

HOLBROOK FARMS AREA PLAN  
PRESSURE IRRIGATION

Introduction

Lehi City conducted a water model analysis of the region which included the Holbrook Farms properties. This document represents a water system analysis specific to the Holbrook Farms Area plan. For this analysis the following assumptions have been made:

1. Water source from connection to existing Lehi City pressure irrigation system on east side of the Jordan River
2. Future water source from Utah Lake Distributing Canal with associated facilities to lift to reservoirs
3. Lower reservoir elevation of 4767 (4760 HW ELEV), operation 4752
4. Upper reservoir elevation of 5110

Design Criteria

|                            |   |
|----------------------------|---|
| Minimum Pipe Size          | 8"  |
| Pipe Roughness Coefficient | 130   |
| Average Flow               | 3.5 gallons per minute per acre                             |
| Peak Hourly Flow           | 7.0 gallons per minute per acre (Peaking Factor = 2)        |
| Storage                    | 5,040 gallons per acre                                      |
| Source                     | 3.5 gallons per minute per acre                             |
| Fire Flow                  | 1,500 gallons per minute (2 hour fire) - Big Box Commercial |
| Minimum Pressure           | 50 psi at peak flow<br>20 psi at peak flow with fire flow   |

Summary of Results

|                  |   |
|------------------|---|
| Peak Hourly Flow | 2,141.70 gallons per minute   |
| Source Required  | 1,070.90 gallons per minute   |
| Storage Required |   |
| Upper Reservoir  | 419,983 gallons + 180,000 gallons fire storage = 599,983 gallons (1.84 ac-ft)     |
| Lower Reservoir  | 1,122,055 gallons + 180,000 gallons fire storage = 1,302,055 gallons (4.00 ac-ft) |

Case 1: Peak Hourly

Minimum Pressure 75.32 psi @ J25

Case 2: Peak Hourly + Fire

Minimum Pressure 71.23 psi @J26  
(1,500 GPM @ J15)

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HOLBROOK FARMS AREA PLAN  
PRESSURE IRRIGATION

|                      |                          | <i>Approx</i> | <i>Irr. Area</i> | <i>Average Flow<br/>(3.50 gpm/acre)</i> | <i>Peak Hourly Flow<br/>(Peak Factor 2.0)</i> | <i>Storage Required<br/>(5,040 gal/acre)</i> | <i>Storage Required</i> |
|----------------------|--------------------------|---------------|------------------|---|---|--|-------------------------|
| <i>Area</i>          | <i>Land Use</i>          | <i>Acres</i>  | <i>Acres</i>     | <i>gpm</i>                              | <i>gpm</i>                                    | <i>gallons</i>                               | <i>ac-ft</i>            |
| 1A                   | Flex Zone*               | 55.00         | 27.50            | 96.25                                   | 192.5   | 138,600                                      | 0.43                    |
| 1B                   | Flex Zone                | 82.18         | 41.09            | 143.82                                  | 287.6   | 207,094                                      | 0.64                    |
| 2                    | Commercial/Office        | 7.18          | 1.80             | 6.28                                    | 12.6  | 9,047  | 0.03                    |
| 3                    | Residential Area         | 11.48         | 5.74             | 20.09                                   | 40.2  | 28,930                                       | 0.09                    |
| 4                    | Commercial/Office        | 28.82         | 7.21             | 25.22                                   | 50.4  | 36,313                                       | 0.11                    |
| 5                    | Commercial/Office        | 6.19          | 1.55             | 5.42                                    | 10.8  | 7,799  | 0.02                    |
| 6                    | Residential Area         | 24.33         | 12.17            | 42.58                                   | 85.2  | 61,312                                       | 0.19                    |
| 7                    | Residential Area         | 29.37         | 14.69            | 51.40                                   | 102.8   | 74,012                                       | 0.23                    |
| 8                    | Residential Area         | 11.98         | 5.99             | 20.97                                   | 41.9  | 30,190                                       | 0.09                    |
| 9                    | Residential Area         | 30.04         | 15.02            | 52.57                                   | 105.1   | 75,701                                       | 0.23                    |
| 10                   | Park #1 (100% Irrigated) | 40.92         | 40.92            | 143.22                                  | 286.4   | 206,237                                      | 0.63                    |
| 11                   | Residential Area         | 34.49         | 17.25            | 60.36                                   | 120.7   | 86,915                                       | 0.27                    |
| 12                   | Residential Area         | 34.00         | 17.00            | 59.50                                   | 119.0   | 85,680                                       | 0.26                    |
| 13                   | Commercial/Office        | 17.97         | 4.49             | 15.72                                   | 31.4  | 22,642                                       | 0.07                    |
| 14                   | Commercial/Office        | 11.86         | 2.97             | 10.38                                   | 20.8  | 14,944                                       | 0.05                    |
| 15                   | Commercial/Office        | 16.82         | 4.21             | 14.72                                   | 29.4  | 21,193                                       | 0.07                    |
| 16a                  | Residential Area         | 33.88         | 16.94            | 59.29                                   | 118.6   | 85,378                                       | 0.26                    |
| 16b                  | Residential Area         | 65.68         | 32.84            | 114.94                                  | 229.9   | 165,514                                      | 0.51                    |
| 17                   | Commercial/Office        | 41.16         | 10.29            | 36.02                                   | 72.0  | 51,862                                       | 0.16                    |
| 18                   | Residential Area         | 24.46         | 12.23            | 42.81                                   | 85.6  | 61,639                                       | 0.19                    |
| 19                   | Park #2 (50% Irrigated)  | 28.19         | 14.10            | 49.33                                   | 98.7  | 71,039                                       | 0.22                    |
| Totals               |                          | 636.00        | 305.96           | 1,070.9                                 | 2,141.7                                       | 1,542,038                                    | 4.73                    |
| Total Approved ERU's |                          | 2,823.00      |                  |   | Upper Reservoir                               | 419,983                                      | 1.29                    |
|                      |                          |               |                  |   | Lower Reservoir                               | 1,122,055                                    | 3.44                    |

