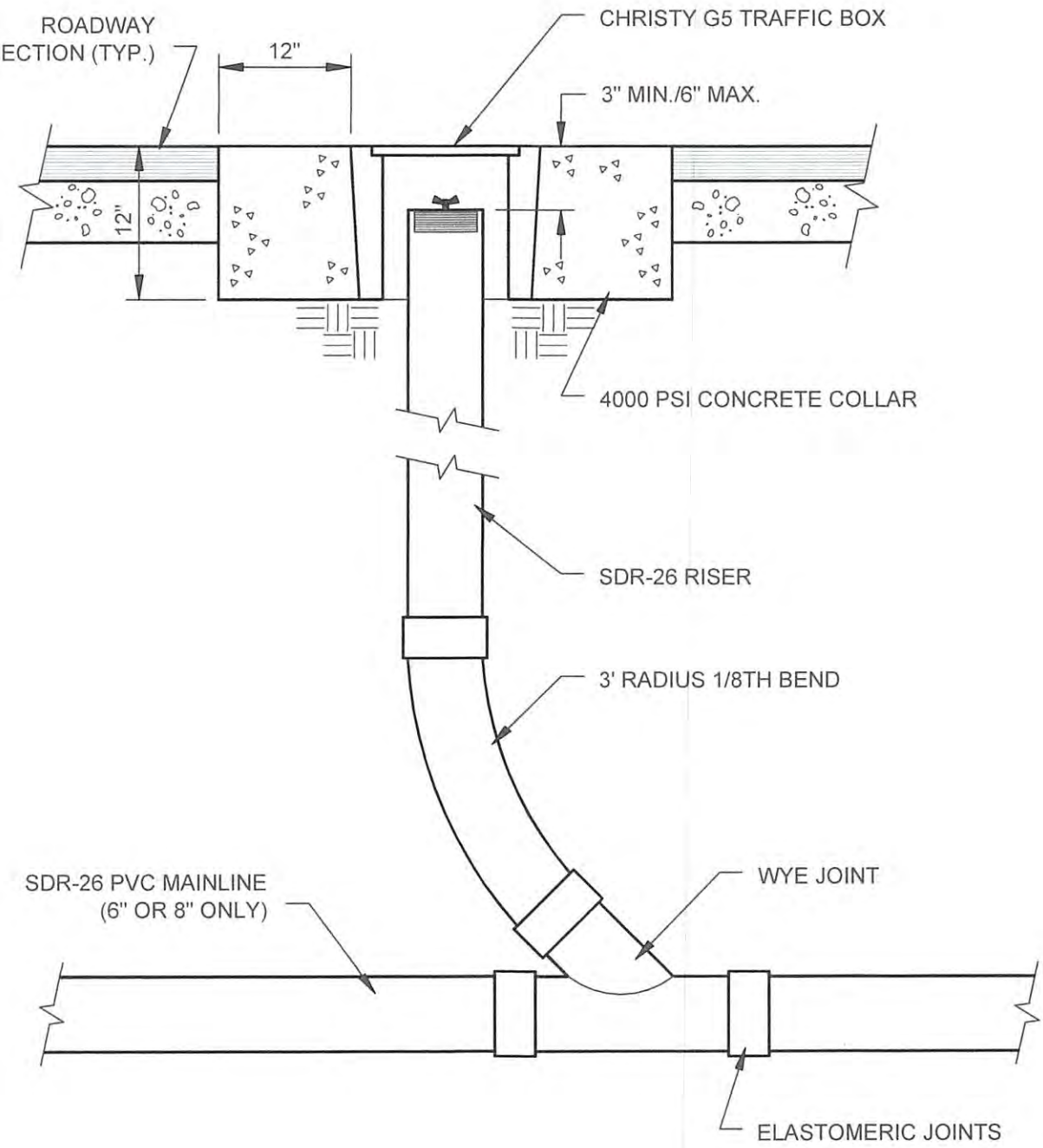
SECTION B - B

NO SCALE

SAMPLING BOX BUILDING INTERIOR

STD. NO. 320

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTE:
BACKFILL PER CITY OF LAKEPORT
STANDARD NO. 222

IN PAVEMENT MAINLINE SEWER CLEANOUT

STD. NO. 321

SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD:	DATE: MAR 2018

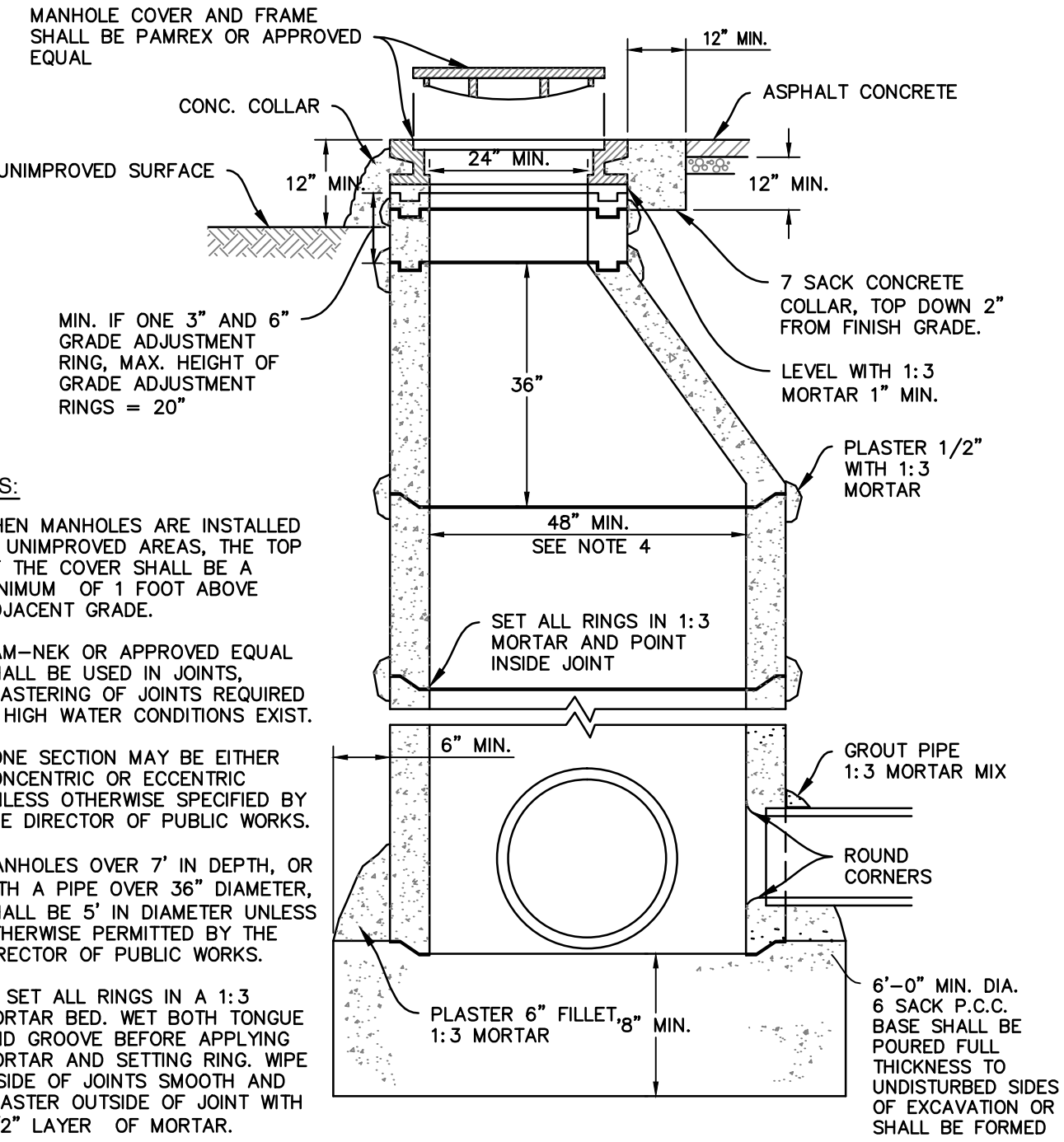
B – Storm Drain Standard Plans (400 Series)

STORM DRAIN STANDARD PLANS

DESCRIPTION

400 SERIES – STORM DRAIN

400	Storm Drain Manhole
401	Standard Manhole Frame and Cover
402	Standard Precast Concrete Storm Drain Manhole Reducer Slab
403	Precast Catch Basin Hood
404	Curb Opening Catch Basin
405	Catch Basin for Pipes Larger Than 24"
406	Storm Drain Gallery
407	Not Used
408	Typical Storm Drain Outfall Detail
409	Sidewalk Drain
410	Sidewalk Cross Drain
411	Sidewalk Underdrain With Cover Plate
412	Sidewalk Corner Cross Drain
413	Typical Lot Drainage
414	Storm Drain Message Layout



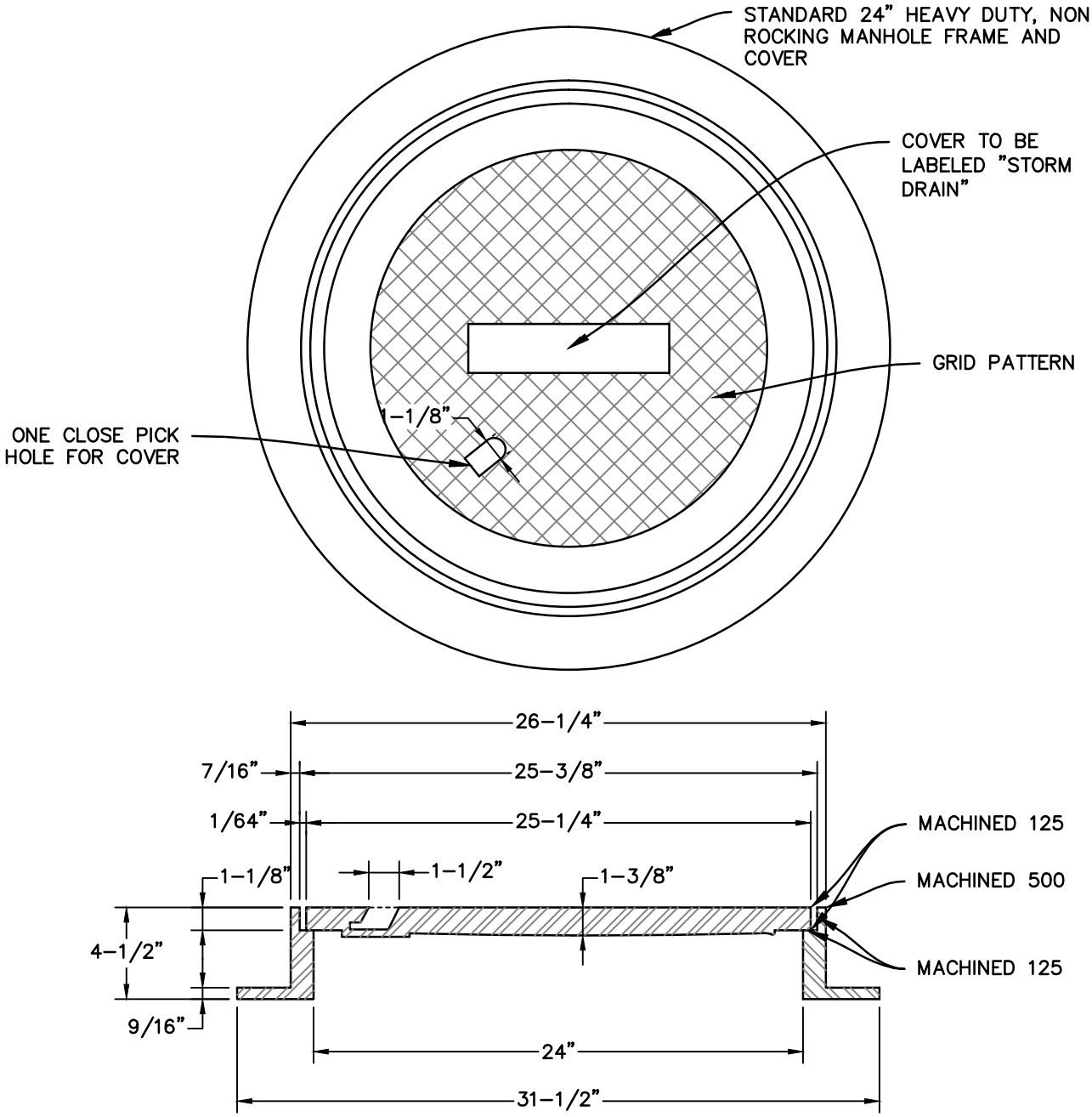
NOTES:

1. WHEN MANHOLES ARE INSTALLED IN UNIMPROVED AREAS, THE TOP OF THE COVER SHALL BE A MINIMUM OF 1 FOOT ABOVE ADJACENT GRADE.
2. RAM-NEK OR APPROVED EQUAL SHALL BE USED IN JOINTS, PLASTERING OF JOINTS REQUIRED IF HIGH WATER CONDITIONS EXIST.
3. CONE SECTION MAY BE EITHER CONCENTRIC OR ECCENTRIC UNLESS OTHERWISE SPECIFIED BY THE DIRECTOR OF PUBLIC WORKS.
4. MANHOLES OVER 7' IN DEPTH, OR WITH A PIPE OVER 36" DIAMETER, SHALL BE 5' IN DIAMETER UNLESS OTHERWISE PERMITTED BY THE DIRECTOR OF PUBLIC WORKS.
5. 5. SET ALL RINGS IN A 1:3 MORTAR BED. WET BOTH TONGUE AND GROOVE BEFORE APPLYING MORTAR AND SETTING RING. WIPE INSIDE OF JOINTS SMOOTH AND PLASTER OUTSIDE OF JOINT WITH 1/2" LAYER OF MORTAR.
6. CONSTRUCT ALL FLOW CHANNELS OF PIPE WHEREVER POSSIBLE. AFTER BASE IS POURED, BREAK OUT TOP HALF OF PIPE FLUSH WITH INSIDE FACE OF M.H. WALL AND CONSTRUCT U-SHAPED CHANNEL. MAKE ELEVATION CHANGES GRADUALLY AND DIRECTIONAL CHANGES WITH SMOOTH CURVES. SET RING BASE IN MORTAR.
7. ALL SECTIONS OF MANHOLE MUST BE OF IDENTICAL MAKE AND MANUFACTURER.

STORM DRAIN MANHOLE

STD. NO. 400

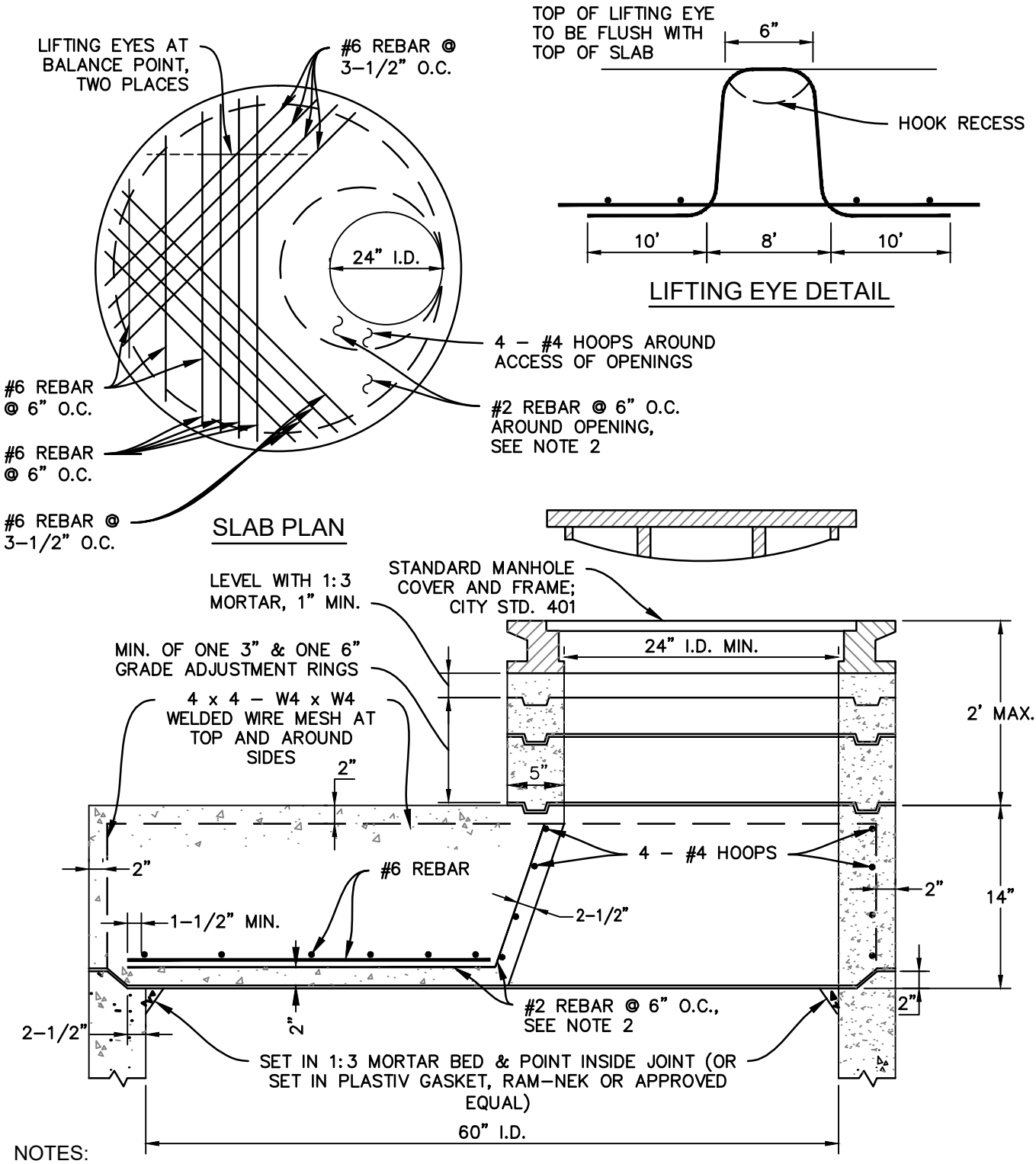
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTES:

1. ALL CASTINGS SHALL BE DIPPED IN APPROVED ASPHALT PAINT.
2. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO A.S.T.M. DESIGNATION 48-30, OR TO UNITED STATES GOVERNMENT SPECIFICATIONS QQI-652B.
3. MINIMUM WEIGHT COMPONENTS:
   COVER - 130 POUNDS
   FRAME - 135 POUNDS

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STANDARD MANHOLE FRAME AND COVER**				STD. NO. **401**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012



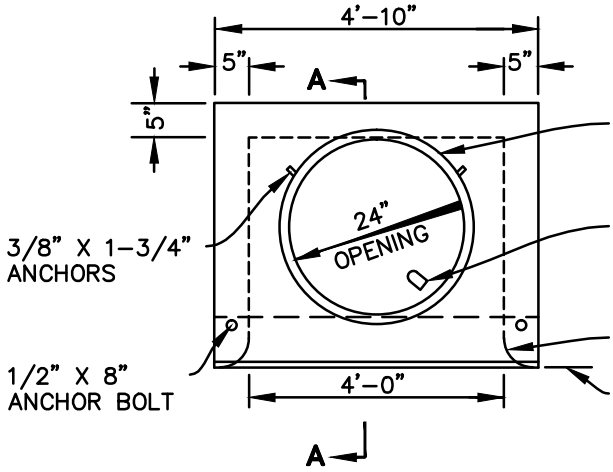
NOTES:

1. FOR DETAILS OF BASE AND BARREL SECTIONS, SEE CITY STD 400.
2. #2 BARS BENT UP AND SPACED 6" O.C. AROUND 24" OPENING. HORIZONTAL LEGS TO FAN OUT EQUALLY SPACED, TO 2–1/2" CLEAR AT EDGE OF SLAB.

STANDARD PRECAST CONCRETE STORM DRAIN MANHOLE REDUCER SLAB

STD. NO. 402

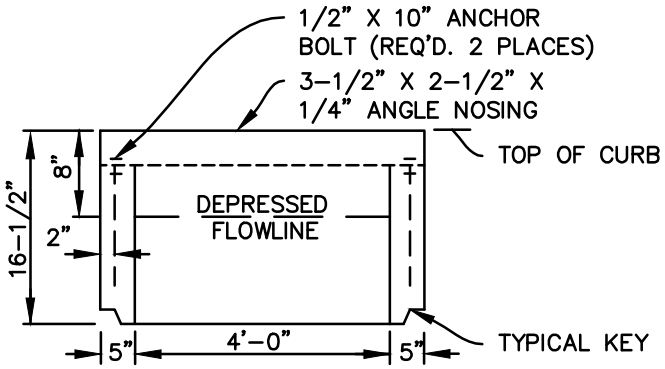
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



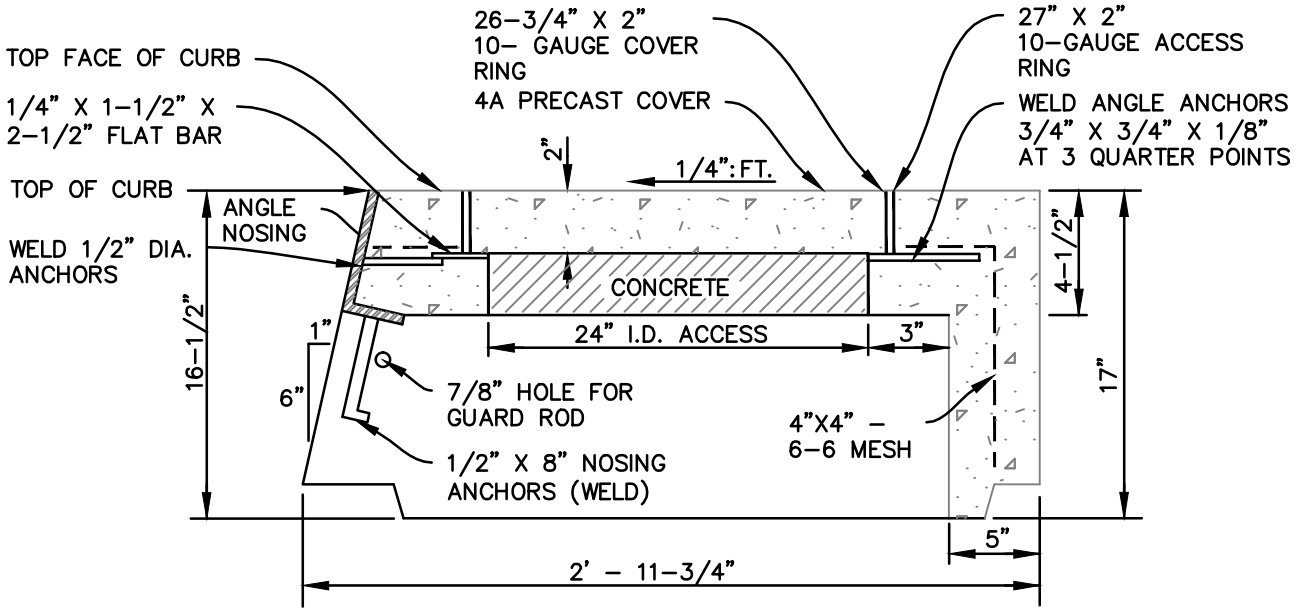
NOTES:

1. ALL METAL PARTS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123.
2. CONCRETE SHALL TEST 3000 PSI AT 28 DAYS.
3. ALL REINFORCING SHALL BE 4"X4" – 6–6 MESH.
4. WEIGHT OF UNIT COMPLETE = 1500± LBS. COVER ONLY = 100± LBS.
5. 3/4" GALVANIZED STEEL GUARD ROD FOR OPENINGS IN EXCESS OF 9".
6. BASE MAY BE PRECAST OR CAST IN PLACE TO SUIT.

PLAN



ELEVATION



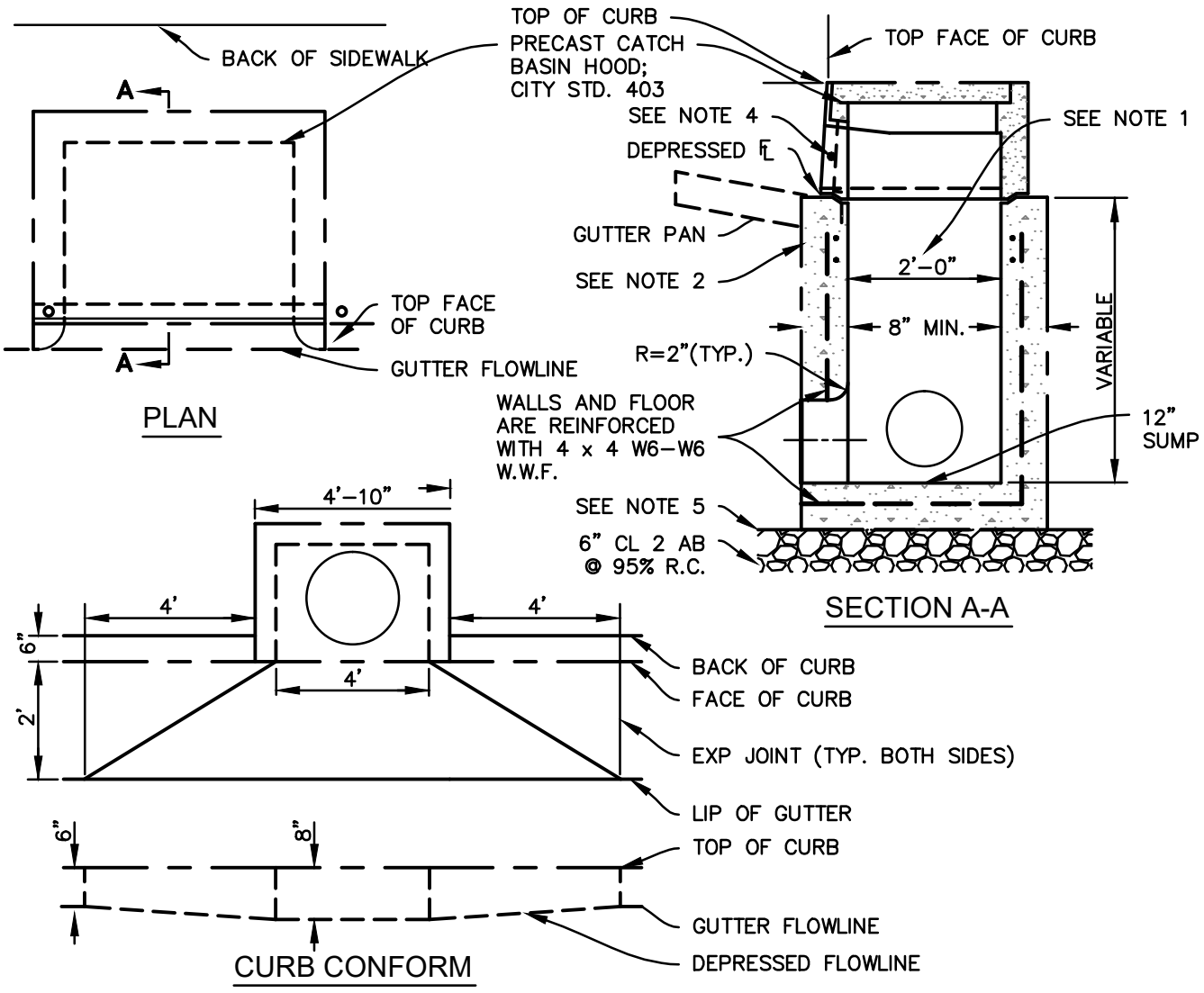
SECTION A-A

APPROVED ALTERNATES:
CENTRAL PRE–CAST PRODUCTS MODEL 4AC
PHEONIX PRECAST CONC. PRODUCTS MODEL P–2448–C

PRECAST CATCH BASIN HOOD

STD. NO. 403

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



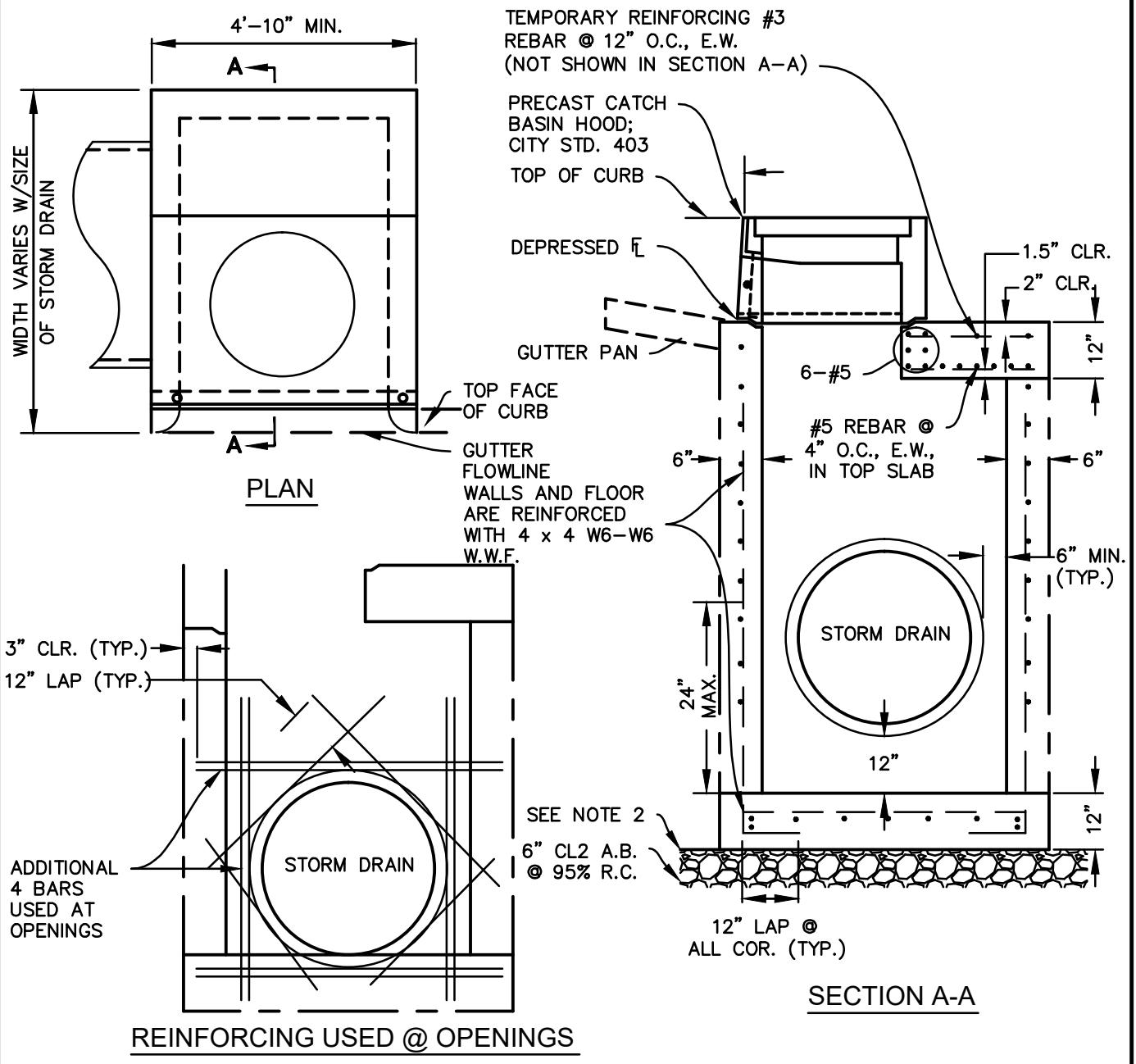
NOTES:

1. IF PIPE INTO OR OUT OF THE CATCH BASIN IS LARGER THAN 24", UNIT SHALL BE TAILOR MADE BY SUPPLIER, OR FIELD FABRICATED PER CITY STD. 405.
2. APPROVED ALTERNATES FOR CURB INLET BASE SECTIONS: CENTRAL PRE-CAST PRODUCTS BASE SECTION MODEL 4A; PHOENIX PRECAST CONC. PRODUCTS BASE SECTION MODEL D14,2.
3. ALL HOOD, BASE, AND PIPE CONNECTIONS SHALL BE GROUTED.
4. 3/4" GALVANIZED STEEL GUARD ROD MUST BE INSTALLED AT CENTER OF OPENINGS IN EXCESS OF 9" INCHES IN LENGTH.
5. POLYETHYLENE BARRIER VISQUEEN 1/4" SHEETING, OR APPROVED EQUAL. OVERLAP JOINTS 6".

CURB OPENING CATCH BASIN

STD. NO. 404

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



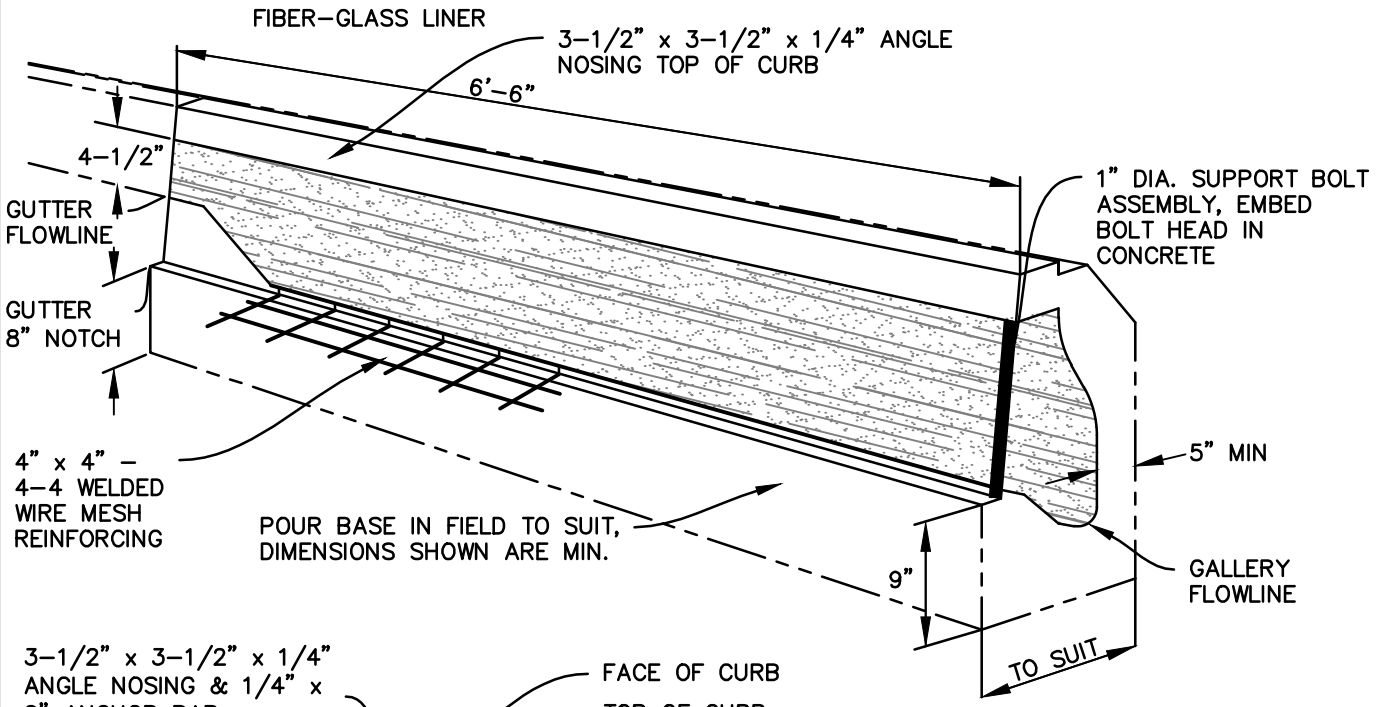
NOTES:

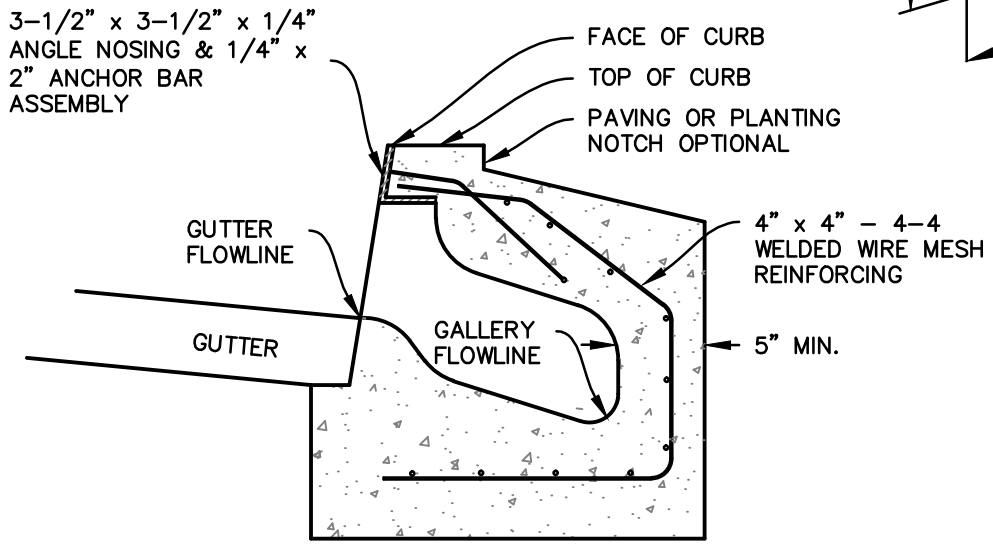
1. INLET AND OUTLET PIPES MAY BE PLACED IN ANY WALL.
2. POLYETHYLENE BARRIER VISQUEEN 1/4" SHEETING, OR APPROVED EQUAL. OVERLAP JOINTS 6".

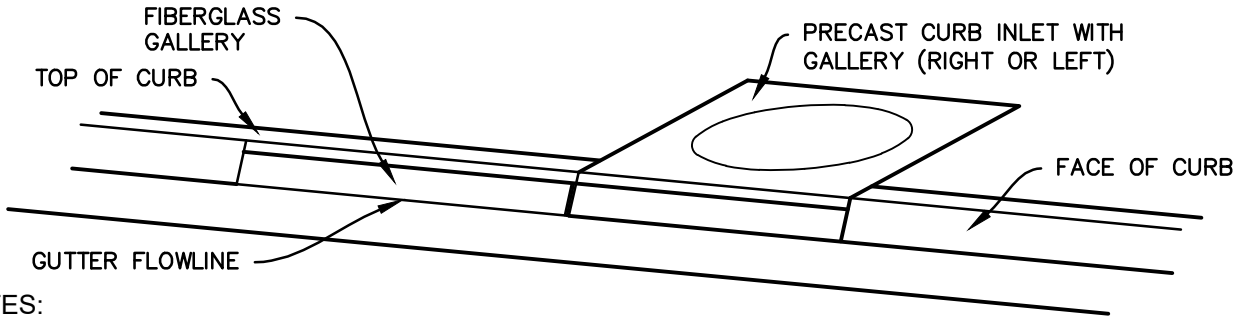
CATCH BASIN FOR PIPES LARGER THAN 24"

STD. NO. 405

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012







NOTES:

1. CONCRETE SHALL BE 3000 PSI AT 28 DAYS.
2. NOSING ASSEMBLY (ANGLED & WELDED ANCHOR BARS) SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION PER ASTM SPEC. A123–59.
3. EITHER CAST–IN–PLACE OR PRECAST UNITS ARE ACCEPTABLE.

STORM DRAIN GALLERY

STD. NO. 406

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

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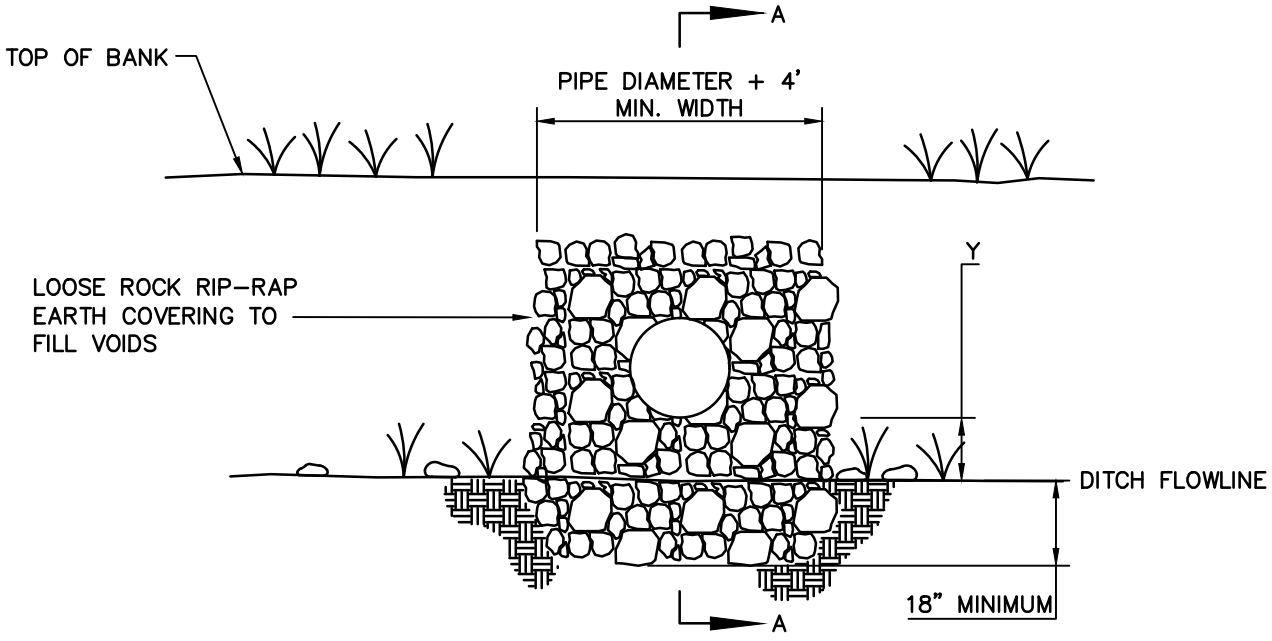
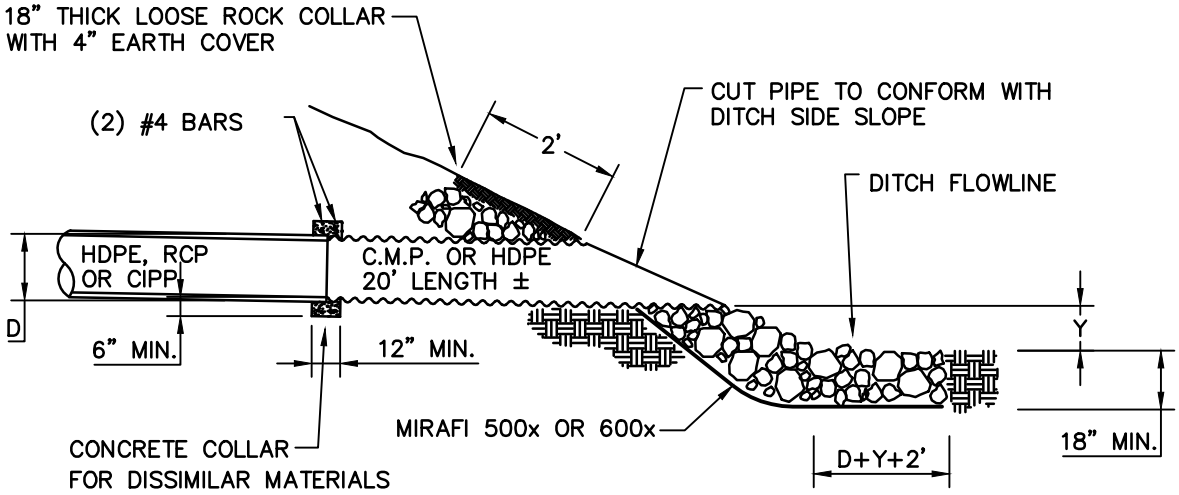
					STD. NO. 407
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



STORM DRAIN OUTLET ELEVATION



SECTION A-A

WHEN D < 24", Y = 2'
WHEN D ≥ 24", Y = 1'

NOTES:

1. CMP SHALL CONFORM WITH SECTION 66-3 OF THE CALTRANS STANDARD SPECIFICATIONS.
2. HDPE PIPE SHALL CONFORM WITH SECTION 64 OF THE STANDARD SPECIFICATIONS FOR TYPE S PIPE.

