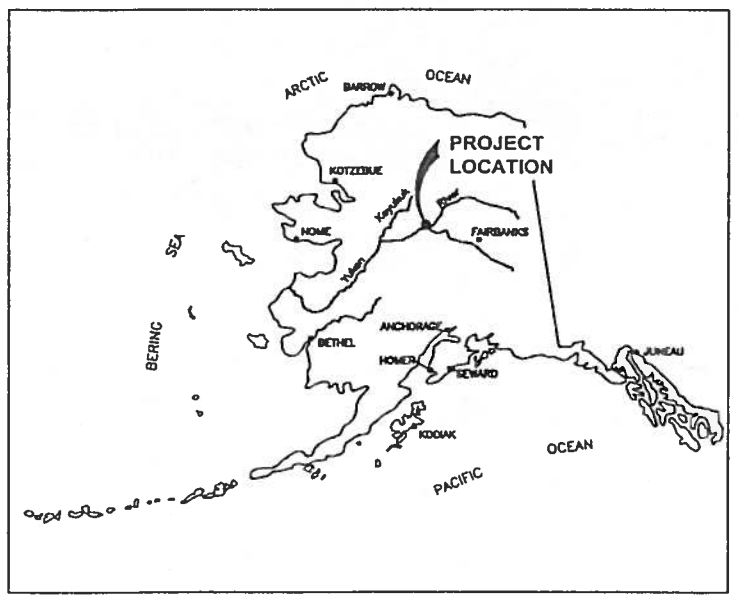
Too'gha Inc.
Tanana Elders Lift Station

PROJECT # 135830

OCTOBER 2011
RECORD DRAWINGS

In Cooperation with the State of Alaska
Department of Environmental Conservation
Village Safe Water Program

SHEET INDEX



Location Map

VILLAGE SAFE WATER

HDR
HDR Alaska, Inc.

Consultant

RECORD DRAWING CERTIFICATE

THESE DRAWINGS REFLECT RECORDED INFORMATION OBTAINED DURING CONSTRUCTION.
INFORMATION PROVIDED HEREIN IS ACCURATE TO THE BEST OF MY KNOWLEDGE.

NAME

11/16/11
DATE

Project Number (Consultant) _____ (VSW) _____
VSW Project Engineer _____
Construction Foreman _____
Final Design (Date) _____
ADEC Approval (Date) _____
Construction Period (From) _____ (To) _____
As-Builts (Date) _____

GENERAL NOTES:

INFORMATION PRESENTED ON THIS DRAWING SHALL APPLY TO THE ENTIRE PROJECT EXCEPT WHERE STATED OTHERWISE ON SPECIFIC DRAWINGS.

1. THE CONTRACTOR SHALL EXAMINE THE DRAWINGS AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR CONFLICTS THE CONTRACTOR MAY FIND BEFORE PROCEEDING WITH THE WORK.
2. THE CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS AT THE SITE AND SHALL NOTIFY THE ENGINEER OF DISCREPANCIES BETWEEN THE ACTUAL CONDITIONS AND INFORMATION SHOWN ON THE DRAWINGS BEFORE PROCEEDING WITH THE WORK.
3. THE CONTRACTOR SHALL PROVIDE AND BE RESPONSIBLE FOR TEMPORARY ERECTION BRACING AND SHORING FOR ALL STRUCTURAL MEMBERS AS REQUIRED FOR STRUCTURAL STABILITY OF THE STRUCTURES DURING CONSTRUCTION.
4. THE CONTRACT DRAWINGS REPRESENT THE FINISHED PRODUCT. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. CONTRACTOR SHALL ENGAGE QUALIFIED PERSONS TO DETERMINE THAT ALL COMPLETED WORK IS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
5. THE CONTRACTOR SHALL STORE ALL FUELS, OILS, SOLVENTS AND HAZARDOUS MATERIALS (OHM) IN ENGINEER-APPROVED STORAGE LOCATIONS AT STAGING AREAS. APPROVED AREAS SHALL BE EXCAVATED AND LINED WITH AN IMPERMEABLE LINER TO CREATE A DEPRESSION HAVING A VOLUME LARGE ENOUGH TO CONTAIN THE TOTAL VOLUME OF OHM BEING STORED. THE CONTRACTOR SHALL KEEP CLEAN-UP CONTAINMENT KITS AT EACH STORAGE SITE.
6. ALL CONSTRUCTION SHALL BE DONE IN A WORKMANLIKE MANNER AND IN CONFORMANCE WITH APPLICABLE CODES, ADEC REGULATIONS, AND PERMIT CONDITIONS.
7. UTILITY EASEMENTS – ALL WATER AND SEWER MAIN LINES SHALL BE INSTALLED WITHIN PUBLIC RIGHT-OF-WAY OR DEDICATED UTILITY EASEMENTS. ALL TEMPORARY CONSTRUCTION EASEMENTS NEEDED SHALL BE THE RESPONSIBILITY OF THE OWNER.
8. HISTORICAL PRESERVATION – SHOULD ANY ARCHAEOLOGICAL, CULTURAL OR PALEONTOLOGICAL RESOURCES BE DISCOVERED AS A RESULT OF CONSTRUCTION ACTIVITY, WORK THAT WOULD DISTURB SUCH RESOURCES WILL BE STOPPED AND THE STATE HISTORIC PRESERVATION OFFICE AND THE TANANA TRIBAL COUNCIL SHALL BE CONTACTED IMMEDIATELY.
9. GENERAL RESTORATION – THE AREAS IMPACTED BY CONSTRUCTION SHALL BE RETURNED TO PRE-CONSTRUCTION CONDITION OR BETTER. DISTURBED AREAS OUTSIDE THE TRAVELED WAY SHALL BE GROOMED AND SEEDED TO MATCH SURROUNDING TERRAIN. DISTURBED AREAS WITHIN THE TRAVELED WAY SHALL BE RESURFACED PER THE DRAWINGS. CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE AREA AND DISPOSED OF AS DIRECTED BY THE OWNER. DUE CARE AND CAUTION SHALL BE TAKEN TO AVOID DISTURBING PERSONAL PROPERTY.
10. BARRICADES AND WARNING SIGNS SHALL BE PROVIDED TO ADVISE RESIDENTS OF ROAD CLOSURES, DETOURS, AND HAZARDOUS OPEN TRENCH CONDITIONS.

UTILITIES SHALL BE CONTACTED PRIOR TO CONSTRUCTION TO IDENTIFY CONFLICTS BETWEEN THE PIPES AND THEIR RESPECTIVE FACILITIES.

UTILITY CONTACTS

- CITY OF TANANA ——— (907)366-7159
- TANANA POWER CO. INC. – YUKON TELEPHONE CO. INC.
  LOCAL: RALPH ELLER ——— (907)366-7190
  WASILLA: DON ELLER ——— (907)373-6007
- TANANA NATIVE COUNCIL ——— (907)366-7113
- TOO'GHA INC. ——— (907)366-7209

CIVIL SPECIFICATIONS:

EARTH WORK

1. WORK PRIOR TO EXCAVATION – CLEARING AND GRUBBING OF CERTAIN AREAS PRIOR TO EXCAVATION MAY BE NECESSARY. DISPOSE OF VEGETATION AND ORGANIC MATERIAL AS DIRECTED BY THE OWNER.
2. SAFETY CONSIDERATIONS – SIDEWALLS OF TRENCHES OR EXCAVATIONS SHALL BE SLOPED OR SUFFICIENTLY BRACED IN CONFORMANCE WITH ALASKA DEPARTMENT OF LABOR STANDARDS TO PROVIDE A SAFE WORKING ENVIRONMENT. ALL TRENCHES SHALL BE BACKFILLED OR COVERED, OR A GUARD SHALL BE POSTED, BEFORE WORK IS STOPPED FOR THE DAY. THE TRENCH SHALL BE GUARDED UNTIL WORK BEGINS THE FOLLOWING DAY. OPEN EXCAVATIONS SHALL BE ADEQUATELY SIGNED AND BARRICADED TO WARN RESIDENTS OF THE HAZARD. TAKE ALL REASONABLE AND PRACTICAL MEASURES TO PROTECT PUBLIC HEALTH AND SAFETY AND PRIVATE PROPERTY.
3. SURFACE WATER/GROUNDWATER CONTROL – TRENCH BOTTOM SHALL BE MAINTAINED IN RELATIVELY DRY CONDITION DURING THE PIPE LAYING OPERATION. SURFACE DRAINAGE SHALL BE DIRECTED AWAY FROM THE TRENCH THROUGH USE OF DIVERSION BERMS OR OTHER APPROPRIATE MEASURES. USE OF PUMPING EQUIPMENT MAY BE REQUIRED IN SOME AREAS FOR TRENCH DEWATERING. DISCHARGE FROM DEWATERING OPERATIONS SHALL BE RETURNED TO NATURAL DRAINAGE ROUTES. SETTLING PITS, STRAW DIKES, OR OTHER APPROPRIATE MEASURES SHALL BE TAKEN TO PREVENT HIGHLY TURBID WATERS FROM ENTERING EXISTING LAKES, STREAMS, OR WETLANDS.
4. EXCAVATED UNUSABLE MATERIAL – DISPOSAL OF UNUSABLE EXCAVATED MATERIAL SHALL BE AS DIRECTED BY OWNER.
5. OVER EXCAVATION – OVER EXCAVATION SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE DRAWINGS WHENEVER ICE RICH FROZEN SOILS, SATURATED THAWED SOILS OR ORGANIC RICH SOILS ARE ENCOUNTERED WITHIN THE LIMITS OF EXCAVATION.
6. PIPE TRENCH MATERIAL SPECIFICATION

   LEVELING COURSE SHALL MEET THE FOLLOWING SPECIFIC GRADED FRACTION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING BY WEIGHT
1-1/2"	100
1"	70–100
3/4"	69–90
3/8"	50–80
#4	30–65
#8	25–55
#40	10–30
#200	4–10

   PIPE BEDDING MATERIAL: WELL GRADED GRAVEL AND COARSE SAND WITH 1" MAXIMUM PARTICLE SIZE AND 6% MAXIMUM PASSING THE NO. 200 SIEVE.

