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Prairie Junction

GEOTECHNICAL STUDY
PRAIRIE JUNCTION
100 WEST 100 SOUTH
KAMAS, UTAH

Prepared By:

Earthtec
Testing and Engineering, P.C.

133 North 1330 West
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Job No. 062675

Prepared for:

Chad Blackhurst
497 West 2760 North
Pleasant Grove, Utah 84062

September 29, 2006

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FIGURES

TABLES

Scott,

Attached is a geotech report and results of the wetland delineation. The Corp has been on site and has verbally agreed w/ the study. Please call w/ questions.

Thanks,

Jon Bingham

(801) 836-3893 - cell

1.0 INTRODUCTION

Earthtec has completed a geotechnical study for an approximately 6 acre parcel located at about 100 West 100 South in Kamas, Utah. The general location of the site is shown on Figure No. 1, *Vicinity Map*, at the end of this report. This report presents our findings and conclusions.

The purposes of this study were to 1) evaluate the subsurface soil conditions at the site, 2) assess the engineering characteristics of the subsurface soils, and 3) provide geotechnical recommendations for general site grading and the design and construction of foundations, concrete floor slabs, miscellaneous concrete flatwork, and asphalt pavement sections. The scope of work completed for this study included field reconnaissance, subsurface investigation, field and laboratory soil testing, engineering analysis, and the preparation of this report.

2.0 CONCLUSIONS

The following is a brief summary of our findings and conclusions:

1. In the test pits we observed approximately 18 to 24 inches of topsoil at the surface. Subsurface soils we encountered were composed of Gravel (GM, GP, GP-GM) extending to the maximum depths explored of about 8½ to 11 feet below the existing surface.

2. Groundwater was encountered at depths of about 6 to 8½ feet below the existing surface in the test pits. Floor slabs should be kept at least 3 feet above the groundwater level and foundation drains should be installed on any residence where a floor slab will be placed below the existing surface.

3. Topsoil and any disturbed or other unsuitable soils should be completely removed from below foundation, floor slab, exterior concrete flatwork, and pavement areas.

4. Conventional strip and spread footings may be used to support proposed residences within this development. We recommend that foundations be constructed entirely on undisturbed, uniform, native gravel soils, or entirely on a minimum 18 inches of structural fill placed on undisturbed native soils. Footings constructed as described above may be designed for a maximum

bearing capacity of 2,000 psf, or more. More details regarding foundation design can be found in Section 10.0 of this report.

These findings and conclusions should not be relied upon without reading and consulting this entire report for a more detailed description of the geotechnical evaluation and recommendations contained herein.

3.0 PROPOSED CONSTRUCTION

We anticipate that development will include placing utilities, concrete flatwork in the form of curb, gutter, sidewalks, and driveways, an asphalt concrete paved residential street, and the construction of single family residences.

We estimate that foundation loads for residences will not exceed 3 kips per linear foot for bearing walls and 150 pounds per square foot for floor slabs. If structural loads will be greater, our office should be notified so that we may review our recommendations and, if necessary, make modifications.

4.0 GENERAL SITE DESCRIPTION

At the time we conducted our subsurface explorations the site was a relatively flat field vegetated with grass and weeds. The site was bounded on the north by a church and residences, on the south by a commercial building, on the west by field, and on the east by 100 West street.

5.0 SUBSURFACE INVESTIGATION

A qualified member of our geotechnical staff visited the subject site on September 21, 2006 and supervised the excavation of 4 test pits. The test pits extended to depths of about 8½ to 11 feet below the existing surface and were excavated with a rubber tire backhoe. The soils exposed in the test pits were classified by visual examination following the guidelines of the Unified Soil Classification System (USCS).

Disturbed samples of the subsurface soils were collected in each test pit, packaged, and transported to our Orem, Utah laboratory where they will be retained for 30 days following the date of this report and then discarded, unless a written request for additional holding time is received prior to the 30 day limit.

6.0 LABORATORY TESTING

Some of the samples collected were selected for laboratory testing to assess pertinent engineering properties and to aid in refining field classifications, if needed. Laboratory testing consisted of natural moisture content tests and mechanical gradation analyses. The following table summarizes the results of the laboratory testing. Test results are also shown on the enclosed test pit logs at the respective sample depths.

Table No. 1: Laboratory Test Results

TEST PIT NO.	DEPTH (ft.)	NATURAL MOISTURE (%)	GRAIN SIZE DISTRIBUTION (%)			SOIL TYPE
			GRAVEL #4	SAND	SILT/ CLAY #200	
TP-1	6	15	59	26	15	GM
TP-1	8½	9	71	25	4	GP
TP-2	3	5	67	18	15	GM
TP-2	5	5	64	20	16	GM
TP-3	4	5	74	18	8	GP-GM
TP-3	10	8	67	30	3	GP
TP-4	7	2	85	13	2	GP
TP-4	10½	6	69	23	8	GP-GM

7.0 SUBSURFACE CONDITIONS

7.1 Soil Types

We encountered topsoil at the surface of the test pits extending about 18 to 24 inches in depth. Below the topsoil we encountered layers of Poorly Graded Gravel with sand (GP), Poorly Graded Gravel with silt and sand (GP-GM), and Silty Gravel with sand (GM) extending to the maximum depths explored of about 8½ to 11 feet below the existing surface. Numerous cobbles and boulders were observed in the subsurface soils.

Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 6, *Test Pit Log* at the end of this report. The stratification lines shown on the logs represent the approximate boundary between soil units, the actual transition may be gradual. Due to potential natural variations inherent in soil deposits, care should be taken in interpolating between and extrapolating beyond exploration points. A key to the symbols and terms on the logs is presented on Figure No. 7, *Legend.*

7.2 Groundwater

Groundwater was encountered in the test pits at depths of about 6 to 8½ feet below the existing surface. Groundwater levels will fluctuate in response to the season, precipitation and snow melt, irrigation, and other on and off-site influences. Precisely quantifying these fluctuations would require long term monitoring.

8.0 SITE GRADING

8.1 General Site Grading

Unsuitable soils and vegetation should be removed from below foundation, floor slab, exterior concrete flatwork, and pavement areas to minimize the potential for distress and settlement. Unsuitable soils consist of topsoil, organic soils, undocumented fill, soft, loose, or disturbed native soils, and any other inapt materials. Topsoil was observed to extend approximately 18 to 24 inches in depth. The topsoil (defined as any soil containing roots larger than about ¼ inch

in diameter) and any other unsuitable soils, should be completely removed beneath building, flatwork, and pavement areas.

Because of the numerous cobbles and boulders observed in the subsurface soils the native gravel soils are not suitable for use as structural fill unless screened of materials larger than 4 inches.

8.2 Temporary Excavations

For temporary excavations less than 5 feet in depth into the native soils or into structural fill, slopes should not be made steeper than 0.5:1.0 (horizontal:vertical). Temporary excavations extending up to 10 feet in depth should not be made steeper than 1:1. If unstable conditions or groundwater seepage are encountered, flatter slopes, shoring, or bracing may be required. Unstable conditions were encountered in the test pits because of the relatively shallow groundwater and the granular soils.

8.3 Fill Material

Regular structural fill should consist of imported material meeting the following requirements:

Maximum particle size:	4 inches
Percent retained on the 3/4 inch sieve (coarse gravel):	30 maximum
Percent passing the No. 200 sieve (fines):	15 maximum
Liquid Limit of fines:	35 maximum
Plasticity Index of fines:	15 maximum

In some situations, particles larger than 4 inches and/or more than 30 percent coarse gravel may be acceptable, however, compaction and compaction testing may be more difficult. As a result more strict quality control measures than normally used may be required. Such measures may include using thinner lifts, and increased or full time observation of fill placement.

Utility trench fill below structures, concrete flatwork, and asphalt paving should consist of structural fill as defined above.

8.4 Fill Placement and Compaction

The thickness of each lift should be appropriate for the compaction equipment that is used. We recommend a maximum lift thickness of 4 inches for hand operated equipment, 6 inches for most "trench compactors", and 8 inches for larger rollers, unless it can be demonstrated by in-place density tests that the required compaction can be obtained throughout a thicker lift. The full thickness of each lift of structural fill placed should be compacted to at least the following percentages of the maximum dry density, as determined by ASTM D-1557:

In landscape areas not supporting structural loads:	90%
Less than 5 feet of fill below foundations, flatwork and pavements:	95%
Five or more feet of fill below foundations, flatwork and pavements:	98%

Generally, placing and compacting fill at a moisture content within 2% of the optimum moisture content, as determined by ASTM D-1557, will facilitate compaction. Typically, the further the moisture content is from optimum the more difficult it will be to achieve the required compaction.

Fill should be tested frequently during placement and early testing (initial lift) is recommended to demonstrate that placement methods and compaction efforts are achieving the required compaction. It is the contractor's responsibility to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

9.0 SEISMIC CONSIDERATIONS

9.1 Faulting

Based on published data no active faults are known to traverse the site and no surficial evidence of faulting was observed during our field investigation. The nearest mapped[1] fault trace is the East Kamas Fault located about 1 mile east of the site.

[1]Hecker, S., 1993, Quaternary Faults and Folds, Utah, Utah Geologic Survey, Bulletin 127.

9.2 Liquefaction Potential

Liquefaction is a phenomenon where a soil loses intergranular strength due to an increase in soil pore water pressures during a dynamic event such as an earthquake. The potential for liquefaction is based on several factors, including 1) the grain size distribution of the soil, 2) the plasticity of the fine fraction of the soil (material passing the No. 200 sieve), 3) relative density of the soil, 4) earthquake strength (magnitude) and duration, and 5) overburden pressures. In addition, the soils must be saturated for liquefaction to occur. As a part of this investigation, the potential for liquefaction to occur in the soils we observed was assessed.

Loose, saturated sands are most susceptible to liquefaction, but soft, sensitive silt soils also have the potential to experience failure and movement during a seismic event. The soils in the test pits were composed of medium dense to dense gravels with large cobbles and boulders which, in our opinion, have a low liquefaction potential.