ROCK SLOPE PROTECTION

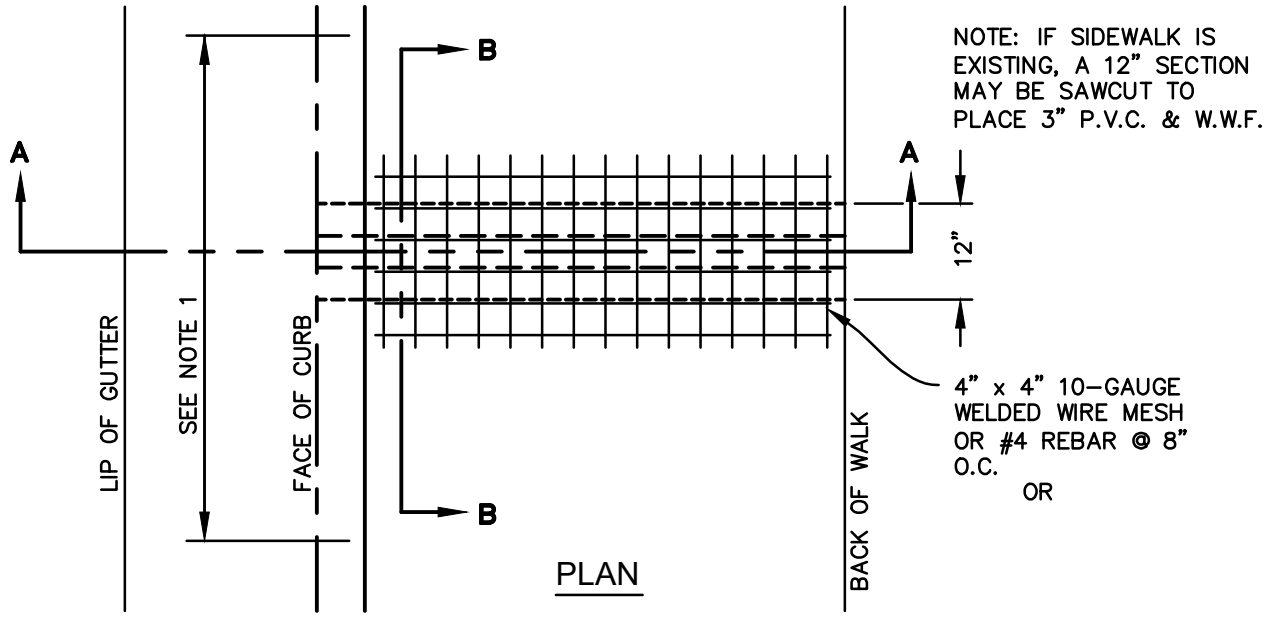
MATERIALS:

ROCKS SHALL BE ANGULAR AND WELL GRADED FROM AN AVERAGE DIAMETER OF FOUR (4) INCHES TO AN AVERAGE DIAMETER OF FIFTEEN (15) INCHES WITH APPROXIMATELY FIFTY (50) PERCENT BY WEIGHT SMALLER THAN NINE (9) INCHES IN AVERAGE DIAMETER. NOT MORE THAN TEN (10) PERCENT OF THE ROCK RIP-RAP BY WEIGHT SHALL BE LESS THAN FOUR (4) INCHES AVERAGE DIAMETER. NOT MORE THAN TEN (10) PERCENT OF THE ROCK RIP-RAP BY WEIGHT SHALL BE GREATER THAN FIFTEEN (15) INCHES IN AVERAGE DIAMETER AND NONE SHALL EXCEED AN AVERAGE DIAMETER OF TWENTY (20) INCHES.

TYPICAL STORM DRAIN OUTALL DETAIL

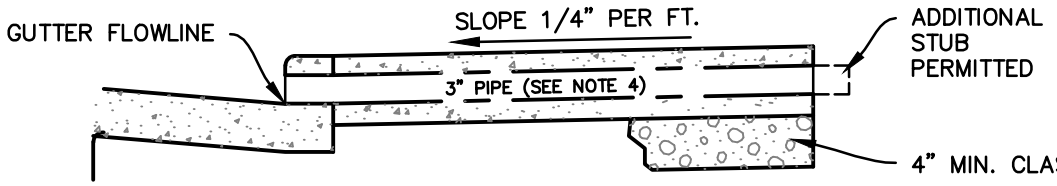
STD. NO. 408

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

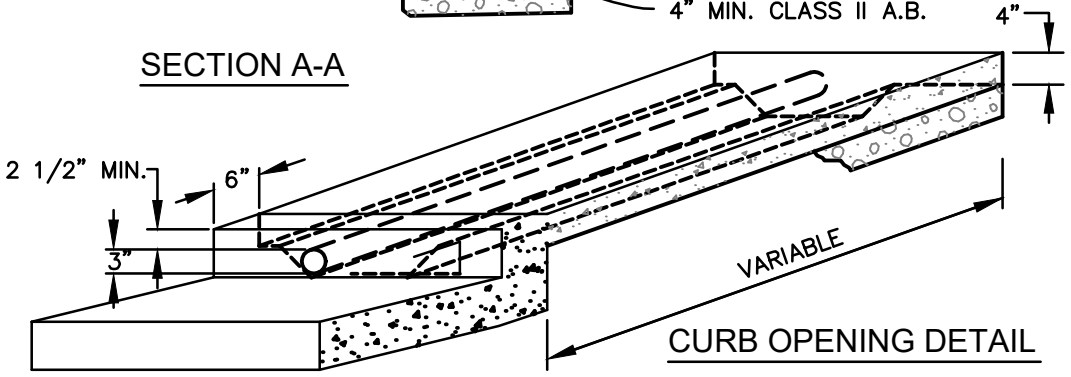


NOTE: IF SIDEWALK IS EXISTING, A 12" SECTION MAY BE SAWCUT TO PLACE 3" P.V.C. & W.W.F.

PLAN



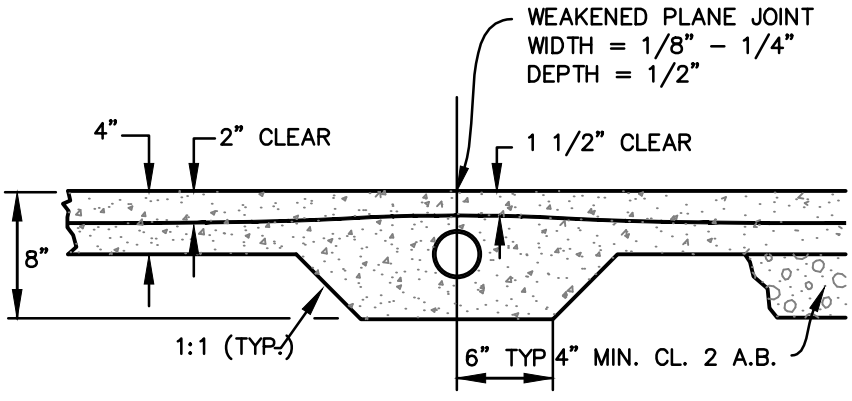
SECTION A-A



CURB OPENING DETAIL

NOTES:

1. WIRE MESH OR REBAR SHALL BE 2' WIDE. LENGTH SHALL EQUAL SIDEWALK WIDTH MINUS 4". IF SIDEWALK IS EXISTING, SEE NOTE ABOVE.
2. ON-SITE DRAINAGE AND LOCATION OF CURB OUTLETS SHALL BE BY THE OWNER TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
3. DRAIN PIPE SHALL BE INSTALLED SO THAT TOP OF PIPE IS 2-1/2" MIN. BELOW FINISH GRADE AT BACK OF SIDEWALK.
4. SIDEWALK DRAIN TO BE 3" SCH. 40, HEAVY WALL, RIGID POLYVINYL CHLORIDE PIPE OR APPROVED SUBSTITUTE.

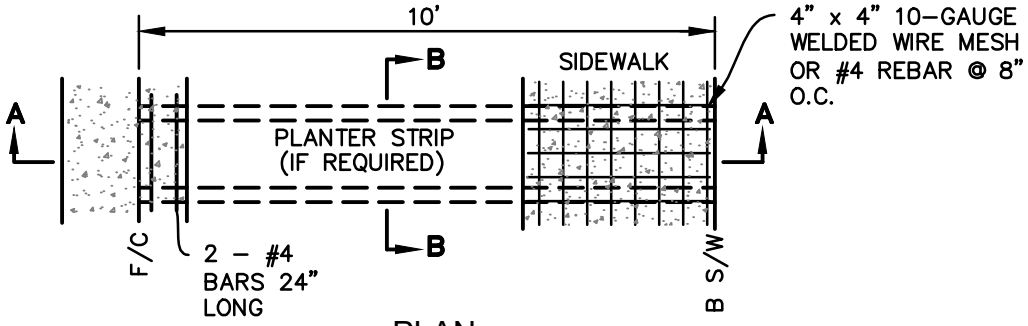


SECTION B-B

SIDEWALK DRAIN

STD. NO. 409

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



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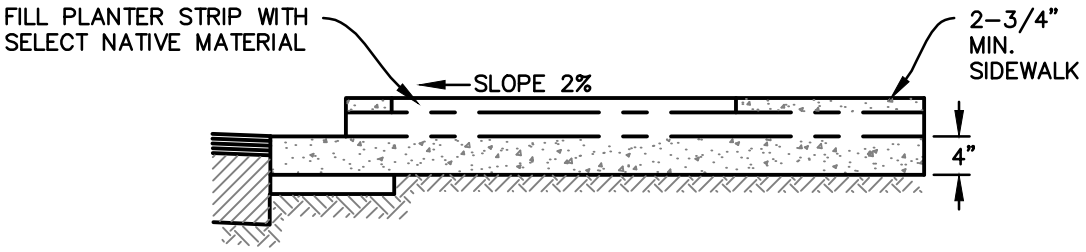
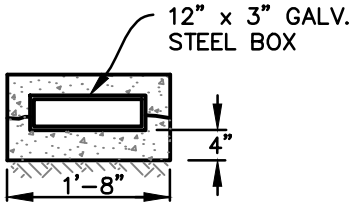


SECTION A-A

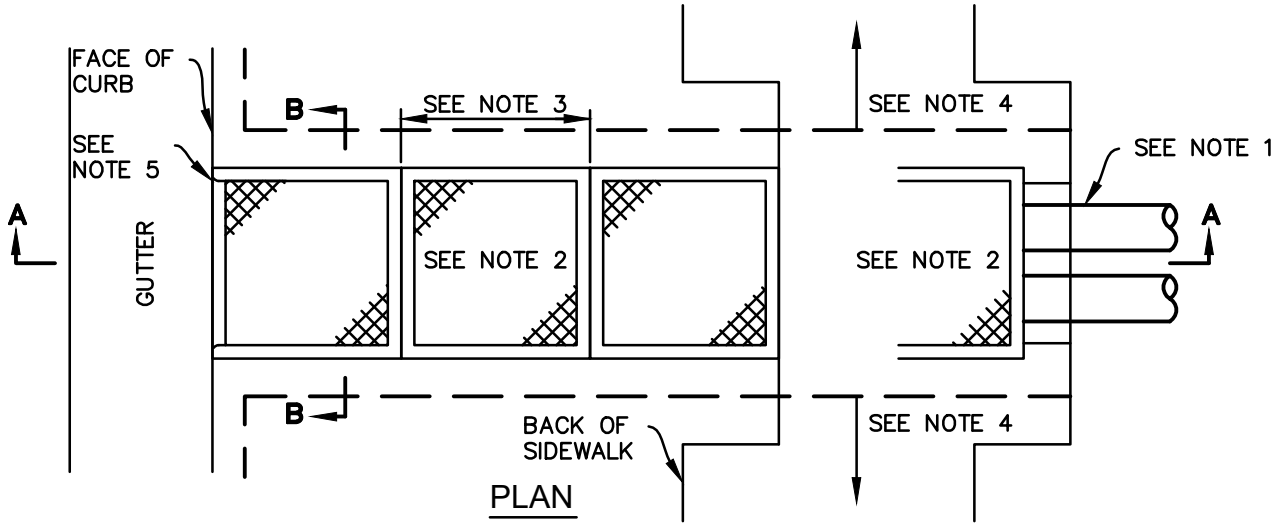


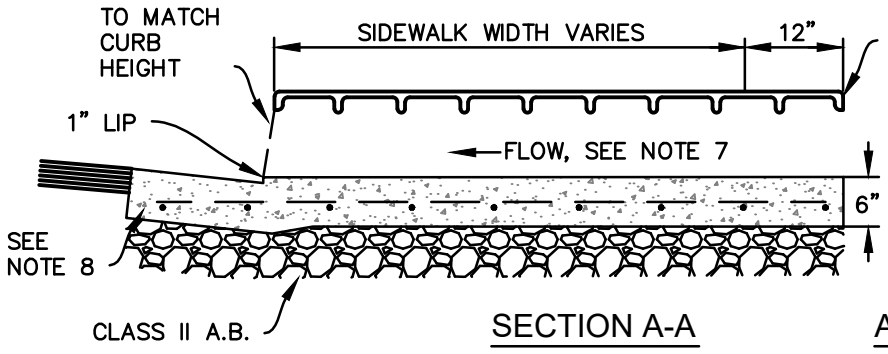
SECTION B-B

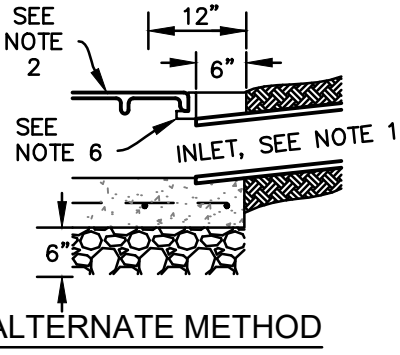
NOTES:

1. WITH APPROVAL OF THE CITY ENGINEER, WIDTH OF BOX MAY VARY FROM 6" TO 12".
2. GALVANIZED STEEL TO BE 1/4" THICK.
3. ALL CONCRETE SHALL HAVE 6 SACKS PER CUBIC YARD.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**SIDEWALK CROSS DRAIN**	STD. NO. **410**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012

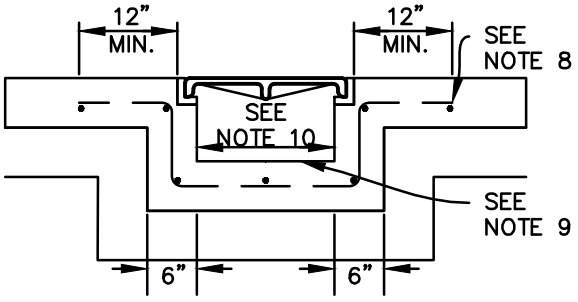






NOTES:

1. INLET SHALL BE PAVED SWALE, RECTANGULAR CONDUIT, OR PIPE(S). MAX. INLET DIAMETER/HEIGHT SHALL BE CURB HEIGHT MINUS 2". A JUNCTION BOX SHALL HAVE ACCESS/CLEANOUT. INLET TYPE SHALL HAVE APPROVAL OF CITY ENGINEER.
2. FRAME AND COVERS: NEEHAH R-4900, TYPE D, SOLID TOP WITH PERMA-GRIP SURFACE, OR APPROVED EQUAL. THERE SHALL BE A 1/8" SPACE BETWEEN THE FRAME AND THE LID. COVERS SHALL BE COATED WITH EPOXY PAINT COLORED TO MATCH SIDEWALK COLOR.
3. COVER LENGTH SHALL MAINTAIN A COVER WEIGHT OF AT LEAST 100 LBS EACH.



4. UNDERDRAIN SHALL NOT BE CLOSER THAN 5' FROM DRIVEWAY OR CURB RETURN.
5. 1" RADIUS AT END OF CHANNEL, EACH SIDE OF OUTLET.
6. FRAME END PIECE, REQUIRED FOR ALTERNATE METHOD.
7. CHANNEL SLOPE SHALL BE NO LESS THAN 2% AND SHALL BE PARALLEL WITH SIDEWALK SURFACE.
8. #4 REBAR @ 12" O.C., E.W.
9. CONCRETE SHALL HAVE 6 SACKS PER CUBIC YARD.
10. CHANNEL WIDTH VARIES, 18" MIN. AND 3' MAX.

SIDEWALK UNDERDRAIN WITH COVER PLATE

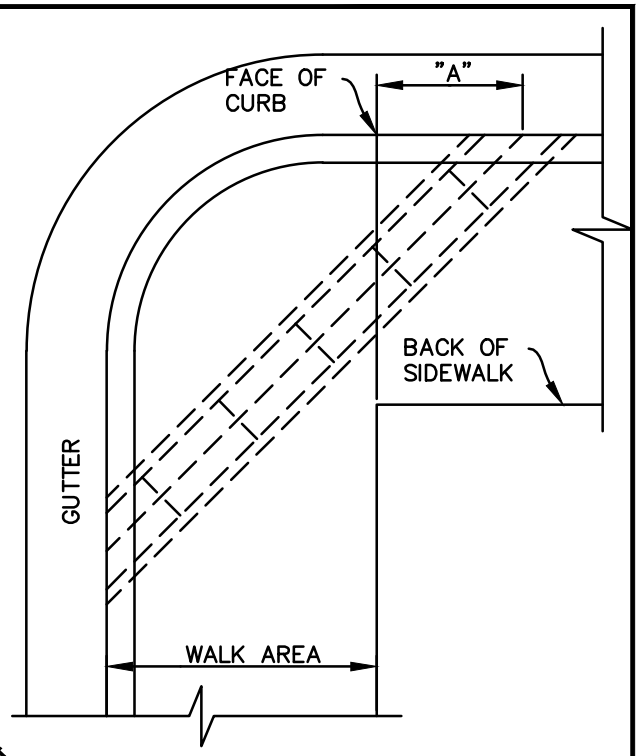
STD. NO. 411

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

NOTES:

1. BOTTOM OF DRAIN TO BE SMOOTHED PRIOR TO SETTING CHANNEL IN WET CONCRETE.
2. DRAIN TO SLOPE A MINIMUM OF 2% TOWARDS GUTTER.
3. AFTER SETTING CHANNEL, THICKENED AREA SHALL BE ALLOWED TO SET UP ENOUGH TO PREVENT FURTHER SINKING OF CHANNEL. A COLD JOINT IS ACCEPTABLE.
4. WIRE FABRIC SHALL BE 4' LONG (MIN.). WIDTH SHALL BE EQUAL SIDEWALK WIDTH MINUS 4".

WALK AREA	"A"
12'	2'
10'	4'
9'	5'
8'	6'
6'	4'
5'	3.5'



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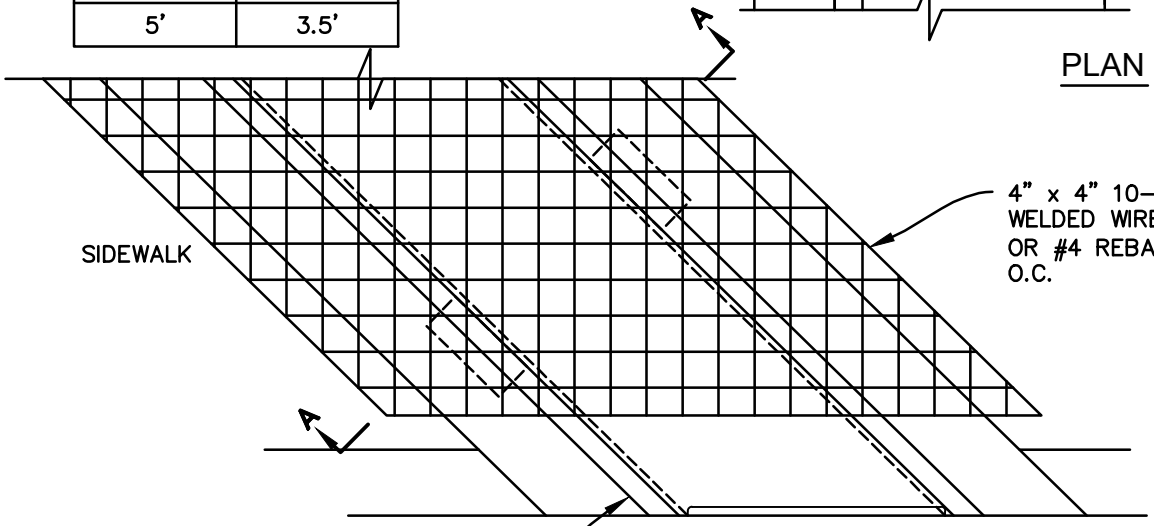

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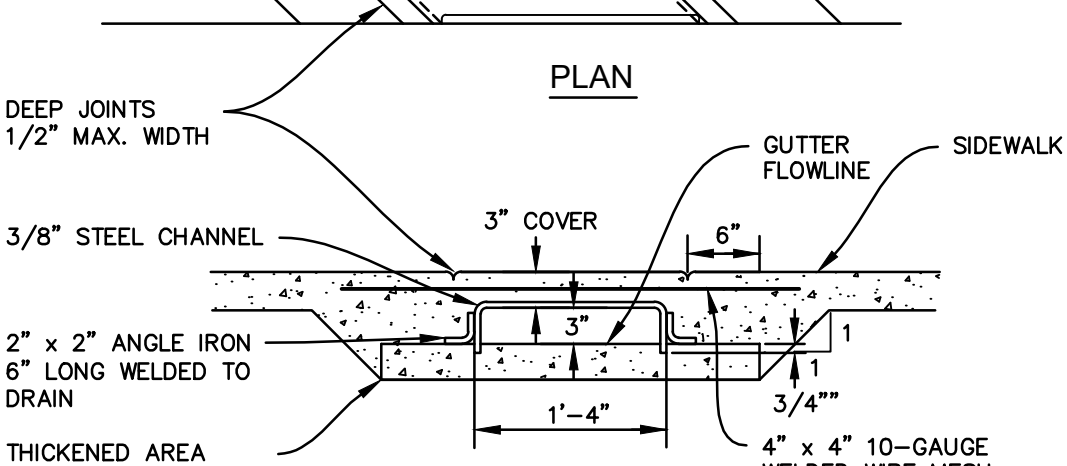
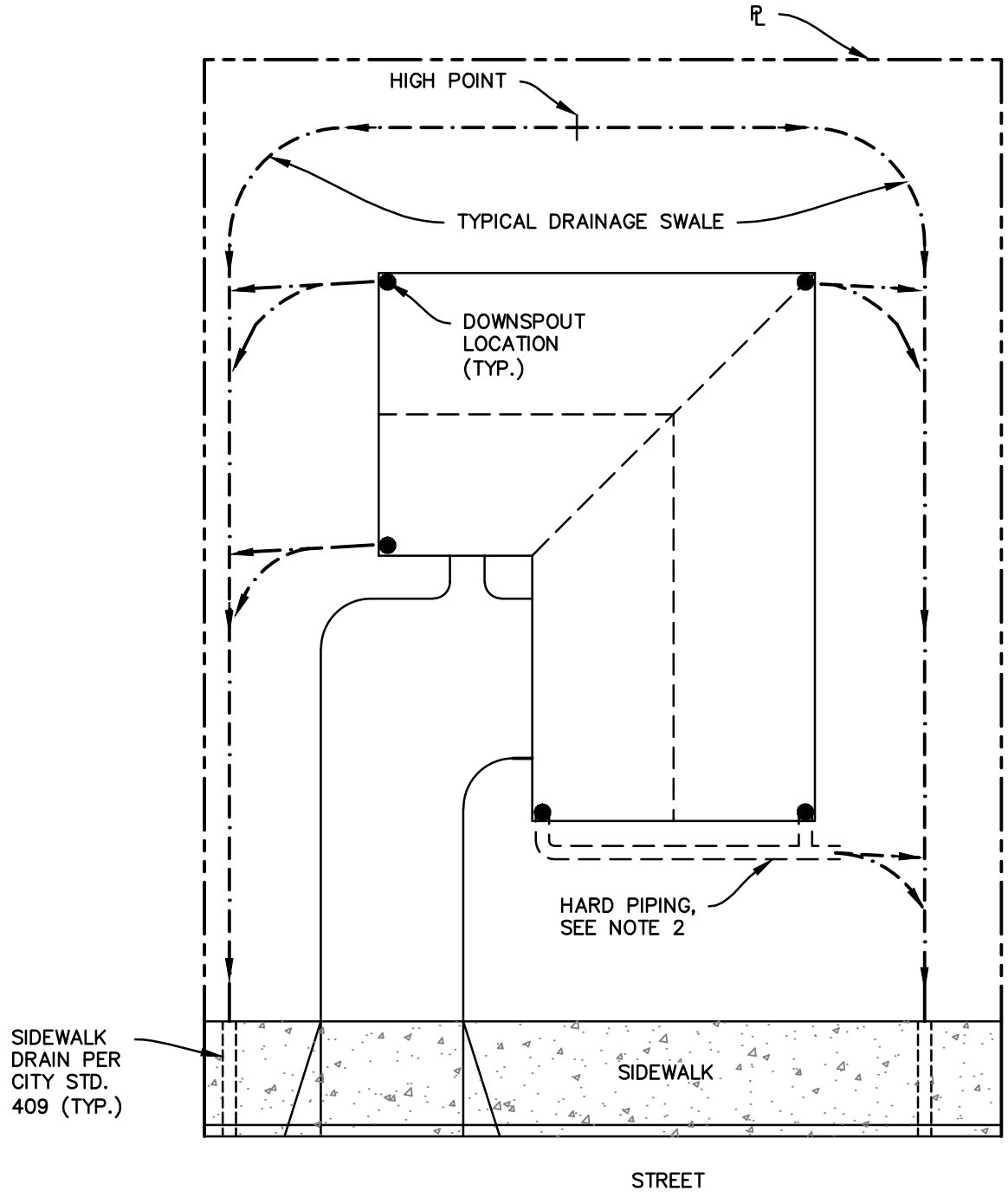


SECTION A-A

SIDEWALK CORNER CROSS DRAIN

STD. NO. 412

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012



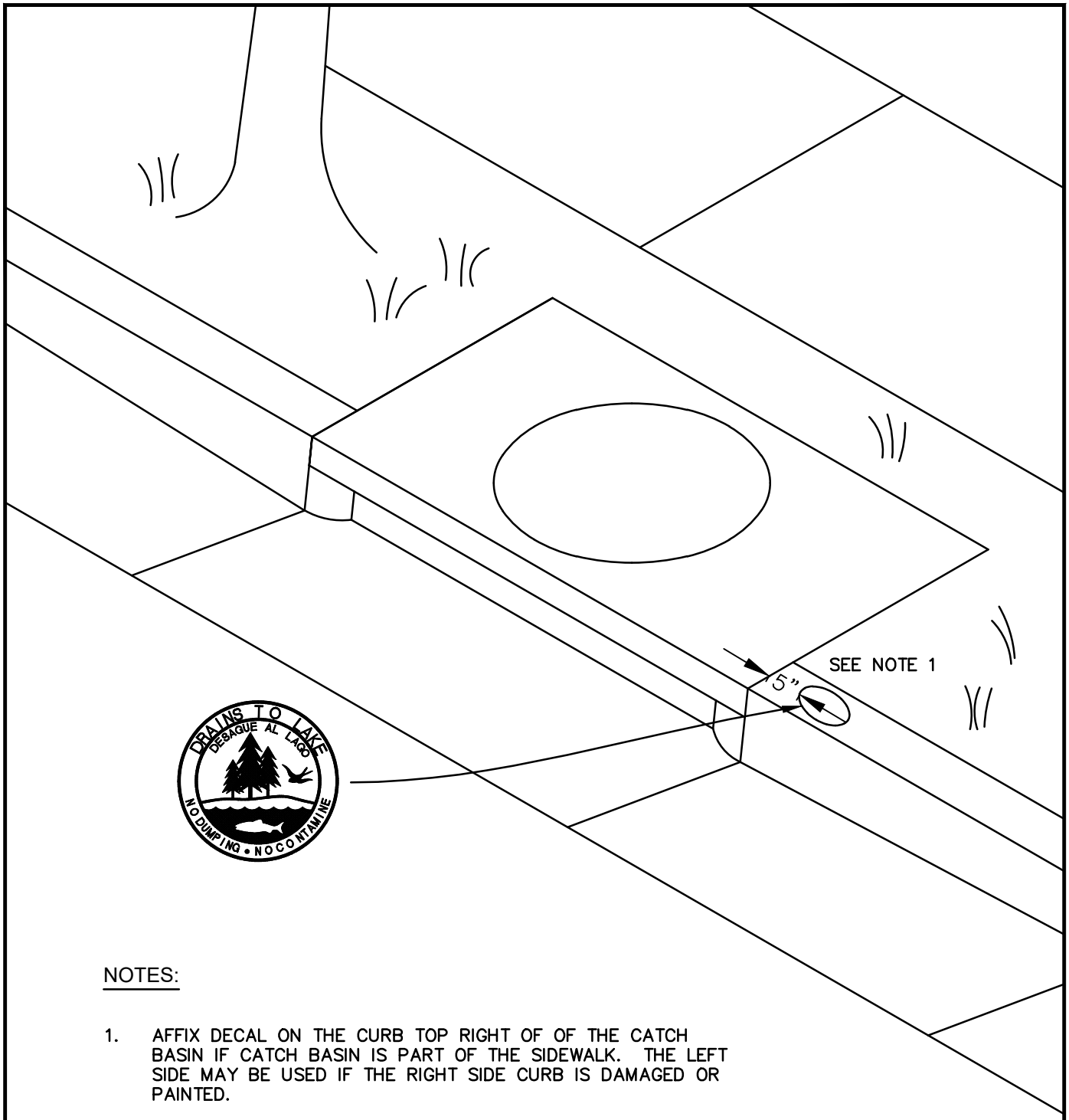
NOTES:

1. ALL ROOF DRAINAGE MUST BE ROUTED FROM EACH DOWNSPOUT THROUGH SURFACE SWALES TO SIDEWALK DRAIN OR OTHER APPROVED DRAINAGE STRUCTURE.
2. HARD PIPING SHALL BE FLEXIBLE A.D.S. PIPE WITH POSITIVE DRAINAGE TO SWALES, AS APPROVED BY THE DIRECTOR OF PUBLIC WORKS OR BUILDING OFFICIAL.
3. ALL CONCENTRATED DRAINAGE FROM A PARCEL MUST BE INTERCEPTED INTO AN UNDERGROUND SYSTEM PRIOR TO CROSSING SIDEWALKS.
4. ALL HARD PIPING SHALL BE BURIED.

TYPICAL LOT DRAINAGE

STD. NO. 413

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTES:

1. AFFIX DECAL ON THE CURB TOP RIGHT OF OF THE CATCH BASIN IF CATCH BASIN IS PART OF THE SIDEWALK. THE LEFT SIDE MAY BE USED IF THE RIGHT SIDE CURB IS DAMAGED OR PAINTED.

APPROVED STORM DRAIN LABELS
SEE ENGINEER'S APPROVED LIST

STORM DRAIN MESSAGE LAYOUT

STD. NO.
414

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

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					STD. NO. 415
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

B – Water System Standard Plans (500 Series)

WATER SYSTEM STANDARD PLANS

DESCRIPTION

500 SERIES - WATER SYSTEM

500	Water Main Construction Notes
501	Gate Valve and Valve Box With Riser
502	Fire Hydrant Detail
503	Water Service Lateral for 5/8" x 3/4" & 1" Meters
504A	2" Service with Dual Meter
504B	2" Water Service with 3 Meters
504C	2" Water Service with 4 Meters
505	2" Domestic Water Service Lateral
506	4" Water Service Lateral Installation for 3" Meter 4"
507	Water Service Lateral Installation for 4" Meter 6"
508	Water Service Lateral Installation for 6" Meter
509	Not used
510	Reduced-Pressure Backflow Preventer
511	Double Check Detector Fire Line Backflow
512	Assembly Air Release Valve
513	Single Combination Water Service
514	Not Used
515	Temporary Blowoff with Main Line Valve
516	Blowoff with Harness
517	Not used
518	Not used
519	Concrete Anchor Blocks for Vertical Bends

520	Concrete Thrust Block
521	Not used
522	Not used
523	Installation of Pressure Reducing Valves
524	Not used
525	Installation of Air and Vacuum & Air Release Valve
526	Not used
527	Dirt Stop and Water Main Encasement
528	Water Main Lowering Detail
529	Water Main Installation Over Structure

WATER MAIN AND SERVICE CONSTRUCTION NOTES

1. All material workmanship and construction details shall conform to the latest edition of the City of Lakeport design and construction standards and applicable project special conditions and plan notes.

   The latest edition of the design and construction standards can be found on the City of Lakeport website. For questions concerning what standards apply, contact the City of Lakeport's water department.

2. The minimum size for all water mains shall be 8 inch.

3. For water main replacement and tie-ins, begin by exposing the existing main at all tie-in points to determine the line and grade of existing mains to remain. Notify city water department a minimum of 72 hours in advance for inspection of existing facilities. City water department will provide direction regarding transitioning the new water mains placed as required under item 4 to the existing facilities. Typical transition length is 8 to 10 feet.

4. Minimum depth of cover from finished grades shall be 36 inches for all mains through 12" and 48 inch for mains 14" and larger. 4" and 10" mains shall not be used without written approval by the City Engineer.

5. Main line water valves up to and including 16 inch shall be resilient seat gate valves. 18 inch and larger mainline valves shall be butterfly valves. Blow off valves shall be 2 or 3 inch brass ball valves with rotational stops.

6. Tracer wire consisting of no. 10 copper wire shall be laid on top of and along the entire length of all mains and services. The tracer wire shall be extended to the surface at all water valve locations, blow off valves and meter boxes. A minimum of 12 inches of tracer wire shall be exposed in boxes. Fasten tracer wire to the top of the pipe sufficient as to not be displaced by backfilling procedures. (Example would be duct tape or plastic zip ties at maximum 10 foot intervals). Tracer wires for services shall be connected to the main tracer wire by wrapping the service wire around the main wire with a minimum of 8 full wraps.

7. Mains to be constructed within 10 feet of sewer pipe require special installation and design. Design shall be approved by the City Engineer.

8. All trenching, backfill and resurfacing required for installation of water system facilities shall be per City Standard 222.

9. Only city personnel shall operate valves on existing water mains (or water services).

10. Service laterals other than those shown or noted on the plans shall not be installed without obtaining prior approval of the City Engineer in writing.

11. Single residential water services shall be 1 inch. Two to four residential water services shall be 2 inch with service wyes as indicated on Standard Plan 504. In lieu of the fittings indicated on Standard Plan 504, the Contractor may construct a manifold from threaded brass pipe and fittings. The manifold may only service 4 meters, two on either size of the tee off of the service line. The service line tee shall be 2" x 1-/2" and the intermediate tee shall be 1-1/2" x 1" x 1".

12. Commercial services shall be 2 inch or larger.

13. No more than one water service shall be placed within a trench unless indicated on the plans.

14. Water services and sewer laterals shall be separated horizontally by a minimum of 10 feet.

15. At the location of each water service lateral, the letter "W" shall be scribed into the face of the curb. The letter "W" shall be 4 inches high and completely legible.

	WATER MAIN CONSTRUCTION NOTES	STD. NO. 500
	SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD:	DATE: APR 2017

WATER MAIN AND SERVICE CONSTRUCTION NOTES (Continued)

16. All residential and commercial water service tubing shall be either 1 or 2 inch HDPE, 200 psi CTS.

17. All meter boxes and vaults shall be bedded on 3 inches minimum thickness of 3/4 inch drain rock, class 2 aggregate base, or other suitable clean material. Suitable material shall have a minimum sand equivalent of 20 and be approved in advance by the city engineer.

    The bedding material shall extend a minimum of 4 inches beyond the outside edges of the boxes or vault. Boxes and vaults shall be set flush with top of curb, sidewalk or ground, whichever is applicable. Lot numbers must be noted on the top side of the meter box with a permanent marking pen. Meter boxes and vaults shall be set so that the reading lids are aligned over the meter registers as closely as possible.

18. Items specified on the Standard Plans or in project Special Provisions are approved for use. All other items shall be submitted and approved by the City Engineer prior to use.

19. Gaskets for flange fittings shall conform to AWWA Standard C115.

20. To abandon a water service, expose and turn off corporation stop, then sever the lateral connection.

21. The minimum distance between corporation stops shall be 12 inches.

22. Pressure testing against valves shall not be allowed.

23. No unmetered connections to the City of Lakeport water system are allowed. Unmetered connections include bypassing meters for testing on-site plumbing or for obtaining construction water. When a subdivision water main has been accepted and tied-in, the individual meter stops shall be locked off with cable ties. Cutting off or tampering with the cable ties will constitute an unmetered connection. Such connections will be severed by the city and will result in penalties including fines and estimated water usage fees.

24. Before combustible materials may be stored or constructed on site, the Fire Department must approve fire flow and access.

25. All fire hydrant flow testing performed on City fire hydrants shall be performed by the City of Lakeport Public Works Department. Prior to placing a fire hydrant in service, a high velocity flushing of the hydrant shall be witnessed and approved by City personnel. High velocity flushing shall consist of removing the hydrant and replacing it with a suitable elbow and diffuser. Under City supervision, the hydrant lateral is flushed until City personnel are satisfied that the lines are clear of debris. Prior to testing and acceptance of hydrants, burlap sacks shall be placed over hydrants.

26. Contractor shall coordinate all water main connection work with the Public Works Department a minimum of 72 hours prior to commencing work. All other water main construction work shall be completed prior to final connection. The final connection shall be made by the contractor under the supervision of City representative. The contractor shall provide all excavation, shoring, backfill and resurfacing per Standard Plan 222 or as shown on the plans.

27. Where a "hot tap" connection is required, the Contractor shall provide and install the tapping valve and sleeve and any other hardware required under the City's supervision. Contractor shall provide a coupon to the City Engineer for each tap.

28. Whenever a water valve has been covered with hot mix asphalt, the valve location shall be marked on the surface of the new pavement with white paint prior to the end of the work shift. The water valve boxes shall be adjusted to grade within 48 hours after final paving.

	WATER MAIN CONSTRUCTION NOTES	STD. NO. 500
	SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD:	DATE: APR 2017

WATER MAIN AND SERVICE CONSTRUCTION NOTES (Continued)

29. New mains shall be disinfected in accordance to AWWA C651–99. A minimum free chlorine residual of 50 MG/L is required to remain in contact with pipe for no less than 24 hours. The tablet method may be used to accomplish this as described below:

    Calcium Hypochlorite tablets shall be placed in each section of pipe, hydrants and other appurtenances. The tablets shall be attached by an NSF approved adhesive. The tablets are to be installed to the top of each pipe prior to being placed in ditch. Filling the main will be at a rate not to exceed 1 Cu Ft/Sec.

Pipe Diameter	# of 5–G Tabs (65%) per 20' of Pipe
6"	2
8"	4
10"	6
12"	8
24"	14

30. Bacteriological Testing is required prior to any Tie–Ins to existing mains by an approved laboratory. The City will analyze the results and determine if the contractor can move forward with the tie–ins. In the event of a positive sample it is the contractor's sole responsibility to resample and or disinfect the main to obtain the "absent" results required.