   SELECT MATERIAL: WELL GRADED GRAVEL AND COARSE SAND WITH 3" MAXIMUM PARTICLE SIZE AND 6% MAXIMUM PASSING THE NO. 200 SIEVE.

   NON-CLASSIFIED MATERIAL: MAY CONSIST OF EXCAVATED NATIVE MATERIAL PROVIDED IT IS FREE OF CONSTRUCTION DEBRIS, BOULDERS OR COBBLES, ORGANIC AND FROZEN MATERIALS.

7. SEEDING – ALL DISTURBED AREAS OUTSIDE TRAVELED WAYS SHALL BE FERTILIZED AND SEEDED UPON COMPLETION OF FINAL GRADING. AN 8-32-16 (NITROGEN-PHOSPHORUS-POTASSIUM) FERTILIZER MIX SHALL BE APPLIED AT A RATE OF 15 POUNDS PER 1,000 SQUARE FEET AND WORKED INTO SURFACE SOILS. SEED SHALL BE 95 PERCENT PURE WITH A MINIMUM GERMINATION RATE OF 85 PERCENT AND SHALL CONFORM TO THE FOLLOWING:

NAME	APPLICATION RATE (LB/1,000 SQ.FT.)
ARCTARED RED FESCUE	1.5
"NUGGET" BLUEGRASS	1.0

   SEED SHALL BE UNIFORMLY MIXED AND MECHANICALLY SPREAD. SEEDING SHALL BE PERFORMED NO EARLIER THAN MAY 15TH AND NO LATER THAN AUGUST 15TH. SEEDING SHALL NOT BE PERFORMED DURING WINDY CONDITIONS OR WHEN CLIMATIC OR GROUND CONDITIONS WOULD HINDER PLACEMENT OR PROPER GROWTH.

STATE OF ALASKA 49TH Lloyd A. Pearson No. CE 6692 11/16/11 REGISTERED PROFESSIONAL ENGINEER

RECORD DRAWING

PIPING

1. GRADE AND ALIGNMENT – SURVEYING EQUIPMENT SHALL BE USED TO TRANSFER GRADES FROM ESTABLISHED CONTROL POINTS. QUALIFIED PERSONNEL SHALL OPERATE SURVEY EQUIPMENT AND MAINTAIN SURVEY NOTES TO BE SUBMITTED TO THE OWNER WITH THE RECORD DRAWINGS AT THE END OF THE PROJECT.
2. PIPE SHALL BE LIFTED AND PLACED USING PIPE SLINGS LOCATED TO PREVENT DAMAGE TO THE PIPE. THE PIPE SLINGS SHALL BE CONSTRUCTED OF NYLON OR OTHER SUITABLE MATERIALS THAT WILL NOT GOUGE, TEAR, PUNCTURE, SCRATCH, OR OTHERWISE DAMAGE THE OUTER JACKET OR THE PROTECTIVE COATING OF THE PIPE AS IT IS HANDLED OR INSTALLED. CHAINS, CHOKERS OR SIMILAR LIFTING DEVICES SHALL NOT BE USED.
3. ONCE THE PIPE IS LOWERED INTO THE TRENCH IT SHALL BE INSPECTED FOR DAMAGE TO THE OUTER JACKET OR PROTECTIVE COATING. ANY DAMAGE TO THE OUTER JACKET SHALL BE REPAIRED USING HEAT SHRINK WRAP. ANY DAMAGE TO THE PROTECTIVE COATING SHALL BE REPAIRED IN ACCORDANCE WITH THE PIPE MANUFACTURER'S RECOMMENDATIONS.
4. PIPE LAYING – ALL PIPE SHALL BE LAID IN REASONABLY CLOSE CONFORMANCE TO LINES AND GRADES SHOWN ON THE DRAWINGS. A CLEAN PIPE SHALL BE LAID, NO TRASH OR DEBRIS SHALL BE ALLOWED TO ENTER THE PIPE. OPEN ENDS OF PIPE AND FITTINGS SHALL BE PLUGGED AT ALL TIMES WHEN WORK IS NOT IN PROGRESS.
5. THE FIELD SUPERVISOR HAS THE AUTHORITY TO FIELD LOCATE BENDS AND INSTALL PIPES THAT BEST MEET SITE AND UNDERGROUND UTILITY CONDITIONS.
6. FLUSHING – ALL UTILITY LINES SHALL BE FLUSHED PRIOR TO PRESSURE TESTING TO REMOVE ANY FOREIGN MATTER.
7. PIPE MATERIALS SHALL BE AS FOLLOWS:

PIPE	MATERIAL
GRAVITY SEWER SERVICE	4"X12" SDR 11 HDPE ARCTIC PIPE
GRAVITY SEWER MAIN	8"X15" SDR 17 HDPE ARCTIC PIPE
FORCE MAIN PIPE DUCT	4"X12" SDR 11 HDPE ARCTIC PIPE
FORCE MAIN	1-1/4" SDR 11 HDPE PIPE

8. PUSH-ON HARCO-TYPE FITTINGS WILL BE PERMITTED FOR HDPE GRAVITY SEWER MAIN, SERVICE LINES, AND FORCE MAIN PIPE DUCT. FORCE MAIN TO BE BUTT FUSED.
9. ARCTIC PIPE JOINTS TO BE COVERED WITH INSULATED HALF-SHELLS AND WRAPPED WITH CANUSAWRAP OR EQUAL.
10. THE GRAVITY SEWER LINES AND PIPE DUCT SHALL BE TESTED BY LOW PRESSURE AIR TESTING PER ASTM-F1417. THE FORCE MAIN LINE SHALL BE TESTED BY HYDROSTATIC PRESSURE TESTING PER ASTM-F2164. HYDROSTATIC TEST PRESSURE MUST BE 1.5 TIMES THE OPERATING PRESSURE OF THE PIPING SYSTEM, BUT SHALL NOT EXCEED 160 PSI FOR SDR 11 PIPE.
11. FUSION JOINTS WILL BE VISUALLY INSPECTED BEFORE AND AFTER FUSION TO ENSURE THAT JOINTS ARE FUSED IN ACCORDANCE WITH THE VISUAL QUALITY CONTROL CRITERIA.
    - i. THE DOUBLE BEAD SHALL BE ROLLED OVER TO THE SURFACE AND BE UNIFORMLY ROUNDED AND CONSISTENT IN SIZE THROUGHOUT THE ENTIRE CIRCUMFERENCE OF THE JOINT.
    - ii. THE GAP BETWEEN THE TWO BEADS MUST NOT BE BELOW THE FUSION SURFACE THROUGHOUT THE ENTIRE CIRCUMFERENCE OF THE JOINT.
    - iii. THE DISPLACEMENT (PERPENDICULAR TO THE PIPE CENTERLINE) BETWEEN THE FUSED ENDS MUST NOT EXCEED 10% OF THE PIPE MINIMUM WALL THICKNESS.
    - iv. THE WIDTH OF THE COMBINED BEAD FOR SDR 11 (1" AND 4" DIAMETER) AND SDR 17 (8" DIAMETER) PIPE SHALL BE AS FOLLOWS:

PIPE DIA.	MINIMUM BEAD WIDTH	MAXIMUM BEAD WIDTH
1-1/4" PIPE	5/32-INCH	1/4-INCH
4" PIPE	5/16-INCH	7/16-INCH
8" PIPE	11/32-INCH	1/2-INCH

    - v. BOTH BEADS OF EACH FUSION JOINT SHALL BE OF UNIFORM SIZE AND SHAPE. THE RATIO OF THE DIFFERENCE IN INDIVIDUAL BEAD WIDTHS DIVIDED BY THE TOTAL WIDTH OF BOTH BEADS SHALL NOT EXCEED 100%.
12. DESTRUCTIVE TESTING OF THE BUTT FUSED JOINT QUALITY WILL BE CONDUCTED BY PERFORMING THE BENT STRAP TEST. FREQUENCY OF TESTING WILL BE A MINIMUM OF ONE TEST EVERY CALENDAR WEEK THAT THE FUSING PROCESS OCCURS.

ISSUED FOR CONSTRUCTION

RECORD DRAWING CERTIFICATE

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NAME ______ DATE 11/18/11

VILLAGE SAFE WATER

STATE OF ALASKA 49TH JAMES WESCOTT BOTT No. CE-11521 REGISTERED PROFESSIONAL ENGINEER

HDR Alaska, Inc.

