

NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018

CITY COUNCIL

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NATHAN MEMMOTT ----- COUNCIL MEMBER
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JUSTIN SEELY ----- COUNCIL MEMBER
SKIP WORWOOD ----- COUNCIL MEMBER
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APPROVALS

GLADE NIELSON
NEPHI CITY MAYOR

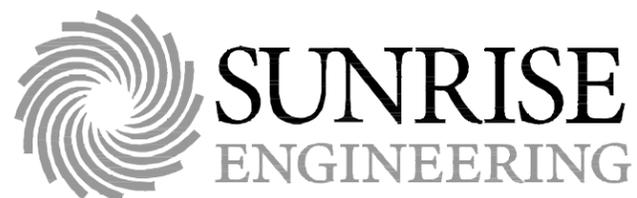
DATE



ROBERT W. WORLEY, P.E.
PRINCIPAL ENGINEER

06/27/2018
DATE

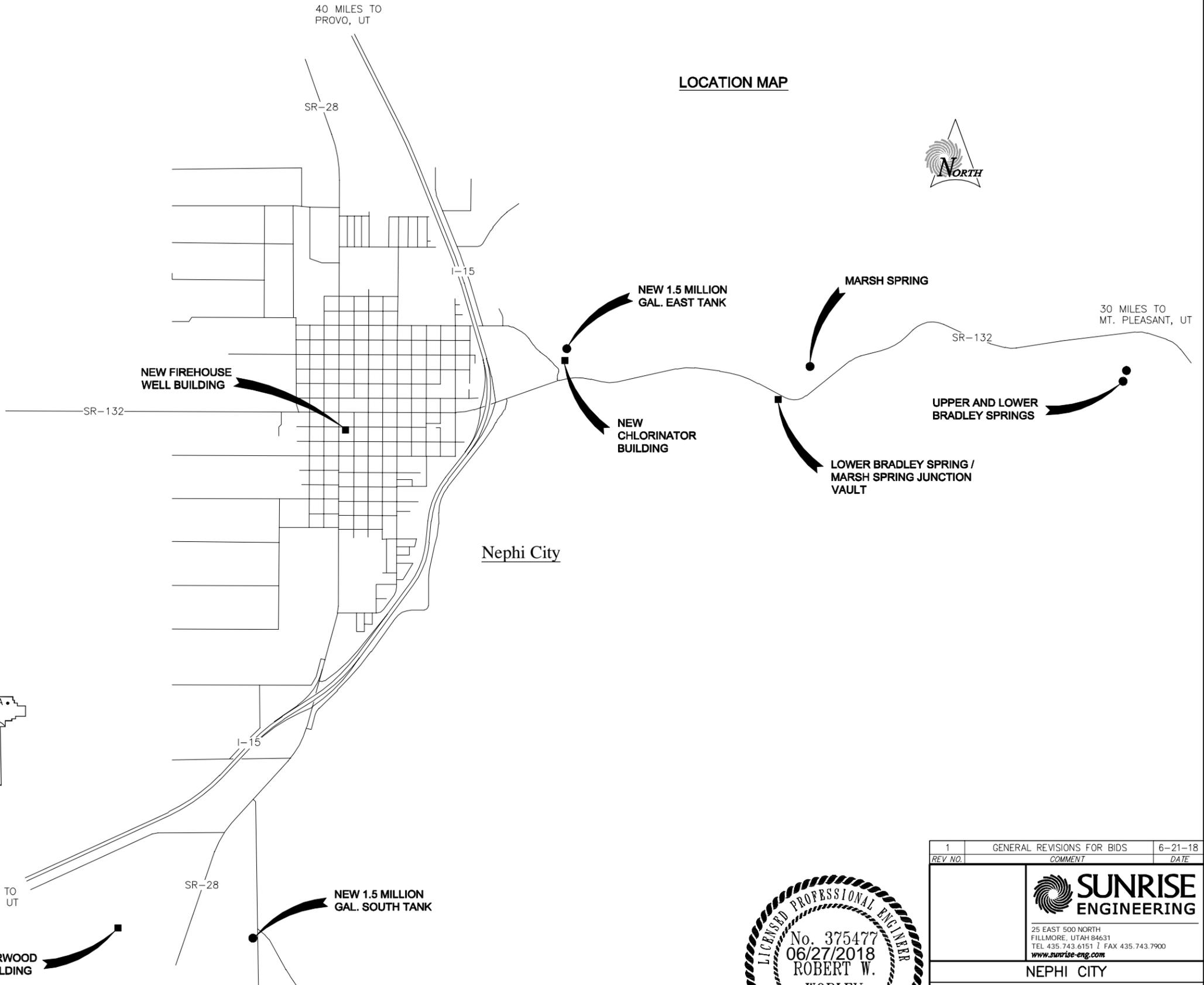
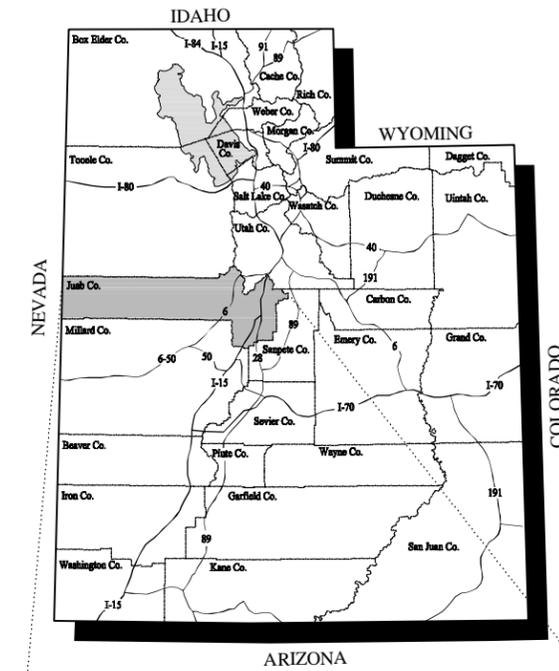
PREPARED BY:



25 EAST 500 NORTH
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AREA MAP

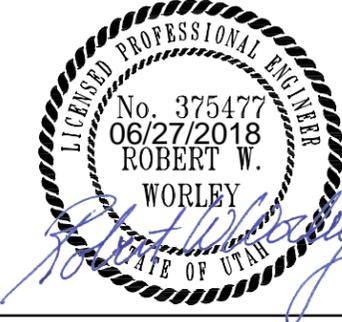
LOCATION MAP



58 MILES TO
FILLMORE, UT

40 MILES TO
PROVO, UT

30 MILES TO
MT. PLEASANT, UT



1	GENERAL REVISIONS FOR BIDS	6-21-18
REV. NO.	COMMENT	DATE
 SUNRISE ENGINEERING <small>25 EAST 500 NORTH FILLMORE, UTAH 84631 TEL 435.743.6151 / FAX 435.743.7900 www.sunrise-eng.com</small>		
NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018		
AREA MAP & LOCATION MAP		
SET NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 2	G2

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ABBREVIATIONS

AB	ANCHOR BOLT	INSUL.	INSULATION
ALT.	ALTERNATE	INV.	INVERT
ALUM.	ALUMINUM	JT.	JOINT
ACI	AMERICAN CONCRETE INSTITUTE	J.B.	JUNCTION BOX
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	L	LENGTH
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS	LN.	LINEAL
L	ANGLE	LN. FT. OR LF	LINEAL FEET
APPROX.	APPROXIMATELY	MH	MANHOLE
ASSY.	ASSEMBLY	MFR.	MANUFACTURER
@	AT (MEASUREMENTS)	MFG.	MANUFACTURING
AVG.	AVERAGE	MATL.	MATERIAL
BD.	BOARD	MAX.	MAXIMUM
BV	BALL VALVE	MECH.	MECHANICAL
B.M.	BENCH MARK	MJ	MECHANICAL JOINT
BSC	BITUMINOUS SURFACE COURSE	MGD	MILLIONS OF GALLONS PER DAY
B.F.	BLIND FLANGE	MIN.	MINIMUM
B.W.	BOTH WAYS	N	NORTH
BOT.	BOTTOM	NO. OR #	NUMBER
BTU	BRITISH THERMAL UNITS	NTS	NOT TO SCALE
BLDG.	BUILDING	O.C.	ON CENTER
BLM	BUREAU OF LAND MANAGEMENT	OD	OUTSIDE DIAMETER
BTM	BUTTERFLY VALVE	OSB	ORIENTED STRAND BOARD
CI	CAST IRON	PERP.	PERPENDICULAR
CIP	CAST IRON PIPE	PL.	PLATE
C	CENTER LINE	PV	PLUG VALVE
C	CHANNEL (STRUCTURAL)	PE	POLYETHYLENE
CV	CHECK VALVE	PE. PIPE	POLYETHYLENE PIPE
CO	CLEAN OUT	PVC	POLYVINYL-CHLORIDE PIPE
CONC.	CONCRETE	LB. OR #	POUND
CONT.	CONTINUOUS	PSI	POUNDS per SQUARE INCH
CMP	CORRUGATED METAL PIPE	PG	PRESSURE GAUGE
CPLG.	COUPLING	PRV	PRESSURE REDUCING VALVE
CFM	CUBIC FEET per MINUTE	R	PROPERTY LINE
CFS	CUBIC FEET per SECOND	R	RADIUS
CU.	CUBIC	RED.	REDUCER
CU. YD.	CUBIC YARD	RDWD.	REDWOOD
DEG. OR °	DEGREE	REINF.	REINFORCING
DET.	DETAIL	REBARS.	REINFORCING BARS
D.O.E.	DEPARTMENT OF ENERGY	REM.	REMOVE
DIAG.	DIAGONAL	REQ'D.	REQUIRED
DIA. OR Ø	DIAMETER	REV.	REVISION
DIM	DIMENSION	R/W	RIGHT-OF-WAY
DIST.	DISTRIBUTION	SCH	SCHEDULE
DWG.	DRAWING	SHT.	SHEET
DIP	DUCTILE IRON PIPE	SL	SLOPE
EA.	EACH	S	SOUTH
E.F.	EACH FACE	SPEC.	SPECIFICATION
E.W.	EACH WAY	SQ.	SQUARE
E	EAST	SQ. FT.	SQUARE FEET
ELL.	ELBOW	SQ. IN.	SQUARE INCHES
ELEV. OR EL.	ELEVATION	ST. STL.	STAINLESS STEEL
EXIST.	EXISTING	STD.	STANDARD
F.D.	FLOOR DRAIN	STA	STATION
FT OR ' "	FEET	STL.	STEEL
F.G.	FINISH GRADE	SYM.	SYMMETRICAL
FND.	FOUNDATION	TP	TEST PIT
FTG.	FOOTING	TYP.	TYPICAL
FLG. OR FLNG.	FLANGE	UBC	UNTREATED BASE COURSE
FLEX.	FLEXIBLE	UDOT	UTAH DEPARTMENT OF TRANSPORTATION
F	FLOW LINE	UNO	UNLESS NOTED OTHERWISE
GALV.	GALVANIZED	VERT.	VERTICAL
GPM	GALLONS per MINUTE	VOL.	VOLUME
GSP	GALVANIZED STEEL PIPE	WS	WATER SURFACE
G.V.	GATE VALVE	WT.	WEIGHT
GA.	GAUGE	W	WEST
H.W.L.	HIGH WATER LEVEL	W/REQ'D.	WHERE REQUIRED
HORIZ.	HORIZONTAL	W/	WITH
HV	HOSE VALVE	W/O	WITHOUT
IN. OR " "	INCH	WI	WROUGHT IRON
ID	INSIDE DIAMETER		

LEGEND

CROSS REFERENCING		DETAIL DESIGNATION
		DRAWING NUMBER
NEW CULINARY WATER PIPELINE		X"W
EXIST. CULINARY WATER PIPELINE		X"W
EXIST. CULINARY WATER PIPELINE TO BE ABANDONED		X"W
EXIST. SEWER PIPELINE		S
EXIST. IRRIGATION WATER PIPELINE		IRR
EXIST. GAS PIPELINE		G
NEW METER SETTER ASSEMBLY		
REPLACE EXIST. SERVICE CONNECTION		
RECONNECT EXIST. SERVICE CONNECTION		
NEW FIRE HYDRANT		
REPLACE EXIST. FIRE HYDRANT		
RECONNECT EXIST. FIRE HYDRANT		
EXIST. FIRE HYDRANT		
NEW GATE VALVE		
EXIST. GATE VALVE		
NEW BUTTERFLY VALVE		
EXIST. COMBINATION AIR VALVE		
NEW COMBINATION AIR VALVE		
REDUCER		
CROSS		
TEE		
ELBOW		
WYE		
CAP OR PLUG		
TRANSITION COUPLING		
EXIST. MANHOLE		

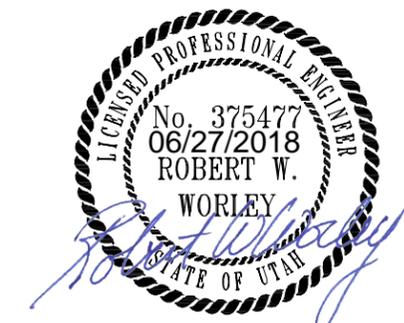


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<p>NEPHI CITY</p> <p>CULINARY WATER IMPROVEMENTS PROJECT</p> <p>2018</p> <p>SHEET INDEX, ABBREVIATIONS & LEGEND</p>					
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05884	JCI	CJC	RWW	3	G3

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CONSTRUCTION NOTES:

1. THE COMPLETED INSTALLATION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODE ORDINANCES AND REGULATIONS.
2. THE CONTRACTOR IS RESPONSIBLE TO MEET ALL REQUIRED STATE AND FEDERAL SAFETY REQUIREMENTS AT ALL TIMES ON THE PROJECT. COLLAPSIBLE SOILS ARE KNOWN TO BE PRESENT WITHIN THE AREA IN AND AROUND NEPHI CITY. THE EXACT LOCATIONS AND EXTENT OF COLLAPSIBLE SOILS ARE NOT KNOWN. NO GEO-TECHNICAL EXAMINATIONS HAVE BEEN MADE EXCEPT AT THE LOCATIONS OF THE NEW TANKS AND CHLORINATOR BUILDING.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, INCLUDING, BUT NOT LIMITED TO BUILDING PERMITS, UDOT AND COUNTY ROAD ENCROACHMENT PERMITS, RAILROAD WORK PERMITS, AND ANY OTHER REQUIRED PERMITS FOR CONSTRUCTION OF THE PROJECT. PERMITS ARE ALSO DISCUSSED IN SPECIFICATION SECTIONS 02005SP, 02501SP AND NOTE 14 BELOW.
4. THE RAILROAD WILL REQUIRE THE SERVICES OF RAIL PROS FLAGGER(S) WHILE WORK IS GOING ON WITHIN THE RAILROAD RIGHT OF WAY. THE RAILROAD MAY ALSO REQUIRE SPECIFIC SAFETY TRAINING FOR ALL PERSONNEL WORKING WITHIN THE RAILROAD RIGHT OF WAY. THE COST OF ALL PERMITS AS WELL AS RAIL PROS FLAGGERS AND SAFETY TRAINING REQUIRED BY THE RAILROAD SHALL BE BORNE BY THE CONTRACTOR AND SHALL BE INCLUDED IN THE COST FOR TRAFFIC CONTROL COVERED IN SECTION 02005SP.
5. THE CONTRACTOR IS RESPONSIBLE TO SCHEDULE AND OBTAIN ALL SPECIAL INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES.
6. ALL WORK SHALL BE COMPLETED IN A NEAT, WORKMANLIKE, FINISHED, AND SAFE MANNER.
7. ALL PIPELINES SHALL BE INSTALLED AT LOCATIONS AND DEPTHS REQUIRED BY THE CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS OR AS OTHERWISE DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL NOT MOVE THE PLANNED ALIGNMENT OF ANY CULINARY WATER PIPELINE WITHOUT THE WRITTEN CONSENT OF BOTH THE OWNER AND THE ENGINEER.
8. DURING PROJECT DESIGN, AN ATTEMPT HAS BEEN MADE TO KEEP NEW WATER PIPELINES AS FAR AS POSSIBLE FROM EXISTING SEWER LINES. THE REQUIRED EDGE TO EDGE SEPARATION OF THE CULINARY WATER PIPELINE FROM THE SEWER PIPELINE IS 18 INCHES VERTICAL ABOVE THE SEWER, AND 10 FEET HORIZONTAL. IF THAT SEPARATION CANNOT BE MAINTAINED, THE CONTRACTOR SHALL REQUEST THAT THE ENGINEER EVALUATE THE INTERFERENCES. IF THERE IS NO OTHER SOLUTION, THE ENGINEER MAY APPROVE A REDUCTION IN HORIZONTAL EDGE TO EDGE SEPARATION TO 6 FEET. THIS APPROVAL MUST BE OBTAINED FROM THE PROJECT ENGINEER IN WRITING. ANY FURTHER REDUCTION IS SEPARATION REQUIRES MITIGATION AND APPROVAL BY THE EXECUTIVE SECRETARY OF THE DDW.
9. ALL COSTS ASSOCIATED WITH THIS PROJECT SHALL BE INCLUDED IN THE PRICES INDICATED IN THE BID SCHEDULE FOR THE VARIOUS ITEMS OF WORK.
10. ALL CONSTRUCTION WORK SHALL BE PERFORMED WITHIN EXISTING RIGHTS-OF-WAY OR RIGHTS-OF-WAY OBTAINED BY THE OWNER FOR CONSTRUCTION PURPOSES.
11. THE CONTRACTOR SHALL PROVIDE, INSTALL, AND MAINTAIN ALL ROAD CONSTRUCTION, BARRICADES, CHANNELING DEVICES, AND CONSTRUCTION SIGNS IN ACCORDANCE WITH THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) FOR ROAD CONSTRUCTION ACTIVITIES.
12. TRAFFIC ACCESS SHALL BE MAINTAINED FOR LOCAL RESIDENTS TO PROPERTIES ALONG CONSTRUCTION BOUNDARIES. THE CONTRACTOR SHALL PROVIDE RESIDENTS AT LEAST ONE DAY NOTICE BEFORE WATER IS TO BE SHUT OFF, AND ANY WORK IS TO BE PERFORMED IN FRONT OF THEIR PROPERTY.
13. ALL DAMAGE TO EXISTING ROADWAYS AND PRIVATE PROPERTY SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.
14. ALL ASPHALT PATCHES SHALL BE PLACED TO PROVIDE A SMOOTH TRANSITION FROM THE EXISTING ASPHALT TO THE PATCH. THE NEW SURFACE SHALL MATCH EXISTING GRADE. DEVIATION FROM THIS SHALL BE IN ACCORDANCE WITH SECTION 02500.3.4.3 OF THE CONTRACT SPECIFICATIONS.
15. PIPELINES TO BE INSTALLED WITHIN THE UDOT RIGHTS OF WAY SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE UDOT ENCROACHMENT PERMIT AND THE PROJECT SPECIFICATIONS. REGION 3 ENCROACHMENT PERMITS ARE ISSUED FOR ONLY 30 DAYS AT A TIME. BECAUSE THE WORK IS BEING COMPLETED FOR NEPHI CITY, UDOT MAY NOT CHARGE FOR THE PERMIT; HOWEVER, THE CONTRACTOR MUST PROVIDE A COPY OF THE CITY'S EXEMPTION LETTER EACH TIME A PERMIT IS REQUESTED. THE CONTRACTOR WILL BE REQUIRED TO MEET OTHER UDOT REQUIREMENTS AS APPLICABLE. IF THERE IS A DISAGREEMENT BETWEEN UDOT PERMIT REQUIREMENTS AND THE PROJECT SPECIFICATIONS, UDOT REQUIREMENTS SHALL APPLY. PROJECT SPECIFICATION SECTION 02501SP COVERS PIPELINES IN THE UDOT RIGHTS-OF-WAY. FOR QUESTIONS REGARDING PERMITS, CONTACT AUSTIN TRIPP, UDOT REGION 3 RIGHT-OF-WAY CONTROL COORDINATOR (ATRIPP@UTAH.GOV) OR BY PHONE AT 801-222-3418).
16. PIPELINES CROSSING THE UNION PACIFIC RAILROAD RIGHT-OF-WAY ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH THE DRAWINGS AND THE RAILROAD PERMIT. A PERMIT TO ALLOW WORKERS ONLY (NO VEHICLES, TOOLS, EQUIPMENT, ETC.) TO BE WITHIN THE RAILROAD RIGHT OF WAY IS REQUIRED DURING CONSTRUCTION.
17. ANY CANAL OR DITCH CROSSINGS NOT SPECIFICALLY CALLED OUT ON THE PLANS AND BID SCHEDULE ARE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE PIPELINE, AND SHALL NOT BE PAID FOR SEPARATELY.
18. ALL FENCED CROSSINGS ENCOUNTERED DURING INSTALLATION OF PIPELINES AND OTHER IMPROVEMENTS SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION. ANY FENCES DAMAGED SHALL BE REPAIRED TO MATCH EXISTING CONDITIONS.
19. THE CONTRACTOR SHALL PROVIDE MEANS OF MANAGING ANY STORM WATER, GROUNDWATER, OR NUISANCE WATER FROM INTERFERING WITH THE CONSTRUCTION OPERATION. THE COST OF CONTROLLING ALL WATER SHALL BE INCLUDED IN THE CONTRACT PRICE FOR RELATED BID ITEMS.
20. THE CONTRACTOR SHALL INCLUDE THE COST FOR ALL EXCAVATION AND DISPOSAL OF EXCESS AND UNSUITABLE MATERIAL IN THE CONTRACT UNIT PRICE FOR THE RELATED BID ITEM.
21. ALL DEBRIS RESULTING FROM WORK ON THE PROJECT SHALL BE DISPOSED OF BY THE CONTRACTOR. THE CONTRACTOR SHALL MAKE APPROPRIATE ARRANGEMENTS FOR DISPOSAL SITES AT WHICH DEBRIS MAY BE LAWFULLY DISPOSED. NO CONSTRUCTION DEBRIS WILL BE BURIED IN ANY PIPELINE TRENCH OR ANY OTHER PROJECT EXCAVATED SITE.
22. ALL PIPING SHALL BE PLACED WITH A MINIMUM OF 4'-0" COVER OVER THE TOP OF THE PIPE UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR SPECIFICALLY SHOWN OTHERWISE ON THE DRAWINGS.
23. THE CONTRACTOR HAS THE ULTIMATE RESPONSIBILITY TO LOCATE ALL UTILITIES (ABOVE & UNDERGROUND) PRIOR TO CONSTRUCTION. ANY UTILITIES DISTURBED DURING CONSTRUCTION SHALL BE REPLACED OR REPAIRED AT THE CONTRACTOR'S EXPENSE UNLESS PAYMENT IS PROVIDED IN SEPARATE ITEMS OF WORK. THE CONTRACTOR MUST CALL BLUE STAKES PRIOR TO ANY WORK REQUIRING EXCAVATION OF ANY TYPE. THE ENGINEER HAS SHOWN SOME EXISTING UTILITIES ON THE PLANS FOR REFERENCE ONLY, BUT THE LOCATIONS ARE NOT EXACT AND SHOULD ONLY BE USED FOR REFERENCE. IN ADDITION, OTHER UTILITIES MAY BE PRESENT, AND THE UTILITIES SHOWN MAY NOT ACTUALLY EXIST AT THE LOCATIONS SHOWN.
24. THE INSTALLATION OF VARIABLE SIZED OPENINGS IN TEES, ELBOWS, CROSSES, ETC. WHERE APPLICABLE IS AN ACCEPTABLE ALTERNATIVE TO THE USE OF REDUCERS. THE INSTALLATION OF TWO TEES IS AN ACCEPTABLE ALTERNATIVE TO THE USE OF A CROSS.
25. AN EFFORT HAS BEEN MADE TO SHOW THE EXISTING SYSTEM AND THE PROPOSED IMPROVEMENTS AS ACCURATELY AS POSSIBLE. ALL PIPELINE LOCATIONS AND SIZES ARE SHOWN ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER. HOWEVER, THE ACTUAL FIELD CONDITIONS MAY VARY. ADDITIONAL WORK MAY BE REQUIRED AND LIKEWISE PROPOSED WORK MAY BE ELIMINATED BASED ON ACTUAL FIELD CONDITIONS. THE ADDITION OR ELIMINATION OF WORK SHALL BE DETERMINED BY THE OWNER. MINOR VARIATIONS IN ACTUAL FIELD CONDITIONS WITHIN THE PROJECT SCOPE ARE TO BE EXPECTED AND SHALL NOT WARRANT A COST INCREASE.
26. ALL BURIED DUCTILE IRON PIPE SPOOLS, VALVES, AND FITTINGS SHALL BE CAREFULLY WRAPPED OR SLEEVED WITH PLASTIC TO PREVENT CONTACT WITH SOIL DURING OR AFTER INSTALLATION, BACKFILL AND AFTER CONSTRUCTION HAS BEEN COMPLETED.



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27. THE CONTRACTOR SHALL MAKE ALL CONNECTIONS TO EXISTING LINES WHERE SHOWN ON THE PLANS AND AS NEEDED TO OBTAIN A FULLY FUNCTIONAL SYSTEM.
28. ALL CONNECTIONS TO EXISTING LINES ARE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE PIPELINE, AND SHALL NOT BE PAID FOR SEPARATELY.
29. FITTINGS REQUIRED FOR NEW PIPELINE CONNECTIONS AND TIE-INS, PIPELINE ABANDONMENT, OR AT OTHER PROJECT LOCATIONS BEYOND THOSE SHOWN ON THE DRAWINGS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
30. DURING CONSTRUCTION AND TESTING OF THE CULINARY WATER DISTRIBUTION SYSTEM, THE CONTRACTOR SHALL PROVIDE EACH RESIDENT ON THE AFFECTED STREET AT LEAST A ONE DAY NOTICE BEFORE REMOVING THE CULINARY WATER SYSTEM ON THAT STREET FROM SERVICE.
31. THE CONTRACTOR SHALL PROTECT VENDOR SUPPLIED EQUIPMENT AND COMPONENTS FROM DAMAGE DUE TO WEATHER OR OTHER CAUSE. SENSITIVE INSTRUMENTATION, ELECTRICAL AND ELECTRONIC EQUIPMENT SHALL BE STORED INDOORS IN A CLEAN DRY ENVIRONMENT UNTIL THEY ARE INSTALLED IN THE PROJECT.
32. DURING CONSTRUCTION, SITE WATERING SHALL BE PERFORMED BY THE CONTRACTOR AS REQUIRED TO MINIMIZE FUGITIVE DUST. THE CONTRACTOR IS REQUIRED TO METER ALL WATER TAKEN OUT OF THE EXISTING CULINARY WATER SYSTEM FOR CONSTRUCTION. THE OWNER WILL NOT CHARGE THE CONTRACTOR FOR WATER REQUIRED FOR CONSTRUCTION AND TESTING.
33. DURING CLEANUP ALONG THE CONSTRUCTION RIGHTS-OF-WAY, ROAD DRAINAGE PROFILES SHALL BE GRADED AND RESTORED. ALL ROCKS ON THE SURFACE LARGER THAN 2" SHALL BE RAKED OUT AND REMOVED..
34. BID ITEM QUANTITIES ARE ESTIMATED BY THE ENGINEER. ACTUAL QUANTITIES MAY VARY AND PAYMENT WILL BE BASED ON ACTUAL QUANTITIES INSTALLED.
35. ALL CONNECTIONS TO POLYETHYLENE SERVICE LATERAL TUBING FROM THE CORPORATION STOP AT THE MAINLINE TO THE METER, INCLUDING SPLICES TO EXISTING POLYETHYLENE TUBING SHALL BE MADE USING MUELLER INSTATITE OR APPROVED EQUAL CONNECTORS. THE CONTRACTOR SHALL INSTALL ADAPTERS TO FACILITATE CONNECTION TO METERS AND CORPORATION STOPS AS NEEDED.
36. WHERE NEW PIPELINES ARE INSTALLED, ALL SERVICE LATERAL PIPELINES SHALL BE REPLACED WITH NEW POLYETHYLENE SERVICE LATERAL TUBING FROM THE MAINLINE CORPORATION STOP TO THE METER, UNLESS THE EXISTING SERVICE LATERAL IS POLYETHYLENE. IF THE EXISTING SERVICE LATERAL IS POLYETHYLENE, THE CONTRACTOR SHALL RECONNECT TO THE EXISTING SERVICE LINE USING AN INSTATITE COUPLING.
37. SERVICE LATERAL TUBING SHALL BE INSTALLED UNDER ROADWAYS BY PULLING, BORING, OR BY USE OF A MISSILE. ROADWAYS SHALL NOT BE OPEN CUT FOR SERVICE LATERAL INSTALLATION UNLESS APPROVED BY THE ENGINEER ON A CASE BY CASE BASIS.
38. NEPHI CITY REQUIRES THAT, EXCEPT IN CASES WHERE NEW GROUPS OF VALVES ARE ADDED AT AN INTERSECTION AND ARE BOLTED TOGETHER TO TEE'S, CROSSES, ETC. AND CONNECTED TO NEW PIPELINES AS AN ASSEMBLY, OR VALVES THAT ARE ADDED AND INSTALLED AS PART OF A "HOT TAP" OPERATION, THE NEW VALVES ADDED TO THE SYSTEM SHALL BE PLACED IN LINE WITH THE PROPERTY LINES ALONG THE INTERSECTING STREETS PERPENDICULAR TO THE PIPELINE.
39. ALL FITTINGS, NIPPLES, CONNECTORS, ETC. USED IN SERVICE CONNECTIONS SHALL BE BRASS.
40. UNLESS DIRECTED OTHERWISE BY THE ENGINEER, ALL NEW SERVICE COMPONENTS SHALL MATCH THE SIZE OF THE EXISTING SERVICE COMPONENTS AND SHALL BE INSTALLED IN ACCORDANCE WITH THE DRAWINGS. 2 INCH OR LARGER SERVICES SHALL BE PROVIDED WITH HEAT FUSION WELDED HDPE SERVICE LINES AND GATE VALVES SHALL BE USED IN LIEU OF CORPORATION STOPS.
41. WHERE SERVICES ARE BEING REPLACED AS CALLED OUT ON THE DRAWINGS, GALVANIZED, CONCRETE, OR CLAY METER SERVICE BARRELS SHALL BE REPLACED WITH NEW BULLET TYPE CARSON – HEAVY WALL – MAX SERIES METER BOXES, OR APPROVED EQUAL, IN ACCORDANCE WITH THE SPECIFICATIONS. OLD METER BARRELS SHALL BE DISPOSED OF BY THE CONTRACTOR AT THE LANDFILL.

42. DURING WORK ON THE SERVICE LINES AND WATER METERS, SERVICE LINES FOR ANY SERVICE LATERAL PIPES THAT ARE FOUND TO BE GALVANIZED STEEL, PVC PIPE, OR OTHER MATERIAL SHALL BE REPLACED FROM THE CORPORATION STOP ON THE MAINLINE TO THE METER, WITH POLYETHYLENE SERVICE LATERAL TUBING OF THE SIZE MATCHING THE EXISTING SERVICE IN ACCORDANCE WITH THE SPECIFICATIONS. EXISTING POLYETHYLENE SERVICE LATERALS SHALL NOT BE REPLACED UNLESS DIRECTED BY THE ENGINEER ON A CASE BY CASE BASIS.
43. WITH THE EXCEPTION OF THE WELL SUPPLY PIPELINES, WHERE NEW PIPELINES ARE BEING INSTALLED PARALLEL TO AN EXISTING CULINARY WATER PIPELINE, THE EXISTING PIPELINE SHALL BE ABANDONED UNLESS DIRECTED OTHERWISE BY THE ENGINEER. GENERALLY, THOSE PIPELINES THAT ARE TO BE ABANDONED ARE SHOWN ON THE DRAWINGS WITH A DASHED LINE TYPE, HOWEVER, ON SOME PIPELINES THE LINE TYPE ON THE DRAWINGS IS DIFFICULT TO DISCERN. PIPELINES SHALL NOT BE ABANDONED BY SIMPLY SHUTTING A VALVE OR VALVES TO ISOLATE THE ABANDONED SECTION. RATHER, THEY SHALL BE ABANDONED AT THE POINT WHERE THEY ARE CONNECTED TO AN EXISTING PIPELINE BY CUTTING OUT A SECTION OF THE ABANDONED PIPE AND INSTALLING A BLIND FLANGE OR RESTRAINED PLUG AT THE CONNECTION TO THE LIVE PIPELINE. AT A MINIMUM, ALL VALVES ON ABANDONED PIPELINES SHALL HAVE THEIR VALVE BOXES REMOVED AND THE VALVES SHALL BE BURIED.
44. WHERE FIRE HYDRANTS ARE CALLED OUT TO BE REMOVED, THE ENTIRE ASSEMBLY SHALL BE REMOVED BACK TO THE CONNECTION TO THE MAINLINE PIPE TEE, UNLESS APPROVED OTHERWISE IN WRITING BY THE ENGINEER, AND THE CONTRACTOR SHALL RESTORE THE GROUND OR ROAD SURFACE IN ACCORDANCE WITH SECTION 02500SP OF THE SPECIFICATIONS.
45. IF AN EXISTING FIRE HYDRANT WITH A 5 INCH PUMPER NOZZLE IS IDENTIFIED TO BE RECONNECTED, BUT UPON INVESTIGATION, IT IS FOUND TO BE FED BY A 4 INCH LATERAL PIPE, THE 4 INCH LATERAL PIPE SHALL BE REPLACED ALL THE WAY TO THE FIRE HYDRANT. THE ADDITIONAL 6 INCH PIPING AND THE LARGER VALVE WILL BE PAID SEPARATELY UNDER THE APPROPRIATE BID ITEM.
46. DISCOVERY AND NOTIFICATION OF CULTURAL RESOURCES AND HISTORICAL/ARCHAEOLOGICAL OBJECTS: IF A SUSPECTED OR UNSUSPECTED HISTORICAL, ARCHAEOLOGICAL, OR PALEONTOLOGICAL ITEM, FEATURE, SITE OR OTHER CULTURAL RESOURCE IS ENCOUNTERED, CONSTRUCTION OPERATIONS SHALL BE IMMEDIATELY STOPPED IN THE VICINITY OF THE DISCOVERY AND THE ENGINEER AND OWNER SHALL BE NOTIFIED OF THE NATURE AND EXACT LOCATION OF THE FINDING. THE CONTRACTOR SHALL NOT DAMAGE THE DISCOVERED OBJECTS AND SHALL PROVIDE WRITTEN CONFIRMATION OF THE DISCOVERY TO THE ENGINEER WITHIN TWO (2) CALENDAR DAYS. THE OWNER AND ENGINEER ARE REQUIRED TO IMMEDIATELY NOTIFY THE STATE HISTORICAL PRESERVATION OFFICE (SHPO), THE UNITED STATES DEPARTMENT OF AGRICULTURE – RURAL DEVELOPMENT (USDA-RD), AND THE UTAH GEOLOGICAL SURVEY (UGS). THE SHPO, USDA-RD, AND UGS, WILL INVESTIGATE THE FINDING AND DETERMINE IF THE RESOURCE REQUIRES PROTECTION AND THE DISPOSITION OF THE SAID RESOURCE.
47. AT THE TIME OF COMPLETION OF ALL WORK, THE CONTRACTOR SHALL INSPECT AND CYCLE ALL VALVES IN THE SYSTEM TO ENSURE THAT THE VALVE BOX IS STRAIGHT, THE VALVES ARE IN THE CORRECT POSITION, AND THAT THE VALVES OPERATE PROPERLY. THIS INCLUDES EXISTING VALVES THAT WERE NOT REPLACED AS PART OF THE PROJECT AND EXISTING AND NEW FIRE HYDRANT VALVES. A LIST SHALL BE PREPARED IDENTIFYING EACH VALVE, THE POSITION OF THE VALVE AS FOUND, THE POSITION OF THE VALVE AFTER CYCLING, THE CONDITION OF THE VALVE, I.E. NEW, OPERABLE, BROKEN, DIFFICULT TO OPERATE, OR INACCESSIBLE AND THE REASON. PROBLEMS FOUND WITH NEW VALVES INSTALLED DURING THE PROJECT SHALL BE IMMEDIATELY CORRECTED. THIS WORK SHALL BE WITNESSED BY THE ENGINEER'S REPRESENTATIVE OR A REPRESENTATIVE OF THE CITY.
48. THE CONTRACTOR SHALL REVEGETATE AREAS OF DISTURBANCE OF PRIVATE LANDS OUTSIDE OF ROADS AS REQUESTED BY THE PRIVATE PROPERTY OWNER. REVEGETATION OF PRIVATE LANDS SHALL INCLUDE CERTIFIED WEED FREE SEEDS OF THE PLANT SPECIES THAT WERE PRESENT ON THE PROPERTY BEFORE CONSTRUCTION BEGAN, UNLESS OTHERWISE APPROVED BY THE OWNER AND PRIVATE PROPERTY OWNER IN WRITING.



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SET NO. 05884	DESIGNED JCI	DRAWN CJC
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**NEPHI CULINARY WATER IMPROVEMENTS PROJECT – 2018
DESIGN CRITERIA**

1. ANNUAL GROWTH RATE AND LENGTH OF PLANNING PERIOD:

A growth rate of 2.73% annually was used to project Nephi City culinary water system demands for a 20 year planning period. This growth rate is based on the growth rate projected in Nephi City’s General Plan and is strongly supported by the Governor’s Office of Management and Budget projections for this area. Projected connection numbers are used in all applicable calculations.

2. SERVICE CONNECTION DATA

Existing Service Connection Data:

	CONNECTIONS	*EDU’s
Residential	1,910	1,910
Commercial	189	705
Industrial	1	162
Total	2,100	2,777

Projected Service Connection Data (at end of 20 year planning period):

	CONNECTIONS	*EDU’s
Residential	3,273	3,273
Commercial	281	1,048
Industrial	**3	**430
Total	3,557	4,751

*One EDU is defined as the amount of culinary water required by an average residential connection. Because an EDU relates to the amount of water required for the average residential connection, use of this term allows commercial and industrial users to be equated to residential connections. A residential connection is assumed to always equal 1 EDU in calculations. Based on average water usage in the Nephi system, a commercial connection represents 3.73 EDUs, and the industrial user was found to represent 162 EDUs. These ratios are assumed for projected commercial and industrial users. The total projected 4,751 EDUs is the basis of design criteria.

**Calculations to determine the projected number of industrial connections based on the 2.73% per year growth rate produces the fractional (2.6533 connections) at the end or the planning period. The connections are rounded to 3, but the 430 EDUs is the product of the fractional number of connections multiplied by 162 EDU per connection, which is used throughout the design criteria calculations for Water Right, Source Capacity, Storage Capacity, etc. in this design criteria.

3. CALCULATION NOTES:

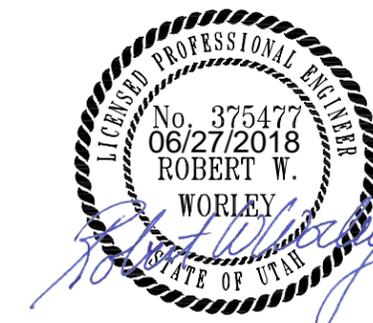
1. According to the *State of Utah Rules for Public Drinking Water Systems* (Rules), Nephi is located in Climate Zone 4, which is listed as moderately high for consumptive use. This means that Nephi requires 1.87 ac-ft per irrigated acre to determine required water right for residential irrigation; 3.96 gpm per irrigated

acre to determine required source capacity for residential irrigation; and 2,848 gallons per irrigated acre to determine required storage capacity for residential irrigation. It is assumed that all of the water for outdoor use is sprinkler applied each year. Sprinkler irrigation is approximately 70% efficient, and this 70% efficiency is used in the water right, source capacity, and storage capacity calculations regarding outdoor water usage.

