

RESOLUTION NO. 2014-081

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ROHNERT PARK ADOPTING REVISED MANUAL OF STANDARDS, DETAILS AND SPECIFICATIONS FOR WATER, STREETS AND ROADWAY SYSTEMS

WHEREAS, the City Council of the City of Rohnert Park adopted the "Manual of Standards, Details and Specifications" (the "Standards") on January 10, 2006, by Resolution No. 2006-19;

WHEREAS, the City Council of the City of Rohnert Park adopted the Bicycle Parking Standards adding to the Standards on November 28, 2006, by Resolution No. 2006-275;

WHEREAS, the City Council of the City of Rohnert Park adopted the Revised Sewer Standards on January 26, 2010, by Resolution No. 2010-08;

WHEREAS, the City Council of the City of Rohnert Park adopted the Revised Water and Streets Standards on March 22, 2011, by Resolution No. 2011-27;

WHEREAS, materials and methods for construction have improved significantly;

WHEREAS, new storm drain requirements for Low Impact Design are required by our Municipal Storm Water Permit;

WHEREAS, City Staff and the Professional Engineering community propose updating the Standards; and

WHEREAS, updating and improving the Standards will ensure that new construction is of the highest quality, therefore minimizing maintenance costs.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Rohnert Park that it does hereby adopt the revised Manual of Standard, Details and Specifications for the Water, Streets and Roadway systems in substantially similar form as attached hereto and incorporated herein as Exhibit A and further described as follows:

1. Volume 1, Chapter 3, Storm Drain Design Standards as shown on the attached revisions
2. Volume 1, Chapter 4, Street and Roadways Design Standards as shown on the attached revisions
3. Volume 1, Chapter 5, Traffic Design Standards as shown on the attached revisions
4. Volume 1, Chapter 6, Street Lighting Design Standards as shown on the attached revisions
5. Volume 2, Chapter 3, Storm Drain Detail Drawings as shown on the attached revisions
6. Volume 2, Chapter 4, Street and Roadways Design Standards as shown on the attached revisions
7. Volume 2, Chapter 5, Traffic Detail Drawings as shown on the attached revisions
8. Volume 2, Chapter 6, Street Lighting Detail Drawings as shown on the attached revisions
9. Volume 3, Construction Specifications, Section 63, Cast-in-Place Pipe of the Standard Specifications is deleted

BE IT FURTHER RESOLVED that except as otherwise specified herein, the Manual of Standards, Details and Specifications shall remain unchanged and in full effect.


BE IT FURTHER RESOLVED that adoption of these revised standards is exempt from the application of the California Environmental Quality Act because it involves minor alteration of existing facilities under CEQA Guidelines Section 15301 and the common sense exemption as it can be seen with certainty that adoption of these revised standards will not have a significant impact on the environment.

BE IT FURTHER RESOLVED that the City Clerk is hereby authorized and directed to keep on file the revised Water, Streets and Roadway Standards dated as of June 2014 in the Manual of Standards, Details and Specifications on behalf of the City of Rohnert Park.

DULY AND REGULARLY ADOPTED this 8th day of July 2014.



CITY OF ROHNERT PARK


Joseph T. Callinan, Mayor

ATTEST:

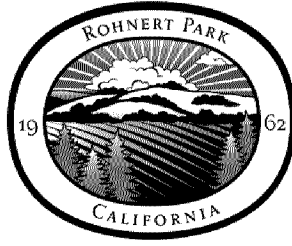

JoAnne M. Buerger, City Clerk

Attachments: Exhibit A

BELFORTE: AYE MACKENZIE: AYE STAFFORD: AYE AHANOTU: AYE CALLINAN: AYE
AYES: (5) NOES: (0) ABSENT: (0) ABSTAIN: (0)

Exhibit A includes:

1. Volume 1, Chapter 3, Storm Drain Design Standards as shown on the attached revisions
2. Volume 1, Chapter 4, Street and Roadways Design Standards as shown on the attached revisions
3. Volume 1, Chapter 5, Traffic Design Standards as shown on the attached revisions
4. Volume 1, Chapter 6, Street Lighting Design Standards as shown on the attached revisions
5. Volume 2, Chapter 3, Storm Drain Detail Drawings as shown on the attached revisions
6. Volume 2, Chapter 4, Street and Roadways Design Standards as shown on the attached revisions
7. Volume 2, Chapter 5, Traffic Detail Drawings as shown on the attached revisions
8. Volume 2, Chapter 6, Street Lighting Detail Drawings as shown on the attached revisions
9. Volume 3, Construction Specifications, Section 63, Cast-in-Place Pipe of the Standard Specifications is deleted



City of Rohnert Park

Storm Drain Design Standards

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Design Standards

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ENGINEER'S LIST OF APPROVED ITEMS
for use with Storm Drain Design Standards
Approved _____ Date _____

Standard 400 – Standard Precast Concrete Storm Drain Manhole

Central Precast Products Drawing No. 20-48C, 20-48E, and 20-60EC
KriStar Enterprises, Inc., Model No. DD-48 & DD-60 series bases, riser and cones

Standard 401 – Precast Concrete Storm Drain Manhole Reducer Slabs

Central Precast Products Drawing NO. 20-48ERS, 20-60ERS, and 20-60CRS
KriStar Enterprises, Inc., Model No. DD-48 & DD-60 series slab reducers

Standard 402 and 405 – Type II Catch Basin

Central Precast Products Model NO. 4A and 3L
KriStar Enterprises, Inc., Model No. P2448CI & DD-P2448B

Standard 403 – Type I Catch Basin *(Note: Approval by variance required)*

Central Precast Products Model No. 3K base and 3K frame and grate (H2O, bicycle proof)
Central Precast Products Model A2 or A4

Standard 404 – Storm Drain Gallery

Central Precast Products Model 6Y and 12Y

Standard 406B – 3" x 12 ½" Sidewalk Drain

Alhambra Foundry Model A-470 size - 3" x 12 ½"

Standard 408 – Side Opening Drop Inlet

Central Precast Products Drawing NO. DI-SO (model 2K or larger) H20 rated with side openings and ¼" galvanized checker-plate cover
KriStar Enterprises, Inc., P24 or larger drop inlets with side openings and ¼" galvanized checker-plate cover.

Standard 409 – "No Dumping" Label

Almetek's MET AL Storm Drain Markers SDS4R0331BLNAH; blue, stainless steel, all copy embossed, square punched center hole

PREFACE

Quick Reference Sheets

These standards have been prepared to assist developers and their engineers in the design of public storm drain facilities. To assist those engineers who are familiar with these standards, quick reference sheets are provided in this Preface section. The quick reference sheets contain design criteria and data from the standards which are most commonly used in the design of public storm drain facilities. Unless otherwise noted, hydrological and hydraulic standards are consistent with the Sonoma County Water Agency Flood Control Design Criteria Manual, Revised August 1983.

Quick reference sheets are provided for the following subjects:

1. Hydrology
2. Hydraulics
3. Design Requirements

QUICK REFERENCE SHEET HYDROLOGY

<i>Waterway Classification</i>	<i>Drainage Area, Square Miles</i>	<i>Recurrence Interval, Years</i>
Major	34	100
Secondary	1–4	25
Minor	>1	10
Diversion	Not applicable	100

$Q = CIAK$

where:

Q = flow (cubic feet per second)

C = runoff coefficient

I = rainfall intensity

A = drainage area (acres)

K = mean seasonal precipitation = 1.1 for small Rohnert Park drainage areas. For large drainage areas, minor and above, see Sonoma County Water Agency Standards.

Initial Time of Concentration (T_c)

<u><i>Land use</i></u>	<u><i>T_c</i></u>
Commercial/industrial/residential with more than 8 units per acre	7 minutes
Residential, 2 to 8 units per acre	10 minutes
Residential, less than 2 units per acre	15 minutes
Open Space	15 minutes

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QUICK REFERENCE SHEET HYDRAULICS

<i>Design Waterway Classification</i>	<i>Downstream Waterway Classification</i>	<i>Design Flow in Downstream Waterway, Years</i>
Secondary	Major	25
Minor	Major or secondary	10
Surface (ground)	Major or secondary	100
Diversion	Not applicable	100

Manning's formula

$$Q = \frac{1.49}{n}(A)(R^{2/3})(S^{1/2})$$

Manning's formula coefficient (n)

<i>Material</i>	<i>Manning's "n"</i>
Storm drain pipe [high density polyethylene pipe (HDPE) and reinforced concrete pipe (RCP)]	0.014
Concrete-lined channel	
Asphaltic concrete	0.015
Grouted rock rip rap	0.017
Loose rock rip rap	0.030
Grass-lined channel	0.035
Constructed natural waterway	0.035 minimum 0.050 minimum

Minimum design flow velocity = 2.5 feet per second

<i>Waterway Classification</i>	<i>Waterway Type</i>	<i>Minimum Freeboard</i>
All	Open channel	1.5 feet or 20 percent of specific energy (whichever is greater)
Major and secondary	Closed conduit	0.2 x diameter
Minor	Closed conduit	1 foot below top of curb or adjacent ground surface
Gutter	Open channel with 6-inch curb	0.4 feet maximum depth

QUICK REFERENCE SHEET DESIGN REQUIREMENTS

Minimum pipe diameter:	15 inches				
Pipe materials:	Reinforced concrete pipe (RCP) or high-density polyethylene (HDPE) pipe that conforms to these specifications; use of cast-in-place concrete is not allowed				
Horizontal separation from sewer lines:	5 feet clear				
Horizontal separation from water lines and other utilities:	4 feet clear				
Vertical curves:	Not allowed				
Horizontal curves:	<table><tr><td>RCP:</td><td>300 feet minimum radius (allowed at catch basins and when pipeline is installed under the pavement parallel to the concrete gutter)</td></tr><tr><td>HDPE:</td><td>765 feet minimum radius for 20 foot sections</td></tr></table>	RCP:	300 feet minimum radius (allowed at catch basins and when pipeline is installed under the pavement parallel to the concrete gutter)	HDPE:	765 feet minimum radius for 20 foot sections
RCP:	300 feet minimum radius (allowed at catch basins and when pipeline is installed under the pavement parallel to the concrete gutter)				
HDPE:	765 feet minimum radius for 20 foot sections				
Pipe slope:	10% maximum				
Minimum cover:	12 inches for class III RCP and HDPE (outside of pipe to road subgrade).				
Maximum distance between structures:	400 feet				

New development and redevelopment projects may be required to implement storm water quality source and treatment controls. Refer to the City of Santa Rosa and County of Sonoma Storm Water Low Impact Development Technical Design Manual for design criteria; available at the following link,
<http://ci.santa-rosa.ca.us/departments/utilities/stormwatercreeks/swpermit/Pages/swLIDtechManual.aspx>

STORM DRAIN DESIGN STANDARDS

I. GENERAL AND DESIGN CRITERIA

All design shall conform to Sonoma County Water Agency design standards and review process.

All storm drainage facilities constructed within the City of Rohnert Park shall comply with the Sonoma County Water Agency master plan.

There shall be no lot-to-lot drainage.

II. PURPOSE

The purpose of this document is to provide standards for design of public storm drain system improvements in the City of Rohnert Park (City). These standards consist of:

- (1) Hydrologic design criteria,
- (2) Hydraulic design criteria, and
- (3) Physical design requirements.

These standards do not include (but may reference) additional requirements established by other departments of the City and other government agencies. These standards are intended to impose **minimum** acceptable design criteria. More stringent requirements may be imposed by the City Engineer based on specific project conditions. Developers and their design engineers are responsible for complying with these standards and all other requirements for design of storm drain facilities within the City. Design engineers are responsible for initiating written requests for approval of any design concepts that differ from these standards, verifying additional requirements set forth by other departments of the City or other government agencies, performing any necessary calculations or studies, and resolving any problems with the appropriate department or agency. Developers and design engineers should be aware that Section 402(p) of the federal Clean Water Act establishes requirements for National Pollutant Discharge Elimination System permits for certain industrial and construction-related storm water discharges.

III. POLICY

The policy of the City is to safely collect and convey storm water to the nearest public flood control facility in a storm drain system approved by the City of Rohnert Park Engineering Department, while achieving water quality objectives to the maximum extent practicable in the City's creeks as defined in the City's Storm Water Management Plan.

IV. HYDROLOGY CONCEPTS

The Rational Method is widely used for determining design flows in urban and small watersheds. The method assumes that the maximum rate of runoff for a given rainfall intensity occurs when

the duration of the storm is such that all parts of the watershed are contributing to the runoff at the interception point. The formula used is an empirical equation that relates the quantity of runoff from a given area to the total rainfall falling at a uniform rate on the same area and is expressed as:

$$Q = CIAK$$

in which

- Q** is the design flow in cubic feet per second.
- C** is a dimensionless runoff coefficient based upon type of ultimate development (i.e., land use) from Table I-1 for the drainage area.
- I** is the intensity of rainfall in inches per hour from Figure I-1 or computed as:

$$I = 5.12 Y^{0.1469} t^{-0.528}$$

in which

Y = recurrence interval (10, 25 or 100 year, etc.)

t = time of concentration (duration in minutes)

- A** is the tributary drainage area in acres.
 - K** is the dimensionless ratio of the average annual rainfall for the drainage area to the average annual rainfall for the overall area for which the rainfall intensity/duration/recurrence interval relationships have been established.
- K** = 1.1 for small Rohnert Park drainage areas. For large drainage areas, minor and above, see Sonoma County Water Agency Standards.

The runoff coefficient (C), the drainage area (A), and the average annual rainfall ratio (K) are all constant for a given area at a given time. (Note that some agencies do not include the factor K when using the Rational Method.) Rainfall intensity (I), however, is determined by using an appropriate storm frequency (i.e., recurrence interval) and duration which are selected on the basis of economics and engineering judgment. Storm drains are designed on the basis that they will flow nearly full during the design storms. Storm frequency is selected through consideration of the size of drainage area, probable flooding, possible flood damage, and anticipated future development for the drainage area.

Runoff Coefficient. The runoff coefficient (C) normally ranges between 0.30 and 0.90. The soil characteristics, such as porosity, permeability, and whether or not it is saturated from preceding storms are important considerations. Another factor to consider is ground cover, i.e., whether the area is paved, grassy or wooded. In certain areas, the coefficient depends upon the slope of the terrain. Duration of rainfall and shape of area are also important factors in special instances. Of primary importance is the percent of land covered with impervious surfaces such as asphalt.

Rainfall Intensity. Rainfall intensity (I) is the amount of rainfall measured in inches per hour that would be expected to occur during a storm of a certain duration. The storm frequency is the

time in years in which a certain storm would be expected again and is determined statistically from available rainfall data. (See Figure I-1.)

Time of Concentration. The time of concentration at any point in a storm drain segment is the time required for runoff from the most hydraulically remote portion of the drainage area to reach that point. The most hydraulically remote portion provides the longest time of concentration but is not necessarily the most distant point in the drainage area. Since a basic assumption of the Rational Method is that all portions of the area are contributing runoff, the time of concentration is used as the storm duration in calculating the intensity. The time of concentration consists of the initial time of concentration, which depends on the anticipated future land use for the drainage area, plus the sum of the additional overland flow time, if any, and the times of travel in street gutters, roadside swales, storm drains, drainage channels, and other drainageways. The time of concentration is affected by the rainfall intensity, topography, and ground conditions.

V. HYDROLOGIC DESIGN

Hydrologic design shall be based on the ultimate development and slope of the tributary watershed. All storm drain facilities shall be designed for flows resulting from 100 percent build-out of the land uses designated in the latest adopted edition of the City's General Plan in effect at the time the proposed development is approved by the appropriate City approval body. Drainage boundaries and basin slope shall be determined from the most current topographic information available. In flat areas, drainage basin boundaries shall be verified with those for other adjacent developments to eliminate gaps or overlaps and maintain consistency. Only areas which do not flow towards the proposed development may be excluded. The design must demonstrate that the excluded areas do not flow into the proposed development.

Flows from tributary areas upstream of the proposed development shall be included in the hydrologic design for the proposed development. The hydrology for the proposed project will be based on a pattern of upstream development which delivers the ultimate development storm runoff to the proposed project. Upstream area flows shall be based on 100 percent build-out of the land uses designated in the latest adopted edition of the City's General Plan in effect at the time the project is designed. Rezoning often results in significantly higher densities than were used in design calculations for existing downstream storm drain facilities. The design of the storm drain system for the proposed development shall be based on the assumption that storm flows from upstream areas will be conveyed in conduits, thereby resulting in lower times of concentration than for undeveloped conditions. The design of the storm drain facilities for the proposed development shall be such that the design flow from the proposed development and the upstream areas is less than or equal to the hydraulic capacity of the downstream storm drain facilities unless otherwise approved. In cases where the design flow exceeds the hydraulic capacity of the downstream storm drain facilities, improvements to the downstream facilities may be required as part of the development.

Developed public areas, including but not limited to public parks and golf courses, may be considered to be vegetated to the extent that they are actually vegetated, unless publicly proposed plans indicate that the governing body having jurisdiction over the area intends to alter the

existing use of the area so as to make the surface less pervious. The developer shall confirm future plans for park lands with the City Planning Department.

Drainage systems shall be designed to accommodate flows from storms with specific recurrence intervals. Recurrence interval is defined as the average number of years, over a long period of time, in which the magnitude of discharge from a given flood event is equaled or exceeded. Flows to be used for the design of waterways shall be calculated using the following minimum recurrence intervals:

<i>Waterway Classification</i>	<i>Drainage Area, Square Miles</i>	<i>Recurrence Interval for Design Flow, Years</i>
Major	>4	100
Secondary	1–4	25
Minor	<1	10
Diversion	NA	100

A given waterway, therefore, will be classed as minor in its upper reaches, then change to the secondary classification at a point where the drainage area exceeds 1 square mile, and then change again to the major classification at a point where the drainage area exceeds 4 square miles.

Design flow shall be determined by the use of the Rational Method formula: $Q = CIAK$

To use Figure I-1, determine the proper duration of the design storm event. The proper duration is equal to the time of concentration, which is the time required for flow from the most distant location in a drainage basin to reach the point of discharge from the basin.

Drainage areas larger than 2 acres are too large for application of the Rational Method formula in an initial step. The designer shall compute the time of concentration by determining the initial time of concentration. This is the time of concentration at the basin(s) which is furthest upstream. It is based on land use according to the table below. The Rational Method formula shall be applied to each subarea, step by step, and the flow shall be hydraulically routed from subbasin to subbasin to properly accumulate the design discharge for the entire watershed. For further details and sample calculations, refer to the latest edition of the SCWA Flood Control Design Criteria Manual.

<i>Land use</i>	<i>Initial time of concentration*, minutes</i>
Commercial, industrial, and residential with more than eight units per acre	7
Residential, two to eight units per acre	10
Residential, less than two units per acre	15
Open Space	15

*initial basins shall be of two acres or less

VI. HYDRAULIC DESIGN CRITERIA

General. For hydraulic design for commonly encountered situations, refer to the latest edition of SCWA Flood Control Design Criteria Manual and supplemental information. For hydraulic design for situations not covered by the SCWA manual, 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 shown on the checklist in SD24. Examples of acceptable calculations are included in the appendix to the SCWA Flood Control Design Criteria.

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.

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.

The Manning equation shall be used for hydraulic design of storm drain facilities. The Manning equation is stated as follows:

$$Q = \frac{1.49}{n} (A)(R^{2/3})(S^{1/2})$$

where

Q = flow in cubic feet per second

A = cross-sectional area of flow in square feet

R = hydraulic radius in feet

S = slope of the pipe or channel (dimensionless)

n = Manning equation roughness coefficient (dimensionless)

The values of the Manning equation roughness coefficient "n" shall be as follows:

<i>Material</i>	<i>n</i>
Storm Drain Pipe Smooth walled high density polyethylene, or reinforced concrete	0.014
Concrete-lined channel	0.015
Asphaltic concrete	0.017
Sack concrete and grouted rock rip rap	0.030
Loose rock rip rap	0.035
Grass-lined channels	0.035 minimum
Constructed natural waterways	0.050 minimum

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. 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.

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.

Open Channels. The maximum allowable depth for flows with 10-year recurrence interval in gutters is 0.4 feet. Valley gutters are unacceptable across through streets. Valley gutters may be authorized for use in alleys on a case-by-case basis.

The use of berms, levees, or other facilities along the channel that create potential hydraulic gradelines higher than abutting lands are unacceptable unless specifically authorized by the City Engineer. This requirement is intended to prevent the need for storm water pump stations.

Open channels shall be designed to SCWA design criteria standards with minimum freeboard between design water surface and the top of bank of 1.5 feet or 20 percent of the specific energy, whichever is greater. Where this minimum freeboard does not provide the necessary differential head to allow gravity flow for the projected development of the tributary areas, the design water surface shall be lowered sufficiently to allow such areas to drain by gravity.

Roadside ditches shall be designed so that the water surface for the design discharge will be at or below the outside edge of the road shoulder such that there is no flood water in the normal travel-way of the road and below adjacent ground level.

The design flow in natural creeks and constructed natural waterways may be allowed to overflow into an area above the defined banks provided that the flow is contained within a defined overflow area. Freeboard shall be provided, as specified above, between the design water surface and the adjacent ground surface or finished grade of lots or areas on which improvements are to be constructed. Less than 1.5 feet of freeboard may be considered for small natural swales and

creeks through open space such as parks and golf courses. In any event, sufficient freeboard shall be provided to retain the 100-year design flow within the right-of-way of the channel.

Channels shall be designed taking into account the energy losses due to existing and proposed future road crossing structures or other obstructions within the channel. Refer to the latest edition of the SCWA Flood Control Design Criteria Manual for required allowances and other design considerations for obstructions within open channels.

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.

Constructed natural waterways shall be excavated as required to pass the design flow through interim and ultimate conditions of natural plant and tree growth and of other natural channel characteristics. Trees and other plants and grasses shown on the proposed development plans shall be planted as a part of initial construction to promote and encourage ultimate natural appearance.

Constructed natural waterways, in their final development and growth stages, shall satisfy the freeboard requirements for open channels described above. Constructed natural waterways are appropriate in any situation where right-of-way space can be provided.

Open channels which will be maintained by the SCWA must be designed as specified in the SCWA Flood Control Design Criteria Manual.

Closed Conduits. The design depth in circular conduits shall not exceed 0.80 of the diameter of the conduit for major and secondary waterways. Closed conduits used as minor waterways may be designed to flow full or surcharged. The hydraulic entrance condition at a closed conduit used as a minor waterway will be designed so that the required freeboard in the upstream channel is provided for the 10-year design flow and the 100-year design flow is contained within the banks of the upstream channel. The entrance to the closed conduit may be submerged provided the above criteria are satisfied.

At inlets, catch basins, and nonpressure-type manholes within a closed conduit system, the design flow hydraulic gradeline shall be at least 1.0 foot below the top of curb or of adjacent ground surface if the area is unpaved unless otherwise approved. At locations where conduits are stubbed out for future extension, the design hydraulic gradeline shall be low enough to allow proper drainage of the future tributary area and shall be a minimum of 1.5 feet below general existing ground level unless otherwise approved. For closed conduits designed for supercritical flow, the energy gradeline shall not be above ground level at inlets, catch basins, and nonpressure-type manholes. Where the energy grade line is above the existing ground elevation bolt down manhole covers shall be used.

Energy losses due to debris load caused by splitting flow at the 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.

VII. DETENTION BASINS

The following section on detention basins is not included in the Sonoma County Water Agency Flood Control Design Criteria.

Detention basins are natural or constructed basins that receive and hold storm water runoff to reduce downstream peak flows for flood control purposes and/or to enhance water quality. Detention basins are allowed only with the approval of the City Engineer. Publicly maintained storm water ponds with permanent pools of water are prohibited. However, approval may be granted provided the applicant/developer executes a binding agreement to provide funding, in perpetuity, for the maintenance costs associated with these facilities.

Detention basins should be designed to be multipurpose wherever possible and designed to enhance storm water quality. Detention basins whose primary purpose is water quality enhancement will be considered during planning for storm drain system improvements.

Publicly maintained detention facilities for flood control purposes may be permitted, with the approval of the City Engineer, when it is more cost-effective than providing storm drains. An analysis, which justifies the financial need for the detention basin by presenting both the estimated capital cost and the estimated annual operation and maintenance costs of the basin as well as comparable costs for an underground closed conduit storm drain system, shall be prepared under the direction of a civil engineer and submitted for approval by the City Engineer prior to approval of a tentative map. The City Engineer may prohibit or restrict the use of detention basins based on specific site conditions such as insufficient depth to bedrock; extreme community disruption; need for extensive relocation of existing improvements and utilities; or lack of sufficient, available, suitable land.

The design of detention basins for flood control purposes shall be based on the size of the basin; the maximum allowable depth of temporary ponding; the recurrence interval of the storm being considered; the peak rate, total volume, and timing of the inflow; the maximum allowable outflow rate; and the length of time water is allowed to remain in the basin. The design shall be accomplished through the development of three items: an inflow hydrograph, a depth-storage relationship, and a depth-outflow relationship. These three items shall be combined in a routing routine to obtain the outflow rate, depth of stored water, and volume of storage at any specific time as the design storm flow passes through the detention basin. Pumped discharges from publicly maintained detention facilities are prohibited.

The design considerations cited above determine the detention basin volume required for flood control purposes only. Design of detention basins should also take into consideration other benefits that can be achieved, such as water quality enhancement, recreational opportunities, and open space aesthetic enjoyment. Public health and safety needs should be considered, such as the need for vector control and fencing in particular applications. Detention basin designs must promote personal safety by locating basin along public streets to assure visual access to basin

area. Site, street and basin design should be coordinated to orient buildings and streets for good surveillance of basin area.

The design of detention basins shall include the recommendations, considerations and procedures discussed in *Design and Construction of Urban Stormwater Management Systems*, Chapter 6, WEF Manual of Practice FD-20, latest edition, and ASCE EWRI *Guidance for Protection of Public Safety at Urban Stormwater Management Facilities*.

The geometry of the basin should be designed to reduce dead zones and increase detention times. Inlet and outlet structures must be carefully designed to reduce turbulence that could resuspend settled solids. Consideration should be given to installation of energy dissipaters, stilling basins, berms, and separation walls.

To prevent erosion during large storm flows, unprotected side slopes shall be no steeper than 3 horizontal:1 vertical. Lesser slopes as described *Design and Construction of Urban Stormwater Management Systems*, Chapter 6, WEF Manual of Practice FD-20, latest edition, and ASCE EWRI *Guidance for Protection of Public Safety at Urban Stormwater Management Facilities* are preferred. Slopes of 3:1 shall include a discussion of maintenance and safety provisions.

Detention basins shall be designed and constructed for easy access to the basin itself and all inlet and outlet structures. Access to the bottom of the basin is necessary. Basins to be maintained by City staff must meet City accessibility criteria discussed below under "Design Requirements."

DESIGN REQUIREMENTS

VIII. CONNECTION TO THE EXISTING STORM DRAIN SYSTEM

- A. New storm drain systems must connect to an existing City or County of Sonoma storm drain facility, a channel or creek maintained by the SCWA, 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 nonresidential 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's Utilities Department; 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.

IX. MATERIALS

- A. Storm drain pipes 15 inches in diameter or larger shall be reinforced concrete pipe (RCP), or annular high density polyethylene (HDPE) pipe.
- B. RCP shall be Class III, IV, or V as specified in Part 3, Public Storm Drain Construction Standard Specifications, of these standards.

Typical total effective loads on buried pipe, expressed in pounds per linear foot of pipe, are shown in Table I-3. 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 I-3. The design engineer

shall interpolate between the values in Table I-3 for conditions not presented in the table.

- C. 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.
- D. Sidewalk drains shall be per Standard 406.

X. 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 Standard 406.
- B. In new portions of the storm drain system, pipe sizes shall not decrease in the downstream direction.

XI. 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 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 HDPE 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:

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

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

XII. SLOPE

Maximum slope for storm drains shall be 10 percent or 10 feet per 100 feet.

XIII. COVER

Minimum cover over storm drains shall be 12 inches (Class III RCP and HDPE). 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 I-3.

XIV. MANHOLES AND STRUCTURES

- A. A manhole or accessible structure shall be installed at every change in pipe size.
- B. The maximum distance between manholes and/or accessible structures shall be 400 feet.
- C. A manhole or accessible structure shall be installed at every horizontal angle point or vertical change in alignment.
- D. Sufficient drop shall be provided through manholes and accessible structures to compensate for energy loss caused by change of alignment.

- E. Manholes shall be 48 inches in diameter with storm drain pipes of 36 inches in diameter or less, and shall be 60 inches in diameter with storm drain pipes larger than 36 inches in diameter. 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. Reducer slabs may be provided as shown on Standard 401.
- F. 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.
- G. Headwalls or structures shall be provided where open ditches, channels, and creeks discharge into closed pipe conduits. Refer to Caltrans Standard Plans.

XV. CATCH BASINS

- A. Catch basins shall be Type II (Standard 402) except as listed below or as otherwise approved by the City Engineer. Galleries per Standard 404 may be used on the upstream side of a Type II 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 100-year design storm event.
 - As required to maintain the following number of 8-foot-wide traffic lanes unimpeded by flowing or standing water during a 100-year 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 or most current version.
- D. Storm drain labels shall be affixed in accordance with City Engineer's Standard 409.

XVI. 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.

XVII. ACCESS ROADS

- A. Clear access must be provided and maintained to all public 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' in width and must be provided with turnarounds per City Standard 206 when the back-up distance for any maintenance vehicle exceeds 100'.
- C. The design of access roads must be included with the drainage system design plans. At a minimum, the design shall conform to the requirements of Standard 216. 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 14' wide gates must be provided with sliding gates preferred. Where vehicular access is not required, 4' 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%.

XVIII. 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.

XIX. WATER QUALITY TREATMENT

- A. Source controls designed or constructed to reduce the discharge of pollutants from the storm water conveyance system shall be designed and maintained as directed by Development Services.

XX. OTHER REQUIREMENTS

- A. 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.

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

Table I-1 Rational Method Runoff Coefficients (C)

Land Use	Average Slope, Percent			
	0–2	>2–7	>7–15	>15
Residential, Rural (1 unit per 5+ acres)	0.35	0.39	0.43	0.45
Residential, Very Low Density (1 unit per .5 to 5 acres)	0.40	0.43	0.46	0.50
Residential, Low Density (2 to 4 units per acre)	0.45	0.49	0.56	0.59
Residential, Medium-Low Density (4 to 8 units per acre)	0.50	0.56	0.64	0.70
Residential, Medium Density (8 to 18 units per acre)	0.70	0.74	0.77	0.80
Residential, Medium-High Density (18 to 30 units per acre)	0.90	0.90	0.90	0.90
Business, Commercial, Institutional and Schools	0.90	0.90	0.90	0.90
General Industrial	0.90	0.90	0.90	0.90
Parks and Recreation	0.31	0.37	0.42	0.45
Agricultural and Open Space	0.30	0.35	0.41	0.45

Note: Coefficients for developments with more than one land use shall be weighted in proportion to the areas of each land use using either the values from Table I-1 or the following formula in on-site design calculations. Off-site design calculations shall use the values from Table I-1.

$$C = C_v (A_v/A_t) + 0.9(A_p/A_t)$$

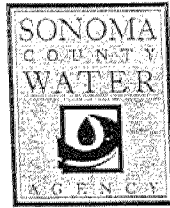
Where:

C_v = value from the vegetated area curve, SCWA Plate No. B1

A_v = vegetated area

A_p = impervious area

A_t = total area



FLOOD AND DRAINAGE REVIEW PLAN SUBMITTAL CHECKLIST

Project Name: _____ Date: _____
SCWA File #: _____

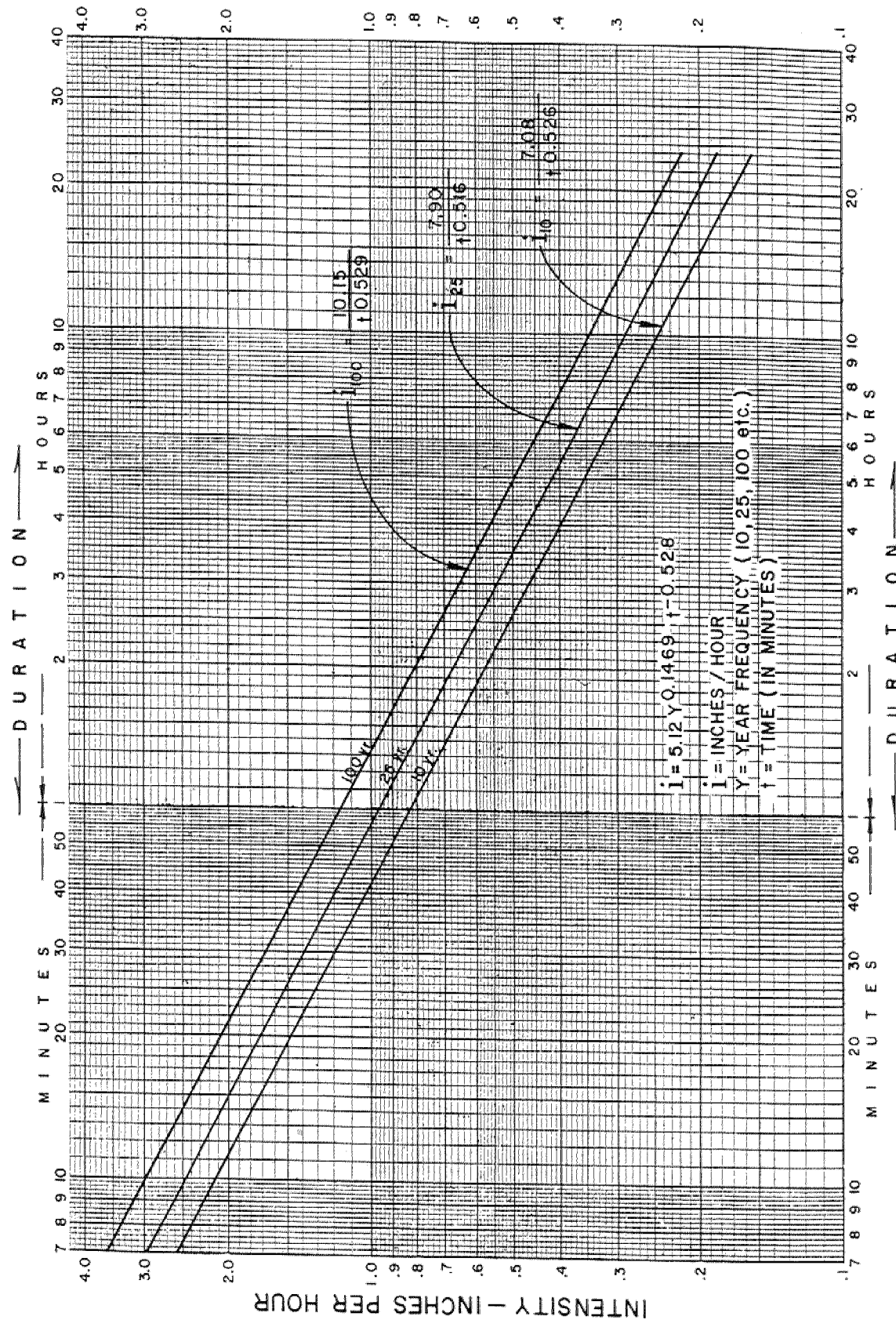
*All of the following items must be submitted before a flood and drainage review can be completed.
Please submit the following items or indicate why they are not necessary.*

- ☐ Transmittal Letter
- ☐ Explanation of Analysis Approach
- ☐ Submittal Information Sheet
- ☐ Plan Check Fee (minimum of 1/2 due; remainder due prior to final approval)
- ☐ Improvement Plans
- ☐ Final Map or Parcel Map (if applicable)
- ☐ Hydrology Map
- ☐ Establish Factors used in Analysis
- ☐ Hydrology Calculations ☐ 10-year Storm and ☐ 100-year Storm
- ☐ Hydraulic Calculations
- ☐ Establish Starting HGL
- ☐ ☐ EGL and ☐ HGL Plots
- ☐ 100-year Storm Routing
- ☐ 100-year Storm Elevations vs. Finished Floor Elevations
- ☐ Inlet Capacity Calculations
- ☐ Curb Water Depth Calculations
- ☐ Assessor Parcel Map with Site Outlined
- ☐ Copy of the conditions of approval for the project

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12/10/02

Figure I-1 INTENSITY-DURATION-FREQUENCY

(see following page)



RAINFALL INTENSITY vs. DURATION

NOTE: THE INFORMATION SHOWN IS SUBJECT TO ANNUAL REVISION AS ADDITIONAL RAINFALL DATA BECOMES AVAILABLE.

PLATE No. B-2

Table I-3 LOADS ON BURIED PIPES
POUNDS PER LINEAR FOOT

Cover to Subgrade				Pipe Diameter In Inches															
in feet	15	18	21	24	27	30	36	42	48	54	60	66	72	78	84	90	96	102	108
1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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	683	667	653	637	627	614
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	1629	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: American Reinforced Concrete Pressure Pipe, 1971, for covers of 2 feet or greater. Loads are interpolated for covers of 1 foot.



City of Rohnert Park

Streets and Roadway Design Standards

STREETS AND ROADWAY DESIGN STANDARDS

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Volume 1

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STREETS AND ROADWAY DESIGN STANDARDS

I. DEFINITIONS

“Alley” means any street contained in the private property or in a common owned parcel or easement(s), used primarily for vehicular service access to the back or side of residential properties, and for which normal building setbacks may not or do not apply.

“Avenue” is a transitional street connecting residential neighborhoods to commercial centers, shopping centers, and other neighborhoods.

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

“Bike path” means a separate, off-street bike path which is not part of the normal street section.

“Boulevard” is a regional street that provides multi-lane access to commercial and mixed use land designations. Boulevards have medians and bike lanes.

“City Engineer” shall be a civil engineer registered by the State of California and shall be designated by the City Manager to discharge those duties prescribed hereinafter to be performed by the City Engineer.

“Cul-de-sac street” shall have the primary purpose of serving abutting land use and connecting to the nearest appropriate local street. It is a minor 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.

“Development” means and includes, but is not limited to, the subdivision of land, the construction of new structures or buildings, and changes 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 Rohnert Park is required prior to commencement.

“Driveway” For the purposes of single-family detached housing, “driveway” means a way for vehicular traffic providing access to four or fewer lots or units over a 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 of the California Fire Code, as adopted by the City, with respect to Fire Department access where such serve as Fire Department access.

“Industrial Street” shall be public and private streets located within industrial areas as defined on the current City zoning map or roadways that primarily serve large trucks transiting to and from retail centers.

“Lane” is a public or private access to 10 residential units or less (see City Std. 200C).

“Local streets” means a street that provides access to individual sites. Local streets include Minor Streets, Neighborhood Streets, Lanes, Alleys, Utility Access Roads, Trails, Loop Streets and Cul-de-sac Streets. On street parking is required on Minor Streets and Neighborhood Streets.

“Loop street” shall be a one-way street providing access to a very limited number of residential houses. Use is extremely limited (see City Std. 200B).

“Main street” provides access to neighborhood commercial and mixed use districts.

“Major Arterial” means a street whose primary purpose is to facilitate movement of heavy traffic between major residential areas, or major residential areas and commercial areas with minimal access. Major Arterial streets may consist of 2-, 4-, or 6-lanes. Intersections with local streets are permitted, provided that they are right-turn-only and at least 200 feet apart, or that they include a left-turn pocket. Driveways are generally not permitted. Driveways are permitted to major traffic generators, provided they are right-turn-only. A deceleration lane must be provided for each driveway. *Major traffic generators include areas designated for Regional Commercial, Office, Mixed Use, and High Density Residential uses.* No on-street parking is allowed. Major Arterial streets include Parkways.

“Minor Arterial” means to provide circulation between neighborhoods, activity centers, and highways and other regional routes. Also provides circulation in rural and open space areas. Intersections with local streets are permitted, provided that they are right-turn-only and at least 200 feet apart, or that they include a left-turn pocket. *This provision is intended to maximize access between neighborhoods.* Driveways are permitted, provided they are right-turn-only and at least 100 feet apart. A deceleration lane must be provided for each driveway. No on-street parking is allowed. Minor Arterial streets include Parkways.

“Major Collector” means to provide circulation within and between neighborhoods. Driveways are permitted, provided they are right-turn-only and at least 50 feet apart, or that they include a left-turn pocket. No on-street parking is allowed. Major Collector includes Boulevards.

“Minor Collector” means to provide circulation within and between neighborhoods. Minor Collector streets shall have the primary purpose of intercepting traffic from intersecting local streets and handling traffic to the nearest arterial/regional street or intercepting traffic from one collector street and handling traffic to another collector street. It shall serve as an access to abutting properties. Minor Collector streets connect residential neighborhoods to commercial centers and service commercial districts. On-street parking is required on both sides of each segment of a one-way couplet. Minor Collector streets include Avenues, Main Streets, and Industrial Streets.

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

“Neighborhood street” shall have the primary purpose of providing access to small residential areas and shall specifically not be used for through traffic. The various streets within this designation are the one-way loop street, the lane, and the neighborhood street.

“Parkway” is a connection between towns or through a natural area and are not designed to accommodate adjoining development.

“Private street” means a way for vehicular traffic providing access to lots or units over a common parcel or private easement, 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 are not maintained by a public agency.

Such streets may be designed and constructed to different standards than public streets in the following areas: surface treatment, street lighting hardware, 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 public streets in terms of minimum width (may be reduced when meeting specific criteria – see City Std. 200A through L) structural section, curb, gutter, sidewalk, and all other aspects not specifically referenced above. No City enforcement of “no parking” signs or other such regulatory signs shall be provided for such streets. Access shall be through a standard curb cut.

“Public street” means a way for vehicular traffic, whether designated as a local, transitional, regional/major thoroughfare, freeway, or other designation, which is improved to City standards, dedicated for general public use and maintained by a public agency.

“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.

“Regional Streets” (equivalent to Arterial or Major Streets; includes Parkways and Boulevards). See “Arterial/Regional Streets.”

“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” shall include avenues, highways, lanes, alleys, crossings or intersections and courts 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 right-of-way width” shall mean the shortest distance between the lines delineating the public right-of-way of a street.

“Street width” shall mean 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.

“Transitional Streets” (equivalent to Collector Streets) connect residential neighborhoods to commercial centers and service commercial districts. Streets in this category are the Avenue and the Main Street.

“Walkway/Trail (mixed use)” shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians, bicycles and horses.

“Walkway/Trail (pedestrian)” shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians.

II. GENERAL

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

Major Arterial

1. Parkway

Minor Arterial

1. Parkway

Major Collector

1. Boulevard

Minor Collector

1. Avenue
2. Main Streets
3. Industrial

Local

1. Minor Street
2. Neighborhood Street
3. Lanes
4. Alleys
5. Utility Access Road, Trails
6. Loop Street

Cul-de-sac Street

- B. Street design standards shall be used for the design and construction of all private and public 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 use of a higher standard.

- E. Reference Appendix D: City amended California Fire Code. Two entrances required for the following:
 - a. Building exceeding 62,000-square-foot area
 - b. 30 units or more
- F. No half streets will be allowed.

III. STREET DESIGNS

A. Geometric Standard Cross Sections

Item	Minimum Width/Length	Street Classification
Center median	16 feet	Parkway
	16 feet	Boulevard
	16 feet	Avenue
Travel lane	14 feet	Industrial
	11 feet	Parkway, Boulevard
	10 feet	Avenue, Main and Minor Street
	10 feet	Neighborhood Street
	12 feet (two-way)	Lane
Parking lane or shoulder	8 feet	Industrial
	8 feet	All others except Neighborhood Street
	6 feet	Neighborhood Street
Curb lane (no Parking or Bike lane)	2 feet increase to curb face	Local streets
	1 foot increase to curb face	All other streets
Bike lane	5 feet	All streets
Divider between frontage road and paralleling road	8 feet, curb to curb	All streets
Left turn lanes:		
Double	Two 11-foot lanes	All streets where required
Single	10 feet	All streets
Two-Way	14 feet	All streets
Right turn lanes	10 feet	All streets
Curb radius for cul-de-sac	48 feet (w/parking and no island)	Cul-de-sac
	48 feet (no parking and with an island)	Cul-de-sac
	48 feet (no parking and no island)	Cul-de-sac
Note: An island in a cul-de-sac (other than those shown in Standard Drawings, when proposed, will require review and approval by the City Engineer, who shall determine the use of the correct turning radius, compliance with required access for emergency vehicles, and any other required design criteria.		

Item	Minimum Width/Length	Street Classification
Maximum length from projected curb or edge of pavement line of intersecting street to center of turnaround	500 feet (or as approved by the City Engineer)	Cul-de-sac
Length of streets allowed with no Fire Department-approved turnaround	150 feet from the projected curb or edge of pavement line of the cross street to end of dead-end street	All streets
Planter strip	10 feet (consistent with space requirements of master street tree plan)	Parkway All streets other than Parkway.
Sidewalk	5 feet	All Local Streets (*see Lane note below), Avenue
	6 feet	Parkway, Boulevard
Sidewalks – contiguous with tree wells (where permitted or required per Standards)	10 feet	Main streets – required on both sides (widen at obstructing locations to provide 4.5-foot minimum clear sidewalk)
Sidewalks – contiguous	5 feet	All streets in PD, one-way loop streets, as approved by Planning Commission – required on both sides (widen at obstructing locations to provide 4-foot minimum clear sidewalk)
Sidewalk – meandering (where permitted by Standards)	5 feet	Where applicable
Sidewalk easement	To back of sidewalk	All streets where applicable
Public utility easement	5 feet behind right-of-way	All streets where required
*Lane requires sidewalk for 5 or more homes, one side minimum. Note: Sidewalk one side as approved by Planning Commission.		

- 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 41 feet in width for non-residential uses, except as otherwise approved by Conditional Use Permit. Minimum of 12 feet for one-way, 24 feet for two-way.
 - 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 by Conditional Use Permit.
 - 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 cut is allowed when it is less than 6 feet from an existing curb cut.
 - 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 additional curb cut is necessary for the efficient operation of the facility and will not significantly reduce street capacity and traffic safety. Twenty 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.
 - f. In commercial/industrial area, a minimum of 200 feet required separation between driveway and the intersection of two arterial and/or collector streets.
 - g. Except as otherwise approved by the City Engineer, curb cuts for any circular or “through” driveway must meet the following requirements:
 - (1) The curb cuts for such driveway shall be at least 20 feet apart top to top and a minimum of 5 feet from the side property line.
 - (2) The combined width of the curb cuts shall not exceed 50% of the lot frontage.
 - h. Standard Detail Drawings, including but not limited to; City Standard Detail Drawings STD-243, STD-250A – E.
 - (1) Minimum Structural Section Thicknesses shall be 6-inch concrete with 8-inch class 2 aggregate base rock for Residential Driveways and 8-inch concrete with 8-inch class 2 aggregate base rock for Multi-Residential & Commercial Driveways.
 2. Pedestrian Curb Ramps. Each pedestrian passageway to any parking or loading facility to or across a public right-of-way shall comply with the following requirements:

- a. Sidewalk Access Ramps shall comply with State of California, Department of Transportation most current Standard Specifications and Standard Plans; including but not limited to Section 73 Concrete Curbs and Sidewalks of the Standards Specifications and Standard Plans A87A, A88A, A88B & A90B.
- b. Sidewalk and ramp concrete thickness shall be 4-inch minimum.

IV. STREET ALIGNMENT

- A. Street alignment shall generally conform to the circulation element of the City's General Plan. 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. Parkway.....500 feet
 - b. Boulevard.....500 feet
 - c. Industrial Street.....300 feet
 - d. Main Streets300 feet
 - e. Avenues.....300 feet
 - f. Minor Street150 feet
 - g. Neighborhood Street100 feet
 - h. Lane.....90 feet
 - i. Alley.....40 feet
 2. Lesser radii may be used only when sufficient evidence is presented to the City Engineer to show that 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 major streets and for any other street with a design speed above 25 miles per hour.
- 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.

V. STREET GRADES

- A. All street grades shown on improvement plans shall refer to the NGVD 1929 benchmarks as accepted by the City of Rohnert Park.
 1. All Arterial and Industrial Streets shall have no grade rate in excess of 6%.
 2. Collector and Local Streets shall have no grade rate in excess of 10%.
 3. Minimum grade rate for all streets shall be 0.5%; 1% for curves equal to or less than 100 feet radius.
 4. The grade of the pavement surface across an intersection shall not be more than 4%.

5. The gradient of each street entering an intersection shall not be more than 4% within a distance of 25 feet from the near curb line of the crossing street.
6. Vertical parabolic curves shall be used to connect grade profiles where the algebraic difference in grade rates exceeds 1% (does not apply at intersecting streets). The length of vertical curve required shall be determined by the following:

	Minimum Stopping Sight Distance	Minimum Length of Curve
Regional/Major and Industrial Streets	350 feet	200 feet
Transitional/Collector Streets	200 feet	100 feet
Local Streets	100 feet	100 feet

7. Minimum cross-slope for all streets shall be 2%. Maximum cross-slopes shall be 5% (offset crown may require tilt section, minimum 2% cross-slope).
8. Maximum cross-slopes in cul-de-sac bulbs shall be 5%.

VI. INTERSECTIONS

- A. All streets entering upon any given street shall have their centerlines directly opposite each other or separated by at least 200 feet.
- 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.
- C. Curb return radii:

Industrial	35 feet
Boulevard, Parkway	20 feet
Main Street, Avenue	20 feet
Minor	20 feet
Neighborhood Street, Lane	20 feet

At all intersections, the curb return radius to be utilized will be determined by the highest street classification

A 15 feet radius is allowed on Local Roads with parking on both streets. The street frontage area 15 feet on either side of the curb return shall be properly marked "No Parking".

VII. 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 typical sections shown. However, any modifications require the specific approval of the City Engineer.
- B. Typical sections are shown in Volume II standards 200. Landscape strips are required on Parkways. Landscape strips are encouraged on Boulevards. Landscape strips are allowed on other roadways as approved by the City Engineer. The minimum width of a Parkway Landscape strip is 10 feet. Landscape strips on other roadways shall be consistent with the Street Tree Table and Section XI.

VIII. PAVEMENT DESIGN

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

- A. Design pavement per Caltrans Highway Design Manual Chapter 610 and 630 using a 20 year design life.
- B. Traffic Index
 - 1. Street classification shall be determined by the City Engineer.
 - 2. For Major Arterial and Industrial streets with high truck volumes, the City Engineer may increase the minimum T.I. to 11.0.
 - 3. In no instance will the T.I. be less than the following:

Major Arterial and Industrial	a minimum T.I. of 10.0
Major Collector and Minor Arterial	a minimum T.I. of 10.0
Minor Collector	a minimum T.I. of 8.0
Local (excludes roads w/commercial traffic/busses)	a minimum T.I. of 7.0
 - 4. For all street design, use Chart No. 2 (3 sheets), "Structural Design Chart for Flexible Pavements."
- C. Soils Reports
 - 1. Resistance "R" Values
 - a. A qualified Soils Engineer shall obtain sufficient soils samples within the proposed street construction to permit determination of the "R" Value of the various materials which 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, Sub-bases, 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 soil engineer shall submit to the City a Materials Report showing the location and elevation of sampling points, "R" Value data, and Expansion Index Tests. The owner's soils engineer may be required to make a field survey of soil conditions when rough subgrade 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. Expansive Soils

- a. Irrespective of the "R" Value used, an Expansion Index Test shall be required.
- b. A soil will be classified as expansive unless the Expansion Index is less than 50 as measured by ASTM D 4829. In addition, soils meeting all four of the following provisions shall be considered expansive.
 - 1. Plasticity Index (PI) of 15 or greater, determined in accordance with ASTM D 4319.
 - 2. More than 10 percent of the soil particles pass a No. 200 sieve (75 μ m), determined in accordance with ASTM D 422.
 - 3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422.
 - 4. Expansion Index greater than 20, determined in accordance with ASTM D 4829.
- c. All expansive soils shall be lime treated based on site specific tests and in conformance with the recommendations of a geotechnical engineer.
- c. Lime treatment shall be a minimum of 18 inches thick and extend to the edge of the back of the curb at a minimum.

D. Gravel Equivalents

1. Structural sections are to be determined from Chart No. 2 utilizing traffic indexes and known basement soil “R” Values. Gravel equivalents are to be converted into structural sections using gravel equivalent factors (Gf) for the various construction materials as shown on Chart No. 2.
2. All streets shall have a safety factor included in the design. Structural sections using aggregate base shall have the gravel equivalent of the asphalt concrete layer increased by 0.2 feet.

E. Other Design Considerations

1. For roadway section design the maximum R-value of lime treated soils will be 40.
2. The structural section required, in some cases, may be governed by the expansion-shrinkage properties of the soil rather than traffic and soil-bearing criteria.
3. The design of all streets must include moisture barriers designed by a geotechnical engineer and shown on improvement plans. Acceptable moisture barriers include:
 - a. Horizontal moisture barrier of lime treated soil extending to the outside edge of a sidewalk that is contiguous to the roadway. (no planter strip between roadway and sidewalk)
 - b. A vertical moisture barrier consisting of plastic sheeting (10 mil minimum) lining a joint trench under a sidewalk.
 - c. A vertical moisture barrier consisting of plastic sheeting (10 mil minimum) lining the side of a bioretention planter strip.
 - d. A moisture barrier as shown in STD-264. This moisture barrier shall be placed at the back of curb where landscape strips are provided and at the back of sidewalk where the sidewalk is contiguous to the road. Cut off walls shall extend to a depth of 6 inches below the aggregate base.

F. Minimum Structural Section: In no instance shall the asphalt thickness in a structural section be less than as follows:

Major Arterial and Industrial Streets	0.50 feet asphalt concrete
Major Collector and Minor Arterial Streets	0.50 feet asphalt concrete
Minor Collector Streets	0.42 feet asphalt concrete
Local Streets	0.42 feet asphalt concrete

G. Improvement Plan Notation

1. All improvement plans shall include the design “R” Value, Expansion Index, 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.

IX. REQUIREMENTS FOR EMERGENCY ACCESS DURING CONSTRUCTION

A. Subgrade Conditions

Summer April 1 – September 30	Excavated and drained subgrade
Winter October 1 – March 31	6 inches Class II AB and 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, 50,000 square feet, 1.5 inches of asphalt base over 4 inches of aggregate base shall be provided in all proposed and approved fire access areas.
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 to as early as September 1, depending on the particular season's rainfall and projections.
3. Subgrade 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 II aggregate base or alternative recommended by the soils engineer and approved by the City Engineer.
5. Poor subgrade is defined as "R" Value of 10 or less.
6. Base shall be placed only on an unyielding excavated and drained subgrade, and to be compacted to at least 90% relative compaction.
7. Fabric to be a ground stabilization fabric such as Mirafi 600X or equivalent.

X. COMPLETION OF ROADWAYS

- A. Plans shall include a note requiring a slurry seal on all streets in a development or public project. All roadways shall be slurry sealed after completion of all roadway infrastructure and prior to the last certificate of occupancy or acceptance of the project. Any subdivision improvement bond shall include this requirement.
- B. Striping and marking may be masked for the application of this slurry seal.
- C. Slurry seal shall carry a warranty covering a period of two years.

XI. STREET TREES

- A. Acceptable street trees are listed in the Table Street Tree List. Only trees listed for use in streets shall be used in street planter strips or medians.

- B. No tree shall be placed in a planter strip more narrow than the dimension listed. The minimum distance from any paved surface shall be half the minimum planter strip dimension. Root barriers are required between all planters and paving. Trees placed behind a sidewalk shall be a minimum of 5 feet behind the sidewalk.
- C. No tree shall be placed in a tree well that is smaller than the dimension listed. Trees shall be centered within a planter strip. Where planters strips vary in size due to meandering sidewalks the most narrow planter strip dimension in 20 feet either side of the tree shall govern.
- D. Only trees listed for use along streets shall be placed adjacent to streets and walkways. Trees listed for use in parking areas only shall not be used along streets.
- E. All trees shall be a minimum of 12 feet high and have a minimum trunk diameter of 1 inch in a 15 gallon can or larger.
- F. Tree Stakes shall be 2 inch in diameter and 10 foot long copper naphthenate treated lodgepole pine stakes driven 30 inches into the ground.

STRUCTURAL DESIGN CHART FOR FLEXIBLE PAVEMENTS

EQUATION:

$$G.E. = 0.0032 (T.I.) (100 - R)$$

G.E. = GRAVEL EQUIVALENT

T.I. = TRAFFIC INDEX

R. = RESISTANCE VALUE

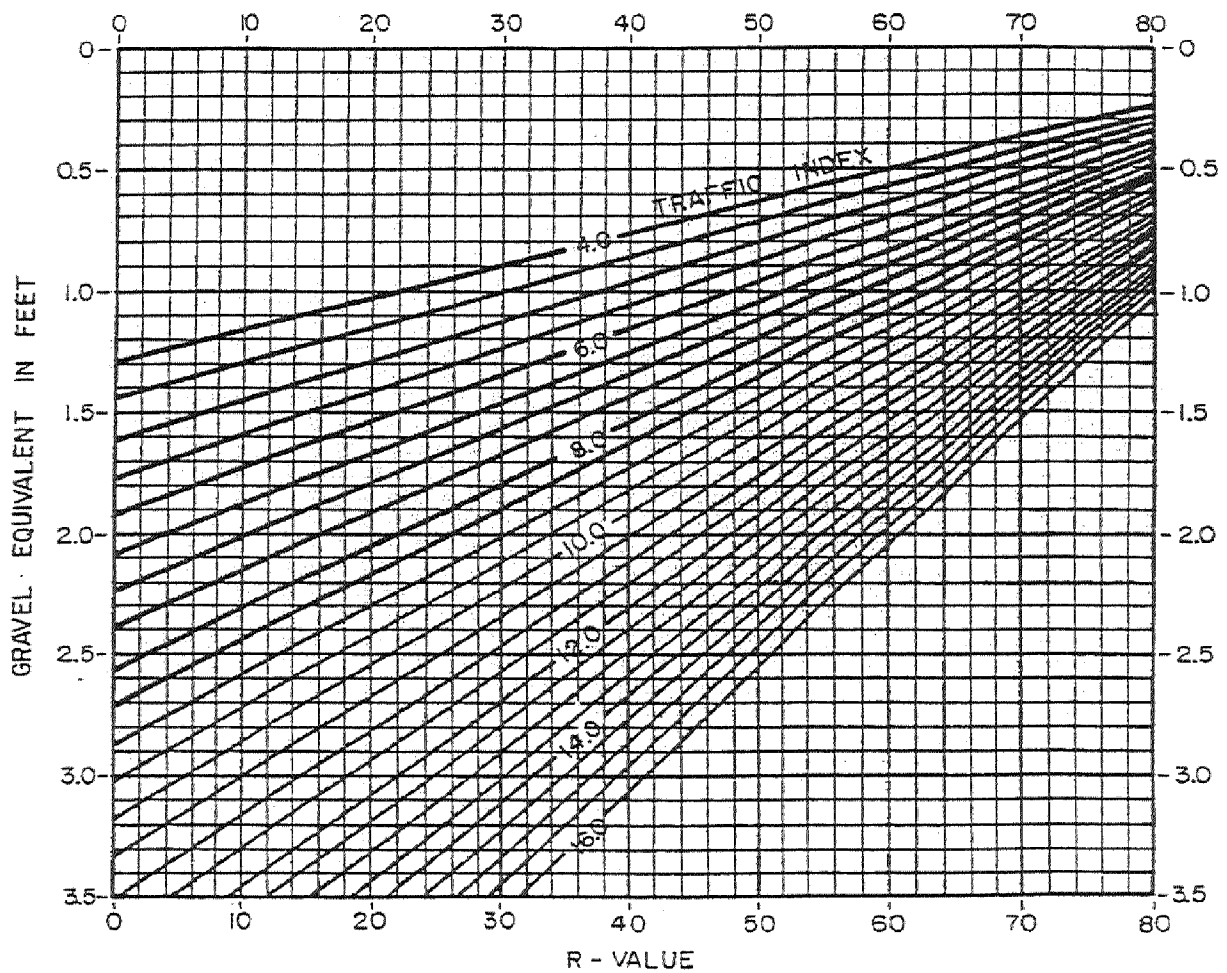


CHART 2.
Structual Design Chart for Flexible Pavements
(1 of 3)

Table 635.1B

Gravel Equivalence Needed for Deflection Reduction

Percent Reduction In Deflection (PRD or PRM) ⁽¹⁾	GE (in feet) For HMA Overlay Design	Percent Reduction In Deflection (PRD or PRM) ⁽¹⁾	GE (in feet) For HMA Overlay Design
5	0.02	46	0.55
6	0.02	47	0.57
7	0.02	48	0.59
8	0.02	49	0.61
9	0.03	50	0.63
10	0.03	51	0.66
11	0.04	52	0.68
12	0.05	53	0.70
13	0.05	54	0.72
14	0.06	55	0.74
15	0.07	56	0.76
16	0.08	57	0.79
17	0.09	58	0.81
18	0.09	59	0.83
19	0.10	60	0.85
20	0.11	61	0.87
21	0.12	62	0.89
22	0.14	63	0.91
23	0.15	64	0.94
24	0.16	65	0.96
25	0.18	66	0.98
26	0.19	67	1.00
27	0.20	68	1.02
28	0.21	69	1.04
29	0.23	70	1.06
30	0.24	71	1.09
31	0.26	72	1.11
32	0.28	73	1.13
33	0.29	74	1.15
34	0.31	75	1.17
35	0.33	76	1.19
36	0.35	77	1.22
37	0.37	78	1.24
38	0.38	79	1.26
39	0.40	80	1.28
40	0.42	81	1.30
41	0.44	82	1.32
42	0.46	83	1.34
43	0.48	84	1.37
44	0.51	85	1.39
45	0.53	86	1.41

Note: (1) PRD is Percent Reduction in Deflection at the surface.
PRM is Percent Reduction in deflection at the Milled depth.

GRAVEL EQUIVALENT FACTORS

MATERIAL	GRAVEL EQUIVALENT FACTOR (Gf)
Lean Concrete Base (LCB)	1.9
Class A Cement Treated Base (CTB)	1.7
Asphalt Treated Permeable Material (ATPM)	1.4
Open Graded Asphalt Concrete (OGAC)	1.4
Class B Cement Treated Base (CTB)	1.2
Asphalt Treated Base	1.2
Soil Cement	1.2
Aggregate Base	1.1
Aggregate Subbase	1.0
Lime Treated Base (LTB)	0.9 + (unconfined compressive strength in psi ÷ 1000)

Gravel Equivalents of Full Depth Asphalt Concrete

AC Thickness (Ft.)	Traffic Index *								
	6	7	8	9	10	11	12	13	14
0.55	1.30	1.20	1.12	1.05	1.00	0.95	0.92	0.87	0.85
0.60	1.44	1.33	1.24	1.17	1.10	1.06	1.02	0.97	0.94
0.65	1.60	1.48	1.38	1.30	1.23	1.17	1.13	1.08	1.05
0.70	1.79	1.65	1.54	1.45	1.37	1.31	1.26	1.20	1.17
0.75	1.97	1.82	1.70	1.60	1.52	1.45	1.39	1.33	1.29
0.80		1.99	1.86	1.75	1.66	1.59	1.53	1.46	1.41
0.85		2.14	2.00	1.88	1.78	1.70	1.64	1.56	1.52
0.90		2.31	2.17	2.04	1.93	1.84	1.77	1.69	1.64
0.95			2.35	2.21	2.09	2.00	1.92	1.83	1.78
1.00			2.51	2.36	2.23	2.13	2.05	1.96	1.90
1.05			2.67	2.51	2.38	2.27	2.18	2.08	2.02
1.10				2.68	2.54	2.42	2.33	2.22	2.16
1.15				2.83	2.68	2.56	2.46	2.35	2.38
1.20					2.82	2.70	2.59	2.48	2.40
1.25					2.98	2.85	2.74	2.62	2.54
1.30					3.15	3.00	2.89	2.76	2.68
1.35						3.16	3.03	2.90	2.81
1.40						3.31	3.18	3.04	2.95
1.45						3.47	3.33	3.18	3.09
1.50							3.48	3.32	3.22
1.55							3.62	3.46	3.36
1.60							3.77	3.61	3.50
1.65								3.76	3.65
1.70								3.90	3.78
1.75								4.06	3.94

* Safety Factor of 0.10 to be added to total GE before entering TI Column.

R-value :	Class B CTB = 80	ASB Class 1 = 60
	AB = 78	ASB Class 2 = 50
		ASB Class 3 = 40
		ASB Class 4 = 50

CHART 2.
(3 of 3)

Botanical Name	Common Name	Size	Crown Diameter	Evergreen	Flowering	Drought Resistant	Growth Rate	Street Tree	Parking Lot	Well	Landscape Strips	Medians	Spacing	Comments
Acer Buergeranum	Trident Maple	M	20				M	X		4'x4'	6'		30'	Native to China. Small tree with a height of 20-25 feet. Adaptable to urban conditions. Good tree for tight locations and under utility lines. Displays a nice red or orange fall color.
Acer Campestre	Hedge Maple	S	30				M	X	X	No	10'		34'	*
Acer Freemanii	Maple, "Autumn Blaze"	M	30				F	X	X	No	10'		35'	
Acer Palmatum	Japanese Maple	M	20		X		S	X		4'x4'	10'		30'	
Acer Platanoides	Norway maple, Easy Street Maple, "Ezestre"	M	20				M		X	4'x4'	10'		30'	*
Acer Rubrum	Maple, "October Glory"	M	30				M	X	No	No	10'		35'	*
Acer Truncatum x Plat.	Pacific/Norwegian	M	25				M		X	No	10'		30'	*
Arbutus Undeo	Sunset Maple Strawberry Tree, "Marina"	S	20		X		M	X		4'x4'	10'		30'	*
Brachychiton Populneus	Bottle Tree	M	25	X	X		M	X		No	10'		30'	*
Carpinus Betulus	European Hornbeam	M	25				M	X			10'		30'	*
Catalpa x Chitalpa Teshkentensis	Chitalpa	S	20		X		F		X	4'x4'	10'			*
Cedrus Deodara	Deodar Cedar	L	30	X		Y	M	X		No	10'	16'	40'	
Celtis Australis	European Hackberry	L	35				M	X	X	6'x6'	8'	16'	40'	Mediterranean native. The Asian woolly aphid is a new pest as of summer 2002. Do not plant in areas where aphid drip would be a problem. Until recently this tree has been free of problems. A good large growing shade tree well adapted for urban use. This is a large tree that can reach 70'. No fall color. Prefers more water than K. paniculata
Cercidium x "Desert Museum"	Desert Museum Palo Verde	M	25	X		X	M		X					
Cercis Reniformis	Redbud, "Oklahoma"	S	20		X		M	X		4'x4'	10'		30'	*
Chilopsis Linearis	Desert Willow	S	20		X	X	M	X		4'x4'	6'			
Cornus Controversa	Giant Dogwood	M	30				S		X					
Diospyros Virginiana	Persimmon (male clones)	M	20				M		X					
Ginkgo Biloba	Ginkgo, "Autumn Gold" (male clones)	L	30				S	X	X	4.5'x4.5'	6'		30'	Native to China but once grew world wide. Great street trees with great fall color. Leaves turn gold and drop all at once. They work well around hardscape, are adaptable to urban conditions and there are not currently any disease or pest problems.
Koelreuteria Elegans	Formosan	M	25				M		X					

Botanical Name	Common Name	Size	Crown Diameter	Evergreen	Flowering	Drought Resistant	Growth Rate	Street Tree	Parking Lot	Well	Landscape Strips	Medians	Spacing	Comments
Koelreuteria Paniculata	Flame Tree / Flamegold Goldenrain Tree	M	30		X	X	M	X		4.5'x4.5'	6'		30'	Native to China. This is a small, slow growing tree around 25' that flowers in the summer. Avoid planting in litter sensitive areas. This tree is drought tolerant. Good under utility lines. High water needs. Does poorly in heavy clay or compacted soils.
Lagerstroemia Indica	Crape Myrtle	S				X		X		4'x4'	5.5'		30'	Native to China. Showy summer flowers. Different cultivars have flower colors red, pink and white. Good as a multi-trunk and standard form. Good tree for tight spots and utility lines. Use mildew resistant hybrids Lagerstroemia x fauriei cultivars typically with Indian names, such as 'Tuscarora'.
Laurus Nobilis	Grecian Laurel	S	25	X			M	X		4'x4'	10'			*
Liriodendron Tulipifera	Tulip Tree	L	30		X		F	X		5'x5'	10'	16'	40'	Native to the Eastern USA. A large, fast growing tree that flowers in late spring. Aphids can be a problem but all in all a good street tree.
Malus Arnoldiana	Arnold Crabapple	S	20		X		M	X		4'x4'	10'			*
Metasequoia Glyptostroboides	Dawn Redwood	M	25				M		X					
Olea Europaea	Fruitless Olive, "Swan Hill"	M	25	X		X	S	X		4'x4'	8'	16'	40'	
Pinus Canariensis	Canary Island Pine	L	30	X		X	F	X		No	8'	16'	40'	
Pistacia Chinensis	Chinese Pistache - Fruitless Varieties Only, "Keith Davey" (male clones) Chinese Pistache - Fruitless Varieties Only, "Pearl Street", "Red Push" (male clones)	L	30				M	X	X	4.5'x4.5'	6'		30'	Native to China. This is a medium to large growing shade tree. Height is generally around 40' but can reach 50'. It's a great street tree that is well behaved around concrete. The fall color is great. This tree does not like soggy, poorly drained soils.
Prosopis Alba	"Colombia" Colorado Mesquite, "Colorado"	M	25	X		X	M		X					
Prunus	Cherry, "Cascade Snow"	S	20		X		M		X					
Prunus Cerasifera	Plum, "Thundercloud"	S	20		X		F		X					Large shrub, good screen; not typically a street tree, produces fruit
Quercus Agrifolia	Coast Live Oak	L	35	X		X	M	X	X	No	10'	16'	40'	Native to California. Evergreen of variable size 40'-70' and equal in width. Smooth, dark gray bark and dark green leaves that are glossy on the surface. This tree does not like to be over watered and likes areas without turf.
Quercus Buckleyi	Texas Red Oak	L	35			X	M	X		No	10'	16'		

Botanical Name	Common Name	Size	Crown Diameter	Evergreen	Flowering	Drought Resistant	Growth Rate	Street Tree	Parking Lot	Well	Landscape Strips	Medians	Spacing	Comments
Quercus Frainetto	Forest Green Oak	L	35			X	M	X	X	No	10'	16'	40'	This is an upright growing, vigorous oak with a strong central leader. Drought resistant and adaptable, its glossy deep green foliage and strong symmetrical shape make it one of the best looking trees all summer.
Quercus Ilex	Holly Oak	L	35	X			M		X					May produce fruit. 'Krauter Vesuvius' is fruitless
Quercus Lobata	Valley Oak	L	35			X	M	X	X	No	10'	16'	40'	Native to California. This is a large drought tolerant deciduous tree. It is considered to be the monarch of the oak species. This tree can reach 70' or greater with an equal spread. Does not like to be over watered.
Quercus Robur	English Oak	L	35				M	X		No	10'	16'	40'	Native to eastern USA. Medium to large tree can reach 70'. Leaves are matte dark green and has a wonderful red fall color. Deep rooted.
Quercus Shumardii	Shumard Red Oak	L	35			X	M	X		5'x5'	8'		40'	Native to eastern USA. Medium to large tree can reach 70'. Tolerates urban conditions. Has a dependable fall color in orange and reds.
Quercus Shumardii	Shumard Red Oak	L	35			X	M	X		5'x5'	8'		40'	Native to eastern USA. Medium to large tree can reach 70'. Tolerates urban conditions. Has a dependable fall color in orange and reds.
Quercus Suber	Cork Oak	L	35	X		X	M	X	X	5'x5'	8'		40'	Native to the western Mediterranean and North Africa. Evergreen tree of moderate growth rate to 70'. Trunk and main limbs covered with thick, corky bark which add a lot of interest. Leaves are shiny dark green.
Quercus Virginiana	Southern Live Oak	L	35	X			M		X					Native to southern coast plains in the US. Large growing evergreen tree with waxy dark green leaves. This is a moderate to fast grower that handles turf well.
Quercus Wislizenii	Interior Live Oak	L	35	X		X	M	X		5'x5'	8'	16'	40'	Native to interior California and southern Oregon. An evergreen tree of medium size up to 50'. Wide-spreading branches with attractive green foliage.
Robina Ambigua	Locust, "Purple robe"	L	30		X	X	F	X				16'		
Sapium Sebiferum	Chinese Tallow	L	30				F		X		6'			
Sequoia Sempervirens	Coast Redwood	L	25	X			F							

Botanical Name	Common Name	Size	Crown Diameter	Evergreen	Flowering	Drought Resistant	Growth Rate	Street Tree	Parking Lot	Well	Landscape Strips	Medians	Spacing	Comments
Syringa Reticulata	<i>Ivory Silk Japanese Tree Lilac</i>	M	20		X		M		X					
Taxodium Distichum	<i>Montezuma Bald Cypress</i>	L	30				M	X	X		No	16'		
Tilia Cordata	<i>Littleleaf Linden</i>	M	30				M	X			10'	16'	40'	
Ulmus Parvifolia Sempervirens	<i>Chinese Elm, Upright</i>	L	30			X	F	X	X	No		16'	40'	
Ulmus Wilsoniana	<i>Varieties, "Athena", "Allee" Hybrid Elms, "frontier", "Prospector"</i>	M	25				M	X	X	4'x4'	10'			
Vitex Agnus-Castus	<i>Chaste Tree</i>	S	20		X	X	S	X		4'x4'	10'			
Xylosma Congestum	<i>Shiny Xylosma</i>	S	20	X			F		X					



City of Rohnert Park

Traffic Design Standards

**TRAFFIC DESIGN STANDARDS
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Design Standards

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ENGINEER'S LIST OF APPROVED ITEMS

for use with Traffic Signal Design Standards

Approved _____ **Date** _____

1. Traffic Signals – C. Traffic Signal Controller, 170E or 2070E
Products listed on the Caltrans Qualified Products List (QPL)
<http://www.dot.ca.gov/hq/traffops/electsys/TEES.htm>
2. Traffic Signals – D. Traffic Signal Controller Cabinet, Model 332L
Products listed on the Caltrans Qualified Product List (QPL)
<http://www.dot.ca.gov/hq/traffops/electsys/TEES.htm>
3. Traffic Signals – E. Traffic Signal Service Cabinet
Tesco type III-BF service cabinet
4. Traffic Signals – J. Detection
Econolite, Autoscope Video Detector System,
<http://www.econolite.com/products/detection.aspx>
ITERIS, <http://www.iteris.com/solutions/detection>
MS SEDCO, http://mssedco.com/intersector_sensor.htm
Aldis, GridSmart, <http://www.aldiscorp.com/gridsmart/> on certain applications with
City Engineer approval.
5. Emergency Vehicle Pre-emption
EMTRAC Systems, <http://emtracsystems.com/>

TRAFFIC DESIGN STANDARDS

GENERAL

- A. Traffic Standards shall be used for all public streets in the City of Rohnert Park.
- B. The purpose of the standards and specifications contained herein is to establish uniform policies and procedures for traffic engineering functions of the City of Rohnert Park. It is neither intended as, nor does it establish, a legal standard for these functions.
- C. The following Traffic Standards designated for use in the City of Rohnert Park substantially comply with the California Manual on Uniform Traffic Control Devices (also known as the California MUTCD), the State of California Standard Specifications, and the State of California Standard Plans; they are to be used in conjunction with the named references for any project within the public right-of-way. Deviations from these standards shall be granted only upon specific written approval of the City Engineer.
- D. The latest version of the California MUTCD shall be assumed whenever referenced.
- E. These standards are considered minimum and do not preclude the use of a higher standard as directed or approved by the City Engineer.
- F. Encroachment onto any City street or right-of-way shall require an encroachment permit issued by the City of Rohnert Park.

DEFINITIONS

“Bike Lane” (see definition in Street Design Standards).

“CAMUTCD” shall mean the California Manual on Uniform Traffic Control Devices, latest edition as adopted by the California Department of Transportation, found on the internet at the following address: <http://www.dot.ca.gov/hq/traffops/engineering/mutcd/index.htm>.

“City Traffic Engineer” shall mean the City Engineer.

“Collector Street” (see Major Collector & Minor Collector definitions in Street Design Standards).

“FHWA” shall mean Federal Highway Administration

“Public Street” (see definition in Street Design Standards).

“Sidewalk” (see definition in Street Design Standards).

“Street” (see definition in Street Design Standards).

“Traffic Standard Plan” shall mean a typical traffic standard detail of the Traffic Standards and Details of the City of Rohnert Park and Caltrans Standard Plans.

“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.

1. 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 materials.
2. Unless otherwise specified by the City Engineer, the thickness of all roadside signs shall be .080 inches, except for mast-arm overhead mounted signs which shall be 0.125 inches.
3. Unless otherwise specified by the City Traffic Engineer, the following sign dimensions shall be used for all warning and regulatory signs:
 - a. Federal sign specifications as found in the FHWA Sign Specifications, and California sign specifications as found in the California Sign Specifications.
 - 1) FHWA signs shall conform to the dimensions for Conventional Road signs indicated by a C, unless otherwise specified in the City of Rohnert Park Traffic Standards or directed by the City Traffic Engineer.
 - 2) California signs shall conform to the dimensions for STANDARD sizes when more than one set of dimensions are offered. In some instances STANDARD is not specified, and the size of the sign shall then be approved by the City Traffic Engineer.
 - b. All Stop Signs shall be 36”x36” in size. At All-Way-Stop controlled intersections the stop sign shall be accompanied with R1-3P “All-Way” plates.
 - c. The Standard Size Dimension shall be used for the R73 series.
 - d. The R81 Bike Lane sign shall be 18”x24” in size.

- e. The FHWA sign for School Pedestrians (S1-1) shall be 30"x30" in size.
 - f. The R49 shall be used for pedestrian barricades, in accordance with California Sign Specifications.
 - g. R1-5 signs shall be 30"x30".
 - h. Signs larger than the standard sign may be required or may be granted by written approval by the City Engineer.
4. For No Parking, No Stopping, and Bike Lane signs, the words "Begin" and "End" shall be used in place of arrows.
 5. Regulatory, warning and guide signs shall be retroreflective to show the same shape and similar color by both day and night, pursuant to California Manual of Uniform Traffic Control Devices latest edition. The retroreflective sheeting and retroreflective lettering shall be warranted for a minimum of 10 years. Retroreflective sheeting and lettering of other traffic signs may be required, as specified by the City Engineer.
 6. Reflective sheeting shall be used in construction of traffic signs according to the following:
 - a. Engineer Grade (Table A)
All signs not indicated below.
 - b. Long Distance Performance Grade (Table B)
Stop signs, yield signs, stop ahead signs, speed limit signs, keep right signs, no U-turn signs, mast-arm mounted street name signs, street name signs, chevrons, wrong way signs, end-of-road signs, and type 1, 2 and 3 object markers.
 - c. Visual Impact Performance Grade (Fluorescent Yellow Green) (Table C)
Pedestrian crossing signs, school pedestrian signs, bicycle warning signs, and associated supplemental arrows.
 - d. High Intensity
All warning signs shall use at minimum high intensity sheeting (Table B).

Table A – Minimum Coefficient of Retroreflection RA (cd/lux/m²) for Engineer Grade Reflective Sheeting

Color	Observation	Entrance Angle		
	Angle	-4°	30°	40°
White	0.2°	80	35	---
	0.5°	41	21	---
	1.0°	---	---	---
Yellow	0.2°	50	22	---

	0.5°	25	13	---
	1.0°	---	---	---
Red	0.2°	14.5	6.0	---
	0.5°	7.5	3.0	---
	1.0°	---	---	---
Green	0.2°	9.0	3.5	---
	0.5°	4.5	2.2	---
	1.0°	---	--	---
Blue	0.2°	4.0	1.7	---
	0.5°	2.0	0.8	---
	1.0°	---	---	---
Brown	0.2°	2.0	1.0	---
	0.5°	1.0	0.5	---
	1.0°	---	---	---

**Table B – Minimum Coefficient of Retroreflection RA (cd/lux/m²)
For High Intensity Grade Retroreflective Sheeting**

Color	Observation	Entrance Angle		
	Angle	-4°	30°	40°
White	0.2°	250	175	95
	0.5°	95	70	55
	1.0°	10	9.5	9.0
Yellow	0.2°	170	135	50
	0.5°	62	60	40
	1.0°	9.0	8.5	8.0
Red	0.2°	45	30	12
	0.5°	15	12	10
	1.0°	2.0	1.5	1.0
Green	0.2°	45	30	12
	0.5°	15	12	10
	1.0°	1.0	0.8	0.5
Blue	0.2°	20	11	6.0
	0.5°	75	5.0	4.0
	1.0°	0.5	0.3	0.1
Brown	0.2°	12	8.5	2.8
	0.5°	5.0	3.5	2.5

1.0° 0.5 0.3 0.1

**Table C –Minimum Coefficient of Retroreflection RA (cd/lux/m²)
For Visual Impact Performance Reflective Sheeting**

Color	Observation	Entrance Angle		
	Angle	-4°	30°	40°
Fluorescent	0.2°	240	150	55
Yellow	0.5°	165	75	15
	1.0°	45	24	6
Fluorescent	0.2°	325	200	75
Yellow	0.5°	236	100	23
Green	1.0°	65	35	8

B. Traffic Sign Installation

1. All poles shall be 2-inch square unistrut galvanized steel, in conformance with the City Standard Plan STD-705B.
2. Where poles are to be installed in finished surfaces, a minimum 4-inch diameter hole shall first be core drilled to a depth of 36 inches, in conformance with City Standard 705B. The pole shall be set using a 1/3 cement to 2/3 sand mix.
3. Where poles are to be installed in unfinished surfaces, an 8-inch diameter hole shall first be dug to a minimum depth of 36. The pole shall be set using 1 part cement to 2 parts sand mix and 3 parts gravel.
4. Signs shall be installed in accordance with the following specifications and facing traffic in the lane adjacent to which the sign is installed.
 - a. “No parking” signs shall be installed at a 30-degree 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.
 - b. Signs in the median area shall be placed midway between curbs. These signs shall be mounted no closer than six inches from the edge of traveled way, and no farther than six feet from the edge of the traveled way which the sign faces.
 - c. Typical installations shall conform to the requirements of Traffic Standard Plan 701.

- d. The minimum mounting height for signs shall be seven feet, measured from the bottom of the sign to the near edge of the pavement, except as otherwise noted below.
- e. The height to the bottom of a secondary sign mounted below a primary sign shall be a minimum of seven feet, measured from the bottom of the sign to the near edge of the pavement.
- f. 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.
- g. Bicycle Wrong Way R5-1h signs shall be installed at the approach to intersections and facing opposite to traffic. They should be installed approximately 100 feet from the intersection or as directed by the City Traffic Engineer.

5. Street Name Signs

- a. Overhead street name signs shall be mounted at all signalized intersections.
- b. Signs shall conform to the requirements of Traffic Standard Plan 703A.
- c. Street name signs installed at signalized intersections shall be mounted to the mast arm per Traffic Standard Plans 703A and 703B. One overhead sign shall be mounted on each mast arm.
- d. Single-sheet, double-faced signs shall be used.
- e. Where the street changes names at the intersection, the far side mast arm shall display the name of the street to the right and the near-side mast arm shall display the name of the street to the left.
- f. When the street name sign is to be mounted on a portion of the mast arm that is level, Hawkins M10J-OCB250FL sign brackets or approved equal shall be used.
- g. When the street name sign is to be mounted on a portion of the mast arm that is curved, Hawkins M10J-OCB250AL adjustable sign brackets or approved equal shall be used.
- h. Three-quarter (3/4) inch heavy duty stainless steel .032" straps shall be used for street sign installation.
- i. With the written permission of the City Engineer, where mast arm mounted signs cannot be used, street name signs installed at signalized intersections shall conform to the requirements of Traffic Standard Plan 705C and the following requirements:
 - 1). Street name signs shall be mounted to the traffic signal standard by the use of a heavy

- duty arm bracket for electrolier mounting.
- 2). Two sets of street name signs shall be mounted at each signalized intersection.

- c. The mounting location at non-signalized intersections shall conform to Traffic Standard Plan 705D.

6. Advance Street Name Signs

- a. Advance street name signs shall be placed on all arterial streets, and collector streets as required by the City Traffic Engineer. Advance street name signs shall be installed in advance of the street in accordance with California MUTCD guidelines for advance placement of warning signs, Condition A. No advance street name signs shall be placed where the distance between side streets is shorter than 200 feet curb to curb.
- b. Advance street name signs shall conform to the requirements of Traffic Standard Plan 704A.
- c. Advance street name sign installation shall conform to the requirements of these Traffic Sign Installation Design Standards and Traffic Standard Plan 704A & 704B.
- d. On streets without a raised median, the advance street name sign shall be mounted on luminaire poles where possible. If luminaire poles are not available, the advance street name sign shall be pole-mounted on the right side of the traveled way.
- e. When mounted on luminaire poles or in a sidewalk setting, the advance street name sign shall be mounted off-center, if necessary, to achieve the minimum setback from the edge of the traveled way per these Design Standards and Traffic Standard Plan 704C.
- f. Sign braces shall be used on pole-mounted advance street name sign installations per Traffic Standard Plan 704B.

2. PAVEMENT MARKINGS

- A. The following City Standards and Specifications are in substantial conformance with the CA MUTCD and the State of California Standard Plans and Specifications, and are to be used in conjunction with these named references.
- B. 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.

- C. Unless otherwise specified by the City Traffic Engineer, the following State of California Standard Plan details shall be used for all pavement marking installed in Rohnert Park. The CA MUTCD details are indicated for cross referencing.
1. Centerlines shall conform to Caltrans Standard Plan A20A Detail 4. Refer to CA MUTCD figure 3A-101.
 2. Lane lines shall conform to Caltrans Standard Plan A20A Detail 10. Refer to CA MUTCD figure 3A-102.
 3. No-passing zones shall conform to Caltrans Standard Plan A20A Detail 23. Refer to CA MUTCD figure 3A-104.
 4. Left edge lines adjacent to raised medians shall conform to City of Rohnert Park Traffic Standard 721.
 5. Striped median islands shall conform to Caltrans Standard Plan A20B Detail 30.
 6. Two-way left turn lanes shall conform to Caltrans Standard Plan A20B Detail 33. Refer to CA MUTCD figure 3A-108.
 7. Channelizing lines shall conform to Caltrans Standard Plan A20D Detail 38. Refer to CA MUTCD figure 3A-112. Channelizing lines with bike lanes shall conform to Caltrans Standard Plan A20D Detail 38A. Refer to CA MUTCD figures 9C-1, 9C-4, 9C-5, and 9C-6.
 8. The 8-foot Type IV arrow shall be used for left- or right-only lanes, and the 10-foot Type I arrow shall be used for through-only lanes. Arrows shall conform to Caltrans Standard Plan A24A. Refer to CA MUTCD figure 3B-24.
 9. For all markings relating to bicycle facilities, refer to the CA MUTCD Part 9, Traffic Controls for Bicycle Facilities.
 10. Bicycle detector pavement markings as shown in CA MUTCD figure 9C-7 shall be installed at signalized intersections at all approaches that have bicycle detection, as directed by the City Traffic Engineer. The specific location shall be determined by the City Engineer.
 11. Unless otherwise specified by the City Engineer, the design width for all Class 2 bicycle lanes shall be a minimum of six feet wide for new construction and a minimum of five feet wide on existing roadways, as measured from the face of curb to the center of the bicycle lane line.
 12. There shall be a minimum of three feet between the lip of the gutter and the 6-inch bike lane line.
 13. Bike lanes where parking is permitted shall include the optional 4-inch white marking shown in the MUTCD, figure 9C-102 for applications without parking stalls.
 14. The standard pavement marking shall be the words BIKE LANE with an arrow indicating the direction of travel, placed in the center of the bicycle lane. BIKE LANE shall be located 40 feet beyond the curb return. On long blocks the BIKE LANE shall be repeated every 1500 feet.
 15. The solid bike lane line shall be dropped 96 feet in advance of the intersection, and a broken line carried to the intersection.
 16. When installing an intersection limit line, the location shall correspond with possible future crosswalk alignment.

17. Crosswalks installed at a controlled intersections (stop control or signalized) shall use the standard two-bar design. For uncontrolled locations, the continental design shall be used. Two-foot by ten-foot blocks shall be centered on each lane line, centerline, and center of each lane (except bike lanes), to avoid wheel path of vehicles.

D. Pavement Marking lines and legends

All pavement markings shall be thermoplastic pavement markings, on both public and private improvements. At the discretion of the City Engineer, pavement marking paint may be substituted for thermoplastic.

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. All paint and thermoplastic shall be lead free.
3. 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.
4. 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).
5. The following markings shall be installed with the indicated materials:
 - a. 4" edge lines shall be thermoplastic with 1.9 and 2.4 index microcrystalline ceramic beads.
 - b. 6" bicycle lane lines shall be thermoplastic with 1.9 and 2.4 index microcrystalline ceramic beads.
 - c. 8" channelizing lines shall be raised pavement markers and extruded thermoplastic. When adjacent to a bike lane, the raised pavement markers shall be excluded. In existing pavement they shall be thermoplastic with 1.9 and 2.4 index microcrystalline ceramic beads.
 - d. Crosswalks, legends, symbols and arrows shall be extruded thermoplastic.

E. Raised Pavement Markings

1. Raised pavement markers shall conform to the shape, types and dimensions of State of California Standard Plan A-20A.
2. All non-reflective raised pavement markers (RPMs) shall be ceramic and shall conform to the requirements and applicable provisions of Section 85 of the most recent State of California Standard Specifications.
3. All retroreflective pavement markers shall conform to the requirements and applicable provisions of Section 85 of the most recent State of California Standard Specifications.
4. The contractor shall provide manufacturer's specifications for all materials prior to the start of work.

5. 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.

F. 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 designed and installed in accordance with the most current California Department of Transportation *Traffic Manual* or as specified by the City Engineer.
5. Temporary pavement markings shall be maintained and replaced by the Contractor until removed in preparation for the next paving course or replaced with durable pavement markings applied on the final wearing course.
6. The Contractor shall remove all temporary pavement markings prior to the next pavement course being applied.
7. Temporary pavement markings shall be applied to clean, dry surfaces in accordance with the manufacturer's recommendations.