Too'gha Inc.
Tanana Elders Lift Station

GENERAL NOTES AND CIVIL SPECIFICATIONS

REVISION	BY	DATE

Project No. 135830
Date 10/5/2010
Designed JJ
Drawn JJ
Approved JWB

Sheet No. C1.0
SHEET 2 OF 8

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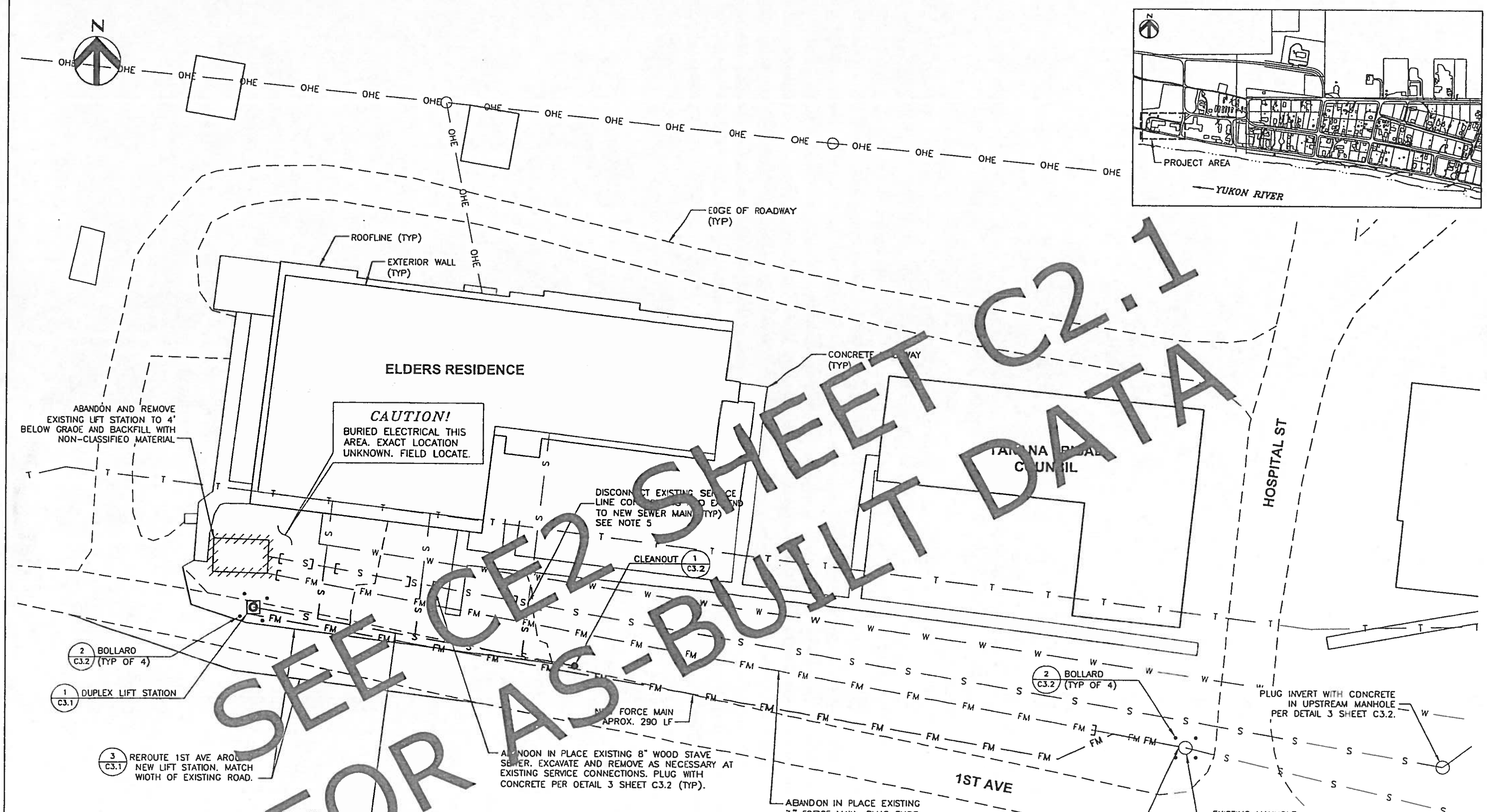
Xrefs: X_EXISTING UTILITYS.DWG 22X34-V.DWG - Images:



NOTES

1. BASIS OF VERTICAL DATUM IS ASSUMED ELEVATION OF 100' AT NORTH RIM OF EXISTING MANHOLE AT CORNER OF 1ST AVE AND HOSPITAL ST.
2. LOCATION OF CENTER OF NEW LIFT STATION DETERMINED FROM DISTANCES MEASURED ON THIS DRAWING. DISTANCE FROM SOUTHWEST CORNER OF EXISTING LIFT STATION STRUCTURE IS 16.5 FT. DISTANCE FROM SOUTHEAST CORNER OF EXISTING LIFT STATION STRUCTURE IS 10.5 FT.
3. NEW FORCE MAIN, GRAVITY SEWER MAIN, AND SERVICE CONNECTIONS SHOWN IN BOLD.
4. REPLACE ALL CONCRETE WALKWAY THAT IS DAMAGED OR DEMOLISHED DURING CONSTRUCTION WITH 3,000 PSI CONCRETE.
5. FIELD LOCATE SERVICE LINES; NUMBER AND LOCATIONS SHOWN ARE APPROXIMATE. FIELD FIT SERVICE LINE EXTENSIONS WITH REPAIR COUPLINGS, MATCHING MATERIAL AND GRADE. CONNECTIONS TO NEW MAIN SHALL BE Y-FITTINGS.

RECORD DRAWING

ISSUED FOR CONSTRUCTION

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NAME 11/18/11 DATE

VILLAGE SAFE WATER

STATE OF ALASKA 49TH JAMES WESCOTT BOTT No. CE-11521 REGISTERED PROFESSIONAL ENGINEER

HDR Alaska, Inc.

Too'gha Inc.
Tanana Elders Lift Station
SITE PLAN

REVISION	BY	DATE

Project No. 135830
Date 10/5/2010
Designed JJ
Drawn JJ
Approved JWB

Sheet No. C2.0
SHEET 3 OF 8

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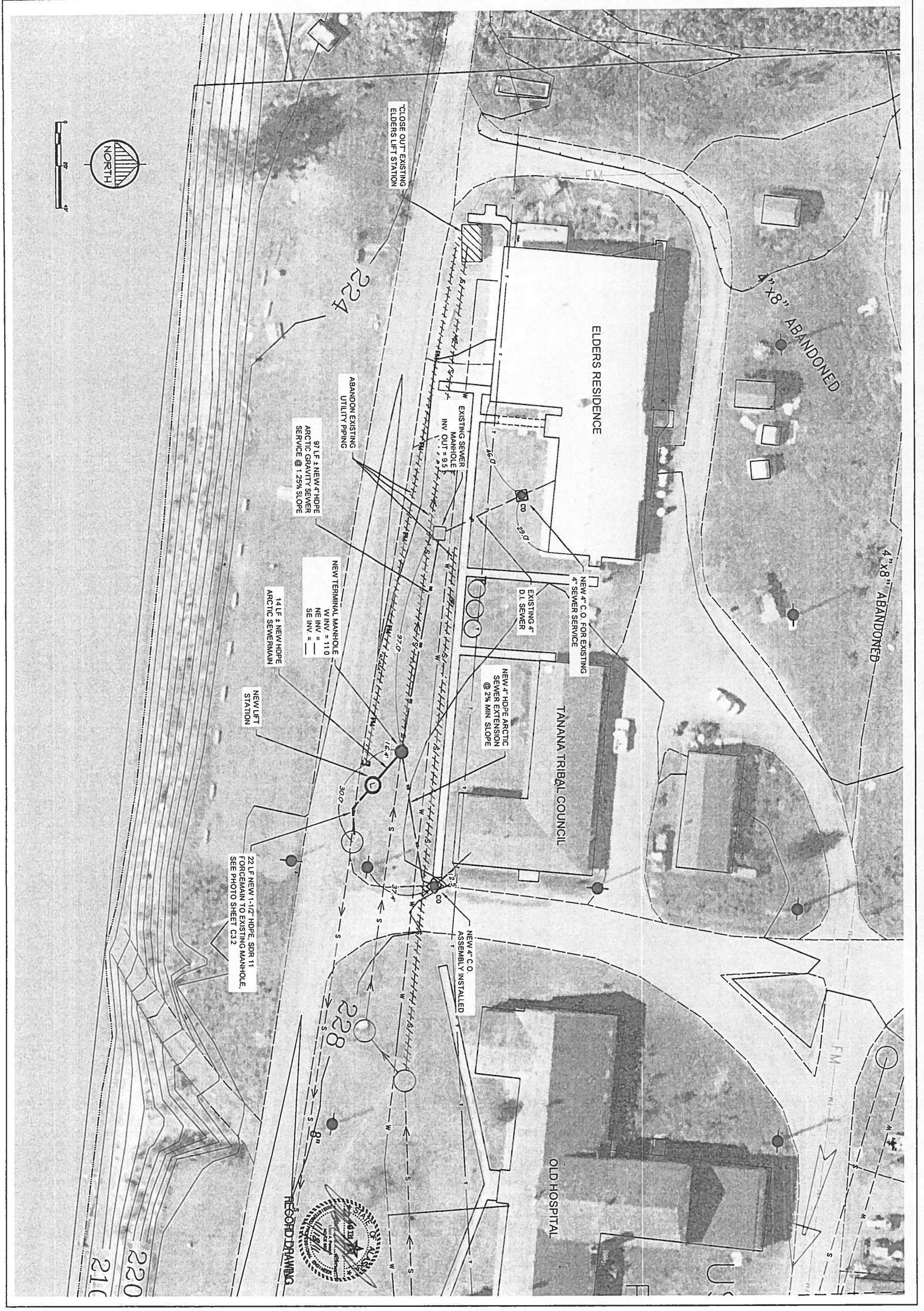

