

# Implementation Plan

City of Allen Park

City of Dearborn Heights

City of Ecorse

City of Inkster

City of Lincoln Park

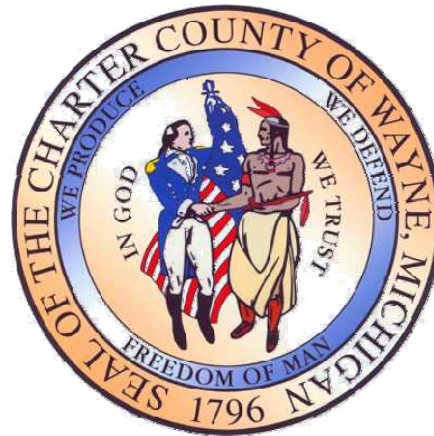
City of Melvindale

City of Taylor

City of Romulus

City of Westland

Prepared by:



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Wayne County Executive



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Wayne County Drain Commissioner

# TABLE OF CONTENTS

	Page No.
<b>Introduction</b> .....	1
<b>Flood Control Project Summary</b> .....	1
<b>Channel Improvements</b> .....	1
<b>Drain Crossing Improvements</b> .....	3
<b>Storm Water Detention Basins</b> .....	4
<b>Drain Enclosure at Merriman Road</b> .....	4
<b>Drain Enclosure at Allen Park</b> .....	4
<b>Spoil Deposition</b> .....	4
<b>Utility Relocation</b> .....	5
<b>Preliminary Project Schedule</b> .....	5
<b>Project Planning and Administration</b> .....	6
<b>Michigan Drain Code Procedure</b> .....	7
<b>Special Assessment Funding</b> .....	7
<b>Grant Funding</b> .....	8
<b>Data Management and Mapping</b> .....	9
<b>Environmental Planning</b> .....	11
<b>State and Federal Environmental Permits and Coordination</b> .....	11
<b>State Highway Right-of-Way Permits and Coordination</b> .....	12
<b>Railroad Right-of-Way Permits and Coordination</b> .....	13
<b>Local Permits and Coordination</b> .....	13
<b>Airport Permits and Coordination</b> .....	14
<b>Private Utility Coordination</b> .....	14
<b>Public Relations</b> .....	15
<b>Hydraulic Analysis and Modeling</b> .....	15
<b>Traffic Control Planning</b> .....	15
<b>Construction Sequencing</b> .....	15
<b>Project Financing</b> .....	25
<b>Right-of-Way Acquisition</b> .....	25
<b>Engineering</b> .....	26
<b>Construction Administration</b> .....	27

# **FLOOD CONTROL IMPLEMENTATION PLAN**

## **Introduction**

The objective of this report is to outline an implementation strategy for the North Branch of the Ecorse Creek (NBECD) Flood Control Project. Development of the implementation strategy is the final step of the NBECD flood control study, which included completion of seven tasks that culminated with the recommendation of the flood control project. Individual reports for each of the tasks have been completed. This report includes a summary of the flood control project scope and implementation plan.

## **Flood Control Project Summary**

The recommended flood control project which is the Greenway Alternative consists of:

- Reconstructing the open channel
- Replacing undersized bridges and culverts
- Installing a parallel drain enclosure near Merriman Road
- Relocating portions of the drain and constructing three regional storm water detention basins

Figure 1 provides a general schematic of the components of the flood control project and the following paragraphs provide discussion on each of the components. Additional information and details of the flood control project, including preliminary plans and design criteria for channel, crossings, basins, enclosures and spoil deposition are provided in the Task 7 report.

## Channel Improvements

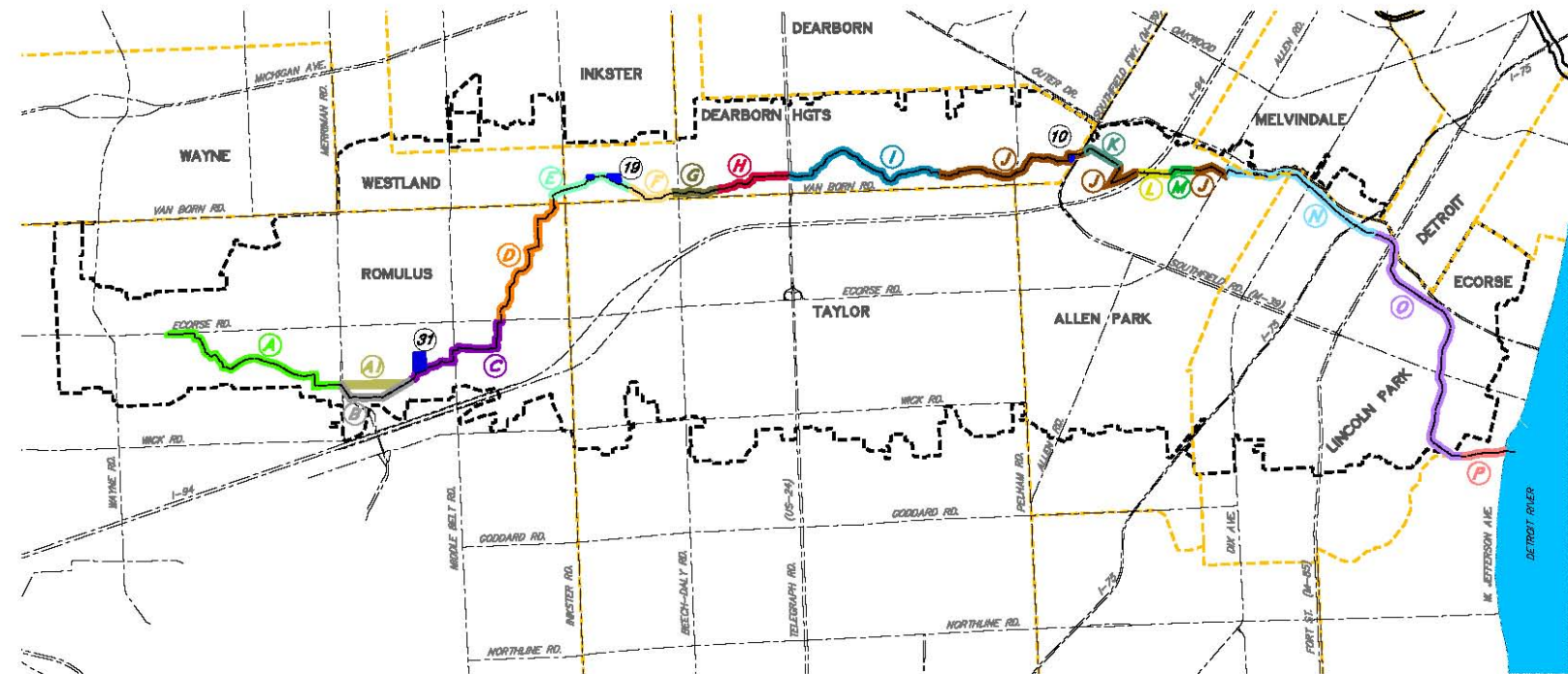
The flood control project includes channel improvements along the entire length of the NBECD. Channel improvements include the construction of a vegetated trapezoidal channel and a two shelf vegetated greenway channel. Figures 2 and 3 depict the general characteristics of each. The bottom widths of the required channel are indicated in Figure 1. The widths vary depending on the peak flood flow rates and the floodplain storage volume provided. Channel side slopes for both types of channel improvements are two (2) horizontal to one (1) vertical.

