CALIFORNIA

DESIGN AND CONSTRUCTION

STANDARDS



September 2017

CITY OF WILLOWS 201 NORTH LASSEN ST. WILLOWS, CA. 95988

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PART I – DESIGN GUIDELINES & DESIGN CRITERIA

GENERAL INFORMATION

PURPOSE AND INTENT

It is the purpose of these Design and Construction Standards to provide <u>minimum</u> standards to be applied to improvements and private development projects to be dedicated to the public and accepted by the City for maintenance or operation, as well as improvements to be installed within existing rights of way and easements. These standards provide for coordinated development of required facilities to be used by and for the protection of the public. These standards shall apply to and regulate the design and preparation of plans for construction of streets, drainage, sewerage, street lighting, and related public improvements.

Waterlines and facilities shall be designed and constructed in accordance with Cal Water Standards.

The intent of these Standards is to assist developers, engineers, and contractors toward completion of improvements that will comply with City requirements and be accepted by City for maintenance and operation. The Planning Commission or City Council may impose project specific requirements which may supersede the requirements and standards set forth herein. Any items or situation not included in these Improvement Standards shall be designed in accordance with accepted engineering practice, the applicable City Standard Drawings and Standard Specifications of the State of California Department of Transportation, and shall be subject to the approval of the City Engineer and/or Public Works Director.

DESIGN

It is the responsibility of the design engineer to initiate written requests for approval of any design concepts that differ with these criteria, to verify additional requirements imposed, to perform any necessary calculations or studies and to resolve specific problems with the appropriate agency and/or District.

ABBREVIATIONS

BC	Beginning of curve	EC	End of curve
BCR	Beginning of curb return	ECR	End of vertical curve
BVC	Beginning of vertical curve	f.p.s.	Feet per Second

DEFINITIONS

In these standards, the intent and meaning of terms used shall be as follows:

APPROVED - means accepted or acceptable under an applicable specification or standard stated or cited in these standards or accepted as suitable for the proposed use under procedures and authority of the City Manager.

CITY - The City of Willows, a municipal corporation in the County of Glenn, State of California, including any special districts administered by the City Council.

CITY ENGINEER - Shall mean the Engineer authorized by the City Council to represent the City or their authorized representatives including City Building Official and inspectors acting under direction of the City Engineer.

CITY STANDARD DRAWINGS – Shall mean Part III of these Improvement Standards.

CONTRACTOR - Shall mean any person or persons, firm, partnership, corporation, or combination thereof, licensed to perform the type of work involved, who has entered into a contract with any person, corporation, company, or the City, for the construction of any improvement or portions of any improvement within the City.

DEVELOPER - Shall mean any person or persons, firm, partnership, corporation, or combination thereof, financially responsible for the work involved.

DEVELOPMENT - Shall mean single properties as well as subdivision improvement.

ENGINEER – Shall mean the project engineer(s), licensed in the state of California, acting on behalf of the Developer.

PG&E – Pacific Gas and Electric Company

OTHER SPECIFICATIONS - wherever in these standards other specifications are mentioned, it shall be understood that the materials or methods mentioned therewith shall conform to all requirements of the latest revision of the specifications so mentioned.

SEWERS -

Building or Lateral Sewer - that portion of the service sewer between the main sewer and the point of connection to the building drain of the structure.

Main Sewer - a public sewer which has been or is being constructed to accommodate one (1) or more service sewers.

Service Sewer - the privately owned and maintained (4" diameter minimum) sewer line which links the sanitary or waste plumbing (building drain) of a house or other building with the main sewer. The service sewer begins at its point of connection with main sewer and terminates at its point of connection to the building drain and includes the lateral sewer and the building sewer. The point of connection to the building drain shall be two (2) feet or less form the point where the plumbing first extends outside the foundation.

State Standards encompasses both the State Standard Specifications and the State

Standard Plans

State Standard Plans shall mean the latest volume of the State of California Standard Plans adopted by the California Department of Transportation, Caltrans.

State Standard Specifications - Shall mean the most recent volume of the State of California Standard Specifications as issued by the Department of Transportation, Caltrans.

Trunk Sewer - a public sewer which has been or is being constructed to accommodate more than one (1) main sewer and is not used for building sewer connections.

PLANS AND SPECIFICATIONS REQUIRED

Complete plans and specifications shall be prepared by an engineer licensed in the State of California for all proposed streets, drainage facilities, sewerage, and street lighting improvements. All plans and specifications for improvements to be accepted for maintenance by the City shall be prepared by an Engineer of the appropriate branch of engineering covering the work submitted. All dedications and easements necessary to accommodate all improvements shall be submitted to the City Engineer for approval and offered for dedication to the City. Possession of a complete set of City approved plans and a valid encroachment permit shall constitute the necessary permits for a Contractor to perform work in the City right of ways or easements. The Engineer or his representative shall order the Contractor to cease work on any project when the Contractor does not have properly approved plans in his possession.

PLAN DETAILS

General

All plans submitted to the City shall be prepared in a manner that will produce legible prints. All line work must be clear, sharp and heavy. Letters and numerals shall be 1/8 inch minimum height, well formed, and sharp. Numerals showing profile elevations shall not be bisected by station grid lines. Computer drafting shall be by clear and legible lettering acceptable to City.

Plan Content Requirements

The following requirements shall apply to all plans submitted for approval. The Engineer shall prepare plans neat, accurate, and comprehensive in keeping with the standards of the profession.

A. Title Sheet

On subdivision or improvement plans, exceeding three sheets in the set, a title sheet shall be prepared showing the entire development or project complete with subdivision or assessment district limits, City limits, street names, section lines, corners, and the location within the City. (Minimum scale 1"=500'.) The title sheet shall also include an index of the sheets; Engineer's name, license number, and signature; the date and

scale of the drawing; north arrow; and the block for the necessary approval of the City Engineer and other officials. All sheets shall be 24" x 36" or as approved.

B. Layout Sheet

The layout sheet (Sheet 2) shall contain thereon the entire subdivision unit on one sheet in skeleton form shown drainage features and sewer and water lines. Drainage pipe, sewer pipe, water lines, and other underground utilities shall each be identifiable from other underground conduits. Appurtenances such as manholes, valves, and drop inlets shall be shown in their proper location. The scale of the project shall be 1" = 100' or 1" = 200' or as approved. An index of the plan and profiles sheets shall be shown on the layout sheet.

C. Title Blocks

Each sheet within the set of drawings shall show the sheet title, sheet number, date, scale, and the Engineer's name, signature, and license number.

D. Right of Way

Right-of-way lines, the boundaries of lots fronting on the street, drainage easements, utility easements, planting easements, section lines and corners, land grant lines, and temporary construction easements both existing and proposed shall be shown on the plans. All right-of-way and easement lines shall be properly dimensioned.

E. Topography

All pertinent topographic features shall be shown such as street lines, curbs, sidewalks, shoulders, location and size of storm and sanitary sewer lines, high water and frequent inundation levels, water lines, gas lines, telephone conduits, other underground utilities, existing structures, houses, trees (6" and larger) and other foliage, traffic signals, street lights, pull boxes, underground electrical conduits, drainage ditches, utility poles, fire hydrants, retaining walls, masonry structures, and all other features in the area which may affect the design requirements for the area. Any tree (6" and larger) which falls within the existing or proposed right of way or easement shall be shown on the cross section when requested by the City Engineer. Permission to remove any tree (not required to be removed by approved construction) in the City rights of way or easements shall be obtained from the City Planner prior to removal.

F. Contours, Elevations, and Drainage Plan

Existing contours or supporting elevation data shall be shown on all plans. The Drainage Plan, if required, shall contain contours of the subdivision unit and the immediate vicinity sufficient to indicate the perimeter of areas to be drained by each structure. Calculations supporting the design of drainage facilities shall be submitted with the drainage plan. Scale of plan shall be of sufficient size to clearly show the drainage features and the location of major structures. FEMA established 100 year floodplains shall be identified when applicable.

G. Profiles

Plans shall show the profile of all existing roadway centerlines, existing edges of pavement, existing curb and gutter flow lines, drainage ditches, storm drain facilities and sanitary sewers. All profiles of proposed improvement shall state centerline elevations at fifty (50) foot intervals and rate of grades, vertical curves and other vertical alignment data. Elevations of any warped surfaces and vertical curves shall be set at twenty-five (25) foot intervals. When required by the City Engineer, the Engineer shall provide centerline profiles and cross section information beyond the limits of the proposed development to facilitate setting proper vertical alignment within the proposed improvement limits.

H. Stationing and Orientation

The stationing on plan and profiles sheets shall read from left to right. Plans shall be so arranged that the north arrow points toward the top or upper 180 degrees of the sheet, insofar as practical.

I. Bench Marks

The bench marks and datum shall be clearly noted on the plans both as to location, description, and elevations. The datum shall be U.S.G.S., NGVD29, NAVD88 or as otherwise approved by the City Engineer.

J. Typical Sections

A typical section, setting out the structural features for each type of facility within the improvement, shall be set forth on the plans.

K. Cross Sections

Cross sections, when required, shall be included with the plans. When, in limited areas, unusual topographic features or special conditions occur that would affect the work, individual cross sections or typical sections may be shown on the pertinent plan sheet.

L. Special Notes

Special notes shall be clearly indicated and it shall be conspicuously noted on the plans that all construction work and installation shall conform to the City of Willows Design and Construction Standards, and that all work is subject to the approval of the City Engineer.

M. Sign and Striping Plan

Sign and striping plan shall be set forth on a separate plan sheet or detail sheet and plan sheets shall contain references thereto.

"AS-BUILT" PLANS

"As-Built" Plan Requirements

One complete set of "as-built" reproducible plans, as prescribed by the City Engineer, shall be submitted to the City Engineer prior to acceptance of the improvements. The Engineer shall keep an accurate record of all approved deviations from the plans. These are to be utilized

with the Inspector's plans for preparing a complete and accurate set of "as-built" drawings for the permanent records of the City. "As-built" plans shall be prepared by the Engineer responsible for the work. Preparation of as-built plans, complete and in accordance with these standards, shall be the responsibility of the Developer.

SECTION 1 – STREET DESIGN STANDARDS

GENERAL

Street design and construction shall conform to these City Design and Construction Standards.

Street and right-of-way, widths, curb return radii, curb, gutter, sidewalk and handicap ramp dimensions shall be as shown in the City Standard Drawings.

The street and highway design shall conform both in width and alignment to any general plan or specific plan adopted by the City Council, and rights-of-way for any street or highway indicated on any such plan shall be dedicated. The Planning Commission or the City Council may specify project specific road improvement requirements different from the standards set forth herein. In all such cases, the "project specific" requirements of the Planning Commission or City Council shall govern.

The City Engineer, at his discretion, may approve or require modifications to the minimum standards for a particular development whenever it appears necessary, reasonable, and proper. Exceptions to these standards will not be allowed unless the request is accompanied by written justification and certification by a licensed engineer that traffic safety is not compromised. The City Engineer shall be the final authority on all questions which may arise as to the interpretation of the Design Standards. The City Engineer's decision shall be final and he shall have authority to enforce and make effective such decisions. Appeals of the City Engineer's decisions shall be in writing to the City Manager.

When lots are proposed for commercial or industrial uses, alleys at least 24 feet in width may be required at the rear thereof.

DESIGN

Geometrics

- A. Minimum cross slope shall be 2%. Maximum cross slope shall be 4% except for traveled ways of major collectors and arterials which shall not exceed 3%.
- B. Minimum street grade with curb and gutter shall be 0.25%.
- C. Minimum street grade without curb and gutter shall be 0.5%.
- D. Vertical curves shall be used to connect grade profiles where the algebraic difference in grade rates exceeds one percent. The roadway minimum vertical curve length allowable at the intersection of two grades shall be fifty (50) feet. Alternatively, the length of vertical curve required shall be determined by sight distance requirements using Caltrans design practices with the submittal of supporting calculations. Vertical curves may be omitted at intersections where the algebraic difference in grades does not exceed 2.0 percent.
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- E. Minimum centerline curve radius shall be 250 feet.
- F. When two streets intersect, the minor street shall not have a grade greater than 7.0 percent for a minimum distance of forty (40) feet measured from the curb line of the intersecting street, except in unusually rough terrain, as determined by the City Engineer. The centerline of the lesser intersecting street shall meet the crown slope at the projected lip of gutter. Crown slope of the major street may be reduced to 1.0 percent within the intersection when approved by the City Engineer. Streets with grades in excess of 5 percent intersecting highways or arterial roads shall have a minimum of thirty (30) feet "storage" area from the edge of pavement of the primary road to the beginning of vertical curves (BVC).
- G. Cut and fill slopes: Fill slopes shall be 2:1 or flatter and cut slopes shall be 2:1 or flatter depending upon the material encountered. Desired slopes are 3:1 where compatible with other project design criteria. This condition may be modified when engineering studies indicate the need for flatter slopes or when stable slopes can be maintained on steeper grades and are approved by the City Engineer. Slope rounding shall be provided where the height of cuts or fills exceeds six (6) feet.
- H. Clearing Right of Way: Designated trees and all brush shall be removed from the road right of way when within a distance of five (5) feet from the edge of the paved surface of the roadway regardless of the width of the paved section. The right of way shall be cleared to a minimum of three (3) feet beyond any cut or fill slope. At intersections, clearing may be required to the property line for a distance of 100 feet from the centerline of the intersection when deemed necessary to provide safe sight distance for approaching traffic. Tree removal shall be consistent with City of Willows Municipal Code and may be restricted by project specific conditions. The clearing limits of this section may be modified to comply therewith.
- I. Driveways: In areas where cuts and fills exceed three (3) feet or where damage may occur to public right of way during future driveway construction, driveways shall be graded into each lot at the time of grading for the roadway. All material from driveway construction shall be disposed of consistent with the grading plan.
- J. Access Roads: All roads to be accepted for dedication and maintenance by the City shall be paved to the boundary of the subdivision. Private road approaches that encroach into a City street shall be designed and constructed in accordance with these standards.

Structural Section

Pavement thickness and total structural section shall be designed on the basis of resistance factor "R" determined in accordance with State of California, Department of Transportation, California R-value determination or other approved method. The thickness of various structural components shall be determined by the tables, charts, formulas, and procedures

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PART I – DESIGN GUIDELINES
& DESIGN CRITERIA
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contained in the State Highway Design Manual and shall be approved by the City Engineer.

Striping and Marking

Where local streets intersect collectors or arterials, the local streets shall have no less than 50 feet of centerline marking, in conformance with State Standard Plan A20A, Detail 23 or Detail 21 (thermoplastic).

Arterials and collector streets shall be striped, marked and signed in accordance with State Standards and/or as approved by the City Engineer.

Centerlines of knuckles will be striped from 50 feet before the BCR to 50 feet past the ECR, see State Standard Plan A20A, Detail 23 or Detail 21 (thermoplastic.)

Signing and Barricades

Street name signs shall be furnished and erected at all intersections. Street name signs shall conform to requirements of these standards and shall appear on plans submitted for approval.

Where phased improvement covers a portion of the ultimate improvement and where an improved street is stubbed or proposed to be extended in the future, the improvements shall include a permanent-type barricade at the end of such a street to extend completely across the right of way to serve as a warning to the public. The barricade shall be constructed, painted, and signed in accordance with State Standard Specifications and State Standard Plans. Gates may be required where streets stub into areas where ingress and egress is required.

SECTION 2 – SEWER SYSTEM DESIGN STANDARDS

DESIGN

Connection to an existing public sewer

- A. Unaccepted connections of new mains to existing mains shall be isolated from the collection system by a positive sealing plug. This plug is to be installed in the outlet of the closest manhole on the new main to the existing main. All labor and expense for this shall be borne by the Contractor. Failure to comply may result in civil penalties.
- B. Proposed sewer design must show a point of connection to an existing public sewer main. It is common for a project on one property to require the construction of sewer on an adjacent property before it can connect to the public sewer. Sewer system designs shall incorporate the design of any off-site sewer that is required for the connection to the public main. Appropriate portions of City approved plans shall be referenced in the plans if applicable.
- C. Capacity of exiting down gradient sewer shall be confirmed by the Engineer.

Materials

- A. Gravity sewer mains shall be Polyvinyl Chloride (PVC) SDR35, SDR35 or Ductile Iron Pipe.
- B. Proposed materials for construction of 18" and larger diameter gravity mains require City Review and City Engineer's approval.
- C. If a gravity sewer main is installed outside of a paved roadway or paved alley, ductile iron pipe is required.
- D. All ductile iron pipe shall be polyethylene encased.
- E. Use of Asbestos Cement Pipe is **NOT** allowed under any circumstances.
- F. Sewer force mains shall conform with the materials and applicable construction requirements for water mains. Non-metallic pipes require tracer wire.

Alignment

- A. Follow the State of California, Department of Public Health "Criteria for the Separation of Water and Sanitary Sewer Main."
- B. Sanitary sewers shall be installed within right-of-way dedicated for public streets where practicable. If not located in street rights of way, sewers shall be installed within the center 10 feet of a 20 foot wide permanent easement dedicated or deeded to the City as a public utility easement. In case of hardship in providing a 20 foot width, lesser widths

may be approved on an individual basis by the City Engineer. Public sewer mains outside the public street shall be kept to a minimum.

- C. Horizontal separation from storm drains shall be a minimum five foot clearance between pipes.
- D. Horizontal separation from other utilities, such as gas, underground electric, underground television cable, etc., shall be a minimum of four feet clearance between the pipes.
- E. Horizontal and vertical curves in gravity sewer mains will not be allowed unless specifically authorized by the City Engineer and shall in no case exceed manufacturer's recommendations.
- F. In general, public sewer mains shall run parallel to street centerlines.