31. Pressure Testing shall be conducted in accordance with AWWA C600 on all new water mains. Contractor shall furnish all equipment necessary for hydrostatic testing including a hydraulic force pump and calibrated test gauge. Test pressure shall not be less than 150 PSI at any location for a minimum of two hours as observed by an inspector designated by the City. Leakage shall not exceed the allowable gallons as calculated in AWWA C600 based on material and length of pipe. If pressure test exceeds the allowable leakage, the contractor shall at his sole expense locate and repair the leaking joints. The pressure testing process will be repeated as necessary until the new main passes the pressure test.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	WATER MAIN CONSTRUCTION NOTES				STD. NO. 500
	SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD:	DATE: APR 2017

GATE VALVE AND VALVE BOX WITH RISER

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 501

STEM EXTENSION FABRICATION NOTES:

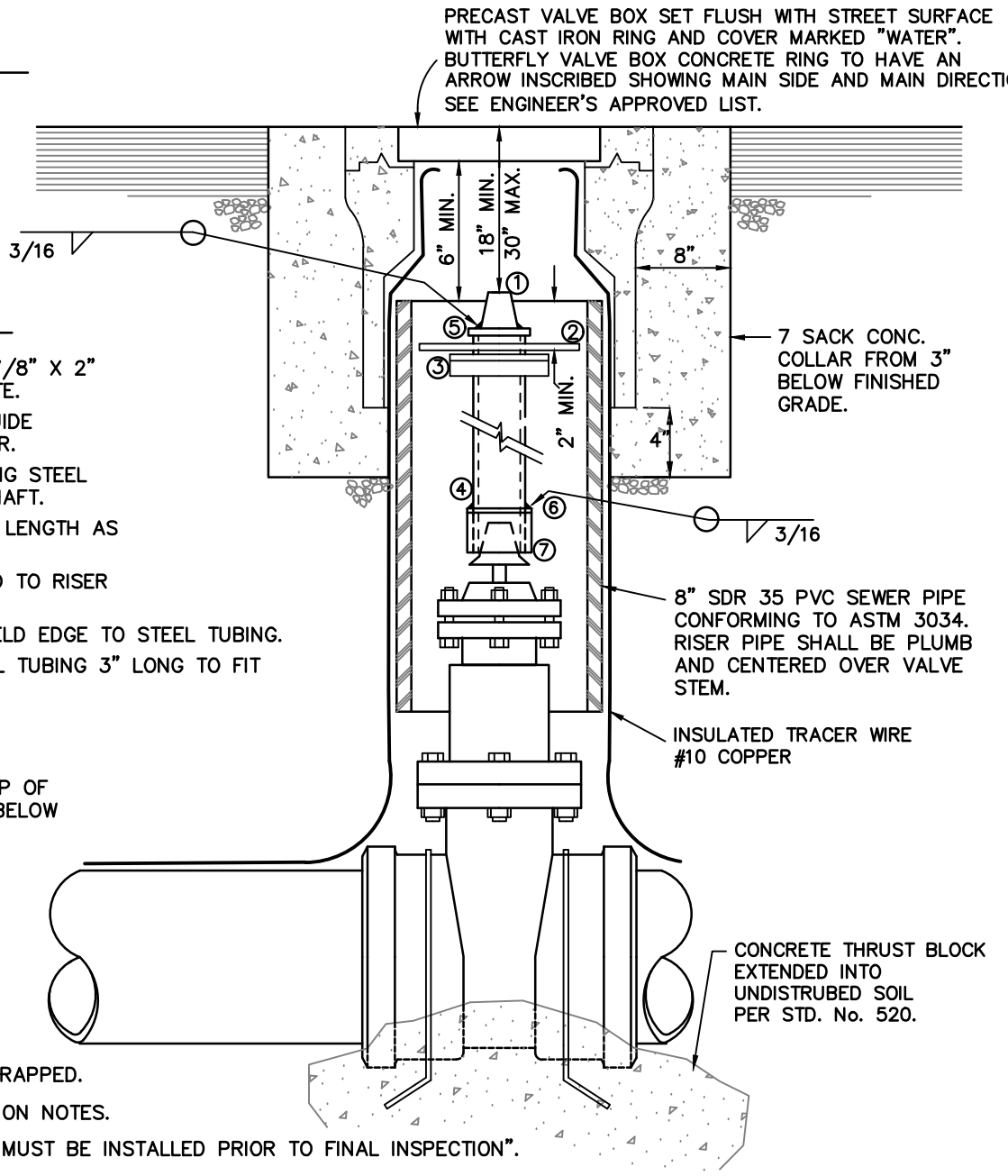
1. ALL WELDS TO RISER SHAFT SHALL BE FILLET WELD ALL AROUND.
2. ALL STEEL REQUIRED FOR RISER FABRICATION SHALL BE STRUCTURAL STEEL PER ASTM A36.

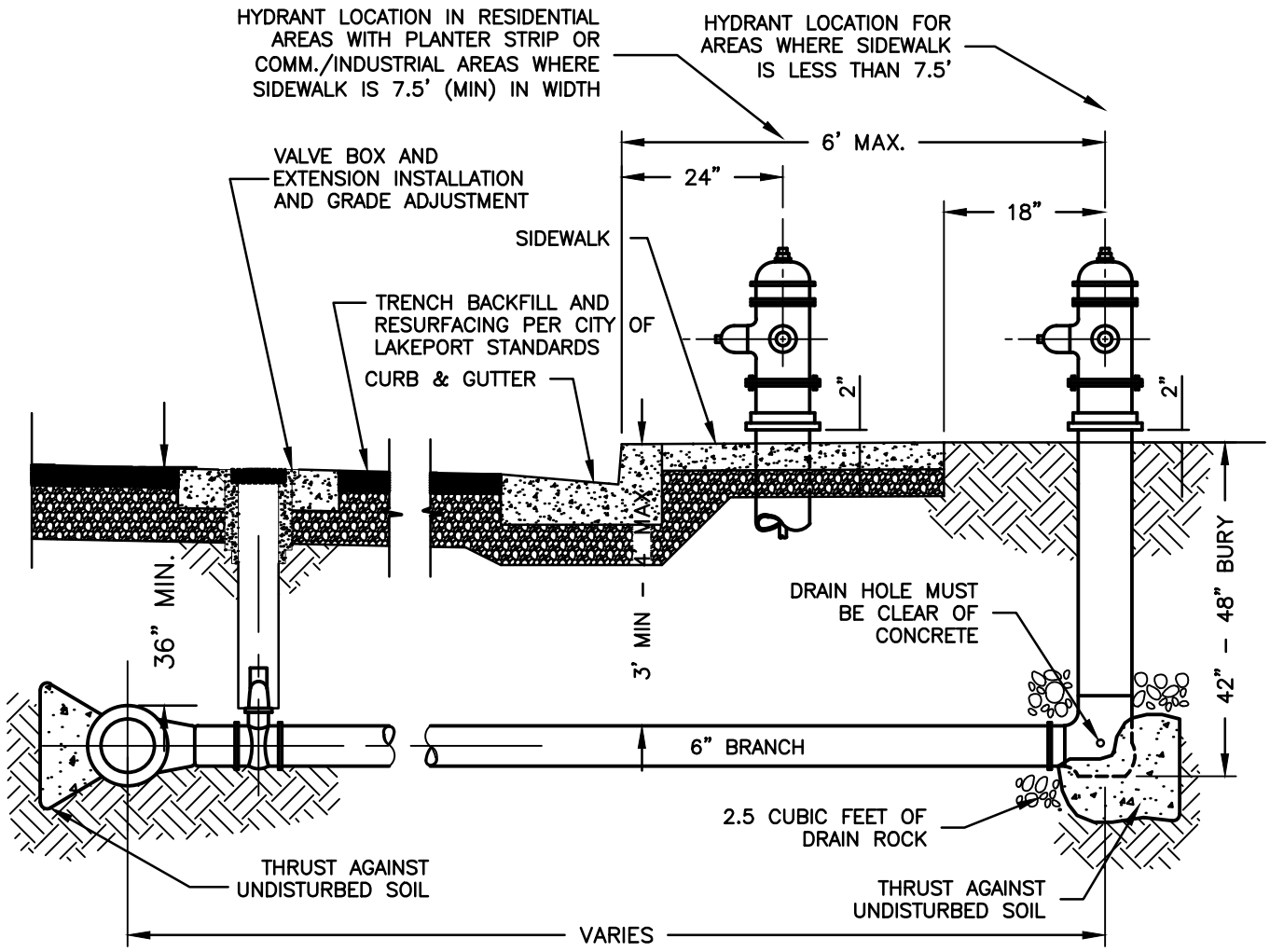
VALVE STEM EXTENSION PARTS LIST:

1. VALVE OPERATING NUT OR 1 7/8" X 1 7/8" X 2" HIGH, SOLID STEEL WELDED TO TOP PLATE.
2. 3/16" THK. X 7" DIA. FREE SPINNING GUIDE PLATE WITH 3 5/8" DIA. HOLE IN CENTER.
3. TWO 3/16" X 1 1/2" X 1 1/2" X 5" LONG STEEL ANGLE WELD TO TWO SIDES OF RISER SHAFT.
4. 2 1/2" X 3/16" SQUARE STEEL TUBING, LENGTH AS REQUIRED. EDGE WELD TO TOP PLATE.
5. 3" X 3" X 1/4" STEEL TOP PLATE. WELD TO RISER SHAFT AFTER GUIDE PLATE IS IN PLACE.
6. 2" X 2" X 1/4" STEEL BASE PLATE. WELD EDGE TO STEEL TUBING.
7. 2" X 2" X 3/16" SQ. STRUCTURAL STEEL TUBING 3" LONG TO FIT OPERATING NUT.

NOTES:

1. IF VALVE IS INSTALLED SO THAT THE TOP OF THE OPERATING NUT IS LESS THAN 30" BELOW FINISHED GRADE, THE VALVE STEM RISER IS NOT REQUIRED.
2. VALVES 2" THROUGH 10" SHALL BE RESILIENT WEDGE GATE VALVES AND VALVES 12" AND LARGER SHALL BE BUTTERFLY VALVES (SEE STD 522) UNLESS OTHERWISE APPROVED BY THE CITY.
3. ALL EXTERNAL BOLTS AND NUTS ON VALVES SHALL BE DUCTILE IRON. VALVE ASSEMBLY SHALL NOT BE POLY WRAPPED.
4. SEE STD. 500 FOR GENERAL CONSTRUCTION NOTES.
5. NOTE ON DRAWING: "VALVE EXTENSIONS MUST BE INSTALLED PRIOR TO FINAL INSPECTION".
6. GATE VALVE ILLUSTRATED. SIMILAR INSTALLATION REQUIRED FOR BALL VALVES & BUTTERFLY VALVES.





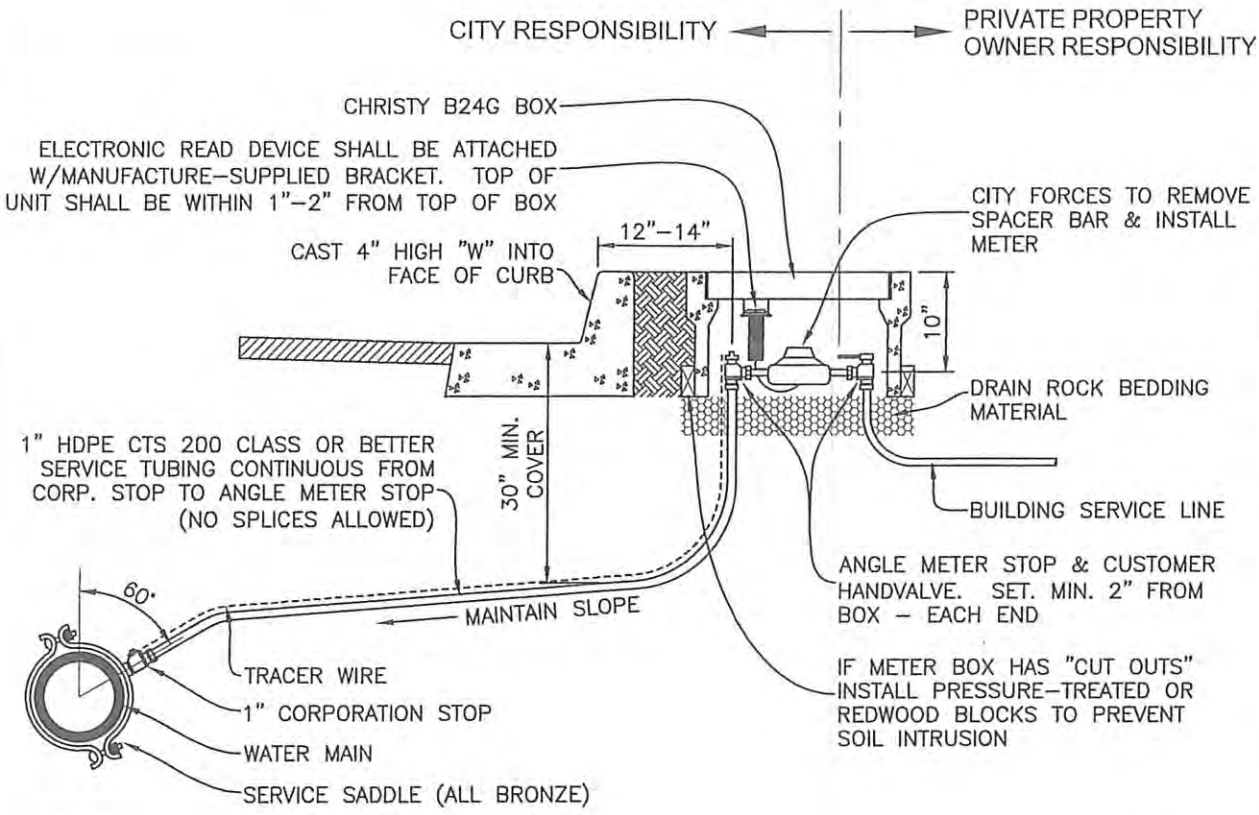
NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF LAKEPORT CONSTRUCTION STANDARDS AND STANDARDS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK, LATEST EDITION).
2. JOINTS ARE TO BE MECHANICAL WITH MEGALUG RESTRAINTS, OR APPROVED EQUAL.
3. FIRE HYDRANTS ARE TO BE 5¼" DRY BARREL WITH (1) 4½" & (2) 2½" NOZZLES.
4. APPROVED HYDRANTS:
   A. AMERICAN DARLING B-62-B
   B. CLOW – MEDALLION
   C. KENNEDY – GUARDIAN
   D. WATEROUS
5. HYDRANT BURY DEPTH MAY VARY WITH PRIOR APPROVAL OF THE CITY ENGINEER.
6. PRIVATE ON SITE HYDRANT LOCATIONS TO BE APPROVED BY THE GOVERNING FIRE DISTRICT.
7. ISOLATION VALVE SHALL BE LOCATED AT PROPERTY LINE ON ALL PRIVATE HYDRANTS.
8. PROVIDE MINIMUM 4' CLEARANCE BEHIND HYDRANTS INSTALLED IN SIDEWALKS.

FIRE HYDRANT DETAIL

STD. NO. 502

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTES:

1. Service lateral bedding material to be compacted to minimum 90% relative compaction prior to installation of poly service tubing.
2. Unless otherwise specified on the plans, provide for 5/8" x 3/4" meter installation for residential uses and 1" meter installation for commercial uses.
3. Unless otherwise specified on the plans, install 1" service tubing for residential uses and 1" service tubing for commercial uses.
4. The City of Lakeport requires a minimum of 10 ft of separation between potable water and sewer lines.
5. Meter box must be set flush with top of curb or sidewalk, if applicable.
6. Prior to meter set, address to be clearly marked on topside lip of meter box with permanent felt marker.
7. For 5/8" x 3/4" meter installation on a 1" water service lateral, use a reducing adapter.
8. Traffic lid to be installed in all drive approaches and locations where vehicular traffic may occur, and where specified on plans.
9. #10 tracer wire required.

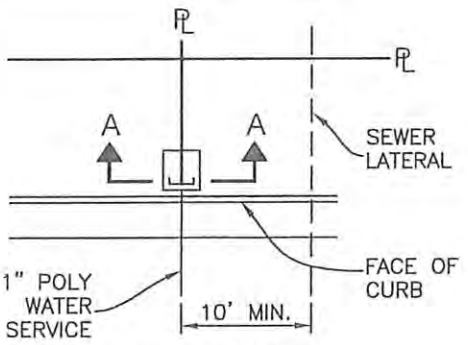
METER SETTING ASSEMBLY PARTS LIST

METER SIZE	ANGLE METER STOP	HAND VALVE
5/8"x3/4"	Ford KV43-341W-NL or equal	Ford GA13-332-NL or equal, w/handle Ford GA23-332-NL or equal, w/handle Ford GA43-332-NL or equal, w/handle
1"	Ford KV43-444W-NL or equal	Ford GA13-444-NL or equal, w/handle Ford GA23-444-NL or equal, w/handle Ford GA43-444-NL or equal, w/handle

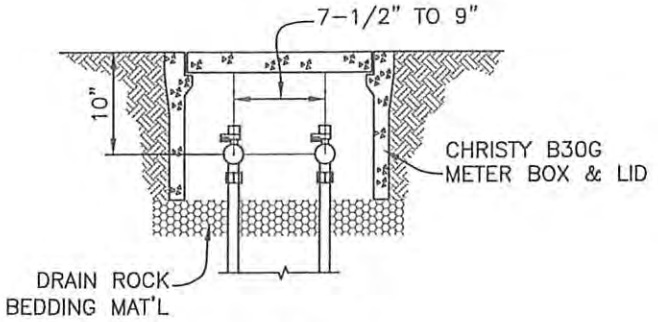
WATER SERVICE LATERAL FOR 5/8" x 3/4" & 1" METERS

STD. NO. 503

SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD: Paul O'Hern | DATE: MAR 2017

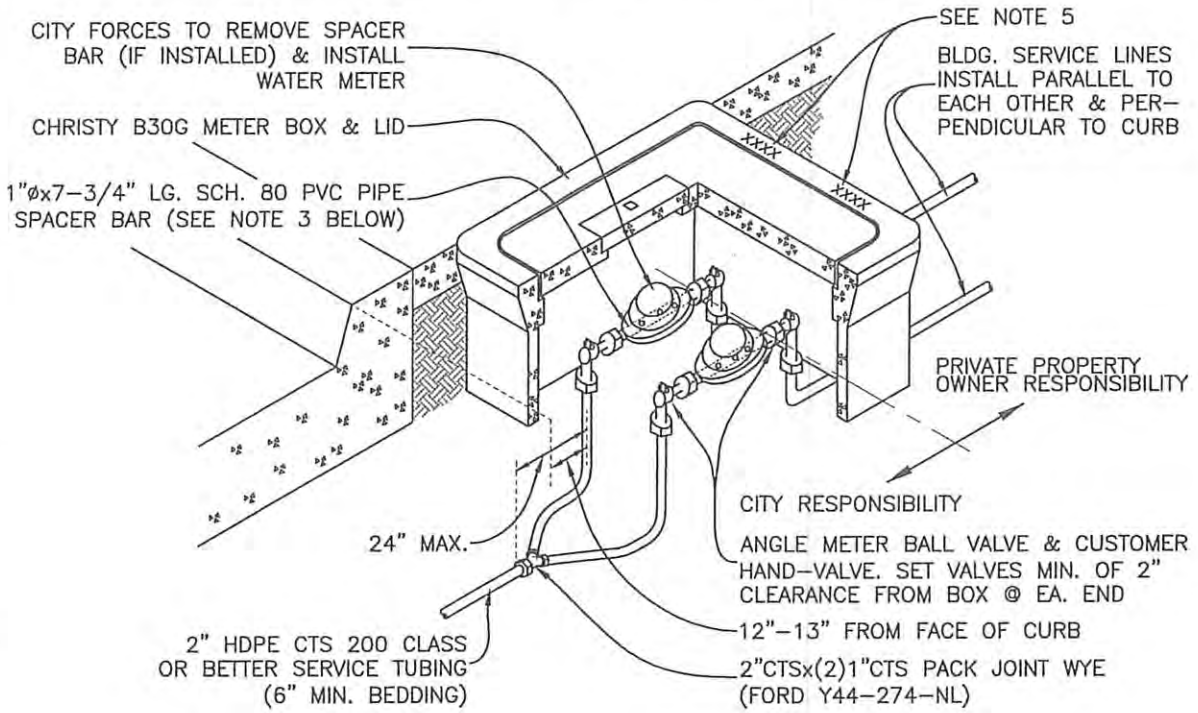


PLAN VIEW



SECTION A-A

SINGLE METER BOX INSTALLATION FOR DUAL 1" MANIFOLD

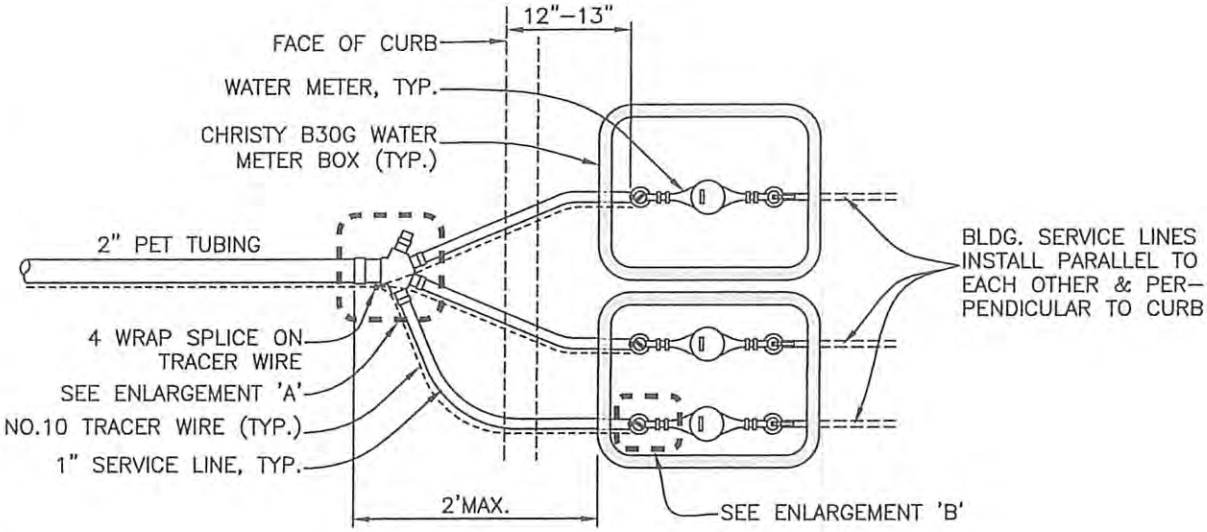


NOTES:

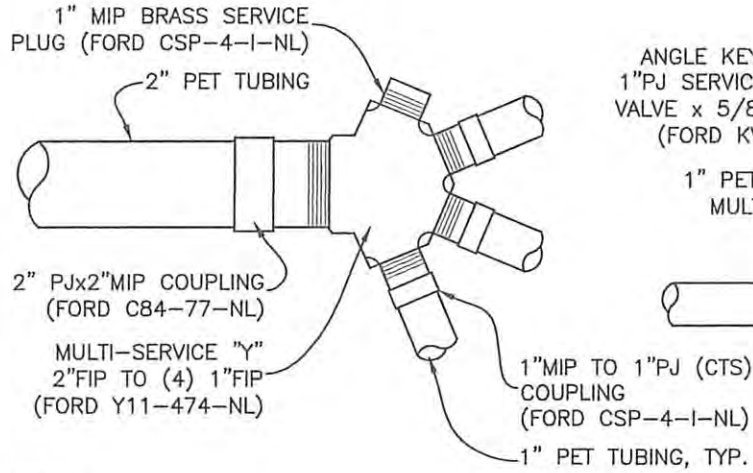
1. Service lateral bedding material to be compacted to minimum 90% relative compaction prior to installation of poly service tubing.
2. Unless otherwise specified on the plans, provide for 5/8" x 3/4" meter installation for residential uses and 1" meter installation for commercial uses.
3. Unless otherwise specified on the plans, install 1" service tubing for residential uses and 1" service tubing for commercial uses.
4. The City of Lakeport requires a minimum of 10 ft of separation between potable water and sewer lines.
5. Meter box must be set flush with top of curb or sidewalk, if applicable.
6. Prior to meter set, address to be clearly marked on topside lip of meter box with permanent felt marker.
7. For 5/8" x 3/4" meter installation on a 1" water service lateral, use a reducing adapter.
8. Traffic lid to be installed in all drive approaches and locations where vehicular traffic may occur, and where specified on plans.
9. #10 tracer wire required.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	2" SERVICE WITH DUAL METER				STD. NO. 504 A
SCALE: NONE	DRAWN: MPW	CHK: PRC	APPVD: Paul Offerman		DATE: MAR 2017

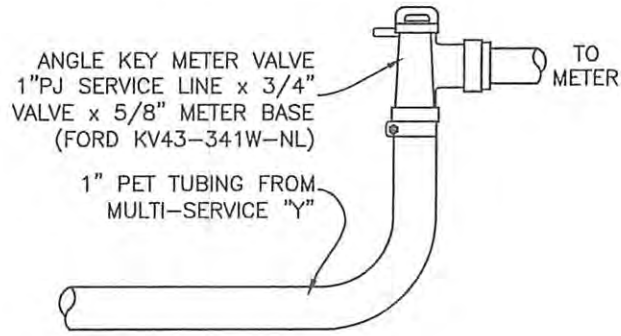
PLAN VIEW



ENLARGEMENT 'A'



ENLARGEMENT 'B'

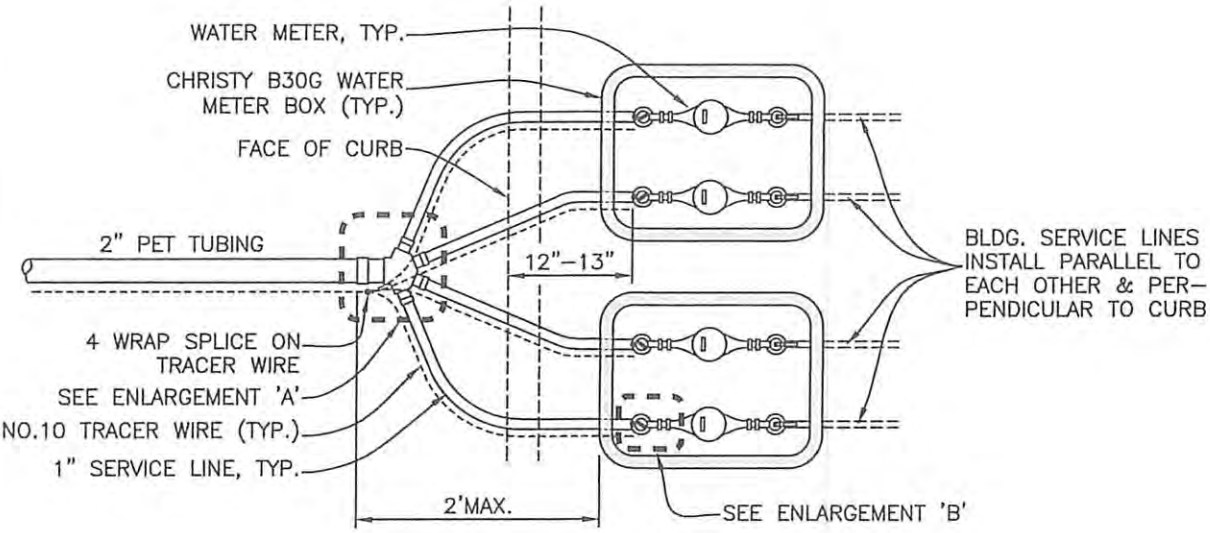


NOTES:

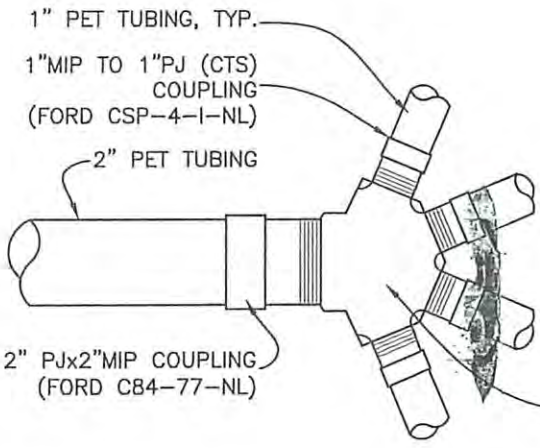
1. Service lateral bedding material to be compacted to minimum 90% relative compaction prior to installation of poly service tubing.
2. Unless otherwise specified on the plans, provide for 5/8" x 3/4" meter installation for residential uses and 1" meter installation for commercial uses.
3. Unless otherwise specified on the plans, install 1" service tubing for residential uses and 1" service tubing for commercial uses.
4. The City of Lakeport requires a minimum of 10 ft of separation between potable water and sewer lines.
5. Meter box must be set flush with top of curb or sidewalk, if applicable.
6. Prior to meter set, address to be clearly marked on topside lip of meter box with permanent felt marker.
7. For 5/8" x 3/4" meter installation on a 1" water service lateral, use a reducing adapter.
8. Traffic lid to be installed in all drive approaches and locations where vehicular traffic may occur, and where specified on plans.
9. #10 tracer wire required.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	2" WATER SERVICE WITH 3 METERS	STD. NO. 504 B
SCALE: NONE | DRAWN: MPW | CHK: PRC | APPVD: Paul D Hern		DATE: MAR 2017

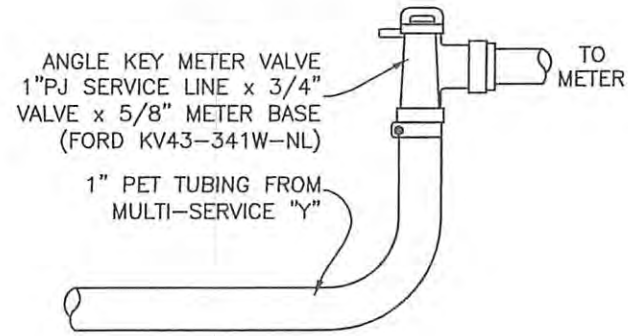
PLAN VIEW



ENLARGEMENT 'A'



ENLARGEMENT 'B'



NOTES:

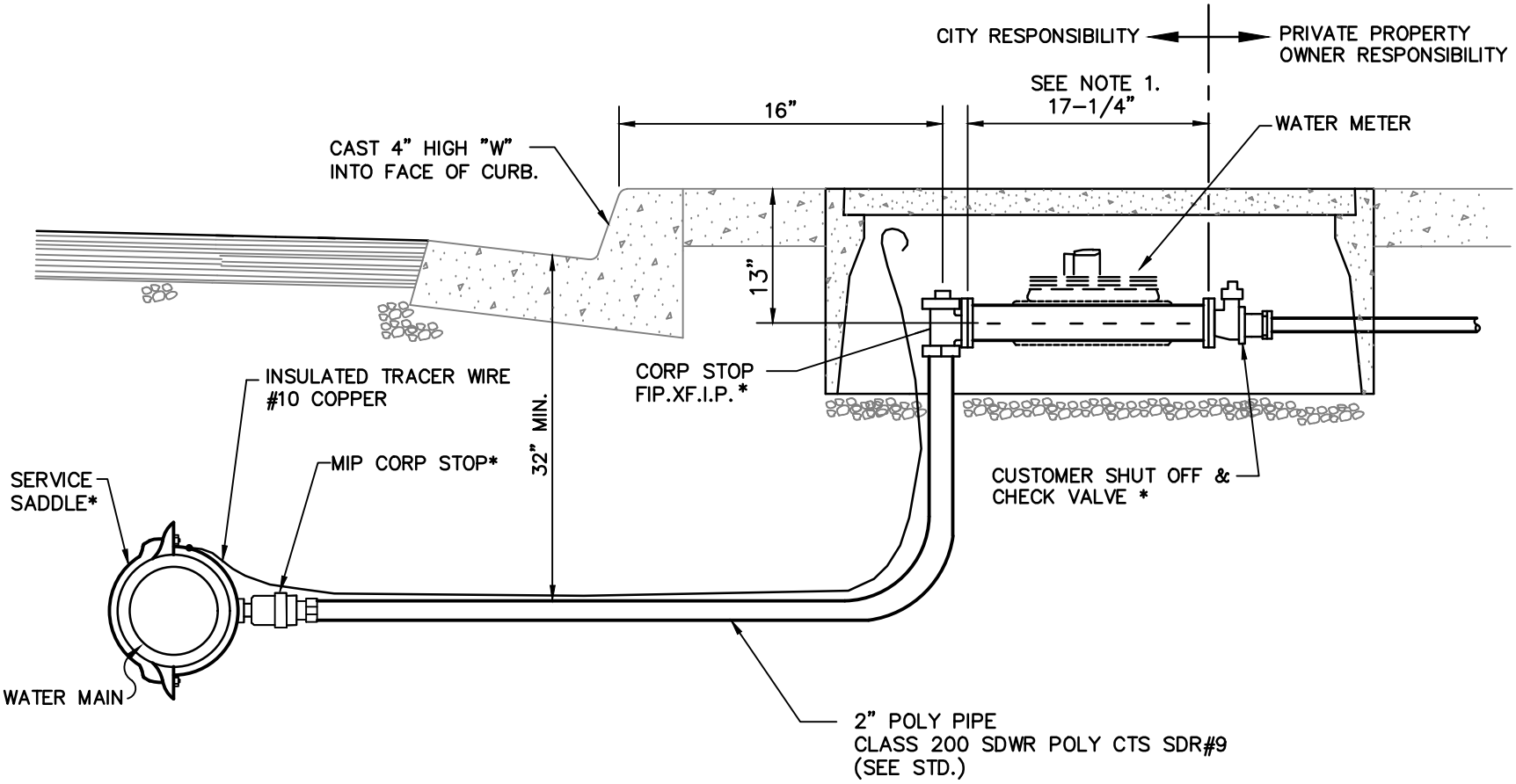
1. Service lateral bedding material to be compacted to minimum 90% relative compaction prior to installation of poly service tubing.
2. Unless otherwise specified on the plans, provide for 5/8" x 3/4" meter installation for residential uses and 1" meter installation for commercial uses.
3. Unless otherwise specified on the plans, install 1" service tubing for residential uses and 1" service tubing for commercial uses.
4. The City of Lakeport requires a minimum of 10 ft of separation between potable water and sewer lines.
5. Meter box must be set flush with top of curb or sidewalk, if applicable.
6. Prior to meter set, address to be clearly marked on topside lip of meter box with permanent felt marker.
7. For 5/8" x 3/4" meter installation on a 1" water service lateral, use a reducing adapter.
8. Traffic lid to be installed in all drive approaches and locations where vehicular traffic may occur, and where specified on plans.
9. #10 tracer wire required.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	2" WATER SERVICE WITH 4 METERS	STD. NO. 504 C
SCALE: NONE	DRAWN: MPW | CHK: PRC | APPVD: [signature]	DATE: MAR 2017

2" DOMESTIC WATER SERVICE LATERAL

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 505



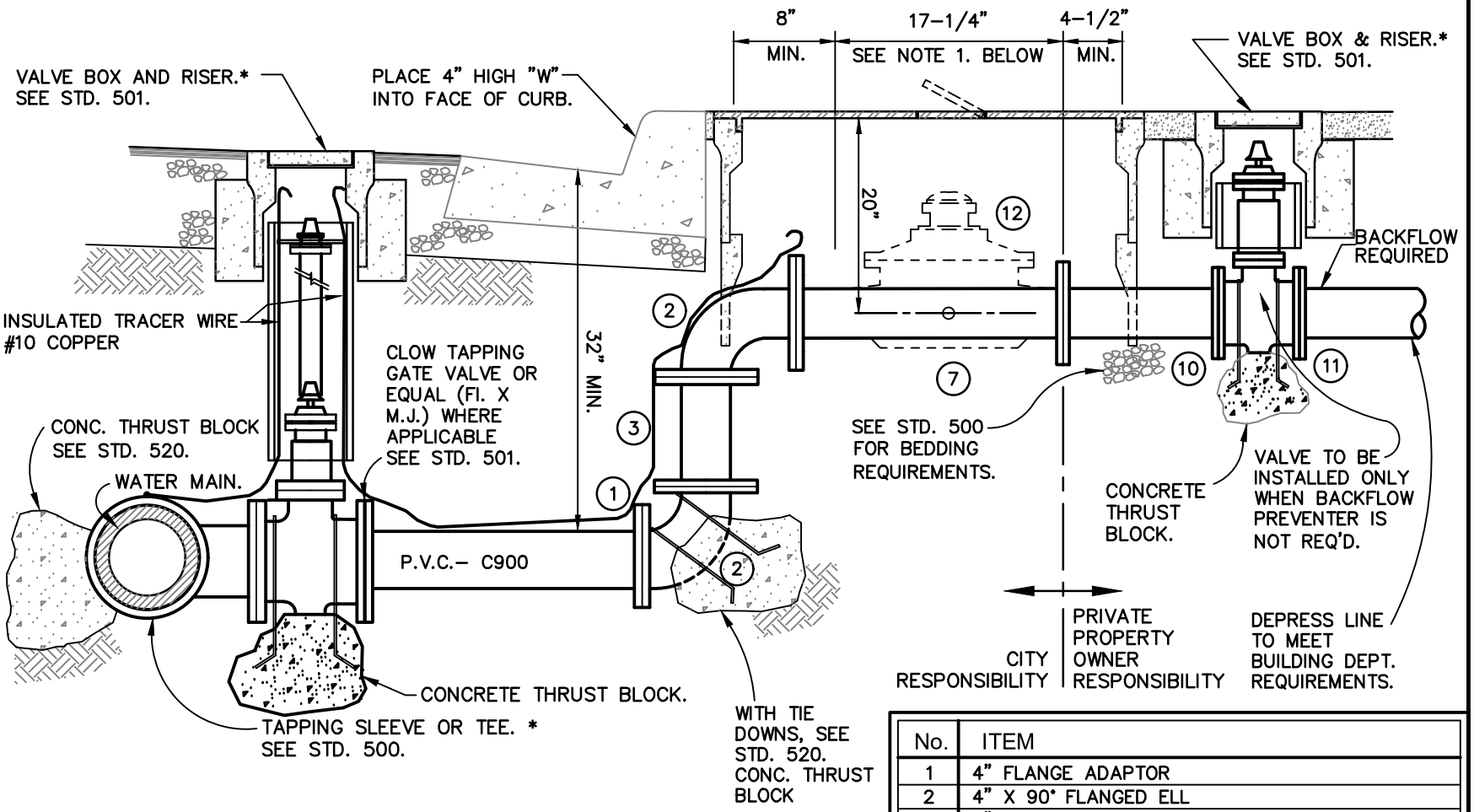
NOTES:

1. SERVICE LATERAL BEDDING MATERIAL TO BE COMPACTED TO MINIMUM 90% RELATIVE COMPACTION PRIOR TO INSTALLATION OF POLY SERVICE TUBING.
2. THE CITY OF LAKEPORT REQUIRES A MINIMUM OF 10 FT OF SEPARATION BETWEEN POTABLE WATER AND SEWER LINES.
3. METER BOX MUST BE SET FLUSH WITH TOP OF CURB OR SIDEWALK, IF APPLICABLE.
4. PRIOR TO METER SET, ADDRESS TO BE CLEARLY MARKED ON TOPSIDE LIP OF METER BOX WITH PERMANENT FELT MARKER.
5. TRAFFIC LID TO BE INSTALLED IN ALL DRIVE APPROACHES AND LOCATIONS WHERE VEHICULAR TRAFFIC MAY OCCUR, AND WHERE SPECIFIED ON PLANS.
6. #10 TRACER WIRE REQUIRED IF SERVICE LATERAL IS NOT INSTALLED PERPENDICULAR TO MAIN.

4" WATER SERVICE LATERAL INSTALLATION FOR 3" METER

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 506



No.	ITEM
1	4" FLANGE ADAPTOR
2	4" X 90° FLANGED ELL
3	4" FLANGED SPOOL – LENGTH AS REQUIRED
4	
5	
6	
7	3" x 17-1/4" SCHL 40 PVC PIPE (SEE NOTE 1)
8	
9	
10	3" P.E. x P.E. PIECE–LENGTH AS REQUIRED
11	3" AWWA RESILIENT WEDGE GATE VALVE (M.J.)
12	3" METER

NOTES:

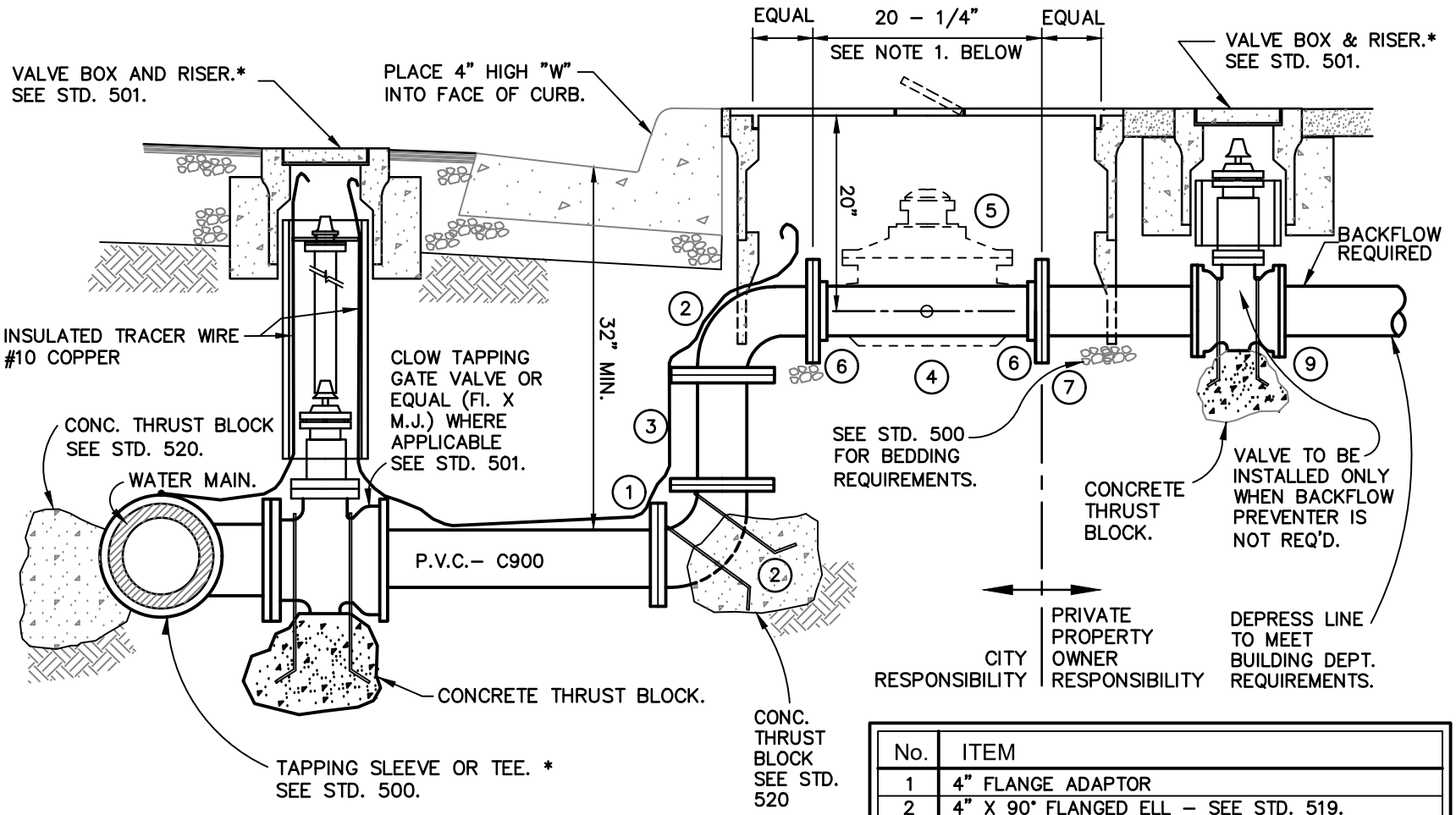
1. SPACER SHALL BE SCHL. 40 PVC PIPE WITH 1/2" ø HOLES @ 2" O.C. (VERTICALLY DRILLED THROUGH PIPE). CITY FORCES TO REMOVE SPACER BAR & INSTALL 3" METER.
2. B40 METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
3. SEE STANDARD 500 FOR CONSTRUCTION NOTES.
4. PRIOR TO METER SET, ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.
5. BOX PIPE KNOCKOUTS TO BE GROUTED SUFFICIENTLY TO PREVENT INTRUSION OF DIRT.

