FINAL ENVIRONMENTAL ASSESSMENT

FRANKLIN BRANCH STREAM BANK STABILIZATION

BLOOMFIELD TOWNSHIP

OAKLAND COUNTY, MICHIGAN

FEMA DR-1346-MI

HMGP APPLICATION A1346.13

Prepared for

Federal Emergency Management Agency - Region V
536 South Clark Street
6th Floor
Chicago, Illinois 60605

and

Federal Emergency Management Agency
500 C Street, SW
Washington, D.C. 20472

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URS Group, Inc.
200 Orchard Ridge Drive, Suite 101
Gaithersburg, Maryland 20878
15292488.10013

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List of Acronyms

APE	Area of Potential Effect
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	Carbon Monoxide
CSO	Combined Sewer Overflow
CWA	Clean Water Act
dB	Decibels
DNL	Day/Night Average Sound Level
DWSD	Detroit Water and Sewer Department
EA	Environmental Assessment
EDR	Environmental Data Resources
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FBFM	Flood Boundary and Floodway Map
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
H&H	Hydrology & Hydraulic
HMGP	Hazard Mitigation Grant Program
HRC	Hubbell, Roth & Clark, Inc.
LF	Linear Feet
LOMR	Letter of Map Revision
LWMD	Land and Water Management Division
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
mg/L	Milligrams per Liter
NAAQS	National Ambient Air Quality Standards
NCA	Noise Control Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act

NO_2	Nitrogen Oxide
NRCS	Natural Resources Conservation Service
NREPA	Natural Resources and Environmental Protection Act
NRHP	National Register of Historic Places
O_3	Ozone
OAQPS	EPA Office of Air Quality Planning and Standards
OCDCO	Oakland County Drain Commissioner's Office
OSDS	On-site Sewage Disposal System
OSHA	Occupational Safety and Health Administration
Pb	Lead
P.L.	Public Law
PM_{10}	Particulate Matter (10 microns or less)
RCOC	Road Commission for Oakland County
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
SESC	Soil Erosion and Sedimentation Control
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SWA	Solid Waste Act
TSCA	Toxic Substances Control Act
URS	URS Group, Inc.
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

1.1 PROJECT AUTHORITY

Severe storms and flooding occurred on September 10 and 11, 2000 in the State of Michigan, leading the Federal Emergency Management Agency (FEMA) to issue a Federal disaster declaration, DR-1346-MI, on October 17, 2000. Under this declaration, Oakland and Wayne Counties became eligible for Individual Assistance, and all counties within the state became eligible for funding through the Hazard Mitigation Grant Program (HMGP).

Bloomfield Township, Oakland County, Michigan, has applied for HMGP Section 404 funding under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Grant funds are provided by FEMA under this program for disaster-related mitigation projects. In accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA [40 Code of Federal Regulations (CFR) Parts 1500 through 1508], and FEMA regulations for NEPA compliance (44 CFR Part 10), FEMA must fully understand and consider the environmental consequences of actions proposed for Federal funding. The purpose of this Environmental Assessment (EA) is to meet FEMA's responsibilities under NEPA and determine whether to prepare a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS) for the proposed project.

1.2 PROJECT LOCATION

The proposed project is located in southeastern Michigan in Oakland County. Oakland County is located inland and within an hour of several of Michigan's major metropolitan areas, including Detroit, Flint, and Ann Arbor (Figure 1). Specifically, the project is located in the southern portion of Oakland County, in Bloomfield Township along 14 Mile Road (Figures 2a and 2b).

1.3 PURPOSE AND NEED

The purpose of the proposed project presented in this EA is to reduce or prevent damages to residential structures located along the Franklin Branch of the Rouge River in Bloomfield Township. Specifically, the project would address the properties located along the north side of Fourteen Mile Road between Inkster Road and Franklin Court, as well as homes located along the north side of Franklin Court and the south side of Pickering Court. The proposed project would help minimize the economic loss associated with structural damage of private property as a result of frequent flooding events and severe erosion. It would also minimize potential damages to utilities and address downstream sedimentation issues.

The Franklin Branch of the Rouge River originates in West Bloomfield Township and traverses Farmington Hills and Southfield Township before entering the southwest section of Bloomfield Township and exiting through the Village of Franklin. Historically, Franklin Branch was an intermittent stream that provided recreational value and flood relief to Bloomfield Township. Increases in flow rates and frequency of bankfull flows in the past few years have consequently increased erosion, sedimentation, and flooding, with resultant threats to public health, safety, and property. Specifically, Franklin Branch has experienced areas of extensive streambed degradation (i.e., downcutting) and channel widening. Channel incision has disconnected natural floodplain and stormwater storage areas and severe bank erosion has created logjams, slope

failures, loss of private property, and threats to septic fields and sanitary sewer lines (see Photographs 1-11).

The CEQ has developed regulations for implementing NEPA. These Federal regulations, set forth in 40 CFR Parts 1500-1508, require an evaluation of alternatives and a discussion of the potential environmental impacts of a proposed Federal action as a part of the EA process. The FEMA regulations, which establish FEMA's process for implementing NEPA, are set forth in 44 CFR, Subpart 10. This EA was prepared in accordance with FEMA's regulations as required under NEPA. As part of this NEPA review, the requirements of other environmental laws and executive orders are addressed.

2.1 ALTERNATIVES CONSIDERED AND DISMISSED

The use of parallel piping was considered as an alternative. Parallel piping is a stream protection measure that utilizes a storm drainage system installed parallel to the natural stream for the purpose of conveying erosive flows past sensitive or highly erodible stream reaches to more stable downstream reaches. With this alternative, streambank instability and subsequent slope failure would likely continue to occur at the proposed project site, potentially affecting any parallel piping installed. Thus, this alternative was dismissed because it does not satisfy the Purpose and Need of the project.

The use of off-line detention and stream impoundment to reduce erosive stream flows was examined in the preliminary stages of developing project alternatives. After evaluating the potential impacts of this alternative, it was concluded that stream impoundment would present a barrier to aquatic species migration and be difficult to maintain with the current high sediment loads in Franklin Branch. The floodplain adjacent to Franklin Branch consists of privately owned land. Purchasing or obtaining permission to utilize this land would likely substantially delay the urgent project timeline. Furthermore, if measures from this alternative are installed, streambank instability and slope failure would still exist at the project site. Thus, this alternative was dismissed because it does not satisfy the Purpose and Need.

2.2 ALTERNATIVE 1 – NO ACTION ALTERNATIVE

Under the No Action Alternative, no efforts would be made to stabilize the streambanks of Franklin Branch in Bloomfield Township. Flooding, erosion, and increased sedimentation would continue to occur, negatively impacting residences, septic fields and utilities.

2.3 ALTERNATIVE 2 –STREAMBANK STABILIZATION UTILIZING CHANNEL AND UPPER SLOPE STABILIZATION, BANK ARMORING, AND FLOODPLAIN TERRACING TECHNIQUES (PROPOSED ACTION)

According to Hubbell, Roth & Clark, Inc. (HRC), the engineering firm that has designed the Proposed Action, the design associated with this Alternative is 30 percent complete at the time of this Draft EA. The selection of specific construction materials (i.e., brand name of geotextile, etc.) and sizing of particular project components has not been determined and project boundaries for specific improvements have not been defined. Completed phases of design include the streambank stabilization methodology (the types of controls that would be installed to stabilize the banks). These controls can be grouped into five classes briefly discussed below. A conceptual distribution of these improvements along Franklin Branch is included in Appendix F. Construction of the Proposed Action is anticipated to take approximately one year.

Controls

Channel Stabilization: refers to in-water controls designed to stabilize the streambed. These controls are modeled after natural features typically found in streams, serve to reduce stream flow velocity and, in some cases, armor the streambed to reduce incising. The applicant is proposing three types of channel stabilization:

1) Artificial Riffle (see Figure 3) - a 1-foot deep trench is excavated across the channel. A wall, approximately 1-foot high and constructed of natural or existing 18-inch to 36-inch diameter fieldstone, is placed directly behind the trench. Smaller cobbles ranging from 4 inches to 10 inches in diameter are placed into the channel and on the banks behind the wall in a V-shape, which tapers downstream. This structure serves primarily to reduce stream flow velocity. Heavy machinery required to complete this work includes small dump trucks to import the material, and backhoes or bobcat tractors to place the material in the channel. When possible, the material would be placed by hand.

2) Boulder Cross Vane (see Figure 3) – a boulder cross vane, which is modeled on a natural in-stream pool, is typically installed on the outer bend of a stream and is constructed by placing 18-inch to 36-inch diameter boulders across the bottom of the channel in a U-shaped wall opening upstream. A pool is excavated in the channel upstream of the wall. This structure reduces stream flow velocity and armors the streambed. Heavy machinery required to complete this work includes dump trucks to import the material, and backhoes to place the material in the channel.

3) J-Hook Vane (see Figure 4) – similar to a boulder cross vane, a J-hook vane is typically installed on the outer bend of a stream. Boulders between 18 inches and 36 inches in diameter are placed in the bottom of the channel in a J-shape downstream of an excavated scour pool. The wall created by the boulders does not traverse the stream entirely, but serves to reduce stream flow velocity and divert stream flow away from the outer bank of the stream in an eddy-effect. Heavy machinery required to complete this work includes dump trucks to import the material, and backhoes to place the material in the channel.

Bank Armoring: refers to the placement of materials onto streambanks that are less susceptible to erosion than the streambank itself. The applicant is proposing six types of bank armoring:

1) Stone/Boulder Armoring (see Figure 4) – large stones and boulders (>18 inches in diameter) are piled from the bottom of the channel to the top of the bank. Heavy machinery required to complete this work includes dump trucks to import the material, and backhoes to place the material in the channel.

2) Steel Sheeting – steel pilings are driven into the ground at regular intervals parallel to the stream channel. Steel sheeting is installed between the pilings from below grade to several feet above grade. The exposed sheeting is back-filled at the top of the bank with locally excavated material and planted with native vegetation. Stone/boulder armoring would be placed at the toe of the slope on the stream side of the sheeting to reduce the potential for erosion to occur along the structure. Heavy machinery required to complete this work includes large trucks and a crane fitted with a pile driver.

3) Geotextile Cells and Grids – geotextile fabrics are placed on an excavated streambank slope, covered with compost, and vegetated. The fabric can be placed directly on the slope (grid), or configured into cells (approximately 2-3 feet deep by 1-2 feet high along the length) that would be filled with soil and placed in the channel or on the slopes of the stream. Heavy machinery required to complete this work includes a backhoe or bobcat tractor. Much of the installation would be done by hand.

4) Rootwad Revetment (see figure 5) – Rootwads of easily sprouting, water-tolerant, woody species are installed into the streambank and anchored with rocks and logs. The rootwads establish and grow, creating a natural streambank armor comprised of woody stems secured by roots. A bobcat tractor and hand labor is required to install the revetment.

5) Brush Mattress (see figure 5) – shallow trenches are excavated along the slope of the stream channel above the 10-year flood elevation. The trenches run parallel to the channel and are spaced approximately 4 feet to 6 feet apart. The trenches are stocked with live stakes of dogwood and willow and back-filled with suitable material. On the stream side of the trenches, the slope is treated with a geotextile fabric anchored into the streambed with stones and cobbles. A bobcat tractor and hand labor are required to install the mattress.

6) Establishment of Point Bar Vegetation – recently deposited sediments have created point bars in the channel of Franklin Branch. Point bars that are currently bare of vegetation would be seeded and staked with native species. This would require hand labor only.

Floodplain Terracing: Floodplain terracing involves excavating and grading parts of the stream channel and floodplain to restore natural flood elevations that have been disturbed due to channel incision, thus increasing floodplain volume. Figure 6 shows representative cross-sections of the proposed excavation. Exposed soil is covered with a biodegradable fabric made from coconut husk (coir blanket), and seeded with a mixture of native woody and herbaceous species. Although general sites for terracing have been considered in the project design, specific excavation requirements have not been finalized. For the purposes of this Draft EA, it is assumed that one streambank along the entire length of the project (Figures 2a and 2b) would be affected. In some cases, the land proposed for terracing is privately owned; easements from landowners would be required. Heavy machinery required to complete this work includes small dump trucks, moderately sized excavation equipment, a backhoe, and a bobcat tractor.

Upper Slope Stabilization: refers to the stabilization of the slopes on either side of the floodplain of Franklin Branch. This would be done by building Geoweb® gravity walls or comparable methods (Figure 7) at the bottom of failing slopes, and back filling with locally excavated soils. The walls would range from approximately 4 feet to 8 feet in height, and would be topped with smaller geocells (see above) and compost, and planted or seeded with native vegetation. When necessary, the base of the gravity wall would be armored. It is anticipated that all fill material would be generated on-site as a result of the floodplain terracing. Heavy machinery required to complete this work includes dump trucks, a backhoe, hand soil compactors, and perhaps a conveyor to lift material into the walls. For certain parts of the project, gravity walls would also be used to stabilize streambanks.

Temporary Road Construction: refers to the creation of access roads from pre-existing staging areas to the project sites. The size of road constructed would be dependent on the size of the equipment necessary to locate on site. Actions that can be performed with hand labor and bobcat tractor would require small access roads (approximately 8 feet in width). Actions that require the import of substantial amounts of material would require larger access roads (approximately 15 feet in width). Access roads would be constructed by compacting the soil to an appropriate density based on the type of vehicles it is anticipated to serve. No soils would be compacted

greater than 4.2 pounds per square inch. Temporary roads would be removed after construction activities are concluded. Road surface materials would be comprised of timber mats and mulch, and soil erosion controls would be implemented during road construction and removal. Heavy machinery required to complete this work includes trucks to import material and vibratory rollers to compact soils.

Action Areas

The Proposed Action would use the methods above to stabilize the streambanks of Franklin Branch in five sections of the stream that are the most problematic. These five sections (see Appendix F), and the activities that are proposed, are described below:

Area 1A: Two failing sections of the western streambank slope would be stabilized by installing 10-foot to 12-foot high gravity walls adjacent to the stream channel. The walls would be topped with geocells and vegetated with brush mattresses. Artificial riffles and rootwad revetments would be installed in the channel to protect lower slopes from erosion.

A sanitary sewer line parallel to the stream would be stabilized by armoring the adjacent streambed with stones and boulders. The channel would be stabilized with an artificial riffle. The linear extent of this improvement is approximately 100 feet.

A floodplain terrace, approximately 500 linear feet (LF) in length, would be excavated along the western side of the stream. Multiple channel stabilization controls would be installed along the length of the stream in this section to dissipate stream flow velocity. All candidate point bars would be vegetated.

