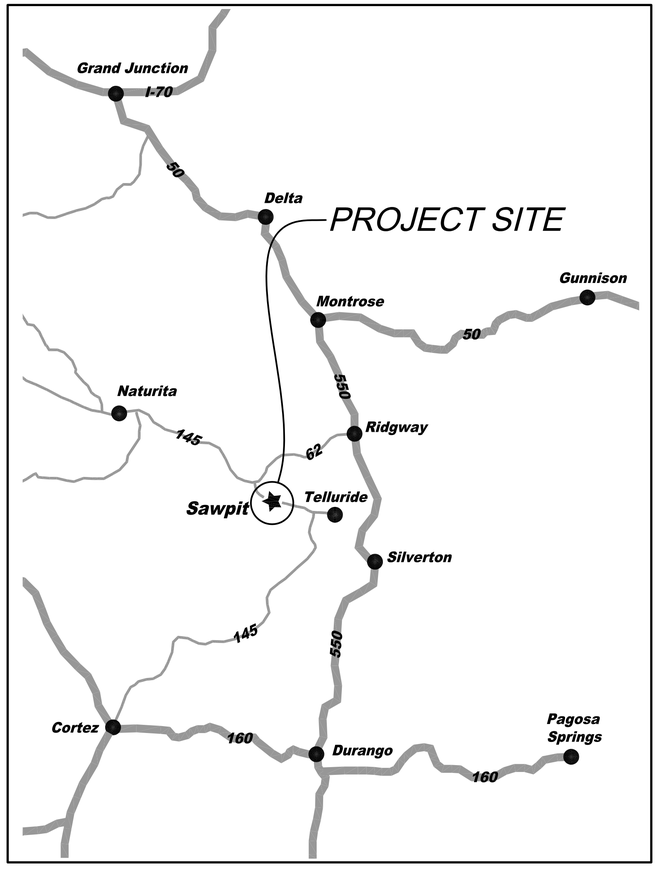
TOWN OF SAWPIT
WATER SYSTEM UPGRADE
SAN MIGUEL COUNTY, COLORADO

BUCKHORN GEOTECH PROJECT # 07-099-CIV
9-21-09



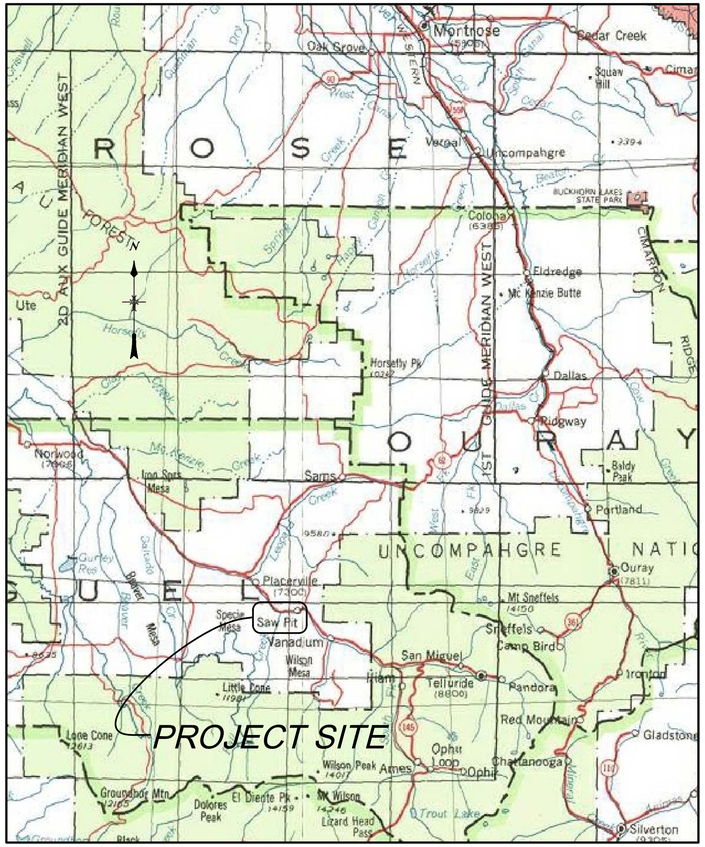
VICINITY MAP
NOT TO SCALE

BUCKHORN GEOTECH
Civil, Structural, and Geotechnical Engineers, Inc.
222 South Park Avenue
Montrose, Colorado 81401
Phone (970) 249-6828 Fax (970) 249-0945
www.buckhorngeo.com

ISSUED FOR APPROVAL TO CONSTRUCT

INDEX TO DRAWINGS

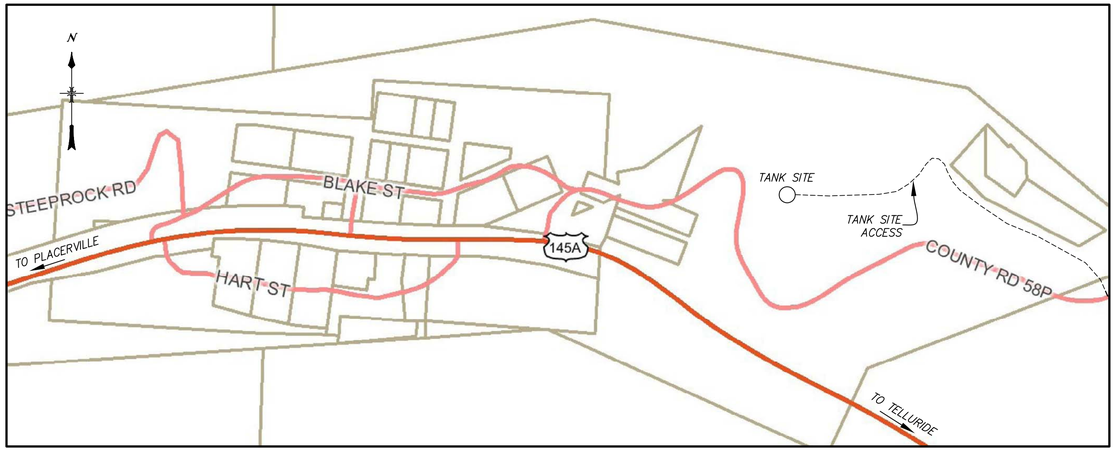
UNCC
CALL BEFORE
YOU DIG
811
OR
1-800-922-1987
Utility Notification Center of Colorado
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.



LOCATION MAP

SCALE: 1" = 24,000'

ISSUED FOR APPROVAL TO CONSTRUCT



TOWN OVERVIEW MAP

SCALE: 1" = 200'

ESTIMATED QUANTITIES

ITEM	QUANTITY
1" HDPE DR-13.5 PIPE - SVC. LINES	140 L.F.
2" HDPE DR-13.5 PIPE - STD. EXC.	375 L.F.
2" HDPE DR-13.5 PIPE - ROCK EXC.	140 L.F.
3" HDPE DR-13.5 PIPE - STD. EXC.	475 L.F.
3" HDPE DR-13.5 PIPE - ROCK EXC.	740 L.F.
6" HDPE DR-13.5 PIPE - ROCK EXC.	25 L.F.
6" HDPE DR-13.5 PIPE - BORE	310 L.F.
2" GATE VALVES	2
3" GATE VALVES	4
6" GATE VALVES	1
BLOW-OFF VALVE & VAULT	2
AIR RELIEF VALVE & VAULT	1
FROST FREE YARD HYDRANT	1
WATER SERVICES (INCL. 15' 1" HDPE PIPE)	25
"ALTERNATE A"	
3" HDPE DR-13.5 PIPE - EXISTING SLEEVE	45 L.F.
3" HDPE DR-13.5 PIPE - STD. EXC.	60 L.F.
REMOVE & REPLACE HBP 4" THICK	36 S.Y.
"ALTERNATE B"	
3" HDPE DR-13.5 PIPE - BORE	60 L.F.
3" HDPE DR-13.5 PIPE - STD. EXC.	25 L.F.
STORAGE TANK	
UNDERGROUND TANK	1
6" HDPE DR-13.5 PIPE - STD. EXC.	30 L.F.
4" GATE VALVE	1
6" GATE VALVE	1
TANK LEVEL SWITCH	1
MISCELLANEOUS	
GRAVEL ALLOWANCE	625 TON
TRAFFIC CONTROL	1
PERMITTING	1
MOBILIZATION	1

LEGEND

DESCRIPTION	NEW	EXISTING
WATER LINE	—W—	—W—
RAW WATER LINE FROM WELL		—RW—
GAS LINE		—G—
TELEPHONE LINE		—T—
UNDERGROUND ELECTRIC		—E—
FENCE		—X—
OVERHEAD UTILITIES		—OHU—
PROPERTY LINE		— —
UTILITY POLE		
WATER GATE VALVE		
WATER FITTING TEE; CROSS		
STEEL OR CONCRETE CASING FOR PIPE		
AIR RELIEF VALVE		
BLOW-OFF VALVE		
WATER SERVICE METER		
POWER PEDESTAL/OUTLET		
TELEPHONE PEDESTAL		
HOUSE ADDRESS		123
CULVERT		
BUILDING		
BOLLARD		
SURVEY CONTROL		

ABBREVIATIONS

APPROX.	APPROXIMATE
ASSY.	ASSEMBLY
EXC.	EXCAVATION
HDPE	HIGH DENSITY POLYETHYLENE
L.F.	LINEAR FEET
TH'D	THREADED

UNCC CALL BEFORE YOU DIG

811

OR

1-800-922-1987

Utility Notification Center of Colorado

CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

GENERAL NOTES

1. All construction shall be done in accordance with the project specifications, CDPHE-WQCD, and applicable utility companies and manufacturer's specifications.

