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ELOY
National Gypsum Company
Sewer Study

TO 2E

Sewer Study For Bralu LLC

between Sunshine Blvd, State Highway 84, La
Ima Rd Alignment, and Interstate-10
Eloy, Arizona

Project No. 06-031

August 2007



APPROVED

CITY OF ELOY ENGINEER

DATE

OCTOBER 26, 2007

THE CITY APPROVES THIS REPORT FOR CONCEPT ONLY AND ACCEPTS NO
LIABILITY FOR ERRORS OR OMISSIONS.

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I. INTRODUCTION

The purpose of this report is to analyze the existing gravity sewer lines, force main lines, and lift station from the Sunshine Blvd and Date Street intersection to the existing wastewater treatment plant (WWTP) located northwest of the Battaglia Road and Eleven Mile Corner Road intersection in Eloy, Arizona. The plans for this sewer infrastructure, except the WWTP, were prepared by DNA, Inc and are dated May 17, 2000. The plans' coversheet also lists an as-built certification date of July 19, 2001. The same firm also prepared a sewer design report dated April 11, 2000.

The City's sewer consultant, Carollo Engineers, has completed a draft version of the City of Eloy Wastewater Master Plan Summary Report dated May 2007. This report delineates proposed service areas, location and sizes of proposed gravity sewer lines, force mains, lift stations, and WWTPs. The report also provides criteria to determine flow projections based on land use.

DNA's design report together with Carollo's master plan will be the basis for this sewer study. This study will provide calculations to be used by both the City and Bralu LLC to determine the available capacity in the existing sewer infrastructure described above.

II. EXISTING SEWER SYSTEM SERVICE AREA

Bralu LLC owns approximately 277 acres of agricultural land which will become future industrial/commercial development. This area is located between Sunshine Blvd, State Highway 84, La Palma Road alignment, and Interstate-10. This location is within a portion of Sections 8 and 17, Township 8 South, Range 8 East of the Gila and Salt River Base and Meridian in Pinal County, Arizona. Other parcels within this boundary are the existing 20 acre Pilot TravelCenter (formerly Williams TravelCenter) located at the northeast corner of Sunshine Blvd and Interstate-10 and the proposed 103 acre National Gypsum Company's (NGC) new wallboard facility located between the proposed Date Street extension and the Union Pacific Railroad (just south of State Highway 84), along the west edge of La Palma Road alignment.

The NGC site will shortly be constructing Date Street with sewer lines and waterlines from Sunshine Blvd to La Palma Road alignment per plans prepared by EPS Group, Inc. Construction includes the installation of a 15" sewerline connected to the existing manhole at Sunshine Blvd, running east for approximately 3,200 LF before becoming a 12" line (approximately 2,900 LF) stubbed at La Palma Road alignment. This sewer line extension in Date Street is designed to serve the 277 acre Bralu property, 103 acre NGC site, and 200 acre Cardon Hiatt property east of La Palma Road alignment between State Highway 84 and Interstate-10. The existing 20 acre Pilot TravelCenter sewers in a 12" sewer line to the north in Sunshine Blvd before turning west at Date Street.

Various exhibits located in the appendix show the total service area analyzed by this sewer study. This area will be served by the existing gravity sewer lines, force main lines, and lift station which were built in 2001 per the DNA plans. This study follows the delineated service area established by the DNA sewer design report (see appendix for DNA exhibit) with some modifications. These modifications include:

- Addition of 200 acre Cardon Hiatt property east of La Palma Road alignment. The Carollo master plan shows the 200 acre Cardon Hiatt property is to be included in this sewer flow calculation as was done in the Date Street sewer extension calculations.
- Addition of 90 acre existing/future residential between 'D' Street and Sunshine Blvd, Alsdorf Road and Interstate-10. This study assumes that this area will tie into this line in the future.
- Addition of 24 acres existing/future residential between Lincoln Street and Sunshine Blvd, Alsdorf Road and Hinton Street. This study assumes Alsdorf Road (section line) to be the north boundary of this service area.
- The City's Land Use Plan defines the area between Lincoln Street, Alsdorf Road, 'D' Street, and Interstate-10 as "Institutional, Public, Industrial".

DNA's plans and sewer design report were developed in order to serve the 20 acre Pilot TravelCenter located at the northeast corner of Sunshine Blvd and Interstate-10. At the time, sewage from the existing 20 acre Flying 'J' Truck Stop, located at the southeast corner of Sunshine Blvd and Interstate-10, was being pumped from a nearby lift station into an existing 6" gravity sewer line which has since been tied into the DNA gravity system at the intersection of 'D' Street and Date Street.

This study includes estimated flows from these 2 sources. It is assumed that no existing residential houses are currently tied into this system; that they are served by smaller, existing gravity lines. However, this study does analyze different scenarios in which these existing homes and any future homes within the service area may be incorporated into this system.

