GOLETA SANITARY DISTRICT

STANDARD SPECIFICATIONS FOR DESIGN & CONSTRUCTION OF SANITARY SEWERS

2008

Protecting Public Health and the Environment

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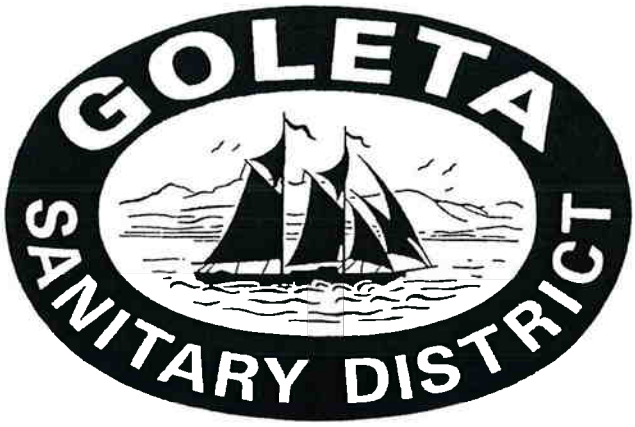


STANDARD SPECIFICATIONS FOR DESIGN AND CONSTRUCTION OF SANITARY SEWERS

2008

APPROVED BY DISTRICT ENGINEER:

Kamil S. Azoury, P.E.

2/1/08
Date

TABLE OF CONTENTS

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

The Goleta Sanitary District, a public agency, was formed under Sanitary District Act of 1923, Part 1 of Division 6 of the Health and Safety Code of the State of California and is subject to State and Federal Regulations.

The jurisdiction of the District includes the entire sewerage system and its appurtenances from the point of connection with the building plumbing to the terminus of the treatment plant outfall in the Pacific Ocean. Ordinances and codes of the District shall be considered a part of these Specifications and all plans, profiles, cut sheets, easement documents, and specifications shall conform to the standards and requirements established herein.

These Standard Specifications shall govern the requirements, design and construction of sewer facilities within the jurisdiction of the Goleta Sanitary District. The Standard Specifications and Drawings included herein establish the performance, quality requirements and general arrangement of materials and equipment, and establish the minimum standards for quality of workmanship and appearance. The Building Departments of Santa Barbara County, the City of Goleta, the City of Santa Barbara and the State of California do not have jurisdiction over the District's sewer construction requirements.

Knowledge of the District's ordinances, rules and regulations is essential to engineering practice in the District. The purpose of this manual is to define in general terms the rules, regulations and standards of the District for sewer facilities under public and private contracts. Copies of the Ordinances can be obtained for a reproduction fee.

1.2 EXCEPTIONS

It is recognized that it is not possible to address all situations that may arise and prescribe standards to every situation. However, it is expected that policies given in this manual will apply to the majority of cases and shall be complied with. In some cases, the District may make exceptions where application of the policies to a particular situation result in an unreasonable requirement not in the District's and/or the public's best interest.

1.3 REFERENCE SPECIFICATIONS

Applicable Publications: Whenever in the Standard Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that whenever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agency which have been published as of the date that the Work is advertised for bids shall apply: except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

The following reference Specifications or Standards are applicable:

- Standard Specifications for Public Works Construction, (latest edition, including supplements) of the Southern California Chapter American Public Works Association, latest edition, published by BNi Building News, 1612 South Clementine Street, Anaheim, California 92802 - (800) 873-6397.

- State of California Department of Transportation (Caltrans) Standard Specifications, latest edition.

- State of California Department of Transportation (Caltrans) Standard Plans, latest edition.

1.4 PRECEDENCE OF CONTRACT DOCUMENTS

If there is a conflict between Contract Documents, the document highest in precedence shall control. The precedence shall be as follows:

1. Permits issued by jurisdictional regulatory agencies.
2. Change Orders and/or Supplemental Agreements; whichever occur last.
3. Contract/Agreement.
4. Addenda.
5. Bid/Proposal.
6. Special Provisions.
7. Plans/Drawings.
8. Standard Plans.
9. Standard Specifications.
10. Reference Specifications.

Detail drawings shall take precedence over general drawings.

END OF SECTION

SECTION 2: DEFINITIONS AND ABBREVIATIONS

2.1 GENERAL

Organizations, abbreviations and definitions most commonly used by the District are listed below. Other definitions used by the District are given in the District's ordinances, applicable sections of the "Uniform Plumbing Code," and the Standard Specifications for Public Works Construction; all on file at the District office.

2.2 ORGANIZATIONS

ANSI	American National Standards Institute.
ASTM	American Society for Testing and Materials.
AI	Asphalt Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials International
AWS	American Welding Society
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
CRSI	Concrete Reinforcing Steel Institute
CRWQCB	California Regional Water Quality Control Board
DIPRA	Ductile Iron Pipe Research Association
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FS	Federal Specification Unit
IEEE	Institute of Electrical and Electronics Engineers
MIL	Military Standardization Documents
NACE	NACE International - National Association of Corrosion Engineers
NCMA	National Concrete Masonry Association
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPCA	National Paint and Coatings Association
NPCA	National Precast Concrete Association
NSF	NSF International - National Sanitary Foundation
NSPI	National Spa and Pool Institute
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
SSPC	The Society for Protective Coatings
STI	Steel Tank Institute
UL	Underwriters Laboratories Inc.

2.3 ABBREVIATIONS

ABS	Acrylonitrile-Butadiene-Styrene
ACP	Asbestos concrete pipe
CIP	Cast Iron Pipe
CCR	California Code of Regulations
CIPP	Cured in place pipe
CO	Cleanout (Sewer)
CMOM	Capacity, Management, Operation, and Maintenance (CMOM) addressing watershed management approaches
DIP	Ductile Iron Pipe
ERU	Equivalent Residential Unit equal to 220 gallons per day per unit
HDPE	High Density Polyethylene Pipe
MH	Manhole
NPDES	National Pollution Discharge Elimination System
PVC	Polyvinyl Chloride
SSPWC	Standard Specifications for Public Works Construction, latest edition (Greenbook)
VCP	Vitrified Clay Pipe

2.4 DEFINITIONS

It is not the intent to have an all inclusive list of definitions. See the Uniform Plumbing Code for additional definitions.

Acceptance The formal written acceptance by the District of a permitted Work which has been completed in all respects in accordance with the plans, specifications, approved modifications and permit requirements.

Addendum Written or graphic instrument issued prior to the opening of Bids that clarifies, corrects, or changes the bidding or Contract Documents.

Applicant Any person making application for District permits.

Approved Approved means accepted under an applicable specification or standard stated or cited in this Code, or accepted as suitable for the proposed use under procedures and authority of the Administrative Authority.

Backwater Valve A device installed in a drainage system to prevent reverse flow.

Bid The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work.

Board Goleta Sanitary District Board of Directors

Bond Bid, performance and payment bond or other instrument of security.

Building A structure built, erected, and framed of component structural parts designed for the housing, shelter, enclosure, or support of persons, animals, or property of any kind.

Building Sewer	That portion of a side sewer beginning at the plumbing or drainage outlet of any building or industrial facility and running to the property line
Change Order	A written order to the Contractor signed by the District directing an addition, deletion or revision in the work, or an adjustment in the contract price or the contract time, issued after the effective date of the contract.
City	The City of Goleta and/or the City of Santa Barbara and the various agencies and departments thereof.
Commercial	Commercial shall mean a site or building used for the exchange or buying and selling of commodities and/or services and shall also mean a hotel or motel.
Contract	Written agreement between the District and the Contractor covering the Work.
Contractor	The individual, partnership, firm or corporation entering into an agreement with the District, or an applicant, to perform or execute the contemplated work.
Consultant	The individual, partnership, firm or corporation entering into an agreement with the District, to provide advice or perform professional services.
County	The County of Santa Barbara, State of California, and the various agencies and departments thereof.
District	The Goleta Sanitary District or its authorized representatives.
District Engineer	The District Engineer shall be a Civil Engineer licensed by the State of California and appointed by the District Board to represent the District.
District Personnel	Anyone engaged or employed to represent the District.
Drawings	See Plans.
General Manager	The General Manager of the District.
District Board	The governing body of the District.
Domestic Sewage	The liquid and water-borne wastes derived from the ordinary living processes, free from industrial wastes, and of such character as to permit satisfactory disposal, without special treatment, into the public sewer or by means of a private sewage disposal system.
Dwelling	A structure for residential occupancy.
Easement	A non-profitable interest in land owned by another that entitles its holder to a specific limited use.

Engineer	A professional, licensed by the State of California as a Civil Engineer, under whose direction plans, profiles, and details are submitted to the District for review and approval.
Fixture Unit	The baseline quantity, or unit value, on a scale that has been developed to represent the relative load-producing effects on the plumbing system from different types of plumbing fixtures.
Grade	The slope or fall of a pipe in reference to a horizontal plane. In drainage, it is usually expressed as the fall in a fraction of an inch (or mm) or percentage slope per foot (or meter) length of pipe.
Grease Interceptor	See Interceptor. (Typically required for restaurants)
Industrial	Any site, structure, building or works which is, or which is designed, to be used for the manufacture, processing, or distribution of materials, equipment, supplies, food or commodities of any description; or which is used or designed as a sanitarium, hospital, penal institution, fraternal organization, private school or charitable institution; together with all appurtenances thereto and the surrounding premises under the same ownership or control.
Industrial Waste	Industrial waste means any and all liquid or water-borne waste from industrial or commercial processes, except domestic sewage.
Inspector	The sewer inspector for the District duly authorized by the District and responsible for the particular duties delegated to him.
Institutional	Institutional shall mean any educational institution supported by state or local taxes.
Interceptor (Clarifier)	A device designed and installed so as to separate and retain deleterious, hazardous, or undesirable matter such as grease and oil from normal wastes and permit normal sewage or liquid wastes to discharge into the disposal terminal by gravity.
Invert	The lowest portion of the inside of a horizontal pipe.
Lateral Sewer	That portion of a sewer system between the main sewer and the structure being served, which is installed and maintained by property owners or agencies other than the District.
Main Sewer	A sewer which has been constructed to accommodate more than one building sewer and which has been approved and accepted by the District.
Multiple Residential Lateral Sewer	A sewer designed to serve more than one single family residence.

Permit	Any written authorization required pursuant to any regulation of the Goleta Sanitary District.
Pipe	A cylindrical conduit or conductor, conforming to the particular dimensions commonly known as "pipe size".
Plans	The official plans, profiles and drawings, or re-productions thereof, approved by the District, which show the location, character, dimensions, and details of work to be done. Said plans will constitute a supplement to these provisions.
Private Sewer	A private sewer is a lateral and building sewer that conveys sewage discharge to a public sewer system.
Public Sewer	A common sewer directly controlled by a public authority
Sampling Manhole	A standard or modified manhole approved by the District that serves to isolate the wastewater flow from a single facility and provides access for sampling and/or monitoring purposes.
Sampling Well	A non-standard or modified cleanout or access point approved by the District that serves to isolate the flow from a single facility and provides access for sampling and/or monitoring purposes.
Sand & Oil Interceptor	See Interceptor. (Typically required for gasoline stations, car washes and automobile shops)
Service Connection	All or any portion of the building and lateral sewer lines between a main sewer line and an individual building.
Sewage	Any liquid waste containing animal or vegetable matter in suspension or solution and may include liquids containing chemicals in solution.
Sewer	Any conduit intended for the conveyance of sewage and fluid industrial waste.
Sewer Connection Fee -	A fee to obtain permission to connect to the District's sewer facilities, including facilities resulting from remodels and additions, to ensure flow capacity rights and to use the trunk sewer, sewage treatment facilities and appurtenances, provided that the District's prevailing service charges have been paid.
Side Sewer	A sewer line beginning at the foundation wall of any building and terminating at the main sewer and includes the building sewer, lateral sewer and wye connection.
Single Family Residence	A building designed to be used as a residence for a "single family" and is the only dwelling located on a parcel of ground with the usual accessory buildings.

Single Residential Lateral Sewer	A sewer to serve a single residence.
Specifications	Standard Specifications, Reference Specifications, Special Provisions, and specifications in Supplemental Agreements between the Contractor and District.
State	The State of California
Storm Drain -	Any conduit and appurtenances intended for the reception and transfer of storm water.
Sub-Contractor	Any contractor licensed by the State of California and properly pre-designated by the Contractor to enter into contracts and to perform work of installing sewers under District jurisdiction.
Vertical Pipe	Any pipe or fitting which is installed in a vertical position or which makes an angle of not more than forty-five (45) degrees with the vertical.
Work	All of the work of the project contemplated and called for or shown in the contract documents.

END OF SECTION

SECTION 3: THE ANNEXATION PROCESS

3.1 GENERAL

All properties receiving sewage collection, treatment, and disposal service from the District must be annexed into the District's service area. Annexation to the District is made pursuant to the Cortese/Knox Local Government Reorganization Act of 1985. Herewith, in outline, is the annexation procedure. Upon request, the District will supply the Applicant with a packet of detailed information and documents needed for annexation. The Applicant shall pay all costs for annexation to the District and construction of sewer facilities.

3.2 PROCEDURE

A. REQUEST FOR ANNEXATION

Applicant(s) submit the following materials to the Goleta Sanitary District, requesting annexation to the District:

1. A brief letter to the District requesting annexation with a description of land and facilities to be annexed. Existing or proposed dwelling(s)/building(s) should be referenced here.

2. "Landowner Consent to Annexation" form completed by property owner(s); must include separate form for each property owner involved in the annexation.

3. Payment of Annexation Processing Fee made payable to GOLETA SANITARY DISTRICT. A current fee schedule is available from the District.

B. DISTRICT FILING APPROVAL

District considers approval of filing annexation application with LAFCO and adoption of "Resolution of Application" including Terms and Conditions of annexation.

C. ANNEXATION APPLICATION

Applicant(s) submit the following annexation application materials to the District for further processing:

1. Map and legal description of property(ies) to be annexed, prepared by Applicant's Engineer/Surveyor.

2. Completed "Proposal Justification Questionnaire".

3. Certified Environmental Documents (EIR or ND); or Environment Application; or Notice of Exemption.

4. A check payable to LAFCO for the LAFCO filing fee. A current fee schedule is available from the District.

5. A check payable to COUNTY OF SANTA BARBARA for reviewing maps and legal descriptions. A current fee schedule is available from the District.

6. A list of existing property owners and lessees in the subject area and any known future owners or lessees.

D. LAFCO PROCESSING

The District submits the annexation package to LAFCO for processing as follows:

1. LAFCO reviews application and corresponds to District with any questions.
2. LAFCO requests County Surveyor to certify maps and legal description.
3. LAFCO staff issues Certificate of Filing and sets date for public hearing.
4. LAFCO considers proposed annexation at public meeting.
5. Upon approval of annexation, LAFCO adopts Resolution Making Determinations.
6. With consent of all property owners, LAFCO can record the annexation after a 30-day waiting period and upon authorization from the District.
7. Without consent of all property owners, the LAFCO staff will conduct a public hearing to receive any written protests from landowners or voters within the annexation area.

E. FINAL ANNEXATION PROCESSING

Applicant(s) submit fees to the District for final annexation processing (District Staff will notify Applicant of fees due at this time):

1. Annexation fee – Prior to the completion of annexation, Applicants shall pay to the GOLETA SANITARY DISTRICT an annexation fee. A current fee schedule is available from the District.
2. Filing fee payable to STATE BOARD OF EQUALIZATION. A current fee schedule is available from the District.

F. FINAL ANNEXATION APPROVALS

1. Upon receiving authorization from the District, LAFCO records annexation and files with the State Board of Equalization.
2. LAFCO issues and distributes a Certificate of Completion.
3. After the requirements outlined in "Sewer Permit Application" are satisfied the District issues the permit and approves connection to District facilities.

END OF SECTION

SECTION 4: SEWER PERMIT APPLICATION

4.1 SEWER SERVICE AVAILABILITY LETTERS

Applicant's seeking sanitary sewer service shall first obtain a "Sewer Service Availability Letter" from the District. Requests for sewer service shall be made in writing to the District Manager. To verify sewer service availability, the District may require the Applicant to prepare a "Sewer Feasibility Study". See Section 5 for the requirements of Sewer Feasibility Studies.

4.2 OVER-SIZING SEWER MAINS FOR FUTURE EXTENSION

When dedicated public sewers are proposed, over-sizing and/or extra depth of certain sewers may be required where such sewers can logically serve an upstream tributary area. When an area outside of the tract or property can be logically served by future extension of said sewer, the sewer shall extend to the tract or property boundary or to the end of the paved street or alley in a manner to facilitate future extension without removing permanent facilities.

4.2.1 REIMBURSEMENT AGREEMENTS FOR OVER-SIZING SEWER MAINS

The District Board, if it deems appropriate, may contract with the Applicant for reimbursement of the additional costs of over sizing and/or extra depth of sewers that may be extended. The District shall determine the reimbursement amount and the method of payment.

4.3 APPLICATION FOR PERMIT

Applicants for a permit shall apply on the form provided by the District. The Applicant shall provide the location, ownership, occupancy/use of the premises, and a description of the proposed work. The information required for review is listed below. Specifications, plans/drawings and other information shall be supplied to the District as deemed necessary.

Proposed additions and/or conversions may require the owner(s) to pay applicable sewer connection fees or sign a "Sewer Service Acknowledgment" document provided by the District, which will be recorded with the County Recorder's Office.

Public sewers and appurtenances shall not be uncovered, opened, connected to, used, altered, disturbed or worked upon without first obtaining a Permit from the District.

Submittals for Review:

1. Development Plan, if applicable.
2. Tentative Tract or Parcel Map, if applicable.
3. Grading Plans.
4. Sewer Improvement Plans - Sewer main improvement plans shall be prepared by the Applicant's licensed Civil Engineer.
5. Side Sewer Layout Drawing
6. Site, floor, and plumbing plans shall be stamped "Received" by County or City Building & Safety Division.

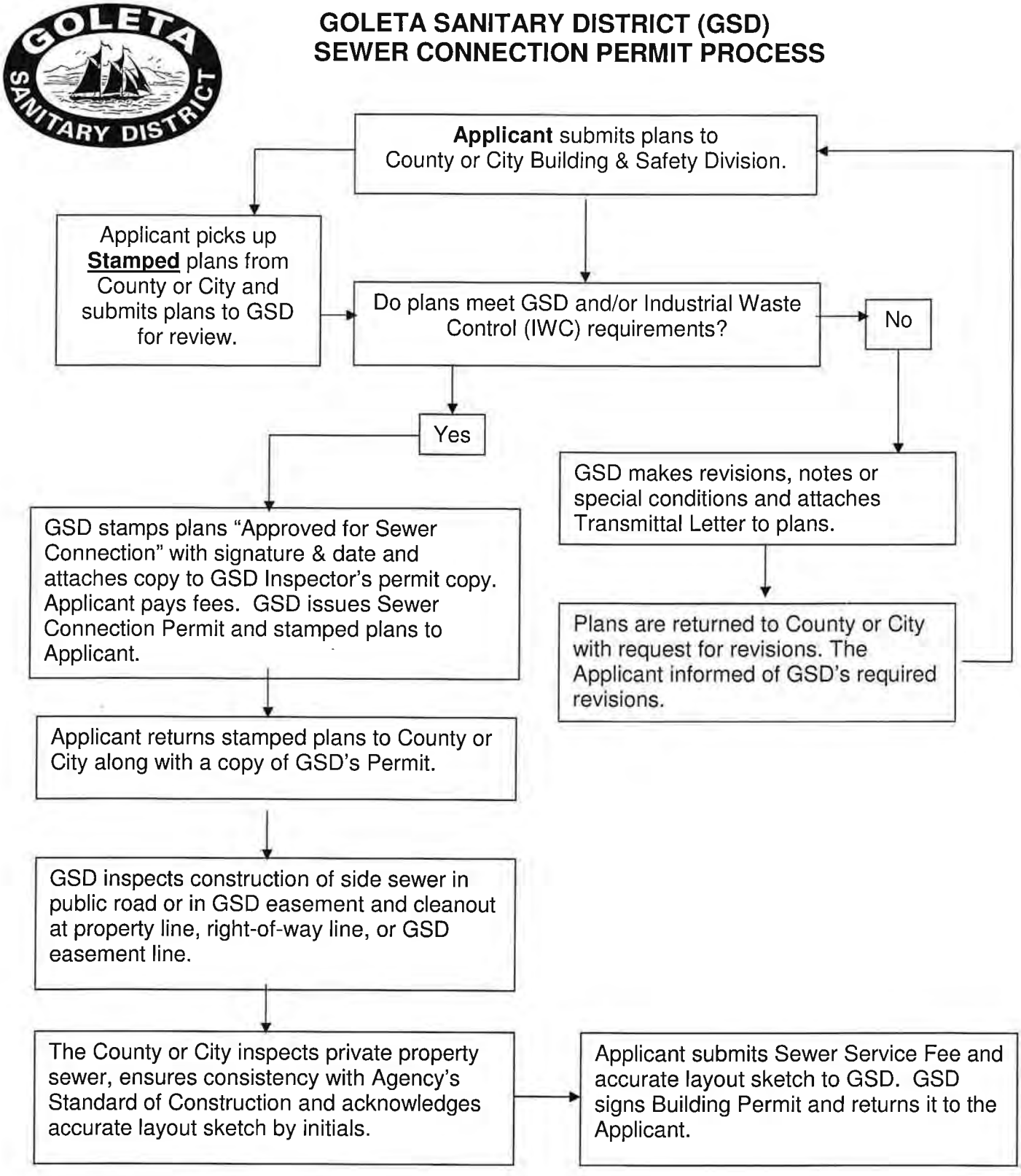
7. Easement and Grant of Rights Documents - Easement and Grant of Rights Documents prepared by the Applicant's Engineer/Surveyor when required.

8. Construction Cost Estimate - Construction cost estimates prepared by the Applicant or their Engineer for the purpose of estimating the District's connection, permit and inspection fees and to determine the construction guarantee bond amount.

9. Other Requested Data

Upon approval of submitted plans, estimates, easements and other data, performance bonds and executed District agreements will be required.

GOLETA SANITARY DISTRICT (GSD)
SEWER CONNECTION PERMIT PROCESS



4.4 CONNECTIONS NOT PERMITTED

District regulations prohibit the connection of septic tanks, cesspools or any other type of pit to a service lateral or main sewer.

Swimming Pools: Swimming pool filters and/or discharge lines shall not be connected to a service lateral or main sewer.

Swimming pool water may be discharged into a sanitary sewer in the manner specified herein with a District permit and payment of applicable fees. The discharged water shall have a pH between 6.5 and 9.0. The rate of flow shall not exceed one hundred (100) gallons per minute. The discharge piping or hose shall include and approved backflow preventor or air-gap separation to prevent sewage backflow into the piping system or swimming pool. The discharge of swimming pool water shall be subject to inspection and monitoring by the District.

Roof drains, gutters, area drains or any other rainwater discharges shall not be connected to a service lateral or main sewer.

4.5 SEWER CONNECTION PERMIT

Upon approval of plans, payment of applicable fees, posting of required bonds, and if applicable, pertinent easements and grant of rights documents, Applicant will be issued a Sewer Connection Permit from the District.

If required, Applicant shall also obtain an "Industrial Wastewater Discharge Permit" in accordance with District Ordinance 44, Chapter VII.

4.6 PERMIT APPROVAL AND COMPLIANCE

The approval of the application is evidenced by the issuance of a Permit. Thereafter, changes shall not be made to the approved plans, specifications or in the use of the premises, without prior written permission from the District.

4.7 PERMIT TIME LIMITS

The permit shall become void if the authorized work is not completed within the time limit specified on the permit. Further work shall not be performed until a new permit or extension has been obtained from the District by proper application and payment of required fees. The work shall be completed within the time limits as specified by the new permit.

4.8 AGREEMENT

The signature of the Applicant on a permit shall constitute an agreement to comply with all approved plans, specifications, change orders, provisions, terms and requirements of the rules, regulations and ordinances of the District. Said agreement(s) shall be binding upon the Applicant and may be modified by the District after the receipt and consideration of a written request for modification submitted by the Applicant.

4.9 LIABILITY

The Applicant shall be solely liable for any defects or failure during performance of the work or any failure which may develop therein for the period of one (1) year. The District, its officers, agents, and employees shall not be responsibility for any liability, death or injury to persons or property damage due to or arising out of the performance of the work by the Applicant or the Applicant's agents. The Applicant shall be responsible for and save the District, its officers, agents and employees from all liabilities imposed by law, including all costs, expenses, fees and interest incurred in seeking to enforce this provision.

4.10 OWNER'S RESPONSIBILITY

The side sewer is private from the connection to the public sewer, including the wye, to its connection with the building. The Owner is responsible for maintaining the side sewer. The District is not responsible for damage caused by breaks or leaks in the side sewer.

4.11 CONTRACTOR QUALIFICATIONS

Contractors doing sewer work in the District shall be properly licensed in accordance with the provisions of Division 3, Chapter 9 of the Business and Professions Code of the State of California. Licensed contractors shall have one or more of the following licenses:

- Class A –General Engineering Contractor
- Class C34 – Pipeline Contractor
- Class C36 – Plumbing Contractor

All terms and conditions of the District Permit shall be binding on the Contractor.

4.12 NOTIFICATION

The District shall be notified at least forty-eight (48) hours prior to commencing construction. Any construction done without prior notification to the District will be rejected, and any rework will be done at the contractor's expense.

4.13 POSTING OF PERMITS

District permits must be posted on site and made available to the District Inspector during construction. Permits must be available at the final inspection.

4.14 POWER AND AUTHORITY OF INSPECTORS

The Officers, General Manager, District Engineer, Inspectors or any other duly authorized employee of the District shall wear or carry an identification card or other credentials. Upon the presentation of proper credentials s/he shall be permitted to enter into residential, commercial, institutional and industrial facilities for the purposes of inspecting, observing, measuring, sampling, testing or otherwise performing the necessary duties pursuant to the enforcement of the provisions of District ordinances, rules and regulations.

4.15 FINAL INSPECTION

A final inspection will be made of constructed sewer facilities to ensure compliance with the approved plans and District Standards. Before the acceptance of any sewer line, and prior to the discharge of sewage into the system, the sewer line shall be complete, tested, and inspected in compliance with District requirements.

The Applicant is responsible for notifying the District that said work is ready for inspection. Notification shall be at least twenty-four (24) hours before the work is to be inspected. The Applicant shall ensure that the work is complete and has been properly executed prior to requesting inspection.

During the final inspection the District's Inspector will verify that the building structure and plumbing fixture unit count are consistent with the approved plans, sewer facilities such as cleanouts and overflow devices have been properly installed in accordance with District Standards.

4.16 SEWER APPROVAL AND OCCUPANCY RELEASE

Once inspection and testing is acceptable, sewer service fees are paid, and all required documents are submitted and recorded as appropriate, the District will issue a Certification of Acceptance and sign the occupancy release forms. Final submittals include, but may not be limited to, Record Drawings in accordance with Section 6.9, Change Order Records, Test Result Records, written approval required from other agencies. Deposits or bonds may be allowed in lieu of some final submittals to allow occupancy.

Final approvals shall be done at the District Administration Office and copies of the sign-off certificate shall be submitted to the District.

4.17 OTHER PERMITS

The Applicant is responsible for obtaining other permits that may required for execution of the permitted Work, including but limited to: Road Encroachment Permits from the County of Santa Barbara and/or City of Goleta, Grading Permits, Building Permits, Coastal Development Permits, Special Use Permits, California Coastal Commission Permits, California Department of Fish and Game Permits and U.S. Corps of Engineer Permits.

4.17.1 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT (NPDES)

As of December 9, 2002, any project consisting of one (1) acre or more of disturbed earth (phased or not) will require the Applicant's contractor to obtain a National Pollutant Discharge Elimination System Storm Water Discharge Permit from the California Regional Water Quality Control Board (CRWQCB). The Owner shall apply for the permit 90 days prior to the start of work, and the contractor shall execute and take out the permit. The necessary permits from the CRWQCB must be obtained before commencing any work related to public sewage collection facilities. When required, a copy of the Notice of Intent (NOI) filed with the CRWQCB shall be submitted to the District prior to commencing construction.

END OF SECTION

SECTION 5: SEWER FEASIBILITY STUDIES

5.1 GENERAL

The District's "Sewer Collect System Master Plan 2000" prepared by Brown and Caldwell, consulting engineers, modeled (Hydra by Pizer) the District's entire collection system and identified system deficiencies. The land use for the modeling was based on the Goleta Community Plan adopted by the Santa Barbara County Board of Supervisors in July 1993.

If a proposed development involves a land use that differs from the designation in the 1993 Goleta Community Plan, a sewer feasibility study prepared by the Applicant may be required. The Owner's Engineer should consult with the District Engineer regarding study requirements.

The District Engineer or a District consultant will input the data into the collection system model and analyze the impact of the development to the District's collection system. The Applicant shall pay the District for all expenses related to the sewer feasibility study modeling update.

5.2 STUDY REQUIREMENTS

The study shall include a scaled topographic map of the subject property and the upstream tributary areas that could logically be served by the proposed sewer extension. The Sewer Feasibility Study shall include the following information:

- ❑ Scaled topographic map of the study area
- ❑ Major street names in the study area
- ❑ Description of proposed land use(s)/zoning
- ❑ Tributary areas and their land uses/zoning
- ❑ Gross and net land areas
- ❑ Calculated average and peak sewage flow rates based on the tributary area, land use and sewage generation factors
- ❑ Facilities that may have a bearing on the sewer design such as storm drains, utilities, roads, etc.
- ❑ Depth of existing sewer at proposed connection point(s)
- ❑ Identified downstream sewer deficiencies noted in the District's Sewer Master Plan (information available from District)
- ❑ Other information necessary for the proper analysis of the sewer system.

