

CITY OF LUCAS

CONSTRUCTION PLANS FOR

WATER SYSTEM IMPROVEMENTS

OSAGE LANE WATER LINE



MAYOR
REBECCA MARK

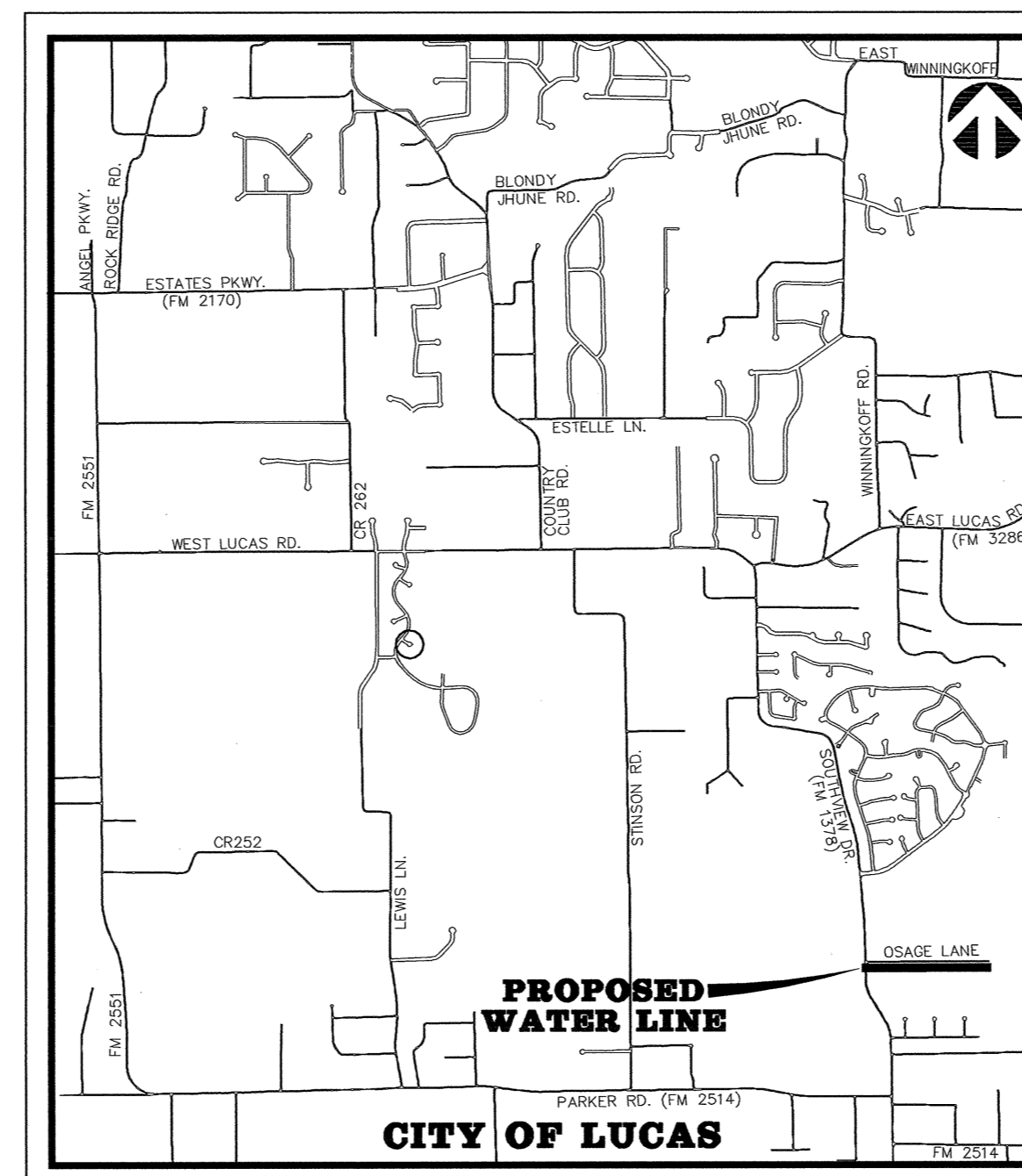
CITY COUNCIL

STEVE DUKE	DEBBIE FISHER
PHILIP LAWRENCE	WAYNE MILLSAP
JIM OLK	KATHLEEN PEELE

CITY MANAGER
JONI CLARKE

PUBLIC WORKS DIRECTOR
STANTON FOERSTER, P.E.

CONTRACTOR
A & M CONSTRUCTION & UTILITIES, INC.
COMPLETED JANUARY 2016



VICINITY MAP

BW2 JOB NO. 13-1592

APRIL 2015

"REVISED PER ADDENDA"

SHEET INDEX

PROJECT GENERAL NOTES	1
PROJECT LOCATION MAP	2
HORIZONTAL & VERTICAL CONTROL PLAN - 1	3
HORIZONTAL & VERTICAL CONTROL PLAN - 2	4
EROSION CONTROL PLAN - 1	5
EROSION CONTROL PLAN - 2, NOTES AND DETAILS	6
LINE "W-A" - STA. 0+00 TO STA. 10+00	7
LINE "W-A" - STA. 10+00 TO STA. 20+00	8
LINE "W-A" - STA. 20+00 TO STA. 27+36	9
GENERAL CONSTRUCTION DETAILS - SHEET 1	10
GENERAL CONSTRUCTION DETAILS - SHEET 2	11

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.
JANUARY 2016

ENGINEER:



BW2 ENGINEERS, INC.

1919 S. SHILOH ROAD
SUITE 500, L.B. 27
GARLAND, TEXAS 75042
Firm Registration No. F-5290

OWNER:

CITY OF LUCAS
151 COUNTRY CLUB ROAD
LUCAS, TEXAS 75002



GENERAL NOTES:

1.

It is the CONTRACTOR's responsibility to maintain neat and accurate plans of record.
2.

The CONTRACTOR is responsible for maintaining adequate site drainage throughout the duration of this project.
3.

The CONTRACTOR is responsible for obtaining all necessary permits and approvals before construction begins.
4.

The CONTRACTOR shall replace all fence removed during construction in as good as or better condition than before construction.
5.

The CONTRACTOR shall take all necessary precautions to ensure that electric power and telephone poles are either moved to a safe location by the affected utility company or not disturbed during construction. All costs incurred for moving electric power and telephone poles shall be included in the price bid for the construction of the project.
6.

The CONTRACTOR shall restore all property including driveways, public streets, sidewalks, public utilities, franchise utilities, private utilities, and all other improvements removed or damaged inside and outside the project limits during construction to as good as or better condition than before construction. Restoration shall be made immediately after the property no longer interferes with construction. All costs incurred for restoring any of the above items shall be included in the price bid for the construction of the project.
7.

The information shown on these drawings concerning type and location of underground and other utilities is not guaranteed to be accurate or all-inclusive. The CONTRACTOR is responsible for making his own determinations as to the type and location of underground utilities and other utilities as may be necessary to avoid damage thereto.
8.

The CONTRACTOR shall not place fill or waste material on any private property without prior written permission from the ENGINEER. No excess excavated material shall be deposited in low areas or along natural drainage ways that will restrict the natural flow of water. If the CONTRACTOR places excavated material in low areas that will cause flood damage, CONTRACTOR will be responsible for all damage resulting from such fill, and he shall remove the fill at CONTRACTOR's expense.
9.

All streets within the scope of the Contract shall be kept accessible to fire trucks, ambulances and other emergency vehicles.
10.

The CONTRACTOR shall be responsible for public safety during the duration of construction. All barricades, warning signs, lights, devices, etc., for the guidance and protection of traffic and pedestrians must conform to the installation shown in 1980 Texas Manual of Uniform Traffic Control Devices, as currently amended by the Texas Department of Transportation. CONTRACTOR shall at all times provide barricades, warning signs and lighting adequate to safeguard the public from any hazards resulting from open trenches during non-work hours.
11.

Filter fabric fence for erosion control shall be provided in accordance with specifications and as shown on the plans and in accordance with the EPA regulations.
12.

The CONTRACTOR shall use the public right-of-ways and existing utility easements for access to the job site.
13.

The CONTRACTOR shall select the subcontractor to be utilized for testing and lab work. The CONTRACTOR shall be responsible for paying for testing and lab work. Selection of subcontractor for this purpose will be subject to approval by the OWNER. Testing referred to herein includes compaction and water pressure testing, which shall be required on this project.
14.

The CONTRACTOR shall keep excavated trenches free of groundwater during construction. If necessary, the CONTRACTOR shall utilize dewatering procedures in order to control groundwater during construction such that it does not affect his construction work.
15.

The CONTRACTOR shall provide means for adequately controlling and avoiding soil erosion during construction. The CONTRACTOR shall not store spoil in drainage ways during construction.
16.

All disturbed earth areas are to be finish graded to original or proposed contours, fertilized and either hydromulched with bermuda seed or covered with block sod according to NCTCOG specifications immediately after construction. Backfill to be select material free of rock and other debris. CONTRACTOR shall thoroughly water the hydromulch or block sod immediately after placement. Block sod shall match the existing type of grass on a case by case basis. There shall be no separate pay for matching each type of grass. The CONTRACTOR shall also be responsible for continued maintenance and watering of the newly hydromulched or sodded areas until the entire project is completed and accepted by the City of Lucas. Watering of the bermuda hydromulch or block sod shall be done in a manner and quantity as directed by City of Lucas field representative.
17.

No existing sprinkler/irrigations systems have been shown on the plans; however, they may exist in certain areas. It is the CONTRACTORS responsibility to locate any existing irrigation systems within the project limits and determine if they will be affected by this construction. If CONTRACTOR encounters any sprinkler systems during construction, he shall repair and/or replace in as good as or better condition than before construction. All costs incurred for restoring any sprinkler/irrigation systems shall be included in the price bid for the construction of the project.
18.

The CONTRACTOR shall maintain adequate sanitary facilities for use by workers throughout construction.
19.

The CONTRACTOR shall conform to the Occupational Safety and Health Administration's (OSHA) standards for trench safety that are in effect during the period of construction.
20.

All materials and workmanship shall conform to the City of Lucas Standards and Specifications and the North Central Texas Council of Government (NCTCOG) Standards and Specifications, except as noted. In the event of a conflict, the City of Lucas Standards and Specifications shall govern.
21.

No existing trees shall be removed without approval of the City of Lucas.
22.

CONTRACTOR shall provide all necessary construction staking.
23.

CONTRACTOR's working hours shall be in accordance with the provisions of the current City Ordinance governing hours of construction work in the City.
24.

The CONTRACTOR shall assume responsibility for protection of public utilities in the construction of this project. All manholes, valve boxes, fire hydrants, etc., must be adjusted to proper line and grade by the CONTRACTOR prior to and/or after placing any permanent paving. The CONTRACTOR shall also be responsible for support of existing utility poles, street signs, etc., when excavating in the vicinity of such poles.

GENERAL NOTES CONT'D.:

25.

Driveways affected by construction shall be replaced with driveway of same type material and surface as that removed for installation of water line. Driveway culverts shall be removed when necessary to allow for construction of water line. Culverts are to be replaced in the same location if condition of culvert is deemed satisfactory by OWNER. If culvert cannot be salvaged, a new culvert of the same type removed will be installed by the CONTRACTOR. Driveways that are disturbed during construction shall be restored to as good as or better condition than they were prior to construction and materials utilized to restore the driveway shall be the same material as what the driveway is presently made of. All costs incurred for removing and replacing driveways and/or driveway culverts shall be included in the price bid for the construction of the project.
26.

All existing water lines and service lines to remain in service during construction. At times when water has to be cut-off, the CONTRACTOR shall coordinate with the City of Lucas to notify the affected area at least 48 hours prior to water cut-off.
27.

The CONTRACTOR shall phase his daily work schedule so that all driveway crossings are to be complete prior to the end of the day. No driveway crossings are to be left open overnight. During installation of the pipeline across driveways, the CONTRACTOR shall be prepared to provide access across trenches and driveways at all times in case of emergency.
28.

Proposed water line shall be polyvinyl chloride (PVC) AWWA C900. New water service line shall be copper pipe with compression type fittings. Main line valves and fittings shall be cast iron.
29.

CONTRACTOR shall install isolation gate valves and fire hydrants at locations shown on plans unless otherwise directed by OWNER. OWNER may direct CONTRACTOR to locate valves and fire hydrants at locations other than those shown on plans. Also, OWNER may add additional isolation gate valves and fire hydrants as required for operational purposes.
30.

The CONTRACTOR is responsible for keeping streets, parking areas, sidewalks, etc., adjacent to the project free of mud and debris from construction.
31.

The City of Lucas Public Works Department is to be notified 48 hours (2 working days) prior to any construction of paving and utilities in rights-of-way and easements.
32.

Arrangements for construction water shall be made through the City of Lucas.
33.

All locations of underground utility lines are approximate. CONTRACTOR shall contact the proper utility companies at least 48 hours prior to construction, shall inform them of beginning of construction and shall make arrangements to have utilities located by flagging. Flagging of utilities shall be completed prior to beginning construction.
34.

PVC pipe shall be manufactured from a low filler PVC component capable of meeting the highest performance standards of the ASTM specifications.
35.

Construction sites shall be secure at all times. Safety precautions shall be taken to protect the public from any injury which might result from construction activities.
36.

As part of bid item, "EROSION CONTROL", the CONTRACTOR shall be responsible for implementing any and all erosion control measures as needed to control runoff of siltation from the project site. This shall include, but is not limited to, silt fencing, rock berms, etc. The CONTRACTOR shall maintain these erosion control measures as required until the construction is completed and sod has been placed over disturbed areas.
37.

CONTRACTOR shall expose each existing pipeline to which a proposed pipeline will be connected and shall verify the horizontal and vertical location of the existing pipeline prior to the installation of the proposed pipeline.
38.

Proposed water line shall have a minimum cover of forty two inches (42").
39.

The fittings for the proposed water line shall be AWWA C153 compact fittings.
40.

All materials furnished and installed on this project shall be domestic materials and shall be in compliance with the appropriate AWWA Standards for such items.
41.