* – SEE ENGINEER'S APPROVED LIST

4" WATER SERVICE LATERAL INSTALLATION FOR 4" METER

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 507



No.	ITEM
1	4" FLANGE ADAPTOR
2	4" X 90° FLANGED ELL – SEE STD. 519.
3	4" FLANGED SPOOL – LENGTH AS REQUIRED
4	4" x 20–1/4" SCHL. 40 PVC PIPE (SEE NOTE 1)
5	4" METER
6	4" SCHEDULE 80 PVC FLANGE
7	4" UNI–FLANGE OR Fl. CPLG. ADAPTER
8	
9	4" AWWA GATE VALVE (SEE NOTE 4)

NOTES:

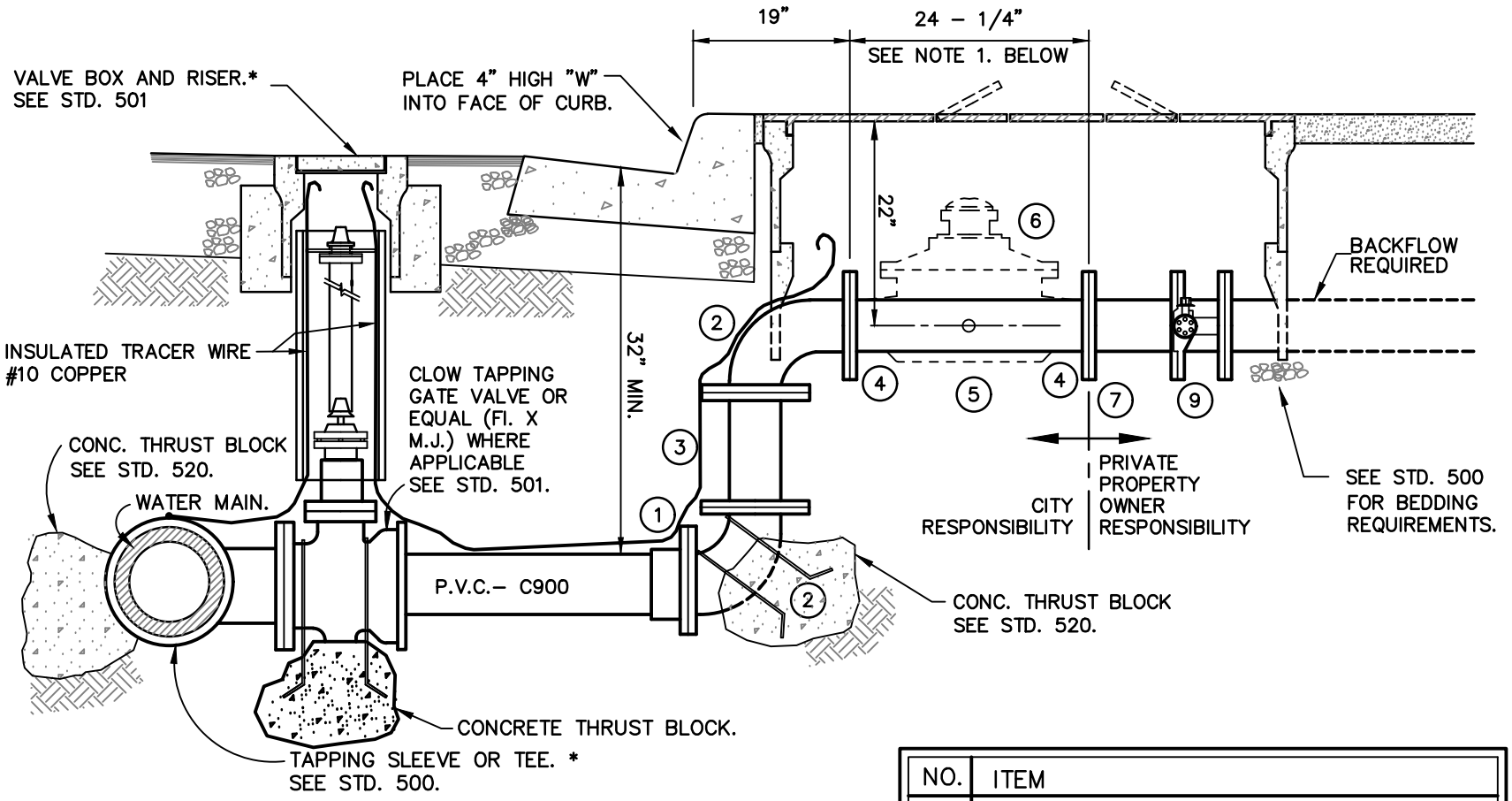
1. CONTRACTOR TO INSTALL SCHL. 40 PVC PIPE SPACER WITH 1/2" ø HOLES @ 2" O.C. (VERTICALLY DRILLED THROUGH PIPE). CITY FORCES TO REMOVE SPACER BAR & INSTALL 4" WATER METER.
2. B40 METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
3. SEE STANDARD 500 FOR CONSTRUCTION NOTES.
4. GATE VALVES TO BE RESILIENT SEAT TYPE PER AWWA SPECIFICATION C509 – SEE STANDARD 501.
5. PRIOR TO METER SET, ADDRESS TO BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.

* – SEE ENGINEER'S APPROVED LIST

6" WATER SERVICE LATERAL INSTALLATION FOR 6" METER

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 508



NO.	ITEM
1	6" FLANGE ADAPTOR AS REQUIRED
2	6" X 90° FLANGED ELL
3	6" FLANGED SPOOL – LENGTH AS REQUIRED
4	6" SCHEDULE 80 PVC FLANGE
5	6" x 24–1/4" SCHL. 40 PVC PIPE (SEE NOTE 1)
6	6" TURBINE METER
7	6" FLANGED COUPLING ADAPTER
8	
9	6" BUTTERFLY VALVE

NOTES:

1. METER BOX MUST BE SET SO THE STEEL COVER IS FLUSH WITH FINISHED SURFACE.
2. SEE STANDARD 500 FOR CONSTRUCTION NOTES.
3. PRIOR TO METER SET, ADDRESS TO BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER.

* – SEE ENGINEER'S APPROVED LIST

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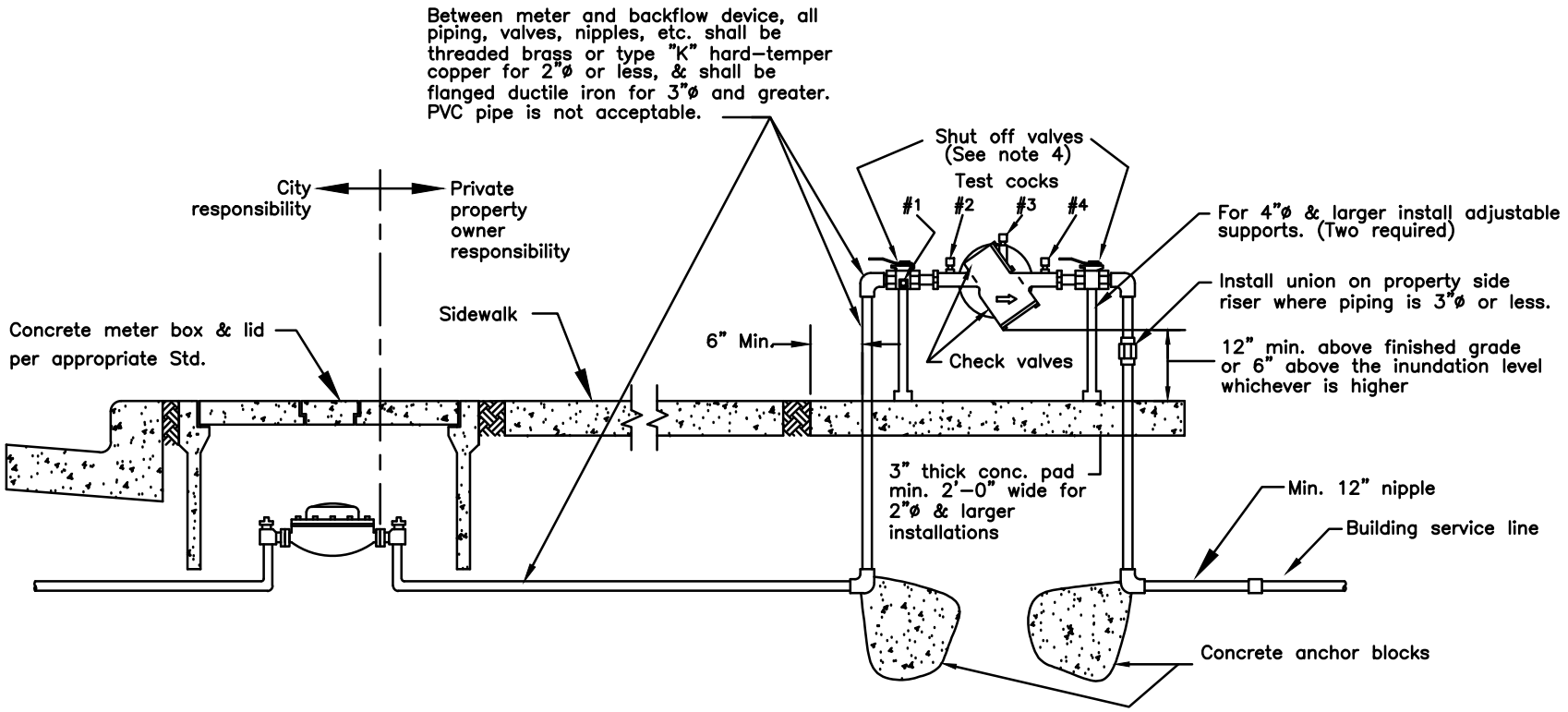
					STD. NO. 509
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

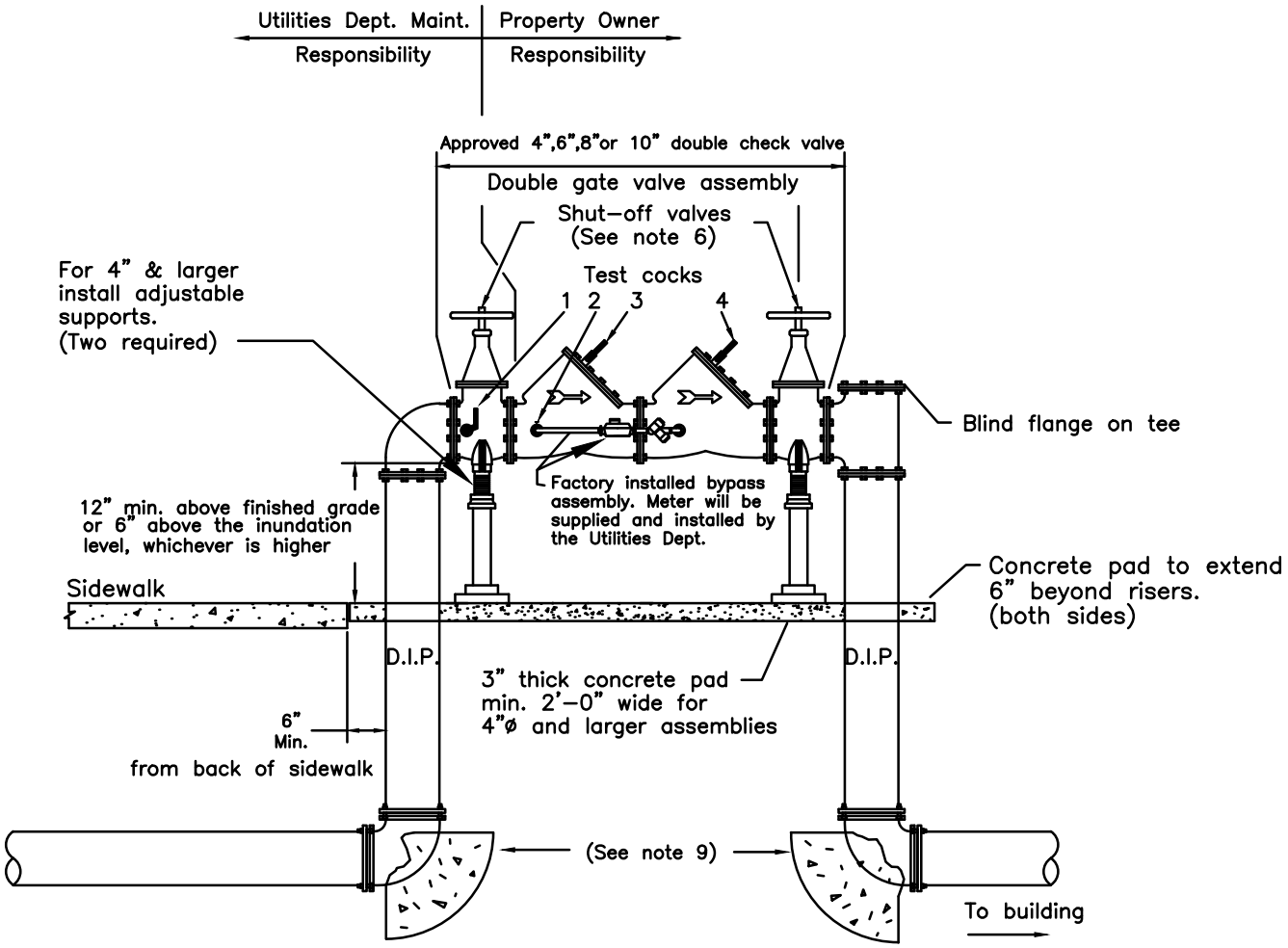
REDUCED PRESSURE BACKFLOW DEVICE



1. Reduced pressure type backflow devices shall be required as determined by the City Utilities Dept.
2. Approved reduced pressure backflow device shall be as shown on "List of approved backflow prevention devices" (of latest revision) by the University of Southern California Foundation For Cross–Connection Control & Hydraulic Research.
3. Backflow prevention devices shall be installed adjacent to and on property side of sidewalk where applicable. Where no sidewalk exists, the assembly shall be installed as close as possible to the water meter location.
4. A valve of the same size as the backflow device shall be installed on each side of the backflow prevention assembly. Valves 2"ø & less shall be ball valves, 3"ø & greater shall be resilient seat gate valves.
5. Any cover or screening for the backflow prevention assembly must be approved by the Utilities Dept. prior to installation.
6. In limited space applications valves may be installed on risers min. 4" above grade.
7. The addition of spools must be approved by the Utilities Director or designee.
8. The piping from the reduced pressure backflow device & the reduced pressure backflow device valve assembly itself must be the same size as the meter unless otherwise approved by the Public Works Director.
9. A lockable cage and/or frost blanket may be required discretion of the Utilities Director.

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 510



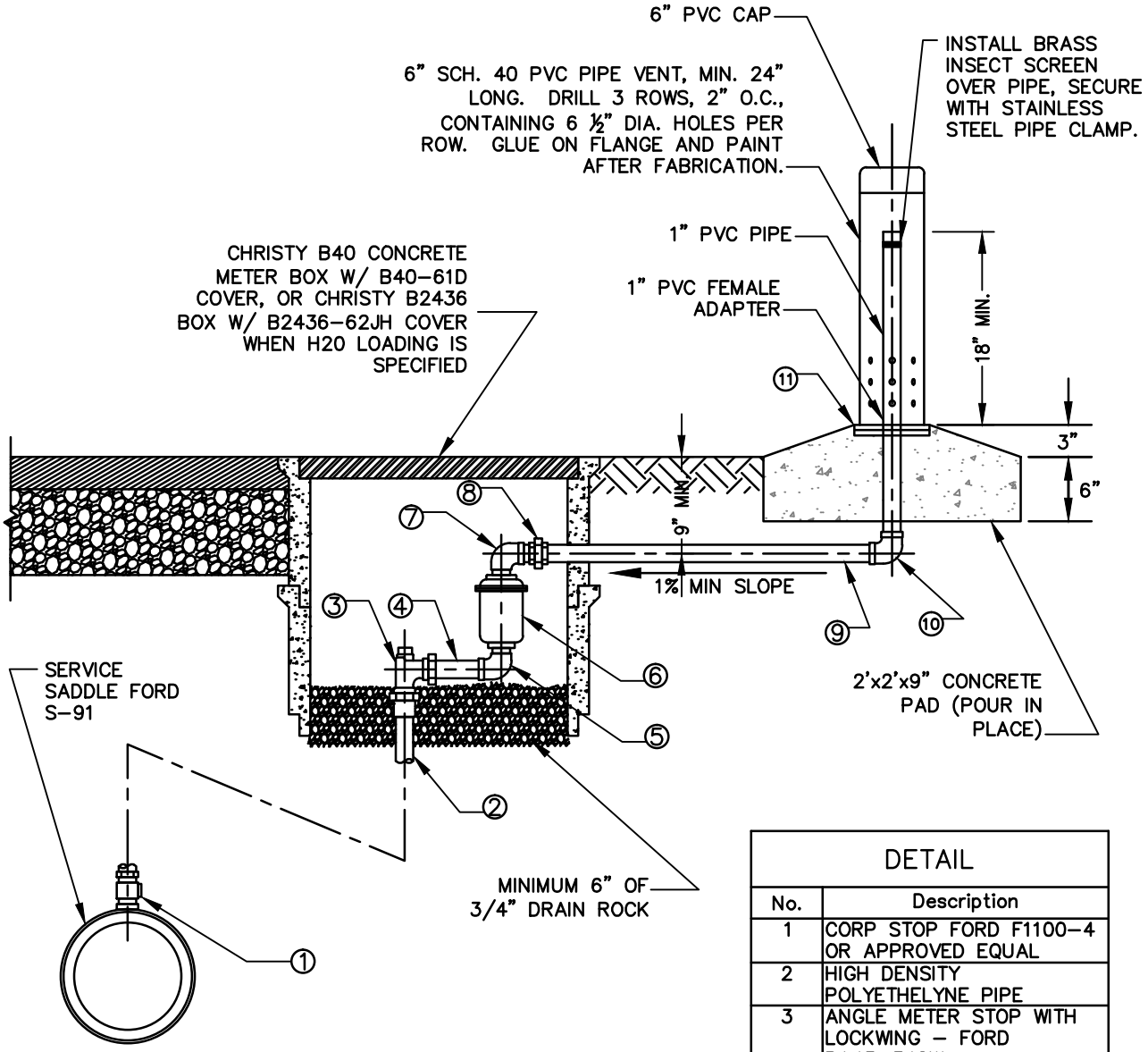
NOTES:

1. This Standard is required for:
   a.) all connections serving commercial fire sprinkler systems.
   b.) any fire line connections to properties with auxiliary water supplies.
   c.) sites with multiple fire line connections to the City water system.
2. Approved double check detector backflow assemblies shall be shown on "List of approved backflow devices" of latest revision, by the University of Southern California Foundation for Cross Connection Control & Hydraulic Research.
3. All test valves shall be fitted with 1/4" female test cocks.
4. Double check detector assembly shall be located as close as possible to the sidewalk or public right–of–way.
5. Any cover or screening for this assembly must have both Fire Department & Utility Department approval prior to installation.
6. Shut–off valves to be resilient wedge type O.S. & Y with rising stem and will be chained and padlocked in the open position.
7. Must have specific approval of the Fire Dept. prior to installation.
8. Double check detector shall be the same size as the fire line except when a 12" fire line is required, then a 10" double detector check backflow assembly is required.
9. Restrained joints are required for all new construction from gate valve to 90° ell. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY

STD. NO. 511

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



DETAIL	
No.	Description
1	CORP STOP FORD F1100-4 OR APPROVED EQUAL
2	HIGH DENSITY POLYETHELYNE PIPE
3	ANGLE METER STOP WITH LOCKWING – FORD BA43-342W
4	RED BRASS NIPPLE, N.P.T.
5	90 DEG. BRONZE STREET ELBOW
6	COMBINATION AIR RELEASE VALVE
7	90 DEG. IRON STREET ELBOW
8	GALV. IRON UNION, MALE – FEMALE, N.P.T.
9	GALV. IRON PIPE OR HDPE\
10	90 DEG. GALV IRON ELBOW
11	GLUED PVC FLANGES (2) WITH BOLTS (4 MINIMUM)

NOTES:

1. AIR RELEASE VALVES SHALL BE 1" UNLESS SHOWN OTHERWISE ON THE PLANS.
2. INSIDE DIAMETER OF PIPE AND FITTINGS SHALL NOT BE LESS THAN A.R.V. SIZE.
3. CAST COMPANION FLANGE IN CONCRETE.
4. VENT TO BE LOCATED IN THE FIELD.
5. VENT PIPE SHALL BE LOCATED ABOVE THE FLOOD LEVEL.
6. SET THE BOX FLUSH WITH THE PAVED SURFACE, SLOPE GROUND AWAY FROM BOX.
7. BURIED METAL PIPE SHALL BE TAPE WRAPPED.

AIR RELEASE VALVE DETAIL

STD. NO. 512

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:

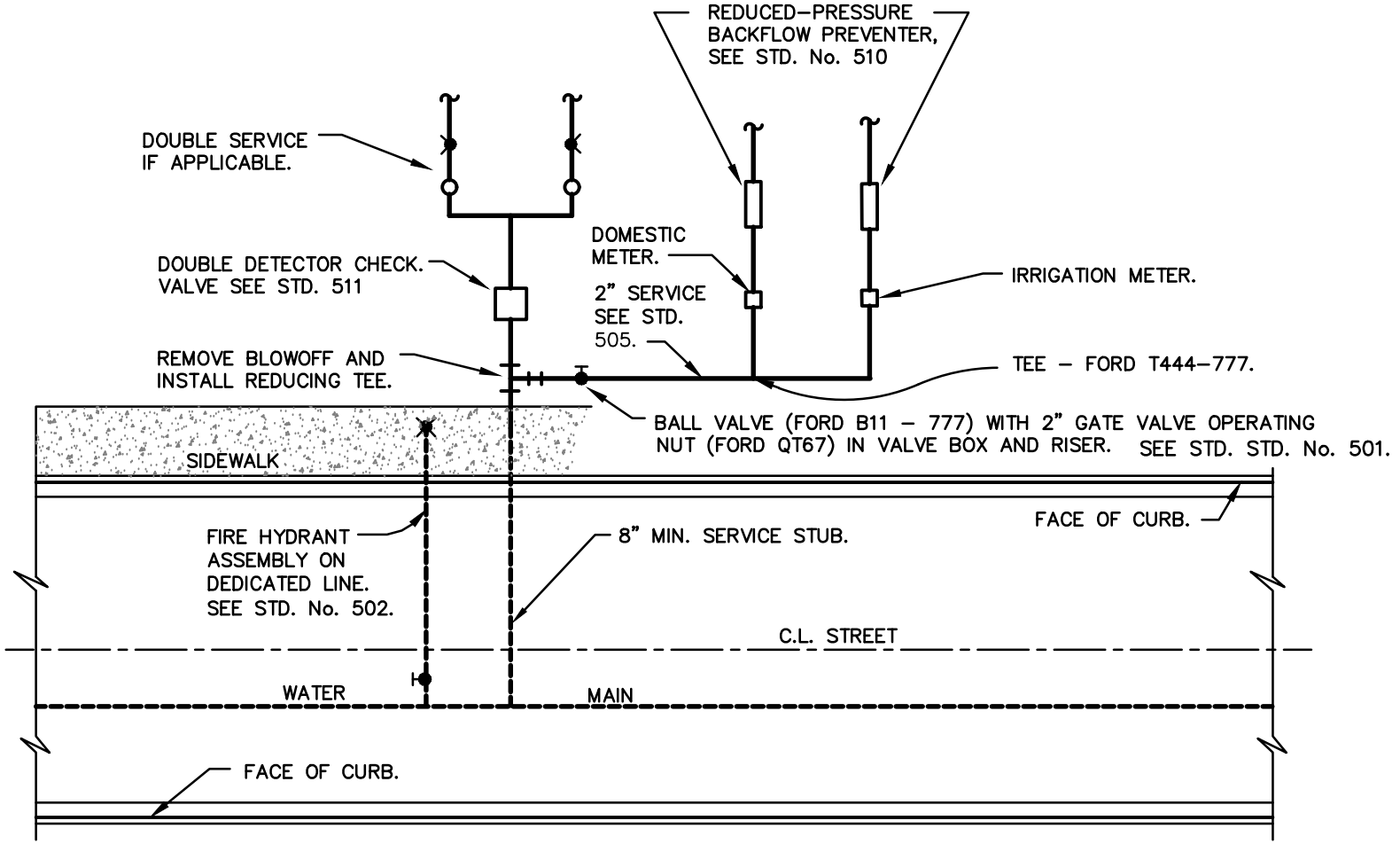
SINGLE COMBINATION WATER SERVICE

STD. NO. 513

DATE: JUN 2012

NOTES:

1. INSTALL FIRE HYDRANT WITHIN 50 FEET OF SIAMESE PUMPER CONNECTION, AS SHOWN ON APPROVED PLANS.
2. LOCATION TO BE APPROVED BY THE CITY AND FIRE DISTRICT.
3. HYDRANT, METER, DOUBLE DETECTOR CHECK & REDUCED PRESSURE BACKFLOW PREVENTER SHALL BE LOCATED PER CORRESPONDING STANDARD Nos., 502, 503, 505, 510, 511.



SINGLE COMBINATION WATER SERVICE

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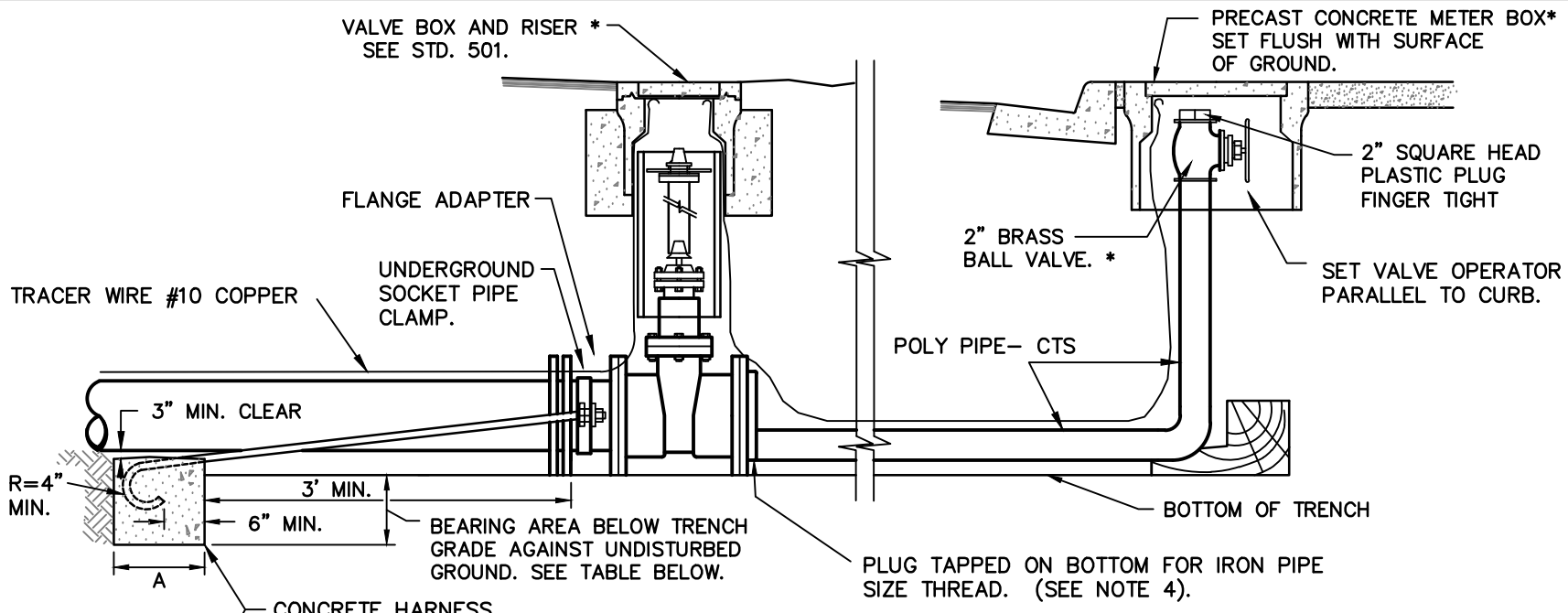
					STD. NO. 514
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012

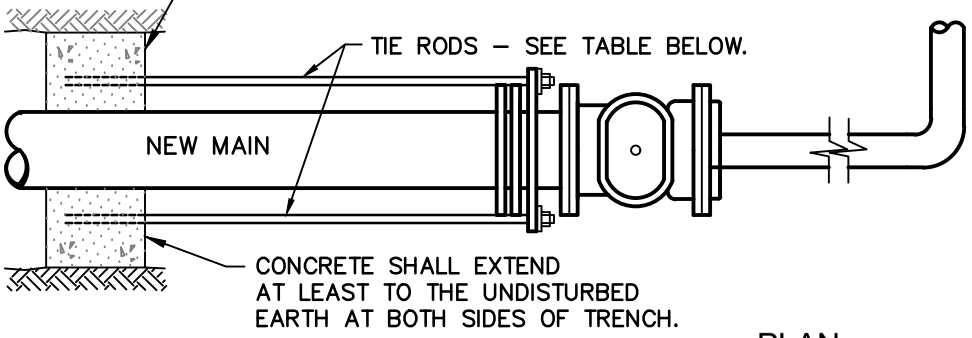
TEMPORARY BLOWOFF WITH MAIN LINE VALVE

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 515



ELEVATION



PLAN

MINIMUM DIMENSIONS				
PIPE SIZE	TIE RODS	BEARING AREA	A	SIZE B.O.
6"	5/8"	4 SQ. FT.	2'	2"
8"	3/4"	7 " "	3'	2"
12"	1 1/8"	15 " "	3'	3"
OVER 12"	BY THE DESIGN ENGINEER			

NOTES:

1. TO BE INSTALLED IN CASES WHERE MAIN MAY BE EXTENDED IN FUTURE AND NO VALVE EXISTS WITHIN 250 FEET.
2. BLOW–OFF SHALL NOT BE INSTALLED WITHIN THE TRAVELED WAY. IF THE MAIN ENDS WITHIN STREET AREA, BLOW–OFF TO BE EXTENDED TO AN AREA OUTSIDE OF THE TRAVELED WAY. LID TO BE HIGHWAY GRADE WITH LOCKDOWN CAPABILITY.
3. FOR 12" PIPE SIZE OR LARGER USE FLxFL MAIN LINE VALVE, PER STD. 502, & FLxMJ ADAPTER & MJ PLUG TAPPED AT BOTTOM FOR B.O.
4. ALL EXPOSED THREADS SHALL BE PAINTED WITH BITUMASTIC PAINT OR APPROVED SUBSTITUTE, AFTER NUTS ARE TIGHTENED.
5. IF MJxMJ GATE VALVE IS USED, RESTRAINING RODS SHALL BE RUN TO UPSTREAM GLAND AND ATTACHED WITH "DILLIE LUG" – (AKA STAR BOLT).

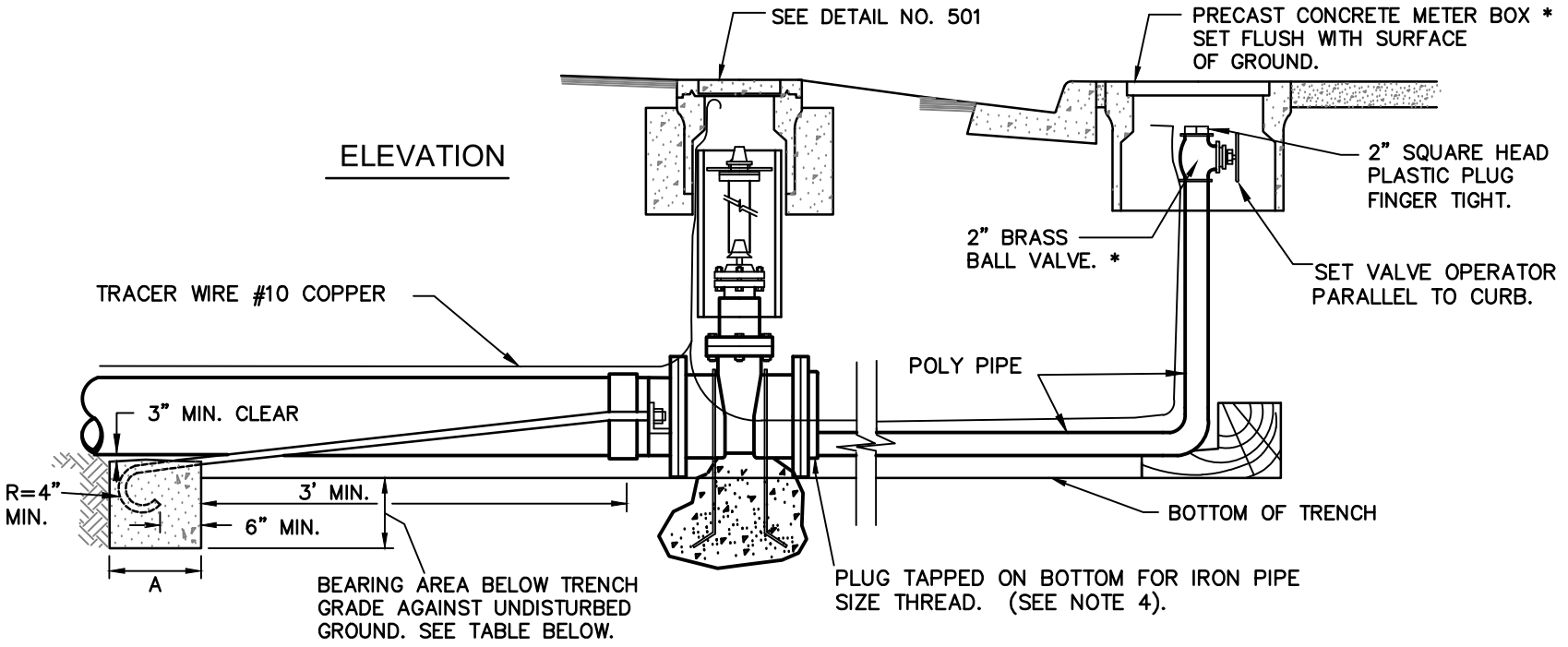
* – SEE ENGINEER'S APPROVED LIST

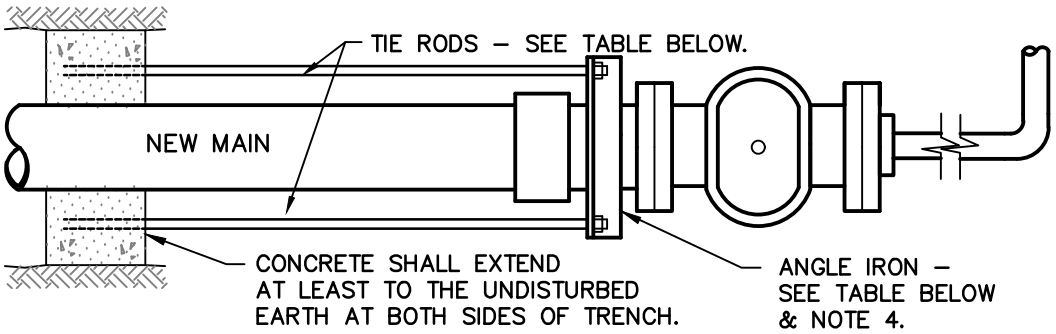
BLOWOFF WITH HARNESS

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 516

ELEVATION





PLAN

MINIMUM DIMENSIONS					
PIPE SIZE	TIE RODS	ANGLE IRON	BEARING AREA	A	SIZE B.O.
6"	5/8"	3"x3"x1/4"**	4 SQ. FT.	2'	2"
8"	3/4"	3–1/2"x3"x1/4"**	7 " "	3'	2"
12"	1 1/8"	4"x3"x1/2"	15 " "	3'	3"
OVER 12"	BY THE DESIGN ENGINEER				

** SEE NOTE 4.

NOTES:

1. SEE STD. 500 FOR CONSTRUCTION NOTES.
2. ALL EXPOSED THREADS SHALL BE PAINTED WITH BITUMASTIC PAINT OR APPROVED SUBSTITUTE AFTER NUTS ARE TIGHTENED.
3. MAINS 8" & SMALLER SHALL HAVE 2" BLOW–OFFS. MAINS 12" & LARGER SHALL HAVE 3" BLOW–OFFS. SEE TABLE BELOW.
4. FOR 6" & 8" MAINS, M.J. PLUGS WITH DILLY LUGS AND 2" CENTER TAP MAY BE USED IN LIEU OF ANGLE IRON.
5. BLOW–OFF SHALL NOT BE INSTALLED WITHIN THE TRAVELED WAY. IF MAIN ENDS WITHIN STREET AREA, BLOW–OFF TO BE EXTENDED TO AREA OUTSIDE OF TRAVELED WAY AND INSTALLED AS SHOWN ABOVE.

* – SEE ENGINEER'S APPROVED LIST

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					STD. NO. 517
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012

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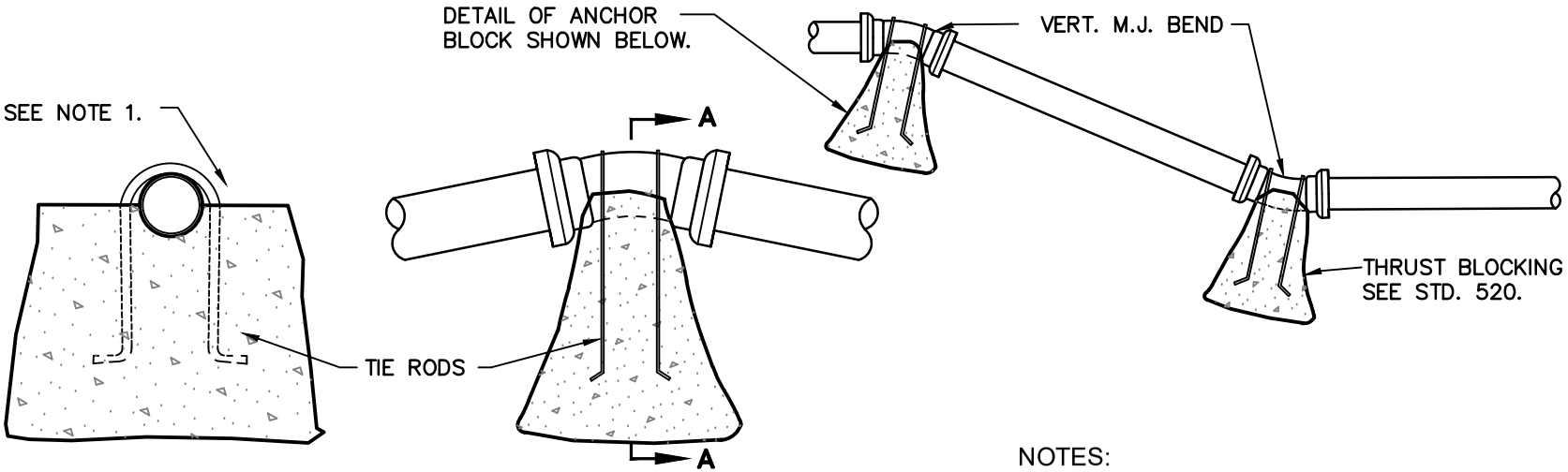
					STD. NO. 518
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

CONCRETE ANCHOR BLOCK FOR VERTICAL BENDS

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 519

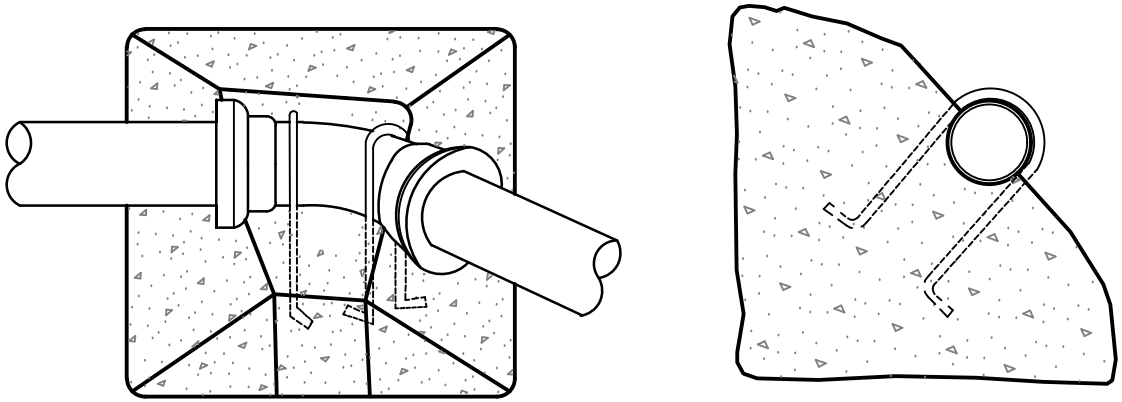


SECTION "A-A" ELEVATION

TYPICAL CONCRETE ANCHOR BLOCK FOR VERTICAL BEND

NOTES:

1. CONCRETE ANCHOR BLOCKS SHALL BE INSTALLED BY THE CONTRACTOR TO WITHSTAND A THRUST PRODUCED BY THE TEST PRESSURE PLUS 50 P.S.I.
2. CONCRETE SHALL BE 6 SACK MIX.