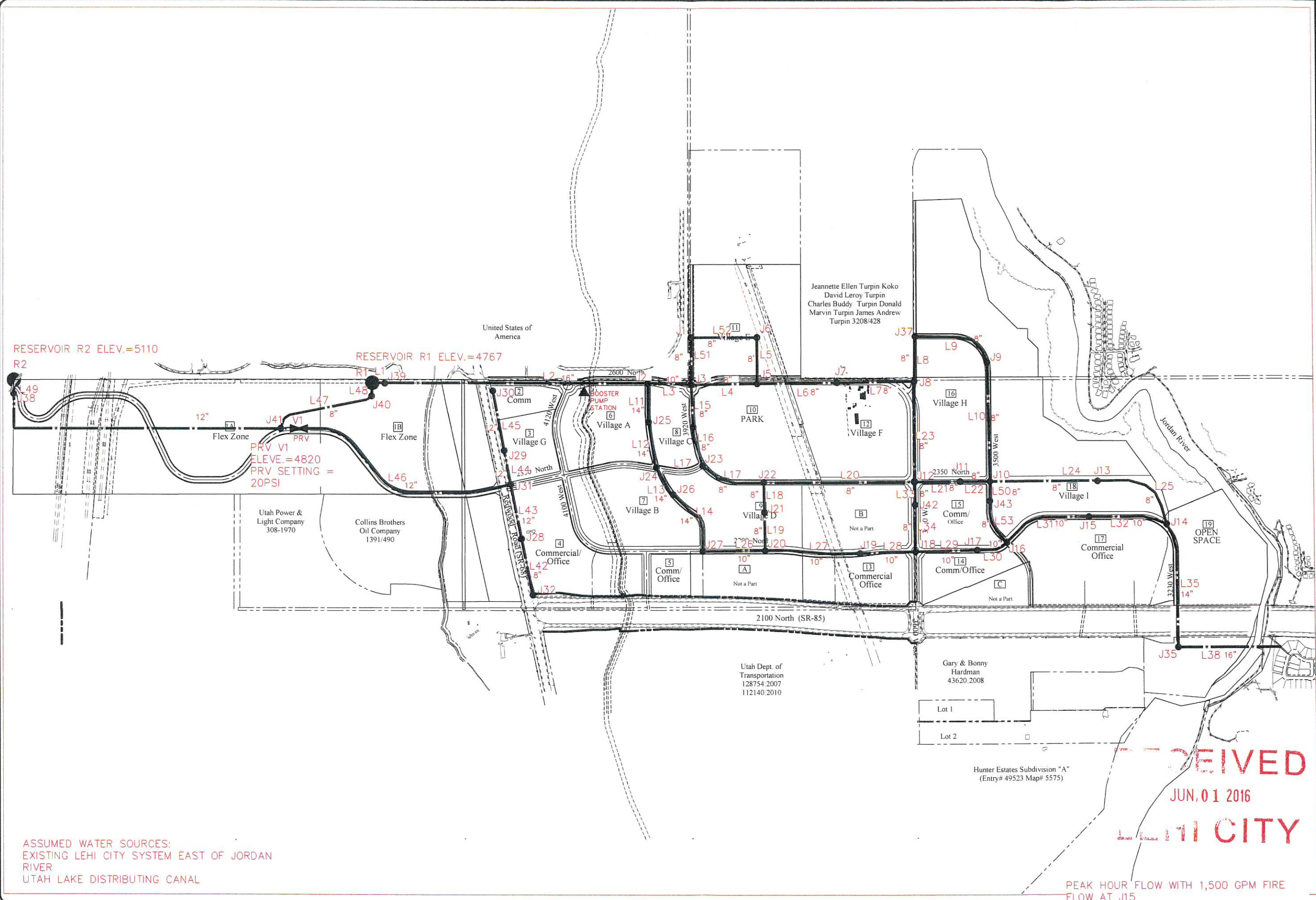
\* Flex Zone 1A excludes Mountain View Corridor and Power Corridor