Hydromulch or block sodding shall be installed to match surrounding areas where the ground is disturbed in the construction area. City reserves the right to provide direction with regard to areas to be hydromulched or sodded. The CONTRACTOR will receive payment only for the square yards of area actually hydromulched or sodded in the construction area.
42.

If any conflicts with other utilities occur during the construction activities, the CONTRACTOR shall immediately notify the City's representative and shall make adjustments as necessary with City's concurrence.
43.

No connections to other City water distribution lines shall be made on Fridays.
44.

CONTRACTOR is responsible for locating all existing buried lines. Locations of pipelines shown on he plans are approximate and are to the best knowledge of the engineer. CONTRACTOR will make all repairs to existing lines damaged during construction work and will have materials on hand to make such repairs.
45.

CONTRACTOR shall take the existing water lines out of service and abandon in place once all service connections are changed over. CONTRACTOR shall cut and plug existing water lines in a sufficient manner to prevent loss of water.
46.

Mega-lugs shall be furnished and installed on all bends, valves, joints, and other fittings that are required for the proposed water line.
47.

A 3M locator type 1266 shall be furnished and installed no deeper than 4 feet by the CONTRACTOR beside all valves, above all bends and above all corporation stops on the proposed water line.
48.

CONTRACTOR shall furnish and install a tracer wire that is compatible with and will allow detection by radio detection corporation's digital PXL-2 pipe locator. The tracer wire shall be installed just above the proposed water lines and throughout the length of the water lines. The tracer wire shall be minimum 14 gauge wire.
49.

If the CONTRACTOR excavates a trench for the proposed water line to a depth requiring a trench safety plan, CONTRACTOR shall provide a trench safety plan prepared and sealed by a licensed engineer, which shall be in conformance with OSHA requirements. CONTRACTOR shall provide trench safety during construction per the trench safety plan when and where it is required as a result of OSHA requirements, job conditions, site conditions, or soil conditions.
50.

There is no separate pay resulting from any of the work required as a result of the requirements included in these general notes, unless otherwise noted. All work required shall be included in the unit price bid for the project.

GENERAL NOTES CONT'D.:

51.

CONTRACTOR may transport good soil resulting from installation of the pipeline to the City's access road on the west side of F.M. 1378. The access road is located next to the electrical transmission line. City will determine condition of soil with regard to its acceptability for spreading it out on the access road. Soil considered not to be good soil by the City shall be removed and deposited elsewhere at the CONTRACTOR'S expense.
52.

Osage Lane shall not be completely shut down by the CONTRACTOR during construction of the proposed water line.
1.

All temporary signs, markings, cones, channelizing devices, warning lights and barricades shall be in accordance with the current State of Texas Manual on Uniform Traffic Control Devices (MUTCD).
2.

Type "A" warning lights shall be placed on all advance warning signs. In addition, flags shall be placed on all advance warning signs that detour traffic.
3.

Any existing conflicting markings shall be removed prior to shifting traffic.
4.

All temporary pavement markings required during construction shall be of the removable type. Temporary markings and striping may be required to transition travel lanes between construction phases. All pavement markings and striping shall be reflective.
5.

The spacing of signs and channelization devices may be adjusted to fit the geometric conditions encountered, such as driveways, intersecting roadways, vertical and horizontal alignment, etc., as approved by the City of Lucas.
6.

Advance warning signs shall not be displayed more than forty-eight (48) hours before physical construction begins. Signs may be erected up to one week before needed, if the sign face is fully covered.
7.

Use of barricades, portable barrier rails, vertical panels, and drums shall be limited to the immediate areas of construction where a hazard is present. These devices shall not be stored along the roadway within thirty (30) feet of the edge of the traveled way before or after use unless protected by guardrail, bridge rail, and/or barriers installed for other purposes. These devices shall be removed from the construction work zone when the City of Lucas determines they are no longer needed. Where there is insufficient right-of-way to provide for this thirty (30) foot setback, the City of Lucas shall approve alternate locations.
8.

The posted speed for warning signage is to be determined at the site by the City of Lucas.
9.

Reduced speed warning signage should be placed prior to and at regular intervals within the construction zone.
10.

As part of the bid item, "Construction Barricading/Signing/Traffic Control," the CONTRACTOR is required to submit a traffic control plan for construction a minimum of 3 days prior to changes in traffic handling or movement. These plans are to be reviewed and approved by the City of Lucas prior to construction of that phase.
11.

The CONTRACTOR shall accommodate existing traffic during construction and shall maintain at least one open lane of traffic at all times. Use of flag men, barricades, vertical panels, etc. shall be required and shall be considered subsidiary to "Construction Barricading/Signing/Traffic Control".
12.

CONTRACTOR shall be required to place temporary pavement markings and/or buttons as needed to maintain traffic in a safe and efficient manner after removal of existing markings. These temporary markings shall not be paid for separately but shall be considered subsidiary to "CONSTRUCTION BARRICADING/SIGNING/TRAFFIC CONTROL".

CONSTRUCTION SEQUENCE:

1.

Existing water lines shall remain in service until all new water lines are installed and ready for service. Once new water lines are all installed and ready for service, new water lines shall be placed in service and existing water service connections shall be switched over to the new water line where existing water lines are being replaced by the new water line.
2.

The CONTRACTOR shall not be responsible for making the switch over from the private property owners' existing service lines to the new water system. The CONTRACTOR shall install the service lines per the service line connection notes. Each individual property owner will be responsible for switching over their individual existing service line from their house to the new meters and making the connection to the end of the corporation stop. The corporation stop installed by the CONTRACTOR shall be installed inside the meter box. The meter box furnished and installed by the CONTRACTOR shall be large enough to include this corporation stop on the homeowner's side of the meter."

SERVICE CONNECTION NOTES:

1.

CONTRACTOR shall install new 1" service lines from the proposed 6" water line to the new water meters. A new water meter shall be installed in the middle of each lot just inside the easement for the proposed 6" water line. The CONTRACTOR shall furnish and install each new 1" service line and all of the components necessary to connect each 1" service line to the 6" water line and the meter for each property (per the City of Lucas Standards and Specifications and the North Central Texas Council of Governments "Standard Specifications for Public Works Construction").
2.

The CONTRACTOR shall be responsible for furnishing and installing the new 1" service lines and all components necessary to connect the new water meters to the proposed 6" water line, including the meter box but not including the water meter. The City will provide the water meters to the CONTRACTOR and the CONTRACTOR shall be responsible for installing them. For the service connections, CONTRACTOR shall furnish and install Ford brass taps and saddles (double saddles) or approved equal.
3.

The CONTRACTOR shall not make the connections between the water meters and the existing service lines to the residences (on the private side of the water meters). The CONTRACTOR shall furnish and install a corporation stop on the residential side of each water meter for future connection by the resident.
4.

Once the CONTRACTOR has completed installation of the proposed 6" water line, the CONTRACTOR shall test the new water line and disinfect it until all of the bacterial samples have passed.
5.

The cost for all the work and materials associated with the above items required to make the service connections between the proposed 6" water line and the new water meters shall be included in the price bid for the service lines (cost for service connections shall not include the cost of the new meters to be furnished by the City).

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.
JANUARY 2016

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.

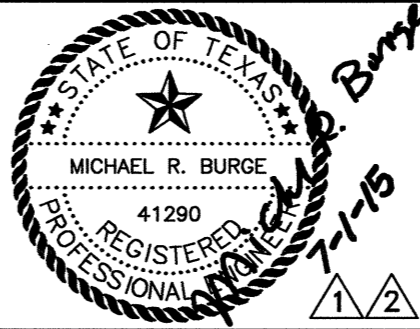
6			
5			
4			
3			
Δ	7/1/15	REVISED PER ADDENDUM NO. 3	MRB
Δ	7/1/15	REVISED PER ADDENDUM NO. 2	MRB
NO.	DATE	R E V I S I O N	REVIEWED

DRAWN: _____ BW2
DESIGN: _____ MRB
REVIEWED: _____ JFW
SCALE: _____ NO SCALE
DATE: _____ APRIL 2015
DWG. NAME: _____ 1592GENNOTE



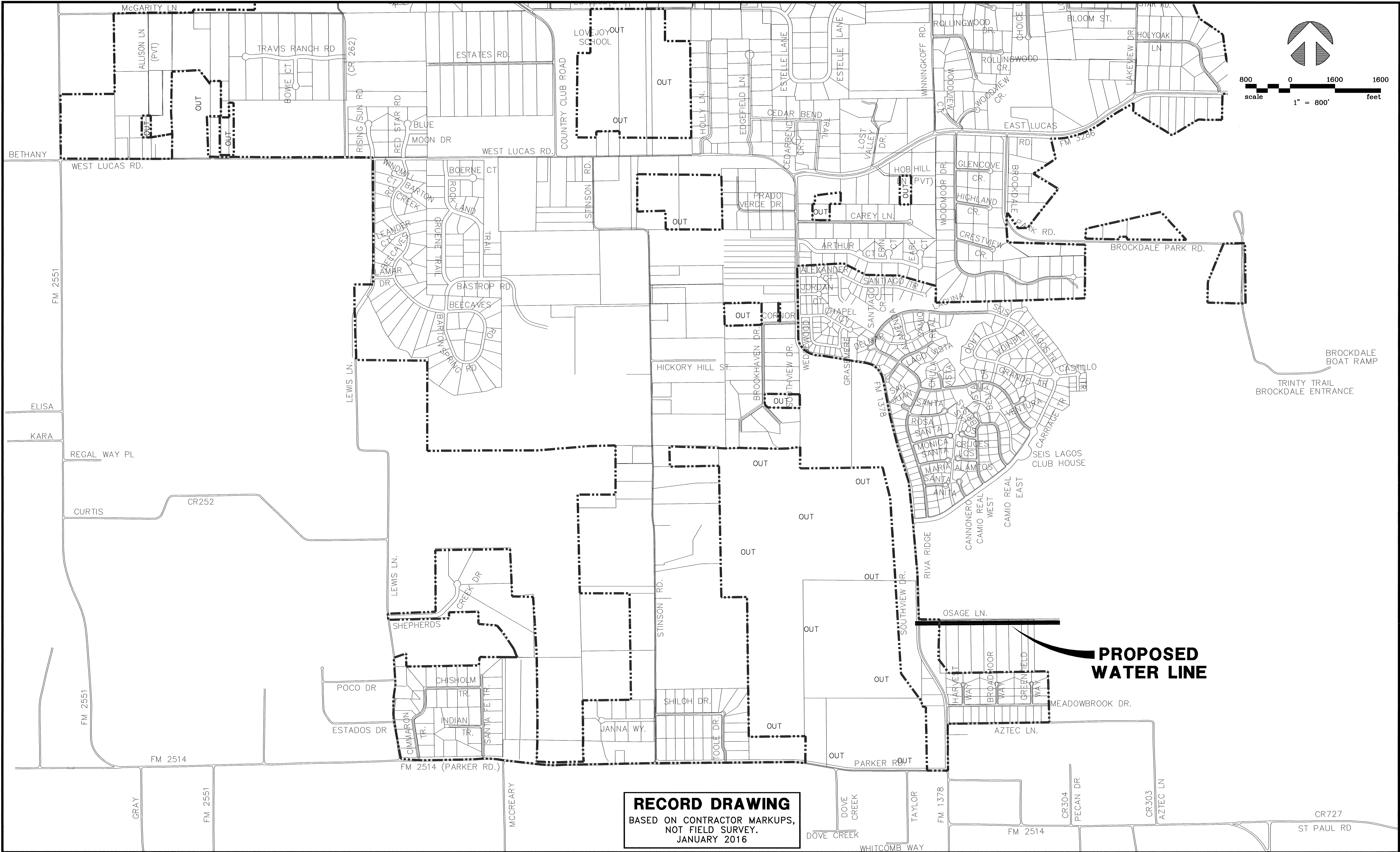
BW2 ENGINEERS, INC.

1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290



WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
PROJECT GENERAL NOTES
CITY OF LUCAS

SHEET NO. 1
OF 11 SHEETS
JOB NO. 13-1592



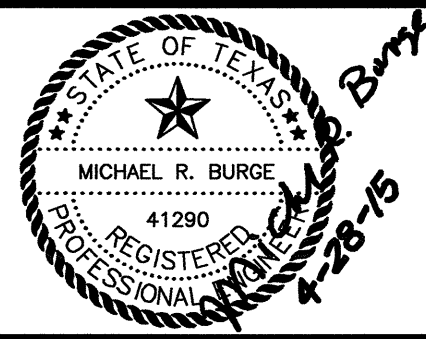
RECORD DRAWING
BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.
JANUARY 2016

6			
5			
4			
3			
2			
1			
NO.	DATE	REVISION	REVIEWED

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: 1" = 800'
DATE: APRIL 2015
DWG. NAME: 1592LOC.MAP