III. SEWER DESIGN FLOW SCENARIOS

The appendix contains maps which show the entire service area in addition to different build-out scenarios and associated design flows. These scenarios are as follows:

Scenario #1

Full sewer area built out except future industrial west of Sunshine Blvd and future industrial east of La Palma Road.

Scenario #2

Full sewer area built out except future industrial west of Sunshine Blvd.

Scenario #3

Full sewer area built out except future industrial east of La Palma Road.

Scenario #4

Full sewer area built out except future industrial and residential west of Sunshine Blvd.

Scenario #5

Full sewer area built out.

IV. DESIGN CRITERIA

This study was performed using the calculations and criteria described below.

Criteria for Calculation of Flows

- 1) For both future and existing industrial areas east of Sunshine Blvd, flows will be calculated at 1200 gallons per acre per day of average flow (per preference of future developers).
- 2) For future industrial areas west of Sunshine Blvd, flows will be calculated at 1000 gallons per acre per day of average flow (design criteria per City of Eloy Wastewater Master Plan Summary Report).
- 3) For both future and existing residential areas west of Sunshine Blvd, flows will be calculated at 65 gallons per capita per day of average flow using the housing density based on this planning area (4 du/ac) and established estimation of people per dwelling unit (3 people/du) (design criteria per City of Eloy Wastewater Master Plan Summary Report).
- 4) A peaking factor was calculated for each scenario using the peaking factor formula set by ADEQ which is based on population. This study assumes 100 gallons per person to calculate the total population. The table below shows these peaking factors.

Scenario	Service area (ac)	Flow (gpd)	Avg flow/person	Total pop	Persons/acre	Peaking Factor
#1	510	574,200	100	5,742	11.26	1.95
#2	710	814,200	100	8,142	11.47	1.88
#3	745	809,200	100	8,092	10.86	1.89
#4	620	744,000	100	7,440	12.00	1.90
#5	945	1,049,200	100	10,492	11.10	1.84

Peak Factor per AA R 18-9-E301, Section D (i):

$$PF = (6.33 \times p^{-0.231}) + 1.094 \text{ (for total population between 1,001 and 10,000)}$$

$$PF = (6.177 \times p^{-0.233}) + 1.128 \text{ (for total population between 10,001 and 100,000)}$$

Criteria for Calculation of Line Capacities

- 1) Use pipe diameters, pipe lengths, and pipe slopes from DNA as-built plans.
- 2) Pipe flow calculated per Manning's Equation:
Where "n"=0.013

Cumulative Flow (Q):

$$Q = (\# \text{ of acres}) * (\text{Demand per acres}) * (\text{Peaking factor})$$

Line Capacity (Q):

$$Q = (1.486/n) A R^{2/3} S^{1/2}$$

$$n = 0.013$$

A= Cross Sectional Area

R = Wetted Perimeter

S = Slope

V. RESULTS / CONCLUSIONS

See the appendix for detailed calculations presenting estimated peak flow versus existing pipe capacity for different build out scenarios for this service area.

These calculations show that there is adequate capacity in all of the existing lines to handle the peak flow except for 2 areas. First, in Scenario #5 (total service area built out) the pipe capacity usage on the last run of 15" before it changes to 18" is 103.5%. This means this segment of pipe will have a minor surcharge during peak conditions. Analyzing this peak flow rate by averaging the slopes between the next manhole upstream (MH #13) to this downstream manhole (MH #11), decreases the pipe capacity usage to 93.1%.

Second, calculations for all the scenarios identify a lack of capacity in the 18" line between MH #10 and MH #9. The as-built plans show a design slope of 0.11% with an as-built slope of 0.19%, however, there seems to be a calculation error as the true as-built slope is 0.02%. This stretch of pipe is located in Hinton Street from Main Street to approximately 400' west of Main Street (approx 165' east of 'E' Street). Analyzing this peak flow rate by averaging the slopes between the next manhole upstream (MH #11) to this downstream manhole (MH #9), increases the pipe capacity from 1.38 cfs to 3.18 cfs. This capacity is adequate for the design peak flow during all 5 scenarios.

The lift station built by the DNA plans is located approximately 270' northwest of the Curiel Street and Fourth Street intersection and approximately 120' south of the Union Pacific Railroad. This railroad parallels Frontier Street (State Highway 84) on the south side. Per DNA's sewer design report, this lift station was designed with two 6" submersible pumps. Each pump is designed to pump 1582 gallons per minute (gpm). Both pumps running simultaneously will pump 2075 gpm. The DNA report verifies that the 10" sewer force main will handle the peak flow rate estimated to be 1436 gpm. Under built out conditions (Scenario #5), this study estimates a peak flow rate of 1341 gpm, based on a cumulative flow of 1.931 MGD. Therefore, the existing lift station and sewer force main will not require augmentation as this peak flow rate is less than that calculated by the DNA report.