Sheet No C2.1 SHEET 3 OF 8

Project No. ____
Date JULY 2011
Designed LAP
Drawn CM
Approved LAP

REVISION	BY	DATE
RECORD DRAWINGS	CM	10/11

CE2 ENGINEERS, INC.
PO BOX 232948 ANCHORAGE, AK 99523 PH: 907-349-1010 FAX: 907-349-1015

TOO'GHA INC.
TANANA ELDERS LIFT STATION

SITE PLAN

TANANA, ALASKA

STATE OF ALASKA 49TH
Lloyd A. Parson NO. CE 9662 REGISTERED PROFESSIONAL ENGINEER

SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

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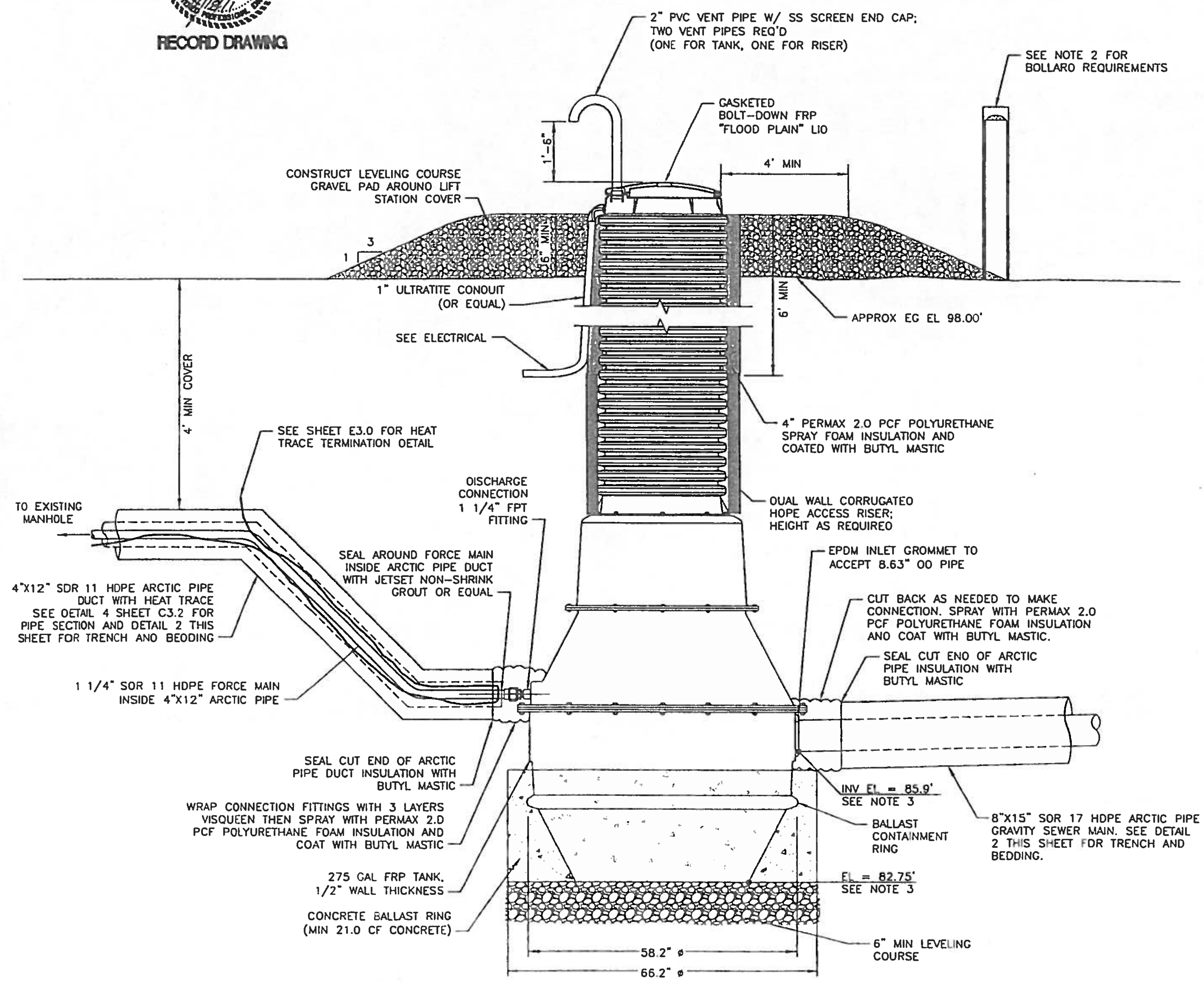
11/18/11
DATE

RECORD DRAWING

DUPLEX LIFT STATION NOTES

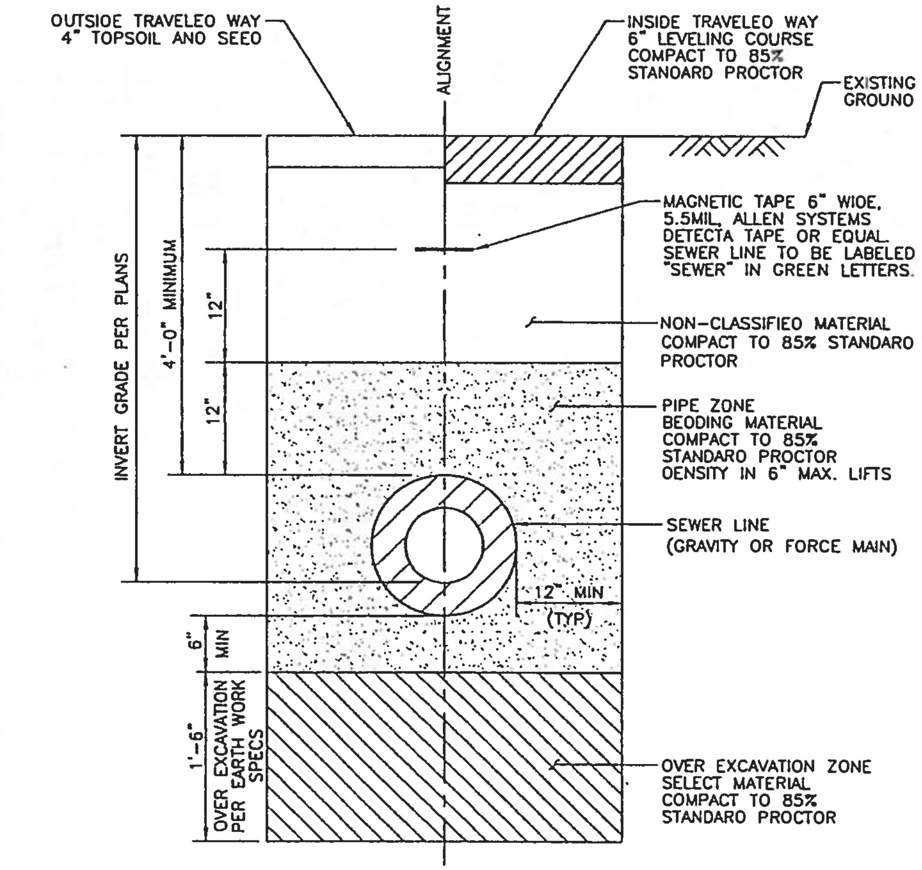
1. DETAIL IS BASED ON E/ONE EXTREME MODEL DH272 PACKAGE DUPLEX GRINDER PUMP STATION WITH 1 HP PUMPS.
2. INSTALL FOUR BOLLARDS AS SHOWN IN DETAIL 2 SHEET C3.2 TO PROVIDE PROTECTION OF GRINDER PUMP STATION. ARRANGE BOLLARDS IN A SQUARE PATTERN, 7' EACH SIDE, CENTERED ON THE GRINDER PUMP STATION LID. ADJUST BOLLARD LOCATIONS AS NECESSARY TO AVOID BURIED PIPES, ELECTRICAL LINES, ETC.
3. INLET INVERT AND BOTTOM OF LIFT STATION ELEVATIONS ARE APPROXIMATED FROM EXISTING LIFT STATION INLET INVERT AND ADJUSTED FOR EXTENDED SEWER SERVICE LINES. ACTUAL ELEVATIONS MAY VARY, ADJUST LIFT STATION DEPTH AS NECESSARY.



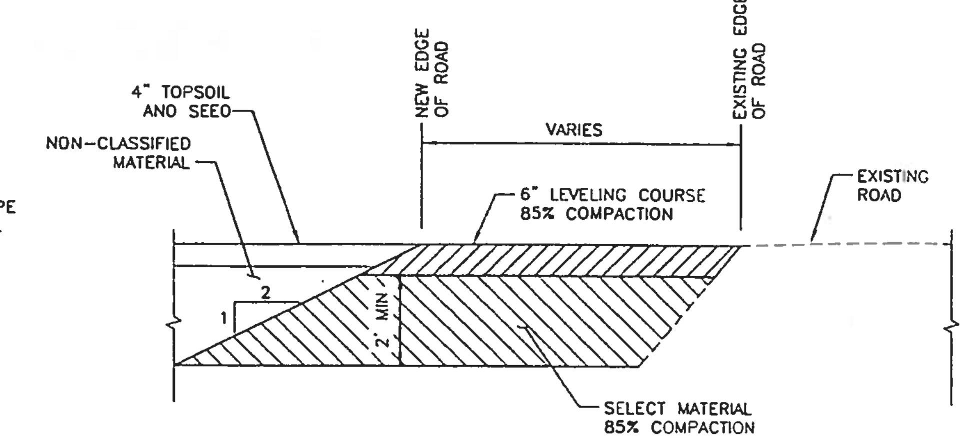
DUPLEX LIFT STATION DETAIL (1 / C2.0)
NTS

NOTES

1. TRENCH WALLS SHALL BE SLOPED OR SHORED IN CONFORMANCE WITH ALL APPLICABLE SAFETY STANDARDS.
2. COMPACT BACKFILL PER SPECIFICATIONS AND/OR DETAIL.
3. IF IN-SITU MATERIAL OF TRENCH WALLS IS WEAK AND SLOUGHS INTO TRENCH, LINE TRENCH WHERE DIRECTED BY ENGINEER WITH NON-WOVEN GEOTEXTILE UP TO 18" BELOW FINISH GRADE. OVERLAP EDGES OF GEOTEXTILE AND CONTINUE BACKFILLING TO FINISH GRADE.



TYPICAL TRENCH SECTION (2 / C2.0)
NTS



ROAD RE-ROUTE SECTION (3 / C2.0)
NTS

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NAME / DATE 11/8/11

VILLAGE SAFE WATER

STATE OF ALASKA 49TH JAMES RESCOTT BOTT No. CE-11521 REGISTERED PROFESSIONAL ENGINEER

HDR Alaska, Inc.

