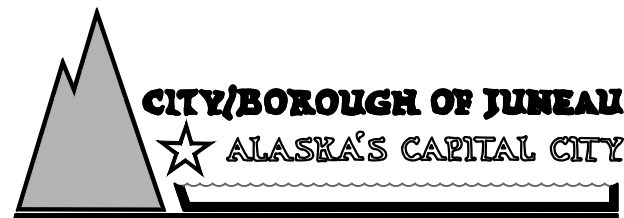
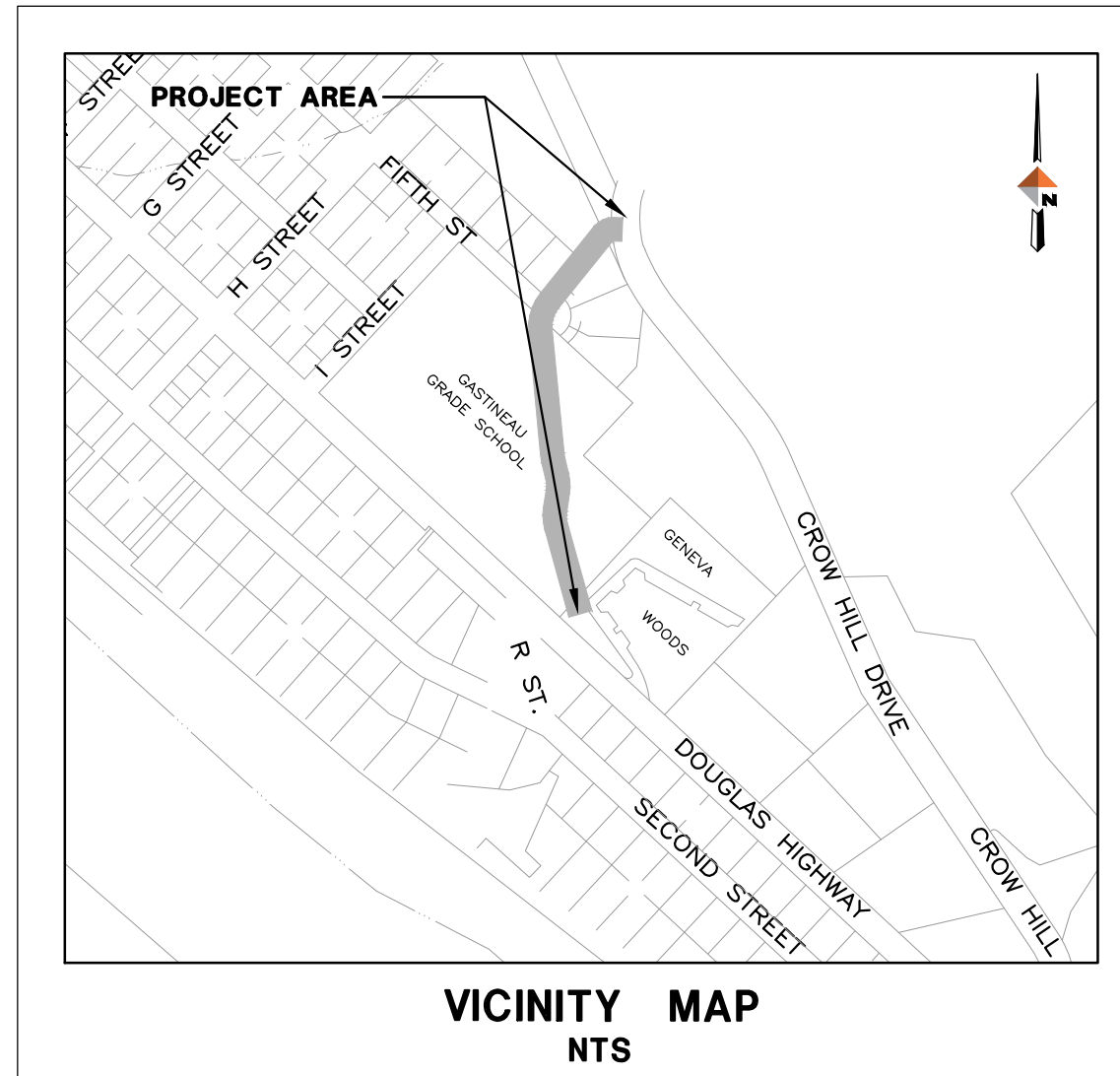


# INDEX

DESCRIPTION	SHEET NO.
COVER SHEET	1 OF 7
LEGEND, ABBREVIATIONS, AND GENERAL NOTES	2 OF 7
TYPICAL TRENCH SECTIONS AND DETAILS	3 OF 7
TIE-IN DETAILS	4 OF 7
CORROSION PROTECTION DETAILS	5 OF 7
PLAN & PROFILE STA "W" 10+00 TO STA "W" 15+25	6 OF 7
PLAN AND PROFILE STA "W" 15+25 TO CROW HILL ROAD	7 OF 7

# CROW HILL RESERVOIR FILL LINE REPLACEMENT CONTRACT NO. E16-144



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SHEET NO.

1  
of  
7

# LEGEND

DESCRIPTION	EXISTING	REMOVE	PROPOSED
BURIED ELECTRICAL UTILITIES			
CATCH BASIN			
CONCRETE PAVEMENT			
CONTROL POINT			
FENCE LINE			
FIRE HYDRANT			
HOUSE NO			
MAILBOX			
PROJECT CONTROL LINE			
PROPERTY LINE			
LIGHT POLE			
SANITARY SEWER PIPE			
SANITARY SEWER MANHOLE			
SIGN			
STORM DRAIN PIPE			
STORM DRAIN MANHOLE			
SURVEY MONUMENT-REBAR W/ PLASTIC CAP			
TREE CONIFER			
TREE DECIDUOUS			
TREELINE			
WATER LINE PIPE			
WATER VALVE BOX			

# ABBREVIATIONS

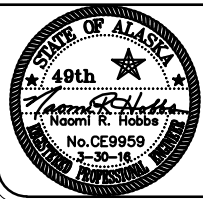
AC	ASPHALT CONCRETE
BOP	BEGINNING OF PROJECT
CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
CONC	CONCRETE
CTE	CONNECT TO EXISTING
DI	DUCTILE IRON
DIA	DIAMETER
EOP	END OF PROJECT
FG	FINISHED GRADE
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HP	HIGH PRESSURE
INV	INVERT
LT	LEFT
MH	MANHOLE
MN	MAGNETIC NAIL
MTE	MATCH TO EXISTING
NO	NUMBER
NTS	NOT TO SCALE
OG	ORIGINAL GROUND
PC	POINT OF CURVATURE
PT	POINT OF TANGENT
PVC	POLYVINYL CHLORIDE PIPE
RT	RIGHT
STA	STATION
STD	STANDARD
TP	TOP OF PAVEMENT

