

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.

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.

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 Dallas-Fort Worth International 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.

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*.

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

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. The design will bridge over the floodplain, and 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 ft. by 5 ft.). 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. DFWIA 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 effect 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 DEIS 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 DEIS.
- 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 DEIS 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. A final alternative will be selected following the circulation of the DEIS and receipt of comments from the public and agencies.

Mitigation of Floodplain Impacts

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 piers 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. DART would coordinate with the USACE and the cities of Dallas and Irving during final design, with respect to floodplain impacts. These regulatory agencies would evaluate and approve the project design, including any mitigation measures that may be required.

Consultation with the USACE has been initiated in order to document the expected permits and mitigation needs. This consultation will continue through completion of the EIS to establish actions required in Final Design.