2. The CONTRACTOR shall be responsible for obtaining all necessary permits required for this project prior to start of construction from the applicable utility companies and any other governing agency as required.

3. The CONTRACTOR shall provide a clear and concise red line set of as-constructed plans to the ENGINEER prior to final acceptance. Plans shall show the as-built locations and depth of all utilities, and fittings installed where different from the approved plans.

4. PRE-CONSTRUCTION MEETING: A pre-construction meeting must be held between the CONTRACTOR, OWNER, and ENGINEER prior to any construction activities.

5. DEPTH OF BURY: All pipe within the Town of Sawpit road R.O.W. shall be buried 72" to the top of pipe. If field conditions prevent full bury depth to the above parameters, the CONTRACTOR shall immediately advise the ENGINEER. The ENGINEER will advise the CONTRACTOR on acceptable bury depth with insulation following consultation with the OWNER.

6. WINTER SHUT DOWN: For the purpose of determining contract times, it shall be assumed that construction activities will not be performed between October 15 and April 15, a period of 180 calendar days.

7. WATER SERVICE MAINTENANCE: The CONTRACTOR shall maintain water service at all times and shall minimize water service interruption to existing water services during all construction activities within the project area. The CONTRACTOR shall support all service lines found in conflict with new water main alignments whether or not shown on plans. Existing water service valves shall remain in place and are not to be disturbed and/or relocated by the CONTRACTOR during water main trenching and installation operations and shall remain accessible for reading or maintenance during construction.

8. SERVICE RECONNECTIONS: Where existing water services are to be relocated, the CONTRACTOR shall be responsible for relocating those services to the new locations as shown on the approved plans. Relocation work shall include, but not be limited to, new services saddles and taps, new service pipe, angle meter stops, ball valves, tracer wire, detector tape, setting new meters, (provided by the CONTRACTOR) and meter boxes, all work necessary to reconnect the private plumbing. Any and all work must be in accordance with the project specifications. All services are to be tapped on the side of the main facing the property that the meter serves.

9. CUSTOMER NOTIFICATION: Connections or tie-ins to the existing water system will not be permitted on any weekday prior to 9 a.m. or after 11:30 a.m. or on any Saturday or Sunday unless prior approval has been obtained in writing from the OWNER'S representative.

If new construction requires the water to be shut off to make connections or tie-ins to the existing system, the CONTRACTOR shall provide ENGINEER and OWNER a written schedule of the proposed tie-ins or connections at least 48 hours prior to the start of such work. However, no water shall be turned off until all affected water users have been notified by the CONTRACTOR of the schedule. The notification by information card shall be made no less than 24 hours before water is to be turned off. All system "shut downs" must be coordinated with the ENGINEER and OWNER. Information cards will be developed by the CONTRACTOR and approved by the ENGINEER and OWNER. The information card should provide a phone number at which the CONTRACTOR can be reached 24 hours a day for water user questions and inquiries. Shut off shall not be made to any lines serving customers dependent on water services during operating hours unless other arrangements have been approved by the ENGINEER. Work involving these customers may be required at night or on weekends and may require installation of temporary water service lines and service connections..

In the event of damage to an existing water main, the CONTRACTOR shall immediately notify the OWNER. The OWNER will close all valves necessary to affect repairs. Emergency repairs made by the CONTRACTOR shall be performed under the supervision of the OWNER. If the CONTRACTOR fails to accomplish repairs within a reasonable time period, the OWNER may hire alternate personnel to do the work and the CONTRACTOR shall be charged for all costs incurred.

10. EXISTING UTILITIES: Utility locations are shown on the plans for design purposes only. Locations of exisitng water lines are approximate and are locatable with conventional means. Water lines do not have tracer wires but are composed of ferrous and copper materials. The CONTRACTOR will be responsible for locating the existing water mains and service lines prior to construction. The information on the drawings has been obtained from field survey work and from descriptions provided by the various agencies involved and represents the best information available. ENGINEER and OWNER do not guarantee the accuracy or completeness of this information and it is to be understood that other facilities not shown on the drawings may be encountered during the course of the work. Under state law the CONTRACTOR shall contact all utilities in order to determine the location of their respective utilities prior to any excavation. The CONTRACTOR shall be responsible for any damages to existing utilities and shall be responsible for any necessary repairs at his own expense.

Existing water lines to be abandoned in place.

If the new pipeline parallels a sewer line, irrigation line or non-potable water line, there shall be a minimum of 10' separation. The water line shall be encased per CDPHE-WQCD specifications when minimum requirements are not met.

The CONTRACTOR shall be required to contact the Utility Notification Center of Colorado (Dial 811) two working days prior to any excavation to determine accurate utility locations. The CONTRACTOR shall keep all utility notification requests up to date and comply with applicable Colorado Statutes pertaining to the Utility Notification Center of Colorado.

11. EXISTING PROPERTY LINES: The property lines on these drawings were acquired from the San Miguel County website.
The information on the County mapping website is a product of the San Miguel County Geographic Information Systems (GIS) Department and is intended for the display of relative positions and locations only. Users of this information hereby recognize, acknowledge and agree that it is not a guaranteed accurate, legal or surveyed representation of land. The data are not a substitute for, and should not be compared with, a survey performed by a Colorado licensed surveyor.

12. OBSTRUCTIONS: Any obstructions, including, but not limited to, stakes set by engineers, mail boxes, gravel, rocks, trees, shrubbery, lawn, landscaped or open areas, fences, embankments, curbs, gutters, unpaved streets, alleys, driveways, sidewalks, drain spouts, pipe lines, sprinkler systems, storm drains, sewers, house connection sewer, conduit, utility poles, traffic signs or controls, etc., shall be supported or protected from injury by the CONTRACTOR during construction and until completion of the work. In the case of shrubbery and lawns which are removed or damaged, it shall be the CONTRACTOR'S responsibility to replace them, using acceptable nursery methods. In any event, however, the CONTRACTOR is liable and responsible for the repair and replacement of any damaged obstructions with duplicating materials and goods in as good or better than the original condition, as determined by the ENGINEER.

13. INSPECTION: Inspectors employed by the ENGINEER or OWNER representative shall be authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. The inspector shall not be authorized to alter or waive the provisions of the contract. The resident inspector duties are under the direction of the ENGINEER. The inspector shall be authorized to issue instructions in keeping with the design intent of the plans and specifications. The inspector shall not act as foreman for the CONTRACTOR; however, the inspector shall have the authority to reject defective materials or work. The ENGINEER shall be the sole interpreter of the specifications and plans.
Items of work requiring inspection prior to being backfilled or otherwise concealed by the CONTRACTOR, include, but are not limited to, trench depth and location, pipe materials and installation, pipe fittings and installation, thrust restraints, fire hydrant installation, temporary plugs, taps and tie-ins, services, drain assembly, bedding, and detectable and marking tape installation.
Any work done or materials used without inspection by the ENGINEER or OWNER representative may be ordered uncovered and removed or replaced at the CONTRACTOR'S expense even if the uncovered work is determined to be acceptable.

14. STORMWATER MANAGEMENT: The CONTRACTOR shall practice basic stormwater management including current best management proctices (BMP) and materials. This may include silt fencing, straw bales or wattles as needed.

TRENCH EXCAVATION DEFINITIONS

STANDARD: ABLE TO EXCAVATE EASILY WITH RUBBER TIRED BACKHOE OR MINI EXCAVATOR. SOIL/ROCK CONDITIONS DO NOT SLOW EXCAVATION PROCESS, ALTHOUGH SOME RESISTANCE WILL BE TOLERATED DUE TO SLIGHT ROCK CONTENT OR SLOUGHING CONDITIONS.

