

2024 Amendments to CFPs, IFFPs, and IFAs

Drinking Water; Wastewater; Public Safety; Parks, Recreation Facilities, Open Spaces and Trails;
Water Rights Acquisition; Storm Drainage; and Transportation

July 18th, 2024
Planning Commission Work Session

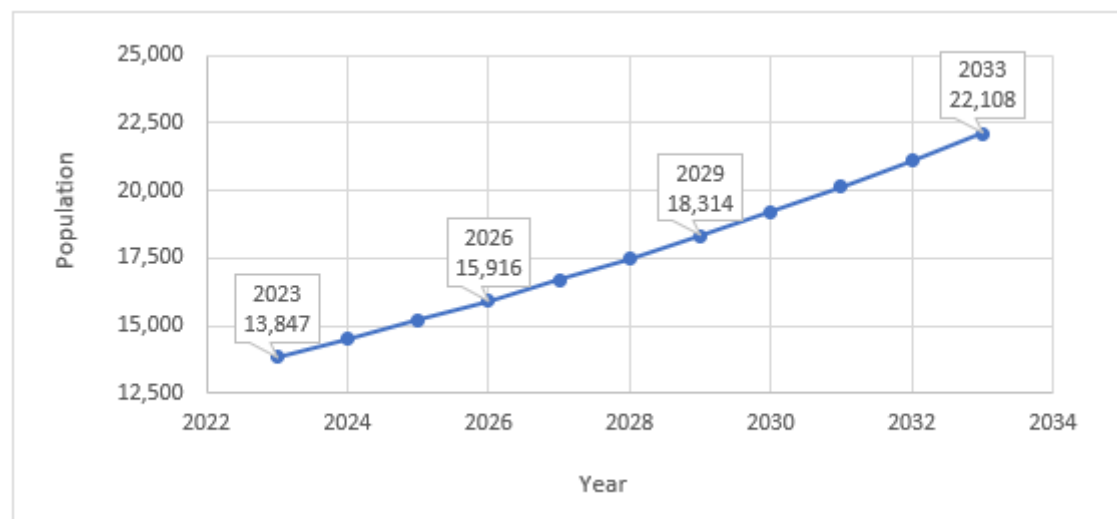


Introduction and Process

- Ensign is amending the Capital Facility Plans (CFPs), Impact Fee Facility Plans (IFFPs), and Impact Fee Analyzes (IFAs).
 - Last amendment was in 2022 to all plans except transportation since the City does not currently have a transportation IFFP or IFA.
 - Have received and incorporated City staff comments along with City Council comments from Work Session.
 - Impact fees help fund expansion of public facilities necessary to accommodate new growth.
 - Plan to amend plans either yearly or bi-yearly.
 - Have received comments from Police Chief recently which will be incorporated in next amendment.
 - It takes 90 days before amended impact fees go into effect once City Council approves.
 - Developer funded projects are not impact fee eligible.
- Updated growth rate to 5% growth rate for 10-year planning period based on historic growth. Did not adjust LOS for any of the plans.
- Determined capital improvement projects using demographics and the existing level of service from 2022 plans.
- Determined non-capital improvement project costs (i.e. interest expense, existing capital assets, professional expenses, future debt service, etc.).
- Amended impact fees and incorporated into water and sewer rate studies.

Demographics

- Population Projection in 10-year Planning Period

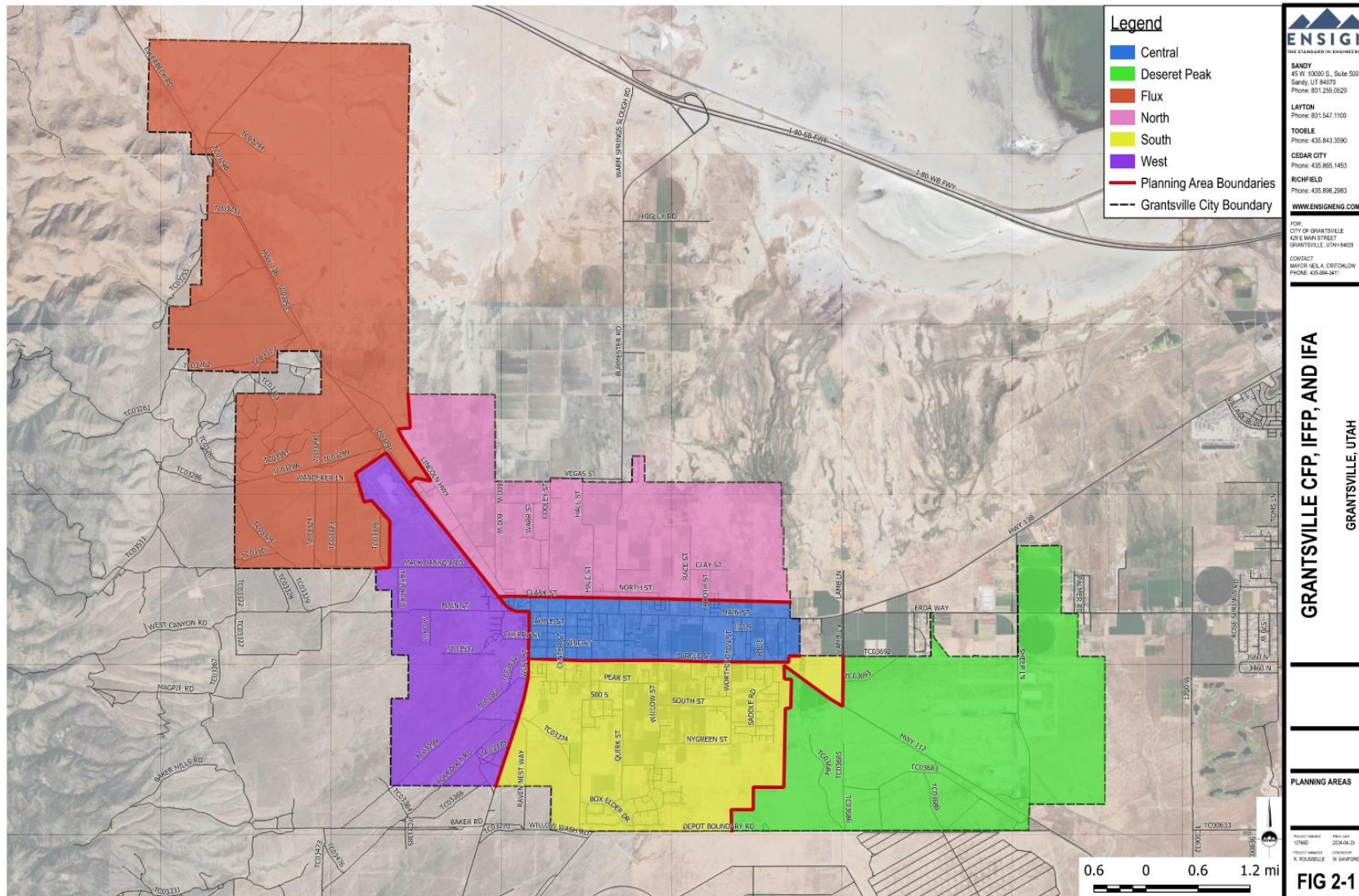


- Current Service Connections and ERCs

Service Connection Type	Service Connections	Units	ERC / Unit	ERCs
Single Family	4,267	4,274	1.00	4,274
Multi-Unit	47	291	0.55	160
Trailer	9	216	1.13	244
Commercial	107	146	7.92	1,156
Church	10	11	9.28	102
School	7	10	5.22	52
Construction Water	13	13	4.83	63
City Rate	5	34	8.60	292
Total	4,465	4,995		6,343

