



CITY OF HENDERSON

2nd Addendum – September 2007 **Design and Construction Standards for Wastewater Collection Systems** **1997 Edition**

GENERAL STATEMENT:

The “Design and Construction Standards for Wastewater Collection Systems” (DCSWCS) addresses the design and construction requirements for wastewater collection systems. Generally, this shall include sewer mains and appurtenances 15-inches in diameter and smaller. For design and construction requirements related to mains larger than 15-inches in diameter, contact the City of Henderson Department of Utility Services, Technical Services Division for specific details.

The intent of this addendum is to clarify specific City of Henderson (City) requirements that may not be fully addressed within the DCSWCS document. Where discrepancies exist between the requirements of DCSWCS and this addendum, this addendum shall apply. If not amended by this addendum, the requirements as specified in DCSWCS shall apply. This 2nd addendum supersedes the 1st addendum.

1.5 Right-of-Way

Easements shall not be less than 20 feet in width and shall be contained within a single parcel of land. The easement shall increase by 10 feet in width for each utility main added to the easement beyond a single main. All mains shall be centered in the available easement space. Unless otherwise allowed by the City, all utility easements in a subdivision, not within a public or private street, shall be within a common element. The easement width required may increase with any main deeper than 10-feet.

1.13 Rules and Regulations

The City of Henderson’s “rules and regulations” are incorporated in: Title 14 of the Henderson Municipal Code, the City of Henderson Service Rules, this Addendum and the City’s Approved Materials List. Copies are available at City Hall and on the City’s web site.

2.2 Design Criteria For Gravity Sewers

2.2.1 Calculation of Wastewater Flow
Table B of this Addendum shall be used for calculating wastewater flows within the City.

- 2.2.2 Minimum Pipe Size Requirements
The minimum sewer main size for any project will be based on the approved sewer analysis or master plan for the project area. The minimum sewer main size may include pipe sizes up to 15-inches in diameter, based on the ultimate sewer system requirements for that area.
- 2.2.3 Minimum Slope Requirements
Engineer shall provide the actual number of contributing equivalent residential units (ERUs) in the calculation to verify the minimum 2 feet per second velocity can be achieved.
- Where the minimum flushing velocity (2 fps) cannot be achieved, a minimum slope of 0.006 ft/ft shall be used.
- 2.2.7 Curved Sewers
Curved sewers shall be allowed only under the condition whereby manholes are installed at each end of the curve. Detailed as-built drawings shall be provided in order to insure proper line locations for future excavation.
- 2.2.8 Manhole Diameters
Within the City, all 15-inch sewer mains require a 60-inch manhole.
- Other geometric configurations may require an increase in manhole diameter. For example, (3) 12-inch mains entering a manhole require a 60-inch diameter manhole.
- 2.2.9 Manhole Appurtenances
Covers:
Locking manhole covers shall be required as directed within the City.
- Steps:
Steps are not utilized for any sanitary sewer manholes within the City.
- Bases:
All manhole bases constructed in a fill section shall be constructed with 12-inches of crushed rock under the base.

Connections:

Where sewers enter existing manholes, the wall of the manhole shall be core drilled and an appropriate seal boot (Link-Seal or an approved equal) shall be used to positively seal against infiltration and exfiltration. In any ground water type application a double seal shall be used. Sewers larger than 15-inches entering an existing manhole will be on a case by case basis.

The 4% decrease in pipe slope is a general rule for a manhole lining requirement. Other geometric configurations that may result in sewer flow turbulence may require a lining system.

Manhole lining systems shall only be applied after all manhole adjustments are complete. The lining system shall cover all inside manhole surfaces except the sewer flow channel.

T-Lock lining is not approved for use within the City of Henderson.

2.2.12 Drop Manholes

The use of a drop manhole within the City is an absolute last resort in the design process. Cost of extending additional sewer main will not be a consideration for allowing drop manholes.

2.2.14 Manhole and Main Line Location

All sewer manholes shall have all-weather, 24 hours per day, 7 days per week drive access. This access corridor shall be a minimum 12 feet wide with a minimum inside radius of 50 feet.

The access corridor must also be configured as a drive-thru corridor or have a turn-a-round area large enough to accommodate the City's sewer maintenance vehicle.