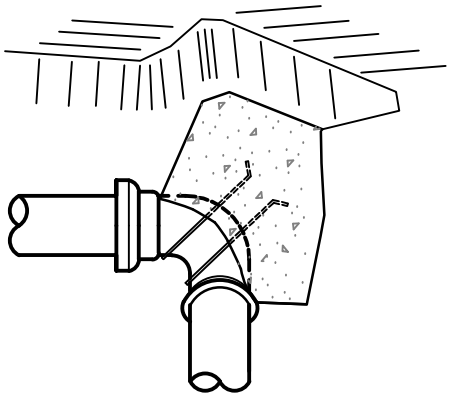


TYPICAL CONCRETE ANCHOR BLOCK FOR COMBINATION HORIZONTAL-VERTICAL BEND

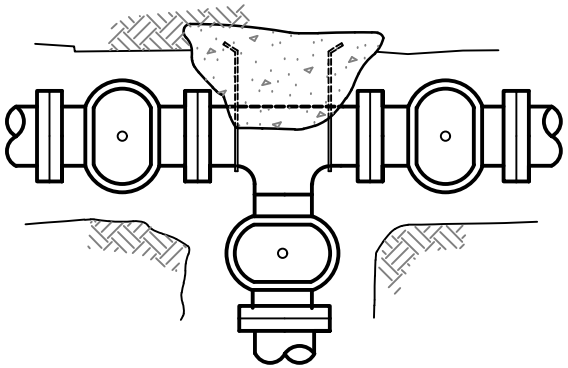
CONCRETE THRUST BLOCKS

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

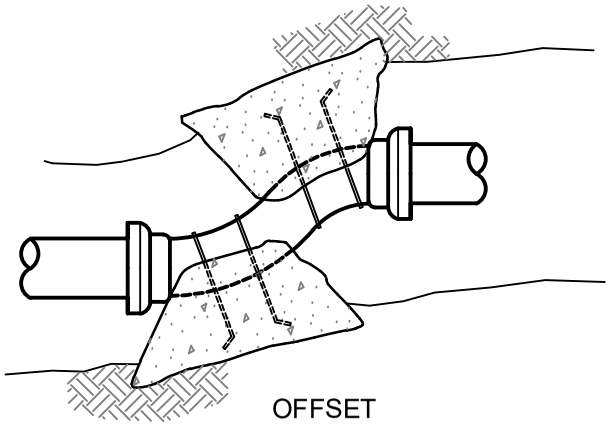
STD. NO. 520



BEND



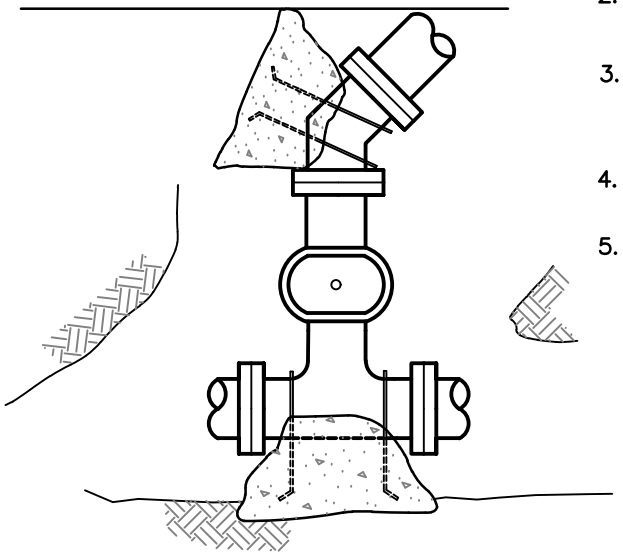
TEE



OFFSET

TYPICAL CONC. BLOCKING

SHOWN IN PERSPECTIVE



WYE

NOTES:

1. SAFE BEARING LOAD OF SOIL FOR HORIZONTAL THRUST SHALL NOT BE EXCEEDED.
2. CONCRETE BLOCKING, CAST–IN–PLACE, TO EXTEND FROM BELLS OF FITTINGS TO UNDISTURBED SOIL AND ENTIRE BEARING AREA MUST BE AGAINST UNDISTURBED SOIL.
3. IN USING THE THRUST BLOCKING TABLE BELOW, ASSUME 2000 P.S.F. BEARING CAPACITY UNLESS OTHERWISE SHOWN ON THE PLANS. THE DESIGN ENGINEER SHALL SPECIFY THRUST BLOCKING REQUIREMENTS FOR ALL OTHER SOIL BEARING CONDITIONS.
4. FOR PLUGGED LEG(S) OF TEE OR CROSS, USE HARNESS TYPE BLOCKING AS SHOWN ON STD. 516 AND CONCRETE BLOCKING INDICATED IN TABLE BELOW.
5. CONCRETE SHALL BE 6 SACK MIX.

MIN. REQ'D BEARING AREA IN SQ. FT. PER 100 P.S.I. TEST PRESSURE *						
PIPE SIZE	SOIL BEARING CAPACITY	HARNESS BLOCKS	TEES & DEAD ENDS	90° BENDS	45° BENDS	22–1/2° BENDS
6"	1000 2000	4 2	4 2	6 3	3 2	2 1
8"	1000 2000	7 4	7 4	10 5	5 3	3 2
12"	1000 2000	16 8	16 8	22 11	12 6	6 3

* MULTIPLY NO. IN TABLE BY TEST PRESSURE & DIVIDE BY 100.

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					STD. NO. 521
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012

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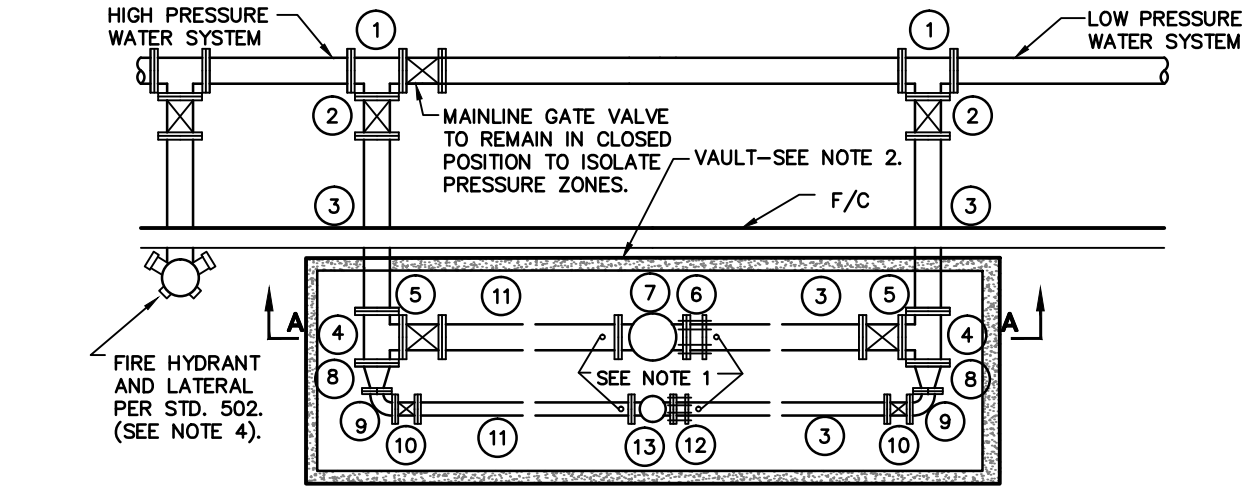
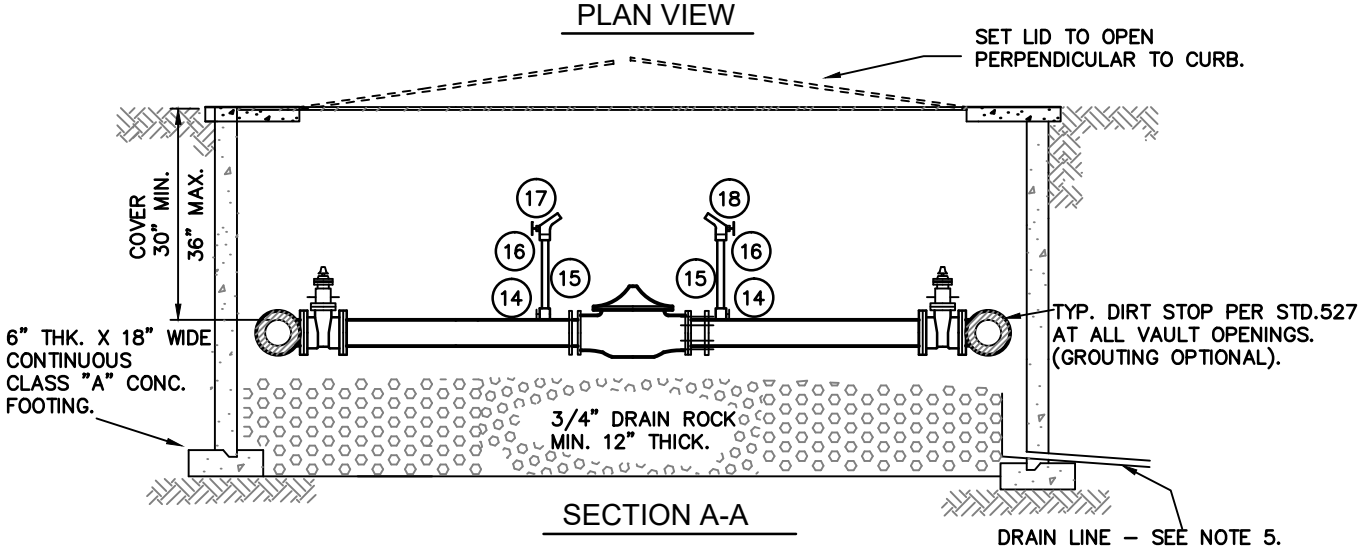
					STD. NO. 522
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



PLAN VIEW



SECTION A-A

NOTES:

1. MAKE 3/4" TOP TAP – INSTALL RISER AS SHOWN FOR PRESSURE CHECKING.
2. THE PRECAST VAULT & PRESSURE REDUCING VALVES SHALL BE APPROVED BY THE CITY ENGINEER.
3. THE LOW FLOW BY–PASS (PART NUMBERS 8–13) SHALL BE INSTALLED UNLESS OTHERWISE APPROVED BY THE CITY. IF A SINGLE P.R.V. IS INSTALLED, CENTER IN VAULT AND CHANGE NUMBER 4 PARTS TO 90° FLANGED ELLS.
4. INSTALL FIRE HYDRANT ONLY WHEN REQUIRED BY THE CITY.
5. RUN 2" SCHEDULE 40 P.V.C. DRAIN PIPE FROM A PERFORATED SUMP CANISTER TO AN EXISTING DRAINAGE SYSTEM OR TO DAYLIGHT.
6. VALVES 18" AND LARGER SHALL BE BUTTERFLY VALVES. VALVES 16" AND SMALLER SHALL BE RESILIENT WEDGE GATE VALVES.
7. SEE GENERAL CONSTRUCTION NOTES.
8. ALL PRESSURE REDUCING VALVES TO BE EPOXY FUSED, INSIDE AND OUTSIDE.

PARTS LIST

NO	ITEM
1	MECHANICAL JOINT TEE
2	MECHANICAL JOINT GATE VALVE
3	DUCTILE IRON PIPE – FL. X P.E.
4	FLANGED TEE
5	FLANGED GATE VALVE
6	FLANGED COUPLING ADAPTER
7	FLANGED P.R.V. – HIGH FLOW
8	FLANGED REDUCER
9	FLANGED 90° ELL
10	FLANGED GATE VALVE
11	DUCTILE IRON PIPE – FL. X FL.
12	FLANGED COUPLING ADAPTER
13	FLANGED P.R.V. – LOW FLOW
14	3/4" BALLCORP (FORD F8 1000)
15	3/4" TYPE "K" COPPER TUBING
16	3/4" COMP. X F.I.P. ADAPTER (FORD C14 – 33)
17	3/4" M.L.P. X HOSE BIBB – BRASS
18	3/4" M.L.P. TEE WITH TWO (2) 3/4" F.I.P. X H.B.

INSTALLATION OF PRESSURE REDUCING VALVES

STD. NO. 523

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

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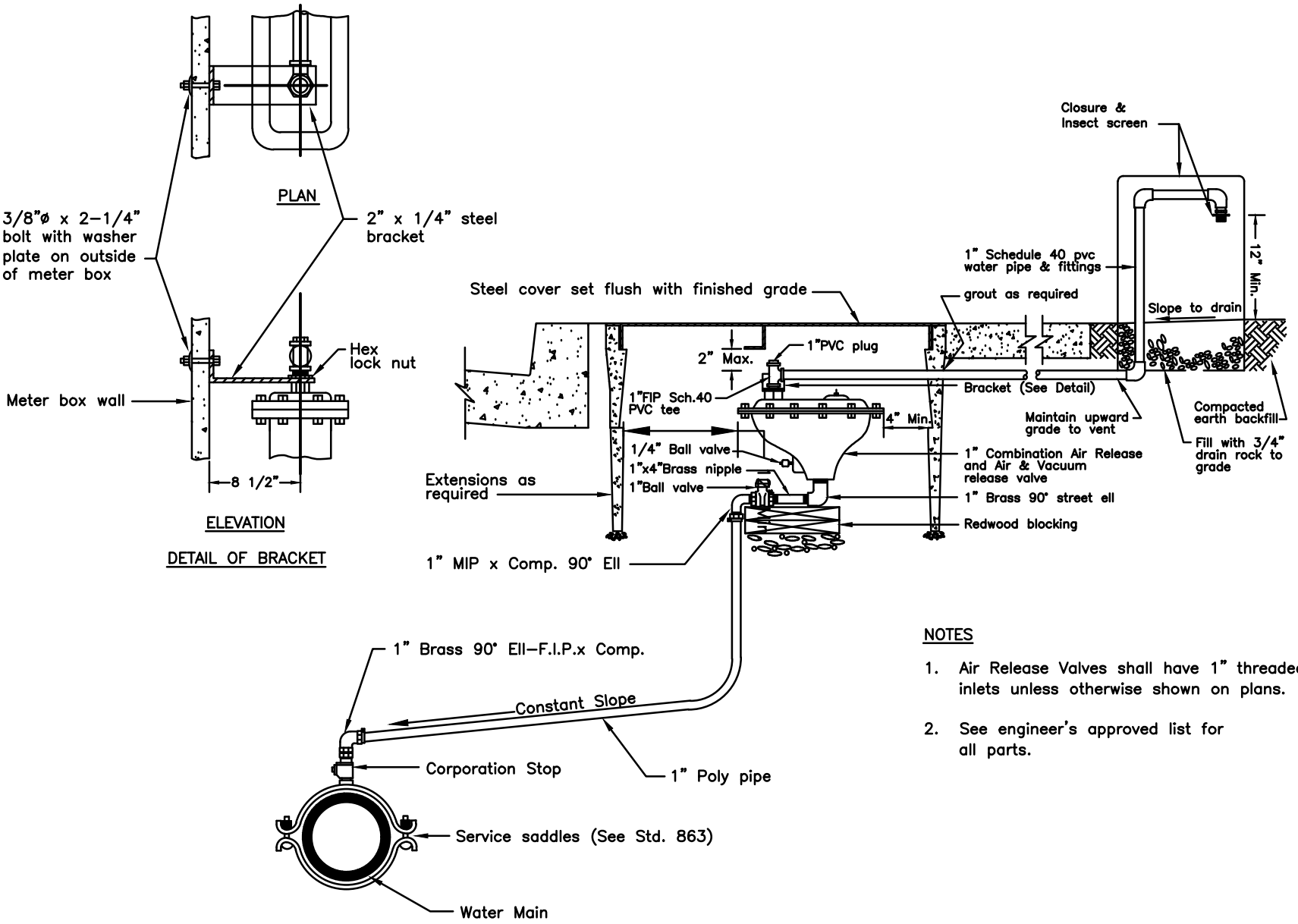
					STD. NO. 524
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

INSTALLATION OF AIR & VACUUM AND AIR RELEASE VALVE

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

STD. NO. 525



NOTES

1. Air Release Valves shall have 1" threaded inlets unless otherwise shown on plans.
2. See engineer's approved list for all parts.

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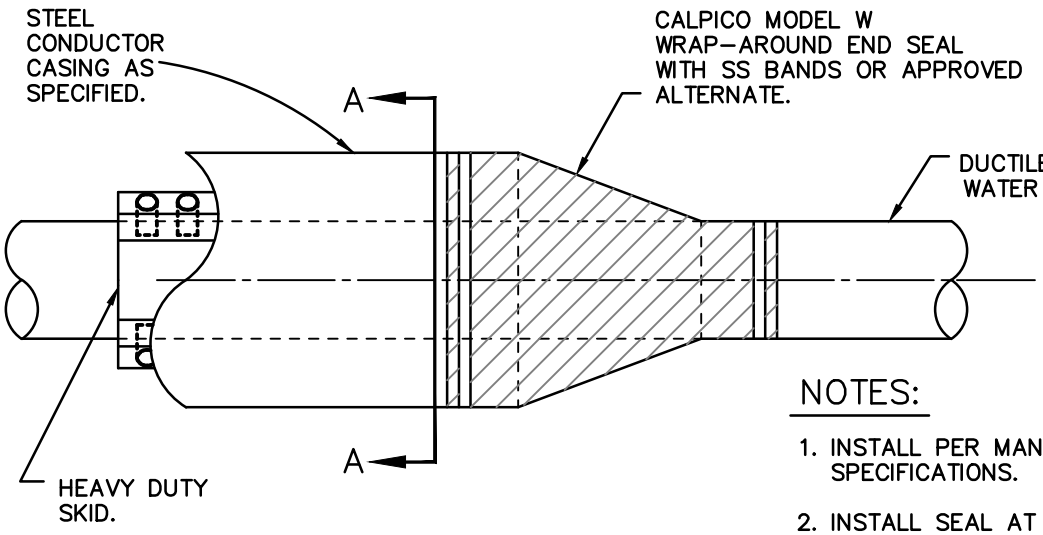
					STD. NO. 526
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

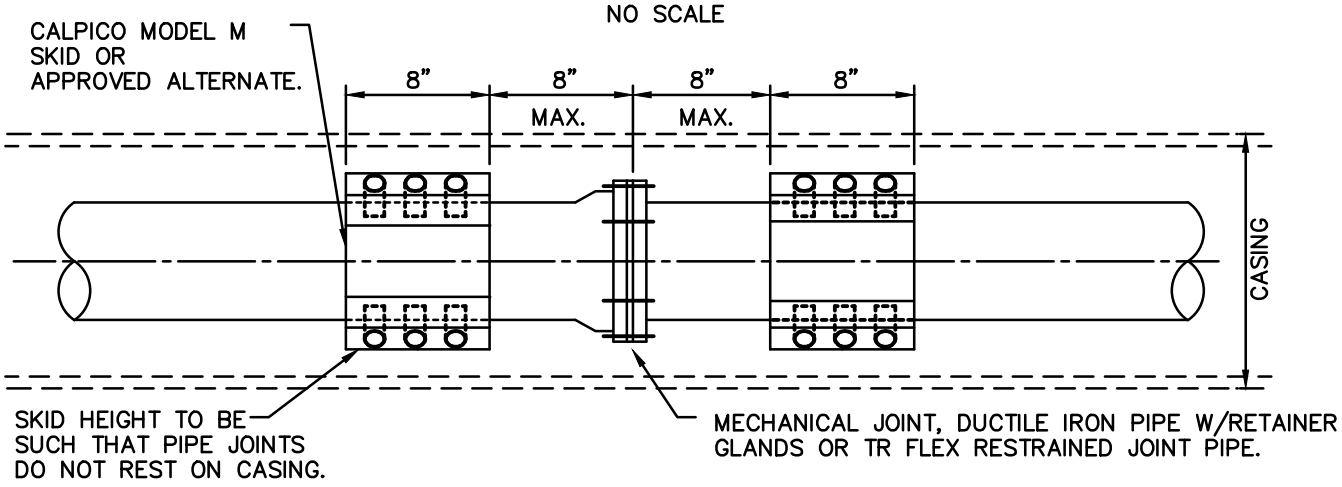


NOTES:

1. INSTALL PER MANUFACTURERS SPECIFICATIONS.
2. INSTALL SEAL AT BOTH ENDS.

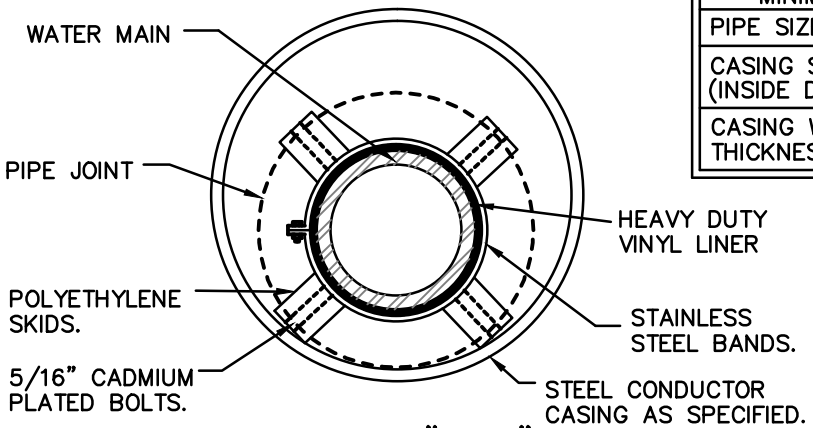
DIRT STOP DETAIL

NO SCALE



PIPE JOINT AND INSULATOR

NO SCALE



SECTION "A–A"

NO SCALE

MINIMUM SIZE CASING REQUIRED							
PIPE SIZE	6"	8"	12"	14"	16"	18"	20"
CASING SIZE (INSIDE DIA.)	16"	16"	20"	24"	30"	36"	36"
CASING WALL THICKNESS	.375	.375	.375	.375	.500	.560	.560

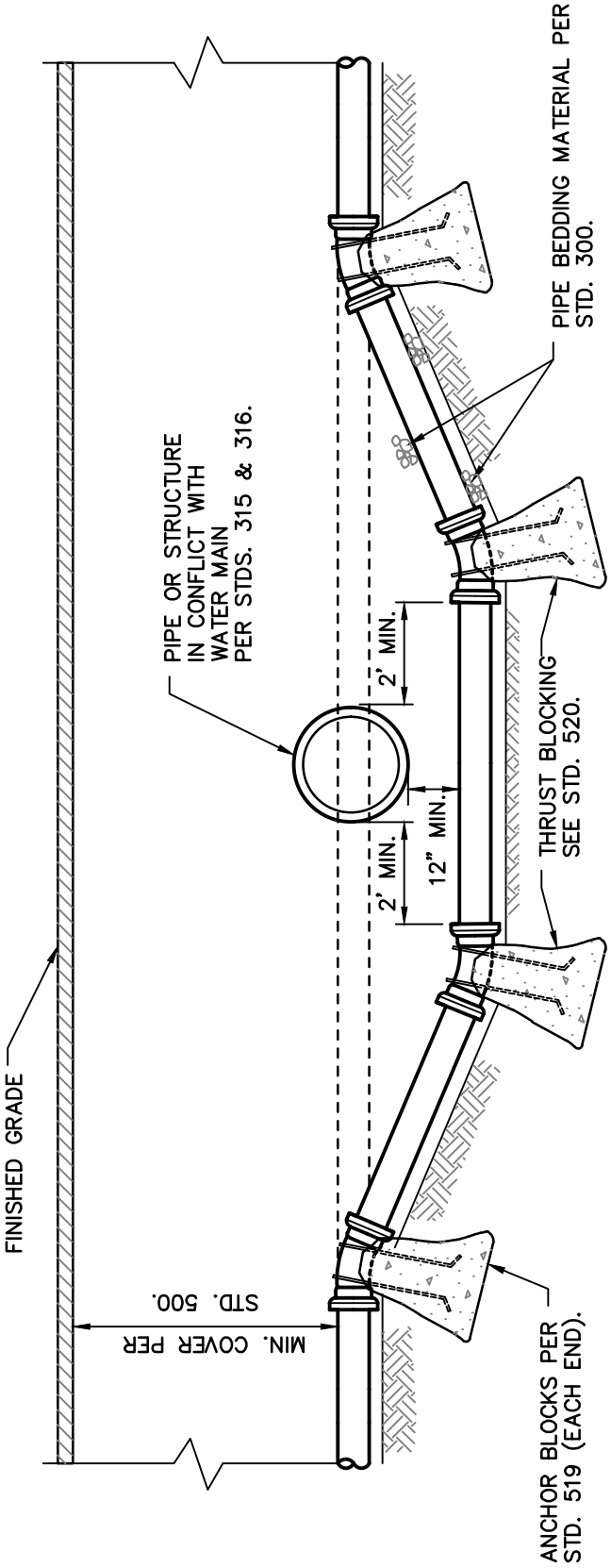
NOTES:

1. INSTALL PER MANUFACTURERS SPECIFICATIONS.
2. SEE GENERAL CONST. NOTES.
3. WHERE CONDUCTOR CASING IS EXISTING R.C.P., REDWOOD SKIDS MAY BE INSTALLED IN LIEU OF POLYETHYLENE SKIDS WITH CITY APPROVAL.

DIRT STOP AND WATER MAIN ENCASEMENT

STD. NO. 527

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



NOTES:

1. ALL PIPE & FITTINGS SHALL BE DUCTILE IRON & SHALL BE PLACED PER CITY STD. CONSTRUCTION SPECIFICATIONS.
2. ONLY MECHANICAL JOINT FITTINGS WITH RETAINER GLANDS MAY BE USED.
3. ALL BENDS SHALL BE 45° OR 22-1/2° FITTINGS.

WATER MAIN LOWERING DETAIL

WATER MAIN LOWERING DETAIL

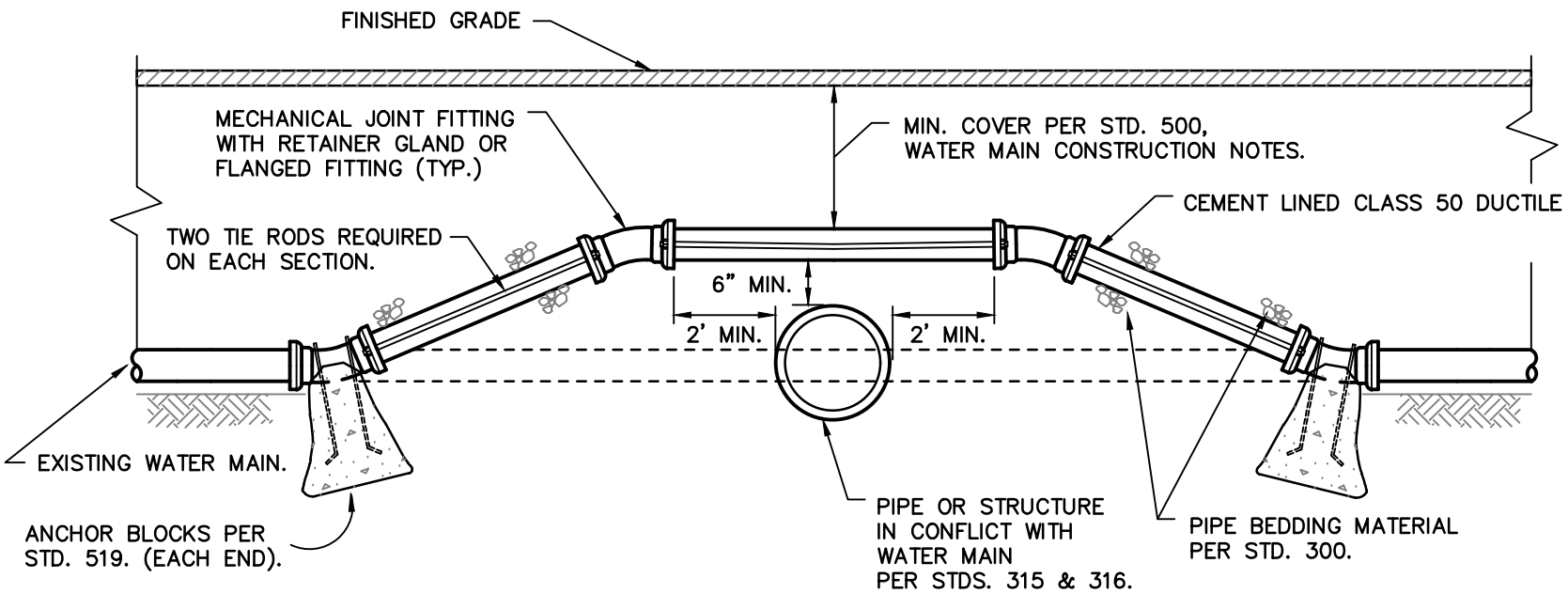
STD. NO. 528

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

WATER MAIN INSTALLATION OVER STRUCTURE

STD. NO. 529



NOTES:

1. ALL PIPE & FITTINGS SHALL BE DUCTILE IRON & SHALL BE PLACED PER THE CITY STD. CONSTRUCTION SPECIFICATIONS.
2. ONLY MECHANICAL JOINT FITTINGS WITH RETAINER GLANDS MAY BE USED.
3. ALL BENDS SHALL BE 45° OR 22–1/2° FITTINGS – NO 90° BENDS ALLOWED.
4. TO BE USED ONLY WITH THE APPROVAL OF THE CITY ENGINEER.
5. CL. 52 DUCTILE IRON REQUIRED WHERE COVER IS LESS THAN THAT REQUIRED BY STD. 500. MINIMUM COVER, IN ANY CASE, IS 30".

PIPE SIZE	TIE RODS
6"	5/8"
8"	3/4"
12"	1–1/8"

WATER MAIN INSTALLATION OVER STRUCTURE

B – Street Light Standard Plans (600 Series)

Rev. 06/12

STREET LIGHT STANDARD PLANS

DESCRIPTION

600 SERIES – STREET LIGHT STANDARDS

600	Street Lighting General Notes
601	Standard Street Light
602	Not Used
603	Electric Service Detail
604	Street Light Wiring Diagram
605	I.E.S. Light Patterns
606	Roadway Illumination
607	Street Light Conduit and Pull Boxes
608	Street Light Conduit
609	Architectural Street Light

GENERAL NOTES:

1. ALL WIRING METHODS AND EQUIPMENT CONSTRUCTION SHALL CONFORM TO THE CURRENT NATIONAL ELECTRICAL CODE.

2. ALL WIRING SHALL BE IN APPROVED CONDUIT. ALL CONDUIT SHALL BE A MINIMUM OF 2" DIAMETER, SCHEDULE 80 P.V.C. (POLYVINYL CHLORIDE), EXCEPT FROM EACH STREET LIGHT TO THE ADJACENT PULL BOX WHICH MAY BE 1" DIAMETER PVC OR METAL, AND SHALL HAVE THE FOLLOWING COVER FROM TOP OF CONDUIT.

A. WITHIN SIDEWALK OF PARKWAY AREAS: 2' – 0" MIN.
B. WITHIN ROADWAY AREAS: 3' – 0" MIN.

3. ALL METAL CONDUIT AND OTHER METAL PARTS SHALL BE CONTINUOUSLY BONDED AND GROUNDED.

4. ALL BENDS AND/OR OFFSETS SHALL BE MADE WITH FACTORY SECTIONS. 90–DEGREE ELBOWS USED FOR STUB–UPS SHALL BE P.V.C.–COATED RIGID STEEL CONDUIT ELBOWS.

5. UNLESS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS, A NO. 5 PULL BOX (STATE STD. ES–8) SHALL BE USED AT ALL STREET LIGHT STANDARDS.

6. ALL PULL BOXES SHALL BE PER CITY STD. 607.

7. JUNCTION BOXES SHALL BE NOT MORE THAN 250' APART ON LONG RUNS.

8. WHEN PULL BOXES ARE SUBJECT TO VEHICULAR TRAFFIC, THEY SHALL BE SET ON CONCRETE FOOTINGS AND CAST IRON TRAFFIC COVERS SHALL BE INSTALLED.

9. ALL SPLICES SHALL BE MADE WITH APPROVED SOLDERLESS WATERPROOF CONNECTORS OF THE PROPER SIZE PER NEC 300–15. (EXAMPLE: WIRENUT OR SPLIT BOLT PLUS TAPE PLUS COATING.) ALL SPLICES SHALL BE LOCATED IN AN APPROVED BOX.

10. ALL EMPTY CONDUITS SHALL HAVE A 1/4" NYLON PULL ROPE PROVIDED INSIDE.

11. ALL CONDUITS SHALL BE SEALED WITH AN APPROVED DUCT SEAL. CONDUITS STUBBED FOR FUTURE EXTENSION SHALL BE CAPPED.

12. ALL STREET LIGHTING PROJECTS ARE SUBJECT TO APPROVAL BY THE DIRECTOR OF PUBLIC WORKS.

13. ALL PULL BOX COVERS SHALL BE SECURED WITH BRASS HOLD DOWN BOLTS AND INSCRIBED, "STREET LIGHTING".

14. STREET LIGHT SPACING SHALL BE A MAXIMUM OF 200' FOR MINOR/COLLECTOR STREETS AND 100' FOR MAJOR STREETS. STREET LIGHT SPACING SHALL BE STAGGERED AND LOCATED AT PROPERTY LINES WHEN POSSIBLE.

15. THE MINIMUM–AVERAGE MAINTAINED FOOT CANDELLAS AND UNIFORMITY RATIO OF ALL STREET LIGHTING SHALL COMPLY WITH STD. 606.

16. ALL STREET LIGHTS EQUIPPED WITH A PHOTOCELL CONTROL SHALL HAVE THE PHOTOCELL ORIENTED TO THE NORTH.

17. ALL WIRE SHALL BE THHN A.W.G. THE MINIMUM SIZE SHALL BE #8.

18. SHIELDS SHALL BE PROVIDED ON ALL STREETLIGHTS TO PREVENT UNNECESSARY LIGHT POLLUTION, AND ARE SUBJECT TO APPROVAL BY THE DIRECTOR OF PUBLIC WORKS.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STREET LIGHTING GENERAL NOTES**	STD. NO. **600**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

GENERAL NOTES (CONTINUED):

THE FOLLOWING NOTES DO NOT APPLY TO CITY–FUNDED PROJECTS:

19. LIGHT POLES ON ALL STREETS OTHER THAN MINOR STREETS OR CUL–DE–SACS SHALL BE GALVANIZED STEEL STANDARDS IN ACCORDANCE WITH CITY STANDARD PLANS. THE POLE HEIGHTS SHALL BE AS DELINEATED ON THE CITY STANDARDS.

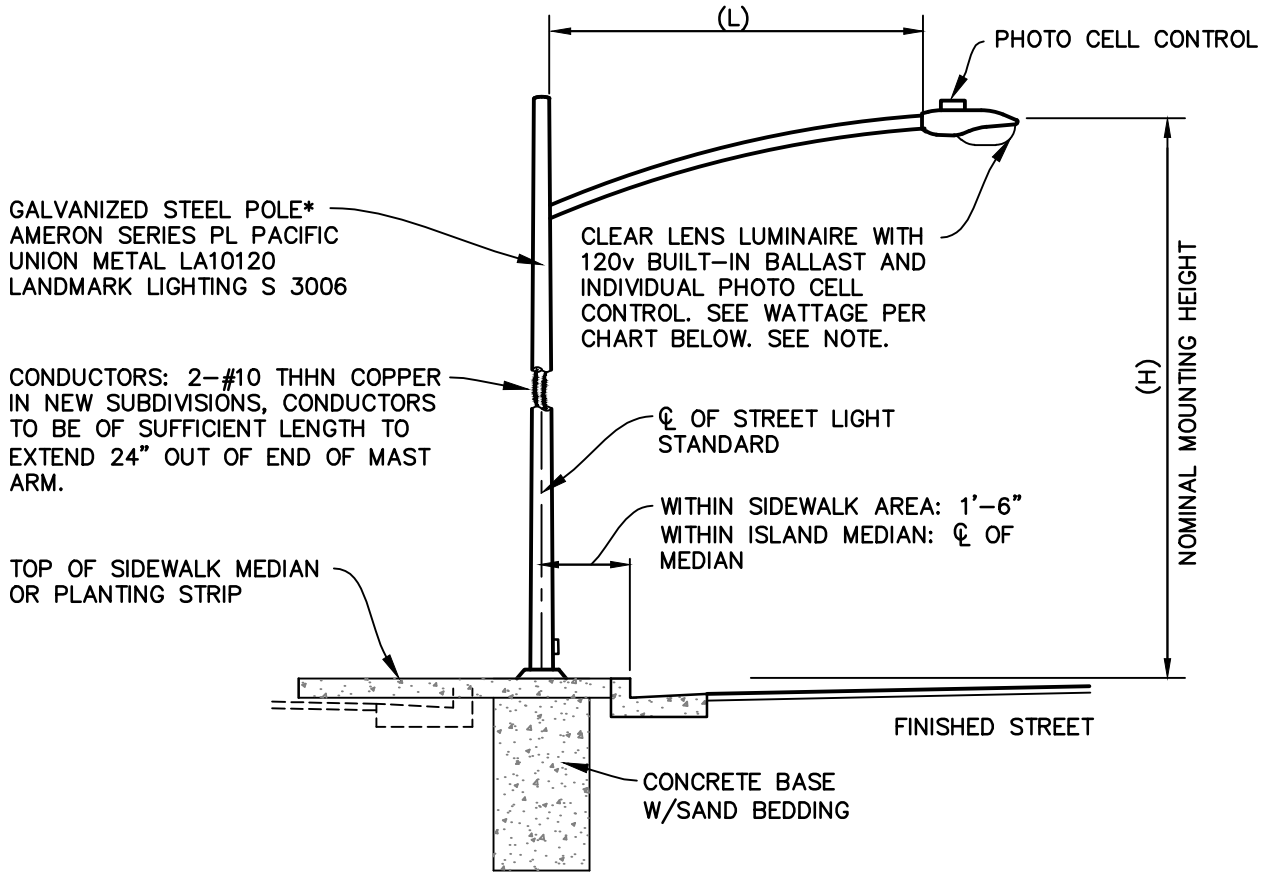
20. THE DEVELOPER/ENGINEER SHALL MAKE ARRANGEMENTS FOR SERVICE POINTS WITH P.G.&E. THE DEVELOPER SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED THEREWITH WHICH SHALL BE PAID DIRECTLY TO P.G.& E. THE CONTRACTOR SHALL VERIFY THE STREET LIGHT SERVICE POINT LOCATION(S) WITH P.G.&E. PRIOR TO INSTALLATION.

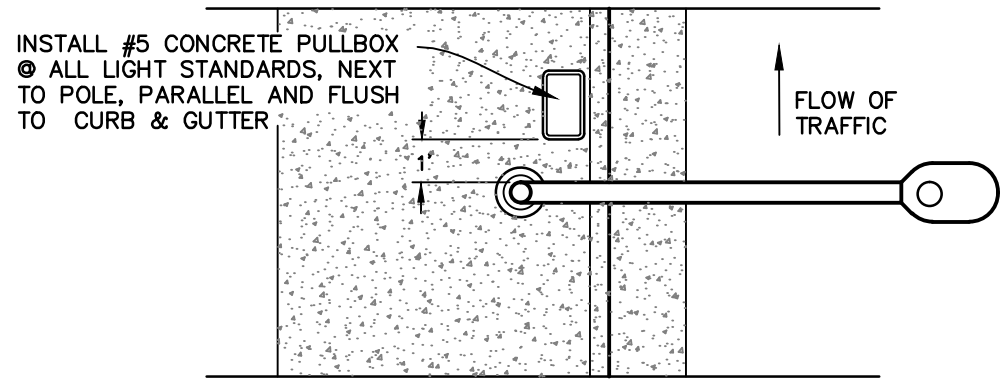
21. ALL STREET LIGHT SYSTEMS SHALL BE DESIGNED FOR 120 VOLT SERVICE UNLESS CONNECTING TO AN EXISTING SYSTEM. IN THE LATTER CASE, THE DESIGN SHALL CONFORM TO THE SYSTEM BEING CONNECTED TO AND MUST BE SPECIFICALLY APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

22. THE CURRENT TO BE USED TO DETERMINE CONDUCTOR SIZES SHALL BE DETERMINED AS FOLLOWS:

$$\frac{\text{TOTAL WATTAGE OF FIXTURES SERVED}}{\text{SERVICE VOLTAGE}} \times 3.5$$

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STREET LIGHTING GENERAL NOTES**				STD. NO. **600**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012





NOTE:

EACH LUMINARE SHALL BE FITTED WITH A HOUSE-SIDE SHIELD AND SHALL HAVE AN OPTICAL SYSTEM PRODUCING TYPE II OR TYPE III DISTRIBUTION.

* ALTERNATES TO BE SPECIFICALLY APPROVED BY DIRECTOR OF PUBLIC WORKSING.