Construction of temporary roadways in the floodplain would be necessary along the length of the improvements. A temporary road would also be constructed from the staging area in an adjacent parking lot, approximately 75 feet to the construction activities.

Area 1B: A failing section of the western streambank slope would be stabilized by installing a 5-foot high gravity wall adjacent to the stream channel. The walls would be topped with geocells and vegetated with brush mattresses. A floodplain terrace approximately 300 LF in length would be excavated along the eastern side of the stream. Multiple channel stabilization controls would be installed along the length of the stream in this section to dissipate stream flow velocity. Construction of temporary roadways in the floodplain would be necessary along the length of the improvements. Machinery would access the site from Area 1A.

Area 2: A failing northern streambank adjacent to a pond would be stabilized by installing approximately 200 LF of steel sheeting and/or stone/boulder armoring. Artificial riffles, boulder cross vanes, or J-hook vanes would be put in place to protect the lower channel from erosion. Approximately 200 LF of sanitary sewer line on the northern bank would also be stabilized using stone/boulder armoring. Multiple artificial riffles, boulder cross vanes, J-hook vanes, and rootwad revetments would be installed along this length of stream. Floodplain terraces approximately 400 feet in length would be excavated along the northern bank. Area 2 would be accessible for construction activities through developed private property on Pickering Road. However, construction of temporary roadways in the floodplain would be necessary along the length of the improvements and an 80-foot temporary access road would also be required.

Area 3: This section of Franklin Branch contains five failing sections of streambank and upper slope that are impacting 14 Mile Road and a 72-inch Detroit Water and Sewer Department (DWSD) water main at the top of the slope. To stabilize the slope, five gravity wall systems between 20 feet and 90 feet in length would be installed on the upper and lower slopes. One system would contain a series of five walls terraced one on top of the other, with a cumulative wall height exceeding 60 feet. The walls would be topped with geocells and vegetated with brush mattresses. The lower slopes would be stabilized with geogrids and rootwad revetments. Channel stabilization would include multiple boulder cross vanes and J-hook vanes. The floodplain would be terraced for approximately 600 LF and geogrids and rootwad revetments would be used to armor the streambank. All candidate point bars would be vegetated. In addition to constructing temporary access roads along the length of the project in the floodplain, temporary access to the project site would consist of three different possible routes: a) along the channel from either upstream or downstream; b) through a newly constructed cul-de-sac at the end of Hiddenbrook; or c) through a temporary access easement in the Hiddenbrook development, which is currently being built. If construction access occurs at the end of Hiddenbrook, a 15-foot wide by 200-foot long temporary construction access through a forested floodplain area would be required.

Area 4: This area may require relocation of 100 feet of channel to the historical bed location to prevent further slope failure on the southern bank and reduce the threat to property located at 27000 14 Mile Road. Stabilization measures include installing 4-foot high gravity walls topped with geocells and vegetated with brush mattresses. Channel stabilization along approximately 150-feet of streambed would include multiple artificial riffles, boulder cross vanes, and J-hook vanes. All candidate point bars would be vegetated and a floodplain terrace up to 400-feet in length would be excavated. Construction access in Area 4 consists of three different possible routes: a) along the channel downstream from Area 3; b) along the channel upstream via the property located at 27020 14 Mile Road; or c) from the north through Ledgerock Court. The final option would depend on whether temporary access easements are obtainable through that area. If Ledgerock Court were utilized, a 15-foot wide by 300-foot long temporary construction access easement through a forested floodplain would be required.

2.4 ALTERNATIVE 3 – STREAMBANK STABILIZATION UTILIZING STEEL SHEETING AND CHANNEL STABILIZATION TECHNIQUES

Alternative 3 proposes the use of piles and steel sheeting to stabilize critical slope and streambank areas along Franklin Branch. This method consists of using a hydroexcavator to dig trenches adjacent to the slopes to be stabilized. The trenches are approximately 2 feet wide and 2 feet to 6 feet deep. Piles (steel beams) are driven into the ground in the trench to a depth several feet below the excavated portion. Steel sheeting is placed between the piles into the trench from the bottom of the excavation to several feet above grade. The structure is back-filled with appropriate fill material and vegetated with brush mattresses. In some cases, stone/boulder armoring would be used to stabilize the toe of the sheeting. As with the Proposed Action, channel stabilization measures such as artificial riffles, boulder cross vanes, and J-hook vanes would be constructed in the waters of Franklin Branch at undetermined intervals. Unlike the Proposed Action, viable construction access routes would be limited due to the size of the equipment required to install the steel sheeting. Consequently, the streambed and the adjacent floodplain may have to be used as construction entrances. Heavy equipment such as a crane, a pile-driver, large trucks to import material, a backhoe, and a bobcat tractor would be required to install the steel sheeting.

3.1 PHYSICAL ENVIRONMENT

3.1.1 Geology, Seismicity and Soils

The southeastern corner of Oakland County consists of a nearly level glacial lake plain, the remaining portions of the county consist of two gently undulating to very hilly end moraine bands that are divided by three major outwash plains. The moraines consist of Saginaw and Huron-Erie systems, and the outwash plains are comprised of the Commerce, Drayton, and Oxford plains. The aforementioned landforms have a northeast to southwest orientation (U.S. Department of Agriculture [USDA], 1982). The surficial geology of the Franklin Branch is likewise comprised of glacial deposits, specifically two end moraines deposits and glacial outwash. The stream channels that presently occur in the project site were developed from water that ran through the outer moraine (Hubbell et al., 2002).

As shown in Figure 8, four soil associations encompass the project area: Fox sandy loam, Sloan-Marlette association, Arkport loamy fine sand, and Urban land-Marlette complex (USDA, 1982).

Fox sandy loams: These soils are well-drained soils that typically occur on side slopes, knolls, and ridges and are often dissected by drainage ways. This soil series consists of a dark grayish brown sandy loam surface layer underlain by brown gravelly sandy clay loam and dark yellowish brown gravelly clay loam.

Sloan-Marlette association: This association is comprised of nearly level, Sloan well-drained soils on floodplains with moderately sloping to steep Marlette soils on adjacent side slopes. Sloan soils consist of a dark brown silt loam surface layer over grayish brown silt loam subsoils. Marlette soils typically contain dark grayish brown loam surface soils and yellowish brown clay loam and pale brown loam subsoils.

Arkport loamy fine sands: These are well-drained soils that typically occur on knolls and ridgetops that are dissected by shallow drainage ways. The soils series contains dark grayish brown loamy fine sand surface soils and yellowish brown loamy fine sand subsoils.

Urban land-Marlette complex: This complex consists of a matrix of urban land and moderately well-drained Marlette soils on knolls, ridges, and side slopes. This complex contains 20-30 percent Marlette soils and 40-75 percent Urban land (i.e., streets, sidewalks, parking lots, houses, and other structures). The Marlette series has dark grayish brown sandy loam surface soils and dark yellowish brown clay loam subsoils. The Fox sandy loams, Sloan-Marlette association, and Arkport loamy fine sands are typically associated with woodlands and rarely used for croplands (USDA, 1982).

Prime and Unique Farmland: The Farmland Protection Policy Act was enacted in 1981 (Public Law 98-98) to minimize the unnecessary conversion of farmland to non-agricultural uses as a result of Federal actions. Programs administered by Federal agencies must be compatible with State and local farmland protection policies and programs. The Natural Resources Conservation Service (NRCS) is responsible for protecting significant agricultural lands, prime farmland, from irreversible conversions that result in the loss of an essential food or environmental resource. Soils underlying the proposed project site are not classified as prime farmland soils (USDA, 1982). Therefore, the project is in compliance with the Farmland Protection Policy Act.

Alternative 1 – No Action Alternative

Impacts to geology, soils, and prime farmland would not occur under this alternative, as construction is not proposed. Streambank and floodplain soils would continue to erode, adversely affecting soils in the project area.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

The Proposed Action would not likely affect the geologic framework of the area, due to the shallow excavations required to stabilize the channel, streambanks, and upper slopes bordering the floodplain of Franklin Branch.

Temporary disturbance to soils along the length of the project would occur during construction activities, increasing potential soil loss due to erosion. However, erosion would be minimized by complying with Part 91, Soil Erosion and Sedimentation Control, of the Natural Resource and Environmental Protection Act of 1994, PA 451, as amended (NREPA) (See Appendix C, HBC-MDEQ, 2002). Under Part 91, stormwater best management practices such as silt fences, hay bales, and seeding and mulching exposed soils shortly after disturbance, would minimize soils lost to erosion.

The construction of access roads and movement of heavy equipment between sites would result in some areas of soil compaction. Many of the proposed methods to stabilize the streambanks would only require light equipment such as bobcat tractors and small trucks to import or move material. Where possible, the applicant would use hand labor to install improvements. If hand labor is not feasible, the applicant would utilize the smallest equipment practicable. Access roads would be constructed primarily of mulch and timber mats, minimizing soil compaction. No long-term effects to soils are anticipated.

The use of sheet piling is being considered for Area 2. Driving piles causes minor seismicity in the soils and geology in the immediate vicinity. While not expected to affect geology or soils, this force could stress nearby water or sewer lines. Appropriate precautions such as shoring or diverting these utilities may be required and would be implemented, as necessary, by the sheet pile contractor in accordance with local construction requirements. In addition, the utilities would be monitored during pile driving activities to ensure that damage does not occur.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Pilings used to create the steel sheeting would be driven into the ground to a depth greater than 5 feet. Although this may require shallow penetration of bedrock directly below the surface, only minor effects such as changing rock into crushed stone and slight heaving or cleaving of adjacent rock are anticipated. Installing piling is anticipated to have no effect to the geology of Franklin Branch or any larger system.

Driving piles causes minor seismicity in the soils and geology in the immediate vicinity. While not expected to affect geology or soils, this force could stress nearby water or sewer lines. Appropriate precautions such as shoring or diverting these utilities may be required and would be implemented, as necessary, by the sheet pile contractor in accordance with local construction

requirements. In addition, the utilities would be monitored during pile driving activities to ensure that damage does not occur.

Soil compaction and temporary disturbance to soils along the length of the project would occur during construction activities, increasing potential soil loss due to erosion. Complying with Part 91, Soil Erosion and Sedimentation Control, of NREPA would minimize soils lost to erosion. The heavier equipment required to install the sheeting would cause soil compaction; however, no long-term effects to soils are anticipated.

3.1.2 Water Resources and Water Quality

The Franklin Branch of the Rouge River is considered part of the Main 1-2 subwatershed of the Rouge River watershed. The Branch originates in West Bloomfield Township and then traverses parts of Farmington Hills, Southfield Township, Bloomfield Township, and the Village of Franklin. Approximately 5,200 linear feet of the Franklin Branch flows through Bloomfield Township.

The Franklin Branch drains close to 20 square miles of the Main 1-2 subwatershed, which has a drainage area of nearly 103 square miles, and accounts for over one-fourth of the total area of the Rouge River watershed, which is roughly 438 square miles (Main 1-2 Subwatershed Management Plan, 2001). The Rouge River empties into the Detroit River, the connecting channel between Lake St. Clair and Lake Erie. Along its way, the river passes through some of the most highly populated and urbanized land in the State. (Main 1-2 Subwatershed Management Plan, 2001). In 1981, the river was designated as an Area of Concern by the International Joint Commission because of its severely degraded and polluted condition and its subsequent impact on the Great Lakes (Washtenaw County Road Commission, 2002). The Environmental protection Agency (EPA) has rated the water as having serious degradation, but a low vulnerability to future degradation (EPA, 2002a). Since the time of its designation, various agencies have begun to address the problems plaguing the Rouge River, and have worked on developing comprehensive watershed management plans.

Surface water quality in the subwatershed was significantly affected in the past by the discharge of untreated sewage from combined sewer overflows (CSOs) in Bloomfield Township and two other neighborhoods. In 1998, three retention facilities were constructed to address this problem and have helped to eliminate the discharge of untreated sewage, lowering elevated bacteria levels. Sanitary sewer overflows, poor sewer line connections, and failing on-site sewage disposal still present problems to the watershed's water quality, raising bacteria levels and creating low dissolved oxygen counts.

Variations in water flow, and accompanying erosion and sediment transport, have also affected the area's surface water quality. The water flow variation has primarily been a result of two factors—an increase in impervious surfaces within the watershed, which has reduced groundwater infiltration rates, and the introduction of municipal water from the Great Lakes, which has raised the average daily flow for the river (Main 1-2 Subwatershed Management Plan, 2001). Data from a U.S. Geological Survey (USGS) water gauge at Evans Ditch at 9 Mile Road, roughly 6 miles from the project site, shows that lowest average daily flows have increased over the years—from 0.4 cubic feet per second (cfs) in the 1960s to 1.1 cfs in recent years. Additionally, there has been an increase in peak flows over 400 cfs, which currently occur up to five times per year (Main 1-2 Subwatershed Management Plan, 2001).

As part of the Clean Water Act, each state is required to prepare a biennial report to be submitted to the EPA, on the quality of its water resources. According to Michigan's 2002 Water Quality Report, Franklin Branch and several tributaries of the Rouge River were found to be in non-attainment, and do not meet Michigan's water quality standards for fishing and swimming purposes. Reasons for non-attainment included poor fish and macroinvertebrate community ratings, the presence of pathogens, and dissolved oxygen exceedances.

While Franklin Branch was found to be in non-attainment, water quality monitoring conducted on the Franklin Branch at 12 Mile Road found that the stream had the highest dissolved oxygen concentrations and the lowest mean dry weather water temperature, and supported one of the healthiest fish communities in the subwatershed. It was also determined that its waters may be capable of supporting brown trout, if flow variations were controlled. However, while these water variables are favorable, measurements of *E. coli*, the presence of which in water indicates fecal contamination and the potential for waterborne disease, were noticeably high. In 1998, roughly 70 percent of the samples at Franklin Branch had levels greater than 1,000 colony-forming units/100 milliliters (the partial body contact limit). These levels were reduced to around 20 percent by 1999, primarily a result of combined sewer retention facilities that were installed in 1998 (Main 1-2 Subwatershed Management Plan, 2001). Additionally, levels of total suspended solids have had several exceedances above the EPA's recommended 25-80 milligrams/Liter (mg/L). Samples taken from the Franklin Branch at 12 Mile Road from May 1994 to September 2000 averaged 72.9 mg/L, with 7 of the 38 samples above 80 mg/L.