2.2.15 Sewer Line Depths and Alignments

Sewer mains greater than 20 feet deep shall only be considered on a case-by-case basis. Alternative pipe material may be required for depths greater than 15 feet.

Case II

6 feet to top of pipe for 8-inch and 12-inch.

2.2.16 Shallow Mains and Laterals

The City does not allow concrete encasement of sewer mains.

2.2.17 Sewer Main Connections
Where sewers enter existing manholes, the wall of the manhole shall be core drilled and an appropriate seal boot (Link-Seal or an approved equal) shall be used to positively seal against infiltration and exfiltration. In any ground water type application a double seal shall be used. Sewers larger than 15-inches entering an existing manhole will be on a case by case basis.

The manhole base of any modified manhole shall conform to drawing SD-7 after modification.

2.2.20 Commercial Laterals
No lateral shall be constructed at less than a 1% slope.

Clean-outs shall be installed at any change in horizontal or vertical direction and shall be spaced not to exceed 100-feet from clean-out to clean-out.

All commercial, industrial and adult-care facilities are required to meet the City's pretreatment requirements.

2.2.21 4c 2) Water and Sewer Utility Crossings and Clearances
Sewer mains and sewer laterals shall only be considered for concrete encasement on a case-by-case basis.

2.2.25 Full Frontage Extension
Unless otherwise specified by the City, all projects shall extend utilities full frontage within all public rights-of-way adjacent to the property/project.

2.4 Design Criteria For Pumping Stations

All wastewater pumping stations within the City are reviewed on a case-by-case basis. The City does not accept any standard design for wastewater pumping stations.

2.5 Design Criteria For Force Mains

2.5.4 Depth
The minimum depth for any force main within the City is 3.5 feet.

2.5.5 Termination
Private force mains shall enter the gravity system in a private manhole then gravity to a public manhole.

2.5.11 Identification Ribbon
Tracer wire shall also be installed in addition to locator ribbon for all wastewater and reuse/reclaimed mains.

3.7 Construction Staking

In addition, all sewer mains designed at a slope less than 1% shall be staked at an interval not to exceed 25 feet.

3.8 As-Builts

At the completion of the project and within two weeks after balling has been completed, the Contractor shall be required to submit certified as-builts to the Engineer. As-builts, at a minimum shall include: distance between manholes, lateral locations at the property line, alignment changes and existing utilities that cross the sewer line. The Engineer will provide record drawing mylars of good quality to the Agency, reflecting the certified as-builts supplied by the contractor. See also Section 3.16, "Final Acceptance".

3.9 Earthwork

3.9.4 Pipe Zone Backfill

The use of flooding within the pipe zone shall be considered only on a case-by-case basis.

3.9.4b Pipe Zone Backfill Operations (Flexible Pipe)

In any area where the pipe will be installed below historic groundwater levels or where the trench could be subject to inundation, crushed rock material shall be placed to the top of the pipe. (The City requires the crushed rock material to be placed to the top of the pipe zone.)

3.10 Pipe Installations

Water stops will be required whenever groundwater is encountered during construction, or whenever at or below the groundwater table (when known).

The City does not allow the use of VCP and RCP pipe for wastewater collection system applications.

3.12 Manhole Construction and Installation

3.12.10 During construction of new facilities, the contractor shall, at the request of the City, put plywood in the manhole to protect against debris getting into the invert. A trap or plug must be installed within the manhole immediately upstream of each point of connection to existing mains. This trap must be constructed, installed and maintained such that construction debris is prevented from entering existing mains. The trap shall be relocated to the manhole immediately downstream of each point of connection prior to any flushing and balling operations within the new facilities.

3.16 Final Acceptance

Accurate as-built drawings must also be provided to the City prior to, and as a condition of final acceptance.

The entire list provided under this section shall be performed to the complete satisfaction of the City. The City shall have sole responsibility for making the determination on whether or not what is provided has met this requirement. In addition, the City reserves the right to require that additional items be provided that is above and beyond what is listed under this section. If so requested by the City, these additional items shall be provided prior to, and be a condition of final acceptance of the sewer lines.