ABBREVIATIONS TO BE USED WITHOUT PERIODS

# GENERAL NOTES

- BEGIN SUBCUT AT 24 INCHES FROM PAVEMENT SAWCUT LINE AT STREET CONNECTIONS, UNLESS OTHERWISE SHOWN ON THE DRAWINGS, OR DIRECTED BY THE ENGINEER. REMOVE AND REPLACE BASE COURSE WITH 6 INCHES OF 2" MINUS SHOT ROCK/BASE COURSE TO 12 INCHES FROM PAVEMENT SAWCUT LINE. SAWCUT AS NECESSARY ALONG ALL STREET, DRIVEWAY AND SIDEWALK APPROACHES TO PROVIDE A NEAT MATCH LINE.
- LARGE BOULDERS, STUMPS, LOGS, ORGANICS AND GROUND WATER MAY BE ENCOUNTERED AT VARIOUS DEPTHS DURING EXCAVATION OPERATIONS.
- CONTRACTOR SHALL ASSURE GARBAGE PICKUP AND DAILY MAIL SERVICE WILL BE UNINTERRUPTED TO ALL RESIDENCES AFFECTED BY THIS PROJECT.
- THE 4TH EDITION OF THE CBJ STANDARD DETAILS, DATED AUGUST 14 2011, IS MADE PART OF THIS CONTRACT, WITH CURRENT REVISIONS AS APPLICABLE.
- EXISTING PIPE LOCATIONS ARE DERIVED FROM CBJ AS-BUILTS OR FIELD LOCATED. ACTUAL LOCATIONS MAY VARY FROM THOSE SHOWN. DEPTH OF THE EXISTING PIPES SHOWN ON THE ELEVATIONS ARE ASSUMED. CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF EACH EXISTING SERVICE PIPE PRIOR TO INSTALLING THE STORM DRAIN PIPES. DIAL BEFORE YOU DIG 586-1333.
- GRADING AND ALIGNMENT ARE SUBJECT TO MINOR REVISIONS BY THE ENGINEER.
- THE CONTRACTOR SHALL NOTIFY CBJ WATER UTILITIES AT 780-6888 OF PROPOSED WATER MAIN INTERRUPTION AND SUBMIT THE "WATER SYSTEM SPECIAL USE PERMIT" (COSIGNED BY THE ENGINEER) AT LEAST ONE WEEK PRIOR TO SHUTDOWN OF MAINLINE WATER PIPE.
- PROPERTY LINE LOCATIONS USED IN THESE PLANS ARE DERIVED FROM RECORD PLATS AND DO NOT REPRESENT BOUNDARY SURVEY. EXISTING RECORD PLATS DO NOT CLOSE WITH EACH OTHER IN SOME CASES. THE PROPERTY LINES SHOWN ON THESE PLANS ARE A BEST FIT APPROXIMATION OF CLOSURE.
- ALL ITEMS DESIGNATED TO BE REMOVED SHALL BE DISPOSED OF AT AN APPROVED DISPOSAL SITE, EXCEPT AS NOTED IN THE CONTRACT DOCUMENTS.
- CONTRACTOR SHALL REFERENCE ALL EXISTING PROPERTY CORNER MONUMENTS (I.E. REBARS, CONCRETE NAILS, BRASS CAP MONUMENT AND ETC.) PRIOR TO CONSTRUCTION AND REMONUMENT AFTER SURFACING IS REPLACED. ALL WORK SHALL BE DONE BY, OR UNDER THE DIRECTION OF, AN ALASKA REGISTERED LAND SURVEYOR.
- ALL ASPHALT PAVEMENT TO BE REMOVED AND DISPOSED OF SHALL BE DELIVERED TO A STOCKPILE AREA AT THE LEMON CREEK CITY PIT TO BE DESIGNATED BY THE ENGINEER. CONTACT THE ENGINEER FOR THE EXACT LOCATION OF THE STOCKPILE.
- AEL&P, ACS, AND GCI MAY CONDUCT WORK WITHIN THE PROJECT LIMITS TO RELOCATE UTILITIES AND UPGRADE THEIR RESPECTIVE SYSTEMS. THE CONTRACTOR SHALL COORDINATE ITS ACTIVITIES WITH EACH UTILITY COMPANY AND PROVIDE ACCESS AS NECESSARY FOR UTILITY COMPANIES TO CONDUCT THEIR WORK.
- NOT ALL VERTICAL PIPE DEFLECTIONS ARE SHOWN ON THE DRAWINGS. ADDITIONAL FITTINGS WILL BE REQUIRED FOR VERTICAL DEFLECTIONS NEAR CONNECTIONS TO EXISTING PIPES AND AT OTHER LOCATIONS REQUIRING GRADE CHANGES TO AVOID CONFLICTS.
- THE CONTRACTOR SHALL RESTRICT ITS COMPACTION AND OTHER VIBRATION INDUCING OPERATIONS AS NECESSARY TO ASSURE NO DAMAGE OCCURS TO ADJACENT BUILDINGS OR STRUCTURES. REFER TO SECTION 01530, ARTICLE 1.7 FOR FURTHER REQUIREMENTS.
- THE PLAN SHEETS DO NOT SHOW ALL OF THE TREES AND OTHER VEGETATION THAT WILL BE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES. ALL TREES REQUIRED TO BE REMOVED FOR THE INSTALLATION OF THE WATER LINE WILL BE REMOVED AS DIRECTED BY THE ENGINEER.
- THE CONTRACTOR SHALL NOT STORE MATERIALS OR EQUIPMENT, OR OPERATIVE EQUIPMENT WITH ITS TRACKS OR WHEELS PLACED ON PRIVATE PROPERTY, WITHOUT WRITTEN APPROVAL OF THE PROPERTY OWNER.
- THE CONTRACTOR SHALL NOTIFY EACH RESIDENT OF ROAD CLOSURE THE DAY PRECEDING THE DAY THE DRIVEWAY IS TO BE CLOSED TO VEHICULAR ACCESS. THE RESIDENT SHALL BE INFORMED OF THE PERIOD OF TIME THE CLOSURE WILL BE IN EFFECT. NO DRIVEWAY CLOSURES WILL BE PERMITTED UNTIL THIS REQUIREMENT HAS BEEN MET TO THE SATISFACTION OF THE ENGINEER.
- "JUMPING JACK" OR SIMILAR TYPE COMPACTORS SHALL BE USED TO THOROUGHLY COMPACT ALL LAYERS OF MATERIAL AROUND WATER VALVE BOXES, WATER LINE, CATCH BASINS, MANHOLES AND OTHER STRUCTURES.
- EXISTING WATER PIPES AS SHOWN BY FIELD LOCATES AND CITY AND BOROUGH OF JUNEAU WATER AS-BUILTS.

