

Environmental Challenges and Opportunities

Introduction

This section evaluates various resources in the US 24/40 Corridor including aesthetic, wetlands, geology and soils, water, ecological, terrestrial, air quality, floodplains and stream corridors, and cultural resources. This analysis serves a significant role in forming policies related to environmental resource preservation and environmental management within the corridor which are addressed in other sections of the Corridor Study. As the Corridor develops, it is important that the natural resources be respected and that the development occurs in a way that does not degrade the natural environment.

The summary and analysis provided in this section are based on information regarding natural, physical, and man-made environmental features that could potentially be affected and/or enhanced by future land uses or the construction of a future roadway network in the corridor. The following agencies were contacted and supplied information for this summary:

- Mid-America Regional Council (MARC)
- Kansas Department of Transportation (KDOT)
- Kansas Department of Wildlife and Parks (KPWP)
- Kansas State Historical Society – Historic Preservation Office
- Kansas Geological Survey (KGS) Data Access and Support Center (DASC)
- National Wetlands Inventory (NWI)
- U.S. Department of Agriculture Natural Resource Conservation Service (NRCS)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (USEPA)
- U.S. Army Corps of Engineers (USACE)

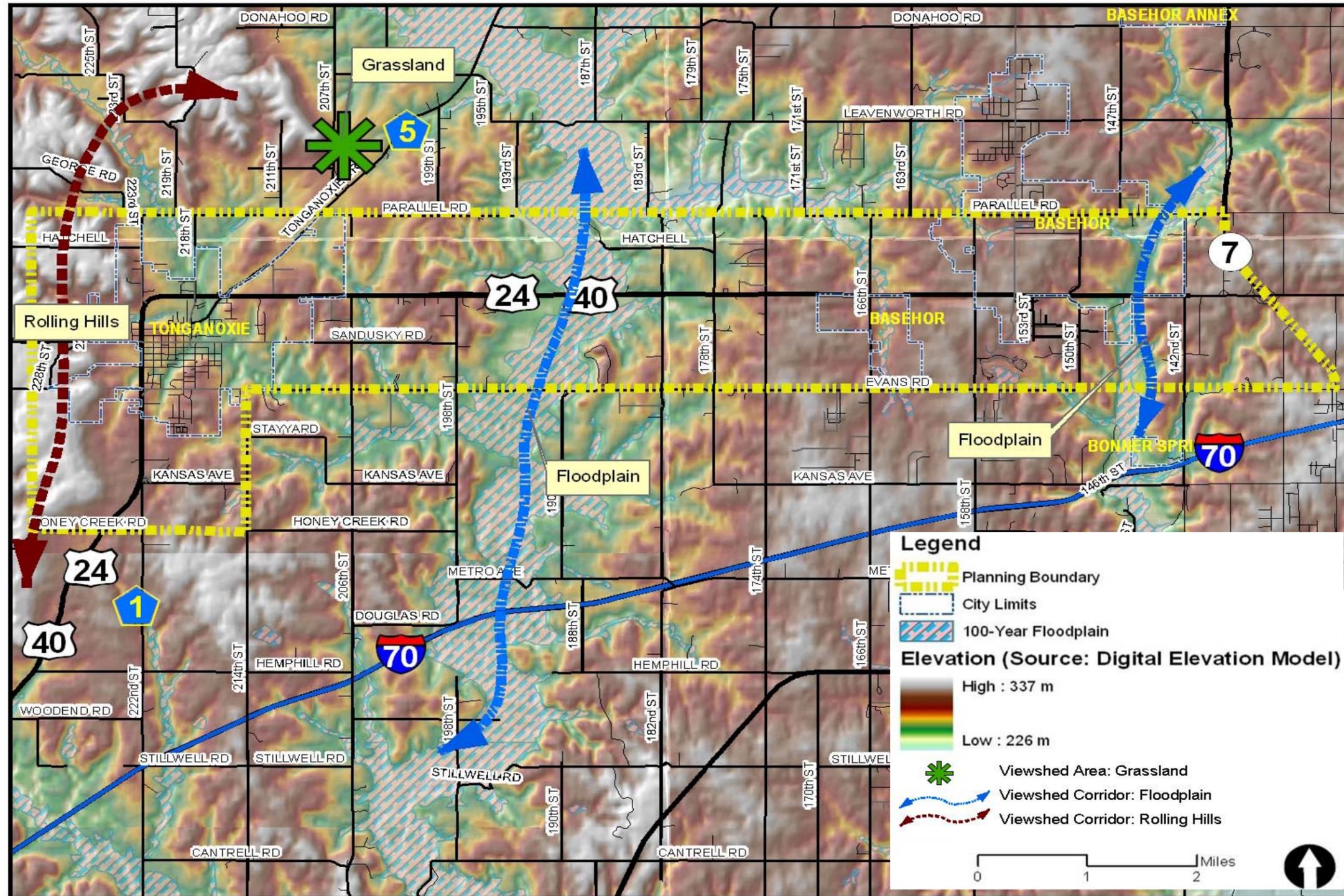
Visual Quality Assessment