3.17 Occupancy Permit Guidelines

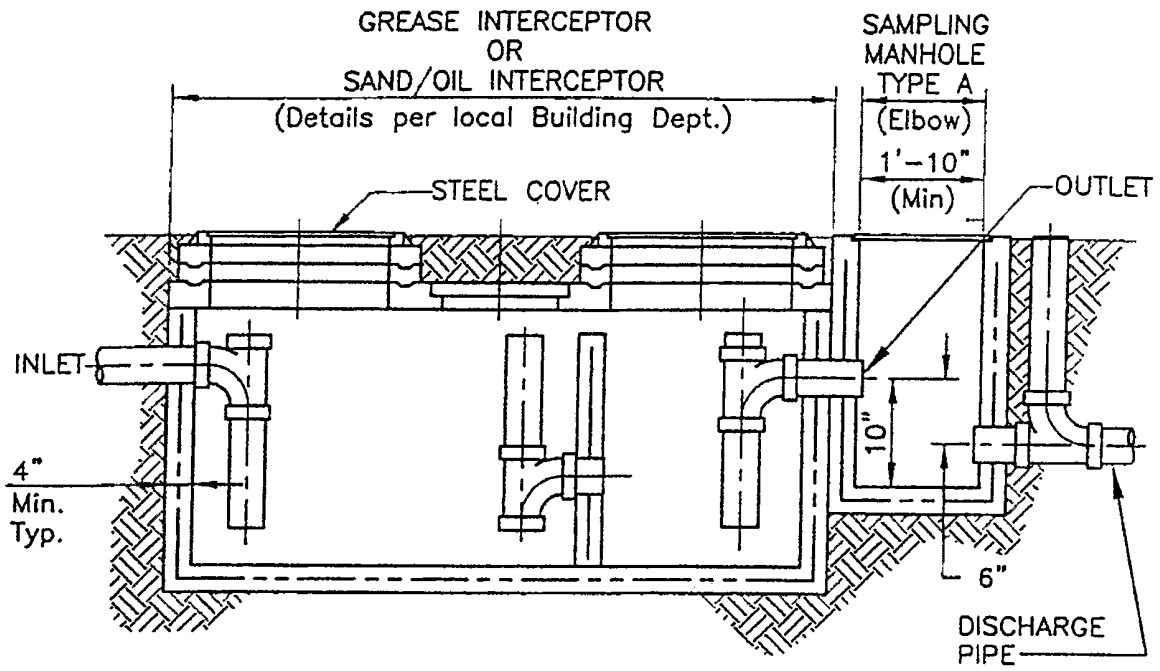
3.17.3 The City will hold portions of the bond as it sees necessary until all corrections are made.

SECTION 5
STANDARD DRAWINGS

DCSWCS
Drawing
No.

Changes/Additions/Deletions

- No. SD-1** Steps are not utilized for any sanitary sewer manholes within the City.
- Where precast manhole bases are installed, "A"-lock type manhole adapters shall be used.
- All manhole bases constructed in a fill section shall be constructed with 12-inches of crushed rock under the base.
- No. SD-3B** Amend Note 2 to read as follows: "Concrete collars shall be required on all sewer manholes, including those installed within residential streets that are less than 80-feet in width".
- No. SD-6** Amend Note 1 to read as follows: "Concrete collars shall be required on all sewer manholes, including those installed within residential streets that are less than 80-feet in width".
- No. SD-8** The use of a drop manhole within the City of Henderson is an absolute last resort in the design process. Cost of extending additional sewer main will not be a consideration for allowing drop manholes.
- No. SD-12** "S" stamp on the top of the curb is required for all sewer lateral installations. The installation of a 4" x 4" Douglas fir post shall also be required to indicate the location of the end of the sewer lateral construction (as also shown in Method "A" on the drawing).
- No. SD-16** Identification or locator ribbons shall be installed on all sewer line installations. The ribbon shall be located 6" above the pipe zone.
- No. SD-16A** Identification or locator ribbons shall be installed on all sewer line installations. The ribbon shall be located 6" above the pipe zone.
- No. SD-16B** Identification or locator ribbons shall be installed on all sewer line installations. The ribbon shall be located 6" above the pipe zone.
- Tracer wire shall also be installed in addition to locator ribbon for all wastewater and reuse/reclaimed mains.
- No. SD-25** This drawing shall be deleted in its entirety.
- No. SD-28** This drawing is attached to this addendum and thereby shall be incorporated into the document (to be used in lieu of the standard drawing SD-28).



