



TOWN OF JACKSON PLANNING & BUILDING DEPARTMENT

TRANSMITTAL MEMO

Town of Jackson

- Public Works/Engineering
- Building
- Title Company
- Town Attorney
- Police

Joint Town/County

- Parks and Recreation
- Pathways
- Joint Housing Dept

Teton County

- Planning Division

- Engineer
- Surveyor- *Nelson*
- Assessor
- Clerk and Recorder
- Road and Levee

State of Wyoming

- Teton Conservation
- WYDOT
- TC School District #1
- Game and Fish
- DEQ

Federal Agencies

- Army Corp of Engineers

Utility Providers

- Qwest
- Lower Valley Energy
- Bresnan Communications

Special Districts

- START
- Jackson Hole Fire/EMS
- Irrigation Company

Date: March 18, 2020

Item #: P20-056

Planner: Tyler Valentine

Phone: 733-0440 ext. 1305

Fax: 734-3563

Email: tvalentine@jacksonwy.gov

Owner:

Town of Jackson
PO Box 1687
Jackson, WY 83001

Applicant:

Jorgensen Associate – Brendan Schulte
PO Box 9550
Jackson, WY 83002

REQUESTS:

The applicant is submitting a request for a Development Plan at 55 Karns Meadow Drive, legally known as PT. SW1/4NE1/4 & PT. SE1/4NW1/4 SEC. 33, TWP. 41, RNG. 116.

For questions, please call Tyler Valentine at 733-0440, x1305 or email to the address shown below. Thank you.

Please respond by: **April 1, 2020 (Sufficiency)**
April 8, 2020 (with Comments)

RESPONSE: For Departments not using Trak-it, please send responses via email to:
tstolte@jacksonwy.gov

Development Plan for Core Services Vehicle Maintenance Facility

The Town of Jackson, Wyoming

55 Karns Meadow Drive

Applicant:
Town of Jackson, Wyoming
PO Box 1687
Jackson, WY 83001

Submittal Date: March 16, 2020
Project No. 06013

Prepared by:



SECTION 1 – PROJECT BACKGROUND AND OVERVIEW

A. PROJECT HISTORY & BACKGROUND

The Town of Jackson/Teton County Transit Operations and Maintenance Facility site is a 5.75 Acre Parcel at 55 Karns Meadow Drive, Jackson, WY and more specifically described as PT. SW1/4NE1/4 & PT. SE1/4NW1/4 SEC. 33, TWP. 41, RNG. 116, Teton County Wyoming, located in an area generally known as Karns Meadow. The parcel is bordered on the west and north by private lands with commercial uses. The property south of the site is owned by Lower Valley Energy and is used as an electrical power substation facility. The property to the east is Karns Meadow Tract 5 and is currently open space with a restrictive covenant held by the Jackson Hole Land Trust. Access to the project site is via Karns Meadow Drive via a 60-foot road easement that connects Snow King Avenue and Wyoming State Highway 89 (West Broadway).

After acquiring the property from Teton County in 2011 it was rezoned to Public-Semi Public-Town of Jackson (P-SP ToJ). A Sketch Plan for a multiphase project was approved in November of 2011. Subsequent to this approval the project went through several changes to reduce the cost and refine the project. This required additional amendments and approvals. In April of 2013, the Town of Jackson/Teton County Transit Operations and Maintenance Facility was approved and the construction process began. The grand opening of the facility was in 2014 and was completed with most of the site improvements that included the connector road (Karn's Meadow Drive) and some site work.

The facility includes indoor storage for the START Bus fleet, maintenance operations for the Town and County's vehicle fleet (relocated from the current Town Public Works facility), bus wash, indoor vehicle circulation, maintenance parts storage, a fueling station for the Town and County, employee housing, and administration and operations offices.

The facility is housed in a single building with a footprint of approximately 76,000 square feet. Through the concept site planning process, enclosing these many uses in a single facility became the most effective and efficient way to proceed with the development of a joint Town/County project on the site. Advantages include increased energy efficiencies through fewer door openings and closings and a singular HVAC system. Once inside the building, vehicle circulation between maintenance and fleet storage occurs indoors, significantly reducing noise from vehicles maneuvering outdoors and the need to leave busses running for long periods to warm up in the winter.

Programming for this facility was initiated in 2006, updated in 2010 and 2012. Through a process of interviews with key START Bus and Public Works staff, the Design Team identified program needs for the entire facility based upon specific relevant expertise with the design, construction, operation, and maintenance of transit and maintenance facilities. These needs were summarized in the Final Programming Report and reviewed by the START Bus and Public Works Directors to ensure they are practical and appropriate for the Town of Jackson and Teton County. The program projects the fleet maintenance needs of the Town of Jackson and START out for 20 years to the year 2032. The facility required to serve the program includes:

- Heated Storage for 36 Buses
- 5 Maintenance Repair Bays
- 3 Heavy Duty Repair Bays
- 3 Light Duty Repair Bays
- 2 Buildout Bays
- Employee/Visitor Parking
- Parts Storage
- START Administration/Operations
- TOJ/TC Employee Housing
- Fueling Island with Diesel and Unleaded Gasoline.

Karns Meadow Drive connects Snow King Avenue to West Broadway. The road, sidewalk, and drainage features were designed as a “complete transportation corridor.” Safe access is provided for all users: pedestrians, bicyclists, motorists, and public transportation users. A connecting pathway will be an important component of the future Karns Meadow pathway system and the WY 22/US Highway 89 Pathway Connector Project – East Segment is not part of this phase, but may be developed in the future.

A goal of the project planning and design was to develop the site efficiently to meet the facility 20 year program and the 50 year building life-span goals. A balance was sought to ensure the facility functions well while remaining of limited size and footprint. Buildings are functional, aesthetically pleasing and sustainable through the use of solar on the roof to help offset the energy demands of the facility.

Landscaping includes all native plant material and be designed to minimize long term maintenance costs. Screening fences and noise barrier walls will be considered, especially along the west and north property lines. Applying creativity to these elements will result in a more interesting design that can be tied back to the building’s architecture and become an amenity to the site.

Proper stormwater management is critical to the health of the receiving waters of Flat Creek. No untreated stormwater will be allowed to enter Flat Creek from this project site. Stormwater will be routed using curb and gutters, bioswales, stormwater treatment chambers (sand/oil separators), and detention ponds.

B. OWNER & PROJECT TEAM INFORMATION

PROPERTY OWNERS & APPLICANT

Town of Jackson, Wyoming
PO Box 1687
Jackson WY 83001
307-733-3932

ENGINEERING & LAND PLANNING

Jorgensen Associates, Inc.
1315 Highway 89 South, Suites 201 & 203; 83001
P.O. Box 9550
Jackson, Wyoming 83002
307-733-5150

ARCHITECTURE

Stantec Architecture Inc.
1050 17th Street Suite A200
Denver CO 80265-2016 US

C. DEVELOPMENT PROPOSAL

In November of 2019 the community voted via the 2019 SPET to continue this project and address several critical fleet maintenance needs. This begins with Phase 2: The Core Services Vehicle Maintenance Facility built for the purpose of servicing and maintaining critical response and general use vehicles for Teton County and the Town of Jackson. These include, but are not limited to, snowplows, street maintenance vehicles, law enforcement vehicles, water/sewer maintenance vehicles, and buses. This building is the signature phase in this development plan and also includes the North and South Parking Areas and all of the remaining grading, drainage, landscaping and site work. The building has very a minor change from the Sketch Plan that fills in the "notch" that had existed on the North elevation and the northeast corner of the building.

Phases 3, 4, and 5 are also a part of this development plan, but timing and funding for those phases is still yet to be finalized. Phase 3 -Second Half of Bus Storage has a minor change in that the building will be replacing the proposed green roof with solar panels.

The green roof on the existing bus storage will stay in place. Construction is set to start as soon as possible for this project. After this process concludes, the project will proceed through a building permit review and bidding process with the ultimate goal of beginning construction in late summer.

D. PHASING

- **Phase One (Completed)**
 - 50% Bus Storage & Indoor Drive/Circulation
 - Administration/Operations Offices
 - Connector Road
 - Landscaping
 - Limited Site Work
- **Phase Two – Begins Summer 2020 and concludes Fall 2021**
 - Core Services Vehicle Maintenance Facility
 - North and South Parking Areas
 - Complete Site Work
 - Grading and Drainage
- **Phase Three – 2022 to 2023 (Funding Dependent)**
 - Second Half of Bus Storage
- **Phase Four – 2023 to 2024 (Funding Dependent)**
 - Fueling Island
- **Phase Five – 2023 to 2024 (Funding Dependent)**
 - Remaining Administration and Operations
- **Phase Six – (Future Phase not a part of this application)**
 - Housing

A. FINDINGS FOR APPROVAL

Division 8.3.2.C Development Plan Findings for approval:

1. *Is consistent with the desired future character for the site in the Jackson/Teton County Comprehensive Plan. Complies.*

This project is in direct alignment with the following sections of the Teton County Comprehensive Plan, Section 7: Multimodal Transportation. Policy 7.1.c: Increase the capacity for use of alternative transportation modes and Policy 7.1.f: Establish a regional transportation strategy. Section 8: Quality Community Service Provision.

Principle 8.2: Coordinate the provision of infrastructure and facilities needed for service delivery. Integrated Transportation Plan (ITP): the plan is to increase service levels (frequency, hours of operation and connectivity) on local routes, bringing much better service to areas of the town and county. The project's location is within the Comprehensive Plan District 4 – Midtown, Subarea 4.3 – Central Midtown.

2. *Achieves the standards and objectives of the Natural Resource Overlay (NRO) and Scenic Resources Overlay (SRO), if applicable.* Complies.

Most of the property resides within the NRO. The proposed development will occur in areas of the parcel that are already disturbed from Phase 1. Since there are no new impacts to protected cover types during Phases 2 through 6, the project complies with NRO standards and meets this finding.

For further details on impacts realized and mitigation required during Phase 1 of this project see Section I.4. ENVIRONMENTAL STANDARDS on page 7.

3. *Does not have significant impact on public facilities and services, including transportation, potable water and wastewater facilities, parks, schools, police fire, and EMS facilities.* Complies.

The existing development is already connected to public utilities for water and sewer, and the project will continue to utilize these public utilities. The project is within town limits and is currently served by police, public works, fire and EMT services; the development will not result in increased impacts on availability of these services.

Moreover, this project actually expands the Town's capacity to deliver these services to the general public by resolving current issues with capacity for repair and maintenance of all Town and County vehicles and equipment.

Multiple transportation options already exist in proximity to the property: these include pedestrian and bicycle connections to the Teton County Pathway System and Town Shuttle stops.

4. *Complies with all relevant standards of these LDRs and other Town Ordinances.* Complies.

The 5.75-acre site provides enough space to build out the final phases of the project to fit programming and circulation needed for this important community facility.

Setbacks are not applicable in the P-SP. The building location, bulk and scale generally conform to the 2013 Sketch Plan Approval with the exception of a few minor modifications and conform to all other requirements of the LDR's when pertaining to the P-SP Zoning District. The project also conforms to the purpose of the P-SP Zoning

District in that the project needs the flexibility intended for this zone and is under the control of the local government.

5. Is in substantial conformance with all standards or conditions of any prior or applicable permits or approvals. Complies. The building location, bulk and scale generally conform to the 2013 Sketch Plan Approval its subsequent Final development Plan and amendments thereto, with the exception of a few minor modifications as noted.

F. ADDITIONAL ZONE-SPECIFIC STANDARDS, SECTION 2.2.6.E.

There are no zone-specific standards within the zone of Public/Semi-Public.

G. PROPOSED DEVELOPMENT PROGRAM

The proposed size of the **Core Services Vehicle Maintenance Facility** is depicted within Architectural Plans in **Section 3**. A proposed development program is depicted in the table below.

PROPOSED DEVELOPMENT PROGRAM	
Area Calculations for 55 Karns Meadow Drive - Phase 2	
Gross Site Area	5.75
Land within road easements and right-of-way	0.00
Land within existing vehicular access easements	0.00
Land between levees or banks of rivers and streams	0.00
Lakes or ponds > 1 acre	0.00
Open Space	0.00
50% of lands with slopes greater than 30%	0.00
Base Site Area	5.75
Adjusted Site Area	5.75

DEVELOPMENT CALCULATIONS	Existing	Proposed	Gross
Floor area	46,606	40,499	87,105
FAR or maximum floor area	N/A	N/A	N/A
Site Development	N/A	N/A	N/A
Landscape Surface Area	0	47,346	47,346
Landscape Surface Ratio	0	0.19	0.19
Setbacks			
Front or street yard	N/A	N/A	N/A
Rear yard	N/A	N/A	N/A
Side yard	N/A	N/A	N/A
Height	N/A	N/A	N/A

H. LANDSCAPING STANDARDS

Landscaping Standards are not applicable within Zone P/SP-ToJ. During Phase 1, some plant units and landscaping were planted as part of that phase. Phases 2 through 6 will also have landscaping installed as part of each phase, in accordance with the LDRS where appropriate, and not in a manner that would hinder the construction of future phases.

I. ENVIRONMENTAL STANDARDS

1. **Natural Resource Buffers (Wetlands and Water bodies)** there are no wetlands or bodies of water on the property according to the Environmental Analysis dated December 12, 2012 issued by Alder Environmental attached in **Section 4**.
2. **Wildlife Friendly Fencing** – no fencing is proposed nor required.
3. **Water Quality** - See subsequent Engineer's report in **Section 2** of this application for discussion on this item.
4. **Natural Resources Overlay (NRO)** The property is located within the NRO. During Phase 1 of this project some protected cover types were predicted to be impacted during construction and a mitigation was compiled to compensate for these impacts at 2 to 1 ratio as required by the LDR's. See the Environmental Analysis dated December 12, 2012 issued by Alder Environmental attached in **Section 4**. It is possible that the mitigation plan and its requirements will be reduced due to the wetlands not being impacted during construction of the Karn's Meadow Drive during Phase 1. Alder Environmental will be inspecting the wetlands in the next week. Should there be a reduction in the required mitigation a revision to the mitigation plan will be submitted concurrently with the grading permit for this project.
5. **Bear Conflict Area** – The property is not mapped as a bear conflict area.

J. SCENIC STANDARDS

1. **Exterior Lighting** - Exterior lighting will be addressed during the Building Permit and will follow requirements in LDR's.
2. **Scenic Resource Overlay (SRO) Standards** - The property is not located within SRO.

K. NATURAL HAZARDS TO AVOID

1. **Steep Slopes** - There are no steep slopes on the site. There is a moderate slope that begins at the northern boundary of the site. This slope will be dealt with using a retaining wall.
2. **Unstable Soils** – In our opinion, the biggest geotechnical concern at the site was the presence of the undocumented fills encountered across the site during the 2010 and 2020 test pit excavation. Undocumented fills and topsoil are unsuitable as subgrade

soils for foundation elements and will have to be removed part of the construction of the foundation of the Core Services Vehical Maintenance Facility.

3. **Fault Areas** – The most potentially active fault in the area is the Teton Fault, which lies approximately 5-miles west of the site. The inferred (buried) traces of the Cache Creek and Jackson thrust faults are located near the site, crossing the town of Jackson on a generally east-west trend. These faults are considered to be relatively old and inactive by the USGS and do not affect the project.
4. **Floodplains** – A portion of the proposed development resides within FEMA Flood Hazard Zone X, Area of Minimal Flood Hazard, and will be comply with Chapter 15.30 for Flood Damage Prevention within the Municipal Code of the Town of Jackson.
5. **Wildland Urban Interface** – The site is not within the WUI

K. SIGN STANDARDS

Sign Standards are not applicable within Zone P/SP-ToJ.

L. GRADING, EROSION CONTROL, DRAINAGE, & STORMWATER

See subsequent Engineer's report in **Section 2** of this application for discussion on these items.

M. ALLOWED USES & USE REQUIREMENTS

1. **Allowed Uses** - The proposed uses within the development include Heavy Industry for transport terminals and the maintenance and repair of trucks and heavy equipment.
2. **Parking** - See subsequent Engineer's report in **Section 2** of this application for discussion on these items.
3. **Operational Standards**
 - a. **Outside Storage** - The development will be for storing, maintaining, and repairing buses within a roofed facility, and thus, will not be using outdoor displays.
 - b. **Refuse and Recycling** - The development will include two areas for consolidating trash and recycling. One enclosed area near the north-eastern corner of the proposed maintenance facility addition and one open space area near the north-eastern corner of the property.

- c. **Noise** - Noise levels will be kept within the permitted 65 DBA, consistent with LDR restrictions for the P/SP Zoning District.
- d. **Vibration** - The development does not include uses in which any regular activity shall cause or create displacements for given frequencies as prescribed by LDR restrictions.
- e. **Electrical Disturbance** - The development does not include any activities which could cause electromagnetic radiation and disturbed operation of equipment such as radios and TVs.
- f. **Fire and Explosive Hazards** – The development will adhere with the fire codes adopted by the State of Wyoming and the Town of Jackson pertaining to the manufacturing, possession, storage, transportation or use of hazardous materials.

N. ALLOWED SUBDIVISION AND DEVELOPMENT OPTIONS

- 1. **Standards Applicable to all Subdivisions** – Although no subdivision is currently proposed the project will adhere to all standards provided in Sections 7.1, 7.2, 7.4 & 7.5 of the LDRs which include developer responsibilities, permits required, installation, working with a professional engineer, over sizing and off-site improvements, and acceptance by Town.

O. DEVELOPMENT EXACTION AND AFFORDABLE HOUSING STANDARDS

- 1. **Employee Housing** –The project is exempt from Affordable Workforce Housing Standards as per the LDR's in the P-SP zone. However, as per the 2013 Sketch Plan, voluntary affordable housing was proposed onsite for Town and County employees. This building had gone through two different iterations based on the varying needs of community over time. Because these needs change over time and this phase being scheduled so far in the future (5+ years) it is not a part of this development plan application. Once it is funded a final design will be put through the appropriate permit application to this a site at that time.
- 2. **School and Parks Exactions** – No saleable subdivision of land is proposed and therefore no School and Park Exactions are required.

P. CONSTRUCTION MANAGEMENT

1. Development coordination between the Town and the 660 West Broadway developer agreed that as part of their project, they could grade over their south property line and onto the subject property. Coordination and alteration of the design of the proposed retaining wall and landscaping around the parking lot is necessary.
2. Construction Staging will occur on the property and adjacent Karns meadow as follows:
 - a. Most of the staging for construction will occur in the Employee Parking area south of the existing building
 - b. If needed some staging can occur on the north side of the site except when the north wall between the properties is being built.
 - c. Parking for construction workers will occur on the Karns meadow property. This temporary parking lot will be shown in future grading permits. Parking is allowed by the covenant that is recorded in this property in Doc #

Q. INFRASTRUCTURE

1. **Transportation Facilities** - See plan sheets provided in **Section 3**.
2. **Required Utilities** - See Engineers Report in **Section 2** and plan sheets provided in **Section 3**.

SECTION 2 – ENGINEER’S REPORT

A. INTRODUCTION

The following Engineer’s Report is intended to provide the engineering basis for design and to discuss engineering related items for the Core Services Vehicle Maintenance Facility. Supporting infrastructure will include driveway access improvements and utility connections to the Town of Jackson water and sewer mains as well as connections to cable utility mains that serve this portion of the Town of Jackson. The basic layout and design elements are shown on the plan set attached in **Section 3**.

B. SOILS AND SITE CONDITIONS

The project site is located within the Town of Jackson just north of Flat Creek in the Quaternary-aged flood-plain deposits (Love and Albee, 2004). Womack and Associates, Inc. (WAI) completed a Geotechnical Investigation Report (Report) for the property located at 55 Karns Meadow drive in December of 2010 for the construction of the START Facility. In order to reduce uncertainty during construction of the proposed addition, Jorgensen Geotechnical (JG) excavated an additional three test pits. In addition to the field work, JG updated all references to building codes and pertinent seismic data to ensure they are current and applicable for the proposed new Core Services Vehicle Maintenance Facility.

In summary, the test pits excavated in 2010 as well as the test pits excavated in 2020 encountered a fill and topsoil layer of varying thickness overlying the alluvial flood plain deposits. The report describes the geological site conditions and includes a site location and geologic map and test pit logs. The report provides engineering analyses (including pavement design, settlement, bearing capacity, lateral pressures, and soil friction) and offers recommendations for construction of foundation elements.

A copy of the Geotechnical Engineering Report by Jorgensen Geotechnical is included in **Section 5** of this report.

C. GRADING, EROSION CONTROL & DRAINAGE

Development on the site will accommodate stormwater by routing drainage through the available green spaces on site. These areas are sufficient to accommodate stormwater runoff and treatment. The parcel is relatively flat and underlain by semi-permeable surface soils and very permeable subsoils.

A Town of Jackson Grading and Erosion Control Permit will be required prior to construction. The GEC permit application drawings will incorporate any revisions made

during the Development Plan process and as a result of incorporating final design elements and coordination with the Town and other utility companies.

D. WATER QUALITY AND STORMWATER

Design of stormwater shall meet or exceed the requirements stated in The Town of Jackson Land Development Regulations: *Article IV*:

Development Standards Division 4900 – Stormwater Management Provisions-The release rate for the post development 10 and 100-year storm events will not exceed the pre-development release rate for these storms. All culverts, channels, and other conveyances will be sized to accommodate the post-development 100-year event peak discharge rate. Given the proximity to Flat Creek, stormwater flows will be managed with sand/oil separators, infiltrators, vegetated bio-swales and detention/retention areas to reduce contaminants that may threaten the health of Flat Creek. The balance of the stormwater from impervious surfaces on the project within the boundaries of the property will be collected, run through separating chambers to remove coarse and fine sediment, debris, and oils, then through a series of stepped vegetated drainage features designed to further remove silts and contaminants. The runoff will then run through a series of stepped infiltration swales. Larger storms will pass through the infiltration structures and be detained in basins. Only the largest storms will fill the detention basins and flow across the connector road into the final treatment wetland that will be constructed as part of the mitigation for any wetland disturbance from construction.

Coordination with the Town Engineer and the information from the stormwater treatment system created on the east side of the Karns Meadow will inform the design of this system to help protect the aquatic habitat of Flat Creek and the wildlife that depends on it.

E. ROADS, ACCESS, AND PARKING

The site is presently served by access directly off of Karns Meadow drive via Snow King Avenue or Broadway (Highway 89)

The amount of parking required for the facility was determined in the Final Programming Report which was developed a series of interviews with START Bus and Public Works staff as well as the relevant technical expertise of the Design Team in these types of facilities. The report anticipated parking needs for the facility looking out approximately 20-years to 2032.

The parking lot on the south end of the site is intended to accommodate START employees, Fleet Maintenance employees, and residents of the employee housing that are Town and/or County employees. The employee housing parking qualifies for shared

parking. 10 visitor parking spaces are located north of the administration portion of the facility, below employee housing. The visitor spaces can serve as parking spaces during the evening for non-Town or County employees residing in the employee housing. 10 additional spaces are located in the northeast corner of the site for visitors and longer-term employee housing. A total of 10 spaces are also available for the down/ready vehicles. These spaces are for vehicles waiting to be maintained, or for which maintenance has been completed. One of the design goals was to break up the parking to prevent one area of the site to have all the parking and become a 'sea' of cars. This was especially important to mitigate views from the 5th side of the project (the views from above). A total of 77 spaces are provided on the project site. The parking summaries are included in the table on the next page.

PARKING CALCULATIONS	
Use	Spaces
Support Vehicle Parking	
Director Vehicle	1
Supervisor Van	2
Shop Service Truck	1
Step Van	1
Employee/Visitor Parking	
Administration/Operations	8
Drivers/Service Workers	38
Visitor	5
Accessible	2
Maintenance Fleet/Employee Parking	
Light Down/Ready Vehicles	6
Heavy Down/Ready Vehicles	5
Employees	8
Employee Housing	
Studio	Shared
2 – Bedroom	Shared
4 – Bedroom	Shared
Total Spaces	77
Total Spaces Provided	77

F. WATER SUPPLY AND DISTRIBUTION SYSTEM

A 12-inch water main runs north-south within the Karns Meadow Drive road easement for most of the site then cuts across the northern portion of the property in an easement before heading up to Broadway Avenue. There it joins an existing east-west main running parallel to Broadway Avenue.

The portion of the main crossing the property will be abandoned and relocated in the connector road easement. This relocation did not happen in Phase 1. According to the Town Engineer the water main is very deep and was not be affected by the limited

amount of grading that will go on in this location during Phase 1. During Phase 2 this water main will need to be relocated.

The point of connection for the facility will be a 4-inch line extended to the building from the existing 12-inch main to serve domestic use, facility uses, lawn watering, and fire suppression.

A separately metered irrigation system will be installed for the property. This system will limit spray irrigation with a preference for drip system, where appropriate to save water.

G. WASTEWATER COLLECTION AND TREATMENT

Two parallel sewer mains exist in Karn's Meadow Road easement at this time. The rationale for two parallel lines is unknown. During, Phase 1 these lines were not consolidated because it was determined to that the best approach was to wait until the lines on Snow King were going to be upgraded and consolidated. One of the lines within Karn's Meadow Drive was upgraded to handle all the flow needed going through this corridor. This would facilitate this inevitable transition with the obsolete line proposed to be abandoned in place. The timing of this sewer project on Snow King is to be determined.

The point of connection for the facility's sanitary sewer will be a 6-inch line installed with a new saddle-tap on the existing 20-inch main running closest to the building. Two-way cleanouts will be provided before entering the building.

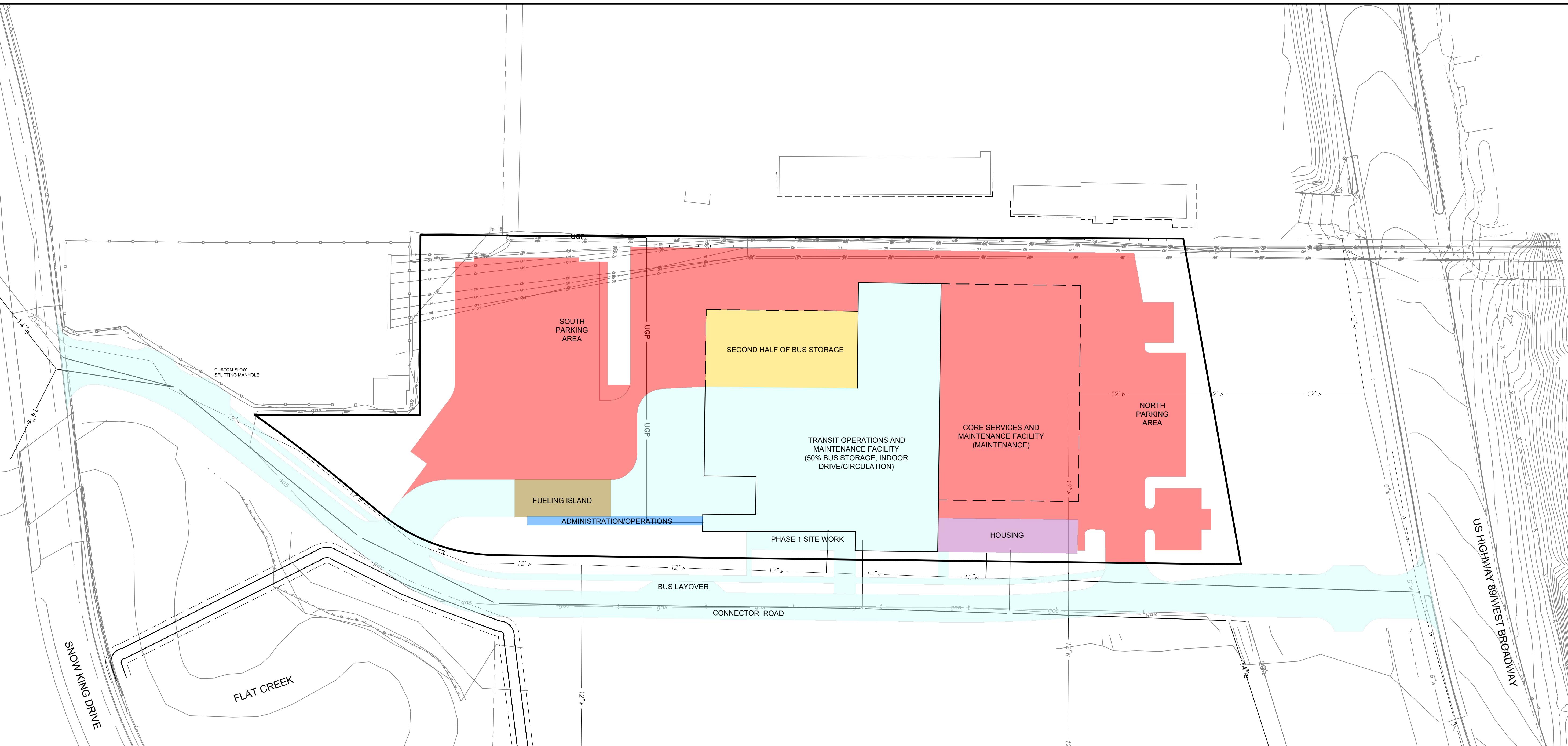
Flow calculations will be provided at building permit. The connection to the Town sewer system will require coordination with the Town Public Works Department to identify the appropriate arrangement. A permit to construct will be required through the Wyoming DEQ. The new sewer lines will be owned and operated by the Town.

H. CABLE UTILITIES

Power and Communications lines will be accessible to the entire project. Lower Valley Energy Electrical Power and Natural Gas, Silverstar Fiber-Optic Communications, Charter Cable Television and Communication, and Century Link communications services are all available to this location.

SECTION 3 –DRAWINGS

- PHASING PLAN
- ARCHITECTURAL DRAWINGS 11 X 17 FORMAT
 - CIVIL DRAWINGS 11" X 17' FORMAT



LEGEND



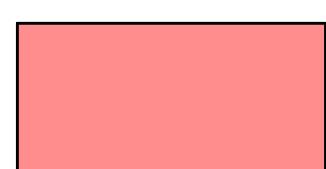
PHASE 1 - COMPLETED (2012)

- 50% Bus Storage
- Indoor Drive/Circulation
- Administration/Operations
- Connector Road
- Western Landscape
- Limited Site Work



PHASE 4 - BID ALT. 2

- Fueling Island



PHASE 2 - 2019 SPET & BASE BID

- Maintenance
- North and South Parking Areas
- Complete Site Work
- Grading and Drainage



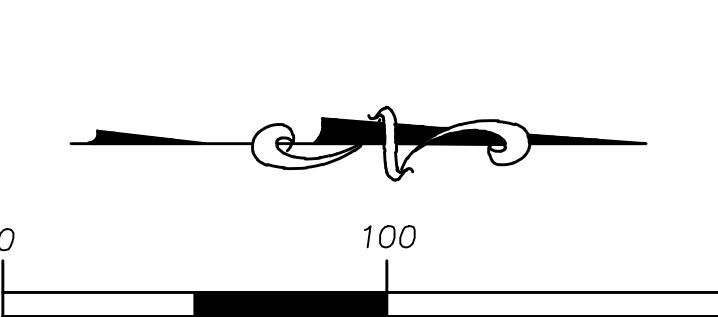
PHASE 5 - BID ALT. 3

- Remaining Administration and Operations



PHASE 3 - BID ALT. 1

- Second Half of Bus Storage



Scale: 1 Inch = 100 Feet

— PRELIMINARY —
SUBJECT TO CORRECTION
AND APPROVAL

PROJECT NUMBER		06013.10	
PROJECT TITLE:		TOWN OF JACKSON/ TETON COUNTY TRANSIT OPERATIONS AND MAINTENANCE FACILITY	
SHEET TITLE:		PHASING PLAN OVERVIEW	
PROJECT APPROVALS			
PLAN VERSION	DATE	DRAFTER	APPROVED
FDP RESUBMITAL	12.20.2019	UC	RD
 JORGENSEN ASSOCIATES, P.C. Engineering • Land Surveying • Planning P.O. Box 9550, 270 East Simpson Ave., Jackson, Wyoming 83002 (307) 733-5150 FAX (307) 733-5187 E-mail: ja@jorgensenassociates.com			



EXISTING PHASE 1 CONSTRUCTION

TOWN OF JACKSON

2270312310

COVER SHEET

CORE SERVICES VEHICLE MAINTENANCE FACILITY

A-900

02/28/20



VIEW FROM KARNS HILLSIDE



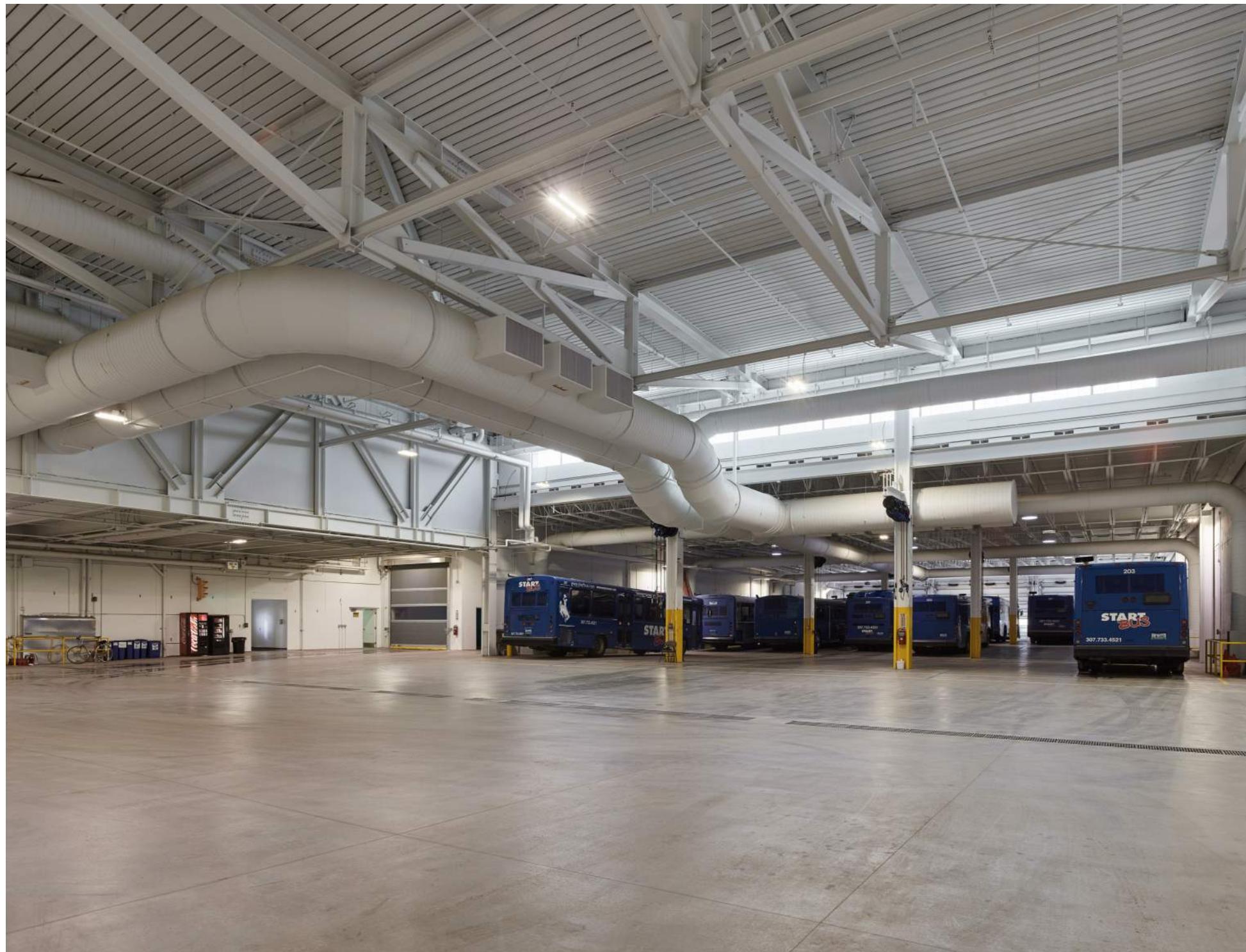
VIEW FROM KARNS MEADOW



VIEW OF EAST ELEVATION



VIEW OF BUS STORAGE



INTERIOR VIEW OF BUS STORAGE AND DRIVE AISLE



INTERIOR VIEW OF 2ND FLOOR OPERATIONS

REFERENCE IMAGES

TOWN OF JACKSON

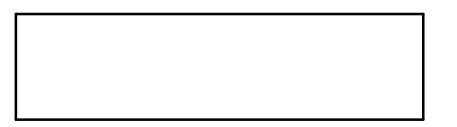
2270312310

EXISTING BUILDING - PHASE 1

CORE SERVICES VEHICLE MAINTENANCE FACILITY

A-901

02/28/20



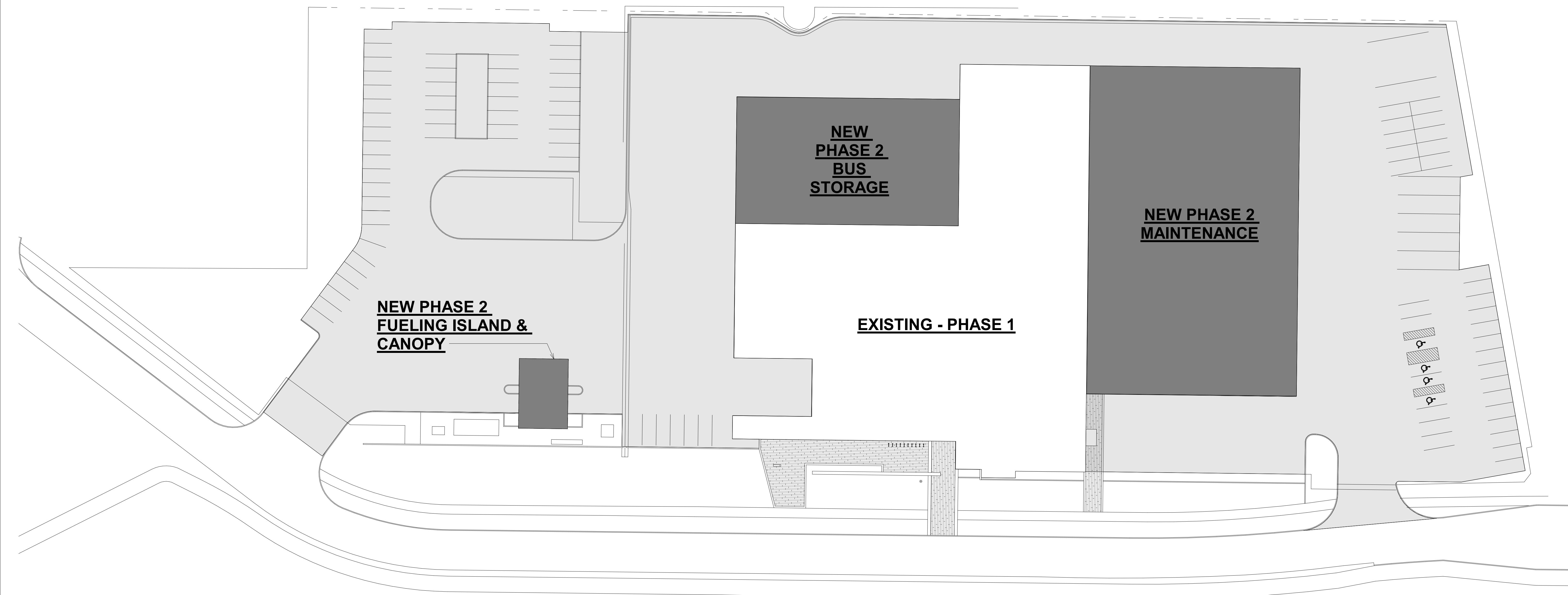
PHASE 1 -
EXISTING



PHASE 2 -
NEW CORE FACILITIES
CONSTRUCTION



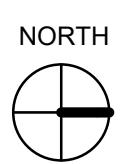
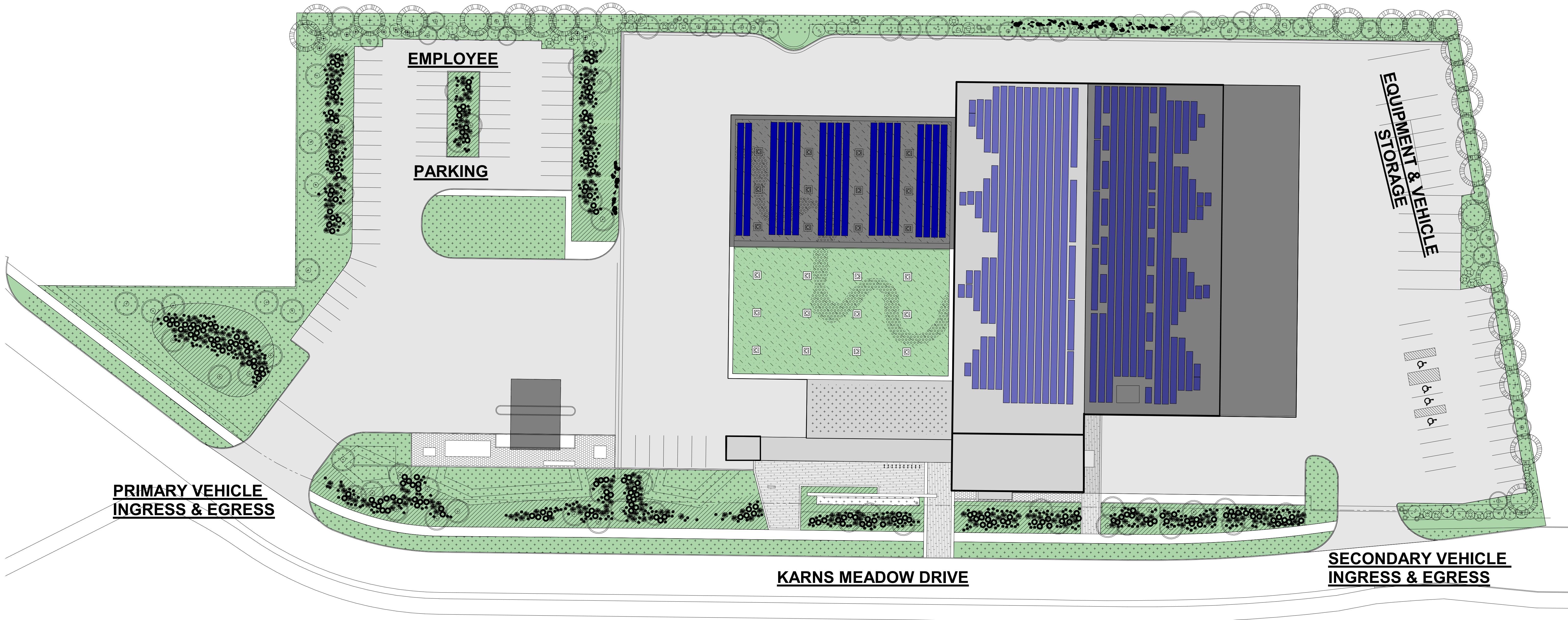
PHASE 2 -
NEW SITWORK



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TOWN OF JACKSON

SITE PHASING DIAGRAM
CORE SERVICES VEHICLE MAINTENANCE FACILITY



2270312310

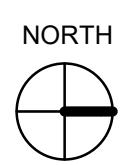
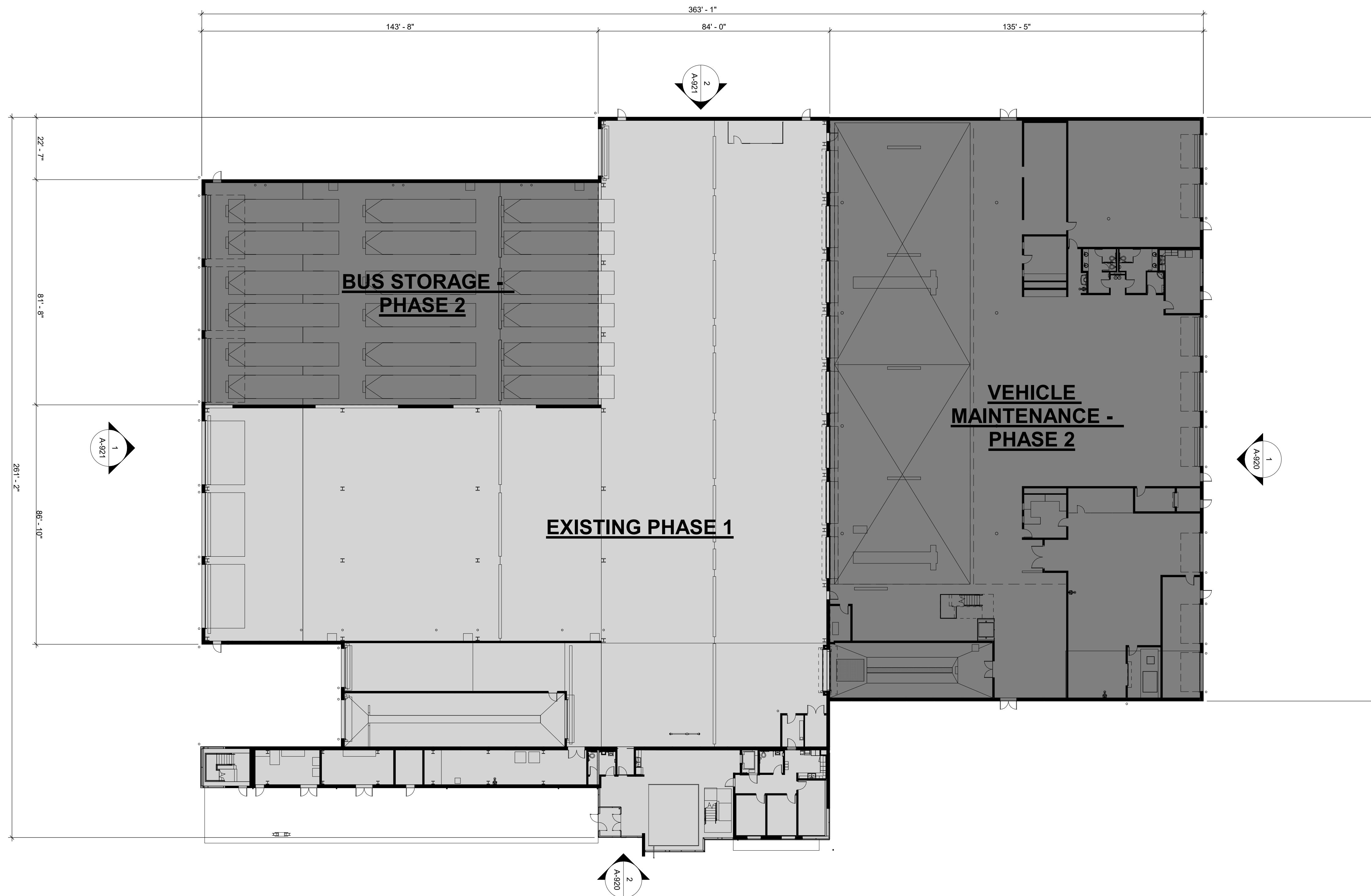
TOWN OF JACKSON

SITE PLAN - PHASE 2

CORE SERVICES VEHICLE MAINTENANCE FACILITY

A-903

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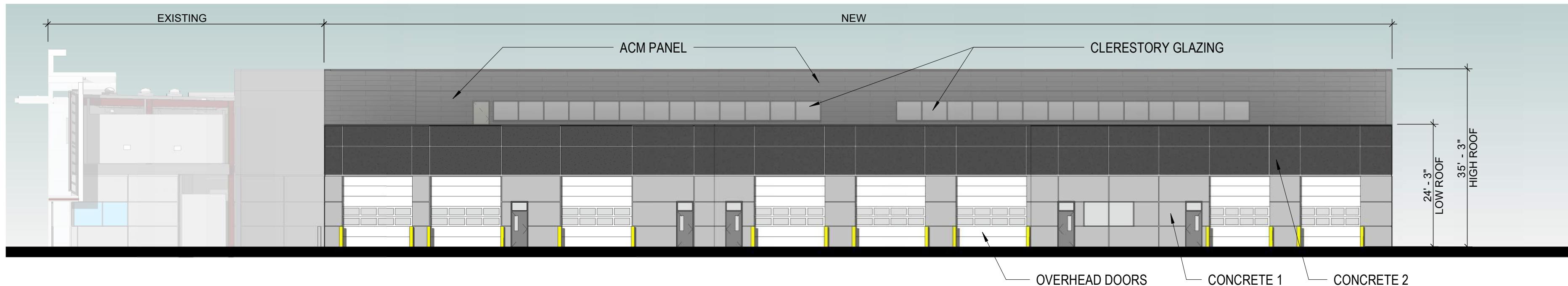
TOWN OF JACKSON

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PHASE 2 OVERALL BUILDING PLAN
CORE SERVICES VEHICLE MAINTENANCE FACILITY

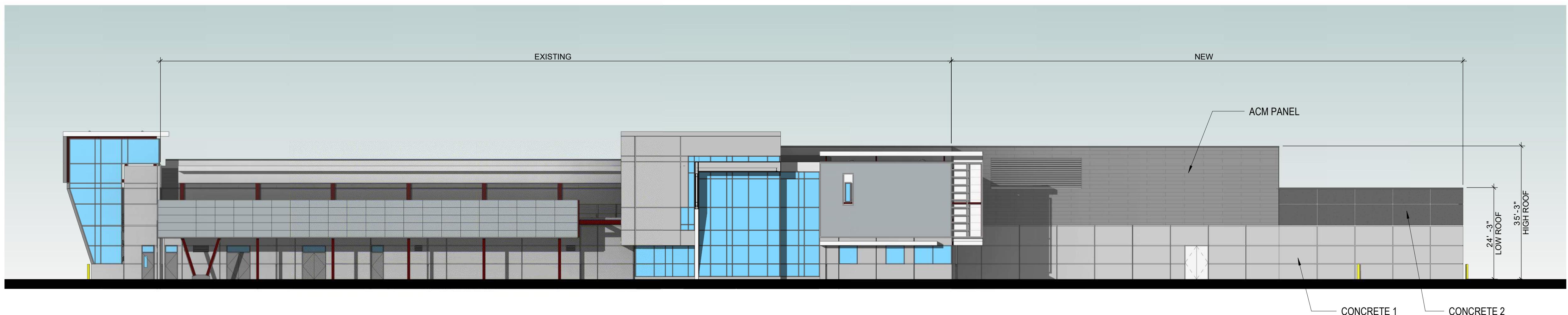
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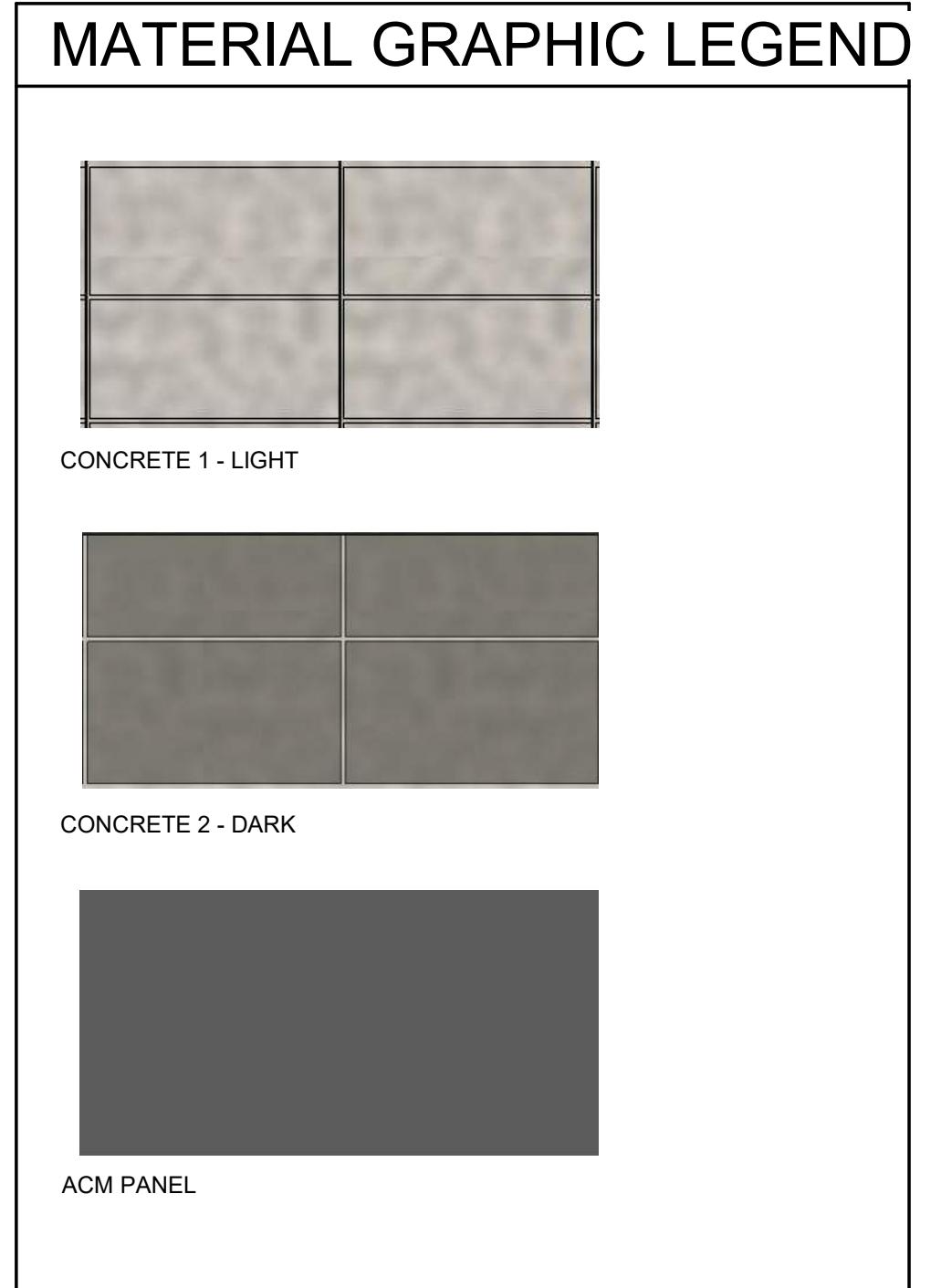
1 NORTH ELEVATION

1/16" = 1'-0"

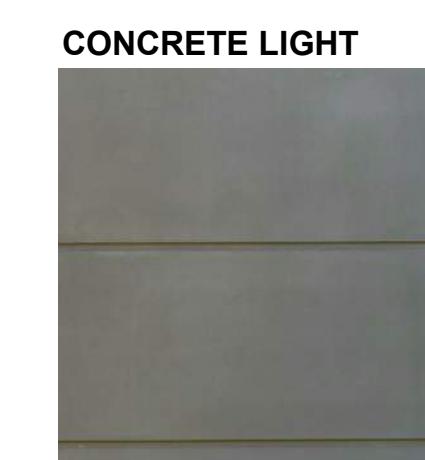
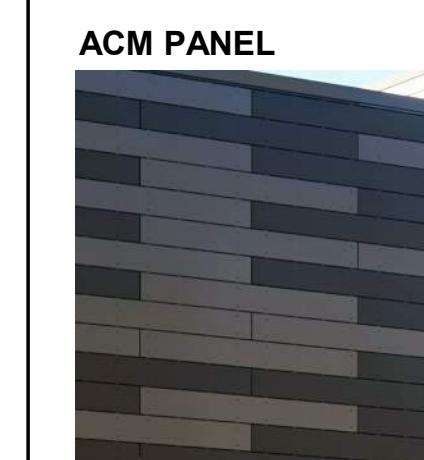


