Programmatic Environmental Assessment

Transportation Technology Center
Pueblo County, Colorado

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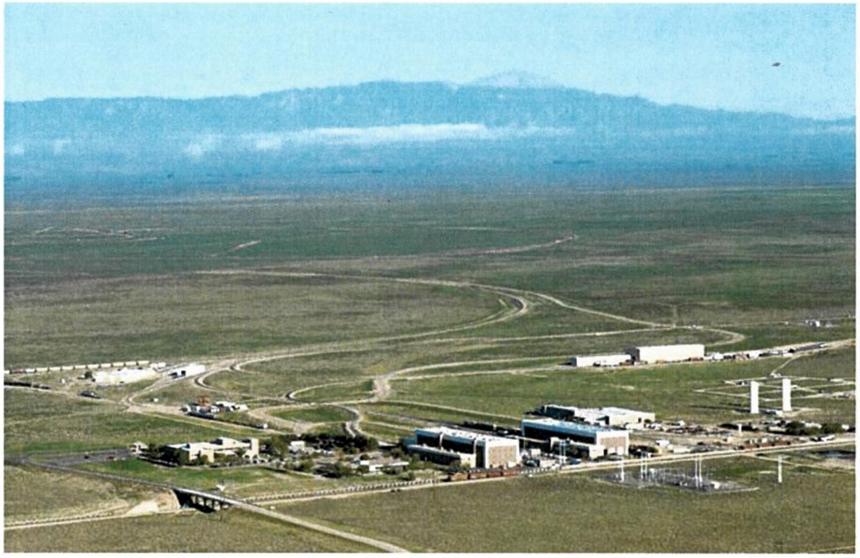

For more information on the Environmental Assessment, please contact:

Luis Maal
On-site Resident Engineer Program Manager
Transportation Technology Center (TTC)
55500 DOT Road
P.O. Box 11130
Pueblo, CO 81001
(719) 584-0551
luis.maal@dot.gov

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Federal Railroad Administration

TTCI
Transportation Technology Center, Inc.

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Acronyms and Terms

AAR – Association of American Railroads
ACOE – Army Corps of Engineers
ACHP – Advisory Council on Historic Preservation
APCD – Air Pollution Control Division
APE – Area of Potential Effect
APEN – Air Pollution Emission Notice
AQCC – Air Quality Control Commission
AST – above ground storage tank
BCC – Birds of Conservation Concern
CAA – Clean Air Act
CE – Categorical Exclusion
CBTC – Communications-Based Train Control
CCC – Care, Custody, and Control Agreement
CDPHE – Colorado Department of Public Health and Environment
CEM – Crash Energy Management
CFR – Code of Federal Regulations
CPW – Colorado Parks and Wildlife
CNHP – Colorado Natural Heritage Program
CSB – Center Services Building
CTA – Chicago Transit Authority Rectifier Substation
CTL – Components Test Laboratory
CWA – Clean Water Act
dB – Decibel
dBA – "A-weighting" Decibels
DC – Direct Current
DHS – Department of Homeland Security
DOD – Department of Defense
DOT – Department of Transportation
EA– Environmental Assessment
EIS – Environmental Impact Statement
EDOP – Engineering Design and Operations Plan
ESA – Endangered Species Act of 1973
FAST – Facility for Accelerated Service Testing
FEMA – Federal Emergency Management Agency
FRA – Federal Railroad Administration
FSB – Flammable Storage Building
GOCO – Government Owned Contractor Operated
gpm – gallons per minute
HAP – Hazardous Air Pollutant
HTL – High Tonnage Loop
HWMPH – Hazardous Waste Management Plan Handbook
MBTA – Migratory Bird Treaty Act
mph – miles per hour
MSU – Mini Shaker Unit
MW - megawatts
NAAQS – National Ambient Air Quality Standards
NDIS – Natural Diversity Information Source
NEPA – National Environmental Policy Act
NESHAP – National Emission Standards for Hazardous Air Pollutants
NFPA – National Fire Protection Association

NHPA – National Historic Preservation Act of 1966
NRCS – Natural Resources Conservation Service
NRHP – National Register of Historic Places
NSPS – New Source Performance Standards
OPS – Operations Building
OSHA – Occupational Safety and Health Administration
PCAPP – Pueblo Chemical Agent-Destruction Pilot Plant
$PM_{2.5}$ – Particulate Matter, less than 2.5 micrometers in diameter (fine particles)
PM_{10} – Particulate Matter, between 2.5 and 10 micrometers in diameter (coarse particles)
PMB – Project Management Building
PSB – Passenger Rail Service Building
PTACV – Prototype Track Air Cushion Vehicle
PTC – Positive Train Control
PTT – Precision Test Track
RCRA – Resource Conservation and Recovery Act
RDTF – Rail Defect Test Facility
R&D – Research and Development
RDL – Rail Dynamics Lab
RTT – Railroad Test Track
SDWA – Safe Drinking Water Act
SERTC – Security and Emergency Response Training Center
SIP – State Implementation Plan
SMB – Storage Maintenance Building
SMU – Simuloader
SOP – Standard Operating Procedure
SPCC – Spill Prevention Control and Countermeasure
TDT – Train Dynamics Track
TLRV – Tracked Levitated Air Cushion Vehicle
TMB – Transit Maintenance Building
TNT – Trinitrotoluene
TSA – Transportation Security Administration
TSCA – Toxic Substances Control Act
TSDF – Treatment, Storage, and Disposal Facility
TSP – Total Suspended Particulates
TTC – Transportation Technology Center
TTCI – Transportation Technology Center, Inc.
TTL – Tight Turn Loop
TTT – Transit Test Track
TTX – TTX Company
TWA – Time-Weighted Average
URB – Urban Rail Building
U.S. DOT – U.S. Department of Transportation
U.S. EPA – U.S. Environmental Protection Agency
U.S. FWS – U.S. Fish and Wildlife Service
UST – Underground Storage Tank
VOC – Volatile Organic Compound
VTU – Vibration Test Unit
WLF – Warehouse Laboratory Facility
WRM – Wheel-Rail Mechanism

Executive Summary

This programmatic Environmental Assessment (EA) evaluates the potential direct, indirect, and cumulative effects on the human and natural environment resulting from the continued and future operation of the Transportation Technology Center (TTC). The TTC property is located on a 33,280-acre site located northeast of the City of Pueblo, CO. The Department of Transportation, Federal Railroad Administration (FRA) has exercised the first of two 50 year renewal options, extending the lease of the site to August 22, 2070. The Department has the option to renew the lease of the site with the state of Colorado for an additional 50 year period. The buildings and facilities are owned by FRA and currently operated by Transportation Technology Center, Inc. (TTCI). The site includes more than 50 miles of railroad track, 14 buildings, substations, communication systems, interior roadways, an electrical power grid, water and sanitation systems, solid and hazardous waste management systems, and fuel storage areas.

Since the 1970s, TTC has been the site of transportation research and testing to serve the railroad industry. Currently, TTCI conducts tests for all categories of freight and passenger rolling stock, vehicle and track components, and safety. In addition, TTCI provides services in engineering, rail performance monitoring, computer modeling, defect testing, and transportation security, including transportation security activities focused on rail infrastructure and equipment against potential terrorist threats. TTCI's staff of engineering and technical experts routinely plan and perform destructive and nondestructive tests in support of these services.

TTC is also home to the Security and Emergency Response Training Center (SERTC), a business unit of TTCI. SERTC is designated by the Department of Homeland Security as a member of its National Domestic Preparedness Consortium specializing in developing and providing training related to surface transportation. SERTC is also designated by the State of Colorado as the Colorado State Training Center for Domestic Preparedness. SERTC provides courses for the transportation industry addressing emergency response related to hazardous materials and terrorism. Training is also provided to Transportation Security Administration (TSA) employees and emergency responders using realistic training scenarios. Training scenarios include use of real and simulated fire and explosives, in, on, and around railcars and rail infrastructure.

TTCI would be responsible for implementation of any minimization or best management practices identified in this EA.

Purpose and Need

The purpose of TTC is to provide the rail industry and public agencies with a facility to conduct the research, testing, and training related to the development and operation of a safe railroad system.

TTC's mission is to maintain state-of-the-art research and test capabilities to support DOT and other governmental and private entities in problem solving, personnel training, product evaluation and the support of research and development of new emerging technologies to improve the safety, security, efficiency and environmental impact of transportation.

TTC's strategy to fulfill this mission is to provide a unique, secure, and secluded, research and test facilities to support and offer partnering opportunities to federal and state agencies, the railroad industry and suppliers for transportation research & development, test and security training activities.

Private companies and federal, state and local governments need a secure and isolated facility to conduct specialized research and testing that supports continued technological advancements and improved safety in the rail industry.

Further development and maintenance at TTC is necessary to enable the facility to meet its mission in a safe, efficient, and environmentally sound manner; and to conduct business activities including research, testing, and training related to the efficient and safe operation of railroads.

Scope of the EA

The Proposed Action will ensure that continued activities, as well as anticipated business at TTC, are conducted in an efficient and environmentally sound manner. This EA evaluates following general categories of business activities at TTC: Testing, Research, Training, and Infrastructure. In addition to those categories, the Proposed Action is also evaluated for the effects of anticipated activities.

Anticipated activities include a new high-speed track (above 165 mph); more terrain props (static 3D props that is constructed as part of the environment/terrain for training exercises) to be used by Department of Homeland Security and TSA for motor carrier, bus, and rail safety research; blast effects on transportation vehicles; research for the Federal Bureau of Investigation (FBI) and the Central Intelligence Agency (CIA), Department of Defense (weapons research); off-road vehicle tests for the U.S. Army; and research related to tunnels and bridges.

The No Action Alternative is defined as maintaining the status quo and is used as a comparative baseline. Under this Programmatic EA, status quo is the continuation of existing TTC operations. Operations and routine assistance activities at TTC would continue at current levels and would not expand or change. Infrastructure would not be constructed, upgraded, or improved, eliminating the potential for growth. Not only would the No Action Alternative eliminate the potential for growth, but it may also cause a decrease in activities at TTC due to the inability of the aging infrastructure to support ongoing projects. The No Action Alternative does not include major remediation activities, facility upgrades, or decommissioning.

Resource areas considered in this EA for potential effects include: air; surface water, floodplains, and wetlands; groundwater and hazardous materials/hazardous waste; soil; biological resources including vegetation, wildlife, and threatened, endangered, and State species of Special Concern; cultural resources; land use and transportation; noise; and socioeconomics. In addition the potential cumulative effect of past, present, proposed, and reasonably foreseeable projects at the TTC facility are evaluated with respect to these resources.

Description of the Alternatives

This EA analyzes two alternatives: the Proposed Action Alternative and a No Action alternative.

Proposed Action Alternative

The Proposed Action Alternative would consist of the continued development of program activities, new or expanded operations, and improved facilities and services at TTC. The Proposed Action Alternative includes anticipated projects as outlined in the TTC Master Plan (TTCI 2012), and discussed below.

No Action Alternative

The No Action Alternative consists of current operations but would not include continued program development, investment, or implementation of the Master Plan. Major cleanup activities, facility upgrades, or decommissioning would not occur under the No Action Alternative. Operational and routine site activities at TTC would continue at the current level and would not expand or change. The Master Plan would not be fully implemented, the infrastructure would not be constructed or upgraded, and new anticipated activities would not occur.

Summary of Potential Environmental Effects of the Proposed Action

Potential environmental effects of the Proposed Action for the individual resource areas are summarized below.

Air

The Proposed Action would be comply with the National Ambient Air Quality Standards, Colorado standards, and the Colorado State Implementation Plan and would result in negligible, if any, short-term effects on air quality. Any short-term effects would only be expected to occur during testing or training activities. Air quality effects resulting from testing would generally range from moderate, in the immediate vicinity of the test, to minor, in areas extending away from the site to the boundary of TTC.

Surface Water, Floodplains, and Wetlands

Surface water, floodplains, or wetlands are found at the Black Squirrel Creek drainage near the west boundary of the project area and the Haynes Creek drainage located near the southern boundary of the project area.

Existing roads and track that are located within the Haynes Creek floodplain have not affected the function of the floodplain. Any new construction would likely avoid the designated 100-year floodplains for Black Squirrel Creek and Haynes Creek. However, if a new facility were constructed within the boundaries of these floodplains, there would likely be negligible, adverse, direct short-term or long-term effects to be determined at that time and construction would be implemented to avoid wetlands. However, if a new facility might impact existing wetlands, an accurate delineation of potentially affected wetlands would be completed and the Section 404 permitting process initiated with the U.S. Army Corps of Engineers (ACOE).

Groundwater and Hazardous Materials/Hazardous Waste

From a water supply perspective, TTC is expected to have adequate decreed groundwater rights and augmentation water arrangements to continue operations at its current level, provided TTC complies with the replacement requirements of the augmentation plan.

The augmentation plan is a court-approved plan, which is designed to protect existing water rights by replacing water consumed on-site by TTC and to provide replacement water to the Arkansas River Basin. Augmentation plans are usually required in areas where there is a shortage of water during part or all of the year. However, expansion of site activities that necessitate use or consumption of additional water may require modification of the site's water augmentation plan to allow withdrawal of additional groundwater from the alluvial aquifer and acquisition of additional replacement water from the Arkansas River basin.

Continued activities at TTC may involve hazardous materials. These materials are managed with standard procedures, including proper containment, separation of incompatible and reactive chemicals, worker warning and protection systems, handling procedures to ensure safe operations, and training. Therefore, no significant effects due to hazardous materials are expected.

In the event of a spill or release from the waste pretreatment system or during handling of secondary wastes, groundwater could be adversely, yet indirectly, affected. The potential effect would be site-specific, but there could be a larger scale effect if contamination entered groundwater and migrated. The duration of the potential effect would be long-term. The impact would be fairly limited, depending on the facility in question and the materials handled. Negligible to minor effects would apply to most facilities where (a) groundwater occurrence beneath the facilities is minor and (b) ongoing inspections, operations, maintenance, and monitoring of the pretreatment system and waste management procedures are performed in accordance with TTCI protocols, as outlined in their Waste Water Treatment Operations and Maintenance Manual, Waste Water Treatment Room Operations, Hazardous Waste Management Plan Handbook, Engineering Design and Operations Plan, and Spill Prevention Control and Countermeasure Plan. These best practices and procedures minimize unintended releases, but do not always extend to floor drains, sumps, and single-walled buried pipelines that service the Rail Dynamics Lab, Center Services Building, and wastewater impoundment facilities. Integrity testing is not currently performed on these floor drains, sumps, and pipelines.

Best management practices for the floor drains, sumps, and single-walled buried pipelines that service the Rail Dynamics Lab, Center Services Building, and wastewater impoundment facility will be performed in the future. TTC will develop and implement an inspection and integrity testing program for these components to verify they do not leak. At a minimum, inspection and testing will be performed annually, with results reported to TTCI management and documented in the project files.

Soil and Wetlands

Total disturbance acreages associated with anticipated developments are unknown but would be relatively minor in relation to the total extent of soil resources across the TTC property. These disturbances would be permanent except for laydown and construction sites that would be reclaimed after construction was complete. It is assumed that construction of facilities would avoid areas of wetlands and associated soils with moderate to high levels of alkalinity and soluble salts. Because of the highly erosive nature of soils on the TTC property, recommended stabilization and revegetation measures would be implemented on temporary disturbance sites to minimize excessive erosion.

Biological Resources

Vegetation

Seven major vegetation communities and one land use type were mapped within the TTC property boundaries. They are sand sage/short-grass prairie, short-grass prairie, cholla/sand sage/short-grass prairie, cholla/rabbitbrush/sand sage/short-grass prairie, greasewood bottomland, wetland, and disturbed/developed. Alkaline meadow and salt flat are subtypes within the wetland vegetation type. Disturbed/developed areas cover approximately 5 percent of the TTC property, and wetlands cover less than 1 percent of the property. Total vegetation cover is highly variable within the project area and ranges from near zero in blowout areas along ridges to 25 to 60 percent total cover in undisturbed areas with stable vegetation cover.

Relatively minor losses of vegetation would result from construction activities. The minor disturbances to vegetation resources associated with the Proposed Action may be permanent or temporary. Where disturbances are temporary, revegetation efforts are likely to be successful with the recommended soil stabilization measures.

Wildlife

The project area provides habitat for numerous wildlife species associated with native prairie habitats. Two big game species, mule deer and pronghorn, are relatively common in the region. There would be minor disturbances to wildlife habitat associated with planned developments; some of those disturbances may be permanent. Effects on wildlife and wildlife habitat resulting from facility upgrades would be minor, adverse, short-term, and long-term.

Threatened, Endangered, and State Species of Special Concern

The Colorado Parks and Wildlife list of State Threatened, Endangered, and species of Special Concern was reviewed for species' potential presence on the TTC property. No species are federally listed as threatened or endangered are known to reside on the site. Based on species' ranges and habitat preferences, it was determined that several state-listed species of Special Concern are potential inhabitants of the property or the surrounding areas. The State Special Concern species are black-tailed prairie dog, swift fox, ferruginous hawk, mountain plover, massasauga, and leopard frogs. One state-threatened species, the burrowing owl, may also be found on the TTC property.

Measures recommended by officials would be employed to preclude any potential disturbance of locally listed species, burrowing owl or mountain plover nest sites.

Effects on wildlife associated with habitat loss would be relatively minor, short-term, and long-term. Effects related to noise would result in short-term, relatively minor adverse effects on wildlife near the test sites, but significant adverse long-term effects are unlikely.

Cultural Resources

Cultural resource inventories indicate that low-density historic and prehistoric occupation likely existed at TTC. Today, TTC's Research and Development (R&D) focus has resulted in, and will likely continue to result in, the creation of objects and properties eligible for inclusion in the National Register of Historic Places (NRHP). Although none yet meet the NRHP 50-year age requirement, the machinery and research and development infrastructure have already achieved significance for their contributions to history and for the distinctive characteristics of the type or method of construction.

FRA is responsible for complying with Section 106 and Section 110 of the National Historic Preservation Act (NHPA) of 1966 for all undertakings at TTC. FRA will ensure that future undertakings are reviewed for their potential effect on historic properties which include architectural and archeological resources. Specifically, for future undertakings that include the potential for ground disturbing activities, FRA would consult with the Colorado State Historic Preservation Office and if needed, any other interested parties to identify the Area of Potential Effect (APE), the presence or absence of cultural resources, the effects of that particular federal undertaking/action would have on those resources, and avoidance or environmental commitments if appropriate.

Land Use and Transportation

No residential developments, businesses, or other populated areas are located in the surrounding area. A few rural residences are located near TTC. Surrounding lands are expanses of open rangeland that are privately owned, or public lands that are state or federally owned. The nearest development is located along the U.S. 50 highway corridor approximately 17 miles to the south of the project. The isolated nature and vacant land buffer characterizing the TTC property ensures that TTC operations do not conflict with neighboring land uses. All access roads to the TTC property are paved and in excellent condition and are well maintained throughout the year.

Effects on land use and transportation are anticipated to be direct, short- to long-term, and negligible. The Proposed Action is not expected to result in any significant increase in demand for local infrastructure such as roads. The Proposed Action would not disrupt the transportation systems in the area or highway vehicle traffic to TTC. Construction related to anticipated activities would have negligible-to-minor, adverse, direct, short-term or long-term effects on transportation and land use.

Noise

Explosive testing or impact testing could have noise-related effects on the outdoor environment. However, most noise related to such tests would not have an effect on the few neighboring residential properties. Landowners would receive notification prior to testing involving large amounts of explosives (50 pounds or larger) so that livestock could be moved out of the area to eliminate the potential for effects on livestock. TTC anticipates performing only a few such tests per year.

The Hearing Conservation Program[1] implemented by TTCI mitigates effects related to noise in the indoor environment; therefore, personnel working on-site are not expected to experience measurable noise effects.

Socioeconomics

TTC currently has approximately 270 permanent employees. Approximately 92 percent of the employees at TTC live in Pueblo County, another 8 percent live in El Paso County, and an additional 20 to 30 customer employees may be on-site for specific test activities. Employees typically commute on a daily basis to and from the facility. TTCI has inspectors traveling within the United States to perform facility inspections for rail vehicle maintenance certifications, and some engineers work remotely from TTC.

The Proposed Action would continue and expand existing actions at TTC and is also not anticipated to disproportionately or adversely affect low-income or minority populations as there are no low-income or minority populations adjacent to the Project area. Under the Proposed Action, the facility will continue to support local economic activity.

Continued permanent and contract employment at TTC from the Proposed Action would provide socioeconomic benefits to the local area. Additional employment would be generated by customers and employees visiting the site for various activities and participants in testing, training, and future activities. However, it is anticipated that operations would continue as they have done in past years. New projects are expected to bring in additional revenue which would require continuing or increased employment at TTC.

Safety, Health, Environmental and Emergency Services

TTC maintains site security 24 hours a day, 7 days a week. The entire perimeter of the TTC property is fenced. Gates at supplementary access roads are locked and warning signs are posted around the entire perimeter of the facility. TTCI currently has a full-time Fire Chief on 24-hour call to coordinate emergency response efforts. TTC security personnel are trained Emergency Medical Technicians and firefighters. TTCI also maintains a pool of Fire Brigade Responders to supplement and support the security staff, jointly serving as primary responders force s during normal business hours; they remain on call during afterhours. Security and medical support personnel, equipped

[1] The Hearing Conservation Program is an approach developed by TTC to address noise issues, generally indoor noise, but can applicable to noise levels in general generated at the facility.

with communications equipment, are on standby during all testing. These personnel provide emergency medical care to TTC personnel, in addition to emergency treatment and response during accidents.

Standard protocol at TTC is to implement a Range Safety Plan for any unique activities at the facility. A Range Safety Plan is developed and followed by on-site employees, contractors, and visitors to ensure safety protocol is followed during test activities. TTCI firefighters are on standby during applicable test, research, or training events. TTCI provides Doss Aviation at the Pueblo Municipal Airport with a 24-hour notice prior to significant tests and training to ensure their flight activities are not conducted in close proximity to the test areas.

TTC anticipates no major effects on public health or safety as a result of the Proposed Action.

Cumulative Environmental Effects

The Proposed Action is not expected to contribute to any cumulative effects at TTC or in the greater Pueblo region. However, the improvements through training and testing would have long-term beneficial impacts to safety and the environment.

Summary of Potential Environmental Effects of the No Action Alternative

The No Action Alternative is not expected to have significant effects on the natural or human environment. Any adverse effects have been minimized and best management practices will be implemented as appropriate.

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1.0 Introduction

1.1 Background

TTC is a railroad research and training facility located northwest of Pueblo, CO (Figure 1-1). It is owned by FRA and operated by TTCI. Activities that are conducted at TTC include research testing, safety training and performance testing of rail equipment including crash and accident testing of railroad cars and locomotives.

1.1.1 Federal Railroad Administration

FRA is an operating administration of the Department of Transportation (DOT) and was created as part of the Department of Transportation Act of 1966. Its mission includes the promulgation and enforcement of rail safety regulations, administration of railroad financial assistance programs, and execution of research and development (R&D) programs in support of improved rail safety and national rail transportation policy.

1.1.2 Transportation Technology Center

Development of a Transportation Technology Center was authorized by The High Speed Ground Transportation Act, Public Law 90-423, 90th Congress, H.R 16024, dated July 24, 1968, which granted the Secretary of Transportation the authority for test site acquisition. The site near Pueblo was selected from an original list of 75 candidate sites throughout the United States.

A substantial portion of the TTC site was developed from the early 1970s through 1981. FRA operated the facility, with the strong presence and collaboration of the Urban Mass Transportation Administration, through September 1982. The mission of federally funded R&D efforts changed with the Reagan Administration, resulting in a Care, Custody, and Control (CCC) Agreement issued between FRA and the Association of American Railroads (AAR), who took over operation and maintenance of TTC in October 1982. AAR represents primarily the major freight railroads of North America (Canada, Mexico, and the United States). AAR works to improve the efficiency, safety, and service of the railroad industry; one way is by maintaining responsibility for the industry's interchange rules and equipment specifications. FRA retains its role as owner of the facility and remains a primary customer at TTC by funding railroad research with an emphasis on safety.

TTC is located on a remote and secure 33,280-acre site approximately 21 miles northeast of the City of Pueblo, CO. The TTC property is located in Range 68 West Township 18 and 19 North and encompasses multiple facilities including 14 office, storage or combined maintenance buildings, 2 direct current (DC) rectifier substations, communication systems, an array of 16 specialized test tracks/facilities with more than 50 miles of railroad track and yard and storage track that enable isolated testing for all categories of freight and passenger rolling stock, vehicle and track components, interior roadways, electrical power grid, water and sanitation systems, solid and hazardous waste disposal, and fuel storage areas.

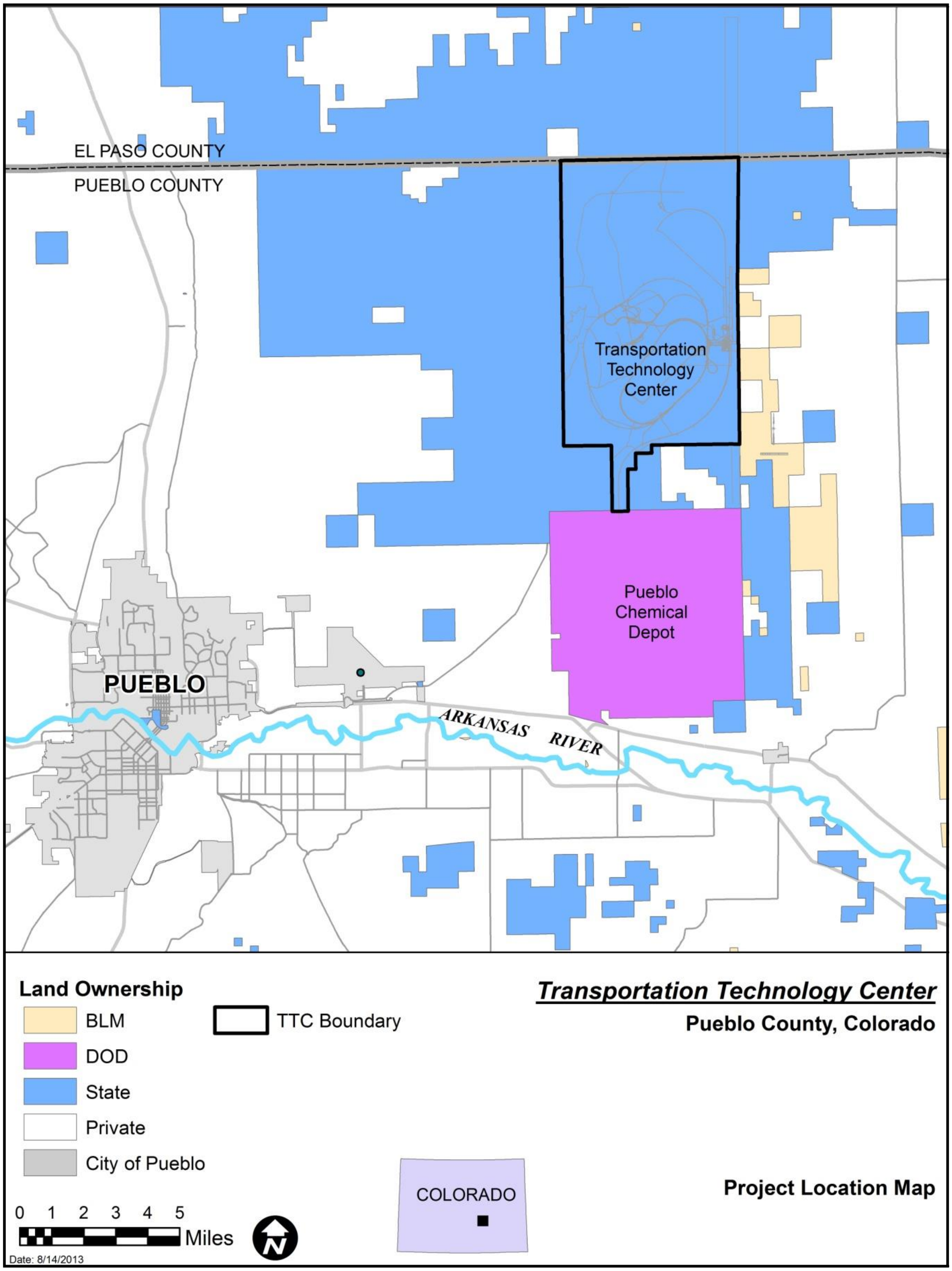

Figure 1-1 Site Location Map

1.1.3 Transportation Technology Center, Inc.

In 1997, TTCI was formed as a subsidiary of AAR to assume operation of TTC effective January 1, 1998. In 2011, FRA and TTCI signed a new contract for the CCC Agreement of TTC, extending the period of performance through September 30, 2022. TTCI concentrates on conducting transportation research and testing to serve the railroad industry. TTC is home to the Security and Emergency Response Training Center (SERTC), which is a business unit of TTCI. SERTC is designated by the Department of Homeland Security (DHS) as a member of its National Domestic Preparedness Consortium to specialize in developing and providing training related to surface transportation. SERTC is also designated by the State of Colorado as the Colorado State Training Center for Domestic Preparedness. SERTC provides courses addressing emergency response related to hazardous materials and terrorism for the transportation industry.

The CCC contract requires TTCI to invest a set amount into maintaining and upgrading the facility, subject to approval of the upgrades by FRA. In many instances, TTCI makes leasehold investments and capital equipment purchases that then become part of the government's inventory at TTC. The CCC agreement between FRA and TTCI enhances the use of the facilities for transportation research, development, security, training, and test activities. FRA encourages broad use of TTC facilities by other government agencies and the private sector. Over the past 40 years, TTCI has made changes to the facilities as a result of program needs, environmental compliance, technical advances, and a changing industry.

1.2 Purpose and Need

The purpose of TTC is to provide the rail industry and public agencies with a facility to conduct the research, testing, and training related to the development and operation of a safe railroad system.

<u>TTC's mission</u> is to maintain state-of-the-art research and test capabilities to support DOT and other governmental and private entities in problem solving, personnel training, product evaluation and the support of research and development of new emerging technologies to improve the safety, security, efficiency and environmental impact of transportation".

<u>TTC's strategy to fulfill this mission</u> is to provide a unique, secure, and secluded, research and test facilities to support and offer partnering opportunities to federal and state agencies, the railroad industry and suppliers for transportation research & development, test and security training activities".

Private companies, federal, state and local governments need a secure and isolated facility to conduct specialized research and testing that supports continued technological advancements and improved safety in the rail industry.

Further development and maintenance at TTC is necessary to enable the facility to meet its mission in a safe, efficient, and environmentally sound manner. Anticipated business activities at TTC includes research, testing, and training related to the efficient and safe operation of railroads.

1.3 Framework for Analysis

This Programmatic EA assesses the Proposed Action to determine the direct, indirect, and cumulative environmental effects of continued activities at TTC as well as future projects (e.g. those identified in the TTC Master Plan). The Proposed Action includes future activities similar to those generic and common activities currently occurring at various sites at TTC.

This Programmatic EA evaluates the potential environmental effects of the Proposed Action that have similar characteristics to past, present, and anticipated activities at the site. This Programmatic EA also sets up a mechanism for analyzing time- and location-specific aspects of future proposed activities at TTC through Project-level NEPA documentation (i.e. tiered EAs or categorical exclusions, as appropriate). Any required subsequent environmental documents will be able to rely on the pertinent information from the Programmatic EA, without duplicating analysis from a previous assessment.

Environmental review of future projects at TTC will begin by determining whether the proposed project is within the scope of activities and impacts presented here as the Proposed Action identified and evaluated within this Programmatic EA, where the action is not analyzed in this Programmatic EA further environmental review will be required. If the proposed project raises any the following issues, coordination with FRA headquarters environmental staff to determine the level of NEPA evaluation or re-examination, is required if the action meets the following criteria:

a. Unique situations presented by specific proposals, such as scientific controversy about the environmental effects of the proposal;
b. Uncertain effects or effects involving unique or unknown risks;
c. Unresolved conflicts concerning alternate uses of available resources within the meaning of Section 102(2)(E) of NEPA; or
d. Where it is reasonable to anticipate cumulatively significant effects on the environment.

Prior NEPA analysis has been performed for projects occurring at TTC. Two previous EAs and multiple categorical exclusions have been completed for actions occurring at TTC, as shown in Table 1.4-1. This Programmatic EA uses the analysis and data from these past NEPA documents. The following table shows environmental analyses that have been completed for various projects at TTC. The table will be updated as other projects are approved or permitted.