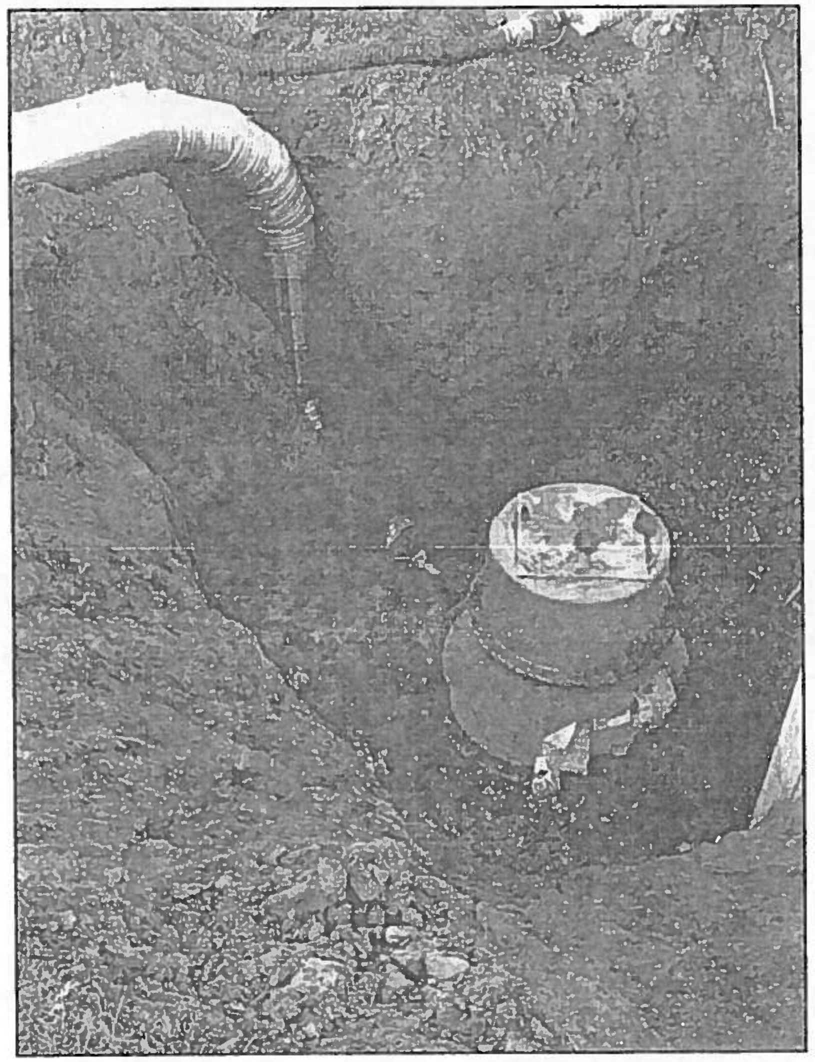
Too'gha Inc.
Tanana Elders Lift Station

LIFT STATION, TRENCH, AND ROAD WIDENING DETAILS

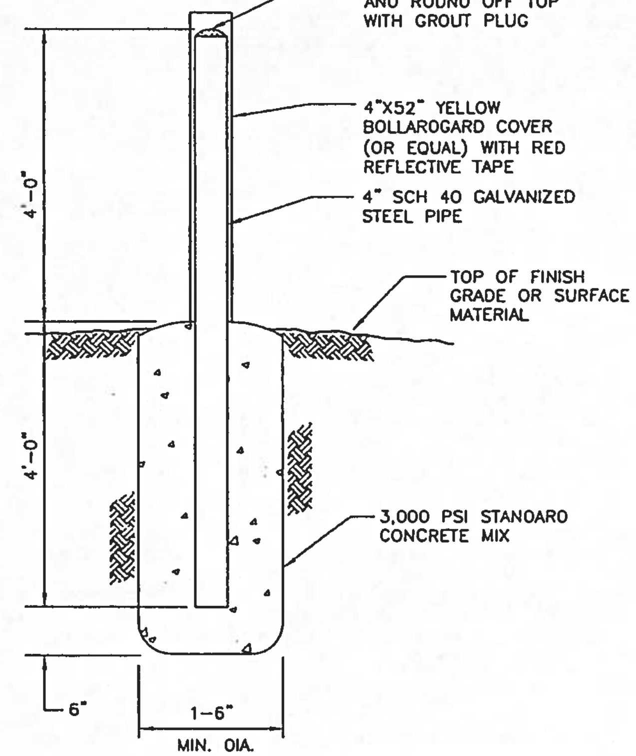
REVISION	BY	DATE

Project No. 135830
Date 10/5/2010
Designed JJ
Drawn JJ
Approved JWB

Sheet No. C3.1
SHEET 4 OF 8



FORCE MAIN CONNECTION (1 / C3.2)
NTS



BOLLARD DETAIL (2 / C2.0)
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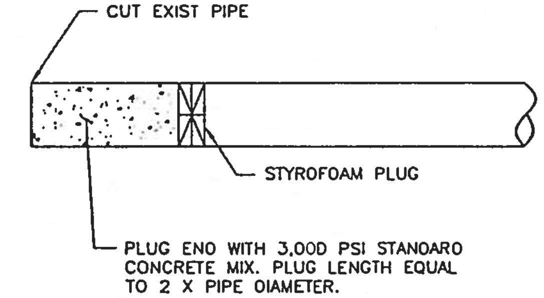
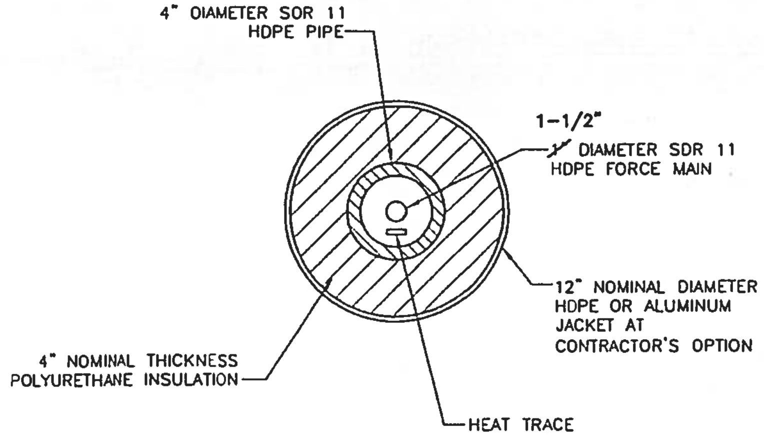


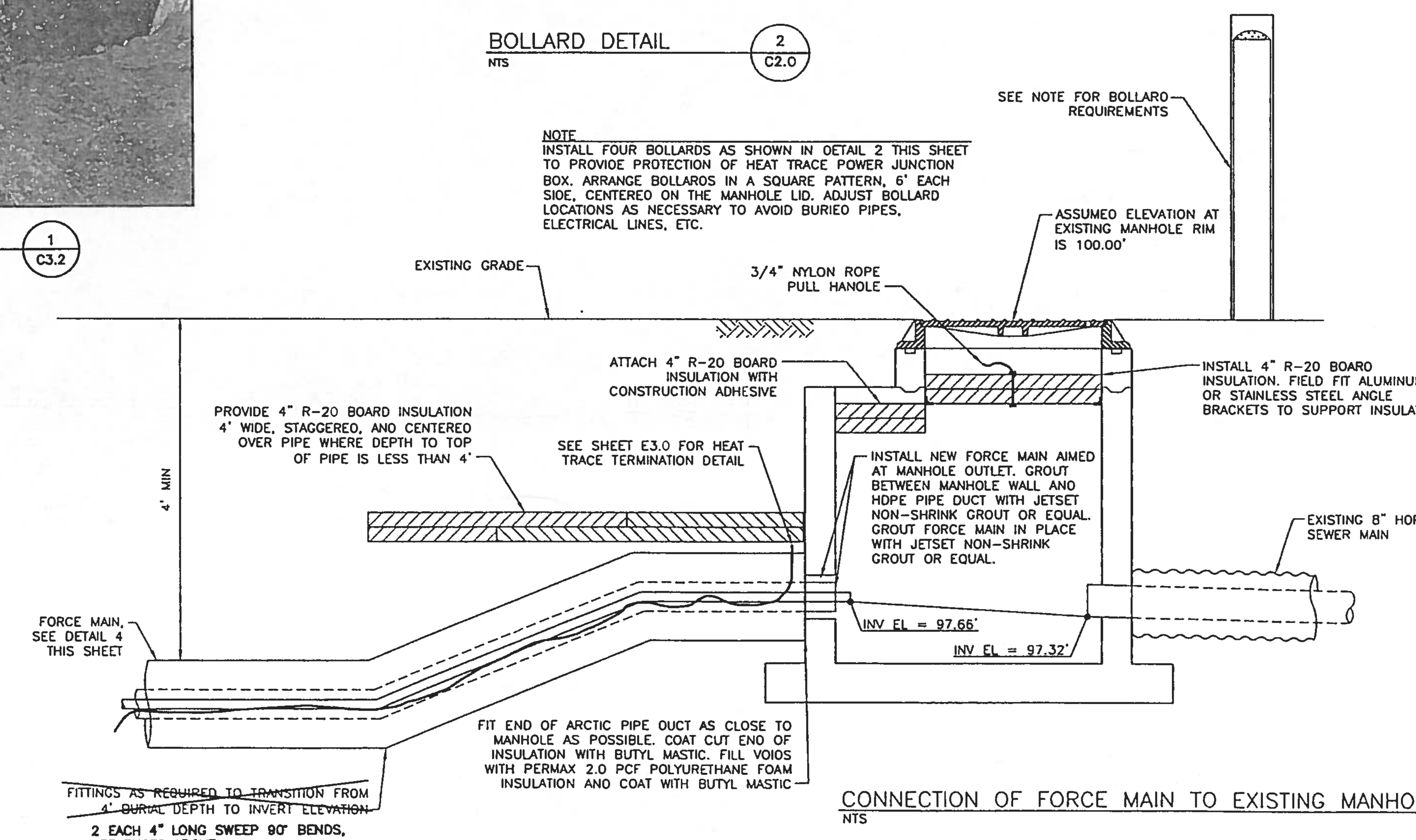
ABANDONED PIPE PLUG DETAIL (3 / C2.0)
NTS

RECORD DRAWING



FORCE MAIN PIPE SECTION (4 / C3.1)
NTS

NOTE
INSTALL FOUR BOLLARDS AS SHOWN IN OETAIL 2 THIS SHEET TO PROVIOE PROTECTION OF HEAT TRACE POWER JUNCTION BOX. ARRANGE BOLLAROS IN A SQUARE PATTERN, 6' EACH SIOE, CENTEREO ON THE MANHOLE LID. ADJUST BOLLARD LOCATIONS AS NECESSARY TO AVOID BURIEO PIPES, ELECTRICAL LINES, ETC.