Demographics

- Planning Sub-Areas



Demographics

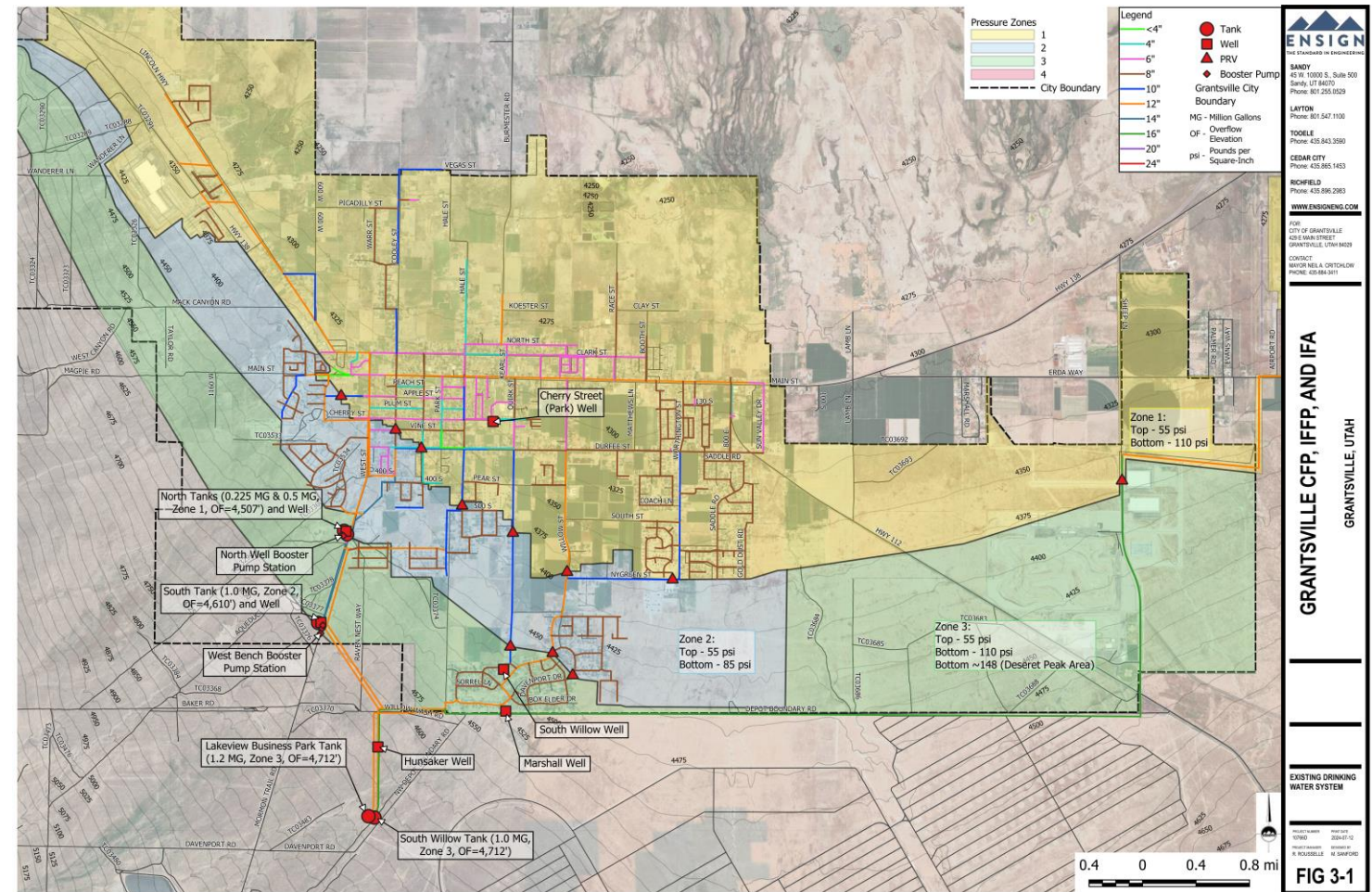
- Projected ERCs and Growth Distribution in 10-year Planning Period

Year:		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033	
Projected Population:		13,847		14,504		15,194		15,916		16,677		17,476		18,314		19,193		20,119		21,090		22,108	
Growth Rate:		5.0%		5.0%		5.0%		5.0%		5.0%		5.0%		5.0%		5.0%		5.0%		5.0%		5.0%	
Area	Percentage of Growth	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs	Units	ERCs
Central	8.10%	2,216	2,774	2,235	2,797	2,256	2,825	2,277	2,850	2,299	2,878	2,323	2,906	2,347	2,937	2,373	2,970	2,400	3,002	2,429	3,037	2,459	3,074
Increase from 2023		-	-	19	24	40	51	61	76	83	104	107	133	131	163	157	196	184	228	213	264	243	300
Deseret Peak	16.02%	92	292	130	339	170	393	212	443	256	498	302	554	351	614	402	679	456	744	512	813	571	885
Increase from 2023		-	-	38	47	79	101	120	151	165	206	211	262	260	322	311	387	364	452	421	521	480	594
Flux	39.80%	174	252	269	369	369	504	473	628	583	764	698	904	819	1,054	946	1,215	1,079	1,374	1,219	1,548	1,366	1,727
Increase from 2023		-	-	95	116	195	252	299	376	409	512	524	652	645	801	772	962	905	1,122	1,045	1,295	1,192	1,475
North	2.38%	574	899	580	906	586	914	592	921	598	929	605	938	612	947	620	956	628	966	636	976	645	987
Increase from 2023		-	-	6	7	12	15	18	22	24	31	31	39	39	48	46	58	54	67	62	77	71	88
South	10.26%	1,623	1,797	1,648	1,827	1,674	1,862	1,700	1,894	1,729	1,929	1,758	1,965	1,789	2,003	1,822	2,045	1,856	2,086	1,893	2,131	1,930	2,177
Increase from 2023		-	-	24	30	50	65	77	97	105	132	135	168	166	207	199	248	233	289	269	334	307	380
West	23.44%	316	329	372	398	431	477	492	551	557	631	625	713	696	801	771	896	849	990	932	1,092	1,018	1,198
Increase from 2023		-	-	56	68	115	148	176	221	241	301	308	384	380	472	455	567	533	661	616	763	702	868
Total		4,995	6,343	5,233	6,635	5,486	6,975	5,747	7,287	6,022	7,629	6,311	7,980	6,615	8,356	6,935	8,761	7,269	9,162	7,621	9,597	7,990	10,048
Increase from 2023		-	-	238	292	491	632	752	944	1,027	1,286	1,316	1,637	1,620	2,013	1,940	2,418	2,274	2,819	2,626	3,254	2,995	3,705

Drinking Water (Existing)

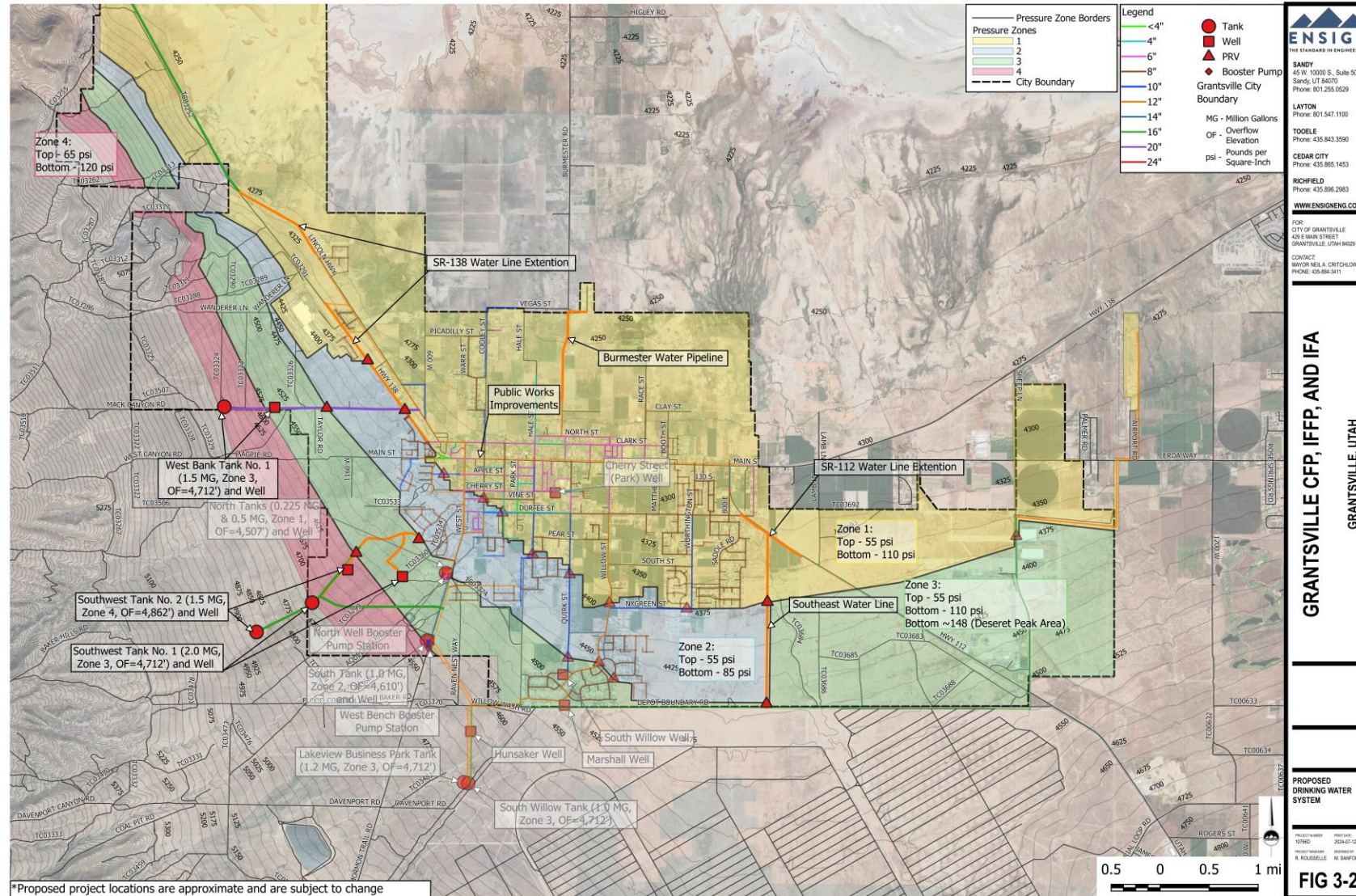
- Level of Service

- Unit Average Day Demand = 807 gpd/ERC (0.618 ac-ft/year/ERC)**
 - Indoor Demand = 195 gpd/ERC (0.218 ac-ft/year/ERC)
 - Outdoor Demand = 612 gpd/ERC (0.400 ac-ft/year/ERC)
- Unit Peak Day Demand = 1,416 gpd/ERC (0.983 gpm/ERC)**
 - Indoor Demand = 275 gpd/ERC (0.191 gpm/ERC)
 - Outdoor Demand = 1,141 gpd/ERC (0.792 gpm/ERC)
- Peak Instantaneous Demand:**
 - Indoor Demand = $10.8 * (\text{ERCs})^{0.64}$ gpm/ERC
 - Outdoor Demand = 1.58 gpm/ERC
- Fire Flow:**
 - Industrial/Commercial Buildings = 2,050 gpm for 4 hours (492,000 gallons)
 - Residential = 1,500 for 2 hours
- Drinking Water System Capacity Requirements:**
 - Sources:**
 - Supply Peak Day Demand
 - Storage:**
 - Storage for Average Day Demand plus Fire Flow (Industrial/Commercial Buildings Fire Flow)
 - Distribution:**
 - Per UAC R309-105-9, distribution systems should be maintain a minimum pressure at all points in the system during:
 - Peak Day Demand plus Fire Flow - 20 psi
 - Peak Instantaneous Demand – 30 psi
 - Peak Day Demand – 40 psi
 - Max Velocity Requirements:
 - Peak Day and Peak Instantaneous Demand - 5 fps
 - Peak Day Demand plus Fire Flow – 10 fps



