7.0 Future Wastewater Servicing and System Assessment

7.1 Future Growth Scenarios

Serviced population estimates were generated using a density of 55 persons/ha and the net-developable areas stipulated in the Growth Study and Financial Assessment Report. Growth in the following areas was considered for the 30 year horizon (Table 7.1) and the 60 year horizon (Table 7.2). Illustrations of the two growth horizons are presented in Figures 7.1 and 7.2 for the 30 year and 60 year growth, respectively.

Table 7.1: 30 Year Horizon Developable Areas (Excluding Within Existing Town Boundary)

ID	Location	Land Use	Developable Area	Population
			ha	
30-1	Northwest	Residential	46.24	2,543
30-2a	Northwest	Residential	26.36	1,450
30-2b	Northwest	Institutional	6.69	368
30-3a	Northwest	Residential	23.47	1,291
30-3b	Northwest	Residential	2.04	112
30-3c	Northwest	Commercial	6.85	0
30-4a	Northwest	Commercial	7.22	0
30-4b	Northwest	Commercial	0.55	0
30-4c	Northwest	Commercial	6.43	0
30-4d	Northwest	Commercial	3.58	0
30-4e	Northwest	Commercial	1.27	0
30-4f	Northwest	Commercial	3.58	0
30-4g	Northwest	Commercial	5.01	0
30-5	Northwest	Commercial	15.30	0
30-6a	Northwest	Residential	41.20	2,266
30-6b	Northwest	Commercial	17.09	0
30-7a	Northwest	Residential	51.48	2,831
30-7b	Northwest	Institutional	6.09	0
30-7c	Northwest	Commercial	2.02	0
30-8a	North	Residential	48.10	2,646
30-8b	North	Institutional	16.18	0
30-9	North	Residential	53.10	2,921
30-10	Northeast	Residential	57.90	3,185
30-11	Northeast	Residential	44.00	2,420
30-12	Northeast	Residential	59.10	3,251
30-13	Northeast	Residential	64.66	3,556
30-14	South	Residential	56.10	3,086
30-15	South	Residential	51.90	2,855
30-16	South	Residential	47.10	2,591
30-17	South	Commercial	31.94	0
30-18	South	Residential	94.96	5,223
30-19	South	Residential	18.16	999
30-20	South	Residential	62.37	3,430
30-21	South	Residential	61.48	3,382
30-22	West	Residential	37.14	2,043
30-23	West	Residential	46.43	2,554
		Total	**1,123.09**	**55,003**[7]

[7] The total population does not account for the development in the existing Town boundary, the population attributed to those areas is approximately 4,110. Similarly, the total area does not account for development within the current Town boundary, an additional area of 156 ha is required.

Table 7.2: 60 Year Horizon Developable Areas

ID	Location	Land Use	Area ha	Population
60-1	North	Residential	62.50	3438
60-2	Northeast	Residential	64.10	3526
60-3	Northeast	Residential	59.80	3289
60-4	Northeast	Residential	58.30	3207
60-5	Northeast	Residential	48.83	2686
60-6	Northeast	Residential	56.90	3130
60-7	Northeast	Commercial / Industrial	33.63	0
60-8	Northeast	Commercial / Industrial	80.73	0
60-9	Northeast	Residential	62.50	3438
60-10	Northeast	Residential	51.70	2844
60-11	Northeast	Industrial	20.20	0
60-12	Southeast	Commercial / Industrial	47.20	0
60-13	Southeast	Commercial / Industrial	49.90	0
60-14	Southeast	Commercial / Industrial	9.90	0
60-15	Southeast	Commercial / Industrial	39.50	0
60-16	South	Residential	61.10	3361
60-17	West	Residential	27.10	1491
		Total	**833.89**	**30,410**

7.2 Future Servicing Concepts

Effectively, there are a number of possible future servicing concepts for the Town. It is not possible to cover them in complete detail, given that some represent a major paradigm shift for the Town that would require extensive discussion to proceed it. That said, the following sections detail a number of servicing options.

Please note that the conceptual sanitary system was sized using a spreadsheet approach based on Alberta Environment and Parks' design parameters as described in Section 5.2; while any potential future upgrades tying into the existing model were sized using the hydrodynamic model.

7.2.1. Tie-In Locations

Before determining any of the servicing concepts that are essential to accommodate growth in the Town's annexed areas, it was necessary to locate any potential tie-in points to the existing system. In total, twenty four possible tie-in locations were determined. The elevations of these locations were calculated and reviewed, and as a result five of the potential tie-in locations were eliminated instantly due to gravity constraints. Preliminary scenario assessments were then undertaken, in which it was determined that seven additional locations were not feasible as they would over utilize the existing system. As a result, twelve tie-in points were deemed acceptable as connections between the future and existing sanitary systems. The following table (Table 7.3) summarizes the twenty four locations.

Table 7.3: Summary of Potential Tie-In Locations

ID	Location	Elevation m	Feasible for Use?	Reason
1	Mountainview Dr.	1077.31	☑	No gravity or capacity issues
2	Sandstone Ridge Cres.	1067.80	☑	No gravity or capacity issues
3	Milligan Dr.	1077.37	☒	Elevated terrain compared to service area elevation
4	Sunset Cres.	1092.38	☒	Elevated terrain compared to service area elevation
5	Banister Dr. & Banister Gate	1094.43	☑	No gravity or capacity issues
6	Carr Cres.	1095.11	☒	Elevated terrain compared to service area elevation
7	Crystal Shores Cres.	1092.56	☑	No gravity or capacity issues
8	32 St. E	1096.96	☑	No gravity or capacity issues
9	Ranch Rd.	1096.63	☒	Over utilizing existing system
10	Ranch Rd.	1093.53	☒	Over utilizing existing system
11	Milligan Dr. & Drake Landing Loop	1073.46	☒	Over utilizing existing system
12	48 St. E	1071.65	☒	Over utilizing existing system
13	32 St. E	1050.55	☑	No gravity or capacity issues
14	North Railway St.	1042.21	☑	No gravity or capacity issues
15	North of Cimarron Estates Rd.	1046.92	☑	No gravity or capacity issues
16	Southbank Blvd.	1057.98	☑	No gravity or capacity issues
17	32 St. E & Cimarron Blvd.	1055.81	☒	Over utilizing existing system
18A	Cimarron Blvd.	1057.19	☒	Over utilizing existing system
18B	Cimarron Common	1057.27	☑	No gravity or capacity issues
18C	Cimarron Blvd. & Cimarron Grove Cres.	1056.21	☒	Over utilizing existing system
19	Westland St. & Westmount Point	1098.07	☒	Elevated terrain compared to service area elevation
20	Westland St. & Westland Point	1098.93	☒	Elevated terrain compared to service area elevation
21	Big Rock Trail & Westland Rd.	1065.49	☑	No gravity or capacity issues
22	Big Rock Trail & Sheep River Dr.	1070.45	☑	No gravity or capacity issues
23	Sheep River Blvd.	1083.69	☑	No gravity or capacity issues
24	Sheep River Cove	1057.76	☑	No gravity or capacity issues

7.2.2. 30 Year Growth Horizon

At build-out of the 30-year growth horizon, the servicing concepts are included for the developable land in this horizon that is currently within the Town's annexed land, mentioned above in Table 7.1. The servicing options have been divided into six concepts (Options 1A, 2A, 3A, 4A, 1B and 2B), generally being dependent on the locations of the connection points between the future and existing systems.

In total, two unique servicing options in the northwest, one in the north, six in the northeast, one in the southeast, six in the south and three in the west-southwest area were developed. Figures illustrating the differences between these concepts have been included in Figures 7.3 to 7.32.

A summary of the cost estimates has been provided below for each of the servicing permutations in Table 7.4.

It should be noted that during the preliminary servicing option evaluation, catchments 30-21 and 30-22 extended north and west around the existing slough comprising a large area in the southwest, located south of 170 Ave W and north of Highway 7. Upon the review of the ensuing upgrades required based on the specified catchment areas, the Town stipulated that they would like to avoid upgrading the Woodhaven Drive Sub-Trunk and the downstream river siphon crossing, as a result the original catchment 30-21 was reduced with its northern portion being merged with the original catchments 30-22 and 30-23 to produce a new catchment 30-22. The original catchment 30-24 was renamed to catchment 30-23 to maintain continuity in the naming convention. The current servicing concepts involve catchment 30-21 discharging south via a brand-new Highway 7 Trunk and eventually tying into #15 or immediately upstream of the WWTP depending on the servicing option.

The developers of the Wind Walk catchment (30-16) have expressed interest in coming online within the near future. The 30-year servicing concepts account for the fact that this land mass will be connecting to the existing system before the remaining areas in the south. Catchments 30-16 and 30-17 currently tie into #18B and are ultimately conveyed to the wastewater treatment plant via the existing sanitary system including the West Siphon.

7.2.3. 60 Year Growth Horizon

At build-out of the 60 year growth horizon, the servicing concepts are included for all developable land in this horizon (Table 7.2), as the land all falls within the annexation areas. The servicing options have been divided into eight concepts (Options 1A, 2A, 3A, 4A, 1B, 2B, 3B and 4B), generally being dependent on the locations of the connection points between the futures and existing systems.

In total, two unique servicing options in the northwest, two in the north, eight in the northeast, three in the southeast, six in the south and three in the west-southwest area were developed.

Figures illustrating the differences between these concepts are presented in Figures 7.33 to 7.72. Cost estimates are provided in Table 7.5 below for each of the servicing concepts.

7.3 Future System Assessment

The performance of the existing system under future population and area growth scenarios for both the 30-year and 60-year growth horizons were assessed using the Town's LOS criteria discussed in Section 5.1. As a result, the calibrated existing system model was run under a 50-year 24-hour Q4 Huff Storm exclusively.

Each of the servicing options detailed in the section above were run in order to assess the HGL relative to the surface, the discharge relative to pipe capacity, and the spare capacity of the pipes. The future system assessment figures for 30-year and 60-year growth horizons have been shown in Figures 7.73 – 7.90, and Figures 7.91 – 7.114, respectively. The corresponding maximum HGL longitudinal profiles are provided in Appendices H, I, K and L.

Table 7.4: Class D Cost Estimates for Considered Servicing Options under the 30 Year Growth Horizon

Servicing Option	Northwest				North				Northeast				Total North Areas			Total Cost - North
	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	
30YR - #1A	$2,615,510	$0	$0	**$2,615,510**	$622,159	$0	$0	**$622,159**	$2,917,581	$5,800,000	$2,671,770	**$11,389,351**	$6,155,250	$5,800,000	$2,671,770	**$14,630,000**
30YR - #2A	$2,720,838	$3,625,000	$2,457,098	**$8,802,936**	$655,241	$0	$0	**$655,241**	$5,745,400	$4,531,250	$823,165	**$11,099,815**	$9,121,479	$8,156,250	$3,280,263	**$20,560,000**
30YR - #3A	$2,615,510	$0	$0	**$2,615,510**	$622,159	$0	$0	**$622,159**	$3,795,991	$5,800,000	$2,078,648	**$11,674,639**	$7,033,660	$5,800,000	$2,078,648	**$14,915,000**
30YR - #4A	$2,720,838	$3,625,000	$2,457,098	**$8,802,936**	$639,972	$0	$0	**$639,972**	$9,621,250	$0	$0	**$9,621,250**	$12,982,060	$3,625,000	$2,457,098	**$19,065,000**
30YR - #1B	$2,615,510	$0	$0	**$2,615,510**	$622,159	$0	$0	**$622,159**	$2,271,976	$4,350,000	$2,195,010	**$8,816,986**	$5,509,645	$4,350,000	$2,195,010	**$12,055,000**
30YR - #2B	$2,720,838	$3,625,000	$2,457,098	**$8,802,936**	$655,241	$0	$0	**$655,241**	$4,549,259	$2,175,000	$529,178	**$7,253,437**	$7,925,338	$5,800,000	$2,986,275	**$16,715,000**

Servicing Option	Southeast				South				South West				Total South Areas			Total Cost - South
	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	
30YR - #1A	$247,660	$0	$0	**$247,660**	$11,756,143	$0	$0	**$11,756,143**	$278,618	$1,740,000	$390,920	**$2,409,538**	$12,282,421	$1,740,000	$390,920	**$14,415,000**
30YR - #2A	$247,660	$0	$0	**$247,660**	$7,936,002	$4,531,250	$691,215	**$13,158,467**	$645,033	$1,740,000	$390,920	**$2,775,953**	$8,828,695	$6,271,250	$1,082,135	**$16,185,000**
30YR - #3A	$247,660	$0	$0	**$247,660**	$12,376,584	$0	$0	**$12,376,584**	$376,565	$1,740,000	$390,920	**$2,507,485**	$13,000,809	$1,740,000	$390,920	**$15,135,000**
30YR - #4A	$247,660	$0	$0	**$247,660**	$8,556,443	$4,531,250	$691,215	**$13,778,908**	$278,618	$1,740,000	$390,920	**$2,409,538**	$9,082,720	$6,271,250	$1,082,135	**$16,440,000**
30YR - #1B	$247,660	$0	$0	**$247,660**	$12,437,701	$0	$0	**$12,437,701**	$278,618	$1,740,000	$390,920	**$2,409,538**	$12,963,979	$1,740,000	$390,920	**$15,095,000**
30YR - #2B	$247,660	$0	$0	**$247,660**	$8,617,560	$4,531,250	$691,215	**$13,840,025**	$645,033	$1,740,000	$390,920	**$2,775,953**	$9,510,253	$6,271,250	$1,082,135	**$16,865,000**

Table 7.5 - Class D Cost Estimates for Considered Servicing Options under the 60 Year Growth Horizon

Servicing Option	Northwest				North				Northeast				Total North Areas			Total Cost - North
	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	
60YR - #1A	$2,615,510	$0	$0	**$2,615,510**	$1,719,541	$0	$0	**$1,719,541**	$9,042,062	$14,717,500	$4,152,655	**$27,912,217**	$13,377,113	$14,717,500	$4,152,655	**$32,250,000**
60YR - #2A	$2,720,838	$3,625,000	$2,457,098	**$8,802,936**	$1,704,272	$0	$0	**$1,704,272**	$12,972,229	$13,775,000	$2,928,964	**$29,676,193**	$17,397,339	$17,400,000	$5,386,061	**$40,185,000**
60YR - #3A	$2,615,510	$0	$0	**$2,615,510**	$1,719,541	$0	$0	**$1,719,541**	$10,340,740	$15,732,500	$4,600,016	**$30,673,257**	$14,675,791	$15,732,500	$4,600,016	**$35,010,000**
60YR - #4A	$2,615,510	$0	$0	**$2,615,510**	$1,648,288	$0	$0	**$1,648,288**	$20,120,222	$3,987,500	$1,841,210	**$25,948,932**	$24,384,019	$3,987,500	$1,841,210	**$30,215,000**
60YR - #1B	$2,615,510	$0	$0	**$2,615,510**	$1,390,021	$0	$0	**$1,390,021**	$9,932,471	$11,020,000	$4,152,655	**$25,105,126**	$13,938,002	$11,020,000	$4,152,655	**$29,110,000**
60YR - #2B	$2,720,838	$3,625,000	$2,457,098	**$8,802,936**	$1,390,021	$0	$0	**$1,390,021**	$12,944,208	$6,525,000	$2,370,388	**$21,839,596**	$17,055,067	$10,150,000	$4,827,485	**$32,035,000**
60YR - #3B	$2,615,510	$0	$0	**$2,615,510**	$1,363,725	$0	$0	**$1,363,725**	$10,027,243	$11,020,000	$3,430,338	**$24,477,581**	$14,006,478	$11,020,000	$3,430,338	**$28,460,000**
60YR - #4B	$2,615,510	$0	$0	**$2,615,510**	$1,390,021	$0	$0	**$1,390,021**	$11,362,142	$9,062,500	$3,621,883	**$24,046,525**	$15,367,673	$9,062,500	$3,621,883	**$28,055,000**

Servicing Option	Southeast				South				South West				Total South Areas			Total Cost - South
	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	Sub-Total	Trunks	Lift Stations	Forcemains	
60YR - #1A	$1,452,045	$2,900,000	$2,871,435	**$7,223,480**	$13,963,660	$0	$0	**$13,963,660**	$632,186	$1,740,000	$390,920	**$2,763,106**	$16,047,890	$4,640,000	$3,262,355	**$23,950,000**
60YR - #2A	$1,452,045	$2,900,000	$2,790,743	**$7,142,787**	$11,233,281	$5,437,500	$691,215	**$17,361,996**	$998,601	$1,740,000	$390,920	**$3,129,521**	$13,683,926	$10,077,500	$3,872,878	**$27,635,000**
60YR - #3A	$1,452,045	$2,900,000	$2,544,859	**$6,896,903**	$15,879,907	$0	$0	**$15,879,907**	$730,133	$1,740,000	$390,920	**$2,861,053**	$18,062,085	$4,640,000	$2,935,779	**$25,640,000**
60YR - #4A	$1,452,045	$2,900,000	$2,544,859	**$6,896,903**	$12,059,766	$5,437,500	$691,215	**$18,188,481**	$632,186	$1,740,000	$390,920	**$2,763,106**	$14,143,996	$10,077,500	$3,626,994	**$27,850,000**
60YR - #1B	$1,452,045	$2,900,000	$2,871,435	**$7,223,480**	$16,676,407	$0	$0	**$16,676,407**	$632,186	$1,740,000	$390,920	**$2,763,106**	$18,760,637	$4,640,000	$3,262,355	**$26,665,000**
60YR - #2B	$1,452,045	$2,900,000	$2,790,743	**$7,142,787**	$12,856,266	$5,437,500	$691,215	**$18,984,981**	$998,601	$1,740,000	$390,920	**$3,129,521**	$15,306,911	$10,077,500	$3,872,878	**$29,260,000**
60YR - #3B	$1,452,045	$2,900,000	$2,544,859	**$6,896,903**	$15,879,907	$0	$0	**$15,879,907**	$730,133	$1,740,000	$390,920	**$2,861,053**	$18,062,085	$4,640,000	$2,935,779	**$25,640,000**
60YR - #4B	$1,452,045	$2,900,000	$2,544,859	**$6,896,903**	$12,059,766	$5,437,500	$691,215	**$18,188,481**	$632,186	$1,740,000	$390,920	**$2,763,106**	$14,143,996	$10,077,500	$3,626,994	**$27,850,000**

A description of the general areas of concern with respect to the gravity system are provided below in Table 7.6 for the 30-year growth horizon and Table 7.7 for the 60-year growth horizon.

Table 7.6: Affected Sewer Sections under the 30 Year Growth Horizon

Sewer Section	Location	Affected Sizes mm	Section Length m	Associated Longitudinal Profile(s)
Pipe 1297 – Pipe 1692	North Railway St.	200 & 300	759.45	LP #1.2
Pipe 137B – Pipe 137D	Clark Ave.	200 & 250	321.38	LP #3.3 & #3.4
Pipe 1588 – Pipe 158B	Crystal Shores Cres.	300	231.37	LP #5.1
Pipe 2181 – Pipe 13CC	Mcrae St.	250	211.44	N/A
Pipe 2176 – Pipe 2175	Poplar Ave.	250	189.50	N/A
Pipe 136C – Pipe 14K2	North Railway St.	250 & 300	524.89	LP #1.3
Pipe 128C – Pipe 12C8	Hunters Cres.	250	310.89	LP #9.2
Pipe 1537 – Pipe 1530	Cimarron Way	300	244.23	LP #12.2
Pipe 1469 – Pipe 556	Cimarron Trail	250	578.20	LP #12.1
Pipe 48 – Pipe 2105	Cimarron Springs Cir.	250	347.07	LP #13.2
Pipe 15B8 – Pipe 15B6	West of 32 St. E	525	420.04	LP #5.3
Pipe 2103_2 – 1623	32 St. E & Crystal Green Way	200	660.43	LP #6.1
Pipe 1163 – 1624	Crystal Shores Dr.	300	696.51	LP #5.1
Pipe 2096 – Pipe 1457	North Railway St.	250, 450 & 525	1224.46	LP #1.4
Pipe 1262 – Pipe 1444	West River Crossing	525	579.43	LP #9.4

Table 7.7: Affected Sewer Sections under the 60 Year Growth Horizon

Sewer Section	Location	Affected Sizes	Section Length	Associated Longitudinal Profile(s)
		mm	m	
Pipe 1297 – Pipe 1024	North Railway St.	200 & 300	963.10	LP #1.2& LP#1a
Pipe 137B – Pipe 137D	Clark Ave.	200 & 250	323.15	LP #3.3 & #3.4
Pipe 1588 – Pipe 1586	Crystal Shores Cres.	300	414.85	LP #5.1
Pipe 2181 – Pipe 13CC	Mcrae St.	250	211.44	N/A
Pipe 2174 – Pipe 2175	Poplar Ave.	250	158.66	N/A
Pipe 137A – Pipe 14K2	North Railway St.	200, 250 & 300	622.56	LP #1.3
Pipe 1293 – Pipe 12C8	Hunters Cres.	250	350.79	LP #9.2
Pipe 152D – Pipe 1530	Cimarron Way	300	229.26	LP #12.2
Pipe 1463 – Pipe 556	Cimarron Trail	250	490.63	LP #12.1
Pipe 48 – Pipe 2105	Cimarron Springs Cir.	250	347.07	LP #13.2
Pipe 15BA – Pipe 15B7	West of 32 St. E	375 & 525	719.94	LP #5.3
Pipe 158K – Pipe 1583	32 St. E & Crystal Green Way	200	287.96	
Pipe 2103_2– Pipe1623	32 St. E & Crystal Green Way	200	660.43	LP #6.1
Pipe 2096 – Pipe 1456	North Railway St.	250, 450 & 525	1552.52	LP #1.4
Pipe 1633 – Pipe 1624	Crystal Shores Dr.	300	696.51	LP #5.1
Pipe 1605 – Pipe 1613	Crystal Shores Rd.	200	373.28	
Pipe 15BK	32 St. E	375	148.137	LP #5.2
Pipe 125F – Pipe 1427	Crystal Ridge Cres.	200	152.45	
Pipe 14K5	North Railway St.	350	119.25	LP #1.3
Pipe Y13 – Pipe 1444	West River Crossing	525	795.17	LP #9.4
Pipe 129A – Pipe 12KK	Big Rock Trail	200 & 250	404.75	N/A

Peak modelled wet weather flow results of the 30- and 60-year growth horizons for both forcemains and siphons are detailed in Table 7.8 and Table 7.9, respectively.

Table 7.8: Forcemain Wet Weather Flow Results under LOS Design Storm

Name	Forcemain Size	Capacity @ 1.5m/s	Peak WWF		Resultant Velocity	
			30 Year	60 Year	30 Year	60 Year
	(mm)	(L/s)			(m/s)	
Pipe Stockton FM	150	26.5	39.1	38.2	2.2	2.2
Pipe Sheep River FM	150	26.5	25.5	25.7	1.4	1.5
Pipe Westmount FM	150	26.5	24.8	24.8	1.4	1.4
Pipe Drake Landing FM	150	26.5	43.0	43.0	2.4	2.4
Pipe Southbank FM	200	47.1	30.7	30.7	1.0	1.0
Pipe Nexen FM	150	26.5	19.2	19.2	1.1	1.1

The review of the above peak wet weather flows and the corresponding resultant velocities indicates that each forcemain operates within an acceptable velocity range of 1.0 m/s – 3.0m/s and below the preferred velocity of 2.5m/s for existing forcemains.

Please note that new forcemains are typically designed to operate between 1.1m/s to 1.8m/s with the preferred velocity of 1.5m/s. This approach was hence utilized to size new forcemains for the purpose of developing future servicing option to minimize the resulting head losses which in turn would yield savings on the energy consumption front.

Table 7.9: Siphon Wet Weather Flow Results under LOS Design Storm

Name	Capacity	Peak WWF		Spare Capacity	
		30 Year	60 Year	30 Year	60 Year
	L/s				
South Siphon	186	296.9	341.3	-110.9	-155.3
West Siphon	190	182.8	188.7	7.2	1.3

Under both growth horizons, it has been noted that the maximum HGL along the West Siphon is elevated as the resultant water level at the downstream end is roughly 1 to 1.5 metres above the pipe crown but more than 1.5 - 2 metres below the ground. The surcharging is largely due to a backwater effect from the downstream pipes that are approaching the wastewater treatment plant as shown in longitudinal profiles depicted in in Figures 18 and 27 of Appendices H, I, K and L. The issue at the siphon is mitigated once the downstream pipes are upgraded as part of the North/South Railway Street and 32nd Street upgrades discussed in detail in the subsequent sections.

Additionally, results have indicated that the South Siphon is under capacity under both 30-year and 60-year growth horizons. Upgrades for this siphon have also been included in Section 7.4, or alternatively a new south river crossing is required depending on the recommended future trunk alignment selected as discussed in Section 8.

7.4 Required Upgrades To Accommodate Each Servicing Option

For the purpose of the Sanitary Master Plan Update, the required upgrades were specified both as twining of the existing sewers with a new section of pipe, as well as upsizing of the existing sewer by means of installing a brand new pipe. Please note that cost estimates were developed primarily for the twinning upgrades as the upsizing/replacement of the existing infrastructure was determined to be cost-prohibitive and impractical, but were specified nonetheless to provide the Town with an equivalent single-pipe size for information purposes. The impracticality and relatively high costs associated with upsizing/replacement option was deemed based on the following:

- Cost of pumping sewage flows to bypass the sections of trunks to be upgraded would be significantly high given the volume of sewage and duration of pumping required.
- Replacement of the existing sewers with larger pipes may not be desired given that fact that resultant velocities, especially prior to full build-out of upstream areas, may be low leading to sediment and solid deposition which in turn can cause increased maintenance costs and premature degradation of sewers.
- Upsizing of sewers is less preferential than twinning as it does not provide an opportunity to take sewers offline with minimal financial and public cost should the infrastructure require maintenance or repair works.

Conceptual upgrades to resolve surcharge conditions along the above identified sections of trunks have been sized using the hydrodynamic model for each servicing option scenario for both growth horizons. An upgrade was deemed successful when the modelled maximum HGL peaks at the pipe crown or below it. In a few instances, the maximum HGL that nominally peaked above the pipe crown, along a short section of sewer, before being dissipated to below the pipe crown of the upstream section was deemed acceptable due to no anticipated adverse effect.

7.4.1. 30-Year Growth Upgrades

In total, the identified six (6) servicing options produced a set of four (4) unique combinations of upgrades for the 30-year growth horizon as shown in Figures 7.115 to 7.118. The equivalent upgrades in the form of upsizing or replacement are depicted in Figures 7.119 to 7.122. The summary of class D cost estimates for each combination of upgrades (assuming twinning of the existing sewers) is summarized in Table 7.10 while the detailed breakdown along with characteristic of each upgrade is summarized in Appendix G. The post-improvement maximum HGLs along the existing trunks based on each 30-year servicing option are shown in Appendix H and Appendix I.

Table 7.10: Cost Estimates of Upgrades Developed for Each 30-Year Servicing Option

Combination No.	Twinning Upgrades For Servicing Option	Total Cost
#1	1A & 3A	$8,995,000
#2	2A & 4A	$6,545,000
#3	1B	$7,840,000
#4	2B	$5,390,000

7.4.2. 60-Year Growth Upgrades

In total, the identified eight (8) servicing options produced a set of five (5) unique combinations of upgrades for the 60-year growth horizon as shown in Figures 7.123 to 7.127. The equivalent upgrades in the form of upsizing or replacement are depicted in Figures 7.128 to 7.132. The summary of class D cost estimates for each combination of upgrades (assuming twinning of the existing sewers) is summarized in Table 7.11 while the detailed breakdown along with characteristic of each upgrade is summarized in Appendix J. The post-improvement maximum HGLs along the existing trunks based on each 60-year servicing option are shown in Appendix K and Appendix L.

Table 7.11: Cost Estimates of Upgrades Developed for Each 60-Year Servicing Option

Combination No.	Twinning Upgrades For Servicing Option	Total Cost
#1	1A & 3B	$9,165,000
#2	2A	$6,960,000
#3	3A, 4A &4B	$9,260,000
#4	1B	$8,015,000
#5	2B	$5,810,000

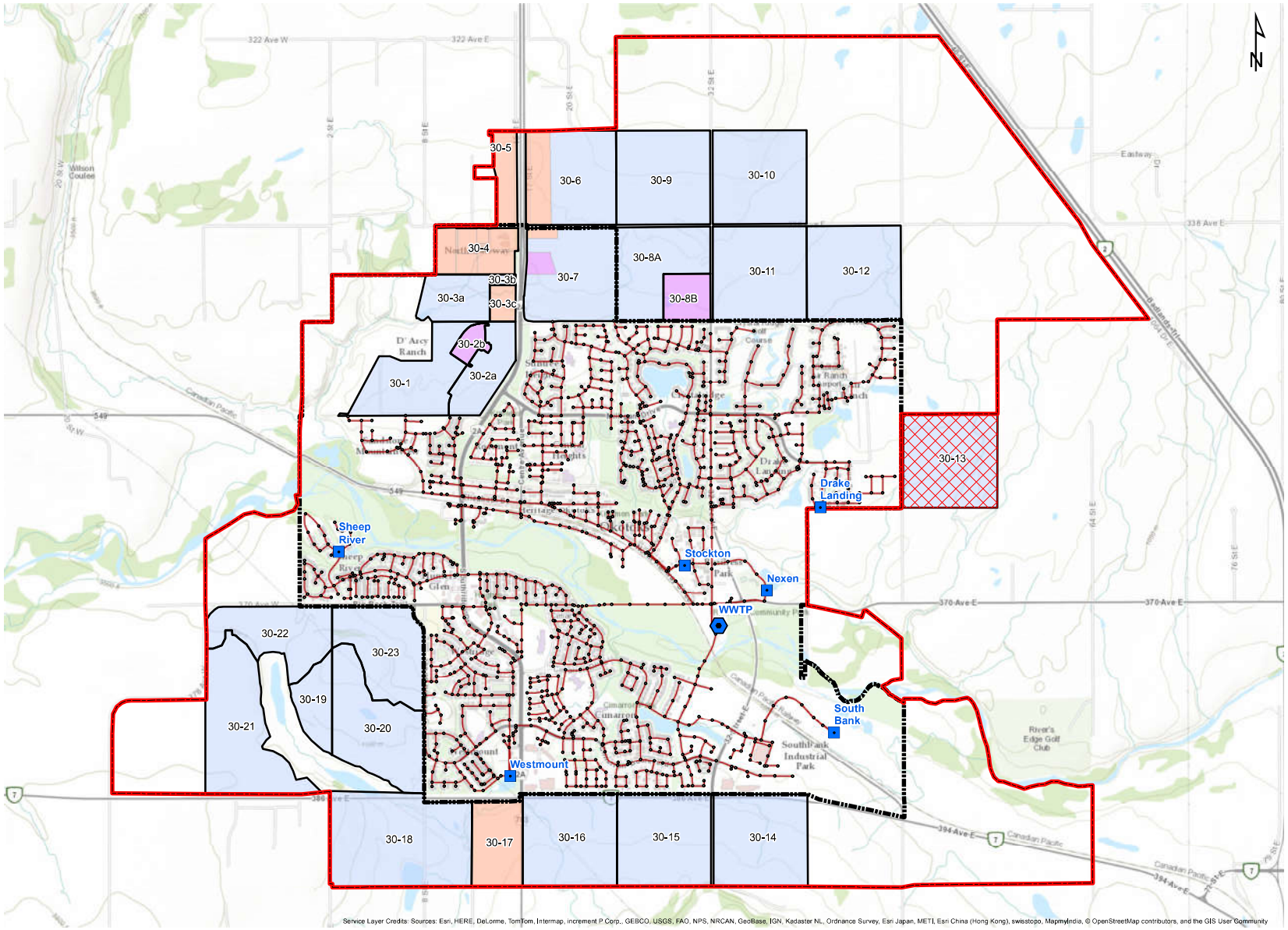

FIGURE 7.1

Legend

- Sanitary Manhole
- Existing Lift Station
- Wastewater Treatment Plant
- Sanitary Pipe

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary

1:32,500

0 200 400 800 1,200 1,600 Meters

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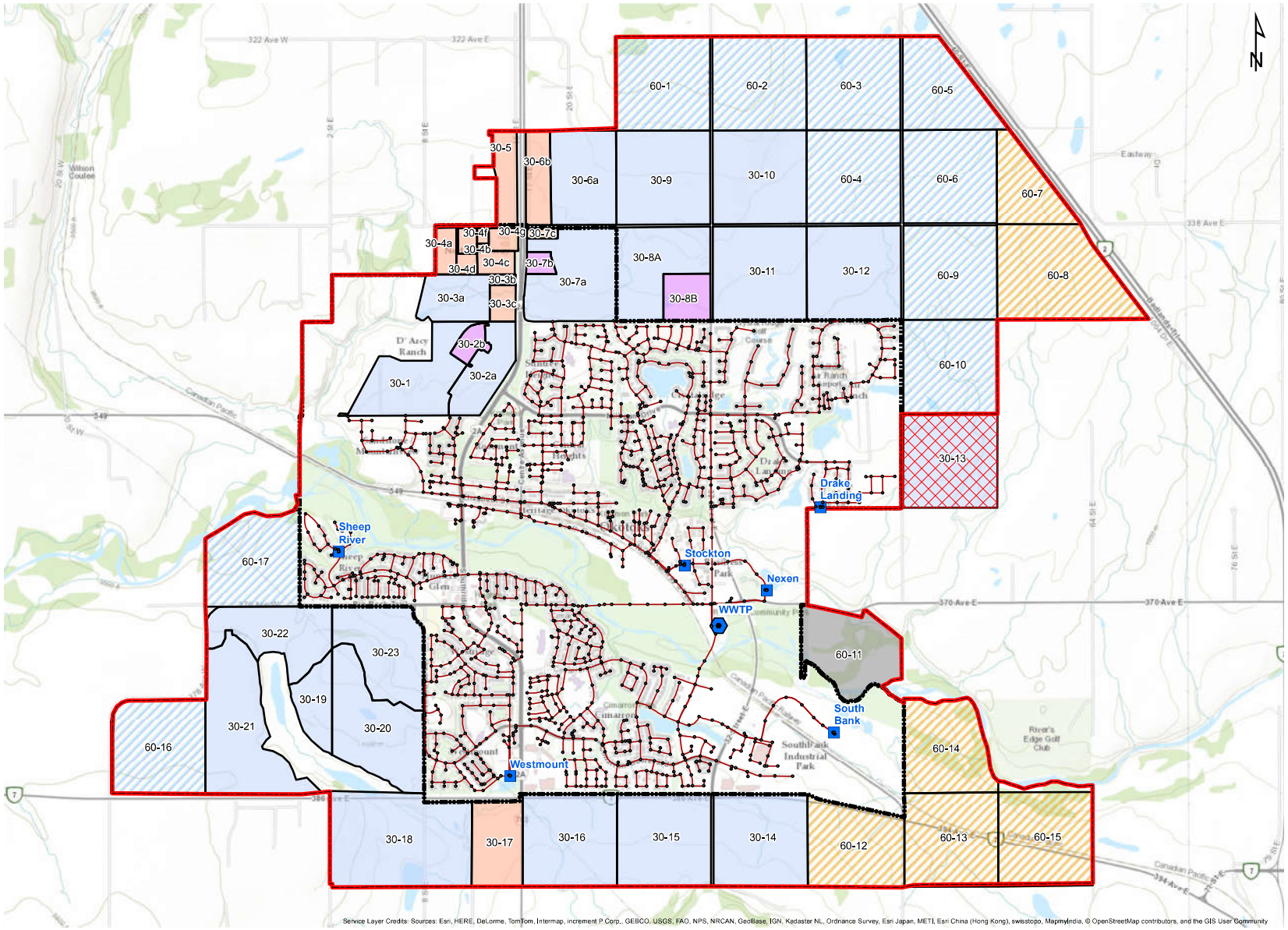

FIGURE 7.2

Legend

- Sanitary Manhole
- Existing Lift Station
- Wastewater Treatment Plant
- Sanitary Pipe

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary

1:32,500

0 200 400 800 1,200 1,600 Meters

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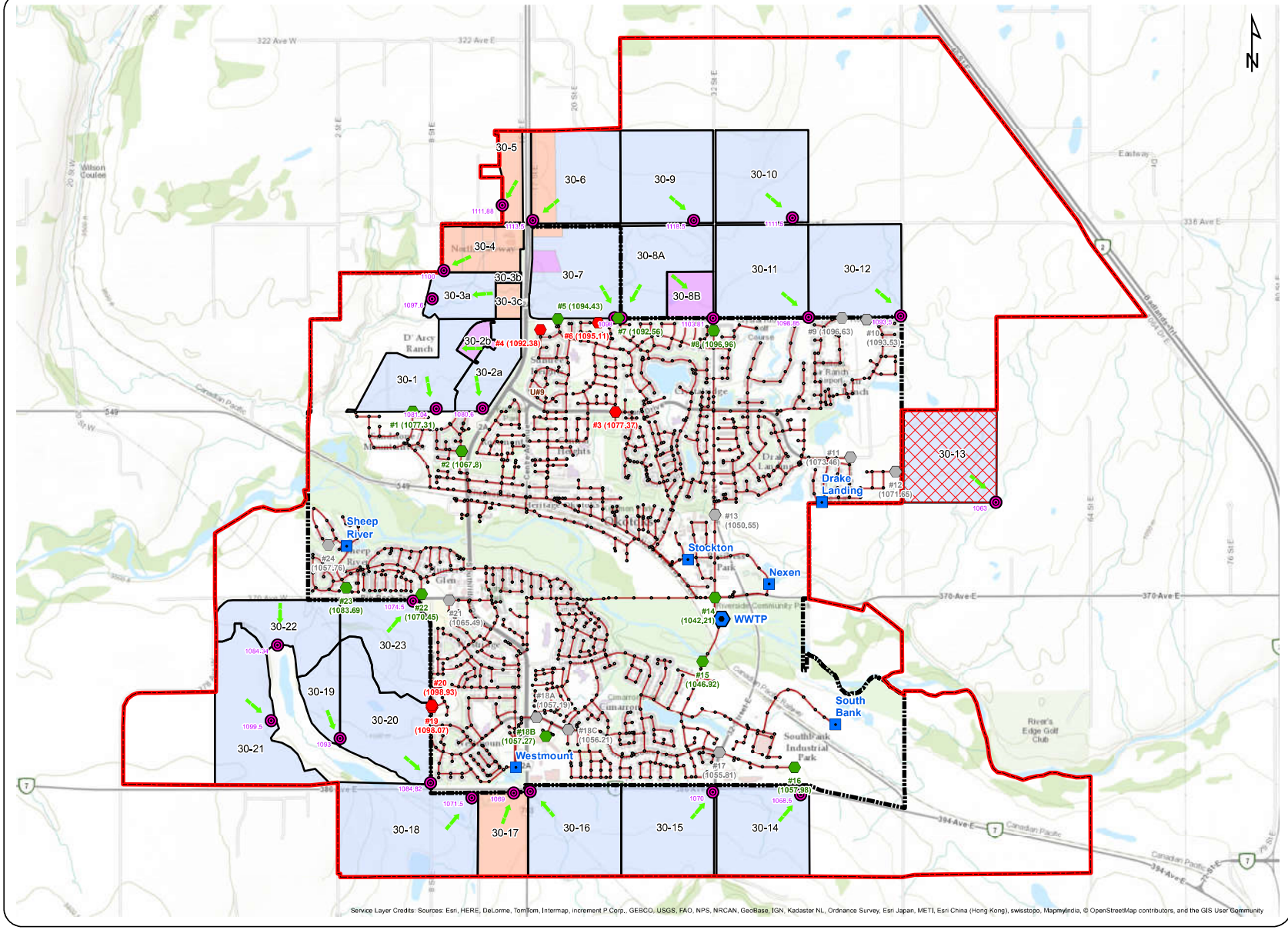

FIGURE 7.3

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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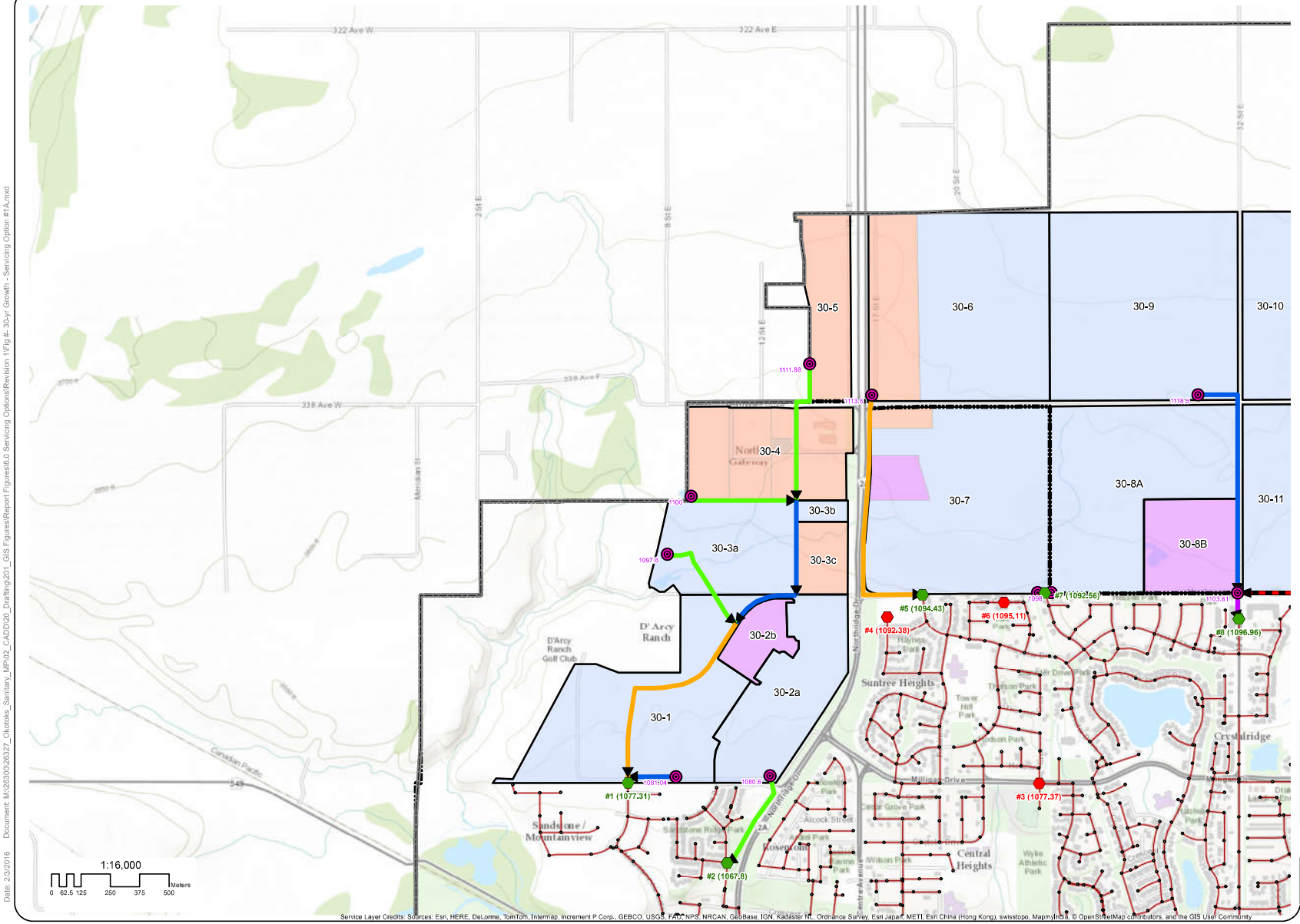
FIGURE 7.4



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N

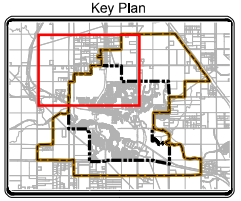
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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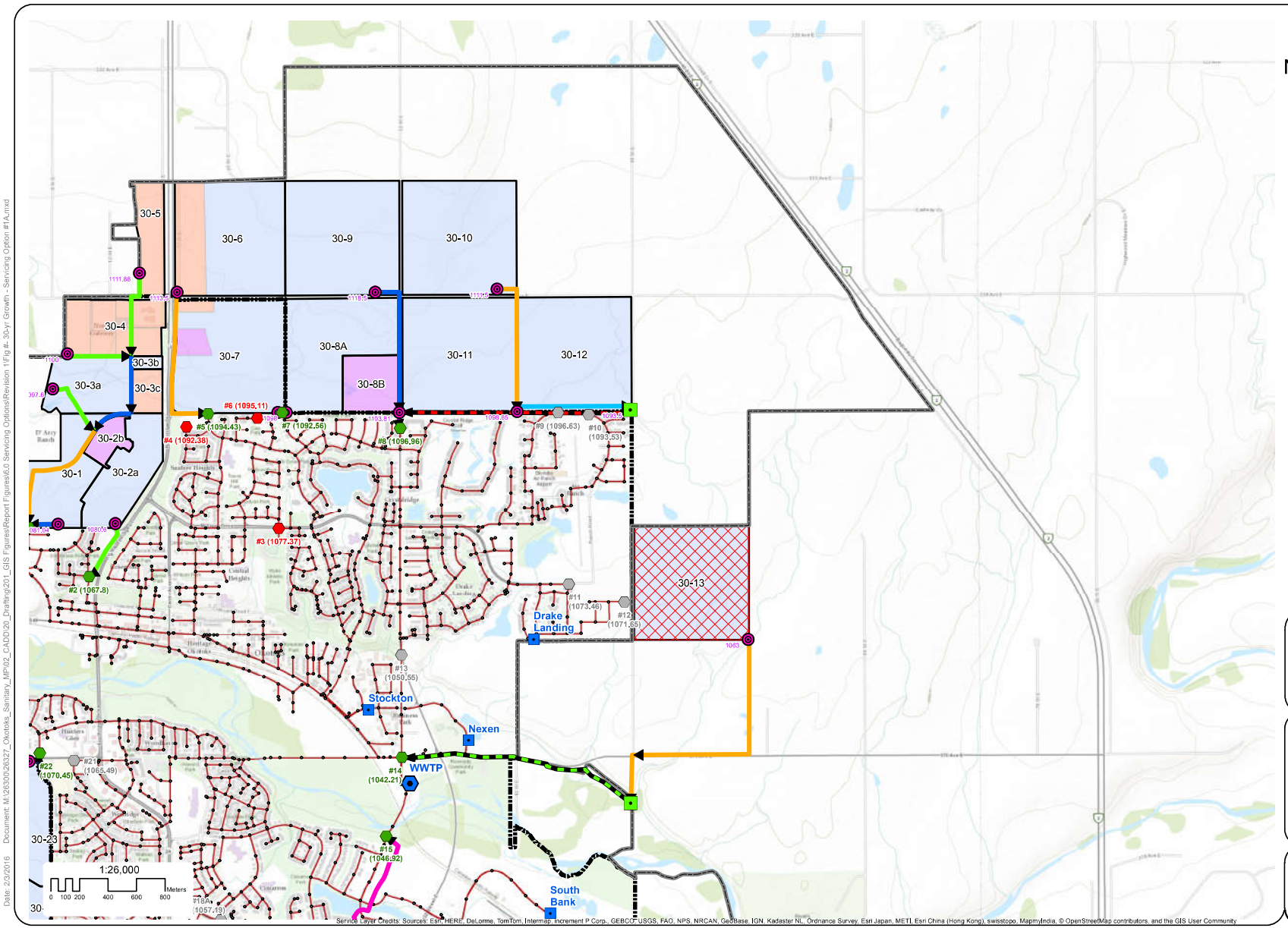


FIGURE 7.5

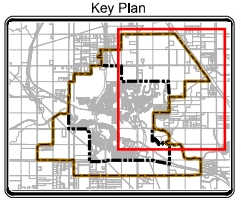
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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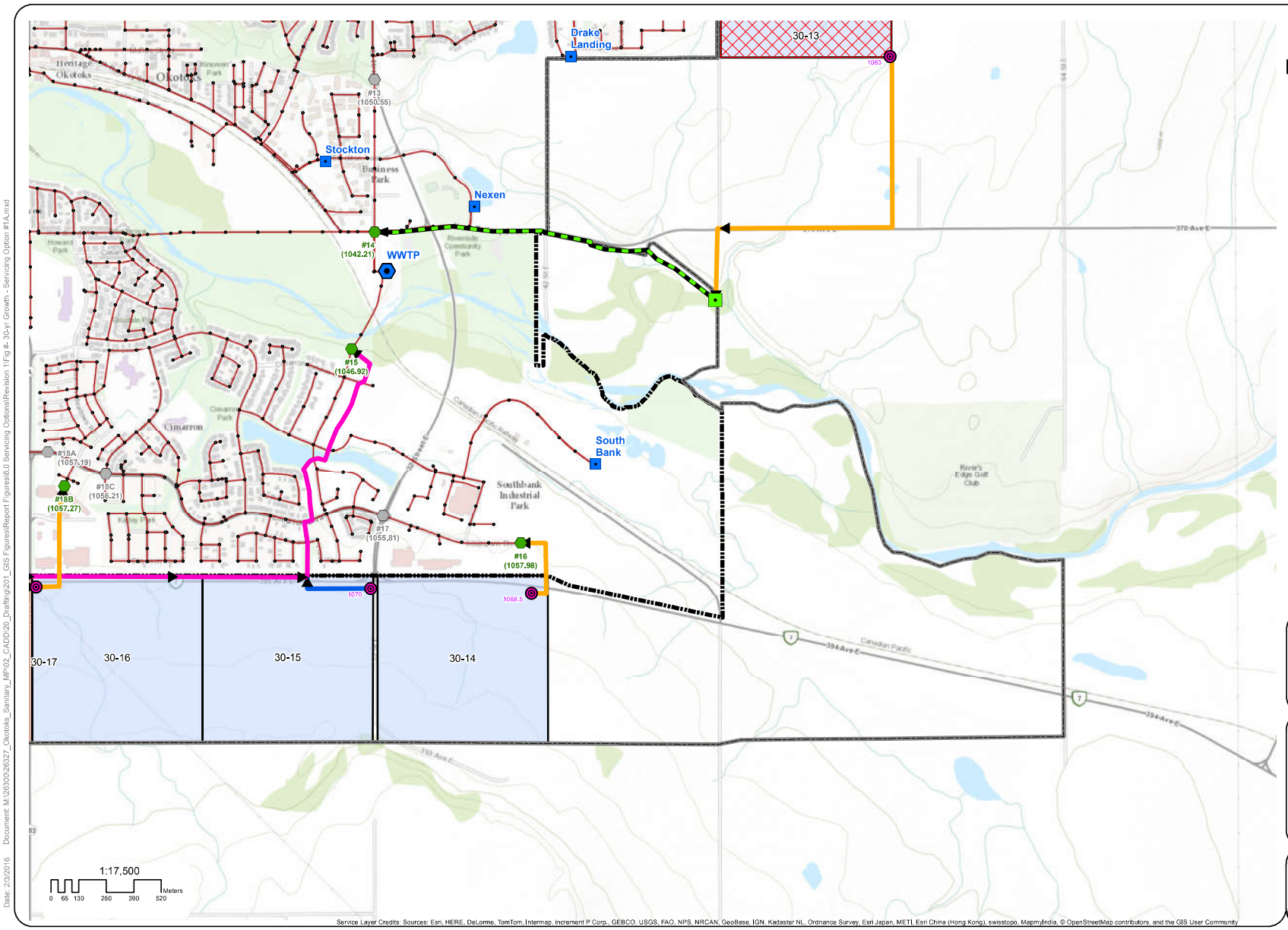


FIGURE 7.6

N

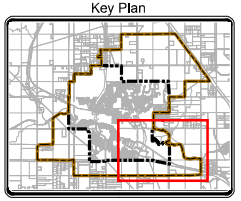
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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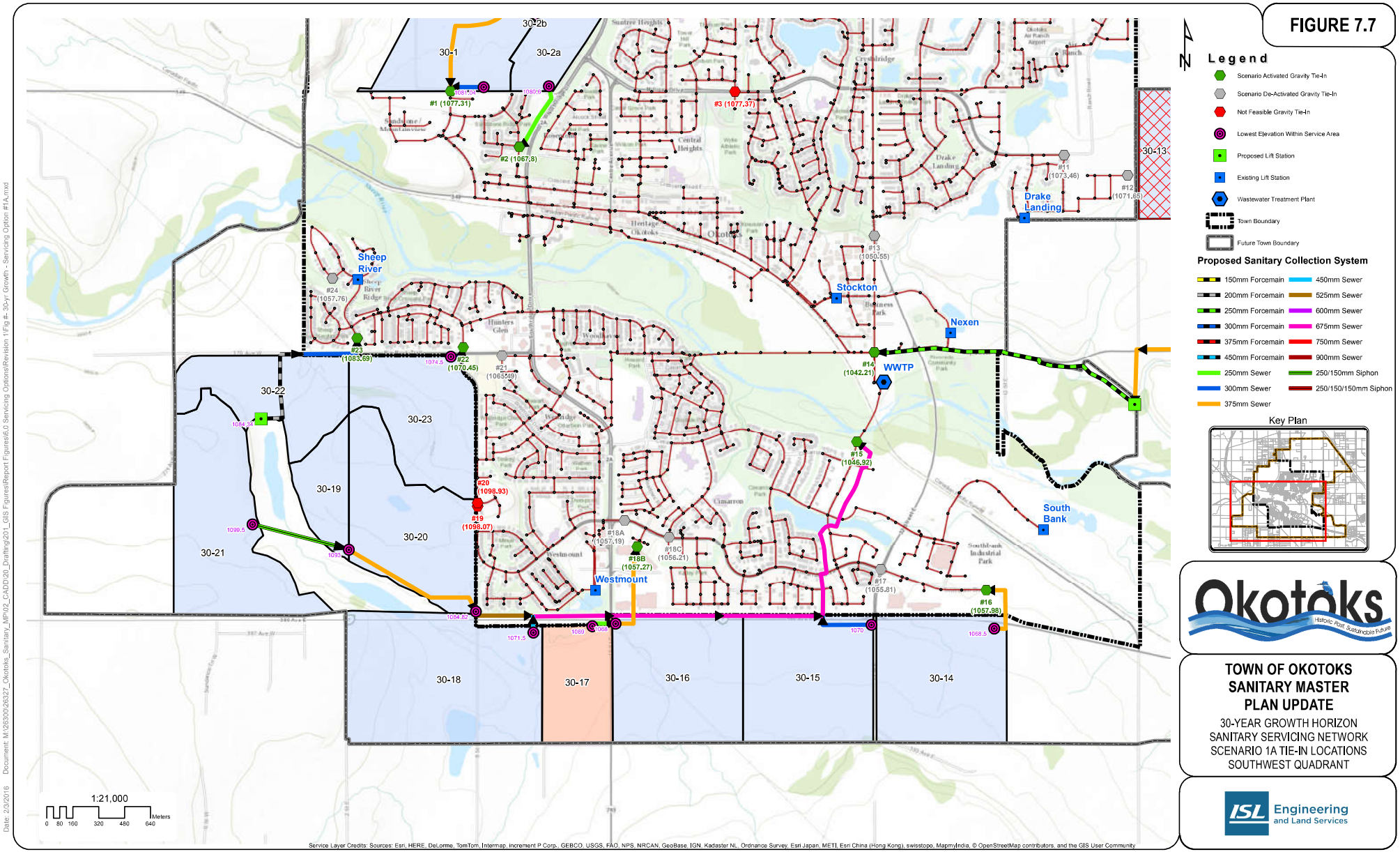

FIGURE 7.7

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

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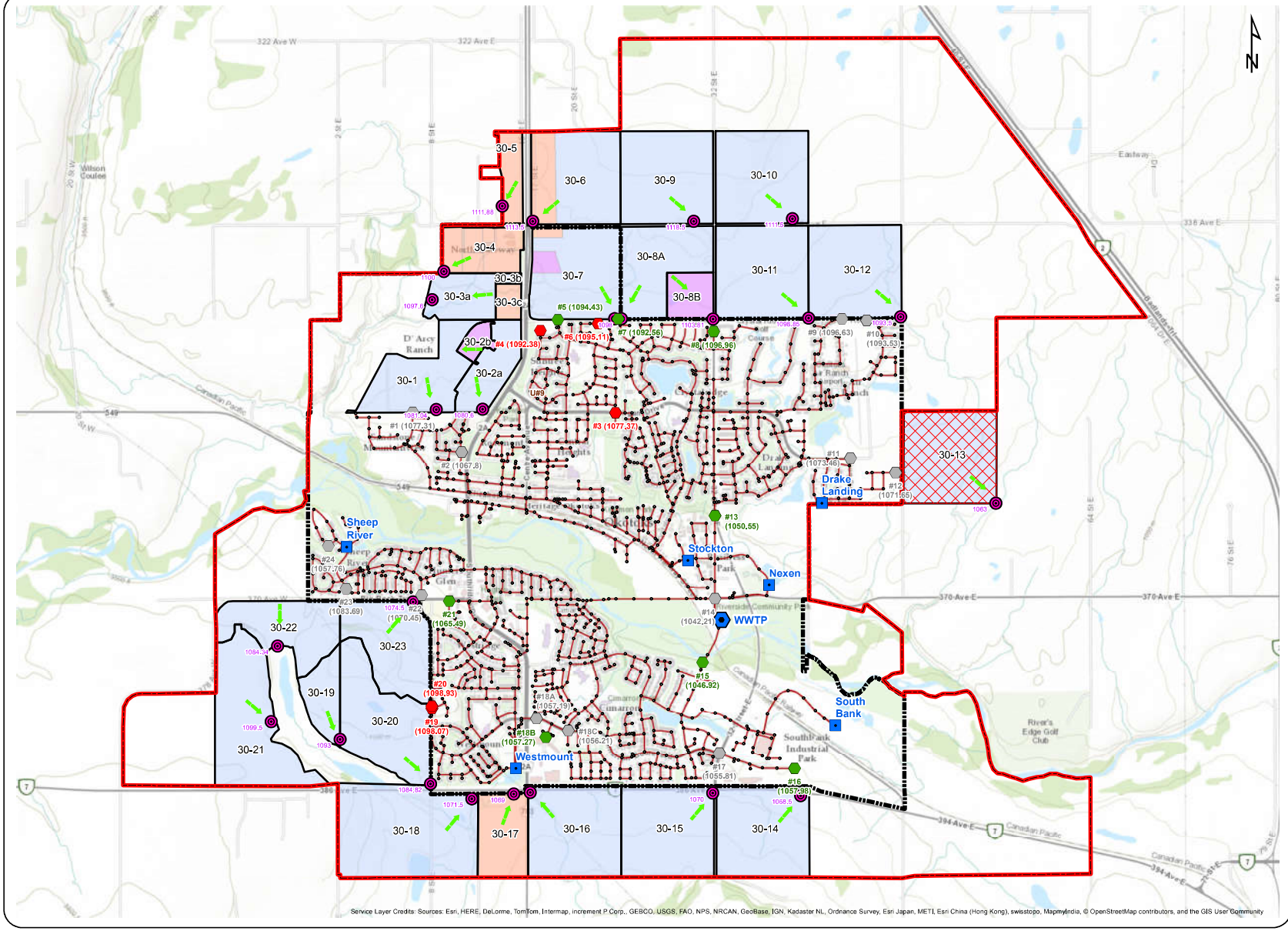

FIGURE 7.8

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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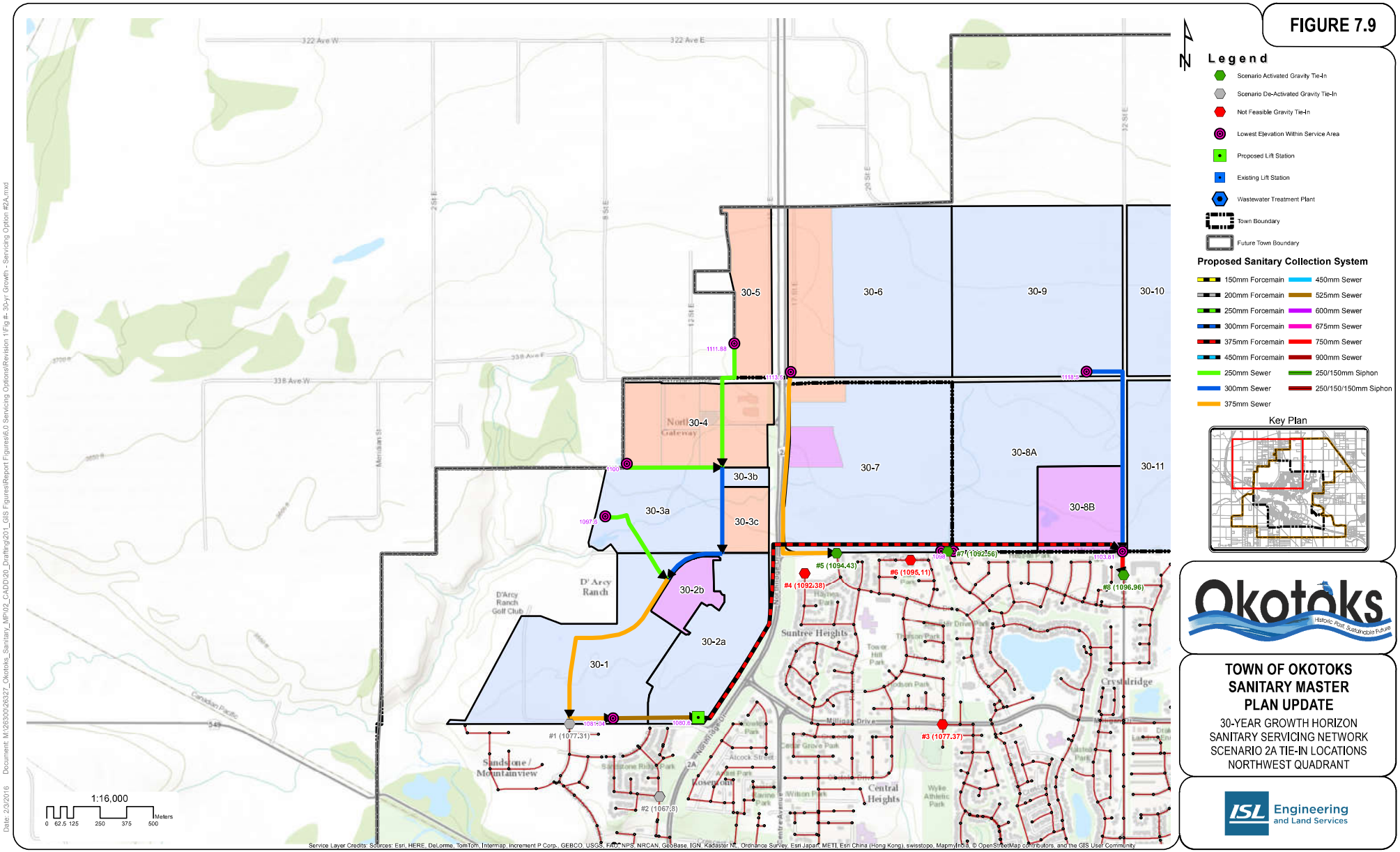

FIGURE 7.9

N

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

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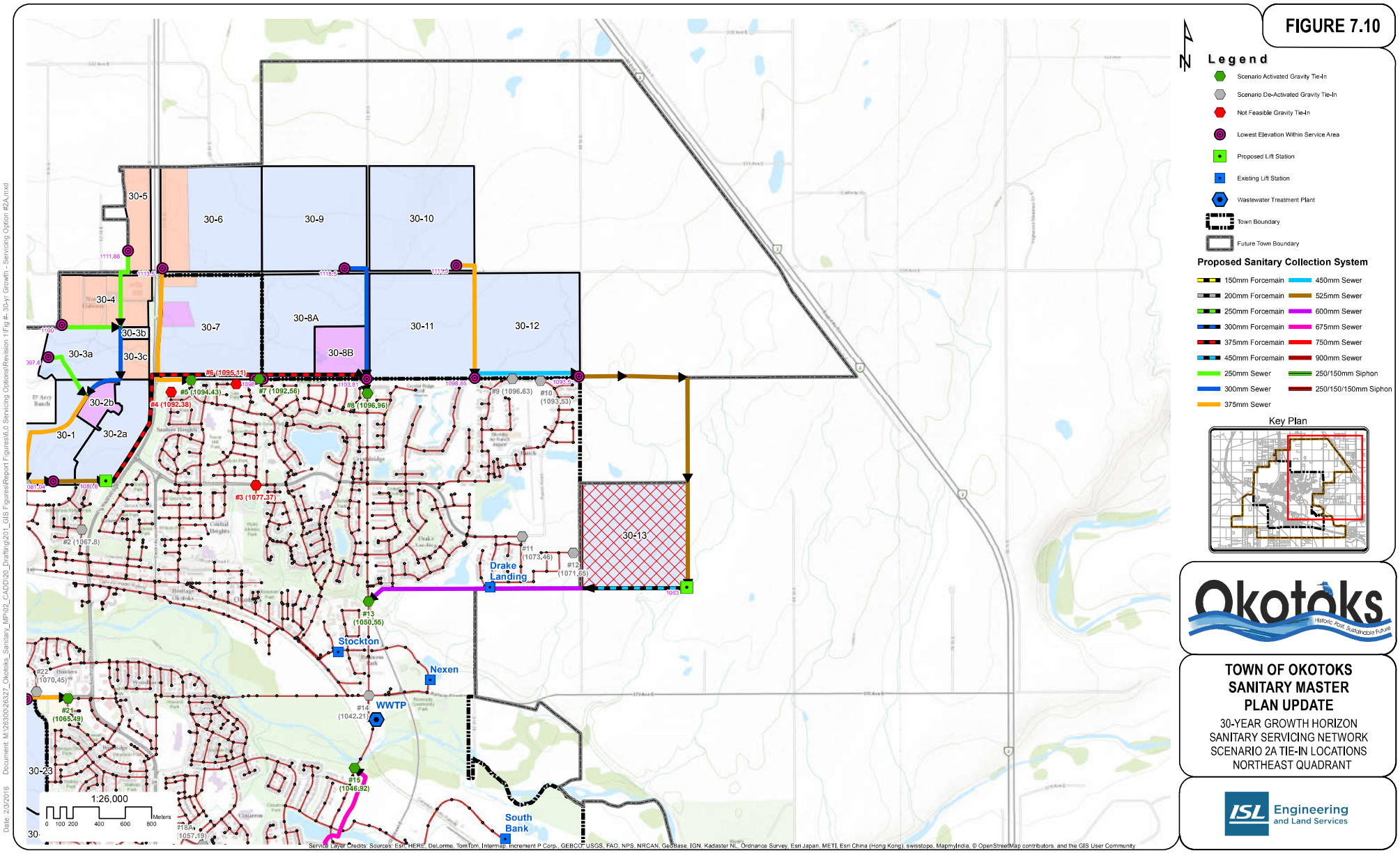

