# RECORD DRAWINGS

# CONSTRUCTION PLANS FOR VILLAGE AT LA ORILLA ALBUQUERQUE, NEW MEXICO

APPROVED AS RECORD DRAWINGS DESIGN REVIEW SECTIONS CITY CONSTRUCTION ENGINEER DATE: 7/31/218

# **INDEX**

SHEET NUMBER

DESCRIPTION

**COVER SHEET** 

2A - 2C

PRELIMINARY PLAT

**GRADING PLAN** 

OVERALL PAVING PLAN

OVERALL UTILITY PLAN

**STATEMENT CERTIFICATION:** This firm, hereby certifies to the best of their knowledge that the infrastructure designed by Bohannan-Huston

(BHI) (Engineer of Record), with observation services performed by SPINELLO-DCS, LLC (Part-time), was constructed in accordance with the plans and specifications provided by the Engineer of Record, while we were On-Site.

Contractor of record and their subcontractors.

Changes and modifications agreed to have been made a part of the As-Builts/Record Drawings. All warranties, guarantees and quality of work are the responsibility of the

CERTIFYING ENGINEER DATE ACG ENGINEERING & CONSTRUCTION MANAGEMENT, LLC AUGUSTINE C. GRACE, PE



BRIAN J. MARTINEZ, A DULY QUALIFIED, REGISTERED, PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF NEW MEXICO, DO HEREBY CERTIFY THAT THE 'AS-BUILT' INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM FIELD CONSTRUCTION AND 'AS-BUILT' SURVEYS PERFORMED BY ME OR UNDER MY SUPERVISION, THAT THE 'AS-BUILT' INFORMATION SHOWN ON THESE DRAWINGS WAS ADDED BY ME OR UNDER MY SUPERVISION, AND THAT THIS 'AS-BUILT' INFORMATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. CARTESIAN SURVEYS IS NOT RESPONSIBLE FOR ANY OF THE DESIGN CONCEPTS, CALCULATIONS, ENGINEERING, OR INTENT OF THE RECORDED DRAWINGS.

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL ABIDE BY ALL LOCAL, STATE, AND FEDERAL LAWS, RULES AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION OF THESE IMPROVEMENTS.

2. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OR CONSTRUCTION OBSERVER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

3. ALL ELECTRICAL, TELEPHONE, CABLE TV, GAS AND OTHER UTILITY LINES, CABLES AND APPURTENANCES ENCOUNTERED DURING CONSTRUCTION THAT REQUIRE RELOCATION, SHALL BE COORDINATED WITH THAT UTILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY ADJUSTMENTS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR DELAYS OR INCONVENIENCES CAUSED BY UTILITY COMPANY WORK CREWS. THE CONTRACTOR MAY BE REQUIRED TO RESCHEDULE HIS ACTIVITIES TO ALLOW UTILITY CREWS TO PERFORM THEIR required work.

4. DISPOSAL SITE FOR ALL EXCESS EXCAVATION MATERIAL, AND UNSUITABLE MATERIAL SHALL BE OBTAINED BY THE CONTRACTOR IN COMPLIANCE WITH APPLICABLE ENVIRONMENTAL REGULATIONS AND APPROVED BY THE CONSTRUCTION OBSERVER. ALL COSTS INCURRED IN OBTAINING A DISPOSAL SITE AND HAUL THERETO SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE.

5. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE EXISTING UTILITY LINES WITHIN THE CONSTRUCTION AREA. ANY DAMAGE TO EXISTING FACILITIES CAUSED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE AND APPROVED BY THE CONSTRUCTION OBSERVER.

6. CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE PROPERTY AND/OR PROJECT LIMITS. ANY DAMAGE TO ADJACENT PROPERTIES RESULTING FROM THE CONSTRUCTION PROCESS IS THE RESPONSIBILITY OF THE CONTRACTOR. ANY COSTS INCURRED FOR REPAIRS SHALL BE THE COST OF THE CONTRACTOR.

7. OVERNIGHT PARKING OF CONSTRUCTION EQUIPMENT SHALL NOT OBSTRUCT DRIVEWAYS OR DESIGNATED TRAFFIC LANES. THE CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIAL WITHIN THE PUBLIC RIGHT-OF-WAY.

8. THE CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FOR THE PROJECT PRIOR TO COMMENCING CONSTRUCTION (I.E. BARRICADING, SURFACE DISTURBANCE).

9. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE AT HIS EXPENSE ANY AND ALL PROPERTY CORNERS DESTROYED DURING CONSTRUCTION. ALL PROPERTY CORNERS MUST BE RESET BY A REGISTERED LAND SURVEYOR.

10. ALL PERMANENT PAVEMENT MARKING AND TRAFFIC SIGNING SHALL BE FURNISHED AND PLACED BY THE CONTRACTOR PER PLAN.

11. THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF ALBUQUERQUE, DMD CONSTRUCTION COORDINATION DIVISION, PRIOR TO BEGINNING ANY CONSTRUCTION WORK ON OR ADJACENT TO EXISTING STREETS.

12. ALL BARRICADES AND CONSTRUCTION SIGNING SHALL CONFORM TO APPLICABLE SECTIONS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), U.S. DEPARTMENT OF TRANSPORTATION, LATEST EDITION.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING CONSTRUCTION SIGNAGE UNTIL THE PROJECT HAS BEEN ACCEPTED BY THE CITY OF ALBUQUERQUE. THE CONTRACTOR SHALL VERIFY THE PROPER LOCATION OF ALL BARRICADING AT THE END AND BEGINNING OF EACH DAY.

14. ALL SAWCUT PAVEMENT SHALL HAVE A UNIFORM EDGE, WHEN ABUTTING NEW ASPHALT (ONLY), EDGE SHALL BE SPRAYED WITH TACK.

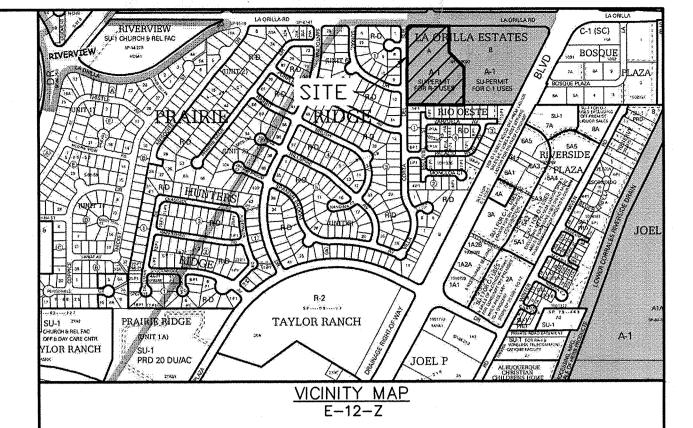
15. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ANY DAMAGE TO EXISTING PAVEMENTS. SIGNAGE, PAVEMENT MARKINGS, CURB & GUTTER, DRIVE PADS, WHEELCHAIR RAMPS, AND SIDEWALK DURING CONSTRUCTION, APART FROM THOSE SECTIONS INDICATED FOR REMOVAL ON THE PLANS AND SHALL REPAIR OR REPLACE PER COA STANDARDS, AT HIS OWN EXPENSE.

17. AN SO 19 PERMIT IS REQUIRED TO PLACE ANY MATERIAL ON OR AROUND A STORM DRAIN INLET IN THE CITY RIGHT-OF-WAY THAT WOULD INTERFERE WITH THE INLET RECEIVING STORM WATER PER THE ENGINEER'S DESIGN. CITY PERSONNEL MAY REMOVE THIS MATERIAL AT ANY TIME WITHOUT NOTICE. THE PREFERRED BMP IS TO REMOVE SEDIMENT/POLLUTANTS ON THE PROPERTY WHERE CONSTRUCTION ACTIVITY

18. ALL EXCAVATION, TRENCHING, AND SHORING ACTIVITIES MUST BE CARRIED-OUT IN ACCORDANCE WITH OSHA 29 CFR 1926.650 SUBPART P.