Manholes and Cleanouts

- A. A manhole is required at every horizontal or vertical change in alignment.
- B. Maximum distance between manholes is 300 feet.
- C. A manhole is required at the end of every main, except as otherwise specific in "D" below.
- D. Cleanouts may be installed in lieu of manholes at the end of a sewer main where the distance is less than 200 feet to the nearest manhole and the main size is 8" or less.
- E. Minimize the number of manholes as much as feasible.
- F. 60" diameter manholes are required for mains larger than 18" in diameter, or deeper than 8'.
- G. Private sewer mains must connect to the public main at a manhole.
- H. Provide sufficient drop through the manhole to compensate for energy loss caused by change of alignment. A minimum drop of 0.10 foot is required for deflection angles greater than 30 degrees.
- I. When pipe size increases, set inlet crown at least as high as the outlet crown.
- J. Stubs for Future Extension: Stub pipes shall be installed in manholes with appropriate plugs or caps for anticipated future extension and shall be extended to the project limits or across project frontage when required by the City Engineer. The location and size of stubs shall be shown on the drawings and are subject to approval by the City.

Drop Manholes

- A. Minimize the number of drop manholes.
- B. Standard drop manhole installations are required when the drop in the manhole is greater than 1.5 feet.

Accessibility

- A. Manholes should be located in paved roadways wherever feasible.
- B. All-weather vehicle access is required to every manhole.
- C. All access roads must be a minimum 12' in width and be within a dedicated easement.
- D. Acceptable types of access roads are:
 - a. 6" of crushed rock over aggregate base for slopes up to 10%.
 - b. 2" of AC on 6" of aggregate base for slopes in excess of 10%.
- E. All access roads longer than 100' must have an approved turn-a-round.

Size

- A. Mains shall be sized to provide adequate capacity for peak design flows and a minimum 2' per second velocity with pipes flowing half full.
- B. The minimum public main is 8" in diameter.
- C. The minimum private main is 6" in diameter.

Cover

- A. Minimum cover for all gravity sewers is 30". All service lines shall have 30" minimum cover at the property line.
- B. Where cover is less than 36" Ductile iron pipe must be used.
- C. Maximum depth shall not exceed 8 feet without approval of the City Engineer.
- D. Definition of cover: Distance from the top of the pipe to finished grade.

Slope

Design all gravity sewers to achieve a minimum velocity of 2' per second when flowing full. Use n = 0.011 for new pipe, n = 0.015 for the existing system or manufacturer's recommendation, whichever is higher. Supporting calculations shall be submitted.

Sewer Laterals - Building Connections

- A. Each lot shall be served by one lateral.
- B. Each building shall have an independent connection to a main sewer except as provided in Section 13.10.140 paragraph (3) of the City Municipal Code.

The applicant for multiple connections to the same service sewer shall provide a plan to scale (preparation by Civil Engineer is recommended but not required) showing:

- a. The location of all physical features such as buildings, trees, creeks, paved areas, building drain outlets, etc.
- b. Existing and proposed sewers, including size, alignment, lengths, grades, elevations, cleanouts, etc.
- c. Ground elevations at critical points sufficient to determine that the system is workable and will serve all buildings, using adequate grade and cover.
- d. Calculations verifying adequacy of piping size for proposed fixture unit loading. See California Plumbing Code for criteria.
- C. All laterals must connect to the main with a wye connection. All bends, where permitted shall be made with long radius fittings.
- D. Minimum slope of sewer laterals is 2% or 1/4" per foot, unless otherwise approved by the City Engineer. Under no circumstance shall the slope on a sewer lateral fall below 1%.
- E. Service sewers shall be sized in accordance with the latest edition of the California Plumbing Code, but in no case smaller than four (4) inches.
- F. A backwater check valve shall be installed in the service sewer line at a location approved by the City Engineer whenever the building has a finished floor elevation twelve (12) inches or less above the top elevation of the nearest upstream manhole or cleanout. Backwater check valves shall be cast iron or cast bronze. Backwater check valves shall be approved by a City representative prior to installation.
- G. Cleanouts of the same size as the line they are intended to serve shall be provided in accordance with the California Plumbing Code and as follows:
 - a. At the point of connection to the building drain.
 - b. At any single turn greater than forty-five (45) degrees.
- c. At intervals along the building sewer when the cumulative total of deflections PART I DESIGN GUIDELINES
- & DESIGN CRITERIA

from the point of connection to the main or from another cleanout exceeds forty-five (45) degrees.

d. At intervals not to exceed one hundred (100) feet along the service sewer.

Cleanouts shall be extended to grade and protected by "Christy" F-8 curb valve boxes, or equal, except that in areas subjected to traffic or where located in traffic areas or sidewalks, "Christy" G-5 traffic valve boxes, or equal, with cast iron lids shall be used. These cleanouts located in traffic areas shall have a 12 inch deep concrete collar poured around the valve box with a minimum outside diameter of at least 20 inches greater than the OD of the top of the box.

- H. Lateral sewer piping and construction shall conform to City Standard Drawings and the requirements contained herein.
 - a. Building sewer piping shall be a minimum of 4 inches in diameter and shall be one of the following when the portion of the line is within the public right-of-way:
 - 1. Ductile Iron Pipe, ANSI A21.51
 - 2. Polyvinyl-Chloride (PVC Pipe SDR35)
 - b. Building sewer piping outside of the public right-of-way shall be a minimum of 4 inches in diameter and shall conform to the adopted Plumbing Code.
 - c. The pipe manufacturer's written instructions shall be closely followed in all piping installations.
 - d. Any gas or electric services or other pipes paralleling a sewer pipe shall be separated from said sewer pipe by a minimum horizontal clear distance of eighteen (18) inches. Such pipes placed in the same trench as a sewer pipe, if above the elevation of said sewer pipe, shall be placed on a solid shelf excavated at one side of the common trench. Any water service pipe shall conform to State Department of Public Health separation requirements.
- I. Where an existing building is disconnected from a septic tank and reconnected to a new service sewer, the connection to the new sewer shall be made at the end of the building drain. No portion of the existing piping from the building drain to the septic tank shall be utilized for connecting to the new service sewer unless said piping is exposed and tested to permit the City to determine that it meets all of the City's requirements for new construction.
- J. When an application is made to connect to an existing building sewer, constructed prior to 1970, or if the City has reason to believe that the sewer is deficient in any respect, the City Engineer may require the Contractor to excavate and/or test the sewer and to repair or replace it if necessary to make sure that it complies with these sewer standards.

PART I – DESIGN GUIDELINES & DESIGN CRITERIA

K. All new connections are prohibited from having inflow/infiltration sources.

Proximity to Wells

Service sewers shall not be located closer than 50 feet from an individual domestic well. However, said clearance can be reduced to 25 feet if the service sewer is constructed of cast iron. Where special hazards are involved, the distance required shall be increased, as may be directed by the Glenn County Health Officer. Also, see Bulletin # 74 "Water Well Standards", State of California, the Resource Agency Division of Water Resources for additional requirements.

Design Flow

An average flow of 100 gallons per person per day or 350 gallons per dwelling unit per day shall be used for design of sewers with peak flows calculated in accordance with standard engineering practice. All sewers shall be designed to carry peak flows without surcharging the manholes.

Sewer mains subject to extension in the future shall be sized to serve the entire area tributary to the proposed development. The design engineer shall submit a study substantiating the proposed size of sewer in such cases. Discussion of parameters with the City Engineer is advised prior to the study.

The estimated population used for design, including population equivalents for commercial, industrial, and institutional uses, shall be submitted prior to commencement of improvement design.

SECTION 3 – STORM DRAINAGE DESIGN STANDARDS

GENERAL

These standards shall serve as a guideline for drainage system design and indicate minimum design standards acceptable to the City.

Improvement projects shall be protected from inundation, flood hazard, sheet overflow, and ponding of storm water, springs, and other surface waters. The design of improvements shall be such that water accumulating within the project will be carried away from the project without injury to adjacent improvements, non-residential development, residential sites, or residences to be constructed on sites within the project, or to adjoining areas. Water accumulating within the project shall be carried to storm drainage facilities or to a natural water course by closed conduit or open channel, and shall meet the design standards herein set forth.

Drainage systems within the project shall accommodate anticipated future development (consistent with the General Plan) within the drainage basin. Off-site drainage facilities shall be adequate for ultimate development of the drainage basin. Diversion of natural drainage will be allowed only within the limits of the proposed improvement. All natural drainage must enter and leave the improvement area at its original horizontal and vertical alignment unless an agreement, approved by the City, has been executed with the adjoining property owners. All concentrated drainage leaving the boundaries of an improvement area shall be connected to existing drainage ways approved by the City Engineer.

Where a development is subject to flood hazard, the developer shall provide flood control works, drainage facilities, or other improvements sufficient to provide all structures or building sites, both existing and proposed, with 100-year flood protection. In low points of streets, designs shall show 100-year relief points. If 100-year relief points are through private properties, easements and overland facilities shall be included in the design.

Street improvements shall include adequate provisions for storm drainage. Adequate storm drainage shall consist of a system of underground piping, generating self-scouring velocities and leading to a disposal point which is workable under conditions of heavy rainfall and runoff. Special design problems involving pump stations, infiltration basins, on-site retention, or other unusual features not covered herein, will require individual study and approval. Pump stations will not be allowed except where special circumstances warrant consideration.

Alignment

The location of storm drainage pipelines in new streets shall be under or adjacent to the curb and gutter parallel to roadway centerline.

Lines

Lines shall be as near parallel with the centerline of streets as possible. Angular changes shall PART I - DESIGN GUIDELINES

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& DESIGN CRITERIA
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not exceed 90 degrees. Open ditches, lined channels, swales, and flood plain areas shall be maintained as nearly as possible in their existing alignment. When an open ditch, other than a roadside ditch, is to be constructed parallel to an existing roadway, the ditch shall be constructed outside the proposed right of way of the ultimate street development.

Easements

Drainage conduits and channels, when not located in a public street, road or alley, or within an existing public drainage easement, shall be located in a recorded or dedicated public utility easement. Easements shall be provided for all ditches, culverts, and conduit systems whether constructed as newly built improvements or as rebuilt improvements and shall adequately meet the minimum width specified herein. Dedications necessary for construction on private property shall be completed prior to acceptance of improvements by the City.

Easements for closed conduits shall have a minimum width of fifteen (15) feet and provide sufficient widths for vehicle access and working space. For pipes exceeding 24" in diameter or trenches exceeding five (5) feet in depth, the easement shall have additional width to provide working space as required by the City Engineer. The centerline of the pipe shall be not less than five (5) feet from the easement limit. Pipe may reverse sides of the easement at angle points.

Natural Drainage Courses

All natural drainage courses within the boundaries of an area to be improved shall be provided with drainage easements extending the full length of the drainage courses within the improved area. The width of such easement shall be determined from the limit of the 100-year flood plain. A natural drainage course is defined as an existing drainage way having specific sides and bottom, but may not have year-round flow.

Drainage Study

A drainage study consisting of calculations and a drainage plan shall be submitted with all improvement plans requiring storm drain improvements. The following information shall be included in the drainage study at a minimum:

- A. A drainage plan that depicts onsite facilities, offsite drainage adjacent to the project, and all natural water courses within the project limits.
- B. All existing drainage structures shall be checked to see that sufficient capacity exists to safely pass any increased runoff.
- C. Calculations as set forth in these standards.
- D. The plan shall be designed, at a minimum, to produce no net increase in the rate and volume of peak runoff from the site compared to pre-project conditions (no net increase standard).

Drainage Plan

A drainage plan shall be submitted with each set of improvement plans and shall reflect the following criteria:

- A. Must be of adequate scale and accurately and clearly show contour lines and reference to the datum.
- PART I DESIGN GUIDELINES & DESIGN CRITERIA

- B. All individual watershed areas shall be clearly delineated on the plan.
- C. Concentrated storm flow patterns shall be delineated on the plan.
- D. The quantity of water arriving at each structure, pipe or ditch from a 10-year and a 100-year frequency storm shall be calculated and shown on the plan.
- E. The size, type, and location of conduit proposed.
- F. Channel dimensions and water surface profile computations for 100-year storm when required.

Calculations

One set of drainage calculations shall be submitted with each set of improvement plans. The calculations shall be submitted by a California registered civil engineer and shall conform to standard engineering practice.

Drainage calculations shall be checked and approved by the City Engineer. Drainage calculations may be from any accepted engineering method. The City will check flow determinations by the rational method.

Storm drains with watersheds under 1 square mile shall be designed to pass a 10-year storm with no head. Storm drain and flood control facilities with watersheds between 1 and 4 square miles shall be designed to carry the 25-year storm. Storm drains and flood control facilities with watersheds of 4 square miles or more shall be designed to carry the 100-year storm. The 100-year storm must be carried within drainage facility or roadways with no potential for property damage. All major structures shall be designed to pass the 100-year storm. Storm drain facilities within watersheds draining

Runoff factors, time of concentration, and rainfall intensities shall be determined by accepted methods. Justification for factors used shall be provided with the calculations.

Closed Storm Drain Systems

Closed conduits shall be of cast-in-place concrete pipe, precast reinforced concrete pipe, nonreinforced concrete pipe, or smooth wall PVC pipe as set forth in the State Standard Specifications.

The specific type of pipe or alternate pipes to be used in the development shall be shown on the plans and be subject to approval of the City Engineer.

The minimum slopes of pipes allowed are:

<u>Diameter</u>	Minimum Slope	
15"	.00375	
18"	.0030	
24"	.0020	
30"	.0015	
36"	.0012	

42"	.0009
48" and larger	.0008

Storm drain pipes within City maintained roads shall be minimum 18" diameter, except laterals may be 15" in diameter. Laterals shall connect directly to a drop inlet.

Minimum cover over pipe shall be 30". The maximum allowable cover shall be limited to 11 feet for all pipe sizes and shall not exceed manufacturer's recommendations. The minimum velocity in closed conduits shall be 2 f.p.s. when flowing at a depth of 0.5 D, (D=pipe diameter).

Open Channels

Open channels shall consist of concrete-lined channels, rock slope protection lined channels, or earth channels with approved fabric liners. Open ditches shall pass the 100 year storm and shall be designed to the following criteria:

- A. Minimum Velocity
 - a. Earth channels 2 f.p.s.
 - b. Other lined channels 2 f.p.s.
- B. Maximum Velocity
 - a. Earth channels 6 f.p.s.
 - b. Other lined channels 10 f.p.s.

All channels with earth sides shall have freeboard of not less than 1.5 feet at design capacity for a 25-year storm. All lined channels shall have freeboard of not less than 0.5 feet at design capacity for a 100-year storm.

In existing channels, abrupt changes in alignment or profile and all underbrush and debris, which restricts flow, shall be removed, trimmed, or otherwise improved.

Drainage Structures

Drainage structures shall comply with the following specifications:

A. **Manholes** - Manholes shall be standard precast concrete. Cast-in-place type manholes may be used where required. Where special manholes or junction boxes are required, the design shall be approved by the City Engineer. In no case will junction boxes be allowed which are less than twenty-four (24) inches (inside dimensions).

Manholes shall have a forty-eight (48) inch inside diameter and shall be located at junction points and changes in conduit size. Manholes shall be placed at the BC and EC of all curves and on 300-foot maximum intervals along the curve.

B. **Manholes, junction boxes or inlets** shall be placed at intervals not to exceed 400 feet. All manholes and junction boxes other than inlets shall have standard manhole covers, as shown in these Standard Drawings. Manholes will not be allowed in gutter flow

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lines.

- C. **Drop Inlets** (DI) Drop inlets shall be open curb-face types as shown in these Standard Drawings or other approved inlets. Drop inlets shall be spaced so that the length of flow in the gutter does not exceed 600 feet. The depth of the flow in the gutter shall not exceed 0.35 feet for a 25-year storm. Outfall pipes shall accommodate the design runoff taking into consideration bypass flow from upstream inlets.
- D. Junction Boxes Junction boxes shall be constructed of reinforced concrete or fabricated from reinforced pipe sections. Minimum wall thickness for reinforced concrete junction boxes shall be 8 inches. The inside dimension of junction boxes shall be sufficient to provide a minimum of three inches clearance on the outside diameter of the largest pipe in each face. Junction boxes deeper than four feet shall have a minimum inside dimension of 48 inches.
- E. **Headwalls, Wingwalls, Endwalls, Trash Racks, and Railings** All headwalls, wingwalls, and endwalls shall be considered individually and shall be, in general, designed in accordance with the Standards and Specifications of the California Department of Transportation and the requirements of the City.

Trash racks

Trash racks shall be provided where, in the opinion of the City Engineer, they are necessary to prevent clogging of culverts and storm drains or eliminate hazards. Trash racks shall conform to the requirements of the City Engineer. Temporary trash racks will be allowed where pipe will be extended in the near future.

Guardrails

Guardrails may be required by the City Engineer at culverts, headwalls, and box culverts and on steep side slopes. When so required, the railing shall be installed in accordance with the requirements of the current edition of the California Building Code or State of California, Department of Transportation.

Detention Basins

Storm water detention basins may be allowed when downstream improvements are either not feasible or impractical at the time of development and where flow increases require mitigation. Basins may be considered a permanent means for handling peak storm runoff flows. A plan may be required outlining the proper maintenance and/or abandonment of the basin in the future.

Basins shall be constructed such that the collection system drains into the basin by gravity.

Design criteria shall be as follows: Design Storm: 100 year, 24 hour Basin volume shall be calculated by V=CAR/12 where: C = Runoff Coefficient (Section 11.09)

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A = Contributing Area in Acres

R = Total Rainfall in Inches for the Design Storm (100 Year, 24 hour event in inches)

The volume shall account for a constant outflow not to exceed the pre-development peak runoff rate.

Alternate methods for volume calculations are subject to approval by the City Engineer.

SECTION 4 - STREET TREE DESIGN STANDARDS

DESIGN

Trees shall have a minimum height of eight 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. All street trees adjacent to sidewalks, curbs, gutters or other facilities shall be installed with root barriers to preclude root heaving.