Currently the US 24/40 Corridor is a mix of land uses (**Ref. Section 4**) that present a mix of visual images. Much of the undeveloped portion of the corridor has clear “view-sheds” predominantly characterized by agricultural land uses, such as pasture lands that rise above the floodplain of Stranger Creek and its tributaries. The rural character and open space preservation as reflected in the views from the highway were identified through the public involvement process as the top issues in corridor identity and image. **Figure 6-1** identifies view-shed preservation opportunities in the corridor. US 24/40 Highway from K-7 Highway to eastern Tonganoxie is mostly designed with a wide median that preserves and enhances the visual quality of the corridor.

Future updates to the Comprehensive Plans and development regulations for Leavenworth County and the cities of Basehor and Tonganoxie should include policies and standards to preserve these natural resources and view-sheds.

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Figure 6-1: Visual Quality Assessment



Source: BWR, Leavenworth County GIS

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Wetlands

Example Wetland



Wetlands are defined by the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) as ***“those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.”*** Wetlands may provide

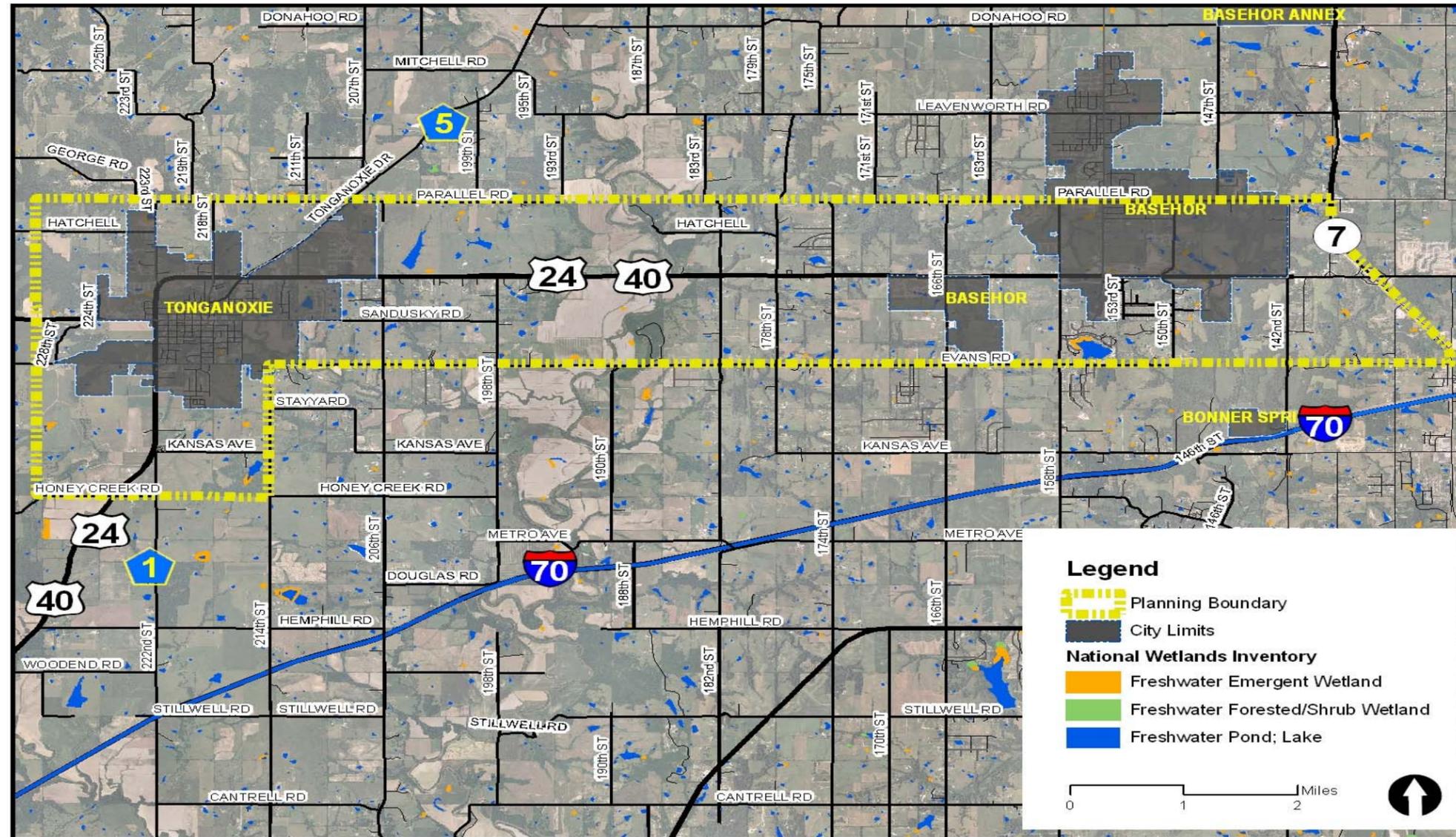
and/or promote a variety of functions including groundwater recharge and discharge, flood flow alternation, nutrient retention and removal, production export, and the promotion of habitat and wildlife diversity and abundance.