FIGURE 7.10

N

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

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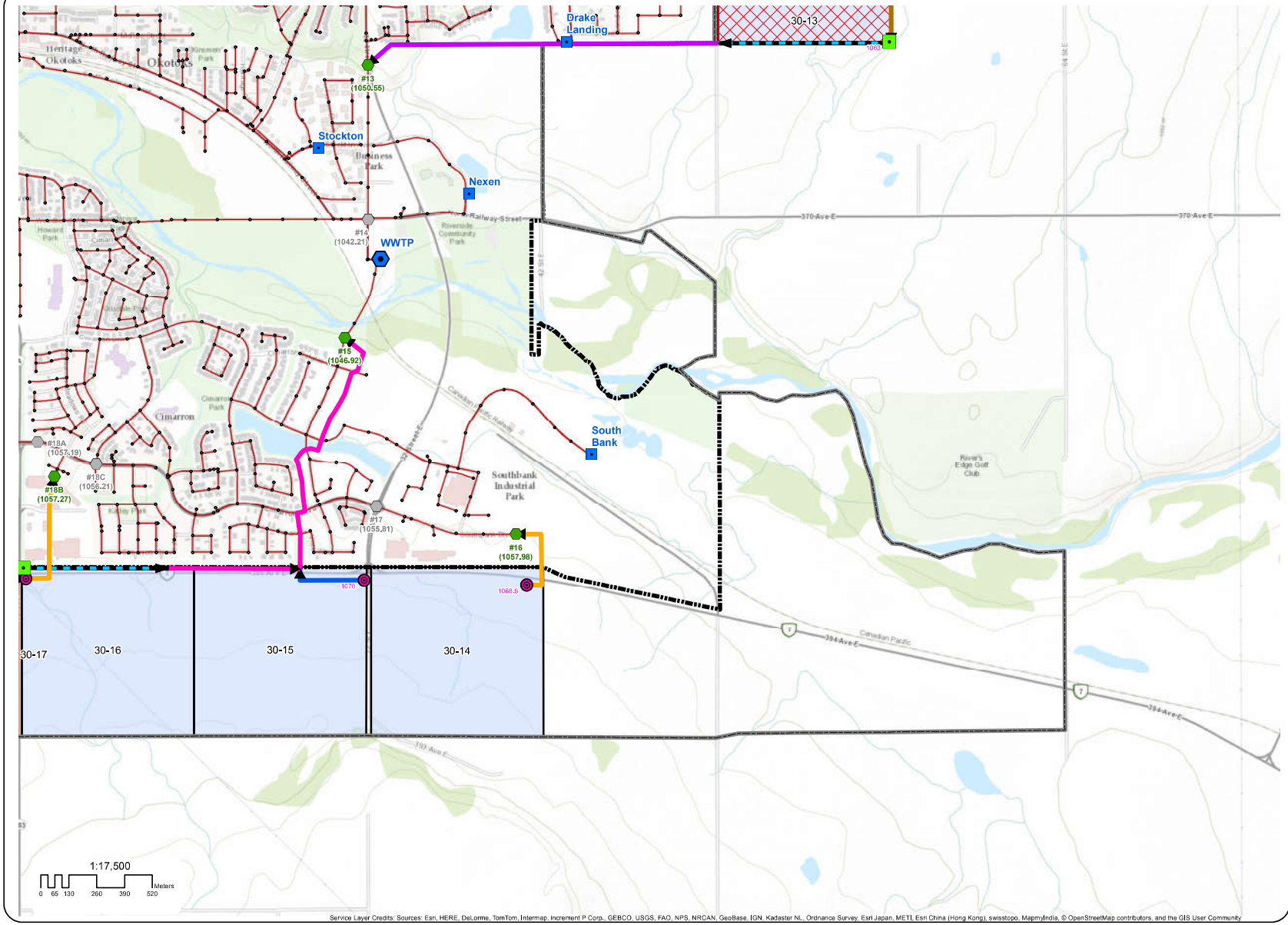


FIGURE 7.11

N

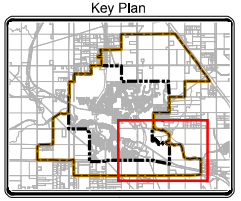
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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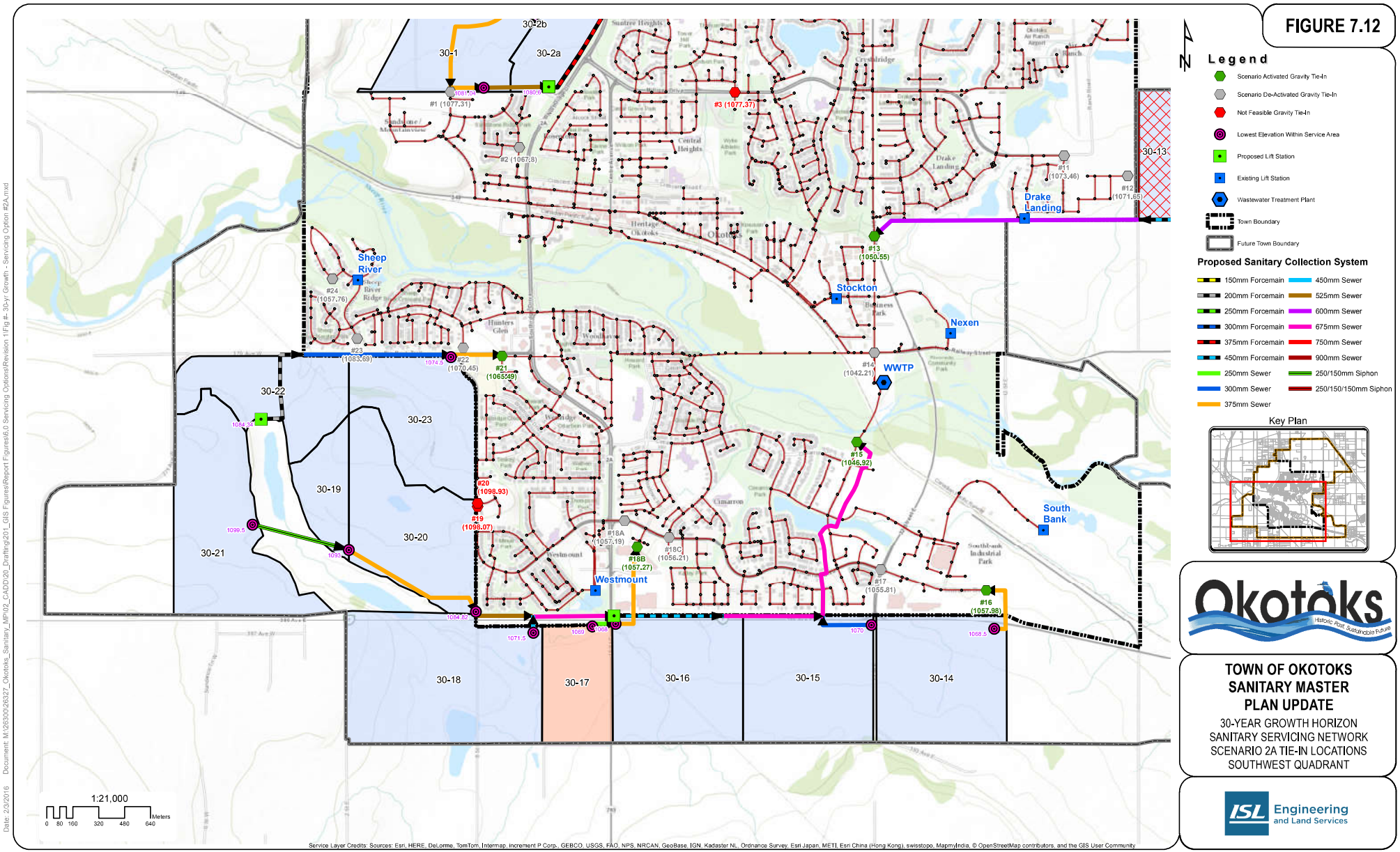

FIGURE 7.12

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

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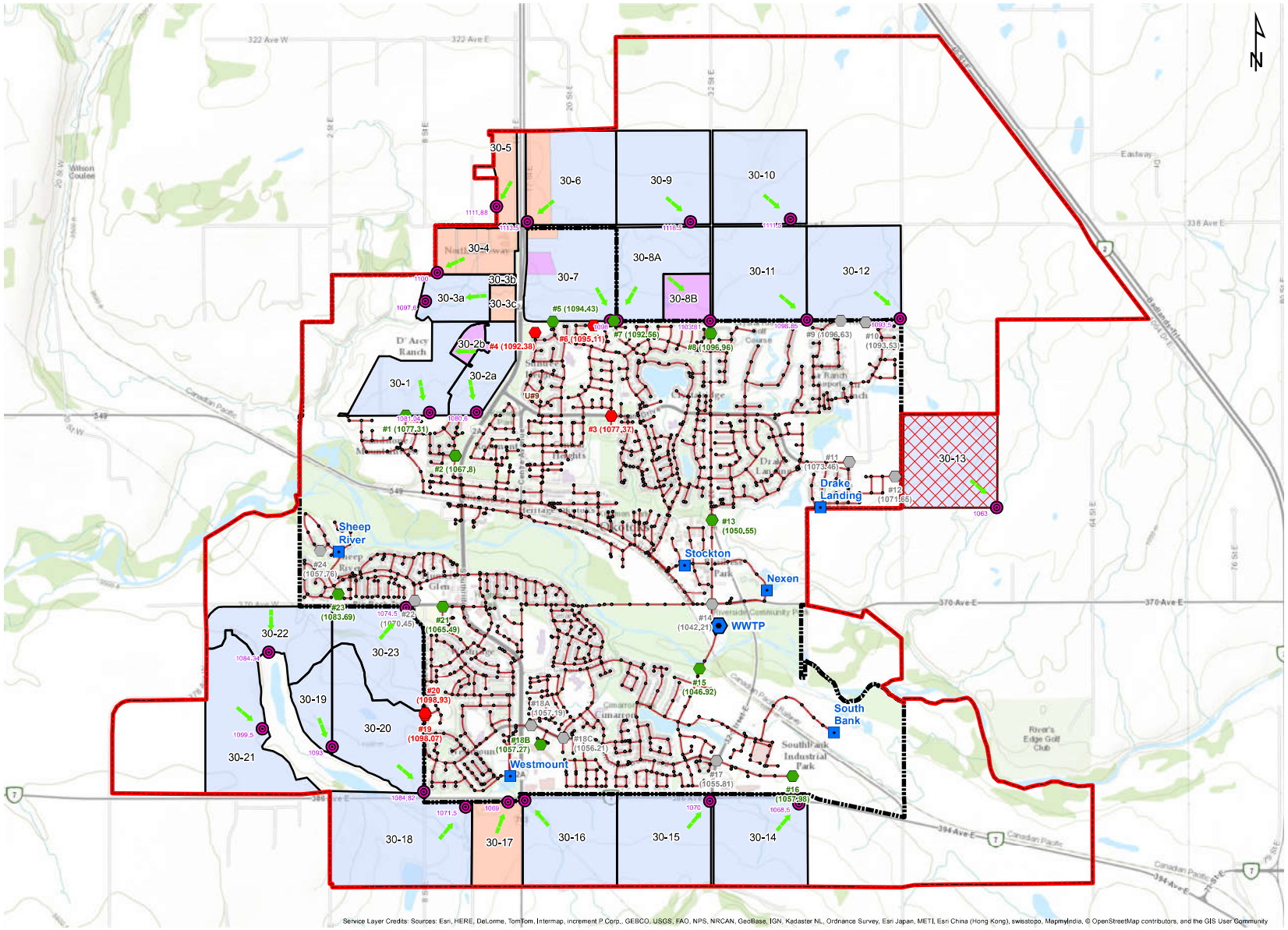

FIGURE 7.13

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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Historic Past, Sustainable Future

TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

30-YEAR GROWTH HORIZON
SANITARY SERVICING NETWORK
SCENARIO 3A TIE-IN LOCATIONS

ISL Engineering and Land Services

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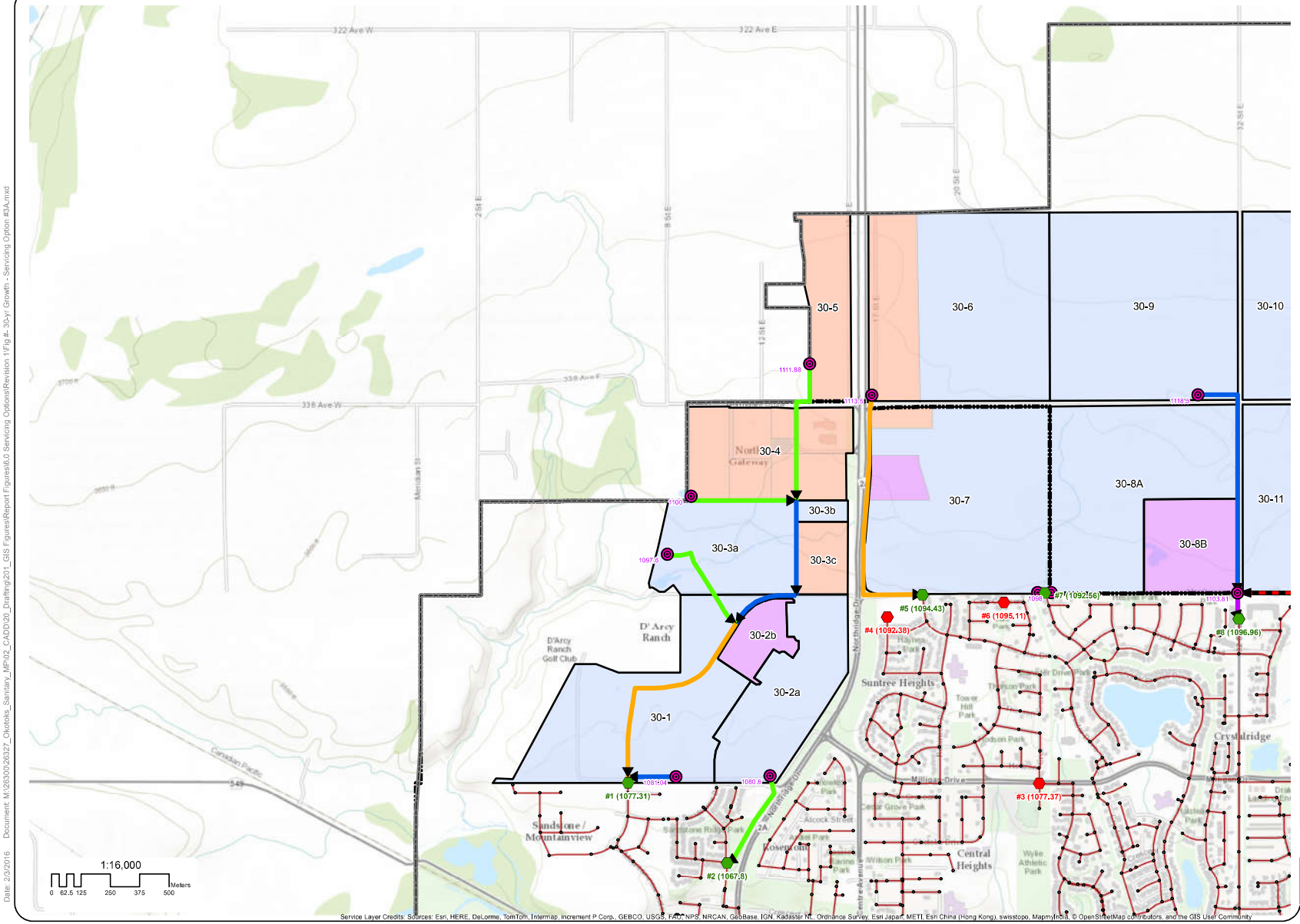
FIGURE 7.14



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N

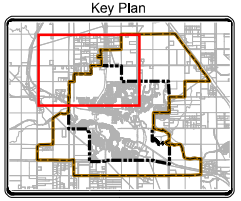
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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30-YEAR GROWTH HORIZON
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ISL Engineering and Land Services

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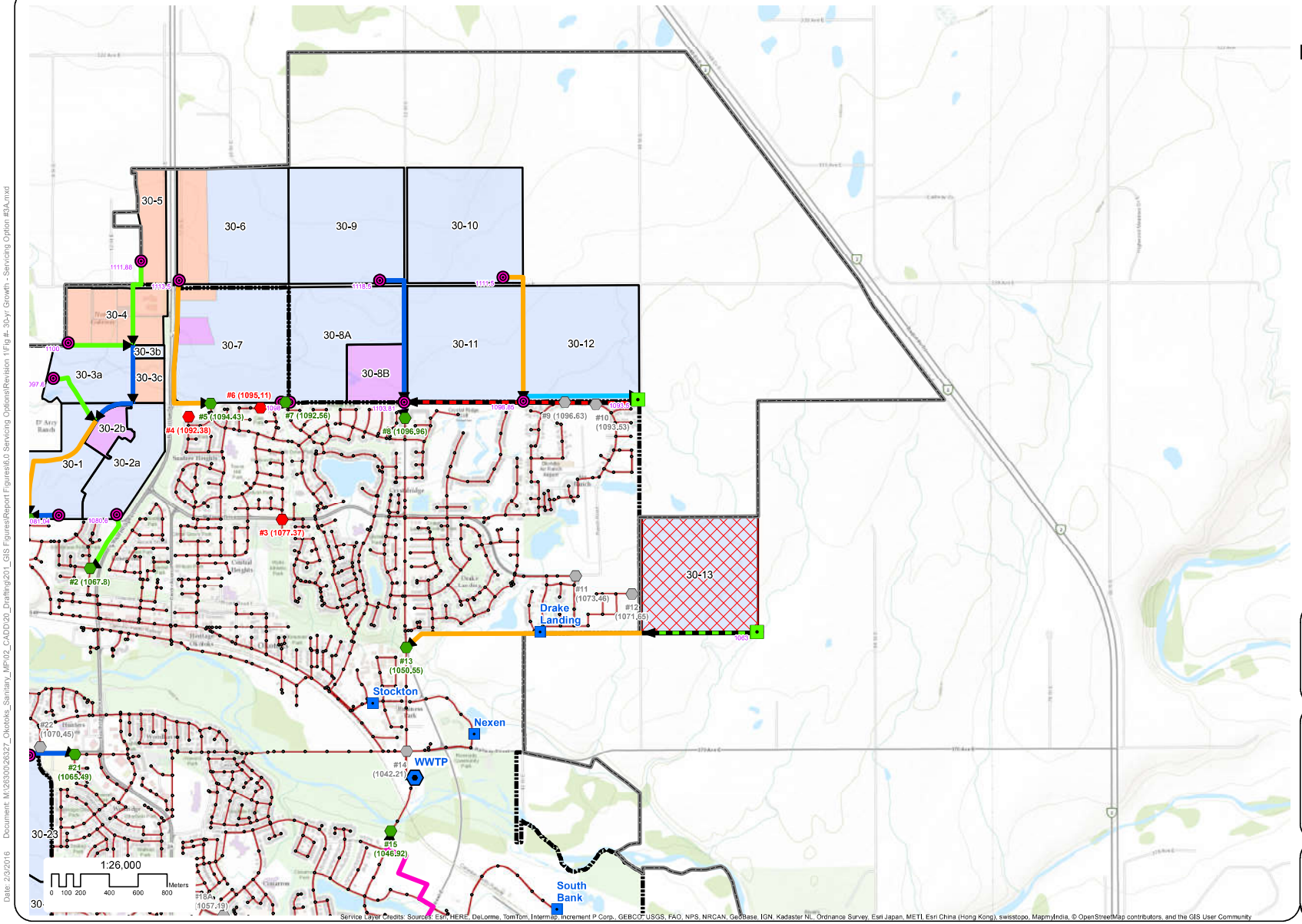
FIGURE 7.15



N

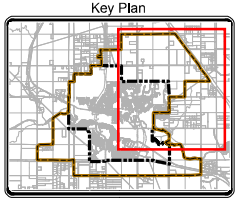
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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30-YEAR GROWTH HORIZON
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NORTHEAST QUADRANT

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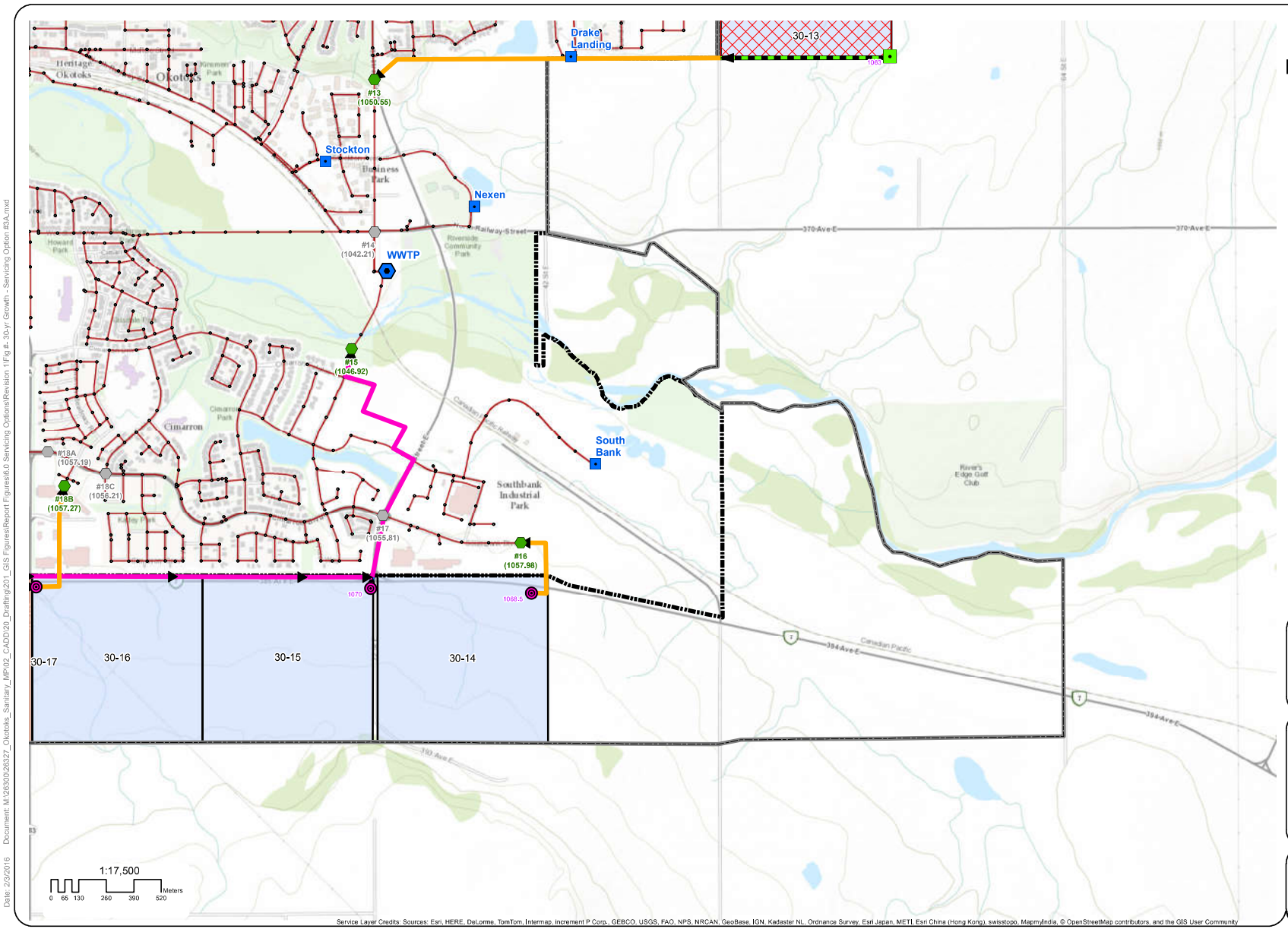


FIGURE 7.16

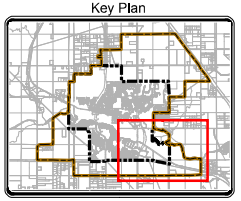
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon
375mm Sewer	

Key Plan



Okotoks — Historic Past, Sustainable Future

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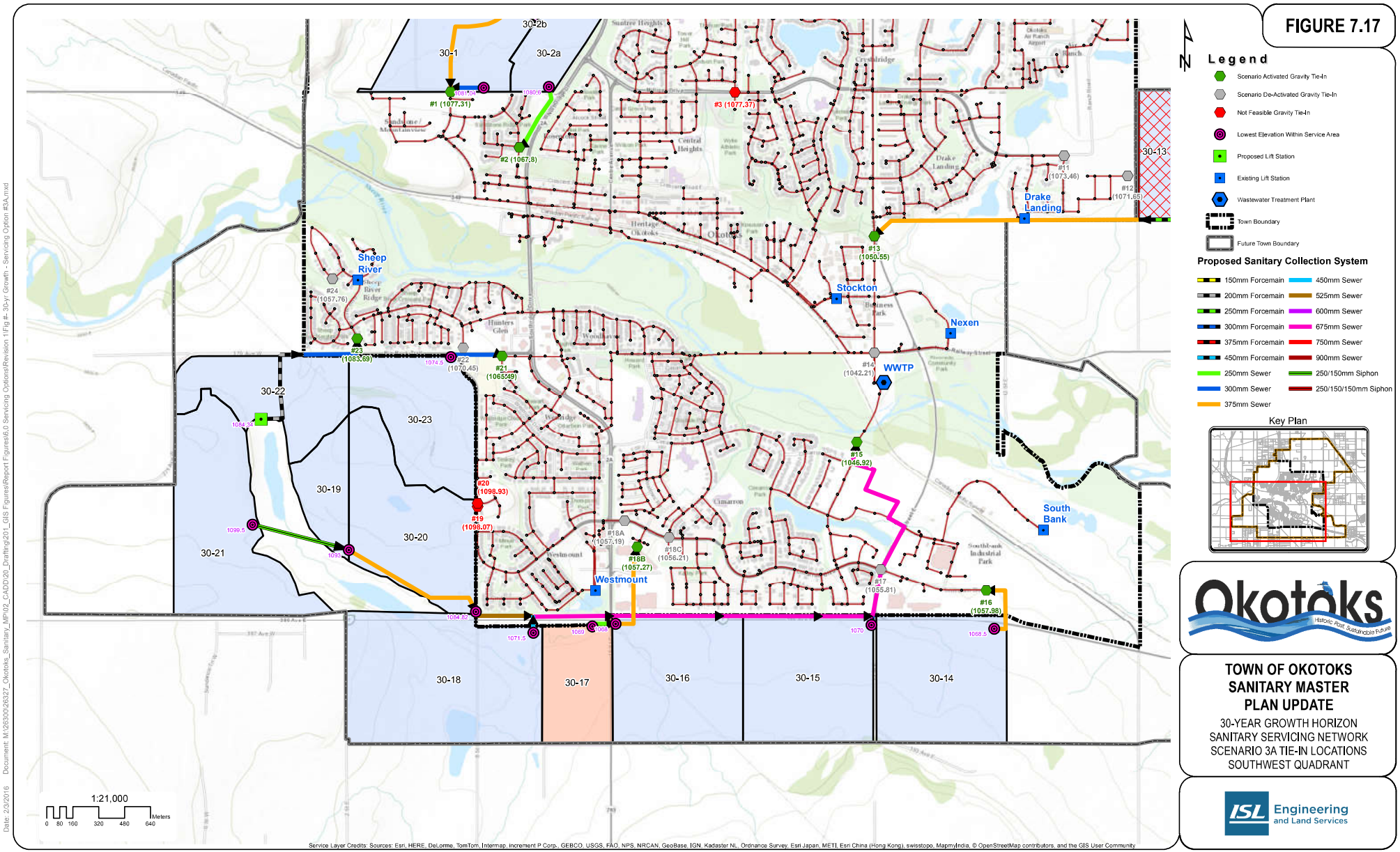

FIGURE 7.17

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan

Okotoks
Historic Past, Sustainable Future

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30-YEAR GROWTH HORIZON
SANITARY SERVICING NETWORK
SCENARIO 3A TIE-IN LOCATIONS
SOUTHWEST QUADRANT

ISL Engineering and Land Services

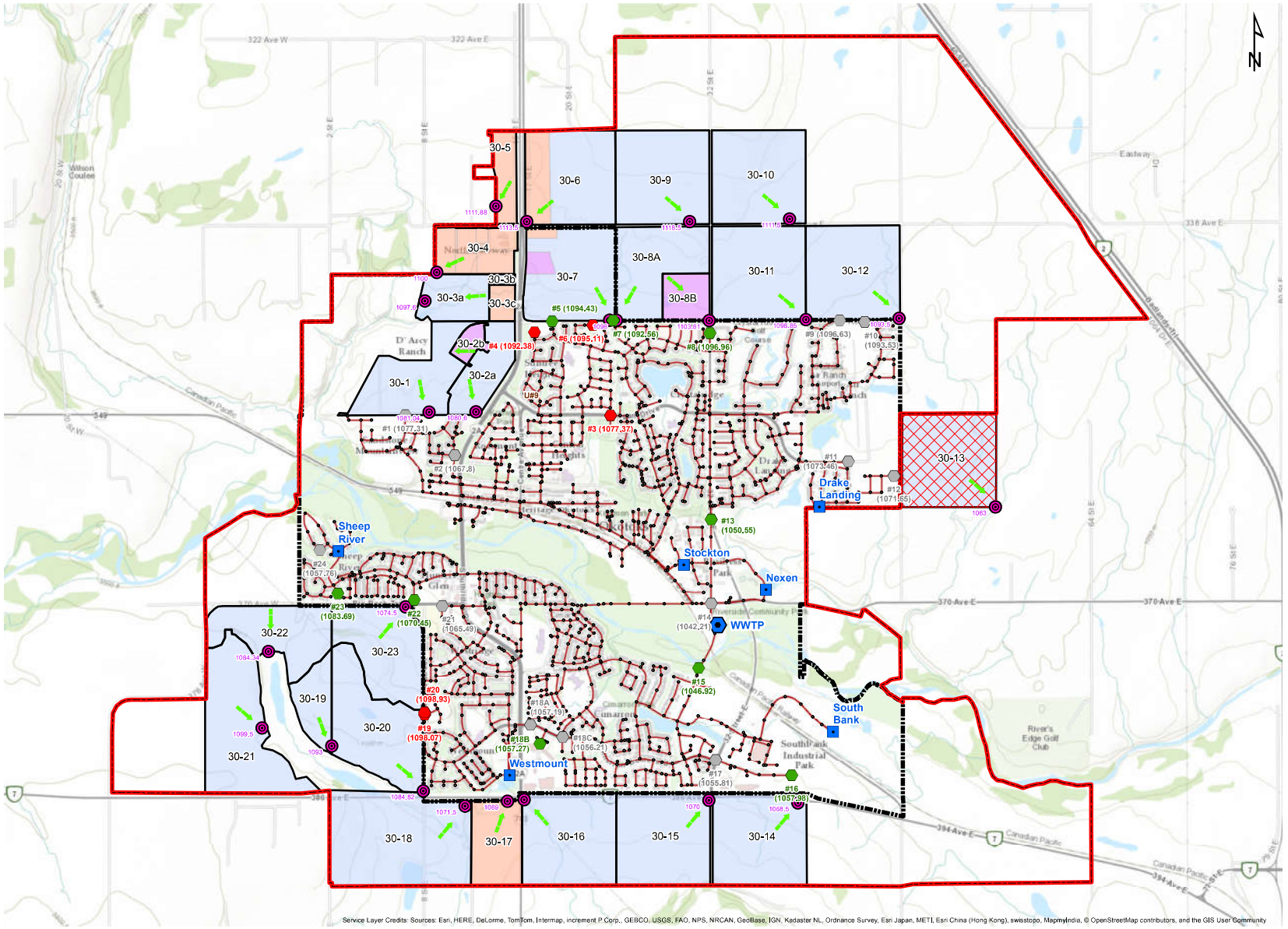

FIGURE 7.18

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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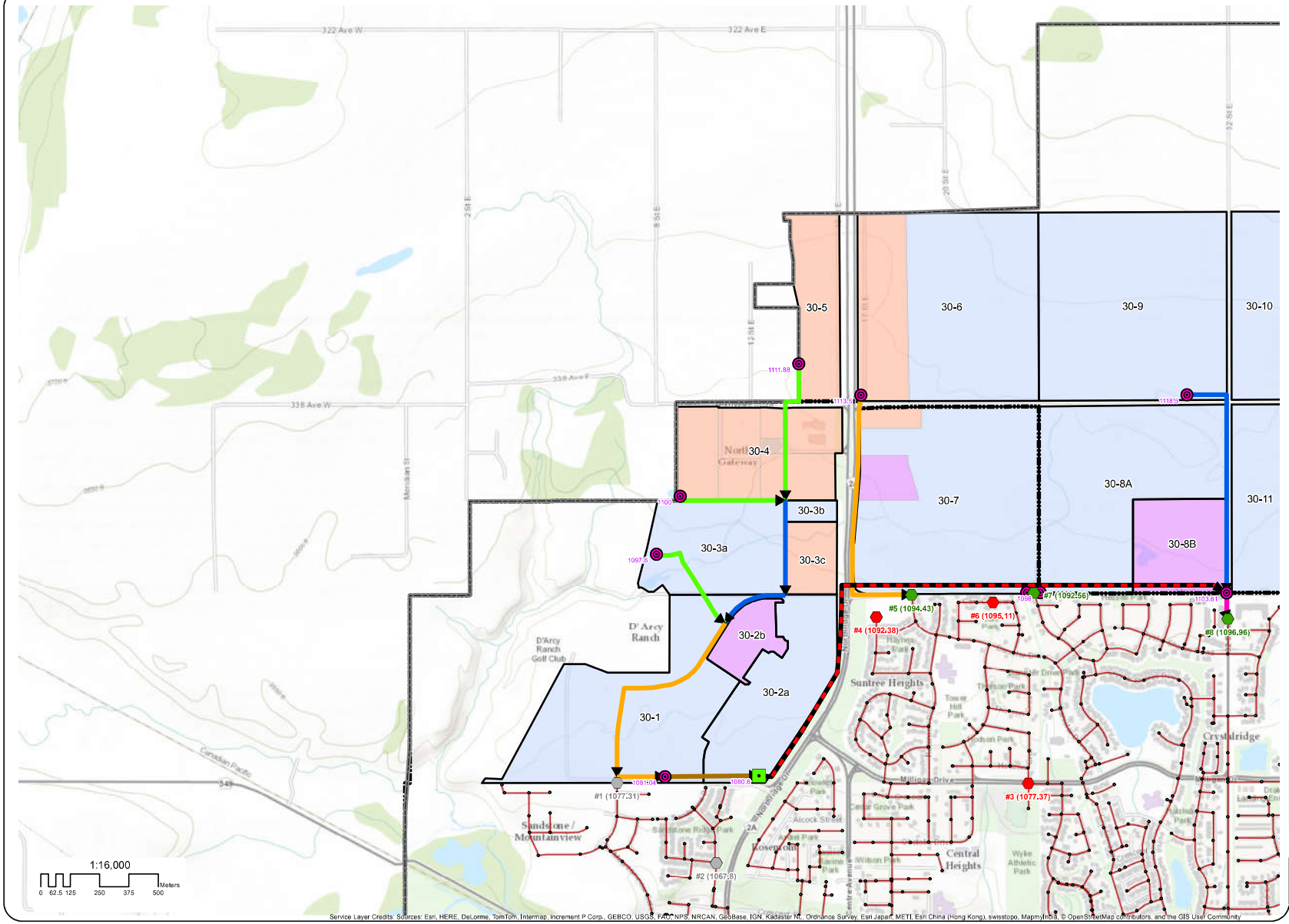
FIGURE 7.19



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N

Legend

- Scenario Activated Gravity Tie-In
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- Lowest Elevation Within Service Area
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- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan

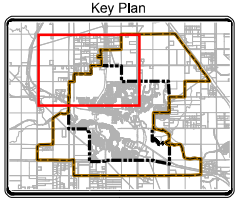

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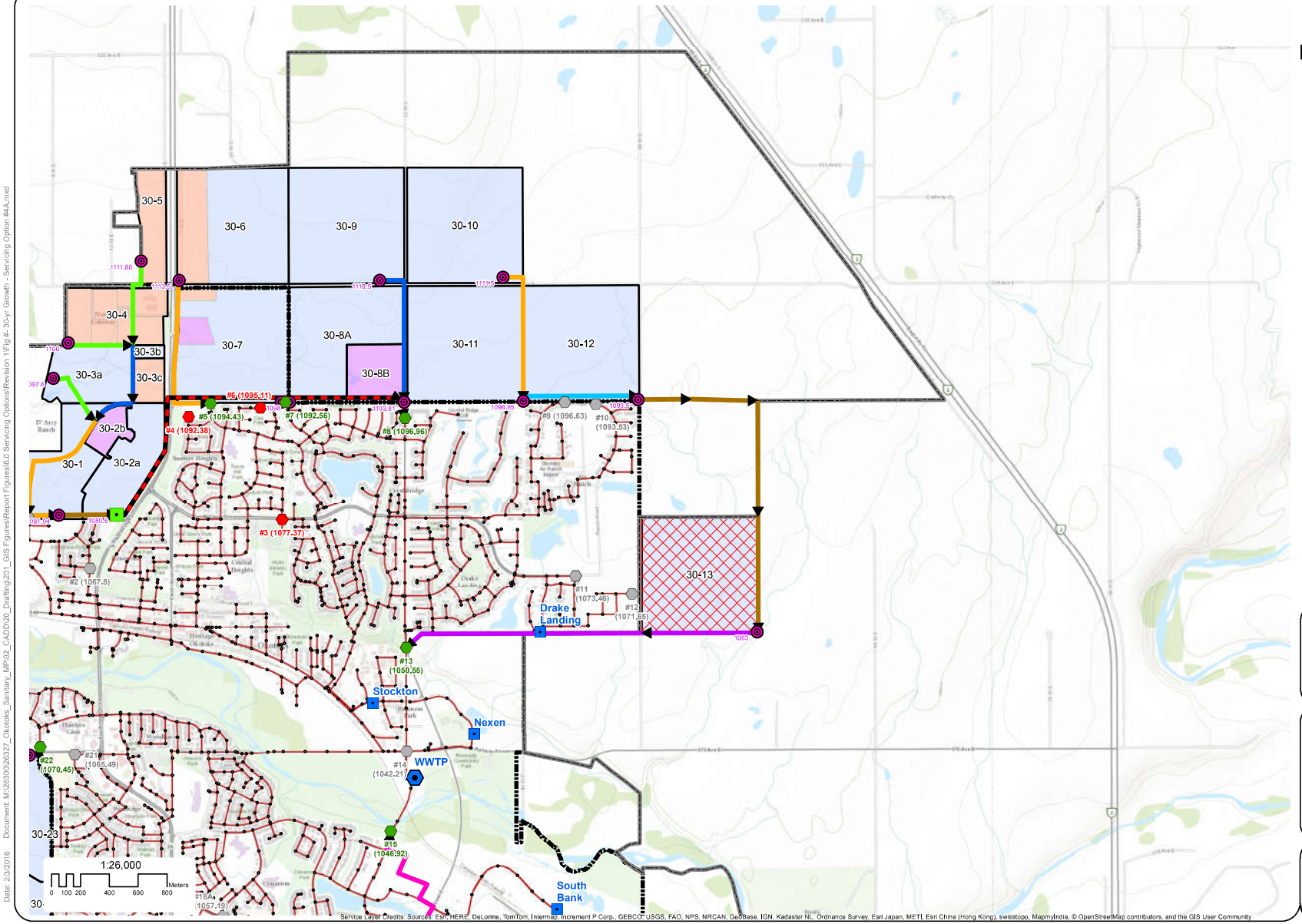
FIGURE 7.20



Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
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Proposed Sanitary Collection System

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- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan

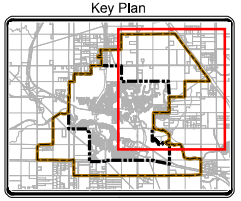

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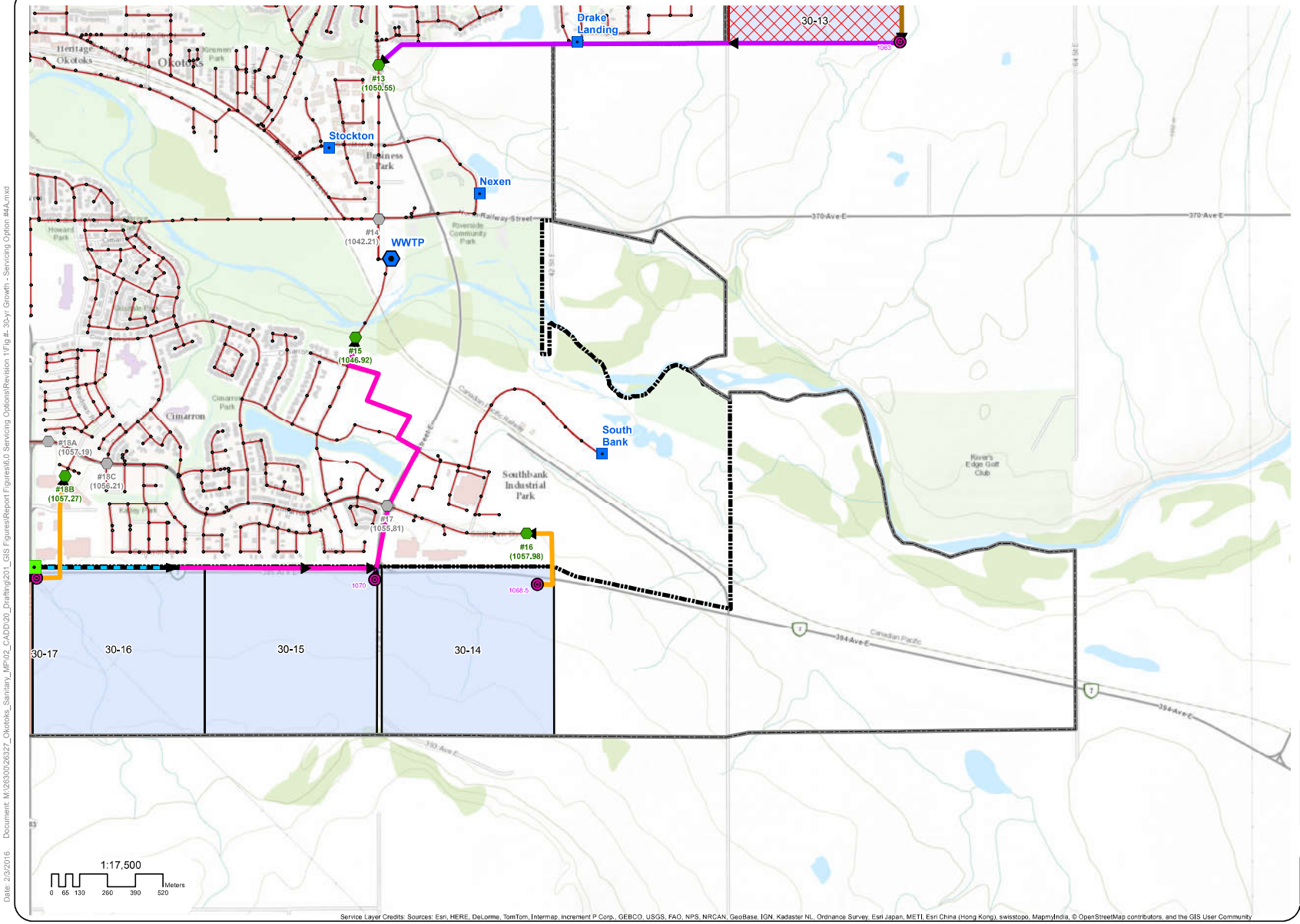
FIGURE 7.21



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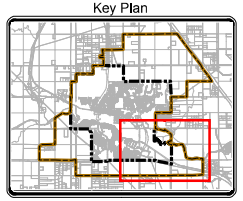
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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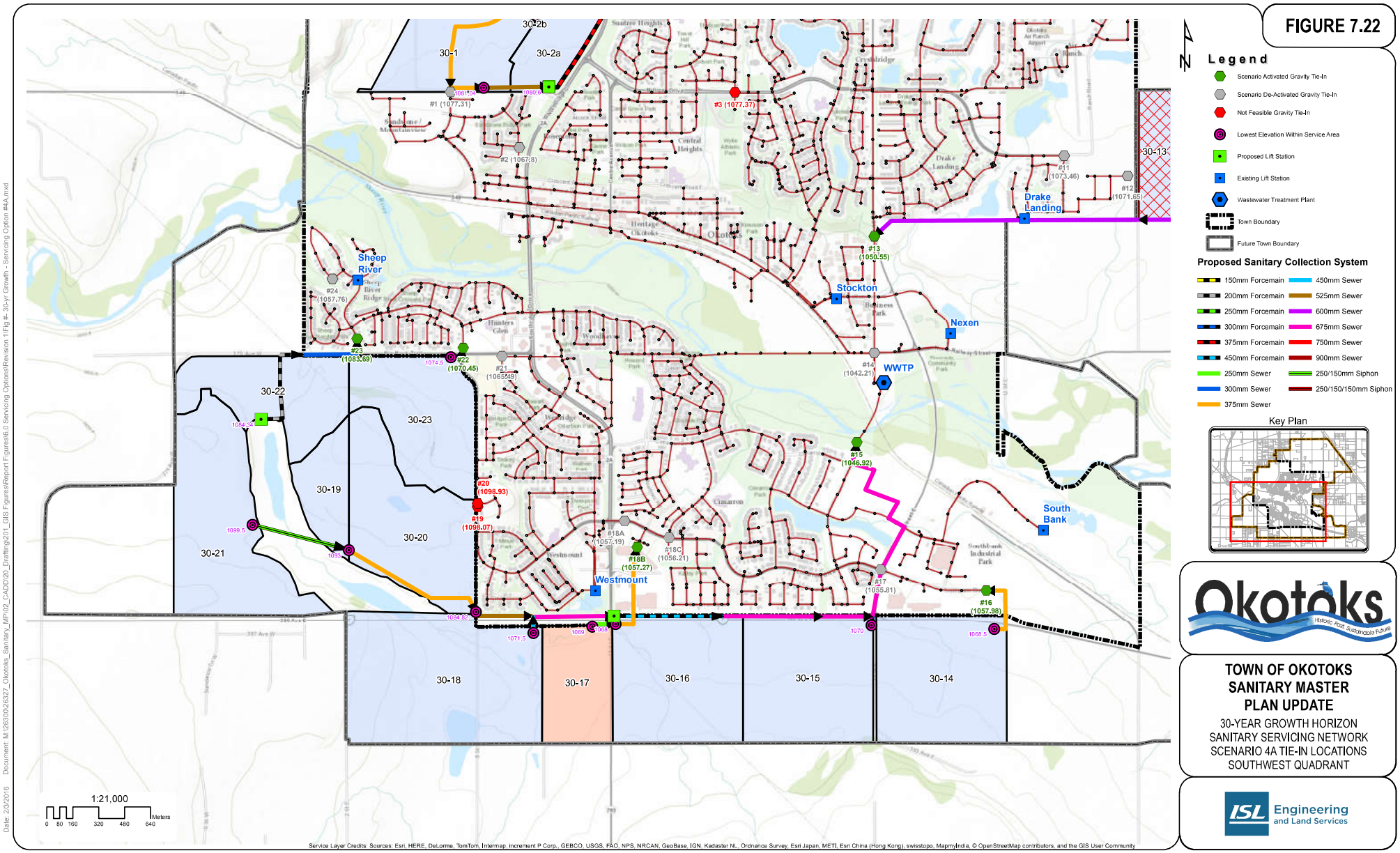

FIGURE 7.22

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
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- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

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- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan

Okotoks
Historic Past, Sustainable Future

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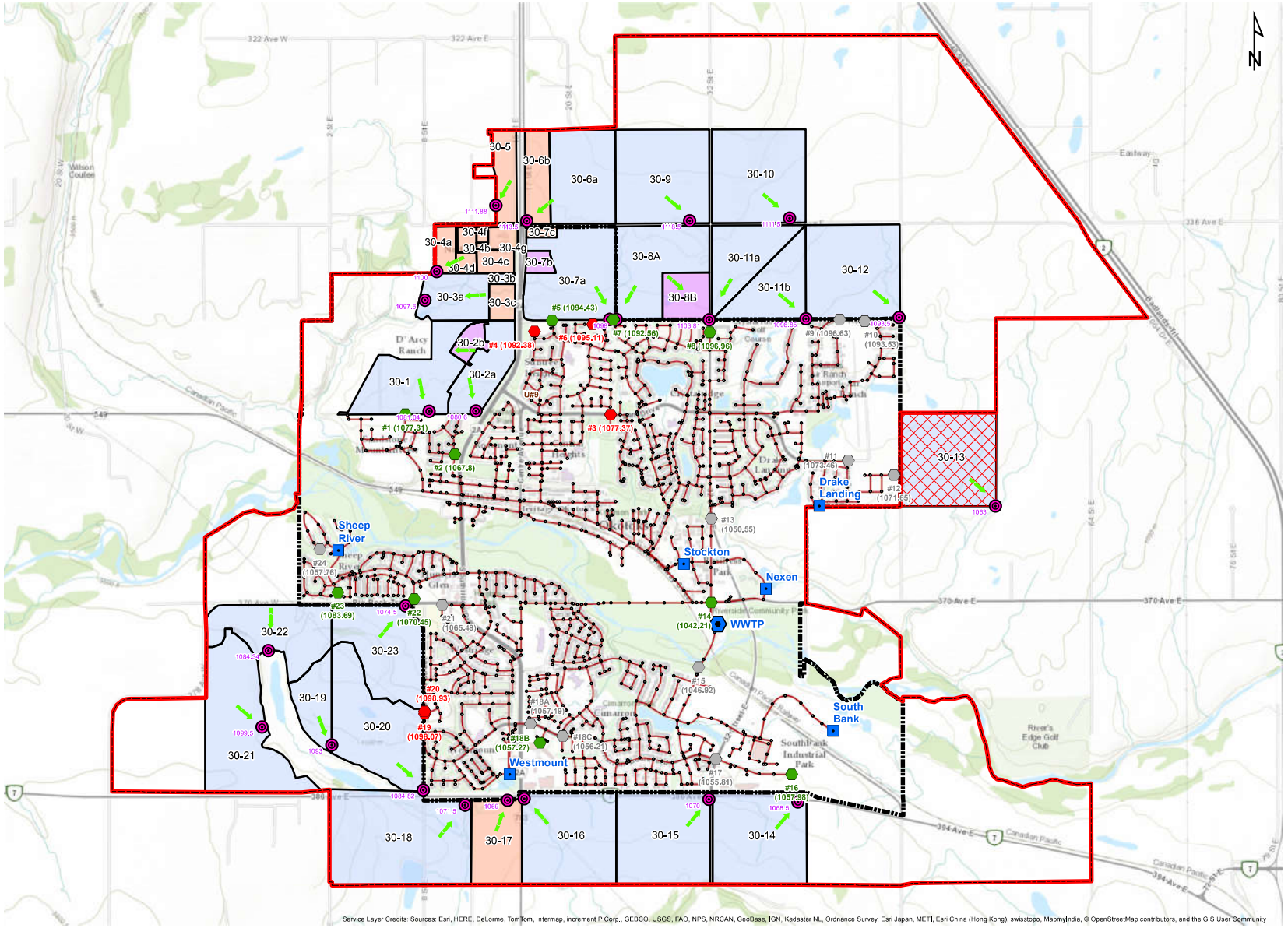

FIGURE 7.23

Okotoks
Historic Past, Sustainable Future

TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

30-YEAR GROWTH HORIZON
SANITARY SERVICING NETWORK
SCENARIO 1B TIE-IN LOCATIONS

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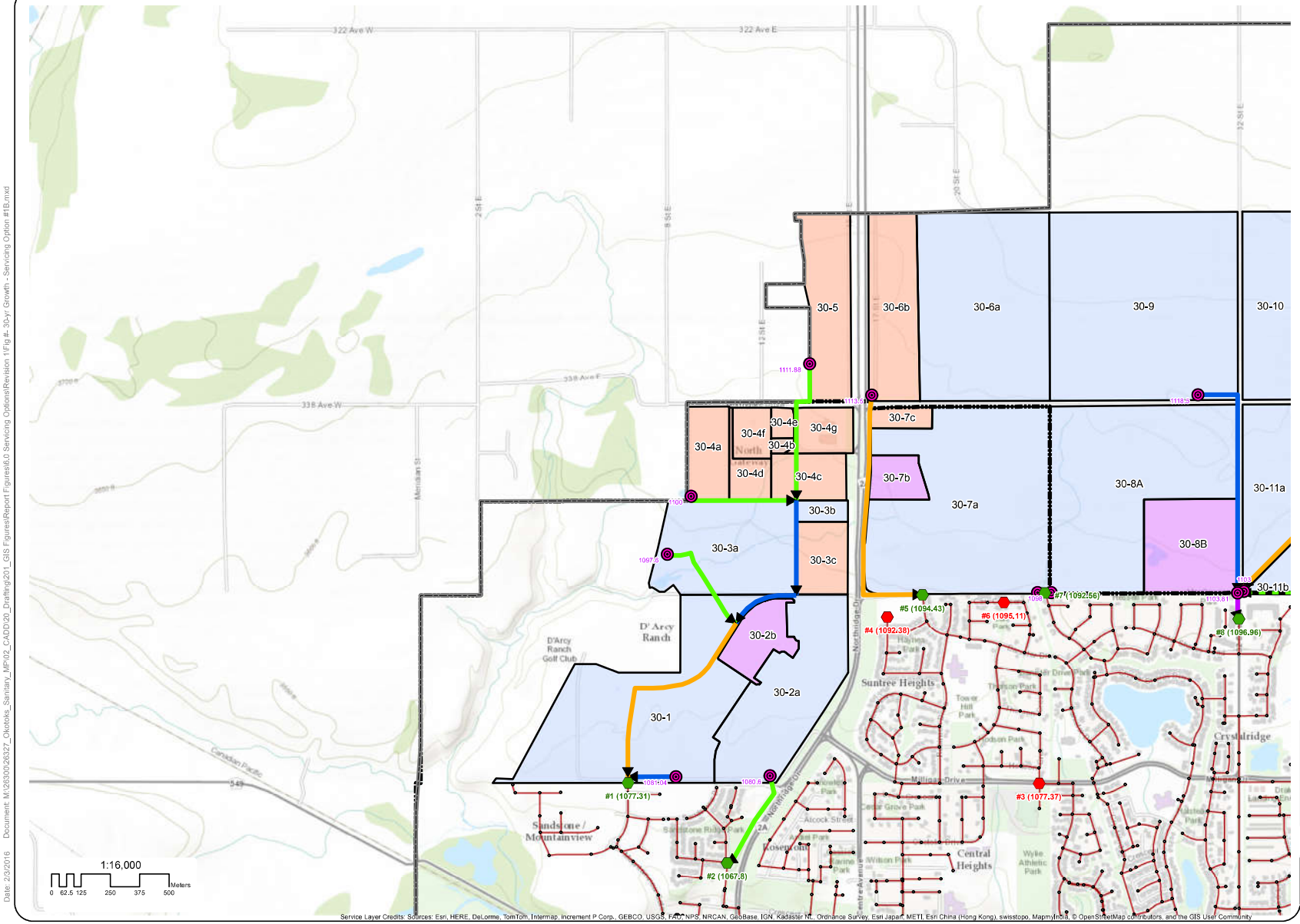
FIGURE 7.24



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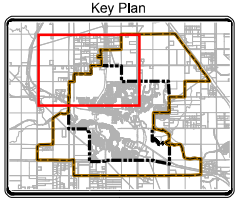
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon
375mm Sewer	400mm Siphon

Key Plan



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NORTHWEST QUADRANT

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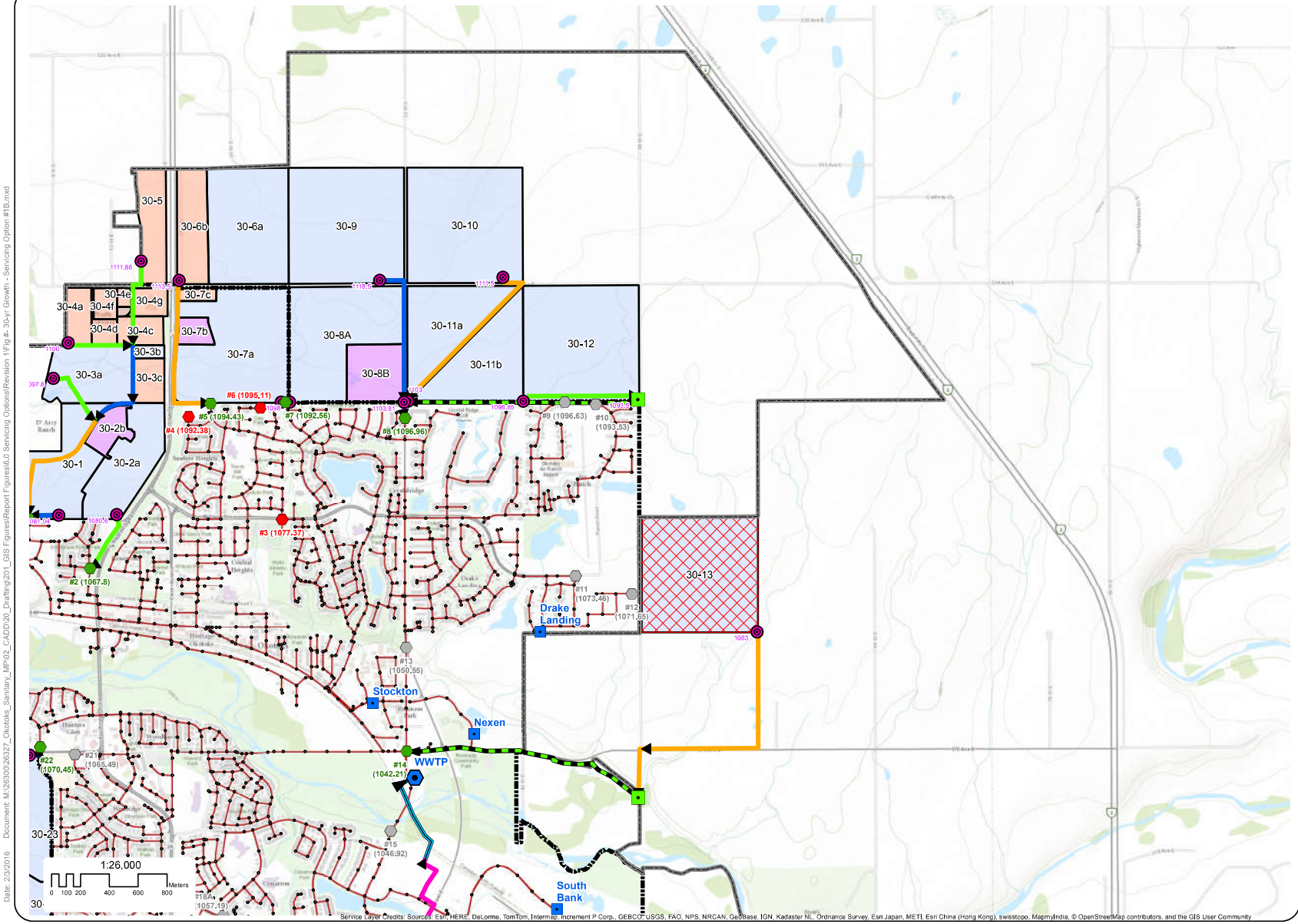
FIGURE 7.25



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N

Legend

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- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
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- Proposed Lift Station
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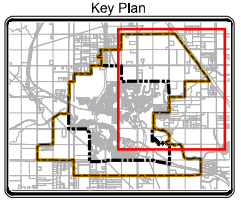
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon
375mm Sewer	400mm Siphon

Key Plan



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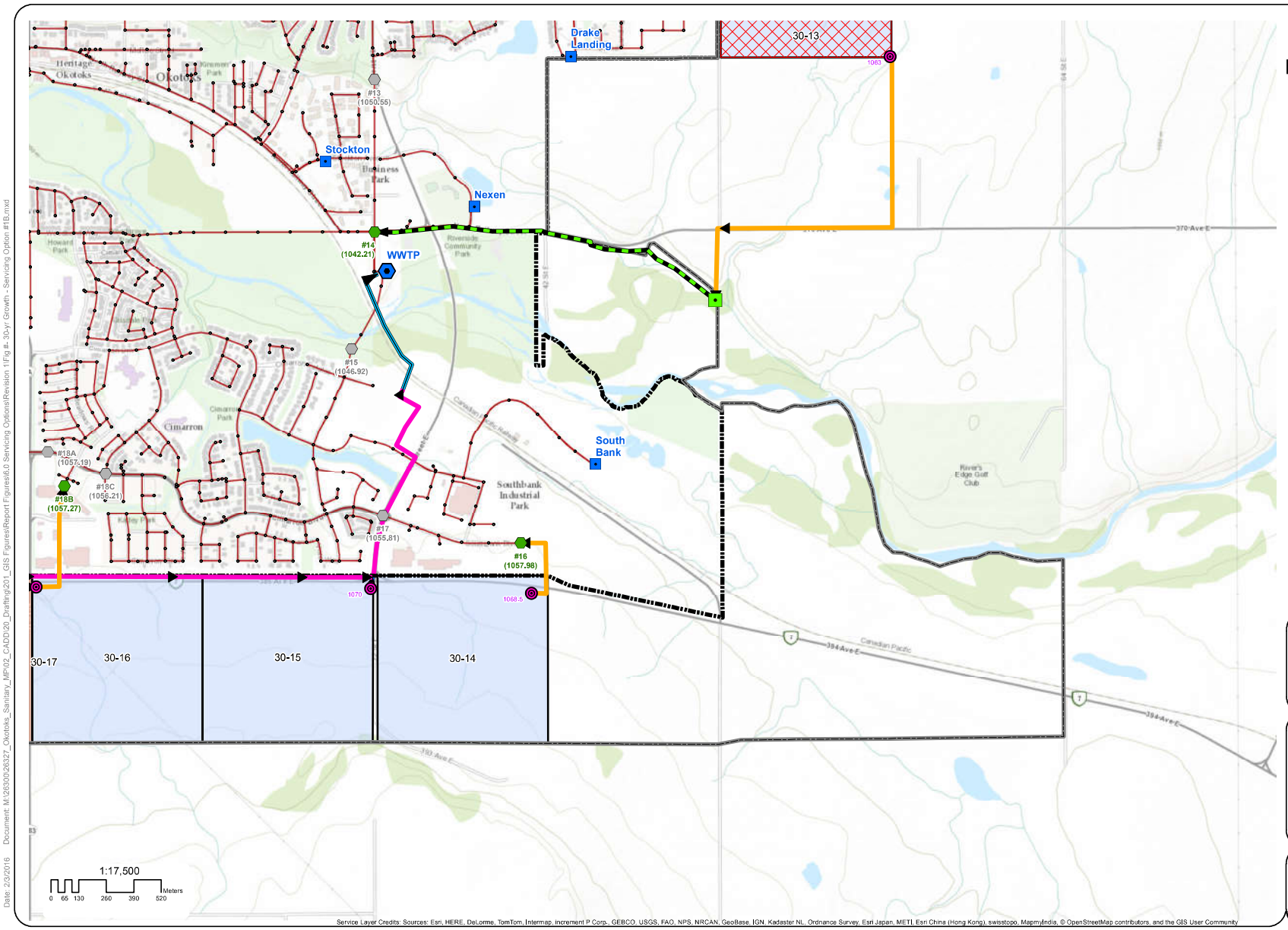


FIGURE 7.26

N

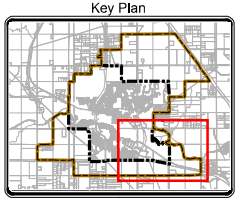
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon
375mm Sewer	400mm Siphon

Key Plan



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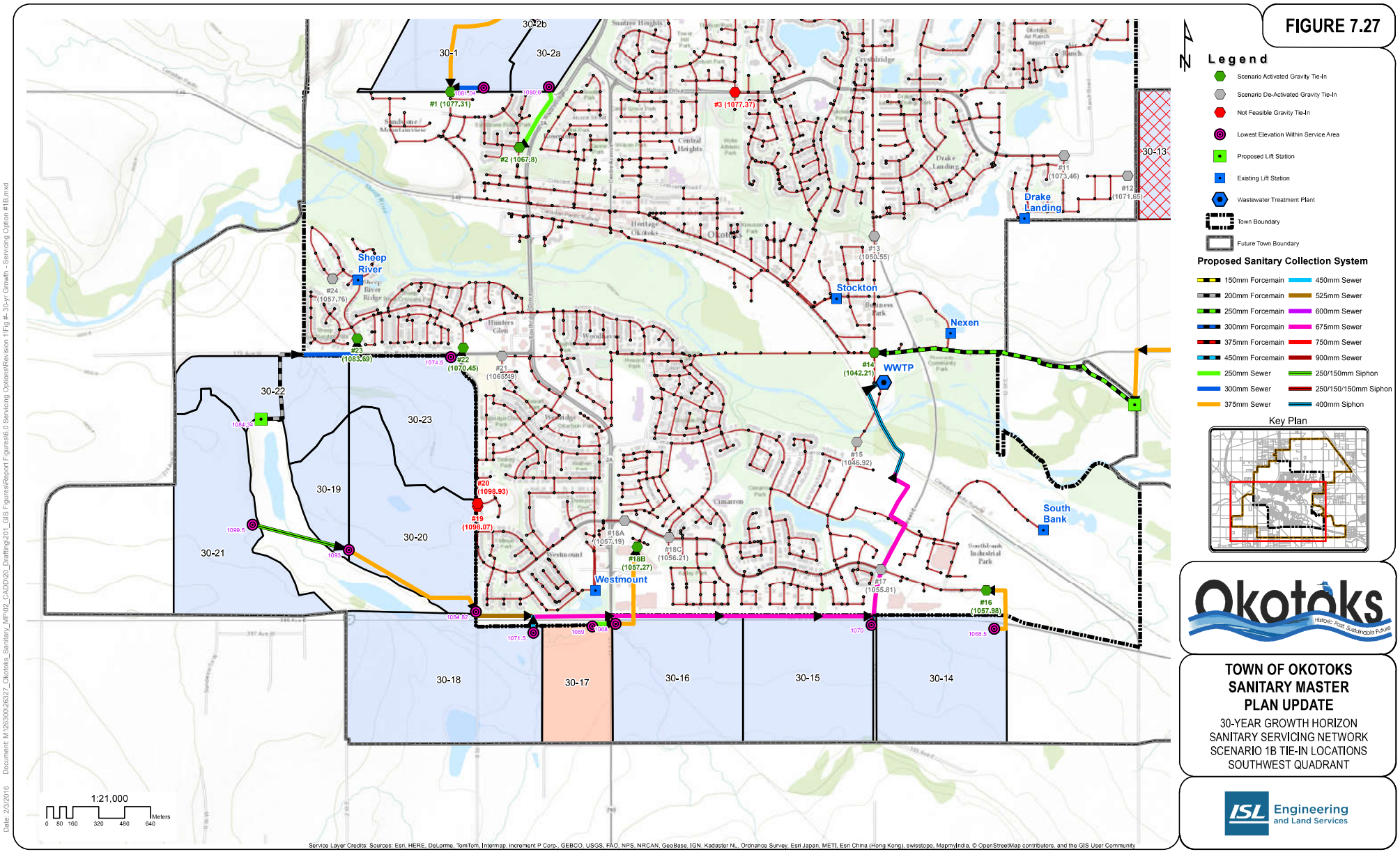

FIGURE 7.27

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon
- 400mm Siphon

Key Plan

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SCENARIO 1B TIE-IN LOCATIONS
SOUTHWEST QUADRANT

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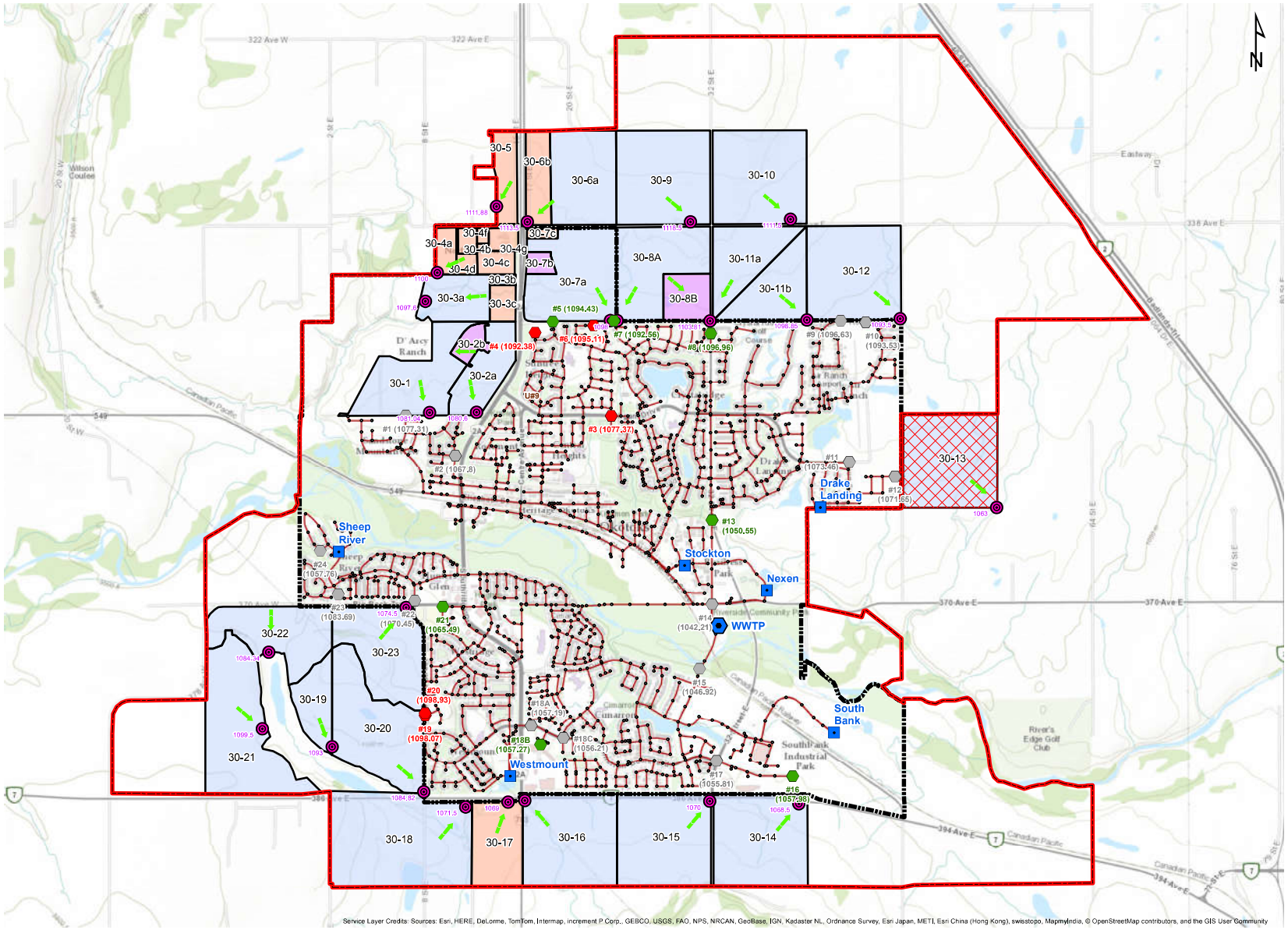

