

**Appendix F**  
**Archeological and Above-Ground Resource Survey**

# PHASE 1 ARCHEOLOGICAL AND ABOVE-GROUND RESOURCE SURVEY SUMMARY REPORT

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*Proposed Willowood Addition Channel Improvements of  
Spring Creek Tributary 1  
City of Edmond, Oklahoma County, Oklahoma*

**Prepared for:**



FEMA

The Federal Emergency Management Agency  
Region VI  
800 North Loop 288  
Denton, TX 76209-3698

**Submitted by:**

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## 1. Introduction

This summary report documents a finding of no historic properties affected for proposed channel improvements to Spring Creek Tributary 1 in the City of Edmond, Oklahoma. The report discusses the project background, the environmental setting, research and field methods, and summarizes the results, conclusions, and recommendations.

### 1.1 Background

Under subcontract to Meshek & Associates, PLC (Meshek) in Tulsa, Oklahoma, URS conducted a Phase I archeological and architectural survey for the Area of Potential Effect (APE) for channel improvements in the Willowood subdivision of Edmond, Oklahoma. Funding for this project will be provided by a Federal Emergency Management Agency (FEMA) grant with matching funds from the City of Edmond (City). The City contracted Meshek to provide engineering design, permitting, and resource compliance.

In response to coordination initiated by Meshek, the Oklahoma Archeological Survey (OAS) determined that an archeological field inspection was necessary prior to project construction (OAS, February 4, 2009, response letter). This investigation was performed in fulfillment of Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470 et seq., as amended). This report summarizes previous reporting to Meshek and has been prepared for FEMA Region VI to clarify and support the determination of no effect for the proposed undertaking.

Pursuant to programmatic allowances within the 2004 Programmatic Agreement among FEMA, the Oklahoma State Historic Preservation Office (SHPO), OAS, and the Oklahoma Division of Civil Emergency Management (OEM), the proposed Willowood flood protection project may warrant exclusion from Section 106 review. Under Appendix A of the Programmatic Agreement, the project may be excluded from review under Item 1, Sections B and C. The APE has been disturbed by previous and planned residential development, stream canalization, channelization, and utility trenching, and riprap and fill placement. The proposed action will upgrade the existing culvert system within an existing stream (Spring Creek Tributary 1) and will relocate and replace the adjacent sewer utilities lines. The southern portion of the project area that has only been canalized ca. 1950 will be upgraded with concrete infrastructure. The stream banks in the southern portion have been maintained with added riprap and fill. Past flood scouring has eroded the original stream banks and development has stripped the adjacent ground surface.

### 1.2 Project Location

As seen on the U.S. Geological Survey (USGS) topographic map, the proposed project area is in the northwest quarter of Section 32, Township 14 North, Range 2 West, Indian Meridian (Attachment 1). The project is located in the Willowood Addition (Willowood) of the City of Edmond in Oklahoma County. Willowood is located southeast of the US Highway 77 (NW 178<sup>th</sup> Street) and North Coltrane Road intersection and is comprised of approximately 60 homes constructed between 1983 and 1995. Stonepoint Addition, a second subdivision, is located southwest of the project area and contains houses constructed after 1995 (Attachment 2 and 14).

### 1.3 Undertaking

Channel improvements of Spring Creek Tributary 1 will involve:

- Expanding the Lonsdale Drive culvert system from a double 10-foot or 3-meters (m) wide by 5-foot (1.5-m) high concrete box structure to a quadruple 10-foot (3-m) wide by 10-foot (3-m) high concrete box structure (Segment A: Attachment 3).
- Modifying approximately 1,320 linear feet (402.3 m) of previously channelized creek bank by converting the existing 30-foot (9.1-m) wide concrete-bottom trapezoidal channel into a 30-foot (9.1-m) wide concrete-lined vertical wall channel (Segment B: Attachment 3), except in the 50-foot (15.2-m) segment north of Lonsdale Drive where the vertical wall channel will be 46 feet (14 m; Segment A).
- Channelizing an additional 230 linear feet (70.1 m) of Spring Creek Tributary 1 south of Willowood with a 12-foot (3.7-m) wide concrete-bottom trapezoidal channel with 7:1 riprap side slopes (Segment C: Attachment 3).
- Installing five drop-down structures within the channel to reduce flow velocities. (This action will require the sewer lines under the channel to be redirected and installed adjacent to the channel. This will occur within the channel right-of-way [ROW] in Segment B of the archeological APE.)

### 1.4 Archeological APE

An archeological APE of approximately 2.13 acres or 0.86 hectare (ha) was delineated to include the existing 50-foot (15.2-m) wide ROW for the stream channel, extending the length of the proposed channel improvements (see Attachment 3). This includes a width to 100 feet (30.5 m) for the APE of Segment A and C at the north and south ends, respectively. This APE corresponds to the construction footprint provided in engineering drawings by Meshek dated July 7, 2009. The three segments of the archeological APE include:

- Segment A: 100 feet (30.5 m) for improvements proposed for the north end of the project area north of Lonsdale Drive.
- Segment B: 1,320 feet (402.3 m) of previously channelized streambed traversing Willowood.
- Segment C: Channelization of an additional 230 linear feet (70.1 m) of stream south of Willowood with a 12-foot (3.7-m) wide concrete-bottom trapezoidal channel and 7:1 riprap sides.

### 1.5 Above-ground APE

The APE for above-ground resources consists of the proposed construction footprint to account for direct effects, and a visual buffer of 150 feet (45.7 m) on all sides to account for indirect effects (see Attachment 2). The APE includes the immediate area of Spring Creek Tributary 1 beginning at approximately 100 feet (30.5 m) north of Lonsdale Drive and extending southeast along the drainage for approximately 1,500 feet (457 m). The width of the APE (east-west) varies from approximately 350 feet (107 m) along the concrete-lined channelized section to approximately 400 feet (122 m) along the non-concrete-lined sections. This APE totals

approximately 11 acres (4.5 ha) and encompasses portions of residential buildings within Willowood.

## **1.6 Personnel**

Charles D. Neel served as Project Archeologist. Architectural Historian Renée Hutter performed the above-ground survey and assessment of resources. Sarah M. Cole served as the Principal Investigator.

## **2. Environmental Setting**

The project area lies within a subdivision in eastern Edmond. Edmond is a suburban community north of Oklahoma City. The area surrounding Willowood has been altered by a variety of construction activities beginning in the 1950s.