ROCK EXCAVATION: ABLE TO ADVANCE WITH CONTRACTOR EQUIPMENT, BUT SLOWLY AND WITH DIFFICULTY. TYPICALLY DUE TO HIGH ROCK CONTENT AND LARGE BOULDERS

BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave, Montrose, Colorado 81401
970-249-6828 Fax. No. 970-249-0945
www.buckhorngeo.com

REVISIONS	DATE
REVISED ESTIMATED QUANTITIES	12/3/08
REVISED ESTIMATED QUANTITIES	11/25/09

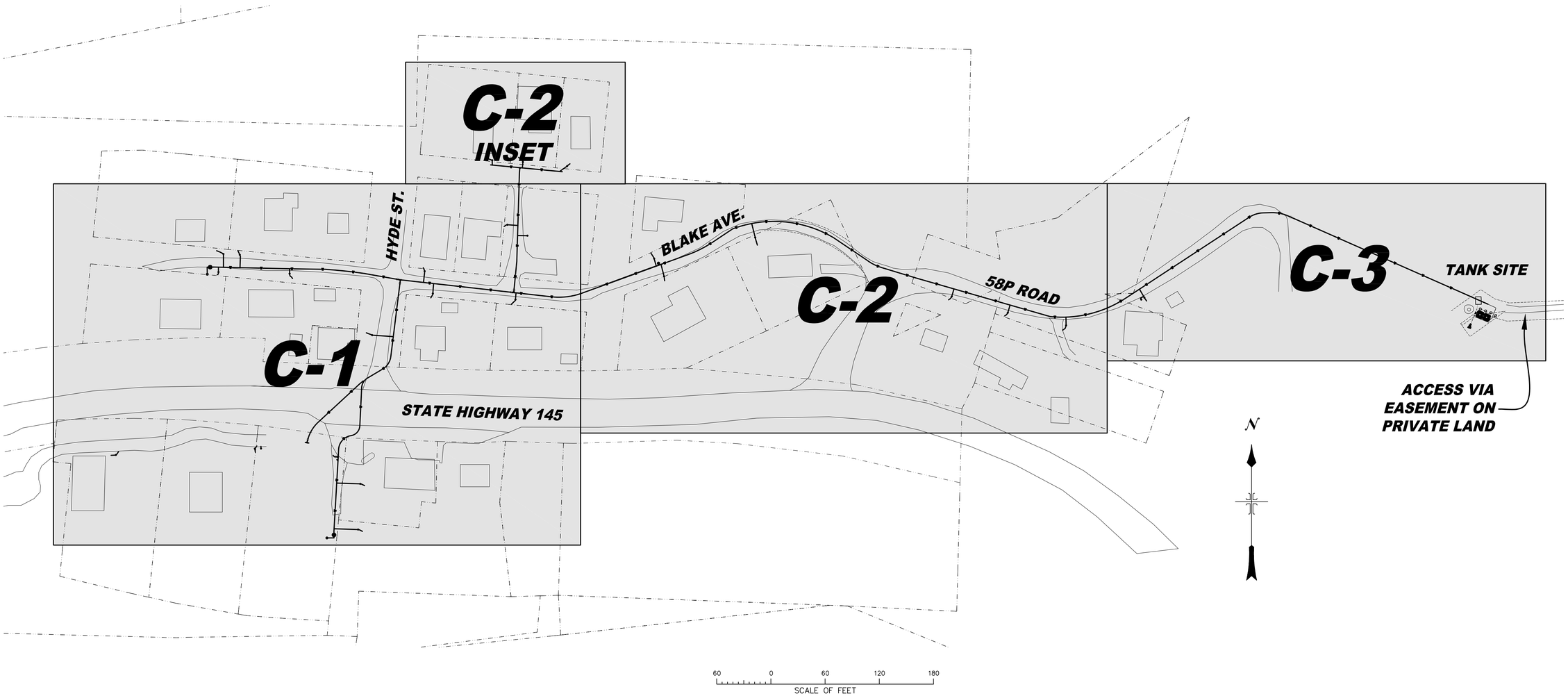
TOWN OF SAWPIT
WATER SYSTEM UPGRADE
GENERAL NOTES, LEGEND & ABBREVIATIONS

DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	9/21/09
PROJ. NO.	07-099

DRAWING NUMBER

G-1

OF 8 DWGS.



ISSUED FOR APPROVAL TO CONSTRUCT

BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave. Montrose, Colorado 81401
970-249-6828 Fax. No. 970-249-0945
www.buckhorngeo.com

REVISIONS		DATE
1	EASEMENTS; RELOCATE TANK	3/10/09

TOWN OF SAWPIT
WATER SYSTEM UPGRADE
DRAWING INDEX

DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	9/21/09
PROJ. NO.	07-099
DRAWING NUMBER	G-2
OF	8 DWGS.

SEE INSET DRAWING C-2

TELEPHONE CROSSING

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

WATER SERVICE CROSSING

TELEPHONE CROSSING

TELEPHONE CROSSING

WATER SERVICE CROSSING

EXISTING 2" PVC WATER LINE

GAS CROSSING

(1) 3"X3" TEE;
(1) 3"X2" REDUCER
(1) 3" GATE VALVE
(1) 2" GATE VALVE

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

NEW 2" HDPE PIPE
140 L.F.
ROCK EXCAVATION
EASEMENT PROVIDED
BY TOWN

STUB OUT NEW WATER SERVICE WITH CURB STOP TERMINATION (NO METER OR PIT) MARK LOCATION WITH DELINATOR POST. FIELD VERIFY LOCATION WITH TOWN.

141

153

SHED

111

85

N

INSTALL NEW BLOW-OFF VALVE ASSY. SEE DETAIL SHEET D-2

ELECTRICAL CROSSING

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

WATER SERVICE CROSSING

WATER SERVICE CROSSING

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

WATER LINE CROSSING

BLAKE AVENUE

(1) 3"X2" TEE
(1) 2" GATE VALVE
(1) 3" GATE VALVE

SEE DRAWING C-2

20698

19

SHED

SHED

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

NEW 3" HDPE PIPE
140 L.F. STANDARD
EXCAVATION

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

TELEPHONE CROSSING

NEW 2" HDPE PIPE 210 L.F. STANDARD EXCAVATION

NEW 3" HDPE PIPE 205 L.F. STANDARD EXCAVATION

SHED

20660

8

76

HYDE STREET

SHED

"ALTERNATE B"
NEW 60 L.F. WATER LINE BORE & CASING UNDER HIGHWAY IF "ALTERNATE A" IS NOT POSSIBLE

"ALTERNATE A"
FEED FUSED 3" HDPE PIPE THROUGH EXISTING 18" CMP SLEEVE UNDER HIGHWAY- 42 L.F.

"ALTERNATE A"
LIMITS OF ASPHALT REMOVAL & REPLACEMENT

ALL HDPE PIPING TO BE DR 13.5

STATE HIGHWAY 145

"ALTERNATE B" TIE-IN LOCATION
NEW 3" HDPE PIPE - 25 L.F.
(1) 3" GATE VALVE
(1) 2"X3" TEE

PROTECT SURVEY MONUMENT

PROTECT EXISTING CONCRETE V-PAN

ESTIMATED LOCATION OF GAS LINE

"ALTERNATE A"
NEW 3" HDPE PIPE-50 L.F.
STANDARD EXCAVATION

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

NATURAL GAS FACILITY

WARNING
UNDERGROUND
FUEL TANK

"ALTERNATE A"
NEW 3"X2" TEE
(1) 3" GATE VAVLE

STORE
20643

20641

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

EXISTING 2" PVC WATER LINE

"ALTERNATE A" TIE-IN LOCATION
TIE NEW WATER LINE TO EXISTING WITH (10') 2" HDPE WATER LINE

NEW 2" HDPE PIPE
85 L.F. STANDARD EXCAVATION

"ALTERNATE B"
CONNECT NEW 2" HDPE PIPE HEADING SOUTH HERE

NEW WATER METER AND VAULT. TIE TO EXISTING SERVICE

INSTALL NEW BLOW-OFF VALVE ASSY. SEE DETAIL SHEET D-2

31

41

PLAN

20 0 20 40 60
SCALE OF FEET

ISSUED FOR APPROVAL TO CONSTRUCT

BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave. Montrose, Colorado 81401
970-249-6828 Fax, No. 970-249-0945
www.buckhorngeo.com

REVISIONS		DATE
1	REVISED WATERLINE ALIGNMENT	12/3/08
2	DR 13.5 NOTE	3/10/09

TOWN OF SAWPIT
WATER SYSTEM UPGRADE
PLAN

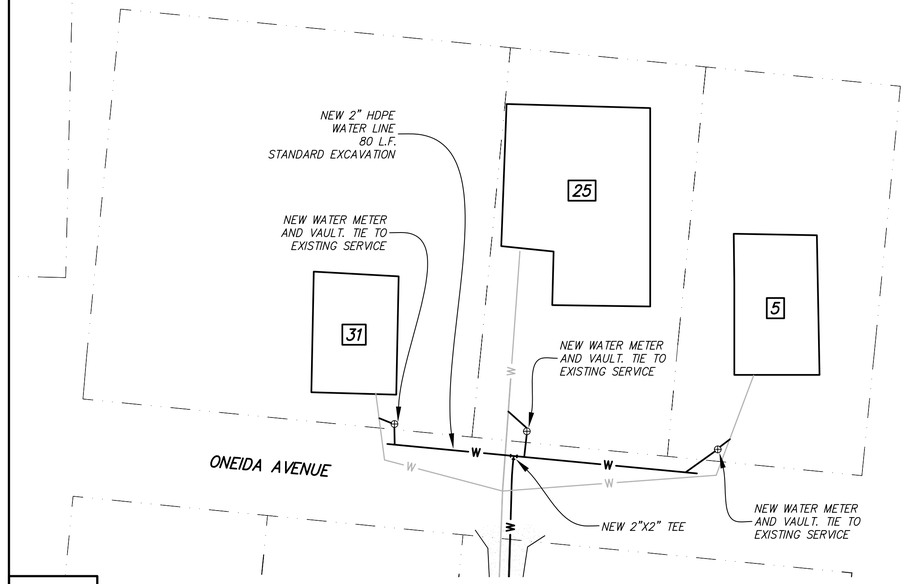
DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	9/21/09
PROJ. NO.	07-099
DRAWING NUMBER	C-1
OF 8 DWGS.	