G. Pavement Markings Notes

1. Words, symbols, and traffic striping shall conform to the applicable shape, sizes, and colors as outlined in the most current California Department of Transportation *Traffic Manual* or as required by the City Engineer.
2. Existing pavement markings conflicting with the proposed striping shall be removed immediately prior to the placement of the new markings.
3. Eradication of pavement markings (paint and thermoplastic) shall be completed by means mechanical grinding. Painting over as a means of pavement marking eradication shall not be permitted. All holes left in the pavement due to the removal of raised pavement markers shall be filled with enough adhesive to leave a level surface.
6. All pavement markings damaged by a contractor during construction shall be replaced in kind. Temporary markings shall be used until permanent markings are applied.
7. Temporary pavement markers shall be installed prior to the removal of any temporary work zone traffic controls, to provide delineation until the permanent pavement markings are installed or replaced. Damaged or missing temporary markers or markings shall be replaced daily until the permanent markings are installed.

8. Any asphalt concrete dikes installed for pedestrian paths must be painted white with retroreflective beads applied per Caltrans Standard Specification, section 84. The top surface and both sides shall be painted.
9. Crosswalk markings which are trenched through or partially removed due to construction shall be ground out in their entirety and replaced according to current City of Rohnert Park Traffic Standards, or as directed by the City Traffic Engineer.

3. TRAFFIC SIGNALS

A. General

1. The following City Standards and Specifications are in substantial conformance with the CA MUTCD and the State of California Standard Plans and Specifications, and are to be used in conjunction with these named references.
2. Traffic signal and safety lighting equipment shall comply with the requirements of the applicable provisions of Section 86 of the most recent California Standard Special Provisions, Standard Specifications, Standard Plans and Transportation Electrical Equipment Specifications (TEES), these traffic standards, and as required by the City Engineer. All traffic signals shall use LED lighting.
3. Foundations for traffic signal standards shall be constructed per the applicable California State Standard Plans and as required by the City Engineer.
4. All Traffic Signal designs in Rohnert Park shall be approved by the City Traffic Engineer.
5. All deviations from these Specifications shall be approved in writing by the City Traffic Engineer.

B. Traffic Signal Poles, Steel Pedestals, and Posts

1. Traffic signal poles, arms, and related appurtenances shall be installed in accordance with the requirements of the California State Standard Plans or 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 2 inch minimum diameter and shall be smoothed after galvanizing to facilitate installation of conductors without damaging the insulation.
3. Each pole shall include one 3 inch x 5 inch minimum hand hole for wiring, located within one foot of the base and on the same side of the pole as the mast arm.

C. Model 170E Traffic Signal Controller – Supplemental to California Specification Section 86-3.011.

1. Controller assemblies shall include Model 170E traffic signal controller units and shall conform to the requirements of the most current edition of the “Traffic Signal Control Equipment Specifications,” issued by the California Department of Transportation, and to all addenda thereto and

be furnished by the contractor. If specified by the City Traffic Engineer, a Type 2070 controller may be required, which shall conform to the most current Caltrans "Traffic Control Equipment Specification" and all addenda, and as specified on the Engineer's List of Approved Items For Use with the City of Rohnert Park Traffic Standards.

2. A listing of field conductor terminations for each contractor-furnished controller cabinet shall be provided to the City at the job site.
3. The power supply shall be a ferro-resonant type of transformer. Linear and switching power supplies shall not be acceptable.
4. The controller shall have a minimum of eight kilobytes of battery-backed RAM memory on the CPU board.
5. The CPU power control circuitry shall be located on the CPU board.
6. The ACIA baud rates shall be jumper selectable from 19.2 KHz to 307.2 KHz.
7. The controller shall be designed to support three additional ACIA auxiliary communication adaptor ports at addresses 6002/6003.
8. The standby battery assembly shall be located on the front panel swing-out assembly, and shall be easily accessible for maintenance and testing purposes.

D. Traffic Signal Controller Cabinet – Supplemental to California Specification Section 86-3.04

1. The controller cabinet shall be a Type 332L as specified and shown in the Caltrans Traffic Signal Control Equipment Specification, and as specified on the plans and approved by the City Engineer.
2. When the controller is not used, conduit shall run directly to the pull box.
3. The controller cabinet shall be constructed of anodized aluminum and mounted no closer than four feet from the service cabinet.
4. The foundation for the Type 332L cabinet shall conform to the Caltrans Standard Plan ES-3C, Detail D.
5. Design shall conform to these requirements except as otherwise approved in writing by the City Engineer.
6. The cabinet shall provide for housing of a battery backup system (BBS) in conformance with Caltrans Standard Specifications.

E. Traffic Signal Service Cabinet - Supplemental to California Specification Section 86-2.11

1. The traffic signal service cabinet shall be a Type III-BF, in accordance with Caltrans Standard Plan ES-2E, and shall meet the following requirements:

a. Inside dimensions

	Minimum	Maximum
Height	41 inches	45 inches
Width	11-3/4 inches	19 inches
Depth	8-1/4 inches	10-1/2 inches

- b. 12-gauge steel treated with primer and two coats of baked-on enamel or electrostatically applied thermosetting polyester.
 - c. A provision for reading the service meter through a window without opening any doors shall be provided. The window shall be clear glass, Lexan or plastic.
 - d. The cabinet shall be watertight with a weatherproof door and window.
- 2. The foundation shall be a Type III-B, in accordance with Caltrans Standard Plan ES-2E, and shall be 24 inches deep below ground level and constructed in accordance with Section 86-2.03 of the California State Specifications.
- 3. The cabinet shall be located no closer than six feet from the distribution pole or pull box.
- 4. The cabinet shall be mounted no closer than four feet from the traffic signal controller cabinet.

F. Conduit

- 1. Conduit shall comply with Section 86-2.05 of the California Standard Specifications and the following requirements:
 - a. Service run conduit shall be 2-inch minimum diameter.
 - b. Any signal run and interconnect conduit shall be 2-inch minimum diameter.
 - c. Conduit under sidewalk or planter areas shall have a minimum of 24 inches of cover.
 - d. All signal interconnect conduit runs shall contain two (2) 2 inches minimum diameter conduit, one with signal interconnect cable and one spare. Signal interconnect conduit shall connect with the main traffic signal pull box for each traffic signal in the run. For signal modifications, the signal interconnect conduit should run exclusively to the 48" box.
 - e. Conduits from the main pull box to the controller shall be two (2) 3-inch diameter.
 - f. Conduits under any street shall be 3-inch minimum diameter and shall have a minimum of 24 inches of cover.
- 2. All conduits shall be Schedule 40 PVC, except pole risers, which shall be Schedule 80 PVC.
- 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 conduits shall have a flat, woven, lubricated soft fiber polypropylene tape (per Caltran's Specifications) provided inside along its entire length and extending 24 inches out of each end.
- 6. After conduits, wire and tape 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. There shall be no cutting of existing conduit to create a window for viewing the contact of the conduit. Any conduit that is cut or broken, whether intentionally or not, shall be replaced at the contractor's expense.
8. Design shall conform to these requirements except as otherwise approved in writing by the City Engineer.

G. Pull Boxes

1. All pull boxes shall be #5 concrete (California Standard Plan No. ES-8), except the main pull box which shall be a 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. Pull boxes subjected to vehicular travel shall be installed with one-quarter inch steel plate covers (galvanized after fabrication) with a diamond-type cover surface.
4. All pull boxes shall be bolted.
5. 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.
6. Design shall conform to these requirements except as otherwise approved in writing 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 Standard Specifications, or as specified herein.
2. All conductors shall be copper and be rated for 600-volt operation.
3. All conductors shall conform to the most current requirements of the National Electric Code (NEC) and shall be labeled by Underwriter's Laboratories, Inc.
4. Colored stripes shall be placed on conductor insulation to identify each phase of vehicle signals, pedestrian signals, pedestrian push buttons, and detectors.
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 a pedestrian push button common installed into the controller.
 - d. Three for spares under each street.

8. Signal Interconnect cable shall be 19AWG, 25-pair (branches) or 50-pair (main run), and meet IMSA Spec. 40-2 requirements, or as determined by the City Engineer.
9. #8 AWG conductors shall be used from the utility service point to service cabinet for traffic signals and safety lights.
10. All signal interconnect cable shall be run exclusively in signal interconnect conduit until the 48" box near the controller cabinet. Signal interconnect cable shall never be run with signal cable.

I. Wiring

1. There shall be no splices of the conductor hot leads for traffic signal light, pedestrian signal light and pedestrian push button in any pull box. There shall be no splicing of interconnect cable and video cable in any pull box. Ground wires may be spliced in pull boxes. All terminal crimps and splices shall be soldered.
2. Subject to Manufacturers recommendation, splicing in pull boxes shall be allowed for the traffic signal neutral, pedestrian push button commons, ground wires and multiple lighting conductors. These shall be straight splices in conformance with Method "A" as shown on California State Standards Plan ES-13A. Tap splices for signal neutral and multiple lighting conductors shall be Type "C" as shown on California State Standard Plan ES-13A.
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 the conductor termination.
4. Identification shall be made 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 in writing by the City Engineer.

J. Detection

1. Video detection shall be used for all approaches. Unless otherwise specified by the City Engineer, video detection equipment shall be selected from the Engineer's List of Approved Items.
2. The detection zone shall extend from the limit line to 60 feet back.
3. Inductive loops shall be used for all advance loops.

K. Loop Detector Wiring

1. All loops shall be type E in accordance with California State Standard Plan No. ES-5B unless otherwise noted, and shall be installed in

accordance with the details shown on the most current California State Standard Plans.

2. Each lane shall have one shielded cable pair lead-in continuous to controller.
3. Splicing of shielded cable pair lead-in is prohibited.
4. Loop wire shall be #12 AWG stranded conductor with USEXLP insulation or Caltrans Type 2.
5. Detector lead-in cable shall be Type B in accordance with the most recent California State Specifications.
6. Detector lead-in cables shall be permanently and clearly marked at cabinet and pull boxes.
7. All advance loop detectors shall have their own detector lead-in cable per approach lane.
8. Type "A" detector hand holes shall be installed per California State Standard Plan No. ES-5D.
9. Design shall comply with these requirements except as otherwise approved by the City Engineer.

L. Detector Loop Wire Sealant

1. The sealant shall be the Elastomeric type as specified in Caltrans Standards 86-5.01A(3)(a)

M. Pedestrian Signals - **Traffic Signal Heads – Supplemental to California Specification Section 86-4**

1. All signal head sections shall be constructed of metal, not plastic.
2. All visors shall be constructed of metal and shall be the full circle type.
3. Countdown pedestrian signals shall conform to Section 4E.07 of the California MUTCD and shall incorporate 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.
4. Messages shall be lunar white WALKING PERSON and Portland Orange UPRAISED HAND (symbol type) in accordance with California State Standard Plan No. ES-3B and the Institute of Traffic Engineers, Standards: "Adjustable Face Pedestrian Signal Head Standard."
5. One of the following types of screen shall be provided, at the discretion of the contractor:
 - a. An aluminum honeycomb screen with 3/16-inch cells, 3/8-inch thick, shall be installed tilting downward, at an angle of 15 degrees (+/-2 degrees) out from the top, and shall completely cover the message plate.

The honeycomb screen shall be covered with a clear, 1/8-inch minimum thickness, acrylic plastic cover supported in an

aluminum frame, or with a 1/16-inch nominal thickness, formed, polycarbonate plastic cover. Screen and cover shall be held firmly in place by the use of stainless steel or aluminum clips or stainless steel metal screws.

- b. A 1-1/2-inch deep egg crate-type screen and mounting frame of 0.032-inch minimum thickness 5052-H32 aluminum alloy shall be provided to cover the message plates. The screening shall be mounted in a frame constructed of 0.04-inch minimum thickness aluminum alloy.

The egg crate-type screen shall be installed parallel to the face of the message plate and shall be held in place by the use of stainless steel screws.

- 6. The screen and frame shall be fabricated from aluminum anodized flat black or may be finished with flat black enamel as specified in Section 91-4.01 of the California State Standard Specifications.
- 7. Alternate methods may be substituted by the contractor for the above screens providing the results are equal to or superior to those obtained with the above-specified screens as determined by the City Engineer.
- 8. The pedestrian control system shall consist of the Polara Engineering EZ Communicator Navigator APS or approved equal to be installed at the location shown on the plans. The system shall consist of pedestrian push button stations (EN2 PBS), one Central Control Unit (CCU2EN) and an E-Configurator. Pedestrian signals shall include ADA-compliant vibrating arrow push buttons and audible sounds. The “cuckoo” output shall be used with pedestrian phases north & south. The “peep-peep” output shall be used with pedestrian phases east & west. Any variation from these phases shall be approved by the City Traffic Engineer.
- 9. Design shall conform to these requirements except as otherwise approved in writing by the City Engineer.

N. Signal preemption

All traffic signals shall provide for preemption by emergency vehicles. Traffic signals near a railroad crossing shall also provide for preemption by the railroad. Refer to Engineer’s List of Approved Items for preemption equipment.

4. Construction Area Traffic Control

A. General

The following City Standards substantially conform to the California MUTCD and the State of California Standard Plans and Specifications, and are to be used in conjunction with these named references.

- B. When normal operation of any City street or sidewalk is impacted by any construction and/or maintenance operation, compliance with appropriate temporary traffic controls used in work zones shall be required as follows:
1. All contractors, permittees, 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 ensure that all devices are in place and operating *at all times*.
 2. A temporary traffic control plan shall be required for all road closures, detours, lane closures, or other work within the public right-of-way. All Temporary Traffic Control Plans shall conform to the most current version of the California MUTCD and all provisions included in this City of Rohnert Park Standard, and be approved in writing by the City Engineer. A temporary traffic control plan may reference a Typical Application in 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 describe each work zone condition and note when each of the Typical Applications will be used. When deviation from the Typical Application is necessary, a site specific design shall be prepared by a person knowledgeable (trained and/or certified) in the fundamental principles of Temporary Traffic Controls and the work activities to be performed, and shall be approved by the City Traffic Engineer. Such plans shall include coning 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 most recent edition of the California Department of Transportation's *Manual of Traffic Controls for Construction and Maintenance Work Zones* and Traffic Standard Plans 740 through 741 shall be used as references for determining appropriate signage. 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. Work within the public right-of-way requiring lane closures, flagging, or any other activities that may impact the flow of traffic shall not be permitted during periods of peak traffic, i.e., from 7:30 AM to 8:30 AM and from 4:00 PM to 6:00 PM. Work within these specific hours shall be permitted only through written authorization of the City Traffic Engineer.
5. Flagging against a functioning traffic signal indication is prohibited.

C. Private Development Projects

1. All private development referrals shall be reviewed by the City Engineer to determine if a traffic handling plan is required for the proposed project.
2. If a traffic handling plan is required, the following paragraph shall be included in the response to the referral: "The City Engineer has determined that a Traffic Handling Plan is required for this project. This Plan shall conform to the most current California Department of Transportation's *Manual of Traffic Controls for Construction and Maintenance Work Zones* and Traffic Standard Plans 740 through 741. This Plan shall detail all methods, equipment, and devices to be implemented for traffic control upon City streets within the work zone and other impacted areas. This Plan shall be included as part of the improvement plans".
3. Projects not requiring a traffic control plan shall be required to follow standard practice for construction zone signing and traffic control during construction as per the most current edition of the California Department of Transportation's *Manual of Traffic Controls for Construction and Maintenance Work Zones* and Traffic Standard Plans 740 through 741.

D. Encroachment Permits

1. Encroachment permit applications for projects requiring road closures, lane closures or detours shall be reviewed for conditions.
2. If a traffic control plan is deemed necessary for the road closure, lane closure, and/or detour, the plan shall be approved in writing by the City Engineer prior to approval of the encroachment permit.



City of Rohnert Park

Street Lighting Design Standards

STREET LIGHTING DESIGN STANDARDS

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Volume 1

Design Standards

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STREET LIGHTING DESIGN STANDARDS

GENERAL

The purpose of the standards and specifications contained herein is to establish uniform standards for street lights on public streets in the City of Rohnert Park, 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.

- A. These Street Lighting Standards shall be used for all street lights on public streets in the City of Rohnert Park.
- 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 do not preclude the use of a higher standard.
- E. Encroachment onto any City street, right-of-way, or public utility easement shall require an encroachment permit issued by the City of Rohnert Park.
- F. Street light spacing shall be staggered and located at property lines when possible. Street light designs utilizing one side, median, or opposite configurations shall require specific approval of the City Engineer.
- G. Electrical service shall conform to the requirements of Standard Plans 603A and 603B.
- H. The City Engineer shall designate specific connection points for connecting new street lights into the existing multiple street light system. The City shall only authorize energization after City acceptance of the installation.
- I. The developer shall verify available capacity when proposing to connect to an existing multiple street light system.
- J. The following additional requirements apply to street light systems installed by private developers:
 - 1. The developer 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 authorize and request energization from PG&E.

2. The developer shall install the following in accordance with the Street Lighting Standard Plans: concrete foundations, galvanized steel poles, mast arms of the appropriate lengths, and wiring.
3. The developer shall install the entire lighting system, including luminaire.
4. All street light systems utilizing street light lamps up to, and including, 150 watts 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 City Engineer. Street light systems utilizing street light lamps above 150 watts shall require 240 volt service.

DEFINITIONS

“Average Maintained Footcandles” is the average level of horizontal illuminance on the roadway pavement when the output of the lamp and luminaire is diminished by the maintenance factors; expressed in average footcandles 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 luminous intensity. Formerly the term “candle” was used.

“City Engineer” for the purposes of the Streetlight Standards, shall mean the City Engineer of the City of Rohnert Park.

“City Traffic Engineer” (See definition in the Traffic Standards).

“Collector Street” Major Collector or Minor Collector

“Cul-de-sac street” shall have the primary purpose of serving abutting land use and connecting to the nearest appropriate local street. It is a minor street with only one outlet.

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

“Footcandle” is the illuminance on a surface one-square-foot in area on which there is uniformly distributed a light flux of one lumen.

“Industrial street” shall be public and private streets located within industrial areas as defined on the current City zoning map, or roadways that primarily serve large trucks transiting to and from retail centers.

“Illuminance” 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.

“Local street” means a street that provides access to individual sites. Local streets include Minor Streets, Neighborhood Streets, Lanes, Alleys, Utility Access Roads, Trails, Loop Streets and Cul-de-sac Streets. On-street parking is required on Minor Streets and Neighborhood Streets.

“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.

“Major arterial” means a street whose primary purpose is to facilitate movement of heavy traffic between major residential areas, or major residential areas and commercial areas with minimal access. Major arterial streets may consist of 2, 4, or 6 lanes. Intersections with local streets are permitted, provided they are right-turn-only and at least 200 feet apart, or they include a left-turn pocket. Driveways are generally not permitted. Driveways are permitted to major traffic generators, provide they are right-turn-only. A deceleration lane must be provided for each driveway. *Major traffic generators include areas designated for Regional Commercial, Office, Mixed Use, and High Density Residential uses.* No on-street parking is allowed. Major arterial streets include Parkways.

“Major collector” means to provide circulation within and between neighborhoods. Driveways are permitted, provided they are right-turn-only and at least 50 feet apart, or they include a left-turn pocket. No on-street parking is allowed. Major collector includes Boulevards.

“Minor arterial” means to provide circulation between neighborhoods, activity centers, and highways and other regional routes, and also to provide circulation in rural and open space areas. Intersections with local streets are permitted, provided they are right-turn-only and at least 200 feet apart, or they include a left-turn pocket. *This provision is intended to maximize access between neighborhoods.* Driveways are permitted, provided they are right-turn-only and at least 100 feet apart. A deceleration lane must be provided for each driveway. No on-street parking is allowed. Minor arterial streets include Parkways.

“Minor collector” means to provide circulation within and between neighborhoods. Minor collector streets shall have the primary purpose of intercepting traffic from intersecting local streets and handling traffic to the nearest arterial/regional street, or intercepting traffic from one collector street and handling traffic to another collector street. It shall serve as an access to abutting properties. Minor collector streets connect residential neighborhoods to commercial centers and service commercial districts. On-street parking is required on both sides of each segment of a one-way couplet. Minor collector streets include Avenues, Main Streets, and Industrial Streets.

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

“Street Lighting Standard Plan” shall mean a typical standard detail of the Street Lighting Standards and Details of the City of Rohnert Park.

“Uniformity Ratio” is the ratio of average footcandles of illuminance on the pavement area to the footcandles at the point of minimum illuminance on the pavement.

ASTM	American Society for Testing and Materials
FC	Footcandle
IES	Illuminating Engineering Society of North America
NEC	National Electric Code
NEMA	National Electrical Manufacturer’s Association
PG&E	Pacific Gas and Electric Company
PVC	Polyvinyl Chloride
UL	Underwriter’s Laboratories, Inc.
U/R	Uniformity Ratio

1. Roadway Illumination Requirements

- A. Design Conformity
 - 1. The design of all street light systems shall conform to the average maintained footcandle and uniformity ratio requirements of these specifications.
- B. Area Classifications
 - 1. Area classifications shall be used when determining the required illuminance 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 areas.

- b. “Intermediate” shall mean that portion of the City which is 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 areas, 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 Footcandle Requirements

- 1. The design of all street lighting systems shall conform to these illumination requirements. Evidence that demonstrates that the street lighting system conforms to 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 footcandle (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
Arterial	Commercial	.75	3:1
	Intermediate	.75	3:1
	Residential	.75	3:1
Collector	Commercial	.30	5:1
	Intermediate	.30	5:1
	Residential	.30	5:1
Minor	Intermediate	.20	4:1
	Residential	.20	4:1

D. Lateral Light Distribution

1. Lateral light distribution patterns shall conform to Illuminating Engineering Society of North America (I.E.S.) lateral light distribution patterns shown in Street Lighting Standard Plan 604
 - a. Type II lights shall be used on local roadways.
 - b. Type III lights shall be used on major arterials and major collectors.
 - c. Type IV lights shall be used at the terminus of cul-de-sacs.
2. Luminaires shall be full cutoff on all local roads and in all residential areas. Luminaires shall be cutoff or full cutoff in all other areas.
3. Design shall conform to these requirements except as specifically approved by the City Engineer.

2. Street Lights

A. Cobra Style Streetlights

1. The luminaire shall be LED, produced by a manufacturer approved by the City of Los Angeles Bureau of Street Lighting. Color temperature shall be between 4000K and 4700K unless otherwise approved by the City Engineer. The luminaire shall have a minimum 5-year unconditional warranty on both the fixture and the bulb.
2. It is recommended that designers use the lowest wattage LED fixture that meets lighting criteria.
3. Street light poles and mast arms shall be galvanized steel.
4. The street light poles shall be an Ameron Series PL, Landmark Lighting S3508, Pacific Union Metal LA 10120 or an approved equal.
5. Street light pole heights shall conform to the applicable standard plan. Alternate pole heights shall require specific approval of the City Engineer by variance.
6. Street light mast arm lengths shall conform to the applicable standard plan. Alternate mast arm lengths shall require specific approval of the City Engineer by variance.
7. The concrete footing requirements shall conform to the requirements of Street Lighting Standard Plan 620A.
8. The base leveling requirements shall conform to the requirements of Street Lighting Standard Plan 621.
9. The wiring for the electrolier shall conform to the requirements of Street Lighting Standard Plan 602.

B. Decorative Street Light (Residential Streets)

1. Decorative street lighting in residential areas is generally discouraged due to glare and light spillage onto residential property. Decorative lighting in

residential areas must be specifically approved by the City Engineer and Planning Director.

2. If decorative street lighting is to be installed, luminaire shields shall be required, unless waived by the City Engineer and Planning Director.

C. Decorative Street Light (City Center Area)

1. Street lights installed within the current boundaries of the City center area shall conform to the requirements of Street Lighting Standard Plan 618.
2. Alternate street light installations shall require the specific approval of the City Engineer and Planning Director by variance.
3. Each luminaire shall have installed an individual photocell control.
4. Base and concrete footing details shall conform to the requirements of Street Lighting Standard Plan 620B. The base leveling requirements shall conform to Street Lighting Standard Plan 621.
5. At the discretion of the City Engineer, luminaire shields may be required.

3. 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 THW A.W.G. stranded, copper only. Unless otherwise specified on the Street Lighting Standard Plans, all wiring shall be of the following sizes:
 1. All field wiring: #8 minimum (NEC)
 2. Pullbox to electrolier: #10 minimum (NEC)
 3. All wire in pole: #10 minimum (NEC)

4. Photocells

- A. All street lights shall be equipped with photoelectric control. 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.

5. Conduit

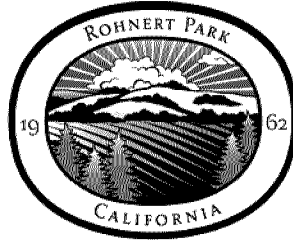
- A. All conduit to be used shall be a minimum of 2-inch diameter, schedule 40 PVC, except from each street light to the adjacent pull box which shall be 1-1/2-inch

diameter galvanized steel. All conduits 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.
- D. All empty conduits shall have a one-quarter-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.

6. Pullboxes

- A. Unless specifically approved by the City Engineer by special request, a No. 5 concrete pull box (California State Standard ES-8) shall be installed within five feet of the base of all street light poles.
- B. All pull boxes shall be installed per Street Lighting Standard Plan 601.
- 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 written approval of the City Engineer.
- E. All pull box covers shall be inscribed with "Street Lighting" and be secured with 3/8-inch bolts, cap screws, or studs and nuts that meet the provisions of the California Standard Specifications.
- F. Poles shall be stenciled with "RP (Pole No.) W (Wattage)" with 2-inch black numbers at 8 feet above the ground to designate the assigned pole number and wattage. Numbers shall be on the street side of the pole.



City of Rohnert Park

Storm Drain Detail Drawings

STORM DRAIN DETAIL DRAWINGS

<u>Standard Number</u>	<u>Title</u>	<u>Date Approved</u>
400 Series		
400	Standard Precast Concrete Storm Drain Manhole	2006
401	Precast Concrete Storm Drain Manhole Reducer Slabs	2006
402	Type II Catch Basin	2006
403	Type I Catch Basin	2006
404	Storm Drain Gallery	2014
405A	Precast Catch Basin Cover	2014
405B	Type I Catch Basin – Throat Opening Detail	2014
406A	3" Sidewalk Drain	2006
406B	3" x 12-1/2" Cast Iron Sidewalk Drain	2006
407	Loose Rock Rip-Rap Storm Drain Outlet	2006
408	Precast Side Opening Field Drain	2006
409	Storm Drain Labels	2014
410	Sidewalk Drain Catch Basin 12" x 12"	2014
411	Sidewalk Drain Catch Basin 16" x 16"	2014
412	Reinforced Concrete Pipe Collar	2014

UNIMPROVED SURFACE

IMPROVED SURFACE

8" Min.

24" min.

8" Min.

12" Min.

Finished grade

Asphalt concrete

Level with 1:3 mortar, 1" min.

Concrete collar. See note 6.

Use impression ring to form keyway for cone or additional barrel section.

6" minimum if poured in place.

48" OR 60" I.D.

Form smooth flow channel in base.

8" MIN.

PRECAST BASE

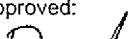
POURED IN PLACE

Class "A" Concrete base (See note 7).

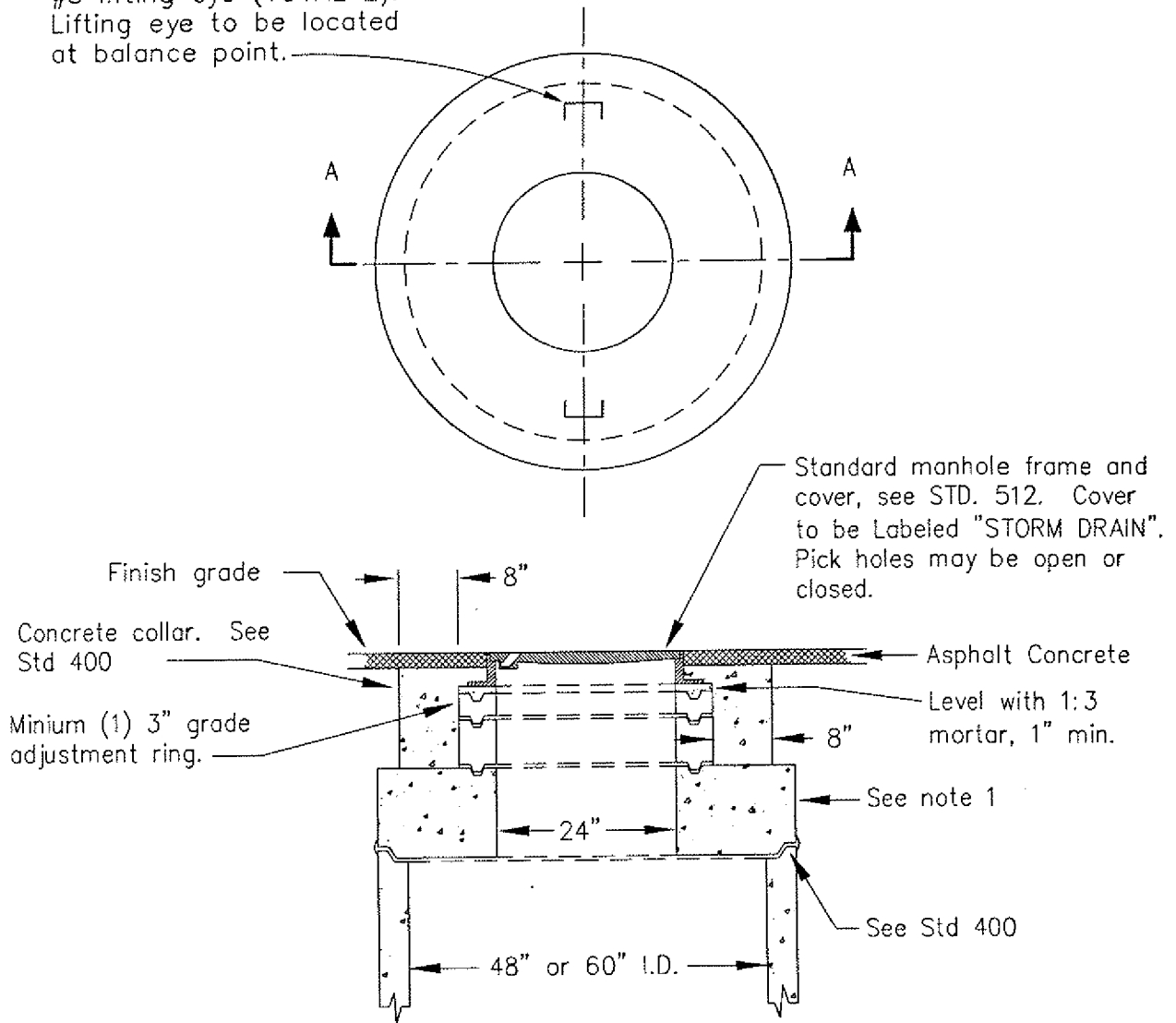
See note 7

(Both acceptable for unimproved and improved areas.)

1. When manholes are installed in unimproved areas, the top of the cover shall be a min. of 1 foot above adjacent finished grade.
2. Min. of one 3" grade adjustment ring. Max. height of grade adjustment rings = 20". Alternatively, contractor may cast grade adjustment rings in place.
3. Set all sections in 1:3 mortar bed. Wet both tongue and groove before applying mortar. Wipe inside of joint smooth and plaster outside of joint with 1/2" layer of mortar. Ram-nek gaskets or approved equal may be used instead of mortar.
4. Cone section (taper) may be concentric or eccentric unless otherwise specified by the Engineer.
5. All precast manhole sections per ASTM C478.
6. Class "A" conc. collar shall be 2" below top of manhole cover in improved surface areas.

CITY OF ROHNERT PARK	
STANDARD CONCRETE STORM DRAIN MANHOLE	
SCALE: NONE	DATE: JANUARY 2006
Approved: 	STD. - 400

#5 lifting eye (TOTAL 2).
Lifting eye to be located
at balance point.



SECTION A-A

NOTES:

1. Reducer slab shall be designed to withstand H20 loading and conform to ASTM C478.
2. All inside joints to be grouted smooth.
3. Class A concrete collar shall be poured to 2" below finished grade.
4. Reducers shall be concentric. Eccentric reducers can be used if it would place the opening in a more desirable location or improve access.

For detail and specifications of barrel section and base see City of Rohnert Park Std. 400.

APPROVED 48" and 60" MANHOLE REDUCER SLAB
See Engineer's approved list

CITY OF ROHNERT PARK

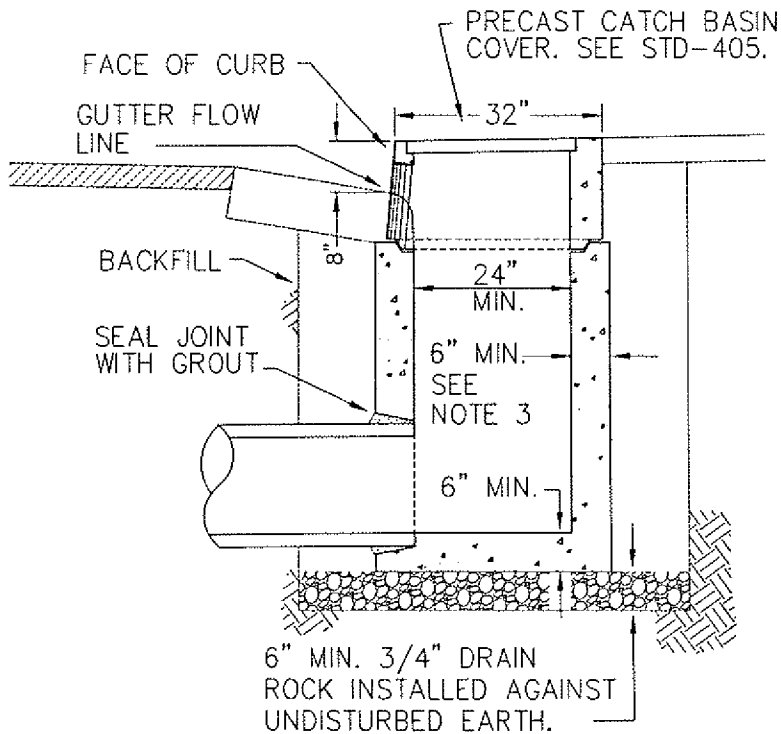
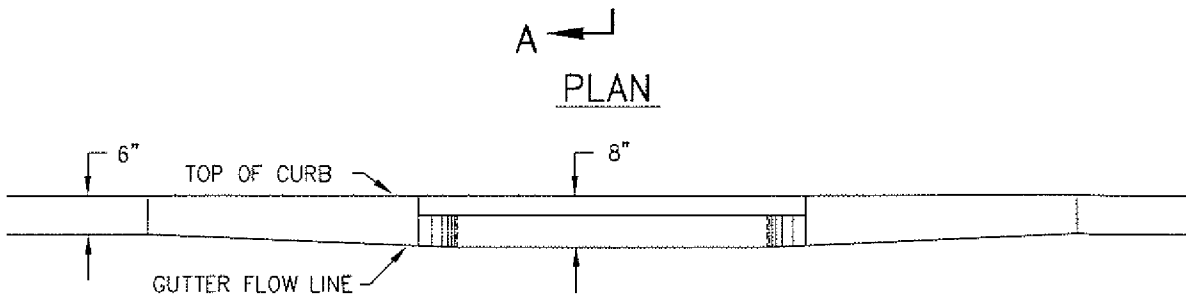
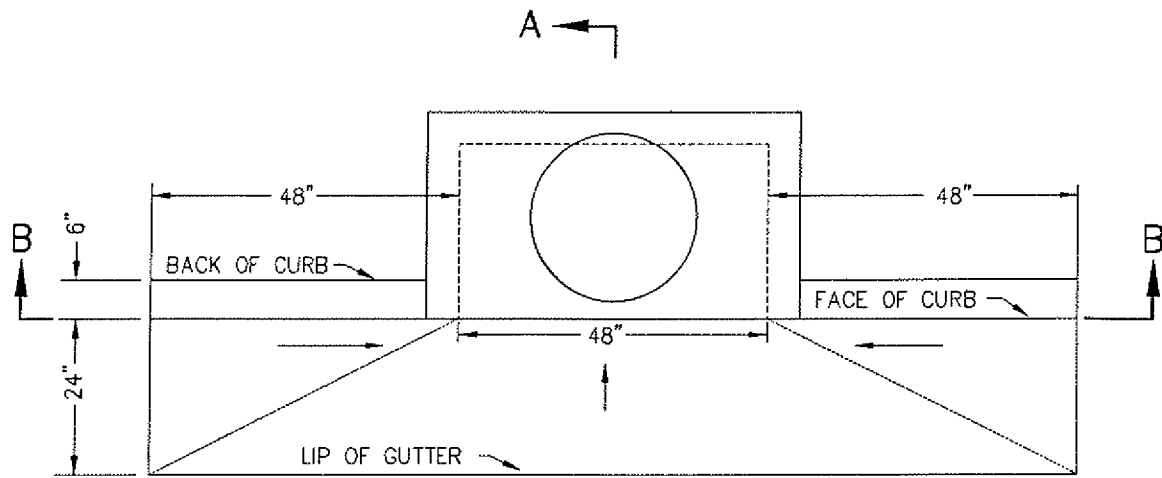
**PRECAST CONCRETE STORM DRAIN
MANHOLE REDUCER SLABS**

SCALE: NONE DATE: JANUARY 2006

Approved:

Dampfman

STD. - 401



NOTES:

1. Catch basin box shall be constructed to withstand H20 loading.
2. Concrete shall have a compressive strength of 4000 psi in 28 days.
3. Wall thickness shall be 6" unless depth is greater than 8', then wall thickness shall be 8".
4. Install label per City Std 409.

CITY OF ROHNERT PARK

TYPE II CATCH BASIN

SCALE: NONE

DATE: JANUARY 2006

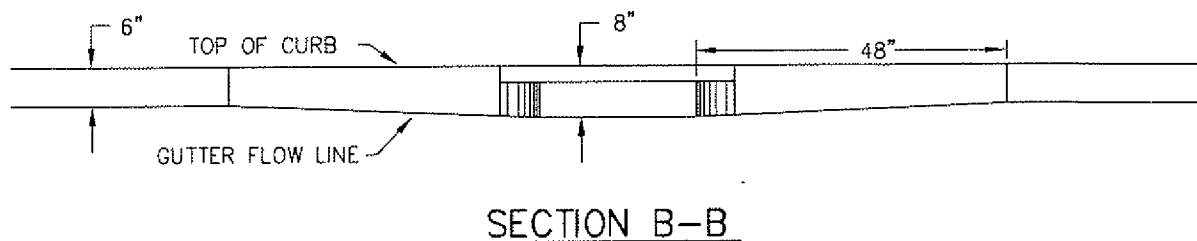
Approved:

Dawn Johnson

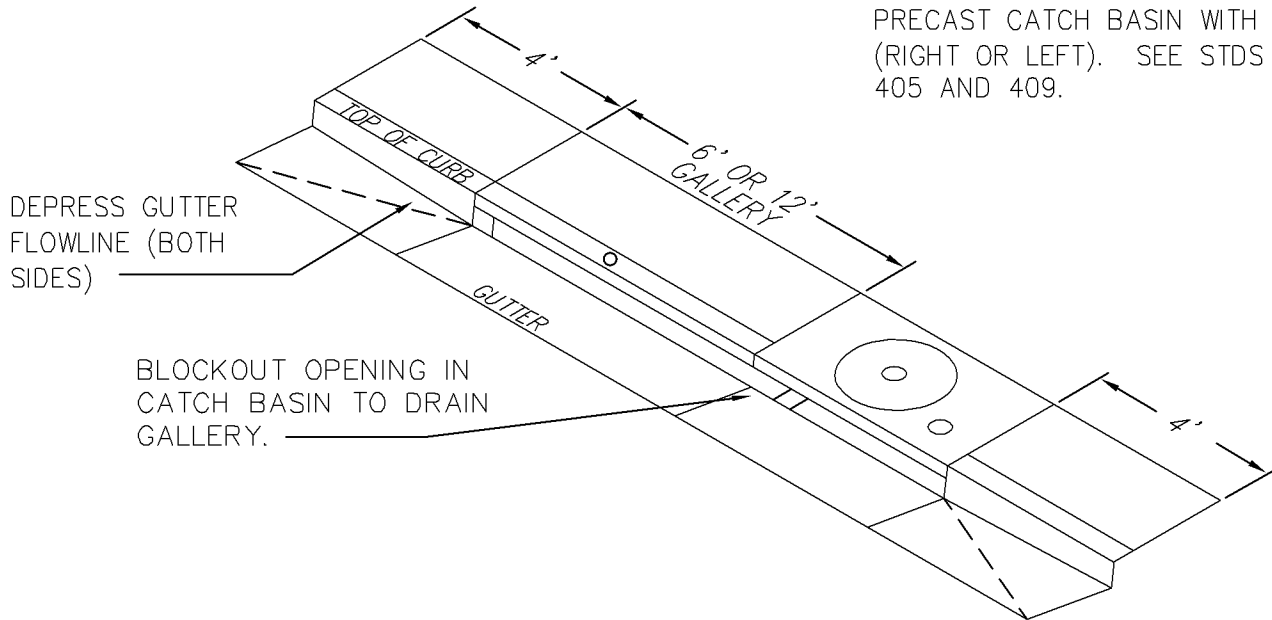
STD. - 402

APPROVED TYPE II CATCH BASINS

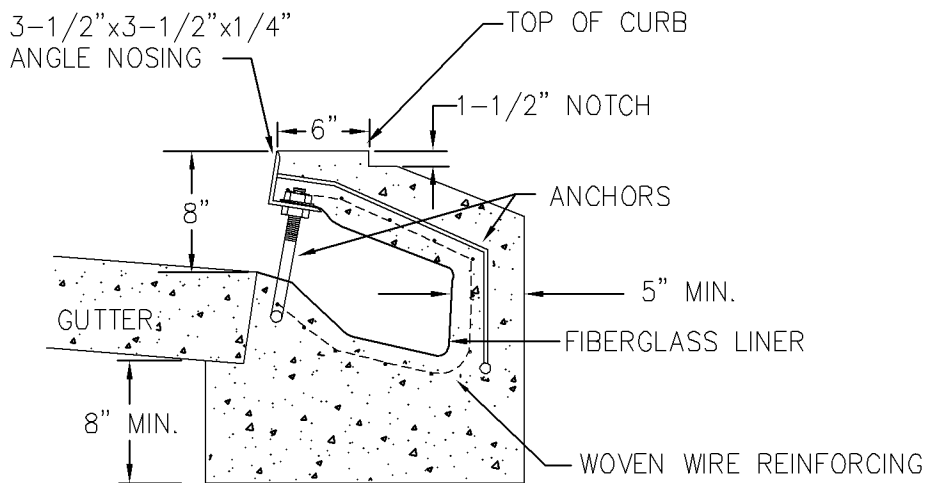
See Engineer's approved list



PRECAST CATCH BASIN WITH GALLERY
(RIGHT OR LEFT). SEE STDS 402,
405 AND 409.



ISOMETRIC VIEW



TYPICAL SECTION INSTALLED

NOTES:

1. Nosing assembly shall be hot dipped galvanized after fabrication per ASTM A-123
2. Concrete shall have compressive strength 4000 psi, at 28 days and meet Caltrans specifications.
3. Install label per City Std 409.

APPROVED STORM DRAIN GALLERY FORM
See Engineer's approved list

CITY OF ROHNERT PARK

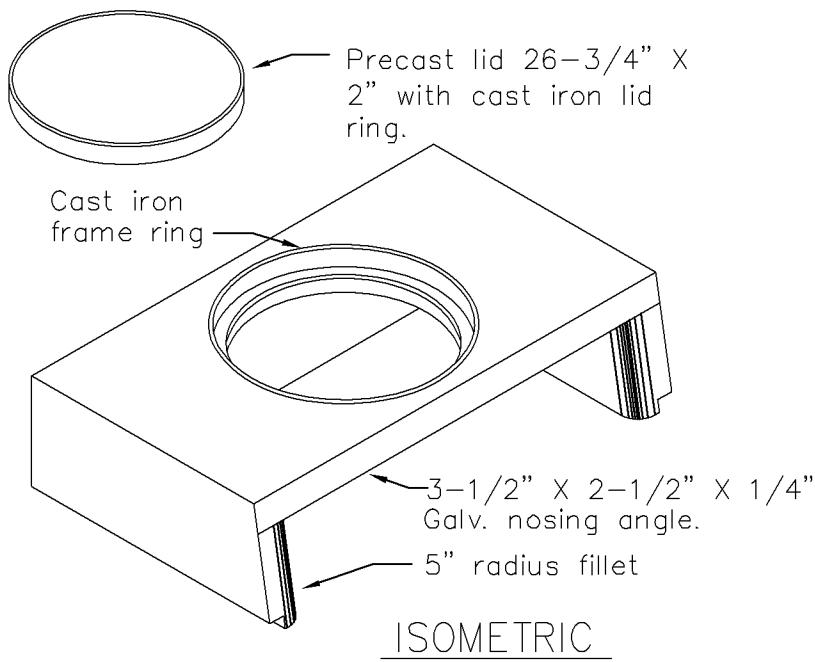
STORM DRAIN GALLERY

SCALE: NONE

DATE: MARCH 2014

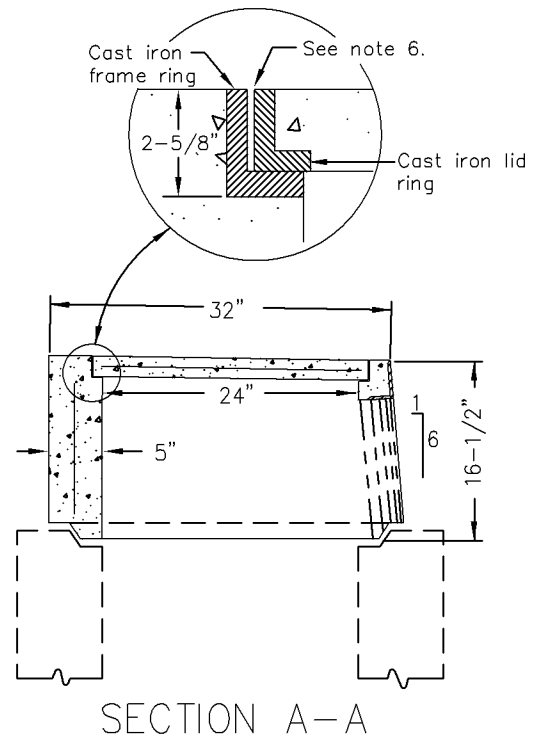
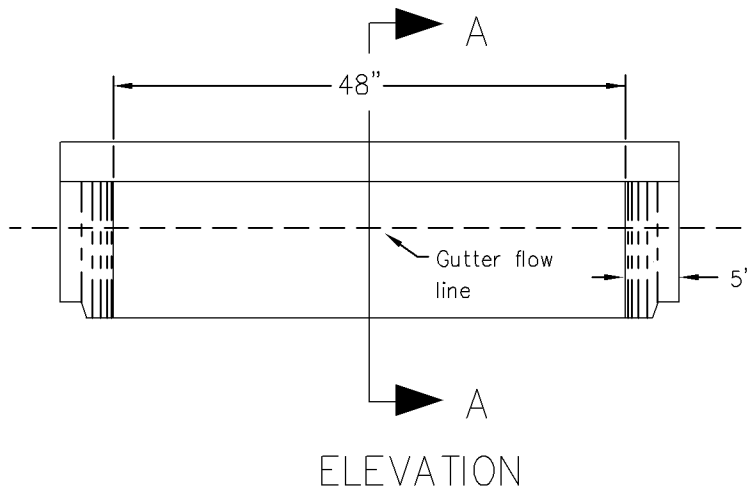
Approved:

STD. - 404



NOTES:

1. Concrete shall have a compressive strength of 4000 PSI at 28 days.
2. Nosing angle shall be galvanized in accordance with ASTM specification A-123.
3. Exposed concrete surface shall have broom finish.
4. Cast iron shall conform to ASTM 48-30.
5. Apply label per City Std 409.
6. Frame ring inside diameter to be 5/16" to 3/8" greater than lid ring outside diameter.
7. Cover and Frame shall be constructed to withstand H20 loading.



APPROVED PRECAST CATCH BASIN COVERS

See Engineer's approved list.

CITY OF ROHNERT PARK

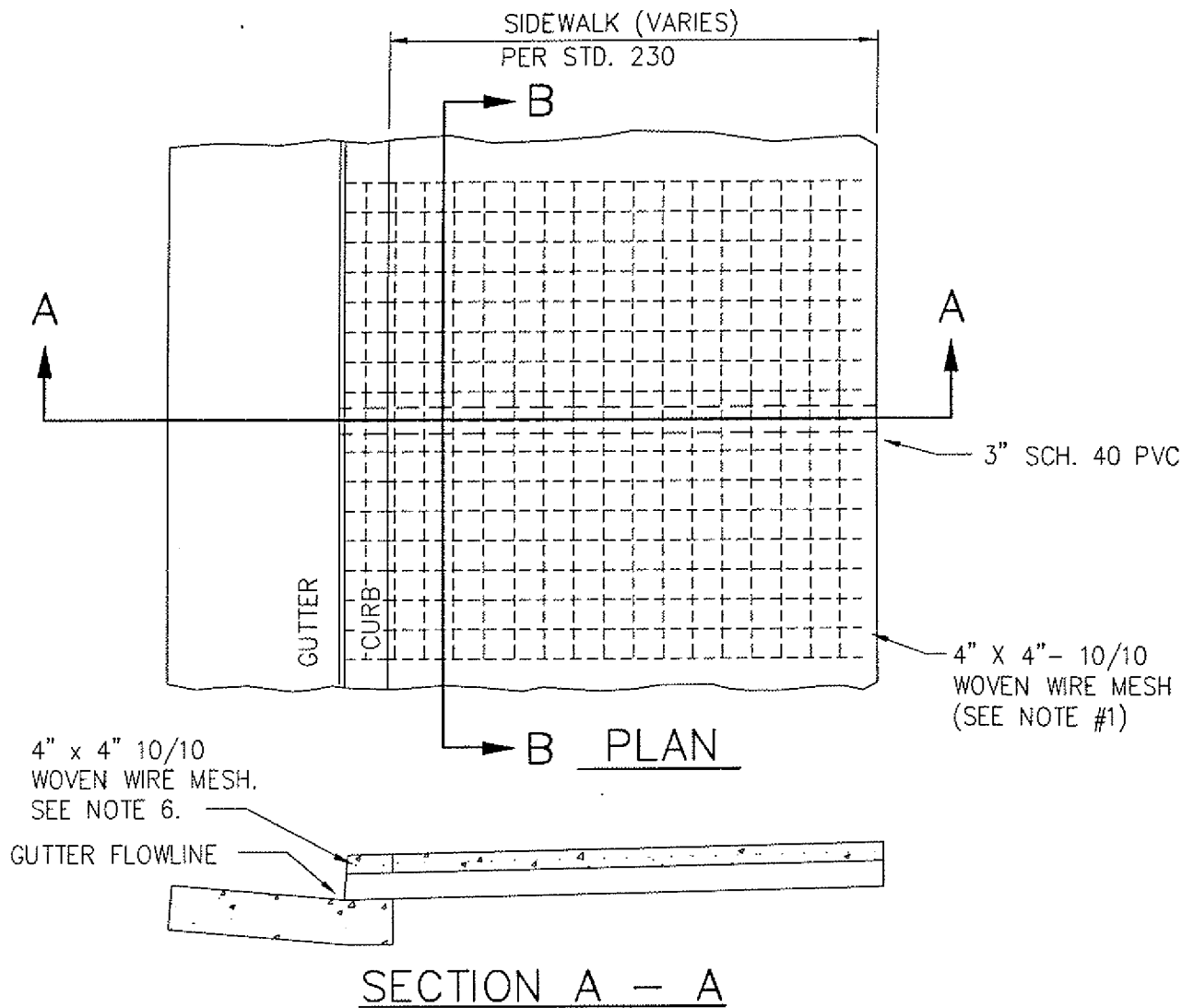
PRECAST CATCH BASIN COVER

SCALE: NONE

DATE: MARCH 2014

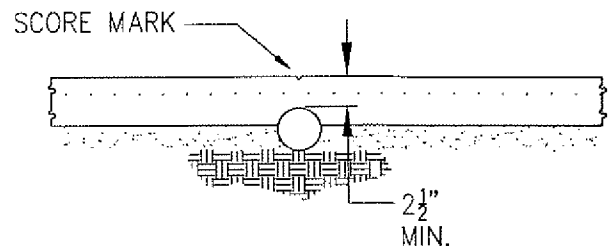
Approved:

STD. - 405A



NOTES

1. Wire mesh shall be full width of sidewalk minus 2". Length of wire mesh shall, at a minimum, equal the width and be centered over the pipe.
2. On-site drainage and location of curb outlets shall be by owner to the satisfaction of the City Engineer.
3. Drain pipe shall be installed so that the top of pipe is 2 1/2" (min.) below finished grade at back of sidewalk.
4. Sidewalk shall be removed to the nearest scoremark.
5. If sidewalk and gutter are not contiguous, curb may be cored or curb and gutter removed and replaced a minimum of one foot on each side of the drain pipe. Dowel new gutter to existing curb and gutter with (2) 12" #4 rebars, place one dowel in curb and one in gutter pan using epoxy.
6. If sidewalk and gutter are contiguous, pour monolithic with wire fabric extending into curb.



SECTION B - B
(for one 3" pipe)

CITY OF ROHNERT PARK

3" SIDEWALK DRAIN

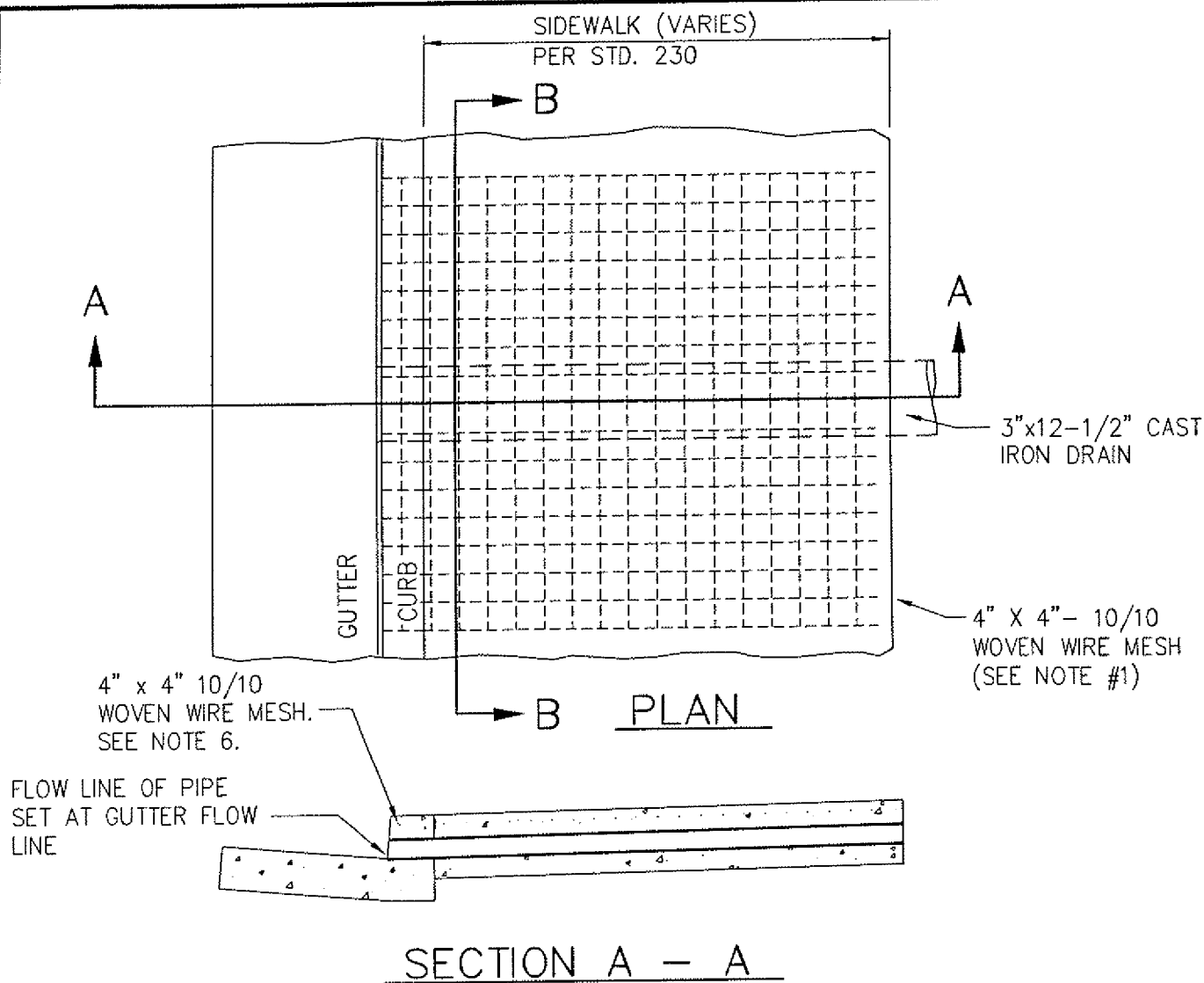
SCALE: NONE

DATE: JANUARY 2006

Approved:

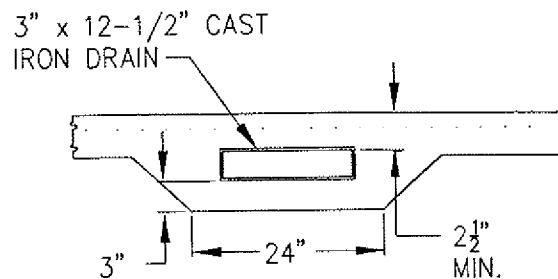
Dan Forster

STD. - 406A



NOTES

1. Wire mesh shall be full width of sidewalk minus 2". Length of wire mesh shall, at a minimum, equal the width and be centered over the pipe.
2. On-site drainage and location of curb outlets shall be by owner to the satisfaction of the City Engineer.
3. Drain pipe shall be installed so that the top of pipe is 2½" (min.) below finished grade at back of sidewalk.
4. Sidewalk shall be removed to the nearest scoremark.
5. If sidewalk and gutter are not contiguous, remove curb and gutter a minimum of one foot on each side of the drain pipe. Dowel new gutter to existing curb and gutter with (2) 12" #4 rebars, place one dowel in curb and one in gutter pan using epoxy.
6. If sidewalk and gutter are contiguous, pour monolithic with wire fabric extending into curb.



CAST IRON SIDEWALK DRAIN
See Engineer's approved list

CITY OF ROHNERT PARK

3"x12½" CAST IRON SIDEWALK DRAIN

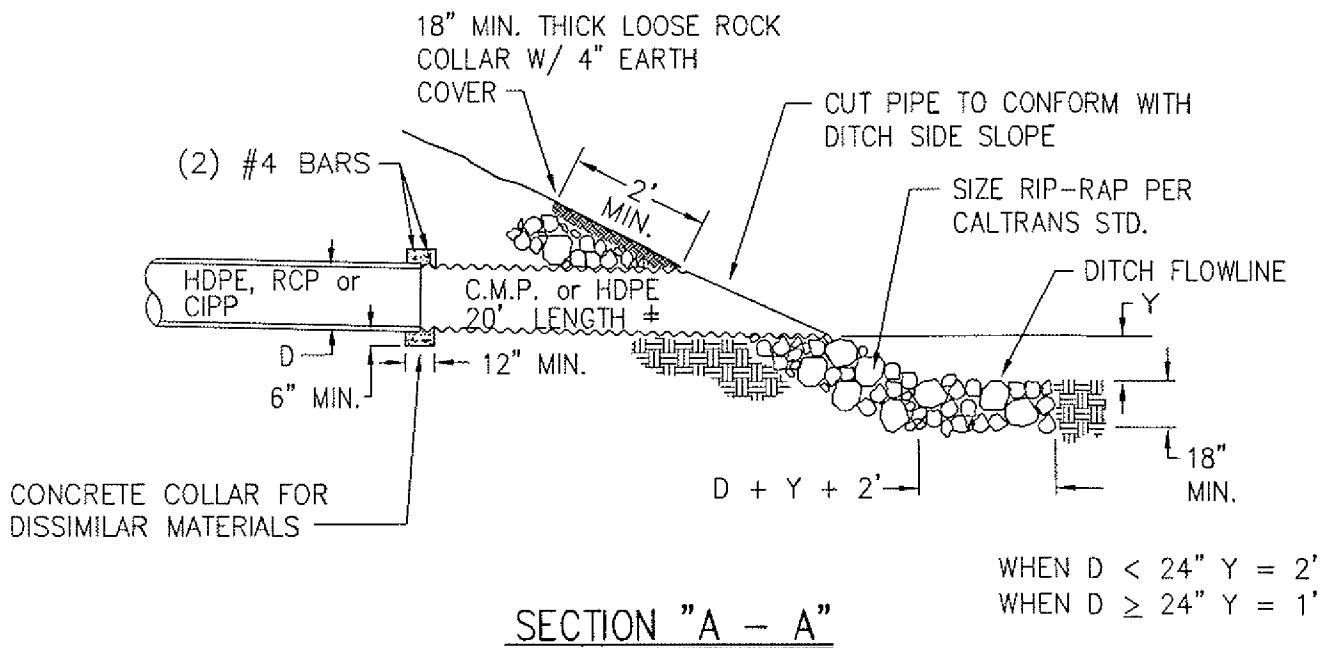
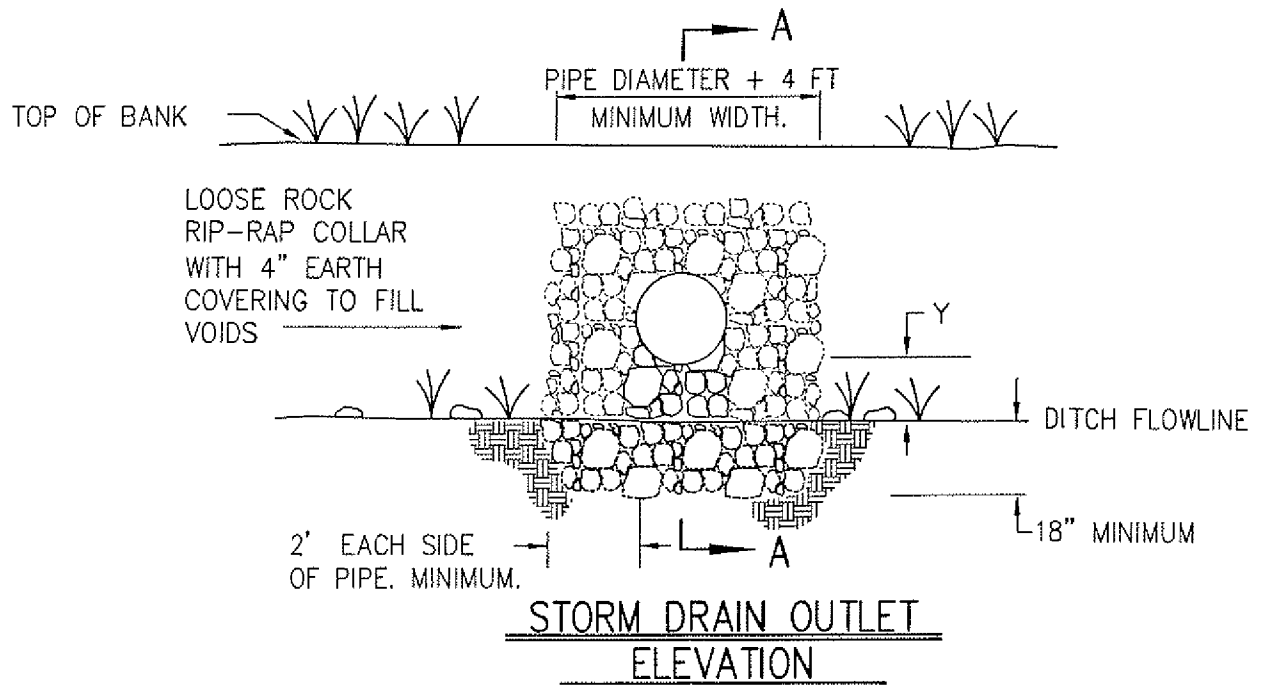
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Schmitt

STD. - 406B



NOTES:

1. CMP shall conform with Section 66-3 of the Standard Specifications.
2. HDPE pipe shall conform with Section 64 of the Standard Specifications for type S pipe.

CITY OF ROHNERT PARK

**LOOSE ROCK RIP-RAP
STORM DRAIN OUTLET**

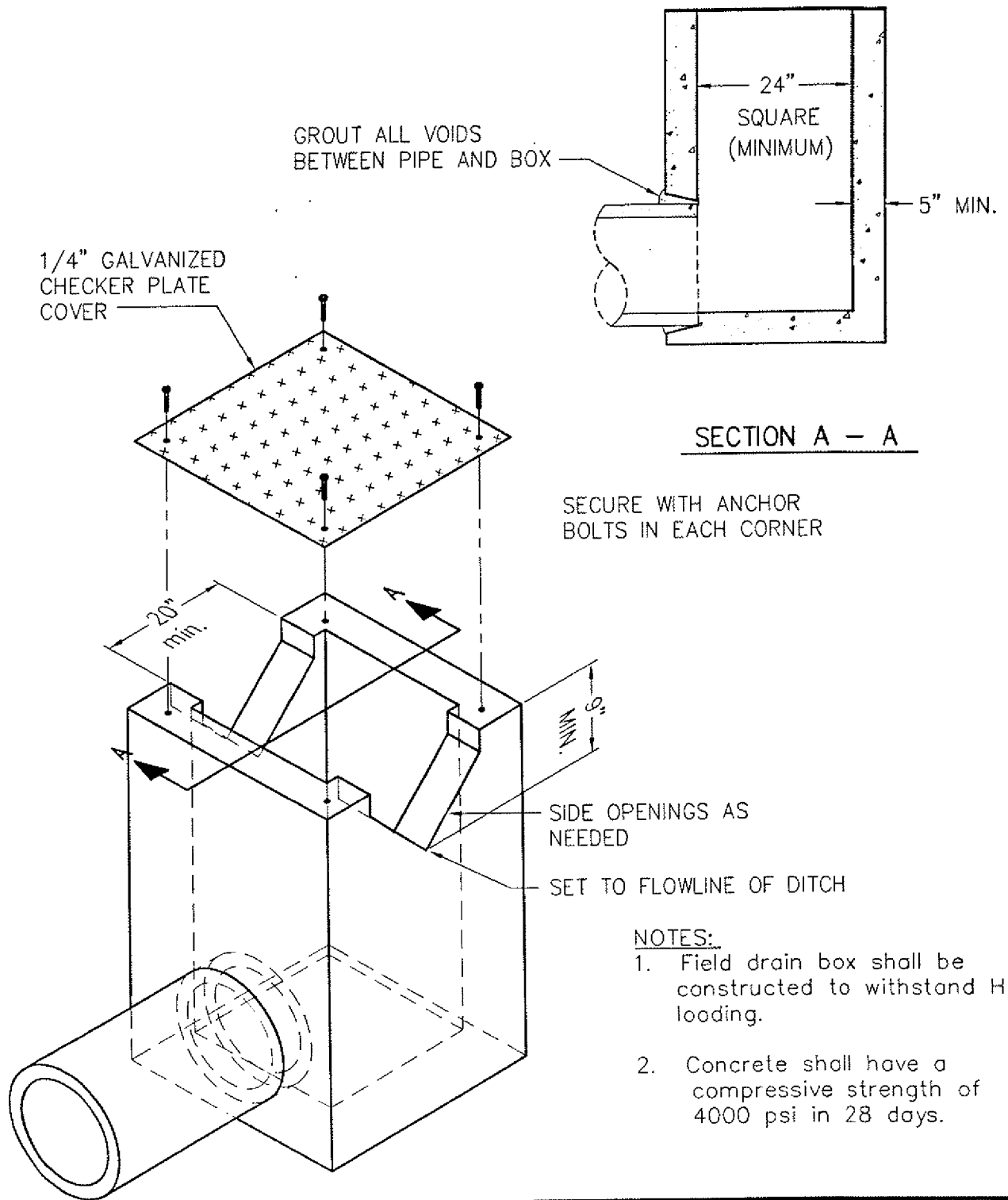
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dennis J. Smith

STD. - 407



ISOMETRIC VIEW

PRECAST SIDE OPENING FIELD DRAIN

See Engineer's approved list

CITY OF ROHNERT PARK

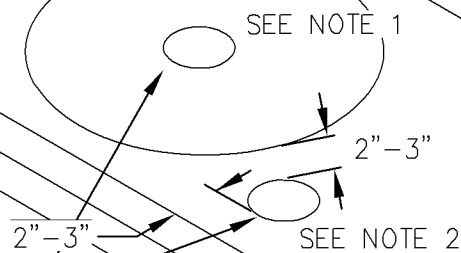
PRECAST SIDE OPENING FIELD DRAIN

SCALE: NONE DATE: JANUARY 2006

Approved:

Damian

STD. - 408



NOTES:

1. Affix label to center of catch basin lid ONLY if catch basin is not part of the sidewalk. Label shall be precast in lid or affix to lid.
2. If the catch basin lid is cast iron AND the catch basin is not part of the sidewalk AND lid does not have label cast into it, affix label in this location, oriented to be read from the street.
3. Affix label on top of curb at inlet, when a Type I catch basin is installed

APPROVED STORM DRAIN LABELS

See Engineer's approved list, STD 409

CITY OF ROHNERT PARK

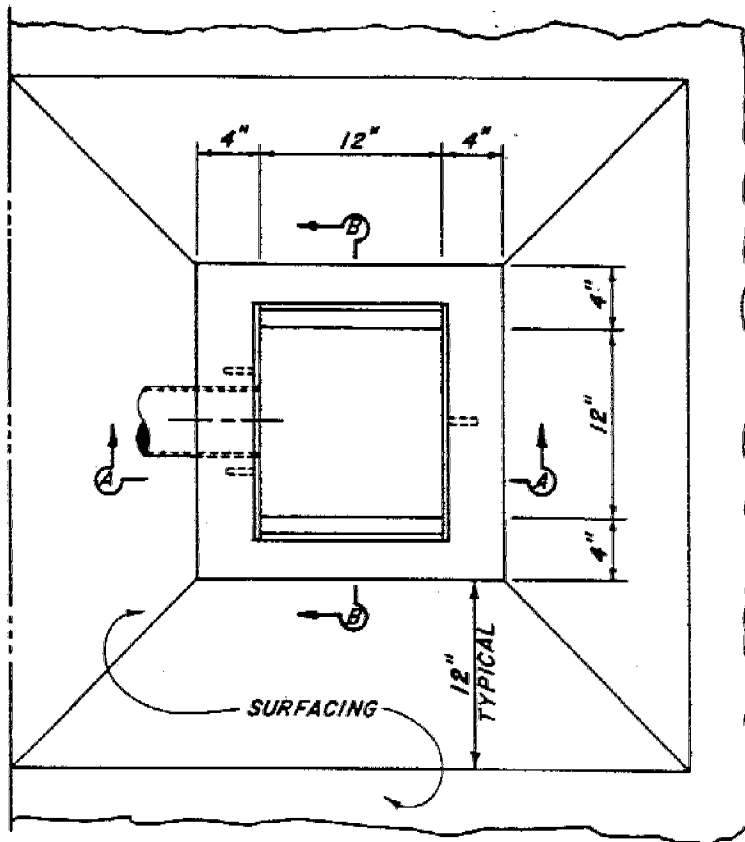
STORM DRAIN LABELS

SCALE: NONE

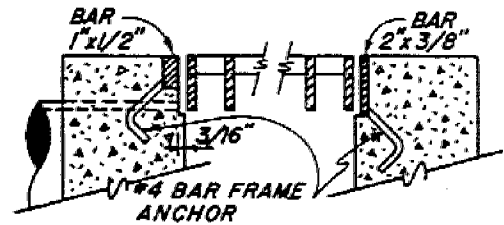
DATE: MARCH 2014

Approved:

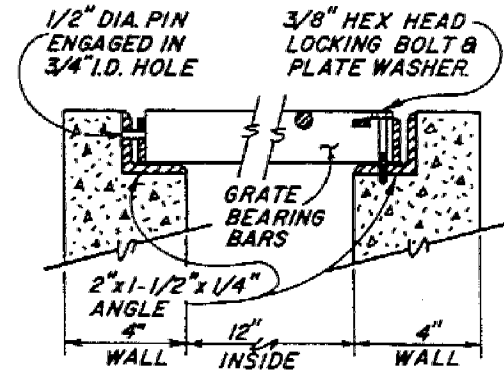
STD. - 409



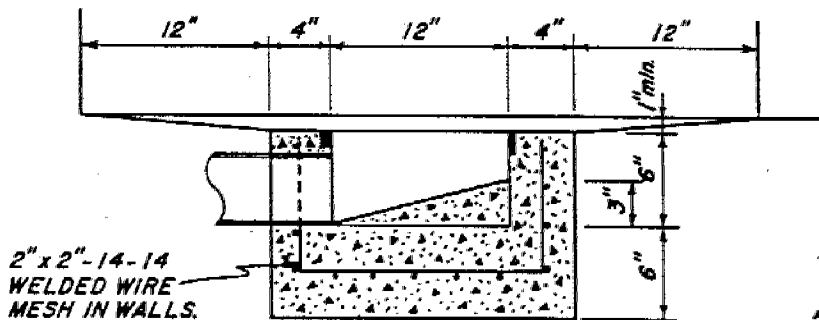
PLAN



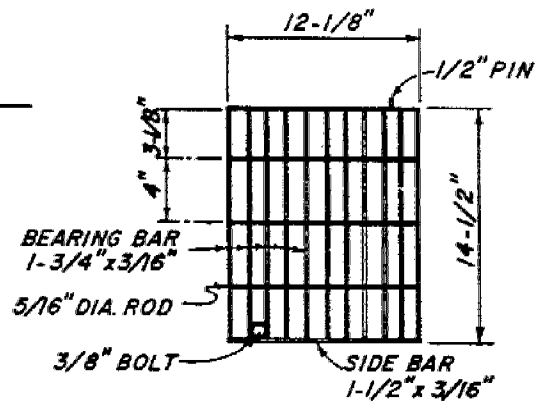
SECTION A-A



SECTION B-B



ELEVATION



GRATE DETAIL

NOTES:

1. ALL CONCRETE SHALL HAVE COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS AND MEET CALTRANS SPECIFICATIONS.
2. GRATING & FRAMES ARE TO BE ASSEMBLED & MADE TO FIT BEFORE DELIVERY ON THE JOB SITE.
3. ALL STEEL COMPONENTS TO BE GALVANIZED AFTER FABRICATION. AFTER ERECTION ALL ABRASED SURFACES SHALL BE CLEANED FREE OF RUST & OIL AND NEATLY SOLDERED OVER WITH 50-50 SOLDER.
4. SEE STD. NO. 406 FOR SIDEWALK UNDERDRAIN DETAIL.

CITY OF ROHNERT PARK

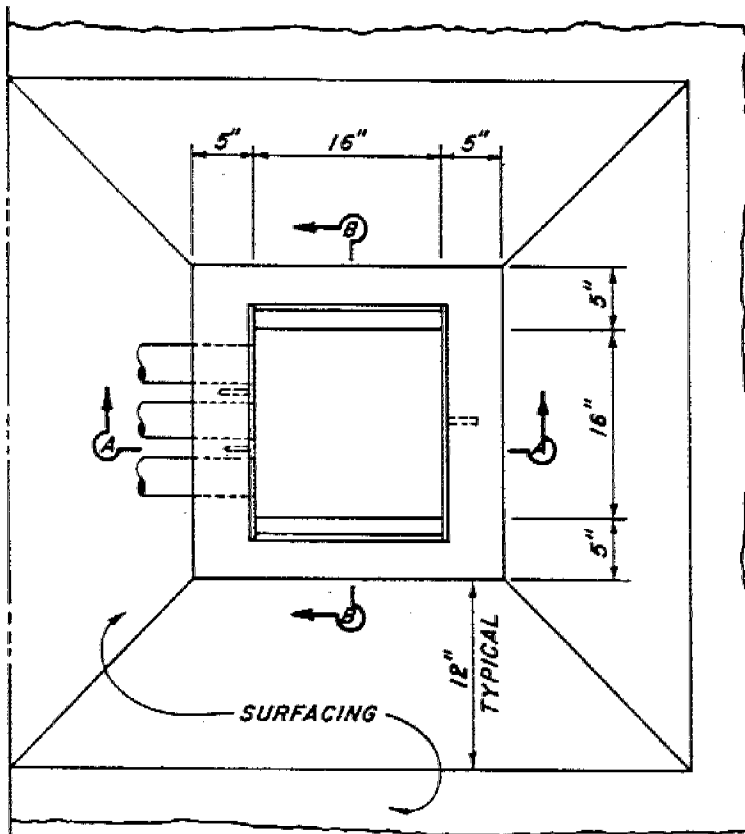
SIDEWALK DRAIN CATCH BASIN 12"x12"

SCALE: NONE

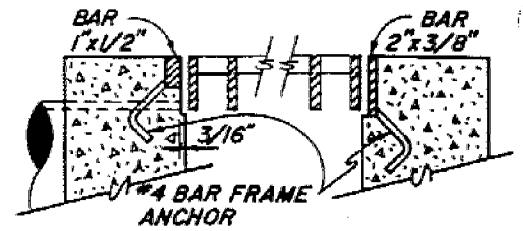
DATE: MARCH 2014

Approved:

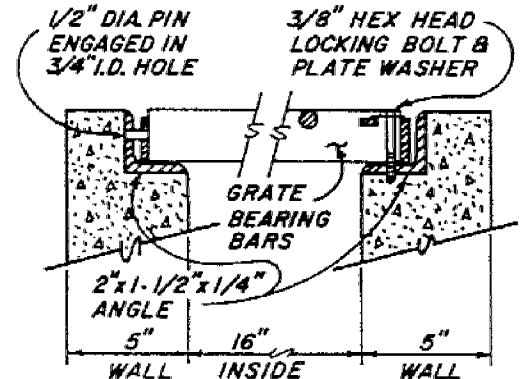
STD. - 410



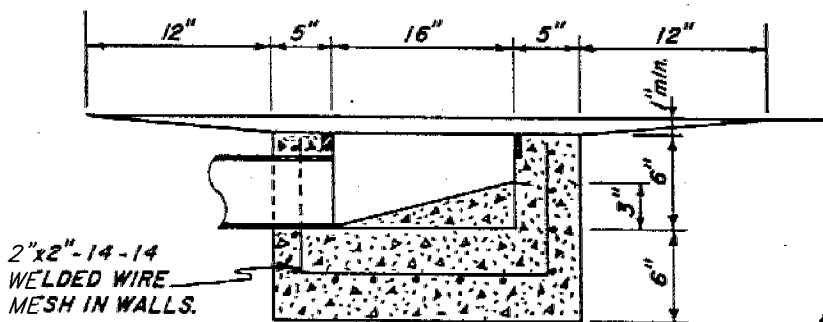
PLAN



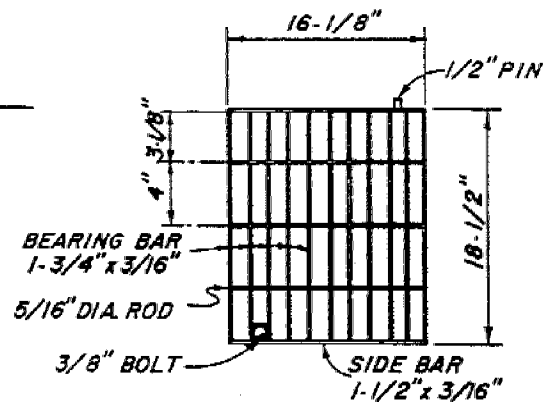
SECTION A-A



SECTION B-B



ELEVATION



GRATE DETAIL

NOTES:

1. ALL CONCRETE SHALL HAVE COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS AND MEET CALTRANS SPECIFICATIONS.
2. GRATING & FRAMES ARE TO BE ASSEMBLED & MADE TO FIT BEFORE DELIVERY ON THE JOB SITE.
3. ALL STEEL COMPONENTS TO BE GALVANIZED AFTER FABRICATION. AFTER ERECTION ALL ABRADED SURFACES SHALL BE CLEANED FREE OF RUST & OIL AND NEATLY SOLDERED OVER WITH 50-50 SOLDER.
4. SEE STD. NO. 406 FOR SIDEWALK UNDERDRAIN DETAIL.

CITY OF ROHNERT PARK

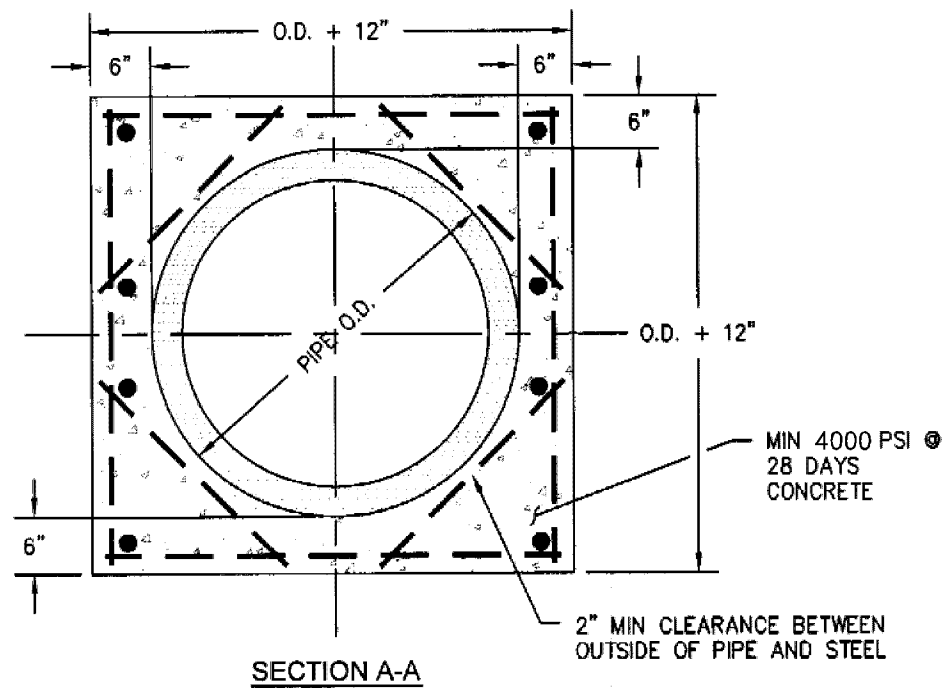
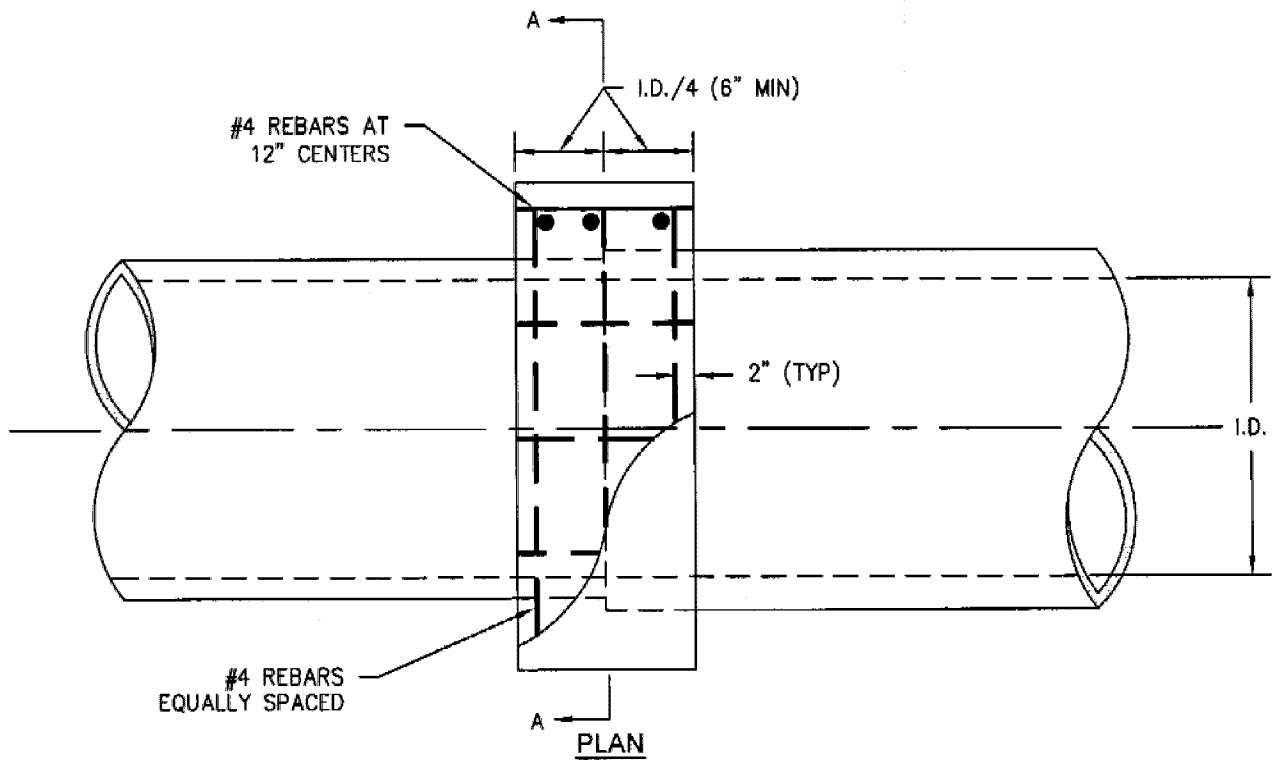
SIDEWALK DRAIN CATCH BASIN 16"x16"

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 411



CITY OF ROHNERT PARK

REINFORCED CONCRETE PIPE COLLAR

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 412



City of Rohnert Park

Streets and Roadway Detail Drawings

STREETS AND ROADWAY DETAIL DRAWINGS

<u>Standard Number</u>	<u>Title</u>	<u>Date Approved</u>
200 Series		
200A	Street Hierarchy	2011
200B	20' One-Way street Without Parking	2011
200C	Lane	2011
200D	Neighborhood Street	2011
200E	Minor Street	2011
200F	Avenue	2007
200G	Main Street	2007
200H	Industrial Street	2011
200I	Boulevard	2007
200J	Parkway	2011
201	Crowns	2007
202	Alleys	2011
203A	Cul-de-Sac – 48-Foot Radius	2011
203B	Cul-de-Sac with Island	2011
203C	Reserved	
203D	Reserved	
203E	Reserved	
203F	Hammerhead Turn Around	2011
204A	Standard Knuckle – Residential and Minor Street	2011
204B	Knuckle Alternatives	2011
205	Emergency Vehicle Turnout	2007
206	Temporary Turnaround for Future Through Road	2011
207	Side Street Conform	2007
208	Side Street and End of Overlay Conforms	2007
209	Reserved	
210	Reserved	
211	Metal Beam Street Barricade	2011
212	Road Width Transition	2011
213	Parking Bay	2011
214	45° Parking Bay	2011
215	Standard Trench Detail, 7 pages	2011
216	Utility Access Road	2011
Bus Stops		
220	Bus Stop at Intersection	2011
221	Mid-Block Bus Stop	2011
222	Concrete Bus Pad Detail	2011
Sidewalks		
230A, D-F	Sidewalk and Planter Dimension	2011
231	Typical Sidewalk Obstruction Transition	2007
232A	Reserved	2014
232B	Reserved	2014
232C	Reserved	2014
232D	Reserved	2014

<u>Standard Number</u>	<u>Title</u>	<u>Date Approved</u>
232E	Reserved	2014
232F	Reserved	2014
232G	Reserved	2014
232H	Reserved	2014
232I	Reserved	2014
232J	Reserved	2014
232K	Reserved	2014
233	Back of Sidewalk Conforms	2011
234	Private Walkway Conforms – PCC and Asphalt Concrete	2007
235	Typical Spacing: Weakened Planes, Score Marks and Expansion Joints	2011
236	Sidewalk Barricade	2011
237	Replacement of Existing Sidewalk	2011
238	Class I Bike Path	2014
Curbs		
240	Curb Return Plan Detail	2007
240a	Curb Return Plan Detail	2011
240b	Curb Return Plan Detail 2	2011
241	Curb and Gutter	2007
242	Street Median Curb	2011
243	Standard Valley Gutter	2007
Driveways		
250A	Commercial Curb Cuts	2014
250B	Residential Curb Cuts	2014
250C	Curb Return Driveways (Alternative A)	2014
250D	Curb Return Driveways (Alternative B)	2014
250E	Curb Return Driveways (Alternative C)	2014
251	Driveway Conform – PCC and Asphalt Concrete	2011
252	Reserved	
Trees		
260	Tree Planting in Planter Strip	2011
261	Tree Planting in Right-of-Way with Contiguous Sidewalk	2011
262	Tree Planting in Tree Well	2011
263	Private Tree in Lieu of Street Tree	2011
264	Moisture Barrier for Median Planting Areas	2011
265	Reserved	
Miscellaneous		
270	Parking Lot Typical Section	2007
271	Reserved	
City Monuments		
280	City Monument	2007
281	Brass Survey Marker	2007
282	City Monument Cover	2007
283	City Monument Cover Replacement	2007
284	Lot Corner Reference Monument	2007

City of Rohnert Park

HIERARCHY

I. Local Streets

20' One Way Street Without Parking	See STD 200 B
Lane	See STD 200 C
Neighborhood Street	See STD 200 D
Minor Street	See STD 200 E

II. Minor Collector

Avenue	See STD 200 F
Main Street	See STD 200 G

III. Industrial Street

Industrial Street	See STD 200 H
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IV. Major Collector

Boulevard	See STD 200 I
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V. Arterials

Parkway	See STD 200 J
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CITY OF ROHNERT PARK

STREET HIERARCHY

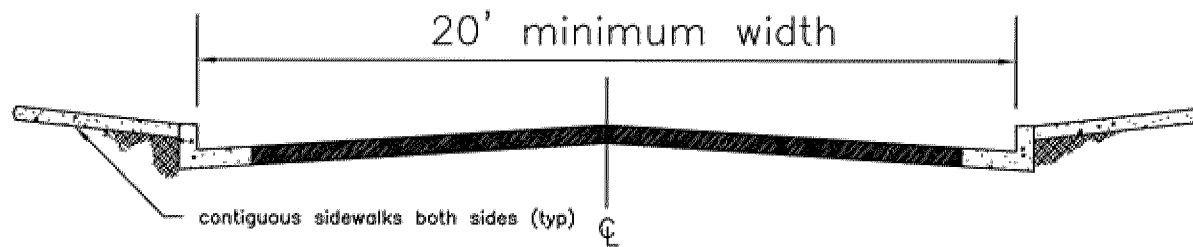
SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 200A

ONE-WAY LOOP STREET WITHOUT PARKING



1. Streets are for access to no more than 10 residential units.
2. Street length shall not exceed 200'.
3. Streets shall have contiguous sidewalks on both sides unless otherwise approved
4. 20' Streets shall connect to other streets not less than 36' in width.
5. No flag lots shall connect to 20' streets.
6. Minimum distance of garage face to opposite curb face shall be 42'.
7. Fire hydrants shall be located at each intersection
8. Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. roof access point. If this height is exceeded, street width curb to curb must be min. 26' clear, required for aerial fire apparatus.

