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Report On The Archeological Survey For The City Of Coleman's Proposed New Waterline, Coleman County, Texas

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REPORT ON THE ARCHEOLOGICAL SURVEY FOR THE CITY OF COLEMAN'S PROPOSED NEW WATERLINE, COLEMAN COUNTY, TEXAS

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Submitted to:
The City of Coleman
and
Howco Services Inc.

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Hicks & Company Archeology Series #281

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HICKS & COMPANY

ENVIRONMENTAL
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CONSULTANTS

ABSTRACT

In July of 2016, Hicks & Company completed an archeological areal survey for the city of Coleman's Proposed New Waterline Project located in Coleman County, Texas. The survey was completed for the city of Coleman under Texas Antiquities Permit #7704 with investigators surveying a total of 31 acres. The project will be funded through a Community Block Grant Program, as managed by the Texas Department of Agriculture, a political entity of the state of Texas, and is therefore subject to the Antiquities Code of Texas (ACT). The archeological investigations consisted of pedestrian survey supplemented by shovel testing (n = 6) along with backhoe trenching (n = 12). No cultural materials were encountered and no archeological sites were recorded during the course of the survey. Based on the results of the survey, regulatory clearance for the project is recommended to proceed with no further cultural resource coordination necessary. This report is offered in partial fulfillment of the requirements for ACT Permit #7704. All project-related materials will be curated at the Center for Archaeological Studies (CAS) in San Marcos, Texas.

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PROJECT DESCRIPTION AND MANAGEMENT SUMMARY

On July 12, 2016, Hicks & Company conducted an archeological survey of the city of Coleman's (the City's) proposed New Waterline Project to be located in Coleman County, Texas (see **Figure 1**). The proposed project is to include the installation of 9,000 linear feet of eight-inch new water line, boring hydrants, service reconnections and associated appurtenances. Directional boring will be utilized in crossing Hords Creek and an unnamed tributary located to the south of Hords Creek. Anticipated depths of impacts are approximately four feet below the surface through the majority of the project area, though directional boring will extend 15 to 30 feet in depth (see **Appendix A: Design Plans**). As the City will receive funding through the Texas Department of Agriculture, an entity of the state of Texas, Hicks & Company was contracted to conduct Antiquities Code of Texas Coordination (ACT) with the Texas Historical Commission (THC). Additionally, the project involves a United States Army Corps of Engineers under the jurisdiction of Section 404 of the Clean Water Act, requiring coordination under Section 106 of the National Historic Preservation Act of 1966, as amended. All work was coordinated with the THC and performed under Texas Antiquities Permit #7704.

This project was initially reviewed by the Texas Historical Commission (THC) in 2016. Following there review, the THC noted that archeological survey was warranted within 100 meters of streams and tributaries located within the APE, an area equating to approximately 31 acres in size, supplemented by shovel testing and backhoe trenching where deeply buried cultural resources may be located.

Josh Haefner, the Principal Investigator for the project, conducted the survey with Will Pratt, the Project Archeologist. Greg Cestaro served as crew chief. Will Pratt and Josh Haefner authored the report. A total of 36 field hours were spent on the archeological investigations. Jerod McCleland conducted Geographic Information Systems (GIS) processing and map production, and Anna Holley aided in report formatting and production. As no artifacts were collected during survey, all project-related documents, forms, and photographs will be permanently curated at the Center for Archeological Studies (CAS) in San Marcos, Texas. This report serves as partial fulfillment of the requirements of Antiquities Permit #7704.

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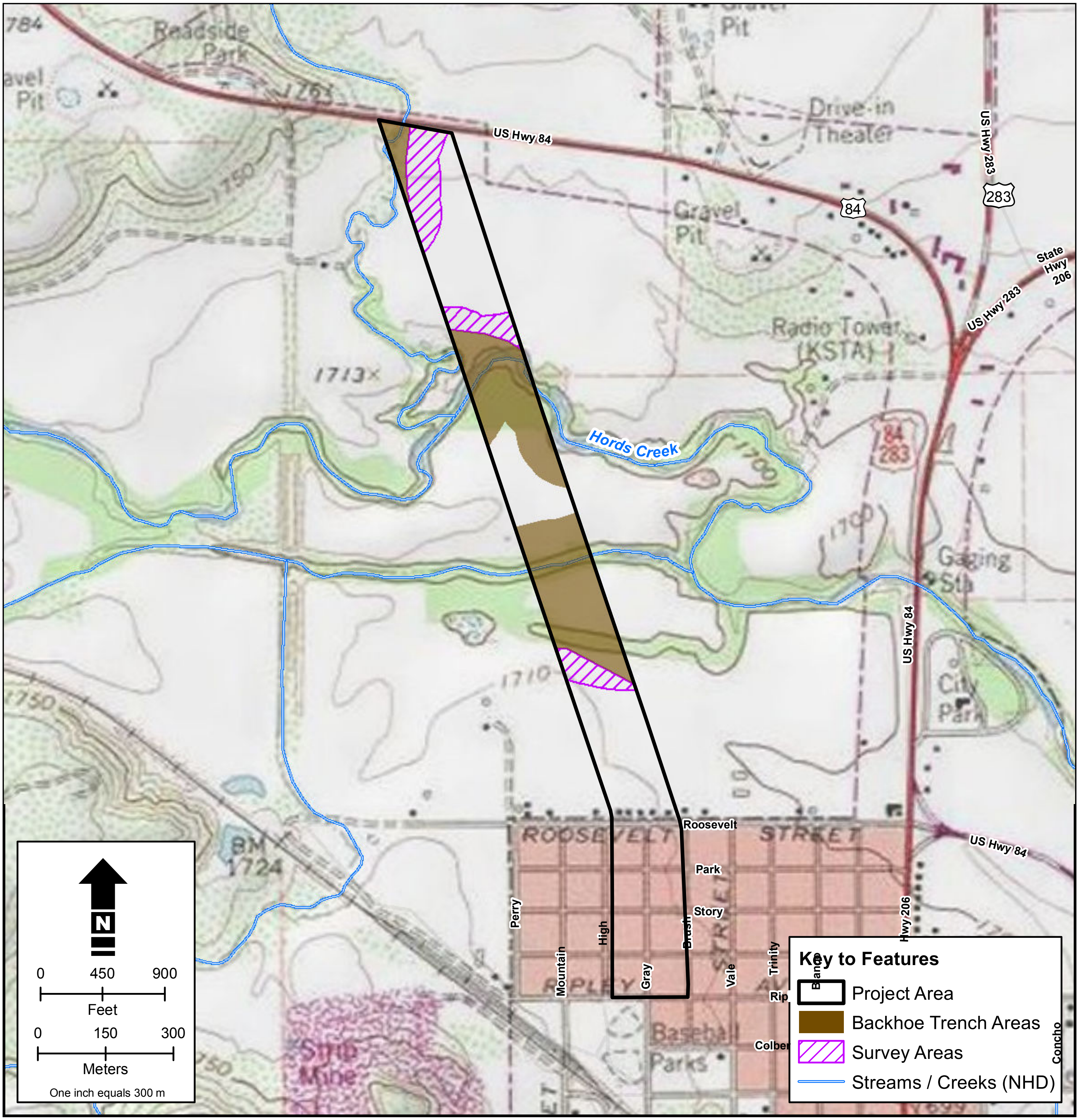

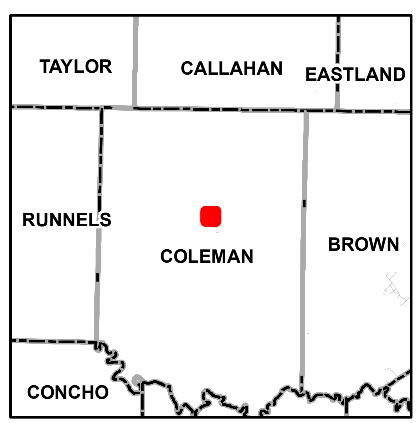

Figure 1
Project Location

City of Coleman
Archeological Survey

USGS 7.5-minute Topographic Quadrangle:
Coleman (USGS# 31099-G4), TX

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ENVIRONMENTAL SETTING

PHYSIOGRAPHY

According to the Bureau of Economic Geology (1996), the project area is located within the North-Central Plains physiographic province of Texas. The North-Central Plains is an Upper Paleozoic erosional surface with rivers that meander through local prairies where shale bedrock prevails. Hills and rolling plains characterize the landscape in places where hard bedrock is dominant. Limestone and sandstone is found capping the steep, severely dissected slopes near rivers. The live oaks and ashe junipers transition into mesquite lotebush brush from east to west.

GEOLOGY AND SOILS

According to the Geologic Atlas of Texas (2016) the underlying geology of the proposed project area consists of Admiral Formation Restricted (Pad), Alluvium (Qal), and Fluviatile Terrace Deposits (Qt) (**Figure 2**). The Admiral Formation Restricted is a Permian-age formation consisting of limestone, shale, and sandstone. Alluvium in this area is a 35-foot-thick, relatively recent Holocene-age floodplain deposits found in low terraces. Fluviatile terrace deposits are Pleistocene-age gravel, sand, silt, and clay terraces.

Soils mapped for the project area include: Frio cay loam; Nuvalde clay loam, 1 to 3 percent slopes; Sagerton clay loam, 1 to 3 percent slopes; Rowena clay loam, 0 to 1 percent slopes; and Rowena clay loam, 1 to 3 percent slopes (**Figure 2**). Frio series soils are very deep, well drained, moderately permeable soils that formed in loamy, calcareous alluvial sediments located on nearly level to gently sloping flood plain. Nuvalde series soils, located on gently sloping stream terraces and alluvial fans, are very deep, well drained, moderately permeable soils that form in limy alluvium. Found on treads of terraces on dissected alluvial plains, Sagerton series soils are nearly sloping to gently sloping, very deep, well drained, moderately slowly permeable soils. Rowena series soils are very deep, well drained, moderately slowly permeable soils formed from calcareous loamy and clayey alluvium. This soil series is located on nearly level to gently sloping dissected plains (USDA NRCS 2015). The Frio series is noted as having a very high chance of containing intact cultural deposits at depths both above and below one meter from the ground surface (Abbott 2013).

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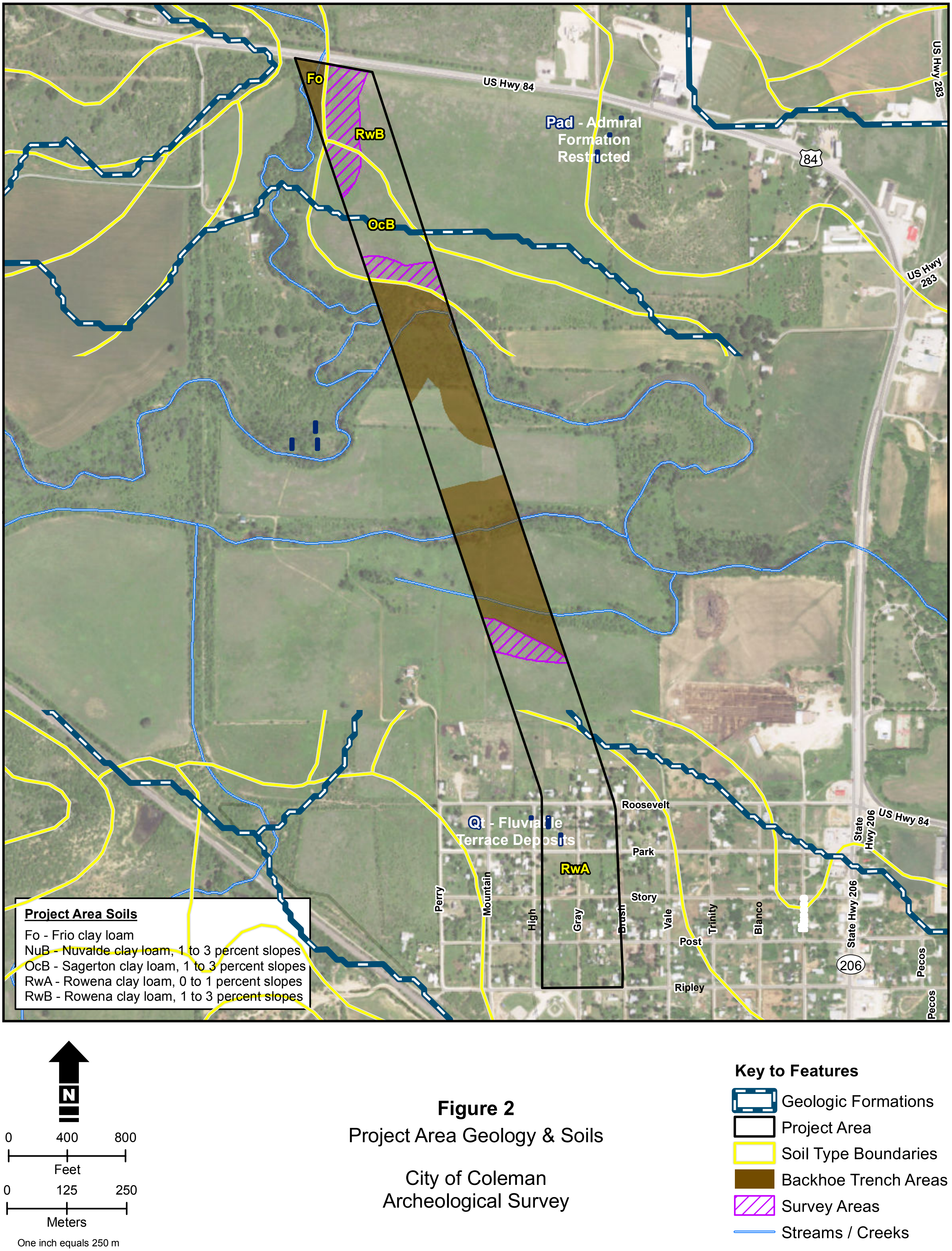

Figure 2
Project Area Geology & Soils

City of Coleman
Archeological Survey

Key to Features
- Geologic Formations
- Project Area
- Soil Type Boundaries
- Backhoe Trench Areas
- Survey Areas
- Streams / Creeks

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CULTURAL BACKGROUND

ARCHEOLOGICAL BACKGROUND

The project area is located within the Central Texas Archeological Region. Most of the recent chronologies for Central Texas are based on six distinct time periods, roughly representing a 12,000-year sequence of occupation. A synthesis of the culture-historical sequences provided by Collins (2004) and Johnson (1995) is as follows: Paleoindian (prior to 8800 BP), Early Archaic (8800–5800 BP), Middle Archaic (5800–4000 BP), Late Archaic (4000–1400 BP), Post-Archaic or Late Prehistoric (AD 600–1600), and Historic (AD 1600 to present). Although these divisions represent convenient temporal categories, they are also based in large part on perceived adaptations in subsistence and are reflected in changes in lithic and other technologies.

Paleoindian (prior to 8800 BP)

The Early Paleoindian culture in South and Central Texas is believed to be related to the well-known big game hunting tradition of the Great Plains (Hester 1980). Most of the well-documented Early Paleoindian sites in Texas that are associated with extinct megafauna are located north and west of Central Texas on the Llano Estacado and adjacent areas of the Southern High Plains. In general, Early Paleoindian sites are scarce in Central Texas, or at least less visible than later sites. Conversely, later Paleoindian sites are much more numerous in South and Central Texas, although both are usually identified from only surface-collected artifacts (Black and McGraw 1985). Subsistence data from several Late Paleoindian sites does suggest, however, that small game was exploited in addition to extinct megafauna. This data supports the idea that a hunting and gathering lifestyle may have already been adopted across much of Central Texas prior to the Early Archaic period.

Paleoindian occupations in Central Texas have typically been associated with lanceolate projectile points such as Clovis, Folsom, Plainview, Golondrina, and Meserve and stemmed points such as Scottsbluff (Turner and Hester 1993). Recent investigations at the Wilson Leonard Site (41WM235) (Collins 2004) equate three styles of projectiles, Golondrina/Barber, St. Mary's Hall and Wilson, to the Late Paleoindian period. The Wilson component is dated at 10,000 to 9650 BP and is associated with features, artifacts, and a burial that are more Archaic-like in nature than Paleoindian (Collins 2004). The data from this site further suggests that the Archaic nature of the adaptation continues during the ensuing Golondrina/Barber and St. Mary's Hall components. These are dated between 9500 and 8800 BP and may represent a transitional period between the Paleoindian and the Archaic.

Early Archaic (ca. 8800–5800 BP)

The Early Archaic period is subdivided into three projectile point style intervals: Angostura, Early Split Stem and Martindale/Uvalde, from 8800–6000 BP (Collins 2004). Generally, the shift from Paleoindian to Archaic subsistence strategies is measured by a change in technology focused on the use of burned rocks to process geophyte plant foods. This shift is traced back as early as 8800 BP at the Wilson-Leonard Site and at roughly comparable ages at several other Central Texas sites (Decker et al. 1999; Thoms et al. 1996). At these sites, evidence for the use of earth ovens and burned rock technologies for processing plant foods is associated with lanceolate Angostura projectile points. Hence, the use of Angostura and Late Paleoindian lithic technologies may have continued into the Early Archaic period for a time but was gradually replaced by the bifurcate base split-stem and Martindale/Uvalde styles.

The Early Archaic period marks a shift to the use of burned limestone and other rocks in the form of scatters, hearths, middens and other features for the heated processing of plant foods. This represents the start of a long-lived Archaic cooking tradition, lasting from roughly 8800 to 1400 BP. This tradition was characterized by the repeated utilization of earth ovens and the resulting creation of burned rock middens at strategic places on the landscape. These new subsistence practices began with a distinctive cooking technology using layered arrangements of heated rocks in earth ovens, allowing for exploitation of a broad range of geophytes. These included upland xerophytic plants like sotol (*Dasylirion wheeleri*) and other species such as Lily family (Liliaceae) onion bulbs, which grow in wetter environments (Decker et al. 1999).

Some of the most recent climatic reconstructions for the period posit a moist and cool Late Pleistocene environment with early to mid-Holocene shifts to drier conditions that became most pronounced during the mid-Holocene (ca. 5000–7000 BP, Ricklis and Collins 1994). In contrast, Johnson (1995) suggests that the relatively mesic conditions of the eastern Edwards Plateau during the Pleistocene and early Holocene/Paleoindian period underwent a brief dry interval during Late Paleoindian times, later returning to more mesic conditions during the ensuing Early Archaic period (roughly 8000–5800 BP). Whether the Early Archaic climate reflects a gradual drying period (Ricklis and Collins 1994) or a more mesic interval within an overall, long-lived trend toward aridity along the eastern Edwards Plateau, it appears that the use of burned rock midden technologies for plant food and other types of subsistence related processing began during this period and continued for many thousands of years.

Overall, the bulk of the Central Texas archeological literature suggests that the Early Archaic occupations were generally small, widely distributed, and non-specialized (Black and McGraw 1985). Explanations for these characteristics support a generalized hunting-gathering strategy involving relatively high group mobility, poorly defined territories, and short-term occupations. Broad spectrum, well-adapted, highly mobile subsistence strategies are theorized.

Middle Archaic (ca. 5800–4000 BP)

The Middle Archaic marks an intensification of the use of burned rock technologies to process plants and other types of foods within an increasingly arid environment. Ricklis and Collins (1994) recognize a pronounced mid-Holocene drying event from 7000–5000 BP, though it may have lasted longer. Johnson (1995) posits the occurrence of a dry Edwards Interval along the eastern Edwards Plateau from roughly 5500–1400 BP. Evidence for this is seen in the cessation of significant overbank sediment aggradation at a number of Central Texas sites. Instead of deposition, arid conditions catalyzed extensive downcutting and erosion along many Central Texas streams. Hypothetically, dry conditions would have promoted the spread of desert succulent xerophytic plants and fostered the increased use of burned rock middens. Drier conditions may also have engendered the return of the American bison (*Bison bison*) to the plateau during the Middle and Late Archaic periods. Furthermore, the proliferation of Bell/Andice/Calf Creek projectile point styles at the beginning of the Middle Archaic may have coincided with the return of bison to the Edwards Plateau and the adjacent Blackland Prairie; these broad bladed points have been associated with the exploitation of bison within archeological literature. Additional Middle Archaic projectile point styles include Early Triangular, La Jita, Nolan, and Travis.

Late Archaic (ca. 4000–1400 BP)

Recent refinements in the Central Texas chronology divide the Late Archaic interval into two different subperiods (Johnson 1995). Late Archaic Subperiod I is marked by the appearance of Bulverde projectile points, which along with later forms (Pedernales, Castroville, Marshall and Montell) were used to hunt bison and other large game. Burned rock middens continued to proliferate during the Late Archaic I interval. The resources processed via burned rock technology may have included species of yucca (*Yucca* spp.), sotol, and perhaps *Agave lechuguilla*. Other middens may simply be dumps for kitchen-type debris, which contain sizeable quantities of animal bones, broken stone tools, and flint-knapping detritus (Johnson 1995). Pedernales peoples in particular may have been adept at both hunting and the processing of large volumes of plant food materials.

The Late Archaic II interval (ca. 600 BC-AD 600) may have been a time of increasingly mesic conditions for all but the western and southwestern portions of the Edwards Plateau (Johnson 1995). The onset of more mesic conditions may have resulted in decreased numbers of upland xerophytic plants and perhaps bison (Johnson 1995), which may have forced adjustments in prehistoric subsistence strategies. There appears to be a decrease in the number of burned rock middens that can be directly attributable to the Late Archaic II interval. The projectile points used at this time are smaller and are characterized by such styles as Ensor, Fairland, Frio and Darl. Evidence suggests the large projectiles well-adapted to bison hunting may have been gradually replaced. Also, it has been posited that the spread of Eastern Woodland religious cults may have had an influence on the Late Archaic II peoples of Central Texas (Johnson 1995).

Late Prehistoric (ca. AD 600–1600)

The Late Prehistoric or Post-Archaic (ca. AD 600–1600) (Johnson 1995) in Central Texas is initially marked by the replacement of the dart and atlatl with the bow and arrow, as reflected in the shift from dart points to smaller, thinner and lighter arrow points (Ricklis and Collins 1994). Despite the shift to the bow and arrow, there is strong indication that the broad based hunting-gathering economy of the Late Archaic persisted into and throughout most of the Late Prehistoric period in Central Texas. The latter part of this period is marked by the appearance of pottery and a distinctive complex of tools composed of contracting-stem Perdiz arrow points, an abundance of unifacial end scrapers, thin, alternately beveled bifacial knives, and drills or perforators made of flakes and blades. The Post-Archaic era again turned dry and somewhat arid toward the middle of the Late Prehistoric, during which a dramatic increase in bison exploitation suggests it became an increasingly important economic activity during the later part of this period.

Historic Period (AD 1528–Present)

The most radical changes in the Native American history of Central Texas came during the historic era (Black 1989). The historic period in Texas begins with the arrival of Alvar Nunez Cabeza de Vaca and other survivors of the Navarez expedition on the Texas coast in 1528. The influences of European colonization were not felt strongly in Texas until several centuries later. By the middle of the eighteenth century, though, the Spanish had established missions in East Texas and settlements in South Texas. This resulted in massive depopulation and cultural disintegration among Native American groups.

The horse was introduced into North America by Spanish settlers in the sixteenth century; nomadic groups, initially the Apaches and later the Comanches adopted the horse and rapidly altered the aboriginal situation of Central Texas. These nomadic groups entered Central Texas from the plains and mountains to the north and west and within 150 years had forced most of the native peoples to flee. Most groups were destroyed by the combined effects of the nomadic raiders and the foreign diseases introduced by Europeans. Others moved south, entering Spanish missions and settlements, or eastward to join various agricultural groups such as the Wichita (Black 1989).

The city of Coleman traces its history to 1876 when R.J. Clow donated 160 acres along Hords Creek for the creation of a new county seat. The town was named after Coleman County which was named for Robert M. Coleman, Sam Houston’s aide during the Texas Revolution (Hunt 2010). The site of the city of Coleman was chosen in a location which showed no evidence of previous human habitation (City of Coleman 2016). The city became a popular location for cattlemen and trail drivers. In 1886, a spurline of the Santa Fe railroad was built to connect the town to the main line. By 1900, cotton farming had become the dominant trade in the city. The city eventually became a meat and wool processing center as well as a manufacturing center for the production of clay and brick tiles, clothing, and leather (Hunt 2010).

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PREVIOUS INVESTIGATIONS

According to the THC's Online Site Atlas (the Atlas), accessed on July 17, 2016, one previously conducted archaeological survey is recorded within one kilometer of the proposed project area (**Figure 3**). This survey was conducted by the State Department of Highways and Public Transportation (now the Texas Department of Transportation) in 1987 (THC 2016). No archeological sites or cemeteries are documented as being located within one kilometer of the project area.