Drinking Water (Proposed)

- Capital Improvement Projects



Drinking Water Impact Fees

- Impact Fees
 - Existing Impact Fees

Residential				
Meter Size (inches)	Maximum Flow Rate (gpm)	ERCs	Impact Fee per Meter Size	Table Used (AWWA M6, Table 5-3) ¹
3/4	25	1.00	\$3,036.00	Displacement Meter Table
1	40	1.60	\$4,857.00	Displacement Meter Table
1 1/2	50	2.00	\$6,072.00	Displacement Meter Table
2	100	4.00	\$12,144.00	Displacement Meter Table
3	200	8.00	\$24,287.00	Electromagnetic and Ultrasonic Meter Type 1 Table
4	400	16.00	\$48,574.00	Electromagnetic and Ultrasonic Meter Type 1 Table
6	800	32.00	\$97,148.00	Electromagnetic and Ultrasonic Meter Type 1 Table
8	1000	40.00	\$121,435.00	Electromagnetic and Ultrasonic Meter Type 1 Table
Non-Residential				
Indoor/Outdoor		Impact Fee		Unit
Indoor		\$31.00		per fixture unit
Outdoor		\$19,186.00		per irrigated acre

¹ Table used in AWWA M6 is based on the types of water meters Grantsville City currently requires

- Proposed Impact Fees

Water Meter Size (inches)	Maximum Flow Rate (gpm)	ERCs	Impact Fee
3/4	25 ¹	1	\$3,432.76
1	40 ¹	1.6	\$5,492.42
1 1/2	50 ¹	2	\$6,865.52
2	100 ¹	4	\$13,731.05
3	200 ²	8	\$27,462.09
4	400 ²	16	\$54,924.19
6	800 ²	32	\$109,848.38
8	1,000 ²	40	\$137,310.47
Non-Residential Development Indoor			\$35.00 per fixture unit
Non-Residential Development Outdoor			\$21,694.03 per irrigated acre

¹ From AWWA M6 Table 5-3 Displacement Meters.

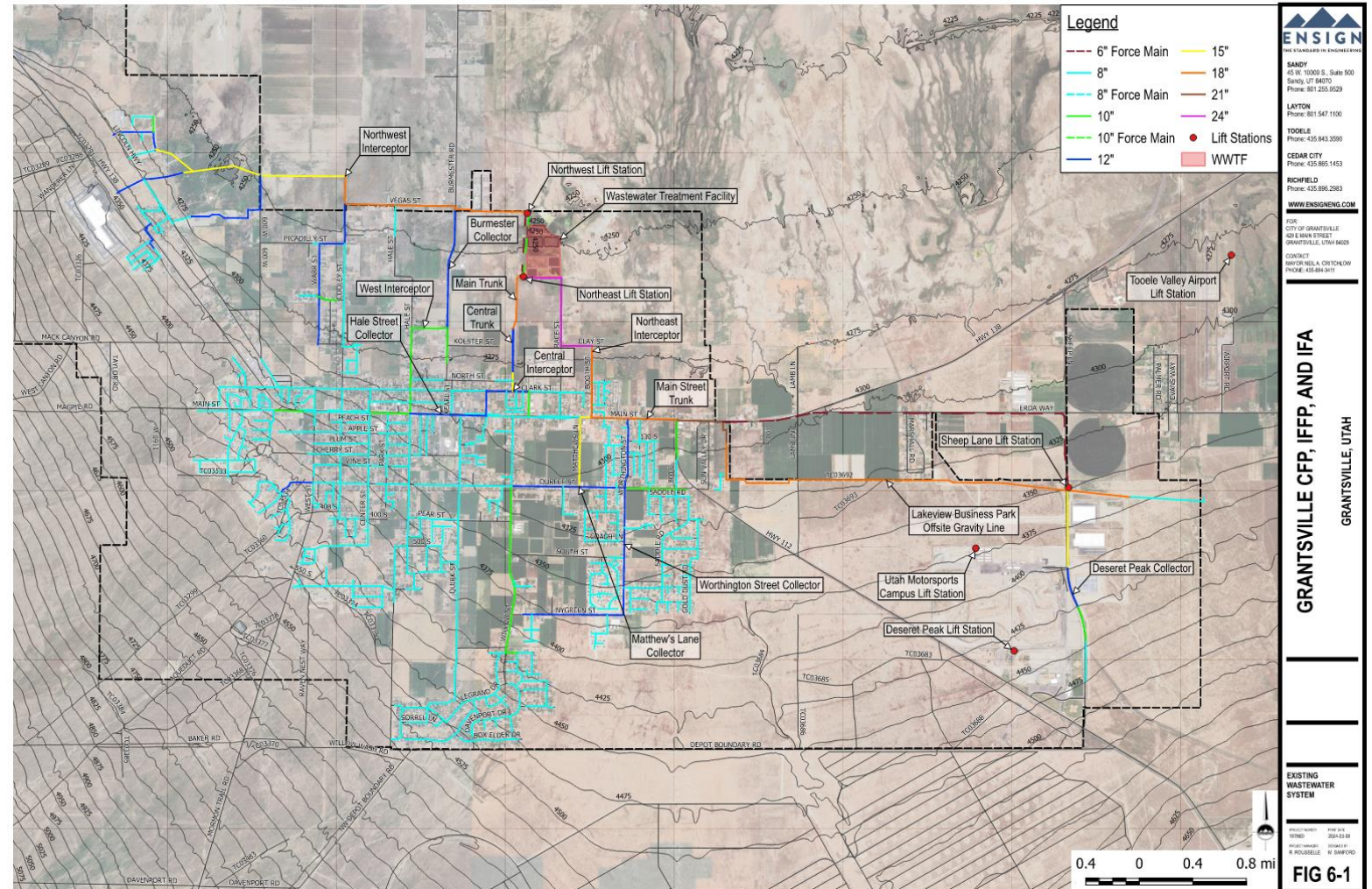
² From AWWA M6 Table 5-3 Electromagnetic and Ultrasonic Meter Type 1.

Other Cities		
Tooele City		
Impact Fee	Unit	
\$7,805.00	per ERC	
Cedar City		
Meter Size (inches)	Impact Fee	
1	\$3,892.00	
1 1/2	\$9,730.00	
2	\$15,568.00	
3	\$22,690.36	
4	\$33,743.64	
6	\$57,095.64	
West Jordan City		
Meter Size (inches)	Impact Fee	
3/4	\$6,608.00	
1	\$11,035.00	
1 1/2	\$22,005.00	
2	\$35,221.00	
3	\$77,115.00	
4	\$132,160.00	
6	\$275,355.00	
Payson City		
Land Use	Impact Fee	Unit
Single Family Residential	\$1,867.00	per Dwelling Unit
Commercial	\$13,685.00	per Connection
Institutional	\$2,128.00	per Connection
Mapleton City		
Land Use	Impact Fee	Unit
Single Family Impact Fee	\$1,417.00	per Dwelling Unit
Multi-Family Impact Fee	\$552.63	per Dwelling Unit
Accessory Apartment	\$552.63	per Dwelling Unit
Commercial		
Meter Size (inches)	Impact Fee	
1	\$1,417.00	
1 1/2	\$4,718.00	
2	\$7,552.00	
3	\$14,170.00	
4	\$23,621.00	