FIGURE 7.28

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

Okotoks — Historic Past, Sustainable Future

TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

30-YEAR GROWTH HORIZON
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SCENARIO 2B TIE-IN LOCATIONS

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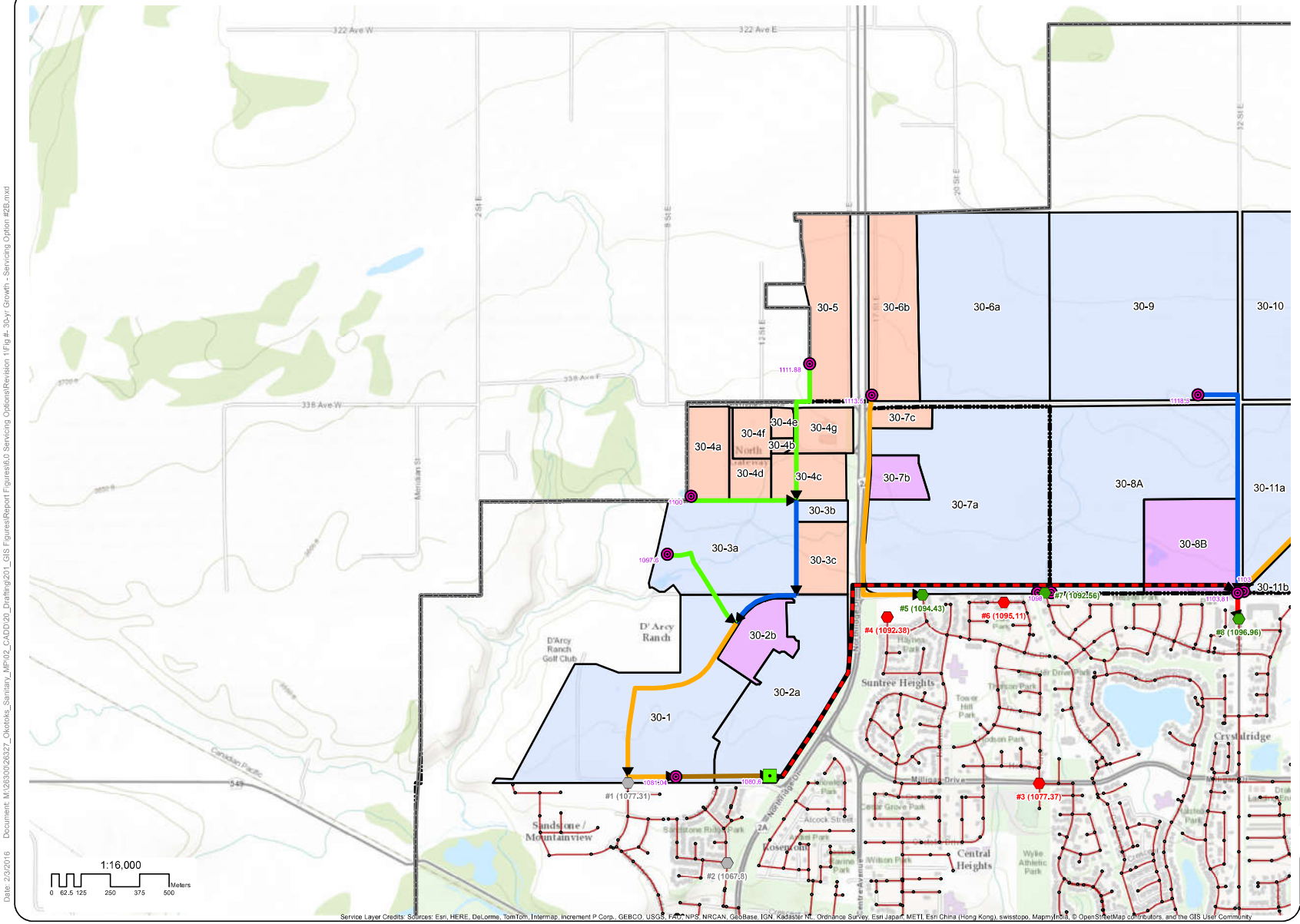
FIGURE 7.29



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N

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon
375mm Sewer	400mm Siphon

Key Plan

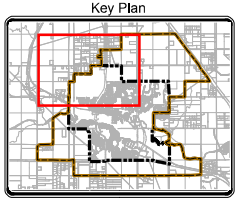

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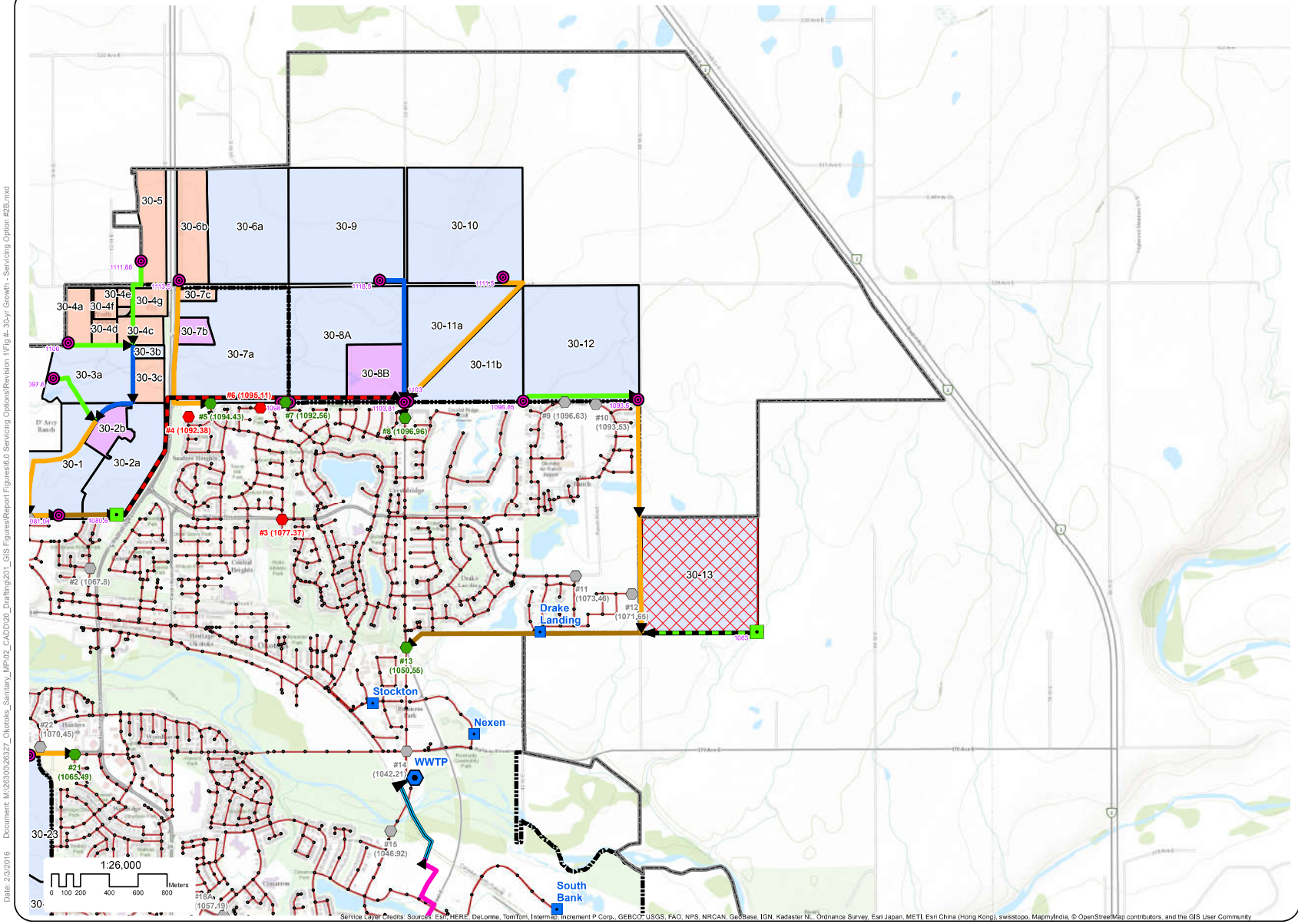
FIGURE 7.30



N

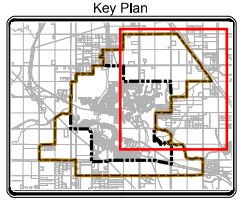
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon
- 400mm Siphon

Key Plan



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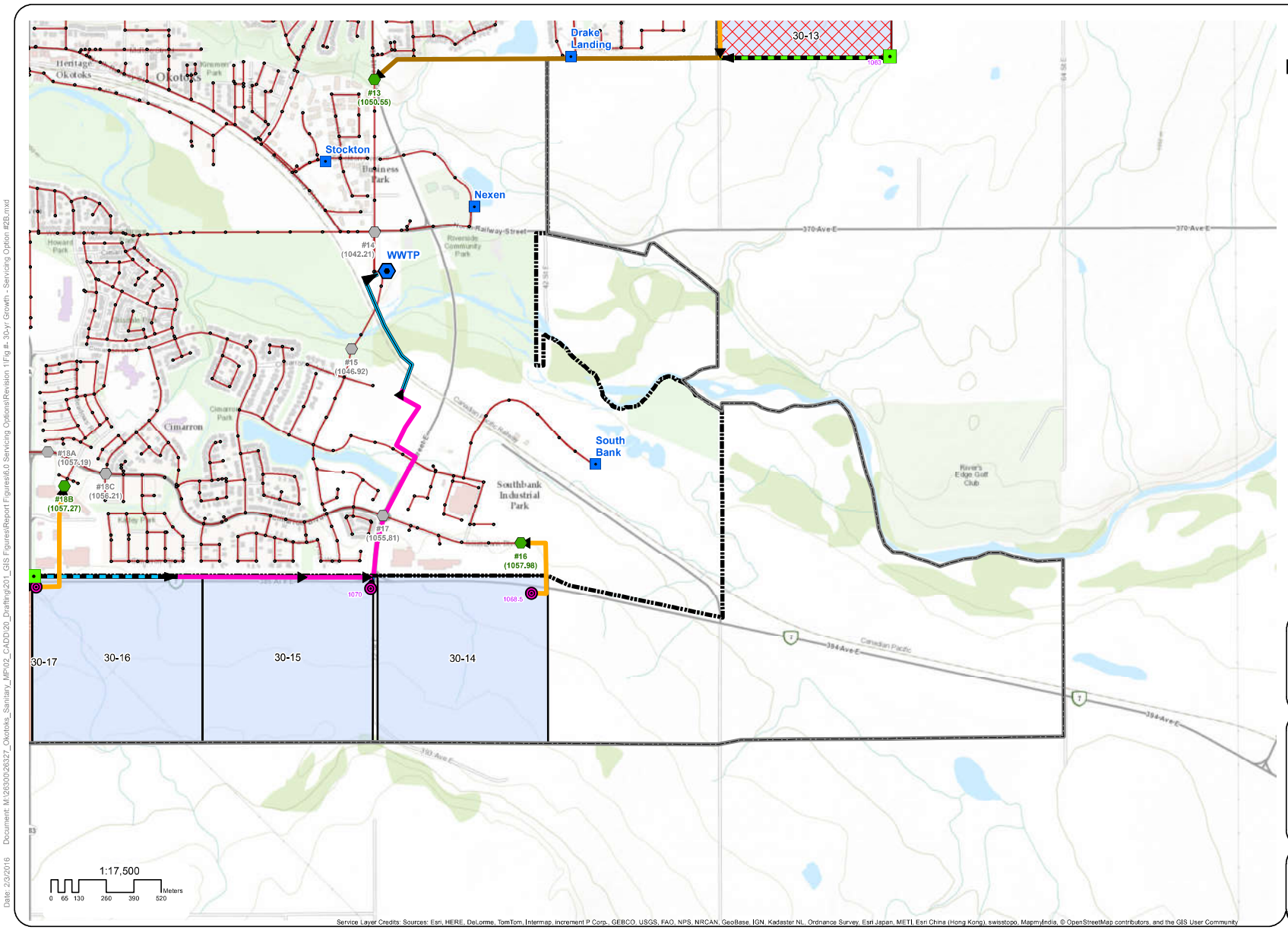

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FIGURE 7.31

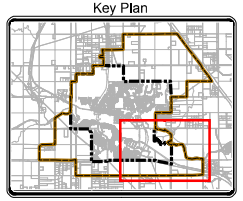
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon
375mm Sewer	400mm Siphon

Key Plan



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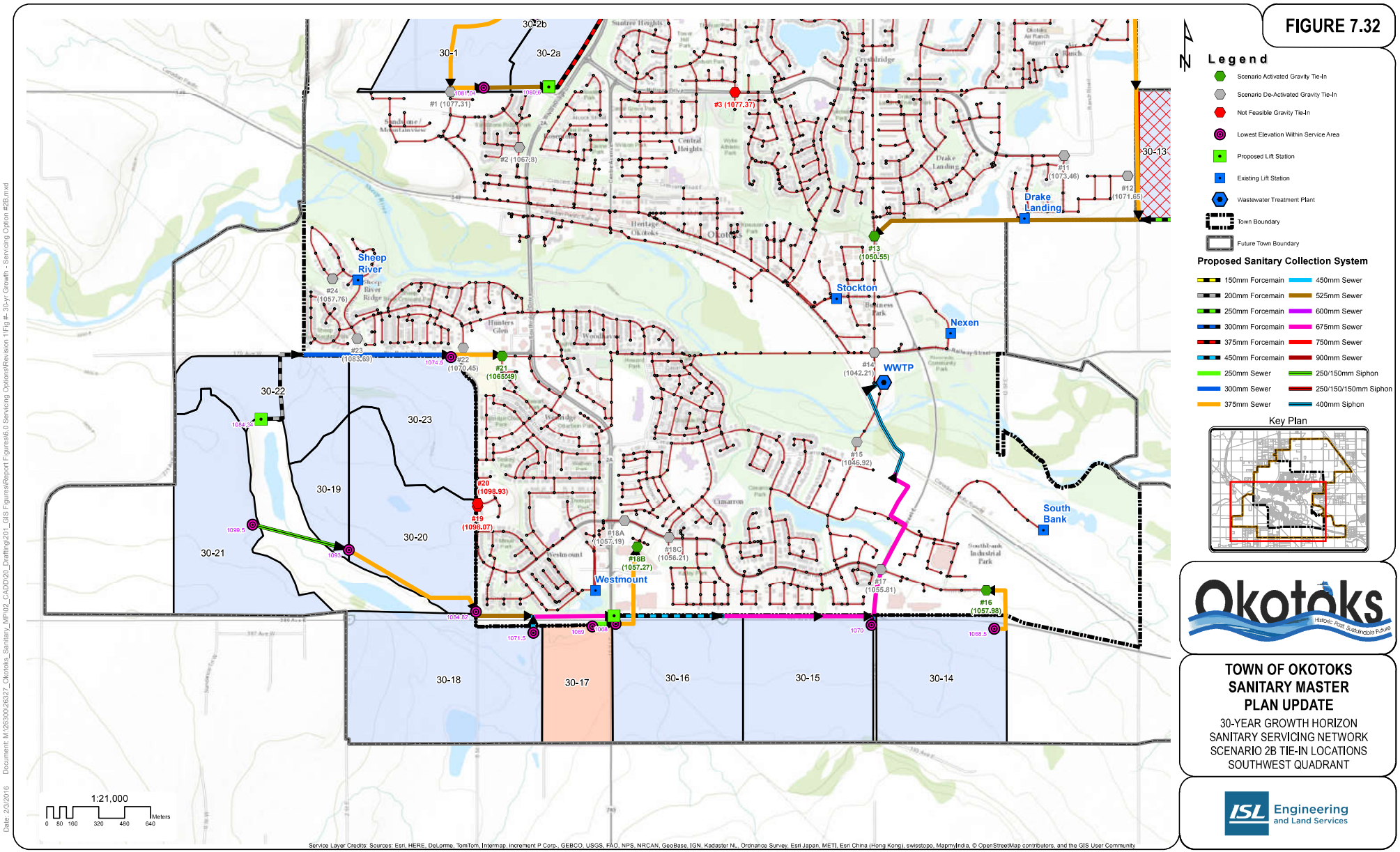

FIGURE 7.32

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon
- 400mm Siphon

Key Plan

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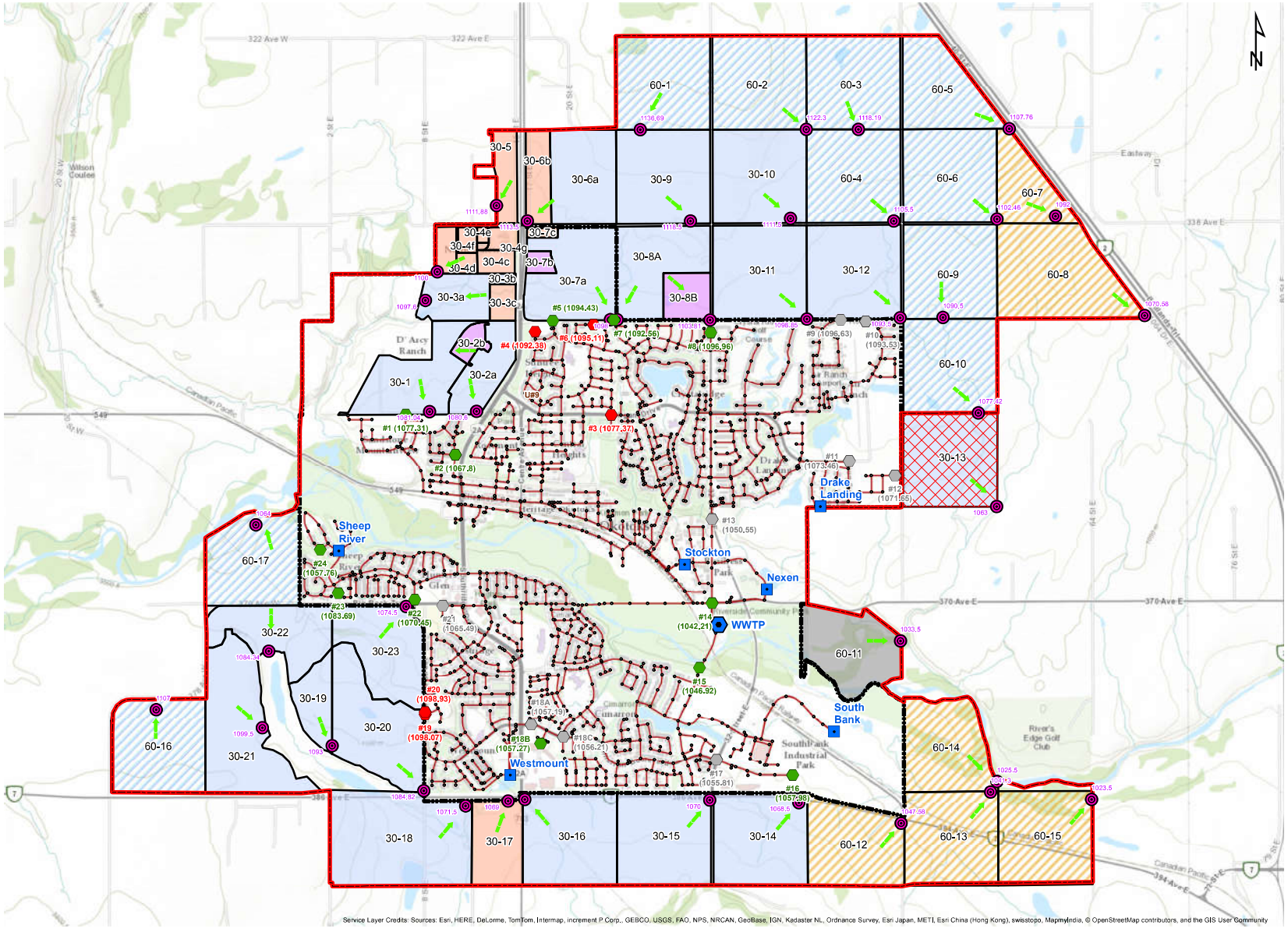

FIGURE 7.33

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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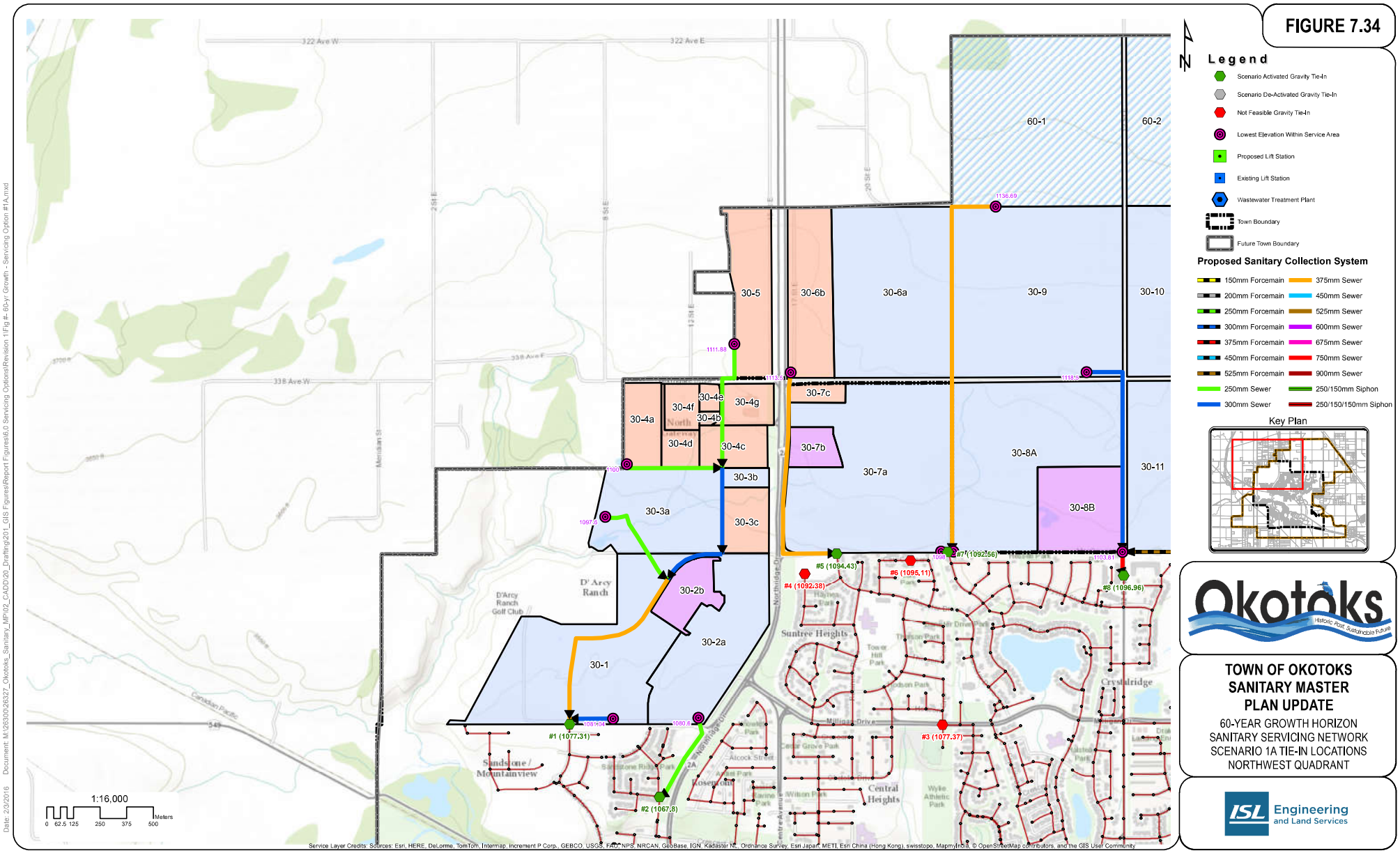

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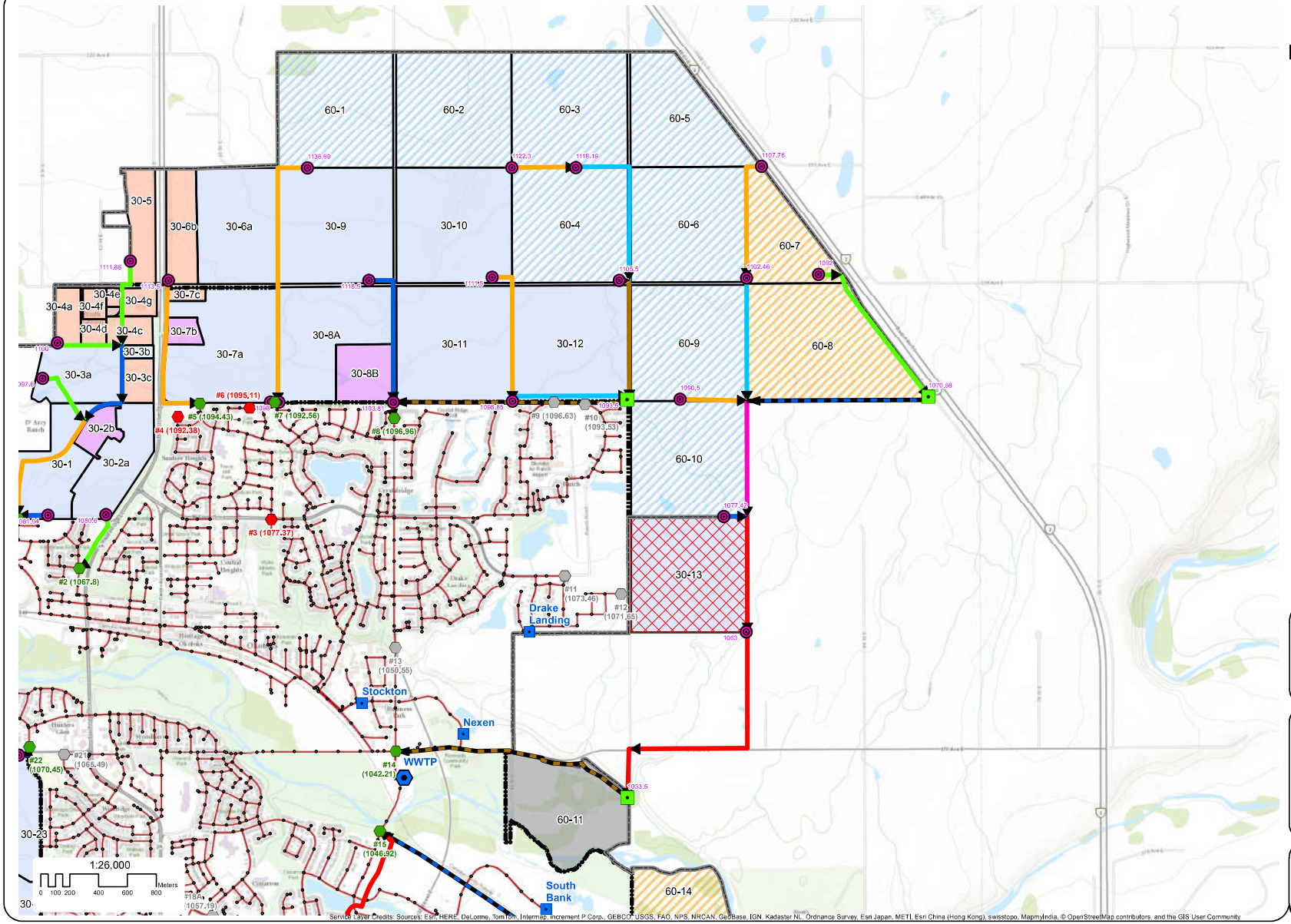
FIGURE 7.35



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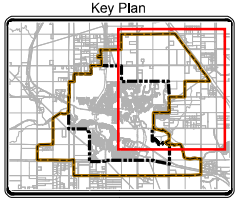
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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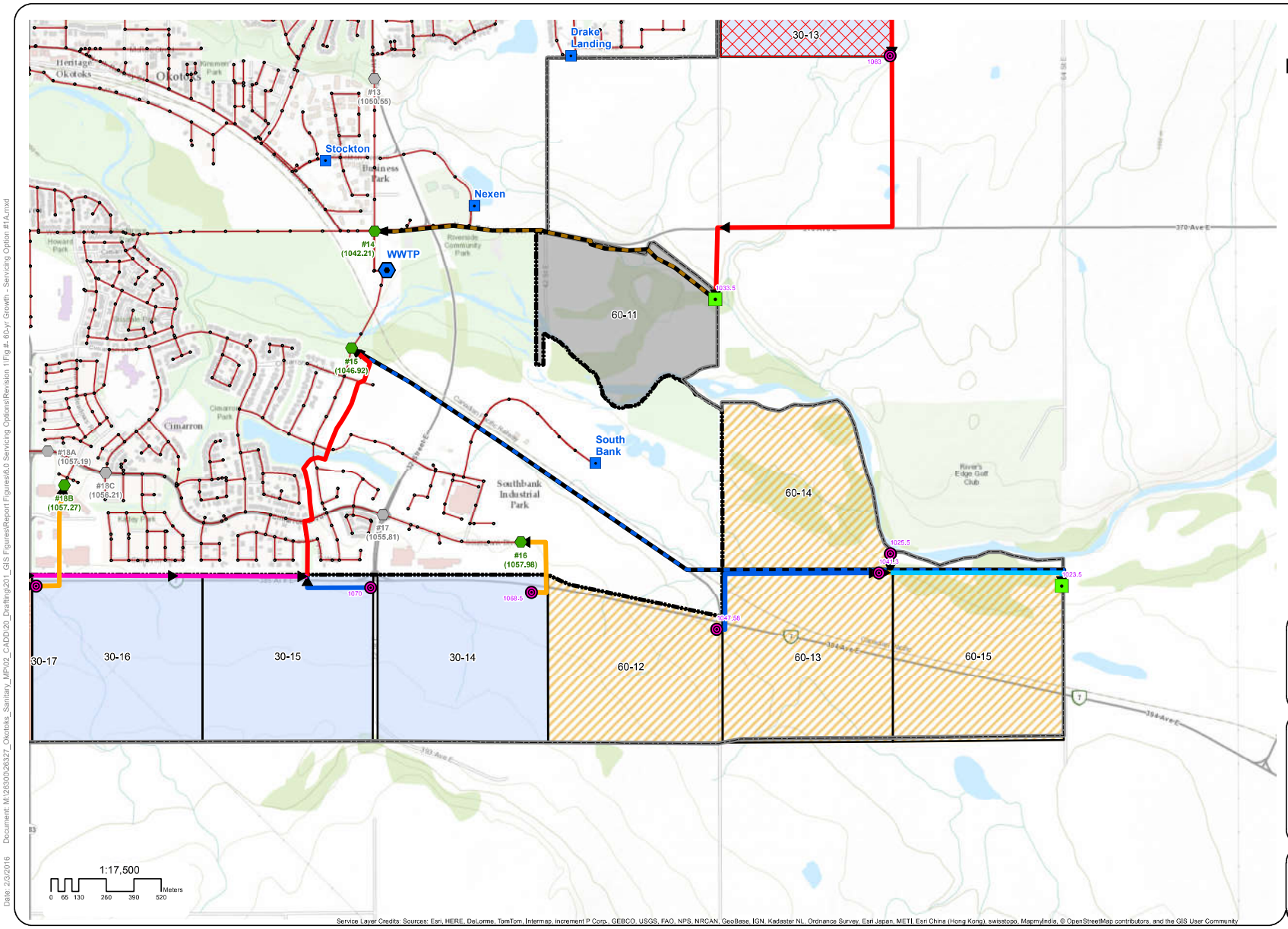


FIGURE 7.36

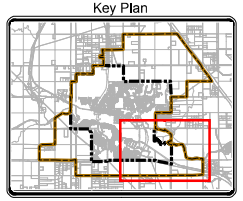
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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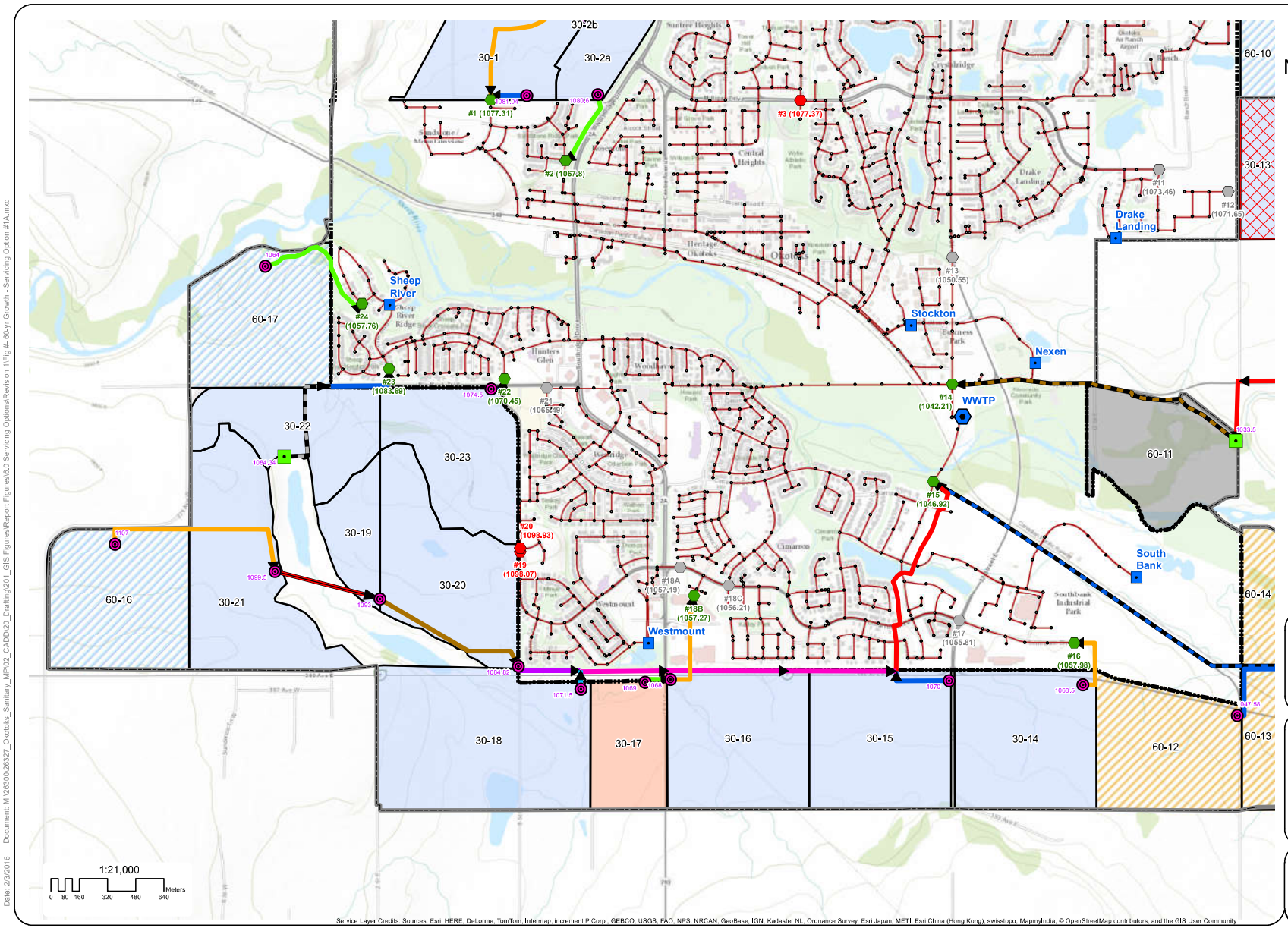


FIGURE 7.37

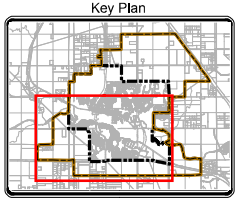
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	375mm Sewer
200mm Forcemain	450mm Sewer
250mm Forcemain	525mm Sewer
300mm Forcemain	600mm Sewer
375mm Forcemain	675mm Sewer
450mm Forcemain	750mm Sewer
525mm Forcemain	900mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon

Key Plan



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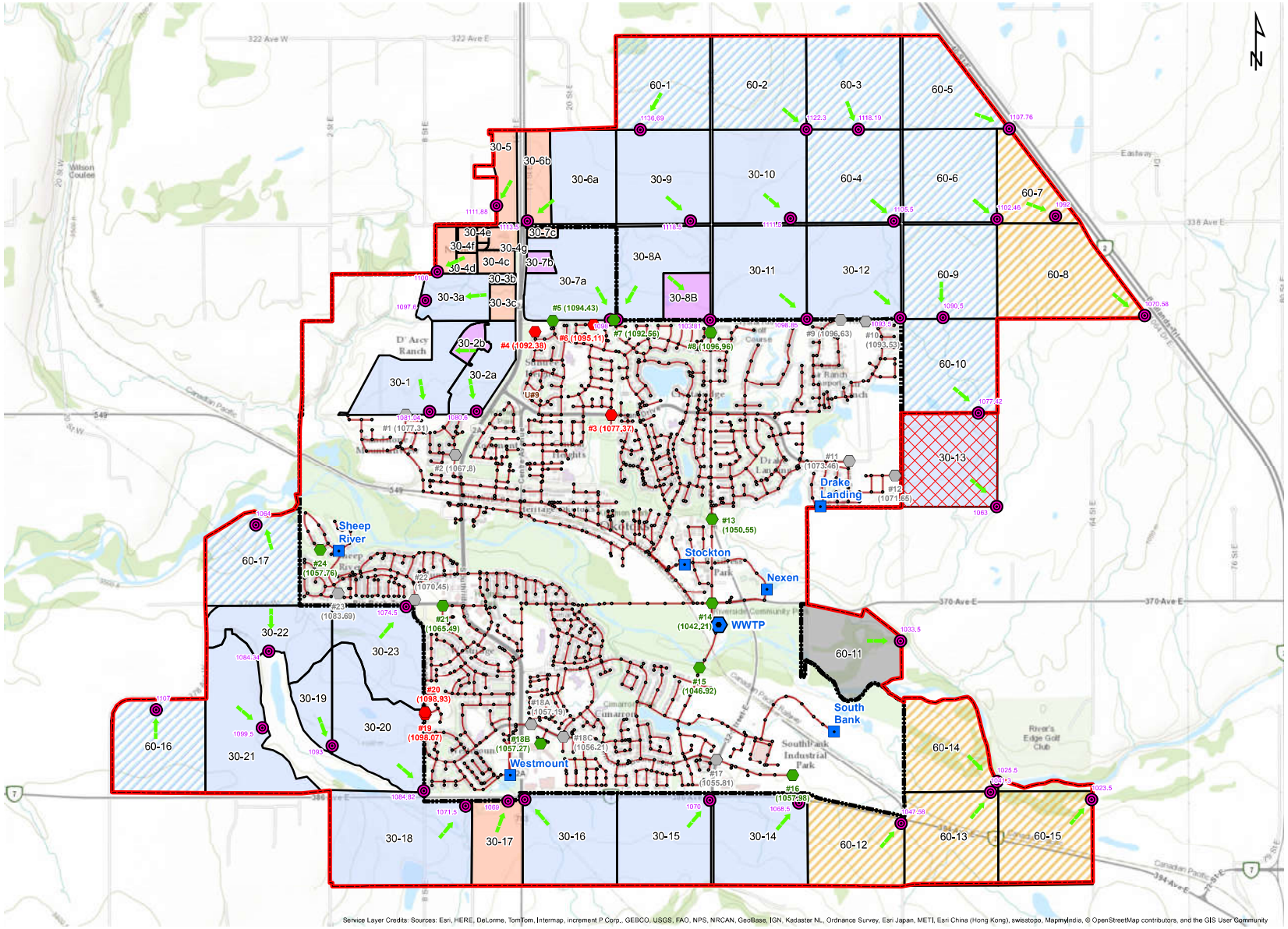

FIGURE 7.38

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
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- Residential, 2073
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- Future Town Boundary
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1:32,500

0 200 400 800 1,200 1,600 Meters

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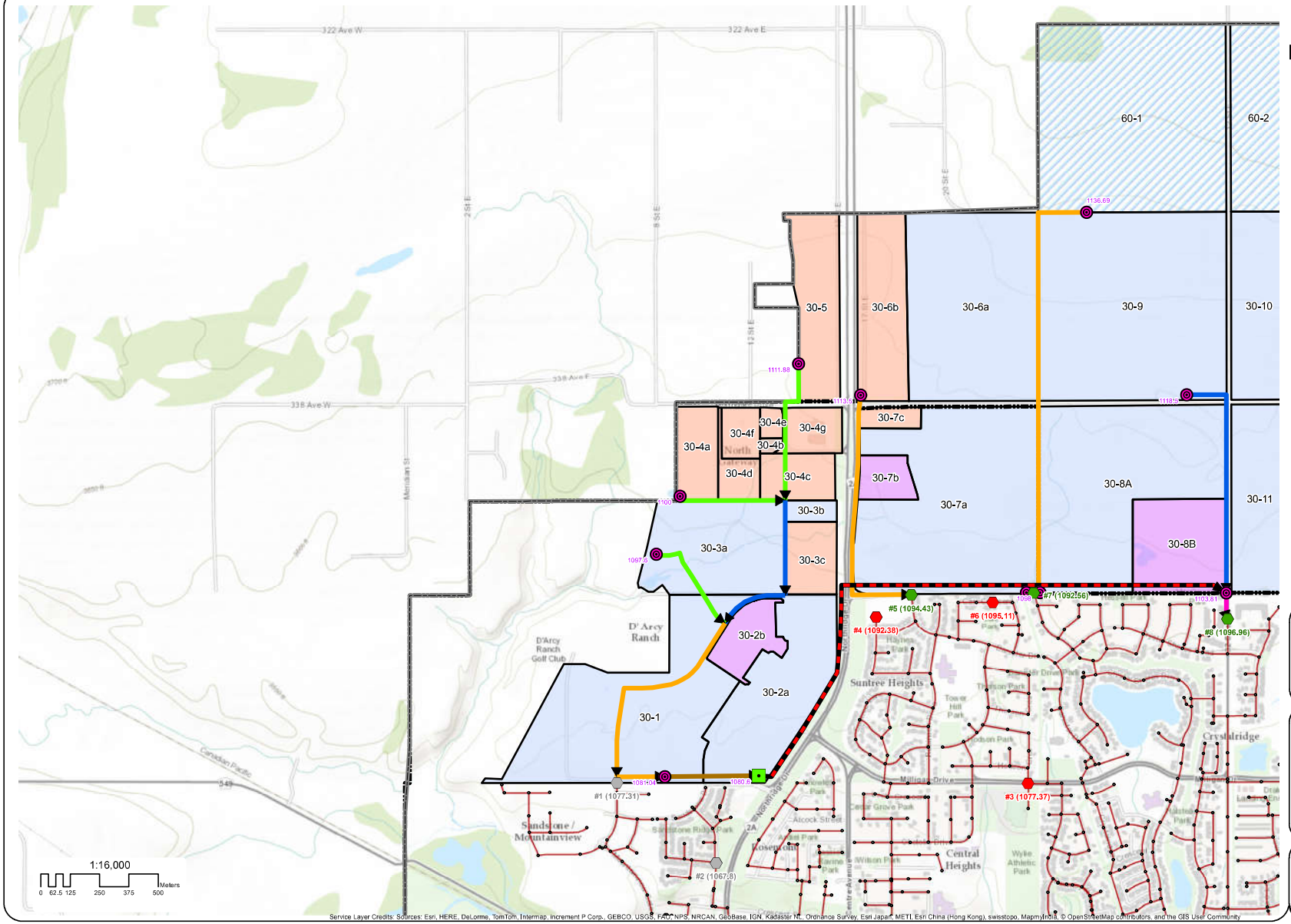
FIGURE 7.39



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N

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
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- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
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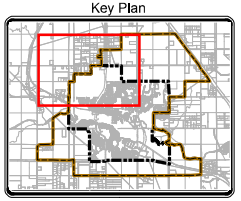
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 675mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 1050mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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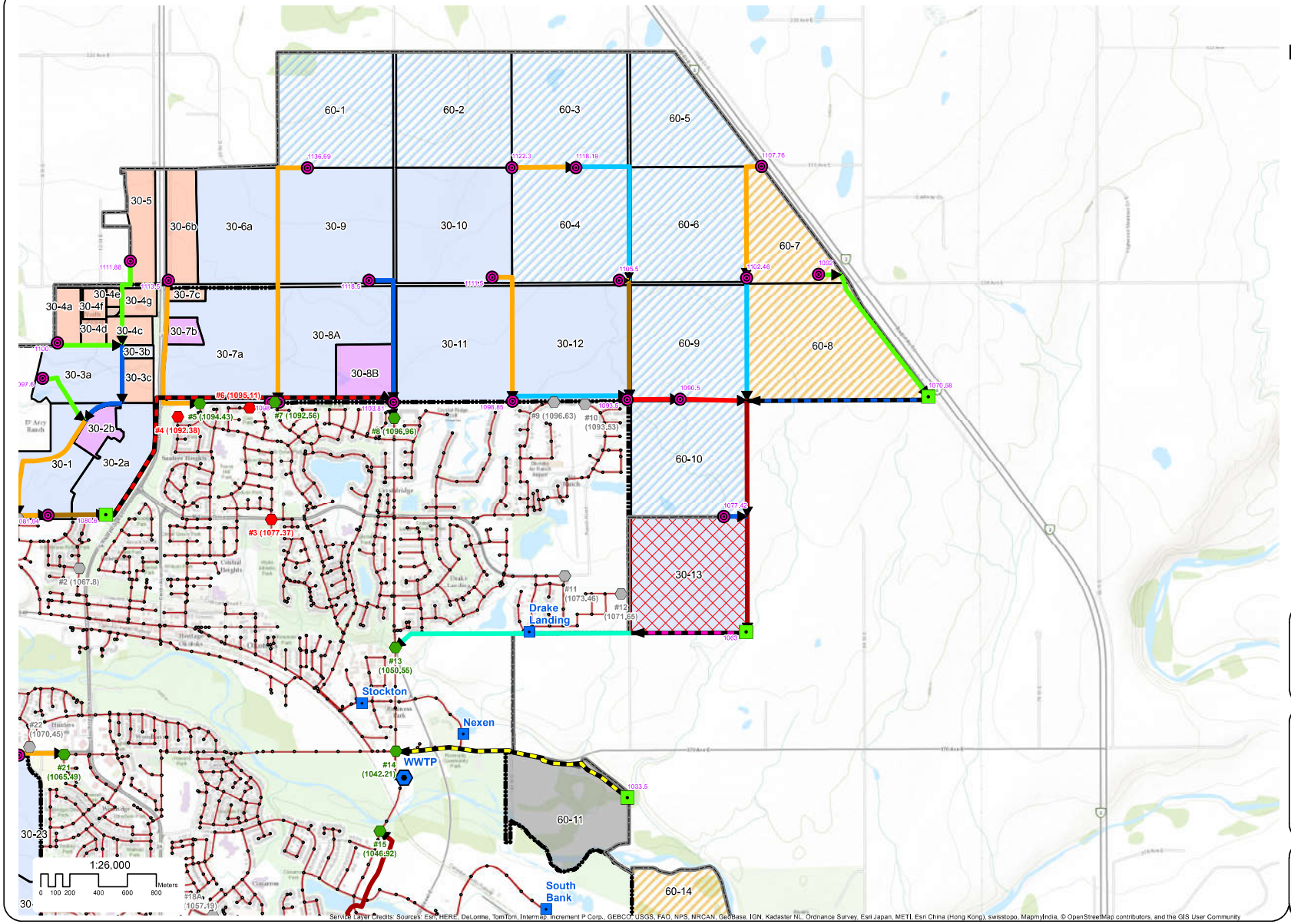

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FIGURE 7.40

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
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- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	375mm Sewer
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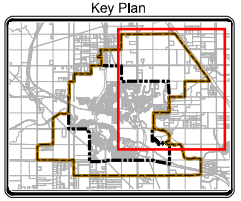
250mm Forcemain	525mm Sewer
300mm Forcemain	600mm Sewer
375mm Forcemain	675mm Sewer
450mm Forcemain	750mm Sewer
525mm Forcemain	900mm Sewer
675mm Forcemain	1050mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon

Key Plan



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SCENARIO 2A TIE-IN LOCATIONS
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ISL Engineering and Land Services

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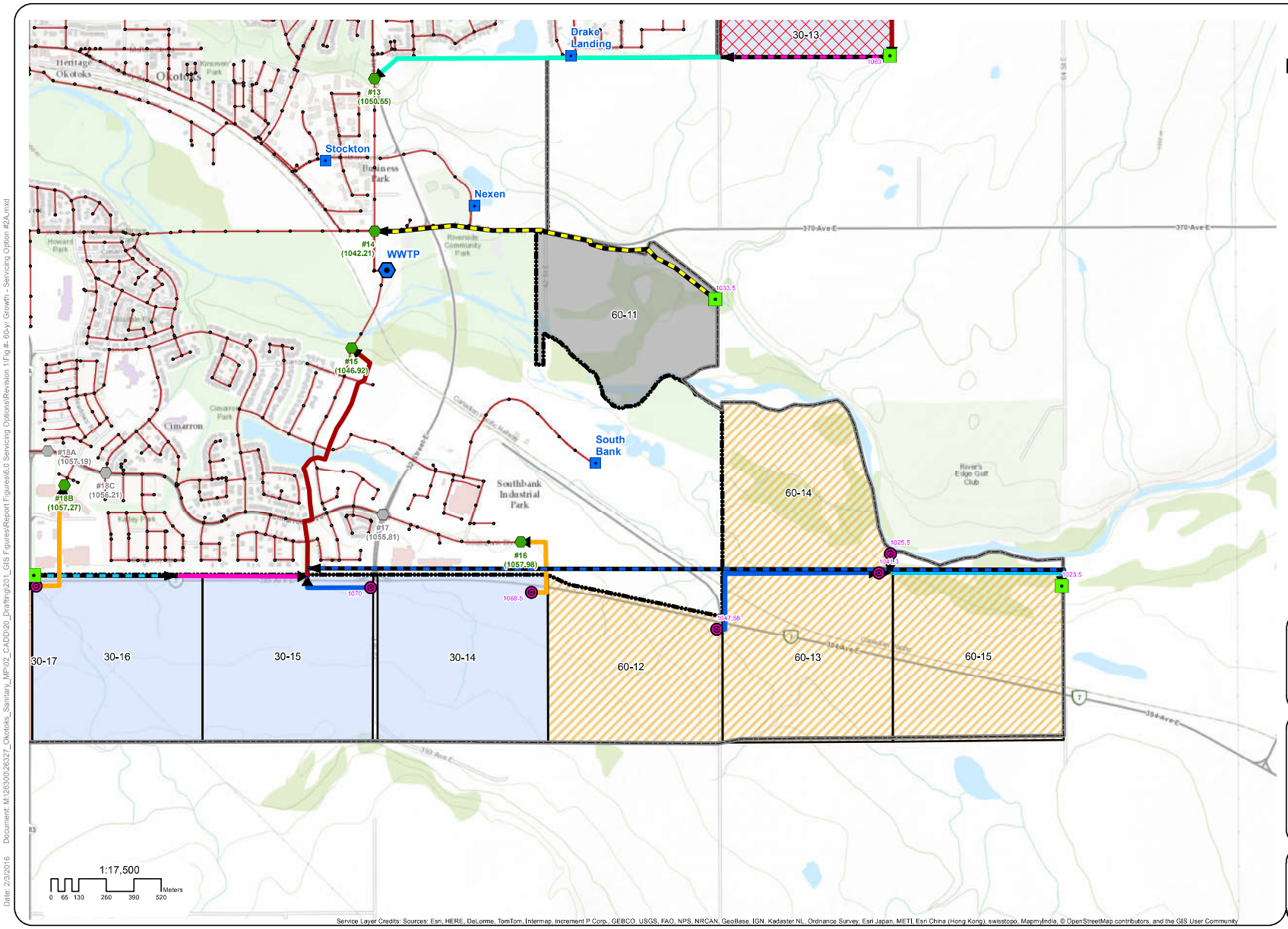


FIGURE 7.41

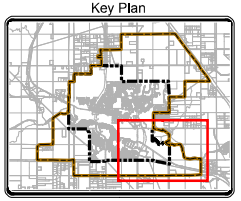
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	375mm Sewer
200mm Forcemain	450mm Sewer
250mm Forcemain	525mm Sewer
300mm Forcemain	600mm Sewer
375mm Forcemain	675mm Sewer
450mm Forcemain	750mm Sewer
525mm Forcemain	900mm Sewer
675mm Forcemain	1050mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon

Key Plan



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SCENARIO 2A TIE-IN LOCATIONS
SOUTHEAST QUADRANT

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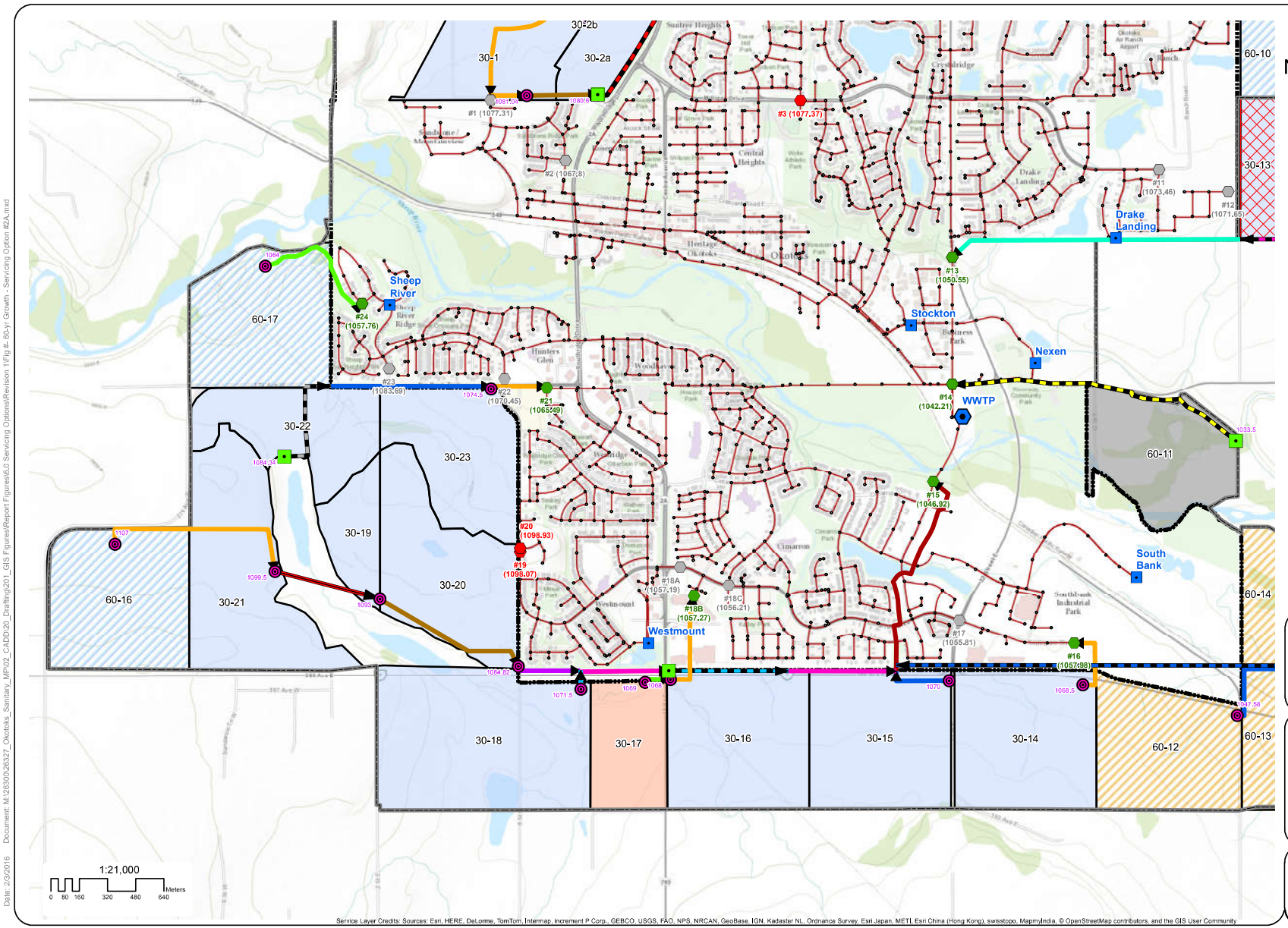

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FIGURE 7.42

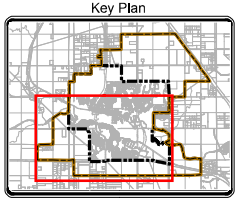
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 675mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 1050mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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SANITARY SERVICING NETWORK
SCENARIO 2A TIE-IN LOCATIONS
SOUTHWEST QUADRANT

ISL Engineering and Land Services

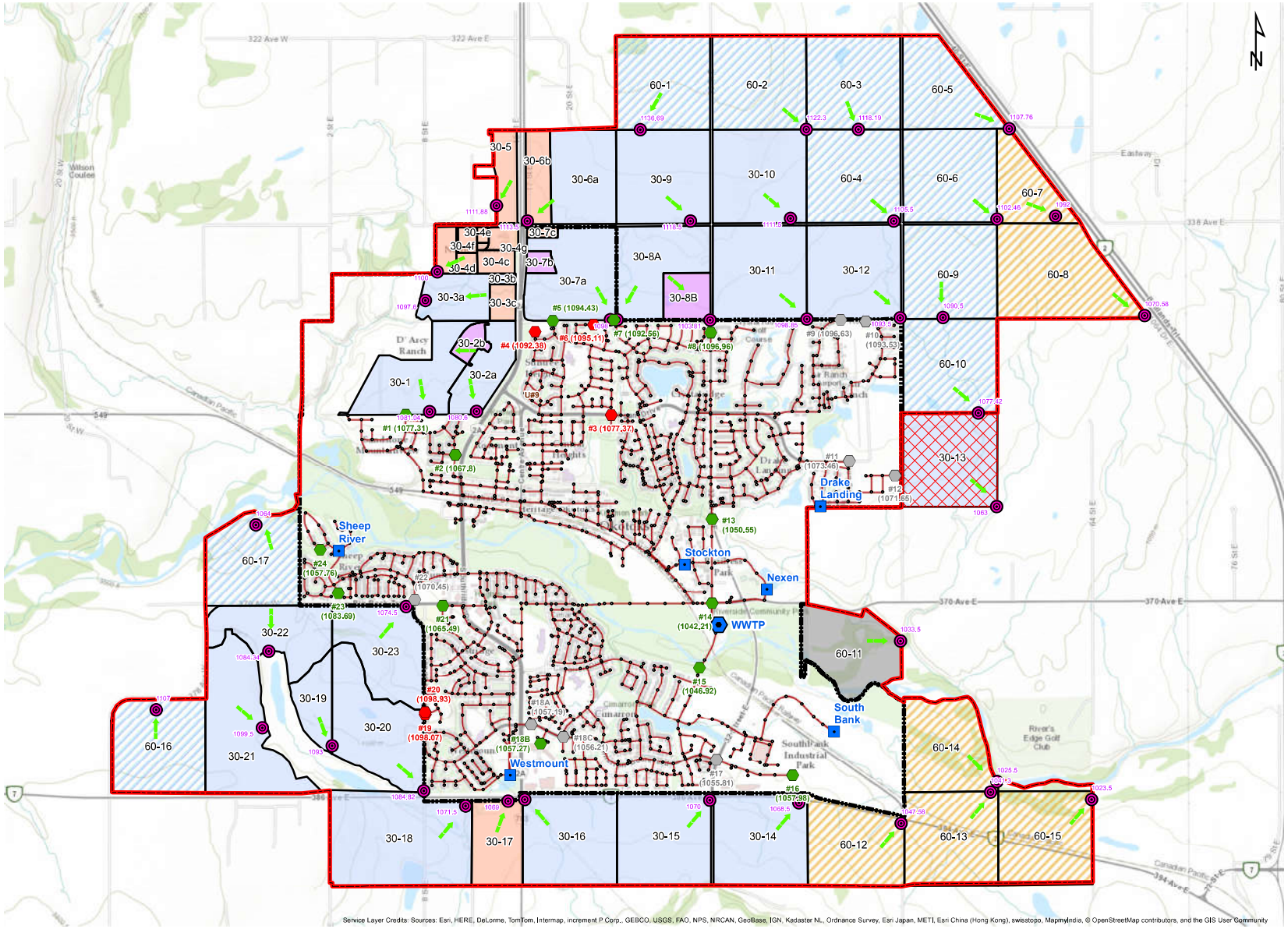

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FIGURE 7.43

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

Okotoks
Historic Past, Sustainable Future

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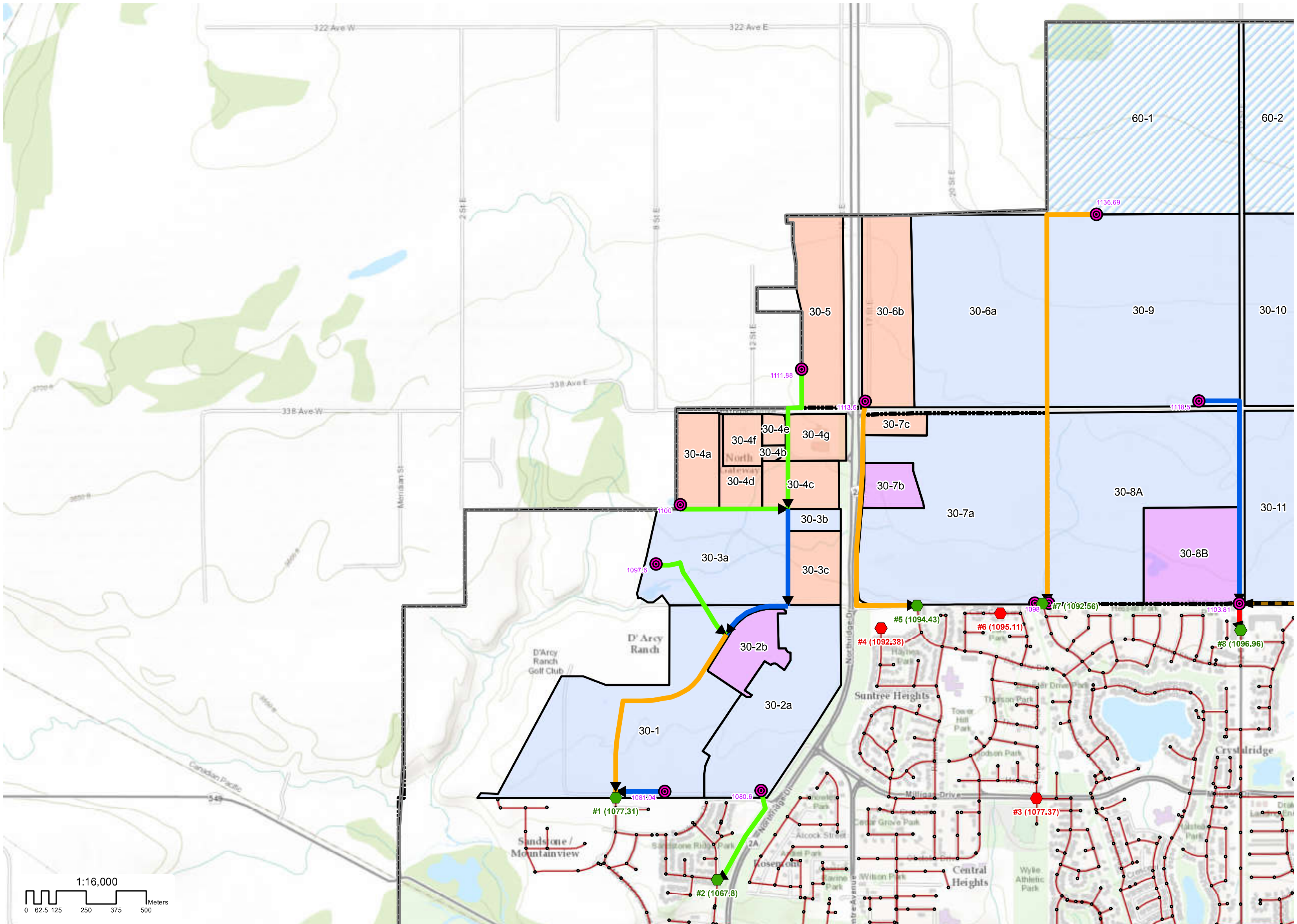
FIGURE 7.44



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	375mm Sewer
200mm Forcemain	450mm Sewer
250mm Forcemain	525mm Sewer
300mm Forcemain	600mm Sewer
375mm Forcemain	675mm Sewer
450mm Forcemain	750mm Sewer
525mm Forcemain	900mm Sewer
675mm Forcemain	1050mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon

Key Plan

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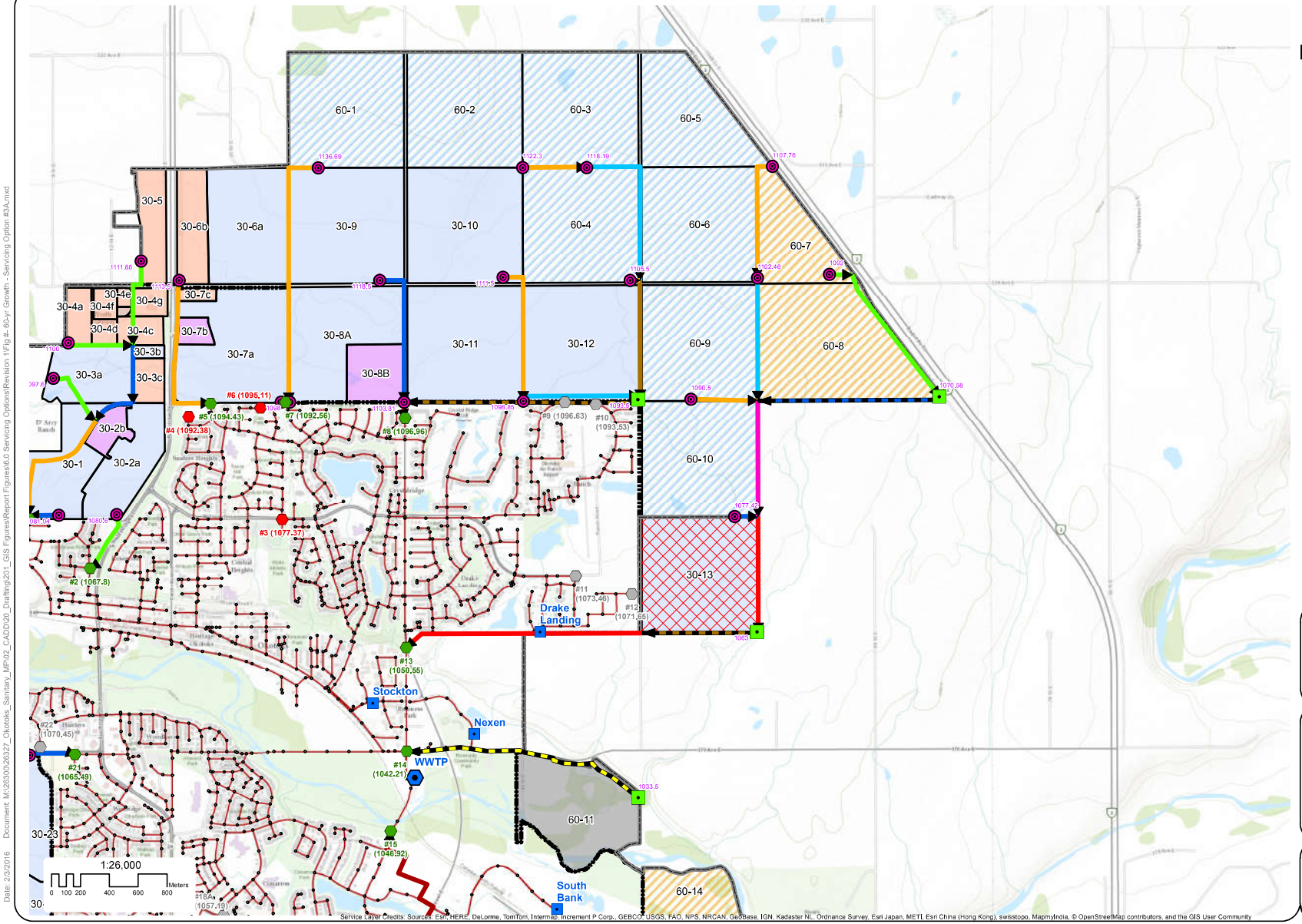
FIGURE 7.45



