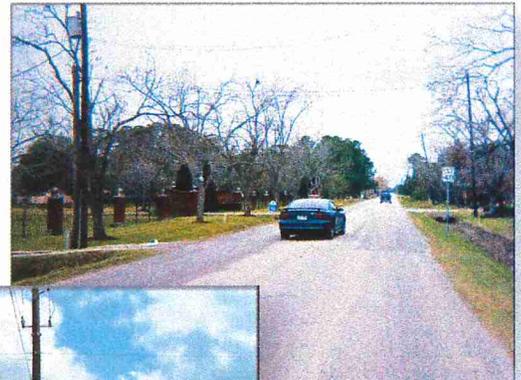
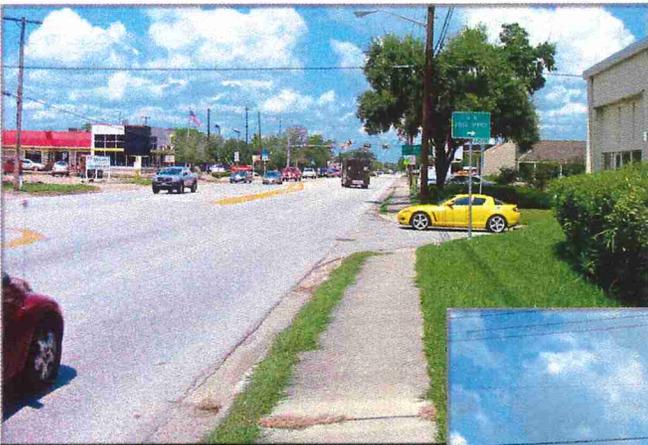


City of Friendswood

Master Drainage Plan - Phase II

March 2007



March 30, 2007

Mr. Zafar Iqbal, P.E.
City Engineer
City of Friendswood
910 S. Friendswood Drive
Friendswood, Texas 77546

RE: City of Friendswood
Drainage Master Plan – Phase II

Dear Mr. Iqbal:

Costello, Inc. (CI) is pleased to provide twenty (20) copies of the final Drainage Master Plan – Phase II report. The report has been prepared in accordance with the work authorized by City Council on July 24, 2007. Please review the report and call me if you have any questions concerning the analysis and recommendations presented. We will be glad to meet with you and your staff to discuss the final report.

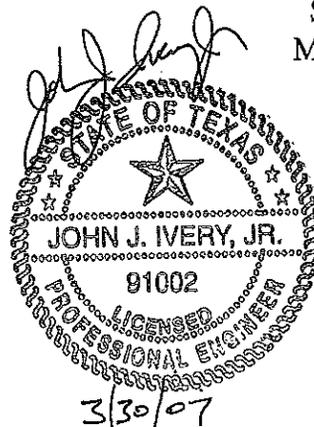
We have appreciated the assistance that you and your staff have provided during this important infrastructure planning project and look forward to being involved in the implementation of the projects identified in this drainage master plan.

Sincerely,
Costello, Inc.



Samuel W. Kruse, Jr., P.E.
Manager – Municipal Services

SWK/ns
Enclosures



MASTER DRAINAGE PLAN

PHASE II

City of Friendswood

**Costello, Inc.
9990 Richmond Avenue
Suite 450, North Building
Houston, Texas 77042
(713) 783-7788 – telephone
(713) 783-3580 - facsimile**

March, 2007

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I. Authorization & Purpose

Costello, Inc. (CI) was engaged to provide engineering services for this Phase II Master Drainage Plan by the Friendswood City Council at their July 24, 2007 meeting.

This Phase II Master Drainage Plan update has two purposes. One purpose will be to provide updated development changes, peak flow calculations, resulting improvement needs, and construction cost estimate updates for three specific known "problem areas" within the City. These problem areas were defined in the 1993 Master Plan and are identified as:

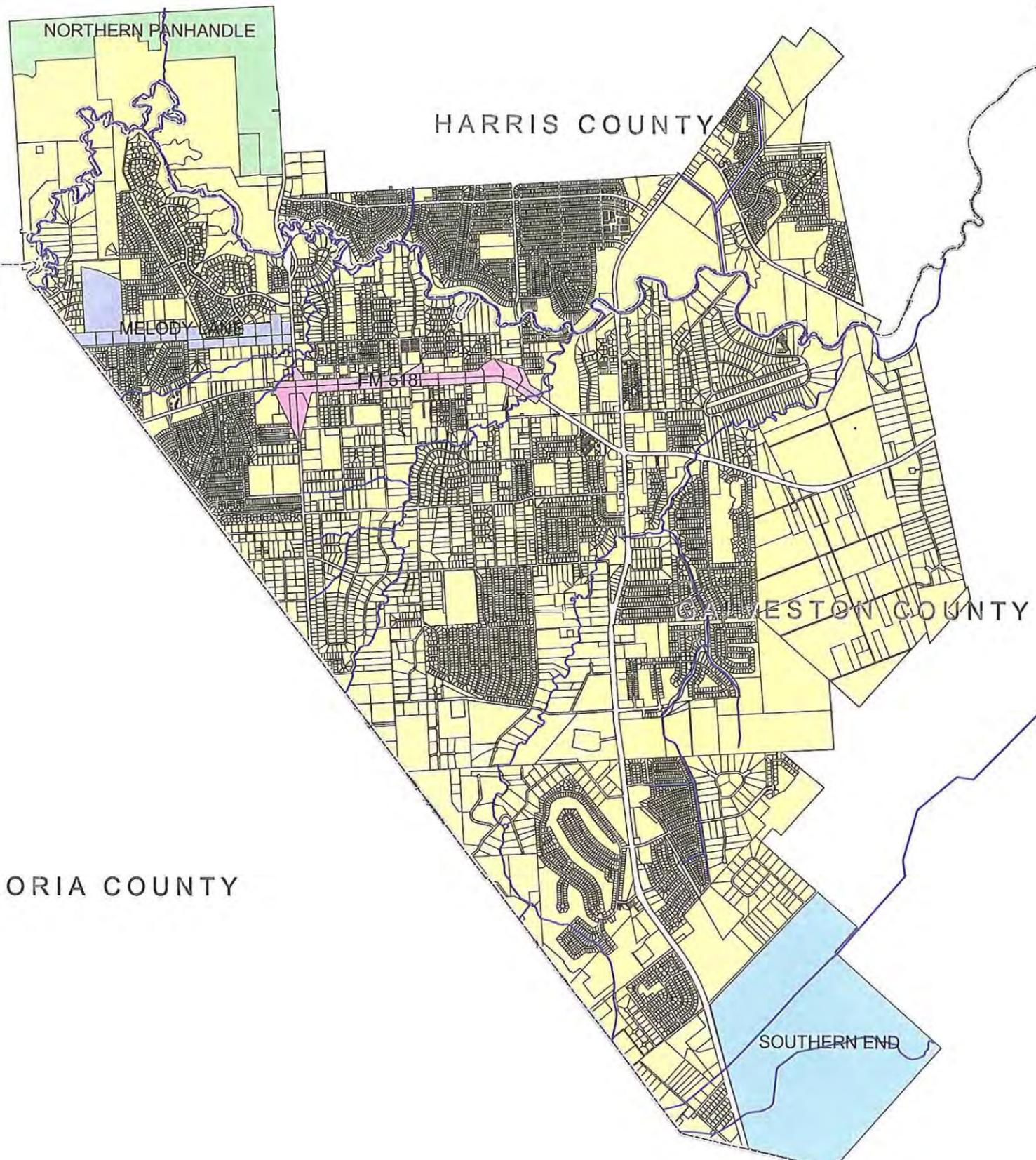
- FM 518 – Willowick to Mary's Creek
- FM 518 – Willowick to Coward's Creek
- Melody Lane – FM 2351 to Friendswood City Limits (west)

This Phase II Study also includes a preliminary analysis of regional detention requirements for two currently undeveloped areas within the City. City staff has targeted these two areas as those with the most potential for near term development. The areas are zoned for either residential, mixed use, or commercial development and are identified as The Northern Panhandle and Southern End service areas. The purpose of this work is to create a planning tool for the City and developers to provide guidance for the provision of adequate detention as these areas develop. This work would include the determination of projected development in the defined areas, the determination of peak drainage flows and resulting detention needs, locate potential detention sites within the area, and coordinate these plans with those of the regional drainage district. The two areas for regional detention study are further defined below:

- Northern Panhandle – area bound by Dixie Farm, Beamer, FM 2351, and Timber Creek Golf Course
- Southern end – area surrounding the American Rice Canal

Discussions with City staff have indicated that the prioritization for the study areas are as follows:

1. FM 518 – Willowick to Mary's Creek (1993 Master Plan)
2. FM 518 – Willowick to Coward's Creek (1993 Master Plan)
3. Northern Panhandle (Regional Detention Plan)
4. Melody Lane (1993 Master Plan)
5. Southern End (Regional Detention Plan)



- Legend**
- Streams
 - Panhandle Study Area
 - Melody Lane Study Area
 - FM 518 Study Area
 - South End Study Area
 - - - County Boundaries
 - Parcels



NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

VICINITY MAP

II. Background

In 1993 The City of Friendswood developed a Master Drainage Plan to map existing drainage areas, inventory facilities, determine peak discharges, and guide the development and implementation of drainage capital improvement projects within 20 "trouble spot areas" identified by City staff throughout the City. The "trouble spot areas" identified in the Plan were selected based on records of customer complaints, FEMA flood insurance claims, and maintenance records.

Historically, problem drainage areas within the City have resulted from overland sheet flow ponding during extreme rainfall events. Of the twenty original problem areas, sixteen of them have been addressed with the construction of additional storm sewer capacity, overland flow swales, and improvements to and addition of drainage outfalls. Phase One analysis resulted in capital improvement projects that have (or will have when completed) resolved sixteen of those problem areas. One additional project remaining from the original 2003 drainage bond election is in the implementation phase. Three remaining projects require updating of the original analysis to provide resolutions that comply with revised criteria and updated land uses in order to provide reliable cost estimates for proposed improvements. These projects include:

- FM 518 – Willowick to Mary's Creek
- FM 518 – Willowick to Coward's Creek
- Melody Lane – FM 2351 to City Limits (west)

For these projects, an analysis of the capacity of the streets and storm sewers will be completed to determine the need for additional improvements to alleviate major street ponding during extreme events (100-year storm). The focus of the study for these problem areas will be the conveyance of sheet flow from the drainage areas to the major creeks and outfalls – with emphasis on existing storm sewer capacity and proposed improvements to convey the 100 year developed sheet flow from each of the problem areas

Typical Scope of Work: Three "Problem Areas" from 1993 Drainage Master Plan

For each specific problem area, plans were reviewed (provided by City staff) for existing development and redevelopment projects and their associated mapping to include any paving, drainage, subdivision, and site improvements that have been made since the 1993 Plan. Obtain plans (from City staff) for any public improvement project in the area and include the drainage system inventory and mapping. Review current City topography and contour maps for use in the study.

Current drainage criteria of agencies with overlapping jurisdiction (Harris County Flood Control District, Galveston County Consolidated Drainage District) was reviewed for outfalls that receive drainage from these areas. Current City of Friendswood drainage system

design criteria was reviewed for any revisions since 1993 and those changes were incorporated into the planning process.

Existing drainage facilities were reviewed including minimal field survey verification (as needed) of outfall sizes and flow lines, as well as critical existing storm sewer and roadside ditch flowlines, and sizes.

Peak flows were calculated to determine required drainage capacities for systems serving the existing and ultimate development within the trouble spot areas (using current drainage criteria). These capacities were compared to existing facility capacities to define "gaps" in the system that would require capital improvements.

Capital Improvements were identified and analyzed for each of the three service areas. Improvements options included proposed or reconstructed storm sewers, box culverts, roadside ditches, outfall ditches, inlets, and potential "buyouts" where necessary.

City staff suggested several possible detention site locations in the vicinity of the storm sewer projects. These sites include the current police station site at 109 E. Willowick Avenue, and the Tropical Storm Allison Recovery Project (TSARP) buy-out lots in the Imperial Estates Subdivision. These locations were considered. Willowick Avenue is the approximate high point boundary of both FM 518 projects and is therefore of little use as a detention site. The Imperial Estates subdivision is adjacent to the east right-of-way boundary of FM2351 and approximately 1500 feet north of Melody Lane. TSARP buy-out lots were considered for detention in this general area and are presented in a few of the alternatives of the FM 518 - Willowick to Mary's Creek project and the Melody Lane project.

The Texas Department of Transportation (TXDOT) Storm Drain Design program, WinStorm v. 3.05, 2002 was used to simulate existing and proposed conditions for project areas along FM 518 and Melody Lane. A document research for construction plans was undertaken to obtain entry data for the WinStorm program. Construction drawings for FM 518 were available; however no construction plans were available for Melody Lane.

TXDOT personnel indicated that no major improvements have been made in the defined project area along FM 518 since the original construction, therefore, invert elevations, top of curb elevations, and inlet and manhole spacing lengths were obtained from the drawings for entry into the WinStorm program from the 1973 construction documents. LiDAR mapping, aerial photographs and a land-use map were reviewed and compared to drainage areas presented in the 1973 drawings. The drainage areas were slightly modified for data entry. Finally, existing data was entered into the WinStorm program.

Since no construction documents were available for Melody Lane, current surveys of the infrastructure were used to provide roadway, ditch and invert elevations along the project route. LiDAR mapping, aerial photographs and a land-use map were reviewed. The drainage

areas were delineated and measured. Finally, existing data was entered into the WinStorm program

After the existing information was entered into WinStorm, the 5-year and the 100-year rainfall scenarios were reviewed. The proposed storm sewer alternatives were derived based on comparing the hydraulic grade line elevations obtained from the 100-year rainfall elevations to the top of curb elevations, sizing the storm sewers to provide the capacity to convey the required flows, lowering the proposed storm sewers as necessary to provide cover, reviewing TSARP, aerial and contour mapping information for possible detention sites, and adhering to other design criteria listed later in this section.

Many of the improvement alternatives presented here require construction of an additional outfall and/or construction within TXDOT right-of-way. Before implementation of any such alternative, additional coordination with the Galveston County Consolidated Drainage District (GCCDD) and Corps of Engineers is required for outfall construction and coordination with TXDOT is required for construction within a Department of Transportation right-of-way. An initial conversation with GCCDD revealed that zero impact from our proposed projects can be subjected to the creeks and tributaries; this concern has been addressed in this update. A conversation with TXDOT personnel revealed that no construction within the FM 518 project areas is anticipated within the next 10 years.

The drainage district of jurisdiction (Galveston County Consolidated Drainage District) was contacted to provide guidance as to whether downstream impact analyses would be required for proposed improvements within the trouble spot areas. Mitigating improvements were recommended (as needed) which may include in-line or regional detention or additional channel improvements to offset the potential impacts.

The format of the body of the Master Plan Update report is:

- Define the drainage area
- Define the problem
- Verify the drainage area
- Describe existing drainage system
- Calculate peak flows (based on revised drainage areas, updated development conditions, and current drainage criteria)
- Describe and analyze alternative drainage system improvements
- Develop level of magnitude cost estimates

"Non-economic" factors such as neighborhood disruption, major utility conflicts, environmental concerns, traffic impacts, operation and maintenance, right of way requirements, and constructability issues will be used along with the construction cost estimates to provide a recommended plan for each study area.

A recommended phasing plan for the improvements may be made based on the severity of the problem in each study area, the construction cost, an evaluation of the non economic factors, and discussions with City staff on customer complaints and overall City department goals and objectives.

Level of magnitude construction cost estimates were made for the proposed improvements to each problem area. Estimates included 30% contingencies, land acquisition costs (using existing City and appraisal district data), and engineering.

Scope of Work: Two Regional Detention Areas

In the Northern Panhandle and Southern end, regional detention needs were the focus. The areas (previously identified by staff) were analyzed as follows:

- City zoning maps were reviewed to determine projected areas of development and type within the serviced area
- Peak flows were determined for the 100 year event within the service area
- The required detention volumes were calculated for the services area
- Alternate locations for future regional detention facilities, required volumes at those locations, and associated areas were identified

For the Southern End study area, the 1994 Dickinson Bayou Watershed Master Drainage Plan was utilized to determine the detention and drainage improvements necessary for that area to develop. All computations and recommendations were made in accordance with the selected alternative from that plan.

Design Criteria

Criteria were incorporated from three different agencies, namely, City of Friendswood Community Development Department, Harris County Flood Control District, and Galveston County Consolidated Drainage District.

Determination of Runoff

Design Storm Events

Road Side Ditch	5 years
Storm Sewers	5 years

Time of Concentration

$$T_c = D/60V + 10 \text{ (minutes)}$$

D = flow distance (ft)

V = flow velocity (ft/sec)

V = 1ft/sec for overland flow

V = 1.5 ft/sec for flow across paved surfaces

V = 2 ft/sec for flow in ditch of channel

V = 3 ft/sec for flow in storm sewer

Land Use Type	"c" coefficient
Raw Undeveloped Acres	0.2
Improved Undeveloped Acres	0.3
Park Land	0.4
Residential	
SFR-Estates	0.45
SFR	0.55
Multi-Family	
MFR-GHD	0.65
MFR-L	0.75
MFR-M	0.80
MFR-H	0.85
MHR	0.85
Commercial/Industrial	
OPD/BP	0.9
OBD/CSC/NC	0.95
LI/I	0.95
Pond	1.0

Design of Storm Sewers

- System shall be analyzed to convey or store the 100 year rainfall.
- Hydraulic gradient shall be calculated assuming the top of the outfall pipe as the starting water surface.
- Manhole shall be spaced at 500 feet along conduit run.

Design of Roadside Ditches

- Water surfaces from the design storm event for the roadside ditch shall be maintained at 0.5 feet below the edge of pavement.
- The design capacity for the roadside ditch shall be to 0.5 feet below the edge of pavement.
- The minimum grades for roadside ditches shall be 0.2 foot per 100 feet.
- Roadside ditch bottoms shall be at least 2 feet wide
- Road side ditch slope shall not exceed 3 horizontal to 1 vertical.

III. FM 518 (Willowick - FM 2351)

Drainage Area:

This area includes approximately 44.87 acres of commercial development along the FM 518 corridor from the FM 2351 intersection east to approximately Willowick. (See Exhibit III). The area is a heavily traveled major mercantile area with strip shopping centers.

Problem

Excessive street ponding during extreme rainfall events. During the 1993 Master Plan, the TXDOT FM 518 drainage plans were reviewed and it was noted that the drainage system was inadequate to convey the 5 year storm and detention sites weren't readily available.

Drainage Area Verification

A review of LiDAR data reveals that TXDOT FM 518 drainage area delineations closely approximate the present drainage conditions. The drainage areas shown in the TXDOT plans were slightly modified for entry into a WinStorm model.

Existing Drainage Facilities

A closed conduit drainage system exists in FM 518 (24" to 36") to the FM 2351 intersection when flows are conveyed north in a closed conduit system in FM 2351 (18" to 42") to the Mary's Creek Tributary outfall. The system also contains several 18" laterals. Analysis of the existing drainage system with use of current City of Friendswood land-use zoning factors reveals that the hydraulic grade line (HGL or water surface elevation) during 5-year and 100-year storms are higher than the existing curb elevation.

Peak Runoff Calculations

Peak runoff rate for a 44.87 acre basin area with an 11.9 inch rainfall excess, during a 100-year event, is approximately 320 cfs.

Proposed Facilities

Four alternatives have been developed that can lower the HGL to below the existing curb elevation. Each alternative includes constructing an additional outfall along Heritage Drive. The alternatives are as follows:

1. Construct a "remove and replace" storm sewer system and participate in the proposed GCCDD Mary's Creek inline regional detention facilities planned for the area. Construction would involve removing the majority of the existing sewer and constructing a portion of the proposed sewer in its place. Additional

storm sewers will be constructed in Heritage Drive, Quaker Drive, and Shadowbend (N) to reach the detention site (See Exhibit VI-1). The existing system will be utilized where its capacity is adequate. All 18-inch laterals will be replaced with 24-inch laterals. The City would buy into regional detention that is being planned by the GCCDD along the Mary's Creek tributary. Implementation may require additional easement acquisition. These improvements, along with the existing outfall on FM 2351, will convey the 100 year rainfall to the Mary's Creek tributary and maintain water surface elevations below top of curb. The new storm sewer system will range in size from 24-inch to 60-inch. (See Exhibit III-1).

2. Construct a storm sewer system including purchase/excavation of a detention facility at a location along FM 518. Construction would involve removing the majority of the existing sewer and constructing the proposed sewer in its place. The existing system will be utilized where its capacity is adequate. All 18-inch laterals will be replaced with 24-inch laterals. The City would acquire a tract along FM 518 (a lot at the northeast corner FM 518 and Heritage Drive) and construct required detention storage on the site. These improvements, along with the existing outfall on FM 2351, will convey the 100-year rainfall to the Mary's Creek tributary and maintain water surface elevations below top of curb. The new storm sewer system will range in size from 24-inch to 48-inch. (See Exhibit III-2).
3. Construct a parallel storm sewer system including detention along Heritage Drive adjacent to Mary's Creek. Construction would involve removing 18-inch and 24-inch storm sewers and replacing them with the proposed sewers. The existing storm sewers will be used where capacity is adequate to convey the 100-year rainfall. Storm sewers will be constructed parallel to the existing storm sewers at locations inadequate to convey the required flow. Additional storm sewers will be constructed in Heritage Drive, Quaker Drive, and Shadowbend (N) to reach the detention site (See Exhibit VI-1). The City would participate in the Mary's Creek inline regional detention that is being planned by the GCCDD. Implementation may require additional easement acquisition. These improvements, along with the existing outfall on FM 2351, will convey the 100-year rainfall to the Mary's Creek tributary and maintain water surface elevations below top of curb. The new storm sewer system will range in size from 24-inch to 60-inch. (See Exhibit III-3).
4. Construct a parallel storm sewer system with detention adjacent to the FM 518 right-of-way. Construction would involve removing 18-inch and 24-inch storm sewers and replacing them with the proposed sewers. The existing storm sewers will be used where capacity is adequate to convey the 100-year flow. Storm sewers will be constructed parallel to the existing storm sewers at locations inadequate to convey the required flow. The City would acquire a tract along

FM 518 (a lot at the northeast corner FM 518 and Heritage Drive) and construct required detention storage on the site. These improvements, along with the existing outfall on FM 2351, will convey the 100-year rainfall to the Mary's Creek tributary and maintain water surface elevations below top of curb. (See Exhibit III-4).

A table of advantages and disadvantages of each alternate is provided below:

Table III- 1 – Advantages/Disadvantages

	ADVANTAGES	DISADVANTAGES
Alternate 1	Participation in regional project No Real Estate Acquisition along FM 518 Construction only with existing R.O.W.	Highest construction cost
Alternate 2	Smaller outfall pipes	Real Estate Acquisition along FM 518, maintenance of detention pond, Highest total cost
Alternate 3	No Real Estate Acquisition along FM 518, Construction only within existing R.O.W. Maintenance of existing service Participation in regional project, Lowest total cost	
Alternate 4	More utilization of existing pipes, Least costly construction alternative, Construction only within existing R.O.W. Maintenance of existing service Most utilization of existing pipes	Real Estate Acquisition along FM 518, maintenance of detention pond

All alternatives will include construction within TXDOT Right-of-Way. A permit will be required along with extensive coordination.

Alternatives including a new outfall to Mary's Creek will require USACOE permitting and coordination.

Mitigation for Additional Peak Flow Generated by the Proposed Improvements

Conversations with the GCCDD Engineer indicate that the projects must have zero impact on the receiving stream. Using the Malcom's hydrograph method, the estimated detention volume requirement for the project is 6.3 ac-ft. Mitigation for the proposed improvements will be provided by one of two methods:

1. City participation in a proposed GCCDD Mary's Creek inline regional Detention site to the north of the service area.

2. The Detention provided by the acquisition of the property adjacent to 203 S. Friendswood Drive along FM 518 and the construction of the required detention capacity on that site.

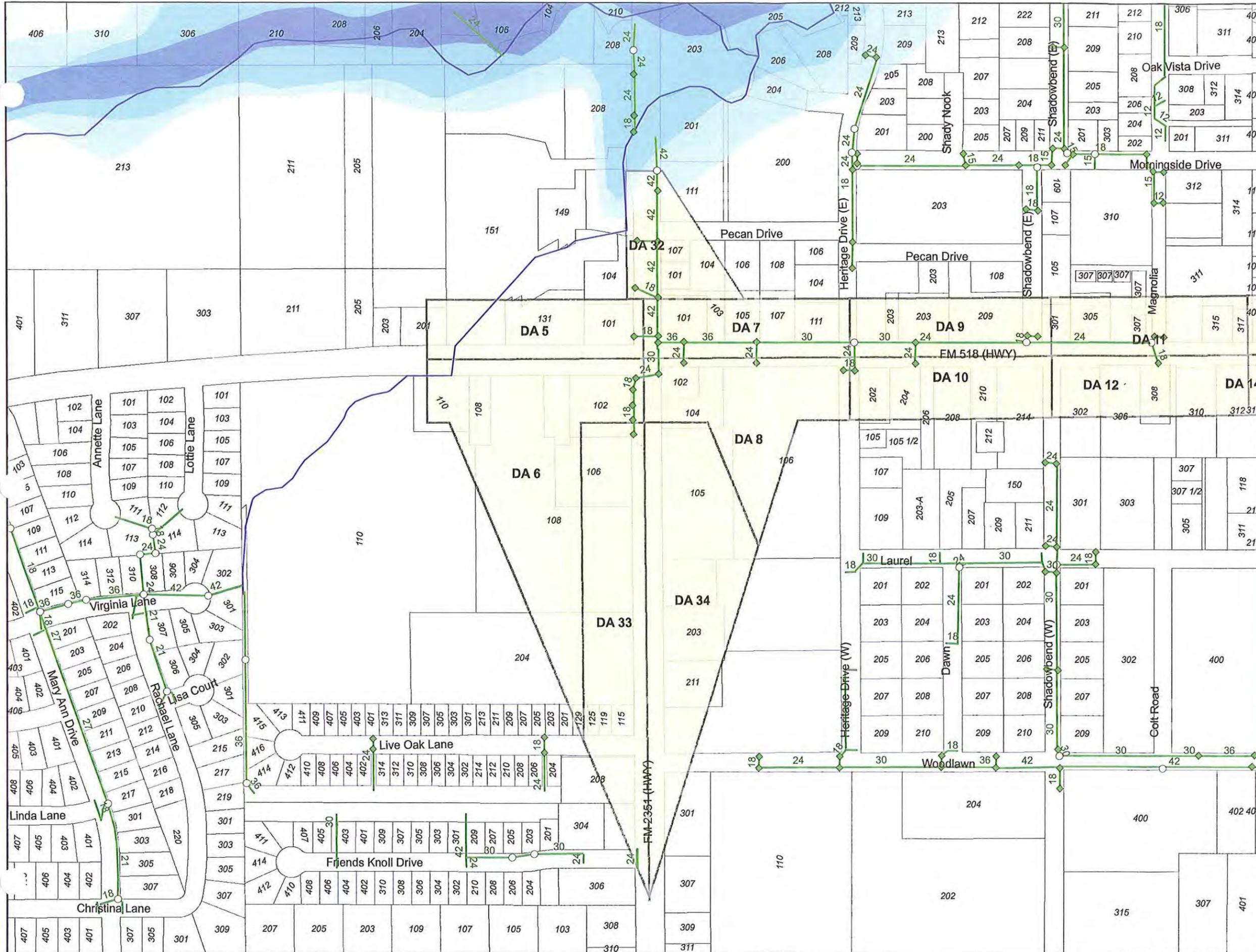
Cost Estimates

The costs of the alternatives are subdivided into three categories general, storm sewer and street and bridge. A contingency factor of 30% is included for items such as public and private utility adjustments, storm water pollution prevention plans, permits, outfall appurtenances, and storm sewer tie-ins. Real Estate acquisition data were obtained from the Galveston County CAD. The estimated costs of alternatives are provided in the table below. More detailed tables of cost estimates are provided in the appendix of this report.

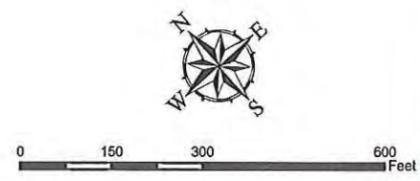
*Table III-2 – Alternate Description and Estimated Costs **

Alternate 1	New Outfall /Detention in GCCDD Facility	This alternate contains storm sewers sized to convey the 100 year rainfall with the hydraulic grade line (HGL) below top of curb elevation to a GCCDD detention facility .	\$2,757,900
Alternate 2	New Outfall / Detention adjacent to FM 518	This alternate contains storm sewers sized to convey the 100 year rainfall with HGL below top of curb elevation and detain the 100 year excess in a facility adjacent to FM 518.	\$3,370,800
Alternate 3	New Outfall/ Parallel Line/Detention in GCCDD facility	This alternate contains new and parallel storm sewers sized to convey the 100 year rainfall with HGL below top of curb elevation to a new outfall that would require participation in a GCCDD Regional Detention Facility.	\$2,036,400
Alternate 4	New Outfall/ Parallel Line/Detention adjacent to FM 518	This alternate provides for new and parallel storm sewers to convey the 100 year rainfall with HGL below top of curb elevation. The excess will be detained in a facility adjacent to FM518.	\$2,814,100

*Total project cost including land acquisitions.



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Creeks
 - ▭ Parcels
 - ▭ Drainage Areas
 - ▭ Floodway
 - ▭ 100 Year Floodplain
 - ▭ 500 Year Floodplain

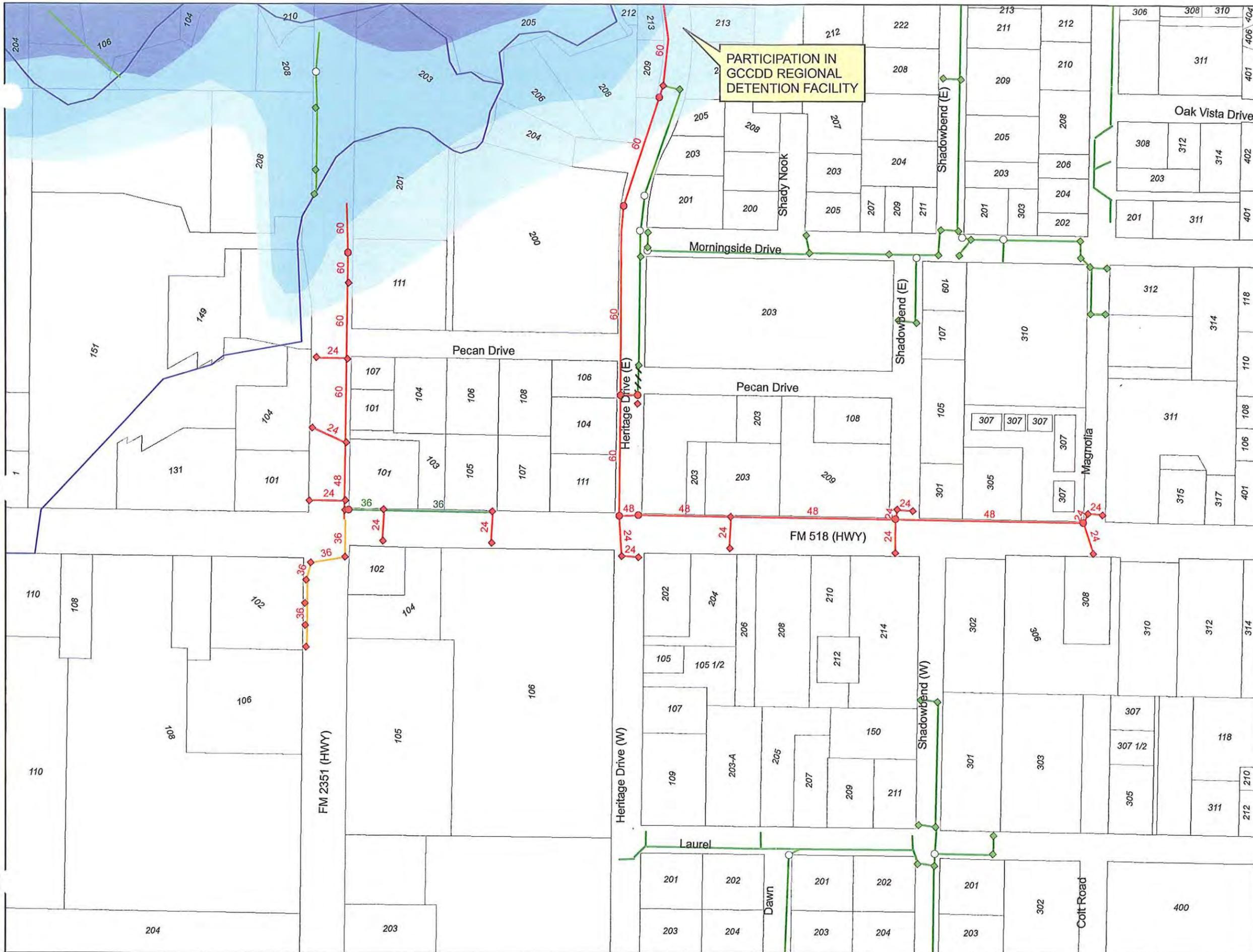


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



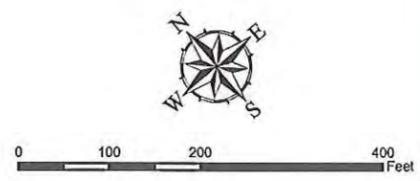
CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

DRAINAGE AREA MAP
FM 518 (WILLOWWICK TO
MARY'S CREEK)



PARTICIPATION IN
GCCDD REGIONAL
DETENTION FACILITY

- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Creeks
 - Parcels
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain

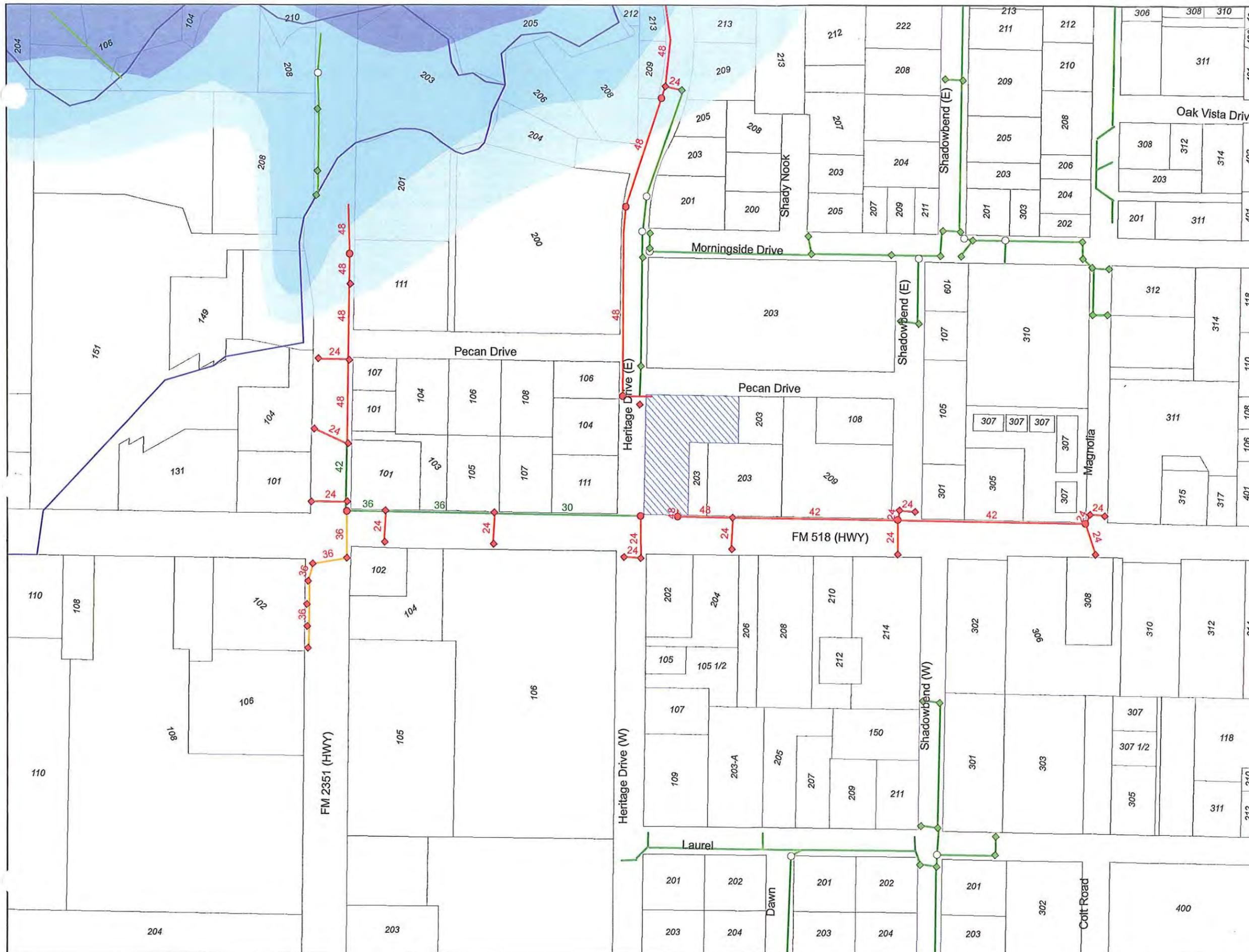


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CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE I
DRAINAGE IMPROVEMENTS
FM 518 (WILLOWICK TO
MARY'S CREEK)



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Creeks
 - ▭ Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain

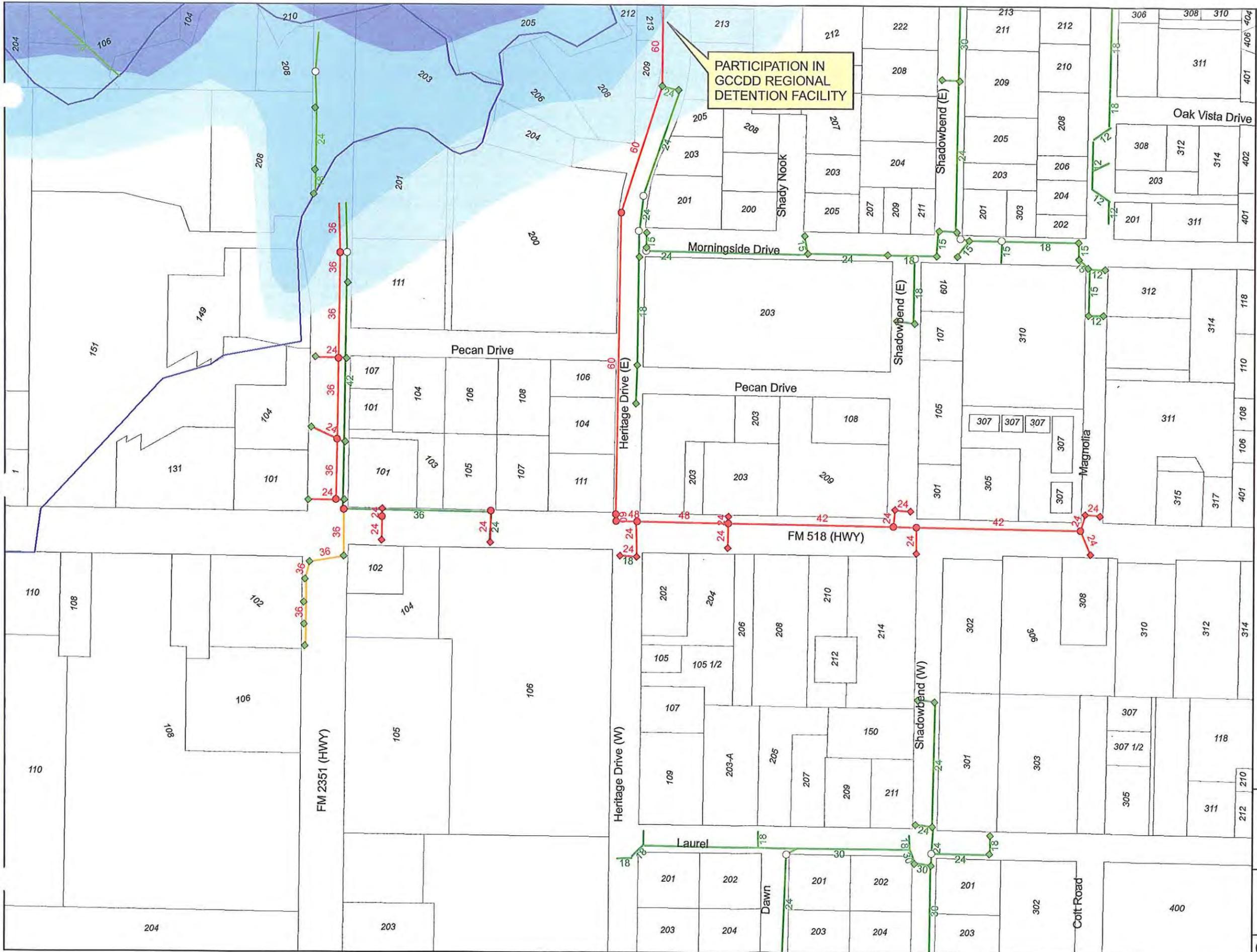


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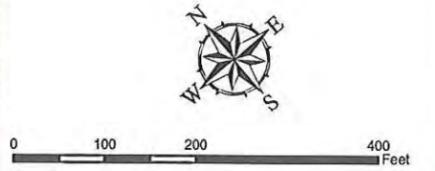
CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE II
DRAINAGE IMPROVEMENTS
FM 518 (WILLOWICK TO
MARY'S CREEK)



PARTICIPATION IN
GCCDD REGIONAL
DETENTION FACILITY

- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Creeks
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Parcels
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain

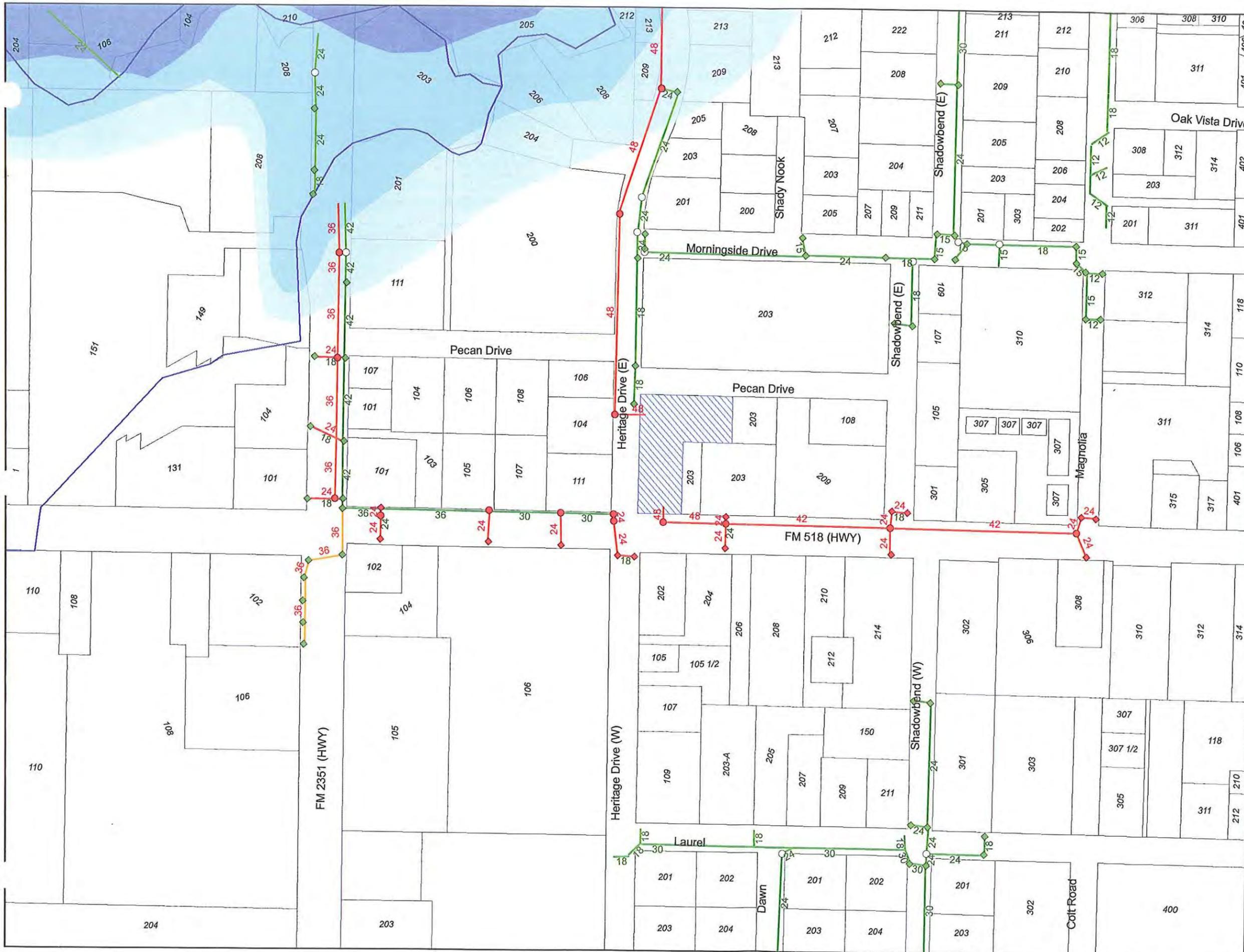


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CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE III
DRAINAGE IMPROVEMENTS
FM 518 (WILLOWICK TO
MARY'S CREEK)



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Drainage Main
 - Creeks
 - Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain



NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE IV
DRAINAGE IMPROVEMENTS
FM 518 (WILLOWICK TO
MARY'S CREEK)

IV. FM 518 (Willowick – Coward’s Creek)

Drainage Area

This area includes approximately 56.14 acres of commercial development along the FM 518 corridor from approximately Willowick east to the Coward’s Creek outfall. (See Exhibit IV). This area is a heavily traveled major mercantile area within the City and includes City Hall, the library, a cemetery, and park.

Problem

Excessive street ponding during extreme rainfall events. During the 1993 Master Plan, the TXDOT FM 518 drainage plans were reviewed and it was noted that the drainage system was inadequate to convey the 5-year storm and detention sites weren’t readily available.

Drainage Area Verification

A review of LiDAR data reveals that areas defined in the TXDOT FM 518 Drainage plans closely approximate current conditions and are therefore used here. The drainage areas shown in the TXDOT plans were slightly modified for entry into a WinStorm model.

Existing Drainage Facilities

A closed conduit drainage system exists in FM 518 (18” to 48”) from Willowick east to the Coward’s Creek outfall. The system also contains several 18” laterals. Analysis of the existing drainage system with use of current City of Friendswood land-use zoning factors reveals that the hydraulic grade lines during 5-year and 100-year storms are higher than the existing curb elevation.

Peak Runoff Calculations

Peak runoff rate for 56.14 acres and a rainfall excess of 17.6 inches (100-year event) is approximately 370 cfs.

Proposed Facilities

Four alternatives have been developed that can lower the HGL to below the existing curb elevation. The alternatives are defined as follows:

1. Construct a storm sewer system including an additional outfall along Castlewood Drive and detention adjacent to Coward’s Creek (existing TSARP Buyout Tract) that will, jointly with the existing outfall, convey the 100-year rainfall and maintain water surface elevations below top of curb. Construction would involve removing the existing storm sewers and placing the proposed system

within the same location. The system will range in size from 24-inch to 72-inch. (See Exhibit IV-1).

2. Construct a storm sewer system that includes an additional outfall along Castlewood Drive and detention across from City Hall, on a tract to be purchased along FM 518. The storm sewer will be designed to convey the 100-year rainfall below the top of curb to the detention site; the detention pond will contain a 100-year rainfall event. The proposed storm sewer will consist of utilizing the existing system where capacity is adequate and removing and replacing the existing system where capacity is inadequate. The storm sewer system will range in size from 24-inch to 60-inch. (See Exhibit IV-2).
3. Construct a storm sewer system that includes removal and replacement of the existing storm sewer with a new system that will convey the 100-year flow within the existing right-of-way to a detention pond and eventually to the existing outfall. The system will range in size from 24-inch to 84-inch. The City would acquire a tract (currently adjacent to TxDOT ROW) near the outfall to Coward's Creek along the FM 518 north right-of-way boundary to be used for detention. (See Exhibit IV-3).
4. Construct a parallel system designed to jointly convey the 100-year rainfall within the existing right-of-way, to a detention pond adjacent to the existing FM 518 right-of-way and near the existing outfall. The system will range in size from 24-inch to 60-inch. The parallel system will be constructed along the south edge of pavement of FM 518. The City would purchase a tract near the outfall to Coward's Creek along the FM 518 north right-of-way boundary (currently adjacent to TxDOT ROW) to be used for detention. (See Exhibit IV-4).

A table of advantages and disadvantages of each alternate is provided below:

Table IV-2 – Advantages/Disadvantages

Alternate 1	No Real Estate Acquisition	Coordination with GCCDD, ACOE for new outfall, more traffic control issues
Alternate 2		Real Estate Acquisition along FM 518, Coordination with GCCDD, ACOE for new outfall, more traffic control issues
Alternate 3		Least utilization of existing pipes, Most probable utility conflicts/relocations, Most costly construction cost, Most costly total cost
Alternate 4	Most utilization of existing pipes, Least construction cost, Least total cost, maintenance of service	Probable utility conflicts/relocations, parallel system interconnections

If necessary to use an alternative detention site along FM 518, other potential detention areas include vacant tracts on either side of the Sonic, and a vacant tract across FM 518 from the library. Off-site detention may be available within the GCCDD Baker-Road Detention facility.

All alternatives will require construction in TXDOT Right-of-Way. A permit will be required along with extensive coordination.

Alternatives including a new outfall to Coward's Creek will require USACOE permitting and coordination.

Mitigation for Additional Peak Flow generated by the Proposed Improvements

Using the Malcom's hydrograph method, the estimated detention volume requirement for the project is 16.8 ac-ft. If alternative 1 is selected, affects to Chigger Creek of the additional 140 cfs of ultimate peak run off may be mitigated through the use of proposed detention facilities identified in Exhibit IV-1. Other alternatives include alternative detention sites. (See Exhibits IV-2 through IV-4).

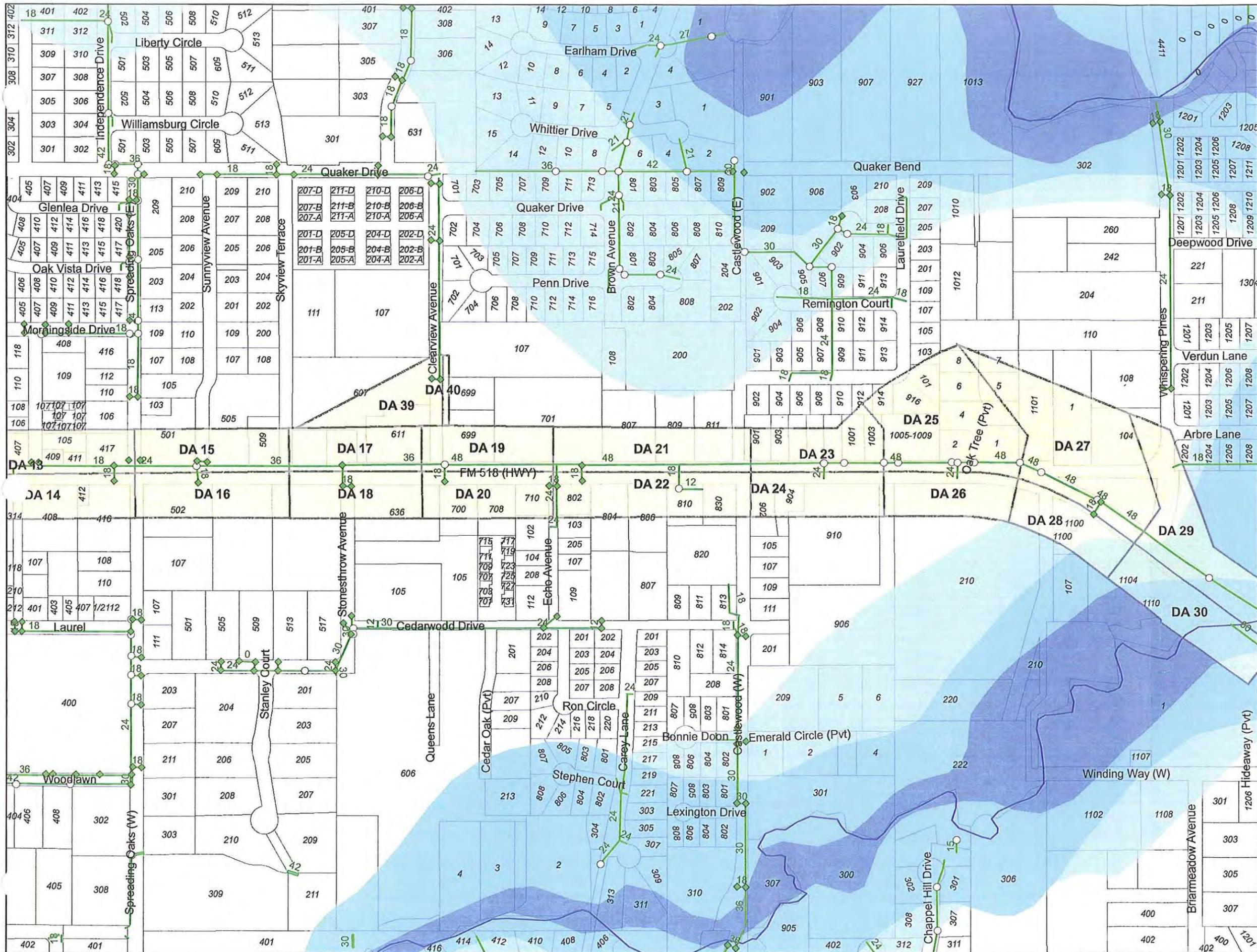
Cost Estimates

The costs of the alternatives are subdivided into three categories general, storm sewer and street and bridge. A contingency factor of 30% is included for items such as public and private utility adjustments, storm water pollution prevention plans, permits, outfall appurtenances, and storm sewer tie-ins. Real Estate acquisition data were obtained from the Galveston County CAD. The estimated costs of alternatives are provided in the table below. More detailed tables of cost estimates are provided in the appendix of this report.

*Table IV-2 – Alternate Description and Estimated Costs **

Alternate 1	New Outfall / New Detention in TSARP Buyout Tract	This alternate contains storm sewers sized to convey the 100-year rainfall with the hydraulic grade line (HGL) below top of curb elevation to an existing TSARP Buyout Tract.	\$ 5,337,500
Alternate 2	New Outfall / New Detention adjacent to FM 518	This alternate contains storm sewers sized to convey the 100-year rainfall with HGL below top of curb elevation and detain the 100-year excess in a proposed detention facility across from Friendswood City Hall.	\$ 5,066,200
Alternate 3	New Detention adjacent to FM 518 and Coward's Creek	This alternate provides for replacement of the existing storm sewers and is sized to convey the 100-year rainfall with HGL below top of curb elevation totally within the current R.O.W. and detain the 100-year excess in a facility adjacent to FM 518 and Coward's Creek.	\$ 6,224,300
Alternate 4	Parallel Sewers and New Detention adjacent to FM 518 and Coward's Creek	This alternate contains the addition of a parallel storm sewer system sized to convey the 100-year rainfall with HGL below top of curb elevation totally within the current R.O.W. and detain in a facility adjacent to FM 518 and Coward's Creek.	\$ 4,132,500

*Total project cost including land acquisitions.



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Creeks
 - ▭ Parcels
 - ▭ Drainage Areas
 - ▭ Floodway
 - ▭ 100 Year Floodplain
 - ▭ 500 Year Floodplain

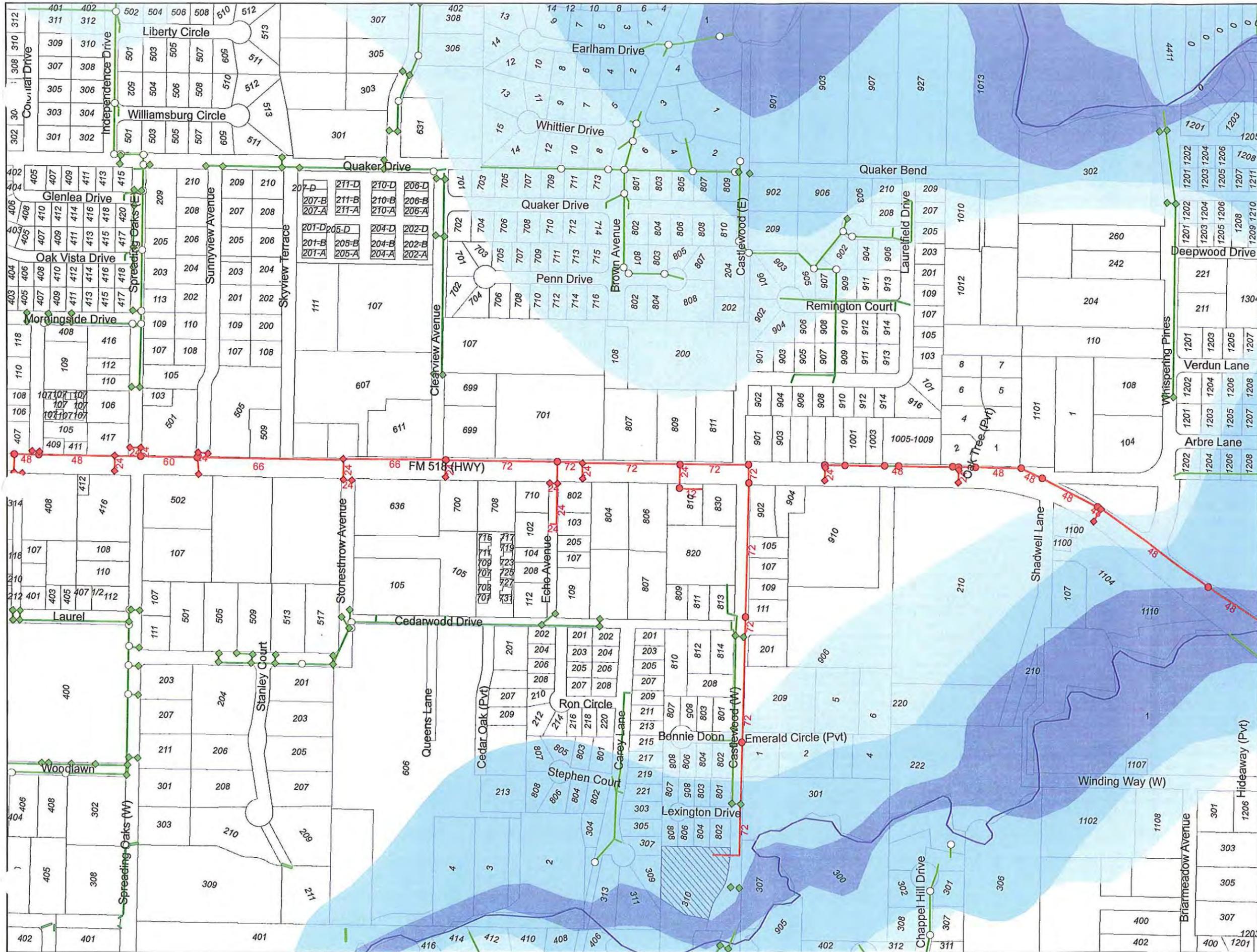


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.