Condition 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, 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.

Tree species must be in conformance with the Approved Street Tree List approved by City Council and approved for the specific location by the Planning and/or Public Works Department.

To avoid conflicts with public utilities, lines of sight and streetscape features, trees shall be located as follows:

- A. 30' back from beginning of curb returns at intersections (visual triangle).
- B. 10-15' from lamp standards, depending on species size.
- C. 4' minimum from driveways, 6' normally.
- D. 6' from all utilities, sewer laterals, water, cable, gas lines and fire hydrants. Street trees shall not be located any closer to a sewer main than its ultimate projected drip line (sewer mains must be outside of the ultimate dripline of the tree.)
- E. Each residential lot shall have at least one (1) tree, corner lots shall have two (2) trees, except where not possible. Normally there will be a tree every 30' as feasible. In small lot subdivisions the intent is that reasonable concessions should be made regarding these standards to maximize the number of street trees planted.
- F. 20' minimum spacing in commercial zones.
- G. Where there is power or service lines above planter areas, tree selection must be appropriate for the limited overhead space restrictions. No single leader trees will be accepted except for very high wires (exceeding 30').

SECTION 5 - STREET LIGHT DESIGN STANDARDS

ABBREVIATIONS

ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
FC	Foot-candle
HPS	High-pressure Sodium
HID	High Intensity Discharge
IES	Illuminating Engineering Society of North America
LED	Light-emitting Diode
NEC	National Electric Code
NEMA	National Electrical Manufacturer's Association
PG&E	Pacific Gas & Electric Company
PVC	Polyvinyl Chloride
UL	Underwriter's Laboratories, Inc.
U/R	Uniformity Ratio

DEFINITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL DESIGN

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

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

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

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

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

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

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.

Electrical service shall conform to the requirements of the City Standard Drawings.

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

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

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

- A. The developer/engineer shall make arrangements with PG&E for service points. Service points shall be shown on the improvement plans. The developer shall be responsible for all costs associated therewith which shall be paid directly to PG&E. The Contractor shall verify the street light service point location(s) with PG&E prior to installation. The City will request energizing from PG&E.
- B. The developer shall install the following in accordance with the Street Light City Standard Drawings: concrete foundations, galvanized steel poles, mast arms of the appropriate lengths, wiring, and standard luminaire.
- C. All street light systems utilizing street 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.

ROADWAY ILLUMINATION REQUIREMENTS

Design Conformity

The design of all street light systems shall conform to the average maintained foot-candle and

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uniformity ratio requirements of these specifications.

Area Classifications

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

- A. "Commercial" shall mean that portion of the City in a business development where ordinarily there are large numbers of pedestrians and a heavy demand for parking space during periods of peak traffic or a sustained high pedestrian volume and a continuously heavy demand for off-street parking space during business hours. This definition applies to densely developed business areas outside of, as well as those that are within, the central part of the City.
- B. "Intermediate" shall mean that portion of the City which is outside of a commercial area but generally within the zone of influence of a business or industrial development, often characterized by a moderately heavy nighttime pedestrian traffic and a somewhat lower parking turnover than is found in a commercial area. This definition includes densely developed apartment area, hospitals, public libraries, and neighborhood recreational centers.
- C. "Residential" shall mean a residential development, or a mixture of residential and commercial establishments, characterized by few pedestrians and a low parking demand or turnover at night. This definition includes areas with single family homes, and/or small apartments. Regional parks, cemeteries, and vacant lands are also included.

Average Maintained Foot-candle Requirements

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

Roadway	Area	Avg.	
Classification	Classification	Maint. FC	U/R
Major	Commercial	.75	3:1
	Intermediate	.75	3:1
	Residential	.75	3:1
(Continued)			
Roadway	Area	Avg.	
Classification	Classification	Maint. FC	U/R

Collector	Commercial	.30	5:1
	Intermediate	.30	5:1
	Residential	.30	5:1
Minor	Intermediate	.20	4:1
	Residential	.20	4:1

Lateral Light Distribution

- A. Lateral light distribution patterns shall conform to Illuminating Engineering Society of North America (I.E.S.) lateral light distribution patterns.
 - a. Street lights mounted at the terminus of a cul-de-sac: I.E.S. Type 4.
- B. Design shall conform to these requirements except as specifically approved by the City Engineer.

STREET LIGHTS

Cobra Style Street lights

- A. The luminaire shall be an American Electric Series 113, Hubbell RM-150, General Electric M250R2, or an approved equal.
- B. Street light poles and mast arms shall be galvanized steel.
- C. The street light poles shall be an Ameron Series PL, Landmark Lighting S3508, Pacific Union Metal LA 10120, or an approved equal.
- D. Street light pole heights shall conform to City Street Light Standard Drawings. Alternate pole heights shall require specific approval of the City Engineer.
- E. Street light mast arm lengths shall conform to City Street Light Standard Drawings. Alternate mast arm lengths shall require specific approval of the City Engineer.
- F. The concrete footing requirements shall conform to the requirements of City Street Light Standard Drawings.
- G. The wiring for the electrolier shall conform to the requirements of City Street Light Standard Drawings.
- H. Cut off lenses and devices shall require specific approval of the City Engineer.
- I. All street lights shall be LED unless otherwise approved by the City Engineer.

WIRING

Except as noted, all wiring methods and equipment construction shall conform to the National Electric Code (N.E.C.) and applicable sections of the State Standard Specifications.

All splices shall be made with solderless and waterproof connectors.

Unless authorized otherwise, all wiring shall be ThW A.W.G. stranded, copper only. Unless otherwise specified on the Street Light City Standard Drawings, all wiring shall be of the following sizes:

- A. All field wiring: #8 minimum (N.E.C.)
- B. Pullbox to electrolier: #10 minimum (N.E.C.)
- C. All wire in pole: #10 minimum (N.E.C.)

PHOTOCELLS

For streetlights 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 State Standard Specifications. The photoelectric controls shall be operable within a <u>minimum</u> voltage range between 105 and 280 volts. All photoelectric controls shall be oriented to the north.

CONDUIT

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 1¹/₂ diameter galvanized steel and shall have a 2-foot minimum cover from the top of conduit to the finished grade of the sidewalk, parkway, or roadway.

All steel conduit and other metal parts, including bonding bushing, shall be N.E.C. approved parts and shall be continuously bonded and grounded per N.E.C. requirements.

All bends and/or offsets shall be made with factory sections using approved couplers per N.E.C. requirements.

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.

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.

PULLBOXES

Unless otherwise approved by the City Engineer, a No. 5 concrete pull box conforming to

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State Standard Plan ES-8 shall be installed within five feet of the base of all street light poles.

All pull boxes shall be installed per City Street Light Standard Drawings.

Pull boxes shall not be more than 250 feet apart on long runs.

Pull boxes shall not be placed where they will be subject to vehicular traffic. Exceptions shall require specific approval of the City Engineer.

All pull box covers shall be inscribed with "Street Lighting" and be secured with 3/8 inch bolts, cap-screws, or studs, and nuts which meet the provisions of the State Standard Specifications.

PART II – CONSTRUCTION SPECIFICATIONS

GENERAL INFORMATION AND PROCEDURES

Contractor shall give the City of Willows Public Works Department 48 hour notice before starting work. Call (530) 934-7041 or contact at 201 N. Lassen St. Willows, CA. 95988 for Inspection Services.

Work hours are limited to from Monday through Friday 8:00 A.M. to 5:00 P.M. unless otherwise approved

All underground improvements shall be installed and approved prior to paving.

WORK WITHIN CITY RIGHT-OF-WAY

Issuance of an Encroachment Permit and associated insurance requirements and surety (i.e. bonding) is required prior to any work within City right-of-way. The Contractor is responsible for providing all traffic control. Contractor shall obtain an encroachment permit from the City of Willows, 201 N. Lassen St. Willows, CA 95988 before start of work. The Contractor shall comply with all requirements of the permit.

The provisions of this section requiring permits shall not be construed to apply to Contractors working under contracts awarded and entered into by the City.

STANDARD DRAWINGS

These specifications are to be used in conjunction with the City Standard Drawings.

INSPECTION DURING CONSTRUCTION

General

Any improvement which is intended for future City maintenance responsibility or required by City as a condition of approval, shall be constructed to City requirements and inspected during construction by the City Engineer and/or Public Works Director. Each phase of construction shall be inspected and approved prior to proceeding to subsequent phases. Inspection includes field inspection during the course of construction and materials testing. All work must be left uncovered and convenient for examination until inspected and approved.

Notification

The Engineer shall notify the City Public Works Director when the Contractor first calls for grades or staking and when any work is ready for inspection. Such inspection shall be made within 24 hours after such notification, weekends and holidays excepted. Any improvements

PART II – CONSTRUCTION SPECIFICATIONS constructed without inspection as provided above or any construction contrary to the orders or instructions of the City representatives shall be deemed not in compliance with City requirements and will not be accepted by City.

Compliance and Responsibility

The City will inspect the work for ultimate compliance with the specifications but will not be responsible for the conduct of the work itself or the manner in which it is performed. Requirements of State, Federal, or other agencies shall be verified by appropriate agency representatives.

FINAL INSPECTION

Clean Up

Upon completion of any improvements which are constructed under and in conformance with these Improvement Standards and prior to requesting a final inspection, the work area shall be thoroughly cleaned of all rubbish, excess material, and all portions of the work shall be left in a neat and orderly condition.

City Inspection

Within five (5) working days after receiving a request for final inspection, the City Engineer shall inspect the work. Contractor, Engineer, and Developer will be notified in writing as to any particular defects or deficiencies to be remedied. Contractor shall proceed to correct all defects or deficiencies at the earliest possible date. At such time as the work has been completed, an inspection shall be made by the City Engineer to determine if all defects have been repaired, altered, and completed in accordance with these Improvement Standards. At such time as the City Engineer finds the work acceptable, the City Clerk will be notified and the matter scheduled for City Council approval. The Contractor, Engineer, and Developer will be notified in writing as to the date of final approval and acceptance by the City Council.

SECTION 1 – STREET CONSTRUCTION

GENERAL

Lines and Grades

The Developer's Engineer or Contractor shall furnish stakes and reference points for the improvements sufficient to control the work and shall provide re-staking as required by the City as set forth in these Improvement Standards. Control and reference stakes for all construction work shall be conspicuously flagged. Contractor shall be responsible for the preservation and perpetuation of these points, marks, and stakes in their proper place until authorized to remove them by the Developer and City Engineer. Any additional stakes required by the City will be set at the Developer's expense. The Developer shall be responsible for any error in the finished work resulting from questionable or erroneous stakes. All supplemental construction staking required by the Contractor shall be supplied by the Contractor.

Construction staking to be supplied by the Engineer shall consist of horizontal and vertical location of curb, gutters, and valley gutters as determined by the Engineer. Flow line, and grate and rim elevations of drop inlets and junction boxes shall be staked with offsets.

The Engineer may revise curb and gutter alignment in the field to avoid tree root structure or conform to existing improvements.

Staking requirements shall not be less than:

One set of slope stakes will be set at fifty (50) foot intervals and twenty-five (25) foot intervals along vertical curves. Reference stakes will be set at an appropriate offset from the top of cut or toe of fill. The top of cut or toe of fill need not be staked. The reference stake will indicate the offset to the top of cut or toe of fill and indicate the cut or fill from the reference point to the top of cut or toe of fill. The reference stakes will indicate the cuts or fills and distances from the top of cut or toe of fill to the subgrade hinge point and centerline subgrade elevation.

When slope stakes are not required, clearing stakes will be set on streets and roads. Lath marked "CLEAR" will be set at fifty (50) foot intervals at the clearing limits. Lath will be oriented so the marking faces the centerline of the street or the improvement.

At street intersections, the radius points for pavement rounding will be staked. The elevation of the top of the stake will be established and marked on witness lath.

Stakes for curb and gutter will be set no more than five (5) feet from the proposed work and at twenty-five (25) foot intervals. Subgrade and forms shall be checked and approved by the City prior to placing curb and gutter.

One set of finish subgrade stakes will be set on centerline at finished subgrade at fifty (50) foot PART II - CONSTRUCTION SPECIFICATIONS
intervals on tangent and twenty-five (25) foot intervals on vertical curve by the Developer's Engineer. An additional set of stakes will be set on hinge points at finished subgrade at fifty (50) foot intervals on tangents and twenty-five (25) feet on vertical curves by Contractor and checked by Developer's Engineer. Any realignment or adjustments of stakes on hinge points will be reset and rechecked as necessary. Developer will be responsible for staking base rock grade from the finished subgrade once the subgrade has been accepted by the City Engineer. The method of staking shall be approved by the City Engineer.

Order of Work

Contractor shall provide City with a schedule of work, and Contractor shall perform all work in accordance therewith. Should circumstances cause Contractor to anticipate falling out of compliance with said schedule, Contractor shall notify City in advance and provide revised schedule for review and approval by the City.

Maintaining Traffic

Attention is directed to Sections 7-1.03, "Public Convenience," 7-1.04, "Public Safety," and 12, "Temporary Traffic Control," of the State Standard Specifications and these standards. Nothing in these standards shall be construed as relieving the Contractor from his responsibility as provided in said Section 7-1.04.

Lane closures shall conform to the provisions under "Traffic Control System for Lane Closure" of these Standards.

The Contractor shall notify local authorities of his intent to begin work at least 5 days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the work area and shall make his own arrangements to keep the working area clear of parked vehicles. Whenever construction vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. A minimum of 9 cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed where directed by the Engineer. Minor deviations from the requirements of this section concerning hours of work which do not significantly change the scope of the work may be permitted upon the written request of the Contractor if in the opinion of the City Engineer public traffic will be better served and the work expedited. Such deviations shall not be adopted until the City Engineer has indicated his written approval.

Construction Area Signs

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Temporary Traffic Control," of the State Standard Specifications.

Type IV reflective sheeting for sign panels for portable construction area signs shall conform PART II - CONSTRUCTION

SPECIFICATIONS

to the requirements specified as "Pre-qualified and Tested Signing and Delineation Materials" by Caltrans.

Traffic Control System for Lane Closure

A traffic control system shall consist of closing traffic lanes in accordance with the provisions of Section 12, "Temporary Traffic Control," of the State Standard Specifications and the provisions under "Maintaining Traffic" elsewhere in these Standards.

The provisions in this section will not relieve the Contractor from his responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.04, "Public Safety," of the State Standard Specifications.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. When the Contractor so elects, said components may be stored at selected central locations approved by the City, within the limits of the right of way.

Work areas adjacent to city streets shall be open to two-way traffic by 4:00 p.m. each work day. One lane shall remain open to traffic during construction unless otherwise approved by the City. Contractor shall submit a Traffic Control Plan for review and approval by the City Engineer and Public Works Director prior to commencing work affecting City streets.

CONSTRUCTION

Asphalt Concrete

Type "A" surface course asphaltic concrete shall conform to Section 39, "Hot Mix Asphalt," of the State Standard Specifications, meeting the one-half ($\frac{1}{2}$ ") inch maximum, medium grading aggregate requirements. Aggregate shall be proportioned by weight and properly mixed according to the provisions of Section 39-3, "Method Construction Process," State Standard Specifications and shall be placed at the locations and thickness shown on the plans.

Asphalt binder shall be steam refined paving asphalt, having a viscosity grade of AR-4000.

A. Asphalt Emulsion

Asphalt emulsion for the application of the tack coat shall be applied with a distributor, which shall be kept on the job site during all phases of paving. Asphaltic emulsion shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction

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joints in the surfacing against which additional material is to be placed, to a pavement to be surfaced and to other surfaces designated by the City Engineer.

B. Spreading Equipment

Asphalt pavers shall be self-propelled mechanical spreading and finishing equipment, provided with a screed of strike-off assembly capable of distributing the material to not less than the full width of a traffic lane. Screed action shall include any cutting, crowding or other practical action which is effective on the mixture without tearing, shoving or gouging, and which produced a surface texture of uniform appearance. The screed shall be adjustable to the required section and thickness. The paver shall be provided with a full width roller or tamper or other suitable compacting devices. Pavers that leave ridges, indentations or other marks in the surface that cannot be eliminated by rolling or prevented by adjustment in operation shall not be used.

The asphalt paver shall operate independently of the vehicle being unloaded and shall be capable of propelling the vehicle being unloaded in a satisfactory manner and if necessary, the load of the haul vehicle shall be limited to that which will insure satisfactory spreading. While being unloaded, the haul vehicle shall be in contact with the machine at all times, and the brakes on the haul vehicle shall be in contact with the machine at all times, and the breaks on the haul vehicle shall not be depended upon to obtain contact between the vehicle and the machine.

Dumping of material in a window and then placing the material in the asphalt paver with loading equipment will not be permitted, unless the asphalt paver is of such design that the material will fall into a hopper which has a movable bottom conveyor to feed the screed and the loading equipment is constructed so that substantially all of the material deposited on the roadbed is picked up and deposited in the paving machine.

C. Pneumatic Rollers

In addition to the requirements for pneumatic rollers in Section 39-1.10 "Spreading and Compacting Equipment," of the State Standard Specifications, the roller shall be equipped so that the air pressure in all tires may be regulated uniformly by the operator while the roller is in motion.

D. Rolling Agents

A rolling agent in the proportions recommended by the manufacturer of such agent shall be added to the lubricating water used in the pneumatic-tire roller. The use of rolling agents and lubricating water will not be required if the pneumatic-tire roller is equipped with a tire heating device that will preheat the tire to a temperature of 105 degrees Fahrenheit.

Spreading, breakdown and compaction shall be in accordance with the State Standard Specifications and shall be completed while the temperature of the asphaltic concrete is 225 degrees Fahrenheit.