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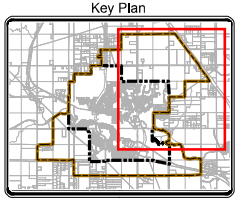
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 675mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 1050mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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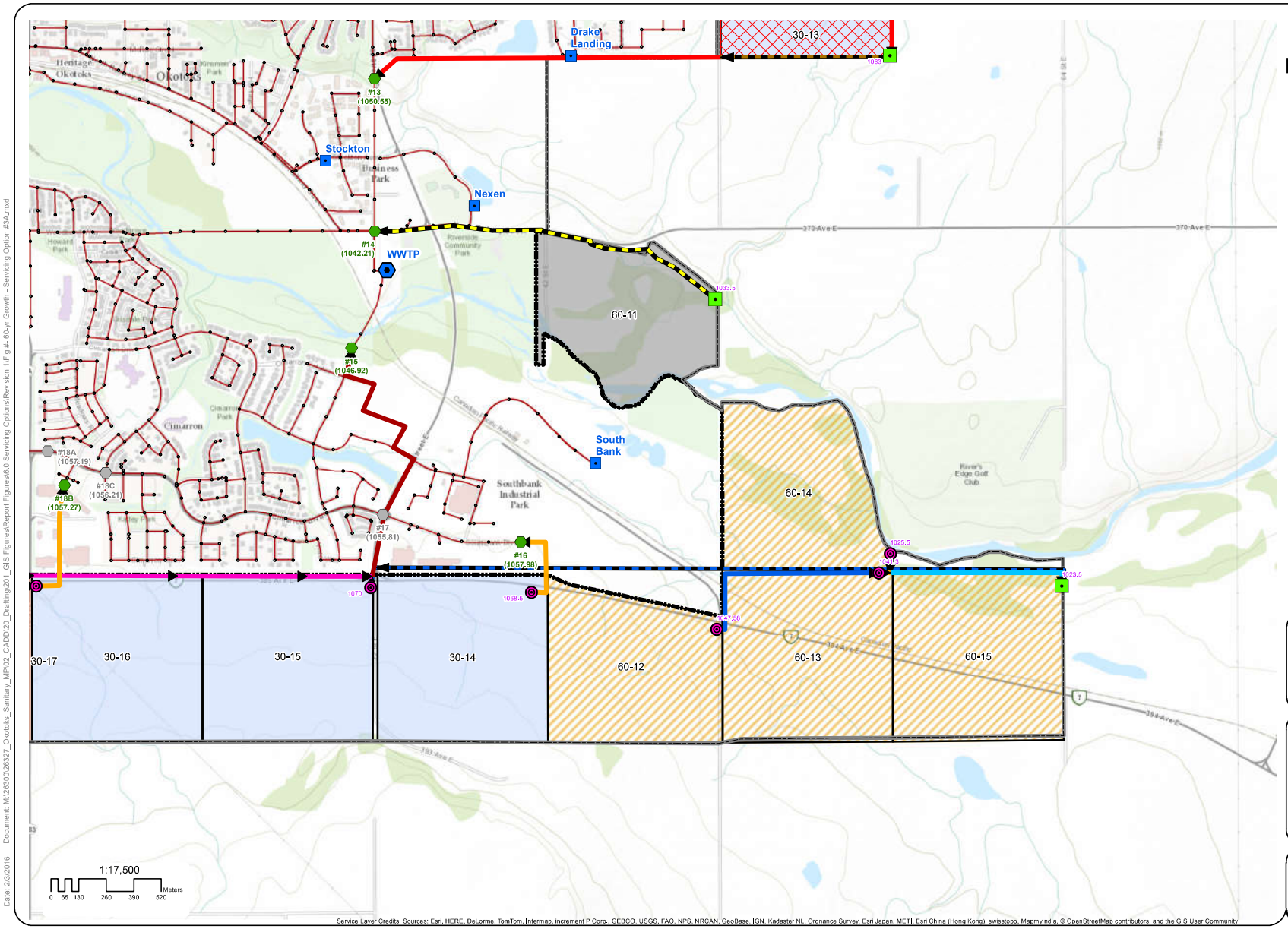


FIGURE 7.46

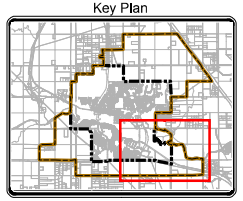
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	375mm Sewer
200mm Forcemain	450mm Sewer
250mm Forcemain	525mm Sewer
300mm Forcemain	600mm Sewer
375mm Forcemain	675mm Sewer
450mm Forcemain	750mm Sewer
525mm Forcemain	900mm Sewer
675mm Forcemain	1050mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon

Key Plan



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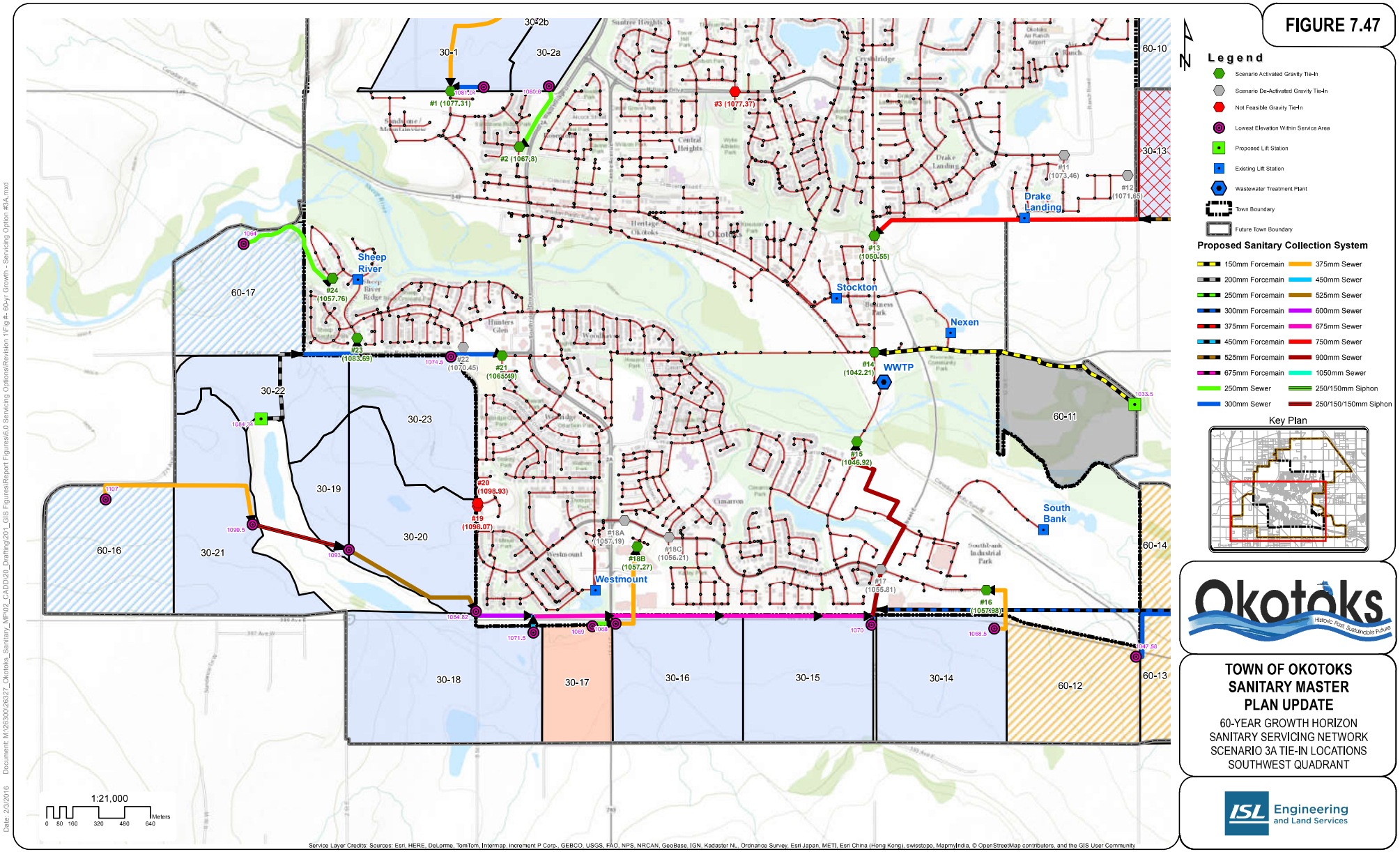

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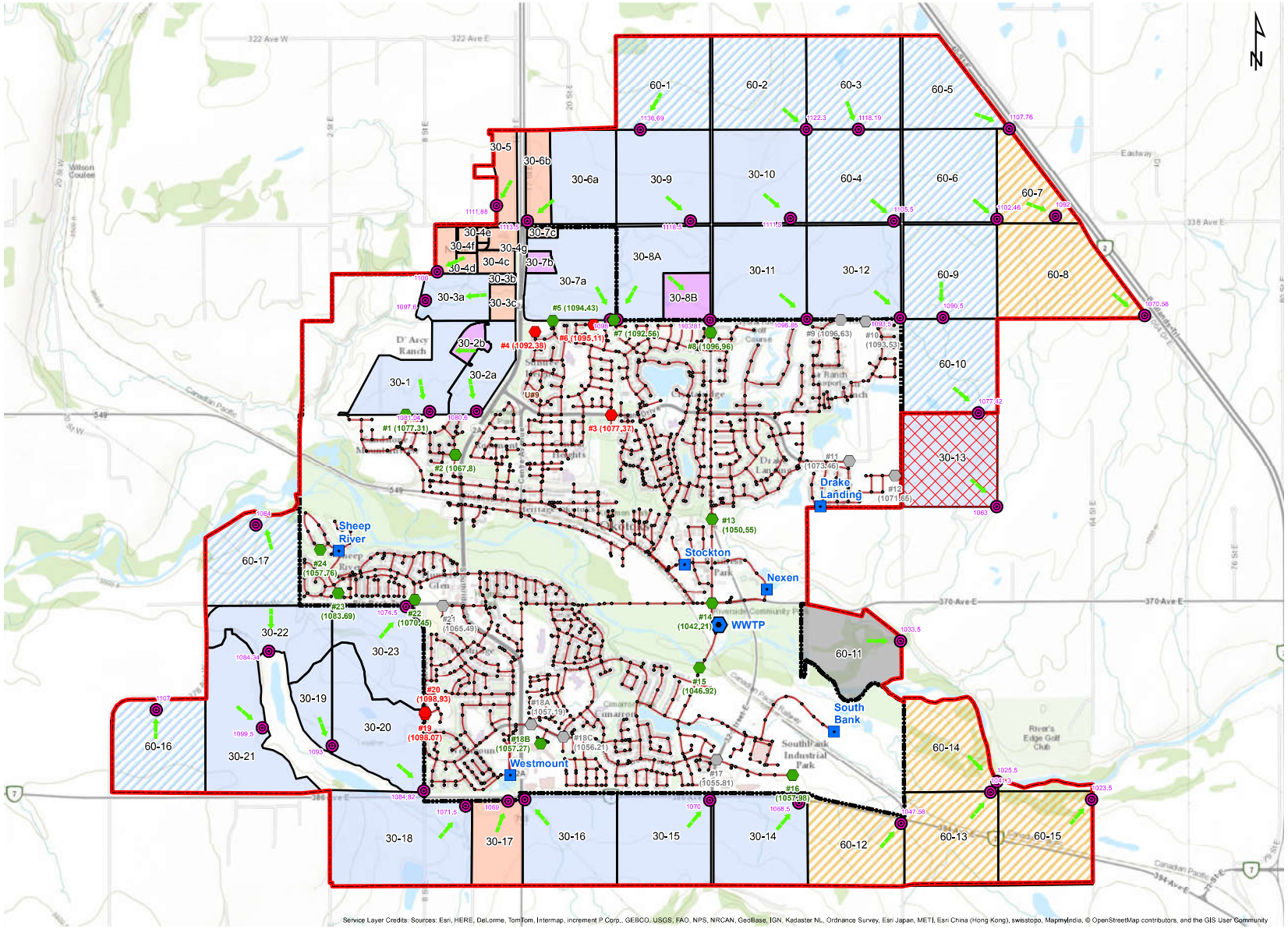

FIGURE 7.48

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

Okotoks
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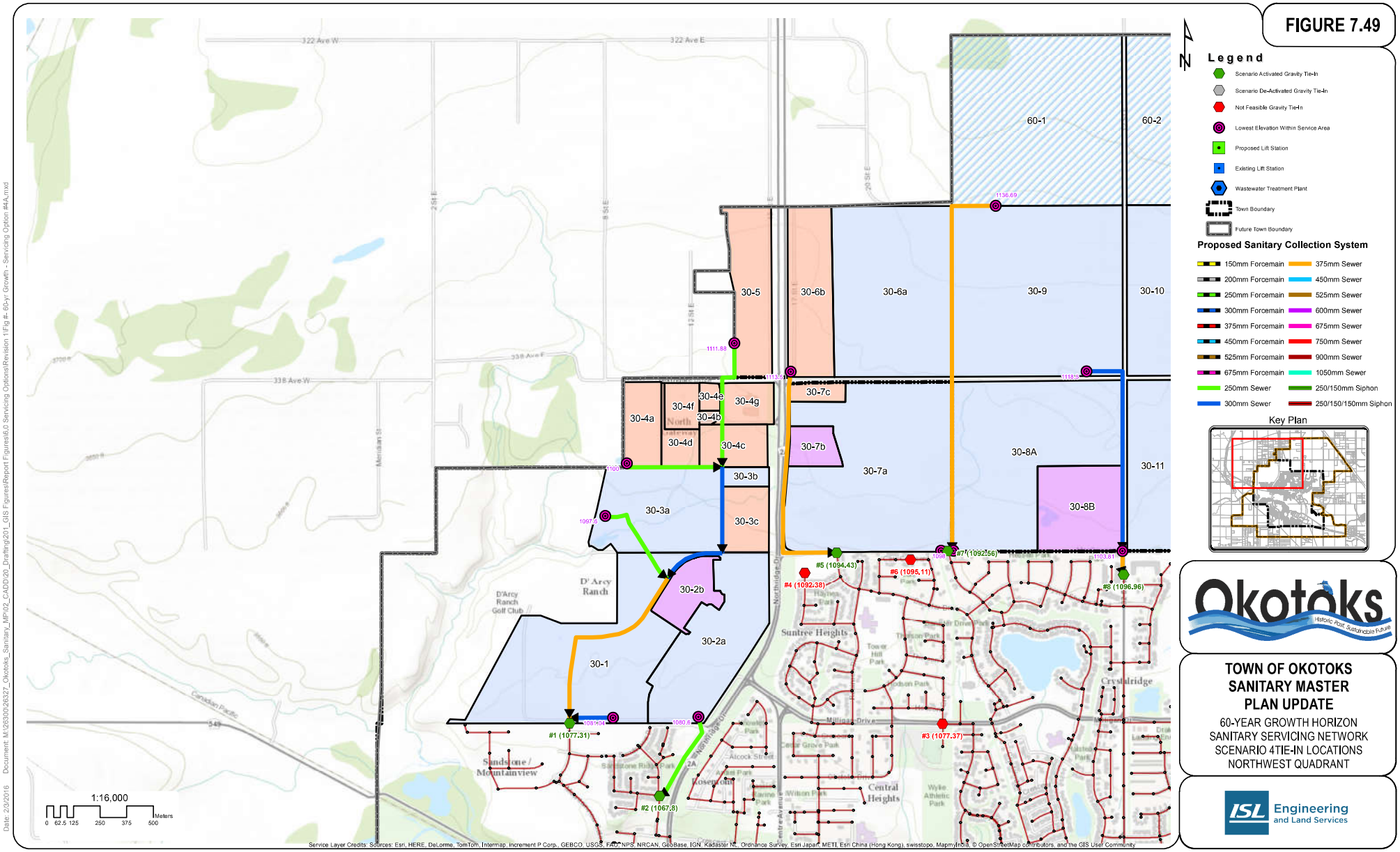

FIGURE 7.49

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 675mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 1050mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan

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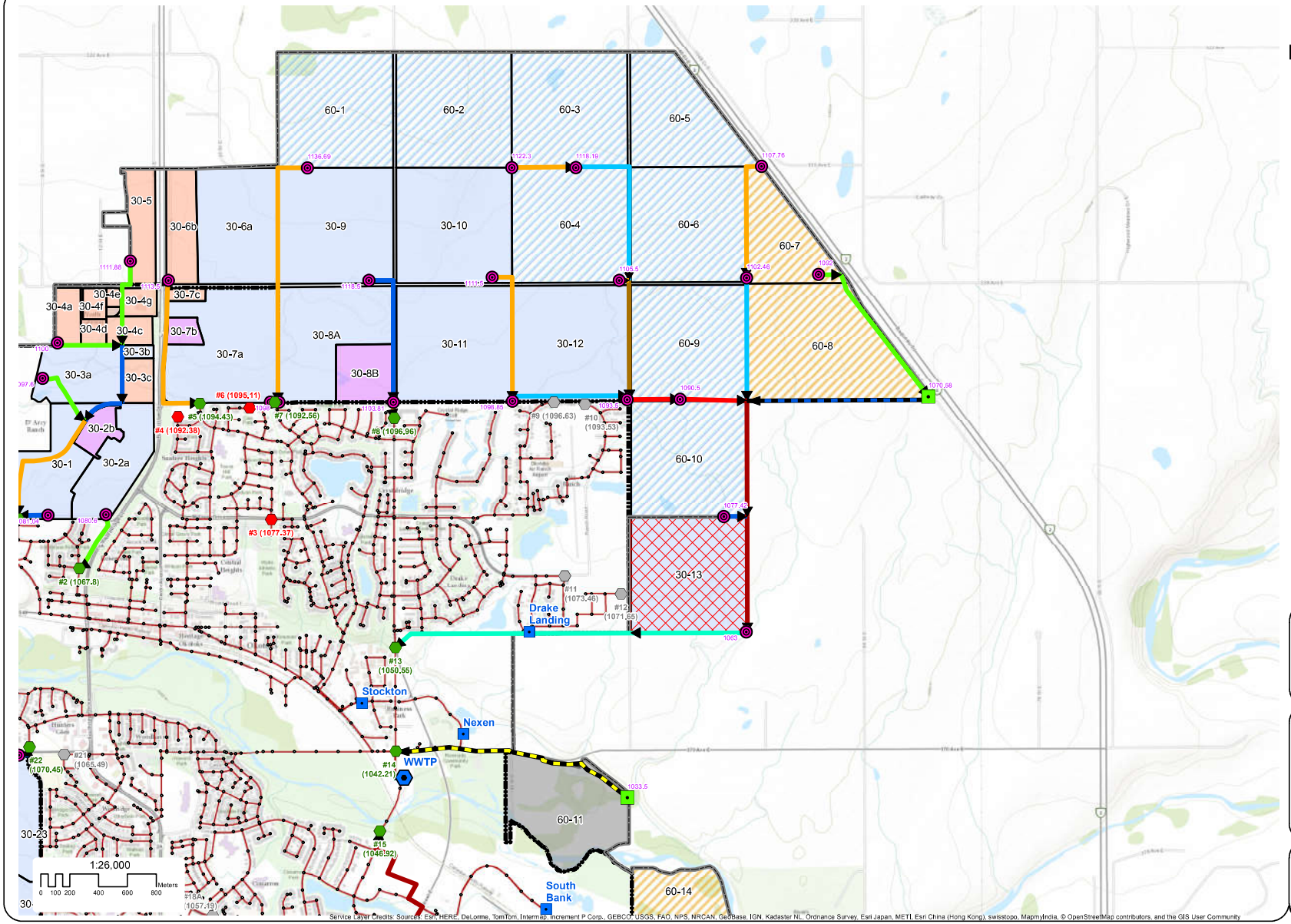


FIGURE 7.50

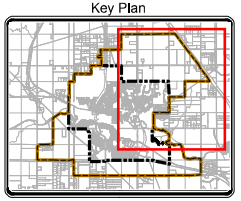
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	375mm Sewer
200mm Forcemain	450mm Sewer
250mm Forcemain	525mm Sewer
300mm Forcemain	600mm Sewer
375mm Forcemain	675mm Sewer
450mm Forcemain	750mm Sewer
525mm Forcemain	900mm Sewer
675mm Forcemain	1050mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon

Key Plan



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SANITARY SERVICING NETWORK
SCENARIO 4 TIE-IN LOCATIONS
NORTHEAST QUADRANT

ISL Engineering and Land Services

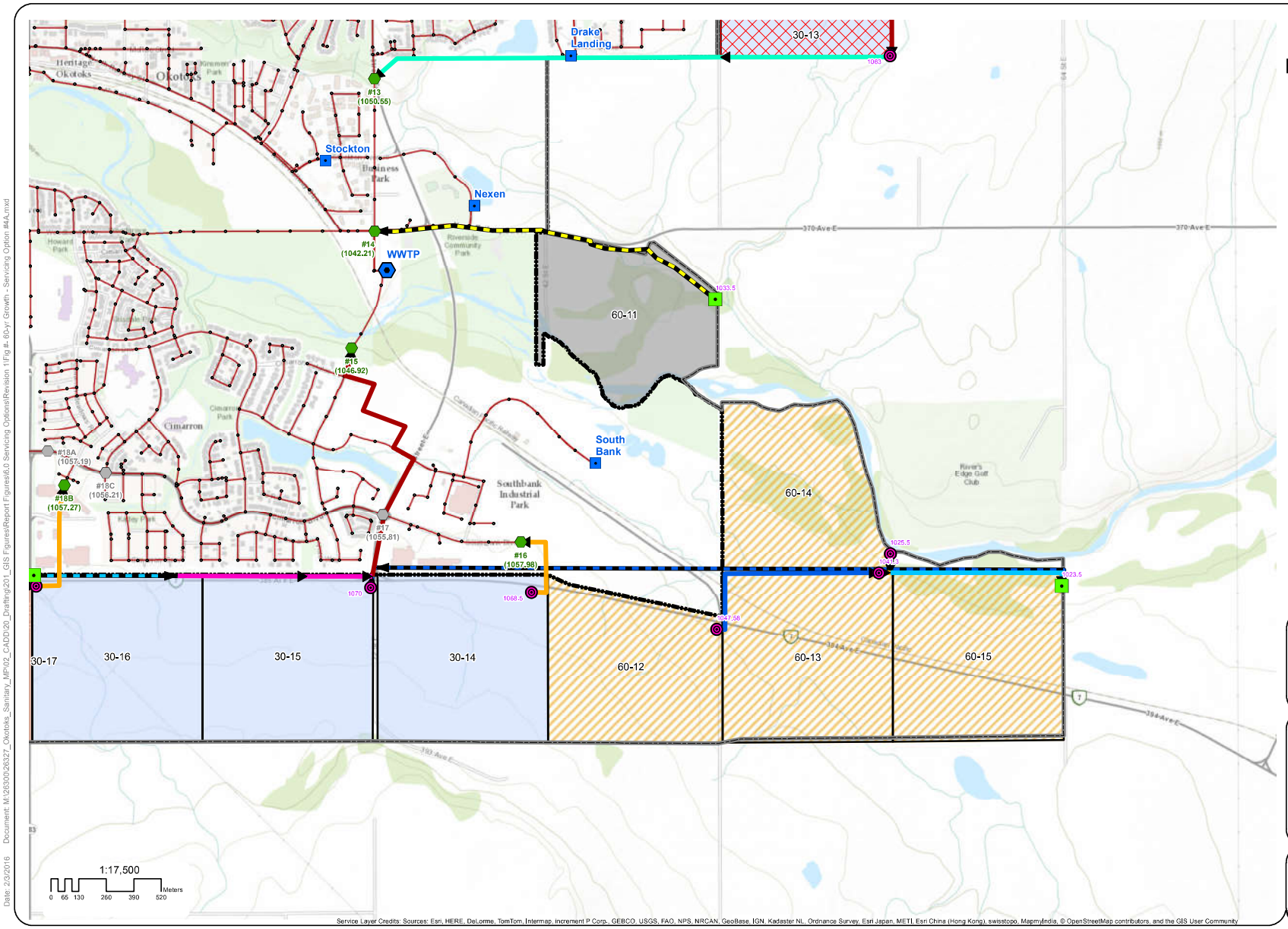


FIGURE 7.51

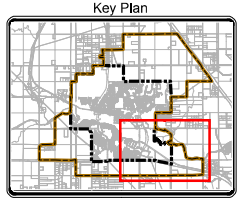
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	375mm Sewer
200mm Forcemain	450mm Sewer
250mm Forcemain	525mm Sewer
300mm Forcemain	600mm Sewer
375mm Forcemain	675mm Sewer
450mm Forcemain	750mm Sewer
525mm Forcemain	900mm Sewer
675mm Forcemain	1050mm Sewer
250mm Sewer	250/150mm Siphon
300mm Sewer	250/150/150mm Siphon

Key Plan



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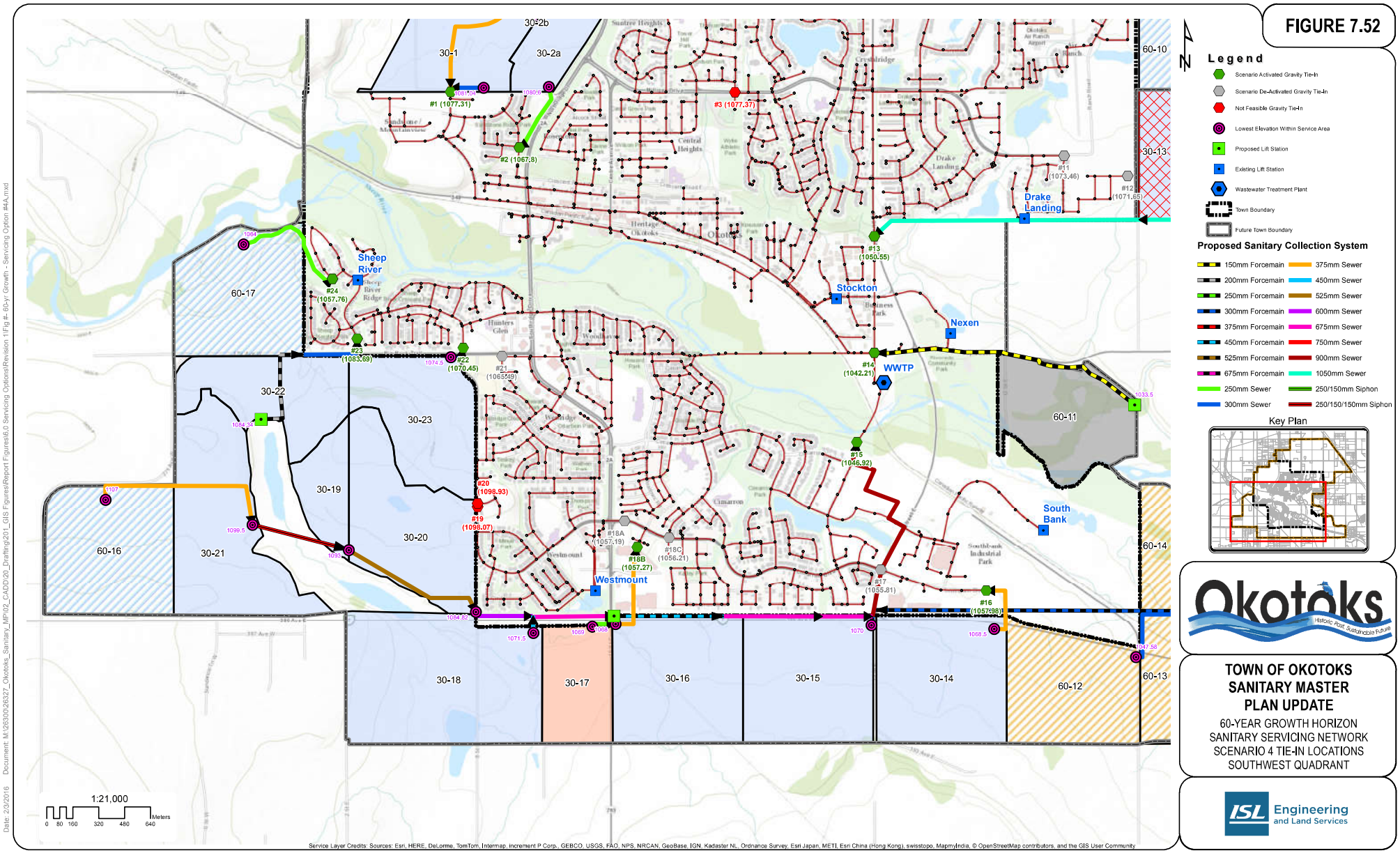

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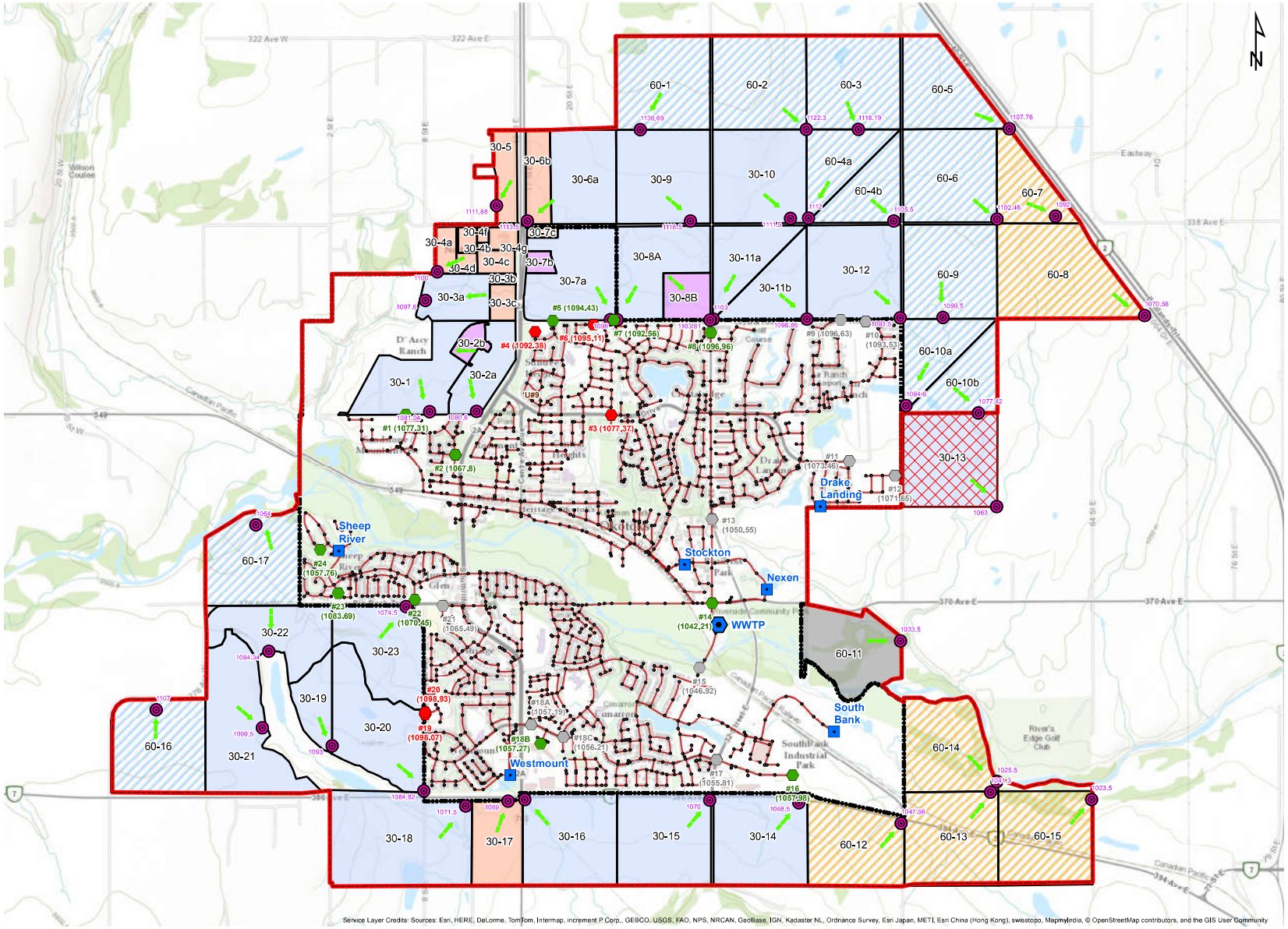

FIGURE 7.53

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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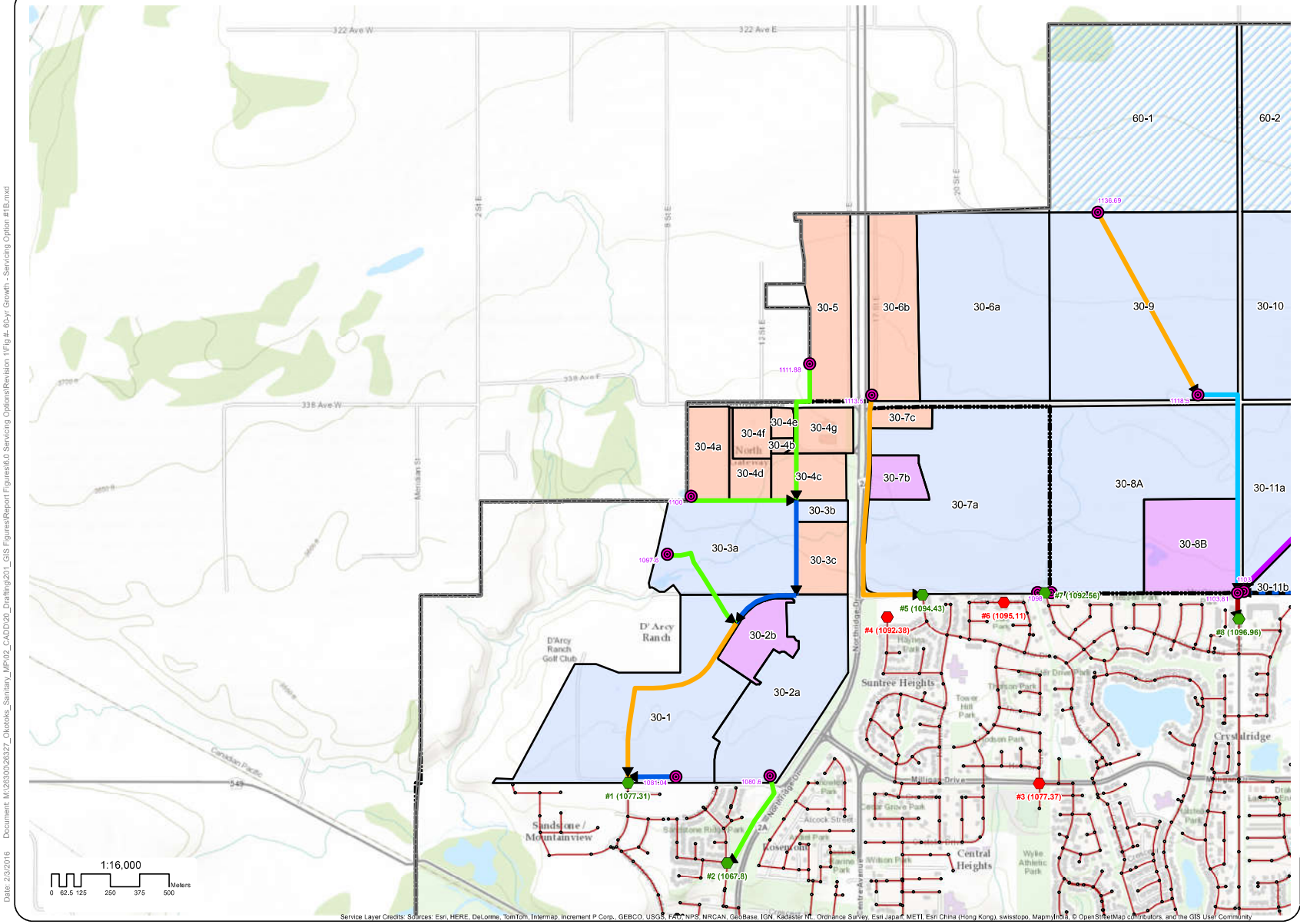
FIGURE 7.54



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N

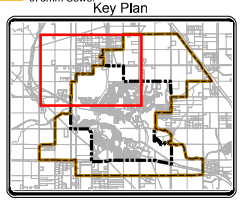
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon
- 400/350mm Siphon

Key Plan



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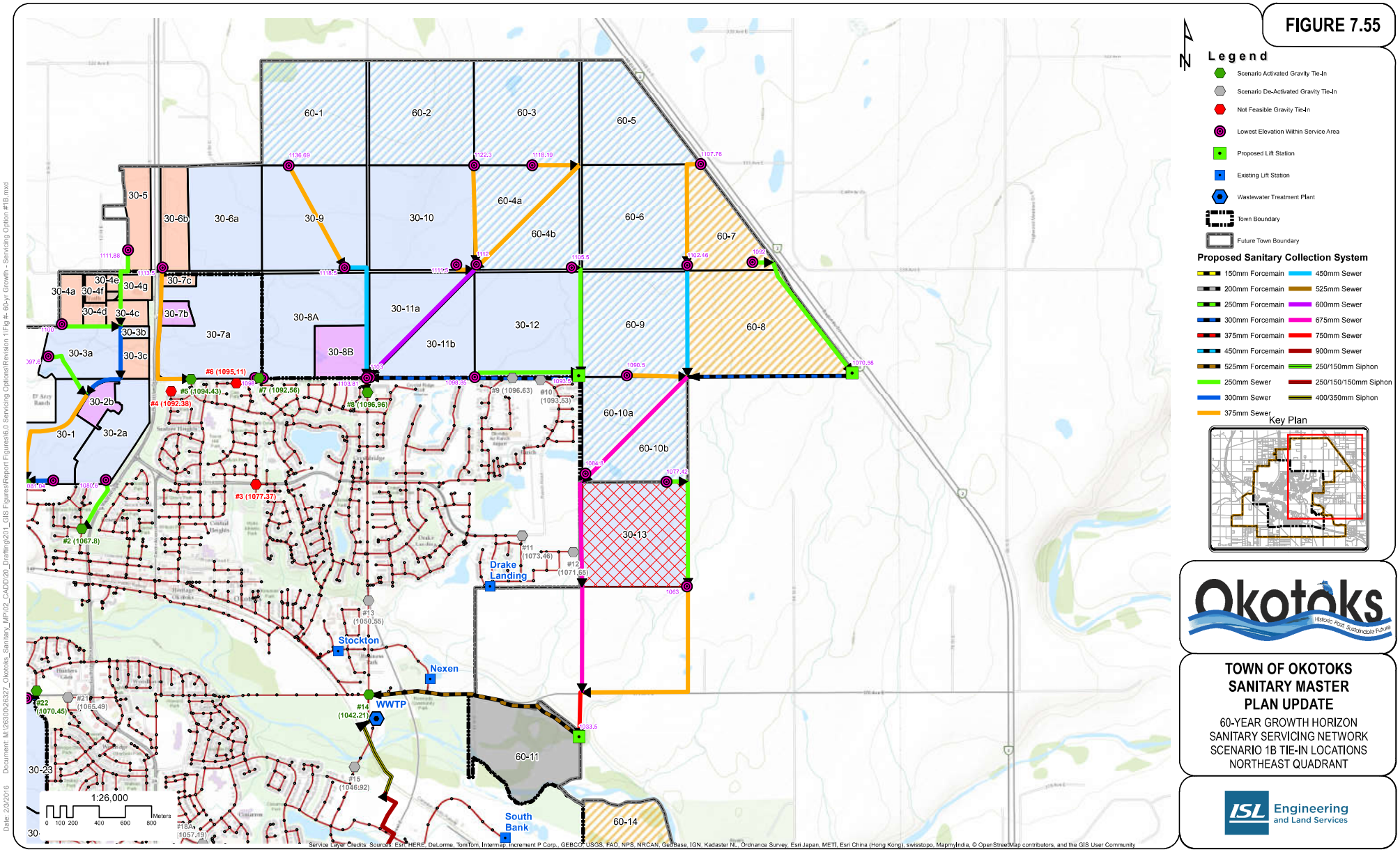
FIGURE 7.55
Legend
Scenario Activated Gravity Tie-In
Scenario De-Activated Gravity Tie-In
Not Feasible Gravity Tie-In
Lowest Elevation Within Service Area
Proposed Lift Station
Existing Lift Station
Wastewater Treatment Plant
Town Boundary
Future Town Boundary
Proposed Sanitary Collection System
150mm Forcemain
200mm Forcemain
250mm Forcemain
300mm Forcemain
375mm Forcemain
450mm Forcemain
525mm Forcemain
250mm Sewer
300mm Sewer
375mm Sewer
450mm Sewer
525mm Sewer
600mm Sewer
675mm Sewer
750mm Sewer
900mm Sewer
250/150mm Siphon
250/150/150mm Siphon
400/350mm Siphon
Key Plan
60-1
60-2
60-3
60-4a
60-4b
60-5
60-6
60-7
60-8
60-9
60-10a
60-10b
60-11
60-14
30-1
30-2a
30-2b
30-3a
30-3b
30-3c
30-4a
30-4b
30-4c
30-4d
30-4e
30-4f
30-4g
30-5
30-6a
30-6b
30-7a
30-7b
30-7c
30-8A
30-8B
30-9
30-10
30-11a
30-11b
30-12
30-13
30-23
#2 (1067.8)
#3 (1077.37)
#4 (1092.38)
#5 (1094.43)
#6 (1095.11)
#7 (1092.56)
#8 (1096.96)
#9 (1096.63)
#10 (1093.53)
#11 (1073.46)
#12 (1071.85)
#13 (1050.55)
#14 (1042.21)
#15 (1046.92)
#18A (1057.19)
#21 (1065.49)
#22 (1070.45)
Drake Landing
Stockton
Nexen
WWTP
South Bank
1:26,000
0 100 200 400 600 800 Meters
Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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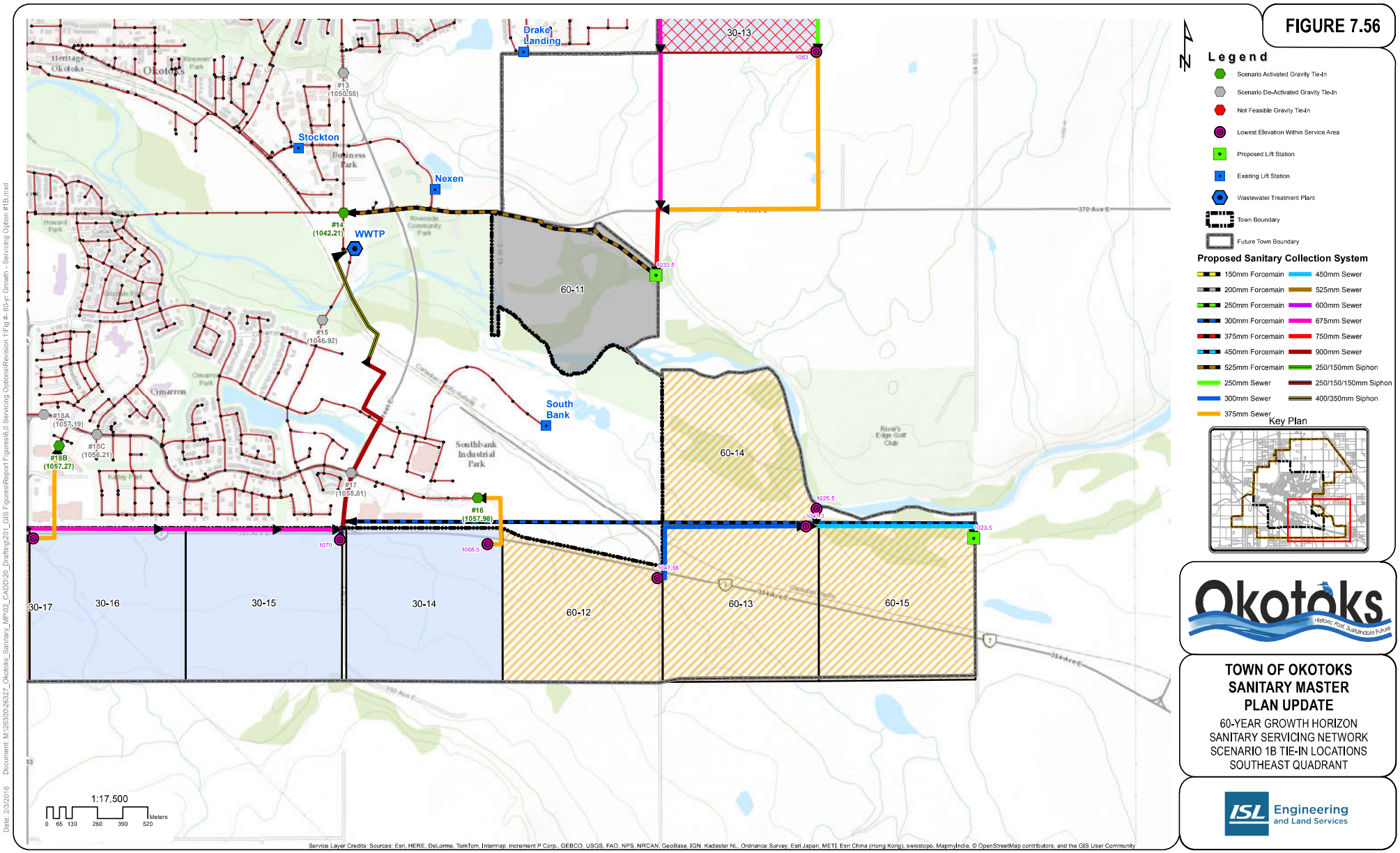

FIGURE 7.56

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon
- 400/350mm Siphon

Key Plan

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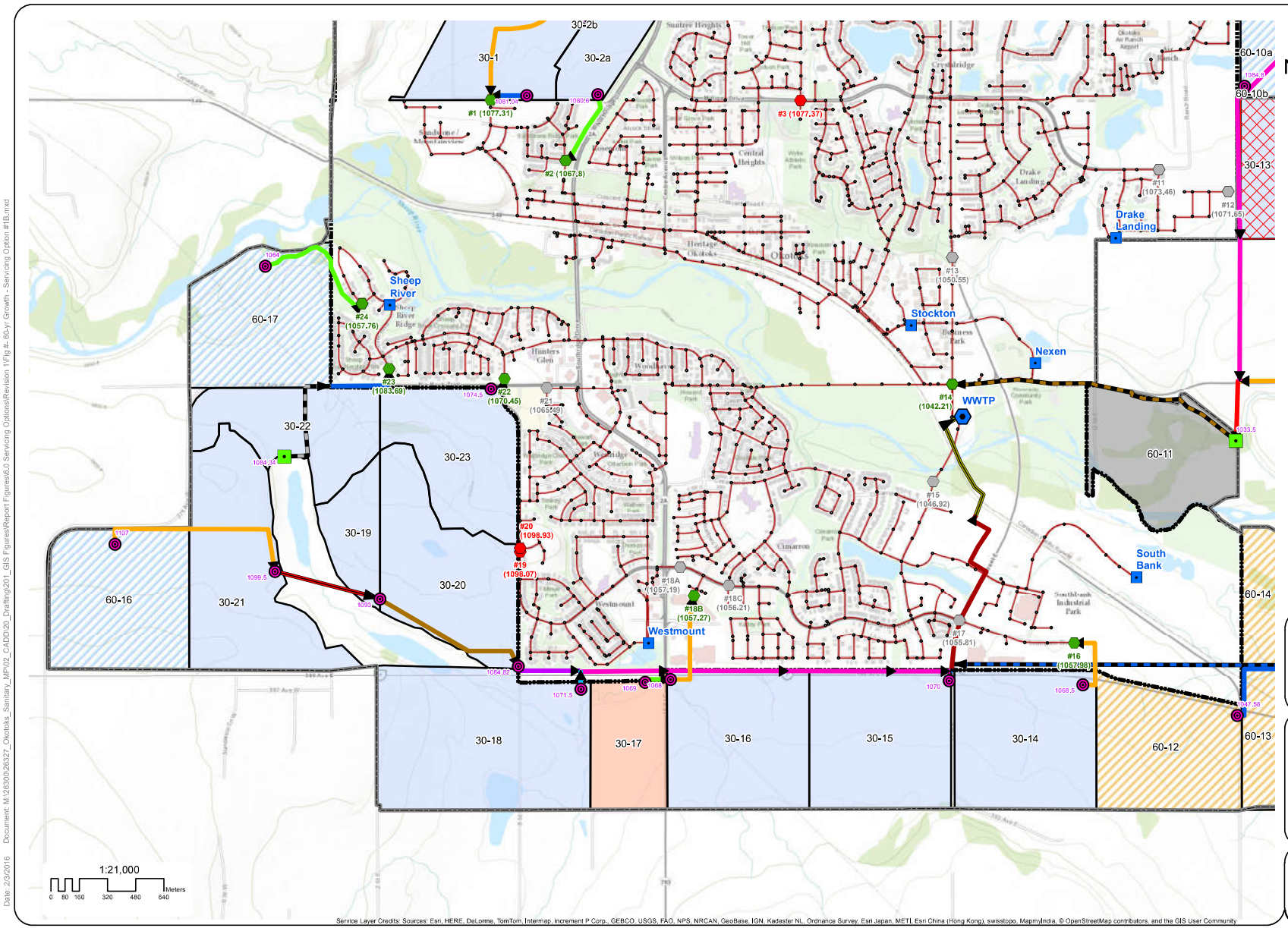


FIGURE 7.57

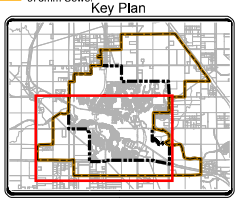
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
525mm Forcemain	250/150mm Siphon
250mm Sewer	250/150/150mm Siphon
300mm Sewer	400/350mm Siphon
375mm Sewer	

Key Plan



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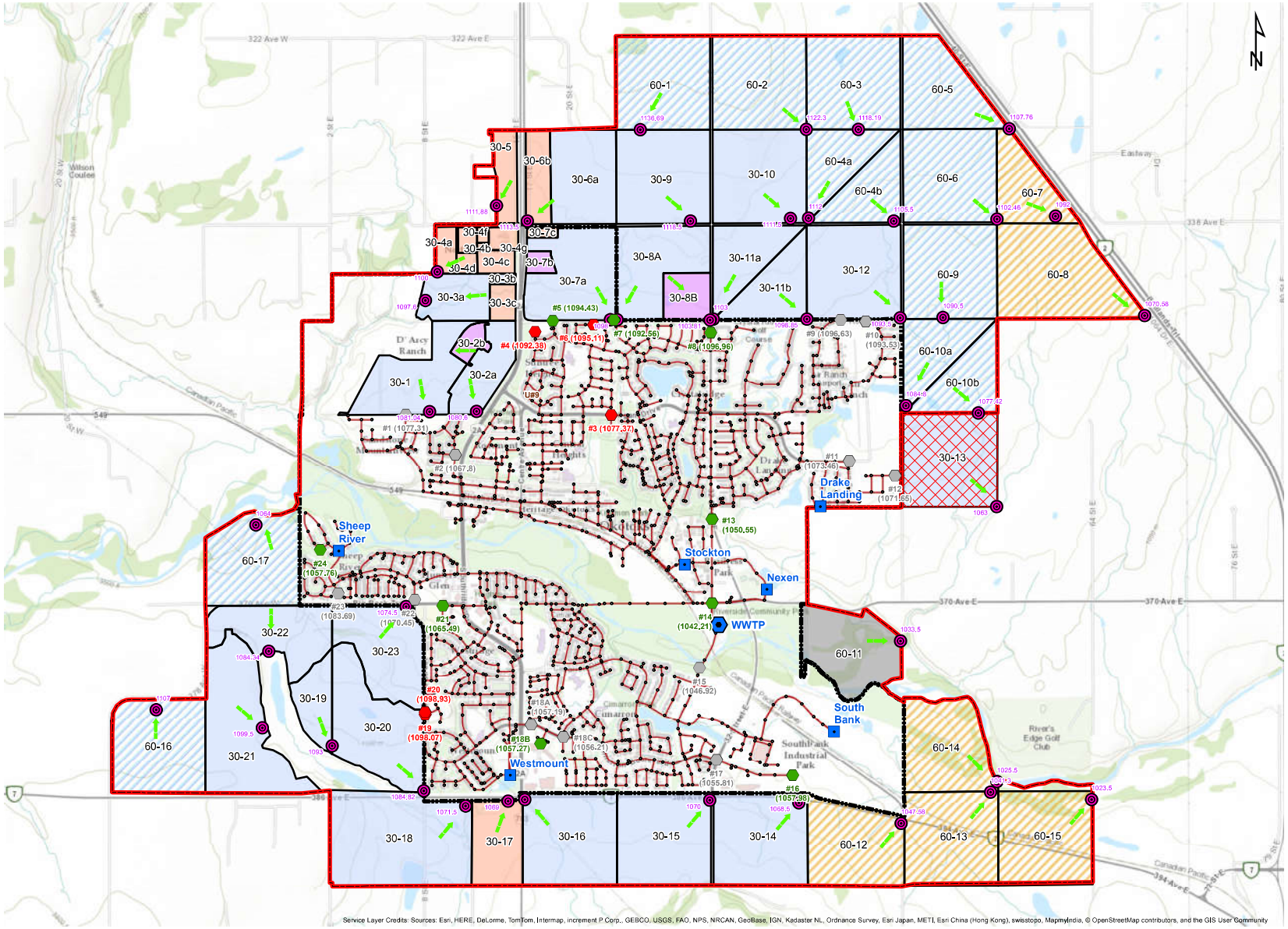

FIGURE 7.58

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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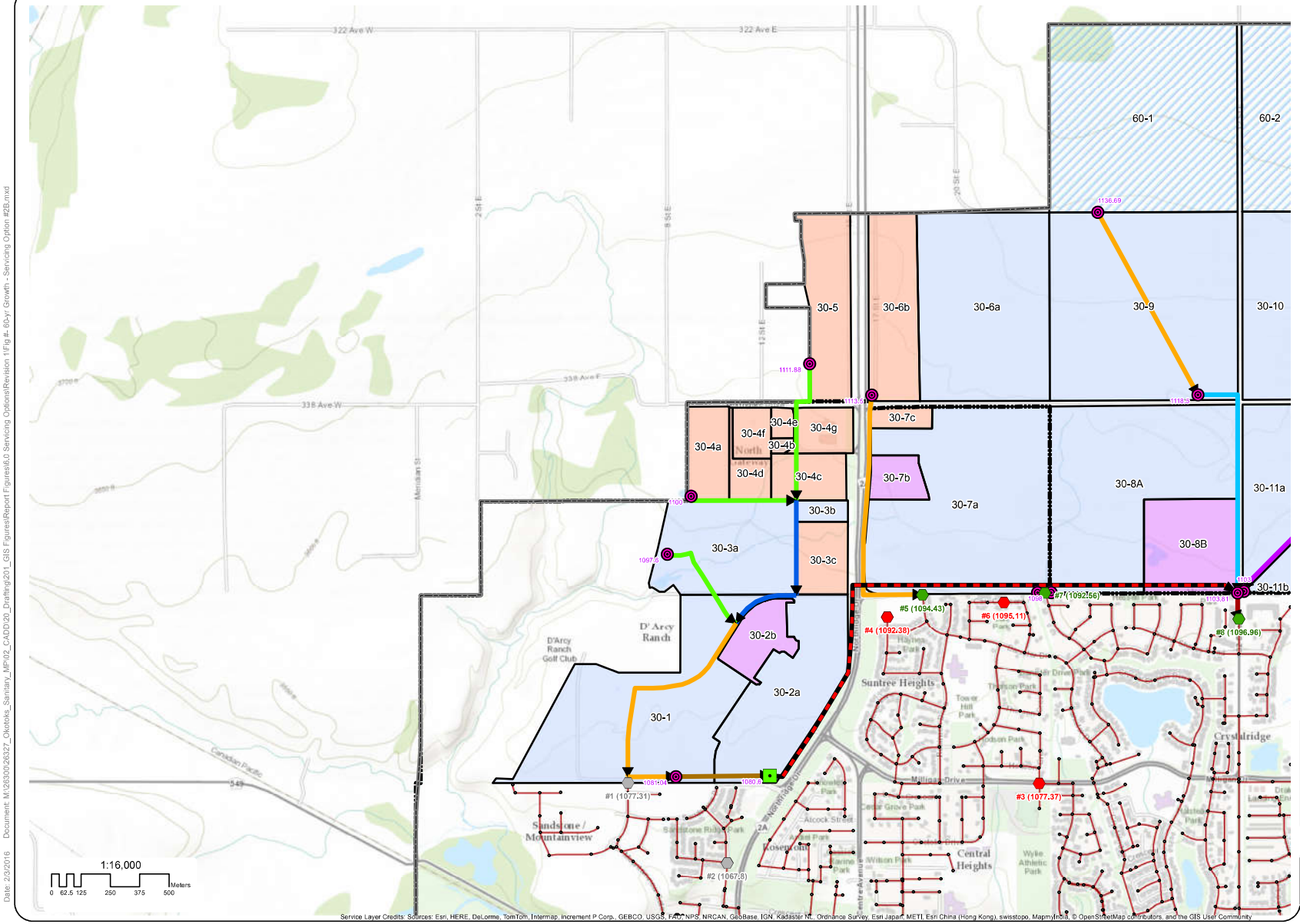
FIGURE 7.59



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N

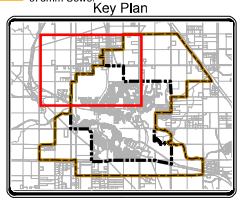
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon
- 400/350mm Siphon

Key Plan



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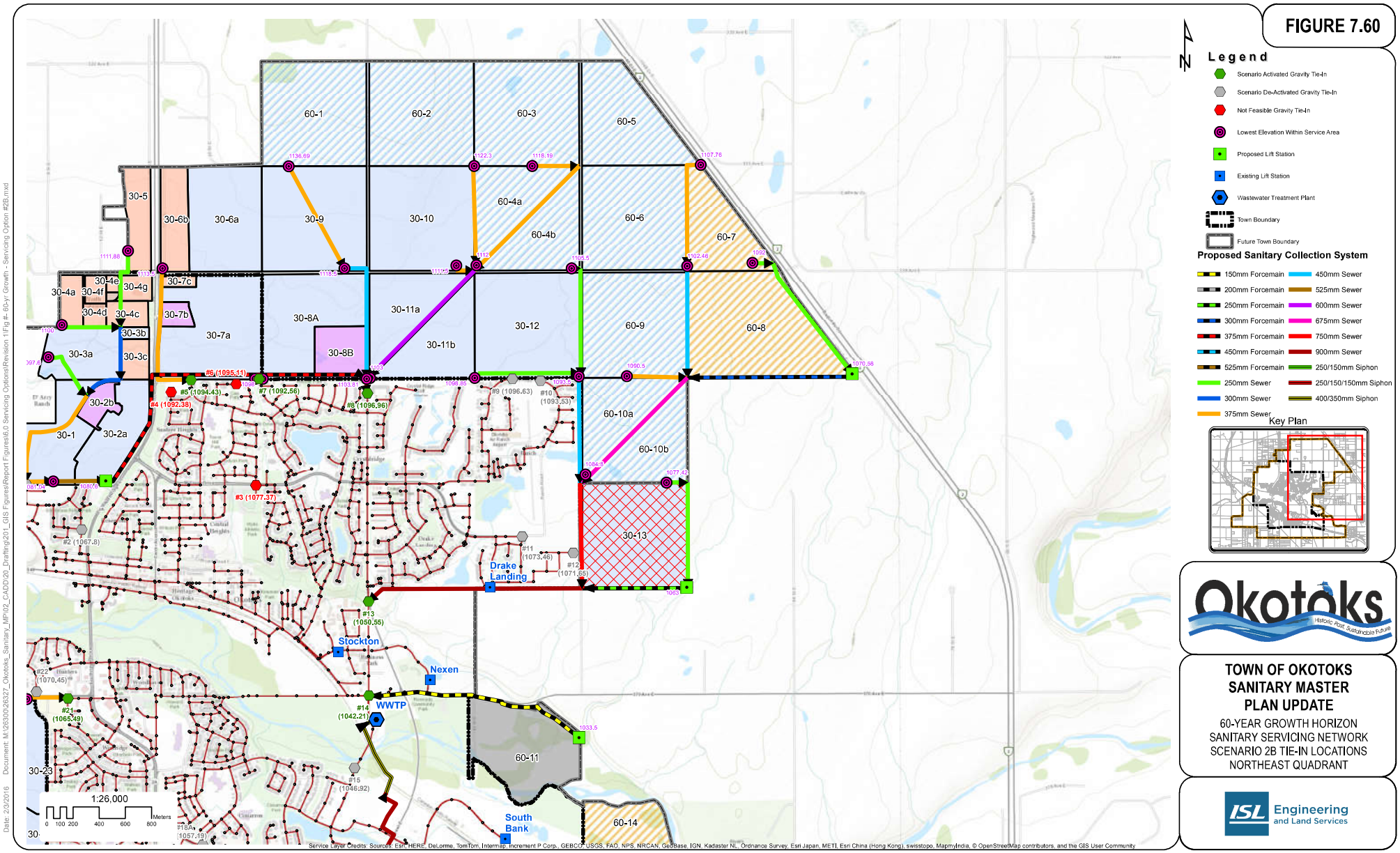


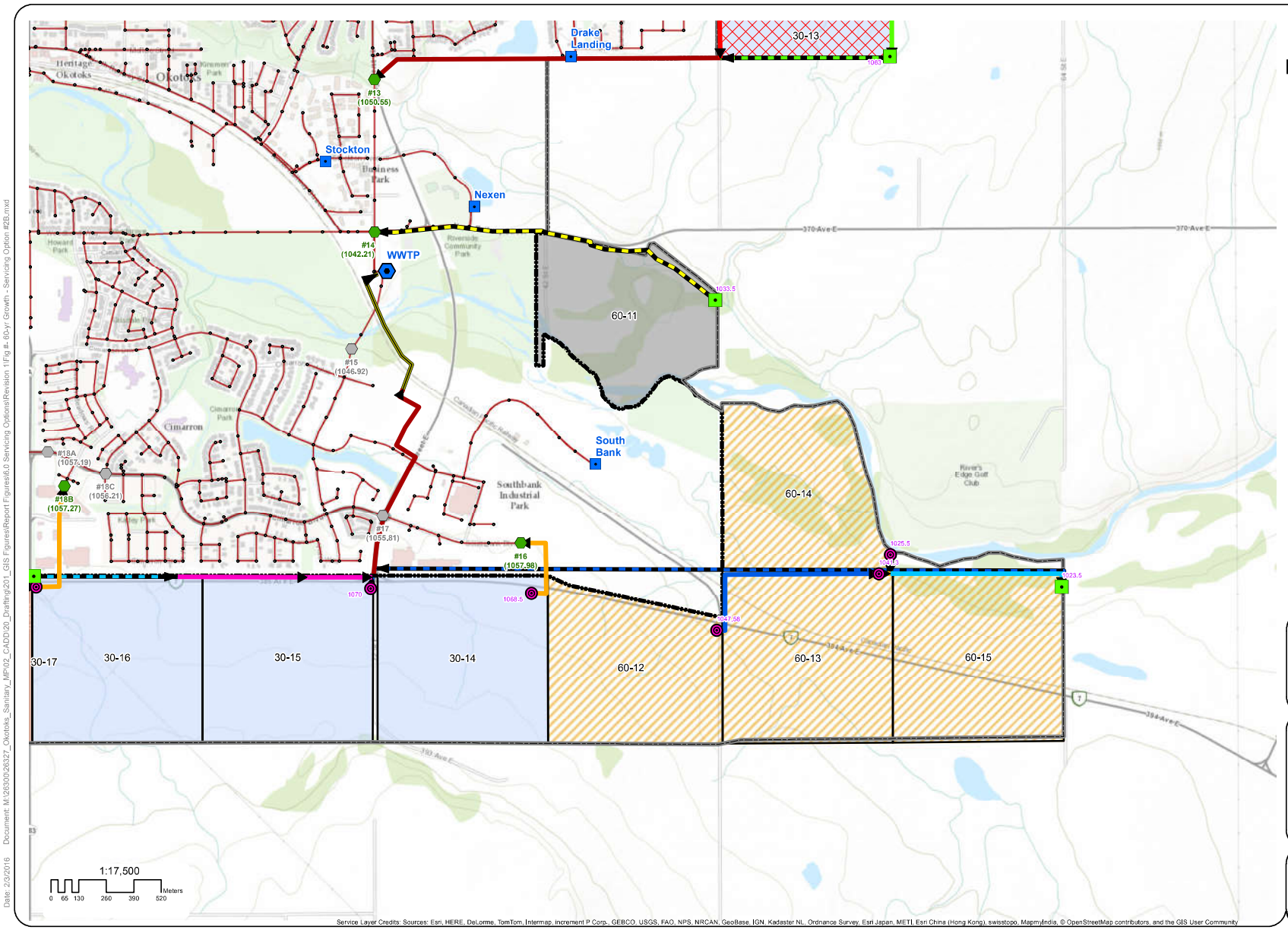


FIGURE 7.61

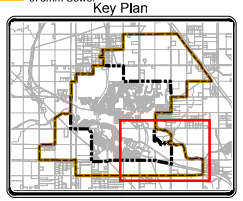
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

150mm Forcemain	450mm Sewer
200mm Forcemain	525mm Sewer
250mm Forcemain	600mm Sewer
300mm Forcemain	675mm Sewer
375mm Forcemain	750mm Sewer
450mm Forcemain	900mm Sewer
525mm Forcemain	250/150mm Siphon
250mm Sewer	250/150/150mm Siphon
300mm Sewer	400/350mm Siphon
375mm Sewer	

Key Plan



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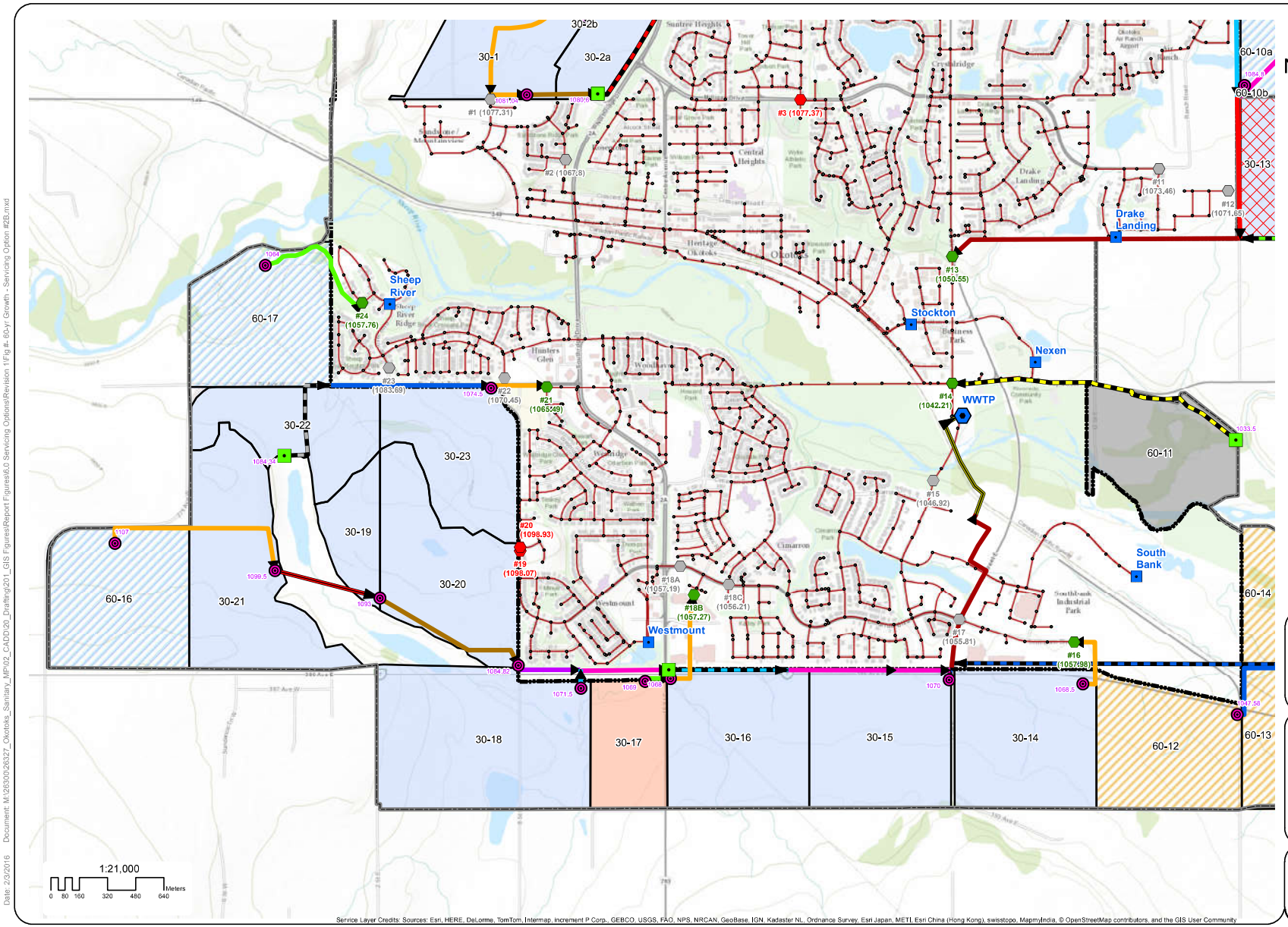