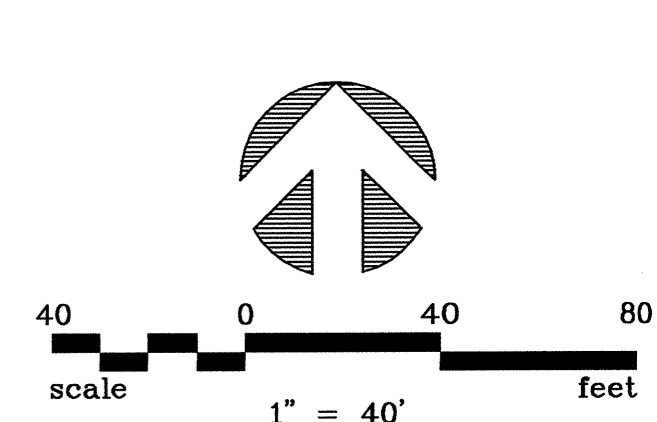
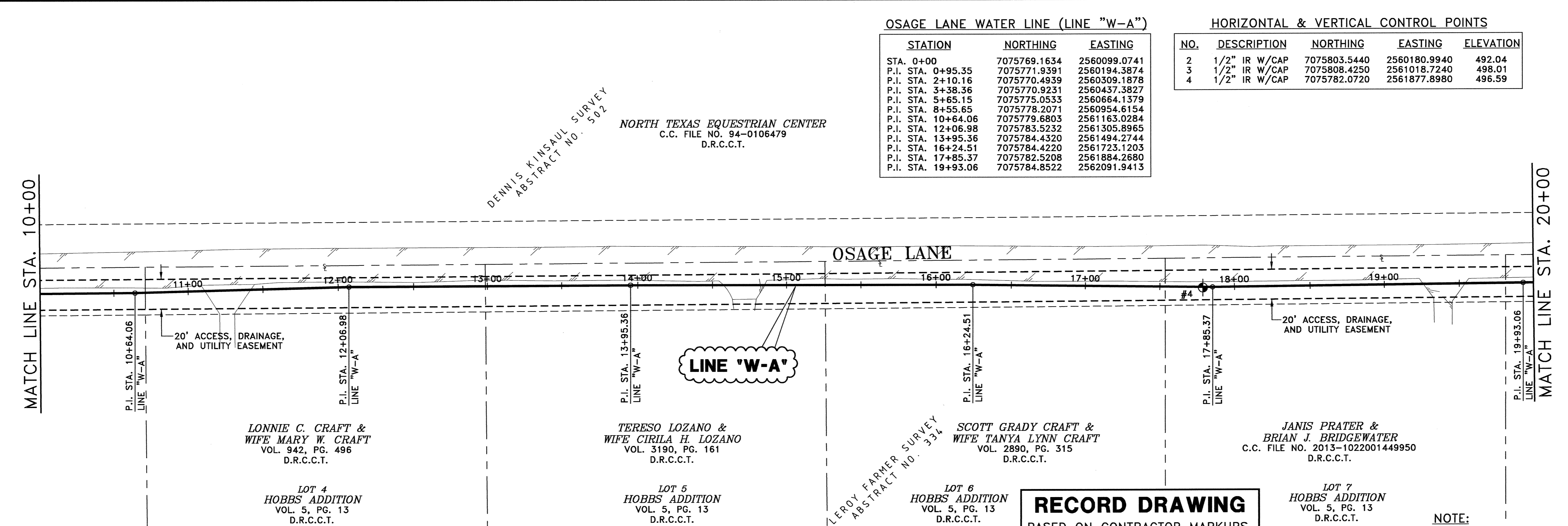
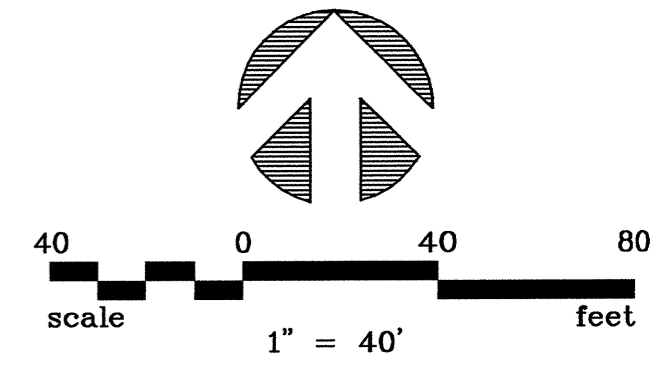
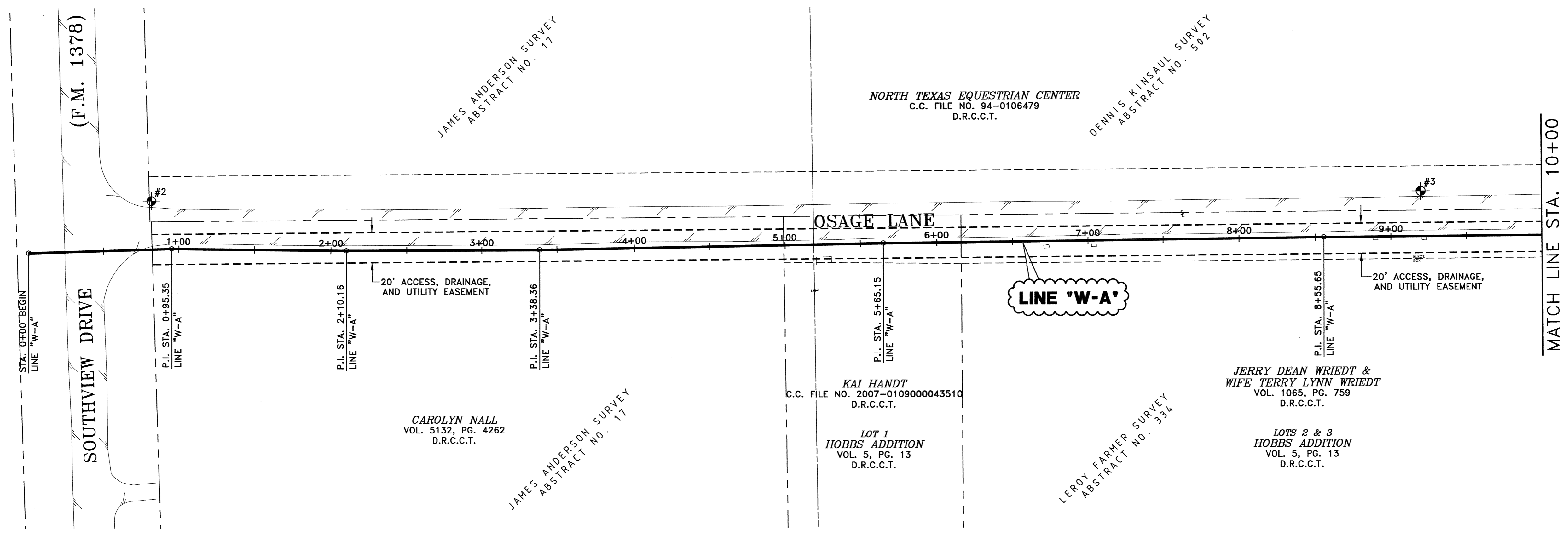


BW2 ENGINEERS, INC.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290



**WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
PROJECT LOCATION MAP
CITY OF LUCAS**

SHEET NO. **2**
OF **11** SHEETS
JOB NO. **13-1592**



OSAGE LANE WATER LINE (LINE "W-A")			
STATION	NORTHING	EASTING	
STA. 0+00	7075769.1634	2560099.0741	
P.I. STA. 0+95.35	7075771.9391	2560194.3874	
P.I. STA. 2+10.16	7075770.4939	2560309.1878	
P.I. STA. 3+38.36	7075770.9231	2560437.3827	
P.I. STA. 5+65.15	7075775.0533	2560664.1379	
P.I. STA. 8+55.65	7075778.2071	2560954.6154	
P.I. STA. 10+64.06	7075779.6803	2561163.0284	
P.I. STA. 12+06.98	7075783.5232	2561305.8965	
P.I. STA. 13+95.36	7075784.4320	2561494.2744	
P.I. STA. 16+24.51	7075784.4220	2561723.1203	
P.I. STA. 17+85.37	7075782.5208	2561884.2880	
P.I. STA. 19+93.06	7075784.8522	2562091.9413	

HORIZONTAL & VERTICAL CONTROL POINTS				
NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
2	1/2" IR W/CAP	7075803.5440	2560180.9940	492.04
3	1/2" IR W/CAP	7075808.4250	2561018.7240	498.01
4	1/2" IR W/CAP	7075782.0720	2561877.8980	496.59

RECORD DRAWING
BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.
JANUARY 2016

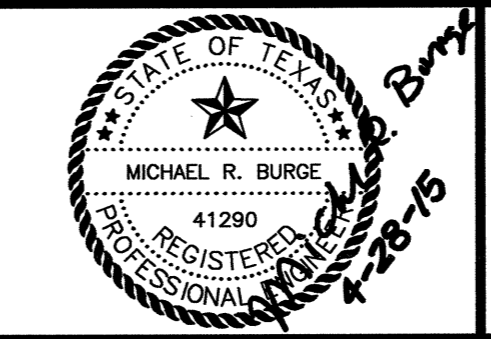
NOTE:
1. COORDINATES SHOWN HEREON ARE TEXAS STATE PLANE COORDINATES NORTH CENTRAL ZONE (4202) NAD 83 AT SURFACE WITH A SCALE FACTOR OF 1.000152710. VERTICAL DATUM IS BASED ON VERTICAL CONTROL ESTABLISHED FOR THIS PROJECT.

6			
5			
4			
3			
2			
1			
NO.	DATE	REVISION	REVIEWED

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: 1" = 40'
DATE: APRIL 2015
DWG. NAME: 1592HORIZCTRL01

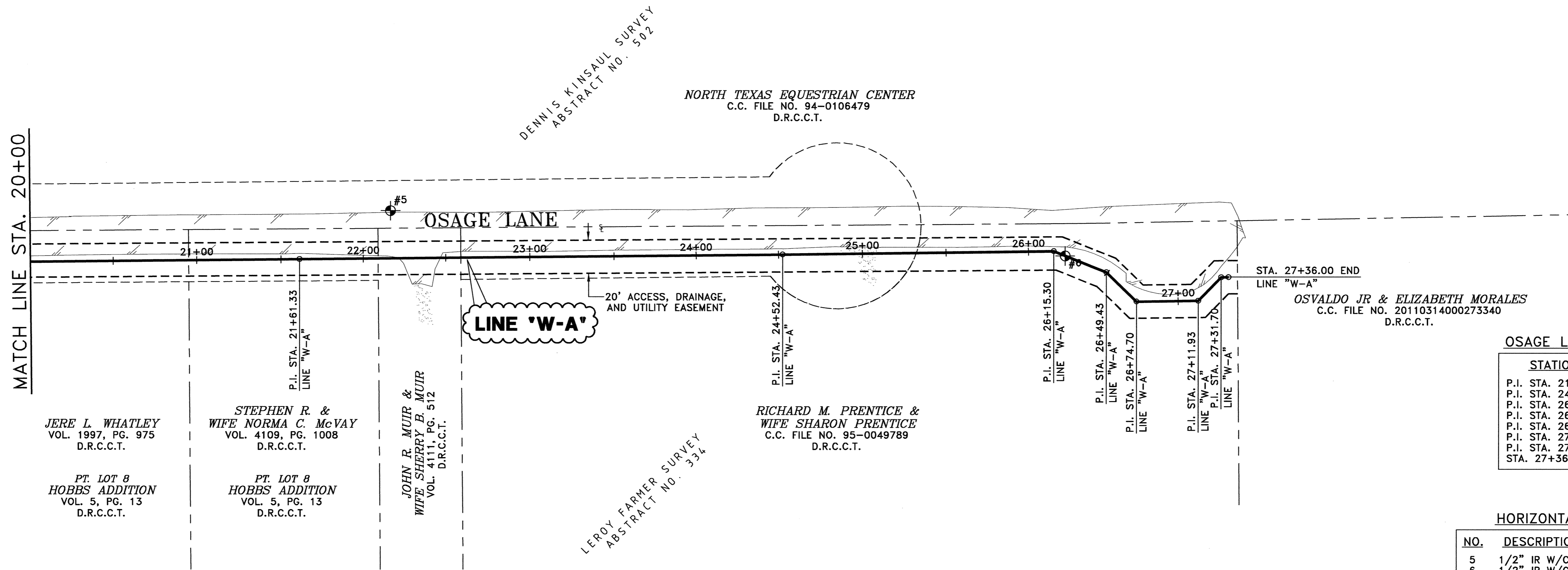
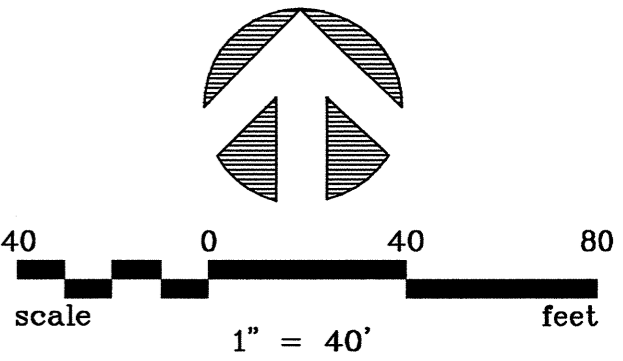


BW2 ENGINEERS, INC.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290



WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
HORIZONTAL & VERTICAL CONTROL PLAN - 1
CITY OF LUCAS

SHEET NO. 3
OF 11 SHEETS
JOB NO. 13-1592



OSAGE LANE WATER LINE (LINE "W-A")

STATION	NORTHING	EASTING
P.I. STA. 21+61.33	7075786.4522	2562260.2107
P.I. STA. 24+52.43	7075789.2822	2562551.2960
P.I. STA. 26+15.30	7075791.3327	2562714.1562
P.I. STA. 26+49.43	7075778.6707	2562745.8477
P.I. STA. 26+74.70	7075761.0279	2562763.9404
P.I. STA. 27+11.93	7075761.4965	2562801.1609
P.I. STA. 27+31.70	7075775.6535	2562814.9658
STA. 27+36.00	7075775.7076	2562819.2656

HORIZONTAL & VERTICAL CONTROL POINTS

NO.	DESCRIPTION	NORTHING	EASTING	ELEVATION
5	1/2" IR W/CAP	7075815.5820	2562315.4090	506.58
6	1/2" IR W/CAP	7075788.4070	2562720.9940	504.41

RECORD DRAWING

BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.
JANUARY 2016

NOTE:

1. COORDINATES SHOWN HEREON ARE TEXAS STATE PLANE COORDINATES NORTH CENTRAL ZONE (4202) NAD 83 AT SURFACE WITH A SCALE FACTOR OF 1.000152710. VERTICAL DATUM IS BASED ON VERTICAL CONTROL ESTABLISHED FOR THIS PROJECT.

