



very high shrink swell potential and low soil strength. As the 100-year and 500-year floodplain of the Trinity River is present along approximately 54% of the proposed alignment, soils in these areas are naturally prone to flooding and wetness. Impacts to the 100-year floodplain would be minimized by bridging these LRT segments or otherwise following all DART criteria to stay above or away from the floodplain area.

Eight stations are proposed for the LRT Line including two which will be deferred; all but one of which are situated on soils described as having a low or very low potential for urban development (USDA, 1980). Limitations to development ascribed to each of the soils present along the proposed line should be considered during Preliminary Engineering and final design.

Direct impacts to soils would include the removal of vegetation, exposure of the soil, mixing of soil horizons, loss of topsoil productivity in areas which are not currently paved, and short-term increased susceptibility to wind and water erosion. These construction activities can lead to an increased potential for erosion and sedimentation during the construction process.

As stated in Section 3.12.2, approximately 22 percent of the study area contains prime farmland soils, consisting of Houston black clay, Burleson clay, Frio silty clay, Silawa fine sandy loam, Trinity clay (occasionally flooded), and Heiden clay. As the study area is located in a developed, urban area with little to no agrarian use, however, the project is not subject to the **Farmland Protection Policy Act** (FPPA), and coordination with NRCS relative to this Act is not required. A copy of the completed Farmland Conversion Impact Rating Form for Corridor Type Projects (CPA-106) is included in Appendix D.

The underlying geology in the region consists primarily of Alluvium floodplain deposits, with smaller areas of Fluvatile terrace deposits. The Eagle Ford group underlies the western portion of the alignment. Proposed below-grade segments of the alignment would occur on Eagle Ford group and Fluvatile terrace deposits. The Eagle Ford group could contain paleontological remains. Care should be taken during trenching activities to protect archeological resources. The presence of sand and gravel deposits along the alignment should be considered in the design process.

### **Geology and Soils Mitigation**

Increased runoff and erosion can be reduced with the establishment of protective vegetation as soon as possible following construction and the use of best management practices (BMPs). Typical BMPs used for erosion control include silt fences, strawbale dikes, diversion ditches, rip-rap channels, water bars, and water spreaders.

Texas Parks and Wildlife has reviewed the project and offered recommendations to help minimize potential impacts to natural resources including soils. These recommendations have been incorporated into mitigation measures. Potential impacts to geological resources are not expected to be significant. Mitigation measures enacted to protect floodplain resources would also protect floodplain soils categorized as having low potential for urban development. Where possible, in order to avoid soil disturbances, machinery and vehicles will utilize existing roadways and bridges when crossing drainages, wetlands, and creeks.

## **5.9 HYDROLOGY/WATER QUALITY**

This section describes several hydrologic and water quality issues that must be addressed prior to construction. These issues include surface water quality impacts, impacts to groundwater resources, and floodplain impacts. The following sections provide information relating to the minimizing of impacts to these resources.

### **5.9.1 Surface Water Quality**

As described in Section 3.3 and shown in **Figure 3-41**, the proposed alignment crosses one major river channel, two smaller streams, and one constructed lake. Because all of the crossings will be



on new location, project construction has the potential to cause both short-term and long-term impacts to these water bodies, due to runoff from grading activities, removal or additions of fill materials, and incidental/accidental spills of mechanical fluids. Best management practices for erosion control, sedimentation control, and control of total suspended solids would be incorporated into the project design, in order to minimize impacts to water quality.

Operation of LRT on the proposed rail line would result in minimal impacts to surface water quality. Potential impacts to water quality could result from the impervious surfaces of station platforms and parking areas associated with the project, if not adequately addressed. Storm water run-off from platforms could contribute to erosion and sedimentation problems adjacent to station sites. Run-off from parking areas could contain anti-freeze, lubricating fluids, gasoline and other petroleum hydrocarbons associated with automobiles. Mitigation of these potential impacts is addressed below.

The amount of non-point source contaminants that automobiles contribute to the surface water in the project area should be reduced, since implementation of the proposed project would reduce the number of automobiles on area roadways. Water quality and runoff during construction is discussed in more detail in Section 5.12.

#### **Mitigation of Surface Water Quality Impacts**

Prior to construction, coordination with the USACE will be initiated to allow the USACE to evaluate potential channel impacts and mitigation options. Additionally, DART will be required to obtain the necessary permits to proceed with construction. The issuance of storm water discharge permits under the Texas Pollutant Discharge Elimination System (TPDES) is administered by the Texas Commission on Environmental Quality (TCEQ). Under TPDES' General Permits for Storm Water Discharges from Construction Activities, the TCEQ requires the development and implementation of a Storm Water Pollution Prevention Plan (SW3P). The plan is designed to reduce pollution at the source before it can bring about environmental problems. A SW3P will be prepared by DART prior to final design submittal.