### **2.1 Physiography**

Edmond and the project area lie within the Redbeds Plains physiographic province as defined by Fenneman (1938). The Redbeds Plains region measures 50 to 150 miles, or 80.5 to 241.4 kilometers (km), in width and comprises a lowland of Permian shale and minor sandstones extending westward from the Flint Hills. This mildly rolling plain rarely reaches elevations over 50 feet (15.2 m).

#### **2.1.1 Geology**

The underlying geology of the project area is Lower Permian age Hennessey shale. The Hennessey shale is of marine origin, contains some sandstone layers in the lower portion, and is locally interbedded with gypsum (Fenneman 1938). Springs are frequently found along fractures within the formation.

#### **2.1.2 Hydrology**

The project area is confined to the channelized streambed and immediate floodplain of Spring Creek Tributary 1, a second-order intermittent stream fed by two springs. One contributing spring is located approximately 2 miles (3 km) north and a second approximately 1.5 miles (2.5 km) northwest. Spring Creek forms approximately 1 mile (1.5 km) south of the project area with the convergence of Tributary 1 and Tributary 2. Tributary 2 is a single spring-fed intermittent stream originating approximately 1.5 miles (2.5 km) west. Spring Creek terminates approximately 2 miles (3 km) east at Lake Arcadia. The spring-fed intermittent streams that contribute to Spring Creek traverse developed and suburbanized portion of the City and have been largely modified to carry suburban runoff.

#### **2.1.3 Soils**

The soils of the project area are mapped as Pulaski fine sandy loam (PukA) with 0 to 1-percent slope and frequent flooding. The Pulaski soil is a loamy alluvial bottomland soil found in the floodplains of valleys and exhibiting a typical Ap/A/C1/C2 soil horizon sequence to 200 centimeters (cm) or 78.7 inches in depth (Woods et al. 2003). The dynamic environment of this

landform indicates continuous reworking of these sediments and suggests in situ archeological resources are unlikely to be encountered.

### 2.1.4 Vegetation

The project area is located in the Tall Grass Savannah as defined by Kuchler (1964). Considering that the project area is near the boundary of the historic prairie areas to the west and the Cross Timbers belt to the east, the natural vegetation of the area is likely Postoak-Blackjack Oak Forest (Web Atlas of Oklahoma 2009). However, the vegetation of the area has been heavily modified as a result of development landscaping. The majority of the APE is comprised of the concrete-lined channel flanked by maintained common areas and yards planted with Bermuda grass. The lower portion of the stream channel segment is overgrown with weeds and immature hackberry and willow.

### 2.2 Land Use

Land use in the project area is comprised of single-family residential houses on lots of approximately 0.25 acre (0.10 ha), the channelized streambed, and on the south, a series of vacant building lots. Canalization of this stream extending well north and south of the APE is clearly depicted in a 1957 historic aerial photograph obtained from Environmental Data Resources (EDR 2009) (Attachment 4). A dark band around the stream, visible in the 1957 aerial photograph, appears to represent the straightening of the stream channel and the deposition of dredge material along the current straight channel alignment.

## 3. Research and Field Techniques

Research for the project area included a review of the Oklahoma archeological site files, EDR Aerial Photo Decade Package (2009), background data on the local environment, and engineering design plans. Field investigation included a site visit with a pedestrian reconnaissance survey and excavation of one shovel test.

### 3.1 Archeological Research

Archeological sites within the project vicinity were reviewed at OAS in Norman on February 27, 2009. Nine archeological sites have been recorded within 3 miles of the project area. All are located along Spring Creek and identified as lithic workshops with the exception of one open camp (see Table 3-1).

**Table 3-1: Sites within 3.0 miles (4.8 km) of the APE**

Site Number	Cultural Affiliation	Site Type	Reference
34OK22	Undefined prehistoric	Ogallala quartzite lithic workshop	Neal 1973a Hartley 1976
34OK23	Undefined prehistoric	Ogallala quartzite lithic workshop	Neal 1973b Hartley 1976
34OK38	Undefined Archaic	Ogallala quartzite lithic workshop /open camp	Neal 1973c Hartley 1976
34OK39	Plains Village	Ogallala quartzite lithic workshop /open camp	Neal 1973d Hartley 1976

Site Number	Cultural Affiliation	Site Type	Reference
34OK44	Undefined prehistoric	Ogallala quartzite lithic workshop	Neal 1973e Hartley 1976
34OK54	Undefined prehistoric	Ogallala quartzite lithic workshop	Saunders 1975a, b
34OK57	Undefined Archaic	Open camp	Lopez & Keith 1976, 1979 Wyckoff & Brooks 1988:207
34OK78	Undefined prehistoric	Ogallala quartzite lithic workshop	Wyckoff 1976
34OK92	Undefined prehistoric	Ogallala quartzite lithic workshop	Drass 1977

The Aerial Photo Decade Package obtained from EDR in 2009 included aerial photographs for 1957, 1963, 1970, 1984, 1995, and 2005. The 1957 aerial photograph depicts the early canalization of Spring Creek Tributary 1, extending well to the north and south of the APE (see Attachment 4). The construction and development of Willowood after 1980 included a series of prepared building sites on the south end of the APE (Segment C). These lots have remained empty and provide communal greenspace.

The archeological field methods developed for the assessment of the APE took into account engineering data collected by Meshek (2009). Meshek identified the portions of the APE that had been subject to previous disturbance, most notably the north and south ends of the APE, where widening beyond the current ROW is proposed (Attachment 5).

### 3.2 Above-ground Research

The Oklahoma Historical Society's Landmark Inventory files were searched on March 12, 2009. No previously identified historic properties, districts, or Oklahoma Landmark properties were located within 2 miles (3.2 km) of the project area. Aerial photographs were used to determine the construction timelines in the APE and surrounding areas.

## 4. Field Techniques

Field reconnaissance was carried out on February 27, 2009. All areas for both the archeological and above-ground APE were available for inspection without constraint. Spring Creek Tributary 1 was dry at the time of cultural survey.

### 4.1 Archeology

Through pedestrian reconnaissance and surface survey, the project archeologist identified the APE limits and assessed previously identified disturbances. Based on this initial reconnaissance and to aid the discussion of results, the project area was divided into the three survey areas seen in Attachments 3 and 5. These segment boundaries were based on the improvement plan, degree of adherence to the channel ROW, and differences in previous ground disturbances (i.e., proposed disturbance of previously undisturbed areas). The pedestrian survey was documented by field notes, notations on project maps, photographs, and accompanying log.