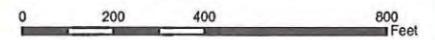


CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

DRAINAGE AREA MAP
FM 518 (WILLOWICK TO
COWARD'S CREEK)



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Creeks
 - ▭ Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain

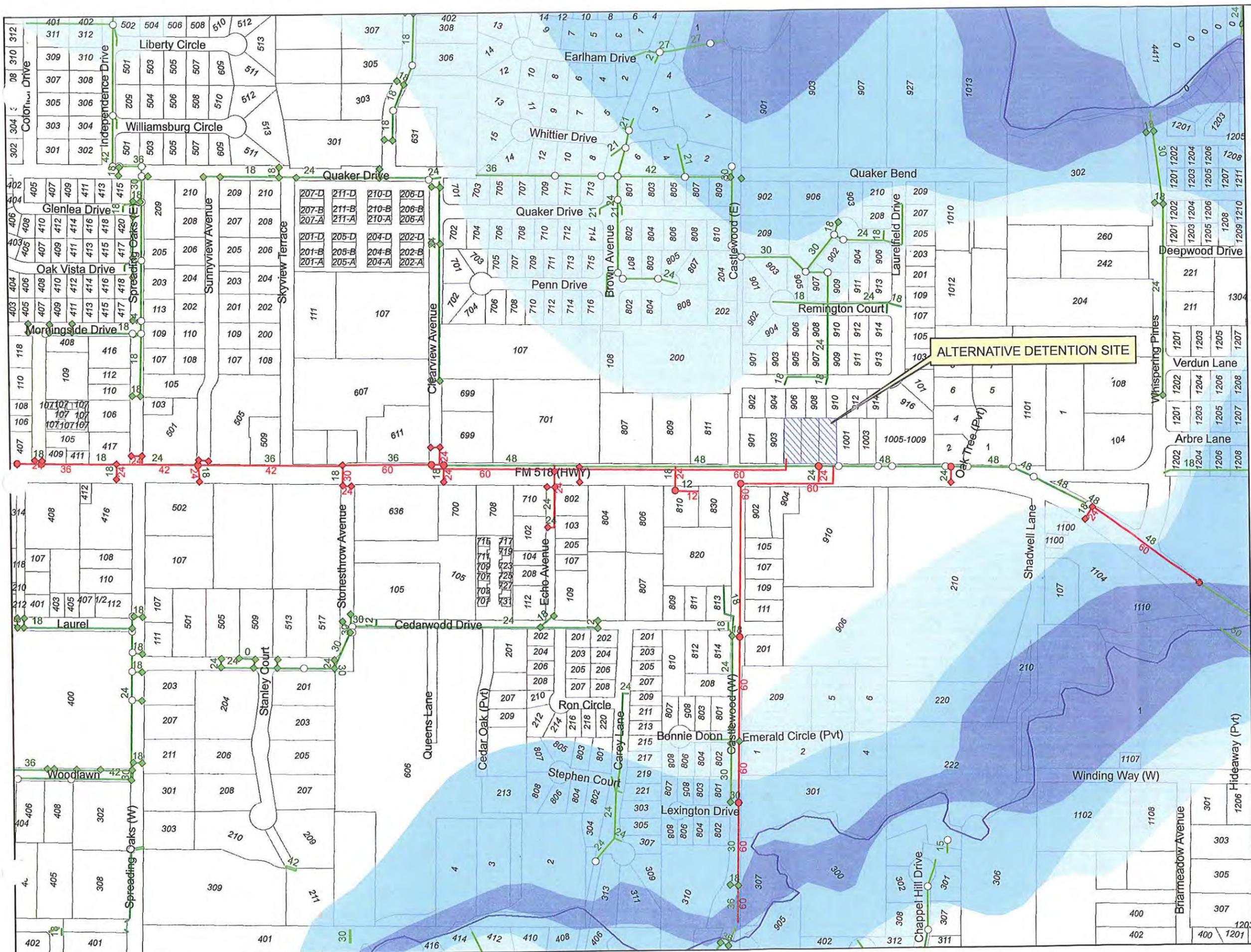


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.

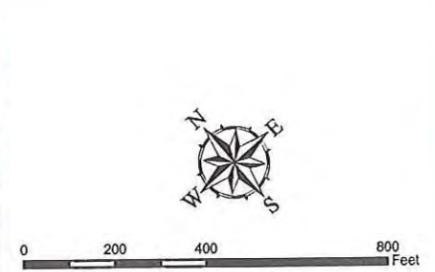


CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE I
DRAINAGE IMPROVEMENTS
FM 518 (WILLOWICK TO
COWARD'S CREEK)



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - EXISTING,
 - Proposed Storm Sewer
 - Abandoned Storm Sewer
 - Drainage Main
 - Creeks
 - Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain

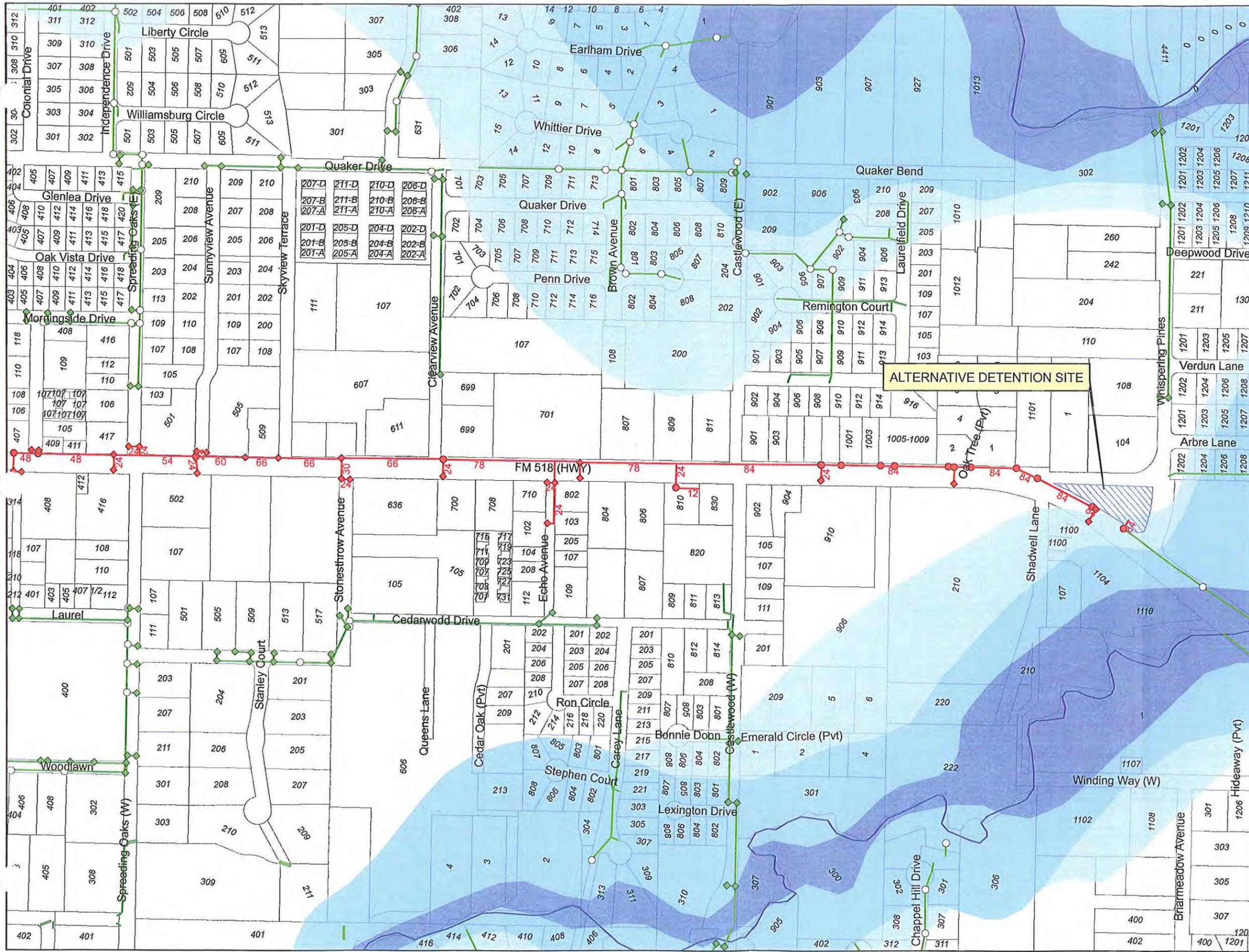


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.

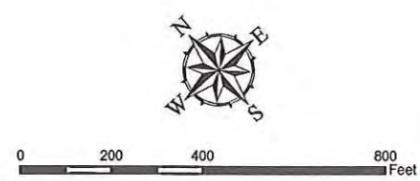


CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE II
DRAINAGE IMPROVEMENTS
FM 518 (WILLOWICK TO
COWARD'S CREEK)



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - EXISTING,
 - Proposed Storm Sewer
 - Abandoned Storm Sewer
 - Creeks
 - ▭ Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain

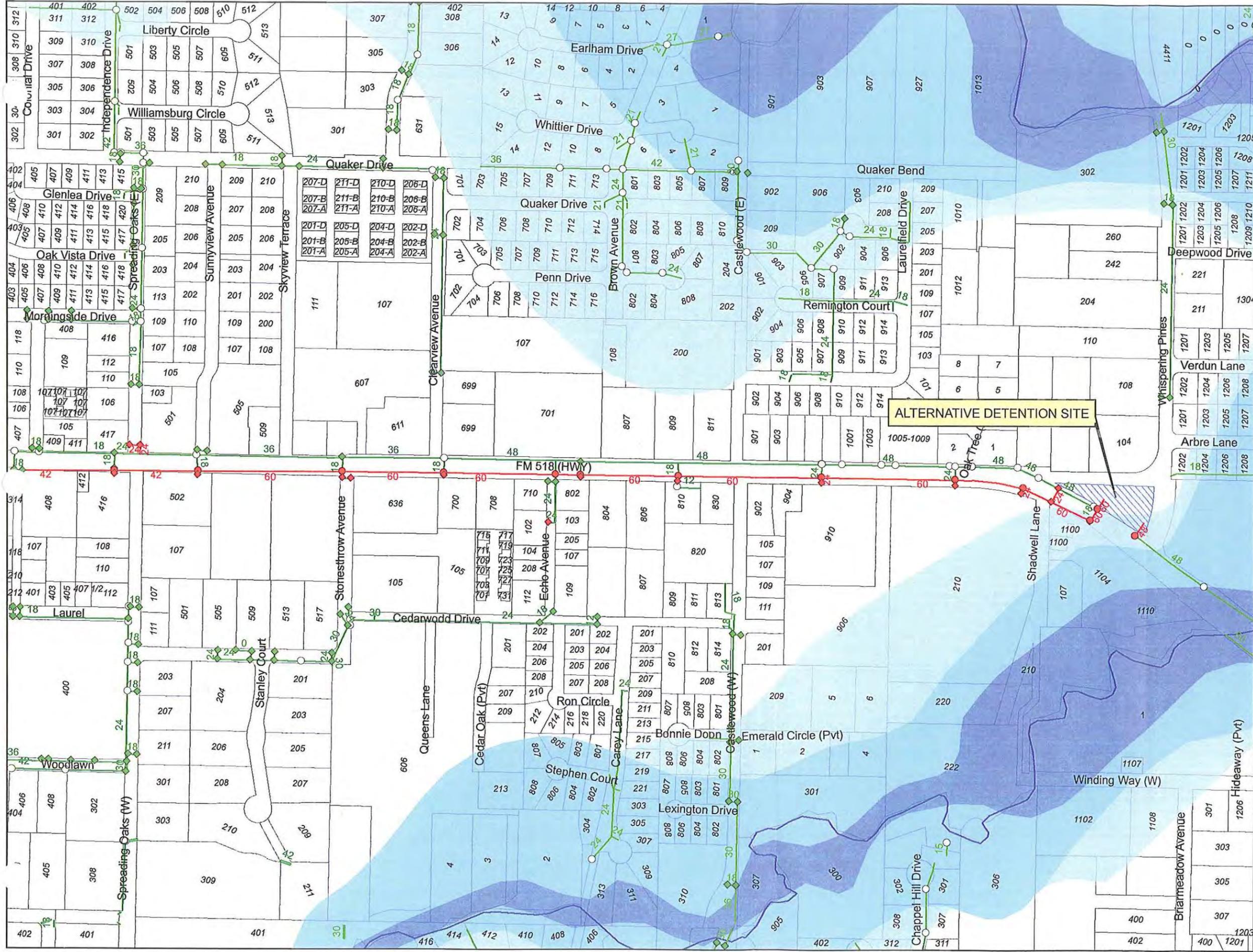


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II

ALTERNATIVE III
 DRAINAGE IMPROVEMENTS
 FM 518 (WILLOWICK TO
 COWARD'S CREEK)



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Abandoned Storm Sewer
 - Creeks
 - ▭ Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain



NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE IV
DRAINAGE IMPROVEMENTS
FM 518 (WILLOWICK TO
COWARD'S CREEK)

V. Northern Panhandle Regional Detention

Study Area

The area referred to as the Northern Panhandle is located in the extreme northern limits of the City. It is bounded by Dixie Farm Road on the west, Beamer Road on the north, F.M. 2351 on the east, and Timber Creek Golf Course on the south. The area to be considered in this master plan is approximately 350 acres. The study area is primarily undeveloped with approximately 24-acres of commercial development along F.M. 2351 and 6 acres of industrial site development along Beamer Road. **Exhibit V-1** depicts the study area and surrounding property and relevant drainage features.

Elevations referenced in this section are based on LiDAR data obtained from the Harris County Flood Control District (HCFCD) and are referenced to the North American Vertical Datum 1988, 2001 Adjustment.

Existing Drainage

The Northern Panhandle study area is located within the Clear Creek Watershed (HCFCD Unit No. A100-00-00). Drainage area delineations were obtained from the Harris County Tropical Storm Allison Recovery Project (TSARP) study, as shown on **Exhibit V-2**. Natural ground elevations within the study area range from 36 to 28 feet. Approximately 82 acres drain to Halls Road Ditch (HCFCD Unit No. A120-00-00), 56 acres to Turkey Creek (HCFCD Unit No. A119-02-00), 119 acres to Turkey Creek Tributary 0.16 (HCFCD Unit No. A119-02-00), with the remaining 92 acres draining directly into Clear Creek. The study area drains by sheet flow into the various channels, with the existing development along F.M. 2351 draining into the roadway by sheet flow and interior storm sewer systems.

Planning and design of an expansion project on Beamer Road is currently underway by Harris County and TXDOT. This expansion project includes drainage and detention improvements which will be considered as base conditions as designed by Lockwood, Andrews, & Newman, Inc. (CSJ #912-71-894, 2005).

Existing Floodplain and Floodway

The recently released revised Flood Insurance Rate Maps and the associated floodplain elevations and floodway delineations were obtained from the HCFCD and are used as the base conditions for this study. The Base Flood Elevations (BFE) range from approximately 26.4 to 30.7 feet, as shown on **Exhibit V-3**. Based on these elevations, approximately 35 acres of the Northern Panhandle lie within the floodway and an additional 90 acres lie within the 1% annual probability recurrence event (100-year) floodplain.

The areas within the 100-year floodplain will require fill to be placed in order to accommodate development. This fill will require mitigating detention to offset the volume of

floodplain storage displaced by the fill. In addition, detention will be required to mitigate the effects of proposed development on the downstream flooding potential along the tributaries and Clear Creek.

The portion of the study area within the floodway, as shown on **Exhibit V-3**, is currently being re-studied by the City, to determine if a re-alignment of the floodway is feasible. Preliminary results of this re-study indicate that a portion of the study area may be recovered from the floodway. Based on these preliminary results, this acreage will be included in the computations for ultimate detention requirements.

Peak Flow Calculations

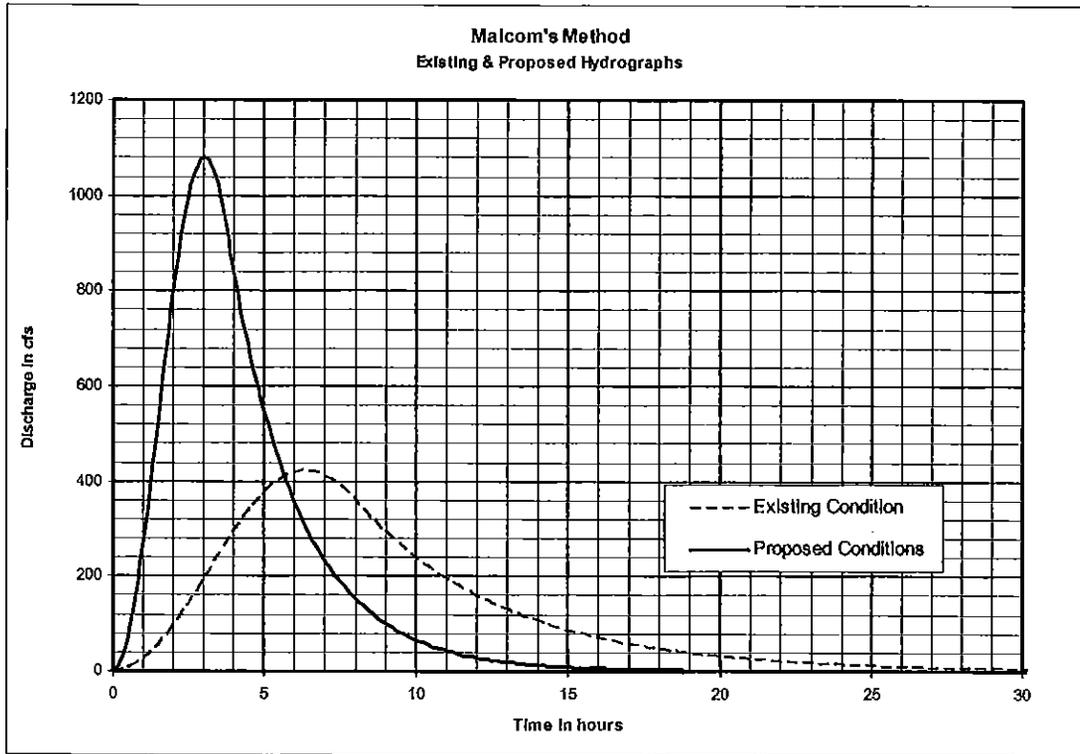
The Malcom's Method for hydrograph development was utilized to determine the detention volume required for ultimate development. This methodology utilizes a dimensionless hydrograph to obtain a design hydrograph which peaks at the design flow rate and which contains a runoff volume consistent with the design rainfall for Harris County. Existing and Ultimate development conditions flow rates were determined using the parameters shown in **Table V-1**.

Table V-1 – Malcom's Hydrograph Parameters

Northern Panhandle Study Area		
Description	Existing	Ultimate Development
Drainage Area (ac.)	350	350
Impervious Cover (%)	0	85
Peak Flow Rate (cfs)	422	1080

Utilizing these parameters, an existing conditions hydrograph and a proposed conditions hydrograph were determined as illustrated in **Figure V-1**. The area under each curve represents the runoff volume. The estimated required detention volume is calculated by subtracting the proposed conditions runoff volume from the existing conditions runoff volume. Utilizing the Malcom's Method an estimated 0.60 acre-feet per acre of volume, approximately 210 acre-feet, would be required for ultimate development of the Northern Panhandle. For the purpose of this analysis, a rounded rate of 0.65 acre-feet per acre of volume will be utilized.

Figure V-1 – Malcom's Hydrographs



Proposed Improvements

Utilizing the current City of Friendswood zoning plan, it is determined that the Northern Panhandle is designated for commercial development. In addition, the amount of floodplain fill required on each tract to raise it above the BFE will be added to this estimated detention. At the time of development, a detailed analysis of each phase of development will be required to determine the appropriate amount of detention for each tract. In addition to the estimated 48 acre-feet of floodplain mitigation fill required, based on the detention rate of 0.65 acre-feet per acre, it is estimated that 227 acre-feet of detention volume will be needed for the entire 350-acre Northern Panhandle Study Area.

Alternatives for providing detention to this area include onsite detention within each tract as it develops or regional detention to be provided in selected areas. Onsite detention is designed to reduce peak runoff rates from new development to existing levels, therefore allowing development of individual tracts without the need for possible downstream improvements along the receiving channels. In addition, onsite ponds allow individual tracts to develop independently of other land acquisition considerations. However, onsite detention typically requires a larger net loss of developable property compared to regional systems. Regional or shared detention facilities are designed to provide mitigating detention for all tracts, with some possible offsite development costs associated with conveying the developed runoff to the regional pond. The net acreage used for regional facilities is typically smaller than onsite systems; however the acquisition of offsite property for constructing regional

facilities could be a significant factor in planning the development of individual tracts. For the purpose of this preliminary study, the analysis of a regional plan is discussed.

As shown on Exhibit V-4, four regional detention sites have been chosen for this analysis. These regional detention sites include expanding the two proposed Beamer Road detention basins along Turkey Creek, a pond near Dixie Farm Road which would outfall into Hall Road Ditch and a pond in the southern end of the Northern Panhandle area which would outfall into Clear Creek through a proposed offsite outfall channel. Detention pond areas and volumes are calculated assuming 30-foot perimeter maintenance berms and 3:1 (H:V) side slopes. For the purpose of this preliminary study, detention pond depths are estimated and have not been field verified to determine any potential utility conflicts (e.g. pipelines). Table V-2 is a summary of the detention pond volume calculations.

Table V-2 - Detention Pond Volume Calculations

DETENTION POND LOCATION	BASIN AREA (AC)	ASSUMED DEPTH (FT)	AVG. SITE ELEVATION (NAVD 88)	APPROX. BFE (NAVD 88)	PROVIDED VOLUME (AC-FT)	REQUIRED FILL VOL (AC-FT)	AVAILABLE VOLUME (AC-FT)	ALLOWABLE DRAINAGE AREA (AC)
A	8	6	25'	28.5'	36	25	11	17
B	20	6	27'	28'	90	18	72	111
C	6	8	29'	31.5'	36	5	32	48
D	20	8	29'	27'	120	0	120	185
Total							234	360

Detention pond Locations A and B (28-acres) are located south of Beamer Road at the Turkey Creek crossing. Approximately 126 acre-feet of volume can be provided at this location, but a large portion of this site lies within the floodplain. Based on the newly released floodplain information, approximately 103 acres draining to Turkey Creek lie within the effective floodplain. Approximately 43 acre-feet of volume will be required for floodplain mitigation, which leaves 83 acre-feet of volume available to be utilized as mitigation of developed condition flows for the 128 acres of service area. Combined usage of Locations A and B will provide detention volume for ultimate development of approximately 128 acres of the Northern Panhandle.

Location C is a portion of a 19-acre parcel located southeast of the Dixie Farm Road and Beamer Road intersection. Based on the newly released floodplain information, approximately 22 acres draining to Halls Road Ditch lie within the effective floodplain. Approximately 5 acre-feet of volume will be required for floodplain mitigation, which leaves 32 acre-feet of volume available to be utilized as mitigation of developed condition flows for 48 acres of service area. Location C will provide for ultimate development of 48 acres of the east portion of the Northern Panhandle.

Location D is a portion of a 29.5-acre parcel located along FM 2351. Base on newly released floodplain information, approximately 0 acres draining to Clear Creek lie within the

floodplain. It is assumed that approximately 9.5 acres of frontage will be allocated for development. Location D will provide for ultimate development of approximately 185 acres of the Northern Panhandle. An easement and outfall structure will be required to convey the detained flows to Clear Creek.

A combined total of approximately 234 acre-feet of volume can be provided for regional detention, which will allow for ultimate development within the Northern Panhandle study area.

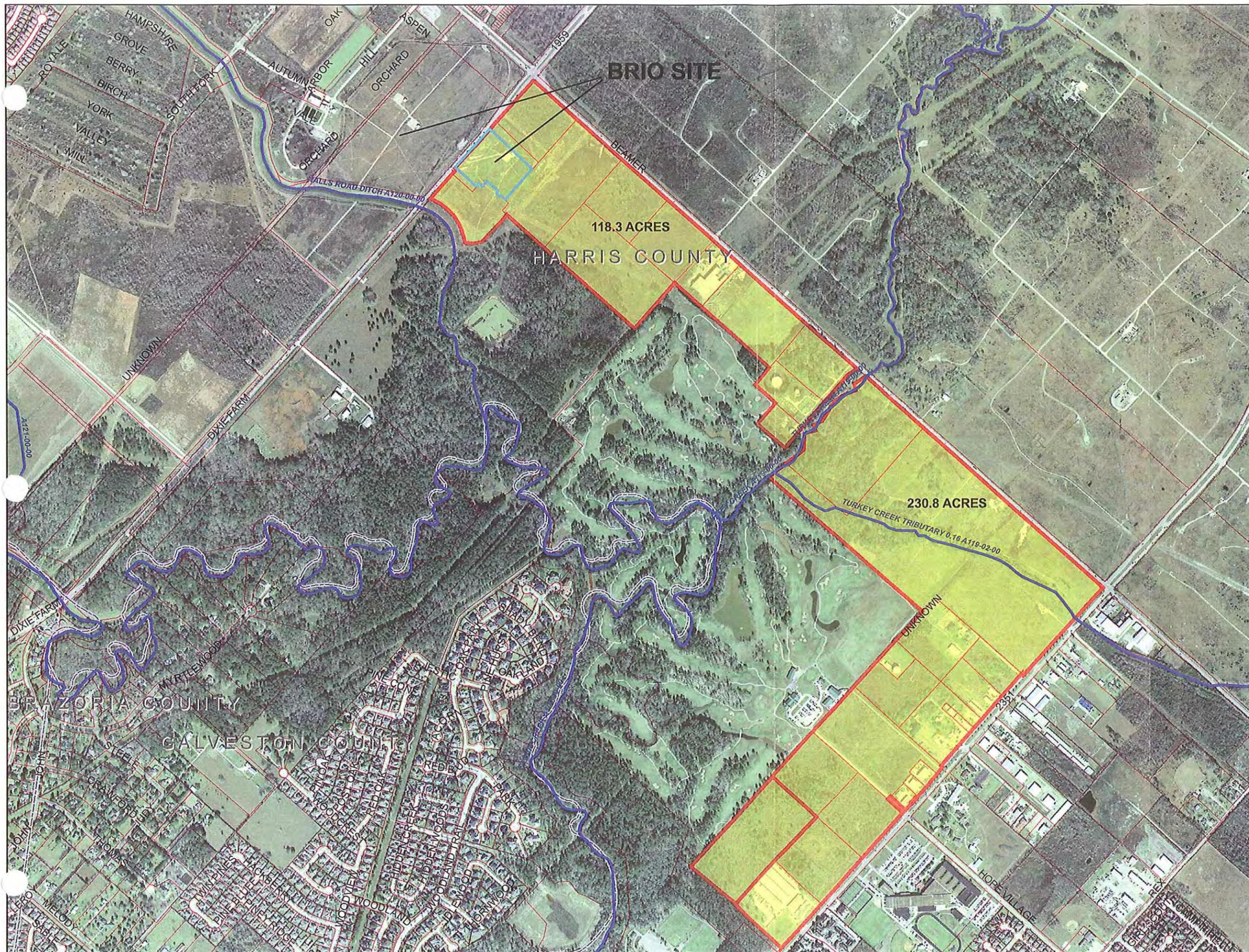
Estimated Construction Costs

The estimated construction costs for the regional detention alternative described above includes construction of the detention facilities and estimated land acquisition costs. Construction costs are based on a unit price of \$6.00 per cubic yard of excavation. This unit price includes hauling, grading, outfall structures and other appurtenant items. **Table V-3** summarizes the approximate cost for each location. It should be noted that the cost included for regional detention is a construction cost estimate suitable for overall planning purposes only.

Table V-3 - Detention Pond Construction Cost

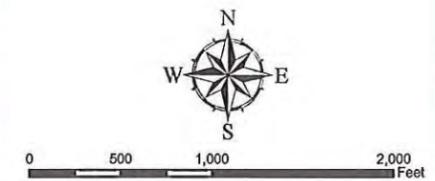
DETENTION POND LOCATION	DETENTION AREA (AC)	APPROX. DEPTH (FT)	PROVIDED VOLUME (AC-FT)	PROVIDED VOLUME (YD ³)	CONSTRUCTION COST (\$/YD ³)	DETENTION COST
A	8	6	36	58,080	6.0	\$ 348,480
B	20	6	90	145,200	6.0	\$ 871,200
C	6	8	36	58,080	6.0	\$ 348,480
D	20	8	120	193,600	6.0	\$ 1,161,600
Subtotal						\$ 2,729,760
15% Engineering						\$ 409,464

DETENTION POND LOCATION	DETENTION AREA (AC)	LAND COST (\$/ACRE)	TOTAL LAND COST (\$)
A	8	45,000	360,000
B	20	45,000	900,000
C	6	45,000	270,000
D	20	45,000	900,000
Subtotal			\$ 2,430,000
TOTAL			\$ 5,569,224



Legend

-  Streams
-  Parcels
-  County Boundary
-  Project Boundary

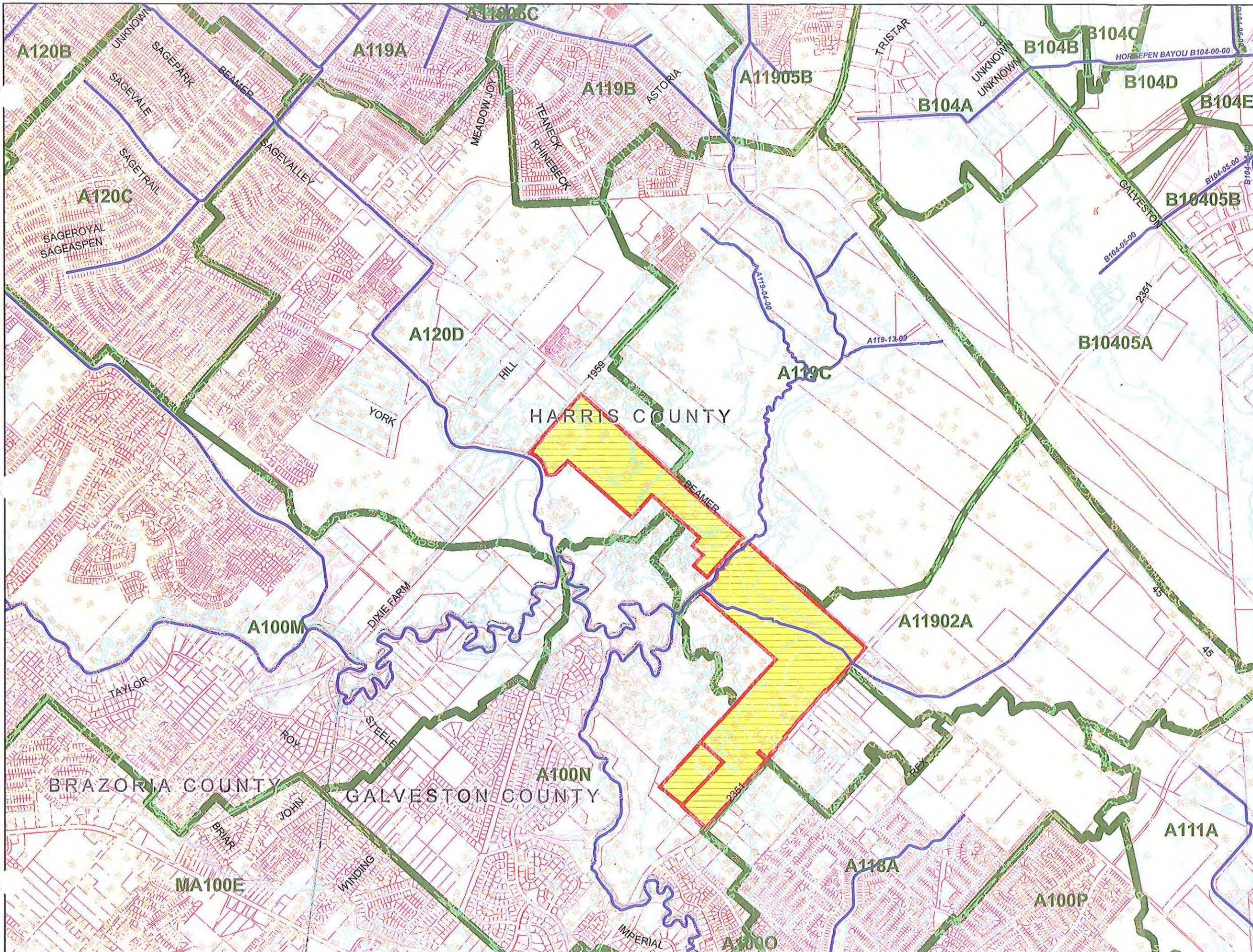


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

NORTHERN PANHANDLE
REGIONAL DETENTION
SITE LAYOUT



- Legend**
-  Streams
 -  Parcels
 -  County Boundary
 -  TSARP Subwatersheds
 -  Project Boundary

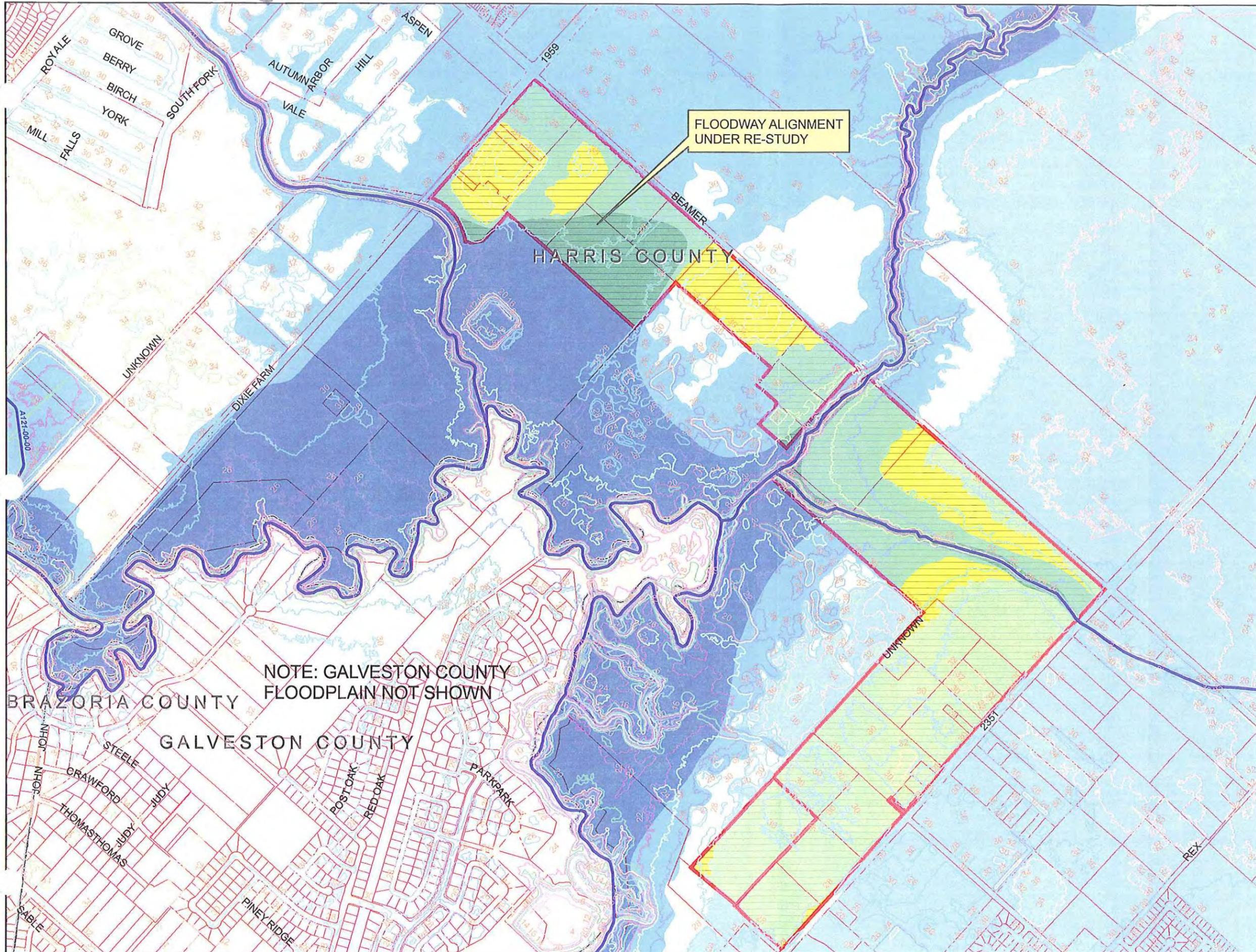


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.

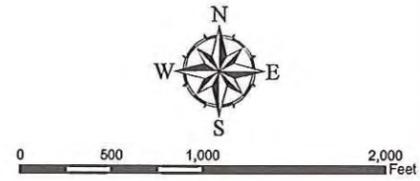


CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

NORTHERN PANHANDLE
REGIONAL DETENTION
WATERSHED MAP



- Legend**
- Streams
 - Parcels
 - County Boundary
 - Floodway
 - TSARP 100 Year Floodplain
 - TSARP 500 Year Floodplain



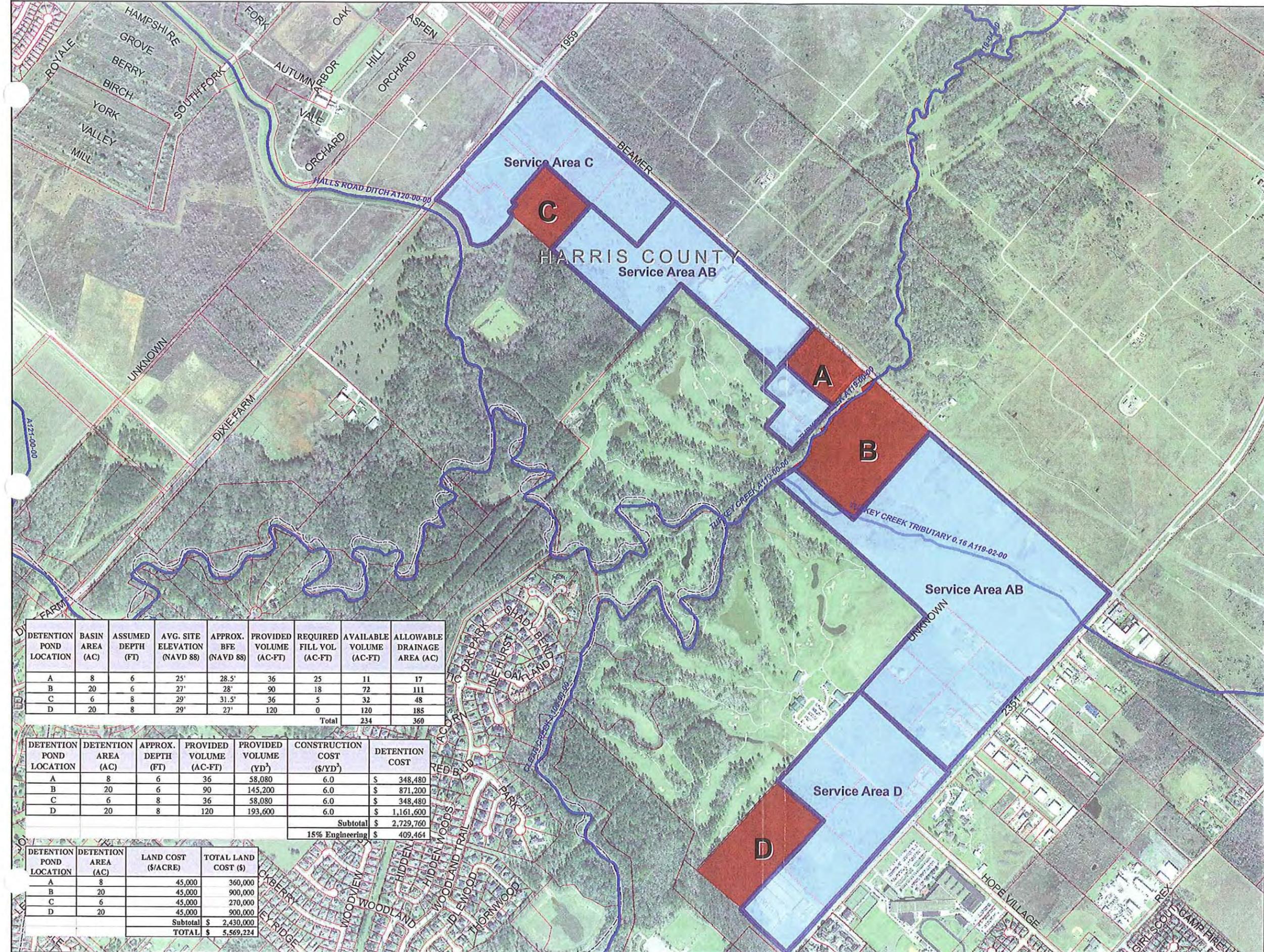
NOTE: GALVESTON COUNTY FLOODPLAIN NOT SHOWN

NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.

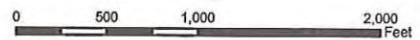


CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II

NORTHERN PANHANDLE
 REGIONAL DETENTION
 FLOODPLAIN MAP



- Legend**
- Streams
 - Parcels
 - County Boundary
 - Detention Location
 - Proposed Service Areas



NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

NORTHERN PANHANDLE
REGIONAL DETENTION
DETENTION LOCATIONS

DETENTION POND LOCATION	BASIN AREA (AC)	ASSUMED DEPTH (FT)	AVG. SITE ELEVATION (NAVD 88)	APPROX. BFE (NAVD 88)	PROVIDED VOLUME (AC-FT)	REQUIRED FILL VOL (AC-FT)	AVAILABLE VOLUME (AC-FT)	ALLOWABLE DRAINAGE AREA (AC)	
A	8	6	25'	28.5'	36	25	11	17	
B	20	6	27'	28'	90	18	72	111	
C	6	8	29'	31.5'	36	5	32	48	
D	20	8	29'	27'	120	0	120	185	
Total							234	360	

DETENTION POND LOCATION	DETENTION AREA (AC)	APPROX. DEPTH (FT)	PROVIDED VOLUME (AC-FT)	PROVIDED VOLUME (YD ³)	CONSTRUCTION COST (\$/YD ³)	DETENTION COST
A	8	6	36	58,080	6.0	\$ 348,480
B	20	6	90	145,200	6.0	\$ 871,200
C	6	8	36	58,080	6.0	\$ 348,480
D	20	8	120	193,600	6.0	\$ 1,161,600
Subtotal						\$ 2,729,760
15% Engineering						\$ 409,464

DETENTION POND LOCATION	DETENTION AREA (AC)	LAND COST (\$/ACRE)	TOTAL LAND COST (\$)
A	8	45,000	360,000
B	20	45,000	900,000
C	6	45,000	270,000
D	20	45,000	900,000
Subtotal			\$ 2,430,000
TOTAL			\$ 5,569,224

VI. Melody Lane

Drainage Area

This area includes approximately 72.7 acres of residential development along Melody Lane which is an east/west roadway that ties to FM 2351 from the West. Because of additional existing drainage problems in the immediate vicinity, staff requested that an additional partially developed area that consists of approximately 60.6 acres which lies to the West of Section VII of the Forest of Friendswood Subdivision be considered for inclusion in the Melody Lane drainage improvement plan. (See Exhibit VI).

Problem

The Melody Lane drainage system consists of road side ditches sloped towards the east for approximately 1.2 miles. These ditches are undersized to convey the flow from a 5-year rainfall event. During extreme events, excessive street ponding occurs.

Drainage Area Verification

A review of LiDAR data overlaid on an aerial photograph of the roadway and storm sewer system was used to delineate the boundaries of the drainage area.

Existing Drainage Facilities

Melody Lane is a, a two-way, two-lane facility that lies within a 60ft right-of-way. Drainage of the project area consists of roadside ditches on either side of Melody Lane that drain to the east for approximately 1.2 miles. Flow from these roadside ditches outfall to inlets that convey flow to the 54-inch storm sewers adjacent to the east ROW of FM 2351 that outfall to Mary's Creek.

Peak Runoff Calculations

Peak rate for 72.7 acres and a rainfall excess of 11.55 inches (100 year event) is approximately 181 cfs.

Proposed Facilities

Three alternatives have been developed in order to convey peak drainage flows and maintain the HGL below the edge of pavement elevations. Melody Lane is proposed to be a two-way, three-lane roadway with a continuous median left-turn lane. It is to be constructed within the existing 60 ft right-of-way. Space constraints preclude road-side ditch improvements that will provide the capacity required to maintain the desired HGL elevation. **Thus each of the alternatives presented here convert the roadway to a curb and gutter system so that**

proposed preliminary project costs include complete pavement replacement as well as drainage improvements. The alternatives are defined as follows:

1. Construct a storm sewer system within the Melody Lane existing right-of-way that conveys the 100-year rainfall eastward to FM 2351 and northward along the west right-of-way line of FM2351 to the proposed GCCDD Mary's Creek inline detention facility. The system will range in size from 24-inch to 66-inch. (See Exhibit VI-1).
2. Construct a storm sewer system that would convey flow to separate outfalls. The western ¾ mile of Melody Lane would be drained to an easement to be acquired along the west boundary of 410 Melody Lane and into a detention facility (to be acquired) located adjacent to Mary's Creek. The eastern ½ mile will be drained to the existing 54-inch storm sewer located in FM 2351. The City would need to acquire the required detention facility. (See Exhibit VI-2).
3. There have been complaints in the northwest section of Section VII of the Forest of Friendswood Subdivision neighborhood concerning standing water along the back lots of Twin Pines Drive. This alternate includes the same configuration and alignment as in Alternate 2. However, Alternate 3 consists of constructing improvements along 1500 feet of existing ditch along the west property line of 915 Melody Lane to convey flow from approximately 60.6 acres of single family large lot residential property into the proposed storm sewer in Melody Lane. The western ¾ mile of sewer would be sized to convey the additional flow. The eastern ½ mile of storm sewer remains the same size as in Alternate 2 along with the requirement for land acquisition for a drainage easement and a detention facility. (See Exhibit VI-3).

Table VI-1 – Advantages/Disadvantages

	ADVANTAGES	DISADVANTAGES
Alternate 1	No detention acquisition costs, Least total cost	Construction within FM 2351, Larger pipes to convey flow, Most construction cost
Alternate 2	Smaller pipes, Least construction cost, minimal work in FM 2351	Acquisition of detention site and easement south of Melody Lane
Alternate 3	Pipes convey additional flow from problem area in the Northwest Section of Section 7 of the Forest of Friendswood Subdivision	Acquisition of detention site and easement south of Melody Lane and additional easement for drainage from Section 7 of the Forest of Friendswood Subdivision, Most total cost

Mitigation of Addition Peak Flow Provided by the Proposed Improvements

Using the Malcom's hydrograph method, the estimated detention volume requirement for the project is 9.4 ac-ft. Alternate 1 consists of mitigation at the proposed detention capacity to be provided at the properties located at 109-115 Woodland Trail Drive previously purchased by the City as part of a "FEMA" Buyout Program as shown on Exhibit VI-1 (GCCDD Mary's Creek inline detention facility). Alternates 2 and 3 consist of purchasing additional property adjacent to Mary's Creek as shown on Exhibits VI-2 and VI-3.

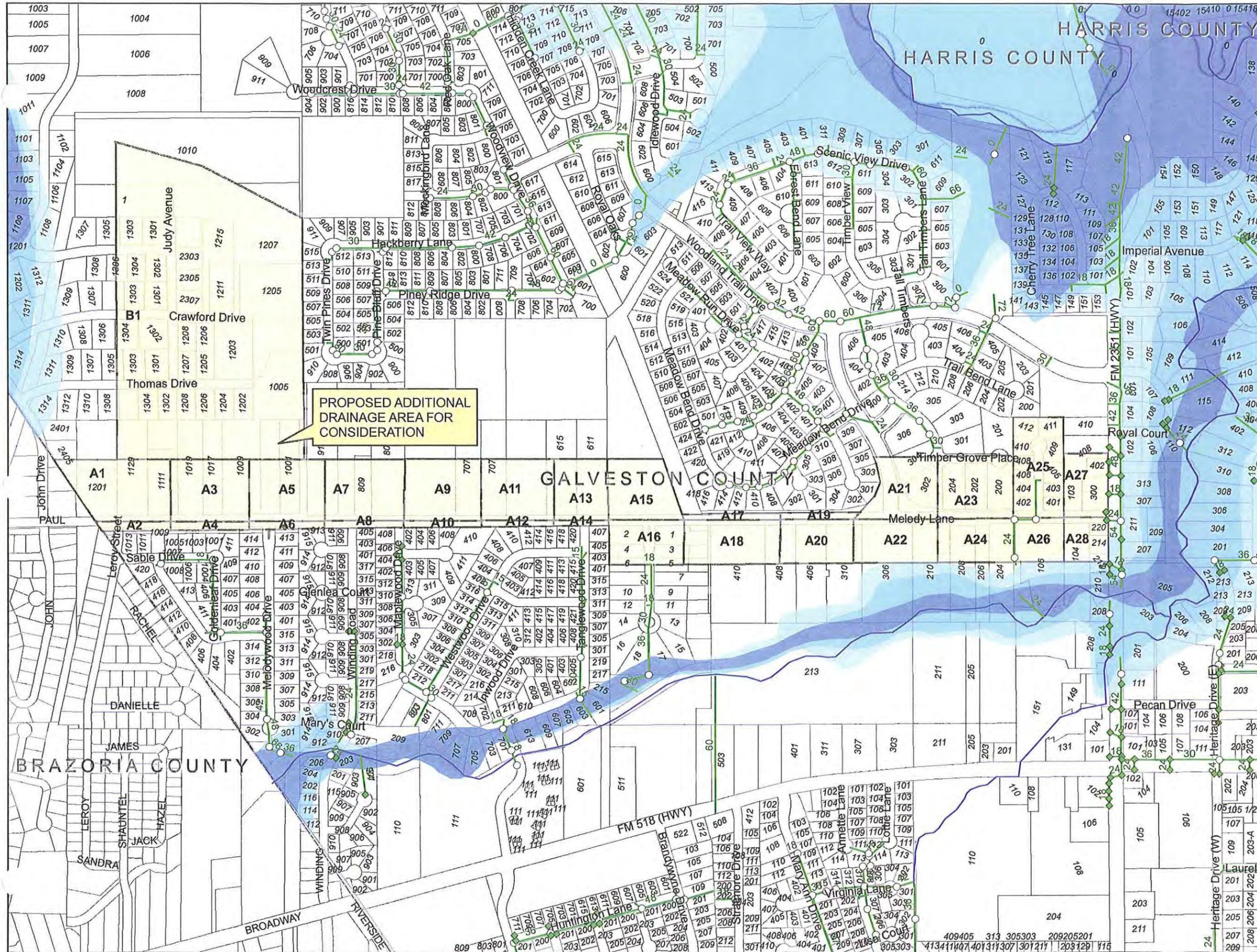
Cost Estimates

The costs of the alternatives are subdivided into three categories general, storm sewer and street and bridge. The pavement construction on these alternates include complete construction of 1.2 miles of roadway. A contingency factor of 30% is included for items such as public and private utility adjustments, storm water pollution prevention plans, permits, outfall appurtenances, and storm sewer tie-ins. Real Estate acquisition data were obtained from the Galveston County CAD. The estimated costs of alternatives are provided in the table below. More detailed tables of cost estimates are provided in the appendix of this report.

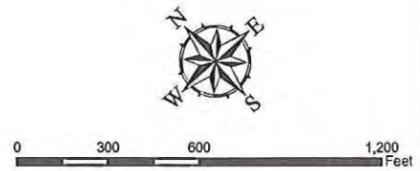
*Table VI-2 – Alternate Description and Estimated Costs **

Alternate 1	New Outfall / New Detention in GCCDD Mary's Creek inline Detention Facility	This alternate contains storm sewers sized to convey entire the 100-year rainfall eastward with the hydraulic grade line (HGL) below the edge of pavement elevation to an existing TSARP Buyout Tract.	\$ 7,243,800
Alternate 2	New Outfall / New Detention for western portion of Melody Lane	This alternate contains storm sewers sized to convey the 100-year rainfall with HGL below edge of pavement and detain the 100 year excess in a proposed detention facility south of Melody Lane.	\$ 7,746,400
Alternate 3	New Outfall / New Detention for western portion of Melody Lane including additional acreage north of Melody Lane	This alternate contains storm sewers sized to convey the 100-year rainfall with HGL below edge of pavement and detain the 100-year excess and rainfall from an additional area west of the Forest Subdivision in a proposed detention facility south of Melody Lane.	\$ 8,908,200

*Total project cost including land acquisitions.



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Creeks
 - ▭ Parcels
 - Drainage Areas
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain

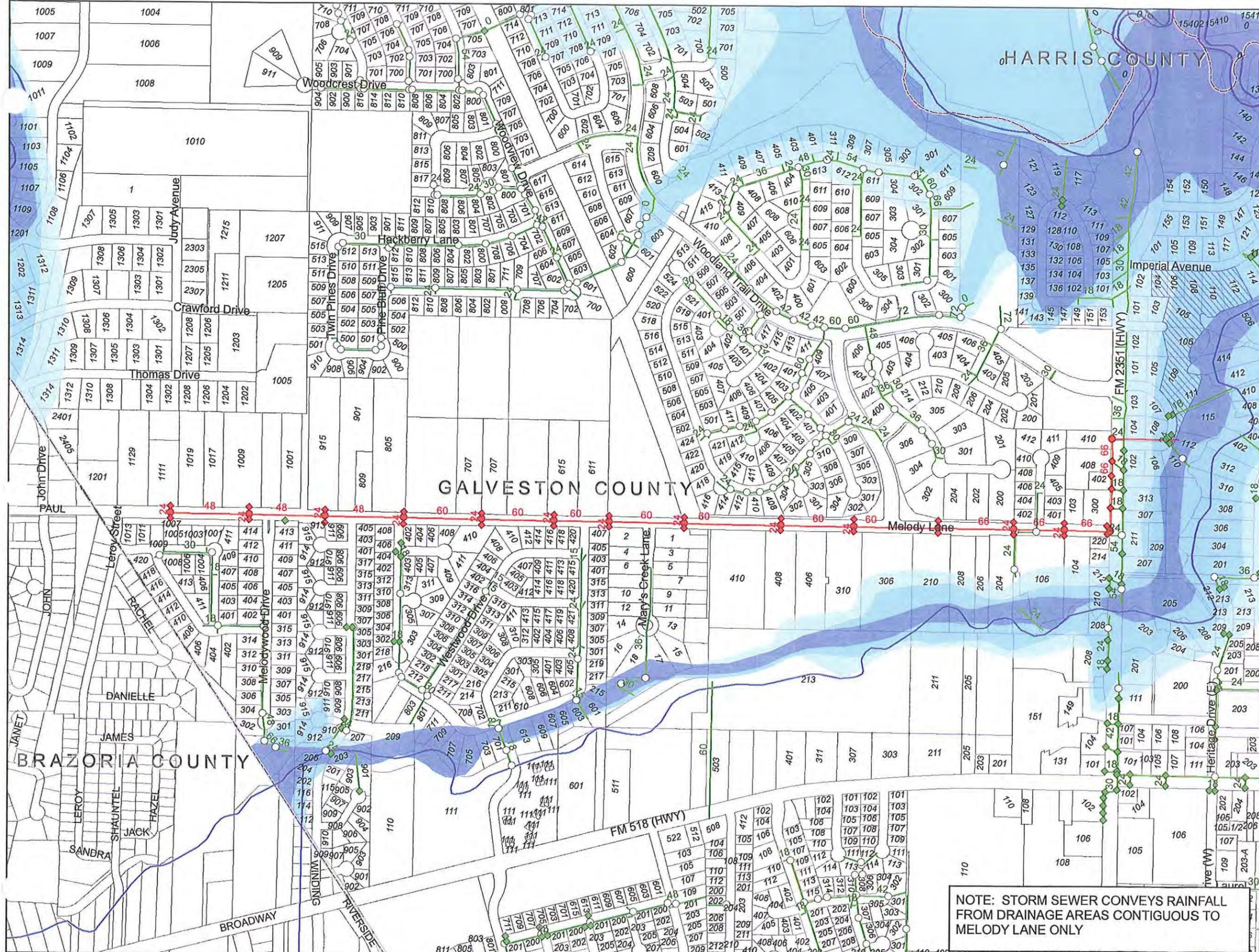


NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.

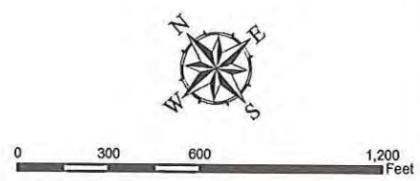


CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

**DRAINAGE AREA MAP
MELODY LANE**



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Storm Sewer
 - Creeks
 - Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain



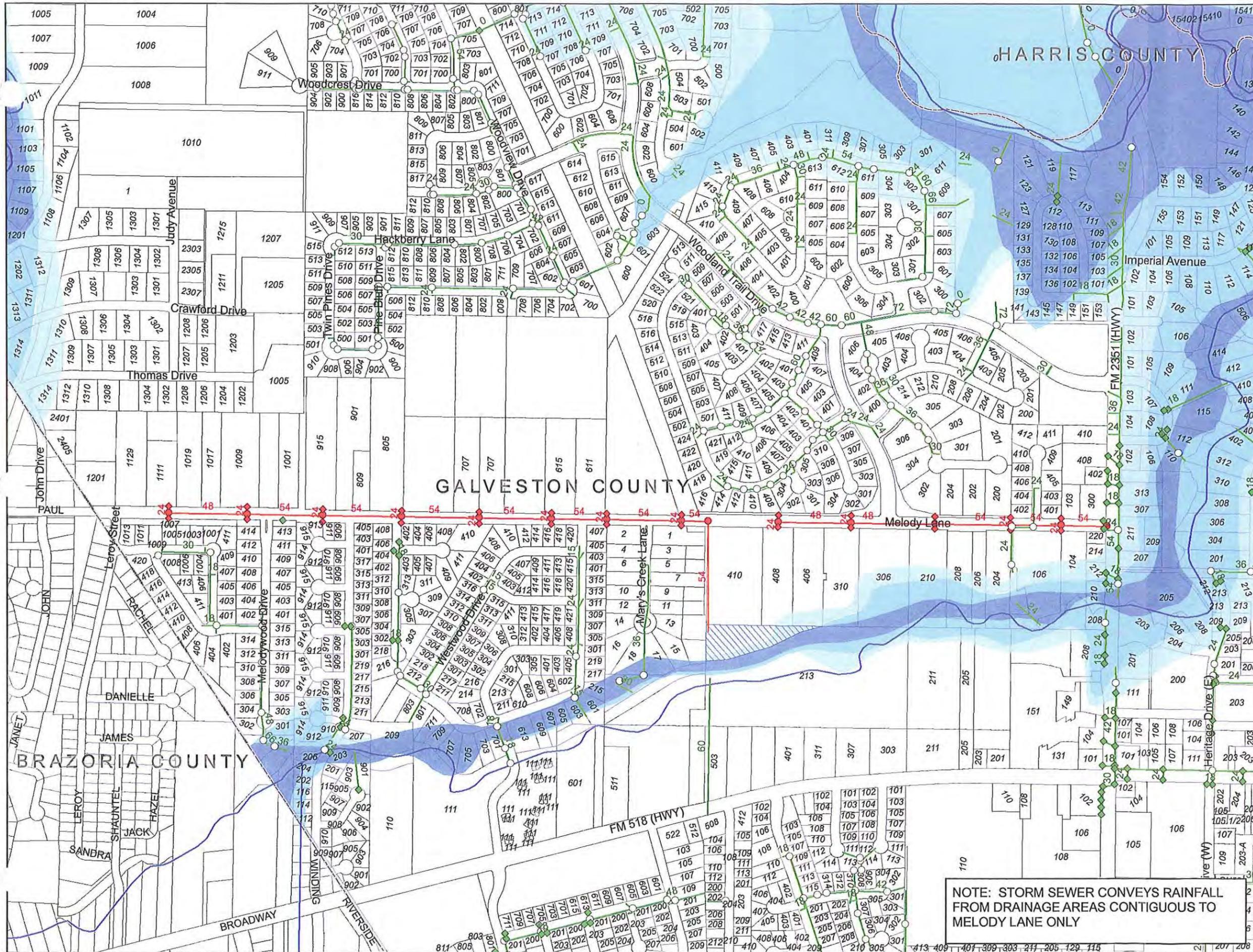
NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



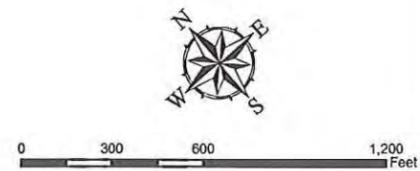
CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE I
DRAINAGE IMPROVEMENTS
MELODY LANE

NOTE: STORM SEWER CONVEYS RAINFALL FROM DRAINAGE AREAS CONTIGUOUS TO MELODY LANE ONLY



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Storm Sewer
 - Creeks
 - ▭ Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain



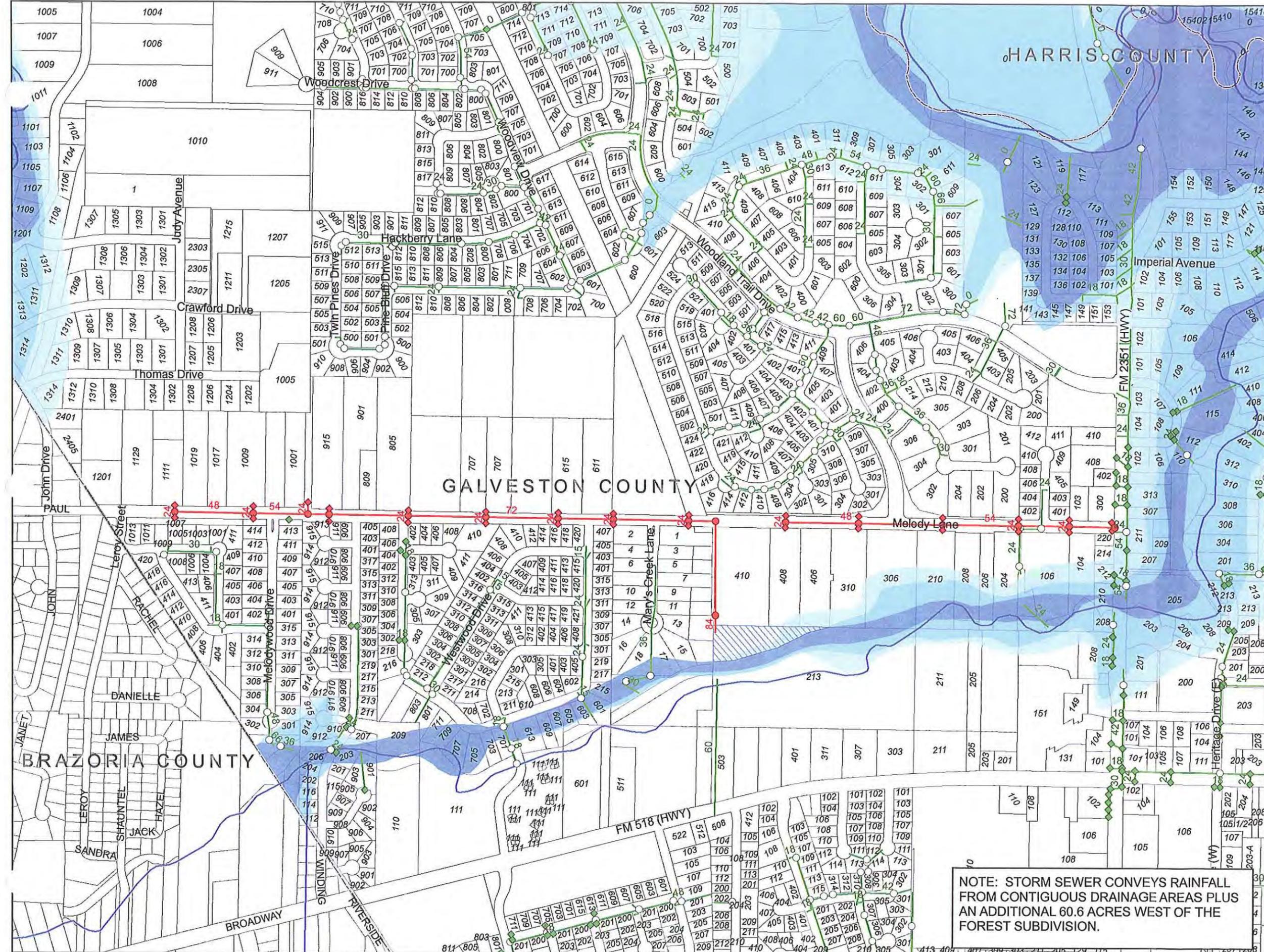
NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



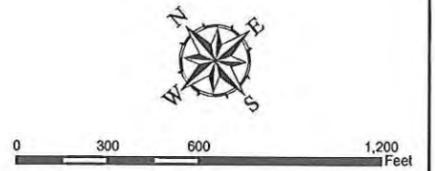
CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE II
DRAINAGE IMPROVEMENTS
MELODY LANE

NOTE: STORM SEWER CONVEYS RAINFALL FROM DRAINAGE AREAS CONTIGUOUS TO MELODY LANE ONLY



- Legend**
- INLET
 - MANHOLE
 - PROPOSED INLET
 - PROPOSED MANHOLE
 - Storm Sewer
 - Proposed Storm Sewer
 - Proposed Storm Sewer (by others)
 - Abandoned Storm Sewer
 - Storm Sewer
 - Creeks
 - Parcels
 - ▨ Proposed Detention
 - Floodway
 - 100 Year Floodplain
 - 500 Year Floodplain



NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

ALTERNATIVE III
DRAINAGE IMPROVEMENTS
MELODY LANE

NOTE: STORM SEWER CONVEYS RAINFALL FROM CONTIGUOUS DRAINAGE AREAS PLUS AN ADDITIONAL 60.6 ACRES WEST OF THE FOREST SUBDIVISION.