NOTE: THE USE OF THIS STREET WIDTH WILL ROUTINELY IMPOSE SPECIAL UTILITY DESIGN REQUIREMENTS, INCLUDING SPECIAL PIPE REQUIREMENTS FOR WATER AND SEWER IF LESS THAN 10' SEPARATION IS PROPOSED. PROPOSED USE OF THIS STREET ON A TENTATIVE MAP MAY REQUIRE DESIGN DETAIL BEYOND NORMAL SCOPE OF TENTATIVE MAPS.

CITY OF ROHNERT PARK

20' ONE-WAY STREET WITHOUT PARKING

SCALE: NONE

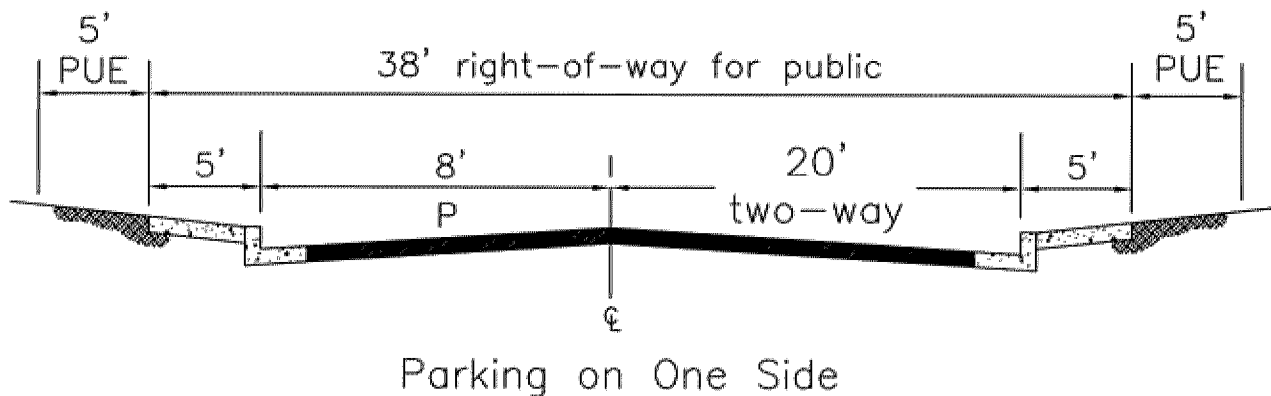
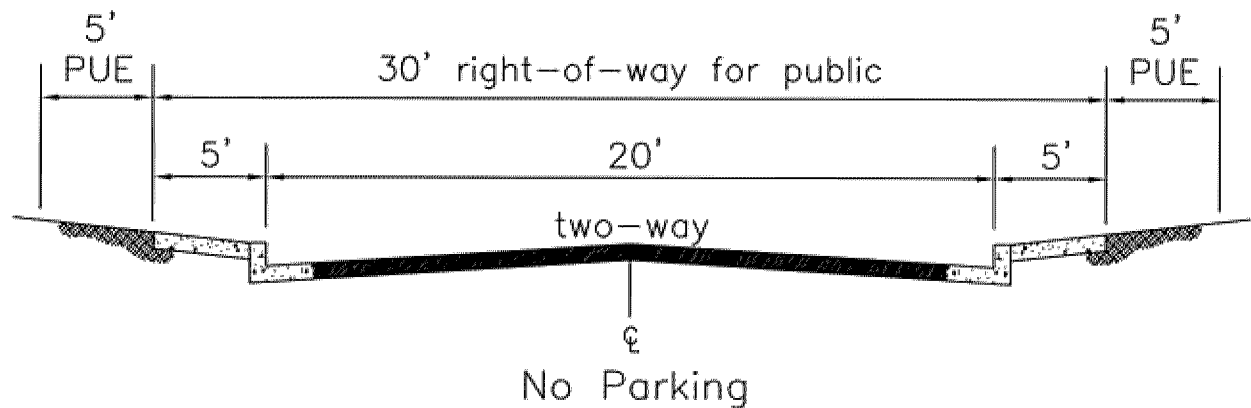
DATE: OCTOBER 2010

Approved:

[Signature]

STD. - 200B

LANE



1. For through streets, length shall not exceed 300'. No dead end lanes are allowed.
2. Maximum 10 residential units.
3. No parking shall be allowed for the first 30 feet measured from curb return at the intersection.
4. Adequate backup space is required for garage and perpendicular parking.
5. Streets shall contain residential units only.
6. Lanes shall connect to streets that provide minimum 24 feet clear width.
7. If Lane is private, access shall be through a Standard 250 A, C, or D curb cut.
8. Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. height at roof access point. If this height is exceeded, width curb to curb or curb to parking must be 26' clear, required for aerial fire apparatus.

NOTE:

THE USE OF THIS STREET WIDTH WILL ROUTINELY IMPOSE SPECIAL UTILITY DESIGN REQUIREMENTS, INCLUDING SPECIAL PIPE REQUIREMENTS FOR WATER AND SEWER IF LESS THAN 10' SEPARATION IS PROPOSED. PROPOSED USE OF THIS STREET ON A TENTATIVE MAP MAY REQUIRE DESIGN DETAIL BEYOND NORMAL SCOPE OF TENTATIVE MAPS.

CITY OF ROHNERT PARK

LANE

SCALE: NONE

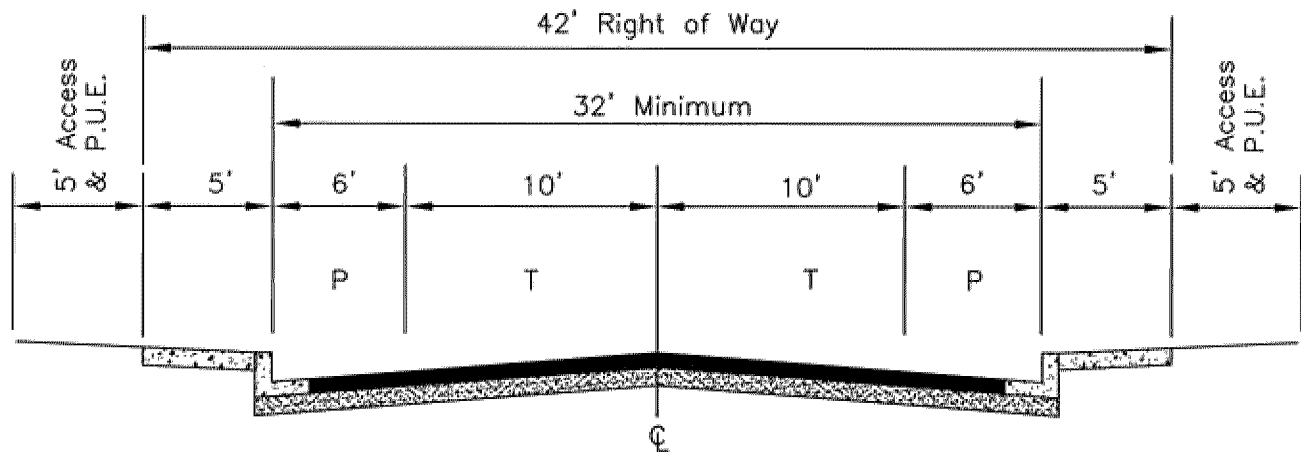
DATE: OCTOBER 2010

Approved:

STD. - 200C

NEIGHBORHOOD STREET

PARKING BOTH SIDES



THIS STANDARD MAY BE USED ONLY WHEN ALL OF THE FOLLOWING CONDITIONS ARE MET:

1. Vehicular speeds shall not exceed 25 miles per hour (MPH).
2. Average daily trips (ADT) shall not exceed 1000.
3. Maximum Street length is 1400.
4. Streets shall have access from two directions (no cul-de-sacs).
5. Streets may neck down to 20' at intersections.
6. Streets shall contain residential units only.
7. Sidewalk and curb width is 5 feet.
8. Corners shall have a 20' min. radius.
9. Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. height at roof access point. If this height is exceeded, the minimum clear width parking to parking must be 26' clear, required for aerial fire apparatus.

CITY OF ROHNERT PARK

NEIGHBORHOOD STREET

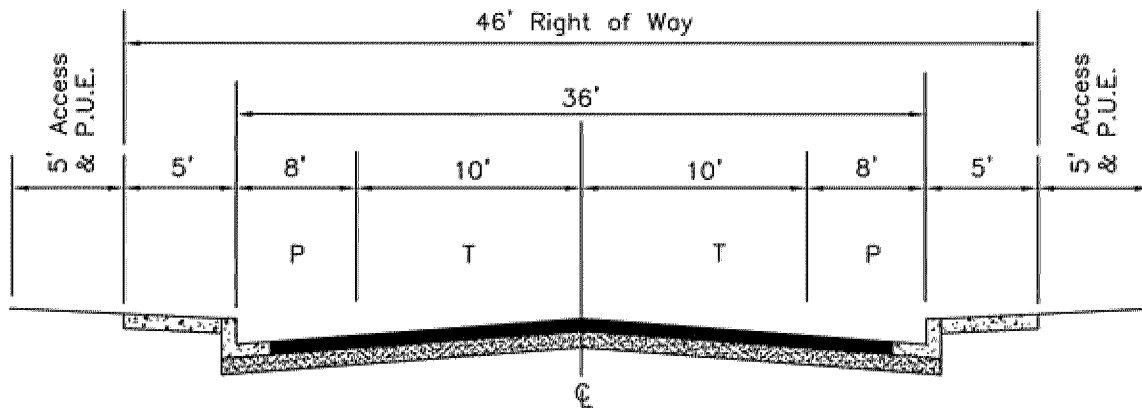
SCALE: NONE

DATE: MARCH 2011

Approved: 

STD. - 200D

MINOR STREET



1. Travel lanes are increased to 12 feet when they are adjacent to curbs (e.g., curb to curb width is 24 feet for no parking and 30 feet for parking on one side only).
2. Sidewalk and curb width is 5 feet.
3. Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. height at roof access point. If this height is exceeded, the minimum clear width parking to parking must be 26' clear, required for aerial fire apparatus.

CITY OF ROHNERT PARK

MINOR STREET

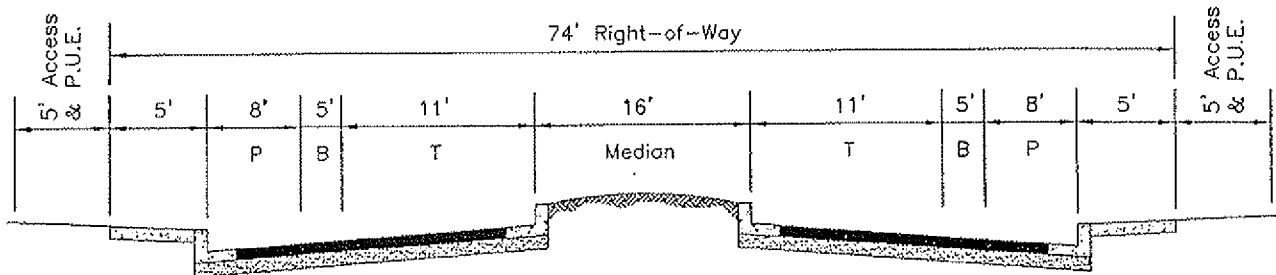
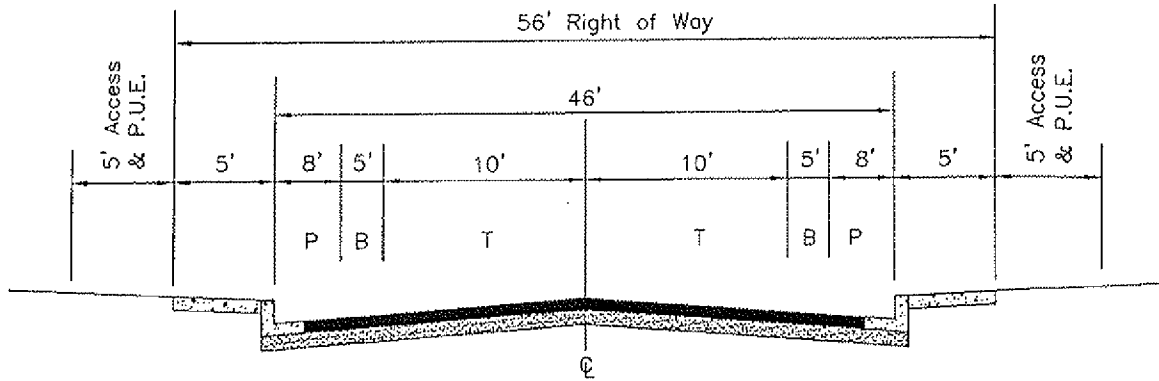
SCALE: NONE

DATE: MARCH 2011

Approved:

STD. - 200E

AVENUE



WITH MEDIAN AND BIKE LANES

1. Sidewalk and curb width is 5 feet.
2. Parking width shown is for parallel parking. Angled parking, if allowed, would require increased parking lane width.

CITY OF ROHNERT PARK

AVENUE

SCALE: NONE

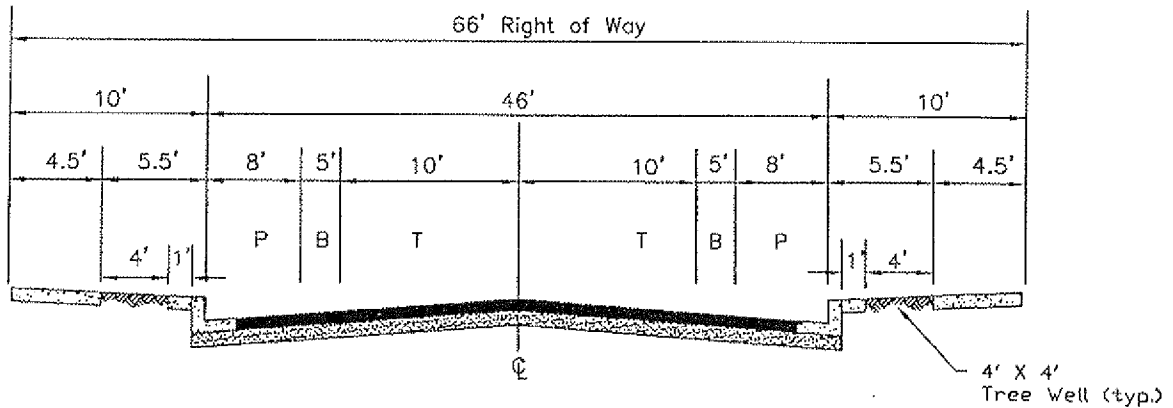
DATE: JANUARY 2006

Approved:

Dan Feltner

STD. - 200F

MAIN STREET



1. Travel lanes are increased to 12 feet when they are adjacent to curbs.
2. Sidewalk width is 9.5 to 12 feet with 4 feet by 4 feet tree wells. Right-of-way extends .5 feet beyond the sidewalk or to building face whichever is less.
3. Public Utility easement is typically contained within the sidewalk.

CITY OF ROHNERT PARK

MAIN STREET

SCALE: NONE

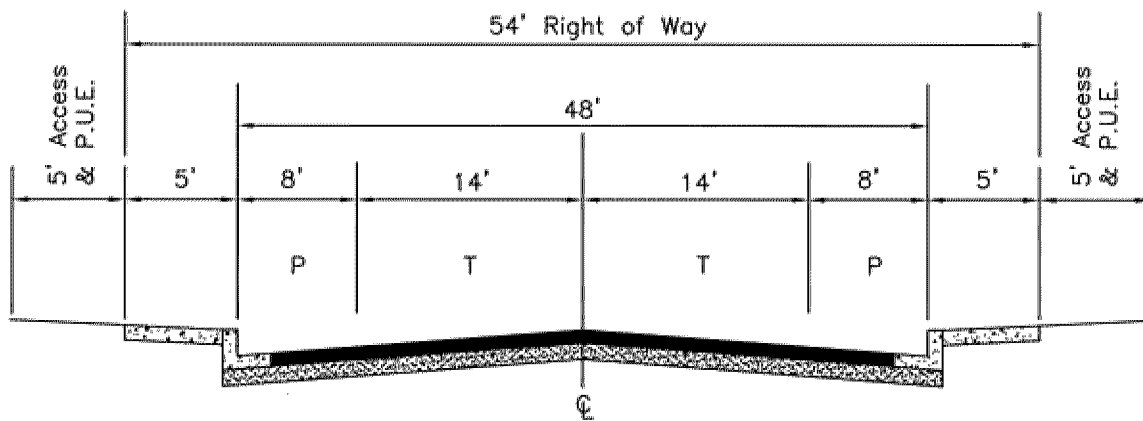
DATE: JANUARY 2006

Approved:

Dan Johnson

STD. - 200G

INDUSTRIAL STREET



1. Sidewalk and curb width is 5 feet.

CITY OF ROHNERT PARK

INDUSTRIAL STREET

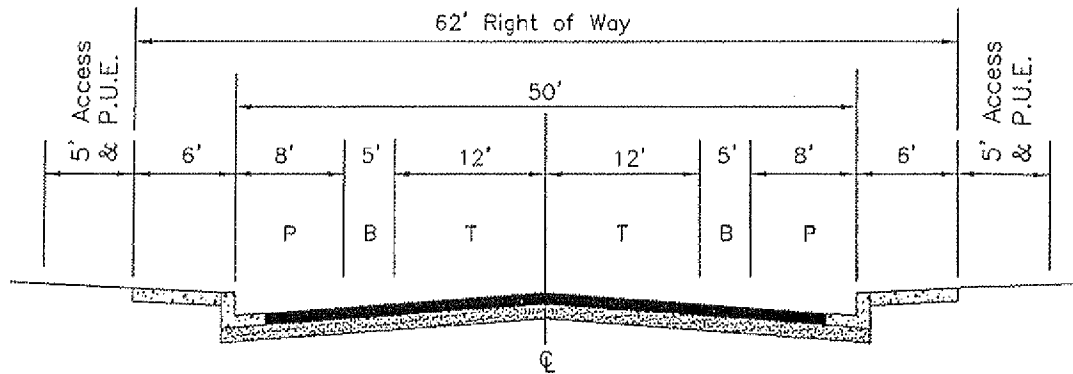
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DATE: OCTOBER 2010

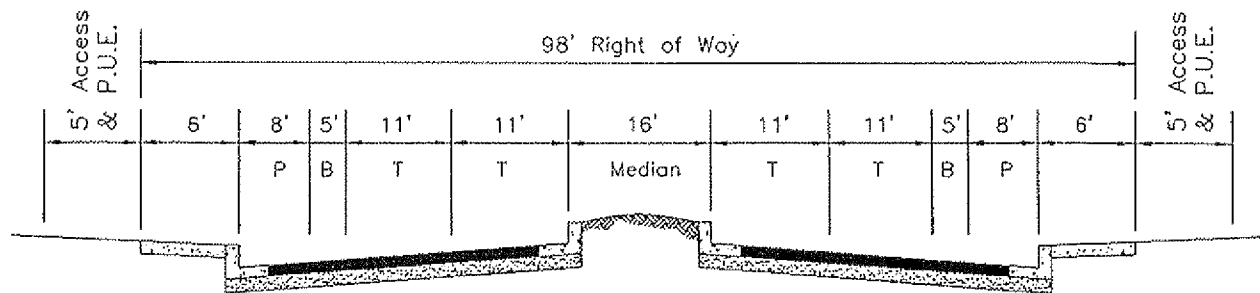
Approved:

STD. - 200H

BOULEVARD



SHOWN WITH 2 LANES, NO MEDIAN



SHOWN WITH 4 LANES, A MEDIAN AND BIKE LANES

1. Travel lanes are 11 feet. Alternate lane configuration is 3 travel lanes — one in one direction and 2 in the opposite. The 2 lane configuration with a median is similar to the 4 lane configuration.
2. Sidewalk and curb width is 6 feet.

CITY OF ROHNERT PARK

BOULEVARD

SCALE: NONE

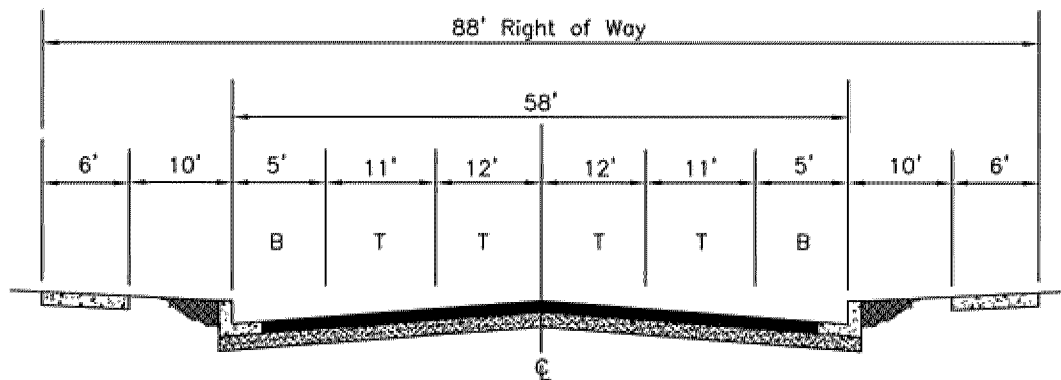
DATE: JANUARY 2006

Approved:

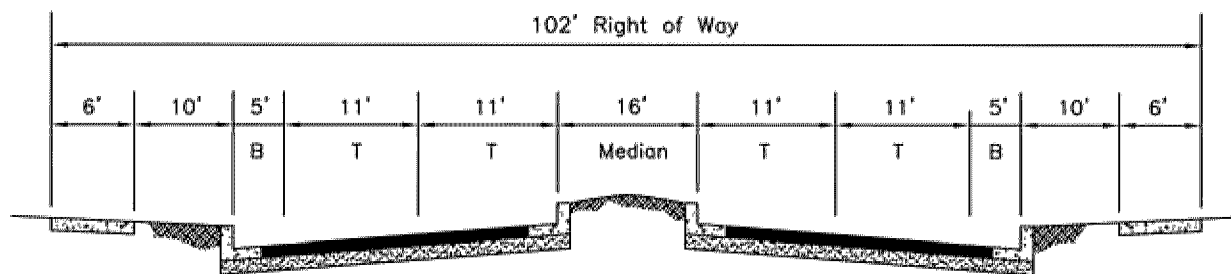
Dan Johnson

STD. - 2001

PARKWAY



SHOWN WITH NO MEDIAN



SHOWN WITH 4 LANES, A MEDIAN AND BIKE LANES

1. Travel lanes are 11 feet. The 2 lane configuration with a median is similar to the 4 lane configuration shown above.
2. Sidewalk width is 6 feet and planter strip width is 10 feet measured from face of curb to front of sidewalk.
3. No parking is allowed.

CITY OF ROHNERT PARK

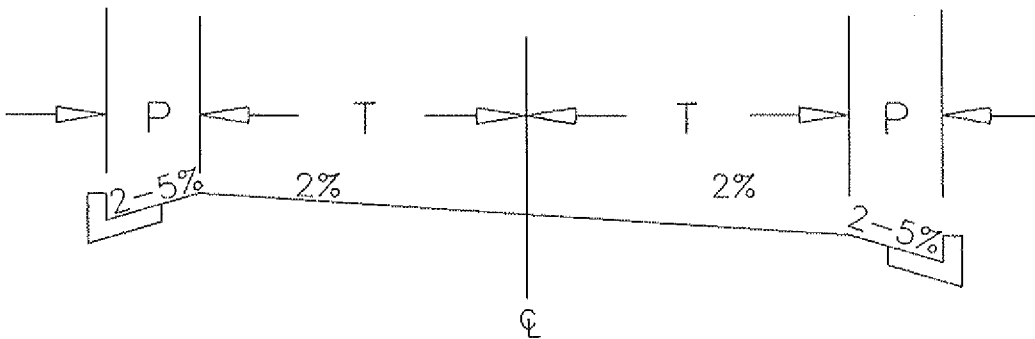
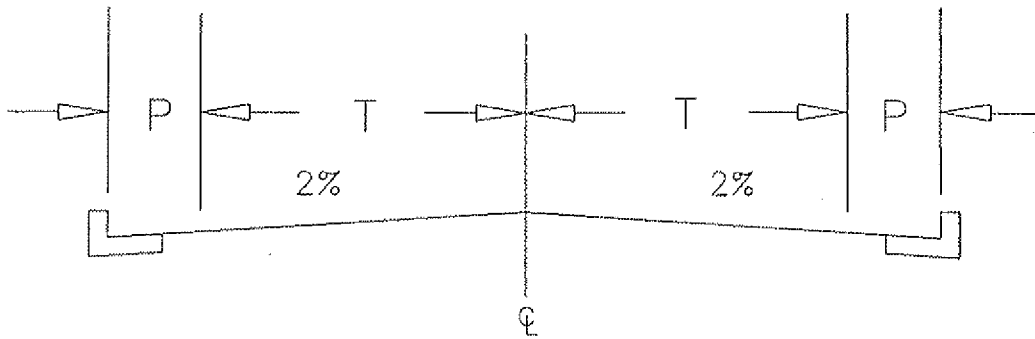
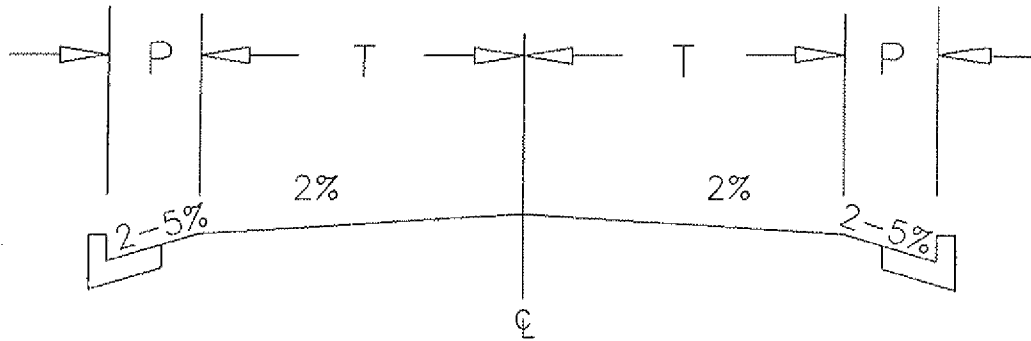
PARKWAY

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 200J



CITY OF ROHNERT PARK

CROWNS

SCALE: NONE

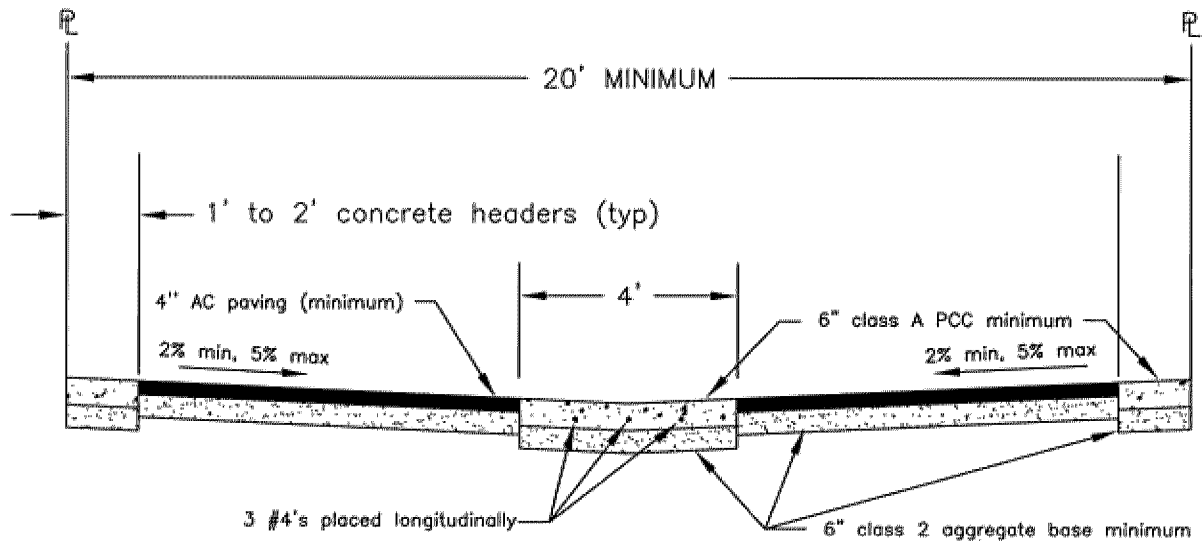
DATE: JANUARY 2006

Approved:

Dennis Sullivan

STD. - 201

ALLEY



1. Alley shall be contained within a commonly owned parcel, joint easements, or within private right of way.
2. Alley lighting shall meet the City's minor street requirements for uniformity ratio and minimum maintained foot candle specifications.
3. Access to 20 or more units will require a minimum 24' alley width for 2 way traffic and 20' for one way traffic.
4. No City utilities (water, storm drainage, sewer) may be constructed in the alleys.
5. Access to alleys will be required to be 24 ft wide for 20 ft beyond the intersection (measured from face of curb), tapering to 20 ft.
6. Adequate backup distance shall be provided. NOTE: 16 ft garage openings require a minimum backup distance of 28 ft.
7. Access to alleys from City Streets shall be through a Std 250A curb cut unless otherwise approved by the City Engineer.
8. Minimum horizontal curve radii shall be 200 ft. NOTE: CURVE RADII MAY NEED TO BE INCREASED DUE TO CLOSE PROXIMITY OF GARAGES TO ALLEY.
9. No dead end alleys will be allowed.
10. Alleys are to be used as secondary access only, with parking provided on primary access road.
11. Maximum alley length is 500'.

CITY OF ROHNERT PARK

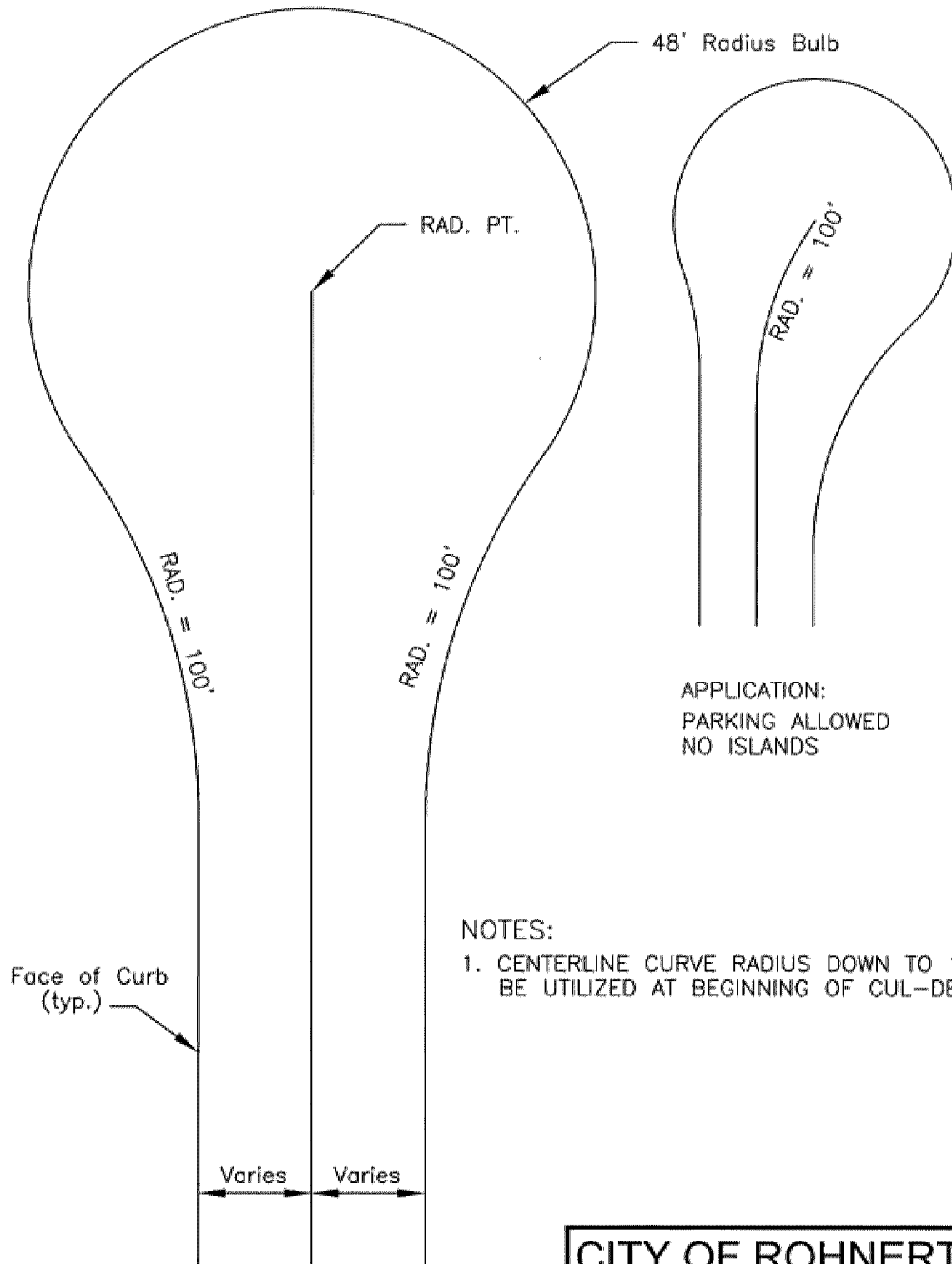
ALLEY

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

STD. - 202



CITY OF ROHNERT PARK

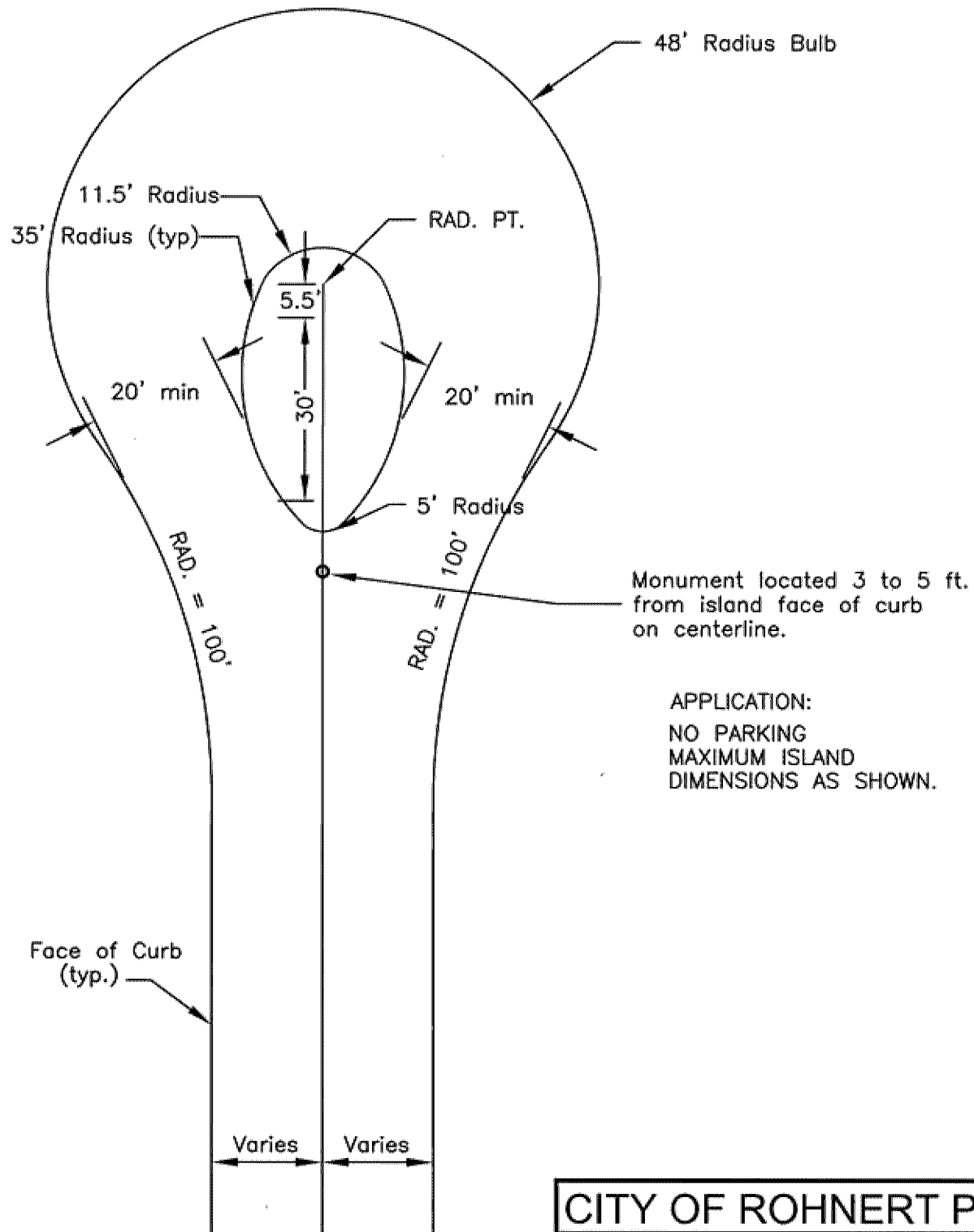
CUL-DE-SAC 48' RADIUS

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 203A



CITY OF ROHNERT PARK

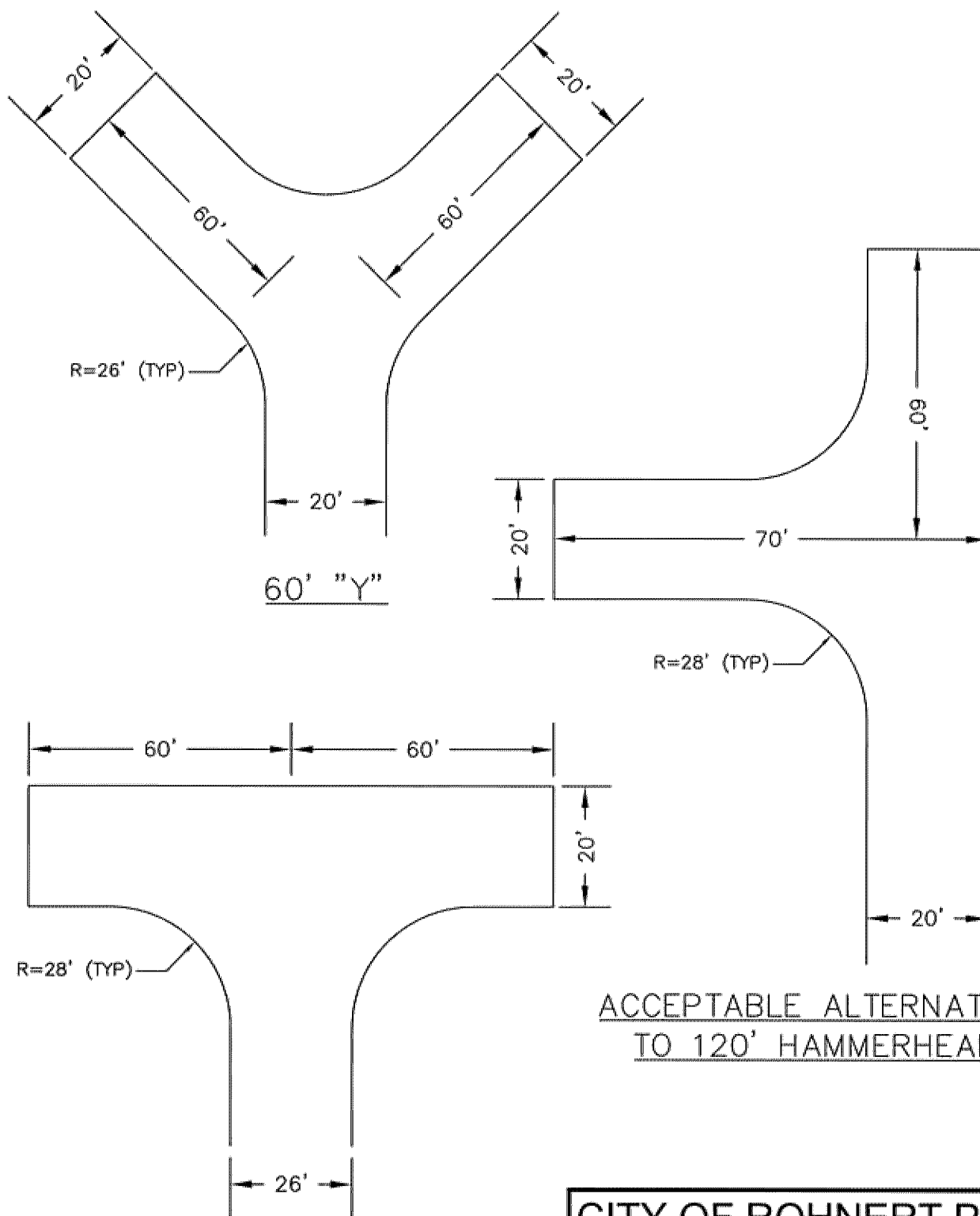
CUL-DE-SAC WITH ISLAND 48' RADIUS

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 203B



ACCEPTABLE ALTERNATIVE
TO 120' HAMMERHEAD

CITY OF ROHNERT PARK

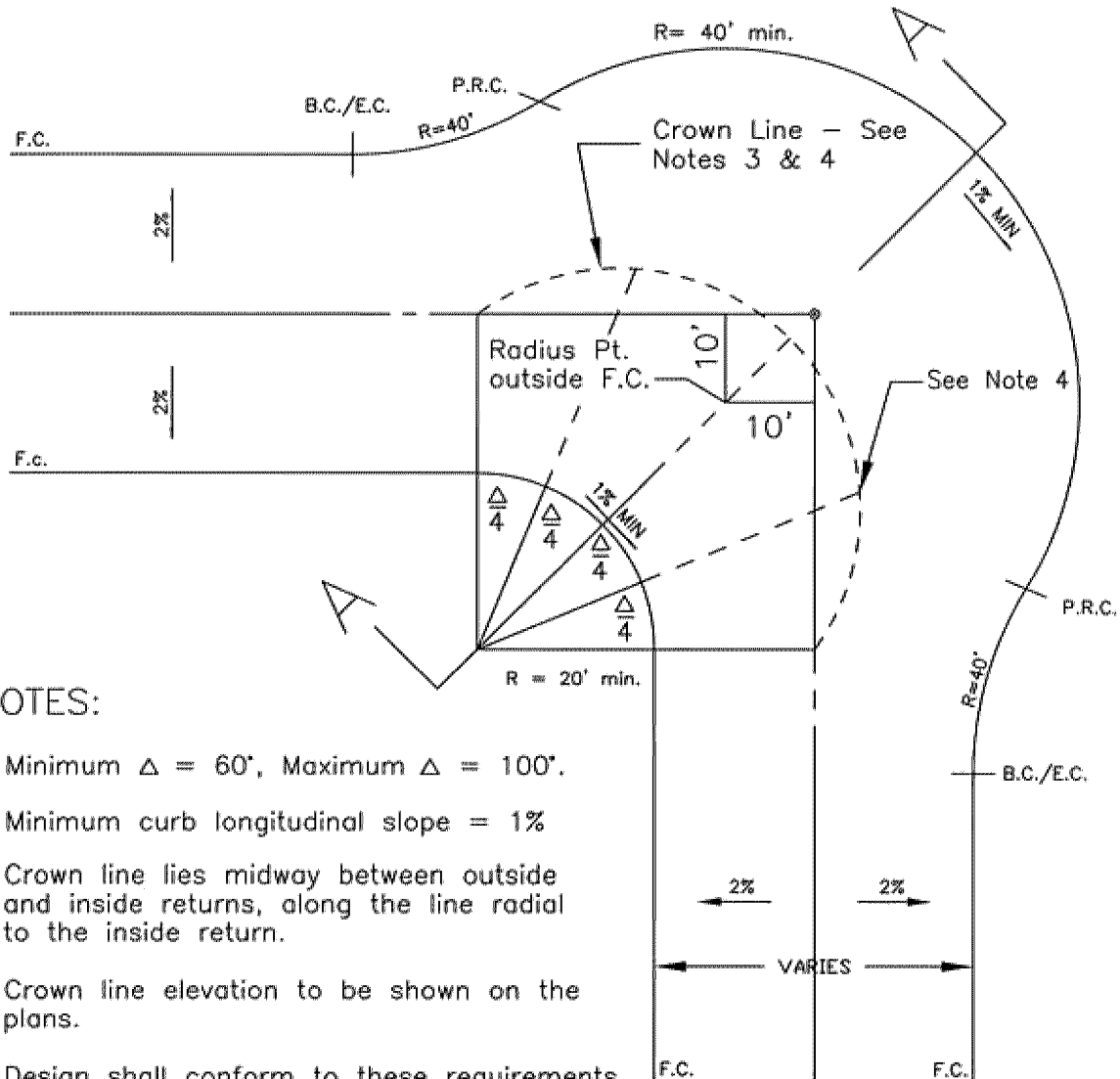
HAMMER HEAD TURN AROUND
PRIVATE DRIVEWAYS ONLY

SCALE: NONE

DATE: OCTOBER 2010

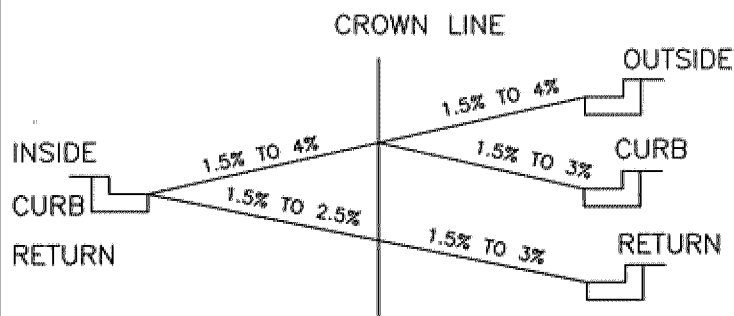
Approved:

STD. - 203F



NOTES:

1. Minimum $\Delta = 60^\circ$, Maximum $\Delta = 100^\circ$.
2. Minimum curb longitudinal slope = 1%
3. Crown line lies midway between outside and inside returns, along the line radial to the inside return.
4. Crown line elevation to be shown on the plans.
5. Design shall conform to these requirements except as otherwise approved by the City Engineer.
6. See City Standard 204B for alternate knuckle designs.



CITY OF ROHNERT PARK

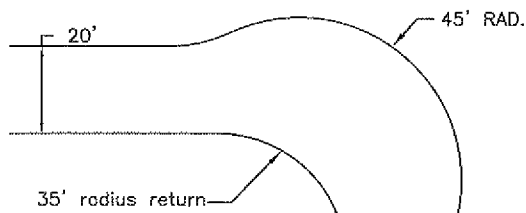
STANDARD KNUCKLE RESIDENTIAL & MINOR STREETS

SCALE: NONE

DATE: OCTOBER 2010

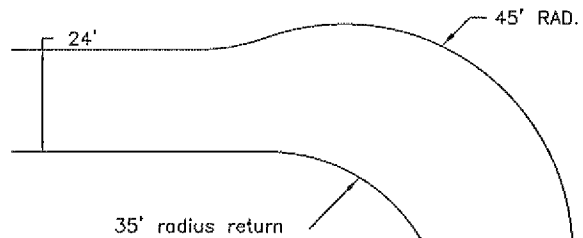
Approved:

STD. - 204A



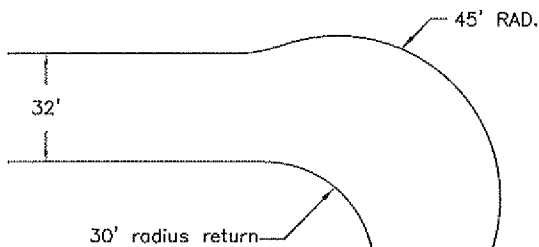
Private 20' street with minimum knuckle

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. No parking allowed.



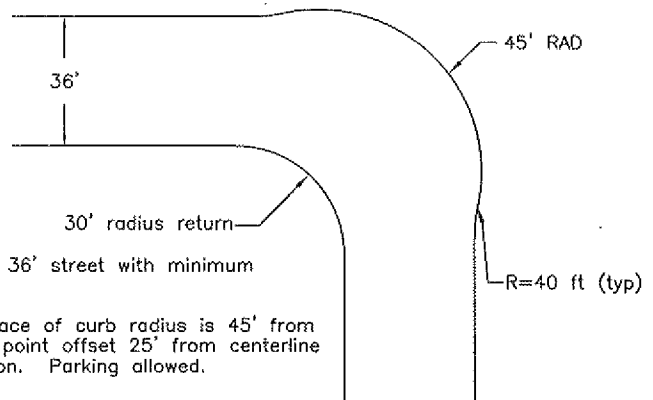
24 ft street with minimum knuckle

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. No parking allowed.



Standard 32' street with minimum knuckle.

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. Parking allowed.



Standard 36' street with minimum knuckle.

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. Parking allowed.


NOTE: Use of these knuckle alternatives (radii offset greater than 10') requires the use of double yellow raised pavement markers following the crown line from the beginning of the outside curve to the end of the outside curve.

CITY OF ROHNERT PARK

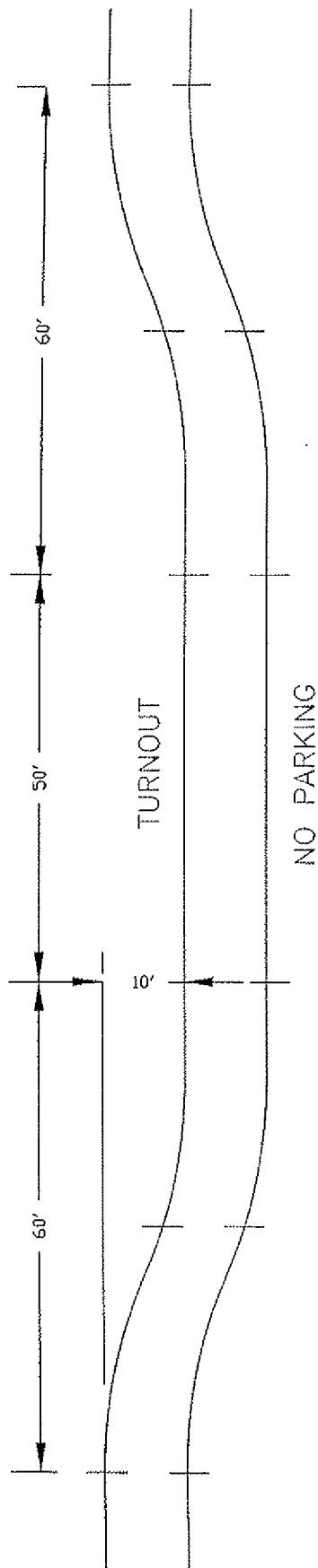
KNUCKLE ALTERNATIVES

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

STD. - 204B



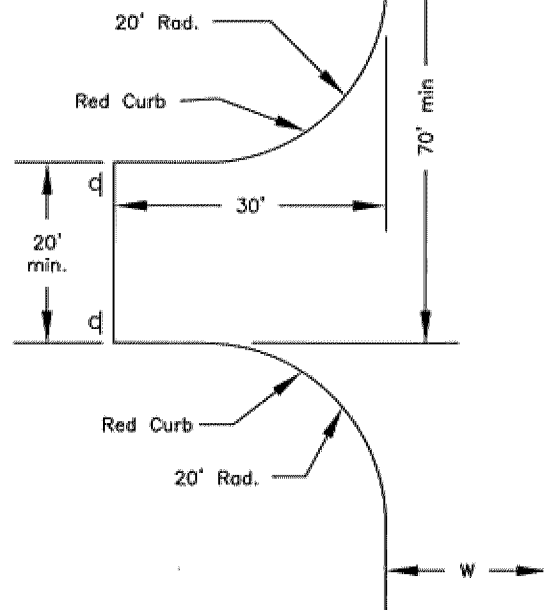
NOTES

1. Emergency turnout to be used as approved by the City Engineer.
2. Design shall conform to these requirements except as otherwise approved by the City Engineer.
3. Valley gutter shall not be used for drainage.

CITY OF ROHNERT PARK	
EMERGENCY VEHICLE TURNOUT	
SCALE: NONE	DATE: JANUARY 2006
Approved: <i>Dan Martin</i>	STD. - 205

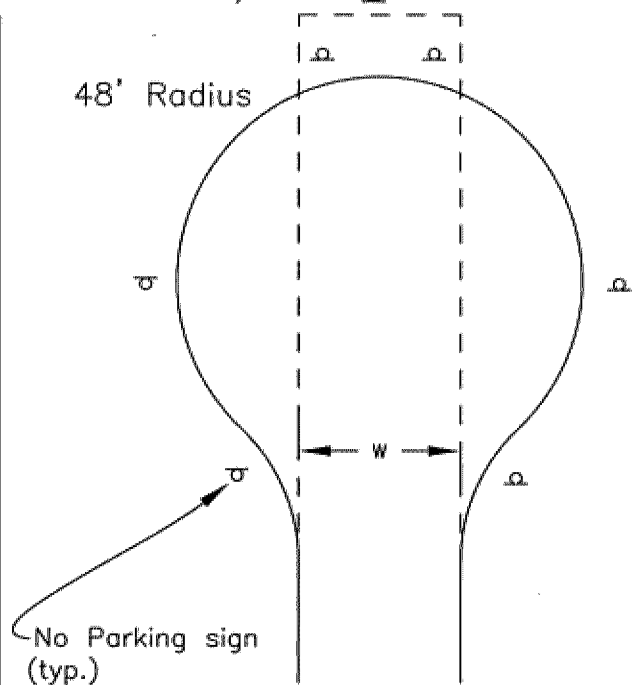
Street Barricade
Per City STD-211

No Parking sign
(typ.)

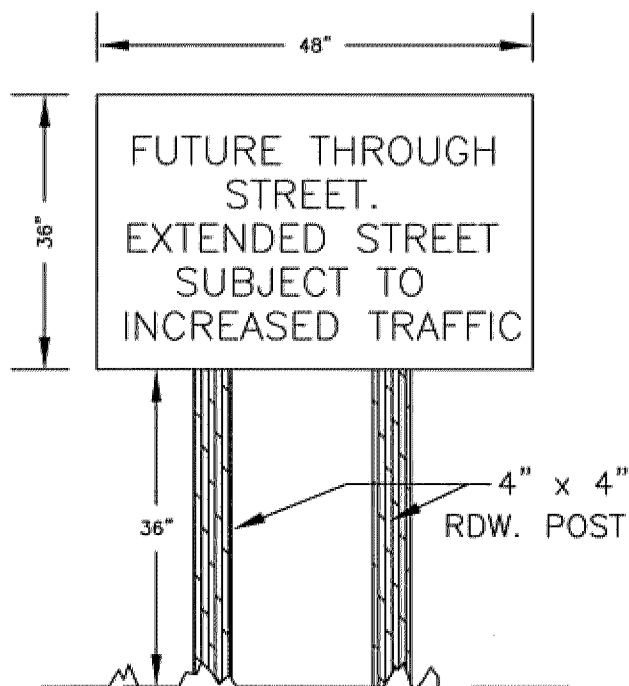


TEMPORARY HAMMERHEAD

Through Street sign
(shown in this Std.)



TEMPORARY CUL-DE-SAC



NOTES:

1. Sign shall be reflectorized as per City standard sheeting black on white metal sign with 4" letters. See City Engineer for details.
2. Design shall comply with appendix D of the Fire Code
3. If W is less than 30' on temporary hammerhead, legs shall be 40' instead of 30'.
4. For temporary hammerhead driveway cut, apron and concrete slab are acceptable if consistent with template above.
5. Temporary turnaround shall be used only when specifically approved by the City Engineer.

CITY OF ROHNERT PARK

TEMPORARY TURNAROUND FOR FUTURE ROAD

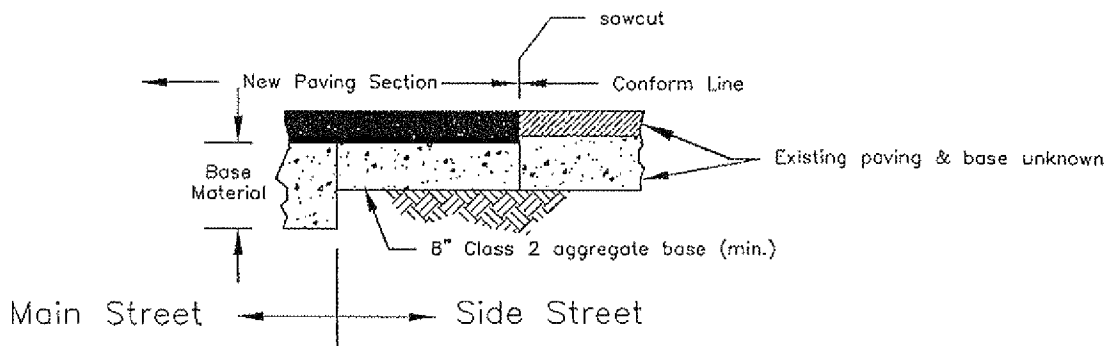
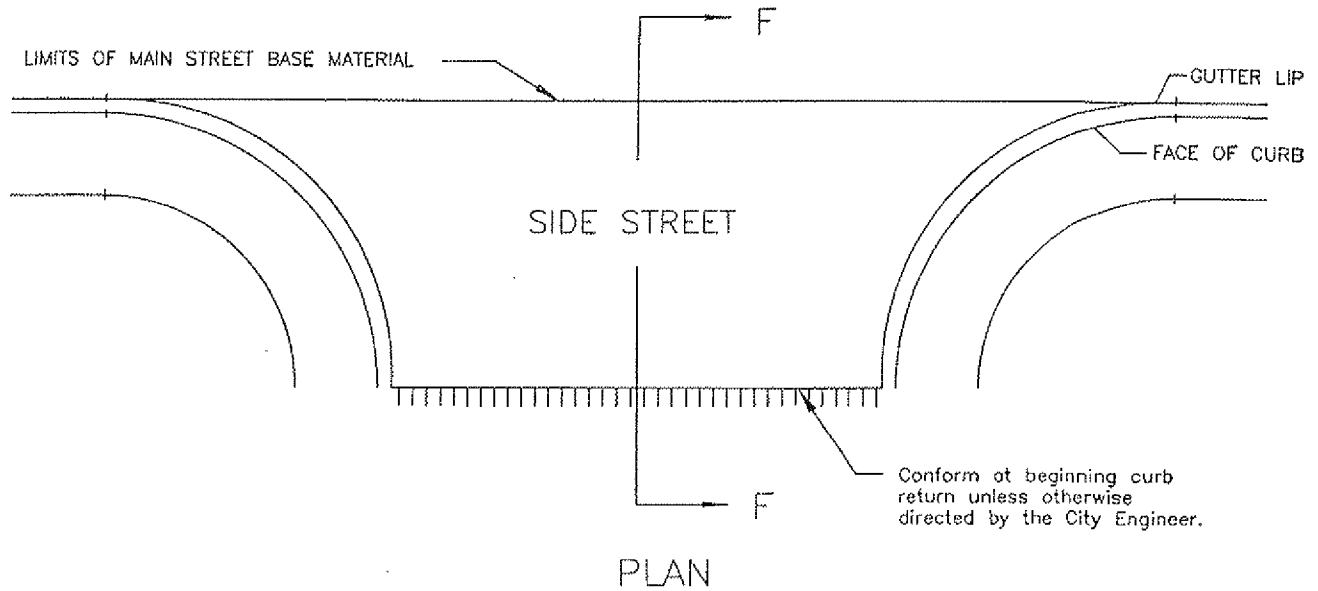
SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 206

MAIN STREET BEING RECONSTRUCTED



NOTES:

Side street A.C. thickness shall match main street paving thickness.

SECTION F-F

CITY OF ROHNERT PARK

SIDE STREET CONFORM

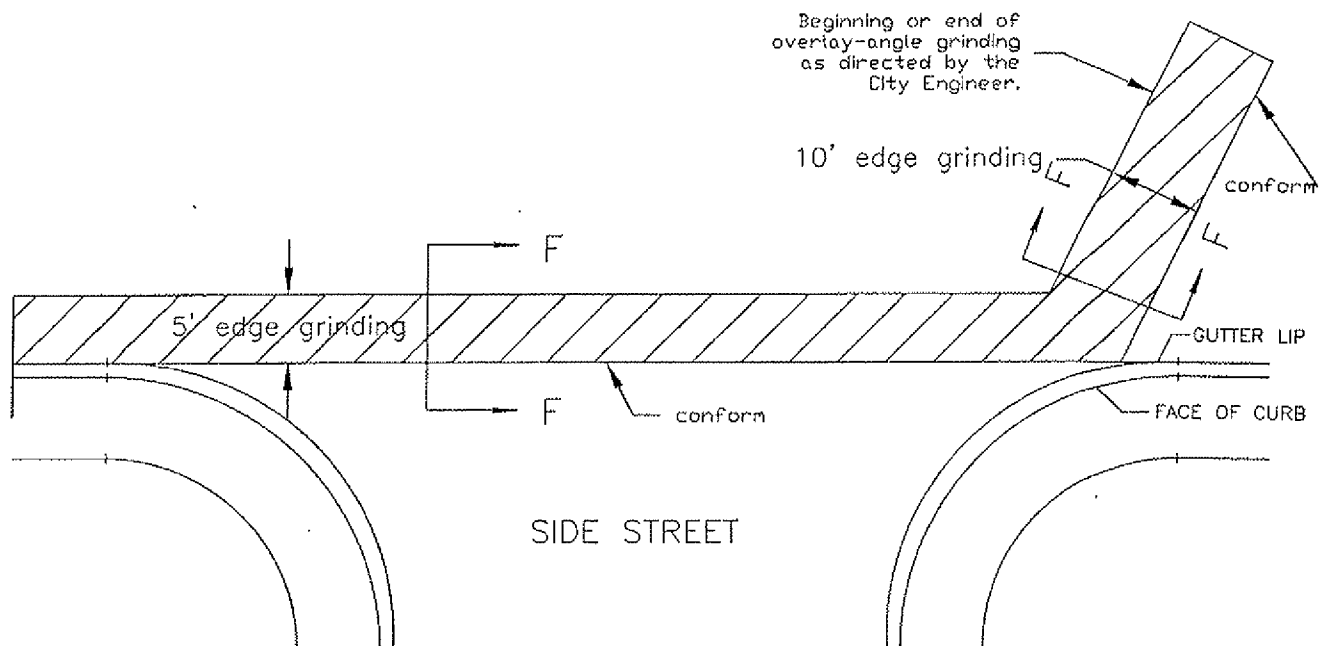
SCALE: NONE

DATE: JANUARY 2006

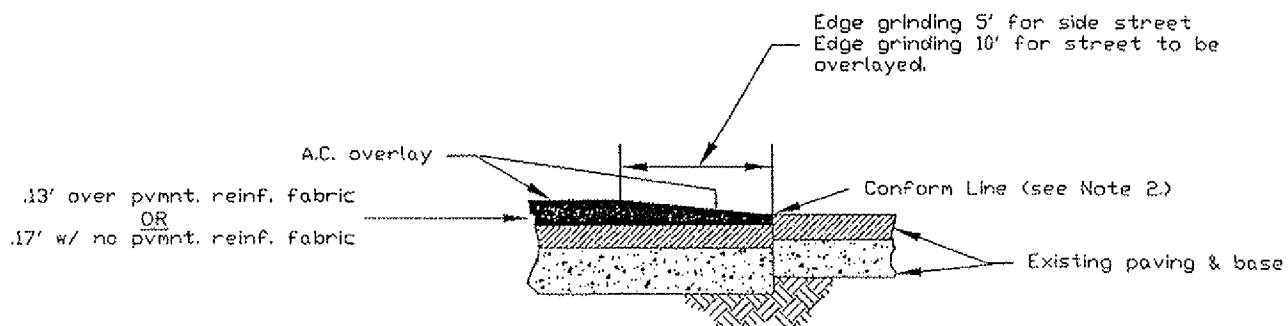
Approved:

[Signature]

STD. - 207



PLAN



SECTION F--F

NOTES:

1. Edge Grinding shall be $1\frac{1}{2}$ ".

CITY OF ROHNERT PARK

SIDE STREET AND END OF
OVERLAY CONFORM

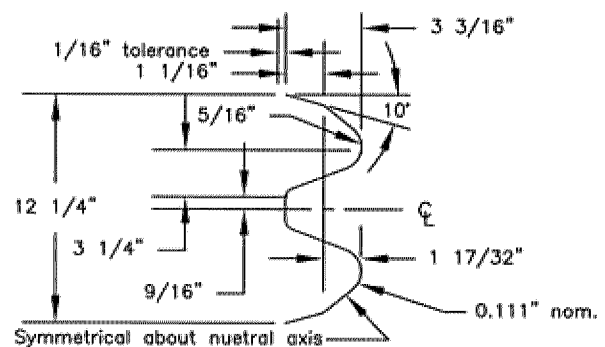
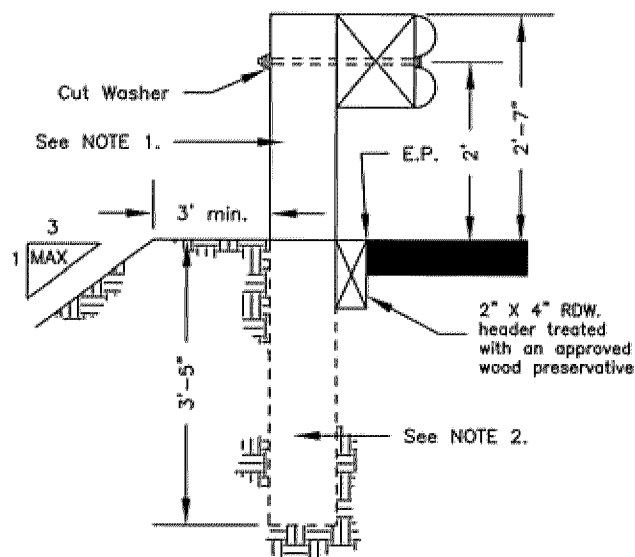
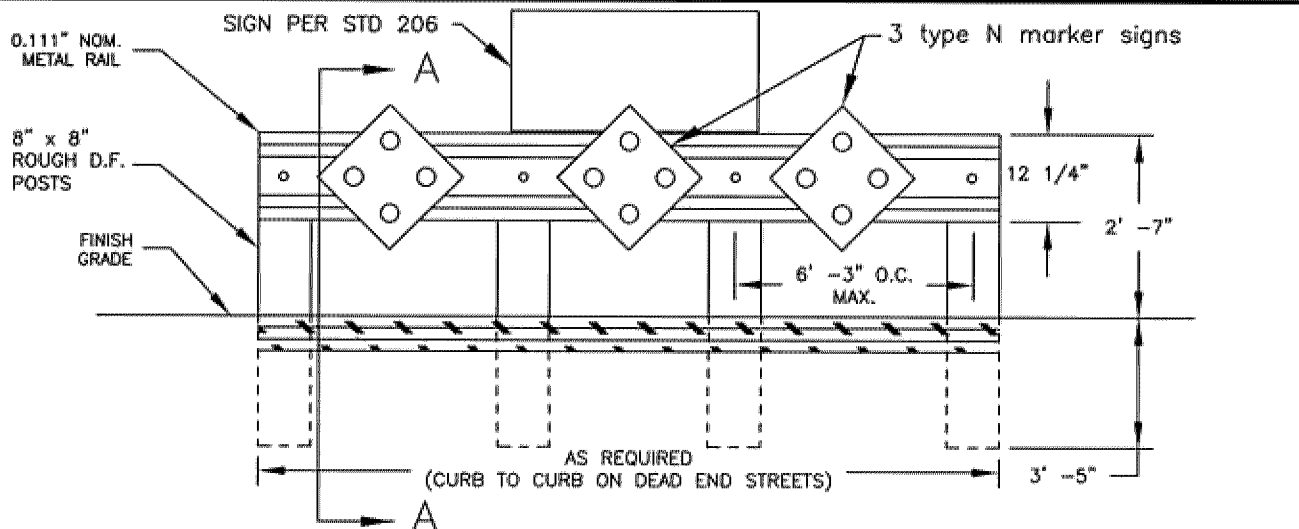
SCALE: NONE

DATE: JANUARY 2008

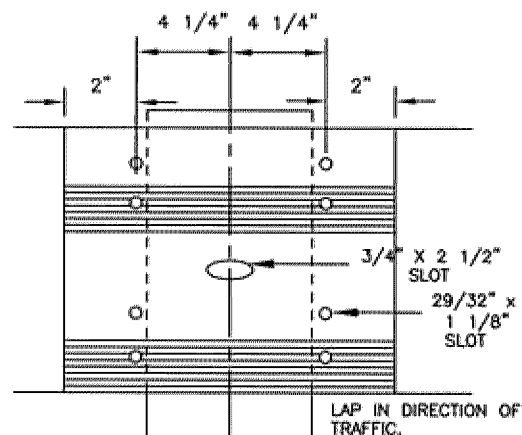
Approved:

Dan Sullivan

STD. - 208



RAIL ELEMENT SECTION



5/8" x 1 1/4" BUTTON HEAD, OVAL SHOULDER BOLTS WITH 1 1/4" RECESSED TOTAL HEX NUTS - TOTAL OF 8 PER SPLICE & 4 PER TERMINAL SECTION.

RAIL SPLICE SECTION

NOTES:

1. POSTS SHALL BE PAINTED ONE COAT OF WHITE PRIMER, AND ONE COAT OF WHITE ENAMEL AFTER ERECTION.
2. ALL PORTIONS OF POSTS TO BE INSTALLED BELOW FINISH GRADE SHALL BE TREATED WITH A WOOD PRESERVATIVE APPROVED BY THE CITY ENGINEER.
3. ON DEAD END STREETS, INSTALL TYPE W21 REFLECTORS AT CITY ENGINEER'S DIRECTION.
4. ALL RAIL ELEMENTS TO BE HOT DIPPED GALV.

CITY OF ROHNERT PARK

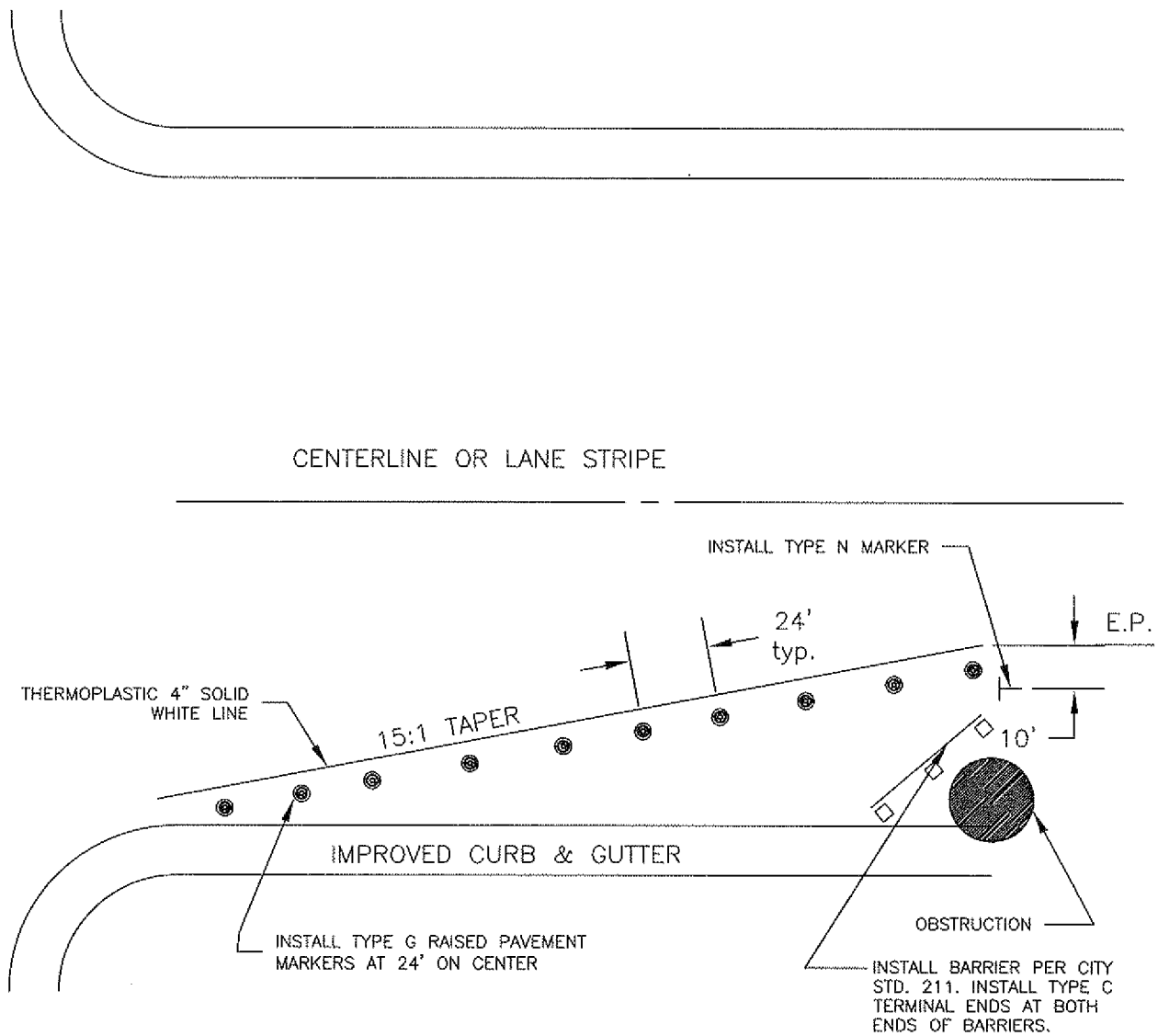
METAL BEAM STREET BARRICADE

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 211



CITY OF ROHNERT PARK

ROAD WIDTH TRANSITIONS

SCALE: NONE

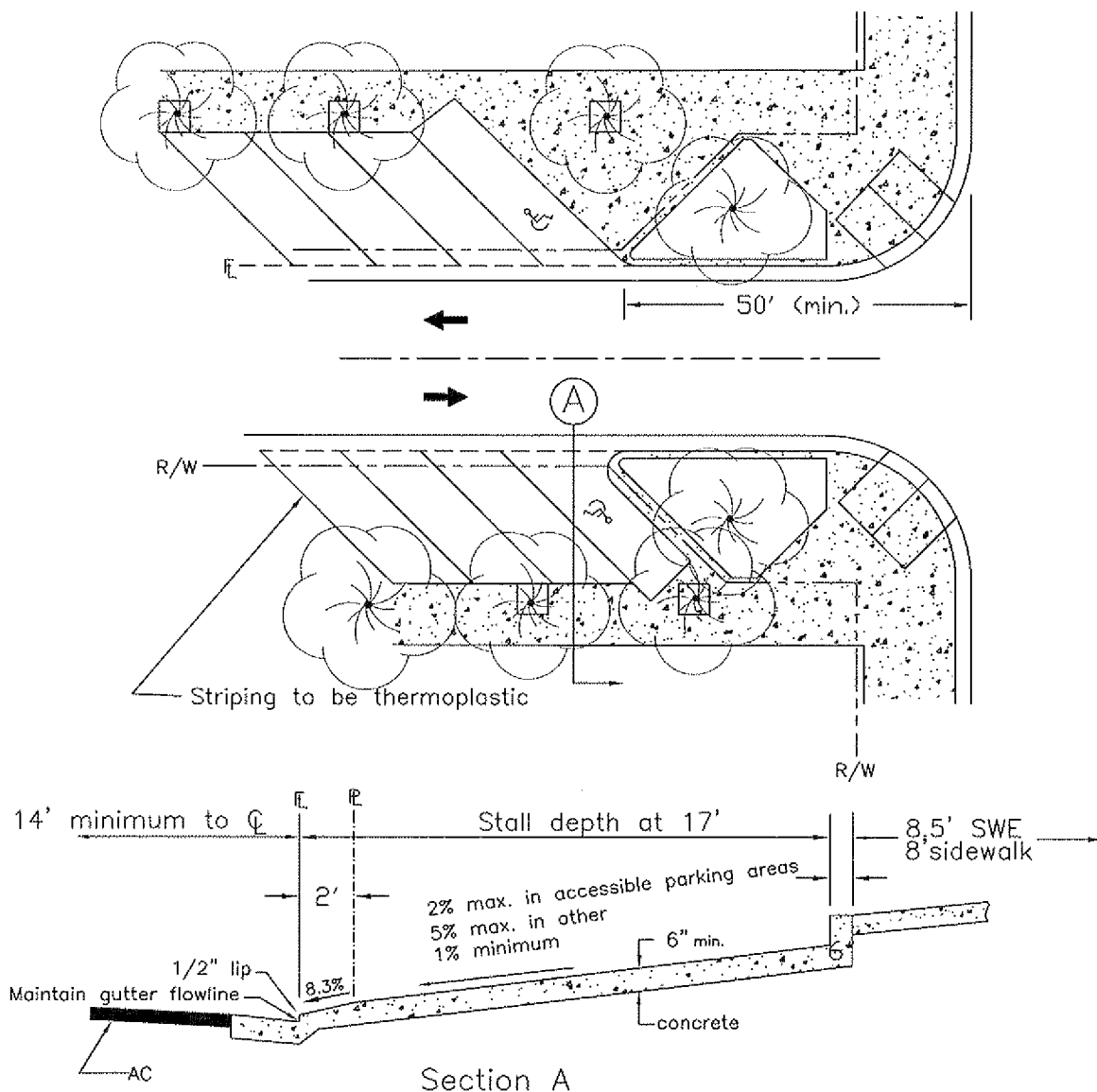
DATE: OCTOBER 2010

Approved:

STD. - 212



1. Parking Bay detail to be used only when specifically authorized by the City Engineer



1. Stall widths vary - 9' minimum for residential and 10' for commercial
2. Parking bays to be privately owned and maintained.
3. For use on low volume, (local or main) streets and/or within short block streets only (300' or less for commercial).
4. Maximum two stalls per lot for single family residential use.
5. Placement of parking bays restricted to areas with adequate sight distance.
6. Surface drainage flows must be maintained within gutter pan and right-of-way.
7. Handicap accessible projects and commercial applications of this standard must meet all handicap requirements.
8. Minimum distance from end of curb return to first stall shall be 50'.
9. Street lighting shall meet the City's minimum street lighting requirements.
10. Street tree spacing shall be per City standards.

CITY OF ROHNERT PARK

45° PARKING BAY

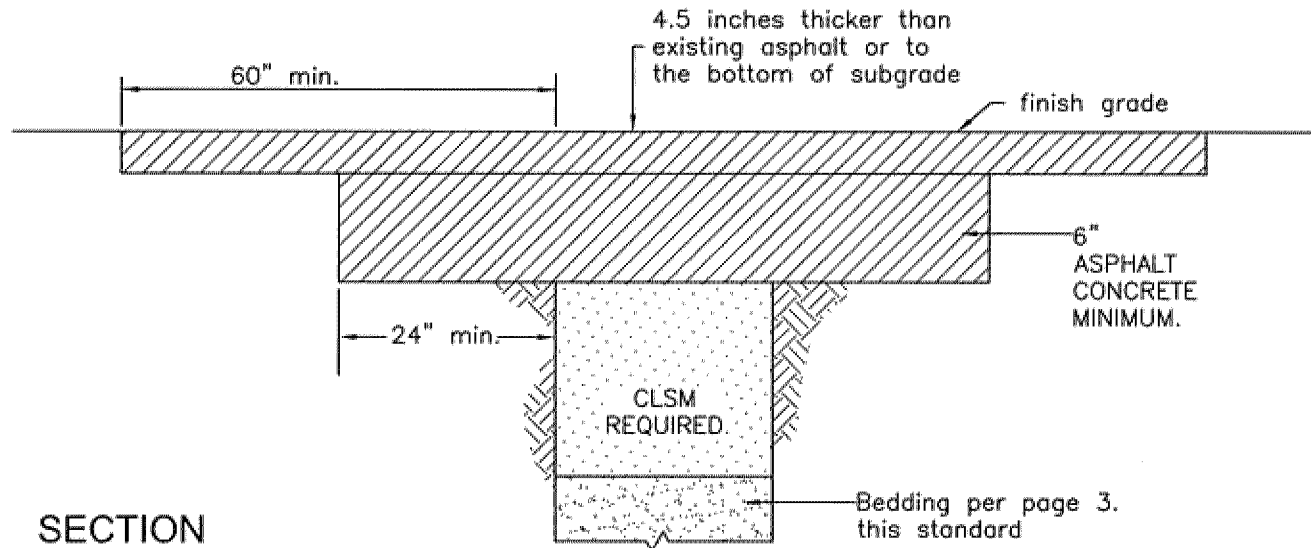
SCALE: NONE

DATE: MARCH 2011

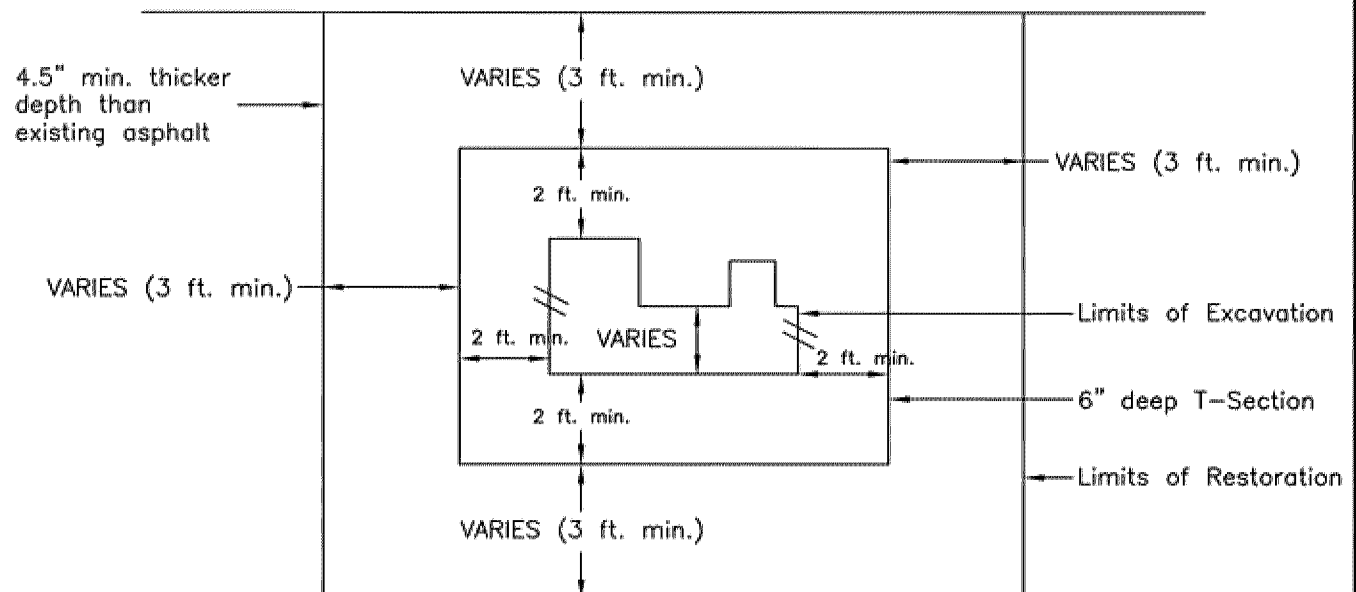
Approved:

STD. - 214

TRENCH BACKFILL AND SURFACING EXISTING ROADS



SECTION



PLAN

NOTES ON PAGES 5-7
THIS STANDARD

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL TRENCH BACKFILL AND SURFACING

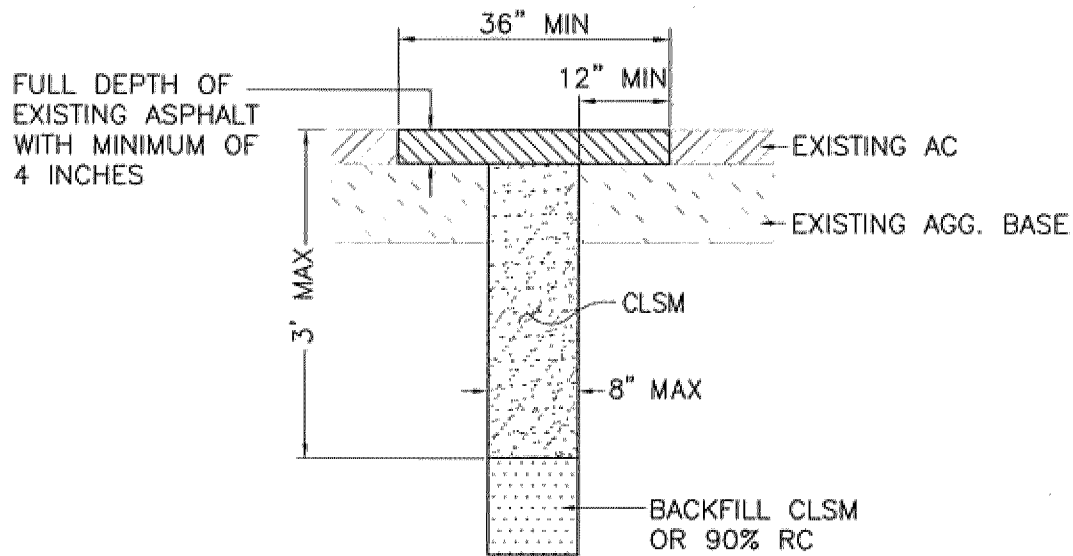
SCALE: NONE

DATE: OCTOBER 2010

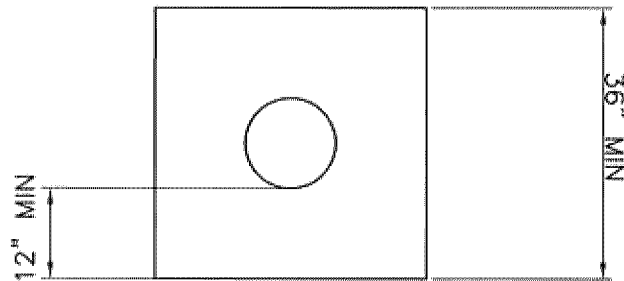
Approved:

STD. - 215

BORE HOLES



SECTION



PLAN

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

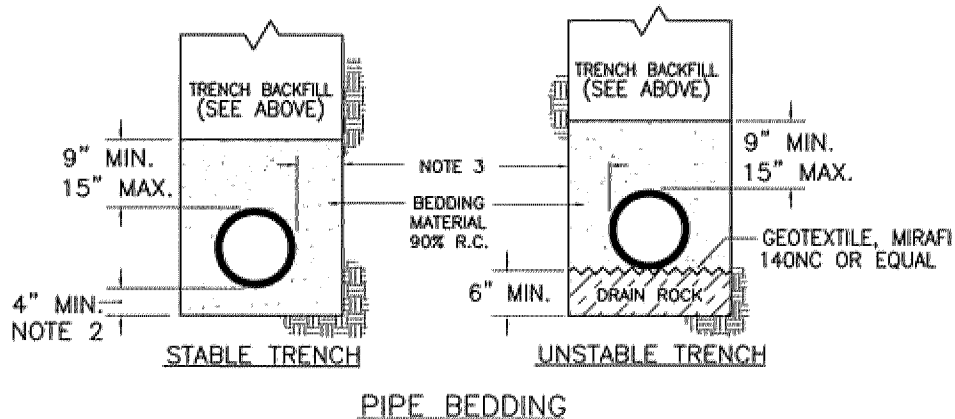
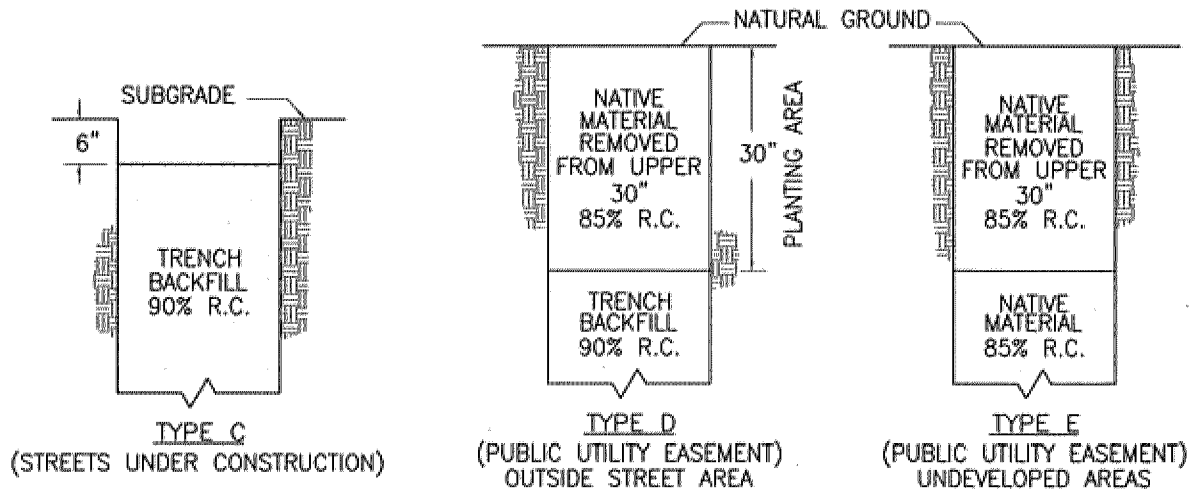
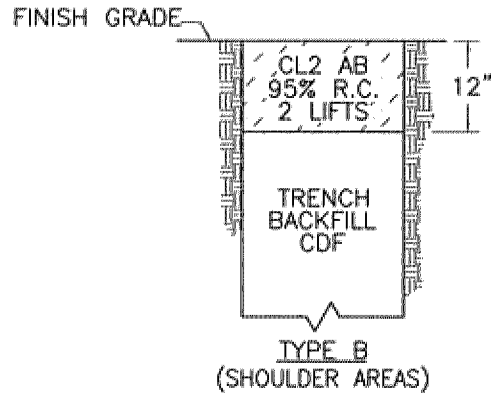
STD. - 215

TRENCH WIDTH FOR HDPE PIPE

PIPE SIZE*	TRENCH WIDTH (MIN.)
15"	36"
18"	48"
24"	54"
30"	60"
36"	72"

PIPE MUST BE CENTERED IN THE TRENCH.
*INSIDE DIAMETER

TRENCH BACKFILL (TYPE TO BE SHOWN ON THE PLANS)



NOTES:

- RELATIVE COMPACTION IS DESIGNATED RC.
- 1/4 PIPE O.D. MINIMUM WHEN EXCAVATION IS IN ROCKY GROUND.
- PIPE DIAMETER 18" OR LESS: 6" MIN., 9" MAX.
PIPE DIAMETER GREATER THAN 18": 9" MIN.,
12" MAX. SEE TABLE ABOVE FOR HDPE PIPE
TRENCH WIDTHS.