Table 1-1 Previous Environmental Analyses at TTC for NEPA Compliance[1]

Environmental Study	Subject Analysis	Date Completed	Agency
Categorical Exclusion (CE) Wayside Track Installation on the West Tangent of the Transit Test Track (TTT)	Proposal to build a 5,000 foot wayside track along the outside west tangent section of the TTT at TTC	January 15, 2013	FRA
Categorical Exclusion (CE) for Automated Cracked Wheel Detector	Project to evaluate cracked wheel detection systems on site at TTC to improve the state of the art of automated cracked wheel detection by bringing forward promising technologies	December 21, 2012	FRA
Final Explosive and Fire Testing At TTC EA	Proposal to establish a test bed to perform tests on rail cars and rail assets at TTC to verify and investigate rail car explosion and fire vulnerability	November 8, 2012	TSA/FRA
Draft Environmental Assessment- Transportation Technology Center, Inc. Solar Generation Facility	Proposal to develop and implement sustainable energy solutions for TTC facilities	January 20, 2011	FRA
CE for Underground Rail Security Testing Facility	A tunnel and substation test bed for testing and training associated with homeland security and related activities	April 20, 2009	FRA
High Speed Ground Test Center Conservation Plan	Resource Conservation Plan to complete inventories on climate, soils, vegetation, wildlife, hydrology, geology and minerals, archaeology and history, and fire control to select alternative land uses and conservation treatments	1972	SCS

[1]All above documents are on file at FRA.

1.4 Regulatory Framework

The Proposed Action will comply with applicable requirements, including the statutes, regulations, and permit requirements listed below. Other federal, state, and local requirements may apply to individual activities. This EA has been prepared to comply with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq), the Council of Environmental Quality regulations implementing NEPA (40 C.F.R. Parts 1500-1508) and FRA's Procedures for Considering Environmental Impacts 64 FR 28546, May 26, 1999.

1.4.1 Summary of Key Federal Compliance Requirements

Key Federal Environmental Compliance laws in addition to NEPA that apply to TCC include:

- Section 4(f) of the Department of Transportation Act (49 U.S.C. 303(c));
- Section 106 of the National Historic Preservation Act (54 U.S.C. 306108)
- The Clean Air Act (42 U.S.C. 7609(a));
- Section 7 of the Endangered Species Act (16 U.S.C. 1536); Migratory Bird Treaty Act (MBTA) 16 U.S.C. §§ 703–712; and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c)

1.4.2 Other Federal, State, and Local Compliance Requirements:

Other Environmental regulations which may apply to the Proposed Action include:

- Endangered Species Act, and implementing regulations at 50 CFR Part 17
- Magnuson-Stevens Fishery Conservation and Management Act, 50 CFR Part 600 Public Law 91-190,
- Clean Water Act of 1977, 33 USC § 1251-1376 Sections 9 and 10 of the Rivers and Harbors Act of 1899, 33 USC § 401
- Section 404 of the Federal Water Pollution Control Act (CWA), 33 USC § 1344
- Section 6(f) of the Land and Water Conservation Act of 1965, 16 USC § 460
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 42 USC § 61 Executive Order 11988,
- Floodplain Management, 42 FR 26951, signed May 24, 1977 Executive Order 11990,
- Protection of Wetlands, 42 FR 26961, signed May 24, 1977 Executive Order 12898,
- Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 FR 7629, signed February 11, 1994 Executive Order 13166,
- Improving Access to Services for Persons with Limited English Proficiency, 65 FR 50121, signed August 11, 2000

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2.0 Current Activity Conducted at TTC

Figure 1-1 shows the general location of the TTC facilities and land ownership in the surrounding area. Figures 3-1 and 3-2 show the TTC site and all facilities and core area buildings. Provided below are descriptions of existing core area buildings, laboratories, engineering tracks, other facilities and infrastructure, training programs and services, other services, and anticipated activities. Detailed descriptions of these core area testing, research, training facilities and infrastructure can be found in the 2012 TTC Master Plan (TTCI 2012) attached.

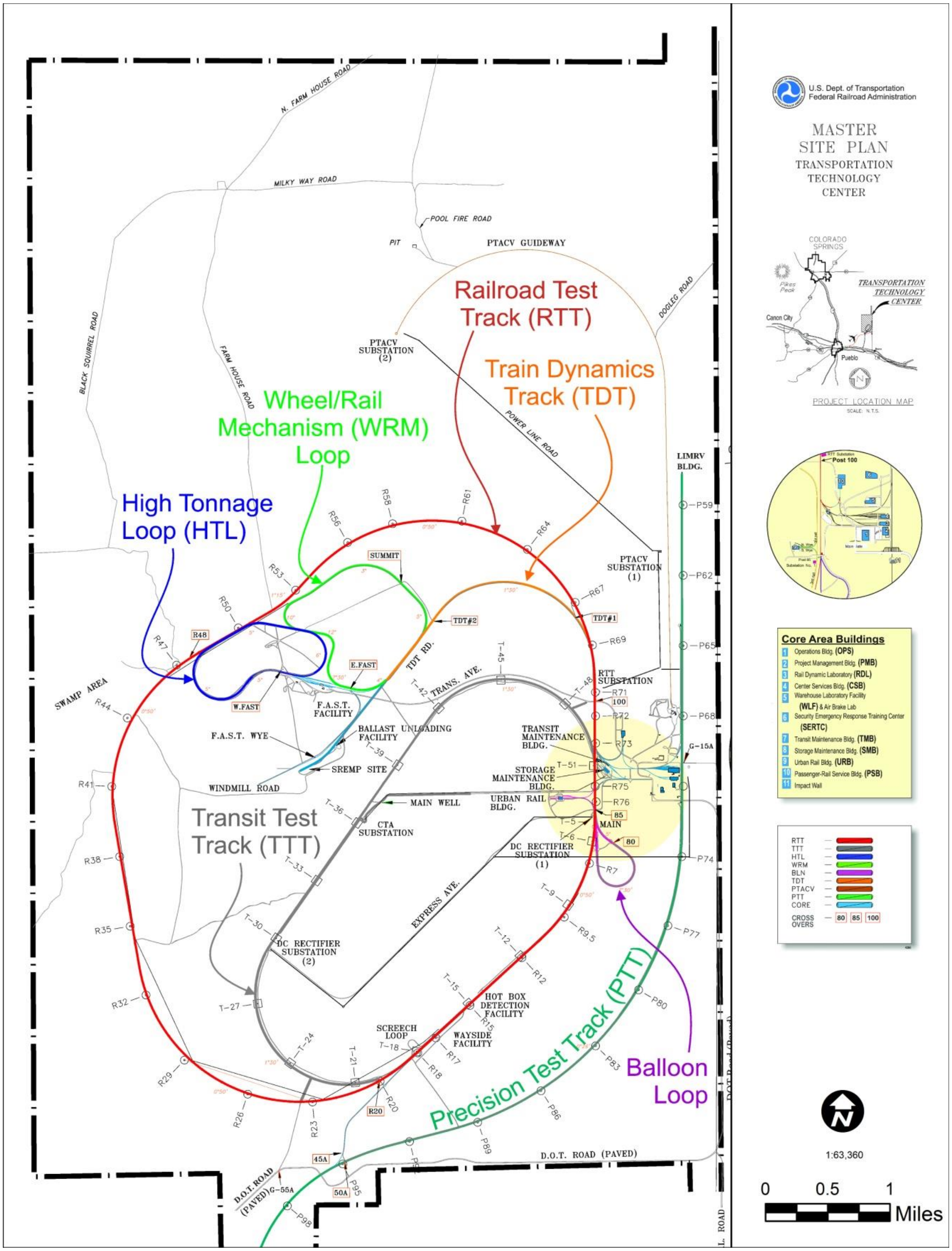

Figure 2-1 Site Facilities

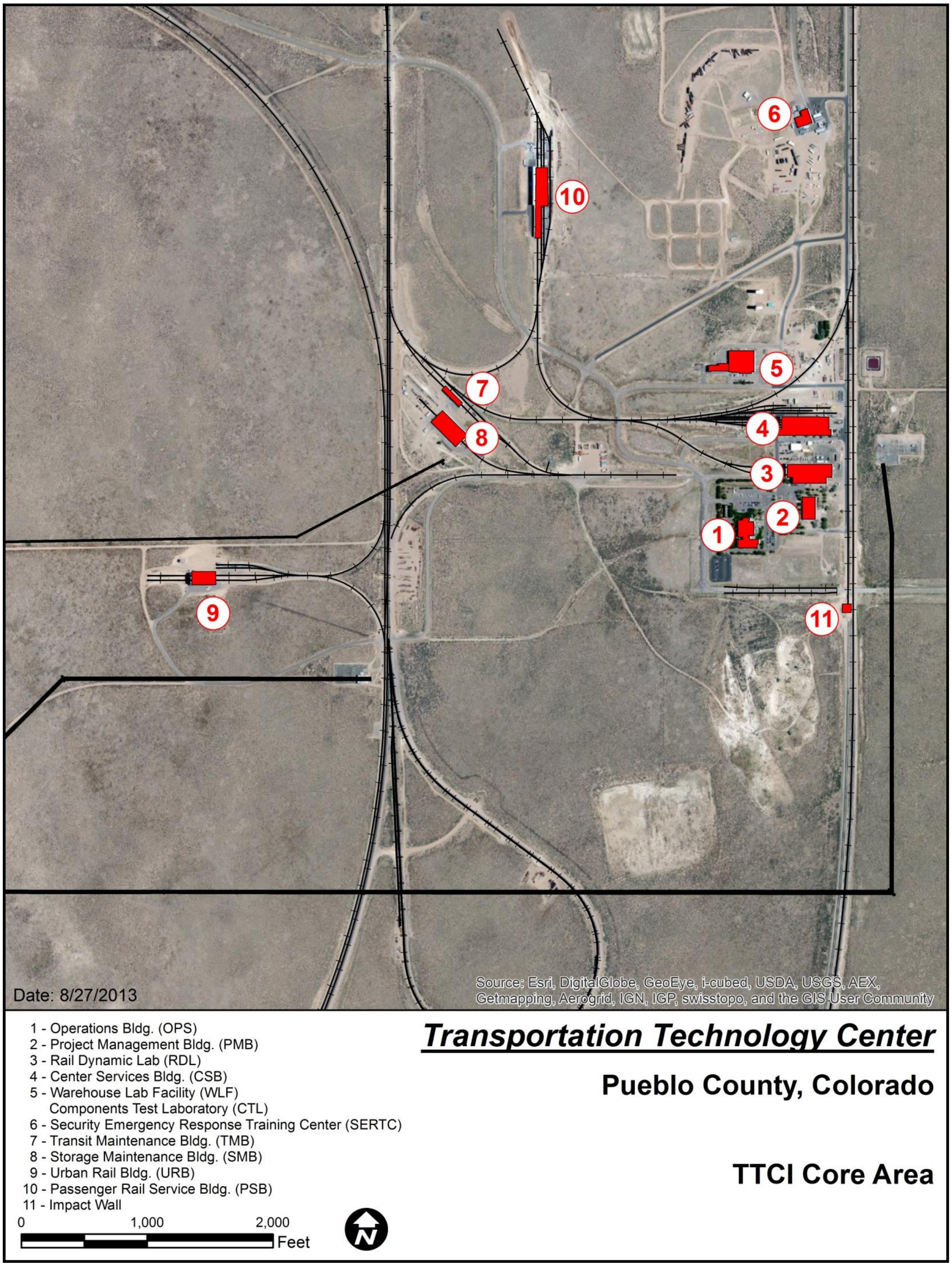

Figure 2-2 Core Area Buildings

2.1.1 Operational Activities

This Section 2.1.1 describes the operational activities at TTC, including testing, research, training, and other anticipated activities.

2.1.1.1 Testing

Examples of testing at TTC include the following: explosive effects research and testing on vehicles, structures, and their components; dynamic vehicle qualifications test of new freight and passenger cars and locomotives to assess compliance with federal regulations and industry standards; low speed impact tests to assess draft gear and coupler systems; low speed derailment tests; vehicle and component fire testing; crash tests consisting of train to impact barrier, train to train, and train to road vehicle scenarios; vehicle and component fatigue tests; and ride quality tests.

Engineering Tracks

As shown in Figure 3-1, TTC has more than 50 miles of specialized test track and yard and storage track. Extensive track facilities for electric and dual mode high-speed passenger, transit, commuter, and freight testing are available. Test tracks are used daily for track structure and vehicle performance testing, specification compliance, track and service worthiness, life-cycle and component reliability, and ride comfort evaluation. Testing of vehicles at operating speeds up to 165 miles per hour (mph) is possible on TTCI's Railroad Test Track, and TTCI can accumulate more than 1 million gross ton-miles per day on its High Tonnage Loop. See TTC Master Plan Section II, Existing Facilities and Utilities, for more detailed information on Engineering Tracks. The tracks include:

- High Tonnage Loop (HTL) – 2.7 miles of infrastructure and rolling stock capabilities utilizing Heavy Axle Loads.
- Railroad Test Track (RTT) – 13.5 miles of high-speed vehicle testing, max speed 165 mph, 12.5-50 kV AC overhead catenary.
- Balloon Loop Track – allows the turning of a group of rail vehicles making up a train.
- Transit Test Track (TTT) and Tight Turn Loop (TTL) (Screech Loop) – 9.1 miles, max speed 80 mph, 1150V DC electrified third rail. A tight-turn or "screech loop" that is used to investigate wheel noise, car curving performance and suspension system stability is located within the TTT.
- Precision Test Track (PTT) – 6.2 mile track used for vehicle dynamic testing, pitch and bounce, twist and roll, yaw and sway.
- Wheel-Rail Mechanism Track (WRM) – 3.5 miles of vehicle and dynamic curve testing.
- Facility for Accelerated Service Testing (FAST) – 4.8 mile test loop including a fueling station with above-ground fuel tanks, dispensing

stations for locomotives, and a separate dispensing station for heavy equipment.

- Impact Facility Track (north of Impact Wall) and Impact Wall – 0.75 mile track that facilitates destructive full scale impact testing. The wall itself is capable of taking an impact load of approximately 3,000,000 pounds. The track leading to the barrier is approximately 2,500 feet in length.

Testing Laboratories

Testing laboratories at TTC include:

- Vibration Test Unit (VTU);
- Simuloader (SMU);
- Mini-Shaker Unit (MSU);
- Rolling Load Test Machines;
- Wheel/Brake Shoe Dynamometer;
- Train Air Brake Research Facility;
- Roller Bearing Test Facility;
- Center Plate Liner Tester;
- Metallurgical Component Testing Laboratory and
- Rolling Contact Fatigue Simulator (RCFS).

These laboratories are used to evaluate the structural integrity and suspension characteristics of rail, wheels, suspension system (including railway trucks or bogies) and vehicles. See TTC Master Plan Section II, Existing Facilities and Utilities, for more detailed information on laboratories. Table 3-1 shows the locations of the laboratories.

Other testing and research facilities at TTC include the following:

- One Million Pound Squeeze Test Fixture, used to show compliance with compressive end load tests for freight and to test crash energy management systems for passenger cars;

- Prototype Track Air Cushion Vehicle Guideway (PTACV) designed to accommodate the Prototype Track Air Cushion Vehicle at speeds up to 150 mph (no longer used for testing, but serves as a sub base for an anticipated test loop); and

- TLRV Guideway (used between 1973 and 1976). A spur track has been installed on the Guideway slab that extends to the Vehicle Impact Wall.

Additional information about other TTC facilities is available in the Master Plan Section II, Existing Facilities and Utilities.

2.1.1.2 Research

Examples of research that occurs at TTC include the following:

- FAST runs a freight train containing heavily loaded cars all night long for most of the year to accumulate mileage on rail, wheels, ties, bearings, car bodies, and other components in order to identify any equipment failures;
- Operating electric rail vehicles;
- Vehicle fuel economy studies; and
- Noise emission studies.

Onboard & Wayside Measurements

Typical vehicle dynamic measurements are made with a computer-equipped instrumentation car that accompanies the test car and collects data pertinent to the test. On the track, sensors installed in specific test sections take dynamic measurements, while wayside computers collect the data. TTCI measurement systems are portable and are frequently mounted on customer locomotives, railcars, and transit vehicles.

2.1.1.3 Training

Training services are provided at TTC for customers. Some programs are provided regularly while others are given on demand and customized to meet individual needs. See TTCI Capabilities Guide (2008) for more detailed information on training programs.

Training Courses offered at TTC include but are not limited to the following:

- Vehicle Dynamics
- Derailment Analysis
- Vehicle Characterization
- Passenger Car Dynamics
- Wheel-Rail Theory
- Vehicle Suspension Systems
- Dynamic Behavior of Tracks
- Nondestructive Rail Flaw Analysis
- Tank Car Nondestructive Testing
- Crude Oil Emergency Response
- Bridges Evaluation for Heavy Axle Loads
- Heavy Axle Loads
- NUCARS® Modeling
- Train Operation and Energy Simulator (TOES™)/ Simulation of Train Action to Reduce Cost of Operations (STARCO™)
- Train Energy Model (TEM™)

Hazardous Materials Transportation Safety Training Services

An important training component at TTC involves the prevention of hazardous materials accidents. The training sessions provide key services to improve transportation safety for shippers, carriers, and the public in the areas of research, development, testing, training, and consulting.

Security Emergency Response Training Center

The SERTC, operated by TTCI, was established in 1985. The original mission of the school was to train railroad officials to safely handle incidents involving tank cars carrying hazardous materials and crude oil. SERTC now serves not only the transportation service industry, but also public emergency responders, the arduous materials container makers and repair facilities, the chemical industry, government agencies, and emergency response contractors from all over the world. Since its inception, SERTC has trained more than 38,000 students worldwide. SERTC offers hands-on training based on the U.S. Occupational Safety and Health Administration (OSHA) regulations 29 CFR 1910.120 (q) and the National Fire Protection Association (NFPA) standards 472 requirements through Hazmat Awareness, Operations, Technician, Specialist Level Courses and Incident Commander training, as well as advanced refresher courses. Intensive training on fire suppression using the Crude by Rail incident response training facility has significantly added to the number of students trained by the center. SERTC's Weapons of Mass Destruction Technician Course has been recently approved by the U. S. Office for Domestic Preparedness and is part of the current curriculum.

The training center is equipped with more than 20 highway cargo tanks, 60 railcars, a locomotive, 4 full-scale simulated derailments, and a full-scale mockup of a chemical barge. Audiovisual equipment and a computer resource center, where students are taught to use the latest in air dispersion modeling to predict chemical dispersion and toxicity, also complement the center. Some routine training activities include use of explosives and burning of hydrocarbon fuels (to simulate railcar fires).

2.1.1.4 Other Services

TTCI provides numerous test tracks and test facilities which, together with the Wireless Communications-Based Train Control (CBTC) Test Beds it has developed, facilitate CBTC systems' development and testing, including benchmarking existing systems and safety/interoperability/compliance testing in a controlled railroad environment without interference to or from revenue rail operations. TTCI is not a supplier of CBTC systems and can therefore act as an advocate for customers to ensure they implement, efficiently and cost-effectively, a system tailored to their needs.

Methods for analysis, prevention, detection, and response to terrorism in the rail sector are rapidly evolving. TTCI is responding by offering facilities and training to keep people safe and protect the railways.

TTCI is currently involved with organizations that are responsible for the security of the transit, intercity rail passenger, and freight rail systems and their providers. Destructive and nondestructive tests of new technology are routinely planned and performed. With an experienced staff of engineering and technical experts, and a 52-square-mile isolated and secure facility, TTCI can design and carry out assessments of new safety, security, and emergency response technology, simulating virtually any type of situation for any level of protection.

2.1.2 Routine Site Activities

2.1.2.1 Infrastructure Management and Maintenance

Routine Site Activities at TTC include management and maintenance of existing infrastructure such as core area buildings, roadways, electrical power, communication systems, water and sanitation systems, hazardous waste management, and fuel storage areas.

See TTC Master Plan Section II, Existing Facilities and Utilities, for more detailed information on infrastructure.

Core Area Buildings

Core area buildings are located adjacent to several of the test tracks on the eastern side of the site, as shown in Figures 3-1 and 3-2. The buildings consist of:

- Building 1 – Operations Building (OPS) is the main office building for TTCI. This building houses 120 of the 270 employees at the site.
- Building 2 – Project Management Building (PMB) is currently vacant and eventually will be renovated.
- Building 3 – Rail Dynamic Laboratory (RDL) is used for testing, labs, and some offices.
- Building 4 – Center Services Building (CSB) is used for support services and offices.
- Building 5 – Warehouse Laboratory Facility (WLF) and Air Brake Lab.
- Building 6 – Security Emergency Response Training Center (SERTC) Building includes the classrooms and warehouse with equipment for the training programs conducted at TTC.
- Building 7 – Transit Maintenance Building (TMB) is used for maintenance of all locomotives and transportation-related vehicles.
- Building 8 – Storage Maintenance Building (SMB).
- Building 9 – Urban Rail Building (URB) is used for storage of customer locomotives.
- Building 10 – Passenger Rail Service Building (PSB) is used for passenger and rail servicing and TSA training.
- Building 11 – Impact Wall.

See Appendix A for more detailed information on age, size, as well as current and anticipated uses of the core area buildings.

Some examples of routine site activities for infrastructure management, construction, and maintenance at TTC include the following:

- Construction activities of new facilities (including labs and offices), roads, tracks, burying test equipment and cables, grading short sections of roadway for access to test areas, upgrading test facilities;
- Maintenance activities including fueling and operating locomotives, road vehicles, repairing railcars and other equipment. For example, construction of a new high speed track would require grading, ballasting, laying track, construction of catenary and/or third-rail power equipment and maintenance of all equipment. Burning fuel for heating, ventilating, and air conditioning, pumping ground water, and discharging sewage;
- Handling and temporary storage of hazardous materials (e.g., asbestos, lead-based paint, Freon, and cleaning solvents) in connection with testing and maintenance activities;
- On-site solid waste consolidation coupled with off-site transportation and disposal; and
- Maintenance of fire breaks throughout TTC site.

The Project Management Building (PMB – Building 2) is currently vacant and when renovated would represent another 3 percent of the energy sustainability requirement. Building layout is intended for multi-use purposes, including conferencing, classroom training, meetings, and project offices. Refurbishment design will comply with LEED Silver/Sustainable Buildings to meet executive orders for federal buildings. Funding for this upgrade is being solicited in the FY 2017 budget. Upgrades to the PMB could possibly be completed by the end of 2018 if funding becomes available.

Some or all buildings at TTC may be upgraded, updated, or renovated in the anticipated (consistent with Executive Orders 13514 and 13423). These modifications would be considered routine site activities.

Roadways

The overpass bridge crossing the PTT at the eastern entrance to the core area is part of TTC property. The Pueblo County Road and Bridge Department maintains the paved access road up to the overpass bridge. TTC maintains all other roads on-site. A network of internal roadways leads to each of the test areas and building sites for maintenance, operations, and emergency response. Additional pioneer roads have been established in the more remote locations to aid in firefighting wildland-type fires. There are approximately 6 miles of bituminous paved roadways and 65 miles of gravel surfaced roads on-site. Most roads are approximately 20 feet wide.

Track maintenance, creating fire breaks throughout the property, and some road building occurs periodically as necessary at TTC.

Electrical Power

Power to TTC is provided through a 115-kilovolt overhead transmission line located along the east side of the IL Road (and the TTC property). The line is approximately 12.5 miles long, coming from the Boone Substation. Power is metered and switched at the Main Substation located directly east of the CSB and PTT. Black Hills Energy is the regional distributor, with most of the power from this area coming from the Comanche Power Plant located in southeast Pueblo, approximately 30 miles from TTC. Maximum rated load on the transmission line is 55 megawatts (MW) at 95 percent power factor.

A 115-killovolt overhead line is extended to the DC Rectifier Substations, PTACV Substations, RTT Substation, and main core area (RDL/CSB) Substation.

Substations

Two substation buildings were constructed in 1976 to house the DC Rectifiers and associated controls for the TTT loop. The units are DC Substation #1 located on the east side of the TTT near Post 85 road crossing and DC Substation #2 near the west side of TTT.

Communications Systems

TTC is presently using a 75-watt, 25 kHz bandwidth, two-way radio system with nine VHS radio base stations. To supplement this system, numerous portable five-watt transmitter-receivers are used, with some locomotives equipped with 20-watt transmitter receivers. CenturyLink supplies telephone service at TTC. An additional communications tower is located adjacent to the Chicago Transit Authority Rectifier Substation (CTA) inside the TTT Loop. The tower belongs to TTC. Verizon Wireless Communications has installed repeater station equipment to the tower for shared use to improve coverage in the area. A new fiber line extension from Pueblo was installed in 2012, along with other on-site fiber line extensions which will eventually replace the microwave system.

Water System

TTC has two groundwater wells in the unconsolidated alluvium known as the Black Squirrel/Haynes Creek Basin, a part of the Arkansas River Basin. The wells are permitted under the Colorado Division of Water Resources, State Engineers Office—under Permit # 15829-F for the main well and #20730-F-R for the backup well. The wells are permitted for 40 acre-feet per year combined, under Case No. 81CW24. The maximum pumping rate of the main well is listed at 850 gallons per minute (gpm), and the maximum pumping rate on the backup well is listed at 120 gpm. An augmentation plan for the wells is maintained through the Arkansas Groundwater Users Association. The augmentation plan provides replacement water to the Arkansas River Basin for water consumed on-site as a condition of well use.

The main well and chlorination system are housed in the main well pump house. The backup well is located in an adjacent pump house.

Sanitation System

Domestic Wastewater

All major facilities at TTC are served by septic tanks and leaching fields for domestic wastewater disposal. Each building or group of buildings is served by a separate system.

Industrial Wastewater

TTC uses a double-lined surface impoundment system for industrial wastewater disposal. The system consists of an oil-water separation system for pretreatment of wastewater and a Class I designed surface impoundment with two membrane layers of 45 mil reinforced (HPDE) polyethylene liners.

The system includes pretreatment equipment to remove and collect suspended and floating oils from the wastewater before discharging them into the surface impoundment. The pretreatment equipment is housed in a room attached to the CSB High Bay.

Solid Waste

Solid wastes generated at TTC consist of garbage, glass, plastic, paper, metal, wood, miscellaneous construction waste, used grease and oil, septic tank solids, etc. Presently, all solid wastes are removed from TTC by truck and hauled to appropriate licensed receiving facilities off-site. Efforts are in place to recycle as much of the solid waste stream as practical by setting up containers and collection areas for sorting and accumulation.

Hazardous Waste Management

TTC has a Hazardous Waste Management Plan in place to operate as a "generator," along with established satellite accumulation areas for waste collection, a main accumulation area, and drum storage/accumulation areas. TTC generally operates as a "conditionally exempt small quantity generator" under Colorado Law; however, activities associated with testing and maintenance may elevate the classification to a higher level. The main accumulation area is a single–room, masonry/pre-cast concrete construction, 20 ft by 20 ft storage building designed as a Flammable Storage Building (FSB) and located inside the SMB security fenced area. The structure meets Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA) requirements for hazardous materials/waste storage.

Fuel Storage Areas

Oil storage and handling facilities on-site are identified in the Spill Prevention, Control and Countermeasure (SPCC) Plan for the site (see TTCI Document Number SI-002-PP04). The plan identifies the size and location of each tank, product type, construction, operational use, and containment and diversionary structure in place to control a potential release of product, should it occur. Tanks not listed in this reference document include propane tanks, which are not regulated by the Oil Pollution Prevention requirements under 40 CFR, Part 112.

Heating oil (diesel) is used in mechanical boilers for hot water circulation systems in the, WLF/CTL, and URB buildings. A propane-fired boiler is used in the PMB. Propane-fired unit heaters are used at the OPS, CSB, SMB, SERTC, PSB, and FAST Facility buildings. TMB uses diesel-fired unit heaters. The RDL and DC Rectifier Substations use electric unit heaters for building heat. Natural gas is currently not available to the site.

Two primary diesel storage and dispensing areas located at the FAST Service Facility and CSB Service Facility are used for locomotive servicing. Both have large capacity above ground tanks to receive fuel in bulk quantities by truck transport. Fuel at both stations can be dispensed to locomotives, heavy equipment, and on-site fuel transfer trucks for remote fuel dispensing. Building fuel tanks are serviced directly by truck transport, or with on-site fuel transfer trucks. Gasoline is dispensed to on-site road vehicles at a service station facility located adjacent to the southwest corner of the CSB motor pool area.

2.1.3 Disturbed Area

Table 3-2 shows total disturbed acreage by type of use at the TTC site.

Table 2-1 Approximate Disturbed Acreage at TTC[1]

Use	Total Acres Disturbed
Buildings	
Operations Building – OPS – 1	0.65
Project Management Building – PMB – 2	0.41
Rail Dynamic Building – RDL – 3	1.41
Center Services Building – CSB – 4	1.32
Warehouse Laboratory Facility – WLF – 5	0.80
Components Test Lab – CTL – 5	0.20
Security Emergency Response Training Center – SERTC – 6	0.27
Transit Maintenance Building – TMB – 7	0.18
Storage Maintenance Building – SMB – 8	0.83
Urban Rail Building – URB – 9	0.46
Passenger-Rail Service Building – PSB – 10	0.95
Substation	0.20
Total Buildings	**7.40**
Total Core Area (Yellow circle area on Master Site Plan Figure 3-1)	**697**
Tracks	
Railroad Test Track – RTT	18.01
Transit Test Track – TTT	13.38
High Tonnage Loop – HTL	4.63
Wheel Rail Mechanism – WRM	5.21
Balloon Loop – BLN	6.23
Train Dynamics Track – TDT	3.46
PTACV Guideway	27.19
Precision Test Track – PTT	13.50
Core Area Tracks	2.86
Total Track	**107.53**
Roadways	
Unnamed	379.69
Black Squirrel Road	12.31
Express Ave	14.90
Farm House Road	8.50
Milky Way Road	3.81
North Farm House Road	3.93
Pool Fire Road	1.92
Windmill Road	3.18
DOT Road	17.47
Power Line Road	10.04
Total Roadway	**455.76**
Grand Total (Buildings, Track and Roadways)	**570.69**
Grand Total (including Core Area estimate)	**1,260.5**

[1]The TTC site has a total area of approximately 33,492 acres.

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3.0 Description of Alternatives

Two alternatives, the Proposed Action Alternative and No Action Alternative, are evaluated in this Programmatic EA. The Proposed Action in the context of a Programmatic NEPA review encompasses anticipated activities. "Near-term" proposed projects are proposed projects that would typically be initiated within 5 to 10 years and that can be described with sufficient specificity for their potential effects on the environment to be evaluated. Near-term proposed projects include facility upgrades, modifications, and renovations, as well as new construction projects. Section 3.1 discusses existing facilities and services, as well as near-term proposed additional projects.

In the context of this EA, the Proposed Action Alternative will be compared with a No Action Alternative that consists of continued current baseline operations without expansion or change. Section 3.2 discusses the No Action Alternative.

3.1 Proposed Action Alternative

The Proposed Action Alternative is to continue to develop program activities with new or expanded operations, and improved facilities and services at TTC. The Proposed Action Alternative includes anticipated projects as outlined in the TTC Master Plan (TTCI 2012), and discussed below.

3.1.1 Site Development Plan

Section III, Site Development Plan, of the TTC Facilities Master Plan includes the following anticipated plans for the site. These proposed modifications or additions to the existing infrastructure should be viewed as conceptual, from which alternative conceptual studies and plans would be developed if the concepts are to advance to an implementation stage. More detail on the proposed improvements can be found in the TTC Facilities Master Plan (TTCI 2012).

- Anticipated Building Construction:
  - Anticipated Main Guard Station
  - Operations Building Extension
  - Passenger Rail Services Building (PSB)
  - Education Training Campus
  - Emergency Services Building
  - Customer/Project Storage Areas
  - Heavy Equipment Maintenance Building

- Anticipated Tracks Facilities Improvements
  - Ultra High Speed Stability Test Loop
  - High Speed Stability Test Loop
  - Yard Tracks/Extensions
  - PTACV Guideway Modifications
  - Facility for Underground Rail Security Testing
  - Intermodal Training Facility

  - Passenger Station Platform
  - Rail and Equipment Static Displays
  - SERTC Highway and Rail Training Station Improvements
  - Classroom Training facility
  - RTT Broken Rail Detection System Signals

- Anticipated Utilities Improvements
  - Power Systems
  - Water System
  - Wastewater Handling System
  - Communications System
  - Natural Gas

- Anticipated Environmental Improvements
  - PMB Asbestos Remediation
  - ATTC Environmental Audit
  - Blast Test Training Area

- Anticipated Roads and Grounds Improvements
  - TTT/RTT Underpass
  - Pavement Extensions/Parking
  - North Access Road

3.1.2 Anticipated Activities

TTCI conducts isolated tests for all categories of freight and passenger rolling stock, vehicle and track components, and safety. In addition, TTCI provides services in engineering, rail performance monitoring, computer modeling, defect testing, and transportation security, including transportation security activities focused on hardening rail infrastructure and equipment against potential terrorist threats. In support of that goal, destructive and nondestructive tests are routinely planned and performed by TTCI's staff of engineering and technical experts. TSA and TTCI also provide training to TSA employees and emergency responders, respectively, using realistic training scenarios. Both destructive testing and training scenarios include use of real and simulated fire and explosives, in, on, and around railcars and rail infrastructure.