VII. Southern End Regional Detention

Study Area

The area referred to as the Southern End region is located in the extreme southern limits of the City along F.M. 528. The area is bounded by F.M. 528 on the west, Lundy Lane on the north, a branch of the American Canal on the east, and undeveloped tracts on the south. The area to be considered in this master plan is approximately 802 acres. The study area is primarily undeveloped with some large lot residential development along Lundy Lane and Schulte Road, a 55 acre tract used as a gun club, and some scattered development along F.M. 528. **Exhibit VII-1** depicts the study area and surrounding property and relevant drainage features.

Elevations referenced in this section are referenced to the 1929 North American Vertical Datum, 1978 Adjustment. This datum was used for the analysis and report entitled "*Dickinson Bayou Watershed, Regional Drainage Plan,*" dated November 1994, prepared by Walsh Engineering and Dodson & Associates, Inc, referred to hereinafter as the Dickinson Bayou Report.

Existing Drainage

The Southern End study area is located within the Dickinson Bayou Watershed. Drainage area delineations were obtained from the Dickinson Bayou Report, as shown on **Exhibit VII-2**. Natural ground elevations within the study area range from 35 to 30 feet. Several drainage areas from the report encompass the study area. Approximately 170 acres within Drainage Area 12a, the area south of Lundy Lane and North of the American Canal drains into Lundy Ditch, then east and south into Dickinson Bayou downstream of McFarland Road. Approximately 530 acres in Drainage Area 9 drains directly to Dickinson Bayou. Approximately 102 acres within Drainage Area 10 drains by sheet flow into an unnamed tributary of Dickinson Bayou, just south of the study area.

Existing Floodplain and Floodway

The floodplain elevations and floodway delineations developed in the Dickinson Bayou Report are used as the base conditions for this study. The Base Flood Elevations (BFEs) range from approximately 34.77 to 34.80 feet, as shown on **Exhibit VII-3**. Based on these elevations, approximately 93 acres of the study area lie within the floodway and approximately 370 acres lie within the 1% annual probability recurrence event (100-year) floodplain.

The areas within the 100-year floodplain will require fill to be placed in order to accommodate development. This fill will require mitigating detention to offset the volume of floodplain storage displaced by the fill. In addition, detention will be required to mitigate the effects of proposed development on the downstream flooding potential along the tributaries and Dickinson Bayou.

Dickinson Bayou Watershed Master Plan

Alternatives for providing detention to this area include onsite detention within each tract as it develops or regional detention to be provided in selected areas. Onsite detention is designed to reduce peak runoff rates from new development to existing levels, therefore allowing development of individual tracts without the need for possible downstream improvements along the receiving channels. In addition, onsite ponds allow individual tracts to develop independently of other land acquisition considerations. However, onsite detention typically requires a larger net loss of developable property compared to regional systems. Regional or shared detention facilities are designed to provide mitigating detention for all tracts, with some possible offsite development costs associated with conveying the developed runoff to the regional pond. The net acreage used for regional facilities is typically smaller than onsite systems; however the acquisition of offsite property for constructing regional facilities could be a significant factor in planning the development of individual tracts.

The Dickinson Bayou Report identified several alternative plans for future drainage improvements within the watershed. The proposed alternative incorporated regional detention facilities in the upper reaches of the watershed along with channel improvements along tributaries in order to convey the developed condition flows to those regional ponds. As shown on **Exhibit VII-2**, the area along Dickinson Bayou, upstream of McFarlan Road, was identified as a potential regional pond site. However, that plan incorporates regional ponds which would serve areas outside of the study area and the regional plan for this portion of the watershed has not progressed since the adoption of the overall watershed plan. In accordance with the Dickinson Bayou Master Plan regional detention should be provided for the portion of the study area south of the American canal, however any proposed detention within the study area will accommodate only the area identified within the study area as shown on **Exhibit VII-2**. In the future, as development within the study area or upstream offsite areas occurs, modifications to the proposed detention improvements, described below, may be accommodated. It should be noted that the Dickinson Bayou Report identified a right-of-way requirement of 140-feet for Dickinson Bayou within the study area. This requirement should be incorporated into any development plan within the study area.

Since the area south of Lundy Lane and north of the branch of the American Canal is currently partially developed as single family residential, a regional detention plan may only be feasible if a large portion of the area develops or re-develops as a planned unit. Otherwise, onsite detention for this limited area should be considered.

Proposed Improvements

Utilizing the current City of Friendswood zoning plan, it was determined that the Southern End Study area is designated for single family residential, industrial and commercial development as shown on **Exhibit VII-1**. The Dickinson Bayou Report computed a detention rate of 0.41 acre-feet per acre to mitigate the effects of development on the downstream

discharges. The study area lies within the boundaries of the Galveston County Consolidated Drainage District. The Drainage District's criterion requires that adequate detention and drainage improvements be constructed to ensure that no adverse drainage impacts would be caused by a proposed development. Based on this requirement, the adequacy of the Dickinson Bayou Report's requirement of 0.41 ac. ft/ac should be considered the minimum allowable detention rate for this area. As individual tracts develop, detailed analysis of the hydrologic and hydraulic conditions will be required to determine the appropriate improvements to be constructed. Based on these considerations, for the purposes of this study, an appropriate detention rate of 0.45 ac. ft/ac will be assumed. This volume would be added to the computed volume of flood plain fill required to raise the proposed developed areas above the 100-year floodplain elevation. As shown in Table VII-1, the estimated volume required is approximately 1,158 acre-feet. Assuming a depth of 8 feet and maintenance berms, 193 acres of land will need to be utilized for detention.

Table VII-1 – Detention Pond Volume Calculations

DRAINAGE AREA NO.	DRAINAGE AREA (AC)	APPROX. DEPTH (FT)	AVG. SITE ELEVATION (NAVD29)	APPROX. BFE (NAVD29)	REQUIRED VOLUME (AC-FT)	REQUIRED FILL VOLUME (AC-FT)	TOTAL REQUIRED VOLUME (AC-FT)	REQUIRED LAND (AC)
9	530	8	33'	34.8'	239	715	954	159
10	102	8	34'	34.8'	46	82	128	21
12a	170	8	36'	34.8'	77	0	77	13
TOTAL							1,158	193

Detention pond area and volumes are calculated assuming 30-foot perimeter maintenance berms and 3:1 (H:V) side slopes. For the purpose of this preliminary study, detention pond depths are estimated and have not been field verified to determine any potential utility conflicts (e.g. pipelines).

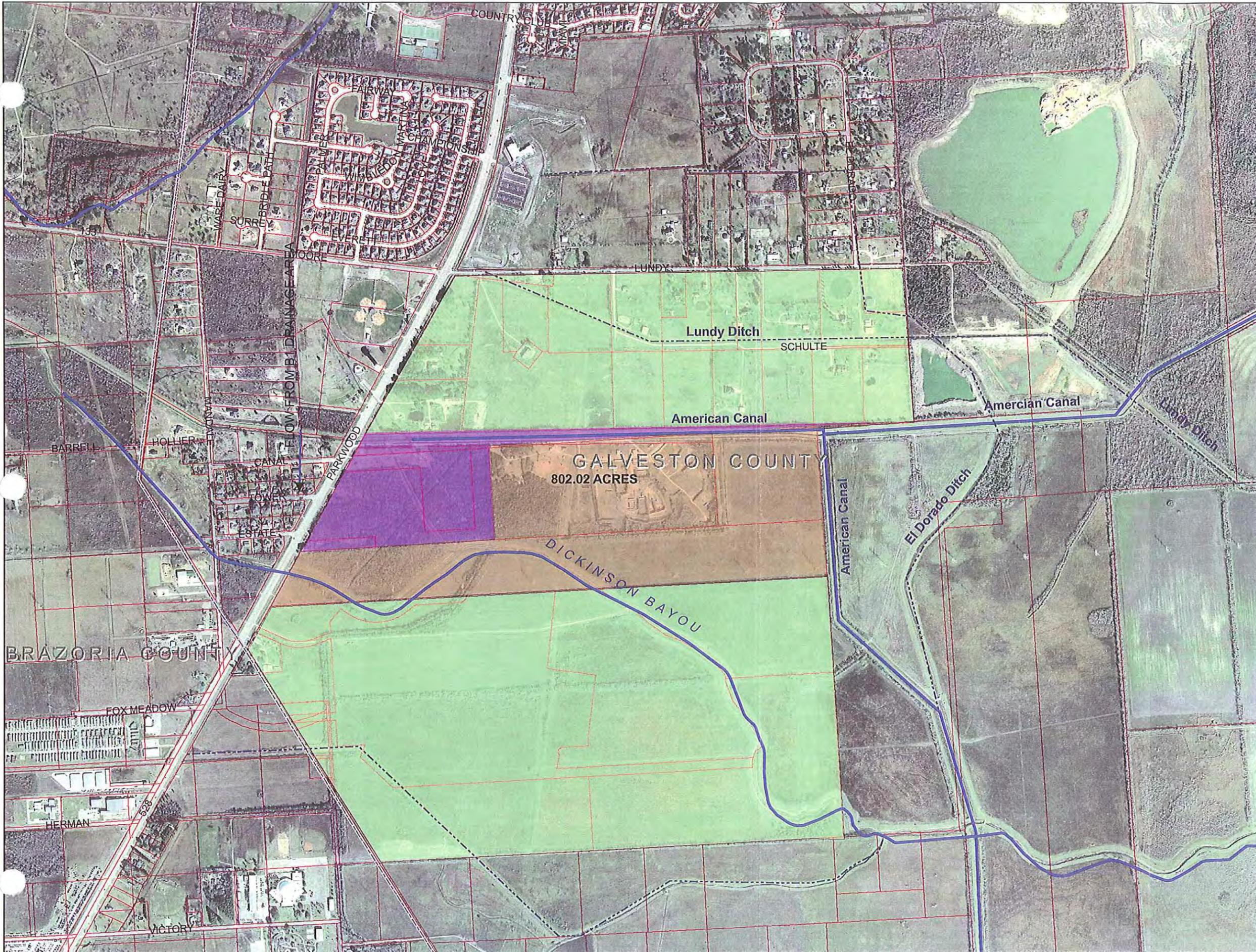
Estimated Construction Costs

The estimated construction costs for the regional detention alternative described above includes construction of the detention facilities and estimated land acquisition costs. Construction costs are based on a unit price of \$6.00 per cubic yard of excavation. This unit price includes hauling, grading, outfall structures and other appurtenant items. Table VII-2 summarizes the approximate cost for each location. It should be noted that the cost included for regional detention is a construction cost estimate suitable for overall planning purposes only.

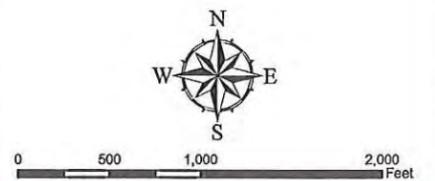
Table VII-2 - Detention Pond Construction Cost

DRAINAGE AREA NO.	DRAINAGE AREA (AC)	ASSUMED DEPTH (FT)	TOTAL REQUIRED VOLUME (AC-FT)	TOTAL REQUIRED VOLUME (YD ³)	CONSTRUCTION COST (\$/YD ³)	DETENTION COST
9	530	8	904	182,307	6.0	\$ 1,093,840
10	102	8	128	25,813	6.0	\$ 154,880
12a	170	8	77	15,528	6.0	\$ 93,170
Subtotal						\$ 1,341,890
15% Engineering						\$ 201,284

DETENTION POND LOCATION	DETENTION AREA (AC)	AVERAGE LAND COST (\$/ACRE)	TOTAL LAND COST (\$)
9	151	4,000	604,000
10	21	4,000	84,000
12a	13	4,000	52,000
Subtotal			\$ 740,000
TOTAL			\$ 2,283,174



- Legend**
- Ditch
 - Streams
 - ▭ Parcels
 - ▭ County Boundary
 - ▭ Business Park
 - ▭ Light Industrial
 - ▭ Single Family Residential

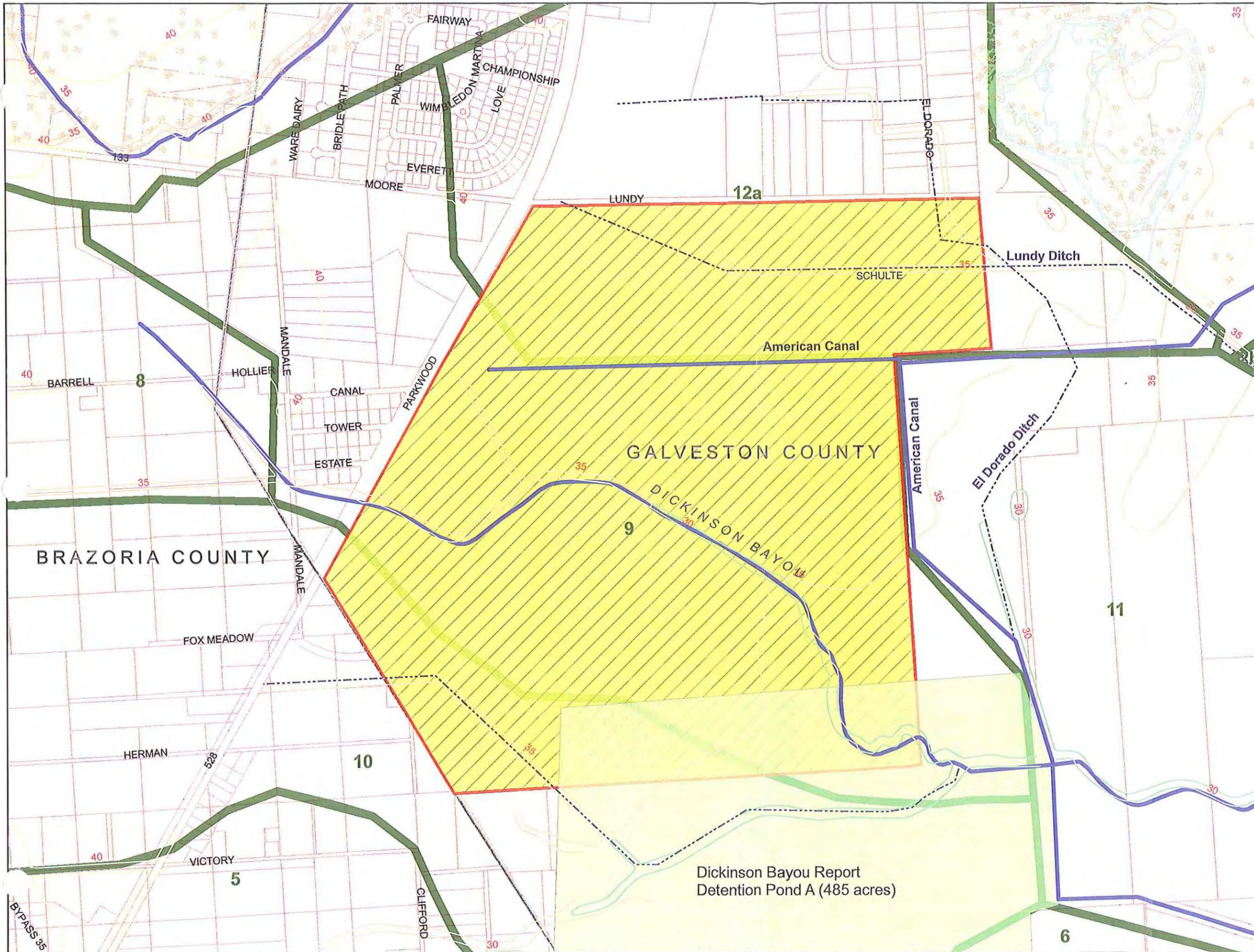


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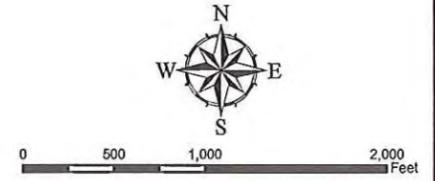


CITY OF FRIENDSWOOD
MASTER DRAINAGE PLAN
PHASE II

SOUTHERN END
 REGIONAL DETENTION
 SITE LAYOUT



- Legend**
- Ditch
 - Streams
 - DB Regional Pond
 - Parcels
 - County Boundary
 - Project Boundary
 - Subwatersheds



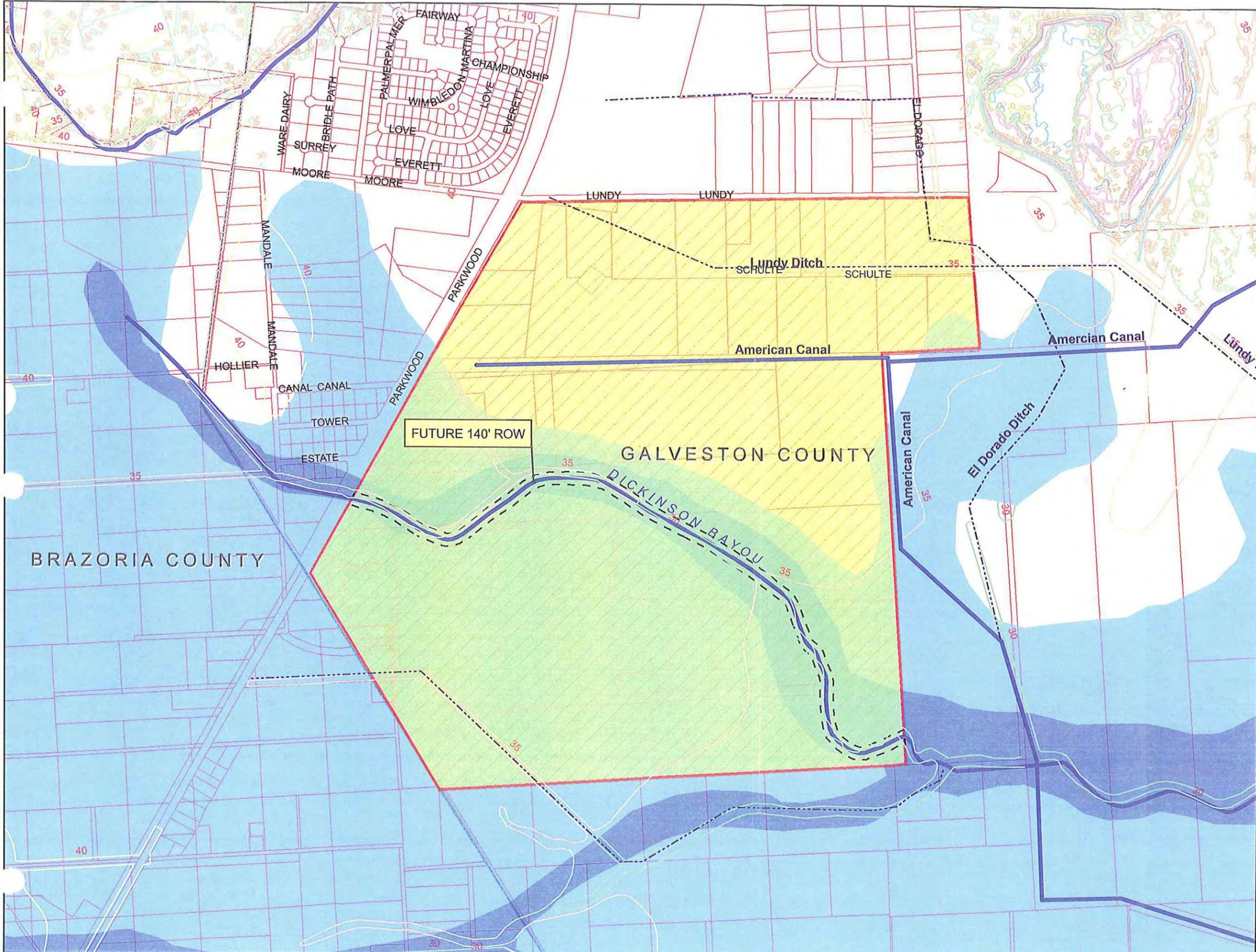
NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



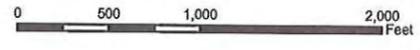
CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II

SOUTHERN END
 REGIONAL DETENTION
 WATERSHED MAP

Dickinson Bayou Report
 Detention Pond A (485 acres)



- Legend**
- Ditch
 - Streams
 - ▭ Parcels
 - ▨ Project Boundary
 - - - Future 140' ROW
 - ▭ County Boundary
 - █ Floodway
 - █ Existing 100 Year Floodplain



NOTE: FLOODPLAIN DATA REPRESENTS EFFECTIVE FLOODPLAIN PER CITY OF FRIENDSWOOD, TEXAS GIS MAPPING.



CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II

SOUTHERN END
 REGIONAL DETENTION
 FLOODPLAIN MAP

VIII. Recommendations and Conclusions

FM 518 (Willowick – Mary’s Creek Tributary)

Our recommendation for this project is to implement Alternative 3 (parallel storm sewer construction in FM 518, remove and replace of some FM 518 storm sewers, new outfall constructed at the northern end of Heritage Drive, and participation in the planned GCCDD regional detention facilities planned for the area). **GCCDD has indicated that capacity in the Mary’s Creek inline facility is limited and the City should pursue the required capacity quickly.**

The construction cost for this alternative is estimated at \$2,036,400.

Benefits to this alternative are that there is no anticipated ROW acquisition required along FM 518, maximum use of existing storm sewer system, and maintenance of service.

It is recommended that existing storm sewers in FM 518 are cleaned and televised to determine their existing condition as there is no anticipated rehabilitation costs for the FM 518 storm sewers presented in this alternative.

Major concerns associated with this recommended alternative (as well as the other FM 518 alternatives) are

- FM 518 construction – traffic disruption, access for businesses and residences, dust and noise control, coordination issues with TXDOT, maintenance of drainage during construction, private and public utility conflicts, city services (school buses, mail, emergency vehicles)
- Coordination with USACOE for outfall planning and construction
- Project depends on available capacity of GCCDD regional detention facilities in the area.

FM 518 (Willowick – Coward’s Creek)

Our recommendation for this project is to implement Alternative 4 (parallel storm sewer construction in FM 518, remove and replace of some FM 518 storm sewers, and acquisition/construction of detention facilities west of Coward’s Creek).

The construction cost for this alternative is estimated at \$3,802,500 and land acquisition cost is estimated at \$330,000.

Benefits to this alternative include acquisition of relatively less costly FM 518 property (currently adjacent to TxDOT ROW) than in Alternative 2 (per GCCAD information),

maximum use of existing storm sewer system, maintenance of service, no new outfall construction.

It is recommended that existing storm sewers in FM 518 are cleaned and televised to determine their existing condition as there is no anticipated rehabilitation costs for the FM 518 storm sewers presented in this alternative.

Major concerns associated with this recommended alternative (as well as the other FM 518 alternatives) are

- FM 518 construction - traffic disruption, access for businesses and residences, dust and noise control, coordination issues with TXDOT, maintenance of drainage during construction, private and public utility conflicts, city services (school buses, mail, emergency vehicles)

Northern Panhandle Regional Detention

- Future development within the Northern Panhandle study area will require significant mitigating detention to offset the effects of fill within the floodplain and increased runoff due to development.
- Regional detention within each of the three service areas A, B, C, and D will provide the most efficient use of available property for future development.
- Onsite detention within service areas C and D should be considered based on the availability of offsite drainage easements at the time these tracts develop.
- A re-study of the floodway along Clear Creek, upstream of Turkey Creek, may identify changes to the floodway which could reduce the amount of property shown in the floodway.

Melody Lane

Our recommendation for this project is to implement Alternative 2 (replace existing roadside ditches along entire project length with storm sewers, acquisition of storm sewer easement along west boundary of 410 Melody Lane, construction of storm sewer outfall, acquisition and construction of detention facilities along Mary's Creek).

The construction cost for this alternative is estimated at \$6,124,400 and land acquisition cost is estimated at \$1,622,000. **Because the existing roadside ditches would be replaced with a closed conduit drainage system, these project costs include total reconstruction of Melody Lane (sidewalks and driveway tie ins included, street lights not included).**

Although this alternative has a total estimated cost (construction and ROW acquisition) more than Alternative 1 (\$7,746,400 vs. \$7,243,800), it is the recommended alternative. Benefits to this alternative include minimal construction in FM 2351 and the ability to expand

the project to include the partially developed area west of the Forest, Section VII.(Alternative 3).

Major concerns associated with this recommended alternative are

- Melody Lane construction – traffic disruption, access for residences, dust and noise control, maintenance of drainage during construction, private and public utility conflicts, city services (school buses, mail, emergency vehicles)

Southern End Regional Detention

- Future development within the Southern End study area will require significant mitigating detention to offset the effects of fill within the floodplain and increased runoff due to development.
- Regional detention, in accordance with the Dickinson Bayou Master Drainage Plan, for the area south of the American Canal, will provide the most efficient use of land within the study area. Provisions for deepening and widening Dickinson Bayou accommodate future upstream development should be included at the time of platting and design of subdivisions within this area.
- Regional detention for the area north of the American Canal (Lundy Ditch) would provide the most efficient use of the land in this area. However since this area is partially developed, onsite detention for the remaining areas should be considered

PROJECT NAME : ALT 1 FM518_west_A_Prop_100_t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : FM2351 - willowick
 DESIGN FREQUENCY : 5 Years
 ANALYSYS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

C-Value = Existing Land Use

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	6.49	0.000	8.514
DA-9A	0.95	0.35	10.00	10.00	7.93	0.000	2.636
DA-9B	0.95	0.96	10.00	10.00	7.93	0.000	7.229
DA-9C	0.95	1.54	15.76	15.76	6.43	0.000	9.408
DA-10A	0.95	0.35	12.74	12.74	7.12	0.000	2.368
DA-10B	0.95	0.96	15.77	15.77	6.43	0.000	5.863
DA-10C	0.95	1.55	15.77	15.77	6.43	0.000	9.466
DA-11A	0.95	0.29	12.50	12.50	7.19	0.000	1.980
DA-11B	0.95	1.28	15.25	15.25	6.54	0.000	7.948
DA-11C	0.95	1.39	15.47	15.47	6.49	0.000	8.570
DA-1	0.95	8.41	16.50	16.50	6.28	0.000	50.206
DA-2	0.95	8.61	15.00	15.00	6.59	0.000	53.899
DA-3A	0.95	0.75	10.00	10.00	7.93	0.000	5.648
DA-3B	0.95	0.80	10.00	10.00	7.93	0.000	6.025
DA-4A	0.95	0.60	10.00	10.00	7.93	0.000	4.518
DA-5A	0.95	1.61	10.00	10.00	7.93	0.000	12.124
DA-5B	0.95	1.64	15.94	15.94	6.39	0.000	9.962
DA-6B	0.95	2.96	16.30	16.30	6.32	0.000	17.780
DA-6C	0.95	1.74	16.30	16.30	6.32	0.000	10.452
DA-7A	0.95	0.42	14.82	14.82	6.63	0.000	2.645
DA-7B	0.95	1.08	14.82	14.82	6.63	0.000	6.801
DA-7C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-8A	0.95	0.42	13.00	13.00	7.06	0.000	2.816
DA-8B	0.95	0.36	12.78	12.78	7.11	0.000	2.433
DA-8C	0.95	2.17	16.83	16.83	6.22	0.000	12.825
DA-12A	0.95	0.30	10.00	10.00	7.93	0.000	2.259
DA-12B	0.95	1.27	10.00	10.00	7.93	0.000	9.564
DA-12C	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-32A	0.95	1.18	15.04	15.04	6.58	0.000	7.377
DA-32B	0.95	0.55	10.00	10.00	7.93	0.000	4.142
DA-33	0.95	5.88	21.25	21.25	5.50	0.000	30.732
DA-34	0.95	8.15	23.24	23.24	5.24	0.000	40.548
DA-6BCr	0.95	4.70	20.05	20.05	5.68	0.000	25.349
DA-7ABr	0.95	1.50	10.00	10.00	7.93	0.000	11.296
DA-35	0.95	1.90	16.39	16.39	6.31	0.000	11.381
DA-36	0.95	0.28	12.45	12.45	7.20	0.000	1.915
DA-9ABCr	0.95	2.85	17.83	17.83	6.04	0.000	16.352
DA10BCAr	0.95	2.81	10.00	10.00	7.93	0.000	21.161
DA-12BCr	0.95	3.65	17.55	17.55	6.09	0.000	21.114

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
Page 1								

ALT 1 West A.txt

DA-33	Grate	0.950	5.88	21.25	5.50	0.000	0.00	30.732
DA-34	Grate	0.950	8.15	23.24	5.24	0.000	0.00	40.548
DA-8A	Curb	0.950	17.41	23.25	5.24	0.000	0.00	86.593
DA-5B	Curb	0.950	1.64	15.94	6.39	0.000	0.00	9.962
DA-32A	Curb	0.950	2.82	16.21	6.34	0.000	0.00	16.983
DA-8B	Curb	0.950	0.36	12.78	7.11	0.000	0.00	2.433
DA-7ABr	Curb	0.950	3.67	16.91	6.21	0.000	0.00	21.637
DA-8C	Curb	0.950	2.17	16.83	6.22	0.000	0.00	12.825
DA-35	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-8D	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-36	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-10A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA10BCAr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9ABC	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-12BC	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-6	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-5	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-4	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-3	CircMh	0.950	4.03	17.59	6.08	0.000	0.00	23.286
MH-2	CircMh	0.950	21.44	23.38	5.22	0.000	0.00	106.317
MH-1	CircMh	0.950	24.26	23.44	5.21	0.000	1.00	121.137
DI-11A	Junct	0.950	24.26	23.44	5.21	0.000	1.00	121.137
DI-11B	JunctBx	0.950	24.26	23.44	5.21	0.000	1.00	121.137
DI-12	Junct	0.950	24.26	23.44	5.21	0.000	1.00	121.137
DI-13	Junct	0.950	24.26	23.44	5.21	0.000	1.00	121.137
DA-6B	Curb	0.950	8.84	21.30	5.50	0.000	0.00	46.149
OUT	outlt	0.950	24.26	23.44	5.21	0.000	1.00	121.137

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
15	DA-8C	DA-7ABr	22.75	19.52	Circ 1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	15.02	14.52	Circ 1	0.00	3.00	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	24.56	Circ 1	0.00	2.00	86.00	0.22	0.013
18	MH-3	MH-2	14.52	13.57	Circ 1	0.00	3.00	96.20	0.99	0.013
19	DA-33	DA-6B	23.00	22.28	Circ 1	0.00	3.00	33.80	2.13	0.013
20	DA-6B	DA-8A	22.28	22.17	Circ 1	0.00	3.00	65.90	0.17	0.013
21	DA-34	DA-8A	24.44	23.82	Circ 1	0.00	2.00	13.00	4.77	0.013
22	DA-8A	MH-2	17.76	16.57	Circ 1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	15.57	15.46	Circ 1	0.00	4.00	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ 1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ 1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	15.46	15.32	Circ 1	0.00	4.00	60.00	0.23	0.013
27	DI-11A	DI-11B	14.32	13.97	Circ 1	0.00	5.00	139.80	0.25	0.013
28	DI-11B	DI-12	13.97	13.61	Circ 1	0.00	5.00	103.60	0.35	0.013
29	DI-12	DI-13	13.61	12.96	Circ 1	0.00	5.00	212.00	0.31	0.013
30	DI-13	OUT	12.96	12.00	Circ 1	0.00	5.00	114.00	0.84	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
15*	24.04	22.64	0.321	0.69	2.00	13.41	4.08	12.82	50.47	0.000	29.92
16	22.64	22.43	0.105	1.78	3.00	4.95	3.06	21.64	33.27	0.000	29.92
17	25.41	25.10	0.012	0.66	0.66	2.71	2.71	2.43	10.63	0.000	30.48
18*	22.43	22.32	0.122	1.23	3.00	8.53	3.29	23.29	66.29	0.000	30.48

ALT 1 west A.txt

19*	25.35	25.28	0.212	1.16	3.00	12.22	4.35	30.73	97.37	0.000	29.2
20	25.28	24.38	0.479	3.00	3.00	6.53	6.53	46.15	27.25	0.000	30.42
21*	25.82	25.20	3.212	1.38	1.38	17.55	17.55	40.55	49.44	0.000	31.19
22	23.87	22.32	1.685	3.00	3.00	12.25	12.25	86.59	75.71	0.000	30.48
23	22.32	22.16	0.548	4.00	4.00	8.46	8.46	106.32	88.48	0.000	30.41
24	25.59	25.48	0.194	1.50	1.81	3.94	3.33	9.96	10.87	0.000	30.42
25	25.48	25.14	0.563	1.81	1.81	5.67	5.67	16.98	16.00	0.000	30.42
26	22.16	21.73	0.711	4.00	4.00	9.64	9.64	121.14	69.40	0.000	30.36
27	21.73	21.43	0.216	3.75	5.00	7.67	6.17	121.14	130.33	0.000	28.85
28	21.43	21.20	0.216	3.36	5.00	8.64	6.17	121.14	153.55	0.000	27.50
29	21.20	20.75	0.216	3.52	5.00	8.21	6.17	121.14	144.23	0.000	26.10
30*	20.75	20.50	0.216	2.52	5.00	12.22	6.17	121.14	239.03	0.000	24.20

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	9.70	0.000	12.711
DA-9A	0.95	0.35	10.00	10.00	11.66	0.000	3.876
DA-9B	0.95	0.96	10.00	10.00	11.66	0.000	10.632
DA-9C	0.95	1.54	15.76	15.76	9.61	0.000	14.056
DA-10A	0.95	0.35	12.74	12.74	10.56	0.000	3.512
DA-10B	0.95	0.96	15.77	15.77	9.60	0.000	8.760
DA-10C	0.95	1.55	15.77	15.77	9.60	0.000	14.143
DA-11A	0.95	0.29	12.50	12.50	10.65	0.000	2.933
DA-11B	0.95	1.28	15.25	15.25	9.75	0.000	11.861
DA-11C	0.95	1.39	15.47	15.47	9.69	0.000	12.796
DA-1	0.95	8.41	16.50	16.50	9.40	0.000	75.140
DA-2	0.95	8.61	15.00	15.00	9.83	0.000	80.384
DA-3A	0.95	0.75	10.00	10.00	11.66	0.000	8.306
DA-3B	0.95	0.80	10.00	10.00	11.66	0.000	8.860
DA-4A	0.95	0.60	10.00	10.00	11.66	0.000	6.645
DA-5A	0.95	1.61	10.00	10.00	11.66	0.000	17.831
DA-5B	0.95	1.64	15.94	15.94	9.56	0.000	14.890
DA-6B	0.95	2.96	16.30	16.30	9.46	0.000	26.598
DA-6C	0.95	1.74	16.30	16.30	9.46	0.000	15.635
DA-7A	0.95	0.42	14.82	14.82	9.88	0.000	3.943
DA-7B	0.95	1.08	14.82	14.82	9.88	0.000	10.138
DA-7C	0.95	1.39	10.00	10.00	11.66	0.000	15.395
DA-8A	0.95	0.42	13.00	13.00	10.47	0.000	4.178
DA-8B	0.95	0.36	12.78	12.78	10.55	0.000	3.607
DA-8C	0.95	2.17	16.83	16.83	9.32	0.000	19.208
DA-12A	0.95	0.30	10.00	10.00	11.66	0.000	3.323
DA-12B	0.95	1.27	10.00	10.00	11.66	0.000	14.066
DA-12C	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-32A	0.95	1.18	15.04	15.04	9.82	0.000	11.003
DA-32B	0.95	0.55	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	21.25	21.25	8.31	0.000	46.446
DA-34	0.95	8.15	23.24	23.24	7.94	0.000	61.500
DA-6BCr	0.95	4.70	20.05	20.05	8.56	0.000	38.222
DA-7ABr	0.95	1.50	10.00	10.00	11.66	0.000	16.613
DA-35	0.95	1.90	16.39	16.39	9.43	0.000	17.029
DA-36	0.95	0.28	12.45	12.45	10.67	0.000	2.837
DA-9ABCr	0.95	2.85	17.83	17.83	9.07	0.000	24.544
DA10BCAr	0.95	2.81	10.00	10.00	11.66	0.000	31.121
DA-12BCr	0.95	3.65	17.55	17.55	9.13	0.000	31.673

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
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ALT 1 West A.txt

DA-33	Grate	0.950	5.88	21.25	8.31	0.000	0.00	46.446
DA-34	Grate	0.950	8.15	23.24	7.94	0.000	0.00	61.500
DA-8A	Curb	0.950	17.41	23.25	7.94	0.000	0.00	131.343
DA-5B	Curb	0.950	1.64	15.94	9.56	0.000	0.00	14.890
DA-32A	Curb	0.950	2.82	16.17	9.49	0.000	0.00	25.435
DA-8B	Curb	0.950	0.36	12.78	10.55	0.000	0.00	3.607
DA-7ABr	Curb	0.950	3.67	16.90	9.30	0.000	0.00	32.420
DA-8C	Curb	0.950	2.17	16.83	9.32	0.000	0.00	19.208
DA-35	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-8D	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-36	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-10A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA10BCAr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9ABCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-12BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-6	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-5	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-4	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-3	CircMh	0.950	4.03	17.54	9.14	0.000	0.00	34.982
MH-2	CircMh	0.950	21.44	23.33	7.93	0.000	0.00	161.449
MH-1	CircMh	0.950	24.26	23.37	7.92	0.000	1.00	183.532
DI-11A	Junct	0.950	24.26	23.37	7.92	0.000	1.00	183.532
DI-11B	JnctBx	0.950	24.26	23.37	7.92	0.000	1.00	183.532
DI-12	Junct	0.950	24.26	23.37	7.92	0.000	1.00	183.532
DI-13	Junct	0.950	24.26	23.37	7.92	0.000	1.00	183.532
DA-6B	Curb	0.950	8.84	21.29	8.31	0.000	0.00	69.759
OUT	outlt	0.950	24.26	23.37	7.92	0.000	1.00	183.532

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
15	DA-8C	DA-7ABr	22.75	19.52	Circ 1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	15.02	14.52	Circ 1	0.00	3.00	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	24.56	Circ 1	0.00	2.00	86.00	0.22	0.013
18	MH-3	MH-2	14.52	13.57	Circ 1	0.00	3.00	96.20	0.99	0.013
19	DA-33	DA-6B	23.00	22.28	Circ 1	0.00	3.00	33.80	2.13	0.013
20	DA-6B	DA-8A	22.28	22.17	Circ 1	0.00	3.00	65.90	0.17	0.013
21	DA-34	DA-8A	24.44	23.82	Circ 1	0.00	2.00	13.00	4.77	0.013
22	DA-8A	MH-2	17.76	16.57	Circ 1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	15.57	15.46	Circ 1	0.00	4.00	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ 1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ 1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	15.46	15.32	Circ 1	0.00	4.00	60.00	0.23	0.013
27	DI-11A	DI-11B	14.32	13.97	Circ 1	0.00	5.00	139.80	0.25	0.013
28	DI-11B	DI-12	13.97	13.61	Circ 1	0.00	5.00	103.60	0.35	0.013
29	DI-12	DI-13	13.61	12.96	Circ 1	0.00	5.00	212.00	0.31	0.013
30	DI-13	OUT	12.96	12.00	Circ 1	0.00	5.00	114.00	0.84	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
15*	25.88	25.41	0.721	0.86	2.00	14.97	6.11	19.21	50.47	0.000	29.92
16	25.41	24.94	0.236	2.44	3.00	5.27	4.59	32.42	33.27	0.000	29.92
17	25.56	25.23	0.025	0.81	0.81	3.01	3.01	3.61	10.63	0.000	30.48
18*	24.94	24.67	0.275	1.55	3.00	9.52	4.95	34.98	66.29	0.000	30.48

ALT 1 West A.txt											
19*	29.14	28.98	0.485	1.46	3.00	13.62	6.57	46.45	97.37	0.000	29.2
20	28.98	28.25	1.094	3.00	3.00	9.87	9.87	69.76	27.25	0.000	30.42
21	29.21	28.25	7.388	2.00	2.00	19.58	19.58	61.50	49.44	0.000	31.19
22	28.25	24.67	3.877	3.00	3.00	18.58	18.58	131.34	75.71	0.000	30.48
23	24.67	24.31	1.263	4.00	4.00	12.85	12.85	161.45	88.48	0.000	30.41
24	25.95	25.67	0.433	2.00	2.00	4.74	4.74	14.89	10.87	0.000	30.42
25	25.67	25.42	1.264	2.00	2.00	8.10	8.10	25.44	16.00	0.000	30.42
26	24.31	23.33	1.632	4.00	4.00	14.61	14.61	183.53	69.40	0.000	30.36
27	23.33	22.63	0.496	5.00	5.00	9.35	9.35	183.53	130.33	0.000	28.85
28	22.63	22.12	0.496	5.00	5.00	9.35	9.35	183.53	153.55	0.000	27.5
29	22.12	21.07	0.496	5.00	5.00	9.35	9.35	183.53	144.23	0.000	26.1
30*	21.07	20.50	0.496	3.28	5.00	13.44	9.35	183.53	239.03	0.000	24.2
=====END=====											

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 1 FM518_west_B_Prop 100_t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : FM2351 - willowick
 DESIGN FREQUENCY : 5 Years
 ANALYSYS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

C-Value = Existing Land Use

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	6.49	0.000	8.514
DA-9A	0.95	0.35	10.00	10.00	7.93	0.000	2.636
DA-9B	0.95	0.96	10.00	10.00	7.93	0.000	7.229
DA-9C	0.95	1.54	15.76	15.76	6.43	0.000	9.408
DA-10A	0.95	0.35	12.74	12.74	7.12	0.000	2.368
DA-10B	0.95	0.96	15.77	15.77	6.43	0.000	5.863
DA-10C	0.95	1.55	15.77	15.77	6.43	0.000	9.466
DA-11A	0.95	0.29	12.50	12.50	7.19	0.000	1.980
DA-11B	0.95	1.28	15.25	15.25	6.54	0.000	7.948
DA-11C	0.95	1.39	15.47	15.47	6.49	0.000	8.570
DA-1	0.95	8.41	16.50	16.50	6.28	0.000	50.206
DA-2	0.95	8.61	15.00	15.00	6.59	0.000	53.899
DA-3A	0.95	0.75	10.00	10.00	7.93	0.000	5.648
DA-3B	0.95	0.80	10.00	10.00	7.93	0.000	6.025
DA-4A	0.95	0.60	10.00	10.00	7.93	0.000	4.518
DA-5A	0.95	1.61	10.00	10.00	7.93	0.000	12.124
DA-5B	0.95	1.64	15.94	15.94	6.39	0.000	9.962
DA-6B	0.95	2.96	16.30	16.30	6.32	0.000	17.780
DA-6C	0.95	1.74	16.30	16.30	6.32	0.000	10.452
DA-7A	0.95	0.42	14.82	14.82	6.63	0.000	2.645
DA-7B	0.95	1.08	14.82	14.82	6.63	0.000	6.801
DA-7C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-8A	0.95	0.42	13.00	13.00	7.06	0.000	2.816
DA-8B	0.95	0.36	12.78	12.78	7.11	0.000	2.433
DA-8C	0.95	2.17	16.83	16.83	6.22	0.000	12.825
DA-12A	0.95	0.30	10.00	10.00	7.93	0.000	2.259
DA-12B	0.95	1.27	10.00	10.00	7.93	0.000	9.564
DA-12C	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-32A	0.95	1.18	15.04	15.04	6.58	0.000	7.377
DA-32B	0.95	0.55	10.00	10.00	7.93	0.000	4.142
DA-33	0.95	5.88	21.25	21.25	5.50	0.000	30.732
DA-34	0.95	8.15	23.24	23.24	5.24	0.000	40.548
DA-6BCr	0.95	4.70	20.05	20.05	5.68	0.000	25.349
DA-7ABr	0.95	1.50	10.00	10.00	7.93	0.000	11.296
DA-35	0.95	1.90	16.39	16.39	6.31	0.000	11.381
DA-36	0.95	0.28	12.45	12.45	7.20	0.000	1.915
DA-9ABCr	0.95	2.85	17.83	17.83	6.04	0.000	16.352
DA10BCAr	0.95	2.81	10.00	10.00	7.93	0.000	21.161
DA-12BCr	0.95	3.65	17.55	17.55	6.09	0.000	21.114
A-40	0.55	0.76	10.00	10.00	7.93	0.000	3.303

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-34	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000

ALT1 West B.txt

DA-8A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-5B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-32A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-7ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-35	Grate	0.950	1.90	16.39	6.31	0.000	0.00	11.381	0.00	11.381
DA-8D	Curb	0.950	3.28	16.42	6.30	0.000	0.00	19.629	0.00	19.629
DA-36	Grate	0.950	0.28	12.45	7.20	0.000	0.00	1.915	0.00	1.915
DA-10A	Curb	0.950	3.91	16.45	6.29	0.000	0.00	23.379	0.00	23.379
DA10BCAr	Curb	0.950	2.81	10.00	7.93	0.000	0.00	21.161	0.00	21.161
DA-9ABC	Curb	0.950	13.81	19.13	5.82	0.000	0.00	76.364	0.00	76.364
DA-9C	Curb	0.950	1.83	15.76	6.43	0.000	0.00	11.179	0.00	11.179
DA-11A	Curb	0.950	0.29	12.50	7.19	0.000	0.00	1.980	0.00	1.980
DA-12BCr	Curb	0.950	3.65	17.55	6.09	0.000	0.00	21.114	0.00	21.114
DA-11B	Curb	0.950	2.67	15.51	6.48	0.000	0.00	16.439	0.00	16.439
DA-11C	Curb	0.950	1.39	15.47	6.49	0.000	0.00	8.570	0.00	8.570
MH-6	CircMh	0.950	6.32	17.68	6.07	0.000	0.00	36.424	0.00	36.424
MH-5	CircMh	0.950	8.15	18.50	5.92	0.000	0.00	45.870	0.00	45.870
MH-4	CircMh	0.950	17.72	19.91	5.70	0.000	0.00	95.932	0.00	95.932
MH-3	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-2	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-1	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11A	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11B	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-12	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-13	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-6B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-40	JnctBx	0.934	18.48	19.91	5.70	0.000	0.00	98.307	0.00	98.307
OUT	outlt	0.934	18.48	19.91	5.70	0.000	0.00	98.307	0.00	98.307

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		shape #	Span (ft)	Rise (ft)	Length (ft)	slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	DA-11C	DA-11B	23.00	22.41	Circ 1	0.00	2.00	24.00	2.46	0.013
2	DA-11B	MH-6	22.41	21.86	Circ 1	0.00	2.00	18.45	2.98	0.013
3	DA-12BC	MH-6	22.67	21.86	Circ 1	0.00	2.00	67.00	1.21	0.013
4	MH-6	MH-5	19.86	17.12	Circ 1	0.00	4.00	407.00	0.67	0.013
5	DA-11A	DA-9C	25.25	25.15	Circ 1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ 1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	17.12	16.06	Circ 1	0.00	4.00	271.40	0.39	0.013
8	DA10BCA	DA-9ABC	23.50	21.56	Circ 1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABC	MH-4	16.06	15.46	Circ 1	0.00	4.00	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ 1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ 1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ 1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ 1	0.00	2.00	95.50	1.58	0.013
14	MH-4	A-40	14.46	10.00	Circ 1	0.00	5.00	1200.00	0.37	0.013
15	A-40	OUT	5.00	-1.00	Circ 1	0.00	5.00	300.00	2.00	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	24.02	23.99	0.143	0.67	1.58	9.29	3.22	8.57	35.48	0.000	30.46
2*	23.99	23.89	0.528	0.91	2.00	11.90	5.23	16.44	39.07	0.000	30.46
3*	24.48	23.89	0.871	1.41	2.00	8.89	6.72	21.11	24.88	0.000	30.71
4*	23.89	23.63	0.064	1.53	4.00	8.23	2.90	36.42	117.88	0.000	30.77
5	25.83	25.76	0.008	0.56	0.61	2.73	2.42	1.98	11.26	0.000	31.11
6*	25.76	23.63	0.244	0.52	1.01	17.29	7.02	11.18	76.11	0.000	31.11
7*	23.63	23.35	0.102	2.03	4.00	7.16	3.65	45.87	89.78	0.000	30.99

ALT1 west B.txt

8*	24.62	23.35	0.875	1.05	1.79	12.65	7.12	21.16	38.95	0.000	30.11
9	23.35	22.55	0.283	4.00	4.00	6.08	6.08	76.36	66.12	0.000	30.11
10*	25.78	25.40	0.253	0.76	0.95	10.30	7.78	11.38	36.70	0.000	30.3
11*	25.40	23.87	0.753	0.79	1.40	16.90	8.37	19.63	59.04	0.000	30.71
12*	27.98	23.87	0.007	0.21	1.40	11.06	0.82	1.91	84.91	0.000	31.51
13*	23.87	22.55	1.068	1.38	1.59	10.09	8.71	23.38	28.45	0.000	30.71
14	22.55	20.93	0.136	2.81	5.00	8.43	4.89	95.93	158.80	0.000	30.62
15*	20.93	20.50	0.142	1.76	5.00	15.89	5.01	98.31	368.41	0.000	29.92

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	9.70	0.000	12.711
DA-9A	0.95	0.35	10.00	10.00	11.66	0.000	3.876
DA-9B	0.95	0.96	10.00	10.00	11.66	0.000	10.632
DA-9C	0.95	1.54	15.76	15.76	9.61	0.000	14.056
DA-10A	0.95	0.35	12.74	12.74	10.56	0.000	3.512
DA-10B	0.95	0.96	15.77	15.77	9.60	0.000	8.760
DA-10C	0.95	1.55	15.77	15.77	9.60	0.000	14.143
DA-11A	0.95	0.29	12.50	12.50	10.65	0.000	2.933
DA-11B	0.95	1.28	15.25	15.25	9.75	0.000	11.861
DA-11C	0.95	1.39	15.47	15.47	9.69	0.000	12.796
DA-1	0.95	8.41	16.50	16.50	9.40	0.000	75.140
DA-2	0.95	8.61	15.00	15.00	9.83	0.000	80.384
DA-3A	0.95	0.75	10.00	10.00	11.66	0.000	8.306
DA-3B	0.95	0.80	10.00	10.00	11.66	0.000	8.860
DA-4A	0.95	0.60	10.00	10.00	11.66	0.000	6.645
DA-5A	0.95	1.61	10.00	10.00	11.66	0.000	17.831
DA-5B	0.95	1.64	15.94	15.94	9.56	0.000	14.890
DA-6B	0.95	2.96	16.30	16.30	9.46	0.000	26.598
DA-6C	0.95	1.74	16.30	16.30	9.46	0.000	15.635
DA-7A	0.95	0.42	14.82	14.82	9.88	0.000	3.943
DA-7B	0.95	1.08	14.82	14.82	9.88	0.000	10.138
DA-7C	0.95	1.39	10.00	10.00	11.66	0.000	15.395
DA-8A	0.95	0.42	13.00	13.00	10.47	0.000	4.178
DA-8B	0.95	0.36	12.78	12.78	10.55	0.000	3.607
DA-8C	0.95	2.17	16.83	16.83	9.32	0.000	19.208
DA-12A	0.95	0.30	10.00	10.00	11.66	0.000	3.323
DA-12B	0.95	1.27	10.00	10.00	11.66	0.000	14.066
DA-12C	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-32A	0.95	1.18	15.04	15.04	9.82	0.000	11.003
DA-32B	0.95	0.55	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	21.25	21.25	8.31	0.000	46.446
DA-34	0.95	8.15	23.24	23.24	7.94	0.000	61.500
DA-6BCr	0.95	4.70	20.05	20.05	8.56	0.000	38.222
DA-7ABr	0.95	1.50	10.00	10.00	11.66	0.000	16.613
DA-35	0.95	1.90	16.39	16.39	9.43	0.000	17.029
DA-36	0.95	0.28	12.45	12.45	10.67	0.000	2.837
DA-9ABCr	0.95	2.85	17.83	17.83	9.07	0.000	24.544
DA10BCAr	0.95	2.81	10.00	10.00	11.66	0.000	31.121
DA-12BCr	0.95	3.65	17.55	17.55	9.13	0.000	31.673
A-40	0.55	0.76	10.00	10.00	11.66	0.000	4.858

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000

ALT1 West B.txt

DA-34	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-5B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-32A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-7ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-35	Grate	0.950	1.90	16.39	9.43	0.000	0.00	0.000	0.00	17.029
DA-8D	Curb	0.950	3.28	16.42	9.43	0.000	0.00	0.000	0.00	29.375
DA-36	Grate	0.950	0.28	12.45	10.67	0.000	0.00	0.000	0.00	2.837
DA-10A	Curb	0.950	3.91	16.44	9.42	0.000	0.00	0.000	0.00	34.991
DA10BCAr	Curb	0.950	2.81	10.00	11.66	0.000	0.00	0.000	0.00	31.121
DA-9ABC	Curb	0.950	13.81	18.97	8.80	0.000	0.00	0.000	0.00	115.404
DA-9C	Curb	0.950	1.83	15.76	9.61	0.000	0.00	0.000	0.00	16.703
DA-11A	Curb	0.950	0.29	12.50	10.65	0.000	0.00	0.000	0.00	2.933
DA-12BCr	Curb	0.950	3.65	17.55	9.13	0.000	0.00	0.000	0.00	31.673
DA-11B	Curb	0.950	2.67	15.51	9.68	0.000	0.00	0.000	0.00	24.551
DA-11C	Curb	0.950	1.39	15.47	9.69	0.000	0.00	0.000	0.00	12.796
MH-6	CircMh	0.950	6.32	17.66	9.11	0.000	0.00	0.000	0.00	54.677
MH-5	CircMh	0.950	8.15	18.40	8.93	0.000	0.00	0.000	0.00	69.128
MH-4	CircMh	0.950	17.72	19.49	8.68	0.000	0.00	0.000	0.00	146.147
MH-3	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-2	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-1	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11A	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11B	JunctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-12	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-13	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-6B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-40	JunctBx	0.934	18.48	19.49	8.68	0.000	0.00	0.000	0.00	149.765
OUT	Outlt	0.934	18.48	19.49	8.68	0.000	0.00	0.000	0.00	149.765

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	DA-11C	DA-11B	23.00	22.41	Circ 1	0.00	2.00	24.00	2.46	0.013
2	DA-11B	MH-6	22.41	21.86	Circ 1	0.00	2.00	18.45	2.98	0.013
3	DA-12BC	MH-6	22.67	21.86	Circ 1	0.00	2.00	67.00	1.21	0.013
4	MH-6	MH-5	19.86	17.12	Circ 1	0.00	4.00	407.00	0.67	0.013
5	DA-11A	DA-9C	25.25	25.15	Circ 1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ 1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	17.12	16.06	Circ 1	0.00	4.00	271.40	0.39	0.013
8	DA10BCA	DA-9ABC	23.50	21.56	Circ 1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABC	MH-4	16.06	15.46	Circ 1	0.00	4.00	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ 1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ 1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ 1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ 1	0.00	2.00	95.50	1.58	0.013
14	MH-4	A-40	14.46	10.00	Circ 1	0.00	5.00	1200.00	0.37	0.013
15	A-40	OUT	5.00	-1.00	Circ 1	0.00	5.00	300.00	2.00	0.013

Conveyance Hydraulic computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	28.61	28.53	0.320	0.83	2.00	10.38	4.07	12.80	35.48	0.000	30.46
2*	28.53	28.31	1.177	1.15	2.00	13.15	7.81	24.55	39.07	0.000	30.46
3	29.63	28.31	1.960	2.00	2.00	10.08	10.08	31.67	24.88	0.000	30.71
4*	28.31	27.72	0.145	1.92	4.00	9.16	4.35	54.68	117.88	0.000	30.77
5	27.85	27.85	0.017	0.70	2.00	2.98	0.93	2.93	11.26	0.000	31.11
6*	27.85	27.72	0.545	0.64	2.00	19.41	5.32	16.70	76.11	0.000	31.11

	ALT1 west B.txt										
7	27.72	27.10	0.232	2.63	4.00	7.91	5.50	69.13	89.78	0.000	30.99
8*	28.34	27.10	1.892	1.35	2.00	13.78	9.91	31.12	38.95	0.000	30.11
9	27.10	25.27	0.645	4.00	4.00	9.18	9.18	115.40	66.12	0.000	30.11
10*	28.15	28.04	0.566	0.96	2.00	11.47	5.42	17.03	36.70	0.000	30.3
11*	28.04	27.55	1.686	1.00	2.00	18.77	9.35	29.38	59.04	0.000	30.71
12*	28.36	27.55	0.016	0.25	2.00	12.45	0.90	2.84	84.91	0.000	31.51
13	27.55	25.27	2.392	2.00	2.00	11.14	11.14	34.99	28.45	0.000	30.71
14	25.27	21.49	0.315	3.75	5.00	9.25	7.44	146.15	158.80	0.000	30.62
15*	21.49	20.50	0.331	2.22	5.00	17.82	7.63	149.76	368.41	0.000	29.92

=====END=====

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 2 FM518 -west_A _Prop_t
JOB NUMBER : 2006129
PROJECT DESCRIPTION : FM2351 - Willowick
DESIGN FREQUENCY : 5 Years
ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