Wastewater

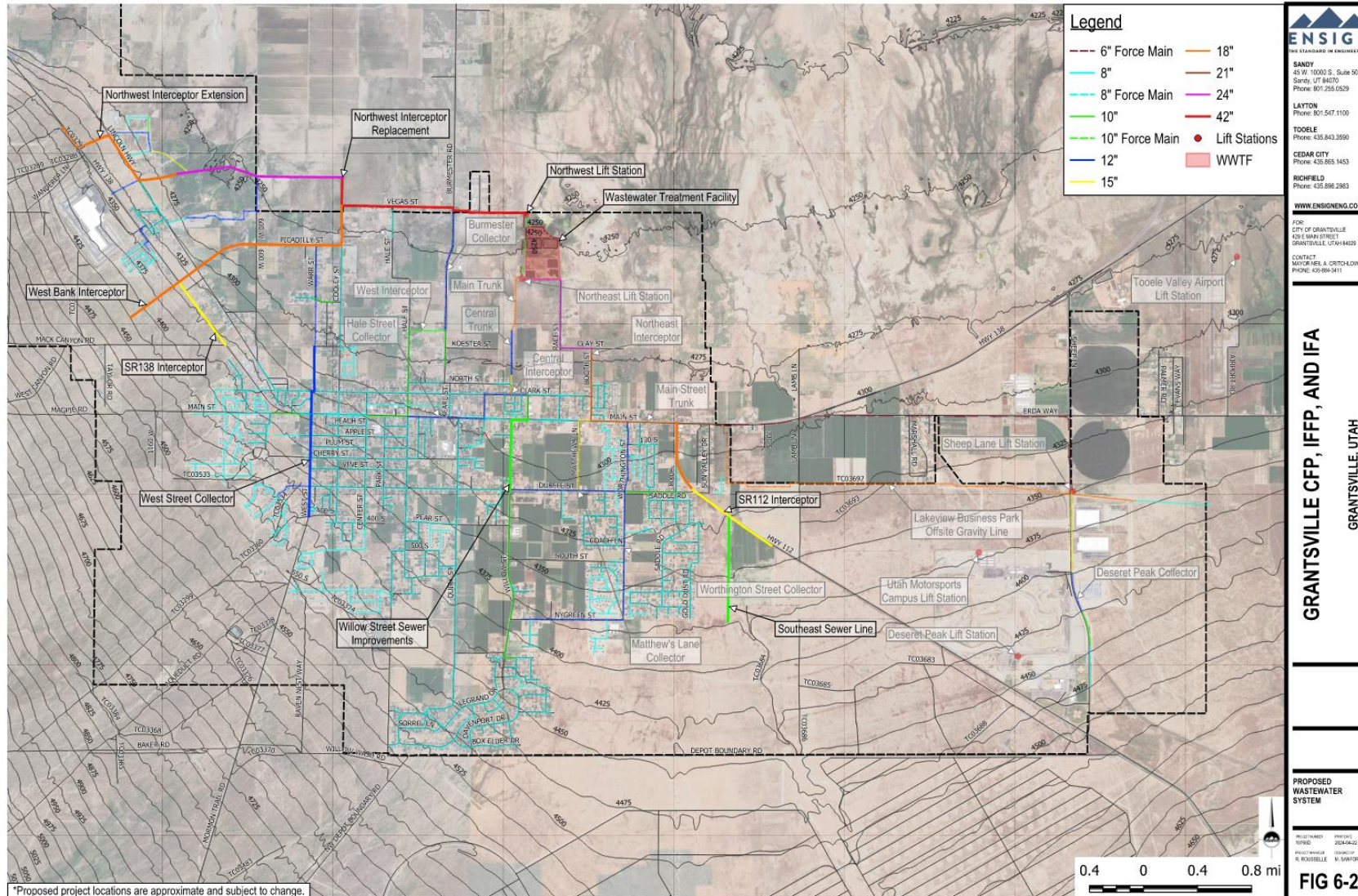
- Level of Service

Component	Parameter	Level of Service	
Collection System	Average Day Flow	150 gpd/ERC	
	Peaking Factors	Miles From WWTF	Factor
		<1	1.85
		>1 and <1.6	2.25
	>1.6	4	
Lift Stations	Peak Inflow	0.35 gpm/ERC	
Wastewater Treatment Facility	Average Day Flow	150 gpd/ERC	
	Peak Day Flow	175 gpd/ERC	
	Peak Instantaneous Flow	0.4 gpm/ERC	



Wastewater

- Capital Improvement Projects



Wastewater

- Impact Fees
 - Existing Impact Fees

Residential				
Meter Size (inches)	Maximum Flow Rate (gpm)	ERCs	Impact Fee per Meter Size	Table Used (AWWA M6, Table 5-3) ¹
3/4	20	1.00	\$1,529.00	Displacement Meter Table
1	32	1.60	\$2,447.00	Displacement Meter Table
1 1/2	40	2.00	\$3,059.00	Displacement Meter Table
2	80	4.00	\$6,117.00	Displacement Meter Table
3	160	8.00	\$12,235.00	Electromagnetic and Ultrasonic Meter Type 1 Table
4	320	16.00	\$24,470.00	Electromagnetic and Ultrasonic Meter Type 1 Table
6	640	32.00	\$48,939.00	Electromagnetic and Ultrasonic Meter Type 1 Table
8	800	40.00	\$61,174.00	Electromagnetic and Ultrasonic Meter Type 1 Table
Non-Residential				
Impact Fee			Unit	
Non-Residential			\$64.00	per fixture unit

- Proposed Impact Fees

Water Meter Size (inches)	Maximum Flow Rate (gpm)	ERCs	Impact Fee
3/4	25 ¹	1	\$5,120.79
1	40 ¹	1.6	\$8,193.26
1 1/2	50 ¹	2	\$10,241.58
2	100 ¹	4	\$20,483.15
3	200 ²	8	\$40,966.30
4	400 ²	16	\$81,932.61
6	800 ²	32	\$163,865.22
8	1,000 ²	40	\$204,831.52

Non-Residential Development \$213.37 per fixture unit

¹ From AWWA M6 Table 5-3 Displacement Meters.

² From AWWA M6 Table 5-3 Electromagnetic and Ultrasonic Meter Type 1.

Other Cities		
Tooele City		
Land Use	Impact Fee	Unit
Residential	\$4,731.00	per ERC
Non-Residential	?	

Cedar City	
Meter Size (inches)	Impact Fee
1	\$1,935.00
1 1/2	\$4,837.00
2	\$7,740.00
3	\$11,281.05
4	\$16,776.45
6	\$28,386.45

West Jordan City	
Meter Size (inches)	Impact Fee
3/4	\$3,495.00
1	\$5,837.00
1 1/2	\$11,639.00
2	\$18,630.00
3	\$40,790.00
4	\$69,905.00
6	\$145,647.00

Payson City		
Land Use	Impact Fee	Unit
Single Family Residential	\$1,824.00	per Dwelling Unit
Commercial	\$1,824.00	per ERC
Institutional	\$6,183.00	per Connection

Mapleton City		
Land Use	Impact Fee	Unit
Single Family Residential	\$3,156.91	per Dwelling Unit
Multifamily Residential	\$1,231.19	per Dwelling Unit
Accessory Apartment	\$1,231.19	per Dwelling Unit
Commercial	\$3,156.91	per ERU (see Table 4-6 of Culinary Water IFA)

Public Safety

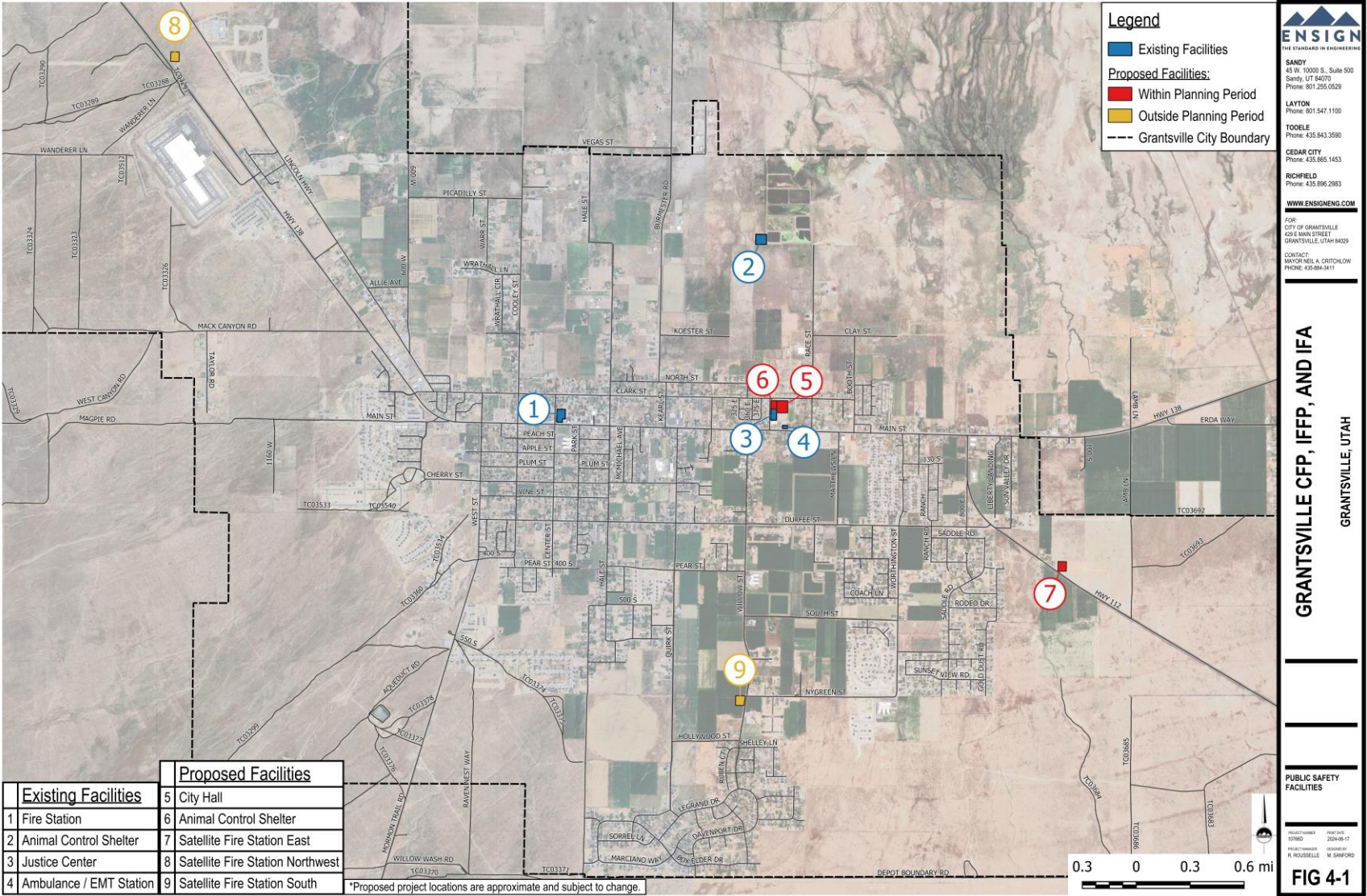
- Level of Service

Table 4-3: Public Safety Level of Service

Department	Staff Level of Service	Facility Level of Service
Police	1.49 officers per 1,000 population	118.6 sq ft building area per officer
Fire	3.52 firefighters per 1,000 population	0.0754 fire stations per 1,000 population
Animal Control	0.156 officers per 1,000 population	90.3 sq ft building area per 1,000 population