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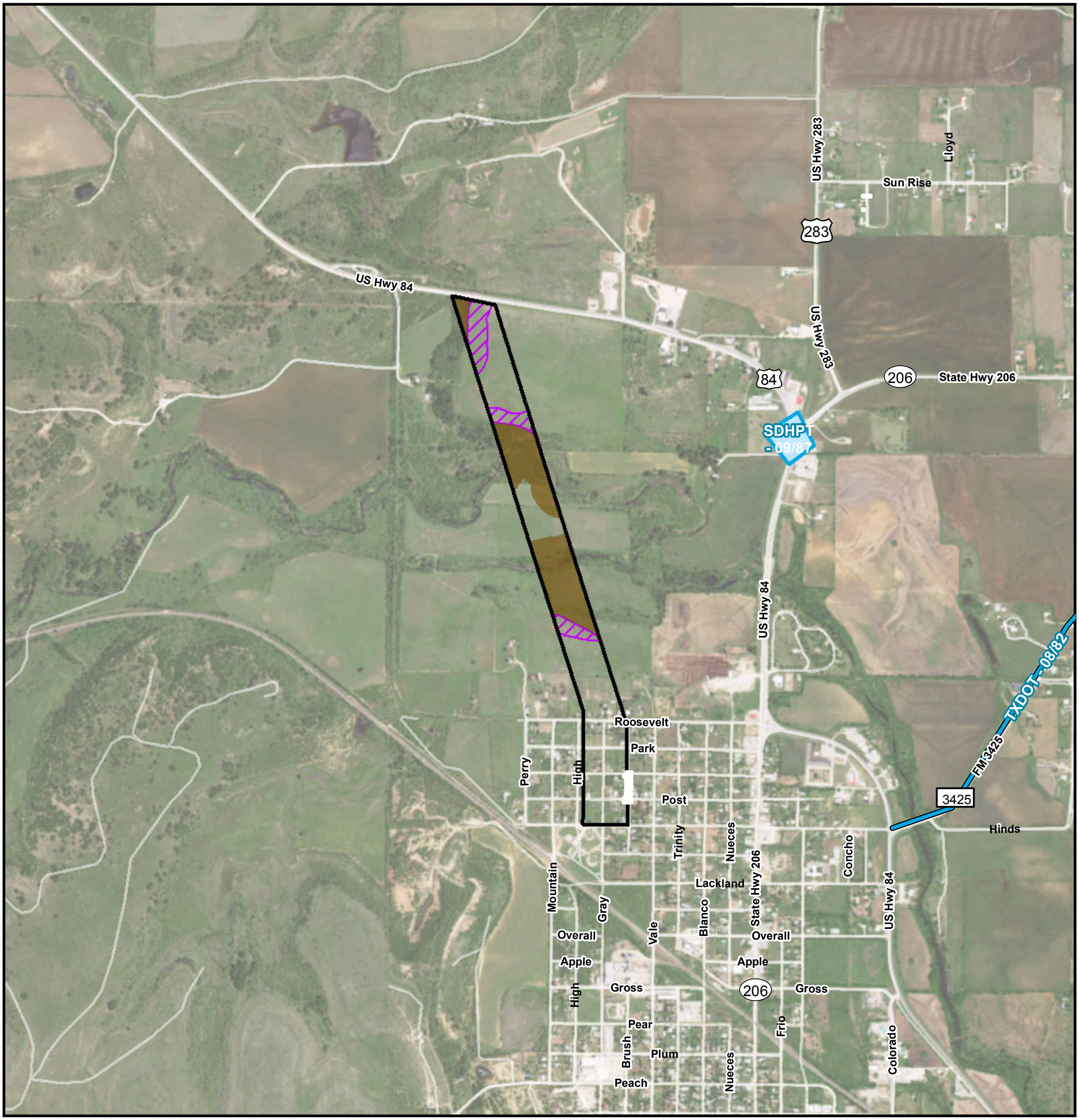

N

0 800 1,600
Feet
0 250 500
Meters
One inch equals 500 m

Figure 3
Cultural Resources and Previous Investigations

City of Coleman Archeological Survey

Key to Features

- Archeological Surveys (linear)
- Streams / Creeks (NHD)
- Project Area
- Backhoe Trench Areas
- Survey Areas
- Archeological Surveys (poly)

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METHODOLOGY

Hicks & Company archeologists conducted the archeological survey of a 31-acre tract for the proposed City of Coleman's New Waterline exceeding the minimum standards established by the THC for areal projects measuring 11 to 100 acres in size (at a rate of one sub-surface tests per two acres), excavating a total of six shovel tests and twelve backhoe trenches. The majority of the shovel tests were excavated to approximately 40 centimeters below existing ground surface terminating at thick Bt horizons (cmbs). Backhoe trenches were excavated to a depth of approximately two meters below the existing ground surface, 80 centimeters below the typical anticipated depth of impacts of 120 centimeters for most of the proposed improvements. All sediment removed from shovel tests was screened through quarter-inch hardware mesh or hand-sorted when dry clay content prevented efficient screening. Backhoe trenching and backdirt was monitored during the course of excavations. All relevant shovel test and backhoe trench information was recorded on standardized forms. Locations were recorded with GPS technology. Photographs were taken to document the project area conditions and to aid in reporting.

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RESULTS OF FIELD INVESTIGATIONS

Hicks & Company archeologists surveyed the entirety of the 31 acre high potential segments of the project. Survey and testing was concentrated along the eastern portion as the City informed survey crews that they intended to install the waterline along the eastern boundary of the project area. During survey it was noted that the project area is bounded on the west by a tributary of Hords Creek. The project area overlies Hords Creek and three associated tributaries. Topography within the project area is generally flat, with slopes ranging from steep to moderately sloping along Hords Creek and its associated tributaries.

During survey, ground visibility was noted as variable, ranging from 5-70 percent. All shovel tests and backhoe trenches conducted during the investigation were negative for cultural materials. A total of six shovel tests were excavated within the project area in a location mapped as overlying Frio series soils which the backhoe was unable to access due to fencing constraints. Generally, shovel tests contained sandy clays and terminated at depths from 40-85 cmbs within dense clays. Observed Munsell values were generally consistent with the Frio soil series mapped for this area (USDA NRCS 2016b). Small-sized limestone gravel inclusions were noted within four of the shovel tests (see **Appendix B** for **Shovel Test** and **Backhoe Trench Locations** and **Appendix C** for **Shovel Test Data**).

BACKHOE TRENCH EXCAVATIONS

Twelve backhoe trenches were excavated in various locations throughout areas mapped as overlying and adjacent to Frio series soils (see **Appendix B: Shovel Test and Backhoe Trench Locations**). Trench 1, 2, and 4 through 12 were oriented east to west and Trench 3 was oriented north to south. No cultural materials were encountered during the course of the backhoe trench excavations.

Backhoe Trench 1

Backhoe Trench 1 (BHT01) was excavated on the north bank of Hords Creek near the eastern extent of the project area to a depth of 163 centimeters below the surface (cmbs). Three distinct strata were documented within this trench. Stratum 1 extended to a depth of 43 cmbs and was noted as a dark red (2.5YR3/6) silty sand which terminated in a wavy but distinct boundary. Stratum 2 was composed of red (2.5YR4/8) clay and terminated at a depth of approximately 113 cmbs in a wavy and diffuse boundary. Stratum 3 was characterized by a pink (2.5YR8/4) clay mottled with pink (10R8/4) clay with caliche inclusions.

Backhoe Trench 2

Backhoe Trench 2 (BHT02) was oriented east to west and excavated to a depth of 153 cmbs on the north bank of Hords Creek approximately 25 meters west of BHT01. Three distinct strata were recorded within BHT2. Stratum 1 within this trench was documented as a weak red (10YR4/3) silty sand which terminated in a wavy but distinct boundary at 33 cmbs. Stratum 2 noted to be a yellowish red (5YR4/6) sandy clay which terminated in a wavy and diffuse boundary at 120 cmbs. Stratum 3 was a strong brown (7.5YR4/6) clay.

Backhoe Trench 3

Backhoe Trench 3 (BHT03) was excavated 30 meters west of BHT02 to a depth of 193 cmbs and oriented north to south. Three distinct strata were identified within BHT03. Stratum 1 within this trench was documented as a weak red (10YR4/3) silty sand which terminated in a wavy but distinct boundary at approximately 30 cmbs. Stratum 2 was noted to be a yellowish red (5YR4/6) sandy clay which terminated in a wavy and diffuse boundary at approximately 120 cmbs. Stratum 3 was recorded as a strong brown (7.5YR4/6) clay.

Backhoe Trench 4

Backhoe Trench 4 (BHT04), oriented east to west, was excavated near the northern limits of the project area to a depth of 183 cmbs. Two distinct strata were documented within BHT 4 (**Figure 4**). Stratum 1 was noted to be a very dark gray (7.5YR3/1) clay loam which terminated in a slightly wavy and distinct boundary at 88 cmbs. Stratum 2 was noted to be reddish yellow sandy clay with limestone gravel inclusions.

Figure 4: BHT04 south wall profile.

Backhoe Trench 5

Backhoe Trench 5 (BHT05) was excavated approximately 50 meters south of BHT04 and oriented east to west. This trench, containing two distinct strata, was excavated to a depth of 210 cmbs. Stratum 1 was recorded as a very dark gray (7.5YR3/1) clay loam which terminated in a slightly wavy and distinct boundary at approximately 80 cmbs. Stratum 2 was noted to be a reddish yellow sandy clay with very few limestone gravel inclusions.

Backhoe Trench 6

Located approximately 75 meters south of Hords Creek near the eastern limits of the project area, Backhoe Trench 6 (BHT06) was oriented east to west and excavated to a depth of 182 cmbs. Within this trench, three distinct strata were identified. Stratum 1 was noted to be a dark brown (7.5YR3/2) sandy loam with a diffuse boundary which transitioned gradually into Stratum 2 at approximately 47 cmbs. Stratum 2 was a brown (7.5YR4/3) sandy loam with few limestone pebble inclusions. This stratum transitioned gradually into Stratum 3 at approximately 145 cmbs. Stratum 3 was documented as a brown (10YR4/3) sandy loam with sparse limestone gravel inclusions.

Backhoe Trench 7

Backhoe Trench 7 (BHT07), located north of a tributary of Hords Creek, was oriented east to west and excavated to a depth of 195 cmbs. Only a single stratum was documented within this trench. Stratum 1 was documented as a yellowish brown (10YR5/4) silty sand with tiny specs of silty white marl inclusions which increased in density with depth.

Backhoe Trench 8

Backhoe Trench 8 (BHT08) was excavated across the tributary 90 meters south of BHT07. This trench was oriented east to west and excavated to a depth of 210 cmbs. Three distinct strata were documented within this trench (**Figure 5**). Stratum 1 was noted to be a yellowish brown (10YR5/4) silty sand with very sparse, white marl inclusions which terminated in a distinct linear boundary at 145 cmbs. Stratum 2 was a thin band of light yellowish brown (10YR6/4) clayey sand with dense limestone gravel inclusions which terminated in a distinct linear boundary at 160 cmbs. Stratum 3 was documented as being similar in texture and color to Stratum 1.

Figure 5: BHT08 south wall profile.

Backhoe Trench 9

Backhoe Trench 9 (BHT09) was excavated to a depth of 215 cmbs approximately 75 meters southwest of BHT08 in an east to west orientation. Three distinct strata similar to those observed in BHT08 were documented within this trench. Stratum 1 was identified as a yellowish brown (10YR5/4) silty sand with very sparse, white marl inclusions which terminated in a distinct linear boundary at 195 cmbs. Stratum 2 was a thin band of light yellowish brown (10YR6/4) clayey sand with dense limestone gravel and cobble inclusions which terminated in a distinct linear boundary at 210 cmbs. Stratum 3 was noted to be a yellowish brown (10YR5/4) silty sand with very sparse, white marl inclusions similar to Stratum 1.

Backhoe Trench 10

Located on the north bank of the southernmost tributary within the project area, Backhoe Trench 10 (BHT10) was oriented east to west and excavated to a depth of 230 cmbs. Two distinct strata were documented within this trench. Stratum 1 was noted to be a dark brown (7.5YR3/2) silty sand which terminated in an indistinct, wavy boundary at 43 cmbs. Stratum 2 was documented as a dark yellowish brown (10YR4.5/4) sandy clay with clay content increasing in density with depth.

Backhoe Trench 11

Backhoe Trench 11 (BHT11), located near the southeastern boundary of the project area, was oriented east to west and excavated to a depth of 210 cmbs. Two distinct strata were identified within this trench. Stratum 1 was a yellowish brown (10YR5/4) silty sand with clay inclusions which increased in density with depth. This stratum terminated in a distinct, wavy boundary at 176 cmbs. Stratum 2 was noted to be a light yellowish brown (10YR6/4) sand with a bit of clay and limestone cobble inclusions.

Backhoe Trench 12

Backhoe Trench 12 was excavated to a depth of 200 cmbs near the southwestern limits of the project area in an east to west orientation. A single stratum was documented within this backhoe trench. Stratum 1 was noted to be a strong brown (7.5YR5/6) silty sand with a bit of clay and numerous gravel-sized chalk inclusions.

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CONCLUSIONS AND RECOMMENDATIONS

On July 12, 2016, Hicks & Company archeologists conducted an intensive pedestrian survey of a 31-acre project area to be utilized for construction of the New Waterline Project by the city of Coleman. A total of six shovel tests were conducted within the project area, all of which were negative for cultural material. Twelve backhoe trenches which were excavated within the project area all of which were negative for cultural material. No artifacts or archeological sites were recorded during the course of the survey. Therefore, the project is recommended to proceed to construction with no further coordination required for compliance with the ACT. In the unlikely event that archeological resources are identified during the course of construction, all work in the immediate vicinity should cease until the THC is notified and appropriate actions are determined. Hicks & Company offers this report in partial fulfillment of Antiquities Permit #7704. All project-related materials will be permanently curated at CAS in San Marcos, Texas.

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APPENDIX A

DESIGN PLANS

CONSTRUCTION PLANS FOR

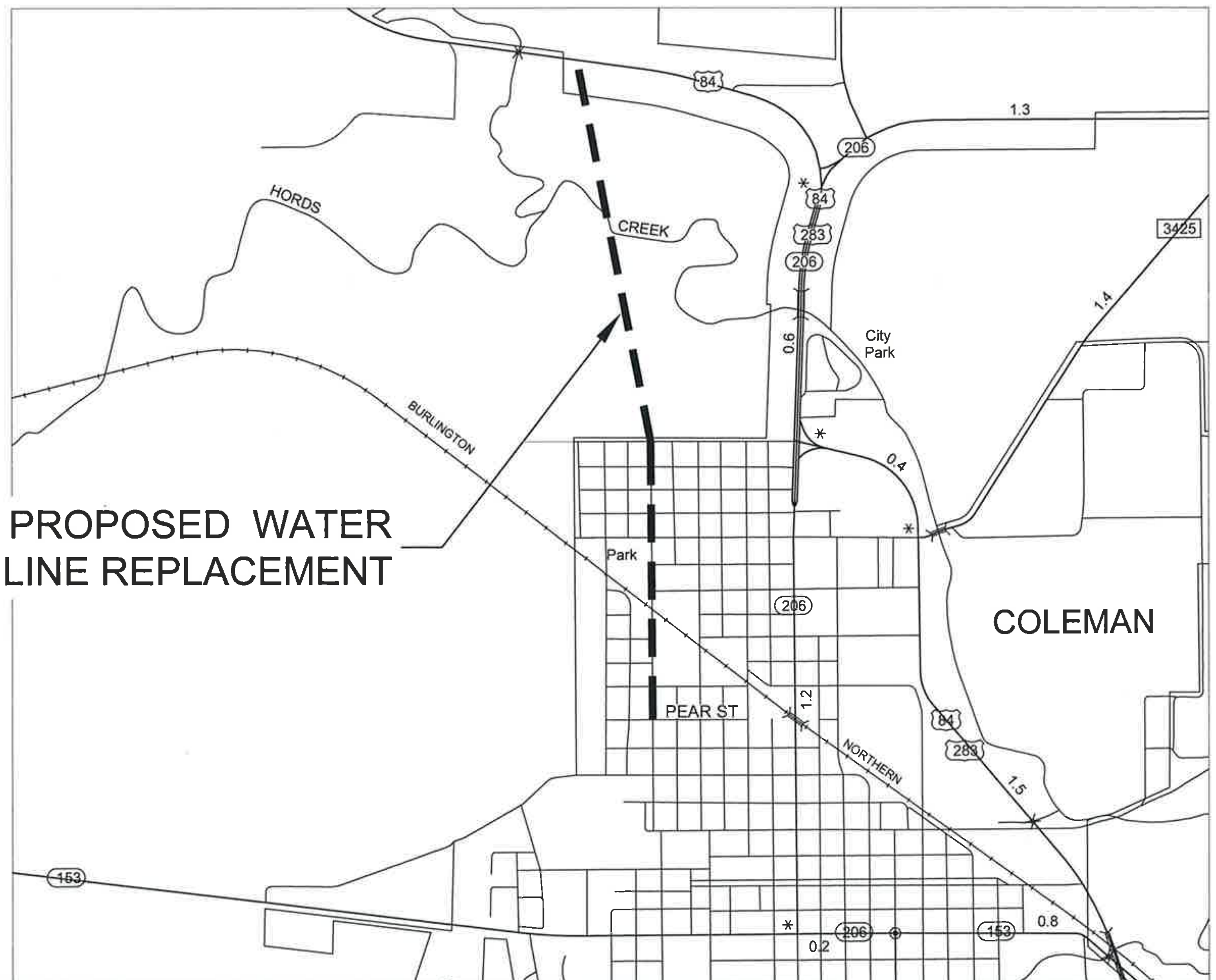
CITY OF COLEMAN, TEXAS

GRAY STREET WATER LINE REPLACEMENT

JUNE, 2016

6/28/16

PRELIMINARY



PROPOSED WATER LINE REPLACEMENT

PROJECT LOCATION MAP

SCALE: 1" = 2,000'

NORTH

CITY COUNCIL

NICK POLDRACK	MAYOR
GARY PAYNE	MAYOR PRO TEM
SHERMAN SMITH	DANNY JAMESON
CAROLYN MERRIMAN	
PAUL CATOE	CITY MANAGER
CRESTON OLINGER	WATER DISTRIBUTION MANAGER
TOBY TERRY	WATER PRODUCTION MANAGER
KAREN LANGLEY	CITY SECRETARY

JACOB MARTIN

3465 CURRY LANE
ABILENE, TX 79606
325-695-1070

1508 SANTA FE DR, STE 204
WEATHERFORD, TX 76086
817-594-9880

FIRM# F-2448

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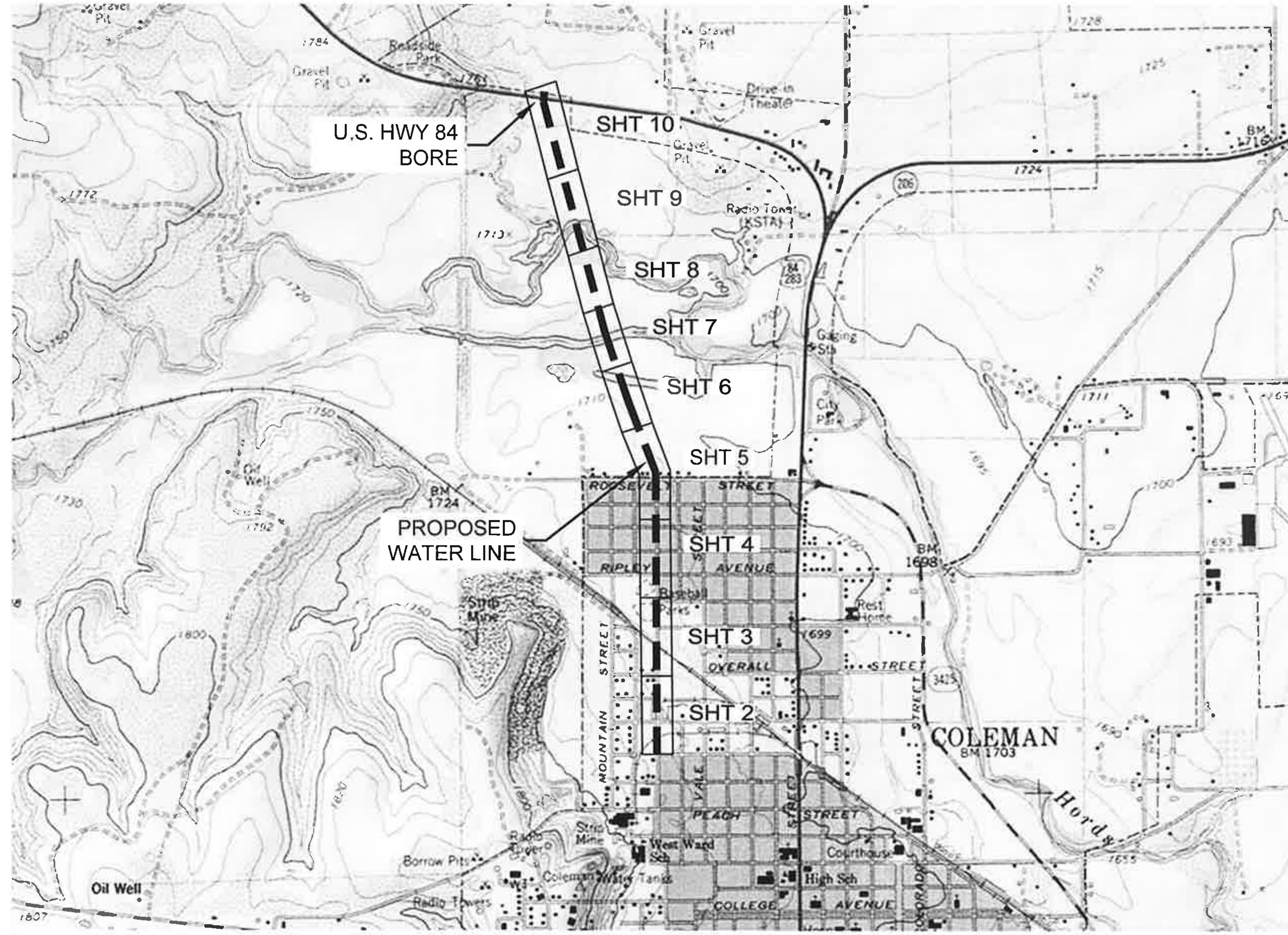
X:\CI_Coleman\15380 -- TDA Gray Street Water Line Replacement\Drafting_Plans_C_Civil\Final\00 COVER.dwg RON MILLER 9/24/14

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY DEPTH AND LOCATIONS OF ALL UTILITIES PRIOR TO PIPE MANUFACTURING, WHETHER SHOWN ON THE PLANS OR NOT. ALL CONTRACTOR ACTIVITIES SHALL BE STRICTLY CONFINED TO THE DESIGNATED EASEMENT AREA.
2. ALL GATES SHALL BE KEPT CLOSED OR A GUARD SHALL BE POSTED TO PREVENT ACCESS TO THE PROJECT SITE AND KEEP LIVESTOCK WITHIN PASTURES. PROVISIONS SHALL BE MADE FOR LIVESTOCK TO CROSS THE PIPELINE DITCH OR CROSS BETWEEN JOINTS OF PIPE AS THEY LAY ON THE SURFACE BEFORE INSTALLATION, AT NOT LESS THEN 800 FOOT INTERVALS ALONG THE PIPELINE DITCH AND 50 FEET WIDE AT SUCH POINTS. GATES SHALL BE LOCKED AT NIGHT.
3. MAXIMUM SPEED LIMIT ON THE PROJECT SHALL BE 20 M.P.H.
4. NO FIREARMS SHALL BE PERMITTED ON THE PROJECT SITE.
5. NO FIRES WILL BE ALLOWED UNLESS WRITTEN PERMISSION FROM THE LANDOWNER AND FIRE MARSHALL ARE OBTAINED. DIRT AND ROCK SHALL BE SEPARATED FROM BRUSH. NO FIRES WILL BE ALLOWED IN R.O.W. DURING CONSTRUCTION.
6. ROCK AND DEBRIS SHALL BE REMOVED FROM THE PROJECT, UNLESS WRITTEN PERMISSION IS PROVIDED FROM THE LAND OWNER. COPIES OF ALL PERMISSIONS GRANTED SHALL BE PROVIDED TO THE ENGINEER, OWNER, AND INSPECTOR.
7. THE CONTRACTOR SHALL EXCAVATE THE TOP 12 INCHES OF TOPSOIL AND STOCKPILE IT SEPARATELY FROM THE GENERAL EXCAVATION. A SUITABLE VOLUME OF TOPSOIL SHALL BE EXCAVATED TO PLACE A MINIMUM OF 12 INCHES OF TOPSOIL OVER ALL EXCAVATED OR BACKFILLED AREAS. TOPSOIL IS NOT REQUIRED WHERE PAVEMENT, CONCRETE CAP, RIPRAP, OR OTHER FACILITIES ARE REQUIRED AT THE SURFACE. WHEN CROSSING CULTIVATED AREAS, DISC PLOW TOPSOIL; REMOVE ROCKS AND STOCKPILE FOR REPLACEMENT BEFORE PIPELINE EXCAVATION. EXCEPT WHERE NOTED, THE GROUND SHALL BE RETURNED TO THE ORIGINAL CONTOURS AFTER CONSTRUCTION. EXISTING TERRACES SHALL BE REPLACED AFTER CONSTRUCTION. DIVERSION DIKES MAY BE ADDED AS REQUIRED AFTER CONSTRUCTION TO PREVENT EROSION OF THE SURFACE. DIKES SHALL BE INSTALLED WHERE DESIGNATED BY THE ENGINEER, OWNER, OR INSPECTOR.
8. NO TREES MAY BE REMOVED OUTSIDE THE PERMANENT EASEMENT OR RAILROAD RIGHT-OF-WAY. TREES WITHIN THE PERMANENT EASEMENT MAY BE REMOVED ONLY IF THEY SHALL PREVENT THE CONTRACTOR FROM LAYING PIPELINE IN A SMOOTH WORK FLOW.
9. CLEARING AND ROOT GRUBBING SHALL BEGIN NO SOONER THAN ONE MONTH PRIOR TO PIPE TRENCHING, STRINGING, AND LAYING OPERATIONS. BACKFILL, SURFACE RESTORATION, AND CLEAN-UP SHALL BE COMPLETED NO MORE THAN ONE MONTH AFTER PIPE LAYING HAS BEEN COMPLETED FOR THAT SECTION OF PIPELINE. THE CHIPPING OR STOCKPILING OF TREES MAY BE ALLOWED IF WRITTEN PERMISSION IS OBTAINED FROM THE LANDOWNER. PILES MAY BE OFF THE R.O.W. AT CONVENIENTLY SPACED INTERVALS. COPIES OF ALL WRITTEN PERMISSION SHALL BE GIVEN TO THE ENGINEER, OWNER, AND INSPECTOR. THE PROJECT SHALL BE KEPT FREE FROM CONSTRUCTION TRASH AND LITTER AT ALL TIMES. FAILURE TO DO SO SHALL RESULT IN FINES OF $500.00 PER INCIDENT. THE CONTRACT SHALL BE REDUCED BY THE AMOUNT OF ALL FINES.
10. THE CONTRACTOR SHALL CONTROL EROSION AND SEDIMENTATION PER THE APPLICABLE PERMITS, LAWS, AND REGULATIONS.
11. THE CONTRACTOR SHALL REMOVE ROCK FROM THE DISTURBED AREAS SUCH THAT IT IS LEFT WITH NO MORE QUANTITY OR SIZE OF ROCK THAN THE LAND ADJACENT TO THE AREA.
12. SEE APPLICABLE SHEETS FOR PERMIT CROSSING REQUIREMENTS WHERE INDICATED ON THE PLAN SHEETS.
13. UNLESS NOTED OTHERWISE ALL COUNTY ROAD CROSSINGS SHALL PROCEED ON A CONTINUOUS 24 HR. PER DAY BASIS UNTIL ALL PIPELINE CONSTRUCTION AND ROADWAY RECONSTRUCTION IS COMPLETE.
14. CONTRACTOR SHALL MAINTAIN AT LEAST ONE LANE OF TRAFFIC ON ALL COUNTY ROADS AT ALL TIMES, AND CONSTRUCT TEMPORARY BYPASS IF NECESSARY.
15. CONTRACTOR SHALL PROVIDE APPROPRIATE SIGNAGE, BARRICADES, FLAGMEN, ETC. REQUIRED TO MAINTAIN SAFE TRAFFIC FLOW AT ALL TIMES. ALL TRAFFIC CONTROL MEASURES SHALL BE IN ACCORDANCE WITH TXDOT'S MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
16. THE CONTRACTOR IS NOT REQUIRED TO RE-SEED DISTURBED AREAS, EXCEPT AS REQUIRED BY TXDOT; HOWEVER, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL DAMAGES TO PROPERTY OUTSIDE OF THE EASEMENT LIMITS, INCLUDING REVEGETATION COST.
17. CONTRACTOR MAY MOUND EXCESS TRENCH EXCAVATED MATERIAL OVER PIPE UP TO 1 FOOT IN HEIGHT ABOVE NATURAL GRADE. MOUND SHALL BE FREE OF BRUSH AND ROCK LARGER THAN TWO INCHES. MOUNDING IS NOT PERMITTED IN DEVELOPED PROPERTIES, ROADS, PAVED AREAS, OR OTHER AREAS AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
18. THE CONTRACTOR MAY NOT USE PRIVATELY OWNED ROADS, UNLESS HE OBTAINS PERMISSION FROM THE LANDOWNERS. CONTRACTOR SHALL REPAIR ANY AND ALL DAMAGE TO PRIVATE AND PUBLIC ROADS.
19. THE TEMPORARY ACCESS ROAD ADJACENT TO THE PIPELINE SHALL BE LEFT CLEAR AND GRADED IN CASE THE OWNER DECIDES TO INSTALL A PERMANENT ACCESS ROAD ALONG PORTIONS OF THE RIGHT OF WAY.
20. THE CONTRACTOR SHALL REPAIR IMMEDIATELY OR HAVE REPAIRED AT HIS COST ALL DAMAGED UTILITIES. REPAIRS SHALL BE MADE WITH SIMILAR OR BETTER MATERIALS.
21. AT LEAST 3 DAYS BEFORE COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL FILE A NOTICE OF INTENT (NOI) WITH TCEQ. THE NOTICE SHALL BE SENT TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, STORM WATER & GENERAL PERMITS TEAM, MC-228, P.O. BOX 13087, AUSTIN, TEXAS 78711-3087. THE NOI FORM AND PERMIT REQUIREMENTS MAY BE OBTAINED FROM TCEQ OR FROM THEIR WEBSITE (www.tceq.state.tx.us). THE CONTRACTOR SHALL PREPARE A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND OBTAIN AND FULLY COMPLY WITH THE TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES) PERMIT TXR 150000. QUESTIONS CONCERN THE NOI AND PERMIT REQUIREMENTS MAY BE ADDRESSED TO TCEQ AT 512-239-4524.
22. ALL EXCAVATION GREATER THAN 5 FEET DEEP SHALL COMPLY WITH O.S.H.A. TRENCH SAFETY STANDARDS.
23. NO CHANGE IN THE WORK PERFORMED REQUIRING MONETARY CHANGES SHALL BE AUTHORIZED WITHOUT WRITTEN APPROVAL BY THE ENGINEER.
24. CONTRACTOR SHALL CONTACT REPRESENTATIVE FROM GAS COMPANY BEFORE COMPLETING GAS LINE CROSSINGS.
25. THE CONTRACTOR SHALL FULLY COMPLY WITH ALL TCEQ REGULATIONS PERTAINING TO SEPARATION DISTANCES AS DESCRIBED IN SECTION 317.13 OF THE ATC DESIGN CRITERIA FOR SEWERAGE SYSTEMS.
26. ALL ASPHALT OR CONCRETE DRIVEWAYS SHALL BE SLICK BORED (NO SEPARATE PAY) AND ALL PAVEMENT OR CONCRETE THAT IS CUT SHALL BE REPAIRED PER THE SPECIFICATIONS (NO SEPARATE PAY).



