RESOLUTION ADOPTING DESIGN AND CONSTRUCTION STANDARDS FOR SANITATION FACILITIES IN THE KELSEYVILLE COUNTY WATERWORKS DISTRICT NO. 3

WHEREAS, it is necessary to adopt Design and Construction Standards for Sanitation Facilities in the Kelseyville County Waterworks District No. 3, and

WHEREAS, the Design and Construction Standards for Sanitation Facilities in the Kelseyville County Waterworks District No. 3 as contained in Exhibit “A” attached hereto are in conformance with current sanitation facilities construction practices.

NOW, THEREFORE, IT IS RESOLVED by the Board of Directors of the Kelseyville County Waterworks District No. 3, State of California, that it finds, determines, orders and hereby declares that:

1. The Design and Construction Standards for Sanitation Facilities in the Kelseyville County Waterworks District No. 3, as contained in Exhibit “A” attached hereto are hereby adopted.

2. All resolution or parts of resolutions in conflict herewith are hereby repealed to the extent of such conflict and no further
Resolution No. 2013-108
Resolution Adopting Design and Construction Standards for Sanitation Facilities
Kelseyville County Waterworks District No. 3

THIS RESOLUTION was passed by the Board of Directors of the Kelseyville
County Waterworks District No. 3, at a regular meeting thereof held on
September 24, 2013, by the following vote:

AYES: Directors Comstock, Rushing, Farrington and Smith

NOES: None

ABSENT OR NOT VOTING: Director Brown

Chair, Board of Directors

ATTEST: MATT PERRY
Clerk of the Board

By: Deputy

APPROVED AS TO FORM: ANITA L. GRANT
County Counsel

ANITA L. GRANT
SPECIAL DISTRICTS

Lake County's Water and Wastewater Agency

DESIGN AND CONSTRUCTION STANDARDS

FOR

SANITATION FACILITIES

KELSEYVILLE COUNTY WATERWORKS
DISTRICT NO. 3

SEPTEMBER, 2013

Lake County Special Districts Administration
230 North Main Street, Lakeport, CA 95453
(707) 263-0119
DESIGN AND CONSTRUCTION STANDARDS
FOR SANITATION FACILITIES

PART A - GENERAL INFORMATION SECTION 1 - GENERAL INFORMATION

1-01 Introduction and Scope

These Design and Construction Standards for Sanitation Facilities shall apply to the design and construction of all public sewerage facilities and be consistent with rules and regulations in the Kelseyville County Waterworks District No. 3 (District) sanitation zones, whether privately financed and constructed under permits issued by the District or publicly financed and constructed under contract with the District.

The jurisdiction of the District includes the entire sewerage system and its appurtenances from the point of connection with the building sewer to the discharge terminus of the final disposal or use. Maps showing the existing sanitation zone boundaries are available for inspection at the District's office.

When deemed necessary by the Administrator/Deputy Administrator, special provisions, specifications Addenda, and/or notes on the plans shall be provided and shall be considered as part of the specifications for the work.

1-02 District Sewer Use Ordinance

The Sewer Use Ordinance of the Lake County Sanitation District (Ordinance No. 871 and further amendments by ordinance or resolution for District sanitation zones) comprise the rules and regulations of the District with respect to the construction and use of sanitary sewerage facilities. In general, the ordinances: 1) provide Board policy and authority of the Administrator/Deputy Administrator, 2) provide regulations for lateral sewer construction and for the use and construction of public sewers; 3) provide for annexation, plan checking, and permit and inspection fees; and 4) provide for the establishment of connection charges.

Knowledge of the ordinance provisions and policies is essential to those proposing to design or construct sewerage facilities under permit in the District's sanitation zone. Upon request, copies of ordinances may be obtained at the District's Administrative office at 230 North Main Street, Lakeport, California 95453.

1-03 Annexation

An annexation into a sanitation district shall comply with the Local Agency Formation Commission requirements.

1-04 Right-of-Way Policy

The right-of-way policy requires that all public sewerage facilities be located in easements granted in perpetuity or rights-of-way granted or dedicated for sewers or public use. In the case of public streets, further dedication is not necessary unless specifically required. With the exception of easements dedicated on subdivision final maps or parcel maps, all new
easements must be granted or deeded directly to the District as sewer easements. Unless otherwise specifically permitted or required by the Administrator/Deputy Administrator, all easements shall be fifteen (15) feet in width, and the easement shall be centered on the sewer line in all cases. Easements shall be dedicated for sewers or granted to the District in all cases where future extensions of sewer lines will be required on the property being sewered. Easements shall not be effective until they are accepted and recorded by the District. Easements dedicated on subdivision final maps become effective when filed by the Lake County Recorder; however, construction may proceed prior to the recordation of the Dedication and Conveyance to LACOSAN.

1-05 Condemnation Policy

When a public sewer must pass through private property and a perpetuity easement or right-of-way cannot be obtained through negotiation with the property owner, the District may, under certain conditions, pursue condemnation of the required easement. If condemnation by the District is necessary, the following will be required.

A. Requirements: Submit complete construction plans, a detailed easement plat, and a letter to the Board of Directors for LACOSAN describing the need for the easement and stating that all reasonable means to acquire the easement through normal procedures have been exhausted and no agreement could be reached, and requesting the District's assistance in acquiring the easement.

B. Condemnation Ordered: If condemnation is required by the District, a duplicate tracing of the easement map shall be submitted showing the entire easement, any required temporary working easements, and all affected properties. Also, a legal description of the easement and temporary working easement including correct and complete names and addresses of all vested owners of the effected property shall be furnished. The Project Engineer shall be responsible for obtaining a litigation appraisal for the effected property.

C. Costs of the Condemnation: All costs of condemnation shall be borne by the applicant who shall deposit with the District, in advance, the estimated just compensation for the easement and all legal, engineering, administrative, and other costs associated with condemnation. The amount of the deposit shall be determined by the Administrator/Deputy Administrator.

1-06 Engineering Policy

The engineering policy of the District requires strict compliance with the Professional Engineers Act of the California Business and Professions Code. All engineering plans, specifications, reports, or documents shall be prepared by a registered Civil Engineer (Project Engineer) or by a subordinate employee under the Project Engineers direction, and shall be signed by the Project Engineer and stamped with the Project Engineers' seal to indicate the Project Engineers' responsibility for them. Prior to engineering or design work, it
shall be the Project Engineers' responsibility to review any proposed sewer system, extension, and/or existing system change with the District to determine any special requirements or whether the proposal is permissible. The Project Engineer shall also be responsible for determining and locating all other underground facilities in the area of the proposed work. Approval of preliminary or final plans by the District does not in any way relieve the Project Engineer of the responsibility to meet all requirements of the District. The plans and specifications for any job shall be revised or supplemented at any time it is determined that the full requirements of the District have not been met.

1-07 Environmental Review under the California Environmental Quality Act (CEQA)

All District projects and private developments are subject to the requirements of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) and the State Guidelines for the Implementation of the California Environmental Quality Act (CFR, Section 15000 et seq.). All District projects are also subject to Lake County Environmental Protection Guidelines. Under the Protection Guidelines, the District will act as a Lead Agency and will prepare environmental documents as needed for District projects. Persons planning private developments should contact the appropriate jurisdictional planning agency early in their planning process to determine that agency's procedures for compliance with CEQA and the State Guidelines for Implementation of CEQA (the Guidelines). This agency will act as a Responsible Agency for private developments, and will review and comment on environmental documents prepared for private developments in its role as a Responsible Agency as required under CEQA, the Guidelines, and Lake County Environmental Protection Guidelines.

1-08 Maintenance of Side Sewer

Side sewers shall be maintained by the owner of the property served thereby. Where a side sewer provides service to more than one single-family residential unit in a development with common walls, condominium, stock cooperative, community apartment, or other similar improvements, the obligation to maintain the side sewer shall be the homeowners' association or other entity responsible for the maintenance of the property and facilities owned in common.

1-09 Maintenance of Backflow Prevention Devices

Where a side sewer serves plumbing fixtures that are located less than one (1) foot above the rim elevation of the nearest upstream manhole or cleanout in the reach of the main sewer into which the side sewer connects, it shall be protected from backflow of sewage by installing a backflow prevention device in accordance with District Standard Drawing 513. The backflow prevention device shall be located on private property and shall be installed by the permittee. The maintenance of the backflow prevention device shall be the sole obligation of the permittee or his/her successor in interest. The District shall be under no obligation to ascertain that the backflow device continues in operating condition. The installation of a backflow prevention device shall require a permit and inspection.
SECTION 2 - DEFINITIONS AND TERMS

2-01 Definitions and Terms

Whenever in these specifications, or in any documents or instruments that these specifications govern, the following terms, abbreviations, or definitions are used, the intent and meaning shall be interpreted as follows.

Abbreviations

MN  American Association of Nurserymen
AAHSTO  American Association of State Highway and Transportation Officials
AB  Aggregate Base
AC  Asphalt Concrete
ACI  American Concrete Institute
ACP  Asbestos Cement Pipe
AREA  American Railway Engineering Association
ANSI  American National Standards Institute
ASA  American Standards Association
ASCE  American Society of Civil Engineers
ASTM  American Society for Testing Materials
AWPA  American Wood Preservers’ Association
AWS  American Welding Society
AWWA  American Water Works Association
CIP  Cast Iron Pipe
CIPP  Cast-in-Place Pipe
CLCSCP  Concrete Lined and Coated Steel Cylinder Pipe
CLSCP  Concrete Lined Steel Cylinder Pipe
CMP  Corrugated Metal Pipe
CO  Clean Out
DIP  Ductile Iron Pipe
Drop MN  Drop Manhole
FG  Finish Grade
FL  Flowline
Inv.  Invert Elevation
MH  Manhole
NACE  National Association of Corrosion Engineers
NEC  National Electrical Code
NEMA  National Electrical Manufacturers Association
PCC  Portland Cement Concrete
PVC  Polyvinyl Chloride Pipe
RCP  Reinforced Concrete Pipe
RPMP  Reinforced Plastic Mortar Pipe
S  Pipe Slope (foot of vertical drop per foot of horizontal distance)
SFD  Equivalent Single-Family Unit
SLP  Steel Pipe
UBC  Uniform Building Code
UPC  Uniform Plumbing Code
URB  Untreated Rock Base
VCP  Vitrified Clay Pipe
WSP  Welded Steel Pipe

Additional abbreviations are contained in Section 1-3 of the Standard Specifications for Public Works Construction (Standard Specifications) and apply to all work.

Definitions & Terms

The following definitions are added to the list of definitions listed in Section 1-2 of the Standard Specifications.

Acceptance  - Formal acceptance by action of the Board of Supervisors or the Administrator/Deputy Administrator on an entire contract or agreement or work completed in all respects under permit in accordance with the plans and specifications and any modifications thereof previously approved.

District  - Kelseyville County Waterworks District No. 3.

Annexation  - The inclusion of property within the Sewer Service Area boundaries by proper legal procedures.

Board of Supervisors  - The governing Board of Directors of the Kelseyville County Waterworks District No. 3.

Building Drain  - The building drain is that part of the lowest piping of a drainage system which receives the discharge from wastes and other drainage pipes inside the walls of the building and conveys it to the building sewer (side sewer), which begins two (2) feet outside the building wall (building foundation).
Caltrans Specifications - The Standard Specifications of the State of California, Department of Transportation (Caltrans), current issue. Where the terms "State" or "Engineer" are used in the Caltrans specifications, they shall be considered as meaning the "District" or "Administrator/Deputy Administrator" as defined hereinabove.

City - Any incorporated municipality lying partly or entirely within the Sewer Service Area.

Contractor or Sewer lateral Contractor - Any contractor licensed by the State of California to enter into contracts for and to perform the work of installing sewers or the owner(s) of private property doing their own house sewer work on their own private property only.

County - The County of Lake, State of California.