STREET CLASSIFICATION	POLE HEIGHT(H)	ARM LENGTH(L)	MAXIMUM SPACING
COMMERCIAL	32'-6"	8'-0"	100'
INTERMIDIATE	28'-0"	6'-0"	200'
RESIDENTIAL	27'-6"	4'-0"	200'

STANDARD STREET LIGHT

STD. NO. 601

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

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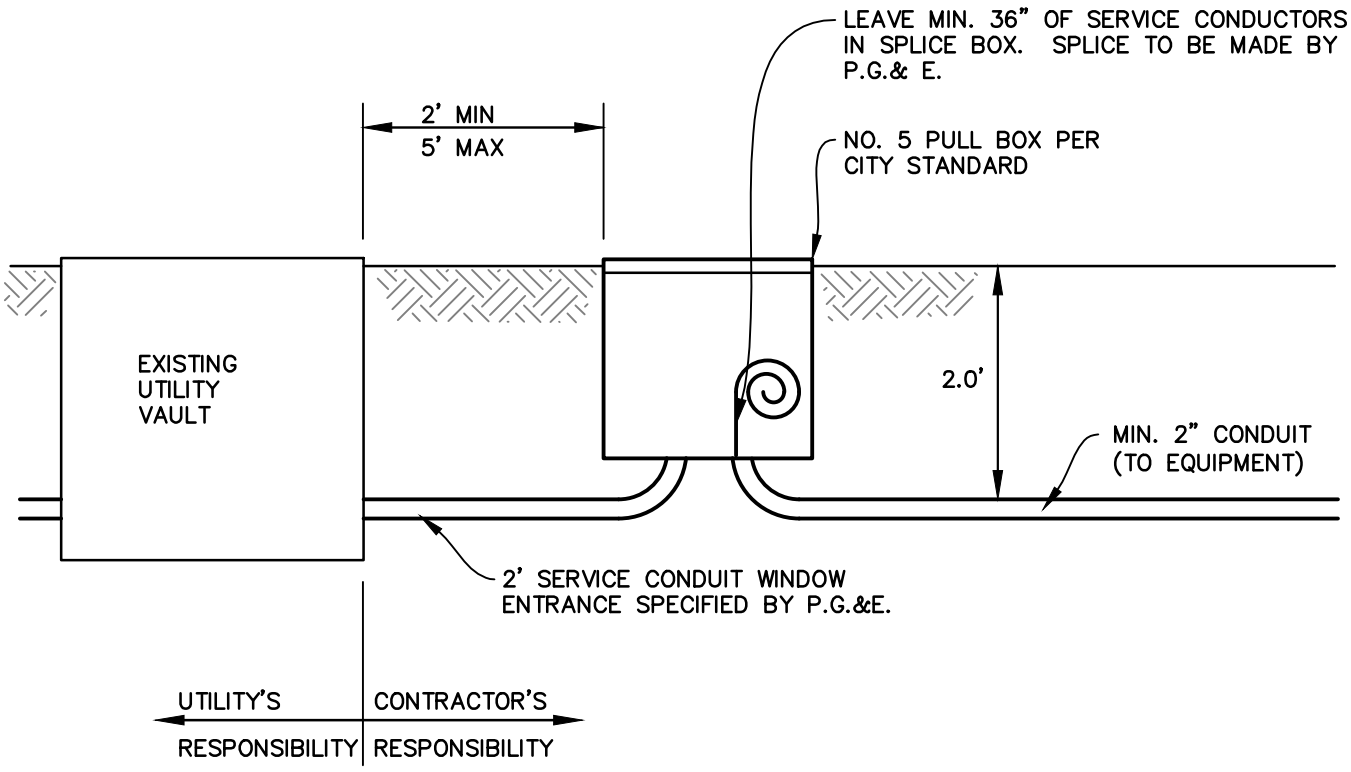
					STD. NO. 602
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



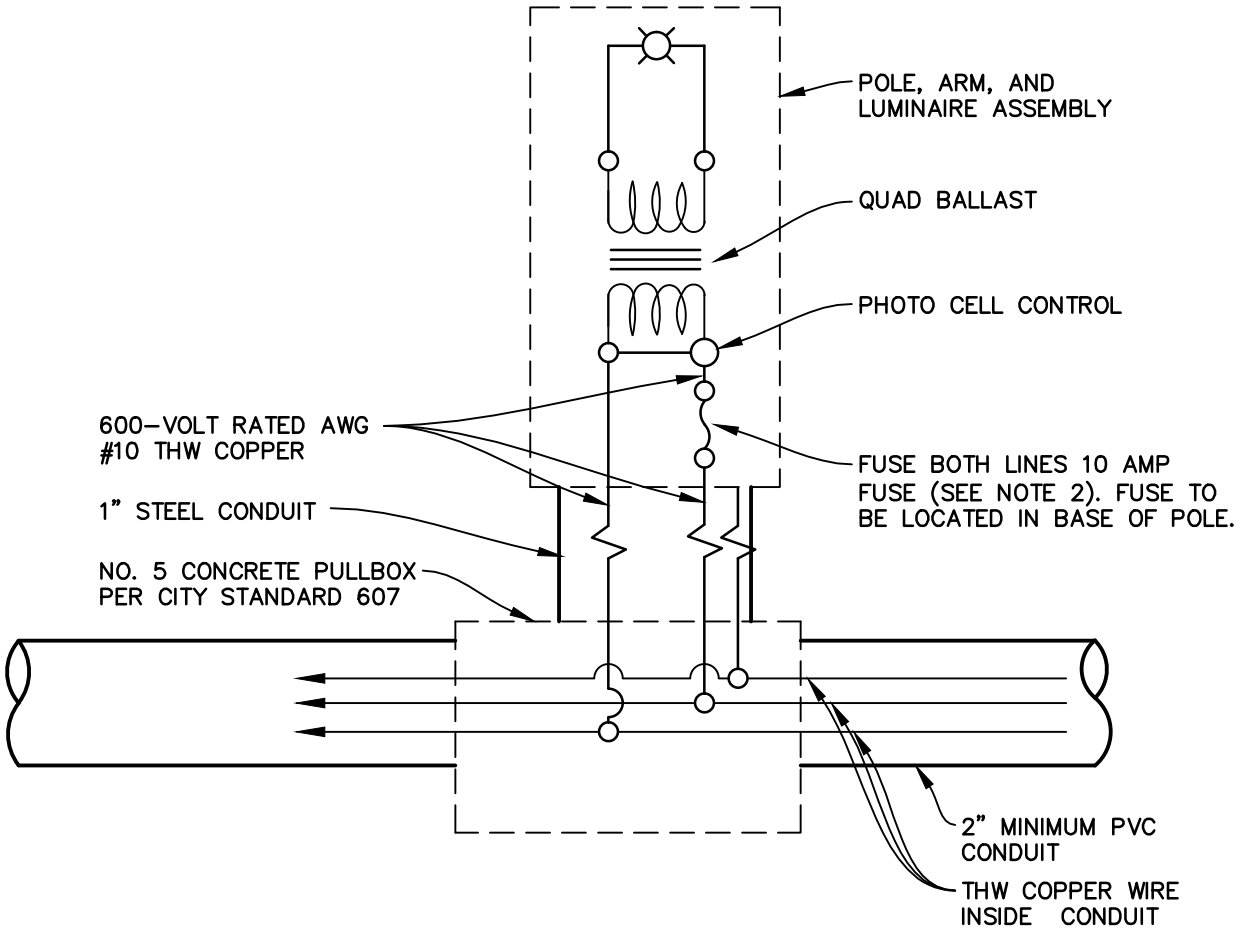
NOTES:

1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
2. CONTRACTOR TO INSTALL CONDUIT INTO UTILITY CO. VAULT WITH UTILITY CO. REPRESENTATIVE IN ATTENDANCE.
3. CONTRACTOR TO INSTALL NO. 5 PULL BOX AND 2" SERVICE CONDUIT (WHEN NONEXISTENT) AND 2" CONDUIT AND CONDUCTORS FROM EQUIPMENT TO PULL BOX.

ELECTRIC SERVICE DETAIL

STD. NO.
603

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

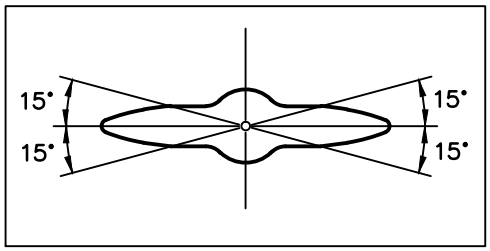


SCHEMATIC STREET LIGHT
WIRING DIAGRAM

NOTES:

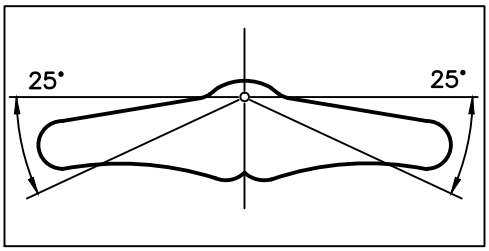
1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
2. 600V 30A IN–LINE WATERPROOF FUSE HOLDER SHALL BE USED.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STREET LIGHT WIRING DIAGRAM**	STD. NO. **604**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012



TYPE 1

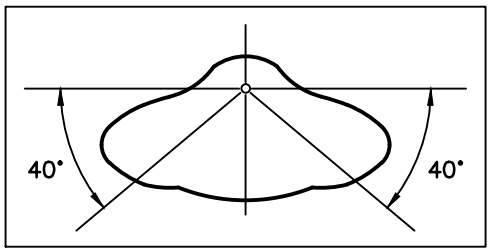
CENTER OF STREET



TYPE 2

SIDE MOUNTING

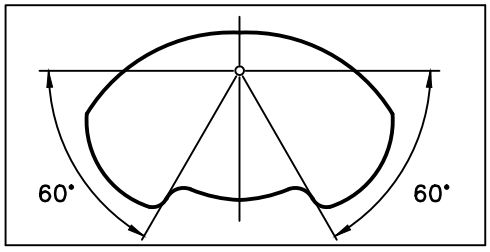
STANDARD FOR LOCAL STREETS
UNLESS NOTED OTHERWISE.



TYPE 3

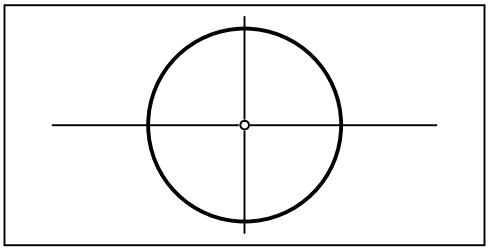
SIDE MOUNTING

STANDARD FOR COLLECTOR AND MAJOR
STREETS UNLESS NOTED OTHERWISE.



TYPE 4

SIDE MOUNTING



TYPE 5

I.E.S. LIGHT PATTERNS

STD. NO.
605

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

AREA CLASS.	ROADWAY CLASS.	MIN. AVG. MAINTAINED F.C.	UNIFORMITY RATIO AVG.F.C./MIN.F.C.
RESIDENTIAL	LOCAL	0.20	6:1
	COLLECTOR	0.30	5:1
	MAJOR	0.50	4:1
INTERMEDIATE	LOCAL	0.30	6:1
	COLLECTOR	0.40	4:1
	MAJOR	0.60	3:1
COMMERCIAL	COLLECTOR	0.75	4:1
	MAJOR	1.00	3:1

AVERAGE MAINTAINED F.C. IS: $F.C. = \frac{(LL)(MF)(CU)}{(W)(S)}$

FC = ILLUMINATION IN FOOTCANDLES
LL = RATED INITIAL LAMP LUMENS
MF = MAINTENANCE FACTOR
CU = COEFFICIENT OF UTILIZATION
W = STREET WIDTH, CURB TO
S = CURB SPACING OF LUMINARES

MINIMUM F.C. IS: $FCmin. = (fc)(LF)(MF)(CF)$

FC_{min} = MINIMUM POINT FOOTCANDLES
fc = RAW TOTAL FOOTCANDLES (AT DARKEST POINT)
LF = LAMP FACTOR
MF = MAINTENANCE FACTOR
CF = MOUNTING HEIGHT CORRECTION FACTOR

$$\text{UNIFORMITY RATIO} = \frac{\text{AVERAGE FOOTCANDLES}}{\text{MINIMUM FOOTCANDLES}}$$

ROADWAY ILLUMINATION

STD. NO. 606

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

CONDUIT AND PULL BOXES

SERVICE RUN – 2" MINIMUM.
UNDER ANY STREET – 2" MINIMUM, 36" TO TOP OF CONDUIT (MINIMUM).
UNDER SIDEWALK OR PLANTER AREA – 24" TO TOP OF CONDUIT (MINIMUM).

ALL PULL BOXES SHALL BE #5 (STATE STD ES–8) EXCEPT THE MAIN PULL BOX WHICH SHALL BE 30" X 48" MINIMUM. COVERS SHALL BE MARKED "STREET LIGHTING".

PULL BOXES SUBJECTED TO VEHICULAR TRAFFIC SHALL BE INSTALLED WITH HS20 TRAFFIC RATED COVERS.

ALL CONDUITS SHALL BE SCH. 80 PVC.

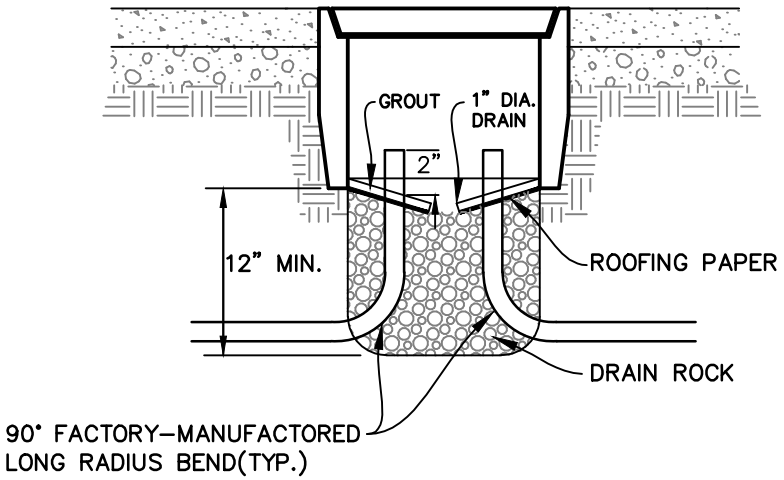
ALL UNDERGROUND CONDUITS AND METAL PARTS SHALL BE CONTINUOUSLY BONDED AND GROUNDED.

ALL BENDS AND/OR OFFSETS SHALL BE MADE WITH FACTORY SECTIONS. 90–DEGREE ELBOWS USED FOR STUB–UPS SHALL BE P.V.C.–COATED RIGID GALVANIZED STEEL.

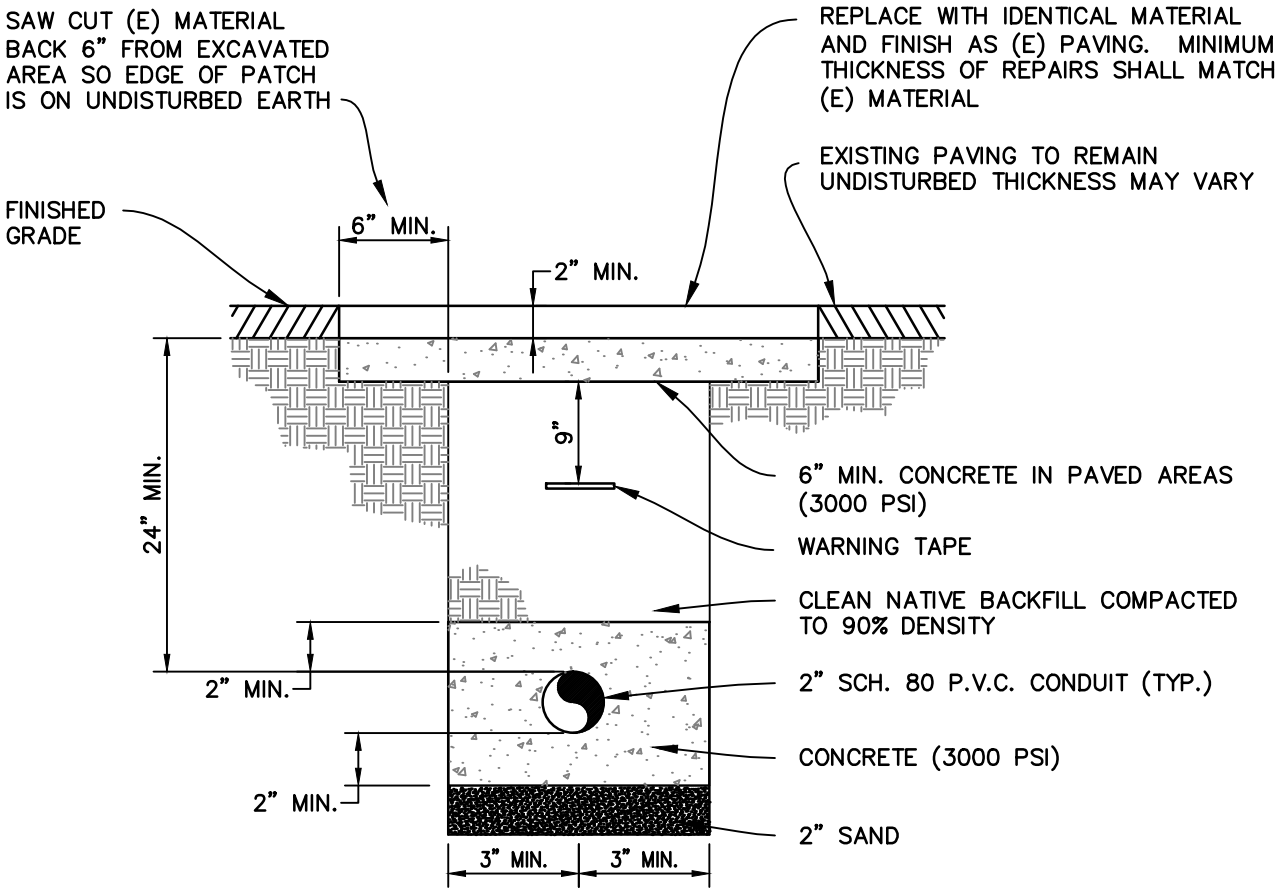
ALL EMPTY CONDUITS SHALL HAVE A 1/4" NYLON ROPE PROVIDED INSIDE.

ALL PULL BOX COVERS SHALL BE SECURED WITH BRASS HOLD DOWN BOLTS.

ALL CONDUITS SHALL BE SEALED WITH AN APPROVED DUCT SEAL. CONDUITS STUBBED FOR FUTURE EXTENSION SHALL BE CAPPED.



	STREET LIGHT CONDUIT AND PULL BOXES				STD. NO. 607
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012



NOTES:

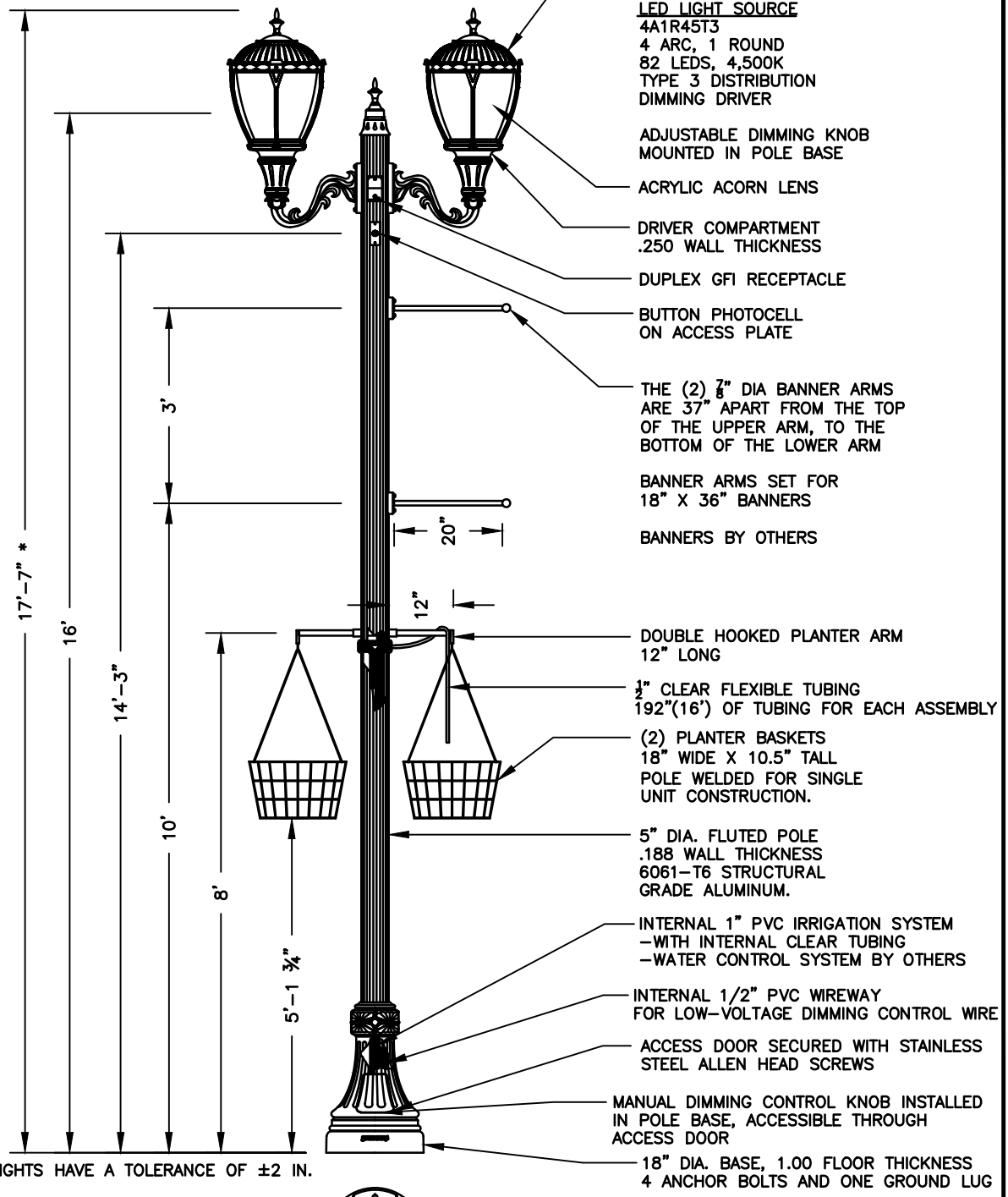
1. REFER TO STD NO. 223 FOR LOCATION OF JOINT UTILITY TRENCH WITHIN THE PUBLIC RIGHT-OF-WAY.

STREET LIGHT CONDUIT

STD. NO. 608

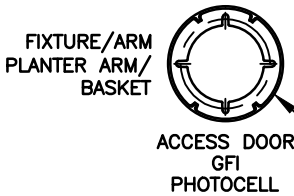
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

MODEL: STERNBERG 2-1130A/ALED/5P/55LPM/6216FP5/SFCC/4A1R45T3-ML/PCD1/1-GFI/1-DBA/DHPA/DIS/2-PB18/VG



*POLE HEIGHTS HAVE A TOLERANCE OF ±2 IN.

SOCKET TYPE:	LED
WATTAGE:	92W
LIGHT SOURCE:	4A1R45T3
VOLTAGE:	120-277
FINISH:	VERDE GREEN



ARCHITECTURAL STREET LIGHT

STD. NO. 609

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

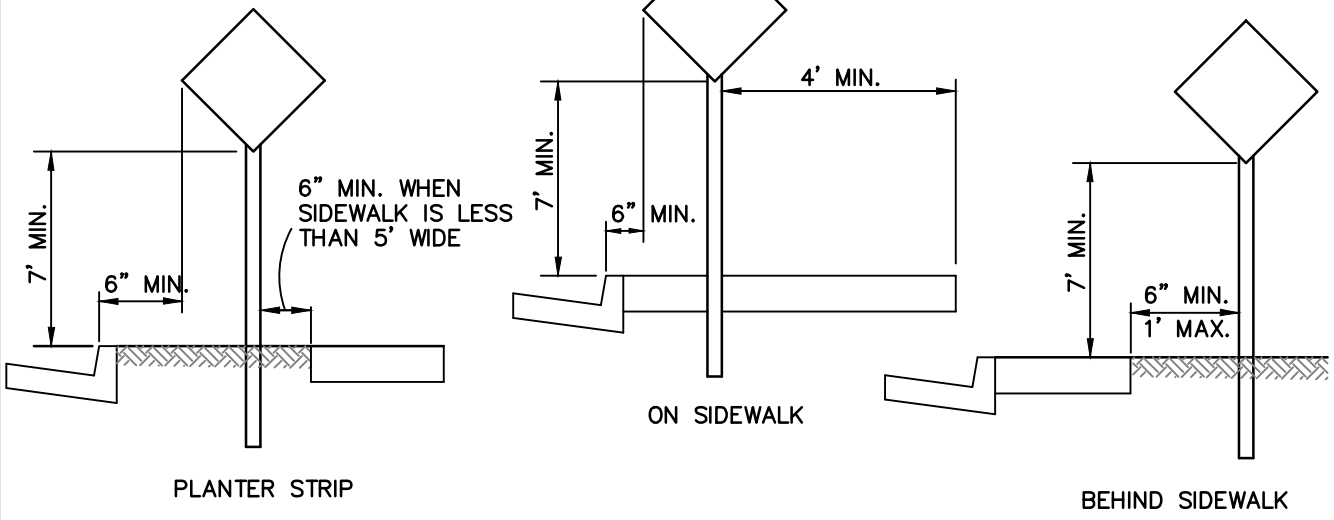
B – Traffic Control Standard Plans (700 Series)

TRAFFIC STANDARD PLANS

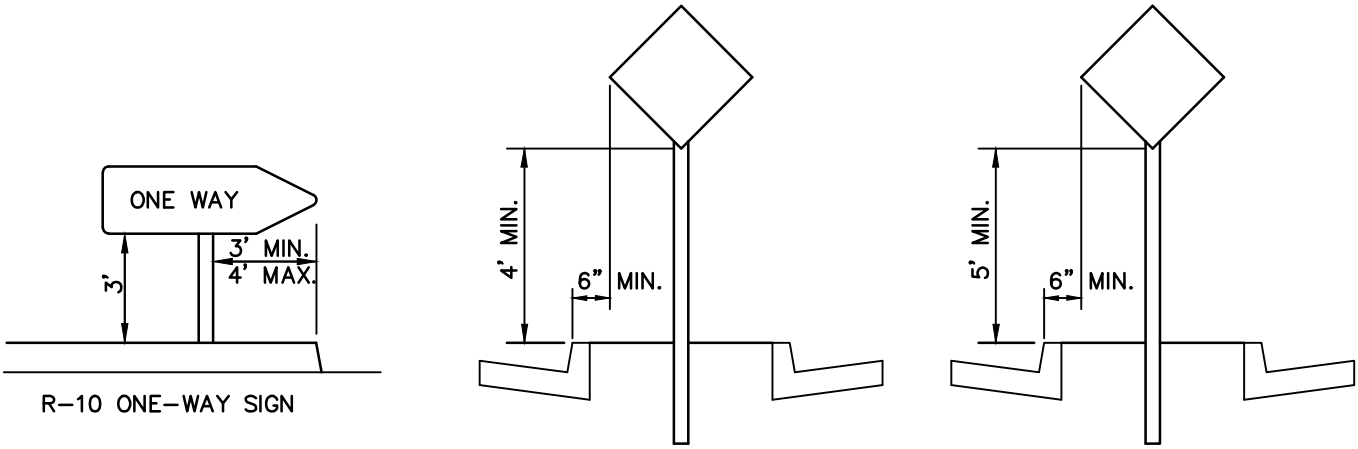
DESCRIPTION

700 SERIES - TRAFFIC

701	Traffic Signs Urban Installations
702	Traffic Signs Rural Installations
703	Street Name Sign Un-Signalized Intersection
704	Street Name Sign Standard
705	Not Used
706	Crosswalk Markings
707	Bike Lanes - Signs and Markings
708	Not Used
709	Electric Service Detail Overhead Service
710	Speed Hump Detail



SIDEWALK AREA

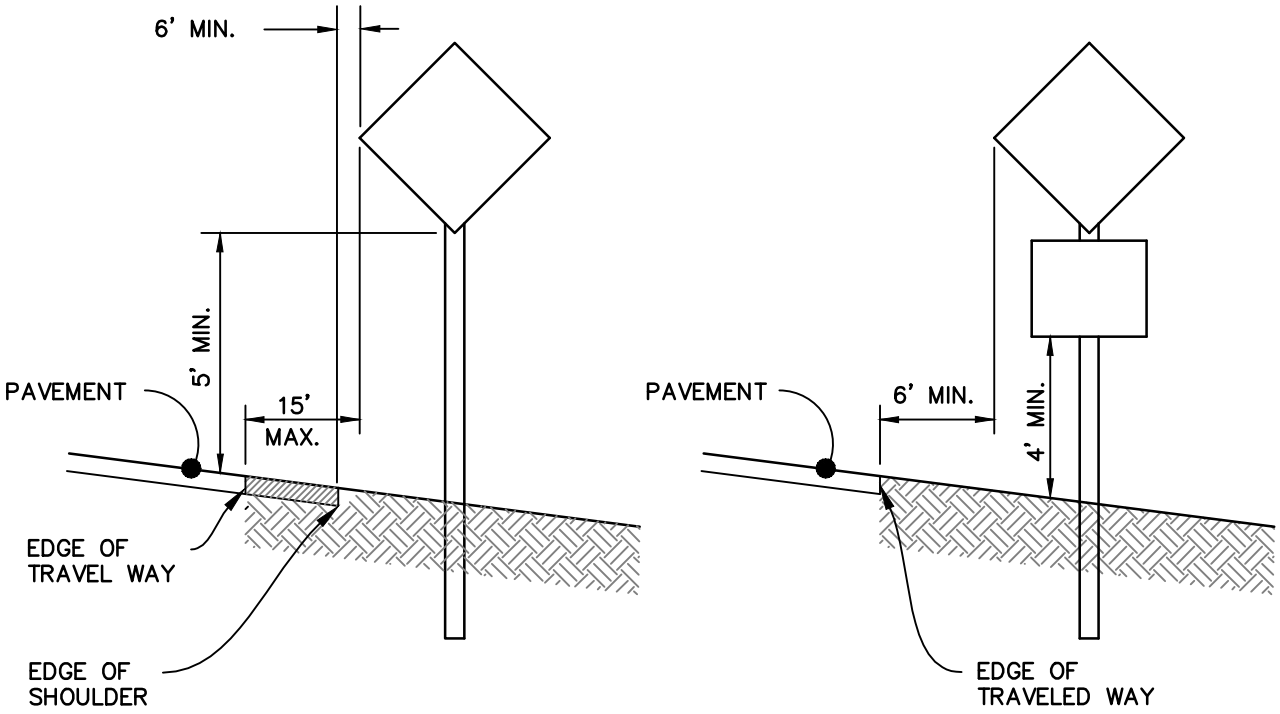


MEDIAN AREA

NOTES:

1. DESIGN SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**TRAFFIC SIGNS URBAN INSTALLATIONS**	STD. NO. **701**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

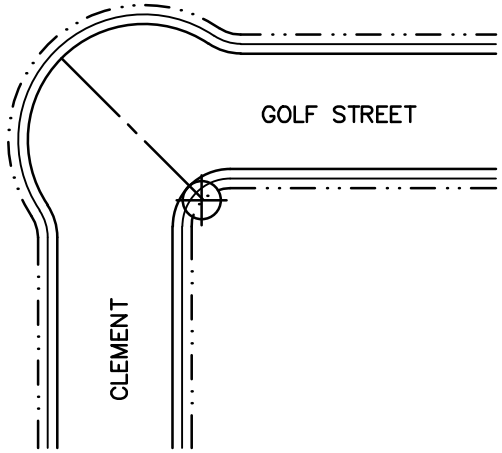


RURAL AREA

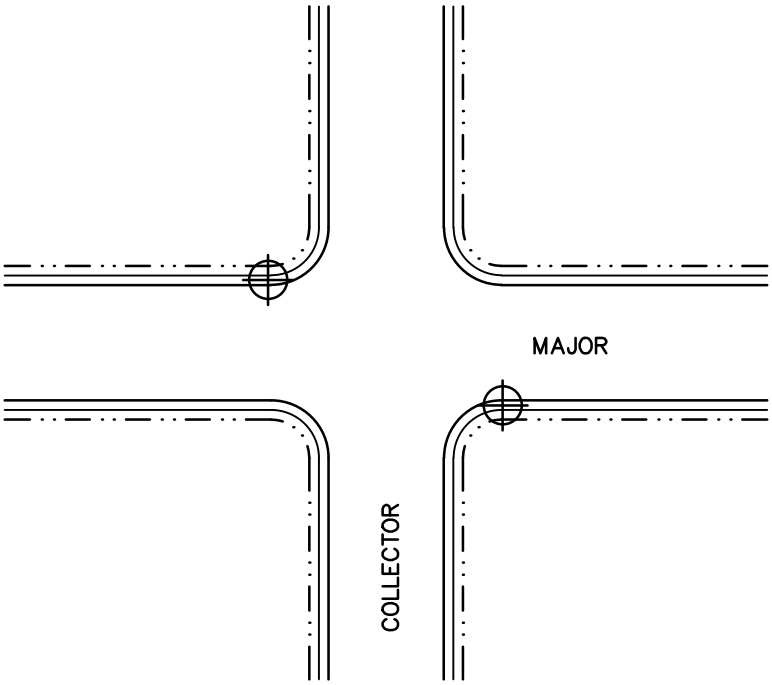
NOTES:

1. DESIGN SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

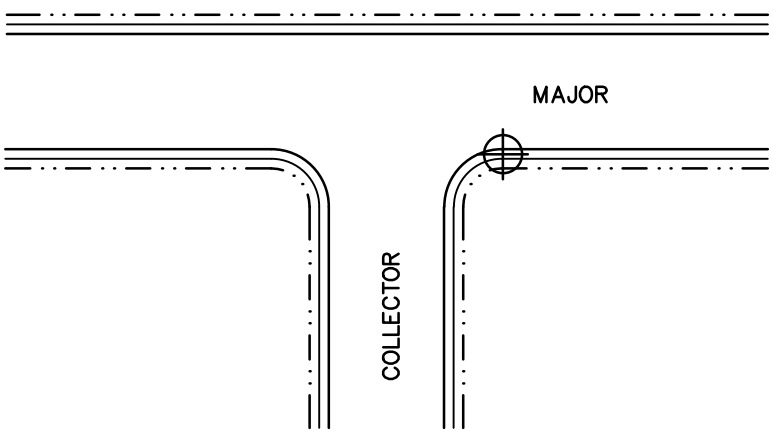
	TRAFFIC SIGNS **RURAL INSTALLATIONS**	STD. NO. **702**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012



"L" INTERSECTION



"FOUR WAY" INTERSECTION



"T" INTERSECTION

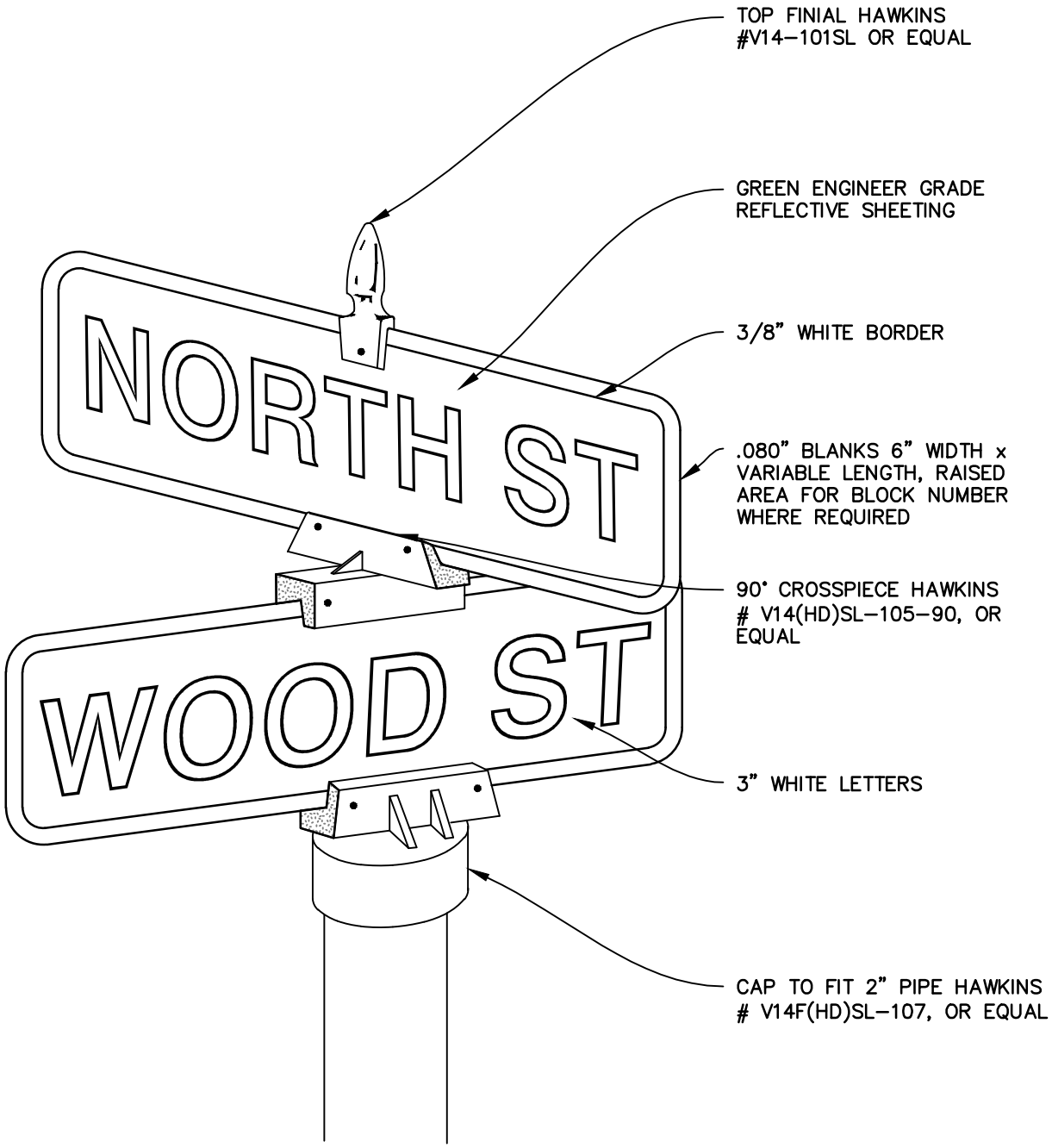
LEGEND:

STREET NAME SIGN

NOTES:

1. DESIGN SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STREET NAME SIGN UN-SIGNALIZED INTERSECTION**	STD. NO. 703
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012



NOTES:

1. DESIGN SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STREET NAME SIGN STANDARD**	STD. NO. **704**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012

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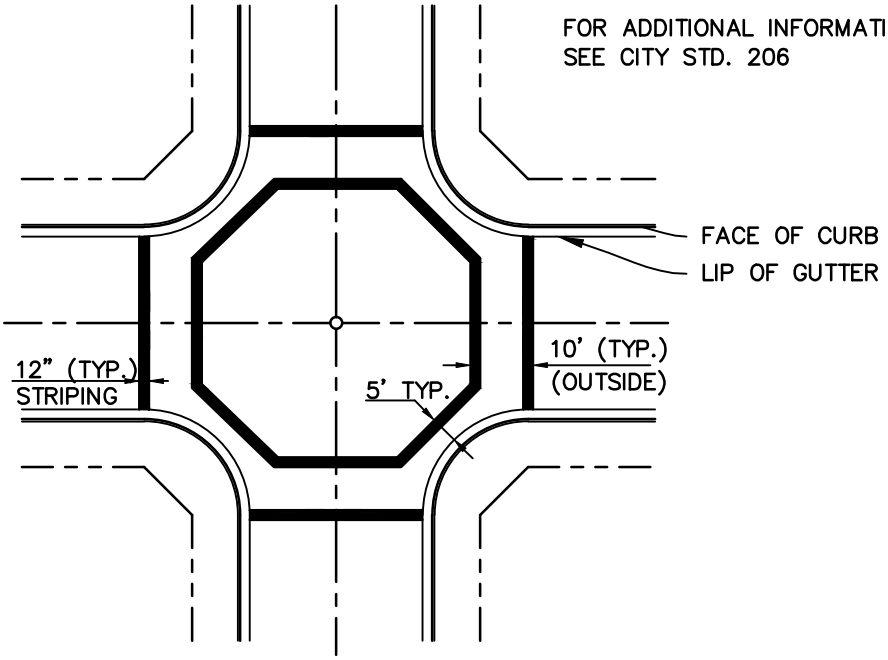
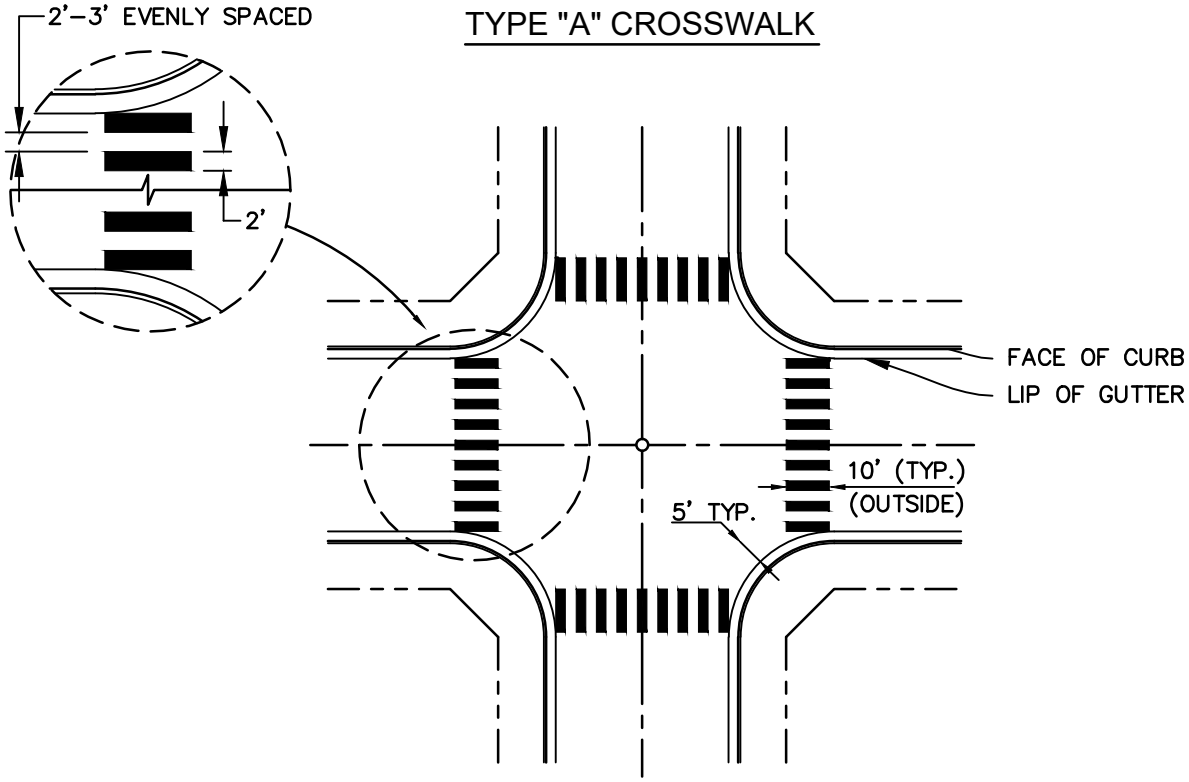
					STD. NO. 705
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

FOR ADDITIONAL INFORMATION
SEE CITY STD. 206



TYPE "A" CROSSWALK



TYPE "B" CROSSWALK

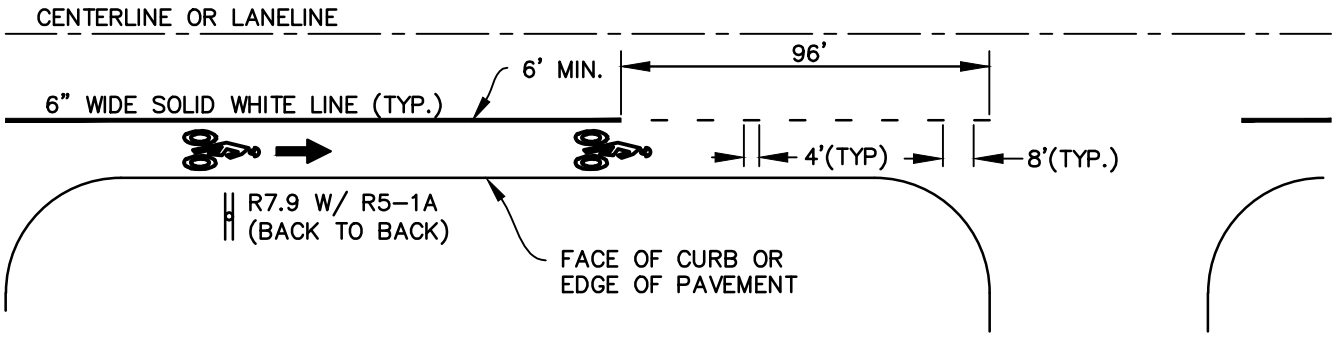
NOTES:

1. DESIGN SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
2. TYPE "B" CROSSWALK LINES SHALL BE LAID OUT TO AVOID STREET TRAFFIC WHEEL TRACKS.