19. CONTRACTOR WILL ENSURE THE ASPHALT HAS A SMOOTH, UNIFORM EDGE WHEN REMOVING AND REPLACING CURB AND GUTTER. IF THE ASPHALT EDGE IS NOT SMOOTH AND UNIFORM, CONTRACTOR WILL SAW CUT AND REPLACE A ONE-FOOT STRIP OF ASPHALT ALONG THE FULL SECTION BEING REPLACED; REFER TO COA STANDARD DRAWING # 2465 WITH THE APPROPRIATE PAVING SECTION BASED ON ROADWAY CLASSIFICATION.

Bohannan A Huston



NOTICE TO CONTRACTORS

1. AN EXCAVATION/CONSTRUCTION PERMITS WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN THE CITY

2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION AS REVISED THROUGH UPDATE #9.

3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM (260-1990) FOR LOCATION OF EXISTING UTILITIES.

PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL OBSTRUCTIONS, SHOULD A CONFLICT EXIST. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

5. SEVEN (7) WORKING DAYS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO CONSTRUCTION COORDINATION DIVISION A DETAILED CONSTRUCTION SCHEDULE. TWO (2) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A BARRICADING PERMIT FROM THE CONSTRUCTION COORDINATION DIVISION, CONTRACTOR SHALL NOTIFY THE CONSTRUCTION COORDINATION ENGINEER (924-3400) PRIOR TO OCCUPYING AN INTERSECTION. REFER TO SECTION 19 OF THE GENERAL CONDITIONS OF THE STANDARD SPECIFICATIONS.

6. ALL WORK AFFECTING ARTERIAL ROADWAYS MAY REQUIRE TWENTY-FOUR HOUR CONSTRUCTION.

7. ALL STREET STRIPING ALTERED OR DESTROYED SHALL BE REPLACED WITH PLASTIC REFLECTORIZED PAVEMENT MARKING BY CONTRACTOR TO THE SAME LOCATION AS WAS EXISTING, OR AS INDICATED BY THIS PLAN SET.

8. CONTRACTOR SHALL NOTIFY THE ENGINEER NOT LESS THAN SEVEN (7) DAYS PRIOR TO STARTING WORK IN MONUMENTS. CONTRACTOR SHALL NOT DISTURB PERMANENT SURVEY MONUMENTS WITHOUT THE CONSENT OF THE IS MADE IN THE FINISHED ELEVATIONS OF THE PAVEMENT OF ANY ROADWAY IN WHICH A PERMANENT SURVEY MONUMENT IS LOCATED, CONTRACTOR SHALL, AT HIS OWN EXPENSE, ADJUST THE MONUMENT COVER TO THE NEW GRADE UNLESS OTHERWISE SPECIFIED. REFER TO SECTION 4.4 OF THE GENERAL CONDITIONS OF THE STANDARD SPECIFICATIONS.

9. CONTRACTOR SHALL RECORD DATA ON ALL UTILITY LINES AND ACCESSORIES AS REQUIRED BY ABCWUA FOR THE PREPARATION OF "AS CONSTRUCTED" DRAWINGS. CONTRACTOR SHALL NOT COVER UTILITY LINES AND ACCESSORIES UNTIL ALL DATA HAS BEEN RECORDED.

10. CONTRACTOR SHALL MAINTAIN A GRAFFITI-FREE WORK SITE. CONTRACTOR SHALL PROMPTLY REMOVE ANY GRAFFITI FROM ALL EQUIPMENT, WHETHER PERMANENT OR TEMPORARY.

11. THE CONTRACTOR SHALL COORDINATE WITH THE WATER AUTHORITY SEVEN (7) DAYS IN ADVANCE OF PERFORMING WORK THAT WILL AFFECT THE PUBLIC WATER OR SANITARY SEWER INFRASTRUCTURE. WORK REQUIRING SHUTOFF OF WELL COLLECTORS, TRANSMISSION LINES, OR FACILITIES DESIGNATED AS MASTER PLAN FACILITIES MUST BE COORDINATED WITH THE WATER AUTHORITY 14 DAYS IN ADVANCE OF PERFORMING SUCH WORK. ONLY WATER AUTHORITY CREWS ARE AUTHORIZED TO OPERATE PUBLIC

VALVES. SHUTOFF REQUESTS MUST BE MADE ONLINE AT http://www.abcwua.org/Water\_Shut\_Off\_and\_Turn\_on\_Procedures.aspx.

THE FOLLOWING NOTES ALSO APPLY WHEN CHECKED

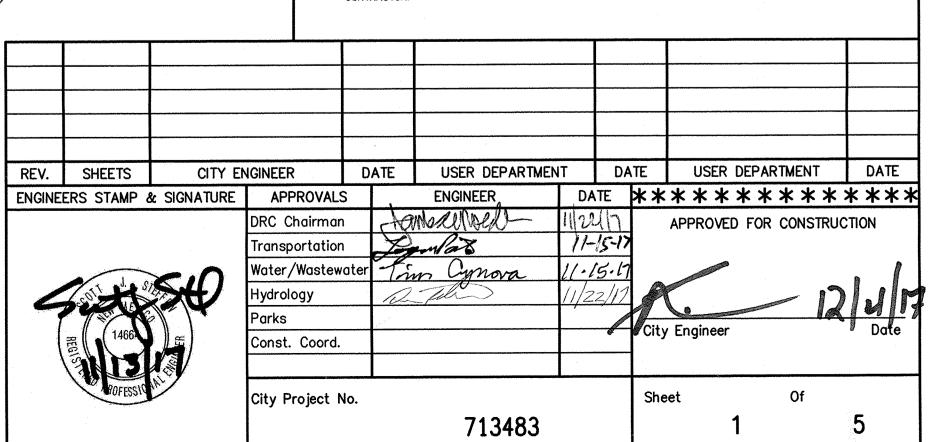
ALL UTILITIES AND UTILITY SERVICE LINES SHALL BE INSTALLED PRIOR TO PAVING.

BACKFILL COMPACTION SHALL BE ACCORDING TO SPECIFIED STREET USE. SIDEWALKS AND WHEELCHAIR RAMPS WITHIN THE CURB RETURNS SHALL BE CONSTRUCTED WHEREVER A NEW