In addition, a shovel test was excavated at the southern end of the APE in Segment C. Excavated soils were screened through 0.25-inch (0.6-cm) mesh hardware cloth for recovery of artifacts. Underground utilities, utility location markers, and the shovel test location were documented by Global Positioning System (GPS), and all information was noted on a shovel test excavation recording form.

## **4.2 Above-ground**

Topographic maps and aerial photographs were reviewed to provide a cursory assessment of the built environment within the APE. Field inspection was used to verify the construction dates indicated by the aerial photographs and to determine the boundaries of the APE.

## **5. Results**

The archeological and above-ground surveys confirmed that the APE was disturbed and/or an altered landscape. No historic properties were evident within the APE. Attachment 6 shows the location of utility trenches identified through the field reconnaissance. Representative photographs of the project area are included as Attachments 7 through 10.

### **5.1 Archeology**

All three segments of the archeological APE have been subject to past disturbance by suburban construction, utility burial, or channelization. No unaltered land surfaces were identified within the archeological APE. Attachment 7 depicts Segment A and degree of evident disturbance. Surface visibility was particularly low in Segment B. The APE in this segment is covered in concrete, with artificial channel walls of riprap covered in Bermuda grass sod. Small areas of the surface were visible for inspection along the channel walls of Segment B; the channel walls and channel bottom of Segment C were most visible. Gopher spoil piles were observed throughout Segment C and investigated when accessible.

#### **5.1.1 Segment A**

Segment A comprises the northern section of the APE. It represents a wide, flat, earthen section of the canalized stream (see Attachments 3, 5 and 7). A flood control levee is located at the western margin of the stream segment, and a manhole riser attests to a sanitary sewer line buried within the channel.

Segment A was determined to be completely disturbed or altered by the construction of levees (1950s), subdivision site preparation and trenching for sanitary sewer lines (approximately 1980), and stabilization and replacement of riprap and sod following recent flood episodes (1990s to present). No subsurface investigations were warranted for Segment A of the APE.

#### **5.1.2 Segment B**

Segment B comprises the central portion of the APE and is represented by a canalized section of the stream with a concrete-lined bottom and earthen and riprap sidewalls beveled to a 45-degree slope. These abut residential lots (see Attachments 3 and 5). As with Segment A, manhole risers attest to a buried sewer line under the channel. The east and west boundaries of Segment B are bounded by private fencing (Attachment 8).

Segment B was completely disturbed by the canalization of the stream segment (1950s), subdivision site preparation and trenching for sanitary sewer lines and the placement of concrete along the stream bottom (1980). Additionally, visual inspection of the channel walls identified the use of riprap and possible fill material for stabilization. No subsurface investigation was warranted for Segment B.

### 5.1.3 Segment C

Segment C is the portion of the APE south of Willowood. It begins as a wide and flat earthen section of the stream, and quickly constricts into a canalized weedy ditch for the remainder of the APE (see Attachments 3, 5 and 9). Portions of channel sidewalls in Segment C are covered with concrete and asphalt rubble. Extensive pipeline trench disturbance was noted throughout the segment (Attachment 5, 6 and 10). The buried sanitary sewer line continues through Segment C on the western side of the stream channel. An Oklahoma Natural Gas (ONG) pipeline extends along the eastern side of the stream channel, and two Pedestal Oil Company gas pipelines extend across the channel in an east-west direction (Attachment 5, 6 and 10). In addition, a buried concrete culvert extends from a grated drop-box at Belmont Circle. The culvert opens at the southern edge of Willowood and drains into the stream channel within Segment C.

Segment C of the APE also appeared to be completely disturbed and/or altered by canalization of the stream segment (1950s). Additional disturbances and alteration of the APE occurred during the 1980s. Development in the project area includes the placement of fill and riprap along the stream margins; trench excavation for the placement of the sanitary sewer lines, two Pedestal Oil Company gas pipelines, and an ONG gas pipeline; and construction of a concrete stormwater culvert.

An exposed section of stream bank within Segment C demonstrates that the lower toe slope of the natural landscape has been altered. Aerial photographs show that the areas east of Segment C were prepared and graded as building lots around 1980. Although no intact landforms were identified and no subsurface investigations were deemed warranted in Segments A through C, one shovel test was excavated in Segment C to assess the floodplain of the stream and to identify the soil fill and landform modification.

### 5.1.4 Segment C: ST-1

One shovel test (ST-1) was excavated at the southern end of Segment C. The location and profile are shown in Attachments 3, 10, and 11. The test yielded only modern debris and soil types indicative of modern fill. The shovel test revealed two soil zones. The 30-by-30 cm shovel test (11.8-in<sup>2</sup>) was excavated to 90 centimeters below surface (cmbs) (35.4 in) to reveal 60 cm (23.6 in) of modern fill soil over 30 cm (11.8 in) of sterile fill sand.

Zone 1 consists of mottled fill layers ranging from reddish brown (2.5YR 4/4) to red (2.5YR 5/8) silty sand. The zone contained modern debris, indicating a disturbed fill soil zone. Items recovered included a black plastic security tag with wire-tie (Attachment 11). This item (impressed with the word MULTIMEDIA) is typically used as a tamper-resistant seal on residential electric meters. Additional items recovered included modern-era colorless bottle glass and concrete fragments. It would appear that Zone 1 fill had been added to raise the landform and decrease flooding.

Zone 2, a yellowish red (5YR 5/6) sterile coarse sand, was identified at 60 cmbs (23.6 in) and excavated to a depth of 90 cmbs (35.4 in). No cultural material or natural inclusions were recovered from Zone 2. The coarse sand appeared to be clean fill material. The soils documented in the shovel test indicate the landform likely represents the active stream channel overlain by more than 90 cm (35.4 in) of modern fill.

## **5.2 Above-ground**

Topographic maps and aerial photographs show that the development of Willowood began after 1983. The 1966 Edmond, OK topographic map indicates Willowood had not yet been constructed. As the 1966 map was photorevised in 1983, the subdivision would have been constructed after this time (USGS 1966). This is consistent with the architecture of the dwellings in the project area.