- Data from the master plan completed in 2013 showed that the average irrigated area per EDU was 1/5 acre; therefore, this design criteria is based on irrigation of 1/5 acre per connection.
- Only 700 out of 1,910 residential connections have secondary irrigation water available. This means that currently 1,210 residential customers depend on culinary water to meet the irrigation needs for their landscapes and other outdoor usage. It is anticipated that no new lots will have secondary irrigation water.
- There is a commercial usage spike during the summer due to increased tourism, recreation, and outdoor water use.

4. WATER RIGHT

Water Right	Source	Ac-Ft (Calculated from cfs value)	CFS Flow (Taken From Water Rights Website)	GPM Flow (Calculated from cfs value)
53-00	Marsh Spring	562.42 ac-ft.	0.78 cfs	348.68 gpm
53-2	Rowley's Spring	83.00 ac-ft.	0.11 cfs	51.46 gpm
53-35	Monument Springs 1,2,3	488.68 ac-ft.	0.68 cfs	302.97 gpm
53-53	Underground, Airport well	57.92 ac-ft.	0.08 cfs	35.91 gpm
53-63	Underground, Salt Creek Well, Rocky Ridge Well, Blake Garrett Well, Airport Well	2,628.04 ac-ft.	3.63 cfs	1,629.28 gpm
53-64	Industrial Waste	200.00 ac-ft.	0.28 cfs	123.99 gpm
53-65	Underground, Jones Well & Bradley Spring	4,343.87 ac-ft.	6.00 cfs	2,693.02 gpm
53-80	Bradley Spring Winter (Nov.1 to April 1)	1092.48 ac-ft.	3.63 cfs	1,629.29 gpm
53-87	Underground, Fire Station Well	3,062.42 ac-ft.	4.23 cfs	1,898.58 gpm
53-88	Underground, Shop Well	3,663.33 ac-ft.	5.06 cfs	2,271.12 gpm
53-1516	Underground, Shop Well	839.82 ac-ft.	1.16 cfs	520.65 gpm
TOTAL:		17,021.98 ac-ft.	25.64 cfs.	11,504.94 gpm



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Required water right is divided into two categories, indoor and outdoor. The Rules require a community to have adequate water right to supply each culinary connection with 400 gallons per day for indoor water use. Outdoor usage is based on the Rules as noted. The projected required water right is:

Residential Use:

$$\text{Indoor: } 3,273 \text{ EDU} \times \frac{400 \text{ gpd}}{\text{EDU}} \times \frac{365 \text{ day}}{1 \text{ year}} \times \frac{1 \text{ ac-ft.}}{325851 \text{ gal.}} = 1,466 \text{ ac-ft.}$$

$$\text{Outdoor: } 2,573 \text{ EDU} \times \frac{1 \text{ ir.-acre}}{5 \text{ EDU}} \times \frac{1.87 \text{ acre-ft}}{\text{ir.-acre}} \times \frac{1 \text{ (efficiency)}}{0.7} = 1,375 \text{ ac-ft.}$$

Commercial Use:

$$1,048 \text{ EDU} \times \frac{400 \text{ gpd}}{\text{EDU}} \times \frac{365 \text{ day}}{1 \text{ year}} \times \frac{1 \text{ ac-ft.}}{325,851 \text{ gal.}} = 470 \text{ ac-ft.}$$

Additional Commercial Summer Use

$$1,048 \text{ EDU} \times \frac{35,780 \text{ gal}}{\text{EDU month}} \times \frac{6 \text{ month/yr.}}{325,851 \text{ gal.}} \times \frac{1 \text{ ac ft.}}{325,851 \text{ gal.}} = 691 \text{ ac-ft.}$$

Industrial Use:

$$430 \text{ EDU} \times \frac{400 \text{ gpd}}{\text{EDU}} \times \frac{365 \text{ day}}{1 \text{ year}} \times \frac{1 \text{ ac-ft.}}{325,851 \text{ gal.}} = 193 \text{ ac-ft.}$$

Leased Water to the Irrigation Co: = 1,057 ac-ft.

TOTAL PROJECTED REQUIRED WATER RIGHT = 5,865 ac-ft.
ESTIMATED PROJECTED WATER RIGHT SURPLUS = 11,157 ac-ft.

Calculations of required water right in the above section show a projected water right surplus of 11,157 acre feet at the end of the planning period. These water right projections are commonly shown as measured by acre-feet, which is how all of the comparisons have been made herein. However, all of Nephi City's water rights have been appropriated with cfs. (flow) limitations. Thus with the current limitations on the water right, as recorded with the State Engineer, Nephi can only draw up to 25.64 cfs at any given time throughout the year. This is a problem because the water demand in the summer is much higher than in the winter.

5. SOURCE CAPACITY

SOURCE	Minimum Flow
Upper and Lower Bradley and Marsh Springs	1,900 gpm
Equipment Shed Well	2,400 gpm
Fire Station Well	0 gpm
Jones Well	The Jones Well is Exchanged with Irrigation Co. for better tasting water from Upper and Lower Bradley springs
Total	4,300 gpm

Projected Required Source Capacity:

Required source capacity is divided into two categories, indoor and outdoor. The Rules require that a community should have adequate source capacity to supply each culinary connection with 800 gallons per day for indoor water use. Outdoor usage is based on the Rules as noted. The projected required source capacity is:

Residential Use:

$$\text{Indoor Use: } \frac{3,273 \text{ EDU} \times 800 \text{ gal}}{\text{day-EDU}} \times \frac{1 \text{ day}}{1440 \text{ min.}} = 1,818 \text{ gpm}$$

$$\text{Outdoor Use: } \frac{2,573 \text{ EDU} \times 1 \text{ acre} \times 3.96 \text{ gpm}}{5 \text{ EDU}} \times \frac{1 \text{ (efficiency)}}{\text{ir. acre} \ 0.7} = 2,911 \text{ gpm}$$

Commercial Use:

$$\text{Indoor Use: } \frac{1,048 \text{ EDU} \times 800 \text{ gal}}{\text{day-EDU}} \times \frac{1 \text{ day}}{1440 \text{ min.}} = 582 \text{ gpm}$$

Additional Commercial Summer Use

$$\frac{1,048 \text{ EDU} \times 1,193 \text{ gal}}{\text{day-EDU}} \times \frac{1 \text{ day}}{1440 \text{ min.}} = 868 \text{ gpm}$$

Industrial Use:

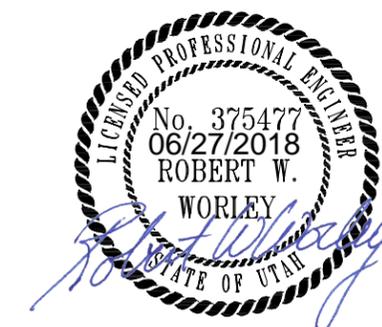
$$\frac{430 \text{ EDU} \times 800 \text{ gal}}{\text{day-EDU}} \times \frac{1 \text{ day}}{1440 \text{ min.}} = 239 \text{ gpm}$$

TOTAL PROJECTED REQUIRED SOURCE CAPACITY = 6,419 gpm
ESTIMATED PROJECTED SOURCE CAPACITY DEFICIT = (2,119) gpm

At the time of this project the Nephi City has a difficult time keeping the storage tanks full during very hot days during the summer months. The projected source capacity calculation above shows that there will be a source capacity shortage of 2,119 gpm in 20 years. This project will re-construct the existing Fire House Well, which, due to sand production, has been out of service for many years, with the goal of producing at least 2,400 gpm, matching the Equipment Shed Well. The project will also purchase the existing Worwood Well, which was constructed to culinary standards, located southwest of the City. Based on test pump data provided by the Worwood family, the Worwood Well should be able to produce 1,000 to 1,500 gpm.

6. STORAGE

Nephi City currently has 2,600,000 gallons of culinary water storage. Water storage capacity requirements are separated into three categories, indoor, outdoor, and fire protection. The Rules require a minimum of 400 gallons per day per EDU for indoor culinary water storage. Outdoor usage is based on the Rules as noted. The projected required storage capacity is:



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Projected Required Storage Capacity:

Residential Use:

Indoor: $3,273 \text{ EDU} \times \frac{400 \text{ gal.}}{\text{EDU}} = 1,309,200 \text{ gal.}$

Outdoor Use: $2,573 \text{ EDU} \times \frac{1/5 \text{ ir ac} \times 2,848 \text{ gal.}}{\text{EDU}} \times \frac{1}{0.7} \text{ (efficiency)} = 2,093,687 \text{ gal.}$

Commercial Use:

Indoor: $1,048 \text{ EDU} \times \frac{400 \text{ gal.}}{\text{EDU}} = 419,200 \text{ gal.}$

Additional Commercial Summer Use:

$1,048 \text{ EDU} \times \frac{1,193 \text{ gal.}}{\text{EDU}} = 1,250,264 \text{ gal.}$

Industrial Use:

$430 \text{ EDU} \times \frac{400 \text{ gal.}}{\text{EDU}} = 171,934 \text{ gal.}$

Fire Protection:

$3,000 \text{ gpm} \times 120 \text{ minutes} = 360,000 \text{ gal.}$

TOTAL PROJECTED REQUIRED STORAGE CAPACITY = 5,604,285 gal.
ESTIMATED PROJECTED STORAGE CAPACITY DEFICIT = (3,004,285) gal.

The project will address increasing the storage by 3,000,000 gallons by constructing two new storage tanks of 1,500,000 gallons each. One tank will be located adjacent to the existing 2,000,000 gallon tank east of the golf course. Addition of an additional tank at this location is critical because all current sources enter this tank and due to system demands the 2,000,000 gallon tank cannot be taken out of service, even for critical maintenance without severe hardship to the system. The other new tank will be located south of the current south I-15 interchange (Exit 222). This tank will dramatically improve distribution system performance on the south side of the system and especially fire protection for the infrastructure that has been constructed in that location.

7. DISTRIBUTION

There is only one pressure zone in the Nephi distribution system. The maximum system pressure is below the normal operating range for the system main line piping. A booster pump station supplies one subdivision at the highest elevation in the City west of I-15, but the rest of the system is in the existing pressure zone. This simplifies analysis and improvement recommendations. Service connections where system pressures exceed 60 psi are recommended to have individual service pressure regulators.

The Rules require all fire hydrants to be supplied from 8-inch diameter or larger lines, unless it can be proven through the use of computer modeling that a smaller line will meet minimum fire flow requirements. A large number of pipes in the distribution system are undersized making it impossible for the system to provide even minimum 1,000 gpm fire flows required by the Rules at many locations.

The transmission pipelines from the tanks to the distribution system consist of 14-inch, 12-inch and 10-inch pipelines. The existing distribution system is made up of 12-inch, 10-inch, 8-inch, 6-inch, 4-inch, and some pipelines smaller than 4 inch. Most of the older pipelines currently in the system are cast-iron lead joint pipelines. Some cast and ductile iron pipe has been deteriorating resulting in the need to repair numerous broken pipelines annually, which impacts not only the water system, but also the streets.

This project will focus on replacing known problem pipelines and lines critical to upgrading system fire flows to meet current standards. Additional larger transmission lines will be brought into the distribution system from the new tanks. Undersized pipelines will be replaced where possible, within the project budget constraints, to meet current recommendations of the Rules. With the exception of piping within and under buildings and tanks, the new distribution and transmission pipelines will be constructed using pipe meeting the requirements of the Project Specifications. Ductile iron fittings that are required for the PVC piping and if used, ductile iron or steel piping will be wrapped or sleeved to limit corrosion.

The Nephi culinary water distribution system was analyzed using an *H₂O Net* computer model for required operating pressures during projected peak demand of 6,500 gpm plus fire flow demands. Pipelines are being upgraded in many areas to meet the City's requested fire flow of 2,500+ gpm at critical industrial and commercial locations, and 1,500 gpm in most other locations. In addition, certain pipelines that have required high maintenance will be replaced to eliminate the maintenance issues. To meet the requirements of the Rules, the system model should be calibrated. If the project budget permits, the model will be calibrated after project construction has been completed.

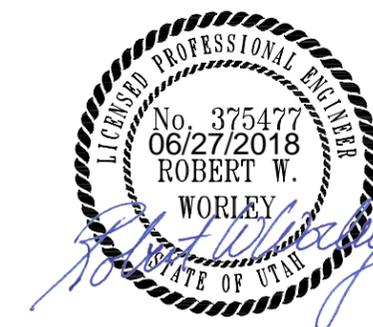
In keeping with the recommendations of the Rules, with the exception of blocks where larger pipelines are installed, most of the replacement distribution piping in the project will be 8 inch or larger, although, to save money, some 6 inch pipelines will be installed where there will be no significant impact the distribution system fire flows.

The existing system has a limited number of operable valves. In many cases a leak or required maintenance can require shutting off water to a significant area of the city. Therefore, where possible, new valves will be installed to allow isolation of individual streets between intersections for maintenance or repair.

All old fire hydrants without pumper nozzles as well as broken or inoperable fire hydrants, will be replaced as part of this project. In addition, fire hydrants will be added on many blocks to correct spacing to meet the intent of the Rules. Some inoperable hydrants will be removed without being replaced where spacing is adequate.

8. SCADA SYSTEM

A SCADA system will be installed concurrently with construction of the water project under a separate contract. The SCADA system will allow remote monitoring and control



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for system wells, tanks, disinfection systems and the new penstock head box at the output of lower Bradley Spring. Installation of the SCADA system will simplify and improve system operability, reliability, and safety. It will also simplify required records maintenance associated with managing the City's water system. The SCADA system monitoring and control functions for the water system are discussed in the remaining sections of this Design Criteria.

$$200,000 \text{ gallons} / 4422 \text{ gpm} = 45 \text{ minutes}$$

The existing chlorination equipment is located in a small concrete masonry block building adjacent to the pipeline from the springs. The injector is buried in the ground outside of the building, and must be dug up to maintain the solution feed system, making maintenance difficult. The ventilation system in the chlorine building does not meet current standards.

9. CULINARY WATER SOURCE MASTER METERS

Nephi City's main source meters are worn out, difficult to maintain, frequently out of service, and are not SCADA compatible. These meters will be replaced with new ultrasonic meters. The meters will include electronic outputs to be used by the SCADA system to record individual source output flows, total system flow and for control of other system functions. New source meters will be located centrally at the chlorination building for all sources except the Worwood Well, which will be located in the Worwood Well building.

Chlorine gas inside the existing chlorine building represents a severe health hazard to the public if it is not properly controlled. The building is not fenced, and since it is located next to the tank access road, it is subject traffic damage and vandalism. The building suffered significant structural damage when it was hit by a vehicle during the planning phase of this project.

In addition, the Jones Well, Equipment Shed Well, and the East Tank overflow can supply water to the pond for the secondary irrigation system owned by the local irrigation company, and to the golf course. Water from the culinary wells is exchanged for "better tasting" water from Bradley Springs, which, during the summer irrigation season, belongs to the irrigation company. A valve lineup is required for the culinary wells to pump to the irrigation pond and the golf course. The Jones Well is normally lined up to the irrigation system and to the golf course, while the Equipment Shed Well is normally lined up to send water to the culinary water tank.

Due to its vulnerability, noted structural damage, and other inadequacies identified, the existing chlorination building will be removed and replaced with a structure located inside of the tank site fence as part of this project. All culinary sources except the new Worwood Well will be piped through the new chlorination structure and then to the East Tanks.

New ultra-sonic meters will be installed in the pipelines from the culinary water sources to the irrigation system in the existing meter vaults. There is an existing 0—2200 gpm KROHNE magnetic flow meter that reads all water pumped to the golf course in the golf course pump building. This meter sends a 4-20 ma signal to a readout in the system control panel, and therefore can be accessed for input to the SCADA system. It is in good condition and will not be replaced. All of the new meters reading culinary system source flows and those to reading flows to the irrigation system and golf course will be monitored by the SCADA system. These meters, along with individual service meters should allow the operators to accurately monitor water into and out of the culinary system in compliance with the Rules.

The amount of chlorine required per day varies with the amount of water used. If the required chlorine residual can be maintained throughout the system, the amount of chlorine actually used may be significantly reduced. If the system demands are reduced and the pumps are not running continuously, the required amount of chlorine required will be reduced accordingly.

The Rules require that chlorination systems be designed to provide a minimum concentration of 2 ppm (2 mg/l) while meeting peak demands. The calculations below assume peak flow from all sources for 24 hours per day and are based on Regal brand chlorinator data. The Regal brand, or approved equal chlorinators are allowed.

$$\text{Pounds of Chlorine per day (ppd)} = V \times \text{Required Concentration in ppm} \times 0.012$$

East Chlorinator System at East Tank Site

Source	GPM Flow	Concentration	PPD
Equipment Shed Well	2000 gpm	2 ppm	48 ppd
Jones Well	2000 gpm	2 ppm	48 ppd
Fire Station Well	2000 gpm	2 ppm	48 ppd
Bradley Springs, (Combined)	2000 gpm	2 ppm	48 ppd
Marsh Springs	1000 gpm	2 ppm	24 ppd
Total =			216 ppd

10. GAS CHLORINATION DISINFECTION

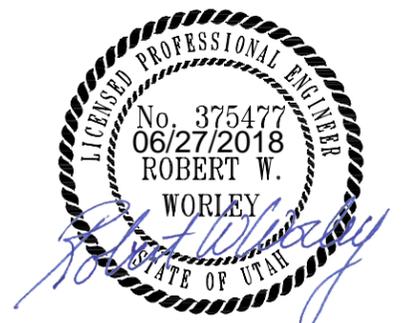
The Rules recommend that all culinary water sources have provisions for continuous disinfection. Nephi City currently has a chlorination system that allows disinfection of only its spring sources, but not the wells. Disinfection of the water from the wells is accomplished by estimating the amount of chlorine needed and manually increasing the chlorine injected into the spring water, which is then blended with well water before the water enters the tank. Disinfection contact time is 30 minutes and achieved in the 2,000,000 gallon tank. The calculation below shows that the disinfection contact time can currently be achieved when the tank is at 10% full.

$$2,000,000 \text{ gallons} \times 10\% = 200,000 \text{ gallons}$$

$$\text{Calculated Peak Day Demand} = 4422 \text{ gpm}$$

$$\text{Standard Chlorinator Required Size} = 250 \text{ ppd}$$

Differential pressure for operation of the chlorination system ejector in the new chlorination building at the east tank will be provided by a pump. The chlorination pump control panel will receive input from the SCADA system and the pump will run



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continuously unless there is no source supplying culinary water to the tank or power to the pump has been lost.

Chlorination Pump Selection for 250 ppd System

Assumption:

The Regal Chlorinator Manual requires 70 psig and 15.9 gpm at 10 psig back pressure at the ejector and 92 psi and 18.1 gpm at 20 psig back pressure at ejector. Since the maximum back pressure at the ejector will exceed 10 psig, but will be significantly less than 20 psig, to determine the correct pump it is assumed that the back pressure is 15 psig, the required pressure at the ejector is 80 psig and the required pump flow rate is 17.1 gpm.

Elevation of Tank Overflow	= 5349 ft.
Elevation 2' Above Chlorination Building Floor	= 5325 ft.
Elevation Head in Feet	= 24 ft.
Pressure at Pump Suction (and Ejector Outlet)	= 10.5 psi
Required Pressure at Ejector From assumption	= 80 psi
<u>Required Pump Pressure Increase</u>	<u>= 69.5 psi</u>
Chlorination Pump Discharge Head in Feet	= 160.5 ft
Required Flow Through Ejector From Mfr. Manual	= 17.1 gpm

Therefore East Tank Chlorination Pump should be a Grundfos CRI 3 - 8 or approved equal.

A manually adjustable gas flow-rate meter will be provided for each of the three well sources because the output from the wells will be a constant gpm value. The gas flow meters for the Combined Bradley Springs and for Marsh Springs will be Regal 7001 Smartvalve™ or approved equal, that will automatically adjust the chlorine dose rate proportional to the flow rate through the meter. Each gas flow meter will have a solenoid operated shut off valve in line with the gas flow-rate meter. The gas flow-rate meters in the chlorination building will supply chlorine gas to a common ejector in the common supply pipeline to the tanks.

As noted previously, each source coming into the new chlorination building will have its own ultra-sonic flow meter that will have an output sent to the SCADA system. The SCADA system will sense flow in the source pipeline(s) from the output of the mainline ultra-sonic flow meters. In addition to providing flow indication, flow records, etc., the flow signal will cause the gas flow meter solenoid valve for the respective source to energize and allow chlorine to be drawn into the system through the vacuum chlorine flow-rate meter and then into the water system through the chlorine ejector. When there is no flow through the ultrasonic meter for a particular source, the vacuum system solenoid valve for that source will remain de-energized and no chlorine will flow through that source's flow-rate meter. The flow-rate meters for individual sources will be manually set by the operator based on observed source flow rates.

Worwood Chlorinator at Worwood Well Building

Worwood Well chlorine dosage is calculated as follows:

Pounds of Chlorine per day (ppd) = V x Required Concentration in ppm x 0.012

Source	GPM Flow	Concentration	PPD
Worwood Well	1,100	2 ppm	26 ppd

Standard Chlorinator Required Size = 50 ppd

Differential pressure for operation of the chlorination system ejector in the Worwood Well chlorination building will be provided by a chlorination pump.

Chlorination Pump Selection for 50 ppd System

Assumption 1:

The total dynamic head with the well operating at 1,100 gpm will be 152 feet.

Assumption 2:

152 feet TDH is equal to 66.4 psig, which is close to 70 psig in the Regal Chlorinator Manual so 70 psig will be assumed in this calculation. 70 psig back pressure requires 129 psi and 20.3 gpm at the ejector.

Total Dynamic Head from well outlet to tank overflow in feet	= 152 ft.
Pressure at Pump Suction (and Ejector Outlet)	= 70 psi
Required Pressure at Ejector From assumption	= 129 psi
<u>Required Pump Pressure Increase</u>	<u>= 59 psi</u>
Chlorination Pump Discharge Head in Feet	= 136 ft
Required Flow Through Ejector From Mfr. Manual	= 20.3 gpm

Therefore Worwood Chlorination Pump should be a Grundfos CRI 5 - 6 or approved equal.

The chlorinator for the Worwood Well will not require a solenoid valve in the vacuum system. However, the well will be pumped at a variable rate to maintain a constant tank level in the South Tank as much as possible. Therefore the gas flow meter for the Worwood chlorination system will also be Regal 7001 Smartvalve™ or approved equal gas flow meter

The chlorination pump will be interlocked with the Worwood Well pump in the pump control panel. The chlorination pump will automatically start once the well has completed its pump to waste cycle and water is being pumped to the new South Tank, and shall run continuously unless the well pump shuts off, or power to the chlorination pump has been lost. When the chlorination pump is running, chlorine gas will be drawn through the gas flow meter and ejector into the pipeline to the tank.

The chlorination system will have dual platform scales for 150 lb. chlorine bottles at both the Chlorination Building at the East Tank and at the Worwood Well building. The scales will be located in the chlorine room. Each bottle on the scales will be connected to an automatic switchover chlorinator, which will recognize when the bottle is empty and automatically switch to the fresh bottle. The SCADA system will monitor the scales and



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provide indication of bottle weights. The SCADA system should send an alarm to the operators when one bottle is empty and there is 75 pounds or less of chlorine remaining in the second bottle. Each of the chlorine rooms will include bottle storage for a minimum of three additional 150 pound bottles.

There will be a chlorine alarm system at both sites. This system will provide a local alarm at the building when there is a chlorine gas leak and send a signal to the SCADA system, which will send a chlorine gas alarm for the respective building to the operators. Emergency air masks and chlorine leak detection kits will be available to allow the operators to locate and repair the leak.

11. WELL PUMPS

1. Fire House Well Pump System

The Fire House Well is a new replacement well, constructed by others. The well pump and motor, plumbing, building, electrical controls, etc. will be completed as part of this project. It is anticipated that the well pump and motor will be rated at 350 horsepower, matching the existing Jones Well and Equipment Shed wells, but depending on final pump testing the required pump and motor may be different.

The Fire House Well pump shall be started and controlled using a Variable Frequency Drive (VFD). The pump will be able to be manually started either remotely, via the SCADA system, locally at the pump control panel, or in an automatic mode controlled by the SCADA system. The operators will also be able to monitor operation, start, stop, control motor speed and observe output flow, historic flows, motor run hours, start and stop history, etc. using the SCADA system at the HMI and on local tablets and devices.

The SCADA system will provide inputs to the well pump VFD pump control panel from the existing Blue Tank and/or the new East Tank level, the flow meter in the east tank chlorination building, and from the well level transmitter.

When the tank level reaches a pre-determined low level set point, the well pump will be started automatically subject to SCADA priority and control, following the normal startup sequence, and pump water to the tank. When tank level has recovered to a pre-determined level, the pump will go into its normal shutdown cycle. During periods of low demand, the SCADA system will also be programmed to start the well and let it run for a pre-determined time at a pre-determined interval to keep the water in the pipelines fresh and the system in an operable condition.

A level transmitter will be installed in the well. The SCADA system will monitor and provide indication of well level. The transmitter will provide control input to the VFD to maintain a minimum water level above the pump bowls as required to protect the pump from damage. The operators will be able to select the minimum level above the bowls. Once the pump reaches minimum speed as controlled by the VFD, and the well level above the pump bowls continues to fall to a predetermined minimum set point, the Pump Control Panel will stop the pump and prevent it from restarting until the well level recovers to a preset level as determined by the operators.

The VFD pump control panel will also control pump to waste output to prevent the pump from operating beyond its design parameters due to the decreased head during pump to waste compared to the head when the pump is pumping to the tank. In conjunction with

the VFD during pump to waste cycles, the pump to waste discharge pipeline includes a flow limiting orifice to provide back pressure on the discharge side of the deep well pump control valve. During initial startup, the VFD frequency during the pump to waste cycle will be set so that the pressure upstream of the well discharge check valve will closely match the calculated total dynamic head pressure to pump water from the well head to the tank. Controlling the discharge pumping rate is important to prevent stressing the aquifer by pumping at a significantly higher rate with a lower discharge head pressure when the well is started, which could result in damage to the well.

The well pump is lubricated by the water in the system piping downstream from the pump discharge check valve. During normal startup, a solenoid operated valve controlled by the pump control panel will open, allowing water from the pump discharge pipeline downstream of the check valve to lubricate the pump bearings for a predetermined amount of time. The SCADA system will indicate that the pre-lube solenoid valve is energized (open). After the bearings have been lubricated, the pump control panel will energize the motor to start the pump and simultaneously deenergize and shut the pre-lubrication solenoid valve. The SCADA system will indicate that the pre-lube solenoid valve is deenergized (shut), and it will indicate that the well pump is running. The VFD pump control panel will be programmed to ramp the speed of the motor up slowly when the pump is started to reduce the electrical surge.

The pump will discharge through the deep well pump control valve. A time delay circuit in the pump control panel starts to countdown while the pump control valve is in the open position and the pump discharges to waste in the adjacent stream channel. The well will pump to waste for a predetermined period of time, keeping rust and mud produced during startup out of the tank. Once the time delay for the pump to waste cycle is complete, a relay in the pump control panel will energize the deep well pump control valve solenoid causing the pump control valve to begin to slowly shut. As the deep well pump control valve shuts, pressure will increase on the well discharge check valve causing it to slowly open, sending water to the storage tanks.

When the predetermined high level setpoint is reached in the tank, the SCADA system will send a shutdown signal to the pump control panel and the pump will go into its normal shutdown sequence. The deep well pump control solenoid will be de-energized, causing the valve to slowly open and the discharge check valve to slowly shut. The well pump will continue to run until the pump control valve is fully open, as indicated by a limit switch on the valve, at which time the pump control panel will de-energize the pump motor, and the pump control panel will automatically reset allowing the pump start normally subject to SCADA control when the tanks again calls for water.

In the event of loss of power to the pump while it is running, the discharge check valve will rapidly shut as the motor spins down. The surge anticipation valve will sense a momentary negative pressure and will open, preventing or limiting the resulting pressure surge. The pump control panel will automatically reset allowing the pump start normally, subject to SCADA control, when power is restored.

2. Worwood Well Pump System

The Worwood Well is a well that was privately constructed to DDW standards. The well was purchased by Nephi City during design of this project and is approximately 13 years old. The Worwood Well was pumped for 24 hours at 1,100 gpm with a drawdown of 78



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feet from its starting static level of 128 feet below ground surface. This will require a pump and motor rated at 150 horsepower to pump 1100 gpm to the South Tank.

The Worwood Well pump will be started and controlled using a Variable Frequency Drive (VFD). The pump will be able to be manually started either remotely, via the SCADA system, locally at the pump control panel, or in an automatic mode controlled by the SCADA system. The operators will also be able to monitor operation, start, stop, control motor speed and observe output flow, historic flows, motor run hours, start and stop history, etc. using the SCADA system at the HMI and on local tablets and devices.

During the pump test using a diesel engine to pump the well, the well pumps started at approximately 900 gpm and then ramped up to 1,100 gpm quickly. At 1,100 gpm, the well required approximately 2 hours to clear up to meet turbidity requirements. At the start, the water was rusty brown and had a sand content of 300 parts per million (ppm). After 2 hours sand production had decreased to 20 ppm and the turbidity was estimated to be less than the Drinking water maximum limit of 5 NTU. The sand content decreased continually over the 24 hour test, until at the end of the test the sand production was down to 10 PPM. To decrease sand production and extend pump life, the finished well will include a Lakos, or approved equal, down hole pump protection sand separator.

The SCADA system will provide inputs to the VFD pump control panel from the new South Tank level, and the flow meter in the Worwood Well Building.

The well pump will normally be lubricated by the water from the system piping downstream from the pump discharge check valve. The well pump lubrication line will include a tee with a plugged threaded connection so that lubrication can be provided from an outside source for initial startup or, if necessary, after the discharge pipeline has been drained for maintenance.

During a normal startup cycle, a solenoid operated valve controlled by the pump control panel will open, allowing water from the pump discharge pipeline downstream of the check valve to lubricate the pump bearings for a predetermined amount of time. The SCADA system will indicate that the pre-lube solenoid valve is energized (open). After the bearings have been lubricated, the pump control panel will energize the motor to start the pump and simultaneously deenergize and shut the pre-lubrication solenoid valve. The SCADA system will indicate that the pre-lube solenoid valve is deenergized (shut), and it will indicate that the well pump is running. The VFD pump control panel will be programmed to ramp the speed of the motor up slowly when the pump is started to reduce the electrical surge.

Under normal start conditions, the well will start and pump to waste until the water is clear. The VFD pump control panel will control pump to waste output to prevent the pump from operating beyond its design parameters. During the pump to waste cycle, a pressure transmitter upstream of the pump to waste valve will control the output of the pump to maintain pressure at a minimum of 15 psi below the pressure on the discharge side of the check valve.

During system startup at the end of construction, the VFD frequency during the pump to waste cycle will be determined and set so that the pump to waste discharge rate will not exceed 1,150 gpm. Controlling the discharge pumping rate is important to prevent stressing the aquifer by pumping at a significantly higher rate at a lower discharge head

pressure when the well is started, which could result in significantly increased sand production and damage to the well.

During the pump to waste cycle, the output of the pump will discharge through the deep well pump control valve. The duration of the pump to waste cycle shall be controlled by an automatic timer relay in the pump control panel that can be adjusted up to 3 hours. The time delay circuit starts to countdown while the pump control valve is in the open position and the pump discharges to waste in a pond adjacent to the well building. The well will pump to waste for a predetermined period of time, keeping rust, sand, and mud produced during startup out of the tank. Once the time delay for the pump to waste cycle is complete a relay in the pump control panel will energize the deep well pump control valve solenoid causing the pump control valve to begin to slowly shut. As the deep well pump control valve shuts, pressure will increase on the well discharge check valve causing it to slowly open, sending water to the storage tank.

The SCADA will then control the pump output based on the level in the tank to maintain a consistent level during system operation. If the tank level is continuing to increase when the pump is at minimum safe operating speed, the pump will continue to run at minimum speed until the tank reaches the high level alarm set point and begins to overflow. In this condition, the SCADA will send an alert to the operators. The operators will then have the option to take action. The action can be to either shut the well pump off or to allow the tank to overflow. If no action is taken by the operators, the tank will overflow for a predetermined amount of time. Once that time limit is reached, the SCADA system will send a command to shut down the well pump. Once the pump is shut down, it will remain off line until the tank level reaches a pre-determined low level set point, at which point the pump will start automatically, following the normal startup sequence, and pump water to the tank.

During periods of low demand, the SCADA system can be programmed to start the well and let it run for a pre-determined time at a pre-determined interval to keep the water in the pipelines fresh and the system in an operable condition.

In the event of loss of power to the pump while it is running, the discharge check valve will rapidly shut as the motor spins down. The surge anticipation valve will sense a momentary negative pressure and will open, preventing or limiting the pressure surge. The pump control panel will automatically reset allowing the pump start normally subject to SCADA control when power is restored.

3. Equipment Shed Well Pump System

The soft start pump control panel for the Equipment Shed Well will be replaced with a VFD pump control panel as part of the project. The existing well pump and motor is rated at 350 horsepower. The Equipment Shed Well pump shall be started and controlled using the new VFD control panel. The pump will be able to be manually started either remotely, via the SCADA system or locally at the pump control panel, or in an automatic mode controlled by the SCADA system. The operators will also be able to monitor operation, start, stop, control motor speed and observe output flow, historic flows, motor run hours, start and stop history, etc. using the SCADA system at the HMI and on local tablets and devices.

The SCADA system will provide inputs to the well pump VFD pump control panel from the existing Blue Tank or the new East Tank level, and the flow meter in the east tank



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chlorination building. When the tank level reaches a pre-determined low level set point, the well pump will be started automatically subject to SCADA priority and control, following the normal startup sequence, and pump water to the tank. When tank level has recovered to a pre-determined level, the pump will go into its normal shutdown cycle. During periods of low demand, the SCADA system will also be programmed to start the well and let it run for a pre-determined time at least once per month to keep the water in the pipelines fresh and the system in an operable condition.

The VFD pump control panel will start the well at a reduced frequency during the pump to waste cycle to prevent the pump from operating beyond its design parameters due to the decreased head during pump to waste compared to the head when the pump is pumping to the tank.

As described for the New Fire House Well, the existing Equipment Shed Well pump is lubricated by the water in the system piping downstream from the pump discharge check valve. During normal startup, the existing solenoid operated pre-lube valve, controlled by the new VFD pump control panel will open, allowing water from the pump discharge pipeline downstream of the check valve to lubricate the pump bearings for a predetermined amount of time. The SCADA system will indicate that the pre-lube solenoid valve is energized (open) After the bearings have been lubricated, the new VFD pump control panel will energize the motor to start the pump and simultaneously deenergize and shut the pre-lubrication solenoid valve. The SCADA system will indicate that the pre-lube solenoid valve is deenergized (shut), and it will indicate that the well pump is running.

The VFD pump control panel will be programmed to ramp the speed of the motor up slowly when the pump is started to reduce the electrical surge more effectively than the existing soft start controller. The pump will discharge through the existing deep well pump control valve. A time delay circuit in the new VFD pump control panel starts to countdown while the pump control valve is in the open position and the pump discharges to waste in the adjacent stream channel. The well will pump to waste for a predetermined period of time, keeping rust and mud produced during startup out of the tank. Once the time delay for the pump to waste cycle is complete a relay in the pump control panel will energize the deep well pump control valve solenoid causing the pump control valve to begin to slowly shut. As the deep well pump control valve shuts, pressure will increase on the well discharge check valve causing it to slowly open, sending water to the storage tanks.

When the predetermined high level setpoint is reached in the tank, the SCADA system will send a shutdown signal to the pump control panel and the pump will go into its normal shutdown sequence. The deep well pump control solenoid will be de-energized causing the valve to slowly open and the discharge check valve to slowly shut. The well pump will continue to run until the pump control valve is fully open, as indicated by a limit switch on the valve, at which time the pump control panel will de-energize the pump motor, and the pump control panel will automatically reset allowing the pump start normally subject to SCADA control when the tanks again call for water.

In the event of loss of power to the pump while it is running, the discharge check valve will rapidly shut as the motor spins down, resulting in a pressure surge, as is the current condition. The new VFD pump control panel will automatically reset allowing the pump to start normally subject to SCADA control when power is restored.

4. Jones Well Pump System

The irrigation company owns the water from the Bradley Springs during the high demand summer months, and the City owns the rights during the winter months. According to City residents, water from Bradley Springs tastes better than the water from the City's wells, therefore the irrigation company and the City trade water during the summer months. The City uses the output from the Jones well, along with normal tank overflow, to supply the irrigation pond, and the water from Bradley Springs and Marsh Spring is diverted into the tanks. The amount of water exchanged has been only estimated in prior years, but more accurate measurements of actual water exchanged will be available once the new meter systems and the SCADA system are online.

The Jones Well pump and motor is a 350 horsepower system. The soft start pump control panel for the Jones Well will be replaced with a VFD pump control panel as part of the project. The Jones Well pump shall be started and controlled using the VFD control panel. The pump will be able to be manually started locally or remotely through the SCADA system. The operators will also be able to monitor operation, start, stop, control motor speed and observe output flow, historic flows, motor run hours, start and stop history, etc. using the SCADA system at the HMI and on local tablets and devices.

As described for the New Fire House Well, the existing Jones Well pump is lubricated by the water in the system piping downstream from the pump discharge check valve. During normal startup, the existing solenoid operated valve controlled by the new VFD pump control panel will open, allowing water from the pump discharge pipeline downstream of the check valve to lubricate the pump bearings for a predetermined amount of time. After the bearings have been lubricated, the new VFD pump control panel will energize the motor to start the pump and simultaneously deenergize and shut the pre-lubrication solenoid valve. The VFD pump control panel will be programmed to ramp the speed of the motor up slowly when the pump is started to reduce the electrical surge more effectively than the existing soft start controller.

At some time in the past, the deep well pump control valve and associated plumbing for the Jones Well was removed from the system. As a result, the output of the well goes directly to the irrigation pond when the pump is started. Each time the well is stopped, there has been no way to stop the check valve from slamming and causing a pressure surge in the system. Under normal conditions, the VFD pump control panel will be programmed to ramp the speed down slowly to allow the check valve to close slowly, which should reduce the severity of the pressure surges and reduce system wear and tear.

The output from the Jones Well can be diverted to the culinary water system if needed in an emergency, but a manual valve lineup and manual control of the pump will be required for this operation. The chlorinator building is plumbed to accept water from the Jones Well to the tank and the flow meter and chlorination system will automatically function when water is supplied from the Jones Well as it does for other sources to the tank.

During the irrigation off season (October to April) the operators currently take the Jones well out of service and drain the transmission pipelines between the pond and the well. In the future, if the operators decide to keep the system available for emergency service



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during the winter, the SCADA system will have the program capability and could be programmed to periodically start the well. If this operation plan is adopted, the periodic start should take place at a pre-determined interval and the pump should run for a pre-determined time, to keep the water in the pipelines fresh so that the Jones Well output can easily be routed to the culinary storage tanks. This operation plan could also be chosen to simplify restoration of the Jones Well to service in the spring for the irrigation system.

In the event of loss of power to the pump while it is running, the discharge check valve will rapidly shut as the motor spins down. This will result in the customary check valve slam that happens now, before modifications are completed, when the pump is manually shut down normally or during loss of power. The new VFD pump control panel will automatically reset allowing the pump to start normally when power is restored.

5. Fire House Well and Equipment Shed Well SCADA Interactions

With the pump control panels in automatic, the SCADA system will control the run time for the Fire House Well and the Equipment Shed Well. This system will allow one of the wells to be the primary and the other to be the backup supply to the tank one month and then the primary and backup rolls will be switched for the next month, ensuring that the run time will be roughly equal for each pump system. In addition, the SCADA system will include not only low and shut-off level controls but also low-low level, high level alarm -high level set points.