Public Safety

- Capital Improvement Projects



Public Safety

- Impact Fees
 - Existing Impact Fees

Land Use	Impact Fee
Single Family Residential	\$590.00 per Dwelling Unit
Multi-Unit Residential	\$255.00 per Dwelling Unit
Non-Residential	\$0.54 per square foot of building area

- Proposed Impact Fees

Land Use	Impact Fee
Single Family	\$996.12 per Dwelling Unit
Multi-Unit	\$430.33 per Dwelling Unit
Non-Residential	\$953.80 per 1,000 sq ft building area

West Jordan City		
Fire		
Land Use	Impact Fee	Unit
Single Family	\$269.00	per Unit
Multi Family	\$348.00	per Unit
Commercial	\$754.00	per 1,000 sq ft
Office	\$429.00	per 1,000 sq ft
Industrial	\$116.00	per 1,000 sq ft
Other	\$482.00	per 1,000 sq ft
Police		
Land Use	Impact Fee	Unit
Single Family	\$371.00	per Unit
Multi Family	\$434.00	per Unit
Commercial	\$609.00	per 1,000 sq ft
Office	\$144.00	per 1,000 sq ft
Industrial	\$89.00	per 1,000 sq ft
Other	\$383.00	per 1,000 sq ft
Payson City		
Land Use	Impact Fee	Unit
Residential	\$600.00	per Dwelling Unit
Commercial/Industrial	\$3,735.00	per Water Connection
Mapleton City		
Land Use	Impact Fee	Unit
Single Family Residential	\$402.52	per Dwelling Unit
Multi-Family Residential	\$176.60	per Dwelling Unit
Accessory Apartment	\$176.60	per Dwelling Unit
Retail	\$302.50	per 1,000 sq ft of building
Office	\$112.93	per 1,000 sq ft of building
Industrial	\$79.82	per 1,000 sq ft of building
Institutional	\$788.52	per 1,000 sq ft of building

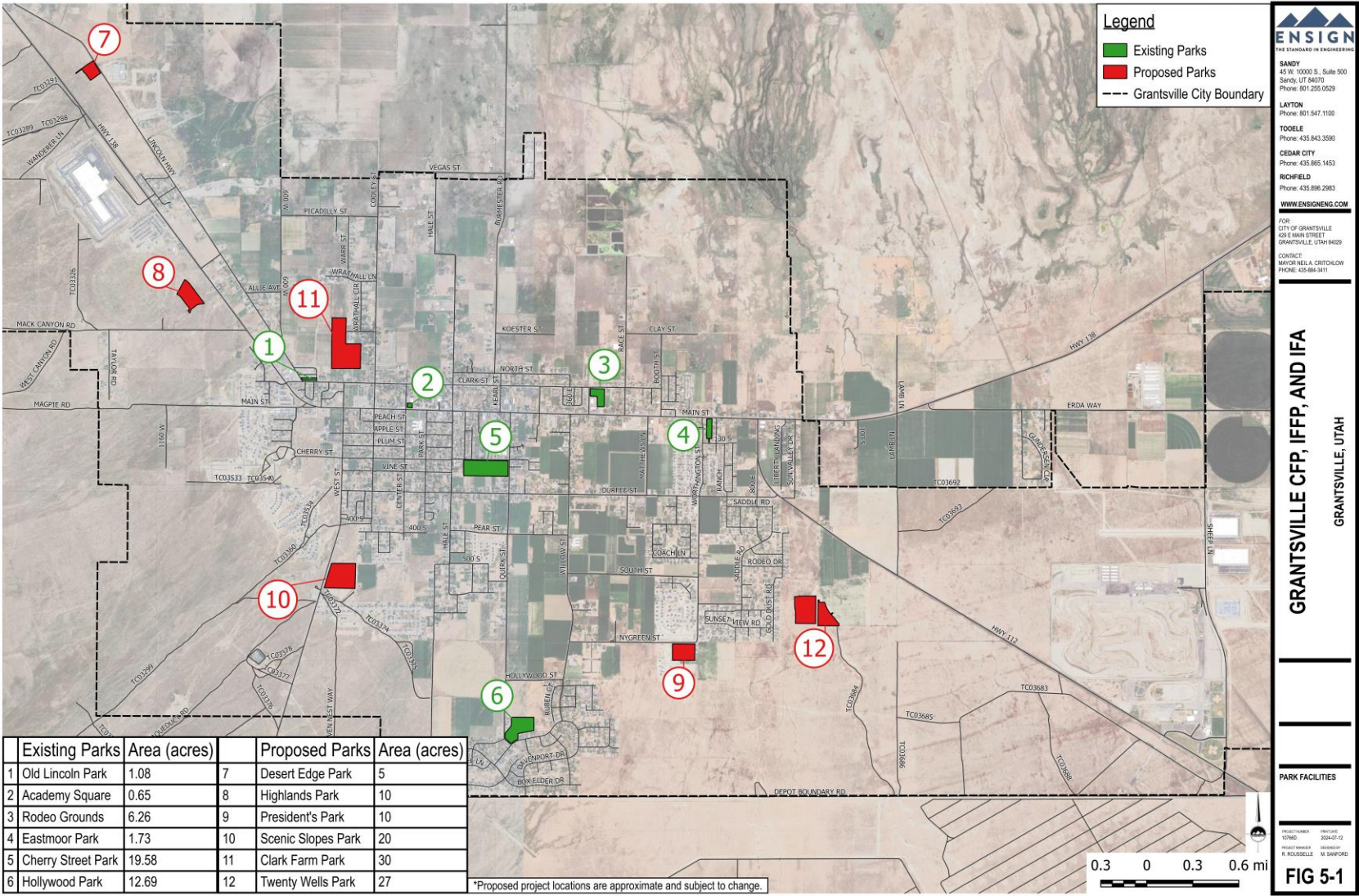
Parks, Recreation Facilities, Open Spaces, and Trails

- Level of Service

Parameter	LOS Requirement
Park Acreage per 1,000 population	4.00 acres

Parks, Recreation Facilities, Open Spaces, and Trails

- Capital Improvement Projects



Parks, Recreation Facilities, Open Spaces, and Trails

- Impact Fees

- Existing Impact Fees

Land Use	Impact Fee
Single Family and Multi-Unit Residential	\$1,925.00 per Dwelling Unit

- Proposed Impact Fees

Land Use	Impact Fee
Single Family and Multi-Unit	\$3,952.56 per Dwelling Unit

- Note: Developer constructed parks are shown as not impact fee eligible.

Other Cities		
Tooele City		
Land Use	Impact Fee	Unit
Single-Family Residential	\$3,194.00	per unit
Multi-Family Residential	\$2,252.00	per unit
Cedar City		
Land Use	Impact Fee	Unit
Single Family	\$1,350.00	per Dwelling Unit
Multi Family	\$1,290.00	per Dwelling Unit
Commercial	N/A	per 1,000 sq ft of building
Industrial	N/A	per 1,000 sq ft of building
Agricultural	N/A	per Acre
Institutional	N/A	per 1,000 sq ft of building
West Jordan City		
Land Use	Impact Fee	Unit
Single Family	\$4,423.00	per Unit
Multi Family	\$3,499.00	per Unit
Payson City		
Land Use	Impact Fee	Unit
Single Family Residential	\$2,800.00	per Dwelling Unit
Multi Family (2-4 Units & Mobile Homes)	\$2,000.00	per Dwelling Unit
Multi Family (5+ Units)	\$1,500.00	per Dwelling Unit
Mapleton City		
Land Use	Impact Fee	Unit
Single Family Residential	\$3,587.00	per Dwelling Unit
Multi-Family Residential	\$1,384.00	per Dwelling Unit
Accessory Apartment	\$1,384.00	per Dwelling Unit

Water Rights Acquisition

- Level of Service

Parameter	Level of Service
Indoor Use	0.218 acre-feet/year/ERC
Outdoor Use	3.33 acre-feet/year/irrigated acre

Water Rights Acquisition

- Impact Fees
 - Existing Impact Fees
 - Indoor Use

Indoor Use Fees	
Land Use	Impact Fee
Single Family Residential	\$4,033.00 per Dwelling Unit
Multi-Unit Residential	\$2,218.00 per Dwelling Unit
Non-Residential	\$168.00 per fixture unit

- Outdoor Use (Typical)

Outdoor Use Fees		
Residential Lot Size	Assumed Irrigated Area	Impact Fee
7,000 sq ft	4,480 sq ft	\$6,336.00
8,000 sq ft	5,120 sq ft	\$7,241.00
10,000 sq ft	6,400 sq ft	\$9,051.00
14,000 sq ft	8,960 sq ft	\$12,672.00
1/2 acre	0.32 acre	\$19,714.00
2/3 acre	0.427 acre	\$26,285.00
3/4 acre	0.48 acre	\$29,570.00
1.0 acre	0.64 acre	\$39,427.00
> 1.0 acre	> 0.64 acre	\$39,427.00
Residential Impact Fee	= (lot size, acres) * (0.64) * (3.33 ac-ft/irr. ac) * (\$18,500/ac-ft)	
Non-Residential Impact Fee	= (irrigated area, acres) * (3.33 ac-ft/irr. ac) * (\$18,500/ac-ft)	

¹Residential lot sizes greater than 1.0 acre are assumed to not have any additional landscaping, which is why the fee is capped at \$39,427.00. The fee for non-residential development is not capped.