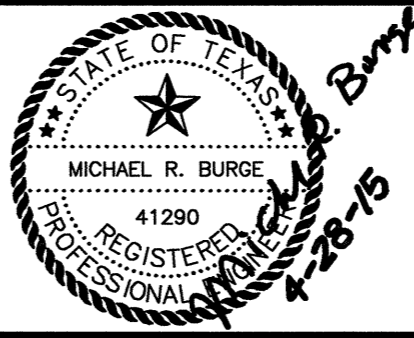
NO.	DATE	REVISION	REVIEWED
6			
5			
4			
3			
2			
1			

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: 1" = 40'
DATE: APRIL 2015
DWG. NAME: 1592HORIZCTRL02



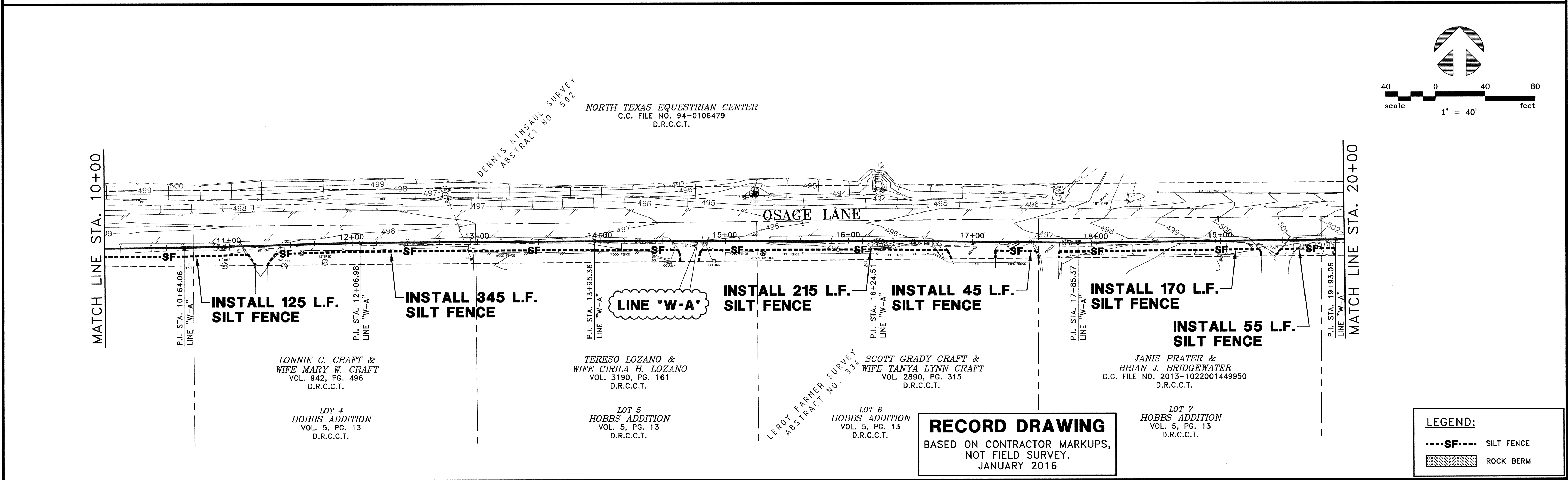
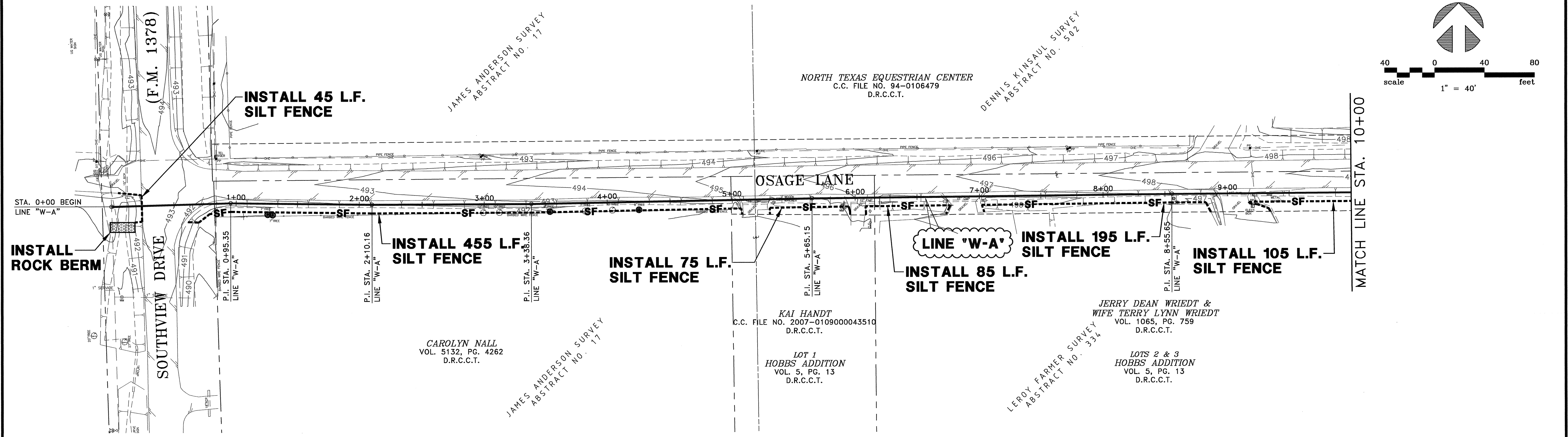
BW2 ENGINEERS, INC.

1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290



WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
HORIZONTAL & VERTICAL CONTROL PLAN - 2
CITY OF LUCAS

SHEET NO. **4**
OF **11** SHEETS
JOB NO. 13-1592

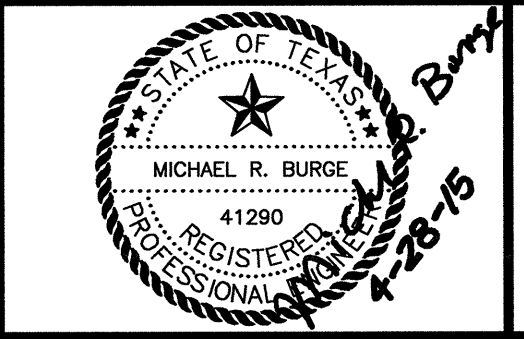


6			
5			
4			
3			
2			
1			
NO.	DATE	REVISION	REVIEWED

DRAWN: BW2
 DESIGN: MRB
 REVIEWED: JFW
 SCALE: 1" = 40'
 DATE: APRIL 2015
 DWG. NAME: 1592EROSCTRL01



BW2 ENGINEERS, INC.
 1919 S. Shiloh Road
 Suite 500, L.B. 27
 Garland, Texas 75042
 (972) 864-8200 (T) (972) 864-8220 (F)
 Firm Registration No. F-5290



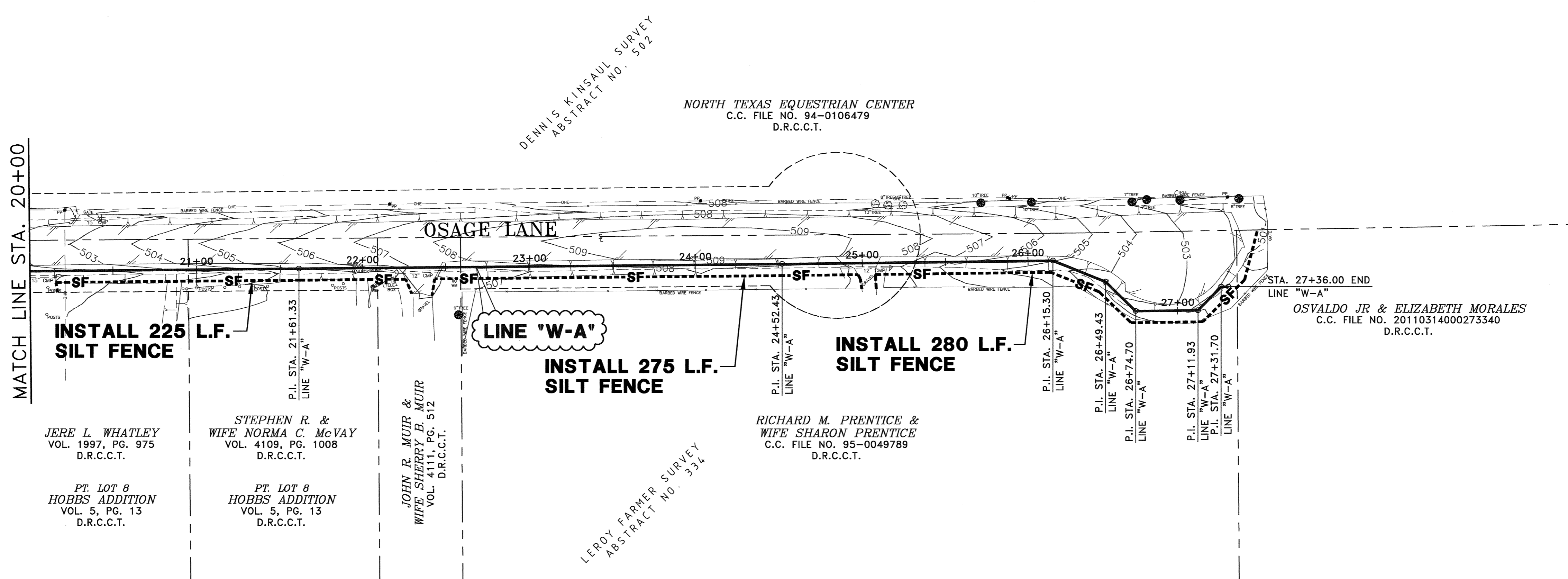
WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
EROSION CONTROL PLAN - 1
CITY OF LUCAS

SHEET NO. **5**
 OF **11** SHEETS
 JOB NO. **13-1592**

LEGEND:

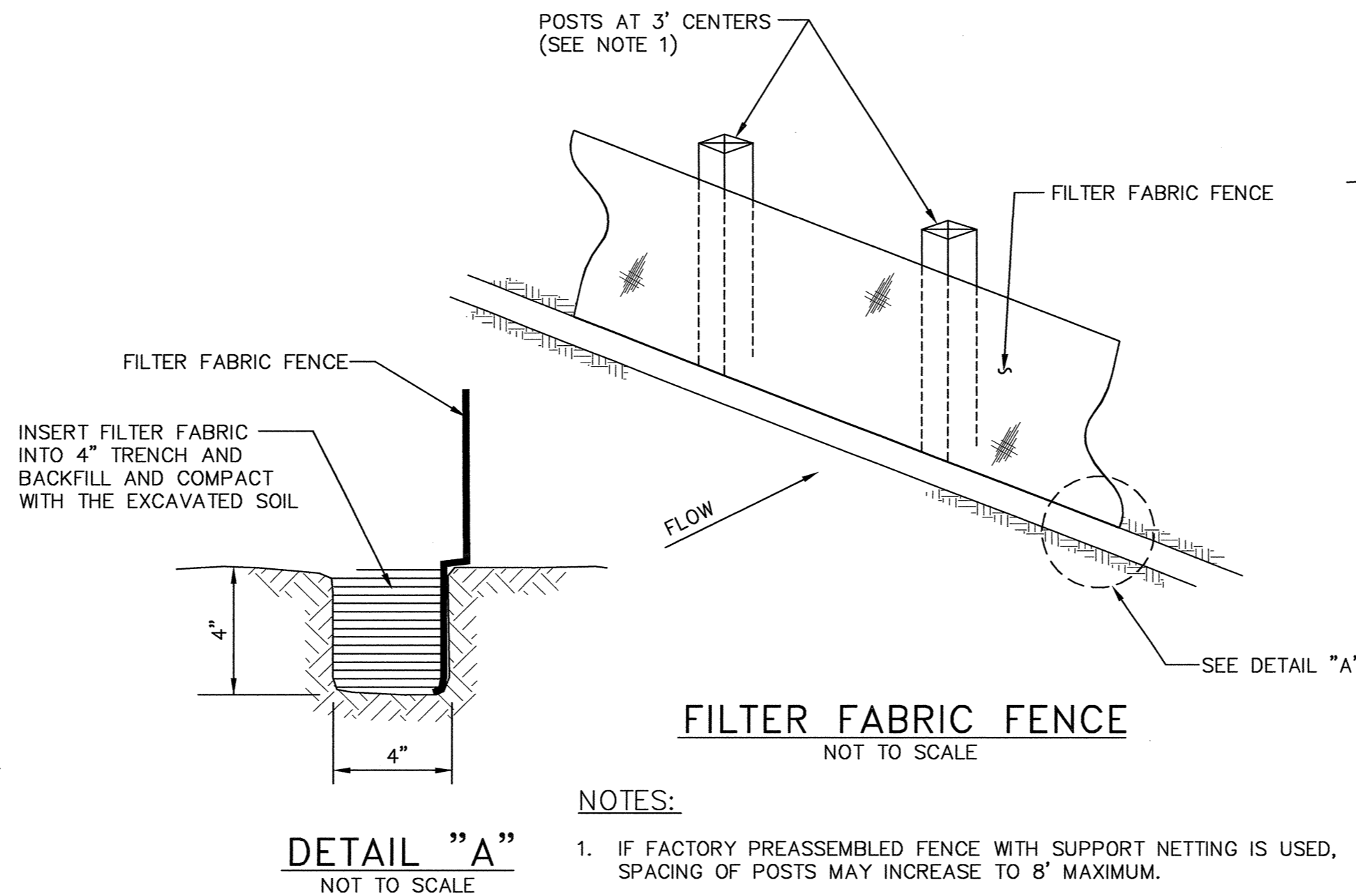
- - - - - **SF** - - - - - SILT FENCE
 [Hatched Box] ROCK BERM