At the low level setpoint, the primary pump will start. If the tank level continues to fall to the low-low setpoint with the primary pump running, the SCADA control system will automatically start the backup well pump, and send an alarm signal to the operator that the tanks are at the low-low setpoint, which may require the operator to check the system. Both well pumps will run after the low-low set point has been achieved until they are either stopped manually by the operator, or the pre-determined pump shut-off level is achieved in the tank. Once the shut-off level is achieved or the pumps are manually stopped by the operator, the pumps will reset to the ready condition, and the primary pump will once again start automatically when the tank low level set point is reached.

The design of the new east tank includes two over flow funnels. The high level setpoint is set at the same elevation as the normal over flow funnel. When the tank level reaches the high level setpoint, the operator will be alerted that the tank is overflowing normally. If a well pump is also running, the SCADA will send the operator an alarm. The SCADA should stop the pump before it reaches the overflow elevation. If it is not stopped, the alarm will alert the operator to stop the pump manually to prevent waste of culinary well water when the tank is overflowing. The normal overflow condition can occur normally when a well pump is not running if spring flows exceed system demand.

The second, emergency, overflow in the new East Tank is much larger than the normal overflow, and it is set 6 inches higher than the normal overflow. This level should only be achieved during exceptionally high spring flow conditions with wells supplying water to the tanks when they should be shut off. If the tank level reaches the high-high level setpoint, an alarm signifying an emergency condition will be sent to the operator to stop the pumps manually, to prevent potential damage to the tanks.

12. UPPER AND LOWER BRADLEY SPRINGS TO BE COMBINED

The pipeline from the Lower Bradley Spring to the tank is a wrapped steel pipe and is in poor condition. Leaks frequently developed in this pipeline and a decision was made to combine the Lower Bradley Spring output with the output of the Upper Bradley Spring in the 16 inch penstock pipeline to the power plant, which is in better condition. The 3 miles of existing steel pipeline from lower Bradley Springs to the vault where the pipeline combines with the output of Marsh Spring will be abandoned.

The dilapidated concrete vault where the existing Lower Bradley Spring pipeline is connected to the pipeline from Marsh Springs will be removed from service. The existing pipeline below the Marsh Spring vault will remain in service for the present time, delivering the output of Marsh Springs to the East Tanks.

Combining the Lower and Upper Bradley Springs will require construction of a new head box for the power plant. The new head box will be lower in elevation than the existing headbox, but with the additional volume of water from Lower Bradley Spring, the power plant output will not be significantly impacted by the slightly lower pressure head.

The new head box that will be located at Lower Bradley Spring will have a 6 foot operating level band, which is the same as the band in the old head box at Upper Bradley Spring. However, the control volume in the new head box will be approximately double that of the existing head box. The head box level will be measured by a solar powered level sensor. The level data will be transmitted to the SCADA system by a solar powered radio transmitter and repeaters as needed. This signal will be used at the power plant to maintain peak operating efficiency for the system.

13. TANK LEVEL CONTROLS

The new tanks will include level transducers which will be used by the SCADA system to provide level indication in the tanks and for well control functions. The controls are similar for both the new East Tank and the New South Tank. In addition to providing level indication, the level transmitters will provide input to the SCADA system to start and stop the well pumps and to provide notifications to the operators when tank levels are outside of the normal control bands.

The normal SCADA control levels for the new South Tank include a low level setpoint that causes the well pump to start, and a pump shut off level setpoint that tells the well pump to stop. Once the Worwood Well pump is up and running the SCADA system shall use the level transducer in the tank to control the level in the tank and the output of the pump within a control band on the tank. The SCADA system will provide an alarm signal when the tank level reaches the pre-determined low-low level setpoint to alert the operators that an abnormal condition exists and that the tank is not being refilled, and the well should be started. The SCADA system will provide an alarm signal when the tank level reaches the pre-determined high level setpoint generally set at or near the overflow level to alert the operators that the tank is approaching its overflow point and the well pump needs to be manually stopped.

A float switch will be provided in the South Tank at the overflow elevation to provide a backup signal to the SCADA system to stop the pump and notify operators of a potential faulty level transducer. A second float switch will be provided at the low-low level alarm elevation to provide a backup signal to the SCADA system to start the Worwood Well pump and notify operators of a potential faulty level transducer.



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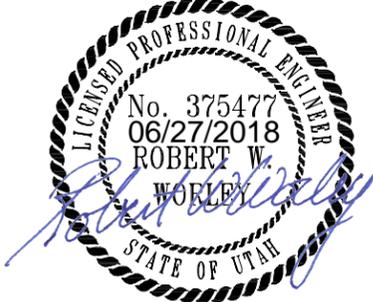
The normal SCADA control levels for the new East Tank are similar to the new South Tank. These include a low level setpoint that causes the appropriate well pump to start, and a pump shut off level setpoint that tells the well pump to stop. At the low-low level setpoint, the SCADA control system will automatically start the backup well pump, and send an alarm signal to the operator that the tanks are at the low-low setpoint, which may require the operator to check the system. Well pumps will run after the low-low set point has been achieved until they are either stopped manually by the operator, or the pre-determined pump shut-off level is achieved in the tank. The well pump will once again start automatically when the tank low level set point is reached.

One Level Transducer will be provided for each east tank. The transducers shall be identified as ES for the steel tank and EC for the concrete tank. Two transducers are provided for well control in case one tank is taken out of service for maintenance. The operator will select the transducer to control the pumps under normal conditions. If one transducer fails, the operator will select the second transducer to provide backup well pump control while the faulty transducer is being replaced. The SCADA system will monitor both transducers and provide an alert signal to the operator if there is an elevation difference greater than 6 inches between the two transducers, which may indicate a failure or pending failure of one of the transducers.

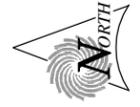
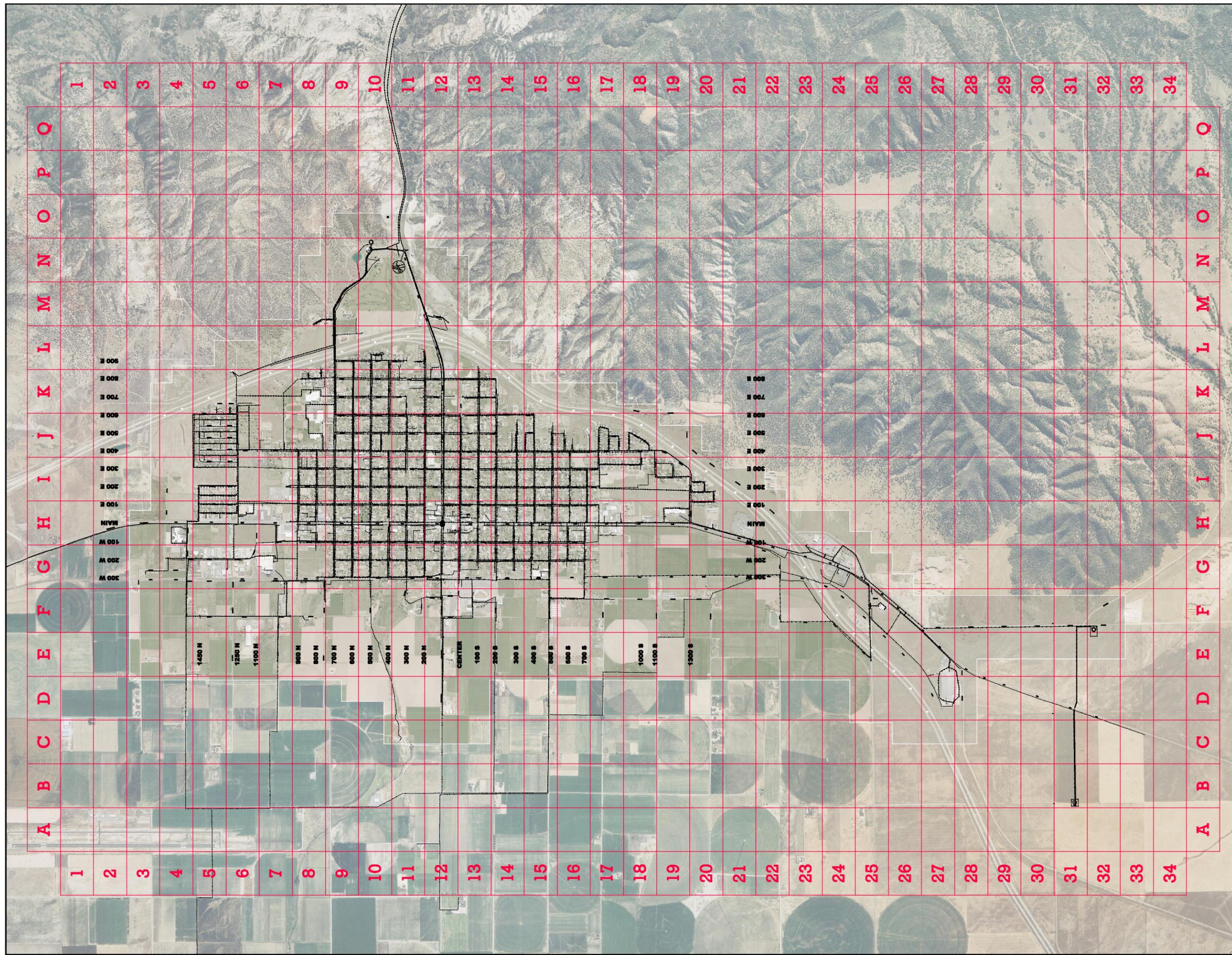
The design of the new east tank includes two overflow funnels. The high level setpoint is set at or near the same elevation as the normal over flow funnel. When the tank level reaches the high level setpoint, the operator will be alerted that the tank is overflowing normally. If a well pump is also running, the SCADA will send the operator an alarm. The SCADA should stop the pump before it reaches the overflow elevation. If it is not stopped, the alarm will alert the operator to stop the pump manually to prevent waste of culinary well water when the tank is overflowing. The normal overflow condition can occur in the East Tanks whether a pump is running or not spring flows into the tank exceed system demand.

The second, emergency, overflow in the new East Tank is much larger than the normal overflow, and it is set 6 inches higher than the normal overflow. A high-high level setpoint is reached when the tank level is at or near the elevation of the emergency overflow. This level should only be achieved during exceptionally high spring flow conditions with wells also supplying water to the tanks. If the tank level reaches this setpoint level, an alarm signifying an emergency condition will be sent to the operator to stop the pumps manually, to prevent potential damage to the tanks.

A float switch will be provided in the new concrete East Tank at the normal overflow elevation to provide a backup signal to the SCADA system to stop the well pumps and notify operators of a potential faulty level transducer. A second float switch will be provided at the low-low level alarm elevation to provide a backup signal to the SCADA system to start the back-up well pump and notify operators of a potential faulty level transducer.



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NEPHI CITY		
CULINARY WATER IMPROVEMENTS PROJECT 2018		
DESIGN CRITERIA		
SET NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 15	G15

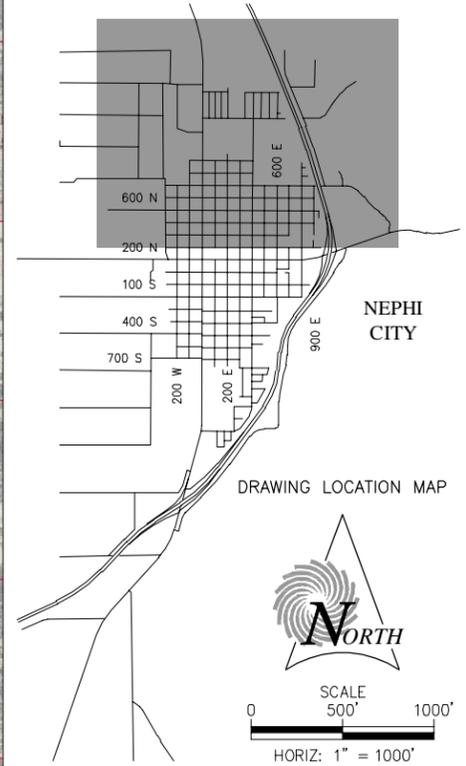
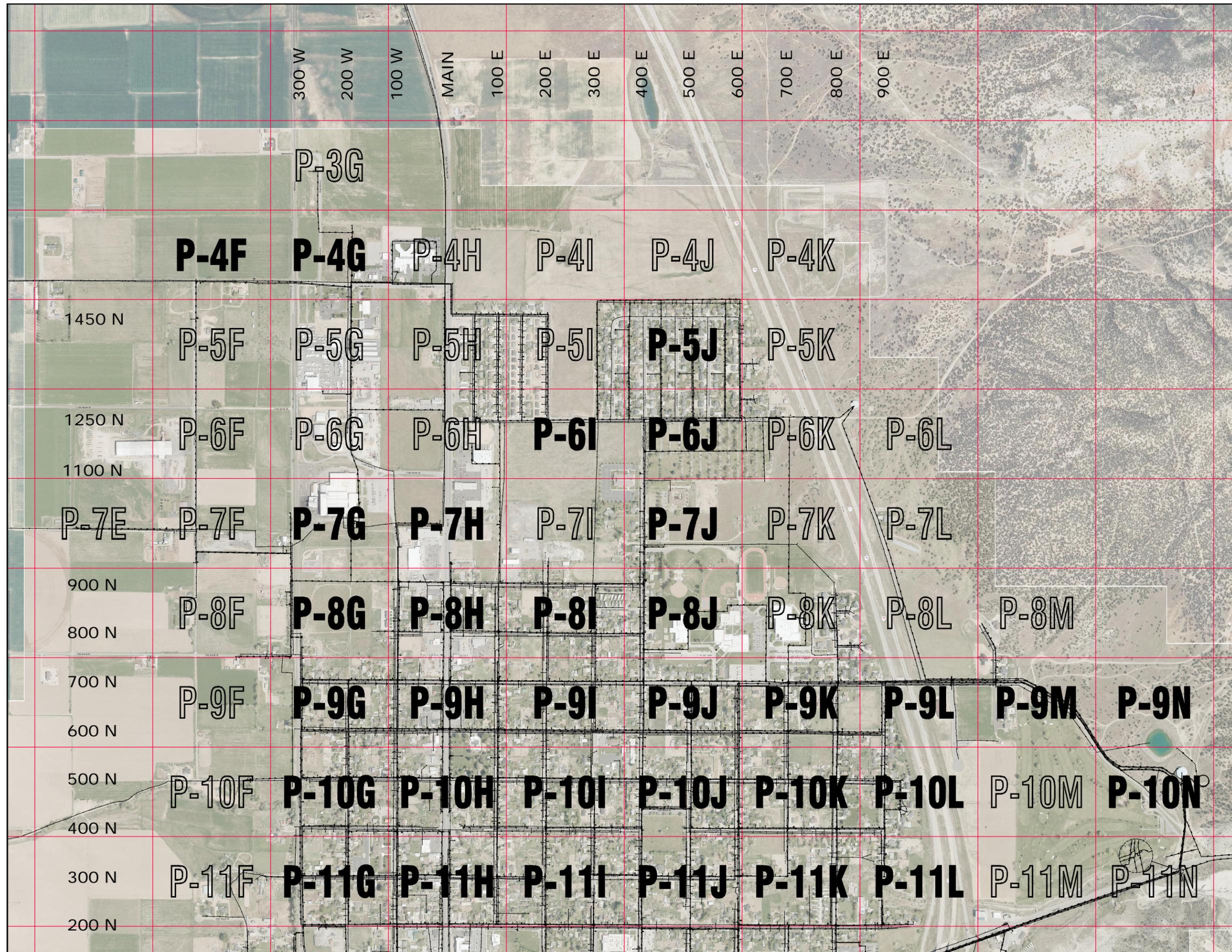


REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1		6-21-18

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CULINARY WATER IMPROVEMENTS PROJECT	
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PLAN SHEET GRID INDEX	

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 16	P-1
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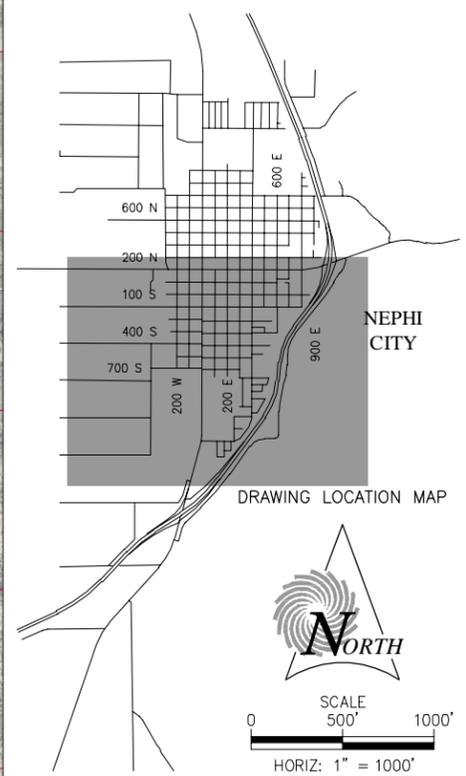
NOTE:
DRAWING NUMBERS IN BOLD TEXT ARE SHEETS WHERE WORK IS TO BE PERFORMED AND DRAWING NUMBERS IN OUTLINED TEXT ARE SHEETS WHERE NO WORK IS TO BE PERFORMED.



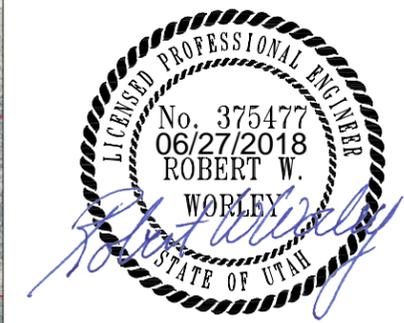
REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1		6-21-18

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25 EAST 500 NORTH FILLMORE, UTAH 84631 TEL 435.743.6151 / FAX 435.743.7900 www.sunrise-eng.com					
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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 17	P-2

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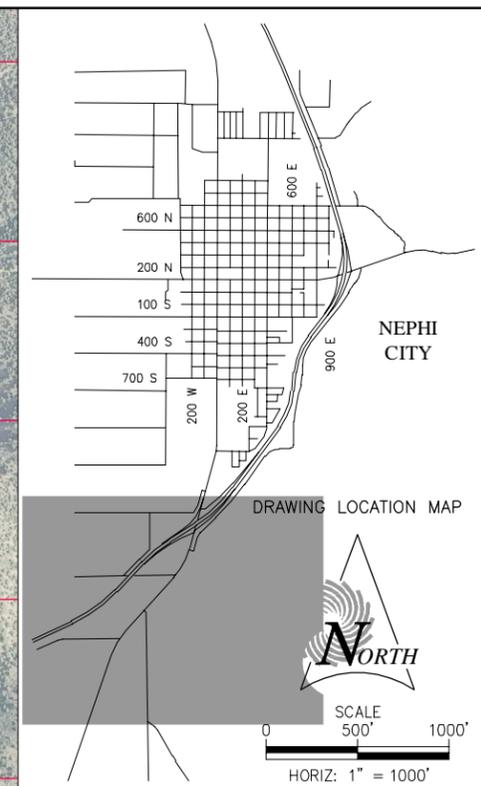
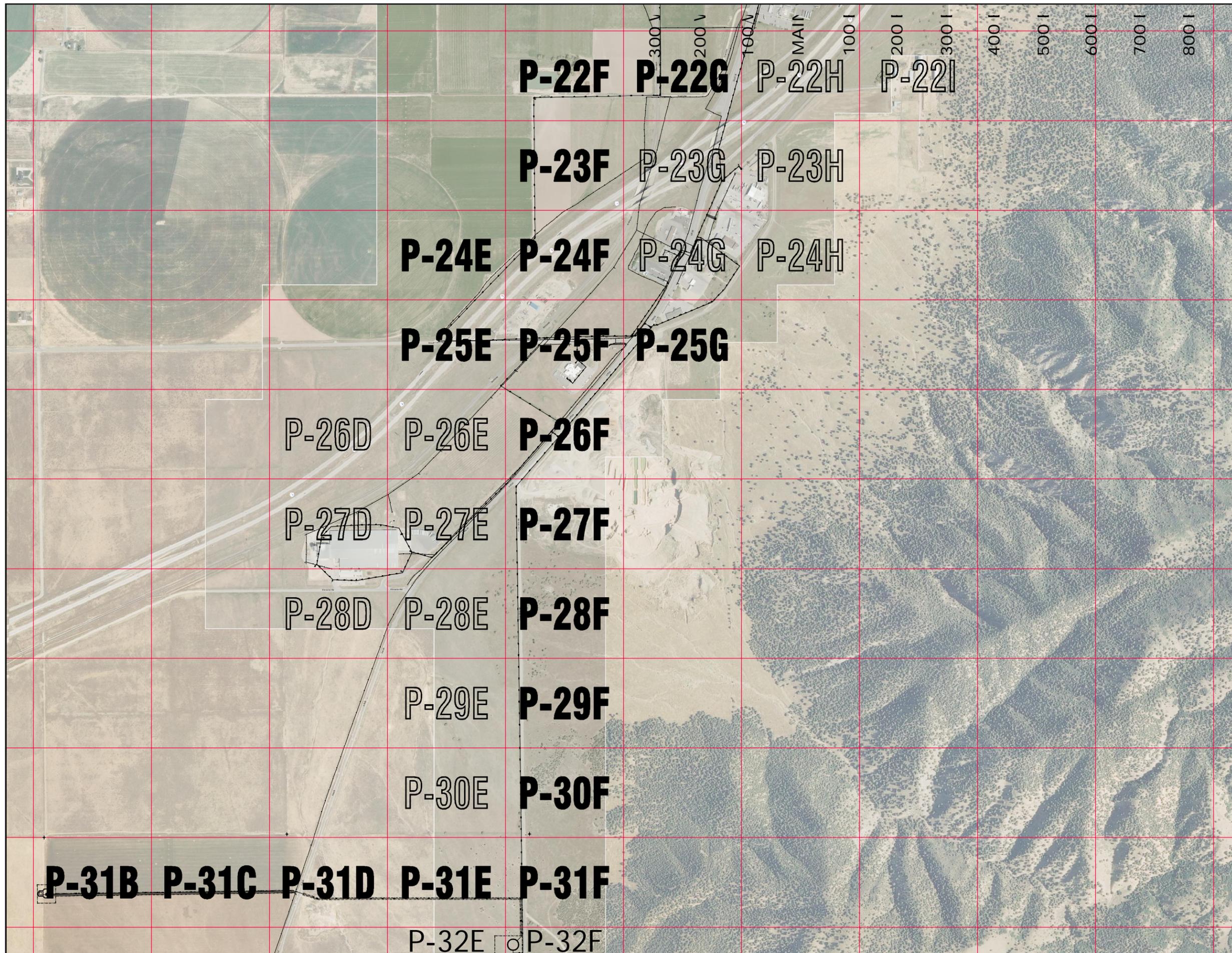
NOTE:
DRAWING NUMBERS IN BOLD TEXT ARE SHEETS WHERE WORK IS TO BE PERFORMED AND DRAWING NUMBERS IN OUTLINED TEXT ARE SHEETS WHERE NO WORK IS TO BE PERFORMED.



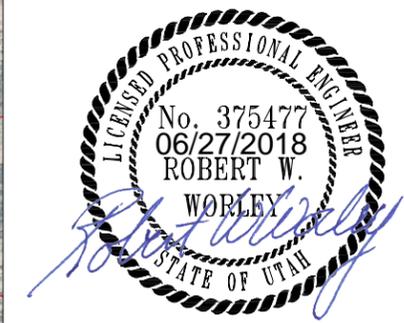
REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1		6-21-18

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<small>25 EAST 500 NORTH FILLMORE, UTAH 84631 TEL 435.743.6151 / FAX 435.743.7900 www.sunrise-eng.com</small>					
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2018 PLAN SHEET INDEX					
SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 18	P-3

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1	GENERAL REVISIONS FOR BIDS	6-21-18
	COMMENT	DATE



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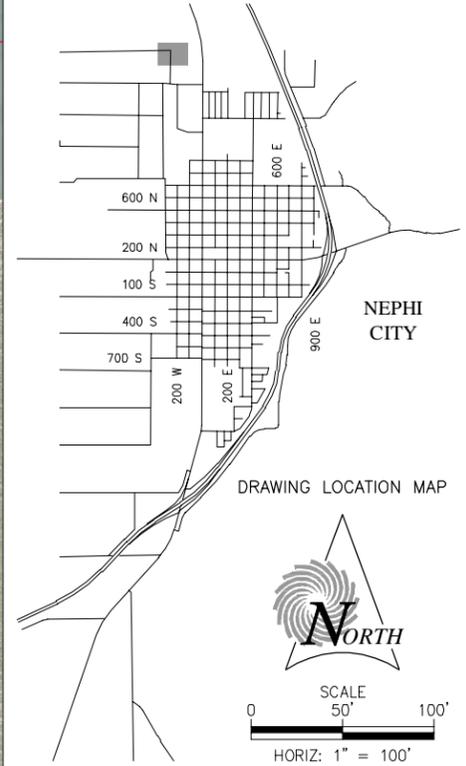
25 EAST 500 NORTH
FILLMORE, UTAH 84631
TEL 435.743.6151 / FAX 435.743.7900
www.sunrise-eng.com

NEPHI CITY

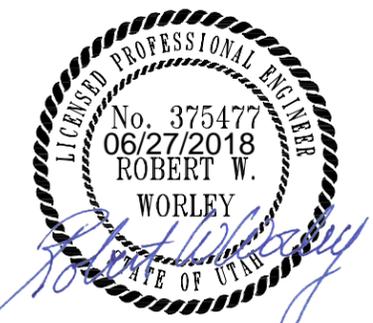
CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET INDEX

SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
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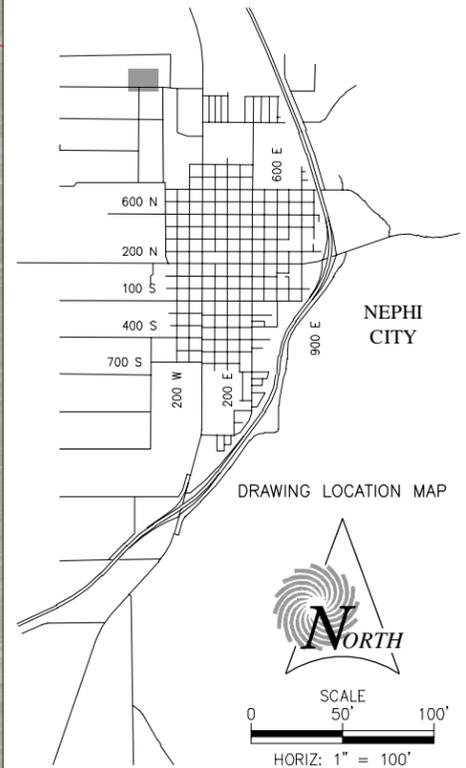
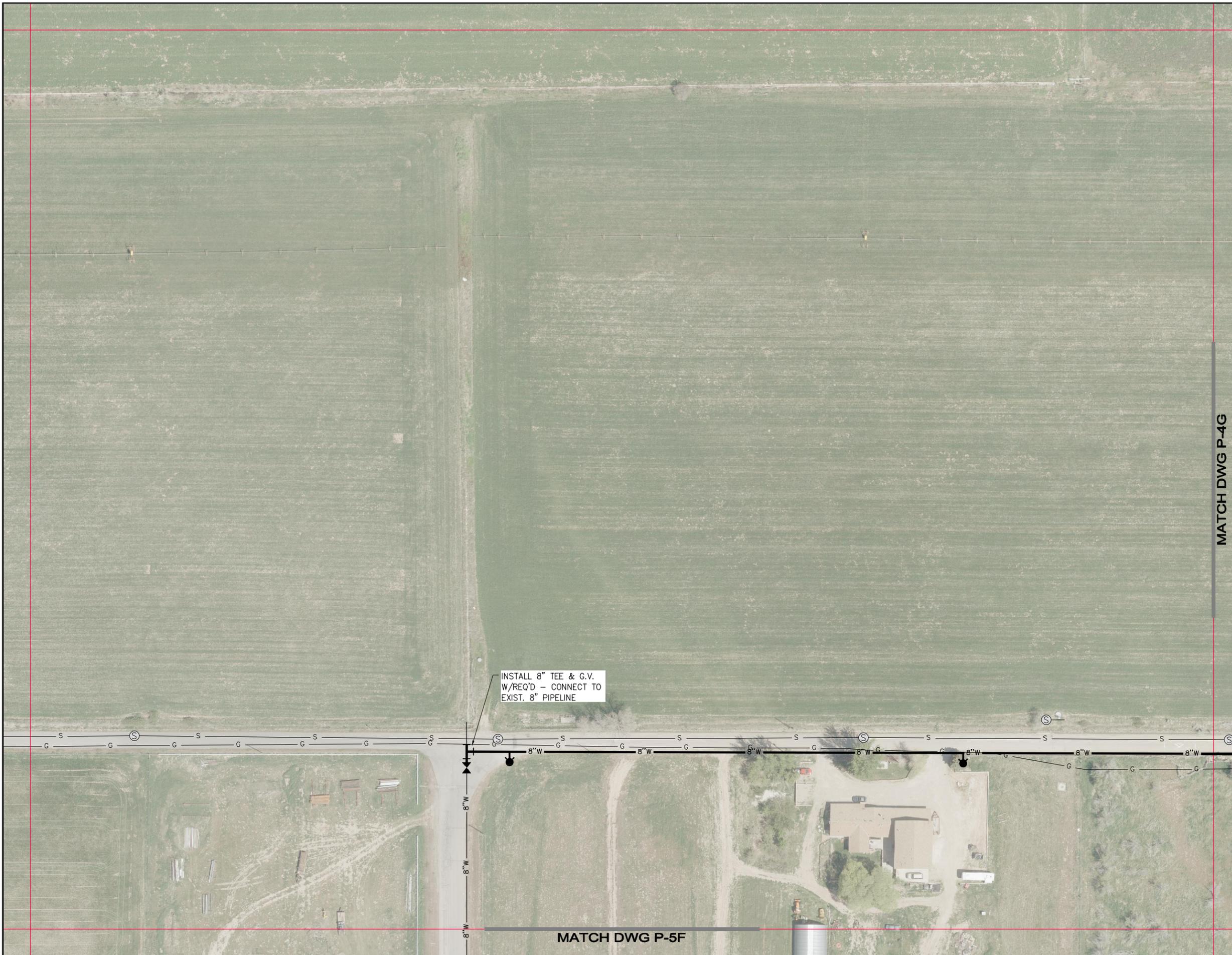
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2018
PLAN SHEET

SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	20	P-3G

MATCH DWG P-4G

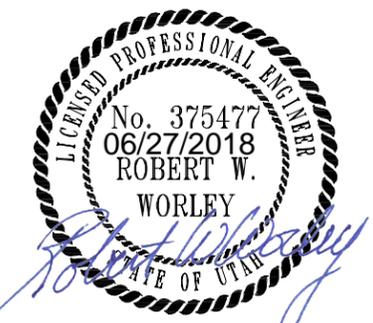
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MATCH DWG P-4G

LEGEND

- NEW CULINARY WATER PIPELINE ——— x" W ———
 - EXIST. CULINARY WATER PIPELINE ——— x" W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - - x" W - - - -
 - NEW METER SETTER ASSEMBLY (E/D2) [Symbol]
 - REPLACE EXIST. SERVICE CONNECTION (C/D2) (D/D2) [Symbol]
 - RECONNECT EXIST. SERVICE CONNECTION (A/D2) (B/D2) [Symbol]
 - NEW FIRE HYDRANT (F/D1) [Symbol]
 - REPLACE EXIST. FIRE HYDRANT (F/D1) [Symbol]
 - RECONNECT EXIST. FIRE HYDRANT (G/D1) [Symbol]
 - NEW GATE VALVE (F/D2) [Symbol]
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



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SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	SHEET NO.
05884	JCI	CJC	RWW	21	P-4F

MATCH DWG P-5F

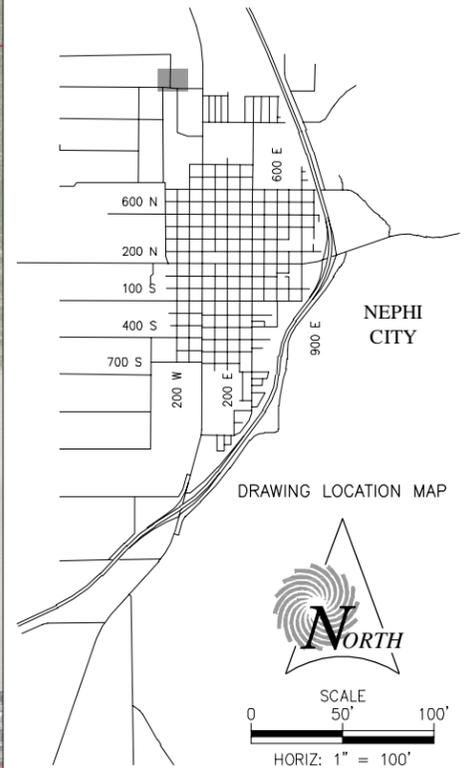
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MATCH DWG P-3G

MATCH DWG P-4F

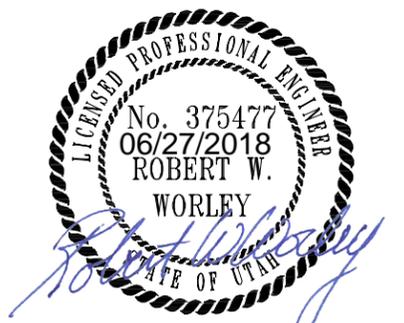
MATCH DWG P-4H

MATCH DWG P-5G



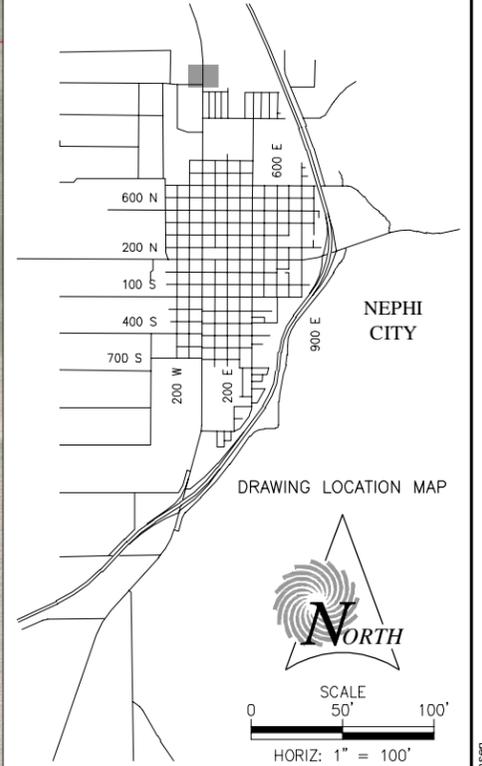
LEGEND

- NEW CULINARY WATER PIPELINE ——— 8"W ———
 - EXIST. CULINARY WATER PIPELINE ——— 8"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - 8"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) [Symbol]
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D D2) [Symbol]
 - RECONNECT EXIST. SERVICE CONNECTION (A B) (B A) [Symbol]
 - NEW FIRE HYDRANT (F D1) [Symbol]
 - REPLACE EXIST. FIRE HYDRANT (F D1) [Symbol]
 - RECONNECT EXIST. FIRE HYDRANT (G D1) [Symbol]
 - NEW GATE VALVE (F D2) [Symbol]
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND

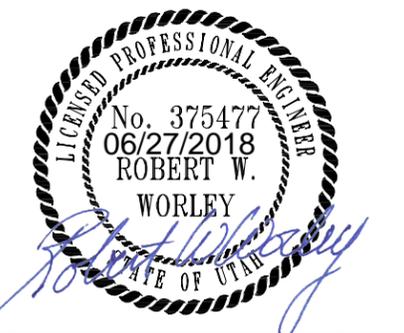


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SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 22	P-4G

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CULINARY WATER IMPROVEMENTS PROJECT

2018

PLAN SHEET

SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	SHEET
05884	JCI	CJC	RWW	23	P-4H

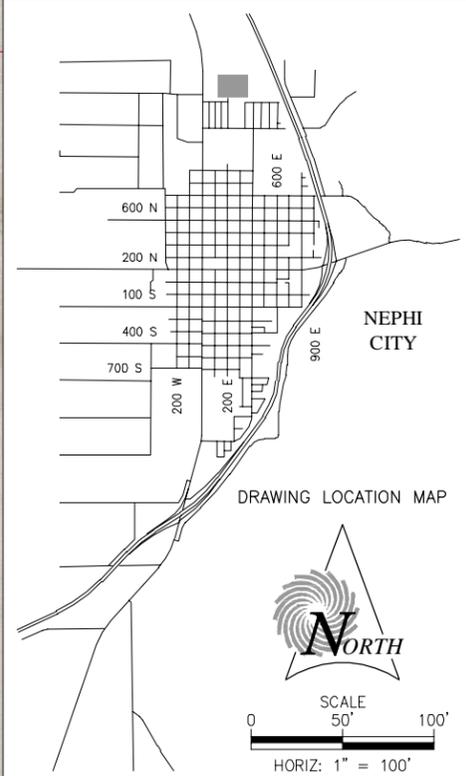
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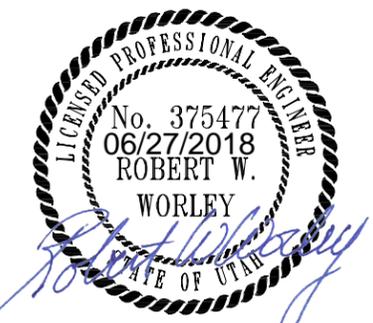
MATCH DWG P-4H

MATCH DWG P-4J

MATCH DWG P-5I



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CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET

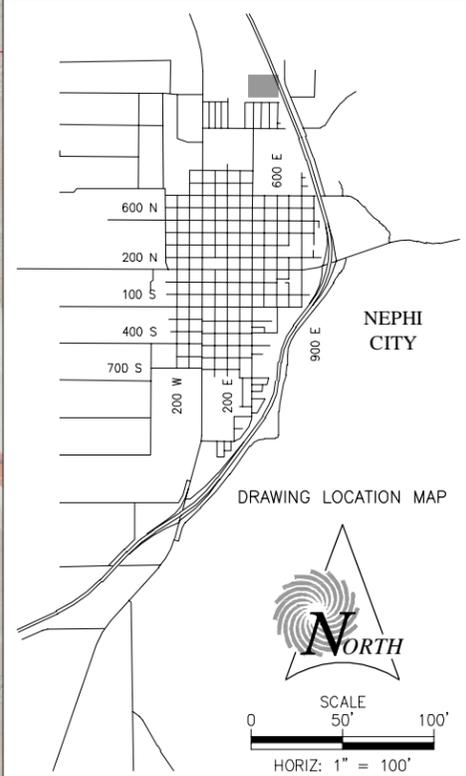
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05884	JCI	CJC	RWW	24	P-4I