C-value = Existing Land Use

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	6.49	0.000	8.515
DA-9A	0.95	0.35	10.00	10.00	7.93	0.000	2.636
DA-9B	0.95	0.96	10.00	10.00	7.93	0.000	7.229
DA-9C	0.95	1.54	15.76	15.76	6.43	0.000	9.409
DA-10A	0.95	0.35	12.74	12.74	7.12	0.000	2.368
DA-10B	0.95	0.96	15.77	15.77	6.43	0.000	5.862
DA-10C	0.95	1.55	15.77	15.77	6.43	0.000	9.465
DA-11A	0.95	0.29	12.50	12.50	7.19	0.000	1.980
DA-11B	0.95	1.28	10.00	10.00	7.93	0.000	9.639
DA-11C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-1	0.95	8.41	16.50	16.50	6.28	0.000	50.206
DA-2	0.95	8.61	15.00	15.00	6.59	0.000	53.899
DA-3A	0.95	0.75	10.00	10.00	7.93	0.000	5.648
DA-3B	0.95	0.80	10.00	10.00	7.93	0.000	6.025
DA-4A	0.95	0.60	10.00	10.00	7.93	0.000	4.518
DA-5A	0.95	1.61	10.00	10.00	7.93	0.000	12.124
DA-5B	0.95	1.64	15.94	15.94	6.39	0.000	9.962
DA-6B	0.95	2.96	16.30	16.30	6.32	0.000	17.780
DA-6C	0.95	1.74	16.30	16.30	6.32	0.000	10.452
DA-7A	0.95	0.42	14.82	14.82	6.63	0.000	2.645
DA-7B	0.95	1.08	14.82	14.82	6.63	0.000	6.801
DA-7C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-8A	0.95	0.42	13.01	13.01	7.06	0.000	2.815
DA-8B	0.95	0.36	12.78	12.78	7.11	0.000	2.432
DA-8C	0.95	2.17	16.83	16.83	6.22	0.000	12.824
DA-12A	0.95	0.30	10.00	10.00	7.93	0.000	2.259
DA-12B	0.95	1.27	10.00	10.00	7.93	0.000	9.564
DA-12C	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-32A	0.95	1.18	15.04	15.04	6.58	0.000	7.378
DA-32B	0.95	0.55	10.00	10.00	7.93	0.000	4.142
DA-33	0.95	5.88	21.25	21.25	5.50	0.000	30.735
DA-34	0.95	8.15	23.24	23.24	5.24	0.000	40.548
DA-6BCr	0.95	4.70	20.05	20.05	5.68	0.000	25.346
DA-7ABr	0.95	1.50	10.00	10.00	7.93	0.000	11.296
DA-35	0.95	1.90	16.39	16.39	6.30	0.000	11.380
DA-36	0.95	0.28	12.45	12.45	7.20	0.000	1.915
DA-9ABCr	0.95	2.85	17.83	17.83	6.04	0.000	16.352
DA10BCAr	0.95	2.81	10.00	10.00	7.93	0.000	21.161
DA-12BCr	0.95	3.65	17.55	17.55	6.09	0.000	21.114

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.950	5.88	21.25	5.50	0.000	0.00	30.735
DA-34	Grate	0.950	8.15	23.24	5.24	0.000	0.00	40.548
DA-8A	Curb	0.950	17.41	23.24	5.24	0.000	0.00	86.609

ALT 2 west A.txt

DA-5B	Curb	0.950	1.64	15.94	6.39	0.000	0.00	9.962
DA-32A	Curb	0.950	2.82	16.21	6.34	0.000	0.00	16.983
DA-8B	Curb	0.950	0.36	12.78	7.11	0.000	0.00	2.432
DA-7ABr	Curb	0.950	3.67	16.91	6.21	0.000	0.00	21.636
DA-8C	Curb	0.950	2.17	16.83	6.22	0.000	0.00	12.824
DA-35	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-8D	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-36	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-10A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA10BCAr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9ABC	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-12BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-6	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-5	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-4	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-3	CircMh	0.950	4.03	17.59	6.08	0.000	0.00	23.284
MH-2	CircMh	0.950	21.44	23.37	5.22	0.000	0.00	106.337
MH-1	CircMh	0.950	24.26	23.41	5.22	0.000	1.00	121.198
DI-11A	Junct	0.950	24.26	23.41	5.22	0.000	1.00	121.198
DI-11B	JnctBx	0.950	24.26	23.41	5.22	0.000	1.00	121.198
DI-12	Junct	0.950	24.26	23.41	5.22	0.000	1.00	121.198
DI-13	Junct	0.950	24.26	23.41	5.22	0.000	1.00	121.198
DA-6B	Curb	0.950	8.84	21.29	5.50	0.000	0.00	46.153
OUT	outlt	0.950	24.26	23.41	5.22	0.000	1.00	121.198

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
15	DA-8C	DA-7ABr	22.75	19.52	Circ 1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	15.02	14.52	Circ 1	0.00	3.00	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	19.04	Circ 1	0.00	2.00	86.00	6.65	0.013
18	MH-3	MH-2	14.52	13.57	Circ 1	0.00	3.00	96.20	0.99	0.013
19	DA-33	DA-6B	23.50	22.78	Circ 1	0.00	2.50	33.80	2.13	0.013
20	DA-6B	DA-8A	22.78	18.26	Circ 1	0.00	2.50	65.90	6.88	0.013
21	DA-34	DA-8A	26.44	18.76	Circ 1	0.00	2.00	13.00	73.22	0.013
22	DA-8A	MH-2	17.76	16.57	Circ 1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	16.07	15.96	Circ 1	0.00	3.50	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ 1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ 1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	15.96	15.82	Circ 1	0.00	3.50	60.00	0.23	0.013
27	DI-11A	DI-11B	15.82	15.47	Circ 1	0.00	3.50	139.80	0.25	0.013
28	DI-11B	DI-12	14.97	14.61	Circ 1	0.00	4.00	103.60	0.35	0.013
29	DI-12	DI-13	14.61	13.96	Circ 1	0.00	4.00	212.00	0.31	0.013
30	DI-13	OUT	13.96	13.00	Circ 1	0.00	4.00	114.00	0.84	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
15*	27.32	27.11	0.321	0.69	2.00	13.41	4.08	12.82	50.47	0.000	29.92
16	27.11	26.90	0.105	1.78	3.00	4.95	3.06	21.64	33.27	0.000	29.92
17*	26.91	26.90	0.012	0.28	2.00	9.18	0.77	2.43	58.36	0.000	30.48
18*	26.90	26.78	0.122	1.23	3.00	8.53	3.29	23.28	66.29	0.000	30.48
19*	29.36	29.17	0.561	1.27	2.50	12.28	6.26	30.73	59.88	0.000	29.92
20*	29.17	28.34	1.266	1.14	2.50	21.08	9.40	46.15	107.56	0.000	30.42
21*	28.76	28.34	3.212	0.62	2.00	48.66	12.91	40.55	193.60	0.000	31.19
22	28.34	26.78	1.686	3.00	3.00	12.25	12.25	86.61	75.71	0.000	30.48

ALT 2 west A.txt

23	26.78	26.46	1.117	3.50	3.50	11.05	11.05	106.34	61.97	0.000	30.41
24	26.60	26.48	0.194	1.50	2.00	3.94	3.17	9.96	10.87	0.000	30.42
25	26.48	26.46	0.563	1.81	2.00	5.67	5.41	16.98	16.00	0.000	30.42
26	26.46	25.59	1.451	3.50	3.50	12.60	12.60	121.20	48.61	0.000	30.36
27	25.59	23.56	1.451	3.50	3.50	12.60	12.60	121.20	50.35	0.000	28.85
28	23.56	22.82	0.712	4.00	4.00	9.64	9.64	121.20	84.69	0.000	27.5
29	22.82	21.31	0.712	4.00	4.00	9.64	9.64	121.20	79.55	0.000	26.1
30*	21.31	20.50	0.712	3.03	4.00	11.86	9.64	121.20	131.84	0.000	24.2

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	9.70	0.000	12.712
DA-9A	0.95	0.35	10.00	10.00	11.66	0.000	3.876
DA-9B	0.95	0.96	10.00	10.00	11.66	0.000	10.632
DA-9C	0.95	1.54	15.76	15.76	9.61	0.000	14.058
DA-10A	0.95	0.35	12.74	12.74	10.56	0.000	3.511
DA-10B	0.95	0.96	15.77	15.77	9.60	0.000	8.759
DA-10C	0.95	1.55	15.77	15.77	9.60	0.000	14.141
DA-11A	0.95	0.29	12.50	12.50	10.65	0.000	2.934
DA-11B	0.95	1.28	10.00	10.00	11.66	0.000	14.176
DA-11C	0.95	1.39	10.00	10.00	11.66	0.000	15.395
DA-1	0.95	8.41	16.50	16.50	9.40	0.000	75.140
DA-2	0.95	8.61	15.00	15.00	9.83	0.000	80.384
DA-3A	0.95	0.75	10.00	10.00	11.66	0.000	8.306
DA-3B	0.95	0.80	10.00	10.00	11.66	0.000	8.860
DA-4A	0.95	0.60	10.00	10.00	11.66	0.000	6.645
DA-5A	0.95	1.61	10.00	10.00	11.66	0.000	17.831
DA-5B	0.95	1.64	15.94	15.94	9.56	0.000	14.890
DA-6B	0.95	2.96	16.30	16.30	9.46	0.000	26.598
DA-6C	0.95	1.74	16.30	16.30	9.46	0.000	15.635
DA-7A	0.95	0.42	14.82	14.82	9.88	0.000	3.943
DA-7B	0.95	1.08	14.82	14.82	9.88	0.000	10.138
DA-7C	0.95	1.39	10.00	10.00	11.66	0.000	15.395
DA-8A	0.95	0.42	13.01	13.01	10.47	0.000	4.177
DA-8B	0.95	0.36	12.78	12.78	10.55	0.000	3.607
DA-8C	0.95	2.17	16.83	16.83	9.32	0.000	19.207
DA-12A	0.95	0.30	10.00	10.00	11.66	0.000	3.323
DA-12B	0.95	1.27	10.00	10.00	11.66	0.000	14.066
DA-12C	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-32A	0.95	1.18	15.04	15.04	9.82	0.000	11.004
DA-32B	0.95	0.55	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	21.25	21.25	8.32	0.000	46.449
DA-34	0.95	8.15	23.24	23.24	7.94	0.000	61.500
DA-6BCr	0.95	4.70	20.05	20.05	8.56	0.000	38.218
DA-7ABr	0.95	1.50	10.00	10.00	11.66	0.000	16.613
DA-35	0.95	1.90	16.39	16.39	9.43	0.000	17.027
DA-36	0.95	0.28	12.45	12.45	10.66	0.000	2.837
DA-9ABCr	0.95	2.85	17.83	17.83	9.07	0.000	24.544
DA10BCAr	0.95	2.81	10.00	10.00	11.66	0.000	31.121
DA-12BCr	0.95	3.65	17.55	17.55	9.13	0.000	31.673

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.950	5.88	21.25	8.32	0.000	0.00	46.449
DA-34	Grate	0.950	8.15	23.24	7.94	0.000	0.00	61.500

ALT 2 West A.txt

DA-8A	Curb	0.950	17.41	23.24	7.94	0.000	0.00	131.364
DA-5B	Curb	0.950	1.64	15.94	9.56	0.000	0.00	14.890
DA-32A	Curb	0.950	2.82	16.17	9.49	0.000	0.00	25.435
DA-8B	Curb	0.950	0.36	12.78	10.55	0.000	0.00	3.607
DA-7ABr	Curb	0.950	3.67	16.90	9.30	0.000	0.00	32.419
DA-8C	Curb	0.950	2.17	16.83	9.32	0.000	0.00	19.207
DA-35	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-8D	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-36	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-10A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA10BCAr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9ABC	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-9C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-12BC	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-11C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-6	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-5	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-4	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-3	CircMh	0.950	4.03	17.54	9.14	0.000	0.00	34.980
MH-2	CircMh	0.950	21.44	23.33	7.93	0.000	0.00	161.475
MH-1	CircMh	0.950	24.26	23.36	7.92	0.000	1.00	183.597
DI-11A	Junct	0.950	24.26	23.36	7.92	0.000	1.00	183.597
DI-11B	JnctBx	0.950	24.26	23.36	7.92	0.000	1.00	183.597
DI-12	Junct	0.950	24.26	23.36	7.92	0.000	1.00	183.597
DI-13	Junct	0.950	24.26	23.36	7.92	0.000	1.00	183.597
DA-6B	Curb	0.950	8.84	21.29	8.31	0.000	0.00	69.763
OUT	outlt	0.950	24.26	23.36	7.92	0.000	1.00	183.597

Conveyance Configuration Data

Run#	Node US	I.D. DS	Flowline US (ft)	Elev. DS (ft)	shape	#	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
15	DA-8C	DA-7ABr	22.75	19.52	Circ	1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	15.02	14.52	Circ	1	0.00	3.00	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	19.04	Circ	1	0.00	2.00	86.00	6.65	0.013
18	MH-3	MH-2	14.52	13.57	Circ	1	0.00	3.00	96.20	0.99	0.013
19	DA-33	DA-6B	23.50	22.78	Circ	1	0.00	2.50	33.80	2.13	0.013
20	DA-6B	DA-8A	22.78	18.26	Circ	1	0.00	2.50	65.90	6.88	0.013
21	DA-34	DA-8A	26.44	18.76	Circ	1	0.00	2.00	13.00	73.22	0.013
22	DA-8A	MH-2	17.76	16.57	Circ	1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	16.07	15.96	Circ	1	0.00	3.50	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ	1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ	1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	15.96	15.82	Circ	1	0.00	3.50	60.00	0.23	0.013
27	DI-11A	DI-11B	15.82	15.47	Circ	1	0.00	3.50	139.80	0.25	0.013
28	DI-11B	DI-12	14.97	14.61	Circ	1	0.00	4.00	103.60	0.35	0.013
29	DI-12	DI-13	14.61	13.96	Circ	1	0.00	4.00	212.00	0.31	0.013
30	DI-13	OUT	13.96	13.00	circ	1	0.00	4.00	114.00	0.84	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
15*	36.12	35.65	0.721	0.86	2.00	14.97	6.11	19.21	50.47	0.000	29.92
16*	35.65	35.18	0.236	2.44	3.00	5.27	4.59	32.42	33.27	0.000	29.92
17*	35.20	35.18	0.025	0.34	2.00	10.32	1.15	3.61	58.36	0.000	30.42
18*	35.18	34.91	0.275	1.55	3.00	9.52	4.95	34.98	66.29	0.000	31.19
19*	40.84	40.40	1.282	1.66	2.50	13.47	9.46	46.45	59.88	0.000	29.2
20*	40.40	38.50	2.892	1.47	2.50	23.32	14.21	69.76	107.56	0.000	30.42
21*	39.46	38.50	7.388	0.77	2.00	54.74	19.58	61.50	193.60	0.000	31.19

ALT 2 west A.txt											
22	38.50	34.91	3.878	3.00	3.00	18.58	18.58	131.36	75.71	0.000	30.48
23	34.91	34.17	2.575	3.50	3.50	16.78	16.78	161.47	61.97	0.000	30.41
24	34.50	34.22	0.433	2.00	2.00	4.74	4.74	14.89	10.87	0.000	30.42
25	34.22	34.17	1.264	2.00	2.00	8.10	8.10	25.44	16.00	0.000	30.42
26	34.17	32.17	3.329	3.50	3.50	19.08	19.08	183.60	48.61	0.000	30.36
27	32.17	27.52	3.329	3.50	3.50	19.08	19.08	183.60	50.35	0.000	28.85
28	27.52	25.82	1.633	4.00	4.00	14.61	14.61	183.60	84.69	0.000	27.5
29	25.82	22.36	1.633	4.00	4.00	14.61	14.61	183.60	79.55	0.000	26.1
30	22.36	20.50	1.633	4.00	4.00	14.61	14.61	183.60	131.84	0.000	24.2

=====END=====

* super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 2 FM518 -west _B_Prop_t
JOB NUMBER : 2006129
PROJECT DESCRIPTION : FM2351 - Willowick
DESIGN FREQUENCY : 5 Years
ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

C-Value = Existing Land Use

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-1	0.95	8.41	16.50	16.50	6.28	0.000	50.206
DA-2	0.95	8.61	15.00	15.00	6.59	0.000	53.899
DA-3A	0.95	0.75	10.00	10.00	7.93	0.000	5.648
DA-3B	0.95	0.80	10.00	10.00	7.93	0.000	6.025
DA-4A	0.95	0.60	10.00	10.00	7.93	0.000	4.518
DA-5A	0.95	1.61	10.00	10.00	7.93	0.000	12.124
DA-5B	0.95	1.64	15.94	15.94	6.39	0.000	9.962
DA-6B	0.95	2.96	16.30	16.30	6.32	0.000	17.780
DA-6C	0.95	1.74	16.30	16.30	6.32	0.000	10.452
DA-7A	0.95	0.42	14.82	14.82	6.63	0.000	2.645
DA-7B	0.95	1.08	14.82	14.82	6.63	0.000	6.801
DA-7C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-8A	0.95	0.42	13.01	13.01	7.06	0.000	2.815
DA-8B	0.95	0.36	12.78	12.78	7.11	0.000	2.432
DA-8C	0.95	2.17	16.83	16.83	6.22	0.000	12.824
DA-12A	0.95	0.30	10.00	10.00	7.93	0.000	2.259
DA-12B	0.95	1.27	10.00	10.00	7.93	0.000	9.564
DA-12C	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-32A	0.95	1.18	15.04	15.04	6.58	0.000	7.378
DA-32B	0.95	0.55	10.00	10.00	7.93	0.000	4.142
DA-33	0.95	5.88	21.25	21.25	5.50	0.000	30.735
DA-34	0.95	8.15	23.24	23.24	5.24	0.000	40.547
DA-6BCr	0.95	4.70	20.06	20.06	5.68	0.000	25.345
DA-7ABr	0.95	1.50	10.00	10.00	7.93	0.000	11.296
DA-35	0.95	1.90	16.39	16.39	6.30	0.000	11.380
DA-36	0.95	0.28	12.45	12.45	7.20	0.000	1.915
DA-9ABCr	0.95	2.85	17.83	17.83	6.04	0.000	16.352
DA10BCAr	0.95	2.81	10.00	10.00	7.93	0.000	21.161
DA-12BCr	0.95	3.65	17.55	17.55	6.09	0.000	21.114
A-40	0.55	0.76	10.00	10.00	7.93	0.000	3.303
DA-8D	0.95	1.38	15.45	15.45	6.49	0.000	8.515
DA-9A	0.95	0.35	10.00	10.00	7.93	0.000	2.636
DA-9B	0.95	0.96	10.00	10.00	7.93	0.000	7.229
DA-9C	0.95	1.54	15.76	15.76	6.43	0.000	9.409
DA-10A	0.95	0.35	12.74	12.74	7.12	0.000	2.368
DA-10B	0.95	0.96	10.00	10.00	7.93	0.000	7.229
DA-10C	0.95	1.55	15.77	15.77	6.43	0.000	9.466
DA-11A	0.95	0.29	12.50	12.50	7.19	0.000	1.980
DA-11B	0.95	1.28	15.25	15.25	6.54	0.000	7.948
DA-11C	0.95	1.39	15.47	15.47	6.49	0.000	8.570

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-34	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000

ALT 2 west B.txt

DA-8A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-5B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-32A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-7ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-35	Grate	0.950	1.90	16.39	6.30	0.000	0.00	0.000	0.00	11.380
DA-8D	Curb	0.950	3.28	16.42	6.30	0.000	0.00	0.000	0.00	19.627
DA-36	Grate	0.950	0.28	12.45	7.20	0.000	0.00	0.000	0.00	1.915
DA-10A	Curb	0.950	3.91	16.45	6.29	0.000	0.00	0.000	0.00	23.377
DA10BCAr	Curb	0.950	2.81	10.00	7.93	0.000	0.00	0.000	0.00	21.161
DA-9ABC	Curb	0.950	13.81	19.12	5.82	0.000	0.00	0.000	0.00	76.380
DA-9C	Curb	0.950	1.83	15.76	6.43	0.000	0.00	0.000	0.00	11.181
DA-11A	Curb	0.950	0.29	12.50	7.19	0.000	0.00	0.000	0.00	1.980
DA-12BC	Curb	0.950	3.65	17.55	6.09	0.000	0.00	0.000	0.00	21.114
DA-11B	Curb	0.950	2.67	15.51	6.48	0.000	0.00	0.000	0.00	16.439
DA-11C	Curb	0.950	1.39	15.47	6.49	0.000	0.00	0.000	0.00	8.570
MH-6	CircMh	0.950	6.32	17.68	6.07	0.000	0.00	0.000	0.00	36.424
MH-5	CircMh	0.950	8.15	18.49	5.93	0.000	0.00	0.000	0.00	45.881
MH-4	CircMh	0.950	17.72	19.90	5.70	0.000	0.00	0.000	0.00	95.952
MH-3	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-2	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-1	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11A	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11B	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-12	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-13	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-6B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-40	JnctBx	0.934	18.48	19.90	5.70	0.000	0.00	0.000	0.00	98.327
OUT	outlt	0.934	18.48	19.90	5.70	0.000	0.00	0.000	0.00	98.327

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	DA-11C	DA-11B	23.00	22.41	Circ 1	0.00	2.00	24.00	2.46	0.013
2	DA-11B	MH-6	22.41	21.86	Circ 1	0.00	2.00	18.45	2.98	0.013
3	DA-12BC	MH-6	22.67	21.86	Circ 1	0.00	2.00	67.00	1.21	0.013
4	MH-6	MH-5	20.36	17.62	Circ 1	0.00	3.50	407.00	0.67	0.013
5	DA-11A	DA-9C	25.25	25.15	Circ 1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ 1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	17.62	16.56	Circ 1	0.00	3.50	271.40	0.39	0.013
8	DA10BC	DA-9ABC	23.50	21.56	Circ 1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABC	MH-4	16.06	15.46	Circ 1	0.00	4.00	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ 1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ 1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ 1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ 1	0.00	2.00	95.50	1.58	0.013
14	MH-4	A-40	15.46	11.00	Circ 1	0.00	4.00	1200.00	0.37	0.013
15	A-40	OUT	6.00	0.00	Circ 1	0.00	4.00	300.00	2.00	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Fr. Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)			Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	29.29	29.25	0.143	0.67	2.00	9.29	2.73	8.57	35.48	0.000	30.46	
2*	29.25	29.16	0.528	0.91	2.00	11.90	5.23	16.44	39.07	0.000	30.46	
3*	29.74	29.16	0.871	1.41	2.00	8.89	6.72	21.11	24.88	0.000	30.71	
4*	29.16	28.62	0.131	1.63	3.50	8.32	3.79	36.42	82.56	0.000	30.77	
5	28.68	28.68	0.008	0.56	2.00	2.73	0.63	1.98	11.26	0.000	31.11	
6*	28.68	28.62	0.244	0.52	2.00	17.29	3.56	11.18	76.11	0.000	31.11	
7	28.62	28.06	0.208	2.21	3.50	7.15	4.77	45.88	62.89	0.000	30.99	

ALT 2 west B.txt

8*	28.63	28.06	0.875	1.05	2.00	12.65	6.74	21.16	38.95	0.000	30.11
9	28.06	27.26	0.283	4.00	4.00	6.08	6.08	76.38	66.12	0.000	30.11
10*	28.54	28.50	0.253	0.76	2.00	10.30	3.62	11.38	36.70	0.000	30.3
11*	28.50	28.28	0.753	0.79	2.00	16.90	6.25	19.63	59.04	0.000	30.71
12*	28.28	28.28	0.007	0.21	2.00	11.06	0.61	1.91	84.91	0.000	31.51
13*	28.28	27.26	1.068	1.38	2.00	10.09	7.44	23.38	28.45	0.000	30.71
14	27.26	21.91	0.446	4.00	4.00	7.64	7.64	95.95	87.58	0.000	30.62
15*	21.91	20.50	0.468	1.96	4.00	16.05	7.82	98.33	203.19	0.000	29.92

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-1	0.95	8.41	16.50	16.50	9.40	0.000	75.140
DA-2	0.95	8.61	15.00	15.00	9.83	0.000	80.384
DA-3A	0.95	0.75	10.00	10.00	11.66	0.000	8.306
DA-3B	0.95	0.80	10.00	10.00	11.66	0.000	8.860
DA-4A	0.95	0.60	10.00	10.00	11.66	0.000	6.645
DA-5A	0.95	1.61	10.00	10.00	11.66	0.000	17.831
DA-5B	0.95	1.64	15.94	15.94	9.56	0.000	14.890
DA-6B	0.95	2.96	16.30	16.30	9.46	0.000	26.598
DA-6C	0.95	1.74	16.30	16.30	9.46	0.000	15.635
DA-7A	0.95	0.42	14.82	14.82	9.88	0.000	3.943
DA-7B	0.95	1.08	14.82	14.82	9.88	0.000	10.138
DA-7C	0.95	1.39	10.00	10.00	11.66	0.000	15.395
DA-8A	0.95	0.42	13.01	13.01	10.47	0.000	4.177
DA-8B	0.95	0.36	12.78	12.78	10.55	0.000	3.607
DA-8C	0.95	2.17	16.83	16.83	9.32	0.000	19.207
DA-12A	0.95	0.30	10.00	10.00	11.66	0.000	3.323
DA-12B	0.95	1.27	10.00	10.00	11.66	0.000	14.066
DA-12C	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-32A	0.95	1.18	15.04	15.04	9.82	0.000	11.004
DA-32B	0.95	0.55	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	21.25	21.25	8.32	0.000	46.449
DA-34	0.95	8.15	23.24	23.24	7.94	0.000	61.498
DA-6BCr	0.95	4.70	20.06	20.06	8.56	0.000	38.217
DA-7ABr	0.95	1.50	10.00	10.00	11.66	0.000	16.613
DA-35	0.95	1.90	16.39	16.39	9.43	0.000	17.027
DA-36	0.95	0.28	12.45	12.45	10.66	0.000	2.837
DA-9ABCr	0.95	2.85	17.83	17.83	9.07	0.000	24.544
DA10BCAr	0.95	2.81	10.00	10.00	11.66	0.000	31.121
DA-12BCr	0.95	3.65	17.55	17.55	9.13	0.000	31.673
A-40	0.55	0.76	10.00	10.00	11.66	0.000	4.858
DA-8D	0.95	1.38	15.45	15.45	9.70	0.000	12.712
DA-9A	0.95	0.35	10.00	10.00	11.66	0.000	3.876
DA-9B	0.95	0.96	10.00	10.00	11.66	0.000	10.632
DA-9C	0.95	1.54	15.76	15.76	9.61	0.000	14.058
DA-10A	0.95	0.35	12.74	12.74	10.56	0.000	3.512
DA-10B	0.95	0.96	10.00	10.00	11.66	0.000	10.632
DA-10C	0.95	1.55	15.77	15.77	9.60	0.000	14.143
DA-11A	0.95	0.29	12.50	12.50	10.65	0.000	2.934
DA-11B	0.95	1.28	15.25	15.25	9.75	0.000	11.861
DA-11C	0.95	1.39	15.47	15.47	9.69	0.000	12.796

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-34	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000

ALT 2 west B.txt

DA-8A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-5B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-32A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-7ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-8C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-35	Grate	0.950	1.90	16.39	9.43	0.000	0.00	0.000	0.00	17.027
DA-8D	Curb	0.950	3.28	16.42	9.43	0.000	0.00	0.000	0.00	29.373
DA-36	Grate	0.950	0.28	12.45	10.66	0.000	0.00	0.000	0.00	2.837
DA-10A	Curb	0.950	3.91	16.45	9.42	0.000	0.00	0.000	0.00	34.988
DA10BCAr	Curb	0.950	2.81	10.00	11.66	0.000	0.00	0.000	0.00	31.121
DA-9ABC	Curb	0.950	13.81	19.03	8.78	0.000	0.00	0.000	0.00	115.240
DA-9C	Curb	0.950	1.83	15.76	9.61	0.000	0.00	0.000	0.00	16.705
DA-11A	Curb	0.950	0.29	12.50	10.65	0.000	0.00	0.000	0.00	2.934
DA-12BC	Curb	0.950	3.65	17.55	9.13	0.000	0.00	0.000	0.00	31.673
DA-11B	Curb	0.950	2.67	15.51	9.68	0.000	0.00	0.000	0.00	24.551
DA-11C	Curb	0.950	1.39	15.47	9.69	0.000	0.00	0.000	0.00	12.796
MH-6	CircMh	0.950	6.32	17.66	9.11	0.000	0.00	0.000	0.00	54.677
MH-5	CircMh	0.950	8.15	18.40	8.93	0.000	0.00	0.000	0.00	69.132
MH-4	CircMh	0.950	17.72	19.54	8.67	0.000	0.00	0.000	0.00	145.941
MH-3	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-2	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
MH-1	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11A	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-11B	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-12	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DI-13	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-6B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-40	JnctBx	0.934	18.48	19.54	8.67	0.000	0.00	0.000	0.00	149.553
OUT	Outlt	0.934	18.48	19.54	8.67	0.000	0.00	0.000	0.00	149.553

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	DA-11C	DA-11B	23.00	22.41	Circ 1	0.00	2.00	24.00	2.46	0.013
2	DA-11B	MH-6	22.41	21.86	Circ 1	0.00	2.00	18.45	2.98	0.013
3	DA-12BC	MH-6	22.67	21.86	Circ 1	0.00	2.00	67.00	1.21	0.013
4	MH-6	MH-5	20.36	17.62	Circ 1	0.00	3.50	407.00	0.67	0.013
5	DA-11A	DA-9C	25.25	25.15	Circ 1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ 1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	17.62	16.56	Circ 1	0.00	3.50	271.40	0.39	0.013
8	DA10BC	DA-9ABC	23.50	21.56	Circ 1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABC	MH-4	16.06	15.46	Circ 1	0.00	4.00	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ 1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ 1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ 1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ 1	0.00	2.00	95.50	1.58	0.013
14	MH-4	A-40	15.46	11.00	Circ 1	0.00	4.00	1200.00	0.37	0.013
15	A-40	OUT	6.00	0.00	Circ 1	0.00	4.00	300.00	2.00	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	40.73	40.66	0.320	0.83	2.00	10.38	4.07	12.80	35.48	0.000	30.46
2*	40.66	40.44	1.177	1.15	2.00	13.15	7.81	24.55	39.07	0.000	30.46
3	41.75	40.44	1.960	2.00	2.00	10.08	10.08	31.67	24.88	0.000	30.71
4*	40.44	39.24	0.295	2.08	3.50	9.19	5.68	54.68	82.56	0.000	30.77
5	39.37	39.36	0.017	0.70	2.00	2.98	0.93	2.93	11.26	0.000	31.11
6*	39.36	39.24	0.545	0.64	2.00	19.41	5.32	16.70	76.11	0.000	31.11
7	39.24	37.96	0.472	3.50	3.50	7.19	7.19	69.13	62.89	0.000	30.99

ALT 2 west B.txt											
8*	39.20	37.96	1.892	1.35	2.00	13.78	9.91	31.12	38.95	0.000	30.11
9	37.96	36.13	0.643	4.00	4.00	9.17	9.17	115.24	66.12	0.000	30.11
10*	39.01	38.91	0.566	0.96	2.00	11.47	5.42	17.03	36.70	0.000	30.3
11*	38.91	38.42	1.685	1.00	2.00	18.77	9.35	29.37	59.04	0.000	30.71
12*	38.42	38.42	0.016	0.25	2.00	12.44	0.90	2.84	84.91	0.000	31.51
13	38.42	36.13	2.391	2.00	2.00	11.14	11.14	34.99	28.45	0.000	30.71
14	36.13	23.75	1.032	4.00	4.00	11.61	11.61	145.94	87.58	0.000	30.62
15*	23.75	20.50	1.084	2.55	4.00	17.65	11.90	149.55	203.19	0.000	29.92
=====END=====											

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 3 FM518 -west _Prop _100_t
JOB NUMBER : 2006129
PROJECT DESCRIPTION : FM2351 - Willowick
DESIGN FREQUENCY : 5 Years
ANALYSYS FREQUENCY : 100 Years
MEASUREMENT UNITS: ENGLISH

C-Value = Existing Land Use

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	6.49	0.000	8.515
DA-9A	0.95	0.35	10.00	10.00	7.93	0.000	2.636
DA-9B	0.95	0.96	10.00	10.00	7.93	0.000	7.229
DA-9C	0.95	1.54	10.00	10.00	7.93	0.000	11.597
DA-10A	0.95	0.35	12.74	12.74	7.12	0.000	2.368
DA-10B	0.95	0.96	15.77	15.77	6.43	0.000	5.862
DA-10C	0.95	1.55	15.77	15.77	6.43	0.000	9.465
DA-11A	0.95	0.29	10.00	10.00	7.93	0.000	2.184
DA-11B	0.95	1.28	10.00	10.00	7.93	0.000	9.639
DA-11C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-1	0.95	8.41	16.50	16.50	6.28	0.000	50.206
DA-2	0.95	8.61	15.00	15.00	6.59	0.000	53.899
DA-3A	0.95	0.75	10.00	10.00	7.93	0.000	5.648
DA-3B	0.95	0.80	10.00	10.00	7.93	0.000	6.025
DA-4A	0.95	0.60	10.00	10.00	7.93	0.000	4.518
DA-5A	0.95	1.61	10.00	10.00	7.93	0.000	12.124
DA-5B	0.95	1.64	15.94	15.94	6.39	0.000	9.962
DA-6B	0.95	2.96	16.30	16.30	6.32	0.000	17.780
DA-6C	0.95	1.74	16.30	16.30	6.32	0.000	10.452
DA-7A	0.95	0.42	14.82	14.82	6.63	0.000	2.645
DA-7B	0.95	1.08	14.82	14.82	6.63	0.000	6.801
DA-7C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-8A	0.95	0.42	13.01	13.01	7.06	0.000	2.815
DA-8B	0.95	0.36	12.78	12.78	7.11	0.000	2.432
DA-8C	0.95	2.17	16.83	16.83	6.22	0.000	12.824
DA-12A	0.95	0.30	10.00	10.00	7.93	0.000	2.259
DA-12B	0.95	1.27	10.00	10.00	7.93	0.000	9.564
DA-12C	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-32A	0.95	1.18	15.04	15.04	6.58	0.000	7.378
DA-32B	0.95	0.55	10.00	10.00	7.93	0.000	4.142
DA-33	0.95	5.88	21.25	21.25	5.50	0.000	30.736
DA-34	0.95	8.15	23.24	23.24	5.24	0.000	40.548
DA-6BCr	0.95	4.70	20.06	20.06	5.68	0.000	25.345
DA-7ABr	0.95	1.50	10.00	10.00	7.93	0.000	11.296
DA-35	0.95	1.90	16.39	16.39	6.30	0.000	11.380
DA-36	0.95	0.28	12.45	12.45	7.20	0.000	1.915
DA-9ABCr	0.95	2.85	17.83	17.83	6.04	0.000	16.352
DA10BCAr	0.95	2.81	15.77	15.77	6.43	0.000	17.159
DA-12BCr	0.95	3.65	17.56	17.56	6.09	0.000	21.110

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.950	5.88	21.25	5.50	0.000	0.00	30.736
DA-34	Grate	0.950	8.15	23.24	5.24	0.000	0.00	40.548
DA-8A	Curb	0.950	17.41	23.24	5.24	0.000	0.00	86.609

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DA-5B	Curb	0.950	1.64	15.94	6.39	0.000	0.00	9.962
DA-32A	Curb	0.950	2.82	16.21	6.34	0.000	0.00	16.983
DA-8B	Curb	0.950	0.36	12.78	7.11	0.000	0.00	2.432
DA-7ABr	Curb	0.950	21.39	20.51	5.61	0.000	0.00	113.969
DA-8C	Curb	0.950	2.17	16.83	6.22	0.000	0.00	12.824
DA-35	Grate	0.950	1.90	16.39	6.30	0.000	0.00	11.380
DA-8D	Curb	0.950	3.28	16.42	6.30	0.000	0.00	19.627
DA-36	Grate	0.950	0.28	12.45	7.20	0.000	0.00	1.915
DA-10A	Curb	0.950	3.91	16.45	6.29	0.000	0.00	23.377
DA10BCAr	Curb	0.950	2.81	15.77	6.43	0.000	0.00	17.159
DA-9ABC	Curb	0.950	13.81	19.14	5.82	0.000	0.00	76.344
DA-9C	Curb	0.950	1.83	10.24	7.85	0.000	0.00	13.643
DA-11A	Curb	0.950	0.29	10.00	7.93	0.000	0.00	2.184
DA-12BCr	Curb	0.950	3.65	17.56	6.09	0.000	0.00	21.110
DA-11B	Curb	0.950	2.67	10.04	7.91	0.000	0.00	20.073
DA-11C	Curb	0.950	1.39	10.00	7.93	0.000	0.00	10.468
MH-6	CircMh	0.950	6.32	17.68	6.07	0.000	0.00	36.418
MH-5	CircMh	0.950	8.15	18.51	5.92	0.000	0.00	45.862
MH-4	CircMh	0.950	17.72	19.88	5.70	0.000	0.00	96.016
MH-3	CircMh	0.950	21.75	20.95	5.54	0.000	0.00	114.563
MH-2	CircMh	0.950	39.16	23.37	5.22	0.000	0.00	194.224
MH-1	CircMh	0.950	41.98	23.42	5.21	0.000	1.00	208.974
DI-11A	Junct	0.950	41.98	23.42	5.21	0.000	1.00	208.974
DI-11B	JnctBx	0.950	41.98	23.42	5.21	0.000	1.00	208.974
DI-12	Junct	0.950	41.98	23.42	5.21	0.000	1.00	208.974
DI-13	Junct	0.950	41.98	23.42	5.21	0.000	1.00	208.974
DA-6B	Curb	0.950	8.84	21.29	5.50	0.000	0.00	46.154
OUT	outlt	0.950	41.98	23.42	5.21	0.000	1.00	208.974

Conveyance Configuration Data

Run#	Node	I.D.	Flowline	Elev.	Shape	#	Span	Rise	Length	Slope	n_value
	US	DS	US	DS			(ft)	(ft)	(ft)	(%)	
			(ft)	(ft)							
1	DA-11C	DA-11B	23.00	22.41	Circ	1	0.00	2.00	24.00	2.46	0.013
2	DA-11B	MH-6	22.41	21.86	Circ	1	0.00	2.00	18.45	2.98	0.013
3	DA-12BC	MH-6	22.67	21.86	Circ	1	0.00	2.00	67.00	1.21	0.013
4	MH-6	MH-5	19.86	17.12	Circ	1	0.00	4.00	407.00	0.67	0.013
5	DA-11A	DA-9C	25.25	25.15	Circ	1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ	1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	16.12	15.06	Circ	1	0.00	5.00	271.40	0.39	0.013
8	DA10BCA	DA-9ABC	23.50	21.56	Circ	1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABC	MH-4	14.56	13.96	Circ	1	0.00	5.50	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ	1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ	1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ	1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ	1	0.00	2.00	95.50	1.58	0.013
14	MH-4	DA-7ABr	15.46	14.02	Circ	1	0.00	4.00	327.62	0.44	0.013
15	DA-8C	DA-7ABr	22.75	19.52	Circ	1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	12.02	11.52	Circ	1	0.00	6.00	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	19.04	Circ	1	0.00	2.00	86.00	6.65	0.013
18	MH-3	MH-2	11.52	10.57	Circ	1	0.00	6.00	96.20	0.99	0.013
19	DA-33	DA-6B	23.50	22.78	Circ	1	0.00	2.50	33.80	2.13	0.013
20	DA-6B	DA-8A	22.78	18.26	Circ	1	0.00	2.50	65.90	6.88	0.013
21	DA-34	DA-8A	26.44	18.76	Circ	1	0.00	2.00	13.00	73.22	0.013
22	DA-8A	MH-2	17.76	16.57	Circ	1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	13.57	13.46	Circ	1	0.00	6.00	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ	1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ	1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	13.46	13.32	Circ	1	0.00	6.00	60.00	0.23	0.013
27	DI-11A	DI-11B	13.32	12.97	Circ	1	0.00	6.00	139.80	0.25	0.013
28	DI-11B	DI-12	12.47	12.11	Circ	1	0.00	6.50	103.60	0.35	0.013
29	DI-12	DI-13	12.11	11.46	Circ	1	0.00	6.50	212.00	0.31	0.013
30	DI-13	OUT	11.46	10.50	Circ	1	0.00	6.50	114.00	0.84	0.013

ALT 3 West.txt
 Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	24.09	24.04	0.214	0.74	1.63	9.83	3.81	10.47	35.48	0.000	30.46
2*	24.04	23.90	0.787	1.02	2.00	12.53	6.39	20.07	39.07	0.000	30.46
3*	24.48	23.90	0.871	1.41	2.00	8.89	6.72	21.11	24.88	0.000	30.71
4*	23.90	23.64	0.064	1.53	4.00	8.23	2.90	36.42	117.88	0.000	30.77
5	25.89	25.84	0.009	0.59	0.69	2.80	2.29	2.18	11.26	0.000	31.11
6*	25.84	23.64	0.364	0.57	1.02	18.34	8.51	13.64	76.11	0.000	31.11
7*	23.64	23.55	0.031	1.82	5.00	7.12	2.34	45.86	162.79	0.000	30.99
8*	24.49	23.55	0.575	0.93	1.99	12.00	5.46	17.16	38.95	0.000	30.11
9	23.55	23.41	0.052	2.75	5.50	6.43	3.21	76.34	154.58	0.000	30.11
10*	25.79	25.41	0.253	0.76	0.96	10.30	7.60	11.38	36.70	0.000	30.3
11*	25.41	24.43	0.753	0.79	1.96	16.90	6.28	19.63	59.04	0.000	30.71
12*	27.98	24.43	0.007	0.21	1.96	11.06	0.61	1.91	84.91	0.000	31.51
13*	24.43	23.41	1.068	1.38	2.00	10.09	7.44	23.38	28.45	0.000	30.71
14	23.41	21.94	0.447	3.31	4.00	8.63	7.64	96.02	95.24	0.000	30.62
15*	24.04	21.94	0.321	0.69	2.00	13.41	4.08	12.82	50.47	0.000	29.92
16	21.94	21.80	0.072	3.14	6.00	7.61	4.03	113.97	211.26	0.000	29.92
17*	25.29	21.80	0.012	0.28	2.00	9.18	0.77	2.43	58.36	0.000	30.48
18*	21.80	21.73	0.073	2.14	6.00	12.62	4.05	114.56	420.93	0.000	30.48
19*	25.21	25.02	0.561	1.27	2.24	12.28	6.62	30.74	59.88	0.000	29.2
20*	25.02	23.28	1.266	1.14	2.50	21.08	9.40	46.15	107.56	0.000	30.42
21*	28.39	23.28	3.212	0.62	2.00	48.66	12.91	40.55	193.60	0.000	31.19
22	23.28	21.73	1.686	3.00	3.00	12.25	12.25	86.61	75.71	0.000	30.48
23	21.73	21.67	0.210	3.84	6.00	10.15	6.87	194.22	260.87	0.000	30.41
24	25.59	25.48	0.194	1.50	1.81	3.94	3.33	9.96	10.87	0.000	30.42
25	25.48	25.14	0.563	1.81	1.81	5.67	5.67	16.98	16.00	0.000	30.42
26	21.67	21.52	0.243	5.06	6.00	8.21	7.39	208.97	204.60	0.000	30.36
27	21.52	21.18	0.243	4.88	6.00	8.49	7.39	208.97	211.93	0.000	28.85
28	21.18	21.02	0.159	3.91	6.50	10.02	6.30	208.97	309.09	0.000	27.5
29	21.02	20.68	0.159	4.06	6.50	9.58	6.30	208.97	290.34	0.000	26.1
30*	20.68	20.50	0.159	3.00	6.50	13.98	6.30	208.97	481.18	0.000	24.2

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OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	9.70	0.000	12.712
DA-9A	0.95	0.35	10.00	10.00	11.66	0.000	3.876
DA-9B	0.95	0.96	10.00	10.00	11.66	0.000	10.632
DA-9C	0.95	1.54	10.00	10.00	11.66	0.000	17.056
DA-10A	0.95	0.35	12.74	12.74	10.56	0.000	3.511
DA-10B	0.95	0.96	15.77	15.77	9.60	0.000	8.759
DA-10C	0.95	1.55	15.77	15.77	9.60	0.000	14.141
DA-11A	0.95	0.29	10.00	10.00	11.66	0.000	3.212
DA-11B	0.95	1.28	10.00	10.00	11.66	0.000	14.176
DA-11C	0.95	1.39	10.00	10.00	11.66	0.000	15.395
DA-1	0.95	8.41	16.50	16.50	9.40	0.000	75.140
DA-2	0.95	8.61	15.00	15.00	9.83	0.000	80.384
DA-3A	0.95	0.75	10.00	10.00	11.66	0.000	8.306
DA-3B	0.95	0.80	10.00	10.00	11.66	0.000	8.860
DA-4A	0.95	0.60	10.00	10.00	11.66	0.000	6.645
DA-5A	0.95	1.61	10.00	10.00	11.66	0.000	17.831
DA-5B	0.95	1.64	15.94	15.94	9.56	0.000	14.890
DA-6B	0.95	2.96	16.30	16.30	9.46	0.000	26.598
DA-6C	0.95	1.74	16.30	16.30	9.46	0.000	15.635
DA-7A	0.95	0.42	14.82	14.82	9.88	0.000	3.943
DA-7B	0.95	1.08	14.82	14.82	9.88	0.000	10.138
DA-7C	0.95	1.39	10.00	10.00	11.66	0.000	15.395

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DA-8A	0.95	0.42	13.01	13.01	10.47	0.000	4.177
DA-8B	0.95	0.36	12.78	12.78	10.55	0.000	3.607
DA-8C	0.95	2.17	16.83	16.83	9.32	0.000	19.207
DA-12A	0.95	0.30	10.00	10.00	11.66	0.000	3.323
DA-12B	0.95	1.27	10.00	10.00	11.66	0.000	14.066
DA-12C	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-32A	0.95	1.18	15.04	15.04	9.82	0.000	11.004
DA-32B	0.95	0.55	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	21.25	21.25	8.32	0.000	46.450
DA-34	0.95	8.15	23.24	23.24	7.94	0.000	61.500
DA-6BCr	0.95	4.70	20.06	20.06	8.56	0.000	38.217
DA-7ABr	0.95	1.50	10.00	10.00	11.66	0.000	16.613
DA-35	0.95	1.90	16.39	16.39	9.43	0.000	17.027
DA-36	0.95	0.28	12.45	12.45	10.66	0.000	2.837
DA-9ABCr	0.95	2.85	17.83	17.83	9.07	0.000	24.544
DA10BCAr	0.95	2.81	15.77	15.77	9.60	0.000	25.637
DA-12BCr	0.95	3.65	17.56	17.56	9.13	0.000	31.668

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.950	5.88	21.25	8.32	0.000	0.00	46.450
DA-34	Grate	0.950	8.15	23.24	7.94	0.000	0.00	61.500
DA-8A	Curb	0.950	17.41	23.24	7.94	0.000	0.00	131.364
DA-5B	Curb	0.950	1.64	15.94	9.56	0.000	0.00	14.890
DA-32A	Curb	0.950	2.82	16.17	9.49	0.000	0.00	25.435
DA-8B	Curb	0.950	0.36	12.78	10.55	0.000	0.00	3.607
DA-7ABr	Curb	0.950	21.39	20.09	8.55	0.000	0.00	173.759
DA-8C	Curb	0.950	2.17	16.83	9.32	0.000	0.00	19.207
DA-35	Grate	0.950	1.90	16.39	9.43	0.000	0.00	17.027
DA-8D	Curb	0.950	3.28	16.42	9.43	0.000	0.00	29.373
DA-36	Grate	0.950	0.28	12.45	10.66	0.000	0.00	2.837
DA-10A	Curb	0.950	3.91	16.45	9.42	0.000	0.00	34.988
DA10BCAr	Curb	0.950	2.81	15.77	9.60	0.000	0.00	25.637
DA-9ABCr	Curb	0.950	13.81	18.97	8.80	0.000	0.00	115.427
DA-9C	Curb	0.950	1.83	10.22	11.56	0.000	0.00	20.097
DA-11A	Curb	0.950	0.29	10.00	11.66	0.000	0.00	3.212
DA-12BCr	Curb	0.950	3.65	17.56	9.13	0.000	0.00	31.668
DA-11B	Curb	0.950	2.67	10.04	11.64	0.000	0.00	29.529
DA-11C	Curb	0.950	1.39	10.00	11.66	0.000	0.00	15.395
MH-6	CircMh	0.950	6.32	17.67	9.11	0.000	0.00	54.669
MH-5	CircMh	0.950	8.15	18.40	8.93	0.000	0.00	69.131
MH-4	CircMh	0.950	17.72	19.62	8.65	0.000	0.00	145.648
MH-3	CircMh	0.950	21.75	20.49	8.47	0.000	0.00	174.958
MH-2	CircMh	0.950	39.16	23.33	7.93	0.000	0.00	294.932
MH-1	CircMh	0.950	41.98	23.37	7.92	0.000	1.00	316.847
DI-11A	Junct	0.950	41.98	23.37	7.92	0.000	1.00	316.847
DI-11B	JnctBx	0.950	41.98	23.37	7.92	0.000	1.00	316.847
DI-12	Junct	0.950	41.98	23.37	7.92	0.000	1.00	316.847
DI-13	Junct	0.950	41.98	23.37	7.92	0.000	1.00	316.847
DA-6B	Curb	0.950	8.84	21.29	8.31	0.000	0.00	69.764
OUT	Outlt	0.950	41.98	23.37	7.92	0.000	1.00	316.847

Conveyance Configuration Data

Run#	Node I.D.	Flowline Elev.	US (ft)	DS (ft)	shape #	Span (ft)	Rise (ft)	Length (ft)	slope (%)	n_value
1	DA-11C DA-11B		23.00	22.41	Circ 1	0.00	2.00	24.00	2.46	0.013
2	DA-11B MH-6		22.41	21.86	Circ 1	0.00	2.00	18.45	2.98	0.013
3	DA-12BCM		22.67	21.86	Circ 1	0.00	2.00	67.00	1.21	0.013
4	MH-6 MH-5		19.86	17.12	Circ 1	0.00	4.00	407.00	0.67	0.013

ALT 3 west.txt										
5	DA-11A	DA-9C	25.25	25.15	Circ 1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ 1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	16.12	15.06	Circ 1	0.00	5.00	271.40	0.39	0.013
8	DA10BCADA	9ABC	23.50	21.56	Circ 1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABC	MH-4	14.56	13.96	Circ 1	0.00	5.50	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ 1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ 1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ 1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ 1	0.00	2.00	95.50	1.58	0.013
14	MH-4	DA-7ABr	15.46	14.02	Circ 1	0.00	4.00	327.62	0.44	0.013
15	DA-8C	DA-7ABr	22.75	19.52	Circ 1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	12.02	11.52	Circ 1	0.00	6.00	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	19.04	Circ 1	0.00	2.00	86.00	6.65	0.013
18	MH-3	MH-2	11.52	10.57	Circ 1	0.00	6.00	96.20	0.99	0.013
19	DA-33	DA-6B	23.50	22.78	Circ 1	0.00	2.50	33.80	2.13	0.013
20	DA-6B	DA-8A	22.78	18.26	Circ 1	0.00	2.50	65.90	6.88	0.013
21	DA-34	DA-8A	26.44	18.76	Circ 1	0.00	2.00	13.00	73.22	0.013
22	DA-8A	MH-2	17.76	16.57	Circ 1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	13.57	13.46	Circ 1	0.00	6.00	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ 1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ 1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	13.46	13.32	Circ 1	0.00	6.00	60.00	0.23	0.013
27	DI-11A	DI-11B	13.32	12.97	Circ 1	0.00	6.00	139.80	0.25	0.013
28	DI-11B	DI-12	12.47	12.11	Circ 1	0.00	6.50	103.60	0.35	0.013
29	DI-12	DI-13	12.11	11.46	Circ 1	0.00	6.50	212.00	0.31	0.013
30	DI-13	OUT	11.46	10.50	Circ 1	0.00	6.50	114.00	0.84	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	(f/s)	Actual (f/s)				
1*	28.74	28.63	0.463	0.92	2.00	10.88	4.90	15.39	35.48	0.000	30.46
2*	28.63	28.31	1.703	1.30	2.00	13.65	9.40	29.53	39.07	0.000	30.46
3	29.62	28.31	1.959	2.00	2.00	10.08	10.08	31.67	24.88	0.000	30.71
4*	28.31	27.72	0.145	1.91	4.00	9.25	4.35	54.67	117.88	0.000	30.77
5	27.91	27.90	0.020	0.73	2.00	3.07	1.02	3.21	11.26	0.000	31.11
6*	27.90	27.72	0.789	0.70	2.00	20.42	6.40	20.10	76.11	0.000	31.11
7*	27.72	27.53	0.070	2.27	5.00	7.99	3.52	69.13	162.79	0.000	30.99
8*	28.37	27.53	1.284	1.18	2.00	13.24	8.16	25.64	38.95	0.000	30.11
9	27.53	27.20	0.118	3.52	5.50	7.18	4.86	115.43	154.58	0.000	30.11
10*	30.08	29.97	0.566	0.96	2.00	11.47	5.42	17.03	36.70	0.000	30.3
11*	29.97	29.48	1.685	1.00	2.00	18.77	9.35	29.37	59.04	0.000	30.71
12*	29.49	29.48	0.016	0.25	2.00	12.44	0.90	2.84	84.91	0.000	31.51
13	29.48	27.20	2.391	2.00	2.00	11.14	11.14	34.99	28.45	0.000	30.71
14	27.20	23.83	1.028	4.00	4.00	11.59	11.59	145.65	95.24	0.000	30.62
15*	24.33	23.83	0.721	0.86	2.00	14.97	6.11	19.21	50.47	0.000	29.92
16	23.83	23.49	0.168	4.13	6.00	8.38	6.15	173.76	211.26	0.000	29.92
17*	25.42	23.49	0.025	0.34	2.00	10.32	1.15	3.61	58.36	0.000	30.48
18*	23.49	23.33	0.171	2.70	6.00	14.21	6.19	174.96	420.93	0.000	30.48
19*	29.25	28.82	1.282	1.66	2.50	13.47	9.46	46.45	59.88	0.000	29.2
20*	28.82	26.91	2.892	1.47	2.50	23.32	14.21	69.76	107.56	0.000	30.42
21*	28.43	26.91	7.388	0.77	2.00	54.74	19.58	61.50	193.60	0.000	31.19
22	26.91	23.33	3.878	3.00	3.00	18.58	18.58	131.36	75.71	0.000	30.48
23	23.33	23.19	0.485	6.00	6.00	10.43	10.43	294.93	260.87	0.000	30.41
24	25.95	25.67	0.433	2.00	2.00	4.74	4.74	14.89	10.87	0.000	30.42
25	25.67	25.42	1.264	2.00	2.00	8.10	8.10	25.44	16.00	0.000	30.42
26	23.19	22.85	0.560	6.00	6.00	11.21	11.21	316.85	204.60	0.000	30.36
27	22.85	22.07	0.560	6.00	6.00	11.21	11.21	316.85	211.93	0.000	28.85
28	22.07	21.69	0.365	5.48	6.50	10.61	9.55	316.85	309.09	0.000	27.5
29	21.69	20.92	0.365	6.09	6.50	9.80	9.55	316.85	290.34	0.000	26.1
30*	20.92	20.50	0.365	3.86	6.50	15.43	9.55	316.85	481.18	0.000	24.2

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 4 FM518_West Prop_Eq_11_100t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : FM2351 - Willowick Eq - Parallel C-Value = Existing Land Use
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years
 =====

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	6.49	0.000	8.514
DA-9A	0.95	0.35	10.00	10.00	7.93	0.000	2.636
DA-9B	0.95	0.96	10.00	10.00	7.93	0.000	7.229
DA-9C	0.95	1.54	15.76	15.76	6.43	0.000	9.408
DA-10A	0.95	0.35	12.74	12.74	7.12	0.000	2.368
DA-10B	0.95	0.96	15.77	15.77	6.43	0.000	5.863
DA-10C	0.95	1.55	15.77	15.77	6.43	0.000	9.466
DA-11A	0.95	0.29	12.50	12.50	7.19	0.000	1.980
DA-11B	0.95	1.28	15.25	15.25	6.54	0.000	7.948
DA-11C	0.95	1.39	15.47	15.47	6.49	0.000	8.570
DA-1	0.95	8.41	16.50	16.50	6.28	0.000	50.206
DA-2	0.95	8.61	15.00	15.00	6.59	0.000	53.899
DA-3A	0.95	0.75	10.00	10.00	7.93	0.000	5.648
DA-3B	0.95	0.80	10.00	10.00	7.93	0.000	6.025
DA-4A	0.95	0.60	10.00	10.00	7.93	0.000	4.518
DA-5A	0.95	1.61	10.00	10.00	7.93	0.000	12.124
DA-5B	0.95	1.64	15.94	15.94	6.39	0.000	9.962
DA-6B	0.95	2.96	16.30	16.30	6.32	0.000	17.780
DA-6C	0.95	1.74	16.30	16.30	6.32	0.000	10.452
DA-7A	0.95	0.42	14.82	14.82	6.63	0.000	2.645
DA-7B	0.95	1.08	14.82	14.82	6.63	0.000	6.801
DA-7C	0.95	1.39	10.00	10.00	7.93	0.000	10.468
DA-8A	0.95	0.42	13.00	13.00	7.06	0.000	2.816
DA-8B	0.95	0.36	12.78	12.78	7.11	0.000	2.433
DA-8C	0.95	2.17	16.83	16.83	6.22	0.000	12.825
DA-12A	0.95	0.30	10.00	10.00	7.93	0.000	2.259
DA-12B	0.95	1.27	10.00	10.00	7.93	0.000	9.564
DA-12C	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-32A	0.95	1.18	15.04	15.04	6.58	0.000	7.377
DA-32B	0.95	0.55	10.00	10.00	7.93	0.000	4.142
DA-33	0.95	5.88	21.25	21.25	5.50	0.000	30.732
DA-34	0.95	8.15	23.24	23.24	5.24	0.000	40.548
DA-6BCr	0.95	4.70	20.05	20.05	5.68	0.000	25.349
DA-7ABr	0.95	1.50	10.00	10.00	7.93	0.000	11.296
DA-35	0.95	1.90	16.39	16.39	6.31	0.000	11.381
DA-36	0.95	0.28	12.45	12.45	7.20	0.000	1.915
DA-9ABCr	0.95	2.85	17.83	17.83	6.04	0.000	16.352
DA10BCAr	0.95	2.81	10.00	10.00	7.93	0.000	21.161
DA-12BCr	0.95	3.65	17.55	17.55	6.09	0.000	21.114

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.950	5.88	21.25	5.50	0.000	0.00	30.732
DA-34	Grate	0.950	8.15	23.24	5.24	0.000	0.00	40.548

ALT 4 west.txt

DA-8A	Curb	0.950	17.41	23.24	5.24	0.000	0.00	86.609
DA-5B	Curb	0.950	1.64	15.94	6.39	0.000	0.00	9.962
DA-32A	Curb	0.950	2.82	16.21	6.34	0.000	0.00	16.983
DA-8B	Curb	0.950	0.36	12.78	7.11	0.000	0.00	2.433
DA-7ABr	Curb	0.950	21.39	20.52	5.61	0.000	0.00	113.932
DA-8C	Curb	0.950	2.17	16.83	6.22	0.000	0.00	12.825
DA-35	Grate	0.950	1.90	16.39	6.31	0.000	0.00	11.381
DA-8D	Curb	0.950	3.28	16.42	6.30	0.000	0.00	19.629
DA-36	Grate	0.950	0.28	12.45	7.20	0.000	0.00	1.915
DA-10A	Curb	0.950	3.91	16.45	6.29	0.000	0.00	23.379
DA10BCAr	Curb	0.950	2.81	10.00	7.93	0.000	0.00	21.161
DA-9ABC	Curb	0.950	13.81	19.15	5.82	0.000	0.00	76.317
DA-9C	Curb	0.950	1.83	15.76	6.43	0.000	0.00	11.179
DA-11A	Curb	0.950	0.29	12.50	7.19	0.000	0.00	1.980
DA-12BCr	Curb	0.950	3.65	17.55	6.09	0.000	0.00	21.114
DA-11B	Curb	0.950	2.67	15.51	6.48	0.000	0.00	16.439
DA-11C	Curb	0.950	1.39	15.47	6.49	0.000	0.00	8.570
MH-6	CircMh	0.950	6.32	17.68	6.07	0.000	0.00	36.424
MH-5	CircMh	0.950	8.15	18.52	5.92	0.000	0.00	45.848
MH-4	CircMh	0.950	17.72	19.89	5.70	0.000	0.00	95.985
MH-3	CircMh	0.950	21.75	20.96	5.54	0.000	0.00	114.530
MH-2	CircMh	0.950	39.16	23.37	5.22	0.000	0.00	194.224
MH-1	CircMh	0.950	41.98	23.42	5.21	0.000	1.00	208.971
DI-11A	Junct	0.950	41.98	23.42	5.21	0.000	1.00	208.971
DI-11B	JnctBX	0.950	41.98	23.42	5.21	0.000	1.00	208.971
DI-12	Junct	0.950	41.98	23.42	5.21	0.000	1.00	208.971
DI-13	Junct	0.950	41.98	23.42	5.21	0.000	1.00	208.971
DA-6B	Curb	0.950	8.84	21.30	5.50	0.000	0.00	46.147
OUT	outlt	0.950	41.98	23.42	5.21	0.000	1.00	208.971