IF CURB IS DEPRESSED FOR A DRIVEPAD, THE DRIVEPAD SHALL BE CONSTRUCTED PRIOR TO ACCEPTANCE OF

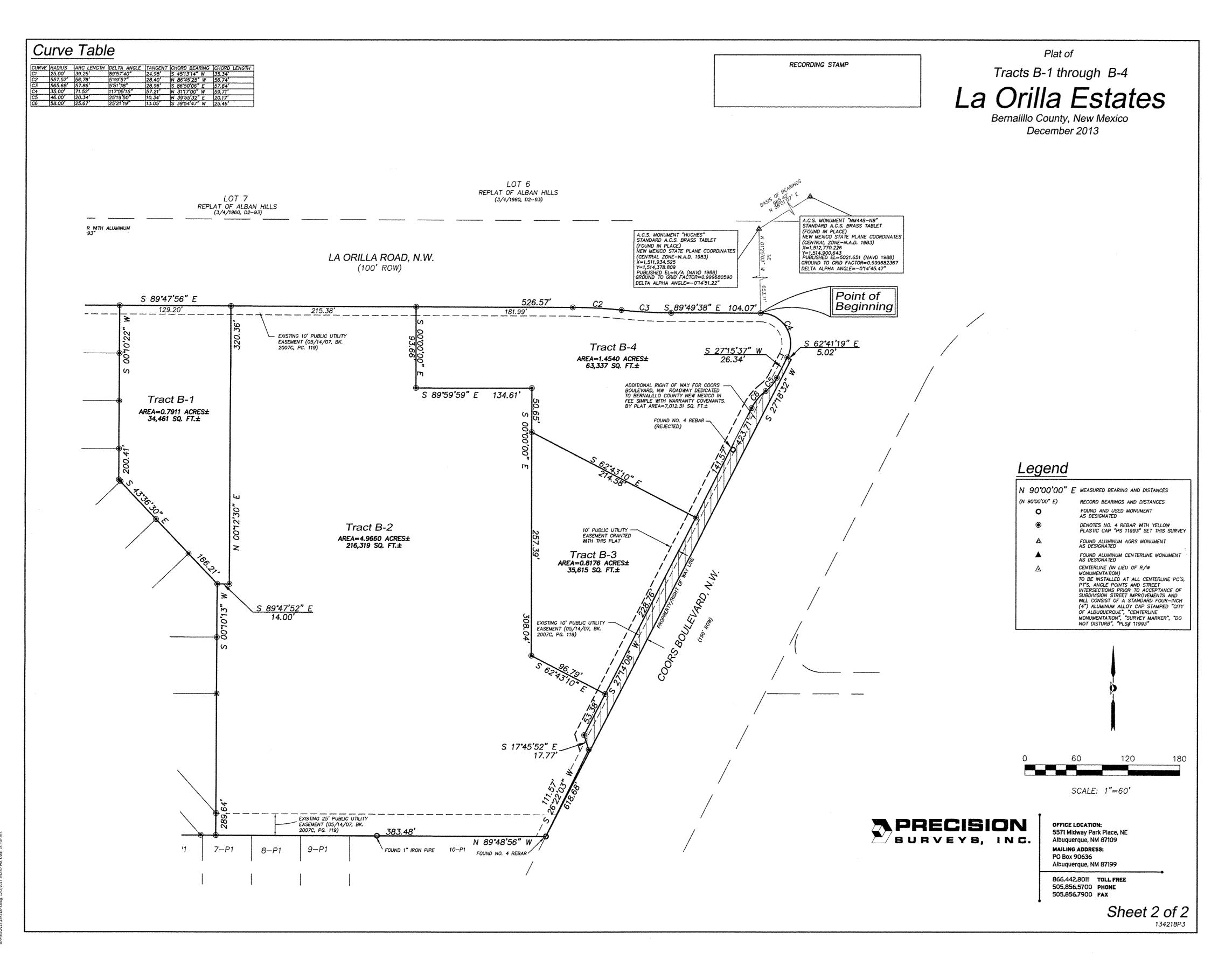
ALL STORM DRAINAGE FACILITIES SHALL BE COMPLETED PRIOR TO FINAL ACCEPTANCE.

THE REQUESTOR OR DEVELOPER SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ALL CURB AND GUTTER OR SIDEWALK DAMAGED AFTER APPROVAL BY THE CITY ENGINEER OF WORK COMPLETED BY THE



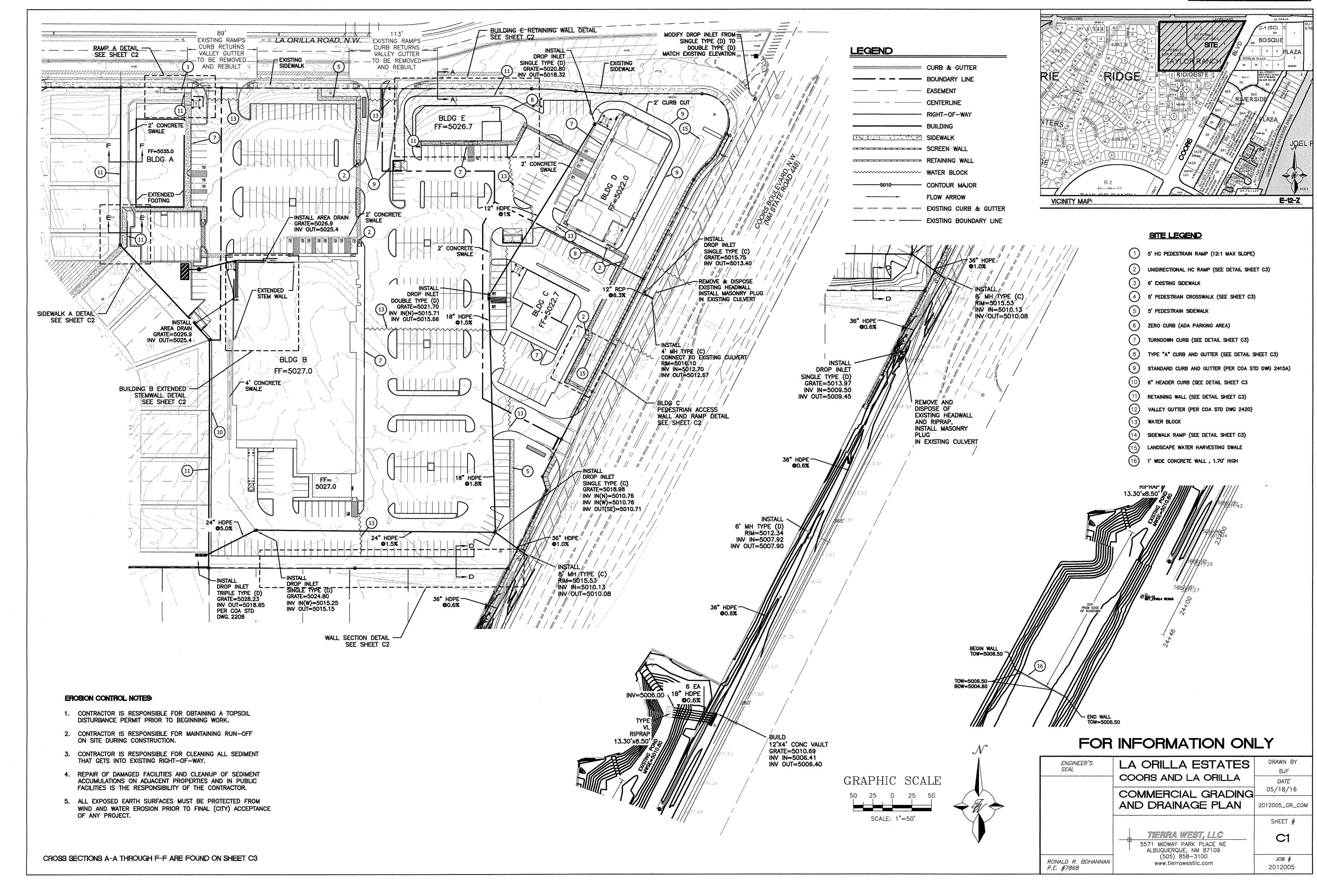
CURB AND GUTTER.