END OF SECTION

SECTION 6: IMPROVEMENT PLANS

6.1 ENGINEERING POLICY

The District requires compliance with the Professional Engineers Act of the Business and Professions Code of the State of California. All civil engineering plans, specifications, reports and related documents shall be prepared by a registered Civil Engineer, or by a subordinate under the responsible charge of the Civil Engineer, and shall be signed and stamped with his/her seal.

It shall be the Project Engineer's responsibility to review any proposed sewer system, extension and/or existing system change with the District, prior to design, to determine any special requirements or whether the proposal is permissible.

Approval of plans by the District does not relieve the Project Engineer of his/her responsibility to meet the requirements of the District. Plans shall be revised or supplemented at any time it is determined that the requirements of the District have not been met.

6.2 IMPROVEMENT PLANS

6.2.1 BASIC REQUIREMENTS

Improvement plans for each sewer project submitted to the District shall consist of a Title Sheet and plan and profile sheets. Detail sheets shall be provided if appropriate.

Title Sheet Requirements:

- ☐ Key Map (Showing the buildings, the proposed sewer alignment, laterals and building sewers to each building, and sewer and access easement boundaries)
- ☐ Vicinity Map
- ☐ Graphic Sheet Index (Referencing Plan and Profile Sheets)
- ☐ Sheet Index
- ☐ General Sewer Notes
- ☐ Sewer Construction Notes
- ☐ Elevation Datum and Benchmarks.
- ☐ Basis of Bearings

Plan and Profile Sheet Requirements:

- ☐ Minimum scale of the Plan shall be 1" = 40'
- ☐ Minimum scale of the Profile shall be 1" = 40' Horizontal and 1"=4' Vertical
- ☐ North Arrow
- ☐ Graphic Scale
- ☐ Rights-of-way, property boundaries and easements
- ☐ Topography
- ☐ Buildings, roads and other structures
- ☐ Alignment of main and building sewers
- ☐ Type, class and size of sewer pipes
- ☐ Manholes, cleanouts and other structures
- ☐ Invert elevations of manhole inlet and outlet pipes
- ☐ Manhole rim elevations
- ☐ Length and slope of sewer pipes from manhole to manhole
- ☐ Sewer line stationing at manholes, cleanouts, wyes and other structures

- Existing utilities and other facilities
- Pipe clearances from other utilities and structures
- Laterals and cleanouts at property lines

Detail Sheet Requirements:

- As required for defining specific construction requirements of structural and/or piping designs.

6.2.2 PLANS

Sewer plans shall show the true horizontal relationship between the proposed sewer improvements and the existing and/or proposed field conditions including existing and proposed utilities and other facilities. Sewer plans shall include the total acreage of the improvement or development, sewer line size and class, structures, property lines and corners adjacent to the sewer alignment, laterals with ties to property corners, required stationing of pipelines and structures, horizontal curve data and street names.

Where applicable, the plans shall show the proposed lateral connection, building floor elevations, and rim elevation of the upstream manhole from the proposed connection.

6.2.3 PROFILES

Sewer profiles shall show the vertical relationship between the sewer invert and the ground surface at the time of sewer construction and the finish ground and/or paving surface. The sewer size, pipe type and class, shall be shown between each consecutive structure on the sewer profile. Profiles shall also show existing and proposed utilities and other facilities which cross the alignment of the sewer and shall accurately indicate the clearance when less than twelve inches (12"). Design rim elevations for each manhole, including existing manholes, shall be shown on the profile.
Proposed and/or completed fill areas shall be shown and labeled on the profile. The proposed finished surface over the sewer or the proposed curb grade shall be shown by a solid line and clearly labeled. The original ground surface shall be shown by a dashed line and clearly labeled.

6.3 STANDARD PLAN SIZE AND LAYOUT

The improvement plan size and layout shall conform to Standard Drawing 1.

Standard sheet size shall have a vertical dimension of 24-inches and a horizontal dimension of 36-inches to the outside edges. All plans shall be drawn with the intent of having them reduced by one half and shall be legible at the reduced scale. Text height shall be not be less than one-tenth of an inch (0.10") on the full size drawing.

It is acceptable to use the County of Santa Barbara or City Of Goleta Public Works Department standard sheets when sewers are part of improvements for new roads or subdivisions. When proposed sewer facilities are shown on County or City Public Works plans, sewer facilities shall be shown bold so that the sewer facilities are prominent. Other information on the plans shall be screened approximately 50%.

6.4 DRAWING MEDIA

Final improvement plans shall produced using black ink on matte mylar, 4 mil minimum thickness. Adhesive decals are not allowed on mylar submittals.

6.5 DATUM REQUIREMENTS

6.5.1 VERTICAL DATUM REQUIREMENTS

Vertical datum shall be the NAVD 88 – North American Vertical Datum 1988.

The benchmark information is to appear in the lower left-hand corner of the Title Sheet. Local benchmark information should appear on the plan sheet where the benchmark can be readily identified.

6.5.2 HORIZONTAL DATUM REQUIREMENTS

Drawings shall be prepared with the horizontal coordinate system of NAD83 - North American Datum 1983 (rev. 1992).

6.6 EXISTING FACILITIES

Improvement plans shall show the location, size and ownership of existing and known future underground works that cross or parallel the sewer. Utility lines that cross the sewer, such as gas, cable television, storm drains, telephone, communication, water, power, gasoline and oil lines shall be shown and labeled on the plans and profiles.

The District is not responsible for the accuracy of the location of these underground lines. Approval of sewer plans by the Goleta Sanitary District does not constitute a representation for the accuracy of the location of, or the existence of, any underground utility, conduit or structure within the limits of the project.

Applicants are advised of the California One Call Law per Government Code 4216 that requires every person planning to conduct any excavation is required to contact the appropriate regional notification center, at least two working days, but not more than 14 calendar days, prior to commencing that excavation. Call Underground Service Alert (USA) at 1-800-227-2600.

6.7 GENERAL NOTES

The following general notes are requirements adopted by the District and shall be shown on the title sheet of the improvement plans:

GOLETA SANITARY DISTRICT
GENERAL SEWER NOTES

1. *Revisions shall not be made to these plans without the approval of the District.*

2. *Before beginning work, the contractor shall obtain a permit to excavate in public road right of ways from the County of Santa Barbara or City of Goleta, as applicable.*

3. *If work is to be done in a state highway, a permit must be obtained from the State of California, Division of Highways, District 5, San Luis Obispo, California.*

4. *Prior to issuance of the required sewer connection permit or Notice to Proceed, the contractor shall obtain and file with the District, copies of: encroachment permit(s) to excavate in County/City streets, a permit for excavations and trenches from the State of California, Division of Industrial Safety, a Certificate of Worker's Compensation Insurance and Liability Insurance with the District named as the certificate holder. The certificate shall state that the holder shall be notified 30 days prior to cancellation of policy.*

5. *Acceptance of the sewer plans by the District does not constitute a representation as to the accuracy of the location of, or the existence of, any underground utility pipe or structure within the limits of this project.*

6. *The Contractor shall have at the Work site, copies or suitable extracts of: Construction Safety Orders, Tunnel Safety Orders and General Industry Safety Orders issued by the State Division of Industrial Safety. The Contractor shall comply with the provisions of these and all other applicable laws, ordinances and regulations.*

7. *The District will not survey or layout any portion of the work.*

8. *The District shall be notified 48 hours prior to staking the sewer line.*

9. *A licensed Civil Engineer or surveyor shall furnish the District with grade (cut) sheets and stationing for all lateral sewers and wyes, and shall provide stakes for them at their proper locations with stationing clearly marked. Lateral sewers shall be constructed in a straight alignment at right angles from the main line sewer, except as shown on the plans. Any change in alignment shall be requested in writing by the Civil Engineer.*

10. *The Civil Engineer or surveyor shall furnish the lateral sewer depth at the property line below the top of curb elevation for each lateral sewer on the grade (cut) sheet.*

6.8 CONSTRUCTION NOTES

The following sewer line construction notes are requirements adopted by the District and shall be shown on the title sheet of the improvement plans:

GOLETA SANITARY DISTRICT
SEWER CONSTRUCTION NOTES

1. *Construction of sewage collection facilities shall not commence until construction plans have been approved and permits issued by the Goleta Sanitary District. Sewer mains, laterals, and appurtenances shall be constructed according to Goleta Sanitary District standards and specifications and shall be subject to inspections to obtain acceptance of the constructed work.*

2. *Compliance with Goleta Sanitary District Standard Specifications and Santa Barbara County/City of Goleta encroachment permit(s) will be required for trench backfill. Certification of backfill compaction and material sand equivalents by a qualified, registered testing laboratory shall be provided to the Goleta Sanitary District by the permittee prior to the issuance of a Certificate of Acceptance.*

3. *Geotechnical investigations and soils reports prepared for the project shall be made available to the District.*

4. *The Goleta Sanitary District shall be notified at least forty-eight (48) hours prior to starting construction. Any construction done without approved plans, permits or prior notification to the District will be rejected, and any rework will be done at the contractor's expense. Inspection and approval by the Goleta Sanitary District shall be requested by the contractor prior to commencing and after each phase of construction, specifically, trench alignment, pipe bedding, pipe installation, backfill over installed pipe, final backfill and compaction, and clean-up.*

5. *Sewer lines near the construction site or involved with the sewer line construction shall be protected with plugs in the inlets and outlets of manholes until work is complete.*

6. *Contractor shall verify existing water, sewer, storm drain and other utility elevations prior to sewer trenching construction.*

7. *Clearance between sewer lines crossing under or over other underground utilities shall not be less than six inches (6") except for water pipes. Sewer lines shall be installed under water lines, unless otherwise approved by the Water and Sanitary Districts. If construction over water lines is permitted, the sewer main construction shall comply with State Health Department Guidelines.*

8. *The contractor shall be responsible for installing adequate bracing and shoring for excavations, temporary structures, and all partially completed portions of the work, as necessary. Sheeting, shoring, bracing, or equivalent protection for all excavations over 5 feet deep shall be provided as required by CAL-OSHA.*

9. *Trenches shall be backfilled or secured with steel traffic plates at the end of each workday. Traffic control devices shall be provided in accordance with State of California (Caltrans) Manual of Traffic Controls for Construction and Maintenance Work Zones, latest edition, or as otherwise directed by the District.*

10. *Solvent joints are not acceptable.*

11. *A minimum four-inch (4") diameter lateral and building sewer shall be installed for each single-family residential unit with a minimum grade of 1/4" per foot (approximately 2%) from the public sewer main to the building connection.*

12. *A minimum six-inch (6") diameter lateral and building sewer shall be installed on a minimum grade of 1/8" per ft. (approximately 1%) for multiple family dwellings, churches, commercial, industrial, school buildings, etc., from the sewer main to the building connection.*

13. *Lateral sewer connections to mainline sewers shall be with fabricated wye fittings in accordance with District Standard Drawing No. 16.*

14. *Lateral sewers shall be constructed with five (5) feet of cover at property line.*

15. *The Contractor shall furnish material, labor and equipment for conducting tests for deflection, leakage, infiltration and CCTV inspections. Tests shall be made after the sewer trench has been backfilled and compacted and before paving. Compaction test reports shall be submitted to the District prior to testing.*

16. *Deflections in installed pipe shall not exceed five (5) percent of the internal pipe diameter. Any section of the pipeline that exceeds the maximum allowable deflection shall be uncovered and, if not damaged, reinstalled at the Contractor's expense. Damaged pipe shall be removed from the Work site. The contractor shall test the deflection with an approved mandrel in the presence of a Goleta Sanitary District representative.*

17. *Prior to paving and video tests, installed pipe shall be cleaned by the balling method or with a hydro jet rodding/debris vacuum unit with a spinning nozzle approved by the District. A debris trap shall be installed at the most downstream manhole during the cleaning operation. A District Inspector shall be present at all times.*

18. *Prior to paving, the main sewer line shall be CCTV inspected from center of manhole to center of manhole by the Contractor in accordance with the District's standards. Water shall be discharged into the pipeline just prior to CCTV inspection. A DVD and (printed) hardcopy of the CCTV inspection shall be submitted to the Goleta Sanitary District. A District Inspector shall be present during the entire CCTV inspection.*

19. *Manhole interiors shall be coated and spark tested in accordance with District Standards. District Inspector shall be present during the coating and testing of the Manhole. A pull test may be required at the Inspector's discretion.*

20. *Manhole covers and frames shall be manufactured of ductile iron in accordance with Goleta Sanitary District Standard Drawing No. 12. Manhole covers shall be stamped with "G.S.D. Sewer".*

21. *Manhole tops in unimproved rights of way shall be 18" above finished grade, 6" above grade in maintained landscaped areas and shall be protected per Goleta Sanitary District Standard Drawing 10.*

22. *New manholes shall be vacuum tested for leaks after assembly and before backfill unless the requirement is waived by the District Inspector.*

23. *Record Drawings. Drawings showing the actual location of all mains, structures, wyes, laterals, manholes, cleanouts, easements, etc., shall be filed with the District before final acceptance of the work. In addition, an electronic AutoCad™ format drawing recorded on a CD, showing the actual location of mains, wyes, laterals, manholes, cleanouts and appurtenant structures, including invert and rim elevations, shall be submitted to the District before final acceptance of work. The Electronic Drawing shall be in the following coordinate system; Horizontal NAD 83 North America Datum, Vertical NAVD 88 North American Vertical Datum.*

6.9 RECORD DRAWINGS

A complete set of approved drawings shall be maintained at the work site during construction. The Contractor shall record changes from the approved plans on the drawings including change orders, approved field revisions, existing utility locations and depths and other information that may differ from the approved plans.

Upon completion of construction, inspection and testing, the Project Engineer shall prepare and submit to the District a complete set of original mylars with all of the changes shown and marked as "Record Drawings". The corrected mylars, one set of prints and a CD with electronic files of the drawings in an AutoCad™ .DWG format shall be submitted to the District within 30 days of completion of construction. Record Drawings are required prior to acceptance of the sewer improvements and prior to release of bonds.

END OF SECTION

SECTION 7: DESIGN CRITERIA

7.1 DESIGN METHODOLOGY

Sanitary sewer capacity is typically determined from an analysis of existing and probable future quantities of domestic, commercial and industrial wastewater, as well as anticipated groundwater infiltration and extraneous inflow. Sanitary sewers are typically sized to convey peak wastewater flow, infiltration and inflow.

Pipe capacity and velocity shall be based upon the Chezy-Manning formula:

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

Where
Q = flow in cubic feet per second (ft^3/s)
v = velocity in feet per second (ft/s)
A = cross section of flow in square feet (ft2)
r_h = hydraulic radius is the ratio of cross-sectional area of flow to wetted perimeter (A/P_w)
S = slope of the pipe in feet per feet (ft/ft)
n = coefficient of roughness

Wetted perimeter is defined as the cross-sectional portion of the channel that has water contact. The coefficient of roughness ("n") shall equal 0.013 or the pipe manufacturer's recommendation, whichever is greater.

7.2 SLOPE AND VELOCITY

Sewage velocity shall be equal to or greater than two feet per second (2 fps), when flowing at the design flow. Where design velocities exceed fifteen feet per second (15 fps) ductile iron pipe conforming to District standards shall be used. The minimum acceptable slope for sewer pipe sizes listed in Table 1 below are based upon a self-cleaning velocity of 2 feet per second in the sewer.

Table 1 – Minimum Pipe Slopes

8 inch	0.0040 ft/ft
10 "	0.0032 ft/ft
12 "	0.0024 ft/ft
15 "	0.0016 ft/t
18 "	0.0014 ft/ft
21 "	0.0012 ft/ft
24 "	0.0010 ft/ft
27 "	0.0008 ft/ft

Slopes of sewers shall be computed using the difference between the outlet flow line elevation of the upstream manhole and the inlet flow line elevation of the next downstream manhole. Flow line elevations at the inlet and outlet of each manhole shall be shown on plans.

7.3 SEWAGE GENERATION FLOW RATES

7.3.1 AVERAGE SEWAGE FLOW RATES

The average flow rate shall be determined by the Project Engineer based on good engineering practice. Sewage flows shall be determined from the potential land use of the tributary area. Average flow rates for various land use and anticipated population density in terms of cubic feet per second per acre are tabulated in Table 2. The flow rates shall be used for new development and determining the effects of future land use per approved General Plan(s). The acreage in the table is gross acreage including roads, yards, parking, etc.

Table 2 - Sewage Generation Flow Rates

Residential –Single Family:	
1 unit/3 acres	0.0002 cfs/acre
1 unit/ acre	0.0005 cfs/acre
1.8 units/acre	0.0009 cfs/acre
3.3 units/acre	0.0016 cfs/acre
4.6 units/acre	0.0022 cfs/acre
Residential – Multi-Family:	
6.0 units/acre	0.0021 cfs/acre
8.0 units/acre	0.0028 cfs/acre
10 units/acre	0.0035 cfs/acre
12.3 units/acre	0.0043 cfs/acre
18 units/acre	0.0063 cfs/acre
20 units/acre	0.0070 cfs/acre
30 units/acre	0.0105 cfs/acre
Commercial:	
General Commercial	0.0023 cfs/acre
Neighborhood Commercial	0.0093 cfs/acre
Highway Commercial	0.0046 cfs/acre
Office and Professional	0.0023 cfs/acre
Manufacturing/Industrial:	
Light Industrial	0.0050 cfs/acre
General Industrial	0.0046 cfs/acre

7.3.2 PEAK SEWAGE FLOW RATES

Peak sewage flow rates shall be used to determine pipe sizes required to convey sewage flow in accordance with District standards. Peak flows shall be determined from the following equations:

For average flow up to 1 cfs: $\underset{\text{(cfs)}}{\text{Peak Flow}} = 2.0 \times \underset{\text{(cfs)}}{(\text{Average Flow})^{0.822}}$

For average flow greater than 1 cfs: $\text{Peaking Factor} = 2.0 \times \underset{\text{(cfs)}}{(\text{Average Flow})^{-0.10}}$

$\underset{\text{(cfs)}}{\text{Peak Flow}} = \text{Peaking Factor} \times \underset{\text{(cfs)}}{\text{Average Flow}}$

7.4 DESIGN CAPACITIES

Main sewers 8-inch to 12-inch diameter shall be designed to flow one-half (1/2) full.
Trunk sewers greater than 12-inch diameter shall be designed to flow three-quarters (3/4) full.

7.5 SIZE OF SEWER MAINS

The minimum inside diameter of a pubic sewer main shall be eight inches (8").

The District Engineer may approve a 6" diameter sewer under the following conditions:

- ❑ The sewer pipe has a minimum grade of 0.008 ft/ft.
- ❑ The length of the main does not exceed 200 ft., with no possibility of extension.
- ❑ A maximum of ten (10) house laterals will be connected to the main.
- ❑ A manhole is installed at the end of the 6" main.

7.6 STRUCTURE AND PIPE STRUCTURAL DESIGN

All structures and pipe constructed in public roads or other traveled ways shall be designed to support the earth load, groundwater, road surfacing, H-20 live load and shall include an adequate factor of safety.

7.7 PIPE COVER OVER SEWER MAINS

Basic Requirements: Sewers shall be installed at a depth that will provide suitable service to the properties connected and will allow subsequent installation of water lines in accordance with the Water Sewer Separation requirements with a minimum of special construction of water lines other than joint spacing.

Where main or trunk sewers are being designed for installation parallel with other utility pipe and/or conduit lines, the Project Engineer shall design the vertical location of the sanitary sewer in a manner that will permit future side connections of main or lateral sewers and avoid conflict with paralleling utilities without abrupt changes in vertical grade of main or lateral sewers. Under no circumstances shall other utilities be installed directly over and parallel to sanitary sewer installations.

The minimum depth of a sewer main is the depth necessary to obtain five feet (5') of cover over the lateral sewer at the property line, typically six feet (6'). The District may require greater depths when it is necessary to extend the main line sewer to serve other areas to provide for future improvements.

Sewer designs with depths not in accordance with the above shall be submitted to the District Engineer for approval along with evidence that the design complies with the basic requirements above.

7.8 SPECIAL DESIGNS – NON-GRAVITY SEWER

Buildings sewers that are too low for gravity flow to the public sewer main will require conveyance by a pump via a force main. The pump, force main and connection the public sewer shall be owned and operated by the Applicant. See Section 7.17.2 for additional information.

7.9 PIPE CLEARANCES

All sewer mains and structures shall be designed and constructed to have a minimum of three (3) feet horizontal clearance and one (1) foot vertical clearance from other utilities and/or improvements, unless approved otherwise by the District Engineer.

Utility, conduit, or pipelines crossing or running parallel to lateral and building sewers must be separated vertically and/or horizontally by a minimum of 12" from the outside edge of the pipe.

The "California Water Works Standards" set forth the minimum separation requirements for water mains and sewer lines. Theses standards, contained in Section 64630, Title 22 of the California Administrative Code specify:

- ❑ Parallel Construction: The horizontal distance between pressure water mains and sewer lines shall be at least 10 feet.
- ❑ Perpendicular Construction (Crossings): Pressure water mains shall be at least 12 inches (12") above sanitary sewer lines where these lines must cross.
- ❑ Separation distances specified above shall be measured from the nearest edges of the facilities.
- ❑ Common Trench: Water mains and sewer lines shall not be installed in the same trench.

When local conditions such as available space, limited slope, existing structures, etc. create a situation where there is no alternative but to install water mains and sewer lines at a distance less than that required by these standards alternative construction criteria shall apply. State Department of Health requirements shall be met for water sewer separation. See Standard Drawings 19-23. Sewer designs that do not meet State Department of Health clearance requirements shall be approved by the Santa Barbara County Health Department. Said approval shall be shown on the plans with the date and signature of the authorized County Health representative.

7.10 SEWER MAIN CLEARANCE OF WATER WELLS

Sewer lines and related structures shall not to be installed within 50 feet of water wells in accordance with State and County Health regulations. The Applicant must obtain approval from the County Health Department for sewer installations proposed within fifty feet (50') of a water well. Said approval shall be shown on the plans with the date and signature of the authorized County Health representative.

7.11 SEWER MAIN LOCATION

7.11.1 SEWERS IN STREETS

Wherever possible sewers shall be located in public road right of ways, alleys or other paved accessible areas. Sewer alignments and easements proposed across private property shall be approved by the District.

Sewers in streets shall be constructed along street centerlines in straight lines where possible. Sewer lines and manholes shall not be constructed within two feet of concrete gutters.

7.11.2 SEWERS IN ALLEYS

Sewer mains shall be located in the center of alleys, except where concrete ribbon gutters are to be constructed in the center of the alley. Where ribbon gutters are used, the sewer mains shall be offset 2 feet clear from the edge of the concrete ribbon gutter. Sewer mains and manholes shall not be located closer than five feet to the adjacent property line or edge of traveled way.

7.12 EASEMENTS

Easements provided for sewer facilities across private property shall be shown on the plans. Sewers that are located outside of public right of ways shall be located in areas that are accessible by maintenance vehicles. An all-weather access road at least twelve (12) feet wide and with fifteen (15) feet of vertical clearance shall be provided to all manholes. The access road grade shall not exceed 15% in unpaved areas and 20% in paved areas. Truck turnarounds may be required. At said manholes twenty-five (25) feet of vertical clearance is required.

Where easements follow common lot lines, the full easement width shall be on one lot, in such a manner that access to the manholes will not be obstructed by walls, trees or permanent improvements. Where this requirement cannot be met without interfering with existing buildings easements may straddle lot lines.

Easements shall not be obstructed by permanent overhead structures. Deeds for easements shall provide for restrictions of permanent construction within the easement to allow ingress and egress for maintenance.

The minimum width for easements shall be as shown in the following table:

Table 3: Easement Widths

SEWER SIZE	DEPTH FROM SURFACE TO SEWER (IN FEET)]				
	0' to 10'	10' to 15'	15' to 20'	20' to 25'	25' Plus
8" –12"	15	15	20	25	-
15"-21"	20	20	20	25	30
24"-36"	20	20	25	30	35

7.13 ALIGNMENT

Sewer mains shall be laid on a straight alignment and grade between manholes.

Horizontal and vertical curves require the approval of the District Engineer. Curved sewers where allowed, shall meet the minimum radii of curvature specified by the pipe manufacturer. Curves shall be accomplished by bending the pipe rather than deflecting the joints. Horizontal curves shall be concentric with the street centerline where possible. No more than one curve shall be used between manholes. Manholes are required at points of reverse curvature and points of compound curvature. The sum of the horizontal curve deflection between consecutive structures shall not exceed 60 degrees (60º).

Minimum grade of horizontally curved sewer shall be at least the same as straight sewers and preferably greater.

7.14 SIDE SEWERS

Definition: That portion of the sewer system between the main sewer and the structure being served including the building sewer, lateral sewer and wye connection, which are private and installed and maintained by property owners.

7.14.1 SEPARATE SEWERS

A separate side sewer shall be provided for each individual building site. Multiple buildings located on the same legal property may be served with the same lateral or building sewer. The District shall render a single bill to the Property Owner, or Applicant of record that shall include the sewer service charge for the entire property. Upon subdivision of said property, separate sewers shall be installed to each property.

7.14.2 SINGLE RESIDENTIAL SEWER SIZE AND GRADE

The minimum inside diameter of a lateral sewer pipe shall be four inches (4") and shall be equal to or greater than the building plumbing stub diameter. The pipe slope shall not be less than 1/4" per foot (approximately 2%) from the sewer main to the building connection.

7.14.3 MULTIPLE RESIDENTIAL SEWER SIZE AND GRADE

The minimum inside diameter of a lateral sewer pipe shall be six inches (6") and shall be equal to or greater than the building plumbing stub diameter. The pipe slope shall not be less than 1/8" per foot (approximately 1%) from the sewer main to the terminal cleanout. The pipe slope

shall be installed on an even slope from the main sewer line to the connection with the building drain.

Each building or unit to be served shall connect to the 6" sewer pipe with a separate 4" building sewer with a minimum slope of 1/4" per foot. The 4" building sewer shall have a cleanout located eighteen (18) inches from the building.

7.14.4 COMMERCIAL/INDUSTRIAL SEWER SIZE AND GRADE

The minimum inside diameter of a lateral sewer pipe shall be six inches (6") and shall be equal to or greater than the building plumbing stub diameter. The pipe slope shall not be less than 1/8" per foot (approximately 1%) from the sewer main to the building connection or terminal cleanout.

7.14.5 EXISTING BUILDING SEWERS

Existing building sewers may be used for new building connections when they are found, upon evaluation by the District, to meet District standards. The fee for examination and testing shall be determined by the District and shall be paid by the Applicant.

Sewers to be abandoned must be capped with a water tight plug and encased in concrete at the property line or at the easement line where sewer mains are in off road easements. Abandoned sewers shall be inspected by the District.

7.14.6 DEPTH

The lateral sewer shall have a minimum cover of five feet (5') at the property line or at a point five feet (5') outside of the curb face or edge of paving, which ever is greater. Laterals shall be installed deep enough to provide service to the most remote and lowest point of the site's buildable area, while providing the required pipe slope and cover.

Minimum cover for laterals in driveways, parking and other traffic areas within properties other than single family residential, from the property line to a point within eight feet (8') of the building drain connection, shall be three feet (3').

Minimum cover for laterals outside of traffic areas, from the property line to a point within eight feet (8') of the building drain connection, shall be twenty four inches (24"') unless otherwise approved by the District.

Minimum cover for laterals at the point of connection to the building sewer shall be eighteen inches (18")

Depth of service laterals shall be at sufficient depth to provide adequate coverage and service to the lowest point and the farthest point to be served on each lot. At no place shall the depth of a service lateral be less than 5 feet at the property line, nor less than 2 feet below grade surface at any point on private property unless otherwise approved by the District Engineer.

7.14.7 BENDS

Lateral sewers shall be designed and constructed to provide the most direct route from the sewer main to the building connection. All bends 45 degrees and greater shall have a cleanout.

22.5 degree bends shall not be used in lieu of 45 degree or greater bends to avoid the need of cleanouts.

7.14.8 CLEANOUTS

General: Cleanout construction shall conform to Standard Drawing No. 6. Cleanout shall consist of a wye and one-eighth bend and a riser pipe extended just below grade and sealed with a threaded plug or cap that can be removed through the cleanout access cover. Cleanouts shall be protected with a concrete cleanout box. The cleanout box lid shall be cast iron and embossed with "sewer" on the lid.

7.14.8.1 LOCATIONS

Cleanouts shall be installed on laterals at the following locations:

- ❑ the property line or sewer easement line
- ❑ vertical grade breaks
- ❑ horizontal alignment changes of 45 degrees or greater
- ❑ straight run intervals of not more than 100 feet
- ❑ the connection of the lateral to the building plumbing - eighteen (18) inches from the wall drain.

7.14.9 BACKWATER VALVES

A backwater valve is required when the elevation of the lowest floor that has plumbing fixtures is located below the elevation of the next upstream manhole cover of the public or private sewer serving the piping. The backwater valve shall be installed at the junction of the lateral sewer and building sewer, generally eighteen (18) inches from the wall, in place of a standard cleanout, and shall be accessible from a concrete vault with a cost iron cover embossed with "Sewer". (See Standard Drawing No. 15)

7.14.10SAMPLING MANHOLE

A sampling manhole, when required, shall be shown on the plans and be constructed and installed at the property line in accordance with Standard Drawing 14.

