

7.0 Existing System Improvements

7.1 Existing Water Distribution System Deficiencies

The existing water distribution system in the study area was assessed for possible deficiencies using the calibrated water model. The following two locations were found to have inadequate fire flow based on a requirement of 95 L/s:

- Location 1: West side of Highway 2 (74 L/s to 84 L/s).
- Location 2: North of Clairmont (64.7 L/s).

These locations are shown in Figure 7.1.1 as highlighted in yellow.

7.2 Existing Water Distribution System Improvements

The required improvements are as follows:

- Location 1: Replace the existing 500 m of 250mm diameter pipes with 300mm, diameter pipes and make connection of two pipes situated right angle to each for a loop to satisfy fire flows. The estimated construction cost is \$250,000.
- Location 2: Replace 400 m of 150mm diameter asbestos cement pipes with 200mm diameter pipes. The estimated construction cost is \$150,000.

These deficiencies will be eliminated once the new reservoir at the SE ¼ Sec 23-72-6-6 is constructed and therefore improvements in those locations will not be required when the reservoir is constructed.

7.3 Reservoir Improvements

7.3.1 Projected Water Demand

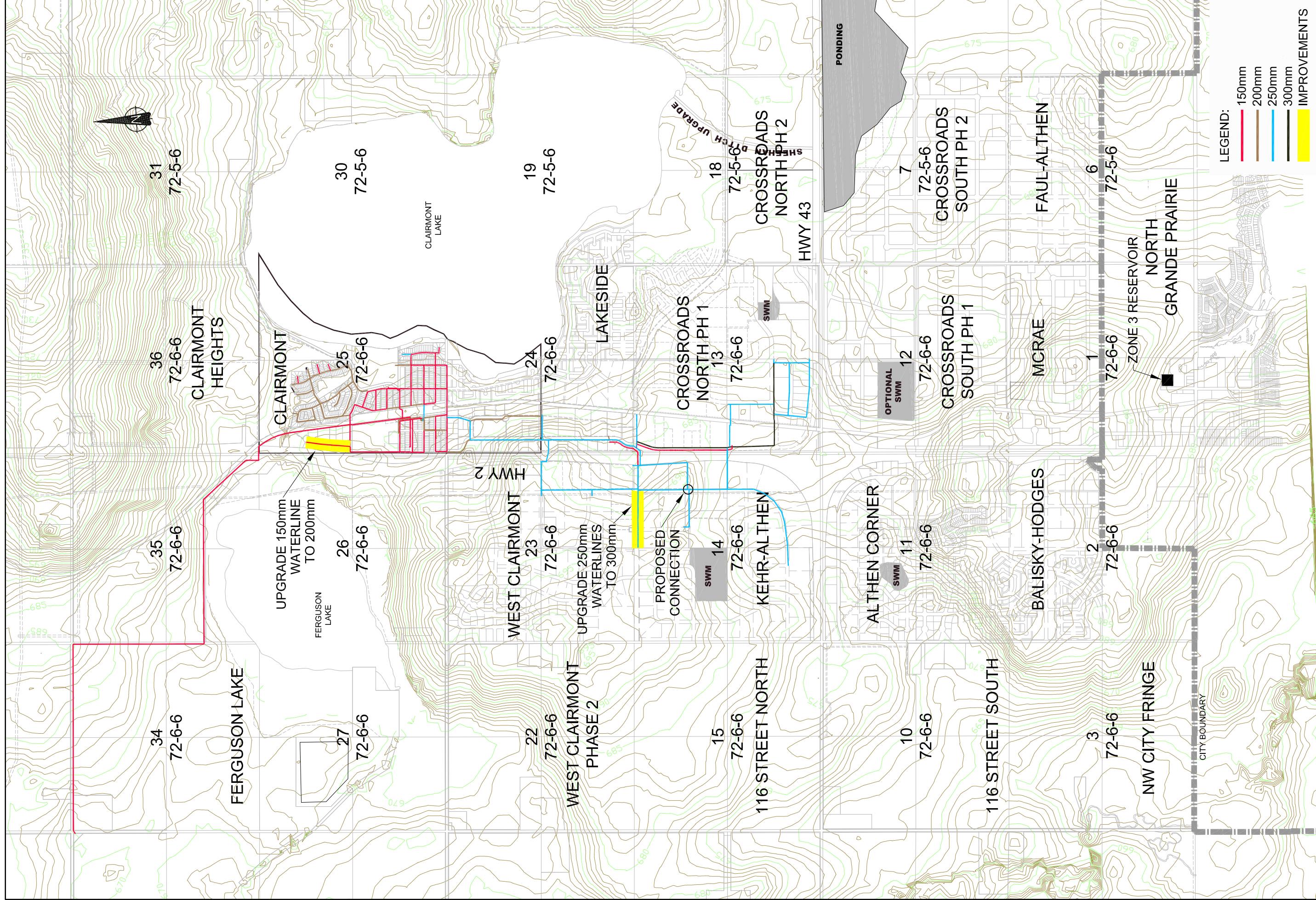
Based on the design criteria and the projected growth contours, the projected water demand for the study area is shown in Table 7.3.1.1.