Consultation with the USACE will also be necessary to evaluate permitting and mitigation needs under Section 404 of the **Clean Water Act**. If a Section 404 permit is required, the project would also need to obtain Section 401 Water Quality Certification from TCEQ. Coordination with the USACE has been initiated and will continue as design progresses, in order to establish actions required in final design.

#### **5.9.2 Groundwater Resources**

Potential impacts to groundwater resources are expected to be minor. Due to over-development in the Dallas/Fort Worth Metroplex, the water table is low in the project area, dropping at times to as much as 1,200 feet below the surface.

Construction of the proposed rail line would not likely impact aquifer resources. The Trinity Group, the primary source of groundwater for the upper Trinity River Basin, and the Woodbine Aquifer, a minor aquifer also producing water in this basin, are the two major components of the area's groundwater resources. Both of these aquifers outcrop west of Dallas County. Construction of below-grade sections of the alignment would not be expected to contact groundwater resources.

#### **Mitigation of Impacts to Groundwater Resources**

Implementation of the mitigation measures provided in Section 5.9.1, Surface Water Quality Impacts, and Section 5.12, Construction Impacts, would similarly mitigate impacts to shallow groundwater.



### 5.9.3 Floodplains

The proposed project crosses the 100-year floodplain of the Elm Fork of the Trinity River and its tributaries at five locations, as explained in Section 3.13. None of the proposed station locations lie within the 100-year floodplain. As preliminary and final design progresses, the amount of impact at these locations will be quantified. Current design proposes that all five floodplain crossings be bridged, limiting direct impacts to the floodplain to minor amounts of fill associated with retaining walls and structures associated with the proposed project.

The Federal Emergency Management Agency (FEMA) has regulations governing alterations or development within floodplains shown on Flood Insurance Rate Maps. Under FEMA regulations, no alterations of flood zones can result in an increase in the 100-year base flood elevation or cause an increase in the velocity of floodwaters. In addition, the cities of Dallas and Irving have their own floodplain ordinances, and DFW Airport is responsible for issuance of construction permits on airport property. An EIS and a complete stream rehabilitation program must be approved prior to any relocation or alteration of the natural channel. It would also be necessary to coordinate with the US Army Corps of Engineers (USACE) on the issue of fill in any floodplains, streams, or wetlands. While a Nationwide permit might suffice for the construction of an aerial structure above the floodplain, an Individual permit may be required if permanent or short-term construction impacts occur in associated streams or wetlands. This will be determined with the development of engineering details during final design.

The project spans or borders the following flood zones: Elm Fork of the Trinity River (City of Dallas and City of Irving), Cottonwood Branch (City of Irving), and South Fork of Hackberry Creek (City of Irving). **Table 5-13** identifies the designated floodplains that would be impacted. Each city has specific ordinances governing land alteration within a floodplain, as does the federal government. Consultation with the appropriate local, state, and federal representatives, including Dallas-Fort Worth International Airport, will be conducted prior to construction across the floodplain.

TABLE 5-13 DESIGNATED AND SUSPECTED FLOODPLAINS CROSSED OR BORDERED BY ALIGNMENT	
Name of Floodplain	City
Elm Fork of the Trinity River	Dallas and Irving
Cottonwood Branch	Irving
South Fork of Hackberry Creek	Irving (located on DFW Airport property)

Source: LGGROUP, 2005

Federal law requires municipalities that participate in the Federal Flood Insurance Program to adopt floodplain ordinances that prohibit development in the existing 100-year floodplain. In compliance with this program, Section 51A-5.101 of the **Dallas City Code**, Part II of the **Dallas Development Code** sets forth floodplain regulations. These regulations include the uses and structures permitted, and the conditions for the development within the floodplain. The deposition or storage of fill, the placement of a structure, or excavation within a floodplain area requires a fill permit. An overview of this permit process is outlined in the **Procedures for Filling in a Floodplain** under the **Floodplain Management Guidelines**.

Floodplain management guidelines reflect several City of Dallas concerns, including that:

- Storm water be moved naturally rather than relying on extensive and costly channel improvements;
- Fill and development which is not unreasonably damaging to the environment should be permitted where it would not create other flood problems and where public acquisition is not required for environmental protection or recreation purposes; and



- A systematic approach to review fill requests for all floodplains not covered by specific guidelines from adopted management plans should be utilized.