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

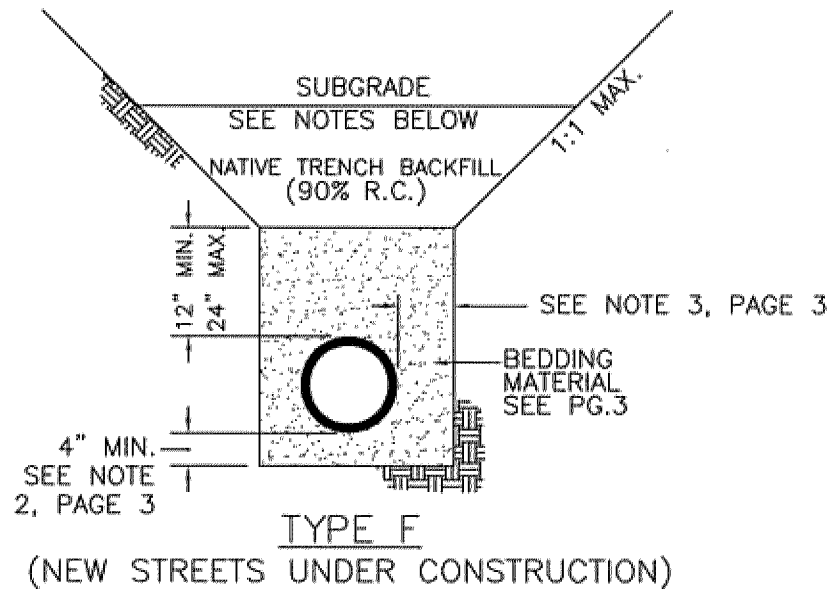
SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 215

STREET STRUCTURAL SECTION
SHALL BE AS SHOWN ON PLANS



NOTES:

1. ROCKS EXCEEDING 6" SHALL NOT BE PERMITTED WITHIN THE TRENCH SECTION.
2. THE MAXIMUM DEPTH OF NATIVE BACKFILL MATERIAL SHALL NOT EXCEED 10', UNLESS THE STREET IS EXCAVATED A UNIFORM DEPTH FROM FACE OF CURB TO FACE OF CURB.
3. EMBANKMENT CONSTRUCTION METHODS SHALL BE USED. ALL SLOPES MUST BE KEYED-IN A MINIMUM OF 1' AS THE TRENCH IS BACKFILLED.
4. THE MINIMUM EQUIPMENT REQUIRED FOR COMPACTION OF NATIVE BACKFILL MATERIAL SHALL CONSIST OF A SHEEPSFOOT VIBRATORY ROLLER WITH A MINIMUM DRUM WIDTH OF 48", A MINIMUM GROSS WEIGHT OF 4600 LBS, OR MUST MEET APPROVAL OF THE CITY ENGINEER.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE PRIVATE SOILS ENGINEER AND THE CITY INSPECTOR 48 HOURS PRIOR TO EXCAVATION.
6. THE PRIVATE SOILS ENGINEER SHALL PROVIDE TESTING AND OBSERVATIONS ON A FULL TIME BASIS DURING ALL NATIVE BACKFILLING OPERATIONS. THE PRIVATE SOILS ENGINEER IS RESPONSIBLE FOR THE VERIFICATION OF ALL NATIVE BACKFILL WORK INCLUDING COMPACTION AND UNIFORM MOISTURE CONDITIONING, AND THAT MOISTURE CONTENT IS ABOVE OPTIMUM MOISTURE TO THE EXTENT APPROPRIATE FOR THE NATIVE MATERIAL BEING USED.

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 215

1. In streets that are less than five (5) years old or have a Pavement Condition Index (PCI) greater than 85, the City Engineer reserves the right to deny any street excavation or require repairs that are over and above these specifications.
2. The Contractor shall at all times so conduct his/her work as to assure the least possible disruption to the motoring traffic and adjacent residents and businesses.
3. During peak traffic and during times when no work is preformed on the new installation, plates shall be in place and the street opened to full traffic flow. Plates shall be placed across the trench in a secure fashion not to move or vibrate under traffic conditions.
4. Avoid weakening or destroying the existing pavement around an excavation with heavy construction equipment, stockpiling, or delivery of materials, etc. No stockpiling of backfill or road building materials is permitted on the pavement.
5. The excavated material from the trench shall be removed from the site. Backfilling shall begin immediately after completion of the designated utility work.
6. Granular backfill shall be used around the pipe and as pipe bedding. Bedding material shall be compacted to at least 90% relative density with moisture control (not on standard Proctor). Lift thicknesses should be less than or equal to 6 inches.
7. PIPE BEDDING and TRENCH BACKFILL shall be free of asphaltic material
8. 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 grading:

1"	3/4"	3/8"	#4	#200
100%	90-100%	65-100%	30-100%	0-15%

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

1"	3/4"	3/8"	#4	#30	#200
100%	90-100%	65-100%	30-100%	0-100%	0-15%

10. Trench backfill shall be compacted to at least 90% relative density with moisture control (not on standard Proctor). Lift thicknesses should be less than or equal to 12 inches. Compaction testing by an approved soils testing laboratory is required if granular trench backfill is used.
11. TRENCH BACKFILL shall conform to the following grading and have a minimum sand equivalent value of 25:

3"	#4	#30
100%	40-100%	10-100%

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

SCALE: NONE	DATE: OCTOBER 2010
-------------	--------------------

Approved: 

STD. - 215

12. CLSM (Flowable-fill) shall be used in all trenches within existing streets or shoulder areas. The depth shall be a minimum of 3 feet below the roadway aggregate base or from the pipe backfill to the roadway aggregate base, whichever is less. *Trench backfill may be used on an exception basis with the permission of the City Engineer. Compaction testing shall be provided by the contractor.
13. CLSM shall be a mixture of Portland cement, sand, 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. CLSM may also contain class f pozzolan (fly ash). CLSM shall be used in all roadways and be free of asphaltic material.
14. CLSM (Flowable-fill) The maximum 28-day strength is 60 psi. The following combination of material, or an equivalent, may be used to obtain the desired "flowable-fill". Cement 42 lb/CY (0.47 sack); Water 235 lb/CY(39 gallons or as needed); Coarse Aggregate 1700 lb/CY; Sand (ASTM C-33) 1845 lb/CY.
15. The consistency of CLSM shall be such that all trench voids are filled with minimum rodding or vibrating but not so wet as to cause excessive shrinkage.
16. Permanent pavement may be placed directly upon the CLSM as soon as it has consolidated for the surface to withstand the process of paving without displacement. The surface of the CLSM shall be firm and unyielding. Any visible movement vertically or horizontally of the CLSM under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the control density fill does not meet this requirement. The contractor shall provide trench plates to allow traffic flow for all locations until control density fill is ready to be paved.
17. Asphalt repair shall extend 5 feet minimum from either side of the trench wall. Transverse patches on arterial and collector streets shall be overlaid across the entire street width for a distance of five (5) feet minimum on all sides of the trench.
18. The replacement asphalt shall be a minimum of 4.5 inches deeper than the existing asphalt or full depth replacement of asphalt in lieu of the aggregate base and asphalt, whichever is less. *A two inch overlay of the roadway surface may be substituted for this replacement asphalt at the discretion of The City Engineer. Conforms shall meet City Standards.
19. AGGREGATE BASE shall conform to the requirements of the City Standard Specifications, Class 2 aggregate base.
20. Asphalt concrete shall conform to the requirements of Section 39 of the State Standard Specifications.
21. A thickened T section of asphalt shall be placed an additional 6 inches deep to 2 feet either side of the trench wall.
22. Pavements shall be removed by saw cutting or grinding. Neatly cut or grind pavement after trench is backfilled to subgrade.
23. Any damage, even superficial, to the existing asphalt surface in the vicinity of the work shall be repaired at the expense of the Contractor, including but not limited to gouges, scrapes, outrigger marks, backhoe bucket marks, etc. A slurry seal type covering will be considered the minimum repair. Patching may be required, at the discretion of the City Engineer.
24. Existing pavements should be removed to clean, straight lines parallel and perpendicular to the flow of traffic. Do not construct patches with angled sides and irregular shapes. All repairs shall be full lane width. Joints shall be placed at lane lines.

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

STD. - 215

25. Utility trench patches shall avoid excessive joints.

- a. When a proposed cut is within ten feet of an existing patch, extend the new patch to the existing patch.
- b. Patches shall be rectangular and maintain the same width throughout the length of the patch.
- c. If a patch is done within an existing patch make the boundaries of the patches coincide.
- d. Avoid frequent changes in width of patches.
- e. Do not leave strips of pavement less than one-half lane in width from the edge of the new patch to the edge of an existing patch or the lip of the gutter.
- f. The patched area must include any damage due to trenching operations within 10 feet of the patch.

26. A tack coat shall be applied to all edges of the existing asphalt before placing the new pavement. After placing the new asphalt, all seams (joints) between the new and existing pavements shall be sealed with rubberized crack seal material.

27. Patch slope and grade must match existing pavement. Patches should have a smooth longitudinal grade consistent with the existing roadway. Patches should also have a cross slope or cross section consistent with the cross slope of the existing roadway.

28. The finish pavement must be flush with the adjacent surfaces. The finished surface of the street repair shall be tested with a twelve- (12-) foot straightedge parallel to the centerline or perpendicular across joints. Variations measured from the testing face of the straightedge to the surface of the street repair shall not exceed 1/8 inch in 12 feet longitudinally and 1/4 inch in 12 feet transversely.

29. The contractor is required to provide material testing for each phase of the work and at no cost to the City. The testing firm chosen to perform this work for the Contractor must be qualified and identified on the Permit application.

30. When the final surface is not immediately installed, it shall be necessary to place a temporary asphalt surface on any street cut opening. The temporary surface installation and maintenance shall be the responsibility of the Permittee until the permanent surface is completed and accepted. It shall be either a hot mix or cold mix asphalt paving material. Temporary surfaces shall be compacted, rolled smooth, and sealed to prevent degradation of the repair and existing structures during the temporary period. Permanent patching shall occur within two (2) weeks except as outlined in the Permit. Trenchplate may be used for 24 hours maximum.

31. Removal and replacement of unsatisfactory work shall be completed within fifteen (15) days of written notification of the deficiency unless deemed an emergency requiring immediate action. In the event the replacement work has not been completed, CITY ENGINEER will take action upon the contractor's bond to cover all related costs.

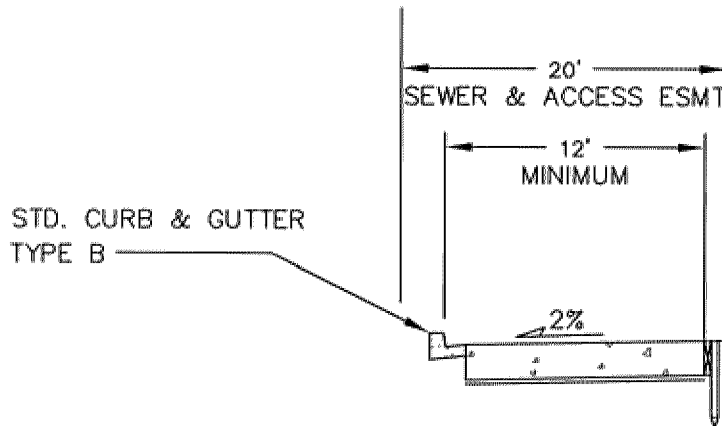
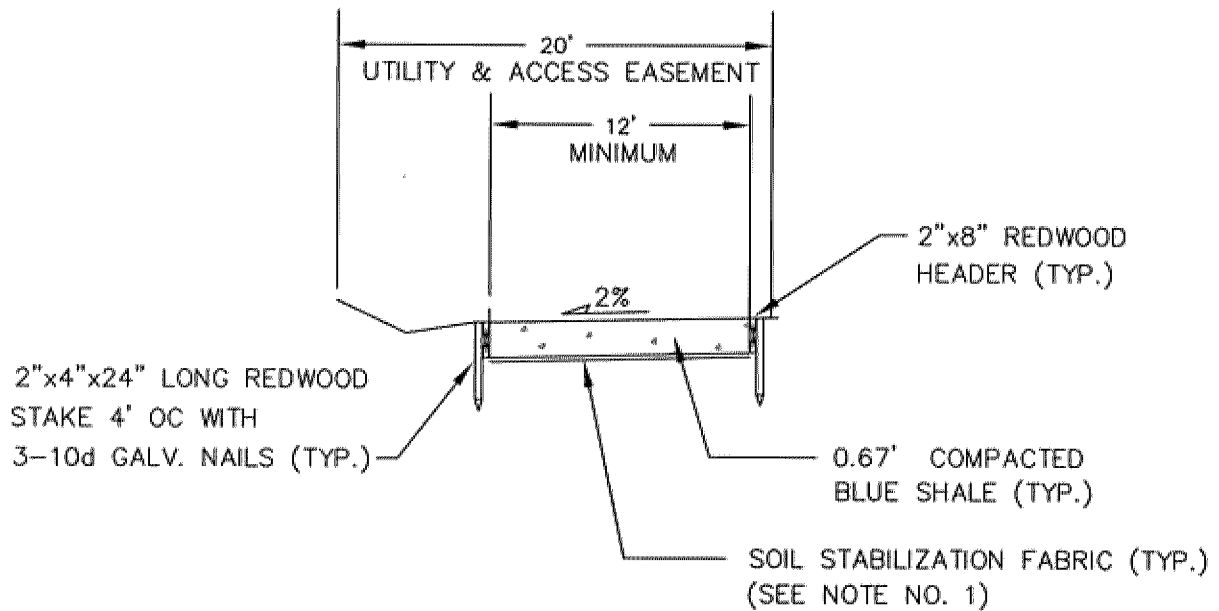
CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

SCALE: NONE DATE: OCTOBER 2010

Approved:

STD. - 215



1. SOIL STABILIZATION FABRIC SHALL BE MIRAFL 500-X OR EQUAL.
2. ALL ACCESS ROADS HAVING A GRADE OVER 5% SHALL BE PAVED WITH 6 INCHES OF CLASS II AGGREGATE BASE AND 2 INCHES OF ASPHALT CONCRETE.
3. ALL ACCESS ROADS HAVING A CURVE WITH A RADIUS OF LESS THAN 100 FEET SHALL BE INCREASED IN WIDTH TO 20 FEET WITH A MINIMUM INSIDE RADIUS OF 20 FEET.
4. A HAMMERHEAD TURNAROUND MAYBE REQUIRED AT THE END OF THE UTILITY ACCESS ROAD AT THE DISCRETION OF THE UTILITIES DEPARTMENT.
5. THE SUBGRADE SHALL BE COMPACTED TO 95% RC.

CITY OF ROHNERT PARK

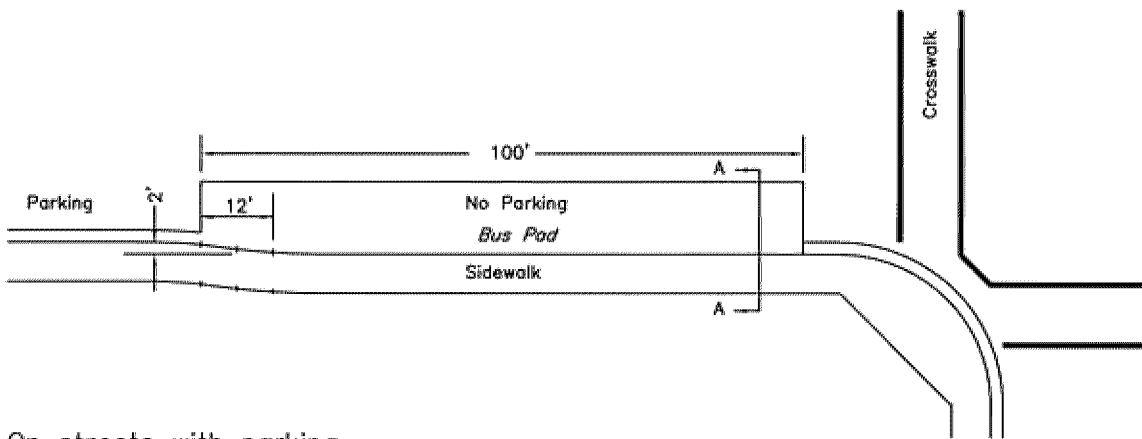
UTILITY ACCESS ROAD

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

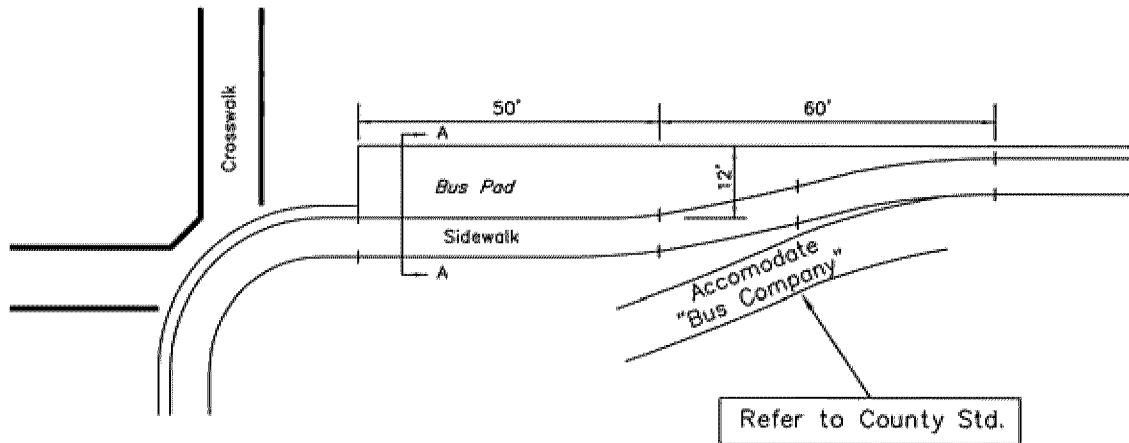
STD. - 216



On streets with parking

This bus stop is "near side" of intersection. "Far side" bus stop is mirror image with the same dimensions. A "far side" bus stop is preferable.

See City Std.-222 for section A-A



On streets without parking

This bus stop is "far side" of intersection. "Near side" bus stop is mirror image with the same dimensions. A "far side" bus stop is preferable.

Notes:

1. Bus benches and shelter shall be located behind the sidewalk or in such a manner that a minimum 5' clear sidewalk is provided.
2. Paved section at bus stop to be as per Std. 222.
3. Design of bus stops shall be done in consultation with the transit agency and as approved by the City Engineer

CITY OF ROHNERT PARK

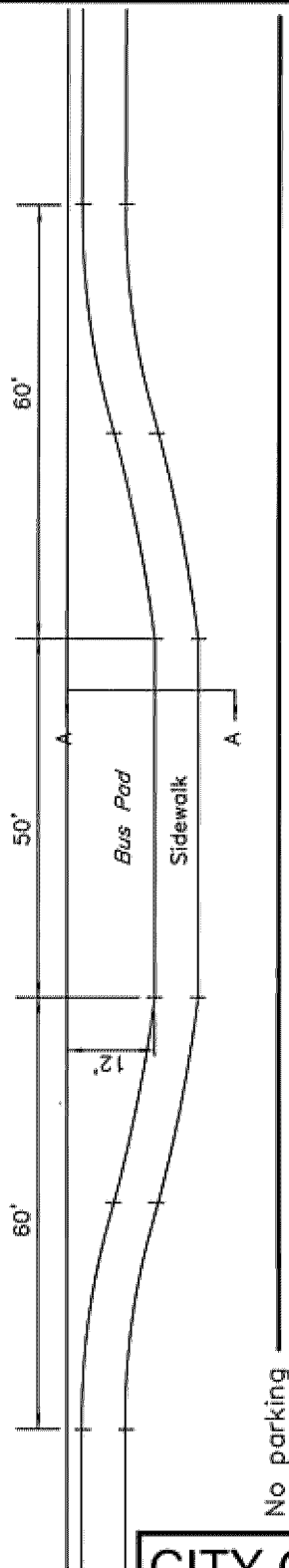
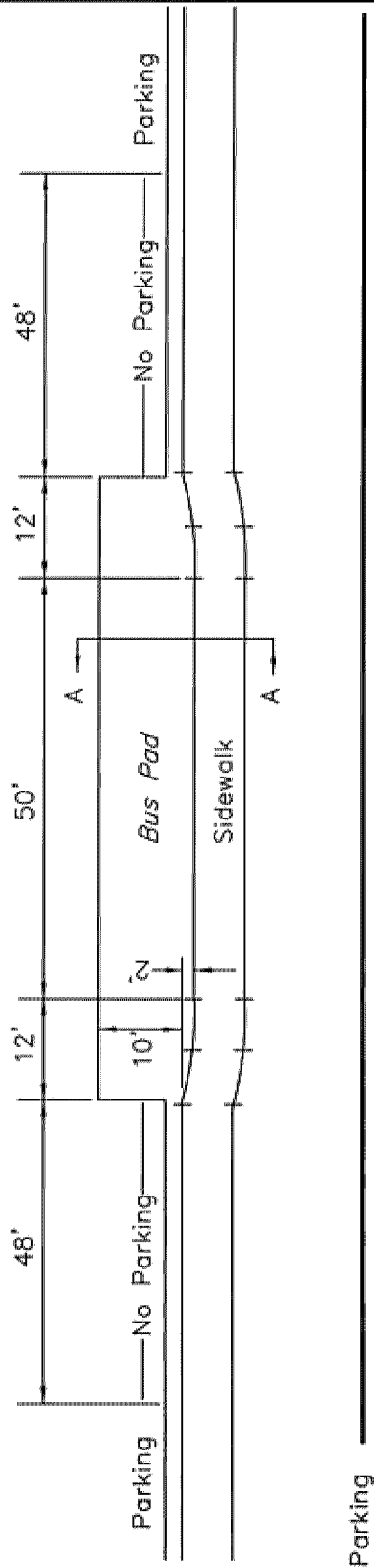
BUS STOP AT INTERSECTION

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 220



See City Std.-222 for section A-A

Notes:

1. Bus benches and shelter shall be located behind the sidewalk or in such a manner that a minimum 5' clear sidewalk is provided.
2. Paved section at bus stop to be as per Std.222.
3. Design of bus stops shall be done in consultation with the transit agency and as approved by the City Engineer

CITY OF ROHNERT PARK

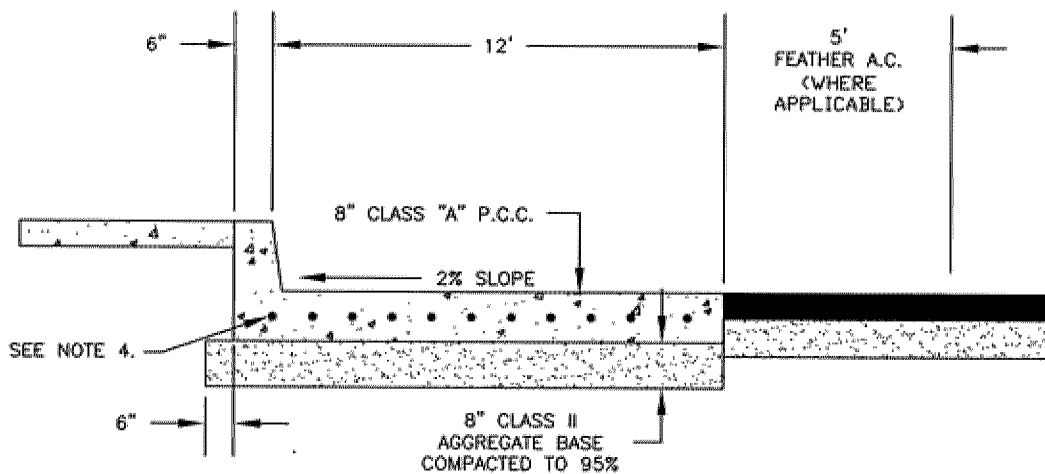
BUS STOP IN MIDDLE OF BLOCK

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 221




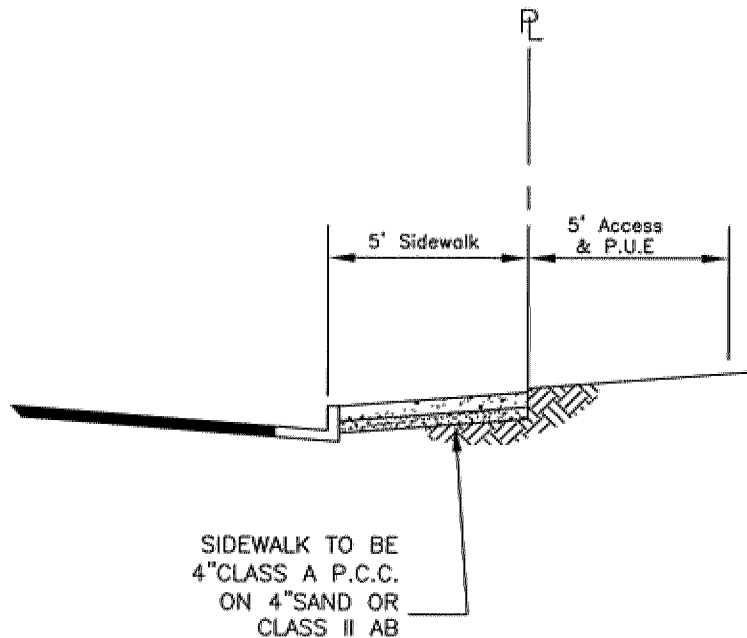
SECTION A-A

REFERENCE STD.-220 & STD.-221

NOTES:

1. Expansion joints & score marks to match existing curb gutter & sidewalk.
2. Use Class A P.C.C.
3. Construct subdrains when required by City Engineer.
4. Reinforcing steel required in concrete: #4 @ 12" O.C. each way, or #5 @ 16" O.C. each way.

CITY OF ROHNERT PARK	
CONCRETE BUS PAD DETAIL	
SCALE: NONE	DATE: OCTOBER 2010
Approved: 	STD. - 222



SIDEWALK DIMENSIONS FOR; LANES, MINOR STREETS, AVENUES, NEIGHBORHOOD STREETS, AND INDUSTRIAL STREETS

NOTES:

1. MEANDERING SIDEWALKS AND PLANTER STRIPS
TO BE REVIEWED ON A CASE-BY-CASE BASIS PER CITY
ENGINEER OR PLANNING COMMISSION.
2. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.

CITY OF ROHNERT PARK

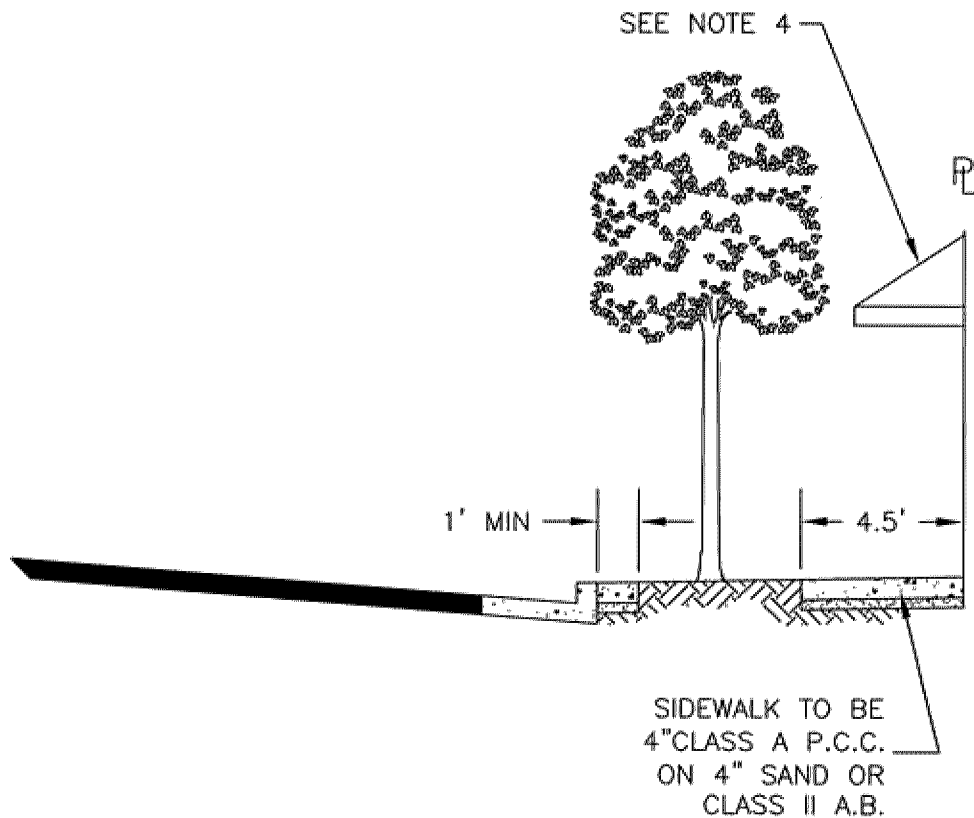
SIDEWALK AND EASEMENT DIMENSIONS FOR LANES,
MINOR STREETS, AVENUES, NEIGHBORHOOD
STREETS, AND INDUSTRIAL STREETS

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 230A



SIDEWALK AND PLANTER STRIP DIMENSIONS FOR FOR MAIN STREETS

NOTES:

1. MEANDERING SIDEWALKS AND CONTIGUOUS SIDEWALKS, TO BE REVIEWED ON A CASE-BY-CASE BASIS PER CITY ENGINEER OR PLANNING COMMISSION.
2. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.
3. TREE WELLS ARE MINIMUM 4' x 4'.
4. ENCROACHMENT PERMIT REQUIRED FOR AWNINGS.

CITY OF ROHNERT PARK

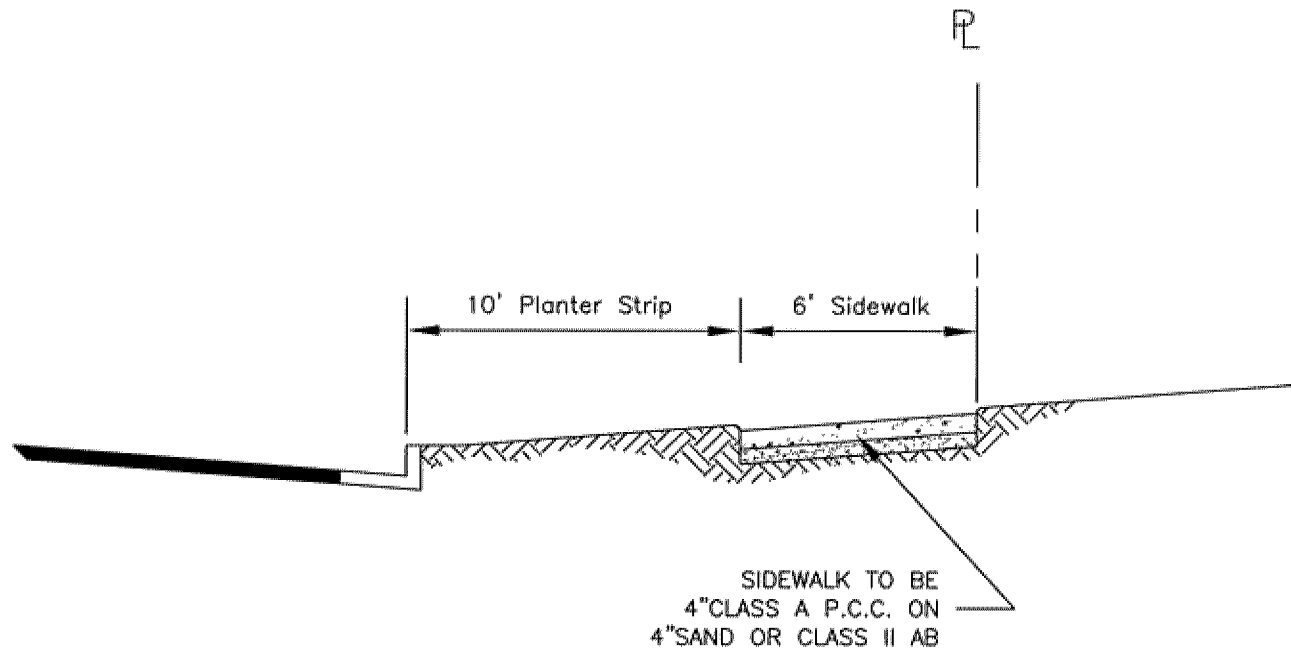
SIDEWALK AND PLANTER DIMENSIONS FOR MAIN STREETS

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 230D



SIDEWALK AND PLANTER STRIP DIMENSIONS FOR PARKWAYS

NOTES:

1. MEANDERING SIDEWALKS AND CONTIGUOUS SIDEWALKS TO BE REVIEWED ON A CASE-BY-CASE BASIS PER CITY ENGINEER OR PLANNING COMMISSION.
2. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.

CITY OF ROHNERT PARK

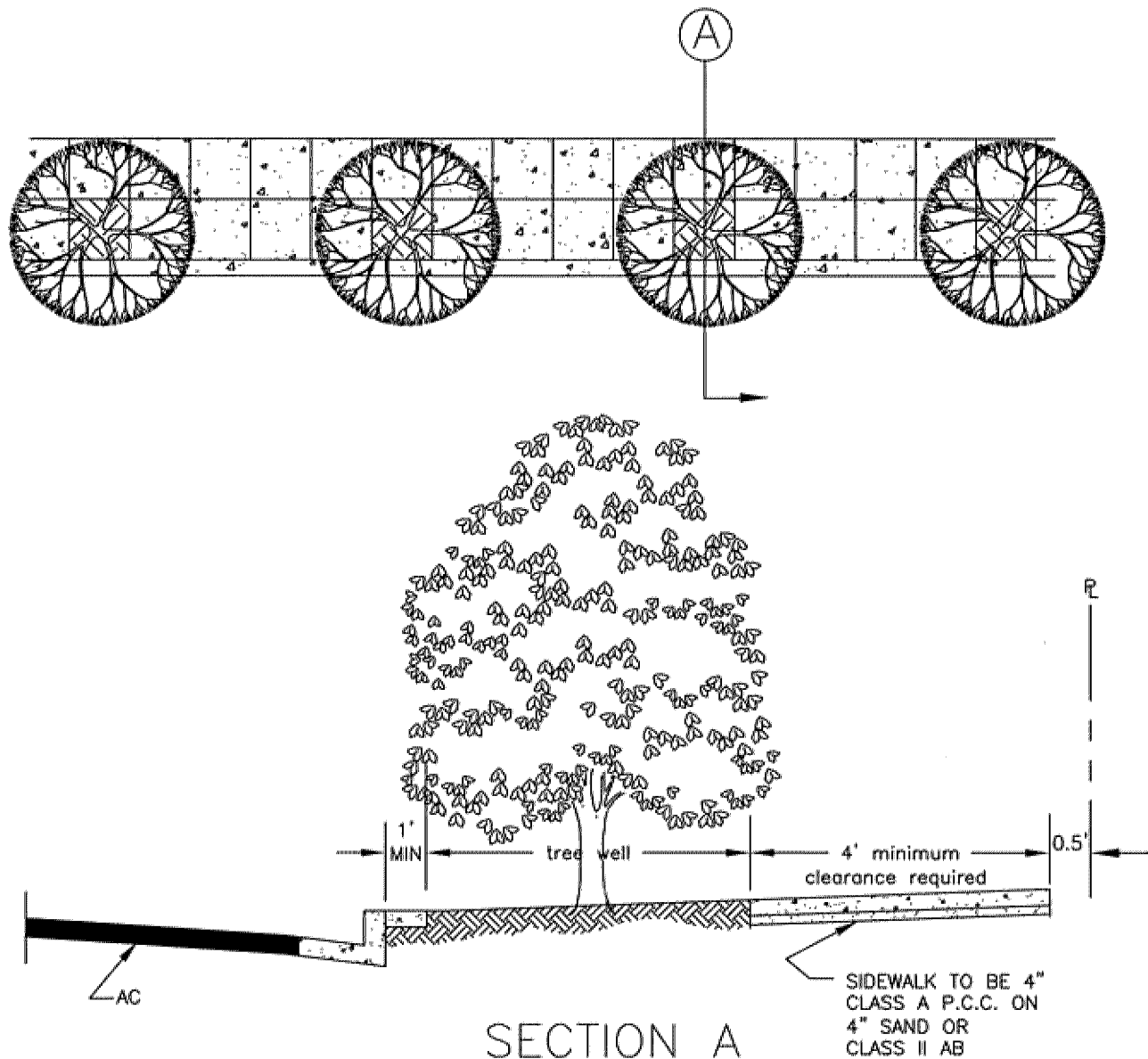
SIDEWALK AND PLANTER DIMENSIONS FOR PARKWAYS

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

STD. - 230E



SECTION A

1. Street tree planting shall be in accordance with City standard.
2. Tree wells are the minimum size called for in the Street Tree List Vol. 1
3. Weakened planes, score marks and expansion joints shall be per standard 235 or may be in a 4 ft. by 4 ft. pattern as shown.
4. Street tree selections shall comply with City Street Tree List Vol. 1.

CITY OF ROHNERT PARK

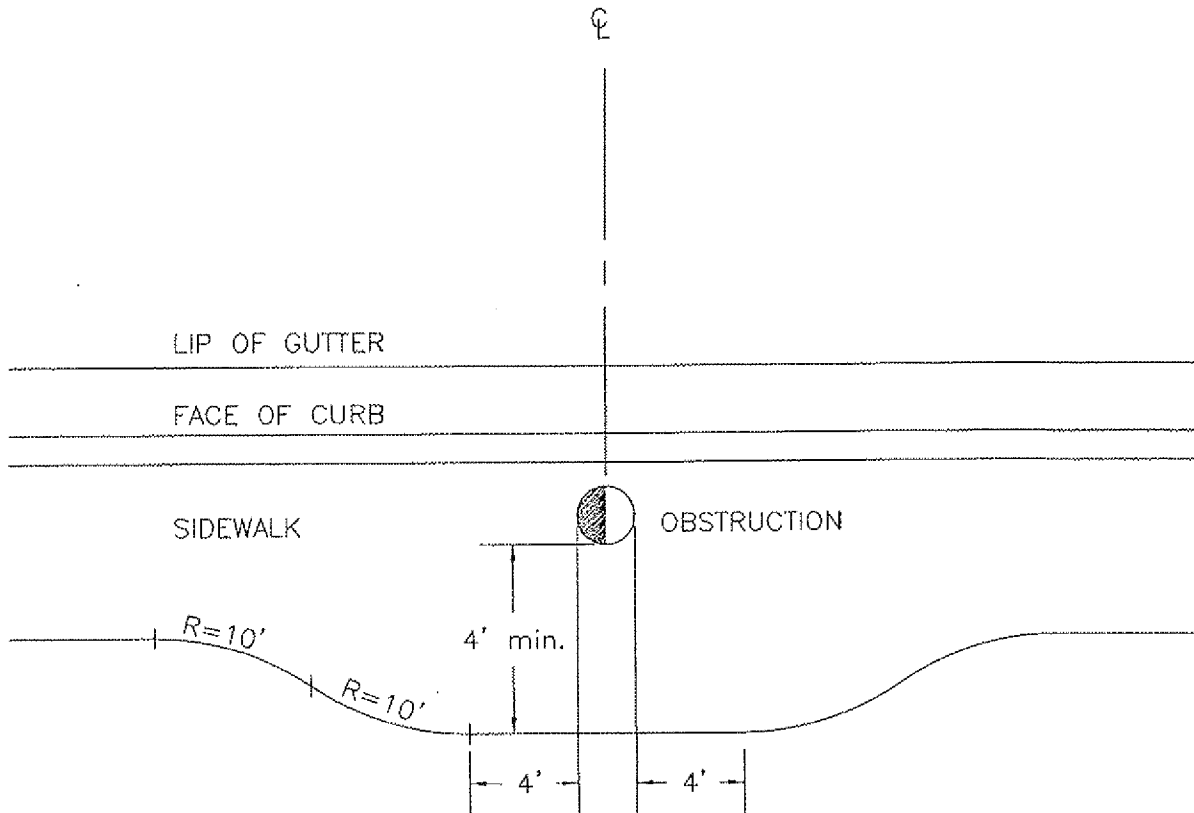
SIDEWALK WITH TREE WELLS

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 230F



CITY OF ROHNERT PARK

TYPICAL SIDEWALK OBSTRUCTION TRANSITION

SCALE: NONE

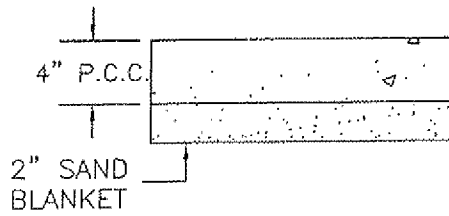
DATE: JANUARY 2008

Approved:

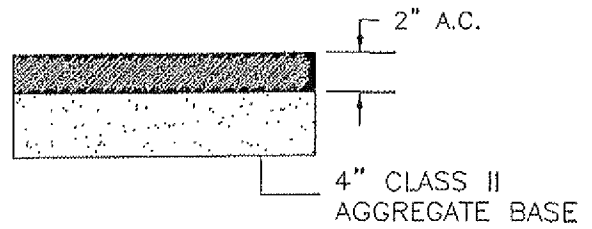
Dan Hinkley

STD. - 231

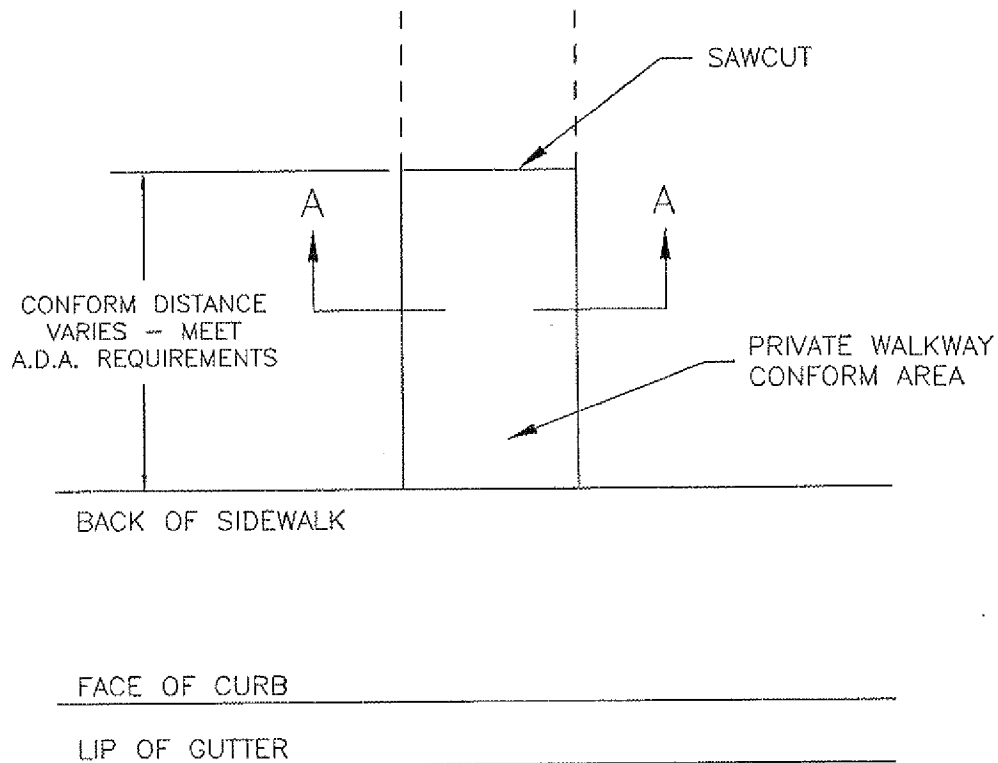
P.C.C. SECTION



A.C. SECTION



SECTION A-A



CITY OF ROHNERT PARK

PRIVATE WALKWAY CONFORM P.C.C. & ASPHALT CONCRETE

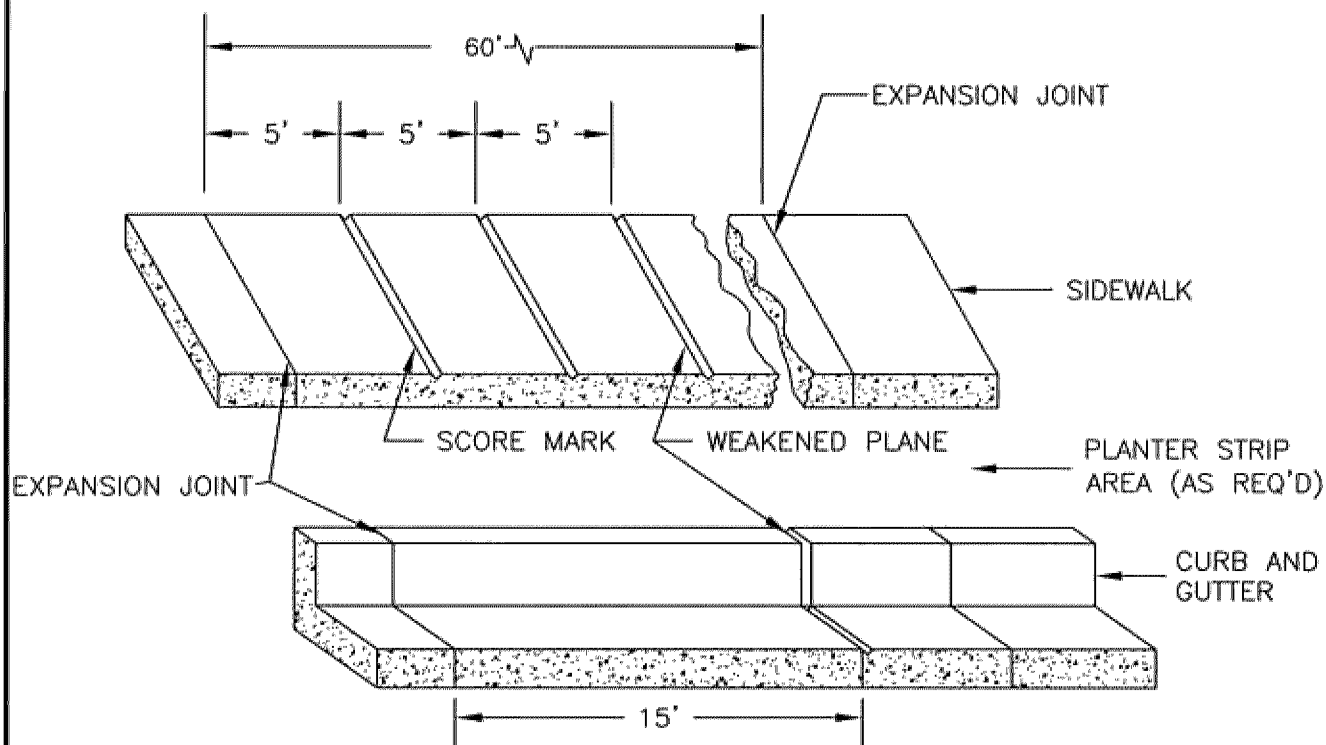
SCALE: NONE

DATE: JANUARY 2006

Approved:

Damian

STD. - 234



NOTES:

1. WEAKENED PLANE: 1/8" WIDE x 1" DEEP IN SIDEWALKS, 1/8" WIDE x 1 1/2" DEEP IN CURB AND GUTTER.
2. EXPANSION JOINTS MATERIAL TO BE 1/4" THICK PREMOLDED JOINT FILLER FULL THICKNESS OF CONCRETE. APPROVED MECHANICAL JOINTS MAY BE USED IN WALKS IN LIEU OF EXPANSION JOINTS.
3. SCORE MARKS FOR SIDEWALKS 6' & MORE IN WIDTH: LONGITUDINAL SCORE MARK ALONG CENTER OF WALK.
4. EXPANSION JOINTS SHALL BE INSTALLED IN THE CURB & GUTTER AT ALL CURB RETURNS.
5. EXPANSION JOINTS SHALL BE PLACED IN THE SIDEWALK AT THE SAME LOCATION AS THOSE IN THE CURB & GUTTER WHEN THE SIDEWALK IS CURB ADJACENT, UNLESS OTHERWISE DIRECTED BY THE CITY ENGINEER.
6. SIDEWALK SHALL HAVE 4" BASE MATERIAL (CLASS II AGGREGATE BASE ROCK OR SAND), 4" OF P.C.C., AND HAVE A 2% SLOPE TOWARDS THE STREET.
7. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.

CITY OF ROHNERT PARK

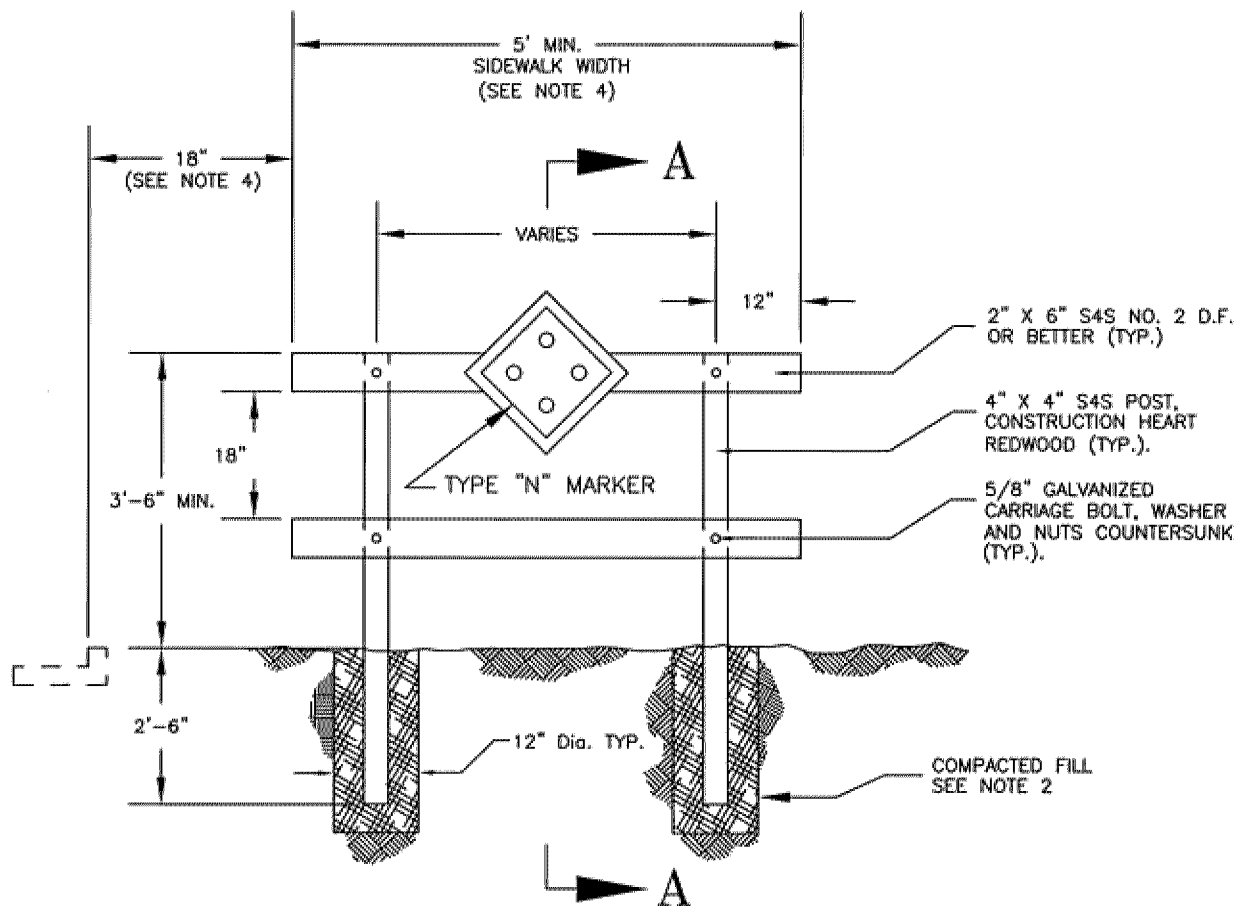
TYPICAL SPACING - WEAKENED PLANES, SCORE MARKS, AND EXPANSION JOINTS

SCALE: NONE

DATE: OCTOBER 2010

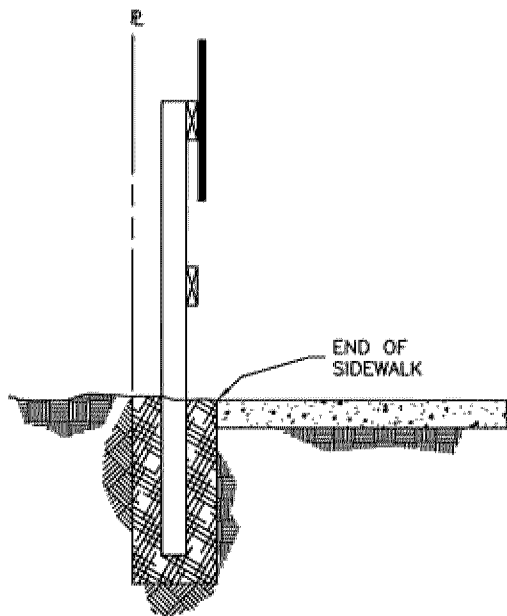
Approved:

STD. - 235



SIDEWALK BARRICADE

NTS



SECTION A-A

NTS

NOTES:

1. PAINT ALL EXPOSED SURFACES WITH 1 COAT OF PRIMER AND 2 COATS OF GLOSS WHITE EXTERIOR ENAMEL AFTER CONSTRUCTION.
2. POSTS SHALL BE BACKFILLED AND COMPACTED WITH NATIVE SOIL.
3. ALL PORTIONS OF POSTS TO BE INSTALLED BELOW FINISHED GRADE SHALL BE TREATED WITH A WOOD PRESERVATIVE.
4. IF SIDEWALK IS CONTIGUOUS TO CURB, BARRICADE SHALL BE 18" BACK FROM FACE OF CURB.

CITY OF ROHNERT PARK

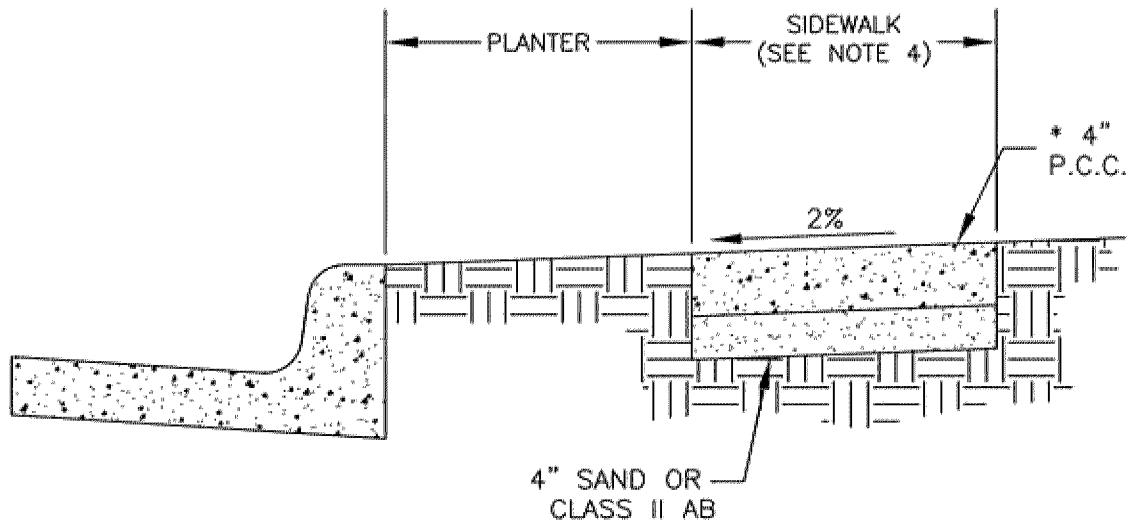
SIDEWALK BARRICADE

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

STD. - 236



NOTES:

1. JOINTS AND SCORING PER STD.-235.
2. ALL CONCRETE SHALL BE CLASS A P.C.C.
3. * 6" FOR DRIVEWAY AREA.
4. SIDEWALK WIDTH SHALL MATCH EXISTING (UNLESS OTHERWISE CONDITIONED) AND SHALL MEANDER OR WIDEN AT OBSTRUCTIONS TO PROVIDE CLEARANCES AS SHOWN IN CITY STD.- 231.
5. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF ROHNERT PARK

REPLACEMENT OF EXISTING SIDEWALK

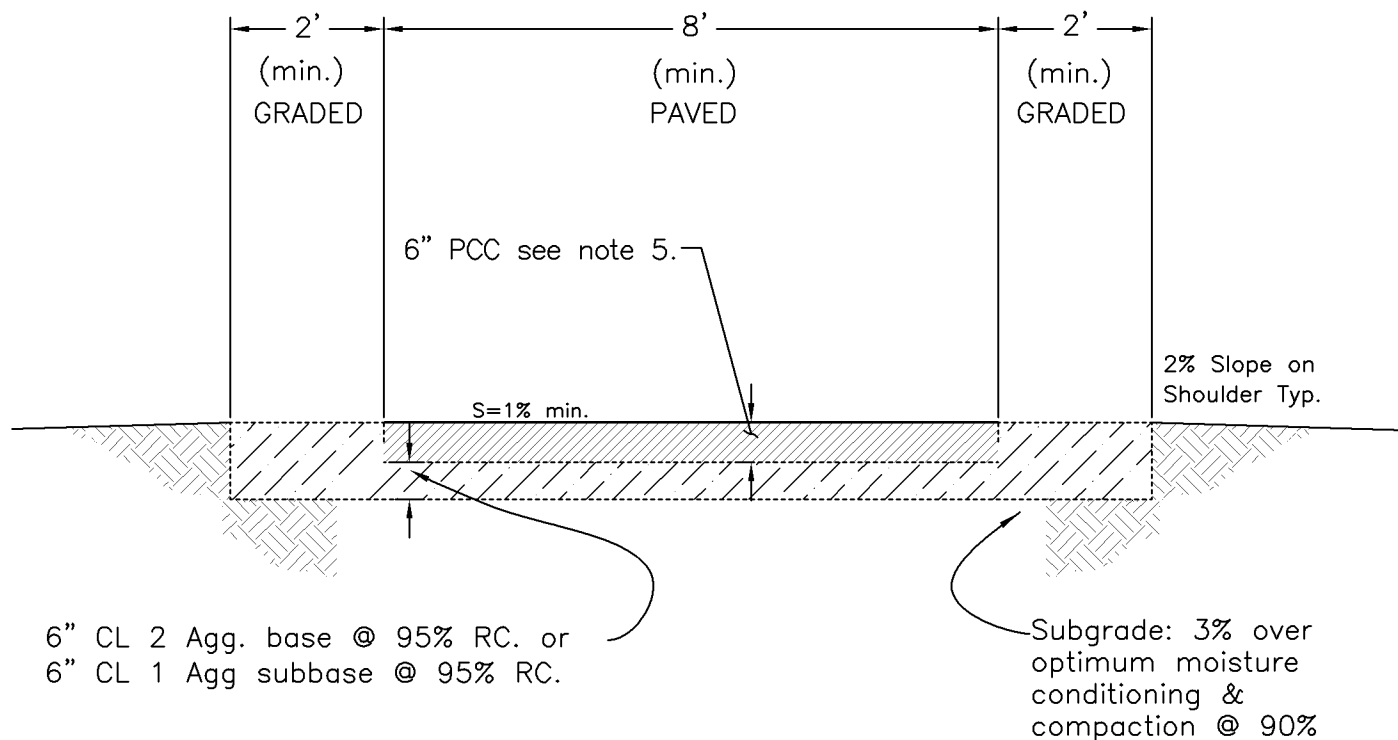
SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 237

CLASS I BIKE PATH OR MULTIUSE TRAIL



NOTES

- Design of Bike Path or Multipurpose Path shall be per chapter 1000 of the Highway Design Manual.
- The minimum paved width for a two-way bike path shall be 8 ft. The minimum paved width for a one-way bike path shall be 4.5 ft. A minimum 2 ft. graded area shall be provided adjacent to the pavement. A 3 ft. graded area is recommended to provide clearance from poles, trees, walls, fences, guardrails, or other lateral obstructions.
- A minimum 2 ft. horizontal clearance to obstructions shall be provided adjacent to pavement.
- The vertical clearance to obstructions across the clear width of the path shall be a minimum of 9 ft.
- Construction of PCC bikepath shall comply with section 73-1 of the State Standard Specifications.
- Concrete shall contain 564 lb. (6 sacks) of Portland cement per cubic yd. and have a minimum 28 day & compressive strength of 4000 PSI.
- Provide sawed transverse joints, 1" deep at 12' spacings.
- Type II Portland cement complying with ASTM 150
- Concrete shall comply with "Minor concrete" of Caltrans Standard Specifications.
- Surface finish shall be transverse medium broom finish.
- Apply curing compound per the CalTrans Standard Specifications.
- Joints shall be saw cut 10 ft. on center

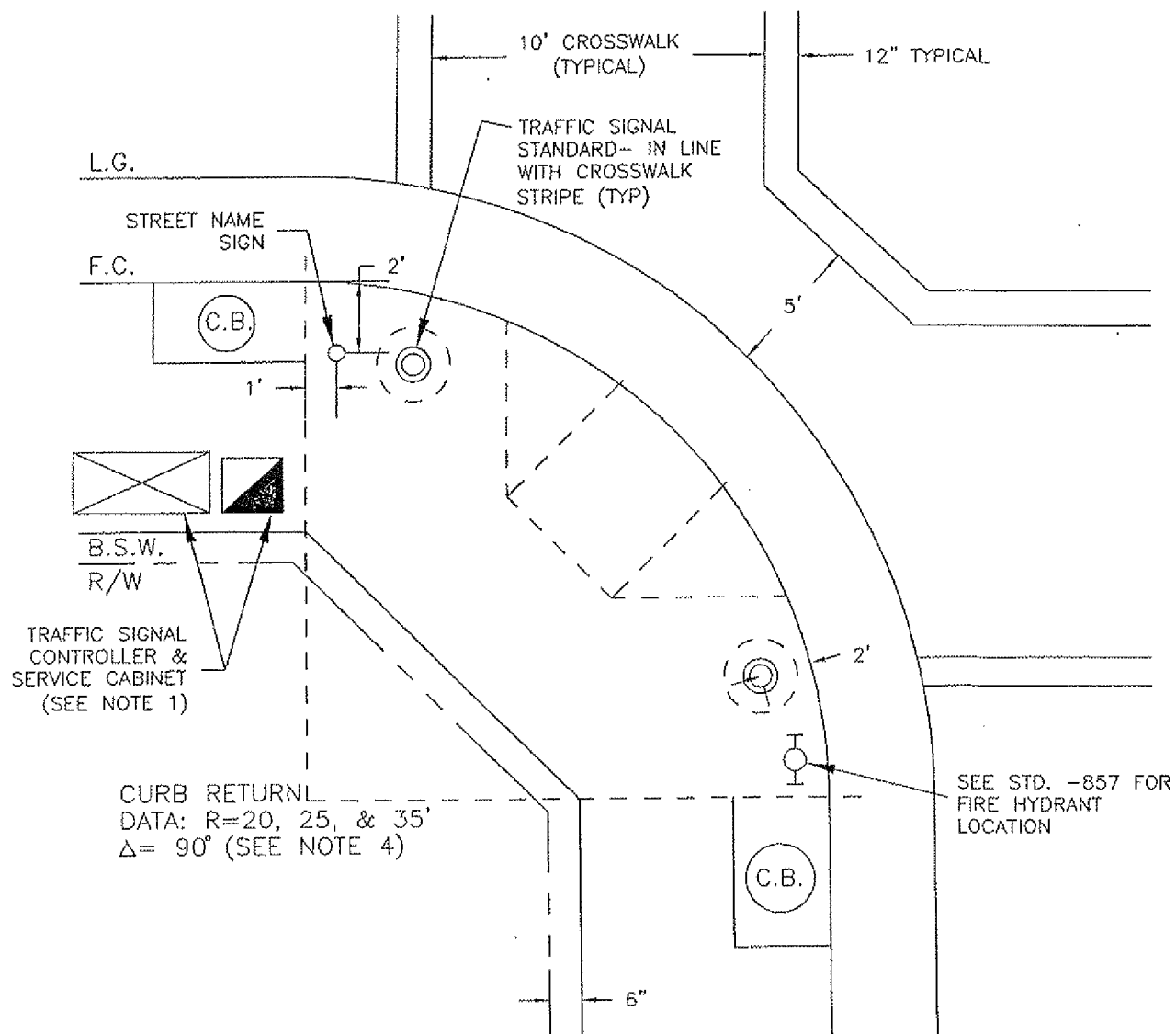
CITY OF ROHNERT PARK

CLASS I BIKE PATH

SCALE: NONE DATE: DECEMBER 2013

Approved:

STD. - 238



NOTES:

1. TRAFFIC SIGNAL CONTROLLER & SERVICE CABINET MAY HAVE ALTERNATE LOCATIONS IF APPROVED BY THE CITY ENGINEER.
2. THE MINIMUM CURB RETURN RADIUS FOR REGIONAL & INDUSTRIAL STREETS SHALL BE PER SECTION VII. INTERSECTIONS, SUBPARAGRAPH C., "CURB RETURNS."
3. FOR RADII GREATER THAN 35' AND DELTA ANGLES GREATER THAN 90°, CURB RETURN PLAN DETAILS SHALL BE APPROVED BY THE CITY ENGINEER.
4. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF ROHNERT PARK

CURB RETURN PLAN DETAIL

SCALE: NONE

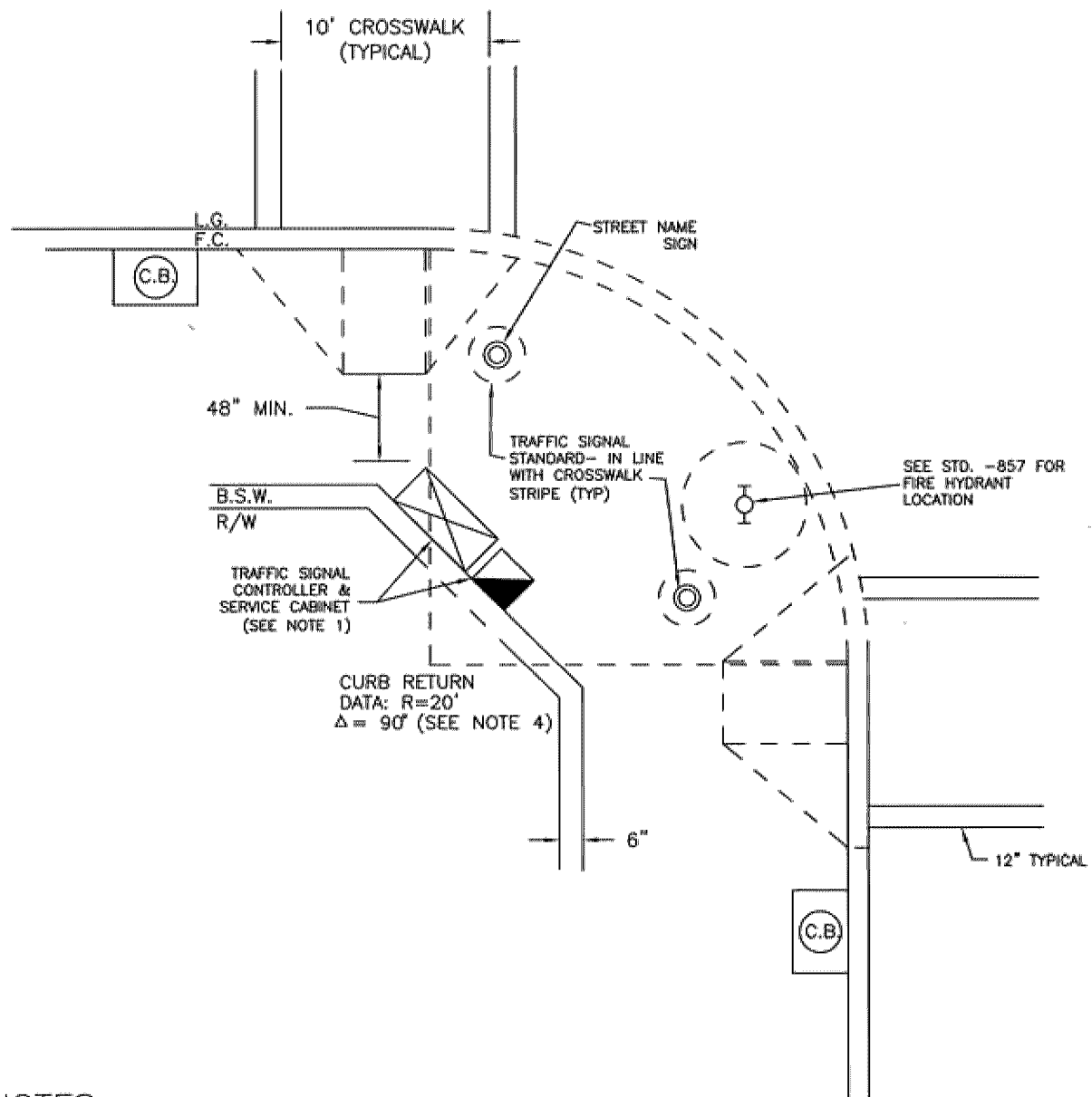
DATE: JANUARY 2006

Approved:

Dan Johnson

STD. - 240

STD. - 240a



NOTES:

1. TRAFFIC SIGNAL CONTROLLER & SERVICE CABINET MAY HAVE ALTERNATE LOCATIONS IF APPROVED BY THE CITY ENGINEER.
2. THE MINIMUM CURB RETURN RADIUS FOR REGIONAL & INDUSTRIAL STREETS SHALL BE PER SECTION VII. INTERSECTIONS, SUBPARAGRAPH C., "CURB RETURNS."
3. FOR DELTA ANGLES GREATER THAN 90°, CURB RETURN PLAN DETAILS SHALL BE APPROVED BY THE CITY ENGINEER.
4. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF ROHNERT PARK

CURB RETURN PLAN DETAIL 2

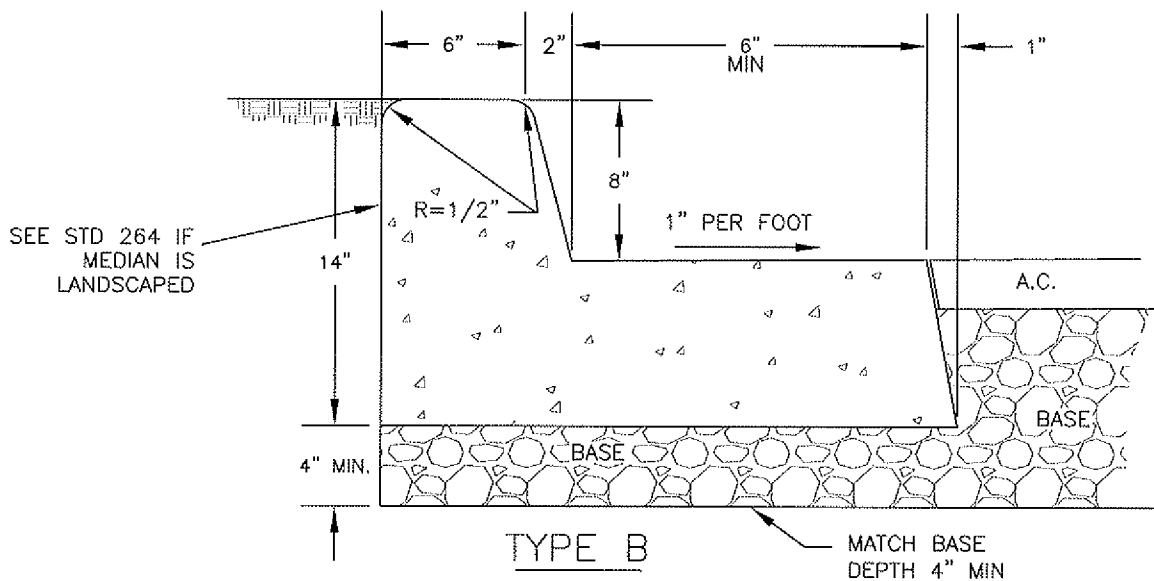
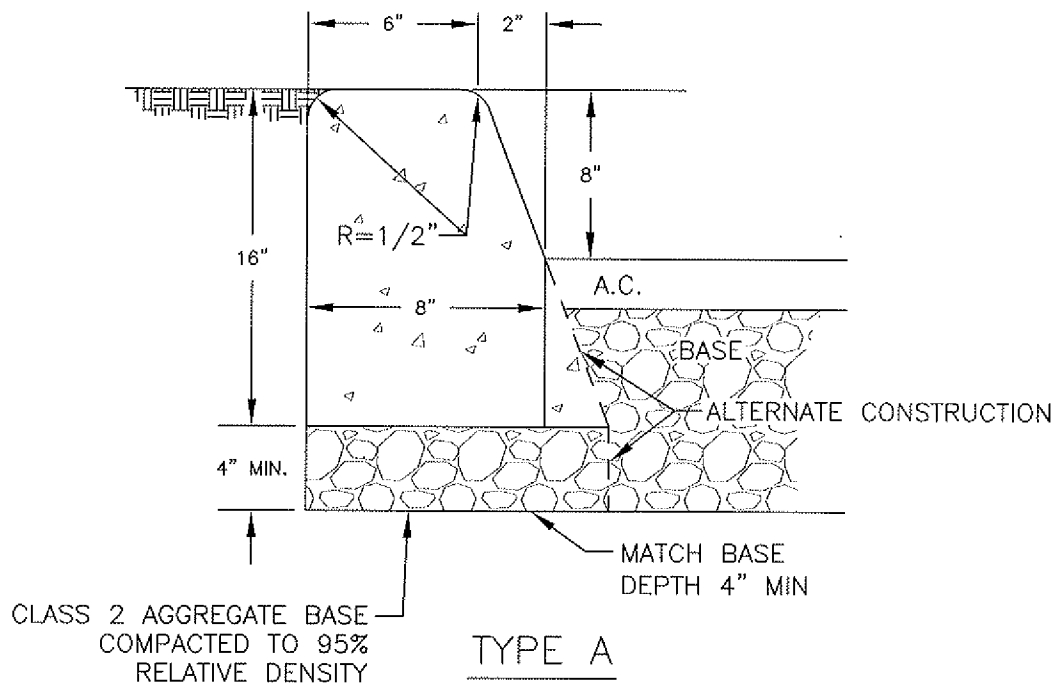
SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 240b

STD. - 241



NOTES:

1. TYPE B TO BE USED UNLESS SPECIFICALLY STATED ON THE PLANS AND APPROVED BY THE CITY ENGINEER
2. SEE CITY STD.-235 FOR LOCATION OF WEAKENED PLANES AND EXPANSION JOINTS.
3. THESE DETAILS APPLY TO NEW CONSTRUCTION AND RECONSTRUCTION PROJECTS ONLY. MEDIAN CURB TO BE DETAILED ON PLANS WHERE INSTALLED ON EXISTING PAVEMENT.
4. ALL CONCRETE SHALL BE CLASS "A" P.C.C.
5. WHERE THE MEDIAN ISLAND IS TO BE PAVED, THE MEDIAN AND THE CURBS ARE TO BE POURED AS A UNIT (NO COLD JOINT).

CITY OF ROHNERT PARK

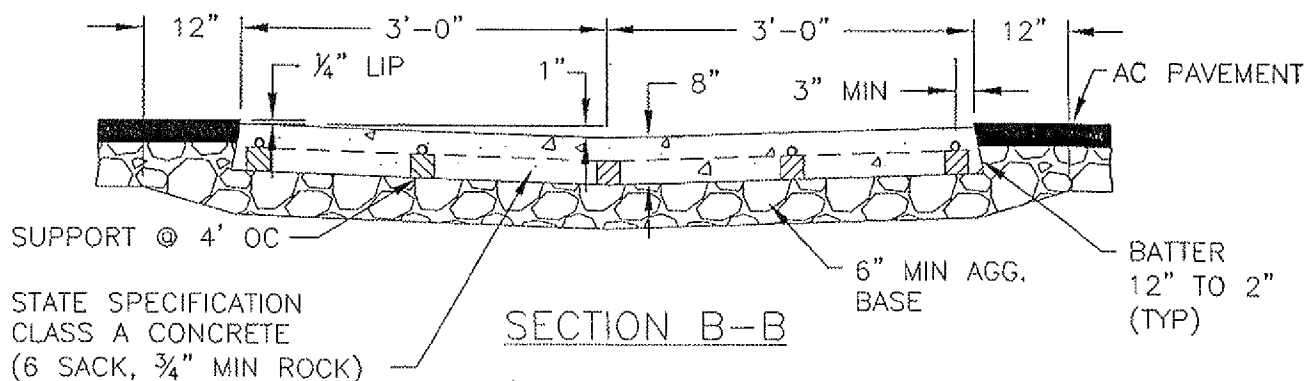
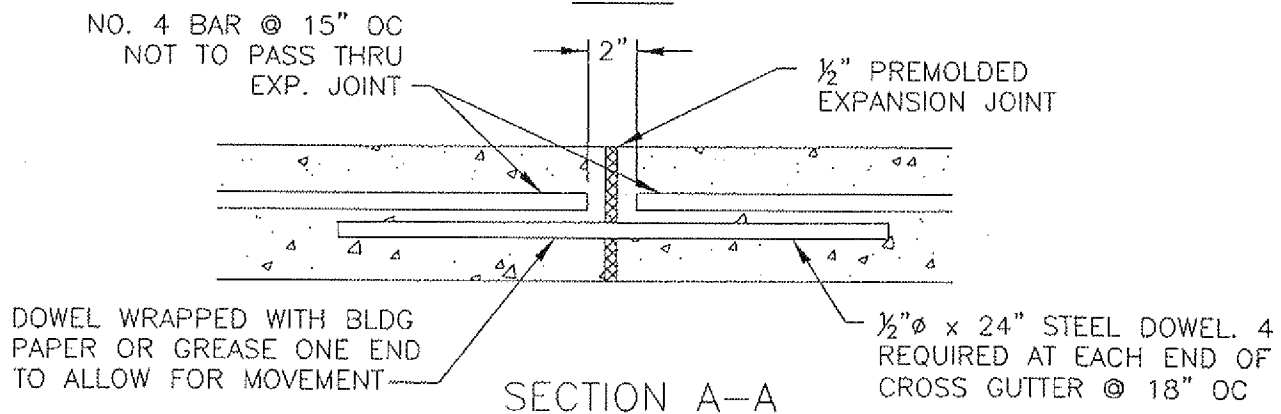
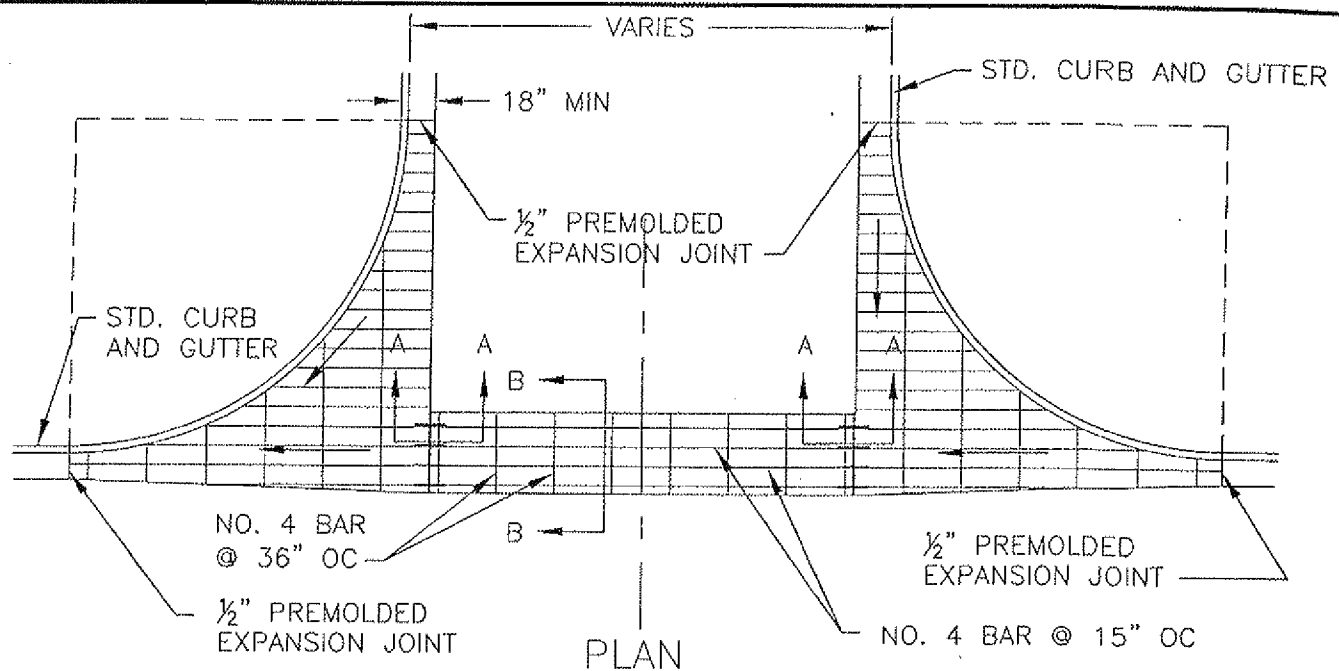
STREET MEDIAN CURB

SCALE: NONE

DATE: OCTOBER 2010

Approved: 

STD. - 242



NOTES:

1. AGGREGATE BASE TO EXTEND TO ENDS OF CURB RETURNS (95% RC).
2. CROSS GUTTER SHALL HAVE 0.40 FEET MIN. FALL BETWEEN ENDS OF RETURNS OR $S=0.005$ WHEN LENGTH BETWEEN ENDS IS MORE THAN 90 FEET.

CITY OF ROHNERT PARK

STANDARD VALLEY GUTTER

SCALE: NONE

DATE: JANUARY 2006

Approved:

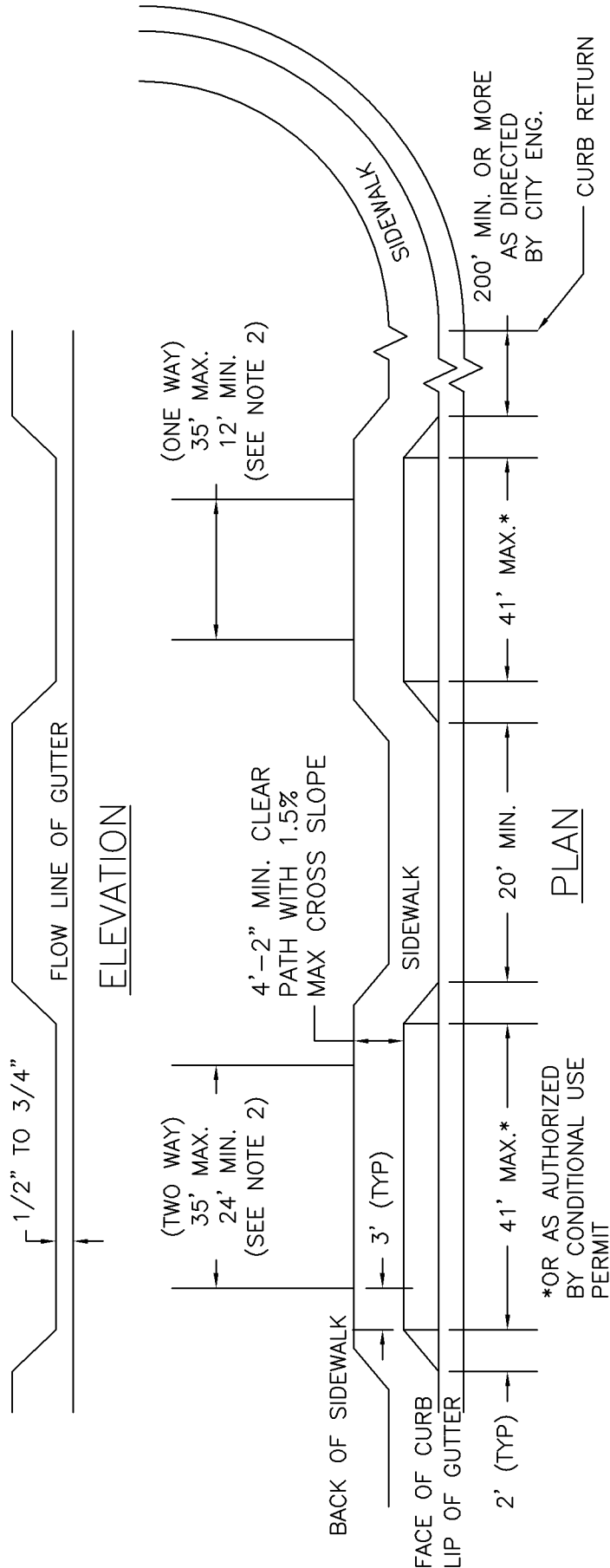
Dan M. [Signature]

STD. - 243

TOP OF CURB

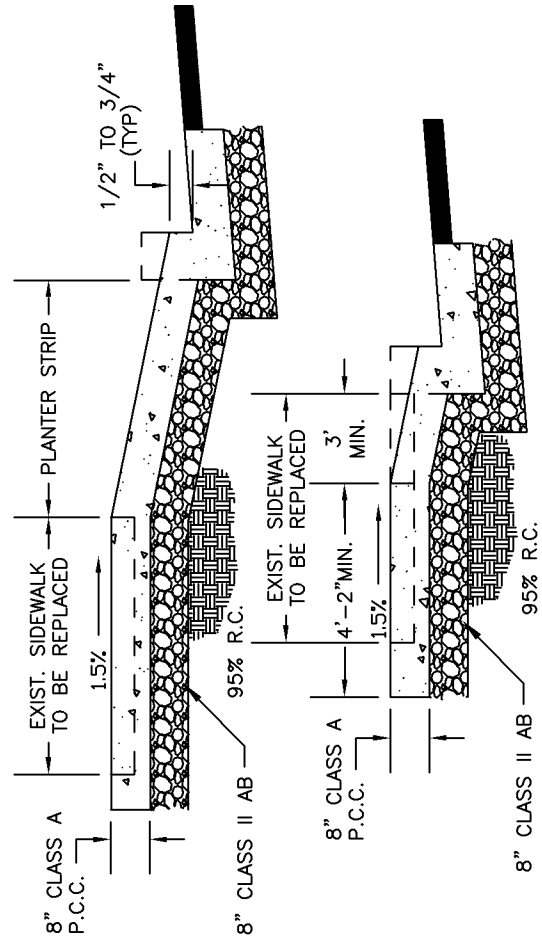
FLOW LINE OF GUTTER

ELEVATION



NOTES:

1. MAXIMUM OF ONE CURB CUT PER PARCEL FRONTAGE, EXCEPT AS AUTHORIZED BY THE CITY ENGINEER.
2. A MAXIMUM OF 41' WILL BE ALLOWED FOR CURB CUTS, EXCEPT AS OTHERWISE APPROVED BY CONDITIONAL USE PERMITS.
3. CURB ISLANDS BETWEEN DRIVEWAYS SHALL NOT BE LESS THAN 20' AT TOP TO TOP ON A SINGLE PARCEL.
4. WHERE NO SIDEWALK IS TO BE INSTALLED, DRIVEWAY APRON SHALL BE CONCRETE TO PROPERTY LINE.
5. DRIVEWAYS SHALL NOT ENCRONCH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
6. CONCRETE SHALL BE 1-1/2" MAX. AGGREGATE (6 SACK).
7. 1/8" x 1-1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.

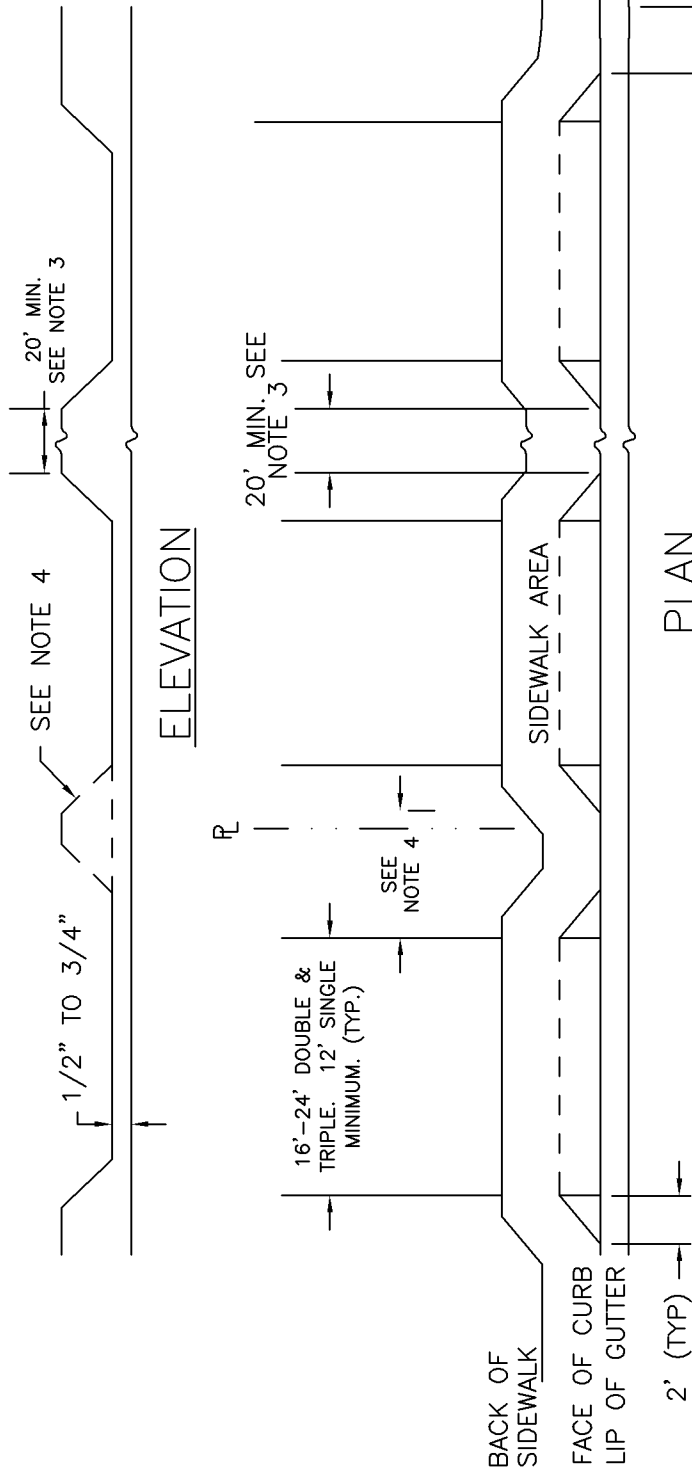


TYPICAL SECTIONS

CITY OF ROHNERT PARK

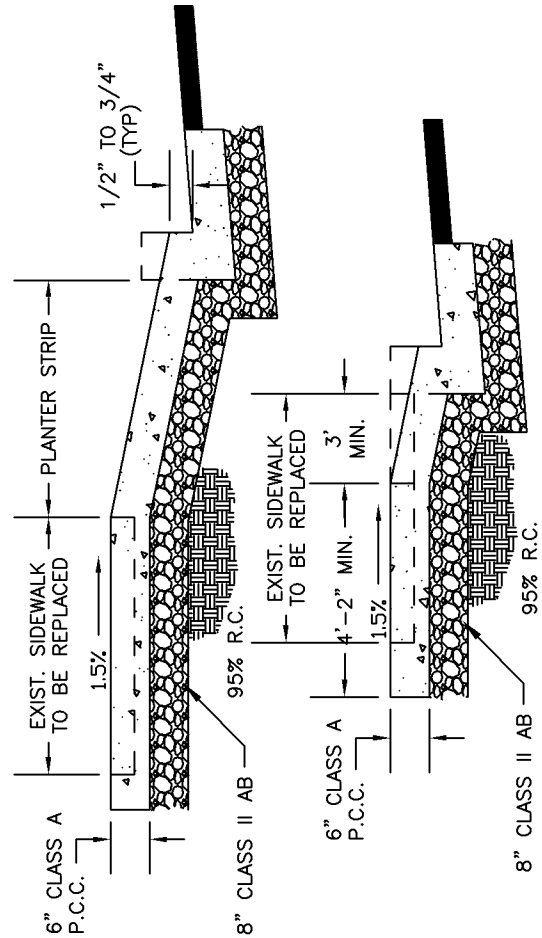
MULTI-RESIDENTIAL AND COMMERCIAL CURB CUTS

SCALE: NONE	DATE: APRIL 2014
Approved:	STD. - 250A



NOTES:

1. MAXIMUM OF ONE CURB CUT PER PARCEL FRONTAGE.
2. A MAXIMUM OF 24' WILL BE ALLOWED FOR CURB CUTS, EXCEPT AS OTHERWISE APPROVED BY CONDITIONAL USE PERMITS.
3. CURB ISLANDS BETWEEN DRIVEWAYS SHALL NOT BE LESS THAN 20' AT TOP TO TOP ON A SINGLE PARCEL.
4. OMIT CURB ISLANDS WHEN ADJACENT DRIVEWAYS ARE LESS THAN 6' APART.
5. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.
6. WHERE NO SIDEWALK IS TO BE INSTALLED, DRIVEWAY APRON SHALL BE CONCRETE TO PROPERTY LINE.
7. DRIVEWAYS SHALL NOT ENCRONCH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
8. CONCRETE SHALL BE 1-1/2" MAX. AGGREGATE (6 SACK).
9. 1/8" x 1-1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.