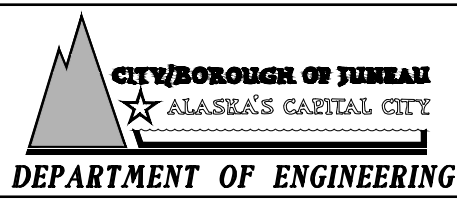
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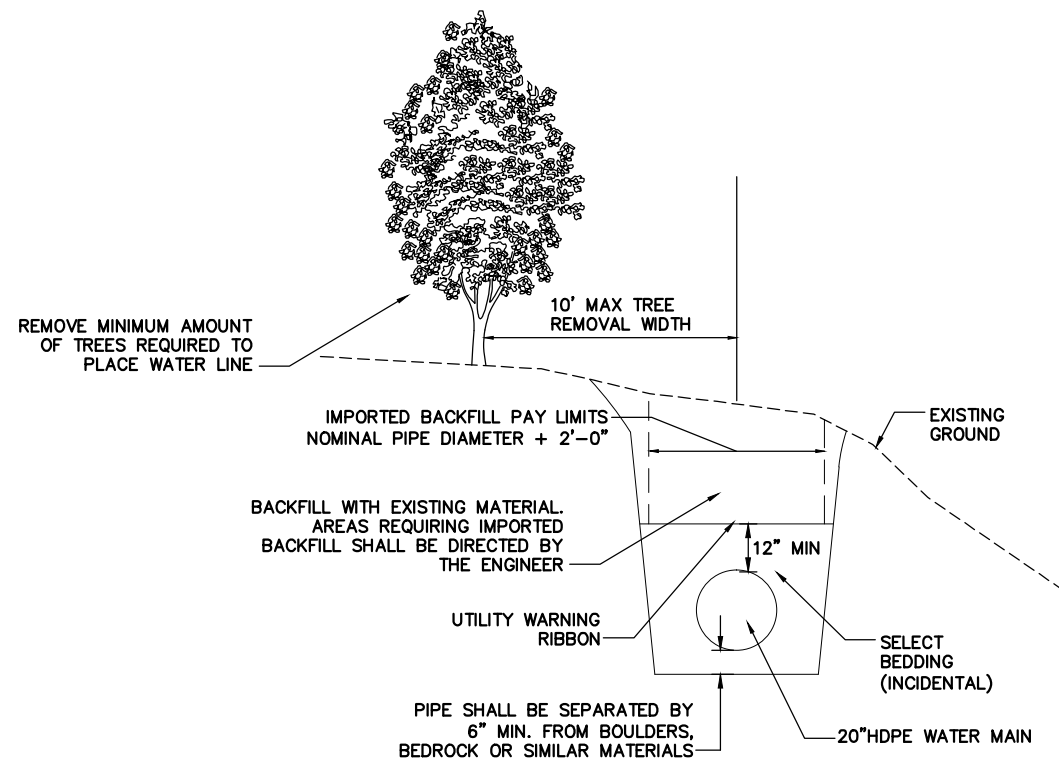
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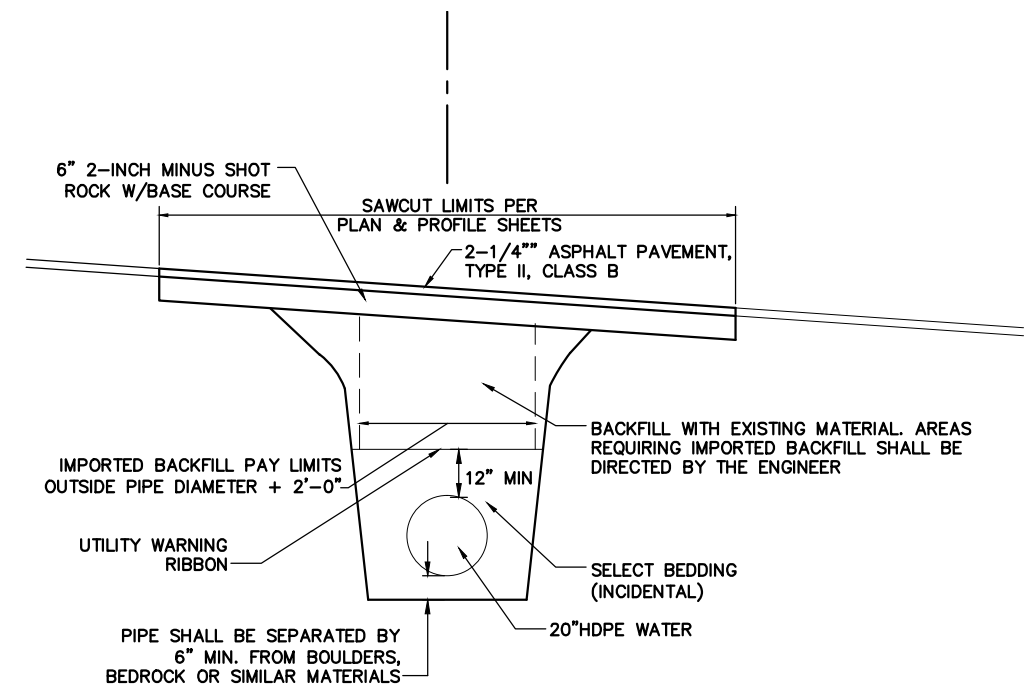
**CROW HILL RESERVOIR FILL LINE REPLACEMENT**  
**CONTRACT NO. E16-144**

**LEGEND, ABBREVIATIONS, AND GENERAL NOTES**



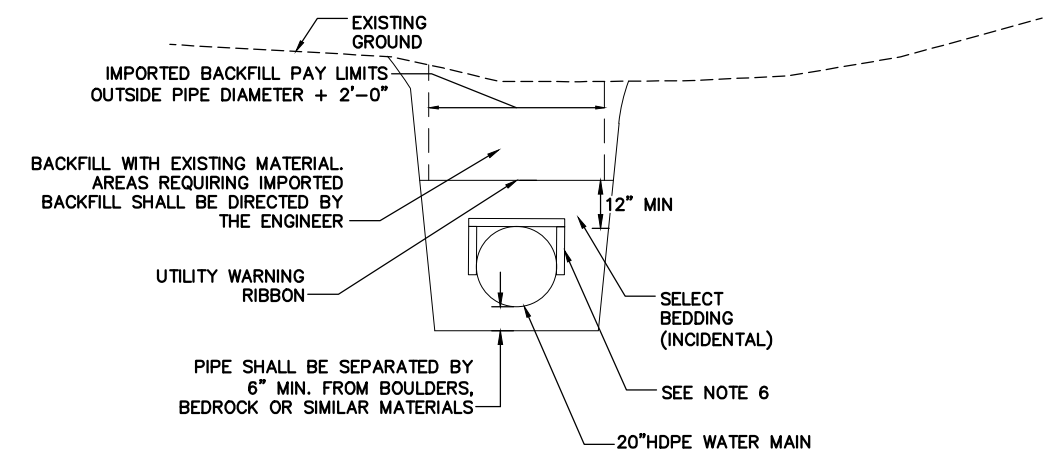
**TYPICAL TRENCH SECTION**

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**TYPICAL ROADWAY SECTION**

NTS



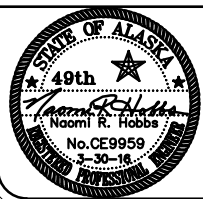
**TYPICAL TRENCH 3' BURY - WATER LINE SECTION**

NTS

**NOTES FOR TYPICAL SECTIONS THIS SHEET**

1. IF EXISTING SOILS WITHIN THE PLANNED SUBCUT LAYER ARE FOUND TO BE USABLE, AS DETERMINED BY THE ENGINEER, THE DEPTH OF EXCAVATION AND BACKFILL MAY BE DECREASED.
2. UNDERGROUND ELECTRICAL, SANITARY SEWER, STORM DRAIN, AND WATER AND SERVICES ARE NOT SHOWN IN THE TYPICAL SECTION. SEE PLAN SHEETS FOR APPROXIMATE LOCATIONS.
3. SANITARY SEWER, WATER AND STORM DRAIN SERVICES ARE NOT SHOWN ON THE TYPICAL SECTION. SEE PLAN VIEW DRAWINGS FOR LOCATIONS.
4. THE BASE COURSE LAYER SHALL BE 4" TO 5" OF 2-INCH MINUS SHOT ROCK WITH 1" TO 2" TOP LAYER OF BASE COURSE, GRADING D-1 FOR A TOTAL THICKNESS OF 6". THE 2" MINUS SHOT ROCK SHALL BE WELL COMPACTED PRIOR TO PLACING THE BASE COURSE GRADING D-1.
5. CATCH LINE FOR USABLE MATERIAL WILL VARY IN DISTANCE FROM RIGHT-OF-WAY LINES. PLACE AND GRADE THESE MATERIALS TO PROVIDE A SMOOTH, WELL DRAINED TRANSITION TO EXISTING GRADES, AS DIRECTED BY THE ENGINEER.
6. INSULATION BOARDS SHALL BE PLACED ALONG THE LENGTH AND SIDES OF THE PIPE THROUGH OUT THIS SECTION. FULL 24" WIDE BOARDS ALONG THE TOP OF PIPE AND HALF BOARDS, 12" WIDE, ALONG THE SIDES.
7. PAY LIMITS FOR TRENCH EXCAVATION SHALL BE NOMINAL PIPE DIAMETER PLUS 2'-0" FROM BOTTOM OF TRENCH (NOT TO EXCEED 6" BELOW BOTTOM OF PIPE) TO EXISTING GROUND ALONG CENTERLINE OF PIPE.