Engineer - The Administrator/Deputy Administrator acting either directly or through his appointed agent as designated in writing.

Fixture Units - The fixture unit load values for drainage piping as computed from Tables 1 and 2 of Chapter 4 of the Uniform Plumbing Code.

Inspector - The engineer or technical inspector(s) duly authorized or appointed by the Administrator/Deputy Administrator and responsible for the particular duties delegated to the inspector in writing.

Administrator/Deputy Administrator - The Administrator and Deputy Administrator of the Kelseyville County Waterworks District No. 3.

Owner - In the case of District projects, the term owner shall mean the Kelseyville County Waterworks District No. 3. In the case of private projects, the term owner shall mean that person who is doing or having work done under permit or agreement with the District.

Permit - The written authorization required pursuant to the rules and regulations of the District for the installation or construction of specific sewerage facilities under specific conditions at specific locations.

Permit Center - County of Lake Community Development Department.

Plumbing System - All plumbing fixtures and traps, or soil, wastes, special waste, and vent pipes within a building and to a point two (2) feet outside the building foundation thereof.

Private Construction or Private Projects - Projects involving construction of sewerage facilities other than District projects that are to be connected to the District sewerage system and done under permit or agreement with the District.

Project Engineer - The engineer licensed by the State of California as a Civil Engineer, under whose direction plans, profiles, and details for the work are prepared and submitted to the District for review and approval.

Record Drawings - Reproducible plans, signed and dated by the Project Engineer and the District's representative, indicating that the plans have been reviewed and revised, if necessary, to show record construction details.
Reach - The section of a mainline sewer between manholes or a manhole and a cleanout.

Right-of-Way - All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public, within which the District shall have the right to install and maintain sewerage facilities.

Section - Any reference to a section which is not accompanied by further reference refers to a section or sections of these standards.

Sewers:

Building Sewer - That portion of any sewer beginning at a point two (2) feet outside the foundation line of any building and running to the property line, street right-of-way line, sewer easement right-of-way line, or to a private sewage disposal system.

Lateral Sewer - That portion of the sewer lateral within a public road right-of-way or easement. (Normally that portion between the main sewer and the property line which may include a portion of the building sewer. Normally 4-inches in diameter or larger.)

Main Sewer - A public sewer which has been or is being constructed to accommodate one or more sewer laterals. (Normally 6-inches in diameter or larger.)

Side Sewer - That reach of pipe of 4-inch or 6-inch diameter that runs parallel to the main collector line, serving multiple single-family dwellings. The construction of side sewers is not allowed within the boundaries of the Kelseyville County Waterworks District No. 3.

Soils Engineer - Any soils engineering firm or authorized representative of such a firm which is retained by the owner of a project for the purpose of designing, testing, or controlling grading, installation of pavements, or trench backfill, and/or means to handle sub-surface water and supplying to the District reports on the same.

Standard Drawings - The drawings of structures or devices commonly used on District work designated by the Administrator/Deputy Administrator as Standard Drawings at the time a District contract or agreement is entered into or permit is issued.

Standard Specifications - The words "Standard Specifications" mean the Standard Specifications for Public Works Construction, current edition, in its entirety, prepared by the Southern California Chapter of the American Public Works Association and Associated General Contractors of California, and published by Building News, Inc., Box 3031, Terminal Annex, Los Angeles, California 90051. This is also known as the "Green Book."

Streets or Roads - Any public highway, road, street, avenue, alley, way, easement, or right-of-way used or to be used for vehicle movement.

Surety - Any firm or corporation executing a surety bond or bonds payable to the District, securing the performance of the contract or permit either in whole or in part.

Traveled Way - That portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

PART B - ENGINEERING AND DESIGN REQUIREMENTS

SECTION 3 - DESIGN CALCULATIONS AND PLAN PREPARATION

3-01 Design Calculations

The Project Engineer shall submit design calculations for District review and approval. Design calculations shall be submitted in duplicate, and shall indicate the date, the signature of the Project Engineer, and the State of California registration number of the Project Engineer.

Calculations for sewers shall be presented in tabular form and shall include the following information for each reach of sewer: terminal manhole designation; ground elevations at terminal manholes; incremental and cumulative tributary areas; incremental and cumulative tributary population; incremental average and maximum domestic sewage flow; incremental infiltration allowance; cumulative design flow; invert elevations of manholes; length of sewer run; and sewer size, slope, capacity, and velocity. Design calculations for pumping stations shall include soils data, structural design calculations, hydraulic calculations including the basis for average and peak flows (if different than those furnished by the District), calculations for wet-well volume, curves indicating force main characteristics, and individual and combined pump head-capacity curves.

All calculations shall be accompanied by a map showing and identifying proposed sewerage facilities and tributary areas, etc.

3-02 Size of Plans and Data Required

Sheet sizes for plans for all sanitary sewerage facilities shall be 24 inches by 36 inches, on 4 mil mylar, unless otherwise specifically approved in advance by the Administrator/Deputy Administrator. Drawings to become the property of Special Districts and shall have the standard County title block located in the bottom right-hand corner. Layout sheets shall be on plan and 3-line profiles. Record drawings shall be provided and shall include X,Y reference that is compatible with the District’s GIS. Approval signature shall be the Special Districts Administrator. Plans shall include as a minimum the following information and data.

General - Each plan shall show the name of the project, subdivision, or main extension, and the sheet number and total number of sheets. Each sheet shall bear the signature and registration number of the Project Engineer. Each sheet shall have a north arrow, match lines indicating adjoining sheet numbers, and appropriate scale or scales indicated thereon. The lettering size for all notes, data, etc. shall be no smaller than #100 Leroy lettering template. The final plans for District bid work will be printed at half size.
A. **Sewer Plans** - The sewer plans shall show the true horizontal relationship between the proposed sewer improvements and the existing and/or proposed field conditions, including existing or proposed utilities and other facilities in accordance with available information. Plans shall include sewer line sizes and designations and shall show all structures and their respective numbers; all property lines and corners adjacent to the sewer alignment, laterals and ties to property corners; and all necessary and required stationing, horizontal curve data, and street names. (Scale: 40 feet to the inch if all required data can be adequately shown.)

B. **Sewer Profiles** - The sewer profiles shall show the vertical relationship between the sewer line invert and the ground surface at the time of sewer construction and the finished ground and/or paving surface. The sewer line size, pipe type, and pipe class shall be shown between each pair of consecutive structures on the profiles. Sewer profiles shall also show all existing and/or other facilities (in accordance with available information) which cross the alignment of the sewer, and shall accurately indicate clearance when less than twelve (12) inches. (Scale: 40 feet to the inch horizontally and 4 or 5 feet to the inch vertically, if all required data can be adequately shown.)

C. **Easements** - All existing and proposed easements and rights-of-way shall be shown on the plans.

D. **Location Map** - Location map shall be included on the first sheet of the plans showing the overall sewer layout and a north arrow to top of sheet, and appropriately indexing each plan sheet for multi-sheet plans.

E. **Line Stationing** - Each sewer line with a separate designation shall be stationed continuously upgrade from 0+00 at its point of connection to another line. Using road centerline stationing with right or left offset to the sewer line is acceptable.

F. **Ties to Existing System** - Horizontal and vertical ties to the existing District sewerage system shall be indicated on the plans.

G. **Structure Numbers** - Manholes, rodding inlets, and all other sewer structures shall be numbered consecutively upgrade by type of structure. The structure number shall appear on the plans and profiles whenever the structure is shown or referred to.

H. **Sewer lateral Locations and Elevations** - All sewer laterals or laterals shall be shown on the plans with ties given to line stationing. The elevation of the lateral at the property line shall be shown on the plans and staked in the field by the Project Engineer if different from Standard Drawing 513. Normally, the lateral shall be shown at a point five (5) feet from the lower lot corner at the property line. The Project Engineer may locate laterals to fit building conditions, but the plans must show proper ties, and the completed lateral must be accurately located and marked per Standard Drawing 513.

I. **Horizontal Datum** - The plans shall indicate what the horizontal datum is and the location of all control points within the area of the work.
J. **Elevation Datum** - The elevation datum used shall be NAVD 1988. If this is not available in the area, the datum may be NGVD 1929 mean sea level. The plans shall include a note indicating the elevation datum and giving the elevation, and describing the location of one or more bench marks in the area of the work. Where new work connects to existing work, both datums shall be noted (between the new and existing work).

K. **Inspections** - The District shall inspect all work that is to be done under District contract unless otherwise noted in the Special Provisions. All other work, including land development, shall be inspected by the County of Lake Community Development Department, Inspection Division, unless otherwise noted on the plans.

3-03 Rights-of-Way

Rights-of-way define and establish the rights for the District to maintain a sewer facility in the location designated by the Project Engineer (see Section 1-04). When main sewers are to be installed outside of public street rights-of-way in subdivisions, the required easements may be dedicated on the subdivision final map or parcel map. Easements shall be 15 feet wide minimum. Outside of subdivisions, when sewers are to be installed on private property, an easement must be granted or deeded to the District. The easement document and required easement map shall be prepared by a licensed land surveyor and be provided to the District by the Project Engineer along with the name(s) and address(es) of the property owner(s) of record and the Assessors Parcel Number(s). Unless otherwise specifically approved by the Administrator/Deputy Administrator, no sewer work will be permitted to proceed until all required easements are accepted and recorded by the District.

**Right-of-Way Plats** - The right-of-way plat shall include a location map and shall show the entire parcel over which the easement is granted; Assessors Parcel Number; or number of grantor; all necessary survey ties, courses and distances; point of beginning of the easement description; last names of each grantor; name of the sewer main extension involved; a north arrow; horizontal basis; record of survey or maps of record; location and character of monuments, found or set; book and page of appurtenant record of survey; map scale; and the signature and registration number of the Project Engineer. Bearings and distances of easement courses shown shall conform to those given in the easement description. Two blue line prints of the easement plat shall be submitted for each grantor involved.

**A. Easement Documents** - The Project Engineer shall furnish the necessary easement description on District forms and conform to District standards. The Project Engineer shall be responsible for obtaining the necessary notarized signatures.

**Size of Plats** - Sheet sizes for right-of-way plats shall be 11" x 17" on 4 mil mylar. Finished work shall be inked; pencil is not acceptable.

**Electronic media** - If any part of the drafting work is compiled by electronic methods, the Project Engineer shall also submit the record drawing in digital form on magnetic media. Data shall be on a
high density DVD compact disk compatible with AutoCad current Release, and readable on a PC operating under MS-Windows 7.

3-04 Easements for Future Extensions
Easements shall be dedicated for sewers or granted to the District in all cases where future extensions of sewer lines will be required on the property being sewered. Easements shall be 15 feet wide minimum. Such easements will be included on the construction plans where there is any doubt as to the ability to properly serve the ultimate service area.

3-05 Flood Control Approval
In the event that a proposed sewer is to cross a storm water channel, structure, or drainage course within the jurisdiction of the District, a detailed large-scale profile of the crossing shall be incorporated on the plans and submitted to the District for approval of the plans by the Administrator/Deputy Administrator.

3-06 Soils Investigation
Due to the inherent hazards involved in excavation, trenching, and pipe laying in certain common soil formations within the District's jurisdiction, the right is reserved to require a geological investigation and report prior to the approval of construction plans. In general, locations on steep side hills, in areas of known instability, in areas of bay mud or filled marshland, or in spring or seepage areas shall be investigated, a report prepared, and construction controlled by the recommendations contained in the Soils Engineers report.

SECTION 4 DESIGN STANDARDS 4-01 Design Criteria
The District is responsible for the operation of a number of sanitation zones, each having different flow characteristics. The flow characteristic information is available at the District's Administrative office and at the County of Lake Community Development Department.