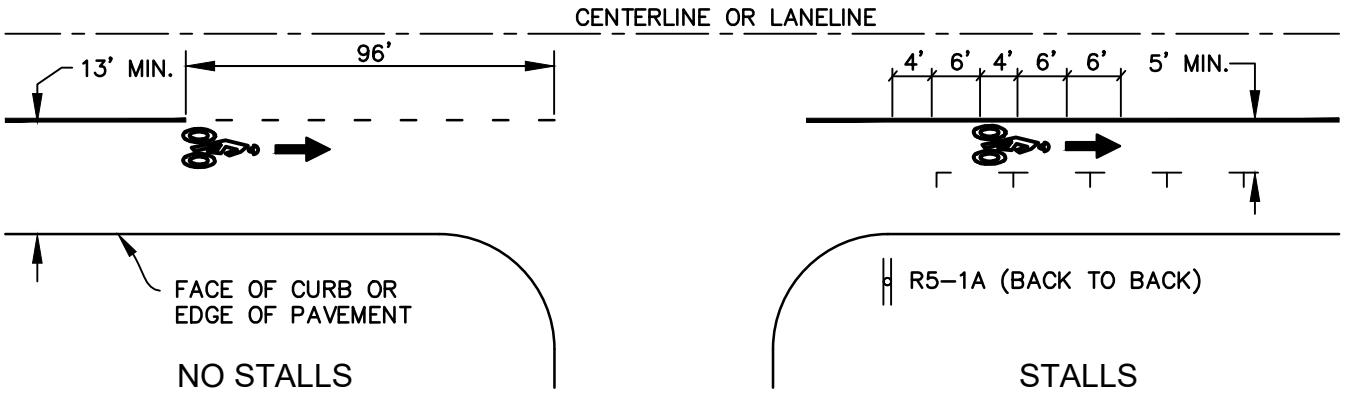
CROSSWALK MARKINGS

STD. NO. 706

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



PARKING PROHIBITED



PARKING PERMITTED

NOTES:

1. DESIGN SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

	BIKE LANES SIGNS AND MARKINGS	STD. NO. 707
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

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					STD. NO. 708
	SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

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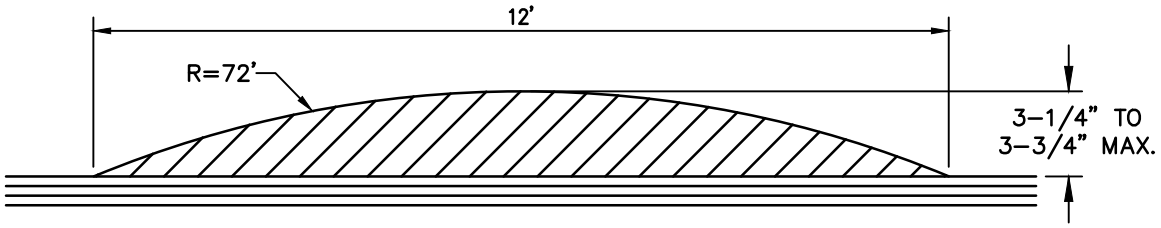
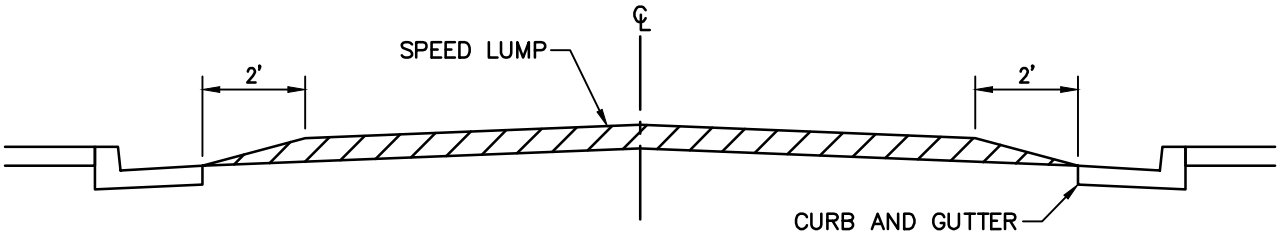
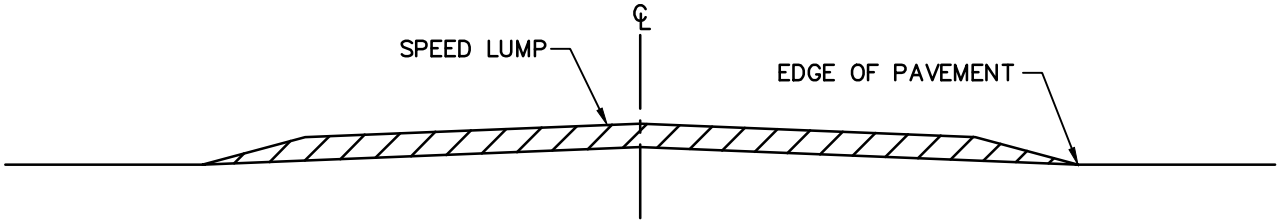
	ELECTRIC SERVICE DETAIL **OVERHEAD SERVICE**	STD. NO. **709**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012



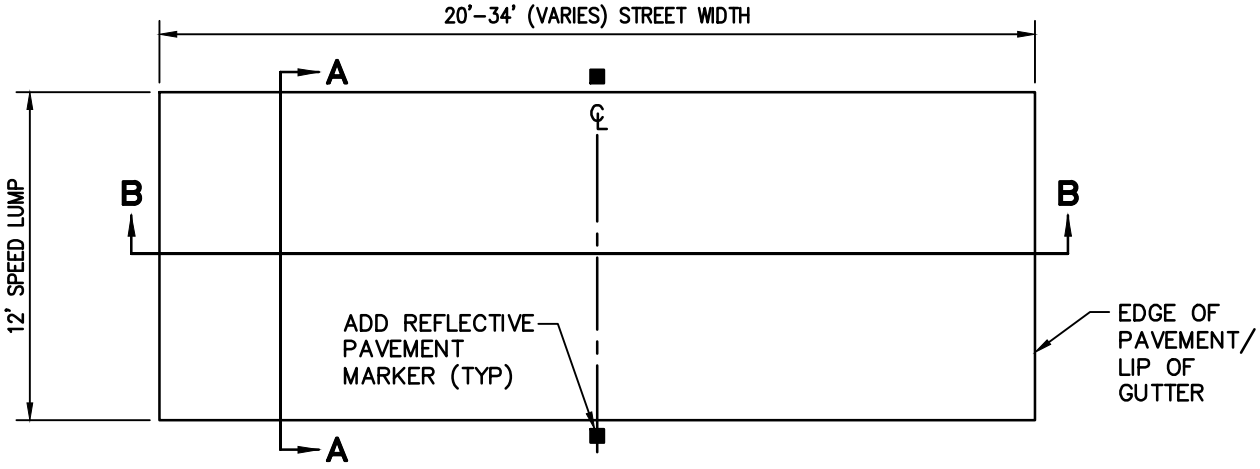
SPEED HUMP CROSS-SECTION A-A



STREET CROSS-SECTION B-B
(WITH SPEED LUMP)



STREET CROSS-SECTION B-B
IN UNIMPROVED AREAS
(WITH SPEED LUMP)



STRIPING PLAN

NOTES:

1. SPEED HUMP SHALL BE PAINTED WHITE (2-COAT) IN ACCORDANCE WITH THE CALTRANS STANDARD SPECIFICATIONS.
2. DESIGN SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
3. PROVIDE ADVANCED SPEED HUMP SIGN (W17-1) AND ADVISORY SPEED PLAQUE FOR ALL APPROACHES.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**SPEED HUMP DETAIL**	STD. NO. **710**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

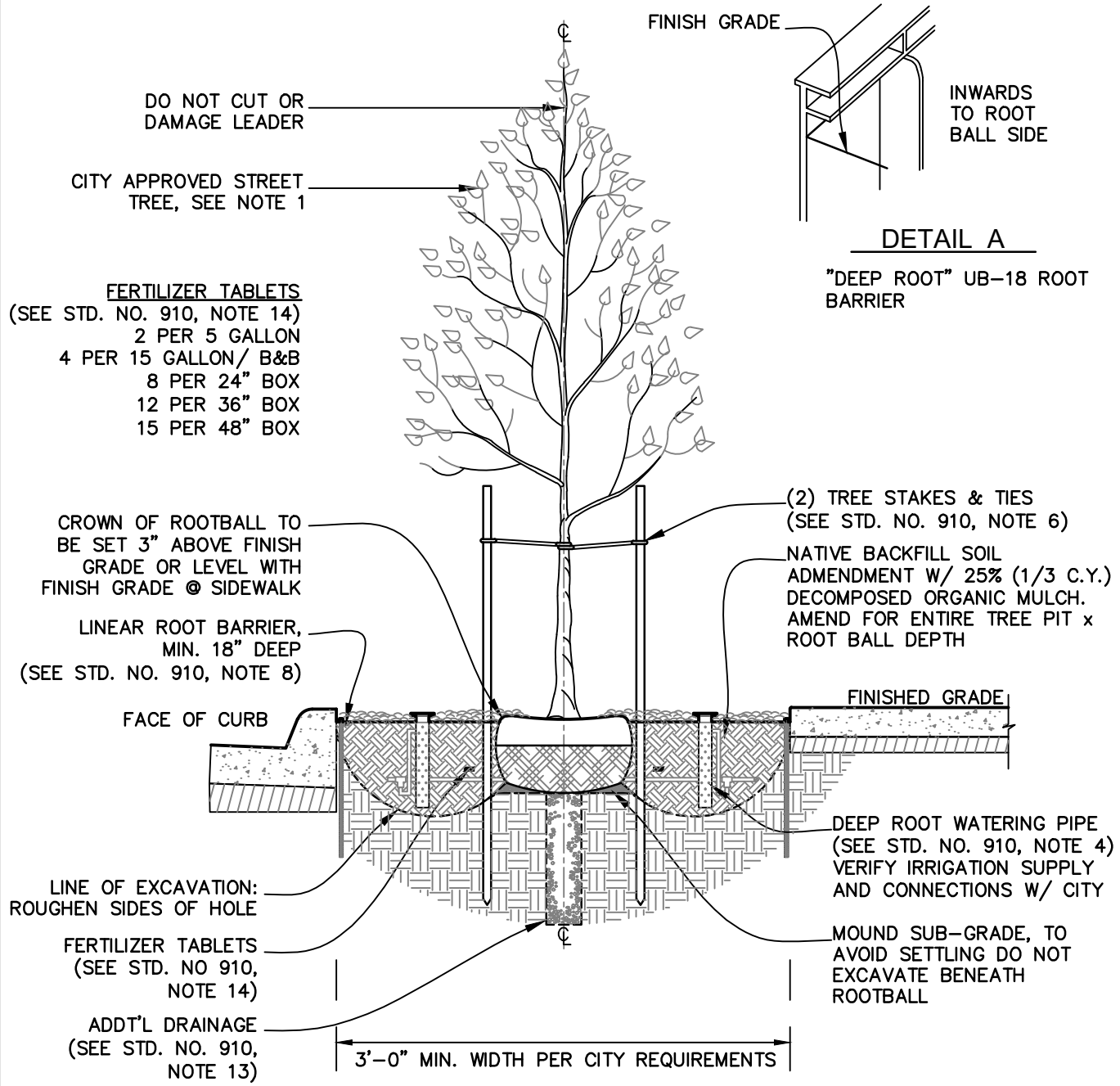
B – Landscape & Streetscape Standard Plans (900 Series)

LANDSCAPE & STREETSCAPE STANDARD PLANS

DESCRIPTION

900 SERIES – LANDSCAPE & STREETSCAPE

901	Street Tree Planting in Planter Strip
902	Street Tree Planting in Tree Well
903	Street Tree Planting in Structural Soil (Alt.)
904	Typical Deciduous Tree Planting
905	Typical Shrub and Ground Cover Planting
906	Tree and Shrub Planting on Slope
907	Tree Protection During Trenching, Tunneling, and Excavation
908	Street Furnishings
909	Mailbox Detail
910	Specifications for Streetscape and Landscape Standards
911	Street Tree List



PLANTING DETAIL

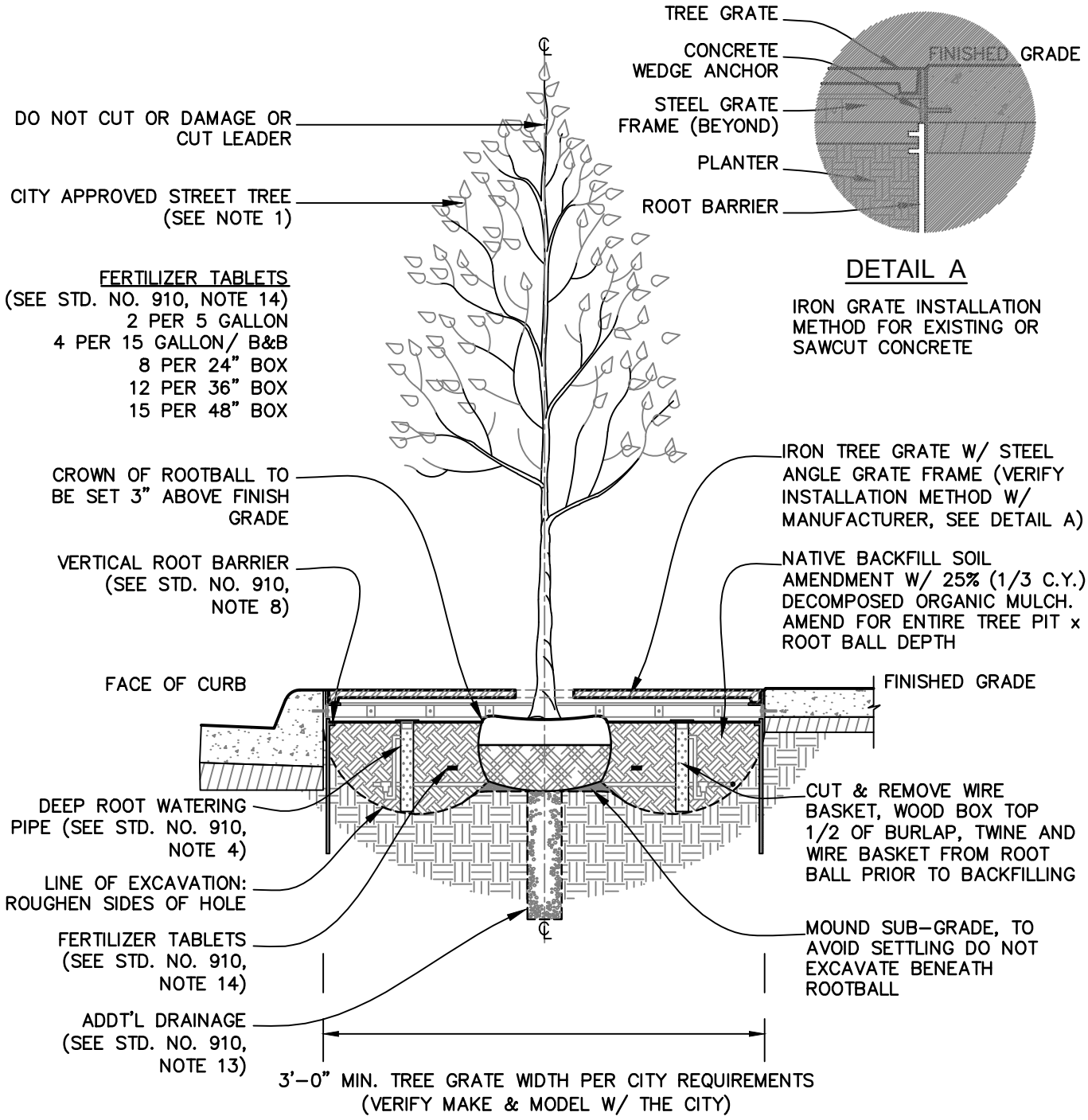
NOTES:

1. REFER TO CITY APPROVED STREET TREE STD. NO. 911 FOR A LIST OF APPROVED TREES WITHIN THE CITY "RIGHT OF WAY".
2. REFER TO STD'S NO. 910 FOR ADDITIONAL STANDARDS AND SPECIFICATIONS FOR LANDSCAPE AND STREETSCAPE REQUIREMENTS.

STREET TREE PLANTING IN PLANTER STRIP

STD. NO. 901

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



DETAIL A

IRON GRATE INSTALLATION METHOD FOR EXISTING OR SAWCUT CONCRETE

PLANTING DETAIL

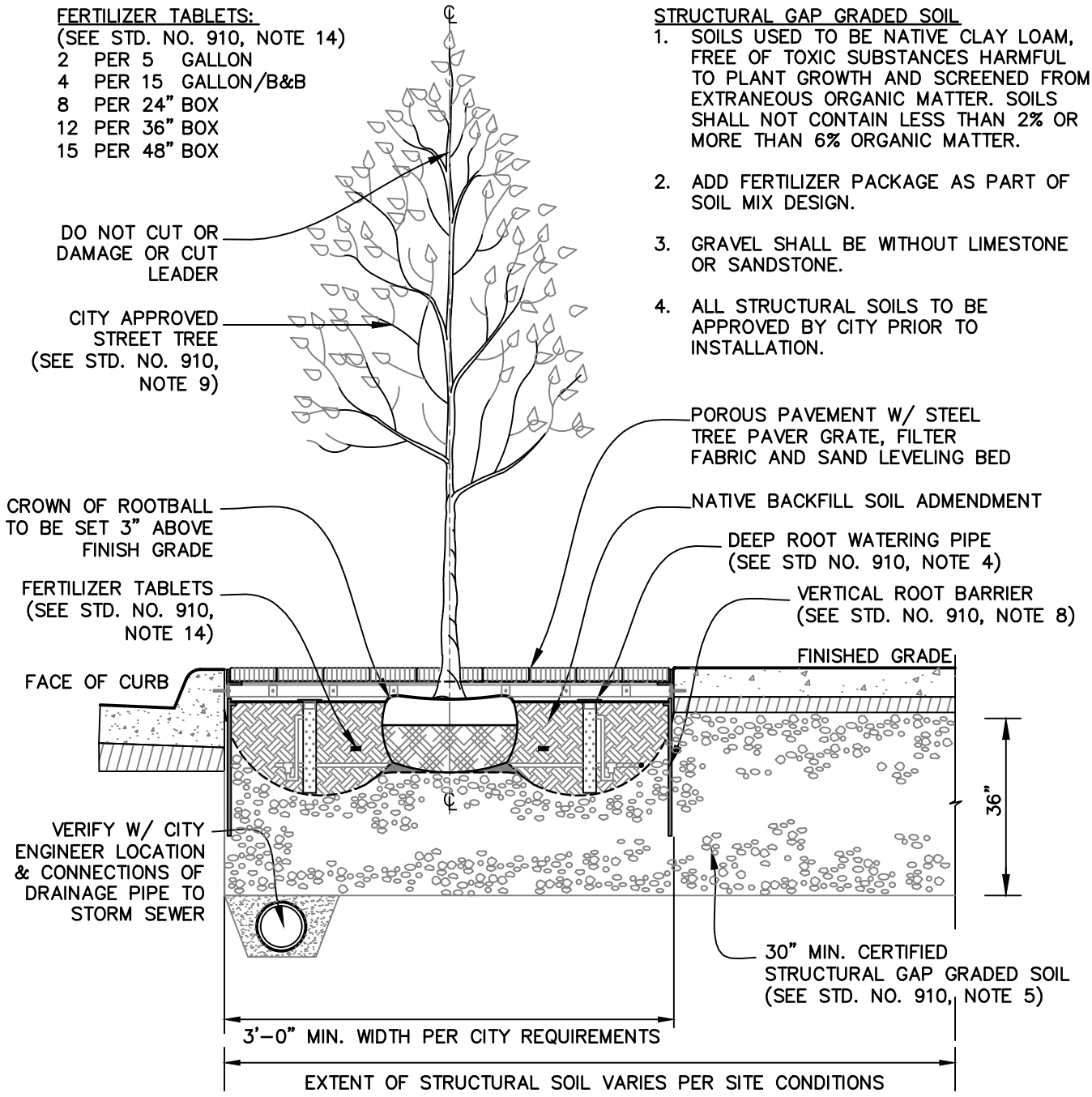
NOTES:

1. REFER TO CITY APPROVED STREET TREE STD. NO. 911 FOR A LIST OF APPROVED TREES WITHIN THE CITY "RIGHT OF WAY".
2. REFER TO STD'S NO. 910 FOR ADDITIONAL STANDARDS AND SPECIFICATIONS FOR LANDSCAPE AND STREETSCAPE REQUIREMENTS.

STREET TREE PLANTING IN TREE WELL

STD. NO. 902

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



STRUCTURAL GAP GRADED SOIL

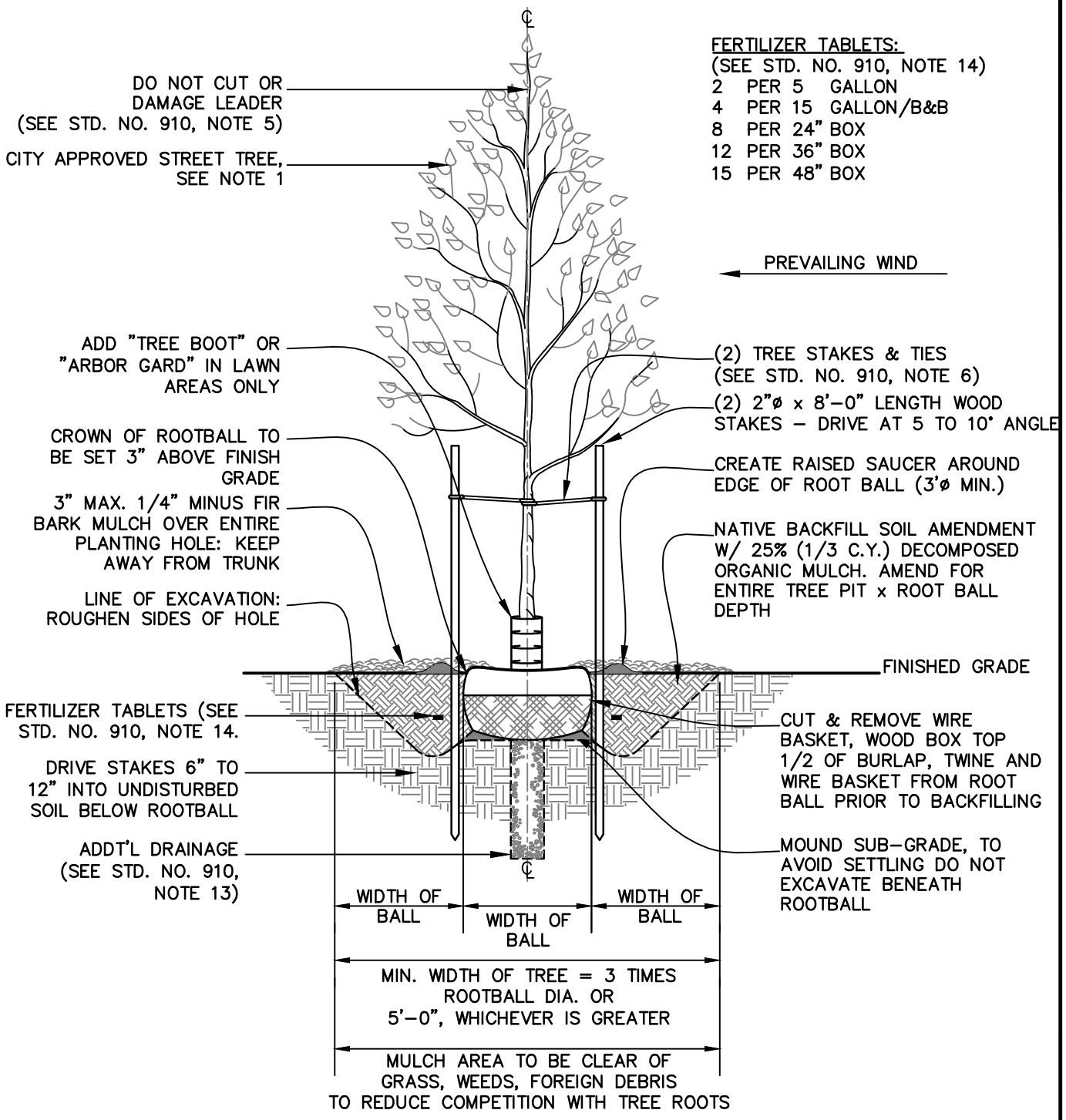
1. SOILS USED TO BE NATIVE CLAY LOAM, FREE OF TOXIC SUBSTANCES HARMFUL TO PLANT GROWTH AND SCREENED FROM EXTRANEOUS ORGANIC MATTER. SOILS SHALL NOT CONTAIN LESS THAN 2% OR MORE THAN 6% ORGANIC MATTER.
2. ADD FERTILIZER PACKAGE AS PART OF SOIL MIX DESIGN.
3. GRAVEL SHALL BE WITHOUT LIMESTONE OR SANDSTONE.
4. ALL STRUCTURAL SOILS TO BE APPROVED BY CITY PRIOR TO INSTALLATION.

PLANTING DETAIL

NOTES:

1. REFER TO CITY APPROVED STREET TREE STD. NO 911 FOR A LIST OF APPROVED TREES WITHIN THE CITY "RIGHT OF WAY".
2. REFER TO STD'S NO. 910 FOR ADDITIONAL STANDARDS AND SPECIFICATIONS FOR LANDSCAPE AND STREETSCAPE REQUIREMENTS.
3. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND TESTED PER SPECIFICATIONS FOR PROPER WATER SOLUBILITY AND COMPACTION RATES.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STREET TREE PLANTING IN STRUCTURAL SOIL (ALT.)**	STD. NO. **903**
SCALE: NONE	DRAWN: CFB | CHK: MGK | APPVD:	DATE: JUN 2012

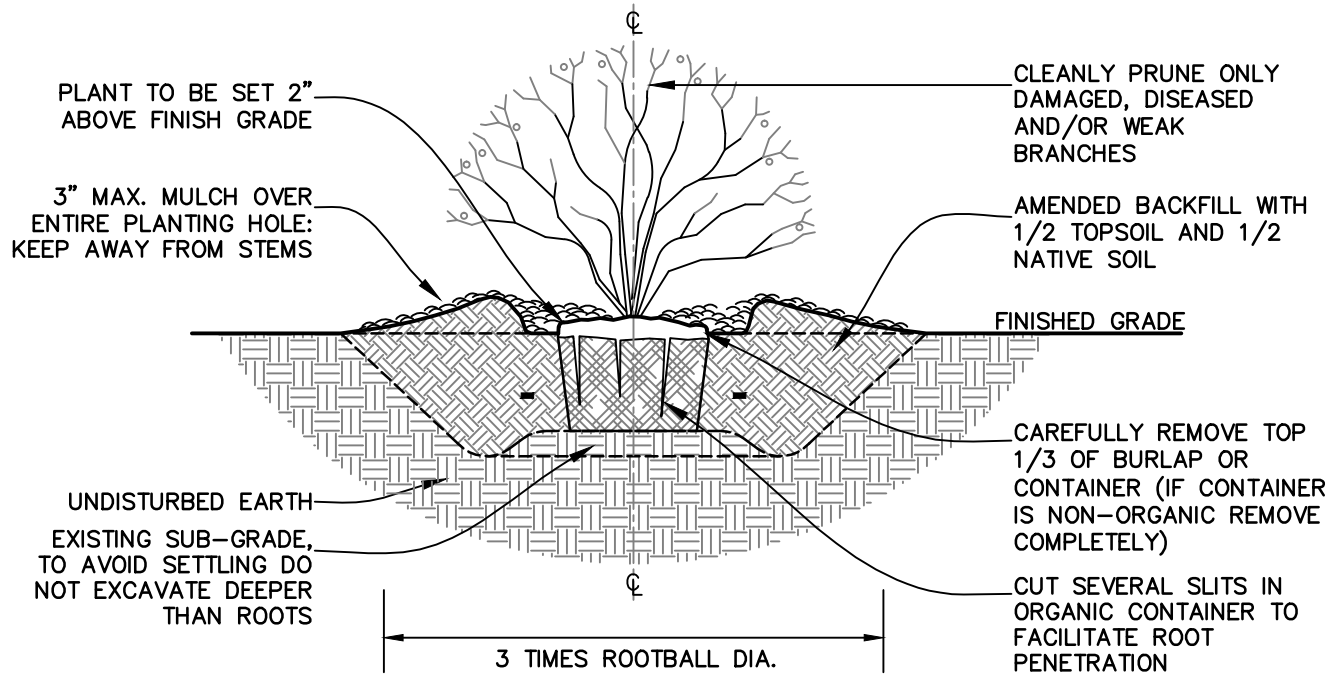


PLANTING DETAIL

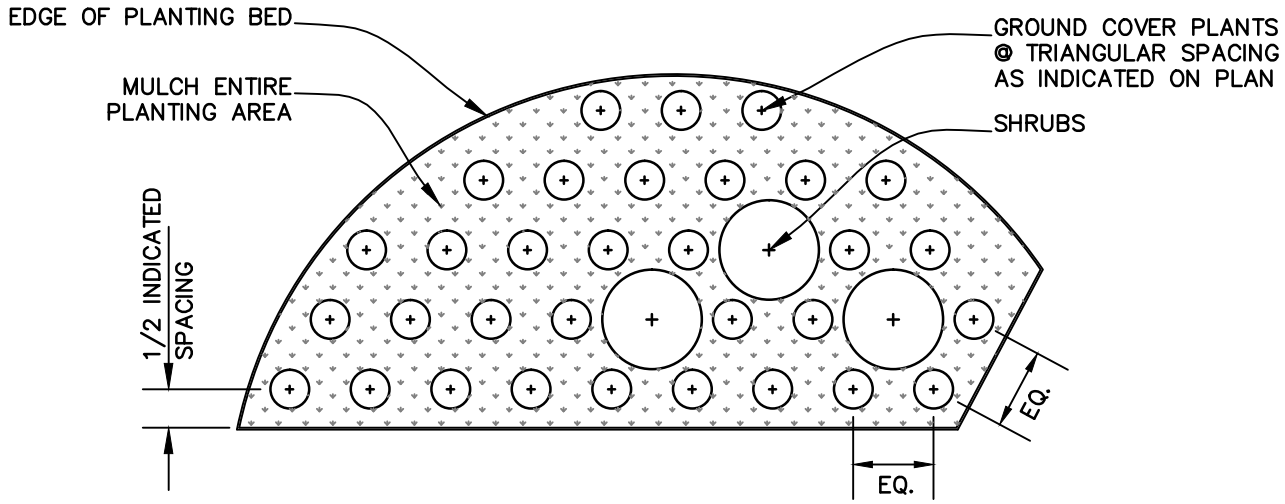
NOTES:

1. REFER TO CITY APPROVED STREET TREE STD. NO. 911 FOR A LIST OF APPROVED TREES WITHIN THE CITY "RIGHT OF WAY".
2. REFER TO STD'S NO. 910 FOR ADDITIONAL STANDARDS AND SPECIFICATIONS FOR LANDSCAPE AND STREETSCAPE REQUIREMENTS.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**TYPICAL DECIDUOUS TREE PLANTING**				STD. NO. **904**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012



SHRUB PLANTING DETAIL

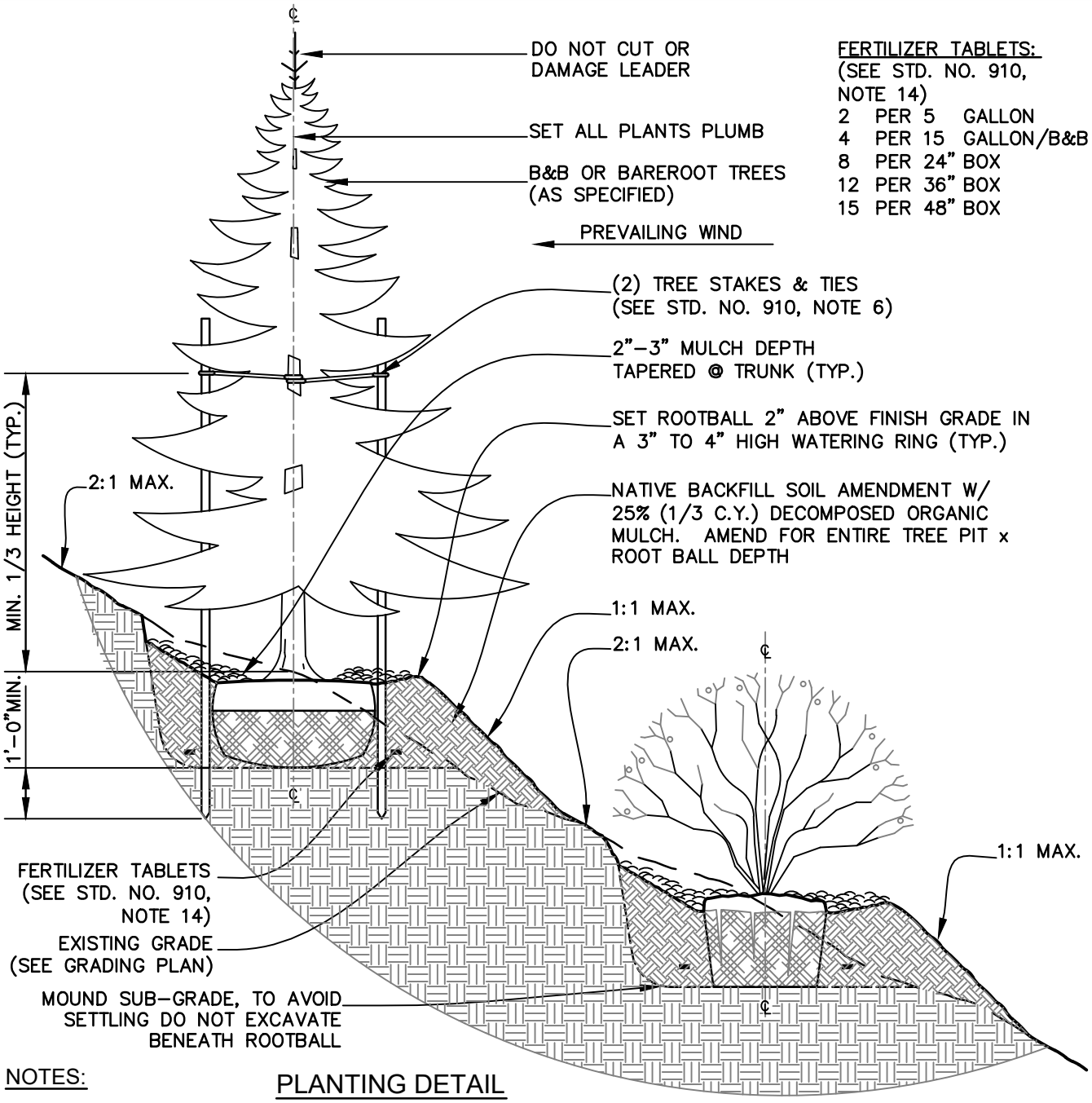


GROUND COVER PLANTING DETAIL

NOTES:

1. ALL CONTAINER PLANTS SHALL BE DUG WITH BOTTOMS LEVEL, THE WIDTH EQUAL TO MINIMUM TWO TIMES THE DIAMETER OF THE ROOT MASS WIDE, BUT NO DEEPER THAN HEIGHT OF THE ROOT MASS.
2. GROUND COVER PLANTS SHALL BE FURNISHED IN POTS. THE PLANTS SHALL BE AT LEAST ONE YEAR OLD, HAVING BEEN GROWING IN POST LONG ENOUGH TO ENSURE SUFFICIENT ROOT GROWTH TO HOLD SOIL IN PLACE WHEN REMOVED FROM THE POT.
3. MAINTENANCE OF PLANTS SHALL BE REQUIRED FROM THE TIME OF PLANTING UNTIL ACCEPTANCE. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, RESETTING PLANTS TO PROPER GRADES OR UPRIGHT POSITION AND REMOVAL OF DEAD MATERIALS. NO PLANT WILL BE ACCEPTED UNLESS THEY SHOW A HEALTHY GROWTH AND SATISFACTORY FOLIAGE CONDITION.
4. PLANTS SHALL BE WATERED AT LEAST TWICE TWICE A WEEK FOR 9 MONTHS EXCEPT DURING THE RAINY SEASON.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**TYPICAL SHRUB AND GROUND COVER PLANTING**	STD. NO. **905**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012



PLANTING DETAIL

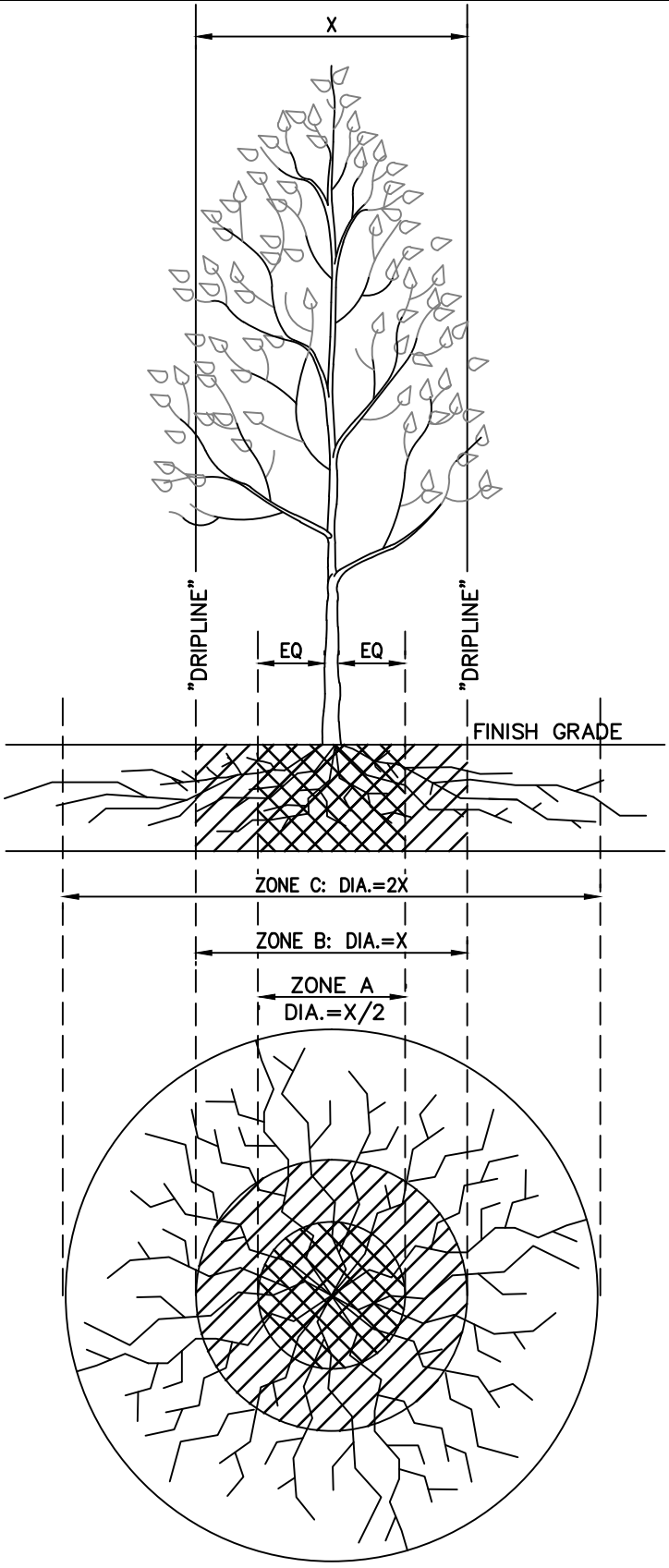
NOTES:

1. STAKE TREES PER STANDARD PLAN NO. 903 AND NOTE 6 ON STD. NO. 910.
2. ONE STAKE PER TREE ON WINDWARD SIDE; SECOND STAKE ON LEEWARD SIDE.
3. SLOPES STEEPER THAN 2:1 MAX. MAY REQUIRE AN APPROVED EMBANKMENT STABILIZATION SYSTEM TO CREATE A LEVEL TREE PIT, SUCH AS: ROCK FACING, PRECAST CONCRETE WALL UNITS, TIMBER WALL, OR MANUFACTURED SLOPE RETENTION UNITS.
4. TREES SHALL BE TIED WITH "CINCH–TIE" TREE TIES. LOOP EACH TIE AROUND TREE LOOSELY TO PROVIDE 1 INCH SLACK FOR DIAMETER GROWTH.
5. SHAPE SOIL TO PROVIDE 3 FT. DIAMETER OR ROOTBALL DIAMETER, WHICHEVER IS GREATER, WATERING RING
6. REMOVE ALL WIRE AND STRING, REMOVE TOP 2/3 OF BURLAP. TO AVOID MOISTURE WICKING DO NOT ALLOW BURLAP TO BE EXPOSED ABOVE SOIL LEVEL.