FIGURE 7.62

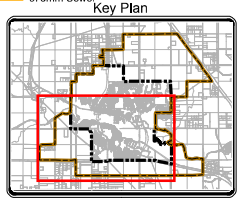
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon
- 400/350mm Siphon

Key Plan



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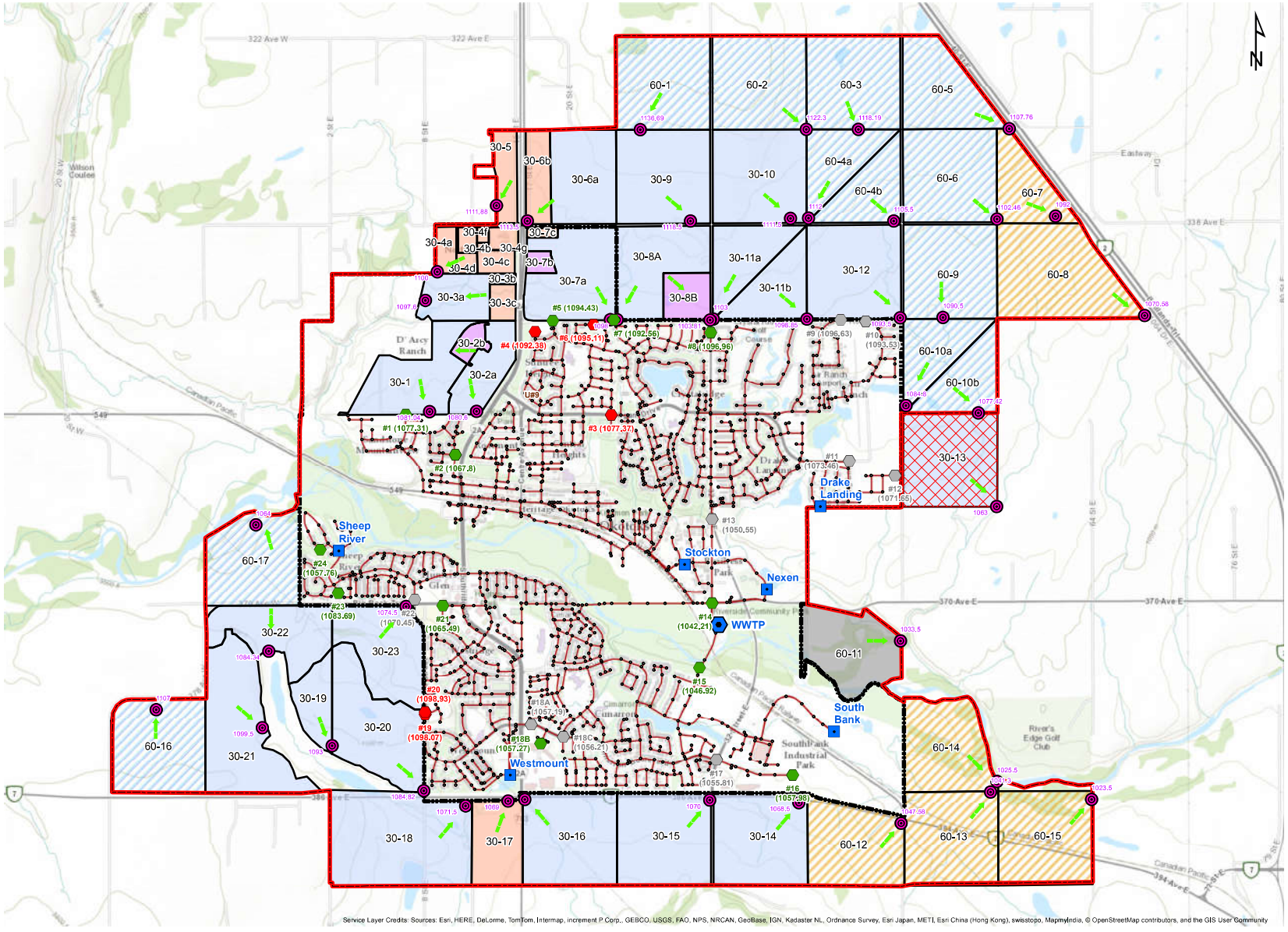

FIGURE 7.63

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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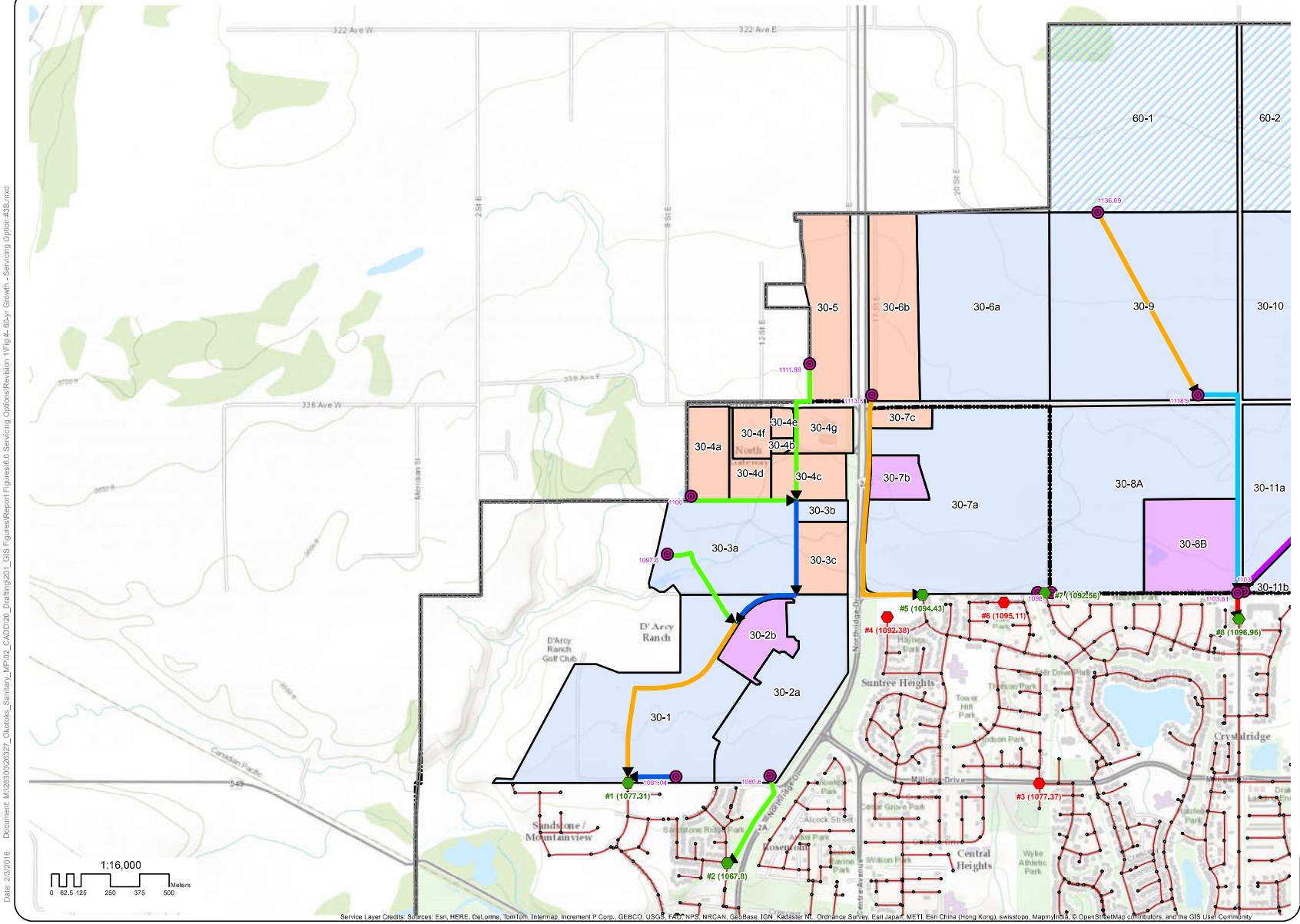
FIGURE 7.64



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N

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan

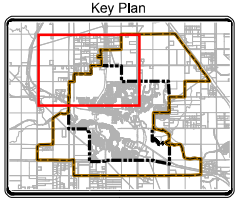

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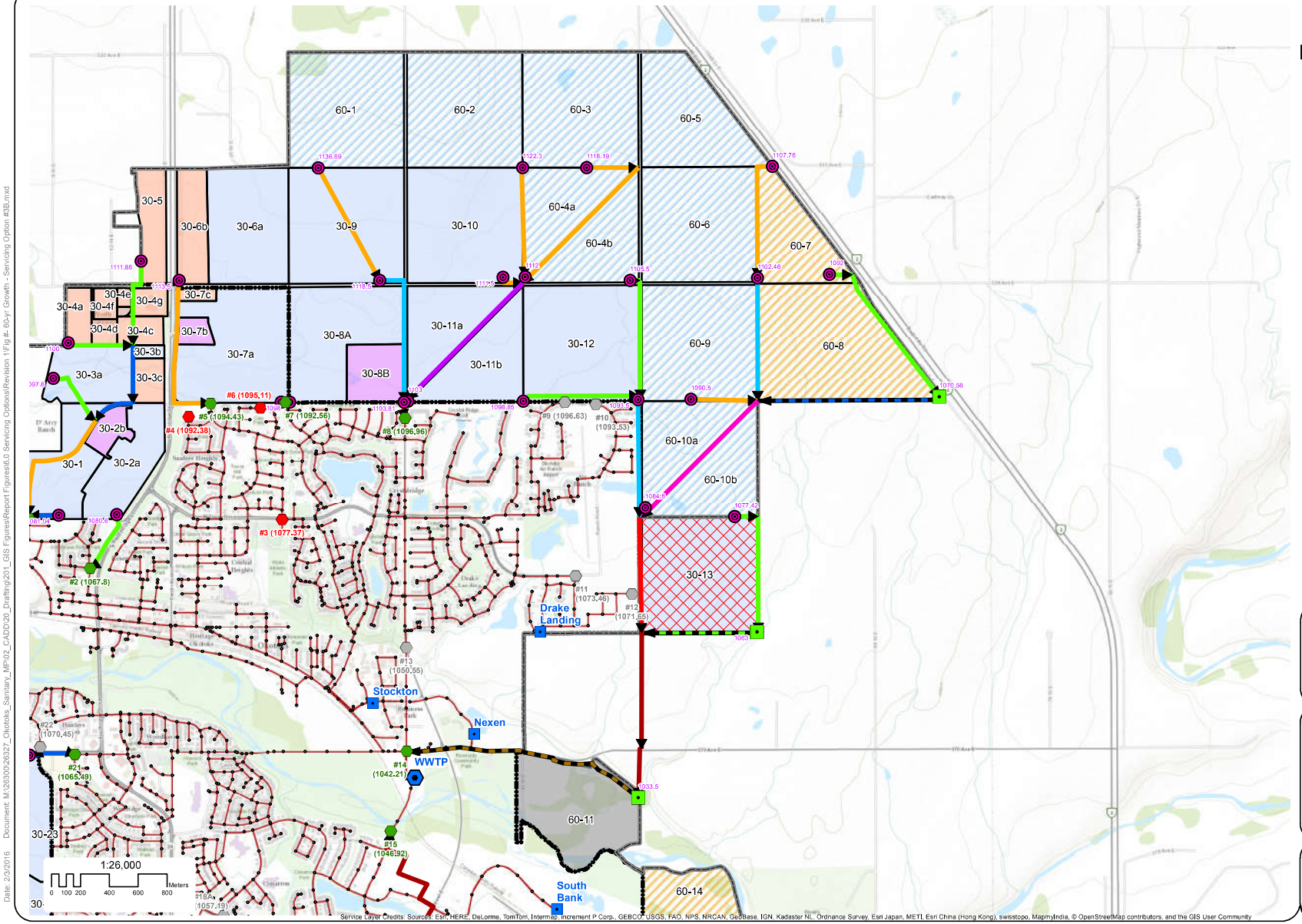
FIGURE 7.65



N

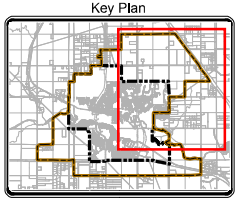
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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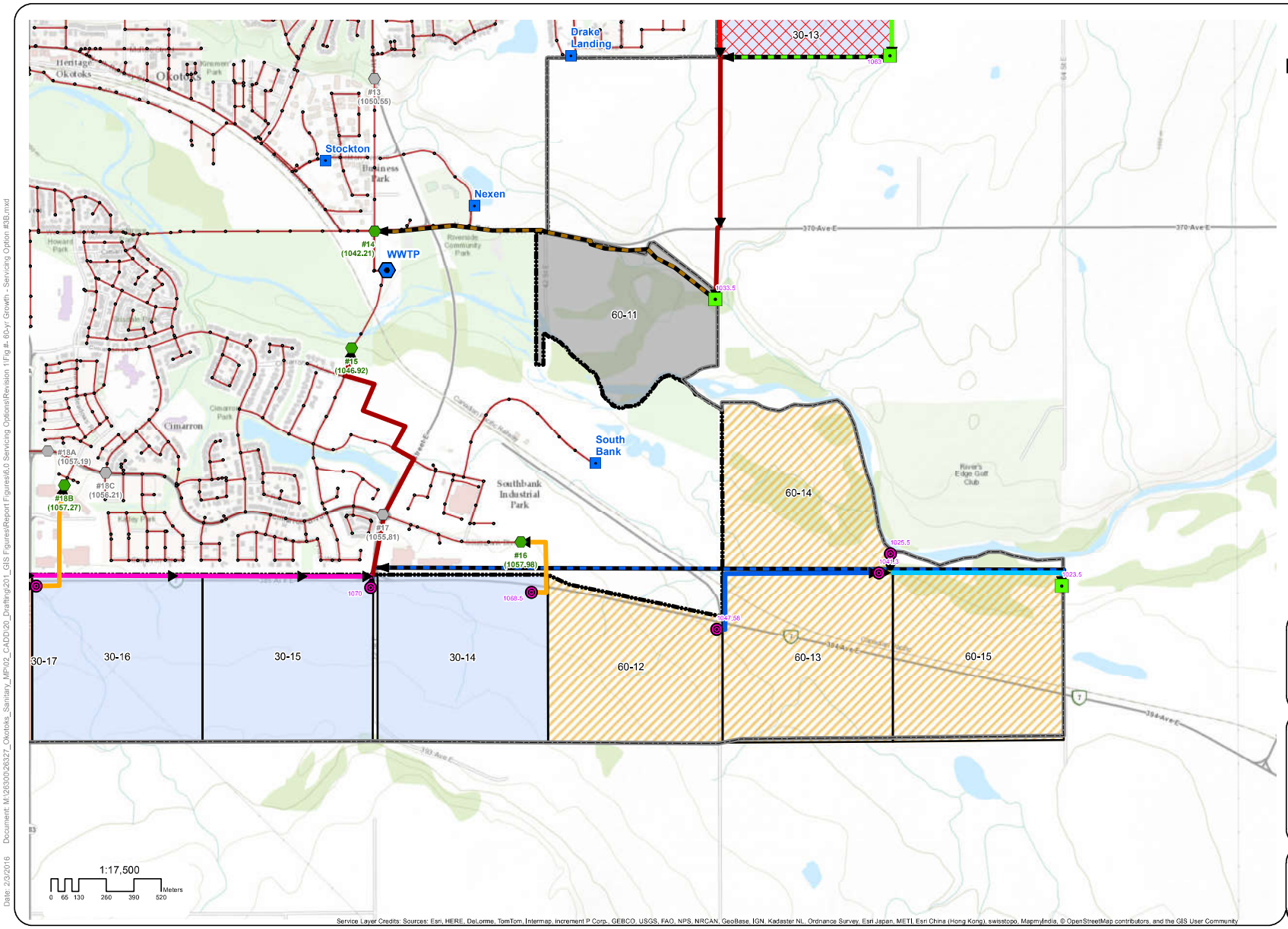


FIGURE 7.66

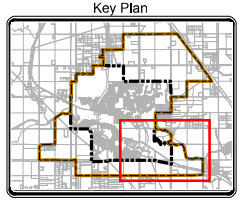
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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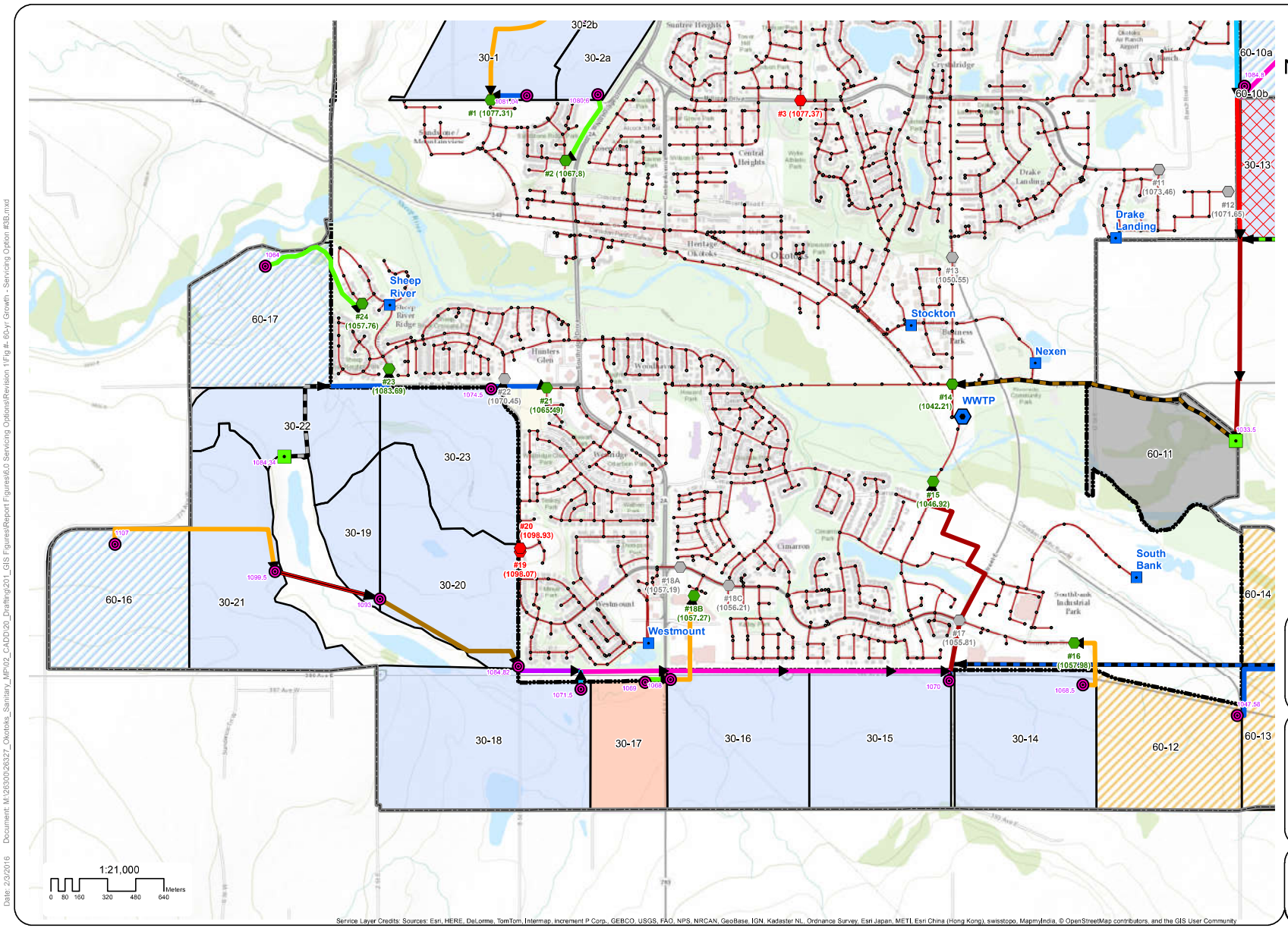


FIGURE 7.67

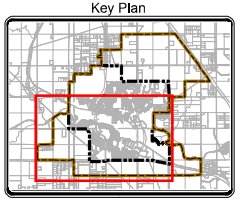
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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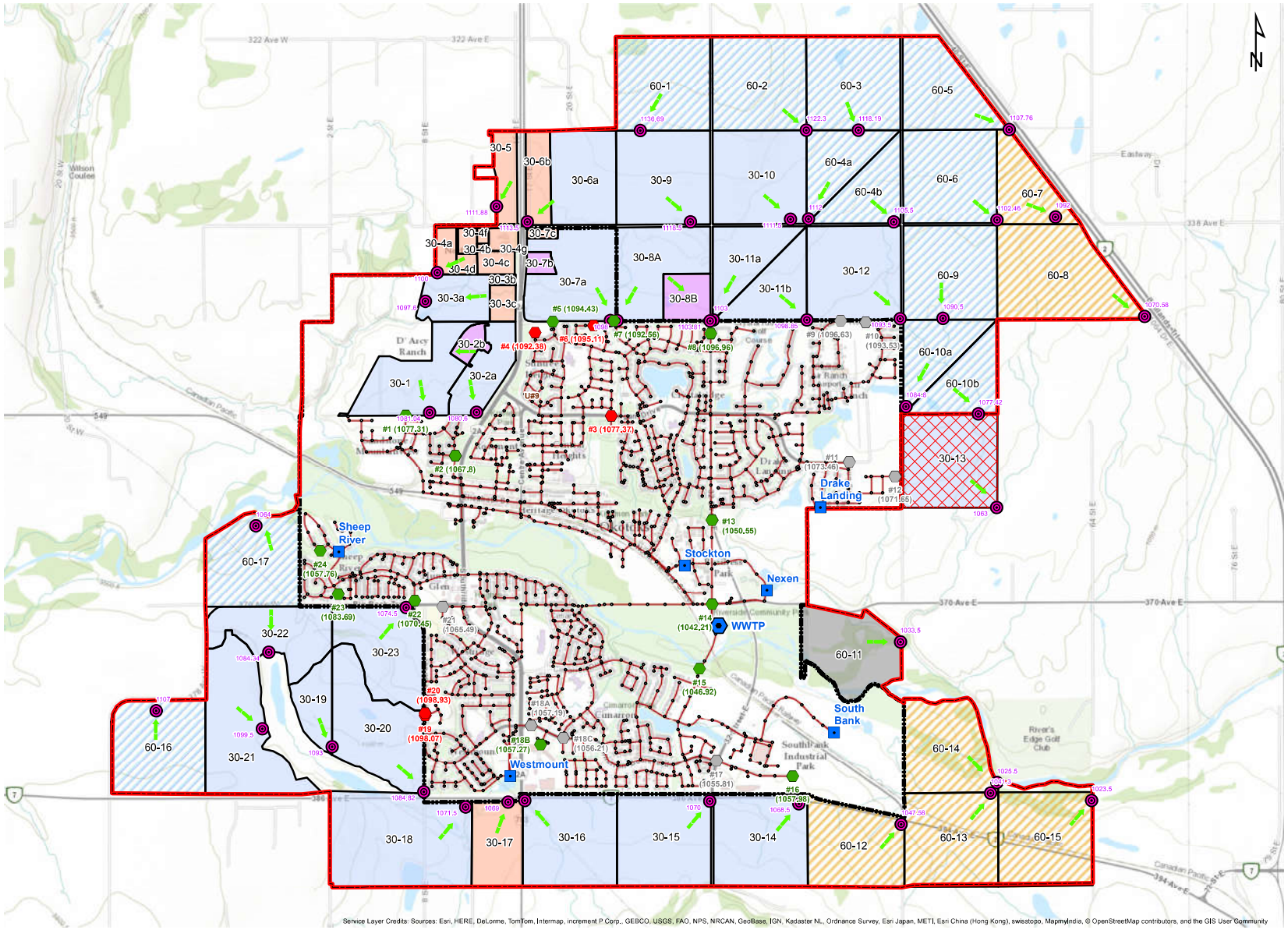

FIGURE 7.68

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Existing Lift Station
- Wastewater Treatment Plant

Annexation Lands / Service Areas

- Residential, 2043
- Commercial, 2043
- Institutional, 2043
- Residential, 2073
- Commercial / Industrial, 2073
- Industrial, 2073
- Considered Additional Annexation Land, 2043
- Town Boundary
- Future Town Boundary
- Overland Flow Direction

1:32,500

0 200 400 800 1,200 1,600 Meters

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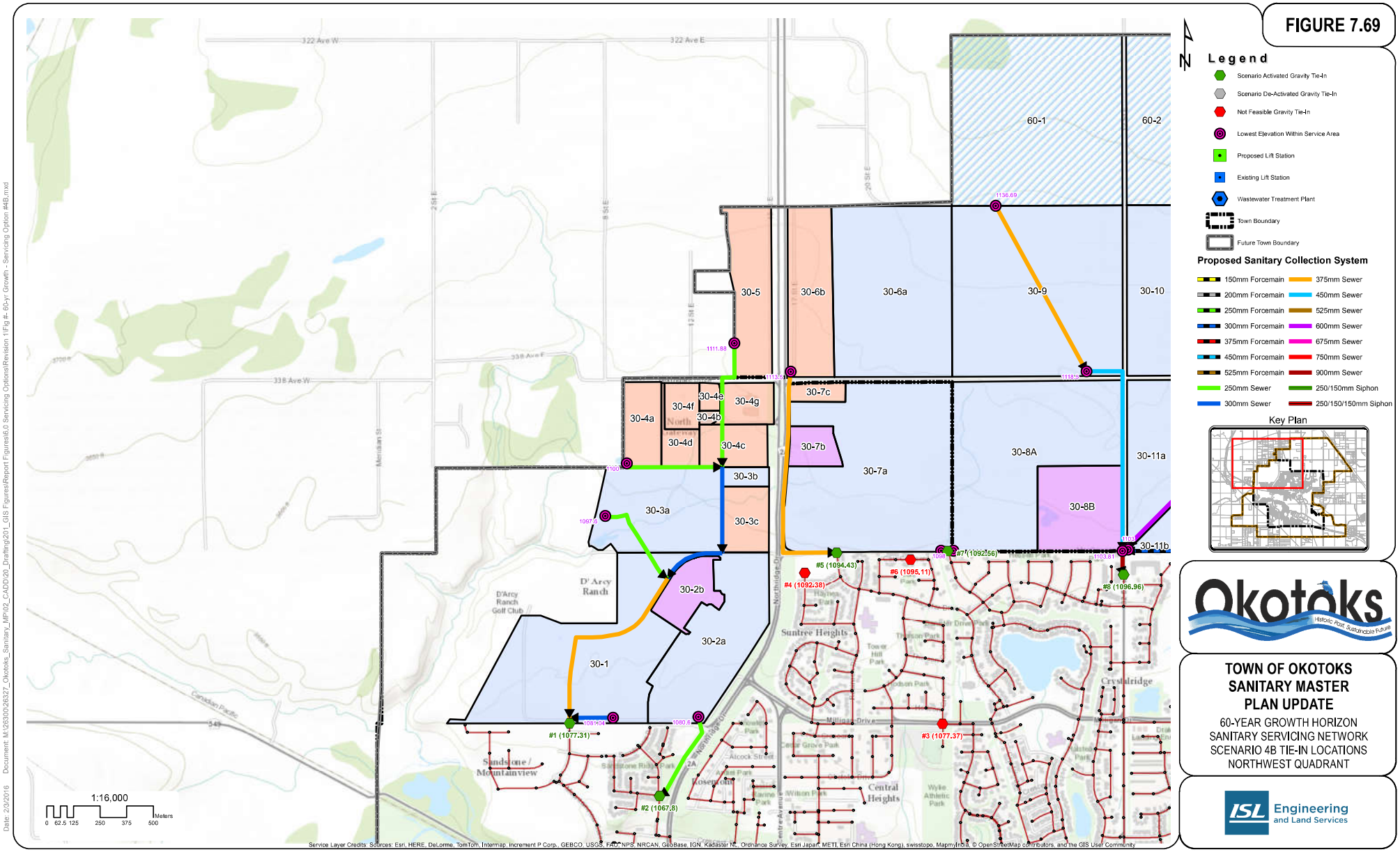

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FIGURE 7.69

N

Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan

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NORTHWEST QUADRANT

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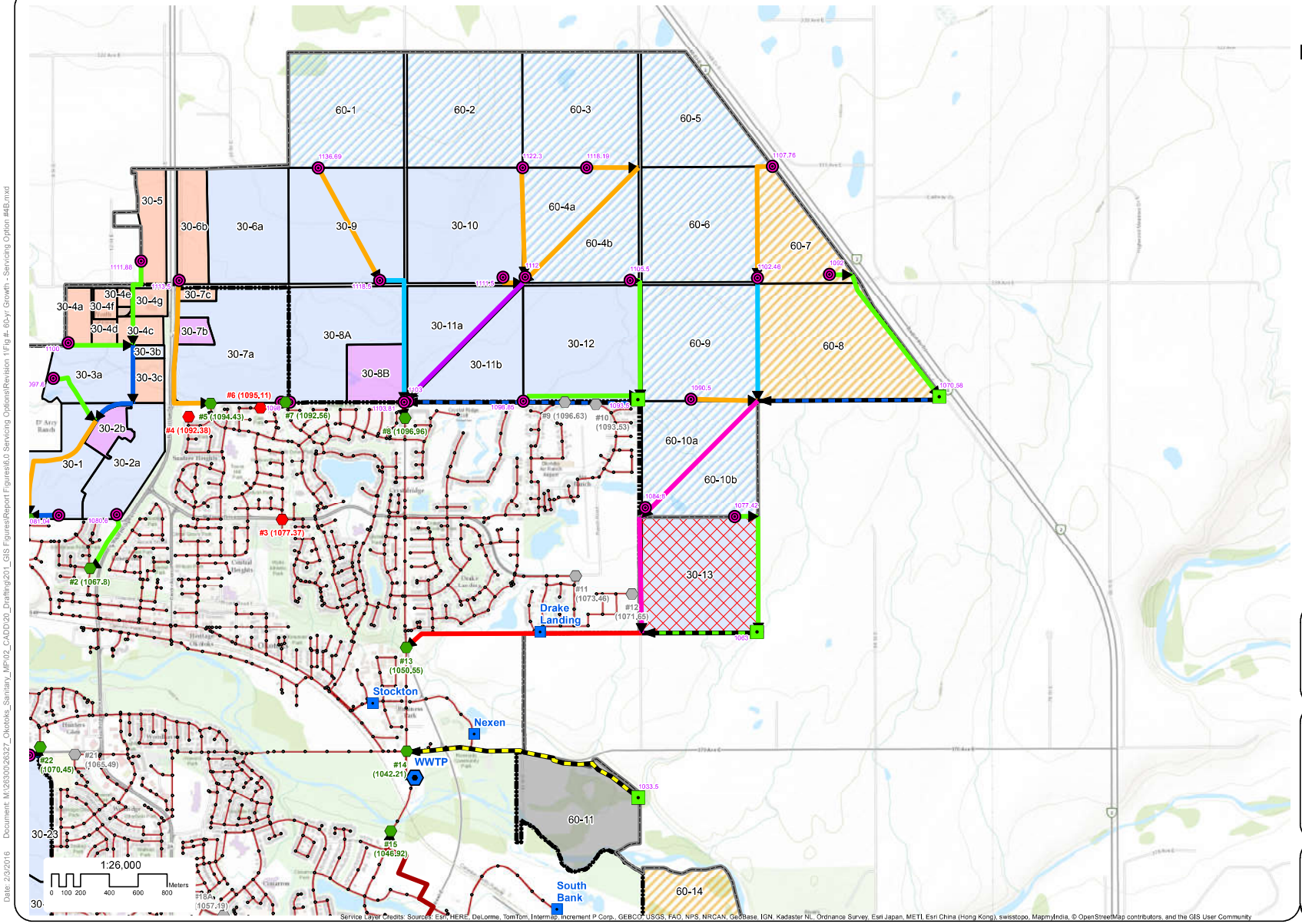
FIGURE 7.70



N

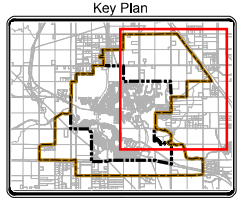
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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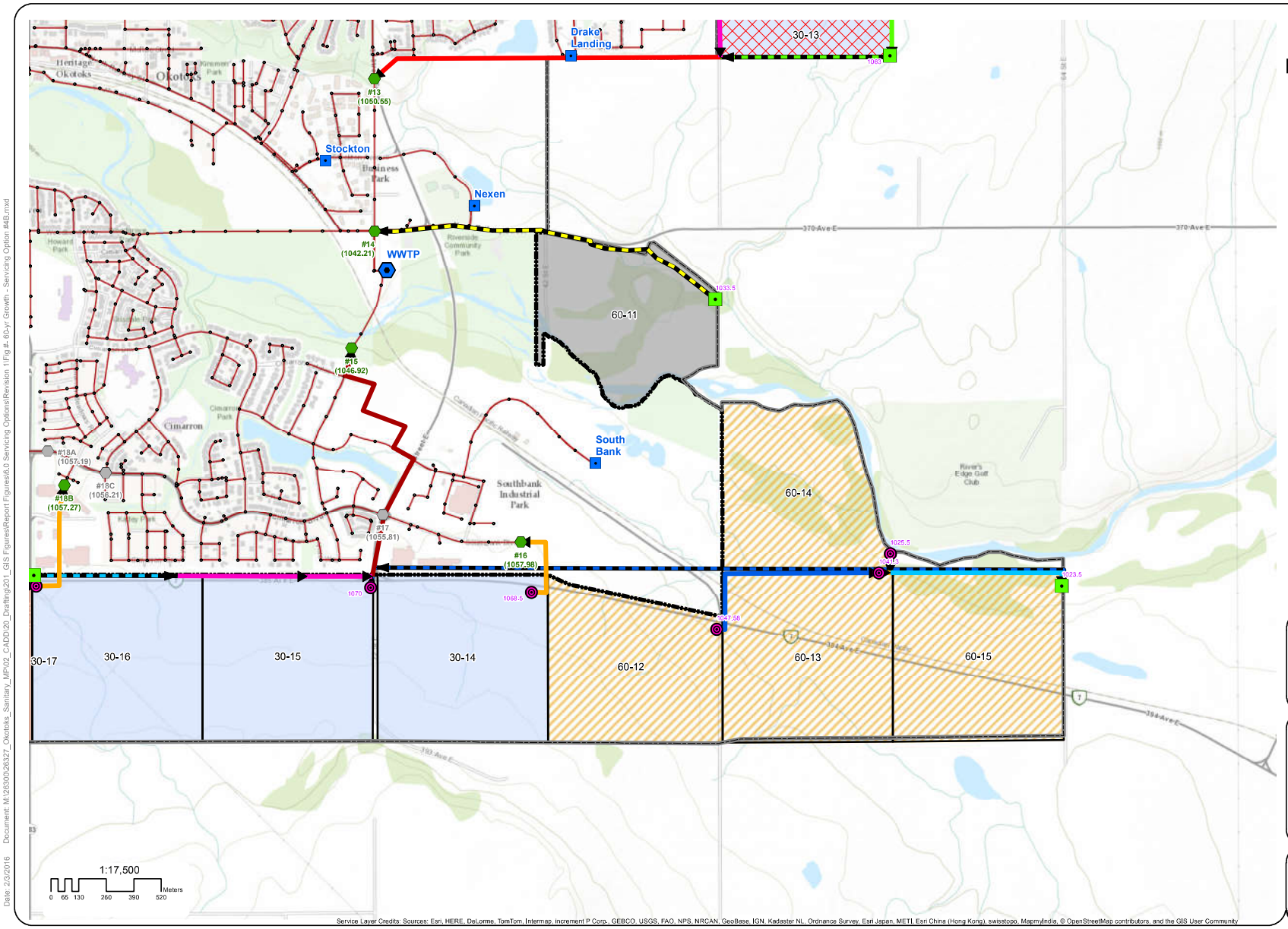


FIGURE 7.71

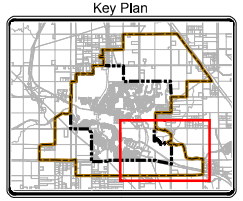
Legend

- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Lowest Elevation Within Service Area
- Proposed Lift Station
- Existing Lift Station
- Wastewater Treatment Plant
- Town Boundary
- Future Town Boundary

Proposed Sanitary Collection System

- 150mm Forcemain
- 200mm Forcemain
- 250mm Forcemain
- 300mm Forcemain
- 375mm Forcemain
- 450mm Forcemain
- 525mm Forcemain
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 900mm Sewer
- 250/150mm Siphon
- 250/150/150mm Siphon

Key Plan



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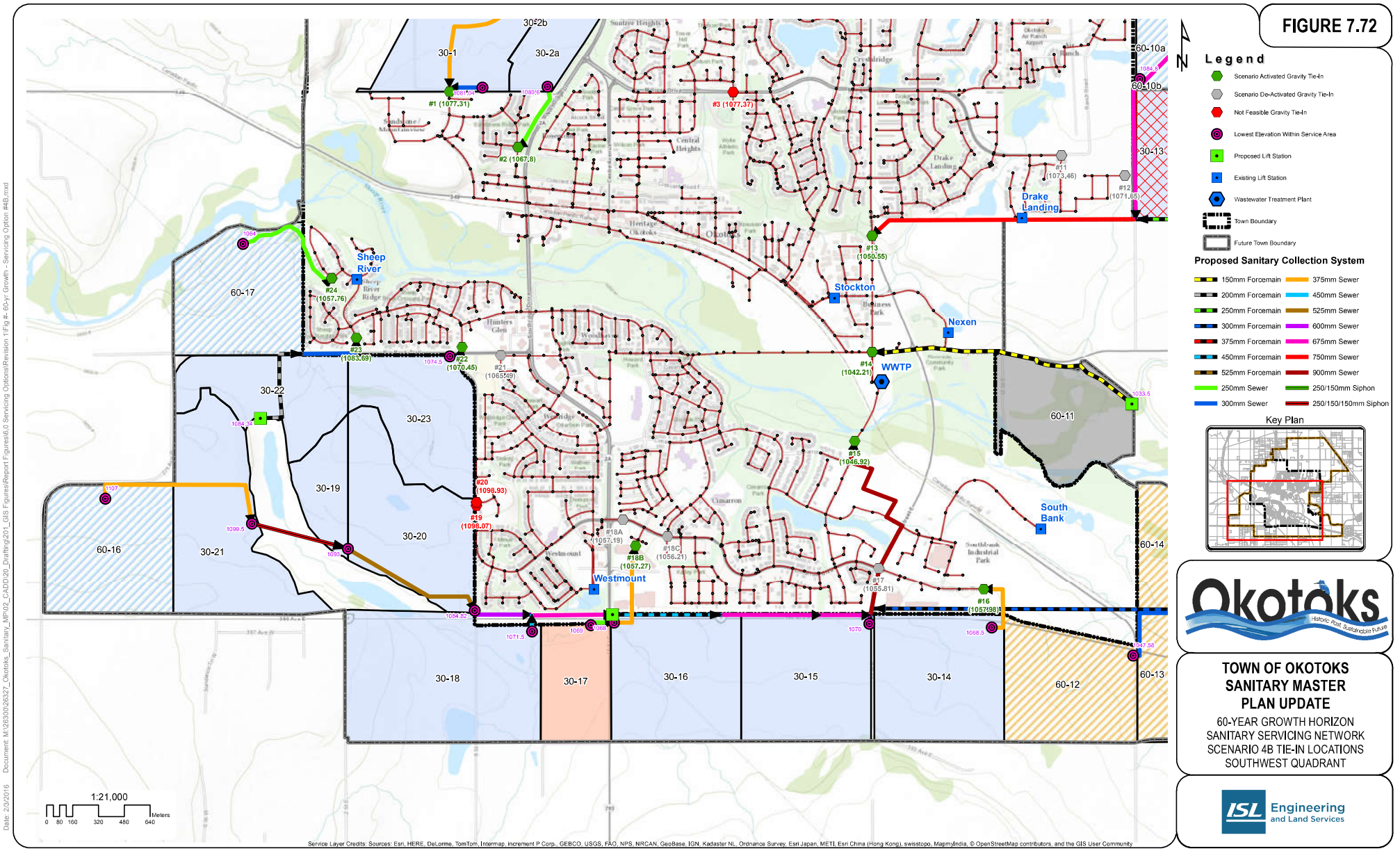

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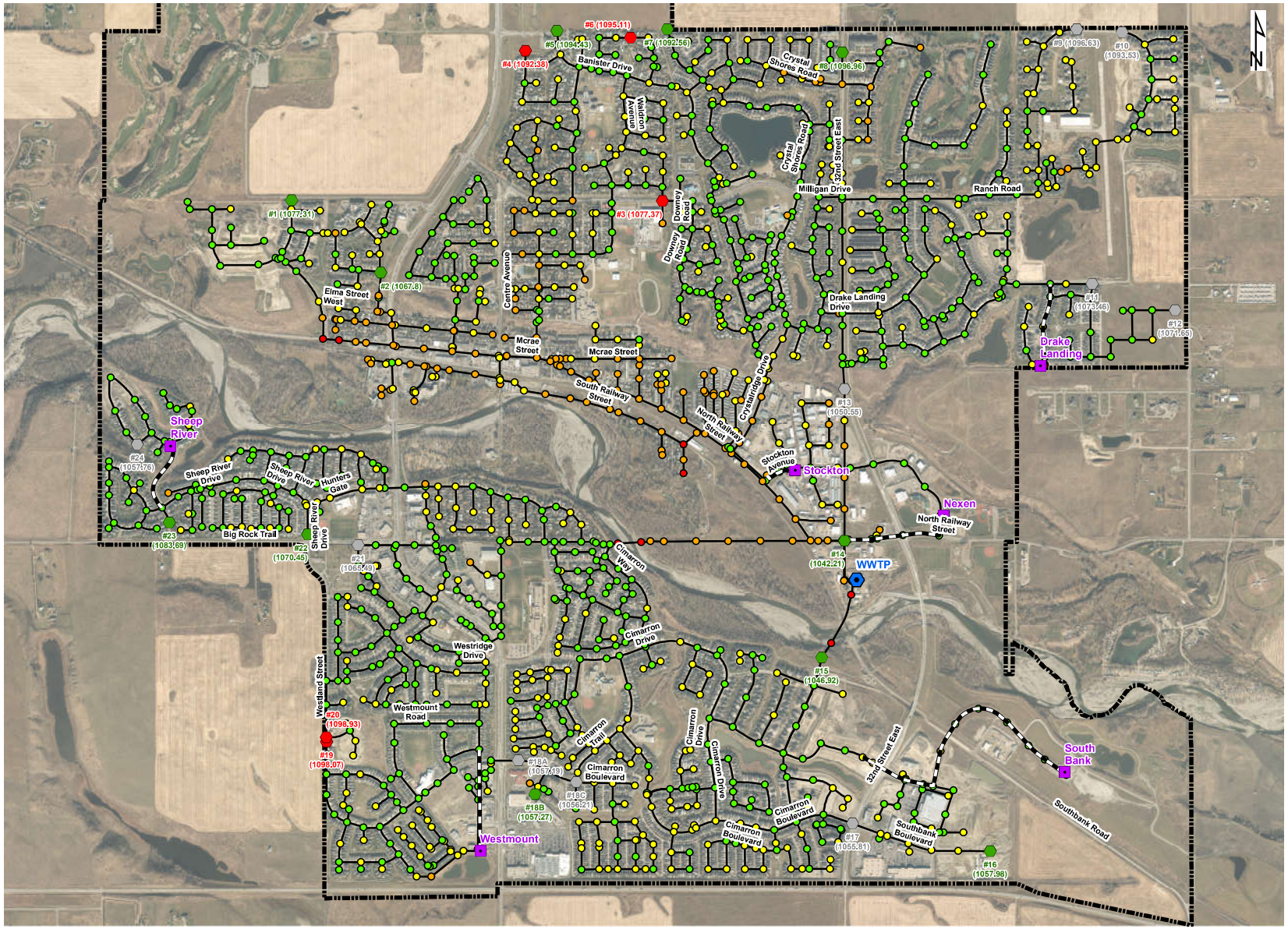

FIGURE 7.73

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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RELATIVE TO GROUND

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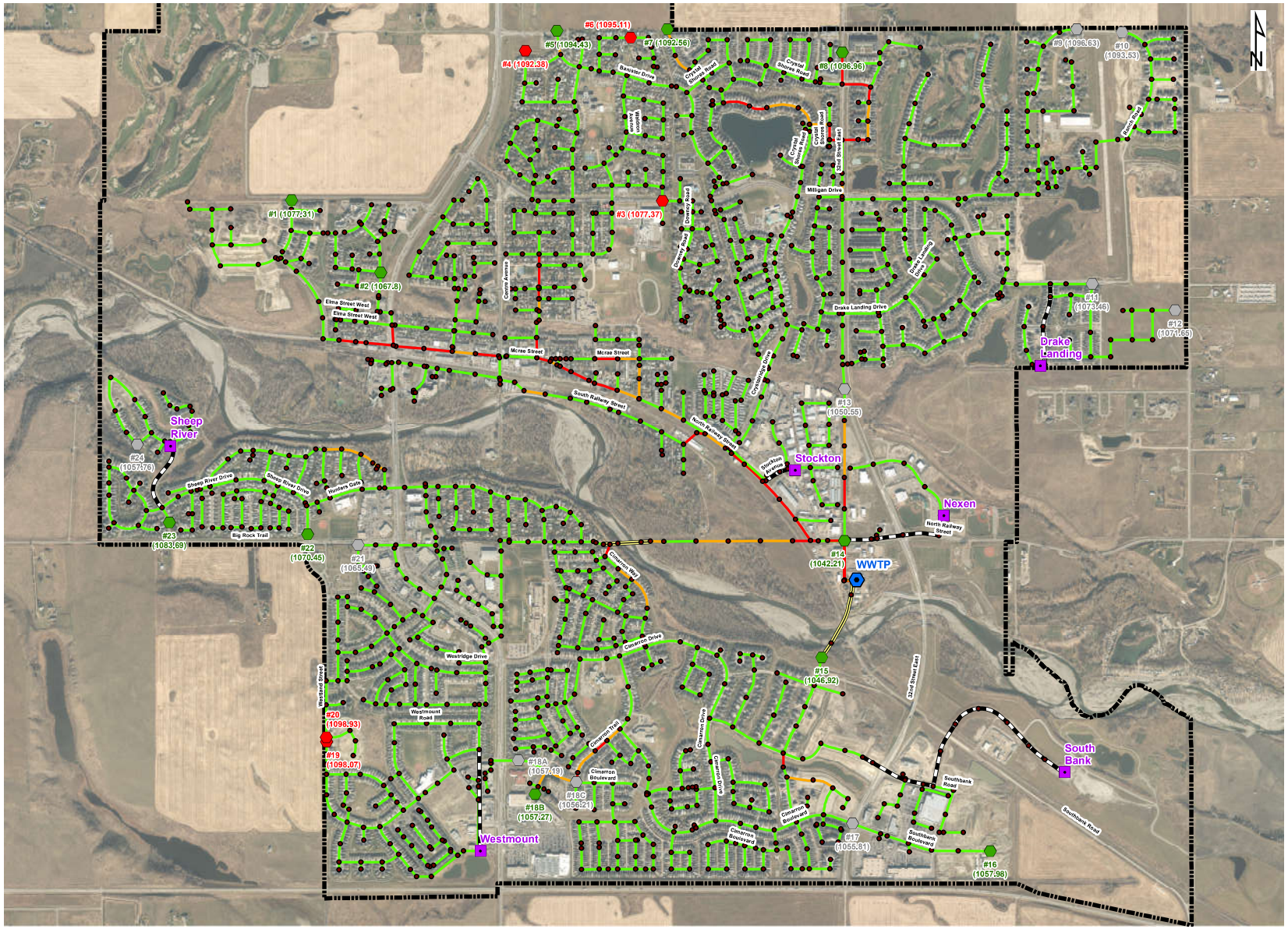

FIGURE 7.74

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

1:18,000

0 100 200 400 600 800 Meters

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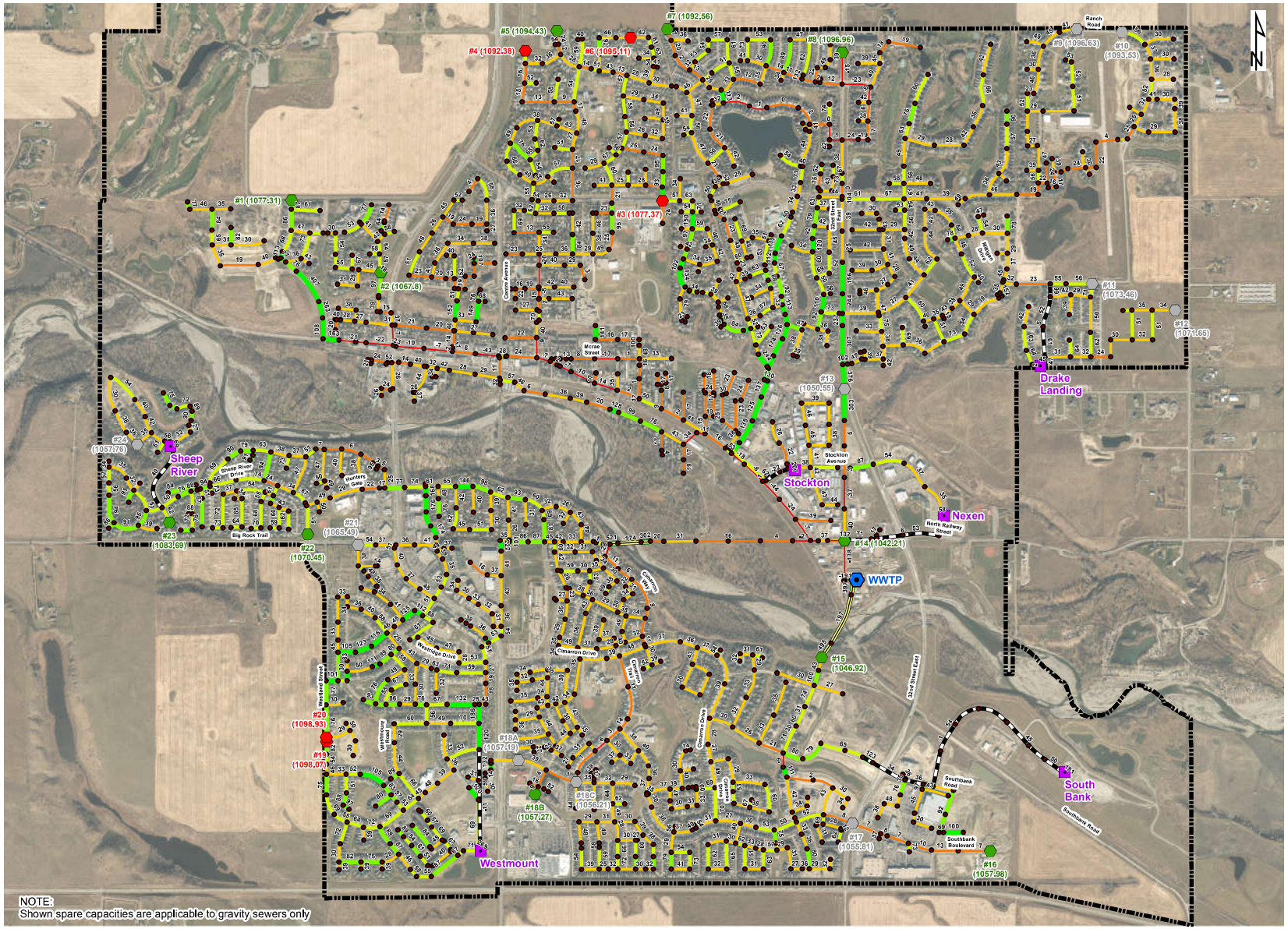

FIGURE 7.75

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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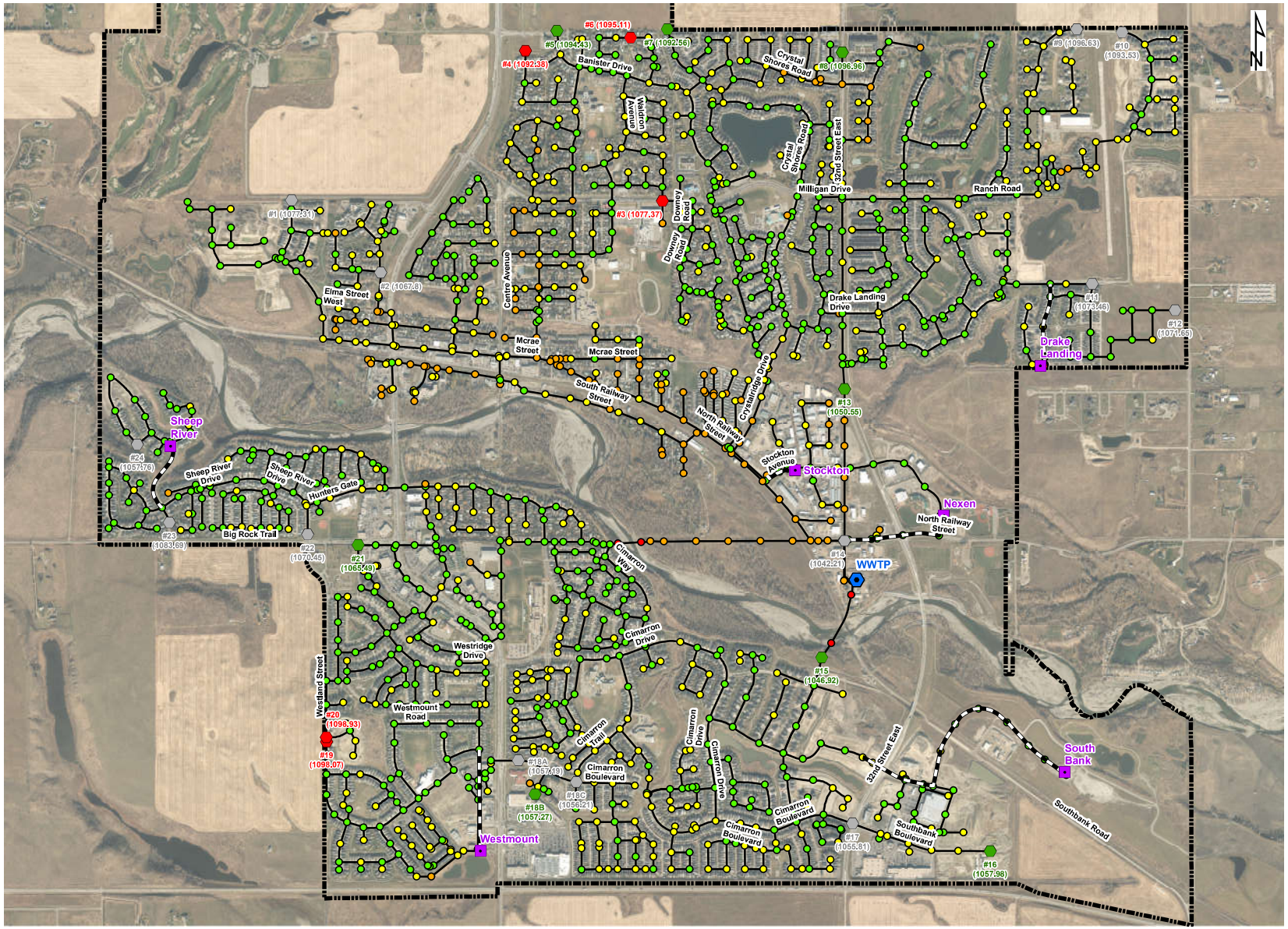

FIGURE 7.76

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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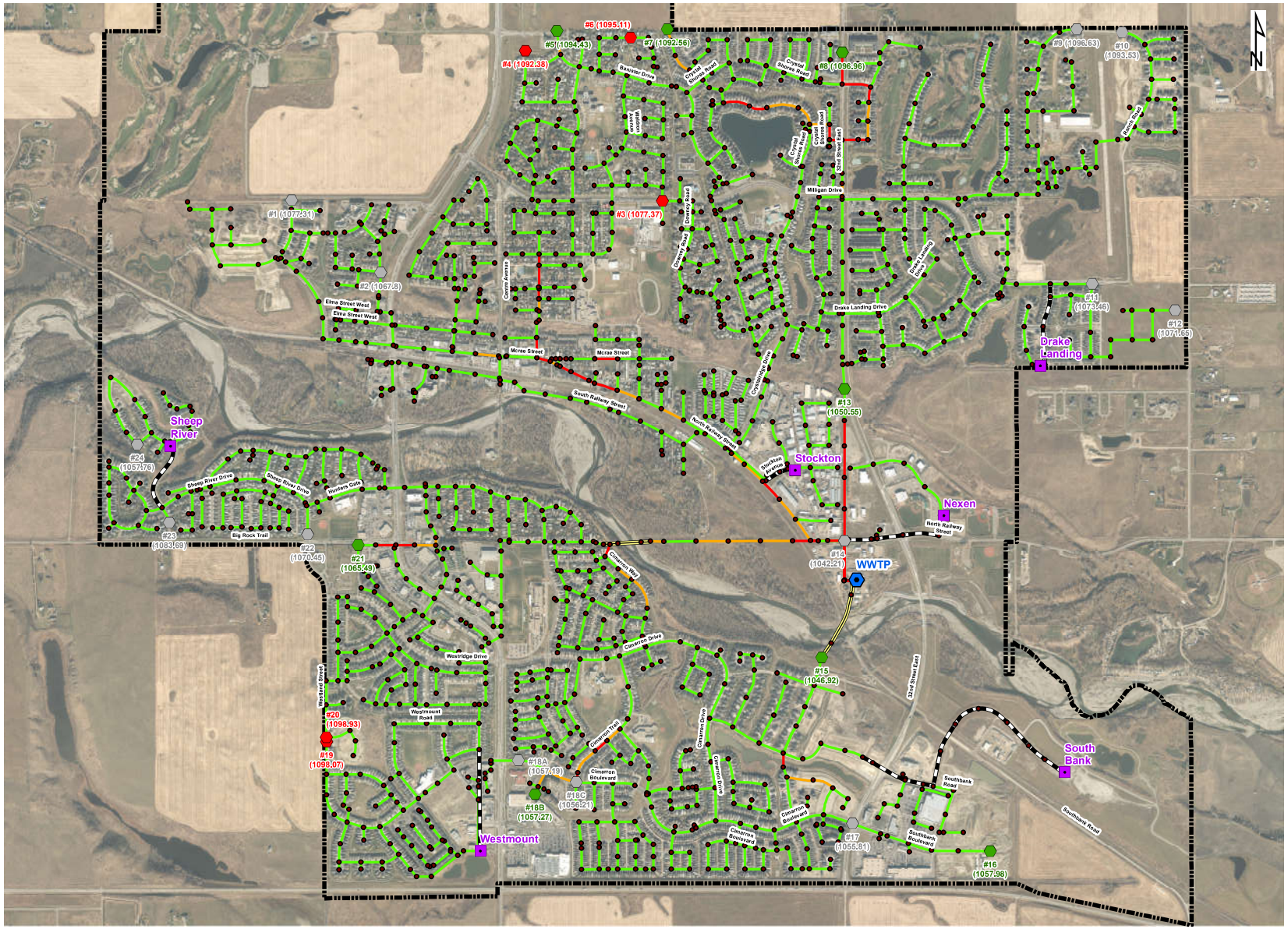

FIGURE 7.77

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

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0 100 200 400 600 800 Meters

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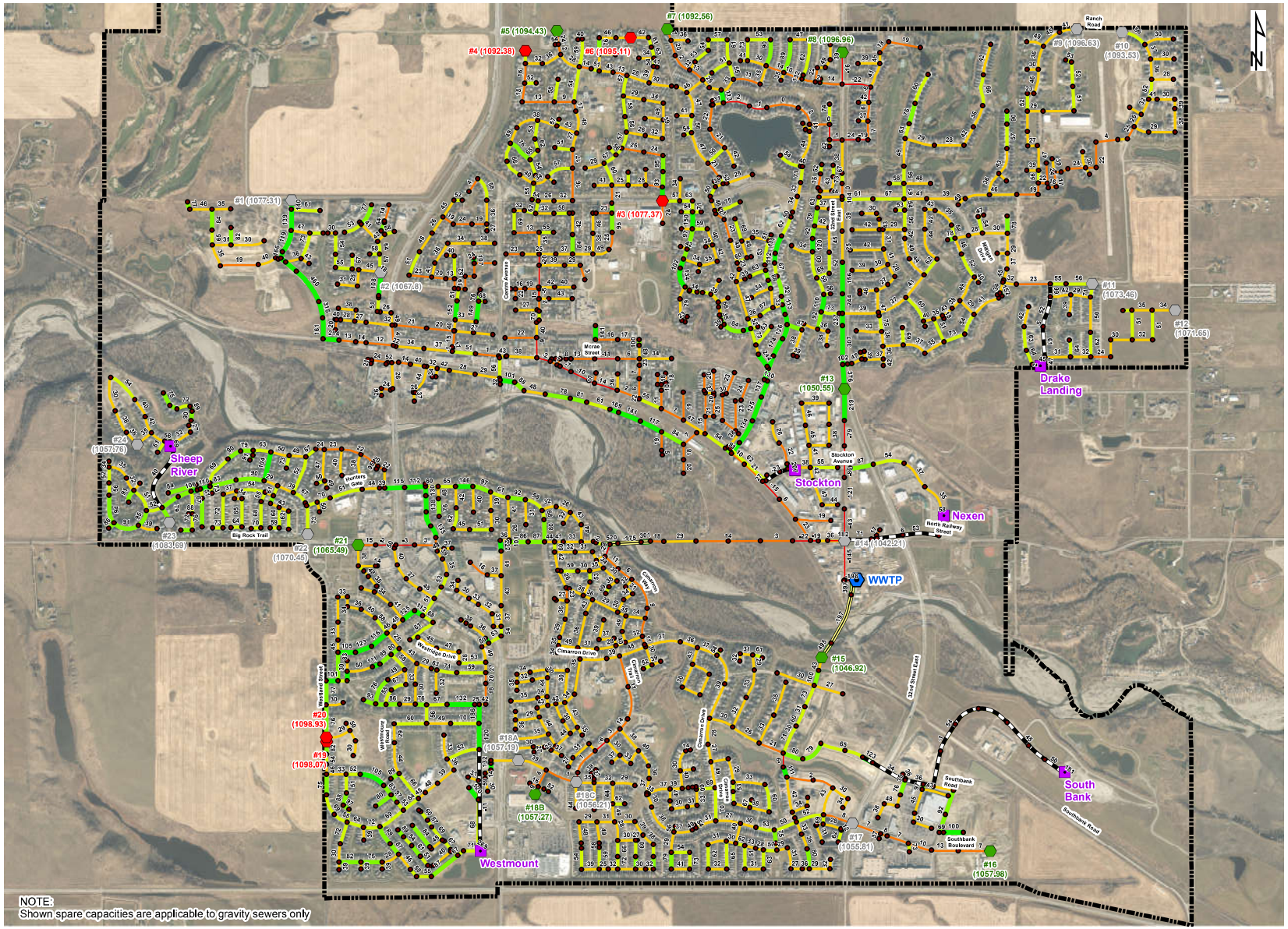

FIGURE 7.78

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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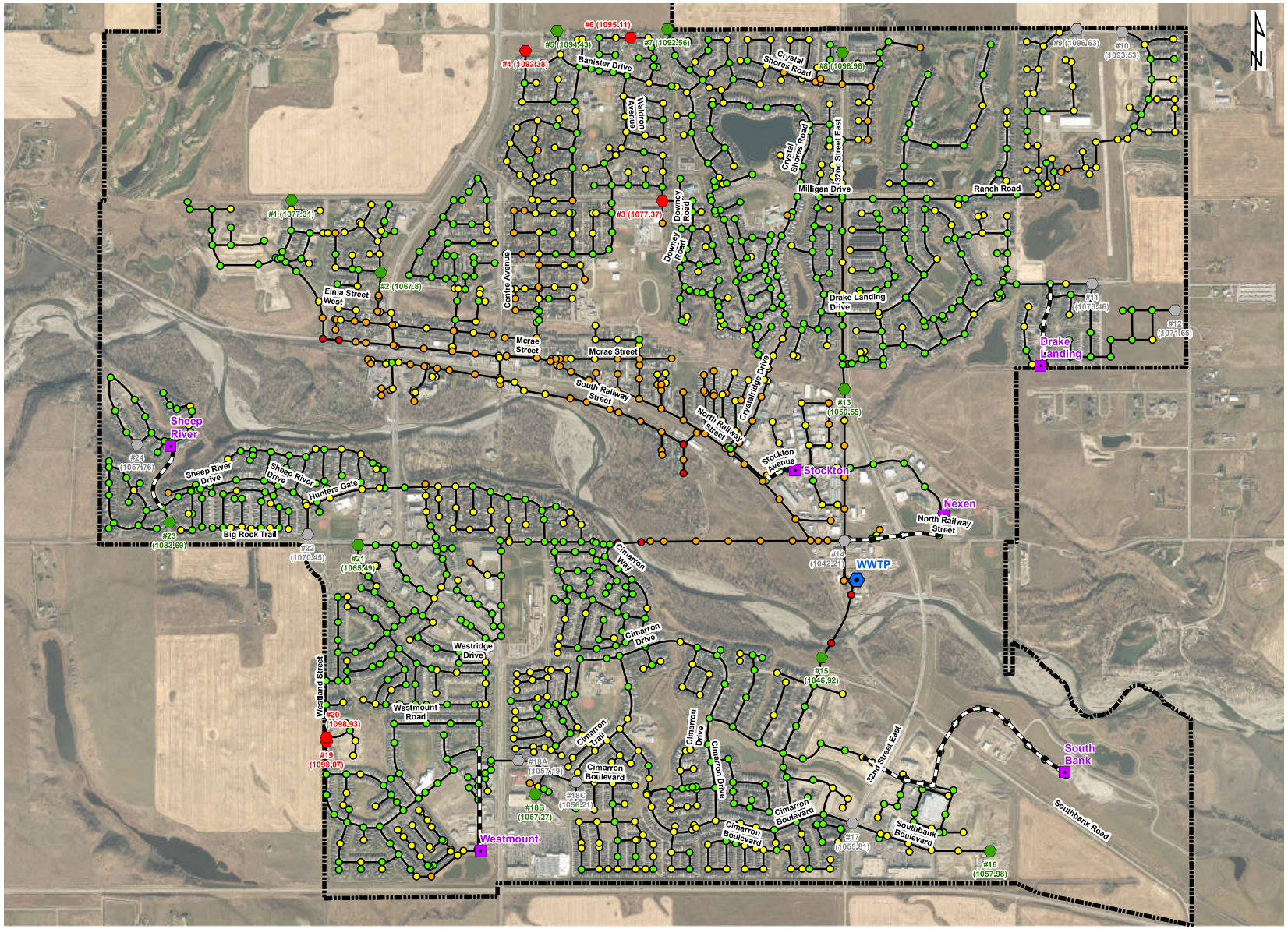