2 EAST ELEVATION

1/16" = 1'-0"



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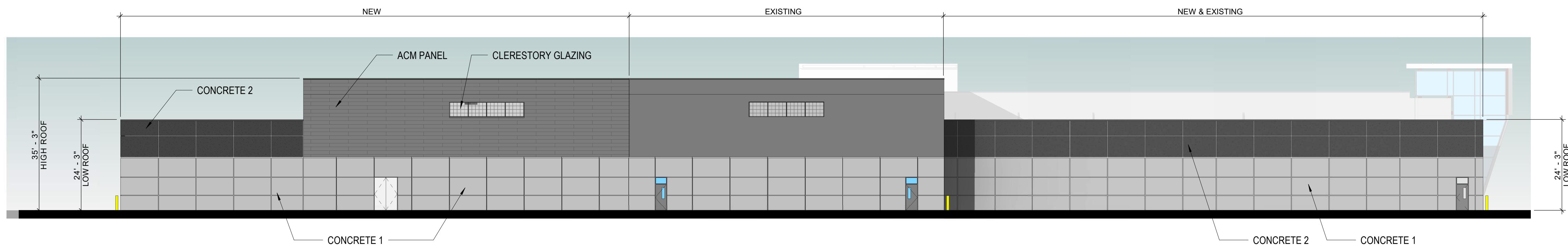
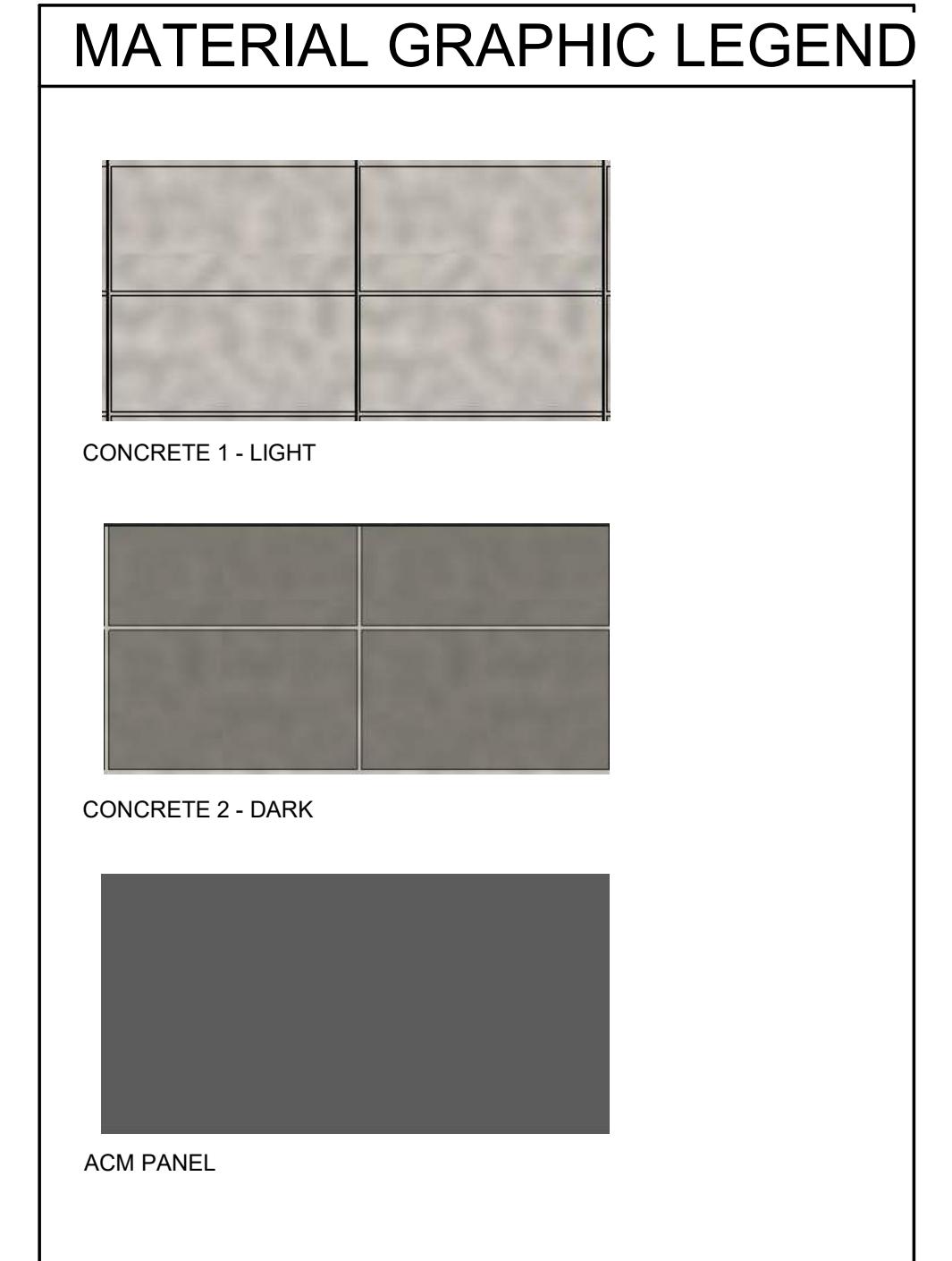
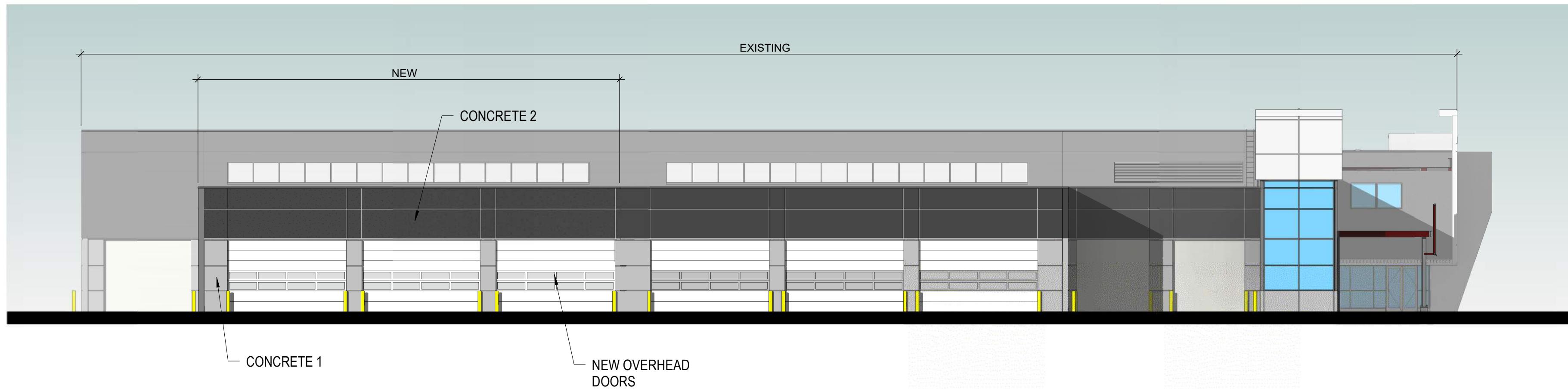


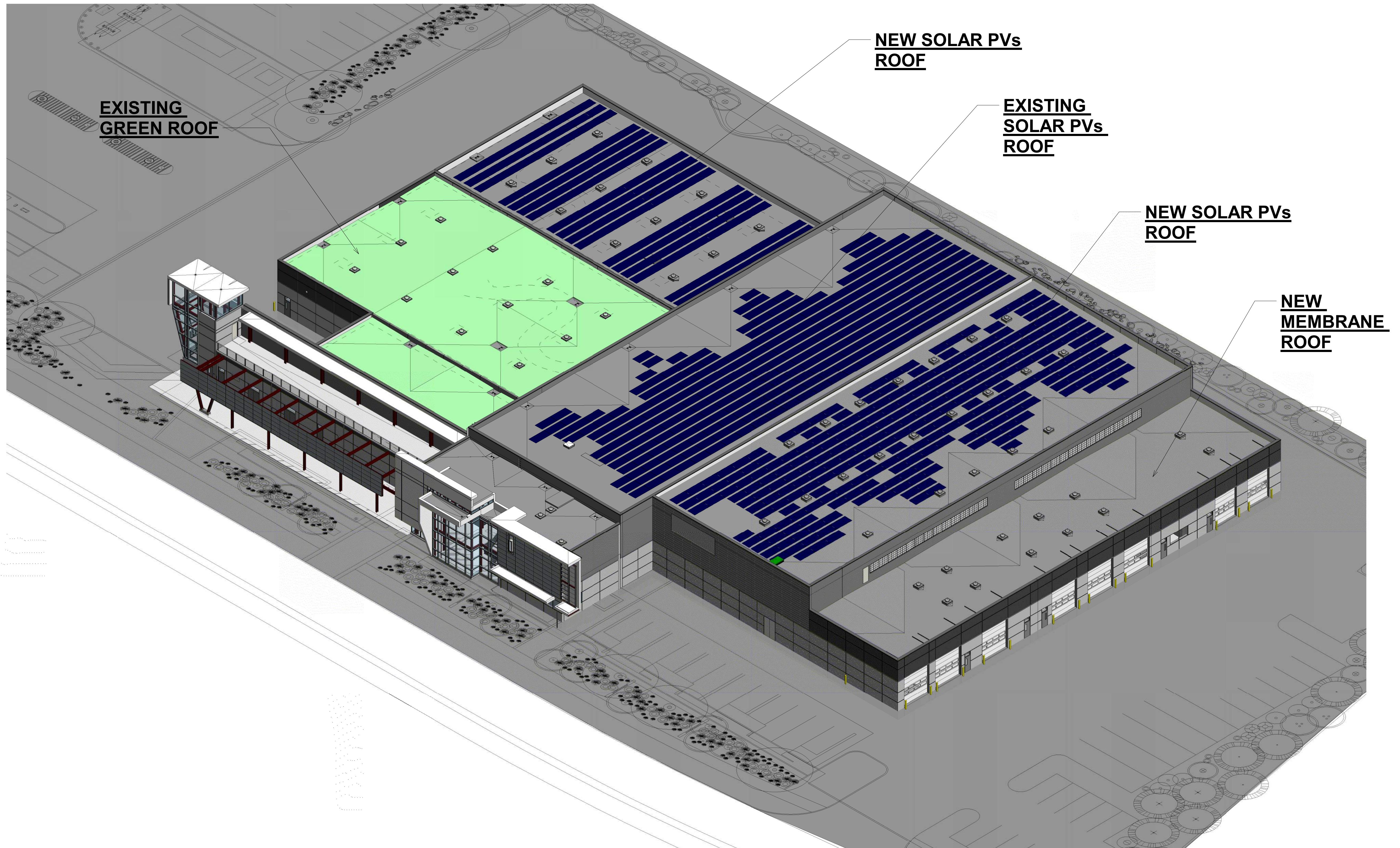
NOTE: MATERIALS FROM PHASE 1, WILL BE UTILIZED IN PHASE 2

TOWN OF JACKSON

BUILDING ELEVATIONS

CORE SERVICES VEHICLE MAINTENANCE FACILITY





TOWN OF JACKSON

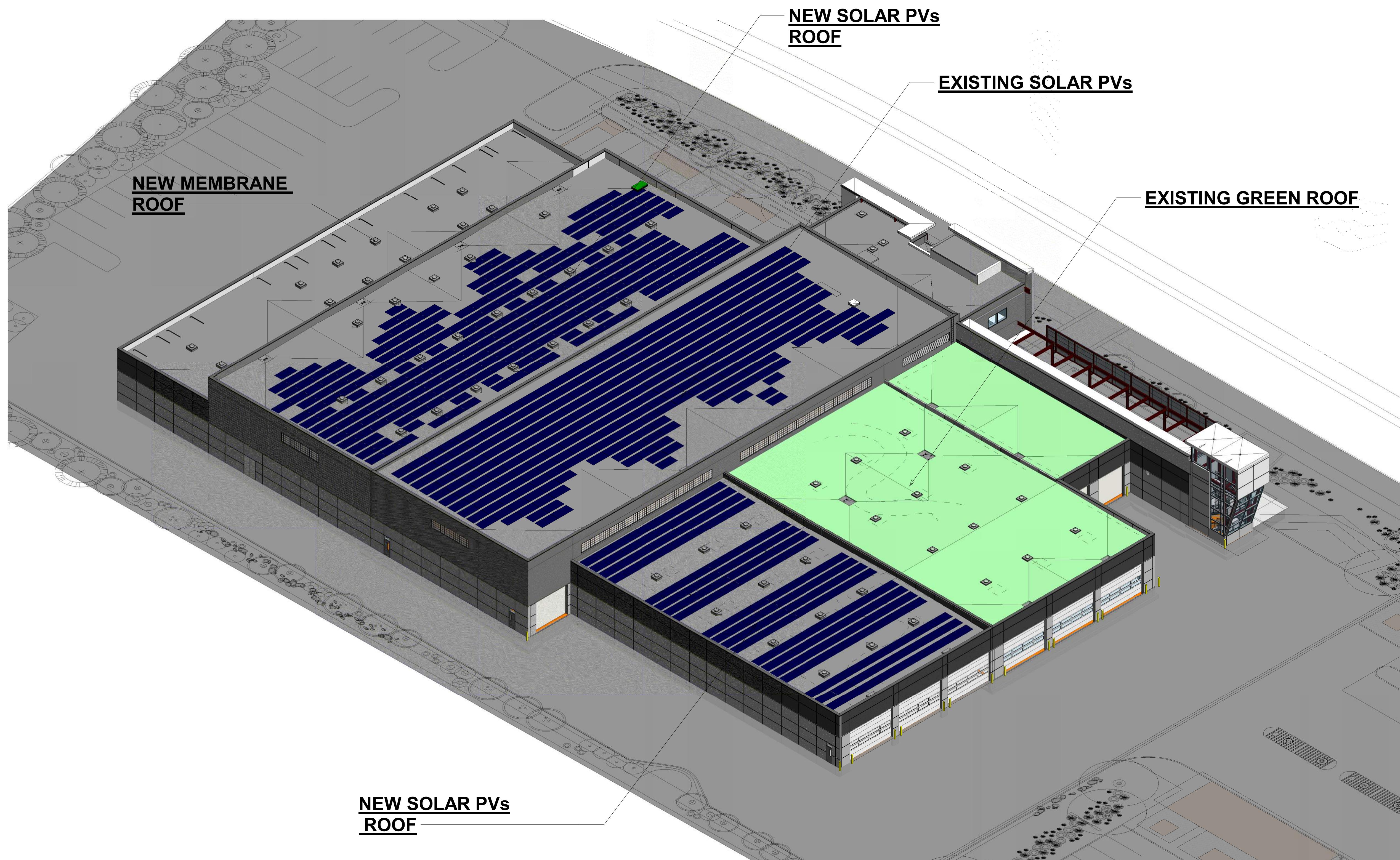
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3D VIEW

CORE SERVICES VEHICLE MAINTENANCE FACILITY

A-930

02/28/20



TOWN OF JACKSON

2270312310

3D VIEW

CORE SERVICES VEHICLE MAINTENANCE FACILITY

A-931

02/28/20



1 VIEW FROM KARNS MEADOW DRIVE SOUTH



2 VIEW FROM KARNS MEADOW DRIVE NORTH

TOWN OF JACKSON

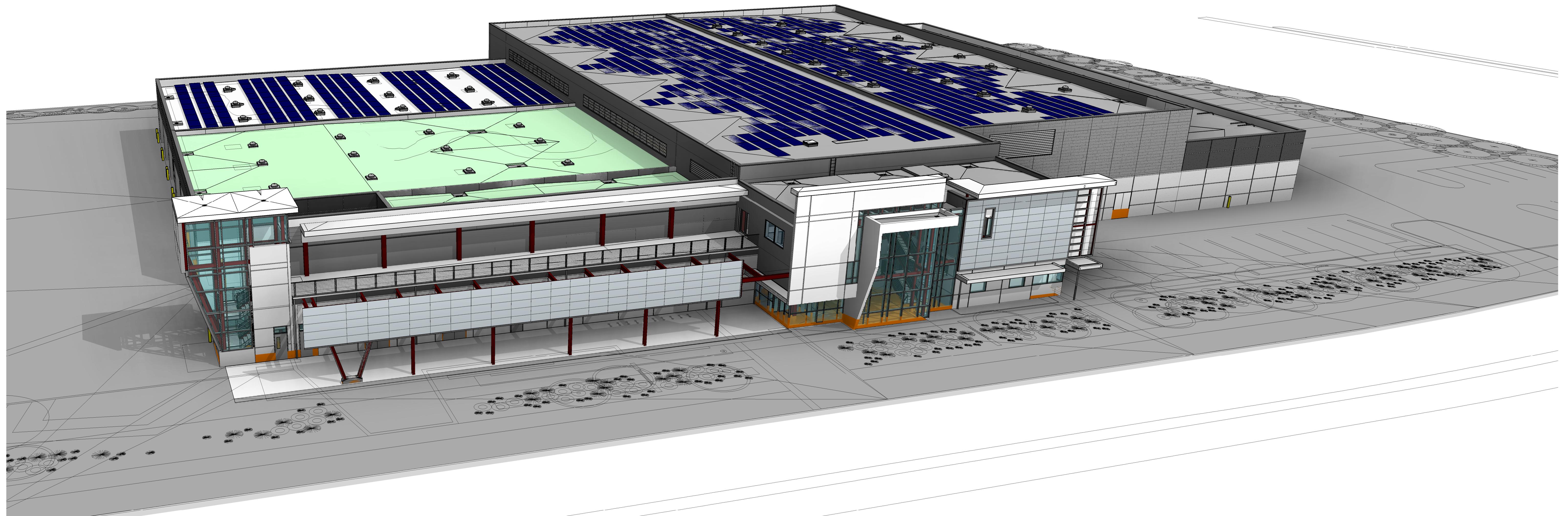
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PERSPECTIVES

CORE SERVICES VEHICLE MAINTENANCE FACILITY

A-932

02/28/20



1 AERIAL VIEW

TOWN OF JACKSON

2270312310

PERSPECTIVE

CORE SERVICES VEHICLE MAINTENANCE FACILITY

A-933

02/28/20

- PRELIMINARY -
SUBJECT TO CORRECTION
AND APPROVAL

TOWN OF JACKSON CORE SERVICES VEHICLE MAINTENANCE FACILITY DEVELOPMENT PLAN

55 KARNS MEADOW DRIVE

LOCATED WITHIN
SECTION 33, T41N, R116W, 6TH P.M.
TETON COUNTY, WYOMING

GENERAL NOTES

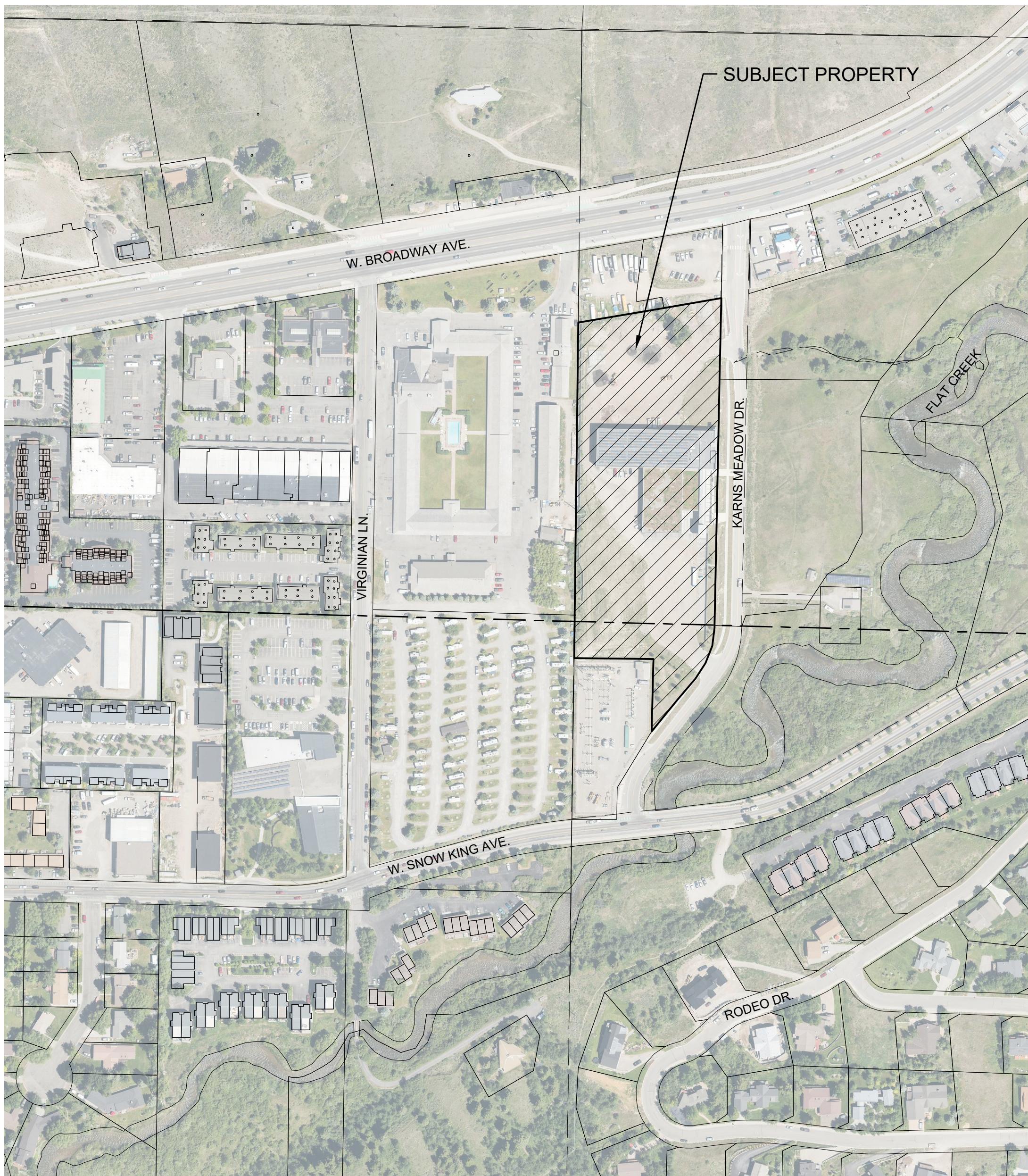
1. THE LOCATION OF THE EXISTING UTILITIES AND PIPELINES SHOWN ON THE DRAWINGS IS BASED ON LOCATION INFORMATION PROVIDED BY THE OWNERS OF THE UTILITIES AND PIPELINES. LOCATION INFORMATION IS GENERAL. THE EXACT LOCATION OF THESE FACILITIES MAY NOT BE SHOWN ACCURATELY ON THE DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE UTILITY AND/OR PIPELINE COMPANIES IN THE AREA OF PLANNED WORK AND SECURE EXACT LOCATIONS FOR THOSE UTILITIES. THE CONTRACTOR SHALL REQUEST THE OWNER OF THE UTILITY TO PROVIDE THE NATURE, LOCATION, AND ELEVATION OF THE UTILITY AT EACH LOCATION AND AT WHATEVER INTERVAL IS NECESSARY FOR THE WORK. IF THE UTILITY COMPANY CANNOT OR WILL NOT PROVIDE THE INFORMATION, THE CONTRACTOR SHALL OBTAIN THE INFORMATION BY WHATEVER MEANS NECESSARY. THE CONTRACTOR SHALL SHOW THE NATURE, LOCATION, AND ELEVATION OF THE UTILITY ON THE ENGINEER'S CONTRACT DRAWINGS AND PROVIDE A COPY OF THE INFORMATION TO THE OWNER. NO TRENCHING OR EXCAVATION OPERATIONS SHALL TAKE PLACE UNTIL ALL UTILITY AND PIPELINE COMPANIES HAVE BEEN CONTACTED AND LOCATIONS AND ELEVATIONS OF THE UTILITIES AND PIPELINES CONFIRMED.
2. THE CONTRACTOR WILL CALL THE UTILITY NOTIFICATION WYOMING ONE CALL AT 1-800-348-1030 FOR UTILITY LOCATIONS AT LEAST 2 BUSINESS DAYS, NOT INCLUDING THE DAY OF ACTUAL NOTIFICATION, PRIOR TO ANY EXCAVATION.
3. THE CONTRACTOR SHALL PROTECT ALL EXISTING SURVEY MONUMENTATION, FROM ANY DAMAGE DURING CONSTRUCTION OPERATIONS. ANY EXISTING MONUMENTS DISTURBED BY THE CONTRACTOR SHALL BE RESET AT THE CONTRACTOR'S OWN EXPENSE. THE CONTRACTOR AND ENGINEER SHALL NOTE THOSE MONUMENTS IN THE FIELD PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR SHALL LIMIT CONSTRUCTION ACTIVITIES TO THOSE AREAS WITHIN THE LIMITS OF DISTURBANCE AND/OR TOES OF SLOPE AS SHOWN ON THE PLANS. ANY DISTURBANCE BEYOND THESE LIMITS SHALL BE RESTORED TO ORIGINAL CONDITIONS BY THE CONTRACTOR AT THE CONTRACTOR'S OWN EXPENSE. CONSTRUCTION ACTIVITIES, IN ADDITION TO NORMAL CONSTRUCTION PROCEDURES, SHALL INCLUDE THE PARKING OF VEHICLES OR EQUIPMENT, DISPOSAL OF LITTER AND ANY OTHER ACTION WHICH WOULD ALTER EXISTING CONDITIONS.
5. WHERE IT IS REQUIRED TO CUT EXISTING PAVEMENT, THE CUTTING SHALL BE DONE TO A NEAT WORK LINE WITH A SAWCUT OR OTHER METHOD AS APPROVED BY THE ENGINEER.
6. ALL COORDINATES ARE GROUND COORDINATES NOT STATE PLANE COORDINATES. ELEVATIONS ARE DERIVED FROM BMV-40, NGVD1929.
7. BASE MAPPING PREPARED FROM SURVEYS PERFORMED BY JORGENSEN ASSOCIATES, INC. DURING THE SUMMER OF 2005, AND SOME TOPO PERFORMED IN FALL AND WINTER OF 2014.
8. IN GENERAL, EXISTING STRUCTURES AND FACILITIES ARE NOTED AS "EXISTING" AND SHOWN IN LIGHT LINE WEIGHTS, OR ARE SHOWN AS SCREENED BACKGROUND. NEW STRUCTURES AND FACILITIES ARE SHOWN IN HEAVY LINE WEIGHTS OR COLORS.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY NPDES PERMIT TO DISCHARGE WASTEWATER PRIOR TO COMMENCING ANY LAND DISTURBING ACTIVITIES.
10. PHASE 5: ADMIN/OPERATIONS AND PHASE 6: HOUSING NOT SHOWN HEREIN.

GRADING NOTES

1. NO LANDSLIDES OR BEDROCK SLUMPS ARE APPARENT AT THE SITE. AVALANCHE PATHS DO NOT EXTEND DOWN TO THE PROPOSED DRIVEWAY OR BUILDING SITE.
2. THE SITE IS PREDOMINATELY VEGETATED WITH WILD GRASSES, SHRUBS AND WILLOWS.
3. REVEGETATION WILL OCCUR POST CONSTRUCTION. REFER TO LANDSCAPE PLANS FOR REVEGETATION PLAN AND SPECIFICATIONS.
4. CUT AND FILL SLOPES DO NOT EXCEED 2:1 AND CATCH POINTS ARE TO BE ROUNDED.
5. THE CATCH SLOPES FOR THE ROAD SECTIONS ARE APPROXIMATE AND MAY CHANGE ACCORDING TO FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER. MAXIMUM CUT AND FILL SLOPES OF 2:1 SHOULD BE ADHERED TO UNLESS OTHERWISE NOTED OR AS DIRECTED BY THE ENGINEER.
6. EXISTING GRADE WILL VARY AS SITE CONDITIONS CHANGE. VERIFY EXISTING GRADE BEFORE CONSTRUCTION. DESIGN BASED ON A COMBINATION A FULL BASEMAP TOPO IN 2005 AND LIMITED TOPO IN FALL AND WINTER OF 2014.
7. ALL NECESSARY CONSTRUCTION EASEMENTS AND NORTH EAST WALL EASEMENT MUST BE OBTAINED BEFORE CONSTRUCTION.
8. ALL NECESSARY PERMITS SHALL BE OBTAINED BEFORE CONSTRUCTION.
 - 8.1. SWPPP
 - 8.2. DEQ
 - 8.3. GRADING AND EROSION CONTROL PERMIT
 - 8.4. TOJ SEWER SERVICE TAPPING PERMIT
9. PROPERTY LINES SHALL BE MARKED BEFORE GRADING IS PERFORMED BY PROPERTY LINES. NO GRADING SHALL GO BEYOND PROPERTY LINES UNLESS EASEMENTS ARE GRANTED. NOTIFY ENGINEER AND OWNER IF DISTURBANCE FROM GRADING VARIES FROM WHAT IS SHOWN IN THE PLANS.

EXISTING LEGEND

— — — — —	SECTION LINE
— — — — —	BOUNDARY SUBJECT PROPERTY
— — — — —	BOUNDARY, ADJACENT PROPERTY
— — — — —	BOUNDARY, ROAD RIGHT-OF-WAY
— — — — —	EASEMENT, AS NOTED
— — — — —	EASEMENT, AS NOTED
— — — — —	EASEMENT, AS NOTED
VVVVVV	BOUNDARY, WETLAND
— — — — —	EDGE OF WATER
— X — — — X — — —	FENCE
— O — — — O — — —	FENCE
— — — — —	EDGE OF CONCRETE
— — — — —	EDGE OF GRAVEL
— — — — —	EDGE OF PAVEMENT
— — — — —	TOP BACK OF CURB
— — — — —	TOE OF SLOPE
— — — — —	TOP OF BANK
— — — — —	FLOWLINE
— — — — —	ROAD PAINT STRIPE
— — — — —	SEWER LINE
— — — — —	SEWER MANHOLE
— — — — —	12" STM
— — — — —	12" STORM WATER PIPE
— — — — —	RECTANGULAR STORM WATER INLET
— — — — —	CULVERT
— — — — —	STORM DRAIN MANHOLE
— — — — —	WATER LINE
— — — — —	6" WATER LINE
— — — — —	12" WATER LINE
— — — — —	FIRE HYDRANT
— — — — —	WATER MANHOLE
— — — — —	WATER VALVE
— — — — —	GAS LINE
— — — — —	GAS
— — — — —	PHASE 1 GAS LINE
— OH — — — OH — — —	OVERHEAD POWER LINE
— ugp — — — ugp — — —	UNDERGROUND POWER LINE
— UGP — — —	PHASE 1 UNDERGROUND POWER LINE
—  —	ELECTRIC BOX
—  —	ELECTRIC TRANSFORMER
—  —	LIGHT POLE
— UT — — —	PHASE 1 SILVERSTAR COMMUNICATIONS LINE
— t — — —	UNDERGROUND TELEPHONE LINE
—  —	TELEPHONE PEDESTAL



VICINITY MAP

1" = 200' for 22x34 Prints
1" = 400' for 11x17 Prints

PROPOSED LEGEND

	BUILDING FOOTPRINT
	CONCRETE APRON
	FENCE
	EDGE OF CONCRETE
	EDGE OF PAVEMENT
	GUARDRAIL
	TOP BACK OF CURB
	FLOWLINE
	SEWER LINE
	SEWER MANHOLE
	STORM WATER PIPE
	STORM DRAIN MANHOLE
	UNDERGROUND POWER LINE
	SITE LIGHTING
	FUEL LINE

INDEX OF SHEETS

C1. TITLE, VICINITY MAP, SHEET INDEX, AND GENERAL NOTES

C2 - EXISTING CONDITIONS MAP

C.3 - PROPOSED CONDITIONS

ENGINEER & PLANNER
Jorgensen Associates, Inc.
1315 S. Highway 89, #201
P.O. Box 9550
Jackson, WY 83002-9550
(307) 733-5150

OWNER
Town of Jackson, Wyoming
P.O. Box 1687
Jackson, WY 83001-1687

PROJECT TITLE:
**TOWN OF JACKSON
CORE SERVICES
VEHICLE MAINTENANCE FACILITY
TETON COUNTY, WYOMING**

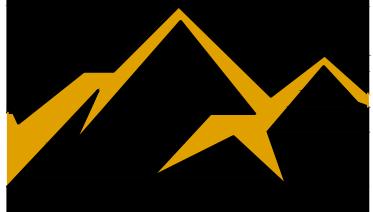
SHEET TITLE:
**TITLE, VICINITY MAP, SHEET INDEX, &
GENERAL NOTES**

DRAFTED BY:		KB
REVIEWED BY:		JB
PLAN VERSION		DATE
DRC SUBMITTAL		
PROJECT NUMBER		
06013		
SHEET		
C1		

VIRGINIAN RV PARK

EXISTING SURFACE FROM
MINIMAL TOPO DONE IN FALL
OF 2014, VERIFY EXISTING GRADES

VIRGIN LODG



JORGENSEN
PINEDALE, WYOMING
307.367.6548
www.jorgeng.com

PROJECT TITLE:
**TOWN OF JACKSON
CORE SERVICES
VEHICLE MAINTENANCE FACILITY
TETON COUNTY, WYOMING**

EXISTING CONDITIONS MAP

DRAFTED BY:	KB
REVIEWED BY:	JB
PLAN VERSION	DATE
DRC SUBMITTAL	

PROJECT NUMBER
06013

SHEET C2

**— PRELIMINARY —
SUBJECT TO CORRECTION
AND APPROVAL**

0 50 100

SCALE: 1 INCH = 50 FEET
THIS SCALE VALID ONLY FOR 22x34 PRINTS



PROJECT TITLE:
**TOWN OF JACKSON
CORE SERVICES
VEHICLE MAINTENANCE FACILITY
TETON COUNTY, WYOMING**

PROPOSED CONDITIONS SHEET 111

— PRELIMINARY —
SUBJECT TO CORRECTION
AND APPROVAL

A scale bar with markings at 0, 40, 80, and 1. Below the bar, text reads: SCALE: 1 INCH = 40 FEET. THIS SCALE VALID ONLY FOR 22x34 PRINTS.

SECTION 4 – SUPPORTING INFORMATION

- **4.1 Geotechnical Engineering Report 12/6/2010**
- **4.2 Addendum to Geotechnical Engineering Report dated 3/10/2020**
 - **4.3 Comprehensive Plan: District 4.2 Northern Hillside**

**GEOTECHNICAL SITE INVESTIGATION
START FACILITY DEVELOPMENT
KARNS MEADOW
JACKSON, WYOMING**

Prepared for:

**Jorgensen Associates
P.O. Box 9550
Jackson, Wyoming 83001**

Prepared by:

**Womack & Associates, Inc.
P.O. Box 12650
Jackson, WY 83002**

December 6, 2010

CONTENTS

1.0 INTRODUCTION	1
2.0 PROPOSED CONSTRUCTION	1
3.0 INVESTIGATION PROCEDURES	1
3.1 FIELD INVESTIGATION	1
3.2 LABORATORY ANALYSIS	4
3.3 REPORT PREPARATION.....	4
4.0 SITE CONDITIONS.....	4
4.1 DESCRIPTION	4
4.2 GEOLOGY	4
4.3 SOILS	4
4.4 GROUNDWATER.....	5
4.5 EARTHQUAKES AND GROUND SHAKING	5
4.6 LIQUEFACTION POTENTIAL	6
5.0 ENGINEERING ANALYSIS	6
5.1 SETTLEMENT	6
5.2 BEARING CAPACITY	6
5.3 LATERAL PRESSURES.....	8
5.3.1 <i>Active Pressures</i>	8
5.3.2 <i>Passive Pressures</i>	9
5.3.3 <i>At-Rest Pressures</i>	9
6.0 RECOMMENDATIONS.....	9
6.1 FOUNDATIONS	9
6.2 SITE GRADING, PREPARATION AND BACKFILL.....	9
6.3 PAVEMENT DESIGN.....	10
6.3.1 <i>Flexible Pavement Design</i>	10
6.3.2 <i>Rigid Pavement Design</i>	11
6.4 INTERIOR SLABS-ON-GRADE	11
6.5 EXTERIOR SLABS-ON-GRADE	11
6.6 POTENTIAL BASEMENT	12
6.7 VENTILATION	12
6.8 REINFORCING, CONCRETE CONSIDERATIONS, AND UTILITIES TESTING	12
6.9 OBSERVATION DURING CONSTRUCTION	12
7.0 LIMITATIONS.....	12
8.0 REFERENCES	12

LIST OF FIGURES

Figure 1 – Site Location and Geology Map	2
Figure 2 – Test Pit Location Map	3
Figure 3 – Response Spectra Curve	7

LIST OF TABLES

Table 5-1: Lateral Pressure Parameters	8
Table 6-1: Compaction Parameters for Stony Fill	9
Table 6-2: Pavement Design Parameters	10
Table 6-3: Rigid Pavement Design Thickness.....	11

LIST OF APPENDICES

Appendix A – Test pit logs

1.0 INTRODUCTION

As authorized by Jorgensen Associates, Womack & Associates, Inc. conducted a geotechnical site investigation for the proposed START Facility located between Karns Meadow and the Virginian Addition in the town of Jackson, Wyoming (Figure 1). The purposes were to investigate surface and subsurface soil conditions, evaluate soil-engineering properties, and to provide recommendations for foundation and roadway construction.

2.0 PROPOSED CONSTRUCTION

It is our understanding that five new buildings are proposed, primarily with shallow slab-on-grade or crawl space construction. As originally proposed, the buildings would be as follows:

• Administration and Operations	6,900 sq.ft.
• Heated Bus Storage	36,900 sq.ft.
• Fleet Maintenance	24,700 sq.ft.
• Fuel and Wash Stations	4,500 sq.ft.
• Employee Housing (2 story)	6,000 sq.ft.

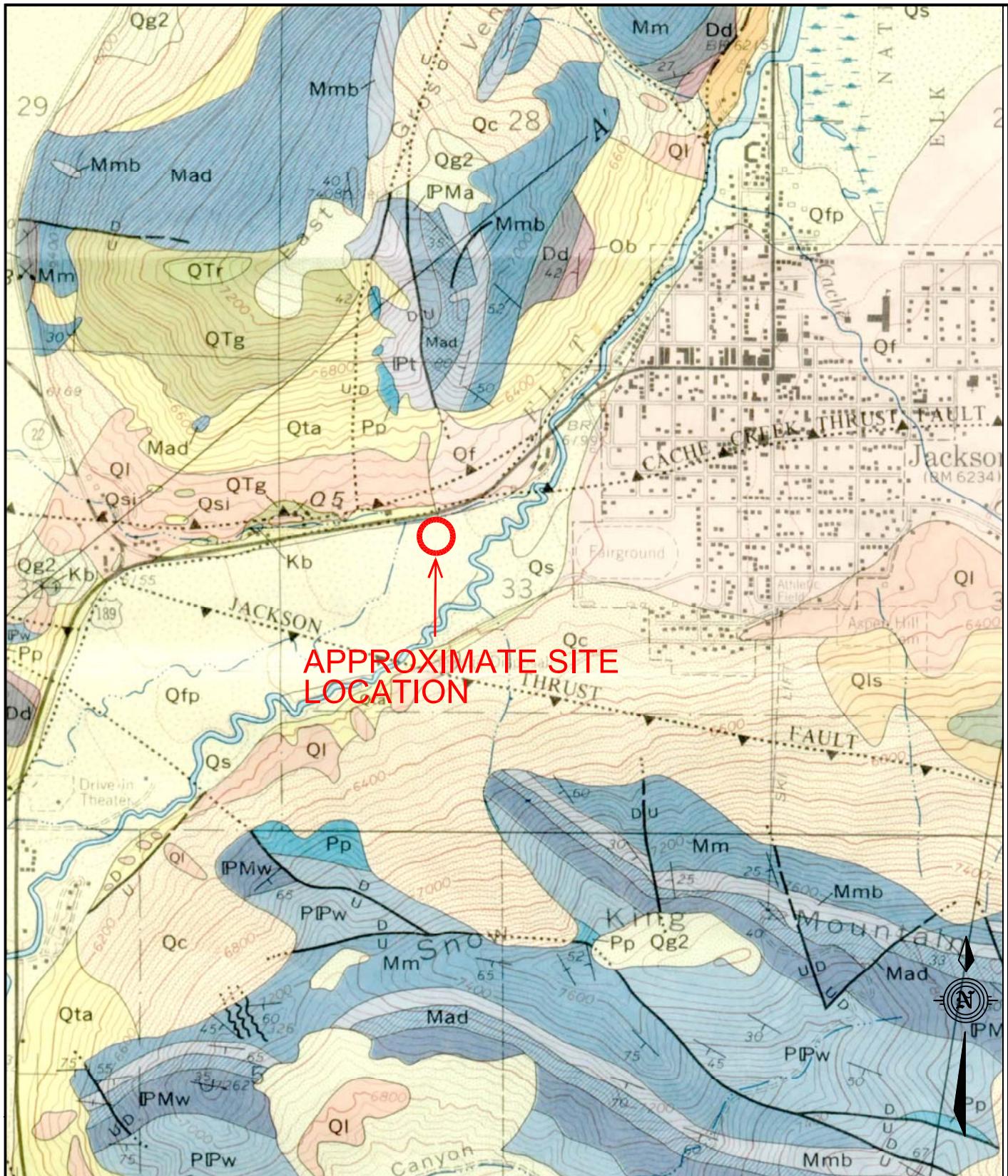
The bus storage facility may be built below existing grade. We have assumed that the perimeter footing depths will be about 3 feet below existing grade. Parking lots, driveways, and a Town of Jackson connector road between Snow King Avenue and West Broadway will be required.

3.0 INVESTIGATION PROCEDURES

3.1 Field Investigation

The field investigation was conducted on June 10 and June 24, 2010. Fieldwork consisted of preliminary site reconnaissance and excavation and logging of 18 exploratory test pits. The test pits were excavated to depths of 6.5 to 13 feet in order to observe subgrade soil and groundwater conditions, and to obtain samples if necessary from below the depth of the proposed foundations. Test pit locations are shown on Figure 2. Descriptive logs of the test pits are appended.

Soil types, consistencies, and stratigraphic thicknesses were observed and documented by an Engineering Geologist. Field conditions were described and 5 standpipe piezometers were installed to allow monitoring of groundwater variability. General topography and site conditions were observed by the Geologist in order to place the test pits in representative locations. Note that site conditions may be variable and actual soil conditions may differ from those represented in the test pit logs.



Map Symbols:
 Qal - Alluvium
 QI - Loess
 Qc - Colluvium
 SCALE: 1" = 1500'

Qfp - Flood Plain Deposits
 Qg2 - Glacial Deposits
 Qs - Swamp Deposits

Qta - Talus
 QTc - Conglomerate
 Qf - Alluvial Fan

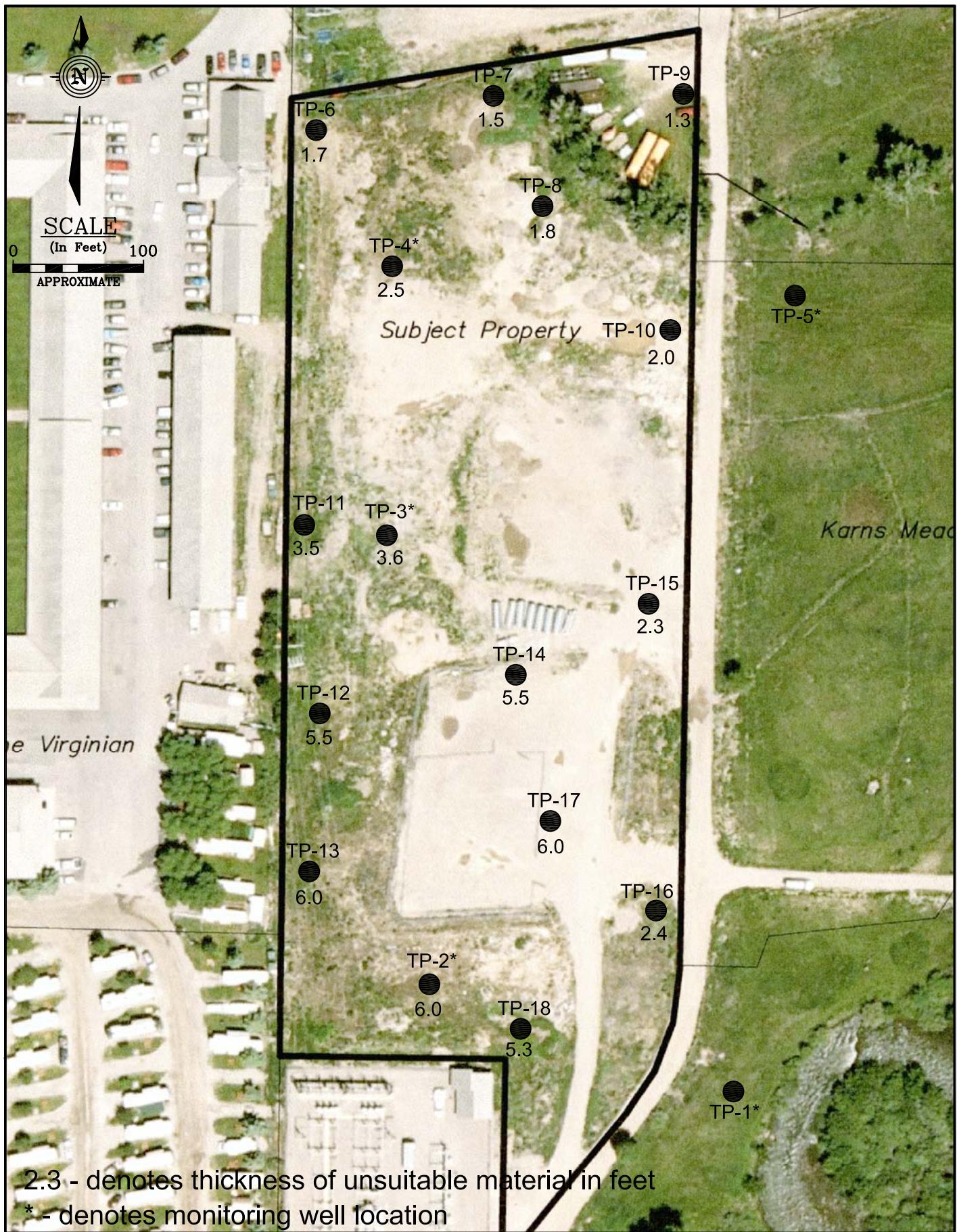
From Love et al, 1972, Geologic Map of the Jackson Quadrangle, Teton County, Wyoming

Geotechnical Investigation Report
 START Facility
 Karns Meadow
 Jackson, Wyoming

Site Location and
 Geologic Map

FIGURE

1



2.3 - denotes thickness of unsuitable material in feet

* - denotes monitoring well location

Geotechnical Investigation Report
START Facility
Karns Meadow
Jackson, Wyoming

Test Pit and Monitoring Well Locations and Site Layout Map

FIGURE

2

3.2 Laboratory Analysis

Laboratory tests were not conducted for this investigation. The site is underlain by gravel and cobble alluvium that did not require testing.

3.3 Report Preparation

The report presents the geological site conditions, test pit logs, location maps, engineering analyses, and recommendations.

4.0 SITE CONDITIONS

4.1 Description

The proposed building site is located in the town of Jackson just north of Flat Creek (Figure 1). The elevation at the site varies from about 6169 feet above sea level in the southeast corner to 6175 on mounds. The site is nearly level but has been used for fill storage, and contains irregular fill mounds up to 6 feet high. At the time of our investigation a small parking lot existed near the south end of the site and vehicles were stored near the northeast corner.

4.2 Geology

Figure 1 shows the generalized geology for the Jackson area (Love, et al, 1972). Most of the west end of the town of Jackson, including the project site, is mapped as Quaternary flood plain deposits (Qfp) consisting of gravel, sand, silt, and clay. The underlying material described in the test pits consists of gravel and cobble with a little clay and silt.. Bedrock was not encountered in any of the test pits, and depth to bedrock is unknown.

The inferred (buried) traces of the Cache Creek and Jackson thrust faults are located near the site, crossing the town of Jackson on a generally east-west trend. These faults are considered to be relatively old and inactive and do not affect the project. The Teton fault at the base of the Teton Range about 5 miles west of the site is considered to be seismically active.

4.3 Soils

Up to 5.5-feet of fill was found in most test pits, underlain by gravel/cobble alluvium. The fill varies from clayey gravel/cobble to gravelly clay, usually described as dark gray to black and very stiff/very dense. Much of the fill appears to represent recycled topsoil.

About 2-feet of black organic gravelly silt topsoil occurs at ground surface in undisturbed areas and underlies the fill in some places. The stony underlying alluvium consists of about 60% loose to very dense, stratified, subangular to subrounded limestone and sandstone gravel and cobbles up to about 6 inch diameter with occasional larger clasts up to about a foot diameter, in a matrix of well-graded sand, sometimes with a little clay or silt. Cobble size apparently increases with

depth. The gravel and cobble alluvium was described as dry to moist (wet only in TP-1 and TP-18 below water table),

4.4 Groundwater

Standpipe piezometers were installed in 5 of the test pits to depths of 6.5 to 13 feet bgs in order to monitor groundwater levels (Figure 2). Test pits TP-1 and 18, located adjacent to Flat Creek near the southeast corner of the site, encountered groundwater at about 5 to 7-feet below ground surface (bgs) at the time of the investigation on June 10 and 24, 2010. Jorgensen Associates measured groundwater depth on October 26, 2010, and all monitoring wells were reported dry. Groundwater levels probably fluctuate in response to seasonal precipitation and flow levels in Flat Creek.

Wyoming DEQ has informed Jorgensen that wells placed for other investigations along Virginian Lane and the public library parking lot encountered groundwater at 13 to 18 feet bgs. These values are too far down-valley from the START site to be definitive, but they suggest groundwater might interfere with construction of a basement. If a basement continues to be considered, two deeper wells should be installed in the basement area and monitored during the spring runoff season in 2011.

4.5 Earthquakes and Ground Shaking

Jackson Hole is located within the Intermountain Seismic Belt, a zone of seismicity that extends from southern Utah through eastern Idaho and western Montana and encompasses western Wyoming and the Teton Range (Smith and Arabasz, 1991). The Teton fault is located along the eastern margin of the Teton Range about 5 miles northwest of the site, and is considered an important structural element of the Intermountain Seismic Belt.

Site ground motion accelerations and design response spectra were derived in accordance with the general procedure defined in the 2006 International Building Code (IBC, unchanged in 2009). The provisions of the IBC are intended to provide uniform levels of performance for structures, depending on their occupancy and use and the risk inherent to their failure.

The approach adopted in the 2006 IBC is intended to provide a uniform margin of safety against collapse at the *design* ground motion. The *design* earthquake ground motion is selected at a ground shaking level that is 2/3 of the *maximum considered earthquake* (MCE) ground motion. The Site Ground Motion and Design Response Spectrum for the 2003 IBC is presented in Figure 3 and seismic parameters are listed below.

*Earthquake Loads – Site Ground Motion and Design Response Spectrum 2006 International Building Code**

Site Location: **Lat. 43.47° Lon. 110.78°**

Site Class: **D Stiff Soil**

Design Spectral Response Acceleration Parameters:

$S_{DS} = 0.78$

$S_{D1} = 0.42$

4.6 Liquefaction Potential

Loose, saturated sands and silty sands, and in some cases silts and gravels, may liquefy when exposed to seismic shaking. During investigation groundwater was encountered at depths 5 to 7 feet below the ground surface in TP-1 and TP-18 adjacent to Flat Creek.

The test pits encountered gravel and cobble alluvium that appears to be too dense to liquefy in a seismic event. However, it is possible that liquefiable materials occur at greater depths. Evaluation of deep subsurface conditions and assessment of liquefaction potential at this site were beyond the scope of this investigation. At this flat lying location, liquefaction could cause damaging differential settlement, but there appears to be little risk of lateral spreading, which is the most damaging phenomenon associated with liquefaction.

5.0 ENGINEERING ANALYSIS

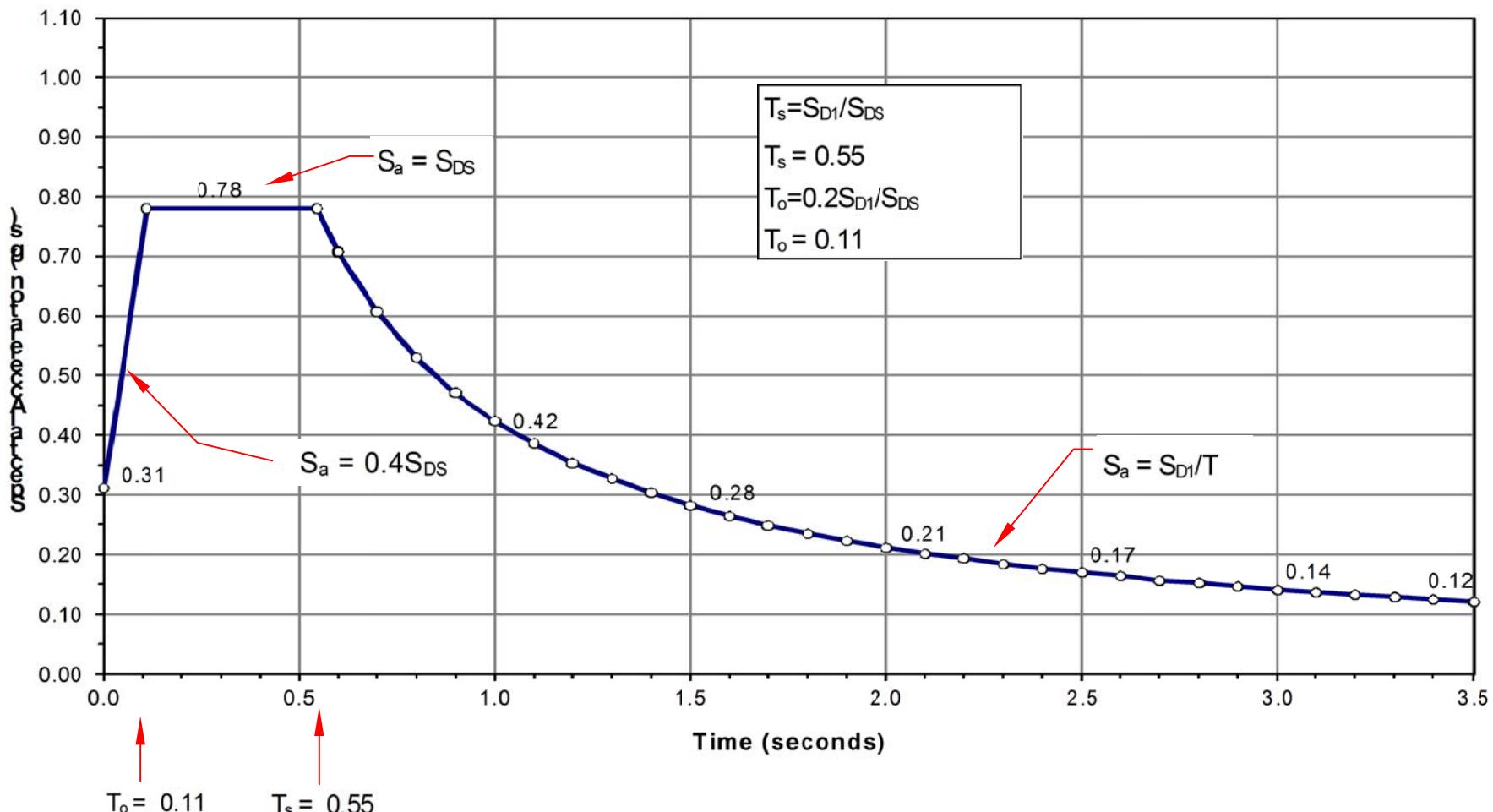
5.1 Settlement

Significant settlement is not anticipated in the stony gravel/cobble alluvium. Fill up to 6 feet thick covers most of the site, often underlain by about 2 feet of silty topsoil. The fill is variable and often consists primarily of silt or clay, perhaps derived from recycled topsoil. Fill and underlying topsoil should be removed down to gravel. Most pits encountered stony alluvium within 2 to 3 feet of existing ground surface. Test pits TP-2, 12, 13, 14, 17, and 18 encountered 5 to 6 feet of fill and topsoil on the fill mound surrounding the existing parking lot near the south end of the site (Figure 2). Other mounds at the site may be underlain by similar profiles, and over-excavation of mounded areas should be assumed. Foundation footings should be placed at depths of at least 3 feet below final grade on the gravel and cobble alluvium. .