PROJECT INDEX MAP

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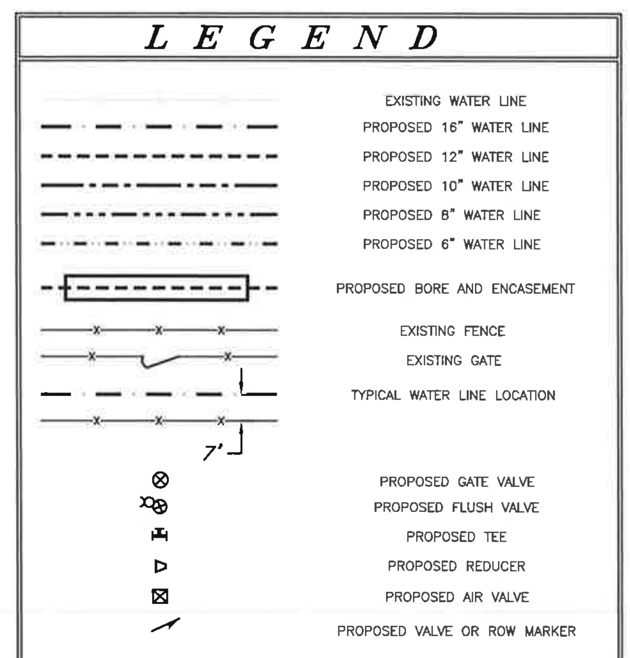

SHEET LIST:

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817-594-9880
FIRM # F-2448

CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS
GENERAL NOTES, INDEX AND INDEX

NO.	REVISION	DATE

SCALE	AS SHOWN
PROJECT #	15380
DESIGNED	K.M.
DRAWN	R.M.
CHECKED	K.M.

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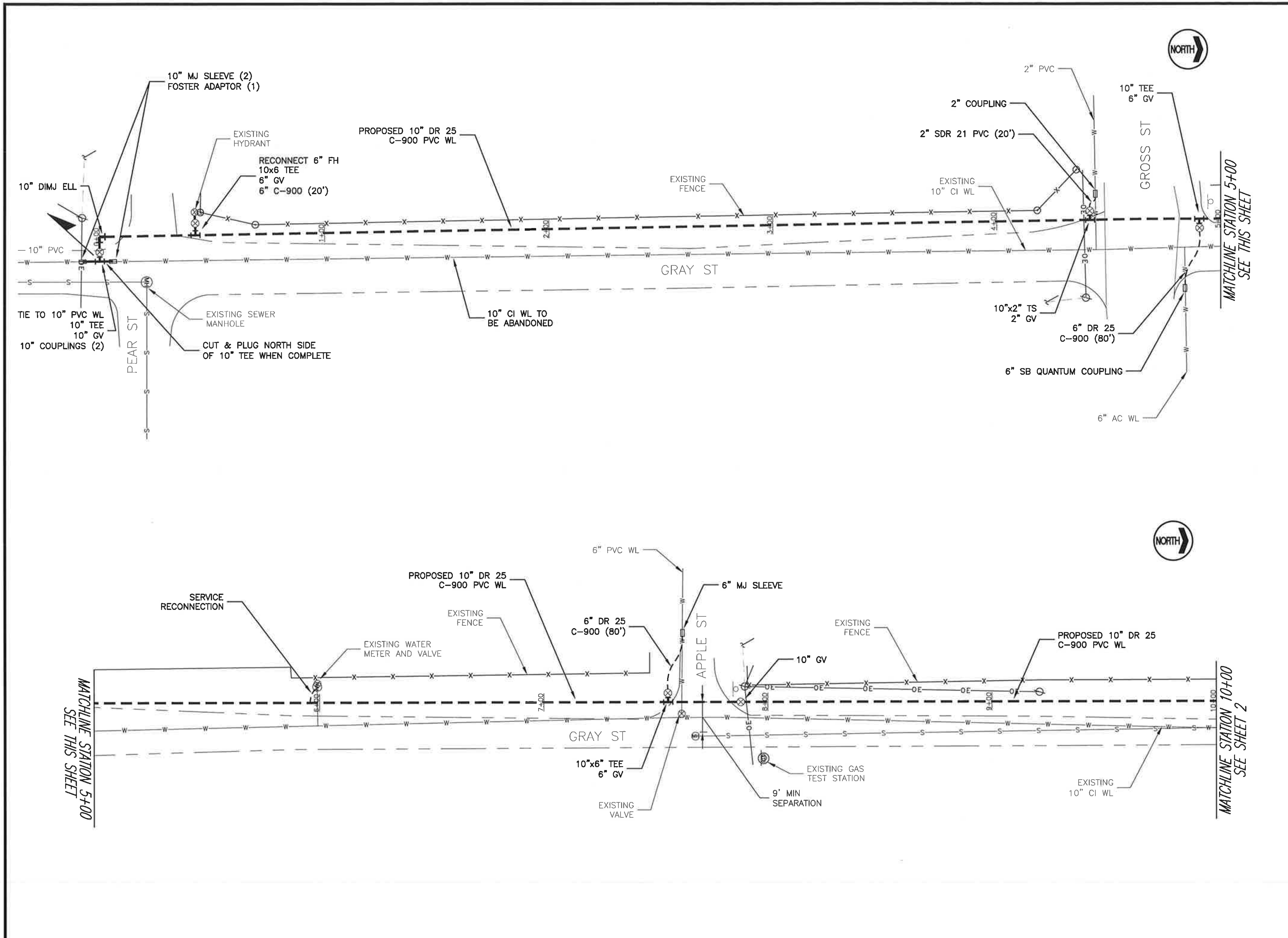
SHEET 1

SEQ. 1 OF 20



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CITY OF COLEMAN

GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS

PLAN VIEW

NO.	REVISION	DATE

SCALE: 1" = 40'
PROJECT # 15380
DESIGNED: K.M.
DRAWN: R.M.
CHECKED: K.M.

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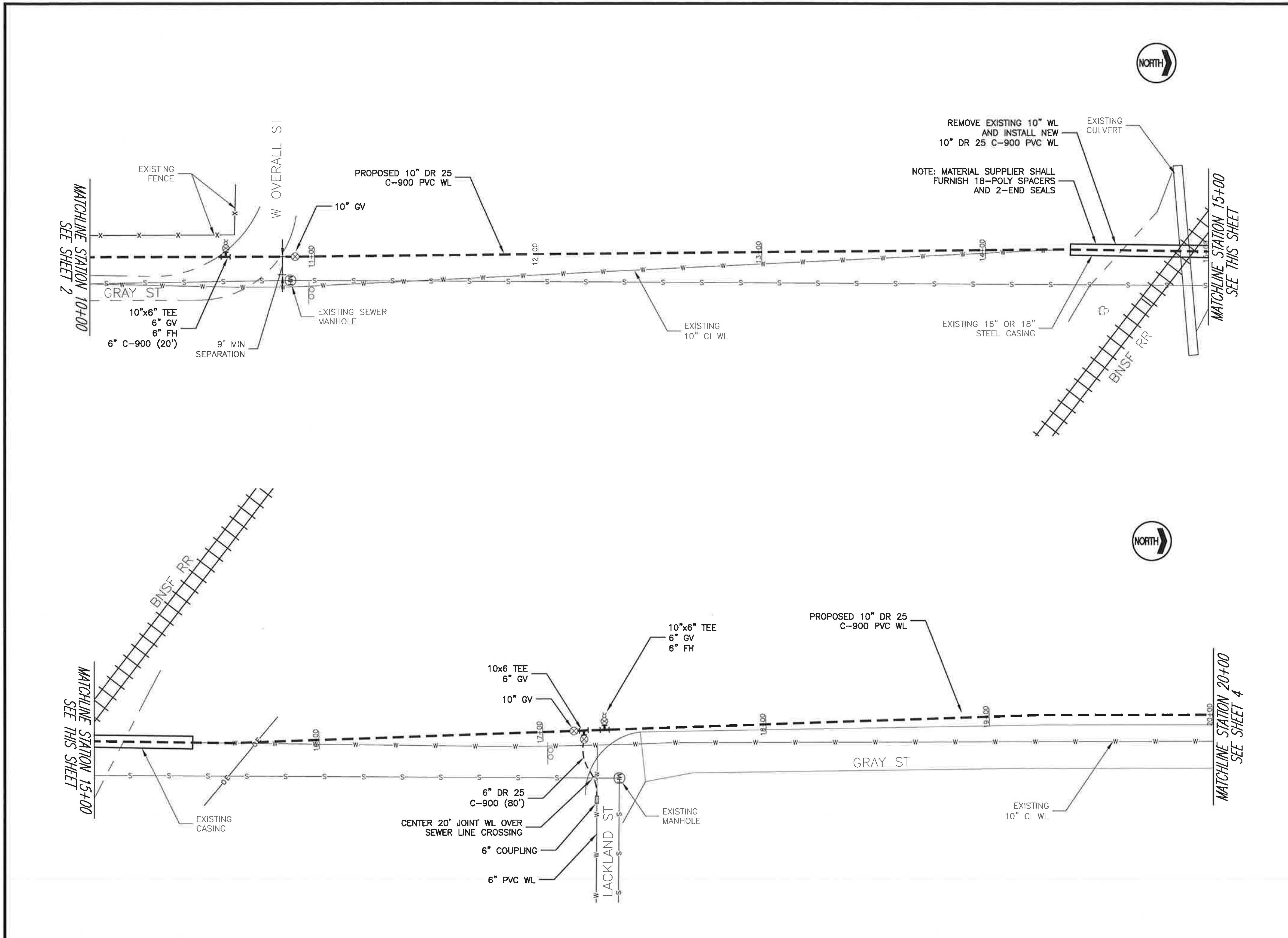

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PLAN VIEW

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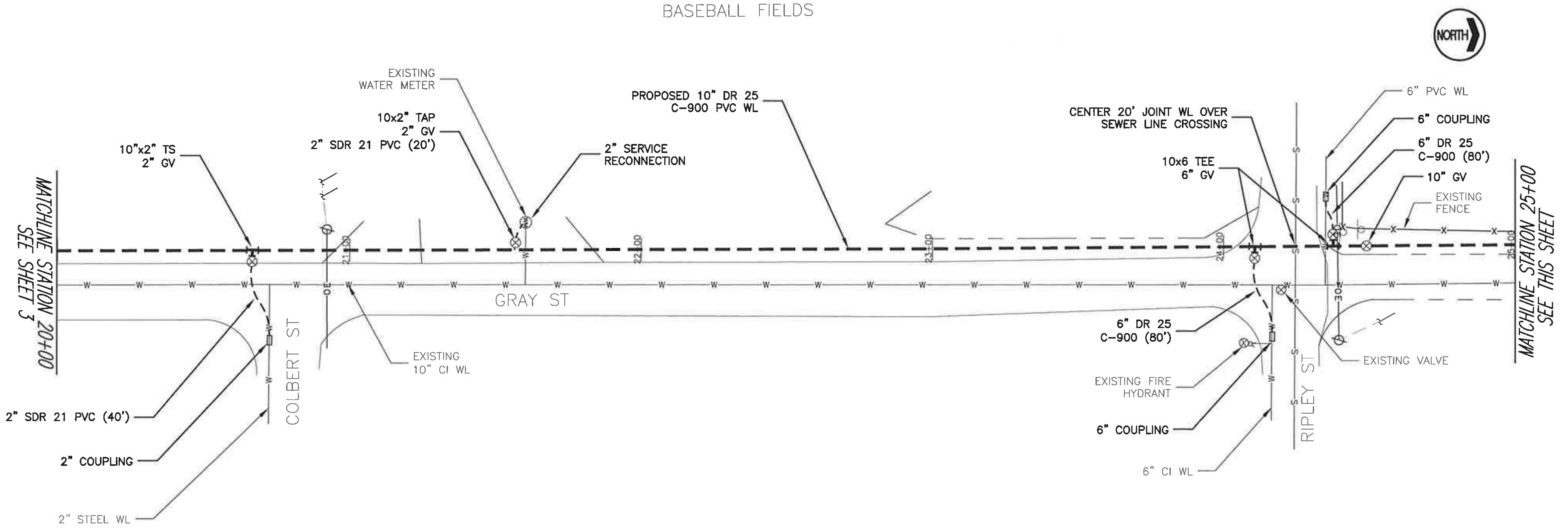

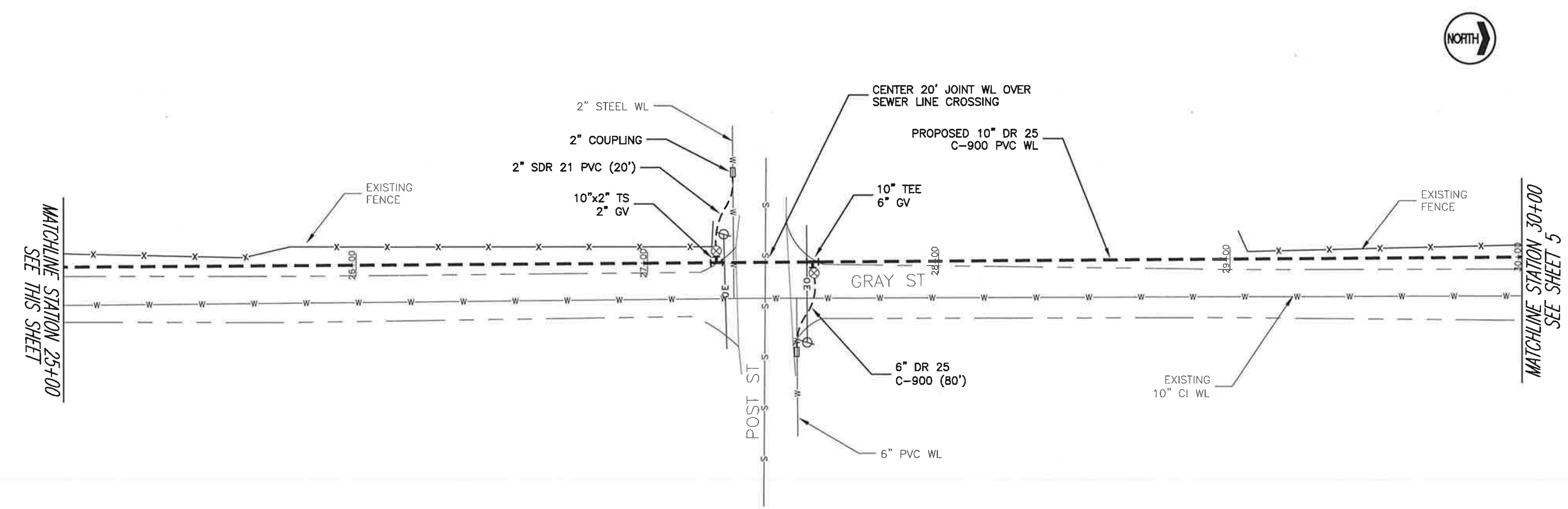

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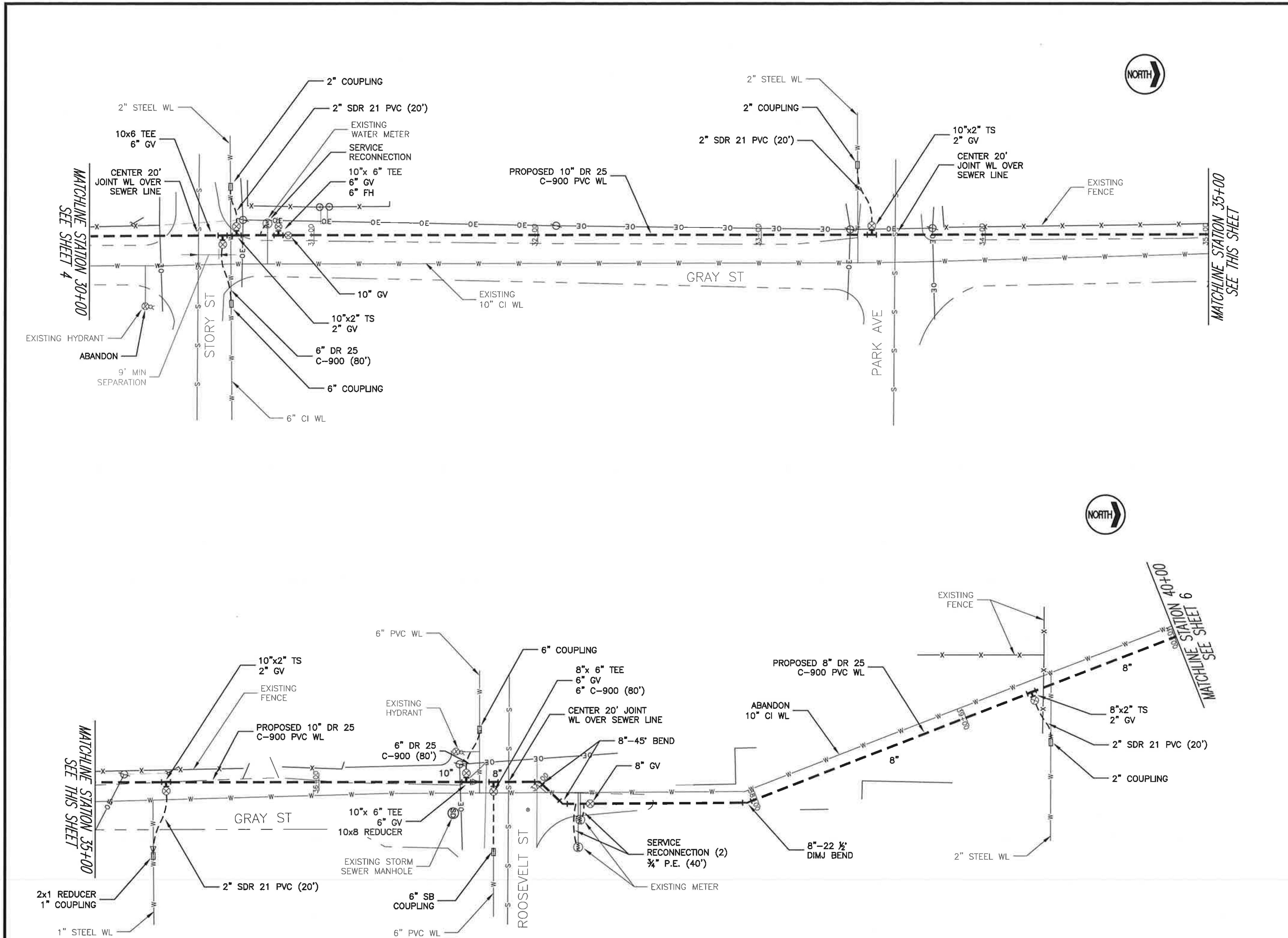

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CITY OF COLEMAN

GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS

PLAN VIEW

SCALE	1" = 40'
PROJECT #	15380
DESIGNED	K.M.
DRAWN	R.M.
CHECKED	K.M.