- Outdoor Use (Xeriscape)

Outdoor Use Fees (Xeriscape)		
Residential Lot Size	Assumed Irrigated Area	Impact Fee
7,000 sq ft	4,480 sq ft	\$4,338.00
8,000 sq ft	5,120 sq ft	\$4,958.00
10,000 sq ft	6,400 sq ft	\$6,197.00
14,000 sq ft	8,960 sq ft	\$8,676.00
1/2 acre	0.32 acre	\$13,498.00
2/3 acre	0.427 acre	\$17,997.00
3/4 acre	0.48 acre	\$20,246.00
1.0 acre	0.64 acre	\$26,995.00
> 1.0 acre	> 0.64 acre	\$26,995.00
Residential Impact Fee	= (lot size, acres) * (0.64) * (2.28 ac-ft/irr. ac) * (\$18,500/ac-ft)	
Non-Residential	= (irrigated area, acres) * (2.28 ac-ft/irr. ac) * (\$18,500/ac-ft)	

¹Residential lot sizes greater than 1.0 acre are assumed to not have any additional landscaping, which is why the fee is capped at \$26,995.00. The fee for non-residential development is not capped.

Water Rights Acquisition

- Impact Fees

- Category 1 includes single family homes only.
- Category 2 covers all other types of development not included in Category 1.
- Proposed Impact Fees

- Indoor Use

Land Use	Water Right Quantity (ac-ft)	Impact Fee	Unit
Single Family Residential	0.218	\$5,450.00	per Dwelling Unit
Multi-Unit Residential	0.120	\$3,000.00	per Dwelling Unit
Non-Residential	0.00908	\$227.00	per fixture unit

- Category 1 Outdoor Use (No Waterwise Landscaping)

Category 1 Lot Size	Water Right Quantity (ac-ft)	Impact Fee
7,000 sq ft	0.34	\$8,561.98
8,000 sq ft	0.39	\$9,785.12
10,000 sq ft	0.49	\$12,231.40
14,000 sq ft	0.68	\$17,123.97
1/2 acre	1.07	\$26,640.00
2/3 acre	1.42	\$35,520.00
3/4 acre	1.60	\$39,960.00
1.0 acre	2.13	\$53,280.00
> 1.0 acre	2.13	\$53,280.00

- Category 1 Outdoor Use (Waterwise Landscaping Front Yard Only)

Category 1 Lot Size	Water Right Quantity (ac-ft)	Impact Fee
7,000 sq ft	0.31	\$7,802.69
8,000 sq ft	0.36	\$8,917.36
10,000 sq ft	0.45	\$11,146.69
14,000 sq ft	0.62	\$15,605.37
1/2 acre	0.97	\$24,277.50
2/3 acre	1.29	\$32,370.00
3/4 acre	1.46	\$36,416.25
1.0 acre	1.94	\$48,555.00
> 1.0 acre	1.94	\$48,555.00

- Category 2 Outdoor Use (No Waterwise Landscaping)

Category 2 = (irrigated area, acres) * (3.33 ac-ft/irr. ac) * \$25,000

- Category 2 Outdoor Use (Waterwise Landscaping)

Category 2 = (irrigated area, acres) * (2.28 ac-ft/irr. ac) * \$25,000

Storm Drainage

- Level of Service

- **Note: The Storm Drainage Design Guidelines will be updated once West Bank Master Plan is approved.**



GRANTSVILLE CITY STORM DRAINAGE DESIGN GUIDELINES

1. Storm Water Collection System Requirements

a) Design Storms

- The storm water pipe collection system shall be designed to convey the 24-hour duration – 10-year storm water event if continuous pathway to the Great Salt Lake. Collection systems for basin and street shall be sized for the 24-hour duration – 100-year storm water event when discharging to a detention /retention basin.

b) Storm Water Runoff into Street Encroachment Requirements

- Flow from the 10-year storm shall not extend more than halfway into the travel lane adjacent to the curb and a minimum 12-foot wide travel lane shall be maintained for emergency vehicles. If there is a curb then no more than 8-feet from the curb face.

c) Easement and Access Requirements

- Easement widths and access for drainage channels, detention basins, lots line swales, and public storm drainage lines shall be reviewed and approved by the City Engineer.

d) Acceptable Pipe Materials

- Acceptable pipe materials include corrugated HDPE with smooth interior, corrugated PVC with smooth interior, and reinforced concrete pipe (RCP). Corrugated metal pipe (CMP0 is not acceptable for public improvements.

e) Minimum Pipe Diameter

- The minimum pipe diameter for any public storm water collection system pipe is 15-inches.

f) Manhole Spacing

- Minimum manhole spacing is 400-feet from pipes 21-inch diameter, unless otherwise approved by the City Engineer.

g) Manhole Drops

- A minimum drop of 0.10feet is required at all storm drainage structures between the inlet and outlet pipe. Where changes in pipe sized occur in a manhole the inlet pipe crown must match the larger outlet pipe crown.

h) Cover

- Minimum cover is 18-inches or 6 inches below the pavement section which ever is greater. Unless approved by City Engineer

i) Catch Basin Requirements

- Catch basins will not be allowed on the radius of curves at intersections.
- Flow through catch basins shall not be allowed unless designed as a combination box with manhole lid access.
- A snout or similar oil/debris/water separator is required prior to a detention basin, retention basin, or any other discharges from a development into a public drainage.

j) Detention/Retention Basin Requirements

- Maximum water level depths greater than 3-feet are required to have a 4-foot minimum fence around the basin to prevent animals and children from being harmed in the basin.



- Project needs to address the frontage storm water as part of the project.

- Retention basins shall completely infiltrate and drain within 72-hours from the beginning of a storm event for vector control. Percolation tests shall be completed for all infiltration basins and submitted with drainage calculations to the City for review.

k) Manning's n Values

- n value for linings shall be determined per an approved Engineers Manual based on size and placement of materials. Calculations shall include the reference used for the n value for review by the City Engineer.

l) Rip-rap Sizing

- Channel Riprap sizing calculations shall utilize the *Truckee Meadows Regional Drainage Manual* dated April 30, 2009 (see https://www.washoecounty.gov/csd/engineering_capitalprojects/files-engineering-capital-projects/tmrdm_final_043009.pdf)

m) Erosion Control

- The developer would need to provide a copy of their Erosion Control Plans, SWPPP, Notice of Intent (NOI), and Notice of Termination (NOT) with the State if their construction project is greater than 1 acre.

2. Hydrology Requirements

a) Rainfall Data

- NOAA Atlas 14 shall be used for rainfall in the City of Grantsville (see https://hdsc.nws.noaa.gov/hdsc/pfds_map_cont.html)

b) Design Storms

- Detain 100-year 24-hour storm for project site
- For the West Bank drainage areas draining into your project you may discharge at the following rates until the 100-year storm volume that shall perc in 3 days:

Table 1: Recommended Unit Discharge Requirement for the Baker and Pope Watersheds

24-hour Duration Storm Event	Baker and Pope Watershed Peak Unit Discharge (cfs/acre)	All Other Watersheds Peak Unit Discharge (cfs/acre)
10 year	0.003	0.05
100 year	0.01	0.15

Source: Table 17 in Section 3 from the Storm Water Management Study for Baker and Pope Watersheds dated April 2015 by AQUA Engineering

- Refer to Figure 1 for a map of Baker and Pope Watersheds.

3. Drainage Report Requirements

- If discharge will be above the allowed discharge per area rates shown on Table 1 then a pre and post development hydrologic analysis will be required showing flows will not cause a negative affect downstream. The Rational Method ($Q=CiA$) may be used in computations for the rate of runoff for urban and small watershed 100 acres or less.
 - Q = peak rate of runoff, cubic feet per second

Storm Drainage

• Level of Service (Continued)



- ii. C = runoff coefficient
- iii. i = average rainfall intensity, inches per hour
- b) The SCS method, SCS TR-55 "Urban Hydrology for Small Watershed", HEC-1/HEC-HMS, or other methods shall be used for larger watersheds.
- c) Table 2 shall be used for runoff coefficients.