A. Flow Characteristics - The flow characteristics information includes the following by sanitation zone.

- Average number of people per SFD
- Average flow per SFD in GPD
- Average dry weather flow (ADWF) 4-month running average
- Peak wet weather flow (PWWF) 5-year
- Ratio of peak to average flow
- Connected SFD load

B. Population Density - Population densities for determining the ultimate tributary area population shall be obtained by reviewing the General Plan documents for the local planning area, actual count, or based upon the character of the proposed development, whichever is greatest.
C. **Commercial or Industrial Flows** - Unit design flows used for commercial or industrial areas shall be based on the type of existing or proposed development and shall be determined by special study subject to the review and approval of the Administrator/Deputy Administrator.

D. **Manning Formula** - The diameter of gravity sewers shall be determined by use of the Manning formula, using a roughness coefficient, "n", of 0.013 or the pipe manufacturers' recommendation, whichever is greater.

E. **Special Design Problems** - Special design problems involving siphons, pumps, force mains, nonresidential connections, or other unusual features require individual study and approval. Where deemed necessary, additional data/calculations may be requested from the Project Engineer to support the review of special design problems.

F. **References to be used as a guide to design of sewers** - Reference is made to the Water Environmental Federation (WEF) manual, Gravity Sanitary Sewer Design and Construction (1982) and the American Society of Civil Engineers manual, Design and Construction of Sanitary and Storm Sewer (latest Edition).

G. **Mobile Home Parks** - If the sewerage system is to be privately owned, the design and installation of new sewerage system serving mobile home parks shall be under the jurisdiction of the State of California Department of Housing and Community Development. However, connection of such newly constructed systems to a lateral sewer shall be subject to inspection of the District following completion of said system to determine that all portions of the system within the mobile home park are secure against possible infiltration and/or inflow of storm, surface, and/or groundwater. All sewer construction within the mobile home park shall satisfactorily pass the test for leakage contained herein prior to connection to the District's sewer system. If the sewerage system is to be publicly owned, it shall be designed and constructed in accordance with District Standards.

H. **Public Schools** - The design and installation of new sewerage systems serving public schools shall be under the jurisdiction of the State Division of Architecture. However, connection of such newly constructed systems to a lateral sewer shall be subject to inspection of the District following completion of said system to determine that all portions of the system within the school site are secure against possible infiltration and/or inflow of storm, surface, and/or groundwater. All sewer construction within the school site shall satisfactorily pass the test for leakage contained herein prior to connection to the District's sewer system.

4-02 **Sewer Pipes**

A. **Gravity Sewer Pipe Materials** - The following pipe materials shall be used for gravity sewer lines unless otherwise specifically required or approved by the Administrator/Deputy Administrator. Selection of the pipe type for a given project shall be made by the Project Engineer, and be subject to the review and approval of the Administrator/Deputy Administrator. Lateral sewers shall be of the same pipe type as the
main sewer when being installed concurrently with the main sewer. The type of pipe used for building sewer installation shall conform to the "Approved Building Sewer Pipe Materials List" (see Part E).

MATERIAL SPECIFICATION

PVC & Fitting 4" - 15" ASTM D 3034 SDR-35 18" - 30" ASTM F 679 T-1
Joints Integral Bell Push-On

ABS. 4" - 15" ASTM D 2751 SDR 35
Joints ASTM D-2680 Solvent Weld

VC ASTM C700 Extra Strength
Joints ASTM C425 Push-On or Band Seal

DI ANSI/WWA C151/A21.51
Thickness Class 50
Joints Push-On or Fittings per Approved Material List

Ductile iron pipe requires a polyethylene encasement ANSI/AWWA C-105/A21.5

B. Minimum Pipe Sizes - The minimum pipe size for main sewers shall be six (6) inches. The minimum pipe size for sewer laterals shall be four (4) inches or the same size as the building plumbing stub, whichever is greater. Where more than 150 fixture units are to be connected, the side sewer shall have a six (6) inch minimum diameter. Also, when more than one building sewer is allowed to be connected to a single side sewer, the side sewer from the point of intersection of one or more building sewers to the main sewer shall be not less than six (6) inches in diameter. Where a sewer cannot be extended, such as a cul-de-sac, a six (6) inch sewer may be installed with the approval of the Administrator/Deputy Administrator. The last reach of such a sewer may be installed at the maximum slope of 0.1500.

C. Minimum Flow - Main Sewers - The slope of the sewer shall be such that the velocity of flow in the pipe when flowing full shall be equal to or greater than two (2) feet per second. The minimum acceptable slopes for various main sewer sizes are tabulated below. For construction in filled marshland or lake mud, adobe, clay soils, or other areas subject to possible differential settlement, the Administrator/Deputy Administrator may require and specify other acceptable minimum slopes greater than those shown.

<table>
<thead>
<tr>
<th>Pipe Size in Inches</th>
<th>Minimum Slope Ratio in Feet per Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.0050</td>
</tr>
<tr>
<td>8</td>
<td>0.0035</td>
</tr>
<tr>
<td>10</td>
<td>0.0025</td>
</tr>
<tr>
<td>12</td>
<td>0.0020</td>
</tr>
<tr>
<td>15</td>
<td>0.0015</td>
</tr>
</tbody>
</table>
D. **Minimum Slope - Sewer laterals** - The minimum slope for four (4) inch diameter sewer laterals shall be 2.0 feet per 100 feet (2%) provided, however, that where unusual conditions exist, making it impractical to obtain this slope, a four (4) inch sewer lateral may have a slope of not less than 1.0 feet per 100 feet (1.0%) when specifically approved by the Administrator/Deputy Administrator. The minimum slope for sewer laterals greater than four (4) inches shall be 0.7 feet per 100 feet (0.7%).

E. **Steep Slopes** - For sewers installed in areas with steep ground slopes (1 to 1 or greater) and when flow velocities exceed fifteen (15) feet per second, special design features may be required. Depending upon conditions of the specific installation, items such as check dams, trench dams, special anchorage or special pipe materials may be required by the Administrator/Deputy Administrator.

F. **Minimum Pipe Cover** - The following minimum pipe covers shall be attained in design and construction of sanitary sewers. If certain conditions exist which make it impractical to meet the minimum cover and clearance requirements, special pipe, bedding, encasement and/or backfill will be required as directed by the Administrator/Deputy Administrator.

1. **Mainline Sewers** - The minimum pipe cover for main sewers within a public street shall be 4.5 feet below finish grade. The minimum cover for mains within easements or other rights-of-way not expected to become streets shall be 3.5 feet. However, when the cover over the main sewer is less than minimum, special pipe, bedding, and/or concrete encasement may be required by the Administrator/Deputy Administrator.

2. **Sewer Laterals** - That portion of a sewer lateral within a street right-of-way (lateral sewer) shall have a minimum cover of 3.0 feet at the property line (measured from the finished ground surface or the adjacent top of curb, whichever is lower). The minimum cover for sewer laterals from the property line to the building drain (building sewer) shall be eighteen (18) inches. However, when the cover over the building sewer is less than twenty-four (24) inches, special pipe, bedding, and/or concrete encasement may be required by the Administrator/Deputy Administrator.

G. **Pipe Strengths and Maximum Depths** - The minimum pipe strengths and classes given in the Standard Specifications, Section 207, and in the "Approved Building Sewer Pipe Materials List," Part E, are based upon the attainment of standard bedding conditions, the maximum allowable trench widths, and the assumption of average pipe depths (depths up to 12 feet). Where for any reason the standard bedding conditions cannot be attained, the maximum allowable trench width is exceeded, or the pipe depth is greater than average, special pipe, bedding, backfill, and/or encasement may be required as directed by the Administrator/Deputy Administrator. Where pipe depths or other known conditions require
pipe strengths other than those specified as standard, the Project Engineer shall indicate the
required pipe classes on the plans.

H. Pipe Clearance - Unless special approval is received from the Administrator/Deputy
Administrator, all sewer pipes and structures shall be designed and constructed to have a
minimum 12-inch vertical clearance from all other utilities and/or improvements. Horizontal
and vertical pipe clearances between sewer pipes and potable water pipes shall be in
accordance with the current requirements of Title 22, Code of Regulations of Health and
Safety Code, State of California. Horizontal clearance from storm drains shall be a minimum
of five (5) feet. Horizontal clearance from other utilities, such as gas, electric, television, etc.,
shall be a minimum of four (4) feet.

I. Horizontal and Vertical Curves - Horizontal curves may be used on curved streets
when the alignment can be kept concentric with street improvements and when minimum
radius requirements can be met. When permitted by the Administrator/Deputy Administrator,
vertical curves may be used in hilly terrain in order to reduce the number of required
manholes. The deflection in the joint between any two successive pipe sections shall not
exceed 80% of the maximum deflection angle as recommended in writing by the pipe
manufacturer. If other than standard joint lengths are required for a given curve in order to
meet the deflection requirements, the required joint length shall be shown on the plans.

J. Sewer Connections to Existing System - Connection of new main or trunk sewers to
the existing sewer system shall be made at existing manholes or sewer stubs, or by
constructing a new manhole at the point of connection. Sewer lateral connections to existing
main sewers shall be accomplished by connecting to wye branches or laterals where they
exist, or by installing a standard saddle connection. Sewer laterals eight (8) inches and
larger shall be connected at manholes only.

K. Sewer Alignment - Sewer lines installed within street rights-of-way shall, wherever
practical, be designed and installed on the side opposite the water line and ten (10) feet
horizontally apart. Where practical, all sewer lines within easements shall be designed and
installed with no less than 7 1/4 feet between the center line of sewer and the edge of the
easement. All sewer lines and structures shall be designed and installed well in the clear of
all other improvements and utilities (see Pipe Clearance above).

L. Sewer Pipe Stubs - Sewer pipe stubs shall be designed and installed in all manholes
from which future sewer line extensions are anticipated. Pipe stubs shall be a minimum six
(6) inches in size, or as directed by the Administrator/Deputy Administrator, and shall be of
an approved type of pipe. Stubs shall protrude a minimum of one (1) foot outside of the
manhole base and shall be channeled as though a regular sewer line was within the
manhole. The outboard end of stubs shall be a standard pipe joint end and shall be plugged
with a standard watertight plug as supplied by the pipe manufacturer.

M. Sewer Line Extensions - In all new streets where sewer lines are expected to be
extended the sewer line shall be designed and installed to the end of the proposed street
improvement prior to street construction. The sewer extension shall terminate with the proper structure or fitting, which will minimize the amount of pavement to be disturbed by future sewer extensions.

N. Sewers to be Installed in Existing Improved Streets - Where sewers are being designed for installation in existing city and/or County streets, the Project Engineer shall submit the plans for the proposed work to the city and/or County for location and encroachment permit approval. In addition, a note shall be placed on the plans to the effect that the Contractor shall obtain an encroachment permit from the city and/or County prior to starting work on sewers within existing street rights-of-way.

O. Separate Sewer laterals Required - In general, each living unit and each individual building shall be connected to the main sewer with a separate sewer lateral. The following facilities will be allowed to be served by a common sewer lateral upon receipt of a written request from the applicant;

1. A duplex, apartment, or other multiple-unit residential structure in undivided ownership.

2. A commercial or industrial structure in undivided ownership where use areas are not bounded by permanent walls, provided that process and domestic waste stream would not co-mingle prior to designated sampling point.

3. A structure or group of structures owned or exclusively occupied by a public entity or entities.

4. A condominium or similar complex of living units served under a contract between the District and a responsible owners' association for the complex.

5. An auxiliary structure on a residentially zoned parcel that is not a living unit, e.g. garage, workshop, pool house, artist studio, etc.

P. Sewer lateral Cleanouts Required - Cleanouts shall be installed in the sewer lateral as provided in Section 1107 of the Uniform Plumbing Code. The cleanout riser shall be equal in size to the sewer lateral. Refer to Standard Drawings 513.

Q. Backflow Prevention Device - Where a sewer lateral serves plumbing fixtures that are located less than one (1) foot above the rim elevation of the upstream manhole or cleanout in the reach of main sewer into which the sewer lateral connects, it shall be protected from backflow of sewage by installing an approved backflow prevention device, as detailed on the Standard Drawing 513. A backflow prevention device is required where the building is located in a flood zone as defined on the FEMA flood zone maps for a 100-year storm.