Figure 1

# NORTH BRANCH OF THE ECORSE CREEK DRAIN FLOOD CONTROL PROJECT COMPONENT MAP



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DRAIN COMMISSIONER: KURT L. HEISE

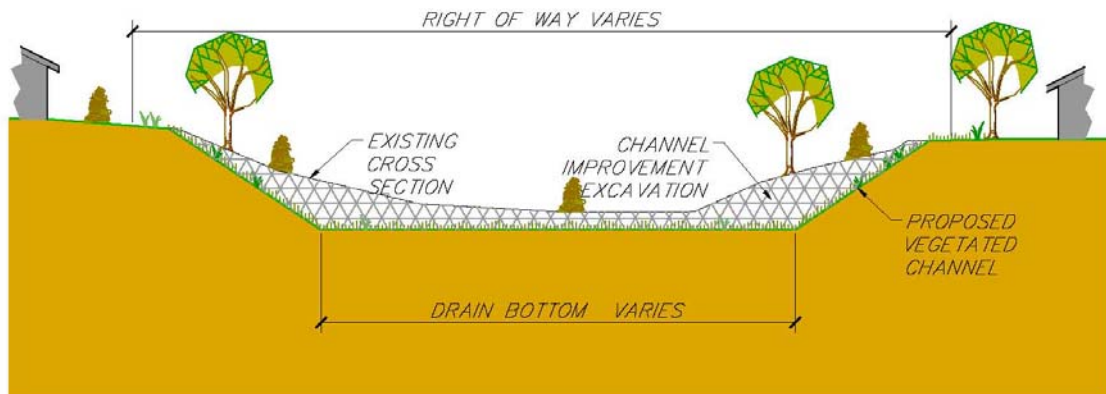


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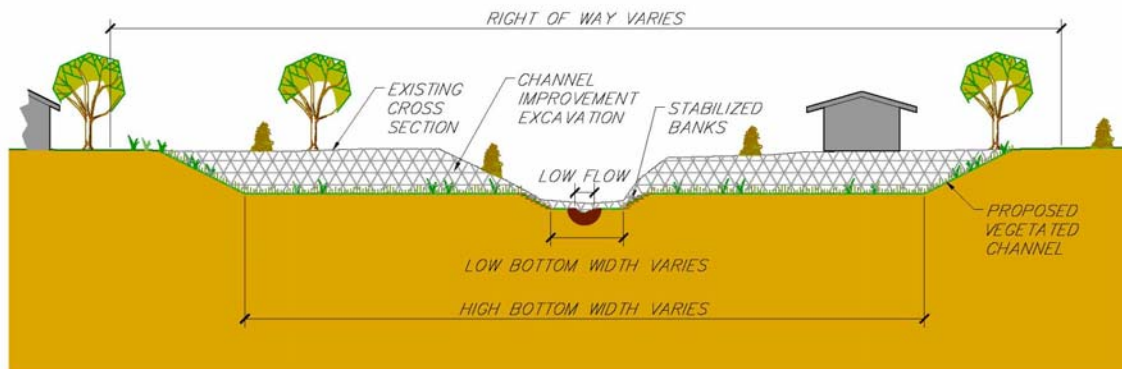
- |  |                                      |                                     |
|--|--------------------------------------|-------------------------------------|
| - 4' BOTTOM CHANNEL WIDTH                  | - 65' BOTTOM GREENWAY CHANNEL WIDTH  | - 45' BOTTOM GREENWAY CHANNEL WIDTH |
| - PARALLEL DRAIN ENCLOSURE                 | - 70' BOTTOM GREENWAY CHANNEL WIDTH  | - 64' BOTTOM CHANNEL WIDTH          |
| - EXISTING DRAIN ENCLOSURE CLEANOUT        | - 74' BOTTOM GREENWAY CHANNEL WIDTH  | - 80' BOTTOM CHANNEL WIDTH          |
| - 6' BOTTOM CHANNEL WIDTH                  | - 92' BOTTOM GREENWAY CHANNEL WIDTH  | - MUNICIPAL BOUNDARY                |
| - 8' BOTTOM CHANNEL WIDTH                  | - 87' BOTTOM CHANNEL WIDTH           | - DRAINAGE DISTRICT BOUNDARY        |
| - 25' BOTTOM GREENWAY CHANNEL WIDTH        | - 109' BOTTOM CHANNEL WIDTH          | - STORM WATER DETENTION BASINS      |
| - 50' TO 35' BOTTOM GREENWAY CHANNEL WIDTH | - 132' BOTTOM GREENWAY CHANNEL WIDTH |                                     |



**Figure 2**  
**Vegetated Trapezoidal Channel**



**Figure 3**  
**Vegetated Greenway Channel**



### Drain Crossing Improvements

Drain crossings are bridges or culverts along the NBECD. There are 81 drain crossings consisting of 50 public roads, 8 railroads, 13 footbridges, 9 private drives and one long enclosure. The required improvements for each crossing vary based on location and each crossing must be individually designed. Generally, the required drain crossing improvements can be summarized as follows:

- 12 existing crossings will remain but will receive maintenance or modification
- 13 crossings will be removed and not replaced
- 53 will be removed and replaced
- 5 new crossings will be installed in areas of drain re-alignment

### Storm Water Detention Basins

Storm water detention facilities collect and temporarily store (detain) excess storm water then release it back into the drain slowly. Many potential storm water detention sites were considered in the flood control study. Three (3) basin sites were selected including a large storm water detention facility (Detention Site No. 31 in Figure 1) located north of Smith Road between Middlebelt and Merriman Roads in the City of Romulus. This basin is required to be a deep, dry basin with dewatering pumps. The dry basin is a regulatory requirement due to its proximity to the Wayne County Metropolitan Airport (Metro Airport). The remaining basins (Detention Sites No. 19 and No. 10 in Figure 1) are located the City of Dearborn Heights near Inkster Road and Southfield Freeway, respectively. These are smaller and shallower basins that will dewater by gravity.

### Drain Enclosure at Merriman Road

A portion of the NBECD near Merriman Road in the City of Romulus is currently enclosed. Since this reach of the NBECD is currently enclosed primarily to provide parking near Metro Airport, it is recommended to keep this enclosure in-place and install a new parallel enclosure to increase the conveyance capacity. The new parallel enclosure would be located along Smith Road.

### Drain Relocation in Allen Park

A large scale relocation of the drain in the City of Allen Park is proposed. This is to reduce the number of homes that must be acquired and accommodate a sanitary sewer overflow improvement project currently being planned by Allen Park. A storm sewer must be placed in the existing drain to service existing storm water outfalls.

### Spoil Deposition

The flood control project is estimated to produce 1.3 million cubic yards of spoils (excavated soil) that must be properly disposed. Two (2) sites have been identified in the Beverly and German Drain located in the City of Taylor.

## Utility Relocations

It is expected that relocations of existing utilities, including public and private utilities, such as gas, water, sewer, pipelines, cable, telephone, fiber optic, electric and streets will be required.

## **Preliminary Project Schedule**

The preliminary project schedule to complete the NBECD flood control project is 10 years. The schedule assumes the project will be administered by the WCDOE in accordance with the Michigan Drain Code. The schedule has been divided into six (6) components as follows:

- Project Management and Administration
- Right-of-way Acquisition
- Engineering Design
- Construction Bidding
- Project Financing
- Construction

Table 1 shows the preliminary project schedule. The schedule calls for initial activities including planning, right-of-way acquisitions, engineering design and permitting to occur simultaneously. This is recommended to accelerate the project schedule and to minimize project costs. Extension of schedule will result in cost increases. The following paragraphs provide a summary of each of the components of the schedule.