Anticipated activities at TTC include implementation of parts of Section III, Site Development Plan, in the TTC Master Plan. Other activities also may include additional types of testing and research for various national and international governmental agencies. Anticipated activities as currently known are summarized below.

These projects have been proposed in the Master Plan for program development. These projects include:

- Facility for Underground Rail Security Testing – would develop a tunnel and substation test bed for testing and training associated with homeland security and related activities.

- Passenger Railcar Security and Integrity Training Facility Plan – to receive a variety of passenger cars at TTC to initiate activity in this area.

- Ultra-High Speed Test Loop – the concept was in the original Facilities Master Plan and was reviewed as a potential consideration with the RTT Restoration Project which retrofitted the RTT with a switch point indication/broken rail detection system in 1997. Although no current activity is in place, the concept is presented for future consideration. Two options for the high speed test loop include: (1) a track that could accommodate 165 mph, or (2) a track that could accommodate 187 to 200 mph on tangent. Currently, no funding is available for this expansion project. A cost estimate for a 6-mile expansion of the RTT line for high speed testing is $25 million (Catenary alone is $3 million.) (Maal 2013).

It is difficult to predict projects that may occur in the future that are not included in the TTC Master Plan. However, possible projects may include the following: burning tests; heating large pressure container until burnt; aeronautical projects; development of additional terrain props for DHS and TSA for motor carrier, buses, and rail safety research; blast effects on transportation vehicles; research for FBI and CIA; Department of Defense (DOD) weapons research; off road vehicle tests for the U.S. Army; and perhaps research related to tunnels and bridges for the science and technology division of TSA.

3.2 No Action Alternative

The Council on Environmental Quality regulations (40 CFR 1502.14) requires discussion of the environmental effects of the No Action Alternative, which would serve as a benchmark for comparison with the action alternative. In the context of this programmatic EA, the No Action Alternative consists of current operations only without continued program development and investment or implementation of the Master Plan. Major cleanup activities, facility upgrades, or decommissioning would not occur with the No Action Alternative. Operational and routine site activities at TTC would continue at the current level and would not expand or change. The Master Plan would not be fully implemented, the infrastructure would not be constructed or upgraded, and new anticipated activities would not occur.

The No-Action Alternative would include the current on-going activities that exist today and that are described in Section 2 of this EA. FRA considers these activities as part of the baseline so the impacts of the Proposed Action Alternative can be compared against a consistent baseline.

3.3 Potential Effects on Resources

FRA determined the resources for analysis in this EA based on the likelihood that the resource would be affected by the Proposed Action. The resources analyzed in the EA include air quality, surface water, floodplains, wetlands, ground water, hazardous materials, hazardous waste, soils, biological resources (wildlife, vegetation, threatened and endangered species), cultural resources, land use, transportation, noise, socioeconomics, safety, health, environmental and emergency services. Table 3-4 presents a summary of services provided by the Proposed Action and No Action alternatives, along with environmental, land, or socioeconomic resources that could potentially be affected by those services. Activities are categorized as operational activities (testing, research, training, and anticipated activities) and routine site activities (infrastructure management and maintenance, including facility and land management as well as construction projects).

As shown in Table 3-4 the potential for environmental, land, or socioeconomic effects from operational and routine site activities has been organized into five categories. The potential impacts to resources resulting from the Proposed Action are provided for both the Proposed Action and No Action alternatives in Section 4.0 of this Programmatic EA.

3.4 Resources Not Requiring Further Study

In an effort to execute a concise analysis of the alternatives, some resource areas were eliminated from further detailed analysis under the Programmatic EA. The following section discusses resource areas eliminated from a more detailed analysis along with supporting justification.

Environmental Justice – Executive Order 12898 directs federal agencies to address environmental and human health considerations in low-income and minority communities and avoid disproportionate adverse impacts on low-income and minority populations. Because of the remote location of the TTC property, the Proposed Action and No Action alternatives are not expected to result in major effects on the local community including both minority and low income populations. Therefore, it is reasonable to conclude that there will be no disproportionate effect low-income or minority populations.

Recreation – TTC is not accessible to the public; therefore, no recreational activities occur on the site or in the project vicinity. Adjacent land to TTC is used for grazing and no developed or undeveloped recreational areas are within proximity of TTC.

Prime Farmland – The TTC facility has been in operation since the 1970s and does not contain any property designated as prime farmland. Therefore, potential impacts of the Proposed Action to prime farmland within TTC's boundaries will not be explored.\

Section 4(f) – There are no properties meeting the Section 4(f) definition within the TTC facility or affected nearby. Adjacent lands to TTC are not 4(f) properties. Thus, there are no impacts to 4(f) properties analyzed in this EA.

Visual Resources – TTC is an isolated, inaccessible site located miles from any sensitive receptors. The closest rural residents are between 4 and 9 miles from the proposed test sites. The nearest development is the Pueblo Chemical Depot which does not conduct any activities that are sensitive to visual impacts. In addition, activities at TTC typically do not affect off-site visual resources.

Table 3-1 Resources Potentially Affected by Proposed Action and No Action Alternatives

Activity Type	Description	Potential for Resource Area to be Affected	Resource Areas Potentially Affected
Operational Activities			
Testing	Product evaluation, new car performance, locomotive performance, track components, train operations	Yes	Air, Surface Water, Ground Water, Vegetation, Wildlife, Land Use, Noise, Public Safety, Socioeconomics
Research	Cooperative research in improved suspension systems, top-of-rail lubrication, improved wheel and rail profiles, performance-based track geometry systems, center plate lubrication, effects of heavy axle loads, track-integrity monitoring systems, and improved ride quality.	Yes	Air, Surface Water, Ground Water, Vegetation, Wildlife, Land Use, Noise, Public Safety, Socioeconomics
Training	Security and emergency response; derailment prevention/mechanisms; vehicle dynamics; special operations; nondestructive testing. TSA training for dismantling and removal of bombs, training for operation of new technology.	Yes	Air, Surface Water, Ground Water, Vegetation, Wildlife, Land Use, Noise, Public Safety, Socioeconomics
Activities at TTC (Only applicable to Proposed Action Alternative)	High speed track (above 165 mph), burning tests, heating large pressure container until burnt, aeronautical types of projects, more terrain props to be utilized by DHS and TSA for motor carrier, bus and rail safety research, blast effects on transportation vehicles, research for FBI and CIA, DOD –weapons research, off road vehicle tests for the U.S. Army and likely possibility of research related to terrain props, tunnels and bridges for science and technology division of TSA and other governmental entities.	Yes	Air, Surface Water, Ground Water, Vegetation, Wildlife, Land Use, Noise, Public Safety, Socioeconomics
Routine Site Activities			
Infrastructure	Buildings, water supply, domestic wastewater treatment, fire protection, and tracks, roads, power transmission, and drainage features that support ongoing operations at TTC.	Yes	Air, Surface Water, Ground Water, Vegetation, Wildlife, Public Safety,

Source: TTCI (2008) Capabilities Guide

**not all resources are affected by site activities in an effort to execute a concise analysis of the alternatives, some resource areas were eliminated from further detailed analysis under the Programmatic EA. The following section discusses resource areas eliminated from a more detailed analysis along with supporting justification.*

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4.0 Affected Environment and Environmental Consequences

4.1 Overview of Analysis Approach

This Programmatic EA evaluates relevant resources with the potential for effects considering type, context, duration, and intensity.

As discussed in Section 3.3, the potential for environmental, land, or socioeconomic effects is organized by:

- Operational Activities (testing, research, training, and anticipated activities) and
- Routine Site Activities (infrastructure including construction, maintenance, and land management).

Potential effects identified in this Programmatic EA are described in terms of type, context, duration, and intensity to determine level of effect. General definitions of these terms are below.

- Type describes the effect as beneficial or adverse, direct or indirect.
    - Beneficial: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
    - Adverse: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
    - Direct: An effect on a resource by an action at the same place and time. For example, soil compaction from construction traffic affects soils directly.
    - Indirect: An effect from an action that occurs later or perhaps at a different place and often to a different resource, but is still reasonably foreseeable. For example, removing vegetation may increase soil erosion and cause increased sediment in a stream.
    - Cumulative: Effects on resources that are added to existing effects from other past, present, and reasonably foreseeable future actions. For example, surface water sediment runoff from the project, added to the sediment load from other unrelated projects in the area, may produce an additional decrease in surface water quality.
- Context describes the area (site-specific) or location (local or regional) in which the effect will occur.
- Duration is the length of time an effect will occur.
    - Short-term effects generally occur during construction or for a limited time thereafter (generally less than 2 years), by the end of which the resources recover their pre-construction conditions. For example, increased traffic during construction activities would be short-term since traffic would return to normal levels once construction was completed.
    - Long-term effects last beyond the construction period, and the resources may not regain their pre-construction conditions for a longer period of

time. For example, visual effects from a new facility being built would be long-term since they continue as long as the project is in place.

- The intensity of an effect is based on how the Proposed Action would affect each resource. This EA uses terms to describe the intensity to determine if any affect would be considered "significant" under NEPA to require further analysis.

4.2 Air Quality

4.2.1 Affected Environment – Environmental Setting for the Proposed Action

TTC is a 52-square mile, secure and remote site operates with a vast array of specialized laboratories and track. TTC enables isolated testing for all categories of freight and passenger rolling stock, vehicle and track components, and safety devices. With an elevation of 4,662 feet above sea level, TTC is located in the high plains desert surrounding Pueblo, CO at about 4,300 feet above sea level.

4.2.1.1 Climate

Information on climate is provided primarily as background information pertinent to the air quality analysis. Specifically, climatic (atmospheric) conditions are what determine the dispersion and transport of pollutants. Certain climatic conditions are not only responsible for the dispersion and transport of pollutants, but can also be responsible for the generation of pollutants, specifically fugitive dust (particulate matter). Periods with dry and windy conditions may result in the generation of fugitive dust from disturbed areas, such as unpaved roads, where soil is exposed.

The project is located in what the Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division (APCD) classifies as the South Central Region (CDPHE-AQCC 2013). From a climatological standpoint, the project area is considered semi-arid, with the potential for wind-blown dust being high, similar to the rest of the intermountain west.

Available wind data from Pueblo, CO, indicate that annual average wind speeds in the project area are approximately 8 mph. The predominant winds are either from the east or the west, occurring just less than 11 percent and just more than 9 percent of the time, respectively. Calm conditions occur almost 17 percent of the time. Wind speeds fall between 4 and 13 mph approximately 58 percent of the time (WRCC 2012).

As expected in a semi-arid area, annual average precipitation totals for the project area are low at approximately 12 inches (WRCC 2012). April through August is the wettest period, with August being the wettest month.

The project area experiences fairly large diurnal variations in temperature due to the relatively high elevation and dry conditions. For example, diurnal temperature variations in excess of 30 degrees Fahrenheit occur in both February and July (WRCC 2012). January is the coldest month of the year with daytime temperatures ranging from the mid-teens in the morning to highs in the mid-40s during the afternoon. Average July temperatures range from around 60 degrees in the morning to the low 90s in the afternoon.

From an air quality standpoint, the above climatic conditions indicate that the potential exists for stable atmospheric conditions. This means that if air pollutants are released into the air during periods of stable conditions, the pollutants will not disperse as well, resulting in higher pollutant concentrations.

4.2.1.2 Air

Applicable Laws and Regulations

The Clean Air Act (CAA) (42 U.S.C. §7401 et seq.) is implemented at the federal, state, and local government levels. The U.S. Environmental Protection Agency (USEPA) is the federal agency primarily responsible for implementing the CAA, and in Colorado the CDPHE-APCD is the state agency responsible for its administration. To comply with the requirements of the CAA, Colorado established Air Quality Control Regulations and developed a State Implementation Plan (SIP). The air quality regulations set forth permitting, monitoring, and reporting requirements, among other tasks, to meet the requirements of the CAA. In addition, the SIP outlines the steps and timelines that Colorado will follow to ensure ongoing compliance with the requirements of the CAA.

Part of USEPA's role is to develop and maintain National Ambient Air Quality Standards (NAAQS). Although the project area is climatologically predisposed to dustiness, the entire project area is located within an "attainment" area (in compliance with the NAAQS) for all criteria pollutants (CDPHE-AQCC 2013). This includes standards for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), and particulate matter (PM_{10} and $PM_{2.5}$). Colorado also defines criteria pollutants to include oxides of nitrogen (NO_x), fluorides, sulfur acid mist, hydrogen sulfide, total reduced sulfur, reduced sulfur compounds, and municipal waste combustor organics, metals, and acid gases.

The Colorado Air Quality Regulations (CDPHE-AQCC 2012), Regulation No. 3, Air Pollution Emission Notices Permits, establishes different permitting requirements based on the following actual uncontrolled emissions of any criteria pollutant in an attainment area.

- No permit is required if emissions are less than 2 tons per year.
- An Air Pollution Emission Notice (APEN) must be obtained if emissions are greater than 2 tons per year but less than 5 tons per year.
- An APEN and a Construction Permit are required if emissions are greater than 5 tons per year for volatile organic compounds (VOCs) and PM_{10} and $PM_{2.5}$; greater than 10 tons per year for total suspended particulates (TSP), CO, SO_2, and NO_x; greater than 200 pounds per year for Pb; and greater than 2 tons per year for the remaining Colorado criteria pollutants.

Prior to initiating anticipated activities, TTCI would be required to prepare a detailed emissions inventory to determine what level of permitting, if any, would be required. The facility currently has no active air quality permits (CDPHE-APCD, 2012). However, TTC does have existing APENs for the Center Services Building Boiler (12PB062), the CTL/WLF Boiler (07PB0518), and Operations Building Boiler (91PB231 (2)). These APENs were last issued in 2009 and are scheduled for renewal in 2014. Assuming sources and operations are unchanged; APENs are typically renewed every 5 years. The

Operations Building diesel-fired boiler was replaced in 2012 with a propane-fired boiler and will therefore be exempt from APEN requirements.

Air Pollutants of Potential Concern

The air pollutants of potential concern include criteria pollutants, listed above, and Hazardous Air Pollutants (HAPs). In general terms, activities involving internal combustion, such as operation of the locomotives, vehicles, boilers, and generators, as well as construction activities, windblown dust, and volatilization of fuels from storage and refueling operations, will be the primary sources of criteria pollutant emissions.

Emission estimates for the proposed alternative for the following sources are provided in Table 4-1 (ALTUS, 2013).

- Above Ground Storage Tanks
- Underground Storage Tanks
- Boilers and Furnaces
- Material Handling
- Cooling Towers
- Dynamometer
- Fuel Dispensing
- Internal Combustion Engines
- Oil Water Separator
- Evaporation Pond
- Locomotive Idling
- Fire Training
- Machine Part Washing

Table 4-1 Air Emissions Estimates for Proposed Action

Criteria Pollutants	
(tons per year)	
PM_{10}	2.2
SO_2	2.3
NO_x	1.2
CO	0.6
VOCs	12.5
Hazardous Air Pollutants (HAPs)	
(pounds per year)	
ethylbenzene	0.9
toluene	8.5
chlorobenzene	0.1
formaldehyde	2.1
hexane	7.5
isomers of xylene	2.9
benzene	0.3
1,1,2-trichloroethane	0.1
1,1,1-trichloroethane	0.01
napthalene	0.1
o-xylene	1.2
cumene	0.04
isomers of hexane	15.8

Appendix B provides air emissions calculations.

4.2.2 Environmental Effects and Environmental Commitments

4.2.2.1 Effects of the Proposed Action

The Proposed Action would:

- Be in compliance with the NAAQS, Colorado standards, and the Colorado SIP; and
- Result in negligible, if any, short-term off-site increases in air quality levels. Any short-term increases would only be expected to occur during testing or training activities.

This Section discusses the potential effects of operational activities (testing, research, training, anticipated activities, including construction of new facilities) and routine site activities (infrastructure management and maintenance) on air quality. For the purposes of these discussions, potential effects on air quality are discussed in terms of emissions of air pollutants that may result from the activity being discussed. Air emissions that may result from these activities contribute to the overall estimates presented in Table 4-1, as more specifically discussed below.

Operational Activities

Testing

The primary contributors to air emissions during testing activities would likely be related to explosives, fire, high temperature burning, and blast effects on transportation vehicles. Because of the nature of the sources associated with these activities is intermittent and diverse in nature, it is not particularly feasible to quantify the amount of pollutants to be released on an annual basis. Rather, a case-by-case basis would be more appropriate to measure potential releases per event.

For explosive testing, the primary emissions resulting from the detonation of explosive charges, presumed to be C-4, consist of the pollutants resulting from the detonation of the explosive charge itself, primarily carbon dioxide (CO_2), and the particulate matter that is generated from the disturbance as a result of the explosive charge. Lesser amounts of other contaminants may also be released. Table 4-2 provides a summary of the quantity of pollutants estimated to be released on a per charge basis. A more detailed discussion can be reviewed in the Final Explosive and Fire Testing at TTC EA (TSA/FRA, 2012).

Emissions generated by fire or high temperature burn testing would result from the pyrolysis or combustion of the polymeric materials that make up the components of the rail cars; those components include seat coverings, seat cushions, carpeting, side panels, ceiling panels, and overhead racks. Because the generation of the gases (pollutants) is dependent on the temperature and degree of combustion, it is not possible to quantify the amount and rate of pollutant production from the fire testing. Additionally, the production of pollutants varies by pollutant based on fire conditions and may be greater or less under flaming conditions versus smoldering conditions (Rakaczky 1980). The following is a list of the major constituents likely to be present during the burning of a passenger rail car, hazardous materials including but not limited to crude oil.

- Acetone
- Actaldehyde
- Ammonia
- Aromatic Amines
- Carbon Dioxide
- Carbon Monoxide
- Cyanogen
- Formaldehyde
- Halogen
- Hydrocarbons
- Hydrogen Bromide
- Hydrogen Chloride
- Hydrogen Cyanide
- Hydrogen Fluoride
- Hydrogen Sulfide
- Isocyanate
- Nitriles
- O-Cresol

- P-Alkylphenol
- Phenol
- Propionaldehyde
- Sulfur Dioxide
- Toluene Diisocyanate

Table 4-2 Emission Estimates for C-4 Detonations

Pollutant	Emission Factor (lb/lb C-4)	500 Pound TNT Equivalent Detonation (lb of pollutant)	50 Pound TNT Equivalent Detonation (lb of pollutant)	2 Pound TNT Equivalent Detonation (lb of pollutant)	1 Pound TNT Equivalent Detonation (lb of pollutant)
Aluminum[a]	0.00017	0.0664071	0.0066402	0.0002652	0.0001326
Carbon Dioxide (CO_2)[b]	0.63	246.0969	24.6078	0.9828	0.4914
Carbon Monoxide (CO)[b]	0.021	8.20323	0.82026	0.03276	0.01638
Ethylene[a]	0.00011	0.0429693	0.0042966	0.0001716	0.0000858
Formaldehyde[a]	0.00011	0.0429693	0.0042966	0.0001716	0.0000858
Hydrogen Cyanide (HCN)[a]	0.00042	0.1640646	0.0164052	0.0006552	0.0003276
Lead (Pb)[a]	0.00014	0.0546882	0.0054684	0.0002184	0.0001092
Methane (CH_4)[b]	0.0013	0.507819	0.050778	0.002028	0.001014
Nitric Acid[a]	0.00099	0.3867237	0.0386694	0.0015444	0.0007722
Oxides of Nitrogen (NO_x)[b]	0.0063	2.460969	0.246078	0.009828	0.004914
Particulate Matter $(PM)_{10}$[b]	0.021	8.20323	0.82026	0.03276	0.01638
$PM_{2.5}$[b]	0.015	5.85945	0.5859	0.0234	0.0117
Total Suspended Particles (TSP)[b]	0.026	10.15638	1.01556	0.04056	0.02028
Sulfur Dioxide (SO_2)[b]	0.00012	0.0468756	0.0046872	0.0001872	0.0000936

[a]AP-42 Table 15.9.1-2 (USEPA 2011)
[b]AP-42 Table 15.9.1-1 (USEPA 2011)

A more detailed discussion can be reviewed in the Final Explosive and Fire Testing at TTC EA (TSA/FRA, 2012).

Effects from testing will be adverse and direct. However, due to the very nature of the testing, those effects will typically be limited to the project site (site-specific), although the potential does exist for local effects beyond the property boundaries. For any given testing scenario, the magnitude and extent of any local effects will be dependent upon the prevailing wind direction and atmospheric conditions at the time of testing. Because of the relatively short duration of the emissions generating portion of the tests, any effects would be considered short-term. In addition, these type of tests are generally a "per-event" test and are not regular or re-occurring. . Air quality effects resulting from testing would generally range from moderate, in the immediate vicinity of the test, to minor, as pollutants disperse as they travel from the test site. It is important to note that from an air quality standpoint (e.g., the CAA), any emissions from testing activities will occur within the TTC boundaries and will not be in areas where the general public can access.

Research

Air emissions associated with research activities will predominantly result from the following source categories and will consist of both criteria pollutants and HAPs.

- Dynamometer
- Fuel Dispensing
- Internal Combustion Engines
- Locomotive Idling

See Table 4-1 and Appendix B for category specific estimates.

Air quality effects resulting from research activities will be adverse, direct, site specific, and short-term. They range from minor to negligible, decreasing with distance from the source of the emissions.

Training

Air emissions associated with training activities will primarily result from emergency training activities and the burning of crude oil or diesel fuel for practice in extinguishing fires and will consist of both criteria pollutants and HAPs emissions. There will also be emissions associated with internal combustion engines for fire fighting vehicles and support equipment. See Table 4-1 and Appendix A for category specific estimates.

Effects from training will be adverse and direct. They will be site-specific, although as with testing, the potential does exist for local effects beyond the property boundaries. Effects will be short-term . Air quality effects resulting from training would generally range from moderate, in the immediate vicinity of the training, to minor, as pollutants disperse as they travel from the training site toward the property line and beyond.

Anticipated Activities

Potential effects of anticipated activities include the release of additional emissions of criteria and HAPs from the source categories discussed for the proposed alternative, with the potential inclusion of construction activities. If future projects do not fall within this environmental assessment it would have to be evaluated to determine the need to for air quality permits prior to construction.

Effects resulting from anticipated activities will be direct, adverse, and primarily site specific with the potential for some local effects, as discussed above. The effects will be both long-term, resulting from the more continuous nature of emissions associated with the facility's infrastructure, and short-term, with increases in effects primarily resulting from testing and training activities. Effects will range from minor to negligible, decreasing with distance from the source(s) of emissions.

Routine Site Activities

Infrastructure Management and Maintenance

Air emissions associated with operation and maintenance of the infrastructure will primarily result from the following source categories and will consist of both criteria pollutants and HAPs.

- Above Ground Storage Tanks
- Underground Storage Tanks
- Boilers and Furnaces
- Material Handling
- Cooling Towers
- Fuel Dispensing
- Internal Combustion Engines
- Oil-Water Separator
- Evaporation Pond
- Parts Washing
- Maintenance of paved and gravel roads

See Table 4-1 and Appendix A for category specific estimates.

Effects resulting from infrastructure management and maintenance will be adverse and direct. They will alternate between site specific and local, predominately because the emissions associated with the infrastructure is more continuous, long-term, than the other activities. However, the fact that APENs are only required for the Center Services Building Boiler, the CTL/WLF Boiler, and the Operations Building Boiler is an indication of how relatively minor the infrastructure, and indeed the entire facility, is from an air quality standpoint. Effects will range from minor to negligible with distance from the point where emissions are released. There will be no cumulative effects.

4.2.2.2 Effects of the No Action Alternative

Potential effects on air quality from the No Action Alternative would be identical to those of the Proposed Action, without anticipated activities.

4.2.2.3 Best Management Practices

Best management practices may include one or more of the following:

- Minimizing disturbed areas;
- Minimizing the number and speeds of vehicles;
- Minimizing locomotive idling times;
- Ensuring that all vehicles and equipment are in proper operating condition;
- Implementing an effective fire suppression procedure;
- Conducting explosive, fire, and burn testing on days that have favorable climatic conditions to minimize the amount of fugitive dust generated;
- Conducting explosive, fire, and burn testing and emergency fire training on days that have favorable climatic conditions to maximize dispersion of pollutants; and
- Conducting explosive, fire, and burn testing and emergency fire training on days with prevailing winds blowing away from populated areas.

4.3 Surface Water, Floodplains, and Wetlands

Federal regulations that protect water resources include the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). The CWA regulates pollutant discharge into streams, rivers, and wetlands. The SDWA protects drinking water resources and requires strategies to prevent pollution. The USEPA has established primary and secondary water quality standards. The CDPHE implements the standards set by the USEPA, regulates the discharge of pollutants into surface and groundwater, and enforces the Primary Drinking Water Regulations.

Executive Order 11988, Floodplain Management, requires federal agencies to ensure their actions minimize the effects of floods on human health and safety, and restore the natural and beneficial values of floodplains.

Authorizations from the ACOE under Section 404 of the CWA are required when there is a discharge of dredge or fill material into Waters of the United States, including wetlands.

4.3.1 Affected Environment – Environmental Setting for the Proposed Action

4.3.1.1 Surface Water

The project area is located in headwaters of the Haynes Creek drainage, which encompasses approximately 210 square miles. Haynes Creek is an ephemeral stream with intermittent reaches and is tributary to the Arkansas River. The Black Squirrel Creek drainage is immediately west of the Haynes Creek drainage. The Black Squirrel Creek drainage (approximately 264 square miles) is tributary to Chico Creek (drainage area of approximately 261 square miles), which is tributary to the Arkansas River.

A stream channel for Haynes Creek is only present south of the PTT (Precision Test Track) located at the southern end of the TTC property. Stormwater occurs rarely in Haynes Creek or Black Squirrel Creek, and only when there is a high-volume storm event. This is because of the high permeability of streambed soils and the relatively flat slope of the stream channels. Stormwater drainage is also minimal across the site because of the rapid percolation of precipitation. The absence of erosional channels on site indicates that normal storm events result in limited runoff (TTCI 2011c).

A Spill Prevention, Control and Countermeasure Plan (TTCI 2011c) describes the drainage pathways for the entire property. As shown in Figure 4-1, drainage from the TTC Core Area infrastructure is contained within the property. In the 1970s, three drainage culverts were installed where Haynes Creek crosses the Railroad Test Track and the Transit Test Track. The RTT and TTT form a 10-foot barrier at the southern end of their loops. Shortly following installation, the culverts became blocked with sand and vegetation, indicating little to no stormwater conveyance through them.

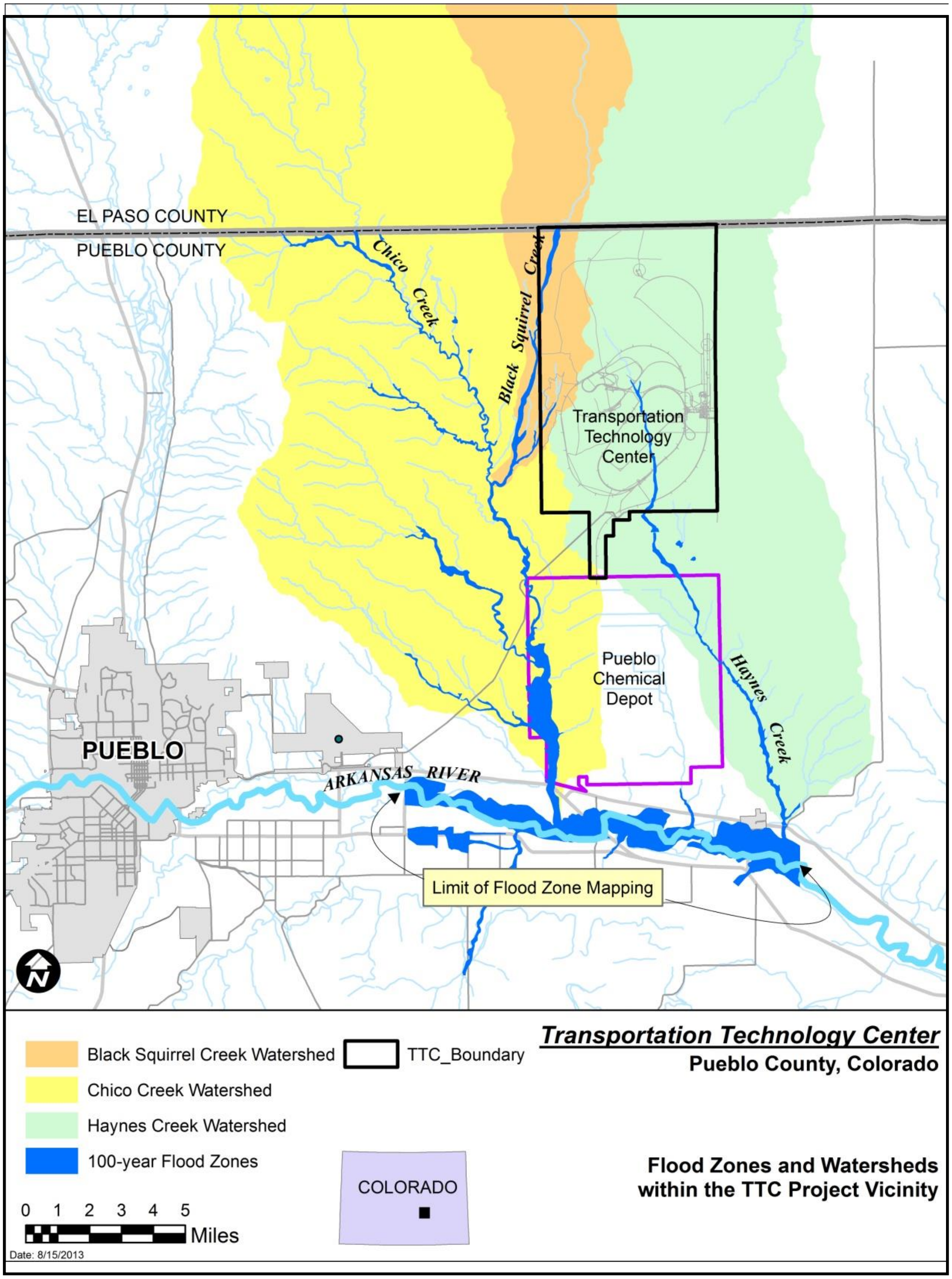

Figure 4-1 Flood Zones and Watersheds within the TTC Project Vicinity

No stormwater flow has been observed at the culverts since TTC was constructed (TTCI personal communication). Then, in the mid-1990s, the culverts were intentionally sealed to prevent stormwater drainage from leaving the property. In 2003, a 100-year storm event occurred with 3.5 inches of precipitation in 6 hours. This storm event did not result in stormwater flow leaving the TTC Core Area infrastructure (TTCI 2011c).

Another set of sealed culverts located where Haynes Creek crosses the Precision Test Track (PTT) acts as an additional barrier to capture any stormwater drainage in the area between the RTT and PTT. Other stormwater conveyance features consist of ditches located in the Core Area and connected to a retention basin positioned between the CSB and the WLF. The intended function of these ditches is to collect and route stormwater from the bulk fuel storage area to the retention basin.

There are only two locations within the project area where surface water occurs, as was observed during a field visit on April 30, 2013. The two locations are:

- a wetland area in the Black Squirrel Creek drainage near the far west border of the project area, and
- a wetland area associated with Haynes Creek located near the south end of the PTT.

Minimal flow was observed in the Black Squirrel Creek wetland area. Flow originates from springs and is perennial. The tributary fed by these springs flows in a southwest direction for approximately 2.5 miles before exiting the west property boundary of the project area. There are no facilities or roads located within the wetland area. The RTT is located immediately east of this wetland area.

Standing water was also observed in the wetland area associated with the Haynes Creek drainage immediately upstream of the sealed culverts located at the PTT. Any localized stormwater drainage that occurs in the track areas or the core area of the TTC property within the Haynes Creek drainage is contained immediately upstream of the blocked culverts.

4.3.1.2 Floodplains

The Federal Emergency Management Agency (FEMA) map panel 0801470150B encompasses the project area (FEMA 1989). As shown in Figure 4-1, there are two designated floodplains on the TTC property. One is associated with the Haynes Creek drainage and the other with the Black Squirrel Creek drainage. The Haynes Creek floodplain is a narrow band that extends north-south through the southern half of the property. Several tracks and roads cross the floodplain, but no buildings are located within it. The Black Squirrel Creek floodplain is located in the northwest corner of the property and in a small area along the western boundary of the property. There are no roads, tracks, or buildings in those areas. As mentioned previously, a 100-year storm event occurred in 2003. Stormwater flow did not damage any tracks or other facilities, and no stormwater flow exited the TTC Core Area infrastructure.

4.3.1.3 Wetlands

The field reconnaissance of the TTC property and review of U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory Mapping (USFWS 2013) indicate wetlands within the Black Squirrel drainage near the western property boundary and in the Haynes Creek drainage near the southern property boundary (see Figure 4-3 in Section 4.6). Both drainages are tributaries to the Arkansas River, and, therefore, these drainages are likely classified as jurisdictional. The Black Squirrel drainage wetlands are associated with the Keynar soil mapping unit and the Natural Resources Conservation Service (NRCS) Salt Meadow Range Site, while the Haynes Creek drainage wetlands are associated with the Arvada soil mapping unit and the NRCS Salt Flat Range Site (see Section 4.5). Both of these soil mapping units and range sites exhibit moderate to high levels of alkalinity and soluble salts, and wetland vegetation species supported in these areas are adapted to these soil conditions.