Table 2: Runoff Coefficients

Land Use Type	Runoff Coefficients "C"
Rural	0.25-0.35
Single Family Residential	0.45-0.60
Multi-Residential	0.60-0.70
Neighborhood Commercial	0.85
Community Commercial	0.85
Tourist Commercial	0.85
Office	0.85
Manufacturing	0.85-0.90
Distribution and Warehousing	0.85-0.90
Public Facility	0.50-0.85
Pavement and Concrete Surfaces	0.90-0.95
Park	0.25
Open Space (0-5% grade – vegetated)	0.20-0.30
Open Space (0-5% grade – no vegetation)	0.30-0.40
Open Space (5-15% grade – vegetated or unvegetated)	0.40-0.50
Open Space (Over 15% grade – sparsely vegetated, rock or clay soils)	0.40-0.60

- i. Weighted values of the runoff coefficient "C" may be required where land use is most accurately described as a mixture of the land uses listed above or where it is a mixture of pervious and impervious areas and not represented by a single entry in **Table 2**
- d) Intensity-Duration-Frequency curves for NOAA Atlas 14 shall be used for determining the applicable intensity. (see https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ut)
- e) Definition for Time of Concentration
 - i. $t_c = 10 \text{ or } \frac{L}{V \times 60}$, whichever is greater
 - t_c = initial time of concentration at inlet, minutes
 - L = length from uppermost point of watershed inlet, feet
 - V = channel or overland velocity, feet per second
 - ii. Given the time of concentration at a design point, the time of concentration at the next design point is determined by adding travel time, expressed as:



$$\text{iii. } t = \frac{L}{V \times 60}$$

t = travel time, minutes
L = length of channel or conduit between design points, feet
V = channel or conduit, feet per second

4. Submittal Requirements for Drainage Drawings and Report

- a) Project Drawings
 - i. Hydraulic grade line (HGL) profiles, (see sample sheet).
 - ii. Location and size of all existing and proposed structures.
 - iii. Proposed materials.
 - iv. Pertinent elevations and slopes.
 - v. Pipe capacity and 10-year and 100-year flows and velocities.
- b) Drainage Report – The following standards apply to the Drainage Report (public and private).
 - 1. Title Page:
 - a. Project name.
 - b. Preparer's name, firm, date.
 - c. Professional engineer's seal of preparer and signature.
 - 2. Introduction:
 - a. Site location:
 - i. Street location, parcel number(s), and section reference.
 - ii. Adjacent developments.
 - b. Site description:
 - i. Topography, ground cover, etc.
 - ii. Existing drainage facilities, major drainage facilities, flood hazard areas, irrigation ditches, other site conditions that must be considered.
 - c. Proposed project description.
 - d. Other previous studies relevant to site.
 - 3. Historic drainage system (discuss the following):
 - a. Major basins and offsite contributions:
 - i. Relationship to major drainage facilities.
 - ii. Major basin drainage characteristics (topography, runoff, cover, use, erosion, etc.).
 - b. Sub-basin and site drainage (1 and 2 may be tabulated on map):
 - i. Minor (10-year) and major (100-year) storm flows for each sub-basin affecting the site.
 - ii. Existing drainage patterns: channelized or overland flow, point of discharge, etc.
 - iii. Effect of historic flows on adjacent properties.
 - 4. Proposed (developed) drainage system (discuss each of the following):
 - a. Criteria:
 - i. Size of major basins, tributary sub-basins, and other offsite contributions.
 - ii. Hydrologic method to be used for analysis (Rational, SCS, etc.).
 - iii. Design storm intensities (minor 10-year, major 100-year) or as required by the City Engineer.
 - b. Runoff and other contributions:
 - i. Historic storm flow rates and paths.

Storm Drainage

- Level of Service (Continued)



- ii. Developed storm flow rates and paths for minor and major storms.
- iii. Contributions added form open joined system.
- iv. Demonstrate that flows are routed to a public system with adequate capacity.
- c. Piping:
 - i. Demonstrate the capacity of the storm drain system, including all downstream improvements.
 - ii. Verify storm flows from inlets to ultimate outlets of the drainage system.
- d. Retention system including:
 - i. Volume required to hold 100-year storm with 1-foot freeboard minimum.
 - ii. Show the overflow location for volumes over the 100-year storm.
 - iii. Passage of storms exceeding the 5-year up to the 100-year.
 - iv. Engineer to provide detailed description of downstream constraints (or none) and design calculations on how to mitigate the problem.
 - v. Need for detention shall be clearly identified in the preliminary or schematic report and the necessary detention area shall be identified on preliminary plans.
- e. Streets (This information may be shown on the plans.):
 - i. Depth and velocity of flow for major and minor storms. Demonstrate that a 12-foot clear lane exists for emergency vehicles at all times.
 - ii. Drainage system.
- f. Open channel flow (This information may be shown on the plans.):
 - i. Type.
 - ii. Depth and velocity.
 - iii. Freeboard.
 - iv. HEC-RAS analysis when required by the City Engineer.
- g. Storm drains and culverts (Show all data on plans.)

5. Areas within flood hazard zone when applicable

- a) Impacts.
- b) Protection.
- c) Compliance with Federal Emergency Management Administration (FEMA) requirements, RMC 18.12 "Flood Hazard Areas", and critical flood zones. Show existing and proposed CLOMR and LOMR information, and show status of submittal and review process.

6. Conclusions

- a) Benefits
- b) Adverse effects with solutions for mitigation of impacts

7. Appendices

- a) Hydrologic and hydraulic computations:
 - i. List and explain basin assumptions and input factors used
 - 1) Tabularized and/or discussed as necessary.
 - 2) Indicate any sensitivity analysis performed.
 - 3) Include source tables and references for parameters, such as soil groups, SCS curve numbers, C values, n values, etc.
 - ii. Historic runoff:
 - 1) Off-site.
 - 2) On-site.



- iii. Developed runoff:
 - 1) Off-site – Flows that have been concentrated into one area from the project shall not flow higher than the project flow in that area.
 - 2) On-site.
- iv. Detention for up to the 100-year storm.
- v. Hydraulic computations:
 - 1) Hydraulic grade line (HGL) minor storm.
 - 2) Hydraulic grade line (HGL) major storm.
 - 3) Inlet/outlet calculations.
- vi. Rip-rap sizing.
- b) Drainage plan:
 - i. Site drainage plan:
 - 1) Show the existing and proposed contours for the property.
 - 2) The site drainage plan may be at the same scale as the grading plan but must meet legibility requirements for scanned documents. Show all sub-drainage areas per catch basin or channel and tabulate existing and proposed drainage showing length, assumed velocity and time of concentration on various runs of grass, gutters, etc., cumulative time of concentration, average rainfall intensity, area, runoff coefficient (weighted if necessary), and peak flows for 10-year and 100-year storms.
 - 3) All inlets and manholes shall be labeled to correspond to tabular numbering system used in drainage report. Pipe sizes, grades, velocities, peak flows and hydraulic grade lines shall be shown for all parts of the system in a tabular form on the plans.
 - 4) Both location plan (overall drainage) and sub-drainage plan shall be signed and sealed by a Utah Registered Civil Engineer and shall be included in the construction plans for the subdivision/development.
 - 5) On grading plans show peak flows for 10-year and 100-year storms at inlets and other sub-basin points of concentration, at discharge points and in channels. Show peak flows entering and leaving the site; trace path leaving site to nearest major drainage facility without adverse impact to downstream owners.
 - 6) On plan and profile sheets, show peak flows for 10-year and 100-year storms at all inlets and in pipes as per above, and in pipes show slope, velocity, and capacity, and hydraulic grade line if surcharged.
 - 7) If the lot cannot drain the yard to the street, then a basin shall be located in the rear yard to prevent storm runoff from draining to the neighbors from the back of the property.
 - ii. Benchmarks – To be shown on plans with benchmarks to match the existing state approved benchmarks.
 - iii. Existing and proposed property lines.
 - iv. Existing and proposed drainage easements.
 - v. Street names, grades, widths and rights-of-way or easements.
 - vi. Routing and accumulative flows at the upstream and downstream ends of the site and at various critical points on-site for both minor and major runoff. Inflow and outflow for both storms for all sub basins.