**Table 1  
NBECD Preliminary Flood Control Project Implementation Schedule**

Phase	Stage (Year from Start)									
	1	2	3	4	5	6	7	8	9	10
Project Management & Administration	■	■	■	■	■	■	■	■	■	■
Right-of-Way Acquisition	■	■	■							
Engineering Design	■	■	■							
Construction Bidding				■						
Project Financing	■	■	■	■						
Construction					■	■	■	■	■	■

**Project Planning and Administration**

Project management and administration activities will be required for all phases of the implementation of the NBECD flood control project. Recommended project management and administration activities have been generalized as follows:

- Administration of project in accordance with Michigan Drain Code procedure
- Project funding coordination
- Data management and mapping
- Coordination with other planned improvements
- Environmental planning
- Regulatory coordination and permitting
- Hydraulic analysis and modeling
- Utility conflict and relocation planning
- Traffic control planning
- Construction sequence planning
- Public relations
- Coordination of right-of-way acquisition
- Review of engineering design
- Oversight of construction

It is recommended that WCDOE assemble an implementation team. The team should consist of WCDOE staff and consultants to assist in project planning and administration.

The team should include a project manager, an assistant project manager, a storm water engineer, an environmental specialist, a traffic engineer, a surveyor, a title research specialist, a drain code attorney, a bond attorney, a land acquisition attorney, an appraiser, a financial consultant, a grant coordinator, data management specialist and public relations specialist.

The following paragraphs provide a summary of project planning efforts completed to date and recommendations for implementation of the project.

#### Michigan Drain Code Procedure

The NBECD flood control project is being administered in accordance with Michigan Public Act 40 of 1956 (Michigan Drain Code). The following is a general summary of milestone procedures in accordance with Drain Code.

- Acquisition of right-of-way
- Development, permitting and approval of engineering construction plans
- Notice of Bid Letting and Day of Review
- Bid Letting
- Notice of Award
- Computation of Cost
- Day of Review of Apportionments
- Board of Review
- Bond Sale
- Notice of Proceed
- Construction

#### Special Assessment Funding

The primary funding mechanisms for the flood control project are (a) assessments to the NBECD Drainage District and (b) obtaining grants or funding. Project costs that are not funded or grants will be assessed by the NBECD Drainage District, in accordance with the Michigan Drain Code. The WCDOE team must develop a final apportionment of costs, based on benefits derived, prior to the Day of Review of Apportionments.

## Grant Funding

The special assessment cost will be reduced if grants/funding for the project is obtained as long as costs do not escalate. Obtaining grants/funding may impact the schedule and implementation plan outlined in this report. The WCDOE team should continue to pursue grants/funding for this project in order to bring financial relief to the property owners. The following is a summary of grant funding pursued to date.

The United States Army Corp of Engineers (USACE), the Michigan Department of Environmental Quality (MDEQ), the Federal Emergency Management Agency (FEMA) and the Michigan Department of Transportation all have been contacted regarding grant funding possibilities for the NBECD flood control project. The following paragraphs summarize the discussions with each agency.

The USACE indicated the potential for g funding through the Water Recourses Development Act (WRDA). Through WROA, potential funding of up to 65 percent of the engineering and construction cost of a flood control project. This funding can be applied towards a project based upon the USACE cost benefit analysis and cannot be applied towards property acquisition. The USACE indicated the first step to securing funding is the authorization of funding from the U.S. Congress to proceed with a study and cost benefit analysis. Currently the NBECD flood control project is listed in WRDA.

The USACE must first complete a cost benefit analysis and study to develop a federally accepted scope of the flood control project. The USACE indicate that funding for a locally preferred project scope is possible up to the cost estimate of the USACE project. Depending upon USACE cost benefit analysis, funding of a locally preferred project scope is likely less than 65 percent.

Upon completion of the USACE cost benefit analysis, a recommendation would be provided to Congress for the funding of engineering and construction. The funding must then be appropriated and authorized by Congress, at which time, the USACE could move forward with the flood control project.

The MDEQ awarded a \$2,000,000 grant through the Clean Michigan Initiative (CMI) for the construction of a demonstration greenway project in the City of Dearborn Heights. The grant requires a 50 percent local match therefore a \$1,000,000 is being received from the MDEQ. The demonstration project includes two storm water detention sites, three short sections of greenway channel and storm water best management practices in Dearborn Heights.

The Michigan State Police Emergency Management Division (MSP-EMD) works in conjunction with FEMA on pre-disaster hazard mitigation planning. In the past, this program provided funding for acquisition of flood prone properties. The MSP-EMD, through FEMA, can fund up to \$3,000,000 annually for the acquisition of flood prone structures. It is expected this funding will be available in upcoming years. Initial discussion with MSP-EMD indicates the NBECD project is a viable application. The grant requires a 25% local match and can be used towards acquiring flood prone structures. The WCDOE approved pre-disaster hazard mitigation plan must address the needs of the NBECD and WCDOE must identify and coordinate with property owners who wish to voluntarily sell their home. The WCDOE then provides MSP-EMD with the application. The FEMA cost benefit analysis is completed and homes meeting cost benefit are submitted to FEMA for funding in a nationally competitive grant program.

MDOT indicated they have no grant funding available but they would pay for 5.15 % of the overall project cost based on their benefits received.

#### Data Management and Mapping

The WCDOE team must maintain a data management and mapping system through the implementation of the NBECD flood control project. Preliminary data management and mapping activities that have been started as part of the flood control study include:

- Topographical survey mapping
- Two foot contour mapping
- Aerial photography
- Flood mapping

- Right-of-way and channel alignment mapping
- Preliminary utility mapping
- Drainage district mapping
- Preliminary assessment roll development

The WCDOE team will need to update and further develop the data management and mapping system. It is expected and recommended that data management and mapping related to the following be completed in the initial phases of the project implementation:

- Establish a vertical and horizontal control network
- Detailed utility mapping
- Planimetric mapping and 1 foot contour mapping
- Right-of-way mapping and acquisition tracking
- Wetland mapping
- Mapping sites of known soil contamination
- Soil sampling and boring location mapping
- Flood mapping of final design
- Drainage district mapping
- Public comment tracking

As the flood control project progresses, it is expected that data management and mapping related to the following will be required:

- Traffic and detour route mapping
- Construction sequencing mapping
- Engineering plan management
- Assessment and notification tracking
- Development of apportionments
- Permit coordination and tracking

It is anticipated that data and information will be provided from various sources and therefore recommended that all data from NBECD be digitally stored, reviewed and managed in a centrally accessible system.

### Environmental Planning

With the implementation of the NBECD flood control project, it is expected that wetlands, soil contamination and illicit discharges will be encountered. It is recommended that wetland delineations, detailed evaluation of soil contamination and coordination with municipalities regarding illicit discharges be completed in the initial planning phases of the project.

### State and Federal Environmental Permits and Coordination

Compliance with environmental regulations and securing permits from state and federal environmental regulatory agencies is required. It is anticipated that environmental permitting from the following agencies will be required:

- United States Environmental Protection Agency (EPA)
- United States Army Corp of Engineers (USACE)
- Michigan Department of Environmental Quality (MDEQ)
- Michigan Department of Natural Resources (MDNR)
- Office of the State Archaeologist
- Michigan's State Historic Preservation Office

Areas regulated by state and federal statutes include:

- Navigable waterways
- Inland streams
- Wetlands
- Floodplains
- Contaminated soil
- Threatened or endangered species
- Archeological or historical sites

Initial meetings with the MDEQ and USACE were conducted to review the recommendations of the flood control study. Based on initial coordination with the MDEQ and USACE and based on preliminary environmental assessments completed in Task 4, it is concluded the flood control project can be implemented within the framework of state and federal environmental regulation. Ongoing coordination with MDEQ and the USACE is required and WCDOE must submit applications for the appropriate permits.