R. Sewer Force Main Material - The following pipe materials shall be used for sewer force mains as approved for the particular project by the Administrator/Deputy Administrator.
MATERIAL SPECIFICATION

4"-12" PVC AWWA C-900 Class 150 Min.
DIP AWWA C-151 Class 350 Min. length -18"
PVC AWWA C-905 165 psi
DIP AWWA C-151 Class 250 20"
DIP AWWA C-151 Class 250
CLSCP AWWA C-301

NOTES:
1. Ductile iron pipe must be encased with polyethylene film. ANSI/AWWA CI 05/A.
2. For working pressures greater than 100 psi use PVC C-900 Class 200; DIP C-151 Class 250.
3. Special pipe and/or design provisions may be required at locations where the force main will not run full at all times.
4. All non-metallic pipes require an insulated 12-gauge copper tracer wire.

4-03 Sewer Structures Manholes: Manholes (Standard Drawing 500) shall be placed at all intersections of sewer lines other than sewer lateral connections less than six' (6) inches in diameter, at all vertical or horizontal angle points, and at intervals not greater than 300 feet. Where practical, manholes shall be located near the center of street intersections. All manholes from which future sewer line extensions are anticipated shall have a pipe stub planned and installed at the grade and the direction of the anticipated sewer extension (see Section 4.02 L).

A. Riser Sections:
1. Minimum 48 inches in diameter or as shown. Use 60 inch ID manhole for Mains 18" or larger. On 60 inch manhole, transition sections are acceptable if installed directly below the cone.
2. Fabricate in accordance with ASTM C478.
3. Minimum Wall Thickness: 4 inches or 1/12 times inside diameter, whichever is greater.
4. Top and bottom of sections shall be parallel.
5. Joints: Tongue-and-groove or confined groove with mortar.

B. Cone Sections:
1. Provide concentric cones.
2. Same wall thickness and reinforcement as riser section.
3. Top and bottom of sections shall be parallel.
C. Base Sections and Base Slab:
1. Cast-in-place concrete: 4000 psi compressive strength meeting the requirements of ACI 301, 318/318R, ASTM C94, Option A (Ready-Mixed), ASTM C150 (Portland Cement—Type II), and having a maximum water/cement ratio of 0.45, a maximum slump of 5 inches, 3 to 6 percent air entrainment (by volume) and no plasticizer.
2. Base Sections: Base slab integral with sidewalls.
3. Fabricate in accordance with ASTM C478.

D. Manhole Extensions:
1. Concrete grade rings; maximum 6 inches high with a minimum of one No. 2 reinforcing bar centered in the ring.
2. Fabricate in accordance with ASTM C478.
3. In general, provide manhole extensions on manholes in streets or other locations where a subsequent change in existing grade may be likely. Limit extensions to a maximum height of 12 inches.

E. Preformed Plastic Gaskets:
1. May be provided in lieu of mortar type joints.
3. Manufacturers:
   Hamilton Kent of Nevada, Sparks, NV; Kent-Seal No. 2.
   Henry Company, Houston, TX; Ram-Nek.

F. Source Quality Control:
1. Prior to delivery of any size precast manhole section to jobsite, conduct yard tests at point of manufacturer.
2. All test specimens shall be mat tested and meet permeability test requirements of ASTM C14.
3. Precast sections to be tested will be selected at random from stockpiled material to be supplied for the Project.

MANHOLE FRAMES AND COVER
A. Castings:
1. Tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.
2. Cast iron: ASTM A48 Class 30B.
4. Plane or grind bearing surfaces to ensure flat, true surfaces.

B. Cover:
   a. True and seat within ring at all points with the word SEWER in 2-inch raised letters. Provide water-tight, bolt-down cover where required by OWNER (Neenah R-1915 with anchor bolts, or equal).

   MORTAR
   A. Standard premixed in accordance with ASTM C387, or proportion 1 part Portland cement to 2 parts clean, well-graded sand that will pass a 1/8-inch screen.

   CLEANOUT FRAMES AND COVERS
   A. Castings:
      1. Tough, close-Grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and defects.
      2. Cast Iron: ASTM A48, Class 30B.
      4. Plane or grind bearing surfaces to ensure flat, true surfaces.

   B. Covers: True and seat within frame at all points.

   IMPORTED BASE MATERIAL
   A. Furnish Class II aggregate base per current Caltrans standard specification.

   EXECUTION
   GENERAL
   A. Remove and keep all water clear from the excavation during construction and testing operations.

   B. Place imported pipe base material on undisturbed earth; thoroughly compact with a mechanical vibrating or power tamper.

   INSTALLATION OF MANHOLES
   A. Concrete Base:
      1. Place or pour on compacted imported base material.
      2. Properly locate, ensure firm bearing throughout, and plumb first section.
      3. Pour in place.

   B. Sections:
      1. Thoroughly clean ends of sections to be joined.
2. Thoroughly wet joint with water prior to placing mortar.

C. Mortar Joints:
1. Place mortar on groove of lower section prior to section installation.
2. Fill joint completely with mortar of proper consistency.
4. Prevent mortar from drying out and cure by applying an approved curing compound or comparable approved method.
5. Do not use mortar mixed for longer than 30 minutes.
6. Chip out and replace cracked or defective mortar.

D. Preformed Plastic Gaskets: If used in lieu of mortar joints, install in accordance with manufacturer's instructions and the following:
1. Carefully inspect precast manhole sections to be joined.
2. Do not use sections with chips or cracks in the tongue.
3. Use only pipe primer furnished by gasket manufacturer.
4. Install gasket material in accordance with manufacturer's instructions.
5. Completed Manholes shall be rigid and watertight.

Extensions:
1. Install extensions as shown, to height not exceeding 12 inches.
2. Lay grade rings in mortar with sides plumb and tops level.
3. Seal joints with mortar as specified for sections, and make watertight.

MANHOLE INVERT

A. Construct with smooth transitions to ensure an unobstructed flow through manhole. Remove sharp edges or rough sections which tend to obstruct flow.

B. Where full section of pipe is laid through manhole, break out top section as shown and cover exposed edge of pipe completely with mortar. Trowel mortar surfaces smooth.

MANHOLE FRAMES AND COVERS

A. Install on top of manholes to positively prevent infiltration of surface or groundwater into manholes.

B. Set frames in bed of mortar with mortar carried over flange as shown.

C. Set tops of covers flush with surface of adjoining pavement or ground surface, unless
MANHOLE PIPING

A. Drop Assembly:

1. Extend pipe from the drop to a minimum of 3 feet, or as shown, beyond the manhole excavation into the trench, and connect to sewer pipe with an adapter.

2. Support lower drop elbow with concrete monolithically placed with manhole base.

3. Flexible Joints: Provide in pipe not more than 1-1/2 feet from manhole walls.

The following regulations shall also apply:

1. A standard drop manhole (Standard Drawing 503, 60-inch) shall be installed when the invert elevation of the incoming sewer is greater than two (2) feet higher than the outgoing sewer.

2. Where there will be more than thirty (30) degrees deflection between any inlet line and the outlet line of a manhole, the fall through the manhole shall be a minimum of 0.20 foot.

3. The angle of deflection between incoming and outgoing lines in a manhole shall not be greater than ninety (90) degrees. If the angle of deflection is greater than 90°, use two manholes.

4. Unless special arrangements are made, all lines connecting to existing manholes shall conform to the Standard Drawings for new manholes (Standard Drawing 500).

5. Change direction or size only at a manhole.

6. Minimum radius 300 feet with approval of Administrator.

B. Sewer Cleanout - A sewer cleanout (Standard Drawing 506) shall be installed at the terminus of a main sewer that will not be extended.

C. Test Fittings - All test fittings shall, unless otherwise approved, be tees or wye branches of the same size, type and quality as that of the line in which they are being installed. The branch of all test fittings shall be installed in an upright position.

D. Pressure Frame and Covers - When specified by the Administrator/Deputy Administrator, pressure (water-tight) frames and covers shall be installed where drainage conditions may cause storm waters to inundate sewer structures.

E. Modification of Structures - All structures to be remodeled shall comply with the Standard Drawings. Remodeling of any structure shall be specified and/or detailed on the plans and approved by the Administrator/Deputy Administrator prior to any remodeling work.

F. Special Structures - Trunk sewer manholes, siphons, pumping stations, and other unusual
structures require specific design approval by the Administrator/Deputy Administrator.

G. **Private Sewer Connections** - Private sewer mains must connect to the public main at a manhole.

4.04 **Accessibility**

A. All sewer easements through fenced areas must be provided with a 12-foot gate and keys, if locked.

B. All easements and access roads to easements must be a minimum 15-foot in width. Access roads shall be 12 feet wide.

C. Access must be available 24 hours per day, every day of the year.

4.05 **Lift Stations**

A. **General Requirements**

1. Lift stations will not be allowed where an alternative gravity route exists.

2. Design the lift station to serve the entire tributary flow at build-out densities conforming to the General Plan under peak hour and 24-hour flow rates.

3. Lift stations must be of the wet-well type, equipped with submersible pumps with quick coupling. Rail mounted.

4. Lift stations are not allowed within street rights-of-way.

5. Provide a paved access road to allow service vehicles to be parked off the street and clear of the sidewalks. Turnarounds may be required for stations constructed along heavily traveled streets. Provide service vehicle access to wet-well.

6. Provide a reinforced concrete base slab sized adequately to counteract buoyancy. Provide supporting design calculations and details.

7. Provide a single-surface pad over wet-well and the area supporting the generator and fuel supply tanks.

8. The wet-well shall be a minimum sixty (60) inches in diameter. Provide a resilient seat gate valve on the line into wet-well.

9. Provide 6-inch PVC emergency bypass system consisting of a suction line and a discharge line equipped with cam-lock connectors. Bypass suction line must extend to eight (8) inches above floor of wet-well and to eighteen (18) inches above finished grade at surface. Discharge line connects to force main through a full port ball valve and a check valve. Provide locking caps for both suction and discharge connectors. Adequately support all pipes.

10. Provide water service with reduced pressure backflow preventer where water service is available.
11. Provide calculations to determine the need for hydrogen sulfide suppression in force main.

12. SPECIFY FLYGT PUMPS, TESCO CONTROLS, SCADA REQ'MENTS?

B. Pumping Equipment
1. All pumps, motors, internal valves and piping, level indicators, control switches, ladders, and alarms shall be manufactured and assembled as a package. Supply and warranty shall be through one company.

2. The pumps shall be submersible, self-priming, vertical, centrifugal sewage pumps. Pumps shall be capable of passing a maximum solid, 2 1/2-inch diameter sphere.

3. Provide two matched pumps and controls to alternate lead and lag pump.

4. Furnish a spare duplicate pump.

5. Provide calculations used to determine the capacity of the wet-well and the specifications for the pump.

6. Provide hour meters for each pump.

C. Electrical Equipment
1. Provide free-standing electrical service, and transfer panel in a heavy duty NEMA 3-R Dead Face Control weather-proof box at least 48 inches above the ground. Provide 110-volt duplex GFI receptacles inside, plus light inside. All boxes shall be of corrosion resistant construction.

2. Provide receptacle connector for mobile generator which is equipped with an Appleton Electric Co. ADP1034D plug.

3. Provide OSHA-approved rubber mat in front of all control panels.

4. Provide ability to operate station with one pump removed for maintenance.

5. Provide hand-off-automatic (HOA) switch to operate pumps for testing.

D. Telemetry
1. Provide a standard telephone service capable of handling multiple alarms such as high/low, wet-well, flow, pressure, and intrusion.

E. Details Required On improvement Plans:
1. Site Plan. Locations of power pole, transfer switch, control panel, wet-well, ground slab, driveway, fencing, water service, emergency suction/discharge connections, and emergency electrical shut-off.