Concrete

All Portland cement concrete used for construction of curbs, gutters, sidewalks, and driveways shall be Class A concrete. The maximum slump shall be 3"; minimum compressive strength at 28 days shall be 3,000 lbs. per square inch.

All expansion joints material for installation in curb, gutters, sidewalks and driveways shall conform to City Standard Drawings.

Upon completion of construction, all stake holes and other construction defects shall be filled with concrete and properly leveled.

A. Curing Compound

Curing compound shall conform to AASHTO Designation M-148 Type II, white pigmented, and shall consist of a practically colorless, impervious liquid which will thoroughly seal the surface of the concrete and will not impart a slippery surface thereto. The liquid shall contain a coloring matter which does not permanently alter the natural color of the concrete, but which colors sufficiently at the time of application to indicate the areas covered. The use of any membrane material which would impart slippery surface to the pavement or alter its natural color will not be permitted. The colorless impervious liquid shall contain not less than twenty-five percent (25%) solids.

B. Adhesive

Adhesives used to bind new concrete to existing concrete or asphaltic concrete surface shall be used only after approval of the City Engineer. Dowels shall be used where required by the City

C. Forms

Forms shall be true and shall have a smooth, straight upper edge. Timber forms shall be surfaced on the side placed next to the concrete, shall have true surfaced upper edge and shall be not less than one and five-eighths inches (1-5/8") after being surfaced. All forms shall be thoroughly cleaned and coated with form oil to prevent the concrete from adhering to them. The depth of forms for back of curbs shall be equal to the full back face height of curb. Lower rear edge of front face form for curb shall be milled to a 1" radius. Forms shall be carefully set to alignment and grade and shall conform to the required dimension. Forms shall be held rigidly in place. Clamps, spreaders and braces shall be used where required to insure rigidity in the forms. Benders or thin plank forms may be used on grade changes or for curb returns. Back forms for curb returns may be made of $\frac{1}{2}"$ thick benders cleated together for the full depth of the curb. Side forms for sidewalks, local depressions and driveways shall not be removed less than 12 hours after the finishing has been completed.

D. Finish

All exposed surfaces shall have a medium broom finish.

PART II – CONSTRUCTION SPECIFICATIONS

Curb and Gutter

In constructing curbs, entrances shall be provided for driveways and shall be of the dimensions shown on the approved plans.

Weakened plane joints shall be constructed at 5 foot intervals. When Portland cement concrete pavement is adjacent thereto, or to be constructed adjacent thereto, the joints shall coincide with the weakened plan joints in the adjacent pavement. The joints shall be constructed to a minimum depth of one and one-half inches. Scoring shall be with a tool which will leave the corners rounded and insure free movement of the concrete at the joint, or by sawing the hardened concrete and covering the exposed area with curing compound.

Expansion joints, 1/2" wide, shall be constructed at each side of structures, at the ends of curb returns, ends of driveways and elsewhere on 25 foot centers. Where possible, expansion joints in curb and gutter shall be set co-linear with the joints of the sidewalk. Expansion joint filler shall be flexible bituminous material or equivalent. Expansion joint material shall be shaped to the cross section of the curb and gutter and shall be installed at right angles to the curb face. A construction joint shall be installed when the delay between successive pours exceed the time of initial set.

Concrete shall be placed and compacted in forms without segregation. Prior to the removal of the forms, the surface shall be finished true to grade by means of a straight edge float, no less than 10 feet in length, operated longitudinally over the surface of the concrete. Form clamps shall be constructed so as not to interfere with the operation of this float. Immediately after removing the front curb form, the face of the curb shall be troweled smooth and then finished with a steel trowel. The top shall be finished and front and back edges rounded as shown on the City Standard Drawings. After the face of the curb has been troweled smooth, it shall be given a final brush finish with brush strokes parallel to the line of the curb. The top and face of the finished curb shall be true and straight and the top surface of the curb shall be of uniform width, free from bumps, sags, or other irregularities. When a straight edge ten feet (10') long is laid on top of the face of the curb, or on the surface of the gutter, the surface shall not vary more than 0.01 foot from the edge of the straightedge, except at grade changes or curves. Where the grade is less than one percent (1%), a water flow test will be required to determine depressions in the gutter. Exposed surfaces of curbs and gutters shall be cured by the pigmented curing compound. The Contractor shall clean, at his own expense, all discolored concrete. The concrete may be cleaned by abrasive blast cleaning.

Repairs shall be made by removing and replacing the entire unit between scoring lines or joints. Repaired sections shall be doweled to existing curb and gutter by the use of dowels or, when the repair length is ten feet or more, by application of epoxy adhesive to the existing concrete.

Sidewalk and Driveway

All Sidewalks shall be constructed one foot from the private property line, except when otherwise permitted by written consent of the City Council.

Fresh concrete shall be struck off and compacted until a layer of mortar has been brought to the surface. The surface shall be finished to grade and cross sectioned with a wood or aluminum float, troweled smooth and finished with a broom.

The surface of the sidewalk shall be marked into squares with one-half inch $(\frac{1}{2}'')$ scoring tool which will leave the edges round. Driveway approaches shall be scored at the bottom of the curb breakdowns and evenly across the apron.

Joints shall be as set forth for curb and gutter, described in these specifications.

A. Base Material

Base material under concrete sidewalk and curb and gutter shall be Class II aggregate base and conform to the provision in Section 26-1.02B of the State Standard Specifications and shall be placed and compacted in conformance with the requirements specified in the City Standard Drawings.

Pavement Striping, Marking & Markers

Centerline and lane line markings shall be raised pavement markers. Stop bars, crosswalks, pavement symbols and pavement markings shall be thermoplastic. Edge lines and bike lane striping and marking shall be no less than two coats of water borne paint.

Where centerline markers have been removed on existing streets temporary markers shall be placed prior to the end of the work day. Temporary marking shall be 4" yellow reflective paint or tape no more than sixteen feet on center.

On existing City streets, permanent centerline marking shall be placed within 72 hours of placing the surfacing.

Miscellaneous

Where new paving meets existing paving, all low areas shall be paved as directed by the City to maintain a uniform cross slope and provide required drainage.

Where connecting to existing streets, saw cuts shall be a minimum of one foot (1 ft.) into the existing structural section asphalt.

Temporary asphalt conforms meeting handicap requirements must be placed at the ends of sidewalk except where right-of-way or unmitigatable physical obstruction exists. Wood barricades shall be placed in those cases.

SECTION 2 – SEWER SYSTEM CONSTRUCTION SPECIFICATIONS

GENERAL

Permits

Public Sewer Construction: No person shall construct, extend or connect to any public sewer without first obtaining a written permit from the City and paying all fees and connection charges and furnishing bonds as required therein. The provisions of this section requiring permits shall not be construed to apply to contractors constructing sewers and appurtenances under contracts awarded and entered into by the City.

Only properly licensed contractors shall be authorized to perform work of sewer construction within the City. All terms and conditions of the permit issued by the city to the applicant shall be binding on the contractor. Any person constructing a sewer within a street shall comply with all state, county, or city laws, ordinances, rules and regulations pertaining to the cutting of pavement, opening, barricading, lighting and protecting of trenches, backfilling and repaving thereof and shall obtain permits and pay all fees required by the department having jurisdiction prior to the issuance of a permit by the city.

Lines and Grades

The Developer's Engineer or Contractor shall furnish stakes and reference points for the improvements sufficient to control the work and shall provide re-staking as required by the City as set forth in these Improvement Standards. Control and reference stakes for all construction work shall be conspicuously flagged. Contractor shall be responsible for the preservation and perpetuation of these points, marks, and stakes in their proper place until authorized to remove them by the Developer and City Engineer. Any additional stakes required by the City will be set at the Developer's expense. The Developer shall be responsible for any error in the finished work resulting from questionable or erroneous stakes. All supplemental construction staking required by the Contractor shall be supplied by the Contractor.

Flow line and manhole rim elevations shall be staked with offsets.

Staking requirements shall not be less than:

Sewer trunk lines will be staked on an appropriate offset from centerline at fifty (50) foot intervals on tangents and twenty-five (25) foot intervals on horizontal and vertical curves. All manholes and curve points will be staked on an appropriate offset from the sewer centerline. Stakes will indicate offset to pipe centerline and the cut to the flow line of the sewer pipe. When a flow-line grade is indicated on the plans for a sewer service, a cut to the flow line at the end of the service will be marked on the offset stake or witness lath thereto.

MATERIALS

Sewer pipe shall be ductile iron pipe, acrylonitrile-butadiene-styrene pipe or polyvinyl chloride pipe.

Acrylonitrile-Butadiene-Styrene (ABS) Pipe

ABS solid wall pipe shall conform to ASTM Designation D-2751, and shall have a wall thickness of not less than SDR35.

Cement used for all ABS pipe joints shall conform to paragraph 6.4 of ASTM D-2680. No primer shall be used in ABS installations. Jointing shall be accomplished by applying a coating of cement to the inside of the socket and to the outside of the spigot end of pipe to be joined in sufficient quantity that when the spigot is fully inserted into the socket a bead of excess cement will form around the entire circumference of the outside juncture of said spigot and socket. Excess cement shall then be removed.

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

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

After the pipe installation and placement and compaction of backfill, but prior to placement of pavement, all pipe shall be cleaned and then mandrelled to measure for obstructions. Obstructions shall include, but not be limited to deflections, joint offsets, and lateral pipe intrusions. A rigid mandrel, with an effective circular cross section having a diameter of at least 95% of the specified average inside diameter shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be corrected by the Contractor. Obstructions due to deflection shall be corrected by replacement of the over-deflected pipe, not by re-rounding in place.

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

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

The average inside diameter for ABS Solid Wall Sewer Pipe shall be the "Average Outside Diameter" (see ASTM D2751) minus 2.12 times the "Minimum Wall Thickness" (see ASTM D2751).

The Contractor shall retest the solid wall pipe using a mandrel with an effective circular cross section having a diameter of at least 95% of the specified average inside diameter eleven (11) months after recordation of Notice of Completion for a City contract or after the acceptance by PART II - CONSTRUCTION

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the City Council for a subdivision. Any pipe which fails to pass the mandrel test shall be replaced at the expense of the Contractor. The City reserves the right to determine the longitudinal limits of any pipe that is required to be replaced. Pipe replacement shall be guaranteed by the project maintenance bond.

Polyvinyl Chloride (PVC) Pipe

PVC solid wall sewer pipe and fittings for gravity sewers shall be made for all new, rigid, unplasticized polyvinyl chloride in accordance with ASTM Standard Specifications D3034 and F-679 and shall have a wall thickness of at least SDR 35. Joints shall consist of an integral thickened bell-and-rubber ring and shall conform to ASTM D3212. Gaskets shall conform to ASTM E477. Joints shall be assembled using only manufacturers recommended lubricant.

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

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

After pipe installation and placement and compaction of backfill, but prior to placement of pavement, all pipe shall be cleaned and then mandrelled to measure for obstructions. Obstructions shall include, but not be limited to deflections, joint offsets and lateral pipe intrusions. A rigid mandrel, with an effective circular cross section having a diameter of at least 95% of the specified base inside diameter shall be pulled through the pipe by hand. The minimum length of the circular portion of the mandrel shall be corrected by the Contractor. Obstructions due to deflection shall be corrected by replacement of the over-deflected pipe, not by re-rounding in place.

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

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

The average inside diameter for PVC Solid Wall Sewer Pipe shall be the "Average Outside Diameter" (see ASTM D3034 and F679) minus 2.12 times the "Minimum Wall Thickness" (see ASTM D3034 and F619).

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

Ductile Iron Pipe (DIP)

Ductile iron pipe shall be cement lined, new pipe conforming to ANSI. A 21.51-1976 or most recent issue, if any, as sponsored by the American Water Works Association for thickness class 50 Ductile Iron Pipe. The pipe shall be furnished with either bell and spigot ends, "Tyton Joints", or mechanical joints except where specifically specified on the plans.

All Ductile iron pipe buried underground shall be encased in polyethylene film in the tube form. Polyethylene material and installation procedure for the encasement shall conform to ANSI/AWWA C105/A21.5-82 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.

Excavation and Backfill

Excavation and backfill shall be as shown on the City Standard Drawing "Service Sewer Trench Detail".

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

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

Existing Manholes and Cleanouts

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

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

At the Contractor's option, in lieu of removing and replacing barrel sections as above provided, the top of the existing upper barrel section may be trimmed and the taper section replaced on such trimmed surface provided, however, that such trimming shall not crack or otherwise damage the remaining portion of barrel section.

PART II – CONSTRUCTION SPECIFICATIONS In the event that the portion of barrel section to remain is cracked or damaged or otherwise made unsuitable for use by such trimming, the entire section shall be removed and replaced with a new section of barrel. Trimming of taper sections will not be permitted.

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

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

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

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

Pipe Laying

Where ground water occurs, pumping shall continue until backfilling 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 or the environment.

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

Where construction consists of constructing a new main or extension of an existing main, the downstream end of the newly constructed pipe shall be securely closed with a tight fitting plug until the construction is accepted by the City. Connection to the public sewer shall be made in the presence of a city inspector and under his supervision and direction. Any damage to the public sewer shall be repaired to the approval of the City at the Contractor's expense

If the new sewer main is connecting to an existing main at a location other than an existing

manhole, the Contractor shall pothole the existing sewer main to verify invert grades and locations.

Sewer pipe shall be installed on the alignment and grade as shown on the plans and in accordance with the State Standard Specifications, or as directed by the City. Existing sewer laterals shall be removed and replaced at the locations shown on the plans, or as directed by the City.

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 installation instructions shall be closely followed unless otherwise directed by the City or these City Standards. The trench shall not be backfilled until authorized by the City. Pipe laying shall proceed upgrade with the spigots pointing in the direction of flow.

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

Any section of pipe found to be defective or which has had grade or joints disturbed shall be re-laid by the Contractor at his expense. Damaged pipe shall be removed and replaced. Field repairs will not be allowed.

Proper implements, tools and facilities satisfactory to the City 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.

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

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

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Sewer Laterals and Services

Sewer lateral inverts shall be set above the mid-point of the sewer main.

A. Grades and Alignment

Service sewers shall be run in practical alignment at a uniform slope of not less than 1/4 inch per foot toward the main sewer; provided that where it is impractical due to the depth of the main sewer or to the structural features or the arrangement of any building or structure, to obtain a slope of 1/4 inch per foot, any such piping may have a slope of not less than 1/8 inch per foot when approved by the City Engineer.

B. Pipe Cover and Clearance

- a. Service sewer laterals shall be installed at sufficient depth to serve the parcel involved, but in no case less than three (3) feet clear cover at the property line.
- b. Building sewers shall have a clear cover of eighteen (18) inches minimum from finished grade. Where clear cover is less than eighteen (18) inches, cast iron pipe shall be used. Where building sewers are located under or cross driveways of the property, ductile iron pipe shall be used.

Sewer Structures

Manholes shall be standard precast concrete manholes as detailed in the City Standard Drawings. Mains larger than 18" in diameter or deeper than eight feet require 60" diameter manholes. Precast concrete manhole bases must be approved by the City.

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

Pre-cast manhole bases, conforming to City Standard Drawings in dimensions and the requirements outlined below for materials may be used. Such pre-cast bases shall be placed on a minimum 12-inch thick cushion of drain rock, as specified in City Standard Drawings. 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. The Portland cement shall be Type V conforming to ASTM Designation: 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 the plans and in accordance with the applicable provisions.

The base slab and initial riser section shall be connected with integrally poured concrete to create a watertight joint. Flow channels shall be constructed as shown on the plans. Changes in size or

grade shall be made gradually and changes in direction by smooth curves. All finished surfaces shall be smoothly troweled with a steel trowel. All manhole barrels and taper section shall be precast concrete sections using Type V Portland cement complying with ASTM Designation C 150 or low-alkali Type II cement meeting the requirements for Type V cement. Manholes shall be finished inside and out with sand-cement mortar to produce a water-tight, smooth finish.

The 48-inch and 60-inch diameter barrels and taper sections shall be constructed in accordance with the applicable provisions of ASTM Designation: C 478 and shall be inspected by the City to determine that the interior surfaces are smooth and free of pockets or depressions. The inside face of all barrels, tapers and rings shall be aligned with and flush to adjacent sections.

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

Mainline cleanouts shall be installed per the City Standard Drawings at the locations shown on the Plans.

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, Texas, or approved equal. Joint seals shall be installed in full compliance with the manufacturer's current recommendations. All manholes shall be water tight prior to grouting.

Backfill shall be placed uniformly around the outside of manholes so as to not create differential forces and the possibility of dislodging the manhole sections.

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 work day.

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

Testing of Sewers

Testing of all portions of the sewer including manholes will be required.

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

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 option, may test the line at any time during construction. However, the final test for acceptance shall be made only after all backfill is in place and compacted.

In the event that the exfiltration test prescribed above is impractical due to wet trench conditions, these portions of the sewer line where such conditions are encountered will be tested for infiltration. The City shall determine whether the exfiltration or infiltration test will be used.

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

Low pressure air testing may be used in lieu of water testing at the option of the Contractor. Water testing may be required by the City. The following procedure shall be used for air testing.

- A. Clean pipe to be tested by propelling a snug fitting inflated rubber ball through the pipe with water. Remove any debris.
- B. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
- C. If the pipe to be tested is submerged in ground water, the Inspector may require that gauge pressures be increased to compensate for groundwater hydrostatic pressure.
- D. Add air slowly to the portion of the pipe installation under test until the internal pressure is raised to 5.0 p.s.i.g.
- E. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
- F. After an internal pressure of 5.0 p.s.i.g. is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
- G. After the two minute period, disconnect the air supply.
- H. When pressure decreases to 5.0 p.s.i.g, start a stop watch. Determine the time in seconds that is required for the internal air pressure to reach 2.5 p.s.i.g. The minimum allowable time in seconds shall be based on the diameters and lengths of pipe under test as noted below. The Contractor will be allowed to manually bleed air as required to drop the internal pressure to 5.0 p.s.i.g. to start the test, if desired.