Conveyance Configuration Data

Run#	Node US	I.D. DS	Flowline US (ft)	Elev. DS (ft)	Shape	#	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	DA-11C	DA-11B	23.00	22.41	Circ	1	0.00	2.00	24.00	2.46	0.013
2	DA-11B	MH-6	22.41	21.86	Circ	1	0.00	2.00	18.45	2.98	0.013
3	DA-12BC	MH-6	22.67	21.86	Circ	1	0.00	2.00	67.00	1.21	0.013
4	MH-6	MH-5	18.69	15.95	Circ	1	0.00	5.17	407.00	0.67	0.013
5	DA-11A	DA-9C	25.25	25.15	Circ	1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ	1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	15.52	14.46	Circ	1	0.00	5.60	271.40	0.39	0.013
8	DA10BCA	DA-9ABC	23.50	21.56	Circ	1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABC	MH-4	14.77	14.17	Circ	1	0.00	5.29	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ	1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ	1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ	1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ	1	0.00	2.00	95.50	1.58	0.013
14	MH-4	DA-7ABr	15.46	14.02	Circ	1	0.00	4.00	327.62	0.44	0.013
15	DA-8C	DA-7ABr	22.75	19.52	Circ	1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	12.56	12.06	Circ	1	0.00	5.46	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	19.04	Circ	1	0.00	2.00	86.00	6.65	0.013
18	MH-3	MH-2	12.06	11.11	Circ	1	0.00	5.46	96.20	0.99	0.013
19	DA-33	DA-6B	24.00	23.28	Circ	1	0.00	2.00	33.80	2.13	0.013
20	DA-6B	DA-8A	23.28	18.76	Circ	1	0.00	2.00	65.90	6.88	0.013
21	DA-34	DA-8A	26.44	18.76	Circ	1	0.00	2.00	13.00	73.22	0.013
22	DA-8A	MH-2	17.76	16.57	Circ	1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	13.90	13.79	Circ	1	0.00	5.67	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ	1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ	1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	13.79	13.65	Circ	1	0.00	5.67	60.00	0.23	0.013
27	DI-11A	DI-11B	13.65	13.30	Circ	1	0.00	5.67	139.80	0.25	0.013
28	DI-11B	DI-12	13.30	12.94	Circ	1	0.00	5.67	103.60	0.35	0.013
29	DI-12	DI-13	12.66	12.01	Circ	1	0.00	5.95	212.00	0.31	0.013
30	DI-13	OUT	12.01	11.05	Circ	1	0.00	5.95	114.00	0.84	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	24.65	24.62	0.143	0.67	2.00	9.29	2.73	8.57	35.48	0.000	30.46
2*	24.62	24.52	0.528	0.91	2.00	11.90	5.23	16.44	39.07	0.000	30.46
3*	25.10	24.52	0.871	1.41	2.00	8.89	6.72	21.11	24.88	0.000	30.71
4*	24.52	24.45	0.016	1.38	5.17	8.07	1.74	36.42	233.65	0.000	30.77
5	25.84	25.78	0.008	0.56	0.63	2.73	2.32	1.98	11.26	0.000	31.11
6*	25.78	24.45	0.244	0.52	1.83	17.29	3.71	11.18	76.11	0.000	31.11
7*	24.45	24.41	0.017	1.73	5.60	7.09	1.86	45.85	220.23	0.000	30.99
8*	25.15	24.41	0.875	1.05	2.00	12.65	6.74	21.16	38.95	0.000	30.11
9	24.41	24.23	0.064	2.81	5.29	6.43	3.47	76.32	139.33	0.000	30.11
10*	26.09	26.04	0.253	0.76	1.59	10.30	4.24	11.38	36.70	0.000	30.3
11*	26.04	25.25	0.753	0.79	2.00	16.90	6.25	19.63	59.04	0.000	30.71
12*	28.25	25.25	0.007	0.21	2.00	11.06	0.61	1.91	84.91	0.000	31.51
13*	25.25	24.23	1.068	1.38	2.00	10.09	7.44	23.38	28.45	0.000	30.71
14	24.23	22.77	0.446	3.31	4.00	8.63	7.64	95.99	95.24	0.000	30.62
15*	24.04	22.77	0.321	0.69	2.00	13.41	4.08	12.82	50.47	0.000	29.92
16	22.77	22.53	0.120	3.33	5.46	7.63	4.87	113.93	164.28	0.000	29.92
17*	25.29	22.53	0.012	0.28	2.00	9.18	0.77	2.43	58.36	0.000	30.48
18*	22.53	22.41	0.121	2.23	5.46	12.75	4.89	114.53	327.33	0.000	30.48
19*	27.33	26.71	1.845	1.53	2.00	11.94	9.78	30.73	33.03	0.000	29.2
20*	26.71	23.97	4.160	1.33	2.00	20.87	14.69	46.15	59.32	0.000	30.42
21*	28.39	23.97	3.212	0.62	2.00	48.66	12.91	40.55	193.60	0.000	31.19
22	23.97	22.41	1.686	3.00	3.00	12.25	12.25	86.61	75.71	0.000	30.48
23	22.41	22.33	0.284	4.08	5.67	10.00	7.69	194.22	224.34	0.000	30.41
24	25.59	25.48	0.194	1.50	1.81	3.94	3.33	9.96	10.87	0.000	30.42
25	25.48	25.14	0.563	1.81	1.81	5.67	5.67	16.98	16.00	0.000	30.42
26	22.33	22.13	0.329	5.67	5.67	8.28	8.28	208.97	175.95	0.000	30.36
27	22.13	21.67	0.329	5.67	5.67	8.28	8.28	208.97	182.26	0.000	28.85
28	21.67	21.33	0.329	4.52	5.67	9.69	8.28	208.97	214.72	0.000	27.5
29	21.33	20.79	0.255	4.46	5.95	9.34	7.52	208.97	229.36	0.000	26.1
30*	20.79	20.50	0.255	3.14	5.95	14.05	7.52	208.97	380.12	0.000	24.2

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-8D	0.95	1.38	15.45	15.45	9.70	0.000	12.711
DA-9A	0.95	0.35	10.00	10.00	11.66	0.000	3.876
DA-9B	0.95	0.96	10.00	10.00	11.66	0.000	10.632
DA-9C	0.95	1.54	15.76	15.76	9.61	0.000	14.056
DA-10A	0.95	0.35	12.74	12.74	10.56	0.000	3.512
DA-10B	0.95	0.96	15.77	15.77	9.60	0.000	8.760
DA-10C	0.95	1.55	15.77	15.77	9.60	0.000	14.143
DA-11A	0.95	0.29	12.50	12.50	10.65	0.000	2.933
DA-11B	0.95	1.28	15.25	15.25	9.75	0.000	11.861
DA-11C	0.95	1.39	15.47	15.47	9.69	0.000	12.796
DA-1	0.95	8.41	16.50	16.50	9.40	0.000	75.140
DA-2	0.95	8.61	15.00	15.00	9.83	0.000	80.384
DA-3A	0.95	0.75	10.00	10.00	11.66	0.000	8.306
DA-3B	0.95	0.80	10.00	10.00	11.66	0.000	8.860
DA-4A	0.95	0.60	10.00	10.00	11.66	0.000	6.645
DA-5A	0.95	1.61	10.00	10.00	11.66	0.000	17.831
DA-5B	0.95	1.64	15.94	15.94	9.56	0.000	14.890
DA-6B	0.95	2.96	16.30	16.30	9.46	0.000	26.598
DA-6C	0.95	1.74	16.30	16.30	9.46	0.000	15.635
DA-7A	0.95	0.42	14.82	14.82	9.88	0.000	3.943
DA-7B	0.95	1.08	14.82	14.82	9.88	0.000	10.138

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DA-7C	0.95	1.39	10.00	10.00	11.66	0.000	15.395
DA-8A	0.95	0.42	13.00	13.00	10.47	0.000	4.178
DA-8B	0.95	0.36	12.78	12.78	10.55	0.000	3.607
DA-8C	0.95	2.17	16.83	16.83	9.32	0.000	19.208
DA-12A	0.95	0.30	10.00	10.00	11.66	0.000	3.323
DA-12B	0.95	1.27	10.00	10.00	11.66	0.000	14.066
DA-12C	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-32A	0.95	1.18	15.04	15.04	9.82	0.000	11.003
DA-32B	0.95	0.55	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	21.25	21.25	8.31	0.000	46.446
DA-34	0.95	8.15	23.24	23.24	7.94	0.000	61.500
DA-6BCr	0.95	4.70	20.05	20.05	8.56	0.000	38.222
DA-7ABr	0.95	1.50	10.00	10.00	11.66	0.000	16.613
DA-35	0.95	1.90	16.39	16.39	9.43	0.000	17.029
DA-36	0.95	0.28	12.45	12.45	10.67	0.000	2.837
DA-9ABCr	0.95	2.85	17.83	17.83	9.07	0.000	24.544
DA10BCAr	0.95	2.81	10.00	10.00	11.66	0.000	31.121
DA-12BCr	0.95	3.65	17.55	17.55	9.13	0.000	31.673

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-33	Grate	0.950	5.88	21.25	8.31	0.000	0.00	46.446
DA-34	Grate	0.950	8.15	23.24	7.94	0.000	0.00	61.500
DA-8A	Curb	0.950	17.41	23.24	7.94	0.000	0.00	131.364
DA-5B	Curb	0.950	1.64	15.94	9.56	0.000	0.00	14.890
DA-32A	Curb	0.950	2.82	16.17	9.49	0.000	0.00	25.435
DA-8B	Curb	0.950	0.36	12.78	10.55	0.000	0.00	3.607
DA-7ABr	Curb	0.950	21.39	20.10	8.55	0.000	0.00	173.725
DA-8C	Curb	0.950	2.17	16.83	9.32	0.000	0.00	19.208
DA-35	Grate	0.950	1.90	16.39	9.43	0.000	0.00	17.029
DA-8D	Curb	0.950	3.28	16.42	9.43	0.000	0.00	29.375
DA-36	Grate	0.950	0.28	12.45	10.67	0.000	0.00	2.837
DA-10A	Curb	0.950	3.91	16.44	9.42	0.000	0.00	34.991
DA10BCAr	Curb	0.950	2.81	10.00	11.66	0.000	0.00	31.121
DA-9ABCr	Curb	0.950	13.81	18.97	8.80	0.000	0.00	115.408
DA-9C	Curb	0.950	1.83	15.76	9.61	0.000	0.00	16.703
DA-11A	Curb	0.950	0.29	12.50	10.65	0.000	0.00	2.933
DA-12BCr	Curb	0.950	3.65	17.55	9.13	0.000	0.00	31.673
DA-11B	Curb	0.950	2.67	15.51	9.68	0.000	0.00	24.551
DA-11C	Curb	0.950	1.39	15.47	9.69	0.000	0.00	12.796
MH-6	CircMh	0.950	6.32	17.66	9.11	0.000	0.00	54.677
MH-5	CircMh	0.950	8.15	18.40	8.93	0.000	0.00	69.123
MH-4	CircMh	0.950	17.72	19.63	8.65	0.000	0.00	145.619
MH-3	CircMh	0.950	21.75	20.52	8.46	0.000	0.00	174.842
MH-2	CircMh	0.950	39.16	23.33	7.93	0.000	0.00	294.932
MH-1	CircMh	0.950	41.98	23.37	7.92	0.000	1.00	316.881
DI-11A	Junct	0.950	41.98	23.37	7.92	0.000	1.00	316.881
DI-11B	JunctBx	0.950	41.98	23.37	7.92	0.000	1.00	316.881
DI-12	Junct	0.950	41.98	23.37	7.92	0.000	1.00	316.881
DI-13	Junct	0.950	41.98	23.37	7.92	0.000	1.00	316.881
DA-6B	Curb	0.950	8.84	21.29	8.31	0.000	0.00	69.764
OUT	outlt	0.950	41.98	23.37	7.92	0.000	1.00	316.881

Conveyance Configuration Data

Run#	Node I.D.	Flowline Elev.	US (ft)	DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	DA-11C DA-11B		23.00	22.41	Circ 1	0.00	2.00	24.00	2.46	0.013
2	DA-11B MH-6		22.41	21.86	Circ 1	0.00	2.00	18.45	2.98	0.013
3	DA-12BCMh-6		22.67	21.86	Circ 1	0.00	2.00	67.00	1.21	0.013

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4	MH-6	MH-5	18.69	15.95	Circ 1	0.00	5.17	407.00	0.67	0.013
5	DA-11A	DA-9C	25.25	25.15	Circ 1	0.00	2.00	40.41	0.25	0.013
6	DA-9C	MH-5	25.15	22.62	Circ 1	0.00	2.00	22.50	11.32	0.013
7	MH-5	DA-9ABC	15.52	14.46	Circ 1	0.00	5.60	271.40	0.39	0.013
8	DA10BCADA	9ABC	23.50	21.56	Circ 1	0.00	2.00	65.50	2.96	0.013
9	DA-9ABCMH	4	14.77	14.17	Circ 1	0.00	5.29	283.25	0.21	0.013
10	DA-35	DA-8D	24.93	24.45	Circ 1	0.00	2.00	18.25	2.63	0.013
11	DA-8D	DA-10A	24.45	22.47	Circ 1	0.00	2.00	29.15	6.81	0.013
12	DA-36	DA-10A	27.77	22.47	Circ 1	0.00	2.00	38.00	14.09	0.013
13	DA-10A	MH-4	22.47	20.96	Circ 1	0.00	2.00	95.50	1.58	0.013
14	MH-4	DA-7ABr	15.46	14.02	Circ 1	0.00	4.00	327.62	0.44	0.013
15	DA-8C	DA-7ABr	22.75	19.52	Circ 1	0.00	2.00	65.00	4.98	0.013
16	DA-7ABr	MH-3	12.56	12.06	Circ 1	0.00	5.46	201.00	0.25	0.013
17	DA-8B	MH-3	24.75	19.04	Circ 1	0.00	2.00	86.00	6.65	0.013
18	MH-3	MH-2	12.06	11.11	Circ 1	0.00	5.46	96.20	0.99	0.013
19	DA-33	DA-6B	24.00	23.28	Circ 1	0.00	2.00	33.80	2.13	0.013
20	DA-6B	DA-8A	23.28	18.76	Circ 1	0.00	2.00	65.90	6.88	0.013
21	DA-34	DA-8A	26.44	18.76	Circ 1	0.00	2.00	13.00	73.22	0.013
22	DA-8A	MH-2	17.76	16.57	Circ 1	0.00	3.00	92.40	1.29	0.013
23	MH-2	MH-1	13.90	13.79	Circ 1	0.00	5.67	29.00	0.38	0.013
24	DA-5B	DA-32A	23.82	23.67	Circ 1	0.00	2.00	65.00	0.23	0.013
25	DA-32A	MH-1	23.67	23.65	Circ 1	0.00	2.00	4.00	0.50	0.013
26	MH-1	DI-11A	13.79	13.65	Circ 1	0.00	5.67	60.00	0.23	0.013
27	DI-11A	DI-11B	13.65	13.30	Circ 1	0.00	5.67	139.80	0.25	0.013
28	DI-11B	DI-12	13.30	12.94	Circ 1	0.00	5.67	103.60	0.35	0.013
29	DI-12	DI-13	12.66	12.01	Circ 1	0.00	5.95	212.00	0.31	0.013
30	DI-13	OUT	12.01	11.05	Circ 1	0.00	5.95	114.00	0.84	0.013

Conveyance Hydraulic Computations. Tailwater = 20.500 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	30.05	29.97	0.320	0.83	2.00	10.38	4.07	12.80	35.48	0.000	30.46
2*	29.97	29.76	1.177	1.15	2.00	13.15	7.81	24.55	39.07	0.000	30.46
3	31.07	29.76	1.960	2.00	2.00	10.08	10.08	31.67	24.88	0.000	30.71
4*	29.76	29.61	0.037	1.70	5.17	9.12	2.60	54.68	233.65	0.000	30.77
5	29.73	29.73	0.017	0.70	2.00	2.98	0.93	2.93	11.26	0.000	31.11
6*	29.73	29.61	0.545	0.64	2.00	19.41	5.32	16.70	76.11	0.000	31.11
7*	29.61	29.50	0.038	2.14	5.60	7.97	2.81	69.12	220.23	0.000	30.99
8*	30.74	29.50	1.892	1.35	2.00	13.78	9.91	31.12	38.95	0.000	30.11
9	29.50	29.09	0.145	3.64	5.29	7.16	5.25	115.41	139.33	0.000	30.11
10*	31.97	31.87	0.566	0.96	2.00	11.47	5.42	17.03	36.70	0.000	30.3
11*	31.87	31.37	1.686	1.00	2.00	18.77	9.35	29.38	59.04	0.000	30.71
12*	31.38	31.37	0.016	0.25	2.00	12.45	0.90	2.84	84.91	0.000	31.51
13	31.37	29.09	2.392	2.00	2.00	11.14	11.14	34.99	28.45	0.000	30.71
14	29.09	25.72	1.027	4.00	4.00	11.59	11.59	145.62	95.24	0.000	30.62
15*	26.19	25.72	0.721	0.86	2.00	14.97	6.11	19.21	50.47	0.000	29.92
16	25.72	25.17	0.278	4.78	5.46	8.00	7.42	173.72	164.28	0.000	29.92
17*	25.42	25.17	0.025	0.34	2.00	10.32	1.15	3.61	58.36	0.000	30.48
18*	25.17	24.89	0.282	2.84	5.46	14.23	7.47	174.84	327.33	0.000	30.48
19	36.17	34.74	4.214	2.00	2.00	14.78	14.78	46.45	33.03	0.000	29.2
20	34.74	28.48	9.508	2.00	2.00	22.21	22.21	69.76	59.32	0.000	30.42
21*	29.44	28.48	7.388	0.77	2.00	54.74	19.58	61.50	193.60	0.000	31.19
22	28.48	24.89	3.878	3.00	3.00	18.58	18.58	131.36	75.71	0.000	30.48
23	24.89	24.70	0.656	5.67	5.67	11.68	11.68	294.93	224.34	0.000	30.41
24	25.95	25.67	0.433	2.00	2.00	4.74	4.74	14.89	10.87	0.000	30.42
25	25.67	25.42	1.264	2.00	2.00	8.10	8.10	25.44	16.00	0.000	30.42
26	24.70	24.25	0.757	5.67	5.67	12.55	12.55	316.88	175.95	0.000	30.36
27	24.25	23.19	0.757	5.67	5.67	12.55	12.55	316.88	182.26	0.000	28.85
28	23.19	22.41	0.757	5.67	5.67	12.55	12.55	316.88	214.72	0.000	27.5
29	22.41	21.17	0.585	5.95	5.95	11.40	11.40	316.88	229.36	0.000	26.1
30*	21.17	20.50	0.585	4.14	5.95	15.36	11.40	316.88	380.12	0.000	24.2

=====END=====

* super critical flow.

NORMAL TERMINATION OF WINSTORM.

ALT 4 west.txt

PROJECT NAME : ALT 1 FM518_East_A_Prop 100_t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : Willowick - Cowart's Ck C-value = Existing Land Use
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-18B	0.95	1.41	15.51	15.51	6.48	0.000	8.682
DA-19A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-19B	0.85	0.78	10.00	10.00	7.93	0.000	5.256
DA-19C	0.85	0.81	10.00	10.00	7.93	0.000	5.458
DA-19D	0.85	0.41	10.00	10.00	7.93	0.000	2.763
DA-20A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-20B	0.95	0.78	10.00	10.00	7.93	0.000	5.874
DA-20C	0.95	0.81	10.00	10.00	7.93	0.000	6.100
DA-20D	0.95	0.41	10.00	10.00	7.93	0.000	3.088
DA-21A	0.85	0.39	10.00	10.00	7.93	0.000	2.628
DA-21B	0.85	0.92	10.00	10.00	7.93	0.000	6.199
DA-21C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-21D	0.55	1.56	10.00	10.00	7.93	0.000	6.801
DA-22A	0.55	0.40	12.93	12.93	7.07	0.000	1.556
DA-22B	0.95	0.92	14.45	14.45	6.71	0.000	5.865
DA-22C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-22D	0.95	1.56	10.00	10.00	7.93	0.000	11.748
DA-23A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-23B	0.95	1.67	10.00	10.00	7.93	0.000	12.576
DA-24A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-24B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-25A	0.95	2.82	17.79	17.79	6.05	0.000	16.198
DA-25B	0.9	3.86	19.11	19.11	5.82	0.000	20.233
DA-26A	0.55	1.38	10.00	10.00	7.93	0.000	6.017
DA-26B	0.4	1.38	10.00	10.00	7.93	0.000	4.376
DA-15B	0.95	1.05	14.75	14.75	6.64	0.000	6.627
DA-15C	0.95	1.59	15.85	15.85	6.41	0.000	9.686
DA-16A	0.55	0.25	10.00	10.00	7.93	0.000	1.090
DA-16B	0.55	1.05	10.00	10.00	7.93	0.000	4.578
DA-16C	0.55	1.59	10.00	10.00	7.93	0.000	6.932
DA-17A	0.95	1.15	10.00	10.00	7.93	0.000	8.660
DA-17B	0.95	1.41	10.00	10.00	7.93	0.000	10.618
DA-13A	0.95	0.96	14.52	14.52	6.69	0.000	6.106
DA-13B	0.95	0.67	13.80	13.80	6.86	0.000	4.367
DA-13C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-14A	0.95	0.55	13.44	13.44	6.95	0.000	3.630
DA-14B	0.95	1.07	10.00	10.00	7.93	0.000	8.058
DA-14C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-15A	0.95	0.25	10.00	10.00	7.93	0.000	1.883
DA-18A	0.55	1.15	14.97	14.97	6.60	0.000	4.172
DA-27A	0.95	4.03	19.31	19.31	5.79	0.000	22.175
DA-27B	0.95	3.46	15.00	15.00	6.59	0.000	21.660
DA-28A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-28B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-29A	0.95	3.30	10.00	10.00	7.93	0.000	24.851
DA-29B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-30A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-30B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-32A	0.55	1.18	10.00	10.00	7.93	0.000	5.145
DA-32B	0.55	0.95	10.00	10.00	7.93	0.000	4.142

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DA-33	0.95	5.88	13.50	13.50	6.93	0.000	38.726
DA-34	0.95	8.15	13.50	13.50	6.93	0.000	53.676
DA-35	0.95	1.90	10.00	10.00	7.93	0.000	14.308
DA-36	0.95	0.28	10.00	10.00	7.93	0.000	2.109
DA-39	0.95	2.32	17.06	17.06	6.18	0.000	13.617
DA-40	0.95	0.14	10.00	10.00	7.93	0.000	1.054
DA-41	0.95	0.31	12.58	12.58	7.16	0.000	2.110
DA-14BCr0.95		2.26	16.97	16.97	6.19	0.000	13.300
DA-16BCr0.55		2.64	17.54	17.54	6.09	0.000	8.844
DA-17ABr0.95		2.56	17.42	17.42	6.11	0.000	14.865
DA-4019A0.95		0.86	14.30	14.30	6.74	0.000	5.510
DA19BCDr0.9		2.00	16.56	16.56	6.27	0.000	11.290
DA20ABCD0.95		2.72	17.65	17.65	6.07	0.000	15.688
DA21ABr 0.85		1.31	15.31	15.31	6.52	0.000	7.264
DA-15A1r0.95		0.13	11.64	11.64	7.42	0.000	0.881
DA-15A2r0.95		0.13	11.64	11.64	7.42	0.000	0.881
DA-21CDr0.75		2.75	17.69	17.69	6.06	0.000	12.507
DA-22CDr0.95		2.75	17.69	17.69	6.06	0.000	15.842
DA23AB 0.55		3.05	18.10	18.10	5.99	0.000	10.052
DA27B29A0.55		6.76	22.06	22.06	5.39	0.000	20.041

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-4019A	Curb	0.950	3.18	17.16	6.16	0.000	0.00	18.611
DA19BCDr	Curb	0.929	4.72	17.86	6.03	0.000	0.00	26.452
DA20ABCD	Curb	0.950	2.72	17.65	6.07	0.000	0.00	15.688
DA-22A	Curb	0.550	0.40	12.93	7.07	0.000	0.00	1.556
DA-41	Curb	0.725	0.71	13.10	7.03	0.000	0.00	3.618
DA21ABr	Curb	0.891	2.23	15.31	6.52	0.000	0.00	12.966
DA-22B	Curb	0.950	0.92	14.45	6.71	0.000	0.00	5.865
DA-21CDr	Curb	0.850	5.50	17.78	6.05	0.000	0.00	28.271
DA-22CDr	Curb	0.950	2.75	17.69	6.06	0.000	0.00	15.842
MH-7	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A1r	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A2r	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-16BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-17ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-39	Curb	0.950	2.32	17.06	6.18	0.000	0.00	13.617
MH-8	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-9	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-10	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 2	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 3	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-11	CircMh	0.950	3.18	17.16	6.16	0.000	0.00	18.611
PCTee	Junct	0.937	7.90	18.25	5.97	0.000	0.00	44.179
MH-12	CircMh	0.920	8.61	19.23	5.80	0.000	0.00	45.972
PCTee2	Junct	0.914	10.84	20.02	5.68	0.000	0.00	56.285
MH-12A	CircMh	0.892	16.34	20.69	5.58	0.000	0.00	81.395
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.839	19.39	23.63	5.19	0.000	0.00	84.365

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DA-25A	Grate	0.853	22.21	24.44	5.09	0.000	0.00	96.427
DA-25B	Grate	0.860	26.07	24.80	5.05	0.000	0.00	113.164
DA-27A	Grate	0.872	30.10	25.86	4.93	0.000	0.00	129.400
DA27B29A	Grate	0.813	36.86	26.84	4.83	0.000	0.00	144.593
OUT	Outlt	0.813	36.86	26.84	4.83	0.000	0.00	144.593

Conveyance Configuration Data

Run#	Node I.D.	Flowline Elev.	Shape #	Span	Rise	Length	Slope	n_value
	US DS	US (ft) DS (ft)		(ft)	(ft)	(ft)	(%)	
23	MH-11 PCTee	21.51 21.31	Circ 1	0.00	3.50	217.00	0.09	0.013
24	DA20ABCD A19BCD	22.52 22.40	Circ 1	0.00	2.00	63.63	0.19	0.013
25	DA19BCD PCTee	23.40 21.31	Circ 1	0.00	2.00	5.00	46.01	0.013
26	PCTee MH-12	21.31 20.94	Circ 1	0.00	4.00	281.00	0.13	0.013
27	DA-22A DA-41	25.33 25.23	Circ 1	0.00	2.00	29.00	0.34	0.013
28	DA-41 MH-12	25.23 20.94	Circ 1	0.00	2.00	99.00	4.34	0.013
29	MH-12 PCTee2	20.94 20.51	Circ 1	0.00	4.00	250.00	0.17	0.013
30	DA-22B DA21ABr	24.73 22.55	Circ 1	0.00	2.00	62.70	3.48	0.013
31	DA21ABr PCTee2	22.55 20.51	Circ 1	0.00	2.00	5.00	44.69	0.013
32	PCTee2 MH-12A	20.51 19.67	Circ 1	0.00	4.00	273.00	0.31	0.013
33	DA-22CDDA-21CD	22.98 21.42	Circ 1	0.00	2.00	62.55	2.49	0.013
34	DA-21CDMH-12A	22.42 19.67	Circ 1	0.00	2.00	6.00	51.57	0.013
35	MH-12A DA23AB	19.67 18.67	Circ 1	0.00	5.00	908.90	0.11	0.013
36	DA23AB DA-25A	18.67 18.23	Circ 1	0.00	5.00	284.30	0.15	0.013
37	DA-25A DA-25B	18.23 15.55	Circ 1	0.00	5.00	268.00	1.00	0.013
38	DA-25B DA-27A	15.55 15.15	Circ 1	0.00	5.00	364.20	0.11	0.013
39	DA-27A DA27B29	15.15 12.25	Circ 1	0.00	5.00	593.80	0.49	0.013
40	DA27B29OUT	12.25 3.00	Circ 1	0.00	5.00	256.20	3.61	0.013
21	DA-39 DA-4019	24.65 24.55	Circ 1	0.00	2.50	29.00	0.34	0.013
22	DA-4019MH-11	24.55 21.51	Circ 1	0.00	2.00	19.70	15.62	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
23	24.34	24.27	0.034	1.97	2.96	3.34	2.14	18.61	30.55	0.000	29.4
24	25.50	25.20	0.481	2.00	2.00	4.99	4.99	15.69	9.83	0.000	29.06
25*	25.20	24.27	1.367	0.56	2.00	36.60	8.42	26.45	153.47	0.000	29.06
26	24.27	23.96	0.095	2.75	3.02	4.80	4.33	44.18	52.13	0.000	29.34
27	25.91	25.90	0.005	0.46	0.67	2.84	1.70	1.56	13.29	0.000	29.99
28*	25.90	23.96	0.026	0.38	2.00	8.87	1.15	3.62	47.12	0.000	29.99
29	23.96	23.71	0.102	2.63	3.20	5.26	4.26	45.97	59.58	0.000	30.23
30*	25.24	23.85	0.067	0.50	1.30	9.45	2.72	5.87	42.20	0.000	29.32
31*	23.85	23.71	0.328	0.40	2.00	29.46	4.13	12.97	151.25	0.000	29.32
32	23.71	23.42	0.153	2.50	3.75	6.81	4.60	56.29	79.69	0.000	28.48
33*	24.56	24.25	0.490	0.93	2.00	11.02	5.04	15.84	35.74	0.000	28.52
34*	24.25	23.42	1.561	0.57	2.00	38.74	9.00	28.27	162.48	0.000	28.52
35	23.42	22.11	0.098	3.75	3.75	5.15	5.15	81.40	86.40	0.000	29
36	22.11	21.02	0.105	3.44	3.44	5.86	5.86	84.36	102.47	0.000	27.7
37*	21.02	20.55	0.137	2.11	5.00	12.25	4.91	96.43	260.48	0.000	26.3
38	20.55	18.28	0.189	5.00	5.00	5.76	5.76	113.16	86.32	0.000	25
39*	18.28	15.38	0.247	3.13	3.13	10.02	10.02	129.40	182.03	0.000	24
40*	14.10	4.85	0.308	1.85	1.85	21.88	21.88	144.59	495.10	0.000	19.5
21	26.14	26.10	0.110	1.35	1.55	5.05	4.25	13.62	24.09	0.000	29.73
22*	26.10	24.34	0.677	0.62	2.00	22.43	5.92	18.61	89.42	0.000	29.73

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-18B	0.95	1.41	15.51	15.51	9.68	0.000	12.965
DA-19A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-19B	0.85	0.78	10.00	10.00	11.66	0.000	7.729
DA-19C	0.85	0.81	10.00	10.00	11.66	0.000	8.027
DA-19D	0.85	0.41	10.00	10.00	11.66	0.000	4.063
DA-20A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-20B	0.95	0.78	10.00	10.00	11.66	0.000	8.639
DA-20C	0.95	0.81	10.00	10.00	11.66	0.000	8.971
DA-20D	0.95	0.41	10.00	10.00	11.66	0.000	4.541
DA-21A	0.85	0.39	10.00	10.00	11.66	0.000	3.865
DA-21B	0.85	0.92	10.00	10.00	11.66	0.000	9.117
DA-21C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-21D	0.55	1.56	10.00	10.00	11.66	0.000	10.003
DA-22A	0.55	0.40	12.93	12.93	10.49	0.000	2.309
DA-22B	0.95	0.92	14.45	14.45	9.99	0.000	8.735
DA-22C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-22D	0.95	1.56	10.00	10.00	11.66	0.000	17.277
DA-23A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-23B	0.95	1.67	10.00	10.00	11.66	0.000	18.496
DA-24A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-24B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-25A	0.95	2.82	17.79	17.79	9.08	0.000	24.312
DA-25B	0.9	3.86	19.11	19.11	8.77	0.000	30.451
DA-26A	0.55	1.38	10.00	10.00	11.66	0.000	8.849
DA-26B	0.4	1.38	10.00	10.00	11.66	0.000	6.435
DA-15B	0.95	1.05	14.75	14.75	9.90	0.000	9.878
DA-15C	0.95	1.59	15.85	15.85	9.58	0.000	14.474
DA-16A	0.55	0.25	10.00	10.00	11.66	0.000	1.603
DA-16B	0.55	1.05	10.00	10.00	11.66	0.000	6.733
DA-16C	0.55	1.59	10.00	10.00	11.66	0.000	10.195
DA-17A	0.95	1.15	10.00	10.00	11.66	0.000	12.737
DA-17B	0.95	1.41	10.00	10.00	11.66	0.000	15.616
DA-13A	0.95	0.96	14.52	14.52	9.97	0.000	9.095
DA-13B	0.95	0.67	13.80	13.80	10.20	0.000	6.493
DA-13C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-14A	0.95	0.55	13.44	13.44	10.32	0.000	5.392
DA-14B	0.95	1.07	10.00	10.00	11.66	0.000	11.850
DA-14C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-15A	0.95	0.25	10.00	10.00	11.66	0.000	2.769
DA-18A	0.55	1.15	14.97	14.97	9.84	0.000	6.222
DA-27A	0.95	4.03	19.31	19.31	8.72	0.000	33.388
DA-27B	0.95	3.46	15.00	15.00	9.83	0.000	32.303
DA-28A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-28B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-29A	0.95	3.30	10.00	10.00	11.66	0.000	36.548
DA-29B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-30A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-30B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-32A	0.55	1.18	10.00	10.00	11.66	0.000	7.566
DA-32B	0.55	0.95	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	13.50	13.50	10.30	0.000	57.536
DA-34	0.95	8.15	13.50	13.50	10.30	0.000	79.748
DA-35	0.95	1.90	10.00	10.00	11.66	0.000	21.043
DA-36	0.95	0.28	10.00	10.00	11.66	0.000	3.101
DA-39	0.95	2.32	17.06	17.06	9.26	0.000	20.405
DA-40	0.95	0.14	10.00	10.00	11.66	0.000	1.551
DA-41	0.95	0.31	12.58	12.58	10.62	0.000	3.127
DA-14BCr	0.95	2.26	16.97	16.97	9.28	0.000	19.927
DA-16BCr	0.55	2.64	17.54	17.54	9.14	0.000	13.267
DA-17ABr	0.95	2.56	17.42	17.42	9.17	0.000	22.294
DA-4019A	0.95	0.86	14.30	14.30	10.04	0.000	8.204
DA19BCDr	0.9	2.00	16.56	16.56	9.39	0.000	16.900
DA20ABCD	0.95	2.72	17.65	17.65	9.11	0.000	23.539
DA21ABr	0.85	1.31	15.31	15.31	9.74	0.000	10.841
DA-15A1r	0.95	0.13	11.64	11.64	10.97	0.000	1.303

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DA-15A2r0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-21CDr0.75	2.75	17.69	17.69	9.10	0.000	18.768
DA-22CDr0.95	2.75	17.69	17.69	9.10	0.000	23.773
DA23AB 0.55	3.05	18.10	18.10	9.00	0.000	15.097
DA27B29A0.55	6.76	22.06	22.06	8.16	0.000	30.333

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-4019A	Curb	0.950	3.18	17.15	9.24	0.000	0.00	27.901
DA19BCDr	Curb	0.929	4.72	17.79	9.07	0.000	0.00	39.783
DA20ABCD	Curb	0.950	2.72	17.65	9.11	0.000	0.00	23.539
DA-22A	Curb	0.550	0.40	12.93	10.49	0.000	0.00	2.309
DA-41	Curb	0.725	0.71	13.08	10.44	0.000	0.00	5.372
DA21ABr	Curb	0.891	2.23	15.31	9.74	0.000	0.00	19.351
DA-22B	Curb	0.950	0.92	14.45	9.99	0.000	0.00	8.735
DA-21CDr	Curb	0.850	5.50	17.78	9.08	0.000	0.00	42.443
DA-22CDr	Curb	0.950	2.75	17.69	9.10	0.000	0.00	23.773
MH-7	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A1r	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A2r	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-16BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-17ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-39	Curb	0.950	2.32	17.06	9.26	0.000	0.00	20.405
MH-8	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-9	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-10	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 2	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 3	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-11	CircMh	0.950	3.18	17.15	9.24	0.000	0.00	27.901
PCTee	Junct	0.937	7.90	18.16	8.98	0.000	0.00	66.532
MH-12	CircMh	0.920	8.61	19.05	8.78	0.000	0.00	69.529
PCTee2	Junct	0.914	10.84	19.80	8.61	0.000	0.00	85.333
MH-12A	CircMh	0.892	16.34	20.45	8.48	0.000	0.00	123.592
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.839	19.39	22.86	8.01	0.000	0.00	130.252
DA-25A	Grate	0.853	22.21	23.57	7.88	0.000	0.00	149.322
DA-25B	Grate	0.860	26.07	23.90	7.83	0.000	0.00	175.458
DA-27A	Grate	0.872	30.10	24.58	7.71	0.000	0.00	202.446
DA27B29A	Grate	0.813	36.86	25.54	7.56	0.000	0.00	226.518
OUT	outlt	0.813	36.86	25.54	7.56	0.000	0.00	226.518

Conveyance Configuration Data

Run#	Node	I.D.	Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
			US (ft)	DS (ft)						
23	MH-11	PCTee	21.51	21.31	Circ 1	0.00	3.50	217.00	0.09	0.013

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24	DA20ABCD A19BCD	22.52	22.40	Circ 1	0.00	2.00	63.63	0.19	0.013
25	DA19BCDPCTee	23.40	21.31	Circ 1	0.00	2.00	5.00	46.01	0.013
26	PCTee MH-12	21.31	20.94	Circ 1	0.00	4.00	281.00	0.13	0.013
27	DA-22A DA-41	25.33	25.23	Circ 1	0.00	2.00	29.00	0.34	0.013
28	DA-41 MH-12	25.23	20.94	Circ 1	0.00	2.00	99.00	4.34	0.013
29	MH-12 PCTee2	20.94	20.51	Circ 1	0.00	4.00	250.00	0.17	0.013
30	DA-22B DA21ABr	24.73	22.55	Circ 1	0.00	2.00	62.70	3.48	0.013
31	DA21ABrPCTee2	22.55	20.51	Circ 1	0.00	2.00	5.00	44.69	0.013
32	PCTee2 MH-12A	20.51	19.67	Circ 1	0.00	4.00	273.00	0.31	0.013
33	DA-22CDDA-21CD	22.98	21.42	Circ 1	0.00	2.00	62.55	2.49	0.013
34	DA-21CDMH-12A	22.42	19.67	Circ 1	0.00	2.00	6.00	51.57	0.013
35	MH-12A DA23AB	19.67	18.67	Circ 1	0.00	5.00	908.90	0.11	0.013
36	DA23AB DA-25A	18.67	18.23	Circ 1	0.00	5.00	284.30	0.15	0.013
37	DA-25A DA-25B	18.23	15.55	Circ 1	0.00	5.00	268.00	1.00	0.013
38	DA-25B DA-27A	15.55	15.15	Circ 1	0.00	5.00	364.20	0.11	0.013
39	DA-27A DA27B29	15.15	12.25	Circ 1	0.00	5.00	593.80	0.49	0.013
40	DA27B29DUT	12.25	3.00	Circ 1	0.00	5.00	256.20	3.61	0.013
21	DA-39 DA-4019	24.65	24.55	Circ 1	0.00	2.50	29.00	0.34	0.013
22	DA-4019MH-11	24.55	21.51	Circ 1	0.00	2.00	19.70	15.62	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
23	28.03	27.87	0.077	2.63	3.50	3.60	2.90	27.90	30.55	0.000	29.4
24	28.71	28.02	1.082	2.00	2.00	7.49	7.49	23.54	9.83	0.000	29.06
25*	28.02	27.87	3.092	0.69	2.00	41.05	12.66	39.78	153.47	0.000	29.06
26	27.87	27.27	0.214	4.00	4.00	5.29	5.29	66.53	52.13	0.000	29.34
27	27.32	27.32	0.010	0.56	2.00	3.19	0.73	2.31	13.29	0.000	29.99
28*	27.32	27.27	0.056	0.46	2.00	9.96	1.71	5.37	47.12	0.000	29.99
29	27.27	26.68	0.234	4.00	4.00	5.53	5.53	69.53	59.58	0.000	30.23
30*	26.81	26.72	0.149	0.62	2.00	10.60	2.78	8.74	42.20	0.000	29.32
31*	26.72	26.68	0.731	0.48	2.00	33.05	6.16	19.35	151.25	0.000	29.32
32	26.68	25.72	0.353	3.75	4.00	6.97	6.79	85.33	79.69	0.000	28.48
33*	26.62	25.93	1.104	1.19	2.00	12.18	7.57	23.77	35.74	0.000	28.52
34*	25.93	25.72	3.519	0.70	2.00	43.46	13.51	42.44	162.48	0.000	28.52
35	25.72	23.67	0.225	5.00	5.00	6.29	6.29	123.59	86.40	0.000	29
36	23.67	22.68	0.250	5.00	5.00	6.63	6.63	130.25	102.47	0.000	27.7
37*	22.68	21.80	0.329	2.71	5.00	13.71	7.60	149.32	260.48	0.000	26.3
38	21.80	20.15	0.454	5.00	5.00	8.94	8.94	175.46	86.32	0.000	25
39	20.15	16.31	0.604	5.00	5.00	10.31	10.31	202.45	182.03	0.000	24
40*	14.62	5.37	0.756	2.37	2.37	24.67	24.67	226.52	495.10	0.000	19.5
21	28.40	28.33	0.247	1.76	2.50	5.53	4.16	20.40	24.09	0.000	29.73
22*	28.33	28.03	1.521	0.77	2.00	25.18	8.88	27.90	89.42	0.000	29.73

=====END=====

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 1 FM518_East_B_Prop 100_t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : willowick - Cowart's Ck C-value = Existing Land Use
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years
 =====

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-17A	0.95	1.15	10.00	10.00	7.93	0.000	8.660
DA-17B	0.95	1.41	10.00	10.00	7.93	0.000	10.618
DA-13A	0.95	0.96	14.52	14.52	6.69	0.000	6.106
DA-13B	0.95	0.67	13.80	13.80	6.86	0.000	4.367
DA-13C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-14A	0.95	0.55	13.44	13.44	6.95	0.000	3.630
DA-14B	0.95	1.07	10.00	10.00	7.93	0.000	8.058
DA-14C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-15A	0.95	0.25	10.00	10.00	7.93	0.000	1.883
DA-18A	0.55	1.15	14.97	14.97	6.60	0.000	4.172
DA-18B	0.95	1.41	15.51	15.51	6.48	0.000	8.682
DA-19A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-19B	0.85	0.78	10.00	10.00	7.93	0.000	5.256
DA-19C	0.85	0.81	10.00	10.00	7.93	0.000	5.458
DA-19D	0.85	0.41	10.00	10.00	7.93	0.000	2.763
DA-20A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-20B	0.95	0.78	10.00	10.00	7.93	0.000	5.874
DA-20C	0.95	0.81	10.00	10.00	7.93	0.000	6.100
DA-20D	0.95	0.41	10.00	10.00	7.93	0.000	3.088
DA-21A	0.85	0.39	10.00	10.00	7.93	0.000	2.628
DA-21B	0.85	0.92	10.00	10.00	7.93	0.000	6.199
DA-21C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-21D	0.55	1.56	10.00	10.00	7.93	0.000	6.801
DA-22A	0.55	0.40	12.93	12.93	7.07	0.000	1.556
DA-22B	0.95	0.92	14.45	14.45	6.71	0.000	5.865
DA-22C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-22D	0.95	1.56	10.00	10.00	7.93	0.000	11.748
DA-23A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-23B	0.95	1.67	10.00	10.00	7.93	0.000	12.576
DA-24A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-24B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-25A	0.95	2.82	17.79	17.79	6.05	0.000	16.198
DA-25B	0.9	3.86	19.11	19.11	5.82	0.000	20.233
DA-26A	0.55	1.38	10.00	10.00	7.93	0.000	6.017
DA-26B	0.4	1.38	10.00	10.00	7.93	0.000	4.376
DA-15B	0.95	1.05	14.75	14.75	6.64	0.000	6.627
DA-15C	0.95	1.59	15.85	15.85	6.41	0.000	9.686
DA-16A	0.55	0.25	10.00	10.00	7.93	0.000	1.090
DA-16B	0.55	1.05	10.00	10.00	7.93	0.000	4.578
DA-16C	0.55	1.59	10.00	10.00	7.93	0.000	6.932
DA-27A	0.95	4.03	19.31	19.31	5.79	0.000	22.175
DA-27B	0.95	3.46	15.00	15.00	6.59	0.000	21.660
DA-28A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-28B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-29A	0.95	3.30	10.00	10.00	7.93	0.000	24.851
DA-29B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-30A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-30B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-32A	0.55	1.18	10.00	10.00	7.93	0.000	5.145
DA-32B	0.55	0.95	10.00	10.00	7.93	0.000	4.142

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DA-33	0.95	5.88	13.50	13.50	6.93	0.000	38.726
DA-34	0.95	8.15	13.50	13.50	6.93	0.000	53.676
DA-35	0.95	1.90	10.00	10.00	7.93	0.000	14.308
DA-36	0.95	0.28	10.00	10.00	7.93	0.000	2.109
DA-39	0.95	2.32	17.06	17.06	6.18	0.000	13.617
DA-40	0.95	0.14	10.00	10.00	7.93	0.000	1.054
DA-41	0.95	0.31	12.58	12.58	7.16	0.000	2.110
DA-14BCr	0.95	2.26	16.97	16.97	6.19	0.000	13.300
DA-16BCr	0.55	2.64	17.54	17.54	6.09	0.000	8.844
DA-17ABr	0.95	2.56	17.42	17.42	6.11	0.000	14.865
DA-4019A	0.95	0.86	14.30	14.30	6.74	0.000	5.510
DA19BCDr	0.9	2.00	16.56	16.56	6.27	0.000	11.290
DA20ABCD	0.95	2.72	17.65	17.65	6.07	0.000	15.688
DA21ABr	0.85	1.31	15.31	15.31	6.52	0.000	7.264
DA-15A1r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-15A2r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-21CDr	0.75	2.75	17.69	17.69	6.06	0.000	12.507
DA-22CDr	0.95	2.75	17.69	17.69	6.06	0.000	15.842
DA23AB	0.55	3.05	18.10	18.10	5.99	0.000	10.052
DA27B29A	0.55	6.76	22.06	22.06	5.39	0.000	20.041
A-71	0.55	0.10	10.00	10.00	7.93	0.000	0.436
A-72	0.55	0.10	10.00	10.00	7.93	0.000	0.436

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-4019A	Curb	0.950	3.18	17.16	6.16	0.000	0.00	18.608
DA19BCDr	Curb	0.929	4.72	17.86	6.03	0.000	0.00	26.452
DA20ABCD	Curb	0.950	2.72	17.65	6.07	0.000	0.00	15.688
DA-22A	Curb	0.550	0.40	12.93	7.07	0.000	0.00	1.556
DA-41	Curb	0.725	0.71	13.10	7.03	0.000	0.00	3.618
DA21ABr	Curb	0.891	2.23	15.31	6.52	0.000	0.00	12.966
DA-22B	Curb	0.950	0.92	14.45	6.71	0.000	0.00	5.865
DA-21CDr	Curb	0.850	5.50	17.78	6.05	0.000	0.00	28.271
DA-22CDr	Curb	0.950	2.75	17.69	6.06	0.000	0.00	15.842
MH-7	CircMh	0.950	2.81	17.05	6.18	0.000	0.00	16.497
DA-14A	Curb	0.950	2.81	17.05	6.18	0.000	0.00	16.497
DA-14BCr	Curb	0.950	2.26	16.97	6.19	0.000	0.00	13.300
DA-13A	Curb	0.950	0.96	14.52	6.69	0.000	0.00	6.106
DA-13B	Curb	0.950	1.63	14.61	6.68	0.000	0.00	10.338
DA-13C	Curb	0.950	6.82	18.75	5.88	0.000	0.00	38.113
DA-14C	Curb	0.950	1.19	15.06	6.58	0.000	0.00	7.435
DA-15A1r	Curb	0.950	0.13	11.64	7.42	0.000	0.00	0.881
DA-15A2r	Curb	0.950	0.25	11.97	7.33	0.000	0.00	1.741
DA-15B	Curb	0.950	2.64	15.95	6.39	0.000	0.00	16.029
DA-15C	Curb	0.950	1.59	15.85	6.41	0.000	0.00	9.686
DA-16BCr	Curb	0.550	2.64	17.54	6.09	0.000	0.00	8.844
DA-17ABr	Curb	0.863	17.47	22.65	5.31	0.000	0.00	80.105
DA-18A	Curb	0.770	2.56	15.55	6.47	0.000	0.00	12.765
DA-18B	Curb	0.950	1.41	15.51	6.48	0.000	0.00	8.682
DA-39	Curb	0.950	2.32	17.06	6.18	0.000	0.00	13.617
MH-8	CircMh	0.950	4.44	17.90	6.03	0.000	0.00	25.421
MH-9	CircMh	0.950	7.07	19.71	5.73	0.000	0.00	38.481
MH-10	CircMh	0.864	12.35	20.27	5.64	0.000	0.00	60.265
JB 2	JnctBx	0.864	12.35	20.27	5.64	0.000	0.00	60.265
JB 3	JnctBx	0.864	12.35	20.27	5.64	0.000	0.00	60.265
MH-11	CircMh	0.877	20.65	23.61	5.19	0.000	0.00	93.975
PCTee	Junct	0.886	25.37	24.32	5.11	0.000	0.00	114.795
MH-12	CircMh	0.882	26.08	25.12	5.01	0.000	0.00	115.287
PCTee2	Junct	0.883	28.31	25.76	4.94	0.000	0.00	123.491
MH-12A	CircMh	0.877	33.81	26.30	4.88	0.000	0.00	144.861
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000

ALT 1 East B.txt

MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA23AB	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-25A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-25B	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-27A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA27B29A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-71	JnctBx	0.876	33.91	26.30	4.88	0.000	0.00	0.000	0.00	145.130
A-72	JnctBx	0.875	34.01	26.30	4.88	0.000	0.00	0.000	0.00	145.398
OUT	outlt	0.875	34.01	26.30	4.88	0.000	0.00	0.000	0.00	145.398

Conveyance Configuration Data

Run#	Node	I.D.	Flowline Elev.		Shape	Span	Rise	Length	Slope	n_value
	US	DS	US	DS	#	(ft)	(ft)	(ft)	(%)	
			(ft)	(ft)						
1	DA-14B	DA-14A	24.30	24.20	Circ 1	0.00	2.00	25.30	0.40	0.013
2	DA-14A	MH-7	24.20	24.11	Circ 1	0.00	3.00	85.10	0.11	0.013
3	MH-7	MH-8	21.11	20.75	Circ 1	0.00	4.00	125.91	0.29	0.013
4	DA-13A	DA-13B	26.70	25.85	Circ 1	0.00	2.00	41.00	2.07	0.013
5	DA-13B	MH-8	25.85	25.75	Circ 1	0.00	2.00	24.00	0.42	0.013
6	MH-8	DA-13C	20.75	20.12	Circ 1	0.00	4.00	264.00	0.24	0.013
7	DA-14C	DA-13C	25.88	25.12	Circ 1	0.00	2.00	64.90	1.17	0.013
8	DA-13C	MH-9	20.12	19.62	Circ 1	0.00	4.00	291.00	0.17	0.013
21	DA-39	DA-4019	24.65	24.55	Circ 1	0.00	2.00	29.00	0.34	0.013
22	DA-4019	MH-11	24.55	21.51	Circ 1	0.00	6.00	19.70	15.62	0.013
23	MH-11	PCTee	19.51	19.31	Circ 1	0.00	6.00	217.00	0.09	0.013
9	DA-15A1	DA-15A2	25.60	25.50	Circ 1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2	MH-9	25.50	24.62	Circ 1	0.00	2.00	22.50	3.91	0.013
11	MH-9	MH-10	20.62	19.18	Circ 1	0.00	5.50	256.30	0.56	0.013
12	DA-15C	DA-15B	24.41	24.31	Circ 1	0.00	2.00	28.90	0.35	0.013
13	DA-15B	MH-10	24.31	23.18	Circ 1	0.00	2.00	22.00	5.14	0.013
14	DA-16B	MH-10	25.25	23.18	Circ 1	0.00	2.00	61.77	3.35	0.013
15	MH-10	JB 2	19.18	19.01	Circ 1	0.00	5.50	187.00	0.09	0.013
16	JB 2	JB 3	19.01	18.87	Circ 1	0.00	5.50	182.00	0.08	0.013
17	JB 3	DA-17AB	18.87	18.67	Circ 1	0.00	5.50	246.00	0.08	0.013
18	DA-18B	DA-18A	24.15	22.86	Circ 1	0.00	2.00	29.05	4.45	0.013
19	DA-18A	DA-17AB	22.86	22.67	Circ 1	0.00	2.50	87.14	0.22	0.013
20	DA-17AB	MH-11	22.67	21.51	Circ 1	0.00	6.00	414.00	0.28	0.013
24	DA20ABC	DA19BCD	24.52	24.40	Circ 1	0.00	2.00	63.63	0.19	0.013
25	DA19BCD	PCTee	24.40	21.31	Circ 1	0.00	2.00	5.00	78.61	0.013
26	PCTee	MH-12	19.31	18.94	Circ 1	0.00	6.00	281.00	0.13	0.013
27	DA-22A	DA-41	25.33	25.23	Circ 1	0.00	2.00	29.00	0.34	0.013
28	DA-41	MH-12	25.23	20.94	Circ 1	0.00	2.00	99.00	4.34	0.013
29	MH-12	PCTee2	18.94	18.51	Circ 1	0.00	6.00	250.00	0.17	0.013
30	DA-22B	DA21ABr	24.73	22.55	Circ 1	0.00	2.00	62.70	3.48	0.013
31	DA21ABr	PCTee2	22.55	20.51	Circ 1	0.00	2.00	5.00	44.69	0.013
32	PCTee2	MH-12A	18.51	17.67	Circ 1	0.00	6.00	273.00	0.31	0.013
33	DA-22C	DA-21CD	23.98	22.42	Circ 1	0.00	2.00	62.55	2.49	0.013
34	DA-21CD	MH-12A	22.42	19.67	Circ 1	0.00	2.00	6.00	51.57	0.013
35	MH-12A	A-71	17.67	17.50	Circ 1	0.00	6.00	360.00	0.05	0.013
36	A-71	A-72	17.50	16.00	Circ 1	0.00	6.00	1550.00	0.10	0.013
37	A-72	OUT	16.00	10.00	Circ 1	0.00	6.00	50.00	12.09	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1	26.24	26.17	0.346	1.53	1.97	5.15	4.25	13.30	14.22	0.000	30.48
2	26.17	25.69	0.061	1.97	1.97	3.35	3.35	16.50	21.69	0.000	30.48
3	25.69	25.67	0.013	1.25	4.00	4.92	1.31	16.50	76.82	0.000	31.27
4*	27.32	27.10	0.073	0.59	1.25	7.96	2.96	6.11	32.58	0.000	30.49
5	27.10	26.90	0.209	1.25	1.25	5.00	5.00	10.34	14.60	0.000	30.49
6	25.67	25.59	0.031	1.66	4.00	5.17	2.02	25.42	70.18	0.000	30.3

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7*	26.64	25.88	0.108	0.76	0.76	6.81	6.81	7.43	24.48	0.000	30.42
8	25.59	25.39	0.070	2.31	4.00	5.06	3.03	38.11	59.55	0.000	30.42
21	26.34	25.88	0.362	1.69	1.69	4.81	4.81	13.62	13.29	0.000	29.73
22*	25.15	24.26	0.002	0.44	2.75	19.66	1.47	18.61	1673.94	0.000	29.73
23	24.26	24.16	0.049	3.75	4.85	5.06	3.84	93.97	128.59	0.000	29.4
9	25.98	25.82	0.002	0.38	0.38	2.10	2.10	0.88	11.15	0.000	30.91
10*	25.78	25.39	0.006	0.27	0.77	6.88	1.58	1.74	44.76	0.000	30.91
11*	25.39	25.35	0.013	1.45	5.50	7.69	1.62	38.48	251.75	0.000	30.59
12	25.81	25.75	0.183	1.27	1.44	4.62	3.99	9.69	13.31	0.000	28.95
13*	25.75	25.35	0.502	0.77	2.00	14.44	5.10	16.03	51.31	0.000	28.95
14*	26.31	25.35	0.153	0.63	2.00	10.48	2.82	8.84	41.43	0.000	29.2
15	25.35	25.29	0.032	3.09	5.50	4.38	2.54	60.27	101.26	0.000	28.67
16	25.29	25.23	0.032	3.27	5.50	4.10	2.54	60.27	93.15	0.000	27.18
17	25.23	25.15	0.032	3.09	5.50	4.38	2.54	60.27	95.76	0.000	27.5
18*	25.27	25.22	0.147	0.58	2.00	11.53	2.76	8.68	47.70	0.000	29.24
19	25.22	25.15	0.097	1.48	2.48	4.20	2.60	12.76	19.16	0.000	29.24
20	25.15	24.26	0.036	2.48	2.75	7.24	6.34	80.11	224.21	0.000	29.49
24	26.52	26.20	0.481	2.00	2.00	4.99	4.99	15.69	9.83	0.000	29.06
25*	26.20	24.16	1.367	0.49	2.00	44.16	8.42	26.45	200.60	0.000	29.06
26	24.16	23.98	0.073	3.94	5.04	5.84	4.53	114.80	153.70	0.000	29.34
27	25.91	25.90	0.005	0.46	0.67	2.84	1.70	1.56	13.29	0.000	29.99
28*	25.90	23.98	0.026	0.38	2.00	8.87	1.15	3.62	47.12	0.000	29.99
29	23.98	23.83	0.074	3.56	5.32	6.59	4.35	115.29	175.66	0.000	30.23
30*	25.25	23.85	0.067	0.50	1.30	9.45	2.71	5.87	42.20	0.000	29.32
31*	23.85	23.83	0.328	0.40	2.00	29.46	4.13	12.97	151.25	0.000	29.32
32	23.83	23.67	0.085	3.09	6.00	8.40	4.37	123.49	234.95	0.000	28.48
33*	24.97	24.25	0.490	0.93	1.83	11.02	5.25	15.84	35.74	0.000	28.52
34*	24.25	23.67	1.561	0.57	2.00	38.74	9.00	28.27	162.48	0.000	28.52
35	23.67	22.75	0.117	6.00	6.00	5.12	5.12	144.86	92.04	0.000	29
36	22.75	19.27	0.117	5.25	5.25	5.53	5.53	145.13	131.77	0.000	27.7
37*	17.27	11.27	0.118	1.27	1.27	33.17	33.17	145.40	1472.60	0.000	26.3

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OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-17A	0.95	1.15	10.00	10.00	11.66	0.000	12.737
DA-17B	0.95	1.41	10.00	10.00	11.66	0.000	15.616
DA-13A	0.95	0.96	14.52	14.52	9.97	0.000	9.095
DA-13B	0.95	0.67	13.80	13.80	10.20	0.000	6.493
DA-13C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-14A	0.95	0.55	13.44	13.44	10.32	0.000	5.392
DA-14B	0.95	1.07	10.00	10.00	11.66	0.000	11.850
DA-14C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-15A	0.95	0.25	10.00	10.00	11.66	0.000	2.769
DA-18A	0.55	1.15	14.97	14.97	9.84	0.000	6.222
DA-18B	0.95	1.41	15.51	15.51	9.68	0.000	12.965
DA-19A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-19B	0.85	0.78	10.00	10.00	11.66	0.000	7.729
DA-19C	0.85	0.81	10.00	10.00	11.66	0.000	8.027
DA-19D	0.85	0.41	10.00	10.00	11.66	0.000	4.063
DA-20A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-20B	0.95	0.78	10.00	10.00	11.66	0.000	8.639
DA-20C	0.95	0.81	10.00	10.00	11.66	0.000	8.971
DA-20D	0.95	0.41	10.00	10.00	11.66	0.000	4.541
DA-21A	0.85	0.39	10.00	10.00	11.66	0.000	3.865
DA-21B	0.85	0.92	10.00	10.00	11.66	0.000	9.117
DA-21C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-21D	0.55	1.56	10.00	10.00	11.66	0.000	10.003
DA-22A	0.55	0.40	12.93	12.93	10.49	0.000	2.309
DA-22B	0.95	0.92	14.45	14.45	9.99	0.000	8.735
DA-22C	0.95	1.19	10.00	10.00	11.66	0.000	13.180