2. Wet-well: Influent piping (standard inside drop manhole); emergency suction line; bubbler line including connection hardware; water/alarm levels (pump on, pump off, low level, high level), redundant high water float switch.

3. Emergency Power Emergency power shall be either mobile or stationary as determined
by the Administrator/Deputy Administrator. Electrical details specified to include size and material of conduit, switch gear, telemetry compatibility. Electrical details must include power source, meter location, cabinetry, and grounding. Wiring diagrams must depict connection to and between PG&E, transfer switch, and emergency generator. A residential muffler shall be provided. A stationary emergency power unit/fuel tank shall be housed in a code-approved, block-constructed building.

5. Landscaping Plan Provide a landscape plan for approval by the District.

SECTION 5 PLAN APPROVAL AND PERMIT ISSUANCE

5-01 General
The procedure outlined in this section shall be followed for submittal, review, and approval of plans and permit issuance for sewer main extensions.

5-02 Plan Checking Deposit
The plan checking deposit shall be paid to Special Districts prior to any review of plans. This deposit is not refundable, but upon issuance of a mainline extension permit, the deposit will be credited against the total plan checking and inspection fees due under District Rules and Regulations.

5-03 Preliminary Review
To facilitate the processing and review of plans for main extensions, all of the following materials shall be submitted at least forty (40) days prior to the time at which approval of plans is desired.

A. Three (3) 24" X 36", blueline or blackline, complete sets of drawings, including sewer plans and profiles.
B. Three (3) complete sets of any required special specifications/provisions.
C. Three (3) copies of the Project Engineers preliminary cost estimates, signed and stamped by the Project Engineer.
D. Three (3) copies of maps and descriptions for any required easements (other than those to be dedicated on a subdivision final map).
E. If the project is a subdivision, submit two (2) copy of the final map including the proposed certificate page, and two (2) copy of the proposed grading plans.
F. Three (3) copies of calculations for system sizing.
G. Three (3) copies of all other engineering, soil, or other technical reports related to the project.

After submittal, the above materials will be reviewed by the Administrator/Deputy Administrator/Deputy Administrator. If there are any required corrections and/or recommended revisions, they will be noted on the plans, easements, etc., and one set will be returned to the Project Engineer for revisions and re-submittal. Where sewers are being designed for installation in existing city and/or County streets, the
Project Engineer shall submit the plans for the proposed work to the city and/or County for location and encroachment permit approval. This procedure will be repeated until all District requirements are met and the plans are ready for approval of the Administrator/Deputy Administrator and the Board of Supervisors.

5-04 Final Review and Approval

In order to obtain final approval, the Project Engineer shall submit the following materials, as revised in accordance with the above paragraph.

a. Four (4) complete sets of sewer Record Drawings, including plans and profiles, one (1) mylar plus three (3) sets of prints).

b. Four (4) complete sets of any required special specifications.

c. Two (2) copies of maps and descriptions for any required easements. (Submit two (2) copies for each grantor involved).

d. If the project is a subdivision, submit two (2) copies of the final map and two (2) copies of the grading plans (both in form to be presented to the City or County for final approval).

e. Any other pertinent plans, information or materials specifically required by the Administrator/District Engineer.

When all of these materials are received and given final review, the plans will be submitted to the Administrator/Deputy Administrator for approval. After approval of the plans, all copies will be signed by the Administrator/Deputy Administrator. The Administrator/Deputy Administrator will then retain two sets of plans. And return the original signed mylar to the Project Engineer for the Project Engineer's use.

Changed Conditions

In the event that any plan or field condition is encountered during construction that necessitates deviation from the approved plans, all work affected by the deviation shall be halted. The first solution will be to make a field change. If this is not possible due to the situation, then the plans shall be revised by the Project Engineer and resubmitted to the District for approval by the Administrator/Deputy Administrator. When revisions are required, the Project Engineer shall submit two (2) preliminary copies of the proposed revised sheets of the plans along with a letter explaining the recommended revisions and why they are required.

When the revisions are in approvable form, four (4) copies of the revised plan sheets shall be submitted for signature by the Administrator/Deputy Administrator, with distribution similar to the original plans. The Project Engineer shall be responsible for seeing that all revisions are appropriately shown on the record drawings for the project. In addition, the Project Engineer shall make corrections to improvement plans when errors or omissions are discovered following approval of the plans by the District.

5-06 Statement of Fees and Charges

During District review of the plans but prior to final approval, the Permit Center will prepare a Statement of Fees and Charges, which will be sent to the Project Engineer, detailing the fees and charges which must be paid and setting forth the required performance, maintenance, and payment bond amounts, and any other information or materials which may be required (other than approval of plans, specifications, etc.)
prior to issuance of the main extension permit.

5-07 Issuance of the Mainline Extension Permit

Written permission to construct the mainline extension will be granted only after all District requirements have been met, including: final approval of plans and specifications; payment of all appropriate fees and charges; posting of the required performance, maintenance, and payment bond amounts; acquisition of all required easements; and the filing of a permit application form, etc. No work shall be permitted to proceed until the mainline extension contract has been approved by the Board of Directors.

5-08 Subdivisions

Before approving the recordation of a subdivision final map, the city and/or the County in which the subdivision lies will require a letter or notification from the District stating that plans and specifications for necessary sewerage facilities to serve each lot in the subdivision have been approved by the District.

5-09 Items to Consider Before Submitting Plans

The following is a general list of items which should be considered by the Project Engineer before submitting plans for review and approval by the District.

a. Have arrangements been made for the payment of the plan checking deposit?

b. Are there any special details needed, such as special drawings, notes, and/or specifications to supplement the Standard Specifications?

c. Is the property to be sewered within a District sanitation zone?

d. If the property is not in a District sanitation zone, has the owner requested in writing that his property be annexed and submitted the required fees?

e. Can the proposed sewerage system provide service to properties other than those arranging for the Installation? If so, have full provisions been made for the additional service or future extension?

f. Has approval been secured from Lake County, the City of Clearlake, the City of Lakeport or other city having jurisdiction for all sewer line crossings of storm water channels?

g. Are all necessary easements prepared?

h. Are special permits and/or licenses required in connection with the work?

SECTION 6 CONSTRUCTION ENGINEERING

6-01 General

All construction work and support work for construction shall be in accordance with the applicable sections of the Standard Specification for Public Works Construction and these Design and Construction Standards for Sanitation Facilities, as modified below.

6-02 Staking Requirements

The Project Engineer shall be responsible for providing all necessary field surveys and construction
staking. Grade and alignment stakes shall be set in advance of any trenching or excavation and, in general, stakes for straight sewers shall be set at 25 to 50-foot intervals, depending upon topography. Intervals of 25 feet or less shall be used through all horizontal and vertical curves. Stakes shall be appropriately marked to show the station, the offset, and the cut to sewer invert.

6-03 Sewer lateral Location

Prior to installation of lateral sewers, the lateral location and elevation at the property line shall be staked and flagged in the field by the Project Engineer.

6-04 Survey Authorization and Responsibility

When a survey is to be made on private property for a public sewer, permission of the property owner shall be obtained by the Project Engineer prior to entry. Neither the District nor the County of Lake will be answerable or accountable in any manner for any loss or damage that may come about during or as a result of survey work by others.

Upon completion of the work and prior to acceptance by the District, the Project Engineer shall provide record drawings to the District. Record drawings shall consist of all details shown on the original approved plans, corrected and/or expanded to reflect all design or construction changes from the approved plans. Particular attention should be paid to changes in the following items:

A. Sewer line and structure locations
B. Surface and invert elevations of structures
C. Slope, size, type of pipe, and length between structures
D. Wye and lateral locations (Total distance from the downstream manhole to the wye, plus the length of the lateral)

The Project Engineer shall submit a preliminary copy of the record drawings for review by the District. After review and approval by the inspector or other District representative, the Project Engineer shall submit one (1) complete set of original mylars and two (2) prints, noted and signed by the Project Engineer as "Record Drawings" (see Section 3-02). The Record Drawing Statement on the cover sheet shall be signed, stamped and dated by the Project Engineer.

If any part of the drafting work is compiled by electronic methods, the Project Engineer shall also submit the record drawing in digital form on high density DVD compact disk compatible with Auto Cad current release and readable on a PC operating under MS Windows-7.

PART C - DISTRICT CONTRACT REQUIREMENTS

SECTION 7 PERMITS, LICENSES, AND BONDS

Section 7 covers all work that is not performed as a District project, including, but not limited to, land developments.

7-01 Permits

All work performed in relation to and for connection to a District sewer system requires a specific permit in
accordance with District rules and regulations. In the case of District project work, the contract is considered to be the District's permit for all work included in the contract under District jurisdiction and as such is not covered by the special terms or conditions of this document.

A. **Main Sewer, Structure, and Manhole Installation Permits** - Engineered plans are required in accordance with Sections 1 through 6 of these Standards.

B. **Sewer lateral, and Building Sewer Connection Permits** - Location plans are required when a 4-inch or larger sewer lateral is to be installed and at any other time when specifically required by the Administrator/Deputy Administrator.

7-02 Licenses

Contractors performing work requiring permits by the District shall be licensed with a Class A General Engineering Contractor License or C-34 for underground projects by the State of California (Chapter 37, Statutes of 1939, as amended). Work on public property, streets, roads, and other rights-of-way shall be performed only by duly licensed contractors. Property owners may perform sewer lateral work on their own property.

7-03 Bonds

Prior to the issuance of a permit for a sewer main extension (public sewer construction), the applicant shall furnish the District a faithful performance bond, cash, or other improvement securities acceptable to the District in the amount of the total estimated cost of the work as determined by the District. Such faithful performance bond, cash deposit, or other improvement security shall be conditioned upon the performance of the work in accordance with the terms and conditions of the permit and, unless more stringent requirements are otherwise specified by the Administrator/Deputy Administrator, shall warrant the correction of faulty workmanship and the replacement of defective materials for a period of one (1) year from and after the date of acceptance (filing of the Notice of Completion) of the work by the Board of Supervisors.

Prior to the issuance of a permit for a sewer main extension, the applicant shall furnish the District a labor and materials bond, cash deposit, or other security acceptable to the District, in the amount of the total estimated cost of the work as determined by the District. Such labor and materials bond, cash deposit, or other security shall be provided for the purpose of guaranteeing payment for all labor and materials performed and used on the project. A separate bond for a sewer main extension will not be required when an equivalent security is held by the County of Lake.

7-04 OSHA Permit

If the work requires an OSHA permit, the permit shall be kept at the job site and a copy provided for the District file.

PART D - CONSTRUCTION REQUIREMENTS

SECTION 8 CONTROL OF WORK

8-01 Reference Standards and Specifications
This part of the Design and Construction Standards for Sanitation Facilities will cover both general and technical requirements for construction of sanitation facilities.

All work, unless otherwise indicated on the drawings or specified, shall be accomplished in accordance with the Standard Specifications. The words "Standard Specifications" mean the Standard Specifications for Public Works Construction, current edition, in its entirety, prepared by the Southern California Chapter of the American Public Works Association and Associated General Contractors of California, and published by Building News, Inc., Box 3031, Terminal Annex, Los Angeles, California 90051.

Where references are made to specifications other than the Standard Specifications for portions of the work, such references shall apply only to construction methods and materials used in said portions. Any reference to measurement and payment or to extra work provisions in such referenced specifications shall not apply, unless otherwise specifically stated in these Special Provisions.

Working titles having a masculine gender, such as "workmen" and "journeyman" and the pronoun "he," are utilized in the specifications for the sake of brevity, and are intended to refer to persons of either sex.

8-02 Conformity with Plans and Allowable Deviations

Finished surfaces in all cases shall conform with the lines, grades, cross-sections, and dimensions shown on the approved plans. Deviations from the approved plans and working drawings, as may be required by the exigencies of construction, will in all cases be determined by the Administrator/Deputy Administrator and authorized in writing.