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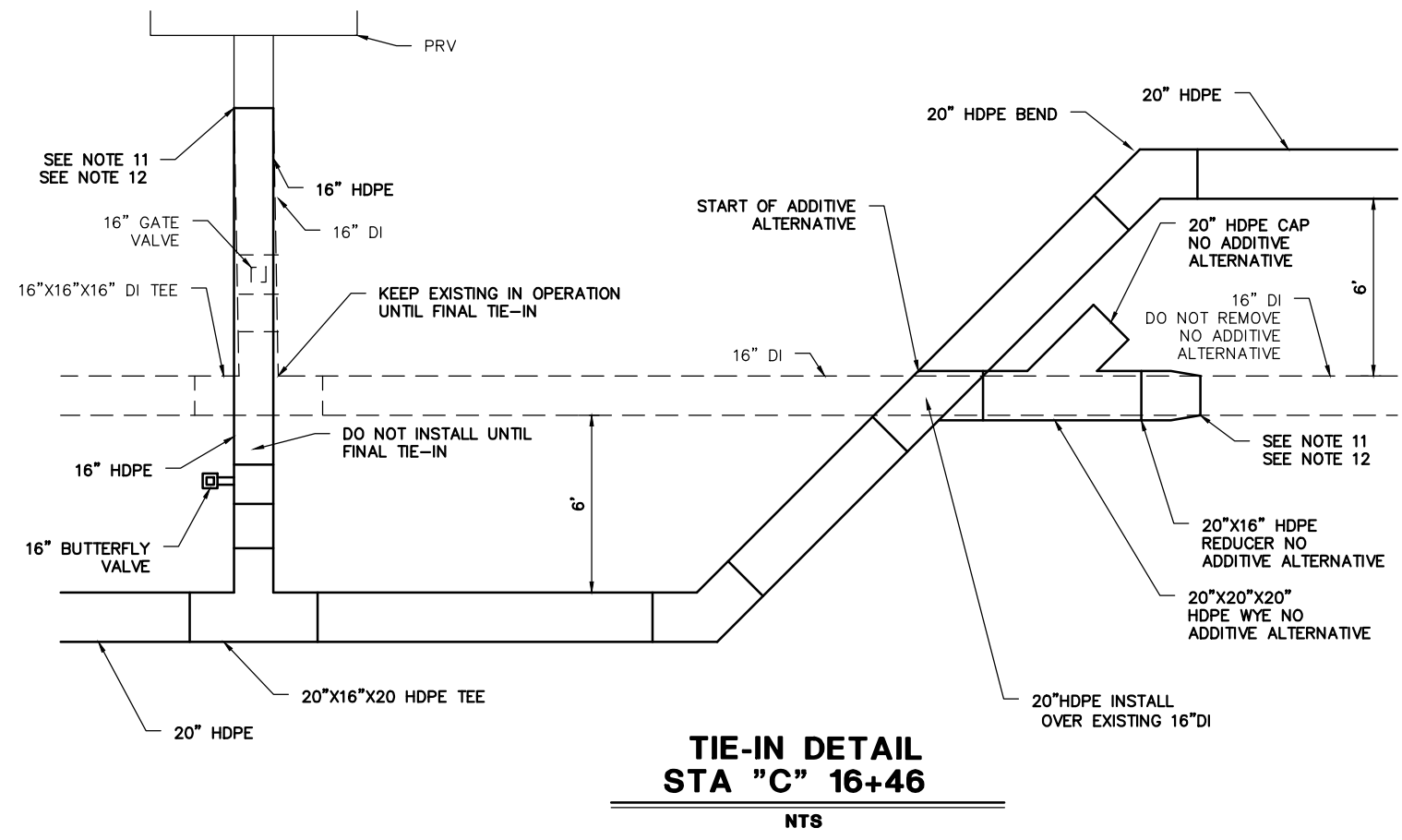
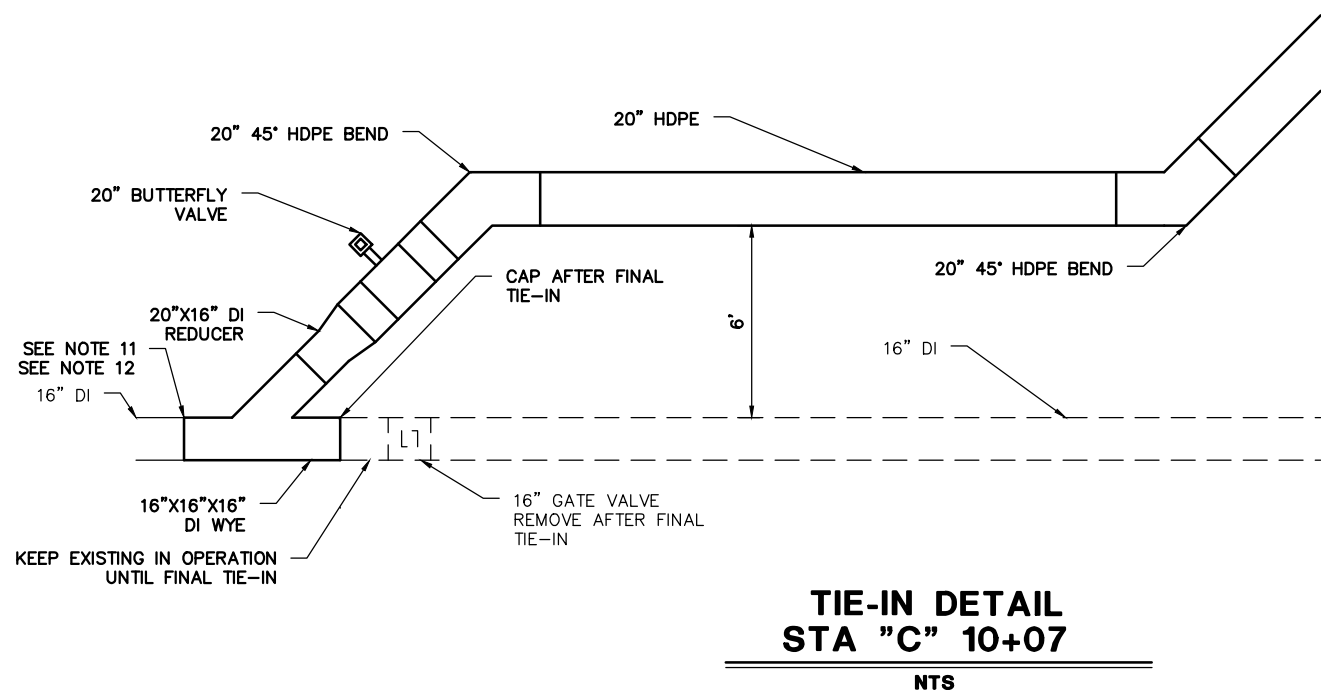
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**DEPARTMENT OF ENGINEERING**