ISSUED FOR APPROVAL TO CONSTRUCT

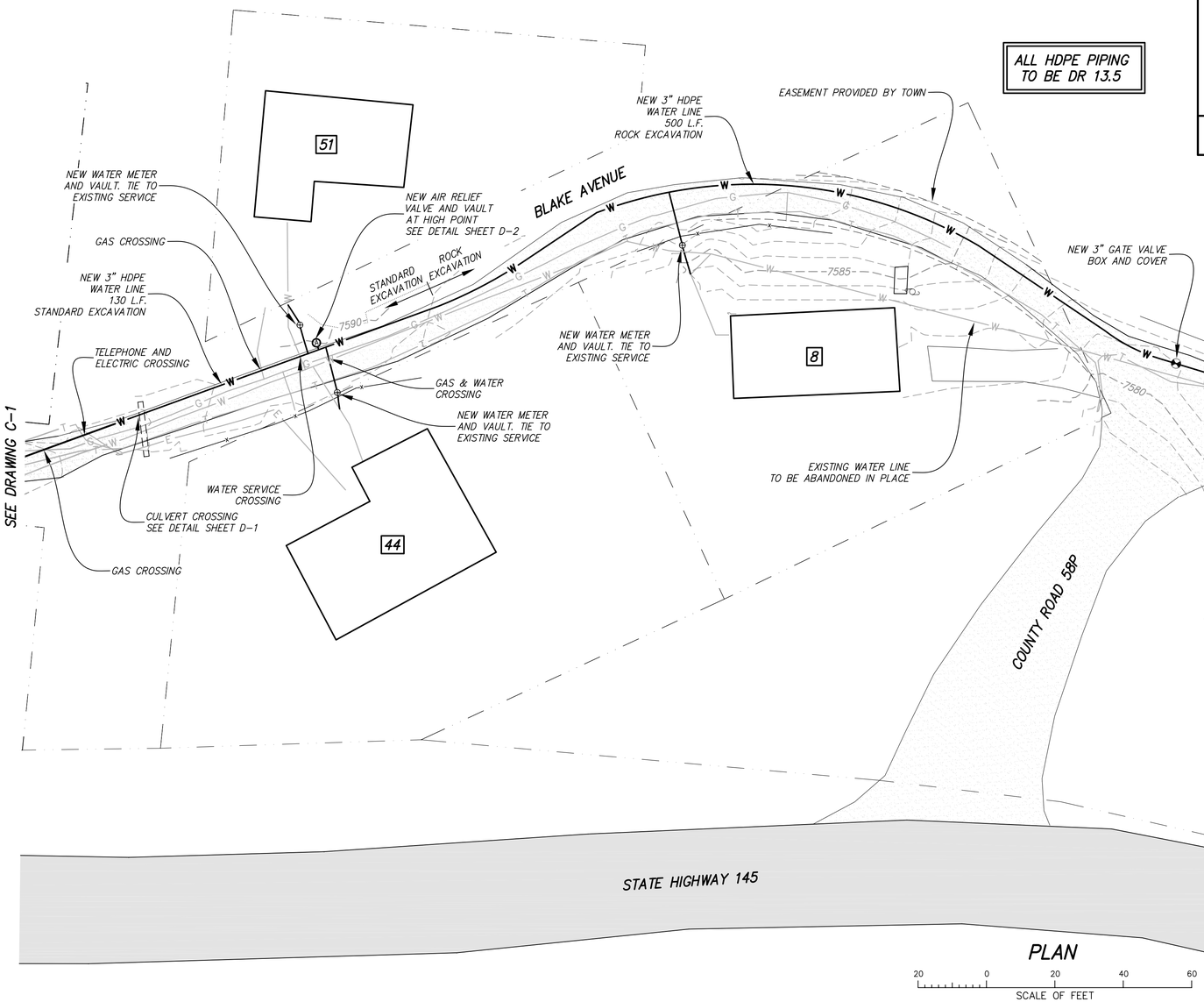
N

ALL HDPE PIPING TO BE DR 13.5

INSET



SEE DRAWING C-1



PLAN

20 0 20 40 60

SCALE OF FEET

BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave. Montrose, Colorado 81401
970-249-6828 Fax, No. 970-249-0945
www.buckhorngeo.com

REVISIONS		DATE
1	DR 13.5 NOTE	3/10/09
2	ADDED 3" GATE VALVE	11/25/09

TOWN OF SAWPIT
WATER SYSTEM UPGRADE
PLAN

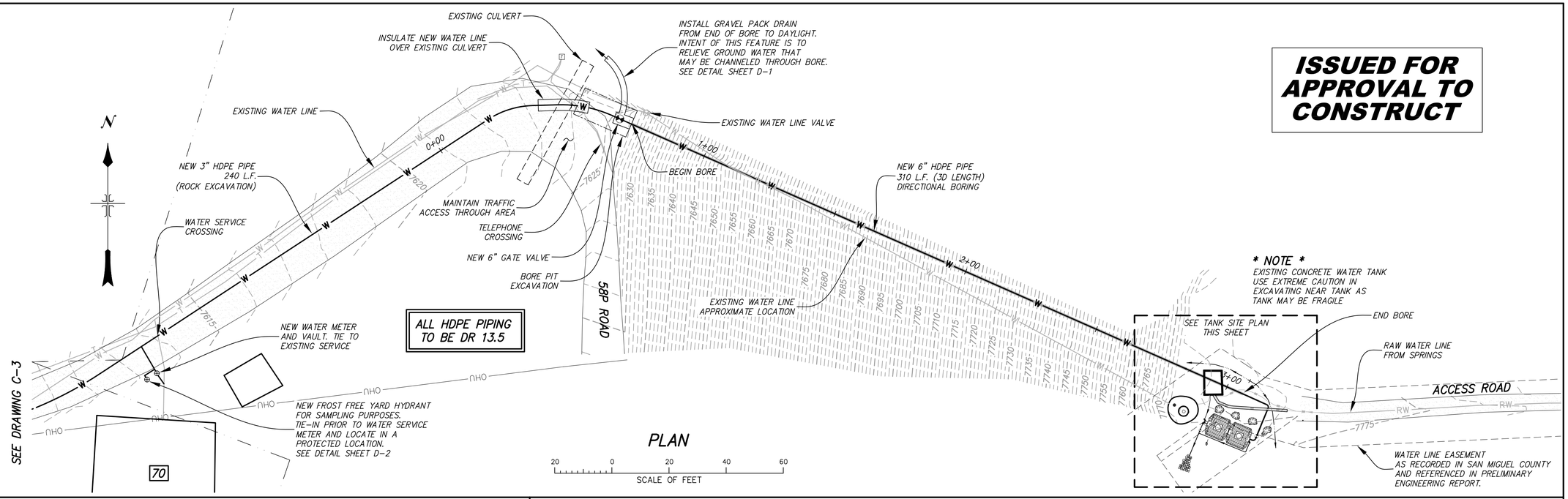
DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	9/21/09
PROJ. NO.	07-099

DRAWING NUMBER

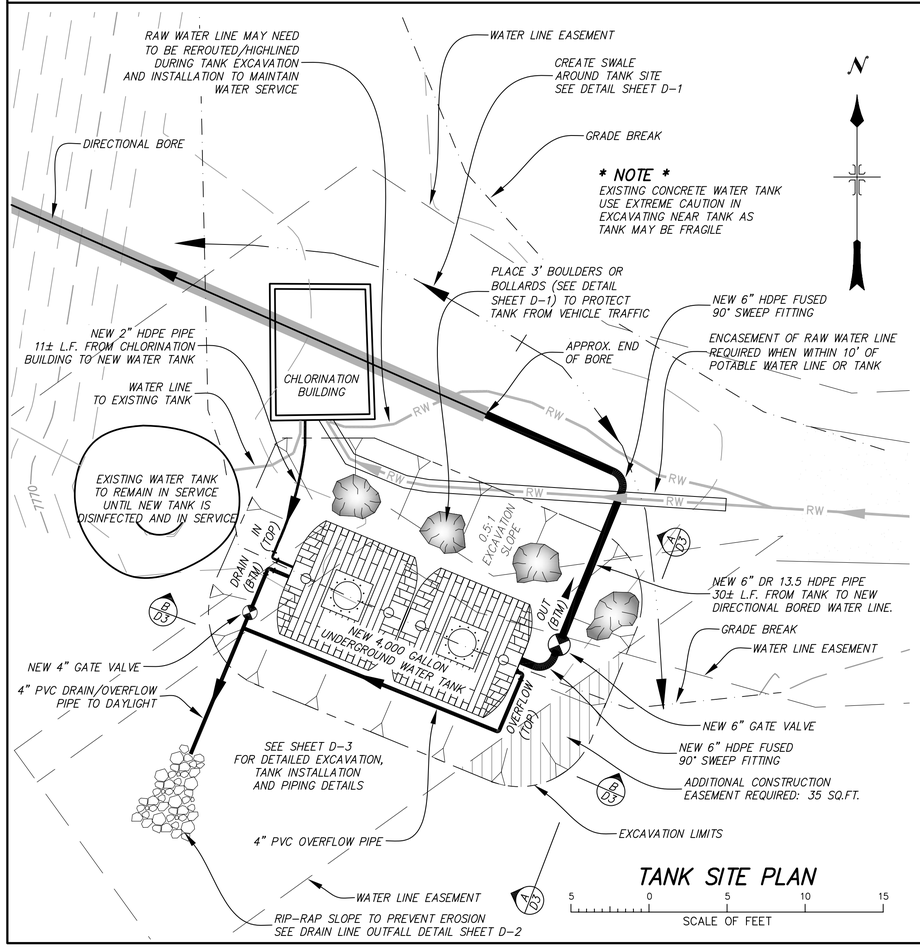
C-2

OF 8 DWGS.