7.14.11SAMPLING WELL

A sampling well in lieu of a standard building sewer cleanout, when required, shall be shown on the plans and constructed and installed in accordance Standard Drawing 13.

7.15 MANHOLES

7.15.1 GENERAL

Manholes shall be constructed in accordance with Standard Drawing 10 and these specifications.

7.15.2 DROP ACROSS STRUCTURE

The vertical drop across manholes from the inlet pipe to the outlet pipe shall be one-tenth of a foot (0.1') where the deflection between the upstream pipe and downstream pipe is less than 30 degrees (30°).

The vertical drop across manholes from the inlet pipe to the outlet pipe shall be two-tenths of a foot (0.2') where the deflection between the upstream pipe and downstream pipe is greater than 30 degrees (30°).

7.15.3 ALLOWABLE DEFLECTION ACROSS STRUCTURE

The angle of deflection between the upstream pipe and downstream pipe shall not be greater than 90 degrees (90°).

7.15.4 SPACING AND LOCATIONS

Manholes shall be located at all abrupt changes in alignment or grade and at all junctions. Manholes are required at the following locations:

- ❑ Pipe grade changes
- ❑ Vertical or horizontal angle points
- ❑ Points of reverse curves and compound curves
- ❑ Pipe size changes
- ❑ Junctions of sewer mains
- ❑ At intervals not greater than 350 feet
- ❑ and at pipe terminuses.

Manholes located at intervals greater than 350 feet shall be approved by the District.

Unless approved otherwise by the District manholes shall be constructed:

- ❑ Within six feet (6') of the street centerline.
- ❑ The last manhole on through streets shall be a minimum of eight feet (8') upstream from the lateral of the last lot served.
- ❑ Manholes at the end of cul-de-sac streets shall end (depending on available space) 10 to 15 feet before the curb face at the end of the street.

Sewers with steep grades may require manholes at closer intervals.

When a proposed sewer connects to an existing manhole, the invert elevation of the inlet and outlet pipes shall be shown in profile as determined by field survey.

If a new manhole is proposed on an existing sewer line, the elevation of the existing sewers in the manhole on each side of the proposed manhole shall be determined by field survey. The Applicant should be prepared to submit the field notes of the survey if requested to do so.

7.15.5 SIZE

Manholes for sewer mains 8 inches to 15 inches in diameter shall have a 48-inch inside diameter shaft with a 24-inch diameter entry.

Manholes for sewer mains 18 inches to 27-inches in diameter shall have a 60-inch inside diameter shaft with a 36-inch diameter entry.

Manholes for sewer mains 30 inches or greater in diameter shall have a 72-inch inside diameter shaft with a 36-inch diameter entry.

The frame and cover for 36-inch diameter entry shall be constructed of three pieces consisting of a frame with a 36-inch clear opening with a standard 24-inch cover nested within a 36-inch cover. See Standard Drawing No. 7.

7.15.6 MANHOLE CONES

Cones shall be eccentric and centered over the outlet of the manhole. Under certain circumstances concentric cones may be required by the District. Flat tops shall not be allowed.

7.15.7 RIM ELEVATIONS

In paved areas, the manhole rim elevation shall match finished grade.

In areas outside of the traveled way, the manhole rim shall be 18 inches above finished adjacent grade, 100-year flood elevation, or the top of future fill, whichever is greater.

In maintained landscaped areas, manhole rims shall be 6 inches above finished grade.

Manholes not in travel areas shall be protected from damage per Standard Drawing No. 8.

7.15.8 REMODELING MANHOLES

Existing manhole bottoms to be remodeled shall be removed a minimum depth of three inches (3") to allow construction of new channels and shelves with an approved concrete/mortar material. Sewage in new and remodeled manholes shall be bypassed or controlled across the manhole in a manner that sewage does not flow over the concrete channels until they have cured for a minimum of twenty four (24) hours.

7.15.9 DROP MANHOLES

Drop manholes require special approval by the District. Drop manholes, when approved, shall conform to the Standard Drawing 11.

7.16 INTERCEPTORS (GREASE AND/OR SAND)

"Interceptors" shall be defined as a device of at least 500 gallon capacity designed and installed so as to separate and retain deleterious, hazardous, or undesirable matter such as grease and oil from wastes and permit normal sewage or liquid wastes to discharge into the disposal terminal by gravity.

Grease interceptors, shall be provided on side sewers that discharge wastewater containing grease, oil or other ingredients detrimental to the sewer system. Grease interceptors are typically required at restaurants, grocery stores and other food preparation facilities.

Sand/Oil Interceptors shall be provided when, in the judgment of the District, they are necessary for the proper handling of sand, grit and/or petroleum-based liquid waste which may be harmful to, or cause obstruction of the publicly owned wastewater collection system, interfere with the operation of the publicly owned treatment works, or as otherwise required. Sand/Oil Interceptors are typically required at gasoline stations, car washes, automobile repair shops, etc.

Interceptors shall be sized in accordance with the Uniform Plumbing Code, latest edition. The interceptors shall be designed, sized, installed, maintained and operated so as to accomplish its intended purpose of intercepting the sand/oil/grease from the customer's wastewater and preventing the discharge of such undesirable matter to the District's wastewater treatment plant. The use of larger capacity Sand/Oil Interceptors is encouraged whenever possible in that larger interceptors work more efficiently. In resolving any question of capacity of Sand/Oil Interceptors, any uncertainties shall be resolved in favor of the larger capacity interceptor.

The volume of grease interceptors shall be determined based on the maximum number of drainage fixture units (DFUs) allowed for the pipe size connected to the inlet of the interceptor. The minimum pipe size allowed to be connected to an interceptor is six inch (6") diameter. Drainage Fixture Unit values are defined in Uniform Plumbing Code Table 7-3. UPC Table 10-3, "Gravity Grease Interceptor Sizing" is partially reproduced here for reference.

UPC Table 10-3, "Gravity Grease Interceptor Sizing"

DFUs	Interceptor Volume (gallons)
8	500
21	750
35	1,000
90	1,250
172	1,500
216	2,000
307	2,500
342	3,000
428	4,000
576	5,000

The size, type and location of each interceptor shall be approved by the District, in accordance with this Regulation. A sampling manhole shall be located at the outlet end of all gravity grease interceptors for effluent quality sampling.

Except where otherwise specifically permitted, no wastes other than those requiring separation shall be discharged into any Interceptor. Toilets, urinals and other similar fixtures shall not drain through an interceptor. Waste lines not connected to the interceptor shall enter the sewer lateral after the interceptor and before the sampling manhole.

Interceptors shall be constructed in accordance with Standard Drawing No. 25. The interceptor shall be located outside the building, within the private property, and shall be accessible at all times for inspection, cleaning and removal of intercepted grease, sand, oil, etc. Interceptors shall be placed as close as practical to the fixtures they serve.

The interior of interceptors shall be coated and water tested. The coating shall be a 100% solvent-free two-component epoxy resin system or approved equal. A water leakage test shall be conducted by filling the unit with water for a period of 24-hours and verifying that the structure does not leak.

One set of plans, including complete mechanical and plumbing sections shall be submitted to the District for approval prior to construction. Such plans shall include the size, type and location of each interceptor. Approval shall not exempt the user from compliance with any applicable code, ordinance, rule, regulation or order of any governmental authority. Such approval shall not be construed as or act as a guarantee or assurance that any discharge is or will be in compliance with any applicable code, ordinance, rule, regulation, or order or any governmental authority. Any subsequent alterations or additions to such facilities shall not be made without due notice to and prior approval of the District.

7.17 LIFT STATIONS AND FORCE MAINS

7.17.1 CRITERIA FOR APPLICATION

Wherever practicable, all plumbing fixtures shall be drained to the public sewer by gravity. Lift stations and force mains will not be allowed if an option for providing gravity sewer service exists. Any deviation from this requirement is subject to the approval of the District. Sewage ejector pumps and force mains shall be designed in accordance with Section 710 of the California Uniform Plumbing Code, latest edition.

7.17.2 SEPARATE LIFT STATIONS

Each building site shall be connected by a separate ejector pump and force main. Lift stations and force mains required for sewage service to a property shall be the responsibility of the property owner. The Applicant shall be responsible for the design, construction, operation and maintenance of the required facilities.

7.18 STANDARD DRAWINGS

The following is a list of District Standard Drawings. The Standard Drawings establish the performance, quality requirements and general arrangement of materials and equipment and establish the minimum standards for quality of workmanship and appearance. Standard Drawings applicable to the work shall be listed on the title sheet of the construction plans.

No. 1 - Standard Plan Size & Layout
No. 2 - Sewer Location in Public Roads
No. 3 - Symbols and Abbreviations
No. 4 - Trench Backfill Requirements
No. 5 - Cased Crossing
No. 6 - Side Sewer Cleanout
No. 7 - 36" Manhole Frame and Cover
No. 8 - Remote Area Manhole Jacket
No. 9 - Sampling Manhole Less Than 3' Deep
No. 10 - Standard Manhole
No. 11 - Standard Drop Manhole
No. 12 - Manhole Frame & Cover
No. 13 - Sampling Well
No. 14 - Sampling Manhole
No. 15 - Backwater Valve
No. 16 - Wye Installation in Existing Sewer Main
No. 17 - Lateral Sewer
No. 18 - New Building and Lateral Sewer "As Constructed" Layout Sketch Example
No. 19 - Water-Sewer Separation (Text)
No. 20 - Water-Sewer Separation (Text)
No. 21 - Water-Sewer Separation (Detail)
No. 22 - Water-Sewer Separation (Detail)
No. 23 - Pipe Anchors and Backfill Stabilizers Type 1
No. 24 - Pipe Anchors and Backfill Stabilizers Type 2
No. 25 - Grease Interceptor

END OF SECTION

SECTION 8: LEGAL RELATIONS AND RESPONSIBILITIES

8.1 CONTRACTOR QUALIFICATIONS

Contractors doing sewer work in the District shall be properly licensed in accordance with the provisions of Division 3, Chapter 9 of the Business and Professions Code of the State of California. Licensed contractors shall have one or more of the following licenses:

- Class A – General Engineering Contractor
- Class C34 – Pipeline Contractor
- Class C36 – Plumbing Contractor

8.2 UNDERGROUND SERVICE ALERT - CALIFORNIA ONE CALL LAW

The Contractor's attention is directed to Sections 4215.5 through 4217, of the Government Code of the State of California requiring that two (2) working days prior to commencing any excavation, that "Underground Service Alert of Southern California" be notified by telephone, toll free, at 1-800-422-4133, for the assignment of an "Inquiry Identification Number".

Prior to commencement of construction, Contractor shall pothole all existing conduits including water, sewer, storm drains, electrical lines, telephone lines, cable television lines and other existing utilities to verify horizontal and vertical location where shown on the plans or marked by Underground Service Alert (USA). Potholes shall be located at each crossing of a proposed pipeline with an existing pipeline or conduit for the limits of the work. Contractor shall deliver a plan to the Project Engineer, five (5) working days prior to the start of construction, that shows the horizontal and vertical location of each potholed conduit and allow five (5) working days to evaluate this information.

8.3 GENERAL SAFETY

In accordance with generally accepted construction practices and State Law, the Contractor shall be solely and completely responsible for conditions on the job site, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to working hours.

Safety provisions shall conform to Federal and State Departments of Labor Occupational Safety and Health Act (OSHA), and other applicable Federal, State, County, and local laws, ordinances, codes, requirements set forth herein. Where these requirements are in conflict, the more stringent requirement shall be followed. Contractor shall become thoroughly familiar with the governing safety provisions and shall comply with the obligations set forth therein.

Contractor shall develop and maintain for the duration of the Contract, a safety program that will effectively incorporate and implement required safety provisions. The Contractor shall appoint a qualified employee who is authorized to supervise and enforce compliance with the safety program.

The Contractor shall maintain at the job site, safety equipment applicable to the Work as prescribed by the governing safety authorities, and articles necessary for giving first-aid to the injured. The Contractor shall establish procedures for the immediate removal of persons who may be injured on the job site to a hospital or a doctor's care.

The Contractor shall carefully instruct all personnel working in potentially hazardous work areas as to potential dangers and shall provide such necessary safety equipment and instructions as are necessary to prevent injury to personnel and damage to property. Special care shall be exercised relative to work underground.

Trench Safety: Attention is directed to the requirements in Section 6705 of the State Labor Code concerning trench safety excavation safety plans. A detailed plan showing design of shoring, bracing, sloping or other provisions shall be prepared by a registered Civil or Structural Engineer. Acceptance by the District or its designated agent only constitutes acknowledgment of the submission of said plans and does not constitute review or approval of the designs, design assumptions or criteria. Completeness of submissions, applicability to areas of intended use, and implementation of the plans, are solely the responsibility of the Contractor and his Registered Engineer.

Confined Spaces: Contractor shall be responsible for developing, implementing, administering and maintaining a confined space entry program in accordance with Sections 5156, 5157, 5158, Title 8 of the California Code of Regulations (CCR). Contractor's entering Permit Required Confined Spaces shall have designated personnel for authorized entrants, attendants and entry supervisors.

Entry into Permit Required Confined Spaces as defined in Section 5157, Title 8, CCR may be required as part of the Work. All manholes, tanks, vaults, pipelines, excavations, or other enclosed or partially enclosed spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise.

Fire Safety: Work shall be performed in a fire safe manner. Furnish and maintain on the site adequate fire fighting equipment capable of extinguishing incipient fires. Contractor shall comply with applicable federal, local, and state fire prevention regulations. Where these regulations do not apply, follow applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

Contractor shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities or unramped grade changes in pedestrian sidewalks or walkways, and trenches or excavations in roadways. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work.

The Contractor shall construct and maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, parking lots, open spaces, and other areas affected by the Work. Such barriers shall have adequate warning lights as necessary or required for safety.

8.4 ENVIRONMENTAL CONTROLS

The Contractor in executing the Work shall maintain affected areas within and outside project boundaries free from environmental pollution that would be in violation of federal, state, or local regulations.

The Contractor shall perform Work as not to expose personnel to, or to discharge into the atmosphere from any source whatever, smoke, dust, asbestos, toxic chemicals or other air

contaminants in violation of the laws, rules, and regulations of the governmental entities having jurisdiction. Contractors or subcontractors removing 100 or more square feet of asbestos must be "Certified" in accordance with state law. All work involving exposure to asbestos and all other hazardous materials shall be performed with protection of personnel in compliance with all applicable regulations and safety requirements.

8.5 SANITATION

The Contractor shall provide and maintain enclosed toilets for the use of employees. The toilet facilities shall be maintained in a neat and sanitary condition. They shall also comply with applicable laws, ordinances, and regulations pertaining to public health and sanitation.

Wastewater shall not be interrupted. If sewer facilities are disrupted, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be allowed to flow in trenches or be covered by backfill.

8.6 TRAFFIC CONTROL

8.6.1 SCOPE

Traffic control shall include all material, labor, and equipment to provide safe and effective work areas and to warn, control, protect, and expedite vehicular, bicycle, and pedestrian traffic. All work and material provided under this section shall be performed or furnished in accordance with the following publications as applicable:

- ❑ State of California Department of Transportation Standard Specifications, latest edition;
- ❑ State of California Department of Transportation Standard Plans, latest edition;
- ❑ State of California Department of Transportation "Manual of Traffic Controls – For Construction and Maintenance – Work Zones", latest edition;
- ❑ Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), latest edition.

No work shall be performed in public right-of-ways without permission and permits from the authorizing agency.

8.6.2 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

Construction area, detour, and special signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices" of the Caltrans Specifications and the publications listed in Section 8.6.1.

Signs and equipment shall conform to the requirements of the "Uniform Sign Chart", MUTCD and the "Manual of Traffic Controls - For Construction and Maintenance - Work Zones."

8.6.3 MAINTAINING TRAFFIC

Attention is directed to Section 7-1.08, "Public Convenience", Section 7-1.09, "Public Safety", and Section 12, "Construction Area Traffic Control Devices", of the Caltrans Specifications and other relevant sections related to public safety. Nothing in these provisions shall be construed as relieving the Contractor from his responsibility as provided in said Section 7-1.09.

The Contractor shall notify local authorities of his intent to begin work at least 5 days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his own arrangements relative to keeping the working area clear of parked vehicles in accordance with Section 8.6.5, "Parking Restrictions and Required Postings", of these Specifications.

Access to properties abutting project work areas shall be maintained. For construction requiring driveway closures, the Contractor shall provide written notification to businesses and residences of affected properties a minimum of 48 hours prior to the closure.

During non working hours, two (2) traffic lanes, each a minimum of 11-feet wide (one lane in each direction), shall be provided and shall be delineated with delineators if the existing striping is not visible. During non-working hours all traffic lanes shall be re-opened. During working hours, local traffic may be controlled by flaggers, lane and road closures, and shall follow approved Traffic Control Plans.

All trench and excavations shall be backfilled or covered with a steel plate at the end of each working day. When working in a street not authorized for closure, Contractor shall install a minimum 2-inch temporary asphalt concrete surfacing to provide safe and comfortable passage over (or along) trenches and/or other excavations to public vehicular traffic.

The Contractor shall be responsible for the placement of advisory signs to inform the public of any street closure, detour, or construction affecting traffic or parking at least 7 days before the closure or other significant disruption of normal traffic flow.

Contractor's equipment shall not be parked within any traffic lanes after working hours.

Existing roadside signs conflicting with the construction area signs shall be either removed and reset upon completion of work or securely covered.

Construction signs that will be left in place longer than 5 days shall be set on wood post(s) and embedded in the ground as shown on S42-15 of the Caltrans Standard Plans, latest edition, and in conformance with other reference standards.

Obliteration of existing striping shall be accomplished by grinding, sandblasting, water jetting or other methods approved by the Engineer. Sand must be removed from the pavement as work progresses.

Sufficient visibility to approaching traffic shall be provided when a street is closed partially or completely on a 24-hour basis. The Contractor shall ensure that sufficient illumination be provided by means of portable flashing beacons, floodlights, or other similar devices.

8.6.4 TRAFFIC CONTROL PLANS

The Contractor shall prepare and submit Traffic Control Plans (TCP) to the authorizing agency (City of Goleta, County of Santa Barbara or Caltrans) and the District when required, for approval. TCPs shall show all proposed street closures, detours, lists of signing, delineation of striping, description of construction activity, and schedule of the various phases.

The TCP submitted shall, in addition to other requirements specified, show the following information:

- ❑ The sequences of construction affecting the use of the roadway conforming to the maximum time required for each phase of the work as specified hereinafter.

- ❑ The provisions for decking over excavations or phasing of operations, or a combination of these two methods, to provide the necessary access.

- ❑ The signing, barricading, and temporary striping or marking specified and, as directed by the Engineer, necessary to provide passages for pedestrians, bicycles, and number and width of vehicular lanes over and adjacent to trenches and other excavations.

All TCPs shall be subject to the approval of the authorizing agency(ies) having jurisdiction of the affected area. Copies of permits and approvals shall be furnished to the District.

8.6.5 PARKING RESTRICTIONS AND REQUIRED POSTINGS

The Contractor shall be responsible for the adequate removal of parked cars. All vehicle removal shall be coordinated by the Contractor with the Sheriff's Department or California Highway Patrol. The Contractor shall notify the Sheriff's Communications Center at (805) 681-4100 or California Highway Patrol at (805) 967-1234 upon posting of the parking restrictions for a particular street. For removal of parked vehicles, the Contractor shall notify the Sheriff's Communications Center or California Highway Patrol not less than two hours prior to the needed removal with the address nearest the parked vehicle, make, model, color and license number.

"No Parking" signs posted by the Contractor shall be of heavy card stock and not less than 1.75 square feet of surface area on the face. Background color shall be white and letters shall be printed in red water resistant ink, except that day, date, and time of restriction may be printed in black water resistant ink. The signs shall be printed with the words "Tow Away" and "No Parking" with a character height of not less than 2.75 inches and a stroke width of not less than 0.5 inches. The day, date, and time of the particular restriction shall be printed or attached below the above-mentioned wording in characters of not less than 2.0 inches in height and 0.4 inches in stroke width. The day of the week shall be written out or properly abbreviated with three to four letters; date or dates of restriction shall be listed completely; the beginning and ending times shall be clearly listed on the sign.

Signs shall be mounted such that the wording "No Parking" is at an elevation at least three feet and not more than seven feet above the adjacent flow line. Signs may be tied with string to trees and power poles, taped to existing sign poles, or mounted to stakes or barricades provided by the Contractor. The signs shall be placed as needed to control the parking of cars within the construction zone; signs shall be placed at intervals of 75 feet or less along each side of the roadway.

Signs shall be posted and maintained by the Contractor for a period of 72 hours prior to the restrictions becoming effective. Upon completion of the work, all signs, stakes, and barricades shall be promptly and completely removed and disposed of by the Contractor. The Contractor shall promptly reset or replace all damaged or defective signs.

END OF SECTION

SECTION 9: CONSTRUCTION MATERIALS

9.1 SEWER PIPE MATERIALS

The following are the acceptable pipe materials for construction of public sewers in the District:

- Vitrified Clay Pipe (VCP) – VCP and fittings shall conform to ASTM C700 and shall be Extra Strength. Joints shall be plain end or bell and spigot.

- Polyvinyl Chloride Pipe (PVC) - PVC pipe and fittings with nominal diameters between four inches (4") and fifteen inches (15") shall conform to ASTM D3034 SDR 35. PVC pipe and fittings with nominal diameters between eighteen inches (18") and thirty inches (30") shall conform to ASTM F679 SDR 26.

- Ductile Iron Pipe (DIP) – DIP and fittings shall conform to ANSI A21.51 / AWWA C151. Pipe joints shall be mechanical or bell and spigot utilizing an elastomeric gasket per AWWA C111.

- High Density Polyethylene Pipe (HDPE) – HDPE pipe and fittings shall be manufactured of material conforming to conform to Cell Classification of PE 345444E. HDPE pipe shall be provided in steel pipe sizes (IPS) based on outside pipe dimensions and shall have a minimum dimension ratio of DR17 in conformance with the requirements of ASTM F714. HPDE pipe and fittings shall be joined by butt fusion.

In addition to the above, the following is an acceptable pipe material for construction of private sewers in the District:

- Acrylonitrile-butadiene-styrene Pipe (ABS) - ABS pipe and fittings shall conform to Schedule 40 ASTM F 628 or ASTM D 2661. All products shall bear the seal of a nationally-recognized listing or certifying agency.

The same manufacturer, type and class of pipe shall be used throughout the work. Materials shall be new and undamaged.

VCP, PVC, ABS and DIP pipe products shall be specified by the nominal inside pipe diameter. HDPE pipe shall be specified in steel pipe sizes (IPS) based on outside pipe dimensions

9.1.1 FITTING AND JOINT MATERIALS

Fittings shall be the same material and class as the sewer pipe. Fittings and accessories shall be manufactured by the pipe supplier and shall have a bell and/or spigot configurations compatible with that of the pipe. Fittings shall be stored, prepared and installed per manufacturer's printed requirements.

Plugs shall be watertight butyl rubber and shall be equipped with an expansion bolt to hold plug in end of pipe.

The Contractor shall use stainless steel banded rubber couplings when connecting replacement pipe to existing pipe. When approved by District and where connections involve joining PVC pipe to vitrified clay pipe (VCP) or other dissimilar material, the Contractor shall use "reducer"

(as appropriate) flexible sewer couplings such as Mission Rubber Company Flex-Seal Couplings or equal. Installation shall be per manufacturer's instructions and recommendations.

9.1.2 REPLACING OR REPAIRING PIPE SECTIONS

Repairs to existing sewers shall use the same type and class of pipe of the pipeline being repaired.

9.2 MANHOLE MATERIALS

Base: Cast in place Class 560-C-3250 Portland Cement Concrete per Standard Specifications for Public Works Construction, latest edition.

Shaft and Cone: Precast reinforced concrete in accordance with ASTM C478 using Type II Portland Cement per ASTM C150 and Federal Specification SS-C-1960/3, Type I/II Low Alkali, with a minimum compressive strength of 4000 psi at 28 days. Reinforcing shall be in accordance with ASTM A185.

Joint Gaskets: Joints between shaft sections shall be set with butyl rubber preformed gaskets for manhole joint application in accordance with ASTM C923.

Frame and Cover: Frame and cover castings shall be in accordance with Standard Drawing 12 or 27. Castings shall be of gray iron conforming to the requirements of AASHTO M105 / ASTM A48 Class 35B. Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, distortion or other defects. The finish shall meet industry standards and be cleaned by shot blasting. The cover and frame seat shall be machined so that the cover will sit evenly and firmly and not rock in the frame. Covers that rock will be rejected. Frames and covers shall be dipped in black bituminous paint.

9.3 PIPE BEDDING AND PIPE ZONE MATERIALS

Pipe bedding and pipe zone shall be defined as the area containing the material supporting, surrounding and extending to twelve inches (12") above the top of the pipe. The minimum depth of bedding materials shall be four inches (4").

Bedding and pipe zone material shall be Class I (angular crushed stone or rock, 3/4 inch gradation) material conforming to the requirements of ASTM D 2321, Section 5. The ¾-inch gradation requirements are reproduced in Table 4. The pipe zone material shall have an installed density of at least 90% Relative Density.

Table 4: ¾ -Inch Gradation

Sieve Size	Percent Passing
1-inch	100
¾ inch	90-100
½-inch	30-60
3/8- inch	0-20
No. 4	0-5
ASTM C131 Test Grading	B

For private side sewers - pipe bedding and pipe zone material may be a granular material with a Sand Equivalent greater than 50 and shall have 100 percent passing the 2-inch sieve.

9.4 TRENCH BACKFILL MATERIAL

Trench backfill shall be defined as the area above the pipe zone and below the bottom of the structural section of paved areas. In unimproved areas the trench backfill extends to the finished surface.

- Class I Backfill material shall have a Sand Equivalent greater than 50 and shall have 100 percent passing the 2-inch sieve.

- Cement Slurry shall be a mixture of cement, sand and water and shall meet the requirements of the County of Santa Barbara and/or City of Goleta Public Works Department Standards.

- Native Material may be used for trench backfill in private road and unpaved areas unless the material is unsuitable. Unsuitable material being defined by Unified Soil Classifications:

  OL – Organic silts and organic silty clays of low plasticity
  MH – Inorganic silt, miscaceous or diatomaceous fine sandy or silty soils, elastic silts
  CH – Inorganic clays of high plasticity, fat clays
  OH – Organic Clays of medium to high plasticity
  Pt – Peat and other high organic soils
  - or soil that cannot be compacted to 90 percent relative density.

Within Public Road Right-of-Way:

Above the pipe zone and up to the bottom of the asphalt concrete surfacing shall be one (1) sack cement slurry in accordance with County of Santa Barbara and/or City of Goleta Public Works Department Standards. Asphalt concrete pavement shall not be placed over the slurry cement backfill until the following day (24 hours), with or without cement accelerators.

Outside Public Road Right-of-Way:

Above the pipe zone to the bottom of the pavement section shall be native material from the trench excavation or with select imported material with a sand equivalent greater than 20 meeting County of Santa Barbara Class I Backfill requirements per County Standard Detail 1-020.

9.5 CRUSHED AGGREGATE BASE

Road base material shall be crushed aggregate and shall contain an individual sieve segregation at least 25 percent of particles having their entire surface area composed of faces resulting from fracture due to mechanical crushing.

Quality Requirements shall conform to the following:

Test	Test Method No.	Requirement
R Value	Calif. 301	78 min.
Sand Equivalent	Calif. 217	28 min.
Durability Index	Calif. 229	35 min.

Recycled aggregate base may be used in place of Crushed Aggregate Base. Recycled aggregate base shall conform to the provisions of Section 200-2.4, "Crushed Miscellaneous Base" of the Standard Specifications. Gradation shall conform to coarse gradation. The aggregate shall not be treated with lime, cement, or other chemical materials before the Durability Index test is performed. Untreated recycled asphalt and portland cement concrete will not be considered to be treated with lime, cement, or other chemical materials for the purposes of performing the Durability Index test.

9.6 HDPE PIPE MATERIAL AND FITTING REQUIREMENTS

Materials used for the manufacture of polyethylene pipe and fittings shall be extra high molecular weight, high density PE 3408 polyethylene resin. The polyethylene pipe and fittings shall be made from virgin resins exhibiting a minimum cell classification of PE 345444E as defined in ASTM D3350 and ASTM D1248 with an established hydrostatic design basis of 1600 psi for water at 73°F. The resin shall be listed by the PPI (Plastic Pipe Institute, a division of the Society of the Plastics Industry) in its pipe-grade registry Technical Report (TR) 4, "Listing of Plastic Pipe Compounds". The pipe color shall be gray. The intent of the gray color is to provide increased visibility during CCTV inspection. Alternatively, a coextruded HDPE pipe with a black exterior and soft white interior may be used.

Polyethylene plastic pipe shall meet the applicable requirements of ASTM F714. Pipe shall be provided in steel pipe sizes (IPS) based on outside dimensions. The wall thickness shall have Dimension Ratio of DR17 as prescribed in ASTM F714. The pipe shall be homogeneous throughout and free of visible cracks, holes, voids, foreign inclusions, or other defects that may affect the wall integrity.

HDPE fittings shall be in accordance with ASTM D 3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabrication from HDPE pipe conforming to this specification. The fittings shall be fully pressure rated and provide a working pressure equal to that of the pipe with an included 2:1 safety factor. The fittings shall be manufactured from the same resin type and cell classification as the pipe itself. The fittings shall be homogeneous throughout and free from cracks, holes, foreign inclusions, voids, or other injurious defects.