NO.	REVISION	DATE

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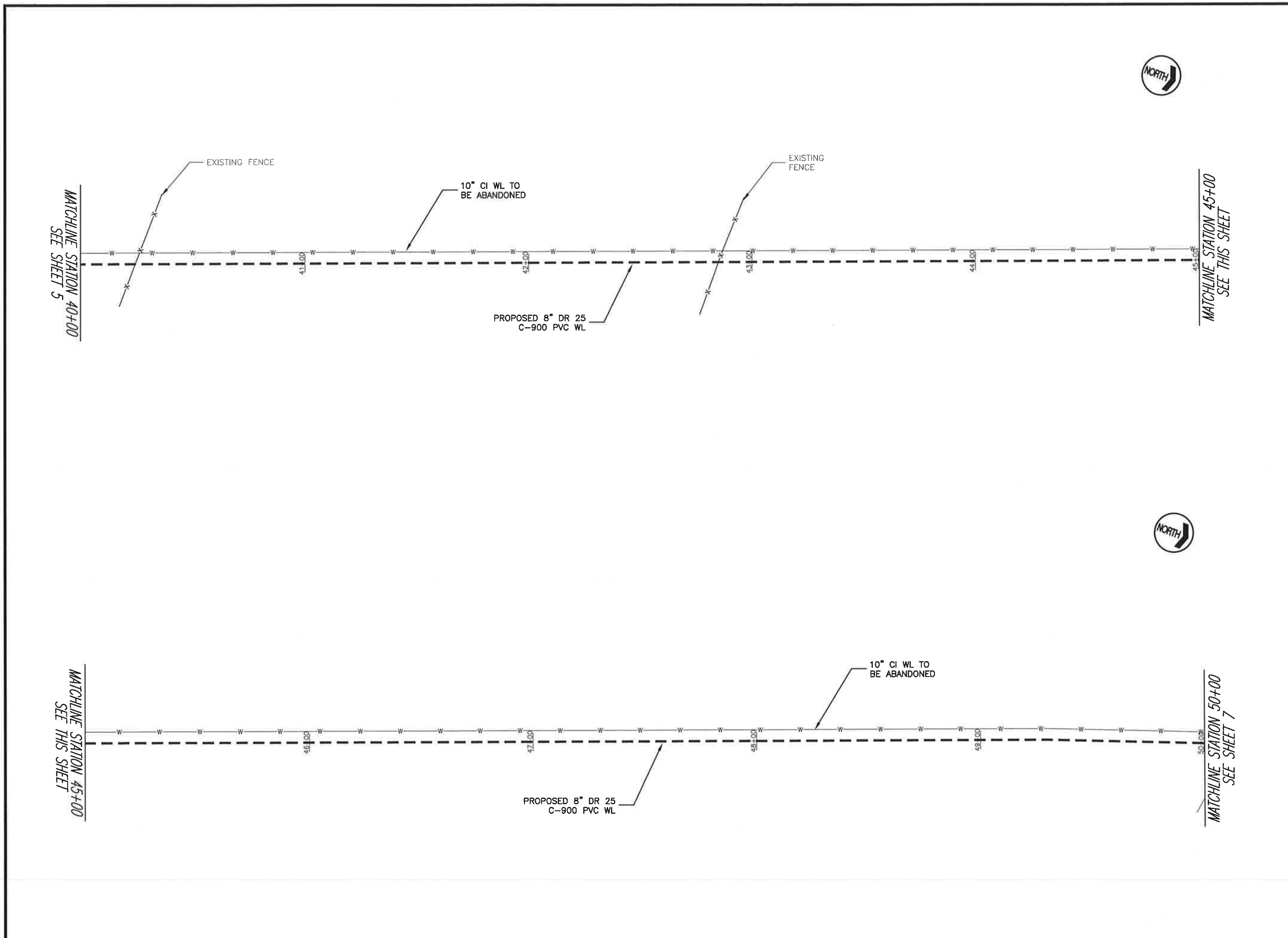
SHEET 5

SEQ. 5 OF 20



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GRAY STREET WATER LINE REPLACEMENT

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SHEET 6

SEQ. 6 OF 20

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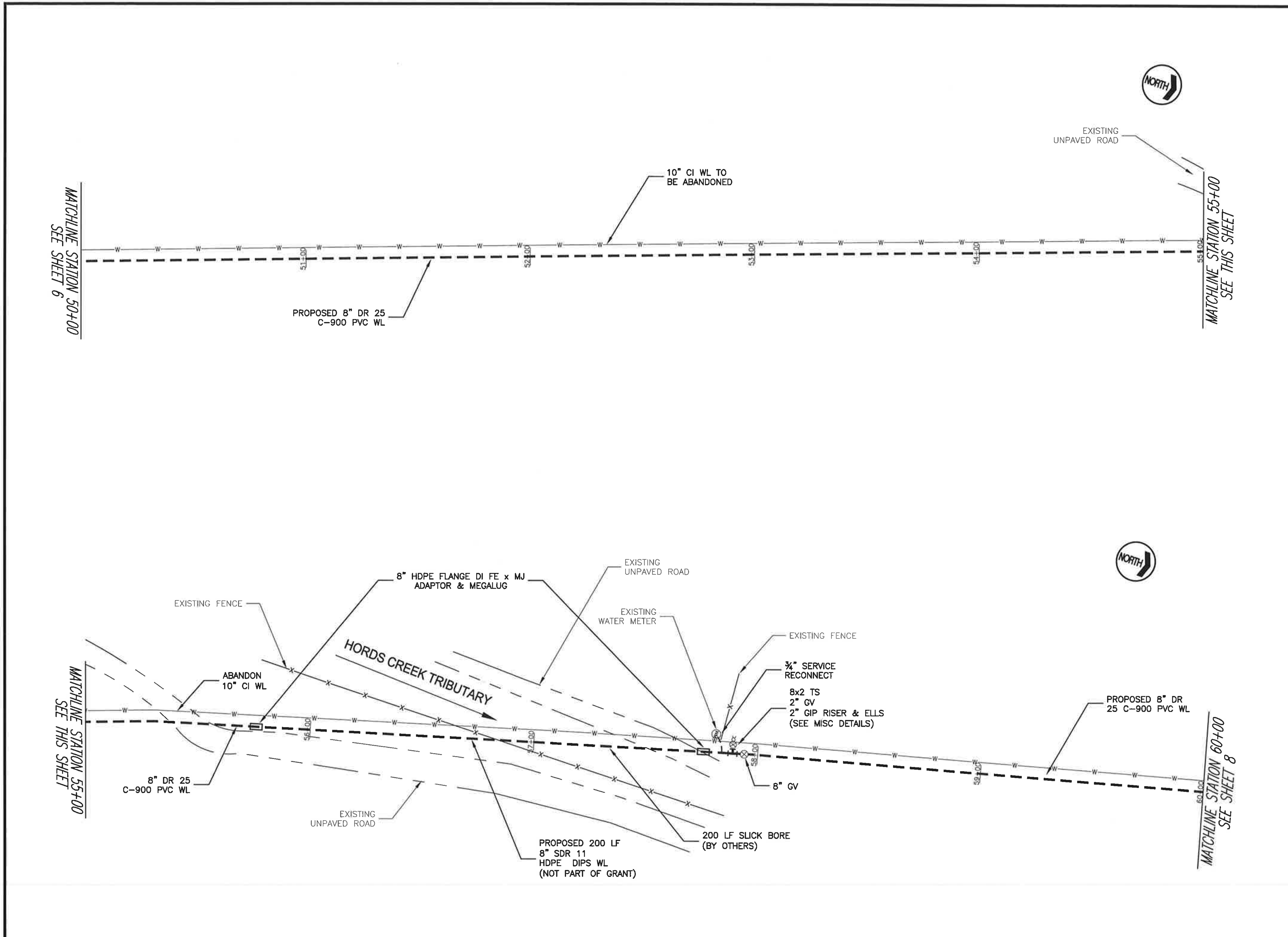

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CITY OF COLEMAN

GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS

PLAN VIEW

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SHEET 7

SEQ. 7 OF 20

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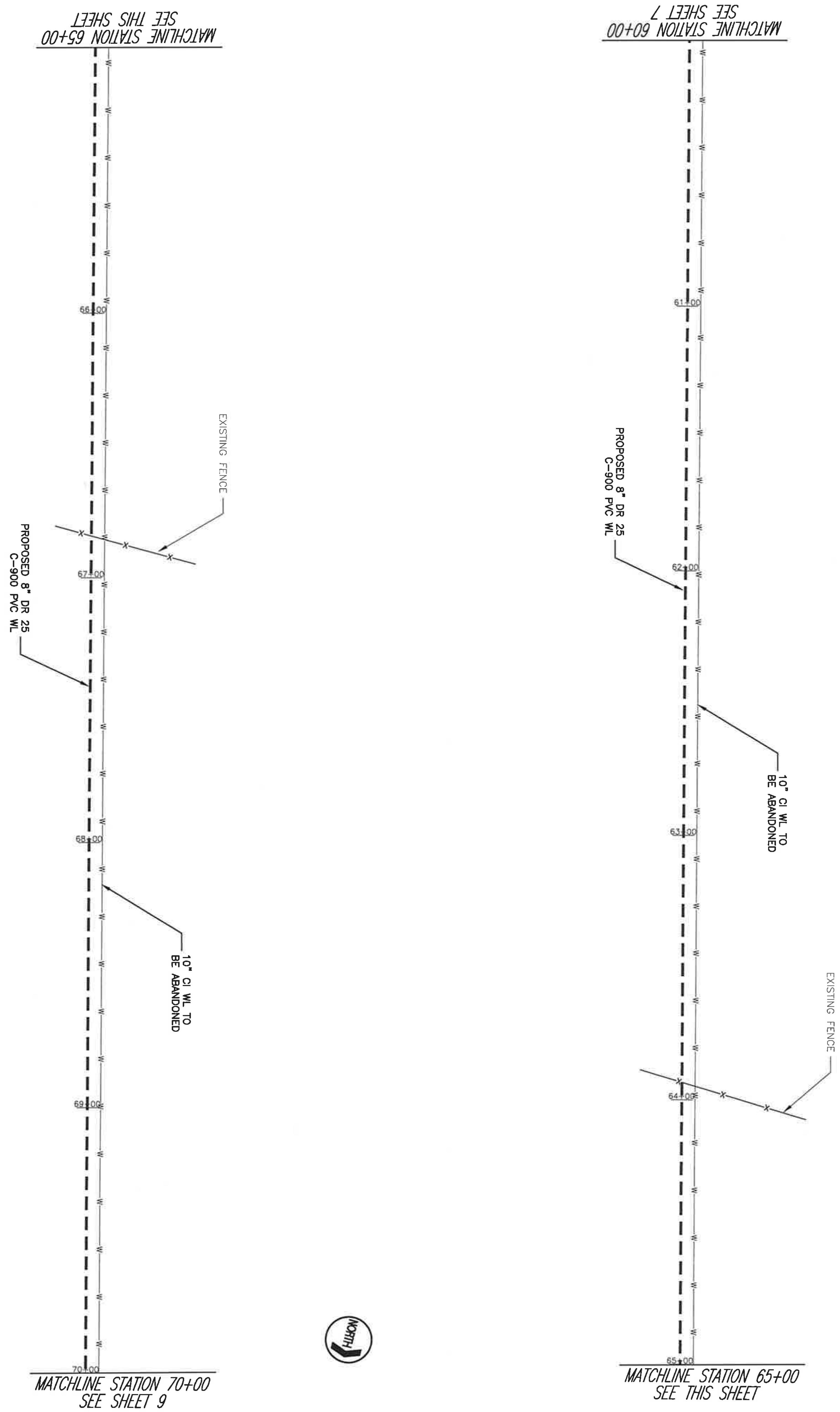

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CITY OF COLEMAN

GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS

PLAN VIEW

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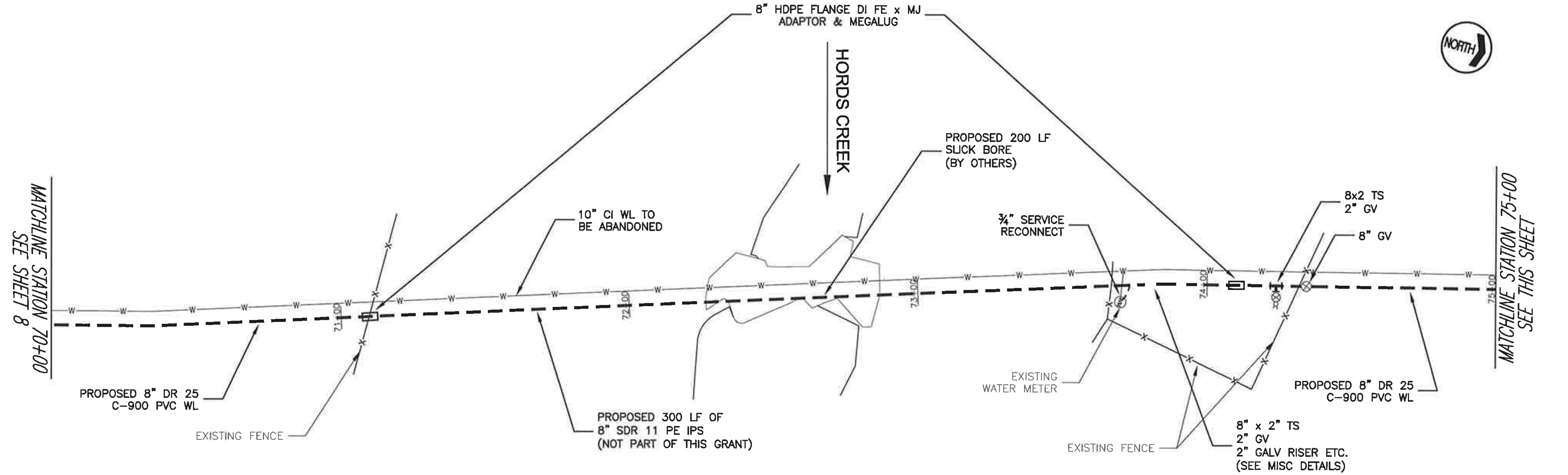
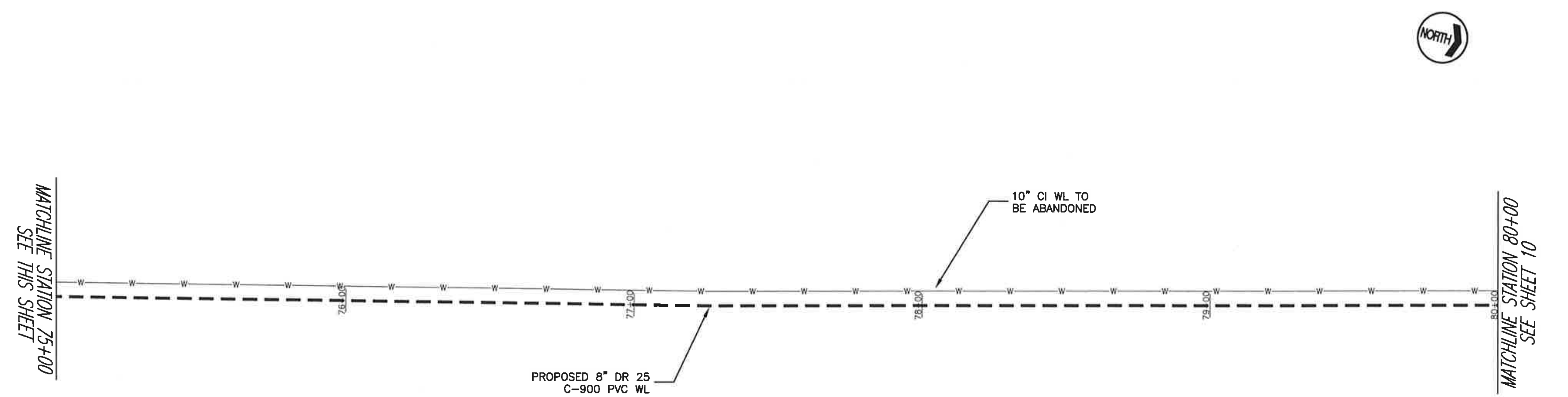
SHEET 8

SEQ. 8 OF 20





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CITY OF COLEMAN

GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS

PLAN VIEW

NO.	REVISION	DATE

SCALE	1" = 40'
PROJECT #	15380
DESIGNED	K.M.
DRAWN	R.M.
CHECKED	K.M.

BAR IS ONE INCH IN LENGTH ON ORIGINAL DRAWING. CHECK SCALE & ADJUST ACCORDINGLY.

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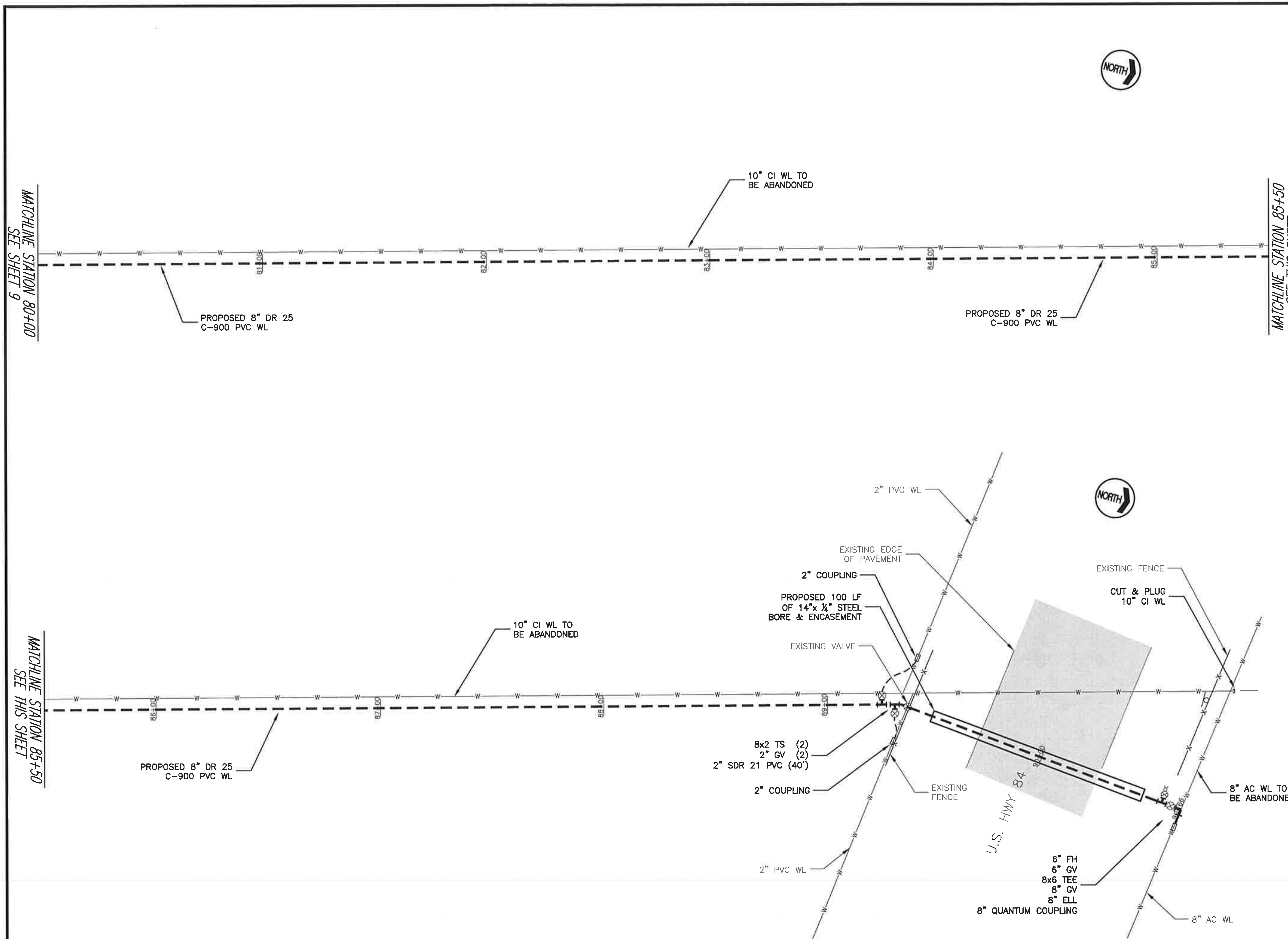

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CITY OF COLEMAN

GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS

PLAN VIEW

SCALE	1" = 40'	
PROJECT # 15380		
DESIGNED	K.M.	
DRAWN	R.M.	
CHECKED	K.M.	

NO.	REVISION	DATE

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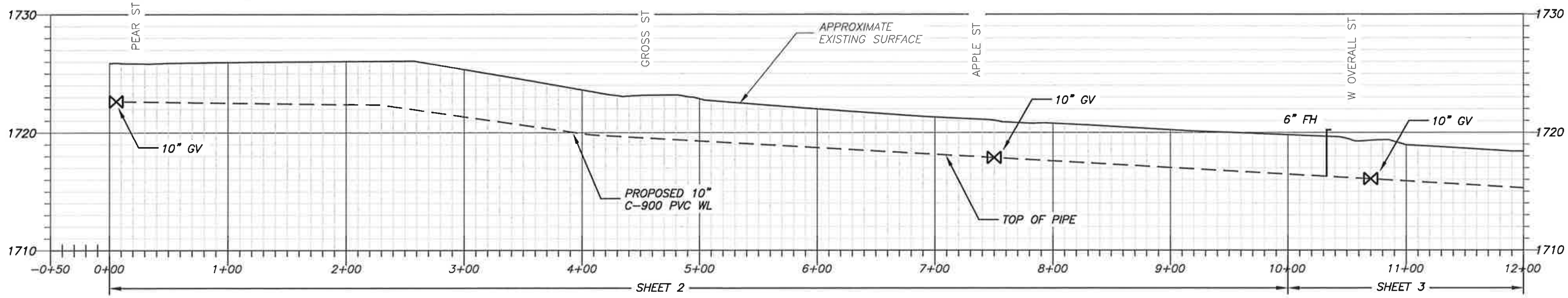
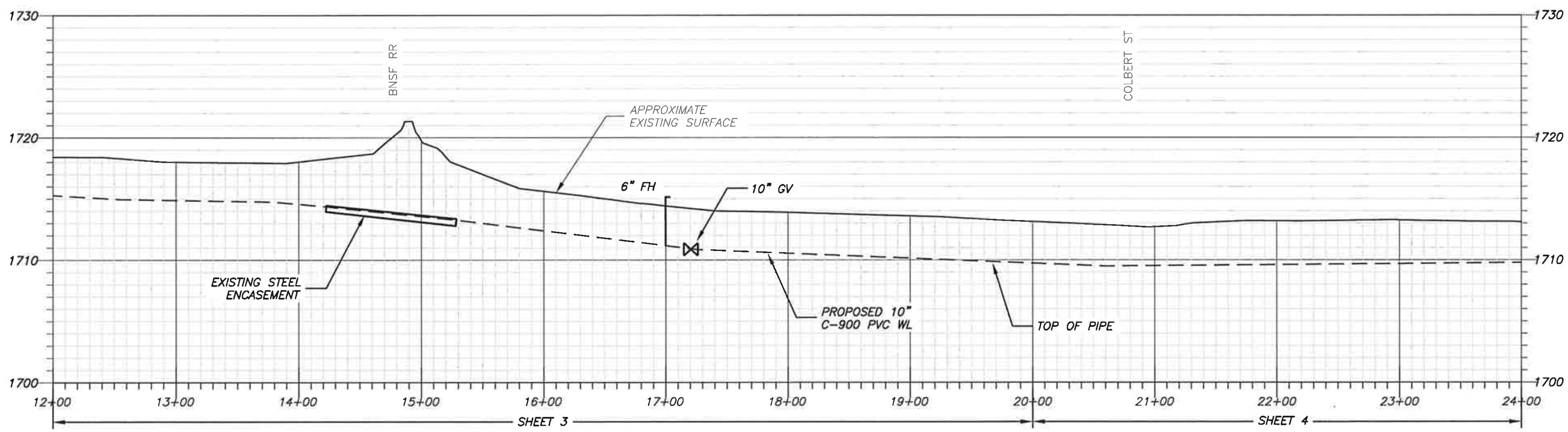
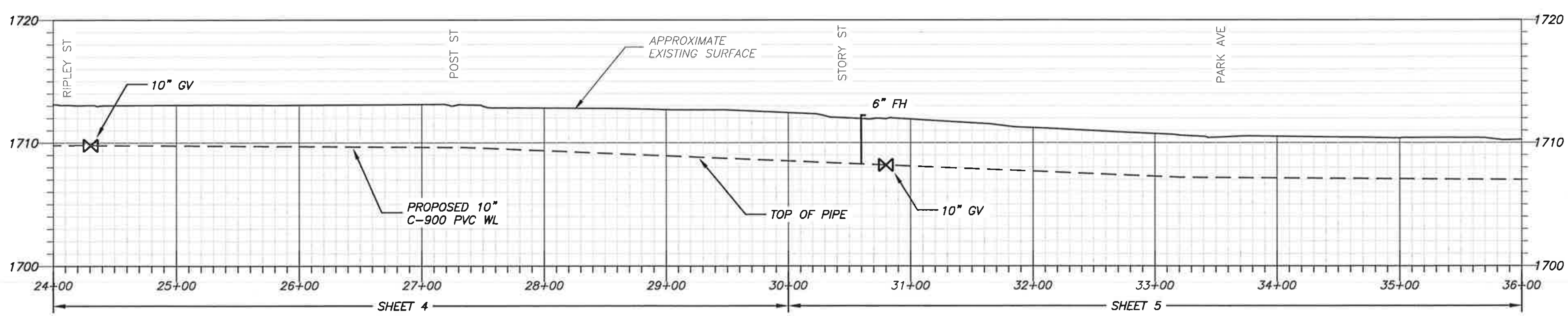
SHEET 10

SEQ. 10 OF 20







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CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS
PROPOSED WATER LINE PROFILE

SCALE V: 1" = 20' H: 1" = 200'
PROJECT # 15380
DESIGNED K.M.
DRAWN R.M.
CHECKED K.M.

NO. | REVISION | DATE

BAR IS ONE INCH IN LENGTH ON ORIGINAL DRAWING. CHECK SCALE & ADJUST ACCORDINGLY.