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MATCH DWG P-4I

MATCH DWG P-4K



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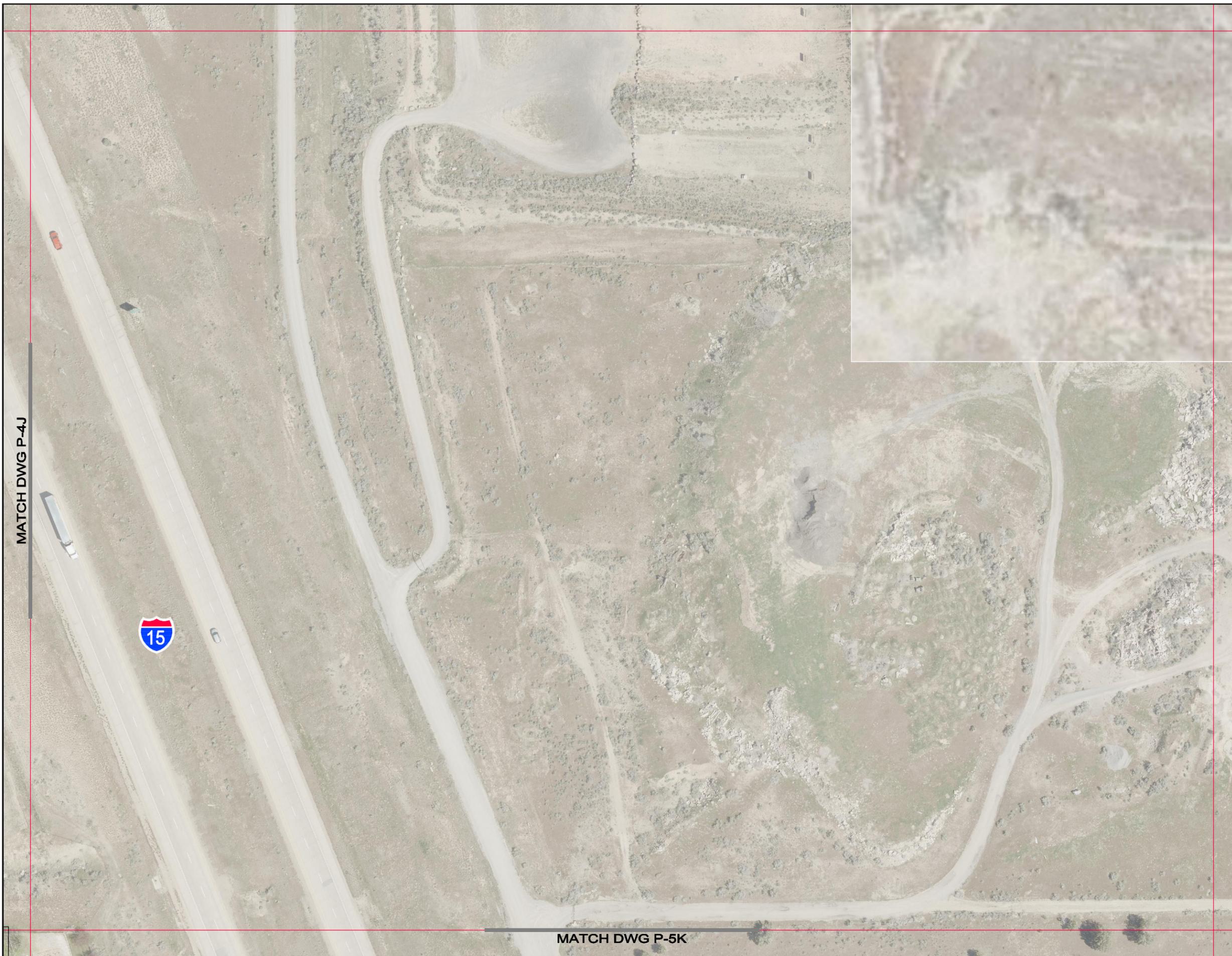


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CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET**

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 25	P-4J
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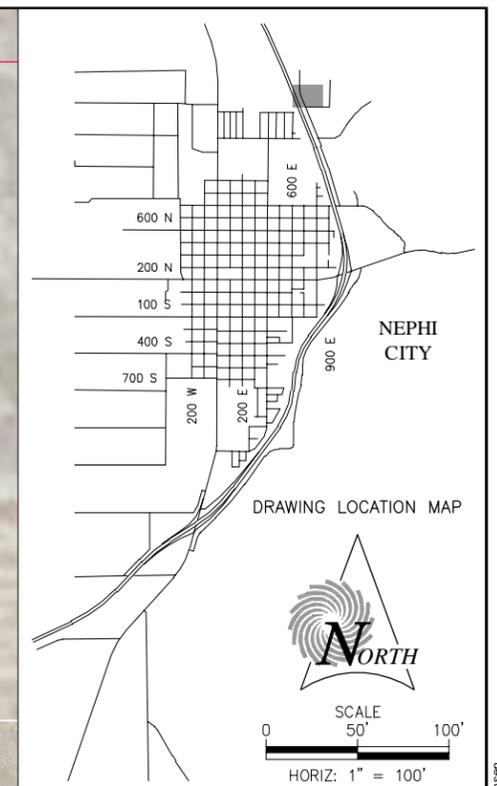
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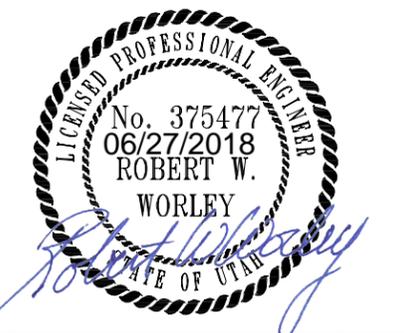


MATCH DWG P-4J

MATCH DWG P-5K



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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 26	P-4K
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MATCH DWG P-5F

300 West St

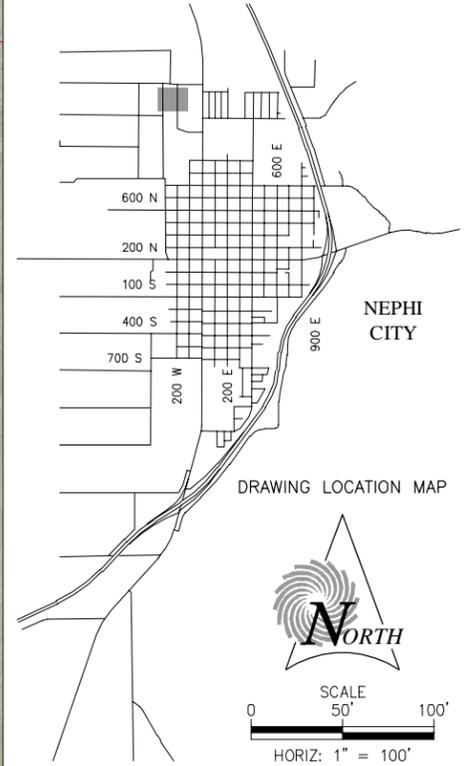
MATCH DWG P-4G

200 West St

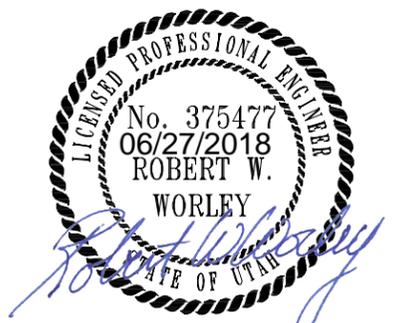
200 West St

MATCH DWG P-6G

MATCH DWG P-5H



NO WORK ON THIS SHEET



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1		6-21-18



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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 28	P-5G
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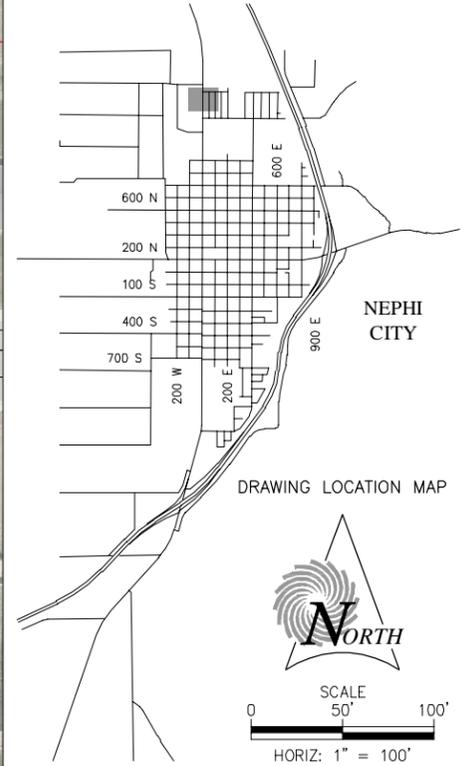
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MATCH DWG P-4H

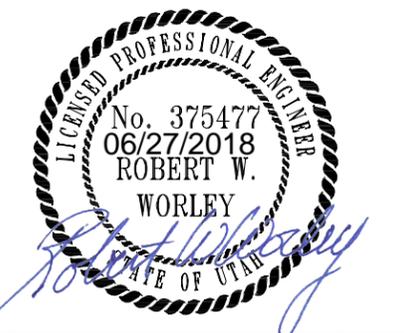
MATCH DWG P-6H

MATCH DWG P-5G

MATCH DWG P-5I



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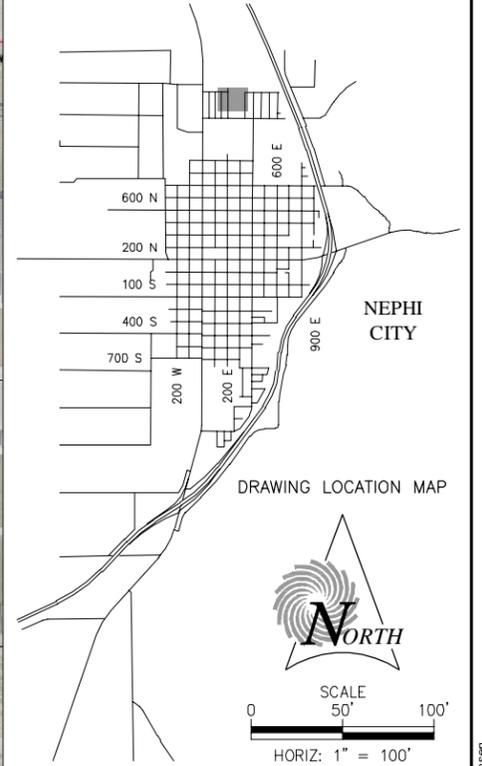
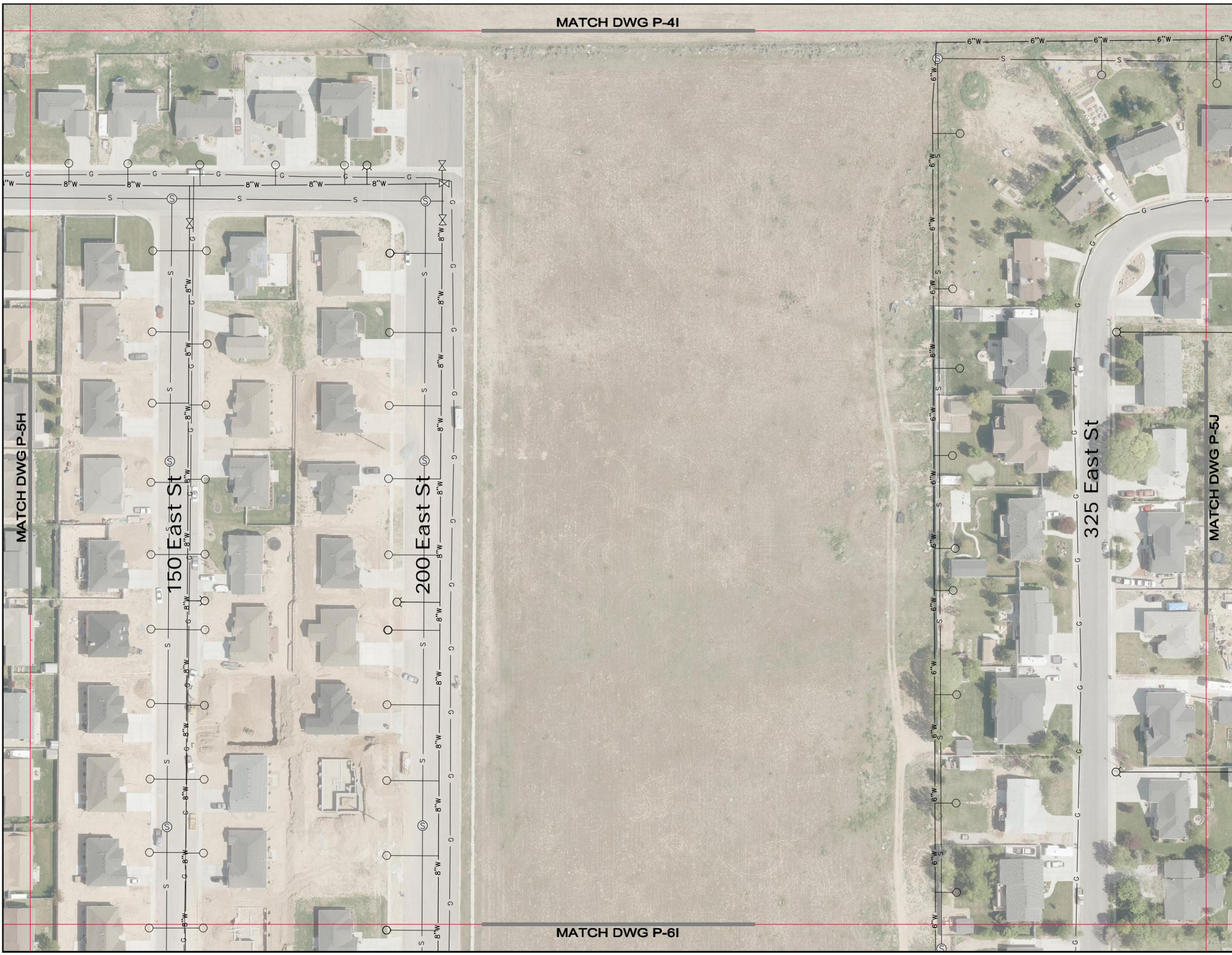
REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18

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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 29	P-5H

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MATCH DWG P-4I

MATCH DWG P-6I

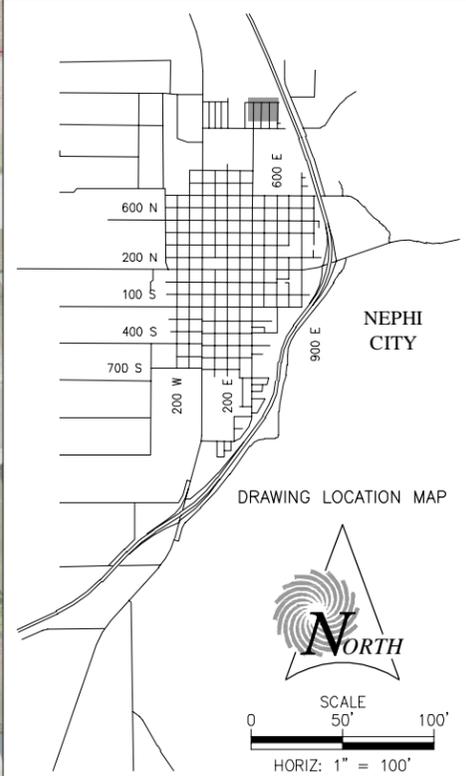
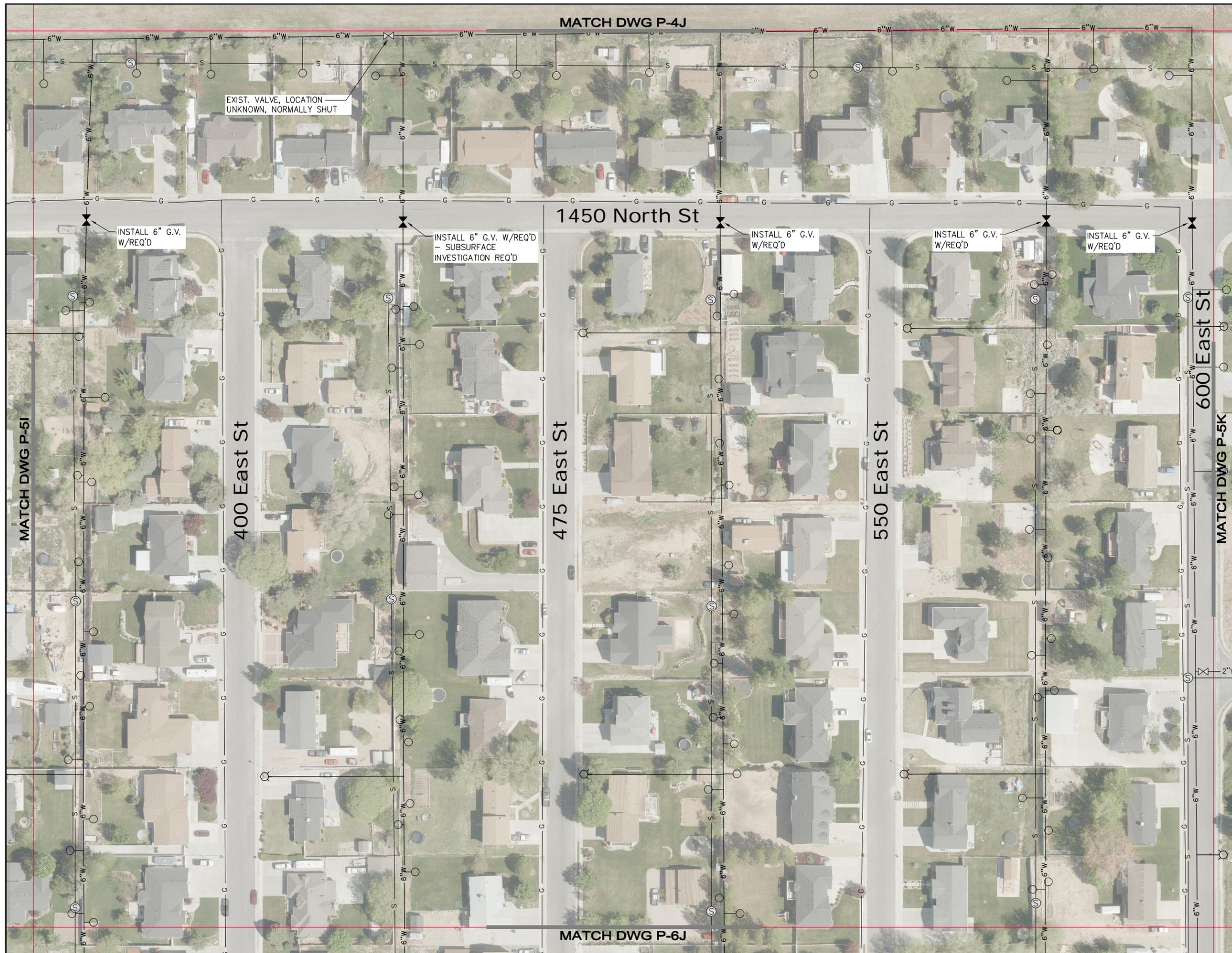


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REV. NO.	COMMENT	DATE
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SEI NO. 05884	DESIGNED JCI	DRAWN CJC
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LEGEND

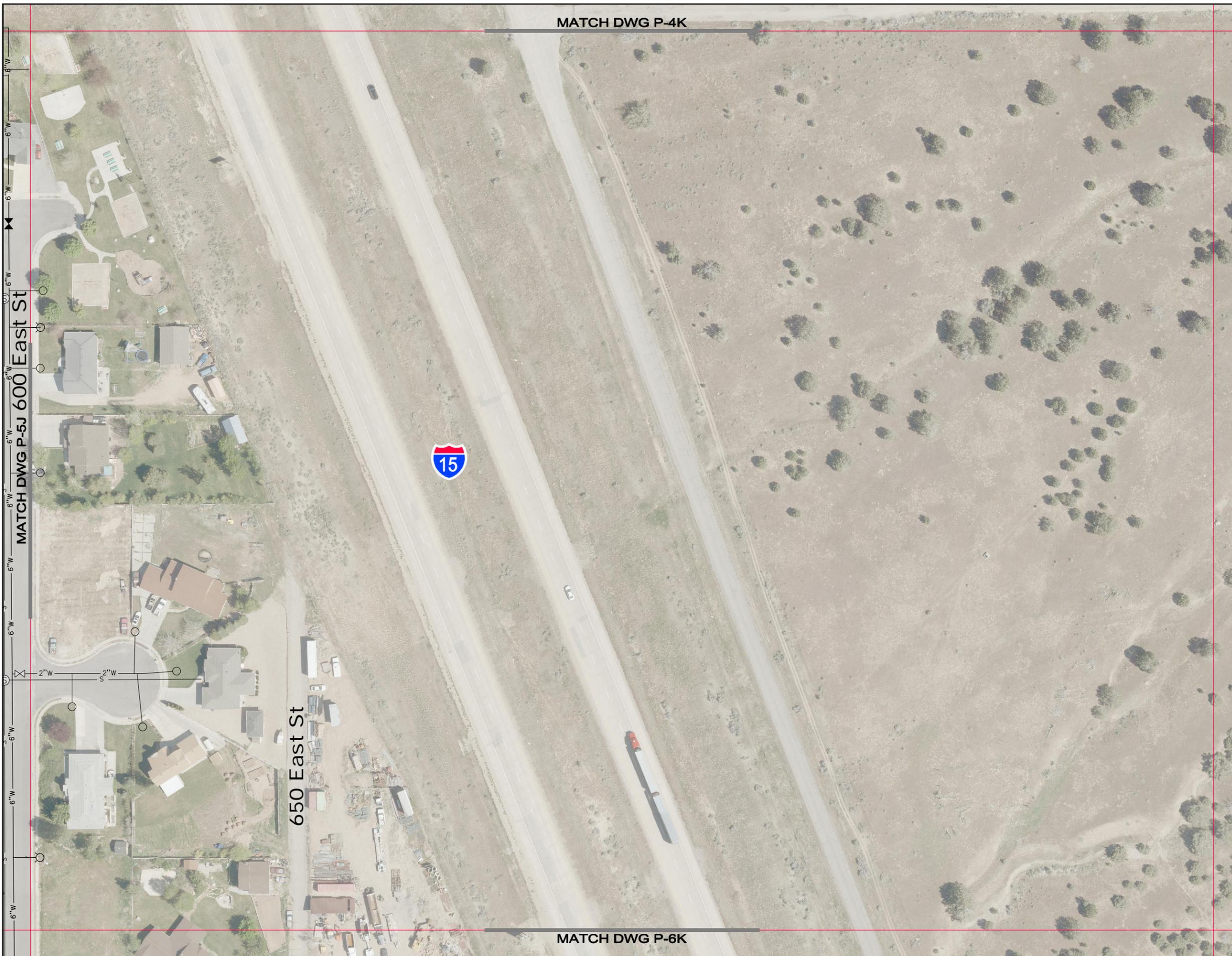
- NEW CULINARY WATER PIPELINE ——— 6" W ———
- EXIST. CULINARY WATER PIPELINE ——— 6" W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - - - 6" W - - - - -
- NEW METER SETTER ASSEMBLY (E D2)
- REPLACE EXIST. SERVICE CONNECTION (C D2 / D2)
- RECONNECT EXIST. SERVICE CONNECTION (A D2 / B D2)
- NEW FIRE HYDRANT (F D1)
- REPLACE EXIST. FIRE HYDRANT (F D1)
- RECONNECT EXIST. FIRE HYDRANT (G D1)
- NEW GATE VALVE (F D2)

NOTE: SEE DWG G3 FOR COMPLETE LEGEND

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SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 31	P-5J

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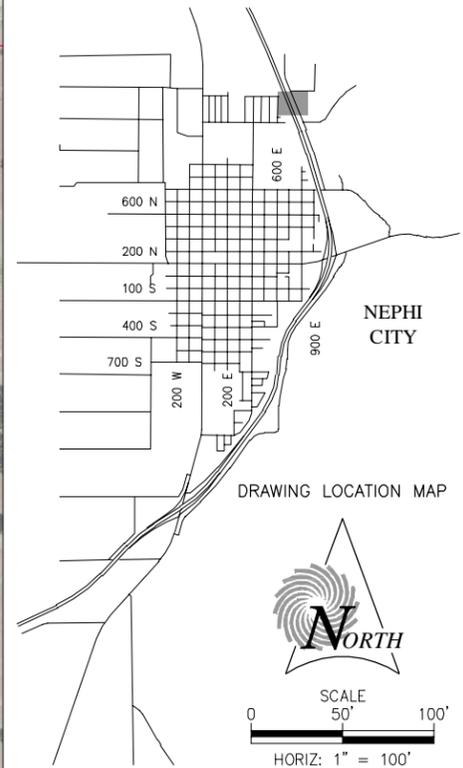
MATCH DWG P-4K



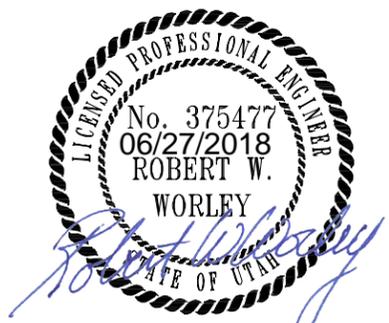
MATCH DWG P-5J 600 East St

650 East St

MATCH DWG P-6K



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SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	32	P-5K

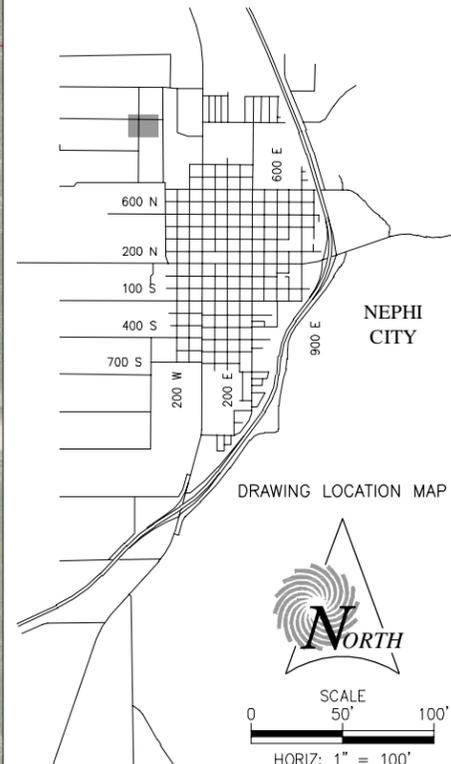
P:\Nephi\05884 - Nephi Culinary Water Improvements Project - 2017\Design\dwg\Nephi-P streets.DWG Jun 27, 2018 10:49am cchistensen

MATCH DWG P-5F

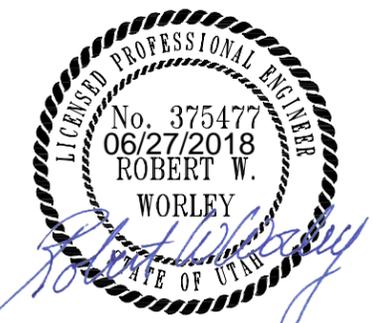
1150 North St

500 West St

MATCH DWG P-7F



**NO
WORK
ON THIS
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1	GENERAL REVISIONS FOR BIDS	6-21-18
REV. NO.	COMMENT	DATE



25 EAST 500 NORTH
FILLMORE, UTAH 84631
TEL 435.743.6151 FAX 435.743.7900
www.sunrise-eng.com

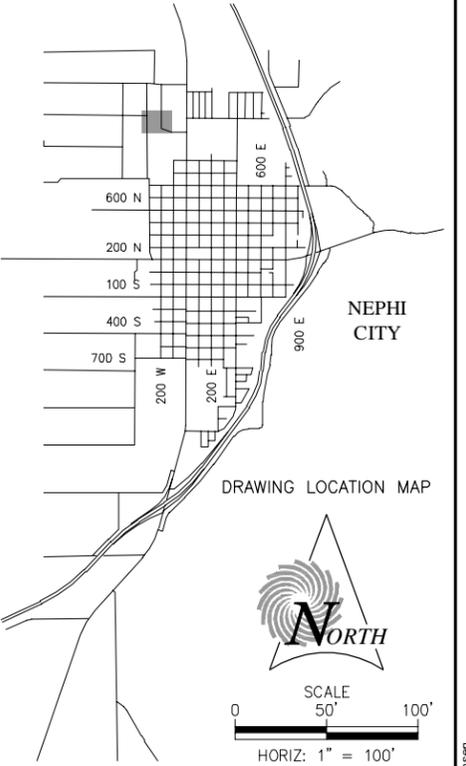
NEPHI CITY

CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET

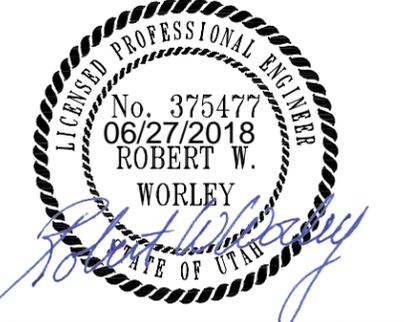
SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 33	P-6F
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MATCH DWG P-6G

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**NO
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1	GENERAL REVISIONS FOR BIDS	6-21-18
REV. NO.	COMMENT	DATE
SUNRISE ENGINEERING 25 EAST 500 NORTH FILLMORE, UTAH 84631 TEL 435.743.6151 FAX 435.743.7900 www.sunrise-eng.com		
NEPHI CITY		
CULINARY WATER IMPROVEMENTS PROJECT		
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SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 34	P-6G

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MATCH DWG P-5H



MATCH DWG P-6G

Main St

50 East St

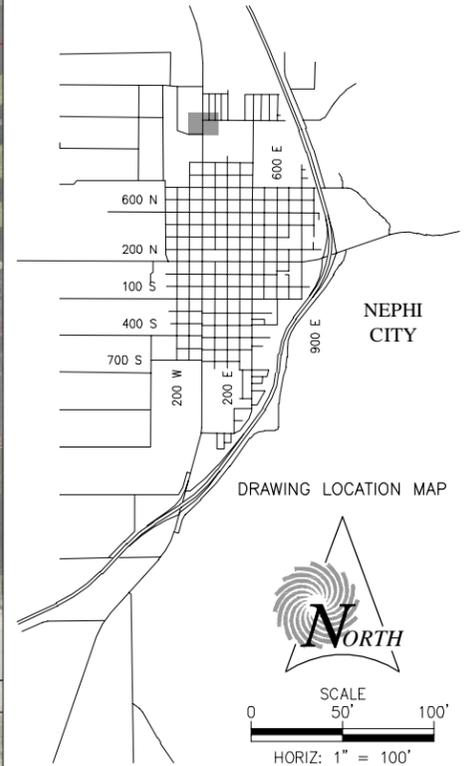
100 East St

1250 North St

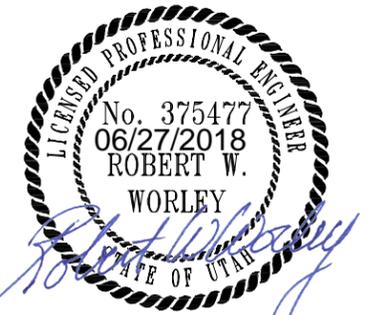
1100 North St

MATCH DWG P-7H

MATCH DWG P-6I



**NO
WORK
ON THIS
SHEET**



REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1		6-21-18



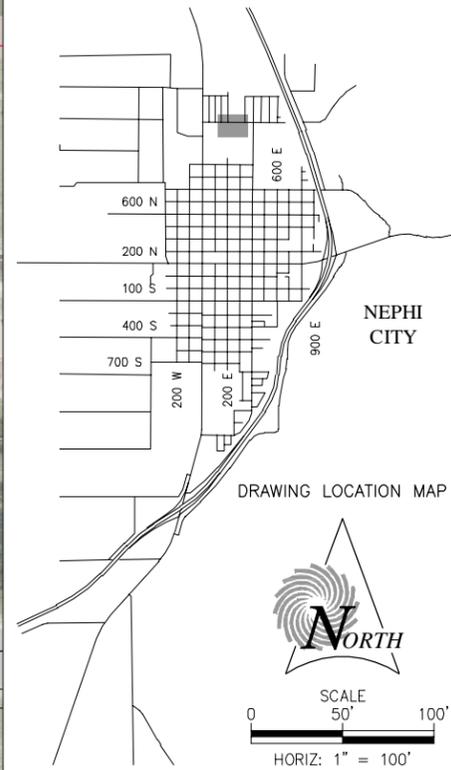
25 EAST 500 NORTH
FILLMORE, UTAH 84631
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2018
PLAN SHEET

REV. NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	SHEET TOTAL
05884	JCI	CJC	RWW	35	P-6H

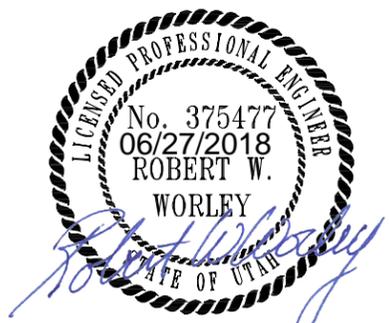
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LEGEND

- NEW CULINARY WATER PIPELINE ——— x" W ———
- EXIST. CULINARY WATER PIPELINE ——— x" W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - - x" W - - - -
- NEW METER SETTER ASSEMBLY (E D2) ———
- REPLACE EXIST. SERVICE CONNECTION (C D2) (D D2) ———
- RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
- NEW FIRE HYDRANT (F D1) ———
- REPLACE EXIST. FIRE HYDRANT (F D1) ———
- RECONNECT EXIST. FIRE HYDRANT (G D1) ———
- NEW GATE VALVE (F D2) ———

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18

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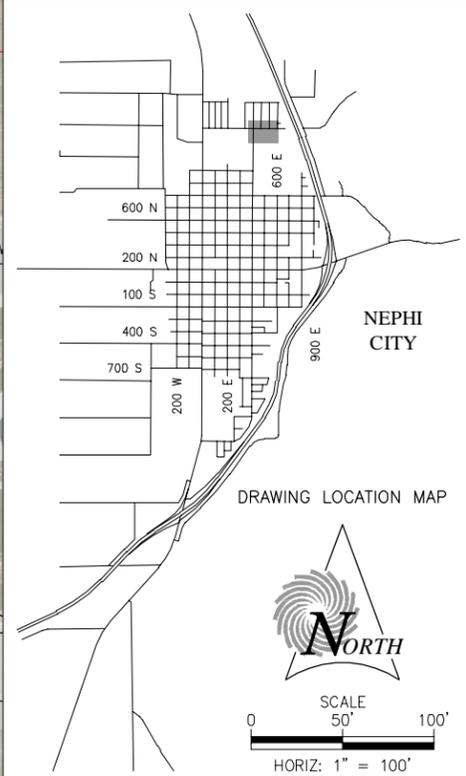
CULINARY WATER IMPROVEMENTS PROJECT

2018

PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 36	P-6I
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LEGEND

NEW CULINARY WATER PIPELINE	— x"W —
EXIST. CULINARY WATER PIPELINE	— x"W —
EXIST. CULINARY WATER PIPELINE TO BE ABANDONED	- - - x"W - - -
NEW METER SETTER ASSEMBLY	(E D2)
REPLACE EXIST. SERVICE CONNECTION	(C D2) (D D2)
RECONNECT EXIST. SERVICE CONNECTION	(A B) (D2)
NEW FIRE HYDRANT	(F D1)
REPLACE EXIST. FIRE HYDRANT	(F D1)
RECONNECT EXIST. FIRE HYDRANT	(G D1)
NEW GATE VALVE	(F D2)

NOTE: SEE DWG G3 FOR COMPLETE LEGEND

LICENSED PROFESSIONAL ENGINEER
 No. 375477
 06/27/2018
 ROBERT W. WORLEY
 STATE OF UTAH

REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18

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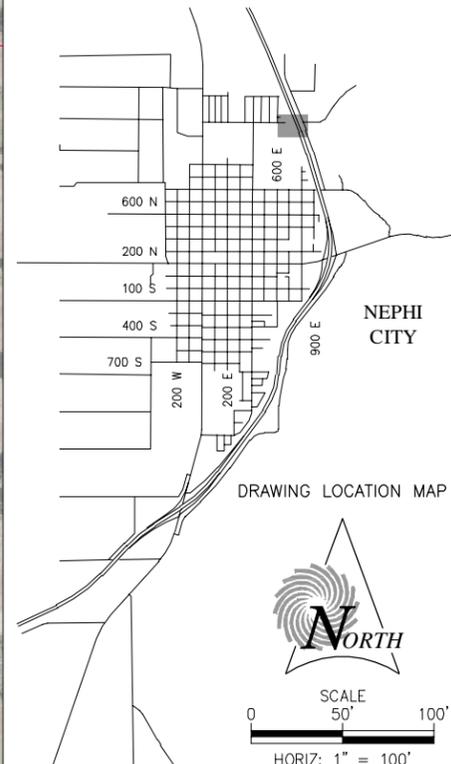
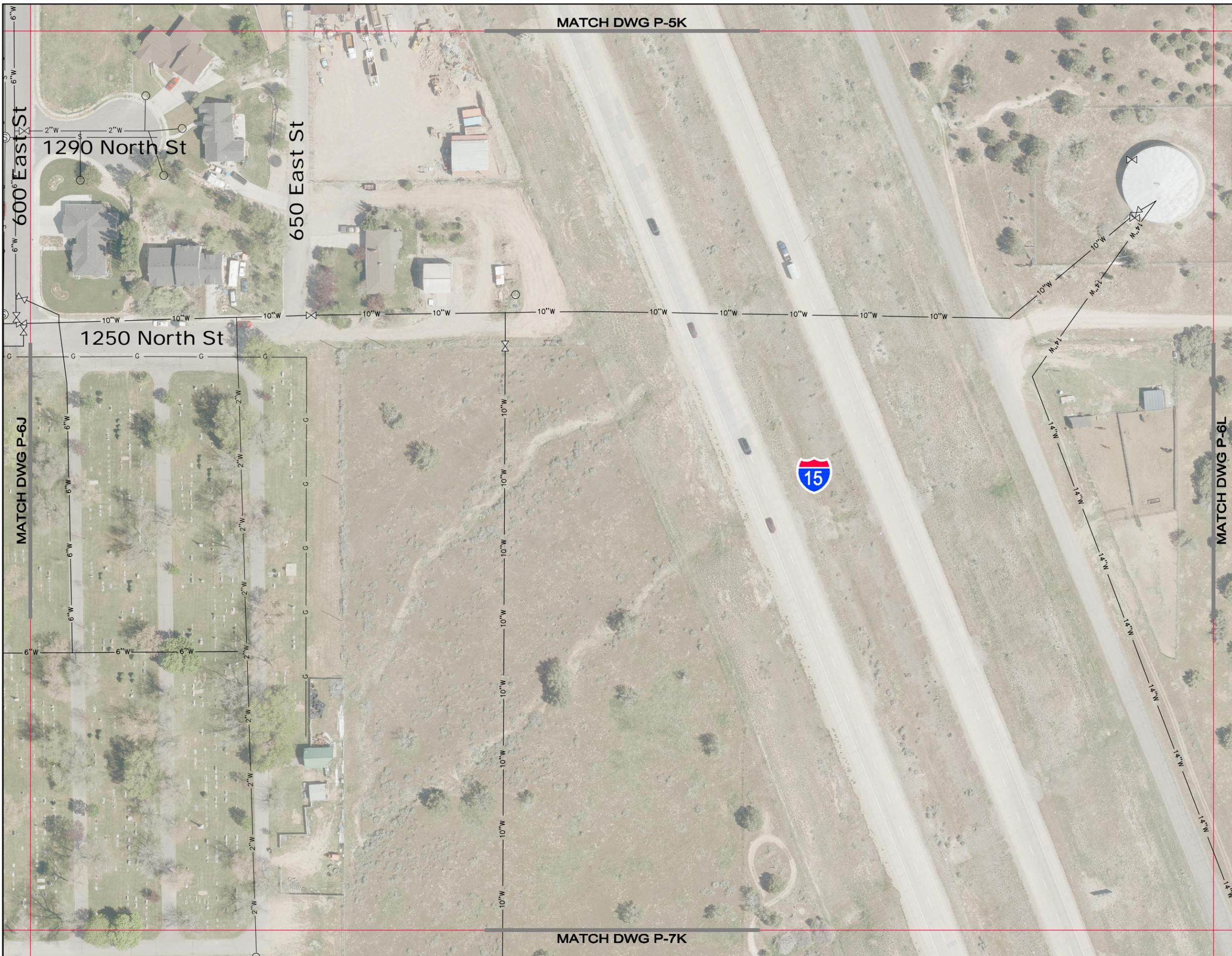
NEPHI CITY
CULINARY WATER IMPROVEMENTS PROJECT
 2018
PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 37	P-6J
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MATCH DWG P-5K