TYPICAL SECTIONS

CITY OF ROHNERT PARK

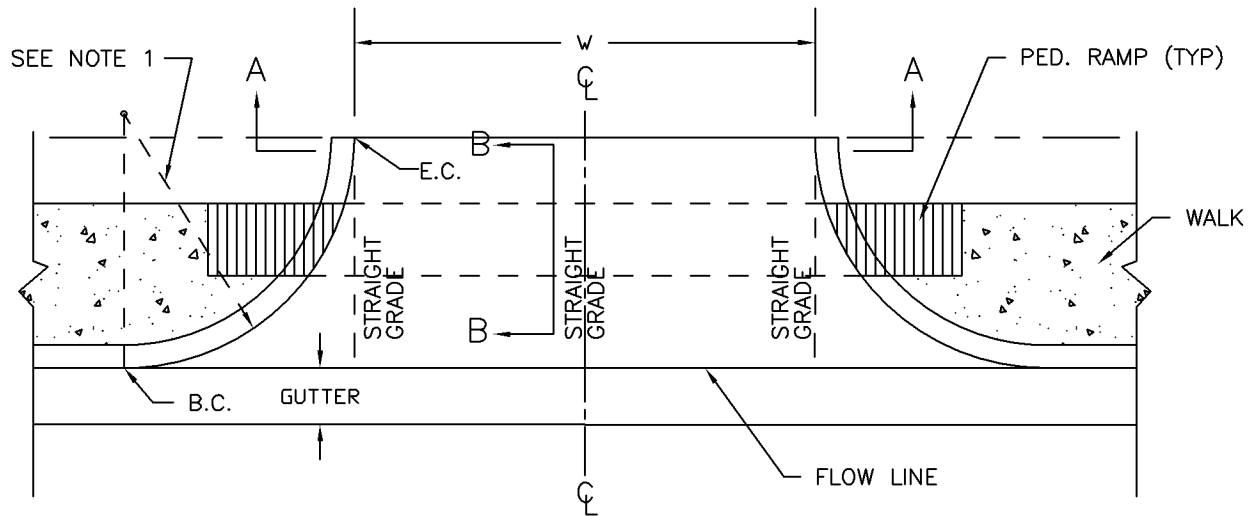
RESIDENTIAL CURB CUTS

SCALE: NONE

DATE: APRIL 2014

Approved:

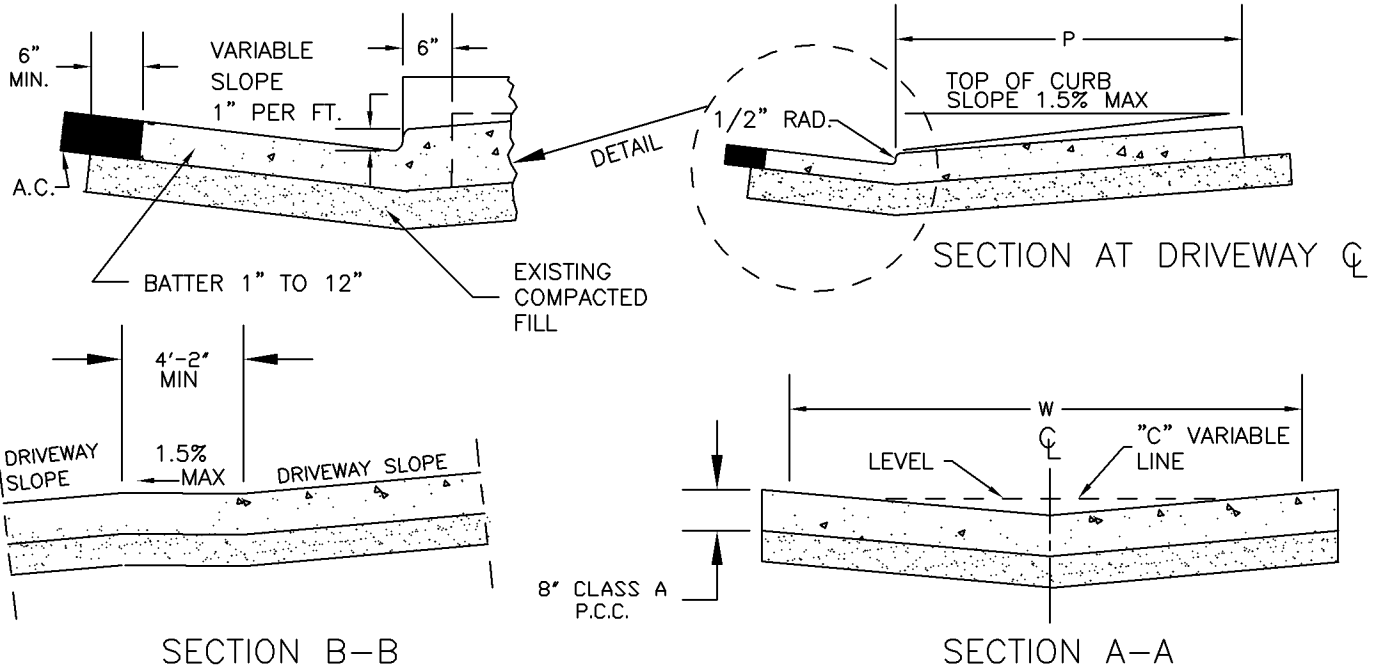
STD. - 250B



NOTES:

THE FLOWLINE SHALL BE RAISED:

1. TWO INCHES AT THE $\Delta/2$ TO EXPEDITE DRAINAGE; OR
2. TO THE BOTTOM OF THE STREET SECTION, WHICHEVER IS GREATER.



NOTES:

1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.
2. RADIUS TO BE A MINIMUM OF 10 FEET.
3. PEDESTRIAN RAMP NEEDED ACROSS DRIVEWAY AT SIDEWALK INTERSECTION WITH DRIVEWAY.
4. USE OF THIS STANDARD AS APPROVED BY THE CITY ENGINEER.
5. DRIVEWAYS SHALL NOT ENCROACH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
6. CONCRETE SHALL BE 1-1/2" MAX. AGGREGATE (6 SACK).
7. 1/8" x 1-1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.

CITY OF ROHNERT PARK

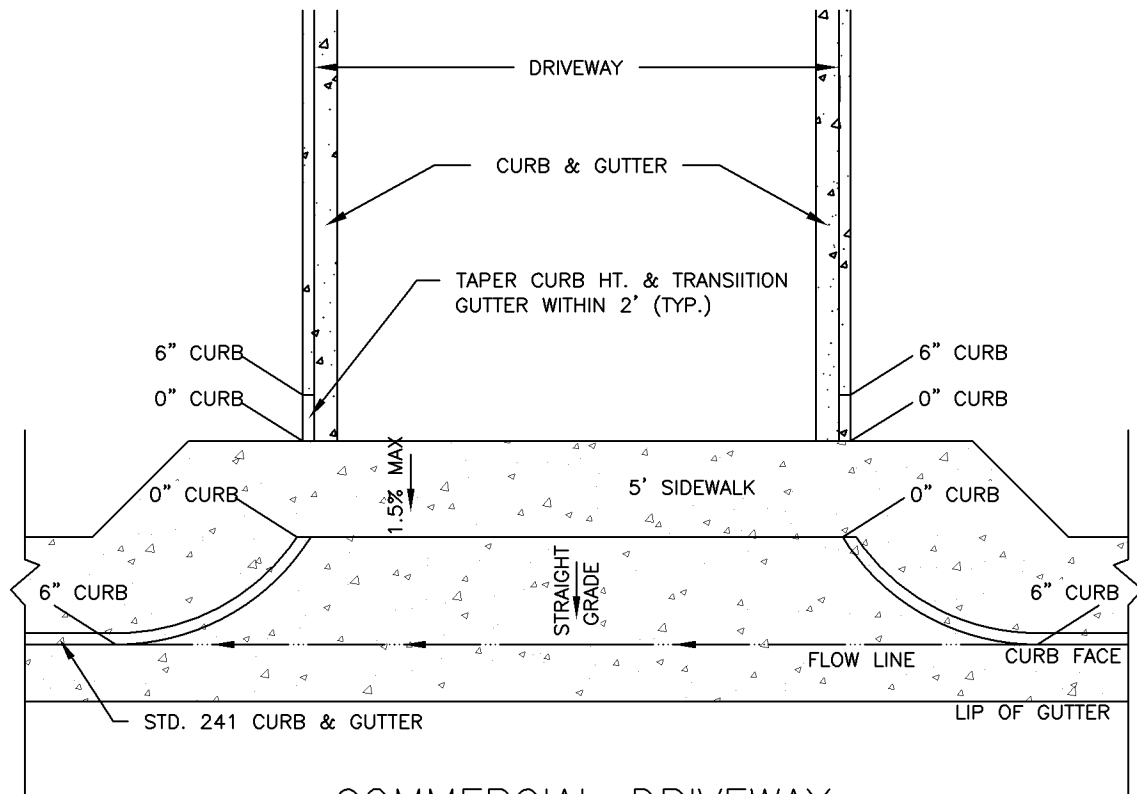
CURB RETURN DRIVEWAY (ALTERNATE A)

SCALE: NONE

DATE: APRIL 2014

Approved:

STD. - 250C

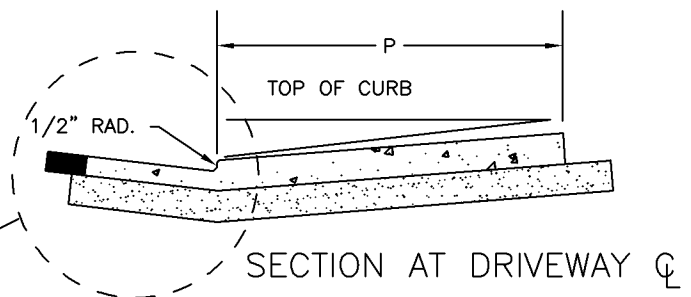
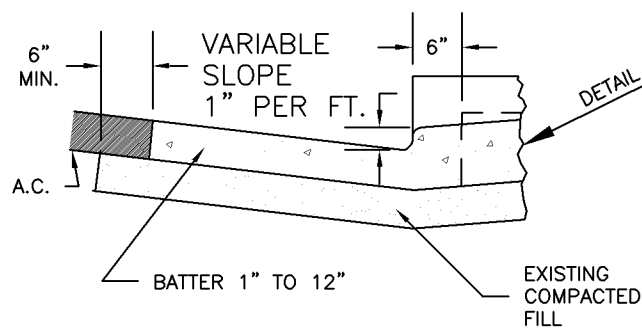


NOTES:

COMMERCIAL DRIVEWAY

THE FLOWLINE SHALL BE RAISED:

1. TWO INCHES AT THE $\Delta/2$ TO EXPEDITE DRAINAGE; OR
2. TO THE BOTTOM OF THE STREET SECTION, WHICHEVER IS GREATER.



NOTES:

1. CURB RETURN RADII TO BE A MINIMUM OF 10 FEET.
2. USE OF THIS STANDARD AS APPROVED BY THE CITY ENGINEER.
3. DRIVEWAYS SHALL NOT ENCROACH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
4. CONCRETE SHALL BE 1-1/2" MAX. AGGREGATE (6 SACK).
5. 1/8" x 1-1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.

CITY OF ROHNERT PARK

CURB RETURN DRIVEWAY (ALTERNATE B)

SCALE: NONE

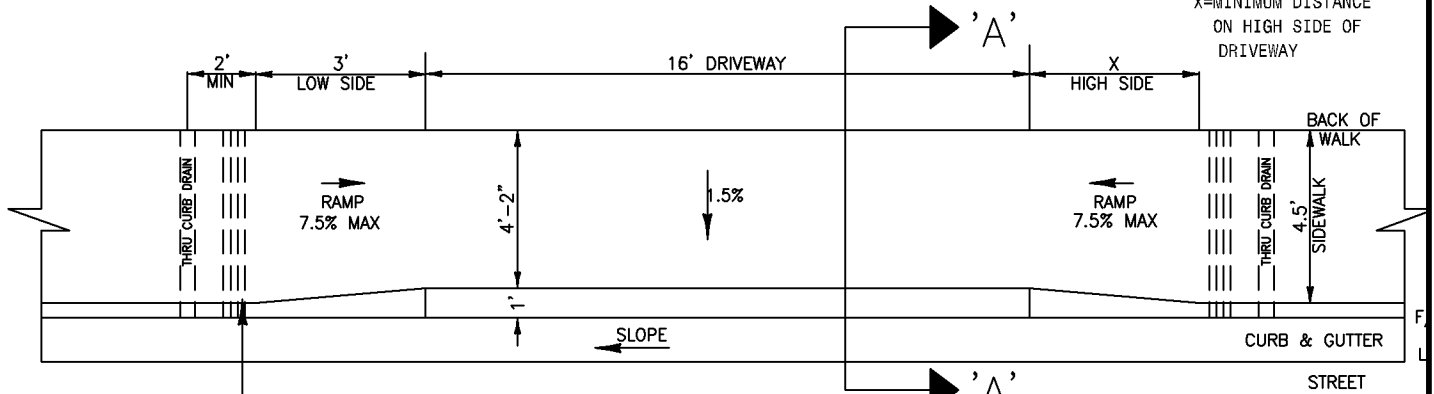
DATE: APRIL 2014

Approved:

STD. - 250D

STREET SLOPE	X
5-6%	8'
4-5%	6'
3-4%	5'
2-3%	4'
0.5-2%	3'

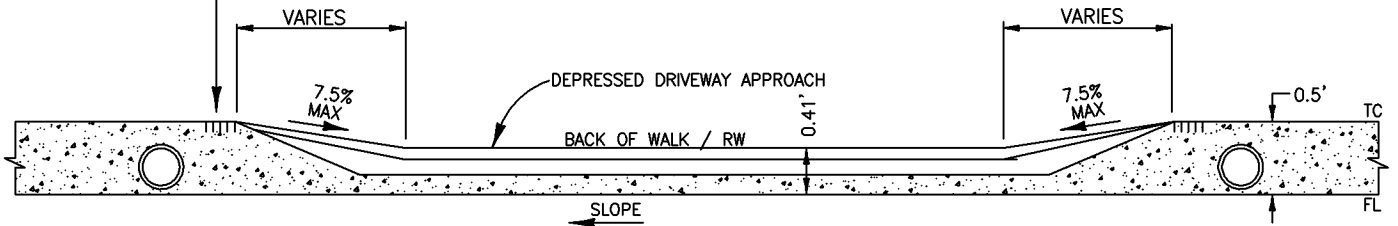
X=MINIMUM DISTANCE
ON HIGH SIDE OF
DRIVEWAY



DRIVEWAY PLAN VIEW

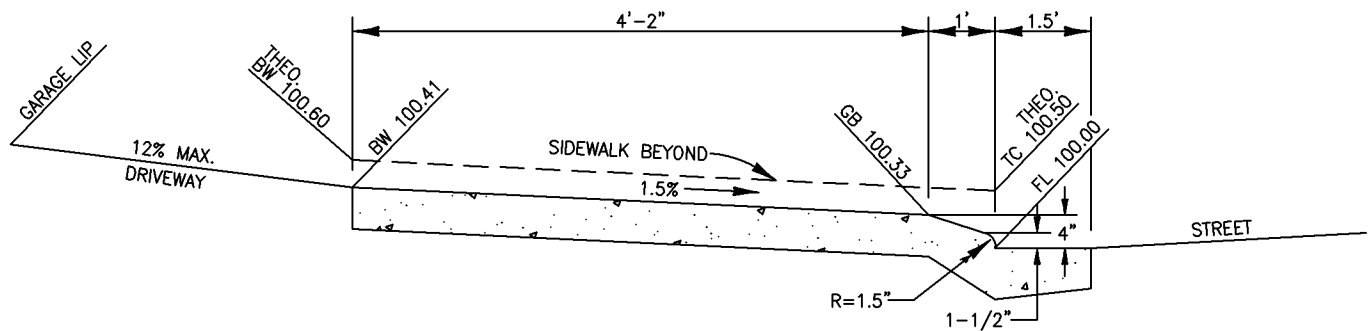
N.T.S.

FOR GROVE DETAIL
REFER TO CALTRANS
STD A88A



PROFILE AT CURB FACE

N.T.S.



CITY OF ROHNERT PARK

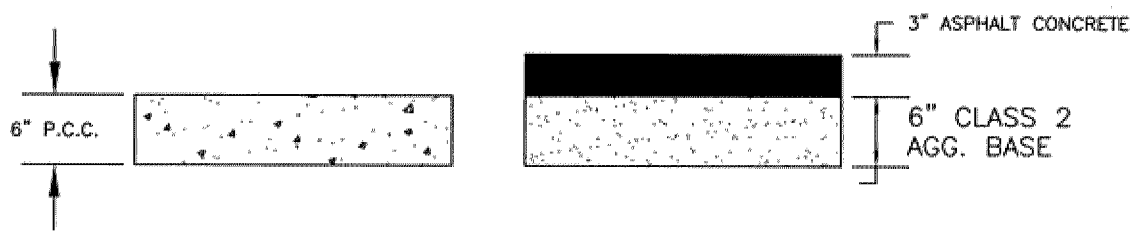
CURB RETURN DRIVEWAY (ALTERNATE C)

SCALE: NONE

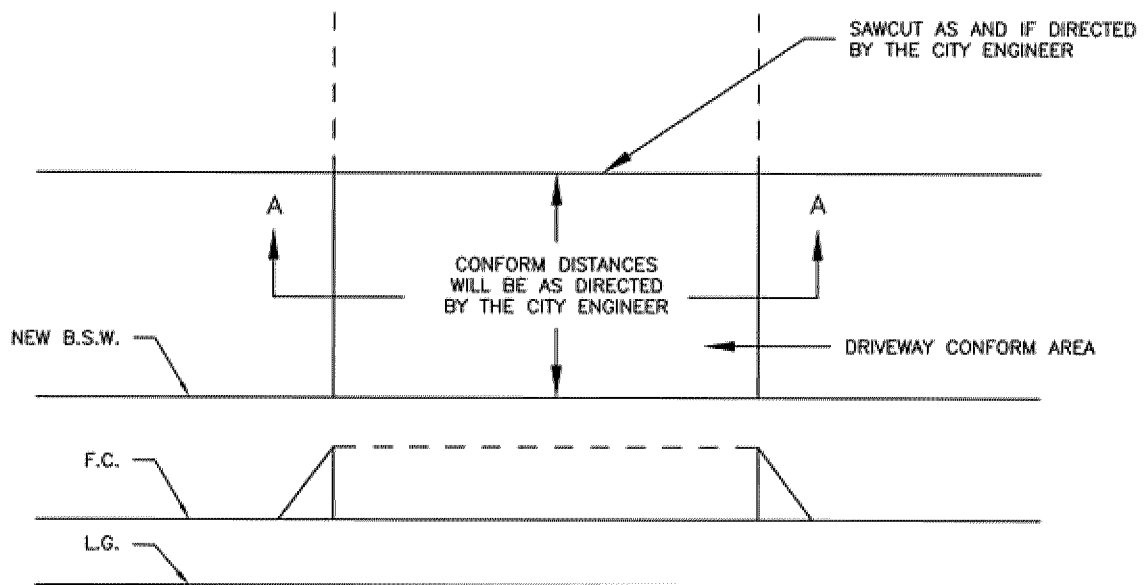
DATE: APRIL 2014

Approved:

STD. - 250E



SECTION A-A



DRIVEWAY CONFORM

NOTE:

1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF ROHNERT PARK

DRIVEWAY CONFORM P.C.C. & A.C.

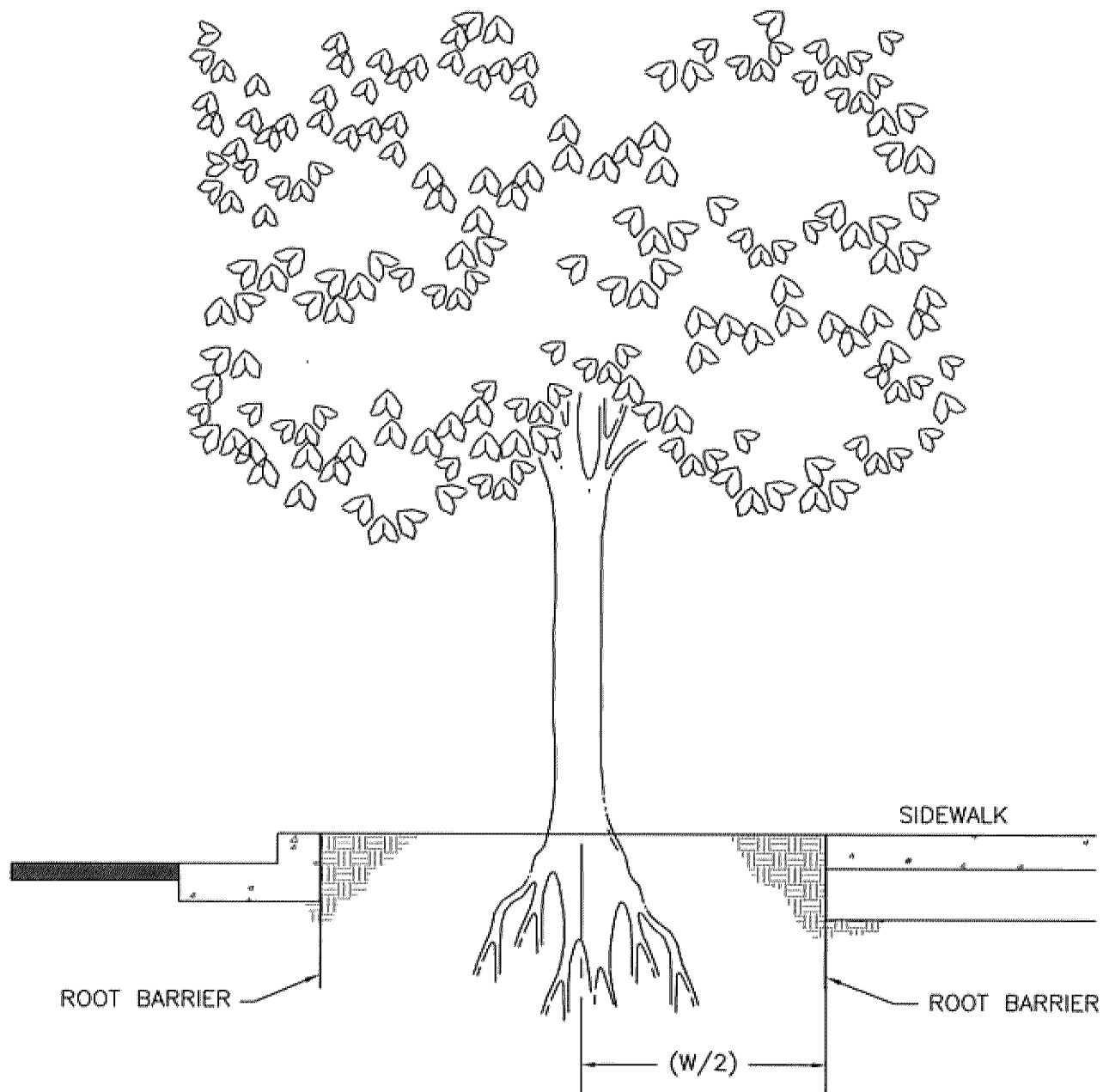
SCALE: NONE

DATE: OCTOBER 2010

Approved:

[Signature]

STD. - 251



NOTES:

1. FOR TREE TYPE, REFER TO THE STREET TREE LIST IN VOLUME 1.
2. ROOT CONTROL DEVICES SHALL BE USED FOR ALL TREES PLANTED IN SIDEWALK CUTOUTS, PLANTER STRIPS, & BEHIND SIDEWALKS BUT WITHIN THE PUBLIC RIGHT-OF-WAY. FOR ROOT BARRIER TYPE, REFER TO PUBLIC WORKS DEPARTMENT.
3. TREES SHALL BE PLANTED 10' MINIMUM FROM WATER SERVICES OR SEWER LATERALS

WIDTHS (W):

PER STREET TREE LIST VOL.1

CITY OF ROHNERT PARK

TREE PLANTING IN PLANTER STRIP

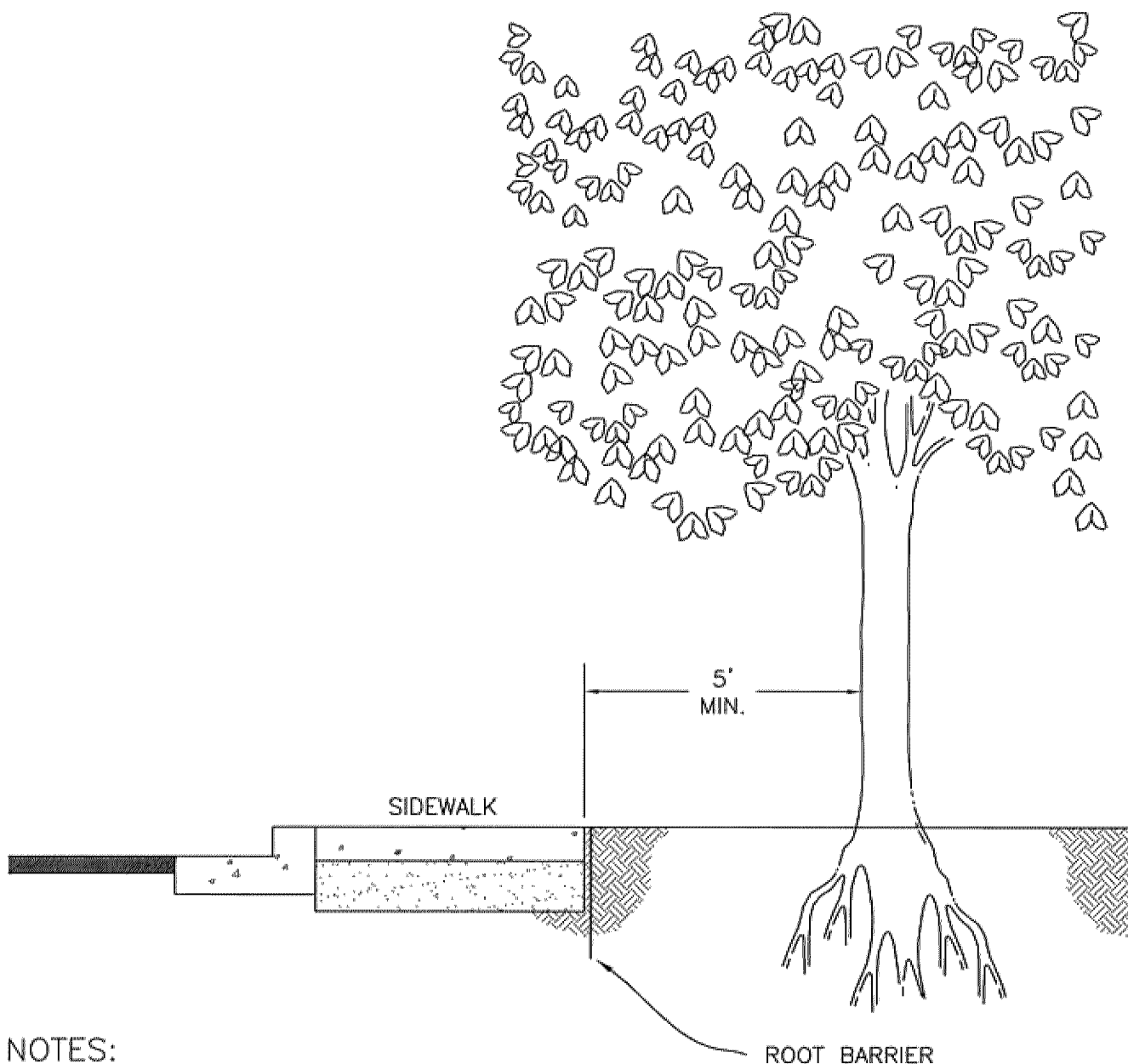
SCALE: NONE

DATE: OCTOBER 2010

Approved:

[Signature]

STD. - 260



NOTES:

1. FOR TREE TYPE, REFER TO THE STREET TREE LIST IN VOL.1.
2. ROOT CONTROL DEVICES SHALL BE USED FOR ALL TREES PLANTED IN SIDEWALK CUTOUTS, PLANTER STRIPS, & BEHIND SIDEWALKS BUT WITHIN THE PUBLIC RIGHT-OF-WAY. FOR ROOT BARRIER TYPE, REFER TO PUBLIC WORKS DEPARTMENT.
3. TREES SHALL BE PLANTED 10' MINIMUM FROM WATER SERVICES OR SEWER LATERALS

CITY OF ROHNERT PARK

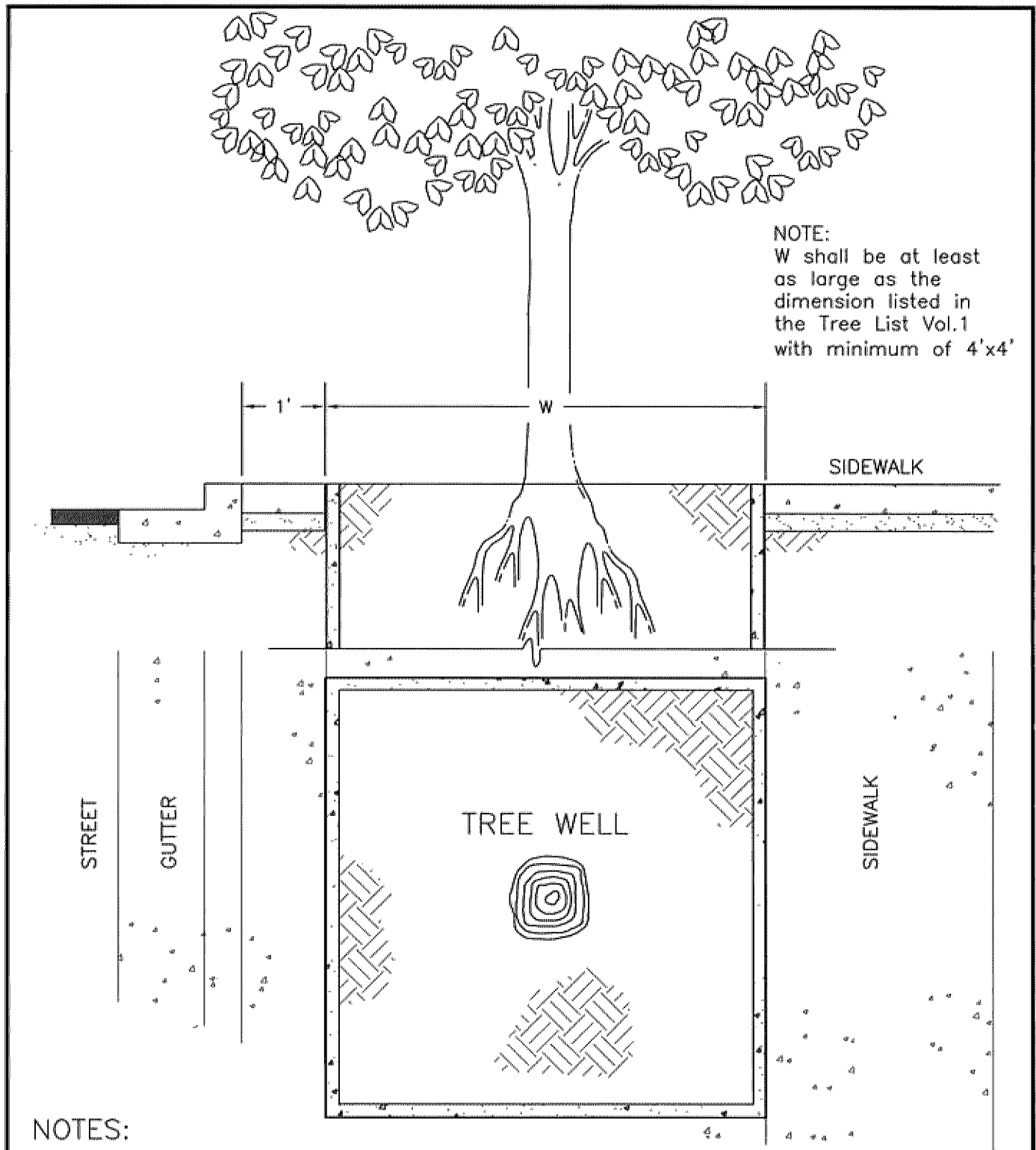
TREE PLANTING IN RIGHT-OF-WAY OR
P.U.E. WITH CONTIGUOUS SIDEWALK

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 261



NOTES:

1. For tree type, refer to the Street Tree List in Vol.1.
2. Root control devices shall be used for all trees planted in sidewalk cutouts, planter strips, & behind sidewalks but within the public right-of-way. for root barrier type, refer to public works department.

CITY OF ROHNERT PARK

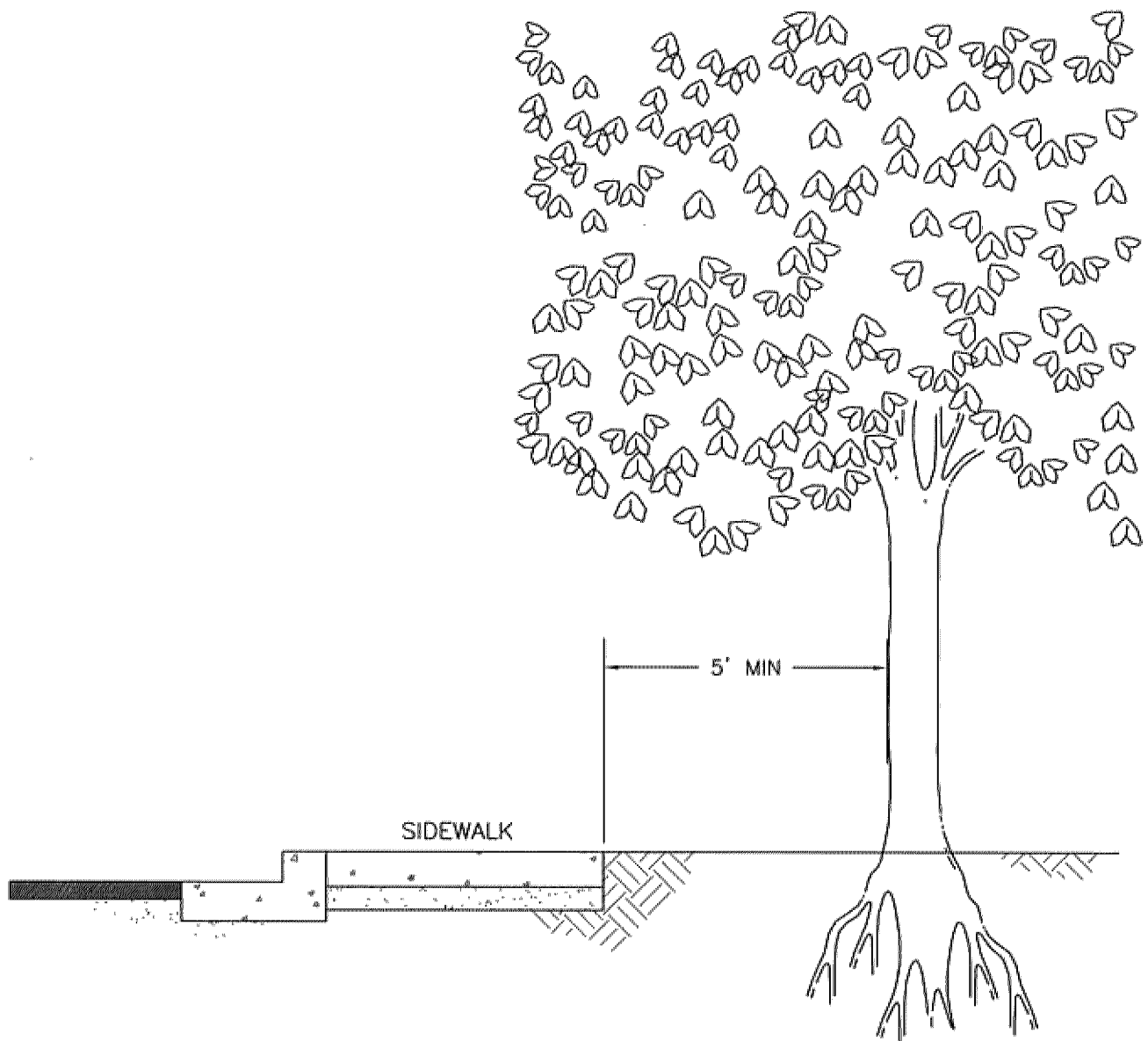
TREE PLANTING IN TREE WELL

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 262



NOTE:

1. FOR TREE TYPE, REFER TO THE STREET TREE LIST IN VOLUME 1.

CITY OF ROHNERT PARK

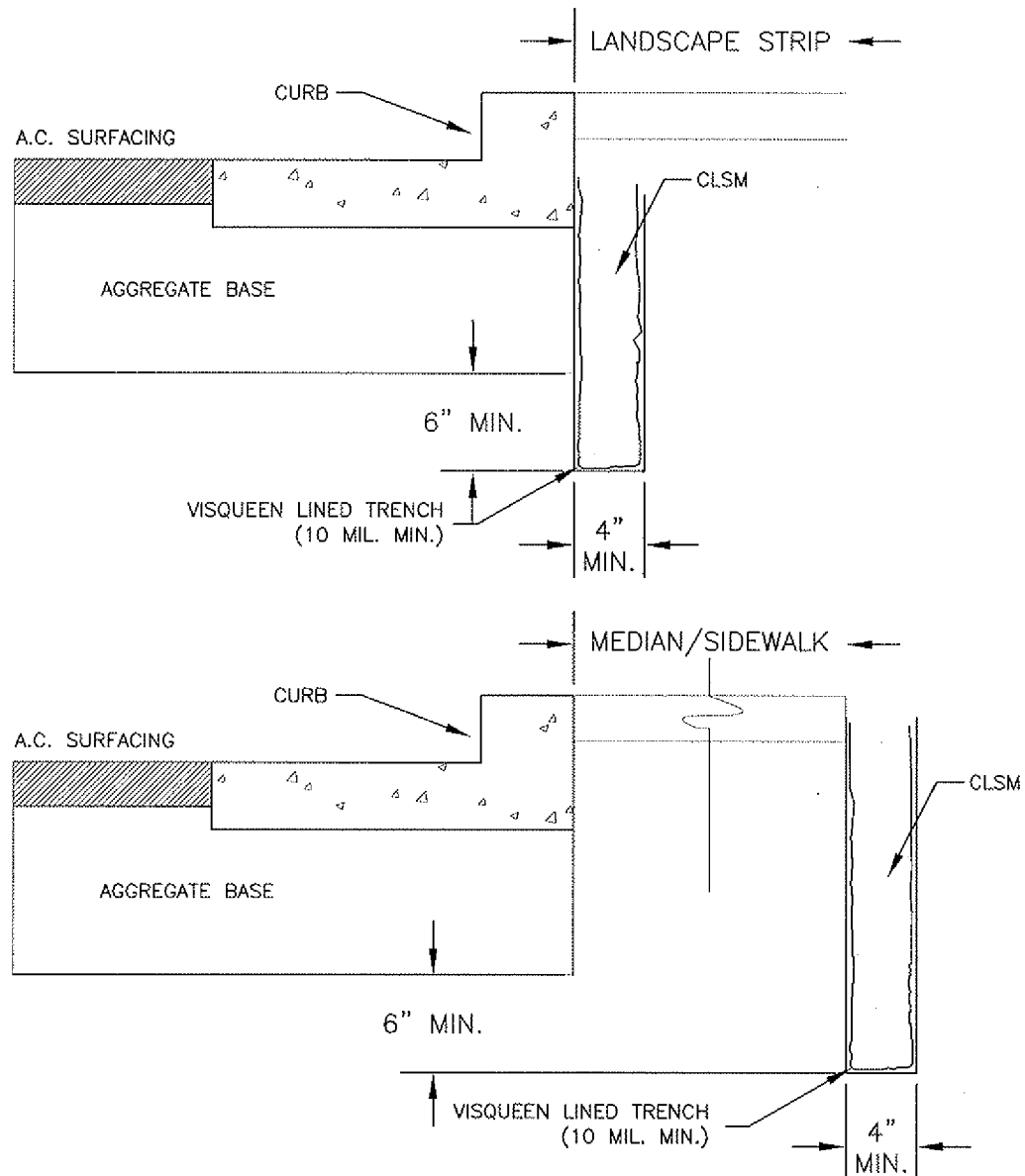
PRIVATE TREE IN LIEU OF STREET TREE

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 263



Refer to Section VII.E.3. of Design Standards

Moisture barrier shall be placed at edge of all roadways and medians

Locate moisture barriers at the outside edge of contiguous pavement (eg. if sidewalk is adjacent to road, place moisture barrier at back of sidewalks, if there is a landscape strip place moisture barrier at back of curb.)

CITY OF ROHNERT PARK

MOISTURE BARRIER

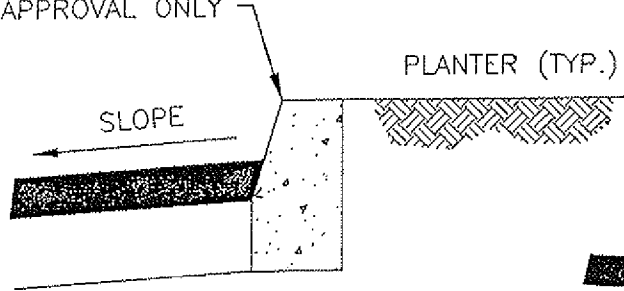
SCALE: NONE

DATE: MARCH 2011

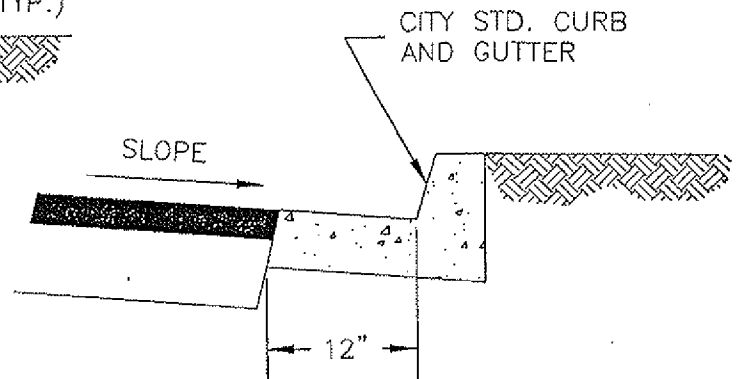
Approved: 

STD. - 264

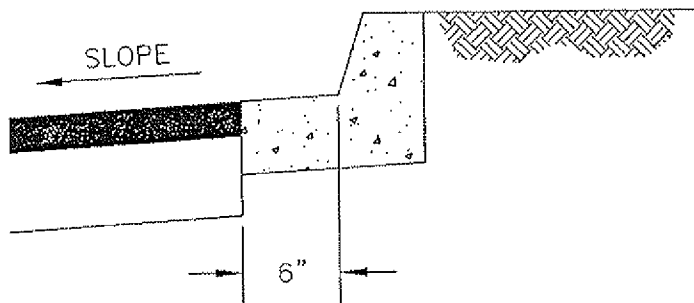
STATE STD.-B-3
P.C.C. CURB
USE WITH CITY
ENGINEER
APPROVAL ONLY



TYPE A



TYPE C



TYPE B

NOTES:

1. MINIMUM PAVING SECTION SHALL BE 2" ASPHALT CONCRETE AND 8" AGGREGATE BASE (CLASS II), UNLESS THE DESIGN IS BASED ON "R" VALUE OF BASEMENT SOIL AND APPROVED BY THE CITY ENGINEER.
2. MINIMUM SLOPE OF PAVING SHALL BE 1%.
3. SURFACE DRAINAGE SHALL BE CARRIED INTO A STORM DRAIN OR UNDER THE SIDEWALK, THROUGH THE FACE OF THE CURB.

CITY OF ROHNERT PARK

PARKING LOT TYPICAL SECTIONS

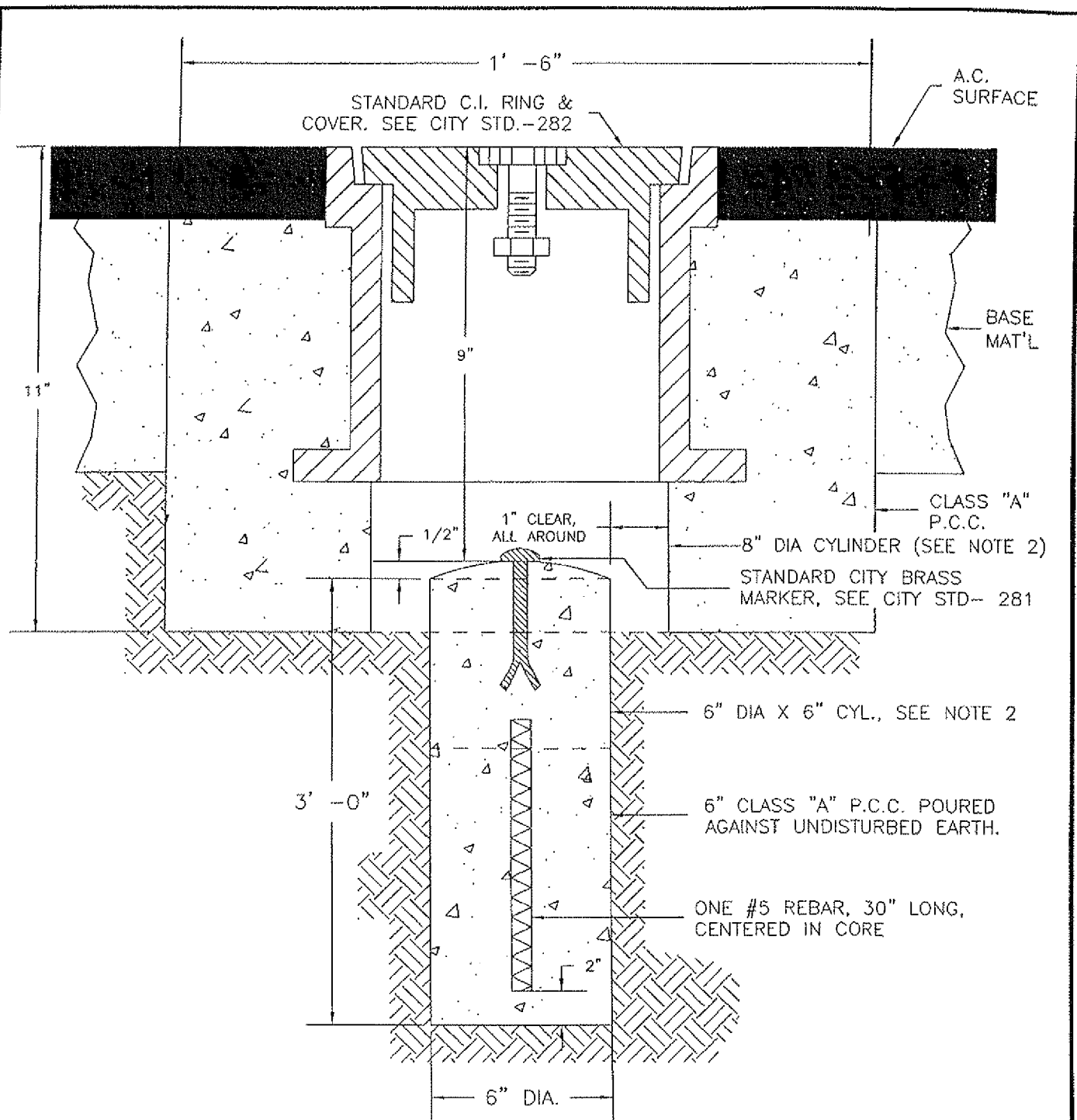
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Johnson

STD. - 270



NOTES:

1. CYLINDER MATERIAL SHALL BE THINWALL A.B.S. OR P.V.C. PLASTIC PIPE.
2. TOP OF MONUMENT CORE SHALL BE FINISHED SMOOTH & ROUNDED WITH NO CONCRETE ABOVE THE EDGE OF THE BRASS SURVEY MARKER.

CITY OF ROHNERT PARK

CITY MONUMENT

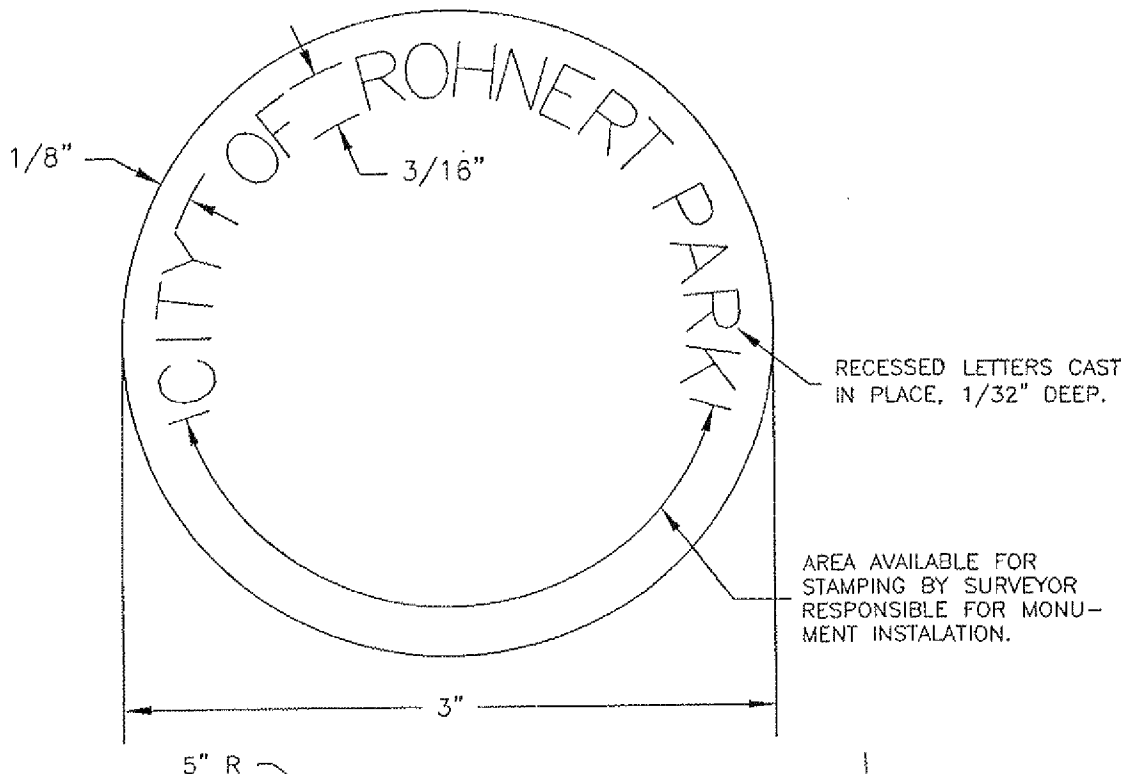
SCALE: NONE

DATE: JANUARY 2006

Approved:

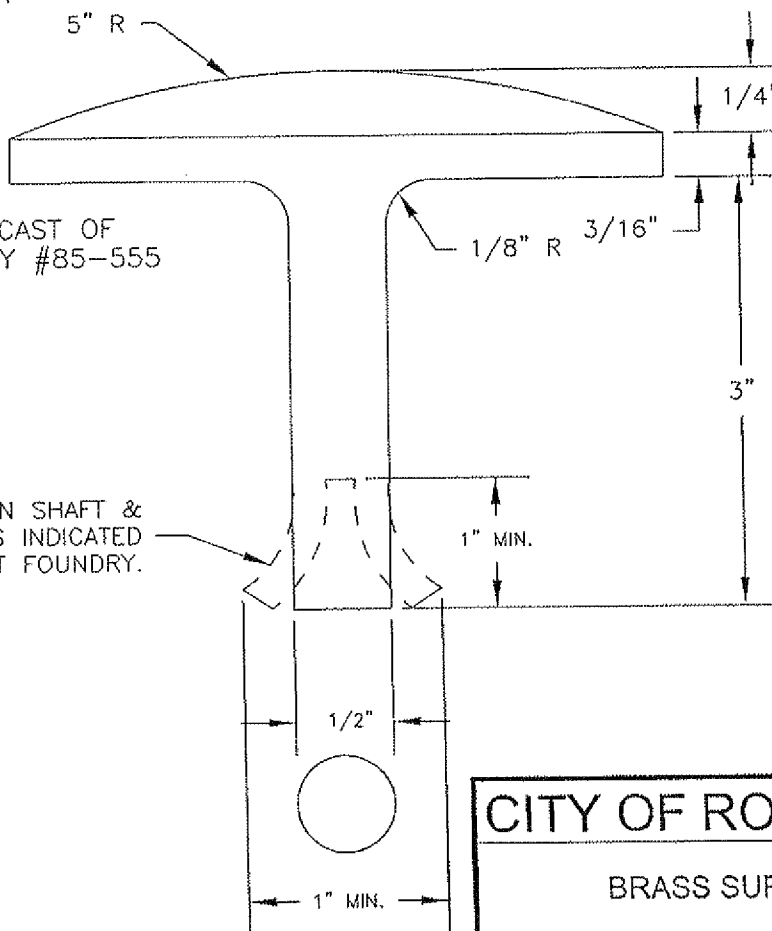
Dennis Johnson

STD. - 280



SURVEY MARKER CAST OF
RED BRASS, ALLOY #85-555
COPPER 85%
TIN 5%
ZINC 5%
LEAD 5%

CUT SLOT IN SHAFT &
SPREAD AS INDICATED
AT FOUNDRY.



CITY OF ROHNERT PARK

BRASS SURVEY MARKER

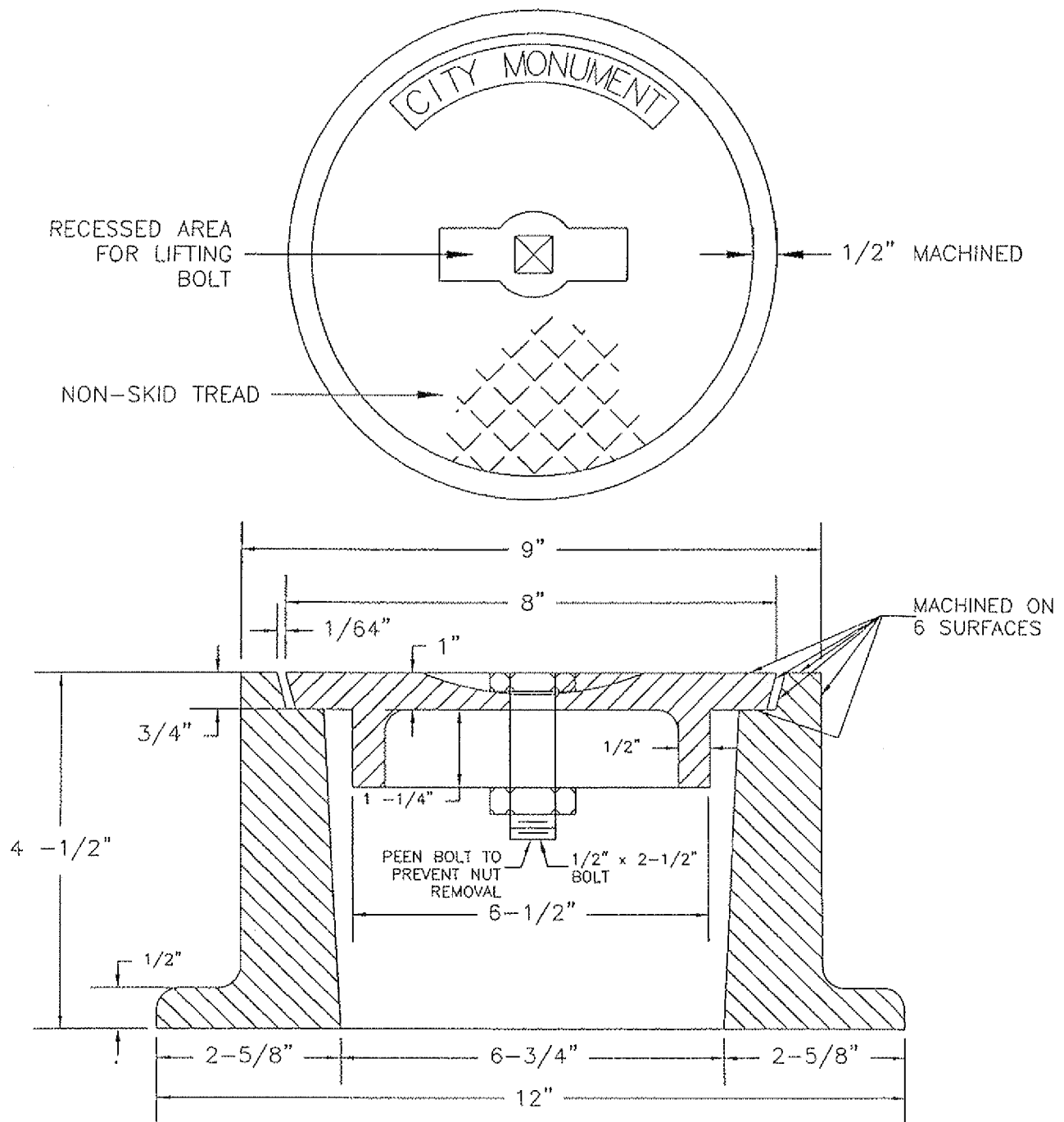
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Polini

STD. - 281



NOTES:

1. ASTM CLASS 30 IRON CASTINGS DIPPED IN ASPHALT PAINT.

APPROVED MONUMENT COVERS

1. PHOENIX NO. P-2001-A OR "P-2001-E"
2. "VISCO NO. 129"
3. "AMERICAN BRASS AND IRON FOUNDRY
MODEL 5020-21"
4. ARTMARK PROD. CO. APC-51
5. SANTA ROSA CAST PRODUCTS SP-51
6. ALTERNATE - FORNI CORPORATION
TYPE 80-60-03

CITY OF ROHNERT PARK

CITY MONUMENT COVER

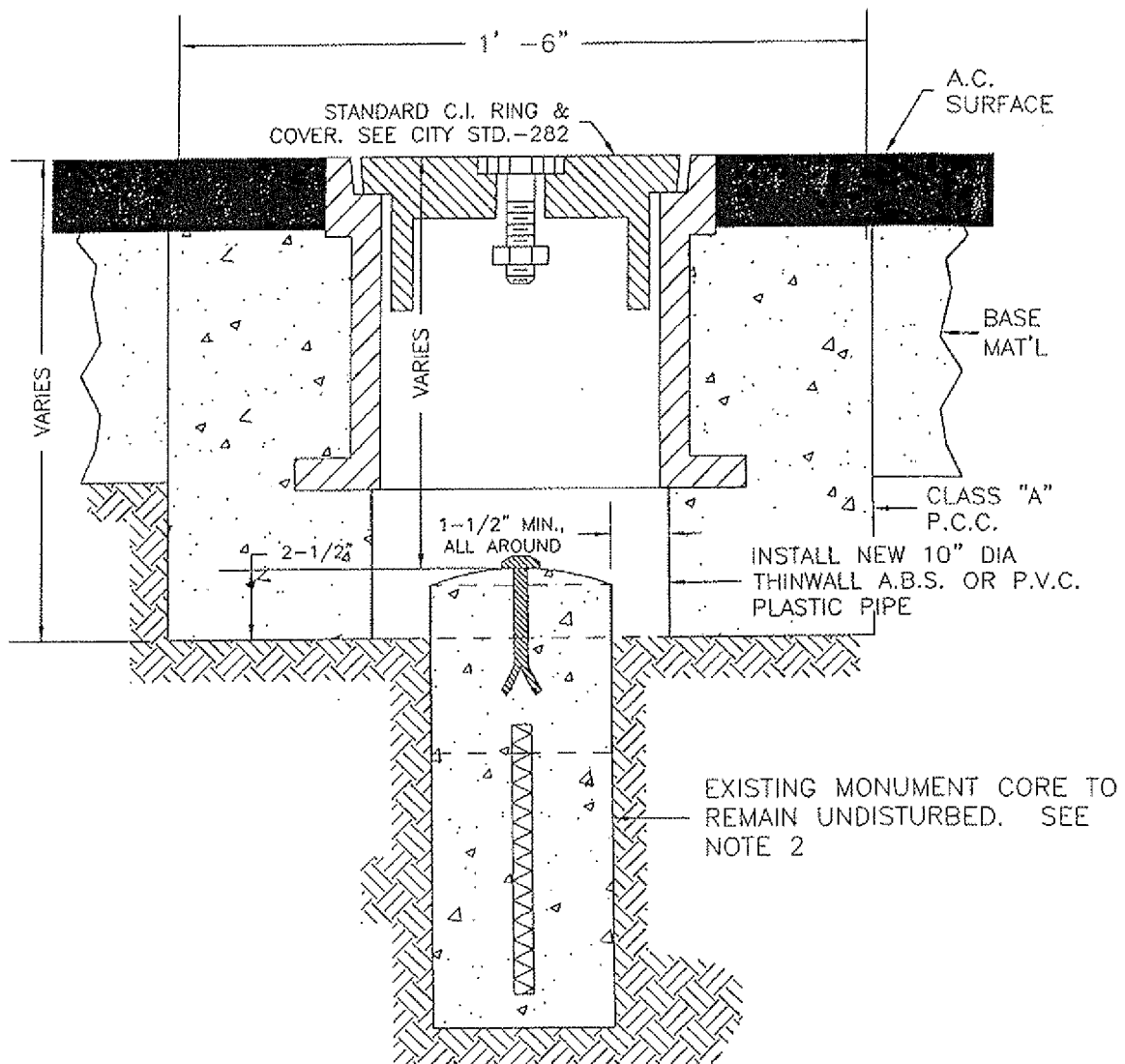
SCALE: NONE

DATE: JANUARY 2006

Approved:

Samuel

STD. - 282



NOTES:

1. EXISTING MONUMENT COVER, CONCRETE COLLAR AND OTHER MATERIAL SHALL BE REMOVED TO A DEPTH OF 2-1/2" BELOW TOP OF EXISTING MONUMENT.
2. DO NOT DISTURB EXISTING MONUMENT CORE. IF DISTURBED, CONTRACTOR SHALL REPLACE AS PER STD. 280 AT HIS EXPENSE FOR INSTALLATION AND SURVEY TIME NECESSARY TO RELOCATE THE ORIGINAL MONUMENT POSITION.

CITY OF ROHNERT PARK

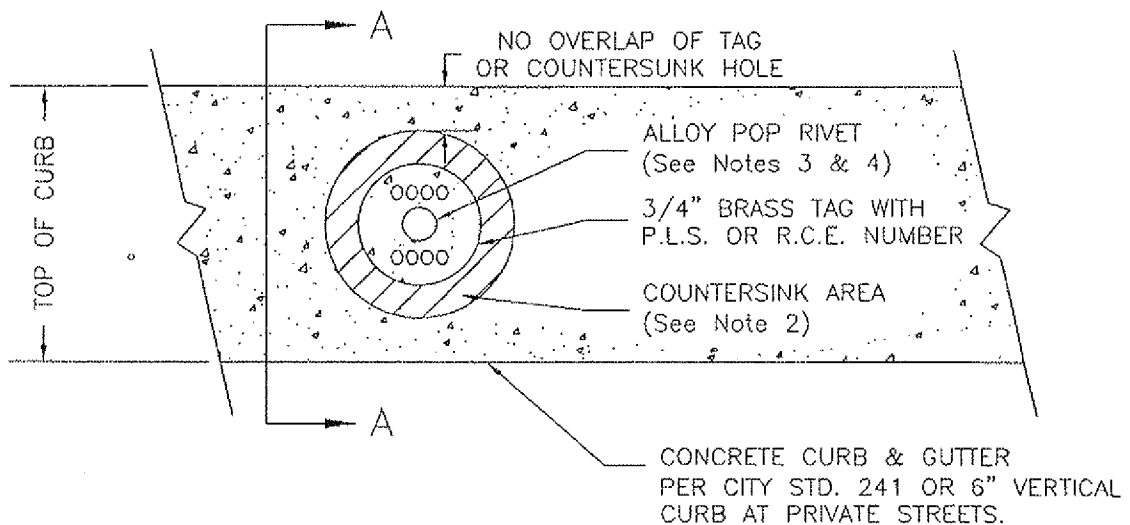
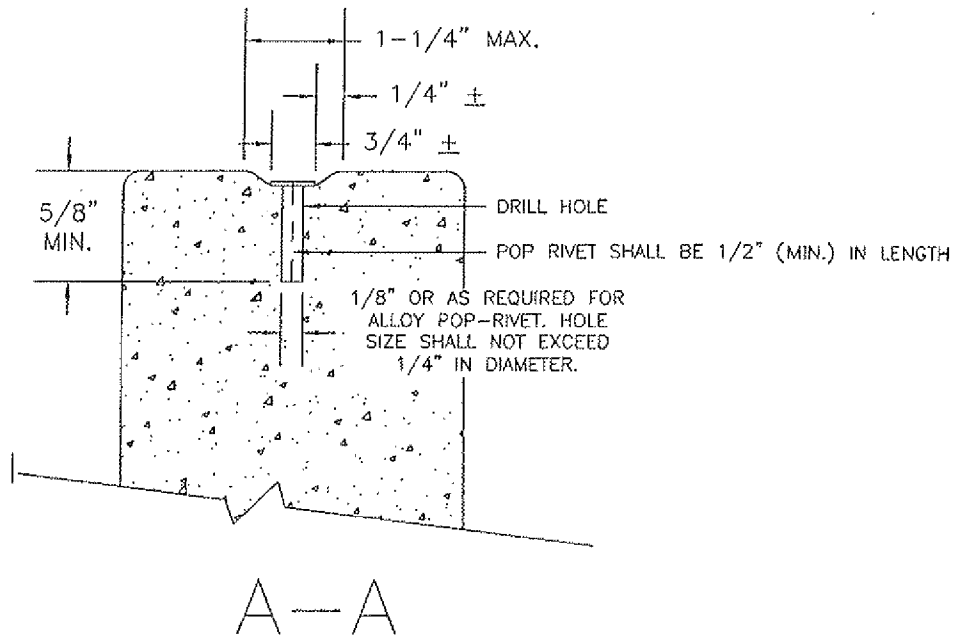
CITY MONUMENT COVER REPLACEMENT

SCALE: NONE DATE: JANUARY 2006

Approved:

Dan Feltman

STD. - 283



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. IMPACT FASTENERS ARE NOT ALLOWED.

CITY OF ROHNERT PARK

LOT CORNER REFERENCE MONUMENT
AT STREET FRONTAGE

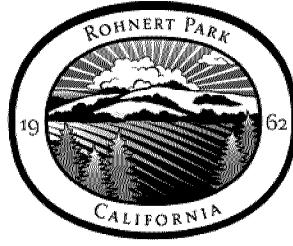
SCALE: NONE

DATE: JANUARY 2006

Approved:

Ramphim

STD. - 284



City of Rohnert Park

Traffic Detail Drawings

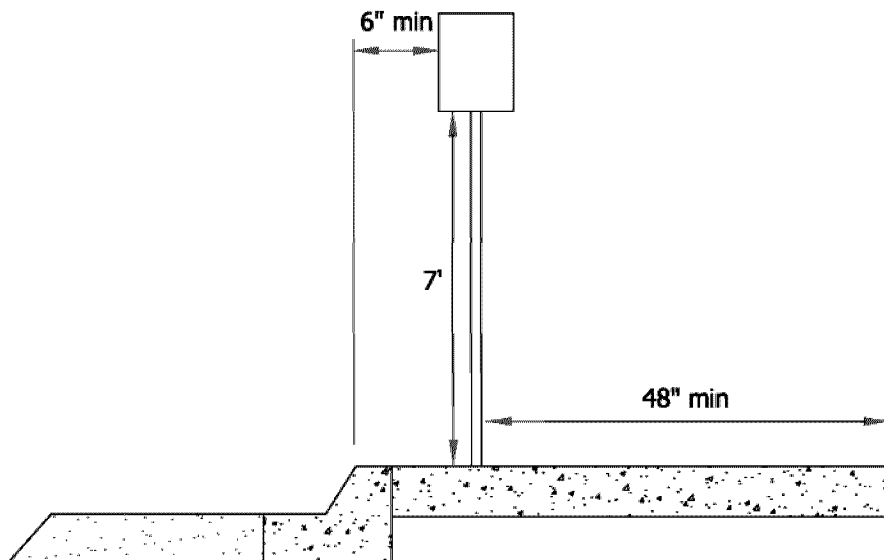
TRAFFIC DETAIL DRAWINGS

<u>Standard Number</u>	<u>Title</u>	<u>Date Approved</u>
700 Series		
701	Traffic Signs Lateral Offset Minimum in Urban Area	2014
702	Reserved	2014
703A	Street Name Signs – Mast-Arm Mounted	2014
703B	Street Name Signs – Mast-Arm Mounted – Brace Detail	2014
704A	Advance Street Name Signs	2014
704B	Traffic Signs & Advance Street Name Signs: Mounting Details	2014
704C	Traffic Signs & Advance Street Name Signs – Typical Installations	2014
705A	Traffic Street Name Signs Design Specifications	2014
705B	Street Name Sign	2014
705C	Traffic Street Name Signs Signalized Intersections	2014
705D	Traffic Street Name Signs Non-Signalized Intersections	2014
706	Reserved	2014
Pavement Markings		
720A	Reserved	2014
720B	Reserved	2014
720C	Reserved	2014
720D	Reserved	2014
721	Traffic Markings Median Island Treatment	2014
Traffic Signals		
730	Traffic Signals Pull Box Installation	2014
731	Traffic Signals Service Wiring Diagram	2014
732	Traffic Signals Detection	2014
733A	Traffic Signals Underground Electric Service	2014
Work Area Traffic Control		
740A	Left Lane Closure	2006
740B	Middle Lane Closure	2006
740C	Right Lane Closure	2006
740D	Half-Roadway Closure	2006
740E	Work Area in Center of Street	2006
740F	Manhole Access in Center of Street	2006
740G	Local Street Closure	2006
740H	Work Area in Parking Lane or Shoulder	2006
740I	Work Within Intersection	2006
740J	Work Beyond Intersection – Left Lane Closed	2006
740K	Work Beyond Intersection – Right Lane Closed	2006
740L	Pedestrian Control	2006
741	Delineation and Sign Placement	2006
742	Project Sign	2014

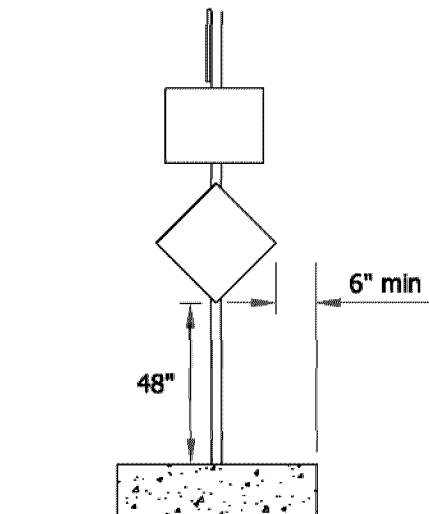
ENGINEER'S LIST OF APPROVED ITEMS
for use with Traffic Signal Design Standards

Approved _____ Date _____

1. Traffic Signals – C. Traffic Signal Controller, 170E or 2070E
Products listed on the Caltrans Qualified Products List (QPL)
<http://www.dot.ca.gov/hq/traffops/electsys/TEES.htm>
2. Traffic Signals – D. Traffic Signal Controller Cabinet, Model 332L
Products listed on the Caltrans Qualified Product List (QPL)
<http://www.dot.ca.gov/hq/traffops/electsys/TEES.htm>
3. Traffic Signals – E. Traffic Signal Service Cabinet
Tesco type III-BF service cabinet
4. Traffic Signals – J. Detection
Econolite, Autoscope Video Detector System,
<http://www.econolite.com/products/detection.aspx>
ITERIS, <http://www.iteris.com/solutions/detection>
MS SEDCO, http://mssedco.com/intersector_sensor.htm
Aldis, GridSmart, <http://www.aldiscorp.com/gridsmart/> on certain applications with City Engineer approval.
5. Emergency Vehicle Pre-emption
EMTRAC Systems, <http://emtracsystems.com/>



In Urban Areas with Curb



In Medians

All other typical applications can be found in chapter 2A of the California MUTCD.

CITY OF ROHNERT PARK

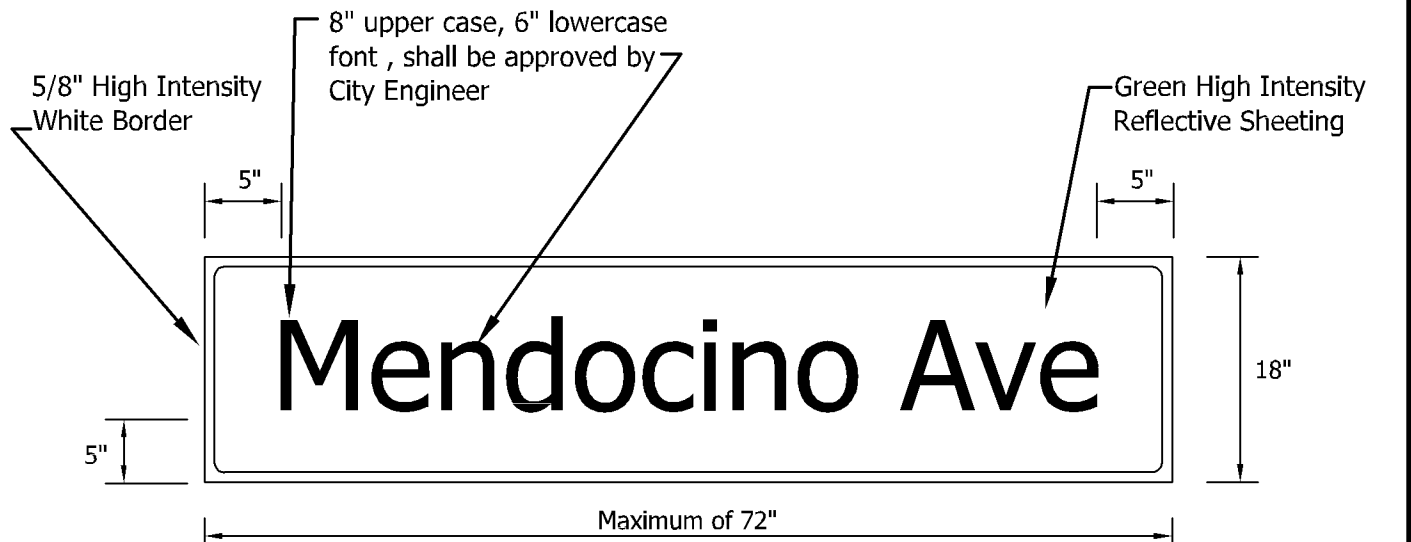
TRAFFIC SIGNS LATERAL OFFSET MINIMUM IN URBAN AREA

SCALE: NONE

DATE: JANUARY 2014

Approved:

STD. - 701



Detail A
Typical Street Name Sign
Mast-Arm Mounted

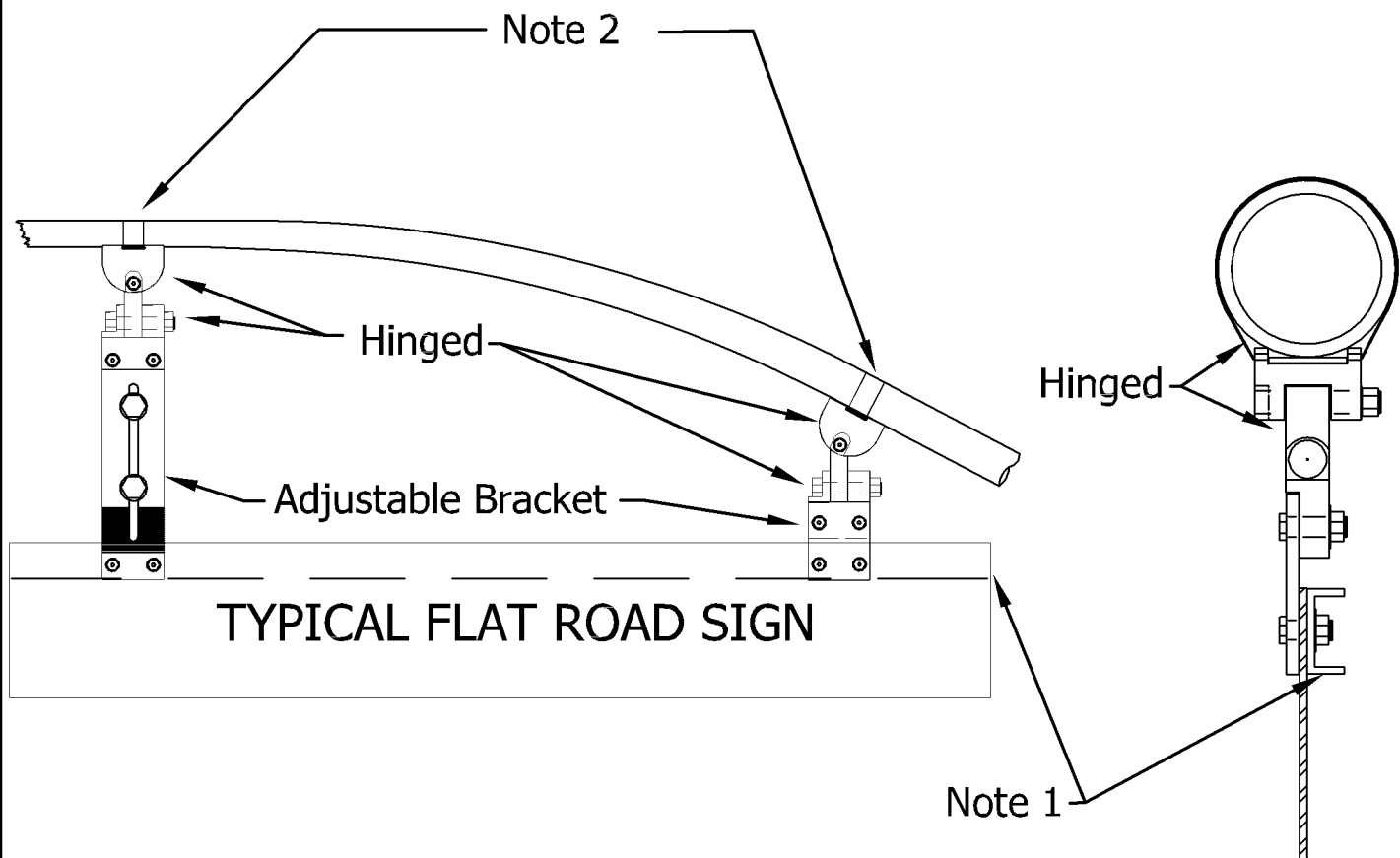


Detail B
Street Name Change at Intersection
Mast-Arm Mounted

NOTES:

1. Blanks are 0.125" aluminum per Caltrans Specifications.
2. Font, dimensions and spacing of letters shall be per the latest edition of the FHWA Standard Alphabets for Traffic Control Devices.
3. All Overhead Street Name Signs shall be double sided, and shall be mounted at all signalized intersections where mast arms exist, One double-sided sign shall be installed on each mast-arm. When street names change at the intersection, the overhead street name signs shall be double sided, with one side acting as the "near-side" sign and the other side acting as the "far-side". The "far-side" sign shall display the name of the street to the right and shall have an arrow facing away from the street name and towards the right. The "near-side" sign shall display the name of the street to the left and shall have an arrow facing away from the street name and towards the left.

CITY OF ROHNERT PARK			
STREET NAME SIGNS MAST-ARM MOUNTED			
SCALE:	NONE	DATE:	MARCH 2014
Approved:		STD. - 703A	



Notes:

1. All signs shall be reinforced by mounting on a 1"x2" aluminum 3/16" channel back brace.
2. a. Mounting bolts shall be 5/16"x1" stainless steel.
b. Banding shall be 0.030" x 0.55" double wrap.
3. Location of sign mounting on mast arm shall be determined by the City Traffic Engineer during the plan check process.
4. Adjustable brackets shall be used as necessary to horizontally level the sign.

CITY OF ROHNERT PARK

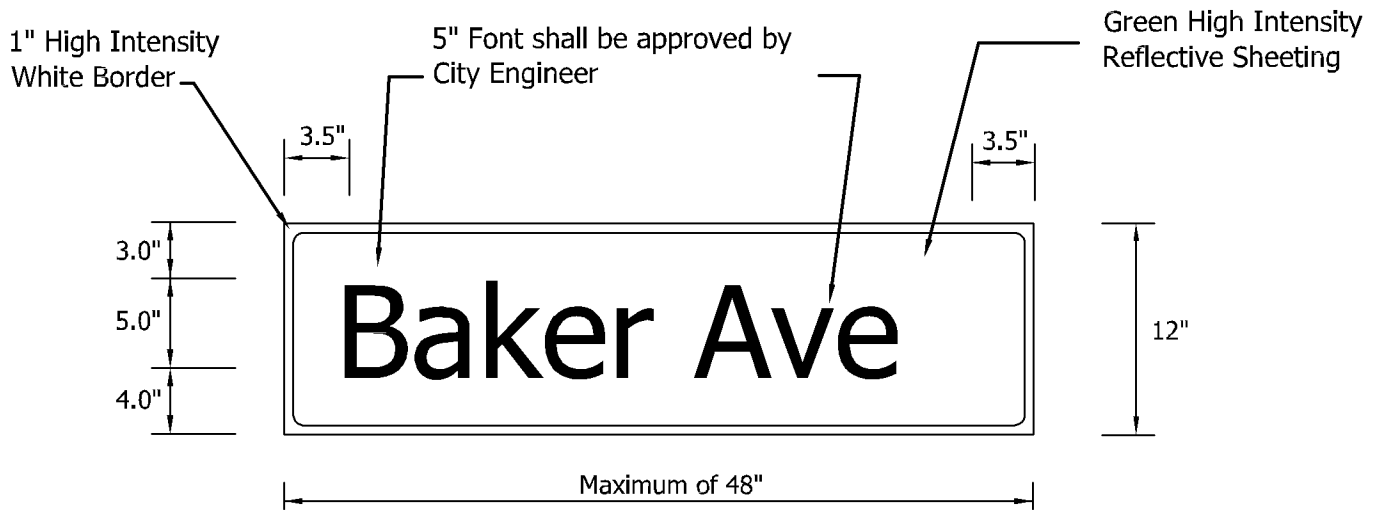
STREET NAME SIGNS
MAST-ARM MOUNTED

SCALE: NONE

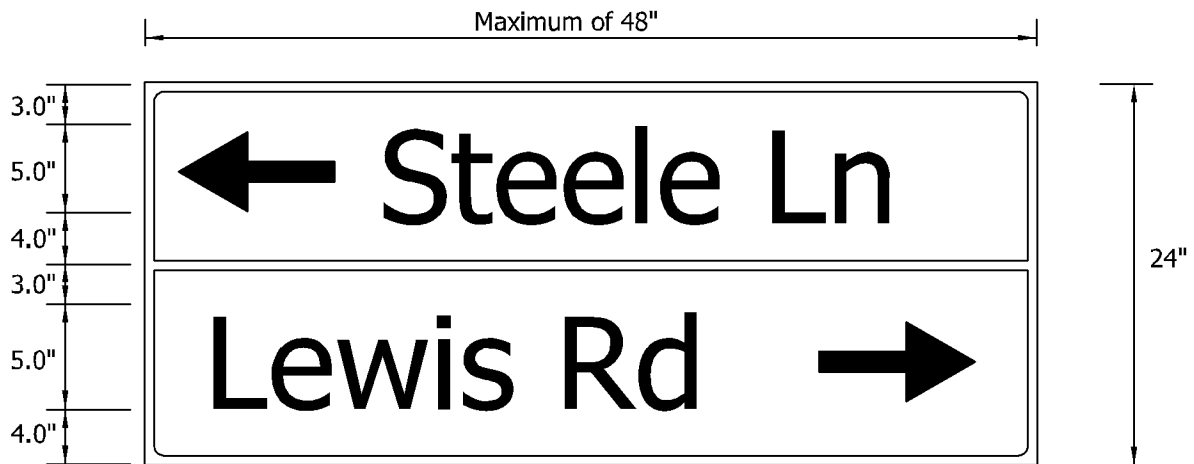
DATE: APRIL 2014

Approved:

STD. - 703B



Detail A - Typical Advance Street Name Sign



Detail B - Street Name Change

NOTES:

1. Blanks are 0.080" aluminum.
2. Font, dimensions and spacing of letters shall be per the latest edition of the FHWA Standard Alphabets for Traffic Control Devices. Any variation in font size shall be approved by City Engineer.
3. When street name changes from one side of the intersection to the other the sign design shall conform to Detail B - Street Name Change.

CITY OF ROHNERT PARK

ADVANCE STREET NAME SIGN

SCALE: NONE

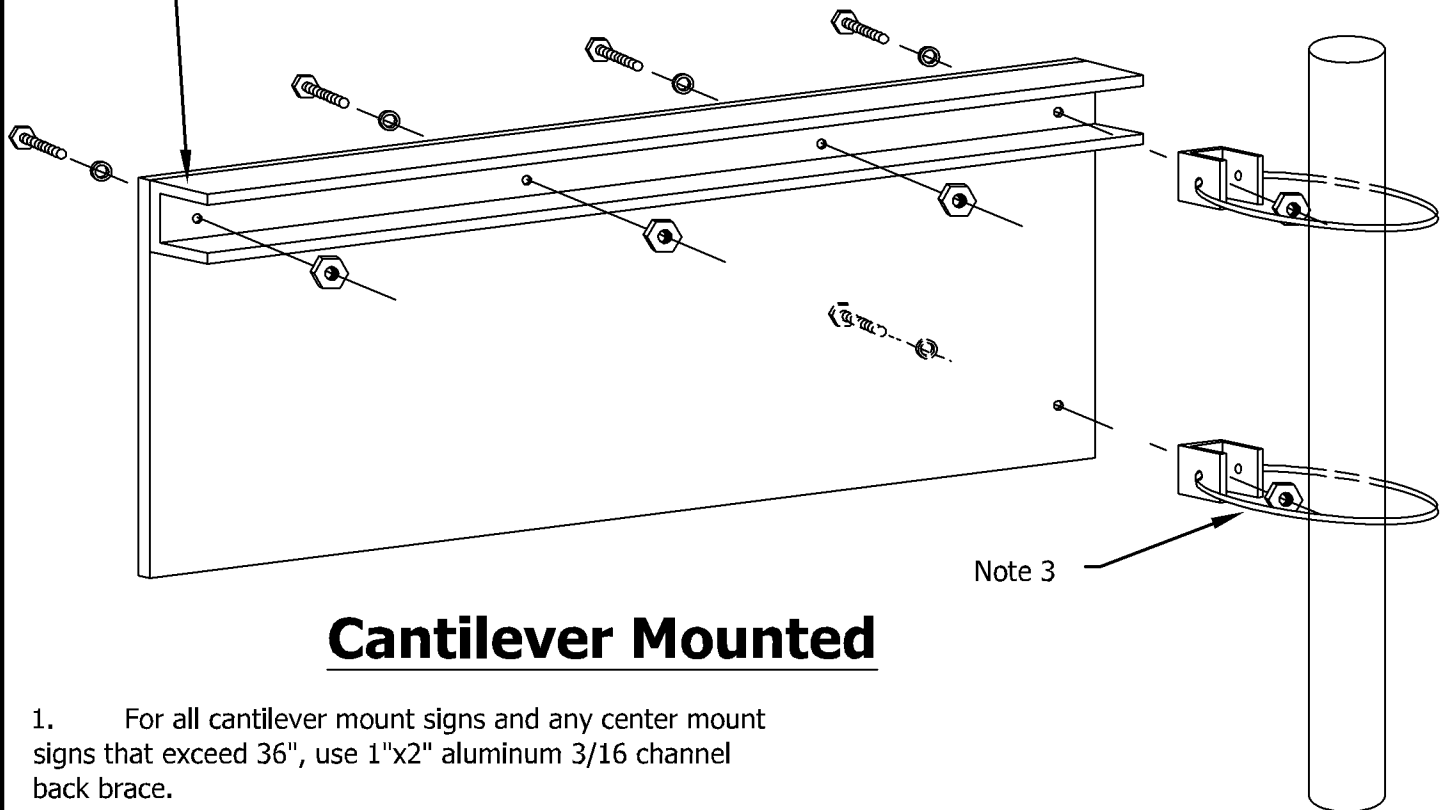
DATE: MARCH 2014

Approved:

STD. - 704A

Note 1

Center Mounted



Note 3

Cantilever Mounted

1. For all cantilever mount signs and any center mount signs that exceed 36", use 1"x2" aluminum 3/16 channel back brace.
2. For center mount signs 36" or less in length, use 1/4 14x3/4 hex washer self drilling screw and mount directly to 2" pole.
3. Use 3/4" heavy duty 0.032" stainless steel mounting banding with 3/4" heavy duty banding buckle, for street light applications.