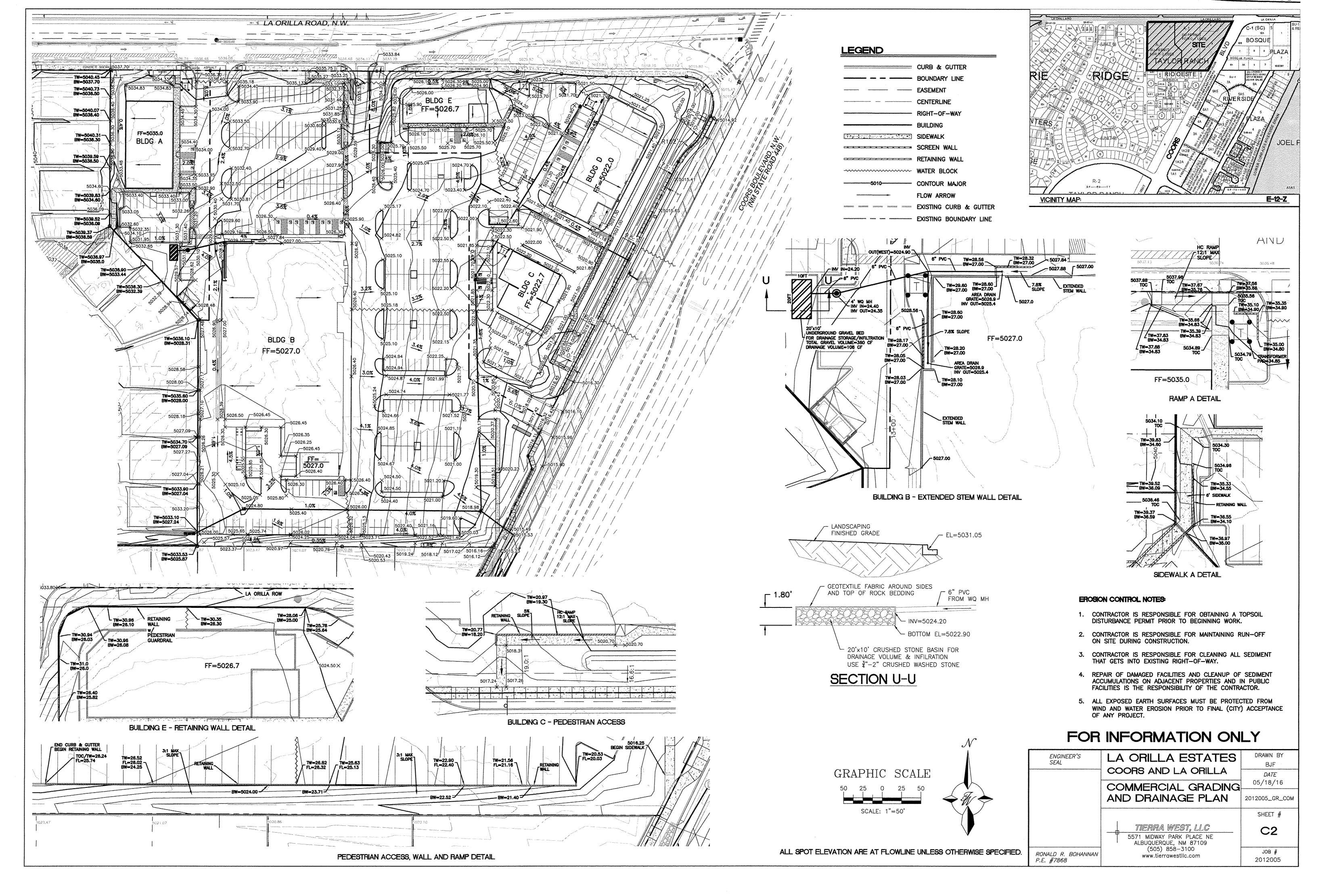
P:\20170398\CDP\Plans\COA PWO\20170398\_CV.dwg