RECORD DRAWING
 BASED ON CONTRACTOR MARKUPS,
 NOT FIELD SURVEY.
 JANUARY 2016



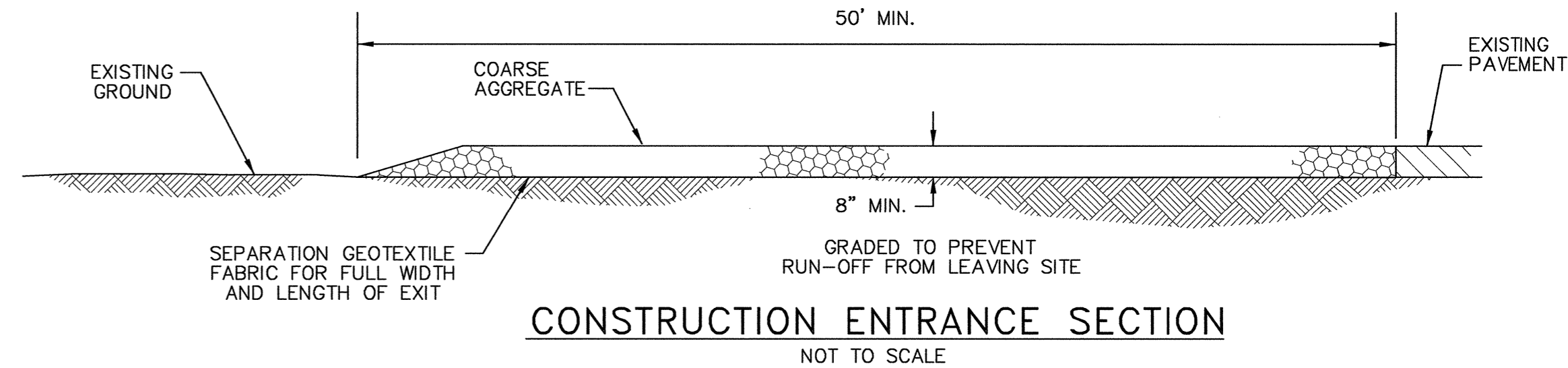
EROSION CONTROL NOTES:

1. EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL PLAN FOR THE PROJECT SHALL BE INSTALLED PRIOR TO THE START OF LAND DISTURBING ACTIVITIES ON THE PROJECT.
2. ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS FOR THE PROJECT. CHANGES ARE TO BE APPROVED BEFORE CONSTRUCTION BY THE DESIGN ENGINEER AND CITY OF LUCAS.
3. IF THE EROSION CONTROL PLANS AS APPROVED CANNOT CONTROL EROSION AND OFF-SITE SEDIMENTATION FROM THE PROJECT, THE EROSION CONTROL PLAN WILL BE REQUIRED TO BE REVISED AND/OR ADDITIONAL EROSION CONTROL DEVICES WILL BE REQUIRED ON SITE.
4. IF OFF-SITE SOIL BORROW OR SPOIL SITES ARE USED IN CONJUNCTION WITH THIS PROJECT, THIS INFORMATION SHALL BE DISCLOSED AND SHOWN ON THE EROSION CONTROL PLAN. STAGING, BORROW, AND SPOIL AREAS (INCLUDING THOSE LOCATED OFF-SITE) ARE CONSIDERED A PART OF THE PROJECT SITE AND THEREFORE SHALL COMPLY WITH THE CITY OF LUCAS'S EROSION CONTROL REQUIREMENTS. PERIMETER CONTROLS WILL BE PROVIDED BY THE CONTRACTOR FOR THESE AREAS. THEY SHALL BE STABILIZED WITH PERMANENT GROUND COVER PRIOR TO FINAL APPROVAL OF THE PROJECT.
5. ALL EROSION CONTROL DEVICES SHALL BE INSPECTED WEEKLY BY THE CONTRACTOR AND AFTER ALL MAJOR RAIN EVENTS. ANY DEVICES THAT ARE DAMAGED OR DISPLACED WILL BE RESTORED (NO SEPARATE PAY).
6. ALL NON-IMPERVIOUS AREAS AFTER CONSTRUCTION SHALL BE COVERED WITH SOD OR LANDSCAPED IN ACCORDANCE WITH THE LANDSCAPE DRAWINGS. ALL OTHER REMAINING AREAS SHALL BE HYDROMULCHED OR COVERED WITH CURLEX BLANKET (WHERE SHOWN) AND MAINTAINED UNTIL ESTABLISHED.
7. TEMPORARY STONE STABILIZED CONSTRUCTION ENTRANCE SHALL HAVE THE FOLLOWING MINIMUM DIMENSIONS (UNLESS OTHERWISE SHOWN): 25' WIDE X 50' LONG X 8" DEEP. (3"-5" COURSE AGGREGATE). PLACE FILTER FABRIC UNDER STONE PER NCTCOG ITEM 2.23.3.
8. THE STABILIZED CONSTRUCTION ENTRANCE IS TO BE USED AS A VEHICLE WASH DOWN AREA FOR DEBRIS AND SOIL REMOVAL PRIOR TO EXITING THE SITE. THIS STABILIZED ENTRANCE SHALL BE TOP DRESSED WITH ADDITIONAL STONE AS NECESSARY. LOCATION OF STABILIZED ENTRANCE MAY BE MODIFIED IF APPROVED BY CITY OF LUCAS AND THE DESIGN ENGINEER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE, AS THE ENTITY EXERCISING OPERATIONAL CONTROL, FOR ALL PERMITTING AS REQUIRED BY THE EPA/TCEQ. THIS INCLUDES, BUT IS NOT LIMITED TO, MEETING ALL REQUIREMENTS OF TPDES GENERAL PERMIT TXR150000 AND PAYMENT OF ALL ASSOCIATED FEES.
10. IT SHOULD BE NOTED THAT THE AREA OF IMPACT ON THIS PROJECT WILL REQUIRE A SMALL CONSTRUCTION PERMIT THROUGH TCEQ.
11. IT IS VERY IMPORTANT THAT MUD AND OTHER DEBRIS BE KEPT OFF ALL ROADS. CONTRACTOR SHALL IMMEDIATELY REMOVE ANY MUD AND DEBRIS DEPOSITED ON ROADS.
12. CONTRACTOR WILL REPLACE ANY EROSION CONTROL DEVICES THAT ARE DAMAGED AND/OR DISPLACED DURING CONSTRUCTION (NO SEPARATE PAY).



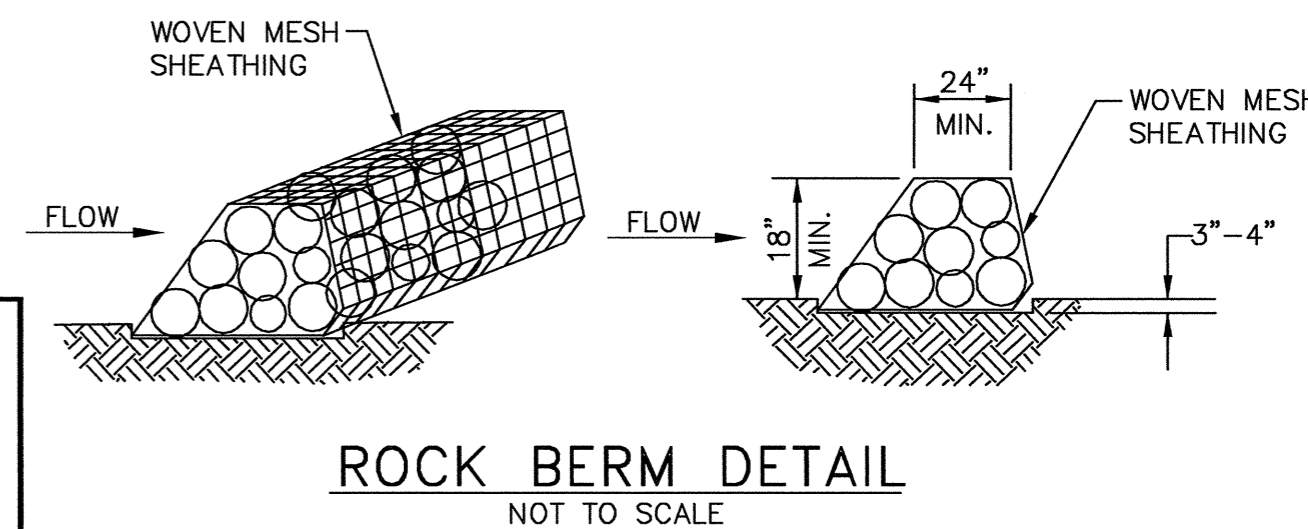
NOTES:

1. IF FACTORY PREASSEMBLED FENCE WITH SUPPORT NETTING IS USED, SPACING OF POSTS MAY INCREASE TO 8' MAXIMUM.
2. FILTER FABRIC SHALL BE AS PER ASTM D4833.
3. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER, PROVIDE 6" OF OVERLAP AT THE POST AND FOLD.



CONSTRUCTION ENTRANCE NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET, UNLESS OTHERWISE SHOWN.
2. THICKNESS SHALL NOT BE LESS THAN 8 INCHES.
3. WIDTH SHALL NOT BE LESS THAN 25 FEET, UNLESS OTHERWISE SHOWN.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION ENTRANCE, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED CONSTRUCTION ENTRANCES ARE REQUIRED FOR ANY STAGING, BORROW, AND SPOIL AREAS.



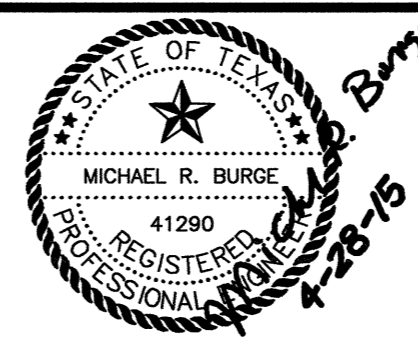
RECORD DRAWING
BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.
JANUARY 2016

6			
5			
4			
3			
2			
1			
NO.	DATE	REVISION	REVIEWED

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: 1" = 40'
DATE: APRIL 2015
DWG. NAME: 1592HORIZCTRL02

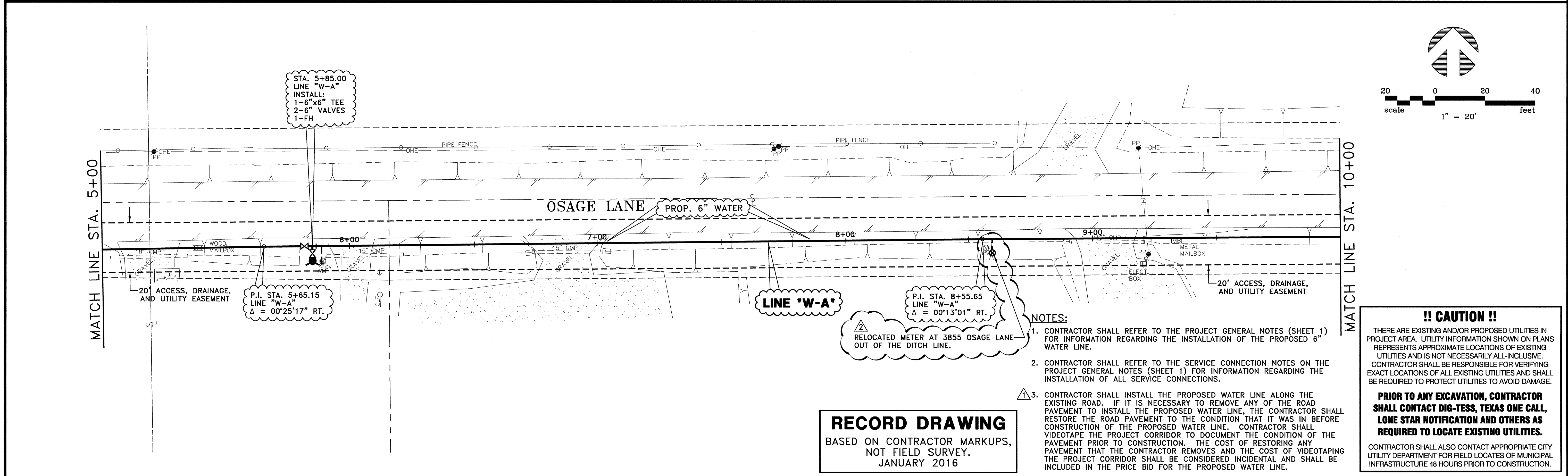
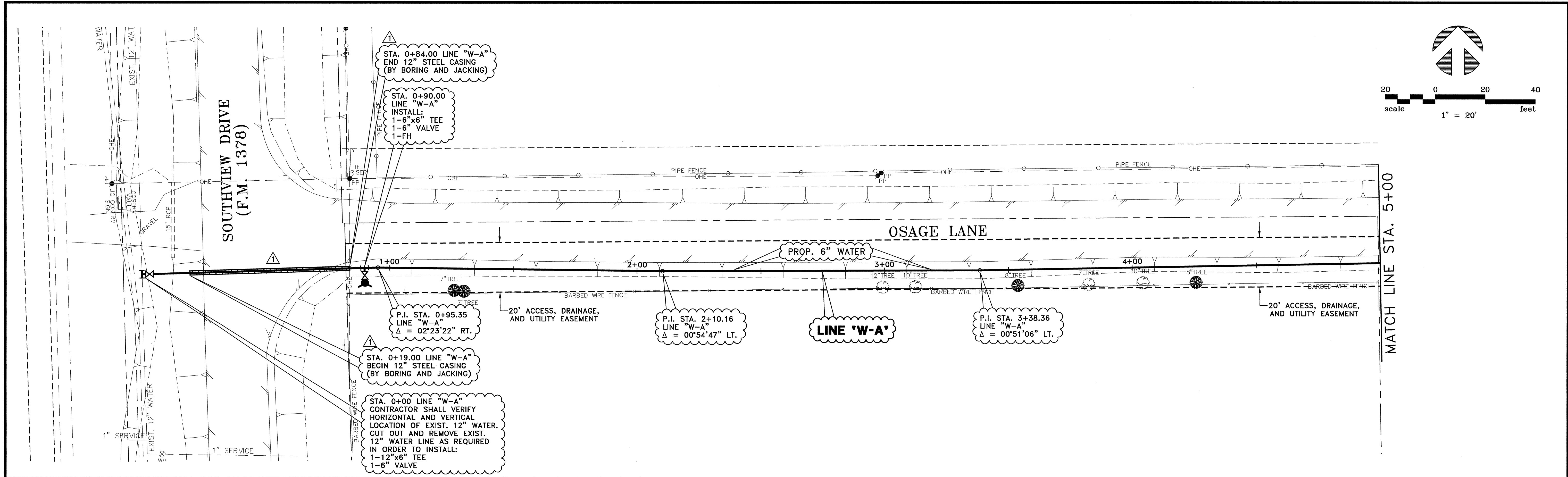