CITY OF ROHNERT PARK

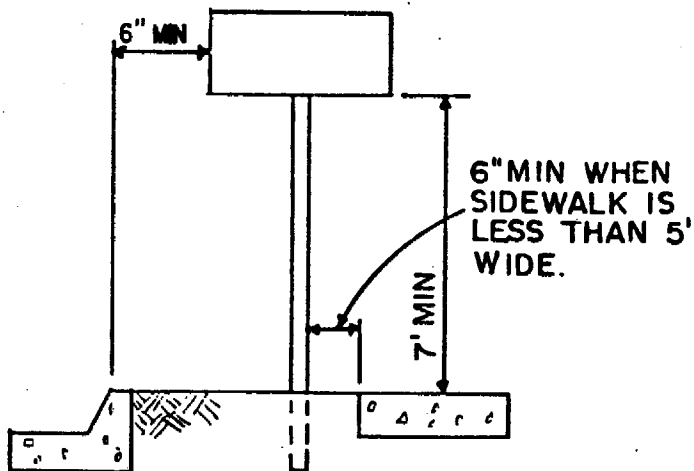
TRAFFIC SIGNS & ADVANCE STREET NAME SIGNS: MOUNTING DETAILS

SCALE: NONE

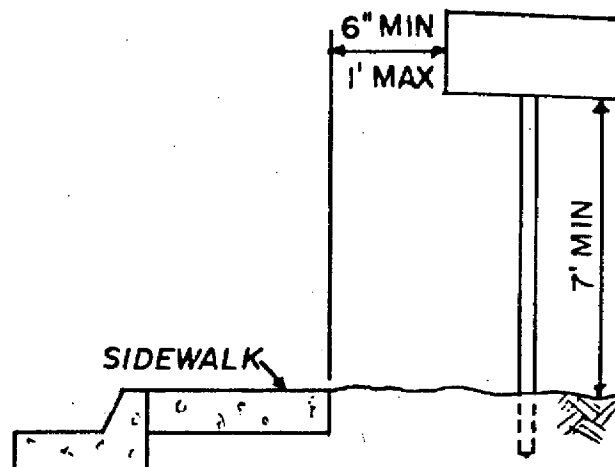
DATE: MARCH 2014

Approved:

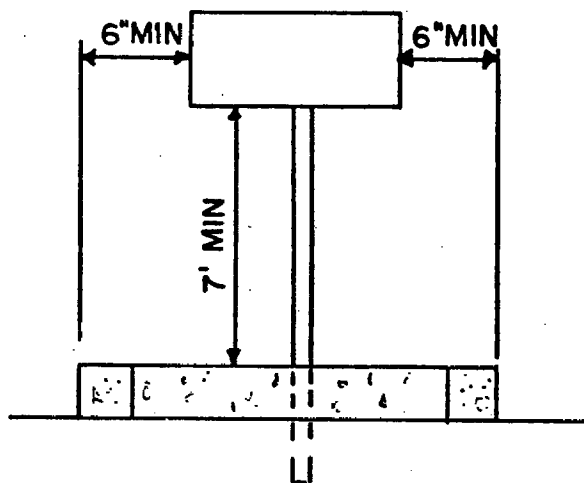
STD. - 704B



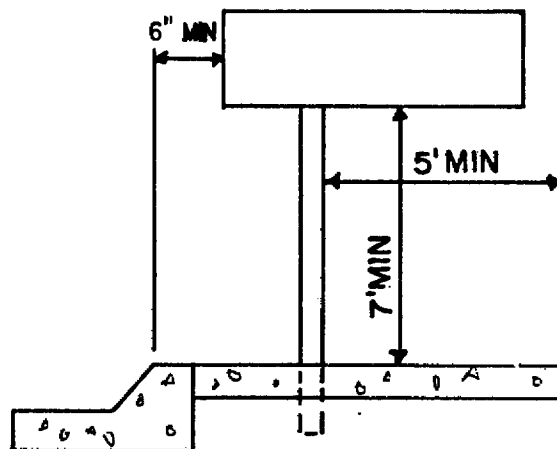
PLANTER STRIP



BEHIND SIDEWALK



MEDIAN



ON SIDEWALK

TYPICAL INSTALLATIONS

CITY OF ROHNERT PARK

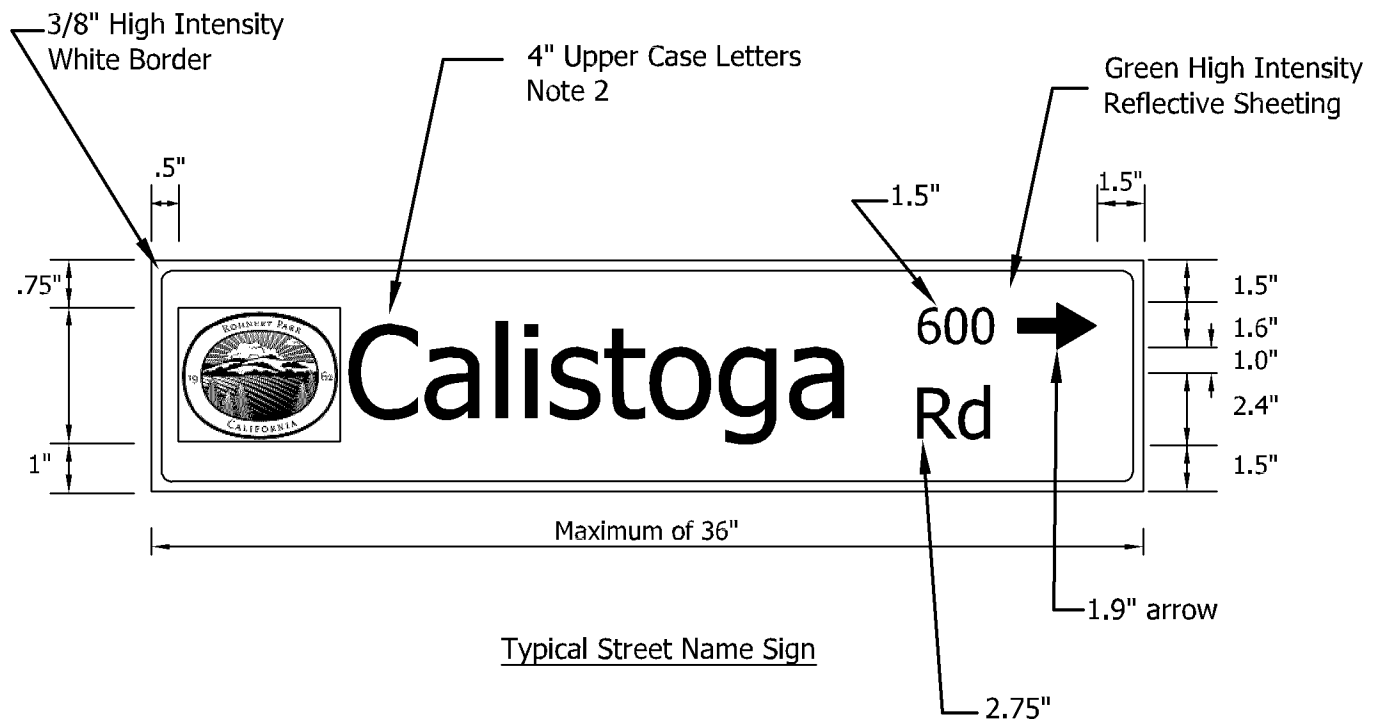
**TRAFFIC SIGN & ADVANCE STREET
NAME SIGNS TYPICAL INSTALLATION**

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 704C



NOTES:

1. Blanks are 0.080" aluminum per latest Caltrans Specifications.
2. Font, dimensions and spacing of letters shall be per the latest edition of the FHWA Standard Alphabets for Traffic Control Devices.
3. Arrows shall point away from block number, indicating the ascending direction for addresses.
4. Signs are to be single sided and riveted together (see STD 705B).

CITY OF ROHNERT PARK

TRAFFIC STREET NAME SIGNS DESIGN SPECIFICATIONS

SCALE: NONE DATE: MARCH 2014

Approved:

STD. - 705A

7 5/8" CITY LOGO DECAL
CITY SHALL PROVIDE TO CONTRACTOR

HIGH INTENSITY (ENCAPSULATED LENS)
REFLECTIVE SHEETING - WHITE
(NO BORDER)

HIGH INTENSITY (ENCAPSULATED LENS)
REFLECTIVE SHEETING - GREEN

6" SERIES C UPPER CASE LETTERS, DIE CUT
4 1/2" SERIES C LOWER CASE LETTERS, DIE CUT

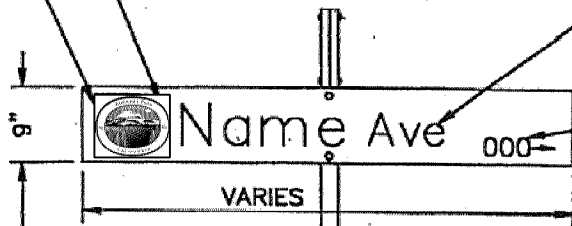
HIGH INTENSITY (ENCAPSULATED LENS)
REFLECTIVE SHEETING - GREEN

3" SERIES C NUMERALS, DIE CUT
(NUMBER TO BE ASSIGNED BY CITY)

1/2" RADIUS CUT CORNERS

NOTES:

1. HD-2C4P. - 0.080 ASSEMBLY Z.A.P., HAWKINS-HAWKINS, OR APPROVED EQUAL
2. REFER TO STD.-600 FOR STREET SIGN LOCATION.
3. SIGN SHALL BE 0.080" THICK ALUMINUM PLATE.
4. ALL SIGN POSTS SHALL BE 2" SQUARE UNISTRUT, OR APPROVED EQUAL.
5. WRAP UNDERGROUND PORTION OF POST WITH TAPE BEFORE PLACING CONCRETE.
6. ALL RIVETS SHALL BE 3/8" X 1/2" UNIVERSAL DRIVE RIVETS, GALVANIZED.



FINISHED GRADE

SEE DETAIL BELOW

3/8" DIA. X 1/2"
UNIVERSAL DRIVE
RIVETS, 2 EA.
(GALVANIZED)

GROUND
SURFACE

ANCHOR
ASSEMBLY

18" MIN.
CONCRETE

SIGN BASE DETAIL



CITY OF ROHNERT PARK

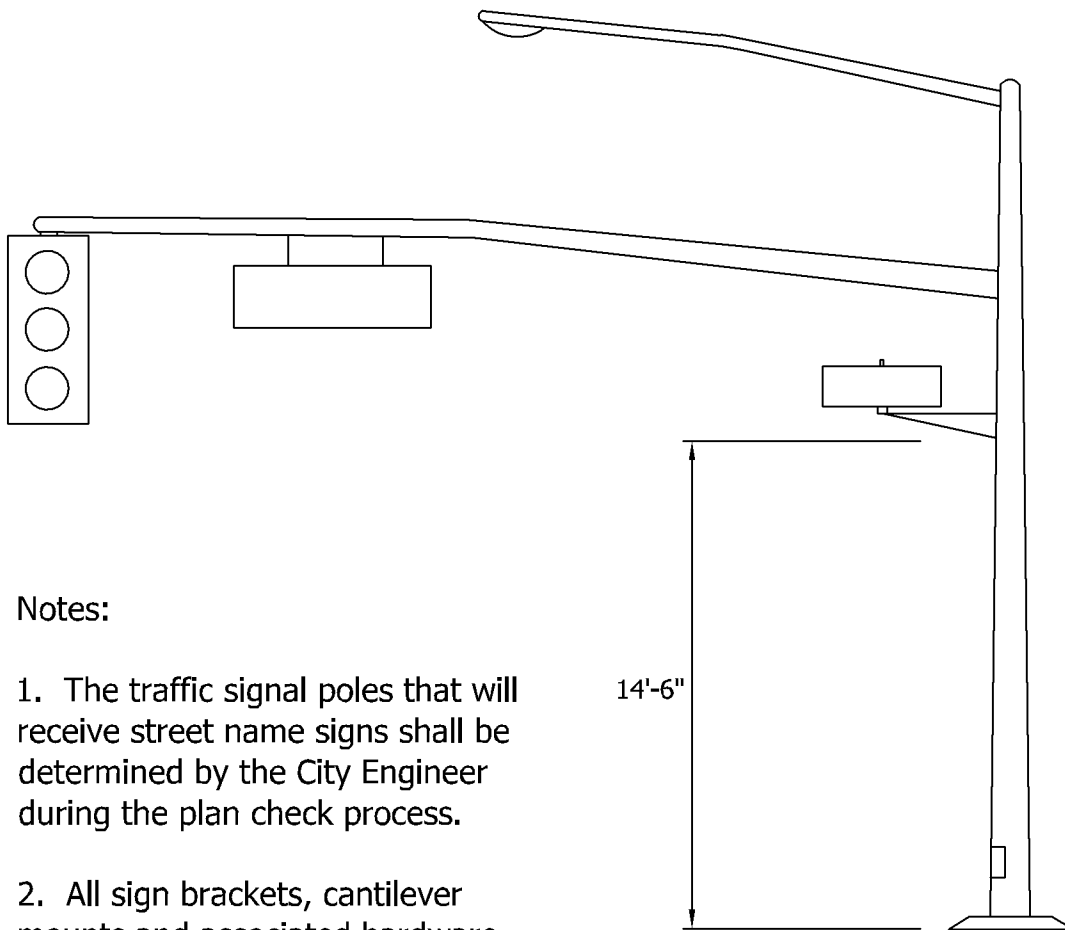
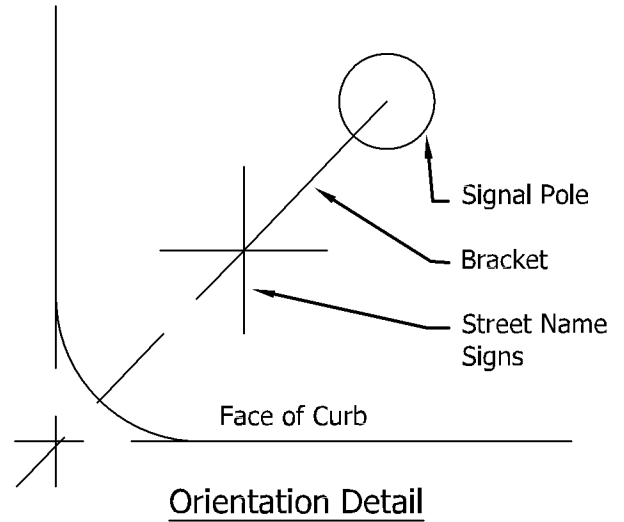
STREET NAME SIGN

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 705B



Notes:

1. The traffic signal poles that will receive street name signs shall be determined by the City Engineer during the plan check process.
2. All sign brackets, cantilever mounts and associated hardware must be designed specifically for the installation of traffic signs, and specifications for this hardware must be submitted for approval by the City Engineer prior to construction.

CITY OF ROHNERT PARK

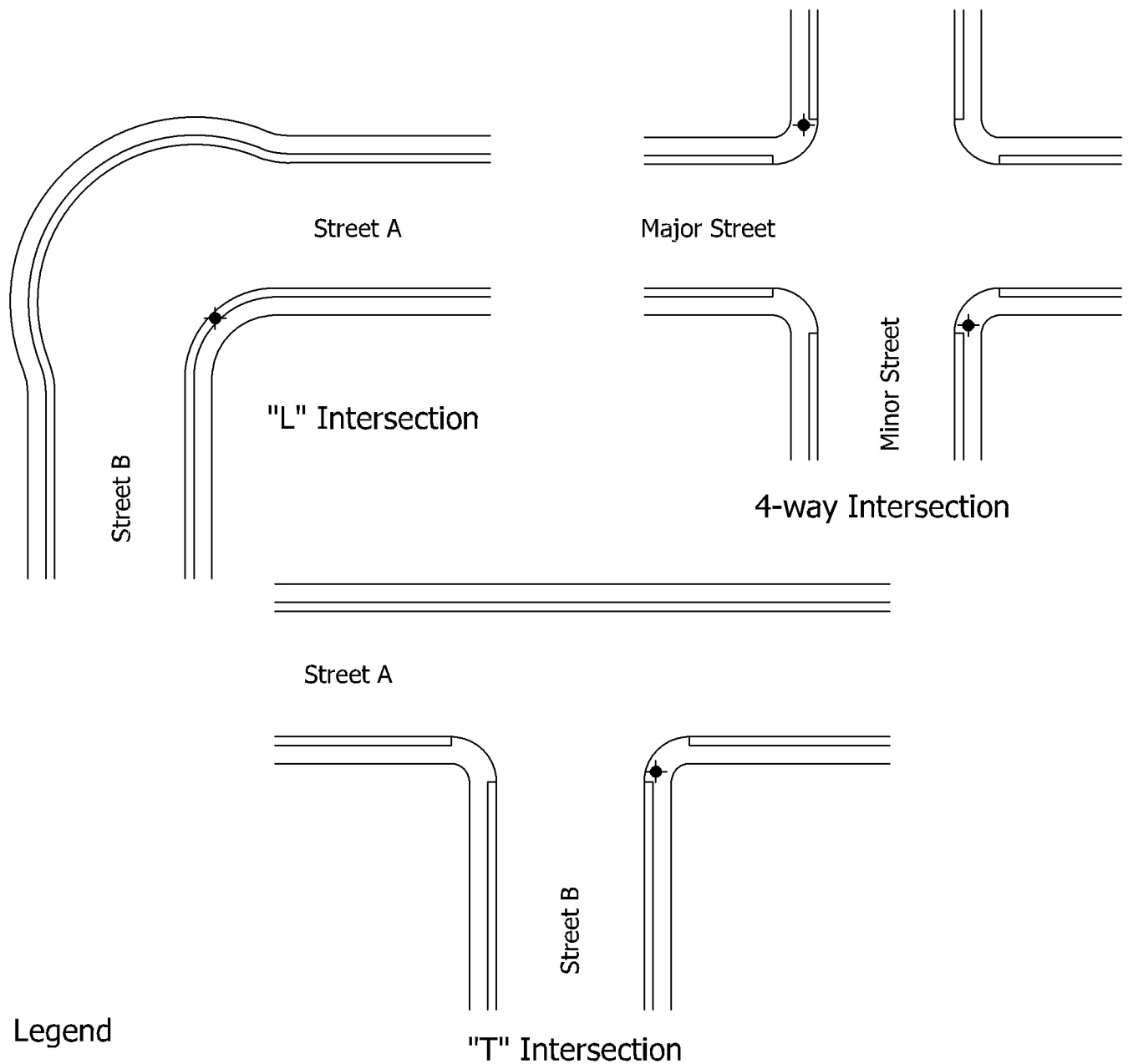
TRAFFIC STREET NAME SIGNS SIGNALIZED INTERSECTIONS

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 705C



Legend

◆ Street Name Sign

Notes

1. Where Stop Signs are present, the Street Name Signs shall be installed above the Stop Sign, per 705B.

CITY OF ROHNERT PARK

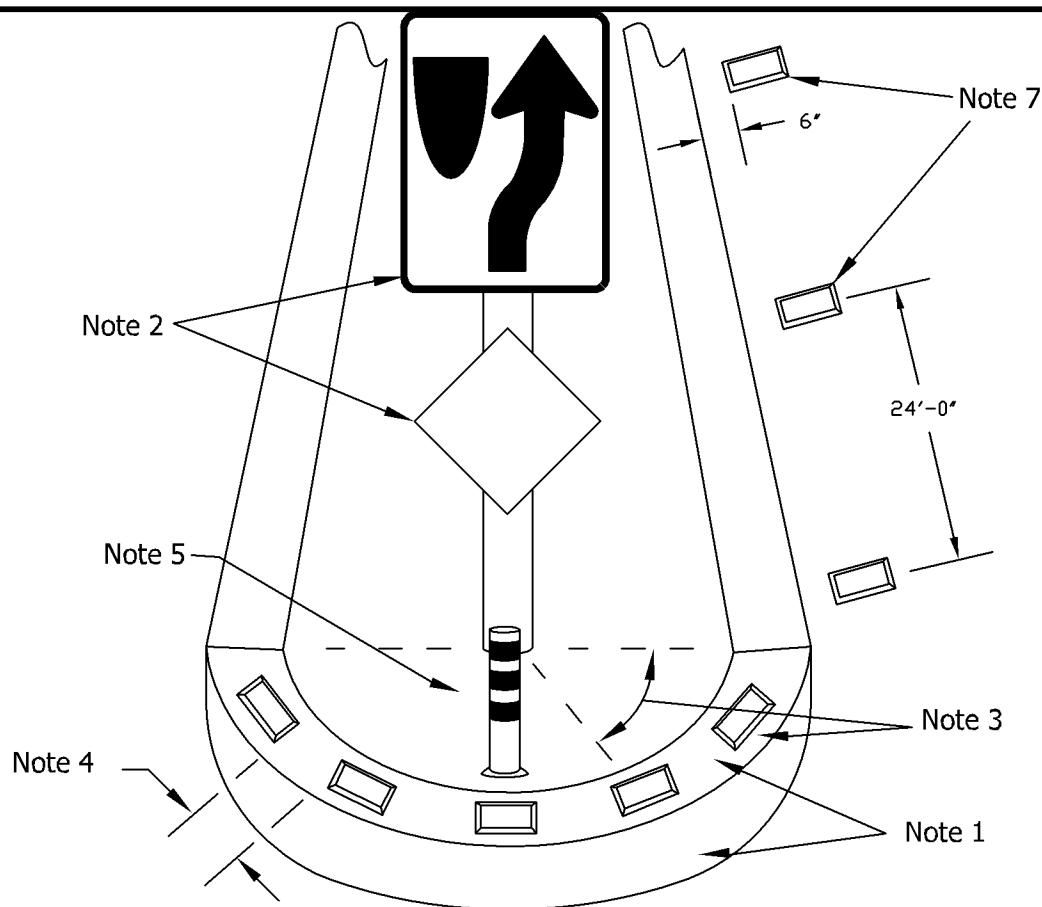
TRAFFIC STREET NAME SIGNS NON-SIGNALIZED INTERSECTIONS

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 705D



Notes:

1. The top and face of the curb at the island nose shall be painted white, with reflective glass beads.
2. When the width of a median island is 3 feet or greater and the island separates traffic of opposite directions, a R4-7 'Keep Right' symbol sign and Type 1 (OM1-3) object marker (per CA MUTCD figure 2C-13) shall be installed at the midpoint of the island nose defined by the radius.
3. Two-way reflective markers shall be installed on top of the curb at the island nose, along radial lines as illustrated in the drawing. The color of these markers shall be in conformance with California MUTCD section 3A, white markers shall be used if the island separates traffic of the same direction and yellow markers shall be used if the island separates traffic of opposite directions.
4. The minimum number of two-way reflective markers on the island nose, shall be five, with one at each beginning of curve and one at the mid point. The maximum distance between markers shall be 2 feet. Additional markers shall be installed to maintain this maximum allowable spacing. Additional markers shall be installed in such a way that the spacing between all markers is equal.
5. A Type Q marker per CA MUTCD fig. 2C-13 shall be installed at the midpoint of the island nose, surface mounted and just behind the island curb, as shown.
6. On median islands which separate traffic of the same direction, a W12-1 Double Arrow Sign shall be used in place of the R4-7.
7. Left Edge Line raised pavement markers shall be placed 6" from the median's face of curb, and shall be spaced 24' on center as shown above.

CITY OF ROHNERT PARK

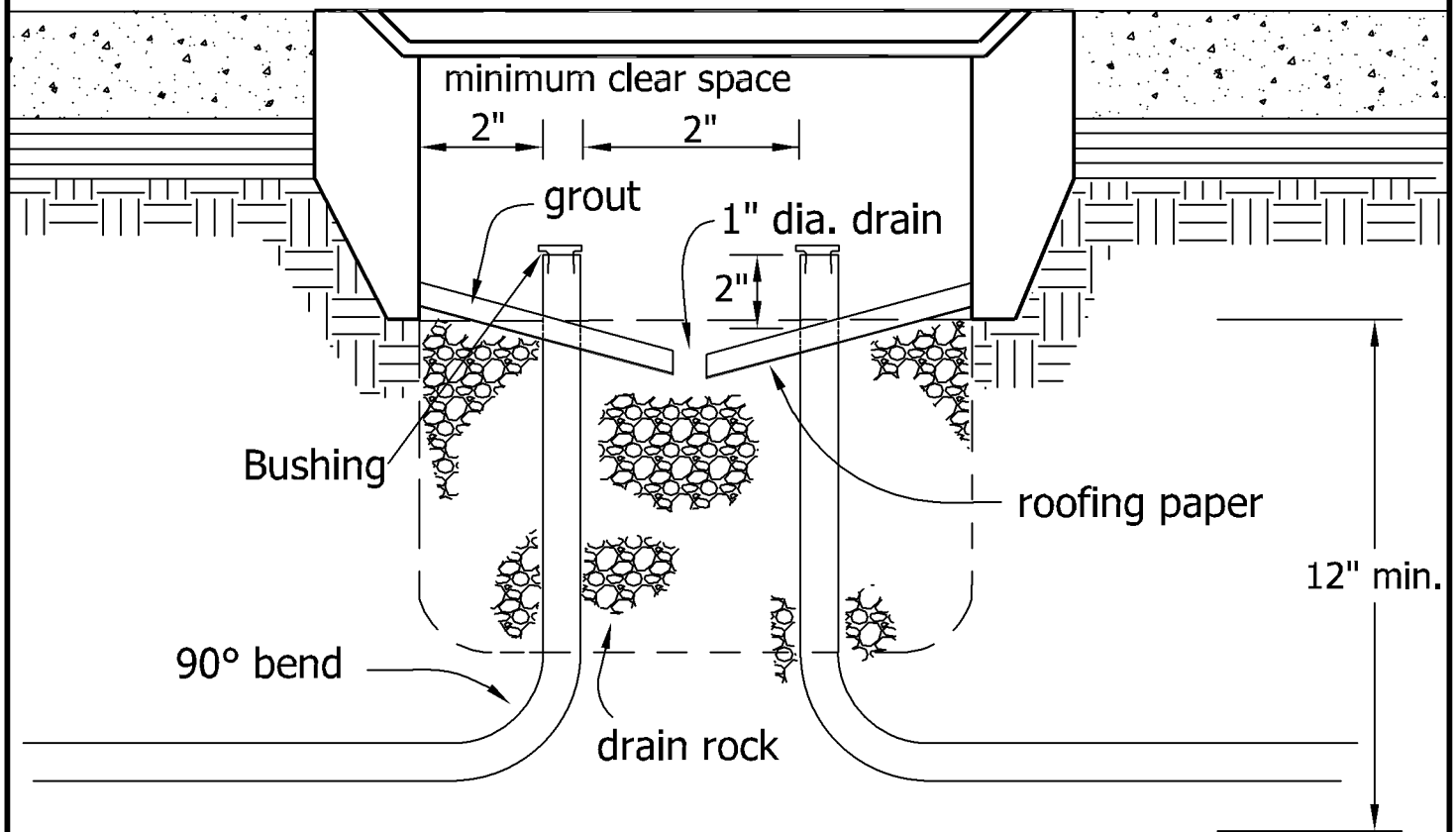
TRAFFIC MARKINGS MEDIAN ISLAND TREATMENT

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 721



NO. 5 CONCRETE PULLBOX

NOTES

1. This design is supplemental to the most current Caltrans plans and specifications.

CITY OF ROHNERT PARK

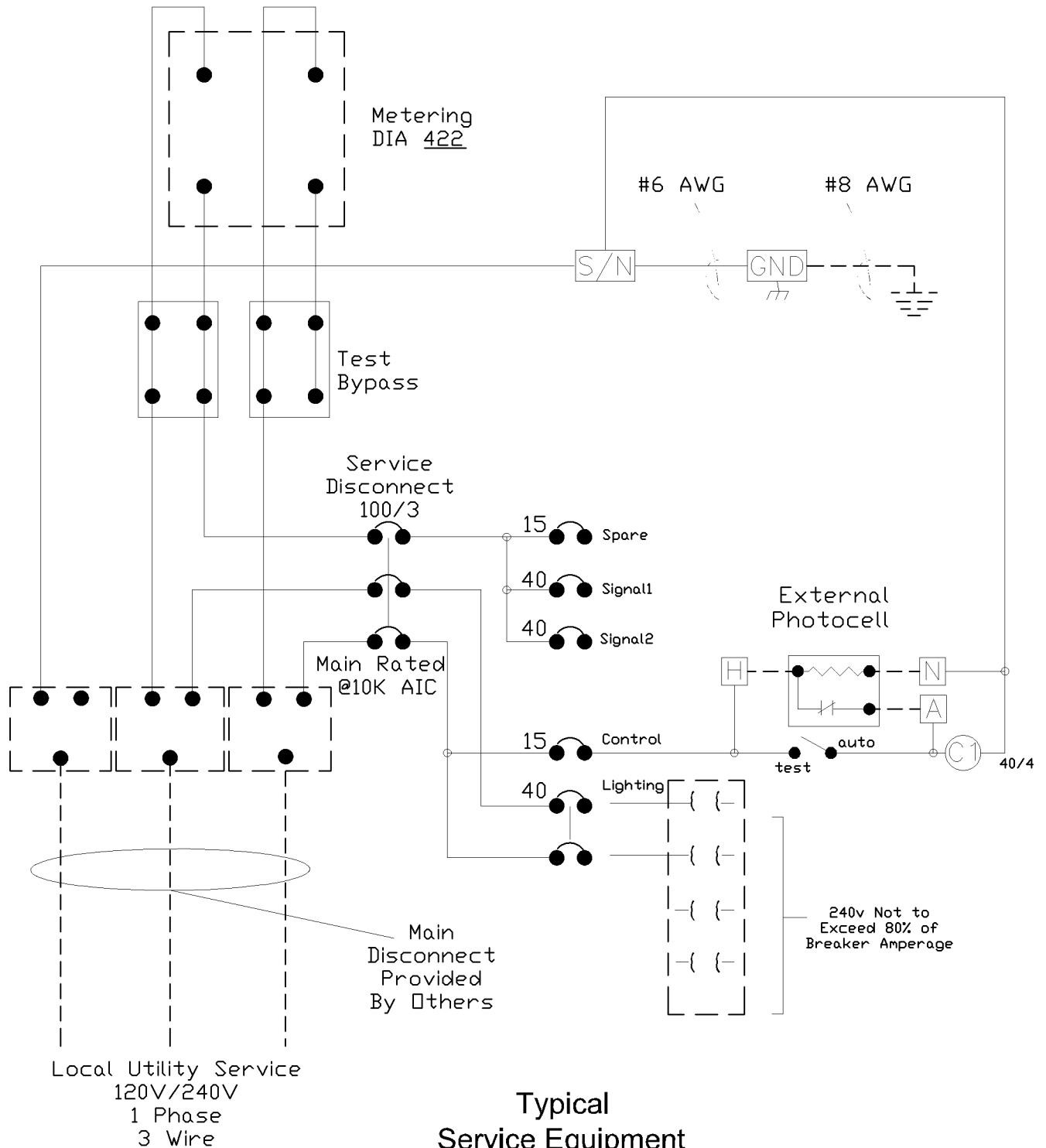
TRAFFIC SIGNALS PULL BOX INSTALLATION

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 730



Typical
Service Equipment
Wiring Diagram

NOTES

1 Spare to be used only when specified

2 Provide sufficient conductor length to connect to Serving Utility connection point either on pole or in U.G. vault. Check with Serving Utility for exact length

CITY OF ROHNERT PARK

TRAFFIC SIGNALS SERVICE WIRING DIAGRAM

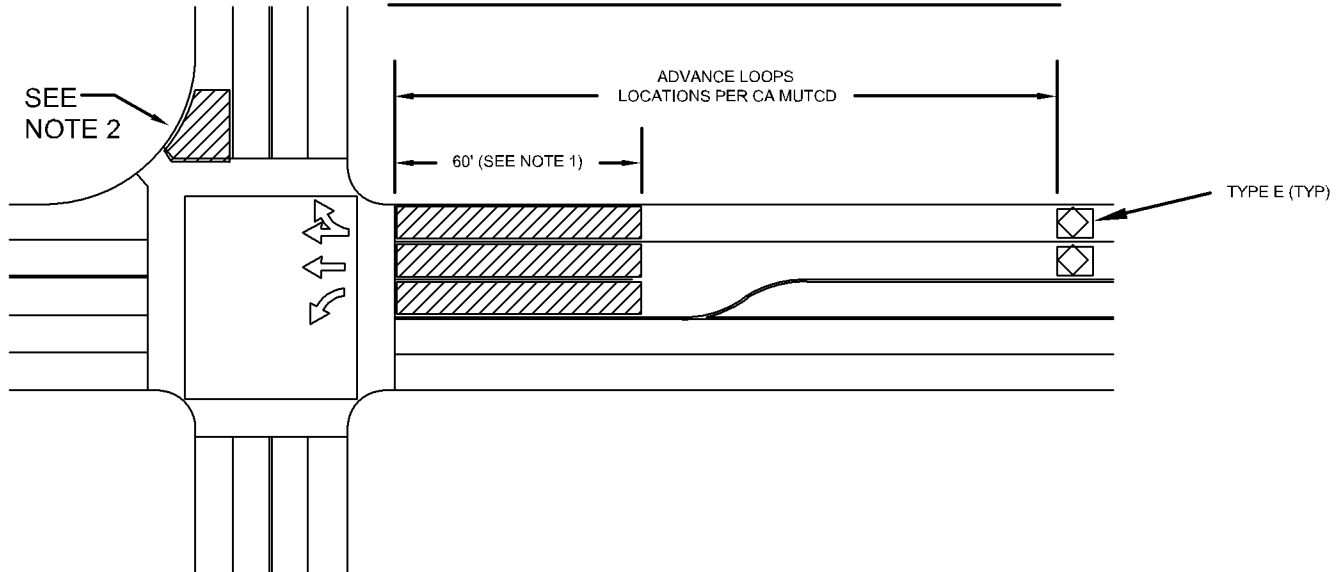
SCALE: NONE

DATE: MARCH 2014

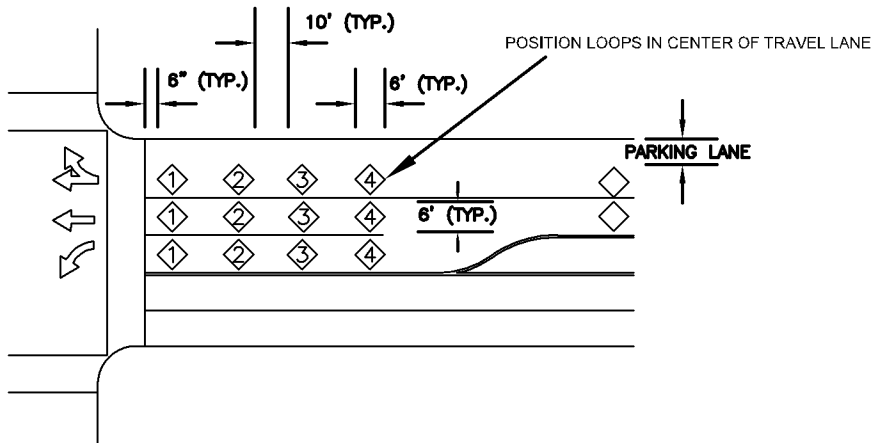
Approved:

STD. - 731

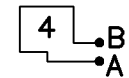
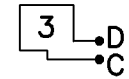
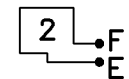
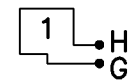
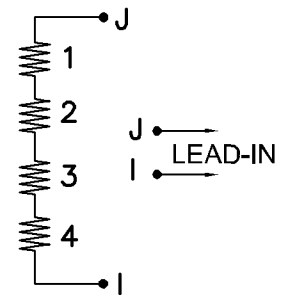
VIDEO DETECTION WITH ADVANCE LOOPS



LOOP DETECTORS



LOOP DETECTOR WIRING



PULL BOX CONNECTIONS

1. CONNECT J TO H
2. CONNECT G TO E
3. CONNECT F TO D
4. CONNECT C TO A
5. CONNECT B TO I

NOTES:

1. THE DETECTION ZONE SHOULD EXTEND TO THE FULL WIDTH OF THE TRAVEL LANE AND EXTEND 60 FEET FROM THE LIMIT LINE OR CROSSWALK, AS SHOWN IN THE DIAGRAM, UNLESS CONDITIONS AND/OR ENGINEERING JUDGEMENT SUGGEST OTHERWISE.
2. TYPICAL APPLICATION FOR LARGE RADIUS RIGHT TURN.
3. ADVANCE LOOPS SHALL BE INGROUND TYPE E LOOPS, INSTALLED PER STATE STANDARD SPECIFICATIONS AND PLANS.
4. LOOPS SHALL BE CENTERED IN TRAVEL LANE. PARKING LANE IS NOT TO BE CONSIDERED IN DETERMINING TRAVEL LANE WIDTH.
5. ADJACENT LOOPS ON THE SAME SENSOR UNIT CHANNEL SHALL BE WOUND IN OPPOSITE DIRECTIONS.
6. LOOPS IN ADJACENT LANES SHALL BE WOUND IN OPPOSITE CONFIGURATION.

CITY OF ROHNERT PARK

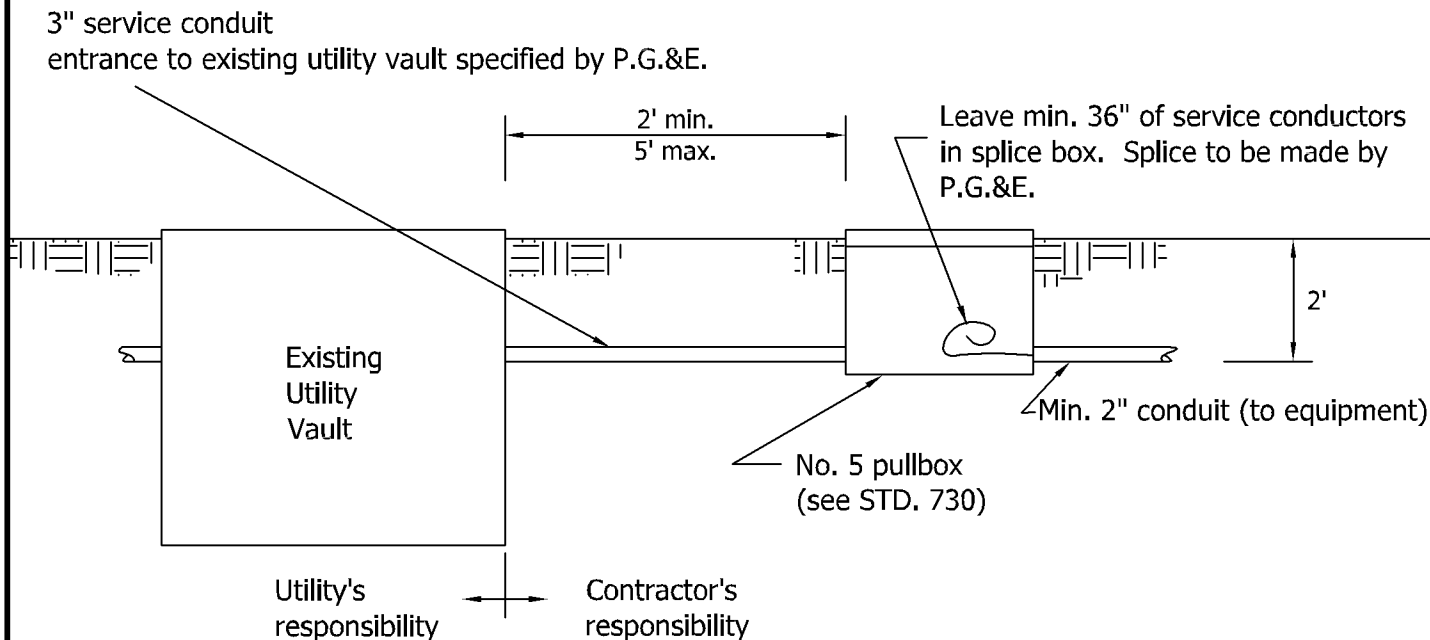
TRAFFIC SIGNALS DETECTION

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 732



UNDERGROUND SERVICE

NOTES:

1. Contractor to install conduit into utility company vault with utility company representative in attendance.
2. Contractor to install #5 pull box, 3" service conduit (when nonexistent), and 2" conduit with conductors from equipment to pull box.

CITY OF ROHNERT PARK

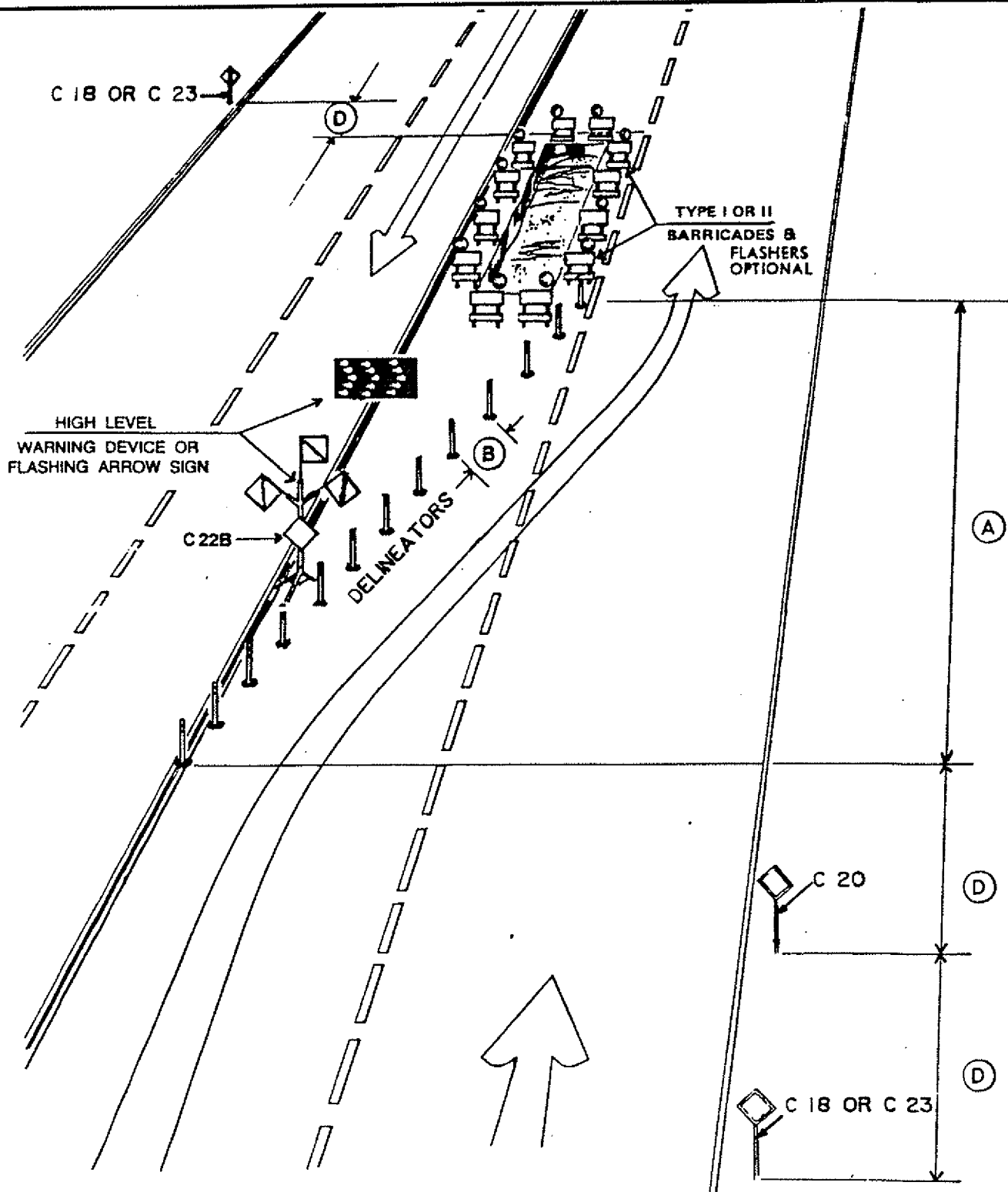
TRAFFIC SIGNAL UNDERGROUND ELECTRIC SERVICE

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 733A



NOTES:

1. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
LEFT LANE CLOSURE

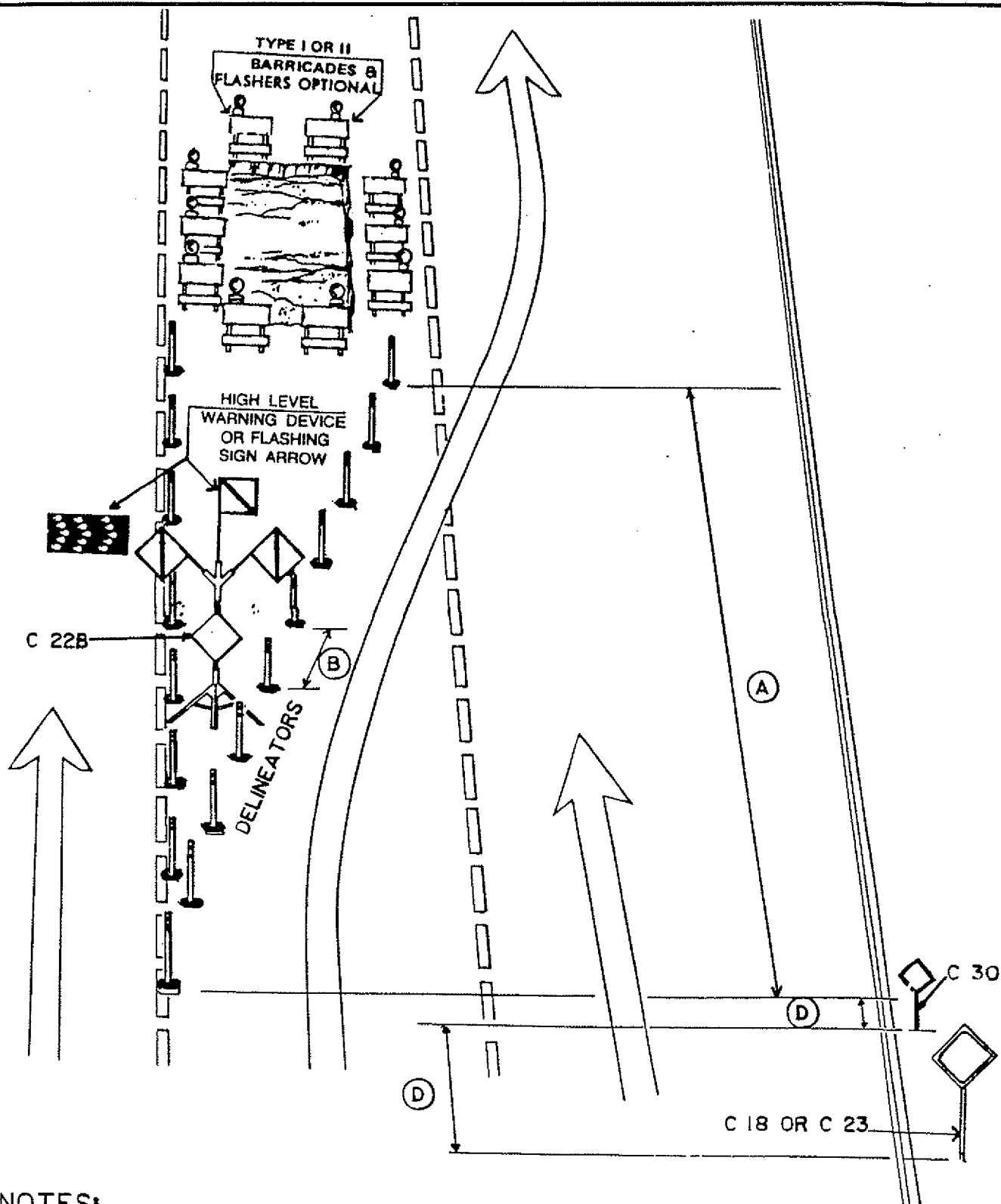
SCALE: NONE

DATE: JANUARY 2006

Approved:

Donna Schin

STD. - 740A



NOTES:

1. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
MIDDLE LANE CLOSURE

SCALE: NONE

DATE: JANUARY 2006

Approved:

Ramphubini

STD. - 740B

C 18 OR C 23

TYPE I OR II
BARRICADES &
FLASHERS OPTIONAL

WORK AREA

HIGH LEVEL
WARNING
DEVICE OR
FLASHING ARROW
SIGN

C 22B

DELINEATORS

C 18 OR
C23

NOTES:

1. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
RIGHT LANE CLOSURE

SCALE: NONE

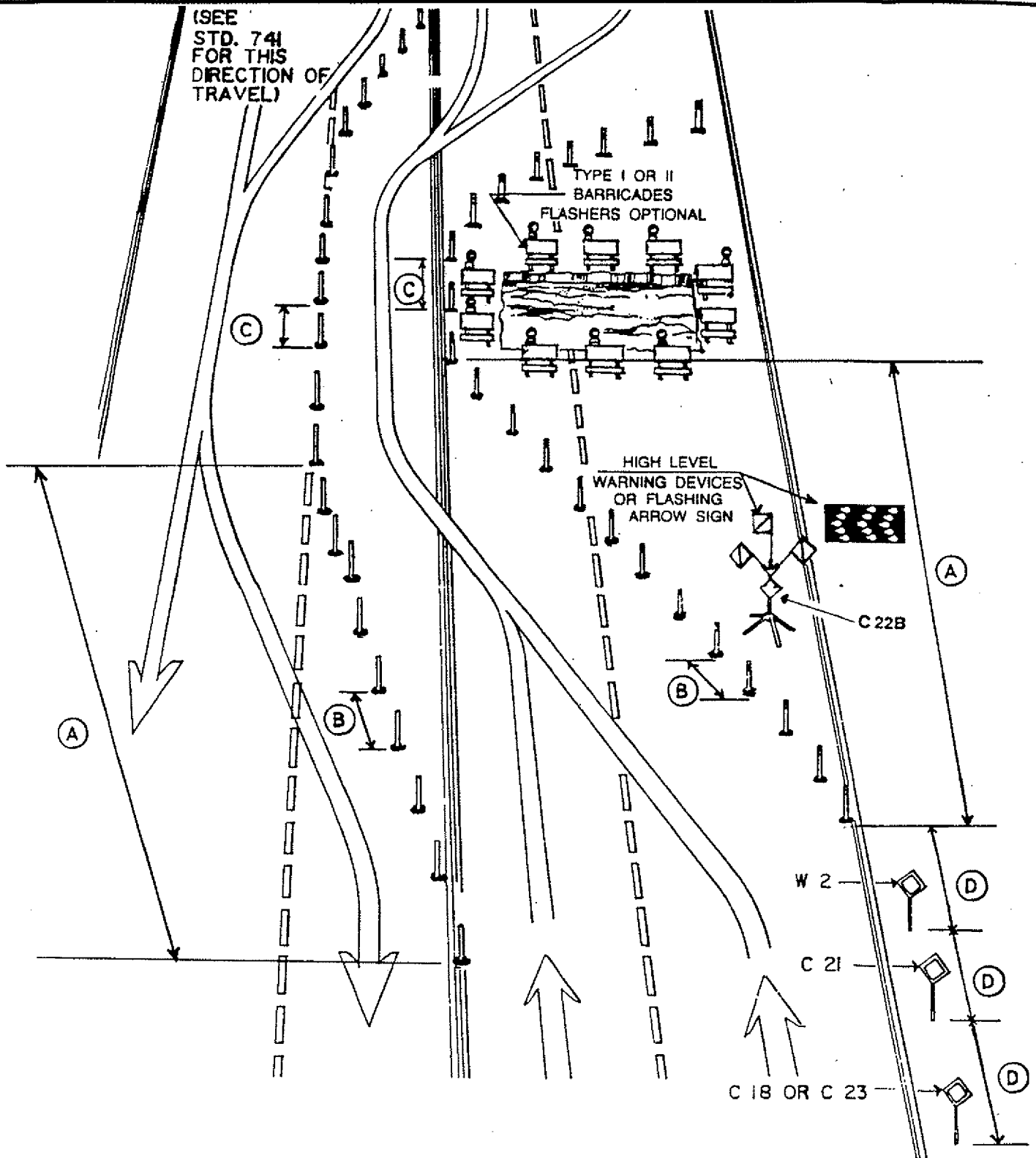
DATE: JANUARY 2006

Approved:

Dan Schir

STD. - 740C

(SEE
STD. 741
FOR THIS
DIRECTION OF
TRAVEL)



NOTES:

1. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITION
- (C) DELINEATOR SPACING-TANGENTS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL HALF-ROAD CLOSURE

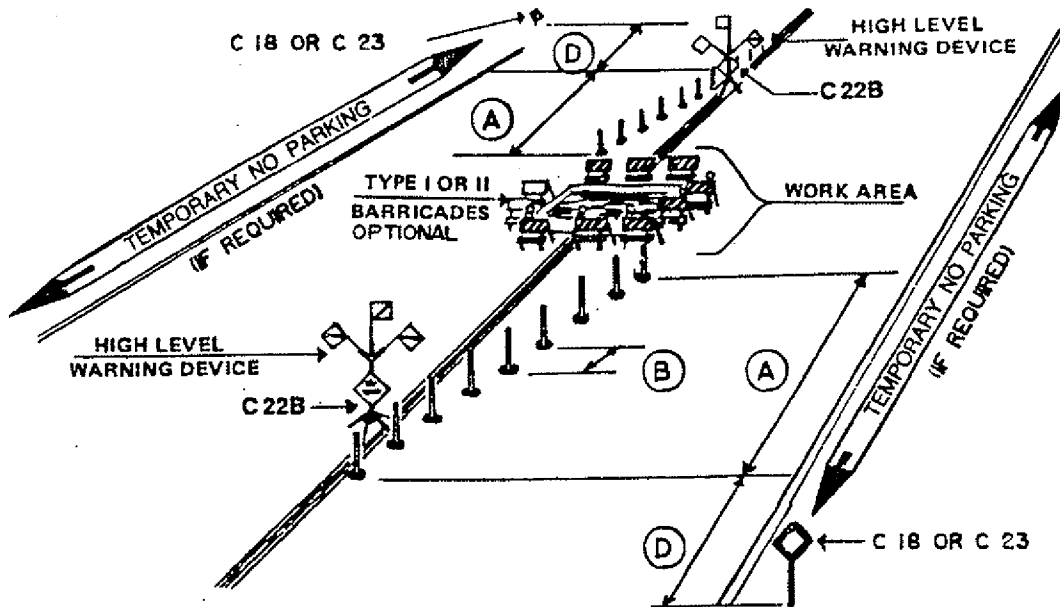
SCALE: NONE

DATE: JANUARY 2006

Approved:

[Signature]

STD. - 740D



NOTES:

I. SEE STD. 74I FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
WORK AREA CENTER OF STREET

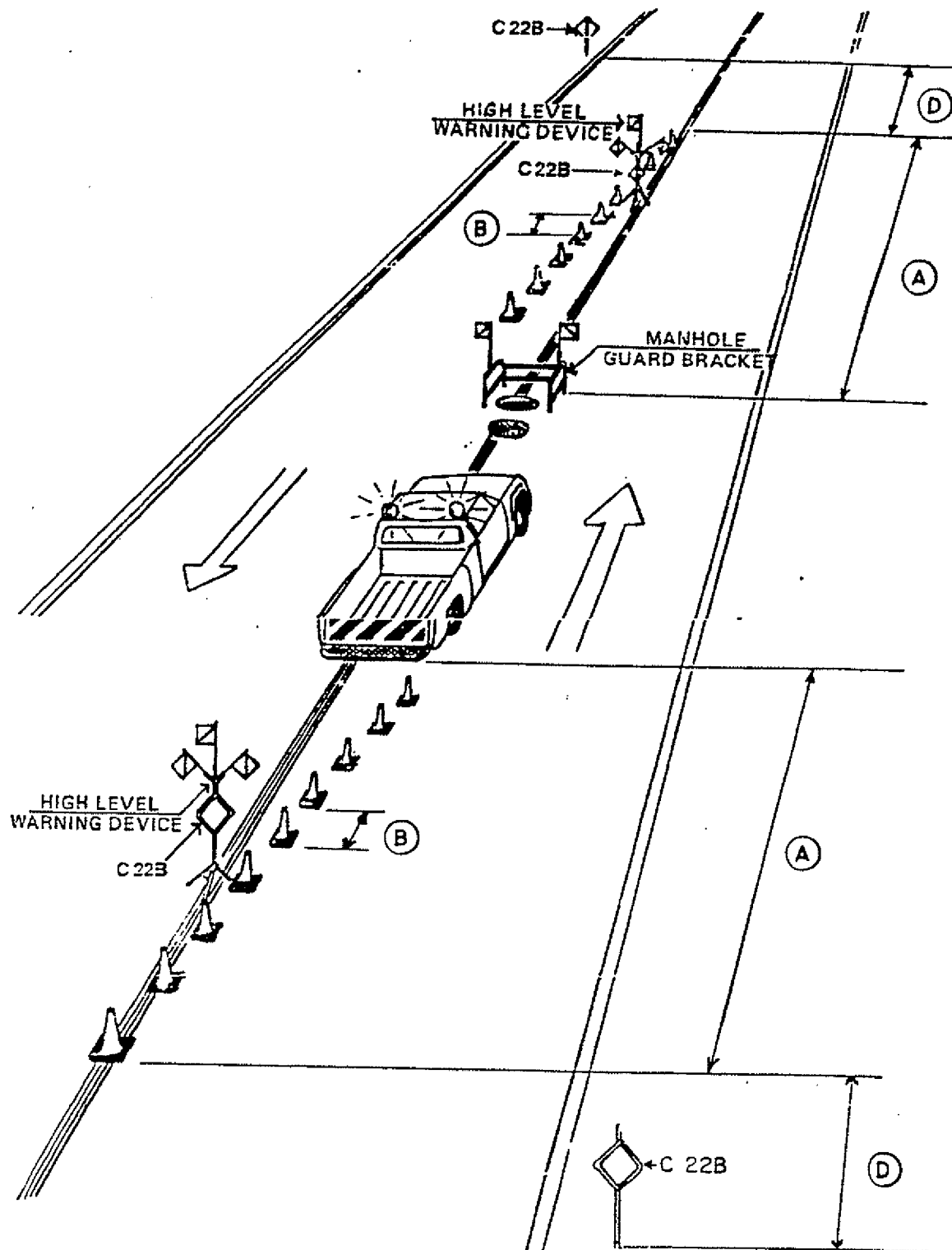
SCALE: NONE

DATE: JANUARY 2006

Approved:

Donna Johnson

STD. - 740E



NOTES:

1. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
MANHOLE ACCESS IN CENTER OF STREET

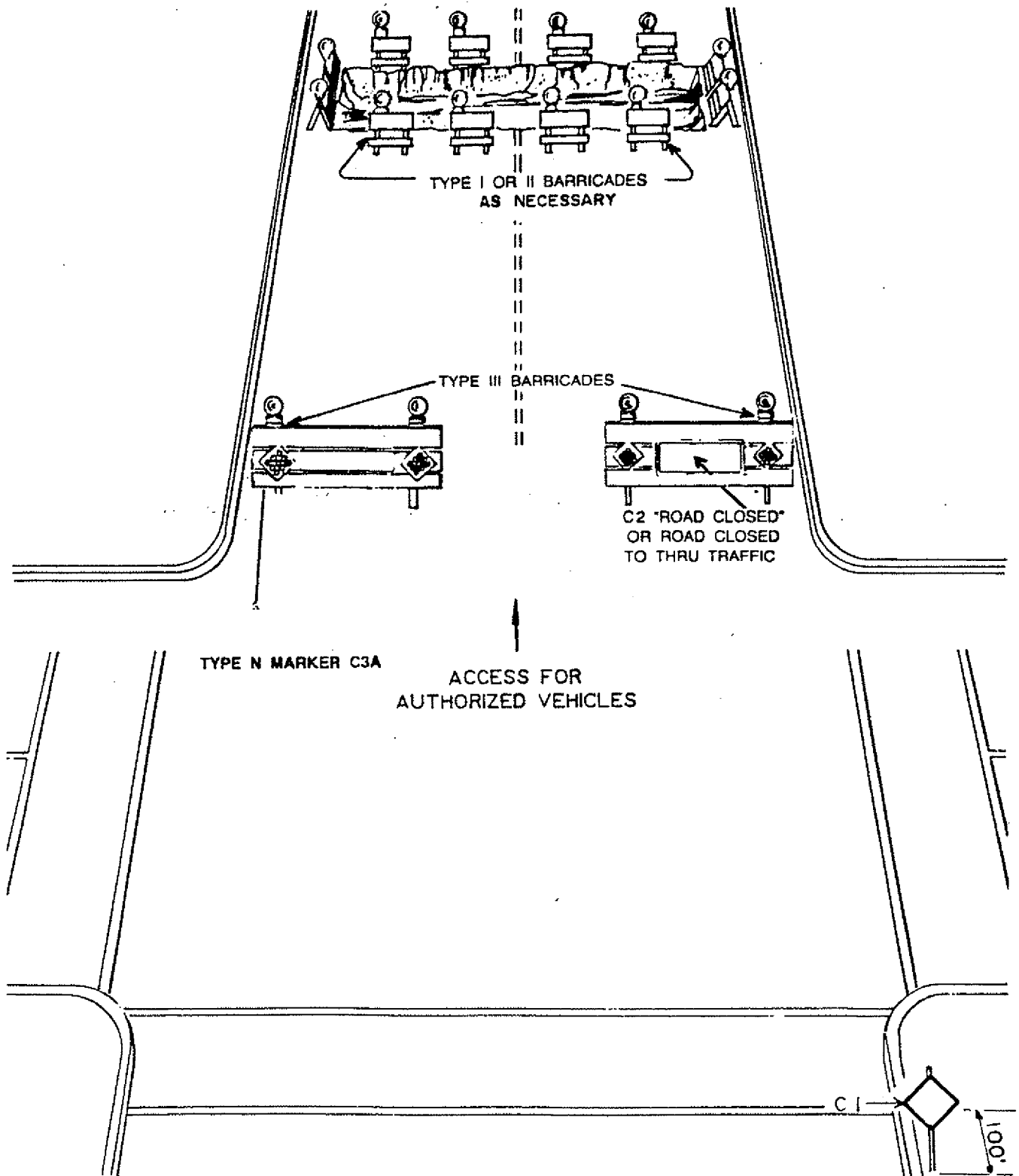
SCALE: NONE

DATE: JANUARY 2006

Approved:

Ram/John

STD. - 740F



CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL LOCAL STREET CLOSURE

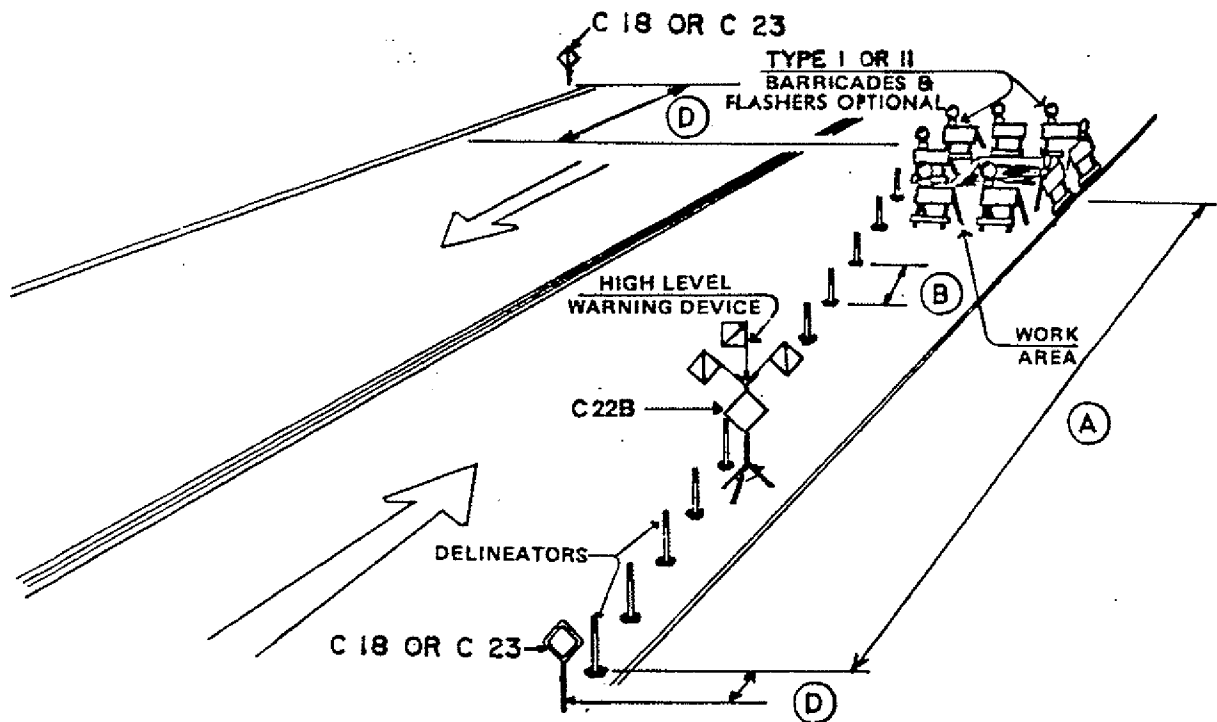
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Phillips

STD. - 740G



NOTES:

1. SEE STD. 741 FOR.

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITION.
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
WORK IN PARKING LANE OR SHOULDER

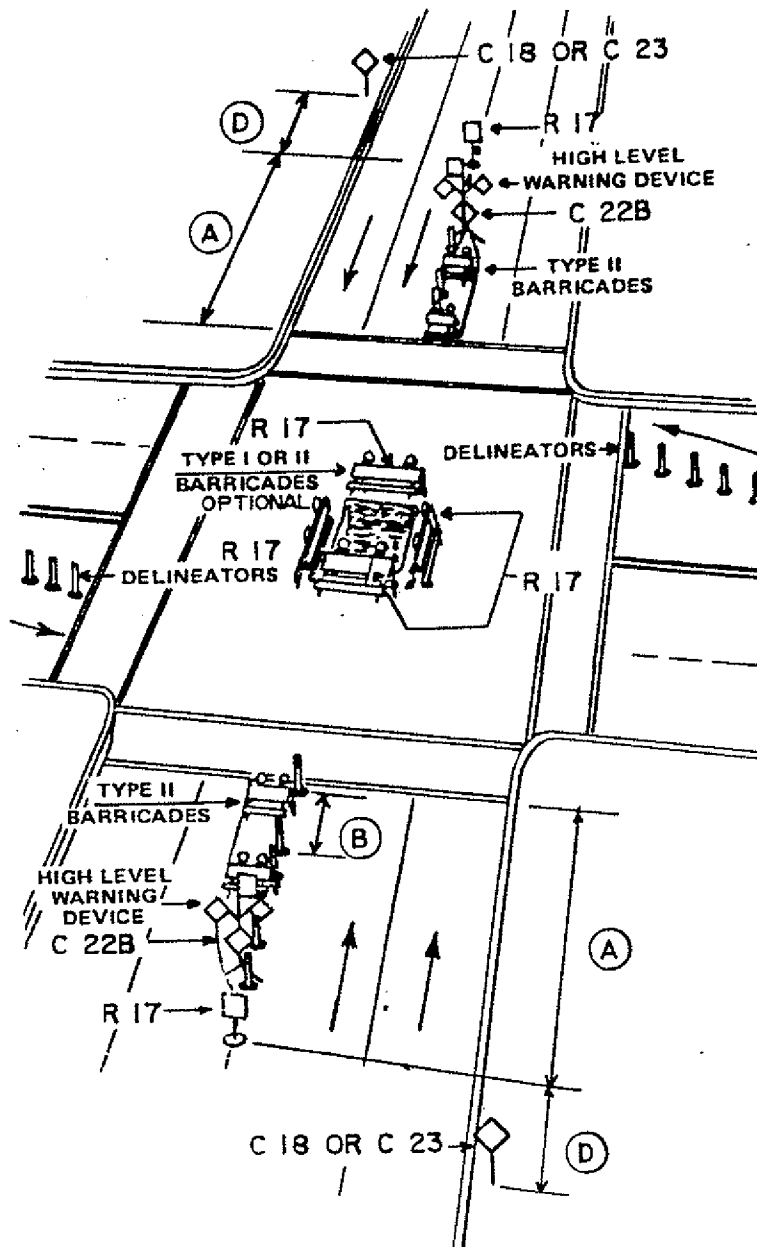
SCALE: NONE

DATE: JANUARY 2006

Approved:

[Signature]

STD. - 740H



NOTES:

I. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
WORK WITHIN INTERSECTION

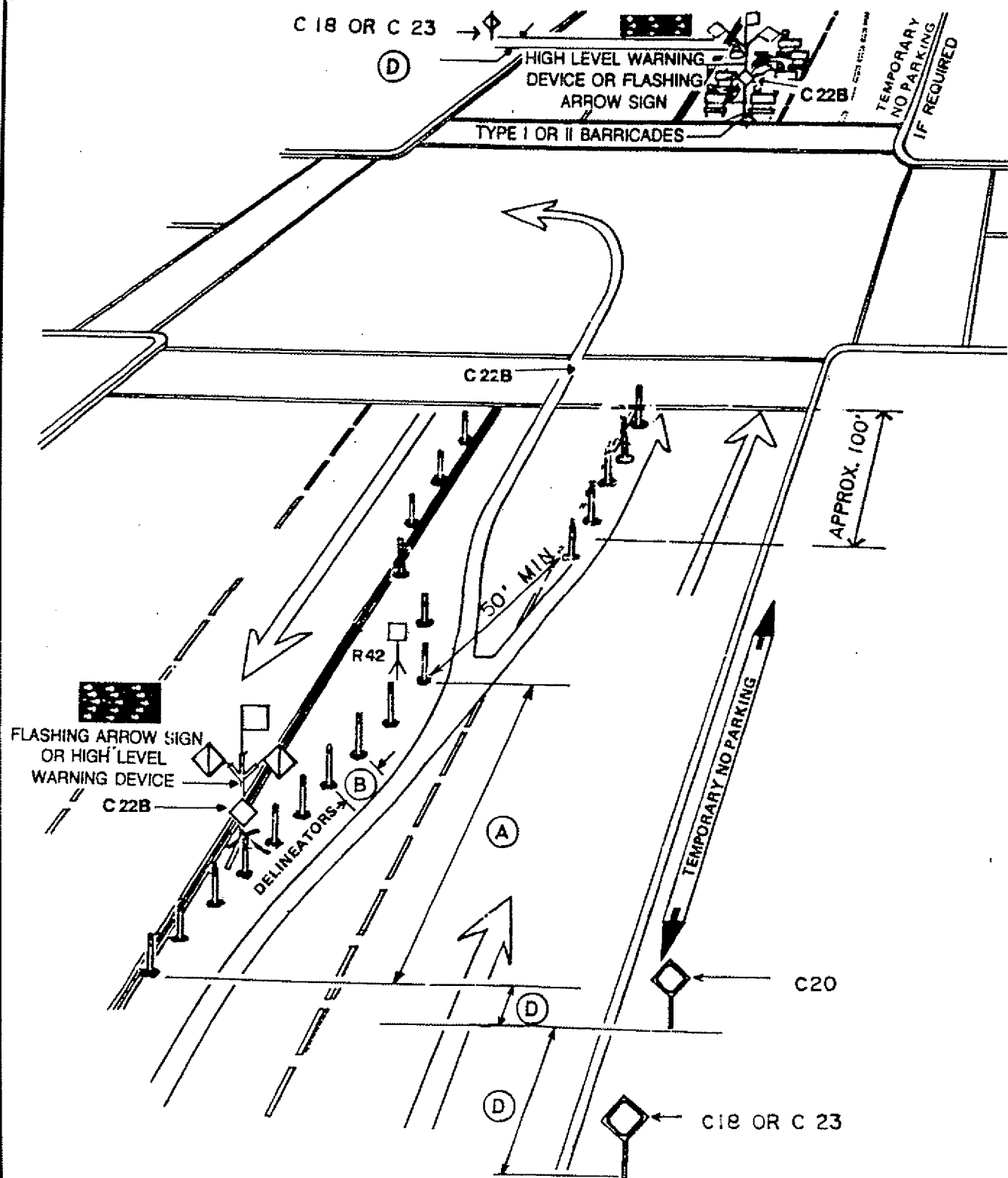
SCALE: NONE

DATE: JANUARY 2006

Approved:

[Signature]

STD. - 7401



NOTES:

1. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL WORK
BEYOND INTERSECTION LEFT LANE CLOSED

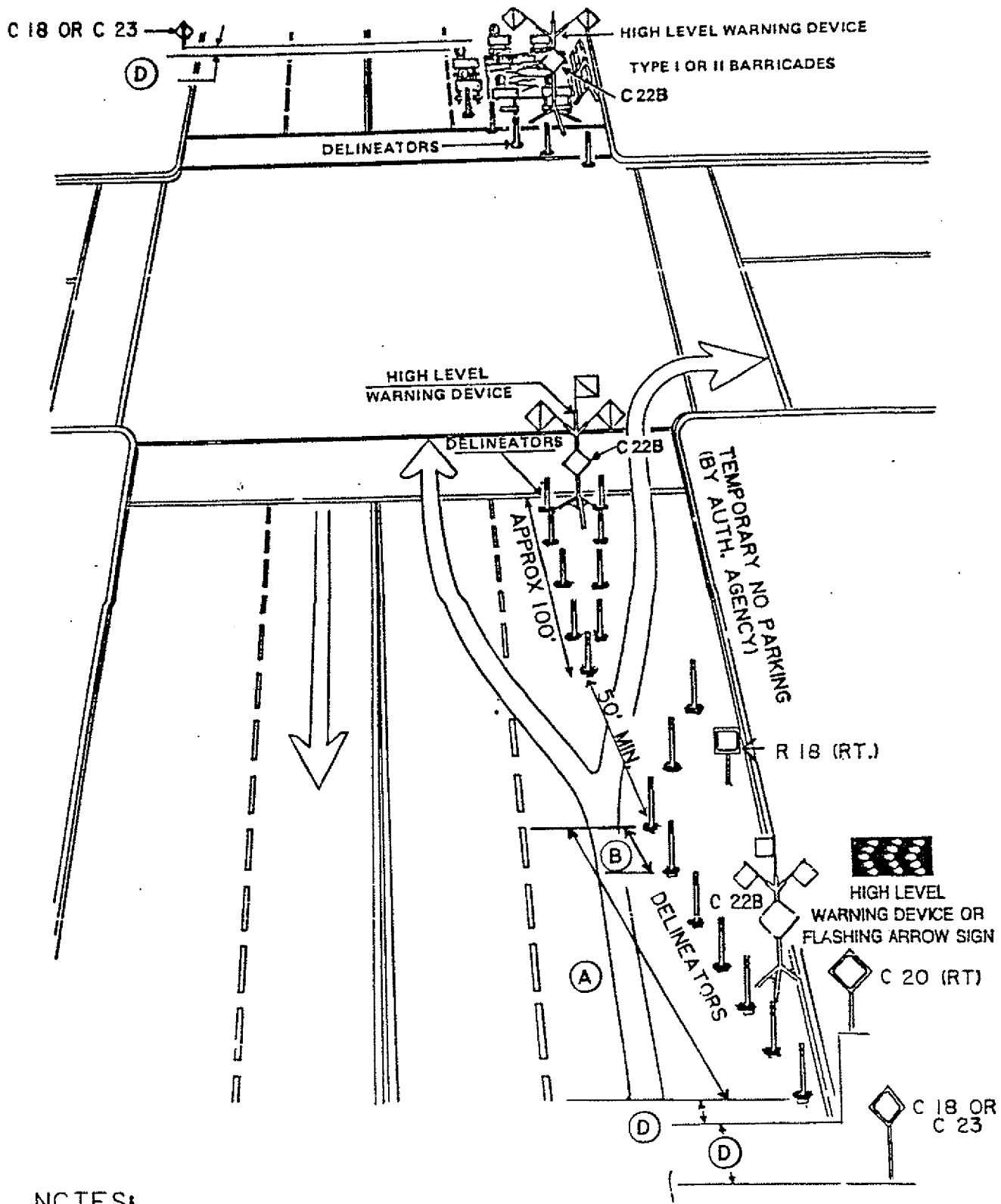
SCALE: NONE

DATE: JANUARY 2006

Approved:

Ram/John

STD. - 740J



NOTES:

1. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL WORK
BEYOND INTERSECTION RIGHT LANE CLOSURE

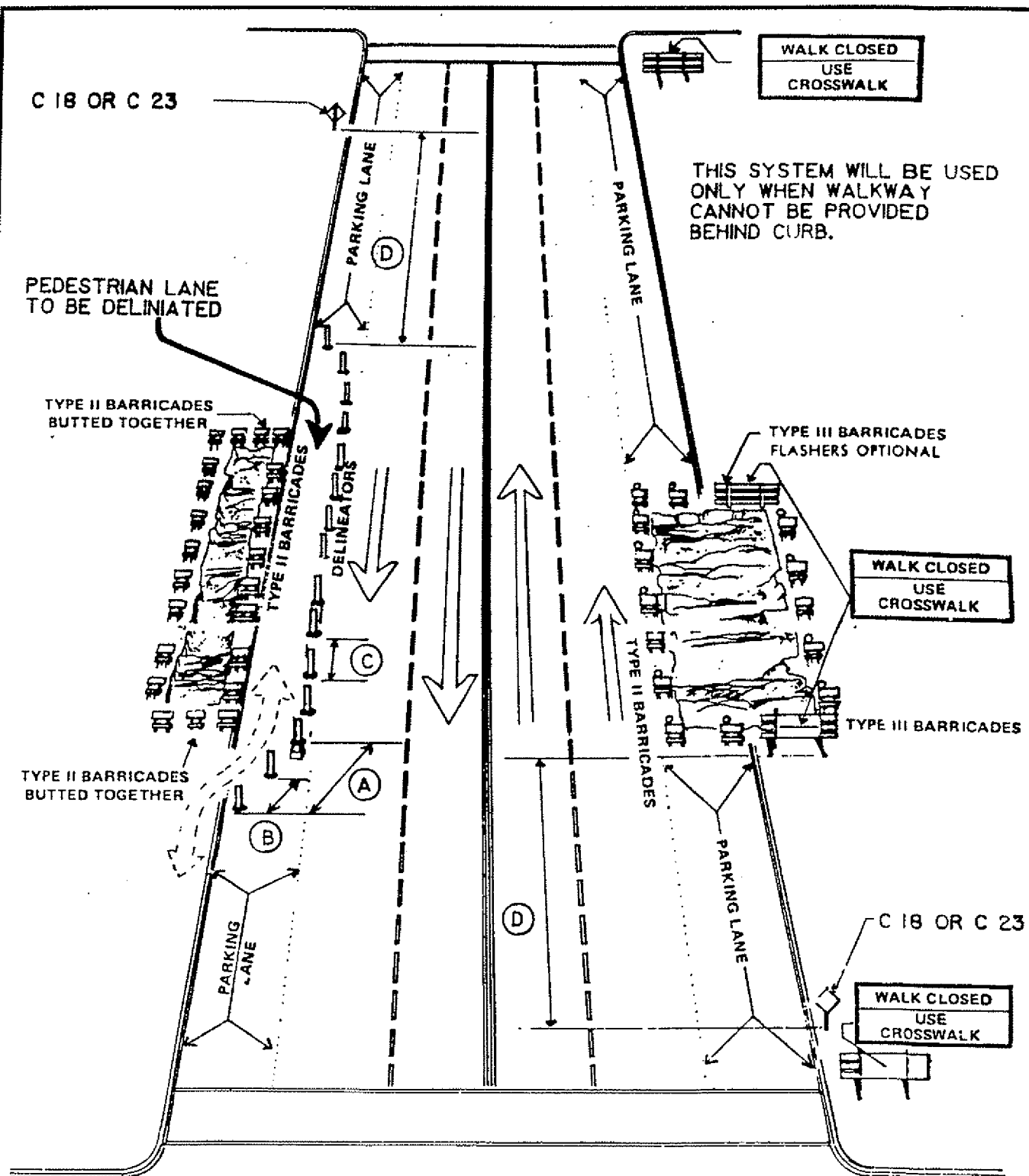
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Fubini

STD. - 740K



NOTES

I. SEE STD. 741 FOR:

- (A) TAPER LENGTH
- (B) DELINEATOR SPACING-TRANSITIONS
- (C) DELINEATOR SPACING-TANGENTS
- (D) SIGN SPACING

CITY OF ROHNERT PARK

WORK AREA TRAFFIC CONTROL
PEDESTRIAN CONTROL

SCALE: NONE

DATE: JANUARY 2006

Approved:

Pamela

STD. - 740L

TRAFFIC SPEED	TAPER LENGTH (EACH LANE)	DELINEATOR SPACING		SIGN SPACING (ADVANCE OF TAPER AND BETWEEN SIGNS)
	(A)	(B) (TRANSITION)	(C) (TAPER)	(D)
25 MPH	150 FT	25 FT	50 FT	150 FT
30 MPH	200 FT	30 FT	60 FT	200 FT
35 MPH	250 FT	35 FT	70 FT	250 FT
40 MPH	350 FT	40 FT	80 FT	350 FT
45 MPH	550 FT	45 FT	90 FT	550 FT
50 MPH	600 FT	50 FT	100 FT	600 FT
55 MPH	700 FT	50 FT	100 FT	700 FT

MINIMUM DELINEATOR AND SIGN SPACING

CITY OF ROHNERT PARK

**WORK AREA TRAFFIC CONTROL
DELINEATION AND SIGN PLACEMENT**

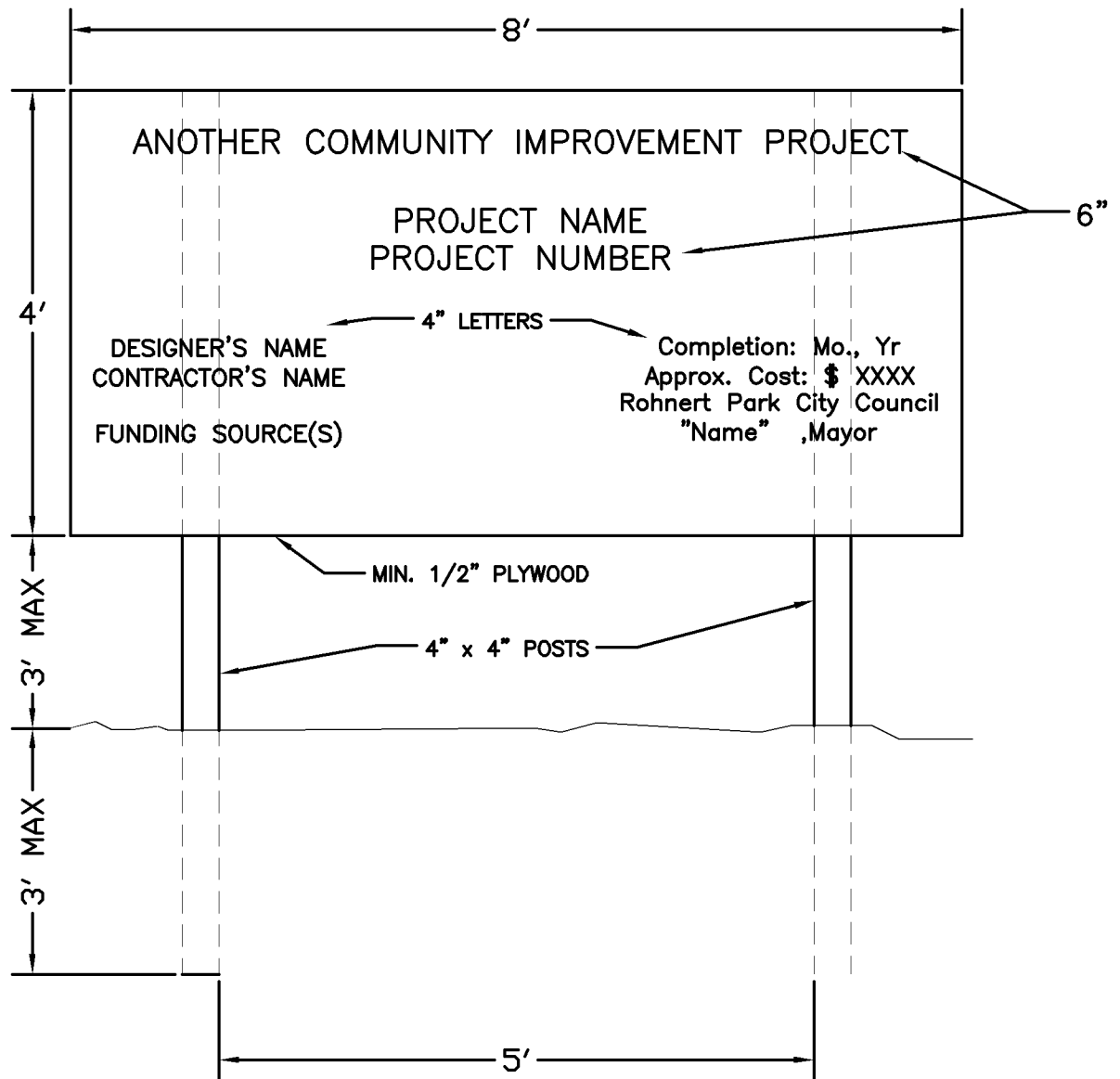
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Johnson

STD. - 741



1. USE APPROPRIATE LETTER THICKNESS.
2. WORDING AND SIGN LOCATION SHALL BE APPROVED BY THE CITY ENGINEER
3. BLUE LETTERS ON YELLOW SIGN

CITY OF ROHNERT PARK

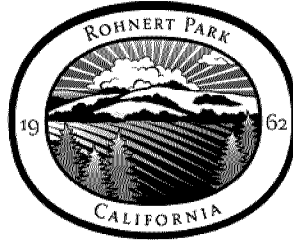
PROJECT SIGN

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 742

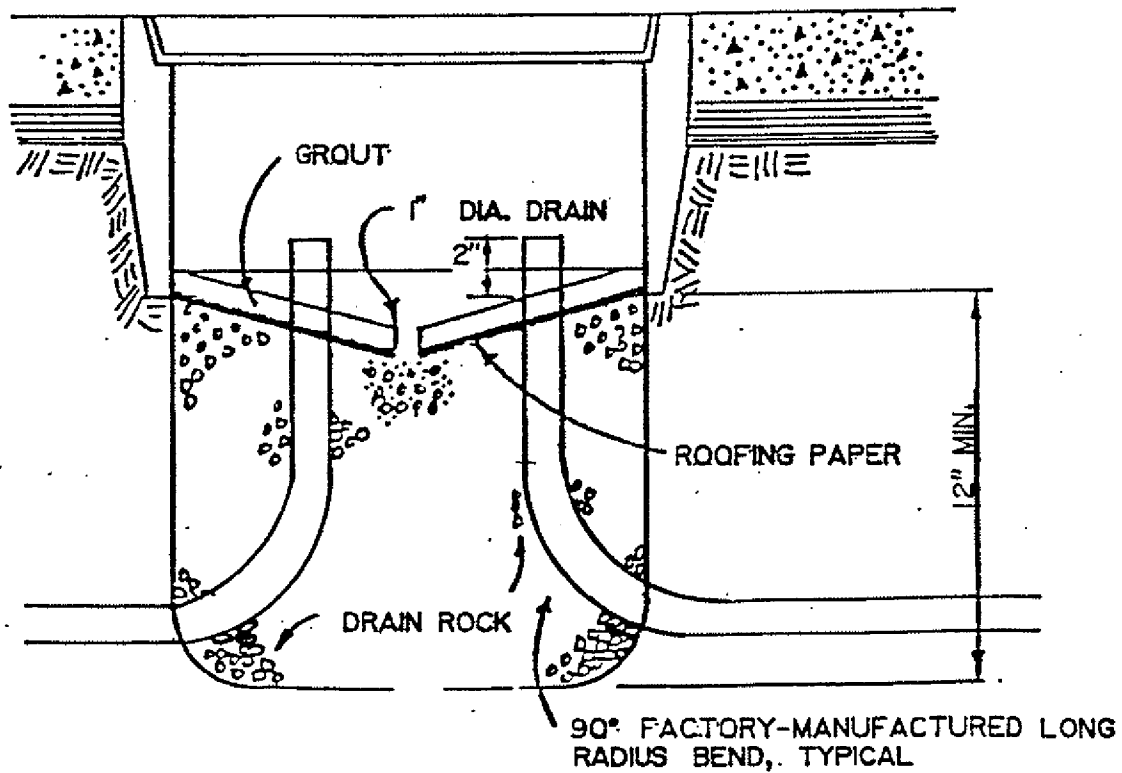


City of Rohnert Park

Street Lighting Detail Drawings

STREET LIGHTING DETAIL DRAWINGS

<u>Standard Number</u>	<u>Title</u>	<u>Date Approved</u>
600 Series		
601	Pull Box Installation	2006
602	Street Light Standard Wiring Diagram	2006
603A	Electrical Service Detail – Underground Service	2006
603B	Reserved	2014
604	Lateral Light Distribution	2006
Poles		
610	Street Lights – Major Streets	2014
611	Street Lights – Collector Streets	2014
612	Street Lights – Minor Streets	2014
613	Reserved	2006
614	Reserved	2014
615	Reserved	2014
616	Reserved	2006
617	Reserved	2014
618	Decorative Street Lights City Center Area	2006
Bases and Trenching		
620A	Concrete Footing & Base Detail – Cobra Style Street Light Pole	2014
620B	Concrete Footing & Base Detail – Decorative Street Light Pole	2014
620C	RESERVED	
621	Street Light Base Leveling Detail	2006
625	Joint Trench Layout for Street Light Conduit	2006



NO. 5 CONCRETE PULLBOX.

NOTES:

- I. PULLBOX COVERS SHALL BE BOLTED AND INSCRIBED "STREET LIGHTING".