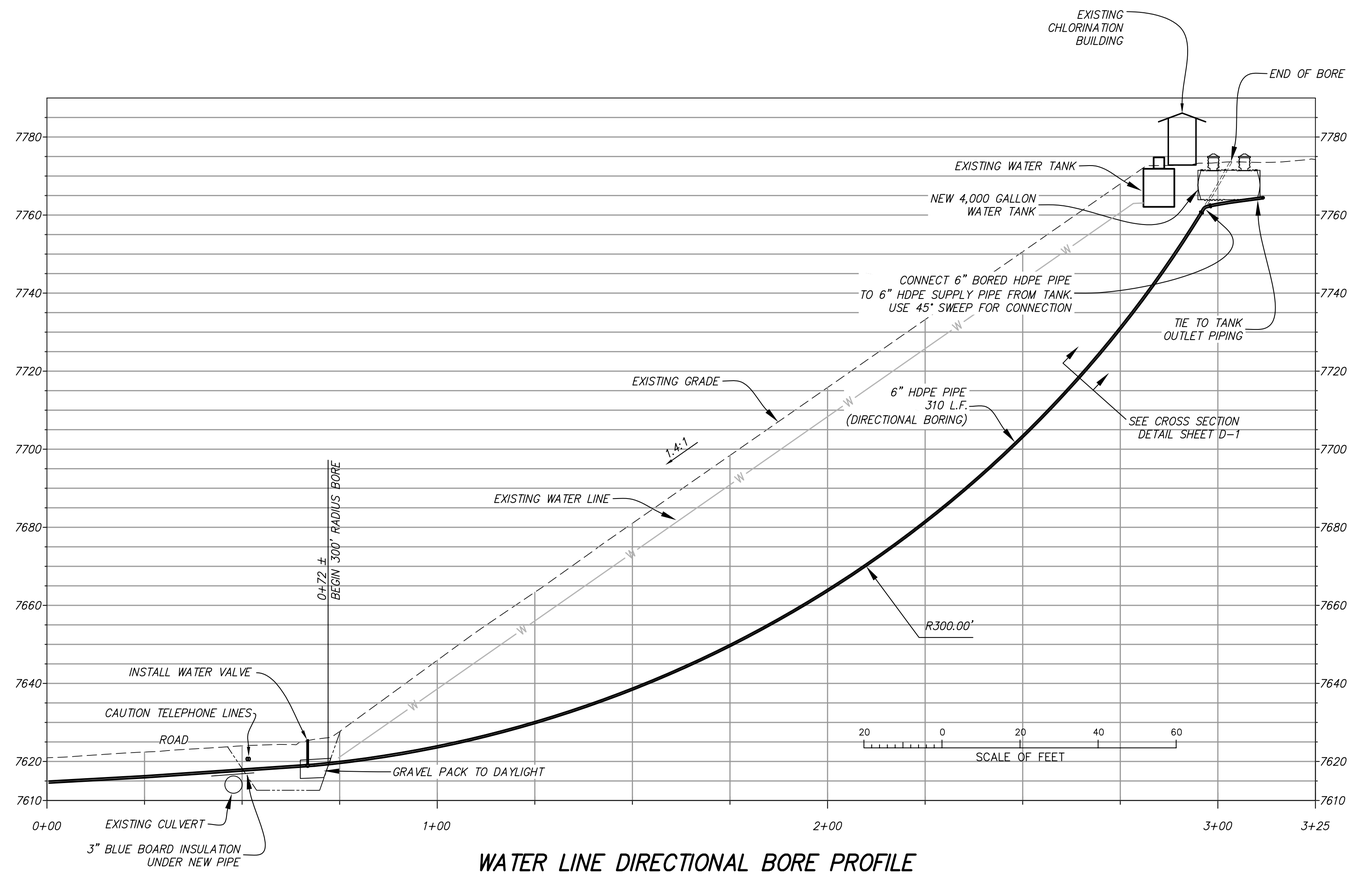
ISSUED FOR APPROVAL TO CONSTRUCT



PLAN



TANK SITE PLAN



WATER LINE DIRECTIONAL BORE PROFILE

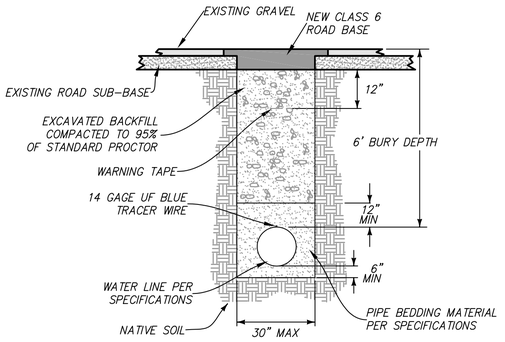
BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave. Montrose, Colorado 81401
970-249-6828 Fax, No. 970-249-0945
www.buckhorngeo.com

REVISIONS		DATE
1	EASEMENTS; RELOCATE TANK	3/10/09
2	ADD DIVERSION SWALE	11/24/09

TOWN OF SAWPIT
WATER SYSTEM UPGRADE
PLAN AND PROFILE

DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	9/21/09
PROJ. NO.	07-099

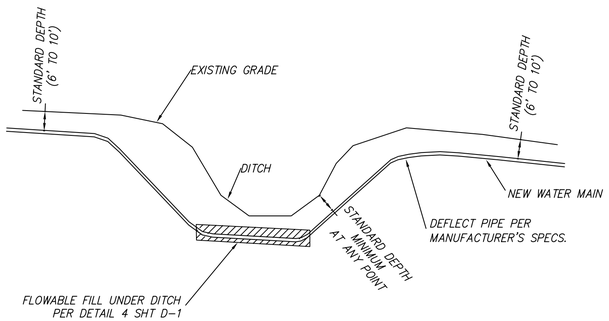
DRAWING NUMBER
C-3
OF 8 DWGS.



SEE PLANS FOR TRENCH LOCATIONS

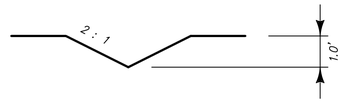
TYPICAL TRENCH DETAIL
UNDER GRAVEL ROADWAYS AND SHOULDERS

NOT TO SCALE



TYPICAL DITCH CROSSING

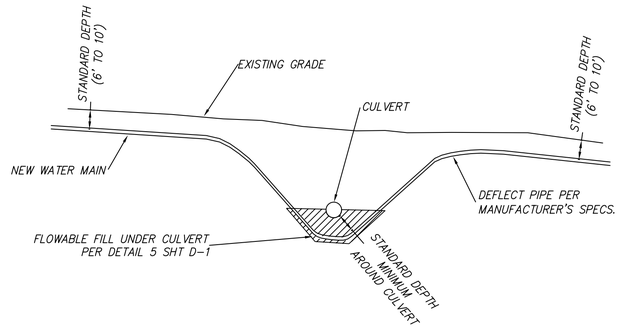
NOT TO SCALE



DIVERSION SWALE

NOT TO SCALE

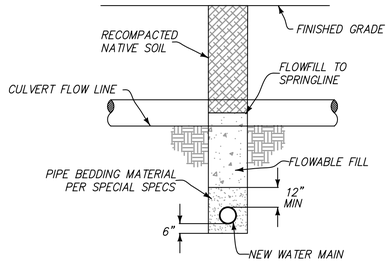
ISSUED FOR APPROVAL TO CONSTRUCT



TYPICAL CULVERT CROSSING

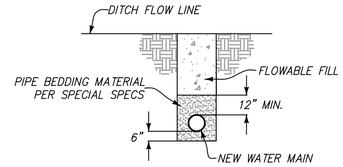
NOT TO SCALE

NOTE: IF STANDARD BUTY DEPTH CANNOT BE OBTAINED, INSULATE OVER WATER LINE WITH 3" BLUE BOARD INSULATION



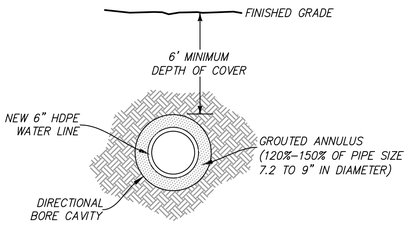
TYPICAL CULVERT CROSSING TRENCH X-SECT

NOT TO SCALE



TYPICAL DITCH CROSSING TRENCH X-SECT

NOT TO SCALE

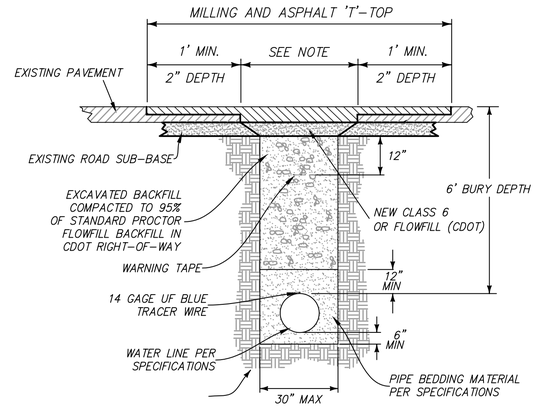


DIRECTIONAL BORE DETAIL
CROSS SECTION

NOT TO SCALE

EXISTING HIGHWAY SLEEVE DETAIL

NOT TO SCALE

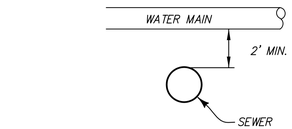


NOTE : REMOVE EXISTING ASPHALT TO A DEPTH EQUAL TO THE UNDISTURBED PAVEMENT FOR THE WIDTH OF THE TRENCH. SAW-CUT, WHEEL-CUT, OR ROTOMILL AT THE CONTRACTOR'S OPTION.