Pipe Size	Allowable Time For 0.5 psi Drop
4"	125 seconds
6"	185 seconds
8"	245 seconds
10"	306 seconds
12"	370 seconds
15"	460 seconds
18"	550 seconds
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24" 735 seconds

The Contractor shall hire an independent television inspection service to perform a closedcircuit television inspection of all newly constructed sewers. A video record of the television inspection shall be produced and delivered to the City in color DVD format, together with a hardcopy log of their inspection.

The following conditions shall exist prior to the television inspection:

- A. All sewer lines shall be in installed, backfilled and compacted.
- B. All structures shall be in place, all channeling complete and all pipelines accessible from structures.
- C. All other underground facilities, utility piping and conduit within two feet of the sewer main shall be installed.
- D. All compactions required shall be completed.
- E. Pipelines to be inspected shall be balled, flushed and mandrel tested.
- F. The final air or water test shall have been completed.
- G. Immediately before the television inspection, run fresh water into the sewer until it passes through the downstream manhole.
- H. No more than 1" deep water will be present at all times during video inspection.

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

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

- A. Off grade 0.08 foot, or over, deviation from grade
- B. Joint separations over 3/4"
- C. Offset joints
- D. Chips in pipe ends none in the flow line and none more than 1/4" deep

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

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

Trench Resurfacing

Trench resurfacing shall be as shown on the City Standard Drawings.

SECTION 3 – STORM DRAINAGE CONSTRUCTION SPECIFICATIONS

STORM DRAIN CONSTRUCTION

Pipe

Storm drain conduits shall be reinforced concrete pipe conforming to State Standard Specification Section 65. Cast in place concrete pipe and High Density Polyethylene (HDPE) and Polyvinyl Chloride (PVC) SDR 35 plastic storm drain conduit are accepted alternates to Class III RCP only. However, cast in place pipe shall not be used in existing roadways and HDPE and PVC may not be used within the traveled way of industrial, collector or arterial streets. HDPE pipe shall have silt tight gasketed couplings and PVC pipe shall have rubber gaskets. Excavation and backfill for plastic pipe shall conform to the provisions in Section 19-3 of the State Standard Specifications and as shown for metal pipe on State Standard Plan A62F.

Backfill

Pipe backfill material, filled and compacted to the spring line of the pipe, shall conform to the following specification:

- A. Reinforced concrete pipe and cast-in-place storm drain pipe shall be placed and backfilled in accordance with State Standard Plans A62D.
- B. Material shall have a minimum durability index of 35 and a minimum sand equivalent of 20. Material shall be free of organic material.

Sieve Size	Percent Passing		
	Min.	Max.	
3/4"	100	100	
3/8"	80	100	
No. 4	30	0 70	
No. 16	5	40	
No. 200	0	4	

Installation of Pipe

Pipe laying shall proceed upgrade without break from structure to structure as shown on the drawings, and each pipe length shall be checked to grade.

Each length of pipe shall be laid on a firm bed and have a true bearing for its length. Adjustment of pipe to line and grade shall be made by fine grading the bedding material. No wedging or blocking to support the pipe will be permitted.

When pipe laying is not in progress, the forward end of the pipe shall be kept effectively closed with an approved temporary barricade.

Storm Drain Manholes

Storm drain manholes shall consist of a precast unit or a cast-in-place unit in conformance with Section 51, "Concrete Structures," of the State Standard Specifications, or a combination thereof.

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

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

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

Adjust Manholes to Paving Grade

Existing manholes located within the street right-of-way shall be adjusted to conform to finished pavement grades in accordance with City Standard Drawings.

Curb Inlets

Curb inlets to be installed shall be in conformance with City Standard Drawings and the details as shown on the plans and as directed by the City Engineer.

Base Material

Base material under curb inlets shall be 4" of base conforming to the provisions in Section 26-1.02A, "Materials, General," of the State Standard Specifications and shall be placed and compacted in conformance with the requirements specified in said section.

GRADING STANDARDS

Plans and Permit

A grading permit shall be issued by the City of Willows Building Department prior to any grading.

Grading Plans shall be prepared by or under the direction of a person licensed to perform civil engineering in the State of California.

Grading Plans shall include the following information:

Benchmark Existing grades (contours) Proposed grades contours or spot elevations Limits of grading Typical sections or details showing how drainage will be dealt with at all the limits of

PART II – CONSTRUCTION SPECIFICATIONS grading and property lines Swale and building pad typical plans or details Existing trees to be saved or removed and fencing around trees to be saved.

All Grading Plans shall also reference the title, preparer and date of the Soils Report on which the plans are based and state that all work shall conform to the report. If the report is not to be used in its entirety, the provisions to be used shall be stated on the plans.

All Grading shall conform to the City Tree Preservation Standards.

The Contractor shall be responsible for coordinating his work with the Soils Engineer. All grading shall be performed to the satisfaction of the Soils Engineer and shall be in conformance with the preliminary Soils Report filed with the Building Department and Chapter 70 - Appendix of the adopted U.B.C.

Street subgrade shall be compacted to 95% relative compaction to a depth of no less than 6" in the roadway section. Asphalt concrete and Class 2 aggregate base shall be compacted to 95% relative compaction.

The use of the sand cone methods (such as ASTM 1557 or CAL 216) for determining field densities will not be allowed as a substitute for nuclear gauge testing.

EROSION CONTROL

Erosion control shall conform to current ABAG manual of standards for erosion and sediment control measures and these provisions. All graded areas and exposed soil within this project shall be seeded for erosion control by the Contractor. Seed and mulch will be applied by October 1st to all cut and fill slopes within or adjacent to project roads. Seed and fertilizer will be applied hydraulically or by hand at the rates specified below. On slopes, straw will be applied by blower or by hand and anchored in place by punching. All critical earthwork operations shall be performed during the dry winter season, from May 1st to October 1st or as otherwise approved by the City Engineer and the Glenn County Water Advisory Committee. The clearing of existing vegetation shall be confined within the limits of actual earthwork. Incremental development shall be required to ensure that the amount of land cleared at any time is limited to the area that can be developed during the construction period. Storm water shall not be allowed to flow directly down unprotected slopes. Energy dissipating structures and erosion control devices shall be placed at all drainage outlets which discharge to natural channels as shown on these plans. All sediment traps shall be maintained by the owner until such time that the City or Glenn County Water Advisory Committee accepts maintenance responsibility.

Item	Pounds per Acre
"Blando Brome"	30
Annual Rye Grass	20
Fertilizer (16-20-0 & 15% Sulphur)	500
Straw Mulch	4000 or 3500 lbs.
	of wood cellulose

Any existing septic system and existing wells shall be destroyed under permit from Glenn County Environmental Health Department.

SECTION 4 – STREET TREE CONSTRUCTION SPECIFICATIONS

A permit must be secured from the City to plant, move, scalp or destroy any tree on public property

Pervious backfill shall be placed around all root structures exposed by Contractor's operations.

PLANTING

Inspection

All plant material shall be subject to 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 and sequences of 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.

Tree Planting Operations

- A. All pits shall be dug with bottoms level, the width equal to two and a half times the diameter of the root ball, and the bottom one and one half times the depth of-the root ball. The City shall inspect pits prior to planting of trees.
- B. Pits shall be backfilled with a thoroughly mixed "prepared soil" to the bottom of the root ball.
- C. Set plants in the center of the pit, in a vertical position, so that the crown of the ball will be level with finish grade after allowing for watering and settling and shall bear the same relationship to finish grade that it did to the soil surface in its original place of growth.
- D. Prepare a depressed earth water basin capable of holding 10 gallons of water. Water shall be applied in that quantity at the time of planting.
- E. Removal of all nursery training stakes is required at the time of planting. Any tree which cannot stand upright without its nursery stakes will be rejected.
- F. Each tree must be properly supported by two Lodgepole Pine stakes. Stakes shall be a

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minimum of 2" x 2" and not less than eight feet in length. Stake all trees at the time of planting by placing stakes in prepared holes and driving stakes a minimum of 30 inches into soil. Six penny scaffold nails shall be used to secure the chain lock plastic or rubber ties to the stakes - two per side

- G. Turf shall be at least 18" away from the trunk of trees in all directions.
- H. The trees shall be watered by the developer at least twice a week except during rainy season until such time as the property becomes occupied.
- I. Root barriers are required in cutouts 4' or smaller; root barrier strips will be used in street-side plantings in new subdivisions.

Planting Tablets

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 the perimeter of the pit on top of prepared soil.

Soil

"Prepared soil" mix for backfill of the pits shall consist of excavated soil and the following:

50% by volume of nitrolized soil amendment. 50% by volume native soil. Five 21-gram planting tablets. (20-10-5 analysis)

Notes

- A. Nitrolized soil amendment shall be a composted wood byproduct combined with one pound of actual nitrogen per cubic yard of shavings.
- B. 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 nutrients over a 12-month period.

Guarantee

Fifteen-gallon trees shall be guaranteed as to growth and health for a period of six months after final acceptance by the City or until occupancy, whichever occurs first; however, in no case shall the guarantee period be less than three months.

Trees that fail to grow or are injured or damaged during planting operations shall be replaced within 15 days after notification. Replacement material shall be guaranteed as specified.

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

PROTECTION

During construction work of all types, good and sufficient guards shall be place to prevent injury, damage, or defacement to any park or street tree in the vicinity of such operations.

No tree or shrub shall be removed or destroyed on public property except upon approval of the Planning Commission.

SECTION 5 - STREET LIGHT CONSTRUCTION SPECIFICATIONS

GENERAL

Street Lighting improvements shall be constructed in conformance with Section 86 Electrical Systems, of the State Standard Specifications and the requirements of the National Electric Code (NEC) except as modified by these standards. The work shall consist of furnishing and installing luminaires with LED, photoelectric cells; electrolier standards, electrolier arms and foundations, conduit and conductor wiring and all other materials and appurtenances in accordance with the project plans and these standards.

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

- A. The developer/engineer shall make arrangements with PG&E for service points. Service points shall be shown on the improvement plans. The developer shall be responsible for all costs associated therewith which shall be paid directly to PG&E. The Contractor shall verify the street light service point location(s) with PG&E. prior to installation. The City will request energization from PG&E only after City acceptance of the installation.
- B. The developer shall install the following in accordance with the City Standard Street Light Drawings. concrete foundations, galvanized steel poles, mast arms of the appropriate lengths, and wiring

MATERIALS AND CONSTRUCTION

All materials and construction shall be in compliance with this section of these Standards.

- A. All materials delivered to the job shall be new and best quality of their respective grades in accordance with the following specifications and packed in their original sealed containers. All materials to be installed shall bear the Underwriters Laboratories, Inc. (U.L.) label.
- B. The Contractor shall use materials mentioned in these Standards as standard, and in no case will a substitute be allowed without written approval of the City Engineer.
- C. All work and material shall be protected at all times. Conduit openings shall be closed with protective caps during installation and all materials shall be covered and protected against dirt, water, and mechanical or other injury. All materials damaged during course of construction shall be replaced or repaired to original condition by the Contractor prior to acceptance of work.

- D. The Contractor shall not allow or cause any of his work to be covered up or enclosed until it has been inspected and approved by the City Inspector. Should any of the work be enclosed or covered up before such inspection, the Contractor shall uncover the work at his own expense and after it has been inspected and approved make all repairs with such material as may be necessary to restore all work to its original and proper condition.
- E. The Contractor shall furnish and install the street lighting equipment in accordance with these Improvement Standards.

FOUNDATIONS

Foundations shall be cast-in-place and in conformance with Section 86-2.01 "Excavating and Backfilling," and Section 86-2.03, "Foundations," of the State Standard Specifications except as amended herein and on the Standard Details.

ELECTROLIER STANDARDS

Electrolier standards shall be defined for the purpose of these Standards to include the pole, base, and base cover. Electrolier Standards shall conform to the Standard Drawings and the following requirements:

- A. Each standard shall have an identification Street Light number sticker as assigned by PG&E.
- B. The hand hole shall be oriented on the pole so that a technician facing oncoming traffic while facing the hand hole.
- C. All electrolier standards shall be furnished with a grounding lug or nut installed opposite the hand hole/removable access door and inside the standard.
- D. Cobra Head Electrolier Standards: Electrolier standards for Cobra head fixtures shall conform to the Standard Details and the following criteria:
 - a. The pole shall consist of galvanized steel material with a minimum thickness of 11 gauge.
 - b. The poles shall be single-arm poles unless the Project Plans specify otherwise.

ELECTROLIER ARM

Electrolier Arms shall conform to City Standard Details, be six (6) feet long unless otherwise specified, and consist of 11 gauge galvanized steel.

CONDUIT

Conduit shall be furnished and installed, conforming to the Standard Details, the requirements

PART II – CONSTRUCTION SPECIFICATIONS of Underwriters Laboratories Publication UL 543, and the following:

- A. Conduit shall be 1 1/2" PVC, Schedule 40 conduit.
- B. Cutting and machining of conduit shall be in accordance with the manufacturer's recommendations. Pre-assembly of sections of conduit shall not be permitted except where jacking is required.
- C. Pulling bells shall be installed on the ends of conduit terminating in pull boxes and electrolier standards.
- D. The installation of conduit shall conform to the following:
 - a. Excavation and Backfill for conduit installation shall conform to City Standards.
 - b. The conduit shall be laid over two inches of uniformly spread sand, and shall be covered by a minimum of 6 inches of sand.

PULL BOXES

Pull boxes shall conform to the provisions of Section 86-2.06, "Pull Boxes," of the State Standard Specifications except as amended by this Section and the Standard Drawings.

- A. Pull boxes shall be precast reinforced concrete, $#3 \ 1/2$ Box with brass hold down bolts.
- B. The cover shall be marked "Street Lighting".
- C. Grout shall not be placed in the bottom of the pull box.

CONDUCTORS AND WIRING

Conductors and wiring shall conform to the provisions of Section 86-2.08, "Conductors and Cables," and Section 86-2.09, "Wiring," of the State Standard Specifications except as amended by this Section and the Standard Drawings.

- A. Conductors shall be AWG and THHN copper stranded conductor Underwriters Laboratory Approved.
- B. The size of the conductors shall be as designated on the Project Plans.
- C. Any NEC approved splice excluding wire nuts connections may be used for splice connections.
- D. Splices shall be insulated in accordance with Section 86-2.09E, "Splice Insulation," type "B" method of the State Standard Specifications.
- E. A fused disconnect splice connector shall be installed in each conductor between the PART II CONSTRUCTION
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line and ballast and shall be located and readily accessible within the hand hole of the electrolier standard. The fused disconnect splice shall consist of a Class CC (NEC) midget fuse holder with a 5 amp 250 volt non time delay midget fuse.

LUMINAIRES

Luminaires shall conform to the Standard Drawings and the following requirements:

A. Luminaires shall be Cobra Head and consist of a housing, a reflector, a photoelectric control, and integral regular type ballast unless otherwise approved by the City Engineer. Luminaires, complete with lamps, shall be installed in the proper orientation to produce the desired light pattern and shall be completely assembled and connected to the conductor. The operating voltage shall be 120 volts unless otherwise specified.

B. Ingress Protection (IP) shall have a minimum rating of 55.

LAMPS

Unless otherwise specified, LED lamps shall be installed in the luminaires. The wattage of the lamps shall be specified on the Project Plans.

PHOTOELECTRIC CONTROL

Photoelectric control shall be multi voltage photoelectric relay on a twist lock receptacle. A photoelectric cell shall be installed on each street light located on the top of the luminaire fixture.

SERVICE CONNECTION

Service connections for street lights served by underground electrical systems will be made at the Service Point Location designated on the Project Plans which is normally a PG&E secondary box. Service Connections shall conform to the following requirements:

A. The Contractor shall provide conduit and wire from the PG&E secondary box to and throughout the new street light system.

B. Wires shall be tagged at secondary box in accordance with the latest and applicable PG&E detail.

C. Service connections for electroliers served by the overhead electrical systems will be made at a junction box located at the base of the service riser pole. The Contractor shall provide the junction box, conduit and wire from the junction box to the pull box adjacent to the nearest street light.

D. All service connections will be made by PG&E. The Contractor/Developer shall bear all costs by PG&E for service connection(s).