8-03 Survey Work

A. Survey requests: Survey requests shall be made directly to the Project Engineer for all work to be done by the Developers engineer or by the Contractor. For District projects, Contractor is referred to Section 2-9.3 of the Standard Specifications for information regarding survey requests. The Contractor shall notify the Administrator/Deputy Administrator in writing at least three (3) working days before survey services will be required in connection with the laying out of any portion of the work. Incomplete or illegible survey requests, or requests for surveys without proper notification, may result in delayed surveys. No extension of time will be allowed due to such delays.

B. Survey of Project Engineer: Where survey for this work is done by the Project Engineer or his designated representative or subcontractor, a copy of various survey notes, such as cut sheets and line surveys, shall be provided to the District prior to the start of work. If any part of the survey work is compiled by electronic methods, the Project Engineer shall provide coordinate points and any data to the District in digital form on magnetic media. Data shall be on high density DVD compact disc in a format compatible with AutoCad current release and readable on a PC operating under MS-Windows 7.

A control diagram over a topographic base shall be provided showing the arrangement of existing basin control, horizontal and vertical; recovered and utilized for origin and closure, the arrangement of monumented control network; a table of adjusted coordinates; elevations and descriptions for all stations; a graphic scales; gild ticks at 10-inch spacing and north arrow; and swing-tie sketches for local recovery of
traverse stations. The control diagram shall be drawn on 4-mil Mylar, 24-inch x 36-inch in size.

8-04 Tests Results

When various tests are done in connection with the work, such as concrete, compaction, and other material tests by the Project Engineer, a copy of the test results shall be provided to the District as they become available (within 24 hours).

8-05 District-Furnished Materials

Contractor shall furnish all materials required to complete the work, except such materials and/or equipment as are designated on the plans, stated in the permit, or as stated in the user agreements to be furnished by the District.

Upon written request of the Contractor, materials to be furnished by the District shall be delivered to the project site in accordance with the time schedule agreed upon or designated in the Special Provisions. The materials shall be unloaded and hauled to the site of the work by the Contractor. The cost of handling and placing all materials after they are delivered to the Contractor shall be considered as included in the contract prices. The Contractor shall be held responsible for all materials delivered to him, and deductions will be made from any monies due him to make good any shortages and deficiencies which may occur after such delivery or for any demurrage charges due to delinquency in unloading.

8-06 Salvage of Existing Materials

Unless otherwise indicated in the Special Provisions or permitted by the Administrator/Deputy Administrator, all old castings for manholes, cleanouts, etc., and any other salvage construction materials which have been a part of the District's sewerage system may be claimed by the District and if so claimed such materials shall be stockpiled at a designated location at the job site. District forces will remove such salvaged materials.

8-07 Crossing Under Railroad, Highway, or Utilities

When any railroad, highway, or private or public utility is crossed, all precautionary construction measures required by the owner of the railroad, highway, or utility shall be followed by the Contractor. Unless otherwise specified, the Contractor shall obtain and pay for all necessary permits, licenses, bonds, and fees required for the crossing and give all notices necessary and incident to the work.

8.08 Testing of Sewers

A. Water Testing: For either exfiltration or Infiltration test, the maximum leakage shall not exceed 50 gallons per inch of pipe diameter per mile per 24 hours as measured over a period of 30 minutes minimum. Refer to Standard Drawing 514, Water Test Allowable Leakage, Sanitary Sewer. 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 Administrator/Deputy Administrator, at no additional cost to the District. After repairs have been completed by the Contractor, the line shall be retested as specified above, all at no cost to the District.
Generally, all testing shall be done after all trenches are compacted, subgrade is completed, and the curb/gutters have been installed.

In the event that the exfiltration test prescribed above is impractical due to wet trench conditions, those portions of the sewer line where such conditions are encountered will be tested for infiltration using the method described in Section 306-1.4.3 of the Standard Specifications. The Administrator/Deputy Administrator shall determine whether the exfiltration or infiltration test will be used.

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

B: **Air Testing:** Low pressure air testing may be used in lieu of water testing at the option of the Contractor.

The following procedure shall be used for air testing.

1. Clean pipe to be tested by propelling a snug fitting inflated rubber ball through the pipe with water. Remove any debris.
2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
3. If the pipe to be tested is submerged in groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to groundwater submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
4. Add air slowly to the portion of the pipe installation under test until the internal pressure is raised to 4.0 p.s.i.g.
5. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
6. After an internal pressure of 4.0 p.s.i.g. is obtained, allow at least two (2) minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
7. After the two (2) minute period, disconnect the air supply.
8. When pressure decreases to 3.5 p.s.i.g., start stopwatch. 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. Refer to Standard Drawing 515, Air Test Allowable Leakage, Sanitary Sewer.

C. **Television inspection:** The Contractor shall perform a closed-circuit television inspection of all newly constructed sewers. A video tape of the television inspection along with a written report shall be produced and delivered to the Administrator/Deputy Administrator in color DVD format. A video log (voice or data display) shall include the reach; locations of stop/start; deficiencies, laterals, and length of reach; time; date; and name of operator. Television inspection shall be part of the cost of construction. The video tape and report will be reviewed by the District and the Contractor shall be notified verbally and in writing
within 48 hours 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.

The following conditions shall exist prior to the television inspection.

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

When the above work has been completed, the Contractor shall notify the Administrator/Deputy Administrator 48 hours in advance of the date for television inspection.

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

1. Off grade - 0.08 foot, or over, deviation from grade.
2. Joint separations over 3/4-inch.
3. Offset joints.
4. Chips in pipe ends — none more than 1/4-inch deep.
5. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, roots, etc.).
6. Infiltration.
7. Debris or other foreign objects.
8. Other obvious deficiencies when compared to Approved Plans and Specifications and these Standards and Standard Drawings.

8-09 Testing of Sewer Force Mains

Testing of sewer force mains shall comply with Section 306-1.4 of the Standard Specifications for testing Pressure Sewers.
APPROVED MATERIALS LIST

FOR USE WITH THE

DESIGN AND CONSTRUCTION STANDARDS
FOR
SANITATION FACILITIES

KELSEYVILLE COUNTY WATERWORKS
DISTRICT NO. 3

SEPTEMBER 2013

Lake County Special Districts Administration
230 North Main Street, Lakeport, CA 95453
(707) 263-0119
APPROVED MATERIALS LIST INFORMATION

Design and Construction Standards for Sanitation Facilities

This document contains the official listing of approved materials and/or suppliers and is not intended to be an endorsement nor all-inclusive or exclusive. The approved list is based upon the products generally available or in use by local contractors. Other manufacturers' products may be approved upon submission of product information and samples (returnable) for testing purposes. Due to the nature of the typical products proposed for use, a time cannot be set for submission, testing, and potential approval. Therefore, if a product is proposed for use which does not appear on the approved list, it is suggested that the District be contacted as soon as possible to arrange for review and/or testing of the product.

Other products will be reviewed and/or tested for conformance with recognized standards such as AWWA, ASTM, and performance history. Such products must be approved for use by the District Administrator as an “Approved Equal”.

PIPE MATERIALS LIST

<table>
<thead>
<tr>
<th>Material</th>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC</td>
<td>ASTM D3034</td>
<td>SDR-35</td>
</tr>
<tr>
<td>ABS</td>
<td>ASTM D2751</td>
<td>SDR-35</td>
</tr>
<tr>
<td>VC</td>
<td>ASTM C700</td>
<td></td>
</tr>
<tr>
<td>DIP</td>
<td>ANSI/AWWA C-151/A2151</td>
<td>Thickness Class 50, 350 psi minimum</td>
</tr>
<tr>
<td>DIP</td>
<td></td>
<td>DIP must have a polyethylene film encasement per ANSI/AWWA C-105/21.5</td>
</tr>
</tbody>
</table>
LIST OF APPROVED ITEMS
FOR USE WITH SEWER SYSTEM CONSTRUCTION
STANDARDS:
July 2009

Effective: September 2013

Standard Drawing 500 - Standard Concrete Manhole for Sanitary Sewer
Precast manhole barrels
Jensen Precast
Hanson Concrete Products, Inc.
Cook Concrete Products, Inc.
Central Precast Concrete, Inc.
Flexible Couplings
APAC 313 Series
Powerseal 3501 Series
Rockwell 441 Series
Romac 501 Series
Connectors
Cast in PVC Coupler
"A LOK" or "A LOK X-CEL"
Note: Special Districts will require shop drawings submitted for approval.

Manhole Interior Coatings
Koester NB1
Tegraproof
Xypex

Manhole Interior Patch Material
All Crete 20
All Patch 5
All Patch 20
Rapid Set Mortar Mix
Rapid Set Cement All
SikaSet Mortar
Speed Crete Red
Speed Crete Blue
Xypex Patch and Plug

Standard 504 - Outside Drop Manhole
Couplings for drop connections
APAC 300 Series
Dresser Style 253
Power Seal 3500 Series
Romac 501 Series
Smith-Blair 441 Series

Standard 505 - Rodding Inlet
Rim and Cover
D & L Supply H8026 CPH
South Bay Foundry SBF 1257

Standards 506 - Temporary Mainline Cleanout
Rim and Cover
D & L Supply H6531
South Bay Foundry SBF-1249

Standard 512 - Manhole Frame and Cover
Manhole Frame and Cover
D & L Supply A-1024M
South Bay Foundry SBF 1900 CPH

Manhole Frame and Cover w/ bolt down cover
D & L Supply E-1928
South Bay Foundry SBF 1900 BS

Standard 513 - 4" & 6" Sewer Service Lateral & Cleanout
Cleanout Box 4"
D & L Supply M-8030
Geneco CC4 w/Lid marked sewer
South Bay Foundry B5230
Cleanout Box 6"
Geneco CC6 w/Lid marked sewer
Flush mount "T" Cone Plug ETCO CO-402
Flush Plug (MPT) 4" & 6"
Multi Fittings 040492 (283440) - 4"
040958 (283060) - 6"
Female Adapter (HxFPT) 4" & 6"
Multi Fittings 040949 (282541) - 4"
040952 (282560) - 6"
Saddle or Taps Geneco Sealitite
Tap-tite Style "CB" Sewer Saddle
Romac Couplings Calder Couplings
Joints, Inc. 1051-44, 1056-44, 1002-44
Fernco 156-44
Indiana Seal Band- Seal Couplings
Mission Flex- Seal Couplings

Backflow Preventers
Clean Check

Standard 516, 517 - Sewer-Water Main Crossing Details
Miscellaneous Pipe Installation Details
Couplings
APAC 300 Series
Dresser Style 253
Fernco 1000 Series
Joints, Inc. Calder Couplings
Maxifit MaxiDaptor
Mission Band- Seal Couplings
Powerseal Flex- Seal Couplings
Romac 3500 Series
501 Series
Smith-Blair 441 Series
Tyler Pipe 5-144L
U.S. Pipe U-584

Standard 519 - Two Stage Grease Interceptor
Pre Manufactured Tanks
Jonson Precast
McNothingham Concrete Precast
Selvage Concrete Products

Standard 520 - Three Stage Sand and Grease Interceptor
Pre manufactured Tanks
Central Precast Company (SRCAST)
McNothingham
Selvage Concrete Products

Standard 521 - Sampling Manhole Exterior Use
Precast Base
Aluminum Floor Hatch
FHA-H20 Load Angle Frame
Johnson Products
Nystrom

Standard 522 - Sampling Box Building Interior
Precast Box
Aluminum Floor Hatch
FHA-H20 Load Angle Frame
Johnson Products
Nystrom

Standard 523 - Three Stage Grease Interceptor
Tanks
Central Precast Company (SRCAST)
Johnson Products
McNothingham
Selvage Concrete Products

Standard 524 - Control Sampling Manhole
Precast Box
Aluminum Floor Hatch

Standard 526 - Recreational Vehicle Disposal Facility
Cleanout Box & Cover
See Std. 513