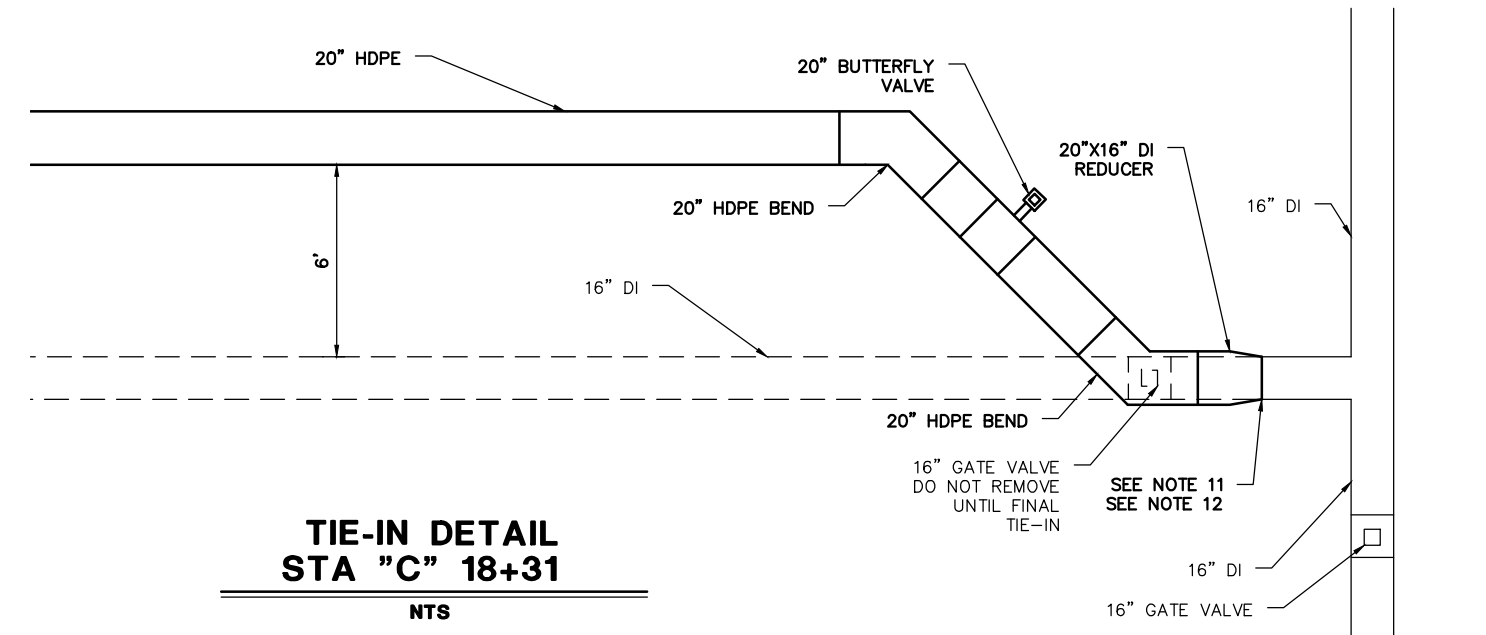
**CROW HILL RESERVOIR FILL LINE REPLACEMENT**  
 CONTRACT NO. E16-144

**TYPICAL TRENCH SECTIONS AND DETAILS**

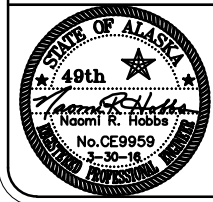


**NOTES**

1. ALL CONNECTIONS OF THE HDPE TRANSMISSION MAIN INCLUDING TO BENDS, TEES, WHYS, REDUCERS, VALVES, AND EXISTING PIPE SHALL BE RESTRAINED, WITH A PRESSURE RATING EQUAL TO THAT OF THE PIPE.
2. ALL BOLTS, NUTS AND WASHERS SHALL BE SERIES 300 STAINLESS STEEL. ALL METALLIC VALVES AND FITTINGS SHALL BE FACTORY EPOXY COATED INSIDE AND OUT.
3. ALL FITTINGS AND APPURTENANCES SHALL BE THRUST BLOCKED BY CBJ STANDARD DETAILS, UNLESS A RESTRAINED LENGTH DESIGN IS COMPLETED, AND REVIEWED AND APPROVED BY THE ENGINEER.
4. BEDDING SHALL BE IMPORTED MATERIAL MEETING THE SPECIFICATIONS AND SHALL BE THOROUGHLY PLACED AND COMPACTED ASSURING NO VOIDS REMAIN AND THAT DENSITIES COMPLY WITH THE SPECIFICATIONS.
5. BENDS, TEES, AND OTHER FITTINGS SHALL BE HDPE WHENEVER POSSIBLE AND SHALL BE FACTORY FABRICATED.
6. IF DUCTILE IRON FITTINGS ARE PROPOSED, A SUBMITTAL SHALL BE PROVIDED FOR REVIEW AND APPROVAL DETAILING ON HOW THIS WILL BE DONE.
7. ALL CONNECTIONS TO VALVES OR EXISTING PIPES SHALL BE FLANGED WITH AN HDPE FLANGE ADAPTOR AND STAINLESS FLANGE BACK-UP RINGS. FLANGE ADAPTORS SHALL BE USED AS NECESSARY ON THE DI.
8. FITTINGS AND OTHER SPECIALTY HDPE PIECES SHALL COMPLY WITH THE SPECIFICATIONS AND BE BY AS MANUFACTURED BY IMPROVED PIPING PRODUCTS, OR APPROVED EQUAL
9. THE VALVE SHALL BE FLANGED, 250 PSI BUTTERFLY VALVES, MUELLER LINESEAL XP11, OR APPROVED EQUAL.
10. VALVE SPACER RINGS MAY BE REQUIRED AT VALVES TO ALLOW THE VALVE TO BE FULLY OPERATED. THIS SHALL BE VERIFIED AND PROVIDED AS REQUIRED. A DETAILED SUBMITTAL SHALL BE PROVIDED FOR REVIEW AND APPROVAL.
11. PROVIDE ALL ADAPTERS, ELBOWS AND OTHER FITTINGS NECESSARY TO CONNECT TO DISSIMILAR PIPE SIZES, MATERIALS AND DEPTHS. CONNECT TO EXISTING.
12. INSTALL CORROSION PROTECTION AS PER SHEET 5



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**DEPARTMENT OF ENGINEERING**

**CROW HILL RESERVOIR FILL LINE REPLACEMENT**  
**CONTRACT NO. E16-144**

**TIE-IN DETAILS**

SHEET NO.  
**4**  
 of  
**7**

# CORROSION PROTECTION SPECIFICATIONS AND NOTES:

## ANODES

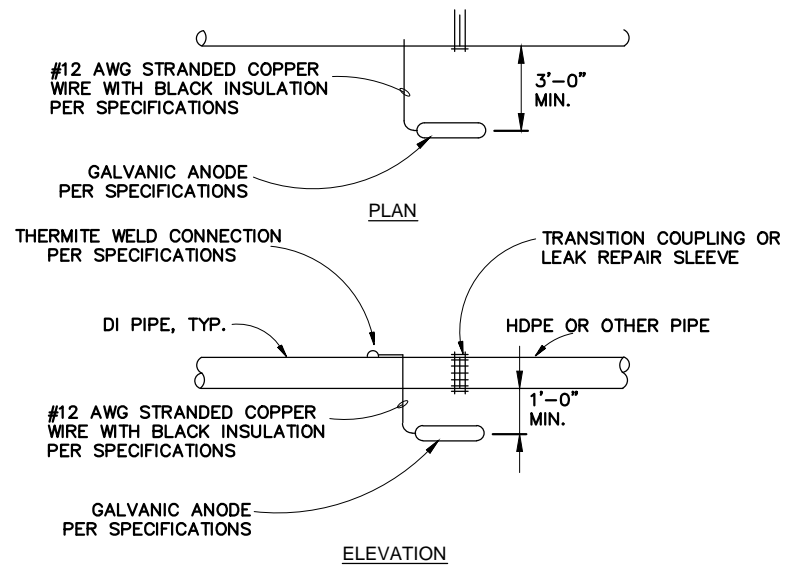
- ANODES SHALL BE 18# BARE WEIGHT ZINC WITH PREPACKAGED ANODE BACKFILL.
- ACCEPTABLE ANODE MODELS ARE:
  - MODEL NO. ZUR-18 FROM FARWEST INDUSTRIES
  - MODEL S18 FROM MESA PRODUCTS
  - APPROVED EQUAL
- INSTALL TYPE, SIZE, AND NUMBER OF ANODES SPECIFIED.
- INSTALL 2 ANODES TO ALL CONNECTIONS TO EXISTING C.I. OR D.I. PIPE 12-INCH DIAMETER AND LARGER.
- CONDUCTOR WIRE SHALL BE A MINIMUM SIZE OF 12 AWG STRANDED COPPER WITH INSULATION SUITABLE FOR WET LOCATION DIRECT BURIAL AND SHALL BE A MINIMUM OF 10 FEET LONG FROM ANODE.
- PREPACKAGED ANODE SHALL BE SATURATED WITH WATER PRIOR TO BACKFILL.
- ANODES SHALL BE PLACED IN NATIVE EARTH BACKFILL. DO NOT PLACE IN PIPE BEDDING MATERIAL.