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FOR  
 IVORY DEVELOPMENT  
 3340 NORTH CENTER STREET  
 LEHI, UTAH 84043  
 CONTACT  
 BRAD MACKAY  
 (801) 331-6740

**HOLBROOK FARMS AREA PLAN  
 WATER SYSTEM ANALYSIS  
 PRESSURE IRRIGATION WATER SYSTEM  
 IVORY DEVELOPMENT**



RESERVOIR R2 ELEV.=5110

RESERVOIR R1 ELEV.=4767

PRV V1  
 ELEVE.=4820  
 PRV SETTING =  
 20PSI

Utah Power &  
 Light Company  
 308-1970

Collins Brothers  
 Oil Company  
 1391/490

Utah Dept. of  
 Transportation  
 128754-2007  
 112140-2010

Gary & Bonny  
 Hardman  
 43620-2008

Hunter Estates Subdivision "A"  
 (Entry# 49523 Map# 5575)

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ASSUMED WATER SOURCES:  
 EXISTING LEHI CITY SYSTEM EAST OF JORDAN  
 RIVER  
 UTAH LAKE DISTRIBUTING CANAL

PEAK HOUR FLOW WITH 1,500 GPM FIRE  
 FLOW AT J15

| NO. | DATE  | REVISION     | BY  |
|-----|-------|--------------|-----|
| 1   | 9/2   | CITY COMMENT | SLJ |
| 2   | 11/24 | CHNG IRP DMD | SLJ |
| 3   | 3/24  | CITY COMMENT | SLJ |