PART III – CONSTRUCTION STANDARD NOTES AND DRAWINGS

SUGGESTED CONSTRUCTION NOTES FOR IMPROVEMENT PLANS

GENERAL NOTES

- 1. ANY DISCREPANCY DISCOVERED BY CONTRACTOR IN THESE PLANS OR ANY FIELD CONDITIONS DISCOVERED BY CONTRACTOR THAT MAY DELAY OR OBSTRUCT THE PROPER COMPLETION OF THE WORK PER THESE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND THE OWNER IMMEDIATELY UPON DISCOVERY. SAID NOTIFICATION SHALL BE IN WRITING.
- 2. ALL MATERIAL WORKMANSHIP AND CONSTRUCTION SHALL CONFORM TO THE STATE OF STATE STANDARD SPECIFICATIONS AND STATE STANDARD PLANS DATED 2010 EXCEPT AS NOTED ON PLANS.
- 3. CONTRACTOR SHALL GIVE THE CITY OF WILLOWS PUBLIC WORKS DEPARTMENT 48 HOURS NOTICE BEFORE STARTING WORK. CALL (530) 934-7041 OR CONTACT AT 201 NORTH LASSEN STREET, WILLOWS, CA. 95988 FOR INSPECTION SERVICES.
- 4. CONTRACTOR SHALL OBTAIN ALL AGENCIES REQUIRED PERMITS AND PAY ALL FEES PRIOR TO COMMENCEMENT OF ANY WORK.
- 5. CONTRACTOR SHALL OBTAIN AN ENCROACHMENT PERMIT FROM THE CITY OF WILLOWS, 201 NORTH LASSEN STREET, WILLOWS, CA. BEFORE START OF WORK. CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE PERMIT.
- 6. GRADE BREAKS ON CURBS AND SIDEWALKS SHALL BE ROUNDED OFF IN FORMS AND SURFACE FINISHING.
- 7. SIDEWALK WARPS SHALL BE PROVIDED TO ALLOW A CLEAR 5 FOOT WALKWAY IN ALL LOCATIONS INCLUDING WHERE MAILBOXES, UTILITY POLES, FIRE HYDRANTS, AND GUY WIRES ARE TO BE INSTALLED.
- 8. WORK HOURS ARE LIMITED TO MONDAY THROUGH FRIDAY 7:00 A.M. TO 7:00 P.M. INSPECTION WILL BE AVAILABLE MONDAY THROUGH FRIDAY FROM 8:00 A.M. TO 4:30 P.M.
- 9. A PRECONSTRUCTION MEETING IS REQUIRED PRIOR TO BEGINNING OF WORK. CONTACT THE CITY ENGINEER TO SCHEDULE SUCH MEETING.
- 10. ITEMS SPECIFIED ON THE CITY STANDARD DRAWINGS ARE APPROVED FOR USE BY THE CITY OF WILLOWS. ALL SUBSTITUTES OR ALTERATIONS SHALL BE SUBMITTED TO THE CITY OF WILLOWS FOR REVIEW AND APPROVAL.
- 11. SURFACE MOUNTED TRANSFORMERS SHALL NOT BE USED UNLESS LOCATION OF

SUCH UTILITIES ARE SHOWN ON THE PLANS AND APPROVED BY THE CITY.

- 12. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROLLING NOISE, ODORS, DUST AND DEBRIS TO MINIMIZE IMPACTS ON SURROUNDING PROPERTIES AND ROADWAYS. CONTRACTOR SHALL BE RESPONSIBLE TO ASSURE THAT ALL CONSTRUCTION EQUIPMENT IS EQUIPPED WITH MANUFACTURERS APPROVED MUFFLERS AND BAFFLES. FAILURE TO COMPLY MAY RESULT IN THE ISSUANCE OF A STOP WORK ORDER.
- 13. IN THE EVENT THAT ARCHEOLOGICAL SITE INDICATORS (CHIPPED CHERT, OBSIDIAN TOOLS, WASTE FLAKES, GRINDING IMPLEMENTS, DARKENED SOIL CONTAINING BONE FRAGMENTS AND SHELLFISH REMAINS, OR CERAMICS, GLASS OR METAL FRAGMENTS) ARE UNCOVERED, THE CITY ENGINEER SHALL BE CONTACTED IMMEDIATELY. ALL GROUND DISTURBING WORK SHALL CEASE IN THE VICINITY OF ANY DISCOVERY UNTIL AN ARCHEOLOGIST COMPLETES AN EVALUATION OF SIGNIFICANCE.
- 14. IF HAZARDOUS MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL HALT CONSTRUCTION IMMEDIATELY, NOTIFY THE CITY, AND IMPLEMENT REMEDIATION (AS DIRECTED BY THE CITY OR ITS AGENT) IN ACCORDANCE WITH ANY REQUIREMENTS OF THE GLENN COUNTY ENVIRONMENTAL HEALTH DEPARTMENT AND THE CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD.
- 15. THE CONTRACTOR SHALL BE REQUIRED TO MAINTAIN TRAFFIC FLOW ON AFFECTED ROADWAYS DURING NON-WORKING HOURS, AND TO MINIMIZE TRAFFIC RESTRICTION DURING CONSTRUCTION. NO EXITING STREET SHALL BE ALLOWED TO BE COMPLETELY CLOSED WITHOUT THE EXPRESSED WRITTEN PERMISSION OF THE CITY ENGINEER. THE CONTRACTOR SHALL BE REQUIRED TO FOLLOW TRAFFIC SAFETY MEASURES IN ACCORDANCE WITH THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (MUTCD)." THE CITY'S EMERGENCY SERVICE PROVIDERS SHALL BE NOTIFIED OF PROPOSED CONSTRUCTION SCHEDULED BY THE CONTRACTOR(S). THE CONTRACTOR(S) SHALL NOTIFY EMERGENCY SERVICE PROVIDERS IN WRITING AT LEAST 24 HOURS IN ADVANCE OF ITS PROPOSED SCHEDULE OF WORK.
- 16. A TRAFFIC HANDLING PLAN SHALL BE DELIVERED TO THE CITY ENGINEER FOR REVIEW 10 WORKING DAYS BEFORE CONSTRUCTION BEGINS.
- 17. CONSTRUCTION TRAFFIC SHALL BE LIMITED TO THE FOLLOWING HAUL ROUTE: (THE ENGINEER SHALL FILL IN THE HAUL ROUTES TO BE USED. CONSTRUCTION TRAFFIC SHALL BE CONFINED TO MAJOR STREETS.)

GENERAL NOTES (OPTIONAL)

- 1. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, GENERAL CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY: THAT THIS REQUIREMENT
- PART III CONSTRUCTION STANDARD NOTES AND DRAWINGS

SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO HOLD HARMLESS, INDEMNIFY AND DEFEND THE OWNER, THE ENGINEER AND HIS CONSULTANTS, AND THE CITY OF WILLOWS, AND EACH OF THEIR OFFICERS, EMPLOYEES AND AGENTS.

- 2. CONTRACTOR SHALL INDEPENDENTLY REVIEW GROUND, TOPOGRAPHY, AND TREE CONDITIONS THROUGHOUT THE SITE, AND ASSUME WHOLLY AND UNCONDITIONALLY THE RISK OF COMPLETING THE WORK SET OUT ON THESE PLANS, REGARDLESS OF ROCK, WATER TABLE, OR OTHER CONDITIONS WHICH CONTRACTOR MAY ENCOUNTER IN THE COURSE OF THE WORK.
- 3. THE DEVELOPER ASSUMES ALL RESPONSIBILITY FOR THE APPROVAL OF MAIL BOX LOCATIONS BY THE LOCAL BRANCH OF THE UNITED STATES POST OFFICE. IN URBAN AREAS, SIDEWALK WARPS ARE REQUIRED PER STANDARD CITY OF WILLOWS DETAIL.

NOTIFICATION FOR INSPECTIONS

APPROVAL OF ALL WORK SHALL BE NECESSARY AT THE COMPLETION OF EACH OF THE FOLLOWING STAGES OF WORK AND SUCH APPROVAL MUST BE OBTAINED BEFORE SUBSEQUENT STAGES OF WORK MAY BE COMMENCED. ADDITIONALLY, THE INSPECTOR SHALL BE NOTIFIED AT LEAST ONE WORKING DAY IN ADVANCE BEFORE ANY OF THE FOLLOWING STAGES OF WORK IS COMMENCED.

ANY CONSTRUCTION OR EXCAVATION REQUIRING INSPECTION THAT IS UNDERTAKEN WITHOUT INSPECTION IS SUBJECT TO RE-CONSTRUCTION AND RE-EXCAVATION AT THE CONTRACTOR'S EXPENSE.

INSPECTION MUST BE SCHEDULED FOR THE FOLLOWING WORK:

- 1. PRIOR TO COMMENCEMENT OF GRADING ACTIVITIES TO CHECK FOR INSTALLATION OF ADEQUATE TREE PROTECTION FENCING, WHERE APPROPRIATE.
- 2. COMPACTION AND PREPARATION OF EMBANKMENTS, EXCAVATIONS, AND SUBGRADE.
- 3. A. CONSTRUCTION OF FORMS FOR ALL CONCRETE STRUCTURES, INCLUDING CURBS, GUTTERS, AND SIDEWALKS.
 - B. EXCAVATION FOR STORM DRAINS AND CULVERTS.
- 4. A. PLACING OF CONCRETE IN STRUCTURES, INCLUDING CURBS, GUTTERS AND SIDEWALKS.
 - B. PLACING OF STORM DRAINS AND CULVERT PIPES.
- 5. EXCAVATION AND BACKFILLING FOR STRUCTURES AND PIPES AND PUBLIC UTILITIES. WATER AND SEWER FACILITIES MUST BE INSPECTED BY THE

COMPANY/AGENCY WITH JURISDICTION, INCLUDING PRIVATE FACILITIES.

- 6. CONSTRUCTION OF ROADSIDE DITCHES AND OTHER DRAINAGE WAYS.
- 7. PLACING AND COMPACTING OF BASE MATERIAL. IF MORE THAN ONE COURSE OF TYPE OF BASE OR SUBBASE IS TO BE USED, APPROVAL SHALL BE NECESSARY FOR EACH COURSE AND/OR TYPE.
- 8. PLACING OF PAVEMENT OR SURFACING. WITHIN 48 HOURS OF PAVING, ALL WATER VALVE BOXES, CLEANOUTS AND MANHOLE FRAMES AND COVERS SHALL BE BROUGHT TO GRADE AND INSPECTED.
- 9. STRIPING AND SIGNING LAYOUT AND PLACEMENT
- 10. FINAL CLEAN-UP.
- 11. UPON COMPLETION OF CONSTRUCTION, FINAL CONNECTION WILL BE MADE BY THE CONTRACTOR AT THE DEVELOPER'S EXPENSE UNDER INSPECTION BY THE CITY INSPECTOR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.

GRADING NOTES

- 1. A GRADING PERMIT SHALL BE OBTAINED FROM THE CITY OF WILLOWS BUILDING DEPARTMENT PRIOR TO THE START OF ANY EARTHWORK, UNLESS EXEMPT UNDER CHAPTER A33, OF THE UNIFORM BUILDING CODE APPENDIX, EDITION PRESENTLY ADOPTED.
- 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE SOILS ENGINEER. ALL GRADING SHALL BE PERFORMED TO THE SATISFACTION OF THE SOILS ENGINEER AND SHALL BE IN CONFORMANCE WITH THE PRELIMINARY SOILS REPORT AND A33 OF THE ADOPTED U.B.C.
- 3. STREET SUBGRADE SHALL BE COMPACTED TO 95% RELATIVE COMPACTION TO A DEPTH OF NO LESS THAN 6" IN THE ROADWAY SECTION. ASPHALT CONCRETE AND CLASS 2 AGGREGATE BASE SHALL BE COMPACTED TO 95% RELATIVE COMPACTION.
- 4. THE USE OF THE SAND CONE METHODS (SUCH AS ASTM 1557 OR CAL 216) FOR DETERMINING FIELD DENSITIES WILL NOT BE ALLOWED AS A SUBSTITUTE FOR NUCLEAR GAUGE TESTING.
- 5. ANY EXCESS MATERIALS SHALL BE CONSIDERED THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF AWAY FROM THE JOB SIDE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
- 6. ALL TREE PROTECTION FENCING MUST BE INSTALLED AND INSPECTED PRIOR TO COMMENCEMENT OF GRADING OPERATIONS. FENCING SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.

7. ANY EXISTING SEPTIC SYSTEM AND EXISTING WELLS SHALL BE ABANDONED UNDER PERMIT FROM GLENN COUNTY ENVIRONMENTAL HEALTH DEPARTMENT.

DUST CONTROL NOTES

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE DUST CONTROL MEASURES FOR THE ENTIRE CONSTRUCTION PERIOD OF THIS PROJECT TO THE SATISFACTION OF THE CITY ENGINEER.
- 2. CONSTRUCTION EQUIPMENT SHALL BE MAINTAINED IN PROPER WORKING ORDER AND SHALL NOT BE ALLOWED TO IDLE FOR A PERIOD OF LONGER THAN 30 MINUTES.
- 3. TO MINIMIZE FUGITIVE DUST AND THE RELEASE OF PM10, THE CONTRACTOR SHALLIMPLEMENT A DUST CONTROL PROGRAM. DUST CONTROL MEASURES SHALL INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - A. ACTIVE CONSTRUCTION SITE SHALL BE WATERED AS NEEDED, PREFERABLE IN THE LATE MORNING AND WHEN WORK HAS CEASED FOR THE DAY.
 - B. STOCKPILES OF LOOSE MATERIAL SHALL BE COVERED AT ALL TIMES, EXCEPT WHEN THIS WOULD INTERFERE WITH IMMEDIATE CONSTRUCTION ACTIVITIES.
 - C. ALL CLEARING, GRADING, EARTHMOVING OR EXCAVATION ACTIVITIES SHALL CEASE WHEN THE AVERAGE WIND SPEED FOR ONE HOUR EXCEEDS 20 MILES PERHOUR (MPH).
 - D. THE AREA DISTURBED BY EXCAVATION OR GRADING SHALL BE KEPT TO THE MINIMUM REQUIRED TO IMPLEMENT THE PROJECT.
 - E. WHEN TRAVELING ON EXPOSED SOILS, CONSTRUCTION SITE VEHICLE SPEED SHALL BE LIMITED TO 15 MPH.
 - F. HAUL VEHICLES SHALL BE COVERED WHEN NOT ACTIVELY ENGAGED IN SITE CONSTRUCTION ACTIVITY.
 - G. STREETS SHALL BE SWEPT REGULARLY AND KEPT FREE OF DIRT AND DEBRIS.
- 4. ANY PROJECT RELATED DEBRIS, DEBRIS AND WASTE SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL STATUES AND REGULATIONS.

EROSION CONTROL NOTES

- 1. A NOTICE OF INTENT SHALL BE FILED BY THE OWNER FOR ALL PROJECTS OVER ONE (1) ACRE IN AREA. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE PERMIT.
- 2. EROSION CONTROL MEASURES SHALL BE INSTALLED AND IN PLACE BETWEEN OCTOBER 1 AND APRIL 30. INSTALLATION SHALL BE IN ACCORDANCE WITH THE APPROVED EROSION CONTROL PLAN.
- 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTANT MAINTENANCE OF EROSION CONTROL MEASURES. SITE EROSION CONTROL SHALL BE INSPECTED BY THE CONTRACTOR AND CLEANED IF NECESSARY AFTER EVERY MAJOR STORM.

- 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANUP OF MUD AND DEBRIS CARRIED ONTO SURROUNDING STREETS TO THE SATISFACTION OF THE CITY ENGINEER
- 5. ALL GRADED AREAS AND EXPOSED SOIL WITHIN THIS PROJECT SHALL BE SEEDED FOR EROSION CONTROL BY THE CONTRACTOR. SEED AND MULCH WILL BE APPLIED BY OCTOBER 1ST TO ALL CUT AND FILL SLOPES WITHIN OR ADJACENT TO PROJECT ROADS. SEED AND FERTILIZER WILL BE APPLIED HYDRAULICALLY OR BY HAND AT THE RATES SPECIFIED BELOW. ON SLOPES, STRAW WILL BE APPLIED BY BLOWER OR BY HAND AND ANCHORED IN PLACE BY PUNCHING.
- 6. ALL CRITICAL EARTHWORK OPERATIONS SHALL BE PERFORMED DURING THE DRY WEATHER SEASON, FROM MAY 1ST TO OCTOBER 1ST OR AS OTHERWISE APPROVED BY THE CITY ENGINEER.
- 7. THE CLEARING OF EXISTING VEGETATION SHALL BE CONFINED WITHIN THE LIMITS OF ACTUAL EARTHWORK. INCREMENTAL DEVELOPMENT SHALL BE REQUIRED TO ENSURE THAT THE AMOUNT OF LAND CLEARED AT ANY TIME IS LIMITED TO THE AREA THAT CAN BE DEVELOPED DURING THE CONSTRUCTION PERIOD. STORM WATER SHALL NOT BE ALLOWED TO FLOW DIRECTLY DOWN UNPROTECTED SLOPES. ENERGY DISSIPATING STRUCTURES AND EROSION CONTROL DEVICES SHALL BE PLACED AT ALL DRAINAGE OUTLETS WHICH DISCHARGE TO NATURAL CHANNELS AS SHOWN ON THESE PLANS. ALL SEDIMENT TRAPS SHALL BE MAINTAINED BY THE OWNER UNTIL SUCH TIME THAT THE CITY ACCEPTS MAINTENANCE RESPONSIBILITY.
- 8. HYDROSEEDING MIX SHALL CONFORM TO THE FOLLOWING

ITEM	POUNDS PER ACRE
"BLANDO BROME"	30
ANNUAL RYE GRASS	20
FERTILIZER (16-20-0 & 15% SULPHUR)	500
STRAW MULCH	4000 OR 3500 LBS
	OF WOOD CELLULOSE

GENERAL UNDERGROUND NOTES

- 1. NO GUARANTEE IS INTENDED THAT UNDERGROUND OBSTRUCTIONS, NOT SHOWN ON THESE PLANS, MAY BE ENCOUNTERED. THOSE SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE AND THE CONTRACTOR IS CAUTIONED THAT THE OWNER, THE ENGINEERS, AND THE CITY OF WILLOWS ASSUME NO RESPONSIBILITY FOR ANY OBSTRUCTIONS EITHER SHOWN OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL COOPERATE WITH ALL UTILITY COMPANIES WORKING WITHIN THE LIMITS OF THIS PROJECT.
- 2. CONTRACTOR SHALL NOT BEGIN EXCAVATION UNTIL ALL EXISTING UTILITIES HAVE BEEN MARKED IN THE FIELD BY THE APPLICABLE ENTITY RESPONSIBLE FOR THAT PARTICULAR UTILITY. THE CONTRACTOR SHALL NOTIFY EACH APPLICABLE ENTITY AT LEAST 24 HOURS BEFORE STARTING WORK.