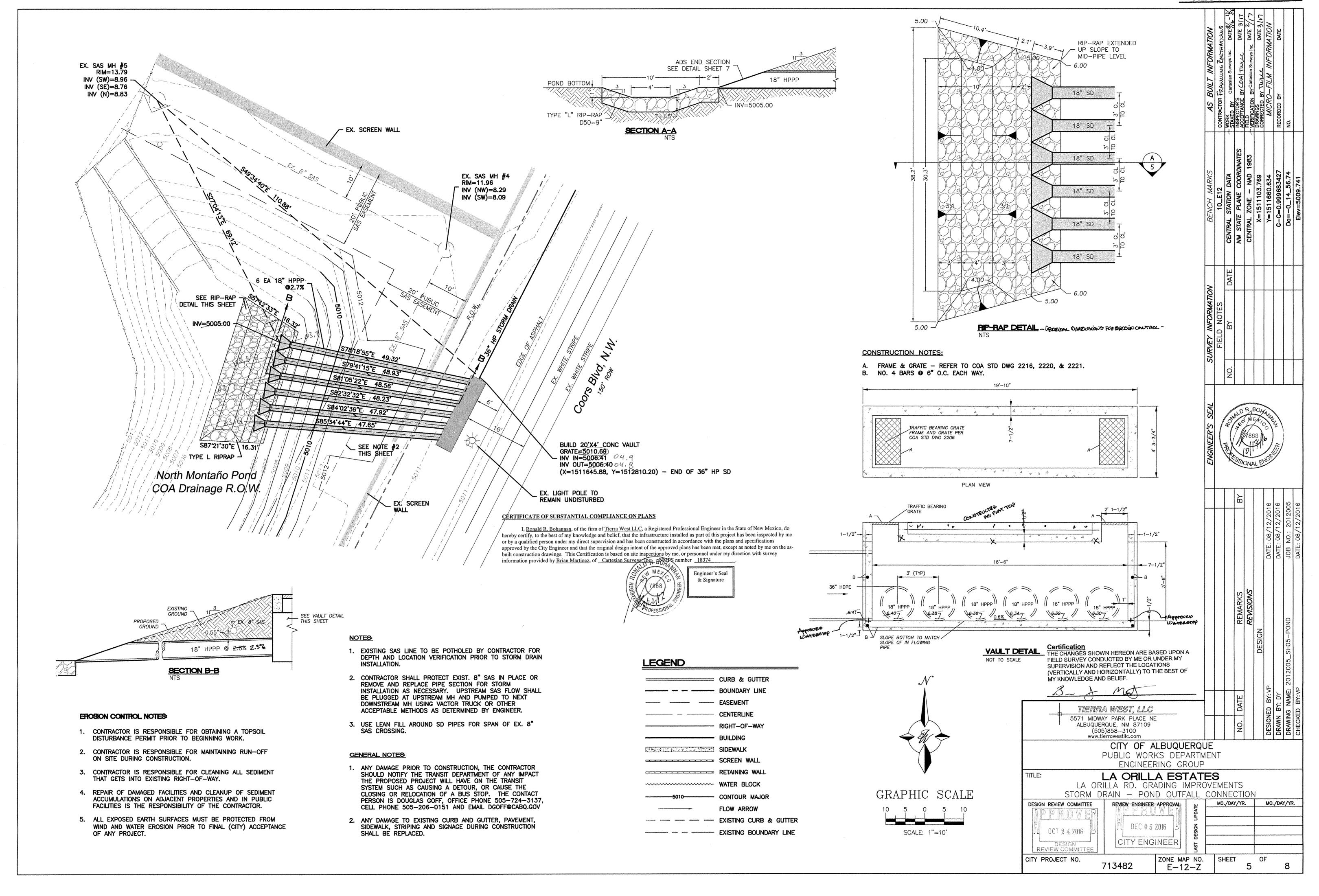


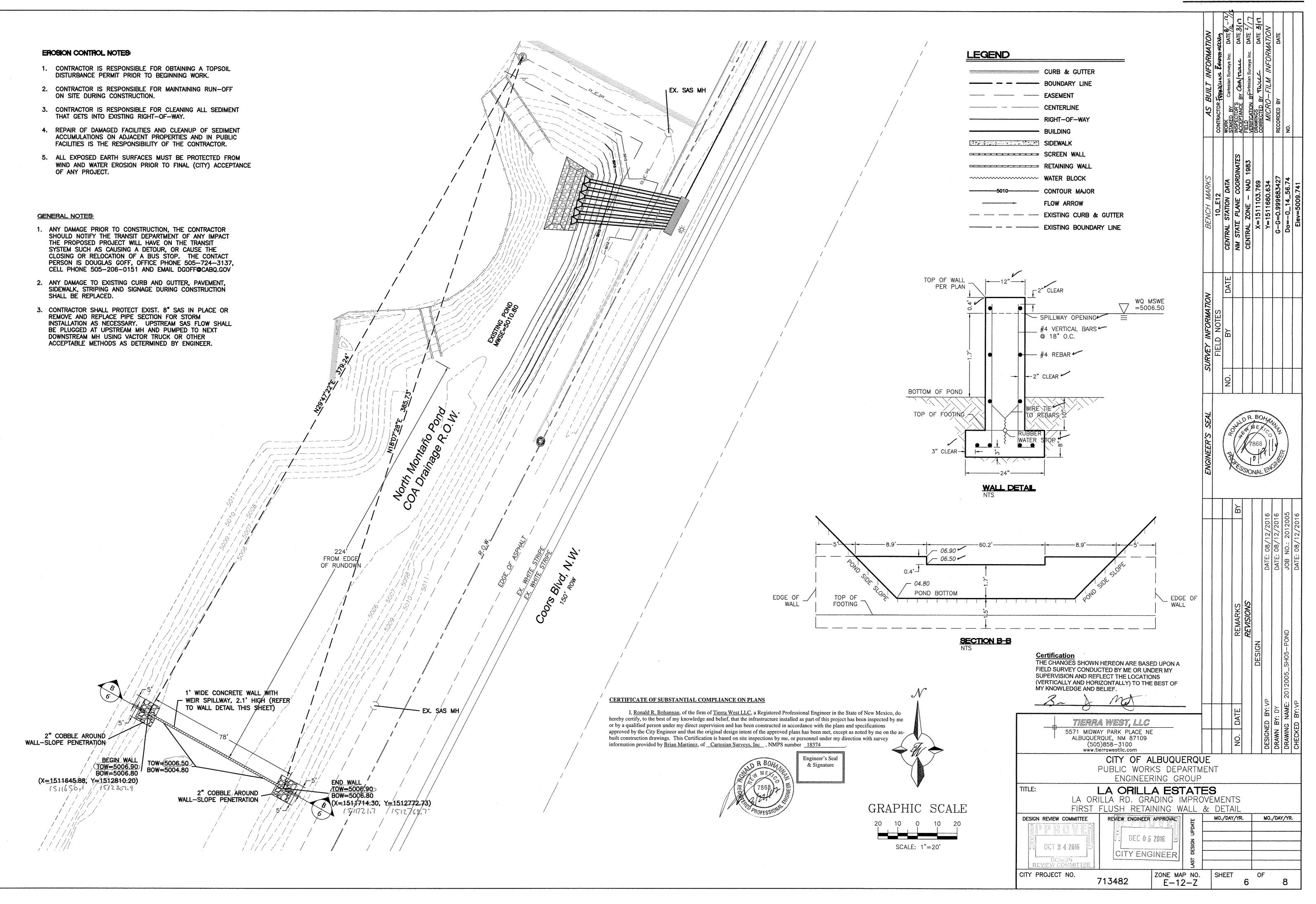
| NO   DATE  |   | *************************************** |   |             |                             |           | <b>\</b> /    |                        |                  | <u> </u>            | <u> </u>         |
|--|---|---|---|-------------|-----------------------------|-----------|---------------|------------------------|------------------|---------------------|------------------|
| REMARKS  |   | 4S PIIIT INFORMATION                    | CONTRACTOR  | DATE 8/1-13 | DATE 3(17                   | s InDATE  |               | MICRO-FILM INFORMATION |                  | NO.                 |                  |
| ENGINEER'S SEAL   SURVEY INFORMATION   |   | BENCH MARKS                             | 10 E12  |             | NIM STATE PLANE COORDINATES | - NAD     | X=1511103.769 | Y=1511660.634          | G-G=0.999683427  | Da=-0_14_56.74      | Elev=5009.741    |
| REMARKS   BY   |   | SURVEY INFORMATION                      | FIELD NOTES   | BY          |                             |           |               |                        |                  |                     |                  |
| REMARKS  REVISIONS  DESIGN  DESIGN  DATE: 08/11/2016  DATE: 08/11/2016  DATE: 08/11/2016  DATE: 08/11/2016   |   | FNGINFFR'S SFAI                         |   | RO          |                             |           | 368           | ) <sub>II</sub> .      |                  |                     |                  |
| DESIGN DESIGN  |   |   |   |             | BY                          |           |               | DATE: 08/11/2016       | DATE: 08/11/2016 | JOB NO.: 2012005    | DATE: 08/11/2016 |
| DESIGNED BY: VP DRAWING NAME: 2012 CHECKED BY: VP C |   |   | туру де де де при |             | REMARKS                     | REVISIONS |               |                        |                  |                     |                  |
| CITY OF ALBUQUERQUE  | 5571 MIDWAY PARK PLACE NE ALBUQUERQUE, NM 87109 (505)858-3100 www.tierrawestllc.com |   |   |             | -                           |           |               | DESIGNED BY: VP        | DRAWN BY: DY     | DRAWING NAME: 2012( | CHECKED BY:VP    |
| g gg a spanner of the first that the | LA ORILLA RD. GRADING IMP<br>PLAT   | PROV                                    | EM  |             |                             |           |               | MO.,                   | /DAY             | ′/YR.               |                  |
| LA ORILLA RD. GRADING IMPROVEMENTS PLAT  |   | DESIGN UPDAT                            |   |             |                             |           |               |                        | 4                |                     |                  |
| LA ORILLA RD. GRADING IMPROVEMENTS PLAT  |   | TAST                                    |   |             |                             | ļ         |               |                        |                  |                     |                  |