9.3 IRC Seismic Design Category

The Seismic Design Categories in the International Residential Code (IRC) are based upon the short period design accelerations determined using the seismic provisions of the International Building Code (IBC) and the soil properties in the upper 100 feet of the soil profile. These properties are determined from SPT blow counts and undrained shear strength measurements. The IBC code also states that "Where site specific data are not available to a depth of 100 feet, appropriate soil properties may be estimated by the registered design professional preparing the soils report...." We estimate that the soils encountered in the test pits have properties consistent with those defined by Site Class C.

The site is located at approximately 40.64 degrees latitude and about -111.28 degrees longitude. For Site Class C, Fa is 1.15 and S_{DS} = 0.49. The Seismic Design Category is C.

10.0 FOUNDATIONS

10.1 General

The foundation recommendations presented in this report are based on the soil conditions observed in the test pits, the results of laboratory testing of samples of the native soils, the site grading recommendations presented in this report, and the foundation loading conditions presented in Section 3.0, *Proposed Construction*, of this report. If loading conditions are significantly different, we should be notified in order to re-evaluate our design parameters and estimates, and to provide additional recommendations if necessary.

Conventional strip and spread footings may be used to support the proposed residences. Foundations should not be installed on topsoil, disturbed native soils, undocumented fill, debris, combination soils (such as gravel/clay combinations), frozen soil, or in ponded water. If foundation soils become disturbed during construction they should be removed or recompacted until firm. Large cobbles and boulders which protrude up from the base of excavations more than a couple inches should be removed from footing areas, or footing thickness increased to maintain minimum code thickness.

To limit the potential for differential settlement, foundations should be constructed entirely on undisturbed, uniform, native gravel soils, or entirely on a minimum 18 inches of properly placed and compacted structural fill placed on undisturbed native soils. If soil conditions differing from those we encountered in the test pits are found a representative from Earthtec should observe the soil conditions after excavation but prior to forming footings, and make additional recommendations if necessary. For design of conventional strip and spread footings, we recommend the following parameters:

Minimum embedment for frost protection:	36 inches
Minimum strip footing width:	20 inches
Minimum spot footing width:	30 inches
Maximum allowable net bearing pressure:	2,000 psf

Bearing pressure increase for transient loading: 33 percent

Structural fill used below foundations should extend laterally a minimum of 6 inches for every 12 vertical inches of structural fill placed. For example, if 18 inches of structural fill are required to bring the excavation to footing grade, the structural fill should extend laterally a minimum of 9 inches beyond the edge of the footings.

10.2 Estimated Settlement

If the proposed foundations are properly designed and constructed using the parameters provided above, total settlement for non-earthquake conditions is estimated not to exceed one inch. Differential settlement is anticipated to be one-half of the total settlement over a 25-foot length of foundation. Additional movements could occur during an earthquake due to ground shaking.

11.0 SUBSURFACE DRAINAGE

According to Section R405 of the 2003 International Residential Code, "Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade." An exception is allowed when the foundation is installed on well drained ground consisting of Group 1 soils. These soils include those defined by the Unified Soil Classification System as GW, GP, SW, SP, GM, and SM. The subsurface native gravel soils are Group 1 soils, but due to the relatively shallow groundwater we recommend that foundation drains be constructed for any residence with a floor slab placed below the existing surface.

12.0 FLOOR SLABS

To facilitate construction, act as a capillary break, and aid in distributing floor loads we recommend that all at-grade slabs and exterior flatwork be underlain by four inches of free-

draining granular material such as "pea" gravel or three-quarters to one-inch minus clean gravel supported on competent native soils or structural fill.

To help control normal shrinkage and stress cracking the floor slabs should have the following features:

1. Adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints;
2. Frequent crack control joints; and
3. Non-rigid attachment of the slabs to foundation and bearing walls.

Special precautions should be taken during placement and curing of all concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking, spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and practices.

13.0 MOISTURE CONTROL AND SURFACE DRAINAGE

As part of good construction practice precautions should be taken during and after construction to reduce the potential for saturation of foundation soils. We recommend the following:

1. Adequate compaction of foundation backfill should be provided i.e. a minimum of 90% of ASTM D-1557. **Water consolidation methods should not be used.**
2. The ground surface should be graded to drain away from the residences in all directions. We recommend a minimum fall of 6 inches in the first 10 feet.

3. Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits, or at least 10 feet from foundations, whichever is greater.

4. Sprinklers should be aimed away foundation walls. Sprinkler systems should be well maintained, checked for leaks frequently, and repaired promptly.

5. Any additional precautions which may become evident during construction.

14.0 PAVEMENT DESIGN

We anticipate that an asphalt concrete paved street will be constructed within this development to serve the residences. We have based our design on an assumed California Bearing Ratio (CBR) value of 10 for the native gravel soils, an assumed traffic volume (consisting mostly of cars and pickup trucks, a daily school bus, some delivery trucks, and a weekly garbage truck) of about 100 vehicles per day or less, a design life of 20 years, and the site grading recommendations presented in this report. Based on these parameters and the procedures outlined in the *AASHTO Guide for Design of Pavement Structures (1993)*, we recommend the minimum asphalt pavement sections presented in the table below.