#### State Highway Right-of-Way Permits and Coordination

Right-of-way permits and coordination of the flood control project with MDOT is required. The recommended flood control project includes the replacement of five (5) MDOT drain crossings including:

- M-85 (Fort Street)
- I-75 Expressway
- I-94 Expressway
- M-39 (Southfield Freeway)
- M-24 (Telegraph Road)

The WCDOE and MDOT have met to review the flood control project. It was identified that an agreement between MDOT and WCDOE is needed to implement the flood control project. Currently, a draft agreement between MDOT and WCDOE regarding the implementation and funding of these improvements is being drafted. In general, the agreement is that MDOT will administer the engineering and construction of the MDOT drain crossings and WCDOE will obtain easements and right-of-way. WCDOE, on behalf of the NBECD Drainage District, will reimburse MDOT for the engineering and construction cost of MDOT drain crossing improvements. MDOT will pay to the WCDOE an assessment for 5.15% of the total cost of the flood control project. MDOT will also pay for supplemental work, if any, that MDOT may request at their discretion.

MDOT has indicated the schedule to replace their crossings is five (5) to seven (7) years. For traffic control purposes, MDOT will allow only one crossing to be under construction

at a time. The WCDOE will provide MDOT with the preliminary channel alignment and drain right-of-way along with the flood flow rates and flood control design criteria and MDOT will oversee design and construction of MDOT drain crossings.

#### Railroad Right-of-Way Permits and Coordination

Right-of-way permits and coordination of the flood control project with various railroad companies is required. There are four railroad companies that own right-of-way with the NBECD drainage district. Each company has been provided notice and preliminary correspondence regarding the flood control project. Detailed coordination of railroad right-of-way permitting requirements, project approach and project cost has yet to be completed. The recommended flood control project includes the replacement of five (5) railroad crossings and working within railroad right of way owned by:

- Canadian National Railway
- Consolidated Rail Corporation
- CSX Transportation
- Norfolk Southern Railway

#### Local Permits and Coordination

Permitting and coordination of the flood control project with local governmental agencies is required. Initial coordination meetings with Wayne County and municipalities have been conducted and must continue. Additional coordination with the following will be required:

- Wayne County Department of Public Services (WCDPS)
- Municipalities within the Drainage District
- City of Detroit (water distribution)

Initial coordination of public utilities has been completed as outlined in Task 7. The flood control project scope will require the replacement of county and local drain crossings and relocation of public utilities including water mains, sanitary sewers and local roads. Detailed utility mapping and coordination of utility relocations is also required.

### Airport Permits and Coordination

Portions of the recommended flood control project are near to the Metro Airport. The following agencies will need to be coordinated with regarding access, air space, and regulations:

- Wayne County Airport Authority (WCAA)
- MDOT Bureau of Aeronautics
- Federal Aviation Administration (FAA)

### Private Utility Coordination

The following is a preliminary list of private utilities that are located within the NBECD corridor. Each of the companies has been provided initial notice regarding the flood control project. It is expected that relocation will be required of private utilities such as gas, electric, phone, cable and others. Detailed utility mapping and coordination of utility relocations is required.

- AT&T/SBC
- Buckeye Pipeline
- Canadian National Railway
- CenturyTel
- Comcast
- Consolidated Rail Corporation
- Consumers Energy Electric
- CSX Transportation
- Detroit Edison
- Detroit Water & Sewer
- Elantic Telecom, Inc.
- Ford Motor Company
- Gabes Construction
- HLG Consulting
- International Transmission Company
- Kinder Morgan/BP Pipeline
- Level (3) Communications
- Marathon Pipeline LLC
- MCI
- Nextel Communications
- Norfolk Southern Railway
- Panhandle Eastern Pipeline
- Praxair Inc.
- RKA Petroleum Companies, LLC
- Qwest Communications
- RVP Fiber Company LLC
- Shell Oil Products US
- Sunoco Pipeline LP
- TDS Metrocom
- Wide Open West
- Wolverine Pipeline Co.

### Public Relations

Due to the magnitude of the NBECD flood control project, the potential for flooding and the 10-year schedule to implement the project, continuous efforts to keep the public informed on the status and progress of the NBECD project is recommended. Currently a web site has been established. It is recommended the web site be maintained and updated. It is also recommended that WCDOE conduct town hall information meetings, provide press releases, and have a public relations coordinator for this project.

### Hydraulic Analysis and Modeling

It is expected that the WCDOE team will update the preliminary design of the flood control project as engineering design and right-of-way acquisition proceeds. The flood control study outlines the design parameters of the flood control project but does not consider detailed design elements. Computer modeling of final design is needed to verify the level of flood reduction is not diminishing and to update the analysis for permitting purposes.

### Traffic Control Planning

The WCDOE team must have a traffic control plan developed as it is expected that traffic control and the ability to provide emergency service will be a primary factor in finalizing the construction sequencing plan. Drain crossing replacement must be staggered to minimize impacts on traffic during construction.

### Construction Sequencing

The majority of the activities described in previous paragraphs must occur prior to construction. Considering the magnitude of the project, four (4) years of work have been estimated.

The initial construction sequencing plan for the NBECD flood control project plans for a 6 year construction schedule with multiple stages of construction activities. Factors considered in developing the initial construction sequencing plan include (a) traffic control, (b) emergency services, (c) bus routes, (d) weather, and (e) road weight

restrictions. Other factors that may impact construction sequencing may include availability of raw materials, environmental contamination and social events. Figures 4 through 9 and Table 2 show the construction sequencing plan on a year by year basis. The following paragraphs provide a written summary of NBECD flood control project components to be completed in each year.

Construction activities have been shown to occur in year 5 through 10 in the overall project implementation schedule shown on Table 1. The following activities have been expressed in construction stages. Each stage is assumed to be one year in length starting in the fifth year of the implementation schedule.

The construction activities included in the initial plan for “**Stage 1**” construction include:

- Right-of-way clearing from Jefferson Avenue to I-75
- Utility and local road relocations from Jefferson Avenue to I-75
- Replace I-75 drain crossing
- Replacement/improvements to eight (8) other drain crossings
- Preparation of spoil disposal facilities and haul routes
- Begin construction of storm water detention basin No. 31 near Smith Road in Romulus

The construction activities included in the initial plan for “**Stage 2**” construction include:

- Channel improvements Jefferson Avenue to M-85
- Right-of-way clearing from I-75 to I -94
- Utility and local road relocations I-75 to I-94
- Replace M-85 drain crossing
- Replacement/improvements to sixteen (16) other drain crossings
- Finish storm water detention basin near Smith Road
- Begin construction of Merriman Road enclosure

The construction activities included in the initial plan for “**Stage 3**” construction include:

- Channel improvements M-85 to I-94

- Right-of-way clearing from I-94 to Monroe Street
- Utility relocations M-94 to Monroe Street
- I-94 drain crossing
- Replace to fourteen (14) drain crossings
- Channel improvement Merriman Road to Ecorse Road
- Allen Road enclosure

The construction activities included in the initial plan for “**Stage 4**” construction include:

- Channel improvements I-94 to Monroe Street
- Right-of-way clearing from Monroe Street to Beech Daly Road
- Utility and local road relocations Monroe Street to Beech Daly Road
- Replace M-39 drain crossing
- Replacement/improvements to fifteen (15) drain crossings.
- Shenandoah Avenue, Larne Avenue, Keppen Avenue, Russell Avenue enclosure

The construction activities included in the initial plan for “**Stage 5**” construction include:

- Channel improvements Monroe Street to Beech Daly Road
- Right-of-way clearing from Beech Daly Road to Smith Road
- Utility and local road relocations Beech Daly Road to Smith Road
- M-24 drain crossing
- Replacement/improvements to nine (9) drain crossings.