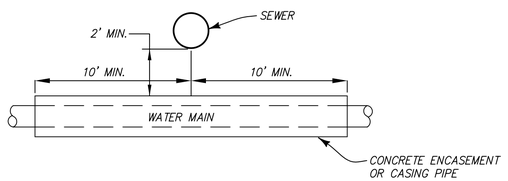
SEE PLANS FOR TRENCH LOCATIONS

TYPICAL TRENCH DETAIL
UNDER ASPHALT PAVEMENT

NOT TO SCALE

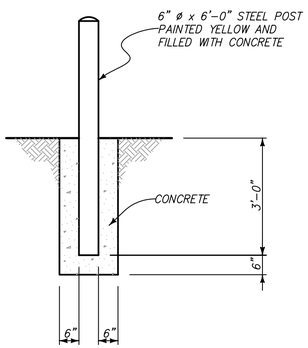


GRAVITY SEWER CROSSING
(SEWER UNDER WATER MAIN)



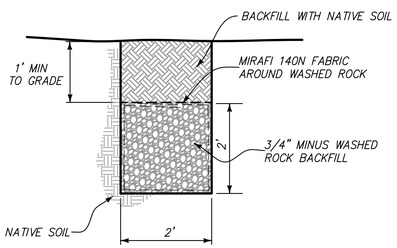
GRAVITY SEWER CROSSING
(SEWER ABOVE WATER MAIN)

SEWER LINE CROSSING VERTICAL SEPARATION



BOLLARD DETAIL

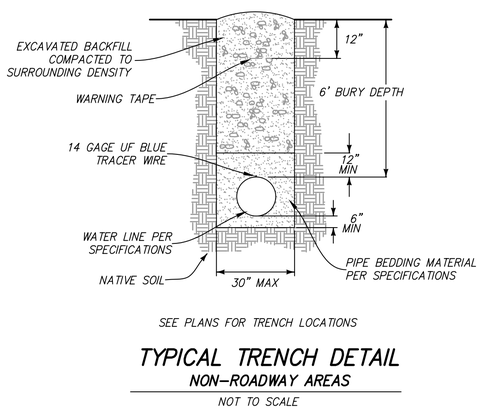
NOT TO SCALE



GRAVEL PACK DRAIN DETAIL
CROSS SECTION

NOT TO SCALE

WATER LINE HORIZONTAL SEPARATION



SEE PLANS FOR TRENCH LOCATIONS

TYPICAL TRENCH DETAIL
NON-ROADWAY AREAS

NOT TO SCALE

BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave, Montrose, Colorado 81401
970-249-6828 Fax, No. 970-249-0945
www.buckhorngeo.com

DATE

REVISIONS

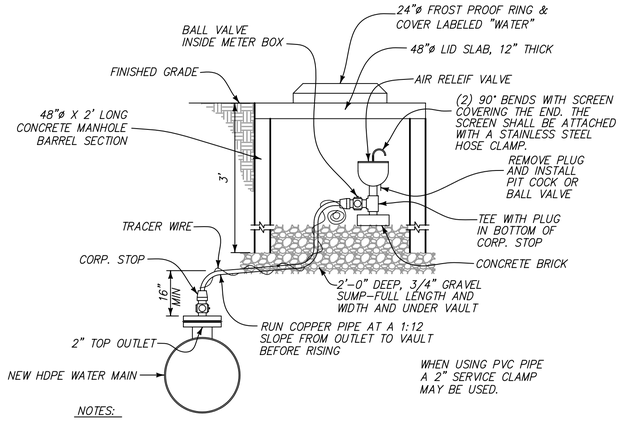
TOWN OF SAWPIT
WATER SYSTEM UPGRADE
WATER SYSTEM DETAILS

DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	9/21/09
PROJ. NO.	07-099

DRAWING NUMBER

D-1

OF 8 DWGS.



NOTES:

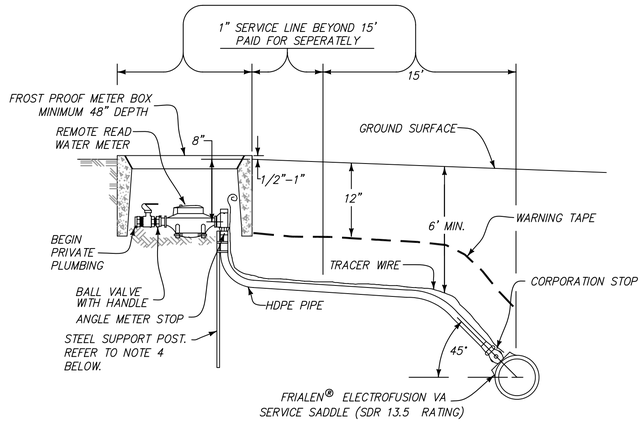
A STEEL SUPPORT POST MUST BE USED. THE POST MUST BE OF SUFFICIENT LENGTH TO SUPPORT THE BALL VALVE.

FLANGE INSULATING KIT MUST BE TESTED TO CONFIRM ISOLATION BEFORE BACKFILL. INCLUDE TEST RESULTS IN FINAL CORROSION REPORT.

ALL AIR RELIEF VALVE INSTALLATIONS REQUIRE A TRACER WIRE. THE TRACER WIRE SHALL BE UF SOLID 14 GAUGE AND RUN IN A CONTINUOUS LENGTH FROM THE CORPORATION TO BALL VALVE. THE TRACER WIRE SHALL BE ATTACHED TO THE AIR RELIEF LINE WITH TAPE OR WIRE TIES AT 1' INTERVALS. A 6" COIL OF WIRE SHALL BE LEFT IN THE METER BOX.

AIR RELIEF VALVE

NOT TO SCALE

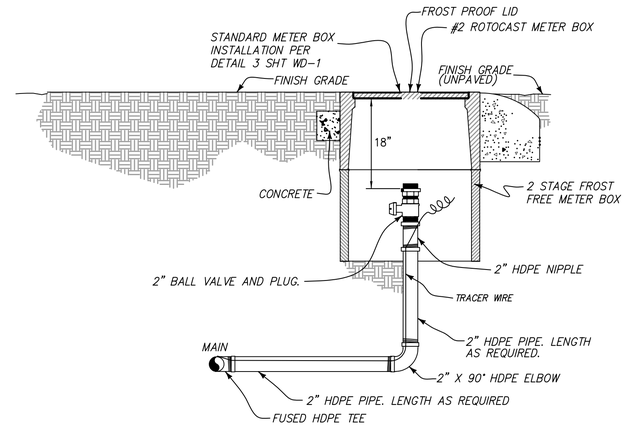


NOTES:

1. METER BOX SHALL BE SUPPORTED BY TWO 2" X 4" X 12" SOLID CONCRETE BLOCKS INSTALLED UNDER THE LONG AXIS SIDES OF THE BOX.
2. PRIVATE PLUMBING MUST BE ADJUSTED TO MATCH METER ELEVATION.
3. IF METER BOX IS LOCATED IN A SIDEWALK AREA, THE BOX SHALL BE INSTALLED ADJACENT TO BACK OF CURB.
4. WHEN USING HDPE, A STEEL POST MUST BE USED FOR SUPPORT. ATTACH SERVICE LINE TO POST WITH NYLON ZIP TIES. THE POST MUST BE OF SUFFICIENT LENGTH TO SUPPORT THE CURB STOP.
5. TYPICAL EXISTING WATER SERVICE IS COPPER PIPE. HOWEVER DUE TO THE VARIETY OF EXISTING SERVICE PIPES, CONTRACTOR SHALL CONFIRM MATERIAL TYPE AND SUBMIT CONNECTION DETAILS TO ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

WATER SERVICE CONNECTION

NOT TO SCALE



NOTES:

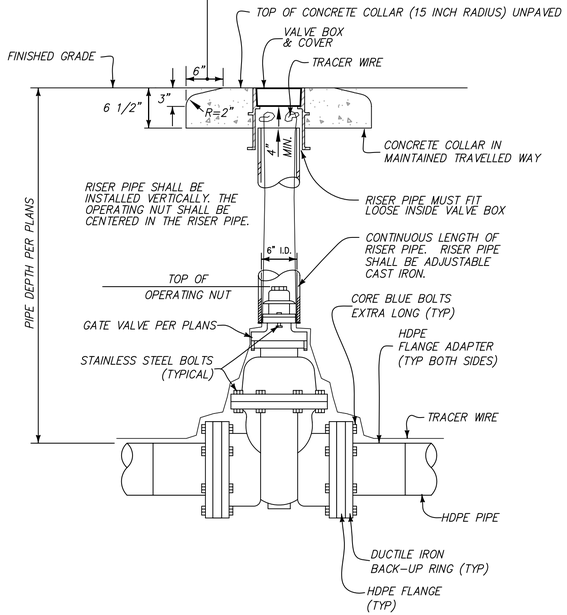
(1) VALVE, PIPE JOINTS, AND END CAP SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH STANDARD AWWA REQUIREMENTS