| PROJECT NO. | DATE      |
|-------------|-----------|
| 15-023-102  | 3/24/2015 |

| DRAWN BY | CHECKED BY |
|----------|------------|
| SLJ      | SLJ        |

| PROJECT MANAGER |
|-----------------|
| PROJECT MANAGER |

HOLBROOK FARMS AREA PLAN  
 PRESSURE IRRIGATION WATER MODEL  
 PEAK HOUR WITH 1,500 GPM FIRE FLOW @ J9

Node Report

| Node ID     | Elevation ft | Demand GPM | Head ft | Pressure psi | Area | Land Use          |
|-------------|--------------|------------|---------|--------------|------|-------------------|
| J2          | 4586         | 0.00       | 4747.96 | 71.34        |      |                   |
| J3          | 4574         | 0.00       | 4746.10 | 74.37        |      |                   |
| J4          | 4574         | 41.90      | 4745.78 | 74.19        | 8    | Residential       |
| J5          | 4566         | 286.40     | 4743.08 | 75.46        | 10   | Park #1           |
| J6          | 4566         | 120.70     | 0077.51 | 75.77        | 11   | Residential       |
| J7          | 4560         | 119.00     | 4736.41 | 75.23        | 12   | Residential       |
| J8          | 4546         | 118.60     | 4732.18 | 78.40        | 16a  | Residential       |
| J9          | 4535         | 229.90     | 4721.58 | 80.46        | 16b  | Residential       |
| J10         | 4529         | 0.00       | 4731.09 | 82.49        |      |                   |
| J11         | 4545         | 0.00       | 4732.83 | 77.20        |      |                   |
| J12         | 4542         | 0.00       | 4733.41 | 80.14        |      |                   |
| J13         | 4527         | 0.00       | 4731.12 | 84.89        |      |                   |
| J14         | 4522         | 98.70      | 4731.33 | 82.04        | 19   | Park #2           |
| J15         | 4525         | 1,572.00   | 4731.60 | 80.43        | 17   | Commercial/Office |
| J16         | 4528         | 0.00       | 4731.75 | 82.58        |      |                   |
| J17         | 4532         | 20.80      | 4733.31 | 82.63        | 14   | Commercial/Office |
| J18         | 4540         | 0.00       | 4733.88 | 81.01        |      |                   |
| J19         | 4546         | 31.40      | 4738.29 | 80.70        | 13   | Commercial/Office |
| J20         | 4554         | 0.00       | 4740.14 | 80.26        |      |                   |
| J21         | 4556         | 105.10     | 4740.14 | 79.35        | 9    | Residential       |
| J22         | 4558         | 0.00       | 4740.14 | 78.49        |      |                   |
| J23         | 4572         | 0.00       | 4743.78 | 74.93        |      |                   |
| J24         | 4584         | 0.00       | 4746.46 | 70.69        |      |                   |
| J25         | 4588         | 85.20      | 4747.52 | 69.70        | 6    | Residential       |
| J26         | 4582         | 102.80     | 4745.64 | 71.23        | 7    | Residential       |
| J27         | 4573         | 10.80      | 4744.20 | 74.60        | 5    | Commercial/Office |
| J28         | 4670         | 50.40      | 4865.89 | 83.78        | 4    | Commercial/Office |
| J29         | 4670         | 40.20      | 4865.89 | 83.78        | 3    | Residential       |
| J30         | 4675         | 12.60      | 4865.89 | 81.61        | 2    | Commercial/Office |
| J31         | 4675         | 480.10     | 4865.89 | 81.61        | 1    | Flex Zone         |
| J32         | 4665         | 0.00       | 4865.89 | 85.95        |      |                   |
| J37         | 4545         | 0.00       | 4728.80 | 77.97        |      |                   |
| J38         | 5100         | 0.00       | 5110.00 | 4.33         |      |                   |
| J39         | 4762         | 0.00       | 4766.97 | 2.16         |      |                   |
| J40         | 4762         | 0.00       | 4767.00 | 2.17         |      |                   |
| J41         | 4820         | 0.00       | 4866.16 | 20.00        |      |                   |
| J1          | 4570         | 0.00       | 4745.58 | 75.54        |      |                   |
| J42         | 4544         | 29.40      | 4733.50 | 79.28        | 15   | Residential       |
| J43         | 4531         | 85.60      | 4731.21 | 81.57        | 18   | Residential       |
| Reservoir 1 | 4752         | -3,069.50  | 4767.00 | 6.50         |      |                   |
| Reservoir 2 | 5095         | -583.30    | 5110.00 | 6.50         |      |                   |

1,500 gpm Fire Flow

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 PRESSURE IRRIGATION WATER MODEL  
 PEAK HOUR WITH 1,500 GPM FIRE FLOW @ J15