CONNECTION OF FORCE MAIN TO EXISTING MANHOLE (5 / C2.0)
NTS

ISSUED FOR CONSTRUCTION

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NAME 11/18/11 DATE

VILLAGE SAFE WATER

STATE OF ALASKA 49TH JAMES WESCOTT BOTT No. CE-11531 REGISTERED PROFESSIONAL ENGINEER

HDR Alaska, Inc.

Too'gha Inc.
Tanana Elders Lift Station

CLEANOUT, BOLLARD, PLUG, PIPE, AND MANHOLE CONNECTION DETAILS

REVISION	BY	DATE

Project No. 135830
Date 10/5/2010
Designed JJ
Drawn JJ
Approved JWB

ELECTRICAL SPECIFICATIONS

PART 1 – GENERAL

1.1 SYSTEM DESCRIPTION:

A. SCOPE OF WORK: FURNISH, INSTALL, TEST AND PLACE INTO SATISFACTORY AND SUCCESSFUL OPERATION ALL MATERIALS, EQUIPMENT, DEVICES AND NECESSARY APPURTENANCES TO PROVIDE COMPLETE SYSTEM POWER, LIGHTING AND CONTROLS AS INDICATED ON THE DRAWINGS AND SPECIFICATIONS.

B. ALL COMPONENTS FOR THE PROJECT SHALL BE LISTED OR LABELED BY UL (UNDERWRITERS LABORATORIES), FM (FACTORY MUTUAL) AND OTHER AGENCIES RECOGNIZED BY INDUSTRY STANDARDS. WORK SHALL COMPLY WITH ALL LISTED AND APPLICABLE INDUSTRY STANDARDS, CODES, LOCAL ORDINANCES AND MANUFACTURER'S INSTRUCTIONS.

C. SYSTEM SHALL BE COMPLETE AND SHALL INCLUDE ALL TERMINATIONS AND SPLICES TO PROVIDE A FUNCTIONAL SYSTEM.

D. PROJECT CONDITIONS: CONTRACTOR SHALL VERIFY IN THE FIELD THAT DIMENSIONS, ROUTING AND CONNECTION LOCATIONS SHOWN ON THE DRAWINGS ARE REASONABLY ACCURRATE.

1.2 STANDARDS AND CODES:

A. NFPA 70 – NATIONAL ELECTRIC CODE, LATEST PUBLISHED ADDITION.
B. LOCAL CODES AND AMENDMENTS.

1.3 SUBMITTALS:

A. GENERAL: PROVIDE SUBMITTALS OF ALL MATERIAL AND EQUIPMENT. INCLUDE CATALOG NUMBERS, PERFORMANCE DATA, WIRING DIAGRAMS, AND ROUGH-IN DIMENSIONS.

B. MANUFACTURER'S INSTALLATION INSTRUCTIONS: INCLUDE INSTRUCTIONS FOR STORAGE, HANDLING, PROTECTION, EXAMINATION, PREPARATION AND INSTALLATION OF PRODUCTS.

1.4 OPERATION AND MAINTENANCE DATA:

A. PROVIDE ALL MANUFACTURER'S RELEVANT MAINTENANCE AND OPERATING INSTRUCTIONS INCLUDING PROCEDURES NECESSARY FOR SYSTEM START-UP, OPERATION, EMERGENCY OPERATION AND SHUTDOWN.

B. MANUAL SHALL BE INDEXED, LABELED AND SHALL INCLUDE MAINTENANCE INSTRUCTIONS, PRODUCT DATA, SHOP DRAWINGS AND STEP BY STEP PROCEDURES FOR INSPECTION, REPAIR, CLEANING AND CALIBRATION.

PART 2 – PRODUCTS

2.1 IDENTIFICATION:

A. PROVIDE ENGRAVED LAMINATED PLASTIC NAMEPLATES WITH BLACK LETTERS ON A WHITE BACKGROUND TO IDENTIFY ALL ELECTRICAL DISTRIBUTION AND CONTROL EQUIPMENT, AND LOADS SERVED AS NOTED ON THE DRAWINGS.

B. LETTER HEIGHTS SHALL BE 1/8 INCH FOR INDIVIDUAL SWITCHES, MOTOR STARTERS AND 1/2 INCH ON PANELBOARDS AND CONTROL PANELS. SECURE NAMEPLATES TO EQUIPMENT FRONTS USING SCREWS OR RIVETS.

C. PROVIDE WIRE MARKERS FOR ALL POWER AND CONTROL CIRCUITS IDENTIFYING BRANCH OR FEEDER CIRCUIT AND WIRE NUMBER INDICATED ON CONTROL SYSTEM SHOP DRAWINGS.

2.2 CONDUCTORS:

A. ALL WIRING SHALL BE COPPER WITH TYPE XHHW-2 INSULATION UNLESS OTHERWISE NOTED. TYPE SIS OR MTW INSULATION SHALL BE ACCEPTABLE FOR CONTROL PANEL WIRING ONLY.

B. MINIMUM BRANCH CIRCUIT CONDUCTOR SIZE SHALL BE #12 AWG. MINIMUM CONTROL CIRCUIT SIZE SHALL BE #18 AWG. MULTI-PAIR CONTROL CABLES SHALL BE RATED FOR DIRECT BURIAL.

C. COLOR CODING SHALL BE AS FOLLOWS AND CONSISTANT THROUGHOUT THE ENTIRE INSTALLATION.

120/208 V, 3PH, 4W:

1. PHASE A – BLACK, PHASE B – RED, PHASE C – BLUE, NEUTRAL – WHITE

277/480 V, 3PH, 4W:

1. PHASE A – BROWN, PHASE B – ORANGE, PHASE C – YELLOW, NEUTRAL – GRAY

D. USE PROPERLY SIZED INSULATED WIRE CONNECTORS WITH PLASTIC CAPS FOR ALL CONDUCTORS #8 AWG AND SMALLER. TERMINATE #6 AND LARGER WITH CRIMP OR COMPRESSION TYPE CONNECTORS INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS AND INSULATE WITH PROPERLY SIZED 600 VOLT RATED HEAT SHRINK TUBING AND ELECTRICAL TAPE.

E. SIZE 14 AND SMALLER CONDUCTORS SHALL BE SOLID COPPER. ALL CONDUCTORS LARGER THAN SIZE 14 SHALL BE STRANDED COPPER.

2.3 CONDUIT:

A. ALL WIRING SHALL BE INSTALLED IN GALVANIZED RIGID METALLIC CONDUIT (GRC) UNLESS OTHERWISE NOTED. ALL FITTINGS, CONNECTORS, BOXES, ETC. SHALL BE APPROVED FOR USE AS GROUNDING MEANS.

B. UTILIZE SHORT EXTENSIONS (36 INCH MINIMUM) OF FLEXIBLE, LOW TEMPERATURE LIQUIDTIGHT CONDUIT FOR CONNECTIONS OF ALL MOTORS AND OTHER EQUIPMENT SUBJECT TO VIBRATION IN NON-HAZARDOUS AREAS. USE EXPLOSION-PROOF FLEXIBLE COUPLINGS FOR CONNECTION IN HAZARDOUS AREAS AND AS SHOWN.

C. COMPLETELY AND THOROUGHLY CLEAN AND SWAB RACEWAY SYSTEM BEFORE INSTALLING CONDUCTORS.

D. ALL UNDERGROUND CONDUIT SHALL BE BURIED A MINIMUM OF 24 INCHES AND IN ACCORDANCE WITH NEC.

2.4 JUNCTION BOXES:

A. NON-HAZARDOUS LOCATIONS: PROVIDE CAST STEEL BOXES WITH THREADED HUBS AND GASKETED COVERS.

B. HAZARDOUS LOCATIONS: PROVIDE BOXES RATED FOR THE LOCATION AND USE.

2.5 WIRING DEVICES:

A. SWITCHES: NEMA WD 1, HEAVY DUTY, SPEC GRADE, 20A, 120VAC GENERAL-USE.

B. RECEPTACLES: NEMA WD 1, HEAVY DUTY, SPEC GRADE, 20A, 120VAC DUPLEX, GFCI TYPE.

2.6 PANELBOARDS AND CIRCUIT BREAKERS:

A. MANUFACTURER

1. SQUARE D OR APPROVED EQUAL

B. NEMA KS1, PB1; PANELBOARD SHALL BE ENCLOSED, DEAD-FRONT CONSTRUCTION WITH COPPER BUSSES, NEMA TYPE 3R ENCLOSURE

C. BRANCH CIRCUIT BREAKERS: NEMA AB1, MOLDED CASE, BOLT-ON THERMAL MAGNETIC TRIP WITH COMMON TRIP HANDLE FOR ALL POLES.

2.7 LIGHTING:

A. PROVIDE ALL LIGHTING EQUIPMENT OR APPROVED EQUAL AS SHOWN ON THE DRAWINGS AND DESCRIBED IN THE "FIXTURE SCHEDULE".

B. PROVIDE LIGHTING EQUIPMENT COMPLETE, WIRED, ASSEMBLED WITH PROPER FLANGES, MOUNTING SUPPORTS, HARDWARE, ETC.

C. PROVIDE HIGH POWER FACTOR, REGULATING OR CONSTANT WATTAGE TYPE BALLASTS FOR HID FIXTURES.

2.8 GROUNDING AND BONDING:

A. ALL GROUNDING AND BONDING SHALL COMPLY WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE (NEC), MANUFACTURER'S RECOMMENDATIONS, ANY LOCAL CODES AND AMENDMENTS.

2.9 EQUIPMENT CONNECTIONS:

A. PROVIDE WIRING AND CONNECTION TO EQUIPMENT REQUIRING ELECTRICAL POWER AND CONTROL BUT SPECIFIED UNDER OTHER DIVISIONS OF THE SPECIFICATIONS. REVIEW SUBMITTALS PRIOR TO INSTALLATION AND ROUGH-IN. VERIFY SIZE AND TYPE OF CONNECTIONS.