(2) CONCRETE THRUST BLOCKS MAY BE USED IF APPROVED BY THE ENGINEER

SEE PLAN FOR VALVE LOCATIONS

BLOW OFF VALVE ASSEMBLY

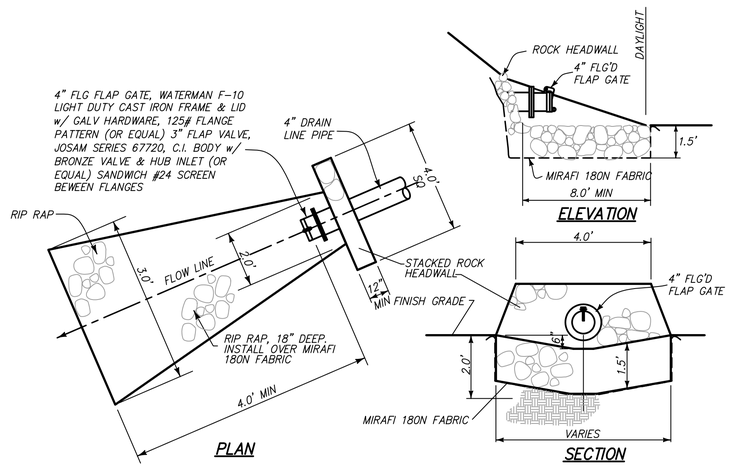
NOT TO SCALE



SEE PLAN FOR VALVE SIZE, PIPE SIZE AND LOCATION

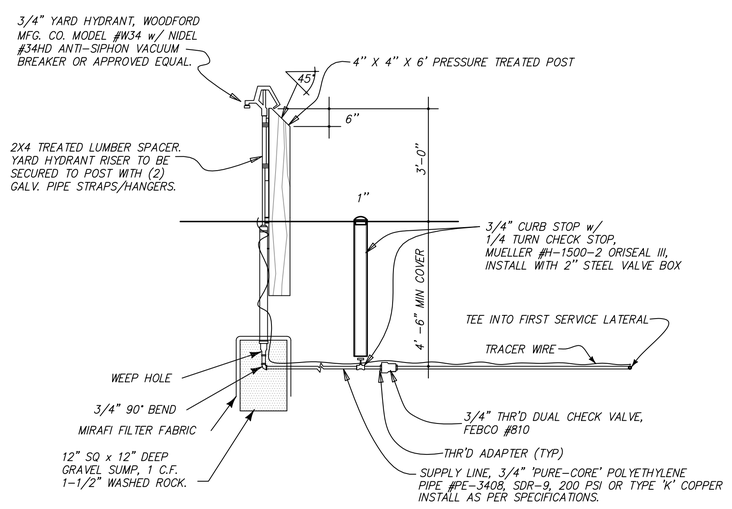
TYPICAL GATE VALVE

NOT TO SCALE



DRAIN LINE OUTFALL DETAIL

NOT TO SCALE



ELEVATION

TYPICAL YARD HYDRANT

NOT TO SCALE

ISSUED FOR APPROVAL TO CONSTRUCT

BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave. Montrose, Colorado 81401
970-249-6828 Fax. No. 970-249-0945
www.buckhorngeo.com

REVISIONS		DATE
1	REMOVED PVC TO HDPE DETAIL	3/10/09

TOWN OF SAWPIT
WATER SYSTEM UPGRADE
WATER SYSTEM DETAILS

DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	9/21/09
PROJ. NO.	07-099

DRAWING NUMBER
D-2
OF 8 DWGS.

SPECIFICATIONS FOR POLYETHYLENE UNDERGROUND WATER TANKS

QUALITY ASSURANCE

PREFERRED MANUFACTURER: DARCO INC. 980 DARCO DR. – P.O. BOX 779 – BENNETT, CO 80102

PHONE NUMBER 800–232–8660, FAX 303–644–5001, INTERNET – WWW.DARCOINC.COM

GENERAL GOVERNING STANDARDS

1. ASTM 1998–93, POLYETHYLENE STORAGE TANKS, THOSE SPECIFIC SECTIONS CONSIDERED GERMANE AND PRUDENT AS APPLIED TO UNDERGROUND WATER STORAGE TANKS ONLY.

– SECTION 4 : TYPE 2 HIGH DENSITY VIRGIN LINEAR POLYETHYLENE RESIN

– SECTION 5 : MATERIAL STANDARDS FOR FOOD CONTACT GRADE POLYETHYLENE RESIN

– SECTION 7 : FITTINGS FOR POLYETHYLENE WATER TANKS

– SECTION 8 : PERFORMANCE REQUIREMENTS BASED ON IMPACT TESTING

– SECTION 9 : DIMENSIONS AND TOLERANCES

– SECTION 10 : WORKMANSHIP

DESIGN STANDARDS FOR POLYETHYLENE TANK SYSTEMS

1. EXTERNAL HYDROSTATIC LOADING : THE EMPTY TANK SYSTEM WITH MANWAY RISERS, WHEN ANCHORED INTO A SAND BACKFILLED EXCAVATION AT A 3 FOOT BURY DEPTH AND FLOODED WITH WATER TO SPRING LINE, MUST MAINTAIN ITS STRUCTURAL SHAPE AND 100% WATER TIGHTNESS.

2. TRAFFIC LOADING : TANK SYSTEMS, WHEN PROPERLY INSTALLED AND INCORPORATING AN APPROVED CONCRETE SURFACE SLAB, MUST WITHSTAND AUTOMOTIVE AND H20 TRUCK TRAFFIC LOADS.

3. DRY BURY INSTALLATION : TANK SYSTEMS MUST HAVE SUFFICIENT WALL STRENGTH AND STRUCTURAL INTEGRITY TO BE INSTALLED AND COMPLETELY BACKFILLED TO A 3 FOOT BURY DEPTH WITHOUT THE ADDITION OF WATER DURING THE BACKFILL PROCESS. FURTHERMORE, TANK SYSTEMS MUST MAINTAIN THEIR STRUCTURAL SHAPE AND FULL STORAGE CAPACITY WHEN LEFT EMPTY FOR EXTENDED PERIODS.

TANK FITTINGS

ALL FITTINGS SHALL BE OF POLYOLEFIN OR PVC CONSTRUCTION AND INCORPORATE ONLY 300 SERIES STAINLESS STEEL HARDWARE. COMPATIBLE AND WARRANTED TANK–TO–PIPE FLEXIBLE COUPLERS MUST BE MADE AVAILABLE ALONG WITH THE TANK SYSTEM AT THE TIME OF PURCHASE. FITTINGS, GASKETS, AND HARDWARE MUST BE AVAILABLE SPECIFICALLY FOR DOMESTIC WATER USE.

POTABLE WATER APPLICATIONS

THE VIRGIN POLYETHYLENE RESIN USED FOR CONSTRUCTION OF POTABLE WATER STORAGE TANKS MUST BE NSF LISTED AND COMPLY WITH FDA TITLE 21 WHEN IN CONTACT WITH DRINKING WATER.

ACCESSORIES

THE ACCESSORY PACKAGE PROVIDED WITH ANY STORAGE TANK SYSTEM MUST CONTAIN ONLY FULLY APPROVED ACCESSORIES AND APPURTENANCES WHICH MEET ALL PERFORMANCE STANDARDS AND WARRANTY COVERAGE GUIDELINES OF TANK MANUFACTURER.

CAPACITY AND SIZE REQUIREMENTS

1. THE NOMINAL VOLUME OF THE TANK SYSTEM SHALL BE 4,000 GALLONS.

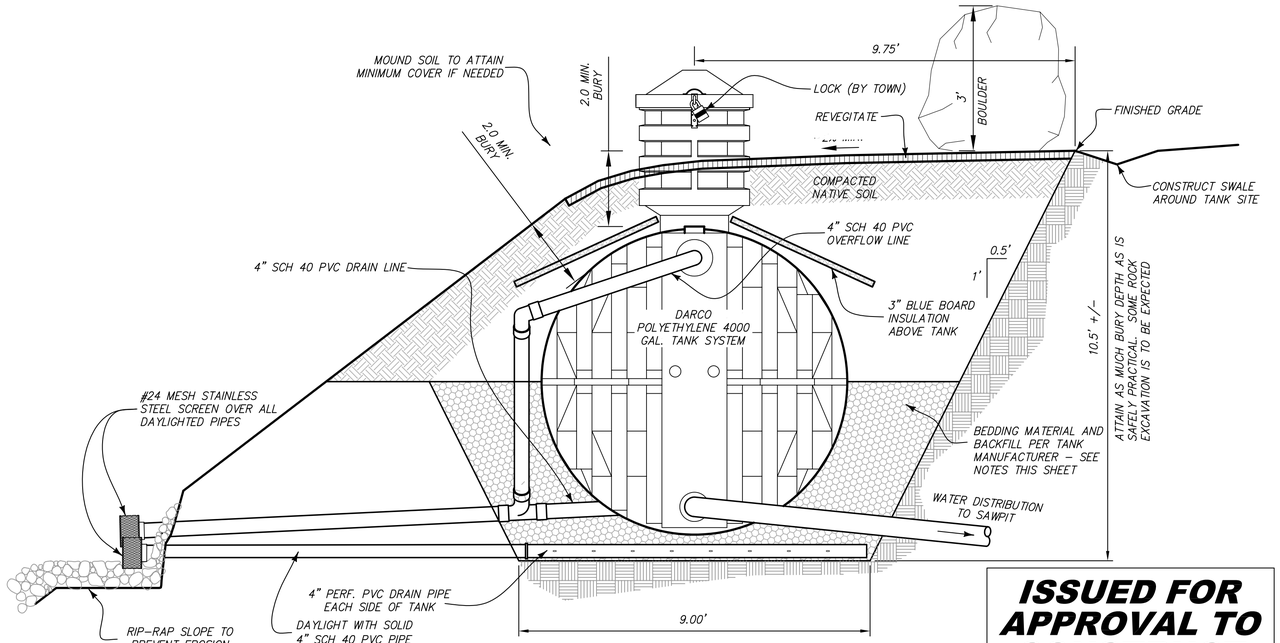
2. THE NOMINAL TANK DIAMETER SHALL BE 7.5 FEET BY A NOMINAL LENGTH OF 15 FEET.