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DA-22D	0.95	1.56	10.00	10.00	11.66	0.000	17.277
DA-23A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-23B	0.95	1.67	10.00	10.00	11.66	0.000	18.496
DA-24A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-24B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-25A	0.95	2.82	17.79	17.79	9.08	0.000	24.312
DA-25B	0.9	3.86	19.11	19.11	8.77	0.000	30.451
DA-26A	0.55	1.38	10.00	10.00	11.66	0.000	8.849
DA-26B	0.4	1.38	10.00	10.00	11.66	0.000	6.435
DA-15B	0.95	1.05	14.75	14.75	9.90	0.000	9.878
DA-15C	0.95	1.59	15.85	15.85	9.58	0.000	14.474
DA-16A	0.55	0.25	10.00	10.00	11.66	0.000	1.603
DA-16B	0.55	1.05	10.00	10.00	11.66	0.000	6.733
DA-16C	0.55	1.59	10.00	10.00	11.66	0.000	10.195
DA-27A	0.95	4.03	19.31	19.31	8.72	0.000	33.388
DA-27B	0.95	3.46	15.00	15.00	9.83	0.000	32.303
DA-28A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-28B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-29A	0.95	3.30	10.00	10.00	11.66	0.000	36.548
DA-29B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-30A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-30B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-32A	0.55	1.18	10.00	10.00	11.66	0.000	7.566
DA-32B	0.55	0.95	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	13.50	13.50	10.30	0.000	57.536
DA-34	0.95	8.15	13.50	13.50	10.30	0.000	79.748
DA-35	0.95	1.90	10.00	10.00	11.66	0.000	21.043
DA-36	0.95	0.28	10.00	10.00	11.66	0.000	3.101
DA-39	0.95	2.32	17.06	17.06	9.26	0.000	20.405
DA-40	0.95	0.14	10.00	10.00	11.66	0.000	1.551
DA-41	0.95	0.31	12.58	12.58	10.62	0.000	3.127
DA-14BCr	0.95	2.26	16.97	16.97	9.28	0.000	19.927
DA-16BCr	0.55	2.64	17.54	17.54	9.14	0.000	13.267
DA-17ABr	0.95	2.56	17.42	17.42	9.17	0.000	22.294
DA-4019A	0.95	0.86	14.30	14.30	10.04	0.000	8.204
DA19BCDr	0.9	2.00	16.56	16.56	9.39	0.000	16.900
DA20ABCD	0.95	2.72	17.65	17.65	9.11	0.000	23.539
DA21ABr	0.85	1.31	15.31	15.31	9.74	0.000	10.841
DA-15A1r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-15A2r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-21CDr	0.75	2.75	17.69	17.69	9.10	0.000	18.768
DA-22CDr	0.95	2.75	17.69	17.69	9.10	0.000	23.773
DA23AB	0.55	3.05	18.10	18.10	9.00	0.000	15.097
DA27B29A	0.55	6.76	22.06	22.06	8.16	0.000	30.333
A-71	0.55	0.10	10.00	10.00	11.66	0.000	0.641
A-72	0.55	0.10	10.00	10.00	11.66	0.000	0.641

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-4019A	Curb	0.950	3.18	17.13	9.24	0.000	0.00	27.911
DA19BCDr	Curb	0.929	4.72	17.79	9.07	0.000	0.00	39.783
DA20ABCD	Curb	0.950	2.72	17.65	9.11	0.000	0.00	23.539
DA-22A	Curb	0.550	0.40	12.93	10.49	0.000	0.00	2.309
DA-41	Curb	0.725	0.71	13.08	10.44	0.000	0.00	5.372
DA21ABr	Curb	0.891	2.23	15.31	9.74	0.000	0.00	19.351
DA-22B	Curb	0.950	0.92	14.45	9.99	0.000	0.00	8.735
DA-21CDr	Curb	0.850	5.50	17.78	9.08	0.000	0.00	42.443
DA-22CDr	Curb	0.950	2.75	17.69	9.10	0.000	0.00	23.773
MH-7	CircMh	0.950	2.81	17.04	9.26	0.000	0.00	24.731
DA-14A	Curb	0.950	2.81	17.04	9.26	0.000	0.00	24.731
DA-14BCr	Curb	0.950	2.26	16.97	9.28	0.000	0.00	19.927
DA-13A	Curb	0.950	0.96	14.52	9.97	0.000	0.00	9.095
DA-13B	Curb	0.950	1.63	14.60	9.95	0.000	0.00	15.406
DA-13C	Curb	0.950	6.82	18.61	8.88	0.000	0.00	57.534

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DA-14C	Curb	0.950	1.19	15.06	9.81	0.000	0.00	11.090
DA-15A1r	Curb	0.950	0.13	11.64	10.97	0.000	0.00	1.303
DA-15A2r	Curb	0.950	0.25	11.93	10.86	0.000	0.00	2.579
DA-15B	Curb	0.950	2.64	15.95	9.55	0.000	0.00	23.962
DA-15C	Curb	0.950	1.59	15.85	9.58	0.000	0.00	14.474
DA-16BCr	Curb	0.550	2.64	17.54	9.14	0.000	0.00	13.267
DA-17ABr	Curb	0.863	17.47	22.27	8.12	0.000	0.00	122.448
DA-18A	Curb	0.770	2.56	15.55	9.67	0.000	0.00	19.065
DA-18B	Curb	0.950	1.41	15.51	9.68	0.000	0.00	12.965
DA-39	Curb	0.950	2.32	17.06	9.26	0.000	0.00	20.405
MH-8	CircMh	0.950	4.44	17.83	9.07	0.000	0.00	38.240
MH-9	CircMh	0.950	7.07	19.53	8.67	0.000	0.00	58.248
MH-10	CircMh	0.864	12.35	20.03	8.57	0.000	0.00	91.445
JB 2	JnctBx	0.864	12.35	20.03	8.57	0.000	0.00	91.445
JB 3	JnctBx	0.864	12.35	20.03	8.57	0.000	0.00	91.445
MH-11	CircMh	0.877	20.65	23.13	7.96	0.000	0.00	144.145
PCTee	Junct	0.886	25.37	23.82	7.84	0.000	0.00	176.346
MH-12	CircMh	0.882	26.08	24.57	7.72	0.000	0.00	177.483
PCTee2	Junct	0.883	28.31	25.15	7.62	0.000	0.00	190.481
MH-12A	CircMh	0.877	33.81	25.64	7.55	0.000	0.00	223.804
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-25A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-25B	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-27A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA27B29A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-71	JnctBx	0.876	33.91	25.64	7.55	0.000	0.00	224.219
A-72	JnctBx	0.875	34.01	25.64	7.55	0.000	0.00	224.634
OUT	Outlt	0.875	34.01	25.64	7.55	0.000	0.00	224.634

Conveyance Configuration Data

Run#	Node	I.D.	Flowline	Elev.	shape	#	Span	Rise	Length	Slope	n_value
	US	DS	US	DS			(ft)	(ft)	(ft)	(%)	
			(ft)	(ft)							
1	DA-14BC	DA-14A	24.30	24.20	Circ	1	0.00	2.00	25.30	0.40	0.013
2	DA-14A	MH-7	24.20	24.11	Circ	1	0.00	3.00	85.10	0.11	0.013
3	MH-7	MH-8	21.11	20.75	Circ	1	0.00	4.00	125.91	0.29	0.013
4	DA-13A	DA-13B	26.70	25.85	Circ	1	0.00	2.00	41.00	2.07	0.013
5	DA-13B	MH-8	25.85	25.75	Circ	1	0.00	2.00	24.00	0.42	0.013
6	MH-8	DA-13C	20.75	20.12	Circ	1	0.00	4.00	264.00	0.24	0.013
7	DA-14C	DA-13C	25.88	25.12	Circ	1	0.00	2.00	64.90	1.17	0.013
8	DA-13C	MH-9	20.12	19.62	Circ	1	0.00	4.00	291.00	0.17	0.013
21	DA-39	DA-4019	24.65	24.55	Circ	1	0.00	2.00	29.00	0.34	0.013
22	DA-4019	MH-11	24.55	21.51	Circ	1	0.00	6.00	19.70	15.62	0.013
23	MH-11	PCTee	19.51	19.31	Circ	1	0.00	6.00	217.00	0.09	0.013
9	DA-15A1	DA-15A2	25.60	25.50	Circ	1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2	MH-9	25.50	24.62	Circ	1	0.00	2.00	22.50	3.91	0.013
11	MH-9	MH-10	20.62	19.18	Circ	1	0.00	5.50	256.30	0.56	0.013
12	DA-15C	DA-15B	24.41	24.31	Circ	1	0.00	2.00	28.90	0.35	0.013
13	DA-15B	MH-10	24.31	23.18	Circ	1	0.00	2.00	22.00	5.14	0.013
14	DA-16BC	MH-10	25.25	23.18	Circ	1	0.00	2.00	61.77	3.35	0.013
15	MH-10	JB 2	19.18	19.01	Circ	1	0.00	5.50	187.00	0.09	0.013
16	JB 2	JB 3	19.01	18.87	Circ	1	0.00	5.50	182.00	0.08	0.013
17	JB 3	DA-17AB	18.87	18.67	Circ	1	0.00	5.50	246.00	0.08	0.013
18	DA-18B	DA-18A	24.15	22.86	Circ	1	0.00	2.00	29.05	4.45	0.013
19	DA-18A	DA-17AB	22.86	22.67	Circ	1	0.00	2.50	87.14	0.22	0.013
20	DA-17AB	MH-11	22.67	21.51	Circ	1	0.00	6.00	414.00	0.28	0.013
24	DA20ABC	DA19BCD	24.52	24.40	Circ	1	0.00	2.00	63.63	0.19	0.013
25	DA19BCD	PCTee	24.40	21.31	Circ	1	0.00	2.00	5.00	78.61	0.013
26	PCTee	MH-12	19.31	18.94	Circ	1	0.00	6.00	281.00	0.13	0.013
27	DA-22A	DA-41	25.33	25.23	Circ	1	0.00	2.00	29.00	0.34	0.013
28	DA-41	MH-12	25.23	20.94	Circ	1	0.00	2.00	99.00	4.34	0.013

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29	MH-12	PCTee2	18.94	18.51	Circ 1	0.00	6.00	250.00	0.17	0.013
30	DA-22B	DA21ABr	24.73	22.55	Circ 1	0.00	2.00	62.70	3.48	0.013
31	DA21ABr	PCTee2	22.55	20.51	Circ 1	0.00	2.00	5.00	44.69	0.013
32	PCTee2	MH-12A	18.51	17.67	Circ 1	0.00	6.00	273.00	0.31	0.013
33	DA-22CDDA	-21CD	23.98	22.42	Circ 1	0.00	2.00	62.55	2.49	0.013
34	DA-21CDMH	-12A	22.42	19.67	Circ 1	0.00	2.00	6.00	51.57	0.013
35	MH-12A	A-71	17.67	17.50	Circ 1	0.00	6.00	360.00	0.05	0.013
36	A-71	A-72	17.50	16.00	Circ 1	0.00	6.00	1550.00	0.10	0.013
37	A-72	OUT	16.00	10.00	Circ 1	0.00	6.00	50.00	12.09	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1	30.72	30.52	0.776	2.00	2.00	6.34	6.34	19.93	14.22	0.000	30.48
2	30.52	30.41	0.137	3.00	3.00	3.50	3.50	24.73	21.69	0.000	30.48
3	30.41	30.37	0.030	1.56	4.00	5.44	1.97	24.73	76.82	0.000	31.27
4*	30.55	30.48	0.162	0.72	2.00	8.89	2.90	9.10	32.58	0.000	30.49
5	30.48	30.37	0.464	1.75	2.00	5.29	4.90	15.41	14.60	0.000	30.49
6	30.37	30.18	0.071	2.13	4.00	5.64	3.04	38.24	70.18	0.000	30.3
7*	30.34	30.18	0.240	0.95	2.00	7.59	3.53	11.09	24.48	0.000	30.42
8	30.18	29.72	0.160	3.25	4.00	5.26	4.58	57.53	59.55	0.000	30.42
21	29.08	28.84	0.813	2.00	2.00	6.50	6.50	20.40	13.29	0.000	29.73
22*	28.84	28.84	0.004	0.54	6.00	22.16	0.99	27.91	1673.94	0.000	29.73
23	28.84	28.59	0.116	5.63	6.00	5.23	5.10	144.14	128.59	0.000	29.4
9	29.72	29.72	0.003	0.46	2.00	2.38	0.41	1.30	11.15	0.000	30.91
10*	29.72	29.72	0.013	0.33	2.00	7.77	0.82	2.58	44.76	0.000	30.91
11*	29.72	29.64	0.030	1.80	5.50	8.59	2.45	58.25	251.75	0.000	30.59
12	30.00	29.89	0.409	1.88	2.00	4.73	4.61	14.47	13.31	0.000	28.95
13*	29.89	29.64	1.122	0.96	2.00	16.05	7.63	23.96	51.31	0.000	28.95
14*	29.85	29.64	0.344	0.78	2.00	11.73	4.22	13.27	41.43	0.000	29.2
15	29.64	29.50	0.074	4.13	5.50	4.78	3.85	91.45	101.26	0.000	28.67
16	29.50	29.37	0.074	4.81	5.50	4.15	3.85	91.45	93.15	0.000	27.18
17	29.37	29.18	0.074	4.13	5.50	4.78	3.85	91.45	95.76	0.000	27.5
18*	29.47	29.37	0.328	0.71	2.00	12.91	4.13	12.96	47.70	0.000	29.24
19	29.37	29.18	0.216	2.03	2.50	4.46	3.88	19.07	19.16	0.000	29.24
20	29.18	28.84	0.084	3.19	6.00	8.02	4.33	122.45	224.21	0.000	29.49
24	29.43	28.74	1.082	2.00	2.00	7.49	7.49	23.54	9.83	0.000	29.06
25*	28.74	28.59	3.092	0.60	2.00	49.67	12.66	39.78	200.60	0.000	29.06
26	28.59	28.10	0.173	6.00	6.00	6.24	6.24	176.35	153.70	0.000	29.34
27	28.16	28.16	0.010	0.56	2.00	3.19	0.73	2.31	13.29	0.000	29.99
28*	28.16	28.10	0.056	0.46	2.00	9.96	1.71	5.37	47.12	0.000	29.99
29	28.10	27.66	0.176	4.88	6.00	7.21	6.28	177.48	175.66	0.000	30.23
30*	27.79	27.70	0.149	0.62	2.00	10.60	2.78	8.74	42.20	0.000	29.32
31*	27.70	27.66	0.731	0.48	2.00	33.05	6.16	19.35	151.25	0.000	29.32
32	27.66	27.11	0.202	4.13	6.00	9.19	6.74	190.48	234.95	0.000	28.48
33*	28.01	27.32	1.104	1.19	2.00	12.18	7.57	23.77	35.74	0.000	28.52
34*	27.32	27.11	3.519	0.70	2.00	43.46	13.51	42.44	162.48	0.000	28.52
35	27.11	26.11	0.279	6.00	6.00	7.92	7.92	223.80	92.04	0.000	29
36	26.11	20.10	0.280	6.00	6.00	7.93	7.93	224.22	131.77	0.000	27.7
37*	17.59	11.58	0.281	1.58	1.58	37.63	37.63	224.63	1472.60	0.000	26.3

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END
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* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 2 FM518 East_A_Prop_t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : willowick - Cowart's Ck C-value = Existing Land Use
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-21B	0.85	0.92	10.00	10.00	7.93	0.000	6.199
DA-21C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-21D	0.55	1.56	10.00	10.00	7.93	0.000	6.801
DA-22A	0.55	0.40	12.93	12.93	7.07	0.000	1.556
DA-22B	0.95	0.92	14.45	14.45	6.71	0.000	5.865
DA-22C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-22D	0.95	1.56	10.00	10.00	7.93	0.000	11.748
DA-23A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-23B	0.95	1.67	10.00	10.00	7.93	0.000	12.576
DA-24A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-24B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-25A	0.95	2.82	17.79	17.79	6.05	0.000	16.198
DA-25B	0.9	3.86	19.11	19.11	5.82	0.000	20.233
DA-26A	0.55	1.38	10.00	10.00	7.93	0.000	6.017
DA-26B	0.4	1.38	10.00	10.00	7.93	0.000	4.376
DA-15B	0.95	1.05	14.75	14.75	6.64	0.000	6.627
DA-15C	0.95	1.59	15.85	15.85	6.41	0.000	9.686
DA-16A	0.55	0.25	10.00	10.00	7.93	0.000	1.090
DA-16B	0.55	1.05	10.00	10.00	7.93	0.000	4.578
DA-16C	0.55	1.59	10.00	10.00	7.93	0.000	6.932
DA-17A	0.95	1.15	10.00	10.00	7.93	0.000	8.660
DA-17B	0.95	1.41	10.00	10.00	7.93	0.000	10.618
DA-13A	0.95	0.96	14.52	14.52	6.69	0.000	6.106
DA-13B	0.95	0.67	13.80	13.80	6.86	0.000	4.367
DA-13C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-14A	0.95	0.55	13.44	13.44	6.95	0.000	3.630
DA-14B	0.95	1.07	10.00	10.00	7.93	0.000	8.058
DA-14C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-15A	0.95	0.25	10.00	10.00	7.93	0.000	1.883
DA-18A	0.55	1.15	14.97	14.97	6.60	0.000	4.172
DA-18B	0.95	1.41	15.51	15.51	6.48	0.000	8.682
DA-19A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-19B	0.85	0.78	10.00	10.00	7.93	0.000	5.256
DA-19C	0.85	0.81	10.00	10.00	7.93	0.000	5.458
DA-19D	0.85	0.41	10.00	10.00	7.93	0.000	2.763
DA-20A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-20B	0.95	0.78	10.00	10.00	7.93	0.000	5.874
DA-20C	0.95	0.81	10.00	10.00	7.93	0.000	6.100
DA-20D	0.95	0.41	10.00	10.00	7.93	0.000	3.088
DA-21A	0.85	0.39	10.00	10.00	7.93	0.000	2.628
DA-27A	0.95	4.03	19.31	19.31	5.79	0.000	22.175
DA-27B	0.95	3.46	15.00	15.00	6.59	0.000	21.660
DA-28A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-28B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-29A	0.95	3.30	10.00	10.00	7.93	0.000	24.851
DA-29B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-30A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-30B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-32A	0.55	1.18	10.00	10.00	7.93	0.000	5.145
DA-32B	0.55	0.95	10.00	10.00	7.93	0.000	4.142

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DA-33	0.95	5.88	13.50	13.50	6.93	0.000	38.726
DA-34	0.95	8.15	13.50	13.50	6.93	0.000	53.676
DA-35	0.95	1.90	10.00	10.00	7.93	0.000	14.308
DA-36	0.95	0.28	10.00	10.00	7.93	0.000	2.109
DA-39	0.95	2.32	17.06	17.06	6.18	0.000	13.617
DA-40	0.95	0.14	10.00	10.00	7.93	0.000	1.054
DA-41	0.95	0.31	12.58	12.58	7.16	0.000	2.110
DA-14BCr	0.95	2.26	16.97	16.97	6.19	0.000	13.300
DA-16BCr	0.55	2.64	17.54	17.54	6.09	0.000	8.844
DA-17ABr	0.95	2.56	17.42	17.42	6.11	0.000	14.865
DA-4019A	0.95	0.86	14.30	14.30	6.74	0.000	5.510
DA19BCDr	0.9	2.00	16.56	16.56	6.27	0.000	11.290
DA20ABCD	0.95	2.72	17.65	17.65	6.07	0.000	15.688
DA21ABr	0.85	1.31	15.31	15.31	6.52	0.000	7.264
DA-15A1r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-15A2r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-21CDr	0.75	2.75	17.69	17.69	6.06	0.000	12.507
DA-22CDr	0.95	2.75	17.69	17.69	6.06	0.000	15.842
DA23AB	0.55	3.05	18.10	18.10	5.99	0.000	10.052
DA27B29A	0.55	6.76	22.06	22.06	5.39	0.000	20.041

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-16BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-17ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-39	Curb	0.950	2.32	17.06	6.18	0.000	0.00	13.617
DA-4019A	Curb	0.950	3.18	17.16	6.16	0.000	0.00	18.611
DA19BCDr	Curb	0.929	4.72	17.86	6.03	0.000	0.00	26.452
DA20ABCD	Curb	0.950	2.72	17.65	6.07	0.000	0.00	15.688
DA-22A	Curb	0.550	0.40	12.93	7.07	0.000	0.00	1.556
DA-41	Curb	0.725	0.71	13.10	7.03	0.000	0.00	3.618
DA21ABr	Curb	0.891	2.23	15.31	6.52	0.000	0.00	12.966
DA-22B	Curb	0.950	0.92	14.45	6.71	0.000	0.00	5.865
DA-21CDr	Curb	0.850	5.50	17.78	6.05	0.000	0.00	28.271
DA-22CDr	Curb	0.950	2.75	17.69	6.06	0.000	0.00	15.842
MH-7	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14BCr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A1r	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A2r	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15C	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-8	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-9	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-10	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 2	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 3	JnctBx	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-11	CircMh	0.950	3.18	17.16	6.16	0.000	0.00	18.611
PCTee	Junct	0.937	7.90	18.25	5.97	0.000	0.00	44.179
MH-12	CircMh	0.920	8.61	19.27	5.80	0.000	0.00	45.917
PCTee2	Junct	0.914	10.84	20.12	5.67	0.000	0.00	56.133
MH-12A	CircMh	0.892	16.34	20.80	5.57	0.000	0.00	81.158
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.839	19.39	23.15	5.25	0.000	0.00	85.340

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DA-25A	Grate	0.853	22.21	23.85	5.16	0.000	0.00	97.767
DA-25B	Grate	0.860	26.07	24.21	5.12	0.000	0.00	114.722
DA-27A	Grate	0.872	30.10	24.87	5.04	0.000	0.00	132.281
DA27B29A	Grate	0.813	36.86	25.98	4.92	0.000	0.00	147.338
OUT	Outlt	0.813	36.86	25.98	4.92	0.000	0.00	147.338

Conveyance Configuration Data

Run#	Node	I.D.	Flowline	Elev.	Shape	Span	Rise	Length	Slope	n_value
	US	DS	US	DS	#	(ft)	(ft)	(ft)	(%)	
			(ft)	(ft)						
22	DA-4019	MH-11	24.55	21.51	Circ 1	0.00	2.00	19.70	15.62	0.013
23	MH-11	PCTee	21.51	21.31	Circ 1	0.00	3.50	217.00	0.09	0.013
24	DA20AB	CDA19BCD	24.52	24.40	Circ 1	0.00	2.00	63.63	0.19	0.013
25	DA19BC	DPCTee	24.40	21.31	Circ 1	0.00	2.00	5.00	78.61	0.013
26	PCTee	MH-12	21.31	20.94	Circ 1	0.00	3.50	281.00	0.13	0.013
27	DA-22A	DA-41	25.33	25.23	Circ 1	0.00	2.00	29.00	0.34	0.013
28	DA-41	MH-12	25.23	20.94	Circ 1	0.00	2.00	99.00	4.34	0.013
29	MH-12	PCTee2	20.94	20.51	Circ 1	0.00	3.50	250.00	0.17	0.013
30	DA-22B	DA21ABr	24.73	22.55	Circ 1	0.00	2.00	62.70	3.48	0.013
31	DA21ABr	PCTee2	22.55	20.51	Circ 1	0.00	2.00	5.00	44.69	0.013
32	PCTee2	MH-12A	20.51	19.67	Circ 1	0.00	3.50	273.00	0.31	0.013
33	DA-22C	DDA-21CD	23.98	22.42	Circ 1	0.00	2.00	62.55	2.49	0.013
34	DA-21C	DMH-12A	22.42	19.67	Circ 1	0.00	2.00	6.00	51.57	0.013
35	MH-12A	DA23AB	19.67	18.67	Circ 1	0.00	4.00	908.90	0.11	0.013
36	DA23AB	DA-25A	18.67	18.23	Circ 1	0.00	4.00	284.30	0.15	0.013
37	DA-25A	DA-25B	18.23	15.55	Circ 1	0.00	4.00	268.00	1.00	0.013
38	DA-25B	DA-27A	15.55	15.15	Circ 1	0.00	4.00	364.20	0.11	0.013
39	DA-27A	DA27B29	15.15	12.75	Circ 1	0.00	4.50	593.80	0.40	0.013
40	DA27B29	OUT	12.75	3.00	Circ 1	0.00	4.50	256.20	3.81	0.013
21	DA-39	DA-4019	24.65	24.55	Circ 1	0.00	2.50	29.00	0.34	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
22*	29.07	28.93	0.677	0.62	2.00	22.43	5.92	18.61	89.42	0.000	29.4
23	28.93	28.86	0.034	1.97	3.50	3.34	1.93	18.61	30.55	0.000	29.73
24	29.23	28.93	0.481	2.00	2.00	4.99	4.99	15.69	9.83	0.000	29.06
25*	28.93	28.86	1.367	0.49	2.00	44.16	8.42	26.45	200.60	0.000	29.06
26	28.86	28.32	0.193	3.50	3.50	4.59	4.59	44.18	36.51	0.000	29.34
27	28.34	28.34	0.005	0.46	2.00	2.84	0.50	1.56	13.29	0.000	29.99
28*	28.34	28.32	0.026	0.38	2.00	8.87	1.15	3.62	47.12	0.000	29.99
29	28.32	27.80	0.208	3.28	3.50	4.90	4.77	45.92	41.73	0.000	29.23
30*	27.85	27.81	0.067	0.50	2.00	9.45	1.87	5.87	42.20	0.000	29.32
31*	27.81	27.80	0.328	0.40	2.00	29.46	4.13	12.97	151.25	0.000	28.32
32	27.80	26.95	0.311	2.84	3.50	6.70	5.83	56.13	55.82	0.000	28.48
33*	27.35	27.04	0.490	0.93	2.00	11.02	5.04	15.84	35.74	0.000	28.52
34*	27.04	26.95	1.561	0.57	2.00	38.74	9.00	28.27	162.48	0.000	28.52
35	26.95	24.05	0.319	4.00	4.00	6.46	6.46	81.16	47.65	0.000	29
36	24.05	23.04	0.353	4.00	4.00	6.79	6.79	85.34	56.52	0.000	27.7
37*	23.04	21.80	0.463	2.42	4.00	12.29	7.78	97.77	143.67	0.000	26.3
38	21.80	19.09	0.638	4.00	4.00	9.13	9.13	114.72	47.61	0.000	25
39	19.09	16.13	0.452	3.94	3.94	8.96	8.96	132.28	125.04	0.000	24
40*	14.68	4.93	0.561	1.93	1.93	22.55	22.55	147.34	383.81	0.000	19.5
21	29.10	29.07	0.110	1.35	2.50	5.05	2.77	13.62	24.09	0.000	29.73

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-21B	0.85	0.92	10.00	10.00	11.66	0.000	9.117
DA-21C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-21D	0.55	1.56	10.00	10.00	11.66	0.000	10.003
DA-22A	0.55	0.40	12.93	12.93	10.49	0.000	2.309
DA-22B	0.95	0.92	14.45	14.45	9.99	0.000	8.735
DA-22C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-22D	0.95	1.56	10.00	10.00	11.66	0.000	17.277
DA-23A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-23B	0.95	1.67	10.00	10.00	11.66	0.000	18.496
DA-24A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-24B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-25A	0.95	2.82	17.79	17.79	9.08	0.000	24.312
DA-25B	0.9	3.86	19.11	19.11	8.77	0.000	30.451
DA-26A	0.55	1.38	10.00	10.00	11.66	0.000	8.849
DA-26B	0.4	1.38	10.00	10.00	11.66	0.000	6.435
DA-15B	0.95	1.05	14.75	14.75	9.90	0.000	9.878
DA-15C	0.95	1.59	15.85	15.85	9.58	0.000	14.474
DA-16A	0.55	0.25	10.00	10.00	11.66	0.000	1.603
DA-16B	0.55	1.05	10.00	10.00	11.66	0.000	6.733
DA-16C	0.55	1.59	10.00	10.00	11.66	0.000	10.195
DA-17A	0.95	1.15	10.00	10.00	11.66	0.000	12.737
DA-17B	0.95	1.41	10.00	10.00	11.66	0.000	15.616
DA-13A	0.95	0.96	14.52	14.52	9.97	0.000	9.095
DA-13B	0.95	0.67	13.80	13.80	10.20	0.000	6.493
DA-13C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-14A	0.95	0.55	13.44	13.44	10.32	0.000	5.392
DA-14B	0.95	1.07	10.00	10.00	11.66	0.000	11.850
DA-14C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-15A	0.95	0.25	10.00	10.00	11.66	0.000	2.769
DA-18A	0.55	1.15	14.97	14.97	9.84	0.000	6.222
DA-18B	0.95	1.41	15.51	15.51	9.68	0.000	12.965
DA-19A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-19B	0.85	0.78	10.00	10.00	11.66	0.000	7.729
DA-19C	0.85	0.81	10.00	10.00	11.66	0.000	8.027
DA-19D	0.85	0.41	10.00	10.00	11.66	0.000	4.063
DA-20A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-20B	0.95	0.78	10.00	10.00	11.66	0.000	8.639
DA-20C	0.95	0.81	10.00	10.00	11.66	0.000	8.971
DA-20D	0.95	0.41	10.00	10.00	11.66	0.000	4.541
DA-21A	0.85	0.39	10.00	10.00	11.66	0.000	3.865
DA-27A	0.95	4.03	19.31	19.31	8.72	0.000	33.388
DA-27B	0.95	3.46	15.00	15.00	9.83	0.000	32.303
DA-28A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-28B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-29A	0.95	3.30	10.00	10.00	11.66	0.000	36.548
DA-29B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-30A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-30B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-32A	0.55	1.18	10.00	10.00	11.66	0.000	7.566
DA-32B	0.55	0.95	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	13.50	13.50	10.30	0.000	57.536
DA-34	0.95	8.15	13.50	13.50	10.30	0.000	79.748
DA-35	0.95	1.90	10.00	10.00	11.66	0.000	21.043
DA-36	0.95	0.28	10.00	10.00	11.66	0.000	3.101
DA-39	0.95	2.32	17.06	17.06	9.26	0.000	20.405
DA-40	0.95	0.14	10.00	10.00	11.66	0.000	1.551
DA-41	0.95	0.31	12.58	12.58	10.62	0.000	3.127
DA-14BCr	0.95	2.26	16.97	16.97	9.28	0.000	19.927
DA-16BCr	0.55	2.64	17.54	17.54	9.14	0.000	13.267
DA-17ABr	0.95	2.56	17.42	17.42	9.17	0.000	22.294
DA-4019A	0.95	0.86	14.30	14.30	10.04	0.000	8.204
DA19BCDr	0.9	2.00	16.56	16.56	9.39	0.000	16.900
DA20ABCD	0.95	2.72	17.65	17.65	9.11	0.000	23.539
DA21ABr	0.85	1.31	15.31	15.31	9.74	0.000	10.841

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DA-15A1r0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-15A2r0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-21CDr0.75	2.75	17.69	17.69	9.10	0.000	18.768
DA-22CDr0.95	2.75	17.69	17.69	9.10	0.000	23.773
DA23AB 0.55	3.05	18.10	18.10	9.00	0.000	15.097
DA27B29A0.55	6.76	22.06	22.06	8.16	0.000	30.333

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-16BCrCurb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-17ABrCurb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18A Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-18B Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-39 Curb		0.950	2.32	17.06	9.26	0.000	0.00	20.405
DA-4019ACurb		0.950	3.18	17.15	9.24	0.000	0.00	27.901
DA19BCDrCurb		0.929	4.72	17.79	9.07	0.000	0.00	39.783
DA20ABCDcurb		0.950	2.72	17.65	9.11	0.000	0.00	23.539
DA-22A Curb		0.550	0.40	12.93	10.49	0.000	0.00	2.309
DA-41 Curb		0.725	0.71	13.08	10.44	0.000	0.00	5.372
DA21ABr Curb		0.891	2.23	15.31	9.74	0.000	0.00	19.351
DA-22B Curb		0.950	0.92	14.45	9.99	0.000	0.00	8.735
DA-21CDrCurb		0.850	5.50	17.78	9.08	0.000	0.00	42.443
DA-22CDrCurb		0.950	2.75	17.69	9.10	0.000	0.00	23.773
MH-7 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14A Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14BCrCurb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13A Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13B Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-13C Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-14C Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A1rCurb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15A2rCurb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15B Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-15C Curb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-8 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-9 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-10 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 2 JnctBx		0.000	0.00	0.00	0.00	0.000	0.00	0.000
JB 3 JnctBx		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-11 CircMh		0.950	3.18	17.15	9.24	0.000	0.00	27.901
PCTee Junct		0.937	7.90	18.16	8.98	0.000	0.00	66.532
MH-12 CircMh		0.920	8.61	18.84	8.83	0.000	0.00	69.902
PCTee2 Junct		0.914	10.84	19.41	8.70	0.000	0.00	86.169
MH-12A CircMh		0.892	16.34	19.92	8.59	0.000	0.00	125.222
MH-13 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16 CircMh		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB Grate		0.839	19.39	21.44	8.28	0.000	0.00	134.578
DA-25A Grate		0.853	22.21	21.89	8.19	0.000	0.00	155.136
DA-25B Grate		0.860	26.07	22.24	8.13	0.000	0.00	182.105
DA-27A Grate		0.872	30.10	22.66	8.05	0.000	0.00	211.184
DA27B29AGrate		0.813	36.86	23.40	7.91	0.000	0.00	237.117
OUT outlt		0.813	36.86	23.40	7.91	0.000	0.00	237.117

Conveyance Configuration Data

Run#	Node I.D.	Flowline Elev.	Shape #	Span	Rise	Length	slope	n_value
	US DS	US DS						

		(ft)	(ft)	ALT 2 East A.txt		(ft)	(ft)	(ft)	(%)
22	DA-4019MH-11	24.55	21.51	Circ 1	0.00	2.00	19.70	15.62	0.013
23	MH-11 PCTee	21.51	21.31	Circ 1	0.00	3.50	217.00	0.09	0.013
24	DA20ABCD A19BCD	24.52	24.40	Circ 1	0.00	2.00	63.63	0.19	0.013
25	DA19BCDPCTee	24.40	21.31	Circ 1	0.00	2.00	5.00	78.61	0.013
26	PCTee MH-12	21.31	20.94	Circ 1	0.00	3.50	281.00	0.13	0.013
27	DA-22A DA-41	25.33	25.23	Circ 1	0.00	2.00	29.00	0.34	0.013
28	DA-41 MH-12	25.23	20.94	Circ 1	0.00	2.00	99.00	4.34	0.013
29	MH-12 PCTee2	20.94	20.51	Circ 1	0.00	3.50	250.00	0.17	0.013
30	DA-22B DA21ABr	24.73	22.55	Circ 1	0.00	2.00	62.70	3.48	0.013
31	DA21ABrPCTee2	22.55	20.51	Circ 1	0.00	2.00	5.00	44.69	0.013
32	PCTee2 MH-12A	20.51	19.67	Circ 1	0.00	3.50	273.00	0.31	0.013
33	DA-22CDDA-21CD	23.98	22.42	Circ 1	0.00	2.00	62.55	2.49	0.013
34	DA-21CDMH-12A	22.42	19.67	Circ 1	0.00	2.00	6.00	51.57	0.013
35	MH-12A DA23AB	19.67	18.67	Circ 1	0.00	4.00	908.90	0.11	0.013
36	DA23AB DA-25A	18.67	18.23	Circ 1	0.00	4.00	284.30	0.15	0.013
37	DA-25A DA-25B	18.23	15.55	Circ 1	0.00	4.00	268.00	1.00	0.013
38	DA-25B DA-27A	15.55	15.15	Circ 1	0.00	4.00	364.20	0.11	0.013
39	DA-27A DA27B29	15.15	12.75	Circ 1	0.00	4.50	593.80	0.40	0.013
40	DA27B29OUT	12.75	3.00	Circ 1	0.00	4.50	256.20	3.81	0.013
21	DA-39 DA-4019	24.65	24.55	Circ 1	0.00	2.50	29.00	0.34	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
22*	49.51	49.21	1.521	0.77	2.00	25.18	8.88	27.90	89.42	0.000	29.4
23	49.21	49.05	0.077	2.63	3.50	3.60	2.90	27.90	30.55	0.000	29.73
24	49.89	49.20	1.082	2.00	2.00	7.49	7.49	23.54	9.83	0.000	29.06
25*	49.20	49.05	3.092	0.60	2.00	49.67	12.66	39.78	200.60	0.000	29.06
26	49.05	47.82	0.437	3.50	3.50	6.92	6.92	66.53	36.51	0.000	29.34
27	47.88	47.87	0.010	0.56	2.00	3.19	0.73	2.31	13.29	0.000	29.99
28*	47.87	47.82	0.056	0.46	2.00	9.96	1.71	5.37	47.12	0.000	29.99
29	47.82	46.61	0.483	3.50	3.50	7.27	7.27	69.90	41.73	0.000	29.23
30*	46.74	46.65	0.149	0.62	2.00	10.60	2.78	8.74	42.20	0.000	29.32
31*	46.65	46.61	0.731	0.48	2.00	33.05	6.16	19.35	151.25	0.000	28.32
32	46.61	44.61	0.733	3.50	3.50	8.96	8.96	86.17	55.82	0.000	28.48
33*	45.51	44.82	1.104	1.19	2.00	12.18	7.57	23.77	35.74	0.000	28.52
34*	44.82	44.61	3.519	0.70	2.00	43.46	13.51	42.44	162.48	0.000	28.52
35	44.61	37.71	0.760	4.00	4.00	9.96	9.96	125.22	47.65	0.000	29
36	37.71	35.21	0.878	4.00	4.00	10.71	10.71	134.58	56.52	0.000	27.7
37	35.21	32.09	1.166	3.75	4.00	12.68	12.35	155.14	143.67	0.000	26.3
38	32.09	26.23	1.607	4.00	4.00	14.49	14.49	182.10	47.61	0.000	25
39	26.23	16.86	1.153	4.50	4.50	13.28	13.28	211.18	125.04	0.000	24
40*	15.31	5.56	1.454	2.56	2.56	25.41	25.41	237.12	383.81	0.000	19.5
21	49.58	49.51	0.247	1.76	2.50	5.53	4.16	20.40	24.09	0.000	29.73

END

* super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 2 FM518 East_B_Prop_t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : willowick - Cowart's Ck C-value = Existing Land Use
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-15B	0.95	1.05	14.75	14.75	6.64	0.000	6.627
DA-15C	0.95	1.59	15.85	15.85	6.41	0.000	9.686
DA-16A	0.55	0.25	10.00	10.00	7.93	0.000	1.090
DA-16B	0.55	1.05	10.00	10.00	7.93	0.000	4.578
DA-16C	0.55	1.59	10.00	10.00	7.93	0.000	6.932
DA-17A	0.95	1.15	10.00	10.00	7.93	0.000	8.660
DA-17B	0.95	1.41	10.00	10.00	7.93	0.000	10.618
DA-13A	0.95	0.96	14.52	14.52	6.69	0.000	6.106
DA-13B	0.95	0.67	13.80	13.80	6.86	0.000	4.367
DA-13C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-14A	0.95	0.55	13.44	13.44	6.95	0.000	3.630
DA-14B	0.95	1.07	10.00	10.00	7.93	0.000	8.058
DA-14C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-15A	0.95	0.25	10.00	10.00	7.93	0.000	1.883
DA-18A	0.55	1.15	14.97	14.97	6.60	0.000	4.172
DA-18B	0.95	1.41	15.51	15.51	6.48	0.000	8.682
DA-19A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-19B	0.85	0.78	10.00	10.00	7.93	0.000	5.256
DA-19C	0.85	0.81	10.00	10.00	7.93	0.000	5.458
DA-19D	0.85	0.41	10.00	10.00	7.93	0.000	2.763
DA-20A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-20B	0.95	0.78	10.00	10.00	7.93	0.000	5.874
DA-20C	0.95	0.81	10.00	10.00	7.93	0.000	6.100
DA-20D	0.95	0.41	10.00	10.00	7.93	0.000	3.088
DA-21A	0.85	0.39	10.00	10.00	7.93	0.000	2.628
DA-21B	0.85	0.92	10.00	10.00	7.93	0.000	6.199
DA-21C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-21D	0.55	1.56	10.00	10.00	7.93	0.000	6.801
DA-22A	0.55	0.40	12.93	12.93	7.07	0.000	1.556
DA-22B	0.95	0.92	14.45	14.45	6.71	0.000	5.865
DA-22C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-22D	0.95	1.56	10.00	10.00	7.93	0.000	11.748
DA-23A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-23B	0.95	1.67	10.00	10.00	7.93	0.000	12.576
DA-24A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-24B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-25A	0.95	2.82	17.79	17.79	6.05	0.000	16.198
DA-25B	0.9	3.86	19.11	19.11	5.82	0.000	20.233
DA-26A	0.55	1.38	10.00	10.00	7.93	0.000	6.017
DA-26B	0.4	1.38	10.00	10.00	7.93	0.000	4.376
DA-27A	0.95	4.03	19.31	19.31	5.79	0.000	22.175
DA-27B	0.95	3.46	15.00	15.00	6.59	0.000	21.660
DA-28A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-28B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-29A	0.95	3.30	10.00	10.00	7.93	0.000	24.851
DA-29B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-30A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-30B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-32A	0.55	1.18	10.00	10.00	7.93	0.000	5.145
DA-32B	0.55	0.95	10.00	10.00	7.93	0.000	4.142

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DA-33	0.95	5.88	13.50	13.50	6.93	0.000	38.726
DA-34	0.95	8.15	13.50	13.50	6.93	0.000	53.676
DA-35	0.95	1.90	10.00	10.00	7.93	0.000	14.308
DA-36	0.95	0.28	10.00	10.00	7.93	0.000	2.109
DA-39	0.95	2.32	17.06	17.06	6.18	0.000	13.617
DA-40	0.95	0.14	10.00	10.00	7.93	0.000	1.054
DA-41	0.95	0.31	12.58	12.58	7.16	0.000	2.110
DA-14BCr	0.95	2.26	16.97	16.97	6.19	0.000	13.300
DA-16BCr	0.55	2.64	17.54	17.54	6.09	0.000	8.844
DA-17ABr	0.95	2.56	17.42	17.42	6.11	0.000	14.865
DA-4019A	0.95	0.86	14.30	14.30	6.74	0.000	5.510
DA19BCDr	0.9	2.00	16.56	16.56	6.27	0.000	11.290
DA20ABCD	0.95	2.72	17.65	17.65	6.07	0.000	15.688
DA21ABr	0.85	1.31	15.31	15.31	6.52	0.000	7.264
DA-15A1r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-15A2r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-21CDr	0.75	2.75	17.69	17.69	6.06	0.000	12.507
DA-22CDr	0.95	2.75	17.69	17.69	6.06	0.000	15.842
DA23AB	0.55	3.05	18.10	18.10	5.99	0.000	10.052
DA27B29A	0.55	6.76	22.06	22.06	5.39	0.000	20.041
A-71	0.55	0.11	10.00	10.00	7.93	0.000	0.480
A-72	0.55	0.10	10.00	10.00	7.93	0.000	0.436

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
MH-8	CircMh	0.950	4.44	17.74	6.05	0.000	0.00	25.537
MH-9	CircMh	0.950	7.07	19.60	5.75	0.000	0.00	38.600
MH-10	CircMh	0.864	12.35	20.14	5.66	0.000	0.00	60.469
JB 2	JnctBx	0.864	12.35	20.14	5.66	0.000	0.00	60.469
JB 3	JnctBx	0.864	12.35	20.14	5.66	0.000	0.00	60.469
MH-11	CircMh	0.863	17.47	21.77	5.43	0.000	0.00	81.881
PCTee	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-12	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
PCTee2	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-12A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-4019A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA19BCDr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA20ABCD	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-22A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-41	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA21ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-22B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-21CDr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-22CDr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-7	CircMh	0.950	2.81	17.05	6.18	0.000	0.00	16.497
DA-14A	Curb	0.950	2.81	17.05	6.18	0.000	0.00	16.497
DA-14BCr	Curb	0.950	2.26	16.97	6.19	0.000	0.00	13.300
DA-13A	Curb	0.950	0.96	14.52	6.69	0.000	0.00	6.106
DA-13B	Curb	0.950	1.63	14.61	6.68	0.000	0.00	10.338
DA-13C	Curb	0.950	6.82	18.61	5.91	0.000	0.00	38.260
DA-14C	Curb	0.950	1.19	15.06	6.58	0.000	0.00	7.435
DA-15A1r	Curb	0.950	0.13	11.64	7.42	0.000	0.00	0.881
DA-15A2r	Curb	0.950	0.25	11.97	7.33	0.000	0.00	1.741
DA-15B	Curb	0.950	2.64	15.95	6.39	0.000	0.00	16.029
DA-15C	Curb	0.950	1.59	15.85	6.41	0.000	0.00	9.686
DA-16BCr	Curb	0.550	2.64	17.54	6.09	0.000	0.00	8.844
DA-17ABr	Curb	0.863	17.47	21.77	5.43	0.000	0.00	81.881
DA-18A	Curb	0.770	2.56	15.55	6.47	0.000	0.00	12.765
DA-18B	Curb	0.950	1.41	15.51	6.48	0.000	0.00	8.682

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DA-39	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA23AB	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-25A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-25B	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA-27A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
DA27B29A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-71	JnctBx	0.861	17.58	21.77	5.43	0.000	0.00	82.209	0.00	82.508
A-72	JnctBx	0.860	17.68	21.77	5.43	0.000	0.00	82.508	0.00	82.508
OUT	Outlt	0.860	17.68	21.77	5.43	0.000	0.00	82.508	0.00	82.508

Conveyance Configuration Data

Run#	Node	I.D.	Flowline Elev.		Shape #	Span	Rise	Length	Slope	n_value
	US	DS	US (ft)	DS (ft)		(ft)	(ft)	(ft)	(%)	
11	MH-9	MH-10	24.62	23.18	circ 1	0.00	3.50	256.30	0.56	0.013
12	DA-15C	DA-15B	24.41	24.31	circ 1	0.00	2.00	28.90	0.35	0.013
13	DA-15B	MH-10	24.31	23.18	circ 1	0.00	2.00	22.00	5.14	0.013
14	DA-16B	CMH-10	25.25	23.18	circ 1	0.00	2.00	61.77	3.35	0.013
15	MH-10	JB 2	23.18	23.01	circ 1	0.00	3.50	187.00	0.09	0.013
16	JB 2	JB 3	23.01	22.87	circ 1	0.00	3.50	182.00	0.08	0.013
17	JB 3	DA-17AB	22.87	22.67	circ 1	0.00	3.50	246.00	0.08	0.013
18	DA-18B	DA-18A	24.15	22.86	circ 1	0.00	2.00	29.05	4.45	0.013
19	DA-18A	DA-17AB	22.86	22.67	circ 1	0.00	2.50	87.14	0.22	0.013
20	DA-17AB	BMH-11	22.67	21.51	circ 1	0.00	5.00	414.00	0.28	0.013
1	DA-14BC	DA-14A	26.30	26.20	circ 1	0.00	2.00	25.30	0.40	0.013
2	DA-14A	MH-7	26.20	26.11	circ 1	0.00	2.00	85.10	0.11	0.013
3	MH-7	MH-8	26.11	25.75	circ 1	0.00	3.00	125.91	0.29	0.013
4	DA-13A	DA-13B	26.70	25.85	circ 1	0.00	2.00	41.00	2.07	0.013
5	DA-13B	MH-8	25.85	25.75	circ 1	0.00	2.00	24.00	0.42	0.013
6	MH-8	DA-13C	25.75	25.12	circ 1	0.00	3.00	264.00	0.24	0.013
7	DA-14C	DA-13C	25.88	25.12	circ 1	0.00	2.00	64.90	1.17	0.013
8	DA-13C	MH-9	25.12	24.62	circ 1	0.00	3.50	291.00	0.17	0.013
21	MH-11	A-71	21.51	18.50	circ 1	0.00	5.00	1650.00	0.18	0.013
22	A-71	A-72	18.50	16.00	circ 1	0.00	5.00	900.00	0.28	0.013
23	A-72	OUT	16.00	4.00	circ 1	0.00	5.00	900.00	1.33	0.013
9	DA-15A1	DA-15A2	25.60	25.50	circ 1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2	MH-9	25.50	24.62	circ 1	0.00	2.00	22.50	3.91	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
11*	28.26	27.88	0.147	1.78	3.50	7.87	4.01	38.60	75.42	0.000	30.59
12	28.04	27.99	0.183	1.27	2.00	4.62	3.08	9.69	13.31	0.000	28.95
13*	27.99	27.88	0.502	0.77	2.00	14.44	5.10	16.03	51.31	0.000	28.95
14*	27.98	27.88	0.153	0.63	2.00	10.48	2.82	8.84	41.43	0.000	29.2
15	27.88	27.21	0.361	3.50	3.50	6.28	6.28	60.47	30.34	0.000	28.67
16	27.21	26.55	0.361	3.50	3.50	6.28	6.28	60.47	27.91	0.000	27.18
17	26.55	25.46	0.361	3.50	3.50	6.28	6.28	60.47	28.69	0.000	27.5
18*	25.59	25.55	0.147	0.58	2.00	11.53	2.76	8.68	47.70	0.000	29.24
19	25.55	25.46	0.097	1.48	2.50	4.20	2.60	12.76	19.16	0.000	29.24
20	25.46	24.71	0.099	2.77	3.20	7.32	6.16	81.88	137.88	0.000	29.49
1	29.68	29.59	0.346	1.53	2.00	5.15	4.23	13.30	14.22	0.000	30.48
2	29.59	29.14	0.532	2.00	2.00	5.25	5.25	16.50	7.36	0.000	30.48
3	29.14	29.07	0.061	1.43	3.00	4.96	2.33	16.50	35.67	0.000	31.27
4*	29.15	29.12	0.073	0.59	2.00	7.96	1.94	6.11	32.58	0.000	30.49
5	29.12	29.07	0.209	1.25	2.00	5.00	3.29	10.34	14.60	0.000	30.49
6	29.07	28.68	0.147	2.02	3.00	5.06	3.61	25.54	32.59	0.000	30.3
7*	28.75	28.68	0.108	0.76	2.00	6.81	2.37	7.43	24.48	0.000	30.42
8	28.68	28.26	0.145	2.63	3.50	4.94	3.98	38.26	41.71	0.000	30.42
21	24.71	21.31	0.099	3.20	3.20	6.16	6.16	81.88	111.25	0.000	29.73
22	21.31	18.57	0.100	2.81	2.81	7.23	7.23	82.21	137.28	0.000	29.73

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23*	17.79	5.79	0.100	1.79	1.79	13.09	13.09	82.51	300.79	0.000	29.4
9	28.26	28.26	0.002	0.38	2.00	2.10	0.28	0.88	11.15	0.000	30.91
10*	28.26	28.26	0.006	0.27	2.00	6.88	0.55	1.74	44.76	0.000	30.91

OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-15B	0.95	1.05	14.75	14.75	9.90	0.000	9.878
DA-15C	0.95	1.59	15.85	15.85	9.58	0.000	14.474
DA-16A	0.55	0.25	10.00	10.00	11.66	0.000	1.603
DA-16B	0.55	1.05	10.00	10.00	11.66	0.000	6.733
DA-16C	0.55	1.59	10.00	10.00	11.66	0.000	10.195
DA-17A	0.95	1.15	10.00	10.00	11.66	0.000	12.737
DA-17B	0.95	1.41	10.00	10.00	11.66	0.000	15.616
DA-13A	0.95	0.96	14.52	14.52	9.97	0.000	9.095
DA-13B	0.95	0.67	13.80	13.80	10.20	0.000	6.493
DA-13C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-14A	0.95	0.55	13.44	13.44	10.32	0.000	5.392
DA-14B	0.95	1.07	10.00	10.00	11.66	0.000	11.850
DA-14C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-15A	0.95	0.25	10.00	10.00	11.66	0.000	2.769
DA-18A	0.55	1.15	14.97	14.97	9.84	0.000	6.222
DA-18B	0.95	1.41	15.51	15.51	9.68	0.000	12.965
DA-19A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-19B	0.85	0.78	10.00	10.00	11.66	0.000	7.729
DA-19C	0.85	0.81	10.00	10.00	11.66	0.000	8.027
DA-19D	0.85	0.41	10.00	10.00	11.66	0.000	4.063
DA-20A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-20B	0.95	0.78	10.00	10.00	11.66	0.000	8.639
DA-20C	0.95	0.81	10.00	10.00	11.66	0.000	8.971
DA-20D	0.95	0.41	10.00	10.00	11.66	0.000	4.541
DA-21A	0.85	0.39	10.00	10.00	11.66	0.000	3.865
DA-21B	0.85	0.92	10.00	10.00	11.66	0.000	9.117
DA-21C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-21D	0.55	1.56	10.00	10.00	11.66	0.000	10.003
DA-22A	0.55	0.40	12.93	12.93	10.49	0.000	2.309
DA-22B	0.95	0.92	14.45	14.45	9.99	0.000	8.735
DA-22C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-22D	0.95	1.56	10.00	10.00	11.66	0.000	17.277
DA-23A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-23B	0.95	1.67	10.00	10.00	11.66	0.000	18.496
DA-24A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-24B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-25A	0.95	2.82	17.79	17.79	9.08	0.000	24.312
DA-25B	0.9	3.86	19.11	19.11	8.77	0.000	30.451
DA-26A	0.55	1.38	10.00	10.00	11.66	0.000	8.849
DA-26B	0.4	1.38	10.00	10.00	11.66	0.000	6.435
DA-27A	0.95	4.03	19.31	19.31	8.72	0.000	33.388
DA-27B	0.95	3.46	15.00	15.00	9.83	0.000	32.303
DA-28A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-28B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-29A	0.95	3.30	10.00	10.00	11.66	0.000	36.548
DA-29B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-30A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-30B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-32A	0.55	1.18	10.00	10.00	11.66	0.000	7.566
DA-32B	0.55	0.95	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	13.50	13.50	10.30	0.000	57.536
DA-34	0.95	8.15	13.50	13.50	10.30	0.000	79.748
DA-35	0.95	1.90	10.00	10.00	11.66	0.000	21.043
DA-36	0.95	0.28	10.00	10.00	11.66	0.000	3.101
DA-39	0.95	2.32	17.06	17.06	9.26	0.000	20.405

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DA-40	0.95	0.14	10.00	10.00	11.66	0.000	1.551
DA-41	0.95	0.31	12.58	12.58	10.62	0.000	3.127
DA-14BCr	0.95	2.26	16.97	16.97	9.28	0.000	19.927
DA-16BCr	0.55	2.64	17.54	17.54	9.14	0.000	13.267
DA-17ABr	0.95	2.56	17.42	17.42	9.17	0.000	22.294
DA-4019A	0.95	0.86	14.30	14.30	10.04	0.000	8.204
DA19BCDr	0.9	2.00	16.56	16.56	9.39	0.000	16.900
DA20ABCD	0.95	2.72	17.65	17.65	9.11	0.000	23.539
DA21ABr	0.85	1.31	15.31	15.31	9.74	0.000	10.841
DA-15A1r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-15A2r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-21CDr	0.75	2.75	17.69	17.69	9.10	0.000	18.768
DA-22CDr	0.95	2.75	17.69	17.69	9.10	0.000	23.773
DA23AB	0.55	3.05	18.10	18.10	9.00	0.000	15.097
DA27B29A	0.55	6.76	22.06	22.06	8.16	0.000	30.333
A-71	0.55	0.11	10.00	10.00	11.66	0.000	0.705
A-72	0.55	0.10	10.00	10.00	11.66	0.000	0.641

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
MH-8	CircMh	0.950	4.44	17.60	9.12	0.000	0.00	38.477
MH-9	CircMh	0.950	7.07	19.21	8.74	0.000	0.00	58.716
MH-10	CircMh	0.864	12.35	19.71	8.63	0.000	0.00	92.177
JB 2	JnctBx	0.864	12.35	19.71	8.63	0.000	0.00	92.177
JB 3	JnctBx	0.864	12.35	19.71	8.63	0.000	0.00	92.177
MH-11	CircMh	0.863	17.47	20.78	8.41	0.000	0.00	126.816
PCTee	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-12	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
PCTee2	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-12A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-4019ACurb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA19BCDrCurb		0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA20ABCD	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-22A	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-41	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA21ABr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-22B	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-21CDr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-22CDr	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-7	CircMh	0.950	2.81	17.04	9.26	0.000	0.00	24.731
DA-14A	Curb	0.950	2.81	17.04	9.26	0.000	0.00	24.731
DA-14BCr	Curb	0.950	2.26	16.97	9.28	0.000	0.00	19.927
DA-13A	Curb	0.950	0.96	14.52	9.97	0.000	0.00	9.095
DA-13B	Curb	0.950	1.63	14.60	9.95	0.000	0.00	15.406
DA-13C	Curb	0.950	6.82	18.41	8.93	0.000	0.00	57.838
DA-14C	Curb	0.950	1.19	15.06	9.81	0.000	0.00	11.090
DA-15A1r	Curb	0.950	0.13	11.64	10.97	0.000	0.00	1.303
DA-15A2r	Curb	0.950	0.25	11.93	10.86	0.000	0.00	2.579
DA-15B	Curb	0.950	2.64	15.95	9.55	0.000	0.00	23.962
DA-15C	Curb	0.950	1.59	15.85	9.58	0.000	0.00	14.474
DA-16BCr	Curb	0.550	2.64	17.54	9.14	0.000	0.00	13.267
DA-17ABr	Curb	0.863	17.47	20.78	8.41	0.000	0.00	126.816
DA-18A	Curb	0.770	2.56	15.55	9.67	0.000	0.00	19.065
DA-18B	Curb	0.950	1.41	15.51	9.68	0.000	0.00	12.965
DA-39	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-25A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-25B	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA-27A	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000

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DA27B29A	Grate	0.000	0.00	0.00	0.00	0.000	0.00 0.000
A-71	JnctBx	0.861	17.58	20.78	8.41	0.000	0.00 127.325
A-72	JnctBx	0.860	17.68	20.78	8.41	0.000	0.00 127.787
OUT	Outlt	0.860	17.68	20.78	8.41	0.000	0.00 127.787

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
11	MH-9	MH-10	24.62	23.18	Circ 1	0.00	3.50	256.30	0.56	0.013
12	DA-15C	DA-15B	24.41	24.31	Circ 1	0.00	2.00	28.90	0.35	0.013
13	DA-15B	MH-10	24.31	23.18	Circ 1	0.00	2.00	22.00	5.14	0.013
14	DA-16B	MH-10	25.25	23.18	Circ 1	0.00	2.00	61.77	3.35	0.013
15	MH-10	JB 2	23.18	23.01	Circ 1	0.00	3.50	187.00	0.09	0.013
16	JB 2	JB 3	23.01	22.87	Circ 1	0.00	3.50	182.00	0.08	0.013
17	JB 3	DA-17AB	22.87	22.67	Circ 1	0.00	3.50	246.00	0.08	0.013
18	DA-18B	DA-18A	24.15	22.86	Circ 1	0.00	2.00	29.05	4.45	0.013
19	DA-18A	DA-17AB	22.86	22.67	Circ 1	0.00	2.50	87.14	0.22	0.013
20	DA-17AB	MH-11	22.67	21.51	Circ 1	0.00	5.00	414.00	0.28	0.013
1	DA-14B	DA-14A	26.30	26.20	Circ 1	0.00	2.00	25.30	0.40	0.013
2	DA-14A	MH-7	26.20	26.11	Circ 1	0.00	2.00	85.10	0.11	0.013
3	MH-7	MH-8	26.11	25.75	Circ 1	0.00	3.00	125.91	0.29	0.013
4	DA-13A	DA-13B	26.70	25.85	Circ 1	0.00	2.00	41.00	2.07	0.013
5	DA-13B	MH-8	25.85	25.75	Circ 1	0.00	2.00	24.00	0.42	0.013
6	MH-8	DA-13C	25.75	25.12	Circ 1	0.00	3.00	264.00	0.24	0.013
7	DA-14C	DA-13C	25.88	25.12	Circ 1	0.00	2.00	64.90	1.17	0.013
8	DA-13C	MH-9	25.12	24.62	Circ 1	0.00	3.50	291.00	0.17	0.013
21	MH-11	A-71	21.51	18.50	Circ 1	0.00	5.00	1650.00	0.18	0.013
22	A-71	A-72	18.50	16.00	Circ 1	0.00	5.00	900.00	0.28	0.013
23	A-72	OUT	16.00	4.00	Circ 1	0.00	5.00	900.00	1.33	0.013
9	DA-15A1	DA-15A2	25.60	25.50	Circ 1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2	MH-9	25.50	24.62	Circ 1	0.00	2.00	22.50	3.91	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
11*	33.39	32.51	0.341	2.32	3.50	8.66	6.10	58.72	75.42	0.000	30.59
12	32.88	32.76	0.409	1.88	2.00	4.73	4.61	14.47	13.31	0.000	28.95
13*	32.76	32.51	1.122	0.96	2.00	16.05	7.63	23.96	51.31	0.000	28.95
14*	32.73	32.51	0.344	0.78	2.00	11.73	4.22	13.27	41.43	0.000	29.2
15	32.51	30.94	0.839	3.50	3.50	9.58	9.58	92.18	30.34	0.000	28.67
16	30.94	29.42	0.839	3.50	3.50	9.58	9.58	92.18	27.91	0.000	27.18
17	29.42	27.35	0.839	3.50	3.50	9.58	9.58	92.18	28.69	0.000	27.5
18*	27.64	27.54	0.328	0.71	2.00	12.91	4.13	12.96	47.70	0.000	29.24
19	27.54	27.35	0.216	2.03	2.50	4.46	3.88	19.07	19.16	0.000	29.24
20	27.35	26.51	0.237	3.75	5.00	8.03	6.46	126.82	137.88	0.000	29.49
1	36.61	36.42	0.776	2.00	2.00	6.34	6.34	19.93	14.22	0.000	30.48
2	36.42	35.40	1.195	2.00	2.00	7.87	7.87	24.73	7.36	0.000	30.48
3	35.40	35.23	0.137	1.83	3.00	5.48	3.50	24.73	35.67	0.000	31.27
4*	35.40	35.34	0.162	0.72	2.00	8.89	2.90	9.10	32.58	0.000	30.49
5	35.34	35.23	0.464	1.75	2.00	5.29	4.90	15.41	14.60	0.000	30.49
6	35.23	34.35	0.333	3.00	3.00	5.44	5.44	38.48	32.59	0.000	30.3
7*	34.50	34.35	0.240	0.95	2.00	7.59	3.53	11.09	24.48	0.000	30.42
8	34.35	33.39	0.330	3.50	3.50	6.01	6.01	57.84	41.71	0.000	30.42
21	26.51	22.25	0.237	5.00	5.00	6.46	6.46	126.82	111.25	0.000	29.73
22	22.25	19.23	0.239	3.75	3.75	8.06	8.06	127.32	137.28	0.000	29.73
23*	18.28	6.28	0.241	2.28	2.28	14.70	14.70	127.79	300.79	0.000	29.4
9	33.39	33.39	0.003	0.46	2.00	2.38	0.41	1.30	11.15	0.000	30.91
10*	33.39	33.39	0.013	0.33	2.00	7.77	0.82	2.58	44.76	0.000	30.91