Table No. 2: Pavement Section Design

ASPHALT THICKNESS (in)	COMPACTED ROADBASE THICKNESS (in)	COMPACTED SUBBASE THICKNESS (in)
3.0	6.0	0.0

The pavement section recommended is not intended to support construction traffic, or heavy semi trucks. All base material and asphalt should conform to local or UDOT requirements regarding thickness, gradation, oil content, and any other requirements pertaining to the project. We recommend that all roadbase and subbase be properly processed, moisture conditioned, and compacted to a minimum of 95% of the maximum dry density as determined by ASTM-D 1557.

All asphalt should be compacted to a minimum of 95% of the laboratory Marshal mix design density.

15.0 GENERAL CONDITIONS

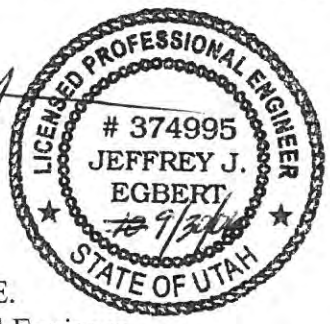
The exploratory data presented in this report was collected to provide geotechnical design recommendations for this project. The test pits may not be indicative of subsurface conditions outside the study area or between points explored and thus have a limited value in depicting subsurface conditions for contractor bidding. Variations from the conditions portrayed in the test pits may occur and which may be sufficient to require modifications in the design. If during construction, conditions are different than presented in this report, please advise us so that the appropriate modifications can be made.

The geotechnical study as presented in this report was conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in the area. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts or reports.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Respectfully;

EARTHTEC TESTING AND ENGINEERING, P.C.