BW2 ENGINEERS, INC.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290



WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
EROSION CONTROL PLAN - 2, NOTES AND DETAILS
CITY OF LUCAS

SHEET NO. **6**
OF **11** SHEETS
JOB NO. 13-1592



6				DRAWN: _____	BW2
5				DESIGN: _____	MRB
4				REVIEWED: _____	JFW
3				SCALE: _____	1" = 20'
Δ	1/27/16	REVISED PER INFORMATION RECEIVED FROM THE CONTRACTOR	MRB	DATE: _____	APRIL 2015
Δ	7/1/15	REVISED PER ADDENDUM NO. 2	MRB	DWG. NAME: _____	1592WTRPLN01
NO.	DATE	REVISION	REVIEWED		

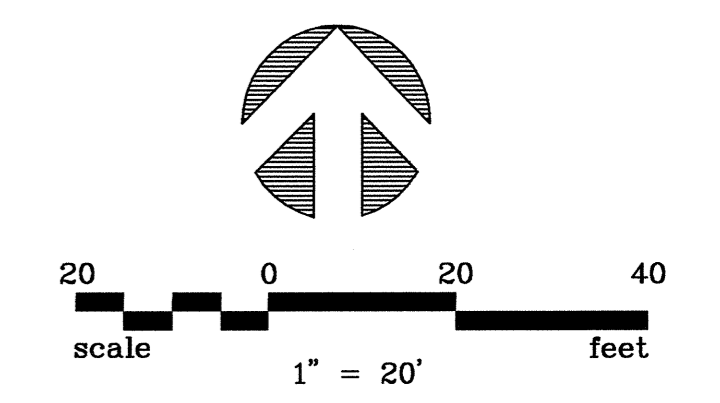
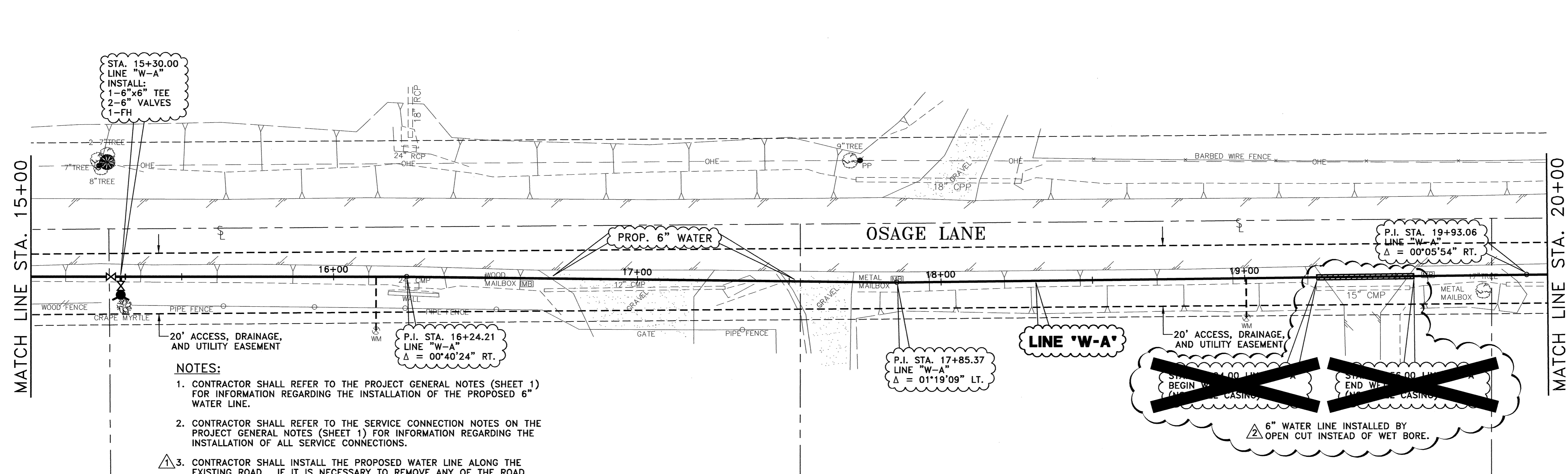
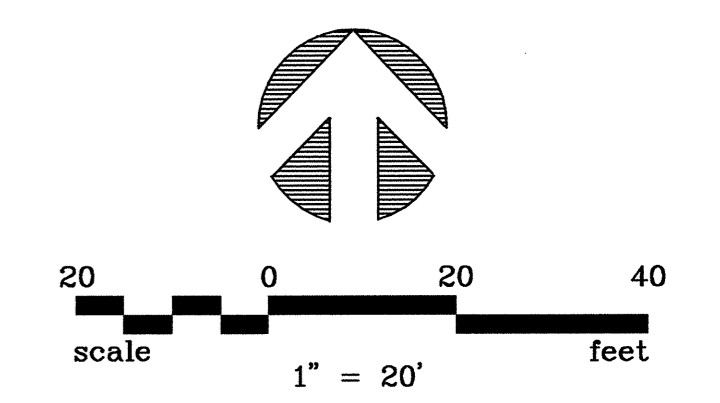
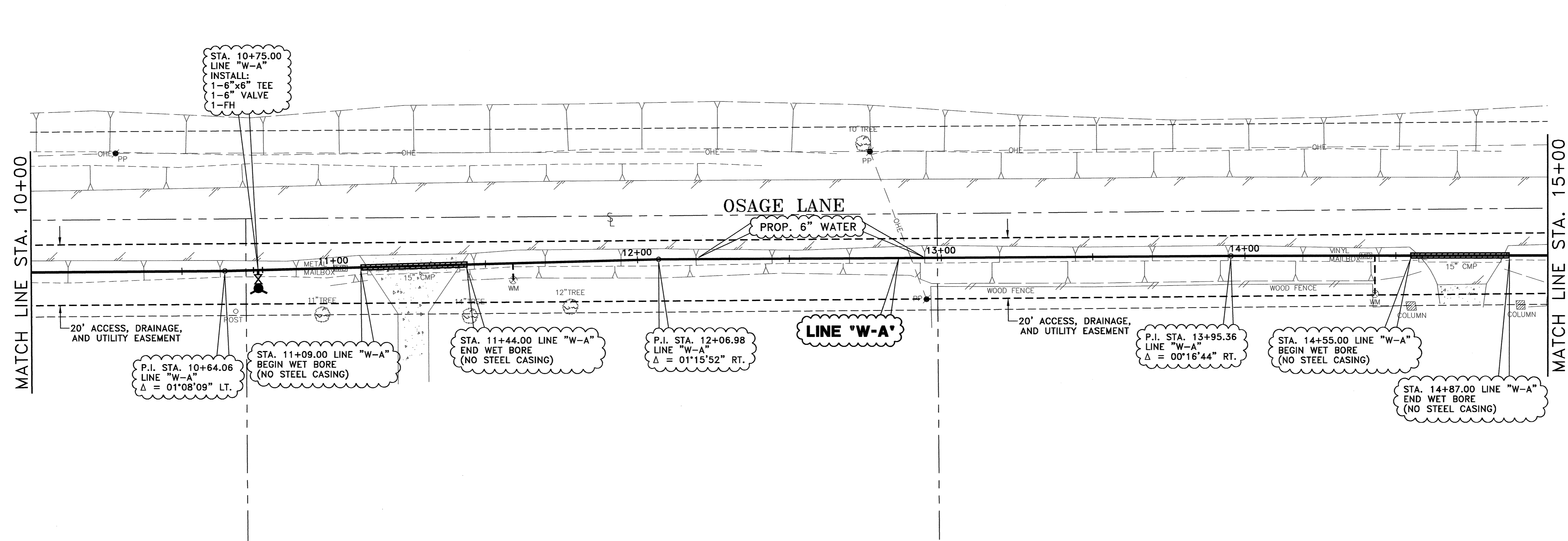
RECORD DRAWING
 BASED ON CONTRACTOR MARKUPS,
 NOT FIELD SURVEY.
 JANUARY 2016

BW2 ENGINEERS, INC.
 1919 S. Shiloh Road
 Suite 500, L.B. 27
 Garland, Texas 75042
 (972) 864-8200 (T) (972) 864-8220 (F)
 Firm Registration No. F-5290

STATE OF TEXAS
 MICHAEL R. BURGE
 41290
 REGISTERED PROFESSIONAL ENGINEER
 12/16

WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
LINE 'W-A' - STA. 0+00 TO STA. 10+00
CITY OF LUCAS

SHEET NO. 7
OF 11 SHEETS
JOB NO. 13-1592



- NOTES:**
1. CONTRACTOR SHALL REFER TO THE PROJECT GENERAL NOTES (SHEET 1) FOR INFORMATION REGARDING THE INSTALLATION OF THE PROPOSED 6" WATER LINE.
 2. CONTRACTOR SHALL REFER TO THE SERVICE CONNECTION NOTES ON THE PROJECT GENERAL NOTES (SHEET 1) FOR INFORMATION REGARDING THE INSTALLATION OF ALL SERVICE CONNECTIONS.
 3. CONTRACTOR SHALL INSTALL THE PROPOSED WATER LINE ALONG THE EXISTING ROAD. IF IT IS NECESSARY TO REMOVE ANY OF THE ROAD PAVEMENT TO INSTALL THE PROPOSED WATER LINE, THE CONTRACTOR SHALL RESTORE THE ROAD PAVEMENT TO THE CONDITION THAT IT WAS IN BEFORE CONSTRUCTION OF THE PROPOSED WATER LINE. CONTRACTOR SHALL VIDEOTAPE THE PROJECT CORRIDOR TO DOCUMENT THE CONDITION OF THE PAVEMENT PRIOR TO CONSTRUCTION. THE COST OF RESTORING ANY PAVEMENT THAT THE CONTRACTOR REMOVES AND THE COST OF VIDEOTAPE THE PROJECT CORRIDOR SHALL BE CONSIDERED INCIDENTAL AND SHALL BE INCLUDED IN THE PRICE BID FOR THE PROPOSED WATER LINE.

RECORD DRAWING
 BASED ON CONTRACTOR MARKUPS,
 NOT FIELD SURVEY.
 JANUARY 2016

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

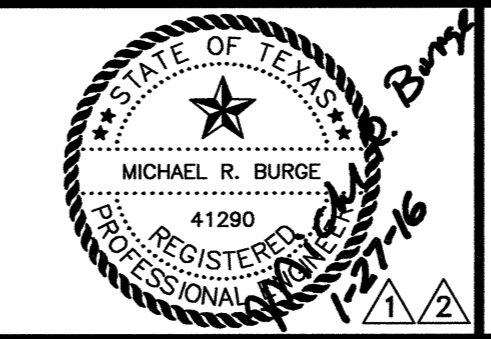
CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.

6			
5			
4			
3			
Δ	1/27/16	REVISED PER INFORMATION RECEIVED FROM THE CONTRACTOR	MRB
Δ	7/1/15	REVISED PER ADDENDUM NO. 2	MRB
NO.	DATE	REVISION	REVIEWED