The USACE has jurisdiction over all waters of the United States. Discharges of dredged or fill material in waters of the United States, including wetlands, require prior authorization from the USACE under Section 404 of the Clean Water Act (33 USC 1344). Additionally, Executive Order 11990 requires all federal agencies to minimize impacts to wetlands when conducting specific activities.

Potential jurisdictional wetlands have been assessed for the corridor and the designated areas are identified in **Figure 6-2**. The wetland investigation was conducted using information provided from the National Wetland Inventory (NWI) and the Kansas Geological Survey (KGS) Data Access and Support Center (DASC). The US 24/40 Corridor contains a total of 20.5 acres of potential jurisdictional wetlands. These potential wetlands are predominantly located along the central portion of the US 24/40 Corridor (within the Stranger Creek floodplain) and along the eastern portion of the Corridor (near Wolf Creek).

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Figure 6-2: National Wetlands Inventory



Source: National Wetland Inventory (NWI) and the Kansas Geological Survey (KGS) Data Access and Support Center (DASC), BWR.

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The following wetland categories were identified in the corridor:

- PABFh – Palustrine, aquatic bed, semipermanently flooded, diked/impounded (between 142nd and 150th – north of U.S. 24/40, 158th and 166th – north of U.S. 24/40, 166th and 178th – north of U.S. 24/40, 190th and 198th – south of U.S. 24/40, 198th and 206th – north of U.S. 24/40, 206th and Village – south of U.S. 24/40, north of Kansas Ave. and east of U.S. 24/40, and 214th and Delaware – south of U.S. 24/40)
- PEMFh – Palustrine, emergent, semipermanently flooded, diked/impounded (between 142nd and 150th – north of U.S. 24/40 and 224th and U.S. 24/40 – west of U.S. 24/40)
- PUBF – Palustrine, unconsolidated bottom, semipermanently flooded (between 182nd and 198th – south of U.S. 24/40 and 214th and Delaware – south of U.S. 24/40)
- PFOAh – Palustrine, forested, temporarily flooded, diked/impounded (between 206th and Village – south of U.S. 24/40)
- PEMA – Palustrine, emergent, temporarily flooded (between 190th and 198th – south of U.S. 24/40)
- PUBFx – Palustrine, unconsolidated bottom, semipermanently flooded, excavated (between 182nd and 190th – south of U.S. 24/40)
- PEMCh – Palustrine, emergent, seasonally flooded, diked/impounded (between 150th and 158th – south of U.S. 24/40, 174th and 178th – south of U.S. 24/40, 198th and 206th – north of U.S. 24/40, 218th and 222nd – north of U.S. 24/40)
- PABF – Palustrine, aquatic bed, semipermanently flooded (between 158th and 166th – north of U.S. 24/40)
- PABFx – Palustrine, aquatic bed, semipermanently flooded, excavated (between 158th and 166th – north of U.S. 24/40)
- PEMC – Palustrine, emergent, seasonally flooded (between 158th and 166th – south of U.S. 24/40 and U.S. 24/40 and 224th – west of U.S. 24/40)
- PEMCx – Palustrine, emergent, seasonally flooded, excavated (between 150th and 158th – north of U.S. 24/40)

Floodplains

The US 24/40 Corridor contains 1,318 acres of land classified as 100-year floodplain. **Figure 6-3** identifies the floodplain lands in the Corridor, which are primarily located along Stranger Creek and its tributaries. Encroachments into the 100-year floodplain were investigated based on information obtained from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRM) for Leavenworth County.