The City of Irving requires that a development permit be obtained should any structure be located or altered within the 100-year floodplain or should there be a change in land use to any property within the floodplain. No encroachments of the floodway are permitted, unless it can be demonstrated that the encroachment would not result in any increase in flood levels within the community.

FAA guidance on federal actions as it relates to evaluating environmental impacts can be found in FAA Order 1050.1E, CHG 1, ***Environmental Impacts: Policy and Procedures*** and FAA Order 5050.4B, the ***National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions***. These FAA Orders and their provisions will be followed for those portions of the project located on Dallas-Fort Worth International Airport property. This includes required coordination with FEMA during the environmental process to address any anticipated impacts to floodplains.

FAA Order 1050.1E requires that any proposed action minimize potential harm to or within the base floodplain. Specifically, the project must not create a “significant encroachment” by causing one or more of the following impacts:

1. The action would have a high probability of loss of human life
2. The action would likely have substantial, encroachment-associated costs or damage, including interrupting aircraft service loss of a vital transportation facility (e.g., flooding of a runway or taxiway; important navigational aid out of service due to flooding, etc.); or
3. The action would cause adverse impacts on natural or beneficial floodplain values.

The proposed project has avoided floodplains where possible, and has been constrained by adjacent development outside of airport property and by the need to cross SH 161 at the safest and most appropriate point. In the case of the South Fork of Hackberry Creek (Water 16), located on airport property, the design minimizes encroachment into the floodplain. Prior to crossing this water and its associated floodplain, the LRT line will cross a minor tributary of Water 16. This tributary will be re-channeled for about 200 feet, and will be crossed with a culvert. This modification will not encroach nor impact the floodplain. The LRT design will then bridge over Water 16 and its floodplain. Impacts will be limited to placement of support columns within the floodplain. Based on the preliminary 10% design, the crossing of the South Fork of Hackberry Creek floodplain would be approximately 90 feet long and would require the placement of one support column (approximately 9 feet by 5 feet). Final design of the project will determine the final size, number and placement of any columns, and hydrologic studies will be conducted to determine that neither the 100-year base flood elevation nor floodwater velocity is increased. Final design plans will be submitted to the USACE for review and appropriate nationwide permit approvals. DFW Airport will be actively involved in the final design review process and will be responsible for issuance of construction permits on airport property. Based on this, the design will not have a high probability of loss of human life, is not located near and will have no affect on any vital transportation facility, and will not cause adverse impacts to the natural or beneficial values of the floodplain.

In addition to ordinances established by the cities of Dallas and Irving, and coordination with FEMA as required by FAA Orders where the project is on airport property, the floodplain associated with the Elm Fork of the Trinity River is also regulated by the Trinity River Corridor Development Certificate (CDC) Process, which aims to stabilize flood risk along the corridor by ensuring that any development that occurs in the floodplain will not raise flood water levels or reduce flood storage capacity. Local governments retain ultimate control over floodplain permitting decisions under the CDC process, but other communities along the Trinity River Corridor are given the opportunity to



review and comment upon them. The proposed project would be required to obtain a CDC from the floodplain/CDC administrators of Dallas and Irving.

Executive Order (EO) 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. As part of the NEPA process, and in compliance with this EO, the AA for the proposed project investigated a number of alignments to serve the corridor. Based on an assessment of a variety of factors described in the AA, the alignment presented in this FEIS was selected as the preferred Build Alternative. It is described in this document along with a No-Build Alternative for comparison. As directed by the EO, the following steps have been (or will be) taken during the EIS preparation and review process:

- Impacts to floodplains that would result from the Build and No-Build Alternatives have been identified and quantified and are presented in this FEIS.
- Measures have been proposed to minimize impacts to the floodplains (e.g. by bridging the floodplains).
- These impacts, along with all the findings of the FEIS have been presented to the public during a series of public meetings held for the proposed project. The DEIS has also been provided to regulatory agencies for their review and comment.

Under 33 United States Code (USC) 408 any proposed modification to an existing USACE project (either federally or locally maintained) that is beyond those modifications required for normal operation and maintenance requires approval from the USACE. This regulation states there shall be no temporary or permanent alteration, occupation or use of any public works including but not limited to levees, sea walls, bulkheads, jetties, and dikes for any purpose without the permission of the Secretary of the Army. Under the terms of 33 USC 408, any proposed modification requires the determination by the Secretary that the proposed alteration or permanent occupation or use of the federal project is not injurious to the public interest and will not impair the usefulness of such work. The authority to make this determination and to approve modifications to federal project under 33 USC 408 has been delegated to the Chief of Engineers.