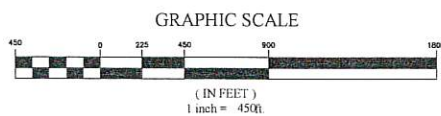
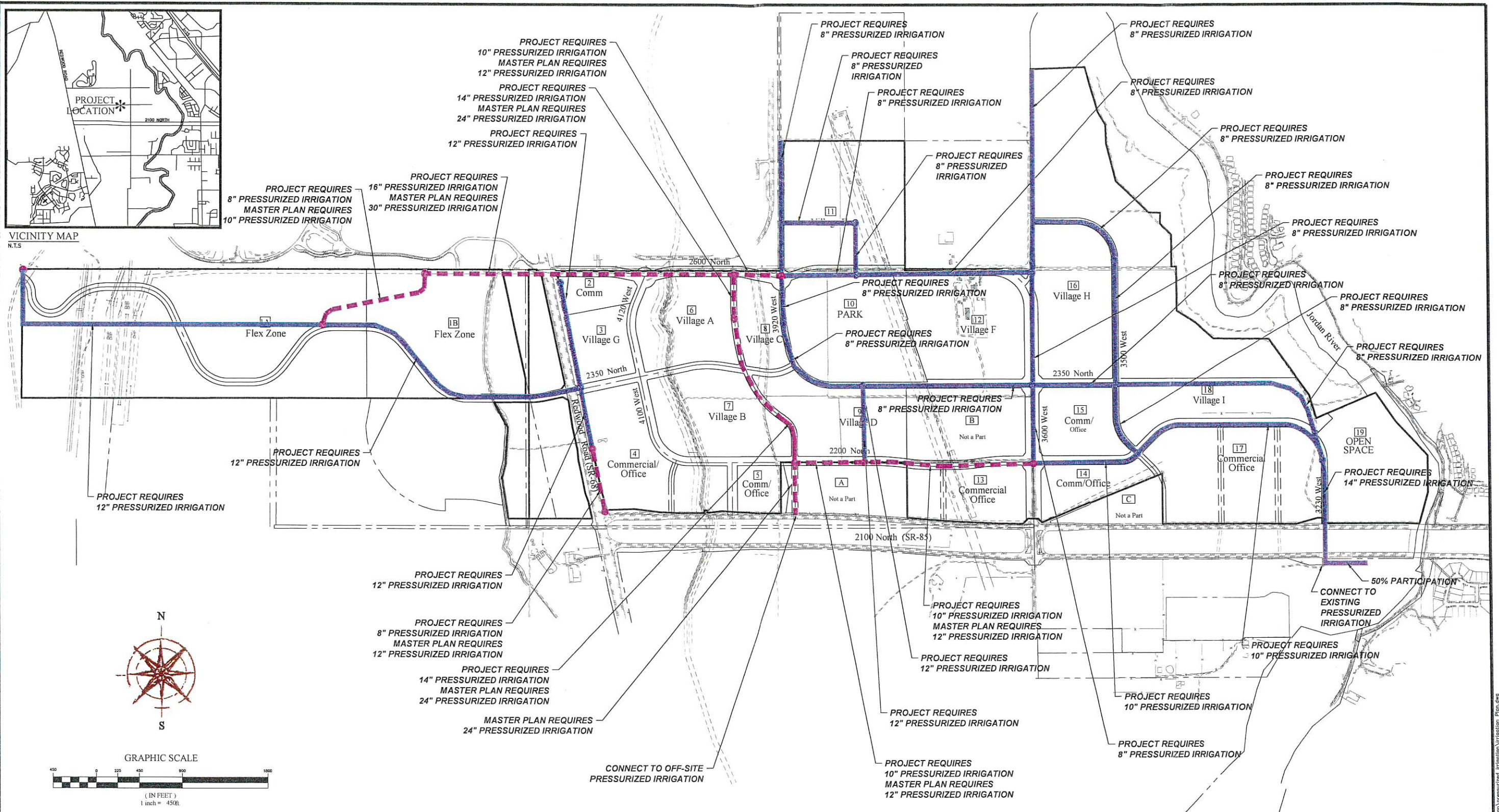
Pipe Report