5.2 Bearing Capacity

Bearing capacity of soil refers to its ability to resist shear failure under load. The bearing capacity of the stony gravel/cobble alluvium was estimated using Terzaghi's bearing capacity equation for strip footings (Bowles, 1996). Soil properties were estimated based on visual soil classification. The unit weight of the gravel is estimated to be about 135 pcf, with a friction angle of about 35 degrees (Pit Slope Manual, 1982; Huang, 1983). The foundation footings are assumed to be 2 feet wide, placed on the sandy gravel alluvium about 3.5 feet below the finished grade elevations. An allowable bearing capacity of about 7,000 psf is recommended. Allowable loads may include full dead load and 50 percent live load.

Design Response Spectrum (2006 IBC) - Site Class D START Facility, 675 W. Snow King Avenue



5.3 Lateral Pressures

Lateral pressures against retaining or basement walls can be estimated using several methods, and there is no overwhelming consensus favoring any one technique. We have used what we believe to be reasonably conservative values that can be justified from normal practice and the technical literature. The main variables are assumptions regarding seismic forces, wall friction, and surcharge pressures created by slopes. As discussed above, the Jackson Hole area is potentially susceptible to ground shaking from earthquakes. A maximum horizontal seismic acceleration k_h of 0.22g is predicted for this site with a uniform likelihood of exceedance of 10 percent in 50 years (USGS 2002). Lateral pressures have been calculated assuming horizontal backslope conditions. Table 5-1 summarizes lateral pressure parameters applicable to the site.

TABLE 5-1: Lateral Pressure Parameters

Condition	Coefficient of Earth Pressure	γK (equivalent fluid pressure)
Static Conditions		
Level Backfill	$K_o = 0.43$ $K_a = 0.27$ $K_p = 3.69$	56 psf 35 pcf 480 pcf
Earthquake Conditions		
Level Backfill	$K_{ae} = 0.33$ $K_{pe} = 3.47$	43 pcf 451 pcf

5.3.1 Active Pressures

For lateral pressure design of retaining walls, which are allowed to deflect and develop an active soil wedge, the calculated equivalent fluid pressure (γK_a) is about 35 pcf (pounds per cubic foot), assuming a horizontal ground surface behind the retaining wall. This pressure distribution would be equivalent to a force of approximately $17.5H^2$ pounds per horizontal foot of wall acting at one-third the wall height (H) above the base.

Research has indicated that lateral pressures due to earthquakes are non-hydrostatic in distribution, and the resultant acts above the lower third-point of the wall (Bakeer, et al, 1990). Accordingly, active soil pressures have been divided into two components that act at different wall heights. The static force acts at the lower third-point, as discussed above. The Mononobe-Okabe equations are often used to estimate dynamic forces against retaining walls. Although there is considerable debate about the theoretical applicability of these equations to rigid walls, they have been used for many years for seismic design and the performance record of underground walls during earthquakes has generally been good. The Mononobe-Okabe equations were applied using half the maximum horizontal acceleration (Bowles, 1996; Whitman, 1990). This force would be in addition to static active earth pressure, equivalent to $4H^2$ pounds per horizontal foot of wall applied at 50% of the wall height above the base.

5.3.2 Passive Pressures

For passive pressures, an equivalent fluid pressure (γK_p) of about 480 pcf was estimated for static conditions and about 451 pcf for seismic conditions. Passive earth pressures were calculated using the Coulomb and Mononobe-Okabe equations, respectively (Bowles, 1996).

5.3.3 At-Rest Pressures

For lateral pressure design of basement walls, which are restrained and not allowed to deflect, the calculated at rest earth pressure (γK_o) is about 56 pcf, assuming a horizontal ground surface behind the basement wall. Use the at-rest pressure or the active pressure under seismic conditions for basement wall design, whichever is greater.

6.0 RECOMMENDATIONS

6.1 Foundations

Excavation for the foundation footings should remove any unsuitable finer grained soil (topsoil and fill) and expose the underlying gravel/bble alluvium at foundation depth. Normal strip or column footings and slabs may be placed directly on the stony alluvium. A structural engineer should review the plans to check that adequate lateral restraint is provided to foundation walls. Minor cracks in the foundation walls, floor slabs, and sheetrock are normal and should not be a cause for concern.

6.2 Site Grading, Preparation and Backfill

Properly compacted backfill and good site drainage are important. Properly compacted backfill will reduce settlement of the soil against foundation walls and differential movement of exterior slabs.. Structural fill should consist of granular fill placed in lifts no greater than 9 inches loose thickness and compacted. Existing site material may be used for structural fill and other backfills if compacted and tested. Large cobbles (>6" diameter) or clay should not be used as structural backfill, except as specified in Table 5-2.

Pre-roll the surface to compact materials that have been disturbed during excavation using a smooth drum vibratory roller (in vibratory mode) with a minimum of three passes. The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed.

Table 6-1: Compaction Parameters for Stony Fill

Compactor Type	Lift Thickness	Maximum Particle Size	Min. No. of Passes
5-ton vibratory	12 inches	9-inch*	3
1.5-ton vibratory	9 inches	6-inch	5
Hand-held	4 inches	4-inch	5

* Occasional clasts to 12-inch are permitted, but should not be nested

If the number of passes and equipment used are verified by a qualified observer, density testing is not required. The actual number of passes should be determined by observing the compaction after each pass to determine if the surface is non-yielding. If the fill surface appears to be yielding the number of passes should be increased until a non-yielding condition is observed. Fill should be placed in horizontal lifts.

Utility trenches and exterior backfill should be placed in lifts and compacted. Site materials other than very stony alluvium should be tested. **A compaction standard for non-structural fill of 92% Standard Proctor density (ASTM D 698) is recommended.** Final grading should provide protection from frost. Do not over-compact exterior backfills against "green" foundation walls.

Prior to placement of structural fill for foundations or exterior slabs-on-grade, the site should be cleared and grubbed. No brush, roots, sod, frozen material, or other unsuitable materials shall be incorporated in the foundation subgrade or structural fill.

Final grading in unpaved areas should provide positive drainage of at least 0.5 foot in the first 10 feet away from the structure.

6.3 Pavement Design

Pavement designs have been evaluated flexible and rigid pavements. Subgrade soils at the site include un-engineered fill and stony alluvial deposits. These materials will likely provide a good quality of roadbed.

Pavement designs were prepared using Chapter 4 of the AASHTO Guide for Pavement Structures, 1993. Pavement sections were developed based on the following design assumptions:

US Climate Region - VI

Reliability – 75 %

Relative Quality of Roadbed Soil – Good (stony alluvial deposits)

Traffic Level – medium (400,000 to 600,000 18-kip ESAL during the design period)

6.3.1 Flexible Pavement Design

Table 6-2: Pavement Design Parameters*

Climate Region	Roadbed	Traffic Level	SN
VI	Good	Medium	3.2

*Table 4.7 (AASHTO, 1993)

The design section is based on the following relationship, where the layer coefficient a_1 is equal to 0.33 and a_2 is equal to 0.12.

$$SN = a_1D_1 + a_2D_2$$

Design section should consist of:

Pavement: 3-inches (D_1) asphalt concrete (AC)
Base Course: 18 inches (D_2) crushed gravel.

6.3.2 Rigid Pavement Design

Cement slab thickness is based on the following design parameters and for 75 % reliability:

Base Course - consisting of 4 to 6-inches of high quality crushed gravel

PCC modulus of rupture (S'_c) 600 psi

PCC elastic modulus 5,000,000 psi

Table 6-3: Rigid Pavement Design Thickness

Roadbed Quality	Load Transfer Devices	Edge Support	S'_c (psi)	Slab Thickness (inches)
Good	No	Yes	600	6.5
		No	600	7.25
	Yes	Yes	600	6.0
		No	600	6.75

Thickness will vary depending on use of load transfer at joints and with or without edge support.

6.4 Interior Slabs-on-Grade

The interior floor slab should be at least 4 inches thick, and any slabs bearing vehicles should be at least 6 inches thick, or as approved by the .Structural Engineer. Minor floor cracking of slab-on-grade construction is difficult to prevent. Such cracking is normal and should be expected to occur with time. Buildings are almost never free of cracks, and cracking is caused by many factors other than soil movement, such as concrete shrinkage, normal activities, and daily and seasonal variability in temperature and humidity.

6.5 Exterior Slabs-on-Grade

Exterior slabs (sidewalks, patios, parking lots, etc.) typically sustain the greatest damage. Cracking is almost impossible to avoid, and freeze-thaw adds to the difficulty caused by soil consolidation. The following suggestions may reduce differential movement of exterior slabs.

Exterior concrete slabs should be at least 4 inches thick, 6 inches if supporting vehicles, or as approved by the .Structural Engineer. Exterior slabs should not be tied to foundation walls. Any movement of exterior slabs may be transmitted to the foundation walls, resulting in damage.

Posts for patios or other exterior columns should not bear on exterior slabs. If the slabs settle or rise, the movement can be transmitted to the post, resulting in damage to the structure.

Exterior slabs placed on topsoil or silty material may be very susceptible to frost heave, and any exterior flat work placed on these soils may perform poorly. Performance of the slabs may be improved by placement of at least 6 inches of gravel, preferably 12 inches, beneath the slab.

6.6 Potential Basement

Groundwater may interfere with construction of a basement. Deeper piezometers (on the order of 20 feet deep) should be installed to monitor groundwater elevation during the spring 2011 runoff season. Boreholes would be required.

6.7 Ventilation

Teton County Building Code requires that slabs below living spaces be ventilated.

6.8 Reinforcing, Concrete Considerations, and Utilities Testing

Footings, slabs, and foundation walls should be reinforced to resist differential movement. We strongly recommend consultation with a structural engineer to specify adequate reinforcement. Exterior concrete should contain 5% to 7% entrained air. We recommend pressure testing of water and sewer lines before backfilling.

6.9 Observation during Construction

A representative of this office should observe construction of any foundation elements recommended in this report. Site grading and soil compaction should be observed by a representative of this office. If any unexpected soils or conditions are revealed during construction, this office should be notified immediately to survey the conditions and make necessary modifications. In particular, the foundation excavations at the east end of the site should be observed by a representative of this office.

7.0 LIMITATIONS

This report has been prepared based on a limited amount of data. Actual site conditions may vary. The report is for single use and under no circumstances are the figures and text to be used separately. These services have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar conditions. No warranty is made or implied.

8.0 REFERENCES

American Association of State Highway and Transportation Officials, 1993, AASHTO Guide for Design of Pavement Structures Washington, D.C.

American Concrete Institute, 1997, Guide for Concrete Floor and Slab Construction: ACI 302.1R-96.

Bakeer, R.M., S.K. Bhatia, and I. Ishibashi, 1990, Dynamic Earth Pressure with Various Gravity Wall Movements *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen ed): ASCE Geotechnical Special Publication 25, p. 887-899.

Bowles, J.E., 1996, Foundation Analysis and Design, 5th Ed.: McGraw-Hill.

Earthquake Engineering research Institute (EERI), 1994, Earthquake Basics -- Liquefaction: Earthquake Basics Brief No. 1., EERI, Oakland California, 8p.

Holland, J.A., and W. Walker, 1998, Controlling Curling and Cracking in Floors to Receive Coverings: Concrete Construction, Publication Number C980603.

Huang, Y.H., 1983, Stability Analysis of Earth Slopes: Van Norstrand Reinhold Company, New York.

International Building Code, 2006.

Love, J.D., and Albee, H.F., 1972, Geologic Map of the Jackson Quadrangle, Teton County, Wyoming: USGS Map I-769-A.

Smith, R.B. and Arabasz, W.J., 1991, Seismicity of the Intermountain Seismic Belt, in Slemmons, D.B., Engdahl, E.R., Zoback, M.L., and Blackwell, D.D., editors, Neotectonics of North America: Geological Society of America, Decade Map Volume 1, p. 185-228.

Smith, R.B., Byrd, J.O.D., and Susong, D.D., 1993, The Teton fault, Wyoming: Seismotectonics, Quaternary History, and Earthquake Hazards, in Snee, Q.W., Steidtmann, J.R., and Roberts, S.M., editors, Geology of Wyoming; Geological Survey of Wyoming Memoir No. 5, p. 628-667.

Suprenant, B.A., and W.R. Malisch, 1998, Where to Place the Vapor Retarder: Concrete Construction, Publication Number C980427.

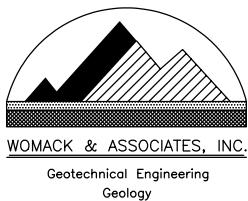
Suprenant, B.A., and W.R. Malisch, 1999, Don't Use Loose Sand under Concrete Slabs: Concrete Construction, Publication Number C99C0223.

U.S. Geological Survey National Seismic Hazard Mapping Project, 2002, Peak Acceleration (%g) with 10% Probability of Exceedance in 50 Years

Whitman, R.V., 1990, Seismic Design and Behavior of Gravity Retaining Walls *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen ed): ASCE Geotechnical Special Publication 25, p. 817-842.

Wyoming DEQ, 2010, Groundwater Conditions along Virginian Lane: personal communication with Jorgensen Associates.

APPENDIX A
TEST PIT LOGS

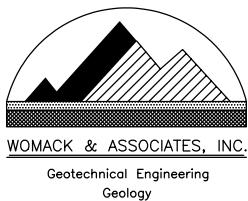


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10							
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-1							
TEST HOLE LOCATION: Southeast of project site, in Karns Meadow ~30' west of Flat Creek bend, see site map														
ELEVATION G.S. (ft.): ~6168			TOTAL DEPTH (ft.): 6.5		GROUNDWATER LEVEL (ft.): 5.0		MEASURED FROM: Ground Surface							
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds					
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1							COMMENTS: Ground surface is grass.							
2							0.0-2.2ft SILT: Black, moist, soft, massive, abundant roots and organic matter [TOPSOIL]							
3							2.2-6.5ft Clayey sandy GRAVELS and COBBLES: Tan, moist to wet, loose, stratified, moderately plastic clay ~15%, sand ~20-25%, subangular to subround limestone gravels and cobbles up to 1' diameter ~60-65%, abundant caving due to groundwater [ALLUVIUM]							
4							Note: Abundant groundwater seeps at 5.0' Installed perforated 4" PVC pipe to 6.5', stickup 3.5' (MW-1) Pipe has a 79 degree angle to it (11 degrees from vertical) Backfilled hole with spoils							
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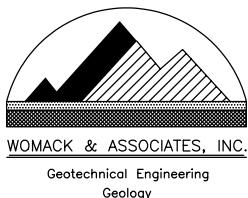


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PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-2			
TEST HOLE LOCATION: South of chainlink fence, see site map										
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 10.3		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1							COMMENTS: Moved test pit ~25' southwest from original stake due to utility location issues.			
2							0.0-4.0ft Clayey/silty GRAVELS and COBBLES: Light to dark brown, slightly moist, dense, massive, 3 different fill events are differentiated in the pit each ~1.3' thick, wavy contacts between fill horizons, planar contact with underlying topsoil [FILL]			
3										
4							4.0-6.0ft Gravelly SILT: Black, dry, stiff to very stiff, layered (from machinery passing over), contains organics [BURIED TOPSOIL]			
5										
6							6.0-7.0ft Sandy CLAY: Pale gray, slightly moist to moist, medium stiff, massive [ALLUVIUM]			
7							7.0-10.3ft Sandy GRAVELS and COBBLES: Yellowish-brown, dry, dense to very dense, stratified, trace (<5%) silt [ALLUVIUM]			
8							Note: No groundwater Near refusal at bottom of hole Installed 4" perforated PVC pipe to 10.3', stickup 1.5' (MW-2) Backfilled hole with spoils			
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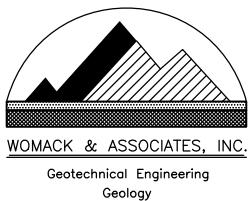


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10							
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-3							
TEST HOLE LOCATION: Central west side of project site, see site map														
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 11.3		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface							
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation	DRILLER: Bill		LOGGED BY: ds					
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1	D1						COMMENTS: Ground surface is packed sandy gravel fill with potholes of standing water.							
2							0.0-3.6ft Clayey/silty/sandy GRAVELS and COBBLES: Dark brown, moist, dense, massive, heterogenous, ~25% fines, ~25% sand, ~50% angular sandstone and limestone gravels and cobbles up to 8" in diameter, pockets of sandy clay and fines [FILL]							
3							3.6-11.3ft Sandy GRAVELS and COBBLES: Tannish-brown, moist, dense, stratified, ~40-45% sand, ~55-60% subangular to subround limestone and sandstone gravels and cobbles up to 5" in diameter, cobble size and density increase with depth, moisture decreases with depth [ALLUVIUM]							
4	D2						Note: No groundwater Installed 4" perforated PVC pipe to 11.3', stickup 2.5' (MW-3) Backfilled hole with spoils							
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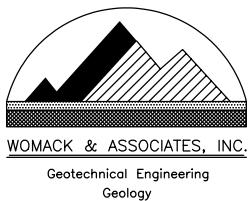


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-4			
TEST HOLE LOCATION: Northwest portion of project site, see site map										
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 13		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1							COMMENTS: Ground surface is silty gravel fill and sparse grass.			
2		D1					0.0-2.5ft Silty GRAVELS and COBBLES: Very dark brown/black, moist, loose to dense, massive to layered, 3 different fill events are represented in the pit [FILL]			
3							1.3ft As above, ~20% sand and gravel, ~30% silt, ~50% angular volcanic and limestone cobbles			
4							2.5-13.0ft Sandy GRAVELS and COBBLES: Tan, dry to slightly moist, medium dense, stratified, ~30% sand, ~70% subround sandstone and limestone gravels and cobbles up to 8" in diameter, cobble size/density/moisture increase with depth [ALLUVIUM]			
5							Note: No groundwater Installed 4" perforated PVC pipe to 13.0', stickup 0.9' (MW-4) Pipe has a 75 degree angle to it (15 degrees from vertical) Backfilled hole with spoils			
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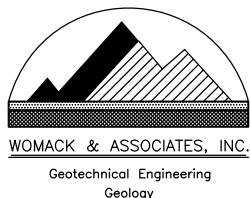


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PAGE 1 OF 1

PROJECT NAME: START Facility						DATE: 6/10/10			
PROJECT LOCATION: Jackson, Wyoming						HOLE NO.: TP-5			
TEST HOLE LOCATION: East of project site, in Karns Meadow, see site map									
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 9		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface		
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION		
1							COMMENTS: Ground surface is grass.		
2							0.0-2.0ft SILT: Black, moist, soft, massive, abundant roots and organic matter [TOPSOIL]		
3							2.0-9.0ft Clayey sandy GRAVELS and COBBLES: Tan, moist to wet, loose, stratified, moderately plastic clay ~15%, sand ~20-25%, subangular to subround limestone gravels and cobbles up to 1' diameter ~60-65%, abundant caving due to groundwater [ALLUVIUM]		
4							Note: No groundwater Installed perforated 4" PVC pipe to 9.0', stickup 1.0' (MW-5) Backfilled hole with spoils		
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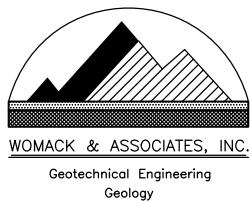


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-6			
TEST HOLE LOCATION: Northwest property corner, see site map										
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 7.1		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1					2.75		COMMENTS: Ground surface is packed fill and sparse grass			
2							0.0-1.7ft Clayey/sandy GRAVELS and COBBLES: Dark brown, dry to slightly moist, medium dense, massive, consists of 2 fill events: upper has clay matrix, lower has sandy matrix [FILL]			
3							1.7-7.1ft Gravelly SAND and COBBLES: Brown, slightly moist, dense, stratified, ~30% gravel, ~35% sand, ~35% subangular to subround limestone and sandstone cobbles up to 7 inches in diameter ~35%, trace (<5%) fines [ALLUVIUM]			
4							Note: No groundwater Backfilled hole with spoils			
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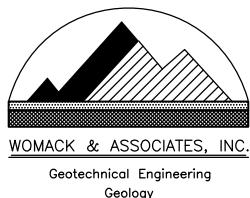


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-7			
TEST HOLE LOCATION: Northwest side of proposed facility housing, see site map										
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 6.8		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1	D1				2.0		COMMENTS: Ground surface is grass and mixed juvenile/mature trees. Roots to 4'.			
2							0.0-1.5ft Gravelly SILT: Black, slightly moist, stiff, massive, non-plastic, ~20% gravel, ~80% silt, abundant large roots [TOPSOIL]			
3							1.5-6.8ft Sandy GRAVELS and COBBLES: Brown, slightly moist, dense, stratified, ~25% sand, subangular to subround limestone and sandstone cobbles to 6 inches in diameter ~45%, ~30% gravel, calcareous matrix, some cobbles have lime coating on surface, ~1/2 inch-sized vugs in limestone cobbles [ALLUVIUM]			
4							Note: No groundwater Backfilled hole with spoils			
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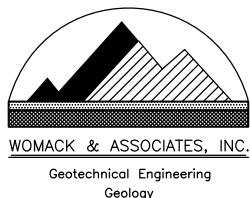


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-8			
TEST HOLE LOCATION: Southwest side of proposed facility housing, see site map										
ELEVATION G.S. (ft.): ~6175			TOTAL DEPTH (ft.): 7		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1	D1				2.0		COMMENTS: Ground surface is tall grass and thin fill surface layer. 0.0-0.1ft Clayey/silty GRAVELS and COBBLES: Gray, dry, dense, massive [FILL] 0.1-1.8ft Gravelly SILT: Black, slightly moist, stiff, massive [BURIED TOPSOIL]			
2							1.8-7.0ft Gravelly SAND and COBBLES: Brown, slightly moist, dense, stratified, ~30% gravel, ~35% sand, ~35% subangular to subround limestone and sandstone cobbles up to 7 inches in diameter ~35%, trace (<5%) fines [ALLUVIUM] Note: No groundwater Backfilled hole with spoils			
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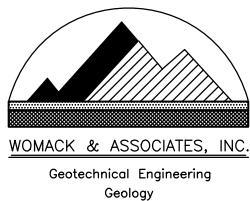


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-9			
TEST HOLE LOCATION: East side of proposed facility housing, see site map										
ELEVATION G.S. (ft.): ~6176			TOTAL DEPTH (ft.): 5		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1							COMMENTS: Ground surface is grass. Test pit located in current employee parking lot for float company.			
2							0.0-1.3ft Gravelly clayey SILT: Black, dry to slightly moist, stiff, massive [TOPSOIL]			
3							1.3-5.0ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, very dense (extremely hard digging), stratified, at refusal at bottom of hole [ALLUVIUM]			
4							Note: No groundwater Backfilled hole with spoils			
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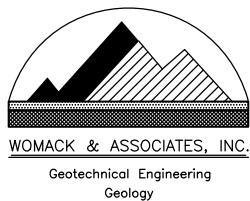


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-10			
TEST HOLE LOCATION: Northeast end of project site, see site map										
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 9.1		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1	D1				1.5-3.0		COMMENTS: Ground surface is fill. Large puddle at test pit, surface is saturated plastic clay and gravel.			
2							0.0-2.0ft Sandy/gravelly CLAY and COBBLES: Tan to dark brown, slightly moist to moist, dense (matrix is stiff to very stiff), massive, ~30% sand and gravel, ~35% moderately plastic clay, ~35% angular to subangular limestone and sandstone cobbles up to 7 inches in diameter, heterogenous, undulating contact with alluvium below [FILL]			
3							Note: Conducted pebble count in fill 2.0-9.1ft Sandy GRAVELS and COBBLES: Brown, dry to very slightly moist, loose to medium dense (some caving despite difficult digging), stratified, ~25-30% sand, ~30% cobbles up to 6 inches in diameter, ~35% gravel, trace (~5%) fines, layers dip gently (~10 degrees) to the east [ALLUVIUM]			
4							Note: No groundwater Backfilled hole with spoils			
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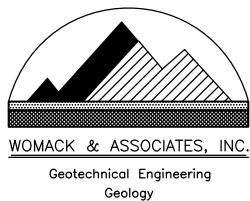


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-11			
TEST HOLE LOCATION: West end of project site, below overhead powerlines, west of berm, see site map										
ELEVATION G.S. (ft.): ~6171			TOTAL DEPTH (ft.): 7.5		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1	D1				1.0		0.0-3.5ft Gravelly CLAY: Dark gray to black, slightly moist to moist, medium stiff, massive, heterogenous, ~30% gravel up to 2 inches in diameter, ~70% clay [FILL]			
2							3.5-7.5ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, dense, stratified, ~40% medium-grained sand, ~60% angular to subround gravels and cobbles up to 5 inches in diameter, density increases with depth, coarsening downward [ALLUVIUM]			
3							Note: No groundwater Backfilled hole with spoils			
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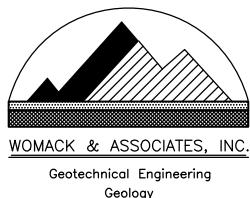


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-12			
TEST HOLE LOCATION: West end of project site, below overhead powerlines, see site map										
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 8.6		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1	D1						0.0-5.5ft Sandy clayey GRAVELS and COBBLES: Dark brown, slightly moist to moist, stiff to very stiff, massive, ~15% sand, ~35% low plastic clay, ~50% gravels and cobbles to 5 inches in diameter, heterogenous [FILL]			
2							Note: Conducted pebble count in fill			
3										
4										
5										
6							5.5-8.6ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, dense to very dense, stratified [ALLUVIUM]			
7							Note: No groundwater Backfilled hole with spoils			
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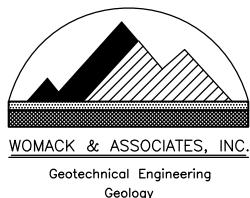


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-13			
TEST HOLE LOCATION: Southwest portion of project site, below overhead powerlines, west of chainlink fence, see site map										
ELEVATION G.S. (ft.): ~6171			TOTAL DEPTH (ft.): 9.4		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1							COMMENTS: Ground surface is fill and grass.			
2							0.0-4.5ft Sandy gravelly silty CLAY: Light brown, slightly moist, stiff, massive, ~15% sand, ~30% gravel and cobbles up to 4 inches in diameter, ~55% fines [FILL]			
3		D1								
4										
5							4.5-6.0ft Gravelly SILT: Black, moist, soft to medium stiff, massive [BURIED TOPSOIL]			
6		U1, U2					6.0-9.4ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, dense to very dense, stratified [ALLUVIUM]			
7							Note: No groundwater Backfilled hole with spoils			
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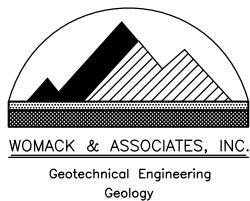


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-14			
TEST HOLE LOCATION: Against north side of buckrail fence, see site map										
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 9.2		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1							COMMENTS: Ground surface is fill with sparse grass.			
2							0.0-4.0ft Sandy clayey GRAVELS and COBBLES: Light to dark brown, moist, dense (matrix is very stiff), massive, ~15% sand, ~35% clay, ~50% angular to subround gravels and cobbles up to 6 inches in diameter, matrix-supported [FILL]			
3										
4							4.0-5.5ft Sandy clayey GRAVELS and COBBLES: Black, moist, dense (matrix is medium stiff to stiff), massive, ~20% sand, ~35% moderately plastic clay, ~45% subround limestone gravel and cobbles up to 6 inches in diameter [BURIED TOPSOIL]			
5										
6							5.5-9.2ft Sandy GRAVELS and COBBLES: Brown, slightly moist to moist, very dense, stratified, ~10% clay, ~40% sand and gravel, ~50% angular to subround limestone cobbles up to 8 inches in diameter, lime coating on surface of cobbles, calcareous matrix [ALLUVIUM]			
7							Note: No groundwater Backfilled hole with spoils			
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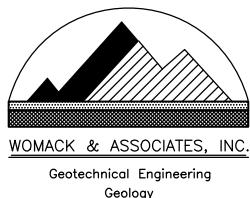


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-15			
TEST HOLE LOCATION: Middle of driving roadway on east side of project site, see site map										
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 6.6		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1	D1						COMMENTS: Ground surface is packed fill roadway.			
2							0.0-2.3ft Sandy/clayey GRAVELS and COBBLES: Light brown, dry to slightly moist, very dense, massive, ~25% sand, ~25% clay, ~50% angular gravels and cobbles up to 7 inches in diameter [FILL]			
3							1.8ft As above, clayey gravel, black			
4							2.3-6.6ft Sandy GRAVELS and COBBLES: Light brown, dry, very dense (extremely hard digging), stratified [ALLUVIUM]			
5							Note: Near refusal at bottom of hole No groundwater Backfilled hole with spoils			
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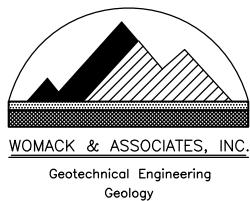


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-16					
TEST HOLE LOCATION: In grassy area between access roads on southeast side of project site, see site map												
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 7.7		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION					
1							COMMENTS: Ground surface is grass.					
2		D1					0.0-1.6ft Gravelly CLAY and COBBLES: Light brown, dry, dense, massive, ~30% gravel, ~35% moderately plastic clay, ~35% angular cobbles up to 4 inches in diameter, matrix-supported [FILL]					
3		U1			3.0		1.6-2.4ft Sandy CLAY: Black, moist, stiff, massive [BURIED TOPSOIL]					
4		D2					2.4-4.4ft Sandy CLAY: Pale gray, slightly moist, very stiff, massive, ~20% sand, ~80% clay, calcareous matrix, moderate pinhole voids [ALLUVIUM]					
5							4.4-7.7ft Clayey sandy GRAVELS and COBBLES: Yellow-brown, slightly moist to moist, very dense, stratified, ~10% clay, ~30% sand, ~30% gravel, ~30% subround cobbles up to 6 inches in diameter [ALLUVIUM]					
6							Note: No groundwater Backfilled hole with spoils					
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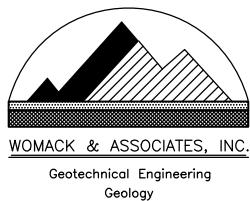


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-17					
TEST HOLE LOCATION: Against east side of chainlink fence, see site map												
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 8		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION					
1							COMMENTS: Ground surface is fill driveway.					
2		D1			2.5		0.0-4.0ft Sandy clayey GRAVELS and COBBLES: Light brown, dry to slightly moist, loose to medium dense (clay is very stiff), ~15% sand, ~25% clay, ~30% gravel, ~30% angular limestone and sandstone cobbles up to 6 inches in diameter, pockets of clay and sand ~1'x1' in size throughout [FILL]					
3							Note: Conducted pebble count in fill					
4		U1			3.5		4.0-6.0ft Sandy gravelly CLAY: Black, slightly moist, very stiff, massive, ~10% sand, ~20% rounded gravel up to 1/2 inch in diameter, ~70% clay [BURIED TOPSOIL]					
5							6.0-8.0ft Sandy GRAVELS and COBBLES: Light brown, dry, very dense, stratified, calcareous, cobbles are typically 7 inches in diameter and smaller, one 2-foot boulder pulled from hole [ALLUVIUM]					
6							Note: At refusal at bottom of hole No groundwater Backfilled hole with spoils					
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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-18			
TEST HOLE LOCATION: South end of project site, in fill/rubble mounds, see site map										
ELEVATION G.S. (ft.): ~6168			TOTAL DEPTH (ft.): 9		GROUNDWATER LEVEL (ft.): 6.9		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1							COMMENTS:			
2							0.0-1.8ft Clayey sandy GRAVELS and COBBLES: Dark brown, slightly moist, loose to medium dense, massive, cobbles typically 5 inches in diameter or smaller, one 1' concrete stone, fill encountered at north end of pit only [FILL]			
3							1.8-4.3ft Gravelly CLAY: Black, slightly moist, stiff, massive, ~20% gravel up to 1/4 inch in diameter, ~80% clay, encountered at ground surface at all sides of pit except for north (see above fill) [TOPSOIL]			
4							4.3-5.3ft Sandy CLAY: Pale gray, slightly moist, very stiff, massive, ~20% sand, ~80% clay, calcareous matrix, moderate pinhole voids [ALLUVIUM]			
5							5.3-9.0ft Clayey sandy GRAVELS and COBBLES: Yellow-brown, slightly moist to wet, very dense, stratified, ~10% clay, ~25% sand, ~65% subangular to subround gravels and cobbles up to 8 inches in diameter [ALLUVIUM]			
6							Note: Encountered groundwater at 6.9 feet Backfilled hole with spoils			
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March 10, 2020

Jeff Bates
Jorgensen Associates
1315 HWY 89 S., Suite 201 | PO Box 9550
Jackson, WY 83002

**RE: UPDATED GEOTECHNICAL INVESTIGATION REPORT, CORE SERVICES VEHICLE
MAINTENANCE FACILITY, JACKSON, WYOMING
PROJECT NO: 06013**

Dear Jeff,

As requested, this report has been prepared to update the Geotechnical Investigation Report originally submitted for the START Facility at Karns Meadow located at 55 Karns Meadow Drive in Jackson, Wyoming, issued by Womack and Associates, Inc., on December 6, 2010. The purposes of this updated report are to examine the original geotechnical recommendations, references to building codes, and updated seismic data to ensure they are current and applicable for the proposed new Core Services Vehicle Maintenance Facility addition. Additionally, 3 test pits were excavated in order to verify subsurface conditions encountered during the 2010 investigation and reduce uncertainty during construction.

In summary, the recommendations made in the 2010 Report are not changed, though code references, seismic data, and lateral pressure have been updated. Engineering analyses and recommendations presented in this report entirely replace those contained in the 2010 Report. The original test pits logs have been appended.

If you have any questions about this report, or if we may provide other services to you, please contact us. As the project progresses, we will be available to answer questions.

Respectfully submitted,

JORGENSEN GEOTECHNICAL

Harrison Carter, P.E.
Geotechnical Project Engineer

Reviewed by:

Colter H. Lane, P.E.
Geotechnical Project Manager

**Geotechnical Investigation Report
2020 Update
Core Services Vehicle Maintenance Facility
Jackson, Wyoming**

Prepared for:

**Jeff Bates
Jorgensen Associates
1315 HWY 89 S., Suite 201 | PO Box 9550
Jackson, WY 83002**

Prepared by:



**PO Box 9550
Jackson, WY 83002**



March 10, 2020

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	PROPOSED CONSTRUCTION	1
3.0	SCOPE OF WORK PROCEDURE.....	4
3.1	FIELD INVESTIGATION SUMMARY	4
3.2	LABORATORY ANALYSIS	4
3.3	REPORT PREPARATION	4
4.0	SITE CONDITIONS	4
4.1	GELOGIC CONDITIONS.....	4
4.2	SOIL CONDITIONS.....	5
4.3	GROUNDWATER.....	5
4.4	EARTHQUAKES AND SEISMICITY	5
4.5	GEOLOGIC AND GEOTECHNICAL HAZARDS.....	7
5.0	ENGINEERING ANALYSES.....	7
5.1	SETTLEMENT	7
5.2	BEARING CAPACITY.....	7
5.3	LATERAL LOADS ON FOUNDATION WALLS.....	8
5.3.1	<i>Active Pressures.....</i>	8
5.3.2	<i>At-Rest Pressures.....</i>	9
5.3.3	<i>Passive Pressures.....</i>	9
5.4	SOIL FRICTION	9
6.0	RECOMMENDATIONS.....	9
6.1	FOUNDATIONS.....	9
6.2	OVER-EXCAVATION AND REPLACEMENT	9
6.3	SITE PREPARATION	12
6.4	PAVEMENT DESIGNS	12
6.4.1	<i>Flexible Pavement Design.....</i>	12
6.4.2	<i>Rigid Pavement Design.....</i>	13
6.5	INTERIOR SLABS-ON-GRADE	13
6.6	EXTERIOR SLABS-ON-GRADE.....	14
6.7	EXCAVATION AND CUT SLOPE STABILITY	14
6.8	FINAL BACKFILLING AND GRADING	15
6.9	VENTILATION AND RADON	15
6.10	REINFORCING, UTILITIES TESTING, AND CONCRETE CONSIDERATIONS	15
6.11	OBSERVATION DURING CONSTRUCTION	15
7.0	LIMITATIONS.....	15
8.0	REFERENCES.....	16

LIST OF FIGURES

Figure 1: Site Location and Geologic Map	2
Figure 2: Updated Test Pit Location Map	3
Figure 3: Over-Excavation and Replacement with Structural Fill	11

LIST OF TABLES

Table 4-1: U.S. Seismic Design Maps Summary	6
Table 5-1: Lateral Pressure Parameters Stony Soils	8
Table 6-1: Compaction Method Specification for Stony Materials.....	10
Table 6-2: AASHTO Pavement Design Parameters	12
Table 6-3: Pavement Design Section.....	13
Table 6-4: Rigid Pavement Design Thickness.....	13

LIST OF APPENDICES

Appendix A: 2010 and 2020 Test Pit Logs

1.0 INTRODUCTION

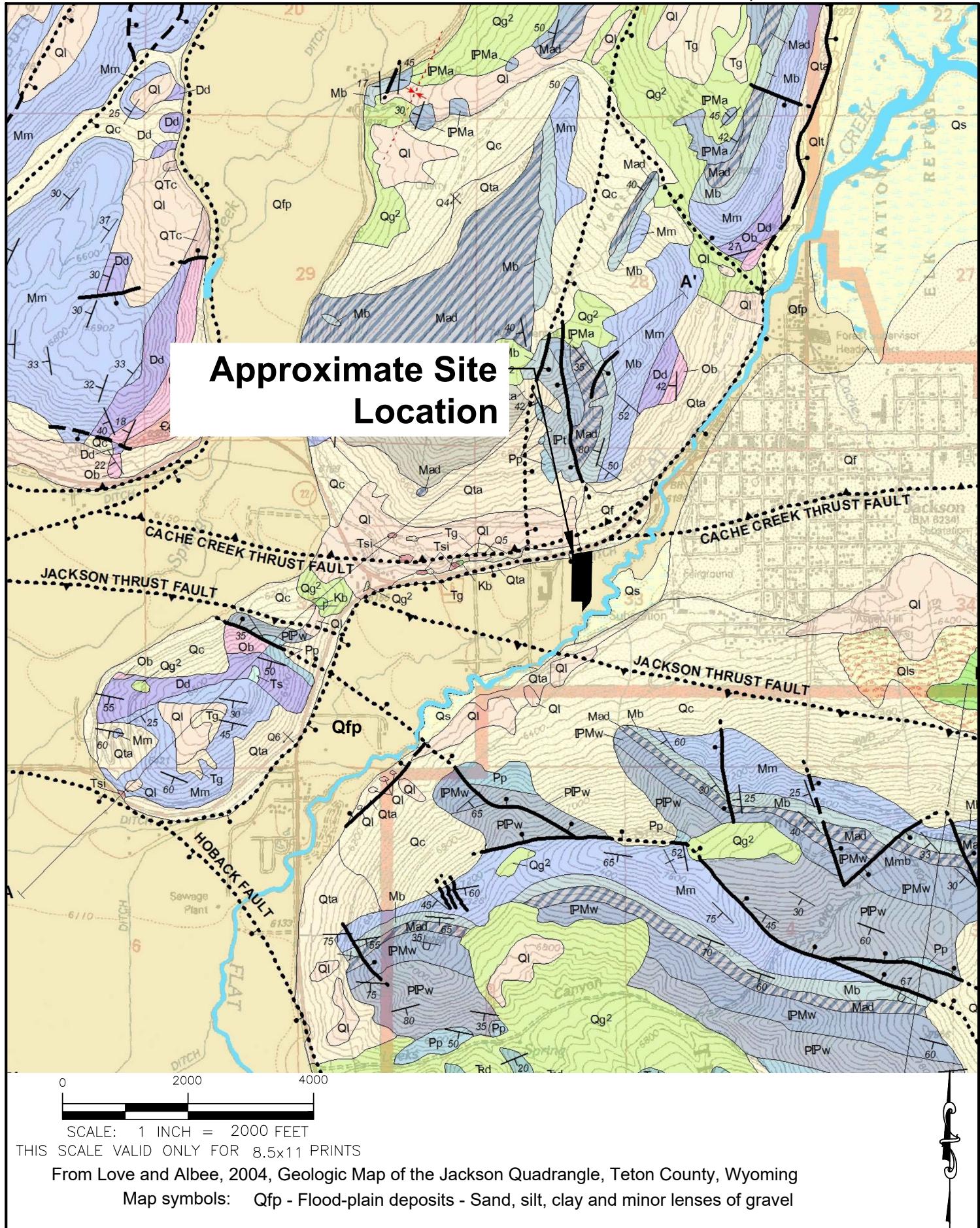
Jorgensen Geotechnical (JG) has updated the original START Facility at Karns Meadow Geotechnical Investigation Report prepared by Womack & Associates, Inc. (WAI), to serve as the Geotechnical Investigation Report for the Core Services Vehicle Maintenance Facility located at 55 Karns Meadow Drive, in Jackson, Wyoming. WAI staff are now performing Geotechnical Engineering services as Jorgensen Geotechnical, LLC. The purposes of updating the report are to examine the original geotechnical recommendations in light of the proposed maintenance facility addition and to update references to currently adopted building codes and seismic data. The scope of services includes:

1. Review site plans made available to us for comparison to the existing subsurface database,
2. Excavate 3 additional test pits in the area of the proposed maintenance facility addition (Figure 2),
3. Review geotechnical engineering recommendations in light of proposed addition,
4. Update seismic and other code references,
5. Include additional recommendations or advice to support foundation design to improve development economy and/or efficiency, and
6. Prepare this Updated Geotechnical Investigation Report.

The Updated Report contains a summary of the surface and subsurface investigations performed, an evaluation of soil-engineering properties, and recommendations to support the design and construction of foundation elements for the proposed addition.

2.0 PROPOSED CONSTRUCTION

The building site is located within the town of Jackson just north of Flat Creek (Figure 1). According to sheet C101 of the drawings dated 9/25/2015, the average existing elevation across the site is approximately 6,174 feet above mean sea level (AMSL). The site is relatively level but has been used for storage of various construction equipment, contains irregular fill mounds, and has had several improvements completed on the site in the past. The construction of the existing START Facility likely introduced additional fill material and soil disturbance. It is our understanding the proposed addition comprises approximately 28,000 square feet and will consist of standard reinforced concrete spread footings and slab-on-grade construction with a finished floor elevation of 6,175-ft AMSL, according to the sheet C201 of the provided plans.



From Love and Albee, 2004. Geologic Map of the Jackson Quadrangle, Teton County, Wyoming

Map symbols: Qfp - Flood-plain deposits - Sand, silt, clay and minor lenses of gravel

DRAFTED BY:	HC	SHEET TITLE:	PROJECT TITLE:	
REVIEWED BY:	CHL	Figure 1	Updated Geotechnical Investigation	
PROJECT NUMBER	06013	Site Location and Geologic Map	Core Services Vehicle Maintenance Facility Jackson, Wyoming	 JORGENSEN Geotechnical, LLC 307-733-5150 www.jorgeng.com



0 100 200
SCALE: 1 INCH = 100 FEET
THIS SCALE VALID ONLY FOR 8.5x11 PRINTS

TP-2* - Test pits excavated by WAI in 2010. Asterisk indicates monitoring well was installed. Number indicates depth to alluvium.

JG-1 - Test pits excavated by JG in 2020. Number indicates depth to alluvium.

DRAFTED BY:	HC
REVIEWED BY:	CHL
PROJECT NUMBER	06013

SHEET TITLE:
Figure 2
Test Pit Location Map

PROJECT TITLE:
Updated Geotechnical Investigation
Core Services Vehicle Maintenance Facility
Jackson, Wyoming



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3.0 SCOPE OF WORK PROCEDURE

3.1 Field Investigation Summary

The original field investigation was conducted on June 10 and June 24, 2010. The 2010 fieldwork consisted of preliminary site reconnaissance and the excavation and logging of 18 exploratory test pits. The test pits were excavated to depths ranging from 6.5 to 13.0-feet below the ground surface (bgs) in order to observe subgrade soils, groundwater conditions, and to obtain bulk samples. Soil types, consistencies, and stratigraphic thicknesses were observed and documented by an Engineering Geologist. The original 2010 test pit locations are shown in gray in Figure 2. Field conditions were recorded and five standpipe piezometers were installed to facilitate groundwater monitoring. General topography and site conditions were observed by the Geologist in order to place the test pits in representative locations.

Three additional test pits were excavated on January 20, 2020, to depths ranging from 6.3 to 7.2-feet below the existing ground surface (bgs). Approximate test pit locations excavated in 2020 are shown in black in Figure 2. Soil type, thickness, consistency, and relative moisture content were observed and documented by a Jorgensen Geotechnical Engineer. Note that site conditions may be variable and actual soil conditions may differ from those represented in the test pit logs attached in Appendix A.

3.2 Laboratory Analysis

Due to the stony nature of the soils encountered throughout the site and our experience with similar deposits in the Jackson Hole area, laboratory testing was not conducted. Engineering properties of the soil have been estimated based on field observations.

3.3 Report Preparation

This report describes the general soil conditions encountered during the subsurface exploration conducted in both 2010 and 2020 and includes an updated test pit location map (Figure 2) and test pit logs. The 2010 and 2020 test pit logs can be found in Appendix A. Current code references, seismic design information, and lateral pressure parameters have also been updated from the original report.

4.0 SITE CONDITIONS

4.1 Geologic Conditions

The geologic map of Grand Teton National Park (Figure 1, Love and Albee, 2004) covers portions of the Jackson Hole area and encompasses the project site. The map shows the location of surficial deposits, bedrock units, and geologic structures (i.e., faults and folds). Most of the west end of the town of Jackson, including the project site, is mapped as Quaternary-aged alluvial flood plain deposits (Qfp) consisting of gravel, sand, and floodplain deposits. The soils underlying the site are generally described as consisting of gravel and cobble alluvium with an overlying layer of variable fill and topsoil, and agree with the mapped geologic units in Figure 1. Bedrock was not encountered in any of the test pits, and is expected to be deep.

Numerous Quaternary-aged (i.e., relatively young and potentially active) faults have been mapped in the Teton County area (Case, 1997; Machette, et al, 2001). The most potentially active fault in the area is the Teton Fault which lies approximately 5 miles west of the site. The inferred (buried) traces of the Cache Creek and Jackson thrust faults are located near the site, crossing the town of Jackson on a generally east-west trend. These faults are considered to be relatively old and inactive by the USGS and do not affect the project. The Teton fault at the base of the Teton Range about 5 miles west of the site is considered to be seismically active.

4.2 Soil Conditions

During the 2010 investigation, up to 5.5-feet of fill and topsoil were found in most test pits underlain by gravel/cobble alluvium. The depth to the stony alluvium is shown in Figure 2 at each test pit location. The fill varies from clayey gravel/cobble to gravelly clay, usually described as dark gray to black and very stiff/very dense. Much of the fill appears to represent recycled topsoil. About 2-feet of black organic gravelly silt topsoil occurs at ground surface in undisturbed areas and underlies the fill in some places. The underlying stony alluvium was described in the 2010 report as consisting of about 60% loose to very dense, stratified, subangular to subrounded limestone and sandstone gravel and cobbles up to about 6-inch diameter with occasional larger clasts up to about a foot in diameter, in a matrix of well-graded sand, sometimes with a little clay or silt. Cobble size apparently increases with depth. The gravel and cobble alluvium was described as dry to moist (wet only in TP-1 and TP-18 below water table).

Similar soil conditions as encountered during the 2010 investigation were observed during the additional test pit excavation in 2020, with fill and topsoil extending to a maximum of 5.6-feet bgs in test pit JG-1.

4.3 Groundwater

Test pits TP-1 and 18, located adjacent to Flat Creek near the southeast corner of the site, encountered groundwater at about 5 to 7-feet below ground surface (bgs) at the time of the investigation on June 10 and 24, 2010. Jorgensen Associates measured groundwater depth on October 26, 2010, and all monitoring wells were reported dry. No groundwater was encountered in test pits excavated in January 2020.

Groundwater levels probably fluctuate in response to seasonal precipitation and flow levels in Flat Creek. Depending on the time of construction, if encountered, high groundwater may affect the performance of the subgrade soils and imported fill. It is recommended the subgrade preparation take place during a time of year when groundwater is expected to be low.

4.4 Earthquakes and Seismicity

Jackson Hole is located within the Intermountain Seismic Belt, a zone of seismicity that extends from southern Utah through eastern Idaho, western Montana, and western Wyoming (Smith and Arabasz, 1991). The Teton Fault, located along the eastern margin of the Teton Range about 5 miles west of the project site, is considered an important structural element of the Intermountain Seismic Belt. Predicted recurrence intervals for maximum credible earthquakes

have passed for most of the fault systems capable of generating magnitude 7.5 events in western Wyoming (Case, 1997), implying the risk of major earthquakes is relatively high.

Ground motion accelerations should be derived for the project site in accordance with the general procedure defined in the International Building Code (IBC). The IBC references ASCE 7-16 to determine the ground motion accelerations. The site class is determined by soil characteristics in the top 100-feet of the soils profile. Based on subsurface soils, geologic mapping, and our experience in the area, the site is classified as Site Class D (Stiff Soils). For your convenience, Seismic Design Maps (SEAOC, 2020) values are summarized in TABLE 4-1 below.

Table 4-1: U.S. Seismic Design Maps Summary

Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters	
Short Period (S_s) = 1.042	
1-Second Period (S_1) = 0.344	
Site Coefficients and Adjusted MCE Spectral Response Acceleration Parameters	
F_a = 1.200	S_{MS} = 1.250
F_v = 1.956	S_{M1} = 0.673
Design Spectral Response Parameters	
	S_{DS} = 0.834
	S_{D1} = 0.449

Note: Per Section 11.4.8 of ASCE 7-16, if the proposed structure foundation will include seismic isolators or damping systems, a site response analysis shall be performed in accordance with Section 21.1 of ASCE 7-16

This report presents design ground motion values calculated in accordance with Chapter 11 of the 2018 IBC for structural design, though the Structural Engineer is ultimately responsible for complying with seismic design codes. Results of the ASCE 7-16 design values indicate the site is classified as Seismic Design Category D.

The site is in an area of moderate seismic activity. The current peak horizontal ground acceleration (PGA) with 10% probability of exceedance in 50-years is approximately 0.20g according to the USGS National Seismic Hazard Maps (2014). This has been applied in this report for analysis of seismic lateral loading on retaining walls in Section 5.3.

The provisions of the IBC are intended to provide uniform levels of performance for structures, depending on their occupancy and use and the risk inherent to their failure. The approach adopted in the IBC is intended to provide a uniform margin of safety against collapse at the *design* ground motion. The *design* earthquake ground motion is selected at a ground shaking level that is 2/3 of the *maximum considered earthquake* (MCE) ground motion, which has a likelihood of exceedance of 2 percent in 50 years (a return period of about 2,500 years). The owner should be aware that the IBC is not intended to prevent damage or loss of function during a major earthquake; it is intended to reduce the risk of loss of life. Structural design should follow the level of risk tolerable to the owner.

4.5 Geologic and Geotechnical Hazards

The owner should be aware that in the event of a large magnitude earthquake (i.e., approximately 7.5 or greater), strong ground shaking could potentially cause damage to structures (Smith, et al, 1993). The owners may wish to consider the option of carrying earthquake insurance in addition to homeowner's insurance. Surface displacement due to faulting is very unlikely.

In our opinion, the biggest geotechnical concern at the site is the presence of the undocumented fills encountered across the site during the 2010 and 2020 test pit excavation. Mitigation measures to manage the undocumented fill are presented in Section 6.0.

Loose, saturated sands and silty sands, and in some cases, silts and gravels may liquefy when exposed to seismic shaking. The gravels and cobbles observed throughout the site are unlikely to liquefy in a seismic event. Liquefaction, if it were to occur, could cause differential settlement, particularly if a structure is placed partially on sand and partially on stony alluvium. However, liquefaction is unlikely to cause lateral spreading, which is major slope movement commonly responsible for catastrophic damage during earthquakes, at this relatively flat site.

5.0 ENGINEERING ANALYSES

5.1 Settlement

Significant consolidation (e.g., greater than 1-inch total settlement or 0.5-inches differential settlement) of the stony alluvial deposits is not anticipated. Differential settlement potential will be increased if the structure is founded partially on the stony alluvium and partially on the fill or topsoil observed to overly the stony alluvium. Thus, over-excavation of all soils overlying the alluvium is recommended and foundation elements should be placed on native stony alluvium, approved site-derived stony soils, or an approved structural fill. Additional discussion of over-excavation may be found in Section 6.2. Any loose or disturbed material encountered on site should be prepared in accordance with Section 6.3. If lenses of loose sand, fine-grained material, or undocumented fills are observed within the stony material, they should be removed and replaced with approved structural fill or native stony alluvium and compacted following the recommendations of Section 6.2.

5.2 Bearing Capacity

Bearing capacity of soil refers to its ability to resist shear failure under load. It is assumed any overlying topsoil and fill will be removed from below foundation elements and footings will be placed directly on the native alluvium or an approved structural fill. If structural fills are required, compaction methods and specifications are discussed in Section 6.2.

The bearing capacity for the stony alluvium and approved fill was estimated using Terzaghi's bearing capacity equation for isolated strip footings (Bowles, 1996). Soil parameters (i.e., inputs to the bearing capacity equation) were derived based on visual classification of the soil and rock. Allowable bearing capacity is calculated to be 7,000 psf for footings placed a minimum of 3.0-ft below final grade.

Soil bearing capacity is dependent not only on its strength, but also the geometry of the foundation elements. The estimate above assumes 24-inch strip footings (i.e., "continuous") placed at the depths mentioned above. If footing size or depth differs remarkably from these assumptions, Jorgensen should be notified to evaluate if the soil will support the proposed loading. It is often the case that heavily loaded, isolated column footings may be optimized (i.e., made smaller) and may reduce the quantity of concrete required. Please contact Jorgensen for an evaluation.