Pipe and fittings must be marked as prescribed by ASTM F714. During extrusion production, the HDPE pipe shall be continuously marked with durable printing including the following information:

1. ASTM Basis
2. PE Cell Classification
3. Nominal Pipe Size
4. Dimensional Ratio/Pressure Rating
5. Manufacturer Name
6. Production Code (Location & Date of Manufacture)
7. Pipe Test Category
8. Resin Supplier Code

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

Sections of polyethylene pipe shall be joined by the butt fusion process into continuous lengths at the job site. The joining method shall be the heat fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The heat fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer. Extrusion welding or hot gas welding of HDPE shall not be used. Refer to the manufacturer's recommendations.

1. The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak-proof joint. Threaded or solvent-cement joints and connections are not permitted.

2. All equipment and procedures used shall be used in strict compliance with the manufacturer's recommendations. Fusing shall be accomplished by personnel certified as fusion technicians by the manufacturer of the polyethylene pipe and/or fusing equipment.

3. The butt-fused joint shall be true to alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to or greater than that of the pipe. All joints shall be subject to acceptance by the District prior to installation. When required by the District the roll-back bead shall be removed from the interior of the pipe.

4. Defective joints shall be cut out and replaced at no cost to the District. Any section of the pipe with a gash, blister, abrasion, nick, scar or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used and shall be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling as determined by the Engineer and/or his representative, shall not be used and shall be removed from the site.

5. The installed pipe shall be allowed the manufacturer's recommended amount of time, but not less than twenty-four (24) hours, for cooling and relaxation due to tensile stressing prior to connection of sewer lines, sealing of the annulus or backfilling of manholes. Sufficient excess length of new pipe, but not less than six (6) inches, shall be allowed to protrude into the manhole.

6. Following the relaxation period, the annular space may be sealed. Sealing shall be made with material approved by the District and shall extend a minimum of eight (8) inches into the manhole wall in such a manner as to form a smooth, uniform, watertight joint.

SECTION 10: OPEN TRENCH CONSTRUCTION METHODS

10.1 STANDARD SPECIFICATIONS

Standard Specifications shall be the "Standard Specifications for Public Works Construction" (Greenbook), latest edition.

Caltrans Specifications govern pavement materials and methods; and pavement delineation and markings in public road right-of-ways. See Section 8.6 for traffic control requirements.

10.2 TRENCH EXCAVATION

Trench Excavation shall conform to Section 306-1.1, "Trench Excavation", of the Standard Specifications.

The Contractor shall furnish all tools, equipment and supplies, and shall perform all labor necessary in connection with all earthwork and incidental appurtenant work, complete, as specified herein and as indicated on approved drawings.

The work of this section includes all earthwork operations necessary to excavate trenches for pipe and appurtenances, excavation for structures and foundations, all as indicated on the drawings and specified herein. Excavated material shall be immediately placed in trucks and removed from the site. Stockpiling material is not allowed.

All paved surfaces to be removed for excavation shall be neatly saw cut in straight lines to the limits of surface removal. Saw cuts in asphalt concrete pavement shall have a minimum depth of 3 inches. Uneven, rough or damaged pavement edges shall be saw cut again to neat, square, straight lines before placing permanent surface restoration.

Where pavement is to be removed near the edge of existing pavements, at least 2 feet of pavement shall be maintained. If 2 feet of pavement cannot be maintained, then all pavement to the edge of the road shall be removed and replaced.

Adjacent Pavement and Improvements
Existing asphalt pavement adjoining concrete improvements to be removed and replaced shall be removed two feet outside of the limits of the concrete improvements to be installed. Concrete or concrete base shall be removed only with specific approval of the Engineer.

Removed asphalt concrete, unsuitable earth materials, debris, loose fill, organic material, roots, and other rubbish shall be removed and disposed of in an approved and legal manner. These materials shall become the property of the Contractor and shall be disposed of off-site at Contractor's expense in accordance with applicable laws and regulations.

Trenches excavated to depths exceeding 5 feet shall be shored in accordance with the CAL/OSHA Trench Construction Safety Orders of the Division of Industrial Safety requirements.

The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavations shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to line and grade shall be made by excavating or filling with gravel bedding material under the body of the pipe and not by wedging or blocking.

If the trench is excavated below the required grade, the part of the trench excavated below grade shall be corrected by filling with bedding materials as specified herein at no additional cost to the Owner. Bedding material shall be placed over the full width of trench in compacted layers not exceeding 6 inches in depth to the established grade with allowance for the pipe base.

When subgrade is encountered that, in the opinion of the District, is unsuitable for pipe support, the District may order the excavation to be carried to an approved depth below the bottom of the pipe and backfilled with crushed aggregate, or an engineered stabilization method, to the lines and grades shown on the plans and/or specified by the District. Excess and unsuitable fill materials shall be disposed of at an appropriate location secured by the Contractor at his expense.

The minimum width of the trench at the top of the pipe zone shall be the outside diameter of the pipe plus sixteen (16) inches plus the thickness of required shoring and bracing.

The minimum trench width for service connection piping may be reduced to three times the outside diameter of the service pipe. This reduced requirement shall be used from the outside of the main trench near the wye or service connection at the main line to the point of connection to the existing service.

Minimum separation distances and requirements between water and sewer pipes shall be as established by the State of California Department of Health Services.

The maximum width at the top of the trench will not be limited, except where excess width of excavation would cause damage to adjacent structures or property. Slope trench walls or provide shoring and sheeting as required for construction and safety.

Open trenches during non-construction hours are not allowed unless specifically authorized by the District. Where trench walls and adjacent soils are sufficiently stable for the use of plate bridging, the Contractor may use steel traffic plates to cover open trenches during non-construction hours. Plate bridging shall be accomplished in accordance with the State of California Department of Transportation "Manual of Traffic Controls – For Construction and Maintenance – Work Zones", latest edition. The plates shall extend a minimum of 12 inches beyond the edge of the trench. The plate edges shall have a minimum 4-inch premixed asphalt concrete grade transition. Trench plates placed by the Contractor in the traveled way (both vehicular and pedestrian) shall have a slip resistant surface.

10.3 TRENCH STABILIZATION

Where unstable, spongy, or otherwise unsuitable foundation soils are encountered they shall be removed to firm soils and replaced with compacted bedding material.

10.4 HANDLING AND TRANSPORTATION OF PIPE

During loading, transportation, unloading, storage, and laying, every precaution shall be taken to prevent damage to the pipe, linings, and coatings. Pipe that is damaged shall be removed from the site of the work and replaced.

Heavy canvas or nylon slings of suitable strength shall be used for lifting and supporting materials. Chains, cables or other products that may cause damage to the pipe shall not be used to handle the pipe.

Pipe gaskets shall be stored in a cool, well ventilated place and not exposed to direct sunlight. Do not allow contact with oils, fuels, petroleum, or solvents. Do not reuse gaskets when joints are disassembled and refitted.

10.5 PIPE PREPARATION AND HANDLING

Except as approved by the District, do not distribute pipe to the job more than 3 days prior to installation. Material shall be stored in a manner that will not be a hazard to the public or to traffic, will not obstruct access to adjacent property, and will not obstruct other Contractors' working in the area.

Each pipe and fitting shall be carefully inspected before being installed. Any pipe which is, in the opinion of the District, damaged shall not be used and shall be promptly removed from the site. Wipe the joints of the pipe, fittings, and appurtenances clean of all dirt, grease, and foreign matter before the pipe is lowered into trench.

Use proper implements, tools, and facilities for the safe and proper protection of the pipe. Carefully handle pipe in such a manner as to avoid any physical damage to the pipe. Do not drop or dump pipe into trenches under any circumstances.

10.6 PREPARATION OF TRENCH

Pipelines shall be installed to line and grade per the Surveyor's cut sheets. Pipelines intended to be straight shall be so installed.

At the location of each joint, dig bell (joint) holes of ample dimensions in the bottom of the trench and at the sides where necessary to permit the joint to be made properly and to permit easy visual inspection of the entire joint and checking of the gasket with a feeler gauge as applicable.

Do not lay pipe in water, on unstable subgrade, or when, in the opinion of the District, trench conditions are unsuitable.

10.7 LAYING BURIED PIPE

All pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's instructions and these specifications. No pipe shall be directly jacked into place unless specifically designated.

All buried pipe shall be prepared as hereinbefore specified and shall be laid on the prepared crushed rock base and bedded to ensure uniform bearing. After each section is jointed, place pipe zone material under and along sides of the pipe to prevent movement and to ensure uniform support. Follow pipe laying operations closely with backfilling of the trenches with sufficient material to prevent the pipe from moving. Take precautions necessary to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.

Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, do not exceed 75 percent of the amount of joint deflection recommended by the pipe, fitting, or coupling manufacturer and as approved by the District.

Foreign material shall not be allowed to enter the pipe while it is being placed in the trench. When laying operations are not in progress, whenever workmen are absent from the job and at the end of the work day, close and block the open end of the last laid section of pipe with a watertight plug to prevent entry of animals, foreign material or creep of the gasket joints. End closure shall be sufficient to prevent trench water from entering pipe. Keep water out of the trench.

10.8 REQUIREMENT FOR PIPE COVER

Sewers shall be installed at a depth that will provide suitable service to the properties connected and will allow subsequent installation of water lines in accordance with the water Sewer Separation requirements with a minimum of special construction.

The sewer main shall have a minimum of five feet (5') of cover from the top of the pipe to the flow line of the existing or proposed gutter, or where no gutter exists from the outer most edge of the traveled way.

Service laterals shall be installed at a minimum depth to provide a connection to any point on the lot within the established building setback lines, to allow for a minimum pipe slope of 2 percent and with a minimum cover of 2 feet (2') to the top of the pipe.

10.9 STRUCTURE BACKFILL

Attention is directed to Section 300-3, "Structure Excavation and Backfill", of the Standard Specifications and these Provisions.

Backfilling shall not begin until construction below finish grade has been approved, forms removed, and the excavation cleaned of trash and debris. Backfill shall be placed symmetrically around structures to prevent eccentric loading upon or against said structures. Backfill shall be compacted in lifts no greater than 8 inches deep and brought to finished grade.

10.10 TRENCH BACKFILL

Attention is directed to Section 306-1.2.1, " Bedding", and Section 306.1.3, "Backfill and Densification", of the Standard Specifications, County of Santa Barbara Public Works Department Standard Details 1-020 and 1-030, approved drawings and these provisions.

During the process of laying pipe in trenches, sufficient bedding material, as described herein, shall be carefully placed and tamped about the pipe to hold it firmly to established line and grade. Oversize material, trash, debris, broken rock or shale, if encountered, shall not be used for backfill.

All backfill material, above the pipe zone, shall be deposited in horizontal layers as specified herein. The distribution of materials shall be such that all material following compaction and consolidation will form a homogeneous mass free of voids, pockets, streaks or other imperfections. Backfill material shall conform to authorizing City or County agency. Do not backfill over porous, wet, or spongy subgrade.

Native backfill material, above the pipe zone, shall be deposited in horizontal layers as specified herein. The distribution of materials shall be such that all material following compaction and consolidation will form a homogeneous mass free of voids, pockets or other imperfections. Backfilling shall be done with soil free from lumps, hardpan, paving materials, organic matter or other deleterious substances. Oversize material, trash, debris, broken rock or shale, if encountered, shall not be used for backfill.

The compaction of backfill material shall be achieved by mechanical equipment. Optimum moisture content of fill materials shall be maintained to attain required compaction density. Compaction of backfill material for trenches or structures, shall be done to a minimum density of 95% as determined by laboratory procedure prescribed in ASTM D-1557. Jetting of trench backfill shall not be permitted. Surplus fill material shall be removed from site.

Within County of Santa Barbara public right-of-ways: Above the pipe zone and up to 5 feet below the bottom of the asphalt concrete surfacing, the trench shall be backfilled with native material from the trench excavation or with select imported material with a sand equivalent greater than 20 meeting County of Santa Barbara Class I Backfill requirements per the County Standard Detail 1-020.

From 5 feet below the bottom of the asphalt concrete surfacing to the asphalt concrete surfacing shall be one (1) sack cement slurry in accordance with County of Santa Barbara Public Works Department Standard Details 1-020, 1-030 and the Project Drawings.

Prior to placement of surfacing materials, the Owner or Applicant's Geotechnical Engineer shall take compaction tests in any backfill area and at any depth, with the Contractor providing equipment and operator to assist in such test. If any such compaction test fails, the Contractor shall correct such failure and pay for any re-testing that is required. The Owner or Applicant's Geotechnical Engineer shall make as many tests as are required to receive a satisfactory and acceptable job.

END OF SECTION

SECTION 11: INSPECTION AND TESTING

11.1 COMPACTION TEST STANDARDS

The standard test used to define minimum density of compaction work for earthwork shall be ASTM Test Procedure D 1557, unless designated otherwise. Densities shall be expressed as a relative compaction in terms of maximum density obtained in the laboratory by the foregoing standard procedure.

The standard test used to define minimum density of compaction work for crushed aggregate base and crushed rock shall be California Test Method 216. Densities shall be expressed as a relative compaction in terms of maximum density obtained in the laboratory by the foregoing standard procedure.

11.2 TESTING AND CLEANING PIPELINES

Attention is directed to Section 306-1.4, "Testing Pipelines", of the Standard Specifications and these Special Provisions.

The Contractor shall furnish the material, labor, and equipment for making tests for leakage and infiltration of groundwater. Tests shall be made after the sewer trench has been backfilled and before paving. All sections of sewer shall be tested in accordance with the following requirements for leakage and infiltration tests as directed by the Engineer. Each section of pipe line between manholes shall be tested by a low pressure air test. If for some reason an air pressure test is not feasible a water infiltration test will be used.

The Contractor may perform any preliminary tests desired which are not harmful to the pipelines before backfilling is completed. Before final tests are performed for acceptance of any sewer the pipe shall be cleaned.

11.2.1 AIR PRESSURE TEST

Attention is directed to Section 306-1.4.4, "Air Pressure Test", of the Standard Specifications, and the District Standards.

The Contractor shall furnish all materials, equipment and labor for conducting an air test. The final acceptance test shall be done in the presence of a District Representative.

1. Air shall be introduced into pipeline until 3.0 psi gage pressure is reached.

2. Maintain internal air pressure between 2.5 and 3.5 psi gage pressure for at least 2 minutes. Pressure in the pipeline shall not be allowed to exceed 5 psi gage pressure. The pipeline pressure shall be constantly monitored. The gage and hose arrangement shall be separate from the hose used to introduce air into the pipe.

3. Air pressure shall be reduced to 2.5 psi gage pressure. A stop watch shall be used to determine the elapsed time for the pressure to drop from 2.5 psi to 1.5 psi gage pressure.

4. If elapsed time is less than that shown in the following table, the Contractor shall make necessary corrections to the pipeline and retest until satisfactory.

Air Test Chart

Diameter of Pipe (inches)	Length of Pipe (Feet)	Allotted Test Minutes
4	All	2
6	0 to 300	2
6	300 to 370	2.5
6	370 and greater	3
8	0 to 170	2
8	170 to 210	2.5
8	210 to 250	3
8	250 to 290	3.5
8	290 and greater	3.75
10	0 to 110	2
10	110 to 165	3
10	165 to 215	4
10	215 and greater	4.75
12	0 to 115	3
12	115 to 155	4
12	155 to 190	5
12	190 and greater	6
15	0 to 120	5
15	120 to 165	7
15	165 and Greater	15
18-30	All	15

11.2.2 WATER INFILTRATION TEST

Attention is directed to Section 306-1.4.3, "Water Infiltration Test", of the Standard Specifications and the District Standards.

The Contractor shall furnish all materials, equipment and labor for conducting a water infiltration test. The final acceptance test shall be done in the presence of a District Representative.

If, in the construction of a section of the sewer between any two structures, excessive groundwater is encountered, a test for exfiltration test for leakage shall not be used, but instead the end of the sewer at the upper structure shall be closed sufficiently to prevent the entrance of water, and the pumping of the groundwater shall be discontinued for at least three (3) days after which the amount of water intercepted at the structure below the plugged end of the sewer shall not exceed two-tenths (0.2) gallon per minute per inch of nominal diameter of pipe per thousand feet of length of sewer being tested. The length of house connections shall not be used in computing the length of sewer main being tested.

If the leakage or infiltration, as shown by the tests, is greater than the amount specified, the pipe shall be overhauled and re-laid, if necessary, by the Contractor, at their expense, until the leakage is reduced satisfactorily.

Regardless of the results of the above tests, any visible evidence of individual leaks shall be corrected by the Contractor to the satisfaction of the Engineer.

After backfilling and compaction testing is completed, sewer lines shall be balled, flushed and cleaned, before acceptance by the District and connection to the sewer system.

The Contractor shall furnish all sewer line plugs necessary for blocking off all lines as required by the Engineer until final acceptance.

11.2.3 DEFLECTION TESTING

The Contractor shall furnish a mandrel and other required apparatus, and personnel for conducting a mandrel test under the direction and supervision of the Inspector. The mandrel shall have an odd number of webs (minimum of nine), and measure pipe deflection not greater than five percent (5%) of the pipe diameter. The mandrel shall be supplied by the pipe manufacturer.

11.3 PIPE CLEANING

All installed sewer mains and trunks shall be cleaned, as required by the Inspector, with a hydraulic jet-rodder with spinning nozzle or by the balling method, as approved by the District, in accordance with the manufacturer's instructions and recommendations. Screens used for trapping debris shall be approved by the District and secured with a nylon rope. Cleaning, including screen installation and removal, shall be done in the presence of the Inspector.

11.4 CCTV INSPECTIONS OF SEWER PIPES

Attention is directed to Section 500-1.1.5, "Television Inspection", of the Standard Specifications. All new sewer mains and trunks installed shall be inspected by close circuit television (CCTV) from center of manhole to center of manhole. CCTV recordings shall be in color on a DVD and have audio and text comments and clearly legible footage readings. Prior to the acceptance of sewer pipe(s), the Contractor shall provide DVD video inspection records of the new sewer pipe. Television Inspection shall be made after the construction of the system is completed and shall follow the sequence from the upstream end to the downstream end of the project. No splicing allowed!

The inspection shall be conducted in the presence of the District or their authorized representative. The CCTV inspection shall be performed while the upstream lines are plugged or bypassed. The line shall be dry except for flow from the laterals in the section of line being televised. Prior to camera inspection, water shall be flushed through the pipe being inspected to make low points easier to detect. Additionally, during camera inspection, if pipe sags are apparent, the District may require flowing water through the pipe. The rate of flow shall be as required by the District Representative.

CCTV inspection shall be performed utilizing a rotating lens video camera system. The video inspection and recording performed with this camera shall stop at each lateral and the head shall be rotated to look up the lateral to identify potential defects. Defects shall also be closely inspected by rotating the camera head for close-up view.

Log sheets indicating date of inspection, location of services, upstream manhole and down stream manhole, direction of view, pipeline length, and all found defects shall be kept during

inspection. DVDs shall be numbered and marked with the location of the inspection. DVDs shall become the property of the District once inspection is complete.

The camera shall be equipped with a remote reading footage counter and shall be checked and calibrated, if required, before inspection begins. Camera runs shall start from the center of the upstream manhole of the pipe being inspected and shall be pulled through at a speed that allows a close of inspection and shall not exceed 20 feet per minute. The Camera shall be in focus and display a clear view of the pipe on the field monitor. The inspection shall end at the center of the downstream manhole of the pipe being inspected.

11.5 MANHOLE VACUUM TEST

The Contractor shall perform a vacuum leak test on all new sewer manholes after assembly and before backfill. The Contractor shall furnish all materials, equipment and labor for conducting a vacuum test. The test shall be done in the presence of a District Representative.

Pipes entering the manhole shall be plugged and braced to prevent movement of the plug during testing. The vacuum apparatus shall be connected to the manhole frame. A positive seal between the manhole and the vacuum base shall be established. The test gauge shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.

A vacuum of ten inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed and the vacuum pump shut off. The time shall be measured for the mercury to drop from ten inches to nine inches of mercury. The manhole shall pass if the time it takes the mercury to drop one inch is more than 60 seconds for a four-foot manhole or more than 75 seconds for a five foot-manhole. If manhole fails, Contractor shall make necessary repairs and retested until a satisfactory test is obtained.

If gaskets are displaced during testing the manhole shall be dismantled and the gasket(s) shall be replaced with new gaskets.

	Diameter of Manhole (feet)		
Depth of Manhole	4	5	6
(feet)	**Time (Sec.)**		
Up to 8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30+	74	98	121

11.6 TEST RECORDS

Records shall be made of each pipe system test. These records shall include:

- ❑ Date of test.
- ❑ Location, description and identification of pipe or structure tested.
- ❑ Test fluid/medium.
- ❑ Test pressure.
- ❑ Remarks to include such items as: Leaks (type, location, etc.). Repairs made on leaks.
- ❑ Certification by Contractor and signed acknowledgment by Inspector/Engineer.

END OF SECTION

SECTION 12: MANHOLE REHABILITATION

12.1 REQUIREMENTS

Attention is directed to Section 500-2, "Manhole and Structure Rehabilitation," of the Standard Specifications. Manhole rehabilitation shall conform to section 500-2 of the Standard Specifications and its supplements except as modified herein.

The Contractor shall select one of the lining systems listed below to rehabilitate manhole interior concrete or brick surfaces.

1. Air-Place Concrete and Polyurethane Protective Lining Manhole Rehabilitation shall comply with Subsection 500-2.4 of the Standard Specification for Public Works Construction.

2. Air-Place Concrete and Epoxy (100% Solids) Protective Lining Manhole Rehabilitation shall comply with Subsection 500-2.4 of the Standard Specification for Public Works Construction.

3. Cured-In-Place Fiberglass Manhole Liner System in accordance with these Section 12.7.

Verification of product conformance with these requirements shall be submitted to the District.

12.2 WARRANTY

Manufacturer shall warrant all work against defects in materials and workmanship for a period of five (5) years from the date of final of acceptance of the project. Manufacturer shall, within a reasonable time after receipt of written notice, repair defects in materials and workmanship within said five (5) year period. Any damage to other work caused by such defects or the repairing of same, shall be at the Contractor's expense and without cost to the District.

12.3 GENERAL

Attention is directed to Section 500-2.1.1, "General" of the Standard Specifications.

Add: Channel And Shelf Rebuilding. Where indicated on the Plans, channel and shelf areas shall be brought back to there original or otherwise specified dimensions using concrete mortar. Shelves shall be hand troweled to provide a smooth and uniform width channel.

12.4 PRE-INSPECTION AND SURFACE PREPARATION

Prior to commencing any work, the Contractor shall inspect and verify all dimensions and the locations and number of all sewer connections entering each manhole, and examine the condition of the existing manholes. Any areas of apparent structural damage shall be reported to the District. For cured-in-place fiberglass manhole liner systems outside dimensions of the reinforcing fabric shall be properly sized to allow for stretch to fit the contour and shape of the interior of the manhole.

Attention is directed to Section 500-2.4.2, "Cleaning" of the Standard Specifications. All surfaces to be lined shall be cleaned by water blasting to remove all loose deteriorated

concrete, dirt, grease, sand and other foreign matter. High-pressure water blast shall be at pressures between 5,000-psi minimum to 10,000 psi maximum. All materials generated by preparation of surfaces shall be trapped and collected for disposal off site; no materials will be allowed to enter the sewer at any time. If a degreasing compound is used, the surface shall be thoroughly rinsed prior to the installation of the lining system.

All voids and spalled areas shall be filled and patched to provide a relatively smooth surface. The cementitious patching/plugging compound shall be a high strength, non-shrink grout approved by the District. All sewer pipes protruding into the manhole shall be cut flush with the interior manhole wall or brought flush with the manhole wall using hydraulic cement and fiberglass, per the manufacturer's recommendation.

All unused stubs shall be bulkheaded and mortared smooth and flush with the interior of the manhole wall. Pull rings shall be left in place and sealed with resin (and fiberglass for CIPP). Other obstructions, including manhole steps, shall be cut flush with the interior manhole wall. After surface preparation and prior to concrete repair, the Contractor shall stop all infiltration in the existing structure. Infiltration in existing structures shall be stopped by injection of chemical grout. Grout shall be installed per the manufacturer's recommendations.

12.5 INSTALLATION

Installation of the lining system shall be performed by a licensed contractor certified by the manufacturer to install their system. Unless otherwise shown on the Plans, limits of the lining shall extend from the manhole frame down to 3" below the low water level in the channel.

Installation of the lining system shall be scheduled and coordinated with the sewer replacement work. Installation of manhole lining system shall be scheduled after the sewer pipe and frames are installed.

The completed product shall be a permanent, monolithic, smooth, impervious liner shaped to the interior of the manhole. The lined manhole shall be completely water tight and free of any joints or openings other than pipe inlets, pipe outlets and the rim opening. All defective areas and imperfections including, but not limited to poor adhesion, voids and air bubbles shall be repaired in strict conformance with the recommendation of the manufacturer and subject to the approval of the Engineer.

12.6 SUBMITTALS

The Contractor shall submit a complete manhole rehabilitation submittal to the District for review and approval. The submittal shall include, but shall not be limited to the following:

1. Name of the manufacturer and product data including material safety data sheets, certifications of materials, and the physical properties and chemical resistance testing of the resin or epoxy system.
2. Name of the manufacturer and product data including the material safety data sheets for the patching/plugging compound and the chemical grout, if infiltration exists.
3. Plan of construction including schedule, equipment setup, inspection, preparation, cleaning, and complete installation procedures and details.
4. Qualifications of the installer including certification by the manufacturer.

12.7 CURED-IN-PLACE FIBERGLASS MANHOLE LINING SYSTEM

12.7.1 MATERIALS

The lining system shall be suitable for continuous service in sewerage environments with 1N sulfuric acid at an average wastewater temperature of 80 degrees F and intermittent exposure to a pH of 11. The lining system shall consist of a 4-ply fiberglass reinforcing fabric impregnated with a modified epoxy resin system with a minimum cured wall thickness of 90 mils. The fiberglass fabric shall be layered product of Type E glass stitched with chopped strand and bound with styrene-soluble binder. The surfacing veil shall be woven and made of Type E glass with volan finish and styrene-soluble binder. The modified epoxy resin shall be a two components resin/mastic system cross-linked with a modified polyamide-curing agent.

12.7.2 INSTALLATION

The reinforcing fabric shall be saturated with the properly mixed resin system and lowered into the manhole and secured in place. The liner system shall be inflated with air pressure to fit the interior of the manhole and allowed to cure under suitable heat and controlled temperature. After curing and after an adequate cool down period, the lining system shall be cut and trimmed with all services restored. The perimeter of the system shall be fully sealed with compatible resin and fiberglass to form a structurally sound and vapor tight joint with the liner pipe and the lined sewer. The completed product shall be a permanent, monolithic, lined and impervious structure shaped to the interior of the manhole. The lined manhole shall be completely water tight and free of any joints or openings other than pipe inlets, pipe outlets and the rim opening. All defective areas and imperfections including, but not limited to poor adhesion, excessive voids, air bubbles, and exposed glass shall be repaired in strict conformance with the recommendation of the manufacturer and subject to the approval of the District.

12.8 TESTING AND INSPECTION

12.8.1 THICKNESS TESTING

During application of coatings a wet film thickness gage meeting ASTM D4414 – "Standard Practice for Measurement of Wet Film Organic Coatings by notched Gages", shall be used to ensure a monolithic coating and uniform thickness during application.

12.8.2 HOLIDAY TESTING

Attention is directed to Section 500-2.4.8, "Spark Test" of the Standard Specifications.

The finished liner will be spark tested for pinholes with a spark tester set at 15,000 volts minimum. All areas in question shall be marked and patched. Patched areas shall be retested with the spark tester set at 15,000 volts minimum.

12.8.3 BOND STRENGTH TESTING

Measurement of bond strength of the protective coating to the substrate shall be made at regular intervals, as directed by the District Inspector, a minimum of one test per five manholes. Bond strength shall be measured in accordance with ASTM D-4541. Passing criteria shall be a pull resulting in concrete failure, with concrete visibly bonded to the test section of coating material. Areas detected to have inadequate bond strength shall be evaluated by the District.

Further bond tests may be required to determine the extent of potentially deficient bonded areas. Repairs shall be made in strict conformance with the manufacturer's recommendations. Tested areas shall be patched and spark tested.

END OF SECTION

SECTION 13: BORING AND JACKING

13.1 GENERAL

Bore and jacking operations shall conform to Section 306-2, "Jacking Operations", of the Standard Specifications and these Special Provisions.

Prior to tunneling or boring and jacking operations, existing utilities being crossed shall be potholed and surveyed to determine their actual depths. The District shall receive a copy of all permits for facilities to be installed within other agencies' jurisdictions or right-of-ways, including but not limited to Caltrans, UPRR, City of Goleta, City of Santa Barbara and the County of Santa Barbara.

Within public right-of-ways, prior to beginning the bore and jack operations, a survey grid shall be established along the centerline of the pipeline alignment and up to 30 feet on either side at 10-foot increments or as required by encroachment permits. The grid shall be surveyed prior to bore and jack operations and shall be monitored throughout the casing installation to detect differential settlement.

Upon completion of jacking operations, all voids around the outside face of the casing pipe shall be filled by grouting.

13.2 BORE AND RECEIVING PITS

Bore and receiving pits shall be shown on the Plans. Pits shall be adequately fenced and/or have a Type K barrier placed around them. Pits shall be shored in accordance with Cal-OSHA requirements. Shoring for pits located within 15 feet of travel lanes shall not extend more than 36-inches above the pavement grade. A 6-foot chain link fence shall be installed around the perimeter of the pits during non-working hours.