SHEET 11
SEQ. 11 OF 20

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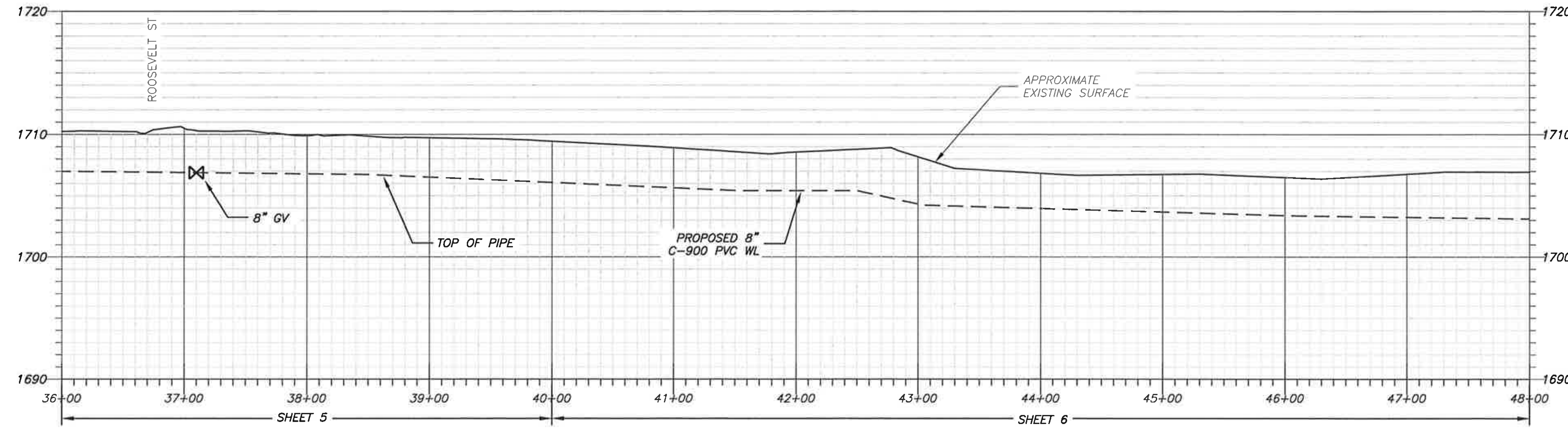

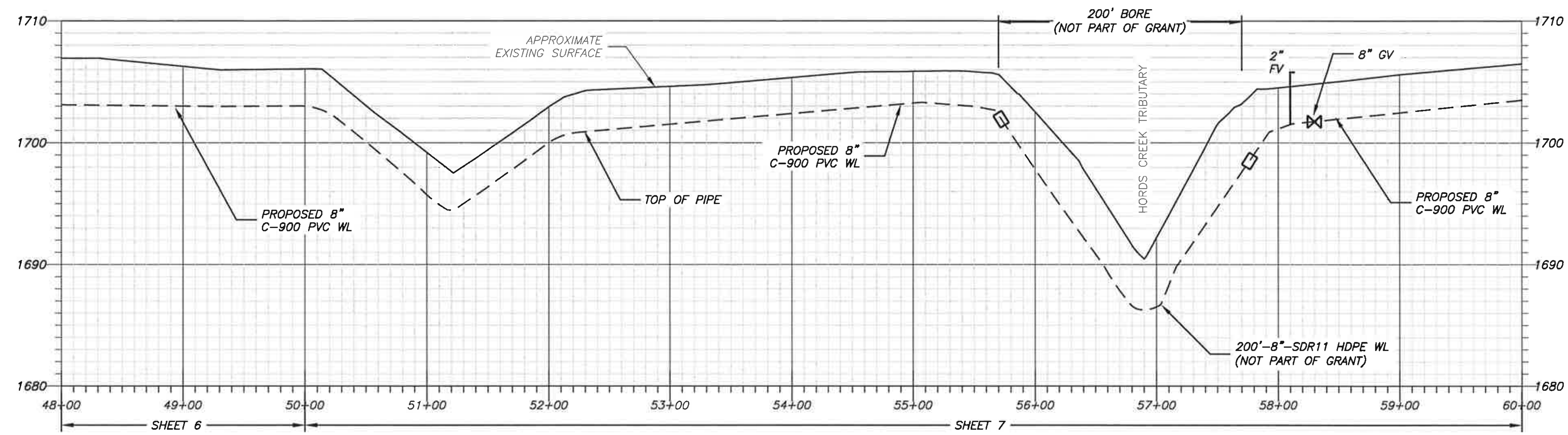

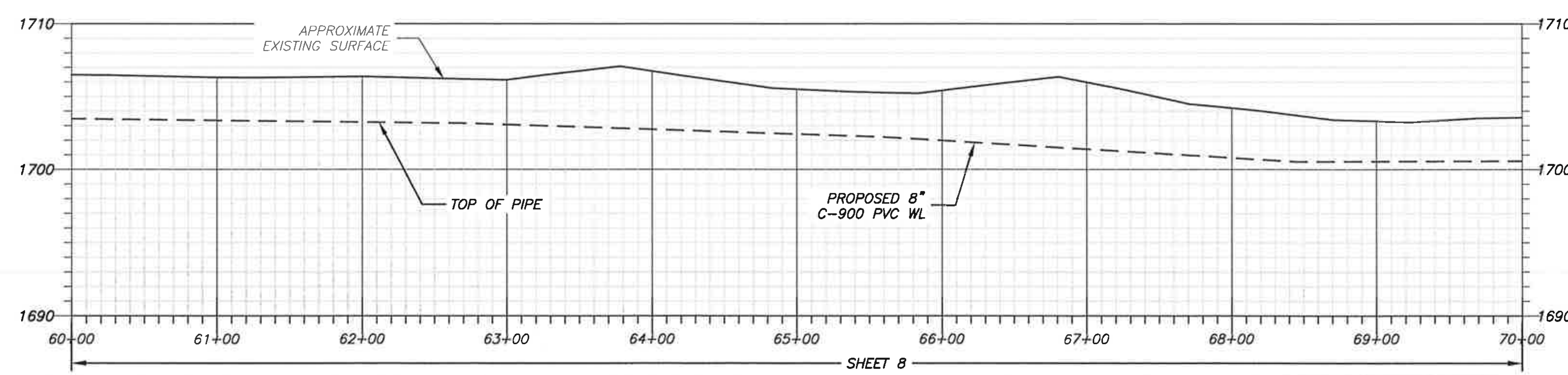

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FIRM# F-2448

CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS
PROPOSED WATER LINE PROFILE

SCALE V: 1" = 10' H: 1" = 100'
PROJECT # 15380
DESIGNED K.M.
DRAWN R.M.
CHECKED K.M.

NO.	REVISION	DATE

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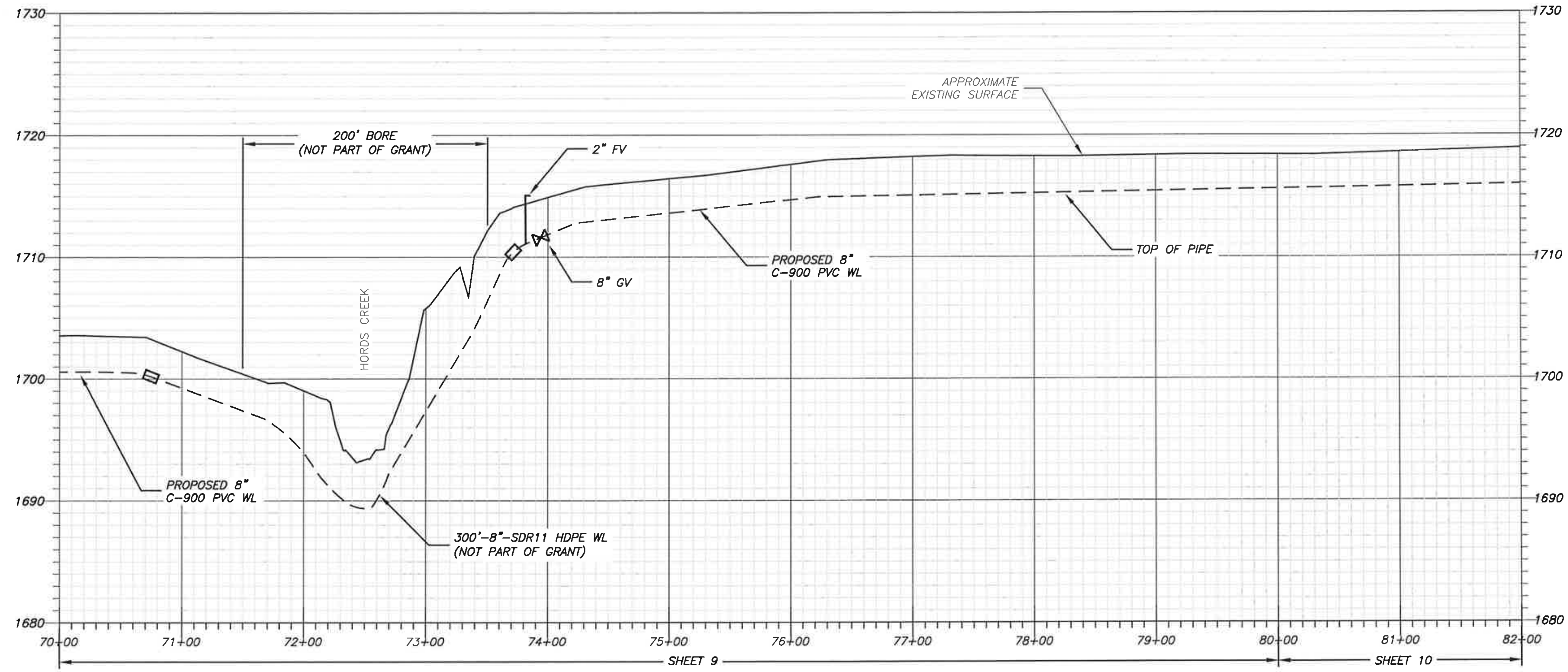
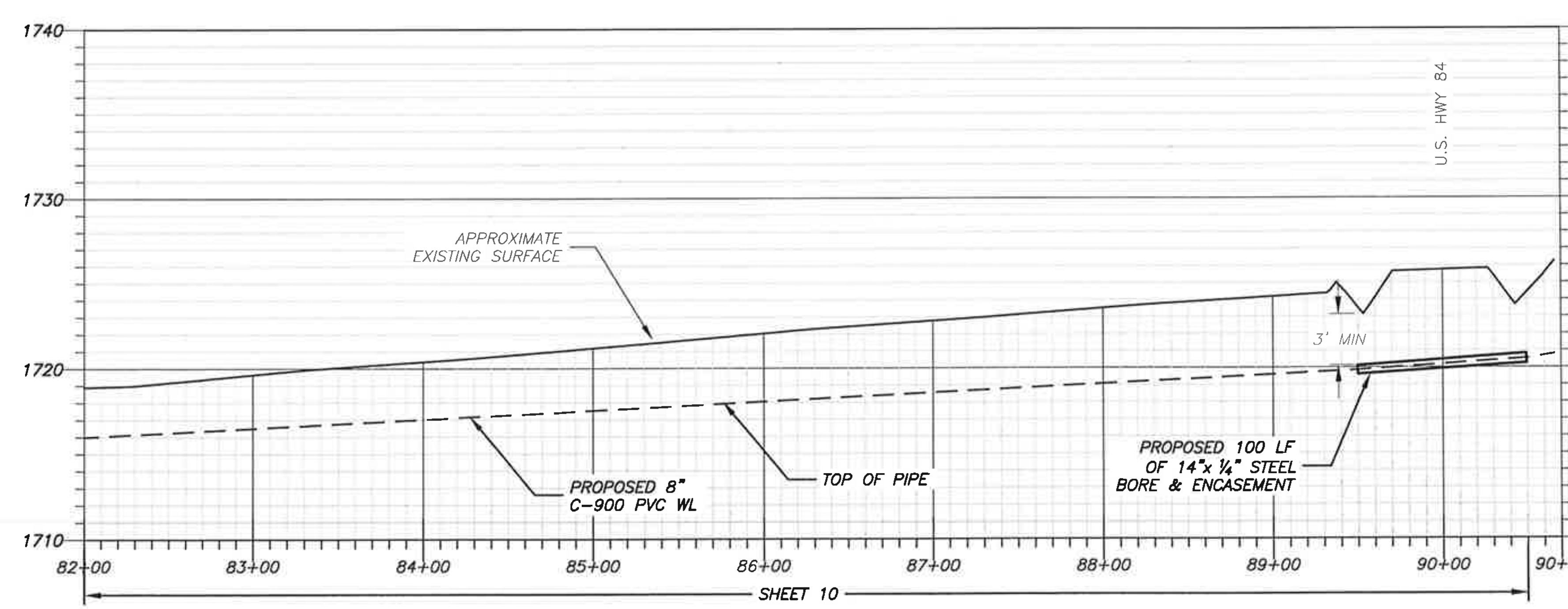
SHEET 12
SEQ. 12 OF 20

X:\C_Coleman\15380 - TDA Gray Street Water Line Replacement\Drafting_Plans_C_Civil\Final\SHEET 12 PROFILE.dwg





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CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS
PROPOSED WATER LINE PROFILE

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PROJECT #	15380
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CHECKED	K.M.

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SHEET 13

SEQ. 13 OF 20

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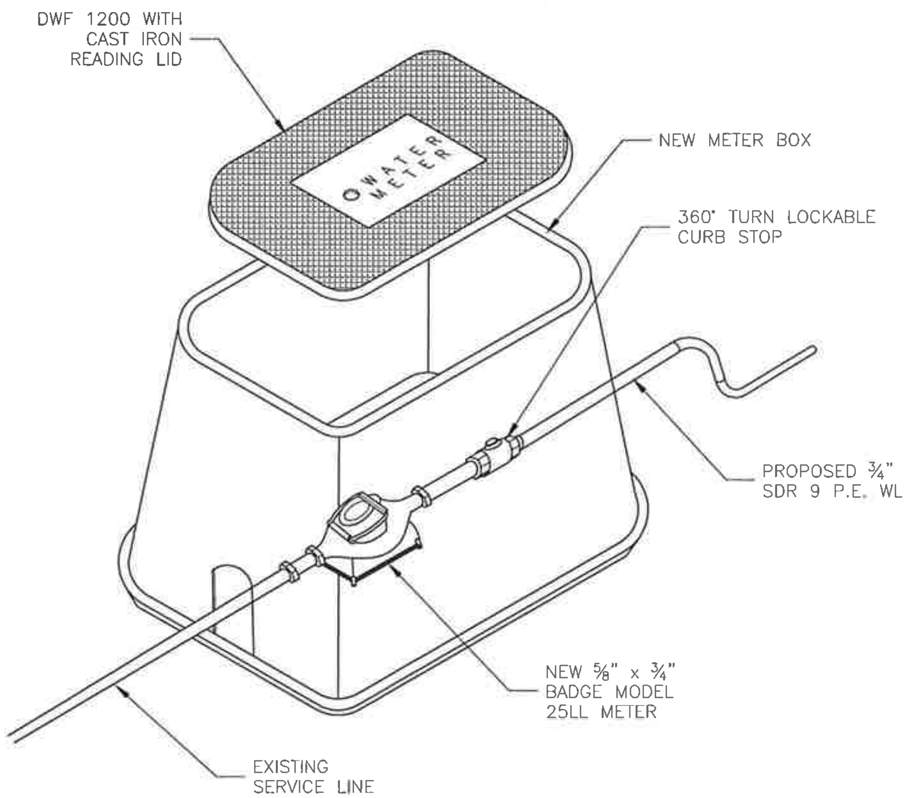
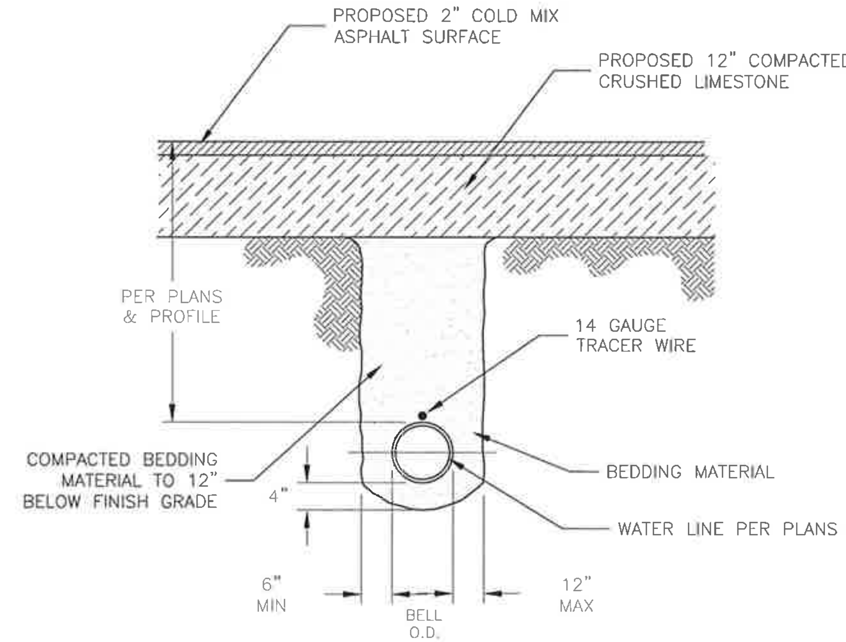


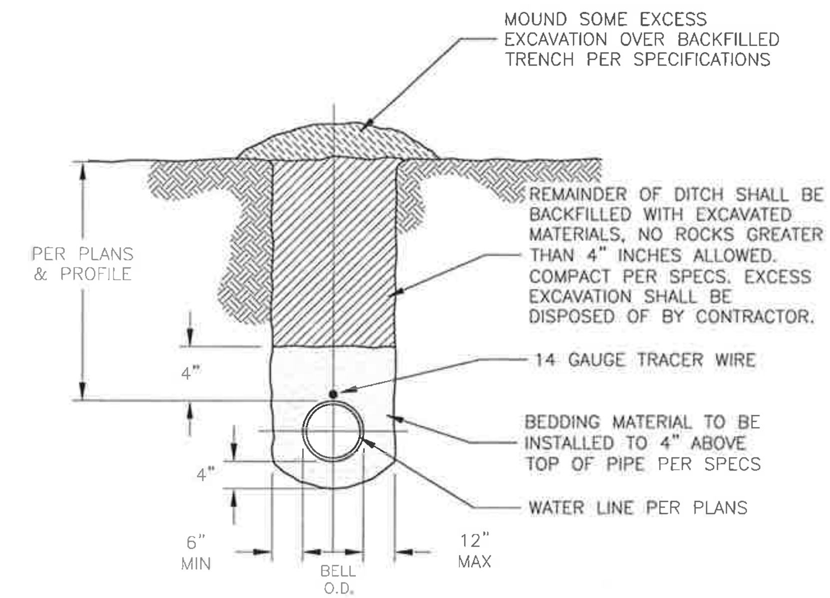
SERVICE METER RECONNECTION
NTS

NOTE:
CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL AS REQUIRED BY OWNER

NOTE:
BEDDING MATERIAL SHALL BE FURNISHED TO THE CITY YARD.

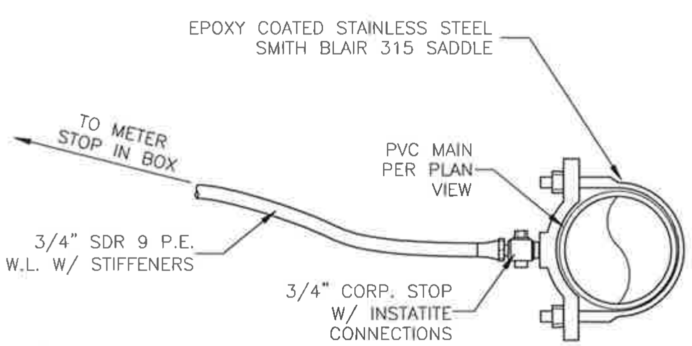


TRENCH WITHIN PAVED STREET

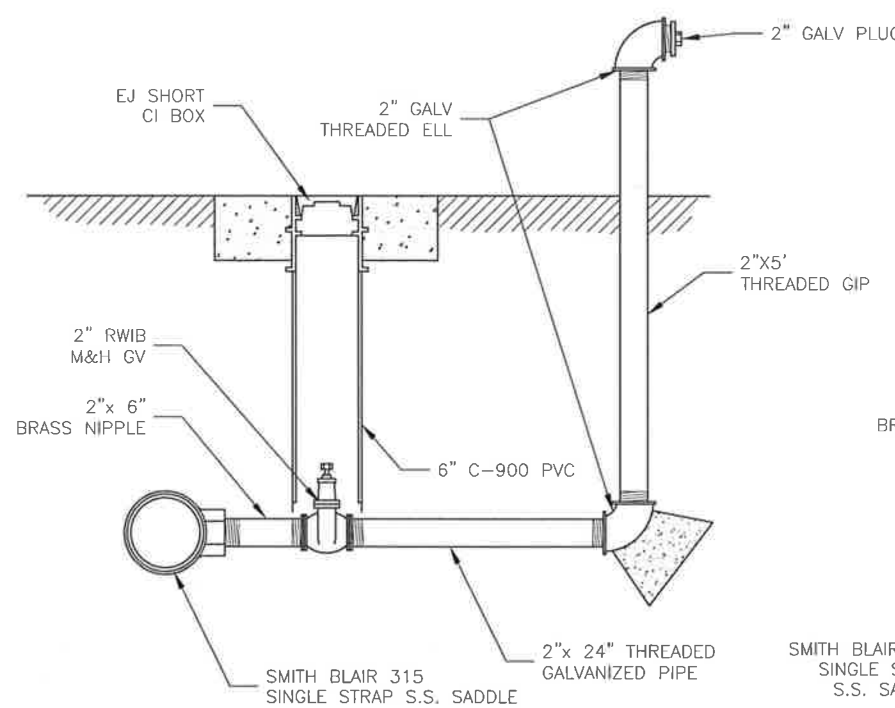


TRENCH OUTSIDE OF STREET

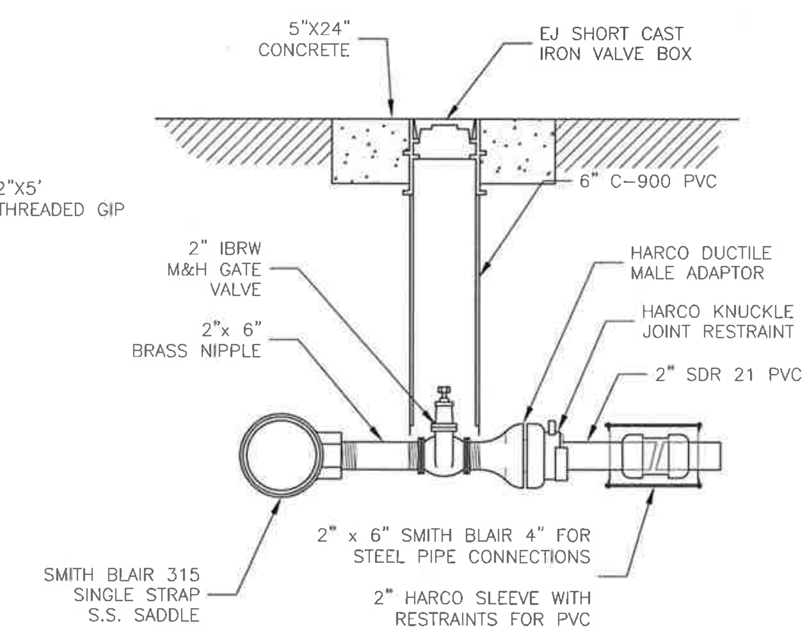
TYPICAL TRENCH SECTIONS
NTS



SERVICE CONNECTION FROM MAIN W.L.
NTS



2" FLUSH VALVE
NTS



2" BRANCH LINE CONNECTION
NTS

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CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS
TRENCHING AND CONNECTION DETAILS

SCALE: NOT TO SCALE
PROJECT # 15380
DESIGNED: K.M.
DRAWN: R.M.
CHECKED: K.M.

NO. | REVISION | DATE

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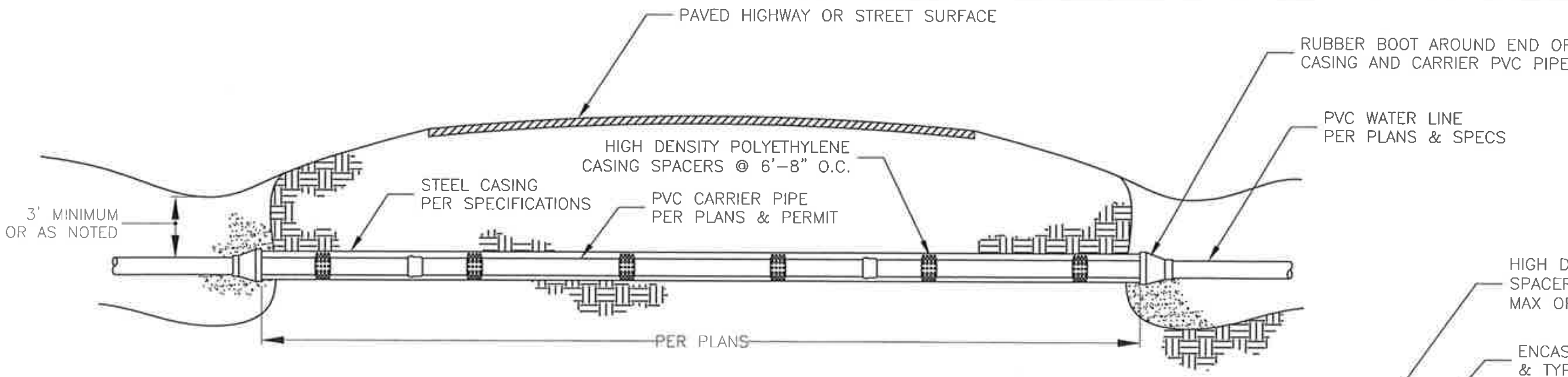
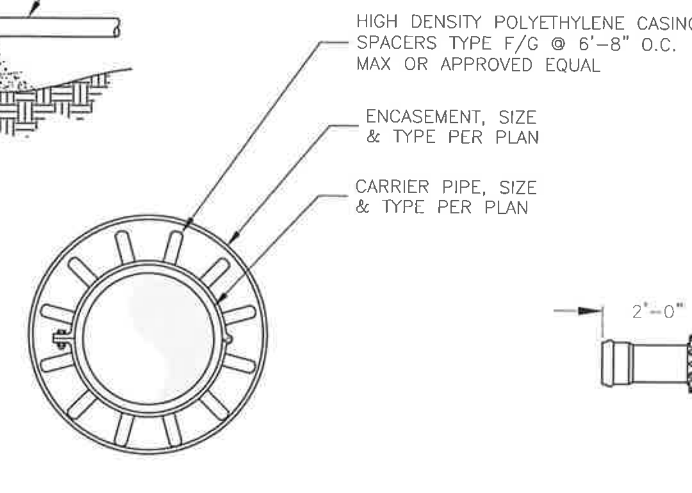
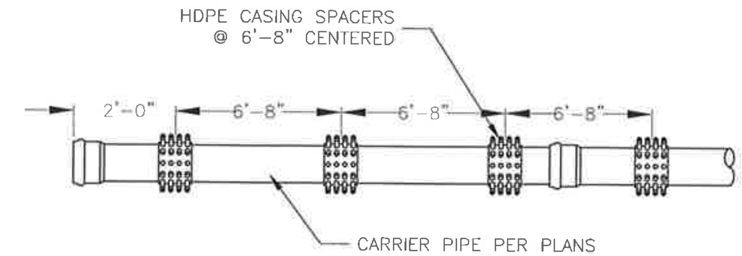
SHEET 14
SEQ. 14 OF 20