Example Floodplain



Executive Order 11988, "Floodplain Management," is the basis for identifying floodplain impacts associated with the construction of improvements located within floodplain boundaries. This order requires federal agencies to avoid actions, to the extent practicable, which will result in the location of facilities in floodplains and/or affect floodplain values. Development associated with this project which lies within floodplains should be planned and located so as not to interfere with stream flow or create a flood hazard.

The FIRM map shows Zone 'A' floodplains along both Wolf Creek and Stranger Creek, as well as along the Stranger Creek tributaries of Hog Creek and Tonganoxie Creek. Zone 'A' areas are susceptible to a 1% chance of being inundated in any given year, i.e. the "100-Year Floodplain". A Zone 'A' designation on the FIRM map is not based upon a detailed flood study and therefore no Base Flood Elevations (BFE's) are provided on the FIRM panel. All areas noted as Zone 'A' are located within the floodplain boundaries, which means development is prohibited under Executive Order 11988.



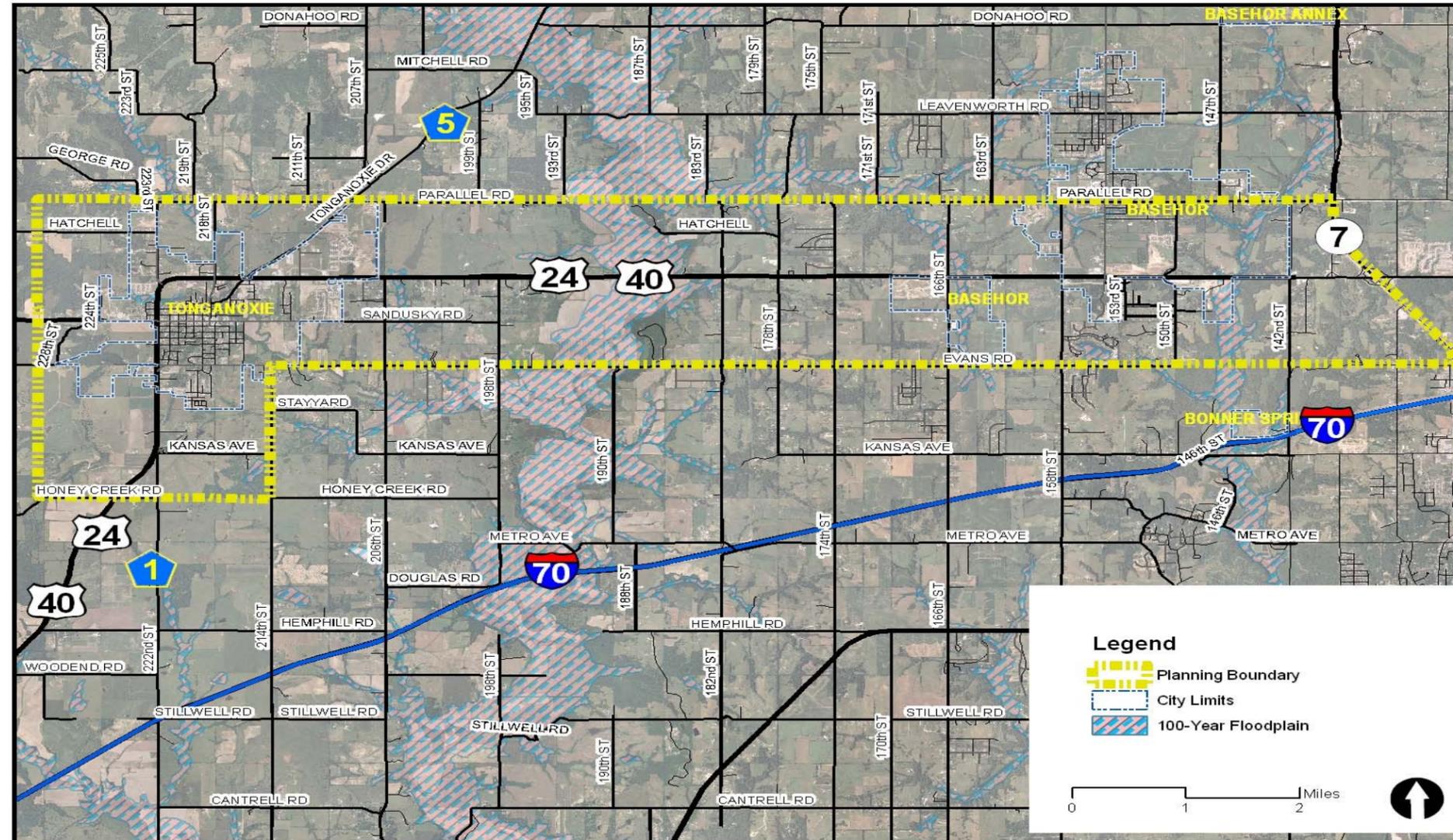
Example Floodplain

Since Zone 'A' floodplains are not based on detailed flood study, a more precise delineation of the floodplain boundary may be established by a detailed hydrologic and hydraulic study of the area. It is possible to expand the developable area through the use of fill within the floodplain (excluding the floodway). Both of these processes would require a formal revision of the FIRM maps through FEMA.

Impacts to the base floodplain should be minimized throughout the development process to insure that any increase of floodwater elevation is less than 0.3048 meter (1.0-foot) and that no rise will occur in the regulatory floodway, in accordance with FEMA standards. Coordination with FEMA and local authorities as appropriate should occur early in the development process to comply with all regulatory and permit requirements.

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Figure 6-3: Floodplain



Source: BWR & Leavenworth County GIS

Water Quality

There are various surface water resources in the corridor that may be affected by development, with a total of 247-acres of open waters located in the corridor. The project corridor has the potential for 22 stream crossings. A total of 295,680 lineal feet (56 miles) of tributary exist within the project corridor.

Storm water and water quality in particular are greatly impacted by development. Implementing an overall storm water management system approach at the countywide level can address the key adverse impacts of storm water runoff by reducing “*quantity*” of storm water runoff and increase the resulting water “*quality*”. Possible storm water management and treatment practices for the corridor are provided in **Section 8, Future Land Use and Development Regulations**.