5.3 Lateral Loads on Foundation Walls

Lateral pressures were calculated using methods suggested by Bowles (1996). Lateral pressures were calculated for at-rest, active, and passive conditions and presented in Table 5-1. Values in the table have been calculated assuming level backfill adjacent to foundation walls

Table 5-1: Lateral Pressure Parameters Stony Soils

Condition	Coefficient of Earth Pressures	γK (equivalent fluid pressure)
Static Conditions Level Backfill	$K_o = 0.43$	55 pcf
	$K_a = 0.27$	35 pcf
	$K_p = 3.69$	480 pcf
Earthquake Conditions Level Backfill	$K_{ae} = 0.33$	43 pcf
	$K_{pe} = 3.49$	454 pcf

*Assumes a unit weight for the backfill of 130 pcf.

5.3.1 Active Pressures

For lateral pressure design of retaining walls, which are allowed to deflect and develop an active soil wedge, the calculated equivalent fluid pressure (γK_a) is 35 pounds per cubic foot (pcf). This pressure distribution would be equivalent to a force of approximately $17.5H^2$ pounds per horizontal foot of wall acting at one-third the wall height (H) above the base.

Lateral pressures on retaining walls from earthquakes were estimated using the Mononobe-Okabe equations (Bowles, 1996). Because the maximum acceleration occurs only briefly during an earthquake, it is common practice when designing dams and other earth structures to reduce the design acceleration to $\frac{1}{2}$ of the maximum design acceleration (Hynes-Griffin and Franklin, 1984). Thus, we have calculated seismic lateral pressures using a horizontal acceleration k_h of 0.10g (1/2 of k_h max) per the USGS (2014).

Research has indicated that lateral pressures due to earthquakes are non-hydrostatic in distribution, and the resultant acts above the lower third-point of the wall (Bakeer, et al, 1990). Accordingly, active soil pressures must be divided into two components that act at different wall heights. The static force acts at the lower third-point, as discussed above. The resultant force from seismic lateral pressures is applied at 60% of the wall height above the base with a

magnitude equal to the difference between seismic and static active pressures; i.e., $\frac{1}{2} (\gamma K_{ae} - \gamma K_a)H^2$, or 4.0H², pounds per horizontal foot of wall applied.

5.3.2 At-Rest Pressures

For lateral pressure design of basement walls, which are restrained and not allowed to deflect, the calculated equivalent fluid pressure (γK_o) is 55 pcf. Design control of such walls shall be whichever generates the higher resultant force: at-rest pressures or active seismic pressures.

5.3.3 Passive Pressures

For passive pressure design, the calculated equivalent fluid pressure (γK_p) is 450 pcf, assuming a horizontal ground surface adjacent to the wall, reduced to 454 pcf for seismic conditions. Passive pressure design should neglect loose fill and soil located within the frost zone.

5.4 Soil Friction

Terzaghi et al. (1996) suggest use of the internal strength of the soil for the friction angle along a concrete base in granular soils, with a maximum value of 30 degrees. Assuming foundation elements will be placed on the stony alluvium or an approved structural fill (i.e. "pit-run"), a friction value of 0.58 ($\tan 30^\circ$) is suggested. The friction value may be combined with the passive pressure to resist horizontal loads.

6.0 RECOMMENDATIONS

6.1 Foundations

In our opinion, the existing native stony alluvium, consisting of sandy gravels and cobble will provide adequate support for anticipated foundation loads. We recommend the building foundation systems be placed entirely on native stony material or compacted structural fill consisting of imported "pit-run" or re-compacted stony site soils. Any overlying fill or topsoil should be over-excavated according to the recommendations of Section 6.2.

The building code for Teton County requires that footings be placed at a minimum depth of 34 inches from finished grade, with a minimum foundation exposure of 6 inches above finished grade. Minor cracks in the foundation walls, floor slabs, and sheetrock are normal and should not be a cause for concern.

6.2 Over-Excavation and Replacement

Over-excavation of the fill soils and topsoil should extend laterally at least one footing width (B) beyond the edge of the footing for strip footings and one-half footing width (0.5B) for square footings. The over-excavation should extend to the surface of the underlying stony alluvium and structural fill should contact directly with the alluvium as illustrated in Figure 3. Replacement material should be approved structural fill, such as imported "pit-run" or approved site material. Pit-run is easy to compact and strict moisture control is usually not required.

Prior to placement of structural fill, a representative of this office should verify the excavation has reached the native stony alluvium. Once approved, pre-roll the surface of the exposed alluvium to compact materials that have been disturbed during excavation using a smooth drum vibratory roller (in vibratory mode) with a minimum of three passes. The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed. A representative of Jorgensen should observe the surface of the native soil prior to the placement of fill. Further discussion of site preparation is in Section 6.3.

Pit-run or other clean, stony material will compact into a dense, strong, well-drained structural fill, and tight moisture control during compaction is usually not required, though non-yielding states are difficult to achieve in saturated pit-run. A vibrating roller-compactor is required for adequate compaction of stony material. Compaction of stony material with a sheepfoot roller is not recommended. Pit-run usually requires minimal compactive effort and, due to the stony nature of the materials, nuclear density testing can yield variable compaction results. Therefore, we recommend compacting stony fills using a **method specification**, for which Table 6-1 provides initial guidelines.

Table 6-1: Compaction Method Specification for Stony Materials

Compactor Type	Lift Thickness	Number of Passes*	Maximum Particle Size
Hand held "whacker"	6-inches	5	4-inches
1.5 ton static weight	9-inches	5	6-inches
5 ton static weight	12-inches	3	9-inches**

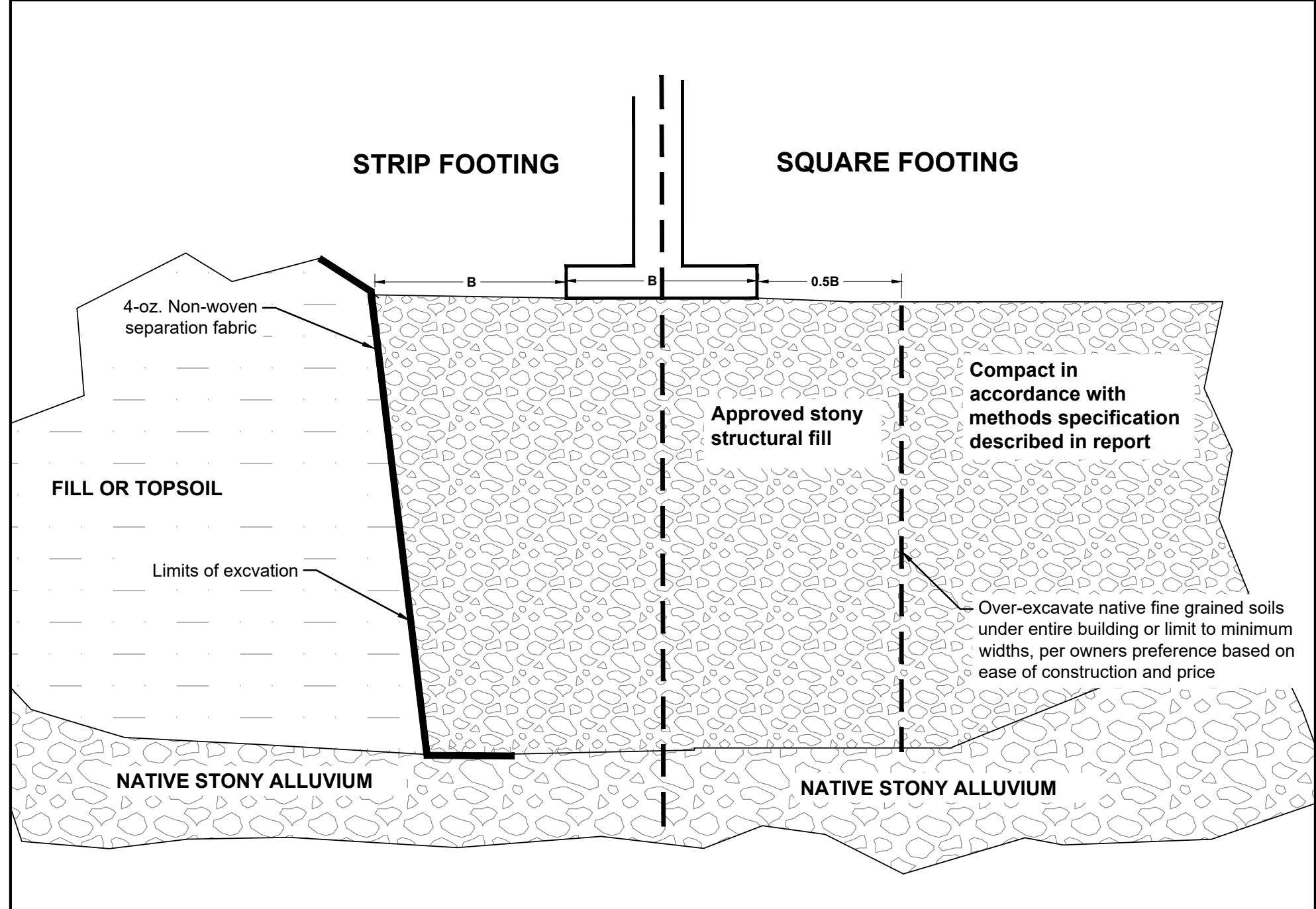
*The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed.

** Occasional 12-inch stones are allowable, but avoid nesting.

The method specification may be established as follows:

- The contractor will place fill in loose lifts no greater than specified in Table 6-1 for whichever class of compactor is used.
- Fill will be compacted with the *minimum* number of passes specified in Table 6-1. The actual number of passes should be determined by observing compaction after each pass to determine if the surface is non-yielding. If the fill surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed.
- Once the number of passes is determined, this **method** (unique to the material type, compactor, lift thickness, and number of passes) may be continued for the rest of the project as long as fill material properties and subgrade soil conditions remain the same.

It is important to establish a method specification as early in the construction as possible and apply it consistently for the entirety of the building pad construction. JG should observe lift thickness, number of passes, and equipment used during compaction. Additional guidance on construction observations may be found in Section 6.11.



DRAFTED BY:	HC
REVIEWED BY:	CHL
PROJECT NUMBER	

SHEET TITLE:
Figure 3
Over-Excavation and Replacement of
Fill and Topsoil

PROJECT TITLE:
Updated Geotechnical Investigation Report
Core Services Vehicle Maintenance Facility
Jackson, Wyoming



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6.3 Site Preparation

Prior to placement of foundation elements or structural fill, the site should be cleared and stripped of topsoil and organic debris. No brush, roots, frozen material, or other deleterious or unsuitable materials shall be incorporated in the foundation subgrade or structural fill. All exposed subgrade surfaces should be free of mounds and depressions which could prevent uniform compaction. If unexpected fills or obstructions are encountered during site clearing or excavation, such features should be removed and the excavation thoroughly cleaned prior to fill placement and/or construction of foundation elements.

The foundations shall bear directly on the native stony alluvium or approved structural fill placed in direct contact with the alluvium.

During excavation for the foundation footings, removal of large cobbles may disturb and loosen the surrounding material. All disturbed areas should be compacted with a smooth-drum vibratory roller, in vibratory mode with a minimum of three passes, prior to placement of structural fill and/or footing construction. The actual number of passes should be determined by observing whether the surface is yielding after each pass. If the surface appears to be yielding, the number of passes should be increased until a non-yielding condition is observed and approved by Jorgensen.

All excavations and foundation subgrades should be observed by a representative of Jorgensen prior to fill or concrete placement, especially if questionable materials are exposed. Notice shall be provided at a minimum of 24 hours before the requested observation.

6.4 Pavement Designs

Pavement designs for both flexible and rigid pavements have been analyzed and are presented below. Subgrade soils include un-engineered fill and stony alluvial deposits. These materials will likely provide a good quality roadbed. Pavement design were prepared using Chapter 4 of the AASHTO Guide for Pavement Structure, 1993.

6.4.1 Flexible Pavement Design

Below is a summary of the flexible pavement design based on Chapter 4 of the AASHTO Guide for Pavement Structures, 1993.

Table 6-2: AASHTO Pavement Design Parameters

Climate Region	Roadbed	Traffic Level	SN
VI	Good	Medium	3.2*

*Table 4.7 (AASHTO, 1993)

The designed section is based on the following relationship where the layer coefficient a_1 (asphalt pavement) is equal to 0.33, a_2 (base course) is equal to 0.12, and a_3 (pit-run) is equal to 0.10:

$$SN = a_1 D_1 + a_2 D_2 + a_3 D_3$$

Two road prisms have been presented, one that includes both a base and subbase course, and one that only includes a base course. The flexible asphalt prism designs are summarized below in Table 6-3.

Table 6-3: Pavement Design Section

Roadbed Quality	Asphalt Pavement (D_1) inch	Base Course (D_2) inch	Subbase (D_3) inch
Good	3	6	14
Good	3	18	-

Fill prisms used to bring the roadway alignment up to grade must be compacted in lifts during installation. Compaction procedures vary based on the fill material used. **It is not necessary to place sub-base in areas where the native gravel and cobble alluvium material are encountered in the roadway prism.**

6.4.2 Rigid Pavement Design

Cement slab thickness is based on the following design parameters and for 75 % reliability:

Base Course - consisting of 4 to 6-inches of high-quality crushed gravel (i.e. $\frac{3}{4}$ -inch crushed aggregate)

PCC modulus of rupture (S'_c) 600 psi

PCC elastic modulus 5,000,000 psi

Table 6-4: Rigid Pavement Design Thickness

Roadbed Quality	Load Transfer Devices	Edge Support	S'_c (psi)	Slab Thickness (inches)
Good	No	Yes	600	6.5
		No	600	7.25
	Yes	Yes	600	6.0
		No	600	6.75

Thickness will vary depending on use of load transfer at joints and with or without edge support.

6.5 Interior Slabs-on-Grade

Interior slabs should be at least 4 inches thick, and any slabs bearing vehicles should be at least 6 inches thick, or as approved by a Structural Engineer. It is our understanding the interior slabs will

support heavy vehicles, therefore the performance of the slabs may be improved by over-excavation 6 to 12-inches of the fill and/or topsoil and replaced with a road mix gravel (e.g., WYDOT Grading W). Prior to the placement and compaction of the gravel, the surface of the exposed subgrade soils should be rolled and compacted. The gravel should be separated from the fill/topsoil soils using a non-woven separation fabric (e.g., Mirafi 140N). Minor floor cracking of slab-on-grade construction is difficult, if not impossible, to prevent. Such cracking is normal and should be expected to occur with time. Buildings are almost never free of cracks, and cracking is caused by many factors other than soil movement, such as concrete shrinkage or curling, or daily and seasonal variability in temperature and humidity.

An impermeable layer (usually plastic) is suggested beneath interior slabs, underlain by 4 inches of clean drain gravel that will act as a capillary break to reduce dampness. Two options to reduce the tendency for the concrete to crack or curl as it dries:

1. A blotter layer may be placed under the slab. In the past, loose sand has been used for this purpose, but is no longer recommended. A cover of 4 inches of trimmable, compactible, granular material (such as WYDOT Grading W) may be placed over the impermeable layer to receive the concrete slab. This material usually consists of "crusher run material", which varies in size from about 1.5-inch down to rock dust.
2. The blotter layer may be eliminated if the concrete is reinforced properly. T If the contractor needs additional guidance on slab reinforcement, a Structural Engineer should provide it.

6.6 Exterior Slabs-on-Grade

Exterior slabs (e.g., sidewalks, patios, driveways, hardscapes, etc.) typically sustain the greatest damage. Cracking is almost impossible to avoid, and freeze-thaw adds to the difficulty caused by soil movement. Performance of exterior slabs in areas underlain by clayey fill may be improved by over-excavation and replacement with 6 to 12-inches of road mix gravel (e.g., WYDOT Grading H). Prior to placement and compaction of the gravel, the surface of the sand should be rolled and compacted.

Exterior slabs should be at least 4 inches thick, 6 inches if supporting vehicles, or as approved by the Structural Engineer. Exterior slabs should not be tied to foundation walls. Any movement of exterior slabs may be transmitted to the foundation walls, resulting in damage. Posts for patios or other exterior columns should not bear on exterior slabs. If the slabs settle or rise, the movement can be transmitted to the post, resulting in damage to the structure. Expansion joints are recommended in all concrete flatwork.

6.7 Excavation and Cut Slope Stability

OSHA regulations (29CFR1926) appear to classify the alluvium as Type C soil. Simple cut slopes should be no steeper than 1.5H:1V. The contractor shall ultimately be responsible for adherence to OSHA and other safety regulations based on conditions observed at the time of construction.

6.8 Final Backfilling and Grading

Properly compacted backfill and site drainage are important. Stony fill (e.g., site-derived sandy gravel and cobble alluvium or imported “pit-run”) will compact into a dense, strong, well-draining engineered fill, and strict moisture control is usually not required, making it a preferred alternative for many contractors for exterior backfills, utility trenches, and subbase under interior and exterior slabs. However, compaction testing with a nuclear density gauge is usually problematic due to the presence of large stones. Therefore, we recommend compacting stony fills using the methods specification described in Section 6.2 and Table 6-1: Compaction Method Specification for Stony Materials.

6.9 Ventilation and Radon

Evaluation of radon was beyond the scope of work; local codes should be followed and specialty contractors employed, if necessary. The building contractor is ultimately responsible for following local building codes. Ventilation to reduce moisture and potential accumulation of radon gas is required by code for habited and inhabited spaces below grade. A capillary break layer may also accommodate a radon vent pipe (see Section 6.5).

6.10 Reinforcing, Utilities Testing, and Concrete Considerations

Footings, slabs, and foundation walls should be reinforced to resist differential movement. Consultation with a Structural Engineer to specify adequate reinforcement is suggested. Water and sewer lines should be pressure tested before backfilling. Exterior concrete should contain 5% to 7% entrained air.

6.11 Observation during Construction

Recommendations in this report are contingent upon our involvement. If any unexpected soils or conditions are revealed during construction, this office should be notified immediately to survey the conditions and make necessary modifications. All excavations and foundation subgrades should be observed by a representative of Jorgensen prior to fill or concrete placement, especially if questionable materials are exposed. Notice shall be provided at a minimum of 24 hours before the requested observation.

We are able to provide the most value observing site conditions at the following times:

1. Upon completion of site preparation to verify native stony alluvium has been reached and prepared in accordance with Sections 6.1 and 6.3,
2. During the placement of the first couple lifts of structural fill, if required, to observe compaction (i.e., develop a method specification, see Section 6.2), and
3. Once the site has been prepped to the bottom of footing elevation to witness a proof roll with the compactor.

7.0 LIMITATIONS

This report has been prepared based on a limited amount of data. Actual site conditions may vary. The report is for single use and under no circumstances are the figures and text to be used

separately. These services have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty is made or implied.

8.0 REFERENCES

American Association of State Highway and Transportation Officials, 1993, AASHTO Guide for Design of Pavement Structure, Washington, D.C.

American Concrete Institute, 1997, Guide for Concrete Floor and Slab Construction: ACI 302.1R-96.

Bakeer, R.M., S.K. Bhatia, and I. Ishibashi, 1990, Dynamic Earth Pressure with Various Gravity Wall Movements *in* Design and Performance of Earth Retaining Structures (P.C. Lambe and L.A. Hansen, ed): ASCE Geotechnical Special Publication 25, p. 887-899.

Bowles, J.E., 1996, Foundation Analysis and Design, 5th Ed.: McGraw-Hill.

Case, J.C., 1997, Earthquakes and Active Faults in Wyoming; Wyoming State Geological Survey, Preliminary Hazards Report 97-2.

Gilbert, J.D., Ostena, D., and Wood, C., 1983, Seismotectonic study of Teton County Lake Dam and Reservoir: U.S. Bureau of Reclamation Seismotectonic Report 83-8, Minidoka Project, Idaho-Wyoming, 123P.

Holland, J.A., and W. Walker, 1998, Controlling Curling and Cracking in Floors to Receive Coverings: Concrete Construction, Publication Number C980603.

Houston, S.L. and W.N. Houston, 1997, Collapsible Soil Engineering in Unsaturated Soil Engineering Practices, S.L. Houston and D.G. Fredland editors: ASCE Special Publication Number 68, p.199-232.

Hynes-Griffin, M.E., and Franklin, A.G., 1984, Rationalizing the Seismic Coefficient Method: U.S. Army Corps of Engineers, Waterways Experiment Station, Miscellaneous Paper GL-84-13.

International Building Code, 2018.

Love, J.D., Reed Jr., J.C., and Christiansen, A.C., 1992, Geologic Map of Grand Teton National Park, Teton County, Wyoming: Geologic Investigation Series Map I-2031, Scale 1:62,500.

Machette, N.M., Pierce, K.L., McCalpin, J.P., Haller, K.M., and Dart, R.L., 2001, Map and Data for Quaternary faults and folds in Wyoming, United States Geological Survey, Open-File Report 01-461.

Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Yuehua, Rezaeian, Sanaz, Harmsen, S.C., Boyd, O.S., Field, Ned, Chen, Rui, Rukstales, K.S., Luco, Nico, Wheeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 update of the United States national seismic hazard maps: U.S. Geological Survey Open-File Report 2014-1091.

Smith, R.B. and Arabasz, W.J., 1991, Seismicity of the Intermountain Seismic Belt, in Slemmons, D.B., Engdahl, E.R., Zoback, M.L., and Blackwell, D.D., editors, Neotectonics of North America: Geological Society of America, Decade Map Volume 1, p. 185-228.

Smith, R.B., Byrd, J.O.D., and Susong, D.D., 1993, The Teton fault, Wyoming: Seismotectonics, Quaternary History, and Earthquake Hazards, in Snee, Q.W., Steidtmann, J.R., and Roberts, S.M., editors, Geology of Wyoming; Geological Survey of Wyoming Memoir No. 5, p. 628-667.

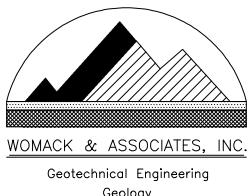
Suprenant, B.A., and W.R. Malisch, 1999, Don't Use Loose Sand under Concrete Slabs: Concrete Construction, Publication Number C99C0223.

Terzaghi, K., Peck, R.B., and Mesri, G., 1996, Soil Mechanics in Engineering Practice, Third Edition, John Wiley & Sons, Inc., New York, New York.

U.S. Geological Survey Earthquake Hazards Program, 2014.

APPENDIX A

2010 and 2020 Test Pit Logs

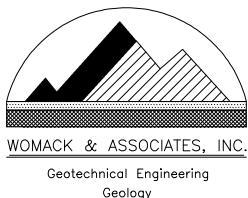


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility								DATE: 6/10/10			
PROJECT LOCATION: Jackson, Wyoming								HOLE NO.: TP-1			
TEST HOLE LOCATION: Southeast of project site, in Karns Meadow ~30' west of Flat Creek bend, see site map											
ELEVATION G.S. (ft.): ~6168			TOTAL DEPTH (ft.): 6.5			GROUNDWATER LEVEL (ft.): 5.0		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1								COMMENTS: Ground surface is grass.			
2								0.0-2.2ft SILT: Black, moist, soft, massive, abundant roots and organic matter [TOPSOIL]			
3								2.2-6.5ft Clayey sandy GRAVELS and COBBLES: Tan, moist to wet, loose, stratified, moderately plastic clay ~15%, sand ~20-25%, subangular to subround limestone gravels and cobbles up to 1' diameter ~60-65%, abundant caving due to groundwater [ALLUVIUM]			
4								Note: Abundant groundwater seeps at 5.0' Installed perforated 4" PVC pipe to 6.5', stickup 3.5' (MW-1)			
5								Pipe has a 79 degree angle to it (11 degrees from vertical) Backfilled hole with spoils			
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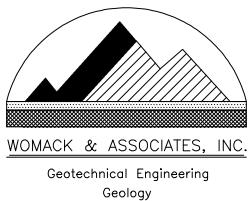


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-10					
TEST HOLE LOCATION: Northeast end of project site, see site map												
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 9.1		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1	D1					1.5-3.0		COMMENTS: Ground surface is fill. Large puddle at test pit, surface is saturated plastic clay and gravel.				
2								0.0-2.0ft Sandy/gravelly CLAY and COBBLES: Tan to dark brown, slightly moist to moist, dense (matrix is stiff to very stiff), massive, ~30% sand and gravel, ~35% moderately plastic clay, ~35% angular to subangular limestone and sandstone cobbles up to 7 inches in diameter, heterogenous, undulating contact with alluvium below [FILL]				
3								Note: Conducted pebble count in fill 2.0-9.1ft Sandy GRAVELS and COBBLES: Brown, dry to very slightly moist, loose to medium dense (some caving despite difficult digging), stratified, ~25-30% sand, ~30% cobbles up to 6 inches in diameter, ~35% gravel, trace (~5%) fines, layers dip gently (~10 degrees) to the east [ALLUVIUM]				
4								Note: No groundwater Backfilled hole with spoils				
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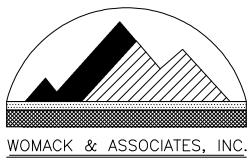


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-11					
TEST HOLE LOCATION: West end of project site, below overhead powerlines, west of berm, see site map												
ELEVATION G.S. (ft.): ~6171			TOTAL DEPTH (ft.): 7.5		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation	DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1	D1					1.0		COMMENTS:				
2								0.0-3.5ft Gravelly CLAY: Dark gray to black, slightly moist to moist, medium stiff, massive, heterogenous, ~30% gravel up to 2 inches in diameter, ~70% clay [FILL]				
3								3.5-7.5ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, dense, stratified, ~40% medium-grained sand, ~60% angular to subround gravels and cobbles up to 5 inches in diameter, density increases with depth, coarsening downward [ALLUVIUM]				
4								Note: No groundwater Backfilled hole with spoils				
5												
6												
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14												

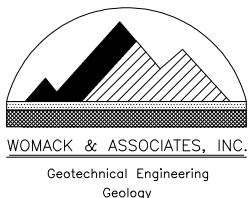


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility								DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming								HOLE NO.: TP-12			
TEST HOLE LOCATION: West end of project site, below overhead powerlines, see site map											
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 8.6			GROUNDWATER LEVEL (ft.): N/A			MEASURED FROM: Ground Surface		
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			WELL COMPLETION
1								COMMENTS:			
2		D1 						0.0-5.5ft Sandy clayey GRAVELS and COBBLES: Dark brown, slightly moist to moist, stiff to very stiff, massive, ~15% sand, ~35% low plastic clay, ~50% gravels and cobbles to 5 inches in diameter, heterogenous [FILL]			
3								Note: Conducted pebble count in fill			
4						2.0					
5											
6								5.5-8.6ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, dense to very dense, stratified [ALLUVIUM]			
7								Note: No groundwater Backfilled hole with spoils			
8											
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13											
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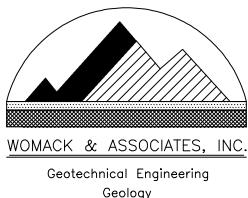


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-13					
TEST HOLE LOCATION: Southwest portion of project site, below overhead powerlines, west of chainlink fence, see site map												
ELEVATION G.S. (ft.): ~6171			TOTAL DEPTH (ft.): 9.4		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation	DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS: Ground surface is fill and grass.				
2								0.0-4.5ft Sandy gravelly silty CLAY: Light brown, slightly moist, stiff, massive, ~15% sand, ~30% gravel and cobbles up to 4 inches in diameter, ~55% fines [FILL]				
3		D1										
4												
5								4.5-6.0ft Gravelly SILT: Black, moist, soft to medium stiff, massive [BURIED TOPSOIL]				
6		U1, U2						6.0-9.4ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, dense to very dense, stratified [ALLUVIUM]				
7								Note: No groundwater Backfilled hole with spoils				
8												
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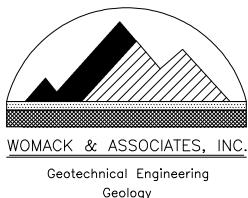


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-14					
TEST HOLE LOCATION: Against north side of buckrail fence, see site map												
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 9.2		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS: Ground surface is fill with sparse grass.				
2								0.0-4.0ft Sandy clayey GRAVELS and COBBLES: Light to dark brown, moist, dense (matrix is very stiff), massive, ~15% sand, ~35% clay, ~50% angular to subround gravels and cobbles up to 6 inches in diameter, matrix-supported [FILL]				
3												
4								4.0-5.5ft Sandy clayey GRAVELS and COBBLES: Black, moist, dense (matrix is medium stiff to stiff), massive, ~20% sand, ~35% moderately plastic clay, ~45% subround limestone gravel and cobbles up to 6 inches in diameter [BURIED TOPSOIL]				
5												
6								5.5-9.2ft Sandy GRAVELS and COBBLES: Brown, slightly moist to moist, very dense, stratified, ~10% clay, ~40% sand and gravel, ~50% angular to subround limestone cobbles up to 8 inches in diameter, lime coating on surface of cobbles, calcareous matrix [ALLUVIUM]				
7								Note: No groundwater Backfilled hole with spoils				
8												
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12												
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14												

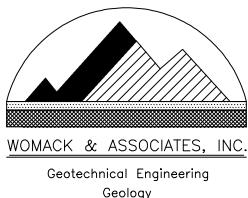


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PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-15					
TEST HOLE LOCATION: Middle of driving roadway on east side of project site, see site map												
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 6.6		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1	D1							COMMENTS: Ground surface is packed fill roadway.				
2								0.0-2.3ft Sandy/clayey GRAVELS and COBBLES: Light brown, dry to slightly moist, very dense, massive, ~25% sand, ~25% clay, ~50% angular gravels and cobbles up to 7 inches in diameter [FILL]				
3								1.8ft As above, clayey gravel, black				
4								2.3-6.6ft Sandy GRAVELS and COBBLES: Light brown, dry, very dense (extremely hard digging), stratified [ALLUVIUM]				
5								Note: Near refusal at bottom of hole No groundwater Backfilled hole with spoils				
6												
7												
8												
9												
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14												
								MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION

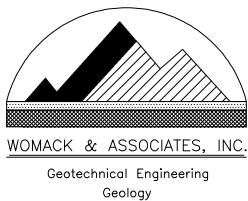


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PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-16					
TEST HOLE LOCATION: In grassy area between access roads on southeast side of project site, see site map												
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 7.7		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS: Ground surface is grass.				
2		D1						0.0-1.6ft Gravelly CLAY and COBBLES: Light brown, dry, dense, massive, ~30% gravel, ~35% moderately plastic clay, ~35% angular cobbles up to 4 inches in diameter, matrix-supported [FILL]				
3		U1						1.6-2.4ft Sandy CLAY: Black, moist, stiff, massive [BURIED TOPSOIL]				
4		D2				3.0		2.4-4.4ft Sandy CLAY: Pale gray, slightly moist, very stiff, massive, ~20% sand, ~80% clay, calcareous matrix, moderate pinhole voids [ALLUVIUM]				
5								4.4-7.7ft Clayey sandy GRAVELS and COBBLES: Yellow-brown, slightly moist to moist, very dense, stratified, ~10% clay, ~30% sand, ~30% gravel, ~30% subround cobbles up to 6 inches in diameter [ALLUVIUM]				
6								Note: No groundwater Backfilled hole with spoils				
7												
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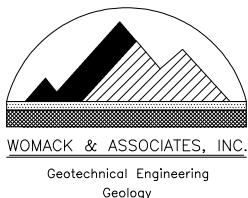


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-17					
TEST HOLE LOCATION: Against east side of chainlink fence, see site map												
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 8		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation	DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS: Ground surface is fill driveway.				
2		D1				2.5		0.0-4.0ft Sandy clayey GRAVELS and COBBLES: Light brown, dry to slightly moist, loose to medium dense (clay is very stiff), ~15% sand, ~25% clay, ~30% gravel, ~30% angular limestone and sandstone cobbles up to 6 inches in diameter, pockets of clay and sand ~1'x1' in size throughout [FILL] Note: Conducted pebble count in fill				
3												
4		U1				3.5		4.0-6.0ft Sandy gravelly CLAY: Black, slightly moist, very stiff, massive, ~10% sand, ~20% rounded gravel up to 1/2 inch in diameter, ~70% clay [BURIED TOPSOIL]				
5												
6								6.0-8.0ft Sandy GRAVELS and COBBLES: Light brown, dry, very dense, stratified, calcareous, cobbles are typically 7 inches in diameter and smaller, one 2-foot boulder pulled from hole [ALLUVIUM]				
7												
8								Note: At refusal at bottom of hole No groundwater Backfilled hole with spoils				
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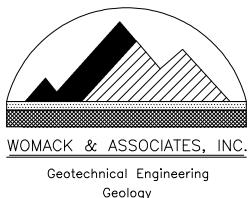


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PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-18					
TEST HOLE LOCATION: South end of project site, in fill/rubble mounds, see site map												
ELEVATION G.S. (ft.): ~6168			TOTAL DEPTH (ft.): 9		GROUNDWATER LEVEL (ft.): 6.9			MEASURED FROM: Ground Surface				
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation	DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS:				
2								0.0-1.8ft Clayey sandy GRAVELS and COBBLES: Dark brown, slightly moist, loose to medium dense, massive, cobbles typically 5 inches in diameter or smaller, one 1' concrete stone, fill encountered at north end of pit only [FILL]				
3								1.8-4.3ft Gravelly CLAY: Black, slightly moist, stiff, massive, ~20% gravel up to 1/4 inch in diameter, ~80% clay, encountered at ground surface at all sides of pit except for north (see above fill) [TOPSOIL]				
4								4.3-5.3ft Sandy CLAY: Pale gray, slightly moist, very stiff, massive, ~20% sand, ~80% clay, calcareous matrix, moderate pinhole voids [ALLUVIUM]				
5								5.3-9.0ft Clayey sandy GRAVELS and COBBLES: Yellow-brown, slightly moist to wet, very dense, stratified, ~10% clay, ~25% sand, ~65% subangular to subround gravels and cobbles up to 8 inches in diameter [ALLUVIUM]				
6								Note: Encountered groundwater at 6.9 feet Backfilled hole with spoils				
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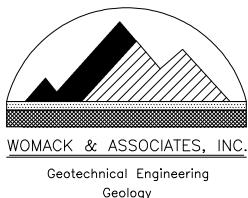


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-2					
TEST HOLE LOCATION: South of chainlink fence, see site map												
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 10.3		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation	DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS: Moved test pit ~25' southwest from original stake due to utility location issues.				
2								0.0-4.0ft Clayey/silty GRAVELS and COBBLES: Light to dark brown, slightly moist, dense, massive, 3 different fill events are differentiated in the pit each ~1.3' thick, wavy contacts between fill horizons, planar contact with underlying topsoil [FILL]				
3												
4								4.0-6.0ft Gravelly SILT: Black, dry, stiff to very stiff, layered (from machinery passing over), contains organics [BURIED TOPSOIL]				
5												
6								6.0-7.0ft Sandy CLAY: Pale gray, slightly moist to moist, medium stiff, massive [ALLUVIUM]				
7								7.0-10.3ft Sandy GRAVELS and COBBLES: Yellowish-brown, dry, dense to very dense, stratified, trace (<5%) silt [ALLUVIUM]				
8								Note: No groundwater Near refusal at bottom of hole Installed 4" perforated PVC pipe to 10.3', stickup 1.5' (MW-2) Backfilled hole with spoils				
9												
10												
11												
12												
13												
14												

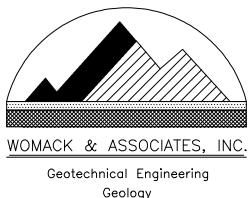


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-3					
TEST HOLE LOCATION: Central west side of project site, see site map												
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 11.3		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1	D1							COMMENTS: Ground surface is packed sandy gravel fill with potholes of standing water.				
2								0.0-3.6ft Clayey/silty/sandy GRAVELS and COBBLES: Dark brown, moist, dense, massive, heterogenous, ~25% fines, ~25% sand, ~50% angular sandstone and limestone gravels and cobbles up to 8" in diameter, pockets of sandy clay and fines [FILL]				
3								3.6-11.3ft Sandy GRAVELS and COBBLES: Tannish-brown, moist, dense, stratified, ~40-45% sand, ~55-60% subangular to subround limestone and sandstone gravels and cobbles up to 5" in diameter, cobble size and density increase with depth, moisture decreases with depth [ALLUVIUM]				
4	D2							Note: No groundwater Installed 4" perforated PVC pipe to 11.3', stickup 2.5' (MW-3) Backfilled hole with spoils				
5												
6												
7												
8												
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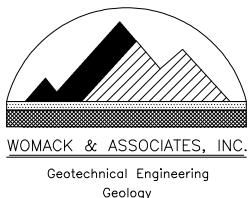


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-4					
TEST HOLE LOCATION: Northwest portion of project site, see site map												
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 13		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS: Ground surface is silty gravel fill and sparse grass.				
2		D1						0.0-2.5ft Silty GRAVELS and COBBLES: Very dark brown/black, moist, loose to dense, massive to layered, 3 different fill events are represented in the pit [FILL] 1.3ft As above, ~20% sand and gravel, ~30% silt, ~50% angular volcanic and limestone cobbles				
3								2.5-13.0ft Sandy GRAVELS and COBBLES: Tan, dry to slightly moist, medium dense, stratified, ~30% sand, ~70% subround sandstone and limestone gravels and cobbles up to 8" in diameter, cobble size/density/moisture increase with depth [ALLUVIUM] Note: No groundwater Installed 4" perforated PVC pipe to 13.0', stickup 0.9' (MW-4) Pipe has a 75 degree angle to it (15 degrees from vertical) Backfilled hole with spoils				
4												
5												
6												
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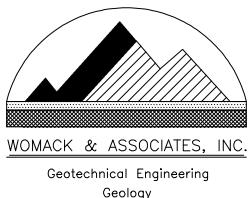


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/10/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-5					
TEST HOLE LOCATION: East of project site, in Karns Meadow, see site map												
ELEVATION G.S. (ft.): ~6172			TOTAL DEPTH (ft.): 9		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:		DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1								COMMENTS: Ground surface is grass.				
2								0.0-2.0ft SILT: Black, moist, soft, massive, abundant roots and organic matter [TOPSOIL]				
3								2.0-9.0ft Clayey sandy GRAVELS and COBBLES: Tan, moist to wet, loose, stratified, moderately plastic clay ~15%, sand ~20-25%, subangular to subround limestone gravels and cobbles up to 1' diameter ~60-65%, abundant caving due to groundwater [ALLUVIUM]				
4								Note: No groundwater Installed perforated 4" PVC pipe to 9.0', stickup 1.0' (MW-5) Backfilled hole with spoils				
5												
6												
7												
8												
9												
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13												
14												

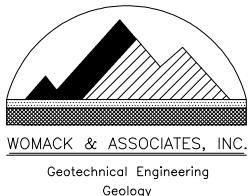


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility								DATE: 6/24/10			
PROJECT LOCATION: Jackson, Wyoming								HOLE NO.: TP-6			
TEST HOLE LOCATION: Northwest property corner, see site map											
ELEVATION G.S. (ft.): ~6173			TOTAL DEPTH (ft.): 7.1			GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface			
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds	
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			MOISTURE CONTENT (%)
1						2.75		COMMENTS: Ground surface is packed fill and sparse grass			DRY DENSITY (PCF)
2								0.0-1.7ft Clayey/sandy GRAVELS and COBBLES: Dark brown, dry to slightly moist, medium dense, massive, consists of 2 fill events: upper has clay matrix, lower has sandy matrix [FILL]			LIQUID LIMITS (%)
3								1.7-7.1ft Gravelly SAND and COBBLES: Brown, slightly moist, dense, stratified, ~30% gravel, ~35% sand, ~35% subangular to subround limestone and sandstone cobbles up to 7 inches in diameter ~35%, trace (<5%) fines [ALLUVIUM]			PLASTICITY INDEX (%)
4								Note: No groundwater Backfilled hole with spoils			WELL COMPLETION
5											
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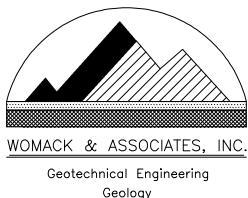


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility								DATE: 6/24/10							
PROJECT LOCATION: Jackson, Wyoming								HOLE NO.: TP-7							
TEST HOLE LOCATION: Northwest side of proposed facility housing, see site map															
ELEVATION G.S. (ft.): ~6174			TOTAL DEPTH (ft.): 6.8			GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface							
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds					
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION			MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	WELL COMPLETION
1	D1 					2.0		0.0-1.5ft Gravelly SILT: Black, slightly moist, stiff, massive, non-plastic, ~20% gravel, ~80% silt, abundant large roots [TOPSOIL]							
2								1.5-6.8ft Sandy GRAVELS and COBBLES: Brown, slightly moist, dense, stratified, ~25% sand, subangular to subround limestone and sandstone cobbles to 6 inches in diameter ~45%, ~30% gravel, calcareous matrix, some cobbles have lime coating on surface, ~1/2 inch-sized vugs in limestone cobbles [ALLUVIUM]							
3								Note: No groundwater Backfilled hole with spoils							
4															
5															
6															
7															
8															
9															
10															
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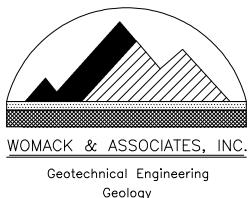


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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility							DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming							HOLE NO.: TP-8					
TEST HOLE LOCATION: Southwest side of proposed facility housing, see site map												
ELEVATION G.S. (ft.): ~6175			TOTAL DEPTH (ft.): 7		GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation	DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN.	(N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION				
1						2.0		COMMENTS: Ground surface is tall grass and thin fill surface layer. 0.0-0.1ft Clayey/silty GRAVELS and COBBLES: Gray, dry, dense, massive [FILL] 0.1-1.8ft Gravelly SILT: Black, slightly moist, stiff, massive [BURIED TOPSOIL]				
2								1.8-7.0ft Gravelly SAND and COBBLES: Brown, slightly moist, dense, stratified, ~30% gravel, ~35% sand, ~35% subangular to subround limestone and sandstone cobbles up to 7 inches in diameter ~35%, trace (<5%) fines [ALLUVIUM] Note: No groundwater Backfilled hole with spoils				
3												
4												
5												
6		D1										
7												
8												
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TEST HOLE LOG

PAGE 1 OF 1

PROJECT NAME: START Facility								DATE: 6/24/10					
PROJECT LOCATION: Jackson, Wyoming								HOLE NO.: TP-9					
TEST HOLE LOCATION: East side of proposed facility housing, see site map													
ELEVATION G.S. (ft.): ~6176			TOTAL DEPTH (ft.): 5			GROUNDWATER LEVEL (ft.): N/A		MEASURED FROM: Ground Surface					
DRILL TYPE: 580 Super L Backhoe			HAMMER:			DRILL CO: Fish Creek Excavation		DRILLER: Bill		LOGGED BY: ds			
DEPTH (ft.)	GRAPHICAL LOG	SAMPLE	S.P.T. (N) BLOWS/6 IN. (N1)60 BLOWS/FT.	RECOVERY (%)	UNCONFINED STRENGTH (TSF)	CLASSIFICATION	DESCRIPTION		MOISTURE CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMITS (%)	PLASTICITY INDEX (%)	WELL COMPLETION
							COMMENTS: Ground surface is grass. Test pit located in current employee parking lot for float company.						
1							0.0-1.3ft Gravelly clayey SILT: Black, dry to slightly moist, stiff, massive [TOPSOIL]						
2							1.3-5.0ft Sandy GRAVELS and COBBLES: Brown, dry to slightly moist, very dense (extremely hard digging), stratified, at refusal at bottom of hole [ALLUVIUM]						
3							Note: No groundwater Backfilled hole with spoils						
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													



JORGENSEN GEOTECHNICAL, LLC

1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150

Test Pit ID: JG-3

Sheet 1 of 1

Project Name: Core Services Vehicle Maintenance Facility

Project Location: Jackson, Wyoming

Client: Town of Jackson

Logged By: HC **Checked By:** CHL

Project Number: 06013

Latitude: 43.473900 **Longitude:** -110.777190 **Elevation:**

Date Started: Jan 20 2020 **Completed:** Jan 20 2020

Notes: _____

Contractor: Town of Jackson

Equipment: CAT 420F

Atterberg



Project Name: Core Services Vehicle Maintenance Facility

Client: Town of Jackson

Project Number: 06013

Date Started: Jan 20 2020 **Completed:** Jan 20 2020

Contractor: Town of Jackson

Equipment: CAT 420F

Project Location: Jackson, Wyoming

Logged By:

Checked By: CHL

Latitude: 43.473824

Longitude: -110.776449

Elevation:

Notes:

10 of 10 pages



JORGENSEN GEOTECHNICAL, LLC

**1315 HWY 89 S., Suite 201 - Jackson, WY 83002
Telephone: 307.733.5150**

Test Pit ID: JG-2

Sheet 1 of 1

Project Name: Core Services Vehicle Maintenance Facility

Project Location: Jackson, Wyoming

Client: Town of Jackson

Logged By: HC **Checked By:** CHL

Project Number: 06013

Latitude: 43.474262 **Longitude:** -110.776669 **Elevation:**

Date Started: Jan 20 2020 **Completed:** Jan 20 2020

Notes: _____

Contractor: Town of Jackson

Equipment: CAT 420F

Atterberg

ENVIRONMENTAL ANALYSIS

for the
Teton County/Town of Jackson
Transit and Maintenance Facility



NW $\frac{1}{4}$ of Section 33, Township 41N, Range 116W
Town of Jackson, Wyoming, PIDN 22-41-16-33-2-00-025 & 22-41-16-33-2-00-028

December 21, 2012

Prepared for:
Jorgensen Associates, P.C.
Agent for Town of Jackson/Teton County

Prepared by:
Brian E. Remlinger

ALDER ENVIRONMENTAL, LLC

Land • Water • Wetlands Consulting

P.O. Box 6519, Jackson, Wyoming 83002
(307) 690-3625 brian@alderenvironmental.com

TABLE OF CONTENTS

INTRODUCTION	1
PROPERTY LOCATION	1
METHODOLOGY	1
HABITAT INVENTORY	2
<i>Site Conditions</i>	2
<i>Vegetative Cover Types</i>	2
<i>Vegetative Cover Type Ranking</i>	6
<i>Protected Resources-Waterbodies, Ten Year FloodPlains & Wetlands</i>	7
<i>Habitat Summary</i>	11
<i>Habitat Type</i>	11
<i>Setbacks and Buffers</i>	11
<i>Endangered Plant and Vertebrate Species</i>	12
DEVELOPMENT IMPACT ASSESSMENT	12
<i>Proposed Development</i>	12
<i>Impact Assessment</i>	12
<i>Project Vicinity Impact Assessment</i>	13
<i>Development Recommendations</i>	13
MITIGATION	15
<i>Mitigation Description</i>	15
<i>Mitigation Plan</i>	16
APPENDIX A - FIGURES	19
APPENDIX B - PHOTOS	20
APPENDIX C – WETLAND DELINEATION	32

INTRODUCTION

In May of 1994, Teton County and the Town of Jackson published the Jackson/Teton County Comprehensive Plan in order to responsibly plan for growth. In conjunction with the plan, they presented a map dividing the county and town into resource districts.

These districts included the Natural Resource Overlay District (NRO), which was developed to preserve the town and county's wildlife resources for valley residents and visitors. The objective of the NRO is to protect habitat for wildlife species of special concern. Development shall be designed to protect the areas these wildlife need to survive; therefore, development within the NRO shall minimize impacts to protected wildlife habitats, as much as possible. All development proposals within the NRO, excluding those exemptions stated in Section 3130 of the Jackson Land Development Regulations (LDRs), and all proposed subdivisions are required to submit an Environmental Analysis (EA) in concurrence with the application for a development permit.

An EA describes the existing conditions of the land, the development proposal and rationale for the location of the proposed building site or subdivision plat, and a description of how the proposal meets all applicable standards and objectives presented in the Comprehensive Plan.

Resources protected by the EA process include: waterbodies; 10-year floodplains; wetlands; crucial elk winter habitat and migration routes; crucial mule deer winter habitat and migration routes; crucial moose winter habitat; trumpeter swan winter habitat and nesting areas; cutthroat trout spawning areas; and crucial winter habitat and nesting areas of bald eagles.

PROPERTY LOCATION

An EA was conducted for the proposed Teton County/Town of Jackson Transit and Maintenance Facility (Facility) and access road located at 675 Snow King Avenue, Jackson, Wyoming (Figure 1). The project development area is approximately 7.42 acres and is located in the SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 33, Township 41N, Range 116W in Teton County, Wyoming. The project area is bordered to the west and north by private lands with commercial uses (Figure 2). The property to the south is owned by Lower Valley Energy and is used as a power line transmission facility. The property to the east and southeast is known as "Karns Meadow" and is currently open space encumbered by a conservation easement held by the Jackson Hole Land Trust (JHLT). Access to the property is through a road easement that connects to Snow King Avenue and State Highway 89/Broadway.

METHODOLOGY

For the purposes of this EA, the Town Planning Staff determined an "Analysis Area" during a January 4, 2010 pre-application conference. The Analysis Area is shown on Figure 2 and is described as the Development Areas and the Karns Meadow Parcels west of Flat Creek. The Analysis Area provides a more representative view of the project area

and immediate vicinity and will provide information necessary to determine protected resource setbacks.

Site visits were conducted on January 13th and 29th and October 15, 2010 to identify and map the conditions of the site including: human structures, slope, soils, hydrologic features, vegetative cover types, protected resources and habitats protected by the NRO. An additional site visits to verify conditions were conducted on August 30, 2011 and December 21, 2012.

Vegetative cover types were broken out into dominant plant communities found on the property according to Teton County LDRs, Section 3211. Plants within these communities were identified and verified using *Vascular Plants of Wyoming* (Dorn 1992). Protected resources and habitats were identified using historic maps, Wyoming Game & Fish GIS databases, published and non-published wildlife research reports and field observations. Habitats protected by the NRO were identified using the definitions from Section 3240 of the Town of Jackson LDRs. The *Natural Resources Inventory for the Karns Meadow Property* (JHLT 2003), *Karns Meadow Wetland Delineation Report* (IMA 2007), *Karns Meadow Vegetation Survey Report* (IMA 2009) and the *Preliminary Wetland Delineation Report – Karns Meadow West* (Alder 2010) provided additional information for identifying vegetation, hydrologic and wildlife resource in the Analysis Area.

HABITAT INVENTORY

SITE CONDITIONS

Human Made

Multiple uses of the Analysis Area were documented during site visits. These include earthen material stockpiling and processing, START Bus storage, vehicle impound storage and Karns Meadow Park parking (Figure 2). The Town of Jackson maintains and operates a water supply well and creek thaw well within the Analysis Area. The vehicle impound yard and well house are fenced with 6-foot tall chain link fences. Two abandoned irrigation supply ditches cross the Analysis Area and numerous laterals branch off these ditches. Historical infrared aerial photos from 1983 indicate this property was once a flood irrigated agricultural meadow (TCD 2010).

Topography

The Analysis Area is generally flat with a slight slope towards the east and Flat Creek.

VEGETATIVE COVER TYPES

The vegetative cover types found in the Analysis Area are associated with landscape, soils, hydrologic features and disturbances (Figure 3). There are four dominant cover types in the Analysis Area: wetland scrub-shrub, narrowleaf cottonwood, agricultural meadow and disturbed grassland. These cover types are characterized as follows:

Wetland Scrub-Shrub Cover Type

The wetland scrub-shrub vegetative community in the Analysis Area is associated with the Flat Creek riparian corridor. Shrub cover in this vegetative community is approximately 80 percent with emergent wetlands providing additional coverage. Dominant shrub species include geyer willow (*Salix geyeriana*) and booth willow (*Salix boothii*) with less dominant thinleaf alder (*Alnus incana* ssp. *tenuifolia*) and chokecherry (*Prunus virginianus*). The shrub understory is dominated by wood's rose (*Rosa woodsii*), reed canarygrass (*Phalaris arundinacea*), Nebraska sedge (*Carex nebrascensis*) and spreading bentgrass (*Agrostis stolonifera*). Table 1 provides a list of plant species identified on Karns Meadow during a 2007 vegetation survey and on the Analysis Area during the January 2010 site visit (IMA 2007).

The wetland scrub-shrub areas likely experience seasonal high ground water and flooding inundation from Flat Creek. The wetland scrub-shrub vegetative cover type has Priority 10 rank according to Teton County LDR Section 3221, Ordinal Ranking System. Priority 10 cover types have the highest wildlife habitat value in Teton County and are the lowest priority for development. A Priority 1 cover type has the lowest habitat value and is the first priority for development.

Medium Narrowleaf Cottonwood Cover Type

Narrowleaf cottonwoods (*Populus angustifolia*) exist along the historic irrigation supply ditches within the Analysis Area. These cottonwoods are generally greater than 20 feet tall and have an understory consisting of wood's rose (*Rosa woodsii*) and immature quaking aspen (*Populus tremuloides*). Despite the degraded condition of the cottonwood trees due to lack of a water supply, they provide cover for wildlife and nesting and perching habitat for avian. The medium narrowleaf cottonwood vegetative cover type has Priority 7 rank according to Teton County LDR Section 3221, Ordinal Ranking System.

Agricultural Meadow Cover Type

Native and introduced herbaceous plants dominate the agricultural meadow cover type within the Analysis Area. These areas were historically flood irrigated and served as a pasture for horses. Common dominant grasses include meadow foxtail (*Alopecurus pratense*), smooth bromegrass (*Bromus inermis*) and orchardgrass (*Dactylis glomerata*). Less common plant species identified in the agricultural meadow cover type include meadow fescue (*Festuca pratensis*), spreading bentgrass (*Agrostis stolonifera*), baltic rush (*Juncus balticus*) and Kentucky bluegrass (*Poa pratensis*). Common forbs include common tansy (*Tanacetum vulgare*), dandelion (*Taraxacum officinale*), western aster (*Aster occidentalis*), and salsify (*Tragopogon dubius*).

Disturbed Grassland Cover Type

The disturbed grassland cover type identified within the Analysis Area was historically flood irrigated agricultural meadows that have been disturbed by human land uses. This cover type consists of a matrix of bare ground, relatively species poor vegetative communities and weedy plant species. Dominant species within this cover type include

meadow fescue (*Festuca pratensis*), dandelion (*Taraxacum officinale*, Canada thistle (*Cirsium arvense*) and gray rabbitbrush (*Chrysothamnus nauseosus*).

Non-native Species Identified

Nonnative species appear to be most abundant in the agricultural meadow and disturbed vegetative cover types. According to a long-time resident in the neighborhood, the meadow once served as pasture for horses and had much more dandelion (*Taraxacum officinale*), an indicator of over-grazing, than currently present. There are also many nonnative forbs present including some state-listed noxious weeds. The most abundant of these is Canada thistle (*Cirsium arvense*), which is also fairly abundant in the wetland scrub-shrub and disturbed grassland cover types.

The other noxious weeds present within the Analysis Area and Karns Meadow including musk thistle (*Carduus nutans*), tansy (*Tanacetum vulgare*), quackgrass (*Elymus repens*), yellow toadflax (*Linaria vulgaris*), spotted knapweed (*Centaura maculosa*), and houndstongue (*Cynoglossum officinale*) are present in low to moderate abundance. Other nonnative invasive species present include reed canarygrass (*Phalaris arundinacea*), bittersweet nightshade (*Solanum dulcmara*) and cheatgrass (*Bromus tectorum*). Reed canarygrass is moderately abundant along Flat Creek throughout the Analysis Area, bittersweet nightshade is sporadic within the wetland scrub-shrub cover type and cheatgrass is found in a couple patches within the disturbed grassland.