ROAD ENCASEMENT FOR PVC WATER LINE
NTS



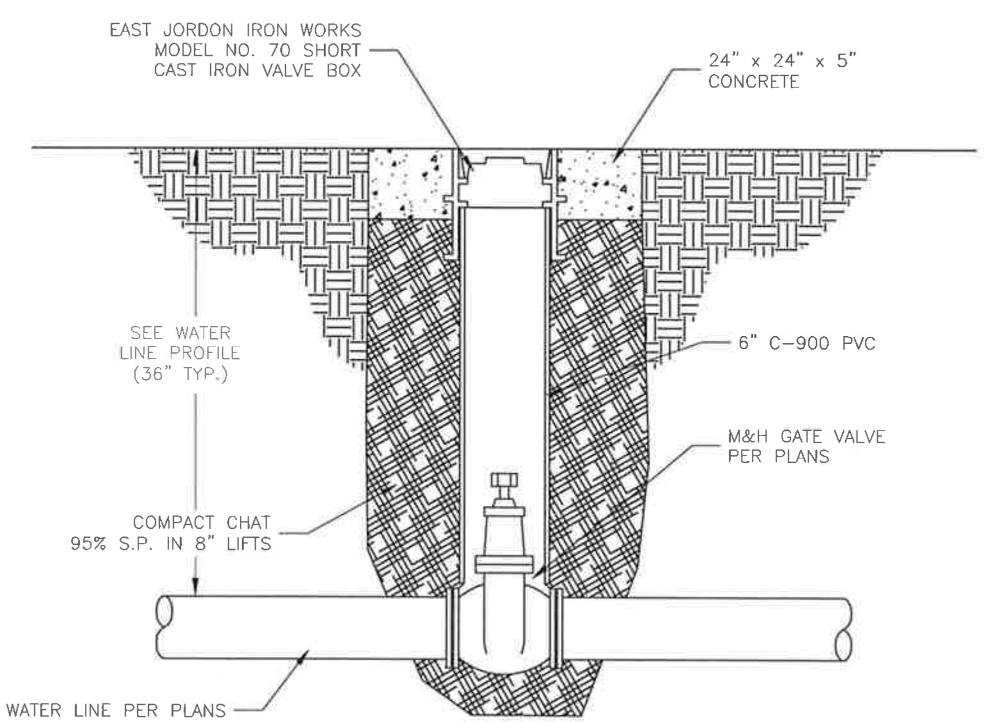
SPACER SECTION DETAIL



SPACING DETAIL

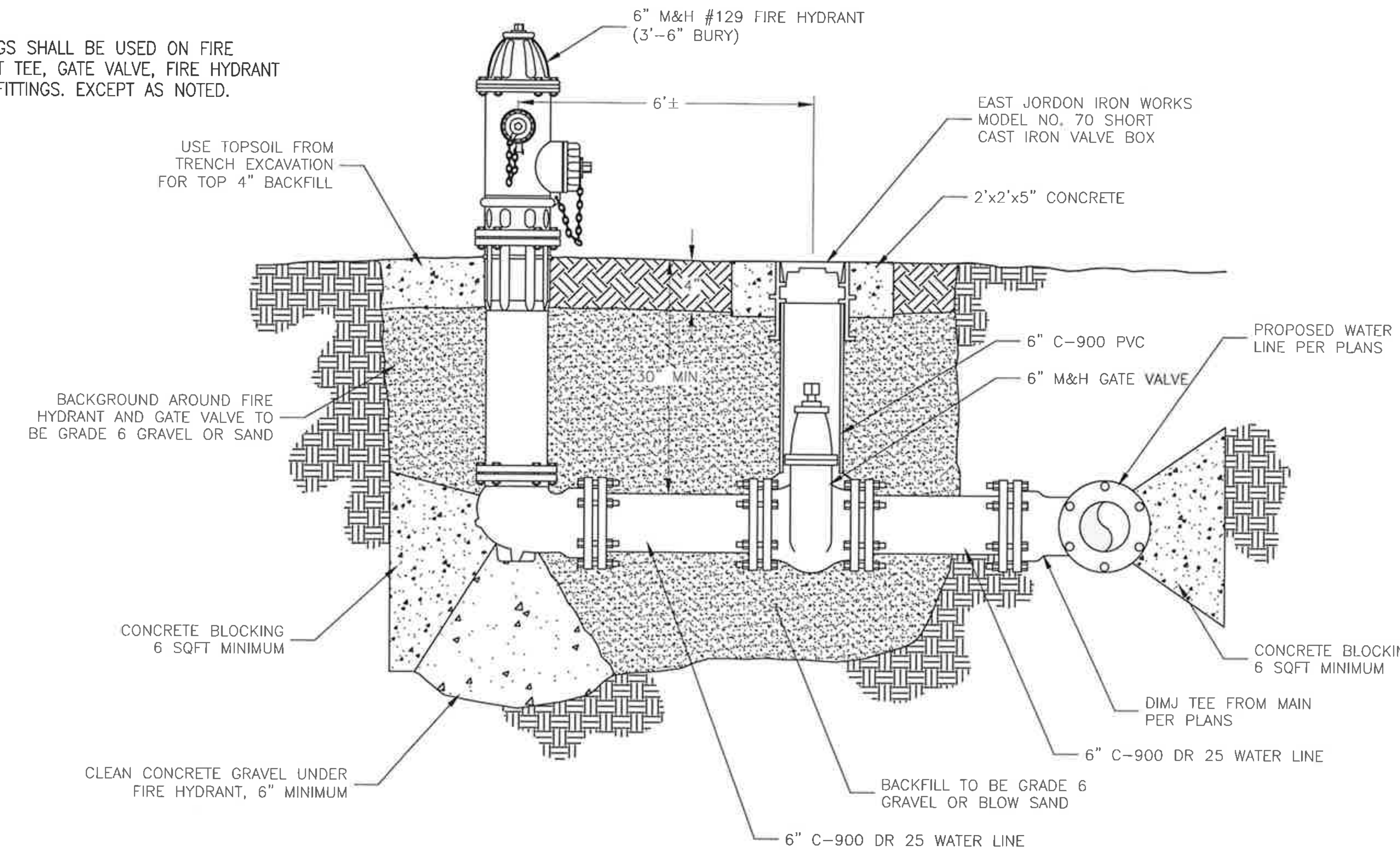
ENCASEMENT SPACER DETAILS
NTS

NOTE:
ALL BURIED VALVES SHALL BE FURNISHED WITH VALVE BOX.



GATE VALVE & BOX
NTS

NOTE:
MEGALUGS SHALL BE USED ON FIRE HYDRANT TEE, GATE VALVE, FIRE HYDRANT & ALL FITTINGS. EXCEPT AS NOTED.



6" FIRE HYDRANT DETAIL
NTS

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CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT
CONSTRUCTION DRAWINGS
VALVE, BORE & ENCASEMENT DETAILS

SCALE	NOT TO SCALE
PROJECT #	15380
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DRAWN	R.M.
CHECKED	K.M.

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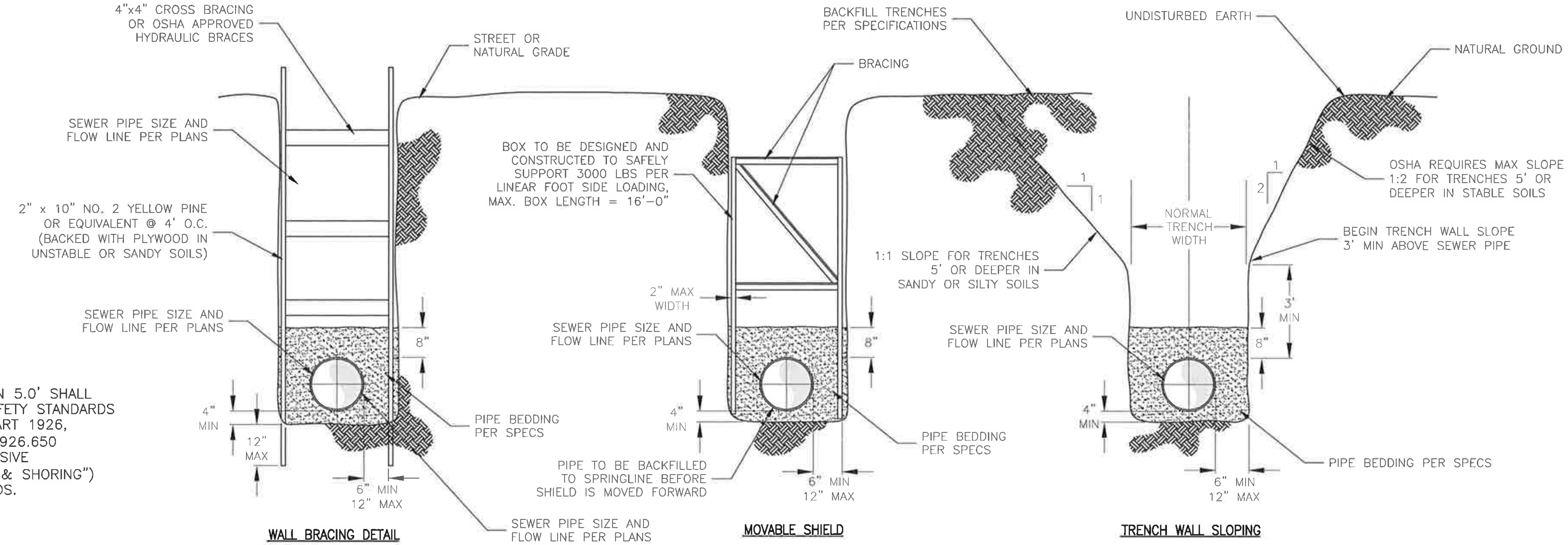
SHEET 15

SEQ. 15 OF 20

X:\CL_Coleman\15380 - TDA Gray Street Water Line Replacement\Drafting_Plans_C_Civil\Final\SHEET 15 VALVE BORE AND ENCASEMENT DETAILS.dwg

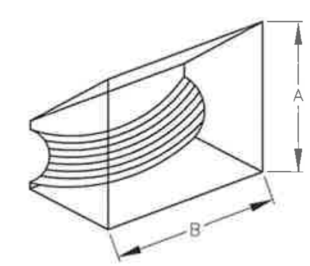


TRENCH SAFETY NOTE:
EXCAVATIONS DEEPER THAN 5.0' SHALL MEET O.S.H.A. TRENCH SAFETY STANDARDS PER REQUIREMENTS OF PART 1926, SUBPART "P", SECTIONS 1926.650 THROUGH 1926.653 INCLUSIVE ("EXCAVATION, TRENCHING & SHORING") OF THE O.S.H.A. STANDARDS.

TRENCH WALL PROTECTION
NTS

NOTE: The Material supplier shall furnish and deliver all incidental material, gasket sets, bolts, nuts, rings, pipe dope, etc as required for a complete product whether or not called out on the plans. The Material supplier shall also furnish and deliver all material required for the installation of the project as shown on the plans and as noted below.

1. All fittings 4" and larger shall be compact ductile iron with megalug joint restraints. All fittings 3" and smaller shall be Harco ductile iron with knuckle joint restraints.
2. For branch connections to 6" PVC lines, a sleeve with megalugs shall be used instead of a coupling. For 6" cast iron or asbestos cement branch lines, a 6" x 12" Smith Blair Quantum coupling shall be used.
3. For 2" branch line connections, a 2" x 6" Smith Blair 411 coupling shall be used for steel pipe, 2" Harco sleeve with restraints for 2" PVC branch line, and all fittings smaller than 4" shall be Harco ductile iron with knuckle joint restraints instead of MJ cast iron with megalugs.
4. For the Connection of HDPE with C-900 PVC, supplier shall furnish fusible HDPE Flanges and Flange x MJ adaptors with megalugs for each end. The HDPE pipe shall be IPS or Iron Pipe Size.
5. Brass material shall be as manufactured by Ford. The meter stop for service meters shall be straight and it shall have a 360 degree lockable operator.
6. The service saddles shall be epoxy coated stainless steel Smith Blair 315.



TYPICAL BLOCKING DIMENSIONS
NTS

DIMENSIONS FOR CONCRETE THRUST BLOCKS			
Pipe Dia. Size (inches)	Minimum Soil Bearing Area Required (Square Feet)	Typical Dimensions Of Bearing Area In Inches (A x B)	Typical Volume Of Conc. Required (Cubic Feet) *
2	2.0	12" x 24"	3.0
2 1/2	2.5	12" x 30"	4.0
3	3.0	14" x 30"	4.5
4	4.0	18" x 32"	6.0
6	6.0	24" x 36"	9.0
8	8.0	29" x 40"	12.0
10	10.0	30" x 48"	15.0
12 & 14	12.0	36" x 48"	18.0

* VARIES CONSIDERABLY W/DISTANCE BETWEEN PIPE AND BEARING POINT

NOTE: ONLY DOMESTIC FITTINGS SHALL BE USED.

NOTES:
BLOCKING REQ'D. ON ALL BENDS 2" & LARGER. ALL REQ'D. BENDS & FITTINGS ARE NOT LABELLED ON THE PLANS. PIPE MAY BE CURVED UP TO 75% OF MFG. RECOMMENDED MAX. CURVATURE WITHOUT A BEND AS APPROVED BY OWNER & ENGINEER.

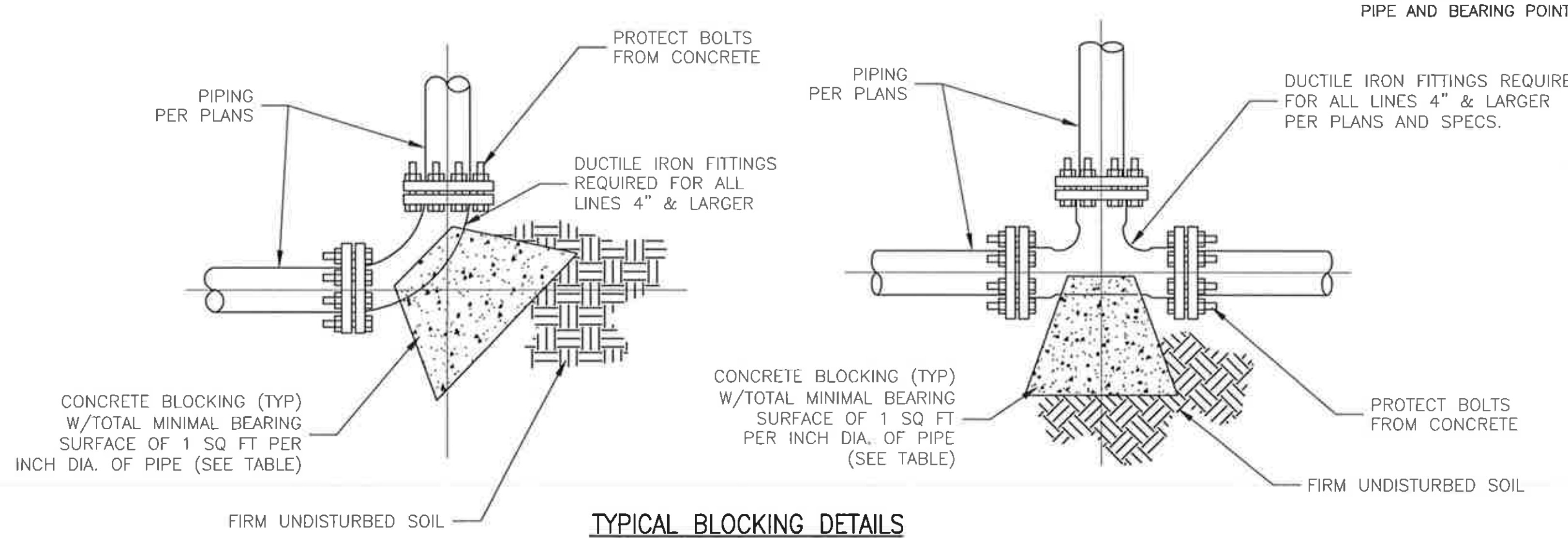
BORE & ENCASEMENT LENGTH SPECIFIED ON PLANS SHALL NOT BE INCREASED W/O PRIOR PERMISSION FROM ENGINEER.

ALL IRON FITTINGS & VALVES SHALL BE ENCAPSULATED IN 8 MIL POLYETHYLENE PER SPECS.

CONTRACTOR SHALL USE MEGALUG RESTRAINTS FOR ALL FITTINGS AND VALVES.

USE FOSTER ADAPTORS BETWEEN VALVES AND FITTINGS WHEN THEY ARE ADJACENT.

3" AND SMALLER FITTINGS SHALL BE HARCO DUCTILE W/KNUCKLE RESTRAINTS.



TYPICAL BLOCKING DETAILS
NTS

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CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT
CONSTRUCTION DRAWINGS
TRENCH SAFETY AND BLOCKING DETAILS

SCALE	NOT TO SCALE
PROJECT #	15380
DESIGNED	K.M.
DRAWN	R.M.
CHECKED	K.M.

NO. | REVISION | DATE

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SHEET 16
SEQ. 16 OF 20

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EROSION CONTROL REQUIREMENTS

IT IS REQUIRED THAT ALL CONSTRUCTION ACTIVITY BE IN COMPLIANCE WITH THE LATEST REGULATIONS OF THE ENVIRONMENTAL PROTECTION AGENCY, THE TEXAS COMMISSION OF ENVIRONMENTAL QUALITY, AND ALL OTHER CITY, STATE, AND FEDERAL REGULATIONS.

TO BE IN COMPLIANCE THE CONTRACTOR WILL FURNISH, INSTALL AND MAINTAIN ALL DEVICES NECESSARY TO INSURE THE ENVIRONMENT IS PROTECTED AS REQUIRED BY SAID REGULATIONS. PROTECTION WILL BE IN PLACE BEFORE CONSTRUCTION BEGINS. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR IS RESPONSIBLE FOR LEAVING THE PROJECT IN A STABILIZED CONDITION THAT ASSURES PREVENTION OF FUTURE EROSION AND SEDIMENTATION POLLUTION.

"STABILIZED CONDITION" IMPLIES THAT DISTURBED AREAS AFFECTED BY THIS ACTIVITY HAVE BEEN RESTORED TO A CONDITION EQUAL TO, OR BETTER THAN, THEY WERE BEFORE THE ACTIVITY OCCURRED. DIFFERENT METHODS SUCH AS PERMANENT GRASS SOD, CONCRETE RIPRAP, CONCRETE RETARDS, GRASS COVERED EARTH BERMS, AND OTHER METHODS MAY ACCOMPLISH THE RESTORATION. UNTIL PERMANENT POLLUTION AND SEDIMENTATION CONTROL IS ESTABLISHED, THE CONTRACTOR WILL PROVIDE TEMPORARY CONTROL SUCH AS SILT FENCE, ROCK RETARDS, BERMS, ETC.

THE COST ASSOCIATED WITH PROVIDING THESE CONTROLS WILL BE CONSIDERED SUBSIDIARY UNLESS SPECIFIC BID ITEMS ARE INCLUDED IN THE PLANS.

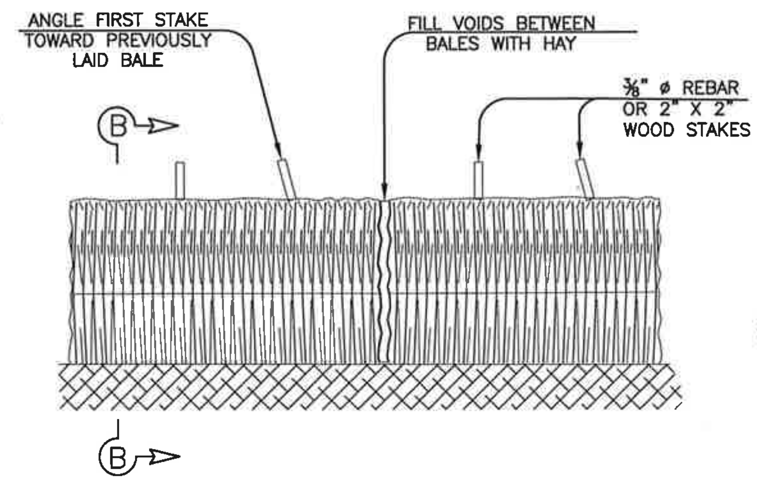
SEDIMENT CONTROL FENCE USAGE GUIDELINES

A SEDIMENT CONTROL FENCE MAY BE CONSTRUCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR A SEDIMENT CONTROL FENCE MAY BE CONSTRUCTED NEAR THE TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF. A 2 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE TO BE FILTERED.

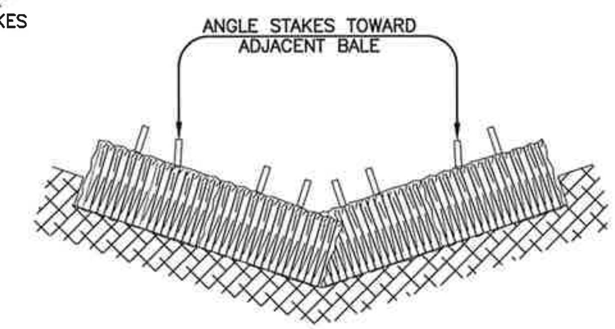
SEDIMENT CONTROL FENCE SHOULD BE SIZED TO FILTER A MAX. FLOW THROUGH RATE OF 100 GPM/FT . SEDIMENT CONTROL FENCE IS NOT RECOMMENDED TO CONTROL EROSION FROM A DRAINAGE AREA LARGER THAN 2 ACRES.

GENERAL NOTES

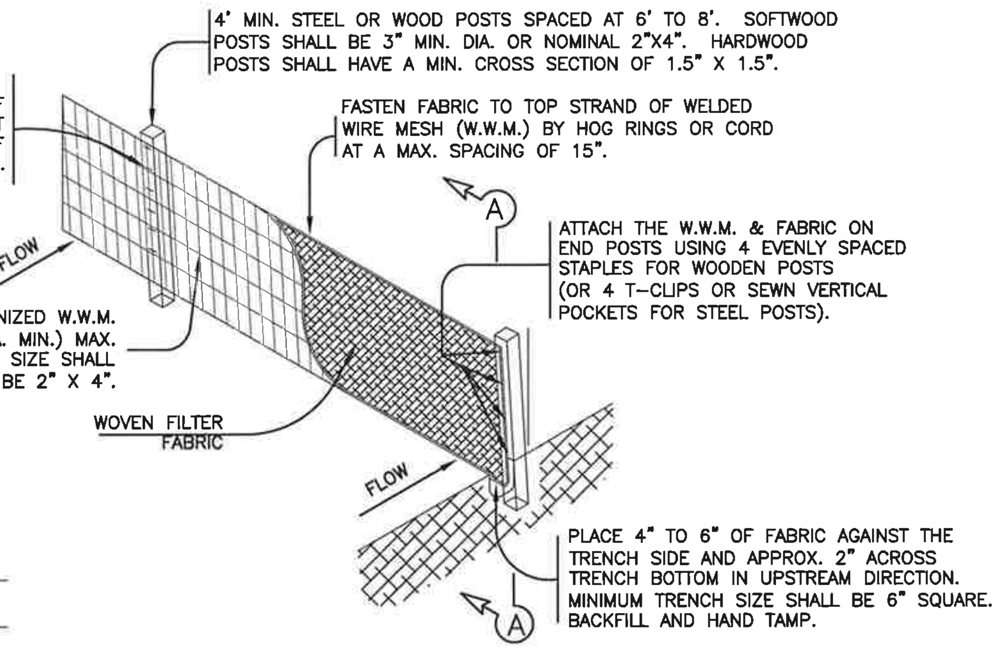
1. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAYBE MODIFIED BY THE ENGINEER.

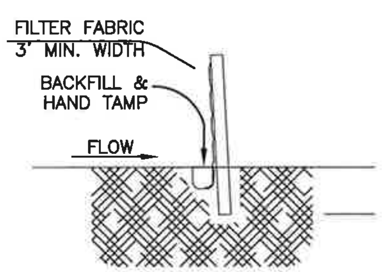


BALED HAY FOR EROSION CONTROL



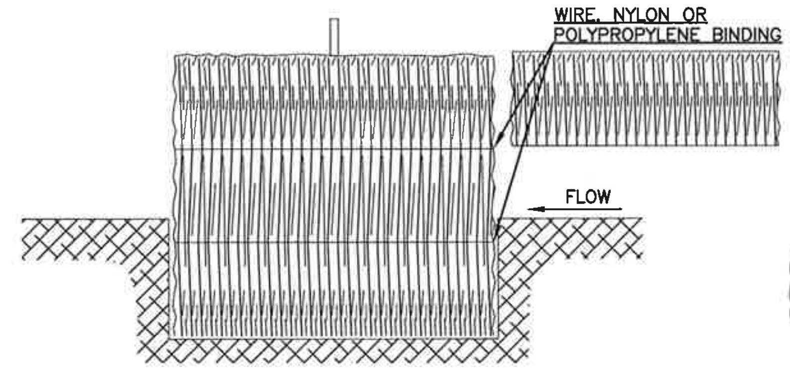
PROFILE VIEW



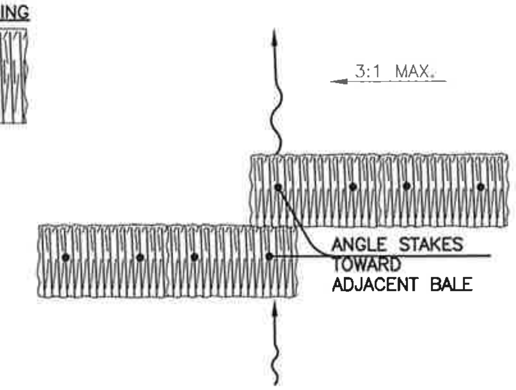


SECTION A–A

TEMPORARY SEDIMENT CONTROL FENCE

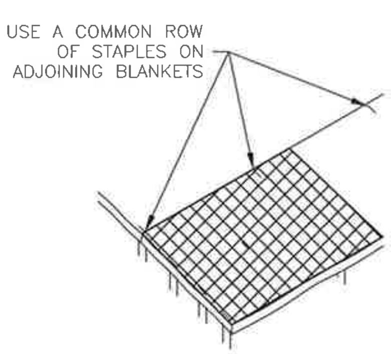


SECTION B–B

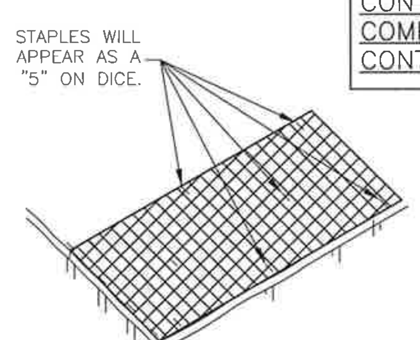


PLAN VIEW

CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL TCEQ EROSION CONTROL REQUIREMENTS AT HIS EXPENSE.



SLOPE INSTALLATION



DITCH INSTALLATION

SOIL RETENTION BLANKET EROSION CONTROL

GENERAL NOTES:

1. USE WIRE STAPLES, .091" IN DIAMETER OR GREATER "U" SHAPED WITH LEGS 6" IN LENGTH AND A 1" CROWN. SIZE AND SHAPE OF STAPLES USED WILL VARY WITH SOIL CONDITIONS. DRIVE STAPLES VERTICALLY INTO THE GROUND. USE FOUR STAPLES ACROSS AT THE START OF EACH ROLL.
2. FOR SLOPE INSTALLATION, CONTINUE TO STAPLE ALONG THE LENGTH OF THE ROLL AT 6 FT. INTERVALS.
3. FOR DITCH LINER, STAPLE ALONG THE LENGTH OF THE ROLL AT 4 FT. INTERVALS.
4. ANOTHER ROW OF STABLES IN THE CENTER OF EACH BLANKET SHOULD BE ALTERNATELY SPACED BETWEEN EACH SIDE FOR EITHER SLOPE OR DITCH.
5. USE A COMMON ROW OF STAPLES ON ADJOINING BLANKETS.