## THERMITE (EXOTHERMIC) WELDING

- THERMITE WELD MATERIALS SHALL BE DESIGNED FOR CONNECTION OF COPPER TO DUCTILE IRON AND CAST IRON SURFACES AND SHALL BE INSTALLED PER MANUFACTURERS INSTRUCTIONS.
- ACCEPTABLE MANUFACTURES OF THERMITE WELD PRODUCTS ARE:
  - CADWELD BY ERICO PRODUCTS INC.
  - THERMOWELD BY CONTINENTAL INDUSTRIES INC.
  - APPROVED EQUAL
- A 2-INCH SQUARE AREA IN THE PIPE SURFACE SHALL BE GROUND CLEAN PER MANUFACTURERS RECOMMENDATIONS PRIOR TO THERMITE WELDING.
- WIRE ENDS SHALL HAVE PROPER ADAPTER SLEEVES TO ENSURE PROPER BOND. 12 AWG SHALL HAVE ADAPTER SLEEVES SPECIFIED BY THERMITE WELD MANUFACTURER. FIELD INSTALLED SLEEVES SHALL HAVE WIRE CONDUCTOR EXTEND 1/4-INCH BEYOND ENDS OF SLEEVE.
- WIRE CONNECTION SHALL BE TESTED FOR INTEGRITY PRIOR TO COATING.
- CONTINUITY STRAPS SHALL BE #2 AWG COPPER STRANDED WIRE WITH THW INSULATION AND SHALL BE ATTACHED TO THE PIPE BY THERMITE WELDING AND COATED AND SEALED AS DESCRIBED BELOW.

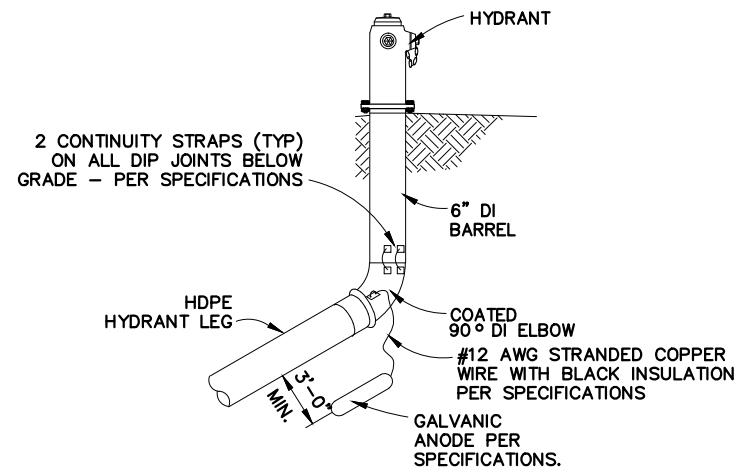
## COATING AND SEALING

- ALL THERMITE WELDS SHALL BE PROTECTED AND SEALED BY:
  - PREFABRICATED THERMITE WELD CAPS, SIZED ACCORDING TO WIRE SIZE, MINIMUM DIMENSIONS OF 4-INCH BY 4-INCH FILLED WITH ELASTOMERIC MASTIC COATING OR,
  - HEAT SHRINK SLEEVE PIPE ENCASUREMENT AFTER COATING THERMITE WELD WITH ELASTOMERIC MASTIC COATING - HEAT SHRINK SLEEVE SHALL BE CANUSA AQUA SEAL OR APPROVED EQUAL.
- ALL PIPE SURFACE COATING DAMAGED BEYOND THE WELD CAPS OR HEAT SHRINK SHALL BE COATED WITH PROTAL 7125 FROM DENSO NORTH AMERICA OR APPROVED EQUAL.



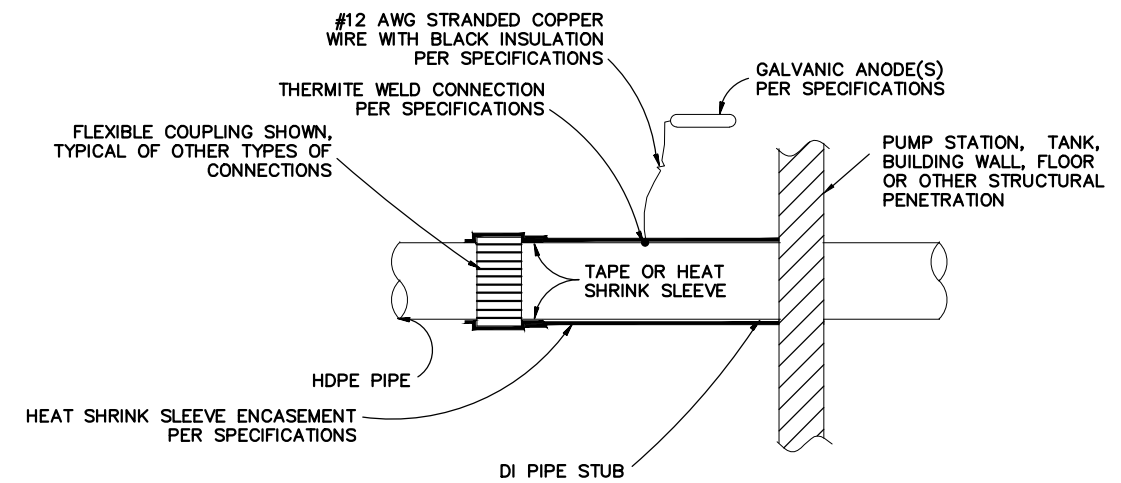
**GALVANIC ANODE INSTALLATION FOR EXISTING METALLIC PIPE CONNECTIONS OR LEAK REPAIR LOCATIONS DETAIL**

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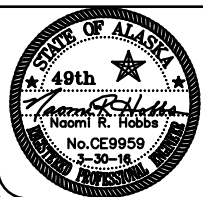
**GALVANIC ANODE INSTALLATION AT HYDRANT ASSEMBLIES W/ HDPE**

NTS



**ENCASED METAL PIPE STUB BETWEEN PLASTIC PIPE, FLEXIBLE COUPLING AND CONCRETE STRUCTURE CONNECTION**

NTS



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**DEPARTMENT OF ENGINEERING**