A surficial aquifer system, consisting primarily of material deposited from glacial advances, is the primary source of groundwater for the area. In Michigan, ice advances transported fragments of sandstone and crystalline rocks from the north further down south, forming sand and gravel aquifers that are extremely permeable and highly productive aquifers (USGS, 1999). They are exposed at the land surface and readily receive, store, transmit, and discharge water, and not only function as a reservoir for recharge from precipitation, but, in most cases, recharge underlying bedrock aquifers (USGS, 1999). The surficial aquifer system is also hydraulically connected to streams due to its shallow depth, ease of recharge, and short ground-water flow systems, and can provide much of the base flow (fair-weather flow) of streams. This connection is affected by the degree of permeability of the deposits comprising the aquifer (USGS, 1999).

Concerns have been raised in Oakland County over the quality of the area's groundwater. A study begun in 1996 has examined levels of arsenic, nitrate, and chloride in Oakland County's groundwater. Arsenic, nitrate, and chloride were detected in almost all wells examined, and it was found that arsenic and nitrate levels are above the EPA's Maximum Contaminant Levels (MCL) in 1 percent of all the wells surveyed and chloride levels are above the MCL in 5 percent of the area's wells. The Franklin Branch area was determined to be within a quarter-mile of sites with detectable arsenic, nitrate, and chloride concentrations.

Wild and Scenic Rivers Act: The Wild and Scenic Rivers Act was established to preserve the free-flowing state of listed rivers or those under consideration for inclusion due to numerous values, such as scenic, recreational, geologic, or historic. Franklin Branch is not listed as a wild and scenic river (National Park Service, 2002a).

Alternative 1 – No Action Alternative

Under this alternative, downcutting along the Franklin Branch would continue to occur, increasing the sediment load of the stream, further impairing water quality. If left unaddressed, the current sewer pipe that is draining into the Franklin Branch could experience further deterioration, leading to an increase in the levels of raw sewage entering the stream.

Further declines in water quality would be detrimental to the subwatershed, particularly since water quality within Franklin Branch has shown signs of improvement over the past few years and the stream has the potential to support native fish.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

The use of bank protection and stabilization techniques would decrease bank erosion, reducing the subsequent sediment transport downstream. The use of "hard" structures, such as gravity walls, steel sheeting, and stone/boulder armoring would occur in areas of severe erosion where immediate protection to prevent further bank sloping is needed. Permanent structures, such as the armoring, gravity walls, and steel sheeting are necessary in portions of the stream due to the constricted nature of Franklin Branch and the immediate need for effective erosion control, as any natural erosion could threaten homes along 14 Mile Road.

The gravity walls have the added benefit of allowing for the growth of streamside vegetation that would eventually help reduce water velocity and trap sediment. Vegetated geogrids, discussed below, would be installed over the steel sheeting, and would also help further reduce water velocity and sediment levels.

Rigid structures tend to work in opposition of the dynamic nature of streams and hold up for long periods of time, regardless of changing stream conditions (Brown, 2000). However, these structures can often become cracked and damaged as they age (Patterson, 2002). Additionally, the potential exists for the stream to start eroding behind these structures. Should this occur, they may be undercut and collapse into the stream bed, leaving the bank exposed to future erosion (UGA, 2002). Increased downstream erosion and greater flood peaks can occur, as some of the stream roughness and resistance is lost (National Park Service, 2002b). The establishment of vegetation over the hard structures should help increase stream roughness and help reduce water velocity, thereby reducing the potential for downstream erosion.

The vegetated geogrids, while providing some immediate protection, would require an establishment period before they would function to their full potential. Initially, the geogrids could be vulnerable to washout; however, after a period of one to two years, vegetation should establish itself and provide long-term protection against surficial erosion (Gray, 1997). Stems and roots would help filter out sediment, and increase surface roughness, slowing runoff velocity (Gray, 1997). Streamside vegetation also has the added benefit of shading the stream, thereby reducing water temperature and increasing the amount of dissolved oxygen available to stream life. However, there could be a short-term increase in water temperature until the vegetation establishes itself and provides shading (i.e. two to five years). Once established, the geogrids would require less upkeep than the steel sheeting and bank armoring. Overall, the combination of "hard" and "soft" (plant materials) techniques should reduce future erosion problems and help improve water quality.

Erosion may occur during construction, particularly during the placement of the in-stream sediment-basins, J-hooks and riffles, which would disturb the stream bottom. This effect would be temporary in nature, and in the long-term, these installations should serve to reduce overall sediment loads, and in some cases provide fish habitat. In-stream sediment basins at low pool areas below construction sites would also serve to trap sediment runoff that may occur from streambank work. Temporary road construction would also serve as a source of soil erosion. Stormwater best management practices such as silt fencing and hay bales would be employed to reduce sediment inputs that could occur from road construction and movement of equipment.

The Proposed Action is not anticipated to affect groundwater resources, due to the shallow excavations required for the streambank stabilization activities and the floodplain terrace excavation. Adverse impacts to residential wells are not anticipated.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

The use of steel sheeting for erosion control, while providing immediate protection, can cause potential water quality concerns as a result of future stream meandering and undercutting.

Under this alternative, erosional areas that are protected by steel sheeting would not be covered by vegetated geogrids. This would reduce some of the streambank roughness, often provided by trees and grasses within the riparian area, potentially leading to increased downstream erosion or sediment deposition. Additionally, the areas that are void of vegetation would increase stream temperature (due to a loss of vegetation overhang), potentially reducing water quality for aquatic communities.

Erosion may occur during construction, particularly during the placement of the in-stream sediment-basins, J-hooks and riffles, which would disturb the stream bottom. This effect would be temporary in nature, and in the long-term, these installations should serve to reduce overall sediment loads, and in some cases provide fish habitat. In-stream sediment basins at low pool areas below construction sites would also serve to trap sediment runoff that may occur from streambank work. Temporary road construction would also serve as a source of soil erosion. Stormwater best management practices such as silt fencing and hay bales would be employed to reduce inputs that could occur from road construction and movement of equipment.

This alternative is not anticipated to affect groundwater resources, due to the shallow excavations required for the streambank stabilization activities and the floodplain terrace excavation. Adverse impacts to residential wells are not be anticipated.

3.1.3 Floodplain Management (Executive Order 11988)

Floodplains refer to the 100-year floodplains as set by FEMA and are shown on Flood Insurance Rate Maps (FIRMs) of Flood Hazard Boundary Maps (FHBMs) for all communities participating in the National Flood Insurance Program (NFIP).

The 100-year floodplain designates the area inundated during a storm having a one percent chance of occurring in any given year. FEMA also identifies the 500-year floodplain. The 500-year floodplain designates the area inundated during a storm having a 0.2 percent chance of occurring in any given year.

Executive Order (EO) 11988 directs Federal agencies to take actions to minimize occupancy of and modifications to floodplains. Specifically, EO 11988 prohibits FEMA from funding construction in the 100-year floodplain unless there are no practicable alternatives. FEMA's regulations for complying with EO 11988 are promulgated in 44 CFR Part 9. FEMA applies the Eight-Step Planning Process as required by regulation to meet the requirements of EO 11988. This step-by-step analysis is included in Appendix B of this document.

Bloomfield Township participates in the NFIP, and is a member in good standing within the program. As indicated on FIRM Community Panel #260169 0013B, effective November 19, 1987 (Figure 9a), the project area is located within Zones A2 and A5 of the 100-year floodplain for Franklin Branch. The project area is also located within the floodway for Franklin Branch as indicated on FBFM Panel #260169 0013, effective November 19, 1987 (Figure 9b). An aerial flight photograph taken in 2000 suggests that the 100-year floodplain elevation along Franklin Branch is typically below the FIRM levels due to the channel enlargement and incision; however, the FIRM map has not been redrawn. As such, potential impacts to the floodplain were examined based upon the current FIRM map.

Consultation with the Michigan Department of Environmental Quality (MDEQ) was initiated to address any potential floodplain-related concerns.

Alternative 1 – No Action Alternative

Under the No Action Alternative, ongoing streambed erosion and channel incision would result in elevated flood velocities and, over time, change the footprint of the floodplain, resulting in flooding of nearby buildings and roads.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

According to preliminary design plans, portions of the project would occur within the 100-year floodplain, including the floodway, of Franklin Branch. Activities include channel relocation, placement of riffle pool controls and stone and boulder armoring, floodplain terracing, and installation of steel sheeting and vegetated geogrids.

In a letter dated June 19, 2001 (Appendix C), the MDEQ indicated that a Land and Water Management Division (LWMD) permit would be required. MDEQ also requested that a hydraulic analysis be conducted to determine if the project would increase flood stages or shift flood flows onto adjacent property owners. If neither of these scenarios were to occur, the project may be permitted under the State's Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended (NREPA).

In telephone consultation on July 23, 2002, the MDEQ indicated that normal MDEQ permitting procedures include a thorough review of the hydraulic analysis. It was stressed that the final design proposed by HRC would not result in any increase in water surface elevations, floodways, or special flood hazard areas (Vanderlaan, Pers. comm., 2002).

An independent hydrology and hydraulic analysis of the proposed project was conducted. Based on the preliminary results of the analysis, the proposed channel improvements and channel bank

stabilization would not have any adverse impacts to the surrounding floodplain areas along Franklin Branch. The proposed channel clearing, grading, and widening would reduce the channel velocities and prevent scouring and continued channel incision. Because channel velocities would be reduced, the project would be unlikely to increase downstream erosion. The floodway width would remain unchanged. To confirm that no increases in the 100-year floodway water surface elevations would occur, the applicant would be required to obtain a "no-rise certificate" and submit it to FEMA for concurrence. The applicant should apply to FEMA for a Letter of Map Revision (LOMR) for the relocated channel, in accordance with Part 65 of the NFIP regulations.

Area 3 and potentially Area 4 would require that an access route be created through a portion of the floodplain. Impacts to the floodplain would include vegetation removal and potential soil compaction as a result of equipment use. Use of heavy equipment on wet or damp soils can compact soils to the extent that infiltration rates within the floodplain could decrease, increasing runoff and erosion. To mitigate the effects of heavy equipment use and compaction, it is recommended that project activities occur during dry periods (precipitation limited to less than 1 inch in the week prior to equipment use) or when the soil is frozen, and preferably with snow cover. Woodchips or mulch could be used along the trail to further reduce compaction.

In accordance with 44 CFR Part 9.5, any debris that is produced as a result of project activities would not be disposed of within any floodplain zones of the project site. If woodchips or mulch are used to reduce compaction, they would be removed from the project site upon completion of project activities. This alternative would be in compliance with EO 11988.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

This alternative would involve the installation of steel sheeting along the channel of Franklin Branch Portions of the project would occur within the floodplain and floodway of Franklin Branch.. A channel lined with steel sheeting would have higher water velocities than the same channel lined with vegetation. However, during flood events, the volume of water contained in the channel would decrease the effect of the difference of resistance, and impacts to flood velocities may become negligible. Therefore, under Alternative 3, minimal additional adverse effects to increased water velocity are anticipated.

It is anticipated that an MDEQ permit under Part 31 of NREPA would be required, as well as a hydraulic analysis. MDEQ has emphasized that the final design proposed by HRC would not be permitted to result in any increase in water surface elevations, floodways, or special flood hazard areas (Vanderlaan, Pers. comm., 2002). To confirm that no increases in the 100-year floodway water surface elevations would occur, the applicant would be required to obtain a "no-rise certificate" and submit it to FEMA for concurrence. The applicant should apply to FEMA for a LOMR for the relocated channel, in accordance with Part 65 of the NFIP regulations.

The installation of steel sheeting along the banks of Franklin Branch would require the construction of access roads through the floodplain adjacent to Franklin Branch. Use of heavy equipment on wet or damp soils can compact soils to the extent that infiltration rates within the floodplain could decrease, increasing runoff and erosion. To mitigate the effects of heavy equipment use and compaction, it is recommended that project activities occur during dry periods (precipitation limited to less than 1 inch in the week prior to equipment use) or when the

soil is frozen, and preferably with snow cover. Woodchips or mulch could be used along the trail to further reduce compaction.

In accordance with 44 CFR Part 9.5, any debris that is produced as a result of project activities would not be disposed of within any floodplain zones. If woodchips or mulch are used to reduce compaction, they would be removed from the project site upon completion of project activities. This alternative would be in compliance with EO 11988.

3.1.4 Air Quality

The Clean Air Act of 1970, as amended, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards, primary and secondary. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, visibility, and damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six principal pollutants, which are called "criteria" pollutants. They include: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), particulate matter (10 microns or less—PM_{10}), and ozone (O_3).

The EPA has designated specific areas throughout Michigan as NAAQS attainment or non-attainment areas. Non-attainment areas are those that either do not meet, or contribute to ambient air quality in a nearby area that does not meet the national primary or secondary air quality standards for a pollutant. Attainment areas are those that meet the primary or secondary ambient air quality standards for the pollutant. According to the EPA, Oakland County is in attainment for all six priority pollutants (EPA, 2002b).

Alternative 1 – No Action Alternative

No construction would occur under this alternative; therefore, there would be no impacts to air quality.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Implementation of the Proposed Action would involve the use of heavy construction equipment such as backhoes, bobcat tractors, dump trucks, and possibly a crane and pile driver to stabilize the streambanks and slopes along Franklin Branch. Proposed construction duration is approximately one year.

Heavy construction equipment is a source of fugitive dust emissions that may have a substantial temporary effect on local air quality. Emissions during construction can be associated with ground excavation, earth moving, and construction. Dust emissions can vary substantially from day to day depending on the level of activity, the specific operations, and weather. A large portion of the emissions results from equipment traffic during construction.

The quantity of dust emissions from construction operations is directly proportional to the area of land being worked, the level of construction activity, the silt content of the soil, and the speed

and weight of the average vehicle. The quantity of dust emissions is inversely proportional to the soil moisture. Higher soil moisture results in lower dust emissions. Emissions from fuel-burning internal combustion engines (heavy equipment and earthmoving machinery), could temporarily increase the levels of volatile organic compounds (VOCs) and some of the priority pollutants, including CO, NO_2, O_3, and particulate matter.

To mitigate potential air quality impacts from fugitive dust and equipment emissions, vehicle engines would be turned off while not in use, construction roads would be watered when dusty conditions exist, and local residents would be advised to close windows during periods of heavy construction activity to prevent dust from infiltrating their homes.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Air quality impacts under Alternative 3 would be similar to the Proposed Action and would include temporary effects on local air quality from heavy equipment emissions and fugitive dust emissions during construction.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Terrestrial and Aquatic Environment

The proposed project area encompasses a variety of habitats, including the forested floodplain of Franklin Branch, steep slopes adjacent to the floodplain, mowed residential lawns, and the aquatic environment of Franklin Branch itself.