At the less mesic and apparently more alkaline wetland areas, saltgrass (*Distichlis spicata*), poverty sumpweed (*Iva axillaris*), pursh seepweed (*Suaeda calceoliformis*), alkali sakaton (*Sporobolus airoides*), Baltic rush (*Juncus balticus*), and three-square (*Schoenoplectus pungens*) are the dominant species. These areas are depicted as alkaline meadow wetland in Figure 4-3. Accumulations of surface salt were often visible in the alkaline meadow wetland areas. The more mesic wetland sites (depicted as wetland in Figure 4-3) support broadleaf cattail (*Typha latifolia*), Nebraska sedge (*Carex nebrascensis*), sedges (*Carex* spp.), scratchgrass (*Muhlenbergia asperifolia*), prairie cordgrass (*Spartina pectinata*), common reed (*Phragmites australis*), Nuttall's sunflower (*Helianthus nuttallii*), showy milkweed (*Asclepias speciosa*), and willows (*Salix* sp.). Sites supporting these vegetation species typically exhibited open, shallow areas of surface water or soils saturated to the surface.

4.3.2 Environmental Effects and Environmental Commitments

4.3.2.1 Effects of the Proposed Action

Surface Water and Floodplains

This section discusses potential effects on surface water and floodplains of operational activities such as testing, research, training, anticipated activities, and routine site activities (i.e., infrastructure management and maintenance).

<u>Operational Activities</u>

Testing

There would be no effects from testing on the 100-year floodplain associated with Black Squirrel Creek because there are no facilities, roads, or tracks located in the floodplain and therefore it is not likely that testing will occur within that floodplain. The roads and tracks located within the Haynes Creek floodplain do not currently impede the natural action or function of the floodplain. The 100-year storm event that occurred in 2003 did not result in damage to any roads or track. It did not produce stormwater that exited the TTCI property. There would be negligible, adverse, direct, short-term or long-term effects from these activities on the Haynes Creek floodplain.

Research and Training

There are no potential effects on surface water or floodplains from these activities.

Anticipated Activities

Anticipated activities that might affect surface water include construction of a new high-speed track (above 165 mph); more terrain props to be utilized by DHS and TSA for motor carrier, bus, and rail safety research; blast effects on transportation vehicles; research for FBI and CIA; DOD weapons research; off road vehicle tests for the U.S.

Army; and possible research related to tunnels and bridges for the science and technology division of TSA. Construction related to these anticipated activities would have minor short-term adverse, indirect, effects on surface water. As with infrastructure maintenance and repair, a stormwater management plan would be required for any new construction activity. The plan would be approved by the Facilities Engineer at TTCI. The stormwater management plan would incorporate erosion control measures In addition, the potentially affected areas are drained by stormwater conveyance ditches that lead to closed-basin retention facilities.

Any new construction would likely avoid the designated 100-year floodplains for Black Squirrel Creek and Haynes Creek. Existing roads and track located within the Haynes Creek floodplain have not affected the function of the floodplain, and the 2003 storm event had no effect on them.

Routine Site Activities

Infrastructure Management and Maintenance

North of the CSB, the bulk fuel storage area is equipped with:

- two 15,000 gallon above ground storage tanks (ASTs) for #2 diesel with secondary containment;
- one 2,000 gallon, double-walled AST for highway diesel;
- one 4,000 gallon AST for lubrication oil with secondary containment; and
- a lubrication oil delivery system with secondary containment.

Stormwater retained in the secondary containment basins is pumped to the wastewater pretreatment system.

A locomotive refueling and lubrication facility at the CSB is equipped with:

- one 120-foot long spill pan;
- one 3,000 gallon double-walled underground storage tank (UST) for retention of leaked oil and/or spilled fuel;
- A 3,000 gallon UST for wastewater retention.

Collected oil and fuel are recycled. Collected wastewater is pumped to the wastewater pretreatment system. See discussion of USTs in Section 4.4.2.1.

The URB has a 3,000 gallon diesel AST to fuel a building boiler. The tank and piping are protected by concrete secondary containment.

The TMB has an 8,000 gallon diesel AST to fuel building boilers. The tank is protected by concrete secondary containment. Fuel is delivered to the boilers by buried double-walled fiberglass pipe.

Inspections and maintenance are performed in accordance with the SPCC Plan (TTCI 2011c) for all of the above-ground tanks, secondary containment systems, and double-walled below-ground piping systems. In addition, secondary containments associated with the pretreatment system are inspected and maintained in accordance with the Waste Water Treatment Operations and Maintenance Manual (O&M Manual) (FESI 1999) and Waste Water Treatment Room Operations standard operating procedures

(SOPs) (TTCI 2013). These activities have potentially adverse, direct, short-term effects on surface water resources. As long as a spill or release is cleaned up in a timely manner, the effect is considered negligible to minor because (a) ideally, secondary containment systems contain spills or releases, preventing them from entering drainage channels, (b) no stormwater from these test facilities leaves the site, and (c) fuels that could potentially enter surface water courses are amenable to natural biodegradation in soils and groundwater.

Maintenance and repair of roads and tracks in existing infrastructure likely pose the only potential effects to surface water. Prior to any maintenance activities at the site, the Facilities Engineer at TTCI require a stormwater management plan that includes best management practices which include measures to prevent erosion and sedimentation from construction activities. The impacts from construction and maintenance activities would be minimized because erosion control measures are standard practice as part of road and track repair, and most of the potentially affected areas are drained by stormwater conveyance ditches that lead to closed-basin retention facilities.

There would be no adverse direct or indirect effects on floodplains from construction or maintenance activities related to infrastructure at the site.

Wetlands

Potential effects on wetlands from testing, research, training, infrastructure, and anticipated activities are discussed below.

Operational Activities

Testing

Existing testing areas and facilities are located well away from wetlands on the TTC property. It is anticipated that future testing activities will occur within the already existing areas and facilities and therefore these activities would not affect wetlands.

Research and Training

These activities have no potential effects on wetlands as the activities involved in research and training do not occur in or near the TTC wetland areas.

Anticipated Activities

Any new construction would likely avoid the designated 100-year floodplains for Black Squirrel Creek and Haynes Creek, and wetlands would not be affected. If a new facility were to be constructed within existing wetlands, a delineation of potentially affected wetlands would need to be completed and the Section 404 permitting process initiated with the ACOE. Development resulting in a wetland fill area from a tenth up to one-half acre would require the issuance of a Nationwide Permit from the ACOE. Development requiring more than one-half acre of wetland fill would require the issuance of an Individual Permit.   Any a Section 404 permits would likely include environmental commitments and mitigation measures therefore the effects on wetlands resulting from construction would be minor.

Routine Site Activities

Infrastructure Management and Maintenance

Existing facilities are located well away from wetlands on the TTC property, and these existing facilities would not affect wetlands during management and maintenance activities.

4.3.2.2 Effects of the No Action Alternative

Potential effects of the No Action Alternative on surface water would be identical to those of the Proposed Action.

4.3.2.3 Environmental Commitments

There are no minimization or mitigation measures required as long as there is continued implementation of best management practices along with existing plans, procedures, and conventional erosion control practices during earthwork, road repair, and any other construction within the project area, as discussed above.

4.4 Groundwater and Hazardous Materials/Hazardous Waste

State regulations protect groundwater resources, both from a water supply perspective and a water quality perspective. For more than 125 years, the Colorado Division of Water Resources has been empowered to administer all water rights according to the Appropriation Doctrine (i.e. 1st in time, 1st in right). The Division of Water Resources employs water commissioners to ensure the priority system is followed, enforcing the decrees and water laws of the State of Colorado. The Colorado Ground Water Law of 1957 established the permitting requirement of ground water wells, and by 1969, surface and ground water rights were administered together.

The Colorado Water Quality Control Division regulates the discharge of pollutants into the State's surface and groundwater under the provisions of the Colorado Water Quality Control Act of 1974. Protection and maintenance of water quality is achieved by issuing permits specifying the types and amounts of pollutants that may be discharged without violating the State water quality standards. This EA assumes that groundwater quality standards established under Regulation 41 (Basic Standards for Ground Water) applicable because TTC withdraws groundwater for potable water supply from the alluvial aquifer that is tributary to the Arkansas River.

Finally, management of hazardous materials and hazardous waste is regulated under the RCRA that is administered by the Colorado Department of Public Health and Environment Hazardous Materials and Waste Management Division. RCRA rules that pertain to the treatment, storage, and disposal of hazardous materials and hazardous waste, and the installation, inspection, and monitoring of above-ground and USTs, are applicable to TTC.

4.4.1 Affected Environment

This section contains a discussion of the geologic and hydrogeologic settings of the project area, as well as the potentially hazardous material/hazardous waste that could affect groundwater quality.

4.4.1.1 Geology

The uppermost bedrock underlying the TTC property consists of the Cretaceous Pierre Shale, which is composed of thinly bedded, dark gray-to-black shale and sandy shale, with some iron concretions and limestone lenses (Watts and Ortiz 1990). The Pierre Shale is reported to be several thousand feet thick beneath the TTC property. The regional upper surface of the Pierre Shale slopes approximately 25 feet/mile to the south (Welder and Hurr 1971); however, the direction and magnitude of the slope vary locally. For example, beneath the western half of the site, the bedrock surface slopes to the south at approximately 29 feet/mile, generally consistent with the regional bedrock topography. Beneath the eastern half of the site, the bedrock surface slopes to the southwest at approximately 70 feet/mile. The south-sloping bedrock surface beneath the western half of the site is eroded into a gently incised north-south oriented paleochannel. The paleochannel elevation is lower than that of the bedrock surface underlying the eastern half of the site. Thus, the eastern bedrock surface forms the eastern flank of the paleochannel underlying the western half of the site.

Overlying the eroded bedrock surface are typically older alluvium and eolian (wind-blown) deposits (Romero 1992). The older alluvium immediately overlies the Pierre Shale and is comprised of fine to coarse sand interbedded with clay. The basal layers of the older alluvium are commonly iron-cemented sand and gravel (Romero 1992) and commonly fill the eroded features of the bedrock surface.

Across the site, eolian deposits overlie the older alluvium and extend to the ground surface (Romero 1992). These deposits consist of unconsolidated very fine to medium sand, silt, and clayey, sandy silt. The deposits are in the form of generally stabilized sand dunes. All of the dunes are oriented in a northwest-southeast direction. They are locally hummocky and have no distinct external drainage. The surface soils are stabilized with vegetation.

The combined thicknesses of the older alluvium and eolian deposits at the site range from approximately 50 feet on the eastern edge of the Core Area to more than 200 feet in the northwest corner of the site (Romero 1992 and TTCI 2012).

4.4.1.2 Hydrogeology

The eolian deposits serve as catchment material that allows for rapid downward percolation of precipitation to the underlying older alluvium. Further downward infiltration is inhibited by the underlying Pierre Shale, which has relatively low hydraulic conductivity and acts as an aquitard. Therefore, the older alluvium is considered the uppermost aquifer. Once groundwater enters the older alluvium, it tends to migrate laterally along the erosional features of the bedrock surface.

No groundwater is reported to be present in the alluvium/eolian deposits along the eastern boundary of the site, or beneath most of the Core Area buildings (Romero

1992). However, some localized alluvial/eolian groundwater may occur in the Core Area because of recharge from the domestic wastewater leach fields and from stormwater conveyance ditches and retention basins within the Core Area. The saturated thickness of the alluvium/eolian deposits begins at zero along the eastern side of the site and gradually increases to 70-80 feet in the western half of the site. In the vicinity of the two water supply wells, the saturated thickness is approximately 65 feet (Romero 1992). These ranges in saturated thickness are consistent with the presence of a relatively shallow bedrock surface along the eastern side of the site, increasing in depth toward the west and southwest as the deeper bedrock paleochannel is approached.

The depth to the groundwater surface ranges from approximately 40 feet near the eastern boundary of the site where groundwater is present to approximately 140 feet in the northwestern corner of the site. In the vicinity of the water supply wells, the depth to the groundwater surface is approximately 115 feet (Romero 1992 and TTCI 2012).

The regional direction of groundwater flow is to the southwest (Radian 1991 and Romero 1992). However, beneath the western half of the site, groundwater movement is predominantly southward following the bedrock paleochannel. Groundwater movement beneath the eastern half of the site is southwestward toward, then into the paleochannel (Romero 1992).

Groundwater is recharged primarily by percolation/infiltration of direct precipitation and intermittent stormwater flow in Haynes and possibly Black Squirrel Creeks. Groundwater leaves the site along the southern boundary of the site then migrates to the south-southeast toward the Arkansas River.

The two TTC water supply wells are positioned in the center of the Railroad Test Track loop, approximately 2 miles west of the Core Area buildings (see Figure 3-1). Both wells are located in the older alluvial deposits that infill the paleochannel. These are the only active supply wells on site and are collectively permitted for a total of 40 acre-feet per year. The maximum pumping rates for the Main Well and Backup Well are 850 gpm and 120 gpm, respectively. Because the supply wells extract alluvial groundwater that is tributary to the Arkansas River, as a condition of well use the site augmentation plan requires TTC to provide replacement water to the Arkansas River Basin for water consumed on site. This replacement water is provided through surface water rights acquired by TTC.

4.4.2 Environmental Effects and Environmental Commitments

4.4.2.1 Effects of the Proposed Action

The sections below discuss potential effects on groundwater from operational activities like testing, research, training, and anticipated activities, as well as routine site activities.

Operational Activities

Testing

Facilities associated with testing that could potentially affect groundwater include the RDL and the CSB. Hydraulic fluids and lubrication oils used by the testing equipment could leak and spill onto floors within the RDL. Floor drains route liquids to a common sump from where they are pumped via buried pipe to the industrial wastewater pretreatment facility at the CSB. At the CSB, lubrication oil from locomotive and rail vehicle maintenance are collected in service pits and recycled, to the extent practicable. Those that mix with aqueous liquids and cannot be recycled are pumped to the industrial wastewater pretreatment facility via single-walled buried PVC piping. Hydraulic fluids and oils could seep through cracks or expansion joints in floor slabs, drains, or collection sump. Also, process water conveyed via buried pipe to the wastewater pretreatment facility could leak into underlying bedding material and soil. The integrities of the floor drains, sumps, and conveyance lines at both facilities are not inspected and groundwater quality beneath and adjacent to the facilities is not monitored. The type of effect on groundwater from these activities is potentially adverse and direct. The potential effect is site-specific, but could extend beyond site boundaries if contamination from either facility were to enter the groundwater and migrate. Even though there is minor groundwater occurrence beneath the facilities and the fluids and oils of concern are amenable to natural biodegradation in soils and groundwater, a prolonged undetected leak could negatively impact subsurface soils and, ultimately, groundwater.

The pretreatment facility at the CSB consists of oil-water separation and solids precipitation. Oils are recovered and recycled in accordance with the Waste Water Treatment Operations and Maintenance Manual (O&M Manual) (FESI 1999), Waste Water Treatment Room Operations (TTCI 2013), Hazardous Waste Management Plan Handbook (HWMPH) (TTCI 2011a), and Engineering Design and Operations Plan (TTCI 2011b). Solids are removed and transported off-site as industrial waste. Aqueous liquids are pumped to the wastewater impoundment facility via single-walled buried PVC pipe and evaporated in the lined facility. Should there be a spill or release from the pretreatment system, a break in the buried conveyance piping, or a mishandling of the secondary wastes, groundwater could be indirectly yet adversely affected. While secondary containment at the pretreatment facility and interstitial space between liners at the impoundment facility are routinely monitored, the integrity of the buried PVC piping is not tested. Consequently, the potential effect of a spill or release is site-specific, but could extend beyond site boundaries if contamination were to enter the groundwater and migrate. Even though there is minor groundwater occurrence beneath the pretreatment and impoundment facilities, a prolonged undetected leak in the buried conveyance piping could negatively impact subsurface soils and, ultimately, groundwater. However, the detection of a leak would be possible through the observations of material present, or lack thereof, in the lined facility which would minimize the release impacts.

At the RDL, blowdown waters from noncontact cooling towers are routed to an underground holding tank from where they are piped to and evaporated in the wastewater impoundment facility. A release from buried piping or the impoundment facility could adversely and directly affect groundwater. The potential effect is site-specific, but as stated in the previous sections, could extend beyond site boundaries if contamination were to enter the groundwater and migrate. However, standard procedures, maintenance and monitoring are in place that would identify and minimize any accidental releases.

Parts washers containing hazardous solvents are used in the RDL and CSB. Spent solvents are containerized and recycled by a contract vendor. Solvent wipes and rags are containerized and disposed off-site in a licensed RCRA Treatment, Storage, and Disposal Facility (TSDF). Should there be a spill or release of solvents, groundwater could be indirectly yet adversely affected. The potential effect is site-specific, but could extend beyond site boundaries if contamination were to enter the groundwater and migrate. The duration of the potential effect is long-term. The intensity of the effect is considered negligible because (a) there is minor groundwater occurrence beneath the impoundment and (b) the solvents, wipes, and rags are containerized and managed in strict accordance with the HWMPH (TTCI 2011a).

Adjacent to the CSB is a Motor Pool gasoline refueling station. It is equipped with a 10,000 gallon UST and above-ground fuel dispenser. The UST is double-walled with an interstitial sump that provides leak detection. In the event of release from either the UST or buried piping servicing the fuel dispenser, groundwater could be adversely and directly affected. The potential effect is site-specific, but the effect could be larger scale if contamination were to enter the groundwater and migrate. The duration of the potential effect is long-term. The intensity of the effect is considered negligible because (a) there is minor groundwater occurrence beneath the refueling station, (b) the UST and fueling system are monitored weekly in accordance with Colorado UST regulations, and (c) gasoline is amenable to natural attenuation via volatilization and biodegradation in soils and groundwater.

The Infrastructure section of the report discusses the potential effect on groundwater of domestic wastewater systems servicing the testing facilities.

Research

Facilities associated with research that could potentially affect groundwater consist of the Warehouse Laboratory Facility (WLF) and Air Brake Lab, as well as the Components Test Laboratory (CTL). A parking area for fuel trucks and a wastewater truck is located adjacent to the WLF. The parking area has secondary containment that drains to a 12,000 gallon fiberglass double-walled UST with leak detection. Water from the tank is pumped to the wastewater pretreatment system. In the event of a spill or release from either the UST or buried piping, groundwater could be adversely and directly affected. The potential effect is site-specific, but the effect could be larger scale if contamination were to enter the groundwater and migrate. The duration of the potential effect is long-term. The intensity of the effect is considered negligible because (a) liquids retained in the UST will likely be a diluted mixture of fuel with water, (b) there is minor groundwater occurrence beneath the parking area, UST, and buried piping, (c) the spill management system and UST leak-detection and containment systems are inspected, operated, and maintained in accordance with the SPCC Plan (TTCI 2011c) and Colorado UST regulations, respectively, and (d) hydrocarbon fuels are amenable to natural attenuation via volatilization and biodegradation in soils and groundwater.

At the CTL, parts washers containing hazardous solvents are used. Spent solvents are containerized and recycled by a contract vendor. Solvent wipes and rags are containerized and disposed off-site in a licensed RCRA TSDF. Should there be a spill or release of solvents, groundwater could be indirectly yet adversely affected. The potential effect is site-specific, but the effect could be larger scale if contamination were to enter the groundwater and migrate. The duration of the potential effect is long-term. The intensity of the effect is considered negligible because (a) there is minor groundwater occurrence beneath the CTL and (b) the solvents, wipes, and rags are containerized and managed in strict accordance with the HWMPH (TTCI 2011a).

There is a potential effect on groundwater from domestic wastewater systems servicing the testing facilities. This is discussed under Infrastructure.

Training

Small quantities of chemicals are used in chemical demonstrations at the SERTC to display the different hazard classes. Some explosives are also used, as is propane to simulate vehicle fires, and crude oil or diesel fuel used in burn pots to generate smoke . Of these chemicals and fuels, the only potential effect on groundwater is from diesel that might spill onto the ground around the burn pots. Should there be a spill or release of diesel, groundwater could be adversely and directly affected. The potential effect is site-specific, but the effect could extend beyond site boundaries if contamination were to enter the groundwater and migrate. The duration of the potential effect is long-term. The intensity of the effect is considered negligible because (a) the volume of potential release will be small (less than a few gallons), (b) the depth to groundwater beneath the SERTC is at least 50 feet, and (c) diesel fuel is readily biodegradable in soils.

In addition, there is a potential effect on groundwater from domestic wastewater systems servicing the training facilities. This is discussed under Infrastructure.

Anticipated Activities

Anticipated activities may affect the adequacy of both water supply and domestic wastewater treatment.

Water Supply

If major track or building construction projects occur, as proposed in the 2012 Facilities Master Plan, temporary supplemental and possibly long-term water may be needed. Similar to existing conditions, the type of potential effect on groundwater is adverse and direct, and the potential effect is site-specific. The duration of the potential effect may be short- or long-term, depending on the rate of aquifer recharge versus the rate of groundwater withdrawal. Variables affecting recharge consist of meterological conditions, potential changes to surface drainage patterns by new construction, and potential increase of impermeable surface area due to new tracks, parking areas, or buildings. The intensity of the effect is considered minor to moderate, as the expansion plans do not include a significant amount of new freshwater (such as new water tanks, hoses or sprayers).

Domestic Wastewater Treatment

An assessment of probable regulatory modifications indicates that the existing septic systems should provide adequate wastewater treatment for the foreseeable future. However, anticipated operations could result in increased waste flows or unexpected operational considerations—either one of which could increase loadings of nitrates and

Total Dissolved Solids (TDS) to groundwater, which would in turn have an adverse and direct effect on groundwater quality. The potential effect is site-specific, but the effect could have a larger-scale effect if contaminants mobilize in groundwater. The duration of the potential effect is long-term. The intensity of the effect would be negligible to moderate, depending on the volume and concentration of additional wastewater introduced to the groundwater system.

<u>Routine Site Activities</u>

Infrastructure Management and Maintenance

Potential effects of infrastructure on groundwater are associated with water supply, domestic wastewater treatment, and temporary storage of hazardous and industrial wastes.

Water Supply

The two TTC water supply wells have been permitted with the State Engineer. While withdrawals will affect the alluvial groundwater aquifer, such withdrawals are allowable provided replacement waters are available and are returned to the Arkansas River basin in accordance with the augmentation plan. An augmentation plan is a court-approved plan, which is designed to protect existing water rights by replacing water consumed on-site by TTC and to provide replacement water to the Arkansas River Basin. Augmentation plans are usually required in areas where there is a shortage of water during part or all of the year. Historical consumption records at TTC since 1972 show that the facility has had problems in some years remaining within the annual 40 acre-feet allocation decreed for the supply wells, whereas in dry years TTC has had difficulty acquiring sufficient augmentation water to meet its 40-acre-feet allocation. The former condition was addressed with the State Engineer and should not recur in the future. The latter condition was evident with the regional drought conditions experienced between 2000 and 2004, when available replacement water was reduced to an annual low of 16 acre-feet. Consequently, the type of potential effect on groundwater is adverse and direct. Provided the replacement requirements of the Augmentation Plan are complied with, the potential effect would be site-specific—only the local groundwater resource would be affected. The duration of the potential effect may be short- or long-term, depending on the rate of aquifer recharge. Variables affecting recharge primarily consist of meteorological conditions, such as the rate, volume, and seasonal timing of precipitation.

Domestic Wastewater Treatment

Domestic wastewater treatment is provided by septic tanks and leach fields positioned adjacent to buildings equipped with restrooms. Under the Federal Facility Compliance Act, septic systems fall under State and local regulations for corrective maintenance and construction. Five of the building septic systems are classified as Large Capacity Septic Systems and were reviewed for compliance as a post condition by CDPHE and Pueblo County. A Site Application Approval (#4459) was given for the systems in 2001, and a Discharge Permit has been issued by CDPHE for the five systems under the Colorado water discharge regulations. However, treated wastewater that flows into leach fields may contain elevated levels of nitrates and total dissolved solids (TDS), which could affect groundwater quality. Thus, the type of potential effect on groundwater is adverse and direct. The potential effect is site-specific, but could have a larger-scale effect if contaminants are mobilized in groundwater. The duration of the potential effect is long-term. The intensity of the effect is considered negligible because CDPHE determined that effluent limits for domestic wastewater treatment are met at the point of compliance through a combination of treatment and attenuation/land treatment in the vadose zone (CDPS). Moreover, in an amendment to the Discharge Permit, CDPHE is not requiring groundwater quality monitoring.

Hazardous and Industrial Waste Storage

The SMB and adjacent FSB are used to temporarily store hazardous and industrial wastes until a contract vendor removes them and relocates them off-site to a RCRA-licensed treatment, storage, or disposal facility. The FSB is used as the main hazardous waste accumulation area for TTC. Hazardous wastes are stored in sealed 55-gallon drums and temporarily staged for pickup. In addition, small quantities of hazardous wastes are temporarily stored in flame-resistant storage cabinets inside the FSB until they can be packaged into lab packs and removed by a disposal contractor. Industrial solid wastes (oily rags and wipes) are placed in 55-gallon drums and temporarily staged in a drum cabinet within the SMB laydown area. Used antifreeze is also stored in drums and temporarily staged in the SMB laydown yard drum cabinet. In the event of a spill or release, groundwater could potentially be indirectly, yet adversely, affected. The potential effect is site-specific, but the effect could be larger-scale if contaminants were to enter the groundwater and mobilize. The duration of the potential effect is long-term. The intensity of the effect is considered negligible because (a) all stored wastes are protected by secondary containment, (b) timeframes for stored wastes are limited by regulation, and (c) all waste management procedures are conducted, inspected, and audited in accordance with the HWMPH (TTCI 2011a).

4.4.2.2 Effects of the No Action Alternative

Potential effects on groundwater from the No Action Alternative would be identical to those of the Proposed Action.

4.4.2.3 Environmental Commitments

The same environmental commitments are recommended for both the Proposed Action and No Action alternatives. They consist of the following best management practices.

Operational Activities

Testing, Research, and Training

For the RDL and CSB facilities, the staff at TTCI will develop and implement when required an inspection and integrity testing program for the floor drains, sumps, and single-walled buried pipelines to verify that these components do not leak. At a minimum, inspection and testing will be performed annually, with results reported to TTCI management and documented in the project files. An alternate approach would be to install a groundwater and/or soil vapor monitoring network immediately adjacent to or beneath the floor drains, sumps, and buried piping that would effectively provide detection monitoring. At a minimum, the frequency of groundwater and/or soil vapor monitoring would also be annual, with results reported to TTCI management and documented in project files.

For all UST systems, TTC will continue to inspect, operate, maintain, and monitor leak detection and secondary containment systems in accordance with Colorado UST regulations and the SPCC Plan (TTCI 2011c).

For the pretreatment system at the CSB and surface impoundment, TTC will continue to inspect, operate, maintain, and monitor the treatment system, impoundment system, and waste management practices in accordance with the O&M Manual (FESI 1999), Wastewater Treatment Room Operations (TTCI 2013), HWMPH (TTCI 2011a), and EDOP (TTCI 2011b). The manuals and SOPs will be updated regularly to reflect changes in process waste streams, treatment requirements, and treatment equipment.

For all parts washers that use hazardous solvents that generate solvent wipes and/or rags, TTC will continue to containerize and recycle the spent solvents, used wipes, and used rags in accordance with the HWMPH (TTCI 2011a).

For the SERTC training area, TTC will continue to handle chemicals and fuels so as to minimize the potential for spill or release. In the event of a spill or release, immediate containment and cleanup will be performed in accordance with the SPCC Plan (TTCI 2011c), and appropriate regulatory agencies would be notified.

Routine Site Activities

Infrastructure Management and Maintenance

For the water supply system, TTC will continue to comply with the limitations, replacement flows, and reporting requirements of the approved augmentation plan for TTC. In addition, to avoid shortages during periods of drought and to allow for anticipated growth of the facility, TTC should obtain supplemental capacity by acquiring additional augmentation water rights and adding decreed pumping capacity. The Colorado Land Board (CLB) owns the rights to seven other wells located on TTC property, as well as the right to develop and pump the water off-site. TTC should pursue purchasing or leasing the decreed rights from the CLB. The CLB North Antelope Well, also located on-site, consists of a small windmill with a stock tank. This well has been tagged by the State Engineer's Office to prevent operation due to noncompliance with the Arkansas River Basin operating rules. The well has been decreed a pumping rate of 0.04 cfs absolute (max. 29 acre-feet, continuous annual pumping). In order to use the well for TTC purposes, the well would need to be re-drilled and developed, electrical power would need to be extended to the well, a pump house with metering and chlorination would need to be installed, and a transmission line between the well site and the FAST Service Facility buildings would need to be installed. Augmentation water would also need to be purchased to meet the operating rules for the basin.

Another option for additional water supply is the CLB Appelt 23 well. This was an exploratory well drilled on-site but never developed. It does not exist as a structure in the field. However, it has a conditional water decree that potentially could be developed under the current permit and operating rule process. The appropriated pumping rate of

4 cfs could be considered high capacity if pumped continuously, but a moratorium against such pumping is proposed for this groundwater basin. Thus, time is working against the development of this well at its implied potential. Augmentation requirements also apply. Nonetheless, should the water right be developed, one or more wells would need to be drilled, and a distribution line would need to be extended from the FAST Maintenance area to the well location(s) inside the HTL. Power is available nearby at the communications tower inside the oval and directly south of the well locations.

For domestic wastewater treatment systems, TTC will continue to train and remind TTCI employees, contractors, and visitors that cleaning solutions, solvents, or anything other than domestic sanitary wastes are not to be disposed of in the domestic wastewater systems. Septic tanks will continue to be pumped annually. Should additional treatment capacity become necessary in the future, topography of the Core Area lends itself to locating a central wastewater treatment unit in its southwest corner, in what is now the Post 85 Laydown Area. Collection lines would then extend to the various septic systems, as discussed in the Master Plan. The wastewater would receive a type of secondary treatment to biologically treat it to a more finished level, with a leach field to return the treated water to recharge the alluvial aquifer.

For the management of hazardous and industrial wastes, TTC will continue to minimize the volume and toxicity of wastes generated on-site, as well as implement the waste handling, inspection, tracking, RCRA training, and manifesting procedures detailed in the HWMPH (TTCI 2011a). This handbook will also be updated regularly to reflect changes in RCRA and U.S. DOT regulations.

4.5 Soils

4.5.1 Affected Environment – Environmental Setting for the Proposed Action

National Resource Conservation Service soil mapping for the TTC property indicates there are 18 soil series units mapped for the TTC Property (Table 4-3, Figure 4-2) (NRCS 2013). Descriptions of the soil profiles, characteristics of these mapping units, and Range Site descriptions are provided in USDA, SCS (1972).

The mineral parent material for soils on the TTC property consists of unconsolidated deposits of Pleistocene and Recent Age. Much of the property is covered with deposits of fine to medium sand having a dune-like relief. This sand is the parent material of the Valent soils. This soil mapping unit includes small wind eroded areas ("blow-outs") up to 5 acres in size. These blow-outs are generally clustered along dune ridges, often arranged in a northwest to southeast orientation.

A mixture of wind-sorted fine sands and silt with nearly level to gently undulating relief is the parent material for Olney and Vonid soils. By contrast, the parent materials of Arvada, Gilcrest, Otero, and Stoneham soils are not as well sorted by wind as the Valent, Vona, and Olney soils. They contain, more or less, heterogeneous mixtures of silt, clay, sand, and gravel.

Table 4-3 Soil Series Mapping Units on the TTC Property

Soil Series Name	Mapping Symbol	NRCS Range Site	Acres
Arvada	AR	Salt Flat	892.94
Bankard sand	Bk	Sandy Bottomland	175.32
Gilcrest sandy loam	GcA	Sandy Plains	1,013.70
Glenberg-Haverson complex	Gh	Sandy Bottomland	319.87
Haverson silt loam	Ha	Saline Overflow	355.75
Keynar	Ke	Salt Meadow	668.08
Limon silty clay	LoA	Salt Flat	242.55
Manzanola clay loam	MpA	Saline Overflow	395.75
Otero dry sandy loam	OdA	Sandy Plains	39.50
Olney loamy sand	Oe	Sandy Plains	3,318.26
Olney sandy loam	Of	Sandy Plains	1,466.01
Olney sandy loam, dry	OfB	Sandy Plains	62.74
Otero gravelly sandy loam	OrD	Sandy Plains	43.90
Stoneham loam	Sh	Loamy Plains	448.22
Valent	Va	Deep Sand	15,688.66
Vonid loamy sand	Vn	Sandy Plains	5,375.69
Vonid sandy loam	Vo	Sandy Plains	1,114.04
Vonid sandy loam, dry	VoC	Sandy Plains	825.67
Total			**32,446.47**

Alluvium of Recent Age is the parent material for Bankard, Glenberg, Haverson, Keynar, Limon, and Manzanola soils. These soils are not as widespread as the sand- and silt-derived soils and are restricted to the floodplains of streams and drainages within the TTC property boundaries. The textures of these soils range from clay to gravelly sand.