Storm Drainage

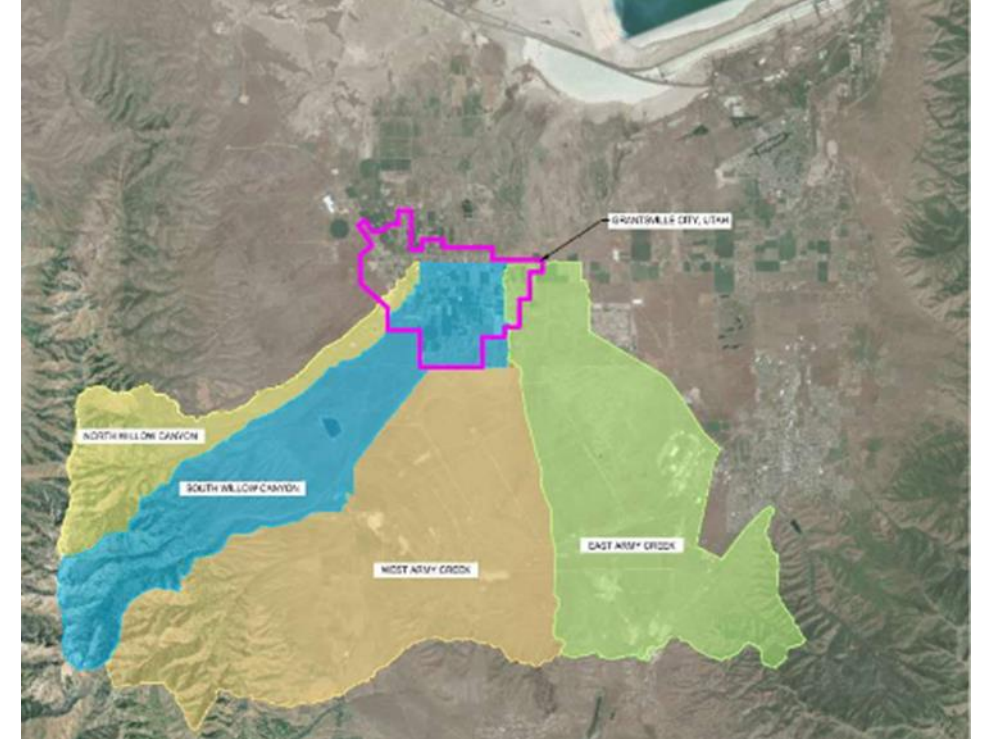
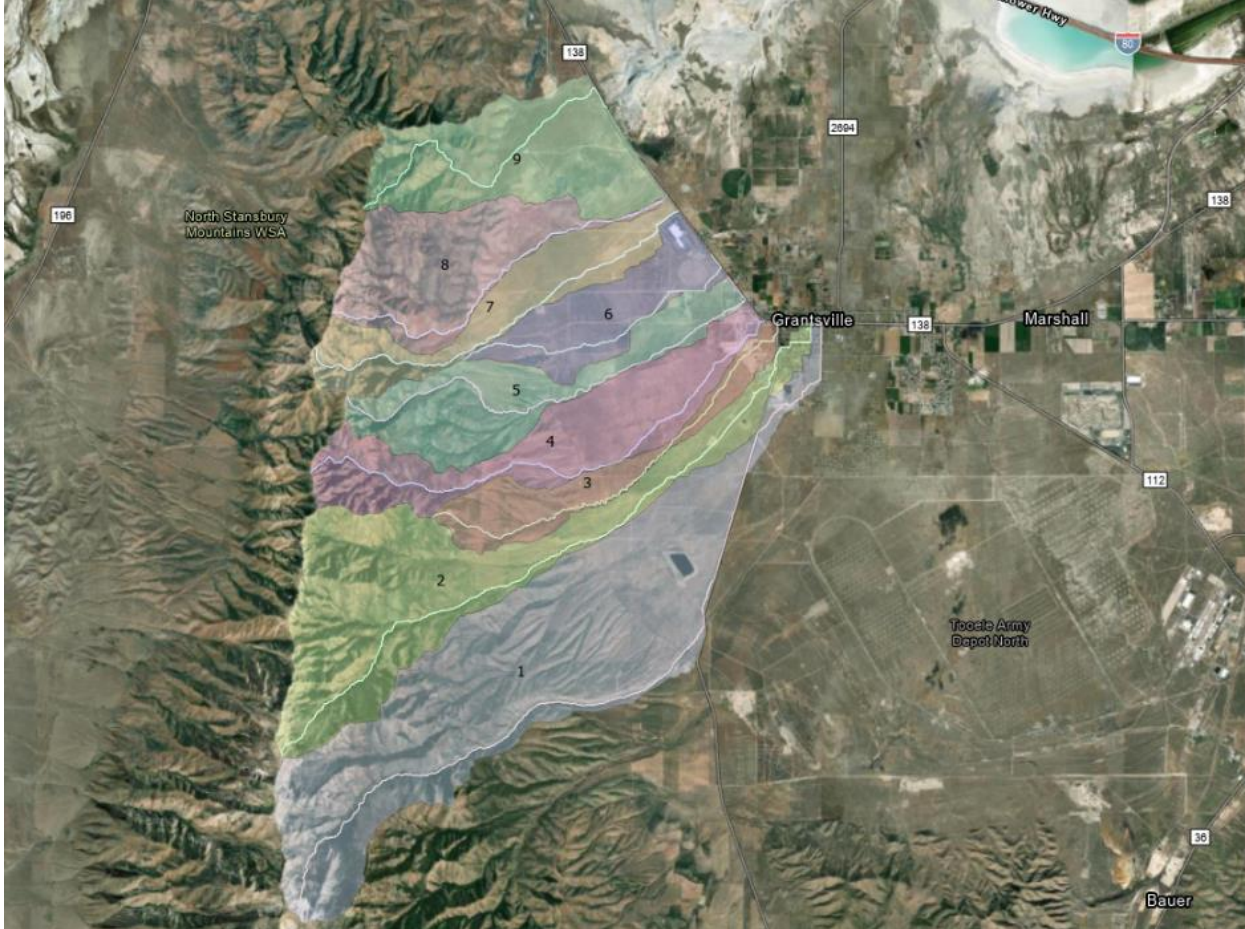
- Level of Service (Continued)



- vii. Street cross sections showing 100-year flood levels, no more than ½ way into the outside travel lane for emergency vehicle clear lane.
- viii. Existing and proposed major drainage facilities.
- ix. Open channel flow in major channels shall be provided with the following information on plans:
 - 1) Channel and hydraulic grade line (HGL) profiles.
 - 2) Cross sections and required rights-of-way at 100-foot intervals.
 - 3) Location and size of all existing and proposed structures.
 - 4) Channel section and lining details.
 - 5) Freeboard for 100-year flows.
 - 6) Channel capacity and storm flows, 10-year and 100-year flows and velocities.

Storm Drainage

- Existing Storm Drainage Infrastructure



- Capital Improvement Projects (Clark Street Storm Drain Improvements Project)



- Capital Improvement Projects (Alternative 4 – West Bank Study)



Storm Drainage

- Impact Fees
 - Not Applicable because Capital Improvement Projects address existing deficiencies.
 - Developers typically also construct improvements necessary to meet the level of service.

Transportation

- Level of Service

Road Classification	Lanes	LOS D Peak Hour Flow Rate (Veh/Hr)
Collector	2	1,216
	3	1,347
Arterial	2-3	1,518
	4-5	3,297

- Existing Arterial and Collector LOS



Source: Grantsville City Transportation Master Plan, 2022

Transportation

- Impact Fees
 - Existing Impact Fees
 - Not Applicable as Grantsville doesn't currently charge impact fees for transportation.
 - Proposed Impact Fees

Development Type	Peak Hour Trips Rate	Impact Fee	Units
Single Family	0.99	\$2,754.42	per Dwelling Unit
Multi-Unit	0.56	\$1,558.05	per Dwelling Unit
Trailer	0.46	\$1,279.83	per Dwelling Unit
Industrial / Manufacturing	0.37	\$1,029.43	per 1,000 sf Building Area
Warehousing	0.09	\$250.40	per 1,000 sf Building Area
Retail	3.295	\$9,167.48	per 1,000 sf Building Area
Church	0.049	\$136.33	per 1,000 sf Building Area
School	0.0665	\$185.07	per Student

Other Cities		
Tooele City		
Land Use	Impact Fee	Unit
N/A	N/A	N/A
Cedar City		
Land Use	Impact Fee	Unit
Single Family Dwelling Unit	\$636.00	per dwelling unit
Multi Family Dwelling Unit	\$453.00	per dwelling unit
Commercial	\$2,516.00	per 1,000 sq ft
Industrial	\$324.000	per 1,000 sq ft
Agricultural	N/A	per Acre
Institutional	\$971.00	per 1,000 sq ft structure
West Jordan City		
Land Use	Impact Fee	Unit
Residential Single Family	\$2,333.00	per housing unit
Residential Multi-Family	\$1,690.00	per housing unit
Assisted Living	\$273.00	per bed
Commercial	\$2.706	per sq ft
Hospital	\$1.359	per sq ft
Hotel/Motel	\$578.00	per room
Industrial	\$0.392	per sq ft
Nursing Home	\$0.781	per sq ft
Office	\$1.706	per sq ft
Warehouse	\$0.365	per sq ft
Payson City		
Land Use	Impact Fee	Unit
N/A	N/A	N/A
Mapleton City		
Land Use	Impact Fee	Unit
N/A	N/A	N/A

Example

Single Family, 0.5 acre lot, with Grantsville Irrigation Company Shares – Impact Fees

- Existing Impact Fee (Single Family, 0.5 acre lot, with Irrigation Shares)
 - Drinking Water– \$3,036.00
 - Wastewater – \$1,529.00
 - Public Safety - \$590.00
 - Parks, Recreation Facilities, Open Spaces, and Trails Impact Fee - \$1,925.00
 - Water Rights Acquisition – Not Applicable (This example assumes lot has Irrigation Shares).
 - Storm Drainage – Not Applicable (City does not charge Storm Drainage Impact Fee.)
 - Transportation – Not Applicable (City does not currently have Transportation Impact Fee.)

Total Impact Fee (Existing) - \$7,080.00

- Proposed Impact Fee(Single Family, 0.5 acre lot, with Irrigation Shares)
 - Drinking Water– \$3,432.76
 - Wastewater – \$5,120.79
 - Public Safety - \$996.12
 - Parks, Recreation Facilities, Open Spaces, and Trails Impact Fee - \$3,952.56
 - Water Rights Acquisition – Not Applicable (This example assumes lot has Irrigation Shares).
 - Storm Drainage – Not Applicable (City does not charge Storm Drainage Impact Fee.)
 - Transportation - \$2,754.42

Total Impact Fee (Proposed) – \$16,256.65 (130% Increase)