Terrestrial Environment

The project area consists primarily of the forested slopes and floodplain of Franklin Branch. In the floodplain, water-tolerant tree species, such as green ash (*Fraxinus pensylvanica*), silver maple (*Acer saccharinum*), box elder (*Acer negundo*), and crack willow (*Salix fragilis*) dominate the dense and relatively immature forest overstory. In the understory, American elm (*Ulmus americana*) saplings, silky dogwood (*Cornus amomoum*), and blueberry (*Vaccinium sp.*) comprise the majority of stems. Within small gaps of the forested canopy, and in places recently disturbed, the herbaceous layer is dominated by rice-cut grass (*Leersia oryzoides*) and aster. Erosion and sedimentation, uprooted trees, and the presence of large woody debris in some places of the channel of Franklin Branch are all indicators that this habitat floods frequently.

The steep slopes bordering both sides of the floodplain are less densely forested, and tree composition shifts to upland species, including yellow-poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*), hickory (*Carya sp.*), and northern red oak (*Quercus rubra*). These trees are more mature than those in the floodplain, but are at risk due to the imminent slope failure along much of the project area. The understory on the slopes is sparse; predominantly comprised of yellow-poplar and white ash. In most of the project area along the slopes, no herbaceous layer was present.

Mowed yards of residences are found in one portion of the proposed project area and these areas are dominated by cultivar grasses. A large white ash tree is also growing in one of the yards.

The forested habitat in the floodplain and on the steep side-slopes could provide habitat for a variety of wildlife. Although no wildlife was directly identified during a site visit by URS Group, Inc. (URS) on May 13, 2002, the habitat present is likely to support mammals, such as white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), fox (*Vulpes* spp.), and rodents, including squirrel (*Sciurus* sp.), chipmunk (*Tamias striatus*), and voles (*Microtus* spp.). Reptiles, such as garter snake (*Thamnophis sirtalis*) and eastern box turtle (*Terrapene carolina*), and amphibians, including spring peeper (*Pseudacris crucifer*) and western chorus frog (*Pseudacris triseriata*), would likely find the floodplain of Franklin Branch suitable for habitat. A variety of bird species also would be anticipated to utilize the project area. Species would include birds such as blue jay (*Cyanocitta cristata*), black-capped chickadee (*Poecile atricapillus*), and nuthatches (*Sitta* spp.), and waterfowl including mallard (*Anas platyrhynchos*), heron (*Butorides* sp.), and Canada goose (*Branta canadensis*). Raptors, such as owls and hawks, are also anticipated to utilize this habitat at least on occasion.

Aquatic Environment

In 1996, an investigation of the quality of the aquatic habitat in the Main 1-2 subwatershed was conducted with funding from the EPA and MDEQ. The results of this investigation indicated that much of the habitat in the Main 1-2 subwatershed has been degraded due to human influence. Particular parameters of concern for the aquatic habitat within the subwatershed included excessive flow variation, lack of riffles and pools, and bank erosion. At 17 sampling stations located throughout the subwatershed, two were determined to have "good" aquatic habitat, four had "fair" habitat, and 11 locations had "poor" habitat. In general, habitat quality was slightly better along the Main Branch of the Rouge River than in its tributaries (Main 1-2 Subwatershed Management Plan, 2001).

In 1995, a Michigan Department of Natural Resources (MDNR) fish monitoring survey sampled fish populations at seven locations in the Main 1-2. Franklin Branch was noted to have one of the healthiest fish communities among the sites sampled (Main 1-2 Subwatershed Management Plan, 2001). Fish species documented in Franklin Branch include American brook lamprey (*Lampetra appendix*), northern hog sucker (*Hypentelium nigricans*), stonecat (*Noturus flavus*), mottled sculpin (*Cottus bairdi*), and minnows, such as spotfin shiner (*Cyprinella spiloptera*) and horneyhead chub (*Nocomis biguttatus*) (Main 1-2 Subwatershed Management Plan, 2001).

The project site is in the upper half of the Franklin Branch watershed, and is estimated to receive the effluence of less than 10 square miles. Franklin Branch, in the vicinity of the project area, is a small stream approximately 30-feet to 40-feet in bank width, and, as observed during a site visit on May 13, 2002, as deep as 3 feet in some places. The aquatic habitat in the project area is subjected to heavy sediment loads from nearby slope failure and bank erosion. Significant amounts of large woody debris clogged the channel in places, and many streambanks exhibited moderate to severe incision. Although no fish were observed at the project area during the site visit, this portion of Franklin Branch may contain at least some of the above-mentioned species during certain parts of the year. It is anticipated that some of the minnow species may inhabit the project area nearly year-round.

Alternative 1 - No Action Alternative

The No Action Alternative does not involve construction; therefore, impacts to the terrestrial environment due to the operation of heavy machinery would not occur. However, continued erosion of the streambanks would eventually result in the loss of some terrestrial habitat as the slopes bordering the floodplain of Franklin Branch are undercut. Under this alternative, aquatic habitat in downstream areas would continue to be impacted from sedimentation due to streambank failure. Failure of the sewer line in Areas 2 and 3 could result in contamination of the waters of Franklin Branch.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

As a whole, the Proposed Action may affect up to 4 acres or more of moderately disturbed floodplain and upland forest. The applicant has estimated that approximately 40 mature trees and hundreds of saplings would have to be removed to implement this action in its current stage of design. Large native trees would be protected where possible. Because specific details of the Proposed Action have not been developed, the types of proposed activities that would occur at the site have been analyzed. The types of proposed activities that may potentially affect the terrestrial environment include bank armoring, floodplain terracing, upper slope stabilization, and construction of temporary roads. Operation of heavy machinery within the terrestrial environment is necessary for almost all of these activities.

All proposed bank armoring activities would require the removal or disturbance of existing bank vegetation. Of the proposed methods, steel sheeting and stone/boulder armoring have the greatest impact on the terrestrial environment. These methods involve removing or crushing vegetation, and covering streambank soils with an impermeable surface. Both methods also require the largest machinery for armor installation. To mitigate loss of habitat for this type of action, the applicant would vegetate streambanks behind steel sheeting and among stone/boulder armoring as possible. If these methods are used selectively, no long-term significant adverse effects to the terrestrial environment in the floodplain of Franklin Branch are anticipated. All other forms of proposed bank armoring involve minimal machinery, and are predominantly characterized by vegetation establishment. Minimal adverse effects of these actions include soil disturbance and removal of some at-risk vegetation on the unstable banks. A long-term beneficial effect of these activities would be the establishment of more permanent vegetative cover that would help reduce erosion.

Floodplain terracing requires the excavation and grading of the vegetated floodplain. Most vegetation at these action sites, including all overstory species, would be removed. This would result in loss of terrestrial habitat for wildlife. After grading, a coir blanket seeded with a native mixture of woody and herbaceous species would be installed. Some vegetation from adjacent sites would also be anticipated to colonize the affected areas. Although floodplain terracing may carry moderate short-term adverse effects, depending on the size of disturbance, including temporary loss of habitat, no long-term effects to vegetation or wildlife are anticipated.

Upper slope stabilization requires the placement of gravity walls on top of the floodplain, natural and cultivated vegetation, and on slopes that have failed or are at risk of failure. Short-term impacts would be both adverse and beneficial: the walls would cover some natural vegetation, but some vegetation on at-risk slopes would be stabilized. Beneficial long-term effects would

result from the permanent stabilization of the slopes and the installation of vegetation on the sides and top of the walls. Due to soil restrictions created by the geotextile fabric, it is not expected that gravity walls would support large trees like those currently on some upper slopes. Equipment required to construct gravity walls include heavy machinery, such as small dump trucks, backhoes, and soil compactors. Because the walls would generally have less lateral extent than improvements such as floodplain terracing, soil compaction as a result of operating heavy machinery would be isolated and less severe. Minimal adverse effects to the terrestrial environment are anticipated due to soil compaction.

The construction of access roads and movement of heavy equipment between sites would result in soil compaction and potentially crush or stress nearby vegetation. Many of the proposed methods to stabilize the streambanks would only require light equipment such as bobcat tractors and small trucks to import or move material. Where possible, the applicant would use hand labor to install improvements. If hand labor is not feasible, the applicant would utilize the smallest equipment practicable, and would operate the equipment only when the soil is dry or frozen. Access roads would be constructed primarily of mulch and timber mats, minimizing adverse effects on the terrestrial environment. After construction activities are concluded, excess temporary road material would be removed, and all bare soils seeded with native vegetation. Although road construction and heavy machinery operation may have short-term adverse impacts to the terrestrial environment, no long-term adverse impacts are anticipated.

The sections below address site specific environmental consequences of implementing the above measures.

Area 1A: The installation of gravity walls to stabilize two failing sections of the western streambank would disturb 5,000 square feet or more of mowed lawns that are already at-risk due to bank failure. Some fringe floodplain vegetation may also be affected. Once constructed, the gravity walls would be vegetated with native shrub and herbaceous species, increasing available habitat for wildlife. As a result, the terrestrial environment would be improved, a long-term beneficial impact.

Armoring the streambank in the vicinity of the sanitary sewer line would disturb 1,000 square feet or more of streamside vegetation. The vegetation would be replaced with stones and boulders, and vegetated as soon as possible. Although the habitat created by the armoring would be less beneficial to wildlife than a well-established riparian buffer, the armoring may be utilized as cover by small mammals and rodents. Because the armoring is not anticipated to extend along the streambank for great distances (~100 feet), and given the poor quality of habitat of the eroding streambank, stabilization using stone/rock armoring is expected to have a positive long-term effect to the quality of terrestrial habitat in the area. Adverse short-term effects would be limited to the temporary removal of at-risk vegetation. Stabilization of the sanitary sewer line would reduce the potential for a sewer line break and resultant impacts to the terrestrial environment

Effects associated with constructing a floodplain terrace are addressed above. At this site, 6,000 square feet or more could be excavated. Although a temporary loss of habitat would occur, no long-term adverse effects are anticipated. Access to the sites would be through private, developed property. Minimal vegetation removal would be necessary. Construction of temporary roads and operation of heavy machinery would be a minimal and temporary disturbance.

Area 1B: The installation of a gravity wall 5 feet in height could affect 1,000 square feet or more. This would be a temporary and minimal adverse effect. Long-term positive effects are anticipated after the streambank is stabilized. Effects associated with constructing a floodplain terrace of 6,000 square feet, or more, also would be temporary and no long-term adverse effects are anticipated. Site access via Area 1A would minimize impacts to the terrestrial environment resulting from the construction of roads and operation of heavy machinery.

Area 2: Although final design has not been completed, the applicant is considering installing approximately 100 LF of steel sheet or stone/boulder armor to stabilize the failing northern streambank adjacent to the pond. The replacement of irregularly maintained vegetation on the berm of the pond with steel sheeting or stone would be a positive long-term effect; the improvement is limited laterally and the existing habitat is eroding. Temporary short-term adverse effects would be limited to the removal of marginal quality riparian habitat.

Stabilizing a sanitary sewer line with stone-boulder armoring could also carry short-term adverse effects to 200 LF or more of streambank by removing vegetation. However, some vegetation would colonize the armoring and the stabilization would reduce the potential for a sewer line break.

Constructing a floodplain terrace could affect 12,000 square feet of vegetation or more in Area 2. These effects would be temporary and no long-term adverse effects are anticipated. Access to the site would be through private, developed property. Minimal vegetation removal would be necessary. Construction of temporary roads and operation of heavy machinery would be a minimal and temporary disturbance.

Area 3: Stabilizing five sections of failing upper slope with gravity walls, geocells, and vegetation would have beneficial long-term effects to habitat that is currently at-risk. Although some vegetation and habitat will be lost to the footprint of the walls in the short term, the establishment of native vegetation on the sides and top of the barrier would mitigate some of those adverse effects. Additionally, exposed and eroding soils would be secured and replaced with the vegetated gravity wall, increasing available vegetated habitat and reducing the potential for adjacent vegetation to be covered with sediments.

Constructing a floodplain terrace could affect 5,000 square feet of vegetation or more in Area 3. These effects would be temporary and no long-term adverse effects are anticipated. Access to the site could be through private, developed property, but final plans have not been confirmed. The worst case scenario would require a 200-foot temporary road through the wooded floodplain that would affect at least 3,000 square feet. Construction of temporary roads and operation of heavy machinery would be a minimal to moderate and temporary disturbance, however. No long-term adverse effects are anticipated.

Area 4: If the channel of Franklin Branch were to be relocated, 2,000 square feet or more of juvenile floodplain forest colonizing the historic channel would be replaced with the streambed of Franklin Branch. Although this effect would be permanent, the current bed of Franklin Branch would be available for recolonization by native species. No long-term adverse effects to the terrestrial environment as a result of the stream diversion are anticipated.

Stabilizing streambanks and upper slopes with gravity walls could affect 3,000 square feet or more in Area 4. Adverse effects would be temporary and long-term beneficial effects would include increased available vegetated habitat and reduced potential for adjacent vegetation to be

covered with sediments. Constructing a floodplain terrace could affect 3,000 square feet or more of vegetation. These effects would be temporary; no long-term adverse effects are anticipated. Access to the site could be through private, developed property, but final plans have not been confirmed. The worst case scenario would require a 300-foot temporary road through the wooded floodplain that would affect at least 4,500 square feet. Construction of temporary roads and operation of heavy machinery would be a minimal to moderate and temporary disturbance, however. No long-term adverse effects are anticipated.

Aquatic Environment

Impacts to the aquatic environment from the Proposed Action are limited to the direct disturbance of aquatic organisms while installing bank stabilization measures and operating machinery in and adjacent to the water, increasing bedload in the waters of Franklin Branch, and the potential to introduce contaminants to the habitat as a result of operating equipment in and adjacent to the water.

Direct disturbance to aquatic organisms refers to effects that may occur due to increased noise and activity in or next to the water. Placement of material, excavation, and operation of machinery in the waters of Franklin Branch would disturb aquatic organisms, potentially rendering that habitat temporarily unsuitable. To mitigate such disturbance, construction activities would be limited to a seasonal work window between August 1 and April 1, a period of the year when fish are least likely to be present. The availability of leaf cover for fish in Franklin Branch may be impacted by the loss of streamside vegetation. This impact would be temporary until replacement vegetation becomes established (i.e. two to five years). Additional mitigation measures to restore the aquatic environment include installing fish habitat structures, such as vegetated crib walls. Both of these mitigation measures were suggested by MDEQ during a meeting with the project engineers (see Appendix C).