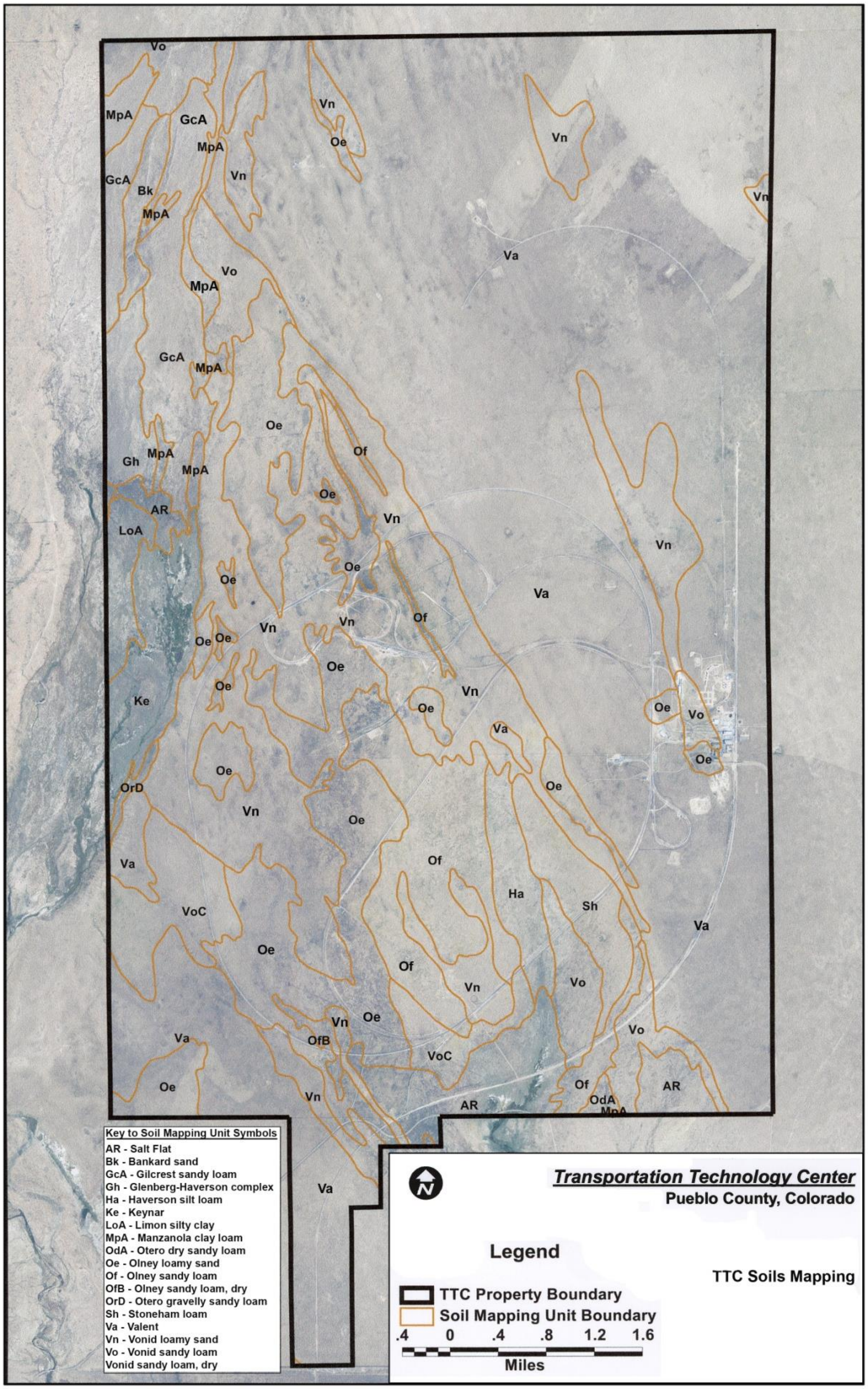

Figure 4-2 Soils Mapping for the TTC Property

Because of the sandy consistency of the majority of soils within the TTC property, wind erosion hazard is high, and most are well-drained with a high water intake rate and low water holding capacity. Blowing sand can be an issue with soils disturbed by surface and building activities that remove or disrupt vegetation cover.

The Arvada, Haverson, Keynar, Limon, and Manzanola soils are more stable than the sandy soils, but pose constraints for revegetation because of moderate to high levels of alkalinity and soluble salts. Restoration of vegetation on these soils, if they are disturbed, would need to rely on vegetation species adapted to moderate to high levels of alkalinity and soluble salts.

4.5.2 Environmental Effects and Environmental Commitments

4.5.2.1 Effects of the Proposed Action

This Section discusses the potential effects on soils of testing, research, training, infrastructure, and anticipated activities.

<u>Operational Activities</u>

Testing

The construction of props for testing activities would cause a relatively minor disturbance to surface soil layers. Although these possible surface disturbance effects would not be significant, there would be minor disturbances to surface soil resources associated with these developments, some of which may be permanent. Wind erosion could result in minor losses of soils resources at these disturbances. However, soil losses would be relatively minor, and revegetation efforts are likely to be successful with the recommended soil stabilization measures (see Section 4.6.2.3).

Research and Training

Research and training activities would occur within existing facilities, and there would be no additional effects on soils resources within the TTC property boundaries.

Anticipated Activities

Construction of additional facilities would disturb or cover additional areas of soil resources in the vicinity of the proposed facilities. Total disturbance acreages associated with these possible developments are unknown but would be relatively minor in relation to the total extent of soils resources across the TTC property. These disturbances would be permanent with the exception of laydown and construction sites that would be reclaimed after construction was complete. Wind erosion could result in additional minor losses of soils resources at these disturbances. However, soil losses would be relatively minor, and revegetation efforts are likely to be successful with the recommended soil stabilization measures (see Section 4.6.2.3). It is assumed that construction of facilities would avoid areas of wetlands and associated soils with moderate to high levels of alkalinity and soluble salts. As long as vegetation restoration efforts utilize suitable native plant material and appropriate soil stabilization measures, effects on soils resources resulting from construction would be minor, adverse, and short-term.

Routine Site Activities

Infrastructure Management and Maintenance

Existing infrastructure and land and facility management would have no additional effects on existing soils resources beyond those that occurred during the construction of the facilities.

4.5.2.2 Effects of the No Action Alternative

Potential effects on soils from the No Action Alternative would be identical to those of the Proposed Action, without anticipated activities.

4.5.2.3 Environmental Commitments

To prevent the potential for wind erosion resulting from land disturbance associated with testing and possible construction activities, best management practices will be employed such as temporary soil stabilization measures, as appropriate, over areas of exposed surface soils. Temporary stabilization would be accomplished with mulches, wind fences, and erosion mats or netting. Once testing and construction activities were completed, permanent soil stabilization would be accomplished by planting native, deep-rooted grass species adapted to the area and to sandy soils. Supplemental watering may be necessary for initial establishment of these grasses during periods of prolonged drought.

There is a minor risk for leaching of explosive particles and/or by-product constituents from the soil into the underlying groundwater system. Therefore based from previous studies completed at TTC, it is recommended that following completion of any explosive testing, surface soil sampling be conducted in the immediate vicinity of the test sites to assess the nature and extent of potential soil contamination.

4.6 Biological Resources

The assessments contained within this EA are based upon information obtained from several sources: (1) published literature, (2) unpublished reports and data from various agencies, (3) Colorado Natural Heritage Program (CNHP) database search, (4) Colorado Division of Parks and Wildlife (CPW) Natural Diversity Information Source (NDIS) mapping system, and (5) field reconnaissance. The CNHP database search for threatened, endangered, and other species of concern was requested for the entire TTC property. Results of the CNHP database search request were received on September 4, 2013 (CNHP 2013). The CPW NDIS mapping system was accessed on July 28, 2013 (NDIS 2013) to obtain distribution and range information for state game species of concern addressed in this analysis.

FRA requested a U.S. Fish and Wildlife Service (USFWS), Colorado Ecological Services Threatened, Endangered, and Proposed species list for the TTC property in Pueblo County. This list was received from the USFWS on-line Information, Planning, and Conservation (IPaC) decision support system on July 24, 2013.

A field reconnaissance of the TTC property was conducted from April 30 through May 2, 2013, to review habitat conditions within the property boundaries. During this reconnaissance, survey personnel noted habitat conditions, dominant vegetation species, and wildlife and wildlife signs. Survey personnel were also alert to identify any important wildlife habitat features such as raptor nesting habitat, wetlands, or springs.

4.6.1 Affected Environment – Environmental Setting for the Proposed Action

4.6.1.1 Vegetation

The TTC property is fenced and there has been no livestock grazing since the mid-1970s. As a result, undisturbed or undeveloped portions of the property are good examples of native sandhills prairie unmodified by grazing activities. Seven major vegetation communities and one land use type were mapped within the TTC property boundaries (see Figure 4-3). They are sand sage/short-grass prairie, short-grass prairie, cholla/sand sage/short-grass prairie, cholla/rabbitbrush/sand sage/short-grass prairie, greasewood bottomland, wetland, and disturbed/developed. Alkaline meadow and salt flat are subtypes within the wetland vegetation type. Short-grass prairie-burned is a subtype of short-grass prairie that has burned in relatively recent history, and as a result, exhibits reduced amounts of vegetation diversity and density. Dominant vegetation species and acreages for each vegetation/land use type are listed in Table 4-4.

As indicated in Table 4-4, sand sage/short-grass prairie and short-grass prairie are the dominant vegetation communities within the property boundaries, occupying 21,855 acres (or about 67 percent) of the 32,446-acre property. These two vegetation communities are widespread through the TTC property and are associated with the Sandy Bottomland, Sandy Plains, Deep Sand, and Loamy Plains Range Sites, as classified by the NRCS (see Section 4.5). Cholla/sand sage/short-grass prairie and cholla/rabbitbrush/sand sage/short-grass prairie communities are also common and occupy similar soil and range sites but exhibit a strong shrub component of cholla, sand sage, and/or rabbitbrush.

Greasewood bottomland and wetland communities are associated with drainages and drainage floodplains primarily in the western and southern portions of the TTC property. These communities occur within the Black Squirrel and Haynes Creek floodplain areas and are associated with the Salt Flat, Saline Overflow, and Salt Meadow Range Sites, as classified by the NRCS (see Section 4.5). Vegetation supported in the greasewood bottomland and wetland communities is adapted to moderate to high levels of alkalinity and soluble salts.

Total vegetation cover is highly variable within the project area and ranges from near zero, in blowout areas along ridges, to 25 to 60 percent total cover in undisturbed areas with stable vegetation cover.

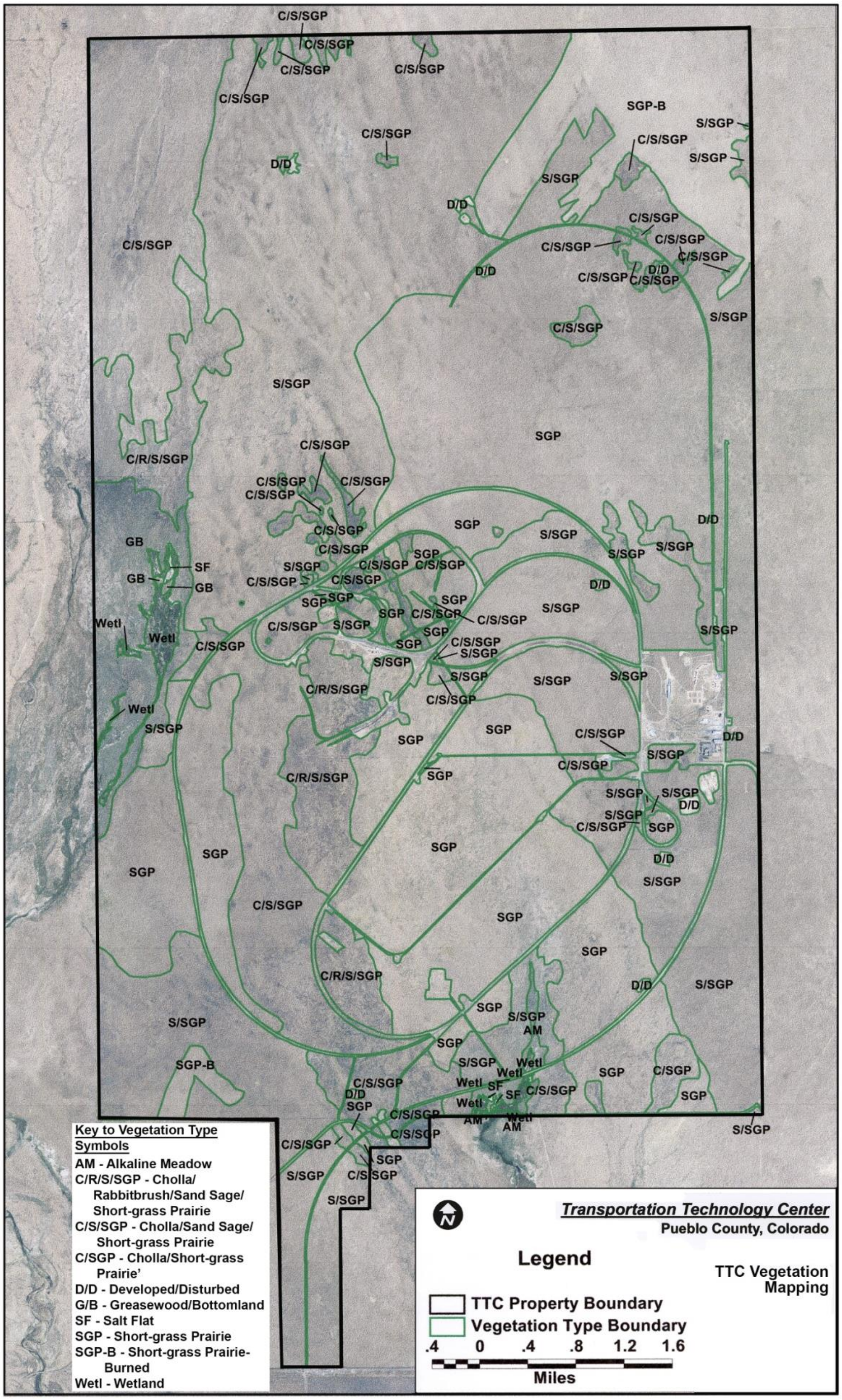

Figure 4-3 Vegetation Mapping for the TTC Property

Table 4-4 Vegetation Communities/Land Types at the TTC Property

Vegetation Community/ Land Type	Dominant Vegetation Species[1]	Acres Within TTC Boundaries
Sand Sage/Short-Grass Prairie	Dominant grasses similar to short-grass prairie, but with sand sagebrush (*Artemisia filifolia*) added as a dominant shrub component	12,300
Short-Grass Prairie	Blue grama (*Bouteloua gracilis*), buffalograss (*Bouteloua dactyloides*), little bluestem (*Schizachyrium scoparium*), sand bluestem (*Andropogon hallii*), sandhill muhly (*Muhlenbergia pungens*), needle-and-thread (*Hesperostipa comata*), yellow Indiangrass (*Sorghastrum nutans*), prairie sandreed (*Calamovilfa longifolia*), blowout grass (*Redfieldia flexuosa*), sand dropseed (*Sporobolus crytandrus*), and purple three-awn (*Aristida purpurea*)	9,555
Cholla/Sand Sage/Short-Grass Prairie	Dominant grasses similar to short-grass prairie, but with cholla cactus (*Cylindropuntia imbricata*) and sand sagebrush added as dominant shrub components	4,500
Short-Grass Prairie-Burned	Similar species to short-grass prairie but vegetation diversity and density has been reduced by fire	1,775
Cholla/Rabbitbrush/Sand Sage/Short-Grass Prairie	Similar species to cholla/sand sage/short-grass Prairie but with rubber rabbitbrush (*Ericameria nauseosus*) added as a dominant shrub component	1,515
Greasewood Bottomland	Greasewood (*Sarcobatus vermiculatus*), rubber rabbitbrush (*Ericameria nauseosa*), alkali sacaton (*Sporobolus airoides*), switchgrass (*Panicum virgatum*), western wheatgrass (*Pascopyrum smithii*), saltgrass (*Distichlis spicata*), prairie cordgrass (*Spartina pectinata*), and green needlegrass (*Nassella viridula*)	907
Wetlands (includes Alkaline Meadow and Salt Flat as subtypes within the wetland category)	In alkaline meadow and salt flat areas: saltgrass, poverty sumpweed (*Iva axillaris*), pursh seepweed (*Suaeda calceoliformis*), alkali sacaton, Baltic rush (*Juncus balticus*), and three-square (*Schoenoplectus pungens*) In more mesic/less alkaline areas: broadleaf cattail (*Typha latifolia*), Nebraska sedge (*Carex nebrascensis*), sedges (*Carex* spp.), scratchgrass (*Muhlenbergia asperifolia*), prairie cordgrass, common reed (*Phragmites australis*), Nuttall's sunflower (*Helianthus nuttallii*), switchgrass, showy milkweed (*Asclepias speciosa*), Baltic rush, and willows (*Salix* sp.). (Wetlands are discussed in Section 4.3)	285
Cholla/Short-Grass Prairie	Dominant grasses similar to short-grass prairie, but with cholla cactus added as a dominant shrub component	131
Developed/Disturbed	Developed areas or bare ground with some annual weeds	1,479

Vegetation Community/ Land Type	Dominant Vegetation Species[1]	Acres Within TTC Boundaries
Total Acres		32,447

[1]Scientific nomenclature follows USDA, NRCS Plants Database. Available online at: http://plants.usda.gov/java/

4.6.1.2 Wildlife

The topography and vegetation within the project area provide habitat for numerous wildlife species associated with native prairie habitats. A multi-strand barbed wire fence exists around the entire TTC facility property boundary to keep livestock from the property. The lack of livestock grazing means relatively high quality sandhill prairie habitat for native wildlife species associated with this habitat type. The fencing is approximately 4 feet high and does not create a significant barrier to wildlife movement. Smaller mammals can easily pass under it while mule deer (*Odocoileus hemionus*) can easily jump the fence and pronghorn (*Antilocapra americana*) can typically crawl under the lowest strand.

Big Game

Two big game species, mule deer and pronghorn, are relatively common in the project area region. The project area is located within CPW Game Management Unit 123. Mule deer occupy all ecosystems in Colorado from grasslands to alpine tundra (Fitzgerald et al. 1994). They are most abundant in shrubland habitats in broken terrain that provides abundant forage and cover. The project area lies entirely within the overall range for mule deer (NDIS 2013) indicating that they can be found in the area year-round. The extreme southwest corner of the TTC property is also located within a mule deer concentration area (see range map in Appendix B). A concentration area is defined as the part of the overall range where higher quality habitat supports significantly higher densities than surrounding areas.

Pronghorn inhabit most of eastern Colorado. NDIS (2013) mapping indicates the entire TTC property is within pronghorn overall range. Most of the property is also within winter range with the exception of the extreme southeast and southwest corners (see range map in Appendix B). Portions of a pronghorn winter concentration area make up the western two-thirds of the property, as well. A winter concentration area is defined as the part of the winter range where densities are at least 200 percent greater than the surrounding winter range density during the same period used to define winter range in the average five winters out of ten.

Pronghorn prefer native grasslands and semi-desert scrublands and are the most common big game animal in the region. TTC personnel suggest that the TTC facility creates a “refuge” effect for pronghorn since no hunting is allowed within the TTC property boundaries. As a result, TTC occasionally asks the CPW to reduce pronghorn numbers on the TTC property. Trapping excess pronghorn on the property and relocating them elsewhere is the usual method employed to control pronghorn population numbers (White 2012).

No part of the TTC property is located within mule deer or pronghorn severe winter range.

Other Mammals

A variety of mammalian predators and small mammal species, including bats, are present on the TTC property. Most of these species are relatively widespread and common and are not likely to be management concerns with respect to anticipated uses by TTCI. The exceptions are black-tailed prairie dog (*Cynomys ludoviciana*) and swift fox (*Vulpes velox*). Both species are listed by the CPW (2013) as species of Special Concern and are discussed in Section 4.6.1.3.

Raptors

Raptors are protected under state and federal laws, including the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. Raptor use of the TTC property is primarily open-country associated species. Raptor species that are typically present as yearlong residents or summer breeders within the project area include the golden eagle (*Aquila chrysaetos*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), burrowing owl (*Athene cunicularia*), great horned owl (*Bubo virginianus*), and barn owl (*Tyto alba*) (Kingery 1998). Burrowing owl is State-listed as Threatened and the ferruginous hawk is a State species of Special Concern. These species are discussed in Section 4.6.1.3. The several additional species from the region may hunt over the project area, but suitable nesting habitats (e.g., trees, cliffs, rock outcrops, buttes, etc.) are not present for them on the TTC property.

Other Birds

A number of songbirds and other bird species may be found on the TTC property, but songbird diversity is restricted by relatively low vegetation. Most are open-country species associated with grasslands, and most songbirds migrate to and from the area and are present only as summer residents. Yearlong residents and breeders include the horned lark (*Eremophila alpestris*) and western meadowlark (*Sturnella neglecta*).

Many of the summer residents are Neotropical migrants that winter in Central and South America. The MBTA provides federal legal protection for all migratory bird species listed under 50 CFR 10.13. The USFWS places the highest management priority on Birds of Conservation Concern (BCC) identified in USFWS (2008). The BCC list was developed as a result of a 1988 amendment to the Fish and Wildlife Conservation Act. This Act mandated that the USFWS "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973." The goal of the BCC list is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions; these species would be consulted on in accordance with Executive Order 13136, Responsibilities of Federal Agencies to Protect Migratory Birds (USFWS 2008).

The BCC list for the short-grass prairie (USFWS 2008) and habitats and ranges of the species were reviewed to create another list of BCC possibly found in habitats on the

TTC property. The only birds on this list that are potential breeders in the project area are the mountain plover (*Charadrius montanus*), burrowing owl, and lark bunting (*Calamospiza melanocorys*) (Kingery 1998). The remaining species on the BCC list for short-grass prairie have ranges outside of the project area, or a suitable breeding habitat is not supported on the TTC property. Burrowing owl and mountain plover are discussed in Section 4.6.1.3.

Lark buntings are migrants that winter in the southwestern United States and farther south into Mexico. These birds breed in grassland and prairie habitats of the Northern Great Plains (Ehrlich et al. 1988). Unlike other prairie nesting species, this species generally prefers moister and taller grassland vegetation (Kingery 1998), and the sandy soils present in the project area are unlikely to support the grassland habitats preferred by this species. Therefore, lark bunting is considered an unlikely breeder on the TTC property and its presence was not documented by field surveys.

Pollinators

On June 20th, 2014, the White House issued a memorandum[2] for creating a federal strategy to promote the health of honey bees and other pollinators. Agencies were asked to assess the lands held by the government for pollinator habitat and support. This facility is rather large, with a lot of undeveloped land suitable for pollinators. The natural field-ecology that comprises the undeveloped acreage in the facility hosts pollinators. Since much of the land on the facility is undeveloped and not managed with herbicides or pesticides, the TTC facility supports habitat suitable for pollinators[3] though none of the pollinators are listed as endangered or threatened.

4.6.1.3 Threatened, Endangered, and State Species of Special Concern

The project biologist requested and received a USFWS Colorado Ecological Services species list for the TTC property from the Service's online Information, Planning, and Conservation (IPaC) decision support system on July 24, 2013. Table 4-5 lists the species provided by the IPaC system. As indicated, there is no suitable habitat for any federally listed wildlife or plant species in the project area.

Table 4-5 Threatened, Endangered, and Candidate Species for TTC Property

Species Common and Scientific Name	Status	Potential to Occur?	Reason For Exclusion
Arkansas darter *Etheostoma cragini*	Candidate	No	No suitable aquatic habitat is present in project area.

[2] Available at http://www.whitehouse.gov/the-press-office/2014/06/20/presidential-memorandum-creating-federal-strategy-promote-health-honey-b. Last checked 1/29/2015

[3] See "Selecting Plants for Pollinators: A Regional Guide for Farmers, Land Managers, and Gardners in the Intermountain Semidesert and Desert Province" published by the North American Pollinator Campaign. Available at http://pollinator.org/PDFs/Guides/IntermtSemiDsrtDesertrx4FINAL.pdf Last checked 1/29/2015

Species Common and Scientific Name	Status	Potential to Occur?	Reason For Exclusion
Black-footed ferret *Mustela nigripes*	Experimental Population, Nonessential	No	Extirpated in State except for experimental reintroduction sties. No reintroductions have occurred within or near TTC property boundaries.
Canada lynx *Lynx canadensis*	Threatened	No	Preferred habitats of montane and subalpine forests are not present in project area.
Greenback cutthroat trout *Oncorhynchus clarki stommias*	Threatened	No	No suitable aquatic habitat is present in project area.
Mexican spotted owl *Strix occidentalis lucida*	Threatened	No	Preferred habitats of late-seral, closed canopy forest, or steep-sided moist canyons are not present in project area.
North American wolverine *Gulo gulo luscus*	Candidate	No	Remote subalpine and spruce/fir forests are not present in the project area.

The CPW (2013) wildlife list of State Threatened, Endangered, and species of Special Concern was reviewed for the species' potential presence on the TTC property. Based on species' ranges and habitat preferences, it was determined that seven State-listed species of Special Concern could be potential inhabitants in or near the property. They are black-tailed prairie dog, swift fox, ferruginous hawk, mountain plover, massasauga, (*Sistrurus catenatus*), northern leopard frog (*Lithobates pipiens*), and plains leopard frog (*Lithobates blairi*). One State-listed Threatened species, the burrowing owl, was also found to be a potential inhabitant on or near the TTC property. The State Special Concern classification is not a statutory category.

USFWS published notice in the Federal Register on February 4, 2000, stating that the status of the black-tailed prairie dog warranted its listing, but higher priority species deserving of more immediate attention precluded the listing of the black-tailed prairie dog at that time. Since that notice was published, most western States have updated population and distribution information for the species and have developed habitat and species management plans to address conservation of the black-tailed prairie dog. Colorado's Conservation Plan for Grassland Species was finalized in November 2003 (CDOW 2003). In light of the updated information provided by many western States, the USFWS has removed this species from its list of Candidate species (USFWS 2009). Black-tailed prairie dog is currently listed by Colorado as a species of Special Concern (CPW 2013).

Black-tailed prairie dogs inhabit grasslands and sparse shrublands. An earlier resource report (USDA, SCS 1972) and the late April-early May 2013 field reconnaissance documented the presence of this species on the TTC property. Current prairie dog town boundaries were delineated based on the presence of prairie dog burrows visible on 2011 NAIP aerial photography obtained for the TTC property (see range map in Appendix B). Based on this mapping and NRCS soils mapping for TTC property (see Section 4.5), prairie dog presence on the TTC property appears to be restricted to the more stable (non Valent loamy sand) soils in the western and southern portions of the property.

Swift fox inhabit short-grass and mid-grass prairies over most of the Great Plains, including eastern Colorado. The swift fox has never been abundant in Colorado, but it is likely to be present anywhere on the eastern plains where native grasslands are present (Fitzgerald et al. 1994). They excavate their own dens, which are typically located along slopes or ridges that provide good views of surrounding areas (Fitzgerald et al. 1994). No observations of swift fox or its dens were recorded by field surveys, but it is a possible inhabitant of the TTC property.

Ferruginous hawk inhabit grasslands, shrublands, and steppe-deserts of the Western United States. It is a summer resident and breeder in Colorado (Kingery 1998). During the winter months, the hawks migrate to similar habitats in the southwestern United States and northern Mexico (Terres 1980). Foraging habitat consists of nonforested, nonmountainous areas such as desert shrub and grassland communities. Habitat occupied by ferruginous hawks in Colorado consists of mixed-grass prairie, shrub-grasslands, grasslands, grass-sagebrush complex, and sagebrush steppe (Kingery 1998). Nesting occurs on bluffs, buttes, rock outcrop or pillars, ridge tops, high points on open ground, and in isolated trees and large shrubs. This species may hunt over the TTC property, but no suitable nesting habitat is present on or near the property.

Mountain plover is a migratory species in Colorado. This species resides in Colorado from the spring through fall and breeds on the eastern plains. This species is an inhabitant of arid, short-grass prairie dominated by blue grama and buffalograss with scattered clumps of cacti and forbs (Dinsmore 2003). It is considered a disturbed-prairie or a semi-desert species. Mountain plovers are very selective in choosing nest sites, preferring expansive, arid flats with very short-grass and a high proportion of bare ground. In parts of its breeding range, the mountain plover selectively nests in prairie dog towns, disturbed sites, overgrazed areas, and previously burned areas with low vegetation cover. Previously burned areas and prairie dog towns within the TTC property boundaries may provide suitable nesting habitat for mountain plover.

Massasauga is a venomous pit viper that is relatively common throughout the southern Great Plains, Midwest, and Great Lakes regions in river bottoms, wet prairies, swamps, bogs, and dry grasslands. In Colorado it is found in dry plains grasslands and sandhill habitats in the southeast portion of the State (Hammerson 1999). CNHP database records indicate that massasauga is relatively common in and near the project area since there are occurrence records for every Section in Township 18 South, Range 62 West. CPW (NDIS 2012) range mapping for this species indicates it is likely to be found in all but the far western edge of the TTC property (see range map in Appendix B). This snake hibernates in burrows from late October to mid-April in Colorado (Hammerson 1999). It can be found hunting on the surface during daylight hours, but generally hunts from early evening through early morning during the hotter summer months (Hammerson 1999).

The northern leopard frog can be found throughout much of Colorado along the banks and in the shallow water areas of marshes, ponds, streams, lakes and reservoirs (Hammerson 1999). Northern leopard frogs are a highly aquatic species and are usually found in close proximity to the banks and shallow water areas of permanent marshes, ponds, streams, lakes, and reservoirs. Water bodies with rooted aquatic vegetation are preferred, although adult frogs can travel into moist, grassy meadows away from aquatic habitat to forage during the summer months (Hammerson 1999). Within the TTC property boundaries, wetlands and open water areas along the Black Squirrel drainage represent the only suitable habitat for northern leopard frog.

The distribution of plains leopard frog in Colorado includes southeast Colorado and the Arkansas River drainage. This species inhabits the margins of streams, natural and artificial ponds, reservoirs, creek pools, irrigation ditches, and other water bodies within plains grassland habitats, although, it may disperse away from water during mild and wet weather conditions (Hammerson 1999). The northern leopard frogs are active primarily from March or April through October and winter underwater at the bottom of ponds or deep pools (Hammerson 1999). Within the TTC property boundaries, wetlands and open water areas along the Black Squirrel drainage represent the only suitable habitat for plains leopard frog.

Burrowing owls are a migratory species in Colorado. This species resides in Colorado from spring through fall (March through October), typically in grasslands and mountain parks in or near prairie dog towns. Families of owls remain together in a prairie dog town into September until they migrate south to Mexico and Central America to spend the winter. Burrowing owls may use prairie dog towns located on the TTC property (see prairie dog range map in Appendix B) for breeding, nesting, and rearing young before they migrate south to Mexico and Central America.

4.6.2 Environmental Effects and Environmental Commitments

4.6.2.1 Effects of the Proposed Action

Vegetation

Operational Activities

Testing

There would be relatively minor losses of vegetation associated with construction of props for testing activities. These possible surface disturbance effects would not be significant. There would be minor disturbances to vegetation resources associated with these developments, some of which may be permanent. Wind erosion would result in minor losses of soils resources at these disturbances. However, soil losses would be relatively minor, and revegetation efforts are likely to be successful best management practice with the recommended soil stabilization measures (see Section 4.6.2.3). As a result, effects on vegetation resulting from testing would be minor, adverse, short-term, and long-term.

Research

Research activities would occur within existing facilities, and there would be no additional effects on vegetation resources within the TTC property boundaries.

Training

Training activities would occur within existing facilities, and there would be no additional direct effects on vegetation resources within the TTC property boundaries. Beyond the training area perimeters, there is a slight risk that minor grass fires could occur in association with possible explosives removal or fire-fighting scenarios. Unintended grass fires would be quickly extinguished by TTC's on-site firefighting equipment, and burned areas would be reclaimed in accordance with the TTC Revegetation Plan. Therefore, additional effects on vegetation resources would be minor, adverse, and short-term.

Anticipated Activities

Construction of additional facilities would affect areas of vegetation resources in the vicinity of the proposed facilities. Total disturbance acreages associated with these possible developments are unknown but would be relatively minor in relation to the total extent of vegetation resources across the TTC property. These disturbances would be permanent except for laydown and construction sites that would be reclaimed after construction was complete. Wind erosion could result in additional minor losses of soils resources at these disturbances. However, soil losses would be relatively minor, and revegetation efforts are likely to be successful with the recommended soil stabilization measures (see Section 4.6.2.3). Effects on vegetation resulting from construction would be minor, adverse, short-term, and long-term.

