Compliance Checklist – Sewer Design Concept

Job Information

Application No.		**Job. No.**	
Submitted by (Engineer)		**Date**	

Other Utilities

Utility	Existing Utility (☐ shown on plans)		Proposed Utility (☐ shown on plans)		none existing or future
	field markings	record info **Variance Request**	approved	in design/ not submitted/ or TBD **Variance Request**	
water	☐	☐	☐	☐	☐
joint trench for PG&E	☐	☐	☐	☐	☐
storm drain	☐	☐	☐	☐	☐
conduit for private streetlights	☐	☐	☐	☐	☐
other:	☐	☐	☐	☐	☐

Compliance with Standard Specifications

Criteria	**Standard**	**Variance Request**
General		
Sewer Shed	☐ serves ultimate tributary area	☐ not consistent with ultimate tributary area
Storm Water Drainage	☐ not applicable	☐ in/near creeks/swales ☐ sewer is over / under culvert ☐ engineered bioswales w/ subdrain (e.g., "C3")
Hillsides	☐ not on hillside; or ☐ in stable, not steep hillside is stable	☐ steep terrain ☐ unstable or slide areas
Other	☐ not applicable	☐ suspended or exposed pipe ☐ railroad crossings ☐ special utility crossings ☐ siphon
Point of Connection (§8-06)		
Point of Connection	manhole: ☐ existing or ☐ new*; and ☐ standard or ☐ trunk (*replace ex Rodding Inlet with new manhole & field verify it was placed at 45° angle)	☐ existing/ new shallow manhole ☐ buried pipe connection ☐ did not field verify if ex RI placed at 45° angle
Invert Verified	☐ direct survey (e.g., pothole or "dip" ex manhole)	☐ interpolation of field-survey ☐ estimated from record drawing
Invert Elevation (IE)	☐ If connecting to main (8-12"), then IE ≤0.25' higher than IE of ex main; or ☐ If connecting to trunk (≥15"), then IE is above crown of ex. trunk	☐ If connecting to main (8-12"), IE > 0.25' higher than IE of ex main ☐ If connecting to trunk, IE to above crown of ex. trunk
Sewer Pipe (§8-07)		
Location of Sewer	centerline of: ☐ existing or ☐ new roadway	☐ not in roadway ☐ not on centerline
Surface Improvement	regular, impervious pavement: ☐ AC or ☐ PCC	☐ pervious pavement/ pavers, etc. (☐ prepared detailed cross-section) ☐ stamped/ coloured pavement ☐ landscaped area or not improved
Pipe Size & Material	☐ 8" PVC SDR-26 (preferred) ☐ other size & material in compliance with Tables 4, 6, 7: ___"; _____	☐ other not in compliance with Tables ____"; _____
Slope	☐ for 8" pipes: 0.0077 ≤ slope ≤ 0.20;	☐ slope < 0.0077 ☐ slope > 0.20

Criteria	Standard	Variance Request
	☐ for other: complies with Table 4 & 6 of Std Specs	
Horizontal Curve	☐ deflection between MHs ≤ 45° ☐ deflection between successive straight segments of pipe ≤ 11-1/4° ☐ deflections at each joint/end of pipe segment complies with latest Approved Materials List	☐ deflection between MHs > 45° ☐ deflection between successive straight segments of pipe > 11-1/4° ☐ deflections at each joint/end does not comply
Vertical Curves	☐ mathematically correct ☐ min slopes comply with Table 4 of Std Specs ☐ max slopes comply with Tables 6 and 7 of Std Specs	☐ slopes do not comply with Tables
Sewer Pipe – clearances (§8-07B)		
Horizontal Clearance	☐ ≥ 5' from face-of-curb and valley gutter ☐ ≥ 5' from structures & building overhangs ☐ ≥ 10' from water ☐ ≥ 3' from all non-potable utilities	☐ < 5' from face-of-curb or valley gutter ☐ < 5' from structures or building overhangs ☐ < 10' from water (☐ submitted authorization from water agency) ☐ less than 3' from any non-potable utilities
Crossing Angles of Utilities	☐ ≥ 30° angle	☐ ≤ 30° angle
Vertical Clearance	☐ ≥ 1' (12-inches) from other utilities or structures	☐ < 1' (12-inches) from other utilities or structures
Manholes (§8-10)		
At required locations	☐ 50' < interval < 500' ☐ change in sewer pipe size ☐ change in sewer pipe material ☐ sewer intersections ☐ sewer grade breaks ☐ last upstream lateral ☐ Pipe Deflection Angle (PDA) < 90°	☐ < 50' or > 500' ☐ not at change in sewer pipe size ☐ not at change in sewer pipe material ☐ not at sewer intersections ☐ not at sewer grade breaks ☐ not at last upstream lateral ☐ PDA > 90°
Min/Max Depth	☐ 44" < depth* < 20' (*min depth as measured from subgrade to top of pipe)	☐ depth ≤ 44" ☐ depth ≥ 20' (☐ prepared structural detail & calcs)
Access to new/ex MHs	☐ all have vehicular access	☐ not all have vehicular access
Drop across	☐ where through-flow, then no drop ☐ where PDA>30°, then drop is 0.25'	☐ does not comply
Wyes Lower Laterals		
Wyes & Lower Laterals (DWG 22-02)	☐ for building approved by, or in review with, Building Department	☐ for future building
Connections to Main	☐ intersect main at 90° ☐ enter manhole min 45° apart	☐ intersect main not at 90° ☐ enter manhole < 45° apart
Material	☐ matches sewer main	☐ does not match
Invert	☐ crown of lateral matches crown of main	☐ does not match