**CROW HILL RESERVOIR FILL LINE REPLACEMENT**  
 CONTRACT NO. E16-144

**CORROSION PROTECTION DETAILS**

SHEET NO.  
**5**  
 of  
**7**

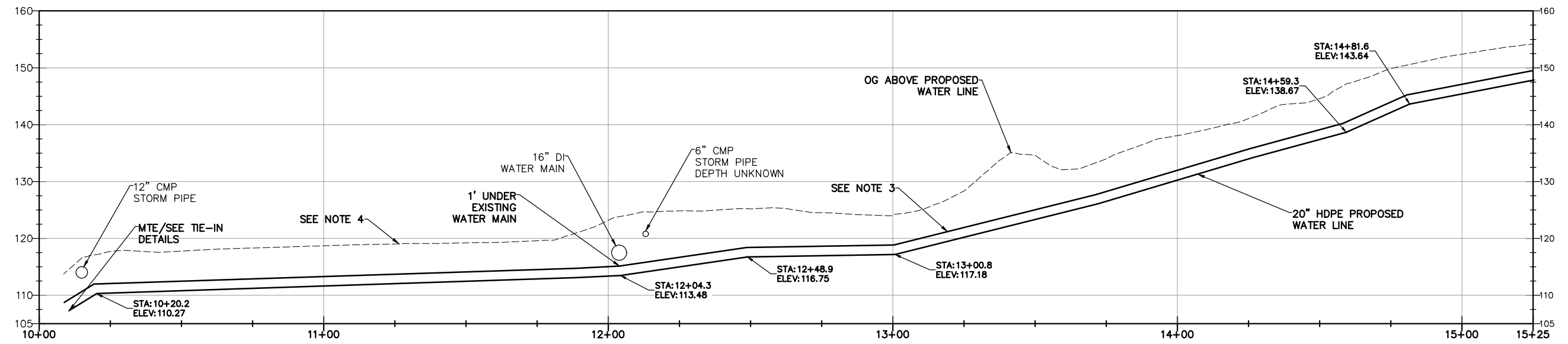
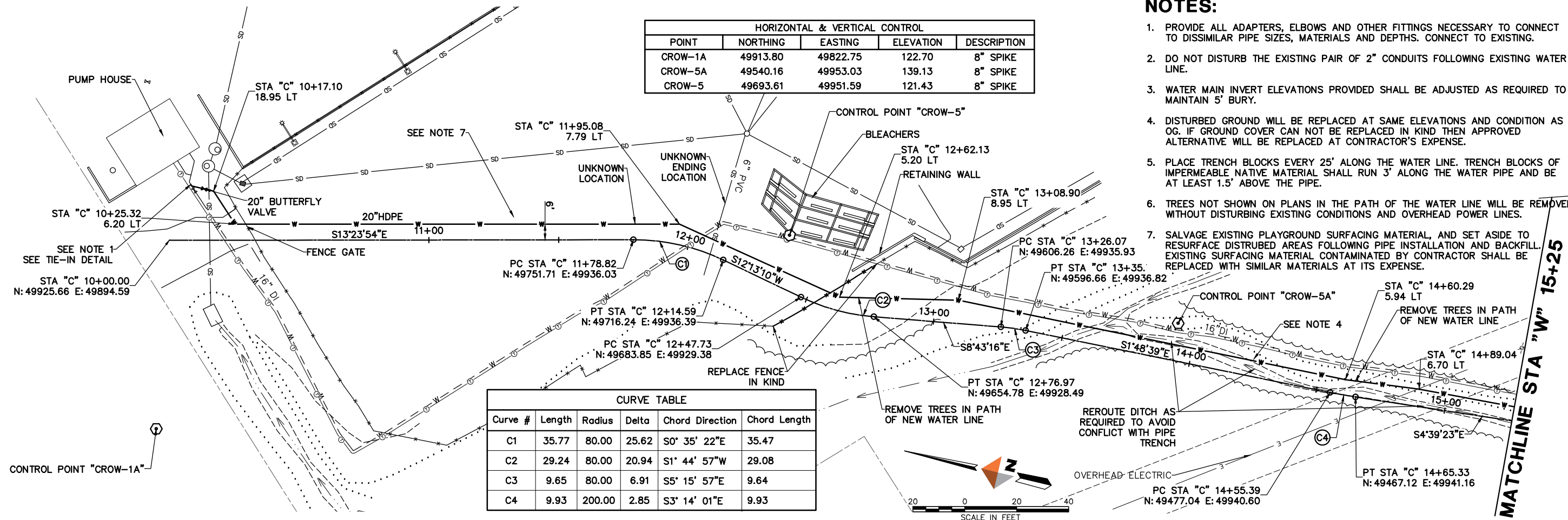


**NOTES:**

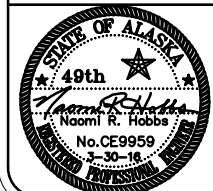
1. PROVIDE ALL ADAPTERS, ELBOWS AND OTHER FITTINGS NECESSARY TO CONNECT TO DISSIMILAR PIPE SIZES, MATERIALS AND DEPTHS. CONNECT TO EXISTING.
2. DO NOT DISTURB THE EXISTING PAIR OF 2" CONDUITS FOLLOWING EXISTING WATER LINE.
3. WATER MAIN INVERT ELEVATIONS PROVIDED SHALL BE ADJUSTED AS REQUIRED TO MAINTAIN 5' BURY.
4. DISTURBED GROUND WILL BE REPLACED AT SAME ELEVATIONS AND CONDITION AS OG. IF GROUND COVER CAN NOT BE REPLACED IN KIND THEN APPROVED ALTERNATIVE WILL BE REPLACED AT CONTRACTOR'S EXPENSE.
5. PLACE TRENCH BLOCKS EVERY 25' ALONG THE WATER LINE. TRENCH BLOCKS OF IMPERMEABLE NATIVE MATERIAL SHALL RUN 3' ALONG THE WATER PIPE AND BE AT LEAST 1.5' ABOVE THE PIPE.
6. TREES NOT SHOWN ON PLANS IN THE PATH OF THE WATER LINE WILL BE REMOVED WITHOUT DISTURBING EXISTING CONDITIONS AND OVERHEAD POWER LINES.
7. SALVAGE EXISTING PLAYGROUND SURFACING MATERIAL, AND SET ASIDE TO RESURFACE DISTURBED AREAS FOLLOWING PIPE INSTALLATION AND BACKFILL. EXISTING SURFACING MATERIAL CONTAMINATED BY CONTRACTOR SHALL BE REPLACED WITH SIMILAR MATERIALS AT ITS EXPENSE.

HORIZONTAL & VERTICAL CONTROL				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CROW-1A	49913.80	49822.75	122.70	8" SPIKE
CROW-5A	49540.16	49953.03	139.13	8" SPIKE
CROW-5	49693.61	49951.59	121.43	8" SPIKE

CURVE TABLE					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C1	35.77	80.00	25.62	S0° 35' 22"E	35.47
C2	29.24	80.00	20.94	S1° 44' 57"W	29.08
C3	9.65	80.00	6.91	S5° 15' 57"E	9.64
C4	9.93	200.00	2.85	S3° 14' 01"E	9.93



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**CROW HILL RESERVOIR FILL LINE REPLACEMENT**  
 CONTRACT NO. E16-144