CITY OF ROHNERT PARK

PULL BOX INSTALLATION NO. 5 PULL BOX

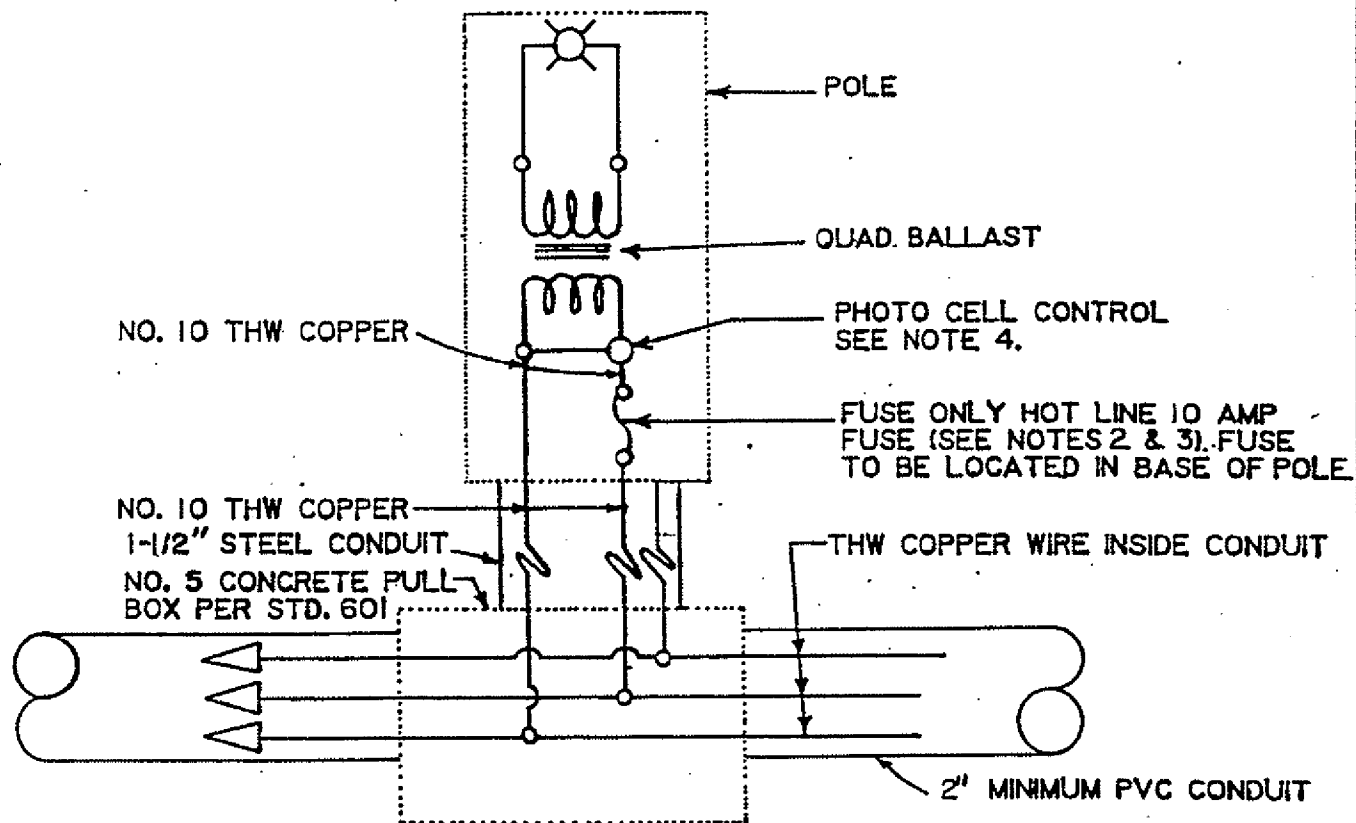
SCALE: NONE

DATE: JANUARY 2006

Approved:

Damian

STD. - 601



SCHEMATIC STREET LIGHT
WIRING DIAGRAM

NOTES:

1. 600V 30A IN-LINE WATERPROOF FUSE HOLDER SHALL BE USED.
2. IF THE OPTIONAL DECORATIVE LUMINAIRE PER STD. 613 IS USED, THE IN-LINE FUSE SHALL BE LOCATED IN THE ADJACENT PULL BOX.

CITY OF ROHNERT PARK

STREET LIGHT
STANDARD WIRING DIAGRAM

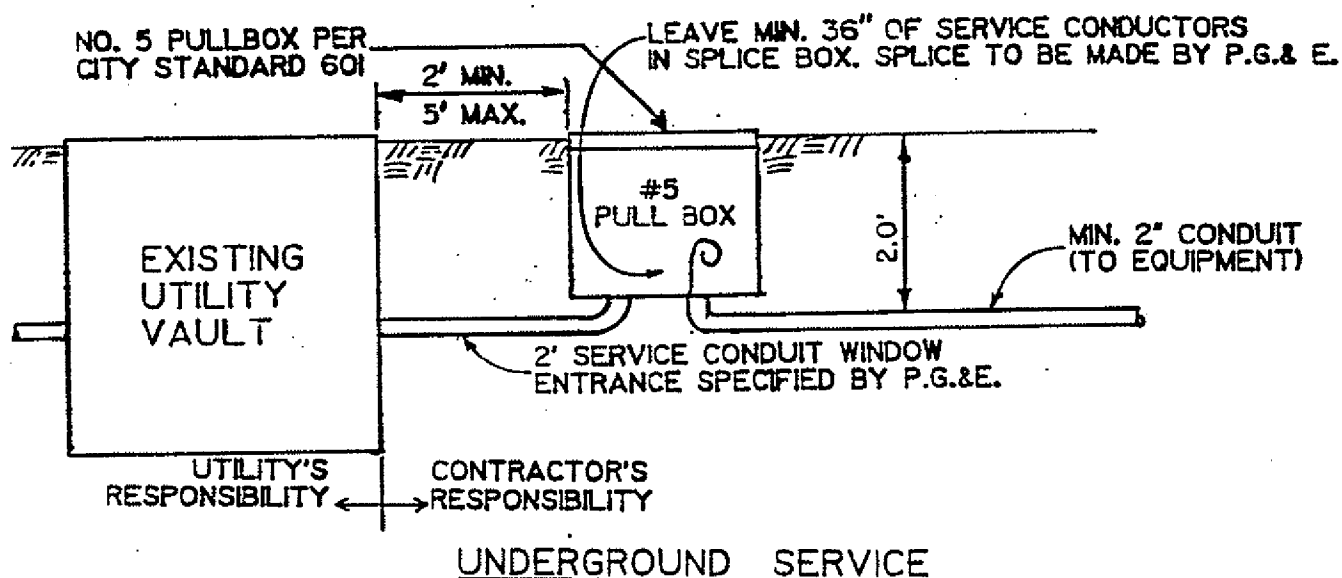
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Sullivan

STD. - 602



NOTES:

1. CONTRACTOR TO INSTALL CONDUIT INTO UTILITY CO. VAULT WITH UTILITY CO. REPRESENTATIVE IN ATTENDANCE.
2. CONTRACTOR TO INSTALL #5 PULL BOX AND 2" SERVICE CONDUIT (WHEN NONEXISTENT) AND 2" CONDUIT AND CONDUCTORS FROM EQUIPMENT TO PULL BOX.
3. CONDUIT AND CONDUCTOR SPLICE BOX ON SHORT SIDE, NO LONG SIDE OR BOTTOM ENTRY PERMITTED.

CITY OF ROHNERT PARK

ELECTRIC SERVICE DETAIL UNDERGROUND SERVICE

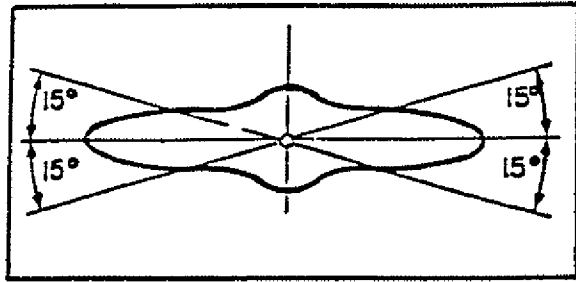
SCALE: NONE

DATE: JANUARY 2006

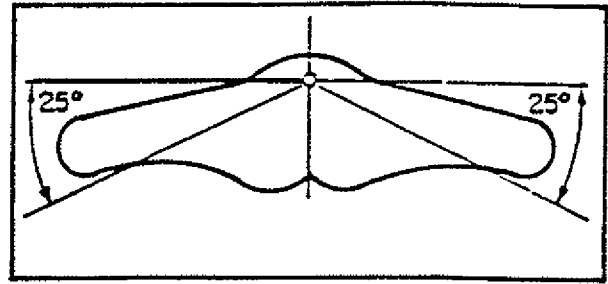
Approved:

Dennis H. H. H.

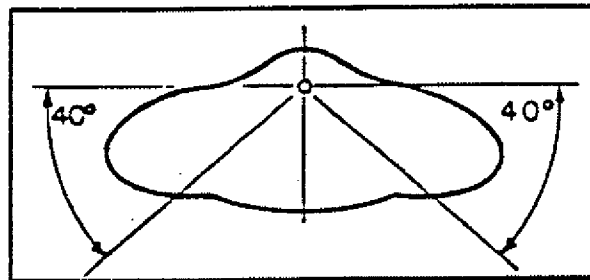
STD. - 603A



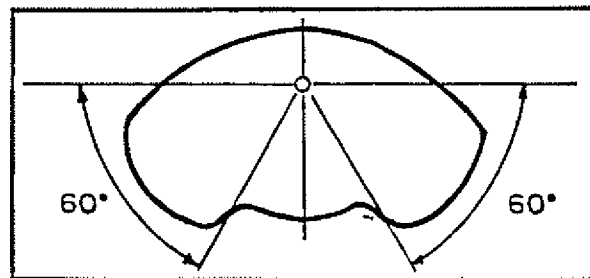
TYPE 1
CENTER OF STREET



TYPE 2
SIDE OF STREET



TYPE 3
SIDE OF STREET



TYPE 4
SIDE OF STREET

CITY OF ROHNERT PARK

LATERAL LIGHT DISTRIBUTION

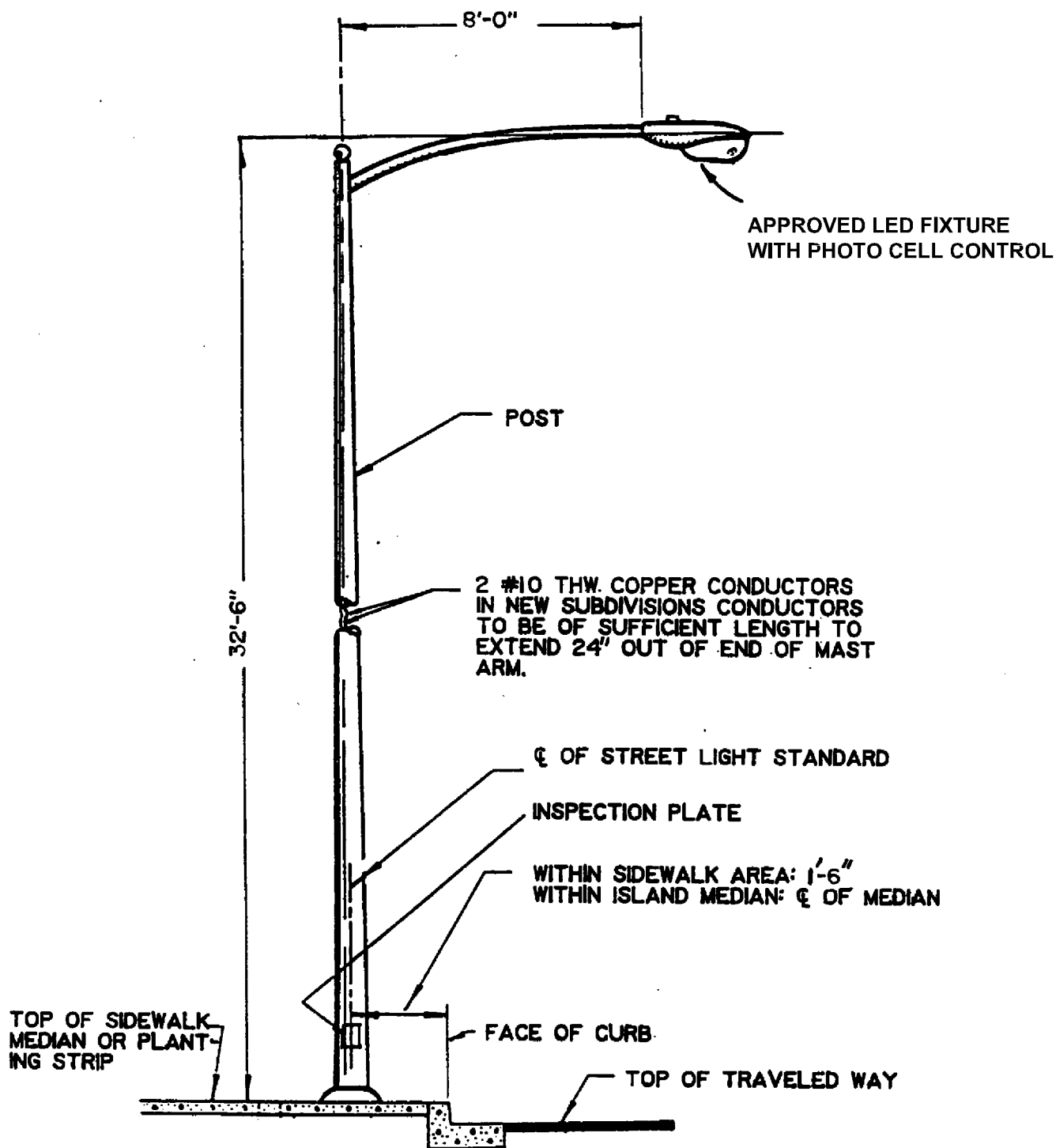
SCALE: NONE

DATE: JANUARY 2006

Approved:

Domestic

STD. - 604



NOTES:

1. FOR BASE DETAIL, SEE STD. 620A.
2. MINIMUM CLEARANCE OF 48-INCHES FROM
BACK OF SIDEWALK REQUIRED.

CITY OF ROHNERT PARK

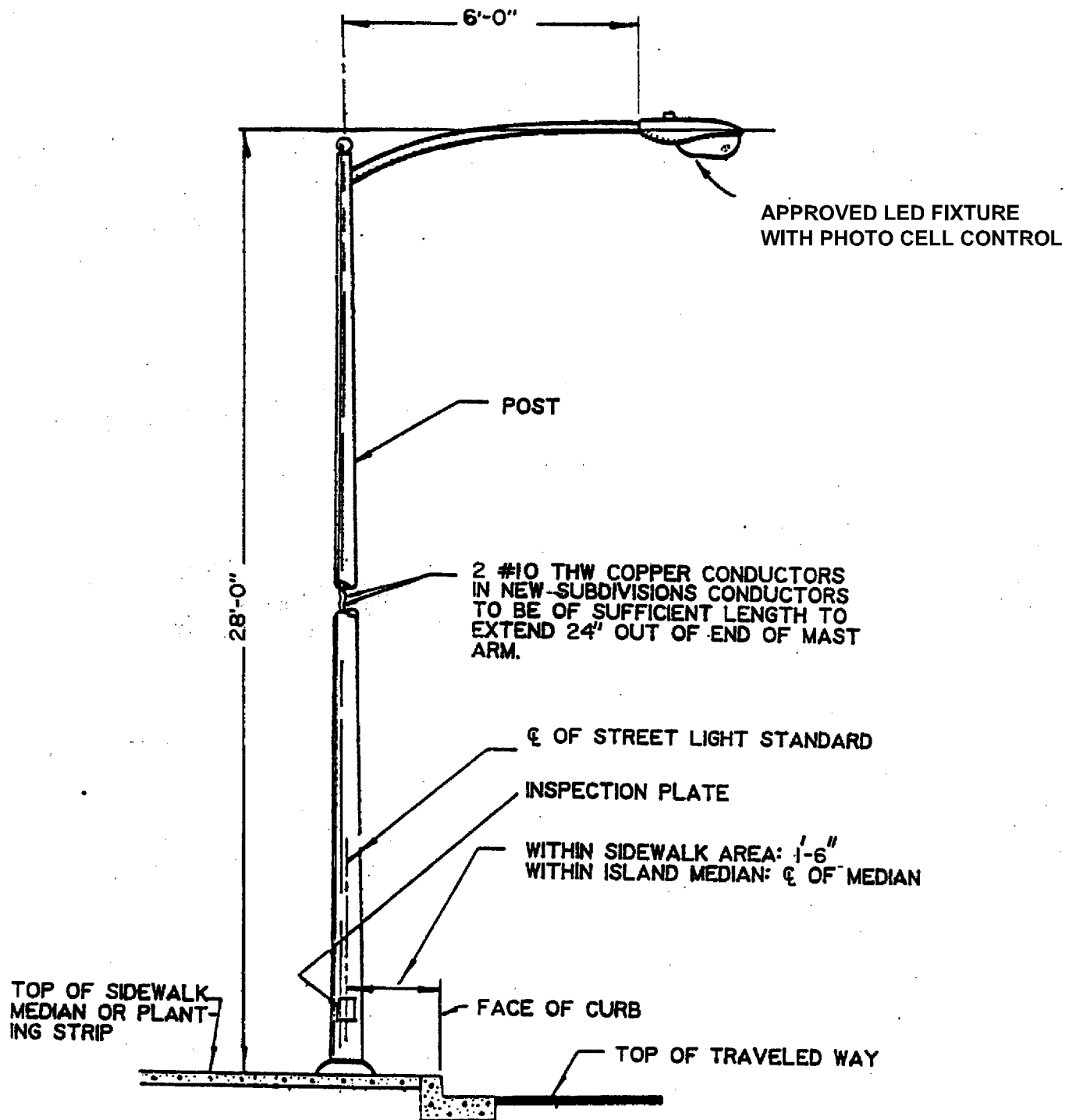
STREET LIGHTS MAJOR STREETS COBRA STYLE

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 610



NOTES:

1. FOR BASE DETAIL, SEE STD. 620A.
2. MINIMUM CLEARANCE OF 48-INCHES
FROM BACK OF SIDEWALK REQUIRED.

CITY OF ROHNERT PARK

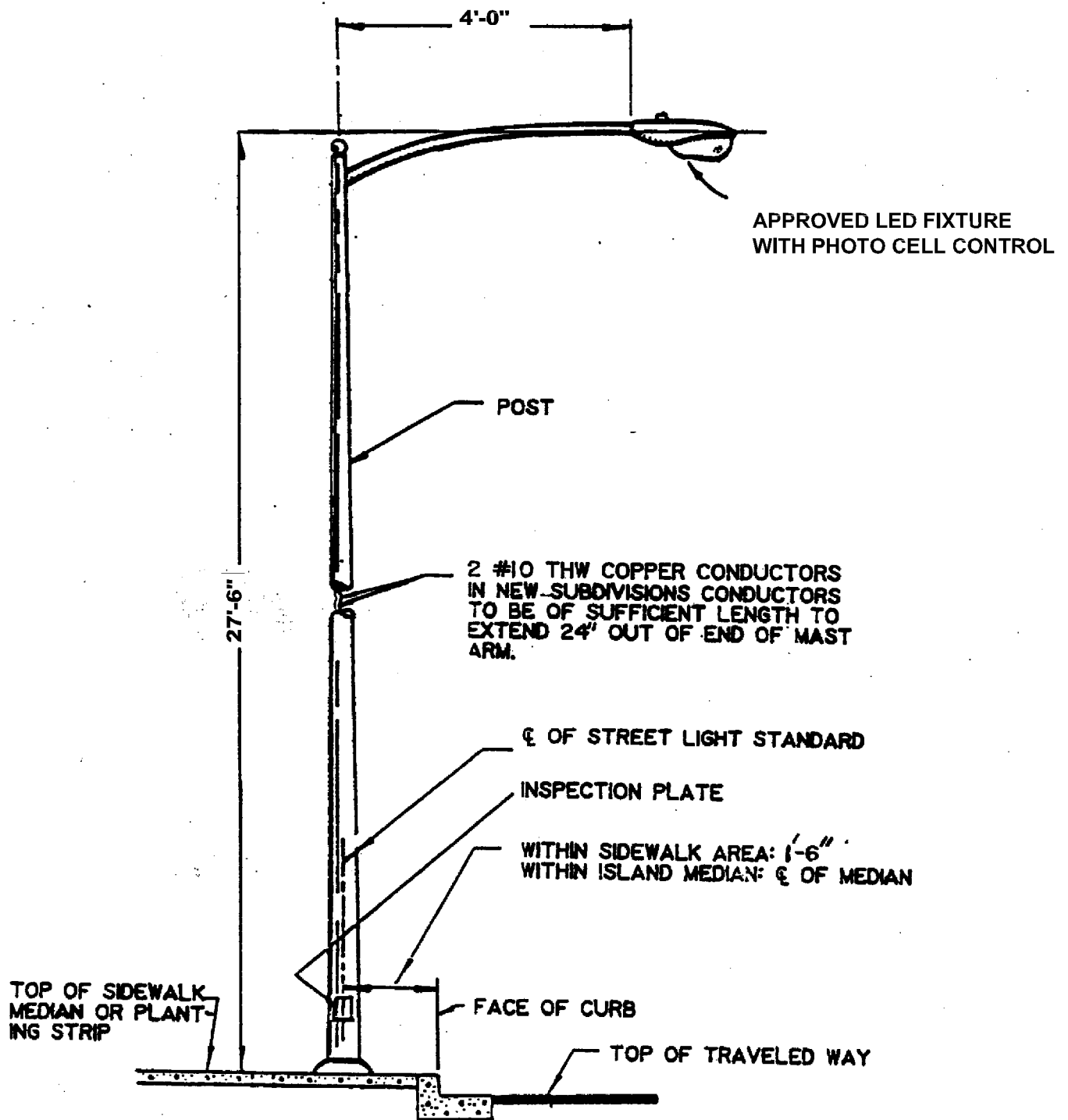
STREET LIGHTS COLLECTOR STREETS COBRA STYLE

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 611



NOTES:

1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER BY VARIANCE.
2. FOR BASE DETAIL, SEE STD. 620A.

CITY OF ROHNERT PARK

**STREET LIGHTS
MINOR STREETS**

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 612

-

Hood:

Luminaire Description:

Post Description:

Base Cover:

-2x4 INCH REINFORCED
HAND HOLE

ANCHOR BOLT PROTECTION

12.0 IN
305 mm

18.0 IN
457 mm
BC6-4 ONLY

3.75 IN.

-CONCRETE FOOTING
BY OTHERS

GROUT UNDER
ENTIRE BASE

-ACCESS
COVER

7" BOLT CIRCLE:
4 LOCATIONS
90° APART

STREET
SIDE

9
DIA.

BOTTOM VIEW
(INDICATES POLE IS LAYING DOWN
WITH HANDLE FACING UP)

CITY OF ROHNERT PARK

DECORATIVE STREET LIGHTS
CITY CENTER AREA

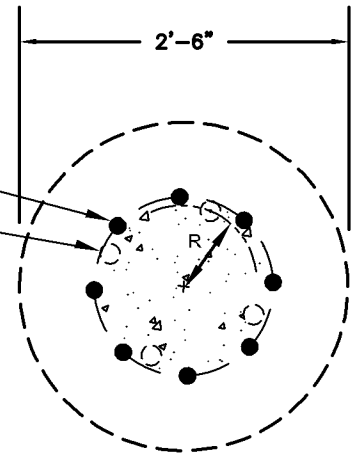
SCALE: NONE

DATE: JANUARY 2006

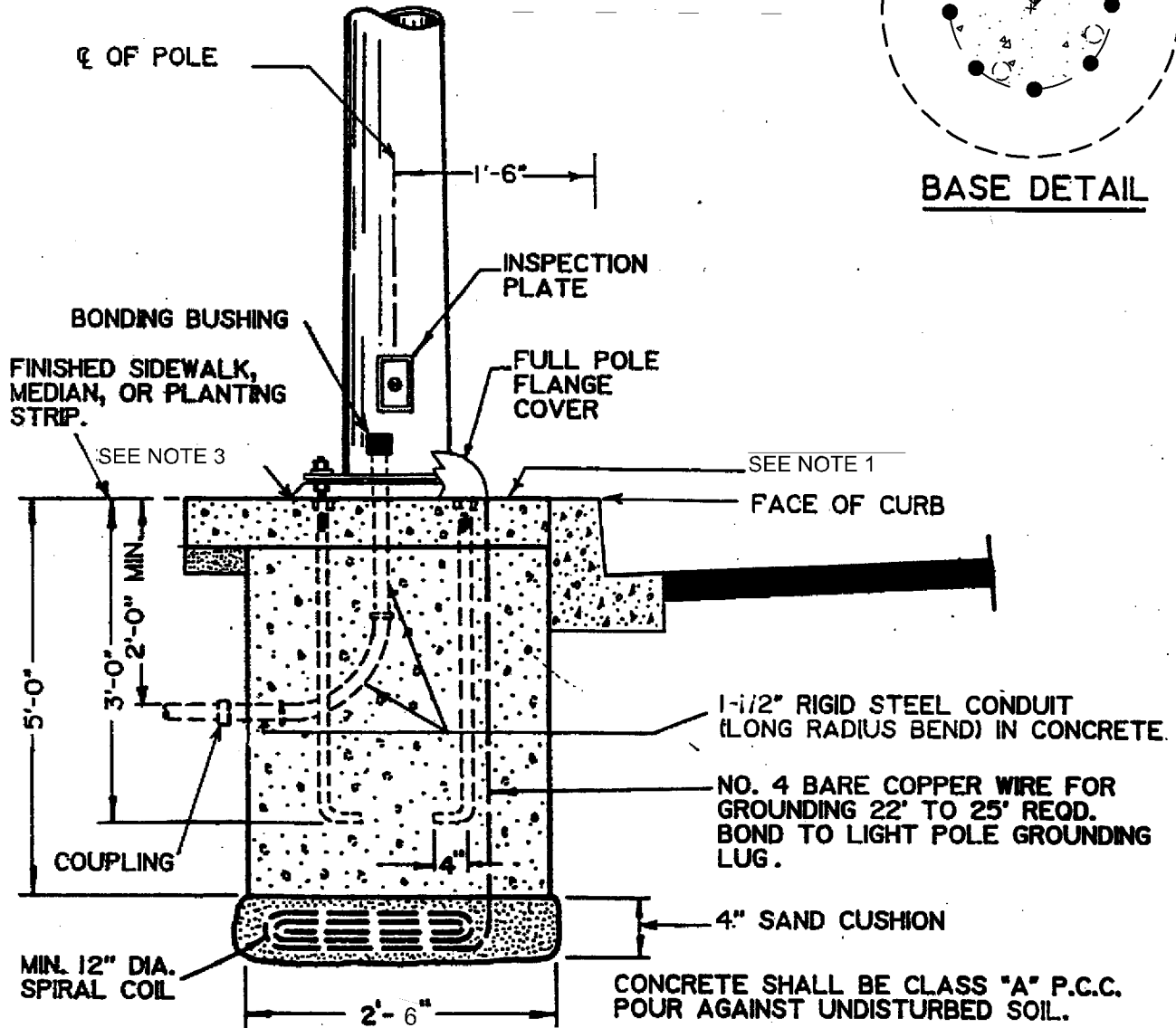
Approved:

STD. - 618

R_1 = ANCHOR BOLT DIA. DIMENSION R AND BOLT PATTERN TO SUIT POLE BASE FURNISHED.



BASE DETAIL



CONCRETE FOOTING

NOTES:

1. IN AREAS WITHOUT CONCRETE AROUND FOOTING, CONSTRUCT A 2'x2' CONC. PAD (4" THICK). IF ROUND FOOTING IS POURED, POUR TO BOTTOM ELEVATION OF THE SIDEWALK.
2. FOUNDATION BOLTS SHALL NOT BE CUT OFF FOR ANY REASON. EXTENSION COUPLERS SHALL NOT BE PERMITTED.
3. LEVELING OF BASE SHALL CONFORM TO THE REQUIREMENTS OF STD. 621.

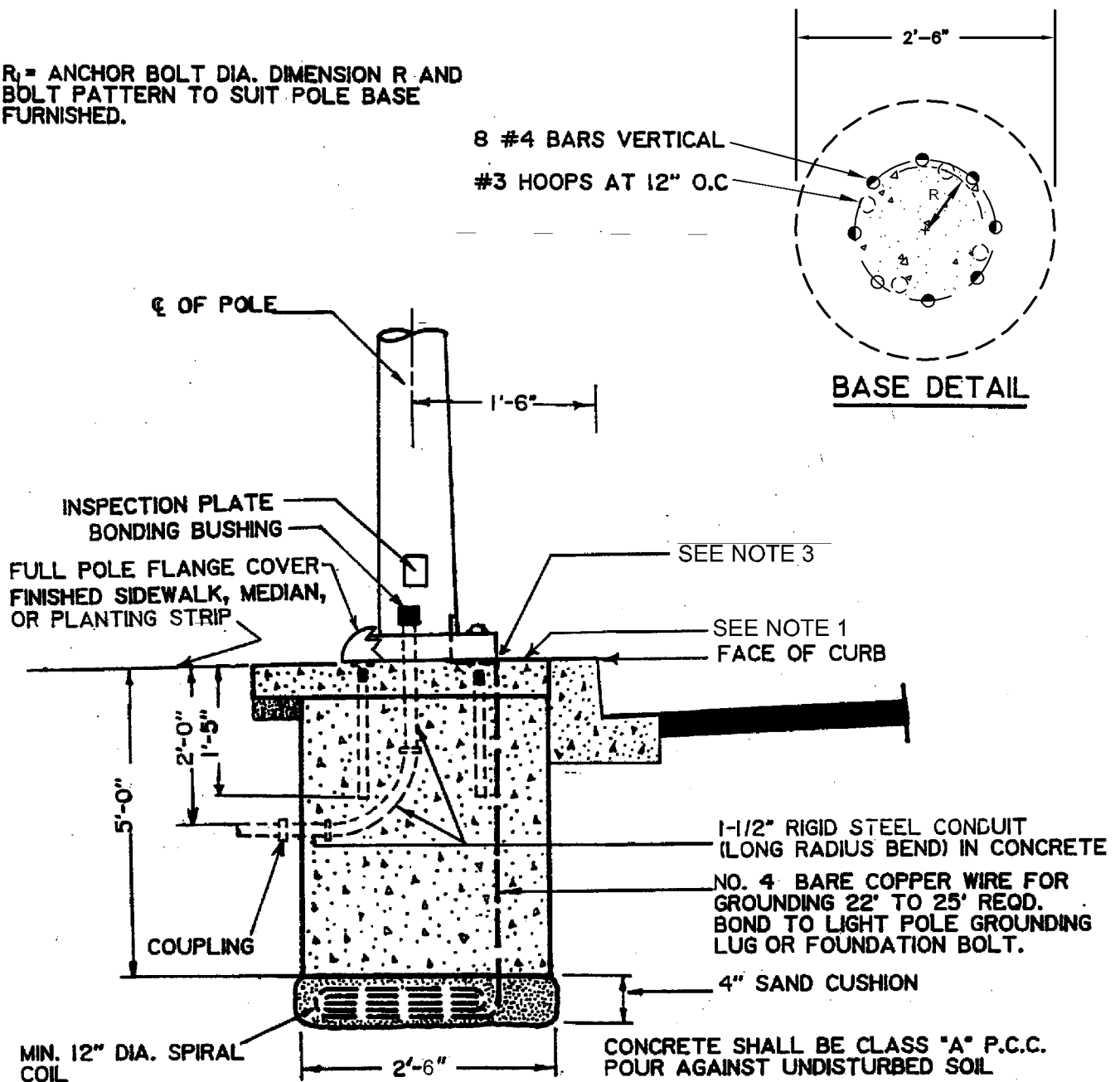
CITY OF ROHNERT PARK

**CONCRETE FOOTING AND BASE DETAIL
COBRA STYLE STREET LIGHT POLE**

SCALE: NONE DATE: MARCH 2014

Approved: STD. - 620A

R_1 = ANCHOR BOLT DIA. DIMENSION R AND BOLT PATTERN TO SUIT POLE BASE FURNISHED.



CONCRETE FOOTING

NOTES:

1. IN AREAS WITHOUT CONCRETE AROUND FOOTING, CONSTRUCT A 2'x2' CONC. PAD (4" THICK). IF ROUND FOOTING IS POURED, POUR TO BOTTOM ELEVATION OF THE SIDEWALK.
2. FOUNDATION BOLTS SHALL NOT BE CUT OFF FOR ANY REASON. EXTENSION COUPLERS SHALL NOT BE PERMITTED.
3. LEVELING OF BASE SHALL CONFORM TO THE REQUIREMENTS OF STD. 621.

CITY OF ROHNERT PARK

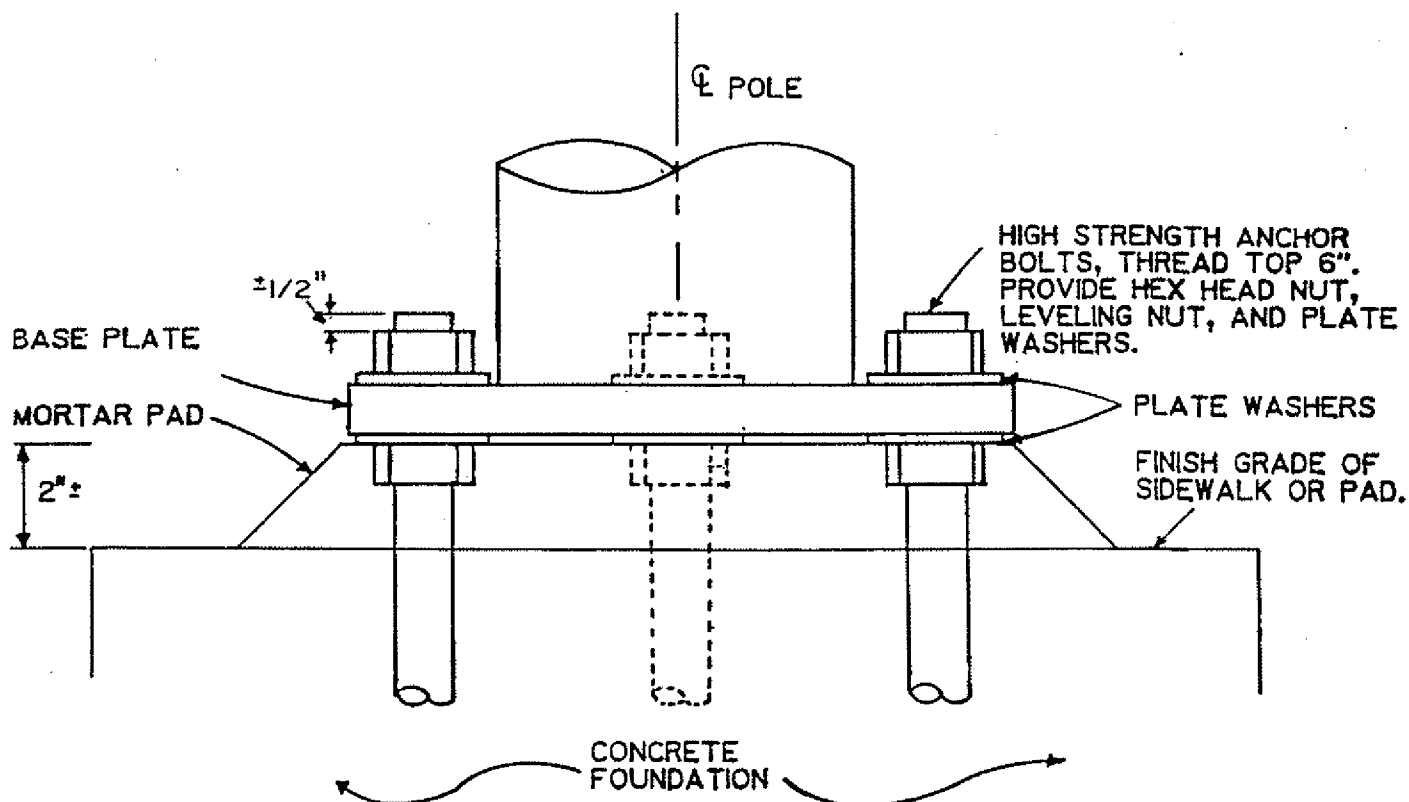
CONCRETE FOOTING AND BASE DETAIL DECORATIVE STREET LIGHT POLE

SCALE: NONE

DATE: MARCH 2014

Approved:

STD. - 620B



BASE LEVELING DETAIL

NOTES:

1. FOUNDATION BOLTS SHALL NOT BE CUT OFF FOR ANY REASON
EXTENSION COUPLERS SHALL NOT BE PERMITTED

CITY OF ROHNERT PARK

STREET LIGHTING BASE
LEVELING DETAIL

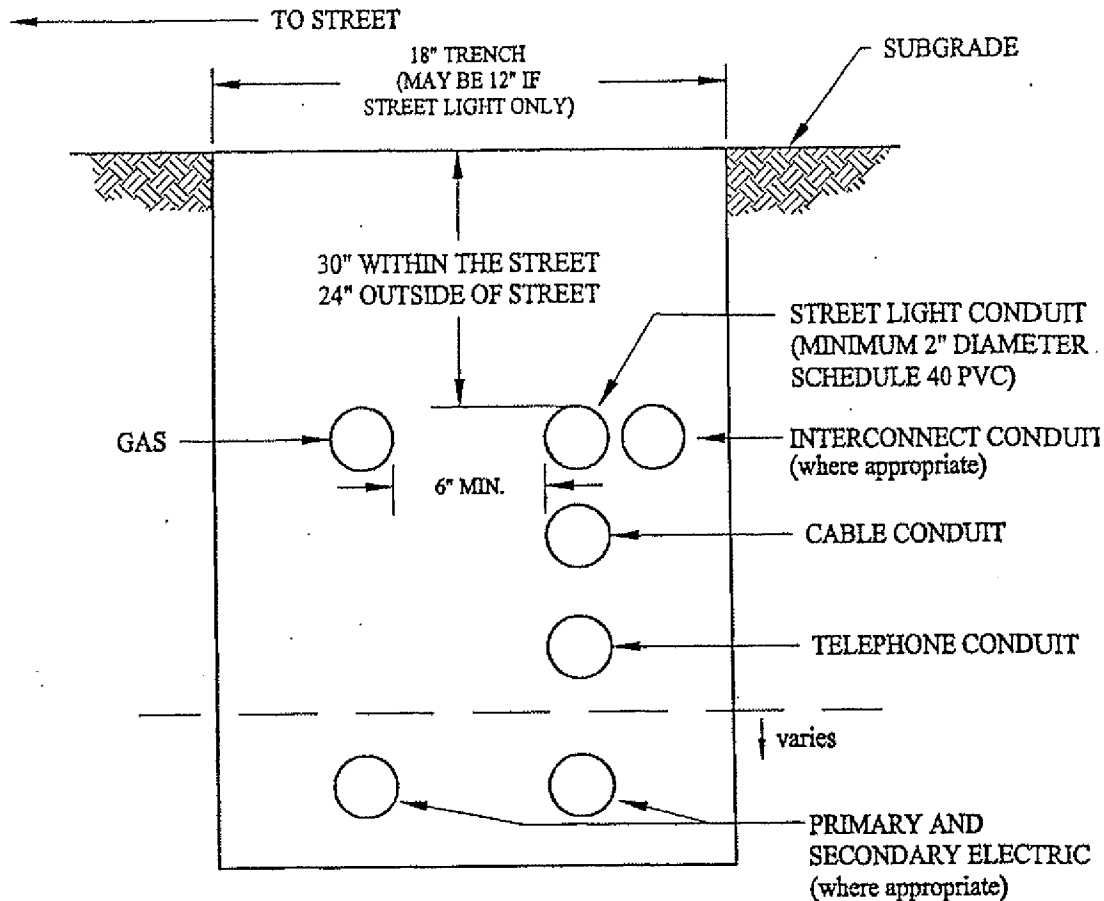
SCALE: NONE

DATE: JANUARY 2006

Approved:

Dan Sullivan

STD. - 621



NOTES:

1. IF JOINT TRENCH IS USED, THE TRENCH LAYOUT SHALL CONFORM TO THE ABOVE CONFIGURATION, UNLESS OTHERWISE SPECIFICALLY APPROVED BY THE CITY ENGINEER.
2. A RUN OF CONDUIT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF FOUR - 1/4 BENDS (360° TOTAL) INCLUDING OFFSETS AND BENDS LOCATED AT PULL BOXES AND SERVICE POINTS (NATIONAL ELECTRIC CODE 347-14).
3. PULL BOXES ARE REQUIRED ON BOTH SIDES OF EACH STREET CROSSING.
4. IF JOINT TRENCH IS USED, COSTS SHALL BE BORNE BY DEVELOPER. JOINT TRENCH DESIGN SHALL BE THE RESPONSIBILITY OF THE DEVELOPER.
5. NO MORE THAN ONE STREET LIGHT CONDUIT IN ANY PG&E SERVICE POINT.
6. PRIOR TO ANY STREET LIGHT CONDUIT CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE 3 COPIES OF THE JOINT TRENCH OR STREET LIGHT CONDUIT PLAN TO THE INSPECTOR AND MEET THE INSPECTOR ON-SITE TO REVIEW STREET LIGHT CONDUIT PLANS & IDENTIFY ALL PULL BOX LOCATIONS & CONDUIT STREET CROSSINGS.
7. REFERENCE THE JOINT TRENCH COMPOSITE OR STREET LIGHT CONDUIT PLANS FOR CONDUIT LOCATION AND CONDUCTOR SCHEDULE.

CITY OF ROHNERT PARK

JOINT TRENCH LAYOUT FOR STREET LIGHT CONDUIT

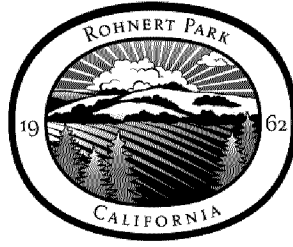
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City of Rohnert Park

Manual of Standards, Details and Specifications

(Volumes 1, 2 and 3)

Volume 3

Construction Specifications



City of Rohnert Park

Manual of Standards, Details and Specifications

Volume 1 Design Standards

Volume 2 Detail Drawings

1. Water
2. Sewer
3. Storm Drain
4. Streets and Roadway
5. Traffic
6. Street Lighting
7. Parks and Landscaping
8. Bicycle Parking

Volume 3 Construction Specifications

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Construction Specifications City of Rohnert Park

Part I Definitions

Public improvements within the City of Rohnert Park shall be constructed in accordance with the Standard Specifications of the State of California, Department of Transportation, Division of Highways (Caltrans), latest edition, which specifications are hereinafter referred to as the Standard Specifications, and in accordance with the following modifications and revisions herein stated in Volume 3 of the City of Rohnert Park Manual of Standards and Specifications.

Whenever in the Standard Specifications the terms, State of California, Department of Transportation, Director, Division of Highways, Engineer, or Laboratory 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 Rohnert Park.

For Department substitute the Public Works Department of the City of Rohnert Park.

For Director substitute the City Engineer of the City of Rohnert Park.

For Division of Highways substitute the Engineering Division of the City of Rohnert Park.

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

For Laboratory substitute Private Laboratory as authorized by the City to test materials and work involved in the contract.

Specifications pertaining to the administration of the City contracts will be contained in the special provisions for the contract.

References to contract administration, measurement, and payment shall not apply to non-City contracts.

Abbreviations:

“City Std.” means City of Rohnert Park Standard Detail

“City Spec.” means City of Rohnert Park Construction Specification

“Standard Specifications” means State of California Department of Transportation Standard Specifications, latest edition.

Part II Modifications to Standard Specifications

Part II includes modifications and revisions to the Standard Specifications.

Only those subsections which are modified or revised will be noted herein. The Standard Specifications number sequence will be followed.

Subsections to be modified will be noted as “(Subsection number) (Title)” followed by the modifications or additional requirements. In case of conflict between the Standard Specifications and the modification, the modification shall apply.

Subsections to be deleted without modification will be noted as “(Subsection number) (Title) (Deleted)”.

Subsections which are completely revised will be noted as “(Subsection number) (Title) (The following shall apply in lieu of Section_____).”

SECTION 6 – CONTROL OF MATERIALS

All materials, parts, and equipment furnished by the Contractor in the Work shall be new, high grade, and free from defects. Quality of work shall be in accordance with the generally accepted standards. Material and work quality shall be subject to the Engineer's approval.

Materials and work quality not conforming to the requirements of the Specifications shall be considered defective and will be subject to rejection. Defective work or material, whether in place or not, shall be removed immediately from the site by the Contractor, at its expense, when so directed by the Engineer.

SECTION 10 – DUST CONTROL

10-1.01 Description

Attention is directed to the provisions in Section 10, "Dust Control", of the Standard Specifications.

10-1.02A Dust Mitigation Measures

1. All dust-producing work and unpaved construction sites shall require at a minimum watering in the late morning and at the end of the workday; the frequency of watering shall be increased if wind speeds exceed 15 mph.
2. Contractor shall maintain dust control to the satisfaction of the City Engineer, seven (7) days a week, 24 hours per day.
3. The Engineer at his discretion may require sprinkling at any time or place.
4. Where recycled water is available potable water shall not be used for dust control.

SECTION 12 – TRAFFIC CONTROL

12-1.01 Description

Construction area traffic control devices shall be installed and maintained in accordance with the applicable sections as specified herein, the Standard Specifications, Part VI of the City Traffic Standards, the current edition of the Manual of Traffic Controls published by Caltrans, and as directed by the Engineer.

12-1.02 Traffic Control Plan

Prior to commencing construction which will affect existing traffic, the Contractor shall submit for review by the Engineer, a Traffic Control Plan on an 11" x 17" sheet of paper which contains only information specifically related to work zone traffic control. If the Contractor proposes to use Manual of Traffic Controls Published by Caltrans in lieu of a traffic control plan, in specific work operations, he/she shall submit in writing for consideration which Standard Plan will be used for each work operation. A Traffic Control Plan or proposal shall be submitted for review at least two weeks prior to implementation.

The Traffic Control Plan shall contain a title block which contains the Contractor's name, address, phone number, project superintendent's name, contract name, dates and hours traffic control will be in effect, and a space for review acknowledgment.

The content of the Traffic Control Plan shall include, but is not limited to, the following:

- A. Show location and limits of the work zone.
- B. Give dimensions of lanes affected by traffic control that will be open to traffic.
- C. Indicate signing, cone placement, and other methods of delineation and reference to appropriate City or Caltrans standard.
- D. Dimension location of signs and cone tapers.
- E. Identify side streets and driveways affected by construction and show how they will be handled.
- F. Show how pedestrian traffic will be handled through the construction site.
- G. Demonstrate how two-way traffic will be maintained.

No work except for installation of project identification signs will be allowed to commence prior to approval of the Work Zone Traffic Control Plan.

12-1.03 Traffic Control

Attention is directed to Section 7-1.08, "Public Convenience" and to Section 5-1.05, "Order of Work" of the Standard Specifications.

Exact locations of Project Identification signs and Advance Notice signs (Section 7-1.08 "Public Convenience") shall be determined in the field by the Engineer.

Lane closures will be permitted between the hours of 8:30 a.m. and 4:00 p.m. only. Only one lane at a time may be closed and no lanes shall be closed at any other hours unless specifically approved by the Engineer. The Contractor shall maintain vehicle access to homes and other properties at all times while work is in progress.

The Contractor shall keep the City of Rohnert Park Police and Fire Department informed regarding the closure of any traveled way. At a minimum, the Contractor shall call the Police Department at 584-2600 **daily** to report any traveled way closure. This means immediately upon closure for that day and again immediately after removal of the closure. For closures over multiple days, the daily notification still applies.

If the Contractor has been given an approved Traffic Control Plan that includes road closures, he/she will be required to maintain vehicular access to homes and other properties where work is in progress within the closure area.

Seventy-two (72) hours prior to construction, the Contractor shall place a notice on each front door, and attempt to notify each owner or tenant verbally that work will be underway within his block between stated hours, and request that cars be parked out of the roadway by 8:00 a.m. Service of notice shall not bar use of local cars within the block.

Barricades and flaggers shall be positioned to allow safe turns at intersections.

The Contractor shall maintain traffic control as necessary and as directed by the Engineer. Flaggers, barricades, signing, etc., shall remain in place for protection of City personnel until such time as all temporary lane delineation is complete.

SECTION 12-5 – MATERIAL RECYCLING

12-5.01 Description

The Contractor shall dispose of all portland cement concrete and asphalt concrete, 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.

SECTION 15 – EXISTING HIGHWAY FACILITIES

15-3 Removing Concrete

15-3.02 Removal Methods

Concrete removal shall conform to applicable provisions of Section 15-3 of the Standard Specifications and as specified herein.

All concrete to be removed shall be disposed of by the Contractor away from the site of the work. Burying of broken concrete within the limits of the project will not be allowed.

All concrete which is to be removed from sidewalk, curb, gutter, and driveway areas shall be removed to the nearest score mark or construction joint as directed by the Engineer.

SECTION 16 – CLEARING AND GRUBBING

16-1.01 Description

Clearing and grubbing shall conform to the applicable provisions of Section 16 of the Standard Specifications, with the following modifications and additional requirements.

Clearing, grubbing, and access shall be confined to the limits shown on the Plans and shall not exceed the minimum necessary to complete operations.

The Contractor shall not remove any trees, brush, shrubs, or other natural objects outside the limits of construction as shown on the Plans, unless directed by the Engineer.

Any trees, brush, shrubs, or other natural objects not ordered removed by the Engineer which have been removed, altered, or damaged shall be replaced in kind by the Contractor before completion of the project.

All unsuitable material shall be disposed of away from the site by the Contractor. The Contractor shall make all necessary arrangements for disposal of material.

16-1.02 Preservation of Property

All existing street designation and traffic control signs and posts within the limits of work shall be carefully removed, cleaned of excess earth and delivered to the City Corporation Yard at 600 Enterprise Drive 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 within the right-of-way 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 3 feet below finished grade in the area of construction. The resulting spaces shall be backfilled with material suitable for the planned use. Such suitable material shall be placed and compacted in layers as specified in Section 19-6 "Embankment Construction" of the Standard Specifications.

16-1.04 Removal and Disposal of Materials

Combustible debris shall be disposed of away from the site of the work. Burning within the limits of the project will not be allowed.

SECTION 19 – EARTHWORK

19-1.01 Description

Unsuitable material may be removed and replaced, or may be stabilized in accordance with the provisions of Section 19-2.02, “Unsuitable Material.”

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 asphalt concrete base 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.

19-2 Roadway Excavation

19-2.02 Subgrade Stabilization

Unsuitable material shall be stabilized per Section 19-2.02 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 six inches as determined by the Engineer, then the Contractor shall excavate an additional six inches, install soil stabilization fabric and install six 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:

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

The material contained on the #4 screen shall consist of 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% R.C.

19-2.02 Unsuitable Material

(The following shall apply in lieu of Section 19-2.02)

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.

19-3.06 Structure Backfill

Specifications for pipe bedding, trench backfill and surfacing shall be as shown on City Std. 215, "Standard Trench Detail."

Except for structural backfill placed at specific locations described and enumerated in Section 19-3.06 of the Standard Specification, structural backfill material specifications and compaction requirements shall be as follows:

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

<u>Sieve Sizes</u>	<u>Percentage Passing</u>
3"	100
No. 4	40-100

Structural backfill shall be compacted to not less than 90 percent relative compaction, except that when placed under any roadbed, relative compaction shall be not less than 95 percent within 3 feet of finished grade.

19-4 Ditch Excavation

Ditch excavation shall conform to the applicable provisions of Section 19-4 of the Standard Specifications.

19-4.01 Description

Ditches shall be constructed in conformance with 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 – California Test 216 and 231) (The following shall apply in lieu of Section 19-5.03)

Relative compaction of not less than 95 percent shall be obtained for a minimum depth of 0.75-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 Section 19-2.02.

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 – California Test 216 and 231) (The following shall apply in lieu of Section 19-5.04)

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,” shall be compacted to not less than 90 percent relative compaction.

19-7.02 Imported Borrow

Imported borrow shall be free of any regulated hazardous materials.

SECTION 20-4 – HIGHWAY ROADWAY PLANTING

20-4.05 Planting

Trees shall have a minimum height of twelve feet including root ball, and a minimum container size of fifteen gallons, with a caliper of 1” at 12” above the top of the root ball.

Conditions of the plants shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, normal root systems, well filling their containers, but not to the point of being root bound. Plants shall not be pruned or topped prior to delivery.

Each tree shall be tagged to indicate genus and species.

All plant material shall be subject of the inspection and approval of the City. The City has the right to reject any item offered.

- a. 48-hour notification shall be given prior to any inspection.
- b. Upon initial notification, the Contractor shall indicate the number of sequences or planting phases necessary to complete the entire project.
- c. 24-hour notice shall be given the City prior to starting any additional phase.
- d. At the time of final inspection, the City may select at random one tree from each planting phase, to be removed and inspected for compliance to planting specification.

Parkway Tree Planting Operations:

All pits shall be dug with bottoms level, the width equal to two times the diameter of the root ball, and the bottom 4 inches less than the depth of the root ball. The City upon notification shall inspect pits prior to planting of trees.

Pits shall be backfilled with a thoroughly mixed “prepared soil”. When planting tablets are required, they shall be placed prior to placing the tree in the pit. Five (21 gram) planting tablets shall be evenly spaced around perimeter of pit on top of prepared soil.

“Prepared soil” mix for backfill of the pits for 15-gallon trees shall consist of excavated soils and the following:

- a. 50% by volume of nitrolized soil amendment.
- b. 50% by volume native soil.
- c. Five 21-gram planting tablets. (20-15-5 analysis)

- Note:
- (1) Nitrolized soil amendment shall be a composted wood byproduct combined with one pound of actual nitrogen per cubic yard of shavings.
 - (2) Planting tablets shall be a commercial fertilizer in tablet form yielding 20% nitrogen, 10% phosphorus and 5% potash. The tablet shall be compressed and yield a slow release of nutrient over a 12-month period.

Set plants in center of pit, in vertical position, so that crown of ball will be level with finish grade after allowing for watering and settling.

Prepare a depressed earth water basin capable of holding 10 gallons of water. Water shall be applied in that quantity at time of planting.

Each tree must be properly supported by two Lodgepole Pine stakes. Stakes shall be a minimum of 2" x 2" and not less than eight feet in length. Stake all trees at time of planting by placing stake in prepared hole and driving stake a minimum of 30 inches into soil. Stakes shall be placed perpendicular to direction of prevailing winds.

All trees shall be secured to stakes as detailed (or approved equal).

Six-penny scaffold nails shall be used to secure the ties to the stakes – two per side.

Guarantees

Fifteen-gallon trees shall be guaranteed as to growth and health for a period of one year after final acceptance by the City.

Trees that fail to grow or are injured or damaged during planting operations, shall be replaced within 30 days. Replacement material shall be guaranteed as specified as original guaranteed material.

Trees not installed according to the requirements will be rejected by the City.

SECTION 21 – NOTIFICATION

21-1.01

The Contractor shall notify the Project Engineer or Project Inspector of any work to be performed on any given work day either on the afternoon of the prior working day or before 8:30 a.m. on the given working day. Any work completed for which the Project Engineer or Project Inspector has not received prior notification of its scheduling MAY NOT BE ACCEPTED.

SECTION 24 – LIME TREATMENT

24-1.01 Description

(The following shall apply in lieu of Section 24-1.01)

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 herein.

24-1.01-A

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 Section 24-1.06, "Mixing". 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.

24-1.02 Materials

Lime to be used shall be granular quicklime and shall be added to the existing material at the approximate rate of four percent by weight of the dry material, the exact percentage to be determined by the Engineer, based on geotechnical tests provided by the contractor.

Lime treatment must be approved by the Engineer in writing, and accompanied by an adequate safety program to be proposed by the Contractor. Granular quicklime shall conform to the specifications of ASTM Designation C51. 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 ASTM: C 25-67.

Granular quicklime 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 insure 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.

24-1.06 Mixing

Mixing shall be in accordance with Section 24-1.06 of the Standard Specification.

24-1.07 Spreading and Compacting

Lime treated material shall be a minimum of 12 inches deep except where required elsewhere to be greater and finished to the lines and grades as shown on the Plans.

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.

The surface of the lime treated material shall not vary more than 0.05-foot above or below the grade established by the Engineer

24-1.09 Curing

Curing of lime treated material shall be in accordance with Section 24-1.09 of the Standard Specifications.

The Contractor may, at his option, omit the curing seal if the first lift of A.C. Base is placed within twenty-four (24) hours after the final compaction of the lime treated material.

SECTION 25 – AGGREGATE SUBBASE

25-1.01 Aggregate Subbase

Aggregate subbase shall be Class 4 conforming to and placed in accordance with the requirements of Section 25 of the Standard Specifications, with the following modifications and additional requirements.

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

<u>Sieve Size</u>	<u>Percent Passing</u>
3"	100
1-1/2"	90-100
3/4"	50-90
#4	25-55
#200	2-11

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

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.

25-1.03 Grade Tolerance

The subgrade to receive aggregate subbase, immediately prior to spreading, shall not vary more than 0.05-foot above or 0.1-foot below the grade established by the Engineer.

25-1.05 Compacting

The surface of the 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 be considered as evidence that the aggregate subbase does not meet this requirement.

SECTION 26 – AGGREGATE BASE

26-1.01 Aggregate Base

Aggregate base shall be Class 2 conforming to and placed in accordance with the requirements of Section 26 of the Standard Specifications, with the following modifications and additional requirements.

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.

26-1.02 Quality Requirements

The minimum sand equivalent shall be 31 for any individual test.

26-1.05 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.

SECTION 37 BITUMINOUS SEALS

37-2 SLURRY SEAL

37-2.01 Description

This item shall consist of furnishing and placing a slurry seal coat on Rohnert Park City streets as designated herein in conformance with the requirements of Section 37-2, "Slurry Seal", of the Standard Specifications, the International Slurry Seal Association Publication A105 and as specified herein.

This work consists of preparation and application of a Type II latex modified slurry seal on various roadway sections as indicated on the plans, these specifications or as directed by the engineer in the field. A roadway will include all travel lanes, shoulders, acceleration and deceleration lanes, truck turnouts and intersections. Repair any roads, driveways, walls and curbs which are damaged during construction, to their original or better condition.

Slurry Seal shall consist of mixing asphalt emulsion, aggregate, and water and spreading the mixture on a surface or pavement where shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

37-2.03 Materials

The materials used shall conform to Section 37-2.02 "Materials" of the Caltrans Standard Specifications, with the exceptions noted in these Technical Specifications.

37-2.02A Asphaltic Emulsion

Latex emulsified asphalt shall be a quick traffic, quick cure (QT-QC) type, conforming to Section 94. This emulsion shall be homogeneous and show no separation after thorough mixing. It shall break and set on the aggregate within five (5) minutes and be ready for cross-traffic within five to thirty minutes. The latex asphalt emulsion shall conform to the following requirements:

Test on Emulsion	Method of Test	Requirements
Viscosity, SSF @ 77 degrees F, sec	ASTM D244	15-90
PH	ASTM D244	2 +/- 1
Residue by Distillation	ASTM D244	60% minimum

Test on Residue from Distillation Test:

Test on Residue	Method of Test	Requirements
Penetration @ 77 degrees	ASTM D5	40 – 80
Softening Point (Ring & Ball) degrees, F	ASTM D36	130 +
Ductility @ 75 degrees F, 5 cm/min., min.	ASTM D113	25
Fraass-Breaking Point (degrees C)	DIN 52012	– 18

37-2.02B Water

Water shall be free of harmful soluble salts and shall be of such quality that the asphalt will not separate from the emulsion before the slurry seal is in place in the work.

37-2.02C Aggregate

Aggregate shall consist of sound, durable, crushed gravel and approved mineral filler. The material shall be free from vegetable matter and other deleterious substances. Aggregate shall be 100% crushed, with no round particles, and shall be volcanic in origin and black in color. The use of gray or light-colored aggregate will not be allowed. The percentage composition of the aggregate shall conform to the following grading.

PERCENTAGE PASSING

Sieve Size	Type II
No. 3/8"	100
No. 4	94 – 100
No. 8	65 – 90
No. 16	40 – 70
No. 30	25 – 50
No. 200	5 – 15

	Type II
Theoretical asphalt content range, % dry aggregate	7.5 to 13.5
Approximate application rate (pounds per square yard)	15 to 20

The aggregate shall conform to the following additional quality requirements:

Test	California test	Type II
Sand Equivalent	217	70 min.
Durability Index fine	229	70 min

37-2.02D Polymer Latex.

Styrene Butadiene Rubber latex shall be added to the water/soap phase by injection prior to the mill manufacture of the asphalt emulsion by the emulsion producer. The latex shall be BASF NX 1118 or approved equal. The amount of latex solids shall be between 2.5 and 3 percent of the asphalt residual content and shall be certified by the emulsion producer on each load of emulsion delivered to the job site. No post or field addition of Polymer Latex will be allowed. Samples of latex shall be provided and shall conform to the following requirements:

Test	Requirement
Total solids, minimum %	60
Bound Styrene %	24-60
PH at 25 degrees C	4.2-5.2
Brookfield viscosity RVT	1000-4000
Residual Monomer %	0.08 max.

37-2.02E Mineral Filler.

The mineral filler shall be either Portland cement or other approved mineral fillers, if required. Portland cement, if used, shall be commercially available Type I-II and shall be free of lumps and clods.

37-2.03 Mix Design

The tests and mix design shall be performed by a laboratory capable of performing the applicable International Slurry Seal Association (ISSA) tests. Provide the Engineer with the test results and the proposed mix design from a City approved laboratory conforming to the following tests in ISSA A105. The plot of Wet Loss on Wet Track Abrasion and Excess Asphalt verses percent emulsion shall be supplied to the Engineer with the mix design. The proposed slurry seal mixture shall conform to the requirements specified when tested in accordance with the following tests:

Test	SSA Test Method	Requirement
Slurry Seal Consistency, cm	T106	3 max.
Wet Stripping	T114	Pass
Compatibility	T115	Pass (a)
Cohesion Test (b), kg - cm within 1 hour	T139	20 min.
Wet Track Abrasion, g/sq. ft.	T100	75 max.
Excess Asphalt by LWT Sand Abrasion	T109	8 g/m ² max.
a. Mixing test must pass at the maximum expected air temperature at the project site during application.		
b. Using project source aggregate asphalt emulsion and set-control agents if used.		

The laboratory report shall be signed by the laboratory that performed the tests and mix design and shall show the results of the tests on individual materials, comparing the test results to those required by the specifications. The report shall clearly show the proportions of aggregate, filler (as determined from the tests, minimum and maximum), water (minimum and maximum), and asphalt solids content based on the dry weight of aggregate and set-control agent usage. Previous laboratory reports covering the same materials may be accepted provided they are made during the same calendar year.

37-2.04 Proportioning

Asphalt emulsion shall be added at a rate determined by the mix design and in the range of the table above. A job mix design shall be submitted by the Contractor for approval by the Engineer that conforms to the specification limits, and that is suitable for the traffic, climate conditions, curing conditions and final use. This will include recommended application rate of slurry to suit the job conditions.

Calibrated flow meters shall be provided to measure both the addition of water and liquid additives to the pug mill. If necessary for workability, a retarding agent, that will not adversely affect the seal, may be used.

Water, and retarder if used, shall be added to ensure proper workability and (a) permit uncontrolled traffic on the slurry seal no more than three (3) hours after placement without the occurrence of bleeding, raveling, separation or other distress; and (b) prevent development of bleeding, raveling, separation or other distress within thirty (30) days after placing the slurry seal.

37-2.05 Mixing and Spreading Equipment

Mixing and spreading equipment shall be in accordance with the Caltrans Standard Specifications, Section 37-2.04 and 37-2.05, respectively, and as specified herein.

The Slurry Seal shall be mixed in a self-propelled mixing machine equipped with a continuous flow pug mill capable of accurately delivering and automatically proportioning the aggregate, emulsified asphalt, water and additives.

The slurry seal retention time in the pug mill shall be less than three seconds. No retention of mixed slurry seal shall be allowed within the pug mill by gate shut-off or other mechanical means. The mixing machine shall have sufficient storage capacity of aggregate, emulsified asphalt, and water to maintain an adequate supply to the proportioning controls.

The mixing machine shall be equipped with controls for proportioning the material to the mix. Each material control device shall be calibrated, properly marked, and lockable at the direction of the Engineer.

The mixing machine shall be equipped with an approved fines feeder that provides a uniform, positive, accurately metered, amount of a mineral filler, if used, at the same time and location that the aggregate is fed.

The mixing machine shall be equipped with measuring device that allows for quick accurate measurement of the volume.

The mixing machine shall be equipped with a water pressure system and nozzle type spray bars to provide a water spray immediately ahead of the spreader box.

Gages or approved means of measurement shall be provided on the equipment so that the proportional rates of aggregate, water and asphalt emulsion can be checked at intervals determined by the Engineer.

The spreader shall be capable of spreading a traffic lane width and shall have strips of flexible rubber belting or similar material on each side of the spreader box and in contact with the pavement to prevent loss of slurry from the box. The box shall have baffles, or other suitable devices, to insure uniform application on super-elevated sections and shoulder slopes. Spreader boxes shall be maintained in such a manner as to prevent chatter (wash boarding) or other surface defects that will affect the aesthetic value of the finished slurry seal mat.

The rear flexible strike-off blade shall be capable of being adjusted to the various crown shapes so as to apply a uniform slurry seal. Any burlap drag used shall be replaced when it loses its flexibility.

The Contractor shall calibrate the spreader vehicle(s) to be used on the project to the approved mix design prior to their arrival at the job site, and shall furnish the Engineer a copy of the calibration settings for each vehicle. Thereafter, no adjustments in the aggregate and emulsion settings shall be made without the approval of the Engineer.

The Contractor shall demonstrate the ability to mix and apply slurry in a satisfactory manner and to the approved mix design with each spreader vehicle. The Contractor may not begin work until the ability to apply slurry as specified is demonstrated to the Engineer.

37-2.06 Placing

Prior to sealing each street, the Contractor shall verify that each street to be sealed has been “approved for sealing” by the Inspector.

Surface to receive slurry seal shall be prepared in accordance with the requirements specified for preparing surfaces to receive asphaltic emulsion as specified in Section 37-1.04, “Preparation for Seal Coat”, of the Caltrans Standard Specifications.

Before placing the slurry seal, the pavement surface shall be cleaned by sweeping, and other means necessary to remove all loose particles of paving, all dirt and all other extraneous material. Power sweepers shall be required to sweep from face of curb to face of curb. This shall involve a minimum of three passes with a power broom street sweeper (Mobile or equivalent). Pavement missed by or inaccessible to broom sweepers shall be swept clean by other approved methods. Contractor shall provide whatever flushing, compressed air, or other cleaning methods necessary to remove all dirt and loose material from the pavement.

Three working days prior to the slurry seal operations, the contractor shall notify all residents, businesses and agencies with an approved written notice detailing the streets and limits of work to be done along, with the hours of work. The contractor shall also post all streets with temporary "No Parking - Tow Away" signs at 50 foot staggered intervals. These signs shall also state the day of the week and hours of no parking.

Immediately preceding the seal application, the Contractor shall cover all grates, slotted manholes, and other appurtenances on and adjacent to the pavement that would allow the entry of the sealing materials; mask with roofing paper, all closed manhole covers, water and gas valve box covers, monuments, monument boxes, etc.; and remove all existing raised pavement markers, paint and thermoplastic pavement markings.

No adhesive material shall be permitted to cover, seal or fill the joint between the frame and cover of the structure.

Drainage inlets, shall be uncovered and cleaned to the satisfaction of the Engineer as soon as the seal sets. The other surface utilities shall be uncovered and cleaned of slurry material by the end of the same work day at each location. If they are not uncovered within this time frame, no additional seal shall be placed until they are uncovered.

Gutters, curbs, sidewalks, driveways, shoulders and other structures adjacent to the pavement to be slurry sealed shall be cleaned of excess seal to the satisfaction of the Engineer.

Asphalt pavement, concrete curb, gutter, sidewalk, and other concrete surface structures along existing streets damaged by the Contractor's operations, including but not limited to walkways, lawns and other landscaping, fences, gates, driveways, walls and mail boxes shall be replaced in kind by the Contractor.

Hand tools shall be available in order to remove spillage. Ridges or bumps in the finished surface will not be permitted. The mixture shall be uniform and homogeneous after spreading on the existing surface and shall not show separation of the emulsion and aggregate after setting.

Full compensation for protecting and repairing property as specified herein shall be considered as included in the price paid for other items of work, and no additional compensation will be allowed therefore.

The slurry seal shall be mixed, spread, and placed in accordance with the provisions of Caltrans Standard Specifications Section 37-2, with the following exceptions and additions:

The slurry seal shall not be applied when either atmospheric or pavement temperature is 55° F and falling but may be applied when both the atmospheric or pavement is 50° F and rising. The slurry seal shall not be applied during periods of abnormally high relative humidity that prolongs the curing beyond a reasonable time. Slurry seal shall not be applied when raining or foggy. Slurry seal shall not be applied when freezing or rain is expected within 24 hours.

The slurry seal mixture shall not be applied prior to 8:00 A.M. Also, the slurry seal mixture shall not be applied after 3:00 P.M., except if approved by the Engineer. Approval of applications after 3:00 P.M. will only be for the purpose of completing the section of work then underway. Beginning a new section of work after 3:00 P.M. will not be permitted.

The surface shall be fogged with water directly preceding the spreader. The slurry mixture shall be of the desired consistency when deposited on the surface. A sufficient amount of slurry shall be carried in all parts of the spreader at all times so that complete coverage is obtained. No lumping, balling or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate will be permitted. If coarse aggregate settles to the bottom of the mix, the slurry will be removed from the pavement. No excessive breaking of the emulsion will be allowed in the spreader box. No streaks such as caused by oversize aggregate will be left in the finished pavement. Ridges (especially at existing raised pavement markers) and wash-boarding in the finished product will not be allowed.

The slurry mixture shall be uniformly spread. The rear flexible strike-off blade shall make close contact with the pavement.

The slurry seal shall be placed at a rate indicated in these specifications, unless approved by the Engineer prior to start of work. The completed mixture shall be such that the slurry seal mixture has proper workability and will permit traffic flow within four hours after placement without the occurrence of bleeding, raveling, polishing, separation or other distress, and prevent the development of bleeding, raveling, polishing, separation, or other distress within 30 days after its placement.

The quantity of asphaltic emulsion to be used in the slurry seal mixture will be determined from the design asphalt binder content, as approved by the Engineer, and the asphalt solids content of the asphaltic emulsion finished.

The slurry seal mixture shall be applied to the lip of gutter. On streets that have no concrete gutter, the slurry seal shall extend to the face of curb. Any application or spillage beyond this limit shall be removed or cleaned up by the Contractor to the satisfaction of the Engineer. Gutter spills shall be cleaned immediately.

The seal coat shall be applied in such a manner that the joint between the new and existing surface is neat and uniform in appearance true to the line shown on the typical cross section and established by the Engineer. Roofing paper or a comparable substitute shall be used at all ends of slurry seal limits to provide for a clean, neat, and straight definition of the end of the slurry. This includes starts and stops and handwork on turnouts.

Longitudinal joints shall be at the crown of the street or at the edge of travel lanes. Avoid joints in wheel paths.

No excessive buildup or unsightly appearance shall be permitted on longitudinal or transverse joints. Burlap drags shall be used. Overlaps shall not exceed 3 inches.

Approved squeegees shall be used to spread slurry in non-accessible areas to the slurry mixer. Care shall be exercised in leaving no unsightly appearance from hand work.

Slurry seal shall be rolled with a rubber tire roller 9-wheel assembly with a minimum tire pressure of 60 psi.

At any time the quality of the mix or workmanship is not to the satisfaction of the Engineer, the job shall be discontinued until a correction is made which is satisfactory to the Engineer.

Adequate means shall be provided to protect the slurry seal from damage from traffic until such time that the mixture has cured sufficiently so that the slurry seal will not adhere to and be picked up by the tires of the vehicles.

A sand blotter shall be spread at selected intersections and where required by the Engineer, to accommodate pedestrian or vehicular traffic until slurry sets. Sand blotter shall be placed by lightly broadcasting slurry aggregate so the wet slurry seal is not displaced. Sand blotters at intersections shall be swept within 24 hours of placement or sooner if directed by the Engineer.

Any traffic control devices (barricades, cones, or signs), which are moved in the process of applying the slurry, are to be returned to a proper position by the Contractor as soon as possible.

Wheel tracks, footprints, and other undesired markings in the slurry seal shall be repaired to the satisfaction of the Engineer.

Treated areas will be allowed to cure until such time as the Engineer permits their opening to traffic.

Fourteen days after completion of the slurry sealing, the contractor shall sweep the roadway section including all slurry sealed areas and all gutters to remove accumulated fines from the roadway surface.

Thirty days after completion of the slurry sealing, the contractor shall sweep the roadway section including all slurry sealed areas and all gutters to remove accumulated fines from the roadway surface.

SECTION 39 – ASPHALT CONCRETE

39-1.01 Description

Asphalt concrete surface and the placing thereof shall conform to the requirements of Section 39 of the Standard Specifications.

A minimum of two weeks prior to the placement of any Asphalt Concrete, the Contractor shall notify the Engineer of which asphalt plant will be used to supply the mix. For any job, Asphalt Concrete shall be supplied from a single plant.

39-2.01 Asphalts

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.

Asphalt binder to be mixed with aggregate for Asphalt Concrete surface, leveling, or Open Graded courses shall be PG-64 grade paving asphalt.

39-2.02 Aggregate

The aggregate grading of the various types of Asphalt Concrete shall conform to one of the following as directed by the Engineer:

Surface Course	Type A – ½” Maximum, Medium or Coarse, or ¾” Maximum, Coarse
Leveling Course	Type A – ¾” Maximum, Medium
Asphalt Concrete Base	Type A or B – ¾” Maximum, Medium
Open Graded	3/8” Maximum

39-4.01 Grade Tolerance

The subgrade to receive Asphalt Concrete or Asphalt Concrete Base immediately prior to applying prime coat, shall not vary more than 0.05-foot above or below the grade established by the Engineer.

39-4.02 Prime Coat and Tack Coat

Prime coat shall consist of either SC-70 or MC-70 grade liquid asphalt as directed by the Engineer and shall be furnished and applied in accordance with the provisions in Section 93 “Liquid Asphalts”. Application shall be made when the surface is dry, and when the air

temperature in the shade is above fifty (50) degrees Fahrenheit, unless otherwise permitted by the Engineer.

- A. Ensure 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 asphalt course shall be removed, including dust, loose aggregate, soil, leaves, and pieces or lumps of other foreign material deposited on the surface.
- B. A paint binder (Tack Coat) shall be applied on asphalt to asphalt seams and joints as specified in Section 39-4. Prime Coat and Paint Binder (Tack Coat)," of the State Standard Specifications.
- C. Before placing asphalt concrete, an asphalt emulsion tack coat of 70 percent CSS-1 and 30 percent water shall be furnished and applied uniformly to contact surfaces of all cold pavement joints, curbs, gutters, and all existing pavement to be surfaced in conformance with Section 39 of the Caltrans Standard Specifications. Apply a tack coat of emulsion at a rate of approximately 1 liter/m² (0.2 gal/yd²) to the sides of the repair area.
- D. If cut does not extend to subgrade, apply prime coat to prepared subbase at 0.2 to 0.25 gallons per sq. yard to fill all void and interstices and uniformly coat subgrade
- E. Asphalt emulsion tack coat shall be applied to any course in advance of spreading the next course at 0.10 to 0.15 gallons per sq yard. Tack coat shall be applied between all asphalt concrete lifts. If successive lifts are paved on the same and when the surface temperature of the lower lift has not fallen below 150°F, and the surface of the lower lift is clean, then the tack coat between lifts can be eliminated.
- F. Asphaltic Concrete shall not be placed until the asphaltic emulsion tack coat has cured.

Following application of the prime coat, at least twenty-four (24) hours shall elapse before placing Asphalt Concrete. Any excess asphalt primer shall be blotted up with sand and removed from the grade.

Tack coat shall be diluted SS1 or CSS1, or undiluted RS-1 or CRS-1 type asphalt emulsion.

39-5 Hauling, Spreading, and Compacting Equipment

39-5.01 Transporting Asphaltic Concrete

- A. From mixing site in trucks having tight, clean compartments.
- B. Coat hauling compartments with lime-water mixture to prevent sticking.
- C. Elevate and drain compartment of excess solution before loading mix.
- D. Provide covers over asphalt concrete mixture to protect from weather and to prevent loss of heat.
- E. During periods of cold weather or for long distance deliveries, pre-insulation around entire truck bed surfaces.

39-5.02 Spreading Equipment

The Asphalt Concrete shall be deposited from the haul vehicle into the hopper of the paving machine.

The practice of depositing the material on the roadbed in a windrow and subsequently using a pick-up machine to deposit the material in the hopper of the asphalt paver will not be allowed. All asphalt shall be placed in such a manner as to avoid separation.

39-5.03 Compacting Equipment

Compaction rollers shall be either 2-axle steel-tired rollers, pneumatic-tired rollers, or approved double-drum vibratory rollers. Steel-tired static compaction rollers shall weigh not less than 12 tons.

Double-drum vibratory rollers shall be operated at a maximum speed of 135-feet per minute (approximately 1.5 mph). Double drum-vibratory rollers shall have a minimum frequency of 2400 VPM and the amplitude shall be field-adjustable.

All pneumatic-tired rollers shall be equipped with an approved wind skirt unless otherwise permitted by the Engineer. Pneumatic-tired rollers used for compaction of Asphalt Concrete Base shall be so equipped that the air pressure in all tires may be regulated uniformly by the operator while the roller is in motion.

Finish rollers shall be 2-axle steel-tired tandem rollers weighing not less than 8 tons.

39-6 Spreading and Compacting

39-6.01 General Requirements

Asphalt Concrete shall not be placed on any roadbed until all utility construction beneath the roadbed has been completed, sewer and water lines have been tested, and water lines chlorinated. The surface course of Asphalt Concrete shall not be placed until final utility connections have been made, unless otherwise permitted by the Engineer.

Asphalt Concrete shall not be placed after thirty (30) minutes before sunset, as established by weather bureau, except as otherwise authorized by the Engineer.

Asphalt Concrete or Asphalt Concrete Base shall not be placed during rainy weather or on a wet surface. Asphalt Concrete shall not be placed when the atmospheric temperature is below fifty (50) degrees Fahrenheit or conditions indicate it will drop below fifty (50) degrees Fahrenheit before the material can be satisfactorily compacted. Asphalt Concrete Base shall not be placed when the atmospheric temperature is below forty (40) degrees Fahrenheit or conditions indicate it will drop below forty (40) degrees Fahrenheit before the material can be satisfactorily

compacted. Material which cannot be placed in compliance with these requirements shall be rejected.

The compacted thickness of Asphalt Concrete layers shall be as directed by the Engineer. The normal minimum and maximum compacted lift thickness for Asphalt Concrete surfacing are 0.17' and 0.25' respectively. The normal minimum and maximum compacted lift thickness for Asphalt Concrete Base are 0.25' and 0.33' respectively. No layer shall be placed over a layer until the temperature at mid depth is not more than 160 degrees Fahrenheit.

39-6.03 Compacting

The temperature of the Asphalt Concrete shall be specified by the Engineer. Unless lower temperatures are specified by the Engineer, all mixtures shall be spread, and the first coverage of initial or breakdown compaction shall be performed, when the temperature of the mixture is not less than 250° Fahrenheit at mid-depth, and all breakdown compaction shall be completed before the temperature of the mixture drops below 200 ° Fahrenheit at mid-depth. Additional rolling equipment shall be required or the rate of spread shall be reduced to permit compliance with this requirement.

A. Asphalt Concrete surface course and leveling courses.

1. Equipment Required.

If production in any one hours exceeds the limits set forth below, the Contractor shall cease his paving operation until additional rolling equipment has arrived on the project.

a. 125 tons per hour or more.

The Contractor will be required to furnish a minimum of two approved double-drum vibratory rollers and one 8-ton tandem finish roller for each asphalt paver, with a separate operator for each roller.

A pneumatic roller may be substituted for one of the vibratory rollers if approved by the Engineer.

b. 50-125 tons per hour.

The required minimum rolling equipment specified above may be reduced to one approved double-drum vibratory roller and one 8-ton tandem roller for each asphalt paver, with a separate operator for each roller when the compacted thickness is not less than 0.17'.

c. 50 tons per hour or less, at any location.

The required minimum rolling equipment specified above may be reduced to one approved double-drum vibratory roller, weighing not more than 12 tons, for each paving machine.

2. Compaction Requirements.

Compaction rolling shall consist of a minimum of four complete vibratory coverages with an approved double-drum vibratory roller.

Finish rolling shall consist of one or more coverages with an 8-ton tandem roller immediately following completion of compaction rolling.

B. Asphalt Concrete Base.

1. Equipment required.

The Contractor shall be required to furnish one approved double-drum vibratory roller and a minimum of one pneumatic-tired roller, with a separate operator for each roller.

An approved double-drum vibratory roller may be substituted for the pneumatic-tired roller specified above.

2. Compaction requirements.

Compaction rolling shall consist of the following: a minimum of two complete vibratory coverages with an approved double-drum vibratory roller, and two complete coverages with a pneumatic-tired roller. The order of rolling shall be specified by the Engineer.

Final rolling shall consist of one coverage with the vibrating units turned off.

Approval of vibratory rollers: The Engineer may approve initial use of a double-drum vibratory roller not previously approved on the basis of tests by other agencies or other information provided by the Contractor.

Approval for subsequent use of the roller shall be based on cores taken from test sections designated by the Engineer and compacted with different numbers of coverages.

Test sections shall be compacted under the following conditions:

1. Asphalt Concrete temperature at mid-depth shall be between 270 and 280 degrees Fahrenheit at the beginning of rolling. Rolling shall not continue after the mix temperature has dropped to 200 degrees Fahrenheit. The compacted thickness shall be between 2" and 3.5".

2. The Contractor or manufacturer's representative shall specify the operating conditions of frequency and amplitude.

The basis for approval shall be the attainment of 97% relative compaction and satisfactory surface condition following final rolling. The number of coverages required shall be the minimum number required to obtain 97% relative compaction.

The mix will be sampled during paving of the test sections, and the test maximum density will be the average density of specimens compacted in accordance with California Test 304. The in-place density for each test section shall be the average of three core densities. Relative density will be the ratio of in-place density to test maximum density as determined by California Test 375.

39-9 Side Street Conforms

39-9.01 Description

Side street conforms shall conform to the requirements of City of Rohnert Park Std. 208, with the following additions: The side street structural section shall be 3.5 inches of asphalt concrete base and 2.5 inches of asphalt concrete surfacing 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.

39-10 Edge Grinding

39-10.01 Description

Edge grinding shall be done per City of Rohnert Park Std. 208, 209 and 210.

39-11 Pavement Reinforcing Fabric

Pavement reinforcement fabric is allowed only with the permission of the City Engineer.

39-11.01 Description

The fabric shall be a needle-punched non-woven 100% polypropylene fabric which conforms to the following properties:

<u>P R O P E R T Y</u>	<u>MIN. VALUE</u>
Tensile Strength, either direction (Per ASTM D1682-64)	90 lbs.
Elongation at Break, either direction (Per ASTM D1682-64)	50%

Weight, oz./sq. yd. (Per ASTM D-1910)	4.0 ± 0.5
Asphalt Retention by Fabric (Army Corps of Engineers Method)	0.20 gsy residual
Mullin Burst Strength (Per ASTM D-751)	160 psi

Prior to placing the fabric, the existing pavement to receive the fabric shall be cleaned to the satisfaction of the engineer of all materials such as, but not limited to, leaves, sand, dirt, gravel, water and vegetation.

Placement of the fabric shall be made only under the following conditions:

- (1) The ambient air temperature is above 50° Fahrenheit and rising.
- (2) The pavement is dry and the pavement temperature is above 40° Fahrenheit and rising.

The surface area to receive the fabric shall be sprayed with steam refined pavement asphalt type AR-4000 at the rate of 0.22 -0.28 gallons per square yard. The Contractor's attention is directed to Section 92-1.04, "Applying", of the Standard Specifications. The exact rate of application will be determined by the Engineer. The asphalt shall be sprayed with a suitably metered truck or the truck must have been recently calibrated by test method California No. 399A. The temperature of the asphalt binder must be spread in the range of 290° Fahrenheit and 365° Fahrenheit.

The width of asphalt application will be the fabric width plus 4 inches. Paving asphalt shall be applied no further in advance of the overlay than the distance which the Contractor can maintain free of traffic and in no case more than 100 yards. The paving operation shall closely follow fabric placement and no more fabric than can be covered up with the hot mix that working day shall be placed.

The fabric shall have no overlap. Fabric shall be butted at all joints. Transverse joints shall be shingled in the direction of paving to prevent edge pick-up by the paver.

The fabric shall be placed into the asphaltic binder with a minimum of wrinkles and broomed or squeegeed to remove any bubbles prior to the binder cooling substantially enough so that the fabric will not adhere to it. The equipment for placing the fabric shall be mechanized and capable of handling full rolls of material and shall be capable of laying the fabric without forming excessive wrinkles and/or folds. As directed by the Engineer, if fabric folds or wrinkles ½ inch in height or greater exist, the fabric shall be slit and allowed to lay flat. Brooming will maximize fabric contact with the pavement surface. The equipment used to place the fabric is subject to approval by the Engineer.

At each utility cover which could be covered with fabric, the fabric shall be neatly cut around the cover to allow for raising the cover to finished grade.

Turning of the paving machine or other vehicles should be gradual and shall be kept to a minimum to avoid damage to the membrane. Should equipment tires tend to stick to the fabric during pavement operations, small quantities of asphalt concrete shall be broadcast ahead to prevent sticking.

Pavement reinforcing fabric shall be Glasspave 25 or equivalent.

SECTION 39A – ASPHALT CONCRETE TRENCH PAVING

39A-1.01 Description

Asphalt concrete surfacing and asphalt concrete base and the placing thereof shall conform to the requirements of Section 39 of the Standard Specifications and as specified herein.

39A-2.01 Asphalts

Asphalt thickness for final asphalt surfacing shall conform to City Std. 215 or as shown on the Plans. **Note to Designer:** State existing section and proposed new trench asphalt concrete thickness.

For temporary paving, use 1/2" 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-6.01 General Requirements

The Contractor shall provide compaction of backfill and base material as the job progresses, each day. Temporary paving (2" 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 A.C. paving shall be used around all edges of steel plates.

Finished asphalt 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 Class 2 aggregate base as shown for Type A trench on City Std. 215, the Contractor shall cut the edges of pavement in a neat manner to the locations shown on said Std. 215.

SECTION 40 – PORTLAND CEMENT CONCRETE PAVEMENT

40-1.01 Description

Portland Cement Concrete Pavement shall be constructed in accordance with Section 40 of the Standard Specifications and as specified herein.

40-1.04 Grade Tolerance

The subgrade to receive concrete pavement, immediately prior to placing, shall conform to the compaction and elevation tolerances specified for the material involved and shall be free of loose or extraneous material.

40-1.05 Reinforcement

Reinforcement, where required, shall conform to the provisions of Section 52 of the Standard Specifications, the details as shown on the Plans, and as directed by the Engineer.

40-1.08 Joints

Expansion joints shall be constructed in accordance with the details and at the locations shown on the Plans and in conformance with the requirements of Section 73 of the Standard Specifications.

SECTION 51 – CONCRETE STRUCTURES

51-1.02 Minor Structures

Catch basins shall be constructed to the details and at the locations shown on the plans and in accordance with these Specifications. Catch basin covers shall be concrete with cast iron frame.

Storm drain manholes and drop inlets shall be constructed in conformance with the details and at the locations shown on the plans and in accordance with these Specifications.

51-1.04 Structures

Storm drain manholes shall be standard 48" diameter precast concrete manholes or 60" diameter precast concrete manhole at the locations shown on the plans and in accordance with City Standard Details.

Concrete for manhole bases shall be Class A portland cement concrete conforming to the applicable requirements of Section 90 of the Standard Specifications and shall be poured full thickness against the sides of the manhole excavation or shall be formed.

Manhole barrels and taper sections shall be precast concrete sections using Type II portland cement complying with ASTM Designation: C150. The barrel and taper sections shall be constructed in accordance with the applicable provisions of ASTM Designation: C478.

Top of manhole frames and covers shall be set accurately to the final finished grade in paved streets and to the elevation shown in unimproved areas.

Concrete for catch basins shall be Class "A" portland cement concrete conforming to the requirements of Section 90 of the Standard Specifications.

In lieu of the inspection of reinforcing steel as provided under Section 52-1.04 of the Standard Specifications, upon request the Contractor shall furnish the Engineer with a certificate from the supplier of the reinforcing steel stating that the steel delivered complies with the requirements of Section 52-1.02 of the Standard Specifications.

Bar reinforcing shall conform to and be placed in accordance with Section 52 of the 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 shall 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.

Drop inlets and grates shall be bicycle-safe and designed for H20 loading. Frame and grate shall be hot-dipped galvanized after fabrication

51-1.135 Mortar

51-1.135A Description

Mortar shall consist of a mixture of Type II Portland Cement complying with ASTM C150, sand, and water. Sand for mortar shall be clean, dry, well-graded sand, free of organic or other deleterious matter, silt or other objectionable matter, and shall be of such size as determined by laboratory sieves, that all will pass a No. 30 sieve size, square openings.

Mortar shall consist of one part by volume of cement and three parts by volume of sand. The mortar shall contain only enough water to permit placing and packing. Mixed mortar shall be used before initial set and in no case will retempering with additional water be permitted.

Mortar shall conform to the requirements of Section 51-1.135 of the State Standard Specifications.

51-1.135B Admixtures

No admixtures will be permitted unless authorized by the ENGINEER.

51-1.135C Curing

After placing, all surface of mortar shall be cured by the water method in accordance with Section 90-7, "Curing Concrete" of the State Standard Specifications, for a period of not less than 3 days.

SECTION 56 – SIGNS

Street name signs and traffic regulatory signs and hardware which are not to be mounted on traffic signal mastarms or poles shall be provided and installed by the Contractor at the locations shown on the Plans and Part III of the City Traffic Standards.

Existing street name signs and traffic regulatory signs which are not on traffic signal mastarms/poles shall be relocated as shown on the Plans by the Contractor.

New street name signs and traffic regulatory signs and brackets to be mounted on traffic signal mastarms/poles shall be provided and installed by the Contractor.

Existing street name signs and traffic regulatory signs on traffic signal mastarms/poles will be relocated by the Contractor.

SECTION 64 – ASBESTOS CEMENT PIPE

SECTION REPLACED

Asbestos cement pipe is not authorized for use within the City of Rohnert Park.

SECTION 64 – PLASTIC PIPE

64-1.01 Description

All plastic storm drain pipe shall be type S corrugated polyethylene pipe.