BALED HAY USAGE GUIDELINES

A BALED HAY INSTALLATION MAY BE CONSTRUCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF. A TWO YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE TO BE FILTERED. THE INSTALLATION SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THRU RATE OF 5 GPM/FT OF CROSS SECTIONAL AREA. BALED HAY MAY BE USED AT THE FOLLOWING LOCATIONS:

1. WHERE THE RUNOFF APPROACHING THE BALED HAY FLOWS OVER DISTURBED SOIL FOR LESS THAN 100'. IF THE SLOPE OF THE DISTURBED SOIL EXCEEDS 10%, THE LENGTH OF SLOPE UPSTREAM THE BALED HAY SHOULD BE LESS THAN 50'.
2. WHERE THE INSTALLATION WILL BE REQUIRED FOR LESS THAN 3 MONTHS.
3. WHERE THE CONTRIBUTING DRAINAGE AREA IS LESS THAN ½ ACRE. FOR BALED HAY INSTALLATIONS IN SMALL DITCHES, THE ADDITIONAL FOLLOWING CONSIDERATIONS APPLY:

1. THE DITCH SIDE SLOPES SHOULD BE GRADED AS FLAT AS POSSIBLE TO MAXIMIZE THE DRAINAGE FLOW RATE THRU THE HAY.
2. THE DITCH SHOULD BE GRADED LARGE ENOUGH TO CONTAIN THE OVERTOPPING DRAINAGE WHEN SEDIMENT HAS FILLED TO THE TOP OF THE BALED HAY. BALES SHOULD BE REPLACED USUALLY EVERY 2 MONTHS OR MORE OFTEN DURING WET WEATHER WHEN LOSS OF STRUCTURAL INTEGRITY IS ACCELERATED.

GENERAL NOTES

1. HAY BALES SHALL BE A MINIMUM OF 30" IN LENGTH AND WEIGH A MINIMUM OF 50 LBS.
2. HAY BALES SHALL BE BOUND BY EITHER WIRE OR NYLON OR POLYPROPYLENE STRING. THE BALES SHALL BE COMPOSED ENTIRELY OF VEGETATIVE MATTER.
3. HAY BALES SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4" AND WHERE POSSIBLE ½ THE HEIGHT OF THE BALE.
4. HAY BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. THE BALES SHALL BE PLACED WITH BINDINGS PARALLEL TO THE GROUND.
5. HAY BALES SHALL BE SECURELY ANCHORED IN PLACE WITH 3/8" DIA. REBAR OR 2" X 2" WOOD STAKES, DRIVEN THROUGH THE BALES. THE FIRST STAKE SHALL BE ANGLED TOWARDS THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER.
6. THE GUIDELINES SHOWN HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

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CITY OF COLEMAN

GRAY STREET WATER LINE REPLACEMENT

CONSTRUCTION DRAWINGS

EROSION CONTROL DETAILS

SCALE	NOT TO SCALE
PROJECT #	15380
DESIGNED	K.M.
DRAWN	R.M.
CHECKED	K.M.

NO.	REVISION	DATE

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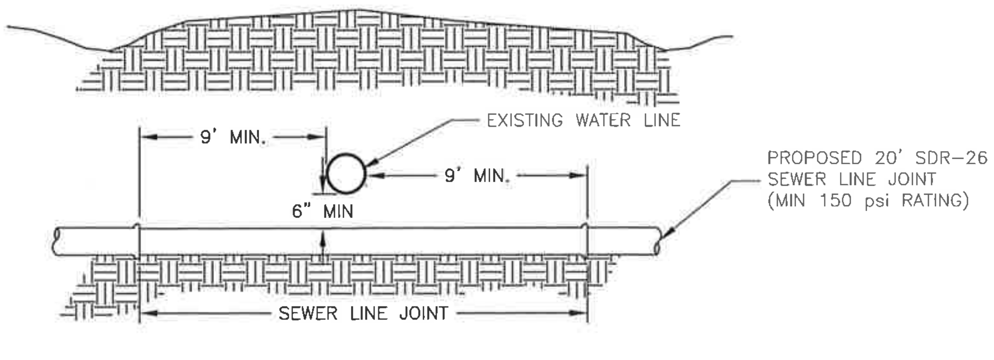
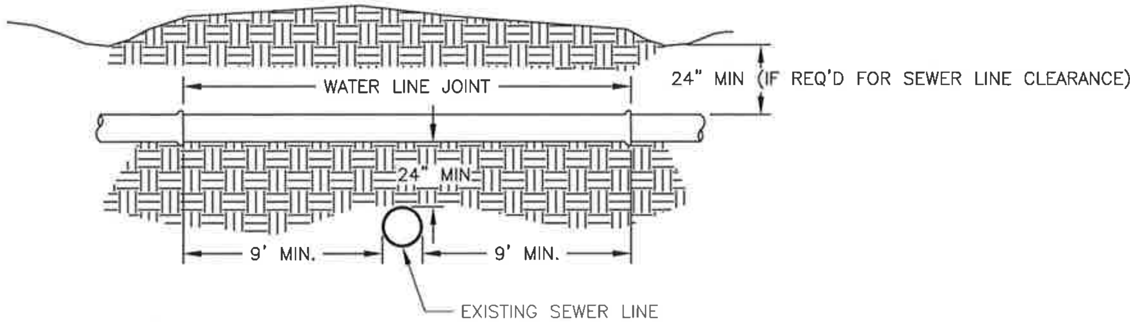
SHEET 17

SEQ. 17 OF 20

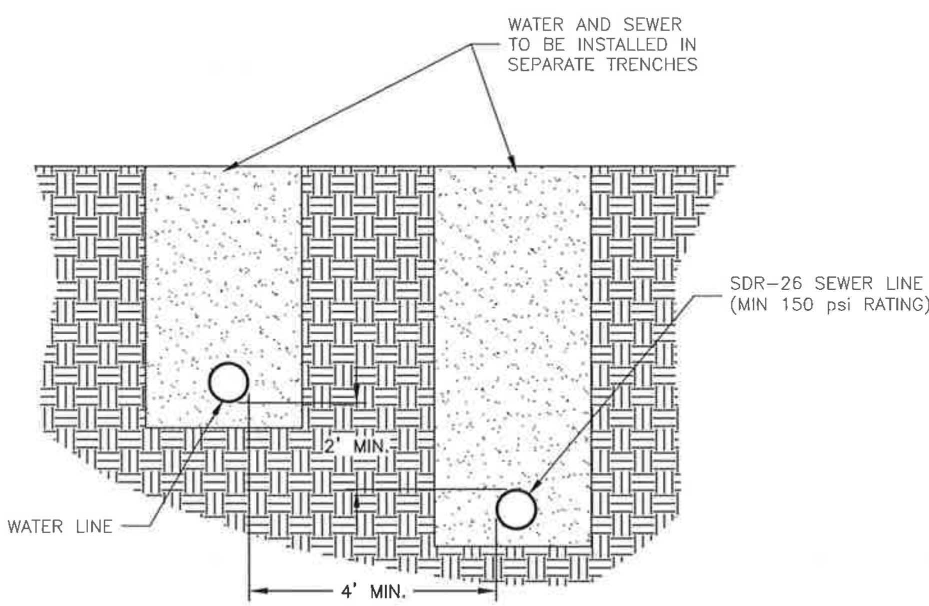
X:\C_Coleman\15380 – TDA Gray Street Water Line Replacement\Drafting_Plans_C_Civil\Final\SHEET 17 EROSION CONTROL DETAILS.dwg



PROPOSED SEWER LINE CROSSING UNDER EXISTING WATER LINE
(PER TCEQ SEE SPECIFICATIONS) NTS

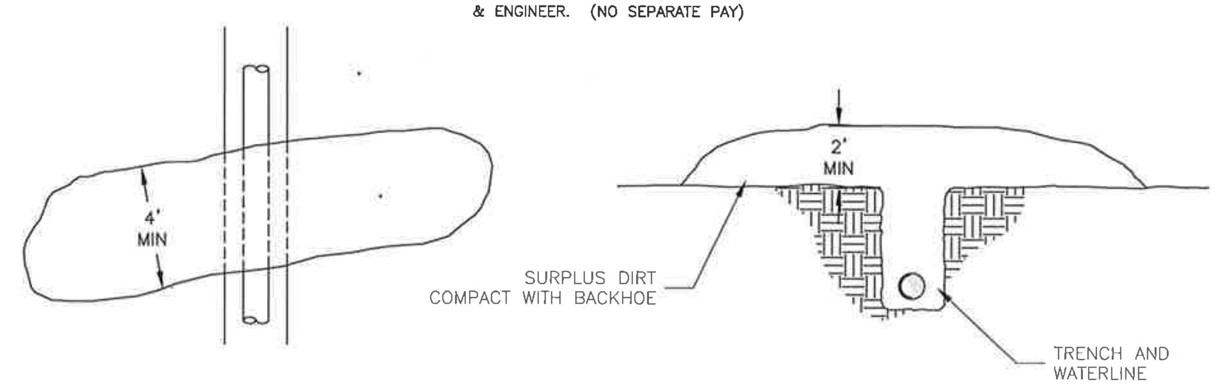


PROPOSED WATER LINE CROSSING OVER EXISTING SEWER LINE
(PER TCEQ SEE SPECIFICATIONS) NTS

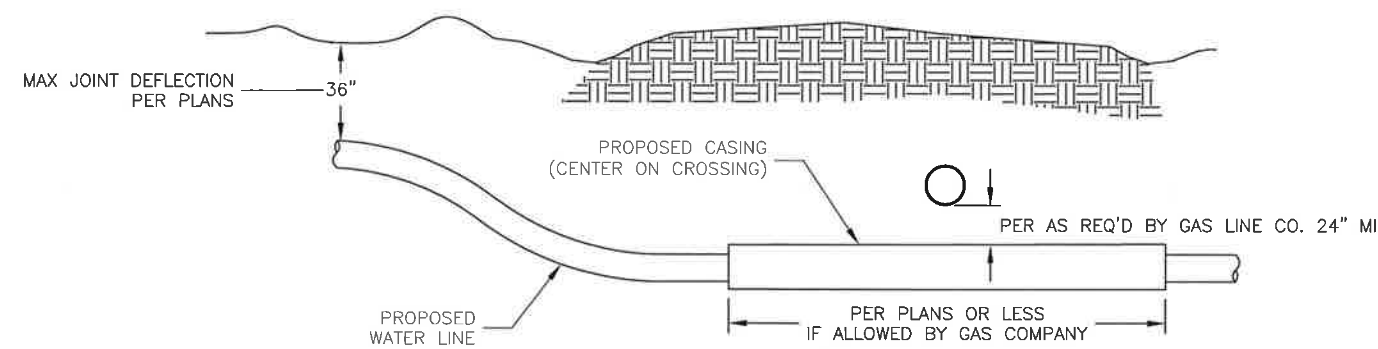


PARALLEL WATER AND SEWER LINES
(WHEN 9' SEPARATION IS NOT POSSIBLE) NTS

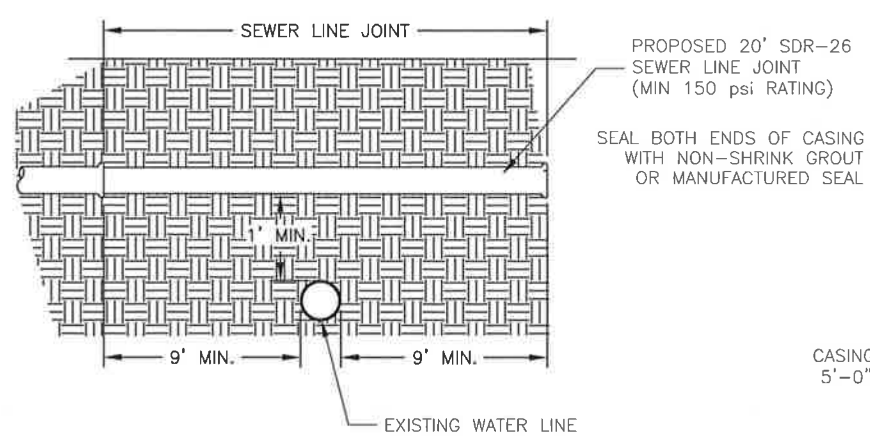
NOTE: CONTRACTOR SHALL GRADE ADJACENT SOIL TO FORM DIVERSION DIKES WHERE WASHING IS EXPECTED OR AS DETERMINED BY THE OWNER & ENGINEER. (NO SEPARATE PAY)



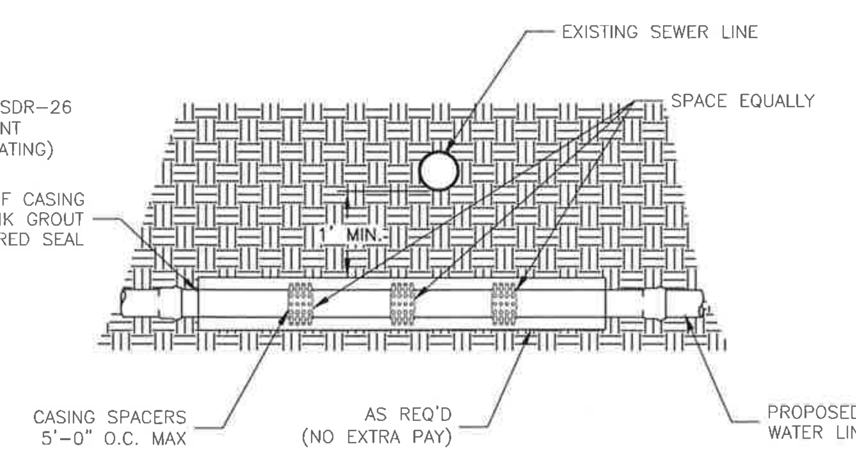
PLAN & ELEVATION OF DIVERSION DIKES
NTS



OIL OR GAS LINE CROSSING
NTS



PROPOSED SEWER LINE CROSSING OVER EXISTING WATER LINE
NTS



PROPOSED WATER LINE CROSSING UNDER EXISTING SEWER LINE
NTS

THIS DOCUMENT IS RELEASED FOR REVIEW ONLY UNDER THE AUTHORIZATION OF KEN MARTIN, P.E. #44025 AND IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMITTING PURPOSES

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CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT
CONSTRUCTION DRAWINGS
WL & SL SEPARATION DETAILS

NO.	REVISION	DATE

SCALE: NOT TO SCALE
PROJECT # 15380
DESIGNED: K.M.
DRAWN: R.M.
CHECKED: K.M.

BAR IS ONE INCH IN LENGTH ON ORIGINAL DRAWING, CHECK SCALE & ADJUST ACCORDINGLY.

SHEET 18
SEQ. 18 OF 20

X:\CI_Coleman\15380 - TDA Gray Street Water Line Replacement\Drafting_Plans_C_Civil\Final\SHEET 18 WL & SL SEPARATION DETAILS.dwg

SEPARATION COMPLIANCE NOTES:

THE CONTRACTOR SHALL FULLY COMPLY WITH TCEQ CHAPTER 290.44 (E) AS SHOWN BELOW. NO EXTRA PAYMENT SHALL BE MADE TO THE CONTRACTOR FOR THIS COMPLIANCE UNLESS LARGE LENGTHS (MORE THAN 20 FEET EACH LOCATION) OF EXISTING WASTEWATER MAIN OR LATERALS HAVE TO BE REPLACED. IF A LEAKING WASTEWATER MAIN OR LATERAL IS DISCOVERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY AND ENGINEER AND CEASE NEW WATER LINE CONSTRUCTION UNTIL THE CONTRACTOR FOLLOWS THE PROVISIONS OF THIS TCEQ RULE. ANY PROPOSED WATER LINE ALIGNMENTS SHOWN ON THE PLANS WHICH DO NOT SCALE TO MEET THE REQUIRED SEPARATION DISTANCES SHALL BE CHANGED TO COMPLY THE REQUIRED SEPARATION DISTANCE AS SHOWN BELOW. THE ACTUAL INSTALLATION SHALL MEET REQUIRED SEPARATION DISTANCES AND ANY ALIGNMENT CHANGE FROM THE PLANS SHALL BE RECORDED ON THE "RECORD DRAWINGS".

(E) LOCATION OF WATERLINES. THE FOLLOWING RULES APPLY TO INSTALLATIONS OF WATERLINES, WASTEWATER MAINS OR LATERALS, AND OTHER CONVEYANCES/APPURTENANCES IDENTIFIED AS POTENTIAL SOURCES OF CONTAMINATION. FURTHERMORE, ALL RATINGS SPECIFIED SHALL BE DEFINED BY ASTM OR AWWA STANDARDS UNLESS STATED OTHERWISE. NEW MAINS, SERVICE LINES, OR LATERALS ARE THOSE THAT ARE INSTALLED WHERE NO MAIN, SERVICE LINE, OR LATERAL PREVIOUSLY EXISTED, OR WHERE EXISTING MAINS, SERVICE LINES, OR LATERALS ARE REPLACED WITH PIPES OF DIFFERENT SIZE OR MATERIAL.

1.

(1) WHEN NEW POTABLE WATER DISTRIBUTION LINES ARE CONSTRUCTED, THEY SHALL BE INSTALLED NO CLOSER THAN NINE FEET IN ALL DIRECTIONS TO WASTEWATER COLLECTION FACILITIES. ALL SEPARATION DISTANCES SHALL BE MEASURED FROM THE OUTSIDE SURFACE OF EACH OF THE RESPECTIVE PIECES.

(2) POTABLE WATER DISTRIBUTION LINES AND WASTEWATER MAINS OR LATERALS THAT FORM PARALLEL UTILITY LINES SHALL BE INSTALLED IN SEPARATE TRENCHES.

(3) NO PHYSICAL CONNECTION SHALL BE MADE BETWEEN A DRINKING WATER SUPPLY AND A SEWER LINE. ANY APPURTENANCE SHALL BE DESIGNED AND CONSTRUCTED SO AS TO PREVENT ANY POSSIBILITY OF SEWAGE ENTERING THE DRINKING WATER SYSTEM.

(4) WHERE THE NINE–FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE FOLLOWING CRITERIA SHALL APPLY.

(A) NEW WATERLINE INSTALLATION – PARALLEL LINES.

(I) WHERE A NEW POTABLE WATERLINE PARALLELS AN EXISTING, NON–PRESSURE OR PRESSURE RATED WASTEWATER MAIN OR LATERAL AND THE LICENSED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS IS ABLE TO DETERMINE THAT THE EXISTING WASTEWATER MAIN OR LATERAL IS NOT LEAKING, THE NEW POTABLE WATERLINE SHALL BE LOCATED AT LEAST TWO FEET ABOVE THE EXISTING WASTEWATER MAIN OR LATERAL, MEASURED VERTICALLY, AND AT LEAST FOUR FEET AWAY, MEASURED HORIZONTALLY, FROM THE EXISTING WASTEWATER MAIN OR LATERAL. EVERY EFFORT SHALL BE EXERTED NOT TO DISTURB THE BEDDING AND BACKFILL OF THE EXISTING WASTEWATER MAIN OR LATERAL.

(II) WHERE A NEW POTABLE WATERLINE PARALLELS AN EXISTING PRESSURE RATED WASTEWATER MAIN OR LATERAL AND IT CANNOT BE DETERMINED BY THE LICENSED PROFESSIONAL ENGINEER IF THE EXISTING LINE IS LEAKING, THE EXISTING WASTEWATER MAIN OR LATERAL SHALL BE REPLACED WITH AT LEAST 150 PSI PRESSURE RATED PIPE. THE NEW POTABLE WATERLINE SHALL BE LOCATED AT LEAST TWO FEET ABOVE THE NEW WASTEWATER LINE, MEASURED VERTICALLY, AND AT LEAST FOUR FEET AWAY, MEASURED HORIZONTALLY, FROM THE REPLACED WASTEWATER MAIN OR LATERAL.

(III) WHERE A NEW POTABLE WATERLINE PARALLELS A NEW WASTEWATER MAIN, THE WASTEWATER MAIN OR LATERAL SHALL BE CONSTRUCTED OF AT LEAST 150 PSI PRESSURE RATED PIPE. THE NEW POTABLE WATERLINE SHALL BE LOCATED AT LEAST TWO FEET ABOVE THE WASTEWATER MAIN OR LATERAL, MEASURED VERTICALLY, AND AT LEAST FOUR FEET AWAY, MEASURED HORIZONTALLY, FROM THE WASTEWATER MAIN OR LATERAL.

(B) NEW WATERLINE INSTALLATION – CROSSING LINES.

(I) WHERE A NEW POTABLE WATERLINE CROSSES AN EXISTING, NON–PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER THE WASTEWATER MAIN OR LATERAL SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE WATERLINE SHALL BE AT LEAST TWO FEET ABOVE THE WASTEWATER MAIN OR LATERAL. WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. IF THE EXISTING WASTEWATER MAIN OR LATERAL IS DISTURBED OR SHOWS SIGNS OF LEAKING, IT SHALL BE REPLACED FOR AT LEAST NINE FEET IN BOTH DIRECTIONS (18 FEET TOTAL) WITH AT LEAST 150 PSI PRESSURE RATED PIPE.

(II) WHERE A NEW POTABLE WATERLINE CROSSES AN EXISTING, PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER THE WASTEWATER MAIN OR LATERAL SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE WATERLINE SHALL BE AT LEAST SIX INCHES ABOVE THE WASTEWATER MAIN OR LATERAL. WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. IF THE EXISTING WASTEWATER MAIN OR LATERAL SHOWS SIGNS OF LEAKING, IT SHALL BE REPLACED FOR AT LEAST NINE FEET IN BOTH DIRECTIONS (18 FEET TOTAL) WITH AT LEAST 150 PSI PRESSURE RATED PIPE.

(III) WHERE A NEW POTABLE WATERLINE CROSSES A NEW, NON–PRESSURE RATED WASTEWATER MAIN OR LATERAL AND THE STANDARD PIPE SEGMENT LENGTH OF THE WASTEWATER MAIN OR LATERAL IS AT LEAST 18 FEET, ONE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER THE WASTEWATER MAIN OR LATERAL SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE WATERLINE SHALL BE AT LEAST TWO FEET ABOVE THE WASTEWATER MAIN OR LATERAL. WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. THE WASTEWATER PIPE SHALL HAVE A MINIMUM PIPE STIFFNESS OF 115 PSI AT 5.0% DEFLECTION. THE WASTEWATER MAIN OR LATERAL SHALL BE EMBEDDED IN CEMENT STABILIZED SAND (SEE CLAUSE (VI) OF THIS SUBPARAGRAPH) FOR THE TOTAL LENGTH OF ONE PIPE SEGMENT PLUS 12 INCHES BEYOND THE JOINT ON EACH END.

(IV) WHERE A NEW POTABLE WATERLINE CROSSES A NEW, NON–PRESSURE RATED WASTEWATER MAIN OR LATERAL AND A STANDARD LENGTH OF THE WASTEWATER PIPE IS LESS THAN 18 FEET IN LENGTH, THE POTABLE WATER PIPE SEGMENT SHALL BE CENTERED OVER THE WASTEWATER LINE. THE MATERIALS AND METHOD OF INSTALLATION SHALL CONFORM WITH ONE OF THE FOLLOWING OPTIONS.

(I) WITHIN NINE FEET HORIZONTALLY OF EITHER SIDE OF THE WATERLINE, THE WASTEWATER PIPE AND JOINTS SHALL BE CONSTRUCTED WITH PIPE MATERIAL HAVING A MINIMUM PRESSURE RATING OF AT LEAST 150 PSI. AN ABSOLUTE MINIMUM VERTICAL SEPARATION DISTANCE OF TWO FEET SHALL BE PROVIDED. THE WASTEWATER MAIN OR LATERAL SHALL BE LOCATED BELOW THE WATERLINE.

(II) ALL SECTIONS OF WASTEWATER MAIN OR LATERAL WITHIN NINE FEET HORIZONTALLY OF THE WATERLINE SHALL BE ENCASED IN AN 18–FOOT (OR LONGER) SECTION OF PIPE. FLEXIBLE ENCASING PIPE SHALL HAVE A MINIMUM PIPE STIFFNESS OF 115 PSI AT 5.0% DEFLECTION. THE ENCASING PIPE SHALL BE CENTERED ON THE WATERLINE AND SHALL BE AT LEAST TWO NOMINAL PIPE DIAMETERS LARGER THAN THE WASTEWATER MAIN OR LATERAL. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE–FOOT (OR LESS) INTERVALS WITH SPACERS OR BE FILLED TO THE SPRINGLINE WITH WASHED SAND. EACH END OF THE CASING SHALL BE SEALED WITH WATERTIGHT NON–SHRINK CEMENT GROUT OR A MANUFACTURED WATERTIGHT SEAL. AN ABSOLUTE MINIMUM SEPARATION DISTANCE OF SIX INCHES BETWEEN THE ENCASEMENT PIPE AND THE WATERLINE SHALL BE PROVIDED. THE WASTEWATER LINE SHALL BE LOCATED BELOW THE WATERLINE.

(III) WHEN A NEW WATERLINE CROSSES UNDER A WASTEWATER MAIN OR LATERAL, THE WATERLINE SHALL BE ENCASED AS DESCRIBED FOR WASTEWATER MAINS OR LATERALS IN SUBCLAUSE (II) OF THIS CLAUSE OR CONSTRUCTED OF DUCTILE IRON OR STEEL PIPE WITH MECHANICAL OR WELDED JOINTS AS APPROPRIATE. AN ABSOLUTE MINIMUM SEPARATION DISTANCE OF ONE FOOT BETWEEN THE WATERLINE AND THE WASTEWATER MAIN OR LATERAL SHALL BE PROVIDED. BOTH THE WATERLINE AND WASTEWATER MAIN OR LATERAL MUST PASS A PRESSURE AND LEAKAGE TEST AS SPECIFIED IN AWWA C600 STANDARDS.