The construction activities included in the initial plan for “**Stage 6**” construction include:

- Channel improvements from Beech Daly Road to Smith Road
- Replacement/improvements to five (5) drain crossings
- Disposal and restoration

**Table 2  
NBECD Flood Control Project  
Drain Crossing Improvement Construction Sequencing Schedule**

No.	Crossing Name	Proposed Stage of Improvements	No.	Crossing Name	Proposed Stage of Improvements
1	W. Jefferson Ave.	N/A	35	Hanover St.	4
2a	Railroad Tracks	N/A	36	Hipp St.	4
2b	Railroad Tracks	N/A	37	Polk St.	3
2c	Railroad Tracks	N/A	38	Hanover St.	3
2d	Railroad Tracks	1	39	Harding Ave.	4
3	Southfield Rd.	1	40	40 Gertrude Ave.	4
4	Austin Ave.	2	41	Campbell St.	4
5	Victoria Ave	1	42	Hanover St.	4
6a	Fort St. (85)	2	43	Williams St.	4
6b	Fort St. (85)	2	45	Monroe St.	3
7	Lafayette Blvd.	2	46	Pardee Ave.	4
8	Fisher Fwy. (I-75)	1	47	Parker Ave.	5
9	John Papalas Dr.	3	48	Madison Ave.	4
10	Railroad Tracks	3	49a	Telegraph (North)	5
11	Private Drive	2	49b	Telegraph (South)	5
12	Porter Ave.	2	50	Banner Ave.	5
13	Dix Hwy.	3	51	Gulley St.	5
14	Footbridge	2	52	Beech Daly Rd.	4
15	Frank Ave.	3	53	Old Driveway	5
16	Stanley Ave.	2	54	Private Footbridge	6
17	Allen Rd.	3	55	Bayham St.	5
17a	Allen Rd.	3	56	Inkster Rd.	6
18	City Park	2	57	Van Born Rd.	6
19	Railroad	3	58	Beverly Rd.	5
20	Railroad	3	58b	Private Drive	6
21	Railroad	3	59	Ecorse Rd.	5
22	Baker College	2	60	Middlebelt Rd.	5
23a	E. I-94	3	61	Private Drive	5
23b	W. I-94	3	62	Smith Rd.	6
23c	E. I-94	3	63*	Merriman Rd.	2
23d	W. I-94	3	63a	Merriman Rd.	2
24	Shenandoah Ave	4	64	Venoy Rd.	1
24a*	Shenandoah Ave	4	65	Henry Ruff Rd.	1
25	Larme/Keppen	4	66	Sargent Rd.	2
25a*	Larme/Keppen	4	67	Private Drive	2
26*	Russell Ave.	4	68	Private Footbridge	1
27	Watson Ave.	3	69	Private Drive	2
28	Euclid Ave.	3	70	Private Drive	2
29	Southfield Rd. (M-39)	4	71	Private Drive	2
30	Bedford St.	4	72	Private Drive	1
31	Edgewood St.	3	73	Private Drive	2
32	Kingston St.	4	74	Private Drive	1
33	Pelham St.	3	75	Ecorse Rd.	2
34	Jackson St.	4			