VI. REFERENCES

- 1-City of Eloy Wastewater Master Plan Draft Summary Report, Carollo Engineers, May 2007
- 2-Sewer Design Report for Williams TravelCenters, Inc City of Eloy Sewer Extension, DNA Inc., April 11, 2000
- 3-Williams TravelCenter Sewer Main Extension (Improvement Plans), DNA Inc., July 17, 2000
- 4- Sewer & Water Report for National Gypsum Co – Date Street, EPS Group, Inc., August 13, 2007
- 5- Arizona Department of Environmental Quality, AA R 18-9-E301, Section D (i)

APPENDIX





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Engineers, Planners & Surveyors

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SEWER EXHIBIT SCENARIO #1



JOB NO. 06-031
DATE AUGUST 16, 2007

Project: Eloy Sewer Study
Job #: 06-031
Date: 8/16/2007
Initials: EDW

City of Eloy Sewer Calculations

Scenario #1: Full sewer area built out except future industrial west of Sunshine Blvd and future industrial east of La Palma Rd

Demand per acre: 1200 gal/acre/day (Estimated flow from industrial east of Sunshine Blvd)
Demand per acre: 1000 gal/acre/day (Estimated flow from industrial west of Sunshine Blvd)
Demand per acre: 780 gal/acre/day (65 gpcd * 4 du/ac * 3 people/du)
Peaking factor: 1.95
Manning's "n": 0.013

Up MH	Down MH	Pipe length (ft)	Pipe dia. (in)	Acres Indust/ Commercial	Acres Residential	Cum. Flow (MGD)	Cum. Flow (cfs)	Line cap. (cfs)	Capacity Usage (%)	Up inv. elev	Down inv. elev	Pipe slope %	Up MH rim elev	Down MH rim elev	Up MH depth (ft)	Down MH depth (ft)
Ex MH 19	Ex MH 18	322.26	15	400.0	0.0	0.936	1.45	2.76	52.4%	1550.00	1549.41	0.183	1568.03	1567.34	18.03	17.93
Ex MH 18	Ex MH 17	501.16	15	400.0	0.0	0.936	1.45	2.41	60.0%	1549.41	1548.71	0.140	1567.34	1566.14	17.93	17.43
Ex MH 17	Ex MH 16	41.78	15	420.0	0.0	0.983	1.52	2.45	62.1%	1548.71	1548.65	0.144	1566.14	1566.35	17.43	17.70
Ex MH 16	Ex MH 15	515.68	15	420.0	40.0	1.044	1.61	2.36	68.3%	1548.59	1547.90	0.134	1566.35	1565.62	17.76	17.72
Ex MH 15	Ex MH 14	494.92	15	420.0	40.0	1.044	1.61	2.41	67.0%	1547.90	1547.21	0.139	1565.62	1565.53	17.72	18.32
Ex MH 14	Ex MH 13	497.56	15	420.0	40.0	1.044	1.61	2.51	64.4%	1547.21	1546.46	0.151	1565.53	1564.80	18.32	18.34
Ex MH 13	Ex MH 12	494.54	15	420.0	70.0	1.089	1.69	2.90	58.0%	1546.46	1545.46	0.202	1564.80	1563.70	18.34	18.24
Ex MH 12	Ex MH 11	263.63	15	420.0	70.0	1.089	1.69	2.48	67.8%	1545.46	1545.07	0.148	1563.70	1563.44	18.24	18.37
Ex MH 11	Ex MH 10	522.46	18	420.0	90.0	1.120	1.73	4.06	42.7%	1545.00	1544.22	0.149	1563.44	1563.40	18.44	19.18
Ex MH 10	Ex MH 9	402.73	18	420.0	90.0	1.120	1.73	1.38	125.1%	1544.22	1544.15	0.017	1563.40	1562.42	19.18	18.27
Ex MH 9	Ex MH 8	445.70	18	420.0	90.0	1.120	1.73	3.62	47.8%	1544.15	1543.62	0.119	1562.42	1561.28	18.27	17.66
Ex MH 8	Ex MH 7	405.13	18	420.0	90.0	1.120	1.73	3.50	49.5%	1543.62	1543.17	0.111	1561.28	1561.10	17.66	17.93
Ex MH 7	Ex MH 6	353.71	18	420.0	90.0	1.120	1.73	4.43	39.1%	1543.07	1542.44	0.178	1561.10	1560.53	18.03	18.09
Ex MH 6	Ex MH 4	614.00	18	420.0	90.0	1.120	1.73	3.65	47.5%	1542.44	1541.70	0.121	1560.53	1559.61	18.09	17.91
Ex MH 4	Ex MH 3	500.83	18	420.0	90.0	1.120	1.73	3.48	49.8%	1541.70	1541.15	0.110	1559.61	1559.02	17.91	17.87
Ex MH 3	Ex MH 2	496.14	18	420.0	90.0	1.120	1.73	3.56	48.7%	1541.15	1540.58	0.115	1559.02	1559.34	17.87	18.76
Ex MH 2	Ex MH 1	189.20	18	420.0	90.0	1.120	1.73	3.50	49.5%	1540.55	1540.34	0.111	1559.34	1558.28	18.79	17.94
Ex MH 1	Ex Lift Station	205.75	18	420.0	90.0	1.120	1.73	5.18	33.5%	1540.24	1539.74	0.243	1558.28	1558.61	18.04	18.87