All pits shall have crushed-rock and sump areas to clear groundwater and construction water. In areas where groundwater is found and pumping is required, the pits shall be lined with filter fabric.

All bore pit repair shall comply with the requirements for bedding, backfill, compaction and pavement surfacing repair for trenching.

13.3 CASING PIPE

Steel casing pipe shall be welded steel pipe of the diameters and thicknesses shown on the Plans. Casing inside diameter shall be a minimum of twice the outside diameter of the carrier pipe to be installed within the casing, but in no case shall the annular space between the carrier and casing pipes be less than 4 inches.

Steel pipe casings shall conform to AWWA C200. Steel shall be ASTM A36 or ASTM A570, Grade 36 and have a minimum yield strength of 36,000 psi. Casing pipe shall be fabricated in sections for welded field joints. Field joints shall be welded butt joints. Each end of the casing for butt welding shall be prepared by providing ¼ inch by 45 degree chamfer on the outside edges. All casing lengths shall equal the auger length. Spiral weld casing will not be allowed. The Contractor shall provide grout connections as shown on the Drawings.

The minimum wall thickness shall be as shown on the Plans. The casing pipe minimum thickness shown on the Drawings is what is required by the District. Contractor shall be responsible for increasing the thickness as necessary for the bore and jack operation. Solely at the Contractor's expense and with the prior approval of the Engineer, casings of a larger diameter than those shown on the Plans may be provided if such a change will facilitate the working methods the Contractor intends to employ.

13.4 PRESSURE GROUTING

Under public roadways and when required by the District or other agency having jurisdiction, the Contractor shall pressure grout the area between the pavement and the casing from within the casing in order to fill any voids caused by the bore and jack installation. Grouting pressure shall not exceed 5 psig for a duration sufficient to fill all voids.

13.5 CARRIER PIPE INSTALLATION

The carrier pipe installed within the casing shall be installed with casing spacers as shown on the drawings and, when required by the District, with restrained joints. The contractor shall install pipe, restrained joints and casing spacers per manufacturer's recommendations.

The annular space between the casing and carrier pipe shall not be filled.

13.6 CASING SPACERS

Casing spacers shall be prefabricated and shall be centered and restrained. Casing spacers shall be a minimum of 8-inches wide. The spacers shall be located at 8-foot intervals (maximum) along the pipe. A minimum of three spacers shall be installed on each carrier pipe segment. Bolts, nuts, washers and other fasteners shall be type 304 stainless steel. Casing spacers shall be manufactured by Advanced Products & Systems (APS) (Tel: 800-315-6009), Pipeline Seal and Insulator (PSI) (Tel: 800-423-2410) or PowerSeal (Tel: 800-800-0932) or approved equal.

13.7 PIPE JOINT RESTRAINTS

Carrier pipe bell and spigot joints, when required by the District, shall have a joint restraining system to prevent displacement of the pipe ends.

13.8 CASING END SEALS

The ends of the casing pipe shall be sealed to prevent the entrance of foreign material. End seals shall be INNERLYNX as supplied by Advanced Products & Systems (APS) (Tel: 800-315-6009). The end seal shall provide a mechanical water-tight seal between the carrier pipe and casing. The seal shall be the model number recommended by the manufacturer for the size(s) of pipe furnished and approved by the District.

END OF SECTION

SANITARY SEWER

STANDARD DRAWINGS

FOR

A PUBLIC AGENCY

PROTECTING PUBLIC HEALTH AND THE ENVIRONMENT

APPROVED BY
GENERAL MANAGER/DISTRICT ENGINEER:

KAMIL S. AZOURY, P.E.

2/1/08
DATE

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12/30/2005

PLEASE CONTACT THE GOLETA SANITARY DISTRICT
IF YOU HAVE ANY QUESTIONS
ONE WILLIAM MOFFETT PLACE, GOLETA CA, 93117 (805) 967-4519

STANDARD DRAWING NUMBER	DRAWING TITLE
1	STANDARD PLAN SIZE & LAYOUT
2	SEWER LOCATION IN PUBLIC ROADS
3	SYMBOLS AND ABBREVIATIONS
4	TRENCH BACKFILL REQUIREMENTS
5	CASED CROSSING
6	SIDE SEWER CLEANOUT
7	36" MANHOLE FRAME AND COVER
8	REMOTE AREA MANHOLE JACKET
9	SAMPLING MANHOLE LESS THAN 3' DEEP
10	STANDARD MANHOLE
11	STANDARD DROP MANHOLE
12	MANHOLE FRAME & COVER
13	SAMPLING WELL
14	SAMPLING MANHOLE
15	BACKWATER VALVE
16	WYE INSTALLATION IN EXISTING SEWER MAIN
17	LATERAL SEWER
18	NEW BUILDING AND LATERAL SEWER REQUIRED "AS CONSTRUCTED" LAYOUT DRAWING EXAMPLE
19	WATER-SEWER SEPARATION (TEXT)
20	WATER-SEWER SEPARATION (TEXT)
21	SEWER-WATER SEPARATION (DETAILS)
22	WATER-SEWER SEPARATION (DETAILS)
23	PIPE ANCHORS AND BACKFILL STABILIZERS TYPE 1
24	PIPE ANCHORS AND BACKFILL STABILIZERS TYPE 2
25	SAND INTERCEPTOR/GREASE INTERCEPTOR

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

STANDARD DRAWING INDEX

REVISIONS	BY	APP	DATE

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GOLETA SANITARY DISTRICT

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

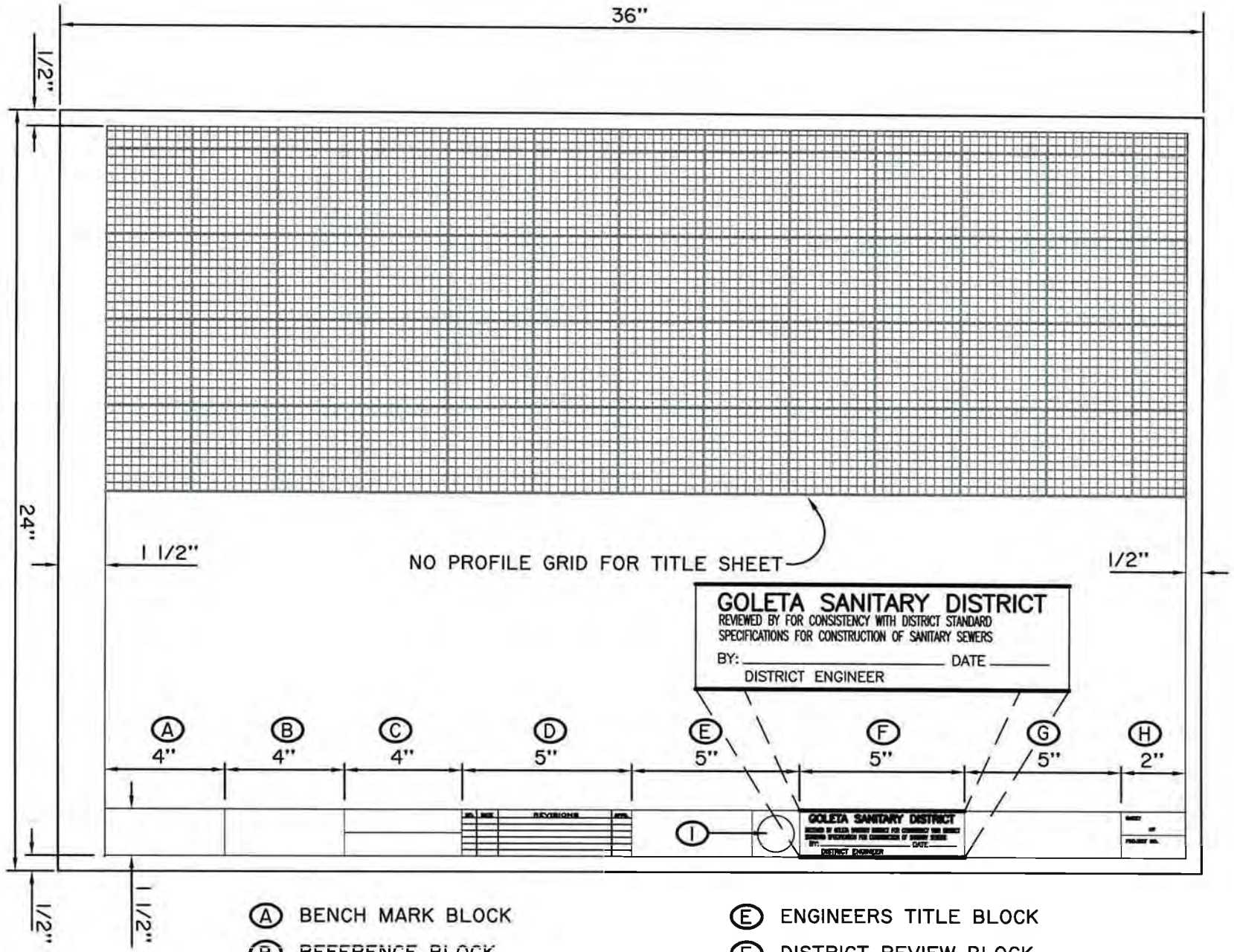
2/1/07
DATE

STANDARD PLAN SIZE & LAYOUT

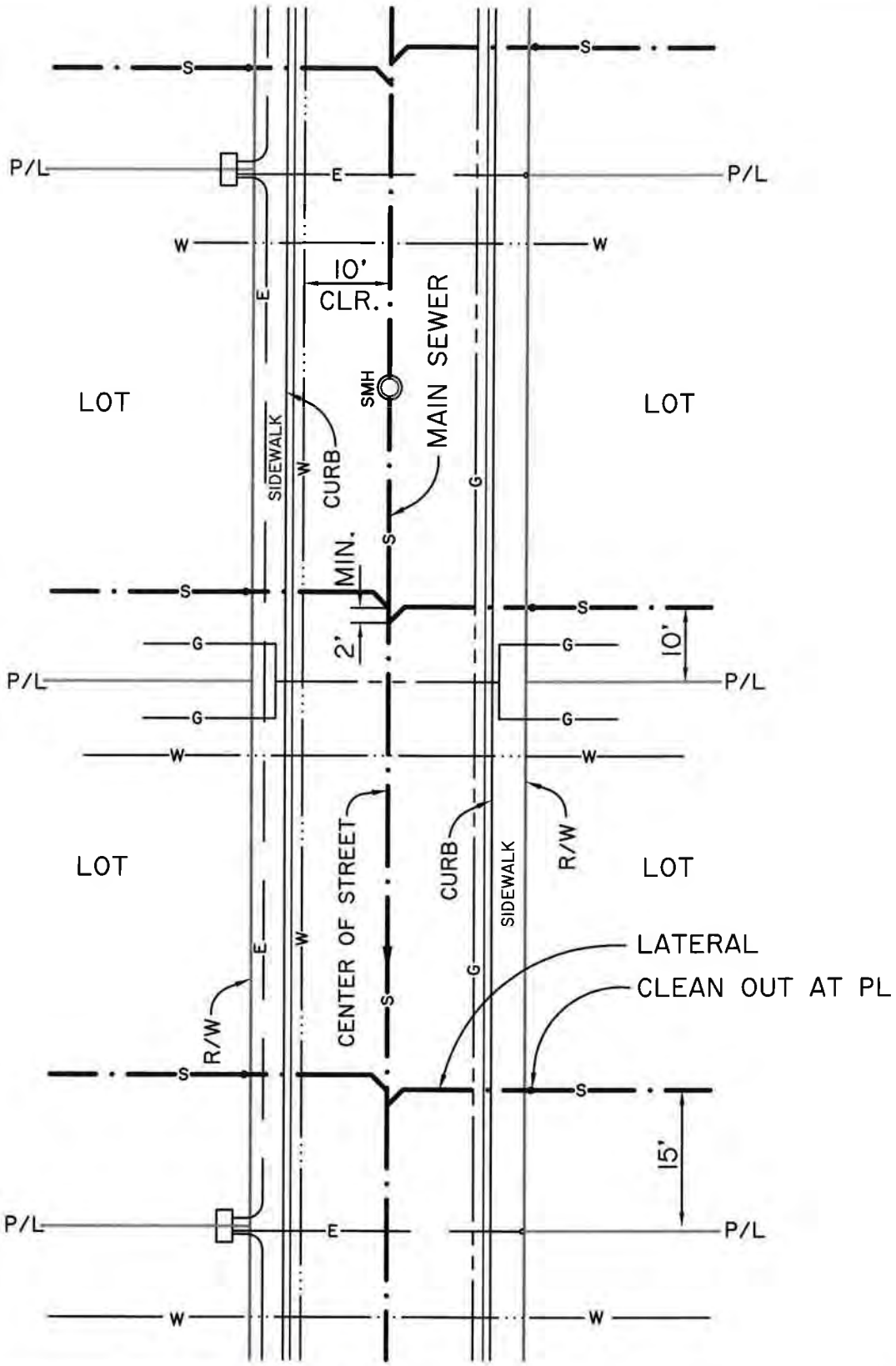
REVISIONS	BY	APP	DATE

STANDARD DRAWING

NO. 1



- (A) BENCH MARK BLOCK
- (B) REFERENCE BLOCK
- (C) OTHER AGENCIES APPROVAL BLOCK
- (D) REVISION BLOCK
- (E) ENGINEERS TITLE BLOCK
- (F) DISTRICT REVIEW BLOCK
- (G) PROJECT TITLE BLOCK
- (H) SHEET NUMBER BLOCK
- (I) ENGINEER'S SEAL



GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

SEWER LOCATION IN PUBLIC ROADS

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 2

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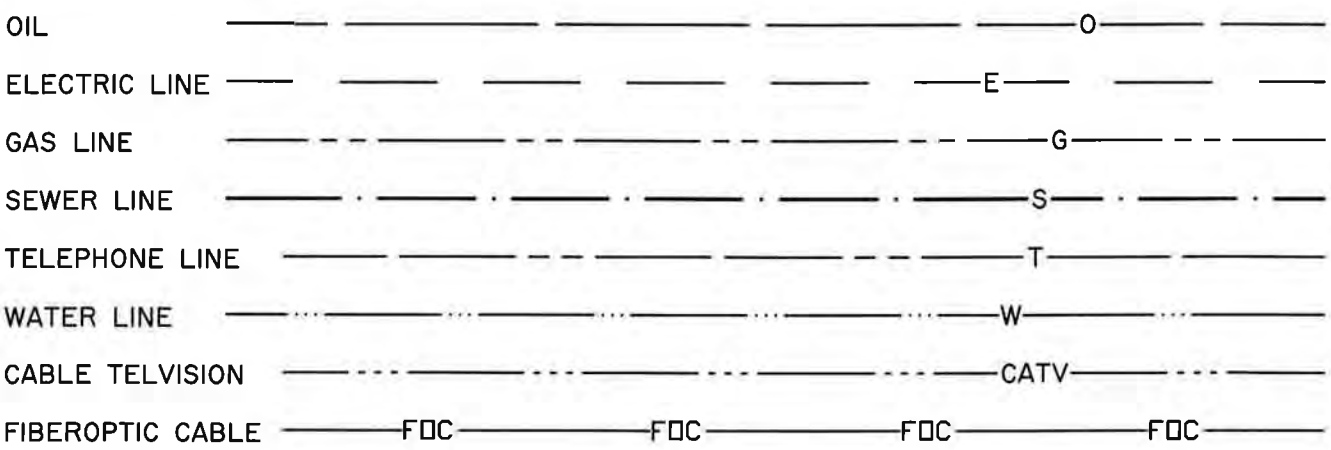
12/30/2005

UTILITY LINES



EQUIPMENT DESIGNATIONS

DEFINITION	ABBREVIATION	SYMBOL EXISTING	SYMBOL PROPOSED
GUY POLE	GP		
POWER POLE	PP	PP	
UTILITY POLE	UP	UP	
PULL BOX	PB	pb	
SEWER MANHOLE	SMH		
WATER METER	WM	W	
WATER VALVE	WV	W	
GAS METER	GM	G	
GAS VALVE	GV	G	
LIGHT POLE	LP		
TRAFFIC SIGNAL STANDARD	TS		
CLEANOUT	C.O.		

GOLETA SANITARY DISTRICT

2/11/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

SYMBOLS AND ABBREVIATIONS

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 3

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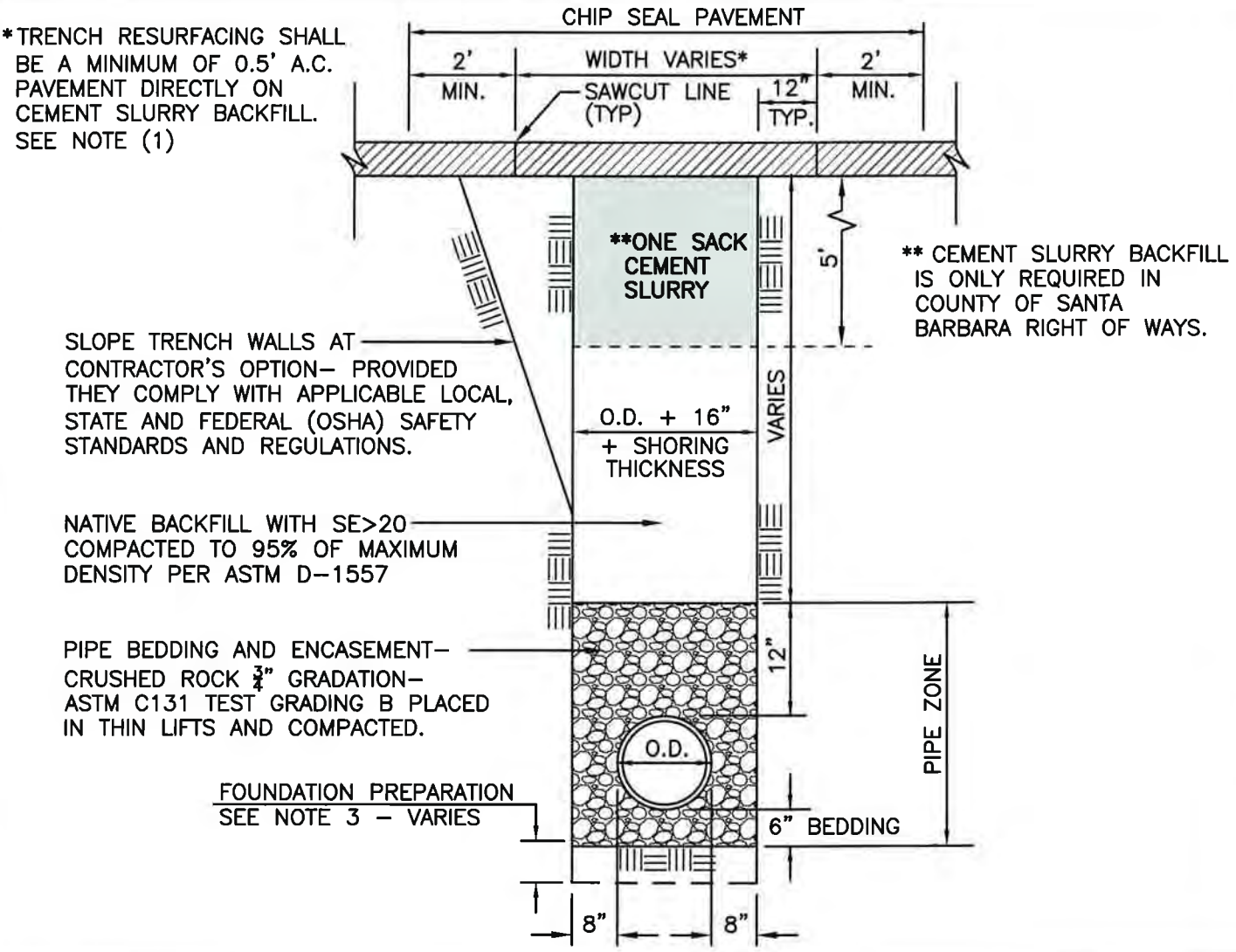
12/30/2005



NOTES

1. THE STRUCTURAL SECTION OF ASPHALTIC CONCRETE REPLACEMENT SHALL BE EQUAL TO THE EXISTING SECTION PLUS 1" OR 6" MINIMUM THICKNESS, WHICHEVER IS GREATER UNLESS OTHERWISE NOTED.
2. COUNTY OF SANTA BARBARA STANDARD DETAILS 1–020 AND 1–030 SHALL SERVE AS GUIDELINES FOR TRENCHING OPERATIONS.
3. FOUNDATION PREPARATION IS REQUIRED WHEN THE TRENCH BOTTOM IS UNSTABLE. REMOVE SOFT, SPONGY OR OTHERWISE UNSUITABLE MATERIAL. OVEREXCAVATION BEYOND 2 FEET REQUIRES ADDITIONAL ENGINEERING. BACKFILL OVEREXCAVATIONS WITH CRUSHED ROCK BEDDING.
4. THE FIRST LIFT SHALL BE WORKED UNDER THE PIPE AND FITTINGS TO ENSURE A COMPLETE AND CONTINUOUS BEARING SURFACE FREE OF VOIDS.
5. BACKFILL MATERIAL AND COMPACTION ABOVE THE "PIPE ZONE" SHALL MEET THE CITY OR COUNTY JURISDICTION'S REQUIREMENTS.

GOLETA SANITARY DISTRICT

2/11/08
DATE

KAMIL S. AZOURY,P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

TRENCH BACKFILL REQUIREMENTS

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 4

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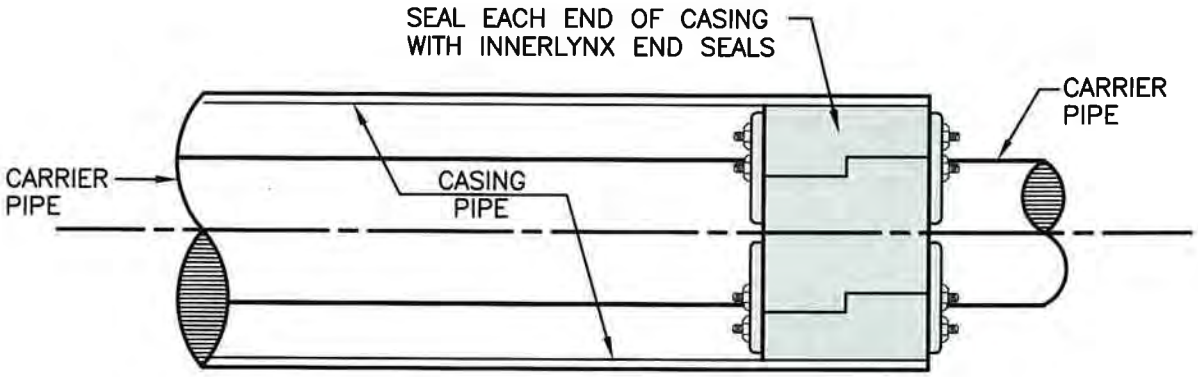
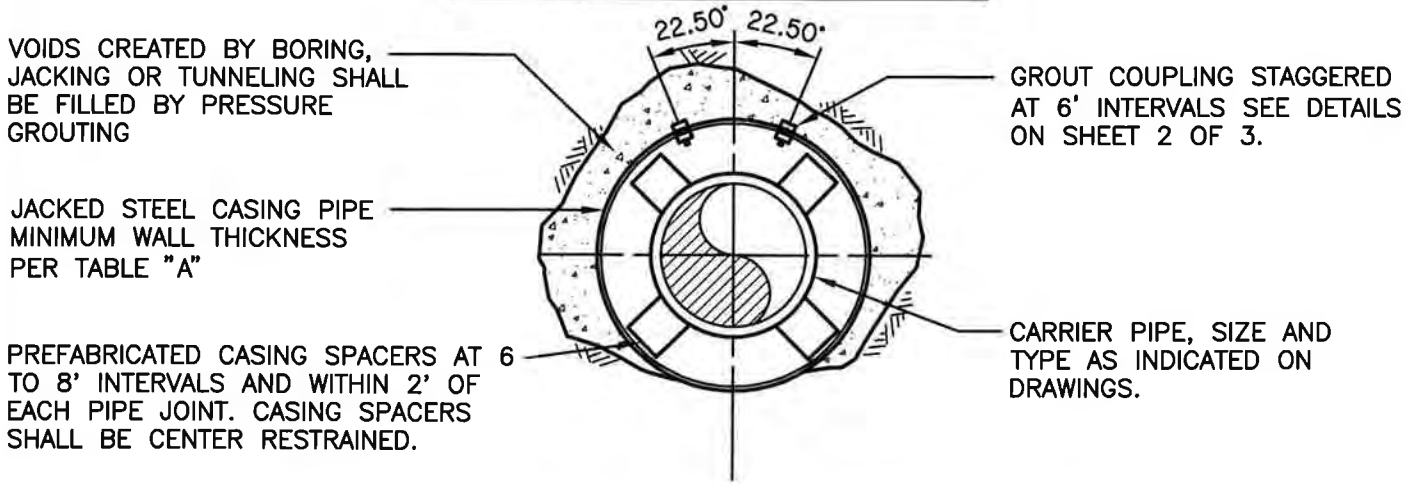


TABLE "A"

STEEL CASING WALL THICKNESS CHART		
MINIMUM THICKNESS		DIAMETER OF CASING PIPE
.2500"	1/4"	12" OR LESS
.3125"	5/16"	OVER 12"–18"
.3750"	3/8"	OVER 18"–22"
.4375"	7/16"	OVER 22"–28"
.5000"	1/2"	OVER 28"–34"
.5625"	9/16"	OVER 34"–42"
.6250"	5/8"	OVER 42"–48"



NOTES

1. CASING PIPE SHALL BE SIZED TO ALLOW A MINIMUM 4" ANNULAR SPACE BETWEEN THE CARRIER PIPE AND CASING PIPE.
2. TABLE "A" IS ONLY FOR SMOOTH STEEL CASING PIPES WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI.

BORED AND JACKED CASED CROSSING

N.T.S.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

CASED CROSSING

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 5
1 of 3

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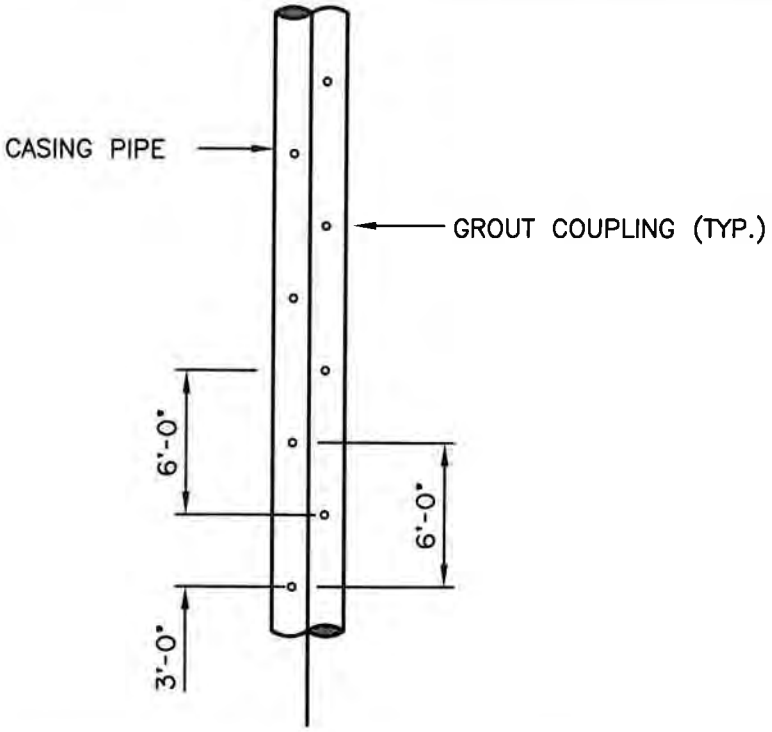
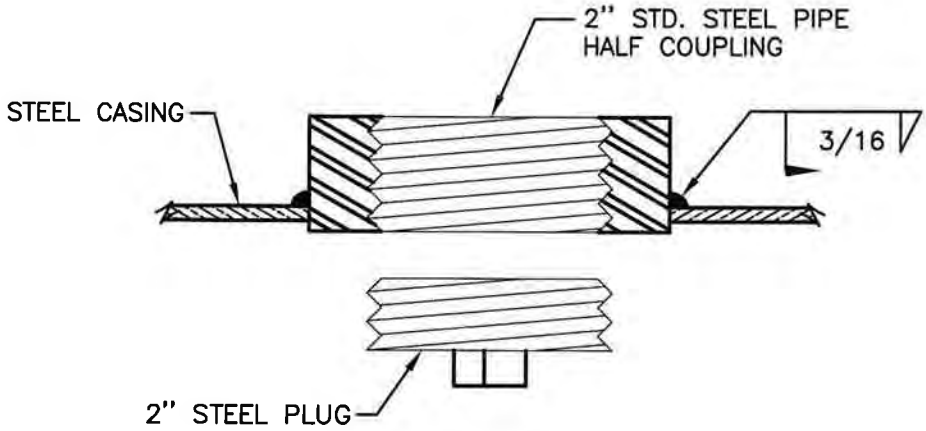


GROUT COUPLING SPACING

N.T.S.



GROUT COUPLING

N.T.S.