Figure 4

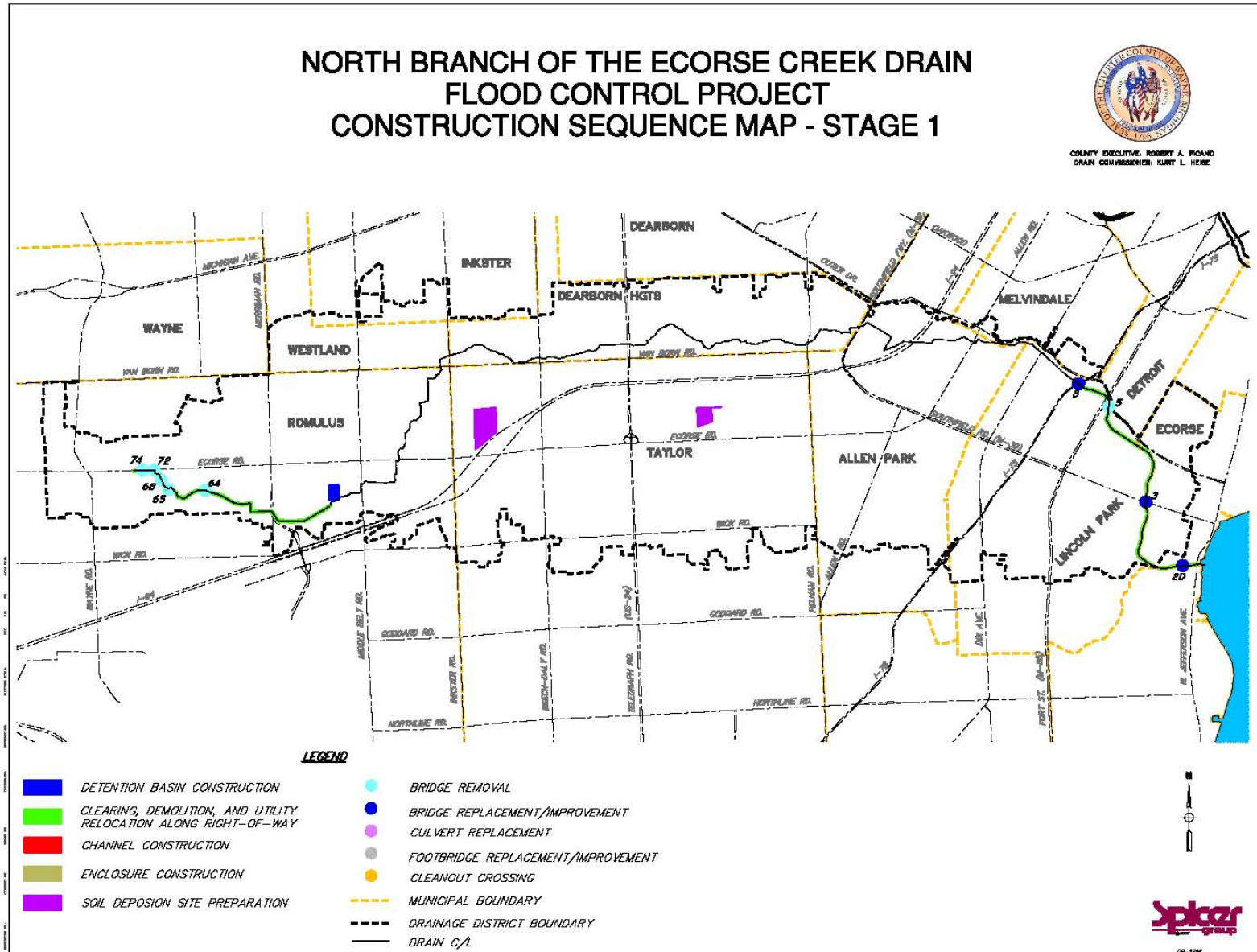


Figure 5

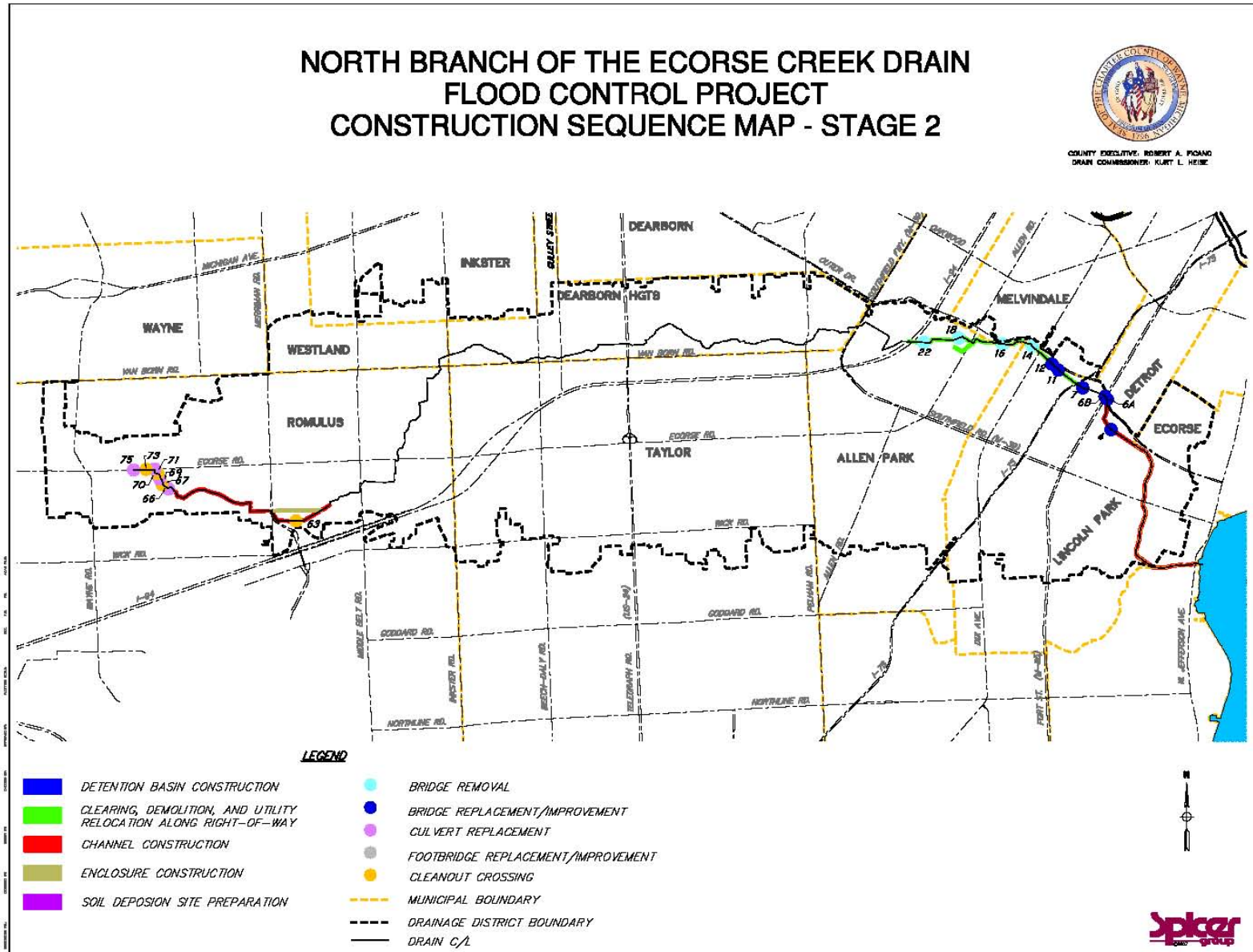


Figure 6

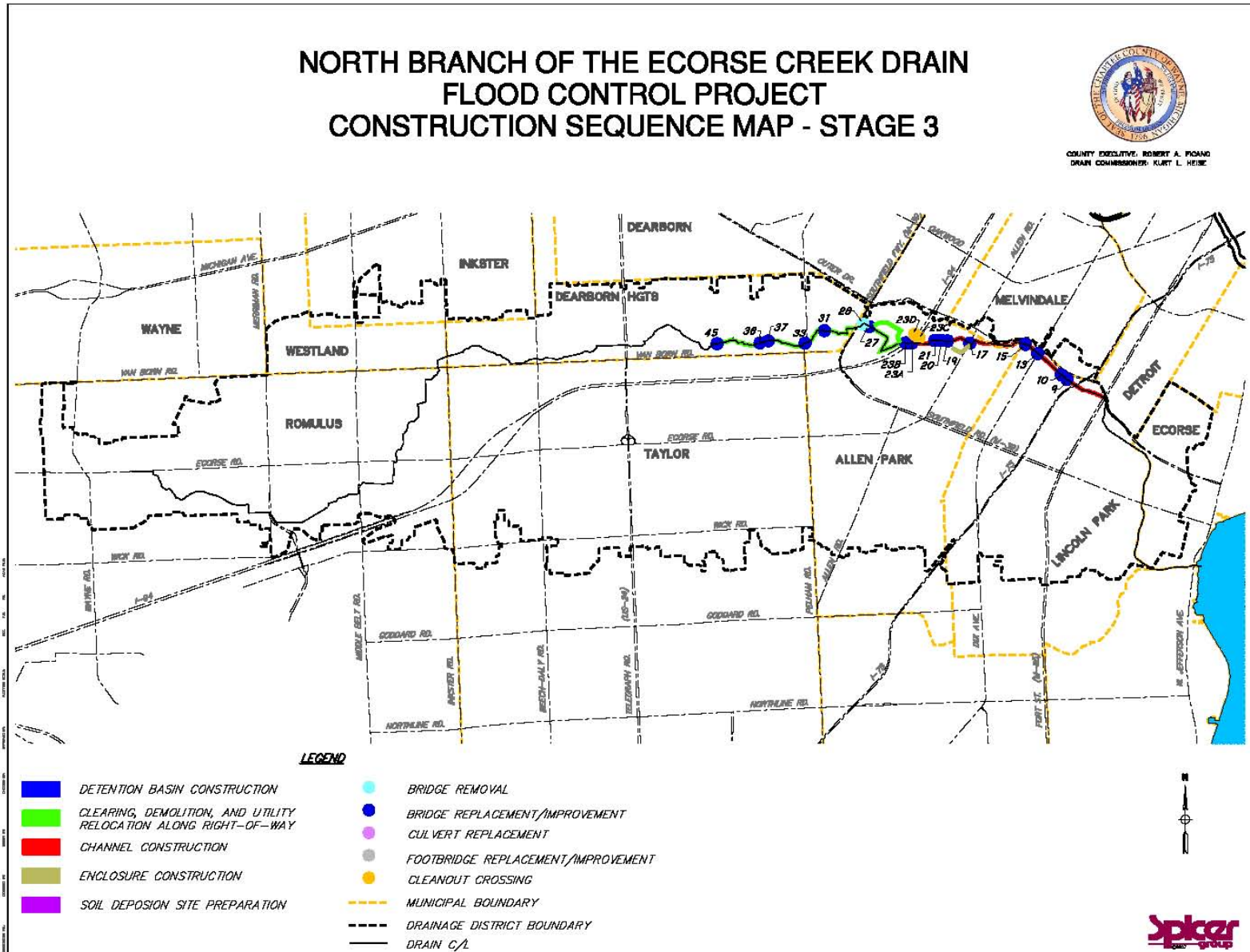


Figure 7

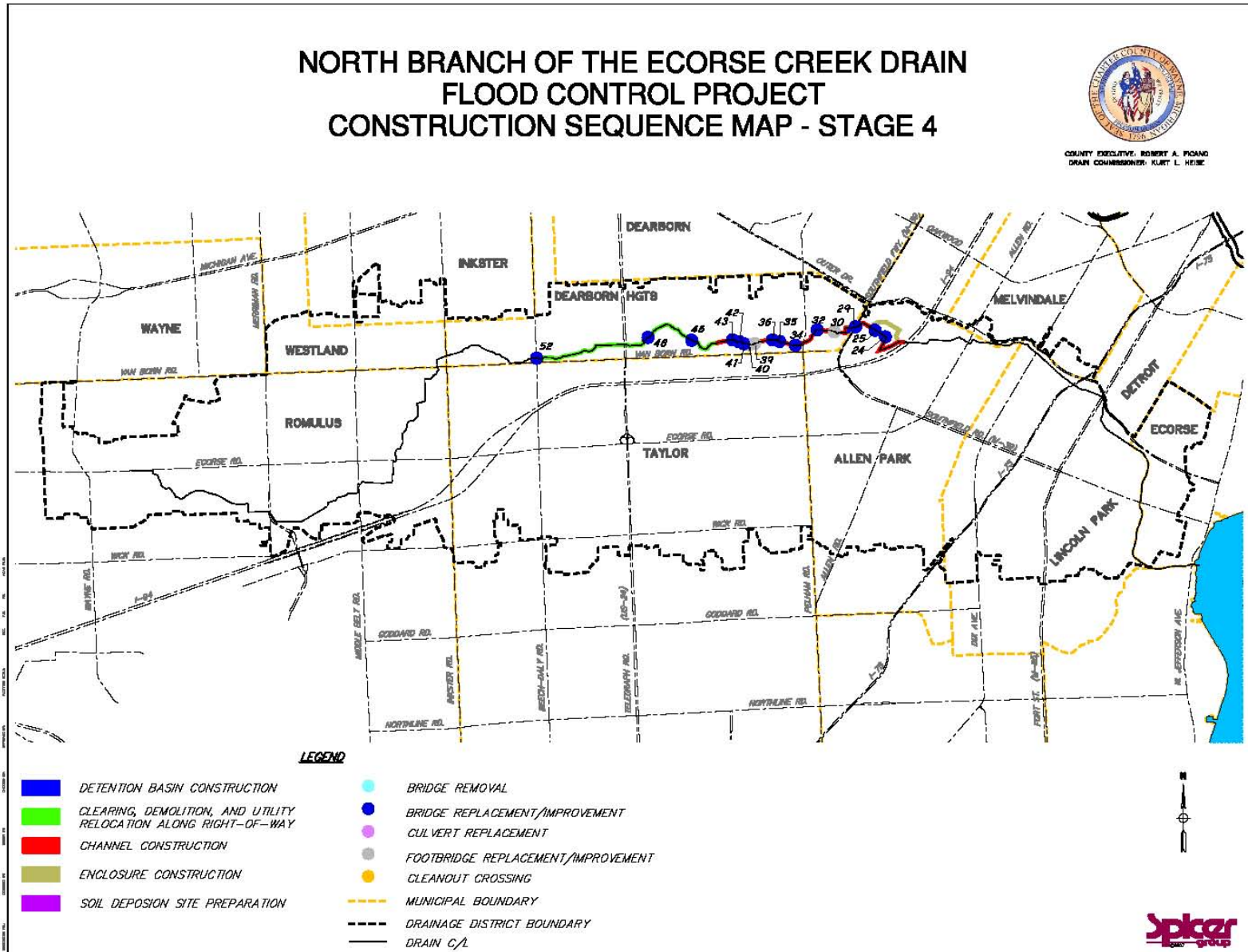


Figure 8

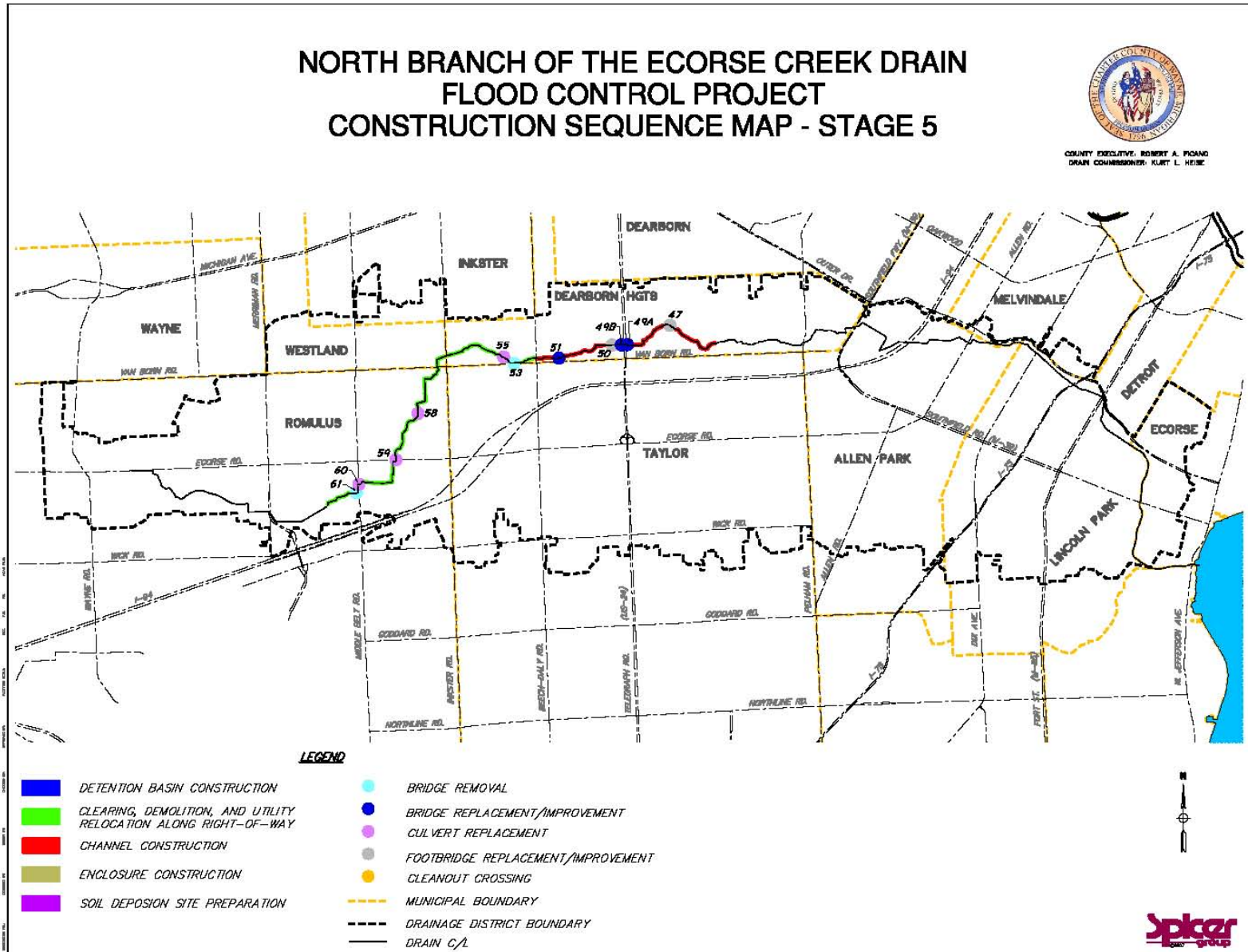
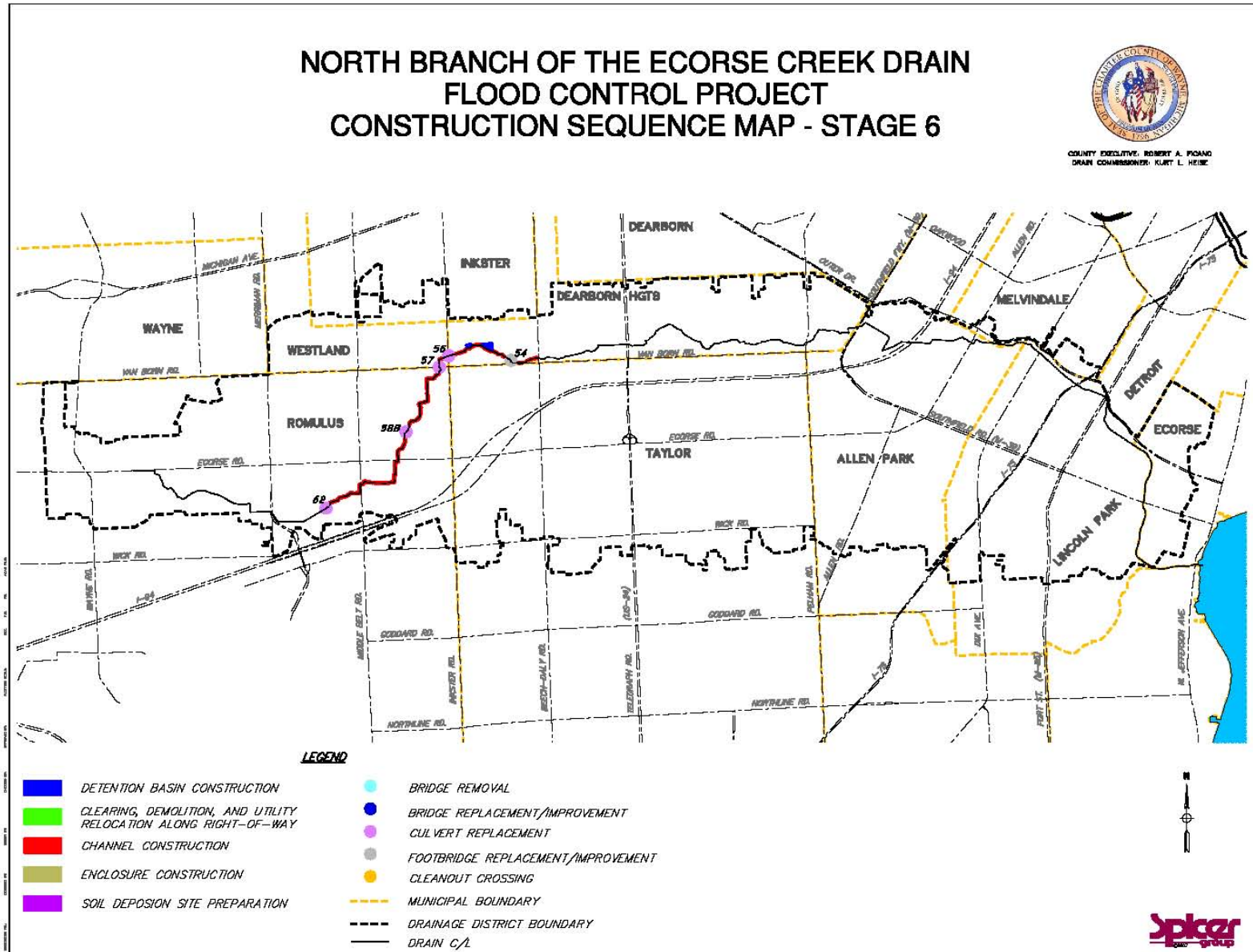


Figure 9



## Project Financing

A project financing plan must be developed. It is recommended that the WCDOE complete preliminary planning with a financial consultant and bond attorney and identify interim and long term financing plans. With Drain Code projects, typically the overall project financing is completed through a bond sale for the total project cost. The bond sale typically occurs after the Day of Review. Prior to the Day of Review, engineering, permitting and right-of-way acquisition must be completed. The estimated cost of these activities is \$78 million.

## Right-of-Way Acquisition

Due to the magnitude of needed improvements, additional right-of-way is required for the construction and maintenance of the flood control project. The development of right-of-way acquisition requirements is outlined in the Task 5 through 7 reports.

Right-of-way across 741 properties is required. Right-of-way across a property will be obtained either through acquisition of an easement or acquisition of the entire property, depending on the location and size of