LIMITED WARRANTY

A STANDARD 2 YEAR STRUCTURAL AND CORROSION WARRANTY SHALL BECOME EFFECTIVE UPON TANK DELIVERY. AN OPTIONAL EXTENDED WARRANTY PROGRAM MUST BE AVAILABLE AT TIME OF PURCHASE.

GENERAL BEDDING AND BACKFILL NOTES

1. BEDDING AND BACKFILL TO BE CRUSHED STONE, THE MATERIAL TO BE A MIX OF ANGULAR PARTICLES, SIZES BETWEEN 1/8 INCH AND 1/2 INCH. THE MATERIAL MUST CONFORM TO THE SPECIFICATIONS OF ASTM C–33, PARAGRAPH 9.1, SIZES 7 OR 8.
2. NO MORE THAN 5% (BY WEIGHT) OF THE BACKFILL MAY PASS THROUGH A #8 SIEVE.
3. THE MATERIAL IS TO BE WASHED, FREE–FLOWING, AND FREE OF ICE, SNOW AND DEBRIS.
4. PLACE ONE 12–INCH LIFT OF BACKFILL MATERIAL EVENLY AROUND THE TANK. WORK THE BACKFILL MATERIAL UNDER THE TANK BODY AND DOMES SO THE TANK IS FULLY SUPPORTED AND THAT THERE ARE NO VOIDS UNDER THE TANK. REPEAT WITH A SECOND 12–INCH LIFT. AFTER THE SECOND LIFT OF MATERIAL HAS BEEN PLACED AND WORKED UNDER THE TANK, BRING THE BACKFILL VERTICALLY UP TO A POINT OF 50% OF TANK DIAMETER.
5. MORE STRINGENT OR VARYING MANUFACTURER'S REQUIREMENTS WILL GOVERN.



TANK TRENCH SECTION A–A

NOT TO SCALE

ISSUED FOR APPROVAL TO CONSTRUCT

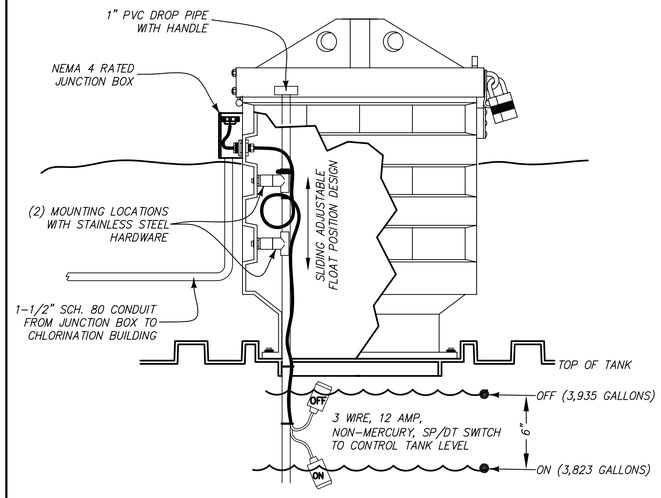
TEST PIT LOCATION: TOWN OF SAWPIT TANK SITE

SURFACE ELEVATION: 7,770 FEET

DEPTH (ft.)	GRAPHIC	SUBSURFACE DESCRIPTION
0		(0' – 0.5') tan, dry, loose, POOR TOPSOIL with gravel
1		(0.5' to 3') tan–red, dry, loose, SANDY GRAVEL with COBBLE
2		
3		
4		(3' to 5') red–tan, dry, compacted, SANDY GRAVEL with COBBLE
5		
6		(5' to 8') red, dry to moist, stiff, WEATHERED SANDSTONE
7		
8		end of excavation @ 8' no bedrock or groundwater encountered

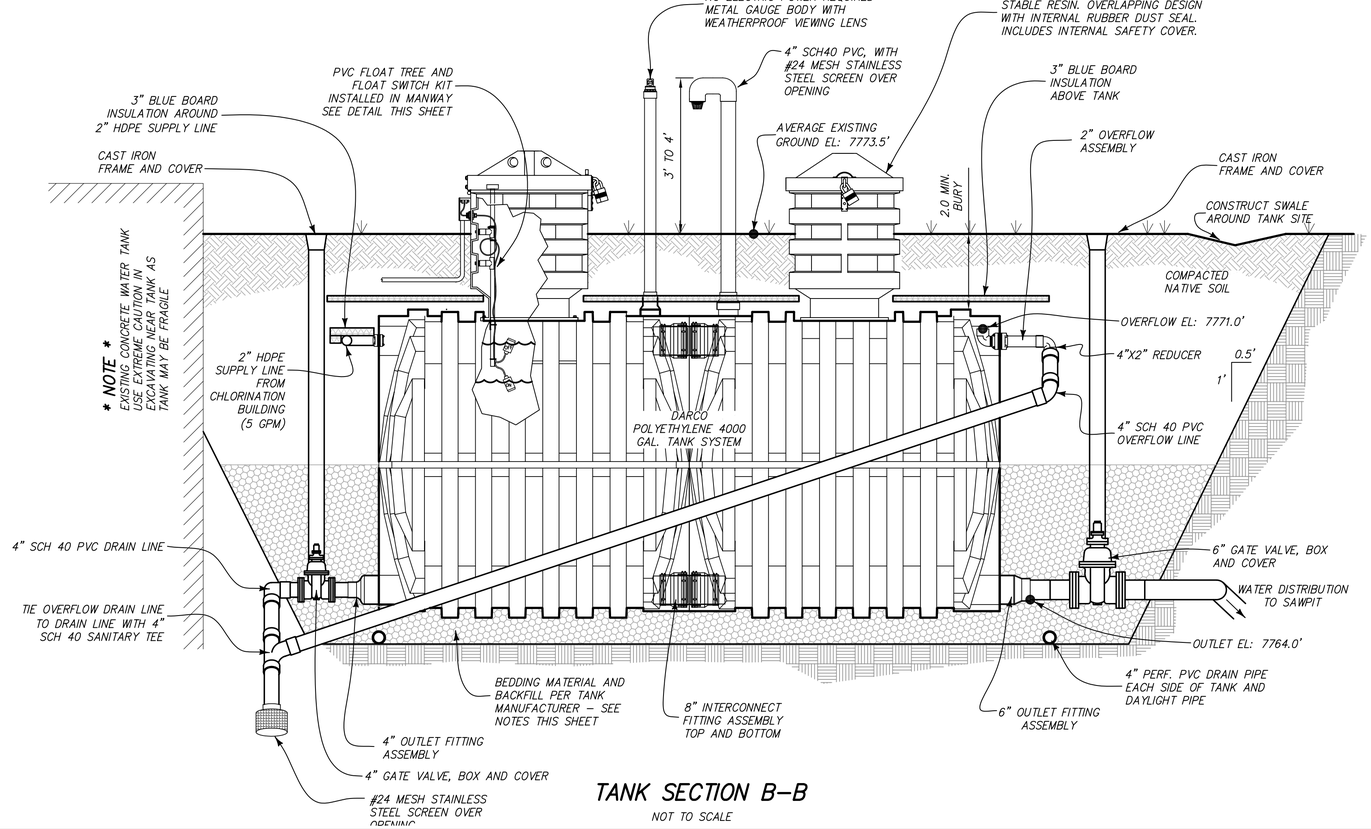
TANK SITE TEST PIT LOG

NOT TO SCALE



FLOAT TREE DETAIL

NOT TO SCALE



TANK SECTION B–B

NOT TO SCALE

BUCKHORN GEOTECH
Civil, Structural & Geotechnical Engineers
222 So. Park Ave. Montrose, Colorado 81401
970-249-6828 Fax, No. 970-249-0945
www.buckhorngeo.com

REVISIONS	DATE
2 ADD TANK INVERTS, ON & OFF GALLONS, SWALE, RETEG.	11/24/09

TOWN OF SAWPIT
WATER SYSTEM UPGRADE
WATER TANK DETAILS

DESIGNED	ELK, P.E.
DRAWN	PJI
DATE	8/06/09
PROJ. NO.	07–099

DRAWING NUMBER D–3

OF 8 DWGS.