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 3 FM518 East_ Prop_100_t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : Willowick - Cowart's Ck C-value = Existing Land Use
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-17A	0.95	1.15	10.00	10.00	7.93	0.000	8.660
DA-17B	0.95	1.41	10.00	10.00	7.93	0.000	10.618
DA-13A	0.95	0.96	14.52	14.52	6.69	0.000	6.106
DA-13B	0.95	0.67	13.80	13.80	6.86	0.000	4.367
DA-13C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-14A	0.95	0.55	13.44	13.44	6.95	0.000	3.630
DA-14B	0.95	1.07	10.00	10.00	7.93	0.000	8.058
DA-14C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-15A	0.95	0.25	10.00	10.00	7.93	0.000	1.883
DA-18A	0.55	1.15	14.97	14.97	6.60	0.000	4.171
DA-18B	0.95	1.41	15.51	15.51	6.48	0.000	8.683
DA-19A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-19B	0.85	0.78	10.00	10.00	7.93	0.000	5.256
DA-19C	0.85	0.81	10.00	10.00	7.93	0.000	5.458
DA-19D	0.85	0.41	10.00	10.00	7.93	0.000	2.763
DA-20A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-20B	0.95	0.78	10.00	10.00	7.93	0.000	5.874
DA-20C	0.95	0.81	10.00	10.00	7.93	0.000	6.100
DA-20D	0.95	0.41	10.00	10.00	7.93	0.000	3.088
DA-21A	0.85	0.39	10.00	10.00	7.93	0.000	2.628
DA-21B	0.85	0.92	10.00	10.00	7.93	0.000	6.199
DA-21C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-21D	0.55	1.56	10.00	10.00	7.93	0.000	6.801
DA-22A	0.55	0.40	12.93	12.93	7.07	0.000	1.556
DA-22B	0.95	0.92	14.45	14.45	6.71	0.000	5.865
DA-22C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-22D	0.95	1.56	10.00	10.00	7.93	0.000	11.748
DA-23A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-23B	0.95	1.67	10.00	10.00	7.93	0.000	12.576
DA-24A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-24B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-25A	0.95	2.82	17.79	17.79	6.05	0.000	16.199
DA-25B	0.9	3.86	19.11	19.11	5.82	0.000	20.232
DA-26A	0.55	1.38	10.00	10.00	7.93	0.000	6.017
DA-26B	0.4	1.38	10.00	10.00	7.93	0.000	4.376
DA-15B	0.95	1.05	14.75	14.75	6.64	0.000	6.627
DA-15C	0.95	1.59	15.85	15.85	6.41	0.000	9.686
DA-16A	0.55	0.25	10.00	10.00	7.93	0.000	1.090
DA-16B	0.55	1.05	10.00	10.00	7.93	0.000	4.578
DA-16C	0.55	1.59	10.00	10.00	7.93	0.000	6.932
DA-27A	0.95	4.03	19.31	19.31	5.79	0.000	22.175
DA-27B	0.95	3.46	15.00	15.00	6.59	0.000	21.660
DA-28A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-28B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-29A	0.95	3.30	10.00	10.00	7.93	0.000	24.851
DA-29B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-30A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-30B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-32A	0.55	1.18	10.00	10.00	7.93	0.000	5.145
DA-32B	0.55	0.95	10.00	10.00	7.93	0.000	4.142

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DA-33	0.95	5.88	13.50	13.50	6.93	0.000	38.726
DA-34	0.95	8.15	13.50	13.50	6.93	0.000	53.676
DA-35	0.95	1.90	10.00	10.00	7.93	0.000	14.308
DA-36	0.95	0.28	10.00	10.00	7.93	0.000	2.109
DA-39	0.95	2.32	17.06	17.06	6.18	0.000	13.615
DA-40	0.95	0.14	10.00	10.00	7.93	0.000	1.054
DA-41	0.95	0.31	12.58	12.58	7.16	0.000	2.110
DA-14BCr	0.95	2.26	16.97	16.97	6.19	0.000	13.300
DA-16BCr	0.55	2.64	17.54	17.54	6.09	0.000	8.845
DA-17ABr	0.95	2.56	17.42	17.42	6.11	0.000	14.865
DA-4019A	0.95	0.86	14.30	14.30	6.74	0.000	5.510
DA19BCDr	0.9	2.00	16.56	16.56	6.27	0.000	11.291
DA20ABCD	0.95	2.72	17.65	17.65	6.07	0.000	15.688
DA21ABr	0.85	1.31	15.31	15.31	6.52	0.000	7.264
DA-15A1r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-15A2r	0.95	0.13	11.64	11.64	7.42	0.000	0.881
DA-21CDr	0.75	2.75	17.69	17.69	6.06	0.000	12.507
DA-22CDr	0.95	2.75	17.69	17.69	6.06	0.000	15.842
DA23AB	0.55	3.05	18.10	18.10	5.99	0.000	10.052
DA27B29A	0.55	6.76	22.06	22.06	5.39	0.000	20.041

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-14C	Curb	0.950	1.19	15.06	6.58	0.000	0.00	7.435
DA-15A1r	Curb	0.950	0.13	11.64	7.42	0.000	0.00	0.881
DA-15A2r	Curb	0.950	0.25	11.97	7.33	0.000	0.00	1.741
DA-15B	Curb	0.950	2.64	15.95	6.39	0.000	0.00	16.030
DA-15C	Curb	0.950	1.59	15.85	6.41	0.000	0.00	9.686
DA-4019A	Curb	0.950	3.18	17.16	6.16	0.000	0.00	18.609
DA19BCDr	Curb	0.929	4.72	17.86	6.03	0.000	0.00	26.453
DA20ABCD	Curb	0.950	2.72	17.65	6.07	0.000	0.00	15.688
DA-22A	Curb	0.550	0.40	12.93	7.07	0.000	0.00	1.556
DA-41	Curb	0.725	0.71	13.10	7.03	0.000	0.00	3.617
DA21ABr	Curb	0.891	2.23	15.31	6.52	0.000	0.00	12.966
DA-22B	Curb	0.950	0.92	14.45	6.71	0.000	0.00	5.865
DA-21CDr	Curb	0.850	5.50	17.79	6.05	0.000	0.00	28.271
DA-22CDr	Curb	0.950	2.75	17.69	6.06	0.000	0.00	15.842
MH-7	CircMh	0.950	2.81	17.05	6.18	0.000	0.00	16.496
DA-14A	Curb	0.950	2.81	17.05	6.18	0.000	0.00	16.496
DA-14BCr	Curb	0.950	2.26	16.97	6.19	0.000	0.00	13.300
DA-13A	Curb	0.950	0.96	14.52	6.69	0.000	0.00	6.106
DA-13B	Curb	0.950	1.63	14.61	6.68	0.000	0.00	10.337
DA-13C	Curb	0.950	6.82	18.62	5.90	0.000	0.00	38.256
DA-16BCr	Curb	0.550	2.64	17.54	6.09	0.000	0.00	8.845
DA-17ABr	Curb	0.863	17.47	22.51	5.33	0.000	0.00	80.391
DA-18A	Curb	0.770	2.56	15.55	6.47	0.000	0.00	12.766
DA-18B	Curb	0.950	1.41	15.51	6.48	0.000	0.00	8.683
DA-39	Curb	0.950	2.32	17.06	6.18	0.000	0.00	13.615
MH-8	CircMh	0.950	4.44	17.75	6.05	0.000	0.00	25.533
MH-9	CircMh	0.950	7.07	19.60	5.75	0.000	0.00	38.591
MH-10	CircMh	0.864	12.35	20.15	5.66	0.000	0.00	60.453
JB 2	JnctBx	0.864	12.35	20.15	5.66	0.000	0.00	60.453
JB 3	JnctBx	0.864	12.35	20.15	5.66	0.000	0.00	60.453
MH-11	CircMh	0.877	20.65	23.45	5.21	0.000	0.00	94.321
PCTee	Junct	0.886	25.37	24.19	5.12	0.000	0.00	115.150
MH-12	CircMh	0.882	26.08	24.97	5.03	0.000	0.00	115.689
PCTee2	Junct	0.883	28.31	25.59	4.96	0.000	0.00	123.943
MH-12A	CircMh	0.877	33.81	26.13	4.90	0.000	0.00	145.399
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000

ALT 3 East .txt

DA23AB	Grate	0.850	36.86	26.13	4.90	0.000	0.00	153.621
DA-25A	Grate	0.857	39.68	29.45	4.57	0.000	0.00	155.564
DA-25B	Grate	0.861	43.54	29.78	4.54	0.000	0.00	170.344
DA-27A	Grate	0.869	47.57	30.78	4.46	0.000	0.00	184.092
DA27B29A	Grate	0.829	54.33	31.75	4.37	0.000	0.00	197.018
OUT	outlt	0.829	54.33	31.75	4.37	0.000	0.00	197.018

Conveyance Configuration Data

Run#	Node	I.D.	Flowline Elev.		Shape	Span	Rise	Length	Slope	n_value
	US	DS	US	DS	#	(ft)	(ft)	(ft)	(%)	
			(ft)	(ft)						
23	MH-11	PCTee	21.51	21.31	Circ 1	0.00	6.50	217.00	0.09	0.013
24	DA20AB	CD A19BCD	24.52	24.40	Circ 1	0.00	2.00	63.63	0.19	0.013
25	DA19BCD	PCTee	24.40	21.31	Circ 1	0.00	2.00	5.00	78.61	0.013
26	PCTee	MH-12	21.31	20.94	Circ 1	0.00	6.50	281.00	0.13	0.013
27	DA-22A	DA-41	25.33	25.23	Circ 1	0.00	2.00	29.00	0.34	0.013
28	DA-41	MH-12	25.23	20.94	Circ 1	0.00	2.00	99.00	4.34	0.013
29	MH-12	PCTee2	20.94	20.51	Circ 1	0.00	6.50	250.00	0.17	0.013
30	DA-22B	DA21ABr	24.73	22.55	Circ 1	0.00	2.00	62.70	3.48	0.013
31	DA21ABr	PCTee2	22.55	20.51	Circ 1	0.00	2.00	5.00	44.69	0.013
32	PCTee2	MH-12A	20.51	19.67	Circ 1	0.00	6.50	273.00	0.31	0.013
33	DA-22CDDA-21CD		23.98	22.42	Circ 1	0.00	2.00	62.55	2.49	0.013
34	DA-21CD	MH-12A	22.42	19.67	Circ 1	0.00	2.00	6.00	51.57	0.013
35	MH-12A	DA23AB	19.67	18.67	Circ 1	0.00	7.00	908.90	0.11	0.013
36	DA23AB	DA-25A	18.67	18.23	Circ 1	0.00	7.00	284.30	0.15	0.013
37	DA-25A	DA-25B	18.23	15.55	Circ 1	0.00	7.00	268.00	1.00	0.013
38	DA-25B	DA-27A	15.55	15.15	Circ 1	0.00	7.00	364.20	0.11	0.013
39	DA-27A	DA27B29	15.15	12.75	Circ 1	0.00	7.00	593.80	0.40	0.013
40	DA27B29	OUT	12.75	3.00	Circ 1	0.00	7.00	256.20	3.81	0.013
1	DA-14BCDA-14A		26.30	26.20	Circ 1	0.00	2.00	25.30	0.40	0.013
2	DA-14A	MH-7	26.20	26.11	Circ 1	0.00	2.00	85.10	0.11	0.013
3	MH-7	MH-8	26.11	25.75	Circ 1	0.00	4.00	125.91	0.29	0.013
4	DA-13A	DA-13B	26.70	25.85	Circ 1	0.00	2.00	41.00	2.07	0.013
5	DA-13B	MH-8	25.85	25.75	Circ 1	0.00	2.00	24.00	0.42	0.013
6	MH-8	DA-13C	25.75	25.12	Circ 1	0.00	4.00	264.00	0.24	0.013
7	DA-14C	DA-13C	25.88	25.12	Circ 1	0.00	2.00	64.90	1.17	0.013
8	DA-13C	MH-9	25.12	24.62	Circ 1	0.00	4.00	291.00	0.17	0.013
9	DA-15A1DA-15A2		25.60	25.50	Circ 1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2	MH-9	25.50	24.62	Circ 1	0.00	2.00	22.50	3.91	0.013
11	MH-9	MH-10	24.62	23.18	Circ 1	0.00	4.50	256.30	0.56	0.013
12	DA-15C	DA-15B	24.41	24.31	Circ 1	0.00	2.00	28.90	0.35	0.013
13	DA-15B	MH-10	24.31	23.18	Circ 1	0.00	2.00	22.00	5.14	0.013
14	DA-16BCM	MH-10	25.25	23.18	Circ 1	0.00	1.50	61.77	3.35	0.013
15	MH-10	JB 2	23.18	23.01	Circ 1	0.00	5.00	187.00	0.09	0.013
16	JB 2	JB 3	23.01	22.87	Circ 1	0.00	5.00	182.00	0.08	0.013
17	JB 3	DA-17AB	22.87	22.67	Circ 1	0.00	5.50	246.00	0.08	0.013
18	DA-18B	DA-18A	24.15	22.86	Circ 1	0.00	2.00	29.05	4.45	0.013
19	DA-18A	DA-17AB	22.86	22.67	Circ 1	0.00	2.50	87.14	0.22	0.013
20	DA-17AB	MH-11	22.67	21.51	Circ 1	0.00	5.00	414.00	0.28	0.013
21	DA-39	DA-4019	24.65	24.55	Circ 1	0.00	2.50	29.00	0.34	0.013
22	DA-4019	MH-11	24.55	21.51	Circ 1	0.00	2.00	19.70	15.62	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr. Slope	Depth		Velocity		Q	Cap	Junc	Crit
	US Elev	DS Elev	(%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)	(cfs)	(cfs)	Loss (ft)	Elev (ft)
	(ft)	(ft)									
23	25.17	24.97	0.032	3.66	3.66	4.91	4.91	94.32	159.19	0.000	29.4
24	26.52	26.20	0.481	2.00	2.00	4.99	4.99	15.69	9.83	0.000	29.06
25*	26.20	24.97	1.367	0.49	2.00	44.16	8.42	26.45	200.60	0.000	29.06
26	24.97	24.44	0.048	3.66	3.66	5.99	5.99	115.15	190.27	0.000	29.34
27	25.91	25.90	0.005	0.46	0.67	2.84	1.70	1.56	13.29	0.000	29.99
28*	25.90	24.44	0.026	0.38	2.00	8.87	1.15	3.62	47.12	0.000	29.99

ALT 3 East .txt											
29	24.44	24.12	0.049	3.35	3.61	6.71	6.10	115.69	217.46	0.000	30.23
30*	25.25	24.14	0.067	0.50	1.59	9.45	2.19	5.87	42.20	0.000	29.32
31*	24.14	24.12	0.328	0.40	2.00	29.46	4.13	12.97	151.25	0.000	29.32
32	24.12	24.05	0.056	2.95	4.38	8.48	5.22	123.94	290.86	0.000	28.48
33*	24.97	24.25	0.490	0.93	1.83	11.02	5.25	15.84	35.74	0.000	28.52
34*	24.25	24.05	1.561	0.57	2.00	38.74	9.00	28.27	162.48	0.000	28.52
35	24.05	22.61	0.052	4.38	4.38	5.75	5.75	145.40	211.93	0.000	29
36	22.61	21.44	0.058	3.94	3.94	6.89	6.89	153.62	251.35	0.000	27.7
37*	20.69	20.36	0.059	2.35	4.81	13.71	5.51	155.56	638.93	0.000	26.3
38	20.36	18.54	0.071	4.81	4.81	6.04	6.04	170.34	211.74	0.000	25
39*	18.46	16.06	0.083	3.31	3.31	10.28	10.28	184.09	406.19	0.000	24
40*	14.63	4.88	0.095	1.88	1.88	23.65	23.65	197.02	1246.85	0.000	19.5
1	28.38	28.29	0.346	1.53	2.00	5.15	4.23	13.30	14.22	0.000	30.48
2	28.29	27.68	0.532	2.00	2.00	5.25	5.25	16.50	7.36	0.000	30.48
3	27.68	27.65	0.013	1.25	1.90	4.92	2.80	16.50	76.82	0.000	31.27
4*	27.72	27.69	0.073	0.59	1.84	7.96	2.02	6.11	32.58	0.000	30.49
5	27.69	27.65	0.209	1.25	1.90	5.00	3.35	10.34	14.60	0.000	30.49
6	27.65	27.50	0.032	1.69	2.38	5.07	3.28	25.53	70.18	0.000	30.3
7*	27.57	27.50	0.108	0.76	2.00	6.81	2.37	7.44	24.48	0.000	30.42
8	27.50	26.69	0.071	2.38	2.38	4.92	4.92	38.26	59.55	0.000	30.42
9	26.70	26.70	0.002	0.38	1.20	2.10	0.45	0.88	11.15	0.000	30.91
10*	26.70	26.69	0.006	0.27	2.00	6.88	0.55	1.74	44.76	0.000	30.91
11*	26.69	26.60	0.039	1.56	3.42	7.85	2.98	38.59	147.42	0.000	30.59
12	26.76	26.71	0.183	1.27	2.00	4.62	3.08	9.69	13.31	0.000	28.95
13*	26.71	26.60	0.502	0.77	2.00	14.44	5.10	16.03	51.31	0.000	28.95
14*	27.03	26.60	0.709	0.71	1.50	10.65	5.01	8.84	19.24	0.000	29.2
15	26.60	26.45	0.054	3.28	3.44	4.43	4.20	60.45	78.54	0.000	28.67
16	26.45	25.96	0.054	3.44	3.44	4.20	4.20	60.45	72.24	0.000	27.18
17	25.96	25.59	0.032	3.09	3.09	4.39	4.39	60.45	95.76	0.000	27.5
18*	25.71	25.67	0.147	0.58	2.00	11.53	2.76	8.68	47.70	0.000	29.24
19	25.67	25.59	0.097	1.48	2.50	4.20	2.60	12.77	19.16	0.000	29.24
20	25.59	25.17	0.095	2.73	3.66	7.32	5.23	80.39	137.88	0.000	29.49
21	26.14	26.10	0.110	1.35	1.55	5.05	4.25	13.62	24.09	0.000	29.73
22*	26.10	25.17	0.676	0.62	2.00	22.48	5.92	18.61	89.42	0.000	29.73

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OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-17A	0.95	1.15	10.00	10.00	11.66	0.000	12.737
DA-17B	0.95	1.41	10.00	10.00	11.66	0.000	15.616
DA-13A	0.95	0.96	14.52	14.52	9.97	0.000	9.095
DA-13B	0.95	0.67	13.80	13.80	10.20	0.000	6.494
DA-13C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-14A	0.95	0.55	13.44	13.44	10.32	0.000	5.392
DA-14B	0.95	1.07	10.00	10.00	11.66	0.000	11.850
DA-14C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-15A	0.95	0.25	10.00	10.00	11.66	0.000	2.769
DA-18A	0.55	1.15	14.97	14.97	9.84	0.000	6.221
DA-18B	0.95	1.41	15.51	15.51	9.68	0.000	12.966
DA-19A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-19B	0.85	0.78	10.00	10.00	11.66	0.000	7.729
DA-19C	0.85	0.81	10.00	10.00	11.66	0.000	8.027
DA-19D	0.85	0.41	10.00	10.00	11.66	0.000	4.063
DA-20A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-20B	0.95	0.78	10.00	10.00	11.66	0.000	8.639
DA-20C	0.95	0.81	10.00	10.00	11.66	0.000	8.971
DA-20D	0.95	0.41	10.00	10.00	11.66	0.000	4.541
DA-21A	0.85	0.39	10.00	10.00	11.66	0.000	3.865
DA-21B	0.85	0.92	10.00	10.00	11.66	0.000	9.117
DA-21C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-21D	0.55	1.56	10.00	10.00	11.66	0.000	10.003
DA-22A	0.55	0.40	12.93	12.93	10.49	0.000	2.309

ALT 3 East .txt

DA-22B	0.95	0.92	14.45	14.45	9.99	0.000	8.735
DA-22C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-22D	0.95	1.56	10.00	10.00	11.66	0.000	17.277
DA-23A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-23B	0.95	1.67	10.00	10.00	11.66	0.000	18.496
DA-24A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-24B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-25A	0.95	2.82	17.79	17.79	9.08	0.000	24.313
DA-25B	0.9	3.86	19.11	19.11	8.77	0.000	30.450
DA-26A	0.55	1.38	10.00	10.00	11.66	0.000	8.849
DA-26B	0.4	1.38	10.00	10.00	11.66	0.000	6.435
DA-15B	0.95	1.05	14.75	14.75	9.90	0.000	9.877
DA-15C	0.95	1.59	15.85	15.85	9.58	0.000	14.475
DA-16A	0.55	0.25	10.00	10.00	11.66	0.000	1.603
DA-16B	0.55	1.05	10.00	10.00	11.66	0.000	6.733
DA-16C	0.55	1.59	10.00	10.00	11.66	0.000	10.195
DA-27A	0.95	4.03	19.31	19.31	8.72	0.000	33.387
DA-27B	0.95	3.46	15.00	15.00	9.83	0.000	32.303
DA-28A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-28B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-29A	0.95	3.30	10.00	10.00	11.66	0.000	36.548
DA-29B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-30A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-30B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-32A	0.55	1.18	10.00	10.00	11.66	0.000	7.566
DA-32B	0.55	0.95	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	13.50	13.50	10.30	0.000	57.536
DA-34	0.95	8.15	13.50	13.50	10.30	0.000	79.748
DA-35	0.95	1.90	10.00	10.00	11.66	0.000	21.043
DA-36	0.95	0.28	10.00	10.00	11.66	0.000	3.101
DA-39	0.95	2.32	17.06	17.06	9.26	0.000	20.403
DA-40	0.95	0.14	10.00	10.00	11.66	0.000	1.551
DA-41	0.95	0.31	12.58	12.58	10.62	0.000	3.127
DA-14BCr	0.95	2.26	16.97	16.97	9.28	0.000	19.926
DA-16BCr	0.55	2.64	17.54	17.54	9.14	0.000	13.268
DA-17ABr	0.95	2.56	17.42	17.42	9.17	0.000	22.293
DA-4019A	0.95	0.86	14.30	14.30	10.04	0.000	8.203
DA19BCDr	0.9	2.00	16.56	16.56	9.39	0.000	16.900
DA20ABCD	0.95	2.72	17.65	17.65	9.11	0.000	23.540
DA21ABr	0.85	1.31	15.31	15.31	9.74	0.000	10.842
DA-15A1r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-15A2r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-21CDr	0.75	2.75	17.69	17.69	9.10	0.000	18.767
DA-22CDr	0.95	2.75	17.69	17.69	9.10	0.000	23.772
DA23AB	0.55	3.05	18.10	18.10	9.00	0.000	15.097
DA27B29A	0.55	6.76	22.06	22.06	8.16	0.000	30.334

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-14C	Curb	0.950	1.19	15.06	9.81	0.000	0.00	11.090
DA-15A1r	Curb	0.950	0.13	11.64	10.97	0.000	0.00	1.303
DA-15A2r	Curb	0.950	0.25	11.93	10.86	0.000	0.00	2.579
DA-15B	Curb	0.950	2.64	15.95	9.55	0.000	0.00	23.963
DA-15C	Curb	0.950	1.59	15.85	9.58	0.000	0.00	14.475
DA-4019A	Curb	0.950	3.18	17.15	9.23	0.000	0.00	27.898
DA19BCDr	Curb	0.929	4.72	17.79	9.07	0.000	0.00	39.785
DA20ABCD	Curb	0.950	2.72	17.65	9.11	0.000	0.00	23.540
DA-22A	Curb	0.550	0.40	12.93	10.49	0.000	0.00	2.309
DA-41	Curb	0.725	0.71	13.08	10.44	0.000	0.00	5.372
DA21ABr	Curb	0.891	2.23	15.31	9.74	0.000	0.00	19.352
DA-22B	Curb	0.950	0.92	14.45	9.99	0.000	0.00	8.735
DA-21CDr	Curb	0.850	5.50	17.78	9.08	0.000	0.00	42.441
DA-22CDr	Curb	0.950	2.75	17.69	9.10	0.000	0.00	23.772

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MH-7	CircMh	0.950	2.81	17.04	9.26	0.000	0.00	24.729
DA-14A	Curb	0.950	2.81	17.04	9.26	0.000	0.00	24.729
DA-14BCrCurb	0.950	2.26	16.97	9.28	0.000	0.00	19.926	
DA-13A	Curb	0.950	0.96	14.52	9.97	0.000	0.00	9.095
DA-13B	Curb	0.950	1.63	14.60	9.95	0.000	0.00	15.406
DA-13C	Curb	0.950	6.82	18.38	8.93	0.000	0.00	57.879
DA-16BCrCurb	0.550	2.64	17.54	9.14	0.000	0.00	13.268	
DA-17ABrCurb	0.863	17.47	21.95	8.18	0.000	0.00	123.351	
DA-18A	Curb	0.770	2.56	15.54	9.67	0.000	0.00	19.067
DA-18B	Curb	0.950	1.41	15.51	9.68	0.000	0.00	12.966
DA-39	Curb	0.950	2.32	17.06	9.26	0.000	0.00	20.403
MH-8	CircMh	0.950	4.44	17.60	9.12	0.000	0.00	38.471
MH-9	CircMh	0.950	7.07	19.30	8.72	0.000	0.00	58.594
MH-10	CircMh	0.864	12.35	19.78	8.62	0.000	0.00	92.001
JB 2	JnctBx	0.864	12.35	19.78	8.62	0.000	0.00	92.001
JB 3	JnctBx	0.864	12.35	19.78	8.62	0.000	0.00	92.001
MH-11	CircMh	0.877	20.65	22.81	8.02	0.000	0.00	145.163
PCTee	Junct	0.886	25.37	23.48	7.90	0.000	0.00	177.666
MH-12	CircMh	0.882	26.08	24.18	7.78	0.000	0.00	178.962
PCTee2	Junct	0.883	28.31	24.75	7.69	0.000	0.00	192.087
MH-12A	CircMh	0.877	33.81	25.23	7.61	0.000	0.00	225.703
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.850	36.86	27.63	7.25	0.000	0.00	227.218
DA-25A	Grate	0.857	39.68	28.28	7.16	0.000	0.00	243.586
DA-25B	Grate	0.861	43.54	28.56	7.12	0.000	0.00	266.992
DA-27A	Grate	0.869	47.57	29.44	7.01	0.000	0.00	289.467
DA27B29A	Grate	0.829	54.33	30.30	6.90	0.000	0.00	310.553
OUT	Outlt	0.829	54.33	30.30	6.90	0.000	0.00	310.553

Conveyance Configuration Data

Run#	Node	I.D.	Flowline	Elev.	Shape	#	Span	Rise	Length	Slope	n_value
	US	DS	US	DS			(ft)	(ft)	(ft)	(%)	
			(ft)	(ft)							
23	MH-11	PCTee	21.51	21.31	Circ	1	0.00	6.50	217.00	0.09	0.013
24	DA20ABCD	A19BCD	24.52	24.40	Circ	1	0.00	2.00	63.63	0.19	0.013
25	DA19BCD	PCTee	24.40	21.31	Circ	1	0.00	2.00	5.00	78.61	0.013
26	PCTee	MH-12	21.31	20.94	Circ	1	0.00	6.50	281.00	0.13	0.013
27	DA-22A	DA-41	25.33	25.23	Circ	1	0.00	2.00	29.00	0.34	0.013
28	DA-41	MH-12	25.23	20.94	Circ	1	0.00	2.00	99.00	4.34	0.013
29	MH-12	PCTee2	20.94	20.51	Circ	1	0.00	6.50	250.00	0.17	0.013
30	DA-22B	DA21ABr	24.73	22.55	Circ	1	0.00	2.00	62.70	3.48	0.013
31	DA21ABr	PCTee2	22.55	20.51	Circ	1	0.00	2.00	5.00	44.69	0.013
32	PCTee2	MH-12A	20.51	19.67	Circ	1	0.00	6.50	273.00	0.31	0.013
33	DA-22CDDA	-21CD	23.98	22.42	Circ	1	0.00	2.00	62.55	2.49	0.013
34	DA-21CD	MH-12A	22.42	19.67	Circ	1	0.00	2.00	6.00	51.57	0.013
35	MH-12A	DA23AB	19.67	18.67	Circ	1	0.00	7.00	908.90	0.11	0.013
36	DA23AB	DA-25A	18.67	18.23	Circ	1	0.00	7.00	284.30	0.15	0.013
37	DA-25A	DA-25B	18.23	15.55	Circ	1	0.00	7.00	268.00	1.00	0.013
38	DA-25B	DA-27A	15.55	15.15	Circ	1	0.00	7.00	364.20	0.11	0.013
39	DA-27A	DA27B29	15.15	12.75	Circ	1	0.00	7.00	593.80	0.40	0.013
40	DA27B29	OUT	12.75	3.00	Circ	1	0.00	7.00	256.20	3.81	0.013
1	DA-14BCDA	-14A	26.30	26.20	Circ	1	0.00	2.00	25.30	0.40	0.013
2	DA-14A	MH-7	26.20	26.11	Circ	1	0.00	2.00	85.10	0.11	0.013
3	MH-7	MH-8	26.11	25.75	Circ	1	0.00	4.00	125.91	0.29	0.013
4	DA-13A	DA-13B	26.70	25.85	Circ	1	0.00	2.00	41.00	2.07	0.013
5	DA-13B	MH-8	25.85	25.75	Circ	1	0.00	2.00	24.00	0.42	0.013
6	MH-8	DA-13C	25.75	25.12	Circ	1	0.00	4.00	264.00	0.24	0.013
7	DA-14C	DA-13C	25.88	25.12	Circ	1	0.00	2.00	64.90	1.17	0.013
8	DA-13C	MH-9	25.12	24.62	Circ	1	0.00	4.00	291.00	0.17	0.013
9	DA-15A1DA	-15A2	25.60	25.50	Circ	1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2	MH-9	25.50	24.62	Circ	1	0.00	2.00	22.50	3.91	0.013
11	MH-9	MH-10	24.62	23.18	Circ	1	0.00	4.50	256.30	0.56	0.013

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12	DA-15C DA-15B	24.41	24.31	Circ 1	0.00	2.00	28.90	0.35	0.013
13	DA-15B MH-10	24.31	23.18	Circ 1	0.00	2.00	22.00	5.14	0.013
14	DA-16BCM-10	25.25	23.18	Circ 1	0.00	1.50	61.77	3.35	0.013
15	MH-10 JB 2	23.18	23.01	Circ 1	0.00	5.00	187.00	0.09	0.013
16	JB 2 JB 3	23.01	22.87	Circ 1	0.00	5.00	182.00	0.08	0.013
17	JB 3 DA-17AB	22.87	22.67	Circ 1	0.00	5.50	246.00	0.08	0.013
18	DA-18B DA-18A	24.15	22.86	Circ 1	0.00	2.00	29.05	4.45	0.013
19	DA-18A DA-17AB	22.86	22.67	Circ 1	0.00	2.50	87.14	0.22	0.013
20	DA-17ABMH-11	22.67	21.51	Circ 1	0.00	5.00	414.00	0.28	0.013
21	DA-39 DA-4019	24.65	24.55	Circ 1	0.00	2.50	29.00	0.34	0.013
22	DA-4019MH-11	24.55	21.51	Circ 1	0.00	2.00	19.70	15.62	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
23	26.76	26.59	0.077	4.88	5.28	5.44	5.03	145.16	159.19	0.000	29.4
24	27.44	26.75	1.082	2.00	2.00	7.49	7.49	23.54	9.83	0.000	29.06
25*	26.75	26.59	3.092	0.60	2.00	49.67	12.66	39.78	200.60	0.000	29.06
26	26.59	26.28	0.115	4.88	5.34	6.66	6.09	177.67	190.27	0.000	29.34
27	26.34	26.33	0.010	0.56	1.10	3.19	1.30	2.31	13.29	0.000	29.99
28*	26.33	26.28	0.056	0.46	2.00	9.96	1.71	5.37	47.12	0.000	29.99
29	26.28	26.03	0.116	4.47	5.52	7.36	5.96	178.96	217.46	0.000	30.23
30*	26.16	26.07	0.149	0.62	2.00	10.60	2.78	8.74	42.20	0.000	29.32
31*	26.07	26.03	0.732	0.48	2.00	33.05	6.16	19.35	151.25	0.000	29.32
32	26.03	25.80	0.134	3.86	6.13	9.36	5.93	192.09	290.86	0.000	28.48
33*	26.70	26.01	1.104	1.19	2.00	12.18	7.57	23.77	35.74	0.000	28.52
34*	26.01	25.80	3.519	0.70	2.00	43.46	13.51	42.44	162.48	0.000	28.52
35	25.80	23.92	0.125	6.13	6.13	6.32	6.32	225.70	211.93	0.000	29
36	23.92	22.94	0.126	5.25	5.25	7.34	7.34	227.22	251.35	0.000	27.7
37*	22.94	22.55	0.145	2.99	7.00	15.50	6.33	243.59	638.93	0.000	26.3
38	22.55	19.53	0.175	7.00	7.00	6.94	6.94	266.99	211.74	0.000	25
39*	19.53	17.13	0.205	4.38	4.38	11.44	11.44	289.47	406.19	0.000	24
40*	15.13	5.38	0.236	2.38	2.38	26.88	26.88	310.55	1246.85	0.000	19.5
1	30.43	30.24	0.776	2.00	2.00	6.34	6.34	19.93	14.22	0.000	30.48
2	30.24	29.22	1.195	2.00	2.00	7.87	7.87	24.73	7.36	0.000	30.48
3	29.22	29.20	0.030	1.56	3.45	5.44	2.15	24.73	76.82	0.000	31.27
4*	29.37	29.31	0.162	0.72	2.00	8.89	2.90	9.09	32.58	0.000	30.49
5	29.31	29.20	0.464	1.75	2.00	5.29	4.90	15.41	14.60	0.000	30.49
6	29.20	29.06	0.072	2.13	3.94	5.67	3.07	38.47	70.18	0.000	30.3
7*	29.21	29.06	0.240	0.95	2.00	7.59	3.53	11.09	24.48	0.000	30.42
8	29.06	28.62	0.162	3.25	4.00	5.29	4.61	57.88	59.55	0.000	30.42
9	28.62	28.62	0.003	0.46	2.00	2.38	0.41	1.30	11.15	0.000	30.91
10*	28.62	28.62	0.013	0.33	2.00	7.77	0.82	2.58	44.76	0.000	30.91
11*	28.62	28.39	0.089	1.97	4.50	8.76	3.68	58.59	147.42	0.000	30.59
12	28.76	28.64	0.409	1.88	2.00	4.73	4.61	14.48	13.31	0.000	28.95
13*	28.64	28.39	1.122	0.96	2.00	16.05	7.63	23.96	51.31	0.000	28.95
14*	29.38	28.39	1.595	0.92	1.50	11.74	7.51	13.27	19.24	0.000	29.2
15	28.39	28.16	0.125	5.00	5.00	4.69	4.69	92.00	78.54	0.000	28.67
16	28.16	27.84	0.125	5.00	5.00	4.69	4.69	92.00	72.24	0.000	27.18
17	27.84	27.68	0.075	4.13	5.01	4.81	4.05	92.00	95.76	0.000	27.5
18*	27.97	27.87	0.328	0.71	2.00	12.91	4.13	12.97	47.70	0.000	29.24
19	27.87	27.68	0.216	2.03	2.50	4.46	3.88	19.07	19.16	0.000	29.24
20	27.68	26.76	0.224	3.67	5.00	7.98	6.28	123.35	137.88	0.000	29.49
21	27.12	27.06	0.247	1.76	2.50	5.53	4.16	20.40	24.09	0.000	29.73
22*	27.06	26.76	1.520	0.77	2.00	25.17	8.88	27.90	89.42	0.000	29.73

END

* super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : ALT 4_FM518 East Prop_Eq_11_100t
 JOB NUMBER : 2006129
 PROJECT DESCRIPTION : willowick - Cowart's ck C-value = Existing Land Use
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years
 =====

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-15B	0.95	1.05	14.75	14.75	6.64	0.000	6.627
DA-15C	0.95	1.59	15.85	15.85	6.41	0.000	9.686
DA-16A	0.55	0.25	10.00	10.00	7.93	0.000	1.090
DA-16B	0.55	1.05	10.00	10.00	7.93	0.000	4.578
DA-16C	0.55	1.59	10.00	10.00	7.93	0.000	6.932
DA-17A	0.95	1.15	10.00	10.00	7.93	0.000	8.660
DA-17B	0.95	1.41	10.00	10.00	7.93	0.000	10.618
DA-13A	0.95	0.96	14.52	14.52	6.69	0.000	6.106
DA-13B	0.95	0.67	13.80	13.80	6.86	0.000	4.367
DA-13C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-14A	0.95	0.55	13.44	13.44	6.95	0.000	3.630
DA-14B	0.95	1.07	10.00	10.00	7.93	0.000	8.058
DA-14C	0.95	1.19	15.06	15.06	6.58	0.000	7.435
DA-15A	0.95	0.25	10.00	10.00	7.93	0.000	1.883
DA-18A	0.55	1.15	14.97	14.97	6.60	0.000	4.172
DA-18B	0.95	1.41	15.51	15.51	6.48	0.000	8.682
DA-19A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-19B	0.85	0.78	10.00	10.00	7.93	0.000	5.256
DA-19C	0.85	0.81	10.00	10.00	7.93	0.000	5.458
DA-19D	0.85	0.41	10.00	10.00	7.93	0.000	2.763
DA-20A	0.95	0.72	10.00	10.00	7.93	0.000	5.422
DA-20B	0.95	0.78	10.00	10.00	7.93	0.000	5.874
DA-20C	0.95	0.81	10.00	10.00	7.93	0.000	6.100
DA-20D	0.95	0.41	10.00	10.00	7.93	0.000	3.088
DA-21A	0.85	0.39	10.00	10.00	7.93	0.000	2.628
DA-21B	0.85	0.92	10.00	10.00	7.93	0.000	6.199
DA-21C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-21D	0.55	1.56	10.00	10.00	7.93	0.000	6.801
DA-22A	0.55	0.40	12.93	12.93	7.07	0.000	1.556
DA-22B	0.95	0.92	14.45	14.45	6.71	0.000	5.865
DA-22C	0.95	1.19	10.00	10.00	7.93	0.000	8.961
DA-22D	0.95	1.56	10.00	10.00	7.93	0.000	11.748
DA-23A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-23B	0.95	1.67	10.00	10.00	7.93	0.000	12.576
DA-24A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-24B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-25A	0.95	2.82	17.79	17.79	6.05	0.000	16.198
DA-25B	0.9	3.86	19.11	19.11	5.82	0.000	20.233
DA-26A	0.55	1.38	10.00	10.00	7.93	0.000	6.017
DA-26B	0.4	1.38	10.00	10.00	7.93	0.000	4.376
DA-27A	0.95	4.03	19.31	19.31	5.79	0.000	22.175
DA-27B	0.95	3.46	15.00	15.00	6.59	0.000	21.660
DA-28A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-28B	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-29A	0.95	3.30	10.00	10.00	7.93	0.000	24.851
DA-29B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-30A	0.95	1.38	10.00	10.00	7.93	0.000	10.392
DA-30B	0.95	1.45	10.00	10.00	7.93	0.000	10.919
DA-32A	0.55	1.18	10.00	10.00	7.93	0.000	5.145
DA-32B	0.55	0.95	10.00	10.00	7.93	0.000	4.142

ALT 4 East .txt

DA-33	0.95	5.88	13.50	13.50	6.93	0.000	38.726
DA-34	0.95	8.15	13.50	13.50	6.93	0.000	53.676
DA-35	0.95	1.90	10.00	10.00	7.93	0.000	14.308
DA-36	0.95	0.28	10.00	10.00	7.93	0.000	2.109
DA-39	0.95	2.32	15.00	15.00	6.59	0.000	14.523
DA-40	0.95	0.14	10.00	10.00	7.93	0.000	1.054
DA-41	0.95	0.31	12.58	12.58	7.16	0.000	2.110
DA-14BCr0.95		2.26	16.97	16.97	6.19	0.000	13.300
DA-16BCr0.55		2.64	17.54	17.54	6.09	0.000	8.844
DA-17ABr0.95		2.56	17.42	17.42	6.11	0.000	14.865
DA-4019A0.95		0.86	14.30	14.30	6.74	0.000	5.510
DA19BCDr0.9		2.00	16.56	16.56	6.27	0.000	11.290
DA20ABCD0.95		2.72	17.65	17.65	6.07	0.000	15.688
DA21ABr 0.85		1.31	15.31	15.31	6.52	0.000	7.264
DA-15A1r0.95		0.13	11.64	11.64	7.42	0.000	0.881
DA-15A2r0.95		0.13	11.64	11.64	7.42	0.000	0.881
DA-21CDr0.75		2.75	17.69	17.69	6.06	0.000	12.507
DA-22CDr0.95		2.75	17.69	17.69	6.06	0.000	15.842
DA23AB 0.55		3.05	18.10	18.10	5.99	0.000	10.052
DA27B29A0.55		6.76	22.06	22.06	5.39	0.000	20.041

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-14C	Curb	0.950	1.19	15.06	6.58	0.000	0.00	7.435
DA-15A1rCurb		0.950	0.13	11.64	7.42	0.000	0.00	0.881
DA-15A2rCurb		0.950	0.25	11.97	7.33	0.000	0.00	1.741
DA-15B	Curb	0.950	2.64	15.95	6.39	0.000	0.00	16.029
DA-15C	Curb	0.950	1.59	15.85	6.41	0.000	0.00	9.686
DA-16BCrCurb		0.550	2.64	17.54	6.09	0.000	0.00	8.844
DA-17ABrCurb		0.863	17.47	22.56	5.32	0.000	0.00	80.286
DA-18A	Curb	0.770	2.56	15.55	6.47	0.000	0.00	12.765
DA-18B	Curb	0.950	1.41	15.51	6.48	0.000	0.00	8.682
DA-39	Curb	0.950	2.32	15.00	6.59	0.000	0.00	14.523
DA-4019ACurb		0.950	3.18	15.09	6.57	0.000	0.00	19.846
DA19BCDrCurb		0.929	4.72	17.86	6.03	0.000	0.00	26.452
DA20ABCDCurb		0.950	2.72	17.65	6.07	0.000	0.00	15.688
DA-22A	Curb	0.550	0.40	12.93	7.07	0.000	0.00	1.556
DA-41	Curb	0.725	0.71	13.10	7.03	0.000	0.00	3.618
DA21ABr	Curb	0.891	2.23	15.31	6.52	0.000	0.00	12.966
DA-22B	Curb	0.950	0.92	14.45	6.71	0.000	0.00	5.865
DA-21CDrCurb		0.850	5.50	17.78	6.05	0.000	0.00	28.271
DA-22CDrCurb		0.950	2.75	17.69	6.06	0.000	0.00	15.842
MH-7	CircMh	0.950	2.81	17.05	6.18	0.000	0.00	16.497
DA-14A	Curb	0.950	2.81	17.05	6.18	0.000	0.00	16.497
DA-14BCrCurb		0.950	2.26	16.97	6.19	0.000	0.00	13.300
DA-13A	Curb	0.950	0.96	14.52	6.69	0.000	0.00	6.106
DA-13B	Curb	0.950	1.63	14.61	6.68	0.000	0.00	10.338
DA-13C	Curb	0.950	6.82	18.61	5.91	0.000	0.00	38.260
MH-8	CircMh	0.950	4.44	17.75	6.05	0.000	0.00	25.531
MH-9	CircMh	0.950	7.07	19.60	5.75	0.000	0.00	38.600
MH-10	CircMh	0.864	12.35	20.15	5.66	0.000	0.00	60.446
JB 2	JnctBx	0.864	12.35	20.15	5.66	0.000	0.00	60.446
JB 3	JnctBx	0.864	12.35	20.15	5.66	0.000	0.00	60.446
MH-11	CircMh	0.877	20.65	23.51	5.20	0.000	0.00	94.183
PCTee	Junct	0.886	25.37	24.22	5.12	0.000	0.00	115.057
MH-12	CircMh	0.882	26.08	25.01	5.02	0.000	0.00	115.574
PCTee2	Junct	0.883	28.31	25.65	4.95	0.000	0.00	123.791
MH-12A	CircMh	0.877	33.81	26.19	4.90	0.000	0.00	145.205
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.850	36.86	26.19	4.90	0.000	0.00	153.416

ALT 4 East .txt

DA-25A	Grate	0.857	39.68	29.57	4.56	0.000	0.00	155.211
DA-25B	Grate	0.861	43.54	29.89	4.53	0.000	0.00	169.969
DA-27A	Grate	0.869	47.57	30.87	4.45	0.000	0.00	183.776
DA27B29A	Grate	0.829	54.33	31.85	4.37	0.000	0.00	196.643
OUT	Outlt	0.829	54.33	31.85	4.37	0.000	0.00	196.643

Conveyance Configuration Data

Run#	Node	I.D.	Flowline Elev.	Shape	#	Span	Rise	Length	Slope	n_value	
	US	DS	US (ft)			(ft)	(ft)	(ft)	(%)		
			DS (ft)								
9	DA-15A	DA-15A2	25.60	25.50	Circ	1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2	MH-9	25.50	24.62	Circ	1	0.00	2.00	22.50	3.91	0.013
11	MH-9	MH-10	24.62	23.18	Circ	1	0.00	5.17	256.30	0.56	0.013
12	DA-15C	DA-15B	24.41	24.31	Circ	1	0.00	2.00	28.90	0.35	0.013
13	DA-15B	MH-10	24.31	23.18	Circ	1	0.00	2.00	22.00	5.14	0.013
14	DA-16B	CMH-10	25.25	23.18	Circ	1	0.00	1.50	61.77	3.35	0.013
15	MH-10	JB 2	23.18	23.01	Circ	1	0.00	5.46	187.00	0.09	0.013
16	JB 2	JB 3	23.01	22.87	Circ	1	0.00	5.46	182.00	0.08	0.013
17	JB 3	DA-17AB	22.87	22.67	Circ	1	0.00	5.46	246.00	0.08	0.013
18	DA-18B	DA-18A	24.15	22.86	Circ	1	0.00	2.00	29.05	4.45	0.013
19	DA-18A	DA-17AB	22.86	22.67	Circ	1	0.00	2.50	87.14	0.22	0.013
20	DA-17AB	MH-11	22.67	21.51	Circ	1	0.00	4.63	414.00	0.28	0.013
21	DA-39	DA-4019	24.65	24.55	Circ	1	0.00	2.50	29.00	0.34	0.013
22	DA-4019	MH-11	24.55	21.51	Circ	1	0.00	2.00	19.70	15.62	0.013
23	MH-11	PCTee	21.51	21.31	Circ	1	0.00	5.67	217.00	0.09	0.013
24	DA20ABCDA19BCD		24.52	24.40	Circ	1	0.00	2.00	63.63	0.19	0.013
25	DA19BCDPCTee		24.40	21.31	Circ	1	0.00	2.00	5.00	78.61	0.013
26	PCTee	MH-12	21.31	20.94	Circ	1	0.00	5.67	281.00	0.13	0.013
27	DA-22A	DA-41	25.33	25.23	Circ	1	0.00	2.00	29.00	0.34	0.013
28	DA-41	MH-12	25.23	20.94	Circ	1	0.00	2.00	99.00	4.34	0.013
29	MH-12	PCTee2	20.94	20.51	Circ	1	0.00	5.27	250.00	0.17	0.013
30	DA-22B	DA21ABr	24.73	22.55	Circ	1	0.00	2.00	62.70	3.48	0.013
31	DA21ABr	PCTee2	22.55	20.51	Circ	1	0.00	2.00	5.00	44.69	0.013
32	PCTee2	MH-12A	20.51	19.67	Circ	1	0.00	5.27	273.00	0.31	0.013
33	DA-22C	DA-21CD	23.98	22.42	Circ	1	0.00	2.00	62.55	2.49	0.013
34	DA-21C	DMH-12A	22.42	19.67	Circ	1	0.00	2.00	6.00	51.57	0.013
35	MH-12A	DA23AB	19.67	18.67	Circ	1	0.00	5.92	908.90	0.11	0.013
36	DA23AB	DA-25A	18.67	18.23	Circ	1	0.00	5.92	284.30	0.15	0.013
37	DA-25A	DA-25B	18.23	15.55	Circ	1	0.00	5.92	268.00	1.00	0.013
38	DA-25B	DA-27A	15.55	15.15	Circ	1	0.00	5.92	364.20	0.11	0.013
39	DA-27A	DA27B29	15.15	12.75	Circ	1	0.00	5.92	593.80	0.40	0.013
40	DA27B29	OUT	12.75	3.00	Circ	1	0.00	5.92	256.20	3.81	0.013
1	DA-14BCDA-14A		26.30	26.20	Circ	1	0.00	2.00	25.30	0.40	0.013
2	DA-14A	MH-7	26.20	26.11	Circ	1	0.00	2.00	85.10	0.11	0.013
3	MH-7	MH-8	26.11	25.75	Circ	1	0.00	3.50	125.91	0.29	0.013
4	DA-13A	DA-13B	26.70	25.85	Circ	1	0.00	2.00	41.00	2.07	0.013
5	DA-13B	MH-8	25.85	25.75	Circ	1	0.00	2.00	24.00	0.42	0.013
6	MH-8	DA-13C	25.75	25.12	Circ	1	0.00	3.50	264.00	0.24	0.013
7	DA-14C	DA-13C	25.88	25.12	Circ	1	0.00	2.00	64.90	1.17	0.013
8	DA-13C	MH-9	25.12	24.62	Circ	1	0.00	3.50	291.00	0.17	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
9	26.74	26.74	0.002	0.38	1.24	2.10	0.43	0.88	11.15	0.000	30.91
10*	26.74	26.73	0.006	0.27	2.00	6.88	0.55	1.74	44.76	0.000	30.91
11*	26.73	26.69	0.018	1.49	3.51	7.67	2.55	38.60	213.45	0.000	30.59
12	26.85	26.80	0.183	1.27	2.00	4.62	3.08	9.69	13.31	0.000	28.95
13*	26.80	26.69	0.502	0.77	2.00	14.44	5.10	16.03	51.31	0.000	28.95
14*	27.12	26.69	0.709	0.71	1.50	10.66	5.00	8.84	19.24	0.000	29.2
15	26.69	26.59	0.034	3.07	3.58	4.46	3.72	60.45	99.31	0.000	28.67

ALT 4 East .txt											
16	26.59	26.49	0.034	3.24	3.62	4.17	3.67	60.45	91.35	0.000	27.18
17	26.49	26.37	0.034	3.24	3.70	4.17	3.58	60.45	93.92	0.000	27.5
18*	26.49	26.45	0.147	0.58	2.00	11.53	2.76	8.68	47.70	0.000	29.24
19	26.45	26.37	0.097	1.48	2.50	4.20	2.60	12.76	19.16	0.000	29.24
20	26.37	25.94	0.143	2.89	4.43	7.25	4.84	80.29	112.32	0.000	29.49
21	26.19	26.15	0.125	1.41	1.60	5.11	4.38	14.52	24.09	0.000	29.73
22*	26.15	25.94	0.769	0.64	2.00	22.92	6.32	19.85	89.42	0.000	29.73
23	25.94	25.79	0.067	3.90	4.48	5.09	4.40	94.18	110.58	0.000	29.4
24	26.52	26.20	0.481	2.00	2.00	4.99	4.99	15.69	9.83	0.000	29.06
25*	26.20	25.79	1.367	0.49	2.00	44.16	8.42	26.45	200.60	0.000	29.06
26	25.79	25.51	0.100	4.08	4.57	5.92	5.28	115.06	132.18	0.000	29.34
27	25.91	25.90	0.005	0.46	0.67	2.84	1.70	1.56	13.29	0.000	29.99
28*	25.90	25.51	0.026	0.38	2.00	8.87	1.15	3.62	47.12	0.000	29.99
29	25.51	25.19	0.149	3.95	4.68	6.59	5.64	115.57	124.29	0.000	29.23
30*	25.59	25.21	0.067	0.50	2.00	9.45	1.87	5.87	42.20	0.000	29.32
31*	25.21	25.19	0.328	0.40	2.00	29.46	4.13	12.97	151.25	0.000	28.32
32	25.19	24.85	0.171	3.38	5.18	8.39	5.70	123.79	166.24	0.000	28.48
33*	25.42	24.94	0.490	0.93	2.00	11.02	5.04	15.84	35.74	0.000	28.52
34*	24.94	24.85	1.561	0.57	2.00	38.74	9.00	28.27	162.48	0.000	28.52
35	24.85	23.30	0.126	5.18	5.18	5.69	5.69	145.20	135.56	0.000	29
36	23.30	21.86	0.141	4.63	4.63	6.65	6.65	153.42	160.77	0.000	27.7
37*	21.86	21.47	0.144	2.53	5.92	13.81	5.64	155.21	408.68	0.000	26.3
38	21.47	18.85	0.173	5.92	5.92	6.17	6.17	169.97	135.44	0.000	25
39*	18.85	16.45	0.202	3.70	3.70	10.15	10.15	183.78	259.81	0.000	24
40*	14.75	5.00	0.232	2.00	2.00	23.98	23.98	196.64	797.53	0.000	19.5
1	28.56	28.47	0.346	1.53	2.00	5.15	4.23	13.30	14.22	0.000	30.48
2	28.47	27.96	0.532	2.00	2.00	5.25	5.25	16.50	7.36	0.000	30.48
3	27.96	27.92	0.027	1.34	2.17	4.87	2.63	16.50	53.80	0.000	31.27
4*	28.00	27.97	0.073	0.59	2.00	7.96	1.94	6.11	32.58	0.000	30.49
5	27.97	27.92	0.209	1.25	2.00	5.00	3.29	10.34	14.60	0.000	30.49
6	27.92	27.75	0.064	1.80	2.63	5.10	3.30	25.53	49.15	0.000	30.3
7*	27.82	27.75	0.108	0.76	2.00	6.81	2.37	7.43	24.48	0.000	30.42
8	27.75	26.73	0.145	2.63	2.63	4.94	4.94	38.26	41.71	0.000	30.42

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OUTPUT FOR ANALYSIS FREQUENCY of: 100 years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
DA-15B	0.95	1.05	14.75	14.75	9.90	0.000	9.878
DA-15C	0.95	1.59	15.85	15.85	9.58	0.000	14.474
DA-16A	0.55	0.25	10.00	10.00	11.66	0.000	1.603
DA-16B	0.55	1.05	10.00	10.00	11.66	0.000	6.733
DA-16C	0.55	1.59	10.00	10.00	11.66	0.000	10.195
DA-17A	0.95	1.15	10.00	10.00	11.66	0.000	12.737
DA-17B	0.95	1.41	10.00	10.00	11.66	0.000	15.616
DA-13A	0.95	0.96	14.52	14.52	9.97	0.000	9.095
DA-13B	0.95	0.67	13.80	13.80	10.20	0.000	6.493
DA-13C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-14A	0.95	0.55	13.44	13.44	10.32	0.000	5.392
DA-14B	0.95	1.07	10.00	10.00	11.66	0.000	11.850
DA-14C	0.95	1.19	15.06	15.06	9.81	0.000	11.090
DA-15A	0.95	0.25	10.00	10.00	11.66	0.000	2.769
DA-18A	0.55	1.15	14.97	14.97	9.84	0.000	6.222
DA-18B	0.95	1.41	15.51	15.51	9.68	0.000	12.965
DA-19A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-19B	0.85	0.78	10.00	10.00	11.66	0.000	7.729
DA-19C	0.85	0.81	10.00	10.00	11.66	0.000	8.027
DA-19D	0.85	0.41	10.00	10.00	11.66	0.000	4.063
DA-20A	0.95	0.72	10.00	10.00	11.66	0.000	7.974
DA-20B	0.95	0.78	10.00	10.00	11.66	0.000	8.639
DA-20C	0.95	0.81	10.00	10.00	11.66	0.000	8.971
DA-20D	0.95	0.41	10.00	10.00	11.66	0.000	4.541
DA-21A	0.85	0.39	10.00	10.00	11.66	0.000	3.865

ALT 4 East .txt

DA-21B	0.85	0.92	10.00	10.00	11.66	0.000	9.117
DA-21C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-21D	0.55	1.56	10.00	10.00	11.66	0.000	10.003
DA-22A	0.55	0.40	12.93	12.93	10.49	0.000	2.309
DA-22B	0.95	0.92	14.45	14.45	9.99	0.000	8.735
DA-22C	0.95	1.19	10.00	10.00	11.66	0.000	13.180
DA-22D	0.95	1.56	10.00	10.00	11.66	0.000	17.277
DA-23A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-23B	0.95	1.67	10.00	10.00	11.66	0.000	18.496
DA-24A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-24B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-25A	0.95	2.82	17.79	17.79	9.08	0.000	24.312
DA-25B	0.9	3.86	19.11	19.11	8.77	0.000	30.451
DA-26A	0.55	1.38	10.00	10.00	11.66	0.000	8.849
DA-26B	0.4	1.38	10.00	10.00	11.66	0.000	6.435
DA-27A	0.95	4.03	19.31	19.31	8.72	0.000	33.388
DA-27B	0.95	3.46	15.00	15.00	9.83	0.000	32.303
DA-28A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-28B	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-29A	0.95	3.30	10.00	10.00	11.66	0.000	36.548
DA-29B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-30A	0.95	1.38	10.00	10.00	11.66	0.000	15.284
DA-30B	0.95	1.45	10.00	10.00	11.66	0.000	16.059
DA-32A	0.55	1.18	10.00	10.00	11.66	0.000	7.566
DA-32B	0.55	0.95	10.00	10.00	11.66	0.000	6.091
DA-33	0.95	5.88	13.50	13.50	10.30	0.000	57.536
DA-34	0.95	8.15	13.50	13.50	10.30	0.000	79.748
DA-35	0.95	1.90	10.00	10.00	11.66	0.000	21.043
DA-36	0.95	0.28	10.00	10.00	11.66	0.000	3.101
DA-39	0.95	2.32	15.00	15.00	9.83	0.000	21.660
DA-40	0.95	0.14	10.00	10.00	11.66	0.000	1.551
DA-41	0.95	0.31	12.58	12.58	10.62	0.000	3.127
DA-14BCr	0.95	2.26	16.97	16.97	9.28	0.000	19.927
DA-16BCr	0.55	2.64	17.54	17.54	9.14	0.000	13.267
DA-17ABr	0.95	2.56	17.42	17.42	9.17	0.000	22.294
DA-4019A	0.95	0.86	14.30	14.30	10.04	0.000	8.204
DA19BCDr	0.9	2.00	16.56	16.56	9.39	0.000	16.900
DA20ABCD	0.95	2.72	17.65	17.65	9.11	0.000	23.539
DA21ABr	0.85	1.31	15.31	15.31	9.74	0.000	10.841
DA-15A1r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-15A2r	0.95	0.13	11.64	11.64	10.97	0.000	1.303
DA-21CDr	0.75	2.75	17.69	17.69	9.10	0.000	18.768
DA-22CDr	0.95	2.75	17.69	17.69	9.10	0.000	23.773
DA23AB	0.55	3.05	18.10	18.10	9.00	0.000	15.097
DA27B29A	0.55	6.76	22.06	22.06	8.16	0.000	30.333