MATCH DWG P-7K



**NO
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SHEET**



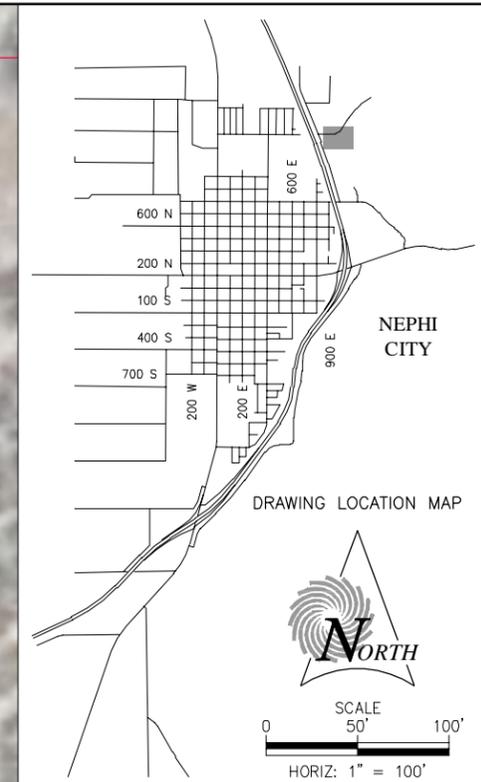
REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18

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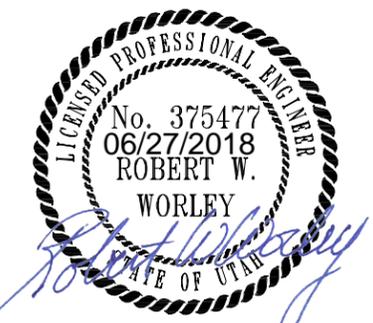
NEPHI CITY
CULINARY WATER IMPROVEMENTS PROJECT
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PLAN SHEET

DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 38	P-6K
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1		6-21-18

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2018
PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 39	P-6L
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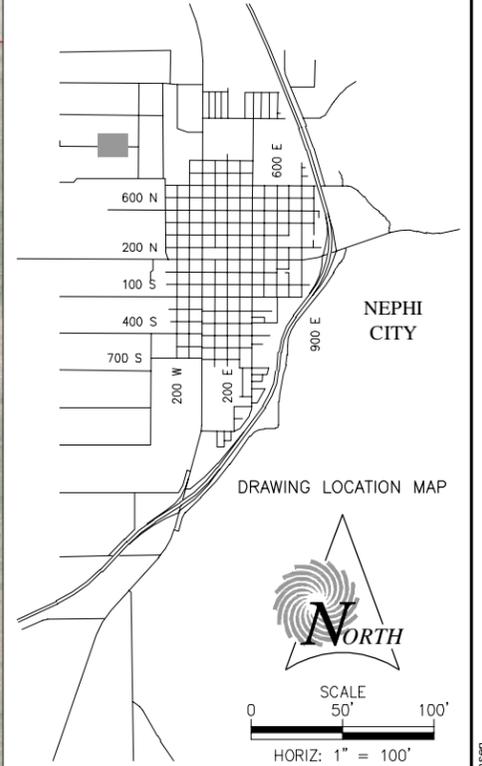
MATCH DWG P-7L

MATCH DWG P-6K

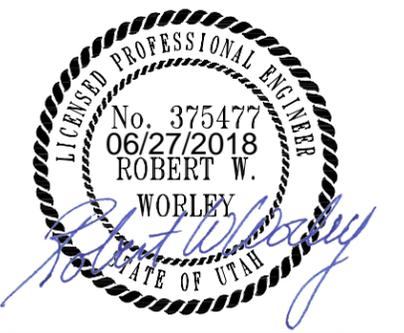
P:\Nephi\05884_Nephi_Culinary_Water_Improvements_Project - 2017\Design\dwg\Nephi-P_streets.DWG Jun 27, 2018 10:51am cchristensen



MATCH DWG P-7F



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2018
PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 40	P-7E
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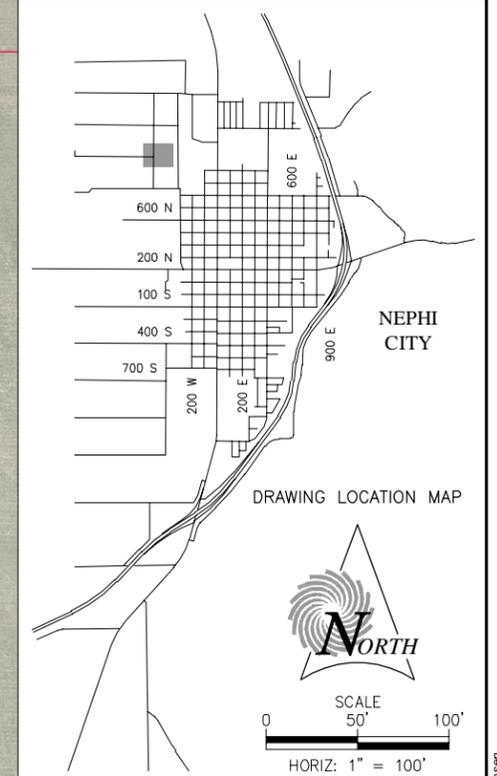
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MATCH DWG P-6F

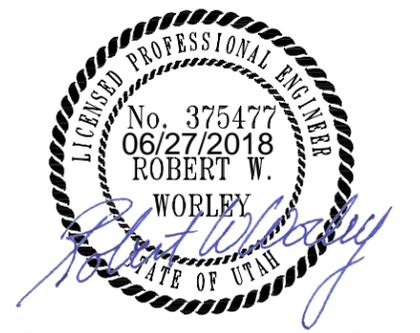
MATCH DWG P-8F

MATCH DWG P-7E

MATCH DWG P-7G



**NO
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REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1		6-21-18

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NEPHI CITY					
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2018					
PLAN SHEET					
SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 41	P-7F

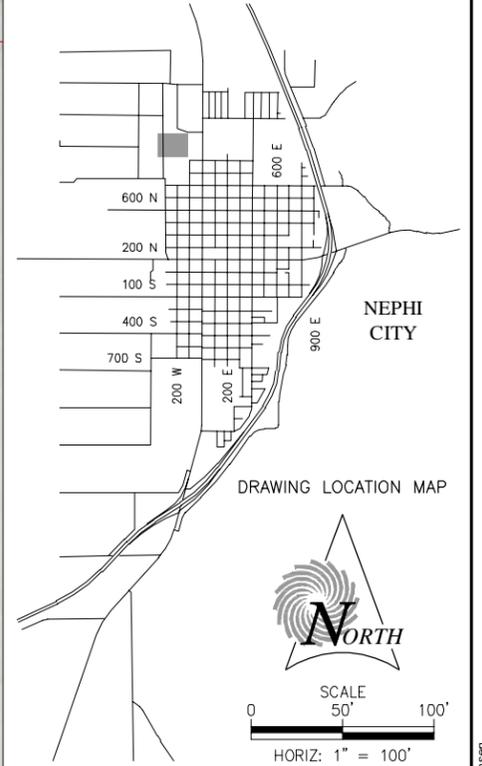
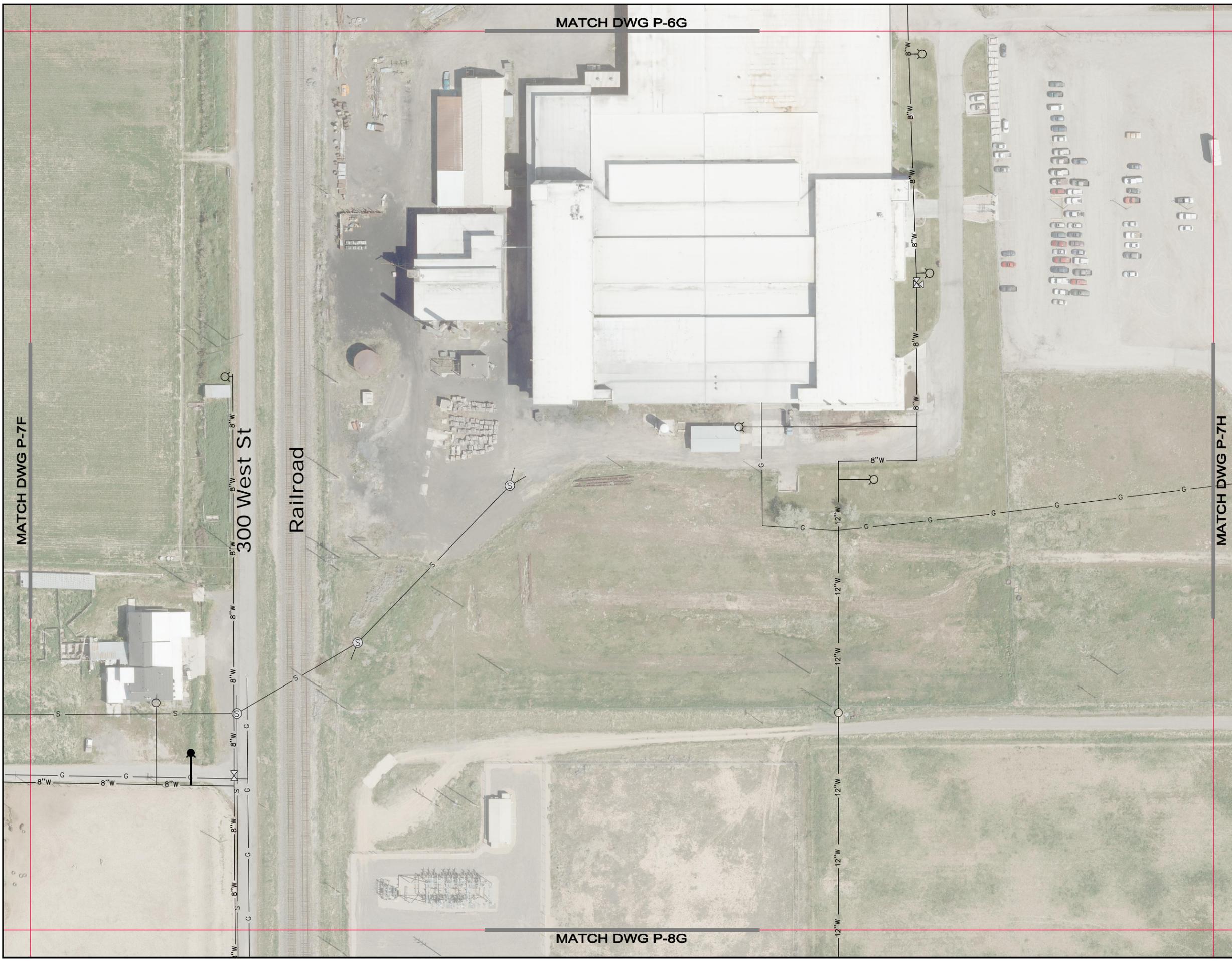
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MATCH DWG P-6G

MATCH DWG P-8G

MATCH DWG P-7F

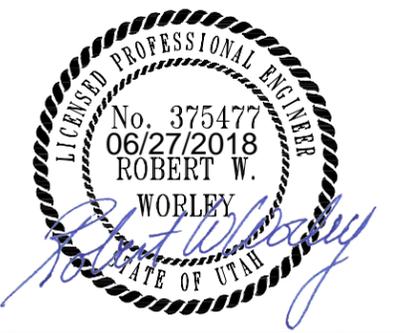
MATCH DWG P-7H



LEGEND

- NEW CULINARY WATER PIPELINE ——— 8" W ———
- EXIST. CULINARY WATER PIPELINE ——— 8" W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - 8" W - - -
- NEW METER SETTER ASSEMBLY (E D2) ———
- REPLACE EXIST. SERVICE CONNECTION (C D2 / D2) ———
- RECONNECT EXIST. SERVICE CONNECTION (A D2 / B D2) ———
- NEW FIRE HYDRANT (F D1) ———
- REPLACE EXIST. FIRE HYDRANT (F D1) ———
- RECONNECT EXIST. FIRE HYDRANT (G D1) ———
- NEW GATE VALVE (F D2) ———

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18



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 2018
 PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 42	P-7G
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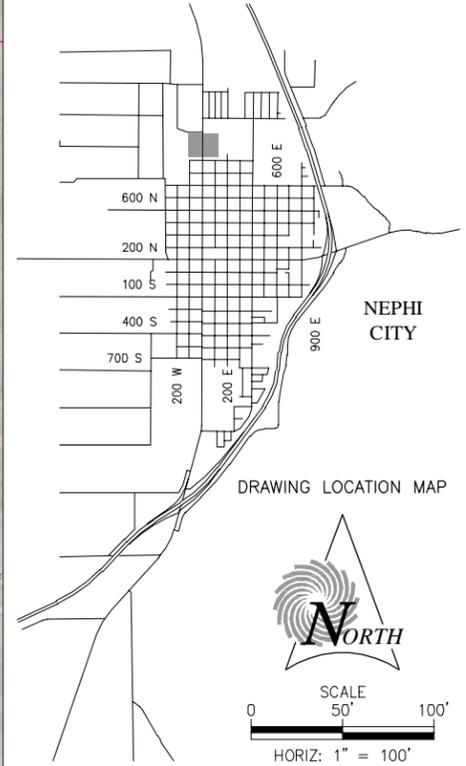
P:\nephi\05884 - Nephi Culinary Water Improvements Project - 2017\Design\dwg\nephi-p streets.dwg Jun 27, 2018 10:27am cchistensen

MATCH DWG P-6H

MATCH DWG P-7G

MATCH DWG P-7I

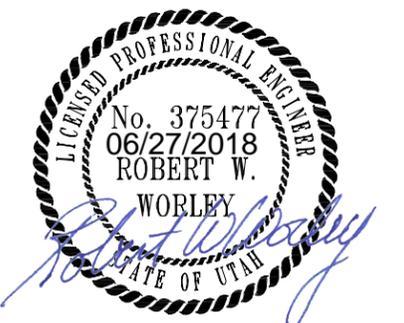
MATCH DWG P-8H



LEGEND

- NEW CULINARY WATER PIPELINE ——— x" W ———
- EXIST. CULINARY WATER PIPELINE ——— x" W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x" W - - -
- NEW METER SETTER ASSEMBLY (E D2) ———
- REPLACE EXIST. SERVICE CONNECTION (C D2) ———
- RECONNECT EXIST. SERVICE CONNECTION (A B D2) ———
- NEW FIRE HYDRANT (F D1) ———
- REPLACE EXIST. FIRE HYDRANT (F D1) ———
- RECONNECT EXIST. FIRE HYDRANT (F D1) ———
- NEW GATE VALVE (G D2) ———

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18



NEPHI CITY
 CULINARY WATER IMPROVEMENTS PROJECT
 2018
 PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 43	P-7H
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MATCH DWG P-6I

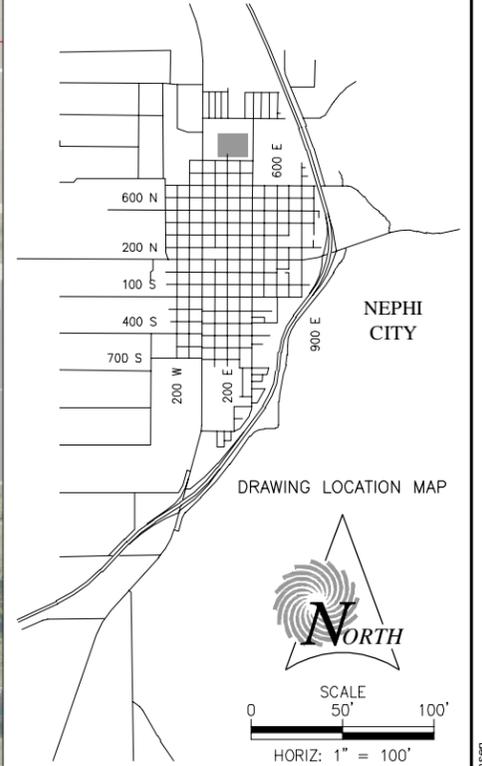
MATCH DWG P-8I

MATCH DWG P-7H

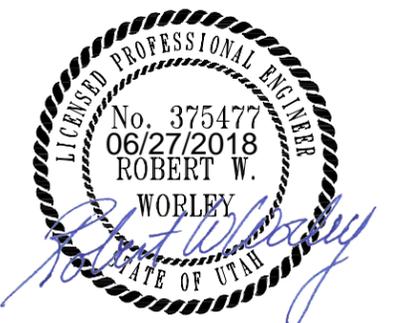
MATCH DWG P-7J

200 East St

2"=100'



**NO
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2018
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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 44	P-7I
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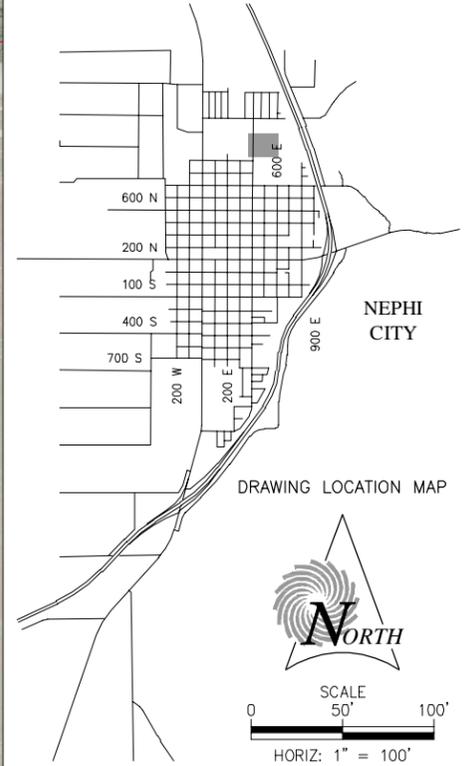
MATCH DWG P-6J

MATCH DWG P-8J

MATCH DWG P-7I

MATCH DWG P-7K

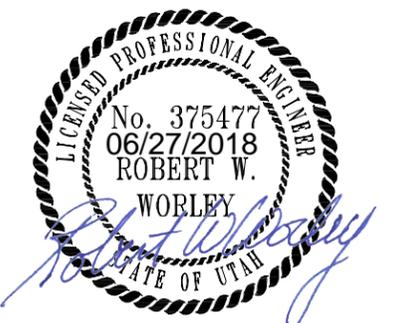
400 East St



LEGEND

NEW CULINARY WATER PIPELINE	— x"W —
EXIST. CULINARY WATER PIPELINE	— x"W —
EXIST. CULINARY WATER PIPELINE TO BE ABANDONED	- - - x"W - - -
NEW METER SETTER ASSEMBLY	(E D2)
REPLACE EXIST. SERVICE CONNECTION	(C D) (D2 D2)
RECONNECT EXIST. SERVICE CONNECTION	(A B) (D2 D2)
NEW FIRE HYDRANT	(F D1)
REPLACE EXIST. FIRE HYDRANT	(F D1)
RECONNECT EXIST. FIRE HYDRANT	(G D1)
NEW GATE VALVE	(G D2)

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18			
REV. NO.	COMMENT	DATE			
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NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018 PLAN SHEET					
SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 45	P-7J

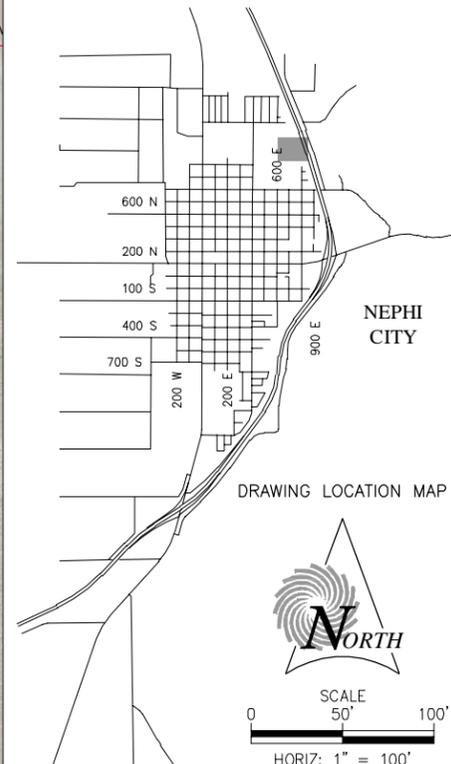
P:\Nephi\05884 - Nephi Culinary Water Improvements Project - 2017\Design\dwg\Nephi-P Streets.DWG Jun 27, 2018 10:28am cchistensen

MATCH DWG P-6K

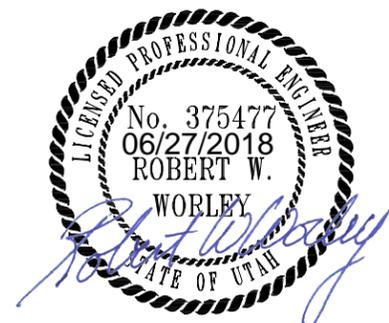
MATCH DWG P-7J

MATCH DWG P-7L

MATCH DWG P-8K



**NO
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1	GENERAL REVISIONS FOR BIDS	6-21-18
REV. NO.	COMMENT	DATE



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2018
PLAN SHEET

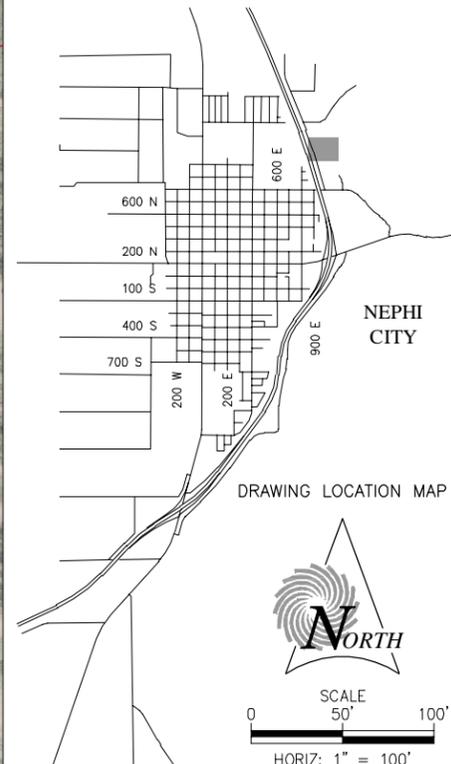
SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 46	P-7K
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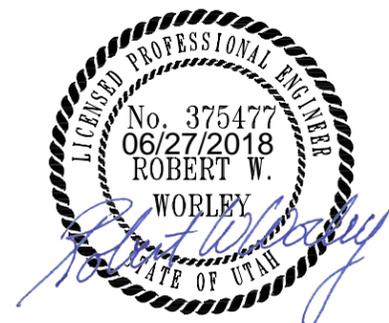
MATCH DWG P-6L

MATCH DWG P-7K

MATCH DWG P-8L



**NO
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REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1		6-21-18



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2018
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SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	47	P-7L



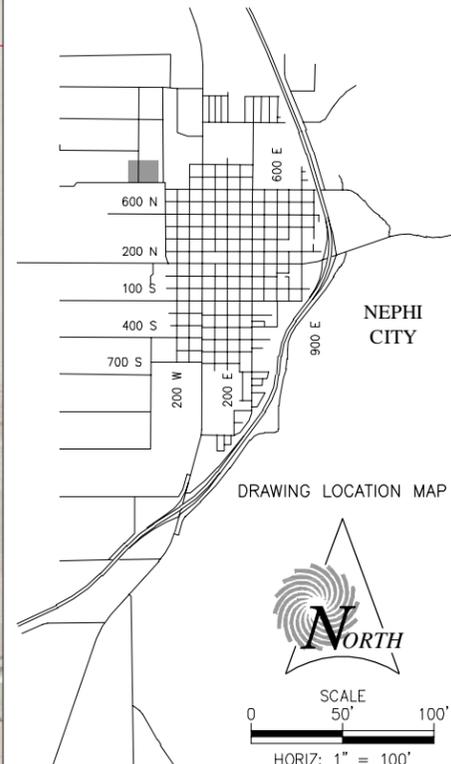
P:\Nephi\05884_Nephi_Culinary Water Improvements Project - 2017\Design\dwg\Nephi-P_sheets.DWG Jun 27, 2018 10:29am cchistensen

MATCH DWG P-7F

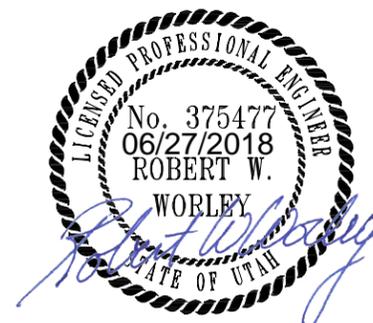
500 West St

700 North St

MATCH DWG P-9F



NO
WORK
ON THIS
SHEET



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1		6-21-18



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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 48	P-8F
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P:\Nephi\05884_Nephi_Culinary Water Improvements Project - 2017\Design\dwg\Nephi-P Streets.DWG Jun 27, 2018 10:29am cchistensen

MATCH DWG P-7G

MATCH DWG P-9G

MATCH DWG P-8F

MATCH DWG P-8H



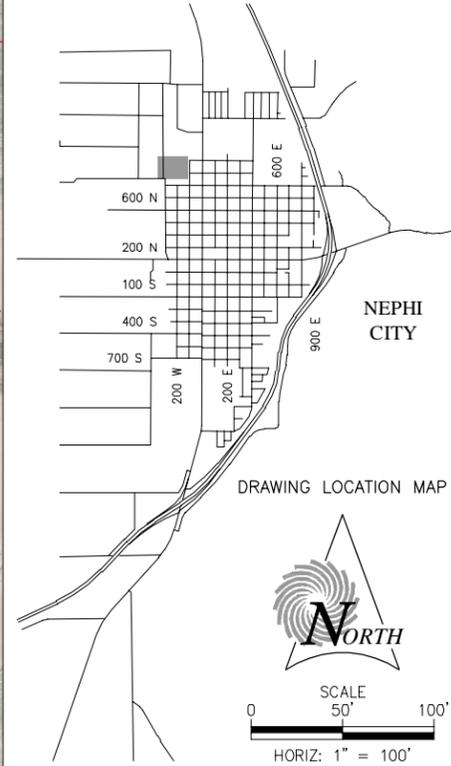
INSTALL 8" TEE, & RED. W/REQ'D - CONNECT TO EXIST. 8" & 6" PIPELINES

INSTALL 8" TEE & G.V. W/REQ'D

A DETAIL-BORING UNDER D5 RAILROAD

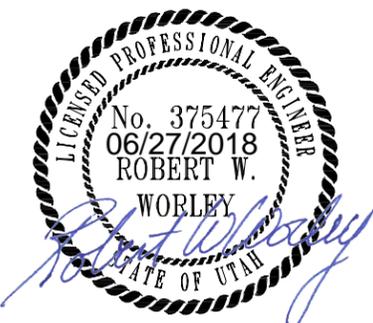
INSTALL 8" TEE W/REQ'D - PLUG NORTH END OF TEE

INSTALL 8" BEND, RED. & G.V. W/REQ'D - CONNECT TO EXIST. 6" PIPELINE



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18



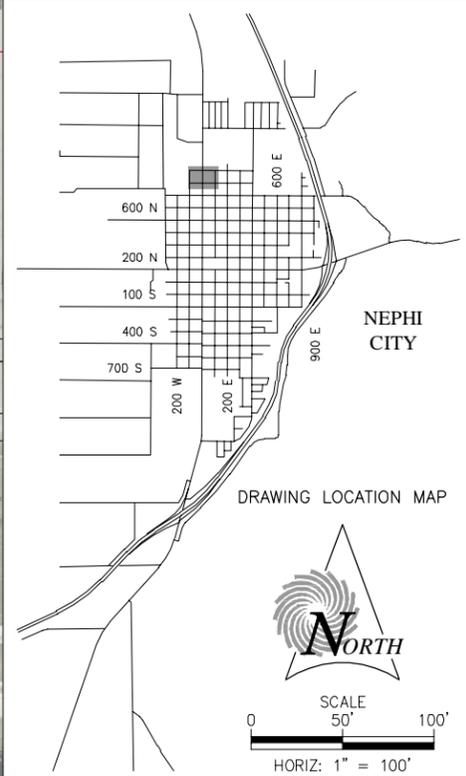
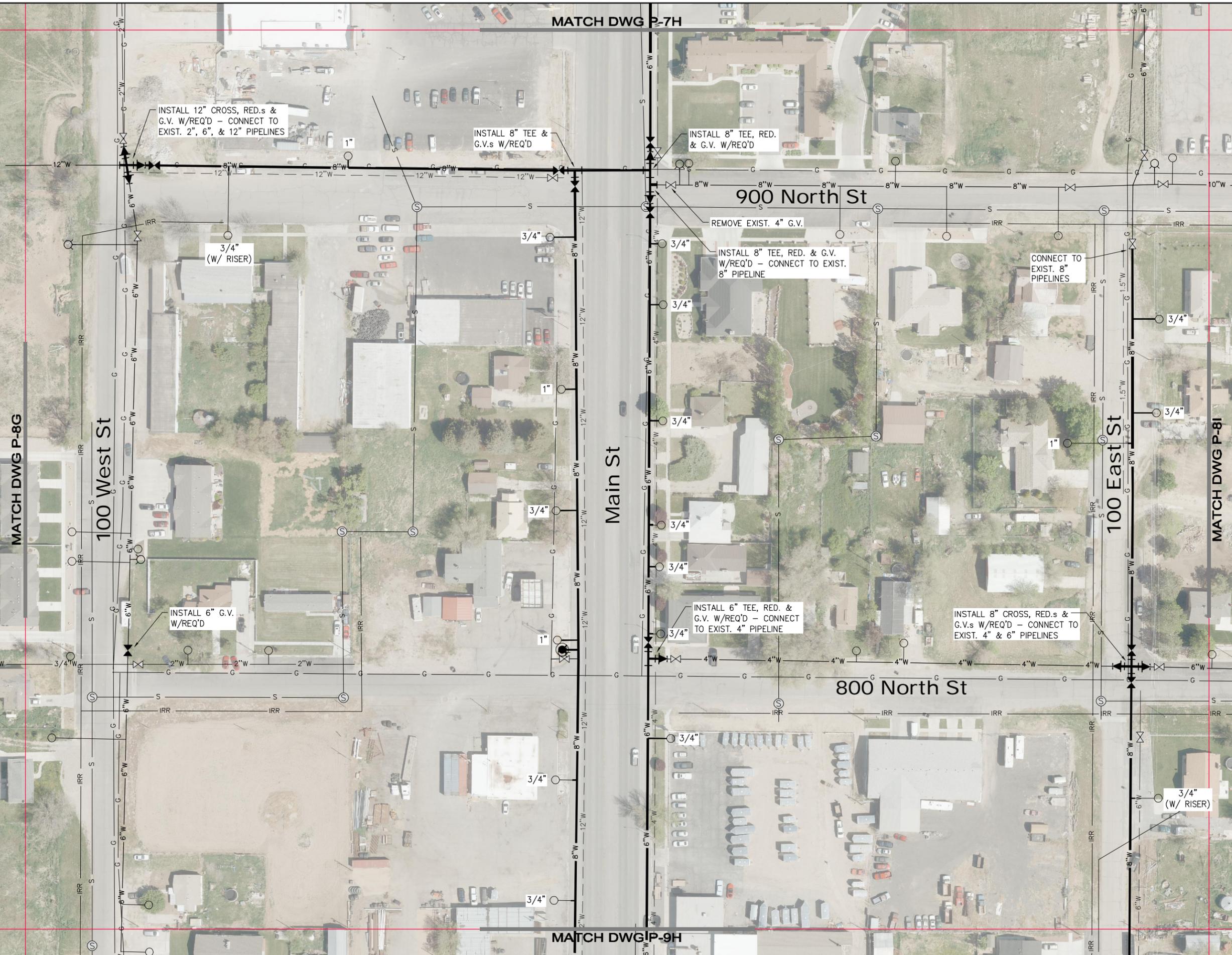
25 EAST 500 NORTH
 FILLMORE, UTAH 84631
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NEPHI CITY
 CULINARY WATER IMPROVEMENTS PROJECT
 2018
 PLAN SHEET

SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	49	P-8G

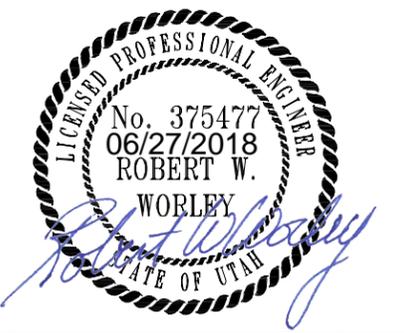
P:\Nephi\05884_Nephi_Culinary Water Improvements Project - 2017\Design\dwg\Nephi-P Streets.DWG Jun 27, 2018 10:29am cchlistensen

MATCH DWG P-7H



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) [Symbol]
 - REPLACE EXIST. SERVICE CONNECTION TO BE ABANDONED (C D2) [Symbol]
 - RECONNECT EXIST. SERVICE CONNECTION (A B D2) [Symbol]
 - NEW FIRE HYDRANT (F D1) [Symbol]
 - REPLACE EXIST. FIRE HYDRANT (F D1) [Symbol]
 - RECONNECT EXIST. FIRE HYDRANT (F D1) [Symbol]
 - NEW GATE VALVE (F D2) [Symbol]
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1		6-21-18



NEPHI CITY
 CULINARY WATER IMPROVEMENTS PROJECT
 2018
 PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 50	P-8H
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MATCH DWG P-71

900 North St

200 East St

300 East St

800 North St

MATCH DWG P-91

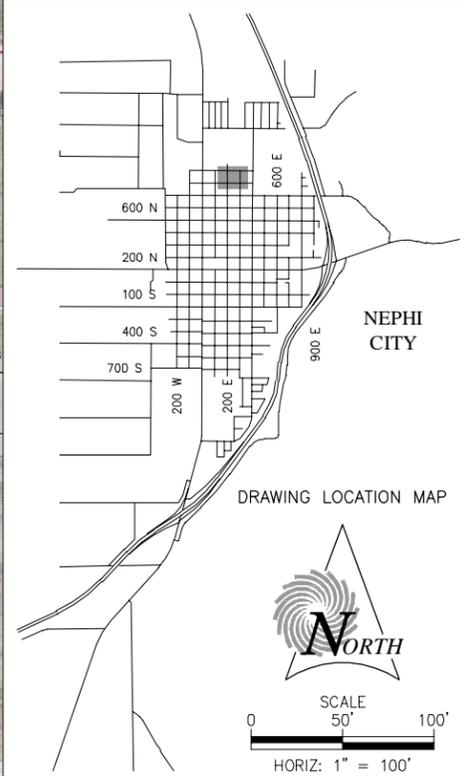
INSTALL 6" TEE, RED.s & G.V.s W/REQ'D - CONNECT TO EXIST. 4" PIPELINE

REMOVE EXIST. FIRE HYDRANT

INSTALL 6" CROSS, RED.s & G.V.s W/REQ'D - CONNECT TO EXIST. 4" & 6" PIPELINES

INSTALL 6" CROSS & G.V. W/REQ'D - CONNECT TO EXIST. 6" PIPELINES

CONNECT TO EXIST. 6" PIPELINE



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1		6-21-18



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NEPHI CITY

CULINARY WATER IMPROVEMENTS PROJECT

2018

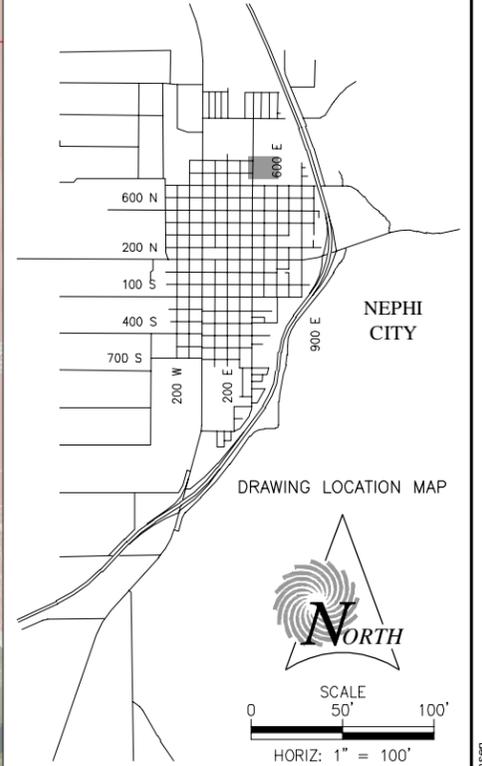
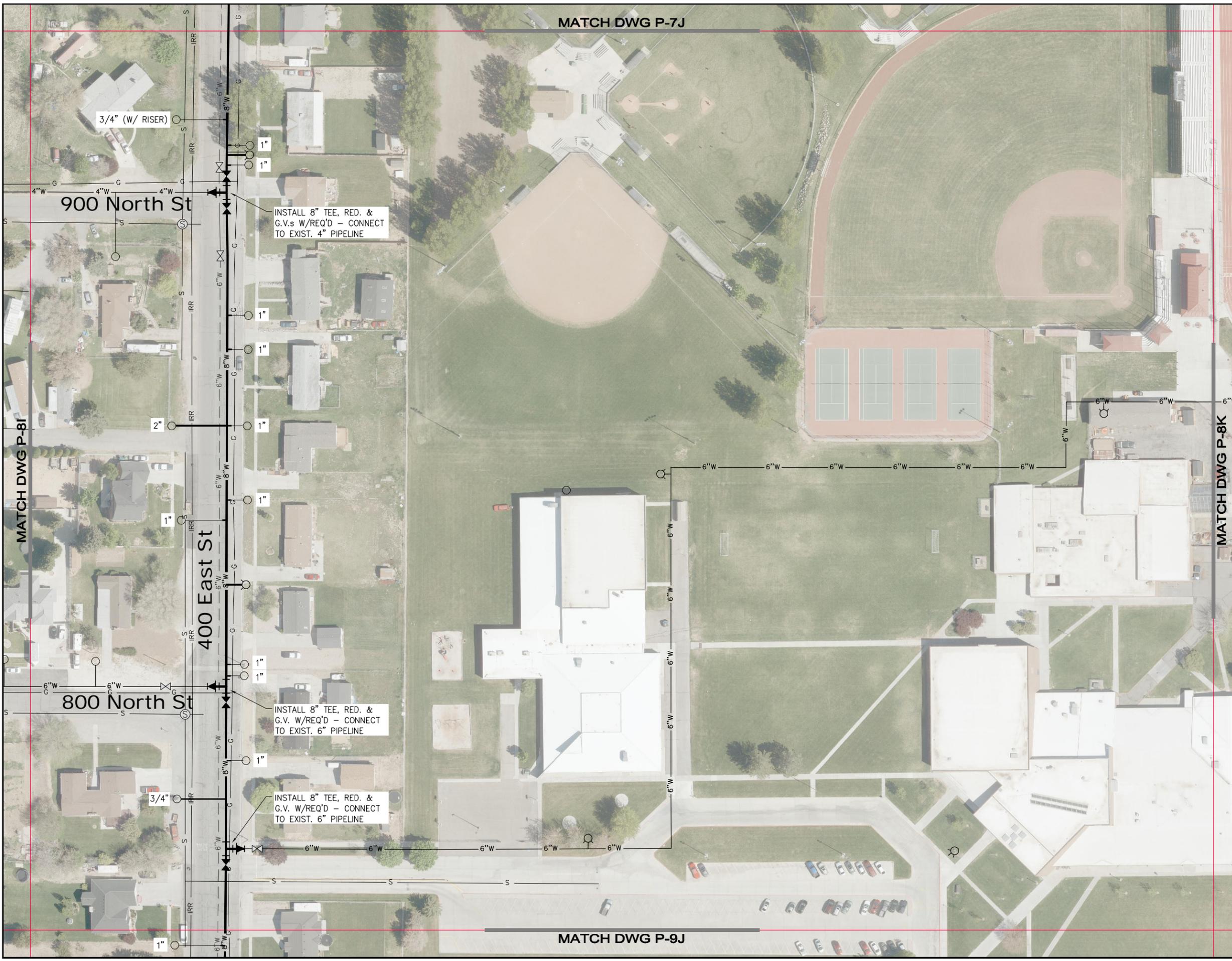
PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 51	P-81
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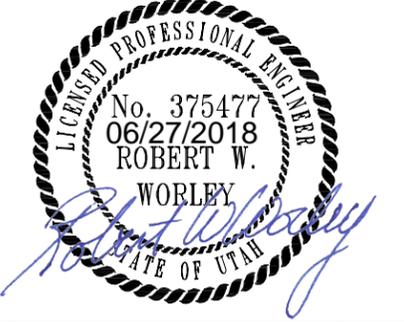
P:\Nephi\05884 - Nephi Culinary Water Improvements Project - 2017\Design\dwg\Nephi-P streets.DWG Jun 27, 2018 10:30am celtistensen