NOTES:

Initial 600 acres of sewage entering at Ex MH 19 (Date St & Sunshine Blvd) is Bralu LLC (277 ac), NGC (103 ac), Cardon Hiatt (200 ac), and Pilot TravelCenter (20 ac).
The existing Flying 'J' Truck Stop (approx 20 ac) is controlled by a lift station that pumps into the existing 6" sewer line which runs north in "D" Street. This flow enters the system at Ex MH 17.
50 ac of industrial flow and 40 ac of residential flow enters at Ex MH 16 (Date St & "D" St).
55 ac of industrial flow and 30 ac of residential flow enters at Ex MH 13 (just north of "D" St & Beech St).
45 ac of industrial flow and 20 ac of residential flow enters at Ex MH 11 ("D" St & Hinton St).
85 ac of industrial flow enters at Ex MH 7 (Curriel St & Hinton St).

Elevations, pipe lengths, pipe diameters, pipe slopes, and MH labels in this table are per DNA as-built drawings.



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SEWER EXHIBIT SCENARIO #2



JOB NO. 06-031
DATE AUGUST 16, 2007

Project: Eloy Sewer Study
Job #: 06-031
Date: 8/16/2007
Initials: EDW

City of Eloy Sewer Calculations

Scenario #2: Full sewer area built out except future industrial west of Sunshine Blvd

Demand per acre: 1200 gal/acre/day (Estimated flow from industrial east of Sunshine Blvd)
Demand per acre: 1000 gal/acre/day (Estimated flow from industrial west of Sunshine Blvd)
Demand per acre: 780 gal/acre/day (65 gpcd * 4 du/ac * 3 people/du)
Peaking factor: 1.88
Manning's "n": 0.013

Up MH	Down MH	Pipe length (ft)	Pipe dia. (in)	Acres Indust/ Commercial	Acres Residential	Cum. Flow (MGD)	Cum. Flow (cfs)	Line cap. (cfs)	Capacity Usage (%)	Up inv. elev	Down inv. elev	Pipe slope %	Up MH rim elev	Down MH rim elev	Up MH depth (ft)	Down MH depth (ft)
Ex MH 19	Ex MH 18	322.26	15	600.0	0.0	1.354	2.09	2.76	75.8%	1550.00	1549.41	0.183	1568.03	1567.34	18.03	17.93
Ex MH 18	Ex MH 17	501.16	15	600.0	0.0	1.354	2.09	2.41	86.8%	1549.41	1548.71	0.140	1567.34	1566.14	17.93	17.43
Ex MH 17	Ex MH 16	41.78	15	620.0	0.0	1.399	2.16	2.45	88.4%	1548.71	1548.65	0.144	1566.14	1566.35	17.43	17.70
Ex MH 16	Ex MH 15	515.68	15	620.0	40.0	1.457	2.26	2.36	95.4%	1548.59	1547.90	0.134	1566.35	1565.62	17.76	17.72
Ex MH 15	Ex MH 14	494.92	15	620.0	40.0	1.457	2.26	2.41	93.5%	1547.90	1547.21	0.139	1565.62	1565.53	17.72	18.32
Ex MH 14	Ex MH 13	497.56	15	620.0	40.0	1.457	2.26	2.51	89.9%	1547.21	1546.46	0.151	1565.53	1564.80	18.32	18.34
Ex MH 13	Ex MH 12	494.54	15	620.0	70.0	1.501	2.32	2.90	80.0%	1546.46	1545.46	0.202	1564.80	1563.70	18.34	18.24
Ex MH 12	Ex MH 11	263.63	15	620.0	70.0	1.501	2.32	2.48	93.5%	1545.46	1545.07	0.148	1563.70	1563.44	18.24	18.37
Ex MH 11	Ex MH 10	522.46	18	620.0	90.0	1.531	2.37	4.06	58.4%	1545.00	1544.22	0.149	1563.44	1563.40	18.44	19.18
Ex MH 10	Ex MH 9	402.73	18	620.0	90.0	1.531	2.37	1.38	171.0%	1544.22	1544.15	0.017	1563.40	1562.42	19.18	18.27
Ex MH 9	Ex MH 8	445.70	18	620.0	90.0	1.531	2.37	3.62	65.4%	1544.15	1543.62	0.119	1562.42	1561.28	18.27	17.66
Ex MH 8	Ex MH 7	405.13	18	620.0	90.0	1.531	2.37	3.50	67.7%	1543.62	1543.17	0.111	1561.28	1561.10	17.66	17.93
Ex MH 7	Ex MH 6	353.71	18	620.0	90.0	1.531	2.37	4.43	53.4%	1543.07	1542.44	0.178	1561.10	1560.53	18.03	18.09
Ex MH 6	Ex MH 4	614.00	18	620.0	90.0	1.531	2.37	3.65	64.9%	1542.44	1541.70	0.121	1560.53	1559.61	18.09	17.91
Ex MH 4	Ex MH 3	500.83	18	620.0	90.0	1.531	2.37	3.48	68.0%	1541.70	1541.15	0.110	1559.61	1559.02	17.91	17.87
Ex MH 3	Ex MH 2	496.14	18	620.0	90.0	1.531	2.37	3.56	66.5%	1541.15	1540.58	0.115	1559.02	1559.34	17.87	18.76
Ex MH 2	Ex MH 1	189.20	18	620.0	90.0	1.531	2.37	3.50	67.7%	1540.55	1540.34	0.111	1559.34	1558.28	18.79	17.94
Ex MH 1	Ex Lift Station	205.75	18	620.0	90.0	1.531	2.37	5.18	45.7%	1540.24	1539.74	0.243	1558.28	1558.61	18.04	18.87