Weapons research, blast testing, and off-road vehicle use have the additional potential to spark grass fires beyond the training area perimeters. Unintended grass fires would be quickly extinguished by TTC's on-site firefighting equipment, and burned areas would be reclaimed in accordance with the TTC Revegetation Plan. Therefore, additional effects on vegetation resources would be minor, adverse, and short term.

In the event that a listed or threatened species is identified, then FRA would perform the necessary actions to comply with Section 7 and other requirements on a future project by project basis, as there are no existing or future projects that affect listed species.

Routine Site Activities

Infrastructure Management and Maintenance

Existing infrastructure would have no additional effects on existing vegetation resources beyond those that have already occurred with the construction of the facilities.

Wildlife

Operational Activities

Testing

There would be relatively minor loss of wildlife habitat associated with construction of props for testing activities. Surface disturbance activities proposed for the project could result in effects that are not expected to be significant. There would be minor disturbances to wildlife habitat associated with these developments, some of which may be permanent. There is also the potential for mule deer or pronghorn fatalities from rail car movement, especially along the high-speed tracks. However, based on past observed incidences of these collisions, the risk of train and big game collisions is very low. As a result, effects on wildlife and wildlife habitat resulting from testing would be minor, adverse, short-term, and long-term.

Research

Research activities would occur within existing facilities, and there would be no additional effects on wildlife or wildlife habitat within the TTC property boundaries.

Training

Training activities would occur within existing facilities, and there would be no additional direct effects on wildlife or wildlife habitat within the TTC property boundaries. Beyond the training area perimeters, there is a slight risk that minor grass fires could occur in association with possible explosives removal or fire-fighting scenarios. Unintended grass fires would be quickly extinguished by TTC's on-site firefighting equipment, and burned areas would be reclaimed in accordance with the TTC Revegetation Plan. Therefore, additional effects on wildlife habitat would be minor, adverse, and short term.

Anticipated Activities

As indicated in the vegetation section, there would be relatively minor, short-term and long-term losses and disturbance to wildlife habitats associated with construction of new facilities, either from direct disturbance or from unintended grass fires. Habitat loss could result in (1) minor direct losses of smaller, less mobile species of wildlife such as small mammals and reptiles and (2) displacement of more mobile species to adjacent undisturbed habitats until construction is complete. Populations of most small mammals and reptiles would be expected to recover upon completion of construction because of their relatively high reproductive potentials. Displacement could result in some local wildlife population reductions if adjacent undisturbed habitats are at carrying capacity. Total disturbance acreages associated with these possible developments are unknown but would be relatively minor in relation to the total extent of available habitat across the TTC property. These disturbances would be permanent except for laydown and construction sites that would be reclaimed after construction was complete.

New facilities' development in undisturbed habitat areas would also have the potential to inadvertently adversely affect nesting songbirds if ground-clearing and grading activities were to occur during the nesting season (April 1 through July 31). Ground-clearing and grading activities in existing prairie dog towns during the nesting season has the potential to inadvertently adversely affect nesting mountain plovers, which is listed as a BCC by the USFWS (2008). Loss of mountain plover or other migratory bird nests would be a violation of the MBTA.

Weapons research, blast testing, and off-road vehicle use have the added potential to spark grass fires beyond the training area perimeters. Unintended grass fires would be quickly extinguished by TTC's on-site firefighting equipment, and burned areas would be reclaimed in accordance with the TTC Revegetation Plan. As described under Testing, there is also the potential for mule deer or pronghorn fatalities from rail car movement along the proposed high-speed track, which would traverse a greater area of terrain than the tracks currently used. The risk for rail car and big game collisions is likely to remain low based on the rarity of past occurrences.

Another potential direct adverse effect would be the risk of explosion debris striking and causing injury to wildlife in the vicinity of a test blast area. Debris would not include hazardous materials, but would include solid objects and particles. Initial estimates are that sheet metal separated from the test items may be as large as 1 meter (3 feet) in diameter. Debris pieces of this size are expected to travel far less than 150 feet from the blast site. Most debris pieces are expected to be much smaller, ranging to microscopic sizes. The level of risk for wildlife strikes by explosion debris is impossible to predict, but is likely to be very low because of the relative infrequency of larger blasts that would create debris fields beyond the immediate blast area.

A final potential effect on resident wildlife species would be the direct effect of loud noise associated with explosive and weapons testing. Reaction of animals to noise varies depending on the intensity of the noise source and whether it is continuous or intermittent. Infrequent, loud noises, like explosions and weapons firing, generally provoke alarm responses (Busnel 1978). Loud noises also have the potential to displace wildlife from a larger area than the immediate test area. The total extent of habitat lost as a result of wildlife avoidance response is impossible to predict for most species since the degree of alarm response may vary from species to species and even between individuals of the same species.

The effects of noise on wildlife have been evaluated by large numbers of studies, and the results of these studies have been summarized and reviewed by a number of authors (Busnel 1978; Larkin no date; Radle 2007; Turina and Barber 2011). Alarm responses can cause physiological stress such as an increased heart rate, a change in metabolism, shifts in hormone balance, and behavioral reactions such as head raising, body shifting, increased alertness, trotting short distances, flapping of wings (birds), and panic and escape behavior. Depending on the length and duration of noise effects, some studies indicate the coupling of these effects has the potential to cause bodily injury, energy loss, a decrease in food intake, habitat avoidance and abandonment, and reproductive losses (Radle 2007). Overall, the level of alarm response would correlate to proximity to the noise source and intensity/duration of noise. Noise levels associated with larger proposed explosives testing would create noise levels similar to a jackhammer within a few miles of the test site. However, these larger explosion events would be very infrequent. Less disruptive events (in terms of noise levels) would be more typical but limited to seven additional smaller explosion tests (between 5 and 50 lb). Because of the infrequency of larger explosions and brief duration of all explosion tests, wildlife species' responses are unlikely to result in any long-term changes in wildlife presence and distribution. This conclusion is corroborated by a review of studies (Larkin, no date) evaluating military and civilian blast noise that concluded that intermittent large blasts appear to have no measurable long-term effects on wildlife, although the risk of hearing damage has not been evaluated.

In summary, effects related to wildlife habitat loss would be relatively small, adverse, short-term, and minimal. Effects related to noise effects would result in short-term, relatively minor adverse effects to wildlife near the test sites, but significant adverse long-term effects are unlikely. Therefore, additional effects related to wildlife habitats would be both short-term and long-term but relatively small; significant, adverse, long-term effects are unlikely.

Routine Site Activities

Infrastructure Management and Maintenance

Existing infrastructure would have no additional effects on wildlife or wildlife habitat beyond those that have already occurred with the construction of these facilities.

Threatened, Endangered, and State Special Concern Species

Since no federally listed Threatened or Endangered species are found in or near the test areas, there would be no significant direct or indirect effects on these species.

Seven State species of Special Concern (black-tailed prairie dog, swift fox, ferruginous hawk, mountain plover, massasauga, northern leopard frog, and plains leopard frog) and one State species designated Threatened (burrowing owl) are known to live or could potentially be found within the TTC property boundaries. The discussions of effects provided for general wildlife would apply to the seven State Special Concern species and the one State Threatened species. Additional species-specific discussions are provided where pertinent in this section.

Operational Activities

Testing, Research, Training, and Infrastructure

Effects of testing, research, training, and infrastructure on Threatened, Endangered, and State Special Concern Species are the same as discussed under wildlife.

Anticipated Activities

Effects of anticipated activities on Threatened, Endangered, and State Special Concern species are the same as discussed under wildlife. Additional analysis specific to the seven State Special Concern species and one State Threatened species are as follows.

Habitat loss could result in minor direct losses of less mobile species of wildlife, such as massasauga and black-tailed prairie dog. Loss of members of these species on the TTC property would be relatively minor since the total acreage of disturbance would be small in relation to remaining available undisturbed habitats. Minor losses of both species may result in a short-term reduction of overall population size within the TTC property, but is unlikely to result in downward population trend of these species in the TTC property region. Any new construction would likely avoid the designated 100-year floodplains for Black Squirrel Creek and Haynes Creek, and wetlands would not be impacted so direct habitat loss or impacts to populations of northern and plains leopard frog are not likely to occur.

Anticipated development activities could result in minor displacement of foraging ferruginous hawks or swift fox on the TTC property. There would be no effect on breeding ferruginous hawks since no nest sites or suitable nesting habitats are located within or near the TTC property. Minor displacement of foraging birds during construction activities would not adversely affect local populations of this highly mobile and wide-ranging species. There is a slight risk that new construction during the swift fox parturition and early pup-rearing season (March through June) could result in the loss of a swift fox den and swift fox pups. Proposed environmental commitments would prevent the risk of swift fox den loss due to construction (see Section 4.6.2.3).

The construction of new facilities in existing prairie dog towns has the potential to inadvertently adversely affect burrowing owls or mountain plover and nests of these species if construction occurs during the nesting and brood rearing season. If a prairie dog town is being used by breeding burrowing owls or mountain plovers, nests of these birds can be destroyed inadvertently during grading and other site preparation activities. Federal (MBTA) and state laws prohibit the killing of burrowing owls, mountain plovers, or the inadvertent loss of occupied nests. Proposed environmental commitments would reduce the risk of burrowing owl or mountain plover nest loss due to construction (see Section 4.6.2.3).

In summary, habitat loss effects on State Threatened and Special Concern species would be relatively small, adverse, short-term, and long-term. Effects related to noise would result in short-term, relatively minor adverse effects to wildlife near the test sites, but significant adverse long-term effects are unlikely. Therefore, additional effects on State Threatened and Special Concern species and their habitats would be both short-term and long-term but relatively small. Significant, adverse, long-term effects are unlikely. Potential loss of burrowing owl or mountain plover nests would be in violation of state and federal (MBTA) laws and would be precluded by recommended best management practices (see Section 4.6.2.3).

4.6.2.2 Effects of the No Action Alternative

Vegetation

Potential effects on vegetation from the No Action Alternative would be identical to those of the Proposed Action.

Wildlife

Potential effects on wildlife from the No Action Alternative would be identical to those of the Proposed Action.

Threatened, Endangered, and State Special Concern Species

Potential effects on Threatened, Endangered, or State Special Concern species from the No Action Alternative would be identical to those of the Proposed Action.

4.6.2.3 Environmental Commitments

Vegetation

As a result of the high potential for wind erosion related to soil disturbances associated with testing and anticipated construction activities, it is recommended that best management practices and minimization techniques be employed such as temporary soil stabilization measures over areas of exposed surface soils to ensure revegetation success. Temporary stabilization can be accomplished with mulches, wind fences, and erosion mats or netting. Once testing and construction activities are completed, permanent soil stabilization can be best accomplished by planting native, deep-rooted grass species adapted to the area and sandy soils. Supplemental watering may be necessary for initial establishment of these grasses during periods of prolonged drought. If wetlands soils, with moderate to high levels of alkalinity and soluble salts, are disturbed, vegetation restoration efforts will need to rely on vegetation species adapted to soils with these revegetation constraints.

Wildlife

Measures to stabilize soils and restore vegetation should be a best management practice implemented to ensure the restoration of wildlife habitat for temporary disturbance sites associated with testing, training, or new facility construction.

To the extent possible, initiation of new construction (ground clearing and grading) should not occur in existing undisturbed habitats during the migratory bird-nesting season (April 1 through July 31) to avoid the inadvertent loss of migratory bird nests, which would be a violation of the MBTA. If early construction ground preparation cannot avoid the migratory bird-nesting season, nest clearance surveys will be completed prior to construction to document a lack of nests prior to construction. If any occupied nests are located, construction activities would need to avoid the nest by creating an appropriate buffer zone until the young are successfully fledged.

Threatened, Endangered, and State Species of Concern

It is recommended that testing, training, and new facility construction avoid active prairie dog towns to the extent possible to minimize potential adverse effects on this State Special Concern species.

If future construction does occur in a prairie dog town, the construction should occur outside of the burrowing owl nesting and brood-rearing season (March 1 to October

31). If construction cannot be avoided in prairie dog towns during these time periods, the towns should be surveyed on two consecutive mornings to confirm the lack of burrowing owl presence prior to potential ground-disturbance activities between March 1 and October 31. If nesting burrowing owls are determined to be present, the CPW recommends maintaining a 150-foot no human intrusion zone around the nest, or site preparation activities should be completed between November 1 and the end of February to ensure burrowing owl young or nests are not inadvertently disturbed or destroyed. For mountain plovers, it is recommended that prairie dog towns be surveyed as per USFWS (March 2002) guidelines for mountain plover presence if a prairie dog town would be disturbed between April 1 and July 31. If an occupied mountain plover nest is located, construction activities should not occur within ¼ mile of the nest site during the breeding season (April through July) in order to avoid disturbance of possible nesting birds and violation of the MBTA.

Depending on the location and timing of anticipated construction activities, additional surveys to update prairie dog burrow locations and determine presence or absence of burrowing owls may be necessary. As long as the recommended measures are followed, initiation of ground disturbance activities would have no adverse effects on breeding burrowing owls or mountain plovers.

Prior to any new construction activities in undisturbed habitats within the TTC property from March through June, the construction area should be surveyed for the presence of any swift fox dens. If an occupied natal den is located, construction within the parturition and early young rearing period should maintain a minimum of a 300-foot non-disturbance buffer zone around the den until the end of June.

4.7 Cultural Resources

Cultural resources are the remains of prehistoric and historic human activity, occupation, or endeavor as reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human history. Cultural resources may include the physical remains themselves, the areas where significant human events occurred (even if evidence of the event no longer remains), or the environment surrounding the actual resource.

The NHPA of 1966 and the Archaeological Resource Protection Act of 1979 provide for the protection of significant cultural resources. Section 106 of the NHPA describes the process that federal agencies must follow to identify, evaluate, and coordinate their activities with the State Historic Preservation Officer, Tribal Nations, the Advisory Council on Historic Preservation, and other consulting parties and recommendations concerning cultural resources. Significant cultural resources are defined as those listed in or eligible for listing in the NRHP. A cultural resource may be considered eligible for listing in the National Register if it retains sufficient integrity (of location, design, setting, materials, workmanship, feeling, and/or association) and meets a specific set of criteria described below:

- The resource must be associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);

- The resource must be associated with the lives of persons significant in our past (Criterion B);
- The resource must embody the distinctive characteristics of a type, period, or method of construction; must represent the work of a master; must possess high artistic values; or must represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); or
- The resource must have yielded, or be likely to yield, information important in prehistory or history (Criterion D).

4.7.1 Affected Environment – Environmental Setting for the Proposed Action

Regional reviews of the history and prehistory of the region can be found in Colorado Prehistory: A Context for the Platte River Basin (Gilmore et al. 1999), Colorado History: A Context for Historical Archaeology (Church and Cassells 2007), and Colorado Plains Historic Context (Mehls 1984).

Very little of the TTC property has been subjected to intensive cultural resource inventory, most of which has occurred in the last decade in conjunction with new development within the facility (see Table 1-1). Off-facility cultural resource inventories indicate that a low-density prehistoric occupation likely existed at TTC and is likely expressed as isolated artifacts and a few large sites. There was a historic occupation of TTC, as evidenced by ranching structures on the facility.

TTC's R&D focus has resulted in, and will likely continue to result in, the creation of objects and properties considered eligible for inclusion in the NRHP. None of the objects or properties meet the 50-year age requirements under the NRHP criteria, there is potential in the future they would meet Criterion A for contributions to the broad patterns of history and Criterion C for the distinctive characteristics of the type or method of construction.

4.7.2 Environmental Effects and Environmental Commitments

Effects on cultural resources that are caused directly or indirectly by government activities would be significant only if they were to occur to a cultural resource considered eligible for or listed in the NRHP.

4.7.2.1 Effects of the Proposed Action

The ACHP has set procedures (36 CFR 800) to be followed to determine the effect a project may have on significant cultural resources and how to mitigate that effect if it is determined to be adverse. When no sites or properties eligible to or listed in the NRHP are located in the APE, a proposed undertaking can be determined to have "No Historic Properties Affected," or "No Potential to Affect" and FRA may proceed with the undertaking. If any site(s) currently in or eligible for nomination to the NRHP is present in the APE, FRA must determine whether the undertaking will adversely affect those properties. In addition, SHPO will be consulted as needed on a project-by-project basis.

If the federal agency determines the undertaking will result in an adverse effect to the resource, the agency will identify the appropriate steps will be taken to avoid or mitigate the adverse effects on the cultural property. An action is considered to have an adverse effect when it may diminish the integrity of the significant property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects may include but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property
- Isolation of the property from or alteration of the character of the property's setting, when the character contributes to the property's eligibility to the NRHP
- Introduction of visual, audible, or atmospherical elements that are out of character with the property or alter its setting
- Neglect of a property resulting in its deterioration and destruction
- Transfer, lease, or sale of the property

Operational Activities

Testing and Research

FRA would be responsible for complying with Section 106 of the NHPA of 1966 for existing and anticipated actions that impact those cultural resources determined to be eligible for listing in or listed in the National Register. TTCI and FRA would consult with the Colorado State Historic Preservation Office and any other interested parties to identify the APEs, the presence or absence of cultural resources, the effects an action would have on those resources, and the appropriate avoidance or minimization measures.

Training

Continued training activities within the current facilities do not have the potential to affect Historic Properties as the training activities occur within previously analyzed facility areas and do not have actions that would affect these properties.

Potential Activities

Direct effects on prehistoric and historic archaeological sites could occur as a result of ground-disturbing activities (e.g., excavation, burial, earth moving), which would occur in conjunction with any future activity. New development has the potential to cause effects to Historic Properties will be considered through the Section 106 process.

Routine Site Activities

Infrastructure Management and Maintenance

Continued maintenance of infrastructure within the current facilities does not have the potential to affect Historic Properties.

4.7.2.2 Effects of the No Action Alternative

There are no effects to cultural resources, because the No Action Alternative is the same as the current existing conditions.

4.7.2.3 Environmental Commitments

SHPO will be consulted as needed on a project-by-project basis.

4.8 Land Use and Transportation

4.8.1 Affected Environment – Environmental Setting for the Proposed Action

The TTC property is located on rural land owned by the State of Colorado and leased to FRA on August 22, 1970. This lease agreement, covering 33,492.13 acres (135,533.78 hectares) approximately 5.5 miles wide and 9 miles long, is for a 50-year period ending on August 22, 2020, with an option to renew for two more 50-year periods with no change in the terms of the lease agreement. The first extension option has been exercised, with the lease period extended to August 22, 2070.

Under this lease agreement, the U.S. Government (U.S. DOT-FRA) has the right to drill wells for water and to use this water for industrial and domestic purposes. At present, TTC has adjudicated water rights to 40 acre-feet of water annually.

U.S. DOT FRA has a lease for the surface use of the said land only, while the State of Colorado retains all rights to the minerals of the site. U.S. DOT-FRA cannot explore, drill, or mine for any minerals on the land.

The project area is situated on an undeveloped area approximately 21 miles northeast of the City of Pueblo. TTC is located on semi-arid rangeland which largely consists of rolling plains. Most of the land is void of erosional channels due to the high permeability of the soil. Some normally dry/shallow arroyos exist to the south and west where clay soils surface. The terrain is generally treeless, covered mainly with sparse bunchgrass, sagebrush, tumbleweed, and cactus. While generally dry, there are a few places where surface water exists intermittently.

Elevations vary from 5,300 feet (1,615 m) above sea level in the northeast part of TTC to about 4,830 feet (1,472 m) in the southwest. The surface varies from gently sloping and slightly undulating terrain in the south and west parts of the site to progressively more sharply rolling sand hills to the north and east.

Surrounding lands are vacant expanses of open rangeland that are privately owned, or state and/or federally owned public lands. Vegetative cover is primarily grasses and sagebrush. Adjacent property owners include the following: the Colorado State Land Board and one private land owner to the north; the Bureau of Land Management, Colorado State Land Board, and private lands to the east; the Department of Defense, Colorado State Land Board, and one parcel of private land to the south; and the Colorado State Land Board to the west. Outlying land ownership includes other private land owners and the Colorado State Land Board. Historically, land uses have been agricultural, primarily involving livestock grazing. The TTC property was a working cattle ranch prior to 1970. Since that time, no grazing has occurred on-site; however, grazing does occur on land adjacent to the site.

No residential developments, businesses, or other populated areas are located in the surrounding area. The nearest development is located along the U.S. 50 highway corridor approximately 17 miles to the south of the project (SEH 2011). The isolated nature and vacant land buffer characterizing the TTC property ensures that TTC operations do not conflict with neighboring land uses. Yet, TTC is close enough to Pueblo to enable a reasonable commuter distance for TTC employees.

Six rural residences border the TTC site and are potential noise receptors.

4.8.1.1 Land Use Regulations

Pueblo County is divided into nearly two dozen districts or zones for the purpose of land use regulation. Each of these zone districts identifies permitted land uses, both by-right and by-review, along with regulations governing minimum lot area, building sizes, building heights, setbacks of structures from property lines, parking requirements, and other development standards. Pueblo County Ordinance, Title 17 Land Use Division I Zoning, sets these zone districts (Pueblo County Zoning Maps 2013).

The zoning designation for the TTC facility is Agricultural One (A-1). According to Title 17.12 of Pueblo County's land use ordinances, the standards for this district are designed to promote and maintain the appropriate use of dry range and irrigated lands, as well as encourage open use of the land in keeping with its natural characteristics and agricultural functions (Pueblo County Code 2013). Surrounding lands are also zoned A-1 and consist of vacant expanses of open rangeland owned by government and private entities.

4.8.1.2 Transportation

As mentioned earlier, TTC is located approximately 21 miles from the City of Pueblo and is accessed from I-25 off U.S. Highway 50/State Highway 96. The primary access is via Paul Harvey Boulevard to United Avenue east past the Pueblo Memorial Airport. From this point, access to the site is via Pueblo County Road 3, commonly called the DOT Road or DOT Test Road. The DOT Road ends at the site. All access roads are paved and in excellent condition. The roads are well maintained throughout the year. A second access route on IL Road is parallel to the eastern boundaries of TTC and the Pueblo Chemical Depot. This is a gravel-surfaced county road, with access a mile west of Boone, CO, on Colorado 96. Boone is 17 miles east of Pueblo on Colorado 96.

The overpass bridge crossing the Precision Test Track at the eastern entrance to the core area is part of the TTC property. The Pueblo County Road and Bridge Department maintains the paved access road up to the overpass bridge. TTCI maintains all other roads on-site. A network of internal roadways leads to each of the test areas and building sites for maintenance, operations, and emergency response. Additional two-track roads have been established in the more remote locations to aid in firefighting wild land type fires. There are approximately 6 miles of bituminous paved roadways and 65 miles of gravel surfaced roads on-site. Most roads are approximately 20 feet wide.

4.8.2 Environmental Effects and Environmental Commitments

4.8.2.1 Effects of the Proposed Action

Potential effects on land use and transportation from testing, research, training, infrastructure, and anticipated activities are discussed below.

No significant effects are anticipated as a result of the Proposed Action. The Proposed Action is consistent with previous and current activities at TTC, which has been in operation for more than 40 years. Vehicle trips per day, Monday through Friday, are estimated at 209 of which 20 are delivery or heavy trucks. An additional 10 to 25 student vehicles are driven to the external parking lot outside the main gate when Hazmat Training is in session. No significant increases in traffic are anticipated as a result of the anticipated activities as described further below.

Effects on land use and transportation are anticipated to be direct, short- to long-term and negligible. However, the resulting information from testing and training is expected to provide future safety benefits in rail transportation and response to emergency situations.

Operational Activities

Testing

Effects on land use and transportation caused by testing activities could be related to noise from explosive testing or impact testing. The neighboring properties would generally be out of visual range of most of the tests conducted, but large blasts would be heard. However, most noise related to these types of tests would not have a significant effect on the few neighboring residential properties. To eliminate the potential for effects on livestock, landowners would receive notification before detonation of tests utilizing larger amounts of explosives (50 pounds or larger) so that they would be able to move their livestock. It is anticipated that very few of the tests that would be performed per year would require notification. Fire testing including crude oil tests in rail cars would not be expected to occur often during any given year.

Noise from explosive tests would be extremely brief in duration, and where appropriate, adjacent owners would be notified before initiation of the testing.

Research

Research activities are not anticipated to have direct or indirect effects on adjoining land uses in the project area. Transportation systems both externally and internally may be somewhat affected if materials are transported to the site for research activities or new roads are constructed to provide access to new rails or research sites that may be required for various research activities.

Training

Effects on land use and transportation would be similar to those potential effects discussed under testing. However, the potential short-term noise and air quality effects are anticipated to be negligible and short-term. Additional props for training activities could be brought on site and stored in other locations on TTC property.

Anticipated Activities

Anticipated activities that might affect land use and transportation consist of a new high-speed track (more than 165 mph); more terrain props to be utilized by DHS and TSA for motor carrier, bus, and rail safety research; blast effects on transportation vehicles; research for FBI and CIA, DOD–weapons research; off-road vehicle tests for the U.S. Army; and possible research related to tunnels and bridges for the science and technology division of TSA. The potential effects related to anticipated activities would be similar to those discussed above as relates to transportation and land use. Construction related to these anticipated activities would have negligible to minor, adverse, direct, short-term or long-term effects on transportation and land use. Resulting information from testing and training is expected to provide future safety benefits in rail transportation and response to emergency situations.

Routine Site Activities

Infrastructure Management and Maintenance

The Proposed Action is not expected to result in any substantial increase in the use of local infrastructure such as roads. The Proposed Action would not disrupt the transportation systems in the area or highway vehicle traffic to TTC. Any increase in traffic would be associated with test personnel, test observers, or deliveries of materials and supplies. Visitors typically obtain hotel accommodations and rental vehicles to travel to and from TTC. The additional traffic generated by visitors traveling to the site is likely to be minimal and vary depending on tests being conducted.

Research and testing activities may require some new internal roads to test sites or for additional fire breaks —generally gravel roads with average widths of less than 20 feet. If the roads are not used for anticipated operation they would eventually be reclaimed by revegetation efforts.

4.8.2.2 Effects of the No Action Alternative

Potential effects on land use and transportation from the No Action Alternative would be identical to those of the Proposed Action, without anticipated activities.

4.8.2.3 Environmental Commitments

There are no environmental commitments required for this resource area.

4.9 Noise

4.9.1 Affected Environment – Environmental Setting for the Proposed Action

The perception of noise is affected by several factors, including the intensity of the noise and the frequencies involved. Intensity of sound is measured in dB units. Sound measured in dB assumes that low frequency sound is perceived with the same clarity as higher frequency sounds. However, the human ear perceives low frequency sound as less loud than higher frequency sound. To adjust the actual intensity of sound to the perceived intensity of sound, a filter is used to weight the sound intensity. The most commonly referenced weighting is "A-Weighting" dB(A). A-Weighting produces a numerical value proportional to the human perception of the strength of that sound independent of frequency. Sound level meters (dosimeters) are used to measure A-weighted (dBA). Audible sounds are measured in a range from 0 dBA ("threshold of hearing") to approximately 120 dBA ("threshold of pain").

Table 4-6 provides examples of typical sound levels in dBA.

Table 4-6 Typical Sound Levels

Sound Sources	**dBA**
Threshold of hearing	0
Quiet house interior or rural nighttime	20
Quiet rural area	40
Ordinary conversation	60
Passing car at 10 feet or garbage disposal at 3 feet	80
Passing bus or truck at 10 feet or food blender at 3 feet	90
Passing subway train at 10 feet or gas lawn mower at 3 feet	100
Night club with band playing	110

Source: Vanderheiden, G. 2004.

Noise and vibration occur from numerous activities at the TTC facility. Examples of these activities are railroad testing, testing locomotive horns, using heavy machinery, construction activities, explosive testing, and more. Many activities occurring outdoors as well as indoors generate noise levels that are equal to or exceed an 8-hour Time-Weighted Average (TWA) of 85 dBA. TTCI has a formal Hearing Conservation Program in place to protect the safety and health of its employees (or visitors) at the TTC property (TTCI 2012). Procedures have been developed to:

- Determine if individual exposure exceeds the TWA of 85 dBA;
- Educate employees about the effects of noise on hearing, the purpose and requirements for wearing hearing protection, screening program and limits of exposure to loud noise;
- Monitor and measure high-noise exposure areas randomly as well as annually;
- Provide hearing tests for all new employees who are working in high level noise areas where noise limits are exceeded;
- Ensure all visitors, customers, contractors, and employees have adequate hearing protection while visiting or working on TTC property.

There are six residences located within an approximate 9-mile radius of the center of the track facility area on the TTC property. Residences within this radius are shown on Figure 4-4. Land surrounding the TTC property is open rangeland used for grazing.

Sound propagation can be significantly attenuated by vegetation (including trees and grasses) as well as ground contour. Rolling hills exist within the project area and near all receptors. These hills provide sound dispersion. Attenuation occurs from both sound absorption and dispersion. Sound propagation is also affected by the direction and speed of wind.

4.9.2 Environmental Effects and Environmental Commitments

4.9.2.1 Effects of the Proposed Action

The Proposed Action includes programs of testing, research, training, infrastructure, and anticipated projects that may create noise in both the outdoor and indoor environments at TTC.

Operational Activities

Testing, Research, Training, Anticipated Activities

TTC implemented the Hearing Conservation Program in order to protect the health of all individuals visiting or working at the site. Personal Noise Exposure procedures described above have been developed and are strictly adhered to at TTC. Notices are posted at all facility locations where there is a possibility of elevated noise exposure. Hearing protection is provided at those locations. Visual cues include flashing red lights that warn of upcoming noise exposure. Written notifications are also used in advance of any planned testing that will generate elevated noise levels.

Any individual testing, research, or training program likely to create noise is required to include a safety plan that outlines specific measures to be taken to limit noise exposure for that particular activity.

With a few exceptions, including explosives testing, ongoing testing at the track facilities does not typically create noise levels that can be heard off-site. As described in the environmental assessment “Explosive and Fire Testing at the Transportation Technology Center” (TSA/FRA 2012), noise generated by explosives testing was not expected to result in significant effects on personnel on-site or to nearby property owners. Subsequent completion of these explosives tests confirmed this prediction.

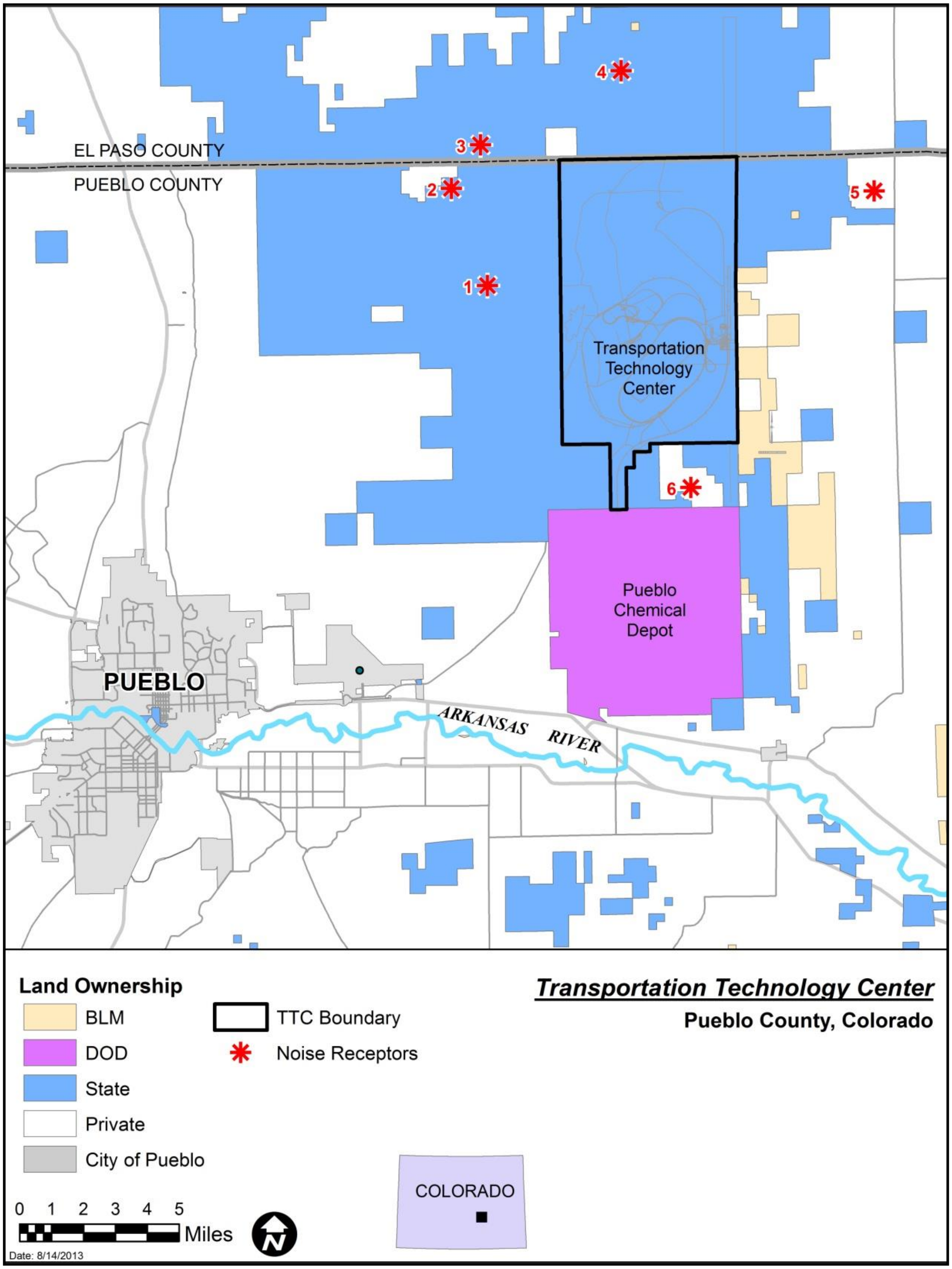

Figure 4-4 Project Area with Noise Receptors

Noise exposure from testing, research, training, or anticipated activities is not expected to result in measurable effects on personnel on-site or to nearby property owners. Personnel Noise Exposure procedures limit the exposure for on-site workers and visitors, while the remote location of the TTC property limits the exposure to off-site receptors. The potential adverse effects are anticipated to be minor to moderate for testing, research, training, or anticipated activities at the TTC facilities. Duration of exposure varies by activity and is closely monitored by the Hearing Conservation Program.