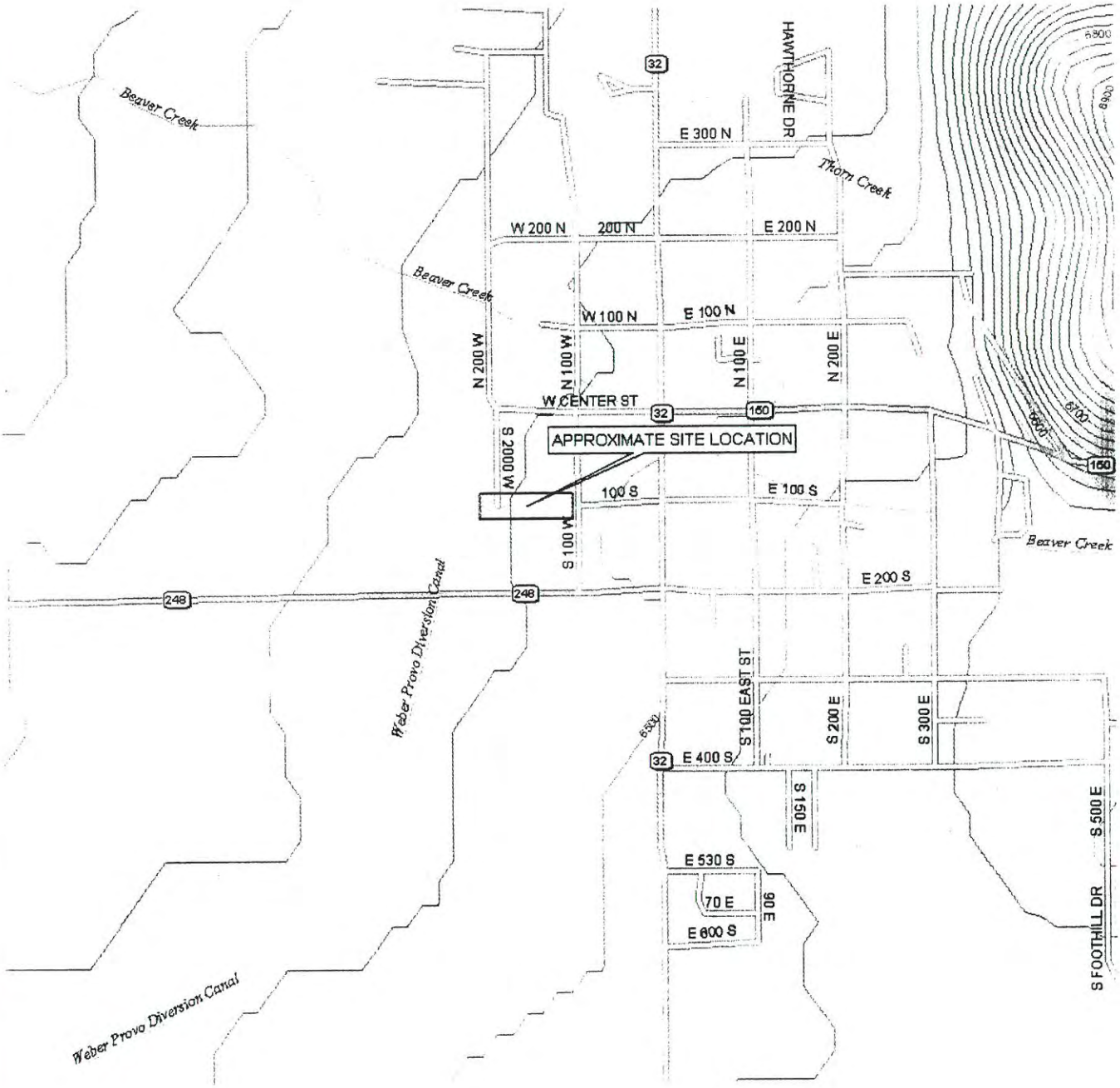


Jeffrey J. Egbert, P.E.
Project Geotechnical Engineer

William G. Turner, P.E.
Senior Geotechnical Engineer

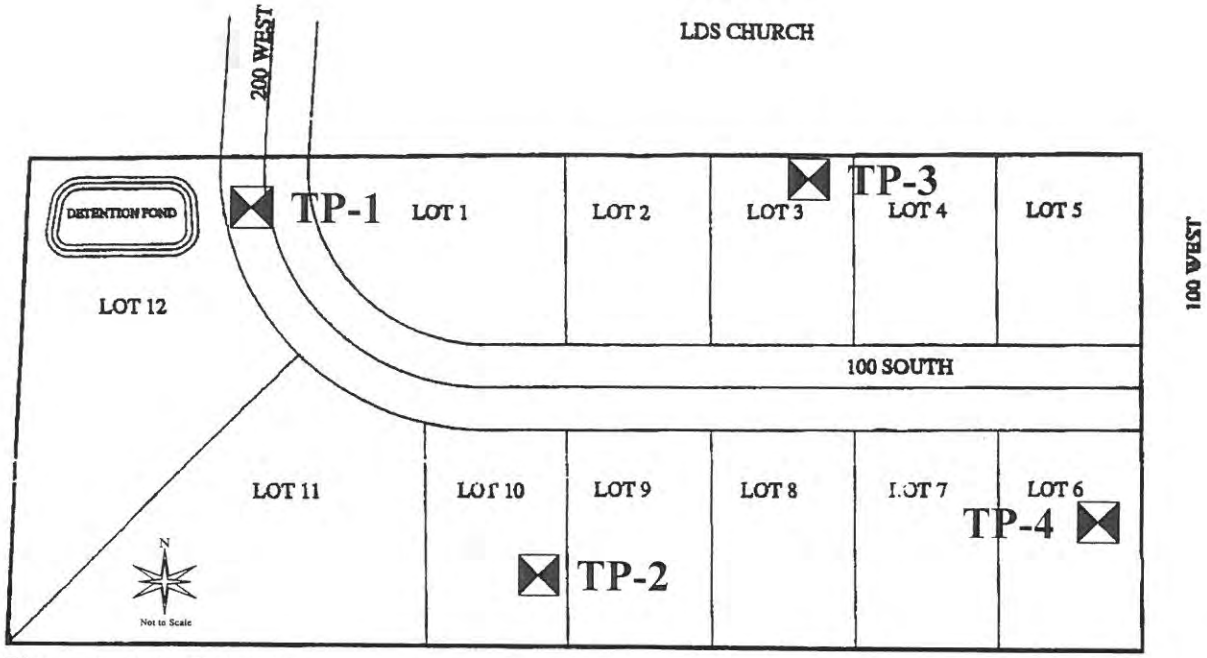
VICINITY MAP

PRAIRIE JUNCTION



PROJECT NO.: 062675	Earthtec Testing and Engineering, P.C.	FIGURE NO.: 1

SITE PLAN & LOCATION OF TEST PITS
PRAIRIE JUNCTION



⊠ Approximate Test Pit Location

PROJECT NO.: 062675	Earthtec Testing and Engineering, PC	**FIGURE NO.:** 2

TEST PIT LOG
NO.: TP-1

PROJECT: Prairie Junction
CLIENT: Chad Blackhurst
LOCATION: Refer to Figure 2.
OPERATOR: Halls
EQUIPMENT: RTB
DEPTH TO WATER; INITIAL ▽ : 6 ft.

PROJECT NO.: 062675
DATE: 09/21/06
ELEVATION: NM
LOGGED BY: P.E.
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Dry Dens. (pcf)	Water Cont. (%)	PI	LL	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand, moist, dark brown.									
1												
2			SILTY GRAVEL with sand, cobbles, boulders, medium dense, moist to wet, brown.									
3												
4												
5		GM		X								
6			▽	X		15			59	26	15	
7												
8		GP	POORLY GRADED GRAVEL with sand, cobbles, boulders, trace silt, medium dense, wet, brown.	X		9			71	25	4	
9			Bottom at approximately 8.5 feet.									
10												
11												
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 062675

Earthtec Testing and Engineering, P.C.

FIGURE NO.: 3

LOG OF TESTPIT 062675.GPJ EARTHTEC.GDT 9/26/06

TEST PIT LOG
NO.: TP-2

PROJECT: Prairie Junction
CLIENT: Chad Blackhurst
LOCATION: Refer to Figure 2.
OPERATOR: Halls
EQUIPMENT: RTB
DEPTH TO WATER; INITIAL ▽ : 6 ft.