NOTES:

Initial 600 acres of sewage entering at Ex MH 19 (Date St & Sunshine Blvd) is Bralu LLC (277 ac), NGC (103 ac), Cardon Hiatt (200 ac), and Pilot TravelCenter (20 ac).
The existing Flying 'J' Truck Stop (approx 20 ac) is controlled by a lift station that pumps into the existing 6" sewer line which runs north in 'D' Street. This flow enters the system at Ex MH 17.
50 ac of industrial flow and 40 ac of residential flow enters at Ex MH 16 (Date St & 'D' St).
55 ac of industrial flow and 30 ac of residential flow enters at Ex MH 13 (just north of 'D' St & Beech St).
45 ac of industrial flow and 20 ac of residential flow enters at Ex MH 11 ('D' St & Hinton St).
85 ac of industrial flow enters at Ex MH 7 (Curtel St & Hinton St).

Elevations, pipe lengths, pipe diameters, pipe slopes, and MH labels in this table are per DNA as-built drawings.



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SEWER EXHIBIT SCENARIO #3



JOB NO. 06-031
 DATE AUGUST 16, 2007

Project: Eloy Sewer Study
 Job #: 06-031
 Date: 8/16/2007
 Initials: EDW

City of Eloy Sewer Calculations

Scenario #3: Full sewer area built out except future industrial east of La Palma Rd

Demand per acre: 1200 gal/acre/day (Estimated flow from industrial east of Sunshine Blvd)
 Demand per acre: 1000 gal/acre/day (Estimated flow from industrial west of Sunshine Blvd)
 Demand per acre: 780 gal/acre/day (65 gpcd * 4 du/ac * 3 people/du)
 Peaking factor: 1.89
 Manning's "n": 0.013