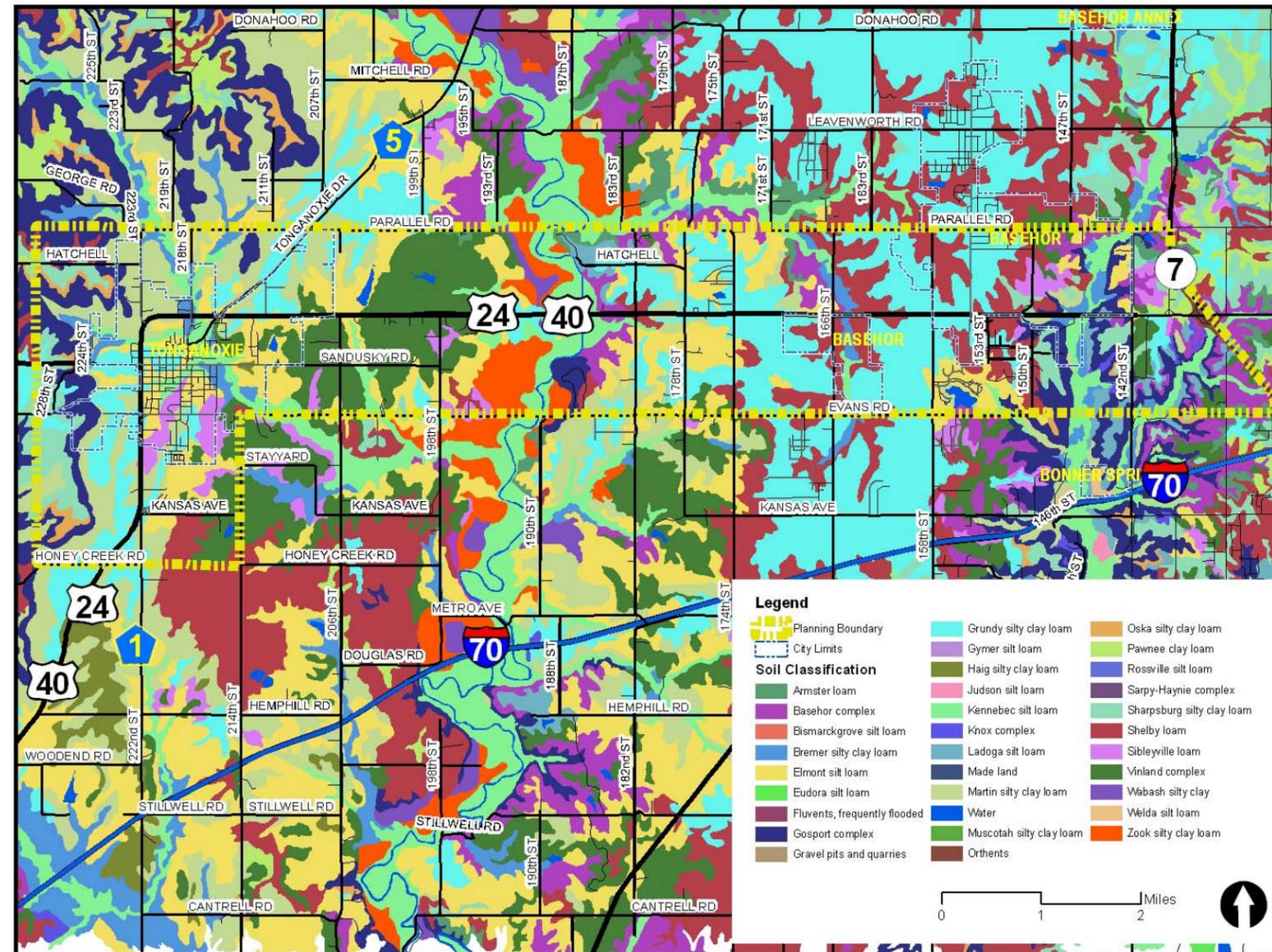
Geology and Soils

Figure 6-4 identifies soil classifications for the corridor using information provided by Leavenworth County, Kansas Soil Survey, and the U.S. Department of Agriculture Natural Resource Conservation Service (NRCS) soils maps. The predominant soil units within the corridor include:

- Kennebec silt loam, occasionally flooded
- Basehor complex, 5 to 30 percent slopes
- Elmont silt loam, 3 to 7 percent slopes
- Grundy silty clay loam, 1 to 3 percent slopes
- Grundy silty clay loam, 3 to 7 percent slopes
- Vinland-Sibleyville complex, 5 to 12 percent slopes
- Shelby-Pawnee complex, 3 to 7 percent slopes
- Martin silty clay loam, 3 to 7 percent slopes
- Sibleyville loam, 3 to 7 percent slopes

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Figure 6-4: Soil Classification



Source: Department of Agriculture Natural Resource Conservation Service (NRCS), Data Access and Support Center (DASC), BWR.

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The Leavenworth County soil survey classifies all of the soil types within the corridor as “somewhat” to “very limited” for construction of:

- small commercial buildings
- local road and streets
- dwellings with basements
- dwellings without basements
- septic tank absorption fields

Development and construction limitations exist throughout the corridor due to the low strength, frost action, shrink-swell action, depth to saturated zone, flooding and slope characteristics of the soil. While these limitations can be overcome during development through special design or installation procedures, a higher level of maintenance can generally be expected over the long term.