Hydromechanical Grease Interceptor
Highland Tank "GreaseStopper" model AGI 15 to AGI 100
Thermaco "Big Dipper"

APPROVED:

MARK DELLINGER
Administrator- Lake County Special Districts
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>313</td>
<td>Standard Trench Details</td>
</tr>
<tr>
<td>500</td>
<td>Standard Manhole for Sanitary Sewer</td>
</tr>
<tr>
<td>502</td>
<td>Shallow Manhole / Junction Structures</td>
</tr>
<tr>
<td>503</td>
<td>Inside Drop Manhole Detail Sanitary Sewer</td>
</tr>
<tr>
<td>504</td>
<td>Outside Drop Manhole Detail Sanitary Sewer</td>
</tr>
<tr>
<td>505</td>
<td>Rodding Inlet</td>
</tr>
<tr>
<td>506</td>
<td>Mainline Cleanout</td>
</tr>
<tr>
<td>507</td>
<td>Abandoned Pipe Plug</td>
</tr>
<tr>
<td>508</td>
<td>Abandoned Manhole</td>
</tr>
<tr>
<td>512</td>
<td>Manhole Frame and Cover</td>
</tr>
<tr>
<td>513</td>
<td>4&quot; &amp; 6&quot; Sewer Service Lateral and Cleanout</td>
</tr>
<tr>
<td>514</td>
<td>Water Test Allowable Leakage Sanitary Sewer</td>
</tr>
<tr>
<td>515</td>
<td>Air Test Allowable Leakage Sanitary Sewer</td>
</tr>
<tr>
<td>516</td>
<td>Discharge for Private Force Main</td>
</tr>
<tr>
<td>517</td>
<td>Sewer – Water Main Crossing Details</td>
</tr>
<tr>
<td>518</td>
<td>Miscellaneous Pipe Installation Details</td>
</tr>
<tr>
<td>519</td>
<td>PVC Sewer Pipe Deflection Mandrel</td>
</tr>
<tr>
<td>520</td>
<td>Two Stage Grease Interceptor</td>
</tr>
<tr>
<td>521</td>
<td>Three Stage Sand and Grease Interceptor</td>
</tr>
<tr>
<td>522</td>
<td>Sampling Manhole Exterior Use</td>
</tr>
<tr>
<td>523</td>
<td>Sampling Manhole Interior Use</td>
</tr>
<tr>
<td>524</td>
<td>Three Stage Grease Interceptor</td>
</tr>
<tr>
<td>525</td>
<td>Control Sampling Manhole</td>
</tr>
<tr>
<td>526</td>
<td>Recreational Vehicle Disposal Facility</td>
</tr>
<tr>
<td>Page</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>527</td>
<td>Trench Dams</td>
</tr>
<tr>
<td>528</td>
<td>Mobile Home Sewer Connection</td>
</tr>
<tr>
<td>529</td>
<td>Mobile Home Sewer Connection with Backflow</td>
</tr>
<tr>
<td>530</td>
<td>Backwater Check Valve Installation Detail</td>
</tr>
<tr>
<td>531</td>
<td>Individual Pumping Detail System Detail</td>
</tr>
<tr>
<td>532</td>
<td>Building Cleanout Detail at Building (Flood Plain Areas)</td>
</tr>
</tbody>
</table>
NOTES:

1. When manholes are installed in unimproved areas, the top of the cover shall be a min of 1 foot above grade.

2. Min of one 3" grade adjustment ring. Max height of grade adjustment rings = 20". Alternately, contractor may cast grade adjustment rings in place.

3. Set all barrel sections & taper sections in plastic gasket, Ram-nek or approved alternate. Typical joint use (1) 3/4"x 2-1/2" Ram-nek seal, (2) seals in high water table areas.

4. Cone section (taper) must be concentric for 48" manhole or eccentric for 60" manhole unless otherwise specified and approved by the Administrator.

5. After lower ring section is set, break out top half of pipe flush with inside face of M.H. wall and construct shelf and u-shaped channel. Make elevation changes gradually and directional changes with smooth curves. Slope and size of channels shall match upstream and downstream pipes. Manhole channels with a horizontal change in direction of 30° or more shall have a minimum drop of 0.1 ft across the manhole or shall match the slope of the pipe, whichever is greater.

6. Poured-in-place base shall be poured full thickness on undisturbed soil.

7. Standard manhole barrel section per ASTM C478.

8. 48" I.D. M.H. to be used for sewer mains less than 18". 60" I.D. M.H. to be used for all trunk and collector sewers 18" to 48" or where drop fittings are used.

9. Flexible pipe coupling is required on all pipe other than SDR 35 PVC pipe. Flex coupling to be installed in mainline trench and out of manhole excavation.

LAKE COUNTY SPECIAL DISTRICTS
POURED / CAST IN PLACE CONCRETE MANHOLE for SANITARY SEWER

SCALE: NONE DATE: MAY, 2009

MANHOLE BASE
CHANNELIZATION PLAN AND LOCATION OF ECCENTRIC MANHOLE COVER
NOTES:
1. AC thickness to match existing or 3' Min., whichever is greater. AC to be placed in lifts not exceeding 2' in thickness. AC to be Type A or B, 1/2' Max. Medium, per CALTRANS Standard Specifications, latest edition.
2. When slurry cement backfill is used in paving areas, Class 2 aggregate base may be eliminated.
3. Sand bedding must be leveled and compacted prior to backfilling.
4. If trench width is less than 12', slurry cement backfill shall be used.
5. Select backfill material as approved by Special Districts or Public Works if trenching within Public Right of Way.

LAKE COUNTY
SPECIAL DISTRICTS

STANDARD TRENCH DETAILS
TYPE "A" MANHOLE

Concrete collar
(See Std. 500)

Frame and cover
(See Std. 512)

Concrete collar
(See Std. 500)

Cone section
to have 24" top and 48" base opening

1'-0" Min.
2'-1" Max.

3" - 6" #

CONCRETE BASE

(See Std. 500 note 6)

1"-6" Max.

2'-2" Min.
3'-3" Max.

15" or
24"

Cone section

INSIDE PIPE DIA.

1 - 3" Grade ring
(minimum)

INSIDE PIPE DIA.

CONCRETE BASE

FOR 48" MANHOLE

TYPE "B" MANHOLE

SHALLOW MANHOLE DETAILS

NOTE - See Std. 500 for typical construction details

NOTE - Type "A" Manhole to be installed only where specifically approved
by the Administrator.

See Note 6 for
Channelization

Remove top half of pipes in manhole

Sewer Main

(See Std. 500)

Min. 6"

Note 10

Max. 12"

Lateral

CONCRETE BASE

ELEVATION SECTION

JUNCTION STRUCTURE FOR MULTIPLE LATERALS

NOTES:

1. An approved water stop shall be installed on all pipe entering or leaving the manhole and centered under manhole well as shown.

2. Generally, the elevations of the top of all pipes entering the manhole base block shall be the same.

3. The maximum number of laterals to be connected to a manhole is (4) four.

4. See Std. 500 for manhole construction details.

5. The channels shall be formed to provide smooth flow through the manhole to the satisfaction of the Administrator.

6. Channels and laterals through the exterior of the base shall be constructed radially.

LAKE COUNTY
SPECIAL DISTRICTS

SHALLOW MANHOLES

JUNCTION STRUCTURES
FOR MULTIPLE LATERALS

SCALE: NONE
DATE: MAY, 2009

OWN:

APPROV.:

FILE NO.

STD.-502
NOTES: New Construction

1. Manholes constructed using this standard shall be 60" in diameter and installed in conformance with Std. 500. Use 72" MH where there are two drop connections.

2. Enclose elbow in concrete. Form smooth channel with sweep to manhole flowline.

3. Install double waterstop in accordance with manufacturer’s instructions as shown.

4. PVC pipe and fittings shall have same nominal size and SDR rating as incoming pipes.

NOTES: Repairs or Tie-in

Inside Manhole Drop to be used only in the following conditions:

1. When excavation depth requires shoring per OSHA standards.
2. To avoid utilities.
3. Other conditions on approval of Administrator.

LAKE COUNTY
SPECIAL DISTRICTS
INSIDE
DROP MANHOLE

SCALE: NONE  DATE: MAY, 2009
DRAWN: SS  FILE NO.  STD.-503
CHECK: PP
NOTES

1. Ductile iron pipe shall be pressure class 350 per AWWA C151.
2. Pipe and fittings shall be furnished with push-on or mechanical joints. Fittings shall conform to ANSI/AWWA C110/C153.
3. To be installed only where specifically approved by the Administrator.
4. Drop inlet pipe and fittings shall be the same size as the incoming sewer main.
5. See Std. 503 for standard inside drop installation.
6. Install double waterstop in accordance with manufacturer's instructions as shown.
7. Form smooth channel with sweep to manhole flowline.
Plastic mechanical gripper plug required.

1" clear from outside wall of pipe to allow for gripper plug tabs.

Sanitary sewer riser pipe shall be placed on bedding material as shown on Std. 313.

PVC, DIP, or VCP pipe to match sewer main.

Note: To be used for main sizes 10" or less and where sewer main will not be extended.
APPROVED BOX & COVER
See Engineer's Approved List.

NOTES:
1. To be used where a sewer main has been stubbed out for future extension.
2. To be used only when specifically authorized by the Administrator.
3. Valve box lid shall be marked "sewer".
4. If depth is less than 3 feet, use Std. 505.

LAKE COUNTY
SPECIAL DISTRICTS
MAINLINE CLEANOUT

SCALE: NONE   DATE: MAY, 2009
DRAWN: SS   APPROVED
CHECKED: PP   FILE NO.  STD.- 506
NOTES:

1. Pipe plugs shall be installed to the satisfaction of the Administrator.

2. Abandoned pipes, 12" and larger, shall be broken into every 50' and shall be filled completely with sand slurry.
NOTES:

1. Remove frame, cover, taper and barrel sections as required to a minimum of 3' below finished grade.

2. After plugging all pipes in manhole, the remaining portion of the barrel section and all voids created by the removal off the upper portions of the manhole, shall be backfilled and compacted to 90% relative density. Use trench backfill or pipe bedding material per Std. 313.
NOTES:

1. Specify sanitary sewer when ordering.
   All castings shall be dipped in approved ASPHALTUM or BITUMINOUS Paint.

2. All material used in manufacturing shall conform to A.S.T.M. designation

3. Minimum weight components:  
   Cover – 130 pounds  
   Frame – 135 pounds

4. Bolt down covers are required on all sewer mains located
   in easements, on school grounds, through parks, and
   on any trunk sewers larger than 12" in diameter.
   Coat the bolt threads on the final bolt up with
   anti-seize compound or teflon based pipe dope.

APPROVED MANHOLE FRAME & COVER
See Approved Material List
NOTES:
1. The sewer service lateral shall be of sufficient depth to adequately serve the building site, and in no case shall be less than 3 ft. deep at the cleanout unless otherwise authorized by Special Districts.
2. Cleanout must be installed within the Public Right of Way or P.U.E. Cleanout to be installed 18" from face of curb or 12" max. behind sidewalk. Where service is in driveway, install cleanout behind apron.
3. In cases where installation conflicts with existing facilities, contractor shall verify alternate location with Special Districts prior to installation.
4. Min. 2% slope for 4" laterals and any 1% slope for 6" laterals unless approved by Special Districts.
5. A min. of 12" when connecting to existing sewer lateral or extend to 12" behind P.U.E. or sidewalk for new construction.
6. For new construction, install cap or plug at end of service lateral.
7. Lateral material shall be PVC SDR 35, ABS Schedule 40, or Ductile Iron Pipe.
8. Cleanout components shall be the same size as the lateral.
9. Tap fittings on mains smaller than 12" may be used only under the approval of Special Districts.
10. Backwater Valve and Box shall be installed where the lowest plumbing fixture is less than 1 ft. above the nearest up-grade manhole cover, or flushing branch of the sewer. Installation shall be on owners' property, as near as possible to the property line.