BORED AND JACKED CASED CROSSING

GOLETA SANITARY DISTRICT

2/11/08
DATE

KAMIL S. AZOURY,P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

CASED CROSSING

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 5
2 of 3

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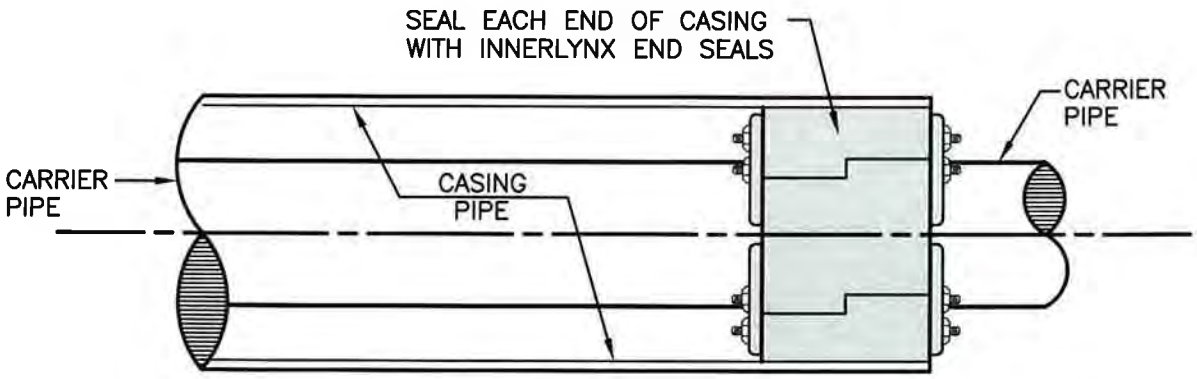

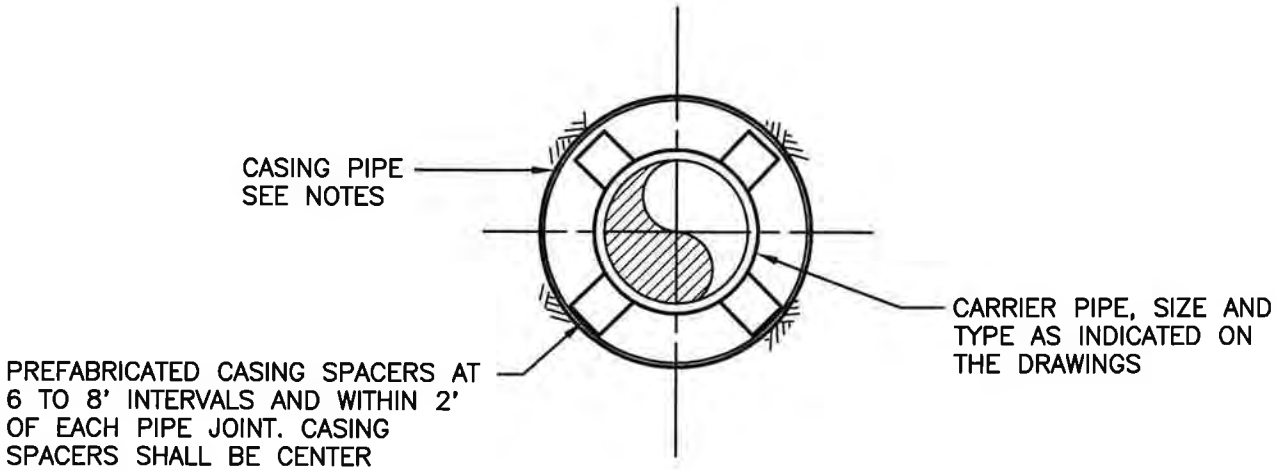

NOTES

1. CASING PIPE SHALL BE SIZED TO ALLOW A MINIMUM 4" ANNULAR SPACE BETWEEN THE CARRIER PIPE AND CASING.
2. CASING PIPE MAY BE DUCTILE IRON, HDPE (SDR17) OR PVC (C905) AS APPROVED BY THE DISTRICT.

CASED CROSSING INSTALLED BY OPEN CUT

N.T.S.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

CASED CROSSING

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 5
3 of 3

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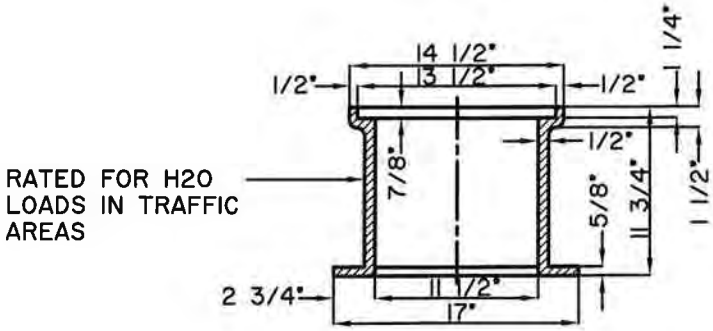
4/2007

ACCESS COVER



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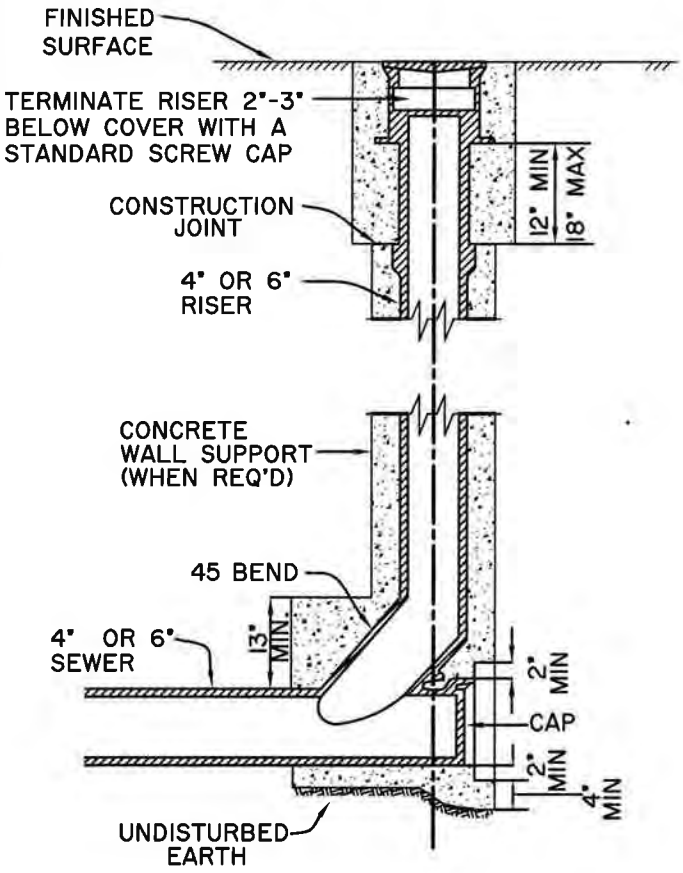

SECTION

NOTES

1. SEWER CLEANOUTS SHALL BE LOCATED A MAXIMUM OF EVERY 100 LINEAR FEET ALONG A SEWER LATERAL.
2. SEWER CLEANOUTS SHALL BE LOCATED AT CHANGES IN DIRECTION OF THE LATERAL PIPE INCLUDING FITTINGS AND BENDS.
3. SEWER CLEANOUTS SHALL BE LOCATED WITHIN 18 INCHES OF BUILDING FOUNDATIONS.
4. CLEANOUT SHALL BE PROTECTED WITH A CONCRETE BOX AND A METAL LID EMBOSSED WITH "SEWER" OR A CAST IRON FRAME AND COVER IN TRAFFIC AREAS.
5. IF REQUIRED, CONCRETE FOR BEDDING AND ENCASEMENT SHALL BE CLASS 420-C-2000. THE VERTICAL ENCASEMENT MAY BE EITHER CIRCULAR OR SQUARE AND SHALL BE PLACED UNIFORMLY AROUND THE RISERS TO MAINTAIN PROPER ALIGNMENT.

GOLETA SANITARY DISTRICT

2/11/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

SIDE SEWER CLEANOUT

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 6

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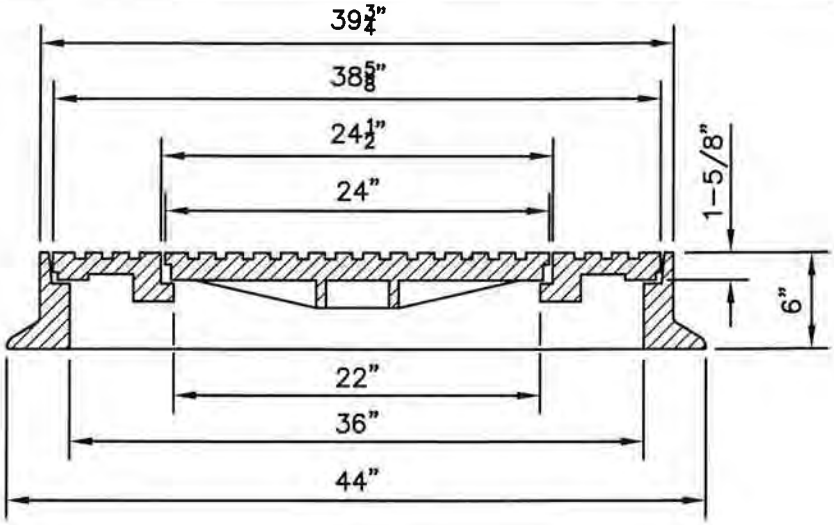
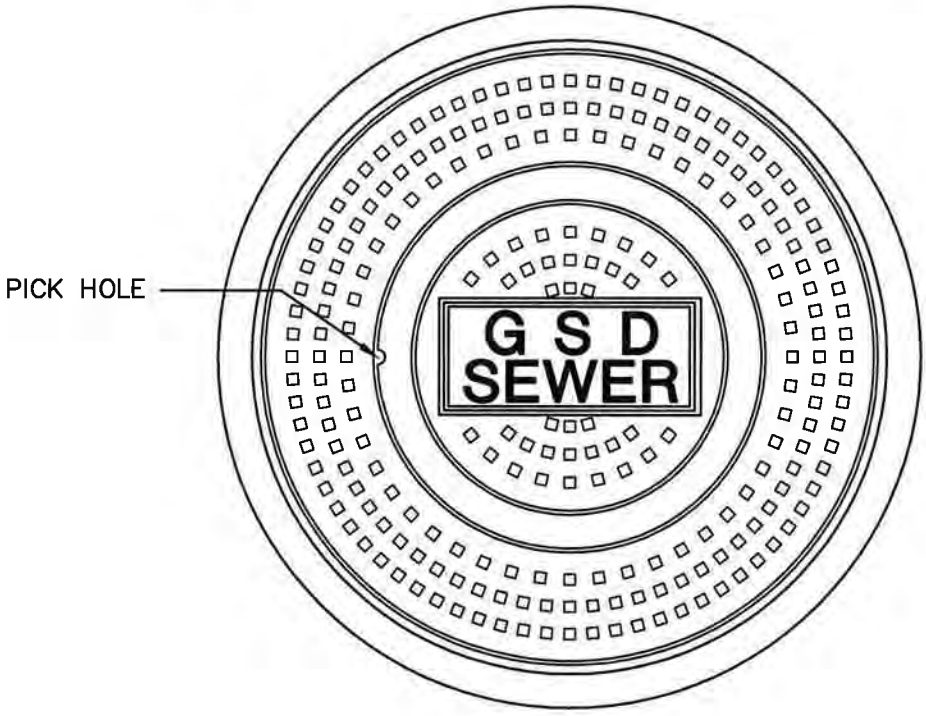


COVER



FRAME

NOTES

1. FRAME AND COVER MATERIALS SHALL CONFORM TO ASTM 48, CLASS 35B.
2. FRAME AND COVER BEARING SURFACES SHALL BE MACHINED TO SEAT UNIFORMLY, WITHOUT ROCKING AND ENSURE A QUIET FIT.
3. CASTINGS SHALL BE DIPPED IN BLACK BITUMINOUS PAINT.
4. FRAME AND COVER SHALL EXCEED H-20 WHEEL LOADING.
5. THE COVER SHALL BE MARKED "GSD SEWER" WITH 2"-3" DIAMETER LETTERS.

MANUFACTURER

SOUTH BAY FOUNDRY
SANTEE, CA
(619) 956-2780

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

36" MANHOLE FRAME & COVER

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 7

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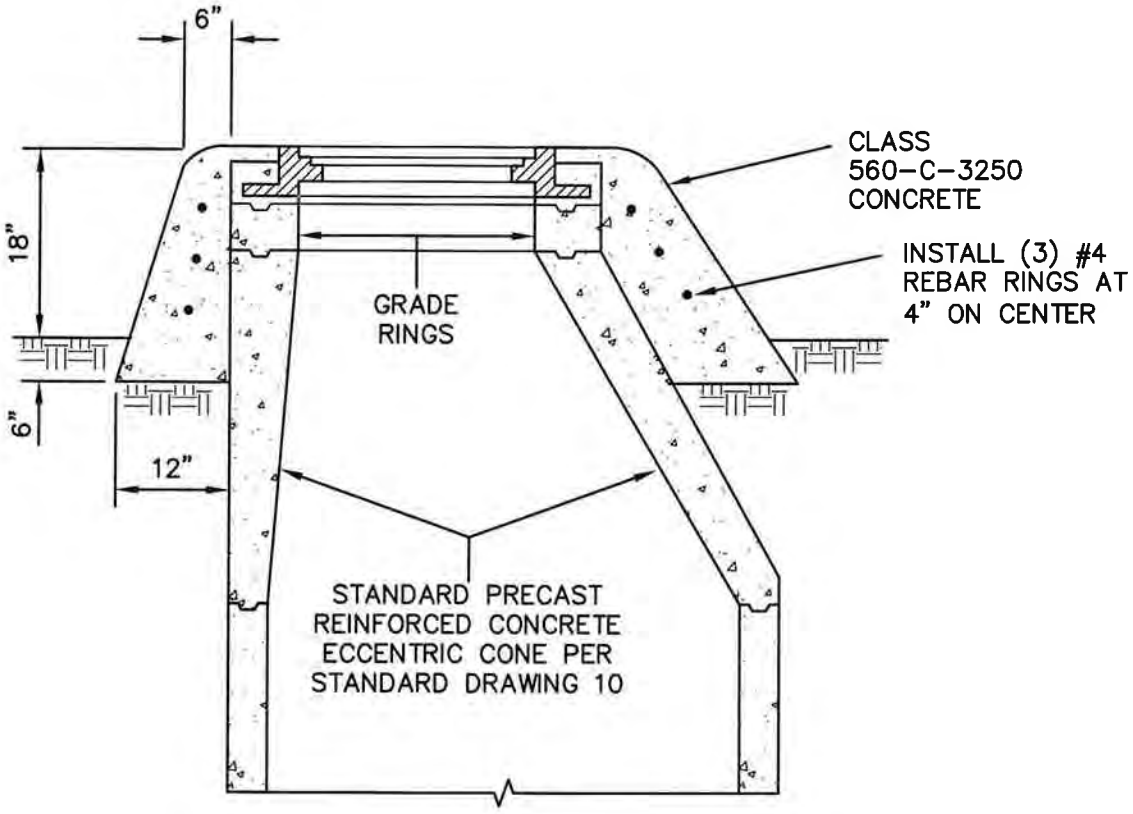
4/2007



NOTES

1. MANHOLES IN UNIMPROVED RIGHTS OF WAY SHALL BE 18" ABOVE FINISHED GRADE AND PROTECTED FROM DAMAGE AS REQUIRED WITH MARKERS AND/OR BOLLARDS.
2. MANHOLES IN MAINTAINED LANDSCAPED AREAS SHALL BE 6" ABOVE FINISHED GRADE AND PROTECTED FROM DAMAGE AS REQUIRED WITH MARKERS AND/OR BOLLARDS.
3. REFER TO STANDARD DRAWING NO. 10 "STANDARD MANHOLE" FOR ADDITIONAL DETAILS.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY,P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

REMOTE AREA MANHOLE JACKET

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 8

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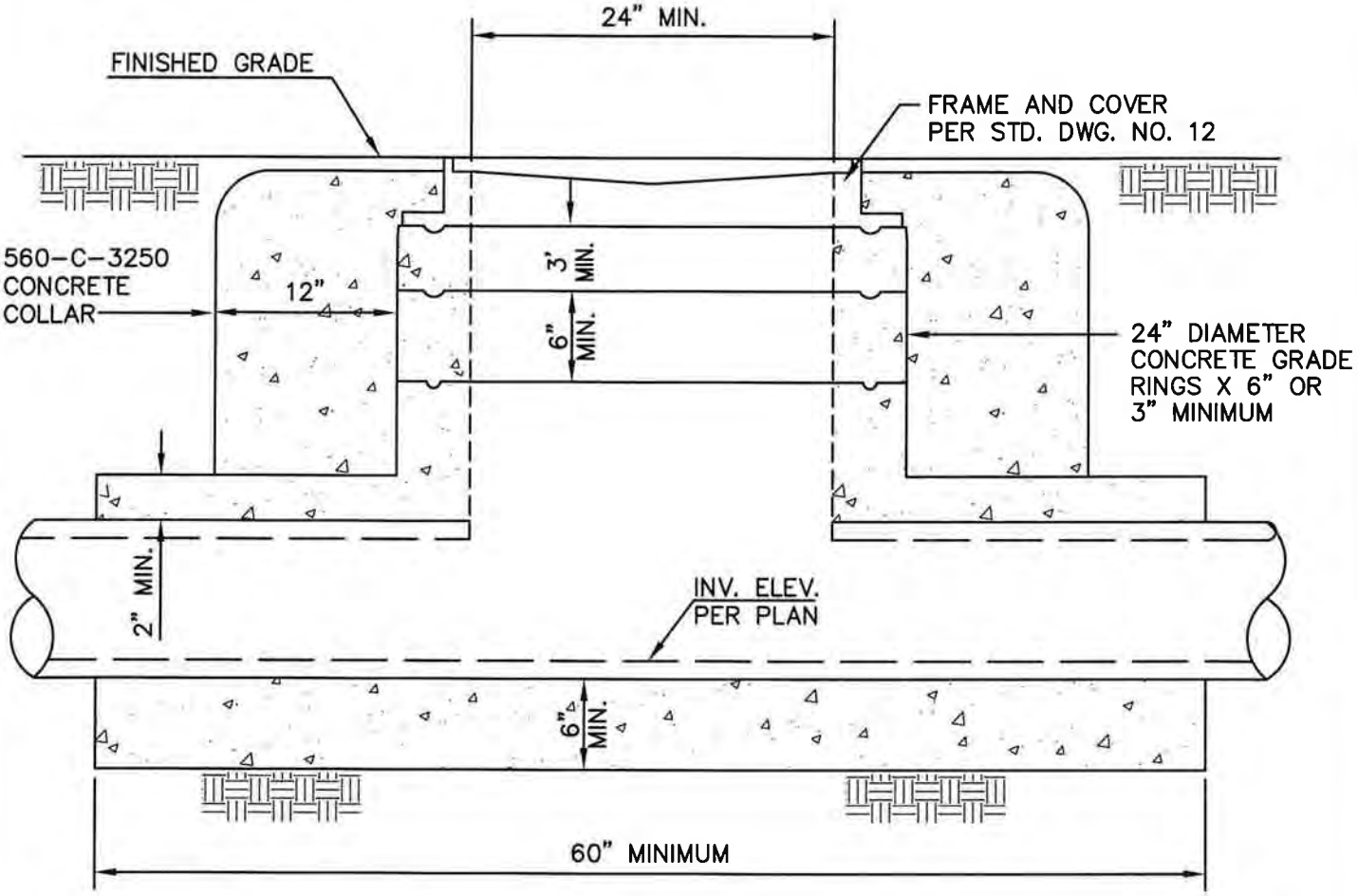

NOTES

1. REFER TO STANDARD DRAWING NO. 10 "STANDARD MANHOLE" FOR ADDITIONAL DETAILS.
2. SAMPLING MANHOLE COVER SHALL BE STAMPED "SAMPLING MH". DO NOT STAMP G.S.D.
3. NO COATING REQUIRED
4. DISTRICT APPROVAL IS REQUIRED.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

SAMPLING MANHOLE LESS THAN 3' DEEP

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 9

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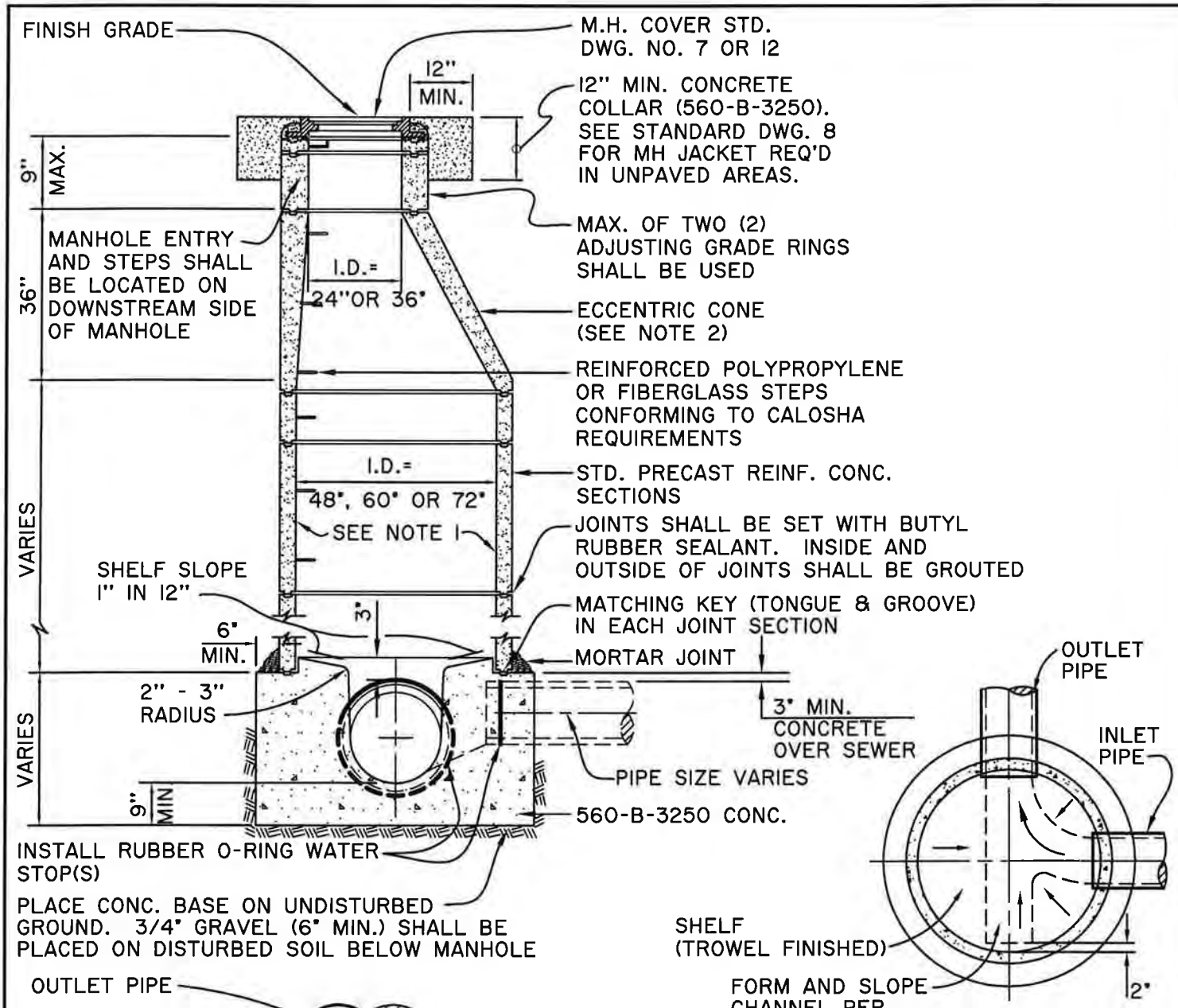

NOTES

1. COMPLETELY SEAL THE INSIDE OF THE MANHOLE WITH DISTRICT APPROVED PROTECTIVE COATING WITH HIGH BONDING STRENGTH AND RESISTANCE TO WATER AND SEWER GASES. THE COATING APPLICATION SHALL BE PER THE MANUFACTURER'S REQUIREMENTS.
2. CONCENTRIC CONES SHALL BE USED WHEN MANHOLES ARE LESS THAN 4' IN DEPTH.
3. PRE-CAST CONCRETE M.H. BASES MAY BE PERMITTED WITH APPROVAL FROM THE DISTRICT GENERAL MANAGER/DISTRICT ENGINEER.
4. CHANNELS, IN THE BASE OF A MANHOLE LOCATED ON A BEND SHALL BE FORMED AND SLOPED AS SHOWN ABOVE TO ALLOW BETTER ACCESS FOR TV INSPECTION UNITS AND OTHER TYPES OF MAINTENANCE EQUIPMENT.

GOLETA SANITARY DISTRICT

2/11/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

STANDARD MANHOLE

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 10

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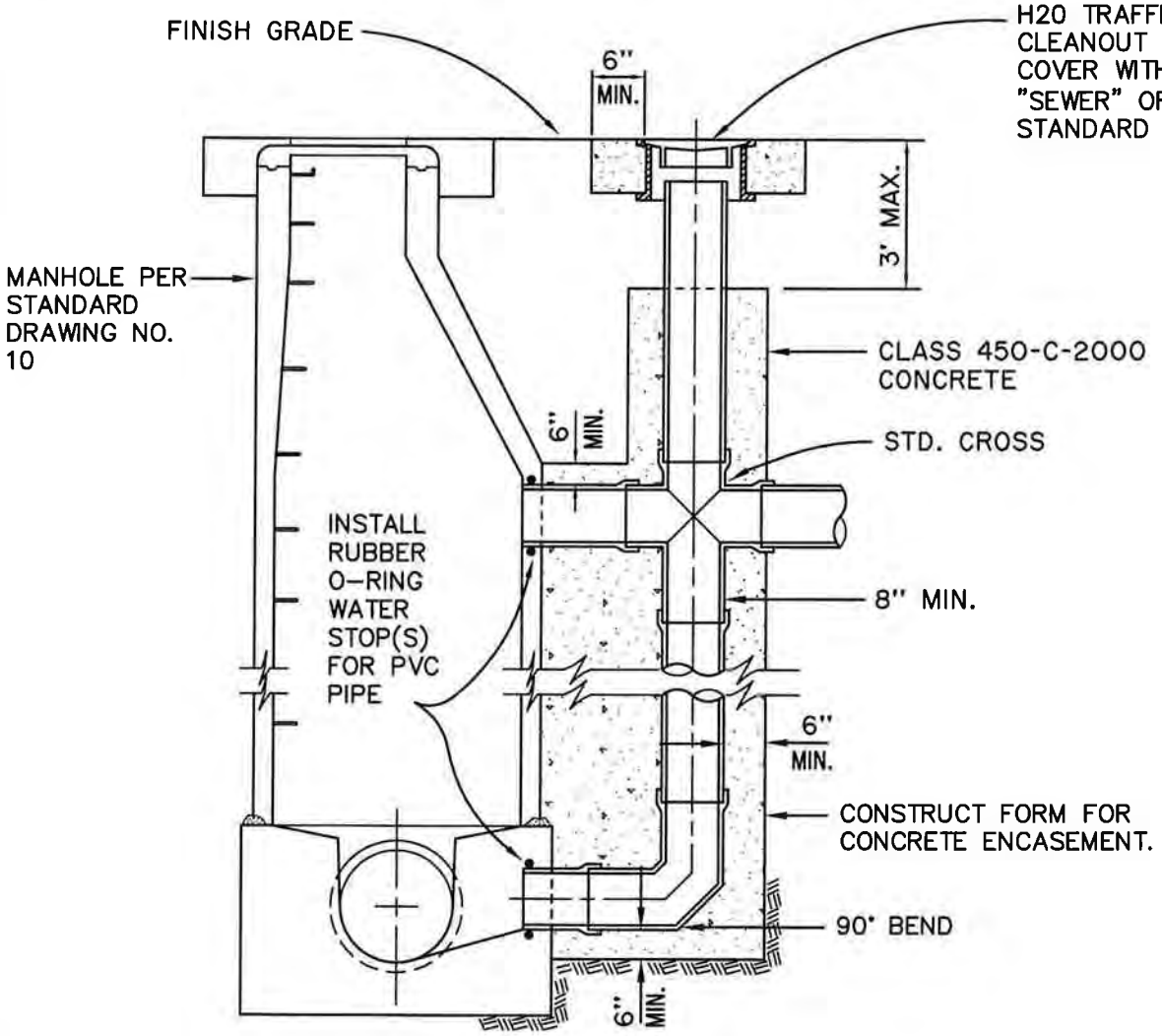

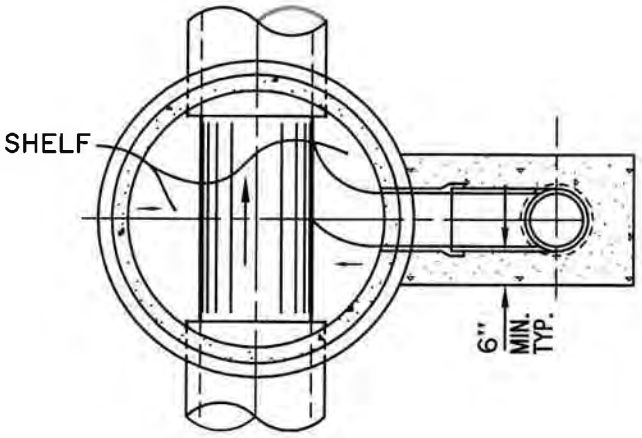

PLAN

NOTES

1. DROP MANHOLES REQUIRE APPROVAL BY THE DISTRICT MANAGER/ENGINEER.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

STANDARD DROP MANHOLE

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 11

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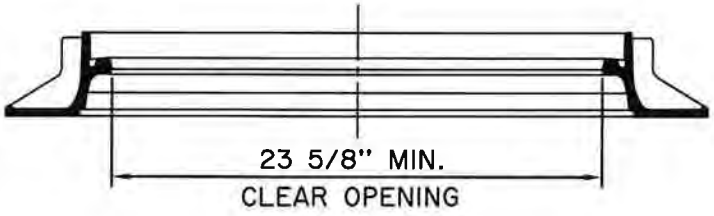
4/2007

COVER



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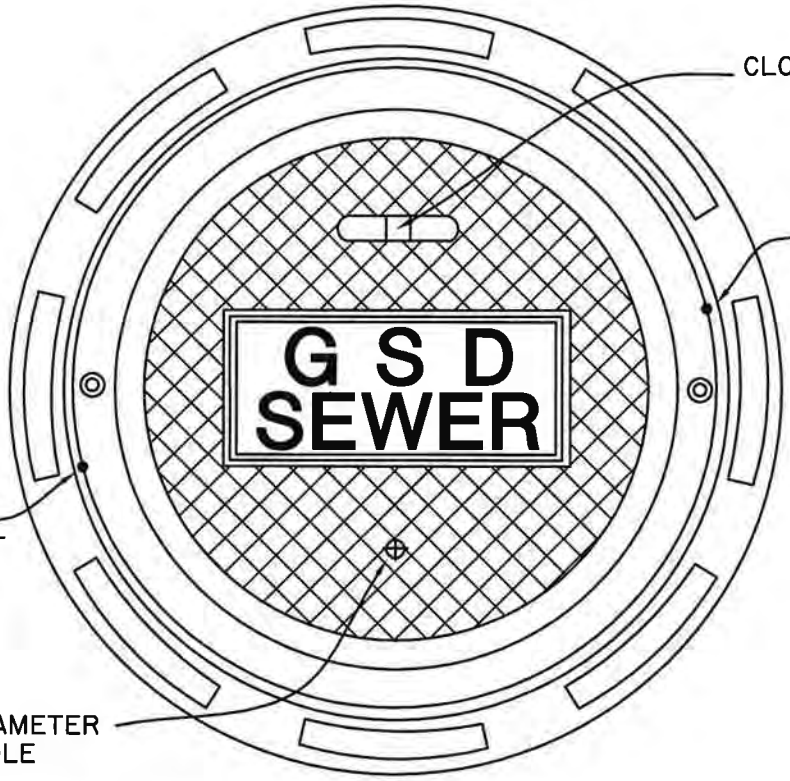

NOTES

1. FRAME AND COVER SHALL BE MADE OF LIGHT WEIGHT DUCTILE IRON MATERIAL AND RATED FOR H-20 LOADS.
2. COVER SHALL BE LOCKING TYPE WITH STAINLESS STEEL NUTS AND BOLTS.
3. THE COVER SHALL BE MARKED "GSD SEWER" (LETTERS SHALL BE 2"-3" DIAMETER).