Increased erosion resulting from construction activities has the potential to increase the amount of sediment that is suspended in the stream. This adverse effect would be temporary during construction activities, and would be mitigated through the installation of in-stream sediment traps (Figure 10) directly below the construction areas. All work would meet the requirements of Part 91, Soil Erosion and Sedimentation Control, of NREPA. Once construction activities are completed, sediment loads in Franklin Branch are anticipated to decrease, which would be a long-term beneficial effect to the aquatic environment.

The operation of heavy machinery in the vicinity of water exposes aquatic habitat to the risk of contamination if a spill of petroleum product should occur. To minimize potential impacts that would result from an inadvertent spill, the applicant would use biodegradable hydraulic fluids in all equipment, and prioritize the cleanup of spills over other work onsite. Protection measures, such as installing floating oil booms in sediment traps, would further limit any potential impacts to the aquatic habitat.

Installation of channel stability structures like artificial riffles, boulder cross vanes, and J-hook vanes would result in temporary disturbance to the aquatic habitat. Over time, however, these structures would create or improve aquatic habitat in Franklin Branch. Bank stabilization would result in decreased sediment loads, also an improvement to the aquatic habitat. Until the geogrids become established, the loss of vegetative cover would cause a reduction in leaf cover and

habitat for fish and other aquatic life. In the long term, the Proposed Action would have a beneficial effect to the aquatic community in Franklin Branch.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Installation of steel sheeting along the banks of Franklin Branch would require operation of heavy machinery and disturbance or removal of floodplain and upper slope vegetation. Up to 4 acres may be affected. Although some terrestrial habitat would be permanently removed as a result of steel sheeting streambank stabilization, this habitat is already at-risk and eroding. The temporary impacts to the terrestrial environment resulting from the creation of access roads and the operation of heavy machinery would be mitigated by planting a mix of native vegetation after construction activities are concluded. No significant long-term effects are anticipated.

Impacts to the aquatic environment would be limited to the direct disturbance of aquatic organisms while installing steel sheeting and operating machinery in and adjacent to the water and a temporary reduction in leaf cover and habitat for fish and other aquatic life. Increasing bedload in the waters of Franklin Branch also has the potential to introduce contaminants to the habitat, as a result of operating equipment in and adjacent to the water. These impacts would be temporary and would be mitigated using measures described above. In the long term, the stabilization of the banks of Franklin Branch would have a beneficial effect to the aquatic community.

3.2.2 Wetlands (Executive Order 11990)

The term wetland refers to areas that are inundated by surface or groundwater at a frequency and duration sufficient to support, and 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.

Under EO 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and preserve and enhance their natural and beneficial values. If a Federal action has the potential to impact jurisdictional waters of the United States as defined by Section 404 of the Federal Clean Water Act (CWA), the U.S. Army Corps of Engineers (USACE) would be contacted for appropriate permitting requirements. Section 404 of the CWA authorizes the USACE to issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into waters of the United States at specified disposal sites. FEMA applies the Eight-Step Decision-Making Process, required by 44 CFR, Part 9, to meet the requirements of EO 11990. Michigan has received authorization from the Federal government to administer Section 404 of the Clean Water Act in most areas of the State. Wetlands in the State of Michigan are regulated in accordance with Part 303, Wetlands Protection, of NREPA, 1994 PA 451, as amended.

Prior to conducting a site characterization, wetland data maintained by MDNR was reviewed for a preliminary identification of wetlands in the vicinity of the site. Based on this review, only open water wetlands associated with the channel of Franklin Branch occur within the vicinity of the project area (see Figures 2a and 2b).

During a site visit on May 13, 2002, several wetlands were identified in the project area adjacent to Franklin Branch. These forested wetlands are dominated by red ash, silver maple, box elder, and crack willow. Understory species include silky dogwood and American elm saplings. Noted herbaceous species include asters and rice cut-grass.

A formal delineation of wetlands and waters of the United States in the potential areas of impact was not conducted as part of this EA. However, using aerial photographs overlaid with 2-foot topographical contours, an estimated 2 acres, or less, of forested wetlands would be impacted as a result of streambank stabilization along Franklin Branch.

Alternative 1 - No Action Alternative

Under the No Action Alternative, no streambank stabilization activities or impacts to wetlands would occur. However, continued deterioration of the streambanks would lead to erosion and sediment deposition into the channel of Franklin Branch. During periods of heavy rains when stream flow is greater, sediment deposition into the adjacent forested wetlands may occur. In addition, the sanitary sewer pipe exposed in Project Area 2 would remain at-risk. Its rupture would result in the discharge of hazardous material into down-gradient wetlands: potentially a serious, even if temporary, adverse effect.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Because many of the specific construction sites have not been identified yet by design engineers, impacts to wetlands cannot be accurately quantified. Activities associated with the Proposed Action include the construction of access roads in and adjacent to wetlands, the operation of heavy machinery in and adjacent to wetlands, the excavation of material in and adjacent to wetlands, and the deposition of fill material up-gradient of wetlands. Activities such as these require a permit under Part 303, Protection of Wetlands, of the NREPA. The applicant must obtain this permit from the MDEQ prior to initiation of construction activities. Additionally, a formal wetland delineation would be required by MDEQ prior to construction activities and submission of permit applications to identify the boundaries of all wetland areas.

Although many of the construction activities would avoid wetland areas, up to 2 acres of wetlands could be impacted by the Proposed Action. Most of these impacts would be temporary, however, and limited to the removal of some wetland vegetation and compaction of wetland soils. These adverse impacts would be mitigated by using methods such as disking or raking to loosen the compacted wetland soils and then planting wetland vegetation in the disturbed areas.

The excavation of the channel of Franklin Branch would require work in wetlands adjacent to the stream, and may affect the hydrology of other nearby wetlands. Heavy equipment, such as backhoes and dump trucks, would be required to excavate material and haul it off-site. This would result in the removal of some wetland vegetation, compaction of wetland soils, and the replacement of wetland with newly constructed stream channel. Although impacts to vegetation and soils along the periphery of the new channel would be temporary, the replacement of wetland with stream channel would be a permanent adverse effect. Based on an informal site survey, it is anticipated that less than one-fourth an acre of wetland would be lost to the construction of the new channel. This wetland loss would be mitigated through conditions

attached to the Part 303 permit, which may include the construction of new wetlands. If this were a condition of the Part 303 permit, the abandoned streambed created by the construction of the new channel could be used as a site for wetland creation.

Activities associated with the proposed project involve the creation of geocells along the slopes of the floodplains. Although no direct impacts to wetlands are anticipated from these activities, the exposed soils that would temporarily result from the geocell construction would be susceptible to erosion and have the potential to deposit sediments into down-gradient wetlands. Erosion control measures, such as the installation of silt fencing and covering exposed soils with mulch or straw, would minimize this indirect, adverse impact.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Impacts to wetlands under this alternative would be similar to Alternative 2, the Proposed Action. Should this alternative be selected as preferred, a permit under Part 303, Protection of Wetlands, of the NREPA would be required. The applicant must obtain this permit from the MDEQ prior to initiation of construction activities.

The installation of steel sheeting along the banks of Franklin Branch would require the construction of access roads through the floodplain adjacent to Franklin Branch. Although many of the wetlands within this area would be avoided by carefully selecting the access route, it is anticipated that at least some wetlands would be impacted by this activity. These impacts would be temporary, however, and limited to the removal of some wetland vegetation and compaction of wetland soils. These adverse impacts would be mitigated by using methods such as disking or raking to loosen the compacted wetland soils and then planting wetland vegetation in the disturbed areas.

3.2.3 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 requires Federal agencies to determine the effects of their actions on threatened and endangered species of fish, wildlife, and plants, and their habitats, and to take steps to conserve and protect these species.

FEMA requested MDNR to review records for known occurrences of threatened, endangered, or otherwise significant plant and animal species, natural plant communities, and other natural features. In a letter, dated April 25, 2001, MDNR responded there are no known occurrences of Federal- or State-listed threatened, endangered, and/or otherwise significant species, natural plant communities, or natural features at the site (Appendix C).

The United States Department of the Interior, Fish and Wildlife Service (USFWS) was also requested to review records for known occurrences of threatened and/or endangered species in the project area. In their consultation letter, dated June 4, 2001, they also concluded that no federally listed endangered, threatened, proposed, and/or candidate species, and/or critical habitat presently occur within the proposed project areas. No further action is required under Section 7 of the Endangered Species Act.

Based on these consultations, none of the alternatives is anticipated to affect threatened or endangered species.

3.3 HAZARDOUS MATERIALS

Hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), are defined as "a solid waste, or combinations of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed." While the definition refers to "solids," it has been interpreted to include semisolids, liquids, and contained gases, as well (Wentz, 1989).

Hazardous materials and wastes are regulated in Michigan via a combination of federally mandated laws and State laws developed by the MDEQ. The hazardous waste statues are contained as Sections 324.11101 through 324.11153 of NREPA, 1994 PA 451, as amended. Federal regulations governing the assessment and disposal of hazardous wastes include RCRA, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Solid Waste Act (SWA), and Toxic Substances Control Act (TSCA).

To determine the presence and approximate location of known hazardous materials in the vicinity of the proposed project, Environmental Data Resources, Inc. (EDR), an independent information service, conducted a database search (EDR, 2002). The database search queries multiple Federal, State, and local hazardous materials and underground storage tank (UST) databases. The database search revealed one leaking underground storage tank (LUST) associated with an automobile service facility located within one-half of a mile from the project site. The LUST is located at a lower elevation than the project site, thus groundwater contamination would not likely occur.

No subsurface hazardous materials testing was conducted in the project area as a part of this EA. Conclusions are based only on the field reconnaissance, database search, and reported historical use of the properties.

Alternative 1 - No Action Alternative

Under the No Action Alternative, no flood mitigation activities would be undertaken using FEMA funds. Hazardous wastes and materials likely to occur in the project area would not be altered from their present conditions.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Based upon the EDR search, under the Proposed Action, no impacts to hazardous materials or wastes are anticipated.

Although subsurface hazardous materials are not anticipated to be present in the project area, excavation activities could expose or otherwise affect subsurface hazardous wastes or materials. Any hazardous materials discovered, generated, or used during implementation of the proposed project would be disposed of and handled by the county in accordance with applicable local, State, and Federal regulations.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

No impacts to hazardous material or wastes are anticipated under Alternative 3, based on the EDR search.

Although subsurface hazardous materials are not anticipated to be present in the project area, excavation activities could expose or otherwise affect subsurface hazardous wastes or materials. Any hazardous materials discovered, generated, or used during implementation of the proposed project would be disposed of and handled by the county in accordance with applicable local, State, and Federal regulations.

3.4 SOCIOECONOMICS

3.4.1 Zoning and Land Use

Prior to the first permanent settlers in Oakland County, Native American tribes such as Ojibwa, Chippewa, Ottawa, and Potawatomi lived in the area. Many of Oakland County's main transportation routes began as Native American trails, such as the Saginaw Trail (now Woodward Avenue) or the Shiawassee Trail (the current Orchard Lake Road) (Oakland County, 2002). The area that now comprises Oakland County was acquired in 1803 from France two years before the territory of Michigan was formed. Initial reports detailed the land as being sterile and barren; however, further exploration of the area found it to be rich in natural resources (Oakland County, 2002)

Oakland County was officially organized in January 1819, with the county seat established in Pontiac. The area was divided into two townships—to the north was Oakland Township and to the south was Bloomfield Township. Shortly after the first township was settled, Oakland County became officially known as the first county established in the interior of the State. In 1827, the county was further divided into five townships: Farmington, Bloomfield, Troy, Oakland, and Pontiac (Oakland County, 2002).

Oakland County comprises approximately 899 square miles, or 575,360 acres. The population has increased continuously since the first census period, with a rapid increase in the past 20 years due to the expansion of the Detroit metropolitan area (USDA, 1982). Currently, Oakland County has a population of 1,194,156 individuals (U.S. Census Bureau, 2000). The project location has been historically and currently zoned as residential (R3) with no plans of developing the area (Brown, Pers. comm., 2002).

The Main 1-2 subwatershed, located entirely within Oakland County, encompasses approximately 438 square miles, or 269,370 acres. Residential development accounts for the most significant land use (66.5 percent), followed by commercial and industrial uses (13.2 percent), forested and rural open land (9.21 percent), water and wetlands (5.11 percent), urban open space and agricultural lands (5.10 percent), and highways (1.90 percent). Land use in Bloomfield Township, with an area of 16,304 acres, is dominated by mid-density residential development. Small patches of commercial and industrial development, as well as urban open space, forested areas, and waterways are located throughout the township, but are more clustered to the north. Land uses surrounding the Franklin Branch include medium density residential areas and forested lands (Main 1-2 Subwatershed Management Plan, 2001).

Alternative 1 – No Action Alternative

Under the No Action Alternative, there would be no changes to current zoning. Further erosion along the Franklin Branch could cause irreparable foundation damage to three homes along 14 Mile Road due to slope failure and settling. This would also likely reduce property values for other homes located along this road.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Under the Proposed Action, no changes to land use and zoning would be anticipated. The area of proposed activity is currently undeveloped and forested. While some vegetation would have to be removed during project excavation and installation activities, these areas, and the eroded areas along the streambank, would be re-vegetated with native species.

Implementation of this alternative would provide protection to the three homes threatened by further streambank erosion.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Changes to land use and zoning would not be anticipated under the implementation of Alternative 3. The area of proposed activity is currently undeveloped and forested. While some vegetation would have to be removed during project excavation and installation activities, these areas would be re-vegetated with native species, except where steel sheeting is installed.

Implementation of this alternative would provide protection to the three homes threatened by further streambank erosion.

3.4.2 Visual Resources

Visual resources refer to the landscape character (i.e., what is seen), visual sensitivity (i.e., human preferences and values regarding what is seen), scenic integrity (i.e., degree of intactness and wholeness in landscape character), and landscape visibility (i.e., relative distances of seen areas) of a geographically defined viewshed.

The Franklin Branch originates in West Bloomfield Township and flows through parts of Farmington Hills and Southfield Townships before entering the southwest section of Bloomfield Township and exiting through the Village of Franklin. The approximately 5,200 feet of the Franklin Branch that flow through Bloomfield Township are contained within a steep-sided ravine of 50 to 70 feet in depth. The immediate floodplain consists predominately of forested wetland systems while the adjacent upland areas are characterized by suburban residential uses.

The character of the Franklin Branch is that of an undisturbed stream in a natural state. The predominately forested slopes and floodplain in the project area comprise a portion of a larger greenbelt consisting of the entire course of the Franklin Branch and Rouge River watershed. The natural character of the Franklin Branch is appealing to both residents who live adjacent the stream valley and to motorists traveling along 14 Mile Road.