PROJECT NO.: 062675
DATE: 09/21/06
ELEVATION: NM
LOGGED BY: P.E.
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Dry Dens. (pcf)	Water Cont. (%)	PI	LL	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand, moist, dark brown.									
1												
2			SILTY GRAVEL with sand, cobbles, boulders, medium dense, moist to wet, brown.									
3				X		5			67	18	15	
4												
5		GM		X		5			64	20	16	
6			▽									
7												
8												
9				X								
			Bottom at approximately 9 feet.									
10												
11												
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 062675

Earthtec Testing and Engineering, P.C.

FIGURE NO.: 4

LOG OF TESTPIT 062675.GPJ EARTHTEC.GDT 9/26/06

TEST PIT LOG
NO.: TP-3

PROJECT: Prairie Junction
CLIENT: Chad Blackhurst
LOCATION: Refer to Figure 2.
OPERATOR: Halls
EQUIPMENT: RTB
DEPTH TO WATER; INITIAL ▽ : 7 ft.

PROJECT NO.: 062675
DATE: 09/21/06
ELEVATION: NM
LOGGED BY: P.E.
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Dry Dens. (pcf)	Water Cont. (%)	PI	LL	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand, moist, brown.									
1												
2												
3			POORLY GRADED GRAVEL with silt and sand, cobbles, boulders, dense, moist to wet, brown.									
4				X		5			74	18	8	
5												
6		GP-GM										
7			▽									
8												
9												
10		GP	POORLY GRADED GRAVEL with sand, cobbles, boulders, trace silt, dense, wet, brown.	X		8			67	30	3	
11			Bottom at approximately 10 feet.									
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 062675

Earthtec Testing and Engineering, P.C.

FIGURE NO.: 5

LOG OF TESTPIT 062675.GPJ EARTHTEC.GDT 9/26/06

TEST PIT LOG
NO.: TP-4

PROJECT: Prairie Junction
CLIENT: Chad Blackhurst
LOCATION: Refer to Figure 2.
OPERATOR: Halls
EQUIPMENT: RTB
DEPTH TO WATER; INITIAL ▽ : 8.5 ft.

PROJECT NO.: 062675
DATE: 09/21/06
ELEVATION: NM
LOGGED BY: P.E.
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS							
					Dry Dens. (pcf)	Water Cont. (%)	PI	LL	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand, moist, brown.									
1												
2			POORLY GRADED GRAVEL with sand, cobbles, boulders, trace silt, dense to medium dense, moist, brown.									
3												
4												
5				X								
6		GP										
7												
8				X		2			85	13	2	
9			▽									
10												
11		GP-GM	POORLY GRADED GRAVEL with silt and sand, cobbles, boulders, medium dense, wet, brown.	X		6			69	23	8	
12			Bottom at approximately 11 feet.									

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 062675

Earthtec Testing and Engineering, P.C.

FIGURE NO.: 6

LOG OF TESTPIT 062675.GPJ EARTHTEC.GDT 9/26/06

LEGEND

PROJECT: Prairie Junction **DATE:** 09/21/06
CLIENT: Chad Blackhurst **LOGGED BY:** P.E.

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR SOIL DIVISIONS			USCS SYMBOL	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 50% retaining on No. 4 Sieve)	GRAVELS (More than 50% of coarse fraction retained on No. 4 Sieve)	CLEAN GRAVELS (Less than 5% fines)	GW	Well Graded Gravel, May Contain Sand, Very Little Fines
			GP	Poorly Graded Gravel, May Contain Sand, Very Little Fines
		GRAVELS WITH FINES (More than 12% fines)	GM	Silty Gravel, May Contain Sand
			GC	Clayey Gravel, May Contain Sand
	SANDS (50% or more of coarse fraction passes No. 4 Sieve)	CLEAN SANDS (Less than 5% fines)	SW	Well Graded Sand, May Contain Gravel, Very Little Fines
			SP	Poorly Graded Sand, May Contain Gravel, Very Little Fines
		SANDS WITH FINES (More than 12% fines)	SM	Silty Sand, May Contain Gravel
			SC	Clayey Sand, May Contain Gravel
FINE GRAINED SOILS (More than 50% passing No. 200 Sieve)	SILTS AND CLAYS (Liquid Limit less than 50)		CL	Lean Clay, Inorganic, May Contain Gravel and/or Sand
			ML	Silt, Inorganic, May Contain Gravel and/or Sand
			OL	Organic Silt or Clay, May Contain Gravel and/or Sand
	SILTS AND CLAYS (Liquid Limit Greater than 50)		CH	Fat Clay, Inorganic, May Contain Gravel and/or Sand
			MH	Elastic Silt, Inorganic, May Contain Gravel and/or Sand
			OH	Organic Clay or Silt, May Contain Gravel and/or Sand
HIGHLY ORGANIC SOILS			PT	Peat, Primarily Organic Matter

SAMPLER DESCRIPTIONS

- SPLIT SPOON SAMPLER (1 3/8 inch inside diameter)
- MODIFIED CALIFORNIA SAMPLER (2½ inch outside diameter)
- SHELBY TUBE (3 inch outside diameter)
- BLOCK SAMPLE
- BAG/BULK SAMPLE