Aerial photographs for the project area were available for the years 1957, 1963, 1970, 1984, 1995, and 2005 (EDR 2009). From 1957 to 1970, the project area is shown as barren ground that may have been under cultivation. By 1984, 12 to 15 houses had been constructed. These are shown abutting the eastern side of the canalized stream. The 1984 aerial image is out of focus, making an exact building count difficult. Data provided by Meshek (2009) indicates that 44 houses had been constructed by the end of 1984, with an additional 14 houses constructed in 1985. Ten houses were added to the Stonepoint Addition on the southwest (Rimrock Road and Stonepoint Drive) between 1985 and 1995 (Attachment 2).

A reconnaissance survey of the above-ground APE substantiates the aerial photograph documentation (Attachments 12 through 13). All buildings appear to date from 1983 or later. No potential historic properties were observed in the project area.

## **6. Conclusions and Recommendations**

Research and field reconnaissance indicate that the project area has been heavily disturbed beginning with canalization of the stream in the 1950s and suburban development and the built environment beginning in the 1980s.

The local prehistoric settlement pattern suggests that there are no preferred landforms in the project area. Soil types identified by the United States Department of Agriculture (USDA) for the project area indicate that in situ archeological resources are unlikely to be encountered in the dynamic environment of the Pulaski soils of the project area. Engineering schematics indicate that, in addition to the extensive impacts of stream canalization, the project area is crossed by numerous buried utilities. Suburban development in the 1980s resulted in alterations to the surrounding landscape for construction and water flow control measures throughout the neighborhood. Stream channelization materials in the APE included concrete, riprap, and fill soil.

Field reconnaissance confirmed the APE has been disturbed and altered. Subsurface investigation consisting of one shovel test confirmed the landform was disturbed. The extensive disturbance and evidence of modern fill episodes indicate a low potential to yield intact archeological deposits.

No intact landforms, archeological resources, or historic properties were identified within the APE for the undertaking. Thus, the proposed Willowood Channel Improvements project will have no effect on historic properties. No further cultural resources investigations are recommended.

## 7. References Cited

Brooks, Robert L.

1984 *Resource Protection Planning Process: Management Regions*. Oklahoma Archeological Survey, Norman, OK.

Drass, Richard

1977 *The Oklahoma Archeological Survey Data Record: 34OK92*. Oklahoma Archeological Survey, Norman, OK.

Environmental Data Resources (EDR)

2009 *The EDR Aerial Photo Decade Package, Willowood Addition, 2nd Street/Coltrane, Edmond, OK 73034*. Environmental Data Resources, Inc., Milford, CT.

Fenneman, Nevin M.

1938 *Physiography of Eastern United States*. McGraw-Hill Book Company, New York.

Hartley, John D.

1976 *A Survey and Assessment of the Prehistoric Resources of Arcadia Lake, Oklahoma County, Oklahoma*. Oklahoma River Basin Survey General Survey Report 16, Norman, OK.

Kuchler, A. W.

1964 *Potential Natural Vegetation of the Conterminous United States*. American Geographical Society, Special Publications 36. New York, NY.

Lopez, David R. and Kenneth D. Keith

1976 *The Oklahoma Archeological Survey Data Record: 34OK57*. Oklahoma Archeological Survey, Norman, OK.

1979 *Oklahoma Highway Archaeological Survey, Highway Archaeological Reconnaissance Program 1972-1978*. Papers in Highway Archaeology VI, Oklahoma Department of Transportation, Planning Division, Oklahoma City, OK.

Meshek & Associates, PLC (Meshek)

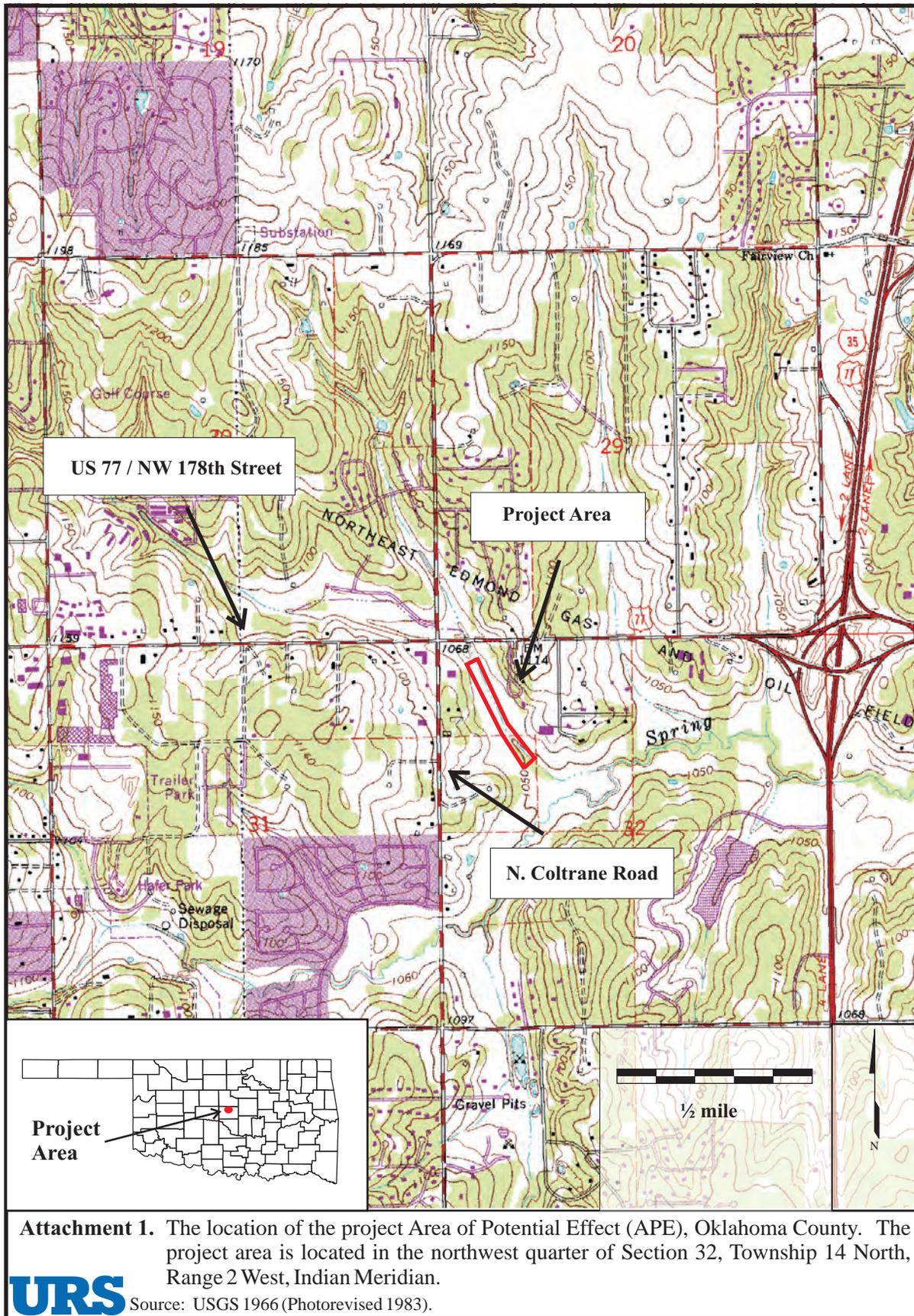
2009 *Plans and Estimates for Willowood Addition Channel Improvement*. Engineering drawings prepared for the City of Edmond. Meshek & Associates, Tulsa, OK.