The natural landscape within the project area currently preserves a high degree of integrity. An exception to this is an area along the south bank that was stabilized several years ago requiring some tree removal because continuing erosion and slope failure was threatening 14 Mile Road. The stabilized area was planted with native grasses and herbaceous plants, and allowed to regenerate naturally.

Topography, vegetation, and, to a lesser degree, residences limit the viewscape from most points in the project area. The steep slopes that border the Franklin Branch limit views to no more than several hundred feet from the floodplain. The forested nature of the ravine and floodplain further limit the viewscape. Additionally, from above the Franklin Branch at the top of the ravine viewscapes are also restricted by residential buildings situated adjacent the stream valley.

Topography, vegetation, and residential buildings also serve to limit the viewshed of the project area. The viewshed of an object refers to all areas from which that object can be seen. Because the Franklin Branch is situated within a forested ravine, its viewshed is restricted to areas in the immediate vicinity. Residential land use and buildings located above the ravine and project area not only obstruct visibility but also serve to limit viewer access.

The Franklin Branch is considered a positive aesthetic element within Bloomfield Township.

Alternative 1 – No Action Alternative

Streambank stabilization would not occur under this alternative. Severe bank erosion would continue to occur, resulting in slope failures, logjams, downstream sedimentation, utility damage, and loss of private property, creating unsightly conditions. Continuing erosion and the resulting slope failures would lead to significant tree loss and would negatively impact both the natural character and the scenic integrity of the Franklin Branch.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Visual resources would not be adversely impacted under this alternative. Heavy equipment would be seen in the project area during construction, but this would be short term. Some trees would be removed during bank stabilization and grade control activities. However, all impacted areas would be stabilized with compost and a native mix of woody and herbaceous plants. These modifications would slightly alter the landscape, but would be a minimal change to visual resources. In some areas, stabilization methods would include the use of soil filled cellular confinement gravity walls. Although, these gravity walls would be black in color and constitute a new visual element within the project viewshed slightly altering the natural character, they would provide protection from further erosion and slope failures, which would have negative impacts to scenic integrity. Impacts to the natural character of Franklin Branch would be short term and would be mitigated by re-vegetation. Because the Franklin Branch is confined within a steep-sided ravine 50 to 70 feet in depth, stabilization activities would be minimally visible from areas above it, such as along 4 Mile Road, and would not negatively impact or alter viewscapes.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Visual resources would not be adversely impacted under this alternative. This alternative would stabilize critical slope and streambank areas along the Franklin Branch using interlocking steel sheeting. Heavy equipment would be seen in the project area during construction, but this would be short term. Some trees would be removed during bank stabilization and grade control activities, however, after installation and backfilling the areas, upslope of the steel sheeting would be vegetated using brush mattresses minimizing impacts to visual resources. Painting the exposed portions of the steel sheeting to match the surrounding landscape would further minimize visual impacts. Impacts to the natural character of Franklin Branch would be short term and would be mitigated by re-vegetation. Additionally, because the Franklin Branch is situated within a steep-sided ravine, this alternative would have minimal impacts on visual resources as viewed from above, and would prevent further erosion and slope failures that would constitute negative impacts to scenic integrity.

3.4.3 Noise

Sound is most commonly measured in decibels (dB) on the A-weighted scale, which is the scale most similar to the range of sounds that the human ear can hear. The Day-Night Average Sound Level (DNL) is an average measure of sound. The DNL takes into account the volume of each sound incident, the number of times each incident occurs, and the time of day each incident occurs (nighttime sound are weighted more heavily because it is assumed to be more annoying to the community). The DNL descriptor is accepted by Federal agencies as a standard for estimating sound impacts and establishing guidelines for compatible land uses.

Noise, defined herein as unwanted or unwelcome sound, is regulated by the Federal Noise Control Act of 1972 (NCA). Although the NCA gives the EPA authority to prepare guidelines for acceptable ambient noise levels, it only charges those Federal agencies that operate noise-producing facilities or equipment to implement noise standards. The EPA's guidelines (and those of many Federal agencies) state that outdoor sound levels in excess of 55 dB DNL are "normally unacceptable" for noise-sensitive land uses such as residences, schools, and hospitals.

According to the Bloomfield Township Noise Ordinance, construction activities are exempt from regulation as bng as they occur between 7:00 am and 5:00 pm, Monday through Saturday (Myllyoja, Pers. comm., 2002). State regulations exist only for worker safety and hearing protection.

Alternative 1 – No Action Alternative

Under the No Action Alternative, streambank stabilization efforts would not be conducted and, therefore, would not generate noise. Noise levels would be expected to remain at current levels.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Most noise associated with the proposed action would be emitted by mechanical equipment used in the installation of streambank stabilization materials. Equipment associated with the Proposed

Action includes backhoes, chainsaws, cranes, bulldozers, excavators, trucks, and graders. Noise typically associated with this type of construction equipment can measure as much as 80-85 dB within 50 feet from the source. A diesel pile driver would be used for the installation of the steel sheeting in Area 2, and would have typical noise levels of 95-100 dB. Noise would attenuate at a rate of 6 dB per doubling of distance away from the source.

Residents adjacent to the project site may be subjected to construction-related noise during daytime periods that could reach 80-100 dB. However, this noise would not be constant and would be temporary in nature. Noise greater than 85 dB would occur only during the period of steel sheeting installation. Per the Bloomfield Township ordinance, construction would occur during daytime hours only.

To mitigate for potential noise impacts, Bloomfield Township would be required to meet with residents prior to construction and develop policies for ongoing communications with residents during the construction period (Myllyoja, Pers. comm., 2002). During the meetings, the residents would be informed of the construction period and potential noise impacts, as well as suggested mitigation measures. Potential mitigation measures could include closing windows during construction or planning daily errands around construction times.

To ensure the hearing protection of project workers, appropriate protective gear would be required.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Under Alternative 3, a hydroexcavator would be used to create trenches of specified sizes. Then, 30-foot cranes with attached pile drivers would install the steel sheeting along unstable portions of the streambank. Noise would not be constant and would be temporary, but would range from 90-100 dB for those residences 50 feet from the project site. Per the Bloomfield Township ordinance, construction would occur during daytime hours only.

To mitigate for these potential noise impacts, Bloomfield Township would be required to meet with residents prior to construction and develop policies for ongoing communications with residents during the construction period (Myllyoja, Pers. comm., 2002). During the meetings, the residents would be informed of the construction period and potential noise impacts, as well as suggested mitigation measures. Potential mitigation measures could include closing windows during construction or planning daily errands around construction times.

To ensure the hearing protection of project workers, appropriate protective gear would be required.

3.4.4 Public Services and Utilities

Public services provided to all residents of Bloomfield Township include police and fire protection, as well as medical and recreational services. Public utilities, such as water, sewerage, and solid waste collection are also provided by the township.

Bloomfield Township's Water and Sewer Department distributes drinking water from the City of Detroit and also provides a means to collect sewage disposal for transport to Detroit's wastewater treatment plant (Bloomfield Township, 2002). Some areas within Bloomfield

Township are not connected to the public water and sewer systems; residents of these areas rely on groundwater wells and private, on-site sewage disposal systems (OSDSs) for these services. Bloomfield Township currently has 3,394 reported OSDS, and roughly 17 homes within the affected project area that rely on OSDSs. Detroit Edison provides electricity to the area and Consumer Energy supplies natural gas. Phone service is provided primarily by AT&T and Ameritech (Domine, Pers. comm., 2002).

Utility infrastructure within or directly adjacent to the project site includes a failing sewer line found in Area 2 and a 72-inch DWSD water main running along 14 Mile Road, to the south of the project site.

Alternative 1 – No Action Alternative

No immediate impacts to public services and utilities are anticipated under the No Action Alternative. However, continued streambank erosion could negatively impact public services and utilities. The current failing sewer pipe would not be protected and could incur greater damage. Additionally, based on past evidence, it is anticipated that an additional ten years of unchecked erosion would result in damage to the 72-inch DWSD water main, 14 Mile Road and the 17 OSDSs within the project site.

Emergency repairs would be required to address damages to roads, waterlines, and OSDSs. During this time period, some residents would be without a reliable water supply or proper sewage treatment. Additionally, temporary closure of 14 Mile Road would not only affect local traffic, but could impair the ability of emergency vehicles to access certain sites.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Under the Proposed Action, adverse impacts to public services are not anticipated. Prior to implementation of the proposed project, septic tanks and wells would be located and marked to ensure that construction vehicles, excavation activities, and pipe installation would not impact these services.

The use of sheet piling is being considered for Area 2. The vibrations from pile driving activities could stress nearby water or sewer lines. Appropriate precautions such as shoring or diverting these utilities may be required and would be implemented, as necessary, by the sheet pile contractor in accordance with local construction requirements. In addition, the utilities would be monitored during pile driving activities to ensure that damage does not occur.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

No direct impacts to public utilities are anticipated under Alternative 3. The potential does exist that vibrations from the pile drivers could damage the water main line and further damage the sewer pipe (Myllyoja, Pers. comm., 2002). Appropriate precautions such as shoring or diverting these utilities may be required and would be implemented, as necessary, by the sheet pile contractor in accordance with local construction requirements. In addition, the utilities would be monitored during pile

driving activities to ensure that damage does not occur. Project activities would be immediately halted should any impacts occur.

3.4.5 Traffic and Circulation

County and township roads are found within the immediate project area. Fourteen Mile Road runs parallel to Franklin Branch to the south, and West Maple Road runs parallel to the north. Franklin Road and Inkster Road run perpendicular to the stream, to its east and west, respectively. U.S. Highway 24 is the closest major highway, located about 1.5 miles to the east of the project site.

The Bloomfield Township Road Department maintains roughly 176 miles of subdivision roads and 37 miles of unpaved gravel roads. Through a contractual agreement with Bloomfield Township, the Road Commission for Oakland County (RCOC) is responsible for 50 miles of primary roads and state highways within the township, including 14 Mile, Inkster, and Franklin Roads (Bloomfield Township, 2002). The Michigan Department of Transportation (MDOT) is responsible for maintenance of the U.S., State, and interstate highways.

Annual average daily traffic counts are available for 14 Mile Road, between Inkster Road and Franklin Road. A May 2000 survey recorded 2,200 cars traveling daily on this stretch of the road (Salisbury, Pers. comm., 2002).

Alternative 1 – No Action Alternative

Under the No Action Alternative, there would be no immediate effects to traffic since construction would not occur. However, it is anticipated that erosion would continue to occur, and that slope failure would eventually lead to the collapse of 14 Mile Road, creating the need for costly road repair and closing the area to traffic for an unspecified amount of time.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Construction activities associated with the Proposed Action could cause minimal traffic impacts, primarily as a result of equipment traveling to the project site. Staging of equipment and vehicles and site access for Areas 1 and 2 would occur through developed private property off of local roads. Proposed access for Area 3 would be off of a cul-de-sac or along the stream channel, and would not impact traffic flow. Access for Area 4 would be either along the channel, off of Ledge Rock Court, or from a property along 14 Mile Road. Again, these areas would be removed from local traffic flow.

Traffic impacts would be temporary and short term in nature. To mitigate potential delays, appropriate signage would be posted during construction.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Staging and transport for construction equipment associated with Alternative 3 would be similar to the Proposed Action. Some equipment would be staged along 14 Mile Road for a portion of

the project activities. However, it is unlikely to have a substantial impact on traffic flow. To mitigate potential delays, appropriate signage would be posted during construction and detour routes would be created, if necessary.

3.4.6 Environmental Justice (Executive Order 12898)

EO 12898 requires Federal agencies to make achieving environmental justice part of their mission. Agencies are required to identify and correct programs, policies, and activities that have disproportionately high and adverse human health or environmental effects on minority and low-income populations. EO 12898 also tasks Federal agencies with ensuring that public notifications regarding environmental issues are concise, understandable, and readily accessible. Socioeconomic and demographic data were studied to determine if a disproportionate number (greater than 50 percent) of minority or low-income persons have the potential to be adversely affected by the alternatives.

Oakland County supports a population of 1,198,593 individuals and is 82.8 percent white, 10.1 percent black, 0.3 percent American Indian/Alaskan Native, 4.1 percent Asian, and 0.8 percent other. Additionally, approximately 2.4 percent of the residents classified themselves as being of Hispanic origin (U.S. Census Bureau, 2000). Median household income for the county is $59,677, 53 percent higher than the State's average of $38,883. Approximately 6.0 percent of the population is considered below poverty level, 47 percent lower than the State's 11.5 percent average (U.S. Census Bureau, 2000).

The proposed project area is located within Bloomfield Township, which has a total population of 43,023 individuals and is 87.7 percent white, 4.3 percent black, 0.1 percent American Indian/Alaskan Native, 6.5 percent Asian, 0.1 Native Hawaiian and other Pacific Islander, and 0.3 percent some other race. Additionally, approximately 1.4 percent of the residents classified themselves as being of Hispanic origin. Median household income for the township is $103,897, 74 percent higher than the State's average of $38,883. Approximately 2.5 percent of the population is considered below poverty level, 78 percent lower than the State's 11.5 percent average (U.S. Census Bureau, 2000).

Based upon a review of the U.S. Census Bureau information, the No Action, Proposed Action, and Action Alternatives are not considered to have a disproportionately high and adverse impact on minority or low-income populations. Additionally, the proposed streambank stabilization project would benefit all populations residing within or adjacent to the project area.

3.4.7 Safety and Security

Safety and security issues that have been considered in this analysis include the health and safety of the area residents, the public at-large, and the protection of personnel involved in activities related to the implementation of the proposed alternatives.

Alternative 1 – No Action Alternative

There are no anticipated immediate effects to safety and security under the No Action Alternative. However, as streambank erosion would continue to occur, the future safety of some local residents living above Franklin Branch along 14 Mile Road would be jeopardized due to

the potential for a massive slope failure to occur, which would cause irreparable damage to at least three homes. The safety of motorists along 14 Mile Road would also be compromised should unchecked erosion continue.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

Under the Proposed Action, construction activities could present safety risks to persons performing the activities. To minimize risks to safety and human health, all project activities would be performed using qualified personnel trained in the proper use of the appropriate equipment, including all appropriate safety precautions. Additionally, all activities would be conducted in a safe manner in accordance with the standards specified in Occupational Safety and Health Administration (OSHA) regulations.