| Link ID | Diameter in | Flow GPM | Velocity fps | Length ft | Roughness | Status |
|---------|-------------|----------|--------------|-----------|-----------|--------|
| L1      | 16          | 3,058.30 | 4.88         | 5         | 130       | Open   |
| L2      | 16          | 3,058.30 | 4.88         | 3300      | 130       | Open   |
| L3      | 10          | 1,248.57 | 5.10         | 540       | 130       | Open   |
| L4      | 8           | 589.28   | 3.76         | 800       | 130       | Open   |
| L5      | 8           | 338.34   | 2.16         | 300       | 130       | Open   |
| L6      | 8           | 641.22   | 4.09         | 1100      | 130       | Open   |
| L7      | 8           | 522.22   | 3.33         | 800       | 130       | Open   |
| L8      | 8           | 432.25   | 2.76         | 515       | 130       | Open   |
| L9      | 8           | 432.25   | 2.76         | 1100      | 130       | Open   |
| L10     | 8           | 202.35   | 1.29         | 1380      | 130       | Open   |
| L11     | 14          | 1,809.73 | 3.77         | 500       | 130       | Open   |
| L12     | 14          | 1,724.53 | 3.59         | 520       | 130       | Open   |
| L13     | 14          | 1,283.45 | 2.67         | 400       | 130       | Open   |
| L14     | 14          | 1,180.65 | 2.46         | 750       | 130       | Open   |
| L15     | 8           | 200.25   | 1028.00      | 450       | 130       | Open   |
| L16     | 8           | 158.35   | 1.01         | 450       | 130       | Open   |
| L17     | 8           | 599.43   | 3.83         | 820       | 130       | Open   |
| L18     | 8           | 5.67     | 0.04         | 400       | 130       | Open   |
| L19     | 8           | 99.43    | 0.63         | 400       | 130       | Open   |
| L20     | 8           | 593.75   | 3.79         | 1750      | 130       | Open   |
| L21     | 8           | 539.71   | 3.44         | 650       | 130       | Open   |
| L22     | 8           | 539.71   | 3.44         | 650       | 130       | Open   |
| L23     | 8           | 28.63    | 0.18         | 1200      | 130       | Open   |
| L24     | 8           | 435.99   | 2.78         | 650       | 130       | Open   |
| L25     | 8           | 435.99   | 2.78         | 1400      | 130       | Open   |
| L26     | 10          | 1,169.85 | 4.78         | 720       | 130       | Open   |
| L27     | 10          | 1,070.42 | 4.37         | 1000      | 130       | Open   |
| L28     | 10          | 1,039.02 | 4.24         | 800       | 130       | Open   |
| L29     | 10          | 1,035.04 | 4.23         | 650       | 130       | Open   |
| L30     | 10          | 1,014.24 | 4.14         | 650       | 130       | Open   |
| L31     | 10          | 1,234.71 | 5.04         | 875       | 130       | Open   |
| L32     | 10          | 337.29   | 1.38         | 875       | 130       | Open   |
| L35     | 14          | 0.00     | 0.00         | 1200      | 130       | Closed |
| L38     | 16          | 0.00     | 0.00         | 1200      | 130       | Closed |
| L42     | 8           | 0.00     | 0.00         | 1600      | 130       | Open   |
| L43     | 12          | 50.40    | 0.14         | 400       | 130       | Open   |
| L44     | 12          | 52.80    | 0.15         | 400       | 130       | Open   |
| L45     | 12          | 12.60    | 0.04         | 600       | 130       | Open   |
| L46     | 12          | 583.30   | 1.65         | 3000      | 130       | Open   |
| L47     | 8           | 0.00     | 0.00         | 1500      | 130       | Closed |
| L48     | 8           | 0.00     | 0.00         | 5         | 13        | Open   |
| L49     | 12          | 583.30   | 1.65         | 5         | 130       | Open   |
| L51     | 8           | 459.04   | 2.93         | 300       | 130       | Open   |
| L52     | 8           | 459.04   | 2.93         | 800       | 130       | Open   |
| L33     | 8           | 25.41    | 0.16         | 200       | 130       | Open   |
| L34     | 8           | 3.99     | 0.03         | 600       | 130       | Open   |
| L50     | 8           | 306.07   | 1.25         | 200       | 130       | Open   |
| L53     | 8           | 220.47   | 1.41         | 600       | 130       | Open   |
| L55     | 8           | 441.08   | 2.82         | 550       | 130       | Open   |
| V1 PRV  | 12          | 163.40   | 0.46         | #N/A      | #N/A      | Active |

Setting 20 psi

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NOTES:  
 1. ADDITIONAL MODELING MAY BE REQUIRED IF THE COMMERCIAL LAND USES CHANGE.

LEGEND  
 PROJECT REQUIRED PI [Blue dashed line]  
 LEHI MASTER PLAN PI [Red dashed line]

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