FIGURE 7.79

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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RELATIVE TO GROUND

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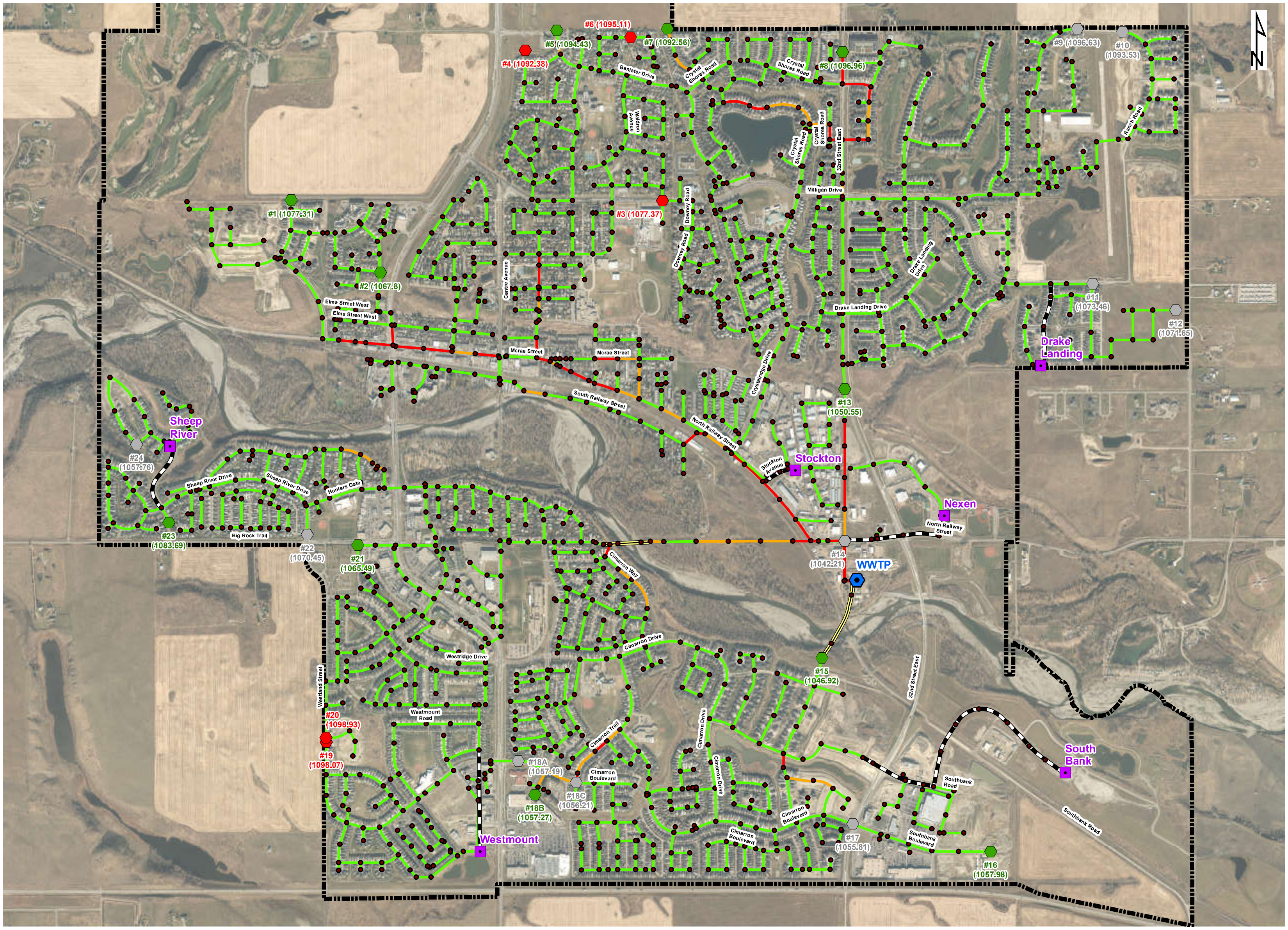
FIGURE 7.80



Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

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0 100 200 400 600 800 Meters

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PEAK DISCHARGE RELATIVE TO PIPE CAPACITY

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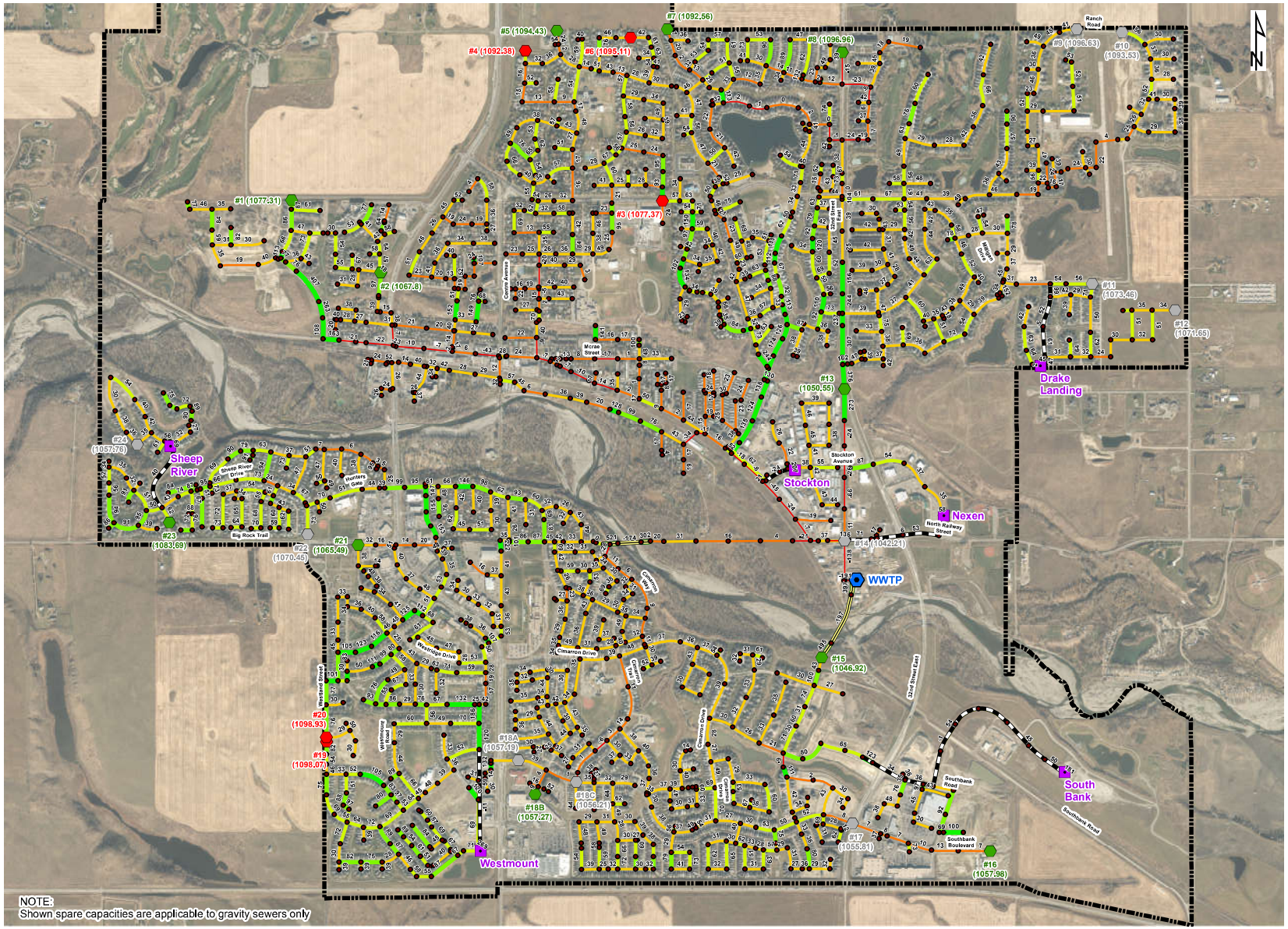

FIGURE 7.81

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

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0 100 200 400 600 800 Meters

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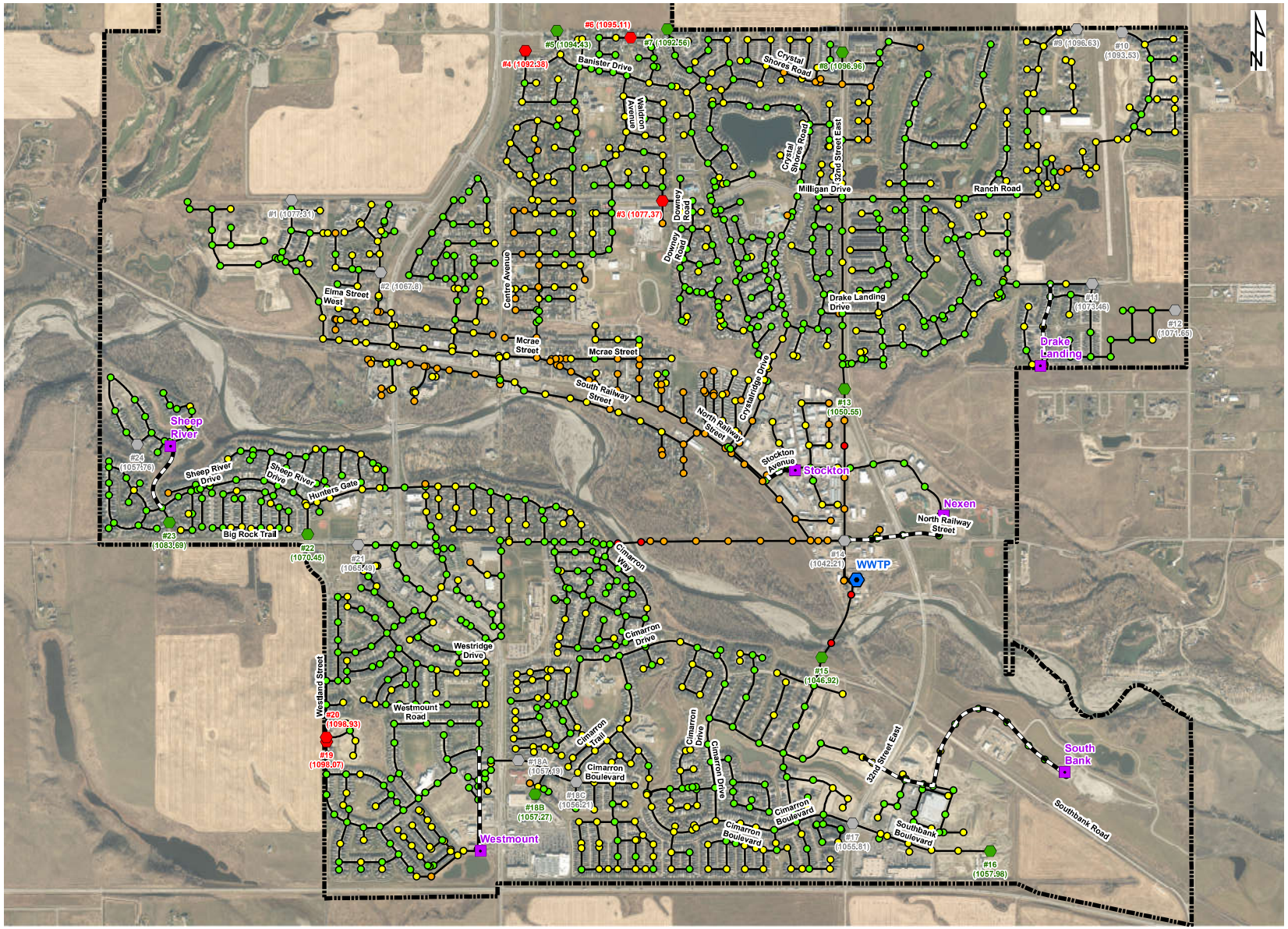

FIGURE 7.82

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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MAXIMUM HGL ELEVATION
RELATIVE TO GROUND

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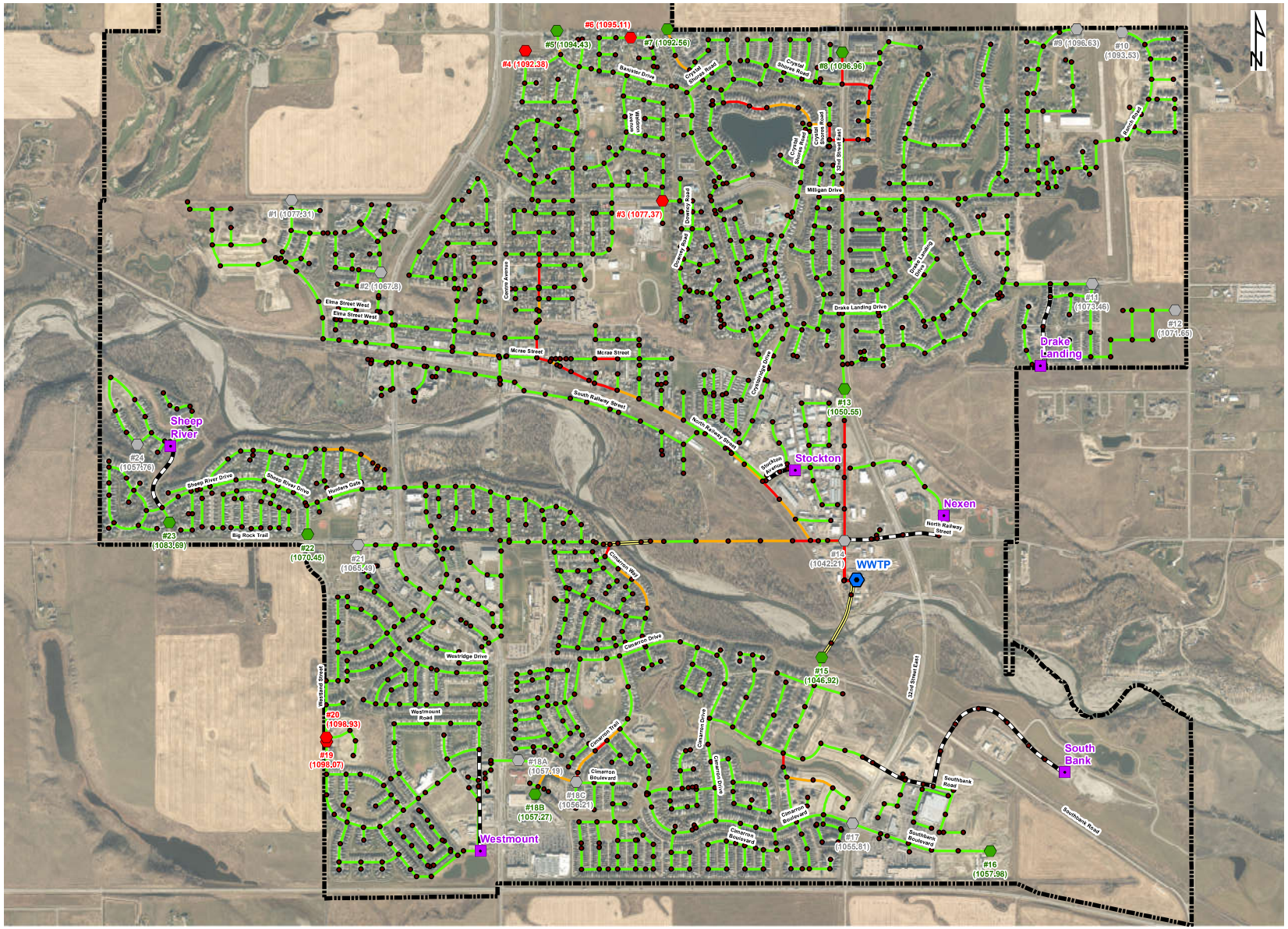

FIGURE 7.83

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

1:18,000

0 100 200 400 600 800 Meters

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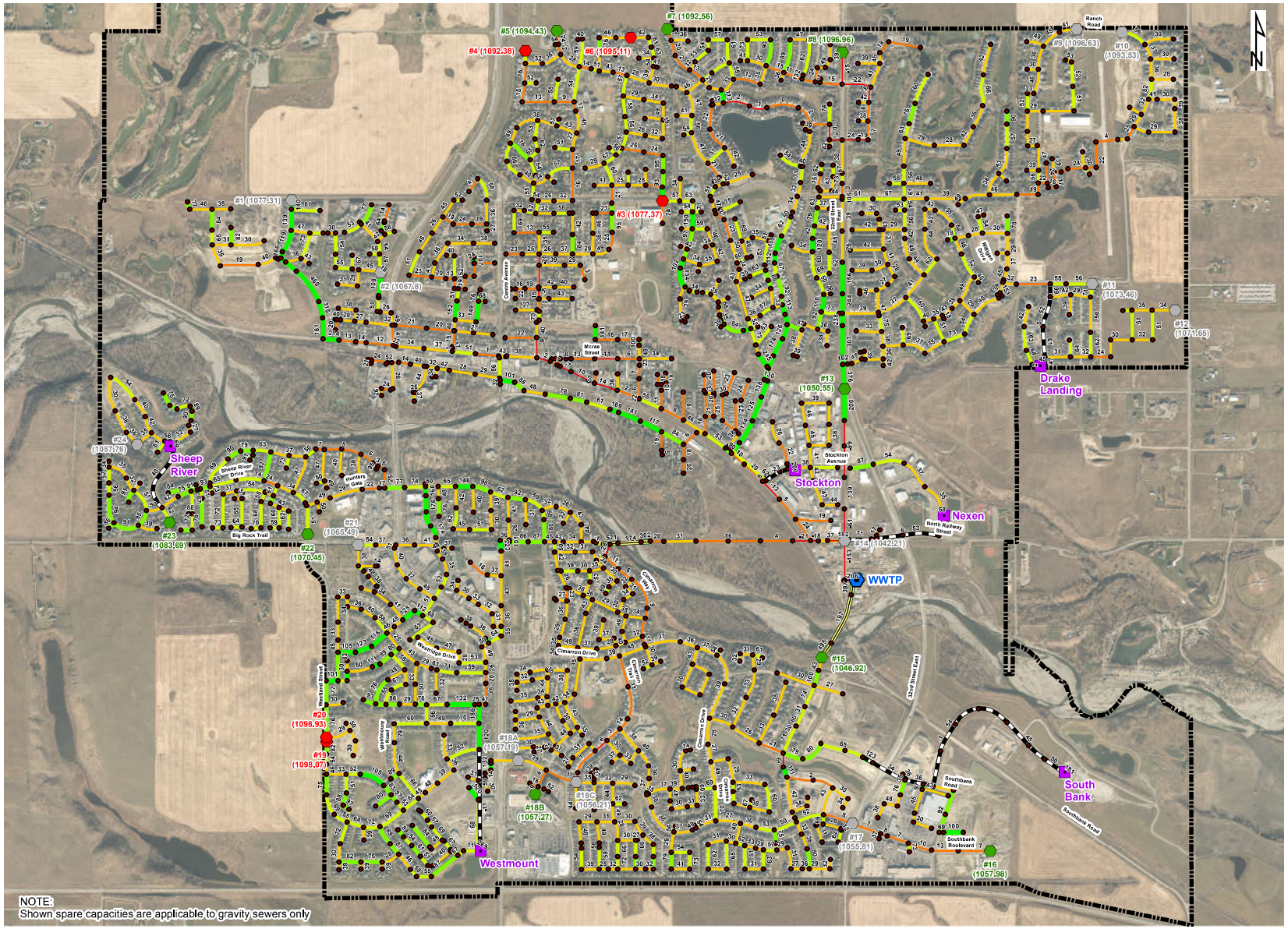

FIGURE 7.84

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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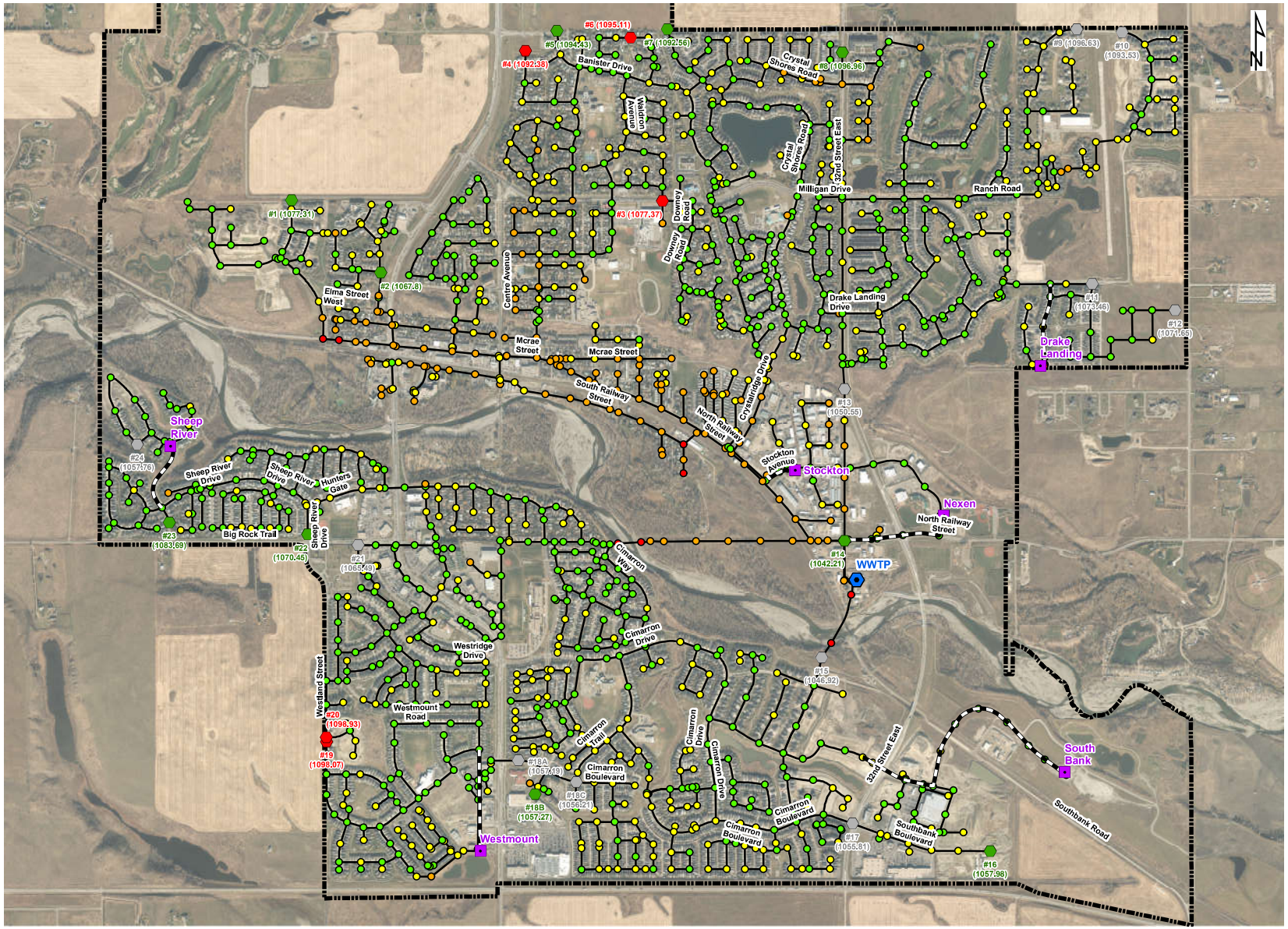

FIGURE 7.85

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

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0 100 200 400 600 800 Meters

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RELATIVE TO GROUND

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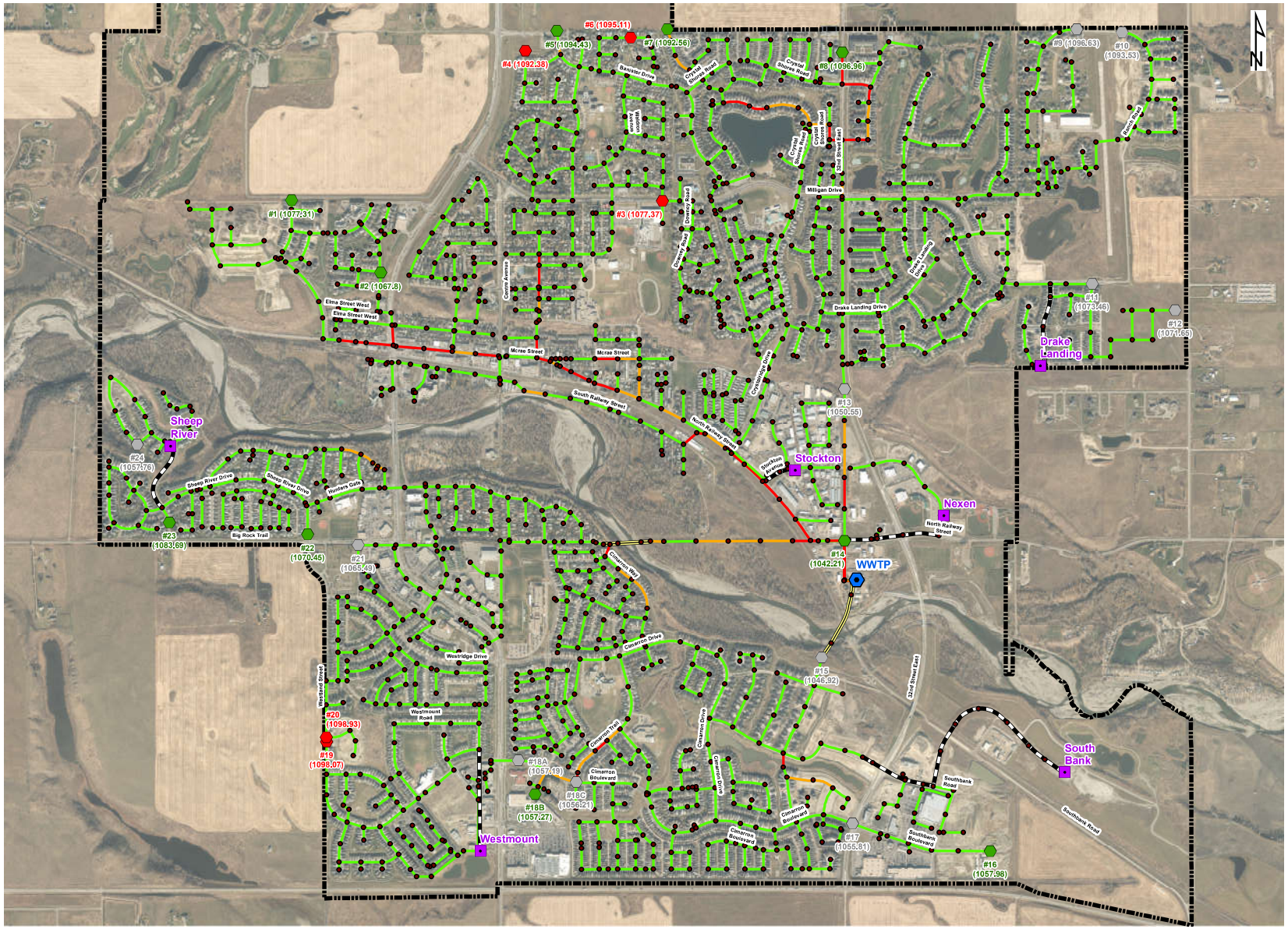

FIGURE 7.86

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

1:18,000

0 100 200 400 600 800 Meters

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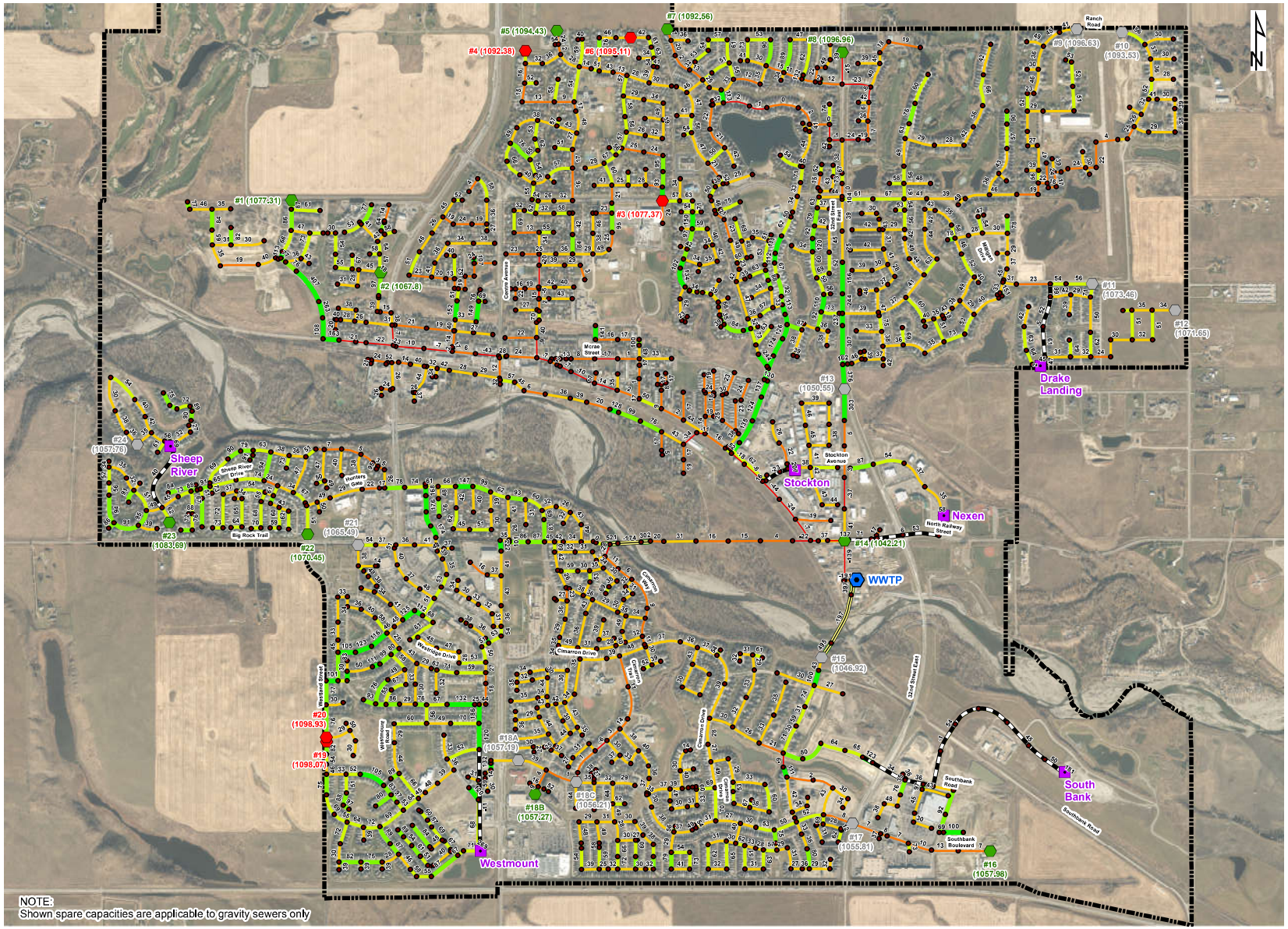

FIGURE 7.87

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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SCENARIO 1B TIE-IN LOCATIONS
SPARE CAPACITY

ISL Engineering and Land Services

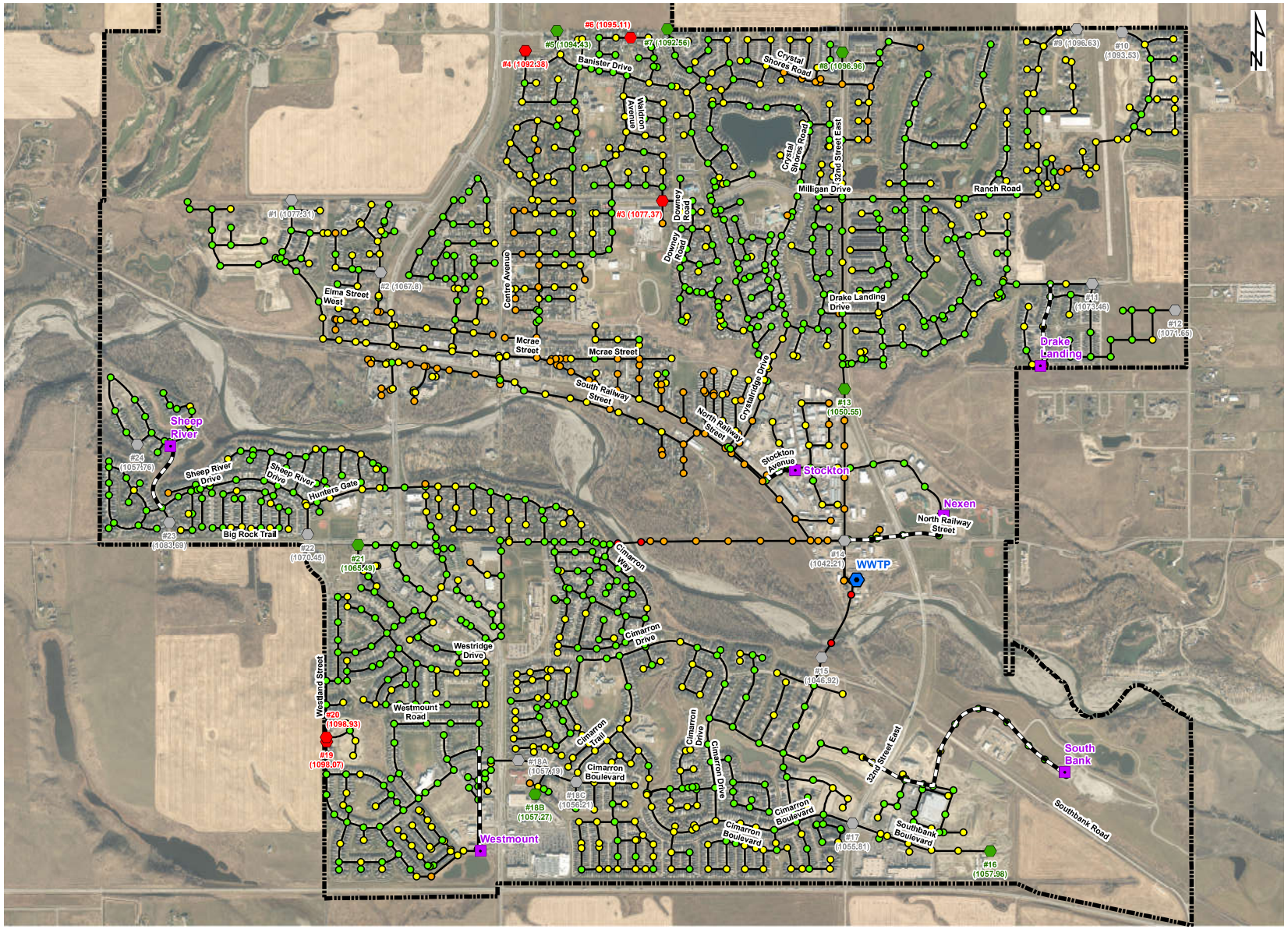

FIGURE 7.88

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

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0 100 200 400 600 800 Meters

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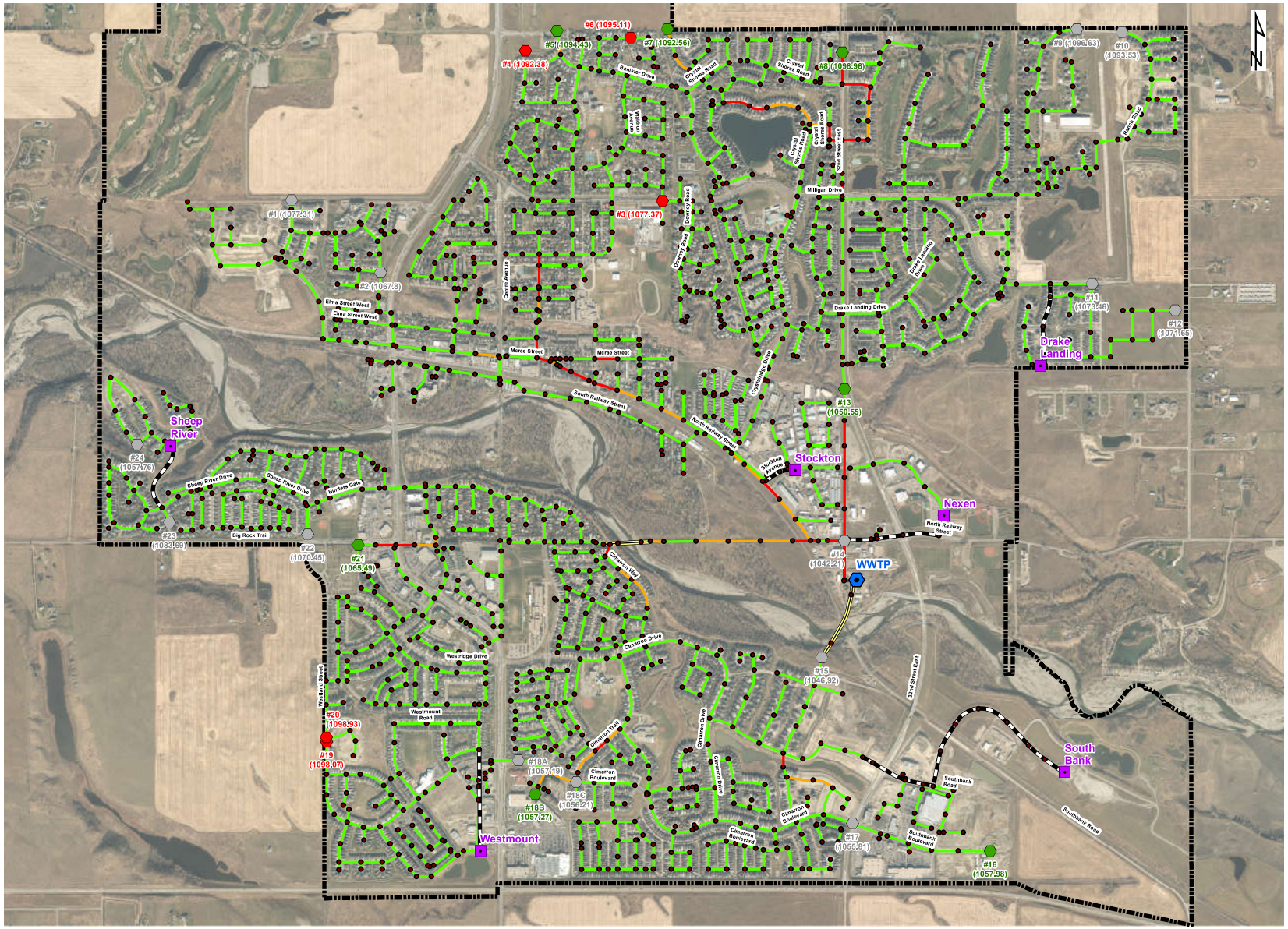

FIGURE 7.89

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

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0 100 200 400 600 800 Meters

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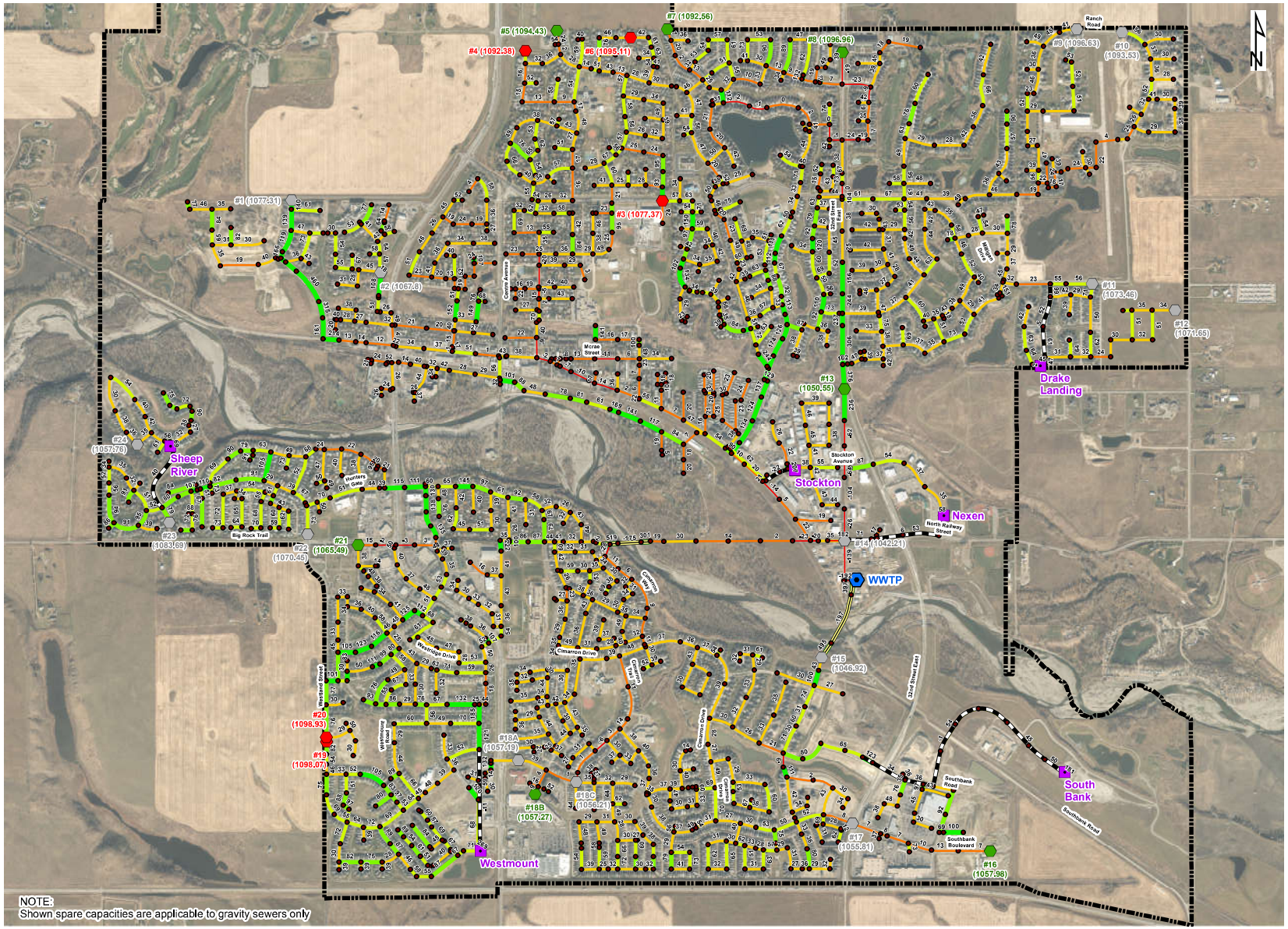

FIGURE 7.90

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

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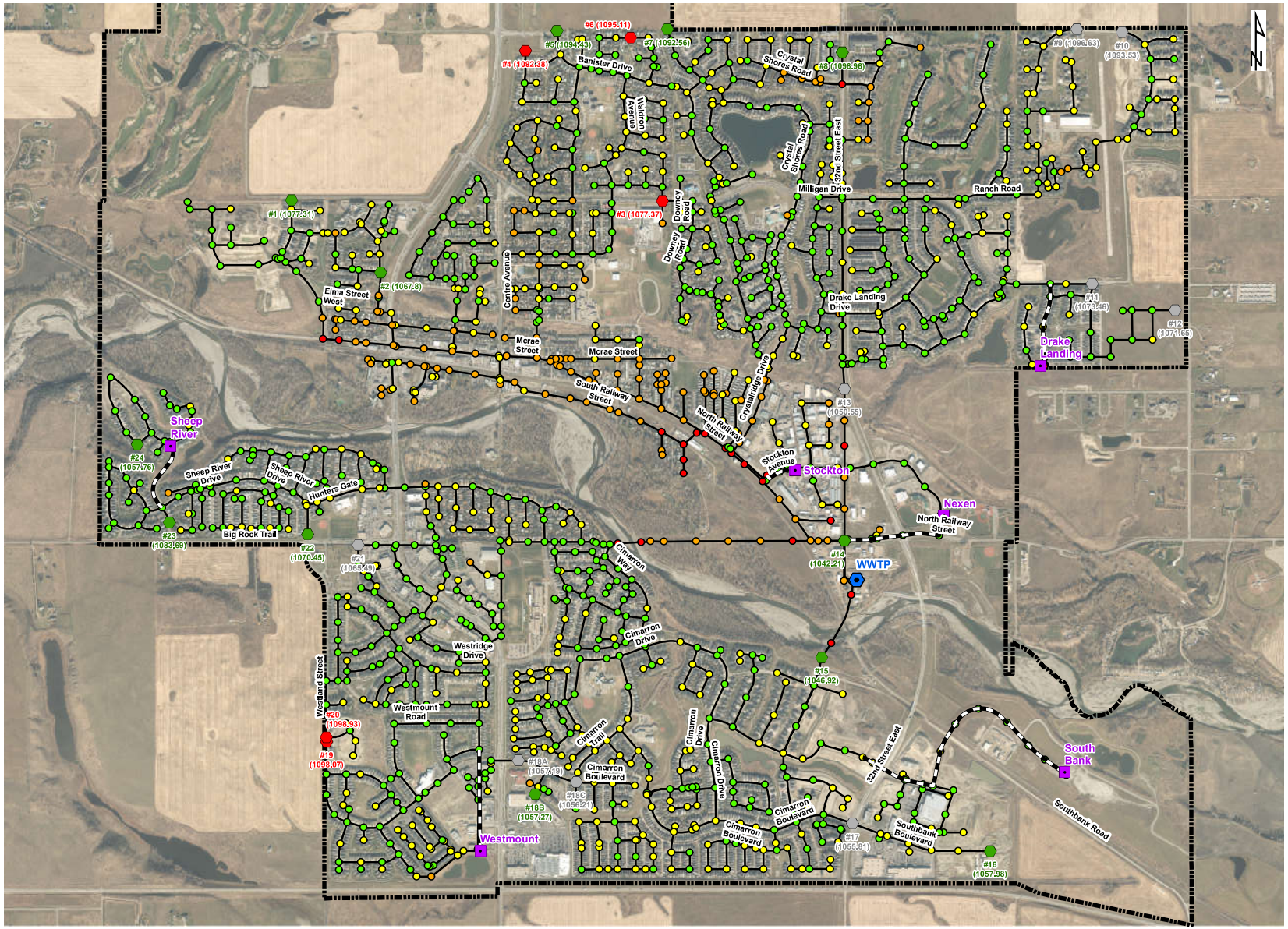

FIGURE 7.91

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

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0 100 200 400 600 800 Meters

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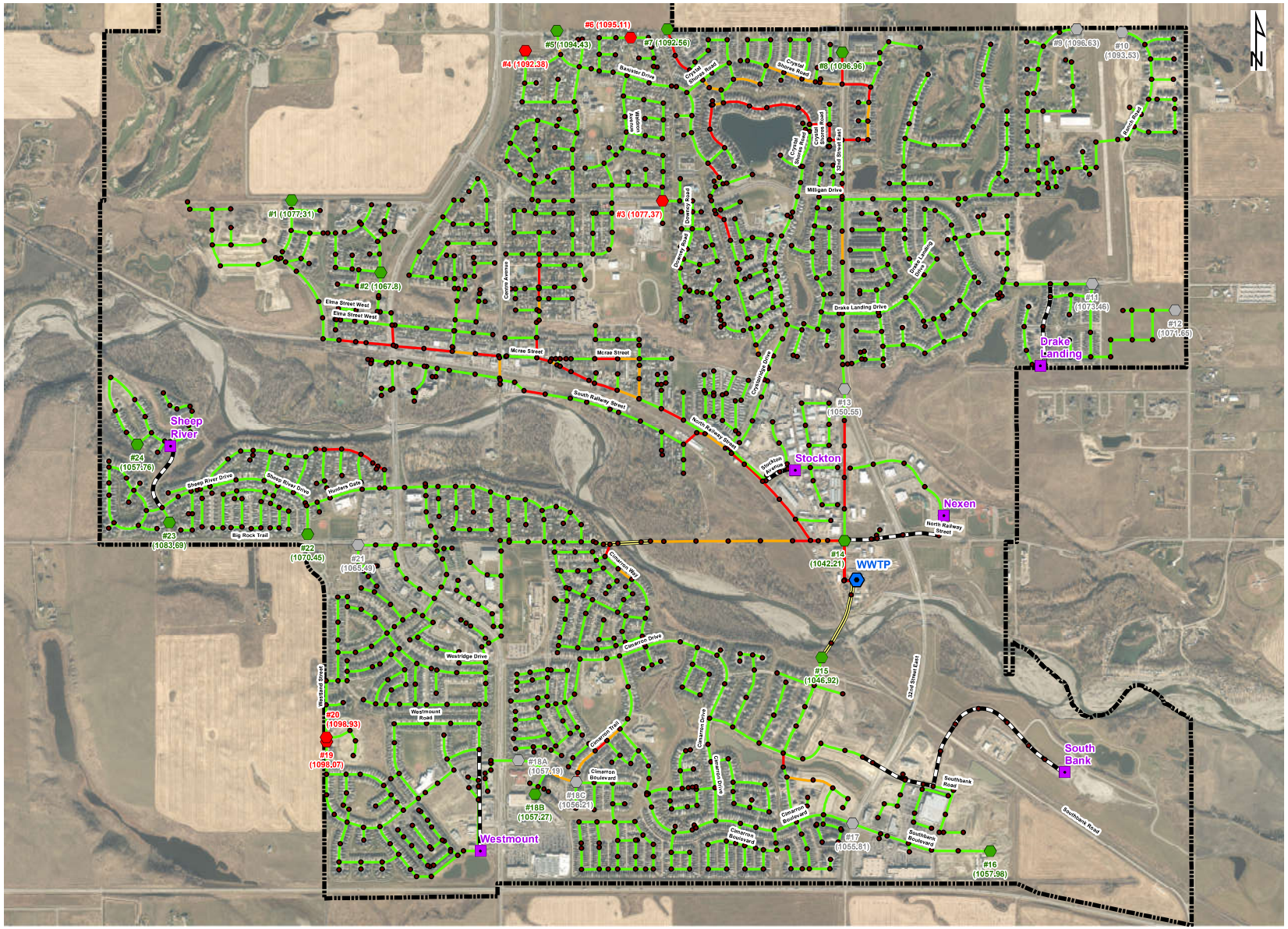

FIGURE 7.92

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

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0 100 200 400 600 800 Meters

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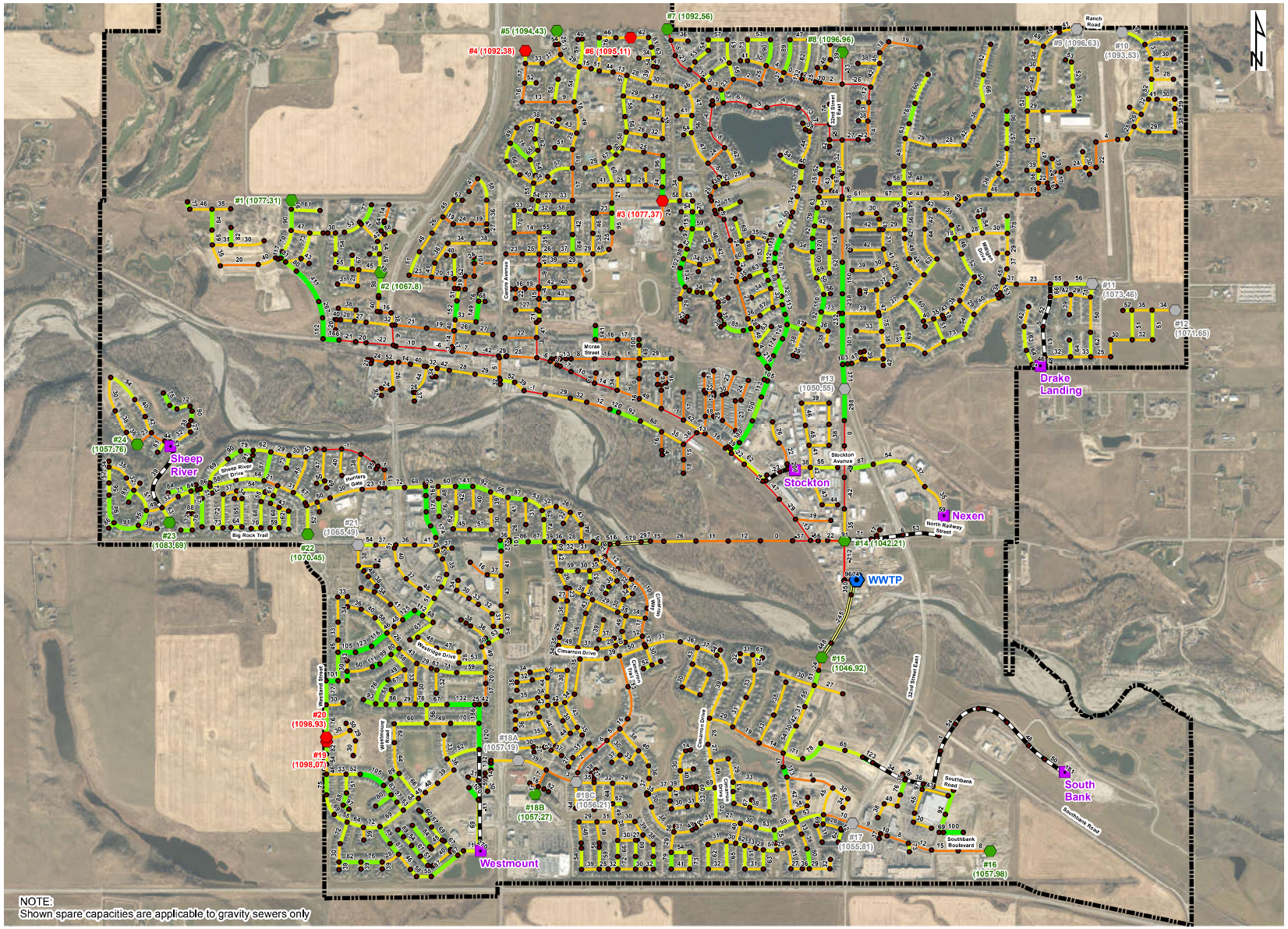

FIGURE 7.93

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

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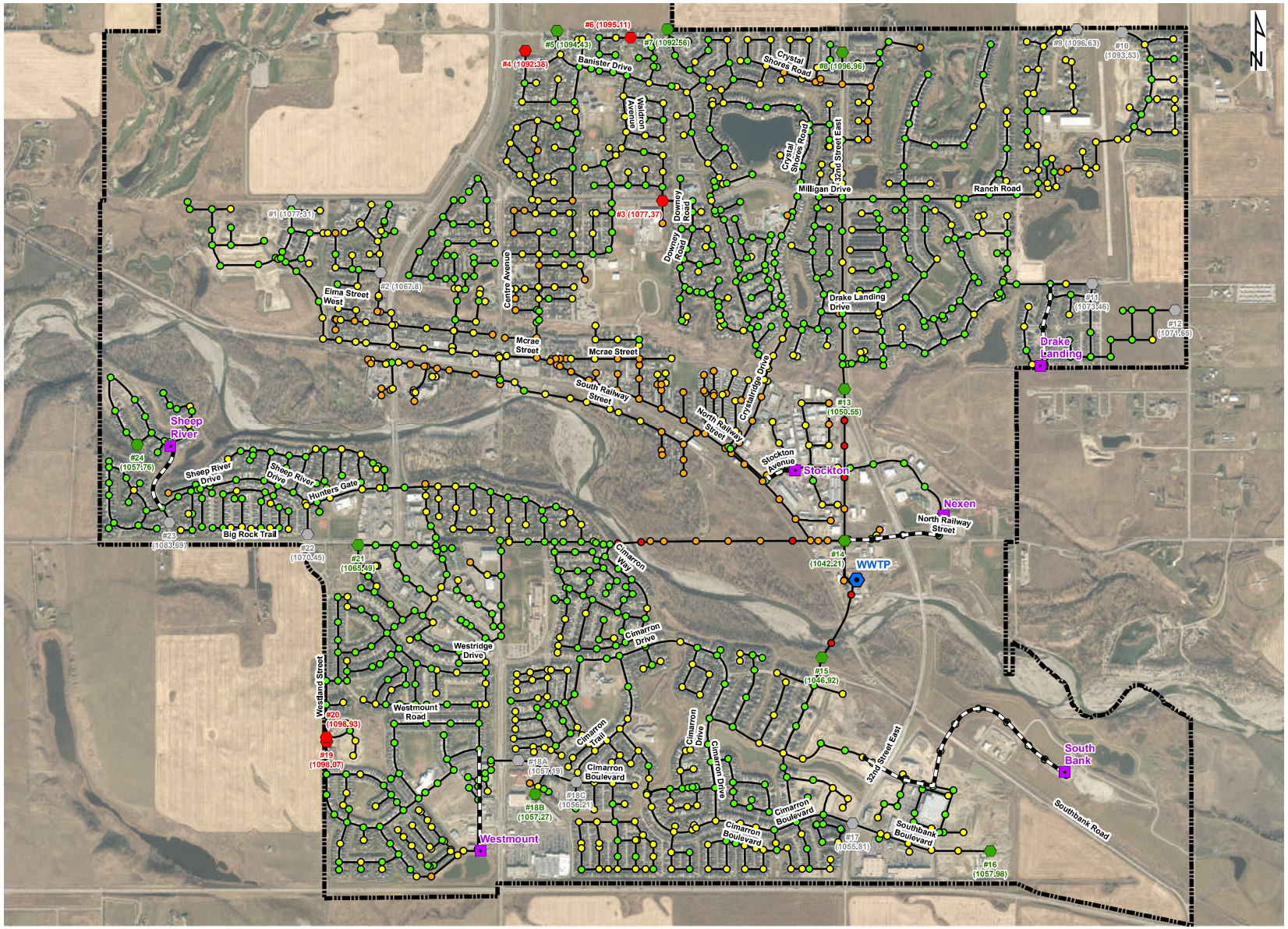

FIGURE 7.94

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

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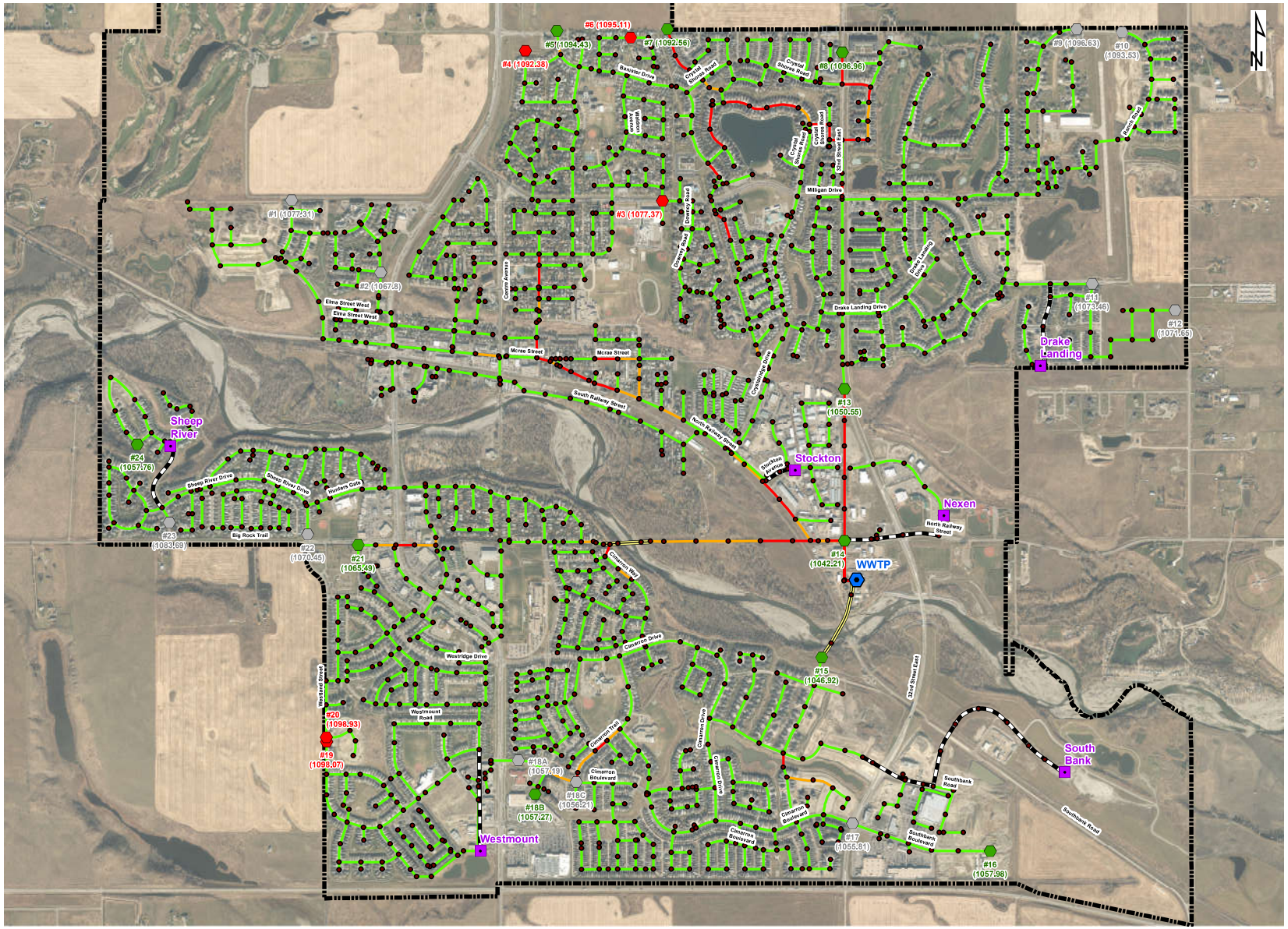

FIGURE 7.95

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
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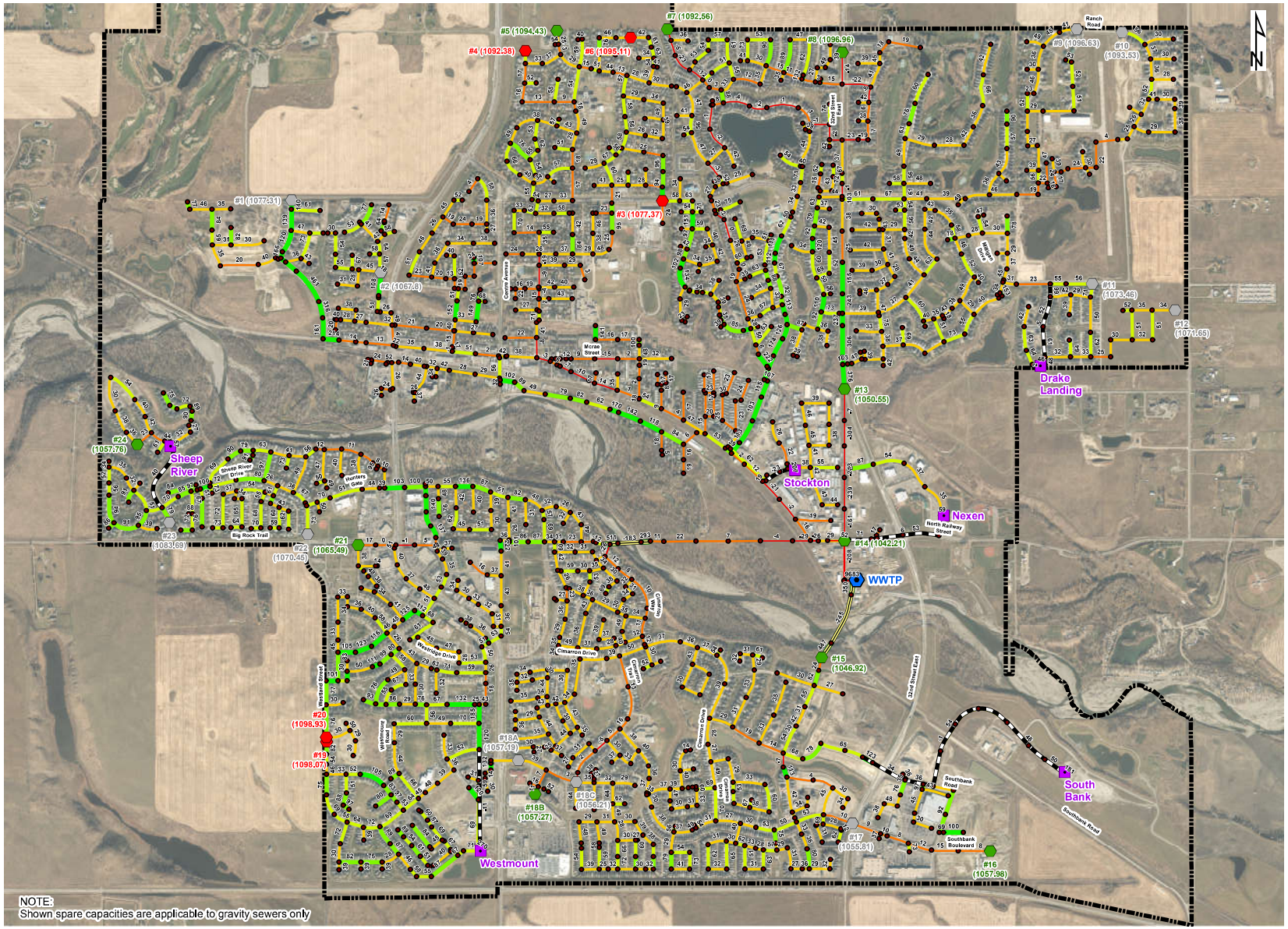

FIGURE 7.96

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

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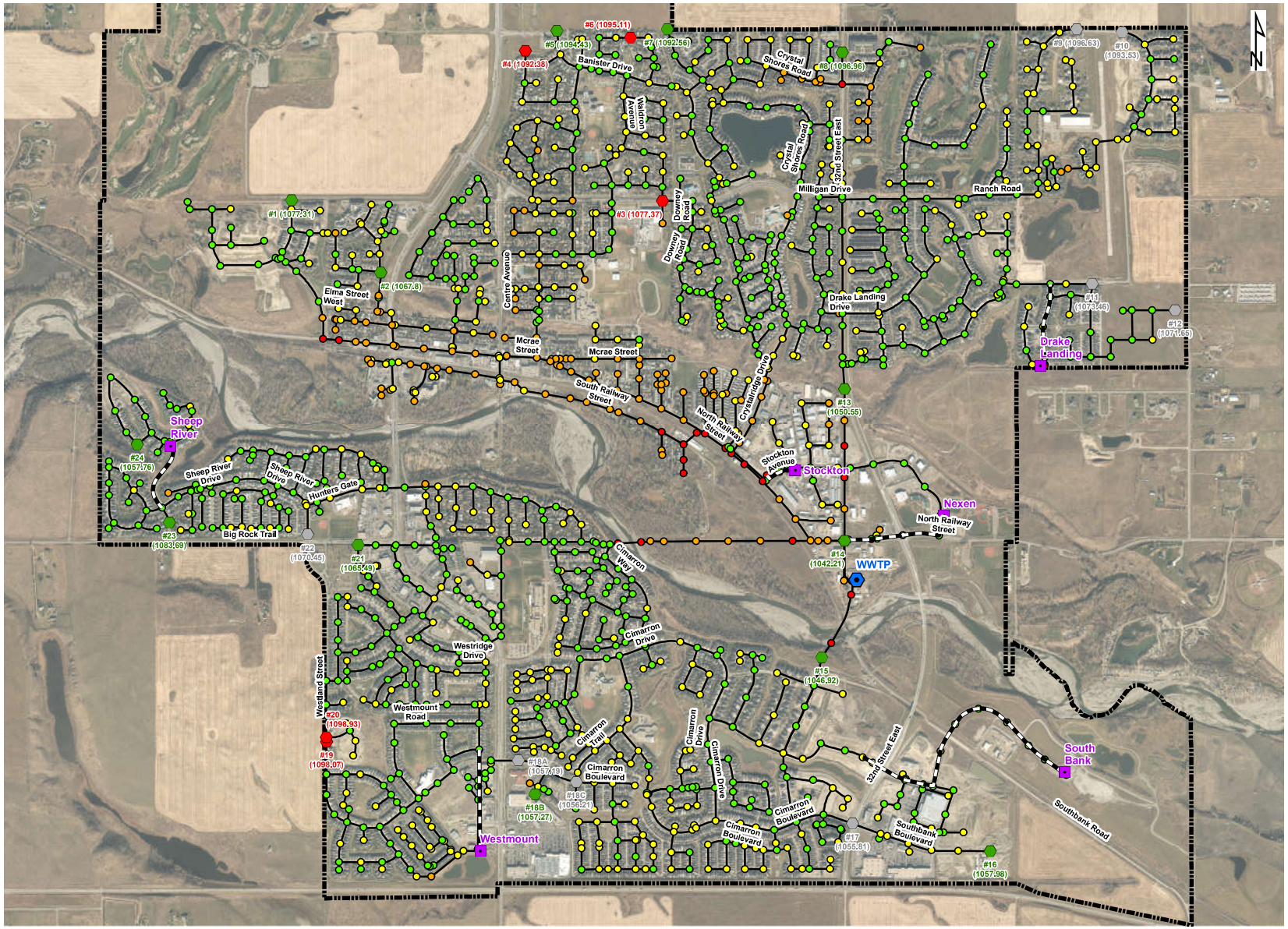