(V) WHERE A NEW POTABLE WATERLINE CROSSES A NEW, PRESSURE RATED WASTEWATER MAIN OR LATERAL, ONE SEGMENT OF THE WATERLINE PIPE SHALL BE CENTERED OVER THE WASTEWATER LINE SUCH THAT THE JOINTS OF THE WATERLINE PIPE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTER LINE OF THE WASTEWATER MAIN OR LATERAL. THE POTABLE WATERLINE SHALL BE AT LEAST SIX INCHES ABOVE THE WASTEWATER MAIN OR LATERAL. WHENEVER POSSIBLE, THE CROSSING SHALL BE CENTERED BETWEEN THE JOINTS OF THE WASTEWATER MAIN OR LATERAL. THE WASTEWATER PIPE SHALL HAVE A MINIMUM PRESSURE RATING OF AT LEAST 150 PSI. THE WASTEWATER MAIN OR LATERAL SHALL BE EMBEDDED IN CEMENT STABILIZED SAND (SEE CLAUSE (VI) OF THIS SUBPARAGRAPH) FOR THE TOTAL LENGTH OF ONE PIPE SEGMENT PLUS 12 INCHES BEYOND THE JOINT ON EACH END.

(VI) WHERE CEMENT STABILIZED SAND BEDDING IS REQUIRED, THE CEMENT STABILIZED SAND SHALL HAVE A MINIMUM OF 10% CEMENT PER CUBIC YARD OF CEMENT STABILIZED SAND MIXTURE, BASED ON LOOSE DRY WEIGHT VOLUME (AT LEAST 2.5 BAGS OF CEMENT PER CUBIC YARD OF MIXTURE). THE CEMENT STABILIZED SAND BEDDING SHALL BE A MINIMUM OF SIX INCHES ABOVE AND FOUR INCHES BELOW THE WASTEWATER MAIN OR LATERAL. THE USE OF BROWN COLORING IN CEMENT STABILIZED SAND FOR WASTEWATER MAIN OR LATERAL BEDDING IS RECOMMENDED FOR THE IDENTIFICATION OF PRESSURE RATED WASTEWATER MAINS DURING FUTURE CONSTRUCTION.

(5) WATERLINE AND WASTEWATER MAIN OR LATERAL MANHOLE OR CLEANOUT SEPARATION. THE SEPARATION DISTANCE FROM A POTABLE WATERLINE TO A WASTEWATER MAIN OR LATERAL MANHOLE OR CLEANOUT SHALL BE A MINIMUM OF NINE FEET. WHERE THE NINE–FOOT SEPARATION DISTANCE CANNOT BE ACHIEVED, THE POTABLE WATERLINE SHALL BE ENCASED IN A JOINT OF AT LEAST 150 PSI PRESSURE CLASS PIPE AT LEAST 18 FEET LONG AND TWO NOMINAL SIZES LARGER THAN THE NEW CONVEYANCE. THE SPACE AROUND THE CARRIER PIPE SHALL BE SUPPORTED AT FIVE–FOOT INTERVALS WITH SPACERS OR BE FILLED TO THE SPRINGLINE WITH WASHED SAND. THE ENCASEMENT PIPE SHALL BE CENTERED ON THE CROSSING AND BOTH ENDS SEALED WITH CEMENT GROUT OR MANUFACTURED SEALANT.

(6) LOCATION OF FIRE HYDRANTS. FIRE HYDRANTS SHALL NOT BE INSTALLED WITHIN NINE FEET VERTICALLY OR HORIZONTALLY OF ANY WASTEWATER MAIN, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE REGARDLESS OF CONSTRUCTION.

(7) LOCATION OF POTABLE OR RAW WATER SUPPLY OR SUCTION LINES. SUCTION MAINS TO PUMPING EQUIPMENT SHALL NOT CROSS WASTEWATER MAINS, WASTEWATER LATERALS, OR WASTEWATER SERVICE LINES. RAW WATER SUPPLY LINES SHALL NOT BE INSTALLED WITHIN FIVE FEET OF ANY TILE OR CONCRETE WASTEWATER MAIN, WASTEWATER LATERAL, OR WASTEWATER SERVICE LINE.

(8) PROXIMITY OF SEPTIC TANK DRAINFIELDS. WATERLINES SHALL NOT BE INSTALLED CLOSER THAN TEN FEET TO SEPTIC TANK DRAINFIELDS.

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CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT
CONSTRUCTION DRAWINGS
SEPARATION COMPLIANCE NOTES

SCALE	NOT TO SCALE
PROJECT #	15380
DESIGNED	K.M.
DRAWN	R.M.
CHECKED	K.M.

NO.	REVISION	DATE

BAR IS ONE INCH IN LENGTH ON ORIGINAL DRAWING. CHECK SCALE & ADJUST ACCORDINGLY.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
WATER DISTRIBUTION SYSTEM
GENERAL CONSTRUCTION NOTES

1. This water distribution system must be constructed in accordance with the current Texas Commission on Environmental Quality (TCEQ) Rules and Regulations for Public Water Systems 30 Texas Administrative Code (TAC) Chapter 290 Subchapter D. When conflicts are noted with local standards, the more stringent requirement shall be applied. Construction for public water systems must always, at a minimum, meet TCEQ's "Rules and Regulations for Public Water Systems.

2. An appointed engineer shall notify in writing the local TCEQ's Regional Office when construction will start. Please keep in mind that upon completion of the water works project, the engineer or owner shall notify the commission's Water Supply Division, in writing, as to its completion and attest to the fact that the work has been completed essentially according to the plans and change orders on file with the commission as required in 30 TAC §290.39(h)(3).

3. All newly installed pipes and related products must conform to American National Standards Institute/National Sanitation Foundation (ANSI/NSF) Standard 61-G and must be certified by an organization accredited by ANSI, as required by 30 TAC §290.44(a)(1).

4. Plastic pipe for use in public water systems must bear the National Sanitation Foundation Seal of Approval (NSF pw-G) and have an ASTM design pressure rating of at least 150 psi or a standard dimension ratio of 26 or less, as required by 30 TAC §290.44(a)(2).

5. No pipe which has been used for any purpose other than the conveyance of drinking water shall be accepted or relocated for use in any public drinking water supply, as required by 30 TAC §290.44(a)(3).

6. Water transmission and distribution lines shall be installed in accordance with the manufacturer's instructions. However, the top of the water line must be located below the frost line and in no case shall the top of the water line be less than 24 inches below ground surface, as required by 30 TAC §290.44(a)(4).

7. Pursuant to 30 TAC §290.44(a)(5), the hydrostatic leakage rate shall not exceed the amount allowed or recommended by the most current AWWA formulas for PVC pipe, cast iron and ductile iron pipe. Include the formulas in the notes on the plans.

   - o The hydrostatic leakage rate for polyvinyl chloride (PVC) pipe and appurtenances shall not exceed the amount allowed or recommended by formulas in America Water Works Association (AWWA) C-605 as required in 30 TAC §290.44(a)(5). Please ensure that the formula for this calculation is correct and most current formula is in use;

$$Q = \frac{LD\sqrt{P}}{148,000}$$

   Where:

   - Q = the quantity of makeup water in gallons per hour,
   - L = the length of the pipe section being tested, in feet,
   - D = the nominal diameter of the pipe in inches, and
   - P = the average test pressure during the hydrostatic test in pounds per square inch (psi).

   - o The hydrostatic leakage rate for ductile iron (DI) pipe and appurtenances shall not exceed the amount allowed or recommended by formulas in America Water Works Association (AWWA) C-600 as required in 30 TAC §290.44(a)(5). Please ensure that the formula for this calculation is correct and most current formula is in use;

$$L = \frac{SD\sqrt{P}}{148,000}$$

   Where:

   - L = the quantity of makeup water in gallons per hour,
   - S = the length of the pipe section being tested, in feet,
   - D = the nominal diameter of the pipe in inches, and
   - P = the average test pressure during the hydrostatic test in pounds per square inch (psi).

8. Projects constructed on or after January 4, 2014 must comply with changes to the Safe Drinking Water Act that reduce the maximum allowable lead content of pipes, pipe fittings, plumbing fittings, and fixtures to 0.25 percent.

9. The system must be designed to maintain a minimum pressure of 35 psi at all points within the distribution network at flow rates of at least 1.5 gallons per minute per connection. When the system is intended to provide firefighting capability, it must also be designed to maintain a minimum pressure of 20 psi under combined fire and drinking water flow conditions as required by 30 TAC §290.44(d).

10. The contractor shall install appropriate air release devices in the distribution system at all points where topography or other factors may create air locks in the lines. All vent openings to the atmosphere shall be covered with 16-mesh or finer, corrosion resistant screening material or an acceptable equivalent as required by 30 TAC §290.44(d)(1).

11. Pursuant to 30 TAC §290.44(d)(4), accurate water meters shall be provided. Service connections and meter locations should be shown on the plans.

12. Pursuant to 30 TAC §290.44(d)(5), sufficient valves and blowoffs to make repairs. The engineering report shall establish criteria for this design.

13. Pursuant to 30 TAC §290.44(d)(6), the system shall be designed to afford effective circulation of water with a minimum of dead ends. All dead-end mains shall be provided with acceptable flush valves and discharge piping. All dead-end lines less than two inches in diameter will not require flush valves if they end at a customer service. Where dead ends are necessary as a stage in the growth of the system, they shall be located and arranged to ultimately connect the ends to provide circulation.

14. The contractor shall maintain a minimum separation distance in all directions of nine feet between the proposed waterline and wastewater collection facilities including manholes and septic tank drainfields. If this distance cannot be maintained, the contractor must immediately notify the project engineer for further direction. Separation distances, installation methods, and materials utilized must meet 30 TAC §290.44(e)(1-4) of the current rules.

15. Pursuant to 30 TAC §290.44(e)(5), the separation distance from a potable waterline to a wastewater main or lateral manhole or cleanout shall be a minimum of nine feet. Where the nine-foot separation distance cannot be achieved, the potable waterline shall be encased in a joint of at least 150 psi pressure class pipe at least 18 feet long and two nominal sizes larger than the new conveyance. The space around the carrier pipe shall be supported at five-foot intervals with spacers or be filled to the springline with washed sand. The encasement pipe shall be centered on the crossing and both ends sealed with cement grout or manufactured sealant.

16. Pursuant to 30 TAC §290.44(e)(6), fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater line, wastewater lateral, or wastewater service line regardless of construction.

17. Pursuant to 30 TAC §290.44(e)(7), suction mains to pumping equipment shall not cross wastewater mains, wastewater laterals, or wastewater service lines. Raw water supply lines shall not be installed within five feet of any tile or concrete wastewater main, wastewater lateral, or wastewater service line.

18. Pursuant to 30 TAC §290.44(e)(8), waterlines shall not be installed closer than ten feet to septic tank drainfields.

19. Pursuant to 30 TAC §290.44(f)(1), the contractor shall not place the pipe in water or where it can be flooded with water or sewage during its storage or installation.

20. Pursuant to 30 TAC §290.44(f)(2), when waterlines are laid under any flowing or intermittent stream or semi-permanent body of water the water main shall be installed in a separate watertight pipe encasement. Valves must be provided on each side of the crossing with facilities to allow the underwater portion of the system to be isolated and tested.

21. The contractor shall disinfect the new water mains in accordance with AWWA Standard C-651 and then flush and sample the lines before being placed into service. Samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure which shall be repeated if contamination persists. A minimum of one sample for each 1,000 feet of completed water line will be required or at the next available sampling point beyond 1,000 feet as designated by the design engineer, in accordance with 30 TAC §290.44(f)(3).

GENERAL CONSTRUCTION NOTES:

1. CONTRACTOR TO FIELD VERIFY SIZE AND LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. (TEXAS ONE CALL SYSTEM 1-800-545-6005). CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES WHICH ARE TO REMAIN. BURIED UTILITIES SHOWN ON THE PLANS HAVE BEEN ESTABLISHED BY ON GROUND INFORMATION AS WELL AS COORDINATION WITH UTILITY COMPANIES. LOCATIONS MAY NOT BE EXACT AND OTHER UTILITIES MAY EXIST.
2. WORKS SHALL BE CONDUCTED IN A WAY AS TO MINIMIZE INTERFERENCE WITH TRAFFIC. CONTRACTOR SHALL PROVIDE ADVANCED WARNING CONSTRUCTION SIGNING AND TYPE III BARRICADES WITH "ROAD CLOSED" SIGNS, LOCATED AT THE START OF CONSTRUCTION. ALL SIGNING AND BARRICADES PROVIDED SHALL BE IN ACCORDANCE WITH THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. PRIOR TO COMMENCEMENT OF CONSTRUCTION, ALL PARTIES THAT MEET THE DEFINITION OF OPERATOR AS DEFINED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) TPDES CONSTRUCTION GENERAL PERMIT TXR150000 SHALL SUBMIT REQUIRED NOTIFICATION WHICH MAY INCLUDE A COPY OF THE NOTICE OF INTENT (NOI) FILED WITH THE TCEQ AND/OR A CONSTRUCTION SITE NOTICE (CSN). A COPY OF THE NOI OR THE CSN SHALL BE PROVIDED TO THE CITY. THE NOI/CSN FORMS AND PERMIT REQUIREMENTS MAY BE OBTAINED FROM TCEQ AT www.TCEQ.state.tx.us/nav/permits/wq_construction.html. A STORMWATER POLLUTION PREVENTION PLAN (SWP3) SHALL BE DEVELOPED AND IMPLEMENTED PRIOR TO COMMENCEMENT OF CONSTRUCTION. QUESTIONS CONCERNING THESE REQUIREMENTS MAY BE ADDRESSED TO TCEQ SMALL BUSINESS LOCAL GOVERNMENT ASSISTANCE PROGRAM AT 800-447-2827.
4. ALL EXCAVATION GREATER THAN 5 FEET DEEP SHALL COMPLY WITH O.S.H.A. TRENCH SAFETY STANDARDS.
5. ALL MATERIAL INSTALLATION SHALL FULLY COMPLY WITH TAC TCEQ CHAPTER 217 FOR NO EXTRA PAYMENT. CHAPTER 217 REQUIREMENTS SHALL TAKE PRIORITY OVER ALL OTHER SPECIFICATIONS, PLANS AND CONTRACT DOCUMENTS.
6. ALL MATERIAL FOR THIS PROJECT SHALL BE FURNISHED BY THE CONTRACTOR. ALL MATERIAL FOR THIS PROJECT SHALL BE INSTALLED BY THE CONTRACTOR.
7. CONTRACTOR SHALL CONTACT A REPRESENTATIVE FROM THE GAS COMPANY BEFORE COMPLETING GAS LINE CROSSINGS.
8. NO CHANGE IN THE WORK PERFORMED SHALL BE AUTHORIZED WITHOUT APPROVAL OF THE ENGINEER.
9. ALL CITY PAVED AND GRAVEL STREETS SHALL BE CUT AND REPAIRED WITHOUT ADDITIONAL PAY.
10. ALL DRIVEWAYS WITHIN TxDOT RIGHT OF WAY SHALL BE SLICK BORED. ALL TxDOT ROAD SHALL BE BORED AND ENCASED AS INDICATED ON THE PLAN SHEETS.
11. ALL FENCES SHALL BE PROTECTED AS MUCH AS POSSIBLE. IF AN EXISTING FENCE MUST BE CUT OR ALTERED AS A RESULT OF THE WORK THE FENCE SHALL BE REPAIRED TO ORIGINAL OR BETTER CONDITION. IF THE FENCE MUST REMAIN CUT AND UNMANNED TEMPORARY FENCING SHALL BE CONSTRUCTED BY THE CONTRACTOR. ALL FENCE ALTERATIONS SHALL BE COORDINATED WITH THE PROPERTY OWNER TO ENSURE THAT LIVESTOCK WILL NOT BE ALLOWED TO LEAVE THE PROPERTY AS A RESULT OF THE CONSTRUCTION OPERATION.
12. ALL BRUSH CLEARING REQUIRED ON THIS PROJECT SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT.
13. WHERE BRUSH CLEARING IS REQUIRED CONTRACTOR SHALL HAUL OFF AND DISPOSE OF CUT BRUSH OR CHIP PER THE DIRECTION OF THE PROPERTY OWNER.
14. THE CONTRACTOR SHALL FULLY COMPLY WITH ALL TCEQ REGULATIONS PERTAINING TO SEPARATION DISTANCES AS DESCRIBED IN SECTION 217.13 OF THE ATC DESIGN CRITERIA FOR SEWERAGE SYSTEMS.
15. ALL PIPE AND ACCESSORIES SHALL BE LAID, JOINTED TESTED FOR DEFECTS AND LEAKAGE WITH PRESSURE, AND DISINFECTED ACCORDING TO AWWA CM651-05. CONTRACTOR SHALL MAINTAIN APPROPRIATE BACKFLOW PREVENTION ACCORDING TO AWWA C651-05 SECTION 4.3.9.
16. ALL ABANDONED FIRE HYDRANTS SHALL BE REMOVED & DISPOSED OF BY THE CONTRACTOR.
17. THE CONTRACTOR SHALL CONTROL EROSION AND SEDIMENTATION PER THE APPLICABLE PERMITS, LAWS, AND REGULATIONS.

SEWER SERVICE CONNECTION NOTES:

1. SERVICE RECONNECTS SHOWN ARE FOR BIDDING PURPOSES ONLY. ACTUAL QUANTITY AND LOCATION WILL DIFFER.
2. CONTRACTOR SHALL PERFORM A TV INSPECTION OF EXISTING SEWER LINES BEING ABANDONED TO LOCATE ALL SEWER RECONNECTS.
3. CONTRACTOR SHALL MINIMIZE DAMAGE TO EXISTING LANDSCAPING ON PRIVATE PROPERTY. EXISTING LANDSCAPING SHALL BE REPAIRED TO ITS ORIGINAL CONDITION INCLUDING THE REPLACEMENT OF EXISTING LAWN AREAS WITH THE SAME TYPE OF LAWN AS WAS REMOVED.
4. ALL ABOVE GROUND STRUCTURES SHALL BE PROTECTED BY THE CONTRACTOR FROM DAMAGE DURING THE CONSTRUCTION PROCESS. ANY DAMAGE DONE ON PRIVATE PROPERTY SHALL BE REPLACED OR REPAIRED TO ORIGINAL OR BETTER CONDITIONS.
5. AFTER INSTALLATION AND TESTING OF NEW SEWER LINES, THE NEW SEWER LINES SHALL BE TV INSPECTED. VIDEOS SHALL BE FURNISHED TO THE ENGINEER WHICH ALSO SHOW THE SEWER LINE SLOPE.
6. WATER SERVICE WATER LINES SHALL BE SDR 9 HDPE UNLESS NOTED OTHERWISE. ALL EXISTING ASPHALT SURFACES SHALL BE SAW CUT. NO EXTRA PAYMENT SHALL BE PAID FOR REPAIR OF PAVEMENT OR SIDEWALKS, ETC.
7. NO EXTRA PAYMENT WILL BE MADE FOR SPECIAL PROVISIONS REQUIRED TO MEET TCEQ REGULATIONS WHEN WATER & SEWER LINES CROSS OR WHEN THEY ARE LAID PARALLEL PER DETAILS & PER TCEQ REGS.

ADDITIONAL NOTES:

1. CONTRACTOR SHALL SPRAY ALL FITTINGS, SADDLES, CORP STOP, ETC WITH BLEACH SOLUTION AS FOLLOWS: 1 GAL BLEACH / 4 GALLON POTABLE WATER.
2. TO BE ELIGIBLE TO BID, THE BIDDER MUST HAVE BEEN A UTILITY CONTRACTOR FOR AT LEAST 5 YEARS AND BE A TEXAS LICENSED UTILITY CONTRACTOR.
3. A TEXAS LICENSED WATER OPERATOR (WITH A MINIMUM OF A "D" LICENSE) HAS TO BE IN CHARGE OF FLUSHING AND SERVICE CONNECTIONS.
4. REMOVE FH ● BOOT & DELIVER OLD FH TO THE CITY.
   FOR ALL KILLED VALVES REMOVE BOXES! & FILL W/ BUCKSHOT & REPAIR PVMT.

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WEATHERFORD, TX 76086
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FIRM# F-2448

CITY OF COLEMAN
GRAY STREET WATER LINE REPLACEMENT
CONSTRUCTION DRAWINGS
PROJECT NOTES

NO.	REVISION	DATE

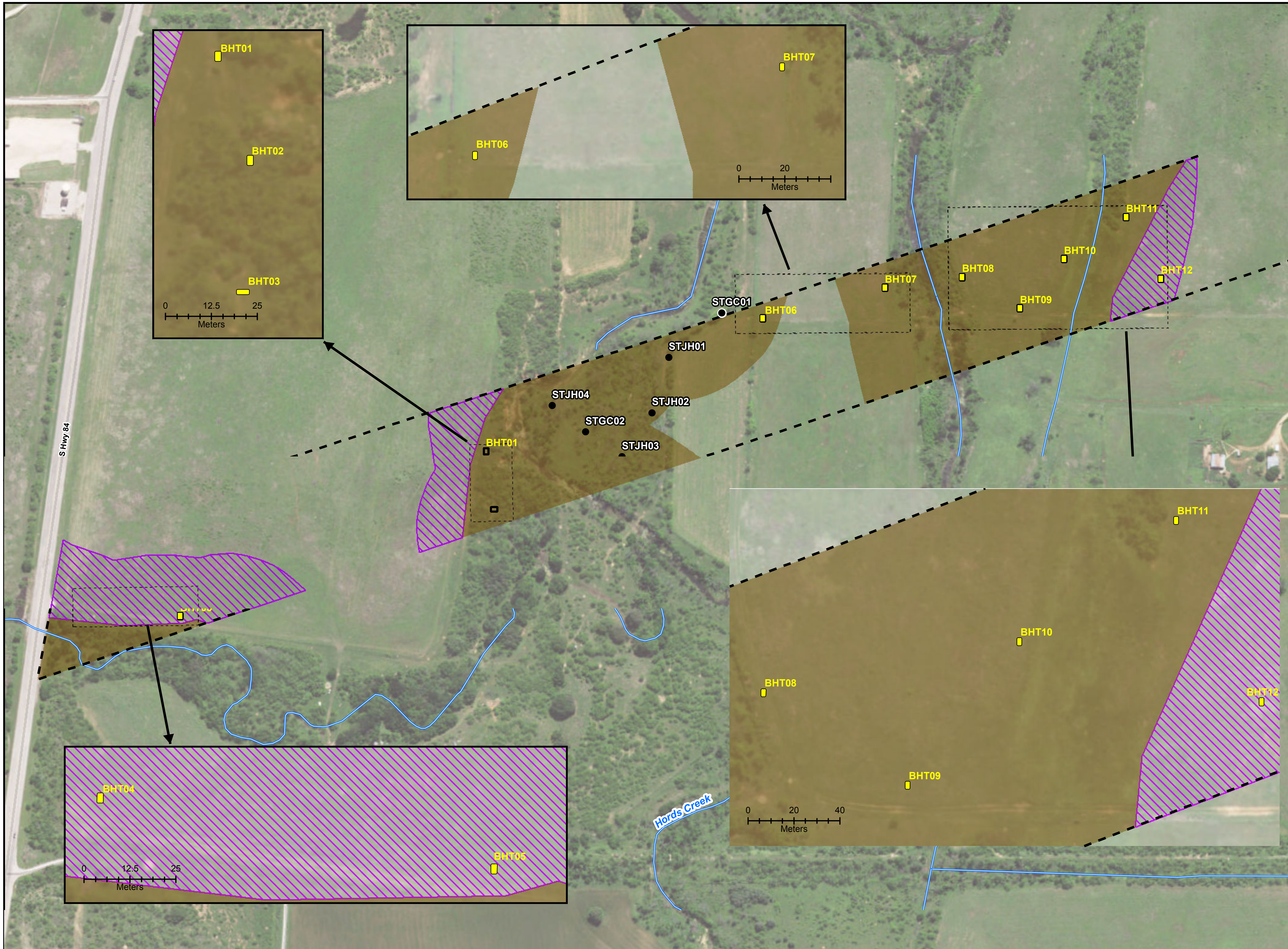
SCALE	NOT TO SCALE
PROJECT #	15380
DESIGNED	K.M.
DRAWN	R.M.
CHECKED	K.M.

BAR IS ONE INCH IN LENGTH ON ORIGINAL DRAWING. CHECK SCALE & ADJUST ACCORDINGLY.

SHEET 20
SEQ. 20 OF 20

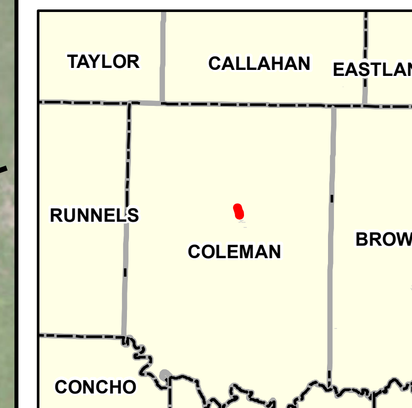
APPENDIX B

SHOVEL TEST AND BACKHOE TRENCH LOCATIONS



Shovel Test Locations &
Backhoe Trench Locations

City of Coleman
Archeological Survey



Key to Features

- Backhoe Trench Locations
- Shovel Tests
- Streams / Creeks
- Project Area
- Backhoe Trench Areas
- Survey Areas

0 170 340 510
Feet
0 50 100 150
Meters
One inch equals 100 m

Appendix B

APPENDIX C

SHOVEL TEST DATA

Shovel Test Results						
Shovel Test	**Material older than 50yrs?**	**Depth (cmbs)**	**Location**	**Ground Surface Visibility**	**Results**	**Cultural Material**
STGC1	No	43	In area under tree along fence 10m north of BHT06	50%	0-25cmbs 10YR4/1 hard silty clay with limestone fragments <3cm diameter @ 5% 25-43cmbs 10YR4/2 cilty clay with limestone fragment inclusions <3cm diameter @ 5%	None
STGC2	No	60	60m south of creek, 50m southwest of STJH6	0%	0-60cmbs 10YR4/4 sandy clay	None
STJH1	No	40	South area of the middle of the APE off of two track next to fenceline	55%	0-40cmbs 7.5YR5/4 compact sandy loam	None
STJH2	No	40	Off of two track	70%	0-40cmbs 7.5YR5/4 compact sandy loam with gravel	None
STJH3	No	40	South of Hords Creek near the western extent of the project area	25%	0-40cmbs 7.5YR5/4 compact sandy loam with gravel	None
STJH4	No	85	Near the south bank of Hords Creek	5%	0-60cmbs 10YR4/4 sandy clay 60-85cmbs 2.5YR4/6 clay loam with high clay content	None