- 3. UNDERGROUND SERVICE ALERT: CALL TOLL FREE (800) 642-2444 AT LEAST 48 HOURS PRIOR TO EXCAVATION.
- 4. THE CONTRACTOR SHALL OBTAIN A TRENCH PERMIT FROM THE CALIFORNIA DIVISION OF INDUSTRIAL SAFETY BEFORE EXCAVATION OF TRENCHES. A COPY OF THE PERMIT MUST BE ON FILE WITH THE CITY BEFORE TRENCH EXCAVATION MAY BEGIN.
- 5. CONTRACTOR SHALL UNCOVER EXISTING BURIED UTILITIES WITH UTILITY OWNER TO VERIFY LOCATIONS AND ELEVATIONS OF UTILITIES. BURIED UTILITIES INCLUDE NOT LIMITED TO WATER MAINS AND LATERALS, SEWER LINES, STORM DRAINS, GAS MAINS AND LATERALS, ELECTRICAL DISTRIBUTION LINES AND TELEPHONE LINES. ALL UTILITIES CONFLICTING WITH THE PROPOSED CONSTRUCTION SHALL BE RELOCATED PRIOR TO THE START OF CONSTRUCTION.
- 6. THE CONTRACTOR SHALL VERIFY EXISTING INVERTS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION. THE PROJECT AND/OR DESIGN ENGINEER MAY ADJUST THE GRADE OF NEW SEWER CONSTRUCTION ACCORDINGLY WITH CONCURRENCE FROM THE CITY ENGINEER.
- 7. DISTANCES AND INVERTS ARE TO AND AT THE CENTER OF THE MANHOLES, CLEANOUTS, DROP INLETS, CATCH BASINS, AND YARD DRAINS OR AS MARKED ON THE DRAWINGS.
- 8. ALL EXISTING OVERHEAD UTILITIES ON SITE AND ALONG PROJECT BOUNDARIES SHALL BE PLACED UNDERGROUND.
- 9. ALL UNDERGROUND IMPROVEMENTS SHALL BE INSTALLED AND APPROVED PRIOR TO PAVING.
- 10. THE CONTRACTOR SHALL STAMP THE LETTER "S" ON THE FACE OF CURB DIRECTLY ABOVE THE SEWER LATERAL, AND THE LETTER "W" ON THE FACE OF CURB DIRECTLY ABOVE WATER SERVICES, AND "B" ON FACE OF CURB DIRECTLY ABOVE A BLOW OFF OR AIR RELIEF VALVE. AT A DRIVEWAY THE STAMP SHALL BE PLACED AT THE BACK OF RAMP. THE LETTERS SHALL BE 4" HIGH AND COMPLETELY LEGIBLE.
- 11. ALL MATERIAL, WORKMANSHIP AND CONSTRUCTION DETAILS SHALL CONFORM TO THE CITY OF WILLOWS DESIGN AND CONSTRUCTION STANDARDS INCLUDING ALL ADDENDA, ANY STANDARD PLAN REVISIONS AND SPECIAL PROVISIONS.
- 12. SERVICE LATERALS, OTHER THAN THOSE SHOWN OR NOTED ON THE PLANS, SHALL NOT BE INSTALLED PRIOR TO OBTAINING CITY APPROVAL.
- 13. WATER AND SEWER SERVICE LATERALS SHALL BE SEPARATED HORIZONTALLY BY A MINIMUM OF 5 FEET CLEAR.
- 14. ITEMS SPECIFIED ON THE CITY STANDARD DRAWINGS ARE APPROVED FOR USE BY THE CITY OF WILLOWS. ALL SUBSTITUTES OR ALTERATIONS SHALL BE

SUBMITTED TO THE CITY OF WILLOWS FOR APPROVAL.

- 15. SURFACE MOUNTED TRANSFORMERS SHALL NOT BE USED UNLESS LOCATION OF SUCH UTILITIES ARE SHOWN ON THE APPROVED PLANS AND APPROVED BY THE CITY.
- 16. IN MULTI-UNIT COMMERCIAL COMPLEXES WHERE THERE IS A POTENTIAL IN ONE OR MORE INDIVIDUAL UNITS FOR A CITY INDUSTRIAL WASTEWATER DISCHARGE PERMIT; PROVISIONS FOR SEPARATE METERING FOR WATER AND/OR SEWER MAY BE REQUIRED

STORM DRAIN NOTES

STORM DRAIN CONDUITS SHALL BE REINFORCED CONCRETE PIPE CONFORMING TO 1. STATE STANDARD SPECIFICATION SECTIONS 65. CAST IN PLACE CONCRETE PIPE, HIGH DENSITY POLYETHYLENE (HDPE), AND POLYVINYL CHLORIDE (PVC) PLASTIC STORM DRAIN CONDUIT ARE ACCEPTED ALTERNATE TO CLASS III RCP ONLY. HOWEVER, CAST IN PLACE PIPE SHALL NOT BE USED IN EXISTING ROADWAYS AND PLASTIC PIPE SHALL NOT BE USED WITHIN THE TRAVELED WAY OF INDUSTRIAL, COLLECTOR OR ARTERIAL STREETS. HDPE PIPE SHALL HAVE SILT TIGHT GASKETED COUPLINGS & PVC PIPE SHALL HAVE RUBBER GASKETS. CAST IN PLACE PIPE SHALL NOT BE USED IN EXISTING ROADWAYS. EXCAVATION AND BACKFILL FOR PLASTIC PIPE SHALL CONFORM TO THE PROVISIONS IN SECTION 19-3, "STRUCTURE EXCAVATION AND BACKFILL," OF THE STATE STANDARD SPECIFICATIONS DATED 2010, AND AS SHOWN FOR METAL PIPE ON STATE STANDARD PLAN A62F. IN ADDITION, PIPE BACKFILL MATERIAL SHALL BE FILLED AND COMPACTED TO THE SPRING LINE OF THE PIPE AND SHALL CONFORM TO THE FOLLOWING SPECIFICATION:

MATERIAL SHALL HAVE A MINIMUM DURABILITY INDEX OF 35 AND A MINIMUM SAND EQUIVALENT OF 20. MATERIAL SHALL BE FREE OF ORGANIC MATERIAL.

SIEVE SIZE		PERCENT PASSING
MIN.	MAX.	
3/4"	100	100
3/8"	80	100
NO. 4	30	70
NO. 16	5	40
NO. 200	0	4

- 2. MINIMUM COVER OVER PIPE TO BE 24", THE MAXIMUM ALLOWABLE COVER SHALL BE LIMITED TO 11 FEET FOR ALL SIZES.
- 3. ALL STORM DRAIN MANHOLES SHALL BE A MINIMUM OF 48" IN DIAMETER.
 - PART III CONSTRUCTION STANDARD NOTES AND DRAWINGS
UNLESS OTHERWISE NOTED, MANHOLE FRAME AND COVER SHALL HAVE 24" CLEAR OPENING, AND BE HEAVY DUTY NON-ROCKING. RAISED LETTERS ON TOP OF THE COVER SHALL READ "STORM DRAIN". PIPES SHALL NOT INTRUDE INTO INSIDE OF MANHOLE. PIPE ENDS SHALL BE ROUNDED.

- 4. REINFORCED CONCRETE PIPE AND CAST-IN-PLACE STORM DRAIN PIPE SHALL BE PLACED AND BACKFILLED IN ACCORDANCE WITH STATE STANDARD DRAWINGS PLAN A62D. STORM DRAIN MAINS WITHIN CITY MAINTAINED ROADS SHALL BE MINIMUM 18 INCH DIAMETER, EXCEPT LATERALS WHICH MAY BE 15 IN. DIAMETER.
- 5. TRENCHING, BACFILL AND RESURFACING FOR STORM DRAIN PIPE SHALL BE IN ACCORDANCE WITH CITY STANDARD DRAWINGS.
- 6. PRIOR TO ACCEPTANCE OF THE STORM DRAIN SYSTEM, THE CONTRACTOR SHALL VIDEO ALL STORM DRAIN LINES TO ENSURE THEY ARE FREE AND CLEAR OF ALL DEBRIS AND SILT.ALL VIDEO TAPES SHALL BE SUBMITTED TO THE CITY WITH WRITTEN REPORTS AND SHALL BE SUBJECT TO REVIEW AND APPROVAL. IF CLEANING OF THE PIPES IS NEEDED, THE CONTRACTOR SHALL NOT BE ALLOWED TO WASH SILT AND/OR DEBRIS INTO THE EXISTING CITY STORM DRAIN SYSTEM INCLUDING ANY CREEKS OR OPEN WATERWAYS.

SANITARY SEWER SYSTEM NOTES

- 1. GRAVITY SEWER PIPE SHALL BE POLYVINYL CHLORIDE (PVC), SDR 35 OR DUCTILE IRON PIPE, CLASS 52, POLYETHYLENE ENCASED.
- 2. SEWER MAIN INSTALLED OUTSIDE OF PAVED ROADWAYS SHALL BE DUCTILE IRON.
- 3. ALL SANITARY SEWER MANHOLES SHALL BE A MINIMUM OF 48" IN DIAMETER. UNLESS OTHERWISE NOTED, MANHOLE FRAME AND COVER SHALL HAVE 24" CLEAR OPENING AND BE HEAVY DUTY NON-ROCKING. RAISED LETTERS ON TOP OF THE COVER SHALL READ "SANITARY SEWER."
- 4. TRENCHING, BACKFILL AND RESURFACING REQUIRED FOR INSTALLATION OF SEWER SYSTEM FACILITIES SHALL BE SHALL BE IN ACCORDANCE WITH CITY STANDARD DRAWINGS.

WATER SYSTEM NOTES

WATER SYSTEM IMPROVEMENTS SHALL CONFORM TO CALIFORNIA WATER SERVICE COMPANY STANDARDS AND REQUIREMENTS.

SIGNING, STRIPES AND PAVEMENT MARKINGS NOTES

1. CONTRACTOR SHALL NOTIFY THE CITY OF WILLOWS PUBLIC WORKS DEPARTMENT

PART III - CONSTRUCTION STANDARD NOTES AND DRAWINGS (530) 934-7041 REFERRED TO HEREINAFTER AS "CITY", OF HIS INTENT TO PLACE ANY PAVEMENT MARKER, TRAFFIC STRIPE, PAVEMENT MARKING, AND PAVEMENT LEGEND LAYOUT LINES 10 WORKING DAYS BEFORE THE MARKER AND STRIPES WORK IS TO BE PERFORMED. ALL LABOR EQUIPMENT AND MATERIALS SHALL BE PROVIDED BY THE CONTRACTOR.

- 2. ALL LAYOUT WORK IS TO BE PERFORMED BY THE CONTRACTOR AND SHALL BE FIELD APPROVED BY A CITY INSPECTOR BEFORE THE ACTUAL WORK BEGINS.
- 3. PAVEMENT MARKERS AND TRAFFIC LINES DETAILS REFERENCE NUMBERS ARE SHOWN ON STATE STANDARD PLAN SHEETS A20A, A20B, A20C AND A20D.
- 4. ROADSIDE SIGNS SHALL BE AS SHOWN ON THE PLANS, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 56, "SIGNS", OF THE STATE STANDARD SPECIFICATIONS, AND AS DIRECTED BY THE CITY.
- 5. SIGN PANELS SHALL CONFORM TO THE CURRENT CALTRANS SIGN PANEL SPECIFICATIONS.
- 6. SIGN PANELS SHALL BE MOUNTED ON METAL POSTS AS DESIGNATED ON THE PLANS. WOOD POST INSTALLATION SHALL BE AS SHOWN ON THE PLANS, AND CITY STANDARD DRAWINGS. WOOD POSTS SHALL BE PROVIDED WITH BREAKAWAY FEATURE. METAL POSTS SHALL BE 2-INCH SCHEDULE 40 GALVANIZED STEEL PIPE CONFORMING TO ASTM A120 WITH GALVANIZED TOP CAPS. EACH SIGN PANEL SHALL BE ATTACHED TO METAL POSTS WITH A MINIMUM OF (2) 5/16-INCH SELF-TAPPING SCREWS OR BOLTS. ALL FASTENERS AND ATTACHMENT HARDWARE SHALL BE GALVANIZED.
- 7. MARKERS AND DELINEATORS SHALL BE AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH THE PROVISIONS OF SECTION 82, "MARKERS AND DELINEATORS" OF THE STATE STANDARD SPECIFICATIONS AND THESE SPECIAL PROVISIONS, AND AS DIRECTED BY THE CITY ENGINEER.
- 8. LOCATION OF ALL MARKERS AND DELINEATORS SHALL BE AS SHOWN ON THE PLANS AND AS DIRECTED BY THE CITY ENGINEER.
- 9. TRAFFIC STRIPES AND PAVEMENT MARKINGS SHALL BE AS SHOWN ON THE PLANS, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 84, "TRAFFIC STRIPES AND PAVEMENT MARKINGS" OF THE STATE STANDARD SPECIFICATIONS AND THESE SPECIAL PROVISIONS, AND AS DIRECTED BY THE CITY.
- 10. ALL PAVEMENT MARKINGS, INCLUDING STOPLINES, AND ALL CHANNELIZING LINES SHALL BE THERMOPLASTIC. ALL OTHER TRAFFIC STRIPES SHALL BE PAINTED, UNLESS OTHERWISE SHOWN OR NOTED ON THE PLANS.
- 11. THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS SHALL CONFORM TO THE PROVISIONS OF SECTION 84-2, "THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS" OF THE STATE STANDARD SPECIFICATIONS.
- 12. THERMOPLASTIC MATERIAL SHALL BE APPLIED AT A MINIMUM THICKNESS OF

PART III - CONSTRUCTION STANDARD NOTES AND DRAWINGS 0.125 INCH.

- 13. THERMOPLASTIC MATERIAL SHALL CONFORM TO STATE SPECIFICATIONS. GLASS BEADS TO BE APPLIED TO THE SURFACE OF MOLTEN THERMOPLASTIC MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF STATE SPECIFICATION.
- 14. STATE STANDARD SPECIFICATIONS FOR THERMOPLASTIC MATERIAL AND GLASS BEADS MAY BE OBTAINED FROM THE TRANSPORTATION LABORATORY, P.O. BOX 19128, SACRAMENTO, CA. 95819 (TELEPHONE: 916-739-2400)
- 15. PAVEMENT MARKERS: PAVEMENT MARKERS SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF SECTION 85, "PAVEMENT MARKERS" OF THE STATE STANDARD SPECIFICATIONS. PAVEMENT MARKERS SHALL BE PLACED TO THE LINE ESTABLISHED BY CITY.
- 16. EXISTING PAINTED/ THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS WHICH CONFLICT WITH THE NEW TRAFFIC STRIPING AND PAVEMENT MARKING PLANS SHALL BE REMOVED BY THE CONTRACTOR, IN ACCORDANCE WITH SECTION 15, "EXISTING FACILITIES," OF THE STATE STANDARD SPECIFICATIONS.
- 17. EXISTING RAISED PAVEMENT MARKERS WHICH CONFLICT WITH THE NEW TRAFFIC STRIPING AND PAVEMENT MARKING PLAN SHALL BE REMOVED BY THE CONTRACTOR IN ACCORDANCE WITH SECTION 15, "EXISTING FACILITIES," OF THE STATE STANDARD SPECIFICATIONS.

STD DWG #NO.	DESCRIPTION
200-1	Traffic Index Chart for Flexible Pavements
200-2	Structural Design Chart for Flexible Pavements
201-1	Typical Street Intersection and Widths
201-2	Minor & Collector Street Section
201-3	Arterial & Industrial/Commercial Street Section
202	Typical Street Section
203-1	Curb, Gutter, Sidewalk and Sidewalk Warp
203-2	Rolled Curb and Gutter
204	Curb Return
205-1	Pedestrian Curb Ramp Type A
205-2	Pedestrian Curb Ramp Type B
205-3	Pedestrian Curb Ramp Type C
206-1	Driveway
206-2	Commercial/Industrial Driveway
207	Sidewalk Drain
208	Residential Cul-de-sac
209	Residential Street Knuckle
210	Hammerhead Turn Around
211	Cross Gutter
212	Standard Permanent Monument
213	Standard Barricade
214	Street Name Sign
221	Bike Lane Signs
222	Stop Sign Post Location

SECTION 1 – STANDARD DRAWINGS - STREETS

STD DWG #NO.	(Street Construction Standard Dwg. Continued) DESCRIPTION
223	Angled parking Bay with Valley Gutter
224	Street Widening
225	Edge Grind at Side Street and End of Overlay Conform
226	Edge Grind at Gutter and Centerline for Overlay
227	AC Conform Detail at Curb & Gutter Replacement
228	Sidewalk, Curb & Gutter Replacement Details
229	Cast-in-Place Pier Supported Concrete Retaining Wall
230	Access Gate and Fencing

SECTION 2 – STANDARD DRAWINGS - SEWER

STD DWG #NO.	DESCRIPTION
132	Standard 48" Dia. Precast Concrete Manhole Sanitary Sewer
133	Standard 60" Dia. Precast Concrete Manhole Sanitary Sewer
134	Inside Drop in Sanitary Sewer Manhole
135	Permanent Mainline Cleanout
136	Temporary Mainline Cleanout
137	Not Used
138	Abandoned Pipe Plug Detail
139	Abandoned Manhole Detail
140	Standard Precast Concrete Manhole Reducer Slab Sanitary Sewer
141	Standard Manhole Frame and Cover
142	Sewer Service Lateral
143	Pipe – Pipe Crossing Details
144	Pipe – Structure Crossing Details
145	Plastic Sewer Pipe Deflection Mandrel
146	Precast Grease Interceptor
147	Sand and Grease Interceptor
148	Sampling Manhole Exterior Use
149	Sampling Box Building Interior
150-1	Typical Service Sewer Connection Details
150-2	Cleanout Detail at Building
150-3	Backwater Check Valve Installation
150-4	Service Sewer Trench Detail