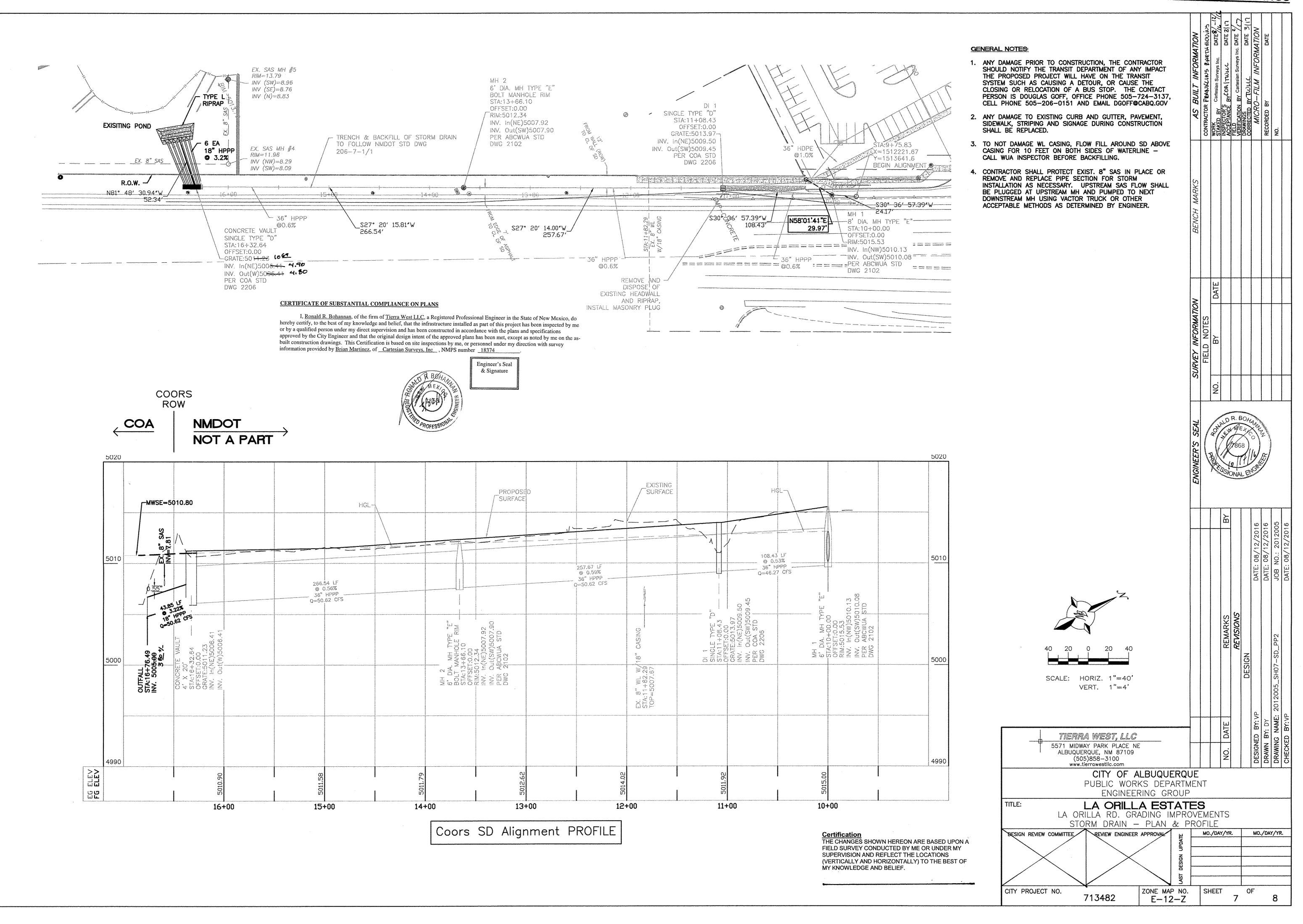
the second secon











# ADS HP STORM - PIPE SPECIFICAITIONS AND STANDARD DETAIL

# PART 1 - GENERAL

### 1.1 Related Requirements

A. Section - Submittals: Shop Drawings, Product Data, and Samples

# B. Section - Earth Moving: Excavation and Fill

A. This section includes gravity-flow storm drainage outside the building, with the following components:

# a. Drainage piping, fittings, and accessories

# 1.3 Reference Standards

A. American Society for Testing and Materials (ASTM)

- a. ASTM D2321 Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- b. ASTM D3212 Joints for Drain and Sewer Plastic Pipes Using
- Flexible Elastomeric Seals c. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- d. ASTM F2736 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall pipe And Double Wall Pipe
- e. ASTM F2764 30 to 60 in. [300 to 1500 mm] Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Storm Sewer
- f. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-

### 1.4 Definitions

# A. PP - Polypropylene Pipe

B. Piping System: All products associated with the drainage system including but not limited to pipe, fittings, drainage structures, geotextile, best management practice products and storage systems.

### 1.5 Performance Requirements

All pipe supplied shall meet the minimum joint performance requirements as defined herein and as further defined in the joint performance requirements of this

A. Watertight Gravity-Flow, Non-Pressure, Drainage-Piping shall pass a 10.8 psi (104kPa), laboratory pressure test for 10 minutes with no visible leaks at the joint or pipe wall. Piping shall pass same tests as above but with an axial joint misalignment of not less than 1 degree.

The following shall be submitted by contractor in accordance with this technical

# Submittal Procedures:

### A. Product Data for the following:

### a. Pipe and Fittings Product specifications

- Installation procedures

B. Products submitted as approved equal must be submitted at least 2 weeks prior to project bid opening and must be approved by project engineer. Submittal for approved equal product must contain a signed letter from an executive officer of the manufacturer stating product is equivalent to all applicable requirements of this specification and shall include all items listed in section 1.6 of this

1.7 Delivery, Storage, and Handling

A. All pipe and fittings shall be delivered to the site and unloaded with handling that conforms to the manufacturer's instructions for reasonable care. Pipe shall not be rolled or dragged over gravel or rock during handling. The Contractor shall take necessary precautions to ensure the method used in lifting or placing the pipe does not induce undue stress fatigue in the pipe.

# PART 2 - PRODUCTS

# 2.1 Corrugated Polypropylene (PP) Pipe

# 2.1.1 General

A. Twelve-through 30-inch (300 through 750 mm) pipe shall be polypropylene or pre-approved equal. Pipe supplied shall be smooth interior and annular exterior corrugated polypropylene (PP) pipe meeting the requirements of ASTM F2736 for respective diameters. The pipe supplied shall be watertight as defined in the joint performance requirements of this specification.

Thirty- through 60-inch (750 through 1500 mm) pipe shall be polypropylene or pre-approved equal. Pipe supplied shall be with annular inner corrugations and smooth interior and exterior surfaces. corrugated polypropylene (PP) pipe meeting the requirements of ASTM F2764 for respective diameters. The pipe supplied shall be watertight as defined in the joint performance requirements of this

B. Virgin material for 12- through 60-inch pipe and fitting production shall be an impact modified copolymer meeting the material requirements of ASTM F2736 and ASTM F2764 for respective pipe diameters.

# 2.1.2 Joint Performance and Pipe Stiffness

Watertight joints shall be bell-and-spigot meeting the watertight requirements of ASTM F2736 and ASTM F2764. Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

### Pipe stiffness - Minimum pipe stiffness at 5% deflection shall meet the requirements per ASTM F2736 and ASTM F2764.

A. Fittings shall conform to ASTM F2736 or ASTM F2764. Joint shall meet waterlight joint performance requirements of ASTM D3212. Bell & spigot connections shall utilize a spun-on, welded or integral bell and spigot with gaskets meeting ASTM F477. Inserta tee type fittings shall be allowed upon approval by the Engineer.

B. Repair couplers may be utilized to connect field-cut pipe,

# 2.1.4 Installation

Pipe installation shall be in accordance with Section 3 of this specification and the product manufacturer's published installation guides.

# PART 3 - EXECUTION

### 3.1 Earthwork

A. Excavation, trenching, and backfilling shall be as specified in Section titled "Excavation and Fill

### 3.2 Identification

A. For all stormwater and subsurface drainage piping, install warning tape directly over pipe and at outside edges of underground structures

### a. Detectable warning tape shall be installed over nonferrous piping and over edges of underground structures.

### 3.3 Piping Inspection

A. Piping, fittings, and drainage structures shall be inspected prior to installation and any defective or damaged product shall be replaced.

### 3.3.2 Corrugated Polypropylene Pipe and Fittings

- A. Any pipe, fittings, or drainage structures with cuts, punctures, or other damage the interior or exterior shall be rejected and replaced.
- B. Any pipe, fittings or drainage structures with damaged ends or joints, which would prevent proper sealing of the joints, shall be rejected and replaced,

# 3.4 Piping, Fitting, and Drainage Structure Installation

### 3.4.1 General

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm and drainage piping system. Location and arrangement of piping layout take design considerations into account. Install piping system as indicated herein and as directed by the product manufacturer, to extent practical. Where specific installation procedure is not indicated, follow product manufacturer's written instructions.

B. All products shall be inspected for defects and cracks before being lowered into the trench, piece by piece. Any defective, damaged or unsound pipe, fitting or drainage structure or any product that has had its grade disturbed after laying shall be taken up and replaced. Open ends shall be protected with a pipe pluc to prevent earth or other material from entering the pipe during construction. The interior of the pipe shall be free from dirt, excess water and other foreign materials as the pipe laying progresses and left clean at the completion of the

C. Install piping system beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions. Follow product manufacturer's instructions for the use of lubricants, cements, and other special installation requirements.

D. Use Manholes or Catch Basins for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing

E. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited

# 3.4.2 Trench Excavation

### 3.4.2.1 Excavation

A. Excavate trenches to ensure that sides will be stable under all working conditions. Slope trench walls or provide supports in conformance with all local and national standards for safety. Open only as much trench as can be safely maintained by available equipment. Backfill all trenches as soon as practicable.

B. Where trench walls are stable or supported, provide a width sufficient, but no greater than necessary, to ensure working room to properly and safely place and compact haunching and other embedment materials. The space between the pipe and trench wall must be wider than the compaction equipment used in the pipe zone. Minimum width shall be not less than the greater of either the pipe outside diameter plus 16 in. or the pipe outside diameter times 1.25, plus 12 in. In addition to safety considerations, trench width in unsupported, unstable soils will depend on the size and stiffness of the pipe, stiffness of the embedment and insitu soil, and depth of cover.