During construction activities, safety measures to mitigate potential impacts to the general public include utilizing appropriate signage and safety fencing to warn the public of dangerous slopes and activities, and restrict access to those sites. The signage and barriers would be in place prior to construction activities (Myllyoja, Pers. comm., 2002). Overall, the project activities would decrease risks to human health and safety associated with localized erosion and slope failure along Franklin Branch.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

Under Alternative 3, all project activities would be performed using qualified personnel trained in the proper use of the appropriate equipment, including all appropriate safety precautions. Additionally, all activities would be conducted in a safe manner in accordance with the standards specified in OSHA regulations. Safety measures to mitigate potential impacts to the general public include utilizing appropriate signage and safety fencing to warn the public of dangerous slopes and activities, and restrict access to those sites. The signage and barriers would be in place prior to construction activities (Myllyoja, Pers. comm., 2002). Overall, Alternative 3 would reduce the human health and safety risks associated with erosion and slope failure.

3.5 CULTURAL RESOURCES

In addition to review under NEPA, consideration of impacts to cultural resources is mandated under Section 106 of the National Historic Preservation Act (NHPA), as amended, and implemented by 36 CFR, Part 800. Requirements include identification of significant historic properties that may be impacted by the Proposed Action Alternative. Historic properties are defined as archaeological sites, standing structures, or other historic resources listed in or eligible for listing in the National Register of Historic Places (NRHP) (36 CFR 60.4).

As defined in 36 CFR Part 800.16(d), the Area of Potential Effect (APE) "is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist."

One property within the vicinity of the project area, the Franklin Cider Mill, is listed in the NRHP and is noted as the site of the Van Every Gristmill established in 1837. The property is

located southeast of the project area at the corner of Franklin and West 14 Mile Roads (Figure 11) and is currently operated as a seasonal cider mill. During flooding events, sediment and water from Franklin Branch accumulate in the parking lot of the facility.

In addition to identifying historic properties that may exist in the proposed project's APE, FEMA must also determine, in consultation with the appropriate State Historic Preservation Officer (SHPO), what effect, if any, the action would have on historic properties. Moreover, if the project would have an adverse effect on these properties, FEMA must consult with the SHPO on ways to avoid, minimize, or mitigate the adverse effect.

A letter was issued to the Michigan SHPO on May 29, 2001 requesting a review of the proposed project for impacts to historic or archaeological resources protected, or proposed for protection, under the NHPA. FEMA has concluded, and the Michigan SHPO concurs, that no archaeological or historic resources would be affected within the APE. The FEMA determination letter, dated March 12, 2003, and the SHPO review letter, dated June 28, 2001, can be found in Appendix C.

Alternative 1 – No Action Alternative

Streambank stabilization would not occur under this alternative. Severe bank erosion would continue to occur resulting in slope failures, log jams, downstream sedimentation, utility damage and loss of private property. Under the No Action Alternative, the Franklin Cider Mill would continue be negatively impacted by the effects of flooding, as it has in the past.

Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)

No adverse impacts to the Franklin Cider Mill would occur as a result of the Proposed Action. Stabilization of Franklin Branch streambanks should reduce sediment deposition at the property during flood events. It is not anticipated that any historic or cultural resources within the project area would be impacted by the Proposed Action; however, if artifacts or human remains are encountered during construction, work in the vicinity would be discontinued, and the applicant would immediately notify FEMA, the SHPO, and the county coroner, if necessary.

Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques

No adverse impacts to the Franklin Cider Mill would occur as a result of the Alternative 2. Stabilization of Franklin Branch streambanks should reduce sediment deposition at the property during flood events. It is not anticipated that any historic or cultural resources within the project area would be impacted by Alternative 3; however, if artifacts or human remains are encountered during construction, work in the vicinity would be discontinued, and the applicant would immediately notify FEMA, the SHPO, and the county coroner, if necessary.

Cumulative impacts are those effects on the environment that result from the incremental effect of the action when added to past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time.

The cumulative impact of the residential and industrial development in the Main 1-2 subwatershed has led to degraded water quality and impaired aquatic habitat. Increasing rates of development, especially over the last 20 years, have resulted in the development of 80 percent of the subwatershed. The remaining 20 percent has been preserved as forested and rural open land, urban open space and agricultural, or water and wetlands. Future development in the subwatershed has been forecasted to be minimal over the next 30 years (SEMCOG, 2002), perhaps due to a shortage of available land to be developed.

Under the leadership of the Oakland County Drain Commissioner's Office (OCDCO), residents and officials of the Main 1-2 subwatershed have identified priority impairments to the subwatershed, and have developed strategies to minimize their effects and restore the environment. As outlined in the 2001 Main 1-2 Rouge River Subwatershed Management Plan, priority concerns include reducing peak flows, reducing sediment loads, reducing sewage entering the river, and preserving and increasing habitat. The Proposed Action is consistent with reducing sediment loads and preserving and increasing habitat.

When added to the past and reasonably foreseeable future actions that may occur within this subwatershed, the Proposed Action can be viewed as a component of the watershed recovery plan supported by OCDCO. Although streambank stabilization improves the slopes that are eroding, it does not solve the problems causing the erosion: higher and more variable peak flows. As such, this project addresses a symptom of this problem, but not the cause; the eroding banks are improved without influencing the agent that is degrading them. The ultimate benefit of this project to the environment is linked to the implementation of planning during future development.

The necessity for planning has been identified by OCDCO and the Main 1-2 Subwatershed Group as a critical component for reducing degradation of watershed health. Implementation of future action plans in the subwatershed are anticipated to address the priority concerns, resulting in an overall improvement to water quality and aquatic habitat. In itself, the Proposed Action is only a temporary measure to improve Franklin Branch. If taken in context with other ongoing and planned improvements, the Proposed Action is a component of a subwatershed restoration effort that is anticipated to result in long-term beneficial impacts to the entire watershed.

A public notice advertising the availability of the draft EA for public review was published in the Oakland Press, and the Birmingham Observer in May 2003 and made available for review online at the FEMA website: http://www.fema.gov/ehp/docs.shtm. (Appendix D). The public was provided the opportunity to review the EA from May 21 to June 19, 2003, and comment on the Proposed Action. One comment was received by FEMA Region V during the comment period. The Village Administrator for the Village of Frankin submitted a comment in support of the Proposed Action alternative (Alternative 2) presented in the EA. A copy of the letter is provided in Appendix E.

This table provides a brief summary of the anticipated permitting and mitigation requirements for the proposed project alternatives.

Alternatives	Permit/Mitigation Requirements
Alternative 1 – No Action Alternative	• No permits are required
Alternative 2 – Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)	• A HEC-RAS model must be developed to quantitatively assess effects on the floodplain as a part of the MDEQ permit process. • A joint permit application issued through the MDEQ would be required for construction activities in the proposed project area, as mandated under National Resources and Environmental Protection Act (NREPA) and Public Act 451. The joint permit application would consist of three regulatory sections: Part 301 – Inland Lakes and Streams, Part 303 – Wetlands Protection, and Part 31 – Floodplains and Water Resources. • Oakland County Drain Commissioner's Office (OCDCO) requires a Soil Erosion and Sedimentation Control (SESC) permit under Part 91 of the NREPA for construction activities in the proposed project area. • A "no-rise" certificate must be submitted to FEMA. • The Applicant should apply to FEMA for a Letter Of Map Revision (LOMR) for the relocated channel in accordance with Part 65 of the NFIP regulations. • The applicant must follow all other applicable local, state, and federal laws, regulations, and requirements. They must obtain and comply with all required permits required prior to initiating work on the project. No staging of equipment or construction activities shall begin until all permits are obtained. • The applicant must apply best management practices for soil erosion, prevention, and containment during staging of equipment and construction activities. • Excavated soils shall not be disposed of within wetland or floodplain areas. • Bare soils shall be revegetated with native seed after construction to prevent future soil erosion. It is recommended that the applicant monitor the site to ensure vegetation establishment. • Disturbed soils in wetland areas shall be deconsolidated and seeded with native wetland species.

Alternatives	Permit/Mitigation Requirements
	• To the extent feasible, construction equipment shall be staged in existing developed or previously disturbed areas, and existing paved areas. • Project applicant shall be required to water down construction areas when necessary to reduce dust. • Running time of fuel-burning equipment shall be minimized and engines should be properly maintained to reduce emission of criteria pollutants. • Appropriate protection measures shall be implemented, as necessary, prior to installation of steel sheeting to prevent damages to adjacent utility lines from the seismic effects of pile driving activities. The utilities shall be monitored during pile driving activities for evidence of stress and damage, and additional protection and repair measures would be implemented, as appropriate. • Applicant shall use native planting materials with different plant types to provide a diverse series of canopy levels and stream shading. Large native trees shall be protected, where possible. • A formal wetland delineation of the project area shall be conducted prior to construction activities to identify the boundaries of all wetland areas. • For streambank armoring, use natural field stone rather than limestone riprap or broken concrete. • Fish habitat structures, such as vegetated crib walls, must be incorporated into the stabilization measures. • Equipment use within the stream shall be conducted in accordance with all permit conditions and within specified seasonal limitations. Sediment traps shall be used downstream of each construction area (per MDOT spec). • Stream channel disturbance shall be limited seasonally to NOT include the period from April 1 through August 1. • To minimize soil compaction effects in floodplain areas resulting from the movement of heavy equipment, the movement of construction equipment shall be limited to periods when the soil is dry or frozen. • Applicant construction plans shall specify constraints on machinery compaction ratings and require the use of biodegradable hydraulic fluids. • Work would begin upstream and continue downstream, permanent stabilization would be required upon

Alternatives	Permit/Mitigation Requirements
	completion of final grading and before disturbing additional areas. • Final specific environmental protection measures would be discussed with the contractor prior to issuing a Notice to Proceed. • The project would be performed in phases to limit impacts due to sedimentation. • The applicant shall erect temporary fences around the drip line of trees outside of the right-of-way (ROW) to prevent encroachment of personnel and construction equipment onto root systems. • If feasible, exposed portions of steel sheeting should be painted to match the surrounding landscape. • Any hazardous materials discovered, generated, or used during implementation of the proposed project must be disposed of and handled by applicant in accordance with applicable local, state, and federal regulations. • If needed, the applicant shall obtain all land easements or leases from property owners and utilities. • Construction activities would occur during normal business hours. • Bloomfield Township would inform the potentially-impacted surrounding residents of the construction period and possible noise impacts, as well as suggested mitigation measures. • Septic tanks and wells shall be located and marked prior to excavation activities. • All construction activities must be conducted by trained personnel in compliance with OSHA standards and regulations to protect worker safety. • Appropriate signage and fencing shall be posted to alert pedestrians, motorists, and school students and staff of project activities, as well as changes to traffic patterns. • Should any potentially historic or archeological significant materials be discovered during project construction or staging of equipment, all activities on the site shall be halted immediately and the city shall consult with FEMA and the SHPO or other appropriate agency for further guidance.

Alternatives	Permit/Mitigation Requirements
Alternative 3 – Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques	• A HEC-RAS model must be developed to quantitatively assess effects on the floodplain as a part of the MDEQ permit process. • A joint permit application issued through the MDEQ would be required for construction activities in the proposed project area, as mandated under National Resources and Environmental Protection Act (NREPA) and Public Act 451. The joint permit application would consist of three regulatory sections: Part 301 – Inland Lakes and Streams, Part 303 – Wetlands Protection, and Part 31 – Floodplains and Water Resources. • OCDCO requires a SESC permit under Part 91 of the NREPA for construction activities in the proposed project area. • The applicant must follow all other applicable local, state, and federal laws, regulations, and requirements. They must obtain and comply with all required permits required prior to initiating work on the project. No staging of equipment or construction activities shall begin until all permits are obtained. • A HEC-RAS hydraulic model must be developed to quantitatively assess effects to the floodplain. • A "no-rise" certificate must be submitted to FEMA. • The Applicant should apply to FEMA for a Letter Of Map Revision (LOMR) for the relocated channel in accordance with Part 65 of the NFIP regulations. • The applicant must apply best management practices for soil erosion, prevention, and containment during staging of equipment and construction activities. • Excavated soils shall not be disposed of within wetland or floodplain areas. • Bare soils shall be revegetated with native seed after construction to prevent future soil erosion. It is recommended that the applicant monitor the site to ensure vegetation establishment. • Disturbed soils in wetland areas shall be deconsolidated and seeded with native wetland species. • To the extent feasible, construction equipment shall be staged in existing developed or previously disturbed areas, and existing paved areas. • Project applicant shall be required to water down

Alternatives	Permit/Mitigation Requirements
	construction areas when necessary to reduce dust. • Running time of fuel-burning equipment shall be minimized and engines should be properly maintained to reduce emission of criteria pollutants. • Appropriate protection measures shall be implemented, as necessary, prior to installation of steel sheeting to prevent damages to adjacent utility lines from the seismic effects of pile driving activities. The utilities shall be monitored during pile driving activities for evidence of stress and damage and additional protection and repair measures implemented, as appropriate. • Applicant shall use native planting materials with different plant types to provide a diverse series of canopy levels and stream shading. Large native trees shall be protected, where possible. • A formal wetland delineation of the project area shall be conducted prior to construction activities to identify the boundaries of all wetland areas. • For streambank armoring, use natural field stone rather than limestone riprap or broken concrete. • Fish habitat structures, such as vegetated crib walls, must be incorporated into the stabilization measures. • Equipment would be allowed to work within the stream within the specified seasonal limitations provided that sediment traps are used downstream of each construction area (per MDOT spec). • Stream channel disturbance shall be limited seasonally to NOT include the period from April 1 through August 1. • To minimize soil compaction effects in floodplain areas resulting from the movement of heavy equipment, the movement of construction equipment shall be limited to periods when the soil is dry or frozen. • Specifying constraints on machinery compaction ratings and requiring the use of biodegradable hydraulic fluids. • Work would begin upstream and continue downstream, permanent stabilization would be required upon completion of final grading and before disturbing additional areas. • Final specific environmental protection measures would be discussed with the contractor prior to issuing a Notice to Proceed.

Alternatives	Permit/Mitigation Requirements
	• The project would be performed in phases to limit impacts due to sedimentation. • The applicant shall erect temporary fences around the drip line of trees outside of the ROW to prevent encroachment of personnel and construction equipment onto root systems. • If feasible, exposed portions of steel sheeting should be painted to match the surrounding landscape. • Any hazardous materials discovered, generated, or used during implementation of the proposed project must be disposed of and handled by applicant in accordance with applicable local, state, and federal regulations. • If needed, the applicant shall obtain all land easements or leases from property owners and utilities. • Construction activities would occur during normal business hours. • Bloomfield Township would inform the potentially-impacted surrounding residents of the construction period and possible noise impacts, as well as suggested mitigation measures. • Septic tanks and wells shall be located and marked prior to excavation activities. • All construction activities must be conducted by trained personnel in compliance with OSHA standards and regulations to protect worker safety. • Appropriate signage and fencing shall be posted to alert pedestrians, motorists, and school students and staff of project activities, as well as changes to traffic patterns. • Should any potentially historic or archeological significant materials be discovered during project construction or staging of equipment, all activities on the site shall be halted immediately and the city shall consult with FEMA and the SHPO or other appropriate agency for further guidance.