Up MH	Down MH	Pipe length (ft)	Pipe dia. (in)	Acres Indust/ Commercial	Acres Residential	Cum. Flow (MGD)	Cum. Flow (cfs)	Line cap. (cfs)	Capacity Usage (%)	Up inv. elev	Down inv. elev	Pipe slope %	Up MH rim elev	Down MH rim elev	Up MH depth (ft)	Down MH depth (ft)
Ex MH 19	Ex MH 18	322.26	15	400.0	0.0	0.907	1.40	2.76	50.8%	1550.00	1549.41	0.183	1568.03	1567.34	18.03	17.93
Ex MH 18	Ex MH 17	501.16	15	400.0	0.0	0.907	1.40	2.41	58.1%	1549.41	1548.71	0.140	1567.34	1566.14	17.93	17.43
Ex MH 17	Ex MH 16	41.78	15	420.0	0.0	0.953	1.47	2.45	60.2%	1548.71	1548.65	0.144	1566.14	1566.35	17.43	17.70
Ex MH 16	Ex MH 15	515.68	15	470.0	40.0	1.106	1.71	2.36	72.4%	1548.59	1547.90	0.134	1566.35	1565.62	17.76	17.72
Ex MH 15	Ex MH 14	494.92	15	470.0	40.0	1.106	1.71	2.41	71.0%	1547.90	1547.21	0.139	1565.62	1565.53	17.72	18.32
Ex MH 14	Ex MH 13	497.56	15	470.0	40.0	1.106	1.71	2.51	68.2%	1547.21	1546.46	0.151	1565.53	1564.80	18.32	18.34
Ex MH 13	Ex MH 12	494.54	15	525.0	70.0	1.254	1.94	2.90	66.8%	1546.46	1545.46	0.202	1564.80	1563.70	18.34	18.24
Ex MH 12	Ex MH 11	263.63	15	525.0	70.0	1.254	1.94	2.48	78.1%	1545.46	1545.07	0.148	1563.70	1563.44	18.24	18.37
Ex MH 11	Ex MH 10	522.46	18	570.0	90.0	1.369	2.12	4.06	52.2%	1545.00	1544.22	0.149	1563.44	1563.40	18.44	19.18
Ex MH 10	Ex MH 9	402.73	18	570.0	90.0	1.369	2.12	1.38	152.9%	1544.22	1544.15	0.017	1562.42	1562.42	19.18	18.27
Ex MH 9	Ex MH 8	445.70	18	570.0	90.0	1.369	2.12	3.62	58.5%	1544.15	1543.62	0.119	1562.42	1561.28	18.27	17.66
Ex MH 8	Ex MH 7	405.13	18	570.0	90.0	1.369	2.12	3.50	60.5%	1543.62	1543.17	0.111	1561.28	1561.10	17.66	17.93
Ex MH 7	Ex MH 6	353.71	18	655.0	90.0	1.529	2.37	4.43	53.4%	1543.07	1542.44	0.178	1561.10	1560.53	18.03	18.09
Ex MH 6	Ex MH 4	614.00	18	655.0	90.0	1.529	2.37	3.65	64.9%	1542.44	1541.70	0.121	1560.53	1559.61	18.09	17.91
Ex MH 4	Ex MH 3	500.83	18	655.0	90.0	1.529	2.37	3.48	68.0%	1541.70	1541.15	0.110	1559.61	1559.02	17.91	17.87
Ex MH 3	Ex MH 2	496.14	18	655.0	90.0	1.529	2.37	3.56	66.5%	1541.15	1540.58	0.115	1559.02	1559.34	17.87	18.76
Ex MH 2	Ex MH 1	189.20	18	655.0	90.0	1.529	2.37	3.50	67.6%	1540.55	1540.34	0.111	1559.34	1558.28	18.79	17.94
Ex MH 1	Ex Lift Station	205.75	18	655.0	90.0	1.529	2.37	5.18	45.7%	1540.24	1539.74	0.243	1558.28	1558.61	18.04	18.87

NOTES:

Initial 600 acres of sewage entering at Ex MH 19 (Date St & Sunshine Blvd) is Bralu LLC (277 ac), NGC (103 ac), Cardon Hiatt (200 ac), and Pilot TravelCenter (20 ac).
 The existing Flying "J" Truck Stop (approx 20 ac) is controlled by a lift station that pumps into the existing 6" sewer line which runs north in "D" Street. This flow enters the system at Ex MH 17.

50 ac of industrial flow and 40 ac of residential flow enters at Ex MH 16 (Date St & "D" St).

55 ac of industrial flow and 30 ac of residential flow enters at Ex MH 13 (just north of "D" St & Beech St).

45 ac of industrial flow and 20 ac of residential flow enters at Ex MH 11 ("D" St & Hinton St).

85 ac of industrial flow enters at Ex MH 7 (Curiel St & Hinton St).

Elevations, pipe lengths, pipe diameters, pipe slopes, and MH labels in this table are per DNA as-built drawings.



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SEWER EXHIBIT SCENARIO #4



JOB NO.
DATE

06-031
AUGUST 16, 2007

Project: Eloy Sewer Study
Job #: 06-031
Date: 8/16/2007
Initials: EDW

City of Eloy Sewer Calculations

Scenario #4: Full sewer area built out except future industrial and residential west of Sunshine Blvd

Demand per acre: 1200 gal/acre/day (Estimated flow from industrial east of Sunshine Blvd)
Demand per acre: 1000 gal/acre/day (Estimated flow from industrial west of Sunshine Blvd)
Demand per acre: 780 gal/acre/day (65 gpcd * 4 du/ac * 3 people/du)
Peaking factor: 1.90
Manning's "n": 0.013