MATCH DWG P-7J

MATCH DWG P-9J

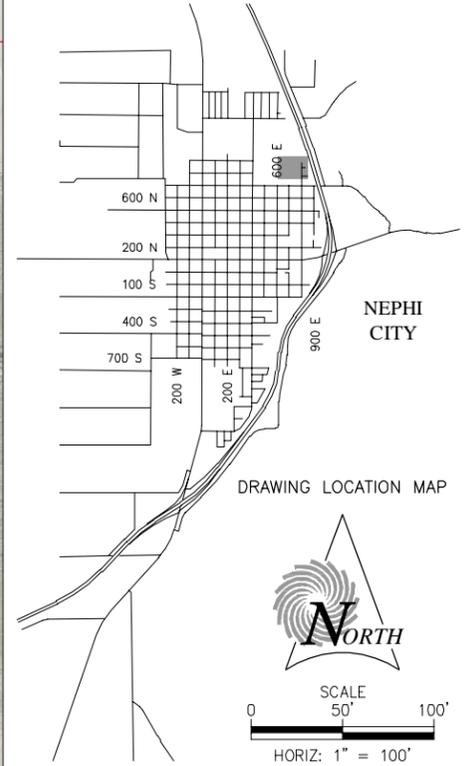
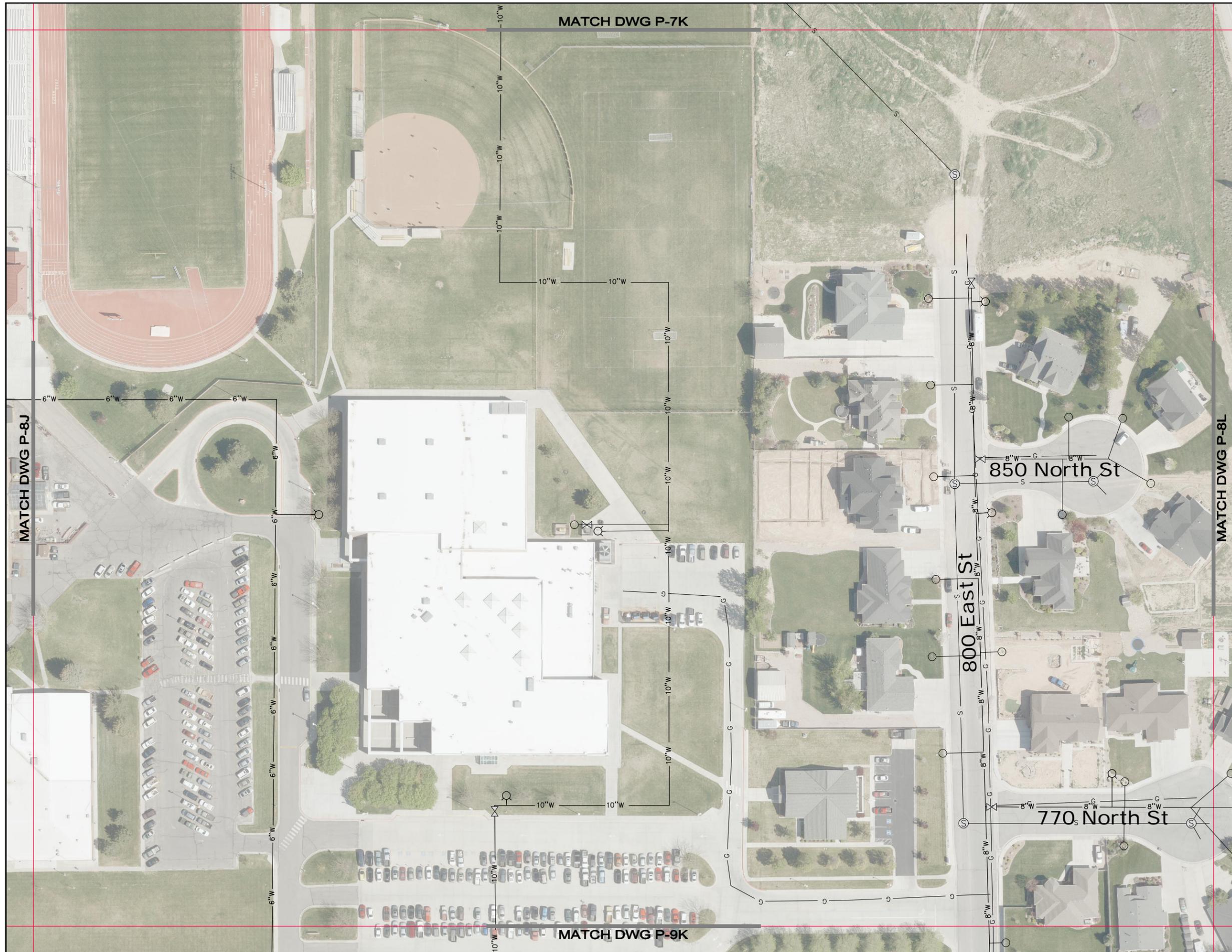


- LEGEND**
- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND

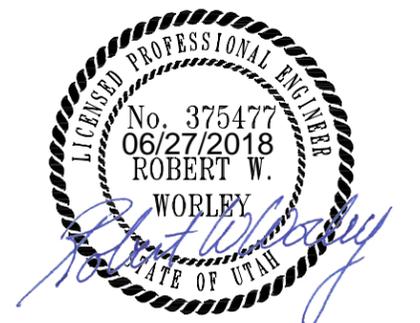


1	GENERAL REVISIONS FOR BIDS	6-21-18
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SUNRISE ENGINEERING 25 EAST 500 NORTH FILLMORE, UTAH 84631 TEL 435.743.6151 FAX 435.743.7900 www.sunrise-eng.com		
NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018 PLAN SHEET		
SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 52	P-8J

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**NO
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NEPHI CITY		
CULINARY WATER IMPROVEMENTS PROJECT		
2018		
PLAN SHEET		
SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 53	P-8K

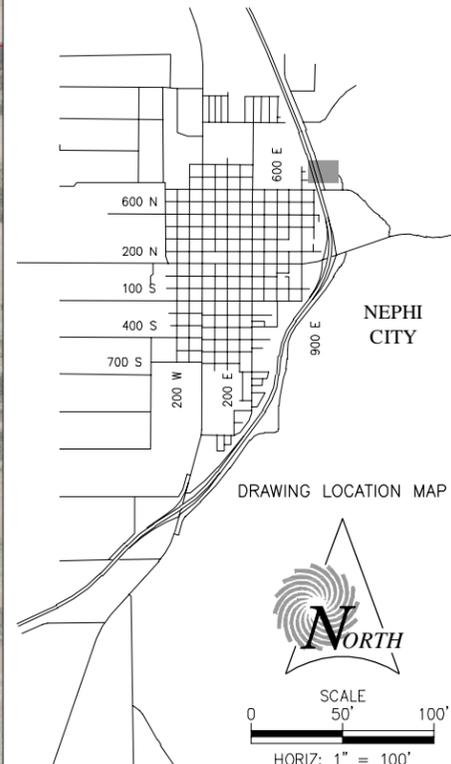
P:\Nephi\05884 - Nephi Culinary Water Improvements Project - 2017\Design\dwg\ipihl-p streets.dwg Jun 27, 2018 10:31am corristensen

MATCH DWG P-7L

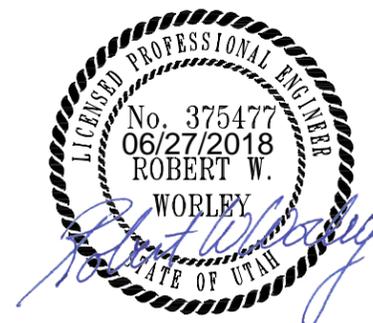
MATCH DWG P-8K

MATCH DWG P-8M

MATCH DWG P-9L



**NO
WORK
ON THIS
SHEET**



REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1		6-21-18



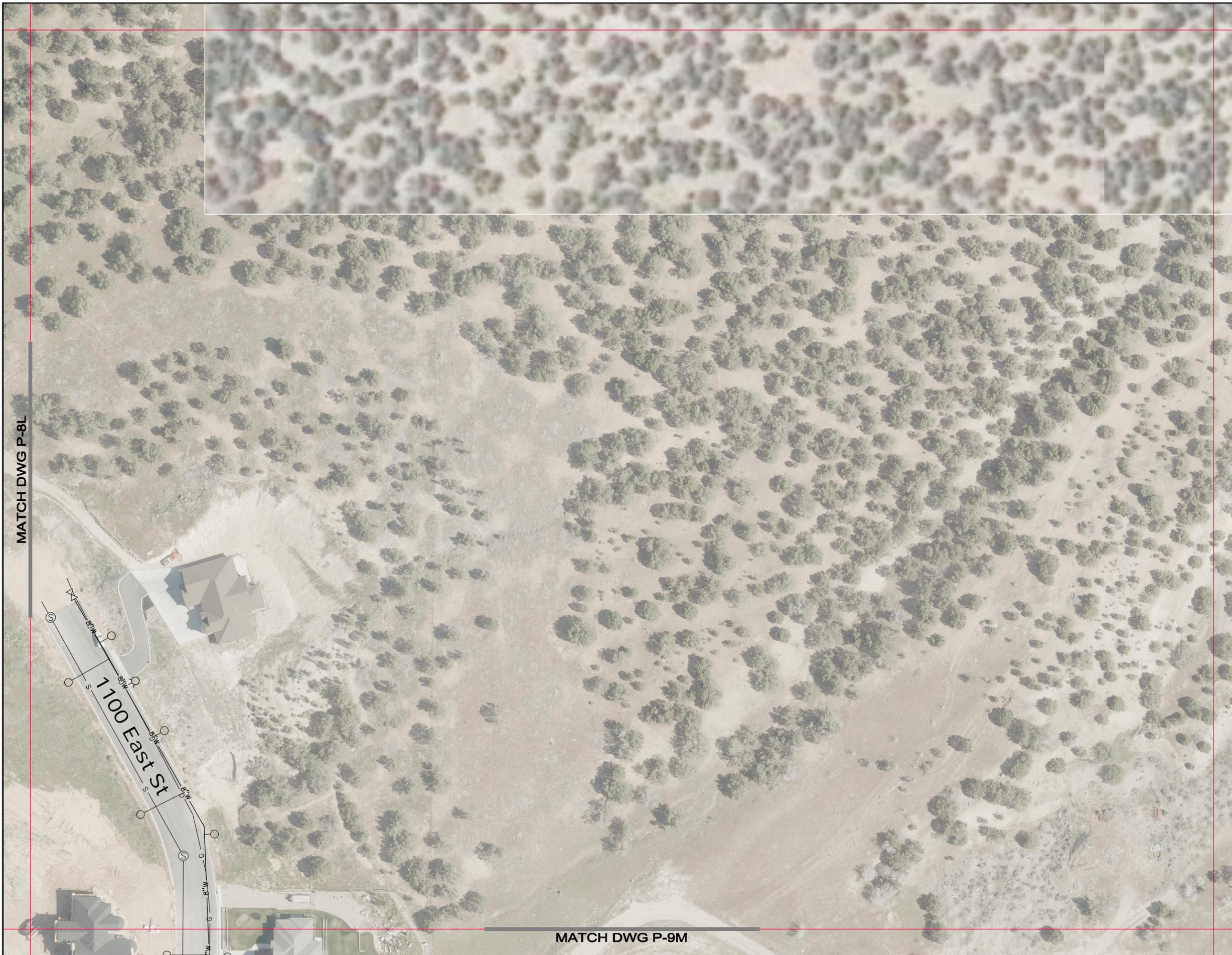
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2018
PLAN SHEET

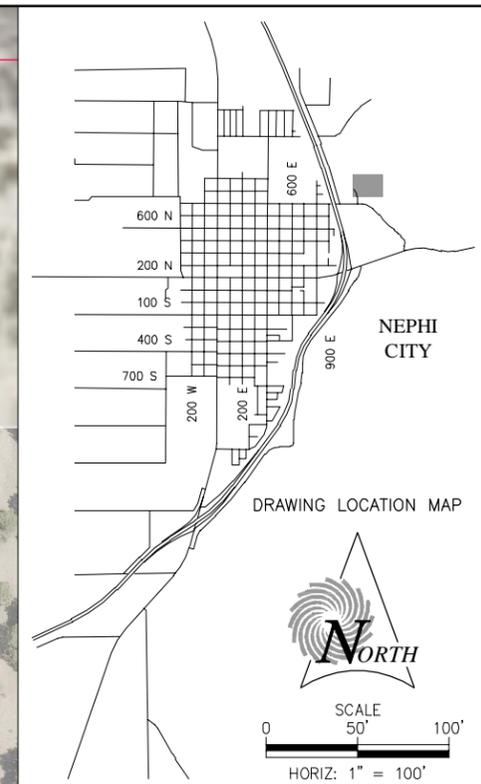
SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	54	P-8L

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MATCH DWG P-8L

MATCH DWG P-9M



**NO
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ON THIS
SHEET**



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1	GENERAL REVISIONS FOR BIDS	6-21-18

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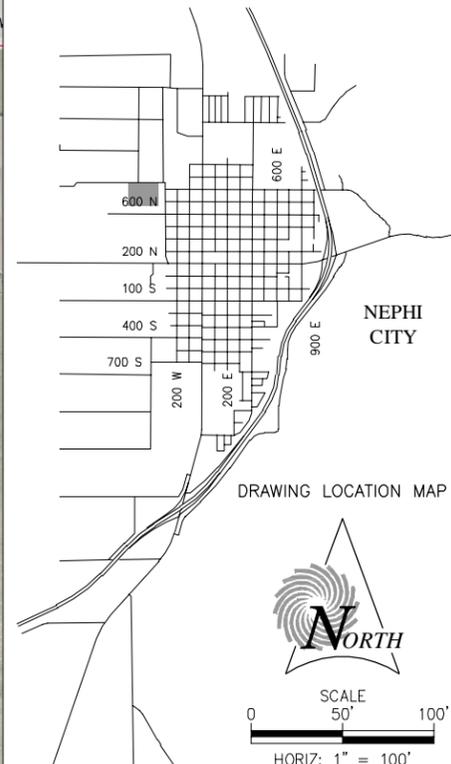
NEPHI CITY
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 2018
 PLAN SHEET

SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	SHEET
05884	JCI	CJC	RWW	55	P-8M

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MATCH DWG P-8F

6"W 6"W 6"W 6"W 6"W 6"W



MATCH DWG P-9G

**NO
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1		6-21-18



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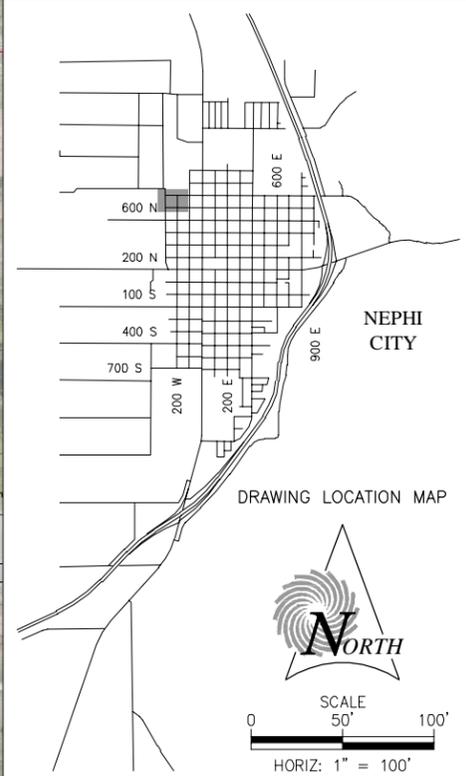
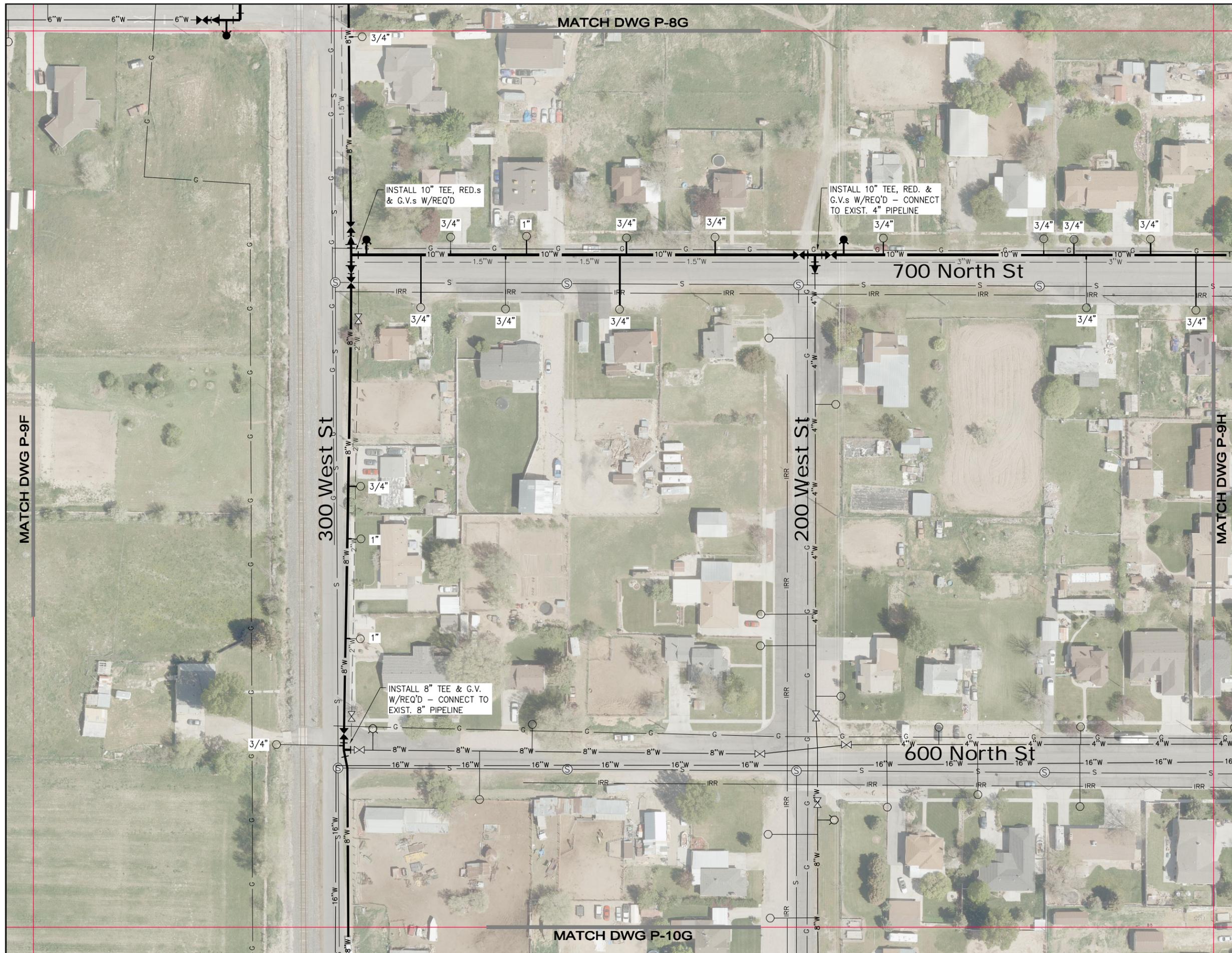
NEPHI CITY

CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET

MATCH DWG P-10F

SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	56	P-9F

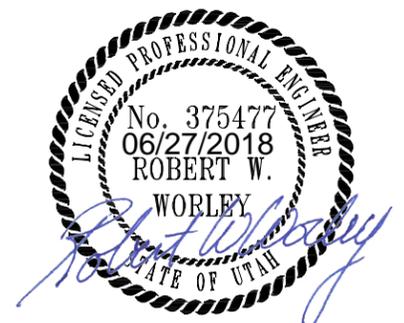
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LEGEND

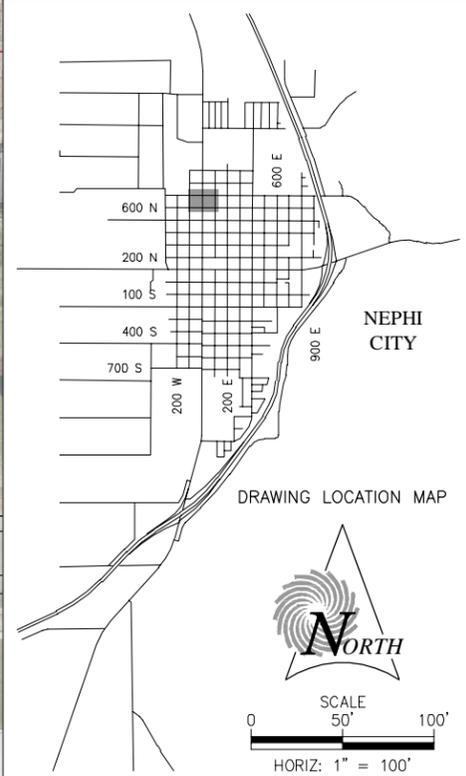
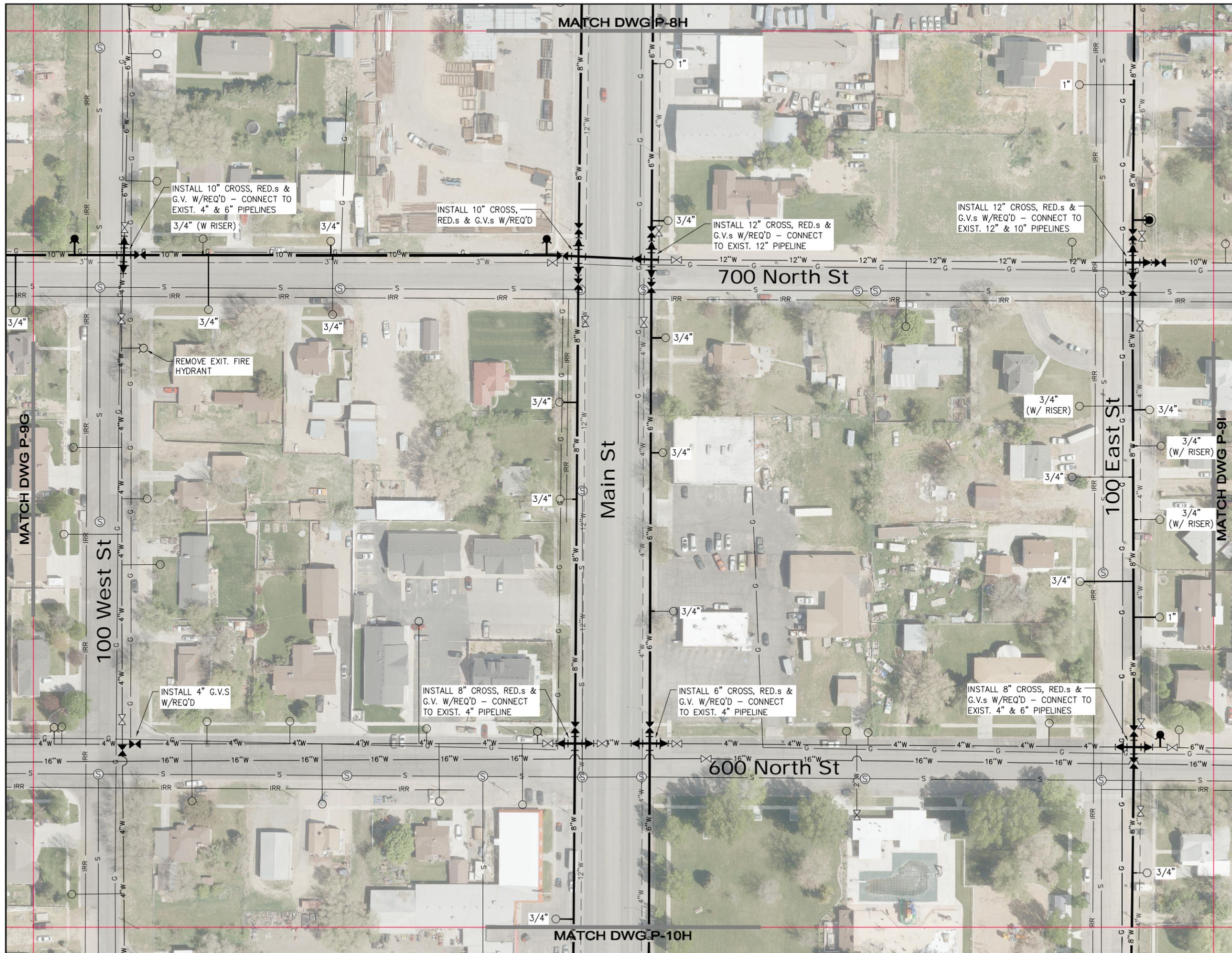
- NEW CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
- NEW METER SETTER ASSEMBLY (E D2)
- REPLACE EXIST. SERVICE CONNECTION (C D2) (D2)
- RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2)
- NEW FIRE HYDRANT (F D1)
- REPLACE EXIST. FIRE HYDRANT (F D1)
- RECONNECT EXIST. FIRE HYDRANT (G D1)
- NEW GATE VALVE (F D2)

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18
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NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018 PLAN SHEET		
SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 57	P-9G

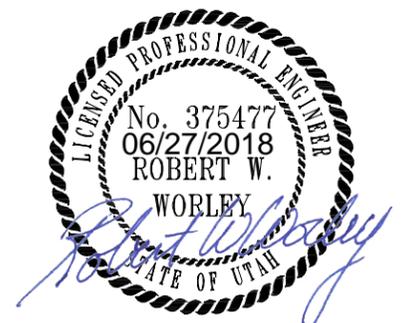
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LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
- NEW METER SETTER ASSEMBLY (E_{D2})
- REPLACE EXIST. SERVICE CONNECTION (C_{D2} / D_{D2})
- RECONNECT EXIST. SERVICE CONNECTION (A_{D2} / B_{D2})
- NEW FIRE HYDRANT (F_{D1})
- REPLACE EXIST. FIRE HYDRANT (F_{D1})
- RECONNECT EXIST. FIRE HYDRANT (G_{D1})
- NEW GATE VALVE (F_{D2})

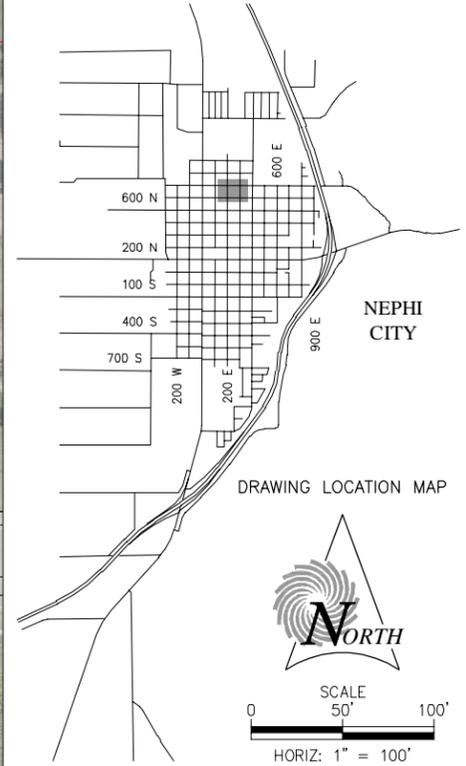
NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18
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NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018 PLAN SHEET		
SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 58	P-9H

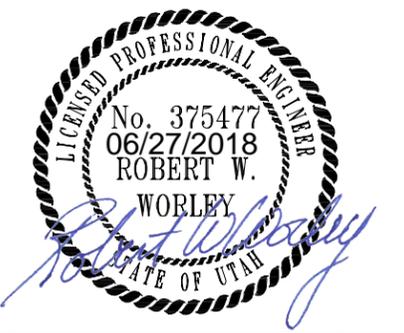
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MATCH DWG P-8I



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A B) (D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1		6-21-18



NEPHI CITY

CULINARY WATER IMPROVEMENTS PROJECT

2018

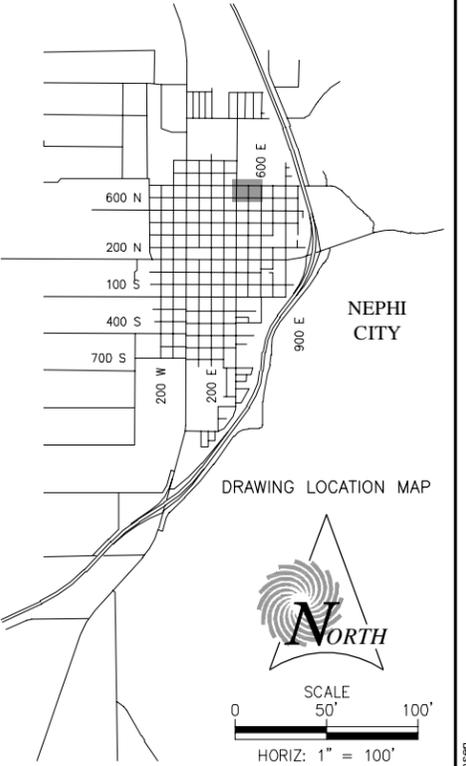
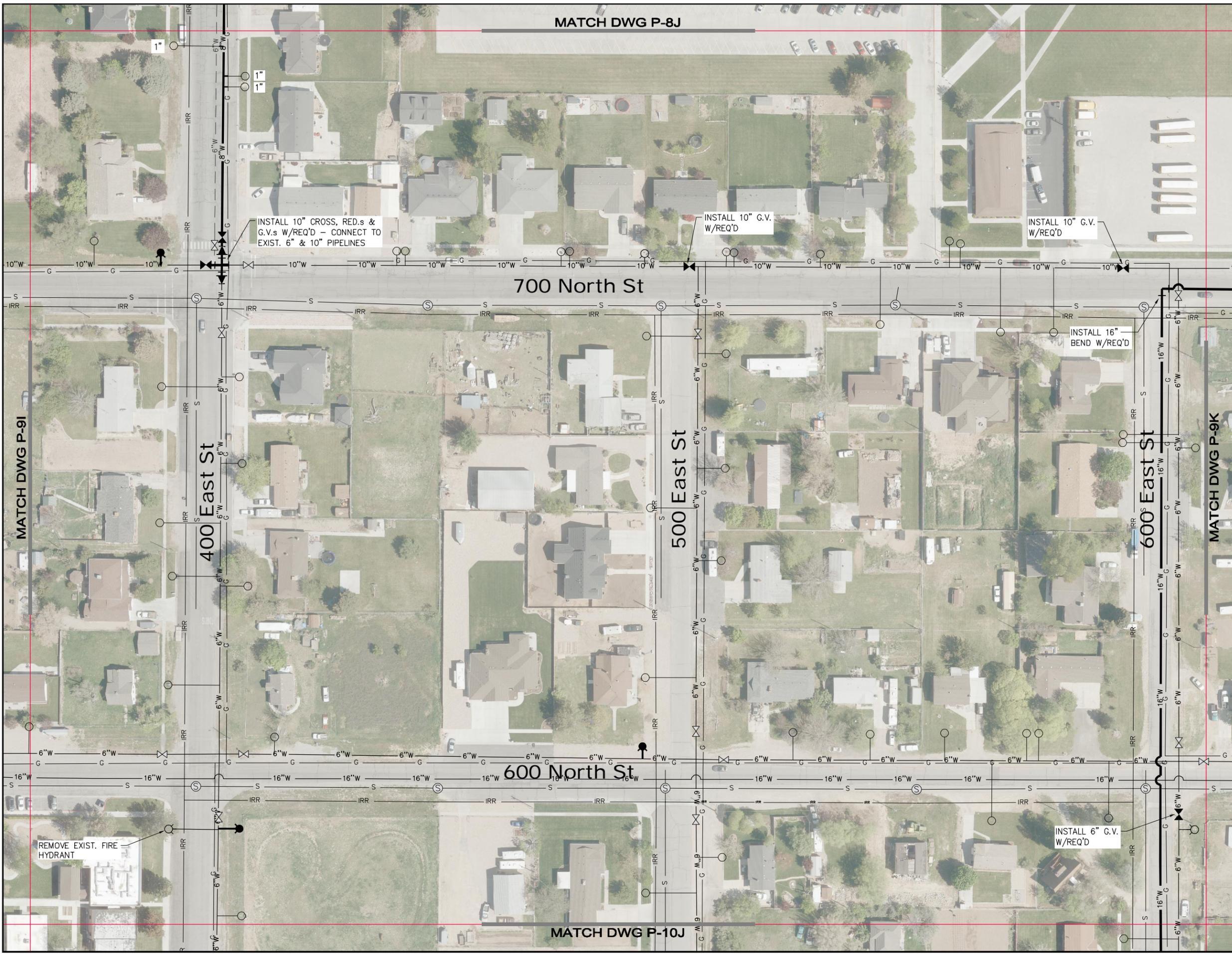
PLAN SHEET

SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	59	P-9I

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MATCH DWG P-8J

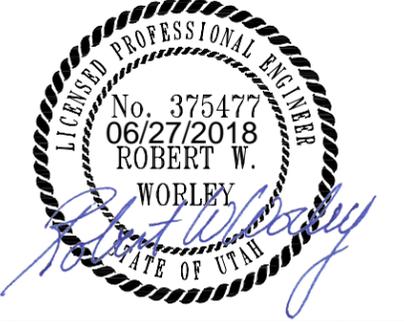
MATCH DWG P-10J



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
- NEW METER SETTER ASSEMBLY (E D2) ———
- REPLACE EXIST. SERVICE CONNECTION (C D2) (D2) ———
- RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
- NEW FIRE HYDRANT (F D1) ———
- REPLACE EXIST. FIRE HYDRANT (F D1) ———
- RECONNECT EXIST. FIRE HYDRANT (G D1) ———
- NEW GATE VALVE (F D2) ———

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18

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 2018
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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 60	P-9J
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MATCH DWG P-8K

MATCH DWG P-10K

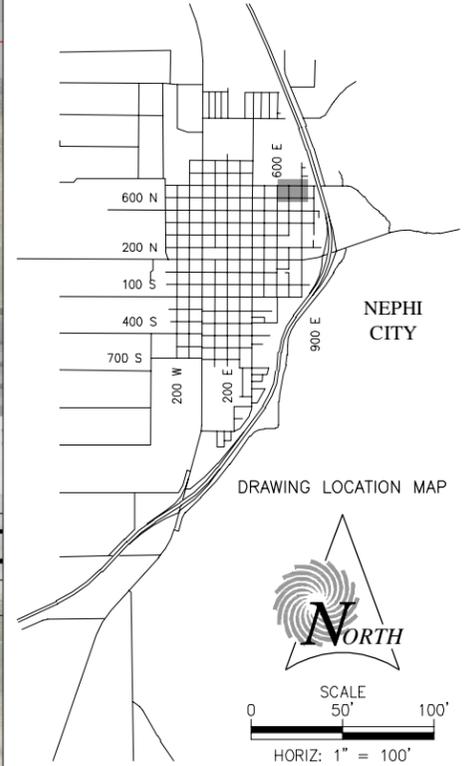
INSTALL 10" TEE & RED. W/REQ'D - CONNECT TO EXIST. 6" & 10" PIPELINES

INSTALL 16" CROSS, RED.s & G.V.s W/REQ'D - CONNECT TO EXIST. 10" PIPELINES

INSTALL 16" CROSS, RED.s, G.V. & BTV W/REQ'D - CONNECT TO EXIST. 8" PIPELINE

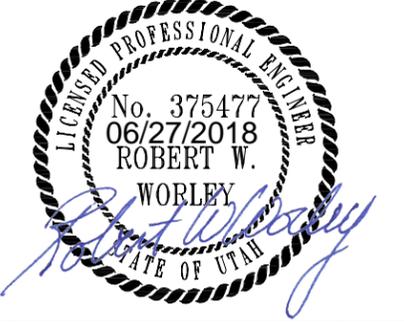
INSTALL 10" CROSS, RED. & G.V.s W/REQ'D - CONNECT TO EXIST. 6" & 10" PIPELINES

INSTALL 10" CROSS, RED.s & G.V.s W/REQ'D - CONNECT TO EXIST. 6" PIPELINES



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2)
 - REPLACE EXIST. SERVICE CONNECTION (C D2 / D2)
 - RECONNECT EXIST. SERVICE CONNECTION (A B / B D2)
 - NEW FIRE HYDRANT (F D1)
 - REPLACE EXIST. FIRE HYDRANT (F D1)
 - RECONNECT EXIST. FIRE HYDRANT (G D1)
 - NEW GATE VALVE (G D2)
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18



NEPHI CITY
CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 61	P-9K
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MATCH DWG P-8L

MATCH DWG P-10L

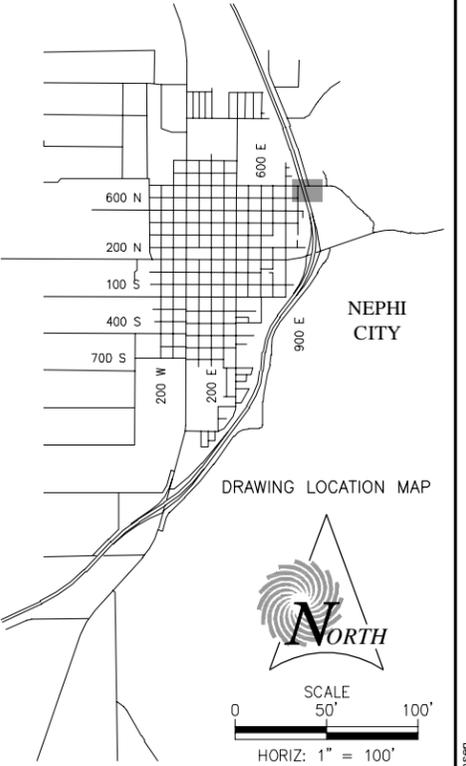
INSTALL 16" TEE, RED. & BTV W/REQ'D - CONNECT TO EXIST. 8" PIPELINE

INSTALL 16" CROSS, RED.s & BTV W/REQ'D - CONNECT TO EXIST. 8" PIPELINES

700 North St Golf Course Rd

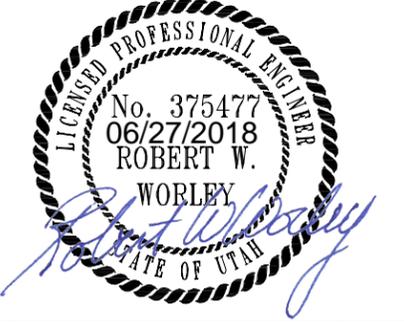
900 East St

600 North St



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) [Symbol]
 - REPLACE EXIST. SERVICE CONNECTION (C D2) [Symbol]
 - RECONNECT EXIST. SERVICE CONNECTION (A B D2) [Symbol]
 - NEW FIRE HYDRANT (F D1) [Symbol]
 - REPLACE EXIST. FIRE HYDRANT (F D1) [Symbol]
 - RECONNECT EXIST. FIRE HYDRANT (G D1) [Symbol]
 - NEW GATE VALVE (F D2) [Symbol]
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



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CULINARY WATER IMPROVEMENTS PROJECT		
2018		
PLAN SHEET		
SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 62	P-9L