DRAWN: BW2
 DESIGN: MRB
 REVIEWED: JFW
 SCALE: 1" = 20'
 DATE: APRIL 2015
 DWG. NAME: 1592WTRPLN02

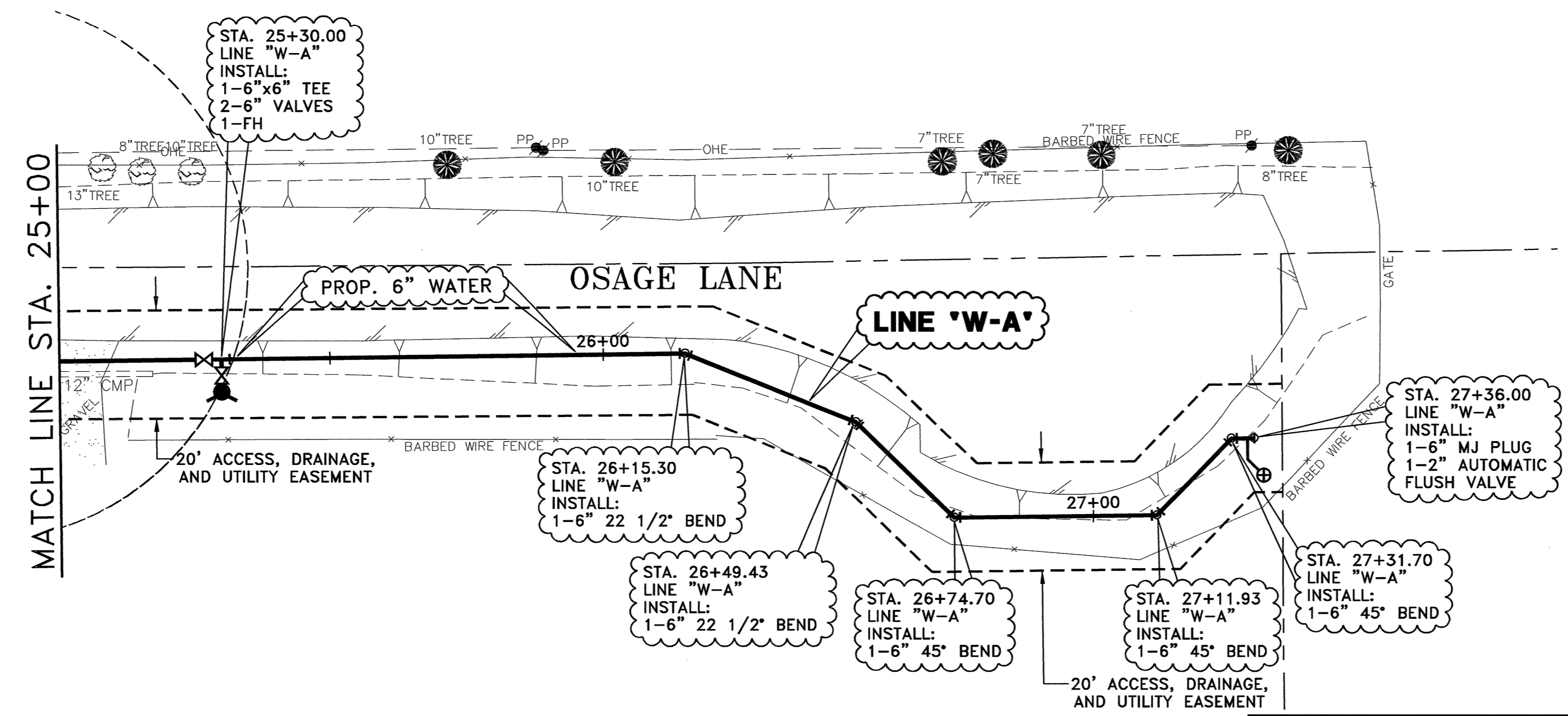
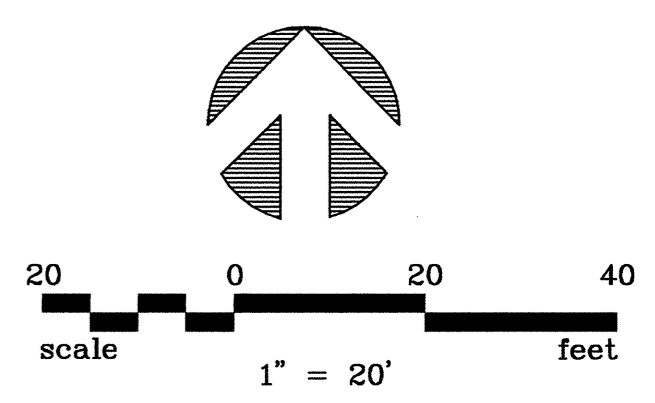
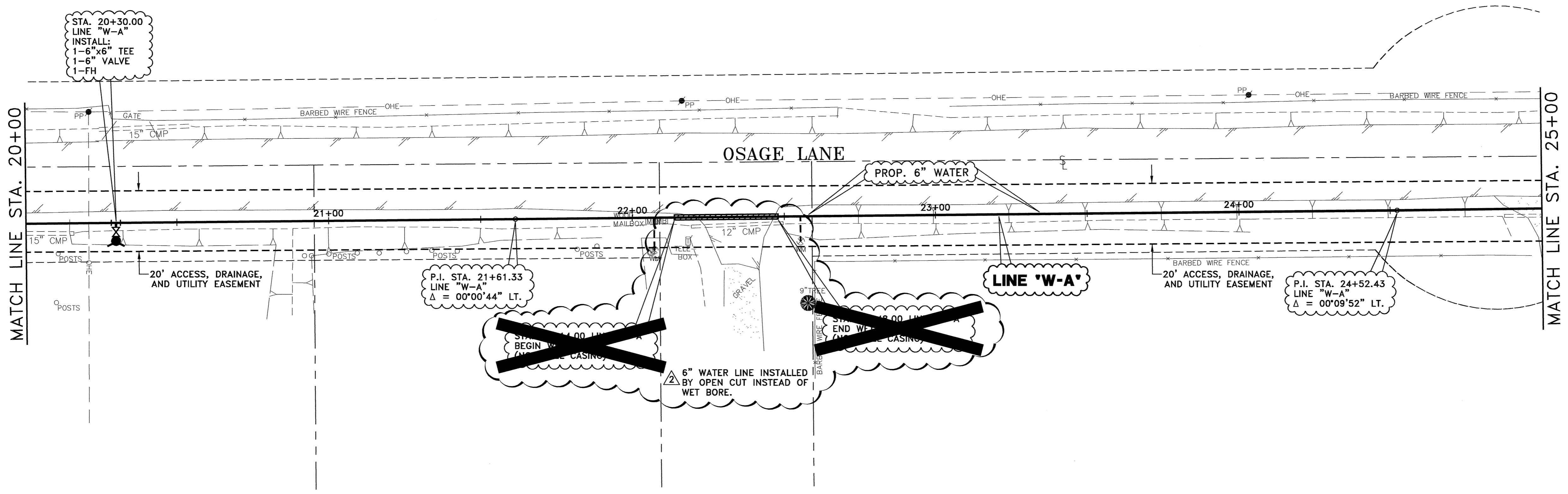
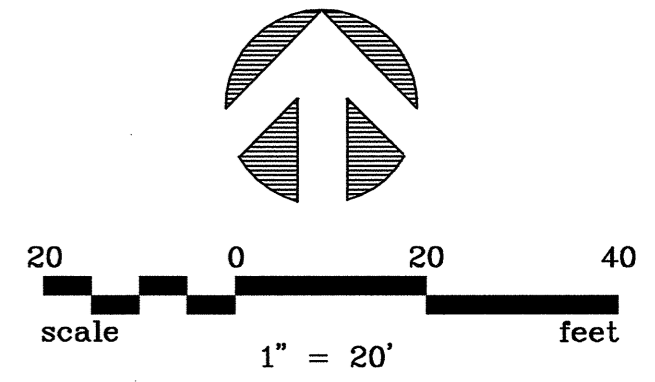


BW2 ENGINEERS, INC.
 1919 S. Shiloh Road
 Suite 500, L.B. 27
 Garland, Texas 75042
 (972) 864-8200 (T) (972) 864-8220 (F)
 Firm Registration No. F-5290



WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
LINE 'W-A' - STA. 10+00 TO STA. 20+00
CITY OF LUCAS

SHEET NO. 8
 OF 11 SHEETS
 JOB NO. 13-1592



- NOTES:**
1. CONTRACTOR SHALL REFER TO THE PROJECT GENERAL NOTES (SHEET 1) FOR INFORMATION REGARDING THE INSTALLATION OF THE PROPOSED 6" WATER LINE.
 2. CONTRACTOR SHALL REFER TO THE SERVICE CONNECTION NOTES ON THE PROJECT GENERAL NOTES (SHEET 1) FOR INFORMATION REGARDING THE INSTALLATION OF ALL SERVICE CONNECTIONS.
 3. CONTRACTOR SHALL INSTALL THE PROPOSED WATER LINE ALONG THE EXISTING ROAD. IF IT IS NECESSARY TO REMOVE ANY OF THE ROAD PAVEMENT TO INSTALL THE PROPOSED WATER LINE, THE CONTRACTOR SHALL RESTORE THE ROAD PAVEMENT TO THE CONDITION THAT IT WAS IN BEFORE CONSTRUCTION OF THE PROPOSED WATER LINE. CONTRACTOR SHALL VIDEOTAPE THE PROJECT CORRIDOR TO DOCUMENT THE CONDITION OF THE PAVEMENT PRIOR TO CONSTRUCTION. THE COST OF RESTORING ANY PAVEMENT THAT THE CONTRACTOR REMOVES AND THE COST OF VIDEOTAPING THE PROJECT CORRIDOR SHALL BE CONSIDERED INCIDENTAL AND SHALL BE INCLUDED IN THE PRICE BID FOR THE PROPOSED WATER LINE.
 4. THE 2" AUTOMATIC FLUSH VALVE SHALL BE A HYDRO-GUARD AUTOMATIC FLUSH UNIT. FLUSH VALVE SHALL INCLUDE A COMPARTMENT WHERE DE-CHLORINATION TABLETS CAN BE PLACED. THE CONTROLLER AND PROGRAMMER COMPATIBLE WITH THIS UNIT SHALL ALSO BE INCLUDED WITH THE UNIT. A TWO-FOOT BY TWO-FOOT CONCRETE SPLASH PAD SHALL BE FURNISHED AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ALSO, SIX-INCH DIAMETER (MINIMUM) ROCK SHALL BE FURNISHED AND INSTALLED AROUND THE SPLASH PAD TWO FEET ON EACH SIDE. THE FLUSH VALVE SHALL NOT BE INSTALLED IN A DITCH OR LOW AREA."

!! CAUTION !!

THERE ARE EXISTING AND/OR PROPOSED UTILITIES IN PROJECT AREA. UTILITY INFORMATION SHOWN ON PLANS REPRESENTS APPROXIMATE LOCATIONS OF EXISTING UTILITIES AND IS NOT NECESSARILY ALL-INCLUSIVE. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT LOCATIONS OF ALL EXISTING UTILITIES AND SHALL BE REQUIRED TO PROTECT UTILITIES TO AVOID DAMAGE.

PRIOR TO ANY EXCAVATION, CONTRACTOR SHALL CONTACT DIG-TESS, TEXAS ONE CALL, LONE STAR NOTIFICATION AND OTHERS AS REQUIRED TO LOCATE EXISTING UTILITIES.

CONTRACTOR SHALL ALSO CONTACT APPROPRIATE CITY UTILITY DEPARTMENT FOR FIELD LOCATES OF MUNICIPAL INFRASTRUCTURE 48 HOURS PRIOR TO CONSTRUCTION.

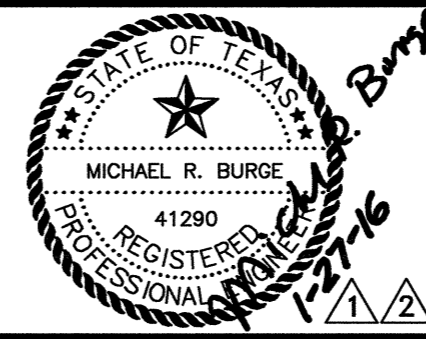
RECORD DRAWING
BASED ON CONTRACTOR MARKUPS,
NOT FIELD SURVEY.
JANUARY 2016

6			
5			
4			
3			
Δ	1/27/16	REVISED PER INFORMATION RECEIVED FROM THE CONTRACTOR	MRB
Δ	7/1/15	REVISED PER ADDENDUM NO. 2	MRB
NO.	DATE	REVISION	REVIEWED

DRAWN: BW2
DESIGN: MRB
REVIEWED: JFW
SCALE: 1" = 20'
DATE: MARCH 2014
DWG. NAME: 1592WTRPLN03

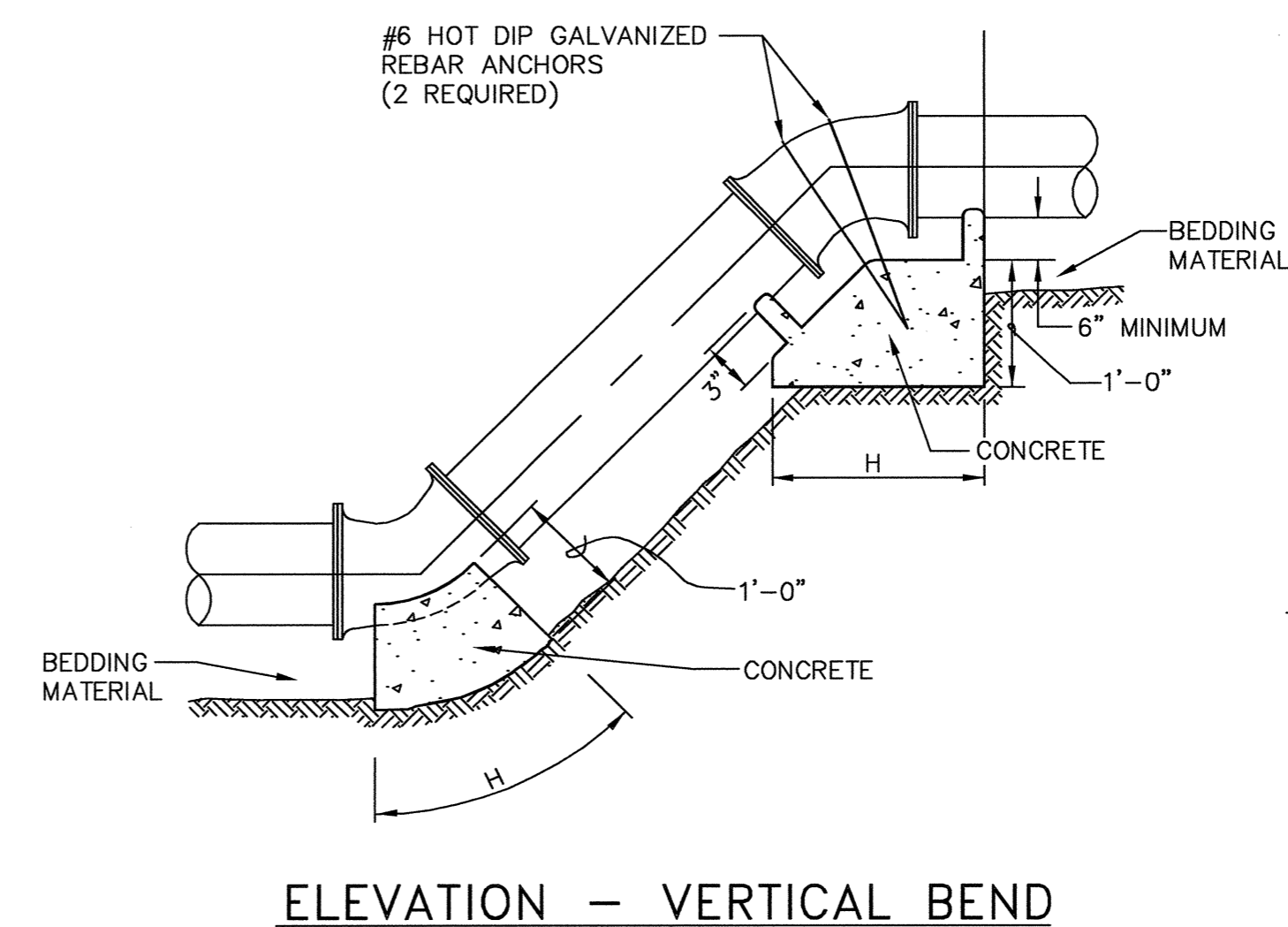
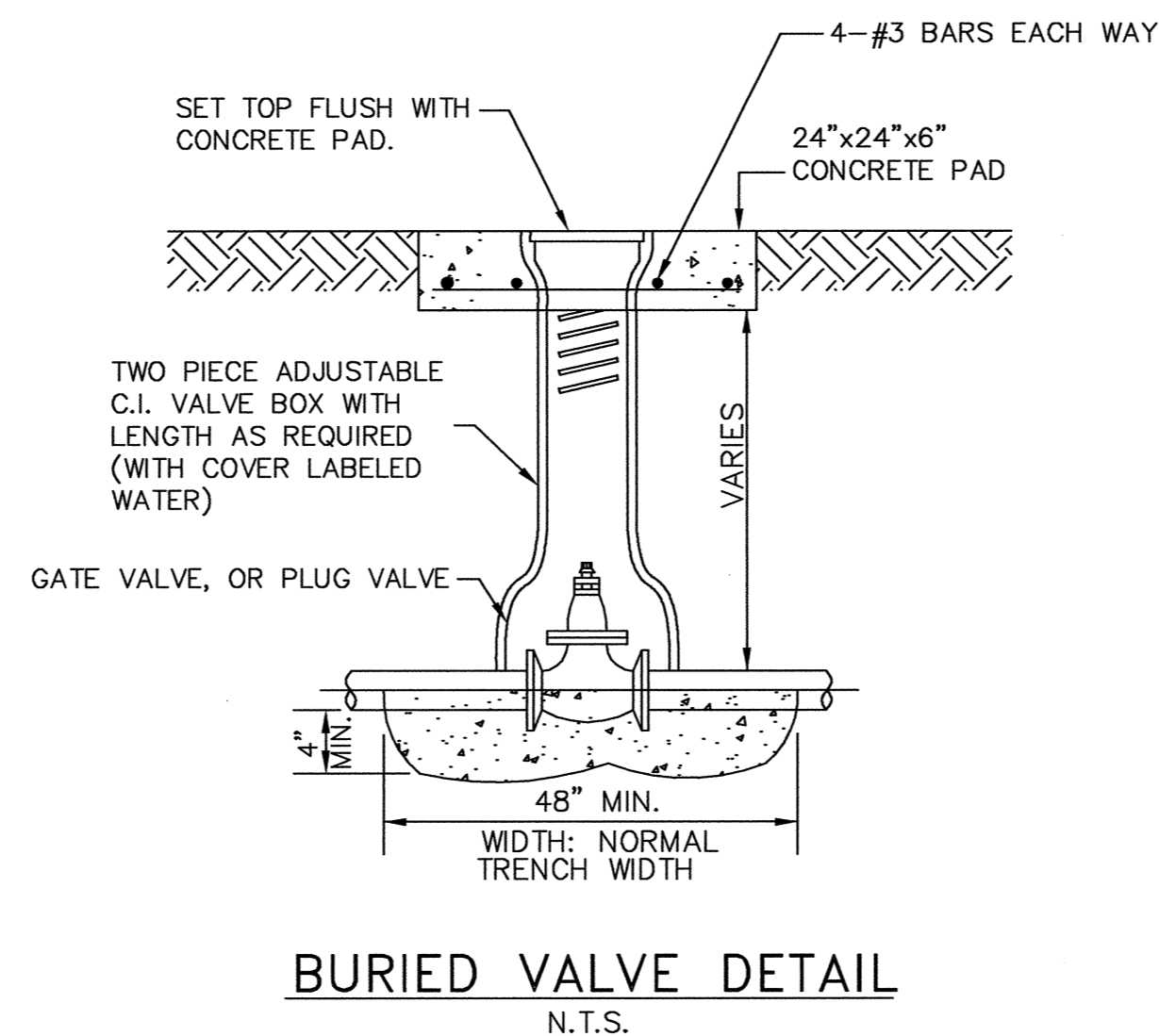