Neal, Larry

1973a *The Oklahoma Archeological Survey Data Record: 34OK22*. Oklahoma Archeological Survey, Norman, OK.

1973b *The Oklahoma Archeological Survey Data Record: 34OK23*. Oklahoma Archeological Survey, Norman, OK.

- 1973c      *The Oklahoma Archeological Survey Data Record: 34OK38*. Oklahoma Archeological Survey, Norman, OK.
- 1973d      *The Oklahoma Archeological Survey Data Record: 34OK39*. Oklahoma Archeological Survey, Norman, OK.
- 1973e      *The Oklahoma Archeological Survey Data Record: 34OK44*. Oklahoma Archeological Survey, Norman, OK.
- Oklahoma Historical Society  
2010      Landmarks Inventory Files. On file at the Oklahoma Historical Society Research Center. Oklahoma City, OK.
- Saunders, Roger S.  
1975a      *The Oklahoma Archeological Survey Data Record: 34OK54*. Oklahoma Archeological Survey, Norman, OK.
- 1975b      *Letter Report: Chimney Hill Development, City of Edmond*. Environmental Assessments, Inc., Norman, OK.
- United States Geological Survey (USGS)  
1966      Edmond, OK. 7.5 minute Topographic Quadrangle. Photorevised 1983. United States Geological Survey, Reston, VA.
- Web Atlas of Oklahoma  
2009      *Vegetation Types of Oklahoma* (map). Electronic database available at <http://www.okatlas.org/okatlas/biotic/vegetation/duckfletcher.htm>. Accessed 4 March 2009.
- Woods, Carl E. Jr., Bobby Bourlier, Allan Johnston, Gerald Sample, and Hayden Rounsaville  
2003      *Soil Survey of Oklahoma County, Oklahoma*. United States Department of Agriculture Natural Resources Conservation Service, in cooperation with the Oklahoma Agriculture Experiment Station and the Oklahoma Conservation Commission, Stillwater.
- Wyckoff, Don G.  
1976      *The Oklahoma Archeological Survey Data Record: 34OK78*. Oklahoma Archeological Survey, Norman, OK.
- Wyckoff, Don G. and Robert L. Brooks  
1988      *Oklahoma Archeology: A 1981 Perspective on the State's Archeological Resources, Their Significance, Their Problems, and Some Proposed Solutions*. Reprint. Oklahoma Archeological Survey, Archaeological Resources Survey Report 16, Norman.
- United States Department of Agriculture  
2009      Web Soil Survey. Available online at [www.websoilsurvey.nrcs.usda.gov/app](http://www.websoilsurvey.nrcs.usda.gov/app). Accessed 26 February, 2009 and 29 April, 2010.