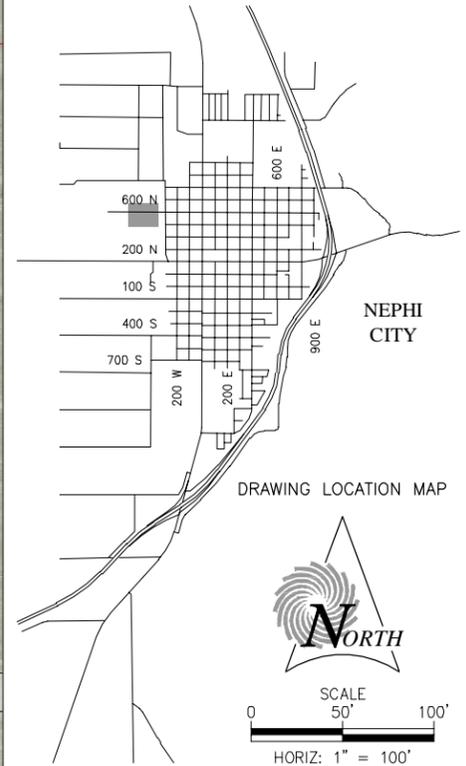
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MATCH DWG P-9F

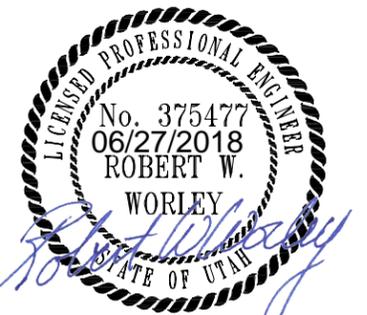
500 North St

MATCH DWG P-10G

MATCH DWG P-11F



**NO
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REV. NO.	GENERAL REVISIONS FOR BIDS COMMENT	DATE
1		6-21-18



25 EAST 500 NORTH
FILLMORE, UTAH 84631
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www.sunrise-eng.com

NEPHI CITY

**CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET**

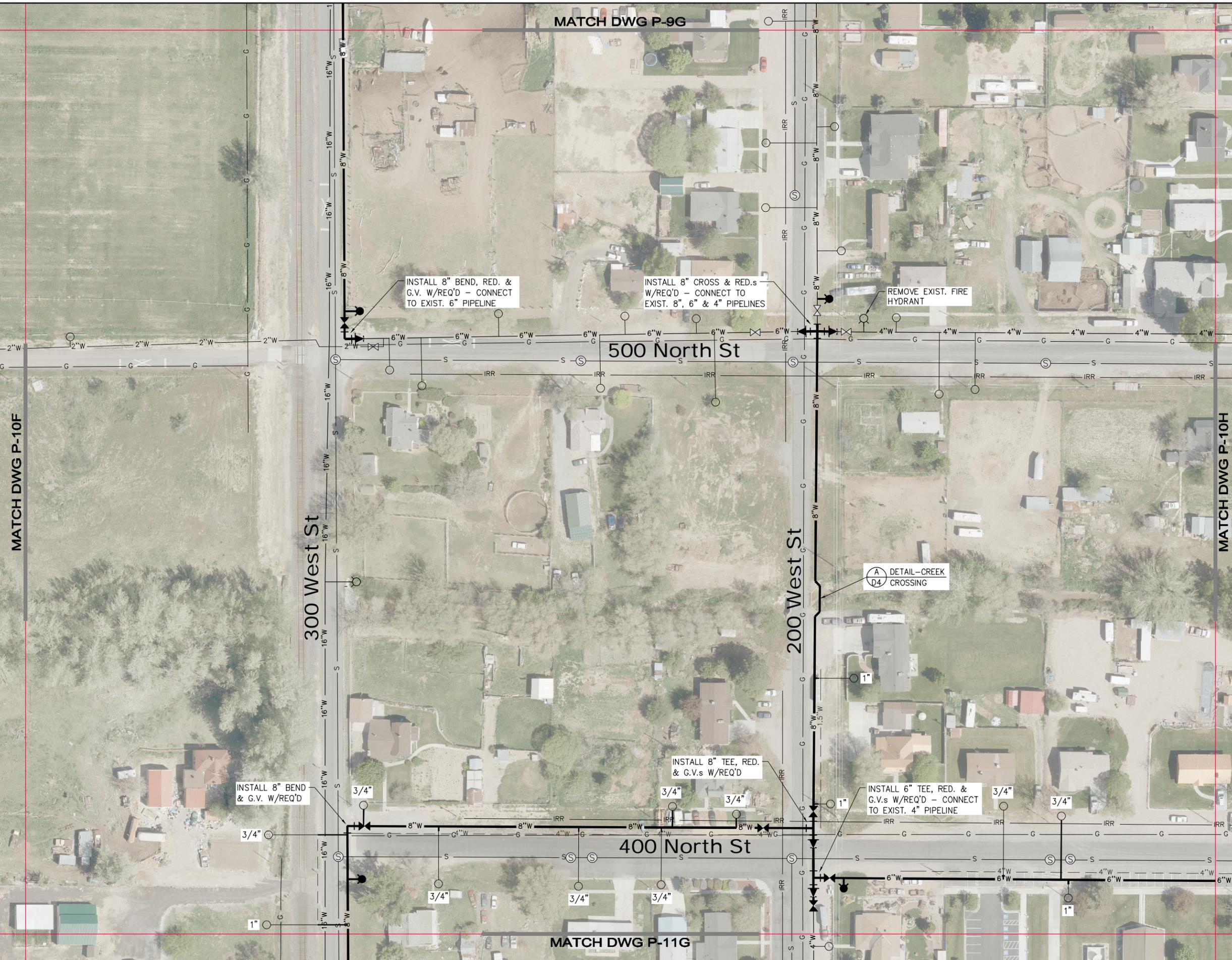
SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	65	P-10F

P:\Nephi\05884 - Nephi Culinary Water Improvements Project - 2017\Design\dwg\iphi-P streets.DWG Jun 27, 2018 10:09am cchistensen

MATCH DWG P-9G

MATCH DWG P-10F

MATCH DWG P-10H



INSTALL 8" BEND, RED. & G.V. W/REQ'D - CONNECT TO EXIST. 6" PIPELINE

INSTALL 8" CROSS & RED.s W/REQ'D - CONNECT TO EXIST. 8", 6" & 4" PIPELINES

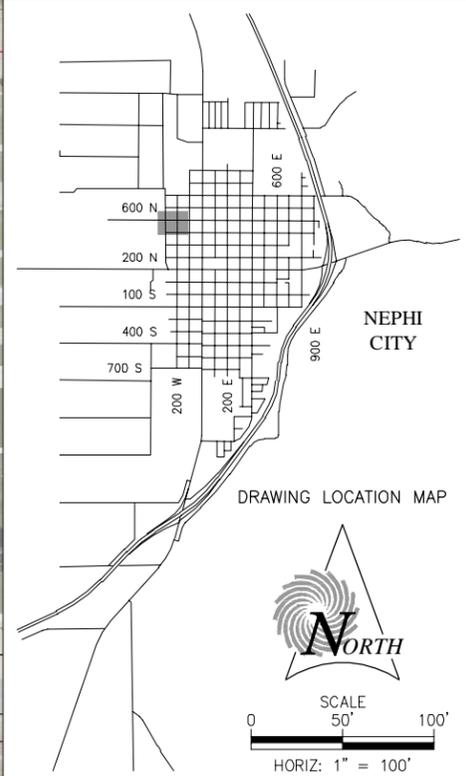
REMOVE EXIST. FIRE HYDRANT

A
D4
DETAIL - CREEK CROSSING

INSTALL 8" BEND & G.V. W/REQ'D

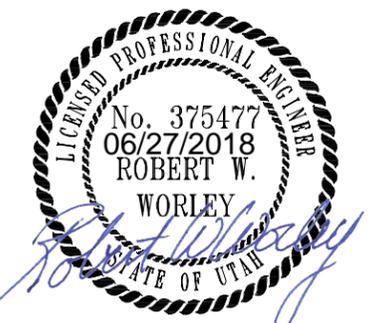
INSTALL 8" TEE, RED. & G.V.s W/REQ'D

INSTALL 6" TEE, RED. & G.V.s W/REQ'D - CONNECT TO EXIST. 4" PIPELINE



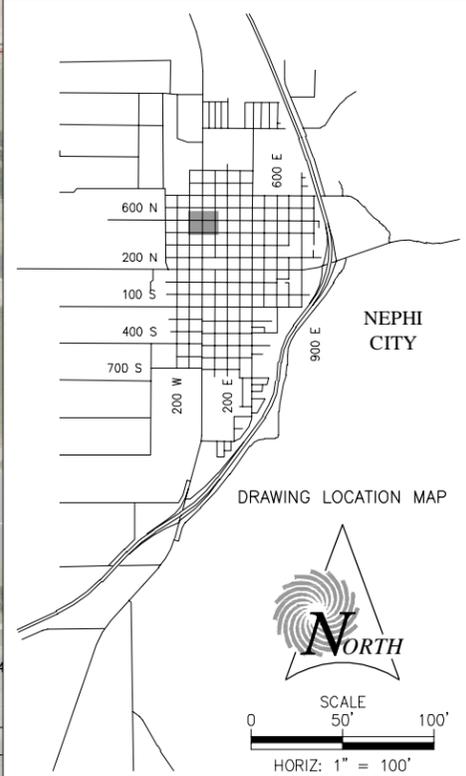
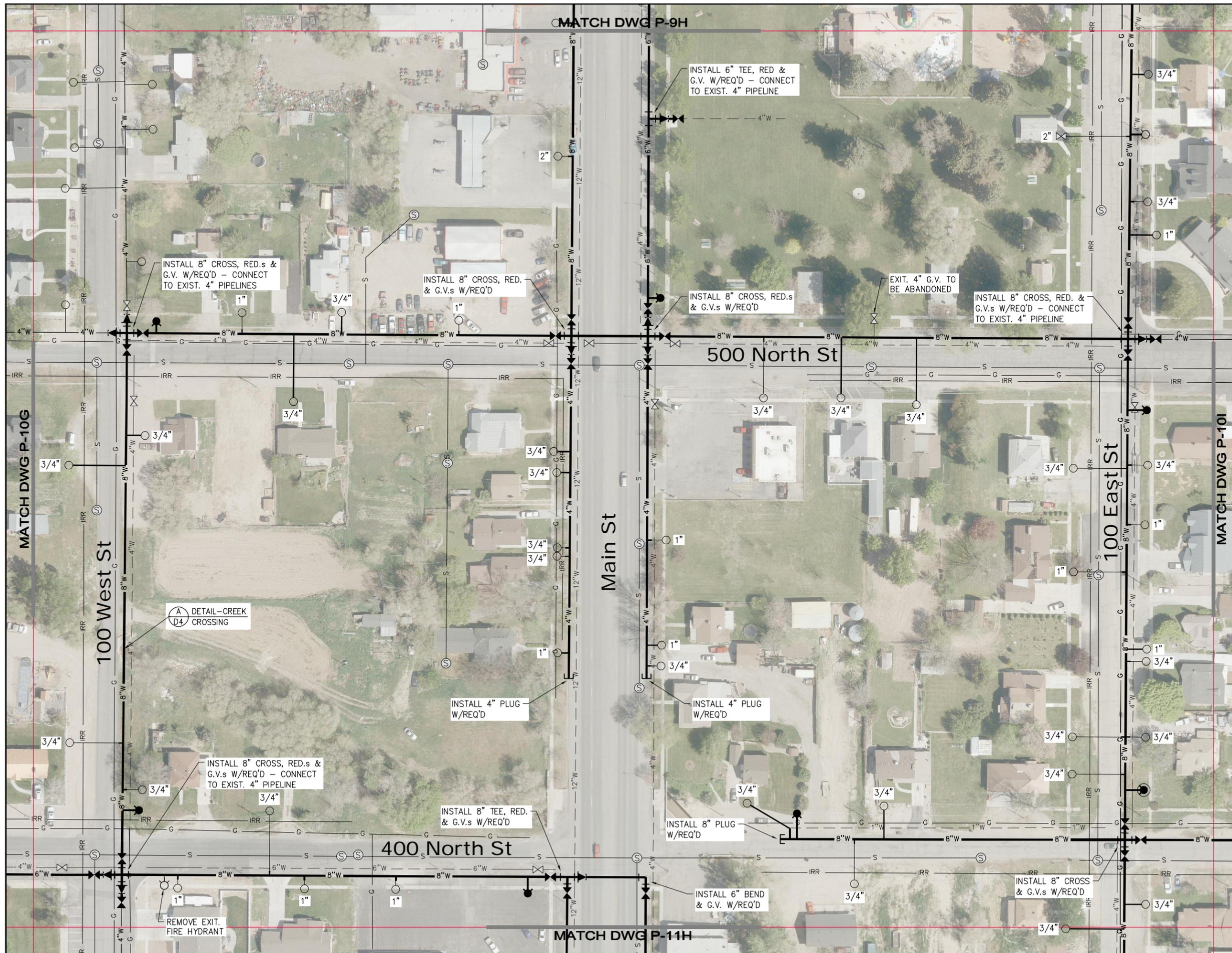
LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2 / D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A B / D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18
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SUNRISE ENGINEERING 25 EAST 500 NORTH FILLMORE, UTAH 84631 TEL 435.743.6151 FAX 435.743.7900 www.sunrise-eng.com		
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SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 66	P-10G

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LEGEND

NEW CULINARY WATER PIPELINE	— x"W —
EXIST. CULINARY WATER PIPELINE	- - - x"W - - -
EXIST. CULINARY WATER PIPELINE TO BE ABANDONED	- - - x"W - - -
NEW METER SETTER ASSEMBLY	(E) D2
REPLACE EXIST. SERVICE CONNECTION	(C) D2 (D) D2
RECONNECT EXIST. SERVICE CONNECTION	(A) D2 (B) D2
NEW FIRE HYDRANT	(F) D1
REPLACE EXIST. FIRE HYDRANT	(F) D1
RECONNECT EXIST. FIRE HYDRANT	(G) D1
NEW GATE VALVE	(F) D2

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18
REV. NO.	COMMENT	DATE

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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 67	P-10H
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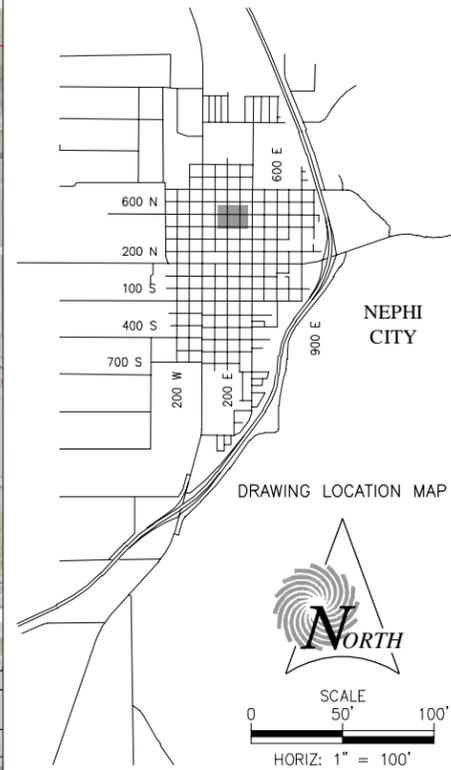
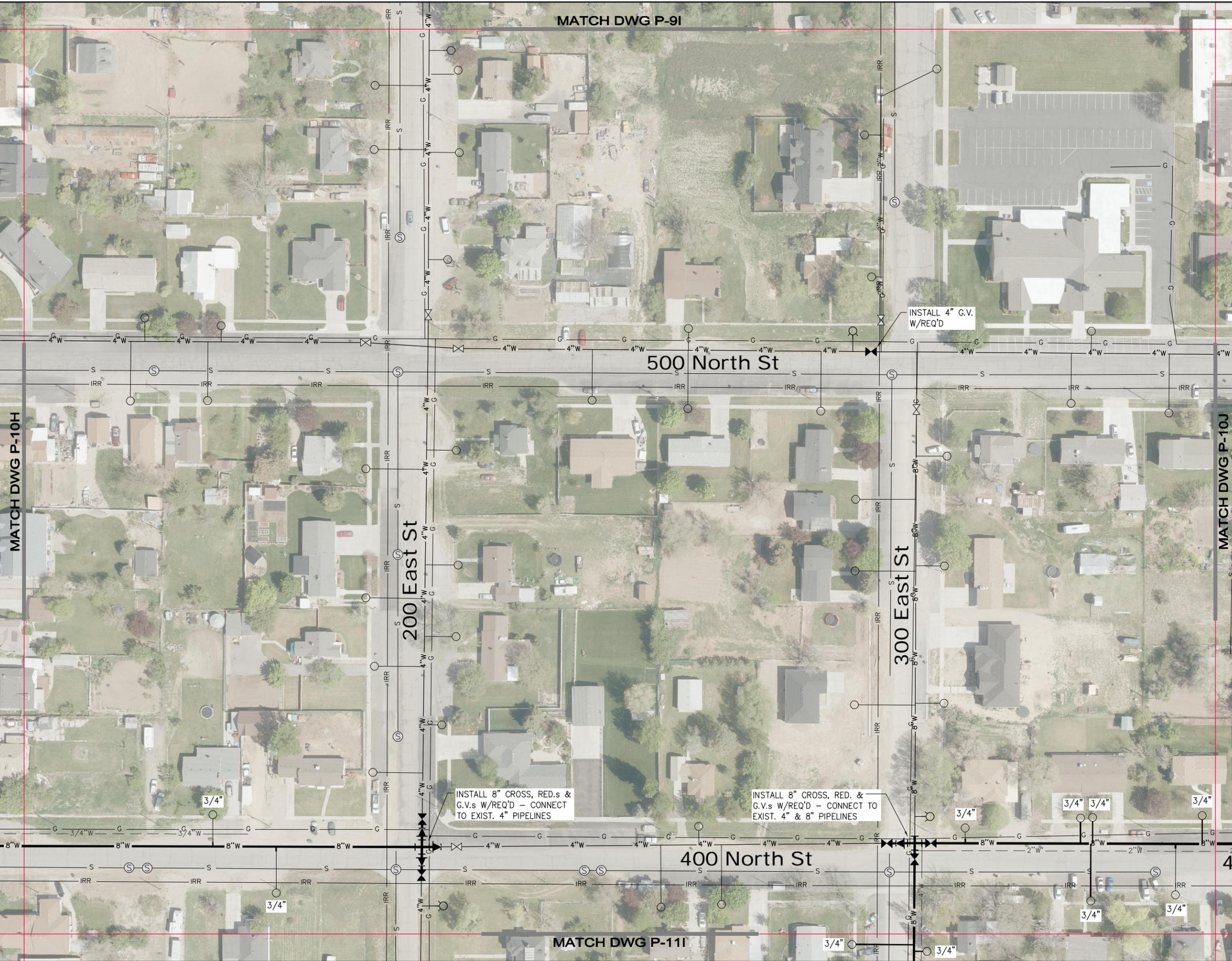
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MATCH DWG P-9I

MATCH DWG P-10H

MATCH DWG P-10J

MATCH DWG P-11I



LEGEND

- NEW CULINARY WATER PIPELINE ——— 4"W ———
 - EXIST. CULINARY WATER PIPELINE ——— 4"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - 4"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A B) (B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND

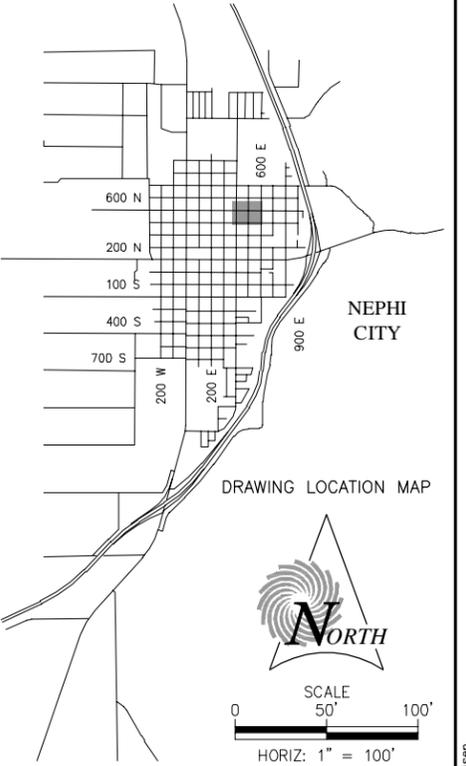
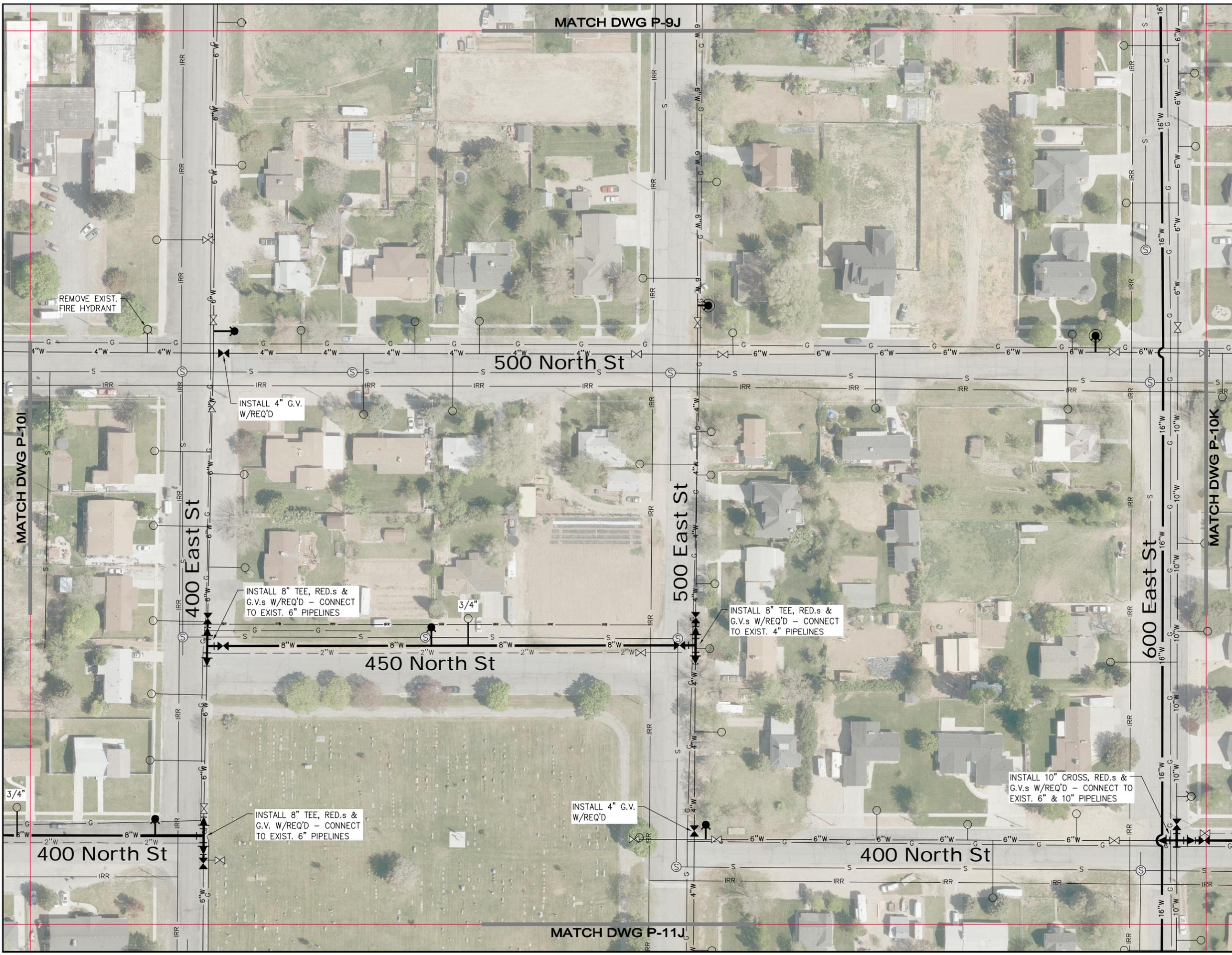


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CHECKED RWW	SHEET NO. 68	P-10I

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MATCH DWG P-9J

MATCH DWG P-11J



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) [Symbol]
 - REPLACE EXIST. SERVICE CONNECTION (C D2) [Symbol]
 - RECONNECT EXIST. SERVICE CONNECTION (A B D2) [Symbol]
 - NEW FIRE HYDRANT (F D1) [Symbol]
 - REPLACE EXIST. FIRE HYDRANT (F D1) [Symbol]
 - RECONNECT EXIST. FIRE HYDRANT (F D1) [Symbol]
 - NEW GATE VALVE (F D2) [Symbol]
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18
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CHECKED RWW	SHEET NO. 69	P-10J

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MATCH DWG P-9K

500 North St

700 East St

800 East St

400 North St

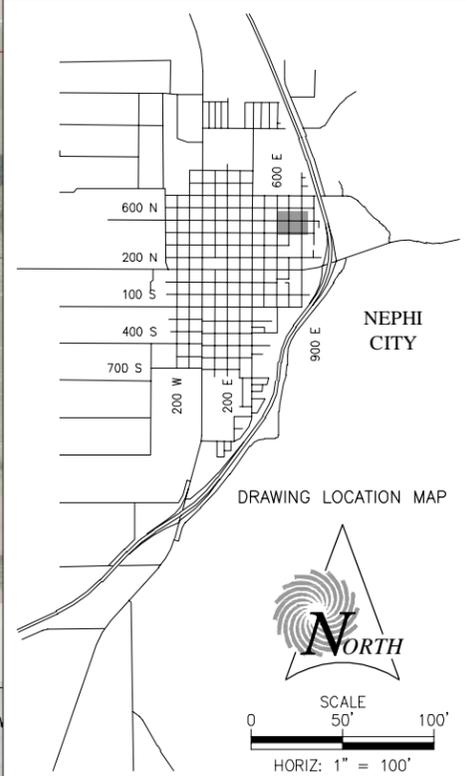
MATCH DWG P-11K

INSTALL 10" G.V. W/REQ'D

CONNECT TO EXIST. 6" PIPELINE

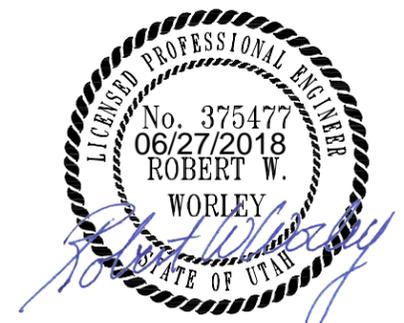
INSTALL 6" CROSS & G.V.s W/REQ'D

INSTALL 8" CROSS, RED.s & G.V. W/REQ'D - CONNECT TO EXIST. 6" PIPELINES



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (G D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND

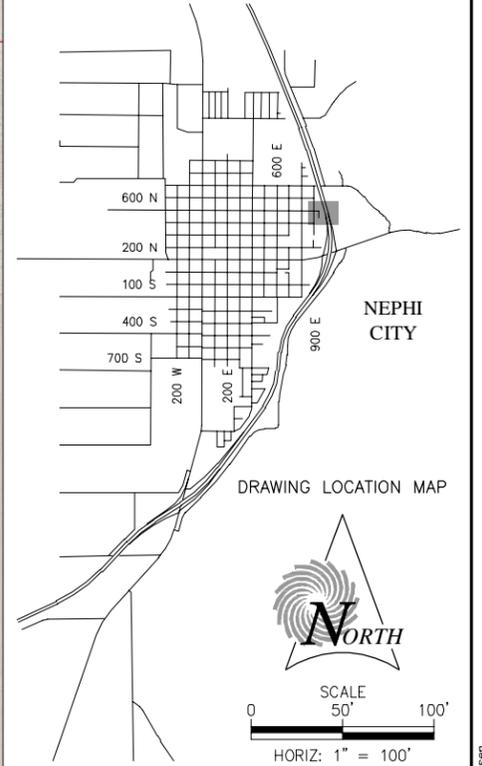
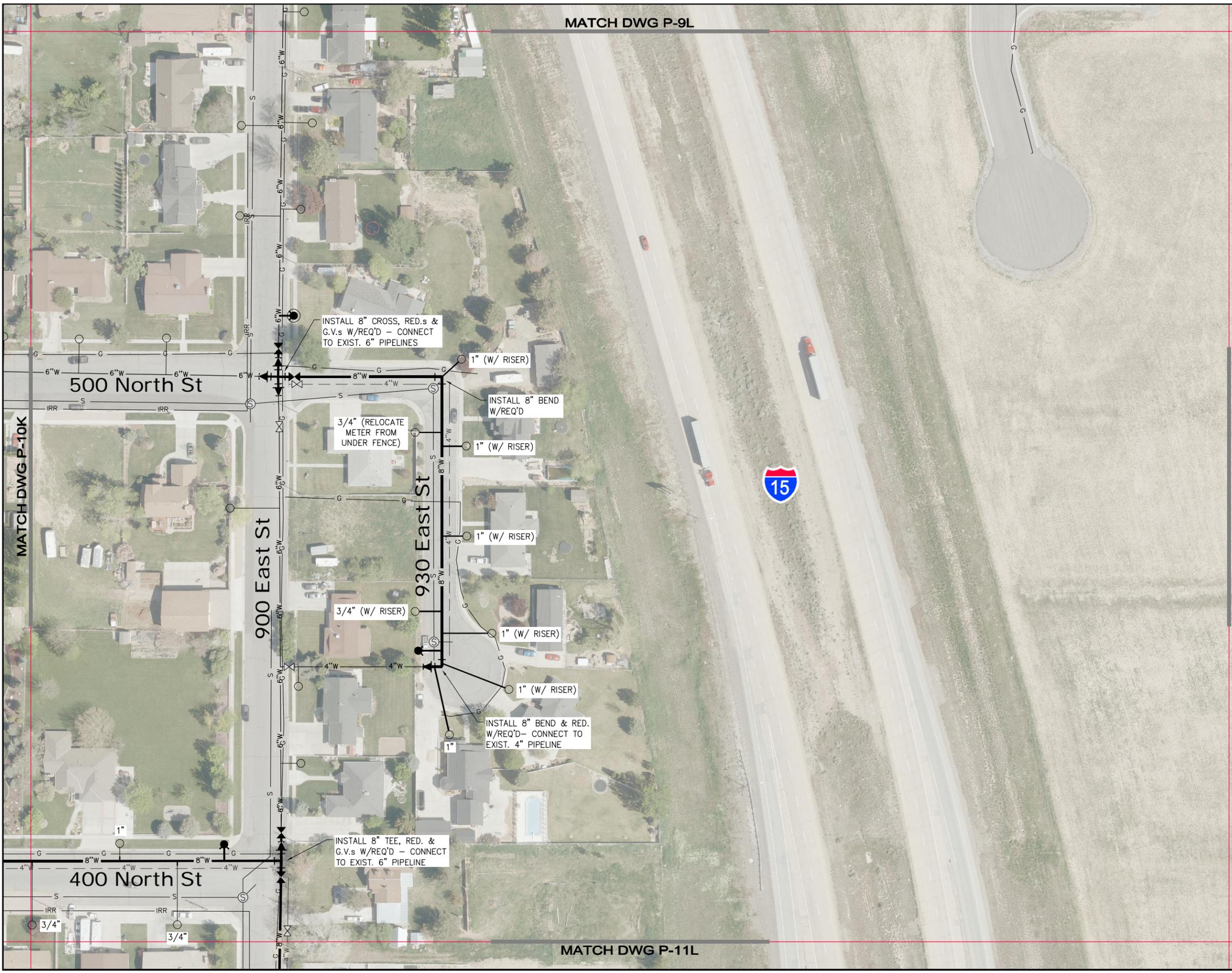


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CHECKED RWW	SHEET NO. 70	P-10K

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MATCH DWG P-9L

MATCH DWG P-11L



LEGEND

NEW CULINARY WATER PIPELINE	— x"W —
EXIST. CULINARY WATER PIPELINE	— x"W —
EXIST. CULINARY WATER PIPELINE TO BE ABANDONED	- - - x"W - - -
NEW METER SETTER ASSEMBLY	(E/D2)
REPLACE EXIST. SERVICE CONNECTION	(C/D2) (D/D2)
RECONNECT EXIST. SERVICE CONNECTION	(A/B) (D2)
NEW FIRE HYDRANT	(F/D1)
REPLACE EXIST. FIRE HYDRANT	(F/D1)
RECONNECT EXIST. FIRE HYDRANT	(G/D1)
NEW GATE VALVE	(F/D2)

NOTE: SEE DWG G3 FOR COMPLETE LEGEND

LICENSED PROFESSIONAL ENGINEER
 No. 375477
 06/27/2018
ROBERT W. WORLEY
 STATE OF UTAH

REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	6-21-18	


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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 71	P-10L
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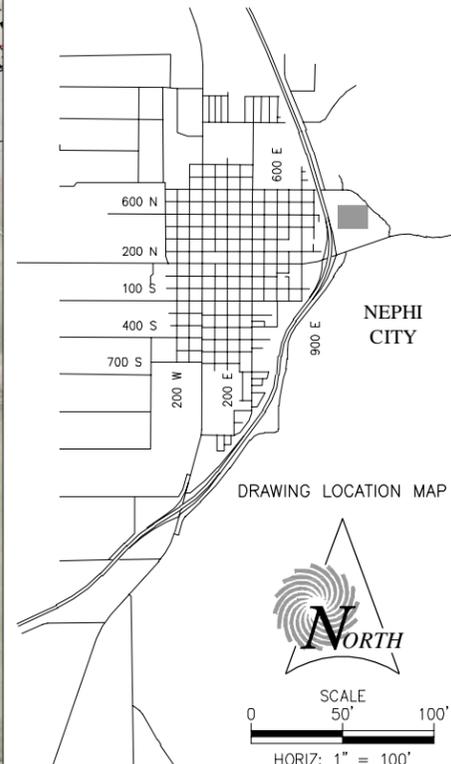
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MATCH DWG P-9M

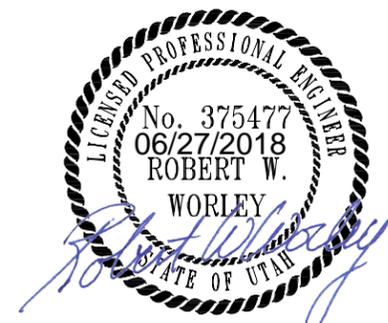
MATCH DWG P-10L

MATCH DWG P-10N

MATCH DWG P-11M



**NO
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1		6-21-18



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2018
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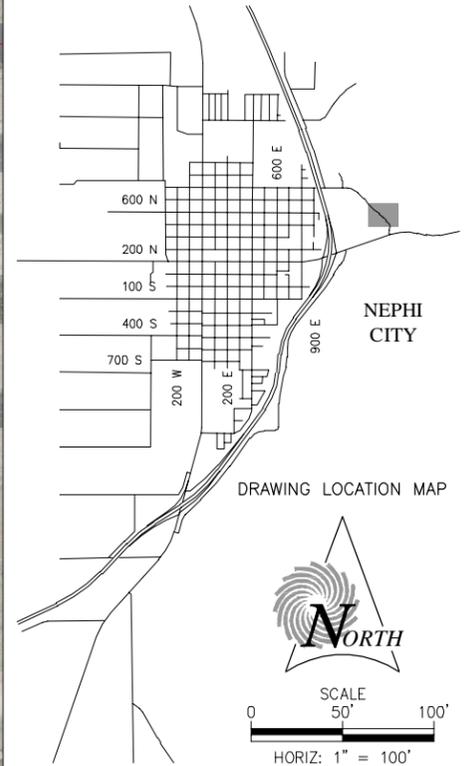
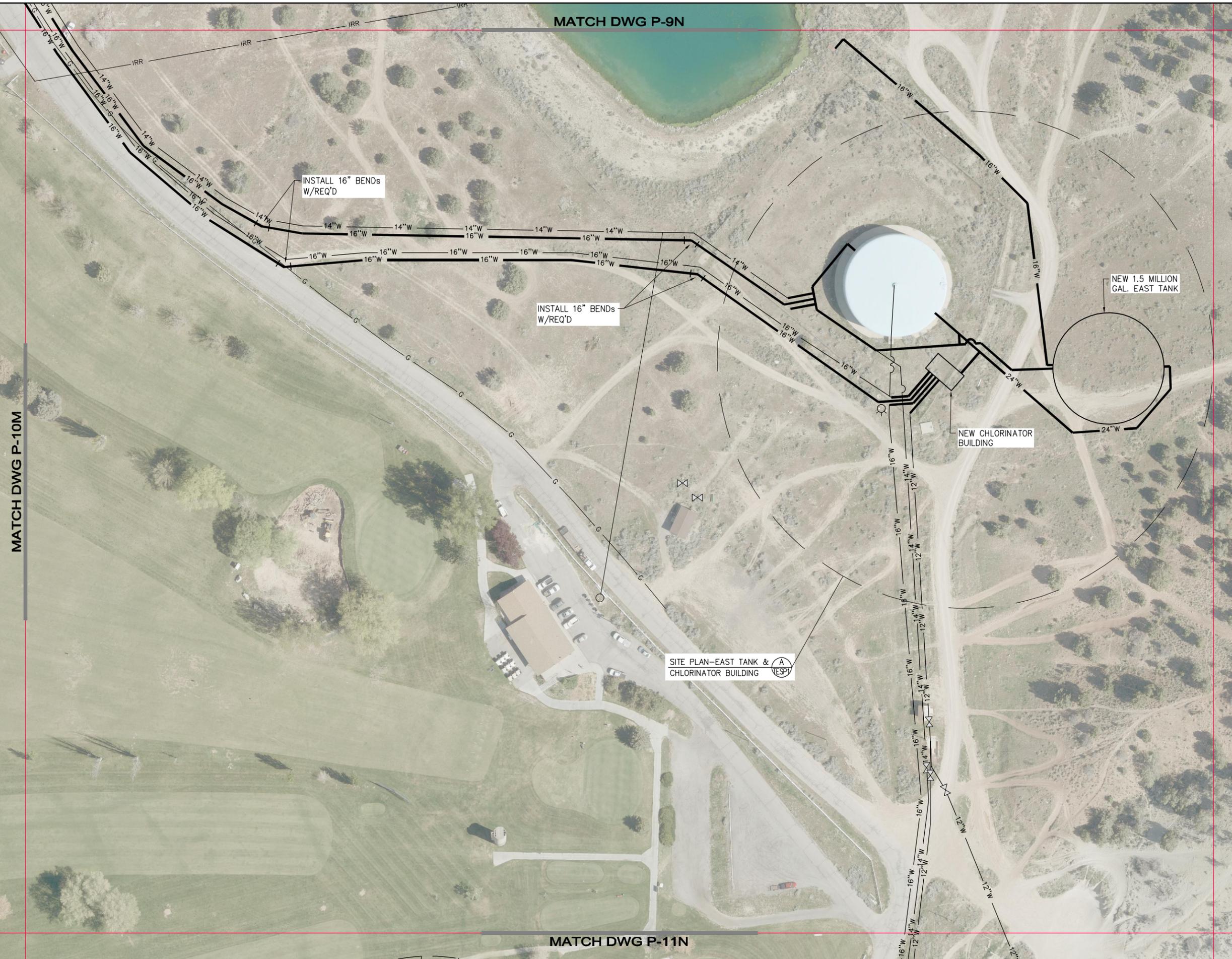
SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.	
05884	JCI	CJC	RWW	72	P-10M