Up MH	Down MH	Pipe length (ft)	Pipe dia. (in)	Acres Indust/ Commercial	Acres Residential	Cum. Flow (MGD)	Cum. Flow (cfs)	Line cap. (cfs)	Capacity Usage (%)	Up inv. elev	Down inv. elev	Pipe slope %	Up MH rim elev	Down MH rim elev	Up MH depth (ft)	Down MH depth (ft)
Ex MH 19	Ex MH 18	322.26	15	600.0	0.0	1.368	2.12	2.76	76.6%	1550.00	1549.41	0.183	1568.03	1567.34	18.03	17.93
Ex MH 18	Ex MH 17	501.16	15	600.0	0.0	1.368	2.12	2.41	87.7%	1549.41	1548.71	0.140	1567.34	1566.14	17.93	17.43
Ex MH 17	Ex MH 16	41.78	15	620.0	0.0	1.414	2.19	2.45	89.4%	1548.71	1548.65	0.144	1566.14	1566.35	17.43	17.70
Ex MH 16	Ex MH 15	515.68	15	620.0	0.0	1.414	2.19	2.36	92.6%	1548.59	1547.90	0.134	1566.35	1565.62	17.76	17.72
Ex MH 15	Ex MH 14	494.92	15	620.0	0.0	1.414	2.19	2.41	90.7%	1547.90	1547.21	0.139	1565.62	1565.53	17.72	18.32
Ex MH 14	Ex MH 13	497.56	15	620.0	0.0	1.414	2.19	2.51	87.2%	1547.21	1546.46	0.151	1565.53	1564.80	18.32	18.34
Ex MH 13	Ex MH 12	494.54	15	620.0	0.0	1.414	2.19	2.90	75.3%	1546.46	1545.46	0.202	1564.80	1563.70	18.34	18.24
Ex MH 12	Ex MH 11	263.63	15	620.0	0.0	1.414	2.19	2.48	88.0%	1545.46	1545.07	0.148	1563.70	1563.44	18.24	18.37
Ex MH 11	Ex MH 10	522.46	18	620.0	0.0	1.414	2.19	4.06	53.9%	1545.00	1544.22	0.149	1563.44	1563.40	18.44	19.18
Ex MH 10	Ex MH 9	402.73	18	620.0	0.0	1.414	2.19	1.38	157.9%	1544.22	1544.15	0.017	1563.40	1562.42	19.18	18.27
Ex MH 9	Ex MH 8	445.70	18	620.0	0.0	1.414	2.19	3.62	60.4%	1544.15	1543.62	0.119	1562.42	1561.28	18.27	17.66
Ex MH 8	Ex MH 7	405.13	18	620.0	0.0	1.414	2.19	3.50	62.5%	1543.62	1543.17	0.111	1561.28	1561.10	17.66	17.93
Ex MH 7	Ex MH 6	353.71	18	620.0	0.0	1.414	2.19	4.43	49.3%	1543.07	1542.44	0.178	1561.10	1560.53	18.03	18.09
Ex MH 6	Ex MH 4	614.00	18	620.0	0.0	1.414	2.19	3.65	60.0%	1542.44	1541.70	0.121	1560.53	1559.61	18.09	17.91
Ex MH 4	Ex MH 3	500.83	18	620.0	0.0	1.414	2.19	3.48	62.8%	1541.70	1541.15	0.110	1559.61	1559.02	17.91	17.87
Ex MH 3	Ex MH 2	496.14	18	620.0	0.0	1.414	2.19	3.56	61.4%	1541.15	1540.58	0.115	1559.02	1559.34	17.87	18.76
Ex MH 2	Ex MH 1	189.20	18	620.0	0.0	1.414	2.19	3.50	62.5%	1540.55	1540.34	0.111	1559.34	1558.28	18.79	17.94
Ex MH 1	Ex Lift Station	205.75	18	620.0	0.0	1.414	2.19	5.18	42.2%	1540.24	1539.74	0.243	1558.28	1558.61	18.04	18.87

NOTES:

Initial 600 acres of sewage entering at Ex MH 19 (Date St & Sunshine Blvd) is Bralu LLC (277 ac), NGC (103 ac), Cardon Hiatt (200 ac), and Pilot TravelCenter (20 ac).
The existing Flying 'J' Truck Stop (approx 20 ac) is controlled by a lift station that pumps into the existing 6" sewer line which runs north in "D" Street. This flow enters the system at Ex MH 17.
50 ac of industrial flow and 40 ac of residential flow enters at Ex MH 16 (Date St & 'D' St).
55 ac of industrial flow and 30 ac of residential flow enters at Ex MH 13 (just north of 'D' St & Beech St).
45 ac of industrial flow and 20 ac of residential flow enters at Ex MH 11 ('D' St & Hinton St).
85 ac of industrial flow enters at Ex MH 7 (Curiel St & Hinton St).

Elevations, pipe lengths, pipe diameters, pipe slopes, and MH labels in this table are per DNA as-built drawings.



- (A) PILOT TRAVELCENTER
- (B) FLYING J TRAVELCENTER
- (C), (D), (E) EXISTING/FUTURE RESIDENTIAL BETWEEN "D" ST AND SUNSHINE BLVD.
- (F), (G), (H), (I) FUTURE INDUSTRIAL



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SEWER EXHIBIT SCENARIO #5



JOB NO. 06-031
 DATE AUGUST 16, 2007

Project: Eloy Sewer Study
 Job #: 06-031
 Date: 8/16/2007
 Initials: EDW

City of Eloy Sewer Calculations

Scenario #5: Full sewer area built out

Demand per acre: 1200 gal/acre/day (Estimated flow from industrial east of Sunshine Blvd)
 Demand per acre: 1000 gal/acre/day (Estimated flow from industrial west of Sunshine Blvd)
 Demand per acre: 780 gal/acre/day (65 gpcd * 4 dufac * 3 people/du)
 Peaking factor: 1.84
 Manning's "n": 0.013