FIGURE 7.97

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

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0 100 200 400 600 800 Meters

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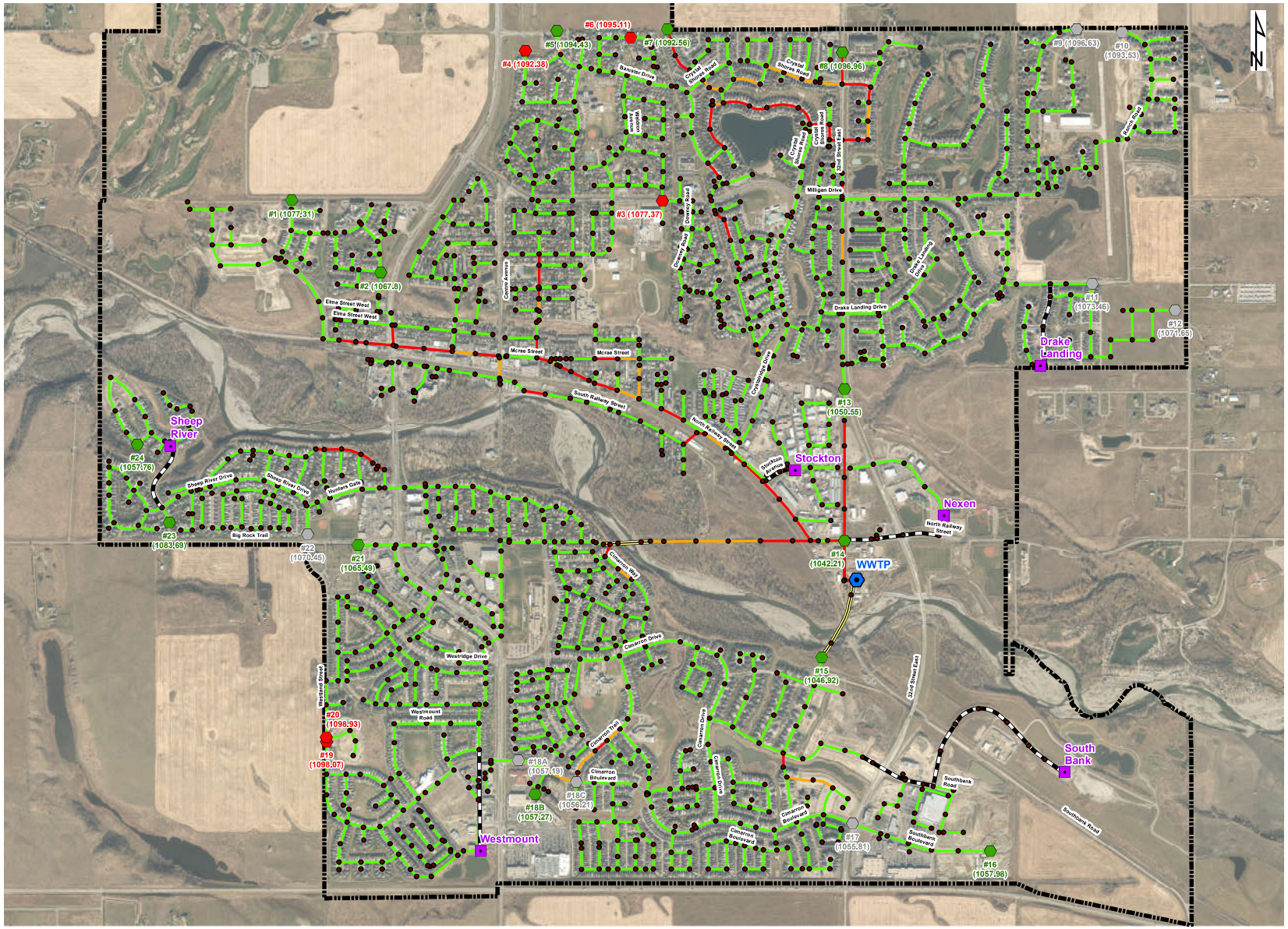

FIGURE 7.98

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

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0 100 200 400 600 800 Meters

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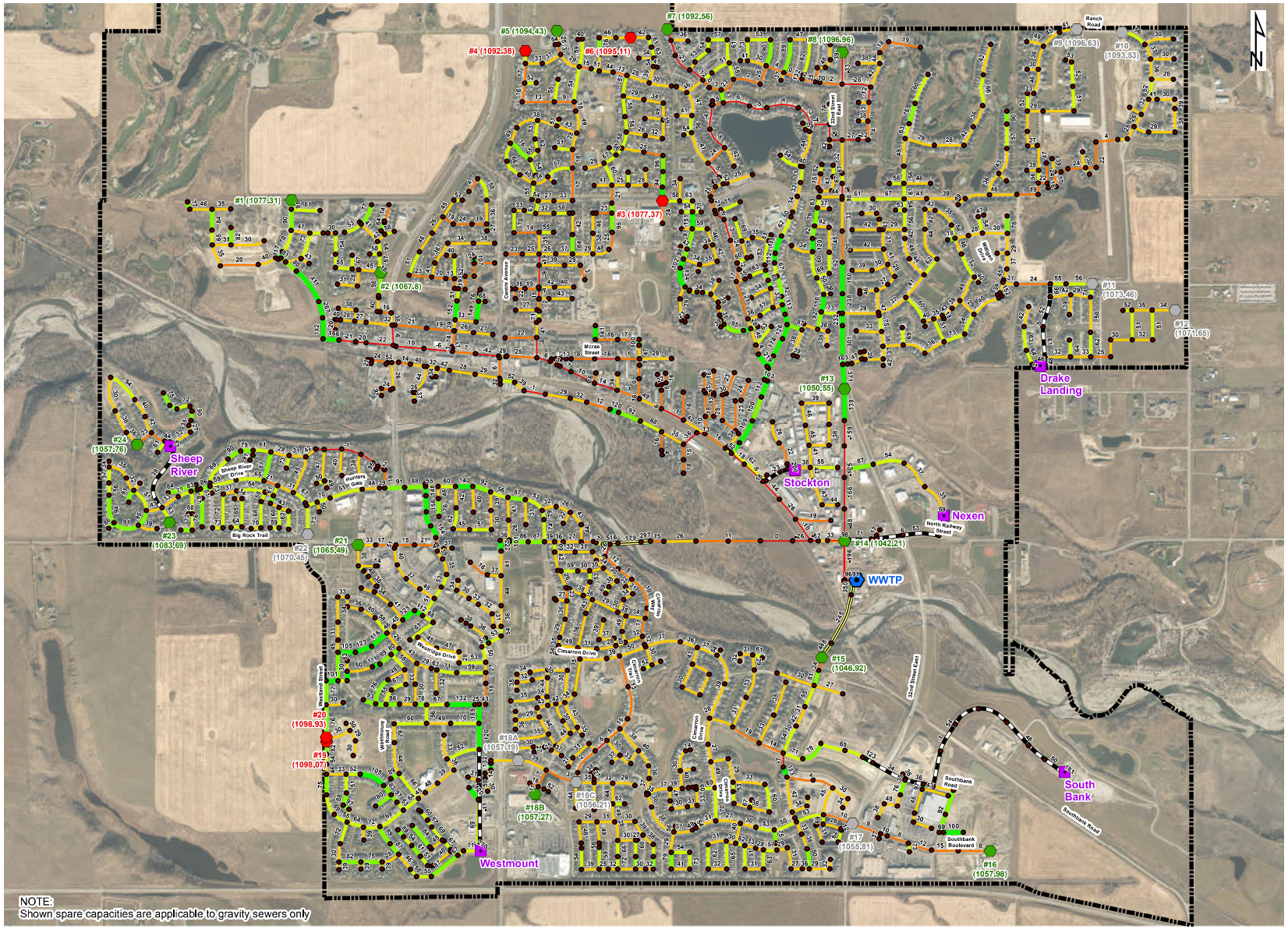

FIGURE 7.99

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
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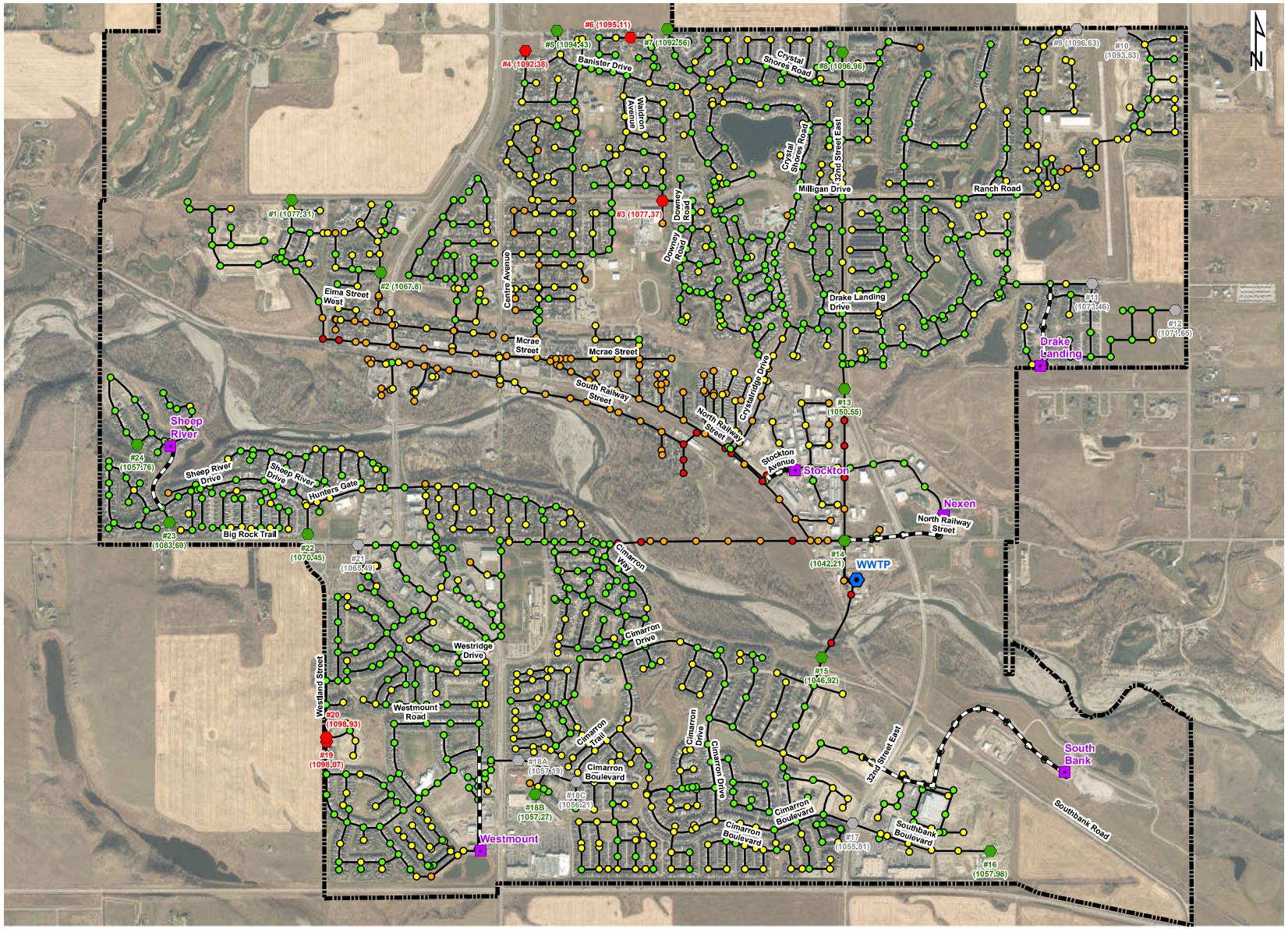

FIGURE 7.100

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
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- Town Boundary

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0 100 200 400 600 800 Meters

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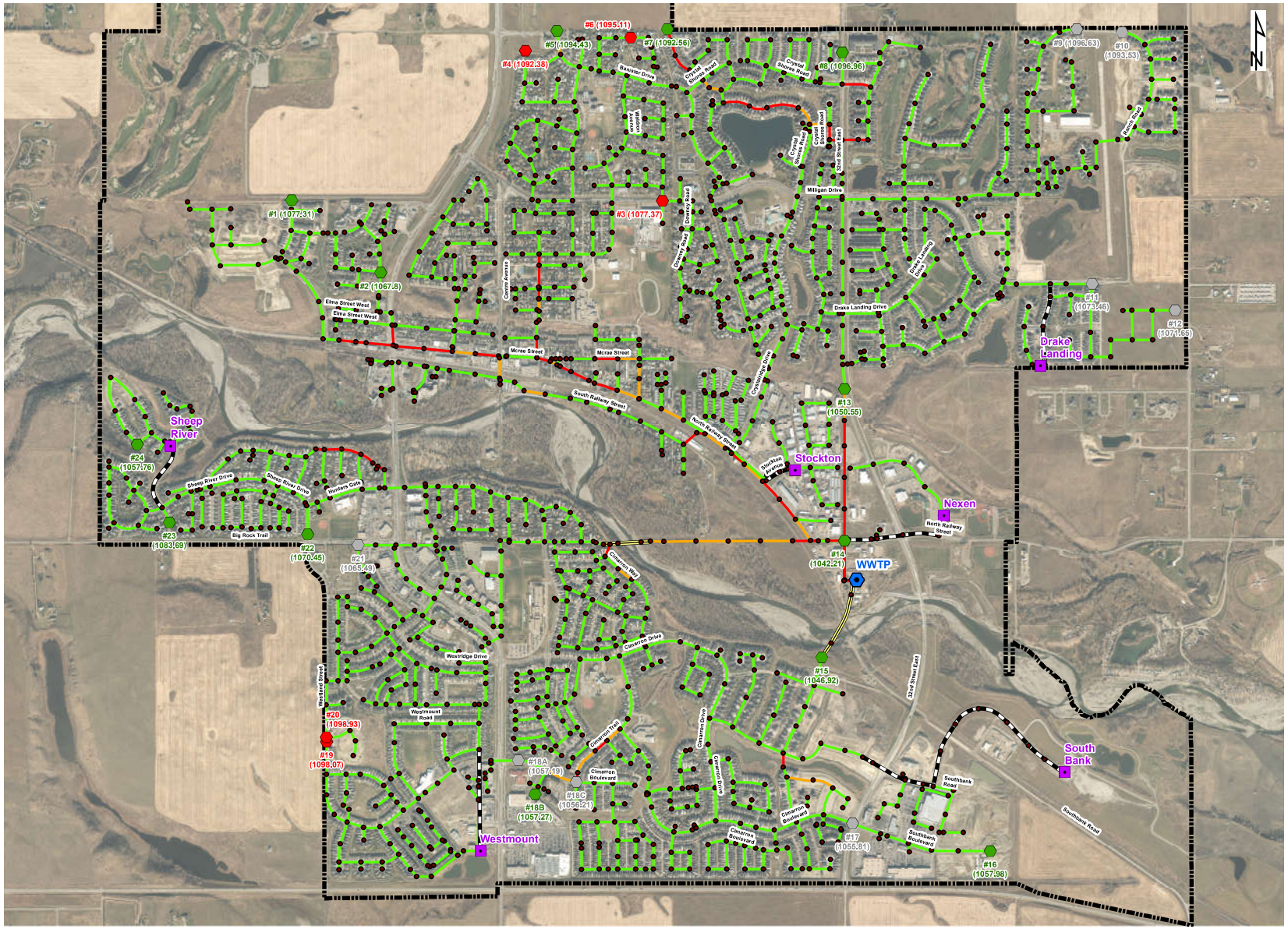

FIGURE 7.101

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
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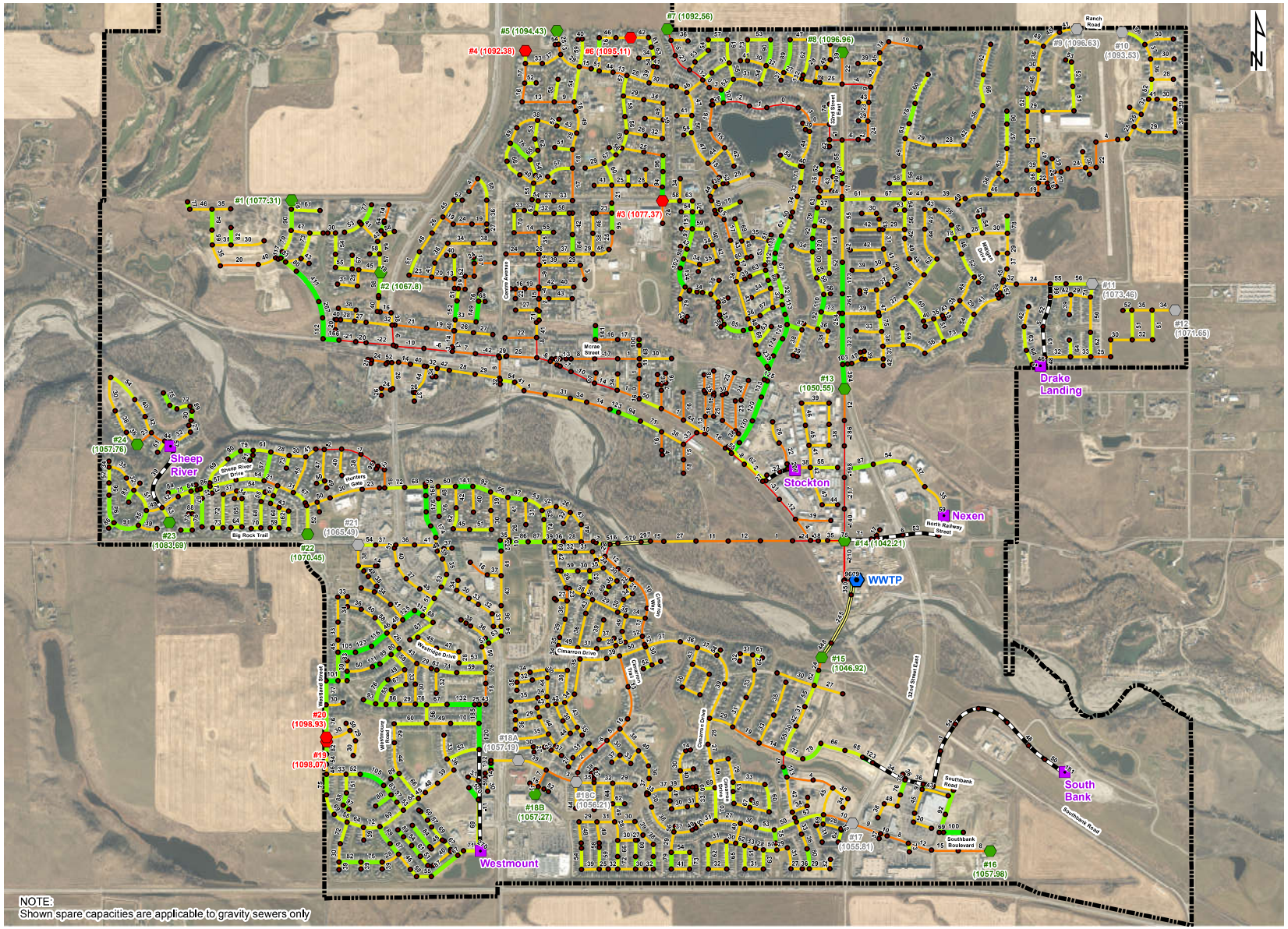

FIGURE 7.102

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
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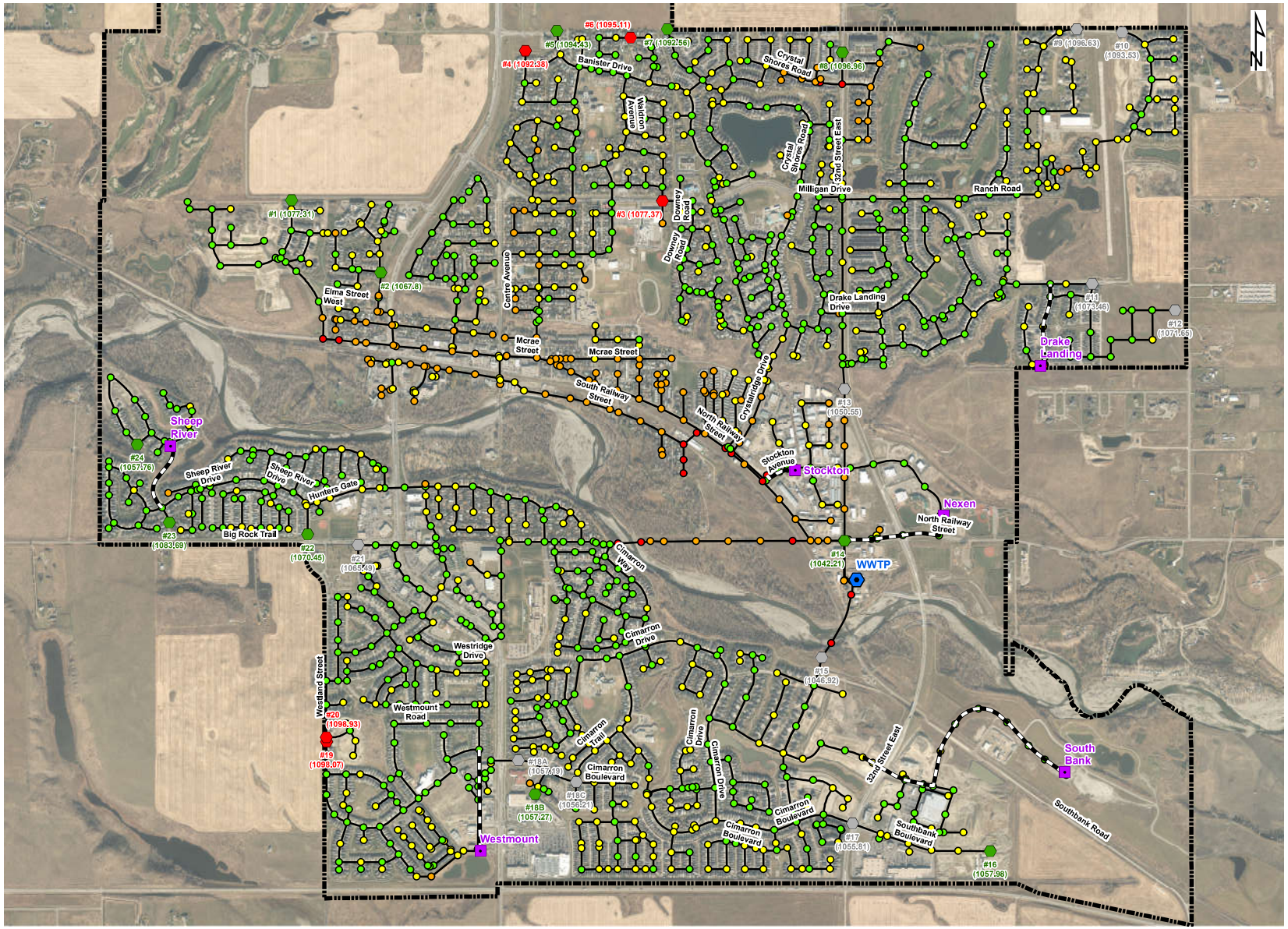

FIGURE 7.103

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
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- Town Boundary

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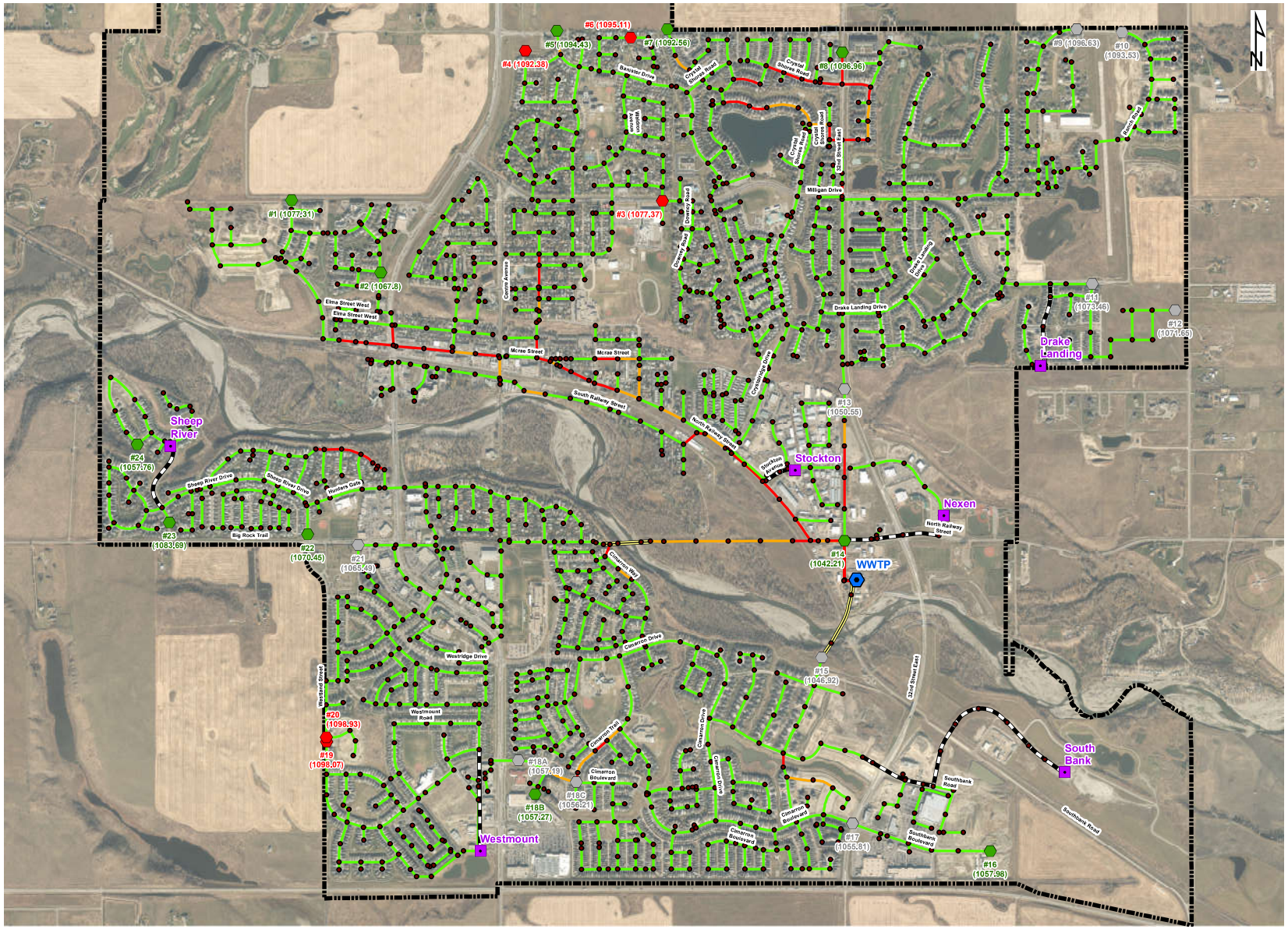

FIGURE 7.104

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
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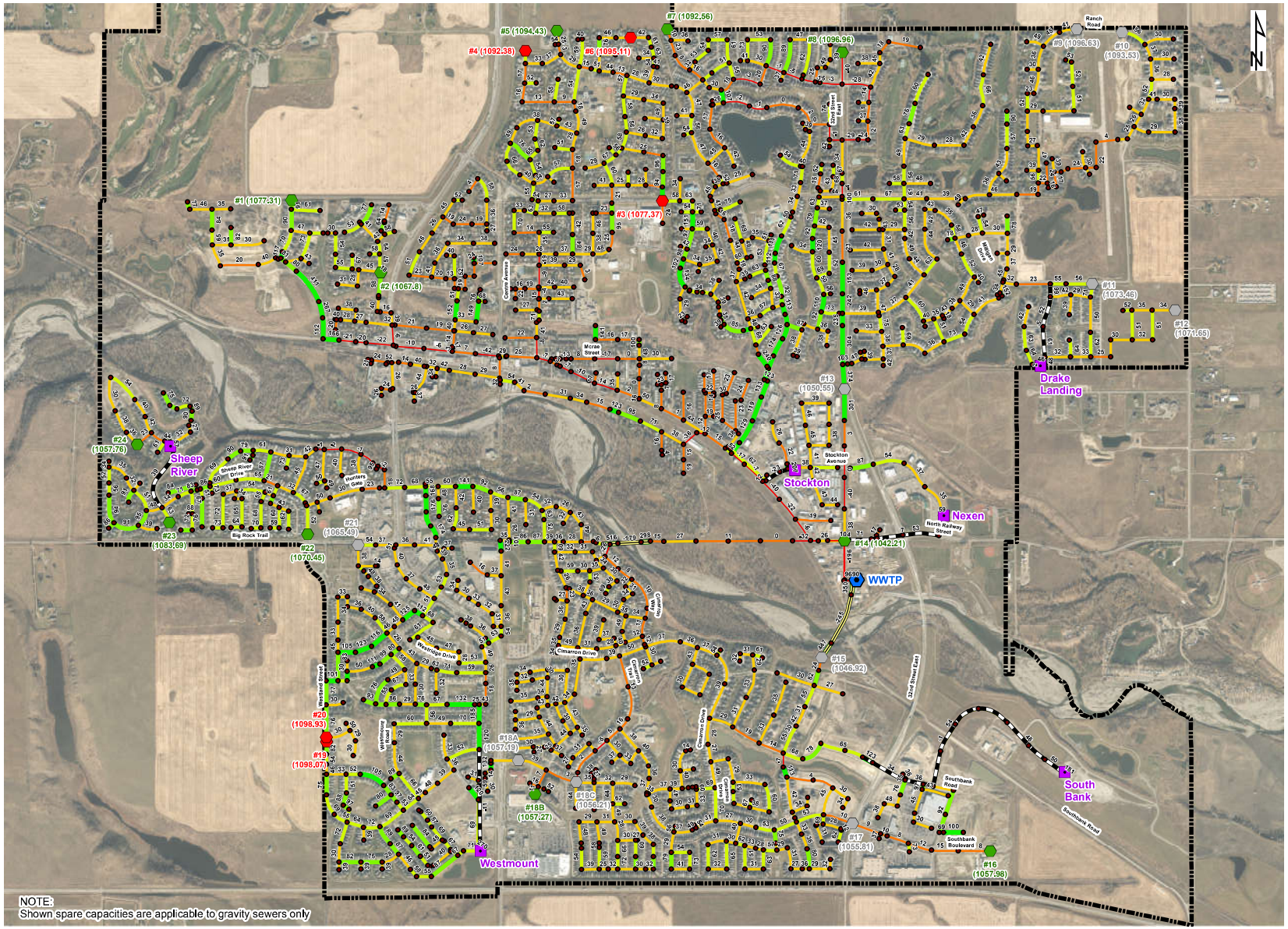

FIGURE 7.105

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
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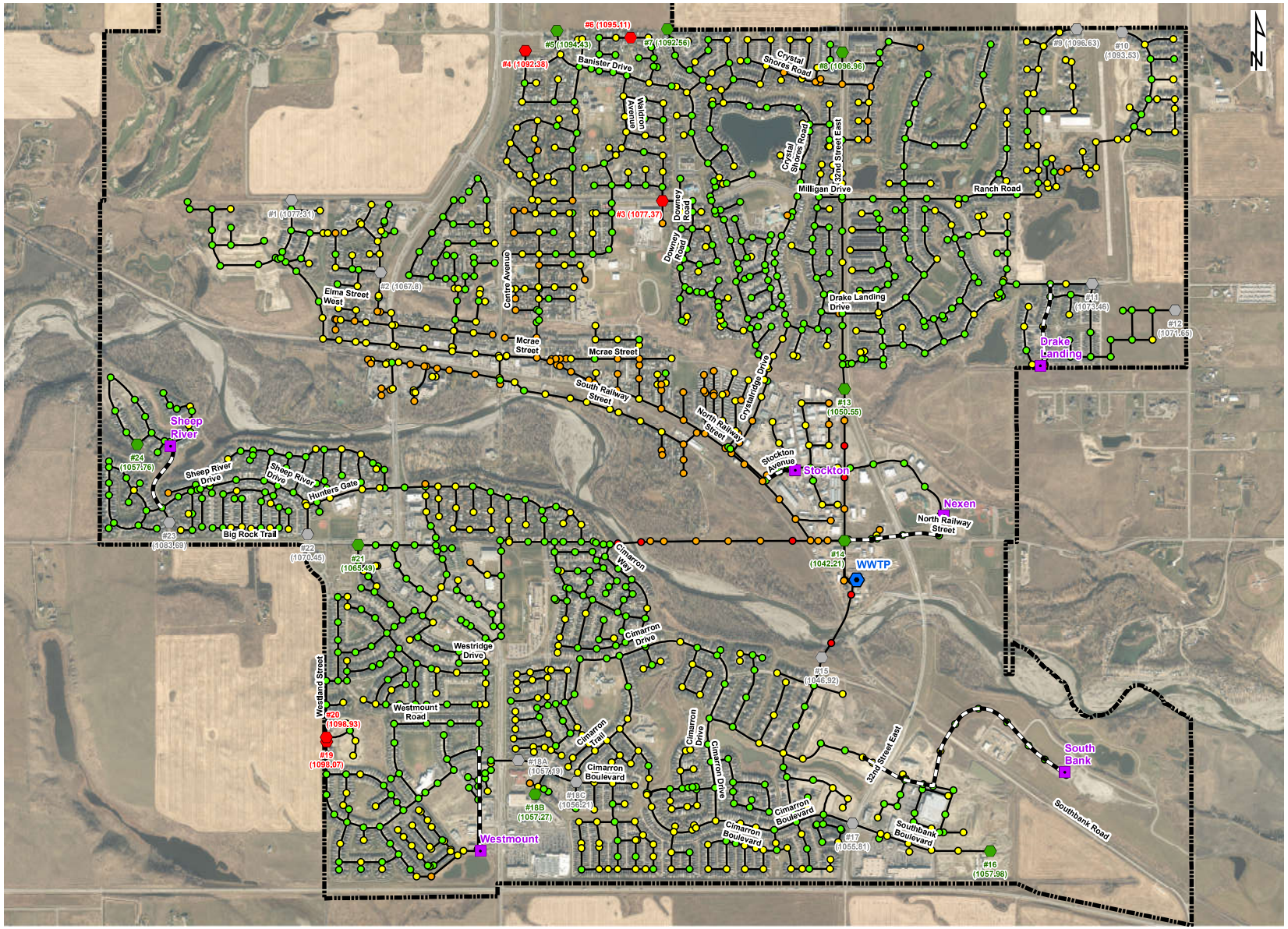

FIGURE 7.106

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

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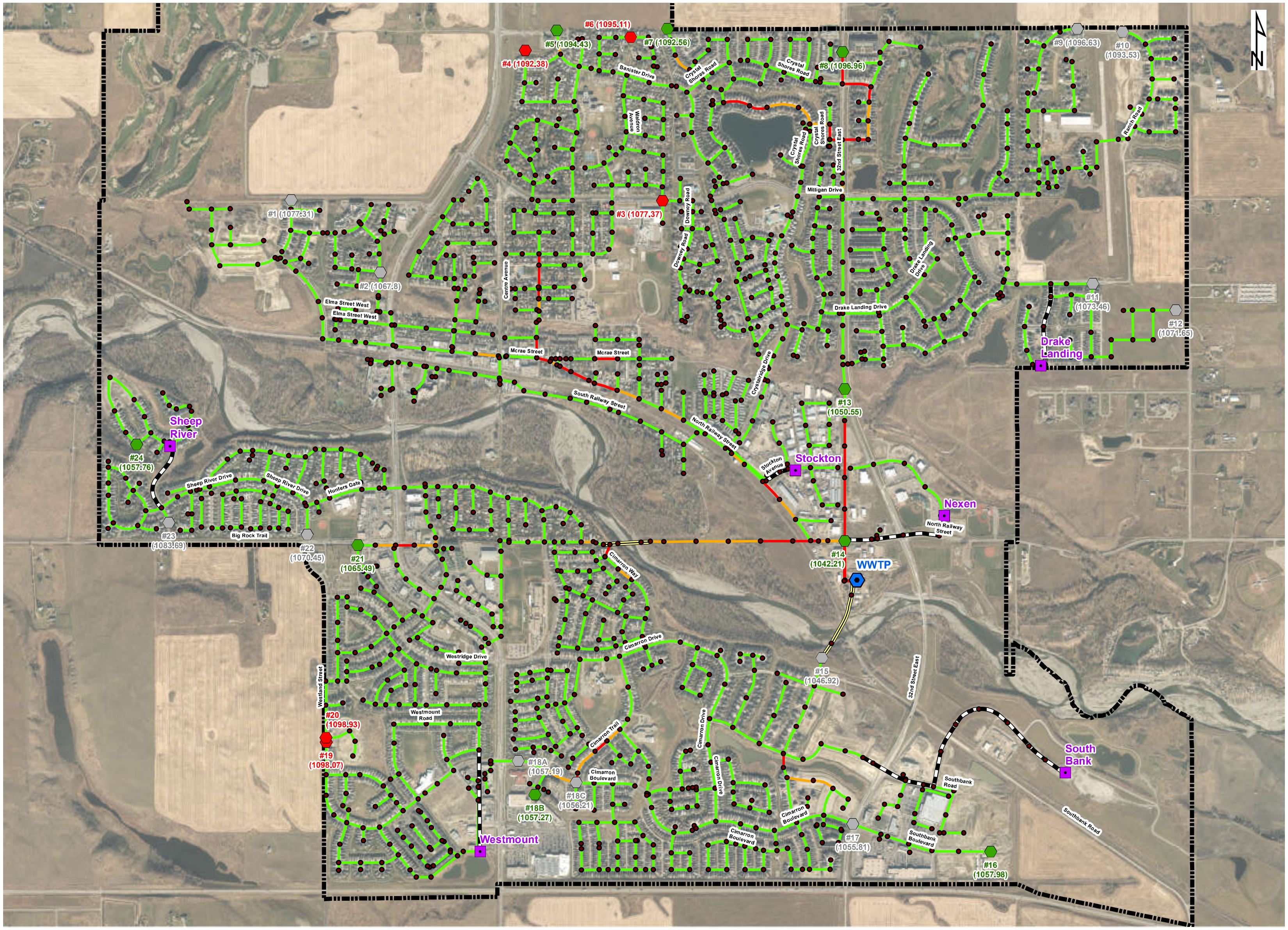
FIGURE 7.107



Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

1:18,000

0 100 200 400 600 800 Meters

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TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

60-YEAR GROWTH HORIZON ASSESSMENTS
SCENARIO 2B TIE-IN LOCATIONS
PEAK DISCHARGE RELATIVE TO PIPE CAPACITY

ISL Engineering and Land Services

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Date: 2/4/2016

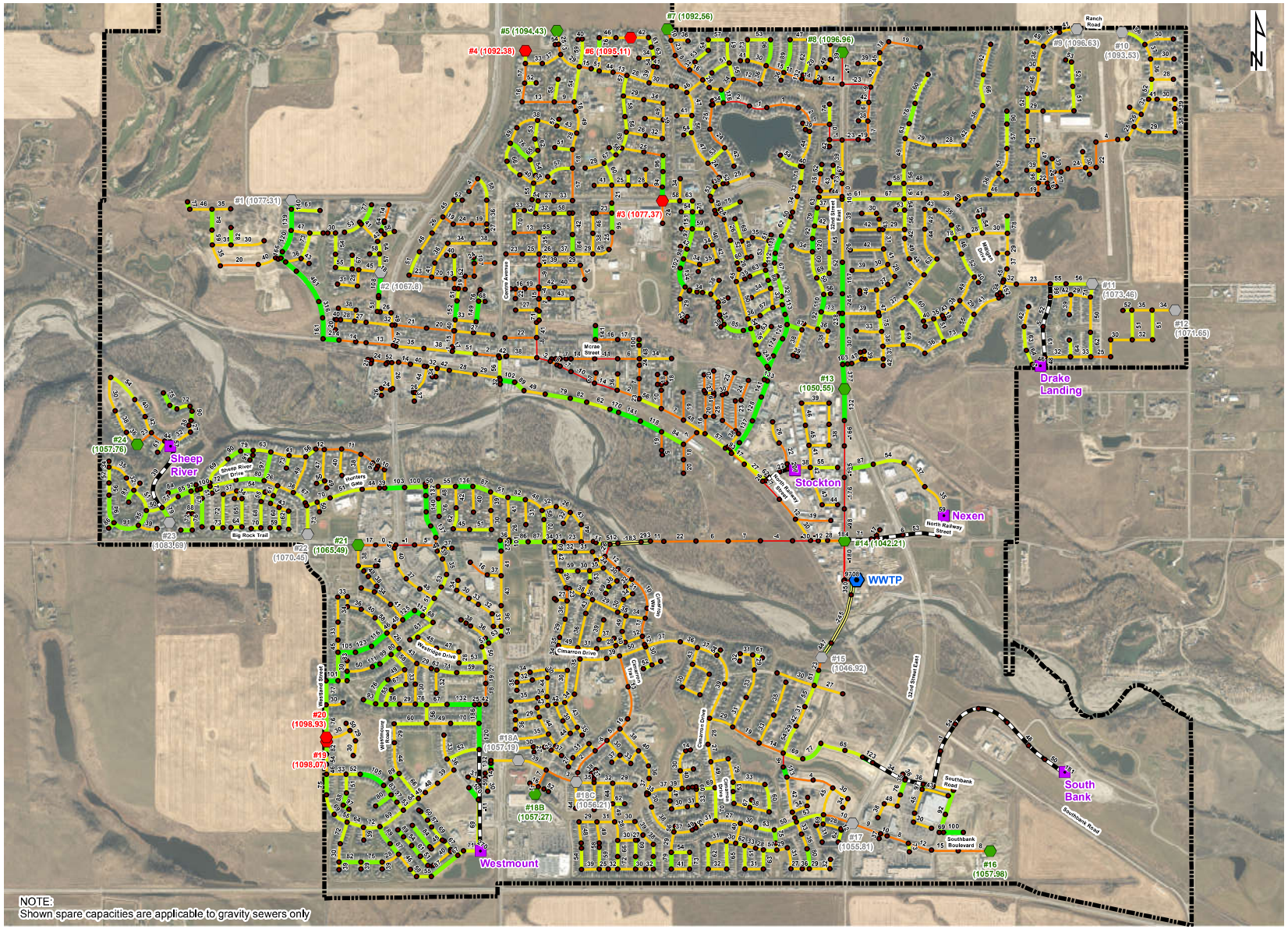

FIGURE 7.108

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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60-YEAR GROWTH HORIZON ASSESSMENTS
SCENARIO 2B TIE-IN LOCATIONS
SPARE CAPACITY

ISL Engineering and Land Services

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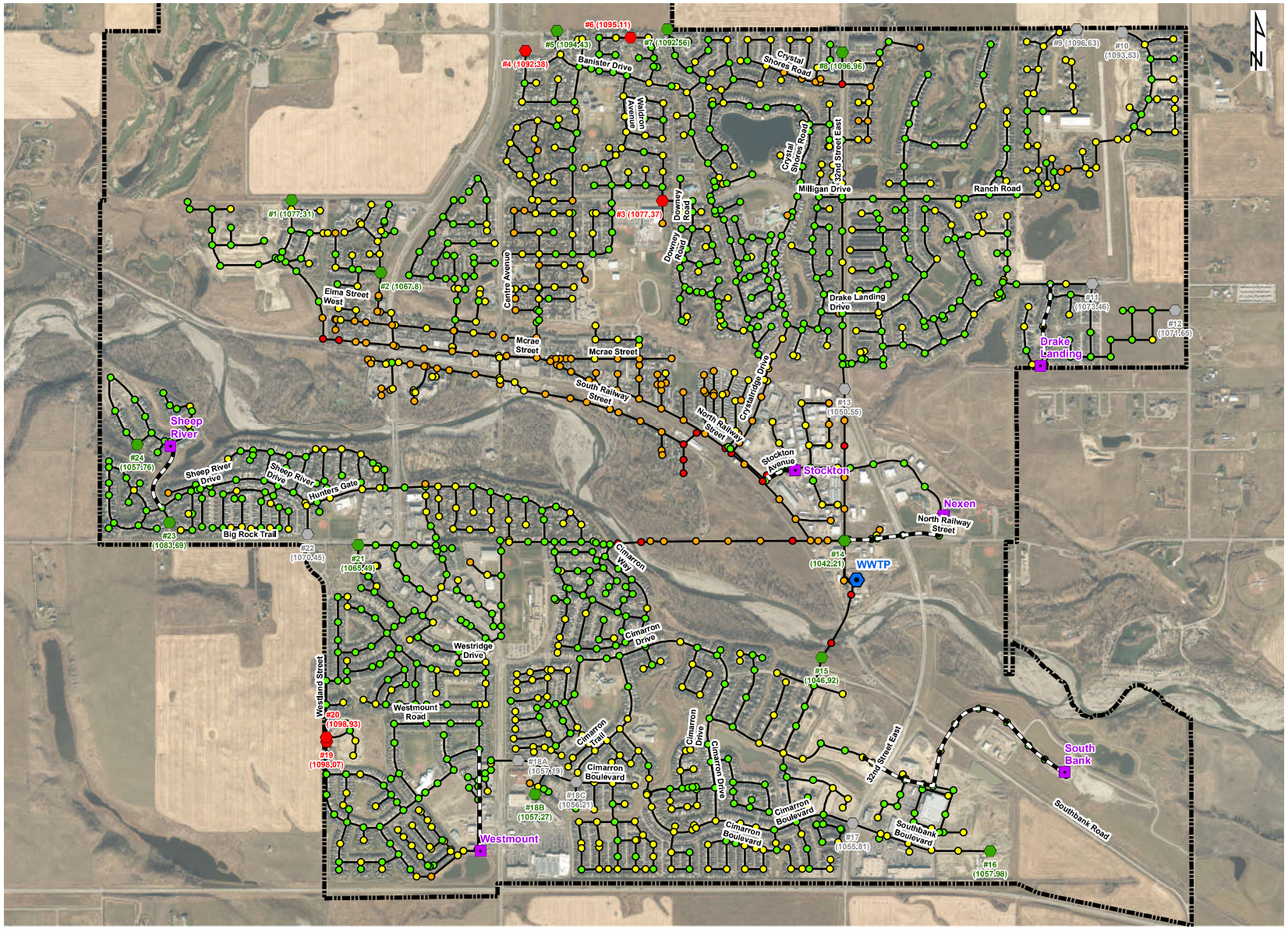

FIGURE 7.109

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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60-YEAR GROWTH HORIZON ASSESSMENTS
SCENARIO 3B TIE-IN LOCATIONS
MAXIMUM HGL ELEVATION
RELATIVE TO GROUND

ISL Engineering and Land Services

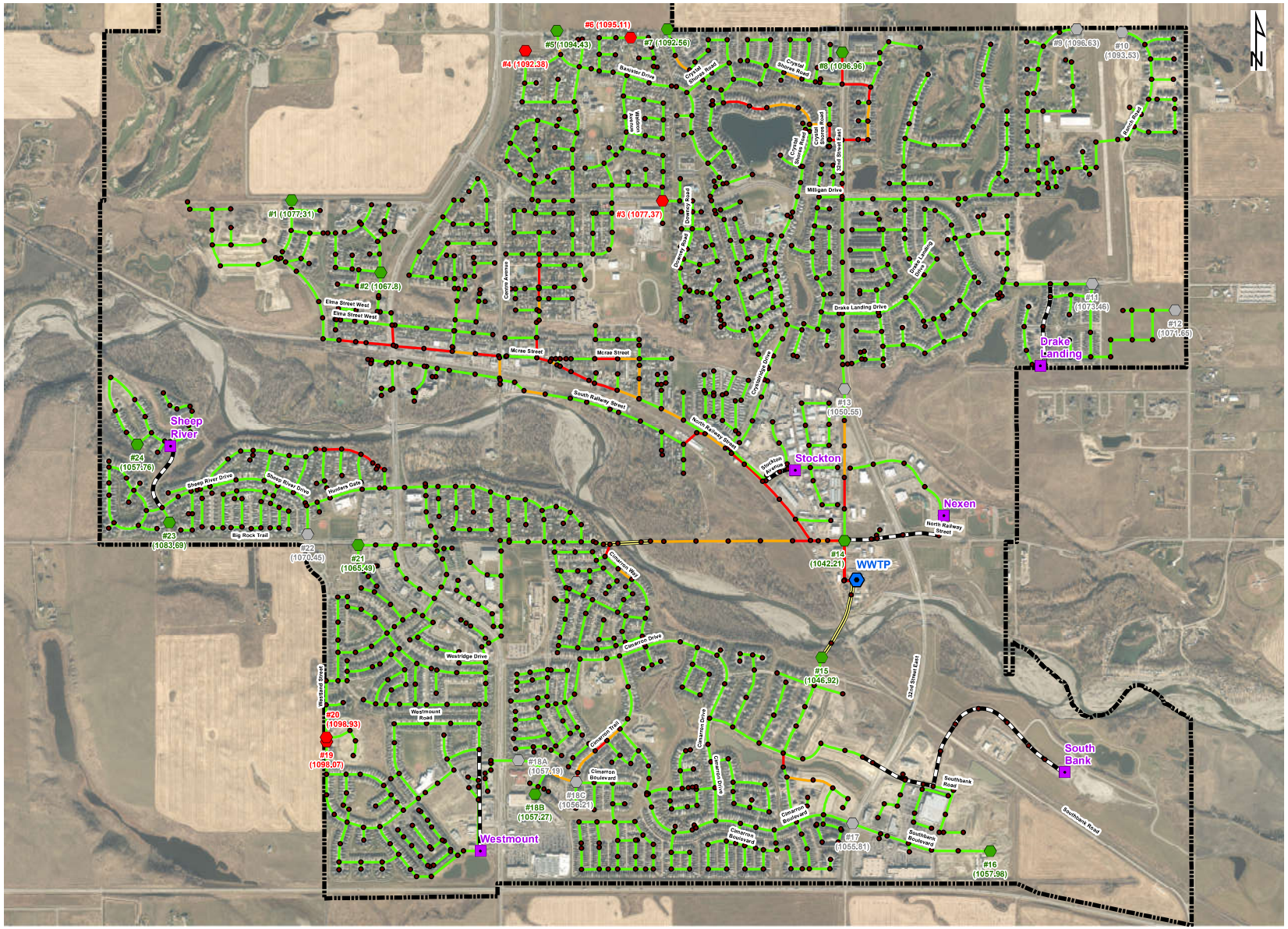

FIGURE 7.110

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

1:18,000

0 100 200 400 600 800 Meters

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SCENARIO 3B TIE-IN LOCATIONS
PEAK DISCHARGE RELATIVE TO PIPE CAPACITY

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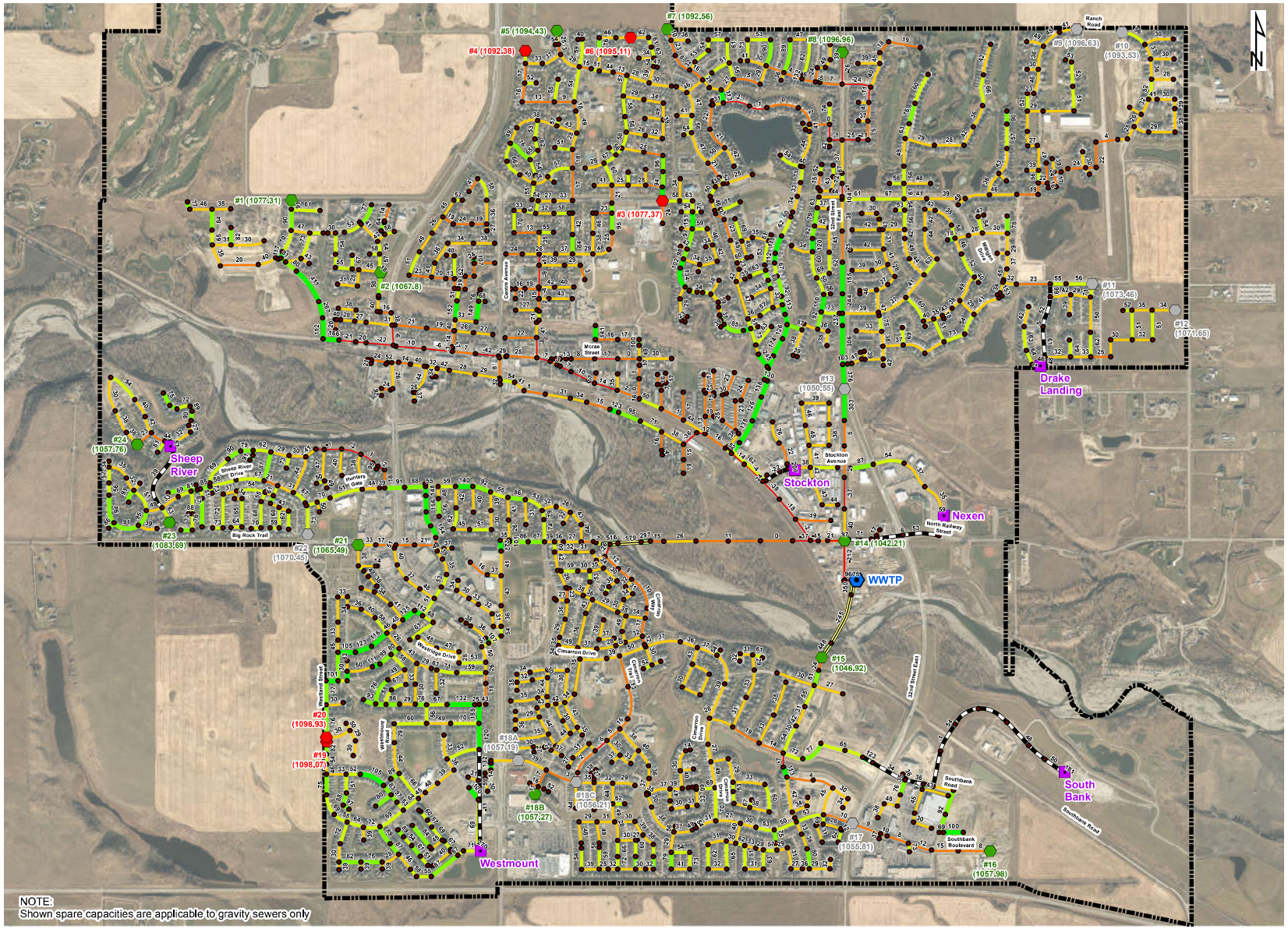

FIGURE 7.111

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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SCENARIO 3B TIE-IN LOCATIONS
SPARE CAPACITY

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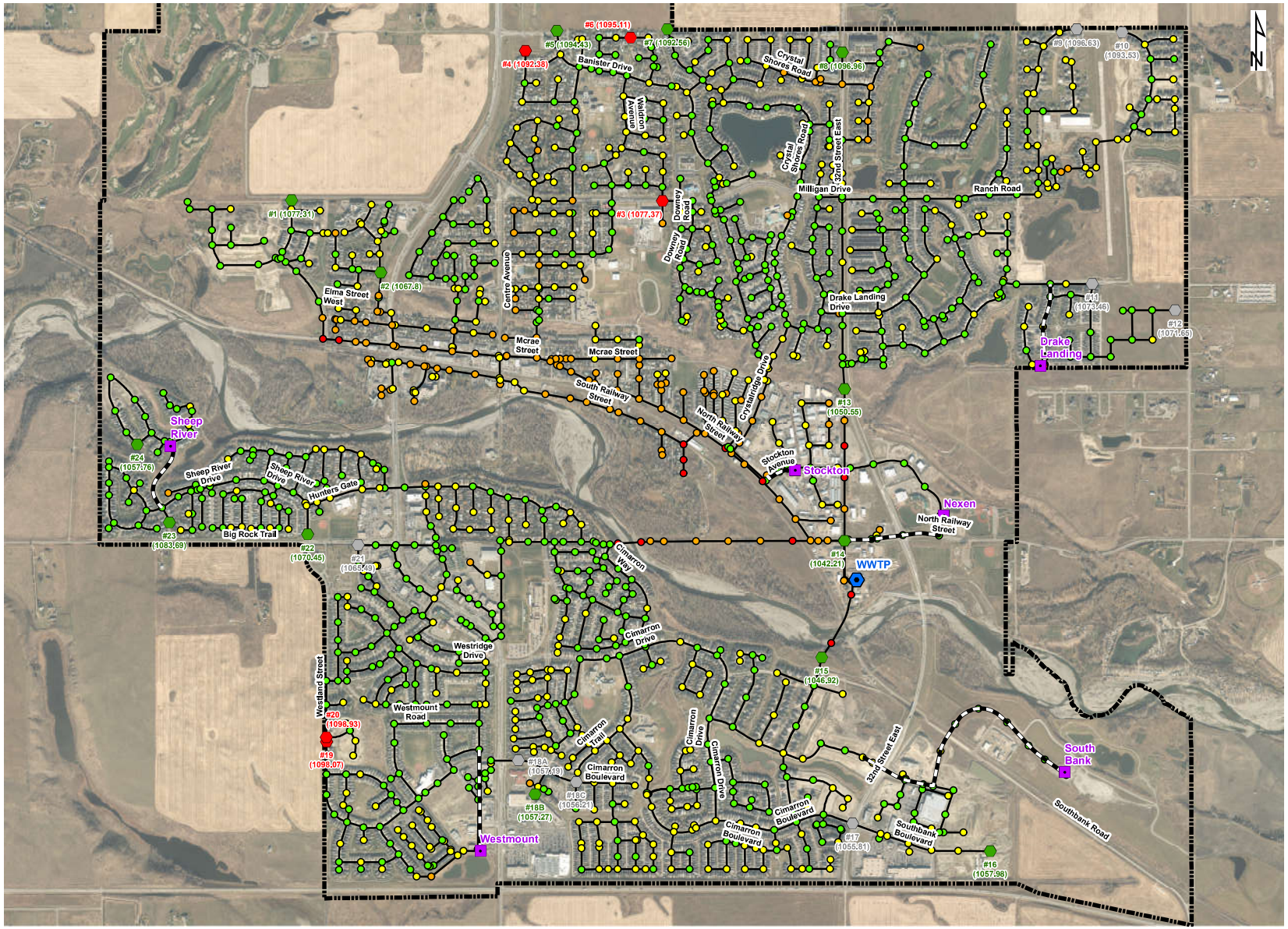

FIGURE 7.112

Legend

Maximum HGL Elevation Relative To Ground

- Less Than -3.50m
- Between -3.50m and -2.50m
- Between -2.50m and -0.00m
- Greater Than 0.00m
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Gravity Sewer
- Forcemain
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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SCENARIO 4B TIE-IN LOCATIONS
MAXIMUM HGL ELEVATION
RELATIVE TO GROUND

ISL Engineering and Land Services

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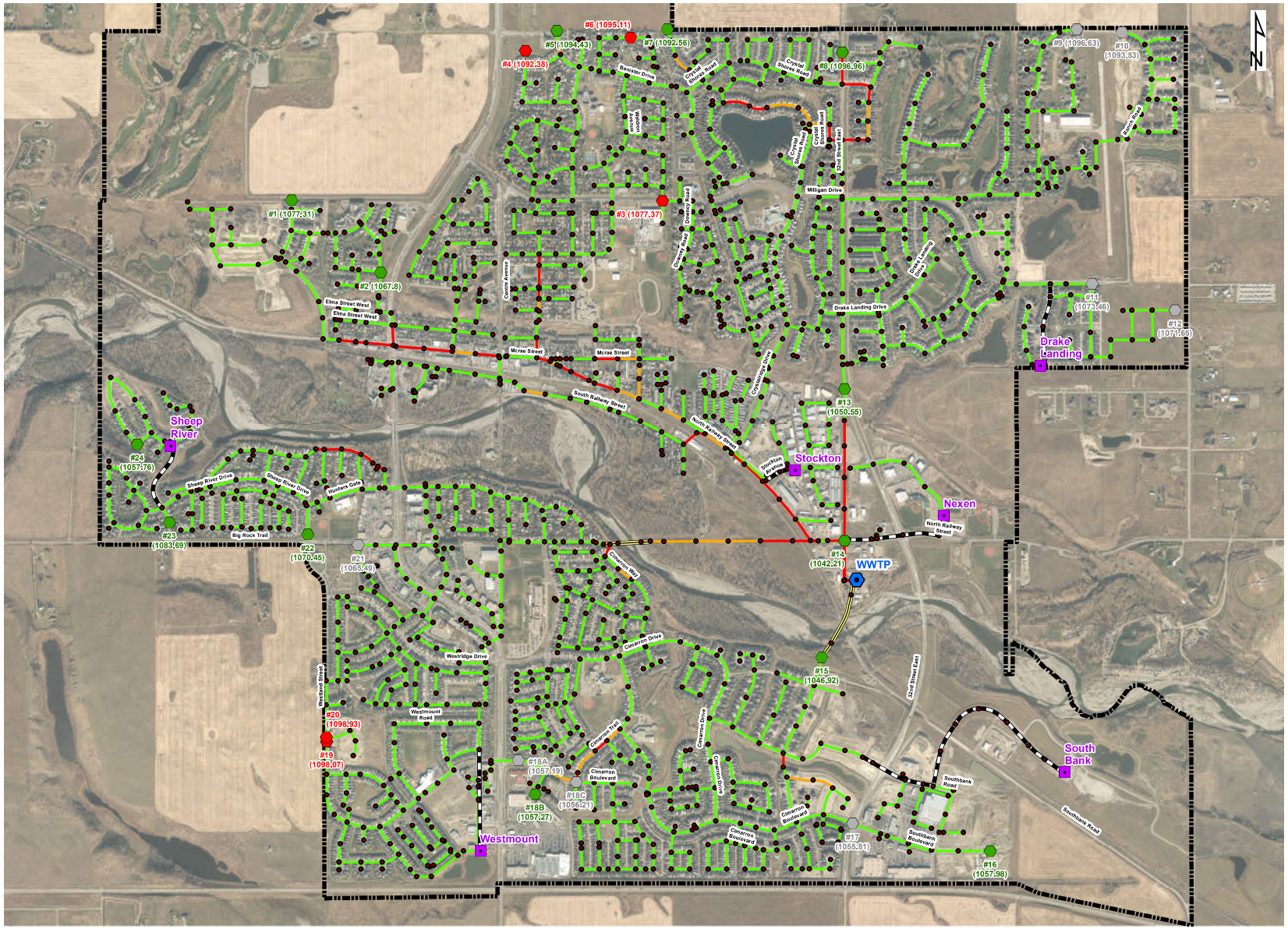

FIGURE 7.113

Legend

Peak Discharge Relative To Pipe Capacity

- Greater Than 100%
- Between 86% and 100%
- Less Than 86%
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

NOTE:
Shown results are applicable to gravity sewers only.