The following agencies were consulted during preparation of this EA:

Federal Agencies Consulted

Federal Emergency Management Agency

U.S. Department of the Interior, Fish and Wildlife Service

State, City, and Local Agencies Consulted

Bloomfield Township Clerk's Office

Michigan Department of Environmental Quality

Michigan Department of Natural Resources

Michigan State Historic Preservation Office

Oakland County Road Commission

Distribution

Brent Paul, FEMA Headquarters

Bruce Menery, Michigan Department of Environmental Quality

Matt Schnepp, Michigan Department of State Police, Emergency Management Division

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Andrea Farley, Environmental Scientist – Technical researcher. Author of Geology, Seismicity, and Soils; Air Quality; Environmental Justice

Tom Hay, Environmental Scientist – Field assessment. Author of Terrestrial and Aquatic Habitat; Wetlands

Laura Dunleavy, Environmental Scientist – Technical researcher. Author of Water Resources; Floodplain Management; Zoning and Land Use; Noise; Public Service and Utilities; Traffic and Circulation; and Safety and Security

Mike Petrakis, Archeologist – Field assessment. Author of Visual Resources; Cultural Resources

Amy Siegel – Document Quality Control

Angela Chaisson, NEPA Group Leader/Senior Ecologist – Document Independent Technical Reviewer

Janet Frey, Project Scientist – Task Order Coordinator

Don Glondys, Certified Floodplain Manger – Project Manager

Figures

Photographs

Photographs – Franklin Branch Streambank Stabilization (Courtesy HRC)

Photograph 1: Threatened sanitary sewer line in Area 2

Photograph 2: Streambank erosion in Area 2, facing downstream

Photograph 3: Streambank erosion in Area 2, facing upstream

Photographs – Franklin Branch Streambank Stabilization (Courtesy HRC)

Photograph 4: Upper slope failure in Area 2 (1)

Photograph 5: Upper slope failure in Area 2 (2)

Photograph 6: Runoff from north side of the floodplain

Photographs – Franklin Branch Streambank Stabilization (Courtesy HRC)

Photograph 7: Upper slope failure in Area 3 along 14 Mile Road

Photograph 8: Upper slope failure in Area 3 below 14 Mile Road

Photograph 9: Streambank erosion in Area 4, facing upstream

Photographs – Franklin Branch Streambank Stabilization (Courtesy HRC)

Photograph 10: Base of slope failure in Area 4

Photograph 11: Upper slope failure in Area 4 below 14 Mile Road

Appendix A

List of Figures/Photographs

Figures:

Photographs:

Appendix B

EO 11988 – Floodplain Management & EO 11990 – Wetland Protection

Eight-Step Planning Process

Step 1: Determine whether the Proposed Action is located in a wetland and/or the 100-year floodplain, or whether it has the potential to affect or be affected by a floodplain or wetland.	**Project Analysis**: Bloomfield Township is a participant in the National Flood Insurance Program (NFIP) in good standing. According to the Flood Insurance Rate Map (FIRM) for this area (Panel 260169 0013 B, effective November 19, 1987), most of the project activities would occur within the 100-year floodplain. During a site visit on May 15, 2002, wetlands were identified within the boundaries of the project. Although specific details of the design are still unknown, it is anticipated that up to 2 acres of these wetlands could be affected.
Step 2: Notify public at earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision-making process.	**Project Analysis:** Initial publication was provided by FEMA on October 20, 2000 in the *Detroit Free Press.*
Step 3: Identify and evaluate practicable alternatives to locating the Proposed Action in a floodplain or wetland.	**Project Analysis:** The proposed project involves repairing existing areas of streambank erosion that are located within the 100-year floodplain. No practicable alternative exists that would not entail work within the floodplain. One alternative, No Action,, would not entail work within the floodplain, but would not meet the Purpose and Need of the project. This alternative, and the two other alternatives considered, are discussed below. **Alternative 1: No Action**. No activities would occur in a wetland and there would be no modifications to the floodplain. Failing streambanks would continue to erode, incising the channel, changing flood velocities and elevations. Potential sediment deposition into wetlands from eroding streambanks could continue. Wetlands would be adversely impacted. **Alternative 2: Streambank Stabilization Utilizing Channel and Upper Slope Stabilization, Bank Armoring, and Floodplain Terracing Techniques (Proposed Action)** Streambanks in five sections of Franklin Branch would be stabilized using a variety of methods including: in-stream channel stability (artificial riffles, boulder cross vanes, J-hook

	vanes), streambank armoring (steel sheeting, stone/boulder, geotextile, vegetation), floodplain terracing, and upper slope stabilization. This alternative would require placement of structures (i.e., streambank armoring structures such as stones, boulders, geotextiles, and vegetation) into the floodplain. Channel stabilization, streambank armoring, and floodplain terracing has the potential to permanently affect or temporarily disturb wetlands. Channel stabilization requires placement of material and work in open water wetlands. Streambank armoring would require placement of material in riverine wetlands that exist on the streambanks of Franklin Branch. Excavation for floodplain terracing is anticipated to occur in some forested wetland areas. **Alternative 3: Streambank Stabilization Utilizing Steel Sheeting and Channel Stabilization Techniques** This alternative involves the installation of steel sheeting along the streambanks of Franklin Branch. Channel stability measures such as artificial riffles, boulder cross vanes, and J-hook vanes would also be installed into the streambed. Steel sheeting, although an investment in the floodplain, is designed to accommodate flooding, and would not be adversely impacted should flooding occur. The sheeting would not lead to a perceptible decrease in the floodplain volume, and is therefore not anticipated to increase flood elevations upstream or downstream. Steel sheeting has very low resistance to flow, however, and installation of the sheeting may result in increased flood velocities. Channel stabilization and streambank armoring with steel sheeting has the potential to permanently affect or temporarily disturb wetlands. Channel stabilization requires placement of material and work in open water wetlands. Streambank armoring with steel sheeting would require placement of material in riverine wetlands that exist on the

	streambanks of Franklin Branch.
Step 4: Identify the full range of potential direct or indirect impacts associated with the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the Proposed Action.	**Project Analysis:** Under the Proposed Action, material would be deposited into the floodplain. This would include gravity walls, in-stream channel stability methods (stones and boulders comprising artificial riffles, boulder cross vanes, and J-hook vanes), and streambank stability methods (stones and boulders, geotextile fabric). These structures are designed to accommodate flooding; therefore no loss of investment is anticipated. The floodplain would be terraced in the vicinity of the streambank stabilization measures, and if engineered correctly, no impact to the floodplain is anticipated. Flood elevations and velocities upstream and downstream are not expected to increase. A hydrologic and hydraulic analysis was conducted and confirmed that the Proposed Action would not adversely impact the floodplain and that floodway width would remain unchanged. The proposed channel clearing, grading, and widening would reduce channel velocities and prevent scouring and continued channel incision, reducing the potential for downstream erosion. Activities associated with the Proposed Action include the construction of access roads in and adjacent to wetlands, the operation of heavy machinery in and adjacent to wetlands, the excavation of material in and adjacent to wetlands, and the deposition of fill material up gradient of wetlands. Although many of the construction activities would avoid wetland areas, it is anticipated that up to 2 acres of wetlands could be impacted by the Proposed Action. Many impacts would be temporary, however, and limited to the removal of some wetland vegetation and compaction of wetland soils.

Step 5: Minimize the potential adverse impacts to work within floodplains and wetlands to be identified under Step 4, restore and preserve the natural and beneficial values served by wetlands.	**Project Analysis:** In order to minimize adverse impacts to floodplains and wetlands, the applicant would obtain permits under Part 31, Water Resources Protection, Part 301, Inland Lakes and Streams, Part 303, Wetlands Protection, and Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), from the Michigan Department of Environmental Quality (MDEQ) and Oakland County Drain Commissioner's Office. By obtaining these permits and adhering to all conditions required for permitting, minimal adverse effects to floodplains and wetlands are anticipated. Mitigating the occupancy of the floodplain would be addressed under Part 31 of the NREPA. To mitigate filling part of the floodplain, the floodplain would be terraced in the vicinity of the streambank stability measures. As proposed by the applicant, material for structures to be placed in the floodplain (gravity walls and geocells) would be excavated from the floodplain in the vicinity of the project. This would result in minimal decrease of floodplain volume. To ensure minimal effects to flood elevations and velocities, the floodplain terracing would be modeled using an appropriate HEC-RAS program. The results of this simulation would be used to modify the proposed extent of terracing and minimize any effects to the floodplain. To ensure the 100-year flood elevation would not increase, the applicant would submit a "no-rise" certificate to FEMA. To mitigate the effects of heavy equipment use and compaction, it is recommended that project activities occur during dry periods (precipitation limited to less than 1 inch in the week prior to equipment use) or when the soil is frozen, and preferably with snow cover. Woodchips or mulch could be used along the trail to further reduce compaction, and if used, would be removed upon project completion. As a result of the "no-rise" certificate and Part 31 permitting, no effects to the floodplain are anticipated.

	As part of the Part 303 permitting, a formal delineation of wetlands in the vicinity of the project area would be conducted. The boundaries of all wetlands would be visibly flagged. Whenever possible, the applicant would avoid activities in wetlands. Coordinating the Part 31 and Part 303 permits with MDEQ would minimize floodplain terracing in the vicinity of wetlands. If wetland loss is unavoidable, the loss would be mitigated through conditions stipulated in the Part 303 permit. If conditions include wetland construction, the abandoned streambed created by the construction of the new channel could be used as a site for wetland creation. Vegetative loss and compaction would be mitigated by methods such as disking or raking to loosen the compacted wetland soils and then planting wetland vegetation in the disturbed areas. Erosion would be mitigated by the use of silt fencing and coverage of exposed soils with mulch or straw. If required under the Part 303 permit, new wetlands would be created in the vicinity of the project. As a result, no long-term impacts to wetlands are anticipated. Wetland values would be restored after construction activities through mitigation measures such as deconsolidating soils and planting native wetland vegetation.
Step 6: Re-evaluate the Proposed Action to determine 1) if it is still practicable in light of its exposure to flood hazards; 2) the extent to which it will aggravate the hazards to others; and 3) its potential to disrupt floodplain and wetland values.	**Project Analysis:** The Proposed Action remains practicable based on the streambank stabilization objective. The action is not anticipated to increase flood elevations or velocities upstream or downstream. No long-term adverse impacts to floodplains are expected. Most impacts to wetlands would be temporary. Permanent impacts to wetlands would be addressed during the Part 303 permitting. Potential mitigation may include wetland restoration to ensure no net loss of wetlands.
Step 7: If the agency decides to take an action in a floodplain or wetland, prepare and provide the public with a finding and explanation of any final decision that the floodplain or wetland is the only practicable alternative. The explanation should include any relevant factors considered in the decision-making process.	**Project Analysis:** Public notice will be made available at the time of the release of this draft Environmental Assessment (EA). Public comment would be incorporated into the Final EA.

Step 8: Review the implementation and post-implementation phases of the Proposed Action to ensure that the requirements of the Eos are fully implemented. Oversight responsibility shall be integrated into existing processes.	**Project Analysis:** This step is integrated into the NEPA process and FEMA project management and oversight functions.

Appendix C
Agency Correspondence

To obtain copies of agency correspondence, please contact:

Janet Frey
URS Group, Inc.
200 Orchard Ridge Drive,
Suite 101
Gaithersburg, MD 20878
phone: 301-258-9780
email: janet_frey@urscorp.com

Appendix D
Public Notice

Federal Emergency Management Agency
PUBLIC NOTICE

Notice of Availability of the Draft Environmental Assessment

for the Franklin Branch Streambank Stabilization Project

Environmental Assessment for the Franklin Branch Streambank Stabilization Project, Bloomfield Township, Oakland County, Michigan. FEMA-DR-1346-MI.

Interested persons are hereby notified that the Federal Emergency Management Agency (FEMA) is proposing to assist in the stabilization of failing streambank slopes along Franklin Branch in Bloomfield Township. In accordance with the National Environmental Policy Act (NEPA) of 1969 and the implementing regulations of FEMA, an Environmental Assessment (EA) is being prepared to assess the potential impacts of the proposed action on the human and natural environment. This also provides public notice to invite public comments on the proposed project in accordance with Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands. In addition, this notice and the draft EA provide information to the public on potential impacts to historic and cultural resources from the proposed undertaking, as outlined in the National Historic Preservation Act of 1966.

The EA evaluates alternatives that provide for compliance with applicable environmental laws. The alternatives to be evaluated include (1) No Action; (2) The Proposed Action, streambank stabilization along Franklin Branch utilizing channel and upper slope stabilization, bank armoring, and floodplain terracing technique; and (3) streambank stabilization along Franklin Branch utilizing steel sheeting and channel stabilization techniques.

The draft Environmental Assessment is available for review between May 26 and June 24, 2003, at the Bloomfield Township Library located at 1099 Lone Pine Road, Bloomfield Hills, Michigan and the Oakland County Research Library located at 1200 North Telegraph, Department 453, Building 14 East, Pontiac, Michigan, during normal business hours. The draft Environmental Assessment is also available for review online at the FEMA website http://www.fema.gov/ehp/docs.shtm.

Written comments regarding this environmental action should be received no later than 5 p.m. on June 24, 2003, to Jeanne Millin, Regional Environmental Officer, 536 South Clark, 6th Floor, Chicago IL 60605-1521, or at Jeanne.Millin@dhs.gov.

If no comments are received by the above deadline, the draft EA will be considered final and a Finding of No Significant Impact will be published by FEMA.

The public may request a copy of the final environmental documents from Jeanne Millin, Regional Environmental Officer, 536 South Clark, 6th Floor, Chicago IL 60605-1521, or at Jeanne.Millin@dhs.gov.

Appendix E
Public Comments

One comment was received from Jon E. Stopples, Village Administrator, Village of Franklin, Michigan, dated June 25, 2003.

Appendix F

Conceptual Distribution of Improvements Along Franklin Branch

To obtain copies of the Conceptual Distribution of Improvements along Franklin Branch, please contact:

Janet Frey
URS Group, Inc.
200 Orchard Ridge Drive,
Suite 101
Gaithersburg, MD 20878
phone: 301-258-9780
email: janet_frey@urscorp.com