Routine Site Activities

Infrastructure Management and Maintenance

There would be no noise effects from management and maintenance activities at TTC. Any construction activities associated with infrastructure development or maintenance would have the same effects as those listed above and would be mitigated by specific safety plans and the Personnel Noise Exposure policies.

4.9.2.2 Effects of the No Action Alternative

Potential noise effects from the No Action Alternative would be identical to those of the Proposed Action.

4.9.2.3 Environmental Commitments

The Proposed Action includes implementation of the Hearing Conservation Program, including the Personnel Noise Exposure policy for any individual working on or visiting the TTC property.

Each proposed testing, research, or training program includes a safety plan that will ensure on-site personnel are taking necessary precautions for noise protection. Any test that would possibly result in an outdoor noise exposure of more than 85 dBA will have a safety plan in place prior to execution of the test. Any residences within 5 miles of a test that is expected to generate excessive noise (explosive tests, for example) would be notified prior to execution of the test. Property owners would be instructed to remove any livestock near the test area.

4.10 Socioeconomics

4.10.1 Affected Environment – Environmental Setting for the Proposed Action

The City of Pueblo is the nearest population center within proximity of the TTC facility. The population in Pueblo in 2012 was estimated at 107,772 with a county population of 160,852. In 2012, the population was 59.8 percent White, 40.2 percent Hispanic, and 6.3 percent other races. The median household income in Pueblo was $34,750 compared with the Colorado median household income of $56,685. The poverty rate in Pueblo County was estimated at 22 percent compared with the Colorado estimate of 12.5 percent. The most recent unemployment rate in Pueblo is 9.5 percent; this is 1.3 percent higher than the Colorado average unemployment rate (U.S. Census Bureau 2013). Employment is somewhat diverse since Pueblo is a relatively large metropolitan area;

with the majority of residents employed in the manufacturing, retail sales, government, and health care sectors. Typically, income levels in Pueblo fall below those in other metropolitan areas in the area because there are generally less employment opportunities in lower paying sectors of the economy found in Pueblo County.

Pueblo County, the City of Pueblo, and other outlying areas all have the infrastructure necessary to provide adequate housing, water, sewer, utilities, streets, schools, fire, police protection, ambulance, health care, recreation, and transportation for personnel at TTC.

TTC, built in 1970, is located approximately 21 miles from the City of Pueblo. Employment was at a high in 1979 and 1980, with approximately 550 personnel and an additional 50 contractors working on-site. FRA was managing the facility with an operations and maintenance contractor and miscellaneous test program contractors. On October 1, 1982, AAR took over operation of the facility with a little less than 200 employees. Employment since that time has ranged from a high of more than 300 in 2000, to the current level in 2013 of approximately 270 permanent employees. An additional 19 skilled and unskilled contract personnel (from custodians to test engineers) are contracted by TTCI and assigned to TTC on a long-term basis (Meeks 2013).

Approximately 92 percent of the employees at TTC live in Pueblo County; another 8 percent live in El Paso County; and an additional 20 to 30 employees brought in by customers of TTCI may be on-site. Employees typically commute on a daily basis to and from the facility. TTCI has inspectors traveling within the United States to perform facility inspections for rail vehicle maintenance certifications, and some engineers work remotely from TTC.

TTCI invests in capital infrastructure at the site for equipment (vehicles, computers, software, tools, instrumentation equipment, etc.), leasehold improvements, and internal R&D equipment. For the past several years these expenditures have averaged approximately $4 million annually. In 2013, FRA had a budget of approximately $1.2 million for construction projects at TTC.

TTCI contracts its security and EMT operation, as well as site maintenance, including building and road maintenance. TTCI has an on-site volunteer fire department staffed by employees of which 14 have been certified as firefighters and now serve on the fire department in addition to working their regular jobs. The fire department has one fire engine, two brush trucks, one pumper truck, and one ambulance. Some of this equipment is owned by FRA and some is owned by TTCI.

TTCI provides leased vehicles to approximately 20 field inspectors. These inspectors are located throughout the country. Local employees are not provided vehicles, but there are vehicles on-site that are used by employees (small pickup trucks, larger trucks, and emergency response vehicles). FRA has 17 vehicles in its fleet, including the fire truck. TTCI has 112 vehicles in its fleet.

A breakdown for local and nonlocal annual expenses for labor, including permanent employees with fringe benefits and consultants, is currently estimated at $29.4 million for local labor and $6.9 million for nonlocal labor. Local versus nonlocal annual expenditures for diesel fuel, materials for test projects, other materials, utility costs, and other direct costs, including property taxes to Pueblo County, is currently estimated at $6.6 million and $5.4 million, respectively (Meeks 2013). An additional $130,000 is paid in sales taxes in more than 40 States.

Operations at TTC are one shift per day, except for FAST which has a night shift operation of approximately five employees and site security which is 24 hours a day. .

Other Activities at TTCI

TTCI conducts an annual 2-day conference in Pueblo that approximately 500 participants attend to see technical presentations on current research at TTC. These participants typically stay 2 nights (Estimated annual local hotel, meals, and other travel expenses are $250,000.). Another conference is periodically held in Pueblo. This conference has an estimated 100 to 200 attendees and can generate upwards of $100,000 in local direct expenditures.

In addition, local customers traveling to TTC spend approximately $1 million per year within the local economy (Meeks 2013).

SERTC trains approximately 2,150 students (2013) per year at TTCI. The local direct expenditures for motels, car rentals, meals, and miscellaneous expenses are estimated at $2.6 million annually (Meeks 2013).

Table 4-7 shows approximate direct and some indirect economic contributions to the local, regional, and national economies from operations at TTC. In addition to the mostly direct expenditures shown in the table, a multiplier for indirect and induced effects would considerably increase the positive effect on the economy.

Table 4-7 Estimated Annual Economic Contributions and Expenditures at TTC (2013)

	Local	Local/ Nonlocal	Nonlocal
Employment			
Permanent	270		30
Contract	19		
Total Employment	**289**		**30**
	$ (in millions)		
Labor Related Expenditures			
Permanent and Contract	$26.9		$4.4
Consultant	$2.5		$2.5
Total Labor Expenditure	**$29.4**		**$6.9**
Materials and Services Expenditures	**$6.6**		**$5.4**
Sales Tax		**$0.13**	
Other Activities			
Annual Conference	$0.25		
Periodic Conference	$0.10		
Total Direct Expenditures by Participants	**$2.95**		
Total Potential Annual Direct and Indirect Expenditures from Activities at TTC	**$38.95**	**$0.13**	**$12.30**

Source: David Meeks, TTCI, CFO 2013

4.10.2 Environmental Effects and Environmental Commitments

4.10.2.1 Effects of the Proposed Action

Operational Activities

Testing, Research, Training, Anticipated Activities

The Proposed Action would provide socioeconomic benefits to the local area through continued permanent and contract employment at TTC. Additional indirect employment opportunities would be generated by customer employees visiting the site for various activities and participants in testing, training, and anticipated and unplanned activities. These direct customer employees at TTCI would require lodging, meals, and would generate other retail sales in the area. The cost of additional TTCI employees to support the Proposed Action cannot be estimated at this time since the anticipated activities and levels of ongoing testing, research, and training have not yet been projected. However, it is anticipated that operations would continue as they have done in past years. New projects are expected to bring in additional revenue which would entail continuing or increased employment at TTCI. The Proposed Action would result in contractors and observers traveling to Pueblo and the TTC property. While in Pueblo, the contractors and visitors would buy goods and services such as lodging and meals, contributing to the economy of the local region.

No effects on the socioeconomics of the Pueblo area are anticipated due to the Proposed Action. Population, housing, public facilities or services in Pueblo, Pueblo County, or outlying areas would not likely be dramatically affected by future actions at the facility. The only anticipated direct or indirect effect of the Proposed Action is the long-term benefit of contributing to the sustained employment of current TTC staff and the short-term economic benefits associated with visiting contractor and observer expenditures.

Routine Site Activities

Infrastructure Management and Maintenance

The TTC Site Development Plan lists a number of projects that have been proposed for program development, and funds are being solicited. Additional personnel for construction activities would be required and would increase development on the site. The Plan is looked at as a conceptual plan depending upon potential customer and program needs over time. It represents a moderate approach to proposed growth over the long-term, based on program-driven development. The Plan assumes that the primary support facilities are in place, with extensions added when existing capacity is reached.

TTC does have a large degree of infrastructure and space available for incorporation of new facilities, with minimal site development requirements. Roads, utilities, tracks, and space allocations were installed with expansion in mind. The original Facilities Master Plan provides insight into the decisions made with the construction layout of existing facilities and improvements at TTC.

The Site Development Plan emphasizes the provisions of flexibility for unforeseen development and efficient major external access and internal circulation patterns. Flexibility for anticipated development is provided by large areas of uncommitted use within existing infrastructure boundaries, typically track test loops.

The Proposed Action would continue and expand existing actions at TTC and is also not anticipated to disproportionately or adversely affect low-income or minority populations. There are no low-income or minority populations within miles of the facility, and, to the extent the facility provides jobs or economic activity, the continued use of the facility supports that economic activity

The socioeconomic effects related to anticipated development would be considered minor to moderate, short- to long-term, direct and indirect, and beneficial, and would be primarily related to employment, income, and local government and private revenue generation.

4.10.2.2 Effects of the No Action Alternative

Potential socioeconomic effects of the No Action Alternative would be similar to those of the Proposed Action. The No Action Alternative would result in zero change to the activities currently being conducted at TTC. No action would result in no incremental positive or adverse effects on the local socioeconomic environment. Future testing and training or expansion of the workforce would provide economic benefits to the region.

4.10.2.3 Environmental Commitments

There are no environmental commitments required for this resource area.

4.11 Safety, Health, Environmental and Emergency Services

4.11.1 Affected Environment – Environmental Setting for the Proposed Action

The responsibilities and duties of the Safety, Health, Environmental and Emergency Services Staff at TTC include establishing and/or providing:

- Site Security and Visitor Control Procedures
- Fire Prevention and Fire Suppression Services
- Emergency Medical Services
- Safety Compliance and Injury Prevention Programs

Site security at TTC is provided 24 hours a day, 7 days a week. The entire perimeter of the TTC property is fenced. Gates at supplementary access roads are locked and warning signs are posted around the entire perimeter of the facility. Additional security fencing is provided around some restricted areas and facilities. The main entrance to the facility is a controlled access point with personnel operating 24 hours a day.

TTCI operates the center as a private facility. Public tours are by invitation only. TTC and authorized contractor personnel, as well as official visitors, are issued badges, which authorize access to the facility in general. Visitors and some contractor personnel have restricted access or escort requirements, depending on the type of business being conducted. Entrance to specific test areas is further controlled by verification against an approved access list, or by an authorized TTCI employee or designee.

TTCI currently has a full-time Fire Chief on 24-hour call to coordinate emergency response efforts. TTC security personnel are trained Emergency Medical Technicians. TTCI maintains 24-hour, 7-day-a-week coverage at TTC, while also handling security control at the Main Gate. Fire Prevention and Security roves are performed after hours and on weekends and are verified by radio contact, with all radio transmissions recorded on a master tape.

TTCI maintains a pool of Fire Brigade Responders (currently 14 members) to serve as primary responders during normal business hours and to remain on call during afterhours. Fire Brigade members are from different on-site departments; members are radio equipped and respond as needed in case of a fire rescue emergency.

Present equipment of the Fire Department includes:

- 1 – 1,000 GPM pumper truck with a 750 gallon water storage capacity
- 1 – Type #1 ambulance with 2-wheel drive
- 1 – Tank truck with 1,500 gallon capacity; used for secondary fire suppression water supply in remote TTC locations
- 2 – Brush trucks with 650 gallon capacity; used for ground cover firefighting

Security and medical support personnel equipped with communications equipment are on standby during all testing. In addition to providing emergency response in the event of an accident, these personnel also provide emergency medical care to TTC personnel. Any case of a serious injury or illness is transported by ambulance to health care providers or a hospital in Pueblo, 25 miles away. If appropriate and as an additional resource, TTC has the option to use Colorado's Flight for Life emergency medical helicopters from either Pueblo or Colorado Springs. Periodic training is conducted with the flight and nursing crews of the service.

All new employees, contractor personnel, customers, and long term visitors must receive relevant safety briefings to access the various facilities on-site. TTC is considered a multi-employer work site for safety compliance. TTCI, as the primary operator of the facility, coordinates the safety compliance requirements under OSHA regulations with the various contractors, vendors, and customers who perform work at TTC.

TTCI considered the potential third parties that could be affected by its activities and identified Doss Aviation. Doss Aviation is a privately owned company in Colorado Springs that conducts activities in airspace in proximity to the TTC property and its test areas.

4.11.1.1 Regulatory Requirements

The following list of regulatory requirements and policies is implemented at TTC to ensure safety, health, environmental, and emergency service compliance:

- Hazardous Assistance for Medical Rescue and Search Emergencies
- Industrial Hygiene Technical Report (for Industrial Hygiene Air and Noise Sampling at TTCI – April 2013)
- Safety Rule Book at TTC (revised June 2013)
- Operating Rule Book at TTC (revised June 2013)
- SI-002-PP04 Spill Prevention, Control and Countermeasure Plan
- SI-002-PP05 Handling Equipment Inspection and Proof Load Testing
- SI-004-PP04 Fire Prevention Program Handbook
- SI-005-PP04 Emergency Reporting and Response Fire/Medical
- SI-006-PP04 Infection Control and Universal Precautions Plan: Bloodborne Pathogens
- SI-007-PP04 Respirator Protection, Use and Selection
- SI-008-PP04 Personnel Noise Exposure
- SI-009-PP04 Chemical Hygiene Plan
- SI-010-PP04 Control of Hazardous Energy Sources: Lockout/Tagout Safety Plan
- SI-011-PP04 Response to Weather Hazards
- SI-012-PP04 Confined Space Entry
- SI-013-PP04 Procedure for Hazardous Operating Permit (HOP)
- SI-014-PP04 Safety Guidelines for Welding, Cutting & Burning
- SI-015-PP04 Bomb Threat Response
- SI-016-PP04 Hazardous Waste Management Plan Handbook

- SI-017-PP04 Hazardous Material Control and Communications Plan
- SI-018-PP04 Workplace Violence and Security Plan, and
- SI-024-PP04 Pandemic Influenza Preparedness and Response Plan

4.11.2 Environmental Effects and Environmental Commitments

4.11.2.1 Effects of the Proposed Action

Operational and Routine Site Activities

Testing, Research, Training, Anticipated Activities, and Infrastructure

No major effects on public health or safety are anticipated as a result of the Proposed Action. A Range Safety Plan for any unique activities at the facility is standard protocol at TTCI. The Range Safety Plan will ensure that employees, contractors, and visitors at the TTC site for research, tests, or training adhere to established safety protocols, and it will eliminate the potential for adverse effects.

The Range Safety Plan will potentially include a description of safety devices and equipment that would be placed at the test, research, or training sites. Safety devices and equipment that could be used include range flags notifying personnel of ongoing explosives events, lockable gates for restricted entry, and warning signs to prevent unauthorized access. In addition, large tests would have surveillance cameras and monitoring equipment with remote displays to allow personnel to remain a safe distance away from the test site.

When conducting some tests, research, or training, there may be a minor threat of fire within the area. In response to this threat, TTCI maintains on-site firefighting equipment. TTCI's full-time Fire Chief directs a firefighter staff that routinely assists in the control of wildland fires both on-site and off-site through mutual aid agreements; this staff would be on standby in the event of an emergency. Firefighting equipment includes all-terrain brush trucks with tanks/pumping equipment, conventional pumper trucks, and a conventional ambulance.

Doss Aviation conducts flight activities near the TTC property, and is ultimately not expected to be affected by the operation. As a precaution, Doss Aviation will be informed of testing at least 24-hours in advance so they can avoid areas near TTC.

4.11.2.2 Effects of the No Action Alternative

Potential Safety and health effects from the No Action Alternative would be identical to those of the Proposed Action, with no future activities.

4.11.2.3 Environmental Commitments

To ensure safety protocol is followed at TTC during test activities, a Range Safety Plan will be developed and observed by on-site employees, contractors, and visitors. TTCI firefighters will be on standby during applicable test, research, or training events in case there is a need to respond. TTCI will provide Doss Aviation with a 24-hour notice prior to significant tests and training to ensure their flight activities are not conducted in close proximity to the test areas.

4.12 Secondary and Cumulative Effects

Cumulative effects are those additive or interactive effects that would occur due to the Proposed Action or No Action alternatives in relation to other past, present, and reasonable foreseeable actions, regardless of what agency (federal or non-federal) or person undertakes such actions.

The following sections describe activities that are planned within the study area to determine if the Proposed Action contributes to effects from other actions and results in significant effects on the surrounding area.

4.12.1 Reasonably Foreseeable Development

While successful execution of the Proposed Action could result in an increased demand on TTC for similar services, research and services provided would likely remain similar to current ongoing activities. Potential effects would be mitigated as described in each resource section or as mitigated in prior tests, research, or training exercises. Based upon historic employment data, it is reasonable to expect that operations at the TTC facilities would remain relatively constant into the future and would not result in effects on the TTC property or surrounding region.

Reasonably foreseeable projects planned in the study area include the following:

TTCI Solar Generation Facility

TTCI has planned to build a solar array for electric power generation, a separate project not associated with the Proposed Action. The Solar Array installation project is currently on hold with no date identified for future implementation. The project was developed to implement sustainable energy solutions for the TTC facilities. TTC requires a substantial amount of power to operate its testing facilities and therefore has its own electric substations and power distribution system. Presently, any renewable power delivered to TTC is sourced from public utility providers in the region.

The site for the 50-acre proposed solar generation facility is immediately east of the TTC buildings and core operational area and is immediately adjacent to the existing substation. The existing access road would remain, but all other vehicle access to each array would be provided by a simple two-track unmaintained road.

The project elements would include photovoltaic solar panels and mounts, a two-acre surface water impoundment for water storage, two-track vehicle access paths running parallel to each array of solar panels, and a conduit below ground to conduct AC-generated solar energy to a converter, then onward as DC power to the substation for transmission into the TTC facility.

FRA must obtain legislative approval to enter into a long-term contractual agreement in order to begin the solar project.

Once initiated, this project would likely reduce electrical consumption at the site, but would have no further impact on infrastructure, testing, training, research, or anticipated activities at the site. Since the solar array would be located outside the core area and away from other major facilities, construction activities would not impact operations at TTC. However, native vegetation at the construction site would be overlaid with solar arrays and temporary impacts to vegetation would occur. Land use would change from native vegetation to industrial use.

FRA issued an Environmental Assessment and signed a FONSI in December, 2104 for this project.

Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP)

The Pueblo Chemical Agent-Destruction Pilot Plant, or PCAPP, is being built to safely and efficiently destroy a stockpile of chemical weapons currently in storage at the U.S. Army Pueblo Chemical Depot. The Pueblo Chemical Depot is located immediately south of the TTC property on 23,000 acres. The pilot plant will utilize neutralization followed by biotreatment as the technology to destroy munitions containing 2,600 tons of mustard agent.

The contract to design, construct, systemize, pilot test, operate, and close the plant was awarded in September 2002. Currently, the plant is under construction and work is progressing on a variety of facilities to support chemical agent processing, energetic processing, control and storage, munitions storage, biotreatment, entry control, utility, laboratory, personnel maintenance, and other tasks. The PCAPP is located near the storage site and employs approximately 800 craft workers and subcontractors.

Inside PCAPP are numerous rooms filled with high-powered machines designed to destroy the chemical weapon, each with a specific purpose. The mustard agent will be destroyed in a neutralization process using water and heat to make the chemical less toxic. However, before the weapons destruction process can take place, a series of tests must be conducted to show the U.S. Army and the Colorado Department of Public Health and Environment that no chemicals will be released into the atmosphere.

Many of the major construction activities at PCAPP were completed during the first quarter of 2012. The plant is scheduled to start operations in 2015. All weapons must be destroyed by 2017 as stated by an international treaty. Additional time may be needed to complete the overall demolition of chemical weapons since construction of the facilities is behind by 2 years.

This ongoing project and the completion of the new facility for it have increased industrial land use at the Pueblo Chemical Depot. However, the project does not have any negative synergistic effect on either operations at the Chemical Depot or at TTC. Land use is consistent with ongoing operations in the project area.

No other reasonably foreseeable projects are proposed in the area.

4.12.2 Cumulative Environmental Effects for Resource Topic

The Proposed Action has the potential to provide positive cumulative impacts in terms of railroad safety from the training and testing performed at the facility. However, because of the relative minor nature of the impacts from the Proposed Action, it is unlikely to result in any Long-term cumulative impacts to the environment In the short term, if construction projects occur at the same time, it is possible that there will be minor cumulative impacts. However, large scale development of the site is not expected and all construction impacts will be avoided or minimized through the implementation of the appropriate BMPs.

Impacts to the greater Pueblo region may include additional economic benefits. Build out of the Master Plan is consistent with current uses at the site. Individual projects related to implementation of the Master Plan may affect specific resources; however, these potential impacts will be analyzed when the scope of the specific project is identified.

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5.0 List of Preparers

Air Quality

Asoian Associates LLC, **Mark J. Asoian**

Education:	B.S., Meteorology, Lowell Technological Institute
Project Responsibility:	Climate and Air Quality
Experience:	Senior Air Quality Scientist – 34 years providing air quality permitting, impact assessment, emissions inventory development, and NEPA compliance services. Air quality practice leader and project manager, EIS and EA discipline leader.

Water Resources and Floodplains, Wetlands, Air Quality

JNS, Inc., **Janet N. Shangraw, PH**

Education:	B.S., Watershed Science/Hydrology, Colorado State University
Project Responsibility:	Surface Water and Floodplains, Noise, Assistant Project Manager
Experience:	Professional Hydrologist – American Institute of Hydrology; more than 30 years of experience in surface water hydrology; NEPA experience as an interdisciplinary team member and project manager on EIS and EA documents for utility projects, timber sales, timber restoration projects, and mining projects.

Groundwater, Hazardous Materials and Hazardous Waste

EMSI, **Timothy Shangraw, PE**

Education:	B.S., Civil Engineering, University of Massachusetts M.S., Civil/Environmental Engineering, University of Colorado, Boulder
Project Responsibility:	Groundwater, Hazardous Materials, and Hazardous Waste
Experience:	Professional Engineer in Colorado with more than 30 years of experience in hydrogeology, hazardous waste management, environmental remediation, and NEPA and RCRA permitting.

Soils and Biological Resources

Cedar Creek Associates, Inc., **T. Michael Phelan, CWB**

Education:	B.A., Zoology, University of California at Los Angeles Post Graduate Studies, Ecology, San Diego State University
Project Responsibility:	Soils, Wildlife, Vegetation, Threatened, Endangered, and Other State Species of Concern, Wetlands
Experience:	President of Cedar Creek Associates, Inc.; Certified Wildlife

	Biologist - The Wildlife Society; 34 years of experience in environmental consulting, field analysis, impact assessment, and mitigation planning in the biological sciences including project management and technical contribution to numerous NEPA compliance EIS and EA documents for a variety of energy development, mining, and other industrial development projects.

Cultural Resources

Alpine Archaeological Consultants, Inc, **Kimberly Redman, M.A., RPA**

Education:	M.A., Anthropology, Washington State University
Project Responsibility:	Cultural Resources
Experience:	Twenty years of experience as an archaeologist and 10 years of experience writing cultural resources sections of EIS and EA documents.

Land Use and Transportation, Socioeconomics, Public Health and Safety

Kathol & Company, **Jennifer Kathol**

Education:	B.S., Natural Resource Economics, Colorado State University
Project Responsibility:	Land Use, Socioeconomics, Transportation, and Public Health and all miscellaneous sections of EA. EA Project Manager responsible for coordination of consultant resource specialists and EA document preparation.
Experience:	President of Kathol & Company; 30 years NEPA experience completing and managing projects and Human Resources sections of EIS, EA, EIR, and international environmental documents.

Technical Editing and Desktop Publishing

Georgia A. Doyle

Education:	M.S. Hydrology/Hydrogeology, University of Nevada, Reno B.S. Hydrology and Water Resources, University of Arizona
Project Responsibility:	Technical Editing and Desktop Publishing
Experience:	Twenty years of experience researching, writing and editing scientific publications; preparation of EIS and EA documents.

6.0 Consultation

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Socioeconomics

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APPENDIX A

CORE AREA BUILDINGS

Buildings at TTC

Building Name	Location/ Building Number	Size	Date Built	Use	Other
Operations Building (OPS)	Core Area/ 1	31,700 sq ft (1st floor) 21,500 sq ft (2nd floor) 6,300 sq ft (basement)	1975	Primary office and administration, conference room, data processing, cafeteria, data retention.	Ongoing improvements to OPS to meet LEED certification standards. Per Executive Order 13514 and 13423 FRA Environmental Management System provides guidance requirements and oversight to attain reductions in building energy intensity and consumption to meet the net zero energy goal.
Project Management Building (PMB)	Core Area/2	17,400 sq ft (1-story)	1972	Office and administration, and test program office.	Currently not in use. Funds have been solicited for renovation of the PMB to meet LEED certification standards.
Rail Dynamics Lab (RDL)	Core Area/ 3	36,565 sq ft with 55 foot height in high bay; 2- 13,200 sq ft floor levels in low bay	1972-74	Vibration Test Unit (VTU) 1977 Simuloader 1980's Primary testing occurs in high bay. Support and service in low bay including offices, bearing lab, craft repair, staging and storage.	2- 100 ton overhead cranes with hook height of 42 feet serve high bay. High bay divided into two test areas for Simuloader and Vibration Test Unit. Built in measures to reduce noise and vibration in low bay permit most activities to continue in low bay while test activities are being conducted in high bay.
Center Services Building (CSB)	Core Area/ 4	36,700 sq ft with 50 foot height in high bay; Low bay		Primary maintenance facility for minor overhauling, repair, maintenance and test preparation of test vehicles in the high bay. The facility also provides office space, motor pool area, parts storage, and craft shop areas for vehicle and building maintenance; 4 tracks enter high bay from west; 6 additional tracks north of the building serve as storage tracks, with one	2- 30 ton cranes with 43.6 foot hook height; Repair pits have air, water and power, drive-on, under wheel-truing machine; areas include a machine/weld, electrical, wood, plumbing, motor pool, locksmith, and rail vehicle maintenance shops.

Building Name	Location/ Building Number	Size	Date Built	Use	Other
				leading to the million pound squeeze fixture (Track #7) and one to the loading dock (Track #8). Also includes 3,600 sq ft of office space.	
CSB Storage Building (TTX)		4,800 sq ft	2007	Field office and storage for TTX	Long term use by TTX who is longtime customer of TTC.
Warehouse Laboratory Facility (WLF) and Components Test Laboratory (CTL)	Core Area/ 5	53,428 total sq ft (2 floors)	1979-80	WLF contains a warehouse facility with a 21' high ceiling, storage racks, forklift access, loading docks, receiving area, walk-in freezer, and a flammable materials storage room and air brake laboratory, and Metallurgy Laboratory. CTL currently houses dynamic test equipment, such as; the dynamometer for railroad wheel / brake testing, rolling load machines for rail and component wear and fatigue testing, and tie wear machine.	
Security Emergency Response Training Center (SERTC)	Core Area/ 6	7,200 sq ft 4,800 sq ft	1973 1995	Hazardous materials training facility (1985 modification to building); 4-auditorium classrooms added; Plus a series of modular buildings and trailers used to house instructors and support technicians.	The SERTC training grounds include train derailment sites that have been retrofitted to provide life-like lading conditions that might be present at a “live” setting, including such conditions as: fires, explosions, commodities under pressure and product leaks, with students working under human environmental protection conditions. A similar training area has been set up for highway type motor vehicles to allow students to train in response to typical accident scenarios. Training areas have also been set up for lading transfers, leak containment, propane fire control, and spill control on water.

Building Name	Location/ Building Number	Size	Date Built	Use	Other
Transit Maintenance Building (TMB)	Core Area/ 7	7,680 sq ft	1973	Project maintenance facility with single track through building. Parallel track to southeast of building.	
Storage Maintenance Building (SMB)	Core Area/ 8	36,010 sq ft	1973	One-story high bay metal building with single track through building. Used for craft material storage, lading and damage material staging, and emergency response vehicle staging. Areas available for project use include ballasted track through the building for staging (no jacking), limited inside secured and unsecured storage, outside secured storage, large office space area (4000 sq ft), which includes separate offices, conference rooms, a break room with kitchen, and restrooms with showers.	Gravel, fenced lay-down yard lies northwest of the building and occupies an area approximately the same size as the building. This secured area is for outdoor storage of material, supplies, and equipment, which cannot be housed in the building.
Urban Rail Building (URB)	Core Area/ 9	19,380 sq ft	1980	Permanent maintenance facility for Transit Vehicles using the Transit Test Track. A Wye track configuration extends to the building from the TTT to allow turning of vehicles for logistics purposes without leaving the TTT test area. Third rail power is extended along the Wye Tracks into the building, with the power source controlled from the building. A portable stinger system can move the cars from the end of the 3rd rail into the building. The D.C. power supply is separate from the TTT, allowing isolation of the URB facility from TTT testing.	Two yard tracks extend through the building and an additional 350 feet to the west of the facility. Two additional yard tracks were added to the facility on the north side of the main access track. Rooms are provided along the south wall, including a break room, offices, equipment storage, and restrooms with shower facilities.

Building Name	Location/ Building Number	Size	Date Built	Use	Other
Passenger Rail Services Building (PSB) (includes original Japan Rail Facility (JRF))	Core Area/ 10	9,200 sq ft 36,960	1999-2000 2005-2009	Originally Japan Rail Facility – metal building with single track running through building and 12ft x 82ft track service pit. With new modifications Transportation Security Administration (TSA) performs1 rail transportation training using the PSB facilities.	Facility has both high bay (27,000 sq ft) and low bay (6,975 sq ft). Three tracks extend through the building: one with catenary power; the two remaining tracks have 2-75 ton overhead cranes with 10-ton auxiliary hoists to service vehicles on tracks. A service pit was also installed for anticipated 125-ton, 3-Axle Drop Table unit to span the distance between the two tracks. The service top and bi-fold doors have been integrated into the floor slab in preparation for the unit. A wheel truing pit was also installed in Track #3 for anticipated in-floor, CNC Wheel Truing Machine. In addition to the tracks that extend through the building, Track #4 runs parallel to the building on the east side of the building. All 4 tracks extend approximately 300 feet north of the building.
FAST Maintenance/ Office Buildings	See Figure 3-1 Master Site Plan	8,400 sq ft		The FAST facility contains two primary structures to house project personnel and to perform routine maintenance on equipment and vehicles associated with the program. The maintenance building has two service tracks extending through the building, with a service pit under one of the tracks.	The FAST Modular Unit is 3,600 sq ft in size, containing offices, restrooms, and a break room.