B. INTRINSICALLY SAFE WIRING: WIRING SHALL NOT BE INSTALLED IN RACEWAY WITH CONDUCTORS OF NON-INTRINSICALLY SAFE CIRCUITS PER NEC 504.

C. RACEWAYS WITH INTRINSICALLY SAFE WIRING SHALL BE IDENTIFIED AS SUCH PER NEC 504.

2.10 HAZARDOUS LOCATIONS:

A. ALL EQUIPMENT AND WIRING IN CLASS 1, DIV 1 AND 2 HAZARDOUS LOCATIONS SHALL BE INSTALLED AND RATED ACCORDINGLY OR SHALL BE INTRINSICALLY SAFE. ALL WIRING METHODS IN HAZARDOUS LOCATIONS SHALL MEET THE REQUIREMENTS OF NEC.

PART 3 – EXECUTION

3.1 GENERAL:

A. INSTALLATION OF ALL WORK SHALL BE MADE SO THAT ALL COMPONENT PARTS ARE INSTALLED AND FUNCTION AS A COMPLETE, WORKABLE SYSTEM.

B. ALL WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE(NEC), NECA 1, AND THE STANDARDS AND CODES LISTED IN PART 1. WHERE QUESTIONS ARISE REGARDING WHICH REQUIREMENTS AND STANDARDS APPLY, THE MORE STRINGENT SHALL PREVAIL.

C. ALL WORK SHALL COMPLY WITH THE REQUIREMENTS AND RECOMMENDATIONS OF THE PRODUCT MANUFACTURER.

D. REPLACE AND/OR REPAIR TO ORIGINAL (OR BETTER) CONDITION ANY EXISTING STRUCTURES, MATERIALS, EQUIPMENT, ETC. INADVERTENTLY DAMAGED OR DEMOLISHED DURING THE COURSE OF CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.

3.2 TESTING

A. TEST ALL SERVICE FEEDERS AND POWER CONDUCTORS PRIOR TO TERMINATION WITH A MEGAOHM METER PER THE MANFACTURER'S RECOMMENDATIONS. REPLACE ALL CONDUCTORS EXHIBITING LESS THAN 10 MEGAOHM IMPEDENCE. REPEAT TESTING AS REQUIRED TO VERIFY COMPLIANCE.

B. HEAT TRACE: PERFORM CONTINUITY AND INSULATION RESISTANCE (MEGGER) TESTS ON ALL HEAT TRACE CABLES BEFORE AND AFTER INSTALLATION PER MANUFACTURER'S INSTRUCTIONS. RECORD AND SUBMIT RESULTS. ANY CABLE WITH A RESISTANCE OF LESS THAN 1,000 MEGOHMS SHALL BE REJECTED AND REPLACED. AFTER INSTALLATION, ENERGIZE EACH CABLE AND AFTER 10 MINUTES RECORD THE VOLTAGE, CURRENT AND TOTAL LENGTH OF CABLE. SUBMIT RESULTS.

C. CONTROL PANELS: ALL CONTROL PANELS SHALL MEET UL-508A STANDARDS AND SHALL BE LISTED AND LABELED BY A UL RECOGNIZED SHOP. PRIOR TO FABRICATION, SUBMIT FOR APPROVAL, SHOP DRAWINGS SHOWING DIMENSIONED LAYOUTS OF PANEL FACES AND INTERIORS, AND DETAILED WIRING SCHEMATICS. ALSO SUBMIT FOR APPROVAL, VENDOR DATA ON ALL PANEL COMPONENTS TO BE USED. PROVIDE COMPLETE BENCH TESTING OF ALL PANELS PRIOR TO SHIPPING AND CORRECT ANY DEFICIENCIES. NOTIFY ENGINEER TWO WEEKS PRIOR TO DATE OF TESTING. PROVIDE AS-BUILT DRAWINGS OF COMPLETED PANELS IN AUTOCAD FORMAT.

ISSUED FOR CONSTRUCTION

VILLAGE SAFE WATER

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HDR Alaska, Inc.

Too'gha Inc.
Tanana Elders Lift Station

ELECTRICAL SPECIFICATIONS

REVISION	BY	DATE

Project No. 135830
Date 10/5/2010
Designed JHF
Drawn OM
Approved –

DRAWING NO. E1.0
SHEET 6 OF 8

ABBREVIATIONS

A	AMPERE
AWG	AMERICAN WIRE GAUGE
BCU	BARE COPPER
C	CONDUIT
DWG	DRAWING
(E)	EXISTING
G	GROUND CONDUCTOR
GES	GROUNDING ELECTRODE SYSTEM
GFI	GROUND FAULT INTERRUPTING
GRC	GALVANIZED RIGID (STEEL) CONDUIT
H	HOT CONDUCTOR
HDPE	HIGH DENSITY POLYETHYLENE
HT	HEAT TRACE
KVA	KILO-VOLT-AMPERES
LTF	LIQUID TIGHT FLEXIBLE CONDUIT (METALLIC)
MIN.	MINIMUM
MLO	MAIN LUG ONLY
N	NEUTRAL CONDUCTOR
(N)	NEW
NEC	NATIONAL ELECTRICAL CODE
NFS	NON-FROST SUSCEPTIBLE
PR	PAIR
SIG	SIGNAL
TWSH	TWISTED SHIELDED WIRE
TYP	TYPICAL
V	VOLTS
VAC	VOLTS ALTERNATING CURRENT
W	WATTS
XFMR	TRANSFORMER

GENERAL NOTES

1. ALL SINGLE PHASE BRANCH CIRCUITS SHALL BE 3#12, AND ALL THREE PHASE BRANCH CIRCUITS SHALL BE 4#12, MINIMUM 1/2"C UNLESS OTHERWISE NOTED. ALL CIRCUITS SHALL HAVE GROUND CONDUCTOR.
2. DIMENSIONS OF EQUIPMENT ARE APPROXIMATE. INSTALLATION SHALL BE VERIFIED BASED ON ACTUAL MANUFACTURER'S DATA AND SHOP MANUALS.
3. ALL SITE WORK AND UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS. VERIFY ALL INSTALLATIONS PRIOR TO COMMENCEMENT OF WORK. COORDINATE ALL WORK WITH UTILITIES AS REQUIRED.

ELECTRICAL LEGEND

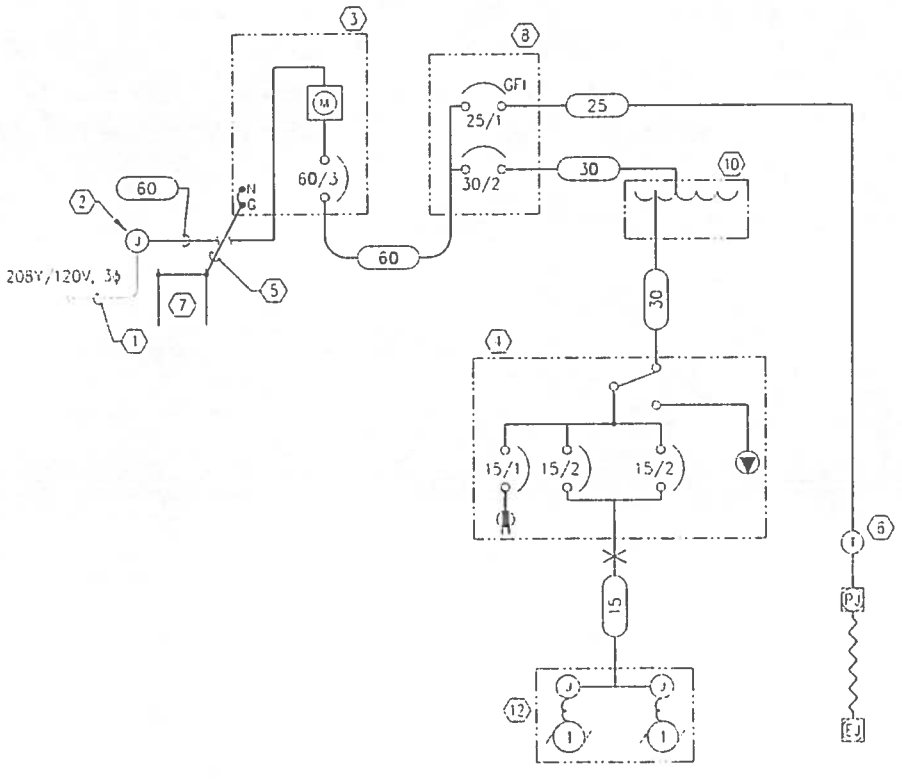
———	EXPOSED CONDUIT, RGSC UNLESS OTHERWISE SHOWN
- - - - -	CONDUIT RUN UNDERGROUND OR IN CONCRETE
~~	HEAT TRACE 120V, 5W/FT SELF-LIMITING, NELSON #LT5-J OR EQUAL
(HP)	SINGLE PHASE MOTOR
	LIQUID-TIGHT FLEXIBLE CONDUIT
X/Y	MOLDED CASE CIRCUIT BREAKER, X = AMPERE RATING, Y = NO. OF POLES
J	JUNCTION BOX OR FITTING
M	KILOWATT-HOUR METER
PJ	HEAT TRACE POWER POINT
EJ	HEAT TRACE END KIT
	LOAD CENTER
T	LINE THERMOSTAT, NELSON #TH4X325 OR EQUAL
	CONTROL PANEL
	20A, 120V, DUPLEX, GFI RECEPTACLE WITH METALLIC WHILE-IN-USE WEATHERPROOF COVER
	HAZARDOUS LOCATION SEAL-OFF FITTING