64-1.02 Size and Materials

Plastic pipe for use in public storm drain systems shall be Type S, smooth interior wall, corrugated exterior wall, high density polyethylene pipe (HDPE) as specified in AASHTO designation M294. Pipe shall be manufactured from virgin compounds with no plasticizers. HDPE compounds used in the manufacture of plastic pipe shall be per the Standard Specifications.

64-1.04 Couplings and Fittings

Pipe couplings and fittings shall be a bell and spigot joint with a rubber gasket on the spigot meeting ASTM F-477 and shall provide a soil-tight seal and be made of the same material and from the same manufacturer as the pipe. The method of joining pipes and fittings shall be as recommended by the pipe manufacturer. Pipes and fittings coupled together shall have no more than one corrugation distance of separation between them.

64-1.05 Excavation and Backfill

Excavation and backfill shall be as shown on Std. 215 of the City of Rohnert Park Design and Construction Standards and the following provisions.

The space between the pipe and trench wall shall be wider than the compaction equipment used in the pipe zone, regardless of the dimensions shown on the Std. 215 unless CLSM backfill material is used.

Pipe bedding will be placed in 6" (maximum) lifts to 6" above the top of pipe with each lift hand or mechanically tamped. The final lift may be compacted with a plate type vibrating compactor.

During construction, heavy equipment vehicle loads shall be avoided over the pipe or additional cover shall be placed at vehicle crossings.

64-1.07 Laying Pipe

Plastic storm drain pipe shall be installed in accordance with the Standard Specifications, generally accepted practice and on the alignment and grade as shown on the plans. When long radius curves are permitted, adjustments in horizontal alignment will be achieved through adjustments at each coupling, within manufacturer's specification, and not by bending of the pipe.

Pipe shall be centered in the trench.

Unless otherwise specifically permitted by the Engineer, all pipe shall be laid upgrade.

Where ground water or surface drainage occurs, pumping shall continue until backfilling has progressed to a sufficient height to prevent flotation of the pipe.

64-1.10 Television Inspection of Plastic Storm Drain Pipe

Television inspection of plastic storm drain pipe shall be as described in Section 79 of these Specifications.

64-2.01 Trench Shoring and Bracing - Storm Drain

All bracing and shoring shall conform to Section 65-2 of these Specifications.

SECTION 65 – REINFORCED CONCRETE PIPE

65-1.01 Description

Reinforced concrete pipe shall be installed on the alignment and grade as shown on the plans and in accordance with the applicable provisions of Section 65 of the City of Rohnert Park Construction Specifications and as directed by the Engineer. Reinforced concrete pipe shall be Class III, Class IV, or Class V, as shown on the plans, and shall conform to the provisions of ASTM C76.

65-1.02 Materials

All concrete pipe shall conform to the provisions of Section 65-1.02 of the Standard Specifications prior to shipment from the manufacturer.

65-1.03 Earthwork

Excavation and backfill shall conform to the City of Rohnert Park Construction Specifications. Backfill shall be in accordance with Std. 215 and as shown on the plans.

If, during excavation for any culvert or structure, material is encountered which is unsuitable as a foundation for such culvert or structure, such unsuitable material shall be removed to a depth as required by the Engineer and the resulting space shall be refilled with approved material.

Trenching operations shall be conducted in such a manner as not to disturb the existing curb and gutter and existing utilities.

Trenching operations for pipelines and structures shall be conducted in such a manner to minimize damage to existing tree roots. Hand digging shall be used where necessary to protect tree roots. Where tree roots are encountered, root pruning shall be accomplished by use of sharp tools appropriate for the size of root to be cut. Each cut shall be clean with no torn bark or splintered wood remaining on the tree. All tree work shall be performed by a certified arborist from the list approved by the City.

All raised pavement markers, street striping, chatter bars or any other traffic markings disturbed during work shall be replaced in kind by the Contractor to the satisfaction of the Engineer.

Excavation and backfill shall be as shown on Std. 215.

65-1.07 Laying Pipe

Unless otherwise specifically permitted by the Engineer, all pipe shall be laid upgrade. No pipe shall be laid which is cracked, checked, spalled, or damaged and which, in the opinion of the Engineer, is unsuitable for use.

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 shall 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.

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 pipes and accessories shall be inspected for visible defects prior to lowering into the trench. Any visibly-defective or unsound pipe shall be replaced.

The line and grade of existing utilities designated to remain 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.

Existing water lines shall be supported in place maintaining service during construction. The Contractor shall be responsible for any damage to the water lines during construction and any damage resulting from improper backfilling techniques. Water services shall be relocated where encountered during construction and as shown on the plans.

Existing sewer lines shall be supported in place maintaining service during construction. The Contractor shall be responsible for any damage to the sewer lines during construction and any damage resulting from improper backfilling techniques.

65-1.08 Television Inspection of Reinforced Concrete Storm Drain Pipe

Television inspection of cast-in-place concrete storm drain pipe shall be as described in Section 79 of the these Specifications.

65-2 Trench Bracing and Shoring - Storm Drain

65-2.01 Description

All bracing and shoring shall conform to Section 5-1.02A and Section 7-1.01E of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.

The Contractor shall take all necessary measures to protect the workers and adjacent areas and structures from the hazards of the trenching or excavation operations.

SECTION 66 – CORRUGATED METAL PIPE

66-1.01 Description

All corrugated metal pipe shall meet the requirements of Section 66 of the Standard Specifications. Corrugated aluminum pipe, if used, shall meet the requirements of Section 66-2 of the Standard Specifications.

SECTION 71 – SEWERS

71-1.02 Materials

Sewer pipe to be installed shall be ductile iron pipe, high density polyethylene, or polyvinyl chloride pipe, in conformance with the appropriate provisions of the City Construction Specifications, Section 71, Standard Specifications for Public Works Construction, as noted on the Plans and as specified herein. Asbestos cement pipe shall not be allowed.

71-1.02A Polyvinyl Chloride (PVC) Pipe

PVC solid wall sewer pipe and fittings for gravity sewer shall be made from all new, rigid, unplasticized polyvinyl chloride in accordance with ASTM Standard Specifications D3034 and F679 and shall have a wall thickness of at least SDR 26. Joints shall consist of an integral thickened bell-and-rubber ring and shall provide for expansion and contraction at each joint. The rubber ring shall be compatible with the pipe manufacturer's 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 an elastomeric waterstop firmly clamped around the pipe exterior and cast into the structure base per City Standard 500 or near the structure wall center per City Standard 533.

71-1.02B Restrained Joint (PVC) Pipe and Fittings

Restrained joint PVC pipe and fittings shall conform to the requirements of ASTM D2241. Joints shall be gasketed and conform to the requirements of ASTM D3139 and ASTM F477. Use only full circle type restraint clamps. Restraint systems that use set screws that impose point loads on the pipe will not be permitted.

71-1.02C Ductile Iron Pipe

Ductile iron pipe shall be cement lined, new pipe conforming to ANSI A 21.51-197s 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 either bell and spigot ends, "Tyton Joints," or mechanical joints, except where specifically specified on the Plans.

Ductile iron pipe used in force mains shall be polyethylene or epoxy lined.

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/A21.5-82 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 Engineer.

71-1.02D Ductile Iron Restrained Joint Fittings

Restrained joint fittings shall be ductile iron in accordance with applicable requirements of ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision and shall be compatible with the type and pressure class of pipe used.

71-1.02E Sewer Force Main and Gravity HDPE Pipe

The Contractor shall provide high density polyethylene pipe (HDPE) as specified. The pipe shall be made to diameter and tolerances in accordance with ASTM F714. All pipe shall be made from virgin grade material. The pipe shall be of the diameter and class shown or specified and shall be furnished complete with all fabricated fittings, and other appurtenances as necessary for a complete and functional system.

Markings: Pipe materials shall be legibly marked by the pipe manufacturer. The following shall be printed on the pipe:

1. Name and trademark of manufacturer.
2. Nominal pipe size.
3. Standard Dimension Ratio.
4. The letters PE followed by the polyethylene grade per ASTM D1248 followed by the Hydrostatic Design Basis in hundreds of psi.
5. Manufacturing Standard Reference.
6. A production code from which the date and place of manufacture can be determined.

The Contractor shall provide submittals to the Engineer for approval on all materials.

Quality Control Submittals:

1. HDPE Pipe, Butt-Fusion Welded Joints:

- a. The Contractor shall provide written verification that personnel using the fusion joining equipment are trained in the skills necessary for the correct joining of HDPE pipe and recommended methods for service connections to the satisfaction of the pipe supplier. Certification of the training shall be provided from the certified representative of the pipe manufacturer.
- b. Fusion equipment shall be operated only by technicians who have been certified by the pipe manufacturer or supplier and who have a minimum of five (5) years of experience fusion welding pipelines. The technician's experience shall be documented in the HDPE pipe submittal, including a current (within the past three years) training certificate.
- c. The Contractor shall perform trial fusion welds and submit samples to the Engineer for review prior to installation of the pipe. Full penetration welds shall provide a homogeneous material across the cross section of the weld. The fusion

machine and technicians employed for the trial welds shall be the same utilized for the installation work.

- d. Quality assurance procedures certified by the pipe manufacturer to be in full accordance with the requirements of this Specification shall be submitted by the Contractor.
4. Certification. The Contractor shall furnish a certified affidavit of compliance for all HDPE pipe and fittings furnished confirming that the materials supplied fully conform to the requirements specified herein.
5. Certifications of Calibration: Approved testing laboratory certificate or manufacturer's calibration certificate.
6. Quality assurance procedures shall be performed by the pipe manufacturer fully in accordance with the requirements of this specification. The certification shall include certified laboratory data confirming that said tests have been performed on a sample of the pipe to be provided under this contract, or pipe from that production run, and that satisfactory results were obtained.

Shop Drawings:

1. The Contractor shall submit catalog cuts, specifications, dimensioned drawings, installation details and sketches, and other pertinent information for the HDPE pipe installation work. All materials provided shall be in full accordance with the requirements of the reference specifications specified above.
2. The Contractor shall verify with the pipe manufacturer all connection details.
3. The Contractor shall submit detail drawings and a written description of the construction procedure to install pipe.

Pipe shall be high molecular weight, high-density polyethylene pipe. The material shall be listed by the Plastic Pipe Institute (PPI) with a designation of PE 3608 and have a minimum cell classification of 345464C, D, or E as described in ASTM D3350. The pipe material shall meet the requirements for Type III, Class B or C, Category 5, Grade P34 material as described in ASTM D1248. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe. Pipe and fittings shall be made in conformance with ASTM F714 and ASTM D3261 as modified for the specified material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other injurious defects. It shall be uniform in density and other physical properties. Any pipe not meeting these criteria shall be rejected.

Only tools approved by the pipe manufacturer or the Engineer shall be used for assembly of pipe fittings and service connections to ensure proper installation.

The heater plate used for pipe joining shall be equipped with suitable means, such as thermometers or pyrometers, to measure the temperature of plate surfaces and to ensure uniform heating.

Butt fusion fittings shall be in accordance with ASTM D3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe. Fabricated fittings shall be manufactured using a McElroy Data logger to record fusion pressure and temperature. A graphic representation of the temperature and pressure data for all fusion joints made producing fittings shall be maintained as part of the quality control. The fitting shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

Each polyethylene fusion fitting shall meet all the material requirements established for the pipe to which the fitting is to be jointed. Fittings fabricated from pipe shall be manufactured from pipe stock with a wall thickness at least 25% greater than that of the pipe to which the fitting is to be joined or shall be otherwise externally reinforced so that the fitting carries a pressure rating equal to that of the pipe from which it is made. Each fitting shall be designed and manufactured to operate at not less than the design pressure of the pipe system for which it is intended.

Polyethylene pipe shall be joined by butt fusion welding, as specified herein.

RESTRAINED JOINTS:

Mechanical restraint for HDPE may be provided by mechanical means separate from the mechanical joint gasket sealing gland. The restrainer shall provide wide, supportive contact around the full circumference of the pipe and be equal to the listed widths. Means of restraint shall be machined serrations on the inside surface of the restrainer equal to or greater than the listed serrations per inch and width. Loading of the restrainer shall be by a ductile iron follower that provides even circumferential loading over the entire restrainer. Design shall be such that restraint shall be increased with increases in line pressure.

Serrated restrainer shall be ductile iron ASTM A536-80 with a ductile iron follower; bolts and nuts shall be corrosive resistant, high strength alloy steel.

The restrainer shall have a pressure rating of, or equal to that of the pipe on which it is used or 150 PSI whichever is lesser. Restrainers shall be JCM Industries, Sur-Grip or pre-approved equal.

Nominal Size	Restraint Width	Serrations per inch
4", 6"	1-1/2"	8
8" 10 & 12"	1-3/4"	8

Pipe stiffeners shall be used in conjunction with restrainers. The pipe stiffeners shall be designed to support the interior wall of the HDPE. The stiffeners shall support the pipe's end and control the "necking down" reaction to the pressure applied during normal installation. The pipe stiffeners shall be formed of 304 or 316 stainless steel to the HDPE manufacturers published average inside diameter of the specific size and DR of the HDPE. Stiffeners shall be by JCM Industries or pre-approved equal.

Install in accordance with manufacturer's recommendations and as directed herein.

JOINING:

BUTT FUSION: Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a McElroy Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.

SIDEWALL FUSION: Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.

MECHANICAL: Bolted joining may be used where the butt fusion method cannot be used. Flange joining will be accomplished by using a HDPE flange adapter with a ductile iron back-up ring. Mechanical joint joining will be accomplished using either a molded mechanical joint adapter or the combination of a Sur-Grip Restrainer and Pipe Stiffener as manufactured by JCM Industries, Inc. Either mechanical joint joining method will have a ductile iron mechanical joint gland.

OTHER: Socket fusion, hot gas fusion, threading, solvents, and epoxies may not be used to join HDPE pipe.

QUALITY AND WORKMANSHIP: The pipe and/or fitting manufacturer's production facility shall be open for inspection by the owner or his designated agents with a reasonable advance notice. During inspection, the manufacturer shall demonstrate that it has facilities capable of manufacturing and testing the pipe and/or fittings to the standards required by this specification.

PIPE PACKAGING, HANDLING & STORAGE: The manufacturer shall package the pipe in a manner designed to deliver the pipe to the project neatly, intact and without physical damage. The transportation carriers shall use appropriate methods and intermittent checks to insure the pipe is properly supported, stacked and restrained during transportation such that the pipe is not nicked, gouged, or physically damaged.

Pipe shall be stored on clean, level ground to prevent undue scratching or gouging. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe

manufacturer's recommendations. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by chokers or lifting equipment.

Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the heat fusion joining method.

Fused segments of the pipe shall be handled so as to avoid damage to the pipe. Chains or cable type chokers must be avoided when lifting fused sections of pipe. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections.

71-1.03 Excavation and Backfill

Backfill shall be in accordance with City Standard 215 except trench backfill section in roadways and paved areas shall be CDF.

Sheet piling and other sheeting shall be withdrawn in such a manner as to prevent caving at the walls of excavations or damage to piping or other structures. Except as may be hereinafter modified, no sheeting shall be left in the trench and no backfill shall be made against the sheeting before it is removed. Any sheeting extending below the invert of the pipe shall be left in place by cutting off in a manner satisfactory to the Engineer.

Trenching operations shall be conducted in such a manner not to disturb the existing curb and gutter and the existing utilities. Flow shall be maintained in any sanitary sewers, storm drains, water lines, or water courses encountered in trenching.

The Contractor shall remove all water which may accumulate in the excavation during the progress of the work can be done in the dry. Trenches shall be kept free from water while the pipe or other structures are installed and until backfilling has progressed to a sufficient height to anchor the work against possible flotation or leakage. At all times, the Contractor shall have sufficient pumping machinery available for immediate use. Water shall be disposed of in such a manner as to cause no injury to public or private property, or be a menace to public health.

Blasting will not be permitted.

All trench excavation materials from trenches shall be the property of the Contractor. None of the excavation material shall be disposed of on the work site. Prior to disposal of any material, the Contractor shall submit to the Engineer written authorization for such disposal of material and entry permission signed by the owners of the disposal site, and shall comply with any other requirements of disposal, such as City and County permits, as may be required.

All raised pavement markets, street striping, chatter bars or any other traffic markings disturbed shall be replaced in kind by the Contractor to the satisfaction of the Engineer.

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

71-1.03A Trench Bracing and Shoring

All bracing and shoring shall conform to Section 5-1.02A and Section 7-1.01E of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.

The Contractor shall take all necessary measures to protect the workmen and adjacent areas and structures from the hazards of the trenching or excavation operations.

Settlement monitoring shall be required for major excavations where shown on the plans, next to existing improvements or as directed by the City Engineer.

71-1.04 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 City Standard 500 and as described in section 71-1.07A of these specifications.

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 asphalt concrete 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.

Trimming of taper sections is not permitted.

All sections of removed and or replaced manhole barrels shall be sealed with a preformed mastic seal, Ram-Nek or approved equal. Exterior joints shall be taped using a 6-inch wide 60 mil tape, Infi-shield or approved equal.

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

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

Existing grade adjustment rings in the adjustment of manhole frames shall become the property of the Contractor.

71-1.05 Pipe Laying

Where groundwater occurs, pumping shall continue until back filling has progressed to a sufficient height to prevent flotation 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.

Where construction consists of constructing 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 Engineer.

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

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.

The pipe manufacturer's written instructions covering the installation of the pipe shall be closely followed unless otherwise directed by the Engineer or as specified herein. After each pipe section is laid, the pipe joints shall be checked by the Contractor with a feeler gauge to determine if the rubber ring is properly seated for push on joint PVC or D.I. pipe. The trench shall not be backfilled until authorized by the Engineer. Pipe laying shall proceed upgrade with the spigots pointing in direction of flow. The invert of the pipe shall be set at required line and grade as determined from batter boards set not over 25 feet apart. Electro-optical grade setting devices may be used provided the Contractor certifies that the device will 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.

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 drains. If the Contractor elects to remove and replace, backfill shall be in conformance with City Standard 215.

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

Sewer lateral inverts shall be set at or above the midpoint of the sewer main. Sewer laterals shall be placed at the locations shown on the Plans or as directed by the Engineer. The Engineer shall have the authority to direct the Contractor as to the location of laterals to be placed in the field. Typically, each sewer lateral found to exist shall be replaced, unless specifically deleted by the Engineer. In all cases, a minimum separation of five (5) feet shall be left between parallel sewer laterals and water services.

71-1.07 Sewer Structures

Manholes shall be standard precast concrete manholes as detailed on City Standard 500, and as shown on the Plans. Mains larger than 27" in diameter require 60" diameter manholes. Concrete manhole bases may be precast or cast-in-place. Precast concrete manhole bases must be approved by the City Engineer.

Manhole bases may be poured-in-place concrete on undisturbed earth. The bases shall be poured a minimum full thickness as shown on City Standard 500 against the side of the manhole excavation or to dimensions shown on the Plans if the dimension exceeds the minimum required. The manhole excavation site shall be dewatered before pouring.

Pre-cast manhole bases, conforming to City Standard 500 in dimensions and the requirements outlined below for materials may be used. Such pre-cast bases shall be placed on a minimum 6-inch thick cushion of drain rock, as specified in City Standard 500. The drain rock shall extend a minimum of 6 inches beyond the outside edges of the base.

Concrete for manhole bases shall be Class A portland cement concrete conforming to the applicable requirements of Section 90 of the Standard Specifications. The portland cement shall be Type V conforming to ASTM C 150 or low-alkali-Type II cement meeting the requirements for Type V cement.

Where steel reinforcement is required in manhole base construction, such reinforcement shall be furnished and placed as shown on City Standard 500 and in accordance with the applicable provisions of Section 52 of the Standard Specifications.

The base slab and initial riser section shall be connected to create a watertight joint per City Standard 500. 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 C150 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 C478 and shall be inspected by the Engineer to determine that the interior surfaces are smooth and free of pockets or depressions.

Manhole frames and covers shall be in accordance with City Standard 512.

Tops of manhole frames and covers shall be set accurately to finished grade in paved streets and one foot above finished grade in unimproved areas. The frames shall be evenly set per City Standard 500. Where manholes are set above finished grade, the earth shall be mounded up around the manhole in a neat and acceptable manner to the satisfaction of the Engineer.

Where sewer pipe is to be installed into or out of existing manholes, and the invert of the new connection penetrates the manhole barrel section, the barrel section wall shall be core drilled. The Contractor shall install an elastomeric seal and silicone caulk per City Standard 533. Where sewer pipe is to be installed into or out of existing manholes, and the invert of the new connection penetrates the manhole base the manhole base may be chipped and the Contractor shall install an elastomeric waterstop and 316 stainless steel band per City Standard 500. Form a smooth channel in the manhole base using Dam-It by Euclid. For either method the Contractor shall backfill the area around the pipe with a non-shrink grout to insure a watertight connection.

All joints in manholes shall be sealed by means of a preformed, self-bonding, self-sealing plastic gasket, such as "Ram-Nek" manufactured by the K.T. Snyder Company, Houston, TX, or approved equal. Joint seals shall be installed in full compliance with the manufacturer's current recommendations.

71-1.07A Chimney Sections

All manhole castings shall be adjusted to meet final paving elevation with the installation of HDPE grade rings and shall be installed per City Standard 500 and as described herein.

After final installation a final deviation of more than 0.25 inch between the top of the manhole lid and the surrounding paving at any location shall be cause for rejection. Installation of HDPE Adjusting Rings shall be per manufacture's recommendations. In order to achieve a flush finish between the top of the concrete cone section and the first HDPE grade ring the alignment tab on grade ring bottom may need to be removed so that the grade ring will sit on the manhole cone section flush and not have point loading.

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. Smooth the top of the concrete cone with a chisel or grind the surface as needed to remove protrusions. Clean the concrete cone or top

slab with a whisk broom . Ensure a flat seating surface free of rocks, gravel, blacktop, protruding concrete or debris. Utilize compressed air to blow dust and debris from the surface after grinding. Where the top of the concrete cone is rough, use non-shrink hydraulic cement, according to manufacturer's recommendations, to fill in depressions and smooth the concrete cone. Grinding and grouting shall be done when required to:

1. Remove any protrusions over ¼ inch.
2. Make the manhole ring stable without any rocking prior to foaming.

The HDPE adjusting ring system shall be measured in place dry prior to final assembly. The annular space between the rings and cone basin, the rings, and the rings and cover frame shall be sealed utilizing an approved construction foam in accordance with manufacturer's instructions. With the sealant applied, place the first ring down onto the cone or top slab with the male lip into the opening. The ring must be stable prior to foaming. Point loading on the ring is cause for rejection of the finished work.

Prior to setting the cover frame in place, construction foam sealant shall be placed on the top of the last ring. Be sure to apply the sealant in a location so that it contacts the cover frame the full 360 degrees. With the sealant applied, set the cover in place verifying that it is centered on the top ring. Cover and frame shall be aligned per Rohnert Park City Standard 512A. Install external joint seal over the entire chimney area, extending from the cover to three inches below the top of the cone. Wrap with 60 mil 6 inch wide corrosion prevention tape.

CONCRETE COLLARS

No backfilling, except with concrete, will be permitted, except over excavated areas may be filled with CLSM. Seal all saw cut grooves beyond the edge of concrete. Concrete collars shall be constructed with quick set concrete, mixture to be approved by the Engineer. Except as approved by the Engineer, Contractor shall keep traffic off of raised facilities for 24 hours.

The surface of the finished concrete shall be finished 2 inches below flush with the pavement. The top surface of the cast collar shall be screeded off at the correct elevation to receive and support the full depth of the pavement surface course. Contractor shall let the 8" concrete collar cure for 24 hours prior to traffic loading. Cover manhole with steel plate during curing process. The concrete shall attain a modulus of rupture of 1,000 pounds per square inch prior to beginning paving operations.

71-1.08 Trench Resurfacing

Trench resurfacing shall be as shown on Standard 215, "Standard Trench Detail," of the City of Rohnert Park Standard Plans except that aggregate base shall be replaced with asphalt concrete paving and as specified in Section 39A, "Asphalt Concrete Trench Paving," of the City of Rohnert Park Construction Specifications.

71-1.09 Testing of Sewers

Testing of all portions of the sewer including manholes will be required.

All sewer pipes shall be tested per the appropriate test as described in City Standard 530 and 530A guidelines or as described below. Manholes shall be tested per City Standard 530B. The Contractor shall furnish to the City a 5% deflection mandrel and proving ring for gravity mains as shown on City Standard 518 at the City's request.

GRAVITY HDPE PIPELINES: Trunk sewers with no lateral connections between manholes constructed of HDPE shall be tested in accordance with ASTM F1417. All other HDPE sewers shall be tested per City Standard 530 and 530B.

HDPE Force Mains shall be tested as referenced in City Standard 530A.

SECTION 72 – SLOPE PROTECTION

72-1.01 Description

Slope protection shall consist of loose rock riprap. The slope protection shall be placed at the location shown on the Plans in conformance with the requirements of the Standard Specifications and the Sonoma County Water Agency Flood Control Design Criteria Manual.

72-2.02 Materials

Loose Rock Riprap - 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 riprap by weight shall be less than four (4) inches average diameter. An occasional rock having an average diameter of not more than 20 inches may be included, provided that no more than five (5) percent of the rock riprap area shall have these larger rocks projecting above the neat lines, but in any event the total rock mass shall be dense and well integrated.

72-5 Grouted Rock Riprap

Grouted rock riprap shall be constructed in accordance with the details as shown on the Plans, Standard Specifications, as specified herein, and at the direction of the Engineer.

Concrete for grouted rock riprap shall be in accordance with Section 90 of the Standard Specifications and shall be Class "C".

Rocks shall not exceed a one foot diameter and shall not be less than three inches in diameter. Rocks shall be so placed as to provide a minimum of voids and the larger rocks shall be placed in the toe course and on the outside surface of the slope protection. The rock may be placed by dumping and may be spread in layers with suitable equipment. Local surface irregularities of the grouted rock riprap shall not vary from the plan slopes by more than six inches, measured at right angles to the slope.

The surfaces of the rock to be grouted shall be cleaned of adhering dirt and clay and moistened. Grout shall be brought to the place of final deposit by means of chutes, tubes, or buckets, or may be placed by means of pneumatic equipment or other mechanical methods. In no case shall grout be permitted to flow on the rock riprap a distance in excess of ten feet. Immediately after depositing, the grout shall be spaded and rodded into place with suitable spade trowels or other approved means until a minimum penetration of eight inches is achieved.

Grouted rock riprap shall be cured as provided in Section 90 of the Standard Specifications.

SECTION 73 – CONCRETE CURBS AND SIDEWALKS

73-1.05 Curb Construction

Portland cement concrete curb and gutter shall be constructed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications and as specified herein.

Curb openings, for driveways, shall be constructed at existing driveways, and at locations shown on the Plans or directed by the Engineer.

All concrete which is to be removed from curb, gutter, and driveway areas shall be removed to the nearest construction joint or as directed by the Engineer.

Median curb per City of Rohnert Park Standard Details shall be constructed at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications and these modifications.

All oil, paint, tire marks, and other discoloring shall be removed from the curb and gutter by sandblasting prior to acceptance by the Engineer. Cement mortar will not be an acceptable substitute for sandblasting.

No deduction in measured length of curb and gutter to be paid for will be made for curb openings for driveways.

73-1.07 Sidewalk, Driveway, Island Paving, Handicap Ramp, and Valley Gutter Construction

Portland cement concrete sidewalk shall be constructed in accordance with the details and at the location shown on the Plans and in conformance with the requirements of Section 73 of the Standard Specifications and as specified herein.

All concrete which is to be removed from sidewalk and driveway areas shall be removed to the nearest transverse score mark across the full width of sidewalk or construction joint as directed by the Engineer.

Concrete for sidewalk shall conform to the requirements of Section 73 of the Standard Specifications.

All soft or spongy material shall be removed and replaced with suitable material as required by the Engineer.

Portland cement concrete driveways shall be constructed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications, and as specified herein.

Island paving shall be constructed in accordance with the details and at the location shown on the Plans, and as directed by the Engineer.

Handicap ramps shall be constructed in accordance with the details and at the locations shown on the Plans per City Std. 232.

Portland cement concrete valley gutter shall be constructed in accordance with the details and at the location shown on the Plans and in conformance with the requirements of Section 73 of the Standard Specifications and City of Rohnert Park Standard Details with the following modifications and additional requirements.

Concrete for valley gutter shall conform to the requirements of Section 73 of the Standard Specifications and as specified herein.

All soft or spongy material shall be removed and replaced with suitable material as required by the Engineer.

SECTION 76 – CONCRETE CYLINDER PIPE

76-1.01 General

Concrete Cylinder Pipe or Reinforced Mortar Pressure Pipe shall meet the requirements of Section 76 as specified herein. If Concrete Cylinder Pipe is selected, it shall conform to the requirements specified in this section and cathodic protection shall be provided as specified in herein.

76-1.02 Description

Mortar lined and coated steel cylinder pipe shall be pretensioned concrete cylinder type in accordance with AWWA C303 and as noted herein. Piping shall be per AWWA C303 for piping inclusive of 60-inch diameter, unless otherwise noted.

Pretensioned concrete cylinder pipe shall conform to AWWA C303 and its appendix except as follows. All piping and appurtenances shall be designed for 100 psi working pressure minimum and shall be capable of withstanding a trench load of 20 feet. Rubber gaskets shall conform to Section 76-1.02 (4), "Flanges, Gaskets, and Bolts", as specified herein. Buttering material for sealing interior joints and grout for exterior sealing of joints shall conform to mortar specified in section 3.10 of AWWA C303.

Piping shall be designed in accordance with the appendix of AWWA C303. Pipe diameter referred to is inside diameter of pipe after installation of pipe lining.

Piping 48 inch diameter and larger shall be designed to limit deflection. When this type of pipe is used for 48-inch diameter and larger pipe, the Contractor shall assume complete responsibility for proper installation to prevent deflections in excess of the limits specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 50, "Pipe Deflection", as specified herein.

1. Materials. Cement shall be portland cement in accordance with ASTM C150 and shall be Type II. Steel cylinders shall be ASTM A570 structural quality Grade C and shall be 10 gauge minimum. Steel for joint rings shall conform to ASTM A570 Grade A and shall be minimum 12 gauge for diameters up to 18 inches, minimum 3/16 inch for diameters 18 through 42 inches and ¼ inch for diameters 48 inches and larger. Spigot rings shall be formed from hot rolled steel having Carnegie Shape M3516.
2. Construction. Reinforcing bars shall be wound helically around the cylinder under a tensile stress in accordance with AWWA C303. A device shall be provided for stressing, measuring, and indicating the tension of the bar reinforcement during the winding operation.

As the circumferential bar reinforcement is wound, a portland cement paste composed of one sack of cement to not more than five gallons of water shall be applied to the

rod or to the cylinder in such a manner that the section of bar bearing on the cylinder shall be coated with cement paste.

Immediately preceding application of concrete encasement, a cement paste composed of one sack of portland cement to not more than five gallons of water shall be applied uniformly over the steel surface.

3. Data Required. The manufacturer shall provide the following data in addition to the other requirements herein: an affidavit of compliance; design calculations; steel test reports; concrete test reports; rubber gasket test reports; and the pipe laying diagram. The pipe shall be marked in accordance with AWWA C303.
4. Flanges, Gaskets, and Bolts. Steel pipe flanges whose nominal diameter is 6 inches or greater shall conform to AWWA Standard C207, Class D. All flanges shall be furnished with gaskets, studs, or bolts and nuts. Where a flange is not connected to another appurtenance or pipe, a blind flange shall be attached.

Gaskets for flanges shall be 1/16-inch thick, rubber or asbestos composition. The gaskets shall conform to ASTM Designation F104 (112100-M6).

Unless otherwise specified, all bolts, studs, and nuts shall be steel conforming to the requirements of ASTM Designations A307, A325, or approved equal. Washers shall be of forged or rolled steel. All bolting material shall be cadmium plated.

Unless otherwise specified, steel bolts shall be furnished with regular semifinished hexagonal heads and nuts. Bolt heads and nuts shall be sufficient to break the bolt in the body portion when tested.

5. Protective Coatings for Appurtenances. This section covers the preparation of surfaces and the application of protective coatings and related materials as required to complete the work as specified herein.

Galvanized metal, non-ferrous metal parts, stainless steel parts, austenitic gray iron, and high nickel cast iron parts shall not be coated unless otherwise specified in these specifications. Surfaces not to be coated shall be protected from contamination and damage during the cleaning and coating of adjacent surfaces.

The items listed in the following schedule shall be shop-coated, unless otherwise specified. Field coating may be permitted on items not specified herein upon approval of the Engineer.

Coating materials, minimum number of coats, and minimum dry film thickness for the various items of work shall be as specified below, unless otherwise shown on the drawings. Surface preparation and undercoat(s) shall be in accordance with the coating manufacturer's recommendations.

<u>ITEM</u>	<u>COATING</u>
A. All bolts, nuts, and washers.	Cadmium plated in accordance with ASTM Designation A165.
B. Exterior surfaces of buried blind flanges.	Two coats, 8 mils each, Kopper's Bitumastic 300 M coal-tar epoxy or ENGARD 800 coal tar epoxy or approved equal.
C. Interior ferrous surfaces of blind flanges and valves.	Same as Item "B".
D. All surfaces of buried valves.	Same as Item "B".
E. Exterior surfaces of pipe ends to coal-tar enamel coating and wrapping.	Same as Item "B"; extend for all sleeve-type couplings.
F. Exterior surfaces of nuts and sleeve-type couplings, and blind flanges.	One coat, 8 mils, of bolts for flanged joints, Kopper Bitumastic 300 M coal-tar epoxy or Engard to be applied after installation and hand tool cleaning.

Compensation for furnishing and application of protective coatings will be deemed included in the contract prices for the various items of work and no additional payment will be made therefore.

6. Marking of Pipes. Each pipe section and special fitting shall be marked clearly on the interior surface with the manufacturer's name or trademark and the date of manufacture. In addition, special marks of identification, sufficient to show the proper location of the pipe or special fitting in the line, shall be placed on each pipe or special.

Each pipe shall be marked with a designation, e.g. 48 PT 100. The first number denotes pipe inside diameter in inches; "PT" denotes pretensioned pipe; and the last number denotes the operating head in psi, as specified herein.

The pipe coating shall be marked with the date the coating was applied.

76-1.07 Laying Concrete Cylinder Pipe

1. Alignment, Angles, and Bends. In general, the centerline of the pipe shall be as shown on the Plans. When necessary, and with the approval of the Engineer, the pipeline may deviate slightly from this alignment.

Changes in the direction of alignment or grade of the pipeline shall be accomplished by using specially fabricated bends, by beveling the ends of the pipe, or by pulling the joints. It is desirable to eliminate special sections or fittings wherever possible and the Contractor may submit alternate curves for approval by the Engineer. Wherever a grade break is shown on the drawings at a specific station, it is permissible to alter

said station so that the change in grade is more gradual and can be taken up in the joints without exceeding the allowable angle of deflection recommended by the pipe manufacturer.

In general, the Contractor shall hold the flow line of the pipe at or below the specific elevation denoted on the profile. When necessary, and with the approval of the Engineer, the pipeline may deviate slightly from this profile; however, in no case shall the top of the pipe have less than the cover indicated on the typical trench details shown on the Plans.

Beveling pipe ends to provide for angles in the pipeline, where fittings or specials are not used, shall be accomplished by cutting the pipe sections to the proper length and beveling one or both ends of each pipe section by welding the bell or spigot ring to the pipe cylinder at a deflection of no more than five degrees from the plane perpendicular to the longitudinal axis of the pipe section. Pulled joints will be permitted at beveled pipe ends.

2. Joints and Couplings. Field joints may be either welded or rubbergasketed type, except where specifically shown on the Plans and where welding is necessary to anchor pipe in tension.

Where the words "weld joints" are shown on the profile sheets, the Contractor is required to weld the joint. The weld may be on the inside or outside.

The Contractor shall weld all vertical and horizontal joints which deflect more than five degrees. The length of pipe to be welded shall be as shown on the Plans.

All field-welded joints shall conform to the requirements of AWWA Standard C206 as modified herein.

Bell and spigot joints shall be double-welded (an inside and outside weld) at concrete encasements and in casings under highways and railroads. Prior to backfilling this type of joint, the Contractor shall test the joint in accordance with AWWA Standard C206, Section A8-2, paragraph 2.2, or by soap or wash pass test.

Where flanged coupling adapters are specifically called for on the drawings, the coupling shall be harnessed against tension in accordance with AWWA Manual M-11 design details. Where there will be no tension across a joint and the Contractor uses a flexible coupling, at his option, the harness may be omitted. The outside of pipe cylinders to be fitted with flexible couplings shall be free from surface defects and shall have the longitudinal or spiral welds ground to plate or sheet surface for a distance of 10 inches back from the pipe ends. Pipe cylinders shall have tolerances within the limits required by the manufacturer of the coupling to be used.

3. Pipeline Anchorage. The Contractor shall provide such anchorage for the pipeline, fittings, and appurtenance structures as may be required to adequately resist 150% of the pipeline working pressures specified herein.

Anchorage for the pipe against longitudinal thrust, when the bend is greater than 5 degrees, shall be provided by Portland Cement Concrete thrust blocks or by welding for the required distances on each side of the vertical or horizontal bends, as shown on the Plans. The length of welded joints each side of a mainline valve shall be the same as for a 90 degree deflection as shown on the Plans. Field-welded joints shall be as specified in Section 76-1.07 as specified herein.

The City retains the right to inspect any and all welds. Any welds found to be unacceptable shall be rewelded and retested. The Contractor will be responsible for the cost of any retesting of welds.

All welds shall be sandblasted prior to grouting of the joints.

In lieu of welding the pipe, Portland Cement Concrete thrust blocks shall be required at bends, tees, and reducers. The concrete thrust blocking shall be as shown on the Detail Sheet provided in these specifications.

4. Pipe Cleaning and Leakage Test. The Contractor, after placement of the pipe, shall remove all construction materials and shall sweep or otherwise clean the pipe of all dirt and debris.

After the backfill has been completed, the pipeline and valves shall be tested for water-tightness by filling it with water and bringing the hydrostatic pressure to not less than 25 percent and not more than 50 percent in excess of the "working pressure". "Working pressure" for the pipeline shall be 100 psi minimum.

The Contractor shall furnish necessary bulkheads, pumps, pressure gages, means of measuring water loss, water, and all other equipment, materials, and labor required for making the test.

The line shall be isolated for testing by placing temporary bulkheads in the pipe. The Contractor shall contact the Public Works Department (707) 588-3300 for information regarding allowable uses of City water and available sources of water, other than the City water system, for construction purposes.

The amount of water required to maintain the test pressure shall be measured accurately by means approved by the Engineer. While the pipe is under pressure, a survey shall be made by the Contractor along the pipeline for leaks. Regardless of the test results, all detectable leaks shall be repaired by the Contractor and the pipeline retested so that the remaining amount of leakage can be determined. If the leakage rate exceeds that specified, the repair and retest procedure shall be repeated until the pipeline passes the leakage test.

For the pipeline to satisfactorily pass the leakage test, the measured leakage under the test shall not exceed 40 U.S. gallons per inch of inside diameter per 24 hours per mile of pipe.

5. Pipe Deflection. Vertical ring deflection in pipe after backfill shall not exceed the following limits:

Pretensioned Steel Cylinder Concrete Pipe is $(\frac{D^2}{4000})$ inches.

Where "D" is nominal pipe diameter in inches.

If deflections are found to be in excess of the above, the pipe shall be uncovered and allowed to reround, and the bedding and backfill shall be re-compacted. If the pipe lining or coating is damaged or if the pipe does not reround to less than the above limits, it shall be replaced at the Contractor's expense.

6. Bedding. Pipe bedding shall conform to City Std. 215.
7. Dewatering. The Contractor shall perform all dewatering and maintain temporary drainage as required to keep the excavation free of water through the construction operations.

Wherever necessary for dewatering or to provide proper drainage, the Contractor shall, at his own expense, furnish and operate all necessary pumping equipment, drainage sumps, well point system, and other drainage facilities.

8. Warning Tape. After bedding is completed and before backfilling begins, the Contractor shall furnish and install underground line warning ribbon or tape, one foot above the pipeline. The tape shall be made of high-quality polyethylene base material that will resist acids, alkalis, and other substances normally found in soils. The tape shall have a thickness of at least .004-inch and have a width of at least 6 inches. The tape shall be color-coded (nonfading bright green) with overcoating printing which reads continuously:

"CAUTION CAUTION"
"RECLAIMED IRRIGATION WATER"

The tape shall be Brady Identoline or approved equal. The cost of furnishing and installing this tape shall be considered as included in the contract price for the appropriate pipe item.

SECTION 77 – PIPE CASING

77-1.01 Description

Pipe casing shall conform to the requirements of the Plans, Sections 65 and 66 of the Standard Specifications and as specified herein.

The method of installing the casing shall be at the Contractor's option. The casing may be either 5/8" thick corrugated galvanized steel liner plate, 5/8" thick steel pipe, or reinforced concrete pipe, Class III minimum. The casing shall be of sufficient strength to withstand surface loads imposed by E80 railroad loads under the railroad area and H20 highway loads under the highway area and must also be of sufficient strength to withstand all additional construction loads. Method of installation and materials to be used shall be submitted to the Engineer for approval. If corrugated steel liner plate or steel pipe is used, the liner or the pipe shall be galvanized and bituminous lined and coated. Bituminous coating shall be either field applied or furnished by the manufacturer and shall conform to the following specification. Coating may be either asphalt mastic or tar base.

Corrugated steel liner plate or steel pipe shall be galvanized in accordance with ASTM A-123-71. Bolts, nuts, and pipe plugs shall be galvanized in accordance with ASTM A-153-67.

Bituminous coating shall be as per AASHTO Designation M243-73 Asphaltic Mastic or Tar Base. All galvanized surfaces shall be coated.

The excavated hole shall be as per AASHTO Designation M243-73 of one part Type II Portland Cement and two parts sand conforming to ASTM C33 and graded so that 100% by weight will pass a standard No. 8 mesh sieve, and at least 48% by weight will pass a standard No. 40 mesh sieve, and the minimum amount of water required for mixing and placing. Sluicing and jetting with water will not be permitted.

SECTION 78 – REINFORCED PLASTIC MORTAR PRESSURE PIPE

78-1.01 General

Reinforced Plastic Mortar Pressure Pipe shall only be used with the permission of the City Engineer.

Concrete Cylinder Pipe or Reinforced Plastic Mortar Pressure Pipe shall conform to the requirements of the Standard Specifications and as specified herein. If Reinforced Plastic Mortar Pressure Pipe is selected, it shall conform to the requirements specified in this section and cathodic protection shall not be required, except for the "Pipe Casing" specified in Section 77 if corrugated steel liner plate or steel pipe is used.

78-1.02 Description

Reinforced Plastic Mortar Pressure Pipe shall be manufactured in accordance with ASTM D-3517 and as specified herein.

All piping and appurtenances shall be designed for 100 psi working pressure minimum and shall be capable of withstanding a trench load of 20 feet.

All Reinforced Plastic Mortar Pressure Pipe shall be designed to limit deflection. When this type of pipe is used, the Contractor shall assume complete responsibility for proper installation to prevent deflections in excess of the manufacturer's recommendations.

- 1) Data Required: The manufacturer shall provide the following data in addition to the other requirements herein: an affidavit of compliance; design calculations; test reports on pipe and joints; pipe laying diagram; and five copies of the manufacturer's installation guide.
- 2) Marking of Pipes: Each pipe section and special fittings shall be marked clearly on interior surface with the manufacturer's name or trademark and the date of manufacture. Pipe markings shall be in accordance with ASTM D-3517. In addition, special marks of identification, sufficient to show the proper location of the pipe or special in the line, shall be placed on each pipe or special.

78-1.04 Laying Reinforced Plastic Mortar Pressure Pipe

- 1) Alignment, Angles, and Bends: Laying of reinforced Plastic Mortar Pressure Pipe shall be as specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 1, except that the last paragraph is not applicable.
- 2) Joints, Couplings, and Adapters: Joints shall be as specified in ASTM D-3517. Couplings and adapters shall be as recommended by the manufacturer.

3) Pipeline Anchorage: The Contractor shall provide such anchorage for the pipeline, fittings, and appurtenance structures as may be required to adequately resist 150% of the pipeline working pressures specified herein.

Portland Cement: Concrete thrust blocks shall be required at bends, tees, and reducers. The concrete thrust blocking shall be as shown on the detail sheet provided in these specifications.

4) Pipe Cleaning and Leakage Test: The Contractor, after placement of the pipe, shall remove all construction materials and shall sweep or otherwise clean the pipe of all dirt and debris.

After the backfill has been completed, the pipeline and valves shall be tested for watertightness by filling it with water and bringing the hydrostatic pressure to not less than 25 percent and not more than 50 percent in excess of the "working pressure". "Working pressure" for the pipeline shall be 100 psi minimum.

The Contractor shall furnish necessary bulkheads, pumps, pressure gages, means of measuring water loss, water, and all other equipment, materials, and labor required for making the test.

The line shall be isolated for testing by placing temporary bulkheads in the pipe. The Contractor shall contact the Public Works Department at (707) 588-3300, for information regarding allowable uses of City water and available sources of water, other than the City water system, for construction purposes.

The amount of water required to maintain the test pressure shall be measured accurately by means approved by the Engineer. While the pipe is under pressure, a survey shall be made by the Contractor along the pipeline for leaks. Regardless of the test results, all detectable leaks shall be repaired by the Contractor and the pipeline retested so that the remaining amount of leakage can be determined. If the leakage rate exceeds that specified, the repair and retest procedure shall be repeated until the pipeline passes the leakage test.

For the pipeline to satisfactorily pass the leakage test, the measured leakage under the test shall not exceed 40 U.S. gallons per inch of inside diameter per 24 hours per mile of pipe.

5) Bedding: Pipe bedding shall conform to City Std. 215 except that pipe bedding material shall be 4 sack Portland Cement concrete with aggregate graded as follows: 100% passing 3/4", 30% to 70 % passing #4, and 0% to 10% passing a No. 200.

6) Dewatering: Dewatering shall be as specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 7.

7) Warning Tape: Warning tape shall be as specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 8.

SECTION 79 – VIDEO INSPECTION OF STORM DRAINS

79-1.01 Description

Television inspection of all new and modified storm drain pipes and structures is required.

The contractor shall hire an independent pipe video inspection service to perform the inspection. The camera used shall be self-propelled or pulled, be able to pan and tilt and shall be equipped with high-intensity lights. A digital video on DVD in an acceptable format of the television inspection shall be produced along with a printed log of the inspection and delivered to the Engineer. The pipe video inspection service shall be pre-approved by the City.

The pan and tilt color camera used for the inspection shall be specifically designed and constructed for such inspection. The camera shall be mounted on adjustable skids or tractor to keep it in the center of the pipe. Lighting for the camera shall be supplied by a lamp(s) on the camera, capable of being dimmed or brightened remotely from the control panel. The lighting system shall be capable of illuminating the entire periphery of the pipe. The color camera shall be operative in 100% humidity conditions and shall have a minimum of 330 lines of resolution but must be capable of discerning small, hairline cracks and other minor defects.

The pan and tilt color camera shall be moved through the line at a uniform slow rate of 30 feet per minute maximum. A 2- inch depth gauge shall be pulled or pushed in front of the camera.

All pipe cleaning prior to the video inspection will be at the contractor's expense. All cleaning water and debris shall be captured, removed and properly disposed. Cleaning water will not be allowed to discharge to the storm drain system.

The contractor is responsible for all stuck, broken or lost equipment and shall bear all necessary cost to retrieve said equipment including dig ups.

All work performed must meet quality and clarity standards set by the City of Rohnert Park and are subject to Public Works review. A pan and tilt color camera will be used for all video inspections of storm drains within the jurisdiction of the City of Rohnert Park.

The following conditions shall exist prior to the television inspection:

- All storm drain pipes shall be installed, grouted, backfilled to 5 feet over the top of the pipe or to subgrade, and compacted;
- Conduits or pipelines for all underground utilities (sewer, water, cable television, telephone, electrical, gas, street light) that cross storm drain trench shall be installed;
- The bases of all structures shall be in place and grouted;
- The system shall be cleaned and all debris removed;

- Street shall be unpaved;

When the above work has been completed, the contractor shall notify the Engineer 48 hours in advance of the date for television inspection. Immediately before inspection the system shall be flushed with clean water. During this inspection, the contractor or authorized representative shall be present to observe the video as provided by the television camera.

At the beginning of each run of storm drain pipe the video shall display:

- A. The project name;
- B. Date;
- C. Company performing the inspection;
- D. Run number (unique designation for each section of pipe);
- E. Street name (if applicable);
- F. Pipe size;
- G. Pipe material;
- H. Structure numbers (as labeled on the plans) at each end of the pipe;
- I. Direction of the camera;
- J. Type of structure.

The video tape shall display the following information continuously during the run:

- A. The camera's location via a continuously updated footage counter measuring the distance from point of entry;
- B. Project name;
- C. Structure numbers (as shown on the plans) at each end of the run;
- D. Run number.

The camera shall stop at all structures, connections or defects (sags, bad joints, etc.) for a period of at least 10 seconds and be noted on the log sheet. The camera will be panned or tilted toward the connection or defect so that any portion of the connection or defect that is visible from within the pipe or structure can be completely inspected.

A printed record shall be made for each pipe run and shall clearly show the:

- A. Run number;
- B. Structure number at each end of the run;
- C. Direction of camera travel;
- D. Location and description of each defect discovered by the camera;
- E. Line size;
- F. Length of run;
- G. Structure depths;
- H. Location of blind connections.

The video inspection disk or tape and report shall be delivered together to the Engineer and become the property of the City of Rohnert Park.

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

- Off grade - 0.08' or more deviation from grade;
- Joint separations;
- Offset joints;
- Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rock, root, etc.);
- Debris or other foreign objects;
- Pipe deflections greater than 7.5% of base diameter, measured inside the pipe;
- Other obvious deficiencies when compared to approved Plans and Specifications, these Standards and City Design and Construction Standards.

The contractor will 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.

Any subsequent televising of the lines, if deemed necessary by the City, shall be completed at the City's expense. Any defects found prior to or during the warranty period shall be corrected by the contractor.

SECTION 80 – CHAIN LINK FENCE CONSTRUCTION

80-1.01 Description

The chain link fence, gates, and appurtenances to be erected under this contract shall be constructed in accordance with Section 80 of the Standard Specifications, the details shown on the Plans, as specified herein, and as directed by the Engineer.

The fence and gates shall consist of six foot high steel mesh fabric with a top rail and topped by three strands of barbed wire equally spaced six inches apart on angled extension arms for a total fence height of approximately seven feet.

80-1.02 Connections

Existing cross fences shall be connected to the new fences. Corner posts with braces for every direction of strain shall be placed at the junction with existing fences. The wire in the new and existing fences shall be fastened to the posts.

80-1.03 Materials

Fabric: Chain link fence fabric shall be galvanized steel fabric conforming to the specifications of AAFHP Designation M-181. The fabric shall be #9 gauge, 72" high, and woven into approximately a two inch mesh. All chain link fabric shall be galvanized after weaving by the hot dip process with a minimum of 1.2 ounces of zinc retained per square foot of uncoated wire service.

Posts and Framework: All posts, gate frames, and top rails shall be steel pipe galvanized according to the specifications of AASHO Designation M-111 and shall conform to the following dimensions and weights:

O.D. Min. Wt. Per L.F.

Line Posts	2"	2.72
Terminal and Corner Posts	2½"	3.65
Gate Posts	4"	9.11
Top Rails	1-5/8"	2.27
Gate Frames	1-5/8"	2.27

Line post spacing shall not exceed ten foot centers. All line and corner posts shall be a minimum of nine feet in length and gate posts a minimum of ten feet in length.

Braces: All terminal and corner posts shall be truss braced from a first line post to the bottom of the terminal post with a 3/8" galvanized truss rod assembly.

Gates: Two 8-foot drive gates providing a 16-foot wide clear opening shall be provided and installed where shown on the Plans and as directed by the Engineer. Gates shall be provided with

catch and locking attachment of an approved design which will not rotate around the latch post. Stops to hold gates open and a center rest with catch shall be provided. Gate hinges shall provide a 90 degree opening. All fittings shall be hot dip galvanized.

80-1.04 Erection

The fence shall be installed by skilled and experienced fence erectors on lines and grades furnished by the Engineer. Line and corner posts shall be set in concrete foundations a minimum of 36" inches deep and gate posts a minimum of 48" deep. Concrete foundations shall be no less than three times the diameter of the posts.

SECTION 80-5 – REDWOOD FENCE

80-5.01 Description

Redwood fencing shall be constructed in accordance with the details shown on the Plans as specified herein and as directed by the Engineer.

80-5.02 Materials

Fencing materials shall consist of the following:

4"x4" Posts @ 6'0" O.C.

2"x4" Running Rails, Top and Bottom

1"x6" or 1"x8" Fence Boards (5')

All fencing material shall be standard, rough-sawn redwood.

80-5.03 Gates

The existing gates shall be relocated as shown on the Plans and as directed by the Engineer. Gates shall be rehung from 4"x4" redwood posts.

SECTION 81 – MONUMENTS

81-1.01 Description

All City monuments shown on the Plans shall be placed in accordance with the requirements of Section 81 of the Standard Specifications and as specified herein.

The exact location of the monuments will be established by the Engineer as shown on subdivision map and upon completion, the monuments will be checked and the center point stamped by the Contractor's/Developer's Engineer.

SECTION 83 – RAILING AND BARRIERS

83-1.01 Railing

The work shall consist of constructing metal tube bridge railing (Type 116) at the locations and in accordance with the details shown on the Plans, and as specified in Section 83 of the Standard Specifications and as specified herein, and as directed by the Engineer.

Metal beam guard railing shall conform to the provisions in Section 83-1, "Railing," of the Standard Specifications and as specified herein. Line posts and blocks shall be wood.

When metal beam guard railing is connected to structures, walls or abutments, the structure, wall or abutment will be considered the end post and the point used for measuring the rail length shall be the midpoint between the 2 bolts attaching the rail element to the structure, wall or abutment.

The quantities of return and end sections and the various types of terminal sections will be determined as units from actual count.

83-1.02D Steel Bridge Railing

Metal tube bridge railing, metal beam guard railing, terminal end sections and all hardware shall be ASTM A-588 structural steel (USS Cor-10 or Bethlehem MAYARI or equal).

SECTION 84 – TRAFFIC STRIPES AND PAVEMENT MARKINGS

84-1.01 Description

Traffic stripes and pavement markings shall conform to the applicable provisions of Section 84 of the Standard Specifications, Part IV of the City Traffic Standards, and as specified herein and shall be done at the locations shown on the Plans.

Existing stripes and pavement markings which are damaged by the work shall be replaced.

SECTION 85 – PAVEMENT MARKERS

85-1.01 Description

Raised pavement markers shall be placed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 85 of the Standard Specifications, as specified herein and Volume 1, Part IV of the City Traffic Standards.

The exact location and limits of raised pavement markers will be determined in the field by the Engineer.

Existing raised pavement markers conflicting with the proposed striping shall be removed immediately prior to placement of new markers.

Existing raised pavement markers to remain, which are damaged by the Contractor, shall be replaced.

Raised pavement markers shall be installed the day following pavement overlay.

SECTION 86 – TRAFFIC SIGNAL DETECTOR LOOPS AND VIDEO DETECTION SYSTEM

86-1.01 Description

The Contractor shall furnish and install traffic signal detector loops or video detection system shown on the Plans in conformance with the applicable provisions of Section 86, "Signals and Lighting", of the Standard Specifications and Standard Plans, the City Traffic Standards, as specified herein, and as directed by the Engineer.

86-2.05 Conduit

Conduit shall conform to the Standard Specifications and the City Traffic Standards.

Trenching depth shall be per Section 86-2.01 of the Standard Specifications and as specified herein.

86-2.06 Pull Boxes

Pull boxes shall conform to Part V.G of the City Traffic Standards and as specified herein.

All existing pull boxes to receive new conductors and/or conduits shall be cleaned out, all existing grout removed, and the bottoms regouted with a drain hole or the boxes replaced to meet current City Traffic Standards.

86-2.08 Conductors

All conductors for traffic signal or street lighting systems shall conform to Section 86 of the Standard Specifications, Part V.H of the City Traffic Standards, as shown on the Plans, or as specified herein.

86-2.09 Wiring

Wiring shall conform to the Standard Specifications and Part V.I of the City Traffic Standards.

86-2.14C Functional Testing

The functional test for each traffic signal detector loops or video detection system shall consist of not less than 48 hours of continuous, satisfactory operation. If unsatisfactory performance of the system develops, the conditions shall be corrected and the test shall be repeated until the 48 hours of continuous, satisfactory operation is obtained.

86-5 Detectors

86-5.01A Inductive Loop Detectors

Inductive loop detectors shall conform to Sections V-J and V-K of the City Traffic Standards.

Detector handholes shall be Type A installed per State Std. ES-5E.

Any existing traffic signal detectors shown on the Plans to remain that are damaged shall be replaced at the Contractor's expense within five (5) working days or as directed by the Engineer.

SECTION 90 - PORTLAND CEMENT CONCRETE

90-1.01 Description

Class A concrete shall be truck-mixed, ready-mixed concrete consisting of a mixture of Type II Portland Cement complying with ASTM C150, sand, fine aggregate, coarse aggregate, and water. The proportions of the water, sand, and aggregate shall be regulated so as to produce a plastic, workable, and cohesive mixture. All materials required, and the procedure of mixing, shall conform to the provisions of Section 90 of State Standard Specifications.

Class A concrete shall contain 564 pounds (six sacks) of Portland Cement per cubic yard and shall have a 28-day compressive strength of 4000 pounds per square inch.

90-1.03 Steel Reinforcement

Reinforcing bars, where required, shall be deformed billet steel in conformance with ASTM A615, including supplementary requirements, Grade 60. Wire fabric, where required, shall be welded steel mesh conforming to ASTM A185.

90-1.04 Mix Designs

Reports of concrete mix designs shall be provided for review by the Engineer.

90-1.05 Placement and Curing

Placement, consolidation, and curing of concrete shall conform to the provisions of Section 90 of State Standard Specifications.

SECTION 98 – HANDICAP RAMP CONSTRUCTION

98-1.05 Curb, Curb and Gutter, and Sidewalk Removal and Construction

Portland cement concrete curb, curb and gutter, and sidewalk shall be removed and constructed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications and as specified herein.

All oil, paint, tire marks, and other discoloring shall be removed from the curb and gutter by sandblasting prior to acceptance by the Engineer. Cement mortar will not be an acceptable substitute for sandblasting.

All soft or spongy material shall be removed and replaced with suitable material as required by the Engineer.

98-1.06 Pull Box Relocation

Existing pull boxes that are within the area of handicap ramp construction shall be reset to grade as directed by the Engineer.

98-1.07 Sign Relocation

Street and traffic signs that conflict with the construction and/or use of the handicap ramp shall be relocated as directed by the Engineer.

SECTION 99 – WATER MAIN CONSTRUCTION

99-1.01 Description

All water mains and related appurtenances shall be constructed in accordance with the City of Rohnert Park Standard Details and Specifications, the Standard Specifications for Public Works Construction “Greenbook” and the Plans.

99-1.02 Pipe

The pipe, except where otherwise specified on the Plans, can be either ductile cast iron or polyvinyl chloride (PVC), all in accordance with the following:

- A. Ductile iron pipe shall be cement lined, new pipe conforming to AWWA C151 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 either bell and spigot end, “Tyton Joints” or mechanical joints except where otherwise specified on the Plans.
- B. Polyvinyl chloride (PVC) pipe shall be new pipe, 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.
- C. 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.

Accompanying 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 State certified materials testing laboratory.

- D. Number 12 insulated copper wire shall be laid on top of and along the entire length of all non-metallic service laterals and mains, and shall be extended to the surface at all valve location blow-offs and meter boxes sufficiently for locator equipment to be attached.

99-1.03 Polyethylene Water Service Tubing

All polyethylene water service tubing shall conform to the latest AWWA Standards as described in ANSI/AWWA of the latest revision for 3/4-inch and 1-inch tubing.

99-1.04 Fittings

All fittings shall be new gray iron or ductile iron fittings conforming to ANSI/AWWA C110/C153 of 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 of 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.

99-1.05 Gate Valves

Gate valves shall conform to AWWA Standard C509 of 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 and poly wrapped per standard.

99-1.06 Butterfly Valves

Butterfly valves shall conform to AWWA Standard C504 of latest revision and shall be of the rubber seat type. Valve discs shall rotate 90 degrees from 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.

99-1.06A Cut-in Tee and Valve Assembly

The Contractor shall cut-in tee and valve assemblies at the location(s) shown on the Plans per City Std. 854 and Std. 877, as directed by the Engineer, as specified herein.

99-1.06B Air Relief Valve Assembly

The Contractor shall install air relief valve assemblies at the location(s) shown on the Plans, per City Std. 883, as directed by the Engineer, and as specified herein.

99-1.07 Valve Boxes

Each gate valve shall be covered by a precast 8-inch valve box set flush with street surface with cast iron ring and cover marked "WATER". The valve boxes are to be Christy G 5, G 8, or approved equal.

99-1.08 Locating and Adjusting Water Valve Boxes

After a street has been paved, mark the location of all water valve boxes in white paint before the close of that workday.

Within 48 hours of paving, adjust all water valve boxes up to grade.

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 City Std. 857.

No bends will be allowed in fire hydrant laterals without approval of the Engineering Department.

Fire hydrants shall conform to the list of approved fire hydrants shown on City Std. 857.

Residential fire hydrants will have one 2-1/2-inch outlet and one 4-1/2-inch outlet.

Commercial fire hydrants will have two 2-1/2-inch outlets and one 4-1/2-inch outlet.

All hydrants shall be painted in accordance with the specifications shown on City Std. 857.

Before a fire hydrant may be placed in service, a high velocity flushing of the hydrant lateral shall be witnessed and approved by the Public Works Inspector.

Barrels of existing fire hydrants to be abandoned shall be removed carefully and delivered to the City Corporation Yard at 600 Enterprise Drive per Section 15-2.04, "Salvage" of the Standard Specifications.

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 Trench Excavation, Backfill, and Resurfacing

Excavation, backfill, and resurfacing of the water main trench under this contract shall conform to City Std. 215, as specified on the Plans and as specified herein.

Excess material from excavation shall become the property of the Contractor and shall be disposed of to the satisfaction of the 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/her, the Contractor shall submit to the engineer written authorization for such disposal of materials and entry permission signed by the owners of the disposal site and the required permits.

Attention is directed to Section 7-1.08, "Public Convenience" of the Standard Specifications.

Caution shall be exercised when trenching through signalized intersections. Location(s) of traffic detector loops, as shown on the Plans, is schematic only.

If trenching or other construction operations cause damage to any traffic detector loops, the Contractor shall notify the Engineer immediately. Five (5) days prior to cutting any traffic detector loop, the Contractor shall contact the Public Works Department at (707) 588-3300.

The Contractor shall replace the traffic detector loops per City Traffic Standards V.J and V.K, and as directed by the Engineer. Replacement shall be accomplished within two (2) working days of damage, as determined by the Engineer, minimizing interruption of full operation of the traffic signal.

Blasting will not be permitted.

All raised pavement markers, street striping, chatter bars or any other traffic markings disturbed during this contract work shall be replaced in kind by the Contractor to the satisfaction of the Engineer.

99-1.11A Trench Bracing and Shoring - Water

All bracing and shoring shall conform to Section 5-1.02A, "Trench Excavation Safety Plans", and Section 7-1.01E, "Trench Safety" of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.

The Contractor shall take all necessary measures to protect the workmen and adjacent areas and structures from the hazards of the trenching or excavation operations.

99-1.12 Laying and Handling Pipe Materials

Proper implements, tools, and facilities satisfactory to the 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. Curing 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 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. 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.

Pipe shall be laid in accordance with the Plans, and as specified herein.

All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter. At times when pipe laying is not in progress, the open ends of any pipe which have been laid shall be closed by mechanical plug or other means approved by the Engineer.

Excavations shall begin by exposing end(s) of existing main(s) to determine individual lines and grades. New mains shall begin eight (8) feet from and on the same line as the existing main. Minimum depth of cover from finished grade shall be 36 inches for 8-inch mains, 44 inches for 12-inch mains and 48 inches for 16-inch and larger mains or as shown on the Plans.

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, valves, 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 push-on type.

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

99-1.14 Laying Ductile Iron Pipe

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 of latest revision and in accordance with the manufacturer's recommendations.

99-1.15 Service Laterals

Service laterals other than those shown or noted on the Plans shall not be installed prior to obtaining City approval. Service laterals encountered in construction that will not be used shall be abandoned.

99-1.6A 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 City Stds. 851 and 852 and as specified herein.

99-1.16B Thrust Blocking and/or Restrained Joints

Thrust blocking and/or restrained joints shall conform to City Stds. 853 and 854 and as specified herein.

99-1.17 Abandoning Water System Components

For all abandoned water services up to and including 2-inch, remove the valve and saddle and install a full circle clamp on main under Public Works Department inspection.

For flanged or mechanical joint tees, remove the valve and install a blind flange or mechanical joint plug under Public Works Department inspection.

For push-on tees, the tee, valve and concrete thrust block must be removed and the main repaired with approved pipe and suitable couplings.

99-1.18 Hydrostatic Test

The test shall be performed after the line has been laid and all backfill placed and compacted as specified elsewhere in these specifications. The Contractor, at his/her 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. Each valved section of pipe, or combined sections, as approved by the engineer, 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 main. The duration of each pressure test shall be thirty minutes. Valves on existing mains in services situated in the public right of way or PUE required to be operated shall be operated only by personnel of the City forces. Each section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, and all necessary apparatus including gauge and measuring devices shall be furnished by the Contractor. The Contractor shall make the taps into the pipe and shall furnish all necessary assistance for conducting the tests. Before applying the test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at the points of the highest elevation, and afterwards tightly plugged.

Suitable means shall be provided by the Contractor for determining the quantity of water leakage under the test pressure. 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 sections of pipe laid disclose leakage per mile of pipe greater than that water specified, or if individual sections show leakage greater than the specified limit, the Contractor shall, at his/her own expense, locate the cause and repair the defect until the leakage is within the specified allowance.

Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section of it, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. The engineer shall designate the time at which the tests shall be made.

The Contractor shall repair any obvious leaks even though the hydrostatic test results are within the prescribed limits above.

99-1.18A Permanent Blow-Offs

Permanent blow-off(s) shown on the Plans shall be installed per City Std. 861 and 862, as directed by the Engineer, and as specified herein.

Blow-off ball valve and plug shall be installed a minimum of two (2) inches and a maximum of six (6) inches below meter box lid.

99-1.18B Temporary Blow-Offs

Temporary blow-off(s) shown on the Plans shall be installed per City Std. 859, with thrust blocking and harness when required, as directed by the Engineer, and as specified herein.

99-1.19 Chlorination of Water Main

Chlorine may be applied by any of the AWWA standard methods, subject to the approval of the Engineer. 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 backpressure 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 treated water shall be thoroughly flushed from the newly laid pipeline. The water throughout its length shall, upon test, both chemically and bacteriologically be proved equal to the water quality served the public from the existing water supply system. The necessary samples will be taken and tests made by the City of Rohnert Park Public Works Department Personnel. Should the initial treatment, in the opinion of the engineer, 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 first test will be paid for by the City. Subsequent tests will be paid for by the Contractor.

There shall be a 24-hour waiting period after blowing off the main prior to taking bacteria samples. The initial bacteria tests shall be of the 72-hour duration type. If the initial bacteria test fails, two consecutive passing bacteria tests must be obtained prior to making the tie-in. The first of these two subsequent tests shall be of the 24-hour duration type, and the second shall be of the 72-hour duration type. Bacteria tests are valid for only 30 days. If there is more than a 30-day lapse between a passing bacteria test and the applicable tie-in, the bacteria test must be repeated prior to water main tie-in.

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.
- (3) North Coast Regional Water Quality Control Board, at 576-2220, must be notified of discharge.

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 shall obtain permission from the City of Rohnert Park Public Works Department at (707) 588-3300 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 shall be between 6.0 and 9.5.
- (3) The discharge rate shall be sufficiently slow to keep from surcharging to sewer collection system at any point.

Should the initial treatment, in the opinion of the Engineer, 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 and tests made by the City of Rohnert Park. 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. The Contractor will pay for additional individual bacteria sample tests. If additional testing is required, it will be necessary for the Contractor to arrange for and to pay for the tests at a State of California certified laboratory. In extreme cases, at the discretion of the 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.

99-1.20 Water Main Connection Work

The Contractor shall notify the City inspector 48 hours prior to individual mainline shutdowns required to facilitate his tie-in operations. The Contractor shall schedule tie-in work with the Public Works Inspector at (707) 588-2237. Tie-ins will not be scheduled until a written passing bacteria test has been received by Public Works. All shutdowns and valve turning operations shall be performed by City Water Utility personnel only. A Public Works Department Inspector must be present during all tie-in operations. All shutdowns and valve turning operations shall be performed by City Water Utility personnel only. 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.

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

As a general rule, customer service shall not be terminated or interrupted on Monday.

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

After hours work or weekend work is to be avoided whenever possible and any overtime costs shall be borne by the Contractor requesting such afterhours work. Normal working hours are Monday through Fridays, 8:00 a.m. to 5:00 .p.m.

Contractors or parties requiring work of any kind by the City forces shall request such services a minimum of 48 hours in advance of the time such services are desired. Work requests, which will involve City forces for more than 8 hours or an extensive number of City supplied parts, 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 a 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-hour 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.

Upon completion of construction, final connection will be made by the Contractor under inspection by City Public Works Inspector, unless otherwise specified on the Plans.

The Contractor shall notify the City inspector 48 hours prior to individual mainline shutdowns required to facilitate a tie-in. The Contractor shall schedule tie-in work with the Public Works Inspector at (707) 588-2237. Tie-ins will not be scheduled until a written passing bacteria test has been received by Public Works. All shutdowns and valve turning operations shall be performed by City Utilities personnel only. A Public Works Department Inspector must be present during all tie-in operations. No tie-ins shall be performed without prior authorization of the Engineer.

Contractors or parties who fail to keep field appointments shall be billed for scheduled City Crew waiting or standby time which was used and the Contractor shall bear the costs incurred by the City for notification of its customers for the subsequent appointment.

When installing a cut-in-tee that is larger than the existing pipe, the new assembly must be installed at the depth sufficient to allow the valve to remain below the subgrade of the street which may necessitate lowering the existing pipe.

When a connection is required to an existing water pipe, the Contractor shall provide all excavation, shoring, backfill and trench resurfacing per City Std. 215. Where the connection is to be a "hot tap", the Contractor shall provide and install the tapping valve and sleeve, and any other hardware required and City forces will make the tap at the developer's expense. When any joint on an existing water pipe is disturbed, that joint and any proposed hot tap 4 inch and larger shall be replaced with a "cut-in" tee. When a "cut-in" tee and valve(s) assembly is required on the Plans, the Contractor shall provide and install the entire assembly (including valves), and any other hardware necessary under City Public Works Department inspection, and shall provide all other work and materials necessary to complete the installation to City Standards.

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.

Tie-in or cut-in tee connections to cast iron, PVC, or ductile iron pipes shall be made with mechanical joint solid sleeves. Flexible connections shall only be used when connecting to asbestos cement pipe.

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

Fire hydrant tie-in shall be considered as a water main tie-in, including the gate valve.

Fire service tie-in shall be considered as a water main tie-in, including the gate valve.

99-1.21 Water Main Component Reporting.

The Contractor shall submit the material type, manufacturer, and model number of all water system components to the City inspector prior to final testing. A water system materials form will be provided to the Contractor for this reporting.

99-1.22 Construction Water

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

The Contractor must obtain permission from the City Public Works Department for each metered construction water connection.

A deposit for each meter/hydrant will be required which is refundable upon removal of the meter by City forces, less any charges for water used. A non-refundable set-up/removal fee will be charged. Hydrant meters are obtained through the City Finance Department.

Contractors are prohibited from operating gate valves or fire hydrants on the City system.

Acquisition of water through appropriation at unmetered fire hydrants or other facilities is a violation of City ordinance and State law. Use of construction water from sources other than the City Water System must be approved by the Engineer.

The Contractor shall obtain water as specified herein.

99-1.23 Water Services

The Contractor shall install new polyethylene service laterals at the location(s) shown on the Plans, including service saddles, ball valve corporation stop, spacer, inlet and outlet meter valves, meter box(es), traffic loading lids when required, and removal and disposal of old meter box(es) when required. Typically new service laterals shall be as close as possible to existing

laterals and as directed by the Engineer in the field. New service laterals shall be installed with a minimum horizontal clearance of five (5) feet from sewer laterals.

Upon completion and successful testing of new water system, the Contractor shall transfer the existing meter and tie-in the new service to the new meter box under City Public Works Inspector. The Contractor shall coordinate this work to provide minimum customer out-of-service time and inconvenience.

Contractor shall notify customers before transferring meter. The Contractor shall turn off house valve and blow off the new service before meter transfer. After transfer, the Contractor shall open hose bib to flush out air and sediment and then turn on house valve.

99-1.24 Fire Service Lateral Assembly

Fire service lateral assembly with appropriately sized tee, pipe, gate valve, and other appurtenances shall be installed at the location(s) shown on the Plans in conformance with City Std. 854, Std. 877, with reference to Std. 879, as directed by the Engineer, and as specified herein.

99-1.25 Remove and Relocate Existing Fire Hydrant

At the location(s) shown on the Plans, the Contractor shall install a hydrant lateral, including tapping sleeve or tee, gate valve, pipe, bury and riser per City Std. 857 with a blind flange for testing, as directed by the Engineer, and as specified herein.

Upon satisfactory completion of the new water system, including tie-ins and testing, the Contractor shall remove the blind flange and relocate the existing hydrant barrel to the new lateral. Relocated hydrants shall be out of service no longer than 24 hours. The riser on the old hydrant shall be removed and salvaged per Section 15-2.04, "Salvage" as specified herein.

99-1.26 Valve Removal

The Contractor shall remove the existing valve, riser, valve box, cover, plug or cap the tee or water main and replace structural section and asphalt surfacing as required at the location(s) shown on the Plans, as directed by the Engineer, and per Section 15-2.04, "Salvage" as specified herein.

99-1.27 Valve Box Removal

The Contractor shall remove existing valve boxes, (including boxes for blow-offs when required) risers, and covers and replace structural section and asphalt surfacing at the location(s) shown on the Plans, as directed by the Engineer and per Section 6-1.04, "Salvage" as specified herein.

99-1.28 Meter Box Removal

The Contractor shall remove existing abandoned meter boxes, remove and replace sidewalk per City Std. 235 at the locations shown on the Plans, as directed by the Engineer, and as specified herein.

99-1.29 Backflow Assembly (Typical Backflow Preventer)

The Contractor shall install a double-check valve assembly per City Std. 874 and/or 876 at the location shown on the Plans, as directed by the Engineer, and as specified herein.

99-1.30 Cleaning and Flushing New Water Mains

The Contractor shall clean and flush water mains in the following manner:

The Contractor shall insert a flexible polyurethane foam "swab" (density: 2# per cu. ft.) complete with polyurethane drive seal, into the beginning section of pipe. The "swab" shall remain there until the remainder of the pipeline is completed.

Cleaning and flushing shall be accomplished by propelling the "swab" down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear.

If the cleaning and flushing exit point is through a fire hydrant (8 inch line or smaller) the Contractor shall remove the hydrant internal valve assembly to allow passage of the "swab".

After swabbing, proper disinfectant procedures shall be used per Section 99-1.19 of the City Specifications.

SECTION 100-2 – ADJUST VALVE COVERS, CLEANOUTS AND MONUMENTS TO GRADE

Existing valve covers, cleanouts, and monuments located within the street section shall be adjusted to conform to finished pavement grades.

Contractor shall accurately locate and record the location of existing valve covers cleanouts, and monuments to be raised to grade and shall furnish the Engineer a copy of said record prior to starting construction.

All sections of valve covers, cleanouts, monuments, and grade rings shall be set in cement mortar the same day that the grade rings are placed. Asphalt concrete paving over cement mortar shall be installed by the end of the following work day.

All silt and debris shall be removed from valve boxes and monument vaults. This shall include all existing silt and debris plus material caused by the Contractor's operation.

SECTION 100-7 – SACKED CONCRETE RIPRAP

Sacked concrete riprap shall be constructed at the location and in accordance with the details shown on the Plans and as directed by the Engineer.

Sacked concrete riprap shall conform to the applicable provisions of Section 72-4 of the Standard Specifications

SECTION 100-8 – REINFORCED CONCRETE HEADWALL

A reinforced concrete headwall shall be constructed with the details and at the location shown on the Plans. Bar reinforcing steel shall conform to and be placed in accordance with the applicable provisions of Section 52 of the Standard Specifications, with the following modifications.

In lieu of the sampling of reinforcing steel as provided under Article (d) of Section 52-1.04 of the Standard Specifications, the Contractor shall furnish the Engineer with a certificate from the supplier of the reinforcing steel stating that the steel delivered complies with the requirements of Section 52-1.02 of the Standard Specifications.

Concrete for the headwall shall be Class "A" Portland Cement Concrete conforming to the requirements of Section 90 of the Standard Specifications.

SECTION 100-10 – REMOVE AND RESET MAILBOX

Existing mailboxes shall be removed and reset in accordance with the Plans and as specified herein.

Existing posts that are not suitable shall be replaced with temporary timber posts of good, sound material suitable for the purpose intended.

Concrete for the pedestals shall be produced from commercial quality aggregates and cement shall contain not less than 5 sacks of cement per cubic yard.

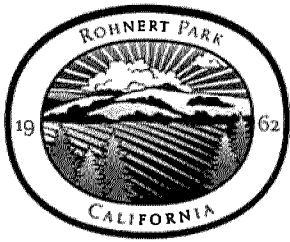
Redwood posts and planks shall be constructed of construction clear redwood, free of heart center, rough.

Existing mailboxes shall be removed and reset on portable mounts consisting of concrete pedestals formed in 5-gallon cans or buckets during construction.

Newspaper boxes attached to existing mailbox posts shall be removed and fastened to the new mailbox posts.

During the construction operations, the mailboxes shall be moved as necessary to clear the way for the Contractor's operations, but at all times shall be accessible for rural delivery.

When construction is complete, the posts and pedestals shall be removed and disposed of as provided in Section 15-2 of the Standard Specifications and the mailboxes shall be installed in final position on new redwood posts and planks.



*City of Rohnert Park
Development Services*

May 12, 2014

Dear Developers, Engineering Contractors Association, Construction Coalition;

This letter is to inform you of proposed changes to the City of Rohnert Park Manual of Standards, Details and Specifications. We previously updated our Sewer Standards in 2010, and our Water and Streets Standards in 2011. This update involves the Storm Drain, Streetlight and Traffic Standards, and minor changes to the Street Standards. We invite your questions and comments regarding our proposed changes.

You can find the revised standards on our website at the following location:

<http://www.rpcity.org/index.aspx?page=959>

1. Storm Drain Design Standards, Storm Drain Detailed Drawings
2. Streetlight Design Standards, Streetlight Detailed Drawings
3. Traffic Standards Design Standards, Traffic Detailed Drawings
4. Street Standards Design Standards, Street Detailed Drawings

At the above link you will find all of Volume 1 and Volume 2 for each of these standards. Volume 1 is the Design Standard and Volume 2 is the Standard Details. In Volume 2, any detail that is signed is a current detail and is not being changed. All the standard details are being provided so that you can see how the standards fit together in their entirety.

Volume 3 is the Standard Specifications. There is only one change proposed to the standard specification in Volume 3 and that change is a deletion. The City is deleting the section on Cast-in-Place Concrete pipe, as this pipe will no longer be allowed. Over the years, the City has discovered a large percentage of cast-in-place concrete pipes were not constructed properly. The City of Santa Rosa has had similar experiences and they are planning on eliminating this option as well. Since the change to Volume 3 is only this deletion, we are not including Volume 3 in the review documents, although we do invite your comments on the deletion of Cast-in-Place Concrete pipe.

Below is a summary of the proposed changes you will find in each section:

Storm Drain

Changes to the Storm Drain Standards in Volumes 1 and 2 include the following, each of which are further described below:

1. Updating references to the SUSMP Manual from the 2005 manual to the City of Santa Rosa and Sonoma County Storm Water Low Impact Development Technical Design Manual.
2. Clarification of the use of the Design and Construction of Urban Stormwater Management Systems (WEF Manual FD-20) in the design of Detention Basins.

3. Clarifying the requirement for H₂O loading on storm drain catch basin manhole covers.
4. Updating the “Drains to Creek” symbol.
5. Adding a requirement that detention basins be designed to meet the guidelines in ASCE Guidance for Protection of Public Safety at Urban Stormwater Management Facilities. These guidelines provide some minimum guidance to protect public safety.

Each of these is briefly discussed below:

Low Impact Design (LID)

The most significant change to the standard is the adoption of the 2011 Low Impact Development Technical Design Manual. This change is required by the City’s Municipal Separate Storm Sewer Systems Permit. The new link as found in the Storm Drain Standards Volume 1 page SD-4 at the bottom of the page.

Currently, the Rohnert Park Manual of Standards, Details and Specifications refers to the Guidelines for the Standard Urban Storm Water Mitigation Plan adopted by Santa Rosa in 2005. This 2005 manual is no longer supported by the City of Santa Rosa.

The City of Rohnert Park recently became a Municipal Separate Storm Sewer Systems (MS4s) Permit Phase 1 co-permittee with the City of Santa Rosa.

A major component of the Phase I Permit is updating the post-construction program to include Low Impact Development (LID) requirements. The Regional Board’s preference is that all local municipalities adopt the City of Santa Rosa/County of Sonoma 2011 Low Impact Development Technical Design Manual (“2011 LID Manual”) to meet the new post-construction LID requirements. We believe that consistency across the region will make it easier for developers and builders.

In accordance with the requirements of the City’s new MS4 permit, the City is adopting the 2011 LID Manual and incorporating it into the Rohnert Park Manual of Standards, Details and Specifications in place of the current 2005 SUSMP manual.

The remainder of the current Rohnert Park Storm Drain Standard is taken from the City of Santa Rosa Standard and was adopted by the City of Rohnert Park in 2006. These standards are generally compatible with the 2011 LID Manual.

Clarification of the use of the Design and Construction of Urban Stormwater Management Systems (WEF Manual FD-20) in the design of Detention basins.

This is not a substantive change as the Standards already require engineers to incorporate WEF Manual FD-20 in the design of detention basins. The changes are simply a clarification of this requirement. This clarification can be found in Storm Drain Standards Volume 1, page SD-13.

Clarifying the requirement for H₂O loading on storm drain catch basin manhole covers.

This is not a substantive change as the Standards already require storm drain catch basin manhole covers to meet H₂O loading requirements. The changes are simply a clarification of this requirement. This is shown in Storm Drain Standards Volume 2 STD 401 and STD 402.

Updating the Drains to Creek symbol

The new Drains to Creek symbol is more durable and more versatile. The standards were also clarified as to the location of the symbols. This is shown in Storm Drain Standards Volume 2 STD 409.

Guidance for Protection of Public Safety at Urban Stormwater Management Facilities

ASCE EWRI is preparing to publish a new guidance document on protecting public safety at urban storm water facilities. These guidelines provide some minimum guidance to protect public safety. Since this is a safety related document, City staff believe it is important to add a requirement that detention basins be designed to meet these guidelines. The final draft from May 2013 is located at:

http://www.weat.org/stormwater/SW2013_SafetyGuidanceFinalDraftforReview.pdf

An article on the document is located at:

<http://stormwater.wef.org/2013/05/public-safety-at-stormwater-management-facilities/>

The new wording can be found in Storm Drain Standards Volume 1 page SD-13.

Streetlight Standards

There have been great advances in streetlight technology since the adoption of the 2006 Streetlight Standards. The new standard proposes all streetlights have LED technology. This change is shown in Volume 1 Streetlight Standard page SL-6, Section 2.A and Volume 2 STDs 610, 611 and 612.

Foundations for poles have been changed to meet the new Caltrans sizes. This change is Streetlight Standard Volume 2 STDs 620A and 620B.

Details for decorative lights are removed and guidance for decorative lights added. The new guidance is found in Volume 1 Streetlight Standard page SL-6, Section 2.B.

Definitions have been updated to match the Standards in other locations as well as the General Plan. These are included in Volume 1 Streetlight Standard pages SL-1 to SL-4.

Traffic Standards

Traffic Standards include striping, marking, signs and traffic signals.

Striping, Marking and Signs

The major change in this standard is a movement toward reference to CAMUTCD and Caltrans as a base document. This will help keep the standards continually updated. This change is found in Traffic Standards Volume 1 pages TR 6 to TR-10.

Signals

The City of Rohnert Park has recently added five new traffic signals. During this process, we have had the opportunity to review different design features. Based on this, we have refined our standards. Significant changes include referencing Caltrans Standards, the addition of battery back-up and the movement away from loops to video detection. Changes are included in Traffic Standards Volume 1 Pages TR11 to TR 17 and Traffic Standards, Volume 2 STDs 730, 731, 732, and 733A.

Construction Sign Standard

Our construction sign standard is modified to provide a place for the funding source. This change can be found on Street Standard Volume 2, STD-238.

Street Standards

As mentioned above, the city updated our Street Standards in 2011. However, we found it necessary to make a few minor updates to our street standards at this time. These include updates to curb ramps and curb cuts and the class 1 bike path standard.

Curb Ramps and Curb Cuts

The national and state standard for pedestrian curb ramps recently changed. Given the number of changes in curb ramps over the past few years, we have eliminated a pedestrian curb ramp standard and now refer to the latest edition of the Caltrans standard plan. Because the pedestrian curb ramp standard affects vehicular curb cuts, we have updated our standards for vehicular curb cuts. The vehicular curb cut standards remain the same except for changes to comply with the new ADA rules. This change can be found on Street Standard Volume 1, Section III.B.2, page ST-7. The slopes in the new Caltrans standard are reflected in Street Standards, Volume 2 Residential and Commercial Curb Cut Standard, STD 250A to 250E.

Class 1 Bike Path

We are updating our bike path standard. The proposed bike path standard is a concrete bike path. Asphalt bike paths do not fare well on the soils in Rohnert Park. Conversely, concrete paths in similar locations have lasted 30 years. Our new standard is modeled on the bike path standard in Davis, CA, a city which has extensive experience constructing and maintaining bike paths. A recent project in Rohnert Park evaluated two alternative designs – an asphalt bike path with extensive subgrade and the proposed standard. The proposed standard was estimated to cost less to construct. This change can be found on Street Standard Volume 2, STD-238.


Please provide any comments or questions to:

Patrick Barnes, PE
Deputy City Engineer
City Hall
130 Avram Avenue
City of Rohnert Park, CA 94928
(707) 588-2234
pbarnes@rpcity.org

The City will hold a workshop on these standards to collect your input and answer questions. This meeting will be held at City Hall in the Council Chambers on Thursday, May, 22, 2014 at 3:00 pm. A conference call-in number is also available if you are unable to attend. You may use 661-673-8600, Access code 1066325#. We look forward to meeting with you.

We thank you for your participation in developing these standards.

Sincerely,

A handwritten signature in black ink, consisting of a large, stylized 'P' followed by a series of loops and a horizontal line extending to the right.

Patrick Barnes, PE
Deputy City Engineer
City of Rohnert Park

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GHD
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SANTA ROSA CA 95407

B&T WORKS
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CHERRY VALLEY CA 82223

SONOMA LAND ACQ
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LOS ANGELES, CA 90017

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SEBASTOPOL CA 95473

D&M CONSTRUCTION
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PETALUMA CA 94954

NCECA
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SANTA ROSA CA 95407

COASTLAND
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CIVIL DESIGN CONSULT
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ADOBE & ASSOC.
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GROENIGER & CO.
4130 SOUTH MOORLAND AVE.
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SONOMA MOUNTAIN VILLAGE
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SUE GREEN
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Northeast Area Specific Plan Rohnert Park Assessor's Parcel Map

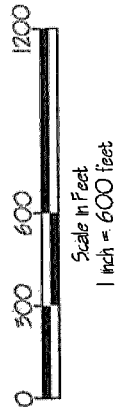


Figure 3

Millbrae Ave

Langner Ave

Labath Ave

Redwood Dr

Rohnert Park

Wilfred Ave

Dowdell Ave

Business Park Dr

101

Legend



RP CITY LIMIT

NWSPA



APN



375 187.5 0 375 Feet



COUNTY ASSESSOR'S PARCEL MAP

TAX RATE AREA

58-000

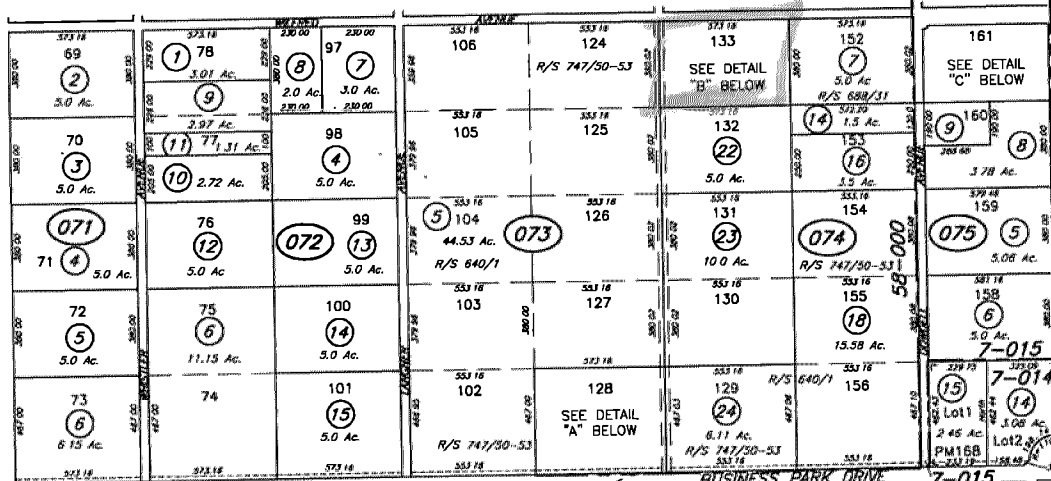
7-014

7-015

45-07

Ptn. SANTA ROSA FARMS NO. 2
REC. 03-07-1910 IN BK. 021, MAPS, PGS. 14-00

45-02



SCALE: 1" = 400'

REVISED

10-16-95=15(072)-KT
10-16-95=06(071)-KT
08-08-01=15(075)-KT
10-28-10=18(074)-KT
08-08-11=15A-BJ
12-20-11=R/S-BJ
08-31-12=Corr-BJ
12-19-12=R/S-BJ
03-19-13=18(073)-BJ
03-19-13=24(074)-BJ
08-18-13=17(075)-BJ

Parcel Map No. 168
REC. 01-26-01 IN BK. 017, MAPS, PGS. 13-15

46-02

DETAIL "B"
1"=200'