The proposed DART project crosses the Elm Fork of the Trinity River adjacent to the Spur 482 / Storey Lane crossing. This proposed crossing of the Elm Fork of the Trinity River would have bridge support columns located within the floodplain as previously discussed and would also have support columns located within the existing west bank levee. Current preliminary design reflects two support columns penetrating the levee at this location. The first support column would be placed on the landside of the levee towards the crest, and the second support column would be placed at the toe of the levee on the riverside. This proposed design and resulting alteration of the levee, due to the placement of the support columns, would require 33 USC 408 approval.

### **Mitigation of Floodplain Levee Impacts**

Consultation with the USACE has been initiated in order to document the expected permits and mitigation needs. The USACE has reviewed and provided comment on the DEIS. These comments have been incorporated into this FEIS. Consultation with the USACE will continue through final design to establish actions required in this undertaking. Upon completion of the FEIS, DART has agreed to submit a 30% Design package of the Elm Fork of the Trinity River Crossing to the USACE in order to initiate the permitting process. The Northwest Corridor to Irving/DFW project has been assigned Project Number 200400681 by the USACE.

The proposed project would be designed to be above any 100-year floodplain that the alignment would cross. Impacts to floodplains would be limited to support columns located in the flood zone or minor amounts of fill associated with retaining walls and other bridge structures. Mitigation measures may include channel improvements or design modifications to ensure that neither the



100-year base flood elevation nor floodwater velocity is increased. In addition, mitigation measures for impacts to the levee would be determined during the 33 USC 408 approval process. DART will coordinate with the USACE and the cities of Dallas and Irving during final design, with respect to floodplain and levee impacts. A possible alternative design at the Elm Fork (Trinity River) crossing may be developed and considered during final design that would clear span the entire levee, thus avoiding the need for the placement of support columns within the levee. If this occurs, there would be no permanent impacts to the levee structures and the 33 USC 408 approval from USACE would not be required. The regulatory agencies previously mentioned would evaluate and approve the project design, including any mitigation measures that may be required.

## 5.10 HAZARDOUS/REGULATED MATERIALS

### 5.10.1 ESA Report Summary

A Phase I Environmental Site Assessment (ESA) was performed by LOPEZGARCIA GROUP (LGGROUP) in order to identify significant environmental concerns for the DART LRT line to Irving/DFW Airport. For purposes of this assessment, the property of concern is defined as the right-of-way that is currently owned by DART and the areas that will be used or acquired running from the intersection of Denton Drive and Community Drive in Dallas, to near the Belt Line Road and Valley View Lane intersection in Irving. The right-of-way extends from Storey Lane (Spur 482), along SH 114 to Las Colinas. At Las Colinas, the right-of-way crosses SH 114 near the intersection with Spur 348. The right-of-way continues to the west across North Lake College and then to the northwest across DFW Airport land near the intersection of Valley View Lane and Belt Line Road. The complete Phase I ESA is included in the ***Existing Conditions Technical Memorandum*** (DART, October 2005). This section summarizes the findings of the ESA.

In order to accomplish the NW Corridor LRT line to Irving/DFW Airport, a significant amount of construction will take place within the property, including the construction of new rail, supporting infrastructure, and stations. The purpose of the ESA is twofold: 1) to identify and document areas within the property and surrounding area that could negatively impact construction activities, and 2) determine the potential for environmental liabilities as a result of past or present practices on the property and adjacent properties.

Banks Information Solutions, Inc. (Banks) provided the regulatory agency database information and historic aerial photographs. LGGROUP reviewed this information and 97 database citations were identified at sixty-nine facilities or areas of concern located within the American Society for Testing and Materials (ASTM) search radii. A visual inspection of the study area was conducted to verify locations and evaluate current conditions. Using the information provided by Banks, study area visual inspection results, historical aerial photographs, topographical and soils information, the database citations were evaluated and sites with the potential to possess recognized environmental conditions (RECs) were identified. The facilities or areas of concern that were identified by the database were then categorized as having high, moderate, or low potential for RECs.

#### High Potential

Facilities or areas of concern found within the ASTM search radii that are located on or immediately adjacent to the subject property and have documented contamination that has not been fully delineated, is undergoing monitoring, has conditions that do not meet current regulatory standards, or has a history of regulatory action were classified as “high” potential for RECs. No locations identified in the regulatory agency database were classified as “high potential”.

#### Moderate Potential

Facilities or areas of concern found within the ASTM search radii that are located adjacent to the subject property and have documented contamination that has not been fully delineated, is undergoing monitoring, has conditions that do not meet current regulatory standards, or has a