TABLE 1. PLANT SPECIES IDENTIFIED ON THE KARNS MEADOW PROPERTY AND ANALYSIS AREA

COMMON NAME ¹	SCIENTIFIC NAME ¹	RIPARIAN SHRUB	MEADOW	DISTURBED AREA
D = dominant; C = common; U = uncommon; T = trace; blank cell = not present				
TREES				
Narrowleaf cottonwood	<i>Populus angustifolia</i>	U		
Chokecherry	<i>Prunus virginianus</i>	U		
SHRUBS				
Thinleaf alder	<i>Alnus incana</i> ssp. <i>tenuifolia</i>	C		
Saskatoon	<i>Amelanchier alnifolia</i>	U		
Grey rabbit-brush	<i>Chrysothamnus nauseosus</i>			U
Red-osier dogwood	<i>Cornus sericea</i>	U		
Black hawthorn	<i>Crataegus douglasii</i>	U		
Black twinberry	<i>Lonicera involucrata</i>	U		
Utah honeysuckle	<i>Lonicera utahensis</i>	U		
Golden currant	<i>Ribes aureum</i>	U		
Black gooseberry	<i>Ribes lacustre</i>	U		
Wood's rose	<i>Rosa woodsii</i>	U		
Booth willow	<i>Salix boothii</i>	D		
Coyote willow	<i>Salix exigua</i>	U		

COMMON NAME ¹	SCIENTIFIC NAME ¹	RIPARIAN SHRUB	MEADOW	DISTURBED AREA
D = dominant; C = common; U = uncommon; T = trace; blank cell = not present				
Geyer willow	<i>Salix geyeriana</i>	D		
Whiplash willow	<i>Salix lucida var. lasiandra</i>	C		
Sitka willow	<i>Salix sitchensis</i>	C		
Spineless horsebrush	<i>Tetradymia canescens</i>		U	
FORBS				
Common yarrow	<i>Achillea millefolium</i>		U	
Western aster	<i>Aster occidentalis</i>		C	U
Musk thistle	<i>Carduus nutans</i>		U	
Canada thistle	<i>Cirsium arvense</i>	U	C	U
Bull thistle	<i>Cirsium vulgare</i>	U	U	
Houndstongue	<i>Cynoglossum officinale</i>		U	
Large-leaved avens	<i>Geum macrophyllum</i>	U		
Yellow toadflax	<i>Linaria vulgaris</i>		U	
Birdsfoot-trefoil	<i>Lotus corniculatus</i>		T	
Field mint	<i>Mentha arvense</i>	U		
Common forget-me-not	<i>Myosotis scorpioides</i>	C		
Common plantain	<i>Plantago major</i>		U	T
Graceful cinquefoil	<i>Potentilla gracilis</i>	T	U	
Curly dock	<i>Rumex crispus</i>	U	U	
Water ragwort	<i>Senecio hydrophilus</i>	U		
False Solomon's seal	<i>Smilacina stellata</i>	C		
Bittersweet nightshade	<i>Solanum dulcmara</i>	U		
Canada goldenrod	<i>Solidago canadensis</i>	C		
Lady's tresses	<i>Spiranthes romanzoffiana</i>	T		
Common tansy	<i>Tanacetum vulgare</i>	T	C	
Dandelion	<i>Taraxacum officinale</i>	C	C	C
Field pennycress	<i>Thlaspi arvense</i>		U	
Salsify	<i>Tragopogon dubius</i>		C	
White clover	<i>Trifolium repens</i>		U	
GRASSES, GRAMINOID & HORSETAILS				
Spreading bentgrass	<i>Agrostis stolonifera</i>	C	U	
Meadow foxtail	<i>Alopecurus pratensis</i>	U	U	
Smooth brome	<i>Bromus inermis ssp.</i>		U	U
Cheatgrass	<i>Bromus tectorum</i>			U
Water sedge	<i>Carex aquatilis</i>	U		
Nebraska sedge	<i>Carex nebrascensis</i>	C	U	
Field sedge	<i>Carex praegracilis</i>	U		

COMMON NAME ¹	SCIENTIFIC NAME ¹	RIPARIAN SHRUB	MEADOW	DISTURBED AREA
D = dominant; C = common; U = uncommon; T = trace; blank cell = not present				
Beaked sedge	<i>Carex utriculata</i>	U		
Tufted hairgrass	<i>Deschampsia cespitosa</i>		U	
Quackgrass	<i>Elymus repens</i>		U	U
Smooth scouring-rush	<i>Equisetum laevigatum</i>	U		
Meadow fescue	<i>Festuca pratensis</i>		C	C
Mannagrass	<i>Glyceria sp.</i>	U		
Meadow barley	<i>Hordeum brachyantherum</i>		T	
Baltic rush	<i>Juncus balticus</i>	U	C	
Western wheatgrass	<i>Pascopyrum smithii</i>		U	
Reed canarygrass	<i>Phalaris arundinacea</i>	C	U	
Timothy	<i>Phleum pratense</i>		U	U
Bulbous bluegrass	<i>Poa bulbosa</i>			U
Kentucky bluegrass	<i>Poa pratensis</i>	U	D	U

¹ Common names and scientific names are primarily from *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1973) and from the USDA Natural Resources Conservation Service PLANTS Database <http://plants.usda.gov/index.html>

VEGETATIVE COVER TYPE RANKING

The dominant vegetative cover types found on the Analysis Area are wetland scrub-shrub, medium narrowleaf cottonwood, agricultural meadow and disturbed grassland. Each vegetative cover type provides habitat for a variety of wildlife species. A priority ranking of each of these habitat types is listed below according to the “Ordinal Ranking System” (Teton County 1994, 2006). An ordinal ranking number is given for each vegetative cover type, 10 being the highest, most important, and 1 being the lowest, or least important and most appropriate location for development.

TABLE 2. VEGETATIVE COVER TYPE ORDINAL RANKING

VEGETATIVE COVER TYPE	ACRES	ORDINAL RANKING/PRIORITY FOR DEVELOPMENT
Wetland Scrub-Shrub	2.20	10
Medium Narrowleaf cottonwood	0.81	7
Agricultural Meadow	8.37	2
Disturbed Grassland	9.25	1
TOTAL	20.63	

PROTECTED RESOURCES-WATERBODIES, TEN YEAR FLOODPLAINS & WETLANDS

Protected resources found on the Analysis Area include Flat Creek, FEMA FIRM A/AE/AO flood zones and delineated wetlands (Figure 4).

Flat Creek meanders through the Analysis Area for an approximate stream length of 2,500 feet or just short of $\frac{1}{2}$ mile. The streambed consists of mostly cobble with smaller gravels and silt in the slower moving and backwater areas. The record maximum flow was 295 cubic feet per second (cfs) on July 6, 2011, and the minimum recorded flow was 14 cfs on September 22, 2001. The average flow in June is 140 cfs and the minimum flows in September average 57 cfs (US Geological Service, 2011).

Flat Creek tends to form anchor ice (ice buildup on the bed of the creek) that causes winter over bank flooding. The Analysis Area is also subject to occasional flooding during spring snowmelt runoff at the headwaters of the creek within the Gros Ventre Mountain Range. Water diverted from the Gros Ventre River into South Park Ditch and Flat Creek affects the flood stage from May to September. The FEMA FIRM A/AE/AO flood zones that relate to the 10-Year Floodplain are shown on Figure 4 and extend minimally onto the road easement and Tract 5.

A wetland delineation of the Analysis Area was based of vegetative cover types, plant species and proximity/relative elevation to Flat Creek. A wetland delineation according to the 1987 Army Corps of Engineers Wetland Delineation Manual was conducted on an area within 100 feet of the road easement in the Analysis Area (Appendix C). At the time of this report preparation, the wetland delineation had not been verified by the Army Corps. A wetland delineation of the Karns Meadow property east of Flat Creek was conducted and verified by the Army Corps of Engineers (IMA 2007). Both wetland delineations were used as a reference for the wetland mapping conducted on the Analysis Area. Mapped wetlands do not exist on the Facility Property or Tract 5; only a narrow strip exists along Flat Creek and within the road easement.

WILDLIFE HABITAT PROTECTED BY THE NRO

Teton County, Wyoming is known worldwide for its wildlife resources. In 1998, the area was home to approximately 15,000 elk, 3,100 moose, 350 antelope and a portion of the 26,000 mule deer of the Sublette County herd (Brimeyer per comm. 1998). There are 293 species of birds, 68 mammal species, 5 species of amphibians and 3 species of reptiles represented in the Jackson Hole area (Raynes 1984, Wile 1996). It is home to rare species like bison, bald eagles, peregrine falcons, trumpeter swans, great gray owls and great horned owls.

The Town of Jackson EA process protects 10 habitat types associated with 6 wildlife species in the valley. These highest value habitat types are protected from development, however disturbance may be permitted if it is unavoidable and appropriate mitigation plans are submitted that demonstrate enhancement of 2 acres of habitat for every 1 acre

of disturbance. The wildlife resources protected by the EA process, their presence or lack of presence on the Analysis Area and those identified by Wyoming Game and Fish Department (WGFD) and local scientific research are described below and shown in Figure 5 (WGFD 2004).

Elk Migration Routes

Elk migration routes are used by elk to migrate from summer to winter ranges. The native elk winter range has been significantly impacted by development in the southern end of Jackson Hole. The WGFD and the National Elk Refuge together have 23 feed grounds in the southern end of Teton County (National Elk Refuge pers. comm. 1998). Each year, elk migrate from their summer winter range in the surrounding mountains to these feed areas and other natural ranges. Their migration routes center around the water ways in Jackson Hole which provide cover and food during migration (Teton County 1994).

Elk migration routes currently do not exist on the Analysis Area or on the Property. However, the Analysis Area separates spring, summer, and fall habitat for elk to the north on East Gros Ventre Butte (EGVB) and Winter/Yearlong habitat to the south. No elk roadkills were recorded along Highway 89 near the Analysis Area by multiple organizations from 1990 and 2001 (BCRI 2003). Elk observations on the south slopes of EGVB are uncommon. However, if the elk feeding regimes on the National Elk Refuge were to change, if wolves displace elk, or when fire burns Snow King Mountain as it did in the 1930's, causing the aspen forest to rejuvenate, the Analysis Area is a likely route that elk would use to move between those important habitat areas.

Crucial Elk Winter Range

Crucial elk winter range consists primarily of xeric and mesic sagebrush grasslands, mixed shrub, mesic and xeric open grassland and agricultural meadows that are used by elk 8 out of every 10 years (Jackson 1994). *The Analysis Area is not designated crucial elk winter range by WGFD and elk are not known to use this area or the Property.* However, the wetland scrub-shrub vegetative cover types on the Analysis Area and Karns Meadow do provide suitable food and cover habitat for wintering elk. The Property does not provide suitable food or cover for wintering elk.

Mule Deer Migration Routes

Mule deer migration routes are used by mule deer to migrate from summer to winter ranges and between non-crucial and crucial winter ranges. Mule deer move between their ranges via watercourses that provide cover and forage during movement (Teton County 1994). *While the Analysis Area and Property is not designated a migration route by WGFD, the Analysis Area has been identified and documented as an important mule deer movement route and provides high value food and cover habitat for deer.* The areas of shrub and tree cover on the Analysis Area provide higher value movement routes than the disturbed grassland and agricultural meadow areas. The Analysis Area is currently a refuge for mule deer due to minimal night lighting, nighttime human activity or significant numbers of dogs.

WGFD designated crucial mule deer winter range is located just north of the property on EGVB and crucial mule deer winter/yearlong range exists south of the property on west Snow King Mountain and the west facing mountain slopes east of the South Park area (Figure 6, WGFD 2003). The wetland scrub-shrub vegetative cover type, particularly the willow component and open space associated with Karns Meadow, the Analysis Area and Property provide a secure movement corridor for mule deer to move between EGVB and Snow King Mountain. Mule deer tracks were documented on the Property and Analysis Area during the January 13, 2010 site visit. Local wildlife studies have also documented mule deer use of and movement through the Analysis Area and Karns Meadow (BRCI 1991). Figure 8 provides a general model of mule deer and other wildlife movement suitability from EGVB and Snow King Mountain through the Property and Karns Meadow.

The Northern Rockies Conservation Cooperative (NRCC) summarized mule deer ecology in Jackson Hole in their 2009 report *Mule deer and Development- Making Science Relevant to Planning -Integrating Science into Policy: A case study of Mule Deer in Jackson Hole* (NRCC 2009). The NRCC report summarized a study initiated by Biota Research and Consulting (BRCI) in 1979. The study documented winter mule deer use of the Gros Ventre Buttes and evaluated movement of mule deer within the vicinity of these buttes. The BRCI study documented deer movement between EGVB and Snow King Mountain, just east of the Virginian Lodge (Karns Meadow and the Analysis Area).

In 1994, the Jackson Hole Wildlife Foundation (JHWF) initiated a study to evaluate road killed wildlife and mitigation efforts to minimize road kill hot spots. A report of JHWF's efforts was prepared by BRCI (BRCI 2003). This summary report provides additional documentation of mule deer movement to and from Karns Meadow and the Analysis Area. Through the use of volunteers and data from governmental organizations, road killed mule deer were documented between 1991 and 2001, 162 mule deer vehicle collisions were documented in the 0.9 mile section of Highway 89/Broadway Powderhorn Lane and Flat Creek Drive (milepost 153.3-154) in the Town of Jackson, just north of the Analysis Area and Karns Meadow. Of the 22 wildlife-vehicle collision hotspots identified by the study, the Highway 89/Broadway section north of the Analysis Area was the shortest in length, but had the highest number of road killed mule deer. These data indicate both significant mule deer movement from EGVB and the Analysis Area and one of the most difficult sections of road for mule deer to cross. The suitability model is for visual interpretation only and is not supported by actual scientific data.

Crucial Mule Deer Winter Range

Crucial mule deer winter range consists of xeric and mesic sagebrush-grasslands, mixed shrubs and shrub scrub-grasslands located at lower elevation and on south facing slopes that are used by mule deer 8 out of every 10 years (Jackson 1994). *The Analysis Area does not have mule deer crucial winter range.* However, mule deer are known to use the dense shrub areas in Karns Meadow for cover and forage during winter months.

Crucial Moose Winter Habitat

Crucial moose winter habitat consists primarily of riparian and palustrine shrub-willow and cottonwood forests, highly mesic cottonwood/spruce forests, upland forest-subalpine fir habitat types, and secondarily xeric and mesic sagebrush-grasslands and mixed shrub types that are used by moose during the crucial winter months 8 out of every 10 years (Jackson 1994). *The Analysis Area is not designated as crucial moose winter habitat by WGFD, however the property does contain one of the most important winter habitats for moose, scrub-shrub wetlands dominated by dense willow.* Moose travel along the Flat Creek Corridor at the base of Snow King Mountain up through Karns Meadow and the Analysis Area.

Trumpeter Swan Nesting Habitat

Trumpeter swan nesting habitat is found on wetland and aquatic sites that have adequate open water, forage and protection from predators. These locations typically are islands located in ponds and wetlands in the Snake River. *The Analysis Area does not have trumpeter swan nesting habitat.*

Trumpeter Swan Winter Habitat

Trumpeter swan winter habitat consists of aquatic sites with abundant vegetation that stay open throughout the winter months. Trumpeter swan habitat is not available in most winters on Flat Creek due to a lack of open water (Patla *pers. comm.* 2003). *The Analysis Area does not have trumpeter swan winter habitat.*

Snake River Cutthroat Trout Spawning Habitat

Snake River cutthroat trout spawning habitat is found in riffles along the Snake River and its tributaries. Inland cutthroat trout species are native to western rivers and streams and have been recognized as a significant species in Teton County (Jackson 1994). *Flat Creek flowing through the Analysis Area contains cutthroat trout spawning habitat.* Recent efforts by the Town of Jackson, Teton Conservation District, Jackson Hole Trout Unlimited and Jackson Hole One Fly Organizations to enhance Flat Creek have improved the natural sorting and abundance of gravels that support cutthroat trout spawning.

Bald Eagle Nesting Habitat

Bald eagle nesting habitat is found along the riparian corridors of the Snake River and its larger tributaries. Prime habitat consists of multi-aged stands of riparian forest near watercourses or water bodies, which provide foraging opportunities (Jackson 1994). *The Analysis Area does not have bald eagle nesting habitat.*

Bald Eagle Crucial Winter Habitat

Bald eagle crucial winter habitat is found in riparian areas near ungulate winter range and in bald eagle nesting areas. The bald eagle winter diet is comprised primarily of carrion from dead carcasses. The remainder of their diet is comprised of fish and waterfowl (Jackson 1994). *The Analysis Area may provide crucial winter habitat for bald eagle, but it is unlikely they would use this property due to its proximity to human activities.* Eagles may feed on wild ungulate carrion on the Analysis Area and supplement their winter food supply with fish from Flat Creek.

Protected Habitats Within ½ Mile Vicinity

Within a 1/2 mile of the Property is designated crucial mule deer winter range on EGVB and crucial mule deer winter/yearlong range on Snow King Mountain (Figure 6). The Flat Creek Corridor at the base of Snow King Mountain and on Karns Meadow provides crucial moose winter habitat and cutthroat trout spawning habitat. A mule deer movement route connects EGVB with Snow King Mountain. The wetland scrub-shrub vegetative cover type and Flat Creek on Karns Meadow and the Analysis Area are the foundation of this movement route. The movement route is not necessarily a linear route as shown in Figure 6, but is likely the entire Karns Meadow and Analysis Area corridor, possibly extending into the adjacent developed areas.

HABITAT SUMMARY

The Analysis Area and adjacent areas provide important habitat for a variety of wildlife activity. Table 3 provides a summary of the wildlife habitats protected by the NRO on the Analysis Area and within ½ mile vicinity.

TABLE 3. WILDLIFE HABITATS PROTECTED BY THE NRO

HABITAT TYPE	PRESENCE ON PROPERTY OR ½ MILE VICINITY
Elk Migration Corridors	POTENTIAL
Crucial Elk Winter Range	NO
Mule Deer Migration Corridors	YES (Movement)
Crucial Mule Deer Winter Range	NO
Crucial Moose Winter Habitat	YES
Trumpeter Swan Nesting Habitat	NO
Crucial Trumpeter Swan Winter Habitat	NO
Snake River Cutthroat Trout Spawning Habitat	YES
Bald Eagle Nesting Habitat	NO
Crucial Bald Eagle Winter Habitat	POTENTIAL

SETBACKS AND BUFFERS

Setbacks and buffers exist to protect the most important natural resources found on the Property. Sections 3220 and 3270 of the Jackson LDRs define these setbacks and buffers. Protected habitats and resources on the Analysis Area include wetlands, Flat Creek, cutthroat trout spawning habitat and the 10-year floodplain. Figure 7 shows a 30' wetland, 50' Flat Creek and 150' cutthroat trout spawning habitat setbacks and the 10-year floodplain.

These setbacks should be maintained at all times, however due to access issues and the density of protected habitat types, the traversing of these setbacks may be necessary to facilitate access to development areas on the property. The 150' cutthroat trout setback

shall be observed unless the developer can demonstrate that the development will cause no water runoff to Flat Creek and have no detrimental effect on water quality of Flat Creek and cause no disturbance which would have detrimental impact on spawning, incubation, hatching or rearing of cutthroat trout.

ENDANGERED PLANT AND VERTEBRATE SPECIES

There are 11 species classified as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS), which are also listed in the Wyoming Natural Diversity Database (WYNDD) and known to occur in the State of Wyoming. One would not expect to find any other threatened or endangered vertebrate species utilizing the Analysis Area or Property. One would not expect to find any other threatened or endangered plant species on the Analysis Area or Property.

Vertebrates

<u>Status</u>	<u>Common Name</u>	<u>Latin Name</u>
Endangered	Kendall warm springs dace	<i>Rhinichthys osculus thermalis</i>
Endangered	Black-footed ferret	<i>Mustela nigripes</i>
Endangered	Razorback sucker	<i>Xyrauchen texanus</i>
Endangered	Wyoming toad	<i>Bufo hemiophrys baxteri</i>
Threatened	Grizzly bear	<i>Ursus horribilis</i>
Threatened	Canada lynx	<i>Lynx canadensis</i>

Plants

<u>Status</u>	<u>Common Name</u>	<u>Latin Name</u>
Endangered	Blowout penstemon	<i>Penstemon haydenii</i>
Threatened	Colorado butterfly plant	<i>Gaura neomexicana c.</i>
Threatened	Ute ladie's tresses	<i>Spiranthes diluvialis</i>
Threatened	Desert yellowhead	<i>Yermo xanthocephalus</i>

DEVELOPMENT IMPACT ASSESSMENT

PROPOSED DEVELOPMENT

The Town of Jackson and Teton County are proposing to develop a 7.4 acre development area to provide for a bus storage, maintenance and transit facility (Figure 9). The preferred development plan is to partially develop the road right of way and entire lot a plant vegetative screening to minimize impacts to wildlife and offsite habitat mitigation to compensate protected resource losses due to development impacts.

IMPACT ASSESSMENT

Protected habitats and resources impacted by the proposed development include 519 ft² of wetlands and 6,712 ft² of cottonwood forest (Figure 9). Encroachments into the creek, cutthroat trout spawning and wetland setbacks and 10-year floodplain will occur as a result of the road and path, an “essential road crossing.” Encroachment into the cutthroat trout spawning setback will occur by the Transit Parking Area, but this impact will be mitigated through the use of onsite stormwater treatment, detention and infiltration. The

Facility development area will likely be rendered unusable by protected species. Indirect impacts also include increased traffic in the road easement with the potential for vehicle-wildlife collisions.

Direct negative impacts to wildlife use patterns on the property and within the vicinity include displacement of wildlife due to human activities and lighting. While the area surrounding Karns Meadow is densely developed and human activities already exist, the proposed Transit and Maintenance Facility will be situated directly adjacent to and at the same topographic plain as Karns Meadow and Flat Creek. While the Property does not contain significant wildlife movement passages or high quality habitat, the proposed buildings, paved parking areas, human activity and lighting associated with the development and operation of the facility and transit center will likely displace mule deer, moose and other wildlife species that currently use the property to adjacent lands including the high quality habitat of the Karns Meadow/Flat Creek corridor.

The entire development area has the potential to negatively impact water quality in Flat Creek, its associated wetlands and cutthroat trout spawning habitat. Runoff from impervious surfaces in the Town of Jackson contain elevated levels of pollutants such as sediment, hydrocarbons and heavy metals (IMA 2005). Runoff from the proposed development will likely contain similar pollutants and if allowed to flow directly to Flat Creek, may contribute to water quality concerns.

PROJECT VICINITY IMPACT ASSESSMENT

Indirect negative impacts to protected wildlife habitat and water resources within a ½ mile vicinity of the proposed development will be minimal for the following reasons:

1. The proposed development is situated on highly disturbed properties adjacent to other densely developed properties within the Town of Jackson limits,
2. The location of the proposed development, south of Karns Meadow and clustered with other development, minimizes impacts to mule deer and other wildlife movement patterns between EGVB, Karns Meadow and Snow King Mountain, and
3. Surface water runoff from impervious surfaces resulting from the proposed development will likely be detained in constructed facilities and the quality improved prior to being discharged to Flat Creek, limiting the direct negative impacts to Flat Creek in the vicinity.

DEVELOPMENT RECOMMENDATIONS

In order to minimize impacts to protected wildlife habitat and water resources in the development area and within the vicinity, the following recommendations should be followed:

1. Impacts to protected habitats should be mitigated at two acres of mitigation/habitat enhancement for every one acre of land impact.

2. Activities associated with the operation of the proposed facility and transit parking area should be screened by dense vegetative cover on the east property boundary to minimize disturbances to wildlife that use Karns Meadow.
3. Artificial lighting on the developed areas and associated road easement should take into consideration wildlife movement patterns in Karns Meadow, a relatively dark area that provides security and cover for wildlife.
4. All watercourse and wetland crossings should minimize the placement of fill and span these protected resources or use pilings to the greatest extent possible.
5. Native plant species should be used in landscaping of open areas however, non-palatable species should be used adjacent to human structures to deter wildlife from these areas and reduce negative human and wildlife interactions.
6. All historic barbed wire should be removed from the property to prevent future wildlife injuries. Wildlife access should be maintained along the historic buck and rail fences with periodic downed rails. All future fences should be wildlife “friendly” and comply with Teton County and/or Wyoming Game and Fish Department wildlife friendly fencing standards.
7. Trash should be kept inside of buildings and in bear proof containers. The use of bird feeders should be avoided.
8. All human and pet contact with wildlife should be kept to a minimum. Many large mammals that are easily scared in the presence of humans and their pets utilize the Karns Meadow area. Dogs should be kept under control around wildlife particularly during winter months. Over-exertion of large mammals in the winter can be fatal and should be prevented.
9. Wildlife-vehicle collision mitigation measures should be considered along the proposed road associated with the development. This may include speed limit restrictions and maintaining open view to each side of the road.

MITIGATION

In accordance with Section 3270.H of the Town of Jackson LDRs, “Where densities/intensities permitted by Table 2400, Schedule of Dimensional Limitations, cannot be achieved by locating development outside of the NRO, then lands protected by Section 3250, Establishment of Natural Resources Overlay (NRO) District, may be impacted pursuant to the standards of this Subsection.” The standards of the Subsection include:

1. The location of the proposed development minimizes wildlife impact to the maximum extent possible and
2. The developer provides mitigation and habitat enhancement for the land impacted.

The developer is proposing off-site mitigation and on-site vegetative screening to minimize impacts and provide compensation for lost habitat. Mitigation measures include habitat enhancements at a 2:1 acre ratio and vegetative screening of the facility and transit parking area.

MITIGATION DESCRIPTION

Mitigation includes habitat enhancements for direct negative impacts to protected habitats and vegetative screening for indirect impacts caused by buildings, lighting and human activity.

The following list and Figure 10 summarize the mitigation:

- 7,231 ft² of protected habitat impacted
- 14,462 ft² of off-site dense wetland shrub and cottonwood enhancements (2 acres of mitigation for 1 acre of impacts ratio)
- 21,973 ft² of on-site vegetative screening

The on-site vegetative screening minimizes impacts from human activity and lighting on the property, provides meaningful mitigation of direct habitat losses on a conservation easement property (Karns Meadow) and allows near full development density of the property. The off-site habitat enhancements will provide additional cover and forage for mule deer, moose and other wildlife in the core of Karns Meadow, relatively secluded from the proposed development and existing development in the vicinity (Figure 10). The off-site habitat enhancements will likely require approval by the Town of Jackson and the Jackson Hole Land Trust.

MITIGATION PLAN

The following is a description of the methods to be used for the 14,462 ft² mitigation site shown in Figure 10.

Wetland Hydrology

The proposed habitat enhancement site is located adjacent to Flat Creek in a low depression. Sufficient wetland and riparian hydrology should be available to plant roots at the planting level below existing grade. The site should be evaluated prior to implementing the habitat enhancement to determine suitable hydrology and grading adjustments made as necessary to capture natural groundwater hydrology at the site.

Plant Species

Native trees and shrubs proposed for the habitat enhancement include narrowleaf cottonwood (*Populus angustifolia*), Booth willow (*Salix boothii*), Geyers willow (*Salix geyerana*), thinleaf alder (*Alnus incana* spp. *tenuifolia*) and Douglas hawthorn (*Crataegus douglasii*).

Plant Material & Spacing

Narrowleaf cottonwood – 30' on-center spacing, 36 trees, 15 gallon size pots

Shrubs - 10' on center spacing, 144 shrubs, 5 gallon size pots

Exclosure Fence

An exclosure fence a minimum 8' tall shall be erected around the perimeter of the habitat enhancement area to prevent wildlife herbivory for at a minimum 3 growing seasons.

Weed Control

Noxious and invasive weeds shall be controlled through mechanical and chemical herbicide methods for a minimum of 3 years following the plant material installation.

References

BRCI – Biota Research and Consulting, Inc. 2003. Final Report, Jackson Hole Roadway and Wildlife Crossing Study, Teton County, Wyoming. Jackson Hole Wildlife Foundation, Jackson, Wyoming.

BRCI, 1991. Teton County Final Wildlife Habitat Assessment – Final Report. Biota Research and Consulting. Teton County, Wyoming.

Clark, Tim W. and Mark R. Stromberg. 1987. Mammals of Wyoming. University of Kansas, Museum of Natural History.

Clark, Tim W. 1981. Ecology of Jackson Hole, Wyoming: A Primer. Paragon Press, Salt Lake City.

Dorn, Robert D. 1992. Vascular Plants of Wyoming,

Ehrlich, P.R, D.S. Dobkin, and D. Wheye. 1988. The Birder's Handbook. Simon and Schuster, New York.

IMA – Intermountain Aquatics, Inc. 2005. Flat Creek Watershed Management Plan. Jackson, Wyoming.

JHLT – Jackson Hole Land Trust, 2003. Natural Resources Inventory for the Karns Meadow Property. Jackson, Wyoming.

NRCC – Northern Rockies Conservation Cooperative 2009. Mule deer and Development Making Science Relevant to Planning -Integrating Science into Policy: A case study of Mule Deer in Jackson Hole. Jackson, Wyoming.

Olson, R. 1992. Mule Deer Habitat Requirements & Management in Wyoming. University of Wyoming, Department of Renewable Resources

Raynes, B. 1984. Birds of Grand Teton National Park and the Surrounding Area. Grand Teton natural History Association. Jackson, Wyoming.

Shaw, R.J. 1976. Field Guide to the Vascular Plants of Grand Teton National Park and Teton County, Wyoming. Utah State University Press. Logan, Utah.

Teton County, Wyoming – Land Development Regulations, 2006.

Teton County Comprehensive Plan with updated amendments 1998.

Teton County, Wyoming – Geographic Information System Database (GIS), 2007.

Town of Jackson, Wyoming – Land Development Regulations, 1994 and rev.

USDA – Soil Conservation Service. 1969. Teton Area Idaho-Wyoming.

WGFD – Wyoming Game and Fish Department, 2009. They Wyoming Mule Deer Initiative. Cheyenne, Wyoming.

WGFD - Wyoming Game and Fish Department. 2006. Geographic Information System Wildlife Range Map Layers and Definitions.

Weinstein, J. Wyoming Department of Transportation, Environmental Coordinator. February 2, 2009 personal communication.

Wile, Darwin 1996. Identifying and Finding the Mammals of Jackson Hole. Jackson, Wyoming.

APPENDIX A - FIGURES

FIGURE 1. LOCATION

FIGURE 2. ANALYSIS AREA & HUMANMADE CONDITIONS

FIGURE 3. VEGETATIVE COVER TYPES

FIGURE 4. PROTECTED RESOURCES: WATERBODIES, FLOODPLAINS AND WETLANDS

FIGURE 5. HABITATS PROTECTED BY THE NRO

FIGURE 6. PROTECTED HABITATS WITHIN 1/2 MILE VICINITY

FIGURE 7. SETBACKS AND BUFFERS

FIGURE 8. GENERAL MULE DEER MOVEMENT SUITABILITY

FIGURE 9. DEVELOPMENT IMPACTS

FIGURE 10. MITIGATION

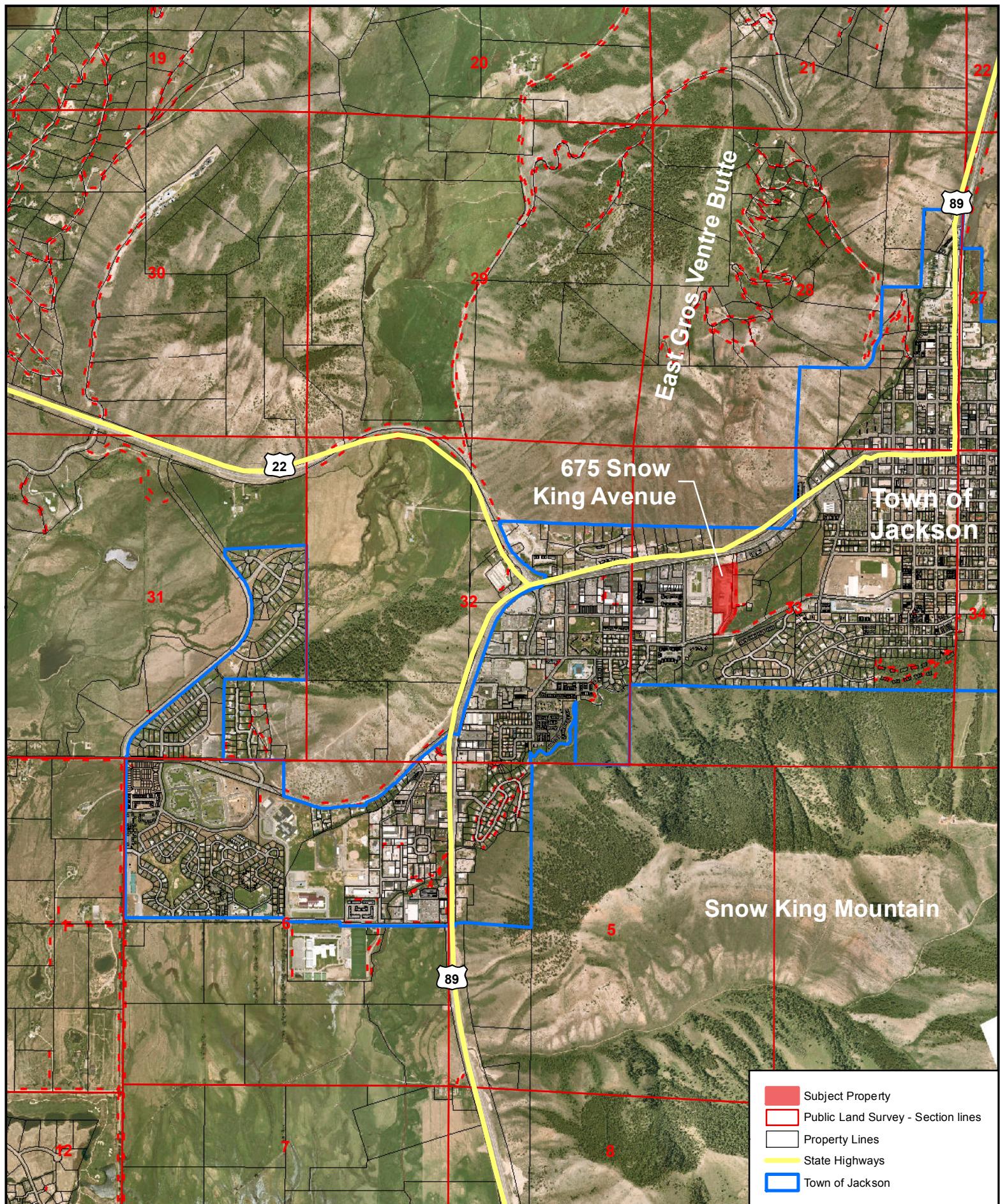


FIGURE 1:
Location

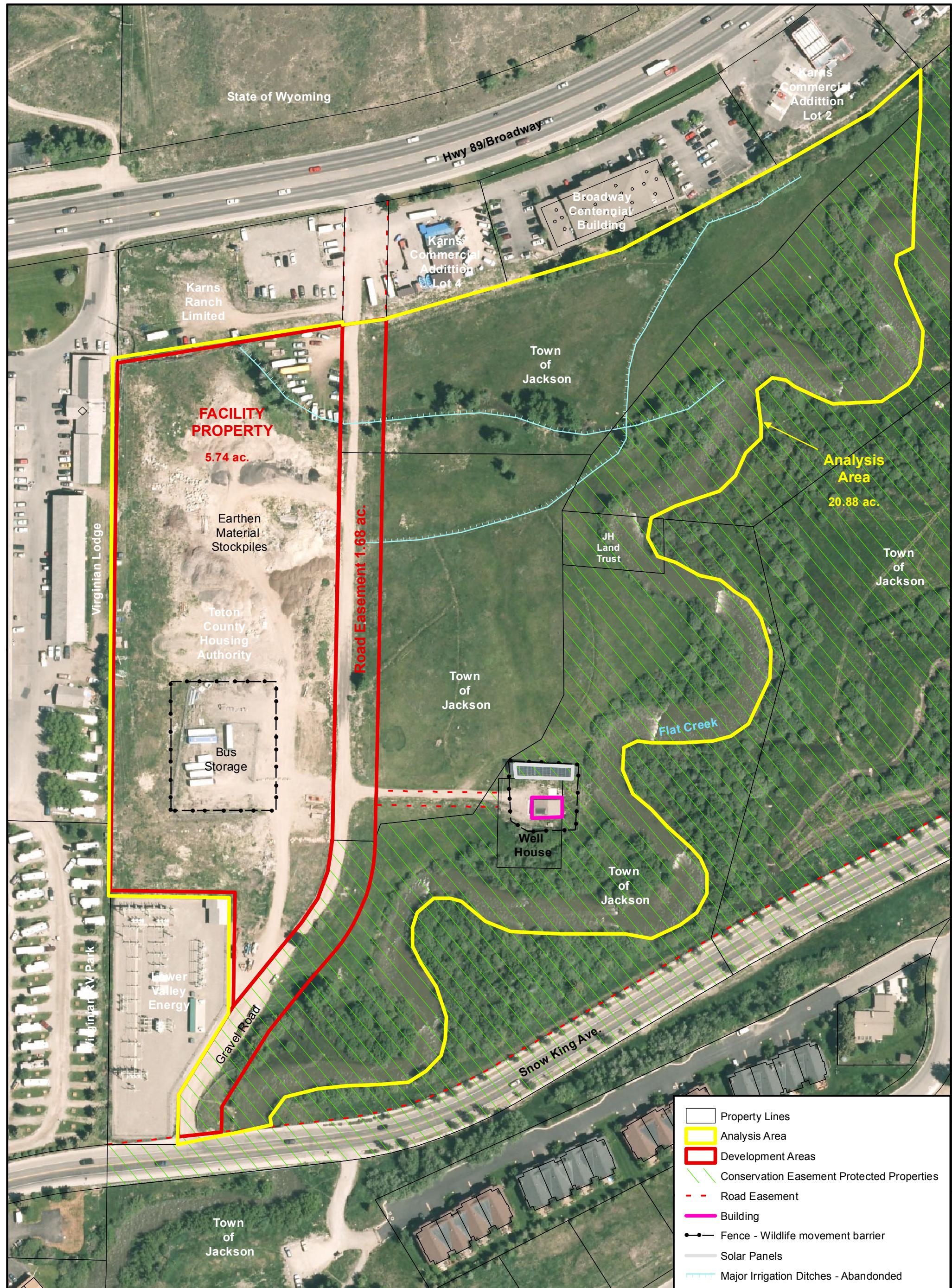
December 21, 2012

Environmental Analysis

Teton County/Town of Jackson
Transit and Maintenance Facility

ALDER ENVIRONMENTAL, LLC

Land • Water • Wetlands Consulting
P.O. Box 6519, Jackson, Wyoming 83002
(307) 690-3625 www.alderenvironmental.com



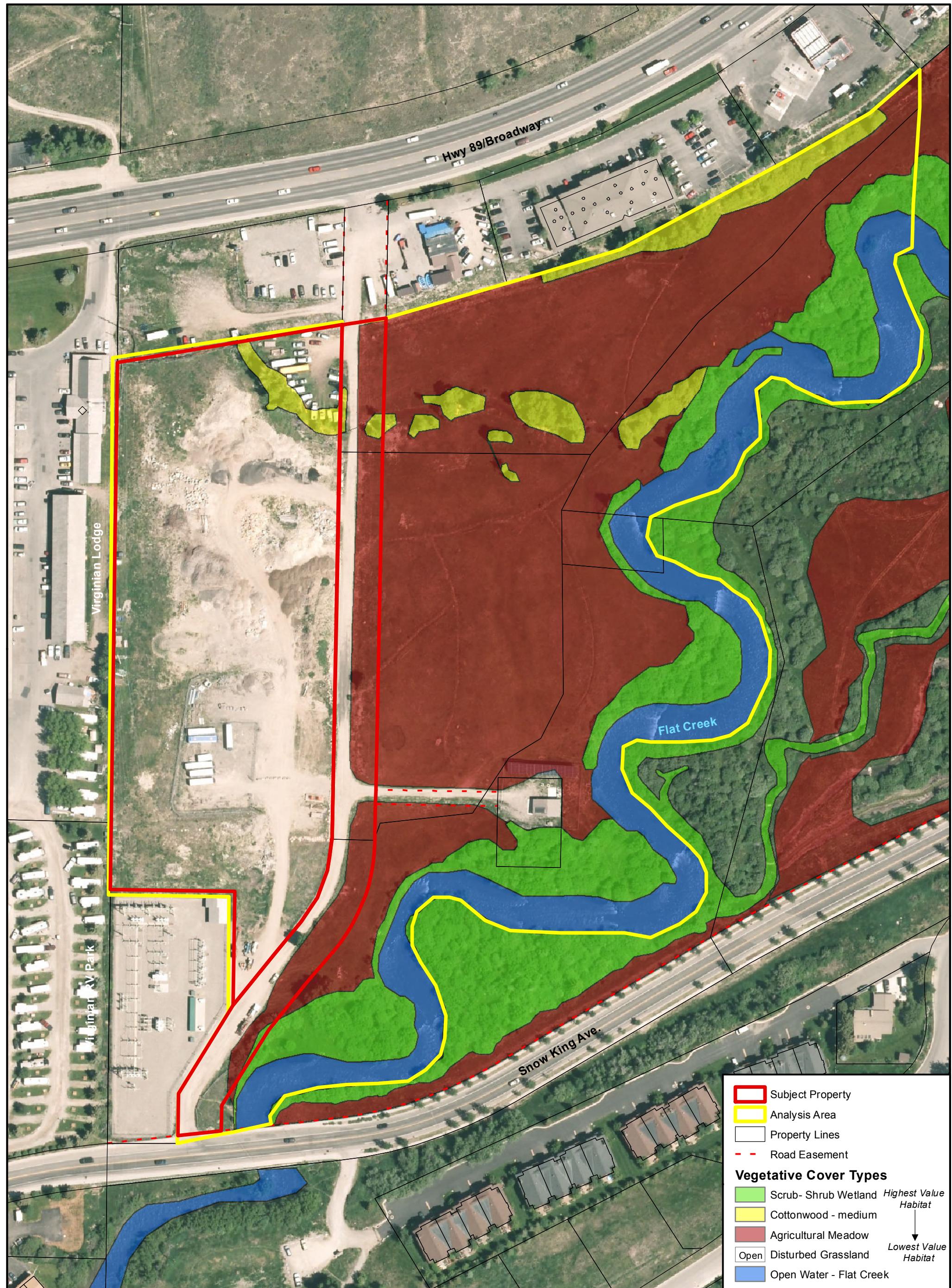


FIGURE 3:

Vegetative Cover Types

December 21, 2012

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Teton County/Town of Jackson
Transit and Maintenance Facility

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1 inch = 125 feet
0 125 250





FIGURE 4:

Waterbodies, 10-year Floodplains & Wetlands

December 21, 2012

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1 inch = 125 feet

0 125 250



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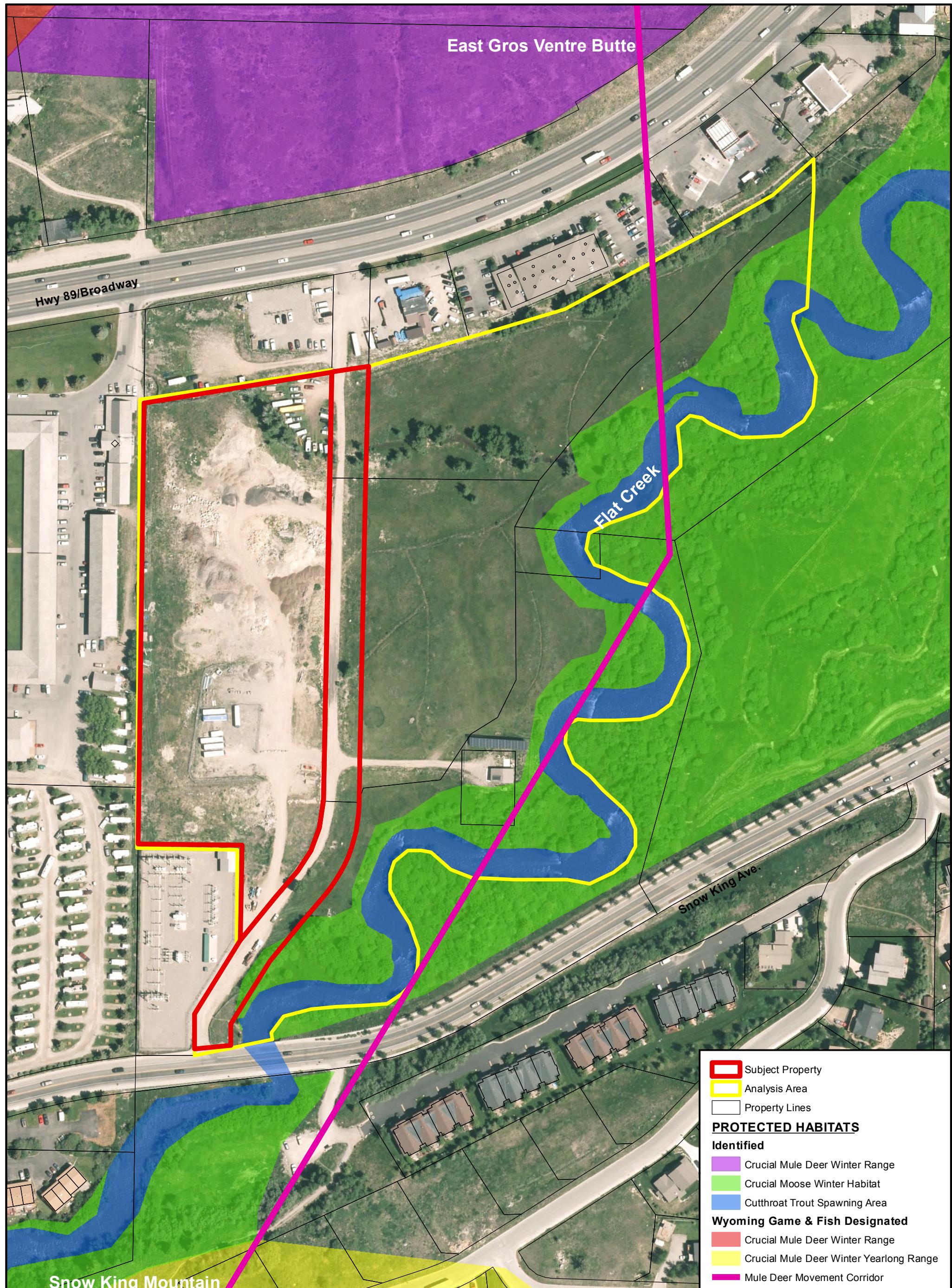


FIGURE 5:

Habitats Protected by the NRO District

December 21, 2012

Environmental Analysis

Teton County/Town of Jackson
Transit and Maintenance Facility

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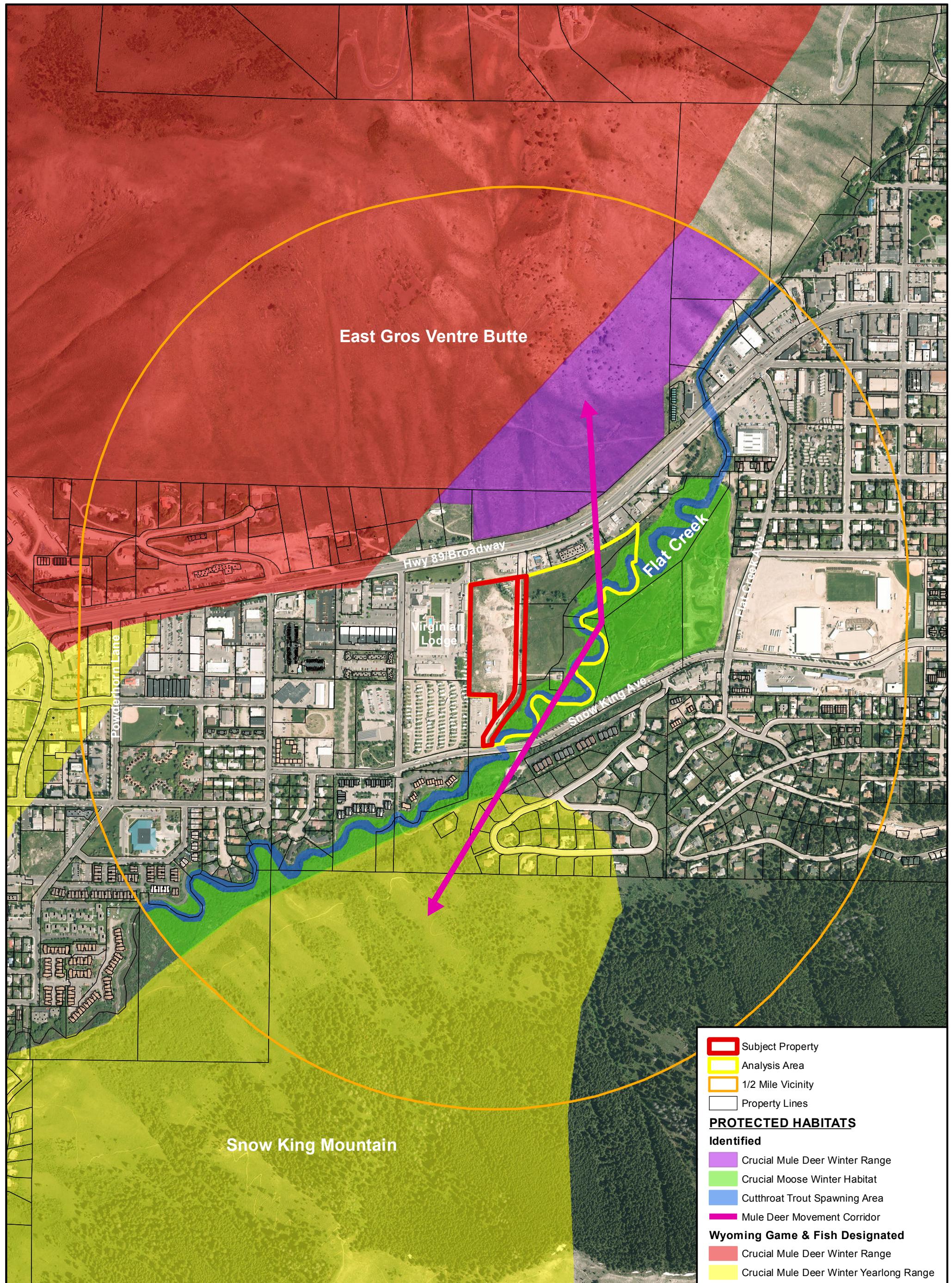


FIGURE 6:

1/2 Mile Vicinity

December 21, 2012

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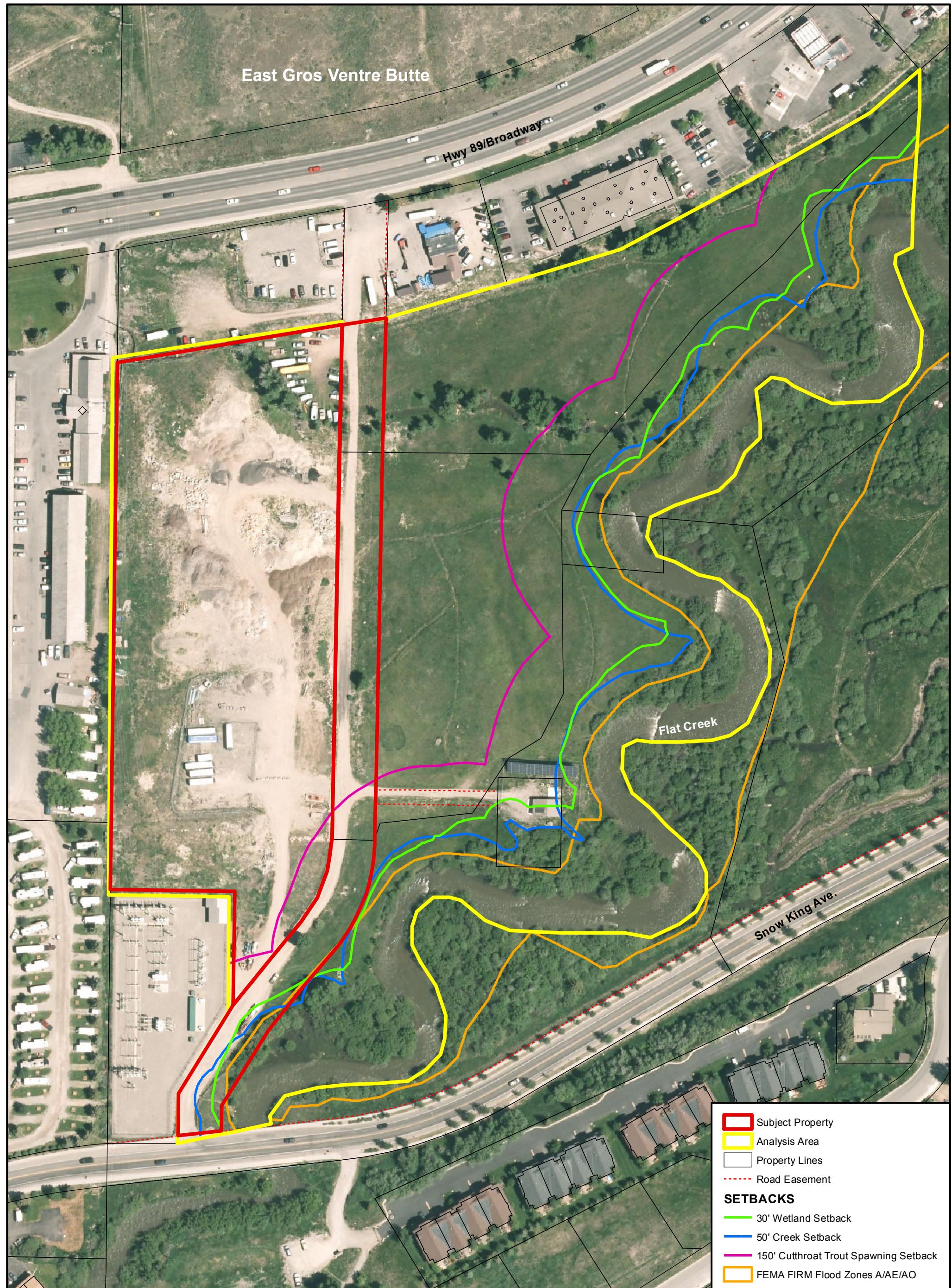


FIGURE 7:

**Protected Resource
Setbacks/Buffers**

December 21, 2012

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1 inch = 125 feet

0 125 250



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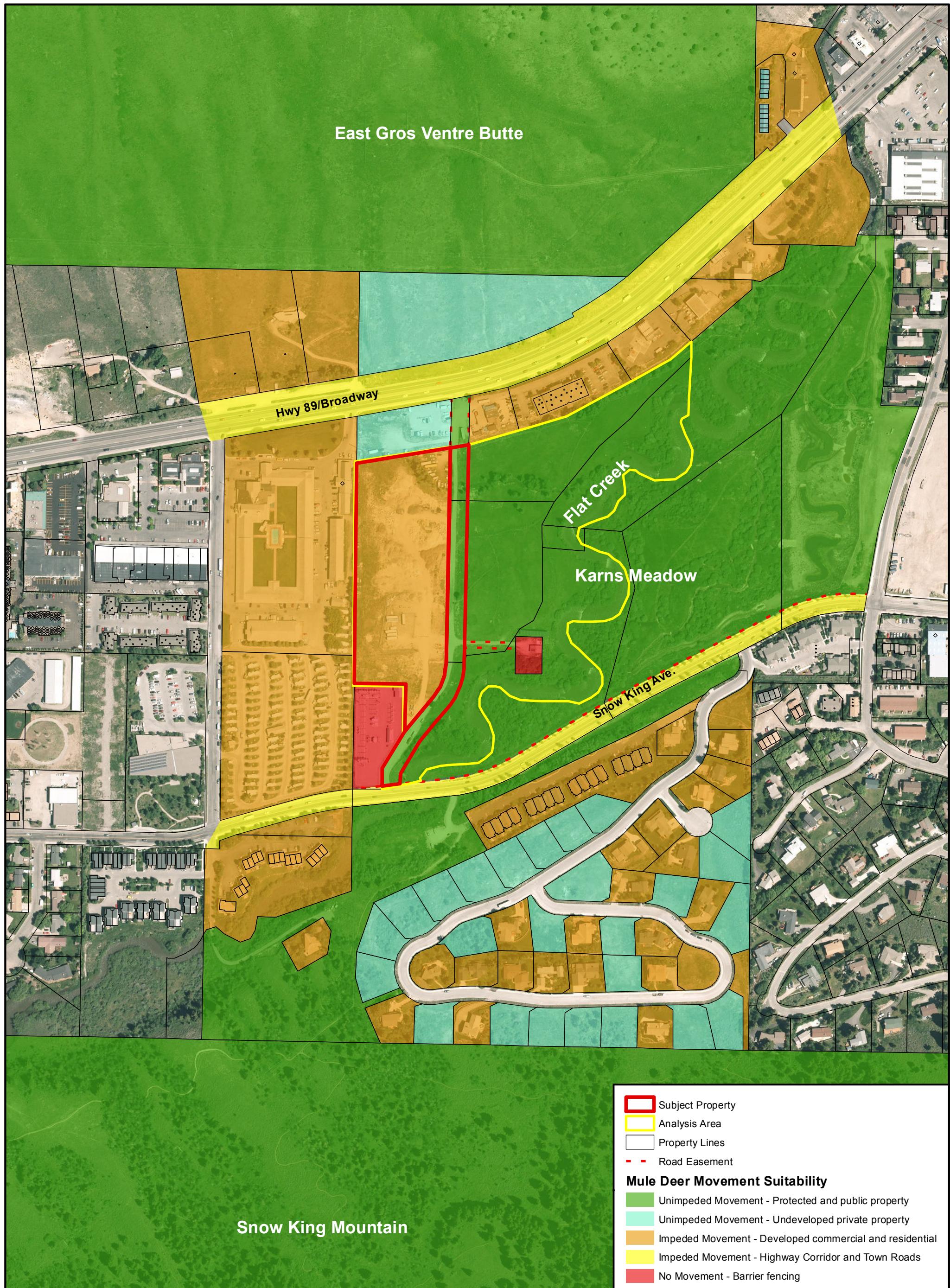


FIGURE 8:

General Mule Deer Movement Suitability

December 21, 2012

Environmental Analysis

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1 inch = 300 feet
0 125 250

NORTH

ALDER ENVIRONMENTAL, LLC
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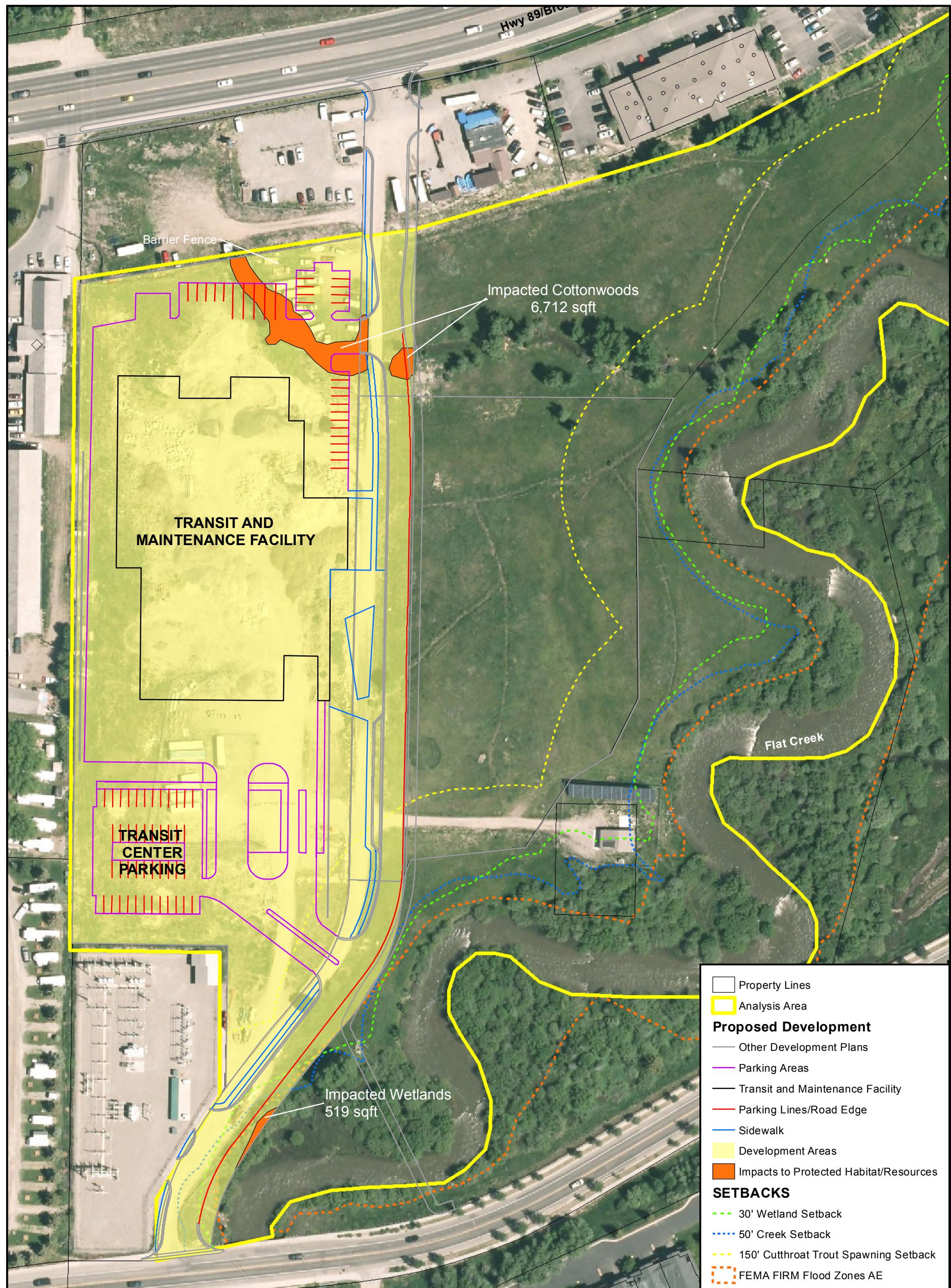


FIGURE 9:

Proposed Development & Impacts to Protected Habitats & Resources

December 21, 2012

Environmental Analysis

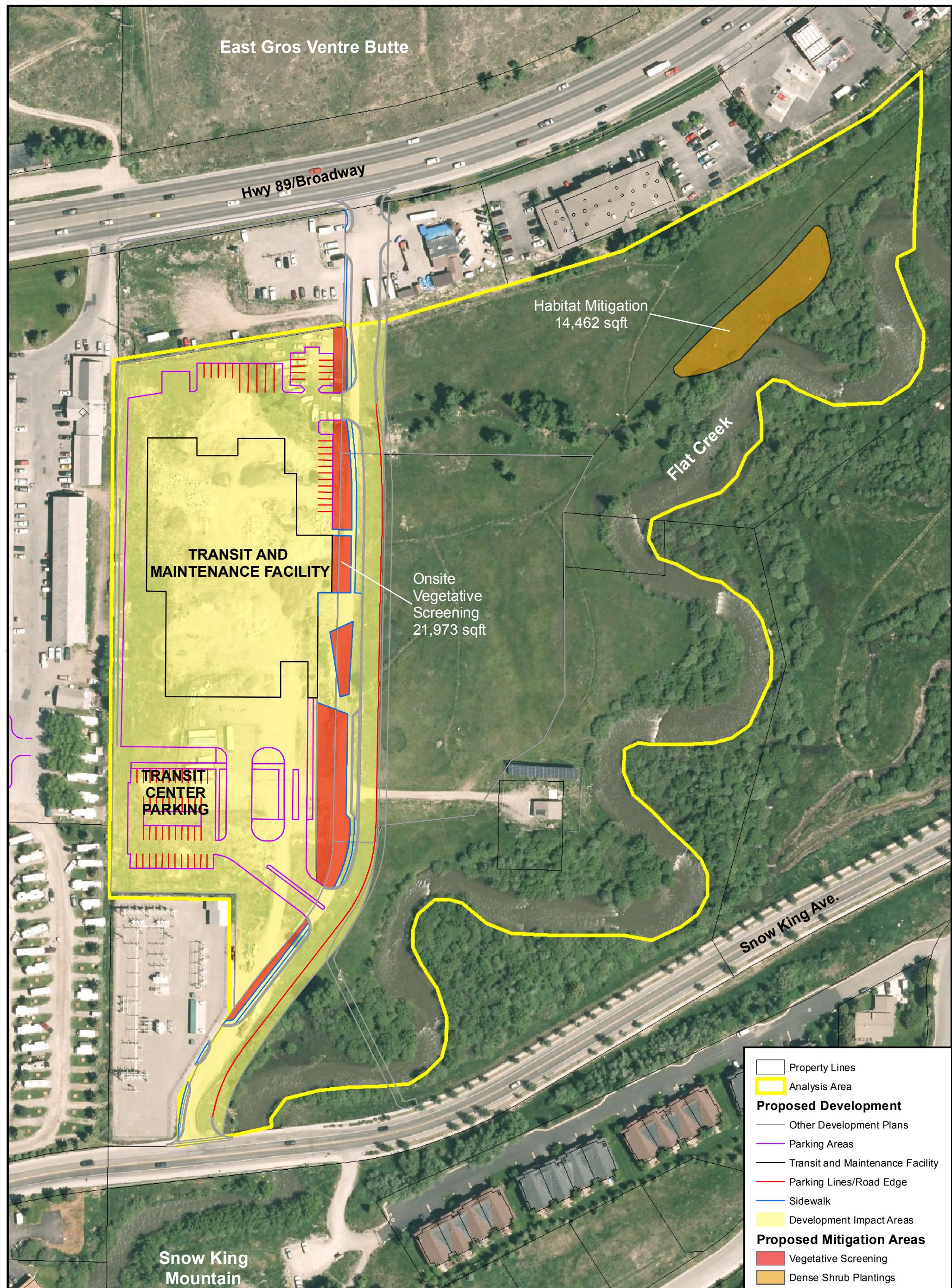
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1 in = 100 ft

0 100 200



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Teton County/Town of Jackson
 Transit and Maintenance Facility

Figure 10:
Onsite Screening & Offsite Habitat Mitigation

December 21, 2012

APPENDIX B - PHOTOS



PHOTO 1 – Looking south of subject property at gravel road leading to Snow King Avenue and Snow King Mountain. Scrub-shrub willow community on left is associated with Flat Creek.

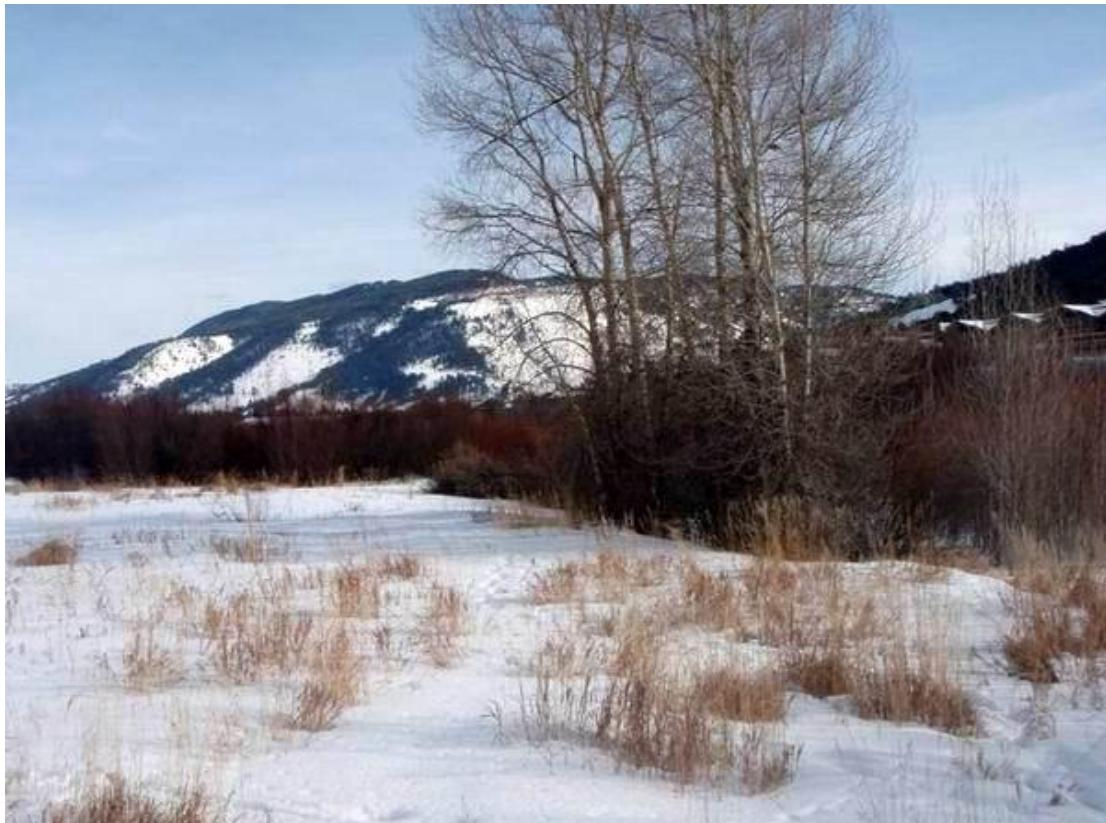


PHOTO 2 – Looking east at Flat Creek scrub –shrub vegetative community near south entrance.



PHOTO 3 – Looking northeast at grassed meadow between road and riparian corridor. East edge of road easement marked by survey stake with orange flag.



PHOTO 4 – Looking northeast at Flat Creek. Creek is approximately 3 feet in elevation than upland meadow.



PHOTO 5 – Looking west at existing gravel road and disturbed area with stockpiles.



PHOTO 6 – Looking northwest at subject property. Existing gravel road and disturbed area with fenced vehicle impound yard and stockpiles shown.

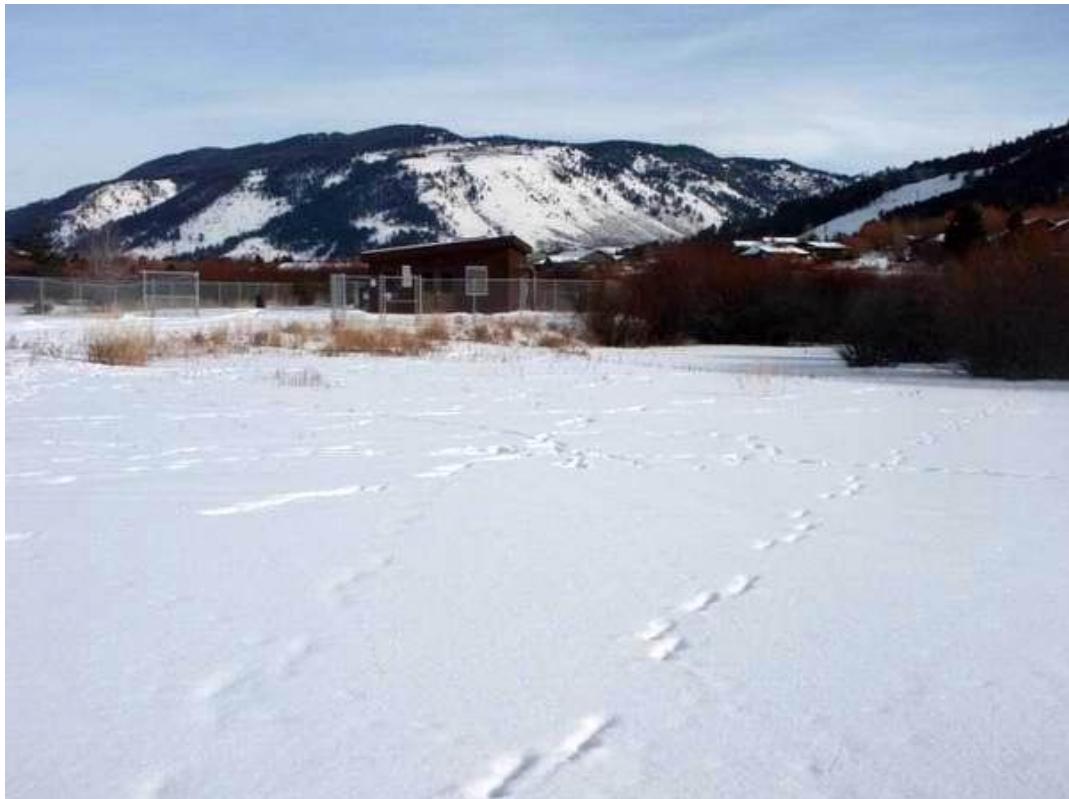


PHOTO 7 – Looking east Town well pumphouse and Flat Creek riparian corridor. Tracks likely belong to domestic dog.



PHOTO 8 – Lone spruce and cottonwood (background) trees north of Town well pumphouse. Heavily browsed by deer and moose.



PHOTO 9 – Looking north at agricultural meadow and East Gros Ventre butte mule deer crucial winter range.



PHOTO 10 – Looking southwest at subject property. Disturbed ground in foreground and vehicle impound yard and bus storage in background



PHOTO 11 – Looking north at subject property. Disturbed ground is being used to stockpile and screen earthen material.

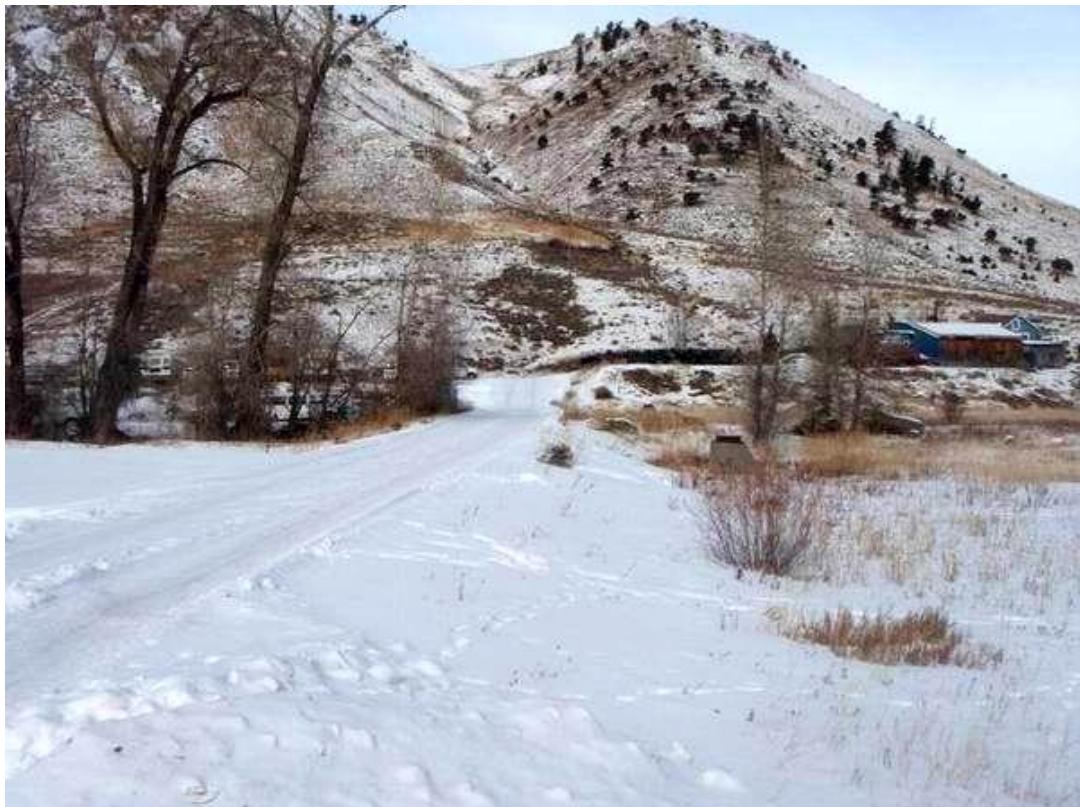


PHOTO 12 – Looking north at gravel road and road easement that leads to Broadway Avenue/HWY89. Mule deer crucial winter range on butte in background.



PHOTO 13 – Looking southwest at subject property. Disturbed ground is being used to stockpile and screen earthen material.



PHOTO 14 – Looking north at road easement with sewer manhole, agricultural meadow, cottonwoods along ditch and scrub-shrub community in background along Flat Creek.

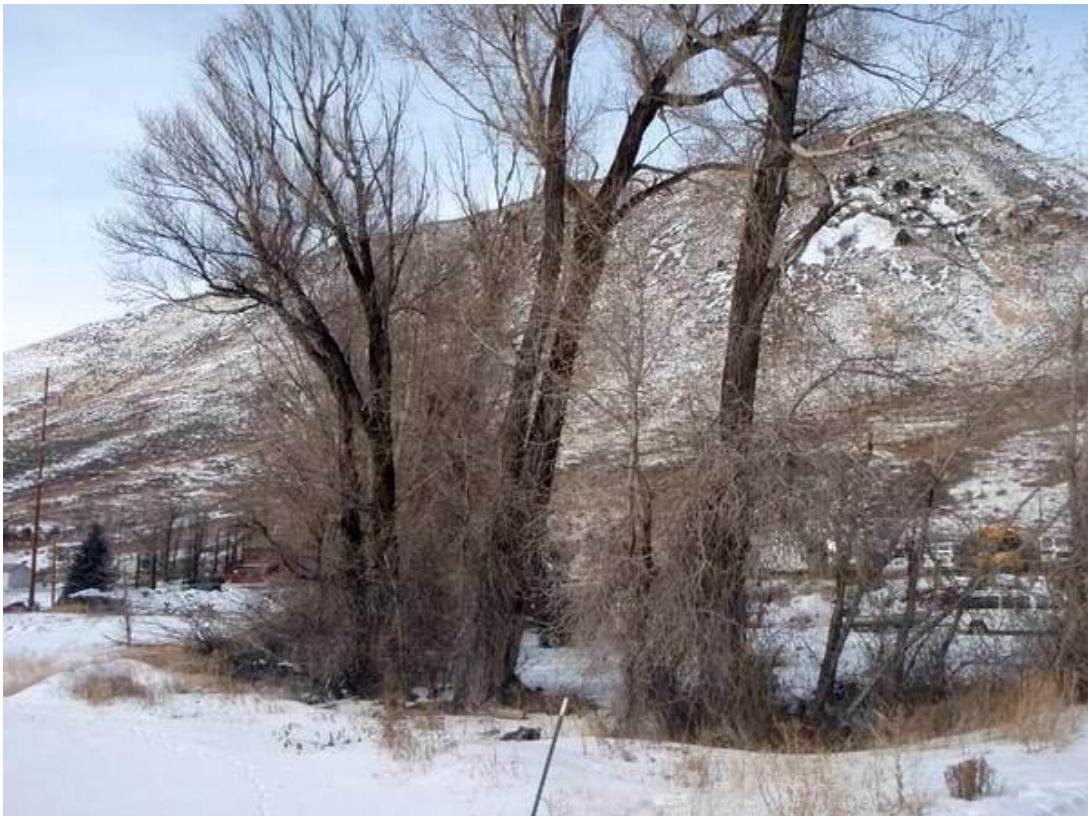


PHOTO 15 – Looking northwest at subject property. Mature cottonwoods and immature aspen along ditch.



PHOTO 16 – Looking west at subject property. Disturbed area being used for vehicle and trailer storage. Miscellaneous debris and equipment dumped in ditch.



PHOTO 17 – Looking west at subject property east property line. Multiple forms of fences create barrier to mule deer and other wildlife movement.



PHOTO 18 – Looking northeast at subject property. Young aspen tree volunteers growing along ditch indicating dryer conditions than historic ditch use.



PHOTO 19 – Looking north of subject property at wildlife barrier fencing and mule deer crucial winter range on south face of East Gros Ventre butte.



PHOTO 20 – Looking north at subject properties north property line. Break in fence shows mule deer tracks migrating to and from East Gros Ventre butte.



PHOTO 21 – Looking north at mule deer tracks leading to East Gros Ventre butte.



PHOTO 22 – Looking north at Broadway/HWY89 and lower face of East Gros Ventre butte.

APPENDIX C – WETLAND DELINEATION

PRELIMINARY Wetland Delineation Report

Karns Meadow West Road Easement Jackson, Wyoming

NE 1/4, Sec. 33, Twn. 41N, Rng. 116W, 6th P.M.
Teton County, Wyoming

In accordance with
Section 404 of the U.S. Clean Water Act

December 28, 2010

Prepared for:
Town of Jackson, START Bus
P.O. Box 1687
Jackson, WY 83001

Prepared by:
Brian Remlinger

ALDER
WATERSHED CONSULTING LLC
Water Resource & Environmental Services

1915 Cinnamon Teal, Jackson, Wyoming 83001
(307) 690-3625

TABLE OF CONTENTS

INTRODUCTION	1
METHODS	1
STUDY AREA LOCATION	1
Karns Meadow West Road Easement	1
PLS Location	1
Directions to the Property	1
PRELIMINARY DATA SUMMARY	2
USGS Quadrangle Map	2
National Wetlands Inventory (NWI) Map	2
USDA NRCS Soil Survey	2
Aerial Photography	2
ONSITE INSPECTION SUMMARY	2
Vegetation	2
Soil	3
Hydrology	3
WETLAND BOUNDARY	4
Rationale for Wetland Boundary Locations	4
Wetlands Mapping Procedure	4
Wetlands Inventory	4
JURISDICTIONAL RECOMMENDATION	4
ATTACHED MAPS	5
ATTACHED DATA FORMS	10
ATTACHED PHOTOS	19
ATTACHED USDA – NRCS SOIL SURVEY REPORT	24

Introduction

A routine wetland delineation was conducted on a study area within the vicinity of the Karns Meadow West Road Easement located in the Town of Jackson, Wyoming. The delineation was performed to ensure compliance with Section 404 of the Federal Clean Water Act and to provide the necessary information to assist the U.S. Army Corps of Engineers (COE) in their determination of wetland presence, boundaries and jurisdiction on the property. The wetland delineation was conducted by Brian Remlinger, principal scientist for Alder Watershed Consulting LLC (Alder), at the request of Jorgensen Associates, P.C., agent for the Town of Jackson.

Methods

The wetland delineation was conducted in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* and 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*. Preliminary data (described below) was reviewed prior to the onsite inspection conducted on October 15, 2010. Eight (8) sample points were selected as necessary to assess various vegetative communities and topographic positions found in the Study Area. Digital photos were taken to document sampling points and vegetative communities. The COE *North American Digital Flora: National Wetland Plant List* website and the 1988 *National List of Plants that Occur in Wetlands: Northwest (Region 9)* were used as references for vegetation wetland indicator status. Maps were prepared using ArcGIS 10 in Wyoming stateplane, North American Datum 1983, west feet projection. A topographic land survey was conducted by Jorgensen Associates, P.C. in November of 2010. Wetland boundary flags and other site characteristics were surveyed at this time. The information from the onsite inspection and land survey was used to prepare the maps included in this report.

Study Area Location

Karns Meadow West Road Easement

The wetland delineation was completed on a 7.5 acre study area that contains the Karns Meadow West Road Easement. The Study Area is defined as the Road Easement shown in Map 1 plus the area 100 foot from the outside edge of the road easement. The Study Area did not extend past Flat Creek's south and east water's edge. This area will be unaffected by development activities associated with the road easement.

PLS Location

The Study Area is located within the East 1/2 of the Southwest 1/4 of Section 33, Township 41 North, Range 116 West, 6th Principal Meridian (Map 1).

Directions to the Property

From the Jackson, Wyoming, Town Square (corner of Broadway and Cache Streets) head south on Cache St. for 0.4 miles. Turn right at Snow King Ave. and go 0.5 miles. After crossing the Flat Creek bridge, turn right onto a gravel road and into Karns Meadow and the Study Area.

Preliminary Data Summary

USGS Quadrangle Map

The *Jackson, Wyo. 1:24,000 scale USGS Quadrangle* (1963) was used to determine the properties legal description, topography and historic location of waterbodies, wet areas and land uses. Map 1 shows the boundaries and location of the Study Area overlaid on the quadrangle map.

National Wetlands Inventory (NWI) Map

The NWI map, Jackson Quadrangle, was used to plan the onsite inspection and to assist in characterizing wetland classifications. Map 2 shows Palustrine forested, scrub/shrub and emergent wetland classifications within the Study Area. While scattered trees were observed in the Study Area, forested wetlands are not present within the Study Area.

USDA-Natural Resources Conservation Service Soil Survey

The USDA-NRCS Web Soil Survey was utilized to prepare a custom Soil Resource Report for the project area from the Teton County, Wyoming, Grand Teton National Park Soil Survey (1982). There are two mapped soils located within the Study Area:

- Map Unit 29 - *Newfork fine sandy loam*
- Map Unit 61 - *Tineman gravelly loam, wet*

These soils generally consist of loam textures and become more gravelly deeper within the soil profile. These soils were formed from glaciofluvial deposits and alluvium material, are located in the mountain valley floodplains and are frequently associated with both uplands and wetlands. The *Newfork fine sandy loam* soil is associated with Flat Creek and its floodplain and is included in the USDA-NRCS 2010 *National Hydric Soils List*. The soil map unit boundaries are shown on Map 3.

Aerial Photography

The 2007 Teton County 1 foot/pixel aerial photography was used to assist with onsite inspection planning and to delineate the wetland boundary (Maps 2-4). This imagery shows buildings, roads and Flat Creek in relation to vegetation and seasonally flooded areas. Additional aerial photography reviewed includes the following USDA products:

- 1945 Black & White
- 1978 Black & White
- 1984 Black & White
- 1999 Color
- 2001 Color Infrared
- 2005 Color

Onsite Inspection Summary

Vegetation

Wetland vegetation on the Study Area was dominated by sedges such as Nebraska and beaked sedge (*Carex nebrascensis* and *c. utriculata*). Grasses such as Kentucky bluegrass (*Poa pratensis*) and reed canary grass (*Phalaris arundinacea*) were also found in the herbaceous stratum. Willow such as Geyer's willow (*Salix geyeriana*) and Booth willow (*Salix boothii*), were the dominant shrub species in shrub stratum. Trees included narrow-leaved cottonwood (*Populus angustifolia*) and water birch (*Betula occidentalis*).

Vegetated uplands on the Study Area were typified by historic agricultural meadows whose dominant grasses consisted of Kentucky bluegrass (*Poa pratensis*) and smooth brome (*Bromus inermis*), along with other less common grass species. Common dandelion (*Taraxacum officinale*) was also present in the herbaceous stratum.

Soil

The two soil types mapped by the USDA-NRCS on the property were identified during the onsite inspection (Map 3). These soils generally consist of loam textures and become more gravelly deeper within the profile. The *Newfork fine sandy loam* soil was observed in sample pits located adjacent to Flat Creek and within the floodplain. Wetland soil indicators included redoximorphic soil features and depleted matrices.

Soil texture, color, and stratigraphy did not differ notably among sample points; the value of the predominant soil hue was 10YR. Upland soils were associated with *Tineman gravelly loam, wet* soil map unit and contained more gravel than the wetland soils. The “wet” modifier in the soil name probably described the historic flood irrigation conditions that were present during the initial NRCS soil survey mapping effort in the area. Wet conditions and wetland soil indicators were not observed in the *Tineman gravelly loam, wet* soil areas.

Hydrology

The only surface water feature on the Study Area is Flat Creek, a tributary of the Snake River (Maps 2-4). Irrigation ditches present on the Study Area appear to have been abandoned and disconnected from Flat Creek decades earlier. These ditches no longer influence wetland hydrology of the Study Area.

Flat Creek is a natural waterway originating to the northeast. The creek receives water from precipitation runoff, springs, groundwater discharge and through an irrigation diversion from the Gros Ventre River. Peak streamflows occur in late May or June with the melting of mountain snowpack. Flows in Flat Creek from September through April are almost entirely from groundwater and spring sources. Cache Creek and upper Flat Creek provide minimal flows to lower Flat Creek during this time.

Snowmelt and rainfall runoff in the Town of Jackson is intensified by the high percentage of impervious surfaces from roads, buildings, parking lots and other paved paths. Snowmelt in the town is common even in the coldest months of the years. Rainfall and/or rain on snow events in the Town of Jackson may increase flows in Flat Creek approximately 30 –50 cfs for short, intense periods of time.

Hydrology indicators observed at sample points within wetlands included surface water, high water table, saturation, depleted and redoximorphic soil characteristics, geomorphic position, FAC-neutral testing of vegetation, and presence of a nationally listed hydric soil.

Wetland Boundary

Field data collected during the onsite inspection confirmed that definitional wetlands were present on the Study Area. Map 4 shows the sample points and delineated wetlands on the Study Area.

Rationale for Wetland Boundary Locations

Hydrologic and topographic gradients associated with Flat Creek and its floodplain dictated the locations of wetland boundaries. Wetland vegetation indicators including sedges and willows aided in the wetland boundary delineation.

Wetlands Mapping Procedure

A topographic land survey was conducted by Jorgensen Associates, P.C. for the Study Area in November of 2010. Wetland boundaries were flagged at 15-30 foot intervals prior to the survey. The survey documented the flags and those survey points were used to prepare the wetland delineation boundaries shown in Map 4.

Wetlands Inventory

Wetlands Inventory - Karns Meadow West Road Easement		
WETLANDS (recommended jurisdictional)	Square Feet	Acres
Palustrine Emergent Wetlands (PEMC)	3,991	0.09
Palustrine Scrub -Shrub Wetlands (PSSC)	16,695	0.38
Wetlands Total	20,686	0.47
OPEN WATER (recommended "Waters of the US")		
Flat Creek	25,700	0.59
Open Water Total	25,700	0.59

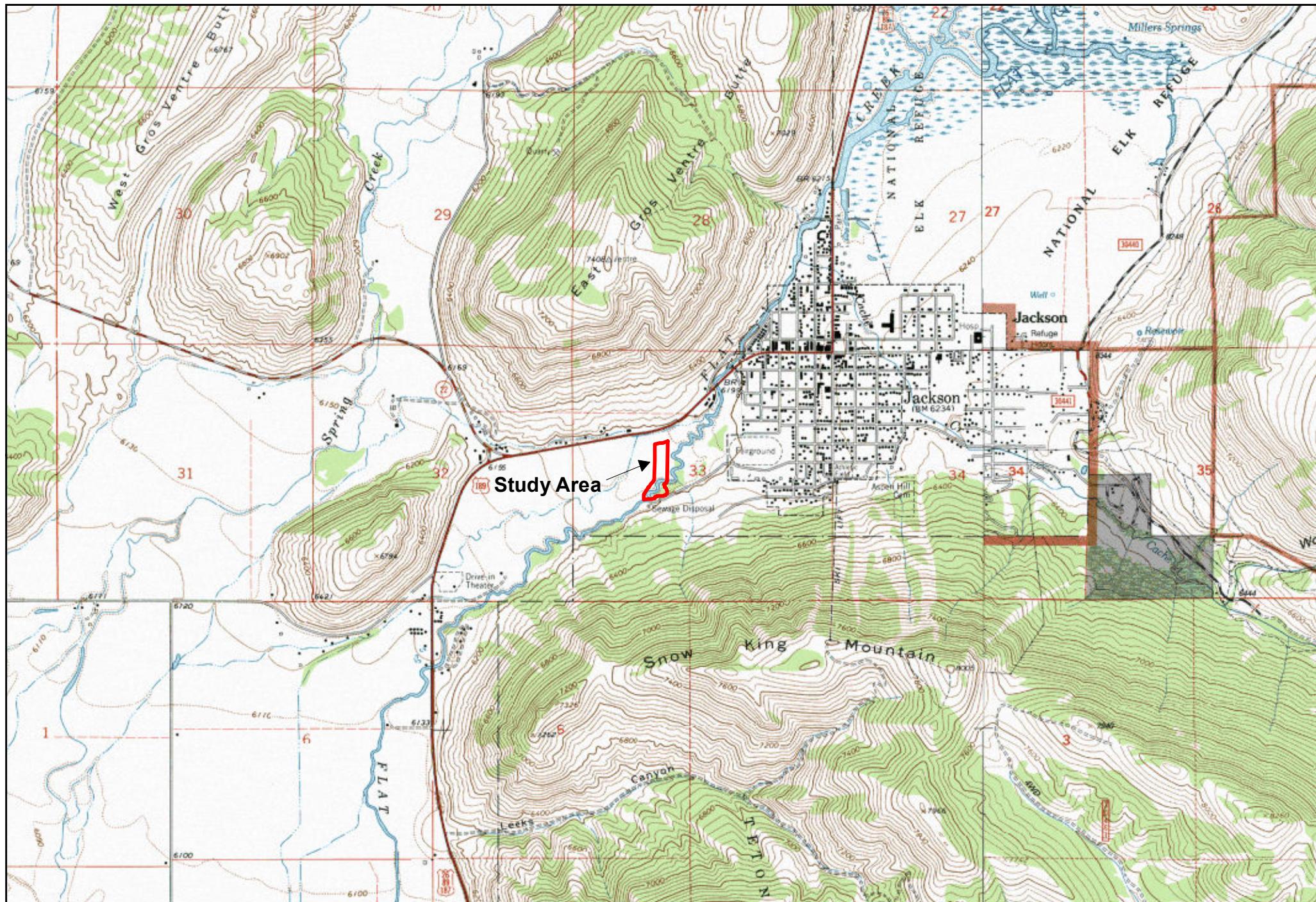
Jurisdictional Recommendation

A total of 0.47 acres of definitional wetlands on the Study Area appear to be hydrologically supported by Flat Creek. All wetlands delineated in Map 4 are recommended as jurisdictional.

Approximately 0.59 acres on The Study Area are comprised of open water/active channel of Flat Creek, a tributary of the Snake River. Flat Creek is recommended as a "Waters of the US."

Attached Maps

- Map 1 - Project Location & USGS Quadrangle
- Map 2 - National Wetlands Inventory
- Map 3 - Mapped Soils
- Map 4 - Wetlands, Sample Points & Water

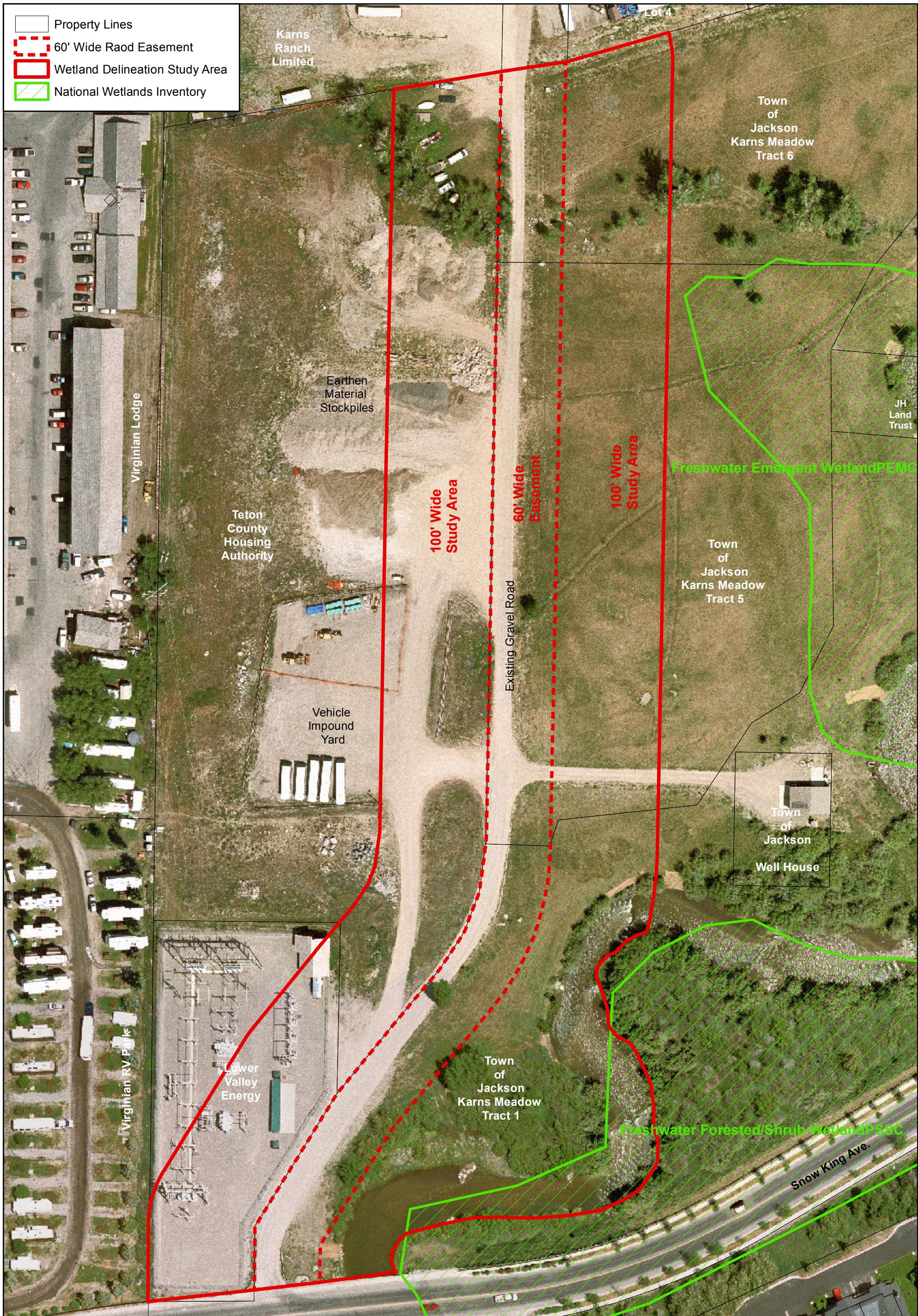


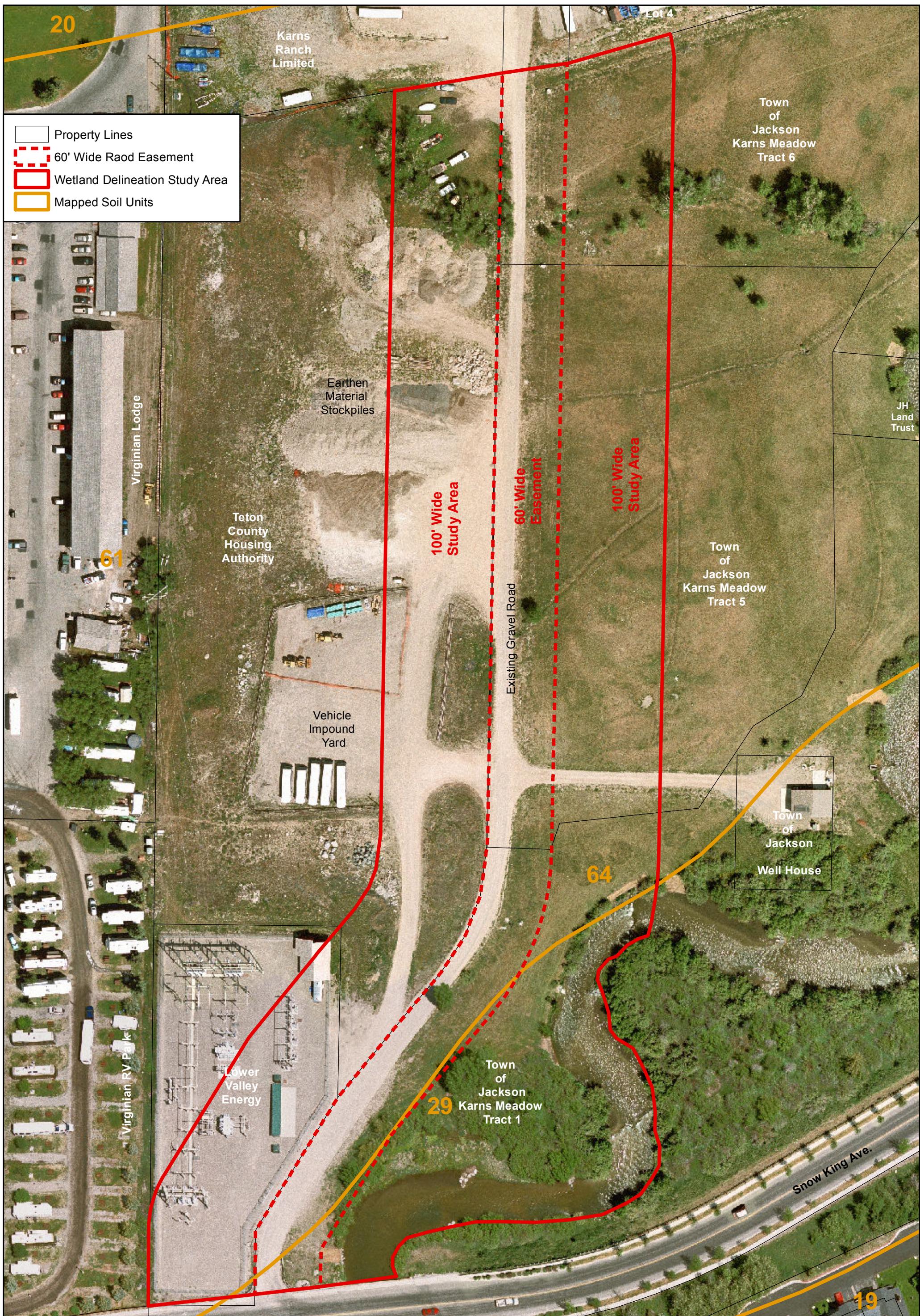
**ALDER
WATERSHED CONSULTING**
Water Resource & Environmental Services
(307)690-3625
1915 Cinnamon Teal Road, Jackson, Wyoming 83001

WETLAND DELINEATION
Karns Meadow West Road Easement
Teton County, Wyoming

MAP 1
Project Location & USGS Quadrangle
December 23, 2010

0 625 1,250 2,500
Feet
1 inch = 2,500 feet
Jackson, Wyo. USGS Quadrangle
Year 1963, 1:24,000 scale



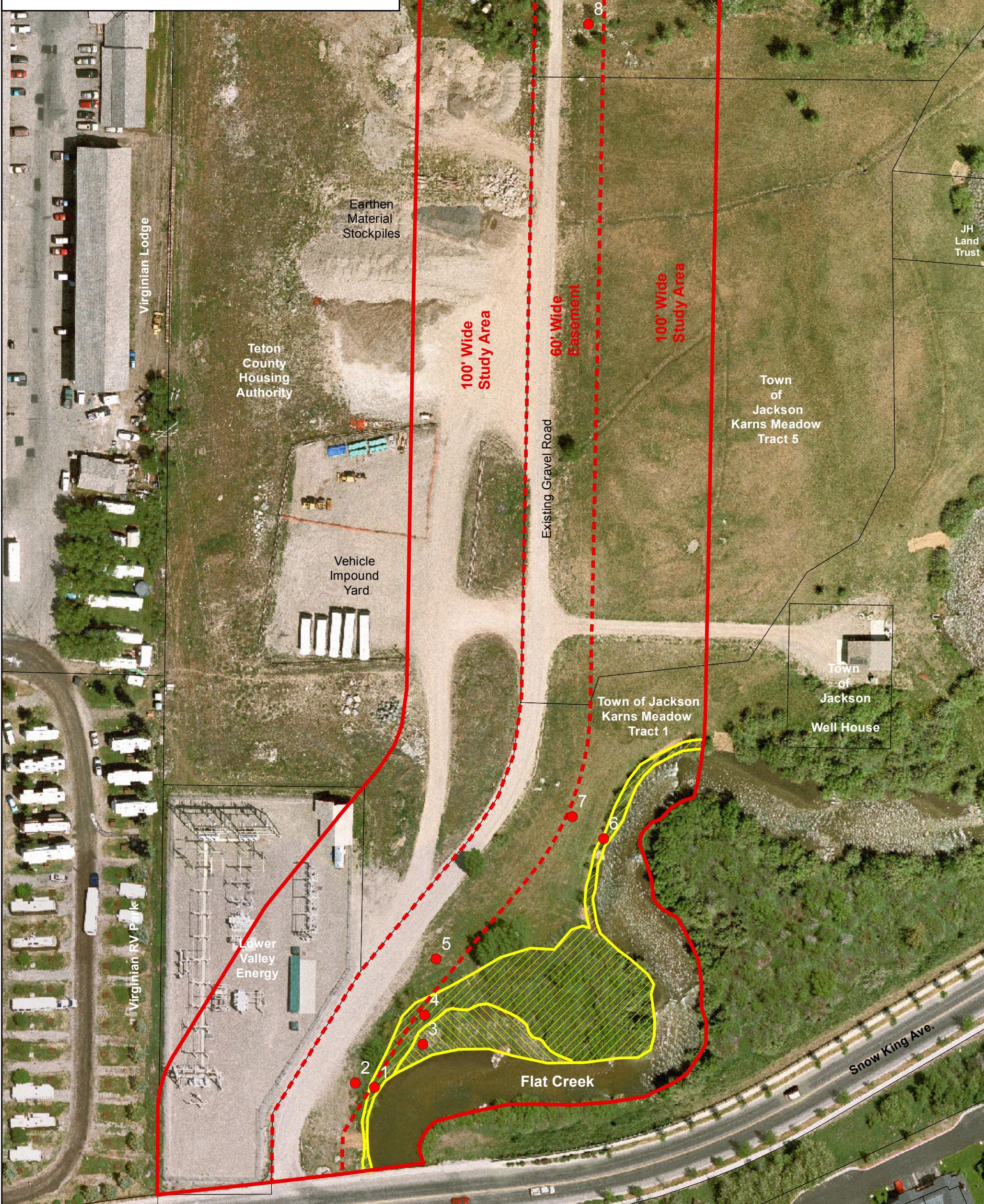


Property Lines
60' Wide Road Easement
Wetland Delineation Study Area
● Sample Points

Delineated Wetlands

Classification

Palustrine Emergent, Seasonally flooded (3,991 sqft)
Palustrine Scrub/Shrub, Seasonally flooded (16,695 sqft)



Attached Data Forms
SP1, SP2, SP3, SP4, SP5, SP6, SP7, SP8

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Karns Meadows Road Easement City/County: Jackson/Teton Sampling Date: 10/15/10
 Applicant/Owner: Town of Jackson State: WY Sampling Point: SP1
 Investigator(s): Brian Remlinger, Alder Watershed Consulting LLC Section, Township, Range: SEC 33, TWN 41N, RNG 116W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 5
 Subregion (LRR): E. Rocky Mtn. Lat: 43°28'17.882"N Long: 110°46'36.201"W Datum: NAD 83
 Soil Map Unit Name: 29—Newfork fine sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks:			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30'x30')				Dominance Test Worksheet:			
	Absolute % Cover	Dominant Species?	Indicator Status	Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)	
1. <u>Betula occidentalis</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>				
2. <u>Populus angustifolia</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>				
3. _____	_____	_____	_____				
4. _____	_____	_____	_____				
50% = <u>20</u> , 20% = <u>8</u>	<u>40</u>	= Total Cover		Total Number of Dominant Species Across All Strata:	<u>5</u>	(B)	
Sapling/Shrub Stratum (Plot size: 15'x15')				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u>	(A/B)	
1. <u>Salix boothii</u>	<u>60</u>	<u>yes</u>	<u>OBL</u>	Prevalence Index worksheet:			
2. <u>Salix geyerani</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	Total % Cover of:	Multiply by:		
3. _____	_____	_____	_____	OBL species	_____ x1 = _____		
4. _____	_____	_____	_____	FACW species	_____ x2 = _____		
5. _____	_____	_____	_____	FAC species	_____ x3 = _____		
50% = <u>40</u> , 20% = <u>16</u>	<u>80</u>	= Total Cover		FACU species	_____ x4 = _____		
Herb Stratum (Plot size: 5'x5')				UPL species	_____ x5 = _____		
1. <u>Phalaris arundinacea</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>	Column Totals:	(A) (B)		
2. _____	_____	_____	_____	Prevalence Index = B/A = _____			
3. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:			
4. _____	_____	_____	_____	<input checked="" type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation			
5. _____	_____	_____	_____	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%			
6. _____	_____	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is $\leq 3.0^1$			
7. _____	_____	_____	_____	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
8. _____	_____	_____	_____	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹			
9. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)			
10. _____	_____	_____	_____	1 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.			
11. _____	_____	_____	_____				
50% = <u>20</u> , 20% = <u>8</u>	<u>40</u>	= Total Cover					
Woody Vine Stratum (Plot size: _____)				Hydrophytic Vegetation Present?			
1. _____	_____	_____	_____	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
2. _____	_____	_____	_____				
50% = _____, 20% = _____	_____	= Total Cover					
% Bare Ground in Herb Stratum <u>20</u>							
Remarks:							

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	<u>Karns Meadows Road Easement</u>		City/County:	<u>Jackson/Teton</u>		Sampling Date:	<u>10/15/10</u>				
Applicant/Owner:	<u>Town of Jackson</u>		State:	<u>WY</u>	Sampling Point:	<u>SP2</u>					
Investigator(s):	<u>Brian Remlinger, Alder Watershed Consulting LLC</u>		Section, Township, Range: <u>SEC 33, TWN 41N, RNG 116W</u>								
Landform (hillslope, terrace, etc.):	<u>floodplain</u>		Local relief (concave, convex, none):	<u>none</u>		Slope (%):	<u>1-2</u>				
Subregion (LRR):	<u>E. Rocky Mtn.</u>		Lat:	<u>43°28'17.922"N</u>		Long:	<u>110°46'36.391"W</u>				
Soil Map Unit Name:	<u>61 - Tineman gravelly loam, wet</u>		NWI classification: <u>None</u>								
Are climatic / hydrologic conditions on the site typical for this time of year?			Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	(If no, explain in Remarks.)				
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	significantly disturbed?	Are "Normal Circumstances" present?	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	naturally problematic?	(If needed, explain any answers in Remarks.)				