LAKE COUNTY
SPECIAL DISTRICTS

4" & 6" SEWER
SERVICE LATERAL
AND CLEANOUT

SCALE: NONE | DATE: JAN. 2009

INN SS | APPROVED | FILE NO.
DM PP | | TID-513
<table>
<thead>
<tr>
<th>PIPE DIAMETER (IN.)</th>
<th>MINIMUM TIME (MIN:SEC)</th>
<th>LENGTH FOR MINIMUM TIME (FT.)</th>
<th>TIME FOR LONGER LENGTH (SEC.)</th>
<th>SPECIFICATION TIME FOR LENGTH (L) SHOWN (MIN. SEC.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 FT.</td>
<td>150 FT.</td>
</tr>
<tr>
<td>4</td>
<td>3:46</td>
<td>597</td>
<td>0.380L</td>
<td>3:46</td>
</tr>
<tr>
<td>6</td>
<td>5:40</td>
<td>398</td>
<td>0.854L</td>
<td>5:40</td>
</tr>
<tr>
<td>8</td>
<td>7:34</td>
<td>298</td>
<td>1.520L</td>
<td>7:34</td>
</tr>
<tr>
<td>16</td>
<td>17:00</td>
<td>133</td>
<td>7.692L</td>
<td>17:00</td>
</tr>
</tbody>
</table>

* PRESSURE AIR TESTING SHALL BE DONE IN ACCORDANCE WITH THE "UNI-BELL PVC PIPE ASSOCIATION" BULLETIN NO. UNI-B-6-90, USING TABLE ABOVE.
NOTES

1. Must be used for all private sewage lift station discharges. No discharges may be made directly to the collector sewer, trunk sewer, or manhole.

2. Any alternate design must be approved by the Administrator.

3. Construction details, slope and materials conform to Std. #513.
1. All installations shall conform to the State of California Dept. of Health Services "Criteria For The Separation of Water Mains & Sanitary Sewers".

2. This Standard applies to pipes less than 24" in diameter. All crossings of larger diameter shall be as approved by the Administrator.

3. All new Ductile Iron shall be wrapped in polyethylene.

4. Per State Std.'s, a min. 4" clearance is required where sewer crosses below a water main. Where there is 1" or more vertical clearance, no special installation is required.

5. Any pipe/pipe crossings with less than 6" vertical clearance shall be padded with styrofoam, felt expansion joint material, or other expansive materials between pipes as approved by the Administrator.

NOTES:

"Approved Couplings"
See Approved Material List
**NOTES:**

1. 1" minimum vertical clearance is required between pipes. Where clearance is less than 6", install felt expansion material or styrofoam between pipes.

2. This installation detail is required only if clearance is less than 1".

3. Ductile Iron pipe shall be encased in polyethylene film.
### NOTES:

1. Mark all materials with ASTM specification number, SDR number and deflection.

2. The 1/2" Bar Stock on edge provides clearance to pass small amounts of soil which may be in pipe.

3. Mandrel diameter has been calculated based on section 306-1.2.12 of the "Greenbook" Standard Specifications for Public Works Construction and or dimensions given in Table 1 of ASTM Standard D3034.

4. Plate diameter shall be 1" less than the mandrel diameter.

### Table: Nom. Pipe Dia. L SDR 35 SDR 26

<table>
<thead>
<tr>
<th>Nom. Pipe Dia.</th>
<th>L</th>
<th>SDR 35</th>
<th>SDR 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6&quot;</td>
<td>5.619</td>
<td>5.503</td>
</tr>
<tr>
<td>8</td>
<td>8&quot;</td>
<td>7.524</td>
<td>7.366</td>
</tr>
<tr>
<td>10</td>
<td>10&quot;</td>
<td>9.405</td>
<td>9.207</td>
</tr>
<tr>
<td>12</td>
<td>12&quot;</td>
<td>11.191</td>
<td>10.961</td>
</tr>
<tr>
<td>15</td>
<td>15&quot;</td>
<td>13.849</td>
<td>13.559</td>
</tr>
</tbody>
</table>
1. Install Interceptor per manufacturer's specifications.

2. Pipe and fittings to be 4" schedule 40 PVC DWV.

3. Grease interceptors shall be located outside of buildings in a location accessible to wastehauler pumper. Location subject to the approval of the Administrator and Lake County Environmental Health Director.

4. Tank capacity to be determined at the time of permit application.

5. Alternate design by a Registered Engineer may be substituted for review by the County.

6. Interceptor to be used in conjunction with "Sampling Manhole" per Std. 522.

7. Stainless steel clamp and bolts 3'-0" o.c. max. (typ.) min. 2 req'd.

8. A waterstop consisting of a standard manhole adapter gasket as supplied by the pipe manufacturer shall be grouted into the interceptor wall near the center of the inlet and outlet walls.

9. Place 3" min. bedding material per Std. 313.

10. Concrete slab to extend min. 24" beyond all sides of tank in traffic areas.

11. Install Interceptor per manufacturer's specifications.

12. Pipe and fittings to be 4" schedule 40 PVC DWV.

13. All surface water must drain away from manholes.

14. All waste must enter through inlet fittings only.

15. Protective coating shall cover all internal surfaces and meet the criteria of ASTM-309.
Notes:

1. Pre manufactured tank shall be per Approved Material List.
2. All grease interceptors shall be located outside public right-of-way except with written approval of the Director of Public Works.
3. Grease interceptors shall be located outside of buildings in a location accessible to wastehauler pumper. Location subject to the approval of the Administrator and the Lake County Environmental Health Director.
4. Tank capacity to be determined at the time of permit application.
5. Alternate design by a Registered Engineer may be substituted for review by the Administrator.
6. Interceptor to be used in conjunction with "Sampling Manhole" per Std. 522.
7. Stainless steel clamp and bolts 3'-0" o.c. max. (typ.) min. 2 req'd.
8. A waterstop consisting of a standard manhole gasket as supplied by the pipe manufacturer shall be grouted into the interceptor wall near the center of the inlet and outlet walls.
9. Place 3" min. bedding material per Std. 313.
10. Concrete slab to extend min. 24" beyond all sides of tank in traffic areas.
11. Install interceptor per manufacturer's specifications.
12. Pipe and fittings to be 4" schedule 40 PVC DWV.
13. All surface water must drain away from manholes.
14. All waste must enter through inlet fittings only.
15. Protective coating shall cover all internal surfaces and meet the criteria of ASTM-309.
Sewer lateral size os required

1. If less than 30", review with Administrator for additional vault requirements. If greater than 48", install sampling manhole similar to Std. 500 or 502 with flow through cut away pipe as per this standard.

2. Sampling manhole to be located outside of Public Right of way except with written approval of the Administrator.

3. An alternative design by a Registered Engineer may be submitted for review by the Administrator.

4. Location subject to the approval of the Administrator.

5. Manhole shall be 30" x 30" Inside dimension precast box with 24" x 24" hinged aluminum floor hatch.

6. All surface water must drain away from sampling manhole.

7. A watertop consisting of a standard manhole adapter gasket as supplied by the pipe manufacturer to be grouted into the box wall near the center of the wall.

---

**NOTES:**

1. If less than 30", review with Administrator for additional vault requirements. If greater than 48", install sampling manhole similar to Std. 500 or 502 with flow through cut away pipe as per this standard.

2. Sampling manhole to be located outside of Public Right of way except with written approval of the Administrator.

3. An alternative design by a Registered Engineer may be submitted for review by the Administrator.

4. Location subject to the approval of the Administrator.

5. Manhole shall be 30" x 30" Inside dimension precast box with 24" x 24" hinged aluminum floor hatch.

6. All surface water must drain away from sampling manhole.

7. A watertop consisting of a standard manhole adapter gasket as supplied by the pipe manufacturer to be grouted into the box wall near the center of the wall.
NOTE:

1. To be used in the interior of buildings in conjunction with a sampling manhole and to be upstream of the sampling manhole.

2. Location subject to the approval of the Administrator.

3. An alternative design by a Registered Engineer may be submitted for review by the Administrator.

4. Box shall be 30" x 30" inside dimension precast box with 24" x 24" hinged aluminum floor hatch.

5. All surface water must drain away from sampling box.

6. A waterstop consisting of a standard manhole adaptor gasket as supplied by the pipe manufacturer to be grouted into the box wall near the center of the wall.

LAKE COUNTY
SPECIAL DISTRICTS

SAMPLING BOX
BUILDING INTERIOR

SCALE: NONE  DATE: MAY, 2009
DRAWN SS  APPROVED  FILE NO.
CHANGE PP  STD.-523
Notes:

1. Pre manufactured tank shall be per Approved Material List.
2. All grease interceptors shall be located outside public right-of-way except with written approval of the Director of Public Works.
3. Grease interceptors shall be located outside of buildings in a location accessible to waste hauler pumper. Location subject to the approval of the Administrator and the Lake County Environmental Health Director.
4. Tank capacity to be determined at the time of permit application.
5. Alternate design by a Registered Engineer may be substituted for review by the Administrator.
6. Interceptor to be used in conjunction with "Sampling Manhole" per Std. 522.
7. Stainless steel clamp and bolts 3'-0" o.c. max. (typ.) min. 2 req'd.
8. A waterstop consisting of a standard manhole adapter gasket as supplied by the pipe manufacturer shall be grouted into the interceptor wall near the center of the inlet and outlet walls.
9. 3" min. bedding material per Trench Std. 313.
10. Concrete slab to extend min. 24" beyond all sides of tank in traffic areas.
11. Install interceptor per manufacturer's specifications.
12. Pipe and fittings to be 4" schedule 40 PVC DWV.
13. All surface water must drain away from manholes.
14. All waste must enter through inlet fittings only.
15. Protective coating shall cover all internal surfaces and meet the criteria of ASTM-309.
Notes:

1. If less than 30", review with Environmental Health Department for additional vault requirements. If greater than 48", install sampling manhole similar to Std. 500 with flow through cut away pipe as per this standard.

2. Sampling manhole to be located outside of public right-of-way except with written approval of the Administrator. The sampling manhole shall be situated in a secure location.

3. An alternative design by a Registered Engineer may be submitted for review by the Administrator.

4. Location subject to the approval of the Administrator and the Lake County Environmental Health Director.

5. Manhole shall be 30" x 30" inside dimension precast box with 24" x 24" hinged aluminum floor hatch.

6. All surface water must drain away from sampling manhole.

7. A waterstop consisting of a standard manhole adapter gasket as supplied by the pipe manufacturer to be grouted into the box wall near the center of the wall.

8. Install 110 VAC Junction box for 4-20MA to provide pulse output for flow proportional sampling.

9. Install a Palmer Bowls, Parshall Style flume, or approved equal per manufacturer's recommendations. Fume shall be placed in the center of the box.
CONCRETE PAD
Reinforced with 6" x 6" / 10 x 10 welded wire fabric

Slope see elev.

Support with 4" x 4" redwood post or approved equal anchored securely in concrete.

2" Vent
3/4" Water Supply

CLeanout Box & Lid

Smooth trowel finish

PLAN VIEW

Drain hole cover
(See detail)

Finish grade

ELEVATION

4" x 2" Tee
(For vent)

4" x 4" P-Trap

NOTES:
1. Must install Reduced Pressure Backflow Prevention Device on water service prior to installation of this disposal facility.
2. See Std. 513 & Approved Material List for cleanout box and cover.

LAKE COUNTY
SPECIAL DISTRICTS
RECREATIONAL VEHICLE DISPOSAL FACILITY

DRAIN HOLE COVER DETAIL

Cast cover in slab so lip of opening is flush for washdown.

VAREC Fig. 46 drain hole cover assembly foot operated, cast iron body, bronze cover, or an approved equal.