the property and the needed improvements across that property. Table 3 summarizes number of right-of-ways and type of acquisition needed in each community. Right-of-way maps for the flood control project are provided in the Task 7 report.

**Table 3**  
**Right-of-Way Acquisition for the NBECD Flood Control Project**

Municipality	Number of Property Acquisitions Required	Number of Easement Acquisitions Required
Allen Park	71	16
Dearborn Heights	301	103
Ecorse	12	20
Lincoln Park	58	61
Melvindale	17	10
Romulus	5	59
Westland	3	5
<b>TOTAL</b>	<b>467</b>	<b>274</b>

The WCDOE implementation team must include legal council, engineer, surveyor, acquisition agent, title research specialist and environmental consultant to assist with right-of-way acquisition. A detailed right-of-way acquisition plan must be developed and implemented. The right-of-way acquisition plan is likely to require condemnation of property. The following is a general list of activities associated with the right-of-way acquisition of private property.

- Final determination of property and easements needed
- Prioritization of acquisitions (e.g. property currently for sale)
- Property title search
- Preparation of legal descriptions and exhibit drawing
- Preparation of legal documents (deed, easement, etc)
- Negotiations with property owners
- Appraisal of property
- Purchase agreement
- License agreements with other easement or interest holders
- Closing conference
- Recording of legal documents
- Property acquisition litigation begins when no agreement can be reached

### **Engineering**

The WCDOE implementation team must consist of multi-discipline engineering professionals to complete preliminary and final design of the project. It is expected that the entire project must be designed and prepared for one bid letting; therefore, coordination and adherence to tight schedule are critical. Engineering design of the following will be required:

- Open channel improvements (17 miles)
- Drain crossing improvements (83)
- Storm water detention basin (3)
- Drain enclosure at Merriman Road

- Utility and road relocations
- Spoil deposition sites

### **Construction Administration**

The WCDOE will need to assemble a construction administration team. It is expected that the following must be completed in the construction phase.

- Construction staking
- Construction inspection
- Data management
- Public relations
- Traffic control
- Storm water operator inspections
- Environmental monitoring
- Material testing
- Material selections/verifications
- Supplemental/replacement control surveying
- As-built surveying and drawings
- Quantity calculations
- Processing of:
  - Progress reports
  - Change orders
  - Bulletins
  - Field orders
  - Shop drawing reviews