NOTES:

1. When possible provide 6" free fall from center line of outlet pipe to centerline of discharge pipe.

PRETREATMENT SAMPLING MANHOLE

ISSUED:

NUMBER: SD-28 (C.O.H.)

Table B, Page T-2 calculating wastewater flows in the City of Henderson.

<u>UC</u>	<u>CUSTOMER CLASS</u>	<u>ERUs</u>	<u>BILLING</u>
10	Single Family	1.00	Each Unit
11	Townhouse, Condo (indiv. billed)	.70	Each Dwelling Unit
12	Multiple Residential	.70	Each Dwelling Unit
13	Townhouse, Condo (assns billed)	.70	Each Dwelling Unit
14	Trailer Estates	1.00	Each Lot
15	Trailer Estates (assns billed)	1.00	Each Lot
16	Trailer Courts (RV Parks)	.70	Each Space
18	Hotels/Motels	.60	Each Room
	Plus fixtures outside of rooms	1.50	Each Fixture
20	Casinos	1.50	Each Fixture
21	Restaurant (disposal)	1.33	Each Fixture
22	Restaurant (with or without bar)	1.33	Each Fixture
TYPE A - 50			
51	Dry Cleaners	1.00	Each Fixture
52	Markets with disposal	1.00	Each Fixture
53	Bars/Taverns with food facilities	1.00	Each Fixture
55	Motor Vehicles Sales with automated car wash	1.00	Each Fixture
56	Miscellaneous	1.00	Each Fixture
TYPE B - 60			
61	Bars/Taverns without food sales	.65	Each Fixture
63	Service Stations	.65	Each Fixture
64	Misc Business (includes shopping centers)	.65	Each Fixture
66	Retail Sales (includes motor vehicle sales without automated car wash)	.65	Each Fixture
67	Drug Stores	.65	Each Fixture
TYPE C - 70			
71	Offices	.45	Each Fixture
72	Service-Alterations/Dry Cleaner Pickup Stations	.45	Each Fixture
73	Maintenance/Repairs	.45	Each Fixture
74	Theaters	.45	Each Fixture
75	Common areas for TYPE C category	.45	Each Fixture
76	Office/Warehouse	.45	Each Fixture
77	Laundromats	.45	Each Fixture
TYPE D - 80			
81	Beauty/Barber/Nail Shops and Tanning Salons	.25	Each Fixture
82	Medical (M.D.)	.25	Each Fixture
83	Dental (D.D.S.)	.25	Each Fixture
84	Medical/Dental (Physician on staff seeing patients)	.25	Each Fixture
85	Veterinarian	.25	Each Fixture
86	Pet grooming/Common areas for TYPE D	.25	Each Fixture
30	Hospital	1.20	Each Bed
32	Convalescent/Rest Home	.75	Each Bed
34	School (includes day care centers)	.10	Each Student
36	Church	.50	Each Fixture
40	Large Continuous Car Wash	Average ERUs of all similar car washes (for SDAs only)	
40	Car Wash (per bays or stalls)	1.275 ERUs x no. of bays or stalls (for SDAs only) (135,000gal per bay)	
40	(Laundry) (Car Wash) (SDA+SS) (SS only)	(Annual Water Use) x .85 = No. of ERUs 90,000 gallons (Must have meter on all sources of water)	
	Large Commercial (Over 250,000 gallons per day)	(Annual Water Use) = no. of ERUs 90,000 gallons (Must have meter on all sources of water)	
Swimming Pools including nonresidential spas, hot tubs and jacuzzis			
<u>Type</u>	<u>Size in Gallons</u>	<u>ERUs</u>	
1	30,000 gallons and less	.10	(includes nonres decorative fountains)
2	30,001 - 99,999	.25	
3	100,000 - 149,999	.50	
4	150,000 - 199,999	.65	
5	200,000 - 249,999	.85	
6	250,000 - 299,999	1.00	
7	300,000 - or more	1.30	(for each additional 50,000 gal or each fraction thereof add .25 ERUs)

For calculating wastewater flows within the City of Henderson use - one ERU = 250 gpd

TABLE B