1:18,000

0 100 200 400 600 800 Meters

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60-YEAR GROWTH HORIZON ASSESSMENTS
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PEAK DISCHARGE RELATIVE TO PIPE CAPACITY

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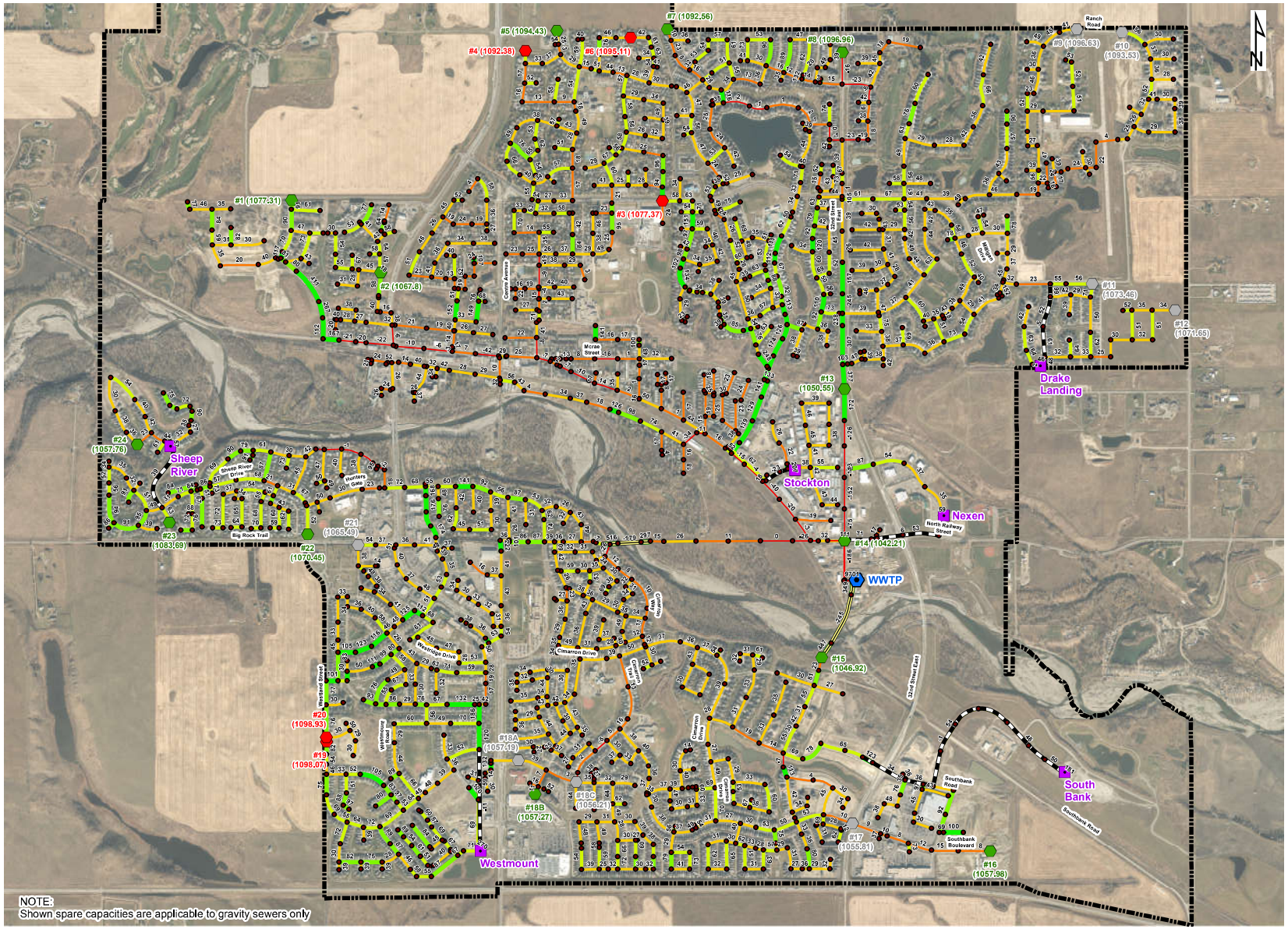

FIGURE 7.114

Legend

Spare Capacity

- < 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- > 100L/s
- Siphon
- Forcemain
- Existing Lift Station
- Wastewater Treatment Plant
- Scenario Activated Gravity Tie-In
- Scenario De-Activated Gravity Tie-In
- Not Feasible Gravity Tie-In
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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SPARE CAPACITY

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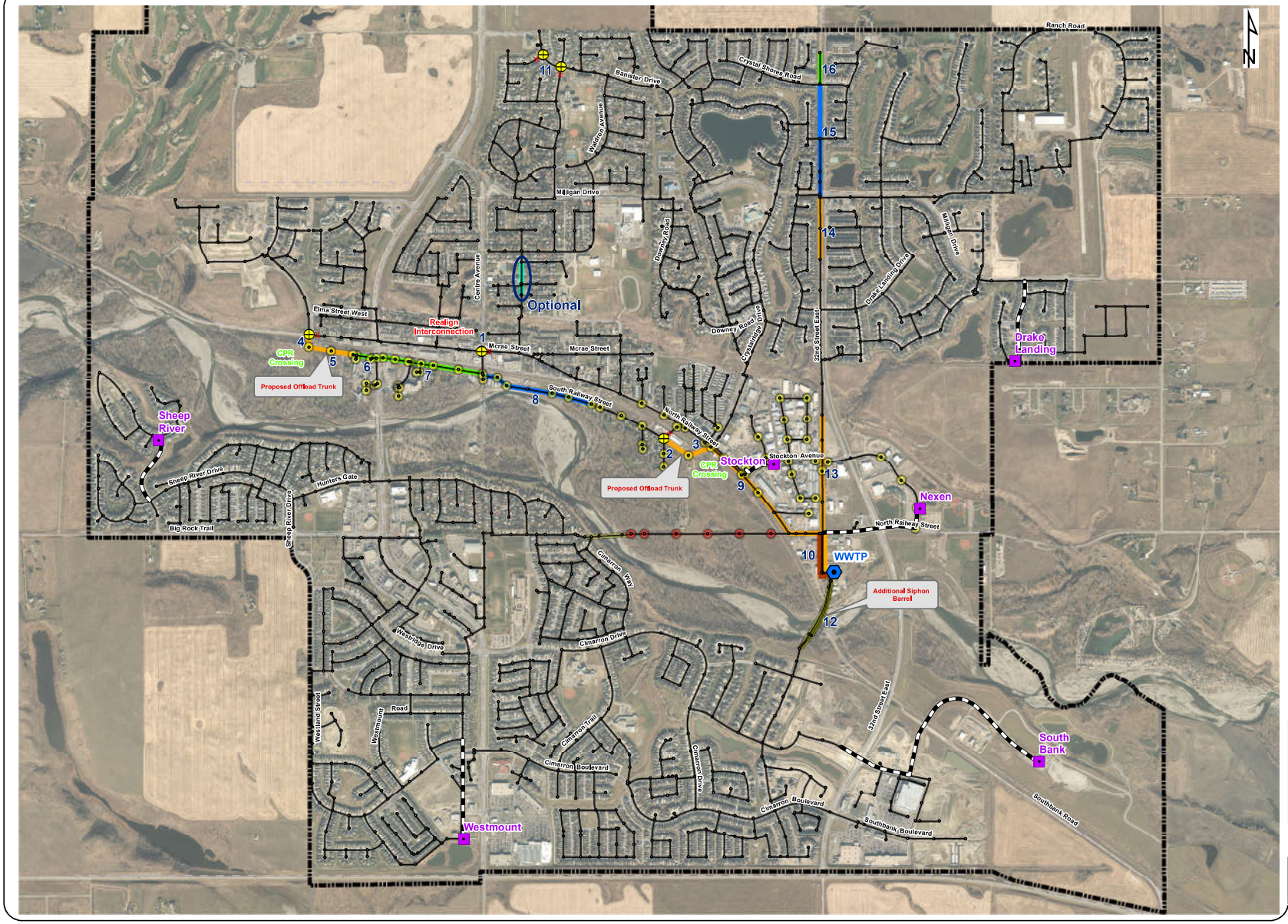

FIGURE 7.115

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 525mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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30-YEAR GROWTH HORIZON UPGRADES
TWINNING OF THE EXISTING SEWERS
FOR SERVICING SCENARIOS
#1A & #3A

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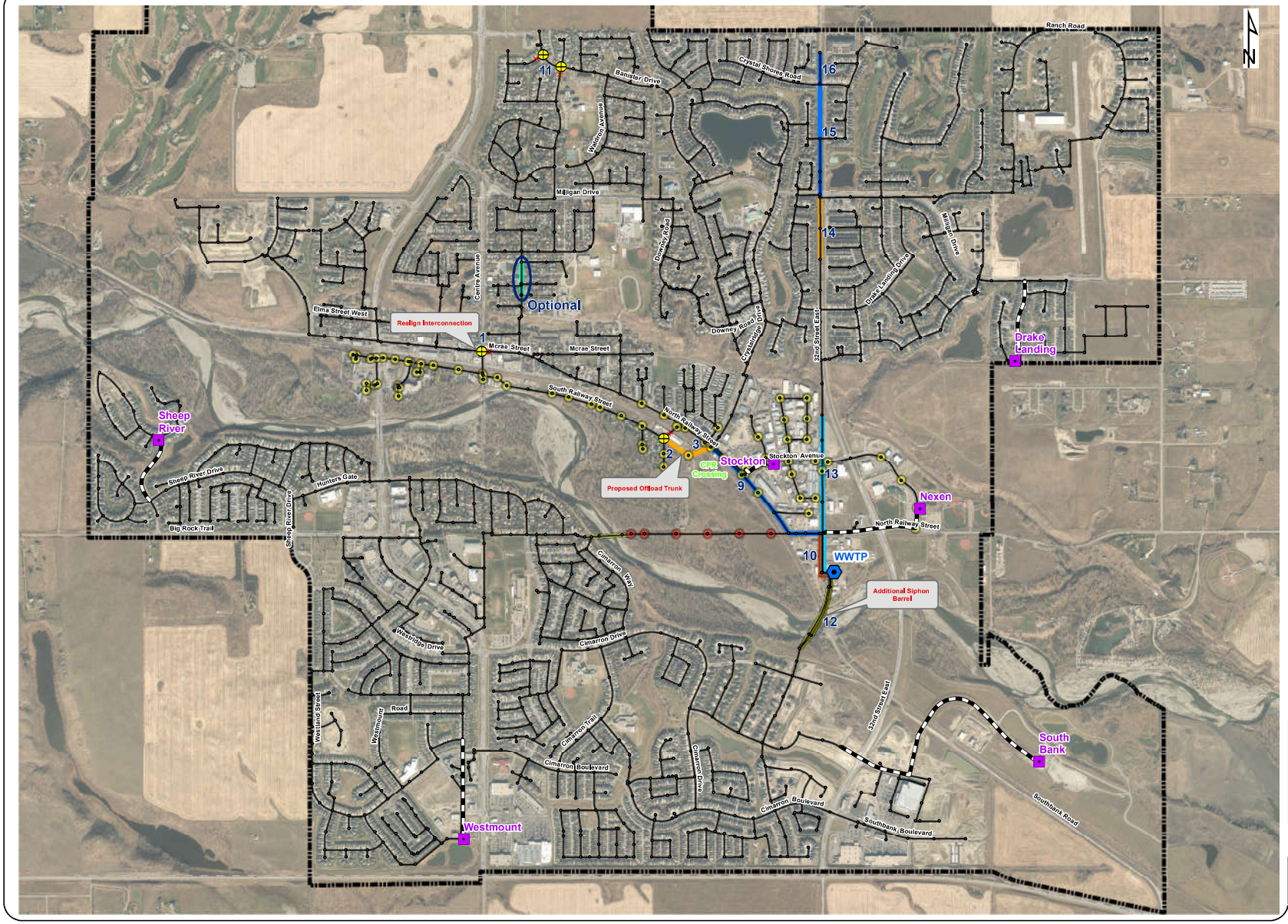

FIGURE 7.116

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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30-YEAR GROWTH HORIZON UPGRADES
TWINNING OF THE EXISTING SEWERS
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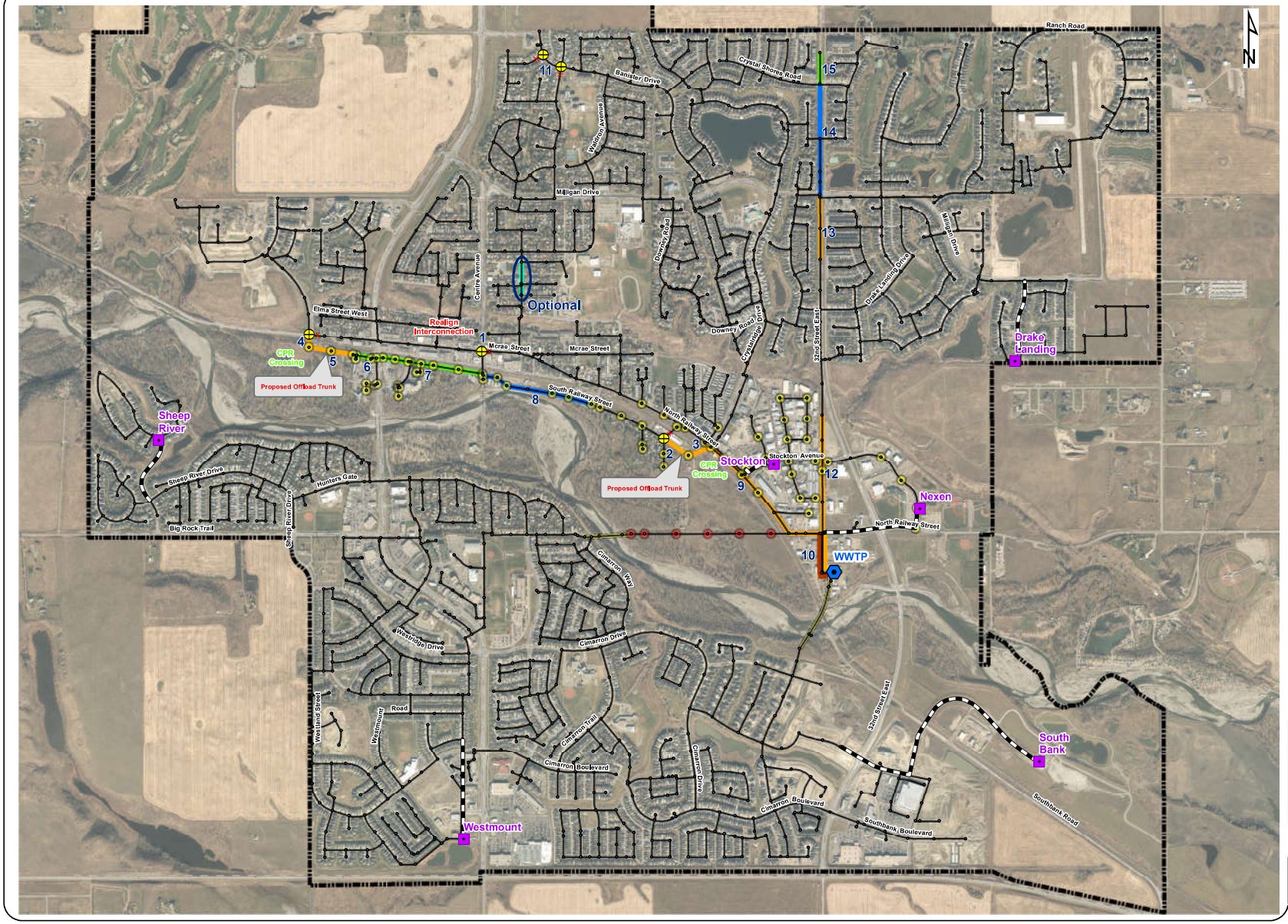

FIGURE 7.117

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 525mm Sewer
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

30-YEAR GROWTH HORIZON UPGRADES TWINNING OF THE EXISTING SEWERS FOR SERVICING SCENARIO #1B

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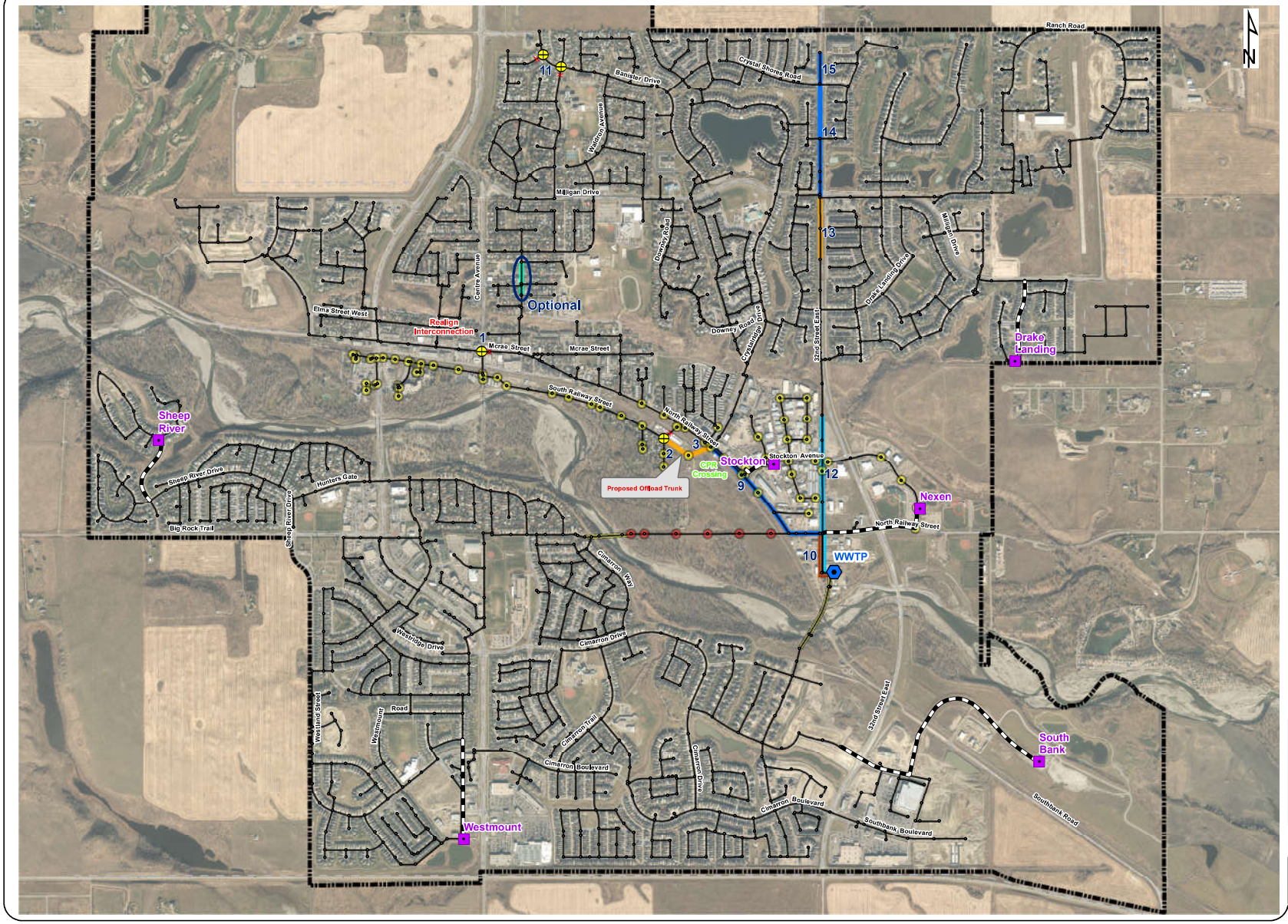

FIGURE 7.118

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

30-YEAR GROWTH HORIZON UPGRADES
TWINNING OF THE EXISTING SEWERS
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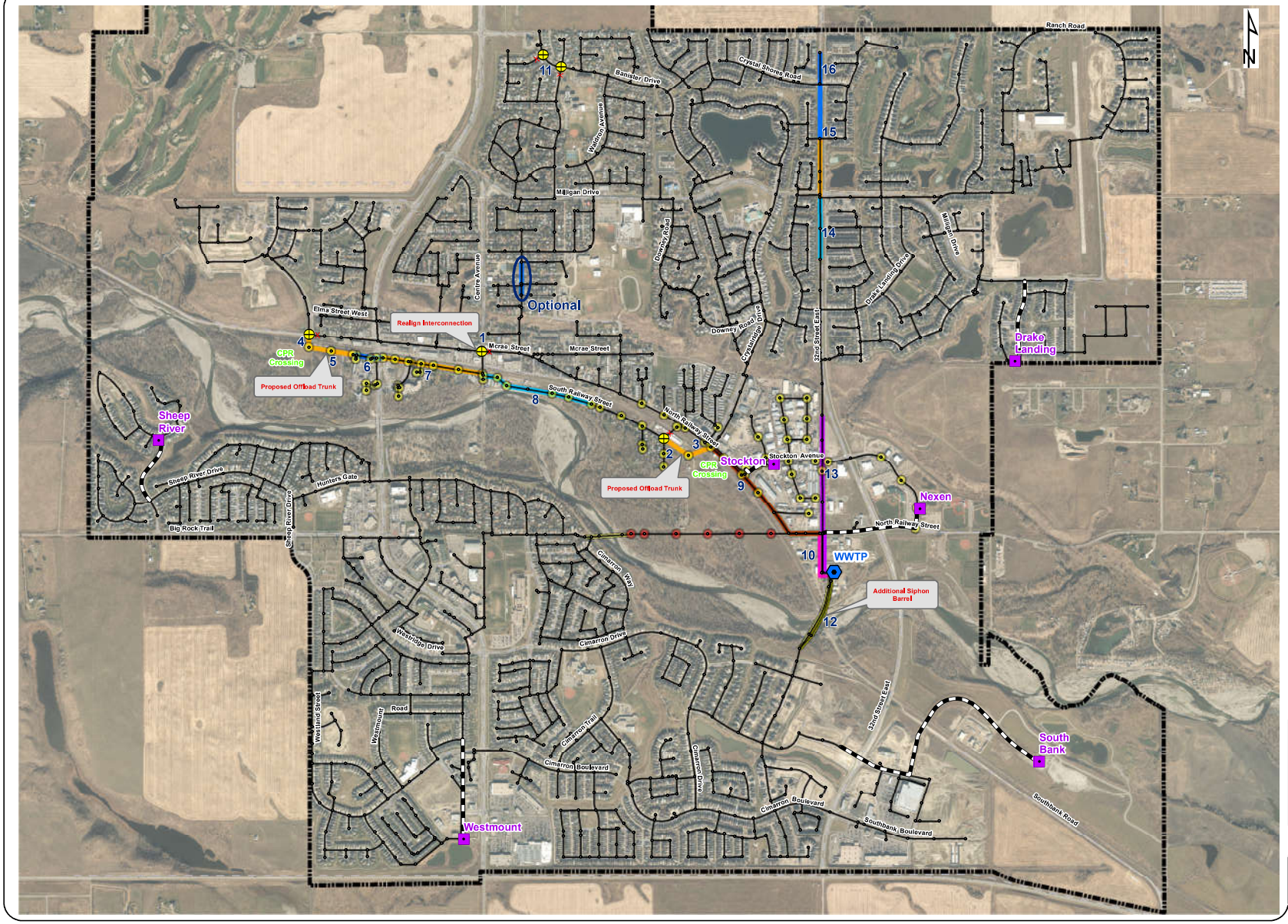

FIGURE 7.119

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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30-YEAR GROWTH HORIZON
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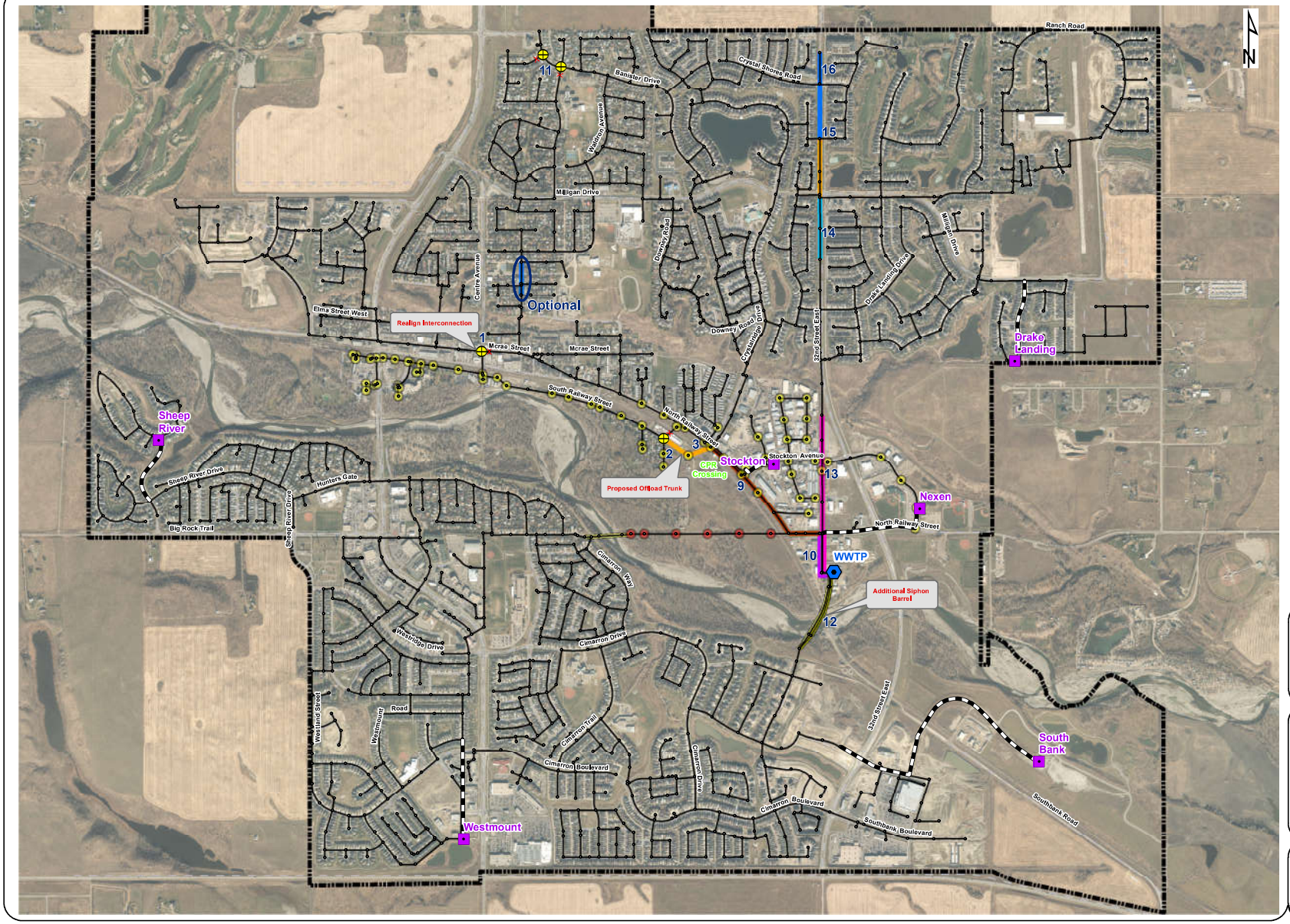

FIGURE 7.120

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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EQUIVALENT UPGRADES
UPSIZING OF THE EXISTING SEWERS
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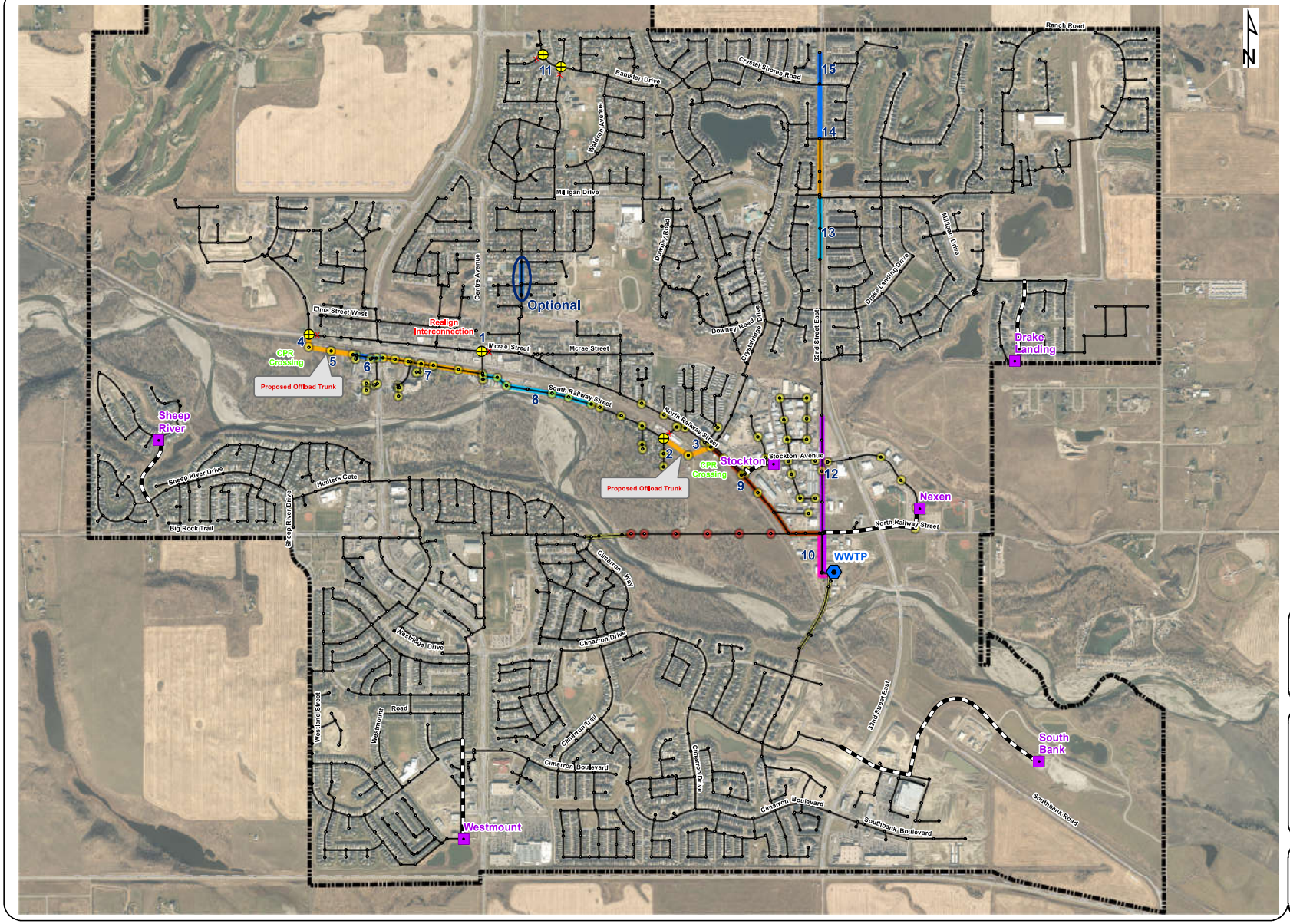

FIGURE 7.121

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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EQUIVALENT UPGRADES
UPSIZING OF THE EXISTING SEWERS
FOR SERVICING SCENARIO #1B

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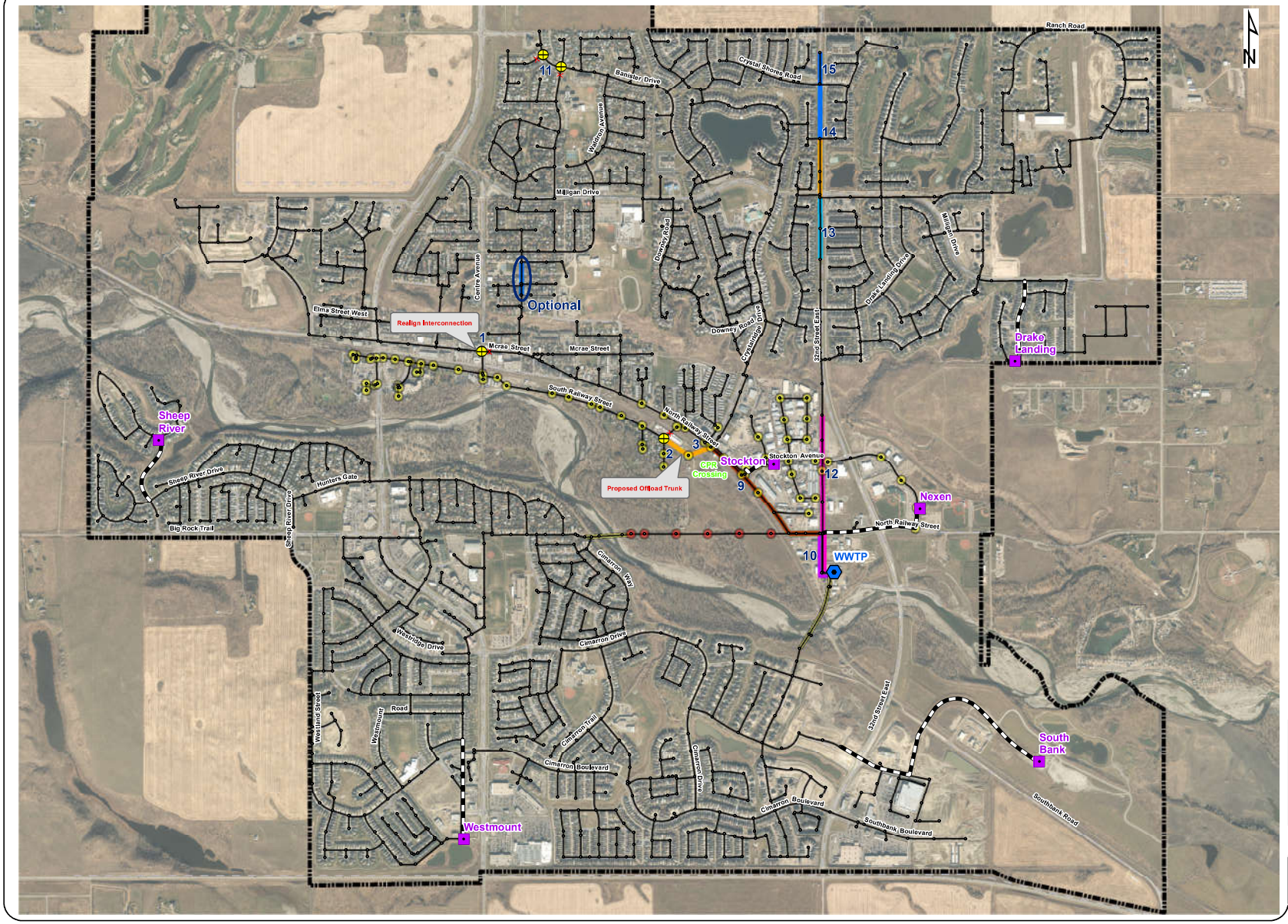

FIGURE 7.122

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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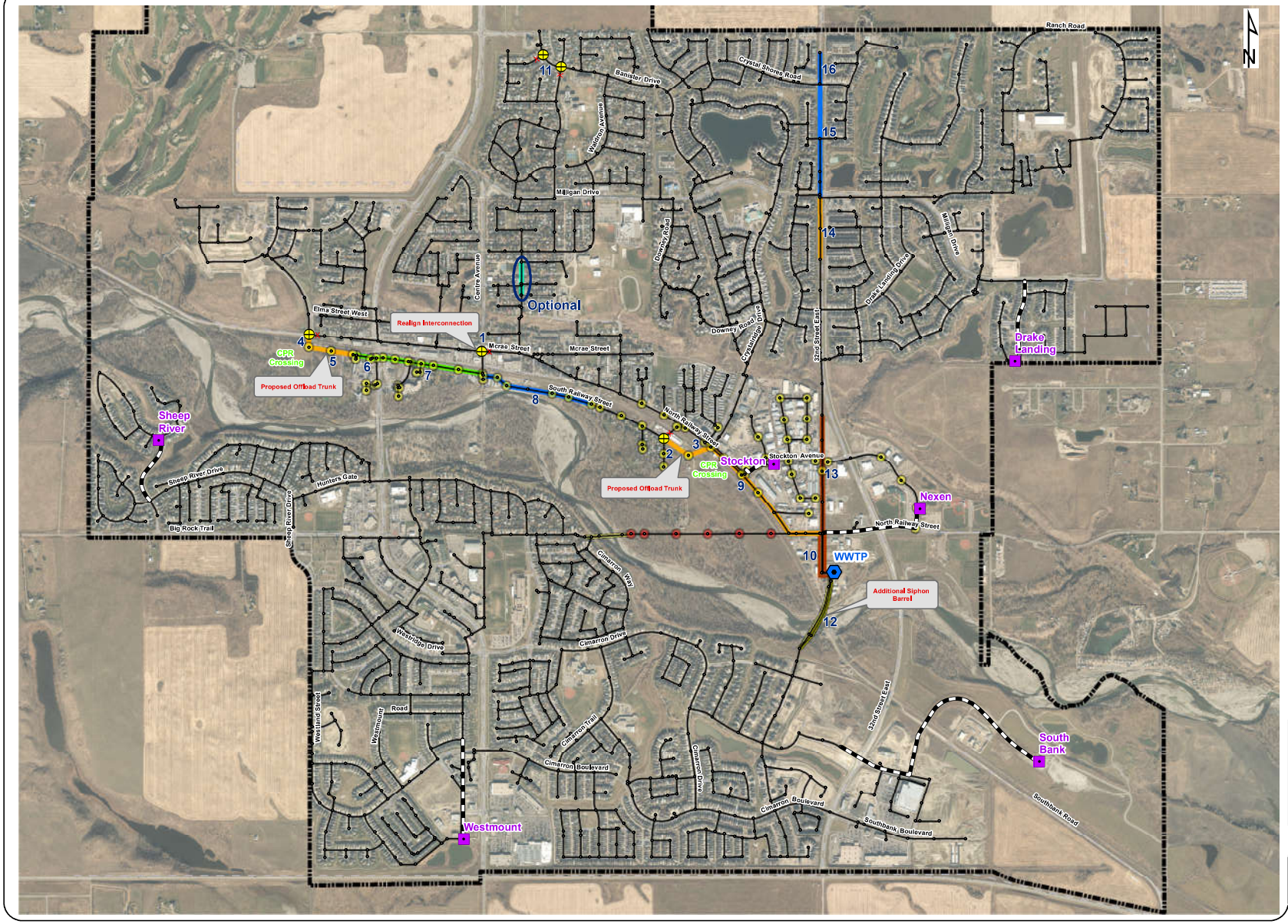

FIGURE 7.123

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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60-YEAR GROWTH HORIZON UPGRADES
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FOR SERVICING SCENARIOS
#1A & #3B

ISL Engineering and Land Services

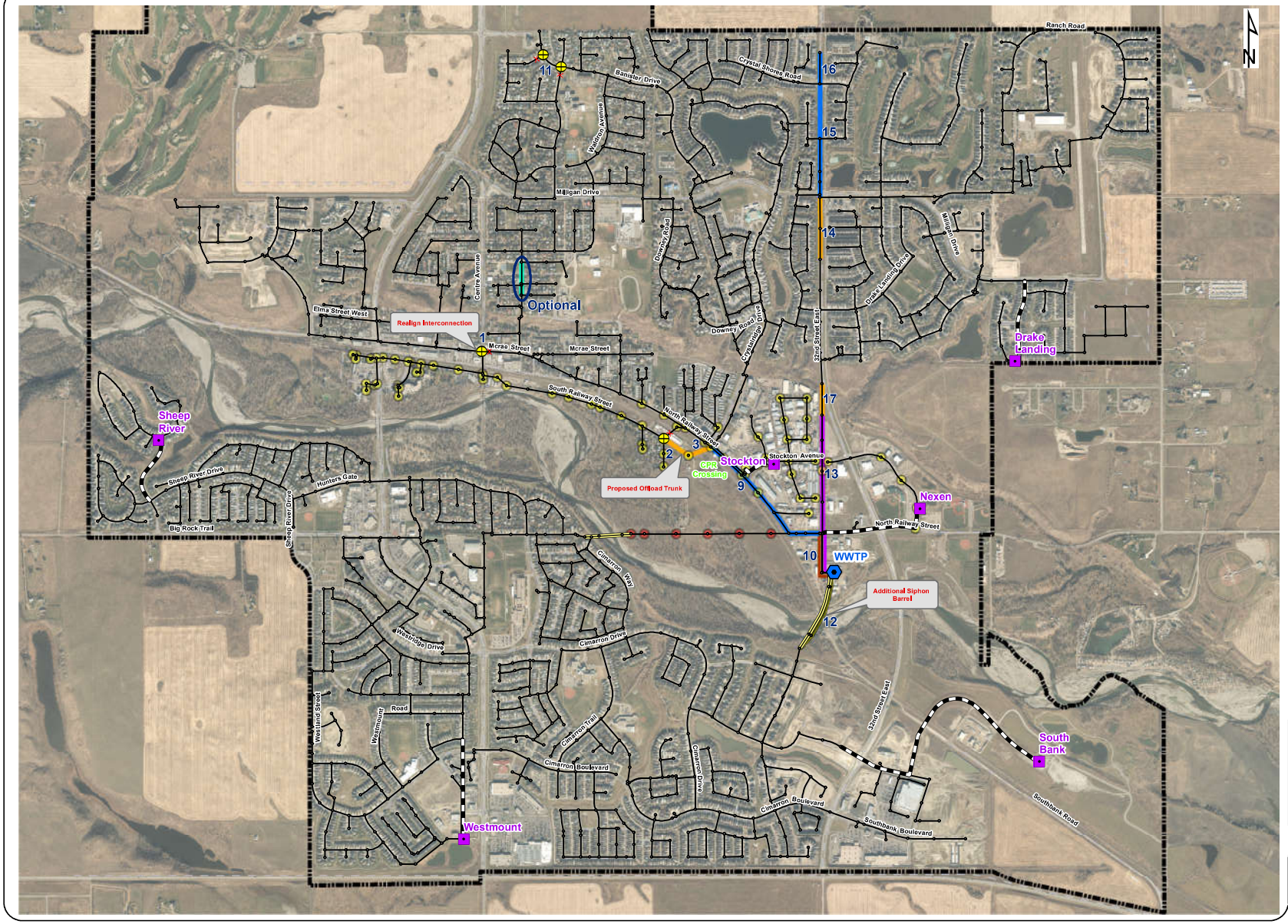

FIGURE 7.124

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

60-YEAR GROWTH HORIZON UPGRADES
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FOR SERVICING SCENARIO #2A

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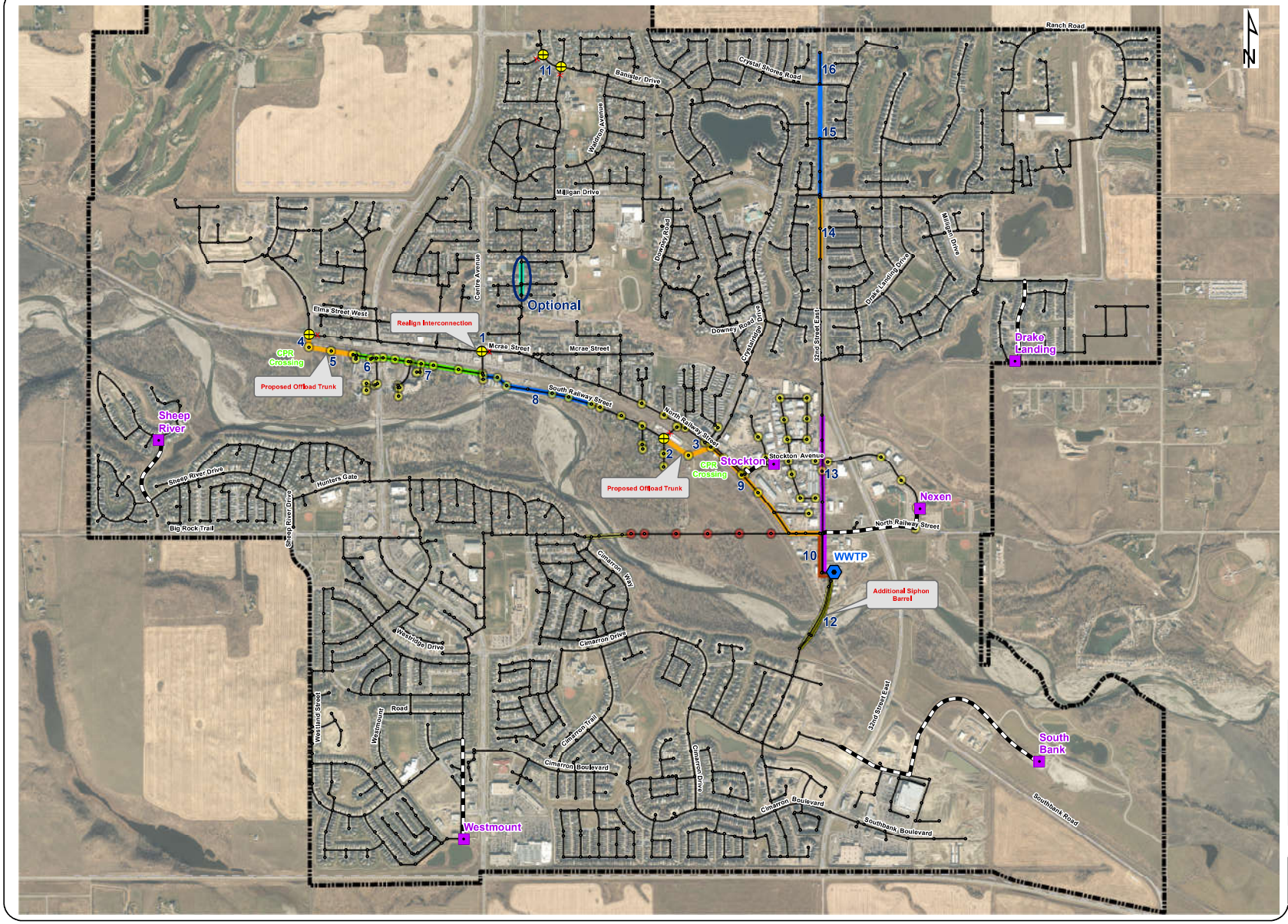

FIGURE 7.125

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain
- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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FOR SERVICING SCENARIOS
#3A, #4A & #4B

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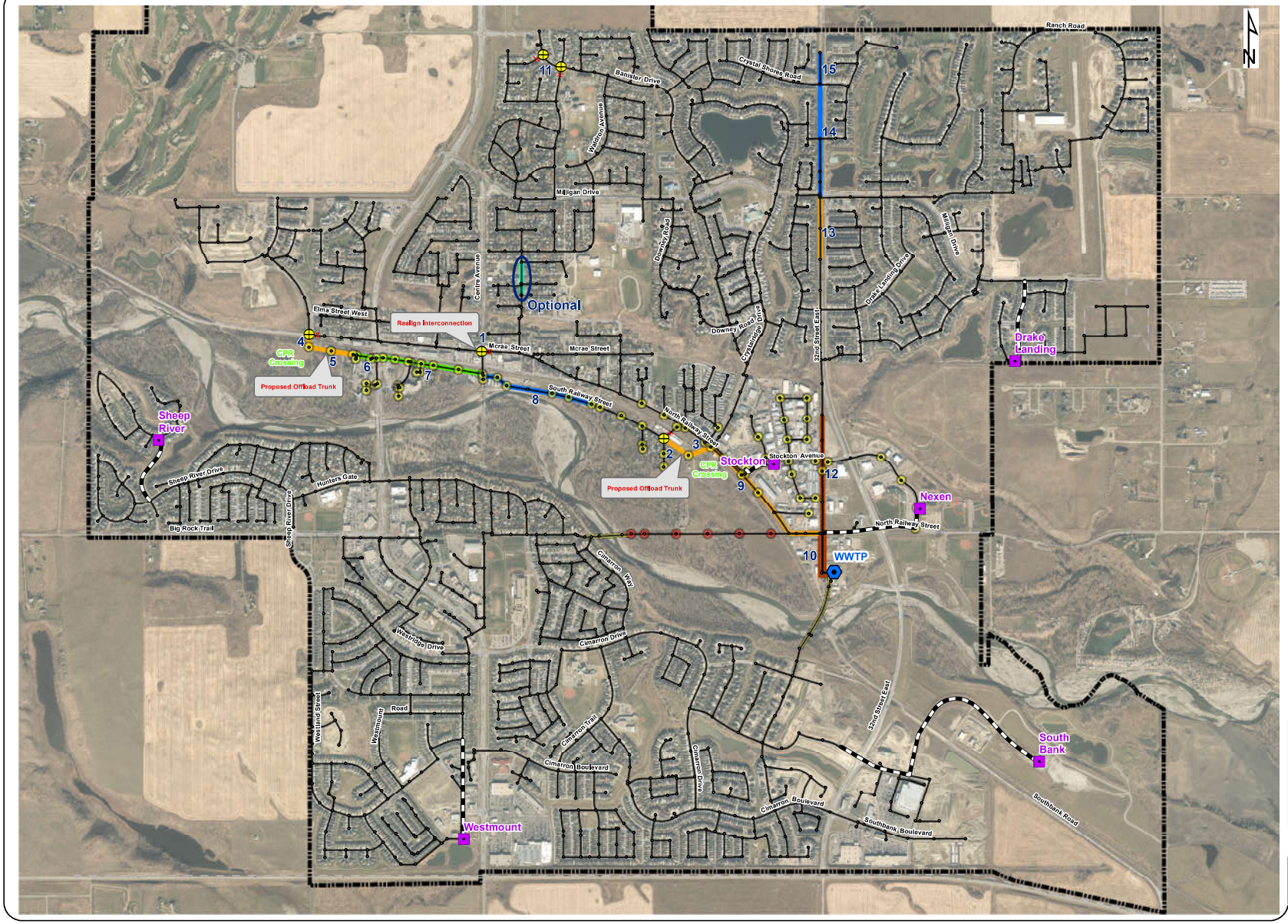

FIGURE 7.126

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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TOWN OF OKOTOKS SANITARY MASTER PLAN UPDATE

60-YEAR GROWTH HORIZON UPGRADES
TWINNING OF THE EXISTING SEWERS
FOR SERVICING SCENARIO #1B

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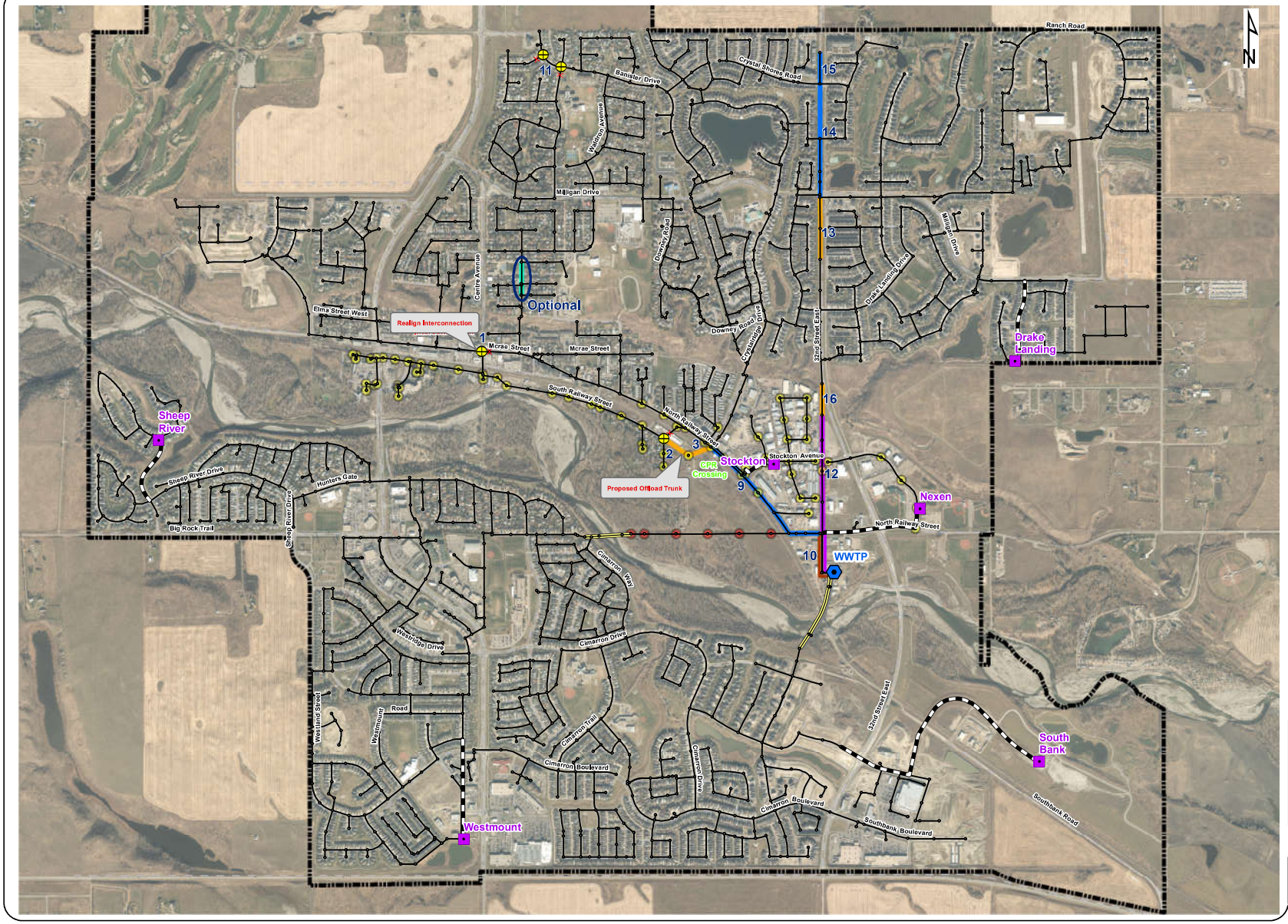

FIGURE 7.127

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Twinning)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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60-YEAR GROWTH HORIZON UPGRADES
TWINNING OF THE EXISTING SEWERS
FOR SERVICING SCENARIO #2B

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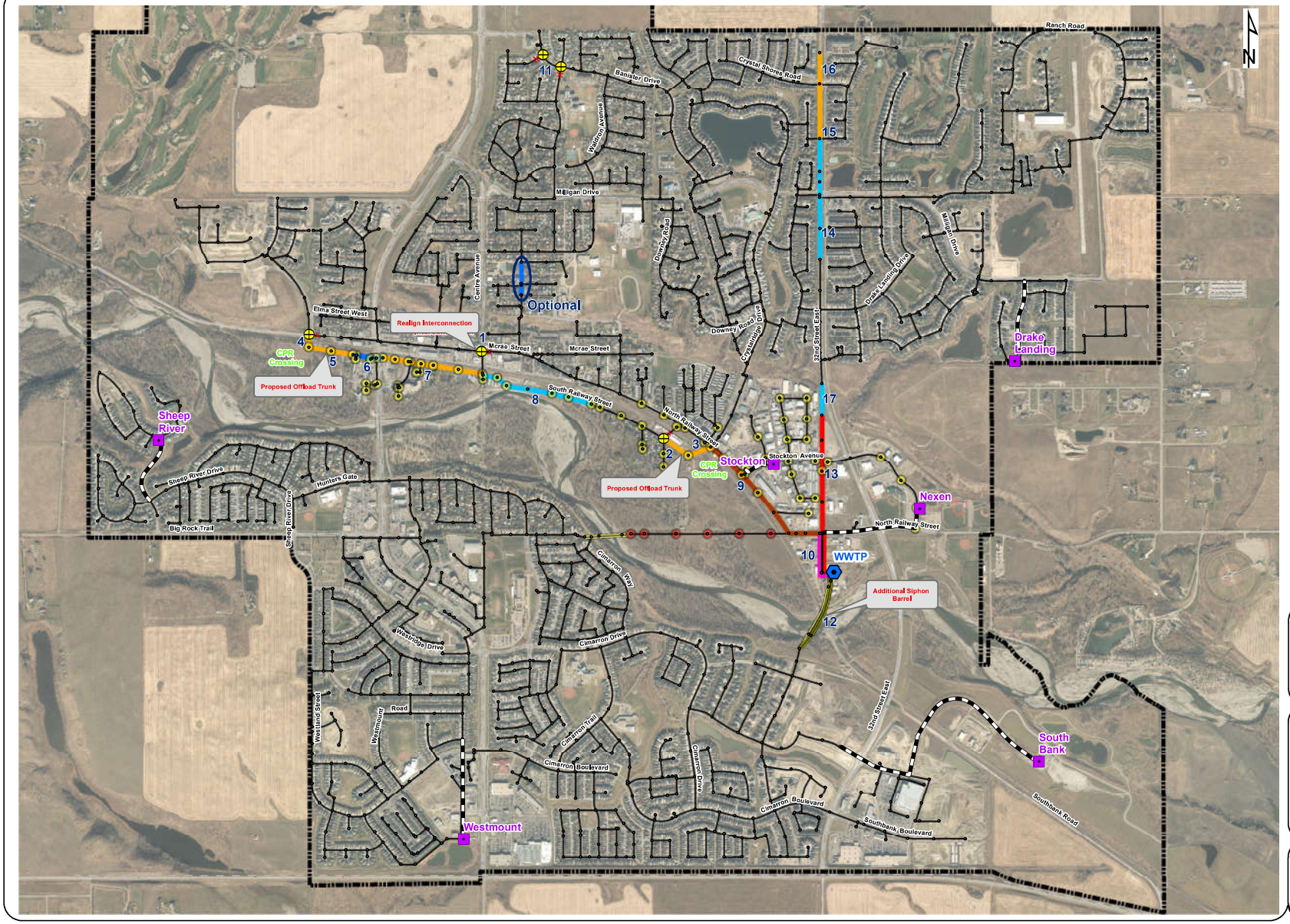

FIGURE 7.128

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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EQUIVALENT UPGRADES
UPSIZING OF THE EXISTING SEWERS
FOR SERVICING SCENARIOS
#1A, #3A, #3B & #4B

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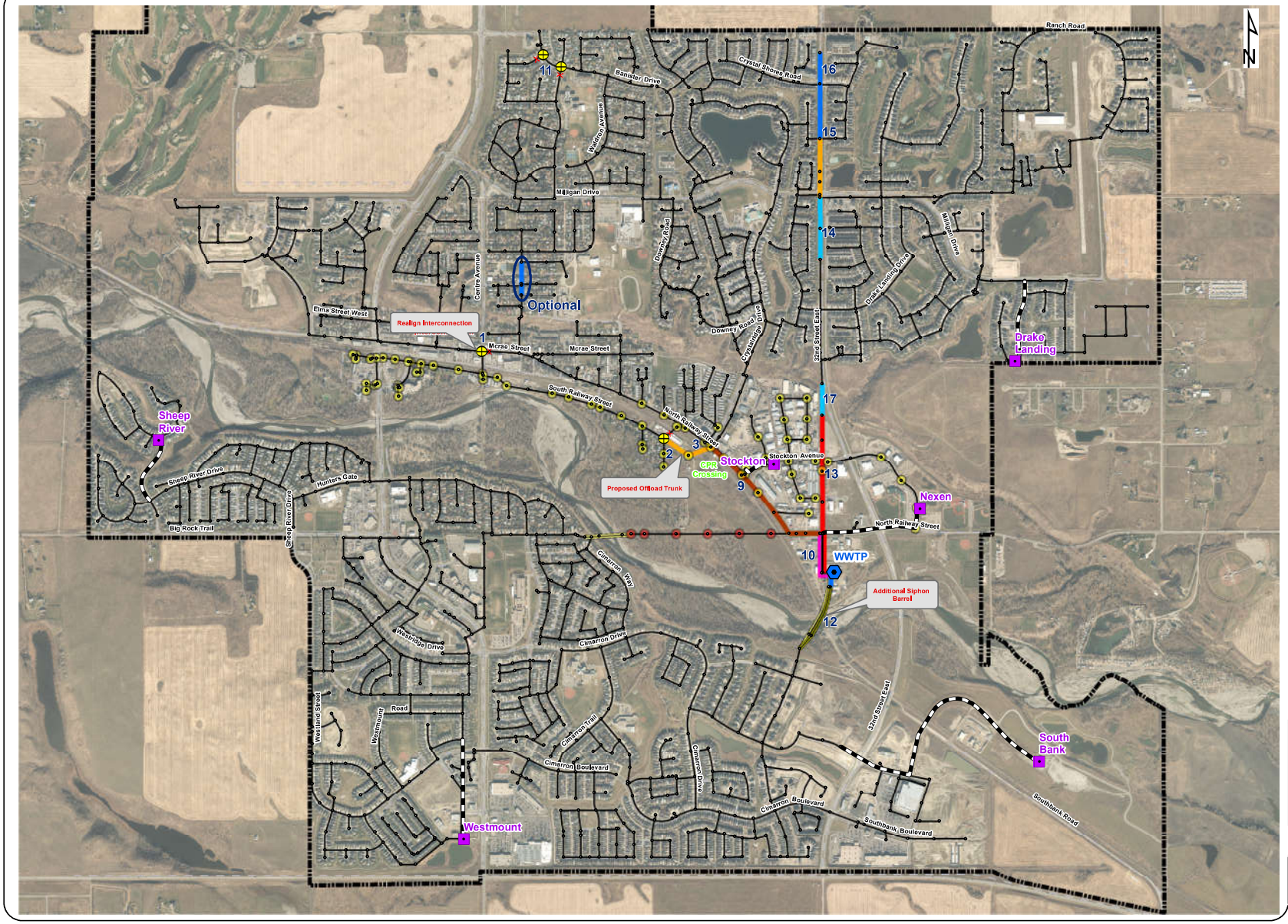

FIGURE 7.129

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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FOR SERVICING SCENARIO #2A

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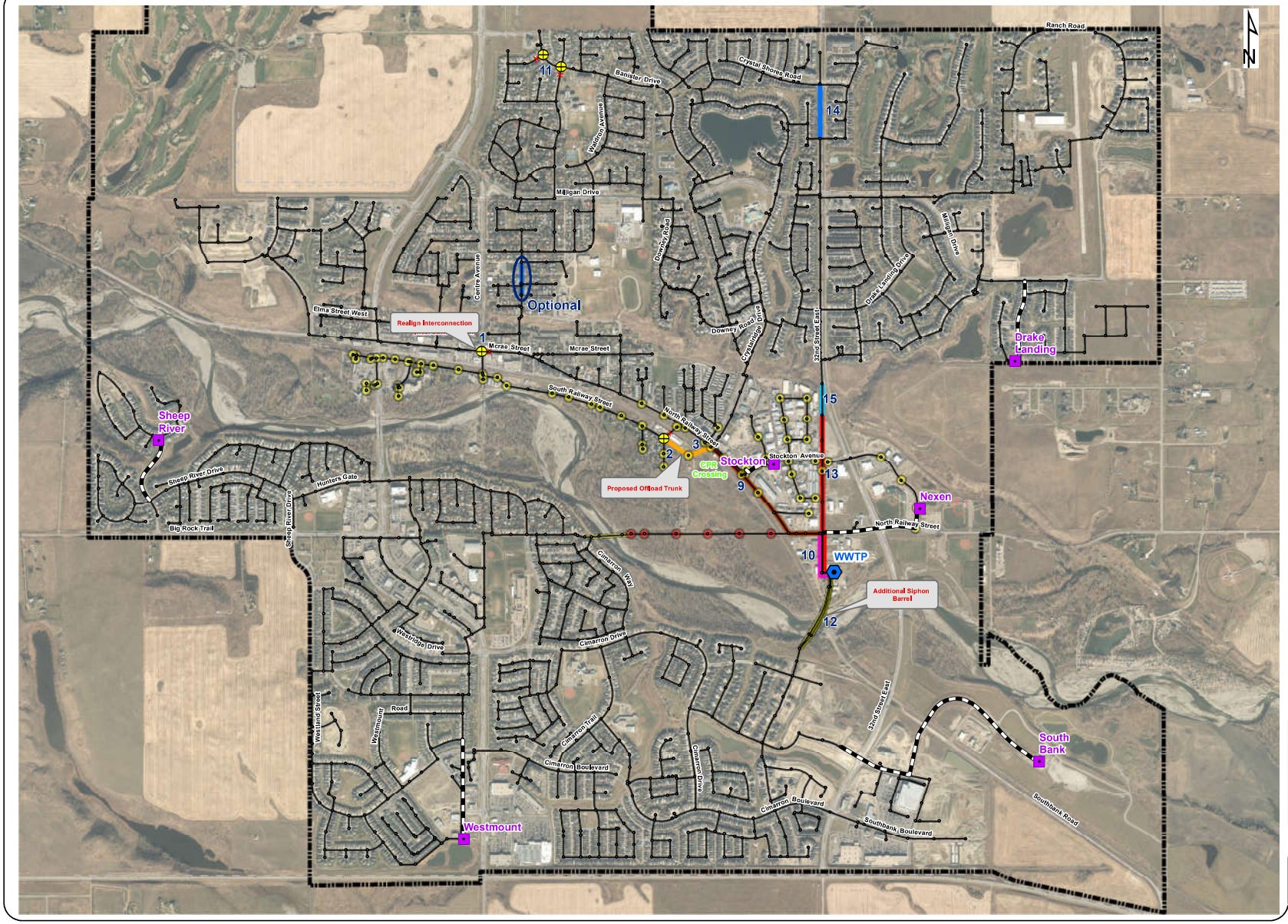

FIGURE 7.130

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- 350mm Siphon
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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60-YEAR GROWTH HORIZON
EQUIVALENT UPGRADES
UPSIZING OF THE EXISTING SEWERS
FOR SERVICING SCENARIO #4A

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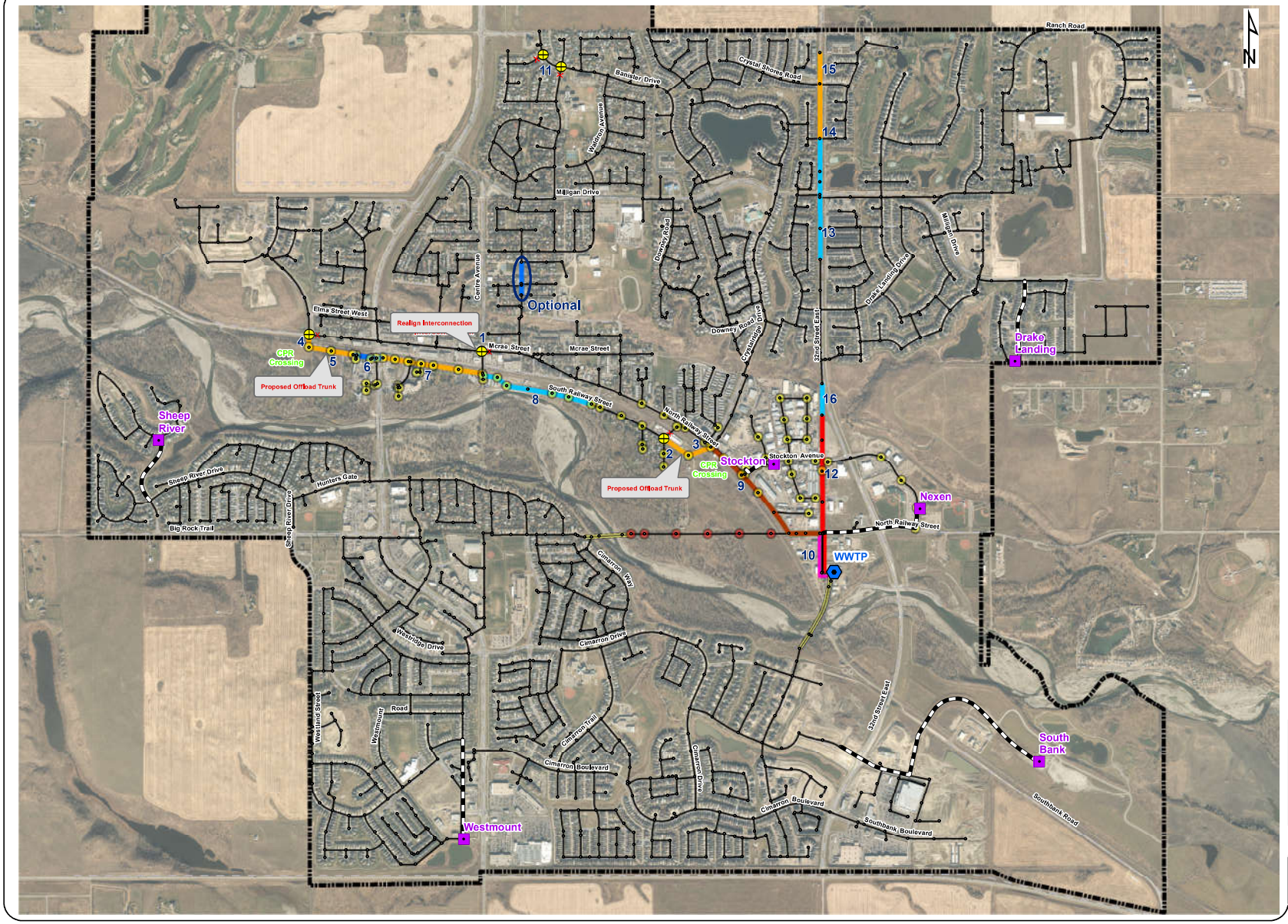

FIGURE 7.131

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
- 450mm Sewer
- 525mm Sewer
- 600mm Sewer
- 675mm Sewer
- 750mm Sewer
- Manhole To Be Sealed - Priority #1
- Manhole To Be Sealed - Priority #2
- Proposed Plug To Divert Flows
- Town Boundary

1:18,000

0 100 200 400 600 800 Meters

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60-YEAR GROWTH HORIZON
EQUIVALENT UPGRADES
UPSIZING OF THE EXISTING SEWERS
FOR SERVICING SCENARIO #1B

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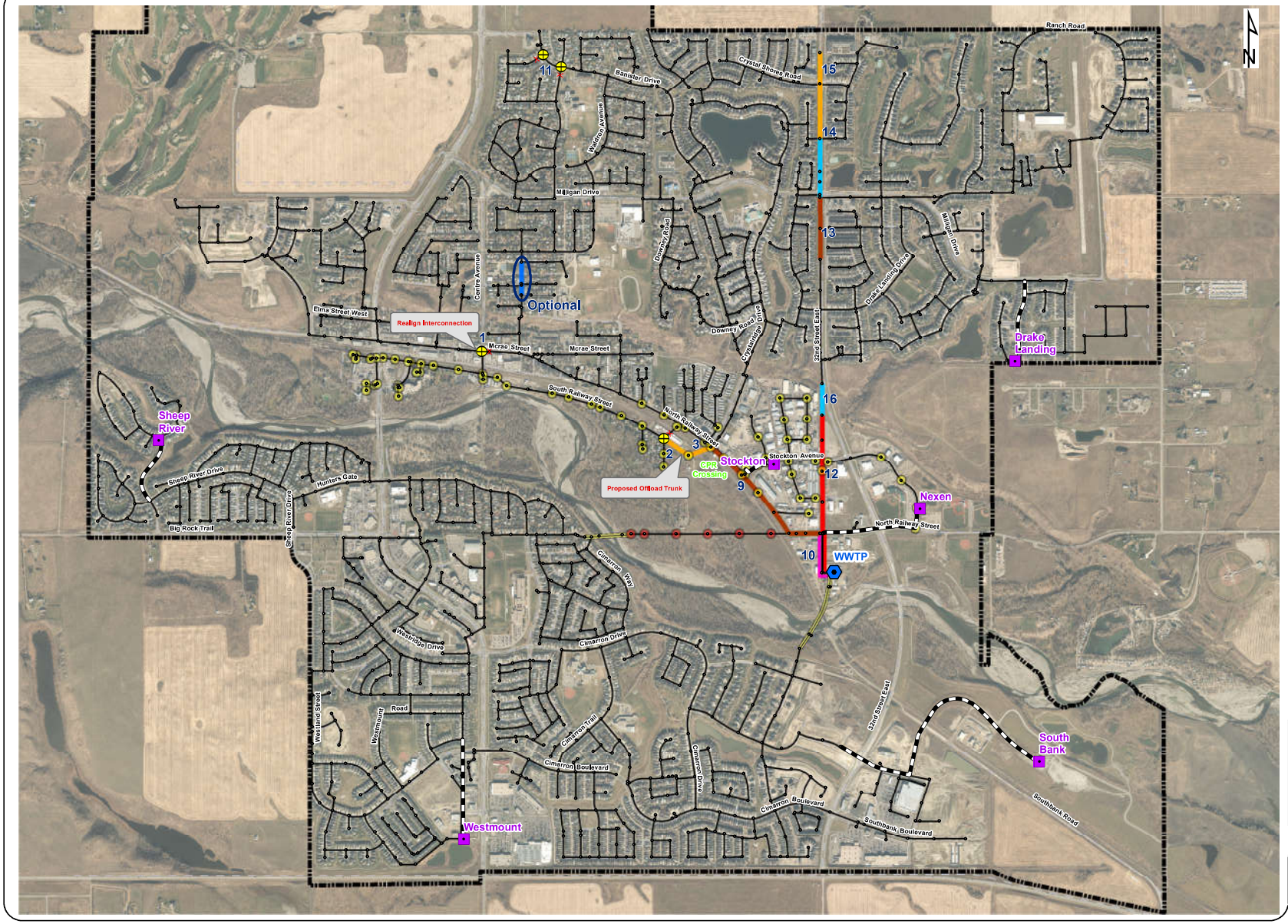

FIGURE 7.132

Legend

- Existing Lift Station
- Wastewater Treatment Plant
- Existing Gravity Sewer
- Existing Siphon
- Existing Forcemain

Proposed Upgrade (Upsizing)

- 200mm Sewer
- 250mm Sewer
- 300mm Sewer
- 375mm Sewer
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