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MATCH DWG P-9N

MATCH DWG P-10M

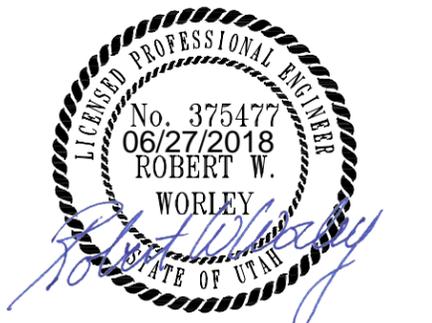
MATCH DWG P-11N



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
- NEW METER SETTER ASSEMBLY (E D2) ———
- REPLACE EXIST. SERVICE CONNECTION (C D2 / D D2) ———
- RECONNECT EXIST. SERVICE CONNECTION (A D2 / B D2) ———
- NEW FIRE HYDRANT (F D1) ———
- REPLACE EXIST. FIRE HYDRANT (F D1) ———
- RECONNECT EXIST. FIRE HYDRANT (G D1) ———
- NEW GATE VALVE (F D2) ———

NOTE: SEE DWG G3 FOR COMPLETE LEGEND

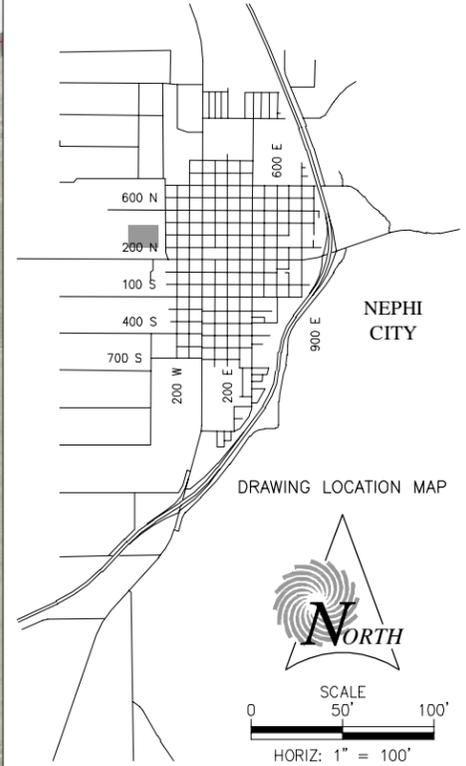


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SEI NO. 05884	DESIGNED JCI	DRAWN CJC
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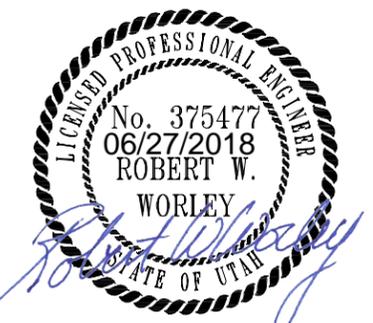
MATCH DWG P-10F

MATCH DWG P-12F

MATCH DWG P-11G



**NO
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1		6-21-18



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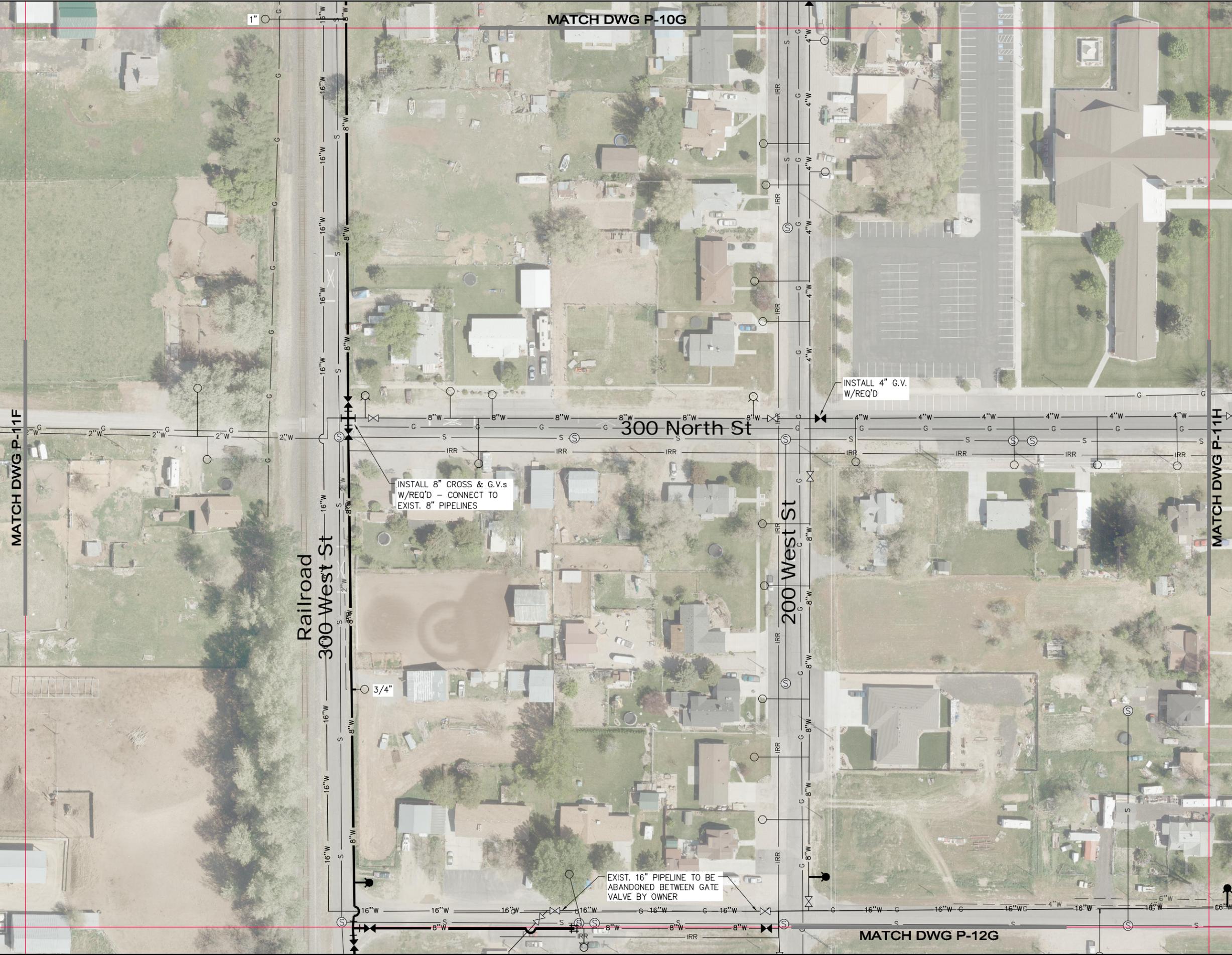
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05884	JCI	CJC	RWW	74	P-11F

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MATCH DWG P-10G

MATCH DWG P-11F

MATCH DWG P-11H



INSTALL 8" CROSS & G.V.s
W/REQ'D - CONNECT TO
EXIST. 8" PIPELINES

INSTALL 4" G.V.
W/REQ'D

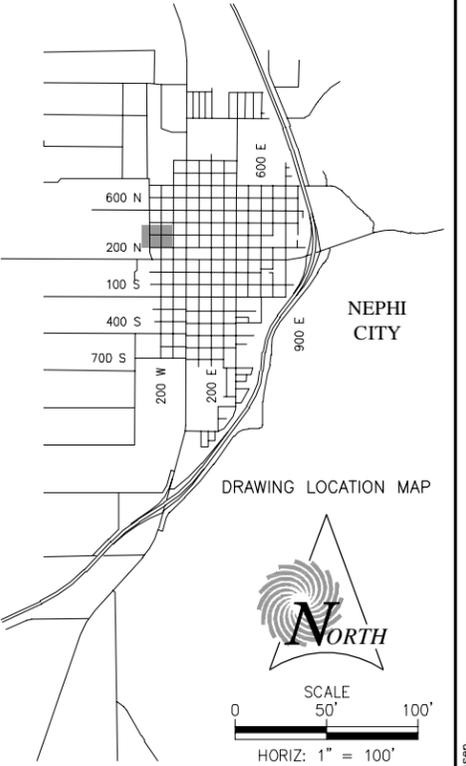
300 North St

200 West St

Railroad
300 West St

EXIST. 16" PIPELINE TO BE
ABANDONED BETWEEN GATE
VALVE BY OWNER

MATCH DWG P-12G



SCALE
50'
100'
HORIZ: 1" = 100'

LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - - x"W - - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2 / D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A D2 / B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



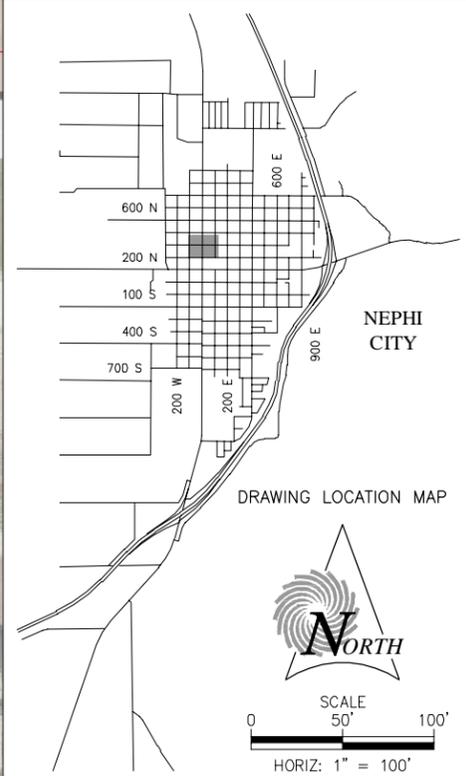
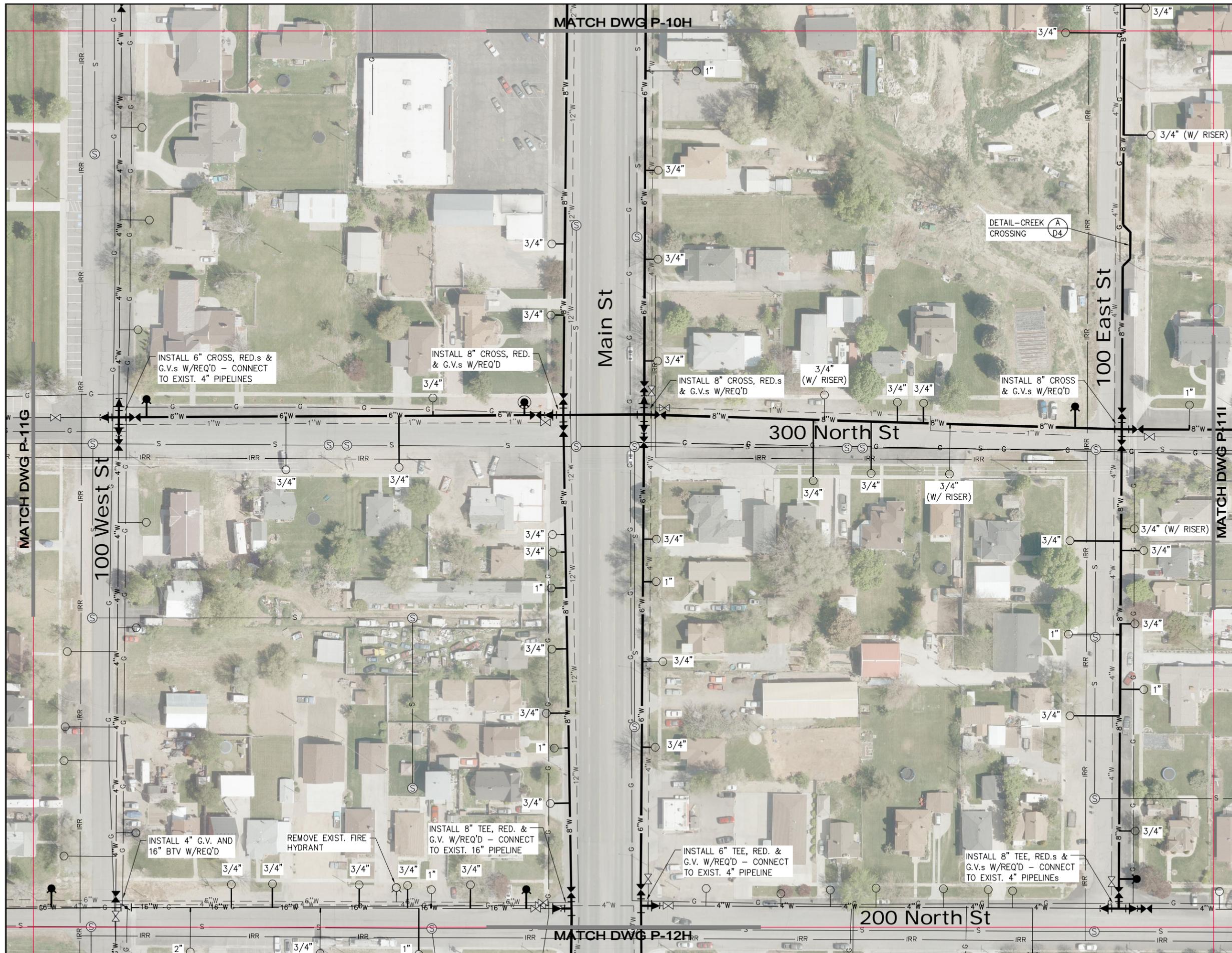
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1	GENERAL REVISIONS FOR BIDS	6-21-18



NEPHI CITY
 CULINARY WATER IMPROVEMENTS PROJECT
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SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 75	P-11G
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LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
- NEW METER SETTER ASSEMBLY (E_{D2}) ●
- REPLACE EXIST. SERVICE CONNECTION TO BE ABANDONED (C_{D2} / D₂) ○
- RECONNECT EXIST. SERVICE CONNECTION (A_{D2} / B_{D2}) ○
- NEW FIRE HYDRANT (F_{D1}) ●
- REPLACE EXIST. FIRE HYDRANT (F_{D1}) ○
- RECONNECT EXIST. FIRE HYDRANT (G_{D1}) ○
- NEW GATE VALVE (F_{D2}) x

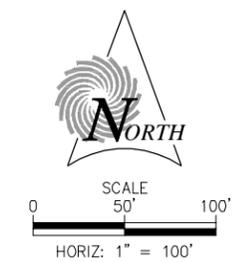
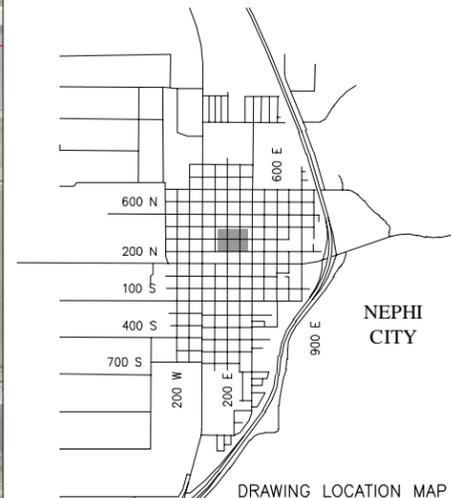
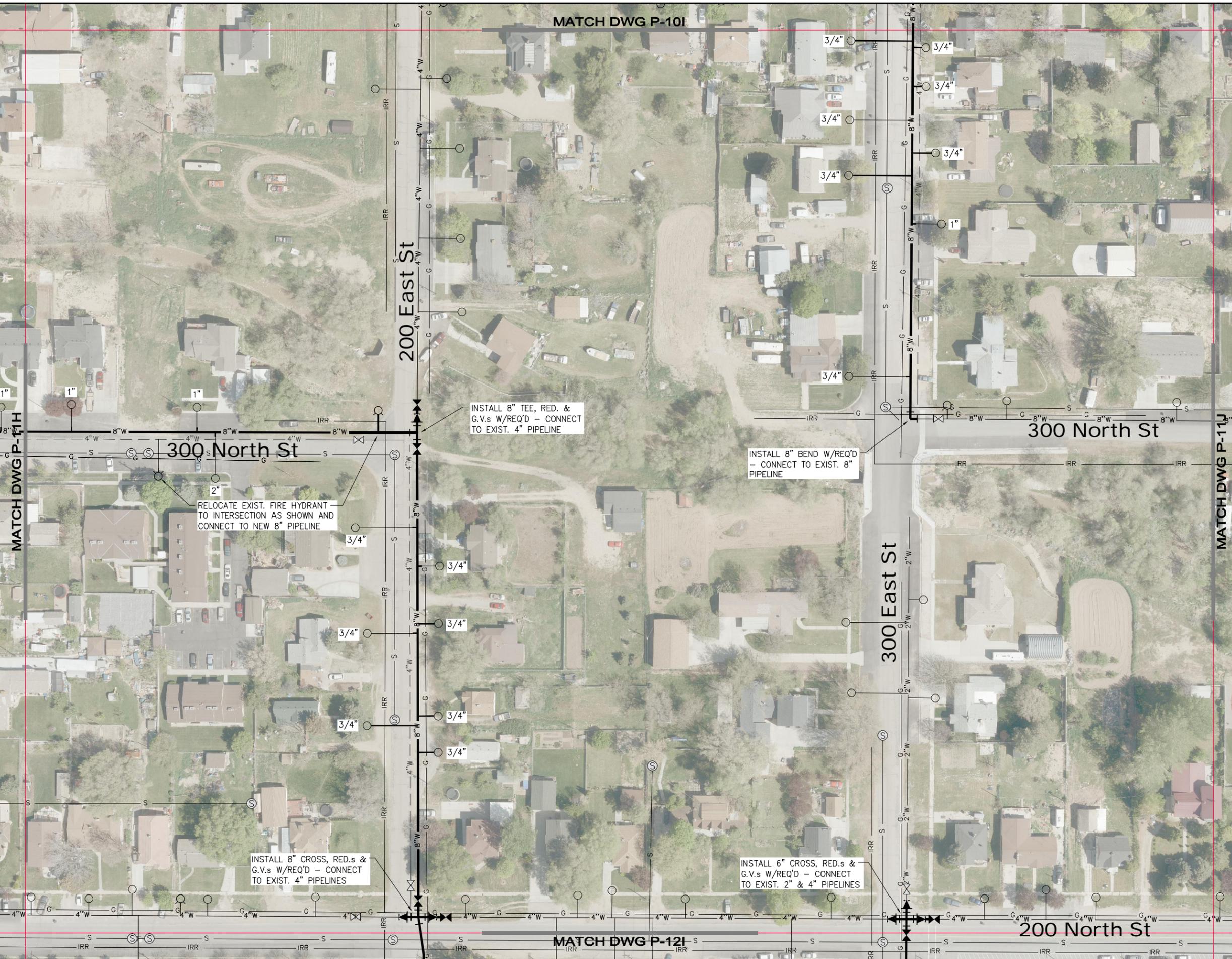
NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18
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MATCH DWG P-101



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18



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SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.
05884	JCI	CJC	RWW	77

P-111

MATCH DWG P-121

200 North St

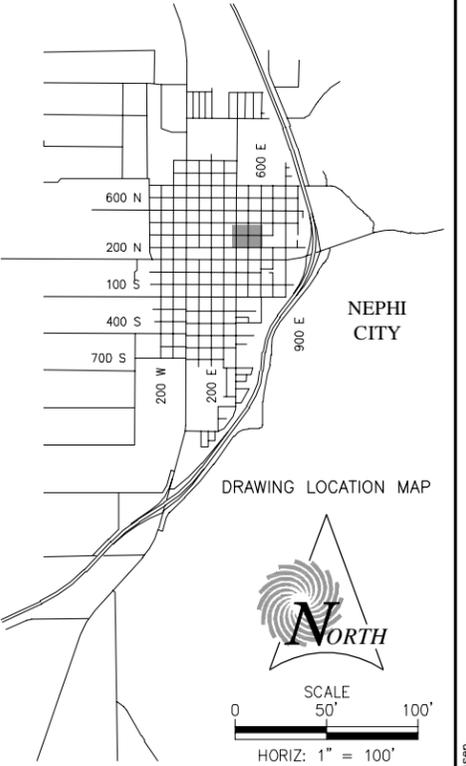
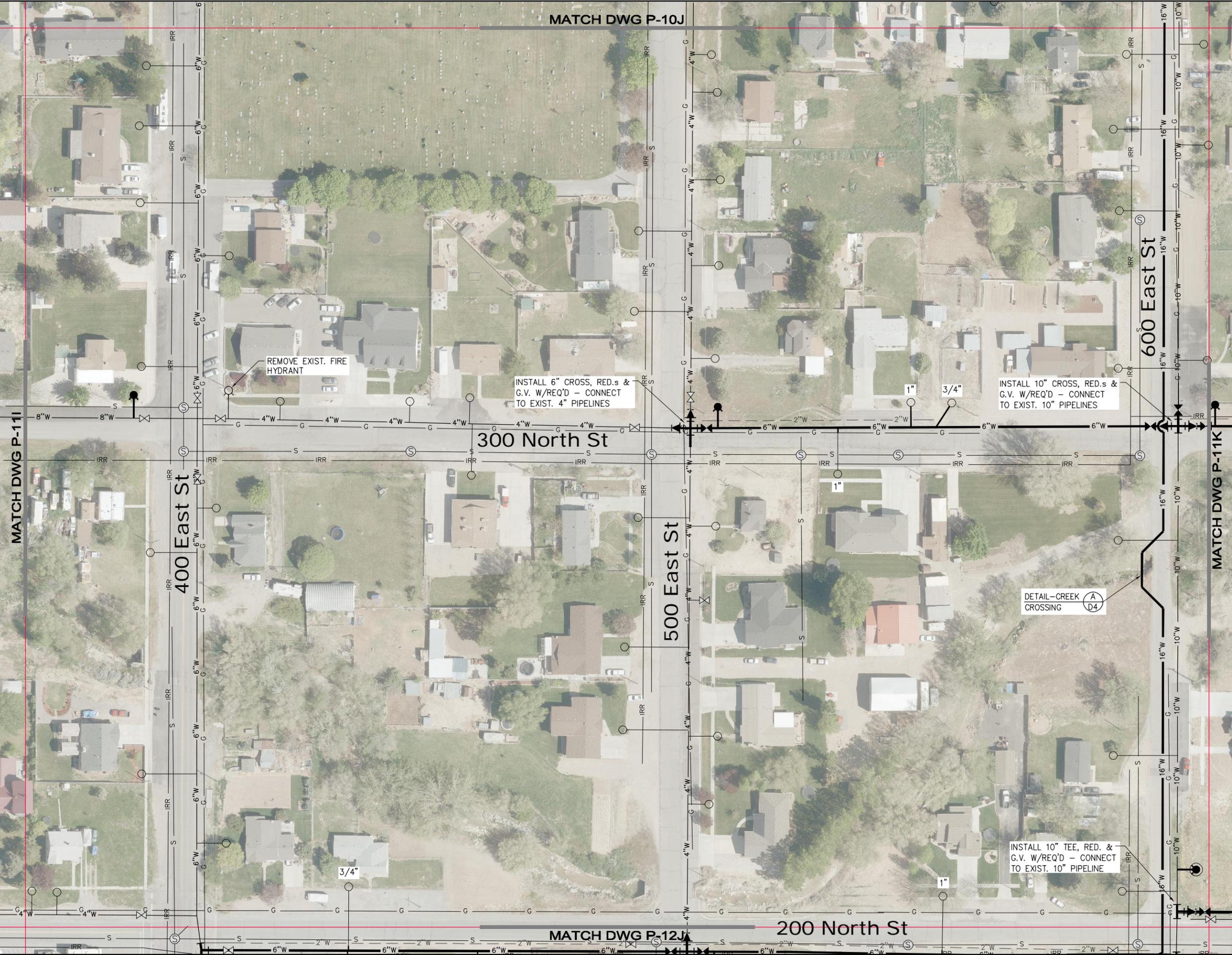
MATCH DWG P-11H

MATCH DWG P-11J

MATCH DWG P-10J

MATCH DWG P-11I

MATCH DWG P-11K



LEGEND

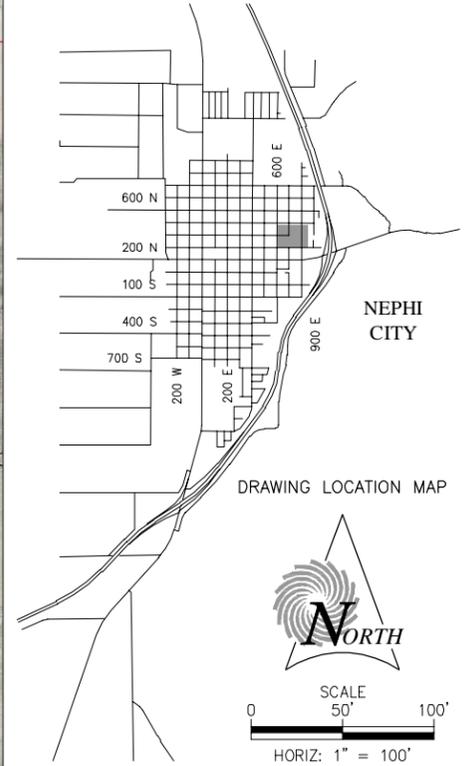
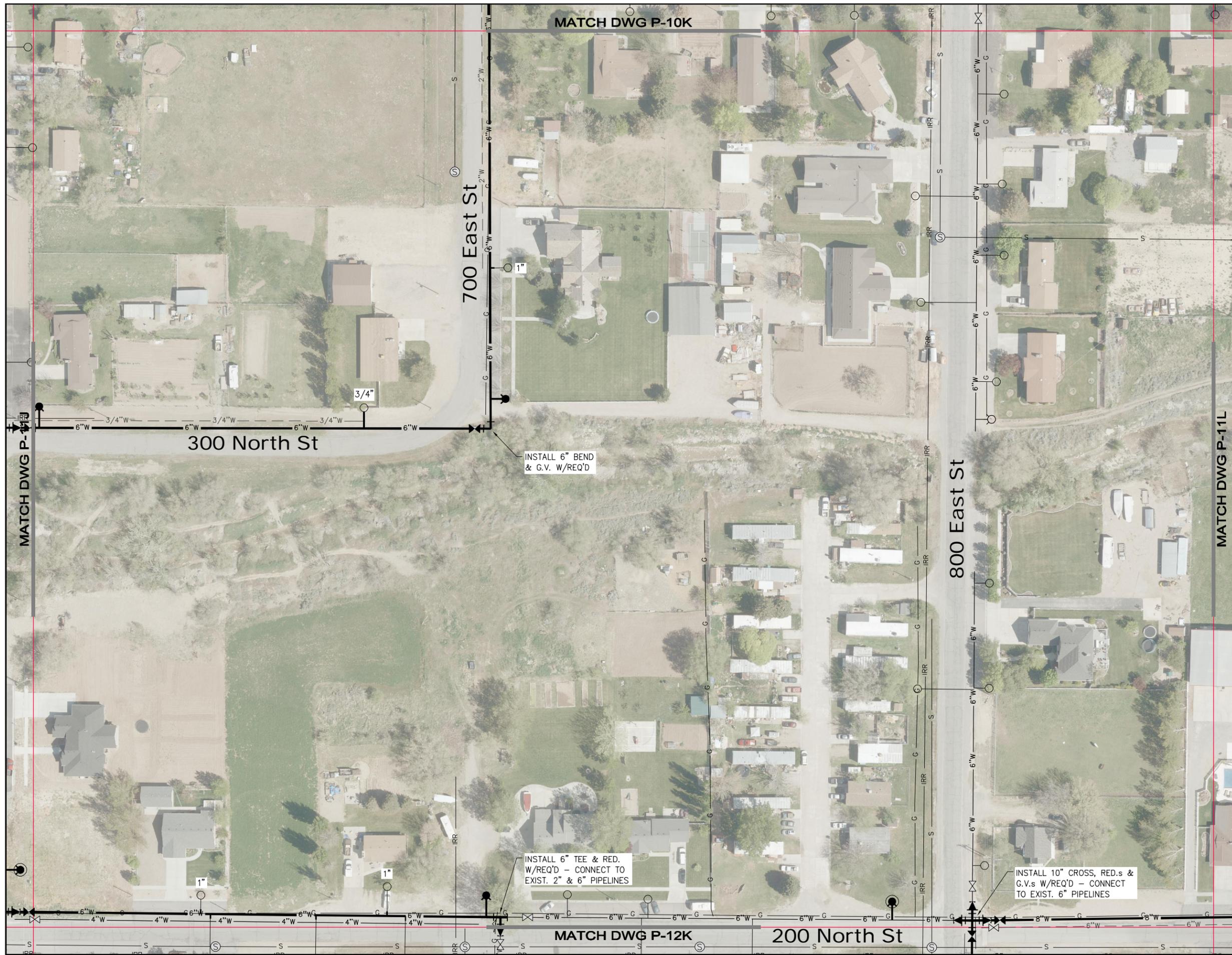
- NEW CULINARY WATER PIPELINE ——— x"W
- EXIST. CULINARY WATER PIPELINE ——— x"W
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W
- NEW METER SETTER ASSEMBLY (E D2)
- REPLACE EXIST. SERVICE CONNECTION (C D2)
- RECONNECT EXIST. SERVICE CONNECTION (A B)
- NEW FIRE HYDRANT (F D1)
- REPLACE EXIST. FIRE HYDRANT (F D1)
- RECONNECT EXIST. FIRE HYDRANT (F D1)
- NEW GATE VALVE (F D2)

NOTE: SEE DWG G3 FOR COMPLETE LEGEND

LICENSED PROFESSIONAL ENGINEER
 No. 375477
 06/27/2018
 ROBERT W. WORLEY
 STATE OF UTAH

1	GENERAL REVISIONS FOR BIDS	6-21-18
REV. NO.	COMMENT	DATE
 SUNRISE ENGINEERING 25 EAST 500 NORTH FILLMORE, UTAH 84631 TEL 435.743.6151 / FAX 435.743.7900 www.sunrise-eng.com		
NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018 PLAN SHEET		
SEI NO. 05884	DESIGNED JCI	DRAWN CJC
CHECKED RWW	SHEET NO. 78	P-11J

P:\Nephi\05884 - Nephi Culinary Water Improvements Project - 2017\Design\dwg\nephi-P streets.DWG Jun 27, 2018 10:13am corstensen



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE ——— x"W ———
- EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
- NEW METER SETTER ASSEMBLY (E D2) ———
- REPLACE EXIST. SERVICE CONNECTION (C D2 / D2 D2) ———
- RECONNECT EXIST. SERVICE CONNECTION (A D2 / B D2) ———
- NEW FIRE HYDRANT (F D1) ———
- REPLACE EXIST. FIRE HYDRANT (F D1) ———
- RECONNECT EXIST. FIRE HYDRANT (G D1) ———
- NEW GATE VALVE (F D2) ———

NOTE: SEE DWG G3 FOR COMPLETE LEGEND



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18

SUNRISE ENGINEERING

25 EAST 500 NORTH
 FILLMORE, UTAH 84631
 TEL 435.743.6151 / FAX 435.743.7900
 www.sunrise-eng.com

NEPHI CITY
 CULINARY WATER IMPROVEMENTS PROJECT
 2018
 PLAN SHEET

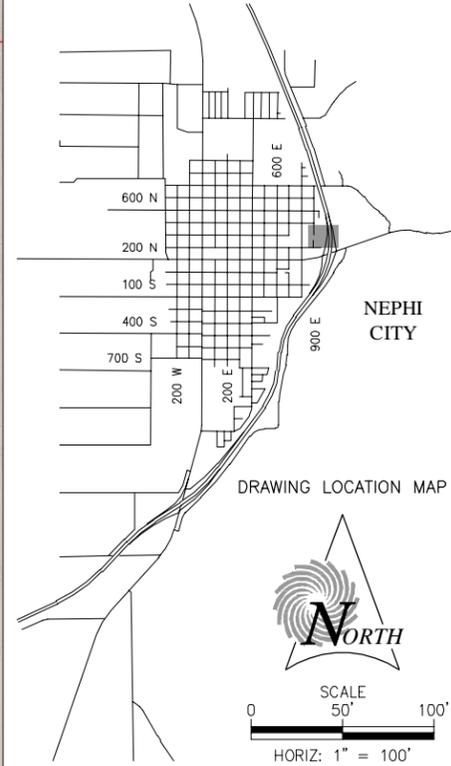
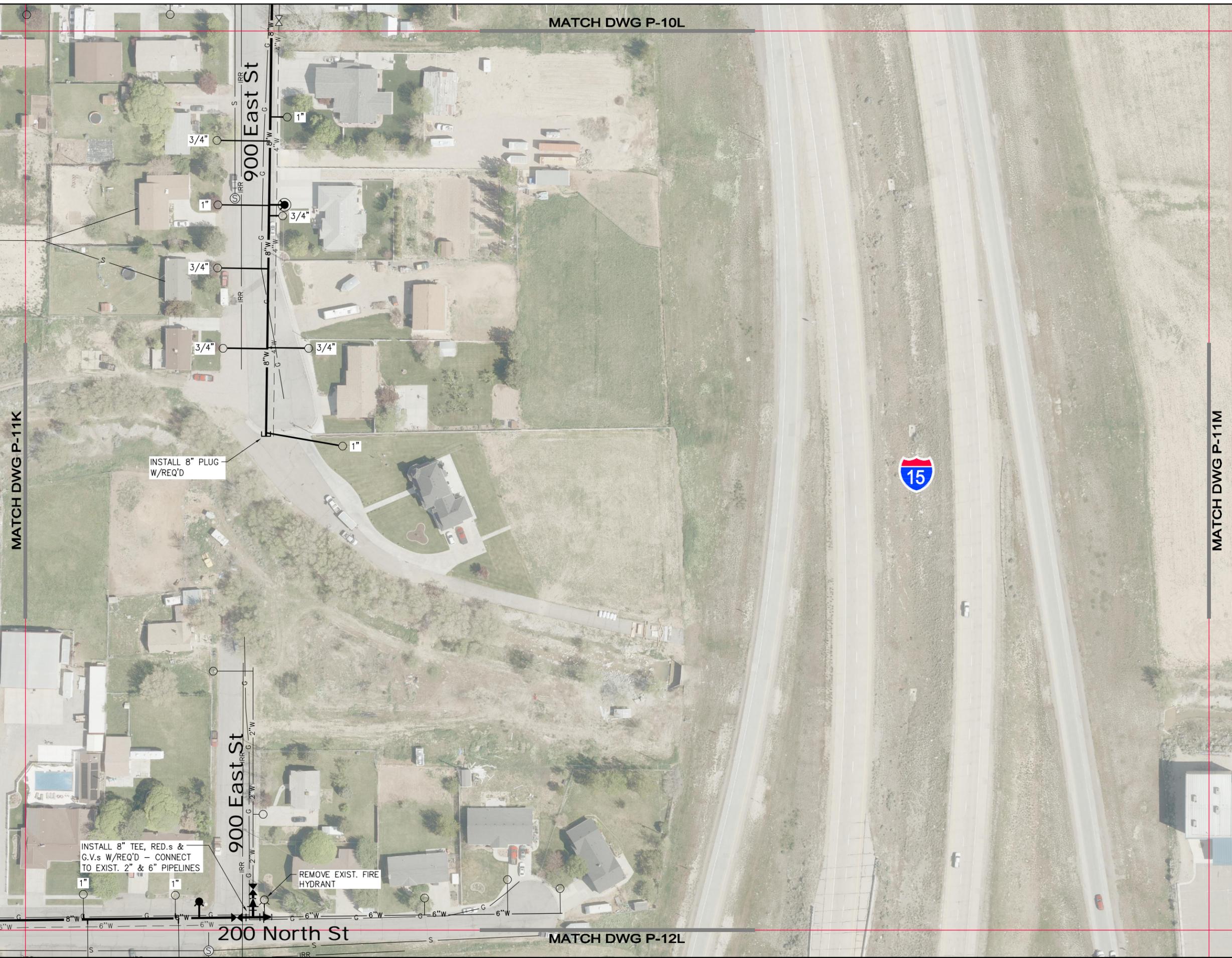
SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 79	P-11K
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MATCH DWG P-10L

MATCH DWG P-11K

MATCH DWG P-11M



LEGEND

- NEW CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE ——— x"W ———
 - EXIST. CULINARY WATER PIPELINE TO BE ABANDONED - - - x"W - - -
 - NEW METER SETTER ASSEMBLY (E D2) ———
 - REPLACE EXIST. SERVICE CONNECTION (C D2) (D D2) ———
 - RECONNECT EXIST. SERVICE CONNECTION (A D2) (B D2) ———
 - NEW FIRE HYDRANT (F D1) ———
 - REPLACE EXIST. FIRE HYDRANT (F D1) ———
 - RECONNECT EXIST. FIRE HYDRANT (G D1) ———
 - NEW GATE VALVE (F D2) ———
- NOTE: SEE DWG G3 FOR COMPLETE LEGEND



1	GENERAL REVISIONS FOR BIDS	6-21-18			
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NEPHI CITY CULINARY WATER IMPROVEMENTS PROJECT 2018 PLAN SHEET					
SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 80	P-11L

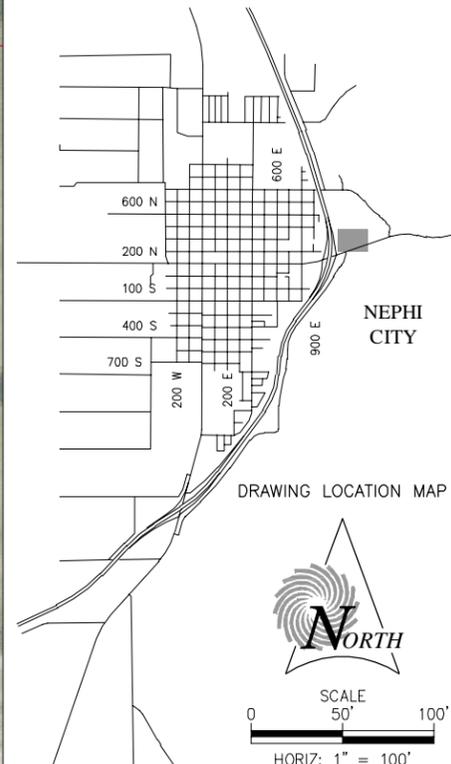
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MATCH DWG P-10M

MATCH DWG P-11L

MATCH DWG P-11N

MATCH DWG P-12M



**NO
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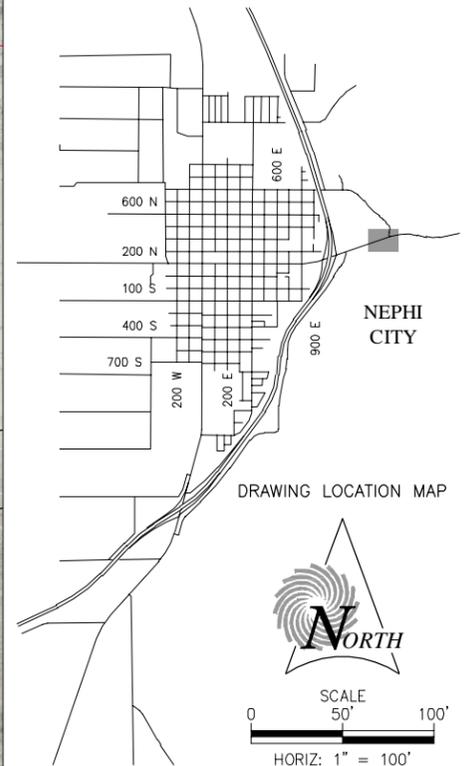
CULINARY WATER IMPROVEMENTS PROJECT
2018
PLAN SHEET

SEI NO. 05884	DESIGNED JCI	DRAWN CJC	CHECKED RWW	SHEET NO. 81	P-11M
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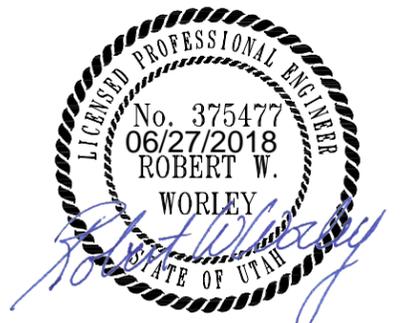
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MATCH DWG P-10N

MATCH DWG P-11M



**NO
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SHEET**



REV. NO.	GENERAL REVISIONS FOR BIDS	DATE
1	GENERAL REVISIONS FOR BIDS	6-21-18



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05884	JCI	CJC	RWW	82	

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