C. When supports such as trench sheeting, trench jacks, trench shields or boxes are used, ensure that support of the pipe and its embedment is maintained throughout installation. Ensure that sheeting is sufficiently tight to prevent washing out of the trench wall from behind the sheeting. Provide tight support of trench walls below viaducts, existing utilities, or other obstructions that restrict driving of sheeting.

# 3.4.2.2 Dewatering

A. Do not lay or embed pipe fittings or drainage structures in standing or running water. At all times prevent runoff and surface water from

B. When water is present in the work area, dewater to maintain stability of in-situ and imported materials. Maintain water level below nine bedding and foundation to provide a stable trench bottom. Use, as appropriate, sump pumps, well points, deep wells, geofabrics, perforated underdrains, or stone blankets of sufficient thickness to remove and control water in the trench. When excavating while depressing ground water, ensure the ground water is below the bottom of cut at all times to prevent washout from behind sheeting or sloughing of exposed trench walls. Maintain control of water in the trench before, during, and after pipe system installation and until embedment is installed and sufficient backfill has been placed to prevent flotation of the pipe, fitting, or drainage structures. To preclude loss of soil support, employ dewatering methods that minimize removal of fines and the creation of voids in in-situ

# 3.4.2.3 Removal of Rock

A. Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between exposed rock and the pipe of at least 12 inches (0,3m). Where Bell-and-Spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe.

# 3.4.2.4 Removal of Unstable Material

A. Where wet or otherwise unstable soil incapable of properly supporting the pipe system, as determined by the Engineer, is encountered in the bottom of a trench, such material shall be removed to at least 24 inches below bottom of pipe and replaced to the proper grade with select granular material, compacted as directed by the engineer. When emoval of unstable material is due to the fault or neglect of the Contractor while performing shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Owner.

# 3.4.3 Bedding

A. A stable and uniform bedding shall be provided for the pipe and any protruding features of its joint and/or fittings. The middle of the bedding, equal to one-third of the pipe outside diameter, shall be loosely placed while the remainder shall be compacted to a minimum of 90% of maximum density per ASTM D1557, or as shown in the plans. Pipe bedding shall be a minimum of 4" - 6" in thickness. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.

# 3,4.4 Placing Pipe

A. Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and the pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches shall be provided as directed by the engineer; see dewatering

A. Joints shall be constructed as described herein and in accordance with manufacturer's installation instructions

B. All Bell-and-Spigot pipe joints shall be thoroughly cleaned. Joint lubricant, supplied by the manufacturer, shall be liberally applied to entire interior of bell and gasket on spigot prior to assembly.

# 3.4.6 Backfilling

### 3.4.6.1 General

Backfill placement and compaction shall be constructed in accordance with the specifications herein and the product manufacturer's published installation guides.

### 3.4.6.2 Backfilling Pipe in Trenches

After the pipe and pipe system have been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layer depths to ensure minimum compaction density is obtained evenly throughout the backfill material. The backfill shall be brough up evenly on both sides of pipe and pipe system for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below.

# 3.4.6.3 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, fill shall be constructed to at least 6 inches above the top of proposed pipe prior to trench excavation. Fill shall be placed in 12 inch lifts and shall be compacted to achieve 90% of maximum density, or as shown on plans. Once fill is placed and compacted pipe trench shall be constructed in accordance with the Trench Excavation section of this specification.

### 3.4.6.4 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

# 3.4.6.5 Compaction

### 3.4.6.5.1 General Requirements

Non-cohesive materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, non-cohesive soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

# 3.4.6.5.2 Minimum Density

Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

a. Under airfield and heliport pavements, paved roads, streets, parking areas, and similar-use pavements including adjacent shoulder areas, the density shall be not less than 90 percent of maximum density as determined by ASTM D 1557, up to the elevation where requirements for pavement subgrade materials and compaction shall control.

# 3.4.6.6 Determination of Density

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval by the Engineer Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D1557 except that mechanical tampers shall be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with ASTM D2167 or ASTM D2922. Test results shall be furnished to the Engineer.

# 3.5 Repair Methods

# 3.5.1 External Methods

Slip Couplings 12- through 30-inch (300 - 750 mm), provides a watertight repair that will meet most pressure testing requirements, when installed correctly. The slip coupling uses PVC bells with gaskets. The gaskets are placed in the valleys on either side of the section to be repaired and slip couplings are then slid over the gaskets. Due to the exterior gasket, the slip coupling can only be used on pipe with a corrugated exterior. PVC slip couplings are most commonly used with watertight smooth interior thermoplastic pipe products. Note: This repair method cannot be used with the triple wall, smooth exterior profile pipe.

Large Diameter Repair Coupler 12- through 60-inch (300 - 1500 mm) are ideal for repairs and alterations of large diameter sewer pipe. Repair couplers similar to those provided by Mission Rubber Company LLC. Fernco® or equal may be used on HP pipe. The couplers are used by removing the damaged section of pipe, replacing it with a new section and then sliding the coupler back around the

joint, similar to the slip coupling above. The couplers stainless steel bands are then tightened to the manufactures recommendations. These rubber couplings are capable of meeting watertight field test requirements when installed per the manufacturer's recommendations

Concrete Collar 12through 60-inch (300 -1500 mm), provides a water tight repair testable to most hydrostatic test with an appropriate leakage requirement. Installing a concrete collar involves building a form around the area to be repaired and encasing it in concrete. A Mar Mac

Polyseal Pipe Coupler is wrapped around the repair area or joint prior to pouring the collar to keep the concrete from seeping into the pipe. WaterStop gaskets are installed outside of the Polyseal coupler towards the outside edge of the concrete collar. Typically, approximately 6" (0.15m) is excavated beneath the pipe to allow for proper application of the Polyseal counter and concrete encasement. If the pipe itself is damaged, the damaged area shall be removed and a replacement pipe section spliced in prior to pouring the collar. This repair option may be employed for either dual wall or triple wall sanitary

# 3.5.2 Internal Methods

a welded repair will be suitable

Internal mechanical repair products generally consist of a flexible cylindrical gasket sleeve, which is expanded to conform to the inner wall of the pipe. The feasibility of this repair method depends on the size of the damaged section or ioint and available access into the pipe. Internal mechanical seals slightly restrict the inside diameter of the pipe. This should be considered when assessing the risk of debris obstruction.

NPC Internal Joint Seal, 18- through 60-inch (450 - 1500 mm), consists of an EPDM rubber seal and stainless steel bands. The rubber seal is inserted into the pipe and positioned over the joint. A torque wrench is used to expand the bands against the inner wall of the pipe. The Internal Joint Seal is designed to seal joints - not repair damaged pipe sections. The damaged area of the pipe must be removed and a replacement section spliced in if necessary in order to use the Internal Joint Seal. This system may provide a watertight joint when installed as recommended. The manufacture should be contacted to verify the product meets the specific application requirements including test requirements, if specified. If pressure tests are required, NPC should be contacted to ensure that the product is suitable for the specific test criteria.