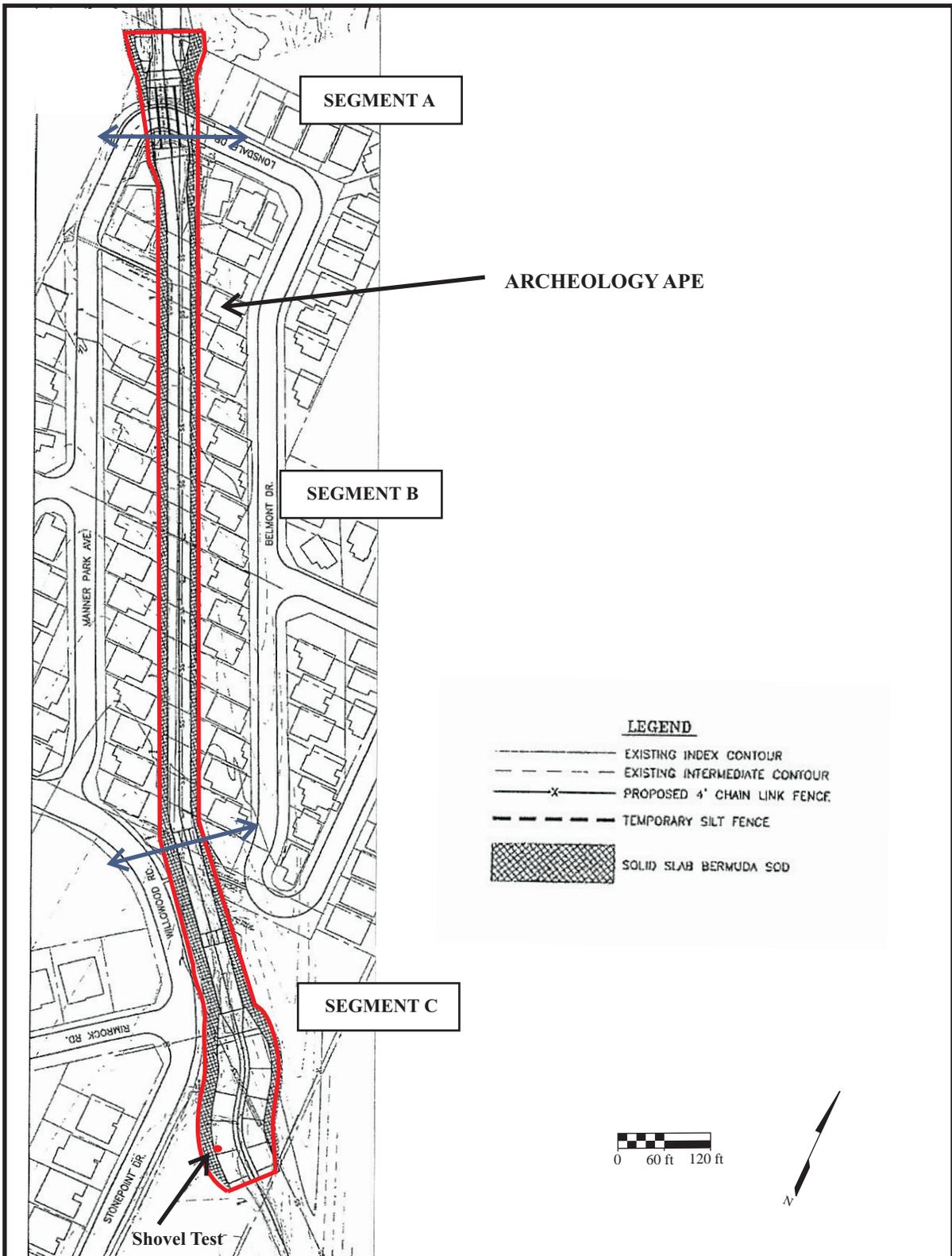


**Attachment 1.** The location of the project Area of Potential Effect (APE), Oklahoma County. The project area is located in the northwest quarter of Section 32, Township 14 North, Range 2 West, Indian Meridian.

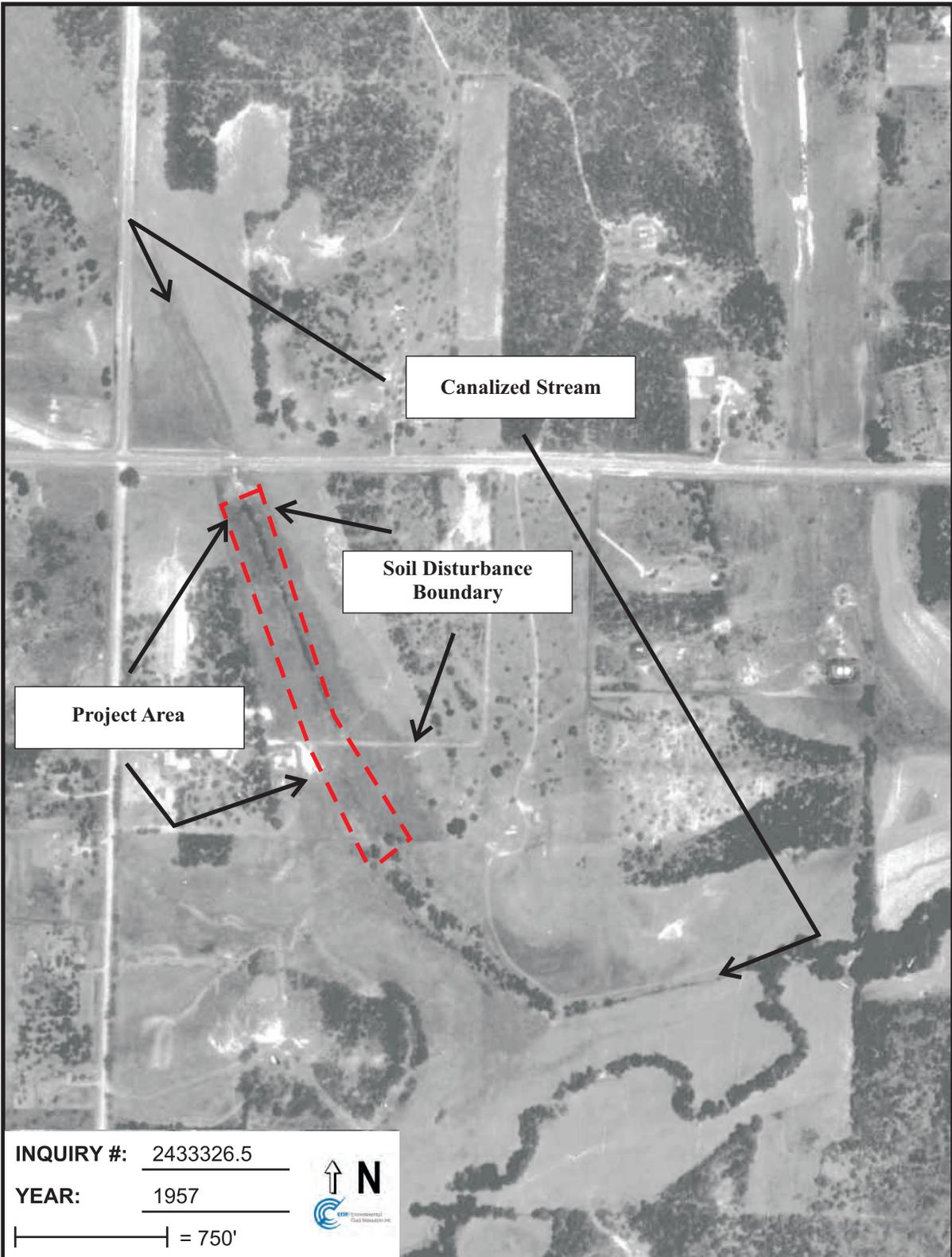
**URS** Source: USGS 1966 (Photorevised 1983).