Threatened and Endangered Species and Critical Habitat

The US Fish and Wildlife Service (USFWS) and the Kansas Department of Wildlife and Parks (KDWP) were contacted regarding threatened and endangered species and critical habitats in the corridor area. Information was collected on a county basis and obtained through phone conversations and website research with both the USFWS and KDWP.

Based on USFWS information there are six federally-listed faunal species (two threatened species and four endangered species) or designated critical habitat within the corridor. **The two federally-listed threatened species include:**

- Bald Eagle (*Haliaeetus leucocephalus*)
- Piping Plover (*Charadrius melodus*)

The four federally-listed endangered species include:

- American Burying Beetle (*Nicrophorus americanus*)
- Eskimo Curlew (*Numenius borealis*)
- Pallid Sturgeon (*Scaphirhynchus albus*)
- Least Tern (*Sterna antillarum*)

The KDWP information indicated that there are eleven threatened species and seven endangered species listed for Leavenworth County, Kansas. **The state-listed threatened species include:**

- Bald Eagle (*Haliaeetus leucocephalus*)
- Chestnut Lamprey (*Ichthyomyzon castaneus*)
- Eastern Spotted Skunk (*Spilogale putorius*)
- Flathead Chub (*Platygobio gracilis*)
- Piping Plover (*Charadrius melodus*)
- Redbelly Snake (*Storeria occipitomaculata*)
- Silverband Shiner (*Notropis shumardi*)

- Smooth Earth Snake (*Virginia valeriae*)
- Snowy Plover (*Charadrius alexandrinus*)
- Sturgeon Chub (*Macrhybopsis gelida*)
- Western Silvery Minnow (*Hybognathus argyritis*)