SECTION 3 – STANDARD DRAWINGS - STORM DRAIN

STD DWG #NO.	DESCRIPTION
301-1	Storm Drain Precast Manhole
301-2	Storm Drain Precast Manhole Reducer Slab
301-3	Storm Drain Precast Concentric Manhole
302	Curb Opening Catch Basins
303	Precast Catch Basin Cover
304	Storm Drain Decal
305	Typical Bio-Retention Unit

SECTION 4 – STANDARD DRAWINGS – STREET TREES

STD DWG #NO.	DESCRIPTION
401	Street Tree Planting
402-1 402-2	Tree Grate and Frame Detail Tree Grate and Frame Detail Install Location
403	Street Tree Planting CU-Structural Soil
404	Median Island Tree Planting CU-Structural Soil
405	Street Tree Planting at Angled Parking Bay CU-Structural Soil
406	Sub-Drain Detail CU-Structural Soil

SECTION 5 – STANDARD DRAWINGS – STREET LIGHTS

STD DWG #NO.	DESCRIPTION
215	Street Light - Cobra
216	Street Light – Decorative (H.P.S.)
217	Street Light – Miscellaneous Details
218	Stub Future Connection Street Posting
219	Street Light – Decorative (LED)
220	Street Light – Decorative (LED) Pendant



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REINFORCED CONCRETE LID. SEE NOTE 2. CHRISTY B36 UTILITY BOX OR EQUAL. 10 ... * /. . vv. : 77 v STANDARD CLEANOUT & RISER IF REQUIRED. 1-WAY OR 2-WAY E CLEANOUT AS REQUIRED BY CHIEF BUILDING OFFICIAL. 3/4" GRAVEL BEDDING 3" MIN. THICKNESS (TYP.) BACKWATER VALVE 4" BUILDING SEE NOTE 3. SEWER "CALDER" COUPLING, OR EQUAL (WHEN REQUIRED). NOTES: 1. THIS INSTALLATION IS REQUIRED WHEREVER THE LOWEST FINISHED FLOOR ELEVATION IS TWELVE (12") INCHES, OR LESS ABOVE THE TOP ELEVATION OF THE NEAREST UPSTREAM MANHOLE OR CLEANOUT. 2. IF THE LID IS SUBJECT TO VEHICULAR TRAFFIC, USE LID DESIGNED FOR H-20 TRAFFIC LOADINGS. 3. BACKWATER VALVE SHALL BE CAST IRON OR CAST BRONZE. VALVE SHALL BE APPROVED BY THE CITY ENGINEER. DESIGN AND CONSTRUCTION STANDARDS STD. NO. BACKWATER CHECK VALVE 150 **INSTALLATION** PAGE 3 OF 4 DATE: SEPTEMBER 2017 SCALE: NONE

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G STREET FACE OF CURB 600' R/W II 18 18 10 10 S=0.0050 MIN. Plot Date: Sep 27, 2017 at 08:29 am MAX. LENGTH OF CUL-DE-SAC P₌₄₀. A=50, <u>R</u>=43'_<u>MIN.</u> R=53' MIN. 10' FACE OF CURB S=0.005 M CROSS SLOPE IN BULB AREA SHALL BE MIN 2%. DESIGN AND CONSTRUCTION STANDARDS STD. NO. -1 208 RESIDENTIAL CUL-DE-SAC PAGE 1 OF 1 DATE: SEPTEMBER 2017 SCALE: NONE FO

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2017 at 08:29 27, Sep Date: Plot [Layout Name: 215-1 C: \Users\gooler\appdata\local\temp\AcPublish_368\Streets 200-215.dwg Xrefs: Images: Willows. jpg; Path:







2017 27, Sep Date: Plot 216-2 Layout Name: C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Light 216-220.dwg Xrefs: Willows. jpg; Images: Path:

NOTES:

- 1. STREET LIGHTS SHALL HAVE I.E.S. TYPE III ILLUMINATION PATTERN.
- 2. ALL WIRING AND EQUIPMENT CONSTRUCTION SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, (N.E.C), AND SECTION 86 OF THE STATE STANDARD SPECIFICATIONS.
- 3. PULLBOX SHALL BE CHRISTY B16 OR APPROVED EQUAL.
- 4. FOUNDATION BOLTS SHALL NOT BE CUT OFF FOR ANY REASON. EXTENSION COUPLERS WILL NOT BE PERMITTED.
- 5. GROUND WIRE SHALL BE ATTACHED TO THE POLE BY A 3/16" OR LARGER BRASS BOLT. WHEN CONDUIT IS METAL, GROUND SHALL ALSO BE BONDED TO THE CONDUIT.
- 6. STREET LIGHT ID. NUMBER ON STREET SIDE OF BASE COVER SHALL BE SELF ADHESIVE ALUMINUM WITH 2" BLACK CHARACTERS. I.D. NUMBERS TO BE ASSIGNED BY THE CITY.

4-WAY INTERSECTION

FACE OF CURB

50'

AT CURB RETURN.





B

40

80:

AT CURB RETURN

50'





Sep 27, Plot Date: Layout Name: 218 Path: C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Light 216-220.dwg Xrefs: Images: Willows.jpg;



at 08:40 2017 (27, Sep Date: Plot Layout Name: 219–1 C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Light 216-220.dwg Xrefs: Images: Willows.jpg; Path:



2017 27, Sep Date: Plot 219-2 Layout Name: C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Light 216-220.dwg Xrefs: Willows, jpg; Images: Path:



2017 at 08:40 27, Sep Plot Date: Layout Name: 220–1 Path: C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Light 216-220.dwg Xrefs: Images: Willows jpg;



2017 at 08:40 am Sep 27, Plot Date: Layout Name: 220–2 Path: C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Light 216-220.dwg Xrefs: Images: Willows jpg;



Plot Date: Sep 27, 2017 at 08:55 C: \Users\gooler\appdata\local\temp\AcPublish_368\Streets 221-230.dwg Layout Name: 221 Xrefs: Images: Willows.jpg; Path: (



Images: Willows pg; Xrefs:





08:55 at 2017 27, Sep Date: Plot ' 224 Layout Name: C: \Users\gooler\appdata\local\temp\AcPublish_368\Streets 221-230.dwg Xrefs: Images: Willows jpg; Path:

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08:55 2017 at 27, Sep Date: Plot 225 Layout Name: C: \Users\gooler\appdata\local\temp\AcPublish_368\Streets 221-230.dwg Xrefs: Images: Willows.jpg; Path:





Plot Date: Sep 27, 2017 at 08:55 Path: C: \Users\gooler\appdata\local\temp\AcPublish_368\Streets 221-230.dwg Layout Name: 227 Xrefs: Images: Willows.jpg;




08:55 2017 at 27, Sep Plot Date: C: \Users\gooler\appdata\local\temp\AcPublish_368\Streets 221-230.dwg Layout Name: 229-1 Xrefs: Images: Willows jpg; Path:

DRILLED PIER FOUNDATION

DESIGN CRITERIA: (CBC CHAPTER 18)

P(ACTIVE) = 50 P.C.F. 2:1 MAX. BACKFILL

P(PASSIVE) = 100 P.C.F. ACTING ON 2 PIER DIAMETERS

SPECIAL INSPECTION IS REQUIRED PER CBC CHAPTER 17

1704.4 CONCRETE

1704.7 CAST-IN-PLACE DRILLED PIERS

"H" MAX.	"D" MIN.	MAX. PIER SPACING	PILASTER REINFORCING
3'	8'-6"	8'	TWO # 4 EACH FACE
4'	10'-0"	6'	TWO #4 EACH FACE
5'	12'-6"	6'	TWO # 5 EACH FACE
6'	14'-9"	6'	THREE #5 EACH FACE

NOTES:

- 1. ALL WORK SHALL BE IN CONFORMANCE CONFORMANCE WITH THE LATEST ADOPTED EDITION OF THE CALIFORNIA BUILDING CODE (CBC).
- 2. CONCRETE SHALL BE 2500 P.S.I. MINIMUM AT 28 DAYS. DO NOT BACKFILL STEM WALL UNTIL CONCRETE HAS REACHED DESIGN STRENGTH.
- 3. REINFORCING STEEL SHALL CONFORM TO ASTM A-615 WITH THE FOLLOWING GRADES: GRADE 60 FOR ALL BARS GRADE 40 FOR ALL STIRRUP & SPIRAL CAGES
- 4. STEEL SHALL BE KEPT CLEAN AND FREE OF RUST SCALES. ALL REINFORCING STEEL BARS SHALL BE SECURING TIED AT EACH END AND AT AT A MAXIMUM OF 48 'O.C. LAP ALL BARS 60 DIAMETERS MINIMUM AT SPLICES, CORNERS AND INTERSECTIONS.



DESIGN AND CONSTRUCTION STANDARDS CAST-IN-PLACE PIER SUPPORTED CONCRETE RETAINING WALL

STD. NO. 229 Page 2 of 2

SCALE: NONE

DATE: SEPTEMBER 2017

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	CHA	3'-0" AT G GATE LENGTH AS	ATE POST REQUIRED		
		GATE POST			
	FENCE HEIGHT	GATE WIDTHS	NOMINAL ID	WEIGHT PER FOOT	
		Up thru 6'-0"	2 1/2"	4.95 LB	
		Over 6'-0" thru 12'-0"	4"	10.79 LB	
	6-0 and Less	Over 12'-0" thru 18'-0"	5"	14.62 LB	
		Over 18'-0" to 24'-0" Max	6"	18.97 LB	
NOTES: 1. ACCESS GATES	S SHALL CONFORM	TO THESES DETAIL	_S AND THE	REFERENCED SP	ECIFICATIONS.
DECORATIVE G 2. CHAIN LINK FE STANDARD SP 3. CHAIN LINK FE	CATES MAY BE ALLO ENCE SHALL CONFOR ECIFICATIONS AND T ENCE SHALL BE CON	WED BUT MUST B RM TO SECTION 80 THESE REQUIREMEN INSTRUCTED IN ACC	E APPROVED D-4, "CHAIN NTS. CORDANCE WI	BY THE CITY E LINK FENCE" OF TH CALTRANS S	NGINEER IN ADVANCE. THE CALTRANS STANDARD PLANS.
4. GATES AND FE	ENCES SHALL BE CO	DATED WITH BLACK	< VINYL.		
JOF WILLO	DESIG	GN AND CONSTR	RUCTION ST	ANDARDS	STD. NO.
	ACC	ESS GATE	AND FE	NCING	230
Company and					PAGE 1 OF 1

8'-0" MAX GATE PANEL

GATE POST

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VERTICAL STAY

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- LATCH POST



27, Sep Date: Plot 301-1 Layout Name: Drain 301-305.dwa Images: Drains to Creek Label B&W.jpg; Willows.jpg; Xrefs: Path: C: \Users\gooler\appdata\local\temp\AcPublish_368\Storm



at 2017 27, Sep Date: Plot . 301-2 Layout Name: 301-305.dwg Drain s: Drains to Creek Label B&W.jpg; Willows.jpg; Xrefs: C: \Users\gooler\appdata\local\temp\AcPublish_368\Storm lmages: Path:

out Name: 301—3 Plot Date: Sep 27, 2017 at 08:42 am		MANHOLE COVER AND FRAME SOUTH BAY FOUNDRY SBF 1900, OR EQUAL. SEE STD 141 FOR COVER SPECS. UNIMPROVED SUFFACE UNIMPROVED SUFFACE SURFACE MIN. OF ONE 3" AND ONE 6" GRADE ADJUSTMENT RINGS = 20" (GRADE ADJUSTMENT RINGS					
NOTES:							
)1-305.	 CONCENTRIC CONE SECTION SHALL BE APPROVED BY THE CITY ENGINEER BEFORE INSTALLATION. WHEN MANHOLES ARE INSTALLED IN UNIMPROVED AREAS, THE TOP OF THE COVER SHALL BE A MINIMUM OF 1 FOOT ABOVE ADJACENT GRADE. RAM-NEK OR APPROVED EQUAL SHALL BE USED IN JOINTS. PLASTERING OF JOINTS REQUIRED IF HIGH WATER CONDITIONS EXIST. 						
Jrain 30							
68\Storm [
1p\AcPublish_3	4.	4. SET ALL RINGS IN A 1:3 MORTAR BED. WET BOTH TONGUE AND GROOVE BEFORE APPLYING MORTAR AND SETTING RING. WIPE INSIDE OF JOINTS SMOOTH AND PLASTER OUTSIDE OF JOINT WITH 1/2" LAYER OF MORTAR.					
pdata\local\ten	 CONSTRUCT ALL FLOW CHANNELS OF PIPE WHEREVER POSSIBLE. AFTER BASE IS POURED, BREAK OUT TOP HALF OF PIPE FLUSH WITH INSIDE FACE OF M.H. WALL AND CONSTRUCT U-SHAPED CHANNEL. MAKE ELEVATION CHANGES GRADUALLY AND DIRECTIONAL CHANGES WITH SMOOTH CURVES. SET RING BASE IN MORTAR. ALL SECTIONS OF MANHOLE MUST BE OF IDENTICAL MAKE AND MANUFACTURER. 						
oler\ap							
th: C: \Users\go		STD. NO. 301 page 3 of 3					
Pa		SCALE: NONE					

ů Plot Date ۲ 701-14 No. _ 705 Au 201 Droin Images: Drains to Creek Label B&W.jpg; Willows.jpg; Xrefs; Path: C:\\\sers\aooler\anodeta\|oca\\temp\Ac2Ublish: 368\Sto



2017 at 08:42 27, Sep Plot Date: 302 Layout Name: s: Drains to Creek Label B&M jpg; Willows.jpg; Xrefs: C: \Users\gooler\appdata\local\temp\AcPublish_368\Storm Drain 301-305.dwg Images: Drains to Creek Label Path:



đ 2017 27, Sep Plot Date: 303 Layout Name: s: Drains to Creek Label B&W.jpg; Willows.jpg; Xrefs: C: \Users\gooler\appdata\local\temp\AcPublish_368\Storm Drain 301-305.dwg lmages: Path:



Images: Drains to Creek Label B&W.jpg;Willows.jpg; Xrefs: Path: C:\Users\gooler\appdata\local\temp\AcPublish_368\Storm Drain 301-305.dwg







GENERAL NOTES

- 1. TREES SHALL BE OF A SIZE NOT LESS THAN 8 FT. IN HEIGHT NOR LESS THAN 1 INCH CALIPER. A TREE MAY BE REJECTED IT IS NOT OF A SHAPE OR CONDITION ACCEPTABLE TO THE CITY OF WILLOWS.
- 2. THE TREE SHALL BE PLANTED IN DEEP ROOT PLANTER BOX. THE PLANTER BOX MUST BE A MINIMUM OF 22 INCHES AT THE TOP, 29 INCHES AT THE BOTTOM AND 18 INCHES DEEP.
- 3. THE TREE SHALL BE PLANTED IN A HOLE 40 INCHES SQUARE BY 36 INCHES DEEP.
- 4. INSTALL TWO DEEP WATERING PERFORATED PLASTIC PIPES AS SHOWN. FILL PIPES WITH 3/4 INCH CLEAN DRAIN ROCK.
- 5. TREES SHALL BE PLANTED IN A MIXTURE OF 1/2 NATIVE SOIL AND 1/2 LEAF MOLD OR REDWOOD MULCH.
- 6. TREES SHALL BE STAKED WITH TWO 2 INCH BY 8 FT. MINIMUM LODGE POLE PINE STAKES OR EQUAL. STAKES SHALL BE COATED WITH GREEN PRESERVATIVE STAIN. TREES SHALL BE TIED WITH "GRO STRAIT" TREE TIES, OR SIMILAR.
- 7. TREES SHALL BE PLANTED A MINIMUM OF 20 FT. APART TO A MAXIMUM OF 50 FT. APART DEPENDING ON THE TYPE OF THE TREE. TREES SHALL BE PLANTED A MINIMUM OF 20 FT. FROM CURB RETURNS, 15 FT. FROM STREET LIGHTS AND 6 FT. FROM DRIVEWAYS, SEWER LATERALS AND WATER SERVICES OR AS OTHERWISE APPROVED BY THE CITY OF WILLOWS.
- 8. DEEP ROOT PLANTER SHALL BE FABRICATED FROM A HIGH DENSITY AND HIGH IMPACT PLASTIC SUCH AS POLYVINYL CHLORIDE, ABS OR POLYETHYLENE AND HAVE A MINIMUM THICKNESS OF 0.06 INCH. THE PLASTIC SHALL HAVE 1/2 INCH HIGH RAISED VERTICAL RIBS ON THE INNER SURFACE SPACED NOT MORE THAN SIX (6) INCHES APART.

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DESIGN AND CONSTRUCTION STANDARDS

STREET TREE PLANTING

std. no. **401**

DATE: SEPTEMBER 2017

PAGE 2 OF 2 SCALE: NONE

at 08:36 2017 27, Sep Plot Date: Layout Name: 401–2 C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Tree 401-406.dwg Xrefs: Images: Willows.jpg; Path:

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Plot Date: Sep 27, 2017 at 08:36 am Path: C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Tree 401-406.dwg Layout Name: 402-1 Images: Willows.jpg; Xrefs:





2017 at 08:36 27, Sep Plot Date: 403-1 Layout Name: C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Tree 401-406.dwg Xrefs: Images: Willows.jpg; Path:





2017 27, Sep Plot Date: Layout Name: 404 C: \Users\gooler\appdata\local\temp\AcPublish_368\Street Tree 401-406.dwg Xrefs: Images: Willows jpg; Path:





Plot Date: Sep 27, 2017 at 08:36 Layout Name: 405–2 Path: C:\Users\gooler\appdata\local\temp\AcPublish_368\Street Tree 401-406.dwg Images: Willows.jpg;

Xrefs:



2017 at 08:36 27, Sep Plot Date: Layout Name: 406 Path: C:\Users\gooler\appdata\local\temp\AcPublish_368\Street Tree 401-406.dwg Xrefs: Images: Willows.jpg;