**Attachment 2.** Above-ground APE overlain on a 2005 aerial photograph.

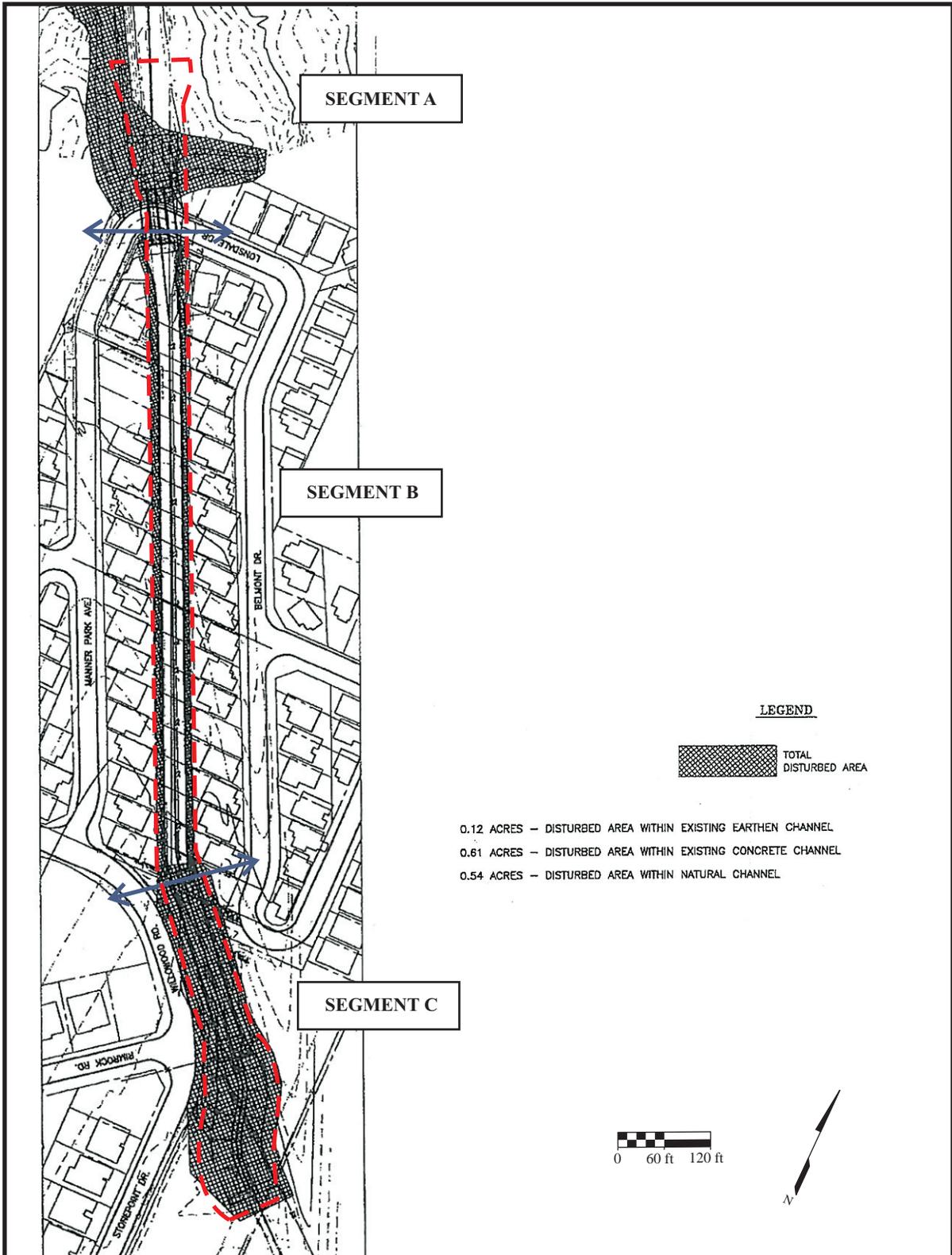


Attachment 3. The archeological APE shown on engineering plans.

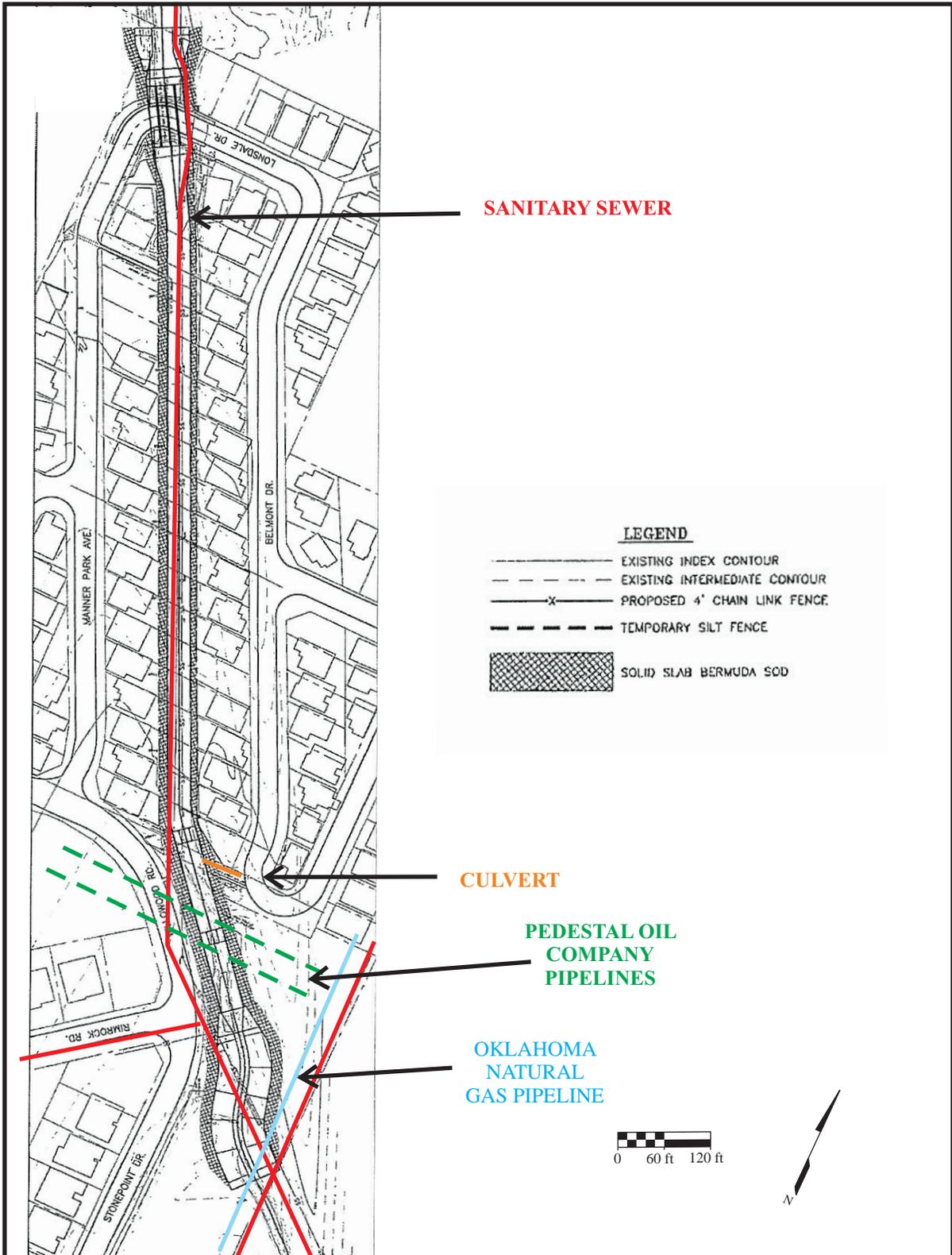


INQUIRY #: 2433326.5  
 YEAR: 1957  
 |—————| = 750'