Source: TTCI 2012

APPENDIX B

AIR EMISSIONS CALCULATIONS

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					Actual				Potential					
Description			Actual Annual Throughput (gal/yr)	Potential Annual Throughput (gal/yr)	Average Vapor Pressure (psia)	Annual Breathing Losses (lbs)	Annual Working Losses (lbs)	Annual VOC Emissions (lbs/yr)	Average Vapor Pressure (psia)	Annual Standing Losses (lbs)	Annual Working Losses (lbs)	Potential Annual VOC Emissions (lbs/yr)	APEN/Permit Status	Basis
ASTs	CSB	15,000 gal. diesel (boiler, locomotive and heavy equipment fueling)	60,335	**	0.008	3.31	1.50	4.81	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
ASTs	CSB	15,000 gal. diesel (boiler, locomotive and heavy equipment fueling)	60,335	**	0.008	3.31	1.50	4.81	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
USTs	CSB	3,000 gal. used oil storage tank (loco service facility)	545	**	0.005	0.00	0.01	0.01	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and aaa. (< 40,000 gal used oil) and Part B, III.D.1.a.
USTs	CSB	3,000 gal. used oil storage tank (WW Room)	1,973	**	0.005	0.00	0.03	0.03	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and aaa. (< 40,000 gal used oil) and Part B, III.D.1.a.
ASTs	CSB	4,000 gal. (locomotive engine oil)	2,512	**	0.003	0.00	0.02	0.02	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and aaa. (< 40,000 gal lube oil) and Part B, III.D.1.a.
ASTs	CSB	2000 gal. diesel (company vehicle fueling)	5,623	**	0.005	0.45	0.10	0.55	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and ccc. (< 400 gal day) and Part B, III.D.1.a.
ASTs	FAST	25,000 gal. diesel (locomotive and heavy equipment fueling)	189,424	**	0.005	5.52	3.21	8.73	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
ASTs	FAST	25,000 gal. diesel (locomotive and heavy equipment fueling)	189,424	**	0..005	5.52	3.21	8.73	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
ASTs	RDL	7,500 gal. hydraulic oil (equipment maintenance)	2,225	**	0.0079	1.96	0.04	2.00	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and aaa. (< 40,000 gal lube oil) and Part B, III.D.1.a.
ASTs	TMB	8,000 gal. diesel (TMB furnace fuel)	6,409	**	0.008	1.72	0.11	1.83	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
ASTs	URB	4,000 gal. diesel (URB boiler fuel)	4,864	**	0.008	0.90	0.08	0.98	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
ASTs	TGB	2,000 gal. diesel (turbine generator)	250	**	0.005	0.45	0.00	0.45	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
USTs	CSB	10,000 gal. gasoline (motor pool)	32,429	**	5.988	0.00	287.00	287.00	**	**	**	**	Exempt	5 CCR, 1001-5, Part A, II.D.1.ccc. 2/22/94 CDPHE letter if 46,500 gal/yr.
USTs	OPS	10,000 gal. diesel (OPS boiler fuel)	4,766	**	0.005	0.00	0.07	0.07	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
USTs	WLF	6,000 gal. diesel (WLF boiler fuel)	10,311	**	0.005	0.00	0.16	0.16	**	**	**	**	Exempt	5 CCR 1001-5, Part A, II.D.1.a. and fff. (< 400,000 gal diesel) and Part B, III.D.1.a.
				Total (lb/yr)		23.14	297.04	320.18		0.00	0.00	0.00		
				Total (tpy)				0.16				0.00		

(1) Actual annual throughputs provided by TTCI from fuel usage for the 2012 year.
(2) VOC emissions presented were calculated using EPA TANKS4.09D program.
(3) Tank provides storage of fuel used in furnace or boiler. Therefore maximum potential annual throughput is based on potential maximum fuel usage of boiler or furnace.

(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Table A-1 Underground and Above Ground Storage Tank Emission Estimates

Description		APEN/Permit Status	Basis	Rating mmBtu/hr	LPG Consumption Actual gal/yr	LPG Consumption Potential gal/yr	Fuel Oil Consumption Actual gal/yr	Fuel Oil Consumption Potential gal/yr	Number of Units
ERTC	- propane-fired heaters (5 total)	***APEN exempt/permit exempt***	5 CCR 1001-5, Part A, II.D.1 and Part B, III.D.1.a.		6,510				
	propane heaters			0.25	3,166	23,934			2
	propane heaters			0.176	3,344	16,850			3
FAST	propane-fired heaters (5 total)	***APEN exempt/permit exempt***	12,000 gal/yr on APEN	0.25	4,552	23,934			5
PMB	American Standard hot water propane-fired boiler	***Previous 91PB231(3)/APEN exempt/permit exempt***	5 CCR 1001-5, Part A, II.D.1 and Part B, III.D.1.a.- 2/22/94 CDPHE letter if < 62,551 gal/yr.	0.936	0	89,610			1
SMB	- propane-fired heaters (7 total)	***APEN exempt/permit exempt***	5 CCR 1001-5, Part A, II.D.1 and Part B, III.D.1.a., APEN specifies 8,300 gal/yr		6,551	65,213 total			
	propane heaters			0.15	854	14,361			1
	propane heaters			0.4	2,279	38,295			1
	propane heaters			0.12	3,418	11,489			5
JRF	propane-fired heaters (8 total)	***APEN exempt/permit exempt***	5 CCR 1001-5, Part A, II.D.1 and Part B, III.D.1.a.	0.16	4,118	15,318			8
PSB	propane-fired heaters (10 Total)	***APEN exempt/permit exempt***	5 CCR 1001-5, Part A, II.D.1 and Part B, III.D.1.a.	0.2	10,838	19,148			10
					32,569				
CSB	Superior Aztec diesel-fired boiler	***12PB062/permit exempt***	2/22/94 CDPHE Corresp - permit exempt if <64,950 gal/yr	12.6			36,657	788,400	1
OPS	Weil-McLain diesel-fired boiler	***91BPB231(2)/permit exempt***	5 CCR 1001-5, Part A, II.D.1.a.- 2/22/94 CDPHE letter if < 120,960 gal/yr.	2.8			4,766	175,200	1
TMB	Jackson & Church Building Unit oil-fired furnaces (6 total)	***APEN exempt/permit exempt***	5 CCR, 1001-5, Part A, II.D.1. and Part B, III.D.1.a.- 2/22/94 CDPHE letter if annual consumption < 9000 gal/yr.	0.173			6,409	10,825	6
URB	Weil-McLain diesel-fired boiler	***Previous 96PB423/APEN exempt/permit exempt***	5 CCR 1001-5, Part A, II.D.1 and III.D.1.a.- 7/11/96 CDPHE letter if < 20,000 gal/yr.	3.1			4,864	193,971	1
WLF(CTL)	hot water diesel-fired boiler	***12PB391/permit exempt***	5 CCR 1001-5, Part A, III.D.5. CDPHE letter of 2/22/94 if <33,000 gal/yr	1.54			10,311	96,360	1
							63,007		
									Total

Description		Actual Emissions/Consumption PM10 (tpy)	SO2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	Maximum Potential Emissions/Consumption PM10 (tpy)	SO2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	Actual HAPs benzene (lb/yr)	Actual HAPs ethylbenzene (lb/yr)	Actual HAPs formaldehyde (lb/yr)	Actual HAPs napthalene (lb/yr)	Actual HAPs 1,1,1-trichloroethane (lb/yr)	Actual HAPs toluene (lb/yr)	Actual HAPs o-xylene (lb/yr)
ERTC	- propane-fired heaters (5 total)																	
	propane heaters	6.33E-04	6.43E-05	0.02	3.01E-03	4.75E-04	0.01	9.72E-04	0.34	0.05	0.01							
	propane heaters	6.69E-04	6.79E-05	0.02	3.18E-03	5.02E-04	0.01	1.03E-03	0.35	0.05	0.01							
FAST	propane-fired heaters (5 total)	9.10E-04	9.24E-05	0.03	0.00	6.83E-04	0.02	2.43E-03	0.84	0.11	0.02							
PMB	American Standard hot water propane-fired boiler	0.00E+00	0.00E+00	0.00	0.00	0.00E+00	0.02	1.82E-03	0.63	0.09	0.01							
SMB	- propane-fired heaters (7 total)																	
	propane heaters	1.71E-04	1.73E-05	0.01	8.12E-04	1.28E-04	2.87E-03	2.92E-04	0.10	0.01	2.15E-03							
	propane heaters	4.56E-04	4.63E-05	0.02	2.16E-03	3.42E-04	0.01	7.77E-04	0.27	0.04	0.01							
	propane heaters	6.84E-04	6.94E-05	0.02	3.25E-03	5.13E-04	0.01	1.17E-03	0.40	0.05	0.01							
JRF	propane-fired heaters (8 total)	8.24E-04	8.36E-05	0.03	3.91E-03	6.18E-04	2.45E-02	2.49E-03	0.86	0.12	1.84E-02							
PSB	propane-fired heaters (10 Total)	2.17E-03	2.20E-04	0.08	1.03E-02	1.63E-03	3.83E-02	3.89E-03	1.34	0.18	2.87E-02							
CSB	Superior Aztec diesel-fired boiler	0.04	1.30	0.37	0.09	0.01	0.79	27.99	7.88	1.97	0.13	0.01	2.33E-03	1.21	0.04	0.01	0.23	4.00E-03
OPS	Weil-McLain diesel-fired boiler	0.00	0.17	0.05	0.01	0.00	0.18	6.22	1.75	0.44	0.03	0.00	3.03E-04	0.16	0.01	0.00	0.03	5.19E-04
TMB	Jackson & Church Building Unit oil-fired furnaces (6 total)	0.01	0.23	0.06	0.02	1.09E-03	0.06	2.31	0.65	0.16	0.01	1.37E-03	4.08E-04	0.21	0.01	1.51E-03	0.04	6.99E-04
URB	Weil-McLain diesel-fired boiler	0.00	0.17	0.05	0.01	8.27E-04	0.19	6.89	1.94	0.48	0.03	1.04E-03	3.09E-04	0.16	0.01	1.15E-03	0.03	5.30E-04
WLF(CTL)	hot water diesel-fired boiler	0.01	0.37	0.10	0.03	0.002	0.10	3.42	0.96	0.24	0.02	2.21E-03	6.56E-04	0.34	0.01	0.00	0.06	1.12E-03
Total		0.07	2.24	0.86	0.19	0.02	1.47	46.84	18.31	3.99	0.33	0.01	0.00	2.08	0.07	0.01	0.39	0.01

*Granted exempt status on 02/22/94.

Data:		
Heating value for fuel oil/diesel	140,000	Btu/gal
Heating value for LPG	91,500	Btu/gal
Maximum Operating Hours	8760	hours/yr

Emission Factors		
Fuel Oil Combustion		
Emission Factors (Utility and Commercial/Institutional Boilers):		
PM10 -	2	lb/10^3 gal
SO2 -	142	S lb/10^3 gal
NOx -	20	lb/10^3 gal
CO -	5	lb/10^3 gal
VOC -	0.34	lb/10^3 gal
Emission Factors for speciated organic compounds:		
benzene	2.14E-04	lb/10^3 gal
ethylbenzene	6.36E-05	lb/10^3 gal
formaldehyde	3.30E-02	lb/10^3 gal
napthalene	1.13E-03	lb/10^3 gal
1,1,1-trichloroethane	2.36E-04	lb/10^3 gal
toluene	6.20E-03	lb/10^3 gal
o-xylene	1.09E-04	lb/10^3 gal
Emission Factor for VOCs is 0.556 lb/10^3 gal, 39% is methane		
Sulfur content = 0.5%, therefore S=0.5		
Fuel Oil Combustion factors were obtained from AP-42, 5th Edition, including Supplement A and B, Section 1.3, Table 1.3-1, 1.3-2, and 1.3-8		
Liquified Petroleum Gas Combustion		
Emission Factors (Commercial Boilers, 0.3 - <10 mmBtu/hr):		
PM10 -	0.4	lb/10^3 gal
SO2 -	0.10	S lb/10^3 gal
NOx -	14	lb/10^3 gal
CO -	1.9	lb/10^3 gal
VOC -	0.3	lb/10^3 gal
Emission Factor for VOCs is 0.5 lb/10^3 gal, 40% is methane		
Sulfur content = 0.0005% (by weight), therefore S=0.406 gr/100 ft^3(2)		
LPG factors were obtained from AP-42, 5th Edition, including Supplement A and B, Section 1.5, Table 1.5-1.		

(1) Actual LPG & Fuel Oil consumption provided by TTCI from fuel usage records for the 2012 year.
(2) Sulfur content of LPG provided by supplier, Phillips Chemical Company.
(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Calculation:
The appropriate emission factors (shown at left) are used to determine emissions
ton/yr PM10 = (Gas Usage[gal/yr])*(Emission Factor [lb/1000 gal])/(2,000 lbs/ton)/1000
Potential Gas Usage is calculated using maximum operating hours and rating in gal/hr (note: potential is for individual unit)
Gas Usage [gal/yr] = (Rating[mmBtu/hr]*8,760 hrs)*(number of units)/(heating value[Btu/gal])
lb/yr HAP = (gas usage [gal/yr]*HAP Emission Factor [lb/1000gal])/1000

gallons/hr = (btu rating of unit)(1000000)(no. of units)\140000 btu/gal (propane)
Next assign percentage of usage/hr for each type of unit.
Multiple percentage time total actual gals/yr for the building.

	gals/hr	%
SMB Heater	1.07	0.130
SMB Heater	2.86	0.348
SMB Heater	4.29	0.522
	8.21	1.000
ERTC	3.57	0.486
	3.77	0.514
	7.34	1.000

Table A-2 Boiler and Furnace Emission Estimates

	Throughput				Operating Hours		PM10 Emissions		APEN/PERMIT	Basis
	Maximum	Drift Factor	Total Drift	Avg. TDS	Actual	Maximum	Actual	Maximum	Status	
Description	(gal/hr)	(%)	(gal/hr)	(lb/gal)	(hrs/yr)	(hrs/yr)	(tpy)	(tpy)		
Cooling Tower #1	30,000	0.02%	6.0	0.0959	2,022	8,760	0.58	2.52	Exempt	5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Cooling Tower #2	30,000	0.02%	6.0	0.0959	2,022	8,760	0.58	2.52	Exempt	5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Cooling Tower #3	30,000	0.02%	6.0	0.0959	2,022	8,760	0.58	2.52	Exempt	5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
						Total (tpy)	1.75	7.56		

Calculation:

Data:

Drift Factor: 0.02% from AP-42, Table 13.4-1

Avg TDS: 0.0959 lb/gal (estimated from AP-42, table 13.4-1)

Calculation:

Total Drift [gal/hr] = (Throughput[gal/hr]) * (Drift Factor[%])

Emissions [tpy] = (Total Drift [gal/hr]) * (Avg.TDS[lb/gal]) * (Operating Hours[hrs/yr])/(2,000 lbs/ton)

(1) Actual based on using actual 2012 operating hours (per TTCI) at maximum design flowrate for equipment

(2) Potential based on maximum design flowrate for 8760 hours.

Table A-3 Cooling Tower Emission Estimates

	Loss from Process Actual (lbs/yr)	Control Factor (%)	PM10 Emissions Actual (tpy)	Permit/APEN Status	Basis
Brake Pad Testing	0.2	99.9994%	6E-10	Exempt	5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
		Total (tpy)	6E-10		

(1) 2010 data on material lost from the process provided by TTCI (Tom Johnson).

Calculation:

Emissions [tpy] = (Loss from Process [lbs/yr])(1-Control Factor[%])/(2,000 lbs/ton)

(1) Material loss from process provided by TTCI for 2012 year.
(2) Control factor of 99.9994% based on manufacturer information provided by FARR
for the cartridge dust and fume collector.
(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Table A-4 Dynamometer Emission Estimates

Description		Usage Actual gal/yr	Potential gal/yr	Actual VOC Emissions (tpy)	Potential VOC Emissions (tpy)	Actual HAPs ethylbenzene (lb/yr)	Actual HAPs Toluene (lb/yr)	Actual HAPs chlorobenzene (lb/yr)	Actual HAPs Hexane (lb/yr)	Actual HAPs isomers of xylene (lb/yr)	Actual HAPs Benzene (lb/yr)	Actual HAPs 1,1,2-trichloroethane (lb/yr)	Actual HAPs napthalene (lb/yr)	Actual HAPs o-xylene (lb/yr)	Actual HAPs cumene (lb/yr)	Actual HAPs isomers of hexane (lb/yr)	Permit/APEN Status	Basis
CSB	gasoline refueling (motor pool)	32,429	**	0.19	**	0.83	8.01	0.08	7.06	2.88	5.99	0.08	0.04	1.18	0.04	15.29	Exempt	5 CCR, 1001-5, Part A, II.D.1.ccc (<400 gal/day)
CSB	heavy equipment diesel refueling	5,227	**	4.44E-05	**		1.24E-03		4.18E-03		2.13E-03					4.53E-03	Exempt	5 CCR, 1001-5, Part A, II.D.1.ccc (<400 gal/day)
FAST	heavy equipment diesel refueling	9,245	**	7.86E-05	**		2.20E-03		7.39E-03		3.77E-03					8.02E-03	Exempt	5 CCR, 1001-5, Part A, II.D.1.ccc (<400 gal/day)
CSB	locomotive diesel refueling	78,785	**	6.70E-04	**		0.02		0.06		0.03					0.07	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a. and Part B, III.D.1.a.
FAST	locomotive diesel refueling	369,604	**	3.14E-03	**		0.09		0.30		0.15					0.32	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a. and Part B, III.D.1.a.
FAST	fuel truck diesel refueling & load	55,890	**	9.50E-04	**		2.66E-02		8.93E-02		4.56E-02					9.69E-02	Exempt	5 CCR, 1001-5, Part A, II.D.1.ccc (<400 gal/day)
			Total	0.19		0.83	8.14	0.08	7.52	2.88	0.23	0.08	0.04	1.18	0.04	15.79		

Emission Factors		
Gasoline		
Displacement losses (uncontrolled)	11.0	lb/1000gal
Spillage	0.7	lb/1000gal
Speciation factors:		
ethylbenzene	0.22	wt %
toluene	2.11	wt %
chlorobenzene	0.02	wt %
hexane	1.86	wt %
isomers of xylene	0.76	wt %
benzene	1.58	wt %
1,1,2-trichloroethane	0.02	wt %
napthalene	0.01	wt %
o-xylene	0.31	wt %
cumene	0.01	wt %
isomers of hexane	4.03	wt %
Emission factors were obtained from AP-42, 5th Edition, 1/95, Section 5.2.		
Speciation factors from SPECIATE.		
Diesel (heavy vehicle)		
Total Displacement losses	0.017	lb/1000gal
Speciation factors:		
toluene	1.4	wt %
hexane	4.7	wt %
benzene	2.4	wt %
isomers of hexane	5.1	wt %
Assume displacement losses similar to loading losses.		
AP-42, 5th Edition, 1/95, Section 5.2., S=1.0, P=0.0054 psia (diesel),		
M=130 (diesel), T=515 deg. R (Pueblo)		
Assume spillage losses are negligible for diesel.		
Speciation factors from SPECIATE.		
Diesel		
Locomotive refueling loading losses	0.017	lb/1000 gal
AP-42, 5th Edition, 1/95, Section 5.2., S=1.0, P=0.0054 psia (diesel),		
M=130 (diesel), T=515 deg. R (Pueblo)		

Calculation:

The appropriate emission factors (shown at left) are used to determine emissions
ton/yr VOC = (Fuel Usage[gal/yr])*(Emission Factor [lb/1000 gal]))/(2,000 lbs/ton)/1000
lb/yr HAPs = (actual VOC emissions [tpy]*((speciation factor [wt%])/100)*2,000 lb/ton

(1) Actual fuel dispensing numbers provided by TTCI from fuel records for 2012 year.
(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Table A-5 Fuel Dispensing Emission Estimates

			Usage		Actual Emissions/Consumption					Maximum Potential Emissions/Consumption					Permit/APEN	Basis
		Number	Actual	Potential	PM10	SO2	NOx	CO	VOC	PM10	SO2	NOx	CO	VOC	Status	
Description		of Units	(hrs/yr)	(hrs/yr)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)	(tpy)		
SMB	Fire department backup generator	1	13	500	3.32E-05	2.79E-05	5.42E-04	0.02	1.01E-03	1.28E-03	1.07E-03	0.02	0.80	0.04	Exempt	5 CCR, 1001-5, Part A, II
TGB	turbine generator	1	4.8	500	1.90E-03	1.78E-03	2.71E-02	5.83E-03	2.21E-03	0.20	0.19	2.82	0.61	0.23	Exempt	5 CCR, 1001-5, Part A, II
				Total (tpy)	1.94E-03	1.81E-03	0.03	0.03	3.22E-03	0.20	0.19	2.84	1.41	0.27		

Capacity of generators:

SMB	0.05115	MMBtu/hr
TGB	2.558	MMBtu/hr

Emission Factors

Gasoline

PM10 -	0.100	lb/MMBtu
SO2 -	0.084	lb/MMBtu
NOx -	1.630	lb/MMBtu
CO -	62.700	lb/MMBtu
VOC -	3.030	lb/MMBtu

VOC taken from table as TOC for this emission factor

Emission factors were obtained from AP-42, 5th Edition, including Supplement A and B, Section 3.3.

Diesel

PM10 -	0.310	lb/MMBtu
SO2 -	0.290	lb/MMBtu
NOx -	4.410	lb/MMBtu
CO -	0.950	lb/MMBtu
VOC -	0.360	lb/MMBtu

VOC taken from table as TOC for this emission factor

Emission factors were obtained from AP-42, 5th Edition, including Supplement A and B, Section 3.3.

Calculation:

ton/yr PM10 = (Actual usage [hrs/yr])*Capacity [MMBtu/hr] * (Emission Factor [lb/MMBtu])/(2,000 lbs/ton)

(1) Actual usage based on data provided by TTCI for the 2011 year.

(2) Potential based on 500 hrs/yr - Memo: calculating PTE for emergency generators, from: John S. Seitz, Director, Sept. 6, 1995

(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Table A-6 Internal Combustion Engine Emission Estimates

Description	Number of Units	Duration (hrs/week)	Fuel Usage (gal/hr)	Fuel Oil Consumption Actual gal/yr	Potential gal/yr	Actual Emissions/Consumption PM10 (tpy)	SO2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	Permit/APEN Status	Basis
Locomotive(s) Idling in CSB	3	2	5	1,173	**	0.01	0.02	0.29	0.04	0.01	Exempt	5 CCR, 1001-5, Part A, II.D.1.ppp.
					Total (tpy)	0.01	0.02	0.29	0.04	0.01		

Emission Factors (Line Haul Locomotive):

PM10 -	0.0116	lb/gal
SO2 -	0.0360	lb/gal
NOx -	0.4931	lb/gal
CO -	0.0626	lb/gal
VOC -	0.0211	lb/gal

Emission Factor for SO2 based on a fuel sulfur content of 0.25% (by weight)

Emissions Factors obtained from AP-42, "Procedures for Emission Inventory Preparation Volume IV: Mobile Sources", 1992

Calculation:

Calculation:

Fuel Consumption [gal/yr] = (Number of Units * Duration [hrs/week] * Fuel Usage [gal/hr] * 6570 [hrs])/(24 hrs per day * 7 day per week)

ton/yr PM10 = (Fuel Consumption [gal/yr])*(Emission Factor [lb/gal])/(2,000 lbs/ton)

(1) Data on number of units, duration and fuel usage during testing was provided by Mr. Dave H. (TTCI)

(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Table A-7 Locomotive Idling Emission Estimates

Description		Diesel Use Actual gal/yr	Potential gal/yr	Actual Emissions/Consumption PM10 (tpy)	SO2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	Maximum Potential Emissions/Consumption PM10 (tpy)	SO2 (tpy)	NOx (tpy)	CO (tpy)	VOC (tpy)	Permit/APEN Status	Basis
SERTC	training exercises	540	11,639	0.37	0.00	0.01	0.39	0.09	8.06	0.02	0.12	8.43	2.02	Exempt	5 CCR, 1001-5, Part A, II.D.1.q. open burning, and II.D.1.z. fire training
		Total	(tpy)	0.37	0.00	0.01	0.39	0.09	8.06	0.02	0.12	8.43	2.02		

Fire Training
Emission Factors

PM10 -	0.195	lb/lb
SO2 -	0.0004	lb/lb
NOx -	0.003	lb/lb
CO -	0.204	lb/lb
VOC -	0.049	lb/lb

Calculation:

The appropriate emission factors (shown at left) are used to determine emissions
ton/yr PM10 = (Fuel Usage[gal/yr])*7.1 [lb/gal]*(Emission Factor [lb/lb]))/(2,000 lbs/ton)

Fire training emission factors were obtained from AQUIS, Section 3.2.3

(1) Actual usage based on data provided by TTCI for the 2012 year.
(2) Potential based on 52 classes per year, and related increased fuel usage.

(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Table A-8 Fire Training Emission Estimates

	Actual Usage (1) (tpy)	Emissions Actual PM-10 (tpy)(2)(3)	Permit/APEN Status	Basis
Ballast Handling	1434	9.46E-05	Exempt	5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Silica sand/locomotives	0.0	0.00E+00	Exempt	5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
	Total (tpy)	9.46E-05		

Truck Unloading:	1.60E-05	lb/ton	**Calculation:**
Truck Loading:	0.0001	lb/ton	*Ballast:*

Crushed Stone Processing Operations factors were obtained from AP-42, 5th Edition, 1/95, Section 11.19.2.

Emissions [tpy] = (Usage [tpy]*(2*truck unloading EF [lb/ton] + truck loading EF [lb/ton]))/(2000 lbs/ton)

Silica Sand:

Emissions [tpy] = (Usage [tpy]*(truck loading EF [lb/ton]))/(2000 lbs/ton)

(1) Actual usage number for 2012 obtained from TTCI.
(2) For ballast handling, assume dumped from truck or rail car, loaded, and dumped again.
(3) For silica sand, sand is loaded in locomotives by sand tower. Therefore assume single loading operation.
No sand purchased in 2010 and no means to evaluate volume in sanding tower.

Table A-9 Material Handling Emission Estimates

TTCI
Water 9 Emissions Calculations
24 August, 2006

Compound*	Evaproation Pond		
	(g/s)	(lb/hr)	(tons/year)
1, 2 Dichlorobenzene	1.28E-07	1.02E-06	4.45E-06
1, 4 Dichlorobenzene	5.28E-06	4.19E-05	1.84E-04
Methylene Chloride	6.08E-07	4.83E-06	2.11E-05
2 Butanone	7.71E-07	6.12E-06	2.68E-05
Ethylbenzene	4.04E-07	3.21E-06	1.40E-05
Total VOCs			2.50E-04

OIL/WATER SEPARATOR EMISSIONS

Emission Factor: AP-42 5th ed., Section 5.1, Petroleum Industry

Equation: E = (Q)(EF)

E = VOC Emission Rate (lb/hr)
Q = Oil Water Separator Volumetric Loading Rates
EF = Oil Water Separator Emission Factor (lb total VOC/1000 gal wastewater) = 0.2

Annual throughput = 93,030 gallons/year
Hourly throughput = 10.61 gal/hr

Annual Average:	E =	(93,030*0.2/1,000/2,000) =	**0.0093**	**TPY**
Maximum Hourly:	E =	(10.61*0.2/1,000) =	**0.0021**	**lb/hr**

Table A-10 Oil Water Separator Emission Estimates

Description			Surface Area (in^2)	Usage (hr/yr)	wt% Light Aliphatic Naptha (LAN)	Emissions Actual VOC (tpy)	Emissions Pot. VOC (tpy)	Permit/APEN Status	Basis
Parts Washers	CSB	35 gal. dip tank, electric shop	811	8760	0.9	1.78	1.78	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Parts Washers	CSB	35 gal. dip tank, rail vehicle maintenance	704	8760	0.9	1.54	1.54	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Parts Washers	CSB	Sink on Drum (SOD), motor pool	704	8760	0.9	1.54	1.54	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Parts Washers	CTL	SOD, highbay	811	8760	0.9	1.78	1.78	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Parts Washers	FAST	35 gal. dip tank, maintenance	811	8760	0.9	1.78	1.78	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Parts Washers	RDL	35 gal. dip tank	811	8760	0.9	1.78	1.78	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
Parts Washers	RDL	35 gal. dip tank, highbay	811	8760	0.9	1.78	1.78	Exempt	<2 tpy, 5 CCR 1001-5, Part A, II.D.1.a.and Part B, III.D.1.a.
					Total (tpy)	11.96	11.96		

Emission Factor 0.08 lb/hr/ft^2

AP-42, Table 4.6-2

Calculation:

Data:

Usage = 8760 hrs

Weight % LAN =99

Calculation:

Emissions [tpy] = (Surface Area [in^2] * Usage [hrs] * (Weight % LAN)/100 * Emission Factor [lb/hr/ft^2])/(144 in^2/ft^2*2000 lbs/ton)

(1) Actual and potential based on 8760 hrs/yr.

(2) Weight % light aliphatic naptha (LAN) obtained from Safety Kleen 105 MSDS. No HAPs specifically identified on product MSDS.

(**) Because the non-exempt sources are significantly below Title V thresholds, the potential-to-emit for sources which are exempt or insignificant with respect to Title V have not been calculated.

Table A-11 Parts Washer Emission Estimates

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APPENDIX C

WILDLIFE RANGE MAPS

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Figure B-1 Mule Deer Range Mapping for the TTC Property

Figure B-2 Pronghorn Range Mapping for the TTC Property

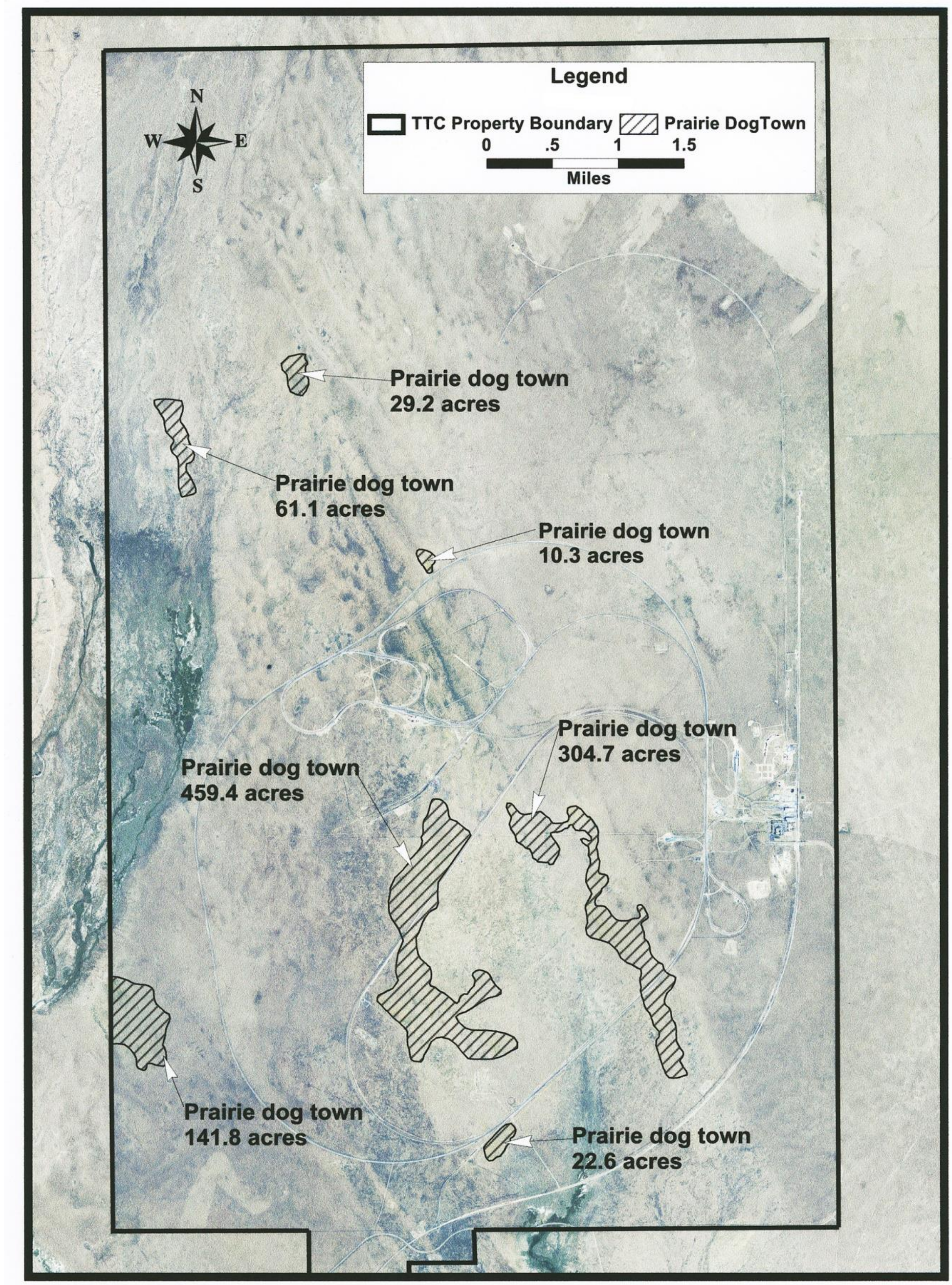

Figure B-3 Prairie Dog Town Mapping for the TTC Property

Figure B-4 Massasauga Range Mapping for the TTC Property