**PLAN & PROFILE**  
 STA "W" 10+00 TO STA "W" 15+25

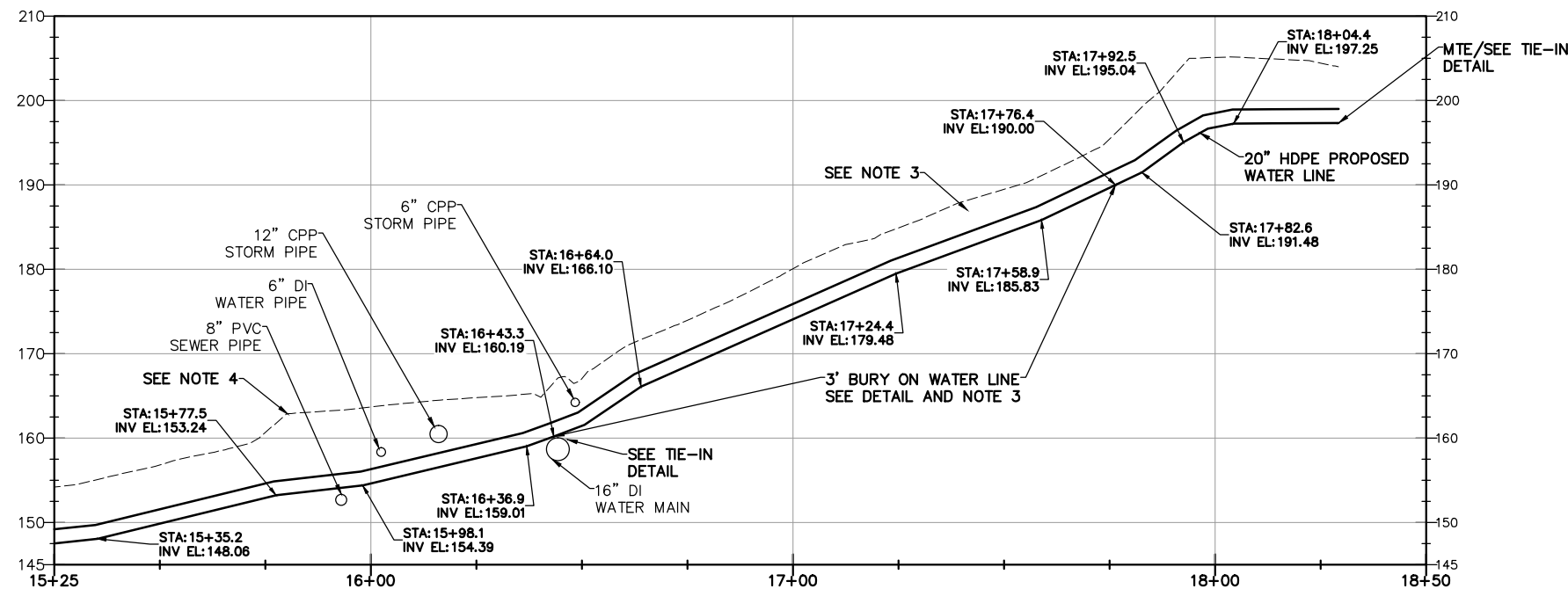
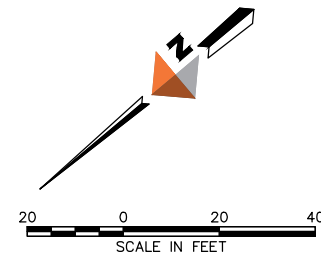
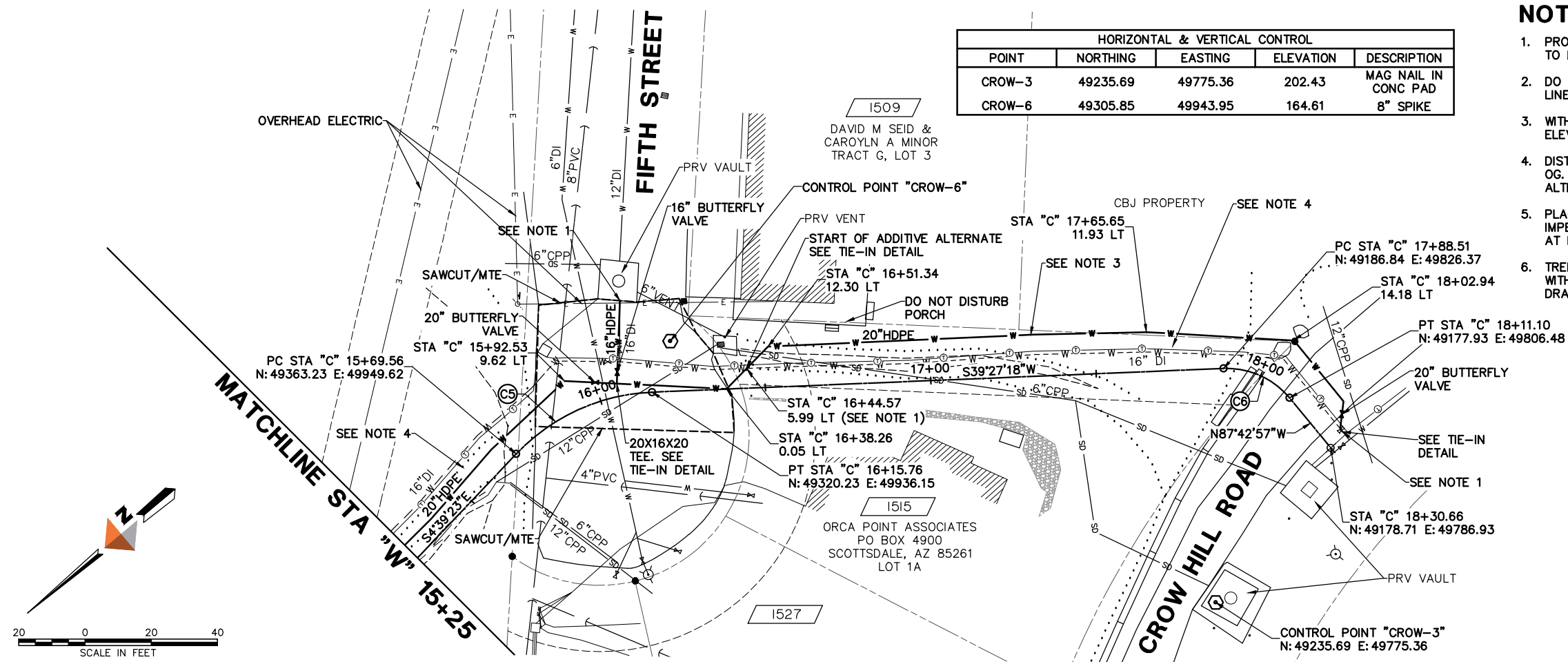
SHEET NO.  
**6** of **7**

**NOTES:**

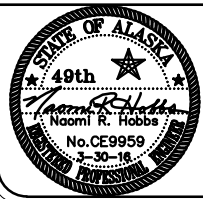
1. PROVIDE ALL ADAPTERS, ELBOWS AND OTHER FITTINGS NECESSARY TO CONNECT TO DISSIMILAR PIPE SIZES, MATERIALS AND DEPTHS. CONNECT TO EXISTING.
2. DO NOT DISTURB THE EXISTING PAIR OF 2" CONDUIT FOLLOWING EXISTING WATER LINE.
3. WITH THE EXCEPTION OF STA "C" 16+43.3 TO 17+76.4, WATER MAIN INVERT ELEVATIONS PROVIDED SHALL BE ADJUSTED AS REQUIRED TO MAINTAIN 5' BURY.
4. DISTURBED GROUND WILL BE REPLACED AT SAME ELEVATIONS AND CONDITION AS OG. IF GROUND COVER CAN NOT BE REPLACED IN KIND THEN APPROVED ALTERNATIVE WILL BE REPLACED AT CONTRACTOR'S EXPENSE.
5. PLACE TRENCH BLOCKS EVERY 25' ALONG THE WATER LINE. TRENCH BLOCKS OF IMPERMEABLE NATIVE MATERIAL SHALL RUN 3' ALONG THE WATER PIPE AND BE AT LEAST 1.5' ABOVE THE PIPE.
6. TREES NOT SHOWN ON PLANS IN THE PATH OF THE WATER LINE WILL BE REMOVED WITHOUT DISTURBING EXISTING CONDITIONS, OVERHEAD POWER LINES AND DRAINAGE CHANNELS

HORIZONTAL & VERTICAL CONTROL				
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
CROW-3	49235.69	49775.36	202.43	MAG NAIL IN CONC PAD
CROW-6	49305.85	49943.95	164.61	8" SPIKE

CURVE TABLE					
Curve #	Length	Radius	Delta	Chord Direction	Chord Length
C5	46.19	60.00	44.11	S17° 23' 58"W	45.06
C6	22.59	24.50	52.83	S65° 52' 11"W	21.80



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**DOWL**  
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JOB No. J70806.01 DRAWN BY: JK DESIGNED BY: J. KANOUSE CHECKED BY: N HOBBS DATE: MARCH 2016

**CITY/BOROUGH OF JUNEAU**  
 ALASKA'S CAPITAL CITY

**DEPARTMENT OF ENGINEERING**

**CROW HILL RESERVOIR FILL LINE REPLACEMENT**  
 CONTRACT NO. E16-144

**PLAN & PROFILE**  
**STA "W" 15+25 EOP**

SHEET NO.  
**7**  
 of  
**7**