Welding, 36- through 60-inch (900 - 1500 mm), is another method of internal

joint repair where personnel use hand-held welding guns to make the needed

repair. Extrusion welding techniques are most commonly utilized; however

other welding methods may be used depending on the condition of the

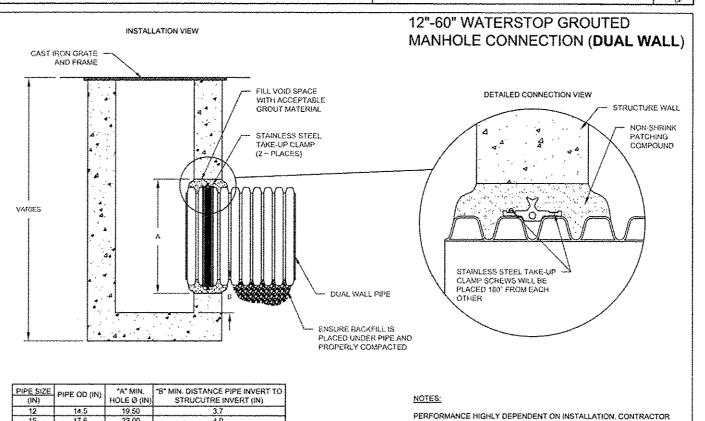
damage. Clean and dry working conditions and skilled operators are critical to a

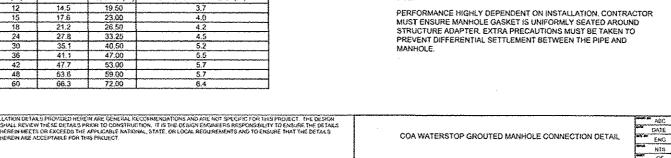
successful repair. Contact ADS to discuss the type of damage and to assess if

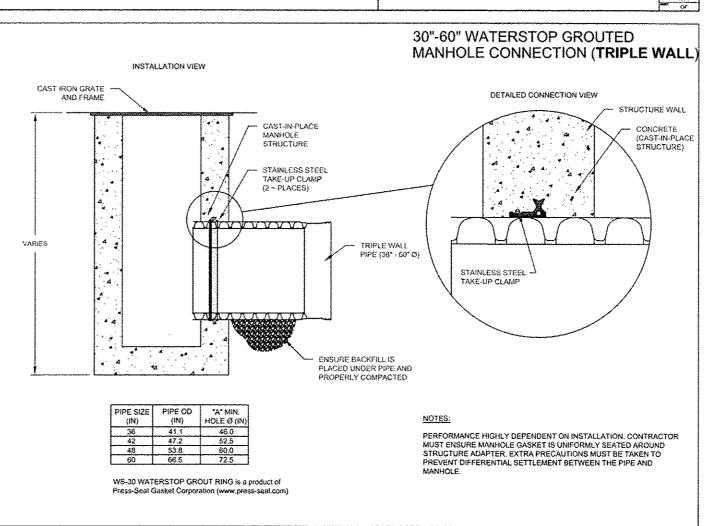
Link Pipe Grouting Sleeve<sup>TM</sup>, 12- through 60-inch (100 - 1500 mm), is a stainless steel grouting sleeve that is installed with an inflatable plug. The sleeve may be used to seal a joint or repair short sections of damaged pipe The manufacture should be contacted to verify the product meets the specific application requirements including test requirements, if specified.

Internal chemical sealing is another method of internal joint repair using chemically activated gel or grout to minimize joint leakage. The grout is typically applied with specialized remote-controlled equipment. Test/seal packer is used to remotely seal a joint. The grouting chemicals are forced through the joint out into the surrounding soil where they gel with the soil. The gelled mass forms a waterproof collar around the pipe. The result is significantly reduced leakage. There are several types of chemical grouts available and the manufacturer should be contacted to review the specific situation and any joint tightness or pressure test criteria. Companies such as Avanti International. Strata Tech Inc. and Carylon Corporation manufacture and/or install chemical grout. Stephen's Fechnologies New Life Coatings and NewLife Liner Systems as well as Avast Hydro-Lining International, are examples of companies that offer cured in place epoxy lining systems that have been effectively used with HDPE pipe. Most pipe diameters can be chemically grouted provided the grouting contractor has the appropriate equipment.

# STORM TRENCH INSTALLATION DETAIL PIPE DIAM. MIN TRENCH WIDTH 12" (300mm) 30" (750mm) BACKFILL 15" (375mm) 34" (860mm) 18" (450mm) 39" (990mm) 24" (600mm) 48" (1200mm) 30" (750mm) 56" (1420mm) 36" (900mm) 64" (1620mm) 42" (1050mm) 72" (1830mm) 60° (1500mm) 96° (2440mm) . ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321. "STANDARD PRACTICE FOR UNDERGROUNI STALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVIT WITH THE EXCEPTION THAT THE INITIAL BACKFILL MAY EXTEND TO THE CROWN OF THE PIPE. SOIL CLASSIF SEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER, AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL. TABLE 2, MINIMUM RECOMMENDED COVER BASED ON 4. <u>BEDDING:</u> SUITABLE MATERIAL SHALL BE CLASS I. H.OR HIL THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. COMPACTION SHALL BE 90% OF MAXIMUM DENSITY PER ASTM D1557 OR AS SHOWN ON THE PLANS. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM REDDING THICKNESS SHALL BE 4" (100mm) FOR 12"-24" (300mm-800mm) DIAMETER PIPE; 6" (150mm) FOR 30"-60" (750mm-900mm) DIAMETER PIPE. THE MIDDLE 1/3 BENEATH THE PIPE INVERT SHALL BE LOOSELY PLACED. SURFACE LIVE LOADING CONDITION HEAVY CONSTRUCTION PIPE DIAM. H-25 HEAVY CURSTINUON (76T AXLE LOAD) \* 12" (300mm) 48" (1200mm) INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II, OR BI IN THE PIPE ZONE EXTENDING TO THE CROWN OF THE PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM 02321, LATEST EDITION, FOR TRAFFIC APPLICATIONS; CLASS I, II OR BI MATERIAL SHALL BE COMPACTED TO A DEDISTRY OF NOT LESS THAN 50 PERCENT OF MAXIMUM DENSITY PER ASTM D1567. CLASS BY MATERIALS AS DEFINED IN ASTM 02321 ARE NOT APPROPRIATE BACKFILL MATERIALS. MINIMUM COVER; MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12' (308mm) FROM THE TOP OF PIPE TO GROUND SURFACE, ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H. IS 12" (300mm) UP TO 48" (1200mm) DIAMETER PIPE AND 24" (600mm) OF COVER FOR 60 (1500mm) DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID COA HP PP STORM TRENCH INSTALLATION DETAIL 12"-60" WATERSTOP GROUTED INSTALLATION VIEW







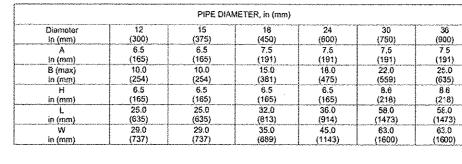
COA WATERSTOP GROUTED MANHOLE CONNECTION 36" - 60" DETAIL

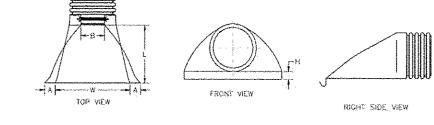
# ADS FLARED END SECTION SPECIFICATION

This specification describes 12- through 36-inch (300 to 900mm) ADS Flared End Sections for use in culvert and drainage outlet applications

The invert of the pipe and the end section shall be at the same elevation. The ADS Flared End Section shall be high density polyethylene meeting ASTM D3350 minimum cell classification 213320C; contact manufacturer for additional cell classification information. When provided, the metal threaded fastening rod

Installation shall be in accordance with ADS installation instructions and with those issued by state or local authorities. Contact your local ADS representative or visit www.ads-pipe.com for the latest installation





Product dotall may differ slightly from actual product appearance.

MO./DAY/YR. MO./DAY/YR. SHEET OF

FOR INFORMATION ONLY

TIERRA WEST, LLC

5571 MIDWAY PARK PLACE NE

ALBUQUERQUE, NM 87109

(505)858-3100 www.tierrawestllc.com CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT ENGINEERING GROUP

LA ORILLA ESTATES LA ORILLA RD. GRADING IMPROVEMENTS STORM DRAIN - SPECIFICATIONS

DESIGN REVIEW COMMITTEE REVIEW ENGINEER APPROVAL DEC 0 5 2016 CITY ENGINEER CITY PROJECT NO.

ZONE MAP NO. 713482 E-12-Z