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Required Exhibits/Reports

☐ Annexation Request & Petition	☐ Geotechnical Report
☐ Potential Reimbursable Lots	☐ Arborist Report
☐ Ultimate Tributary Service Area	☐ Typical Cross-Sections
☐ Capacity Study	☐ Detail/Specific Cross-Sections

Mandatory Tables

Required	Table	Approved	Missing	Incomplete	Errors
☒	Manhole Table	☐	☐	☐	☐
☒	Utility Crossing Table	☐	☐	☐	☐
☐	Horizontal Curve Table	☐	☐	☐	☐
☐	Curve Deflection Table	☐	☐	☐	☐

Variances

☐ Approved
☐ Denied
☐ Need to Submit

Comments:

Approval Status

☐ Yes, date: _____
☐ No, ☐ see comments or ☐ schedule Compliance Meeting

Central San Comments:

Attachment - Design Tables

The Mainline Review Engineer will determine which tables are required, or if any can be waived.

Manhole Table

If required, then provide one Table for each SS Line designation, in format shown below, on most appropriate sheet.

SSMH Table - SS Line Segment X[1] (governs if provided elsewhere)						
SS Sta[2]	SSMH #[3]	Type[4] (Dwg #)	Height[5] (feet)	PDA[6] (deg)	Drops and Flow Direction across SSMHs	
					Delta[7] (feet)	U/S to D/S SSMH# or Terminal[8] SSMH
0+00	ex SSMH 24 (73C3)	19-01	6.0	0	0	#1 to ex SSMH 24 (73C3)
3+00	1	19-01	6.0	90	0.25	#2 to #1

[1] Use separate SSMH table for different SS Line Designations
[2] The most downstream Point of Connection (0+00) shall be 0+00 with no offsets.
[3] Start with #1 for most downstream SSMH. If existing SSMH, use Central San's Tag #. Example: Ex SSMH 71 (69Es)
[4] For trunk manholes, incoming pipe must be above crown of existing trunk line.
[5] Measured from Rim to lowest Invert Elevation Out. Use shallow SSMH if 44" and less; use trunk SSMH if greater than 20' deep.
[6] Pipe Deflection Angle (PDA) of pipe out versus pipe in for this line designation. Calculated acute angle (cannot be greater than 90°) as measured from upstream to downstream direction. N/A at Terminal SSMHs.
[7] For thru conditions use 0.00'. If PDA is greater than 30^0, use 0.25' exactly (between 0.25-1.0, requires Central San approval). See item #4 for connecting to existing trunks. N/A at Terminal SSMHs.
[8] If more than one pipe in, use separate SSMH table as PDA and Deltas could be different.

Utility Crossing Table

If applicable, then provide one Table for each SS Line designation, in format shown below, on most appropriate sheet.