Table 7.3.1.1: Projected Average Day Water Demand

Area	2010 (m ³)	2015 (m ³)	2025 (m ³)	Ultimate (m ³)
Entire Study Area	19,735	26,099	31,244	41,830
Area South of Hwy. 43	9,184	12,540	15,269	19,697
Area North of Hwy. 43	10,551	13,559	15,976	22,133

The following assumptions were used to determine the water demand for various growth contours:

- One hundred percent of the water demand from projected population for all growth contours.
- One sixth of the water demand of commercial and industrial developments for 2010.
- One third of the water demand of commercial and industrial developments for the remaining growth contours.




2005 WATER SYSTEM MASTER PLAN
GRANDE PRAIRIE CLAIRMONT AREA
SERVICING STRATEGY
 EXISTING SYSTEM IMPROVEMENTS

Figure 7.1.1

SCALE: 1:30,000

The rationale of using this approach is as follows:

- A reservoir can be expanded easily and the expansion can be determined on the basis of monitoring the water demand in the study area.
- A small size reservoir will minimize the initial construction cost while providing time to monitor growth and demand.
- Projected growth is very optimistic and needs to be confirmed through monitoring.
- Industrial and commercial developments have large lot sizes and most likely the entire lot will be developed in stages.

The reason of reducing the projected water demand in 2010 to 1/6 of the projected demand shown in Table 7.3.1.1 is that using this reduction, the water demand for the lots in the industrial and commercial developments will approximately equal to the current water demand of 3,000L to 5,000L as determined from the water billing records. The water demand determined using this approach appears therefore to be more realistic.

Based on these assumptions, the total water demand for the study area for each of the growth contours is tabulated in Table 7.3.2.2.

Table 7.3.2.2: Projected Average Day Water Consumption with Reduction

Area	2010 Year (m ³)	2015 Year (m ³)	2025 (m ³)	Ultimate (m ³)
Entire Study Area	4,428	10,205	13,437	22,533
Areas South of HWY 43	1,822	4,503	6,013	9,812
Area North of HWY. 43	2,606	5,703	7,424	12,722

7.3.2 Reservoir Capacities

Reservoir capacity was determined using the formula as recommended by Alberta Environment and the assumptions stated in Section 7.3.1. The capacity of the reservoir is the sum of the following components:

- Maximum Day Demand - 25 % (Equalization Storage)
- Average Day Demand – 15 % (Emergency Storage)
- Fire Storage – 95 L/s for a duration of 2.5 hours.

The required capacity of reservoir for each growth contours is shown in Table 7.3.3.3.

Table 7.3.3.3: Reservoir Required Capacities

Area	2010 Year (m ³)	2015 Year (m ³)	2025 (m ³)	Ultimate (m ³)
Entire Study Area	3,274	6,297	8,253	14,054
Areas South of HWY 43	1,818	3,179	4,069	6,491
Area North of HWY. 43	2,311	3,973	5,039	8,418

As shown in Table 7.3.3.3, the required reservoir capacity will be larger than the capacity of the existing Clairmont reservoir of 1,500 m³. Since there is space constraint for the expansion of the existing Clairmont and Zone 3 reservoir, locations for constructing new reservoirs should be investigated. The potential site for the construction of additional reservoirs to service the study area will be discussed in Section 8.0.