BW2 ENGINEERS, INC.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290



WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
LINE 'W-A' - STA. 20+00 TO STA. 27+36
CITY OF LUCAS

SHEET NO. 9
OF 11 SHEETS
JOB NO. 13-1592



PIPE SIZE	DEGREE OF BEND	MINIMUM CONCRETE ANCHOR BLOCK			
		EARTH (FEET)		ROCK (FEET)	
(INCHES)	(DEGREE)	"L"	"H"	"L"	"H"
6, 8 10, 12* 16**	11 1/4	1.0	1.5	1.0	1.0
	22 1/2	1.5	1.5	1.0	1.0
	45	2.0	2.0	1.5	1.5
	90	5.0	1.5	2.0	2.0

* FOR 12" LINE ADD 1 FOOT TO ALL DIMENSIONS IN THE TABLE.

** FOR 16" LINE ADD 2 FEET TO ALL DIMENSIONS IN THE TABLE.

NOTES:

1. THE ABOVE TABLE IS BASED ON 2000 PSF SOIL BEARING CAPACITY AND FOR A TEST PRESSURE OF 150 P.S.I.
2. CONCRETE FOR THRUST BLOCKING SHALL BE 2000 PSI CONCRETE.
3. VERTICAL BEND THRUST BLOCKING SHALL HAVE REINFORCING BARS NO. 4 AT 12" C-C.
4. ALL BEARING SURFACES OF THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH.
5. ALL THRUST BLOCKING SHALL BE AS INDICATED OR AS PER THE MANUFACTURE'S SPECIFICATIONS.

RECORD DRAWING
 BASED ON CONTRACTOR MARKUPS
 NOT FIELD SURVEY.
 JANUARY 2016

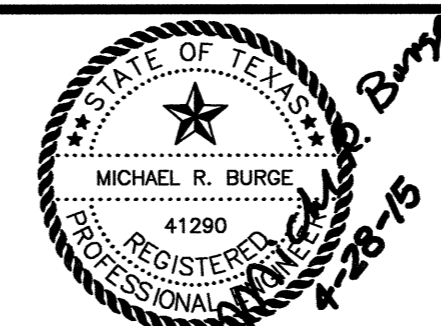
CONCRETE ANCHOR BLOCKS
N.T.S.

6			
5			
4			
3			
2			
1			
NO.	DATE	REVISION	REVIEWED

DRAWN: _____ BW2
DESIGN: _____ MRB
REVIEWED: _____ JFW
SCALE: _____ N.T.S.
DATE: _____ APRIL 2015
DWG. NAME: _____ 1592DET1

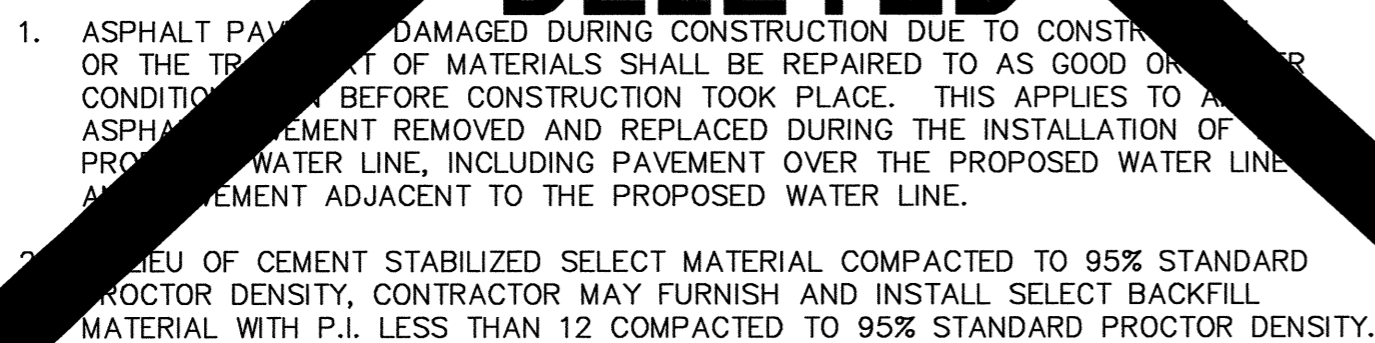


BW2 ENGINEERS, INC.
1919 S. Shiloh Road
Suite 500, L.B. 27
Garland, Texas 75042
(972) 864-8200 (T) (972) 864-8220 (F)
Firm Registration No. F-5290

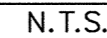


WATER SYSTEM IMPROVEMENTS
OSAGE LANE WATER LINE
GENERAL CONSTRUCTION DETAILS - SHEET 1
CITY OF LUCAS

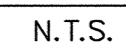
SHEET NO. 10
OF 11 SHEETS
JOB NO. 13-1592



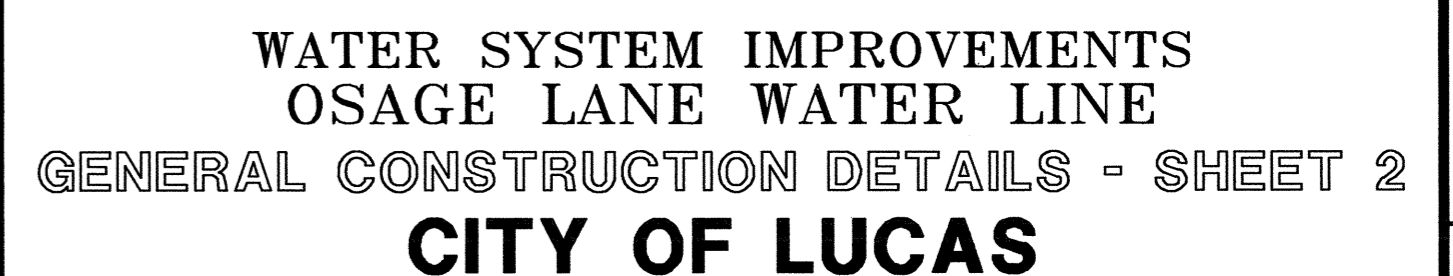
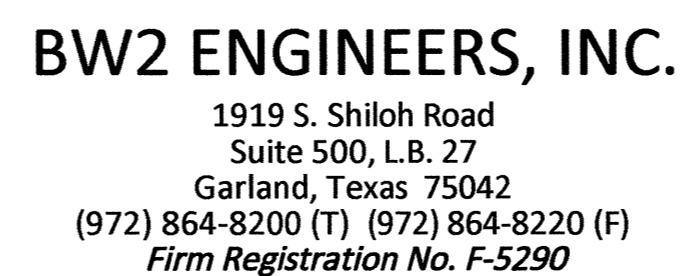
1. ALL CONSTRUCTION ACTIVITIES SHALL BE RESTRICTED TO THE EASEMENTS.
2. WHERE A BORE/TUNNELING PIT EXCEEDS FIVE (5) FEET IN DEPTH THE CONTRACTOR SHALL INSTALL SHORING OF THE PIT WALLS AS REQUIRED BY TEXAS STATE LAW (HB 662 AND HB 665) REGARDING THE SAFETY SYSTEMS TO BE USED DURING TRENCH EXCAVATION (AS STATED IN THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATIONS STANDARDS.
3. ALL BORE/TUNNELING PITS SHALL BE BACKFILLED WITHIN FORTY-EIGHT (48) HOURS OF UTILITY INSTALLATION. NO BORE/TUNNELING PIT SHALL REMAIN OPEN IN EXCESS OF SEVENTY-TWO (72) HOURS WITHOUT SHORING TO PREVENT THE CAVING OF PIT WALLS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PHYSICALLY VERIFYING ALL UTILITY CLEARANCES PRIOR TO BEGINNING INSTALLATION.
5. CONTRACTOR SHALL REMOVE UNSTABLE MATERIAL FROM THE BOTTOM OF THE BORE PITS ONCE CONSTRUCTION OF THE TUNNEL IS COMPLETE AND CARRIER PIPE HAS BEEN INSTALLED AND SHALL REPLACE THIS UNSTABLE MATERIAL WITH DRY STABLE MATERIAL THAT WILL ADEQUATELY AND SUFFICIENTLY SUPPORT THE PROPOSED PIPELINE.
6. CONTRACTOR SHALL INSTALL RACI SPACERS (OR EQUAL) IN ANNULAR SPACE BETWEEN CARRIER PIPE AND CASING PIPE.



1. UNLESS OTHERWISE NOTED, TRENCH BACKFILL AND EMBEDMENT SHALL BE AS SPECIFIED IN NTCOG SPECIFICATION ITEMS 2.1.8, 6.2.9, AND 6.2.10.
2. ALL TRENCH BACKFILL SHALL BE COMPACTED TO 95% DENSITY WHEN UNDER PAVEMENT.
3. SAND SHALL BE FREE FROM LUMPS, STONES, CLAY AND ORGANIC MATTER. ALL PARTICLES MUST PASS A NO. 8 SIEVE.
4. GRANULAR MATERIAL SHALL BE DEFINED AS FREE FLOWING RIVER RUN, SANDY MATERIAL, FREE FROM LARGE STONES, CLAY AND ORGANIC MATERIAL. THE EMBEDMENT MATERIAL WILL NOT BE SUCH THAT WHEN WET, THE FINE MATERIAL FORMS MUD OR MUCK. THE EMBEDMENT MATERIAL SHALL BE COMPOSED OF TOUGH DURABLE PARTICLES, REASONABLY FREE FROM THIN, FLAT AND ELONGATED PIECES, AND OF SUITABLE QUALITY TO INSURE PERMANENCE IN THE TRENCH. THE P.I. OF THE FINES SHALL NOT EXCEED 3. LIGHT WEIGHT AGGREGATE IS NOT ACCEPTABLE FOR GRANULAR EMBEDMENT. STONES LARGER THAN 2" IN DIAMETER ARE NOT ALLOWED.
5. STONES LARGER THAN 6" ARE NOT ALLOWED IN THE TRENCH BACKFILL.
6. THE TOP 12" (MINIMUM) OF ALL TRENCHES SHALL BE TOPSOIL. STONES LARGER THAN 2" ARE NOT ALLOWED.



DRAWN: _____ BW2
DESIGN: _____ MRB
REVIEWED: _____ JFW
SCALE: _____ N.T.S.
DATE: _____ APRIL 2015
DWG. NAME: _____ 1592DET2



SHEET NO. 11
OF 11 SHEETS
JOB NO. 13-1592