Utility Crossing Table[1] (governs if provided elsewhere)											
#	Angle Xing[2]	Upper Pipe (bottom)				Lower Pipe (top)				Vertical Clearance	
		Status	Utility	Size/ Mat'l	Invert Elev	Status	Utility	Size/ Mat'l	Top Elev[3]	clear	determined by[4]
X1	90°	new	Water (EBMUD)	6" PVC	97'	new	SS (CCCSD)	8" PVC	96'	12"	record dwg
X2	45°	ex	Joint trench	24"	80'	new	SS (CCCSD)	8" DIP	85'	5'	potholed

[1] not required for services
[2] shall be greater than 30° to the centerline of sewer
[3] elevation of the top of pipe/utility
[4] method to determine vertical clearance of existing utilities cannot be by design, instead determine by pothole data, record drawings, interpolations, past practice, etc.

Horizontal Curve Table

If alignment includes horizontal curves, then provide one Table for each SS Line designation, in format shown below, on most appropriate sheet.

Horizontal Curve Table (governs over Plan View)						
#[1]	**BC Station (D/S)[2]**	**EC Station (U/S)[2]**	**Delta (D) (degrees)**	**Radius (R) (ft)[3]**	**Arc Length (ft)**	**Cumulative Angle of Pipe Run (degrees)**
C1	1+00	1+50	26º 45' 00''	309	144.26	26º 45' 00''
C2	4+35.18	4+71.78	see Curve Deflection Table[1]			

[1] Depict Curve ID # on profile
[2] Downstream (D/S) and Upstream (U/S)
[3] If less than allowable axial bending and/or for DIP (see Dwg 21-01), then provide fitting or straight pipe Deflection Table.

Reference: See Std Specs Section 8-07.C, Curves – Vertical and Horizontal for design requirements.

Curve Deflection Table

Where radius is less than the allowable axial bending or for ductile iron (DIP), provide one Table for each Curve, in format shown below, on most appropriate sheet.

Curve Deflection Table (governs over Plan View)			
C2 Curve - 3º 29' 41'' deflections[5] for 12.20' pipe length $10^0$29'02" (D), 200.00' (R), 36.60' (L)			
Description	**Station**	**8" Invert**	**Type**
BC	4+35.18	78.56	
½ Pipe Length	4+41.29	78.60	Coupling
	4-53.50	78.70	Coupling
½ Pipe Length	4+65.71	78.79	Coupling
EC	4+71.78	78.84	SSMH 4

[5] deflections at each joint/end of pipe segment to not exceed allowable deflection as shown on latest "Approved Materials List" located https://www.centralsan.org/standard-specifications-and-approved-materials

Attachment – Standard Specifications References

Table 4. Minimum allowable slopes

Nominal Pipe Size (in)	Minimum Design Flow (cfs)	Maximum Design Flow (cfs)	Minimum Slope (ft/s)
8	0.0	0.81	0.0077
10	0.82	1.28	0.0057
12	1.29	1.57	0.0022
15	1.58	2.45	0.0015
18	2.46	3.53	0.0012
21	3.54	4.81	0.00095
24	4.82	6.28	0.0008
27	6.29	7.95	0.0007
30	7.96	9.81	0.0006
33	9.82	11.87	0.00055
36	11.88	14.13	0.0005

Table 6. Preferred Material for Main and Trunk Sewers

If diameter is…	And shall be installed…	Then use…
<12”	with a slope exceeding 20%	ductile iron pipe
	under a roadway with pipe slope less than 20%	PVC SDR-26
	not under a roadway and with pipe slope less than 20%	PVC C900 DR 14
12-15”	with a pipe slope exceeding 20%	ductile iron pipe
	with a pipe slope less than 20%	PVC SDR-26
>15”		PVC C905

Table 7. Main and Trunk Sewer Pipe Cover Limitations

Size	Material	Type and Minimum Class	Min- Max Cover in ft	
Main Sewers under Roadway				
8"	VC	-	6	30
10"				15
8"-10"	DI	Class 52	1	35
	PVC	SDR-26	5	24
		C 900 DR 25		
		C 900 DR 18	4	
		C 900 DR 14	3	
	HDPE	SDR-17	5	
Main Sewer not under Roadway				
8"-10"	DI	Class 52	1	30
	PVC	C900 DR 14	3	24
Small Trunk Sewers				
12"	VC	-	6	18
15”				25
12-16”	DI	Class 52	1	30
12"-15"	PVC	SDR-26	6	24
14"-24"		C905 DR 51		
		C905 DR 41		
		C905 DR 32.5		
		C905 DR 25		
		C905 DR 21		
		C 905 DR 18		