MANUFACTURER

SOUTH BAY FOUNDRY
SANTEE, CA
(619) 956-2780

GOLETA SANITARY DISTRICT

2/11/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

MANHOLE FRAME & COVER

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 12

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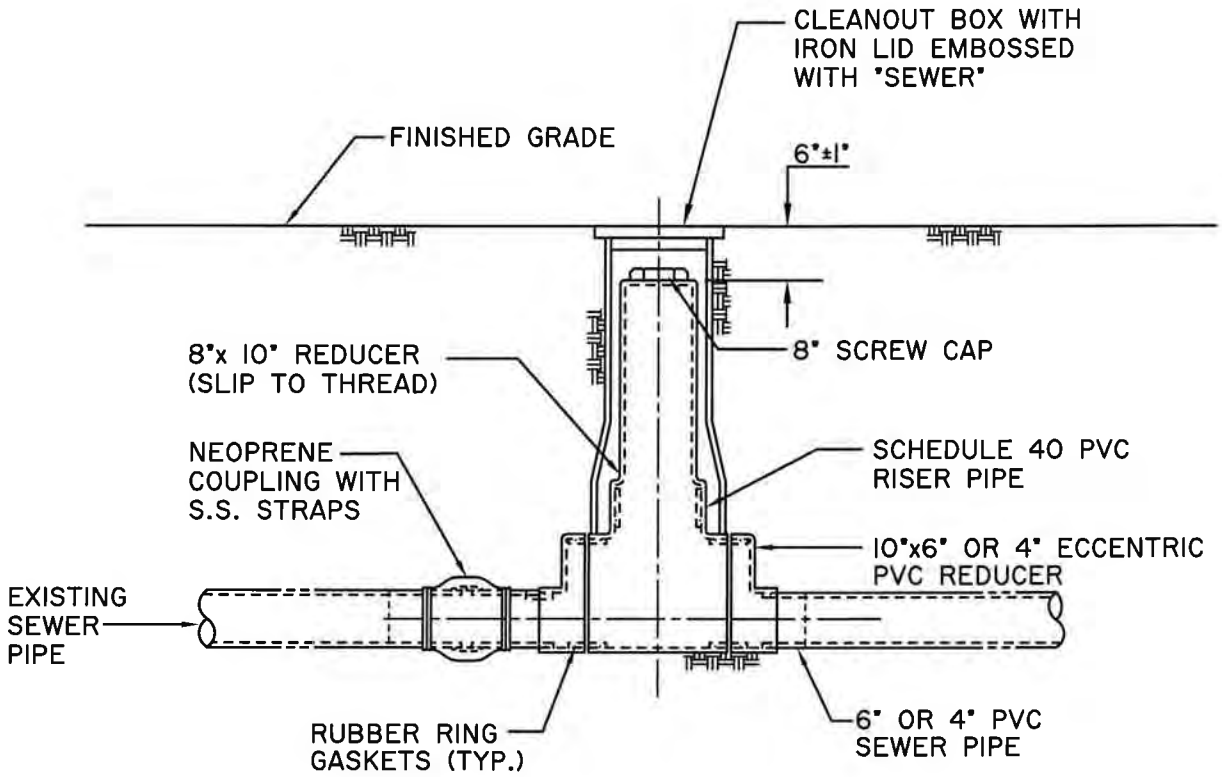

SAMPLING WELL

NOTES

1. ON EXISTING BUILDING SEWER, INSTALL APPROVED STANDARD TWO-WAY CLEANOUT TEE WITH BANDED RUBBER COUPLINGS.
2. THE SAMPLING WELL SHALL BE LOCATED ON THE BUILDING SEWER, DOWNSTREAM OF ALL BUILDING DRAIN CONNECTIONS, SO THE ENTIRE COMBINED BUILDING WASTE WATER FLOW CAN BE SAMPLED.
3. CONTACT THE DISTRICT ENGINEER FOR LOCATION OF SAMPLING WELL IF LOCATION IS NOT SHOWN ON APPROVED DRAWINGS.

MANUFACTURER

FITTINGS FROM FAMCON (OR EQUAL)
(805) 485-4350

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

SAMPLING WELL
(DISTRICT APPROVAL IS REQUIRED)

REVISIONS	BY	APP	DATE

STANDARD DRAWING

NO. 13

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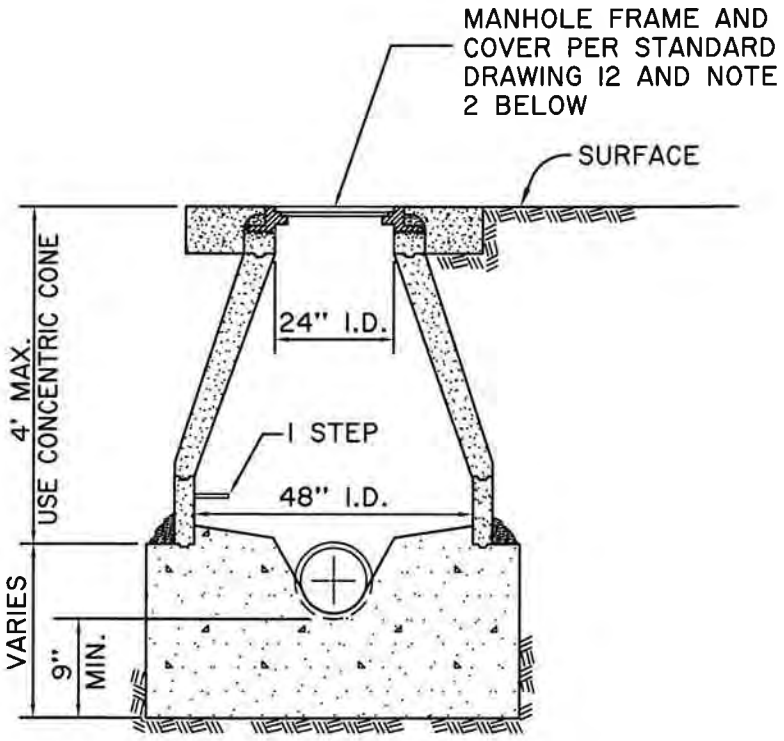

SECTION

NOTES

1. REFER TO STANDARD DRAWING NO. 10 "STANDARD MANHOLE" FOR ADDITIONAL DETAILS.
2. SAMPLING MANHOLE FRAME AND COVER SHALL BE PER STANDARD DRAWING 12 - EXCEPT DO NOT STAMP G.S.D.
3. NO COATING REQUIRED.
4. DISTRICT APPROVAL REQUIRED.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

SAMPLING MANHOLE

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 14

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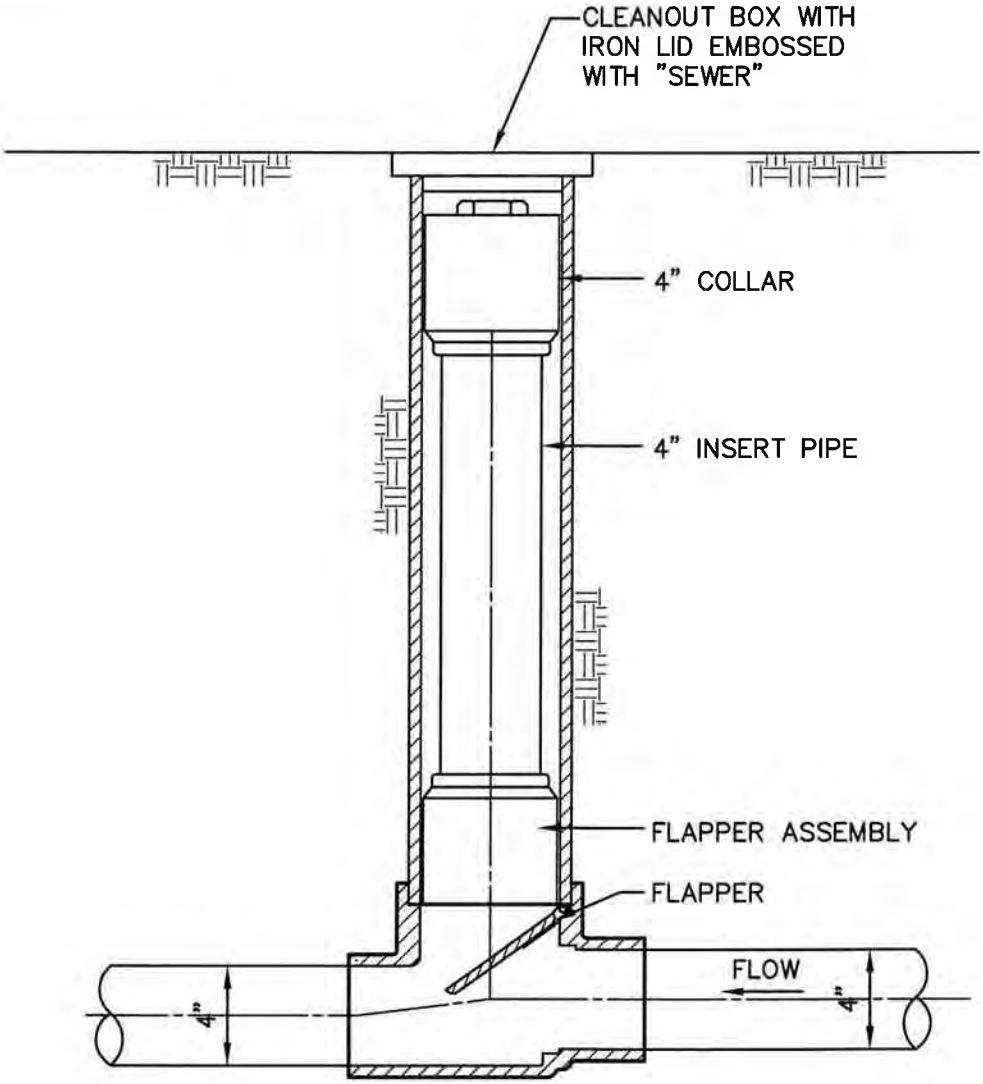

TYPICAL SECTION

NOTES

1. A BACKWATER VALVE WILL BE REQUIRED WHENEVER THE LEVEL OF THE LOWEST FLOOR THAT HAS PLUMBING FIXTURES IS LOWER IN ELEVATION THAN THE UPSTREAM MANHOLE OR CLEANOUT ON THE SEWER MAIN TO WHICH THE LATERAL CONNECTS.

2. THE BACKWATER VALVE SHALL BE INSTALLED AT THE JUNCTION OF THE BUILDING DRAIN AND BUILDING SEWER. UNLESS OTHERWISE AUTHORIZED BY DISTRICT MANAGER/DISTRICT ENGINEER.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

BACKWATER VALVE

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 15

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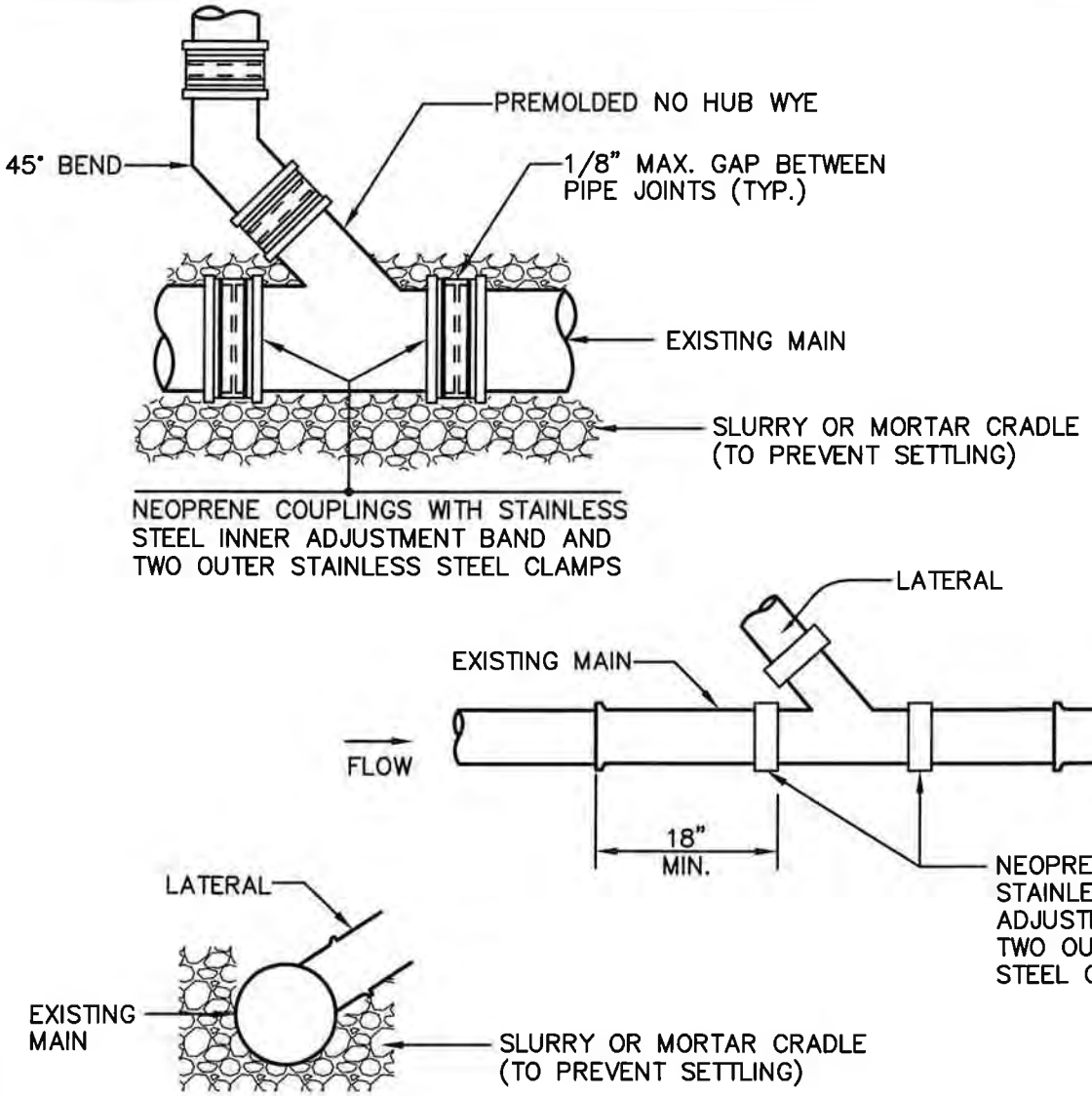

NOTES

1. ON EXISTING SEWERS INSTALL APPROVED PREMOLDED NO HUB WYE AND COUPLINGS. TAPPING TYPE OR SADDLE WYES ARE NOT PERMITTED.
2. LATERAL SHALL BE PERPENDICULAR TO MAIN WHENEVER POSSIBLE.
3. OVEREXCAVATE A MINIMUM OF 6" AROUND COUPLINGS. BACKFILL TO A MINIMUM OF 12" ABOVE SEWER MAIN PIPE WITH APPROVED BEDDING AND PIPE ZONE MATERIAL.
4. A DISTURBED OR OVEREXCAVATED BELL AND SPIGOT JOINT ON EXISTING VCP PIPE SHALL BE REMOVED AND REPLACED WITH A PIPE SECTION AND COUPLING.
5. WYES SHALL NOT BE INSTALLED WITHIN 18" OF A VCP JOINT.

GOLETA SANITARY DISTRICT

2/15/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

WYE INSTALLATION IN EXISTING SEWER MAIN

STANDARD DRAWING

REVISIONS	BY	APP	DATE

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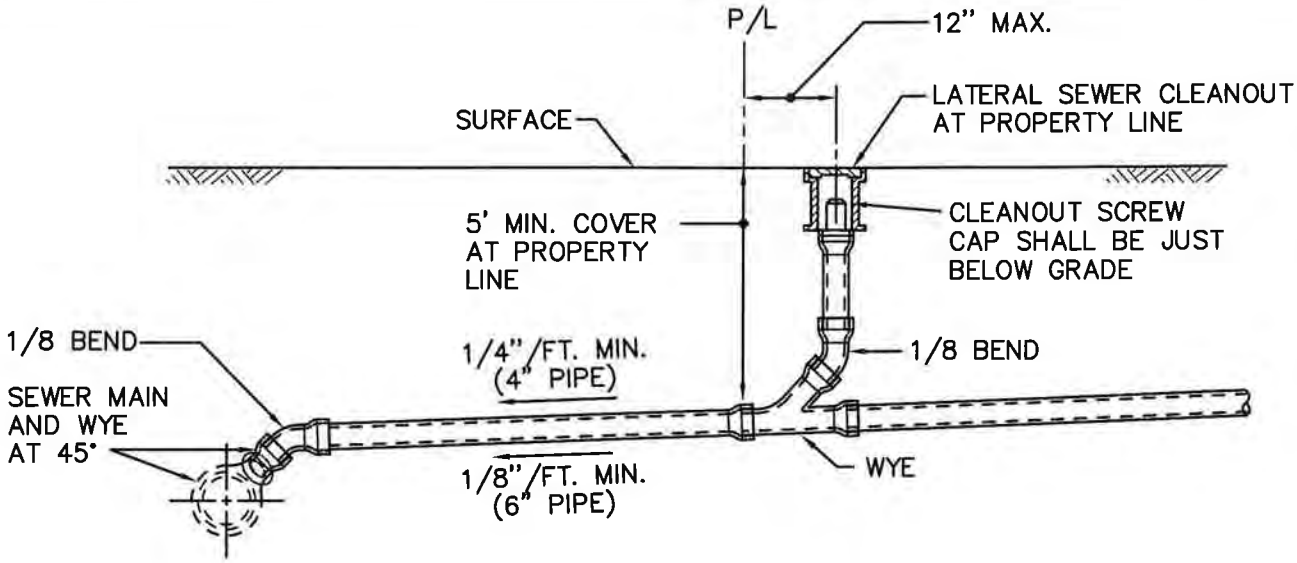
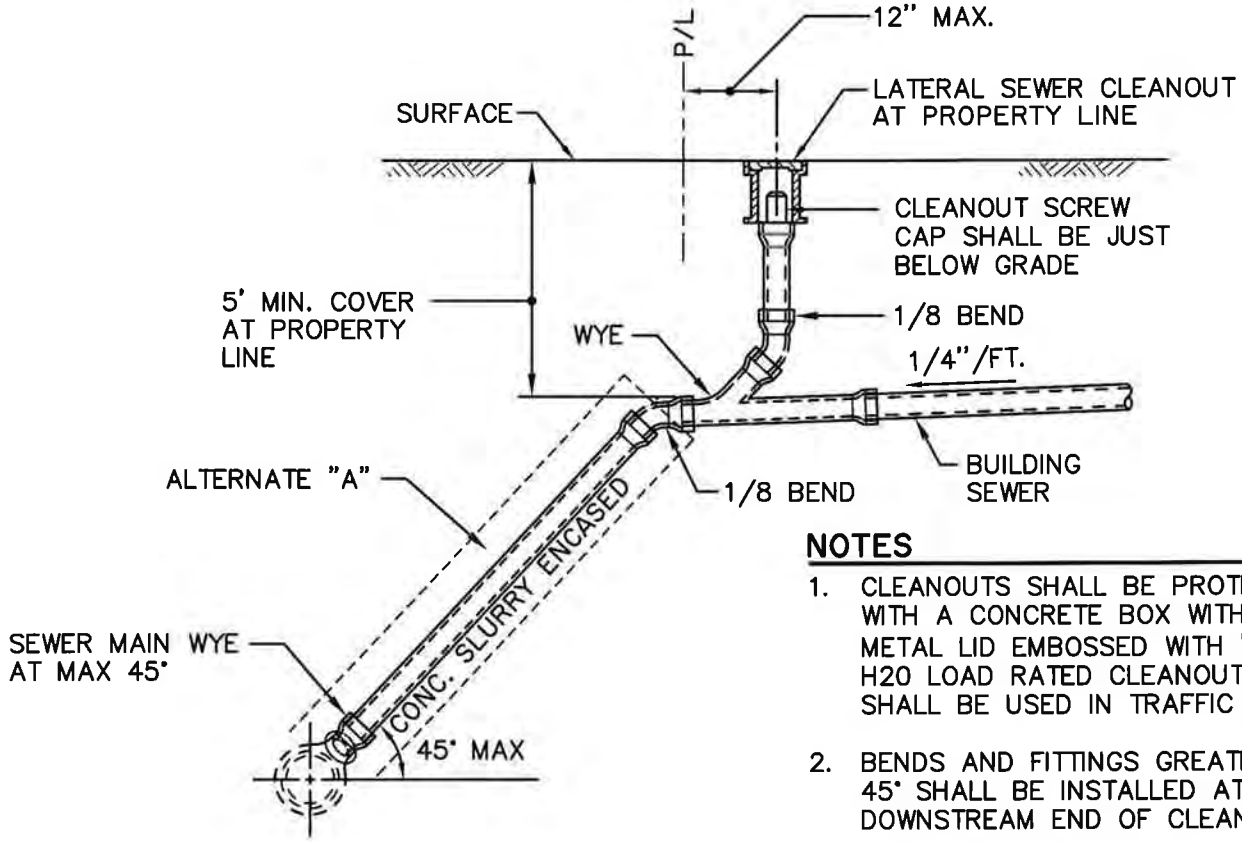


4" & 6" LATERALS AT TYPICAL DEPTH



4" & 6" DEEP LATERALS

NOTES

1. CLEANOUTS SHALL BE PROTECTED WITH A CONCRETE BOX WITH A METAL LID EMBOSSED WITH "SEWER". H20 LOAD RATED CLEANOUT BOXES SHALL BE USED IN TRAFFIC AREAS.
2. BENDS AND FITTINGS GREATER THAN 45° SHALL BE INSTALLED AT THE DOWNSTREAM END OF CLEANOUTS.
3. LATERALS SHALL BE INSTALLED PERPENDICULAR TO SEWER MAIN AND CONTINUE STRAIGHT TO THE PROPERTY OR EASEMENT LINE.

GOLETA SANITARY DISTRICT

2/15/08
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KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

LATERAL SEWER

STANDARD DRAWING

REVISIONS	BY	APP	DATE

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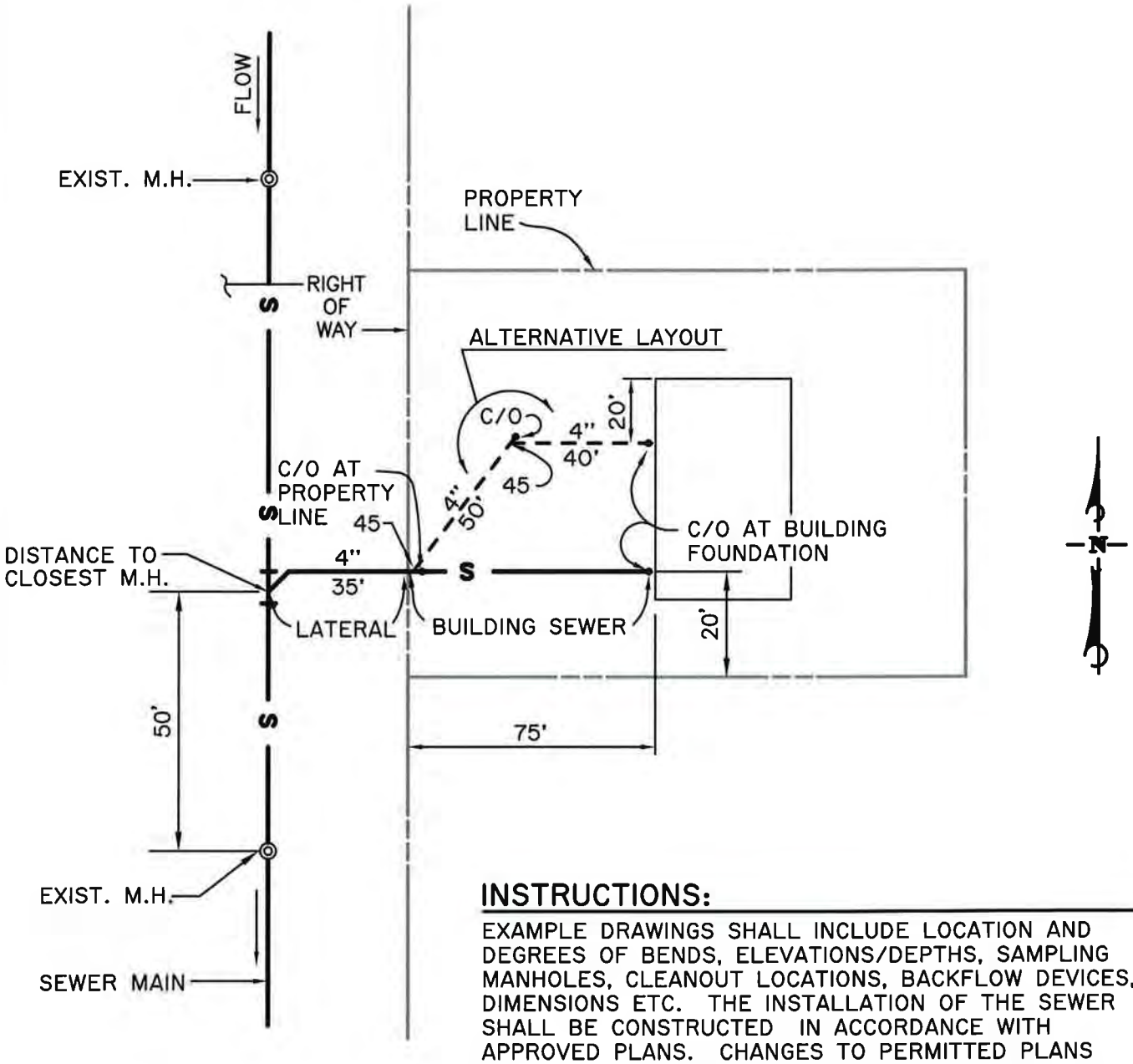

INSTRUCTIONS:

EXAMPLE DRAWINGS SHALL INCLUDE LOCATION AND DEGREES OF BENDS, ELEVATIONS/DEPTHS, SAMPLING MANHOLES, CLEANOUT LOCATIONS, BACKFLOW DEVICES, DIMENSIONS ETC. THE INSTALLATION OF THE SEWER SHALL BE CONSTRUCTED IN ACCORDANCE WITH APPROVED PLANS. CHANGES TO PERMITTED PLANS SHALL BE APPROVED IN ADVANCE BY THE DISTRICT'S INSPECTOR AND SHALL BE REFLECTED ON A FINAL LAYOUT DRAWING SUBMITTED BY THE CONTRACTOR OR PLUMBER PRIOR TO APPROVAL OF THE SEWER INSTALLATION.