TREE AND SHRUB PLANTING ON SLOPE

STD. NO. 906

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



FENCING/ROOT PROTECTION

CHAIN LINK FENCING TO BE MAINTAINED AT DRIPLINE.

ENGINEER'S APPROVAL REQUIRED FOR USE/ACCESS WITHIN ZONE B. PERMISSION FOR USE/ACCESS REQUIRES SURFACE PROTECTION FOR ALL UNFENCED, UNPAVED SURFACES WITHIN ZONE B.

*SURFACE PROTECTION MEASURES

1. MULCH LAYER, 6"–8" DEPTH
2. 3/4" PLYWOOD
3. STEEL PLATES

TRENCHING/EXCAVATION

ZONE A (CRITICAL ROOT ZONE)

1. NO DISTURBANCE ALLOWED WITHOUT SITE–SPECIFIC INSPECTION AND APPROVAL OF METHODS TO MINIMIZE ROOT DAMAGE.
2. SEVERANCE OF ROOTS LARGER THAN 2" DIA. REQUIRES ENGINEER'S APPROVAL.
3. TUNNELING REQUIRED TO INSTALL LINES 3'–0" BELOW GRADE OR DEEPER.

ZONE B (DRIPLINE)

1. OPERATION OF HEAVY EQUIPMENT AND/OR STOCKPILING OF MATERIALS SUBJECT TO ENGINEER'S APPROVAL. SURFACE PROTECTION* MEASURES REQUIRED.
2. TRENCHING ALLOWED AS FOLLOWS:
   - EXCAVATION BY HAND OR WITH HAND–DRIVEN TRENCHER MAY BE REQUIRED.
   - LIMIT TRENCH WIDTH. DO NOT DISTURB ZONE A.
   - MAINTAIN 2/3 OR MORE OF ZONE B IN UNDISTURBED CONDITION.
3. TUNNELING MAY BE REQUIRED FOR TRENCHES DEEPER THAN 3'–0".

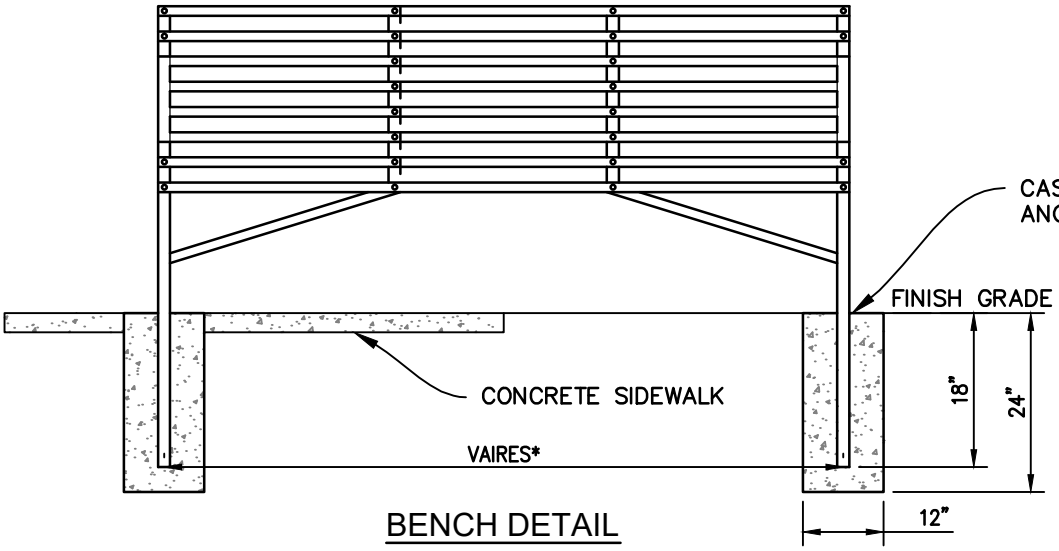
ZONE C (FEEDER ROOT ZONE)

1. OPERATION OF HEAVY EQUIPMENT AND/OR STOCKPILING OF MATERIALS SUBJECT TO ENGINEER'S APPROVAL. SURFACE PROTECTION* MEASURES REQUIRED.
2. TRENCHING WITH HEAVY EQUIPMENT ALLOWED AS FOLLOWS:
   - MINIMIZE TRENCH WIDTH
   - MAINTAIN 2/3 OR MORE OF ZONE C IN UNDISTURBED CONDITION

TREE PROTECTION DURING TRENCHING, TUNNELING, AND EXCAVATION

STD. NO. 907

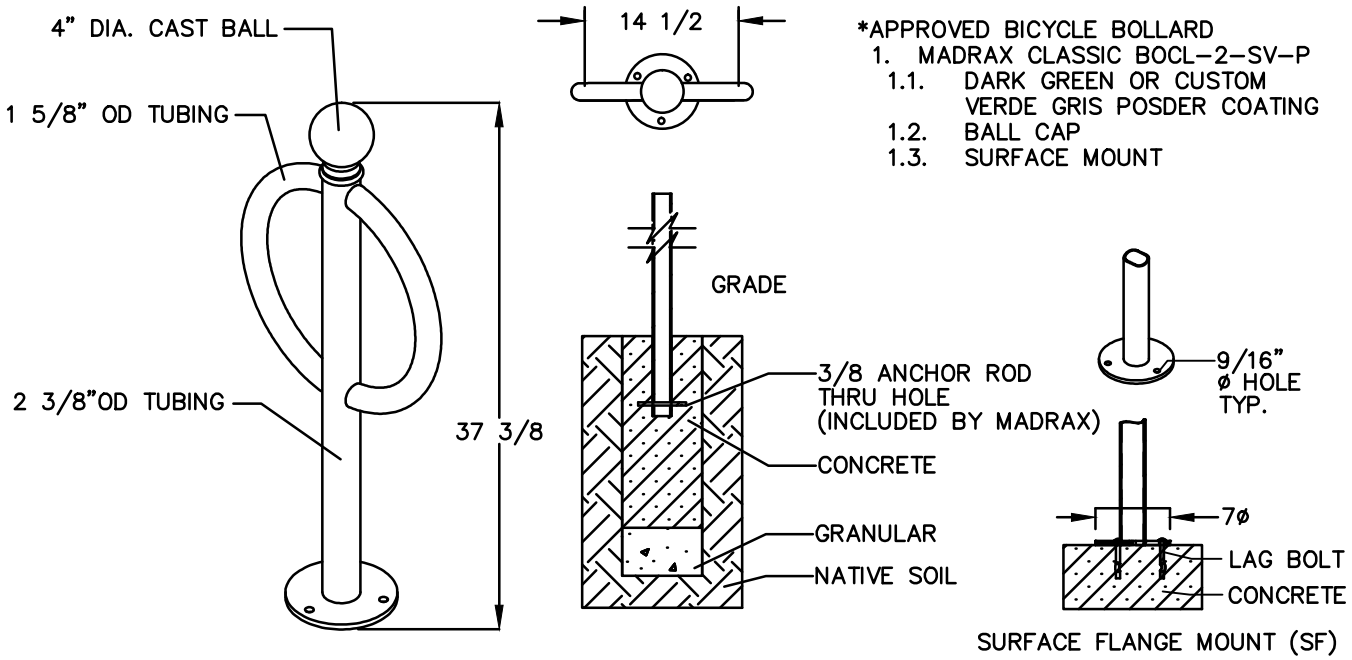
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012



BENCH DETAIL

*APPROVED BENCHES:

1. TIMBERFORM "RESTORATION" SERIES #2118–6
   - 1.1. 6 FEET LENGTH
   - 1.2. ALASKAN YELLOW CEDAR SLATS, KILN DRIED
   - 1.3. DARK GREEN OR CUSTOM VERDE GRIS POWDER COATED CAST IRON FRAME
   - 1.4. OPTIONAL CENTER ARM REST
   - 1.5. OPTIONAL CUSTOM LETTERING AND/OR GRAPHIC
2. VICTOR STANLEY STEELSITES MODEL RB–28
   - 2.1. 6 FEET LENGTH
   - 2.2. METAL SLATS
   - 2.3. DARK GREEN OR CUSTOM VERDE GRIS POWDER COATED STEEL FRAME
   - 2.4. OPTIONAL CENTER ARM REST
   - 2.5. OPTIONAL CUSTOM LETTERING AND/OR GRAPHIC
   - 2.6. RECOMMENDED MATCHING TRASH RECEPTACLE OPTION



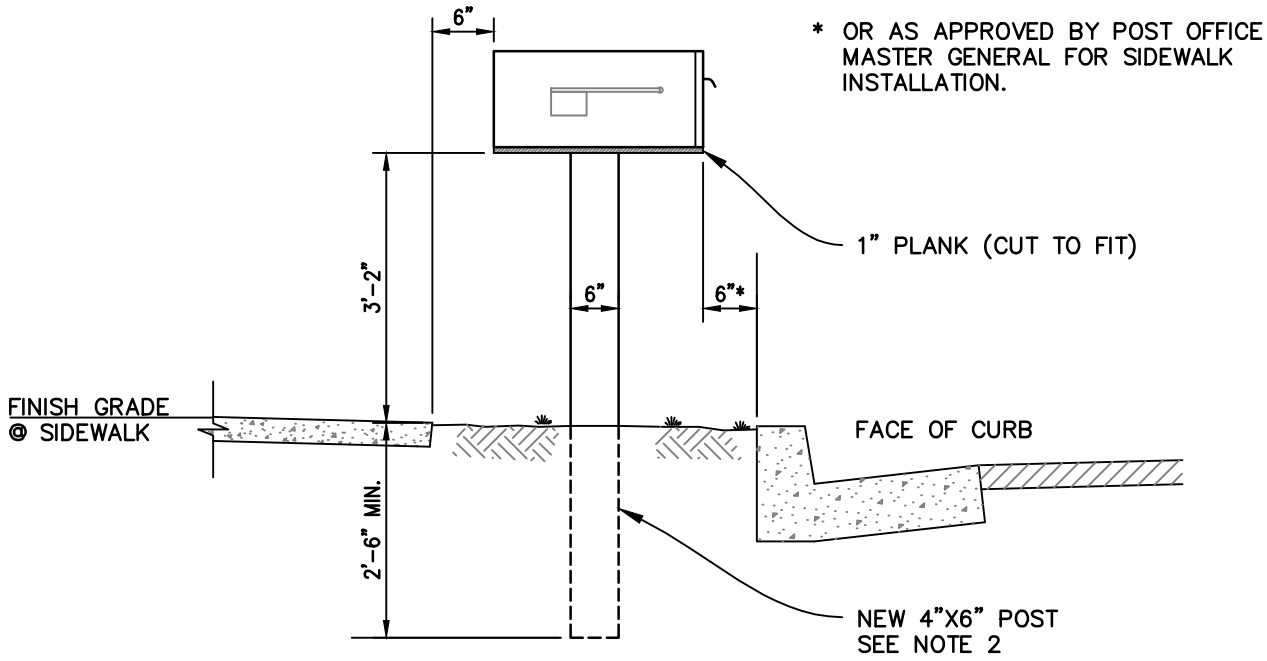
*APPROVED BICYCLE BOLLARD

1. MADRAX CLASSIC BOCL–2–SV–P
   - 1.1. DARK GREEN OR CUSTOM VERDE GRIS POSDER COATING
   - 1.2. BALL CAP
   - 1.3. SURFACE MOUNT

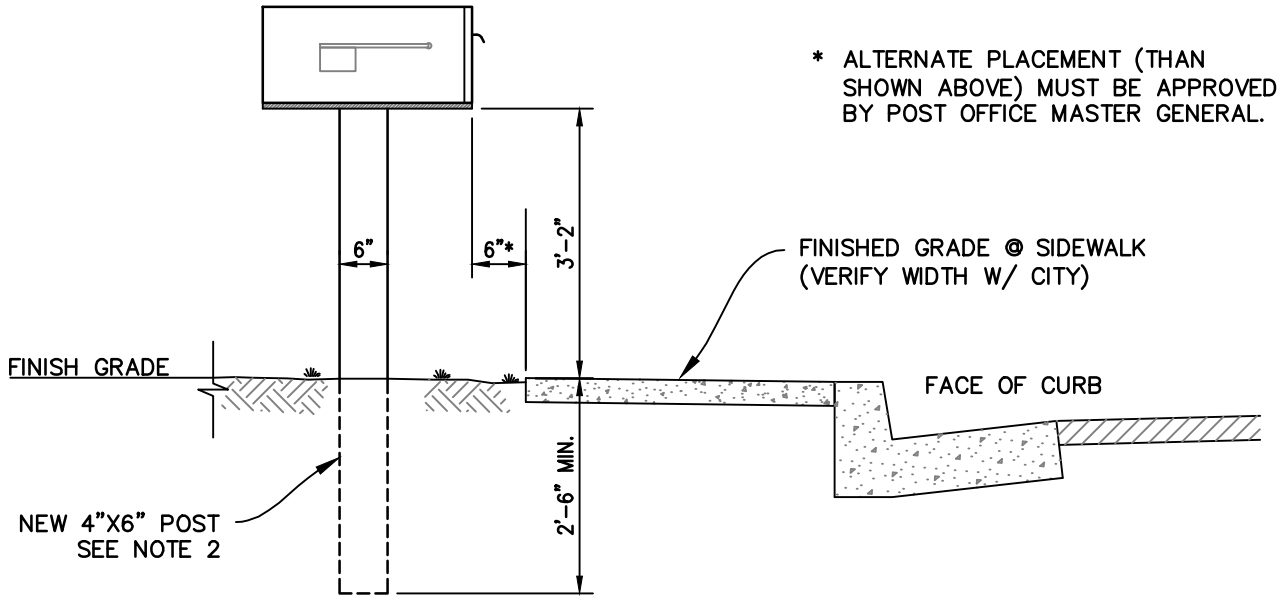
SURFACE FLANGE MOUNT (SF)
SECTION VIEWS

BICYCLE BOLLARD

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**STREET FURNISHINGS**				STD. NO. **908**
SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:		DATE: JUN 2012



MAILBOX LOCATION - BACK OF CURB & GUTTER



MAILBOX LOCATION - BACK OF SIDEWALK (ALTERNATIVE)

NOTES:

1. ALL WOOD TO BE USED SHALL BE PRESSURE TREATED OR CLEAR HEART REDWOOD.
2. AN APPROVED STEEL POST MAY BE USED FOR SIDEWALK INSTALLATION.
3. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

MAILBOX DETAIL

STD. NO. 909

SCALE: NONE	DRAWN: CFB	CHK: MGK	APPVD:	DATE: JUN 2012

GENERAL REQUIREMENTS, OPERATIONS AND GUARANTEES :

1. TREES SHALL BE CONTAINER GROWN (IF AVAILABLE) AND A SIZE NOT LESS THAN 8 FT. IN HEIGHT NOR LESS THAN 1 INCH CALIPER. TREES SHALL BE FREE OF DISEASES AND PEST INFESTATIONS AND SHALL CONFORM TO THE AMERICAN STANDARD FOR NURSERY STOCK. PLANT MATERIAL SHALL BE FIRST CLASS REPRESENTATIVES OF THEIR SPECIES OR VARIETY. A TREE MAY BE REJECTED IF IT IS NOT OF A SHAPE OR CONDITION ACCEPTABLE TO THE CITY.
2. THE TREE SHALL BE PLANTED WITH A MINIMUM 18" DEEP LINEAR ROOT BARRIER PANELS. REFER TO NOTE 8. FOR MANUFACTURER'S SPECIFICATIONS AND REQUIREMENTS FOR INSTALLATION.
3. THE TREE SHALL BE PLANTED IN A HOLE DUG WITH BOTTOMS LEVEL, WITH THE WIDTH 3 TIMES THE DIAMETER OF THE ROOTBALL, AND 3 INCHES LESS THAN THE ROOT BALL DEPTH. THE CITY, UPON 48 HOUR NOTIFICATION, SHALL INSPECT HOLES PRIOR TO PLANTING TREES.
4. INSTALL TWO DEEP WATERING PERFORATED PLASTIC PIPES AS SHOWN. USE HUNTER 18" RZWS WITH CHECK VALVE AND FILTER FABRIC SLEEVE. PROVIDE IRRIGATION AS REQUIRED PER MANUFACTURERS SPECIFICATIONS. ADD VENTED DRAIN INLET CAP (COLOR TO MATCH) ON TOP OF PIPE.
5. TREES SHALL BE PLANTED IN A MIXTURE OF $\frac{1}{2}$ NATIVE SOIL WITH 25% (@ $\frac{1}{3}$ CU.YD.) DECOMPOSED ORGANIC MULCH AMENDMENT FOR ENTIRE TREE PIT AREA X ROOT BALL DEPTH (PROVIDE SAMPLE FOR APPROVAL). INSTALL STRUCTURAL GAP GRADED SOIL (STRUCTURAL SOIL) PER MANUFACTURER'S SPECIFICATIONS. PROVIDE SAMPLE FOR APPROVAL PRIOR TO INSTALLING.
6. TREES SHALL BE STAKED WITH 2 INCH DIAMETER BY 8 FT. MINIMUM LENGTH LODGE POLE PINE STAKES OR EQUAL. TREES SHALL BE TIED WITH MINIMUM "CINCH–TIE 24" TREE TIES. PLACE TIES 6 INCHES HIGHER ON STAKE FROM SUPPORT POINT DETERMINED ON TREE TRUNK. TREES SECURED SHOULD REMAIN ERECT USING NO LESS THAN 2 TIES PER TREE. PROVIDE 1 INCH OF SLACK FOR TRUNK GROWTH.
7. TREES SHALL BE PLANTED A MINIMUM OF 20 FT. APART TO A MAXIMUM OF 50 FT. APART DEPENDING ON THE TYPE OF THE TREE. TREES SHALL BE PLANTED A MINIMUM OF 30 FT. FROM CURB RETURNS, 15 FT. FROM STREET LIGHTS AND 8 FT. FROM DRIVEWAY, SEWER LATERALS AND WATER SERVICES, CABLE, GAS LINES, AND FIRE HYDRANTS, OR AS OTHERWISE NOTED BY THE CITY.
8. "DEEP ROOT" ROOT BARRIER OR APPROVED EQUAL SHALL BE FABRICATED FROM A HIGH DENSITY AND HIGH IMPACT PLASTIC SUCH AS POLYVINYL CHLORIDE, ABS OR POLYETHYLENE AND HAVE A MINIMUM THICKNESS OF 0.08 INCH. THE PLASTIC SHALL HAVE $\frac{1}{2}$ INCH RAISED VERTICAL RIBS ON THE INNER SURFACE SPACED NOT MORE THAN SIX (6) INCHES APART. THE VERTICAL ROOT DEFLECTING RIBS SHALL BE FACING INWARD TO THE ROOT BALL AND THE TOP OF THE DOUBLE EDGE SHALL BE $\frac{1}{2}$ INCH ABOVE SOIL GRADE. EACH PANEL SHALL BE CONNECTED TO FORM A CIRCLE AROUND THE ROOT BALL OR JOINED IN A LINEAR FASHION AND PLACED ALONG THE ADJACENT HARDSCAPE SURFACE.
9. ALL STREET TREES TO BE PLANTED SHALL BE SELECTED FROM THE CURRENT "CITY OF WILLITS" APPROVED STREET TREE LIST. REFER TO STD. NO. 910 FOR CITY APPROVED STREET TREE LIST.
10. THE PROTECTION OF EXISTING VEGETATION: THE EXISTING STREETSCAPE SHALL BE IDENTIFIED IN THE FIELD PRIOR TO CLEARING AND SHALL BE PHYSICALLY PROTECTED THROUGHOUT THE CONSTRUCTION PROCESS. A PLAN SHALL INCORPORATE TREE PROTECTION MEASURES WITH A STURDY PHYSICAL BARRIER, SUCH AS A FENCE, ERECTED A MINIMUM OF 1 FT. OUTSIDE THE DRIPLINE OR A MINIMUM OF 20 FT. FROM THE TREE'S TRUNK, WHICHEVER IS GREATER, ON ALL SIDES. REQUIRED ENGINEERS' APPROVAL FOR USE/ ACCESS INTO THIS ZONE IS NECESSARY FOR SURFACE PROTECTION MEASURES AS IS THE HEALTH AND SAFETY OF THE PUBLIC.
11. ALL TREES PROPOSED WITHIN RIPARIAN CORRIDORS SHALL BE REVIEWED AND APPROVED BY THE CITY'S OFFICIAL TO DETERMINE AND COORDINATE WITH LOCAL SETBACK REQUIREMENTS. ANY NON–NATIVE TREE SPECIES SHALL NOT BE PLACED WITHIN 25 FT. OF UPLAND RIPARIAN CORRIDORS OR 50 FT. OF A FLATLAND RIPARIAN CORRIDOR.
12. SITE FURNISHINGS SUCH AS BENCHES, TRASH RECEPTACLES, AND BIKE RACKS, PUBLIC FOUNTAINS, ETC. SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION AND SHALL BE INCORPORATED INTO THE IMPROVEMENT PLANS FOR NECESSARY UTILITIES AND MAINTENANCE PROGRAM AND SCHEDULES.
13. VERIFY WITH CITY ENGINEER IN EXTREMELY COMPACTED HEAVY CLAY OR FRACTURED SHALE SOILS, TO AUGER AN 8 INCH HOLE 4 FT. TO 6 FT. DEEP. BACKFILL HOLE WITH CRUSHED DRAIN ROCK. FILL PIT WITH 10 GALLONS OF WATER AND CHECK AFTER 24 HRS. TO VERIFY SUFFICIENT DRAINAGE. THIS PROCEDURE IS USED TO PROVIDE ADDITIONAL DRAINAGE TO AN OTHERWISE UNDESIRABLE SOIL/ PLANTING MEDIUM IN ADDITION TO TESTING ADEQUATE PERMEABILITY OF NATIVE SOIL FOR NEW TREE PLANTINGS. IF WATER DOES NOT DRAIN CONSIDER AN ALTERNATE LOCATION.
14. PROVIDE THE FOLLOWING SLOW–RELEASE FERTILIZER TABLETS: 20–10–5 TWO–YEAR TREE FEEDING TABLET AS SUGGESTED AT PLANTING. USE AGRI–TAB "AGSAFE" PLANTING TABLETS OR APPROVED EQUAL PER PLANTING DETAILS.
15. TREES THAT SHOW FAILURE FROM PLANTING OPERATIONS AFTER 90 DAYS OF CITY ACCEPTANCE TREES SHALL BE REPLACED AS SPECIFIED AND GUARANTEED AS ORIGINAL PLANT MATERIAL.

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**SPECIFICATIONS FOR STREETSCAPE AND LANDSCAPE STANDARDS**	STD. NO. **910**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012

STANDARD STREET FURNISHINGS :

16. SEE STANDARD 908 FOR APPROVED BENCH AND BICYCLE BOLLARD
17. APPROVED NEWS RACKS
 17.1. SHO-RACK BY KASPAR WIRE WORKS, "CONCOURSE" MODEL
  17.1.1. METAL INTEGRATED MODULAR DESIGN WITH 2, 4, OR 6 NEWS BOXES, PEDESTAL SURFACE MOUNT
  17.1.2. DARK GREEN OR CUSTOM VERDE GRIS POWDER COATING
 17.2. EQUIVALENT: K-JACK "THE STACKER
 17.3. CUSTOM OPTION: CITY OF VENTURE STYLE CABINET BY LNI CUSTOM MANUFACTURING
  17.3.1. HIP ROOF DESIGN
  17.3.2. DARK GREEN OR CUSTOM VERDE GRIS POWDER COATING
18. APPROVED TRASH AND RECYCLING RECEPTACLE
 18.1. TIMBERFORM CRAFTSMAN #2667
  18.1.1. OPTIONAL ASH/DOME TOP
  18.1.2. DOES NOT HAVE SIDE ACCESS
  18.1.3. OPTIONAL CUSTOM LETTERING AND/OR GRAPHIC
  18.1.4. DARK GREEN OR CUSTOM VERDE GRIS POWDER COATING
 18.2. OPTION (WITH SIDE ACCESS): VICTOR STANLEY SD-42
  18.2.1. METAL RIBBING WITH DARK GREEN OR CUSTOM VERDE GRIS POWDER COATING
  18.2.2. HAS SIDE DOOR
  18.2.3. MATCHING BENCH OPTION
19. APPROVED TREE GRATE
 19.1. 4'X6' STREET TREES AND 4'X4' CORNER ACCENT TREES
 19.2. ADA COMPLIANT
 19.3. "BARE" SELF-OXIDIZING FINISH ON ALL GRATES (OPTION 1)
 19.4. BLACK OR DARK GREEN POWDER COATED FINISH (OPTION 2)
 19.5. APPROVED HISTORIC/ORNATE MODEL/MANUFACTURER
  19.5.1. DTN STYLE BY OLYMPIC FOUNDRY
  19.5.2. LP STYLE BY OLYMPIC FOUNDRY
  19.5.3. LPT STYLE BY OLYMPIC FOUNDRY
  19.5.4. CNK STYLE BY OLYMPIC FOUNDRY
 19.6. APPROVED CONTEMPORARY MODEL/MANUFACTURER
  19.6.1. MARINA BY IRONSMITH (WATER THEME)
  19.6.2. STA STYLE BY OLYMPIC FOUNDRY
 19.7. APPROVED CUSTOM OPTION MODEL/MANUFACTURER
  19.7.1. SALMON GRATE BY OLYMPIC FOUNDRY
  19.7.2. OTHER CUSTOM FISH/LAKE/BOAT DESIGN

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888	**SPECIFICATIONS FOR STREETSCAPE AND LANDSCAPE STANDARDS**	STD. NO. **910**
SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD:		DATE: JUN 2012

THE FOLLOWING IS A LIST OF APPROVED STREET TREES PREPARED IN ACCORDANCE WITH THE LANDSCAPE AND STREETSCAPE DESIGN STANDARDS. ALL TREE SPECIES SHALL BE APPROVED BY A CITY OFFICIAL PRIOR TO PLANTING AND SHALL BE PLANTED IN CONFORMANCE WITH THESE GUIDELINES. SPECIES OTHER THAN THOSE LISTED IN THIS STANDARD MAY BE APPROVED BY THE CITY WITH SUFFICIENT DOCUMENTATION ON CLIMATE, DISEASE, WATER USE, AND PLANTING AND CARE REQUIREMENTS.

2'–3' PLANTER 20'–25' TALL	ACER BUERGERANUM (TRIDENT MAPLE) ♥ ACER CAMPESTRE (HEDGE MAPLE)♥ ACER CIRCIRNATUM (VINE MAPLE)♥ ACER DAVIDII (DAVID'S MAPLE)♥ ACER GINNALA (AMUR MAPLE)♥ CRATAEGUES PHANEOPYRUM (WASHINGTON THORN)♥♠ LAGERSTOEMIA INDICA 'MUSKOGEE' (CREPE MYRTLE)♥♠ TRISTANIA LAURINA 'ELEGANT'♣
3'–4' PLANTER & 4x4 WELLS 25'–30' TALL	ACER RUBRUM 'ENDOWMENT' (RED MAPLE)♥ ACER PALMATUM (JAPANESE MAPLE: NO VARIETIES)♥ CARPINUS BETULUS 'FASTIGIATA' (PYRAMIDAL EUROPEAN HORNBEAM)♥ CHIONANTHUS RETUSA (CHINESE FRINGE TREE)♠ PYRUS CALLERYANA 'JACK' (ORNAMENTAL PEAR)♥♠ LAURUS 'SARATOGA' (HYBRID LAUREL)♣ MALUS 'STERILE VARIETIES' (CRABAPPLE)♠
4'–5' PLANTER 30'–40' TALL	ACER RUBRUM 'VARIETIES' (RED MAPLE)♥ AESCULUS CARNEA (RED HORSECHESTNUT)♠ GINKGO BILOBA 'SARATOGA' (SARATOGA GINKGO)♥ PISTACIA CHINENSIS (CHINESE PISTACHE)♥
5'–6' PLANTER 40'–45' TALL	ACER FREEMANII (AUTUMN BLAZE MAPLE)♥ ACER PSEUDOPATANUS (SYCAMORE MAPLE) CELTIS OCCIDENTALIS (COMMON HACKBERRY) FRAXINUS HOLOTRICHA 'MORAINE' (MORAINE ASH)♥ WASHINGTON ROBUSTA (MEXICAN FAN PALM) ULMUS PARVIFOLIA (LACEBARK ELM)♥
6'–8' PLANTER 50' TALL	CALOCEDRUS DECURRENS (INCENSE CEDAR)♣ CELTIS AUSTRALIS (EUROPEAN HACKBERRY)♥ CELTIS SINENSIS (CHINESE HACKBERRY)♥ GINKGO BILOBA 'AUTUMN GOLD' (AUTUMN GOLD GINKGO)♥ QUERCUS ILEX (HOLLY OAK)♣ QUERCUS SUBER (CORK OAK)♣
> 8' PLANTER 50'–60' TALL	QUERCUS RUBRA (RED OAK)♥ QUERCUS DOUGLASII (BLUE OAK)♣ ZELKOVA SERRATA 'VILLAGE GREEN' (ZELKOVA)♥♠

♣=EVERGREEN ♠=FLOWERING ♥=FALL COLOR

CITY OF LAKEPORT INCORPORATED APRIL 30, 1888

STREET TREE LIST

STD. NO. 911

SCALE: NONE | DRAWN: CFB | CHK: MGK | APPVD: | DATE: JUN 2012

APPENDIX A

STANDARD DEED FORMS
& PARCEL/FINAL MAP CERTIFICATES

GRANT DEED

EASEMENT DEED

PUBLIC UTILITY EASEMENT DEED

TEMPORARY CONSTRUCTION EASEMENT DEED

PARCEL/FINAL MAP CERTIFICATES

WHEN RECORDED RETURN TO:

CITY OF LAKEPORT
CITY CLERK
225 PARK STREET
LAKEPORT, CA 95453

GRANT DEED

(Insert names of entity or person(s) granting easement)

GRANT (S) TO

THE CITY OF LAKEPORT, A MUNICIPAL CORPORATION

All that Real Property situated in the County of Lake, State of CALIFORNIA, and described as follows:

SEE EXHIBIT "A" ATTACHED HERETO
AND BY REFERENCE MADE A PART HEREOF.

By: _____ Date: _____

By: _____ Date: _____

A notary certificate is required.

CERTIFICATE OF ACCEPTANCE	
This is to certify that the interest in real property conveyed above is hereby accepted by order of the Council of the City of Lakeport pursuant to Council Resolution/Ordinance No. _____ , dated _____ , 20 ___, and Grantee consents to recordation thereof by its duly authorized officer. Recording of this document is requested for and on behalf of the City of Lakeport pursuant to Section 6103 of the Government Code.	**CITY OF LAKEPORT,** **A Municipal Corporation** By: _____ Title: _____ Date: _____

NOTARY CERTIFICATE

STATE OF_____

COUNTY OF_____

On _____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument, the person(s), or entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

WHEN RECORDED RETURN TO:

CITY OF LAKEPORT
CITY CLERK
225 PARK STREET
LAKEPORT, CA 95453

EASEMENT DEED

(Insert names of entity or person(s) granting easement)

GRANT (S) TO

THE CITY OF LAKEPORT, A MUNICIPAL CORPORATION

An easement with a right of immediate entry and continued possession for construction, improvement, maintenance, repairs, operation and replacement of (***describe facility***) more particularly described as follows:

SEE EXHIBIT "A" ATTACHED HERETO
AND BY REFERENCE MADE A PART HEREOF.

By: _____ Date: _____

By: _____ Date: _____

A notary certificate is required.

CERTIFICATE OF ACCEPTANCE	
This is to certify that the interest in real property conveyed above is hereby accepted by order of the Council of the City of Lakeport pursuant to Council Resolution/Ordinance No. _____ , dated _____ , 20 ___, and Grantee consents to recordation thereof by its duly authorized officer. Recording of this document is requested for and on behalf of the City of Lakeport pursuant to Section 6103 of the Government Code.	**CITY OF LAKEPORT,** **A Municipal Corporation** By: _____ Title: _____ Date: _____

NOTARY CERTIFICATE

STATE OF_____

COUNTY OF_____

On _____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument, the person(s), or entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

WHEN RECORDED RETURN TO:

CITY OF LAKEPORT
CITY CLERK
225 PARK STREET
LAKEPORT, CA 95453

EASEMENT DEED

(Insert names of entity or person(s) granting easement)

GRANT (S) TO

THE CITY OF LAKEPORT, A MUNICIPAL CORPORATION

An easement with a right of immediate entry and continued possession for construction, improvement, maintenance, repairs, operation and replacement, for public utility purposes, including but not limited to electricity, gas, sewer and water facilities, storm drains, sidewalks, telephone, cable television, and for such other public or public utility purposes as the City of Lakeport may choose to make and over, upon, across, through and beneath that certain real property situated in the County of Lake, State of California, described as follows:

SEE EXHIBIT "A" ATTACHED HERETO
AND BY REFERENCE MADE A PART HEREOF.

By: _____ Date: _____

By: _____ Date: _____

A notary certificate is required.

CERTIFICATE OF ACCEPTANCE	
This is to certify that the interest in real property conveyed above is hereby accepted by order of the Council of the City of Lakeport pursuant to Council Resolution/Ordinance No. _____ , dated _____ , 20 ___, and Grantee consents to recordation thereof by its duly authorized officer. Recording of this document is requested for and on behalf of the City of Lakeport pursuant to Section 6103 of the Government Code.	**CITY OF LAKEPORT,** **A Municipal Corporation** By: _____ Title: _____ Date: _____

NOTARY CERTIFICATE

STATE OF_____

COUNTY OF_____

On _____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument, the person(s), or entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

WHEN RECORDED RETURN TO:

CITY OF LAKEPORT
CITY CLERK
225 PARK STREET
LAKEPORT, CA 95453

EASEMENT DEED

(Insert names of entity or person(s) granting easement)

GRANT (S) TO

THE CITY OF LAKEPORT, A MUNICIPAL CORPORATION

A temporary construction easement with a right of immediate entry for construction, improvement, and repairs, described as follows:

SEE EXHIBIT "A" ATTACHED HERETO
AND BY REFERENCE MADE A PART HEREOF.

Said Temporary Construction shall terminate on **(*Insert Timeframe*)**

By: _____ Date: _____

By: _____ Date: _____

A notary certificate is required.

CERTIFICATE OF ACCEPTANCE	
This is to certify that the interest in real property conveyed above is hereby accepted by order of the Council of the City of Lakeport pursuant to Council Resolution/Ordinance No. _____ , dated _____ , 20 ___, and Grantee consents to recordation thereof by its duly authorized officer. Recording of this document is requested for and on behalf of the City of Lakeport pursuant to Section 6103 of the Government Code.	**CITY OF LAKEPORT,** **A Municipal Corporation** By: _____ Title: _____ Date: _____

NOTARY CERTIFICATE

STATE OF_____

COUNTY OF_____

On _____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument, the person(s), or entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

City of Lakeport

PARCEL & FINAL MAP CERTIFICATES

OWNER'S STATEMENT
(Final Map/Parcel Map)

(I / We) hereby state that (I / we) (am / are) the owner(s) of and have the right, title, and interest in and to the real property included within the subdivision shown upon this map, and (I / we) (am / are) the only person(s) whose consent is necessary to pass clear title to said property, and (I / we) consent to the making and filing of said map of the subdivision shown within the border lines, and hereby dedicate for public use the *(Avenues, Courts, Drives, Roads, Streets, Easements and Public Utility Easements)* as shown hereon.

No building or other structure shall be erected nearer to the street lines than the distances indicated by the building setback lines shown hereon.

_____ _____
(Owner's Name) Date

The information shown within the parentheses will vary with each map.

Requires Notary Public Certificate.

TRUSTEE'S CERTIFICATE

_____, a _____ corporation, Trustee under a Deed of Trust recorded as Document No. _____, Official Records of Lake County, against the land herein shown, consents to the making and filing of this Map.

In witness whereof, said corporation has caused its name to be affixed this _____ day of _____ _____, 20___.

By: _____ By: _____

Title _____ Title _____

Requires Notary Public Certificate

PARCEL & FINAL MAP CERTIFICATES

OWNERS OF INTEREST
(Final and Parcel Maps)

Signatures of owners of the following easements have been omitted under the provisions of Section 66436 of the Subdivision Map Act; their interest is such that it cannot ripen into a fee title and such signatures are not required by the governing body:

NAME	RECORDED	NATURE OF EASEMENT
_____	Bk.____ Pg.___	_____
_____	Doc._____	_____

SURVEYOR'S OR ENGINEER'S STATEMENT
(Final Map/Parcel Map)

This map was prepared by me or under my direction and is based on a field survey in conformance with the requirements of the Subdivision Map Act and local ordinance at the request of _____ in the month of _____, 20___, and that the monuments shown hereon are sufficient to enable the survey to be retraced and that said monuments will be placed within one year of the filing of this map. I hereby state that this map substantially conforms to the conditionally approved tentative map, if any.

Security in the amount of $ _____ has been filed to assure such placing.

Date:_____, 20___

_____
Surveyor's or Engineer's Name & L.S. or R.C.E. No.

SURVEYOR'S OR ENGINEER'S STATEMENT
(Parcel Map Based on Record Data)

This map was prepared by me or under my direction and was compiled from record data in conformance with the requirements of the Subdivision Map Act and local ordinance at the request of _____ in the month of _____ , 20___. I hereby state that this map substantially conforms to the conditionally approved tentative map, if any.

Date: _____, 20___

_____
Surveyor's or Engineer's Name & L.S. or R.C.E. No.

PUBLIC UTILITY EASEMENT STATEMENT
(For Use on All Subdivision Maps When a PUE is Dedicated)

A public utility easement is an easement to construct, install, inspect, maintain, replace, remove and use facilities of the type hereinafter specified, including but not necessarily be limited to the following:

Construct curb, gutter and sidewalk, installation of transmission and distribution facilities such as electrical, gas, water, telephone, cable television, sewer, street lighting, drainage, roadway, landscaping; also uses for pedestrian, equestrian, and non-powered vehicle purposes.

Said easement shall also include the right to excavate or fill the easement for the full width and to a reasonable depth thereof.

IMPROVEMENT CERTIFICATE
(For Use on Parcel Maps)

The following improvements shall be constructed prior to the issuance of a permit or other grant of approval for the development of any parcel shown on this map in accordance with Section 66411.1 of the Subdivision Map Act: *(List Improvements)* _____. All improvements shall be constructed in accordance with the approved plans on file in the office of City Engineering.

The information shown within the parentheses will vary with each map.

CITY ENGINEER'S STATEMENT
(For Use on All Subdivision Maps)

I do hereby state that this Subdivision Map, consisting of _____ sheets, this statement being on sheet one thereof, has been examined by me and that the subdivision, as shown upon said map, is substantially the same as said subdivision appeared on the approved or conditionally approved tentative map and any approved amendments thereof, and that all provisions of the Subdivision Map Act of the State of California and amendments thereto and of any local ordinances applicable at the time of approval of the tentative map have been complied with.

_____ _____

City Engineer Date

I do hereby state that I have examined this Subdivision Map on behalf of the City Engineer of the City of Lakeport, and I am satisfied that this map is technically correct.

_____ _____

City Surveyor Date

PARCEL & FINAL MAP CERTIFICATES

PLANNING COMMISSION CERTIFICATE

I hereby certify that this map has been examined by me and was found to substantially conform to the tentative map approved by the Planning Commission of the City of Lakeport on _____ 20___.

_____ _____

Planning Commission, City of Lakeport Date
County of Lake, State of California

CITY TREASURER'S CERTIFICATE

I the City Treasurer, in and for the City of Lakeport, State of California, do hereby certify that there are no liens for unpaid City taxes against the tract of land hereon shown, or any part thereof, except those not payable, and I further certify that there are no special assessments against said tract of land that are unpaid, except those estimated to total $_____, which constitute a lien against the property, but which are not yet due and payable and can or may be paid in full.

_____ _____

City Treasurer, City of Lakeport Date
County of Lake, State of California

CITY CLERK'S CERTIFICATE

I hereby certify that the City Council of the City of Lakeport, State of California, on the _____ day of _____, 20___, by Minute Order regularly passed and entered in the Minutes of said Council, did approve this map and accept, subject to improvement for public use, *(Avenues, Courts, Drives, Roads, Streets, etc., and public easements)* as shown hereon.
*

_____ _____

Clerk of the City of Lakeport Date
County of Lake, State of California

* Should there a vacation of right-of-way or easement to be approved with the map, insert the following:

Pursuant to Government Code Section 66499.20 1/2 the following public right-of-way and easements located within this subdivision are hereby vacated:

(DESCRIPTION) _____ *(DOCUMENT NO. OR MAP)*

The information shown within the parentheses will vary with each map.

PARCEL & FINAL MAP CERTIFICATES

COUNTY CLERK'S CERTIFICATE

I certify that all bonds, money or negotiable bonds required under the provisions of the Subdivision Map Act to secure payment of taxes and assessments have been filed with and approved by the Board of Supervisors of the County of Lake, namely bond(s) under Government Code Sections 66493(a) and 66493(c) in the sum of $_____ and $_____ respectively.

_____ _____

Clerk of the Board of Supervisors Date
County of Lake, State of California

COUNTY TAX COLLECTOR'S CERTIFICATE

According to the records in the office of the undersigned, there are no liens against this subdivision, or any part thereof, for unpaid state, county, municipal or local taxes, or special assessments collected as taxes and not yet payable. My estimate of taxes and special assessments collected as taxes and not yet payable is $_____. The land in said subdivision is not subject to a special assessment or bond, which may be paid in full. Security required pursuant to Government Code Sections 66493(a) and 66493(c) are hereby accepted and approved.

_____ _____

Tax Collector Date
County of Lake, State of California

COUNTY RECORDER'S CERTIFICATE

Filed this _____ day of _____, 20___, at _____.m. in Book _____ of Maps at Page(s) _____, at the request of the City of Lakeport

Fee of $_____ Document No. _____

Signed: _____ _____

County Recorder Deputy
Lake County, California

ACKNOWLEDGEMENT

STATE OF_____

COUNTY OF_____

On _____, before me, _____, a Notary Public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument, the person(s), or entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)