WATER SYMBOLS

- ▽ Water level encountered during field exploration
- ▼ Water level encountered at completion of field exploration

NOTES:
1. The logs are subject to the limitations, conclusions, and recommendations in this report.
2. Results of tests conducted on samples recovered are reported on the logs and any applicable graphs.
3. Strata lines on the logs represent approximate boundaries only. Actual transitions may be gradual.
4. In general, USCS symbols shown on the logs are based on visual methods only: actual designations (based on laboratory tests) may vary.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

November 16, 2006

Regulatory Branch (200650296)

Mary Argyle
Blackhurst Properties
Post Office Box 876
Midway, Utah 84049

Dear Mrs. Argyle:

We are responding to your consultant's request for an approved jurisdictional determination for the Blackhurst Properties site located at 150 South 100 West in Kamas. This approximately 6-acre site is located in Section 17, Township 2 South, Range 6 East, SLB&M, Latitude 40° 38′ 29.1852″, Longitude 111° 17′ 2.85713″, Summit County, Utah.

Based on available information and site visit conducted by Hollis Jencks of this office October 24, 2006, we concur with the estimate of waters of the United States as depicted on the enclosed drawing, **October 2006, Figure 2 Wetland Delineation,** prepared by **Todd Sherman of Wetland Resources**. Approximately **0.07 acre** of waters of the United States, including wetlands, are present within the survey area. These waters are regulated under Section 404 of the Clean Water Act since they are **adjacent to a tributary, to the Weber River**.

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the South Pacific Division Office at the following address: Doug Pomeroy, Administrative Appeal Review Officer, Army Corps of Engineers, South Pacific Division, CESPD-PDS-O, 333 Market Street, Room 923, San Francisco, California 94105-2195, Telephone: 415-977-8035 FAX: 415-977-8129.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **January 15, 2007**. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

Please refer to identification number 200650296 in any correspondence concerning this project. If you have any questions, please contact Mr. Hollis Jencks at the Utah Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010-7744, email *hollis.g.jencks@usace.army.mil*, or telephone 801.295.8380 ext. 18.