**Attachment 4.** 1957 aerial photograph of the project area showing the canalized segment of Spring Creek Tributary 1.



**Attachment 5.** Meshek-defined disturbance based on 2009 engineering survey with archeological APE defined in red.



**Attachment 6.** Locations of buried utilities confirming project area disturbances.



Approximate  
Archeology APE

Lonsdale Drive

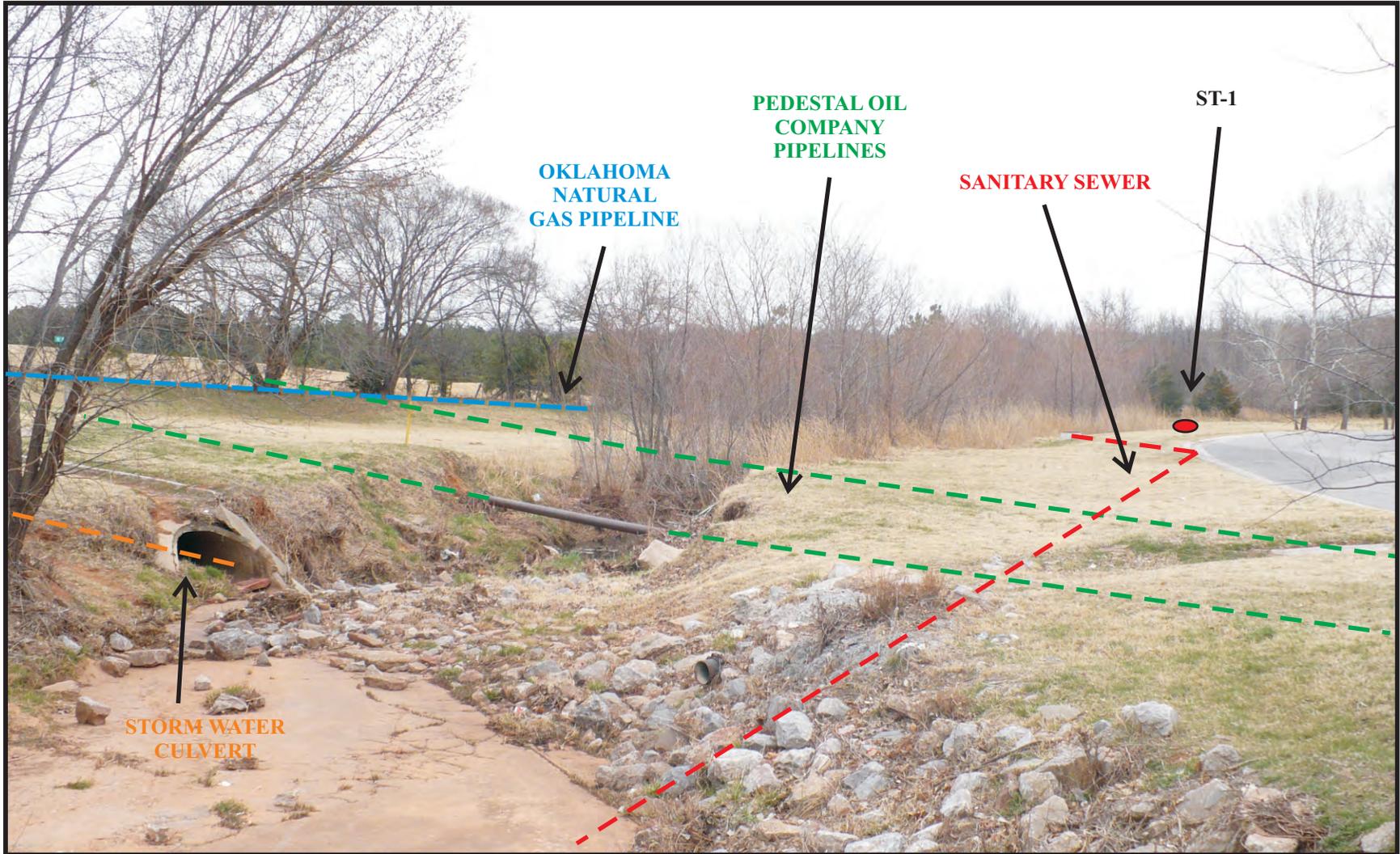
Attachment 7. Segment A, view to west showing canalized stream, levee, and sanitary sewer riser.



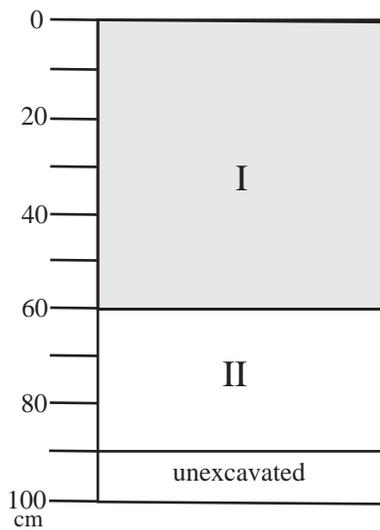
**Attachment 8.** Segment B showing channeled stream with concrete-lined bottom, view southeast from Lonsdale Drive (a), and from Willowood Road, view northwest (b).



**Attachment 9.** Segment C showing reduction of stream to canalized weedy ditch and riprap fill, view southeast (a), and view north (b).



**Attachment 10.** Overview of Segment C showing extensive utility trench disturbances and the location of shovel test ST-1.



Zone I: 0-60 cm  
mottled  
2.5 YR 4/4 to 2.5 YR 5/8  
silty sand with modern debris

Zone II: 60-90 cm  
5 YR 5/6  
sterile coarse sand

**Attachment 11.** Modern debris recovered from Zone 1 fill and ST-1 soil profile.



a



b



c



d

**Attachment 12.** Representative overview of Willowood Addition, Willowood Road, view to north (a) and south (b), and Belmont Drive, view to north (c) and south (d).



a



b



c



d

**Attachment 13.** Representative buildings in Willowood Addition along Manner Park Avenue, view to northeast (a) and west (b, c, and d).



**Attachment 14.** Viewshed of Stonepoint Addition along Stonepoint Drive, view to southwest (a) and west (b).