The state-listed endangered species include:

- American Burying Beetle (*Nicrophorus americanus*)
- Eskimo Curlew (*Numenius borealis*)
- Least Tern (*Sterna antillarum*)
- Pallid Sturgeon (*Scaphirhynchus albus*)
- Peregrine Falcon (*Falco peregrinus*)
- Sicklefin Chub (*Macrhybopsis meeki*)
- Silver Chub (*Macrhybopsis storeriana*)

According to KDWP, the state of Kansas has twelve state-listed critical habitats within Leavenworth County for the threatened and endangered species. **The state-listed critical habitats include the following species:**

- Bald Eagle (*Haliaeetus leucocephalus*)
- Chestnut Lamprey (*Ichthyomyzon castaneus*)
- Flathead Chub (*Platygobio gracilis*)
- Least Tern (*Sterna antillarum*)
- Pallid Sturgeon (*Scaphirhynchus albus*)
- Piping Plover (*Charadrius melodus*)
- Redbelly Snake (*Storeria occipitomaculata*)
- Sicklefin Chub (*Macrhybopsis meeki*)
- Silverband Shiner (*Notropis shumardi*)
- Smooth Earth Snake (*Virginia valeriae*)
- Sturgeon Chub (*Macrhybopsis gelida*)
- Western Silvery Minnow (*Hybognathus argyritis*)

Many of the threatened and endangered species listed have critical habitats within the stream and riparian forest areas in Leavenworth County. Future updates to the Comprehensive Plans and development regulations for Leavenworth County and the cities of Basehor and Tonganoxie should include policies and standards to preserve these stream corridors and natural resources. In addition, future development will require continued coordination with KDWP and the USFWS.

Vegetation

Figure 6-5 identifies the various types of vegetation located in the US 24/40 Corridor based on data provided by the Natural Resources Inventory prepared by the Mid-America Regional Council. Vegetation classifications identified within the inventory included:

- Deciduous forest
- Mixed evergreen deciduous
- Deciduous woodland and immature forest
- Grassland
- Lowland hardwood forest and woodland
- Marsh and wet herbaceous vegetation
- Urban forest