* THE COMBINED LATERAL & BUILDING SEWER ARE DEFINED AS A SIDE SEWER

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

NEW BUILDING & LATERAL SEWER "AS CONSTRUCTED" LAYOUT DRAWING EXAMPLE

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 18

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4/2007

DEFINITIONS

COMPRESSION JOINT - A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.
DIMENSIONS - are from the outside of water main to outside of sewer line or manhole.
FUSED JOINT - The joining of pipe using thermal or chemical bonding processes.
GROUND WATER - Subsurface water found in the saturation zone.
HEALTH AGENCY - The State Department of Health Services. For those water systems supplying less than 200 service connections, the local health officer shall act for the Department of Health Services.
HOUSE LATERAL - A sewer pipe connecting the building drain and the main sewer line.
LOW HEAD WATER MAIN - Any water main which has a pressure of 5 psi or less at any point in the main.
MECHANICAL JOINT - Bolted joint.
RATED WORKING WATER PRESSURE or **PRESSURE CLASS** - A pipe classification system based upon internal working pressure of the fluid in the pipe, type of pipe material, and thickness of the pipe wall.
SLEEVE - A protective tube of steel with a wall thickness of not less than one-fourth inch into which a pipe is inserted.
WATER SUPPLY - Any person who owns or operates a public water system.

CRITERIA FOR THE SEPARATION OF WATER MAINS AND SANITARY SEWERS

A. PUBLIC HEALTH CONSIDERATIONS

Waterborne disease outbreaks attributed to the entry of sewage-contaminated groundwater into the distribution systems of the public water supplies continue to be a problem in the United States. A community with its buried water mains in close proximity to sanitary sewers is vulnerable to waterborne disease outbreaks.

Sanitary sewers frequently leak and saturate the surrounding soil with sewage. This is caused primarily by structural failure of the sewer line, improperly constructed joints, and subsidence or upheaval of the soil encasing the conduit. A serious public health hazard exists when the water mains are depressurized and no pressure or negative pressures occur. The hazard is further compounded when, in the course of installing or repairing a water main, existing sewer lines are broken. Sewage spills into the excavation and, hence, enters into the water main itself. Additionally, if a water main fails in close proximity to a sewer line, the resultant failure may disturb the bedding of the sewer line and cause it to fail. In the event of and earthquake of man-made disaster, simultaneous failure of both conduits often occurs.

The water supplier is responsible for the quality of the water delivered to consumers and must take all practical steps to minimize the hazard of sewage contamination to the public water supply. Protection of the quality of the water in the public water system is best achieved by the barrier provided by the physical separation of the water mains and sewer lines.

This document sets forth the construction criteria for the installation of water mains and sewer lines to prevent contamination of the public water supplies from nearby sanitary sewers.

B. BASIC SEPARATION STANDARDS

The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and sewer lines. These standards, contained in Section 64630, Title 22, California Administrative Code, specify:

(c) (1) Parallel Construction: The horizontal distance between pressure water mains and sewer lines shall be at least 10 feet.

(2) Perpendicular Construction (Crossing): Pressure water mains shall be at least one foot above sanitary sewer lines where these lines must cross.

(d) Separation distances specified in (c) shall be measured from the nearest edges of the facilities.

(e) (2) Common Trench: Water mains and sewer lines must not be installed in the same trench.

When water mains and sanitary sewers are not adequately separated, the potential for contamination of the water supply increases. Therefore, when adequate physical separation cannot be attained, an increase in the factor of safety should be provided by increasing the structural integrity of both the pipe materials and joints.

GOLETA SANITARY DISTRICT

2/1/05
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

WATER-SEWER SEPARATION
TEXT

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 19

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12/30/2005

C. EXCEPTIONS TO BASIC SEPARATION STANDARDS

Local conditions, such as available space, limited slope, existing structure, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by the Basic Separation Standards. In such cases, alternative construction criteria as specified in Section E should be followed, subject to the special provisions in Section D.

Water mains and sewers of 24 inches in diameter or greater may create special hazards because of the large volumes of flow. Therefore, installations of water mains and sewer lines 24 inches in diameter or larger should be reviewed and approved by the health agency prior to construction.

D. SPECIAL PROVISIONS

1. The Basic Separation Standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions such as high groundwater exist.
2. Sewer lines shall not be installed within 25 feet horizontally of a low head (5 psi or less pressure) water main.
3. New water mains and sewers shall be pressure tested where the conduits are located ten feet apart or less.
4. In the installation of water mains or sewer lines, measures should be taken to prevent or minimize disturbances of the existing line. Disturbance of the supporting base of this line could eventually result in failure of this existing pipeline.
5. Special consideration shall be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage which produces corrosive hydrogen sulfide.
6. Sewer Force Mains
   a. Sewer force mains shall not be installed within ten feet (horizontally) of a water main.
   b. When a sewer force main must cross a water line, the crossing should be as close as practical to the perpendicular. The sewer force main should be at least one foot below the water line.
   c. When a new sewer force main crosses under an existing water main, all portions of the sewer force main within ten feet (horizontally) of the water main shall be enclosed in a continuous sleeve.
   d. When a new water main crosses over an existing sewer force main, the water main shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating.

E. ALTERNATE CRITERIA FOR CONSTRUCTION

The construction criteria for sewer lines of water mains where the Basic Separation Standards cannot be attained are shown in standard drawings 1 and 2 (on following pages). There are two situations encountered:

Case 1 - New sewer line (new or existing water main).

Case 2 - New water main (existing sewer line).

For case 1, the alternate construction criteria apply to the sewer line.

For case 2, the alternate construction criteria may apply to either or both the water main and sewer line.

The construction criteria should apply to the house laterals that cross above a pressure water main but not to those house laterals that cross below a pressure water main.

GOLETA SANITARY DISTRICT

2/1/05
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

WATER-SEWER SEPARATION
TEXT

STANDARD DRAWING

REVISIONS	BY	APP	DATE

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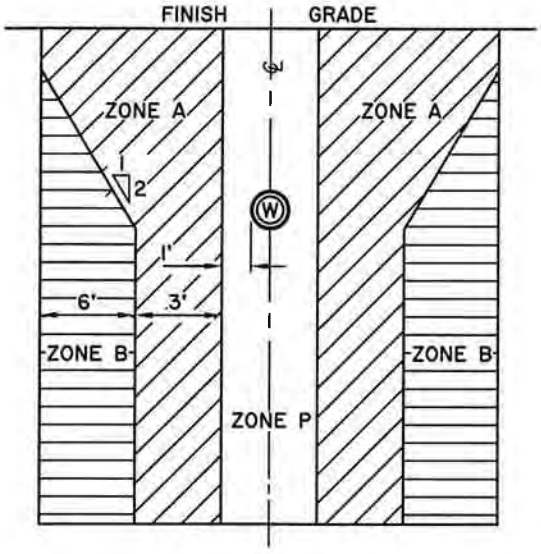
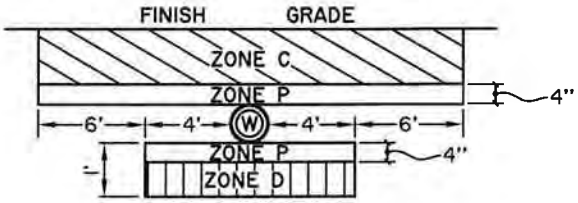


PARALLEL CONST.



PERPENDICULAR CONST.

ZONE	SEWER CONSTRUCTION REQUIREMENTS
A	Sewer lines parallel to water mains shall not be permitted in this zone without approval from the responsible health agency and water supplier.
B	A sewer line placed parallel to a water line shall be constructed of: 1. Extra strength vitrified clay pipe with compression joints. 2. Class 4000, Type II, asbestos-cement pipe with rubber gasket joints. 3. Plastic sewer pipe with rubber ring joints (per ASTM D3034) or equivalent. 4. Cast or ductile iron pipe with compression joints. 5. Reinforced concrete pressure pipe with compression joints (per AWWA C302-74).
C	A sewer line crossing a water main shall be constructed of: 1. Ductile iron pipe with hot dip bituminous coating and mechanical joints. 2. A continuous section of class 200 (DR 14 AWWA C900) plastic pipe, or equivalent, centered over the pipe being crossed. 3. A continuous section of reinforced concrete pressure pipe (AWWA C302-74) centered over the pipe being crossed. 4. Any sewer pipe with a continuous sleeve.
D	A sewer line crossing a water main shall be constructed of: 1. A continuous section of ductile iron pipe with hot dip bituminous coating. 2. A continuous section of Class 200 (DR 14 per AWWA C900) plastic pipe or equivalent, centered on the pipe being crossed. 3. A continuous section of reinforced concrete pressure pipe (per AWWA C302-74) centered on the pipe being crossed. 4. Any sewer pipe within a continuous sleeve. 5. Any sewer pipe separated by a ten-foot by ten-foot, four-inch thick reinforced concrete slab.

ZONE P Is a prohibited zone per section 64630(e)(2) California Administrative Code, Title 22.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

WATER-SEWER SEPARATION DETAILS

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 21

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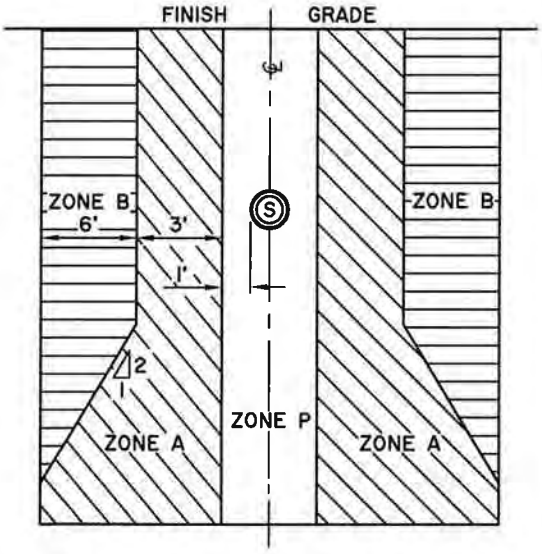
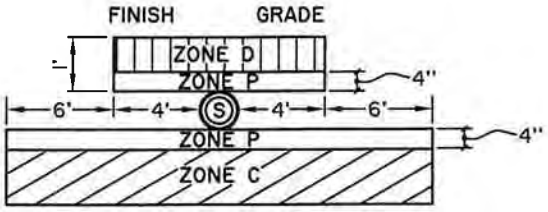


PARALLEL CONST.



PERPENDICULAR CONST.

ZONE	WATER CONSTRUCTION REQUIREMENTS
A	No water mains parallel to sewers shall be constructed without approval from the health agency.
B	A water main placed parallel to a sanitary sewer shall be constructed of: 1. Dipped and wrapped one-quarter inch thick steel pipe. 2. Class 200 pressure rated PVC water pipe (DR-14 per AWWA C-900) or equivalent. 3. Reinforced concrete pressure pipe, steel cylinder type, per AWWA C-300-74, C-301-79 or C-303-70.
C	A water main crossing a sanitary sewer shall have no joints in this zone and shall be constructed of: 1. Dipped and wrapped one-quarter inch thick welded steel pipe. 2. Class 200 pressure rated PVC water pipe (DR-14 per AWWA C-900) or equivalent. 3. Reinforced concrete pressure pipe, steel cylinder type, per AWWA C-300-74, C-301-79 or C-303-70.
D	A water main crossing a sanitary sewer shall have no joints within four feet from either side of the sanitary sewer and shall be constructed of: 1. Dipped and wrapped one-quarter inch thick welded steel pipe. 2. Class 200 pressure rated PVC pipe (DR-14 per AWWA C-900) or equivalent.

ZONE P Is a prohibited zone per section 64630(e)(2) California Administrative Code, Title 22.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

WATER-SEWER SEPARATION DETAILS

STANDARD DRAWING

REVISIONS	BY	APP	DATE

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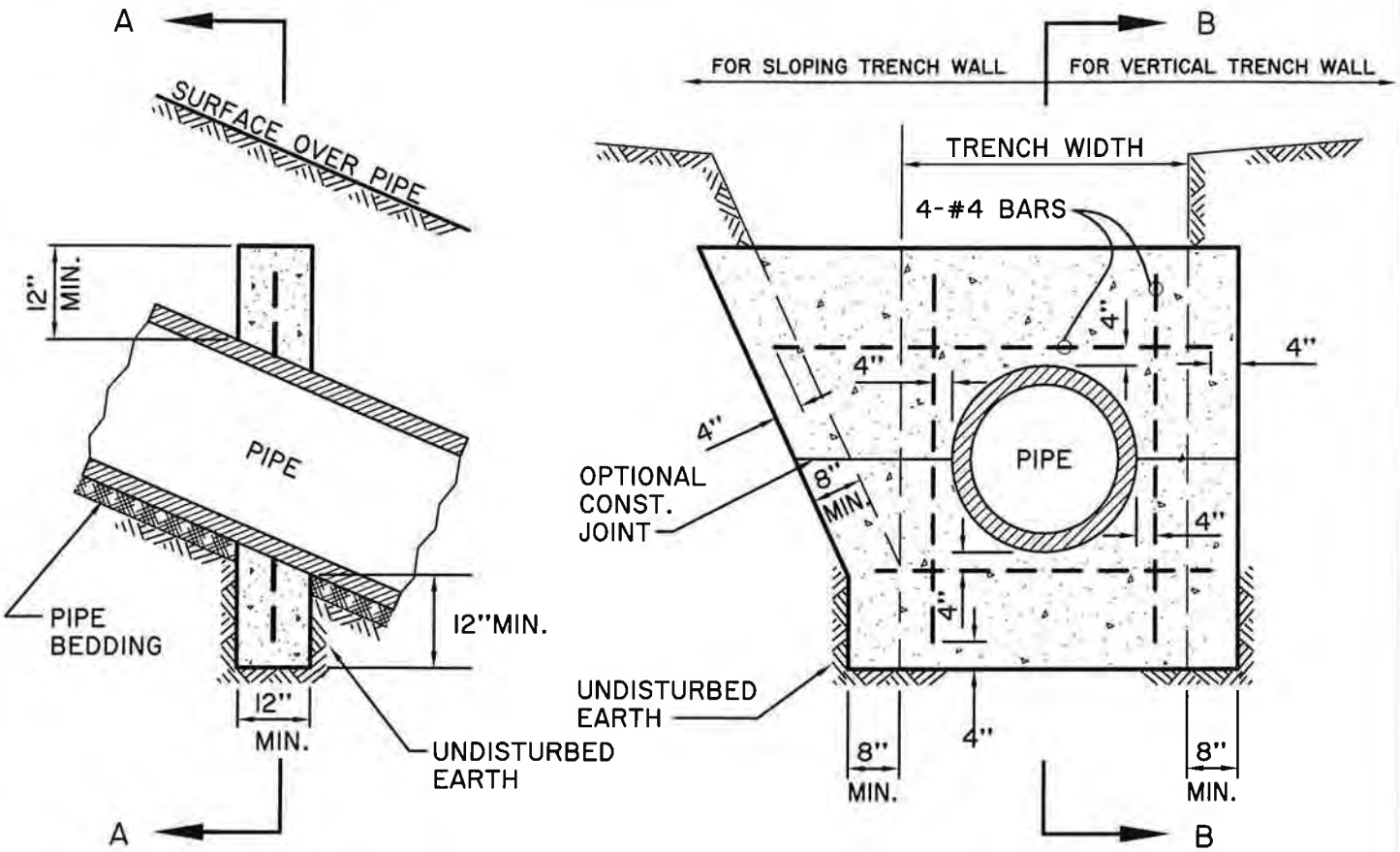

SECTION B-B

SECTION A-A

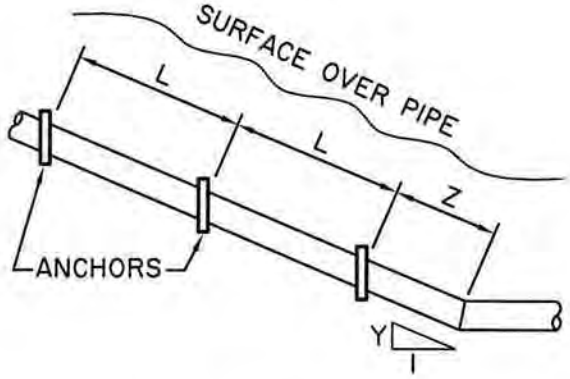

TABLE A

PIPE SLOPE(%) Y:1(100)	L DISTANCE (MAX.)	Z DISTANCE (MAX.)
100	12'	4'
67	14'	8'
50	16'	12'
40	18'	18'
33	20'	20'

ELEVATION PIPE ANCHORS

NOTES:

1. ANCHORS SHALL BE CLASS 420-C-2000 CONCRETE.
2. FOR CLAY PIPE, ANCHORS SHALL NOT BE PLACED WITHIN 6" OF A PIPE JOINT.
3. TRENCH BACKFILL SHALL BE CONSOLIDATED BY MECHANICAL COMPACTION. IN LIEU OF MECHANICAL COMPACTION, SOIL CEMENT MAY BE USED. HOWEVER, THE TOP 12" OF BACKFILL SHALL BE MECHANICALLY COMPACTED NATIVE SOIL.
4. SPACING OF ANCHORS FOR PIPE SLOPES BETWEEN VALUES SHOWN IN TABLE "A" MAY BE PROPORTIONED.

GOLETA SANITARY DISTRICT

2/11/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

PIPE ANCHORS AND BACKFILL STABILIZERS
TYPE 1

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 23

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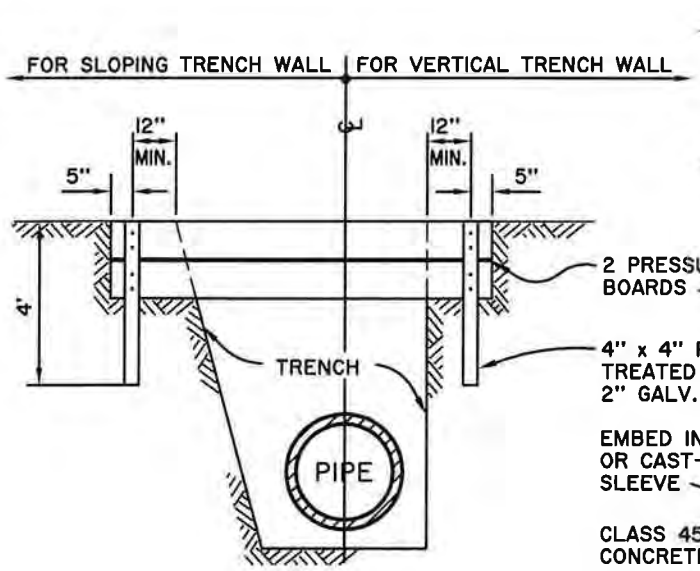
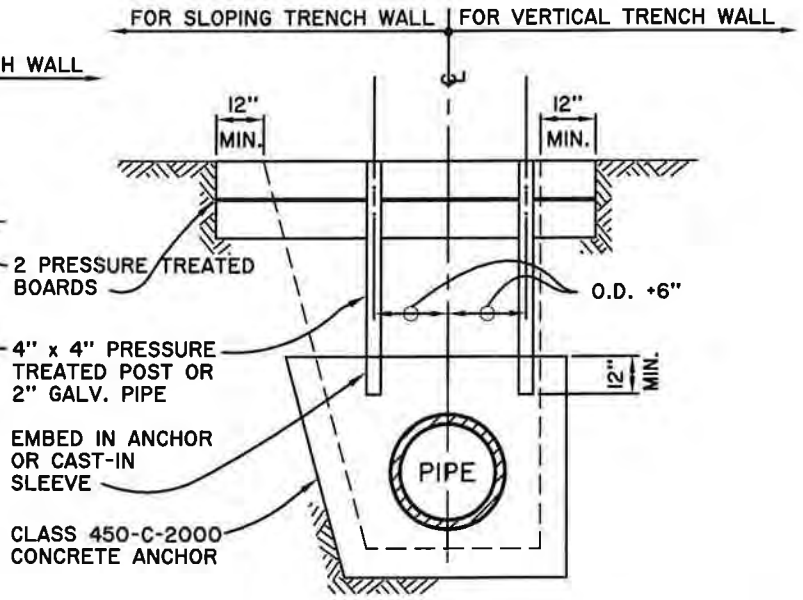
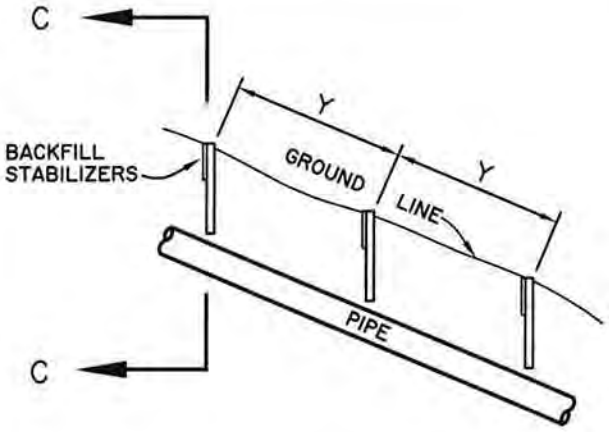


ALTERNATE 1



ALTERNATE 2

SECTION C-C



ELEVATION BACKFILL STABILIZERS

TABLE B

GROUND SLOPE X:1	Y SPACING (MAX.)
1:1	5'
1 1/2:1	9'
2:1	12'
2 1/2:1	16'
3:1	20'

NOTES:

1. PRESSURE TREATED BOARDS SHALL BE 2"x 12" WHERE DEPTH OF COVER OVER PIPE PERMITS. OTHERWISE USE 2"x 8".
2. BOARDS SHALL BE PLACED ON THE HIGH GROUND SIDE OF THE POSTS.
3. EACH BOARD SHALL BE FASTENED BY USING 2-16d NAILS TO EACH POST OR A 3/8 INCH BOLT AND NUT WITH WASHERS TO EACH GALVANIZED PIPE. ALL HARDWARE SHALL BE GALVANIZED.
4. TRENCH BACKFILL SHALL BE CONSOLIDATED BY MECHANICAL COMPACTION. IN LIEU OF MECHANICAL COMPACTION, SOIL CEMENT MAY BE USED. HOWEVER, THE TOP 12" OF BACKFILL SHALL BE MECHANICALLY COMPACTED NATIVE SOIL.
5. SPACING OF STABILIZERS FOR GROUND SLOPES BETWEEN VALUES SHOWN IN TABLE "B" MAY BE PROPORTIONED.

GOLETA SANITARY DISTRICT

2/1/08
DATE

KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
DISTRICT ENGINEER

PIPE ANCHORS AND BACKFILL STABILIZERS
TYPE 2

STANDARD DRAWING

REVISIONS	BY	APP	DATE

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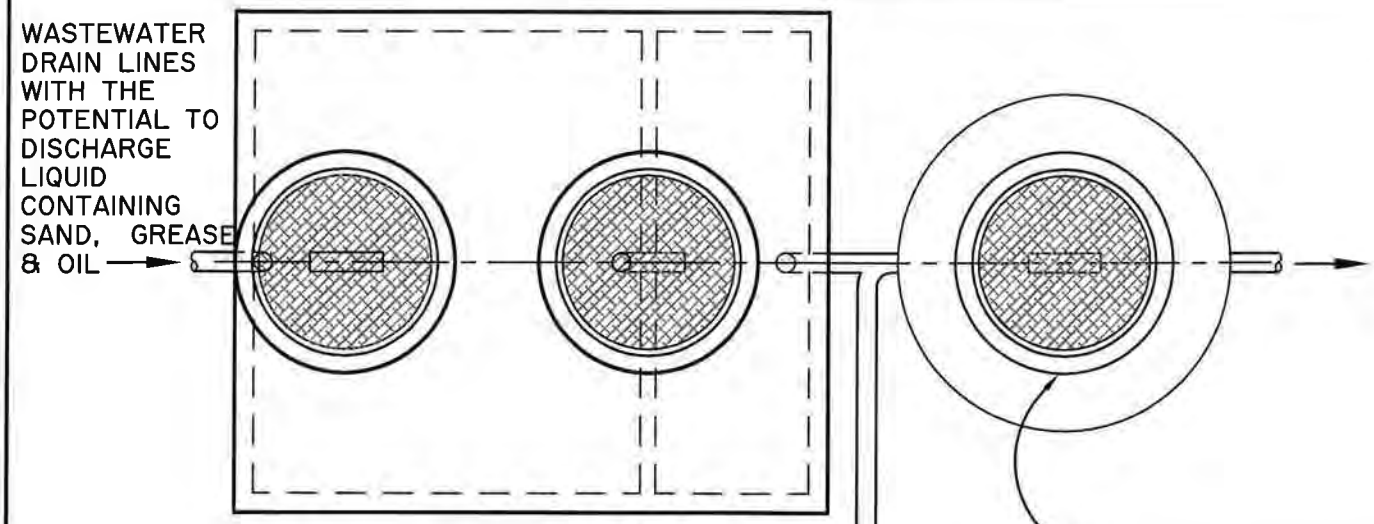
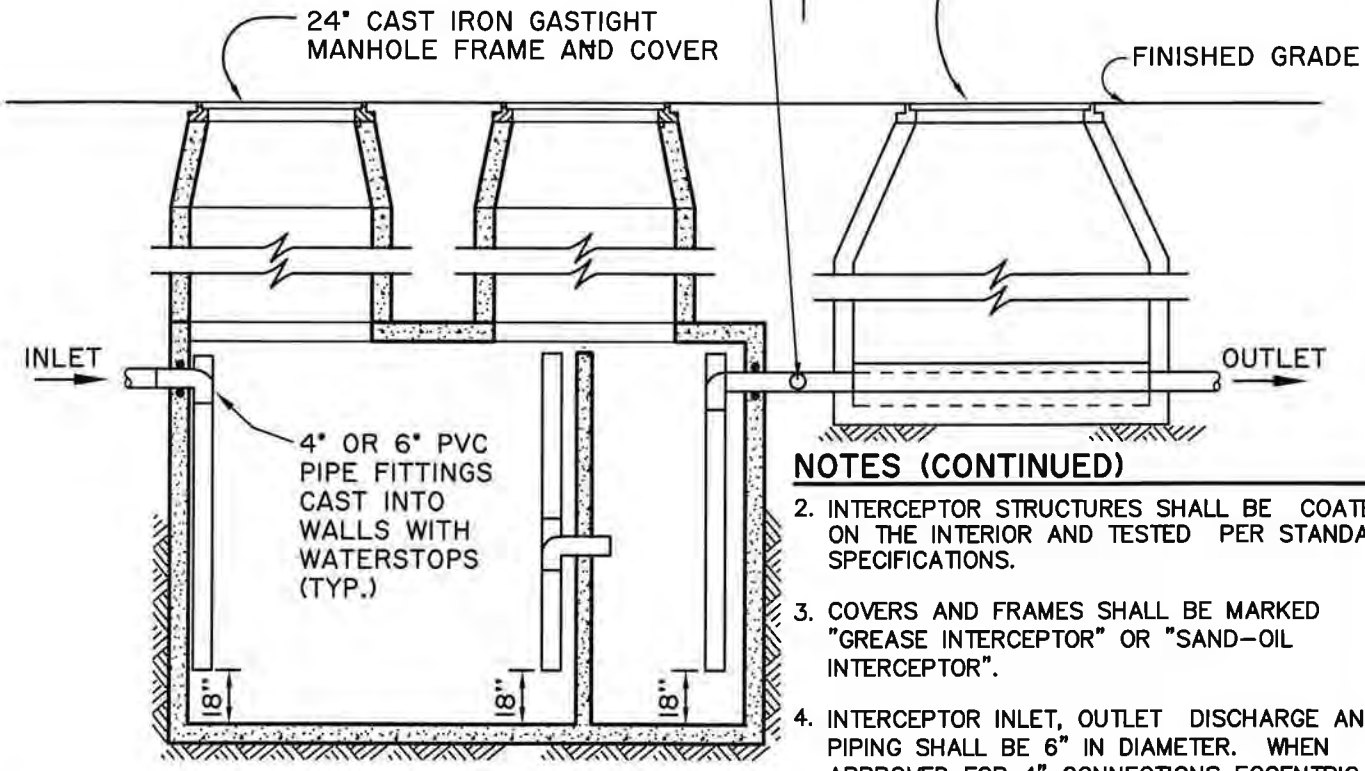


PLAN

SAMPLING MANHOLE SEE STD. DWG. NO. 14

ALL REMAINING BUILDING WASTEWATER DRAIN LINES WITH NO POTENTIAL TO DISCHARGE LIQUID CONTAINING GREASE & OIL



SECTION

NOTES

1. GREASE INTERCEPTORS SHALL BE SIZED IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE REQUIREMENTS. THE MINIMUM GREASE INTERCEPTOR SIZE SHALL BE A 500 GAL. UNIT.

NOTES (CONTINUED)

2. INTERCEPTOR STRUCTURES SHALL BE COATED ON THE INTERIOR AND TESTED PER STANDARD SPECIFICATIONS.
3. COVERS AND FRAMES SHALL BE MARKED "GREASE INTERCEPTOR" OR "SAND–OIL INTERCEPTOR".
4. INTERCEPTOR INLET, OUTLET DISCHARGE AND PIPING SHALL BE 6" IN DIAMETER. WHEN APPROVED FOR 4" CONNECTIONS ECCENTRIC 6"x 4" REDUCERS SHALL BE USED.
5. ALL INTERCEPTORS SHALL BE VENTED PER PLUMBING CODE.

GOLETA SANITARY DISTRICT

2/1/08
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KAMIL S. AZOURY, P.E.
GENERAL MANAGER/
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INTERCEPTORS

STANDARD DRAWING

REVISIONS	BY	APP	DATE

NO. 25

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