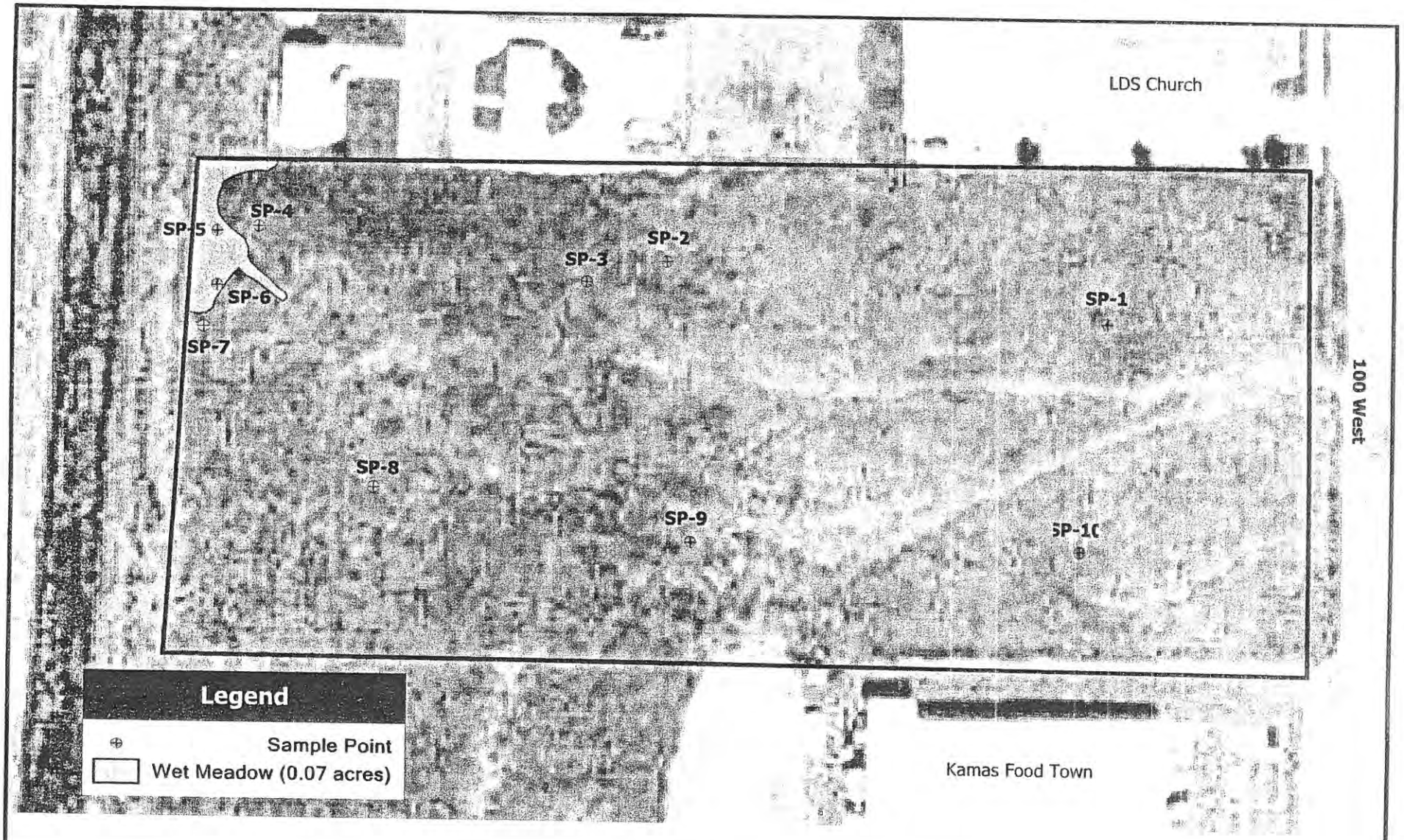
Sincerely,

Jason Gipson
Chief, Utah Regulatory Office

Enclosures

Copy furnished:

Mr. Todd Sherman, Wetland Resources, 182 East 300 North, Logan, Utah 84321



Prepared by: Wetland Resources
Prepared for: Blackhurst Properties
October 2006
Figure 2

Wetland Delineation

N

0 100 ft

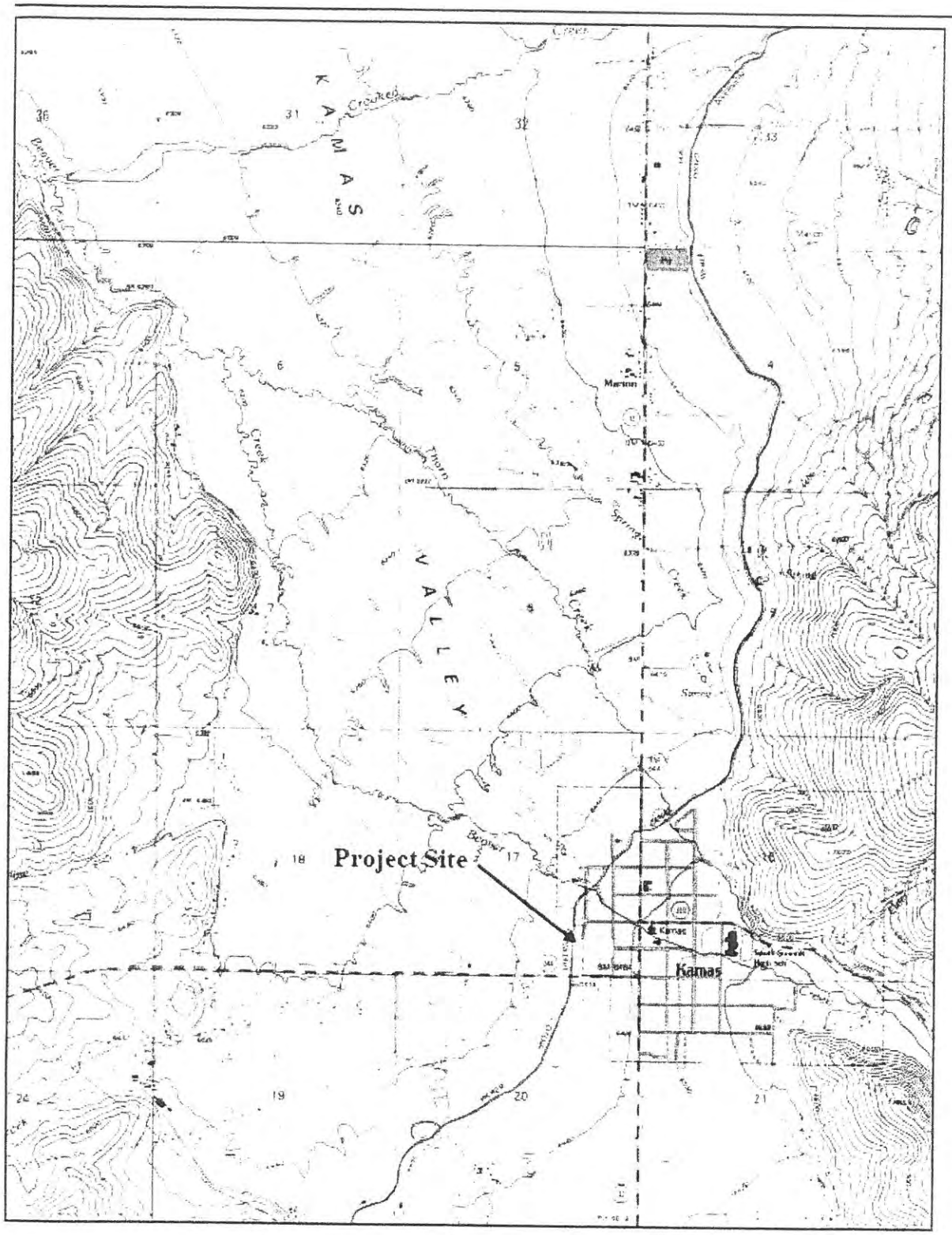


Figure 1. USGS Map showing Project Site