Up MH	Down MH	Pipe length (ft)	Pipe dia. (in)	Acres Indust/ Commercial	Acres Residential	Cum. Flow (MGD)	Cum. Flow (cfs)	Line cap. (cfs)	Capacity Usage (%)	Up inv. elev	Down inv. elev	Pipe slope %	Up MH rim elev	Down MH rim elev	Up MH depth (ft)	Down MH depth (ft)
Ex MH 19	Ex MH 18	322.26	15	600.0	0.0	1.325	2.05	2.76	74.2%	1550.00	1549.41	0.183	1568.03	1567.34	18.03	17.93
Ex MH 18	Ex MH 17	501.16	15	600.0	0.0	1.325	2.05	2.41	84.9%	1549.41	1548.71	0.140	1567.34	1566.14	17.93	17.43
Ex MH 17	Ex MH 16	41.78	15	620.0	0.0	1.369	2.12	2.45	86.5%	1548.71	1548.65	0.144	1566.14	1566.35	17.43	17.70
Ex MH 16	Ex MH 15	515.68	15	670.0	40.0	1.518	2.35	2.36	99.4%	1548.59	1547.90	0.134	1566.35	1565.62	17.76	17.72
Ex MH 15	Ex MH 14	494.92	15	670.0	40.0	1.518	2.35	2.41	97.4%	1547.90	1547.21	0.139	1565.62	1565.53	17.72	18.32
Ex MH 14	Ex MH 13	497.56	15	670.0	40.0	1.518	2.35	2.51	93.7%	1547.21	1546.46	0.151	1565.53	1564.80	18.32	18.34
Ex MH 13	Ex MH 12	494.54	15	725.0	70.0	1.663	2.57	2.90	88.6%	1546.46	1545.46	0.202	1564.80	1563.70	18.34	18.24
Ex MH 12	Ex MH 11	263.63	15	725.0	70.0	1.663	2.57	2.48	103.5%	1545.46	1545.07	0.148	1563.70	1563.44	18.24	18.37
Ex MH 11	Ex MH 10	522.46	18	770.0	90.0	1.774	2.75	4.06	67.6%	1545.00	1544.22	0.149	1563.44	1563.40	18.44	19.18
Ex MH 10	Ex MH 9	402.73	18	770.0	90.0	1.774	2.75	1.38	198.2%	1544.22	1544.15	0.017	1563.40	1562.42	19.18	18.27
Ex MH 9	Ex MH 8	445.70	18	770.0	90.0	1.774	2.75	3.62	75.8%	1544.15	1543.62	0.119	1562.42	1561.28	18.27	17.66
Ex MH 8	Ex MH 7	405.13	18	770.0	90.0	1.774	2.75	3.50	78.4%	1543.62	1543.17	0.111	1561.28	1561.10	17.66	17.93
Ex MH 7	Ex MH 6	353.71	18	855.0	90.0	1.931	2.99	4.43	67.4%	1543.07	1542.44	0.178	1561.10	1560.53	18.03	18.09
Ex MH 6	Ex MH 4	614.00	18	855.0	90.0	1.931	2.99	3.65	81.9%	1542.44	1541.70	0.121	1560.53	1559.61	18.09	17.91
Ex MH 4	Ex MH 3	500.83	18	855.0	90.0	1.931	2.99	3.48	85.8%	1541.70	1541.15	0.110	1559.61	1559.02	17.91	17.87
Ex MH 3	Ex MH 2	496.14	18	855.0	90.0	1.931	2.99	3.56	83.9%	1541.15	1540.58	0.115	1559.02	1559.34	17.87	18.76
Ex MH 2	Ex MH 1	189.20	18	855.0	90.0	1.931	2.99	3.50	85.4%	1540.55	1540.34	0.111	1559.34	1558.28	18.79	17.94
Ex MH 1	Ex Lift Station	205.75	18	855.0	90.0	1.931	2.99	5.18	57.7%	1540.24	1539.74	0.243	1558.28	1558.61	18.04	18.87

NOTES:

Initial 600 acres of sewage entering at Ex MH 19 (Date St & Sunshine Blvd) is Bralu LLC (277 ac), NGC (103 ac), Cardon Hiatt (200 ac), and Pilot TravelCenter (20 ac).
 The existing Flying 'J' Truck Stop (approx 20 ac) is controlled by a lift station that pumps into the existing 6" sewer line which runs north in "D" Street. This flow enters the system at Ex MH 17.
 50 ac of industrial flow and 40 ac of residential flow enters at Ex MH 16 (Date St & 'D' St).
 55 ac of industrial flow and 30 ac of residential flow enters at Ex MH 13 (just north of 'D' St & Beech St).
 45 ac of industrial flow and 20 ac of residential flow enters at Ex MH 11 ('D' St & Hinton St).
 85 ac of industrial flow enters at Ex MH 7 (Curtel St & Hinton St).
 Elevations, pipe lengths, pipe diameters, pipe slopes, and MH labels in this table are per DNA as-built drawings.