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Remarks:					

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot size: _____) 1. _____ 2. _____ 3. _____ 4. _____ 50% = _____, 20% = _____ <u>Sapling/Shrub Stratum</u> (Plot size: _____) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 50% = _____, 20% = _____ <u>Herb Stratum</u> (Plot size: '5'x5') 1. <u><i>Bromus inermis</i></u> 40 yes FAC 2. <u><i>Poa pratensis</i></u> 10 yes FAC 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 50% = 25, 20% = 10 <u>Woody Vine Stratum</u> (Plot size: _____) 1. _____ 2. _____ 50% = _____, 20% = _____ % Bare Ground in Herb Stratum 30	Absolute % Cover <u>Absolute % Cover</u> Dominant Species? <u>Dominant Species?</u> Indicator Status <u>Indicator Status</u> Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B) Prevalence Index worksheet: <u>Total % Cover of:</u> <u>Multiply by:</u> OBL species _____ x1 = _____ FACW species _____ x2 = _____ FAC species _____ x3 = _____ FACU species _____ x4 = _____ UPL species _____ x5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is $\leq 3.0^1$ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
		Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:		

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Karns Meadows Road Easement City/County: Jackson/Teton Sampling Date: 10/15/10
 Applicant/Owner: Town of Jackson State: WY Sampling Point: SP3
 Investigator(s): Brian Remlinger, Alder Watershed Consulting LLC Section, Township, Range: SEC 33, TWN 41N, RNG 116W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 1
 Subregion (LRR): E. Rocky Mtn. Lat: 43°28'18.26"N Long: 110°46'35.595"W Datum: NAD 83
 Soil Map Unit Name: 29—Newfork fine sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks:			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:		
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A)		
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)		
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)		
4. _____	_____	_____	_____			
50% = <u>_____</u> , 20% = <u>_____</u>	_____	= Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'x15'</u>)				Prevalence Index worksheet:		
1. <u>Salix boothii</u>	<u>10</u>	<u>yes</u>	<u>OBL</u>	Total % Cover of: _____		
2. <u>Populus angustifolia</u>	<u>10</u>	<u>yes</u>	<u>FACW</u>	Multiply by: _____		
3. _____	_____	_____	_____	OBL species	_____	x1 = _____
4. _____	_____	_____	_____	FACW species	_____	x2 = _____
5. _____	_____	_____	_____	FAC species	_____	x3 = _____
50% = <u>10</u> , 20% = <u>4</u>	<u>20</u>	= Total Cover		FACU species	_____	x4 = _____
Herb Stratum (Plot size: <u>5'x5'</u>)				UPL species	_____	x5 = _____
1. <u>Carex utriculata</u>	<u>40</u>	<u>yes</u>	<u>OBL</u>	Column Totals: _____ (A)	_____ (B)	
2. <u>Carex nebrascensis</u>	<u>20</u>	<u>yes</u>	<u>OBL</u>	Prevalence Index = B/A = _____		
3. <u>Phalaris arundinacea</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>			
4. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:		
5. _____	_____	_____	_____	<input checked="" type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation		
6. _____	_____	_____	_____	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%		
7. _____	_____	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is $\leq 3.0^1$		
8. _____	_____	_____	_____	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)		
9. _____	_____	_____	_____	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹		
10. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)		
11. _____	_____	_____	_____			
50% = <u>40</u> , 20% = <u>16</u>	<u>80</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.		
Woody Vine Stratum (Plot size: _____)				Hydrophytic Vegetation Present?		
1. _____	_____	_____	_____	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
2. _____	_____	_____	_____			
50% = <u>_____</u> , 20% = <u>_____</u>	_____	= Total Cover				
% Bare Ground in Herb Stratum <u>0</u>						
Remarks:						

SOIL**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-5	10YR 3/2	90	—	—	—	—	CL	—
5-12	10YR 3/2	60	7.55YR 5/6	5	C	PL/M	CL	—
—	—	—	2.5Y 4.5/1	20	D	M	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**

Type: —

Depth (inches): —

Hydric Soils Present?Yes No

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> (except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water-Stained Leaves (B9)
<input type="checkbox"/> (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:Surface Water Present? Yes No Depth (inches): —Water Table Present? Yes No Depth (inches): —Saturation Present?
(includes capillary fringe) Yes No Depth (inches): —**Wetland Hydrology Present?** Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Directly adjacent to Flat Creek, 10 year floodplain

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	<u>Karns Meadows Road Easement</u>		City/County:	<u>Jackson/Teton</u>		Sampling Date:	<u>10/15/10</u>				
Applicant/Owner:	<u>Town of Jackson</u>		State:	<u>WY</u>	Sampling Point:	<u>SP4</u>					
Investigator(s):	<u>Brian Remlinger, Alder Watershed Consulting LLC</u>		Section, Township, Range: <u>SEC 33, TWN 41N, RNG 116W</u>								
Landform (hillslope, terrace, etc.):	<u>floodplain</u>		Local relief (concave, convex, none):	<u>concave</u>		Slope (%):	<u>1-2</u>				
Subregion (LRR):	<u>E. Rocky Mtn.</u>		Lat:	<u>43°28'18.511"N</u>		Long:	<u>110°46'35.581"W</u>				
Soil Map Unit Name:	<u>29—Newfork fine sandy loam</u>		NWI classification: <u>None</u>								
Are climatic / hydrologic conditions on the site typical for this time of year?			Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	(If no, explain in Remarks.)				
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	significantly disturbed?	Are "Normal Circumstances" present?	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	naturally problematic?	(If needed, explain any answers in Remarks.)				

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Remarks:					

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:			
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)			
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)			
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)			
4. _____	_____	_____	_____				
50% = <u> </u> , 20% = <u> </u>	_____	= Total Cover					
Sapling/Shrub Stratum (Plot size: <u>15'x15'</u>)				Prevalence Index worksheet:			
1. <u>Salix geyerana</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>	Total % Cover of: _____ Multiply by: _____			
2. <u>Salix boothii</u>	<u>30</u>	<u>yes</u>	<u>OBL</u>	OBL species	_____	x1 =	_____
3. <u>Salix exigua</u>	<u>20</u>	<u>yes</u>	<u>OBL</u>	FACW species	_____	x2 =	_____
4. _____	_____	_____	_____	FAC species	_____	x3 =	_____
5. _____	_____	_____	_____	FACU species	_____	x4 =	_____
50% = <u>45</u> , 20% = <u>18</u>	<u>90</u>	= Total Cover		UPL species	_____	x5 =	_____
Herb Stratum (Plot size: <u>5'x5'</u>)				Column Totals: _____ (A) _____ (B)			
1. _____	_____	_____	_____	Prevalence Index = B/A = _____			
2. _____	_____	_____	_____				
3. _____	_____	_____	_____				
4. _____	_____	_____	_____				
5. _____	_____	_____	_____				
6. _____	_____	_____	_____				
7. _____	_____	_____	_____				
8. _____	_____	_____	_____				
9. _____	_____	_____	_____				
10. _____	_____	_____	_____				
11. _____	_____	_____	_____				
50% = <u> </u> , 20% = <u> </u>	_____	= Total Cover		Hydrophytic Vegetation Indicators:			
Woody Vine Stratum (Plot size: <u>5'x5'</u>)				<input type="checkbox"/>	1 – Rapid Test for Hydrophytic Vegetation		
1. <u>Clematis ligusticifolia</u>	<u>10</u>	<u>yes</u>	<u>FAC</u>	<input checked="" type="checkbox"/>	2 - Dominance Test is >50%		
2. _____	_____	_____	_____	<input type="checkbox"/>	3 - Prevalence Index is $\leq 3.0^1$		
50% = <u>5</u> , 20% = <u>2</u>	<u>10</u>	= Total Cover		<input type="checkbox"/>	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)		
% Bare Ground in Herb Stratum <u>90</u>				<input type="checkbox"/>	5 - Wetland Non-Vascular Plants ¹		
				<input checked="" type="checkbox"/>	Problematic Hydrophytic Vegetation ¹ (Explain)		
Remarks:				1Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.			

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Karns Meadows Road Easement City/County: Jackson/Teton Sampling Date: 10/15/10
 Applicant/Owner: Town of Jackson State: WY Sampling Point: SP5
 Investigator(s): Brian Remlinger, Alder Watershed Consulting LLC Section, Township, Range: SEC 33, TWN 41N, RNG 116W
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0-1
 Subregion (LRR): E. Rocky Mtn. Lat: 43°28'18.994"N Long: 110°46'35.453"W Datum: NAD 83
 Soil Map Unit Name: 61 - Tineman gravelly loam, wet NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Remarks:			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: _____)		Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1.	_____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)	
2.	_____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>2</u> (B)	
3.	_____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)	
4.	_____	_____	_____	_____		
5.	_____	_____	_____	_____		
50% = _____, 20% = _____	_____	= Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'x15'</u>)				Prevalence Index worksheet:		
1.	_____	_____	_____	Total % Cover of:		
2.	_____	_____	_____	OBL species	x1 = _____	
3.	_____	_____	_____	FACW species	x2 = _____	
4.	_____	_____	_____	FAC species	x3 = _____	
5.	_____	_____	_____	FACU species	x4 = _____	
50% = _____, 20% = _____	_____	= Total Cover			UPL species	x5 = _____
Herb Stratum (Plot size: <u>5'x5'</u>)				Column Totals: _____ (A) _____ (B)		
1. <u>Bromus inermis</u>	<u>60</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index = B/A = _____		
2. <u>Poa pratensis</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>			
3.	_____	_____	_____	Hydrophytic Vegetation Indicators:		
4.	_____	_____	_____	<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation		
5.	_____	_____	_____	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%		
6.	_____	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is $\leq 3.0^1$		
7.	_____	_____	_____	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)		
8.	_____	_____	_____	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹		
9.	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)		
10.	_____	_____	_____			
11.	_____	_____	_____			
50% = <u>40</u> , 20% = <u>16</u>	<u>80</u>	= Total Cover			¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (Plot size: <u>5'x5'</u>)				Hydrophytic Vegetation Present?		
1.	_____	_____	_____	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
2.	_____	_____	_____			
50% = _____, 20% = _____	_____	= Total Cover				
% Bare Ground in Herb Stratum _____						
Remarks:						

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	<u>Karns Meadows Road Easement</u>		City/County:	<u>Jackson/Teton</u>		Sampling Date:	<u>10/15/10</u>				
Applicant/Owner:	<u>Town of Jackson</u>		State:	<u>WY</u>	Sampling Point:	<u>SP6</u>					
Investigator(s):	<u>Brian Remlinger, Alder Watershed Consulting LLC</u>		Section, Township, Range: <u>SEC 33, TWN 41N, RNG 116W</u>								
Landform (hillslope, terrace, etc.):	<u>floodplain</u>		Local relief (concave, convex, none):	<u>concave</u>		Slope (%):	<u>5</u>				
Subregion (LRR):	<u>E. Rocky Mtn.</u>		Lat:	<u>43°28'20.034"N</u>		Long:	<u>110°46'33.487"W</u>				
Soil Map Unit Name:	<u>29—Newfork fine sandy loam</u>		NWI classification: <u>None</u>								
Are climatic / hydrologic conditions on the site typical for this time of year?			Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	(If no, explain in Remarks.)				
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	significantly disturbed?	Are "Normal Circumstances" present?	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	naturally problematic?	(If needed, explain any answers in Remarks.)				

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Remarks:					

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:			
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)			
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)			
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)			
4. _____	_____	_____	_____				
50% = <u>_____</u> , 20% = <u>_____</u>	_____	= Total Cover					
Sapling/Shrub Stratum (Plot size: 15'x15')				Prevalence Index worksheet:			
1. <u>Salix boothii</u>	<u>30</u>	<u>yes</u>	<u>OBL</u>	Total % Cover of: _____ Multiply by: _____			
2. <u>Amelanchier alnifolia</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>	OBL species	_____	x1 =	_____
3. <u>Rosa woodsii</u>	<u>10</u>	<u>no</u>	<u>FACU</u>	FACW species	_____	x2 =	_____
4. _____	_____	_____	_____	FAC species	_____	x3 =	_____
5. _____	_____	_____	_____	FACU species	_____	x4 =	_____
50% = <u>30</u> , 20% = <u>12</u>	<u>60</u>	= Total Cover		UPL species	_____	x5 =	_____
Herb Stratum (Plot size: 5'x5')				Column Totals:	_____ (A)	_____ (B)	Prevalence Index = B/A = _____
1. <u>Carex utriculata</u>	<u>30</u>	<u>yes</u>	<u>OBL</u>	Hydrophytic Vegetation Indicators:			
2. <u>Carex nebrascensis</u>	<u>30</u>	<u>yes</u>	<u>OBL</u>	<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation			
3. <u>Poa pratensis</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%			
4. _____	_____	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is $\leq 3.0^1$			
5. _____	_____	_____	_____	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
6. _____	_____	_____	_____	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹			
7. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)			
8. _____	_____	_____	_____	1 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.			
9. _____	_____	_____	_____				
10. _____	_____	_____	_____				
11. _____	_____	_____	_____				
50% = <u>40</u> , 20% = <u>16</u>	<u>80</u>	= Total Cover					
Woody Vine Stratum (Plot size: _____)				Hydrophytic Vegetation Present?			
1. _____	_____	_____	_____	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
2. _____	_____	_____	_____				
50% = <u>_____</u> , 20% = <u>_____</u>	_____	= Total Cover					
% Bare Ground in Herb Stratum <u>0</u>							
Remarks: Steep streambank leads to significant stratification of vegetation indicators in the shrub strata							

SOIL**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features					Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	
0-8	10YR 3/2	90	—	—	—	—	CL	—
8-12	10YR 5/1	50	7.5YR 4/4	5	C	M	CL	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**

Type: —

Depth (inches): —

Hydric Soils Present?

Yes No

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> (except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water-Stained Leaves (B9)
<input type="checkbox"/> (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:Surface Water Present? Yes No Depth (inches): —Water Table Present? Yes No Depth (inches): —Saturation Present?
(includes capillary fringe) Yes No Depth (inches): 8Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Directly adjacent to Flat Creek, 10 year floodplain

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	<u>Karns Meadows Road Easement</u>		City/County:	<u>Jackson/Teton</u>		Sampling Date:	<u>10/15/10</u>				
Applicant/Owner:	<u>Town of Jackson</u>		State:	<u>WY</u>	Sampling Point:	<u>SP7</u>					
Investigator(s):	<u>Brian Remlinger, Alder Watershed Consulting LLC</u>		Section, Township, Range: <u>SEC 33, TWN 41N, RNG 116W</u>								
Landform (hillslope, terrace, etc.):	<u>floodplain</u>		Local relief (concave, convex, none):	<u>none</u>		Slope (%):	<u>0-1</u>				
Subregion (LRR):	<u>E. Rocky Mtn.</u>		Lat:	<u>43°28'20.231"N</u>		Long:	<u>110°46'33.862"W</u>				
Soil Map Unit Name:	<u>61 - Tineman gravelly loam, wet</u>		NWI classification: <u>None</u>								
Are climatic / hydrologic conditions on the site typical for this time of year?			Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	(If no, explain in Remarks.)				
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	significantly disturbed?	Are "Normal Circumstances" present?	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Are Vegetation	<input type="checkbox"/>	Soil	<input type="checkbox"/>	or Hydrology	<input type="checkbox"/>	naturally problematic?	(If needed, explain any answers in Remarks.)				

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Remarks:					

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:			
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)			
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)			
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)			
4. _____	_____	_____	_____				
50% = _____, 20% = _____	_____	= Total Cover					
Sapling/Shrub Stratum (Plot size: _____)				Prevalence Index worksheet:			
1. _____	_____	_____	_____	Total % Cover of:		Multiply by:	
2. _____	_____	_____	_____	OBL species	_____	x1 =	_____
3. _____	_____	_____	_____	FACW species	_____	x2 =	_____
4. _____	_____	_____	_____	FAC species	_____	x3 =	_____
5. _____	_____	_____	_____	FACU species	_____	x4 =	_____
50% = _____, 20% = _____	_____	= Total Cover		UPL species	_____	x5 =	_____
Herb Stratum (Plot size: 5'x5')				Column Totals: _____ (A) _____ (B)			
1. <u>Poa pratensis</u>	<u>60</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index = B/A = _____			
2. <u>Taraxacum officinale</u>	<u>10</u>	<u>no</u>	<u>FACU</u>				
3. <u>Bromus inermis</u>	<u>10</u>	<u>no</u>	<u>FAC</u>				
4. _____	_____	_____	_____				
5. _____	_____	_____	_____				
6. _____	_____	_____	_____				
7. _____	_____	_____	_____				
8. _____	_____	_____	_____				
9. _____	_____	_____	_____				
10. _____	_____	_____	_____				
11. _____	_____	_____	_____				
50% = <u>35</u> , 20% = <u>17.5</u>	<u>70</u>	= Total Cover		Hydrophytic Vegetation Indicators:			
Woody Vine Stratum (Plot size: _____)				<input type="checkbox"/>	1 – Rapid Test for Hydrophytic Vegetation		
1. _____	_____	_____	_____	<input checked="" type="checkbox"/>	2 - Dominance Test is >50%		
2. _____	_____	_____	_____	<input type="checkbox"/>	3 - Prevalence Index is $\leq 3.0^1$		
50% = _____, 20% = _____	_____	= Total Cover		<input type="checkbox"/>	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)		
% Bare Ground in Herb Stratum <u>10</u>				<input type="checkbox"/>	5 - Wetland Non-Vascular Plants ¹		
				<input type="checkbox"/>	Problematic Hydrophytic Vegetation ¹ (Explain)		
Remarks:							

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Karns Meadows Road Easement City/County: Jackson/Teton Sampling Date: 10/15/10
 Applicant/Owner: Town of Jackson State: WY Sampling Point: SP8
 Investigator(s): Brian Remlinger, Alder Watershed Consulting LLC Section, Township, Range: SEC 33, TWN 41N, RNG 116W
 Landform (hillslope, terrace, etc.): floodplain, historic irrigation ditch Local relief (concave, convex, none): none Slope (%): 0-1
 Subregion (LRR): E. Rocky Mtn. Lat: 43°28'27.034"N Long: 110°46'33.751"W Datum: NAD 83
 Soil Map Unit Name: 61 - Tineman gravelly loam, wet NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Remarks: Abandoned irrigation supply ditch from Flat Creek			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30'x30')				Dominance Test Worksheet:			
	Absolute % Cover	Dominant Species?	Indicator Status	Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)	
1. <u>Populus angustifolia</u>	<u>30</u>	<u>yes</u>	<u>FACW</u>				
2. _____	_____	_____	_____				
3. _____	_____	_____	_____				
4. _____	_____	_____	_____				
50% = <u>15</u> , 20% = <u>6</u>	<u>30</u>	= Total Cover		Total Number of Dominant Species Across All Strata:	<u>4</u>	(B)	
Sapling/Shrub Stratum (Plot size: 15'x15')				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u>	(A/B)	
1. <u>Ribes aureum</u>	<u>30</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index worksheet:			
2. _____	_____	_____	_____	Total % Cover of:	Multiply by:		
3. _____	_____	_____	_____	OBL species	x1 = _____		
4. _____	_____	_____	_____	FACW species	x2 = _____		
5. _____	_____	_____	_____	FAC species	x3 = _____		
50% = <u>15</u> , 20% = <u>6</u>	<u>30</u>	= Total Cover		FACU species	x4 = _____		
Herb Stratum (Plot size: 5'x5')				UPL species	x5 = _____		
1. <u>Poa pratensis</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	Column Totals:	(A)	(B)	
2. <u>Bromus inermis</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	Prevalence Index = B/A = _____			
3. <u>Taraxacum officinale</u>	<u>10</u>	<u>no</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators:			
4. _____	_____	_____	_____	<input type="checkbox"/> 1 – Rapid Test for Hydrophytic Vegetation			
5. _____	_____	_____	_____	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%			
6. _____	_____	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is $\leq 3.0^1$			
7. _____	_____	_____	_____	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)			
8. _____	_____	_____	_____	<input type="checkbox"/> 5 - Wetland Non-Vascular Plants ¹			
9. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)			
10. _____	_____	_____	_____	1 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.			
11. _____	_____	_____	_____				
50% = <u>35</u> , 20% = <u>17.5</u>	<u>70</u>	= Total Cover					
Woody Vine Stratum (Plot size: _____)				Hydrophytic Vegetation Present?			
1. _____	_____	_____	_____	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		
2. _____	_____	_____	_____				
50% = _____, 20% = _____	_____	= Total Cover					
% Bare Ground in Herb Stratum <u>5</u>							
Remarks:							

Attached Photos

Flat Creek, Study Area and Road Easement,
SP1, SP2, SP3, SP4, SP5, SP6, SP7, SP8



Study Area looking north from Snow King Ave. entrance.



Gravel road and road easement looking north from area of Sample Point 1.



Study Area looking north from Sample Point 7.



Study Area looking south from point near Sample Point 8.



SP1 (Flat Creek)



SP1



SP2



SP2



SP3 (Flat Creek)



SP3



SP4



SP4



SP5



SP5



SP6 (Flat Creek)



SP6



SP7



SP7



SP8



SP8

Attached USDA – NRCS Soil Survey Report



United States
Department of
Agriculture



NRCS
Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

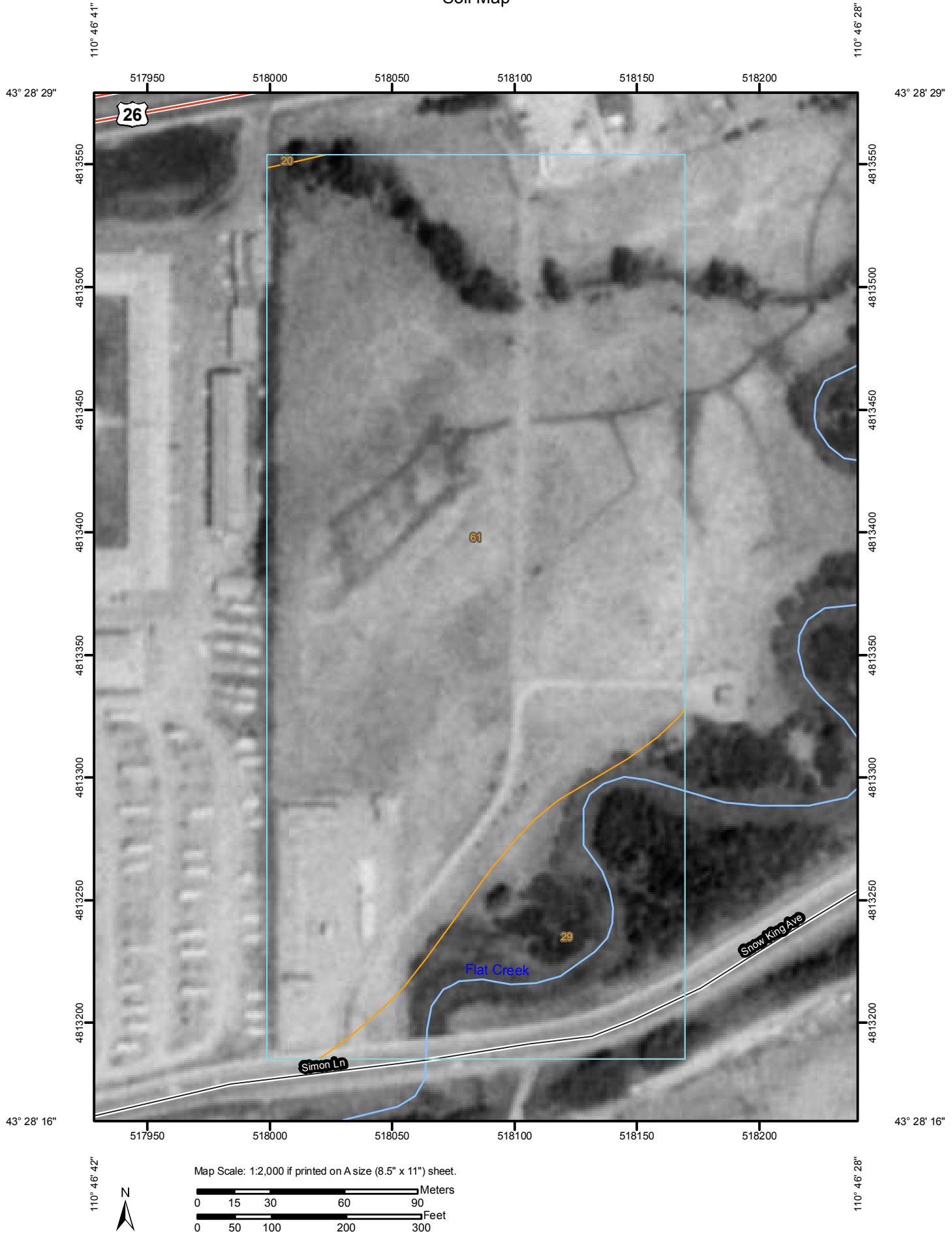
Custom Soil Resource Report for Teton County, Wyoming, Grand Teton National Park Area

START Bus Facility - Karns Meadow



Custom Soil Resource Report

Soil Map

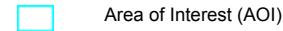


Map Scale: 1:2,000 if printed on A size (8.5" x 11") sheet.
0 15 30 60 90 Meters
0 50 100 200 300 Feet

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)



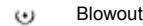
Area of Interest (AOI)

Soils



Soil Map Units

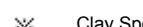
Special Point Features



Blowout



Borrow Pit



Clay Spot



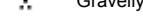
Closed Depression



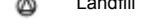
Gravel Pit



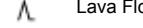
Gravelly Spot



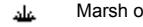
Landfill



Lava Flow



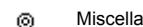
Marsh or swamp



Mine or Quarry



Miscellaneous Water



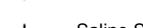
Perennial Water



Rock Outcrop



Saline Spot



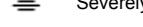
Sandy Spot



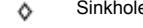
Severely Eroded Spot



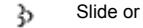
Sinkhole



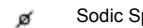
Slide or Slip



Sodic Spot



Spoil Area



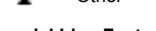
Stony Spot

Very Stony Spot



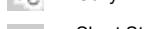
Very Stony Spot

Wet Spot



Wet Spot

Other

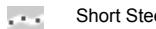


Other

Special Line Features



Gully



Short Steep Slope



Other

Political Features



Cities

Water Features



Oceans



Streams and Canals

Transportation



Rails



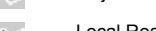
Interstate Highways



US Routes



Major Roads



Local Roads

MAP INFORMATION

Map Scale: 1:2,000 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: UTM Zone 12N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Teton County, Wyoming, Grand Teton National Park Area

Survey Area Data: Version 6, Jun 30, 2008

Date(s) aerial images were photographed: 6/27/1994

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Teton County, Wyoming, Grand Teton National Park Area (WY666)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
20	Greyback-Thayne complex, 20 to 30 percent slopes *	0.0	0.1%
29	Newfork fine sandy loam	2.8	17.8%
61	Tineman gravelly loam, wet	12.8	82.1%
Totals for Area of Interest		15.6	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Teton County, Wyoming, Grand Teton National Park Area

20—Greyback-Thayne complex, 20 to 30 percent slopes *

Map Unit Setting

Elevation: 5,300 to 7,500 feet
Mean annual precipitation: 13 to 21 inches
Mean annual air temperature: 30 to 45 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Greyback and similar soils: 60 percent
Tetonia and similar soils: 15 percent
Thayne and similar soils: 15 percent
Minor components: 10 percent

Description of Greyback

Setting

Landform: Mountain slopes
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock and/or glaciofluvial deposits derived from igneous, metamorphic and sedimentary rock

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability (nonirrigated): 6e
Ecological site: GRAVELLY (15-19W) (R043XY212WY)

Typical profile

0 to 5 inches: Gravelly loam
5 to 13 inches: Gravelly loam
13 to 30 inches: Very gravelly sandy loam
30 to 60 inches: Very gravelly loamy sand

Description of Thayne

Setting

Landform: Mountain slopes

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Gravelly alluvium derived from igneous, metamorphic and sedimentary rock

Properties and qualities

Slope: 20 to 30 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 12 percent

Gypsum, maximum content: 5 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 5.0

Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability (nonirrigated): 6e

Ecological site: LOAMY (15-19W) (R043XY222WY)

Typical profile

0 to 6 inches: Gravelly loam

6 to 34 inches: Gravelly loam

34 to 60 inches: Very gravelly sandy loam

Description of Teton

Setting

Landform: Mountain slopes

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Loess

Properties and qualities

Slope: 20 to 30 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 30 percent

Maximum salinity: Nonsaline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum: 5.0

Available water capacity: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 6e

Land capability (nonirrigated): 6e

Ecological site: LOAMY (15-19W) (R043XY222WY)

Typical profile

0 to 8 inches: Silt loam

8 to 30 inches: Silt loam

30 to 60 inches: Silt loam

Minor Components

Crow creek

Percent of map unit: 2 percent

Lantonia

Percent of map unit: 2 percent

Robana

Percent of map unit: 2 percent

Willow creek

Percent of map unit: 2 percent

Unnamed 1

Percent of map unit: 1 percent

Unnamed 2

Percent of map unit: 1 percent

29—Newfork fine sandy loam

Map Unit Setting

Elevation: 5,500 to 10,500 feet

Mean annual precipitation: 12 to 18 inches

Mean annual air temperature: 36 to 37 degrees F

Frost-free period: 60 to 90 days

Map Unit Composition

Newfork and similar soils: 85 percent

Minor components: 15 percent

Description of Newfork

Setting

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: About 6 to 48 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Available water capacity: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 5w

Land capability (nonirrigated): 5w

Ecological site: WETLAND (15-19W) (R043XY278WY)

Typical profile

0 to 10 inches: Gravelly fine sandy loam

10 to 16 inches: Gravelly fine sandy loam

16 to 60 inches: Very gravelly loamy sand

Minor Components

Tetonville

Percent of map unit: 8 percent

Wilsonville

Percent of map unit: 7 percent

61—Tineman gravelly loam, wet

Map Unit Setting

Elevation: 6,000 to 7,000 feet

Mean annual precipitation: 15 to 21 inches

Mean annual air temperature: 39 to 41 degrees F

Frost-free period: 60 to 90 days

Map Unit Composition

Tineman, wet, and similar soils: 80 percent

Minor components: 20 percent

Description of Tineman, Wet

Setting

Landform: Mountain slopes

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Gravelly glaciofluvial deposits

Properties and qualities

Slope: 0 to 3 percent

Custom Soil Resource Report

Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: About 36 to 48 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 4w

Land capability (nonirrigated): 4w

Ecological site: SUBIRRIGATED (15-19W) (R043XY274WY)

Typical profile

0 to 7 inches: Gravelly loam

7 to 15 inches: Gravelly loam

15 to 27 inches: Very gravelly sandy loam

27 to 60 inches: Very gravelly sand

Minor Components

Tineman

Percent of map unit: 7 percent

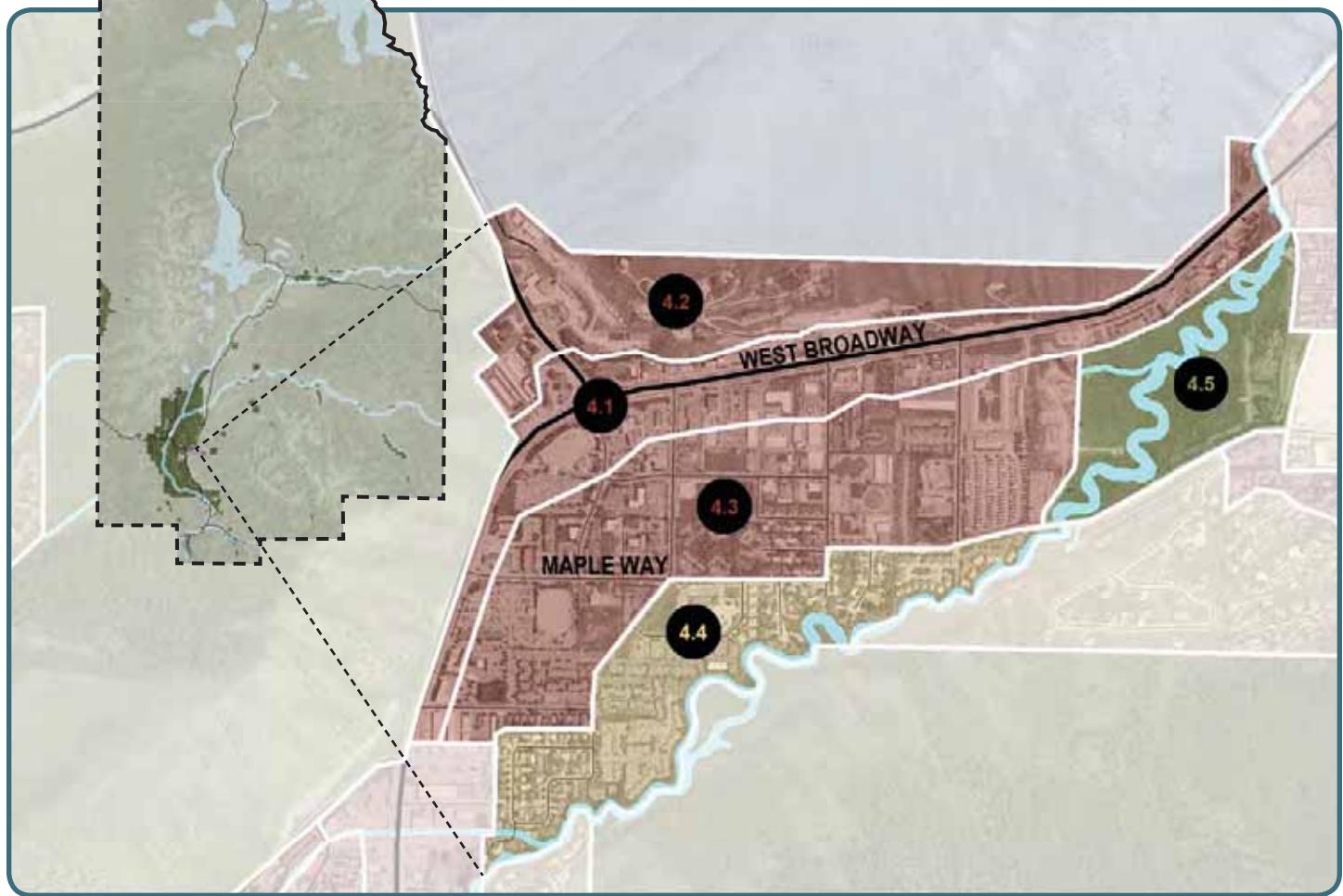
Wilsonville

Percent of map unit: 7 percent

Tetonville

Percent of map unit: 6 percent

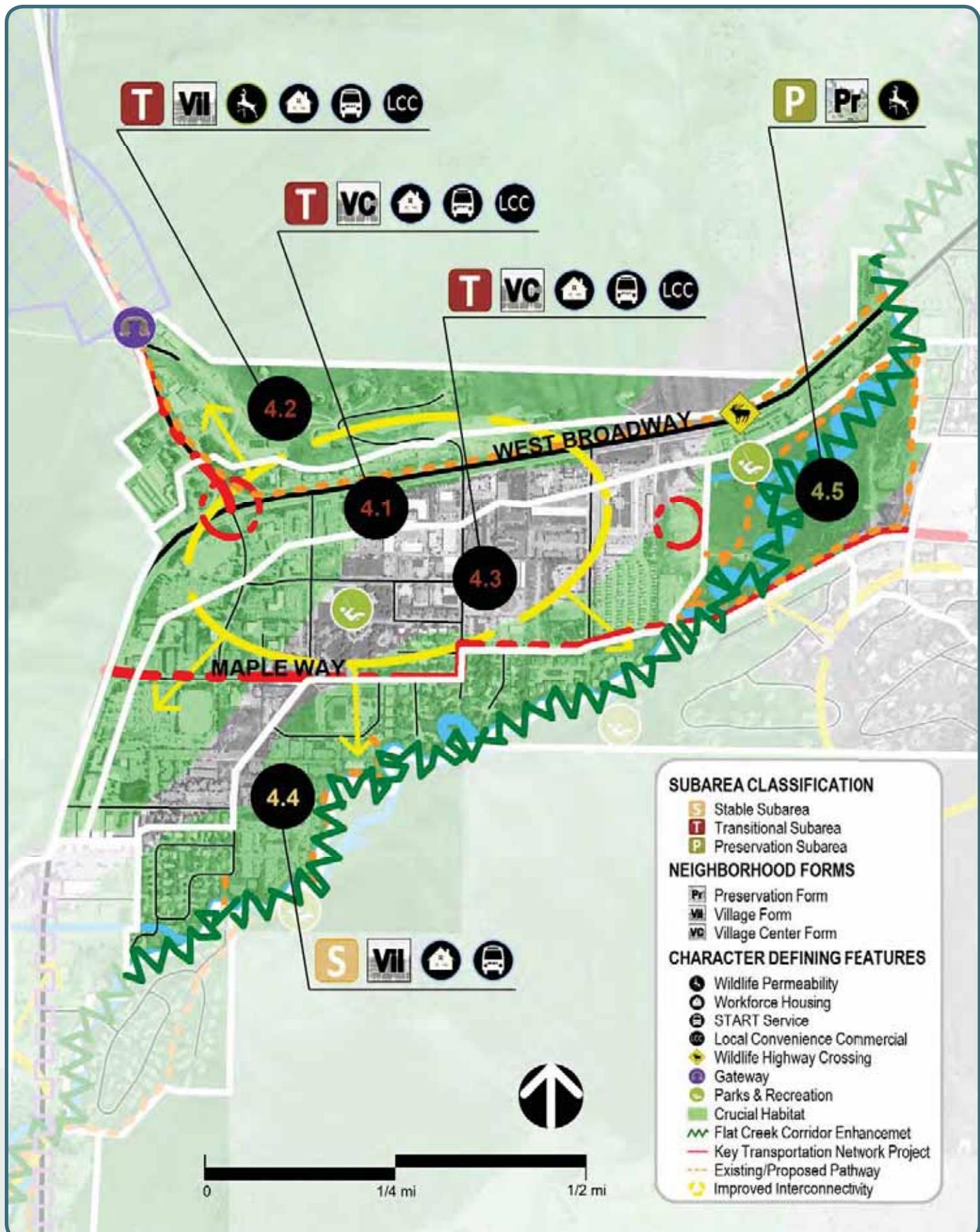
District 4: Midtown



Complete Neighborhood + Rural Area Chart

DEFINITION	EXST.	FUTURE	
COMPLETE NEIGHBORHOOD	Defined Character/High Quality Design	○	● 2-3 stories, vibrant pedestrian mixed use, street wall with landscape buffer
	Public Utilities	●	Water, sewer, storm sewer
	Quality Public Space	●	Powderhorn Park, Karns Meadow and Garaman Park Pathway
	Variety of Housing Types	●	Single family, duplex, condominiums, townhomes, apartments, multifamily
	Walkable Schools, Commercial + Recreation	●	Post office, START, limited convenience commercial, schools, parks, pathways
	Connection by Complete Streets	●	Alternative transportation a priority
RURAL	Viable Wildlife Habitat + Connectivity	●	Flat Creek enhancement, wildlife crossings
	Natural Scenic Vistas	○	
	Agricultural + Undeveloped Open Space	●	Karns Meadow
	Abundance of Landscape over Built Form	○	
	Limited, Detached, Single family Res. Development	○	
	Minimal Nonresidential Development	○	

Legend: ● Generally Present; ○ Partially Present; ○ Generally absent



Existing + Future Desired Characteristics

Midtown is one of the most Complete Neighborhoods in the community. It contains many of the service, office and retail establishments that meet Teton County residents' daily needs. It also contains a significant amount of workforce housing in a variety of housing types, including single family, duplex and multifamily structures. Another important characteristic of the district is the "Y", the intersection of the community's two main highways, U.S. 89 and Wyoming 22. Midtown is a highly visible district that is experienced on a daily basis by most residents. Today, the land use pattern is automobile-oriented and made up of large blocks containing low intensity single-use structures (both residential and non-residential) surrounded by significant surface parking, with little connectivity between blocks and lots. It is also the location of a significant amount of existing lodging uses developed prior to the Lodging Overlay that will be allowed to continue in the future. Flat Creek and the Karns Meadow are significant natural features in this district.

The future vision is to create a walkable mixed use district with improved connectivity and increased residential population. Key to achieving this vision will be the creation of a concentrated and connected land use pattern. To support this goal, future land uses will continue to include a variety of non-residential uses serving the needs of the local community and a variety of residential types focusing on workforce housing in multifamily and mixed use structures, specifically including deed-restricted rental units.

Mixed use, non-residential and multifamily residential buildings should be two to three stories in height and oriented to the street. Four story structures may be considered when adjacent to a natural land form. In the future, a landscape buffer between buildings and the street with well-designed green space and/or hardscape will be important to create an attractive pedestrian environment becoming of a desirable, walkable, mixed use district. Parking areas should be predominantly located behind buildings or screened from view. The creation of complete streets will be critical to increase connectivity between uses and between blocks and lots by all modes of travel. It is also important to recognize Snow King Avenue as a primary transportation corridor that will need to be maintained and improved in order to support regional transportation goals.

Despite the intensity of human activity within the district, Midtown contains or is adjacent to prominent natural resource lands such as the Karns Meadow, Flat Creek, East Gros Ventre Butte, High School Butte and the northwestern foot of Snow King Mountain. A key characteristic of this area is the mule deer movement corridor between East Gros Ventre Butte and Karns Meadow, and consequently, the high rate of wildlife vehicle collisions along West Broadway Avenue. The natural resources found in or adjacent to this district should be considered in the course of future planning, with development being located in a way that protects wildlife habitat and facilitates wildlife movement through the district. Future enhancements and redevelopment should seek to incorporate Flat Creek as a recreational and ecological amenity for the entire community.

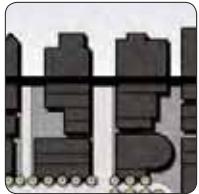
Whether it is enhancing the gateway to Town at the Y intersection, redeveloping under-utilized properties with mixed use structures, improving alternative transportation infrastructure and connectivity, or enhancements to Flat Creek - change in this district is desirable.

Policy Objectives

<i>Common Value 1: Ecosystem Stewardship</i>	1.1.c: Design for wildlife permeability
<i>Common Value 2: Growth Management</i>	4.1.b: Emphasize a variety of housing types, including deed-restricted housing 4.1.d: Maintain Jackson as the economic center of the region 4.2.c: Create vibrant walkable mixed use subareas 4.3.a: Preserve and enhance stable subareas 4.3.b: Create and develop transitional subareas 4.4.b Enhance Jackson gateways 4.4.d: Enhance natural features in the built environment
<i>Common Value 3: Quality of Life</i>	5.2.d: Encourage deed-restricted rental units 5.3.b: Preserve existing workforce housing stock 6.2.b: Support businesses located in the community because of our lifestyle 6.2.c: Encourage local entrepreneurial opportunities 7.1.c: Increase the capacity for use of alternative transportation modes 7.2.d: Complete key Transportation Network Projects to improve connectivity 7.3.b: Reduce wildlife and natural and scenic resource transportation impacts

Character Defining Features

4.1: Midtown Highway Corridor



Village Center Form

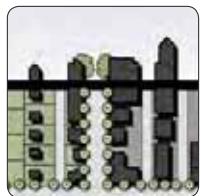
This mixed use, TRANSITIONAL Subarea is dominated by West Broadway Avenue, Highway 22 and the Y intersection. Development intensity should be oriented towards these roadways and configured in two to three story mixed use buildings with adequate setbacks and screening proportional to these busy highway

corridors and intersections. Along the north side of West Broadway four stories buildings will be allowed when they are built into and used to screen the adjacent hillside. All building designs should incorporate techniques to mitigate height such as stepping back upper floors from the streetscape. Parking areas should be predominantly in the rear or screened from view. The lower levels of buildings should contain a variety of non-residential uses including retail, service and office uses catering to locals, while residential uses should be located predominantly on the upper levels of mixed use buildings or to the rear of a site and away from the highway. Future structures will be predominantly mixed use, while multifamily will be allowed if it properly addresses the street. It will be important to successfully integrate the land uses and patterns in this area with adjacent subareas.

A goal of the subarea will be to implement complete street amenities, balancing the needs of vehicle and alternative transportation users. Pedestrian connectivity across West Broadway Avenue will be needed to ensure access to the neighborhood amenities located in the southern portion of the district. Some single use and auto-oriented uses (e.g. gas stations and auto dealers) will still be needed in the future. These uses should follow the desired building form and pattern as much as possible, including providing connectivity by all travel modes to adjacent lots. A key challenge in this area will be to identify a solution to accommodate a wildlife crossing along West Broadway Avenue.



4.2: Northern Hillside

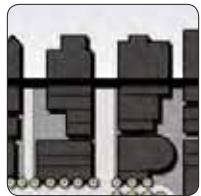


Village Form

This TRANSITIONAL Subarea must strike a delicate balance between allowing some mixed use and residential development while maintaining wildlife permeability and the natural form of the undeveloped hillsides. A key to successful future development will be to sensitively place development in harmony with the existing terrain in order to minimize land disturbance. Development intensity in this subarea should be less than that found within the adjacent Midtown Highway Corridor (Subarea 4.1). Structures will be allowed up to two stories and may be configured in a variety of layouts with attached and detached units blending into the natural surroundings. Smaller building footprints will be encouraged in order to provide adequate open and/or landscaped areas. A variety of residential types, including live/work, multifamily, and duplexes, may be appropriate in this area depending on the specific characteristics of a site and its existing topography. Low density single family housing may continue to be appropriate at the edges of this area, particularly when adjacent to existing undisturbed hillsides. Future development should address wildlife permeability and assist in guiding wildlife movement to future roadway crossings.



4.3: Central Midtown

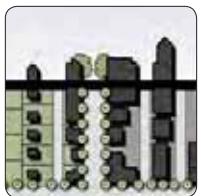


Village Center Form

This TRANSITIONAL Subarea in the core of the district will be critical in achieving the overall goal of transforming the area into a walkable mixed use district. Opportunities should be taken to expand the currently limited street network in order to break up large existing blocks and increase connectivity for all transportation modes. Key to this transition will be the addition of increased residential intensity in a variety of types and forms to take advantage of the Complete Neighborhood amenities in the area. Mixed use structures will be encouraged with non-residential uses located predominantly on the street level and residential units on upper levels. Multifamily structures in a variety of forms will also be desirable. Mixed use and multifamily residential buildings should be a combination of two and three story structures oriented to the street, though a buffer should be placed between buildings and the street with green space and/or hardscaping. Parking areas should be predominantly located behind buildings or screened from view. Live-work housing opportunities will be encouraged, as well as any other opportunities to promote local entrepreneurship. Single family residential units are not envisioned for this area. Particular care and attention will need to be given to ensure a successful transition between this mixed use subarea to the adjacent Midtown Residential (Subarea 4.3). The location of buildings and parking, types of uses and overall intensity of use should be considered to ensure a successful blend of these two subareas.

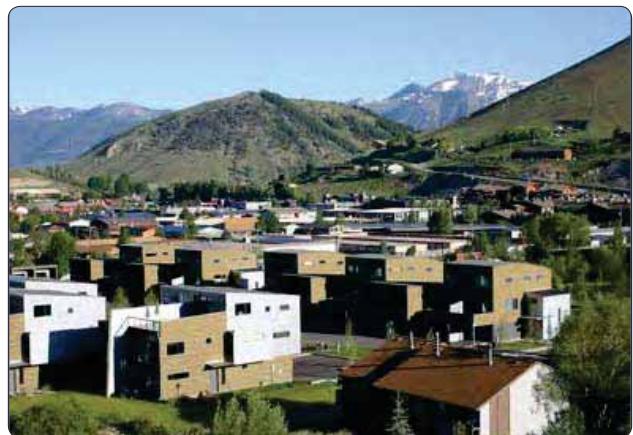


4.4: Midtown Residential

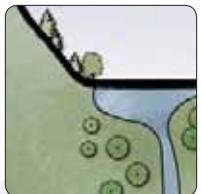


Village Form

This residential, STABLE Subarea should continue as a single family and multifamily residential neighborhood with a mix of ownership and rental units in close proximity to Complete Neighborhood amenities. Pedestrian and bicycle connections should be enhanced, both in terms of internal destinations and those beyond, particularly to schools in other districts. Portions of this subarea also function as a wildlife movement corridor. In the future, wildlife permeability to and from Flat Creek will be maintained and enhanced. Development should also occur in a manner that is sensitive to hillsides, and smaller building footprints should be encouraged in order to provide open and/or landscaped areas. Future improvements to Flat Creek and the adjacent pathway and park system will be needed to support the health of this natural feature for wildlife and residents.



4.5: Karns Meadow



Preservation Form

This PRESERVATION Subarea should continue to serve as wildlife habitat and a key wildlife movement corridor in the future. Moving forward wildlife needs will need to be carefully balanced with providing the recreational and other amenities envisioned in the original land owners conveyance of the property. The future addition of a street connection through this district will improve connectivity for all modes of transportation and create a separation between the developed and undeveloped portions of the area.



Why Illustrate Our Vision?

Realizing our Vision requires proactively planning for what we want - rural open spaces and high quality Complete Neighborhoods - by identifying where we want them and what we want them to look like. Our Vision is that development be designed to enhance our community character and located in suitable areas in order to preserve and protect the ecosystem and western, rural character. The Illustration of Our Vision defines the type of preservation or development in each area of the community that will allow us to realize our Vision. In areas suitable for development, the Illustration of Our Vision describes how we will protect the character we love while ensuring that development enhances our Quality of Life. In all other areas, the Illustration of Our Vision describes how we will preserve and enhance wildlife habitat, wildlife connectivity, scenic vistas, and open space.

Defining desired character for all areas of the community provides predictability in planning and development, which has been absent in the past. Incremental, site-specific determinations of policy applicability that are emotionally, politically

and legally tied to a specific development plan are no longer the community's growth management principle. The Illustration of Our Vision bridges the gap between our Vision and the development of an individual site so that all community members can understand how an individual preservation or development project should contribute to the achievement of our Vision. The Illustration of Our Vision will inform land development regulations that ensure no policy of this Plan is forgotten and that all policies are implemented within the proper context.

The Illustration of Our Vision also provides accountability and measurability. By defining the existing and desired character of each area of the community, we can quantify our progress toward achieving our Common Values of Community Character. With this information we can determine what policies and strategies are appropriate in which locations. The Illustration of Our Vision will enable the rigorous analysis needed to continually adapt our implementation strategies to ensure that preservation and development occur in the desired amount, location and type.

How is the Vision Illustrated?

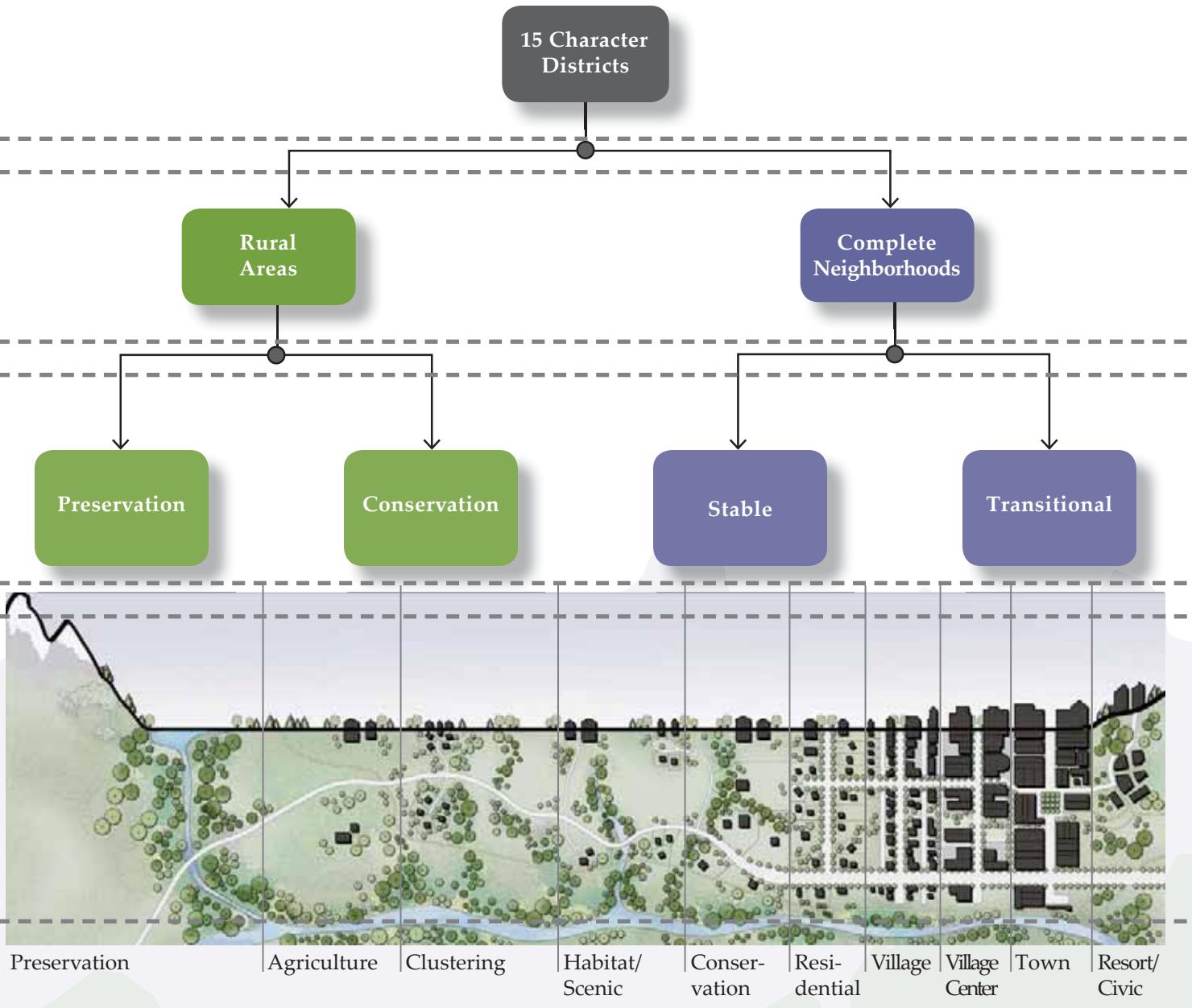
The Illustration of Our Vision depicts the policies of the community's three Common Values of Community Character through four levels of character classification.

At the highest level, the private lands of the community are divided into Character Districts – areas with common natural, visual, cultural and physical attributes, shared values and social interaction. Character District boundaries are based on a layering of the best available quantitative and qualitative data for each of the three Common Values of Community Character (Ecosystem Stewardship, Growth Management, Quality of Life) in order to identify areas that share similar characteristics (see Appendix B Framework Maps).

While our community's 15 Character Districts share Common Values, each has a unique identity, based upon the presence or absence of specific characteristics, each Character District is classified as either a Rural Area focused on ecosystem stewardship or a Complete Neighborhood focused on enhancing Quality of Life. The map on pages IV-4 and IV-5 shows the Character District boundaries, defines Complete Neighborhood and Rural Area characteristics and identifies the classification of each Character District.

At the next level, each Character District is divided into subareas. Each subarea is categorized as Stable, Transitional, Preservation or Conservation based upon the existing character of the subarea and the desired future character for the entire Character District. Stable and Transitional Subareas are the most suitable locations for people to live, work and play. Subareas focused on Ecosystem Stewardship are designated as Preservation or Conservation. The map on pages IV-6 and IV-7 shows the subareas and defines the subarea classifications.

Finally, for each subarea, Character Defining Features are described to ensure the desired character is illustrated. The Character Defining Features provide the greatest level of site specific detail; however the characteristics are still conceptual and will inform specific regulations, incentives and programs. The characteristics valued by the community within a subarea are mapped, described and illustrated. On pages IV-8 and IV-9 is a legend that describes the symbols and graphics used on the Character Defining Features Maps. An appropriate Neighborhood Form(s) is also identified for each subarea. A Neighborhood Form identifies the general pattern and intensity of development that meets the desired character. On pages IV-10 and IV-11 is a transect that depicts the continuum of Neighborhood Forms that make up our community and shows the relationship between the various patterns and intensities.