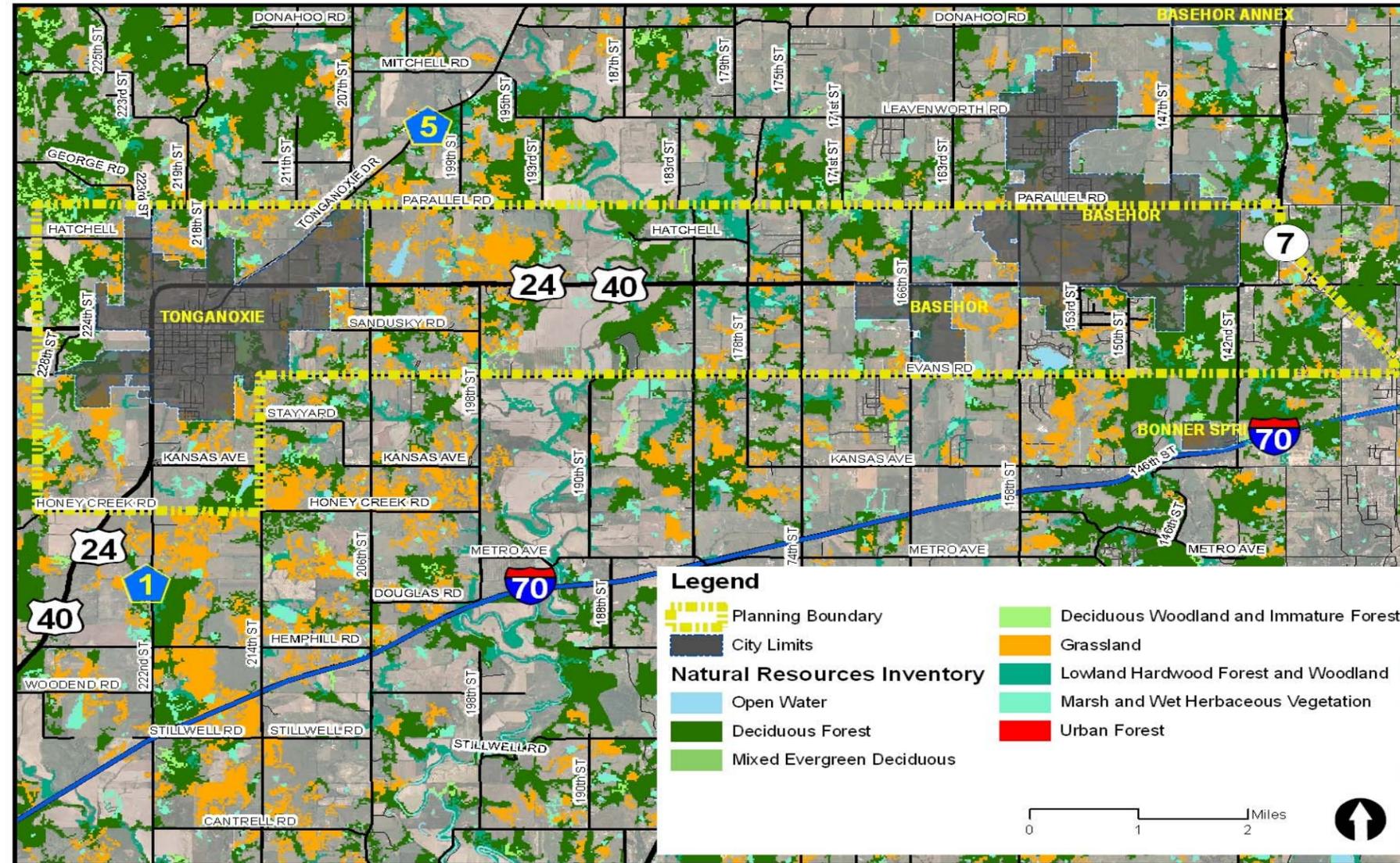


The most predominant vegetation classes in the Corridor are deciduous forest, grasslands and lowland hardwood forest and woodland. The deciduous forest areas are typically located near the riparian corridors of streams. Deciduous forest exists along Stranger Creek, Wolf Creek and the tributaries associated with each stream. The predominant grasslands areas of the project corridor are located between 206th and 193rd Streets east of Tonganoxie and between 163rd and 153rd Streets south and east of Basehor. Lowland hardwood forest and woodland areas are scattered throughout the corridor area. Often areas of lowland hardwood forest and woodland are located near creek tributaries with small pockets of marsh and wet herbaceous vegetation clustered within the forest/woodland areas.

Preservation of these significant resources should be addressed in the various jurisdictions through policies related to future land use, and through development regulations.

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Figure 6-5: Natural Resources Inventory (MARC)



Source: Mid-America Regional Council (MARC), BWR

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Cultural Resources

Historic properties are protected under the National Historic Preservation Act (NHPA), codified under 16 U.S.C 470. The intent of the NHPA is to ensure federal leadership in the preservation of prehistoric and historic resources. Under the NHPA, federal agencies are to integrate historic preservation into all activities that directly or indirectly involve land use decisions.

Information was obtained from both the Kansas State Historical Society and National Register of Historical Places website regarding the identification and evaluation of historic properties within the project corridor. Also, a letter was submitted to the Kansas Historical Preservation Office regarding information about state and national registered historical sites within the corridor area.

There are four national registered historical sites within the “vicinity” of the City of Tonganoxie. For the general protection of these sites, the specific addresses are listed as restricted. These sites include two agricultural fields and two archeological sites. The agricultural fields include:

- Scott Site
- Evans Site (14LV1079)

The archeological sites include:

- Caenen Site (14LV1083)
- Paul Site (14LV1043)

The Tonganoxie Historical Society is located at 201 West Washington Street and owns ten acres of land with a museum consisting of: an old milk house, a renovated barn, the Honey Valley one room school house, and the Reno Methodist Church. None of these structures are listed on the state or national historical registers.

At the time of this study, the Basehor Historical Museum Society has efforts for the construction of a 29,000 square foot facility to be built at the southwest corner of 158th and Parallel.

Due to the existing/known agricultural and archeological sites in the vicinity of Tonganoxie, any future development would require close coordination and regulatory compliance with Section 106 of the NHPA. Unavoidable effects would require mitigation through strict adherence to the laws and regulations protecting NHPA properties and management practices included in standards set forth by the Federal Highway Administration (FHWA), the Advisory Council on Historic Preservation and the Kansas State Historical Society.

Knowledge of the actual site locations are restricted in an effort to protect them from vandalism. However, this also makes it difficult for the cities and the county to protect the historical and archeological resources from development damages. City and county staff should ascertain the locations of these sites from the Kansas State Historical Society to be aware of possible encroachment onto the sites by proposed developments.