FEEDER SCHEDULE

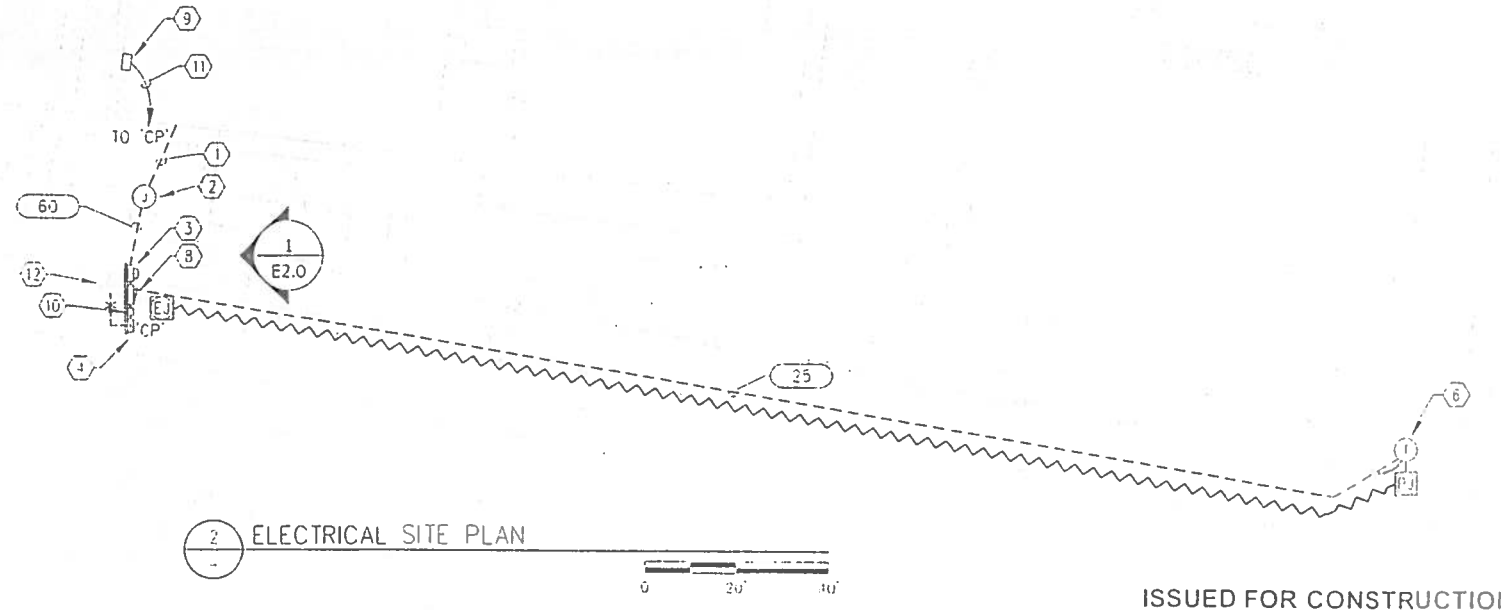
15	(2 EA) FACTORY PROVIDED CABLE, 2" C.
25	(2) #10, (1) #10 (G), 1/2" C.
30	(3) #10, (1) #10 (G), 1/2" C.
60	(4) #6, (1) #10 (G), 2" C.

SHEET NOTES:

1. (E) 120/208V, 3φ UNDERGROUND FEEDER TO (E) LIFT STATION.
2. INTERCEPT (E) UNDERGROUND FEEDER BY PROVIDING (N) WATERPROOF SPLICE OF CONDUCTORS AT (N) JUNCTION BOX. SEE DETAIL 2 SHEET E3.0.
3. (N) 100A, 208V, 3-PHASE, 4-WIRE, 7-JAW METER/MAIN, CIRCLE AW #217MTB OR EQUAL.
4. (N) DUPLEX GRINDER STATION CONTROL PANEL WITH GFI RECEPTACLE, GENERATOR RECEPTACLE AND AUTOMATIC TRANSFER SWITCH OPTIONS. E/ONE MODEL T260.
5. #6 BCU. BOND TO MAIN DISCONNECT AND TO THE GES.
6. (N) IN-LINE THERMOSTAT WITH REMOTE BULB SENSOR INSTALLED IN ARCTIC PIPE. SEE DETAIL 3 ON SHEET E3.0.
7. GES CONSISTING OF TWO, 3/4"X10', COPPER CLAD GROUND RODS IMBEDDED A MIN. OF 12" BELOW GRADE, SEPARATED A MIN. OF 10' AND INTERCONNECTED WITH #1/0 BCU, BURIED A MIN. OF 30" BELOW GRADE. ALL BELOW GRADE CONNECTIONS TO BE EXOTHERMICALLY WELDED.
8. (N) 125A, 208Y/120V, MLO, NEMA 3R LOAD CENTER (PANEL 'A') SQUARE D CAT #00312L125GRB OR EQUAL.
9. (N) REMOTE SENTRY DISPLAY MODULE.
10. (N) 0.75kVA, 208V TO 240V, BUCK BOOST TRANSFORMER SOLA #HS20F750B.
11. 1/2"C, 3#12 (2SIG,G)
12. (N) DUPLEX LIFT STATION. THE INTERIOR OF THE DUPLEX LIFT STATION AND ASSOCIATED PIPING ARE TO BE CONSIDERED HAZARDOUS AREAS DUE TO THE PRESENCE OF COMBUSTIBLE GAS AND ANY ELECTRICAL WORK WITHIN THE CLASSIFIED AREAS SHALL COMPLY WITH ARTICLE 500 OF THE NEC.



1 / - POWER ONE-LINE DIAGRAM
SCALE: NONE



2 / - ELECTRICAL SITE PLAN

ISSUED FOR CONSTRUCTION

VILLAGE SAFE WATER

STATE OF ALASKA — REGISTERED PROFESSIONAL ENGINEER — 10/5/2010

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Too'gha Inc.
Tanana Elders Lift Station

LEGENDS & ABBREVIATIONS, ELECTRICAL SITE PLAN

REVISION:	BY	DATE

Project No. 135830
Date 10/5/2010
Designed JHF
Drawn DM
Approved —

Sheet No. E2.0
SHEET ___ OF 8

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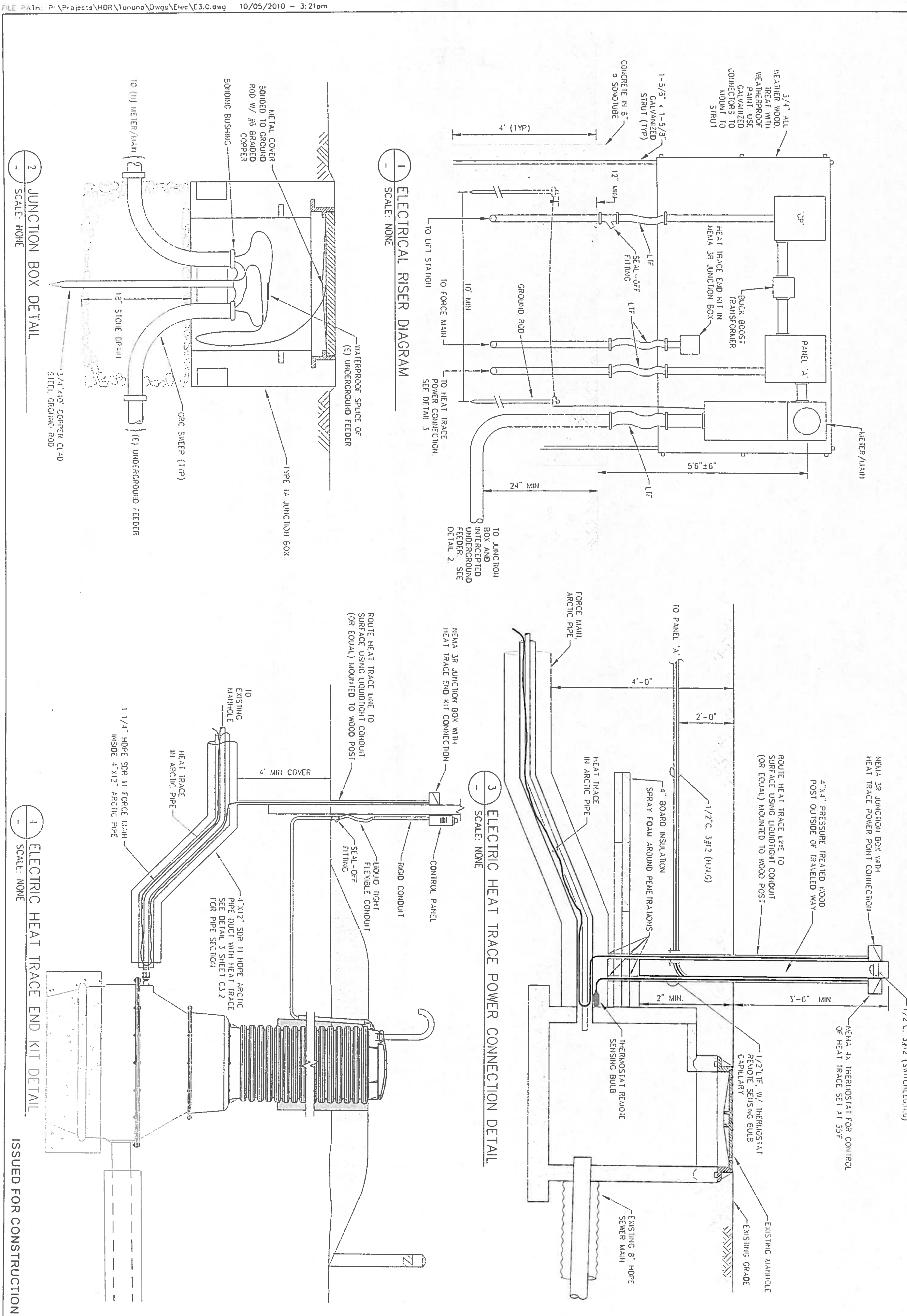

Sheet No. E3.0	Project No. 135830	REVISION	BY	DATE
SHEET 9 OF 8	Date 10/5/2010			
	Designed JHF			
	Drawn OM			
	Approved –			

Too'gha Inc.
Tanana Elders Lift Station

ELECTRICAL DETAILS

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HDR Alaska, Inc.

STATE OF ALASKA 49th
No. EE8286
REGISTERED PROFESSIONAL ENGINEER
10/5/2010

VILLAGE SAFE WATER