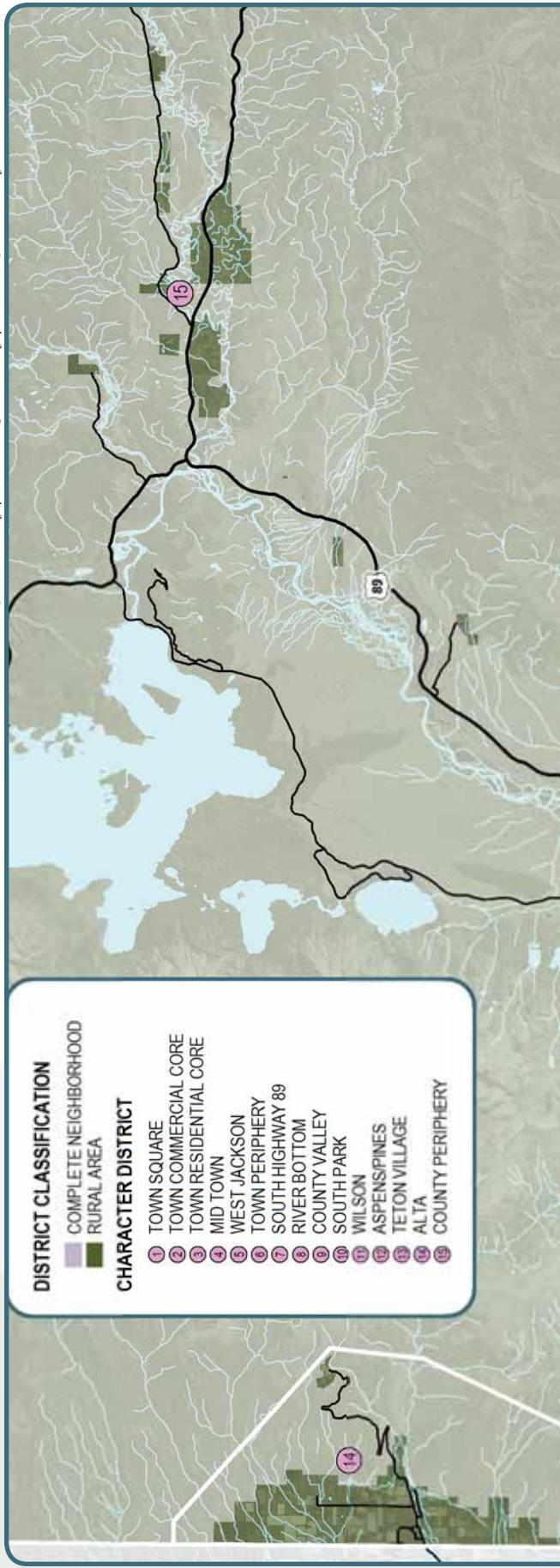


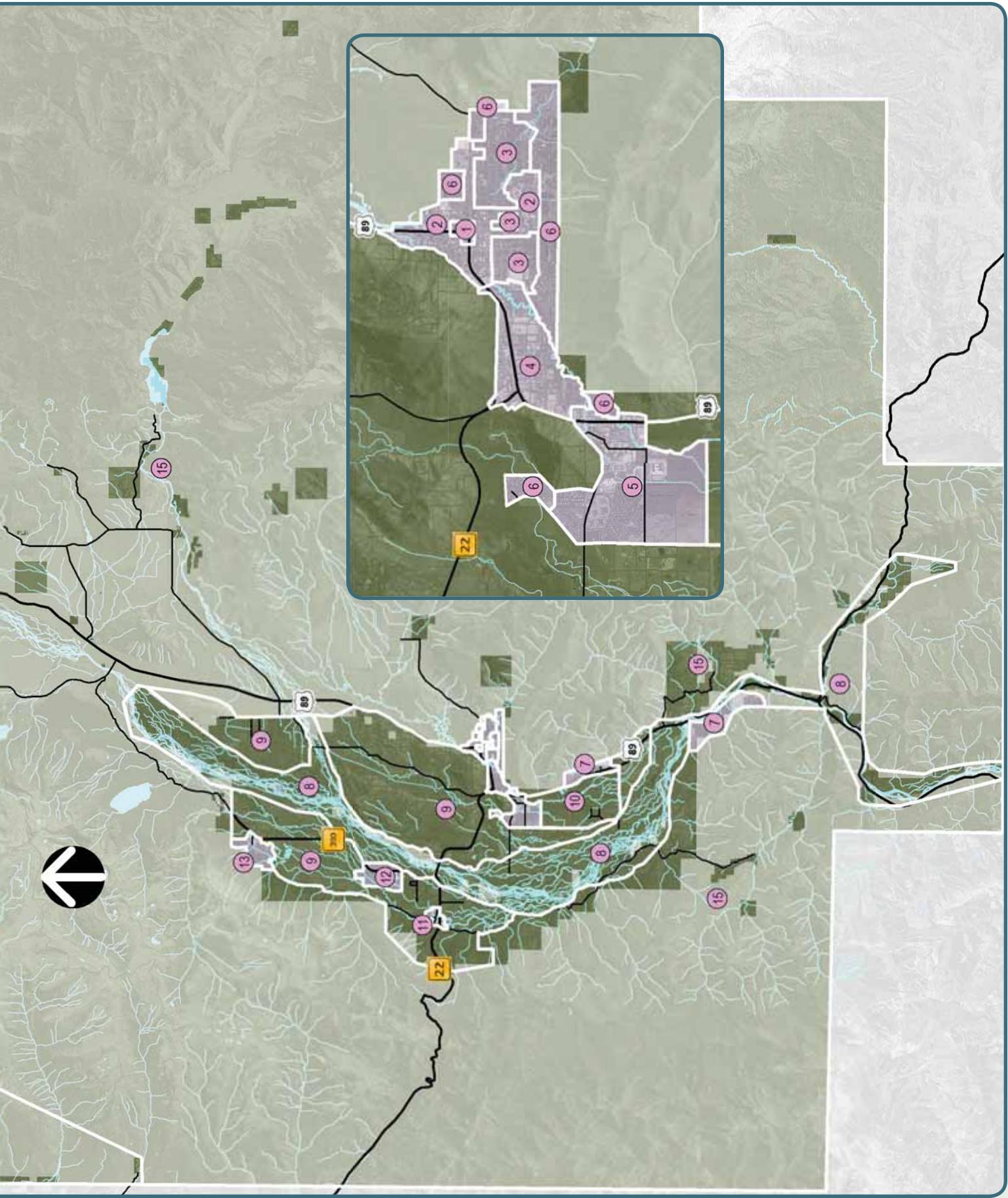
Complete Neighborhoods + Rural Areas

Character Districts

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Defined character and high-quality design	●														
Public utilities (water, sewer, and storm sewer)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Quality public spaces														●	●
A variety of housing types															
Schools, childcare, commercial, recreation, and other amenities within walking distance (1/4 to 1/2 mile) of residences	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Connection by complete streets that are safe for all modes of travel	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Viable wildlife habitat and connections between wildlife habitat															
Natural scenic vistas															
Agricultural and undeveloped open space															
Abundance of landscape over built form															
Limited, detached single family residential development															
Minimal additional nonresidential development															

● Generally present; ● Partially present; ○ Generally absent

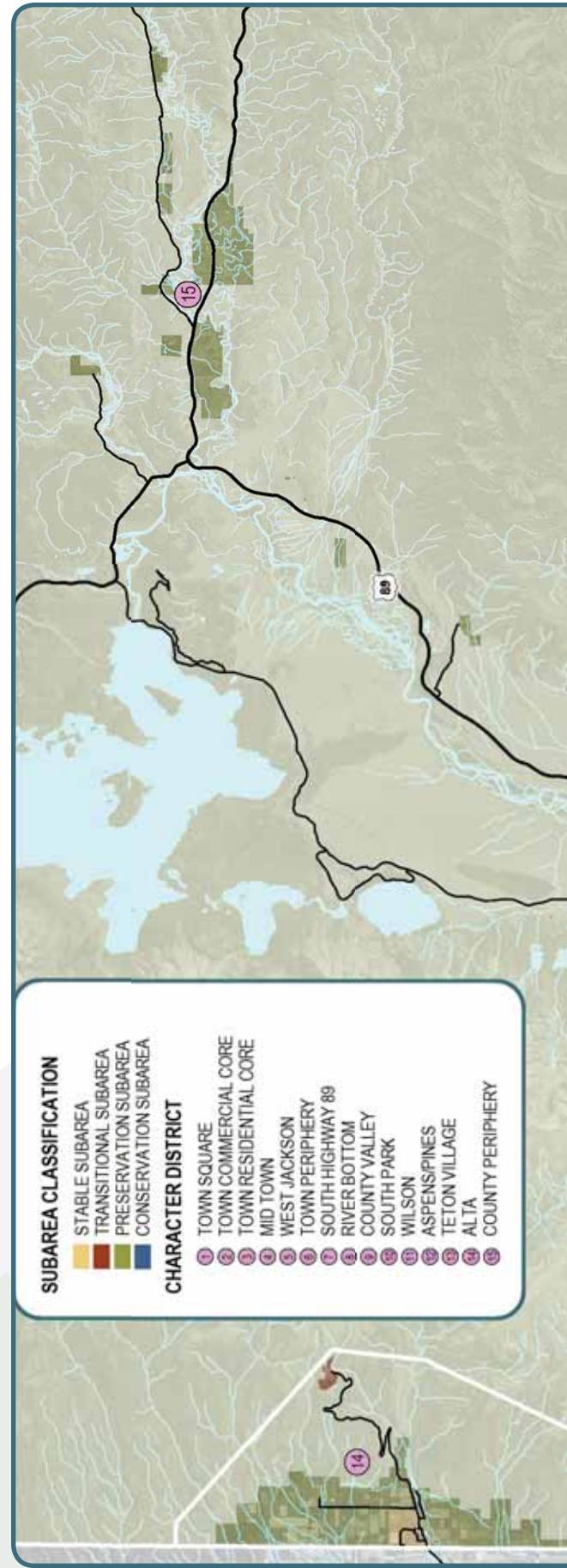


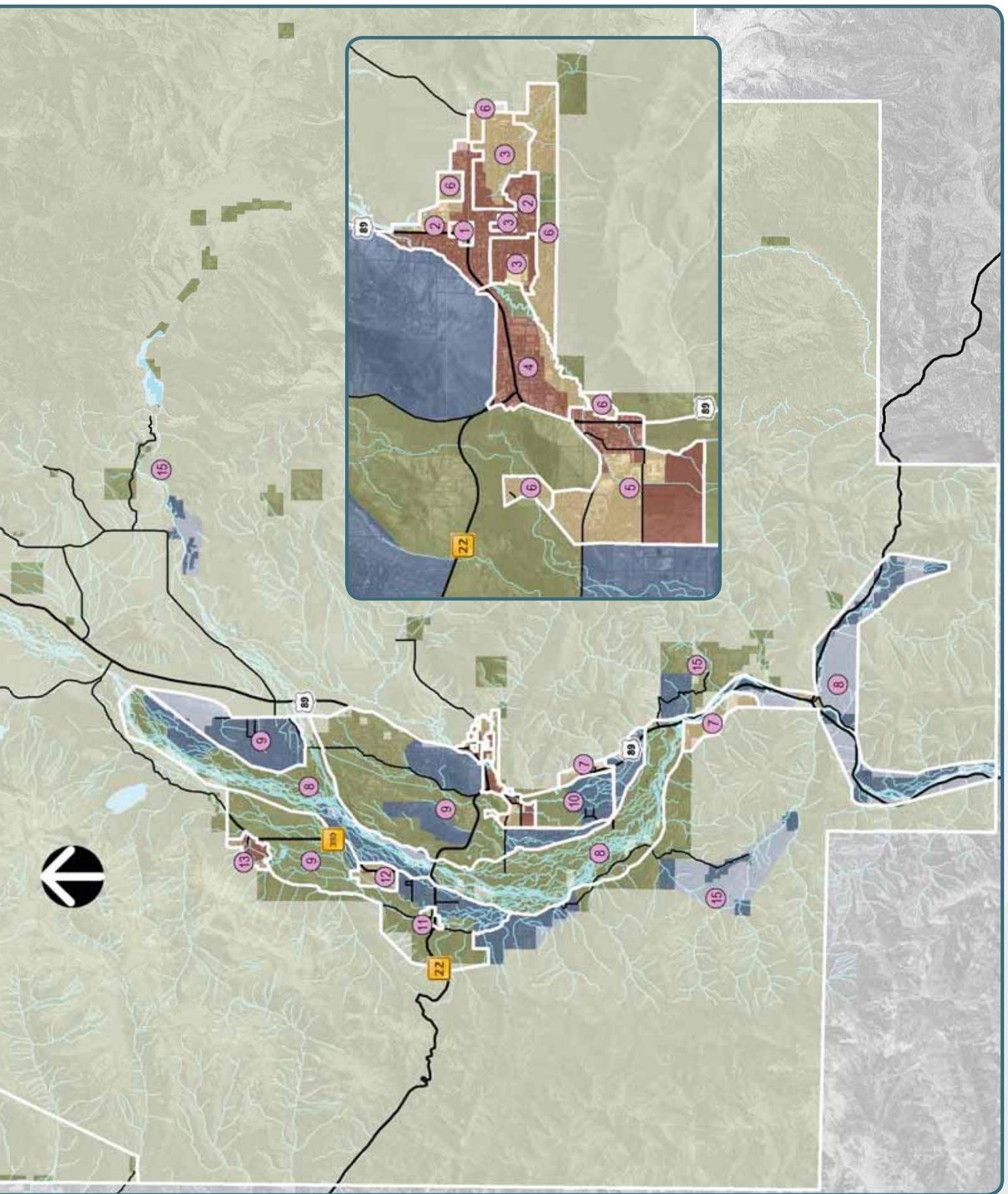


Stable, Transitional, Preservation + Conservation Subareas

IV-6

Stable Subarea	<ul style="list-style-type: none">Subareas in which no change to the existing character is necessaryDevelopment will be infill that maintains the existing identity or vitalityThe subarea may benefit from strategic infill or development of non-existing Complete Neighborhood amenities	Preservation Subarea <ul style="list-style-type: none">Subareas in which no change to the existing undeveloped character of the scenic resources and wildlife habitat is necessaryAdditional amenities and infrastructure are inappropriateMay benefit from some clustered residential development that improves the overall preservation of open space	Conservation Subarea <ul style="list-style-type: none">Areas of existing development and platted neighborhoods with high wildlife values, where development/redevelopment should focus on improved conservationAreas that benefit from an increase in open space, scenic resources, and habitat enhancementGoals include balancing existing development with improved wildlife permeability and scenic enhancements.
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Character Defining Features - Map Symbols

The Character Defining Features Maps depict the characteristics that define each district and subarea. Below is a list of symbols and map attributes that are used on the maps. Characteristics that are locational are shown on the map using colored symbols or map attributes. Other characteristics depicted using black symbols, apply generally to a subarea, but are not location specific. All mapped features are illustrative of the character of an area and do not imply desired regulatory boundaries or specific locations for certain attributes.

Common Value 1 – Ecosystem Stewardship

-  Wildlife Permeability: Design for wildlife permeability should be a characteristic of the subarea.
-  Agriculture: Agricultural use should be characteristic of the subarea.
-  Wildlife Highway Crossing: Wildlife-vehicle collision mitigation emphasis site as identified by the Western Transportation Institute and Montana State University College of Engineering in 2012.
-  Crucial Habitat: Bald eagle, trumpeter swan, mule deer, elk, and/or moose crucial winter habitat; mule deer and/or elk migration corridor; and/or bald eagle and trumpeter swan nesting area; and/or cutthroat trout spawning area as identified by the Conservation Research Center of Teton Science Schools in 2008.
-  Scenic Corridor/Vista: Scenic highway corridors and vistas as identified on 1994 Community Issues Maps.

Common Value 2 – Growth Management

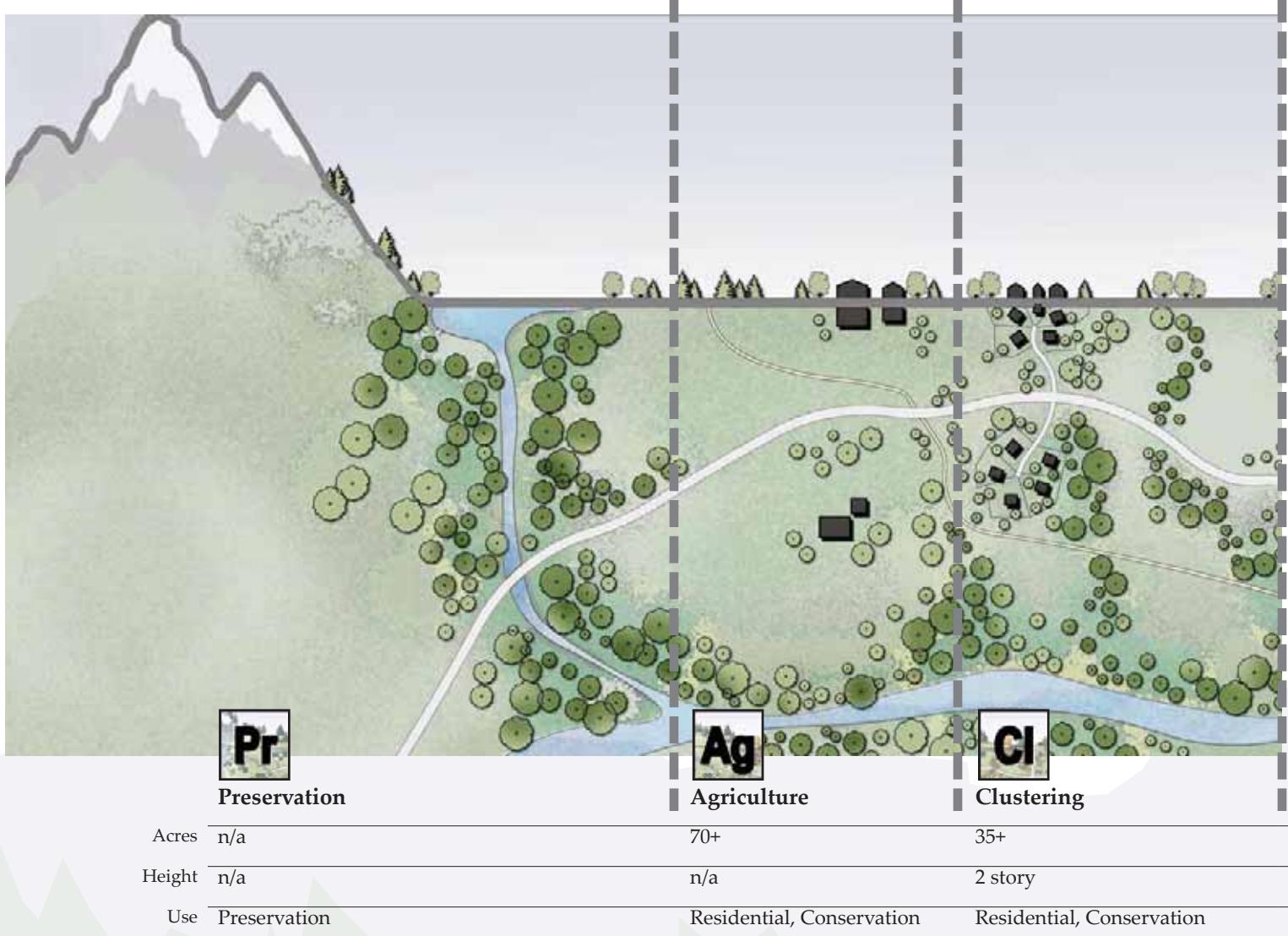
-  Gateway: A gateway into the community.
-  Public Parking: Existing parking provided by the Town of Jackson.
-  Road Corridor Enhancement: A roadway corridor that will be characterized in the future by enhanced pedestrian and commercial vitality.
-  Creek Corridor Enhancement: A creek within a Complete Neighborhood that will be characterized in the future by enhanced recreational opportunities and ecological value.

Common Value 3 – *Quality of Life*

- Workforce Housing: Housing occupied by the workforce should be a characteristic of the subarea.
- START Service: START service should be a characteristic of the subarea.
- LCC Local Convenience Commercial: Local convenience commercial should be located within the subarea.
- I Industrial: Light industrial and heavy retail use should occur in the subarea.
- Parks and Recreation: Existing parks and recreation facilities.
- School: Existing schools.
- Key Transportation Network Project: Transportation network projects identified in Policy 7.2.d.
- Existing/Proposed Pathways: Existing and proposed pathways identified in the Pathways Master Plan (2007).
- Improved Interconnectivity: An area that will be characterized in the future by increased interconnectivity.

Character Defining Features - Neighborhood Form Continuum

A Neighborhood Form identifies the general pattern and intensity of development representative of a certain character. One or more Neighborhood Forms are associated with each subarea. Below is a transect that depicts the continuum of Neighborhood Forms that make up our community and shows the relationship between the various patterns and intensities that define our character. The table below the transect describes characteristic acreages, heights, uses, and special considerations for each Neighborhood Form. These general characteristics are not prescriptive and are only meant to help describe the general pattern and intensity depicted in the transect.



Special Considerations	Preserved open space, wildlife habitat	Agricultural exemptions + incentives, scale of historic agricultural compounds	Improved wildlife habitat, open space and scenic protection with respect for private property rights, integrated transportation planning, scale of historic agricultural compounds
------------------------	--	--	--



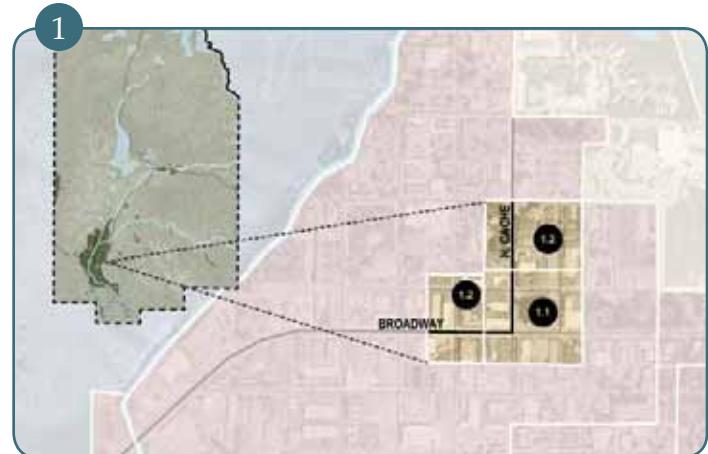
H/S Habitat/Scenic	Cn Conservation	Rs Residential	VII Village	VC Village Center	Tn Town	R/C Resort/Civic
+/- 35	1-5	± 1	n/a	n/a	n/a	n/a
2 story	2 story	2 story	2 story	2-3 story	2-3 story	n/a
Residential, Conservation	Residential	Residential	Residential, Local Convenience	Residential, Commercial, Industrial, Civic	Residential, Commercial, Civic	Resort, Civic
Design for wildlife and/or scenery, scale of historic agricultural compounds	Design for wildlife and/or scenery, predominance of landscape over built form	Design for wildlife and/or scenery, predominance of landscape over built form	Variety of housing types, complete streets, workforce housing	Mixed use, pedestrian oriented, complete streets, workforce housing	Pedestrian oriented, public spaces, complete streets, workforce housing, employment center	Master Planned, more intense development, public, semi-public facilities

What Does the Illustration of the Vision Address?

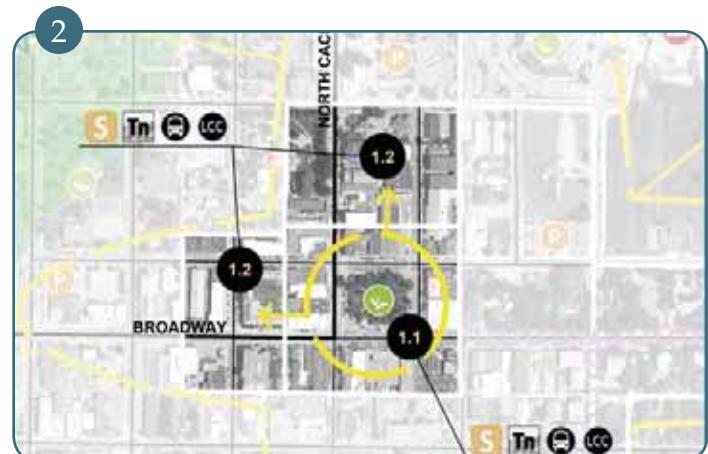
Our community's Vision is illustrated in 15 Character Districts. Each Character District has unique issues, opportunities and objectives. Each Character District contributes to the overall implementation of the Comprehensive Plan and will ensure that preservation and development occur in the desired amount, location and type throughout the community.

Each Character District is composed of 6 parts:

1. The Vicinity Map identifies the district boundaries and the size of the district in relation to the entire community. It also depicts the boundaries of the district subareas and their Stable, Transitional, Preservation, or Conservation classification.



2. The Character Defining Features Map depicts the characteristics that define each district and subarea. Characteristics are described through mapping or shown symbolically. Mapped features are illustrative of the character of an area and do not imply desired regulatory boundaries or specific locations of attributes. A complete list of symbols used on the maps can be found on pages IV-8 and IV-9.



3. The Complete Neighborhood/Rural Area Table indicates whether the district currently has the characteristics of a Complete Neighborhood or a Rural Area. It also indicates whether those characteristics will be maintained or enhanced in the future. This table serves to explain the classification of the district and identify the district's broad focus, basic issues, and opportunities.

CHARACTER DISTRICT	DEFINITION	EXISTING		FUTURE	
		GENERAL	PARTIAL	GENERAL	PARTIAL
COMPLETE NEIGHBORHOOD	Defined Character/High Quality Design	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Public Utilities	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Quality Public Space	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Variety of Housing Types	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Walkable Schools, Commercial + Recreation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Connection by Complete Streets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RURAL	Visible Wildlife Habitat + Connectivity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Natural Scenic Views	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Agricultural + Undeveloped Open Space	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Absence of Landscape over Built Form	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Limited, Detached, Single Family Res. Development	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Minimal Nonresidential Development	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

4. Existing + Future Characteristics describe in words the existing and future character of the district, focusing on the elements of character that should be preserved or enhanced. This section provides the overall goals and vision for the district.
5. The Policy Objectives are policies from the Common Values of Community Character chapters of the Comprehensive Plan that are particularly relevant and should be implemented in the district. There may be other policies that apply to the district, but these are the key objectives to be met in the district in order for the community to achieve our Vision.
6. The Character Defining Features describe each subarea through text, Neighborhood Forms, and photos and/or drawings. The focus of the description is the character priorities that will allow for the desired character of the district, and consequently the community Vision, to be achieved. The Neighborhood Form(s) depict the general pattern and intensity of development that meets the desired character; while the illustrations and/or photos provide a more detailed illustration of the desired built form. The entire continuum of Neighborhood Forms can be found on pages IV-8 and IV-9.

4

Existing + Future Desired Characteristics

The Town Square District is the historic center of Jackson Hole and the central gathering space for residents and visitors alike. The district is home to iconic buildings and public spaces, including the Cowboy Bar, George Washington Memorial Park (the "Town Square"), and the sawtooth building profiles surrounding the Town Square. Preserving the existing western character and heritage found in the buildings and public spaces in this district will be key to maintaining the existing character. The district is the center of the community experience in Town and plays an important role in defining our community's western heritage and overall community identity.

A future goal of the district is to have visitors and residents visit the area more often and stay longer, increasing the vitality of the area and supporting the local economy. To support this goal, commercial uses that create an active and engaging pedestrian experience, will be located on the first and second floors of buildings. Examples of these uses include restaurants, bars, a variety of retail shops and commercial amusement. In the future, the district will be the center of a Downtown Retail Shopping District, and office, residential and lodging uses will be predominantly located on upper floors.

Future community reinvestment in the district will create great public spaces and amenities for residents and visitors alike. This investment will not only create a positive visitor experience that supports our local economy, but will also continue the tradition of the Town Square as the gathering place for our community. The district will continue to be the center of community life, hosting a variety of events and community celebrations for residents and visitors. The temporary closure of streets, parking lots, parks and other public spaces will be encouraged to support such events. In addition, the community should consider the temporary and permanent closure of some streets to vehicles in order to create a vibrant pedestrian environment. *forward, the community will take great care and consideration in all future planning and development.*

5

Policy Objectives

Common Value 1: Ecosystem Stewardship	N/A
Common Value 2: Growth Management	4.1.d: Maintain Jackson as the economic center of the region 4.2.c: Create vibrant walkable mixed-use subareas 4.2.d: Create a Downtown Retail Shopping District 4.2.e: Protect the image and function of Town Square 4.2.f: Maintain lodging as a key component in the downtown 4.4.a: Maintain and improve public spaces 4.4.c: Continue traditions and community events 4.5.a: Identify and preserve historically significant structures and sites
Common Value 3: Quality of Life	6.2.a: Enhance tourism as the basis of the economy 6.3.a: Ensure year-round economic viability 7.1.c: Increase the capacity for use of alternative transportation modes

6

Character Defining Features

1.1. Town Square

This STABILIZE Subarea will focus on maintaining western character by retaining or replicating the existing built environment. Building heights directly fronting the Town Square should not exceed two stories. Buildings should be located near the street to create an attractive street front. A desired western architectural style and approach will be defined. The continuation of covered wooden boardwalks is vital to maintaining the desired western character. Parking will be provided predominantly in public lots, underground, and on street to create a vibrant, walkable area oriented to pedestrians.



SECTION 5 – APPLICATION MATERIALS

- **5.1 Application**
- **5.2 Warranty Deed**
- **5.3 Pre-application Conference Checklist**



PLANNING PERMIT APPLICATION
Planning & Building Department

150 E Pearl Ave. | ph: (307) 733-0440
P.O. Box 1687 | www.townofjackson.com
Jackson, WY 83001

For Office Use Only

Fees Paid _____

Date & Time Received _____

Application #s _____

Please note: Applications received after 3 PM will be processed the next business day.

PROJECT.

Name/Description: _____

Physical Address: _____

Lot, Subdivision: _____ PIDN: _____

PROPERTY OWNER.

Name: _____ Phone: _____

Mailing Address: _____ ZIP: _____

E-mail: _____

APPLICANT/AGENT.

Name: _____ Phone: _____

Mailing Address: _____ ZIP: _____

E-mail: _____

DESIGNATED PRIMARY CONTACT.

_____ Property Owner _____ Applicant/Agent

TYPE OF APPLICATION. Please check all that apply; review the type of application at www.townofjackson.com/200/Planning

Use Permit

Basic Use

Conditional Use

Special Use

Relief from the LDRs

Administrative Adjustment

Variance

Beneficial Use Determination

Appeal of an Admin. Decision

Physical Development

Sketch Plan

Development Plan

Design Review

Subdivision/Development Option

Subdivision Plat

Boundary Adjustment (replat)

Boundary Adjustment (no plat)

Development Option Plan

Interpretations

Formal Interpretation

Zoning Compliance Verification

Amendments to the LDRs

LDR Text Amendment

Map Amendment

Miscellaneous

Other: _____

Environmental Analysis

PRE-SUBMITTAL STEPS. To see if pre-submittal steps apply to you, go to www.townofjackson.com/200/Planning and select the relevant application type for requirements. Please submit all required pre-submittal steps with application.

Pre-application Conference #: _____ Environmental Analysis #: _____
Original Permit #: _____ Date of Neighborhood Meeting: _____

SUBMITTAL REQUIREMENTS. Please ensure all submittal requirements are included. The Planning Department will not hold or process incomplete applications. Partial or incomplete applications will be returned to the applicant. Go to www.townofjackson.com/200/Planning and select the relevant application type for submittal requirements.

Have you attached the following?

Application Fee. Fees are cumulative. Go to www.townofjackson.com/200/Planning and select the relevant application type for the fees.

Notarized Letter of Authorization. A notarized letter of consent from the landowner is required if the applicant is not the owner, or if an agent is applying on behalf of the landowner. Please see the Letter of Authorization template at www.townofjackson.com/DocumentCenter/View/102/Town-Fee-Schedule-PDF.

Response to Submittal Requirements. The submittal requirements can be found on the TOJ website for the specific application. If a pre-application conference is required, the submittal requirements will be provided to applicant at the conference. The submittal requirements are at www.townofjackson.com/200/Planning under the relevant application type.

Note: Information provided by the applicant or other review agencies during the planning process may identify other requirements that were not evident at the time of application submittal or a Pre-Application Conference, if held. Staff may request additional materials during review as needed to determine compliance with the LDRs.

Under penalty of perjury, I hereby certify that I have read this application and associated checklists and state that, to the best of my knowledge, all information submitted in this request is true and correct. I agree to comply with all county and state laws relating to the subject matter of this application, and hereby authorize representatives of Teton County to enter upon the above-mentioned property during normal business hours, after making a reasonable effort to contact the owner/applicant prior to entering.

Signature of Property Owner or Authorized Applicant/Agent

Date

Name Printed

Title



WARRANTY DEED

First American Title
Insurance Company

Teton County Housing Authority, a duly constituted Housing Authority established by Teton County, Wyoming pursuant to W.S. § 15-10-116 as amended GRANTOR, of Teton County, Wyoming, for and in consideration of TEN DOLLARS (\$10.00) and other good and valuable consideration, in hand paid, receipt of which is hereby acknowledged, CONVEYS AND WARRANTS to Town of Jackson, Wyoming, a Wyoming municipal corporation of the State of Wyoming, GRANTEE, whose address is Post Office Box 1687, Jackson, Wyoming 83001, the following described real estate, situate in the County of Teton, State of Wyoming, hereby waiving and releasing all rights under and by virtue of the homestead exemption laws of the State of Wyoming, to-wit:

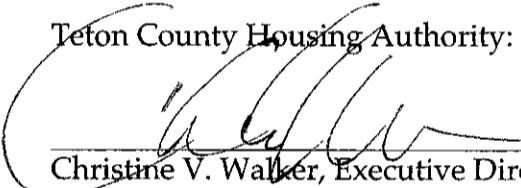
See attached Exhibit A.

PIN #22-41-16-33-2-00-025

Together with and including all improvements thereon and all appurtenances and hereditaments thereunto belonging. Subject to all covenants, conditions, restrictions, easements, reservations, and rights-of-way of sight and/or record.

WITNESS my hand this 17th day of August, 2011.

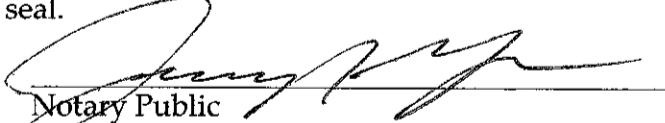
Teton County Housing Authority:

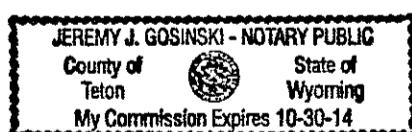

Christine V. Walker, Executive Director

STATE OF WYOMING)
)
COUNTY OF TETON)

The foregoing instrument was acknowledged before me this 17th day of August, 2011 by Christine V. Walker as Executive Director of the Teton County Housing Authority.

WITNESS my hand and official seal.


Notary Public
My Commission Expires: _____



GRANTOR: TETON COUNTY HOUSING AUTHORITY
GRANTEE: TOWN OF JACKSON WYOMING

Doc 0799665 bk 787 pg 741-742 Filed At 13:12 ON 08/18/11

Sherry L. Daigle Teton County Clerk fees: 11.00

By Kassie Hansen Deputy

Exhibit A

A Tract of Land located in the SE $\frac{1}{4}$ NW $\frac{1}{4}$ and the NE $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 33, Township 41 North, Range 116 West, 6th P.M., Town of Jackson, Teton County, Wyoming, being more particularly described as follows:

BEGINNING at the Southwest Corner of Said SE $\frac{1}{4}$ NW $\frac{1}{4}$, the center-west one-sixteenth corner of Said Section 33;

THENCE along the west line of Said SE $\frac{1}{4}$ NW $\frac{1}{4}$, N00°12'25"E, 660.83 feet;

THENCE N79°53'10"E, 321.32 feet, more or less, to the intersection with the west line of that easement for ingress and egress granted to Lower Valley Power and Light, Inc. as described in that instrument of record in Book 50 of Photo, pages 21 to 23, records of Teton County;

THENCE along the westerly line of said easement through the following courses and distances:

S00°38'59"W, 727.63 feet to a horizontal, circular curve to the right;
Thence along said curve, having a radius of 180.00 feet, a chord of 119.60 feet bearing S20°03'15"W, through a central angle of 38°48'27", an arc distance of 121.92 feet;
Thence S39°27'30"W, 61.85 feet;
Thence S38°49'10"W, 89.67 feet to a point on the easterly boundary line of that parcel conveyed to Lower Valley Power and Light, Inc. in said instrument of record in Book 50 of Photo, pages 21 to 23, records of Teton County;

THENCE departing said westerly line of said easement and proceeding along the easterly and northerly lines of said parcel in Book 50 of Photo through the following courses and distances:

N00°15'38"E, 160.00 feet to the northeast corner of said parcel;
N89°44'23"W, 175.00 feet to the northwest corner of said parcel, a point on the west line of Said NE $\frac{1}{4}$ SW $\frac{1}{4}$;

THENCE departing said boundary and proceeding along said west line, NE $\frac{1}{4}$ SW $\frac{1}{4}$, N00°15'37"E, 79.51 feet to the CORNER OF BEGINNING.



PRE-APPLICATION CONFERENCE SUMMARY

Planning & Development Department

Planning Division

150 E Pearl Ave. | ph: (307) 733-0440
P.O. Box 687 | fax: (307) 734-3563
Jackson, WY 83001 | www.townofjackson.com

This Summary will be prepared by Planning Staff. The applicant, or the applicant's agent, shall receive a copy of this summary for their reference in submitting a sufficient application.

Staff may request additional materials during review as needed to determine compliance with the LDRs.

PRE-APPLICATION MEETING GENERAL INFORMATION.

PAP#: P19-289
Date of Conference: 1/30/20
Planning Staff: Tyler Valentine

PROJECT.

Name/Description: Preapplication for Core Maintenance Facility Future Phases
Physical Address: 55 Karns Meadow Drive
Lot, Subdivision PT. SW1/4NE1/4 & PT. SE1/4NW1/4 SEC. 33, TWP. 41, RNG. 116 PIDN: 22-41-16-33-2-00-025
Zoning District(s): Public/Semi-Public (P/SP)
Overlay(s): Natural Resource Overlay (NRO)

STAKEHOLDERS.

Applicant: Jorgensen Associates – Brendan Schulte
Owner: Town of Jackson – Larry Pardee (Town Manager)
Agent: _____

REQUIRED APPLICATIONS. *This project will require the following applications:*

Application	Reason	Fee
Development Plan	Required for all future phases of the Core Maintenance Facility per the original Sketch Plan and CUP.	No fee
Design Review Committee (DRC)	Design review required for all nonresidential development, unless exempted by Planning Director	No fee
Grading Pre-application	Required for disturbing more than 3,000 sf of site area	No fee
Building Permit	Required for physical development	TBD

MEETING ATTENDEES:

Name	Company	Phone/Email
Brendan Schulte	Jorgensen Associates	(307) 733-5150

Reed Armijo	Jorgensen Associates	(307) 733-5150
Jeff Bates	Jorgensen Associates	(307) 733-5150
Brian Lenz	Town Engineer	(307) 733-3079 x1410
Kevin Meagher	Town Facilities Manager	(307) 733-3079
Johnny Ziem	Assistant Public Works Director	(307) 733-3079
Tyler Valentine	Town Senior Planner	(307) 733-0440 x1305

TIMELINES. This table is intended to provide general information regarding the review process and timing of decisions. See Article 8 for a complete explanation of the review process.

The following timelines are generally applicable:

Application Types:	Sufficiency	Decision-Maker	Timeline
Development Plan	14 days	Council	150 days from sufficiency
Design Review Committee (DRC)	n/a	DRC	Concurrent with Development Plan

Checklist Key.

✓ *Required.* Applicant must demonstrate compliance with this requirement.

N/A *Not Applicable.* Review requirement is not applicable to this project.

General Information

Requirement	Notes
✓ Planning Permit Application. The application should list all pertinent permits (use, physical development, interpretation, relief from the LDRs, Development Option/Subdivisions, Amendments to the LDRs) for which you are applying.	
✓ Notarized Letter of Authorization. See "Permit and Applications" section on Planning Department website for copy of form.	
N/A Application Fees. Fees are cumulative. Applications for multiple types of permits, or for multiple permits of the same type, require multiple fees. See the currently adopted Fee Schedule in the Administrative Manual for more information.	
✓ Review fees. The applicant is responsible for paying any review fees and expenses from consulting services necessitated by the review of the application by the County Surveyor, Town Engineer, Title Company and any other required consultant. Such fees shall be paid prior to approval of the permit.	
✓ Mailed Notice fee. See Section 8.2.14.C.2 for notice requirements. If mailed notices are required, the applicant is responsible for paying for any mailing in excess of 25 notices.	
✓ Digital Format. All applications submitted to the Town Planning Department must be submitted in digital format.	Upon submittal, only a digital copy is required. Hard copies will be required at a later date prior to the first public hearing.

v	Response to Submittal Checklist. All applications require response to applicable review standards. For applications where a pre-application conference is required, applicable standards are identified below. If a pre-application conference is optional, see the submittal checklist for the relevant application type, established in the Administrative Manual.	
N/A	Title Report. A title report, title certificate or record document guarantee prepared within the last six months that includes evidence of ownership and all encumbrances on the subject property. Copies of the documents referenced in the report should not be submitted unless requested by the planner during review.	
v	Narrative description of the proposed development. Describe in detail the existing condition of the property and the proposed development, use, or subdivision for which you are seeking approval.	This should include an update on outstanding environmental mitigation requirements, if any.
v	Findings for approval. Include in your narrative a response to the findings for approval found in LDR Div 8.5, as applicable.	
v	Proposed Development Program. Provide a table that summarizes the the projects compliance with the primary development standards (setbacks, heights, FAR, LSR, etc.). An example is found in the Administrative Manual.	
v	Site Plan. Provide a detailed site plan of the proposed project. A list of minimum standards for a site plan are established in the Administrative Manual.	
v	Floor Plans. Include floor plans for any existing buildings that will be occupied by a proposed use. If changes to existing buildings are proposed, indicate those on the floor plans.	
N/A	Neighborhood Meeting Summary. See Section 8.2.3 for Neighborhood Meeting requirements.	Optional.
v	Posted Notice. See Section 8.2.14.C.4 for Posted Notice requirements for all public hearings.	

ARTICLES 2 (COMPLETE NEIGHBORHOODS), 3 (RURAL AREA ZONES), and 4 (SPECIAL PURPOSE ZONES).

Applicable Zone: Public/Semi-Public

Applicable LDR Section: Section 4.2.1.

PHYSICAL DEVELOPMENT. *Please see Subsection B in applicable Zone District for specific standards.*

Requirement	Notes
v Structure Location and Mass (setbacks, height, FAR, etc.)	
N/A Maximum Scale of Development (individual building size)	
v Design Review (Design Guidelines and Design Review Committee)	Required.
v Site Development (Driveway and Access limits)	
v Landscaping (see Div. 5.5 for more information)	How many plant units provided? Sketch Plan mentions native plant types.
v Fencing (see Sec. 5.1.2 for more information)	

<input checked="" type="checkbox"/>	Environmental Standards (see Div. 5.1 and 5.2 for more information)	Please provide an update as to the original EA requirements (Alternative #2), what has been implemented and what obligations remain.
<input checked="" type="checkbox"/>	Scenic Standards (see Div. 5.3 for more information)	All lighting must comply with the exterior lighting standards in Section 5.3.1.
<input checked="" type="checkbox"/>	Natural Hazards to Avoid (see Div. 5.4 for more information)	Not in Wildland Urban Interface No steep slopes May be in flood plain.
<input checked="" type="checkbox"/>	Signs (see Div. 5.6 for more information)	
<input checked="" type="checkbox"/>	Grading, Erosion Control, Stormwater (see Div. 5.7 for more information)	
	<ul style="list-style-type: none"> • Grading • Erosion Control • Stormwater Management 	

USE STANDARDS. *Please see Subsection C in applicable Zone District for specific standards.*

Requirement	Notes
<input checked="" type="checkbox"/>	Allowed Uses (see Div. 6.1 for more information)
<input checked="" type="checkbox"/>	Parking (see Div. 6.2 for more information) How many spaces are required?
<input checked="" type="checkbox"/>	Employee Housing (see Div. 6.3 for more information)
<input checked="" type="checkbox"/>	Maximum Scale of Use
<input checked="" type="checkbox"/>	Operational Standards (see Div. 6.4 for more information) <ul style="list-style-type: none"> • Outside Storage • Refuse and Recycling • Noise • Vibration • Electrical Disturbances • Fire and Explosive Hazards • Heat and Humidity • Radioactivity

DEVELOPMENT OPTIONS. *Please see Subsection D in applicable Zone District for specific standards.*

Requirement	Notes
PAP Summary	4

<input checked="" type="checkbox"/>	Allowed Subdivision and Development Options (see Div. 7.1 and 7.2 for more information)	
<input checked="" type="checkbox"/>	Residential Subdivision Requirements (see Div. 7.4 and 7.5 for more information)	Housing is approved in the final phase which appears to be excluded from this Development Plan.
<input checked="" type="checkbox"/>	Infrastructure (see Div. 7.6 and 7.7 for more information)	
	<ul style="list-style-type: none"> • Affordable Housing • School and Parks Exactions 	
	<ul style="list-style-type: none"> • Transportation Facilities • Required Utilities 	

OTHER APPLICABLE LDR STANDARDS

Requirement	Notes:
<u>N/A</u> Division 1.9, Nonconformities	
	<ul style="list-style-type: none"> 1.9.2 Nonconforming Physical Development 1.9.3 Nonconforming Uses 1.9.4 Nonconforming Development Options and Subdivisions 1.9.5 Nonconforming Signs
<u>N/A</u> Division 7.3, Open Space Standards	
	<ul style="list-style-type: none"> 7.3.3 Configuration and Location of Required Open Space 7.3.4 Use of Open Space 7.3.5 Physical Development Permitted in Open Space 7.3.6 Record of Restriction 7.3.7 Ownership of Open Space

ADDITIONAL COMMENTS

- Applicant needs to demonstrate compliance with the Environmental Analysis, specifically with regard to the off-site mitigation in Karns Meadow. Alternative #2 was approved and needs to be completed with this proposed Development Plan. It appears that some of the off-site mitigation may have been related to the parking lot in Karns Meadow which is no longer in this proposal. If this is the case, the applicant will need to demonstrate whether that is the case and if so, the applicant needs to provide justification as to the new adjusted amount and location of off-site mitigation.
- At the meeting it was stated that the Building Permit can be submitted any time. However Planning will not accept a Building Permit until Council approval is received. There may be a possibility of submitting a Building Permit after Planning Commission and before Council, but this would need to be discussed with the Town Planning Director, Paul Anthony.
- At time the project would likely go back to the DRC based on the north elevation changes. However DRC may be waived if it is determined by the Planning Director that the changes are negligible.
- In the Development Plan narrative, the applicant needs to provide a detailed history of events starting from the original approval to the current date. The narrative should also highlight all changes from previous approvals including the solar panels that are proposed to replace the green roof.
- Applicant should consider the potential for an east-west road/pedestrian connection through the START site to connect to the adjacent Virginian property if the Virginian site is redeveloped with high density housing/commercial. This new road would connect Virginian Lane to Karns Meadow Lane. The Comprehensive Plan has goals to increase multi-modal connectivity in Mid Town Jackson by breaking up some of the 'super blocks' with new connections where appropriate to reduce congestion on the existing road network, such as the intersection of Snow King Ave and Virginian Lane. To minimize inconvenience to the START site, we would propose that any such road connection would be located on the southern edge of the site and to the north of the LVP&L transformer station. More discussion will be needed to make sure any connection would not compromise the function of the START facility.

PLAN REVIEW COMMITTEE. *The Plan Review Committee consists of the following listed agencies. Planning Staff will transmit pertinent portions of the application to each agency. Other agencies and individuals not checked off on this list may be added to the PRC if necessary.*

Agency	Required for:
<input checked="" type="checkbox"/> Building Official	
<input checked="" type="checkbox"/> Town Attorney	
<input checked="" type="checkbox"/> Town Engineer	
_____	Title Company – for subdivision plat
_____	County Surveyor – for subdivision plat
<input checked="" type="checkbox"/> Jackson Hole Fire EMS	
<input checked="" type="checkbox"/> Housing Authority	
_____	Integrated Solid Waste & Recycling
_____	National Park Service
<input checked="" type="checkbox"/> Parks and Recreation Department	
<input checked="" type="checkbox"/> Pathways Coordinator	
_____	Public and Environmental Health
<input checked="" type="checkbox"/> Police Department	
_____	Teton Conservation District
_____	Teton County School District
_____	Teton County (required when subdividing land within one mile of the Teton County)
_____	U.S. Forest Service (if adjacent to or accessing through forest service lands)
_____	Wyoming Department of Environmental Quality
_____	Wyoming Department of Game & Fish
_____	Other

PLANNING

Project Number	P19-289	Applied	12/24/2019	STOL
Project Name	Pre-App - Core Maintenance Facility	Approved		
Type	PREAPPLICATION	Closed		
Subtype	DEVELOPMENT PLAN	Expired		
Status	STAFF REVIEW	Status		

Applicant **Owner** TOWN OF JACKSON, WYOMING

Site Address 55 Karns Meadow Drive	City JACKSON	State WY	Zip 83001
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Subdivision **Parcel No** **General Plan**

Type of Review	Status	Dates			
		Sent	Due	Received	Remarks
Contact					
Notes					
Building	APPROVED	1/2/2020	1/23/2020	1/3/2020	
Kelly Sluder					

Fire APPROVED W/CONDITI 1/2/2020 1/23/2020 1/27/2020 see notes
Kathy Clay
(1/27/2020 10:41 AM CLAY)
TO: Tyler Valentine

FROM: Kathy Clay

DATE: January 27, 2020

SUBJECT: Pre-Application START
555 W Snow King Ave
P19-289

This office has received the request for pre-application review at the above location. The 2018 edition of the International Fire Code (IFC) and the most current edition of the National Electric Code (NEC) shall be used for building design.

Staff will review the construction documents for specific code concerns when construction documents are submitted. Please pay special attention to requirements for repair garages.

Please feel free to contact me if you have any further questions at 307-733-4732.

Joint Housing Dept APPROVED W/CONDITI 1/2/2020 1/23/2020 1/7/2020 See Notes
Stacy Stoker
(1/7/2020 1:58 PM SAS)

A Housing Mitigation Plan must be submitted with all future applications.

Legal NO COMMENT 1/2/2020 1/23/2020 1/23/2020 No comment at this time.
Lea Colasuonno

Type of Review	Status	Dates				Remarks
		Sent	Due	Received		
Contact						
Notes						
Parks and Rec	NO COMMENT	1/2/2020	1/23/2020	1/23/2020		
Steve Ashworth						
(1/24/2020 10:12 AM STOL)						
No comments from P&R related to P19-289.						
Andy						
Pathways	NO COMMENT	1/2/2020	1/23/2020	1/23/2020		
Brian Schilling						
(1/24/2020 10:11 AM STOL)						
No comments from Pathways.						
Brian						
Planning	APPROVED W/CONDITI	1/2/2020	1/23/2020	2/7/2020		
Tyler Valentine						
(1/30/2020 11:33 AM TV)						
Please see checklist.						
Police		1/2/2020	1/23/2020			
Todd Smith						
Public Works	APPROVED	1/2/2020	1/23/2020	1/23/2020		
Brian Lenz						

Type of Review	Status	Dates			Remarks
		Sent	Due	Received	
Contact					
Notes (1/23/2020 3:53 PM BTL)					
Pre-Ap Comments					

P19-289

ADDRESS: 55 Karns Meadow Drive

OWNER: Town of Jackson; Larry Pardee Town Manager

APPLICANT: Jorgensen Associates

1/23/2020

Brian Lenz, 733-3079

DATE OF SUBMITTAL: 1/2/2020

DATE OF MATERIALS: Phasing, 12/20/2019; Architectural No Date

REVISION NO.: 00

The engineering division has reviewed your application for a DEVELOPMENT PLAN AMENDMENT PRE-APPLICATION submitted on and with application materials as dated above.

*The following comments are being provided for use in preparation of future applications.

It is our understanding that the project has received approval and that there are only minor proposed changes to the application. Plans for the development not included with the application were used for the review.

PROJECT SPECIFIC COMMENTS

1. Development coordination between the Town and the 660 West Broadway developer agreed that as part of their project, they could grade over their south property line and onto the subject property. Coordination and alteration of the design of the proposed retaining wall around the parking lot is necessary.

TOJ CODE

A construction-staging narrative shall be submitted for review and approval with the Development Plan application.

LAND DEVELOPMENT REGULATIONS

Development shall comply with the physical development standards for its zoning.

5.4 NATURAL HAZARDS PROTECTION STANDARDS

5.4.2 Unstable Soils: Identify any unstable soils and show compliance with this section.

5.4.3 Faults: Identify any unstable soils and show compliance with this section.

5.4.4 Floodplains: Identify and floodplains or floodways and show compliance with the municipal code and / or the LDRs.

5.7 GRADING, EROSION CONTROL, AND STORMWATER

5.7.1 Grading Permit Required: Provide information on how the application will comply with this section, including the Geotechnical Report.

5.7.2 Grading Standards: Provide a grading plan that shows compliance with this section. Plan shall include existing and proposed site contours with elevation labels, spot elevations, high and low points, grade breaks. Provide easements for grading proposed on adjacent properties.

5.7.3 Erosion Control Standards: Provide an erosion control plan that shows compliance with this section.

5.7.4 Stormwater Management Standards: Provide an erosion control plan that shows compliance with this section. Stormwater discharges shall have sand/oil separation pre-treatment.

6.4 OPERATIONAL STANDARDS

6.4.1 Outside Storage: Provide a Construction Management Plan / Narrative, for any offsite storage address compliance with this section.

6.4.3 Noise: Provide a statement to address compliance with this section.

6.4.4 Vibration: Provide a statement to address compliance with this section.

7.7 – REQUIRED UTILITIES

Type of Review	Status	Dates				Remarks
		Sent	Due	Received		
Contact						
Notes						
7.7.2 Potable Water Supply:						
1.	Show compliance with local and state regulations, construction standards, connections for lots of record, provisions for system expansion, and fire protection. Provide information on planned metering and backflow prevention locations.					
7.7.3 Sanitary Sewer System:						
1.	Show compliance with local state regulations, construction standards, maximum allowable infiltration, connections for lots of record, provisions for system expansion.					
7.7.5 Other Utilities:						
Provide a plan for all other utilities, such as telephone, cable TV, electric, fiber, gas. All utilities shall be installed underground. Provide right-of-way or easements as required. Show that private utilities can be located on private properties, e.g. transformers.						
7.7.6 Fuel Storage Tanks:						
Provide a plan showing any buried fuel storage tanks. All fuel storage tanks shall be underground. All fuel tanks shall meet setbacks for accessory structures in the applicable zone, and no fuel may be buried within 50 feet from any stream, excluding irrigation ditches.						

START 1/2/2020 1/23/2020
 Darren Brugmann

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