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
DA-14C	Curb	0.950	1.19	15.06	9.81	0.000	0.00	11.090
DA-15A1r	Curb	0.950	0.13	11.64	10.97	0.000	0.00	1.303
DA-15A2r	Curb	0.950	0.25	11.93	10.86	0.000	0.00	2.579
DA-15B	Curb	0.950	2.64	15.95	9.55	0.000	0.00	23.962
DA-15C	Curb	0.950	1.59	15.85	9.58	0.000	0.00	14.474
DA-16BCr	Curb	0.550	2.64	17.54	9.14	0.000	0.00	13.267
DA-17ABr	Curb	0.863	17.47	21.94	8.18	0.000	0.00	123.366
DA-18A	Curb	0.770	2.56	15.55	9.67	0.000	0.00	19.065
DA-18B	Curb	0.950	1.41	15.51	9.68	0.000	0.00	12.965
DA-39	Curb	0.950	2.32	15.00	9.83	0.000	0.00	21.660
DA-4019A	Curb	0.950	3.18	15.09	9.80	0.000	0.00	29.610
DA19BCDr	Curb	0.929	4.72	17.79	9.07	0.000	0.00	39.783
DA20ABCD	Curb	0.950	2.72	17.65	9.11	0.000	0.00	23.539
DA-22A	Curb	0.550	0.40	12.93	10.49	0.000	0.00	2.309
DA-41	Curb	0.725	0.71	13.08	10.44	0.000	0.00	5.372
DA21ABr	Curb	0.891	2.23	15.31	9.74	0.000	0.00	19.351

ALT 4 East .txt

DA-22B	Curb	0.950	0.92	14.45	9.99	0.000	0.00	8.735
DA-21CDr	Curb	0.850	5.50	17.78	9.08	0.000	0.00	42.443
DA-22CDr	Curb	0.950	2.75	17.69	9.10	0.000	0.00	23.773
MH-7	CircMh	0.950	2.81	17.04	9.26	0.000	0.00	24.731
DA-14A	Curb	0.950	2.81	17.04	9.26	0.000	0.00	24.731
DA-14BCr	Curb	0.950	2.26	16.97	9.28	0.000	0.00	19.927
DA-13A	Curb	0.950	0.96	14.52	9.97	0.000	0.00	9.095
DA-13B	Curb	0.950	1.63	14.60	9.95	0.000	0.00	15.406
DA-13C	Curb	0.950	6.82	18.39	8.93	0.000	0.00	57.870
MH-8	CircMh	0.950	4.44	17.60	9.12	0.000	0.00	38.476
MH-9	CircMh	0.950	7.07	19.19	8.75	0.000	0.00	58.749
MH-10	CircMh	0.864	12.35	19.69	8.64	0.000	0.00	92.227
JB 2	JnctBx	0.864	12.35	19.69	8.64	0.000	0.00	92.227
JB 3	JnctBx	0.864	12.35	19.69	8.64	0.000	0.00	92.227
MH-11	CircMh	0.877	20.65	22.88	8.01	0.000	0.00	144.929
PCTee	Junct	0.886	25.37	23.52	7.89	0.000	0.00	177.522
MH-12	CircMh	0.882	26.08	24.18	7.78	0.000	0.00	178.965
PCTee2	Junct	0.883	28.31	24.69	7.70	0.000	0.00	192.328
MH-12A	CircMh	0.877	33.81	25.21	7.61	0.000	0.00	225.843
MH-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-14A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-15	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
MH-16	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
DA23AB	Grate	0.850	36.86	27.05	7.33	0.000	0.00	229.819
DA-25A	Grate	0.857	39.68	27.62	7.25	0.000	0.00	246.700
DA-25B	Grate	0.861	43.54	27.91	7.21	0.000	0.00	270.380
DA-27A	Grate	0.869	47.57	28.52	7.13	0.000	0.00	294.482
DA27B29A	Grate	0.829	54.33	29.45	7.00	0.000	0.00	315.457
OUT	outlt	0.829	54.33	29.45	7.00	0.000	0.00	315.457

Conveyance Configuration Data

Run#	Node I.D.	Flowline Elev.	US	DS	Shape	#	Span	Rise	Length	slope	n_value
	US DS		(ft)	(ft)			(ft)	(ft)	(ft)	(%)	
9	DA-15A1DA-15A2		25.60	25.50	Circ	1	0.00	2.00	41.15	0.24	0.013
10	DA-15A2MH-9		25.50	24.62	Circ	1	0.00	2.00	22.50	3.91	0.013
11	MH-9 MH-10		24.62	23.18	Circ	1	0.00	5.17	256.30	0.56	0.013
12	DA-15C DA-15B		24.41	24.31	Circ	1	0.00	2.00	28.90	0.35	0.013
13	DA-15B MH-10		24.31	23.18	Circ	1	0.00	2.00	22.00	5.14	0.013
14	DA-16BCMh-10		25.25	23.18	Circ	1	0.00	1.50	61.77	3.35	0.013
15	MH-10 JB 2		23.18	23.01	Circ	1	0.00	5.46	187.00	0.09	0.013
16	JB 2 JB 3		23.01	22.87	Circ	1	0.00	5.46	182.00	0.08	0.013
17	JB 3 DA-17AB		22.87	22.67	Circ	1	0.00	5.46	246.00	0.08	0.013
18	DA-18B DA-18A		24.15	22.86	Circ	1	0.00	2.00	29.05	4.45	0.013
19	DA-18A DA-17AB		22.86	22.67	Circ	1	0.00	2.50	87.14	0.22	0.013
20	DA-17ABMH-11		22.67	21.51	Circ	1	0.00	4.63	414.00	0.28	0.013
21	DA-39 DA-4019		24.65	24.55	Circ	1	0.00	2.50	29.00	0.34	0.013
22	DA-4019MH-11		24.55	21.51	Circ	1	0.00	2.00	19.70	15.62	0.013
23	MH-11 PCTee		21.51	21.31	Circ	1	0.00	5.67	217.00	0.09	0.013
24	DA20ABCDA19BCD		24.52	24.40	Circ	1	0.00	2.00	63.63	0.19	0.013
25	DA19BCDPCTee		24.40	21.31	Circ	1	0.00	2.00	5.00	78.61	0.013
26	PCTee MH-12		21.31	20.94	Circ	1	0.00	5.67	281.00	0.13	0.013
27	DA-22A DA-41		25.33	25.23	Circ	1	0.00	2.00	29.00	0.34	0.013
28	DA-41 MH-12		25.23	20.94	Circ	1	0.00	2.00	99.00	4.34	0.013
29	MH-12 PCTee2		20.94	20.51	Circ	1	0.00	5.27	250.00	0.17	0.013
30	DA-22B DA21ABr		24.73	22.55	Circ	1	0.00	2.00	62.70	3.48	0.013
31	DA21ABrPCTee2		22.55	20.51	Circ	1	0.00	2.00	5.00	44.69	0.013
32	PCTee2 MH-12A		20.51	19.67	Circ	1	0.00	5.27	273.00	0.31	0.013
33	DA-22CDDA-21CD		23.98	22.42	Circ	1	0.00	2.00	62.55	2.49	0.013
34	DA-21CDMH-12A		22.42	19.67	Circ	1	0.00	2.00	6.00	51.57	0.013
35	MH-12A DA23AB		19.67	18.67	Circ	1	0.00	5.92	908.90	0.11	0.013
36	DA23AB DA-25A		18.67	18.23	Circ	1	0.00	5.92	284.30	0.15	0.013
37	DA-25A DA-25B		18.23	15.55	Circ	1	0.00	5.92	268.00	1.00	0.013
38	DA-25B DA-27A		15.55	15.15	Circ	1	0.00	5.92	364.20	0.11	0.013
39	DA-27A DA27B29		15.15	12.75	Circ	1	0.00	5.92	593.80	0.40	0.013

ALT 4 East .txt										
40	DA27B29OUT	12.75	3.00	Circ 1	0.00	5.92	256.20	3.81	0.013	
1	DA-14BCDA-14A	26.30	26.20	Circ 1	0.00	2.00	25.30	0.40	0.013	
2	DA-14A MH-7	26.20	26.11	Circ 1	0.00	2.00	85.10	0.11	0.013	
3	MH-7 MH-8	26.11	25.75	Circ 1	0.00	3.50	125.91	0.29	0.013	
4	DA-13A DA-13B	26.70	25.85	Circ 1	0.00	2.00	41.00	2.07	0.013	
5	DA-13B MH-8	25.85	25.75	Circ 1	0.00	2.00	24.00	0.42	0.013	
6	MH-8 DA-13C	25.75	25.12	Circ 1	0.00	3.50	264.00	0.24	0.013	
7	DA-14C DA-13C	25.88	25.12	Circ 1	0.00	2.00	64.90	1.17	0.013	
8	DA-13C MH-9	25.12	24.62	Circ 1	0.00	3.50	291.00	0.17	0.013	

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
9	32.39	32.38	0.003	0.46	2.00	2.38	0.41	1.30	11.15	0.000	30.91
10*	32.38	32.38	0.013	0.33	2.00	7.77	0.82	2.58	44.76	0.000	30.91
11*	32.38	32.27	0.043	1.86	5.17	8.66	2.80	58.75	213.45	0.000	30.59
12	32.64	32.52	0.409	1.88	2.00	4.73	4.61	14.47	13.31	0.000	28.95
13*	32.52	32.27	1.122	0.96	2.00	16.05	7.63	23.96	51.31	0.000	28.95
14*	33.26	32.27	1.595	0.92	1.50	11.74	7.51	13.27	19.24	0.000	29.2
15	32.27	32.13	0.078	4.10	5.46	4.90	3.94	92.23	99.31	0.000	28.67
16	32.13	31.98	0.078	4.78	5.46	4.25	3.94	92.23	91.35	0.000	27.18
17	31.98	31.79	0.078	4.44	5.46	4.53	3.94	92.23	93.92	0.000	27.5
18*	32.08	31.98	0.328	0.71	2.00	12.91	4.13	12.96	47.70	0.000	29.24
19	31.98	31.79	0.216	2.03	2.50	4.46	3.88	19.07	19.16	0.000	29.24
20	31.79	30.39	0.338	4.63	4.63	7.33	7.33	123.37	112.32	0.000	29.49
21	30.81	30.73	0.279	1.88	2.50	5.48	4.41	21.66	24.09	0.000	29.73
22*	30.73	30.39	1.713	0.79	2.00	25.57	9.43	29.61	89.42	0.000	29.73
23	30.39	30.05	0.158	5.67	5.67	5.74	5.74	144.93	110.58	0.000	29.4
24	30.89	30.20	1.082	2.00	2.00	7.49	7.49	23.54	9.83	0.000	29.06
25*	30.20	30.05	3.092	0.60	2.00	49.67	12.66	39.78	200.60	0.000	29.06
26	30.05	29.38	0.238	5.67	5.67	7.03	7.03	177.52	132.18	0.000	29.34
27	29.44	29.44	0.010	0.56	2.00	3.19	0.73	2.31	13.29	0.000	29.99
28*	29.44	29.38	0.056	0.46	2.00	9.96	1.71	5.37	47.12	0.000	29.99
29	29.38	28.49	0.357	5.27	5.27	8.20	8.20	178.97	124.29	0.000	29.23
30*	28.62	28.53	0.149	0.62	2.00	10.60	2.78	8.74	42.20	0.000	29.32
31*	28.53	28.49	0.731	0.48	2.00	33.05	6.16	19.35	151.25	0.000	28.32
32	28.49	27.37	0.412	5.27	5.27	8.82	8.82	192.33	166.24	0.000	28.48
33*	28.27	27.58	1.104	1.19	2.00	12.18	7.57	23.77	35.74	0.000	28.52
34*	27.58	27.37	3.519	0.70	2.00	43.46	13.51	42.44	162.48	0.000	28.52
35	27.37	24.59	0.305	5.92	5.92	8.20	8.20	225.84	135.56	0.000	29
36	24.59	23.64	0.316	5.92	5.92	8.35	8.35	229.82	160.77	0.000	27.7
37*	23.64	22.66	0.364	3.32	5.92	15.54	8.96	246.70	408.68	0.000	26.3
38	22.66	21.07	0.438	5.92	5.92	9.82	9.82	270.38	135.44	0.000	25
39	21.07	17.45	0.519	5.92	5.92	10.70	10.70	294.48	259.81	0.000	24
40*	15.34	5.59	0.596	2.59	2.59	27.29	27.29	315.46	797.53	0.000	19.5
1	35.02	34.82	0.776	2.00	2.00	6.34	6.34	19.93	14.22	0.000	30.48
2	34.82	33.81	1.195	2.00	2.00	7.87	7.87	24.73	7.36	0.000	30.48
3	33.81	33.73	0.060	1.67	3.50	5.47	2.57	24.73	53.80	0.000	31.27
4*	33.91	33.84	0.162	0.72	2.00	8.89	2.90	9.10	32.58	0.000	30.49
5	33.84	33.73	0.464	1.75	2.00	5.29	4.90	15.41	14.60	0.000	30.49
6	33.73	33.34	0.146	2.35	3.50	5.60	4.00	38.48	49.15	0.000	30.3
7*	33.50	33.34	0.240	0.95	2.00	7.59	3.53	11.09	24.48	0.000	30.42
8	33.34	32.38	0.331	3.50	3.50	6.01	6.01	57.87	41.71	0.000	30.42

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* Super critical flow.
 NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : Melody Lane
 JOB NUMBER : 2006129-04
 PROJECT DESCRIPTION : Melody Lane Existing North Ditch
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-21	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-22	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-23	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-24	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-25	0.55	4.63	26.00	26.00	4.92	0.000	12.518
A-26	0.55	1.21	17.67	17.67	6.07	0.000	4.051
A-27	0.55	1.53	18.67	18.67	5.90	0.000	4.962
A-28	0.55	2.66	21.50	21.50	5.47	0.000	8.007
A-1	0.55	4.82	34.17	34.17	4.19	0.000	11.095
A-2	0.55	0.48	16.83	16.83	6.22	0.000	1.649
A-3	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-4	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-5	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-6	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-7	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-8	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-9	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-10	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-11	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-12	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-13	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-14	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-15	0.55	4.19	25.00	25.00	5.03	0.000	11.584
A-16	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-17	0.55	0.92	19.63	19.63	5.74	0.000	2.905
A-18	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-19	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-20	0.55	3.44	23.33	23.33	5.23	0.000	9.887

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-1	Junct	0.550	4.82	34.17	4.19	0.000	0.00	11.095
A-2	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-3	Junct	0.550	9.41	40.86	3.75	0.000	0.00	19.409
A-4	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-5	Junct	0.550	14.00	45.78	3.49	0.000	0.00	26.885
A-6	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-7	Junct	0.550	18.59	50.22	3.29	0.000	0.00	33.654
A-8	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-9	Junct	0.550	23.18	55.12	3.10	0.000	0.00	39.513
A-10	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-11	Junct	0.550	27.77	59.29	2.96	0.000	0.00	45.136
A-12	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-13	Junct	0.550	32.36	63.17	2.83	0.000	0.00	50.451

Melody Lane_Exist_North_1 t.txt

A-14	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-15	Junct	0.550	36.55	66.64	2.74	0.000	0.00	0.000	0.00	55.004
A-16	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-17	Junct	0.550	37.47	66.64	2.74	0.000	0.00	0.000	0.00	56.388
A-18	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-19	Junct	0.550	38.16	66.64	2.74	0.000	0.00	0.000	0.00	57.426
A-20	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-21	Junct	0.550	42.75	76.31	2.50	0.000	0.00	0.000	0.00	58.770
A-22	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-23	Junct	0.550	47.34	79.28	2.44	0.000	0.00	0.000	0.00	63.425
A-24	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-26	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-27	Grate	0.550	48.87	81.41	2.39	0.000	0.00	0.000	0.00	64.316
A-28	Grate	0.550	51.53	81.45	2.39	0.000	59.05	0.000	126.847	126.847
A-29	CircMh	0.550	51.53	81.45	2.39	0.000	59.05	0.000	126.847	126.847
A-30	CircMh	0.550	51.53	81.45	2.39	0.000	59.05	0.000	126.847	126.847
A31	CircMh	0.550	51.53	81.45	2.39	0.000	59.05	0.000	126.847	126.847
OUT	outlt	0.550	51.53	81.45	2.39	0.000	59.05	0.000	126.847	126.847

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	A-1	A-3	31.24	30.82	Ditch 1	1.00	3.00	500.00	0.08	0.033
3	A-3	A-5	30.82	30.22	Ditch 1	1.00	3.00	500.00	0.12	0.033
5	A-5	A-7	30.22	29.57	Ditch 1	1.00	3.00	500.00	0.13	0.033
7	A-7	A-9	29.57	29.12	Ditch 1	1.00	3.00	500.00	0.09	0.033
9	A-9	A-11	29.12	28.47	Ditch 1	1.00	3.00	500.00	0.13	0.033
11	A-11	A-13	28.47	27.87	Ditch 1	1.00	3.00	500.00	0.12	0.033
13	A-13	A-15	27.87	27.62	Ditch 1	1.00	3.00	500.00	0.05	0.033
15	A-15	A-17	27.62	27.35	Ditch 1	1.00	3.00	500.00	0.05	0.033
17	A-17	A-19	27.35	26.90	Ditch 1	1.00	3.00	500.00	0.09	0.033
19	A-19	A-21	26.90	25.85	Ditch 1	1.00	3.00	500.00	0.21	0.033
21	A-21	A-23	25.85	25.45	Ditch 1	1.00	3.00	500.00	0.08	0.033
23	A-23	A-27	25.45	20.78	Ditch 1	1.00	3.00	580.00	0.81	0.033
30	A-27	A-28	20.78	17.45	Circ 1	0.00	2.00	50.00	6.67	0.013
31	A-28	A-29	17.45	16.95	Circ 1	0.00	2.00	87.50	0.57	0.013
32	A-29	A-30	16.95	16.45	Circ 1	0.00	4.50	187.50	0.27	0.013
33	A-30	A31	16.45	14.23	Circ 1	0.00	4.50	200.00	1.11	0.013
34	A31	OUT	14.23	10.98	Circ 1	0.00	4.50	20.00	16.47	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1	61.24	61.20	0.008	1.88	3.00	1.25	0.53	11.10	35.22	0.000	33.00
3	61.20	61.07	0.026	2.16	3.00	1.69	0.92	19.41	42.09	0.000	32.00
5	61.07	60.83	0.049	2.44	3.00	1.88	1.28	26.89	43.81	0.000	31.00
7	60.83	60.45	0.077	2.91	3.00	1.70	1.60	33.65	36.45	0.000	31.00
9	60.45	59.92	0.106	2.91	3.00	2.00	1.88	39.51	43.81	0.000	30.80
11	59.92	59.23	0.138	3.00	3.00	2.15	2.15	45.14	42.09	0.000	30.08
13	59.23	58.37	0.172	3.00	3.00	2.40	2.40	50.45	27.17	0.000	31.00
15	58.37	57.34	0.205	3.00	3.00	2.62	2.62	55.00	28.24	0.000	31.00
17	57.34	56.27	0.215	3.00	3.00	2.69	2.69	56.39	36.45	0.000	31.00
19	56.27	55.74	0.105	2.63	3.00	2.46	1.91	57.43	81.19	0.000	30.00
21	55.74	54.57	0.234	3.00	3.00	2.80	2.80	58.77	34.37	0.000	30.00
23	54.57	52.99	0.272	2.40	3.00	4.55	3.02	63.42	109.04	0.000	29.12
30	52.99	48.95	8.081	2.00	2.00	20.47	20.47	64.32	58.45	0.000	29.12
31	48.95	21.45	31.432	2.00	2.00	40.38	40.38	126.85	17.10	0.000	29.12
32	21.45	19.77	0.416	4.50	4.50	7.98	7.98	126.85	101.56	0.000	26.17
33*	19.00	16.78	0.416	2.55	2.55	13.65	13.65	126.85	207.22	0.000	24.39

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OUTPUT FOR ANALYSYS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-21	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-22	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-23	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-24	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-25	0.55	4.63	26.00	26.00	7.49	0.000	19.073
A-26	0.55	1.21	17.67	17.67	9.10	0.000	6.079
A-27	0.55	1.53	18.67	18.67	8.87	0.000	7.461
A-28	0.55	2.66	21.50	21.50	8.27	0.000	12.106
A-1	0.55	4.82	34.17	34.17	6.45	0.000	17.100
A-2	0.55	0.48	16.83	16.83	9.32	0.000	2.470
A-3	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-4	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-5	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-6	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-7	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-8	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-9	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-10	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-11	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-12	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-13	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-14	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-15	0.55	4.19	25.00	25.00	7.65	0.000	17.621
A-16	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-17	0.55	0.92	19.63	19.63	8.65	0.000	4.377
A-18	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-19	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-20	0.55	3.44	23.33	23.33	7.93	0.000	14.998

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-1	Junct	0.550	4.82	34.17	6.45	0.000	0.00	17.100
A-2	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-3	Junct	0.550	9.41	40.20	5.88	0.000	0.00	30.431
A-4	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-5	Junct	0.550	14.00	44.69	5.53	0.000	0.00	42.563
A-6	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-7	Junct	0.550	18.59	48.69	5.26	0.000	0.00	53.730
A-8	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-9	Junct	0.550	23.18	51.94	5.06	0.000	0.00	64.455
A-10	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-11	Junct	0.550	27.77	54.66	4.90	0.000	0.00	74.886
A-12	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-13	Junct	0.550	32.36	57.00	4.78	0.000	0.00	85.079
A-14	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-15	Junct	0.550	36.55	59.05	4.68	0.000	0.00	94.046
A-16	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-17	Junct	0.550	37.47	60.91	4.59	0.000	0.00	94.604
A-18	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-19	Junct	0.550	38.16	60.91	4.59	0.000	0.00	96.346

Melody Lane_Exist_North_1_t.txt

A-20	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-21	Junct	0.550	42.75	65.36	4.40	0.000	0.00	0.000	0.00	103.366
A-22	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-23	Junct	0.550	47.34	67.05	4.33	0.000	0.00	0.000	0.00	112.672
A-24	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-26	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-27	Grate	0.550	48.87	68.85	4.26	0.000	0.00	0.000	0.00	114.420
A-28	Grate	0.550	51.53	68.88	4.26	0.000	59.05	0.000	59.05	179.680
A-29	CircMh	0.550	51.53	68.88	4.26	0.000	59.05	0.000	59.05	179.680
A-30	CircMh	0.550	51.53	68.88	4.26	0.000	59.05	0.000	59.05	179.680
A31	CircMh	0.550	51.53	68.88	4.26	0.000	59.05	0.000	59.05	179.680
OUT	outlt	0.550	51.53	68.88	4.26	0.000	59.05	0.000	59.05	179.680

Conveyance Configuration Data

Run#	Node US	I.D. DS	Flowline US Elev (ft)	Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
1	A-1	A-3	31.24	30.82	Ditch 1	1.00	3.00	500.00	0.08	0.033
3	A-3	A-5	30.82	30.22	Ditch 1	1.00	3.00	500.00	0.12	0.033
5	A-5	A-7	30.22	29.57	Ditch 1	1.00	3.00	500.00	0.13	0.033
7	A-7	A-9	29.57	29.12	Ditch 1	1.00	3.00	500.00	0.09	0.033
9	A-9	A-11	29.12	28.47	Ditch 1	1.00	3.00	500.00	0.13	0.033
11	A-11	A-13	28.47	27.87	Ditch 1	1.00	3.00	500.00	0.12	0.033
13	A-13	A-15	27.87	27.62	Ditch 1	1.00	3.00	500.00	0.05	0.033
15	A-15	A-17	27.62	27.35	Ditch 1	1.00	3.00	500.00	0.05	0.033
17	A-17	A-19	27.35	26.90	Ditch 1	1.00	3.00	500.00	0.09	0.033
19	A-19	A-21	26.90	25.85	Ditch 1	1.00	3.00	500.00	0.21	0.033
21	A-21	A-23	25.85	25.45	Ditch 1	1.00	3.00	500.00	0.08	0.033
23	A-23	A-27	25.45	20.78	Ditch 1	1.00	3.00	580.00	0.81	0.033
30	A-27	A-28	20.78	17.45	Circ 1	0.00	2.00	50.00	6.67	0.013
31	A-28	A-29	17.45	16.95	Circ 1	0.00	2.00	87.50	0.57	0.013
32	A-29	A-30	16.95	16.45	Circ 1	0.00	4.50	187.50	0.27	0.013
33	A-30	A31	16.45	14.23	Circ 1	0.00	4.50	200.00	1.11	0.013
34	A31	OUT	14.23	10.98	Circ 1	0.00	4.50	20.00	16.47	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1	114.42	114.33	0.020	2.25	3.00	1.38	0.81	17.10	35.22	0.000	33.00
3	114.33	114.01	0.063	2.63	3.00	1.85	1.45	30.43	42.09	0.000	32.00
5	114.01	113.40	0.123	2.95	3.00	2.09	2.03	42.56	43.81	0.000	31.00
7	113.40	112.42	0.196	3.00	3.00	2.56	2.56	53.73	36.45	0.000	31.00
9	112.42	111.02	0.281	3.00	3.00	3.07	3.07	64.45	43.81	0.000	30.80
11	111.02	109.12	0.380	3.00	3.00	3.57	3.57	74.89	42.09	0.000	30.08
13	109.12	106.67	0.490	3.00	3.00	4.05	4.05	85.08	27.17	0.000	31.00
15	106.67	103.67	0.599	3.00	3.00	4.48	4.48	94.05	28.24	0.000	31.00
17	103.67	100.64	0.606	3.00	3.00	4.50	4.50	94.60	36.45	0.000	31.00
19	100.64	99.16	0.296	3.00	3.00	3.21	3.21	96.35	81.19	0.000	30.00
21	99.16	95.54	0.724	3.00	3.00	4.92	4.92	103.37	34.37	0.000	30.00
23	95.54	90.56	0.860	3.00	3.00	5.37	5.37	112.67	109.04	0.000	29.12
30	90.56	77.77	25.575	2.00	2.00	36.42	36.42	114.42	58.45	0.000	29.12
31	77.77	22.59	63.067	2.00	2.00	57.19	57.19	179.68	17.10	0.000	29.12
32	22.59	20.33	0.835	4.50	4.50	11.30	11.30	179.68	101.56	0.000	26.17
33*	19.68	17.46	0.835	3.23	3.23	14.68	14.68	179.68	207.22	0.000	24.39
34*	15.68	12.43	0.835	1.45	1.45	40.51	40.51	179.68	798.15	0.000	22.15

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

Melody Lane_Exist_North_1_t.txt

PROJECT NAME : Melody Lane
 JOB NUMBER : 2006129-04
 PROJECT DESCRIPTION : Melody Lane Existing South Ditch
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-16	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-17	0.55	0.92	19.63	19.63	5.74	0.000	2.905
A-18	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-19	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-20	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-21	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-22	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-23	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-24	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-25	0.55	4.63	26.00	26.00	4.92	0.000	12.518
A-26	0.55	1.21	17.67	17.67	6.07	0.000	4.051
A-27	0.55	1.53	18.67	18.67	5.90	0.000	4.962
A-28	0.55	2.66	21.50	21.50	5.47	0.000	8.007
A-1	0.55	4.82	34.17	34.17	4.19	0.000	11.095
A-2	0.55	0.48	16.83	16.83	6.22	0.000	1.649
A-3	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-4	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-5	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-6	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-7	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-8	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-9	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-10	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-11	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-12	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-13	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-14	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-15	0.55	4.19	25.00	25.00	5.03	0.000	11.584

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-1	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-2	Junct	0.550	0.48	16.83	6.22	0.000	0.00	1.649
A-3	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-4	Junct	0.550	1.17	35.30	4.10	0.000	0.00	2.645
A-5	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-6	Junct	0.550	1.86	42.45	3.66	0.000	0.00	3.750
A-7	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-8	Junct	0.550	2.55	51.76	3.23	0.000	0.00	4.531
A-9	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-10	Junct	0.550	3.24	56.31	3.06	0.000	0.00	5.450
A-11	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-12	Junct	0.550	3.93	64.51	2.80	0.000	0.00	6.046

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A-13	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-14	Junct	0.550	5.08	72.78	2.58	0.000	0.00	0.000	0.00	7.211
A-15	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-16	Junct	0.550	6.23	80.50	2.41	0.000	0.00	0.000	0.00	8.264
A-17	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-18	Junct	0.550	9.67	87.22	2.28	0.000	0.00	0.000	0.00	12.147
A-19	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-20	Junct	0.550	13.11	93.33	2.18	0.000	0.00	0.000	0.00	15.725
A-21	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-22	Junct	0.550	16.55	99.41	2.09	0.000	0.00	0.000	0.00	19.012
A-23	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-24	Junct	0.550	19.99	105.25	2.01	0.000	0.00	0.000	0.00	22.079
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-26	Junct	0.550	21.21	112.90	1.91	0.000	0.00	0.000	0.00	22.311
A-27	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-28	Junct	0.550	23.87	113.90	1.90	0.000	134.03	0.000	158.990	158.990
A-29	CircMh	0.550	23.87	113.90	1.90	0.000	134.03	0.000	158.990	158.990
A-30	CircMh	0.550	23.87	113.90	1.90	0.000	134.03	0.000	158.990	158.990
A-31	CircMh	0.550	23.87	113.90	1.90	0.000	134.03	0.000	158.990	158.990
OUT	outlt	0.550	23.87	113.90	1.90	0.000	134.03	0.000	158.990	158.990

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
2	A-2	A-4	30.98	30.85	Ditch 1	1.00	3.00	500.00	0.03	0.033
4	A-4	A-6	30.85	29.97	Ditch 1	1.00	3.00	500.00	0.18	0.033
6	A-6	A-8	29.97	29.62	Ditch 1	1.00	3.00	500.00	0.07	0.033
8	A-8	A-10	29.62	28.34	Ditch 1	1.00	3.00	500.00	0.26	0.026
10	A-10	A-12	28.34	27.99	Ditch 1	1.00	3.00	500.00	0.07	0.033
12	A-12	A-14	27.99	27.61	Ditch 1	1.00	3.00	500.00	0.08	0.033
14	A-14	A-16	27.61	27.22	Ditch 1	1.00	3.00	500.00	0.08	0.033
16	A-16	A-18	27.22	26.73	Ditch 1	1.00	3.00	500.00	0.10	0.033
18	A-18	A-20	26.73	26.28	Ditch 1	1.00	3.00	500.00	0.09	0.033
20	A-20	A-22	26.28	25.88	Ditch 1	1.00	3.00	500.00	0.08	0.033
22	A-22	A-24	25.88	25.48	Ditch 1	1.00	3.00	500.00	0.08	0.033
24	A-24	A-26	25.48	25.21	Ditch 1	1.00	3.00	500.00	0.05	0.033
26	A-26	A-28	25.21	17.45	Ditch 1	1.00	3.00	500.00	1.55	0.013
28	A-28	A-29	17.45	16.95	Circ 1	0.00	4.50	500.00	0.10	0.013
32	A-29	A-30	16.95	16.45	Circ 1	0.00	4.50	187.50	0.27	0.013
33	A-30	A-31	16.45	14.23	Circ 1	0.00	4.50	200.00	1.11	0.013
34	A-31	OUT	14.23	10.98	Circ 1	0.00	4.50	20.00	16.47	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
2	32.11	31.71	0.000	1.13	1.13	0.45	0.45	1.65	19.59	0.000	33.5
4	31.71	31.19	0.000	0.84	1.22	1.17	0.63	2.64	50.98	0.000	33.5
6	31.19	30.52	0.001	1.22	1.22	0.90	0.90	3.75	32.15	0.000	33.33
8	30.52	29.81	0.001	0.89	1.47	1.83	0.78	4.53	78.04	0.000	31.24
10	29.81	29.53	0.002	1.41	1.54	1.02	0.87	5.45	32.15	0.000	31.24
12	29.53	29.27	0.002	1.50	1.66	1.01	0.85	6.05	33.50	0.000	31.19
14	29.27	29.00	0.004	1.59	1.78	1.08	0.88	7.21	33.94	0.000	31.19
16	29.00	28.80	0.005	1.59	2.07	1.24	0.78	8.26	38.04	0.000	29.73
18	28.80	28.56	0.010	1.88	2.28	1.36	0.96	12.15	36.45	0.000	29.73
20	28.56	28.27	0.017	2.16	2.39	1.37	1.14	15.72	34.37	0.000	29.48
22	28.27	27.92	0.024	2.34	2.44	1.43	1.33	19.01	34.37	0.000	29.44
24	27.92	26.34	0.016	2.44	2.44	1.09	1.09	22.08	41.17	0.000	29.07
26*	26.34	25.22	0.002	0.79	3.00	8.31	0.74	22.31	560.33	0.000	33.69
28	25.22	21.96	0.653	4.50	4.50	10.00	10.00	158.99	62.19	0.000	33.34
32	21.96	20.14	0.653	4.50	4.50	10.00	10.00	158.99	101.56	0.000	31.19

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33* 19.40 17.18 0.653 2.95 2.95 14.37 14.37 158.99 207.22 0.000 29.83
 34* 15.59 12.34 0.653 1.36 1.36 39.15 39.15 158.99 798.15 0.000 29.83

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OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-16	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-17	0.55	0.92	19.63	19.63	8.65	0.000	4.377
A-18	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-19	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-20	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-21	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-22	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-23	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-24	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-25	0.55	4.63	26.00	26.00	7.49	0.000	19.073
A-26	0.55	1.21	17.67	17.67	9.10	0.000	6.079
A-27	0.55	1.53	18.67	18.67	8.87	0.000	7.461
A-28	0.55	2.66	21.50	21.50	8.27	0.000	12.106
A-1	0.55	4.82	34.17	34.17	6.45	0.000	17.100
A-2	0.55	0.48	16.83	16.83	9.32	0.000	2.470
A-3	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-4	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-5	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-6	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-7	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-8	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-9	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-10	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-11	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-12	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-13	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-14	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-15	0.55	4.19	25.00	25.00	7.65	0.000	17.621

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-1	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-2	Junct	0.550	0.48	16.83	9.32	0.000	0.00	2.470
A-3	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-4	Junct	0.550	1.17	32.88	6.59	0.000	0.00	4.248
A-5	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-6	Junct	0.550	1.86	39.31	5.96	0.000	0.00	6.099
A-7	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-8	Junct	0.550	2.55	47.51	5.33	0.000	0.00	7.484
A-9	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-10	Junct	0.550	3.24	51.58	5.08	0.000	0.00	9.053
A-11	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-12	Junct	0.550	3.93	59.06	4.68	0.000	0.00	10.116
A-13	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-14	Junct	0.550	5.08	66.40	4.35	0.000	0.00	12.168
A-15	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-16	Junct	0.550	6.23	73.06	4.10	0.000	0.00	14.063
A-17	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-18	Junct	0.550	9.67	78.82	3.91	0.000	0.00	20.814

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A-19	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-20	Junct	0.550	13.11	84.55	3.74	0.000	0.00	0.000	0.00	26.996
A-21	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-22	Junct	0.550	16.55	89.95	3.60	0.000	0.00	0.000	0.00	32.767
A-23	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-24	Junct	0.550	19.99	94.99	3.48	0.000	0.00	0.000	0.00	38.229
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-26	Junct	0.550	21.21	101.15	3.34	0.000	0.00	0.000	0.00	38.955
A-27	Junct	0.000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000
A-28	Junct	0.550	23.87	102.02	3.32	0.000	134.03	0.000	134.03	177.636
A-29	CircMh	0.550	23.87	102.02	3.32	0.000	134.03	0.000	134.03	177.636
A-30	CircMh	0.550	23.87	102.02	3.32	0.000	134.03	0.000	134.03	177.636
A-31	CircMh	0.550	23.87	102.02	3.32	0.000	134.03	0.000	134.03	177.636
OUT	outlt	0.550	23.87	102.02	3.32	0.000	134.03	0.000	134.03	177.636

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape	#	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)							
2	A-2	A-4	30.98	30.85	Ditch	1	1.00	3.00	500.00	0.03	0.033
4	A-4	A-6	30.85	29.97	Ditch	1	1.00	3.00	500.00	0.18	0.033
6	A-6	A-8	29.97	29.62	Ditch	1	1.00	3.00	500.00	0.07	0.033
8	A-8	A-10	29.62	28.34	Ditch	1	1.00	3.00	500.00	0.26	0.026
10	A-10	A-12	28.34	27.99	Ditch	1	1.00	3.00	500.00	0.07	0.033
12	A-12	A-14	27.99	27.61	Ditch	1	1.00	3.00	500.00	0.08	0.033
14	A-14	A-16	27.61	27.22	Ditch	1	1.00	3.00	500.00	0.08	0.033
16	A-16	A-18	27.22	26.73	Ditch	1	1.00	3.00	500.00	0.10	0.033
18	A-18	A-20	26.73	26.28	Ditch	1	1.00	3.00	500.00	0.09	0.033
20	A-20	A-22	26.28	25.88	Ditch	1	1.00	3.00	500.00	0.08	0.033
22	A-22	A-24	25.88	25.48	Ditch	1	1.00	3.00	500.00	0.08	0.033
24	A-24	A-26	25.48	25.21	Ditch	1	1.00	3.00	500.00	0.05	0.033
26	A-26	A-28	25.21	17.45	Ditch	1	1.00	3.00	500.00	1.55	0.013
28	A-28	A-29	17.45	16.95	Circ	1	0.00	4.50	500.00	0.10	0.013
32	A-29	A-30	16.95	16.45	Circ	1	0.00	4.50	187.50	0.27	0.013
33	A-30	A-31	16.45	14.23	Circ	1	0.00	4.50	200.00	1.11	0.013
34	A-31	OUT	14.23	10.98	circ	1	0.00	4.50	20.00	16.47	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
2	32.29	31.93	0.000	1.31	1.31	0.52	0.52	2.47	19.59	0.000	33.5
4	31.93	31.47	0.001	1.05	1.50	1.30	0.71	4.25	50.98	0.000	33.5
6	31.47	30.76	0.003	1.50	1.50	1.02	1.02	6.10	32.15	0.000	33.33
8	30.76	30.21	0.002	1.13	1.87	2.05	0.85	7.48	78.04	0.000	31.24
10	30.21	29.96	0.006	1.78	1.97	1.11	0.93	9.05	32.15	0.000	31.24
12	29.96	29.74	0.007	1.88	2.13	1.14	0.90	10.12	33.50	0.000	31.19
14	29.74	29.52	0.010	1.97	2.30	1.25	0.95	12.17	33.94	0.000	31.19
16	29.52	29.34	0.013	1.97	2.61	1.45	0.87	14.06	38.04	0.000	29.73
18	29.34	29.10	0.029	2.44	2.82	1.45	1.11	20.81	36.45	0.000	29.73
20	29.10	28.79	0.049	2.72	2.91	1.54	1.36	27.00	34.37	0.000	29.48
22	28.79	28.39	0.073	2.91	2.91	1.66	1.66	32.77	34.37	0.000	29.44
24	28.39	26.65	0.047	2.91	2.91	1.35	1.35	38.23	41.17	0.000	29.07
26*	26.65	26.61	0.008	1.01	3.00	9.56	1.30	38.96	560.33	0.000	33.69
28	26.61	22.53	0.816	4.50	4.50	11.17	11.17	177.64	62.19	0.000	33.34
32	22.53	20.31	0.816	4.50	4.50	11.17	11.17	177.64	101.56	0.000	31.19
33*	19.65	17.43	0.816	3.20	3.20	14.69	14.69	177.64	207.22	0.000	29.83
34*	15.67	12.42	0.816	1.44	1.44	40.37	40.37	177.64	798.15	0.000	29.83

END

* Super critical flow.

Melody Lane_Exist_South_1_t..txt
NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : Melody Lane
 JOB NUMBER : 2006129-04
 PROJECT DESCRIPTION : Melody Lane (Entire Length w/o additional area)
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.55	4.82	34.17	34.17	4.19	0.000	11.095
A-2	0.55	0.48	16.83	16.83	6.22	0.000	1.649
A-3	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-4	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-5	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-6	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-7	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-8	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-9	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-10	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-11	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-12	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-13	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-14	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-15	0.55	4.19	25.00	25.00	5.03	0.000	11.584
A-16	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-17	0.55	0.92	19.63	19.63	5.74	0.000	2.905
A-18	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-19	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-20	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-21	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-22	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-23	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-24	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-25	0.55	4.63	26.00	26.00	4.92	0.000	12.518
A-26	0.55	1.21	17.67	17.67	6.07	0.000	4.038
A-27	0.55	1.53	18.67	18.67	5.90	0.000	4.962
A-28	0.55	2.66	21.50	21.50	5.47	0.000	7.998
B-1	0.55	60.60	66.00	66.00	2.75	0.000	91.782

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
N-11	CircMh	0.550	59.30	57.19	3.03	0.000	0.00	98.686
N-12	CircMh	0.550	67.33	59.20	2.96	0.000	0.00	109.552
N-13	CircMh	0.550	68.54	60.57	2.91	0.000	0.00	109.856
A-26	Curb	0.550	1.21	17.67	6.07	0.000	0.00	4.038
A-27	Grate	0.550	1.53	18.67	5.90	0.000	0.00	4.962
A-1	Curb	0.550	4.82	34.17	4.19	0.000	0.00	11.095
A-2	Curb	0.550	0.48	16.83	6.22	0.000	0.00	1.649
A-3	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-4	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-5	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-6	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197

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A-7	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-8	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-9	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-10	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-11	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-12	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-13	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-14	Curb	0.550	1.15	20.00	5.68	0.000	0.00	3.596
A-15	Curb	0.550	4.19	25.00	5.03	0.000	0.00	11.584
A-16	Curb	0.550	1.15	20.00	5.68	0.000	0.00	3.596
A-17	Curb	0.550	0.92	19.63	5.74	0.000	0.00	2.905
A-18	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-19	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-20	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-21	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-22	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-23	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-24	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.550	5.30	34.18	4.18	0.000	0.00	12.203
N-2	CircMh	0.550	10.58	38.47	3.89	0.000	0.00	22.658
N-3	CircMh	0.550	15.86	40.78	3.75	0.000	0.00	32.756
N-4	CircMh	0.550	21.14	43.35	3.61	0.000	0.00	42.020
N-5	CircMh	0.550	26.42	45.61	3.50	0.000	0.00	50.860
N-6	CircMh	0.550	31.70	47.97	3.39	0.000	0.00	59.099
N-7	CircMh	0.550	37.44	50.19	3.29	0.000	0.00	67.801
N-8	CircMh	0.550	42.78	51.18	3.25	0.000	0.00	76.503
N-9	CircMh	0.550	47.14	53.32	3.17	0.000	0.00	82.103
N-10	CircMh	0.550	51.27	55.32	3.09	0.000	0.00	87.197
A-28	Grate	0.550	2.66	21.50	5.47	0.000	0.00	7.998
A-29	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-30	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-31	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-8A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-14	CircMh	0.550	72.73	60.96	2.90	0.000	0.00	116.080
N-15	CircMh	0.550	72.73	60.96	2.90	0.000	0.00	116.080
OUT	Outlt	0.550	72.73	60.96	2.90	0.000	0.00	116.080

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	A-1	N-1	29.00	25.69	Circ 1	0.00	2.00	12.00	28.70	0.013
2	A-2	N-1	29.00	25.69	Circ 1	0.00	2.00	12.00	28.70	0.013
3	A-3	N-2	28.00	25.79	Circ 1	0.00	2.00	12.00	18.74	0.013
4	A-4	N-2	28.00	25.79	Circ 1	0.00	2.00	12.00	18.74	0.013
5	A-5	N-3	27.50	25.24	Circ 1	0.00	2.00	12.00	19.18	0.013
6	A-6	N-3	27.50	25.24	Circ 1	0.00	3.00	12.00	19.18	0.013
7	A-7	N-4	25.39	24.89	Circ 1	0.00	2.00	12.00	4.17	0.013
8	A-8	N-4	26.74	24.89	Circ 1	0.00	2.00	12.00	15.60	0.013
9	A-9	N-5	26.50	24.54	Circ 1	0.00	2.00	12.00	16.56	0.013
10	A-10	N-5	26.40	24.54	Circ 1	0.00	2.00	12.00	15.69	0.013
11	A-11	N-6	26.30	24.24	Circ 1	0.00	2.00	12.00	17.43	0.013
12	A-12	N-6	26.30	24.24	Circ 1	0.00	2.00	12.00	17.43	0.013
13	A-13	N-7	25.58	23.94	Circ 1	0.00	2.00	12.00	13.80	0.013
14	A-14	N-7	26.50	23.94	Circ 1	0.00	2.00	12.00	21.84	0.013
15	A-15	N-8	26.50	23.64	Circ 1	0.00	2.00	12.00	24.54	0.013
16	A-16	N-8	26.50	23.64	Circ 1	0.00	2.00	12.00	24.54	0.013
17	A-17	N-9	26.50	23.34	Circ 1	0.00	2.00	12.00	27.30	0.013
18	A-18	N-9	25.50	23.34	Circ 1	0.00	2.00	12.00	18.30	0.013
19	A-19	N-10	26.50	23.39	Circ 1	0.00	2.00	12.00	26.83	0.013
20	A-20	N-10	25.50	23.39	Circ 1	0.00	2.00	12.00	17.86	0.013
21	A-21	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
22	A-22	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
23	A-23	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013
24	A-24	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013

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25	A-26	N-13	24.57	22.64	Circ 1	0.00	2.00	12.00	16.30	0.013
26	N-1	N-2	23.79	23.69	Circ 1	0.00	4.00	500.00	0.02	0.013
27	N-2	N-3	23.69	23.24	Circ 1	0.00	4.00	500.00	0.09	0.013
28	N-3	N-4	23.24	22.89	Circ 1	0.00	4.00	500.00	0.07	0.013
29	N-4	N-5	22.89	22.54	Circ 1	0.00	5.00	500.00	0.07	0.013
30	N-5	N-6	22.54	22.24	Circ 1	0.00	5.00	500.00	0.06	0.013
31	N-6	N-7	22.24	21.94	Circ 1	0.00	5.00	500.00	0.06	0.013
32	N-7	N-8	21.94	19.64	Circ 1	0.00	5.00	500.00	0.46	0.013
33	N-8	N-9	19.64	19.34	Circ 1	0.00	5.00	500.00	0.06	0.013
34	N-9	N-10	19.34	19.29	Circ 1	0.00	5.00	500.00	0.01	0.013
35	N-10	N-11	19.29	19.14	Circ 1	0.00	5.00	500.00	0.03	0.013
36	N-11	N-12	19.14	18.89	Circ 1	0.00	5.50	500.00	0.05	0.013
37	N-12	N-13	18.89	18.64	Circ 1	0.00	5.50	380.00	0.07	0.013
39	A-27	N-14	24.62	24.10	Circ 1	0.00	2.00	24.00	2.17	0.013
40	A-28	N-14	24.57	24.10	Circ 1	0.00	2.00	12.00	3.92	0.013
41	N-13	N-14	18.64	15.17	Circ 1	0.00	5.50	310.00	1.12	0.013
42	N-14	N-15	15.17	14.87	Circ 1	0.00	5.50	550.00	0.05	0.013
43	N-15	OUT	14.87	12.00	Circ 1	0.00	5.50	400.00	0.72	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	29.56	27.54	0.240	0.41	1.85	24.01	3.65	11.10	121.20	0.000	33.65
2*	29.19	27.54	0.005	0.16	1.85	13.62	0.54	1.65	121.20	0.000	33.5
3*	28.67	27.51	0.315	0.49	1.72	21.55	4.40	12.69	97.94	0.000	33.65
4*	28.25	27.51	0.009	0.21	1.72	12.86	0.76	2.20	97.94	0.000	33.5
5*	28.78	27.40	0.315	0.48	2.00	21.67	4.04	12.69	99.08	0.000	33.12
6*	27.74	27.40	0.001	0.19	2.16	12.15	0.40	2.20	292.12	0.000	33.33
7*	27.18	27.14	0.315	0.72	2.00	12.54	4.04	12.69	46.20	0.000	31.37
8*	27.25	27.14	0.009	0.22	2.00	12.02	0.70	2.20	89.37	0.000	31.24
9*	27.78	27.03	0.315	0.50	2.00	20.60	4.04	12.69	92.06	0.000	31.37
10*	27.03	27.03	0.009	0.22	2.00	12.02	0.70	2.20	89.62	0.000	31.24
11*	27.58	26.87	0.315	0.50	2.00	20.95	4.04	12.69	94.45	0.000	31.15
12*	26.87	26.87	0.009	0.21	2.00	12.51	0.70	2.20	94.45	0.000	31.19
13*	26.86	26.65	0.315	0.53	2.00	19.27	4.04	12.69	84.04	0.000	31.15
14*	27.16	26.65	0.025	0.25	2.00	15.60	1.14	3.60	105.73	0.000	31.19
15*	27.72	26.31	0.262	0.43	2.00	23.01	3.69	11.58	112.08	0.000	29.7
16*	27.16	26.31	0.025	0.25	2.00	16.33	1.14	3.60	112.08	0.000	29.73
17*	27.09	25.88	0.016	0.22	2.00	15.89	0.92	2.91	118.21	0.000	29.7
18*	26.63	25.88	0.191	0.43	2.00	19.76	3.15	9.89	96.79	0.000	29.73
19*	26.73	25.38	0.009	0.19	1.99	14.44	0.70	2.20	117.20	0.000	29.41
20*	26.11	25.38	0.191	0.43	1.99	19.64	3.15	9.89	95.62	0.000	29.48
21*	26.78	24.82	0.315	0.43	2.00	25.20	4.04	12.69	122.19	0.000	29.36
22*	26.63	24.82	0.191	0.38	2.00	23.37	3.15	9.89	122.19	0.000	29.44
23*	26.14	24.39	0.315	0.47	1.50	22.84	5.02	12.69	106.80	0.000	29.12
24*	26.05	24.39	0.191	0.41	1.50	21.25	3.91	9.89	106.80	0.000	29.07
25*	24.86	22.93	0.032	0.29	0.29	14.64	14.64	4.04	91.33	0.000	29.12
26	27.54	27.51	0.007	2.00	3.82	1.94	0.99	12.20	20.32	0.000	33.69
27	27.51	27.40	0.025	2.00	4.00	3.61	1.80	22.66	43.10	0.000	33.59
28	27.40	27.14	0.052	3.00	4.00	3.24	2.61	32.76	38.01	0.000	33.34
29	27.14	27.03	0.026	2.81	4.49	3.69	2.26	42.02	68.92	0.000	31.42
30	27.03	26.87	0.038	3.44	4.63	3.53	2.68	50.86	63.80	0.000	31.42
31	26.87	26.65	0.051	3.75	4.71	3.74	3.08	59.10	63.80	0.000	31.29
32*	26.65	26.31	0.068	2.15	5.00	8.41	3.45	67.80	176.67	0.000	31.19
33	26.31	25.88	0.086	5.00	5.00	3.90	3.90	76.50	63.80	0.000	29.83
34	25.88	25.38	0.099	5.00	5.00	4.18	4.18	82.10	26.05	0.000	29.83
35	25.38	24.82	0.112	5.00	5.00	4.44	4.44	87.20	45.12	0.000	29.56
36	24.82	24.39	0.086	5.50	5.50	4.15	4.15	98.69	75.10	0.000	29.52
37	24.39	21.54	0.106	5.50	5.50	4.61	4.61	109.55	86.14	0.000	29.21
39*	25.14	24.62	0.048	0.52	0.52	7.61	7.61	4.96	33.31	0.000	29.21
40*	25.14	24.67	0.125	0.57	0.57	10.78	10.78	8.00	44.79	0.000	29.07
41*	21.54	20.67	0.107	2.09	5.50	13.22	4.62	109.86	355.34	0.000	29.21
42	20.67	17.86	0.119	5.50	5.50	4.89	4.89	116.08	78.44	0.000	29.10
43*	17.32	14.45	0.119	2.45	2.45	11.35	11.35	116.08	284.49	0.000	29.05

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OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

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Runoff Computation for Analysis Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.55	4.82	34.17	34.17	6.45	0.000	17.100
A-2	0.55	0.48	16.83	16.83	9.32	0.000	2.470
A-3	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-4	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-5	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-6	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-7	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-8	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-9	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-10	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-11	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-12	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-13	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-14	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-15	0.55	4.19	25.00	25.00	7.65	0.000	17.621
A-16	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-17	0.55	0.92	19.63	19.63	8.65	0.000	4.377
A-18	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-19	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-20	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-21	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-22	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-23	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-24	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-25	0.55	4.63	26.00	26.00	7.49	0.000	19.073
A-26	0.55	1.21	17.67	17.67	9.10	0.000	6.059
A-27	0.55	1.53	18.67	18.67	8.87	0.000	7.461
A-28	0.55	2.66	21.50	21.50	8.27	0.000	12.093
B-1	0.55	60.60	66.00	66.00	4.37	0.000	145.645

Cumulative Junction Discharge Computations

Node I.D.	Node Type	Weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
N-11	CircMh	0.550	59.30	53.30	4.98	0.000	0.00	162.365
N-12	CircMh	0.550	67.33	54.52	4.91	0.000	0.00	181.854
N-13	CircMh	0.550	68.54	55.34	4.87	0.000	0.00	183.445
A-26	Curb	0.550	1.21	17.67	9.10	0.000	0.00	6.059
A-27	Grate	0.550	1.53	18.67	8.87	0.000	0.00	7.461
A-1	Curb	0.550	4.82	34.17	6.45	0.000	0.00	17.100
A-2	Curb	0.550	0.48	16.83	9.32	0.000	0.00	2.470
A-3	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-4	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-5	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-6	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-7	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-8	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-9	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-10	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-11	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-12	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-13	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-14	Curb	0.550	1.15	20.00	8.57	0.000	0.00	5.421
A-15	Curb	0.550	4.19	25.00	7.65	0.000	0.00	17.621

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A-16	Curb	0.550	1.15	20.00	8.57	0.000	0.00	5.421
A-17	Curb	0.550	0.92	19.63	8.65	0.000	0.00	4.377
A-18	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-19	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-20	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-21	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-22	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-23	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-24	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.550	5.30	34.18	6.45	0.000	0.00	18.808
N-2	CircMh	0.550	10.58	38.66	6.01	0.000	0.00	35.001
N-3	CircMh	0.550	15.86	40.85	5.83	0.000	0.00	50.822
N-4	CircMh	0.550	21.14	42.91	5.66	0.000	0.00	65.828
N-5	CircMh	0.550	26.42	44.91	5.51	0.000	0.00	80.102
N-6	CircMh	0.550	31.70	46.95	5.37	0.000	0.00	93.620
N-7	CircMh	0.550	37.44	48.70	5.25	0.000	0.00	108.199
N-8	CircMh	0.550	42.78	49.58	5.20	0.000	0.00	122.325
N-9	CircMh	0.550	47.14	50.91	5.12	0.000	0.00	132.665
N-10	CircMh	0.550	51.27	52.15	5.04	0.000	0.00	142.233
A-28	Grate	0.550	2.66	21.50	8.27	0.000	0.00	12.093
A-29	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-30	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-31	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-8A	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-14	CircMh	0.550	72.73	55.69	4.85	0.000	0.00	193.933
N-15	CircMh	0.550	72.73	55.69	4.85	0.000	0.00	193.933
OUT	outlt	0.550	72.73	55.69	4.85	0.000	0.00	193.933

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	A-1	N-1	29.00	25.69	Circ 1	0.00	2.00	12.00	28.70	0.013
2	A-2	N-1	29.00	25.69	Circ 1	0.00	2.00	12.00	28.70	0.013
3	A-3	N-2	28.00	25.79	Circ 1	0.00	2.00	12.00	18.74	0.013
4	A-4	N-2	28.00	25.79	Circ 1	0.00	2.00	12.00	18.74	0.013
5	A-5	N-3	27.50	25.24	Circ 1	0.00	2.00	12.00	19.18	0.013
6	A-6	N-3	27.50	25.24	Circ 1	0.00	3.00	12.00	19.18	0.013
7	A-7	N-4	25.39	24.89	Circ 1	0.00	2.00	12.00	4.17	0.013
8	A-8	N-4	26.74	24.89	Circ 1	0.00	2.00	12.00	15.60	0.013
9	A-9	N-5	26.50	24.54	Circ 1	0.00	2.00	12.00	16.56	0.013
10	A-10	N-5	26.40	24.54	Circ 1	0.00	2.00	12.00	15.69	0.013
11	A-11	N-6	26.30	24.24	Circ 1	0.00	2.00	12.00	17.43	0.013
12	A-12	N-6	26.30	24.24	Circ 1	0.00	2.00	12.00	17.43	0.013
13	A-13	N-7	25.58	23.94	Circ 1	0.00	2.00	12.00	13.80	0.013
14	A-14	N-7	26.50	23.94	Circ 1	0.00	2.00	12.00	21.84	0.013
15	A-15	N-8	26.50	23.64	Circ 1	0.00	2.00	12.00	24.54	0.013
16	A-16	N-8	26.50	23.64	Circ 1	0.00	2.00	12.00	24.54	0.013
17	A-17	N-9	26.50	23.34	Circ 1	0.00	2.00	12.00	27.30	0.013
18	A-18	N-9	25.50	23.34	Circ 1	0.00	2.00	12.00	18.30	0.013
19	A-19	N-10	26.50	23.39	Circ 1	0.00	2.00	12.00	26.83	0.013
20	A-20	N-10	25.50	23.39	Circ 1	0.00	2.00	12.00	17.86	0.013
21	A-21	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
22	A-22	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
23	A-23	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013
24	A-24	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013
25	A-26	N-13	24.57	22.64	Circ 1	0.00	2.00	12.00	16.30	0.013
26	N-1	N-2	23.79	23.69	Circ 1	0.00	4.00	500.00	0.02	0.013
27	N-2	N-3	23.69	23.24	Circ 1	0.00	4.00	500.00	0.09	0.013
28	N-3	N-4	23.24	22.89	Circ 1	0.00	4.00	500.00	0.07	0.013
29	N-4	N-5	22.89	22.54	Circ 1	0.00	5.00	500.00	0.07	0.013
30	N-5	N-6	22.54	22.24	Circ 1	0.00	5.00	500.00	0.06	0.013
31	N-6	N-7	22.24	21.94	Circ 1	0.00	5.00	500.00	0.06	0.013
32	N-7	N-8	21.94	19.64	Circ 1	0.00	5.00	500.00	0.46	0.013
33	N-8	N-9	19.64	19.34	Circ 1	0.00	5.00	500.00	0.06	0.013

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34	N-9	N-10	19.34	19.29	Circ 1	0.00	5.00	500.00	0.01	0.013
35	N-10	N-11	19.29	19.14	Circ 1	0.00	5.00	500.00	0.03	0.013
36	N-11	N-12	19.14	18.89	Circ 1	0.00	5.50	500.00	0.05	0.013
37	N-12	N-13	18.89	18.64	Circ 1	0.00	5.50	380.00	0.07	0.013
39	A-27	N-14	24.62	24.10	Circ 1	0.00	2.00	24.00	2.17	0.013
40	A-28	N-14	24.57	24.10	Circ 1	0.00	2.00	12.00	3.92	0.013
41	N-13	N-14	18.64	15.17	Circ 1	0.00	5.50	310.00	1.12	0.013
42	N-14	N-15	15.17	14.87	Circ 1	0.00	5.50	550.00	0.05	0.013
43	N-15	OUT	14.87	12.00	Circ 1	0.00	5.50	400.00	0.72	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	32.82	32.76	0.571	0.51	2.00	27.31	5.44	17.10	121.20	0.000	33.65
2*	32.76	32.76	0.012	0.20	2.00	15.30	0.79	2.47	121.20	0.000	33.5
3*	32.76	32.67	0.728	0.60	2.00	24.21	6.14	19.30	97.94	0.000	33.65
4*	32.67	32.67	0.021	0.25	2.00	14.51	1.05	3.31	97.94	0.000	33.5
5*	32.46	32.38	0.728	0.60	2.00	24.43	6.14	19.30	99.08	0.000	33.12
6*	32.38	32.38	0.002	0.22	3.00	13.75	0.47	3.31	292.12	0.000	33.33
7*	31.84	31.75	0.728	0.90	2.00	14.05	6.14	19.30	46.20	0.000	31.37
8*	31.75	31.75	0.021	0.26	2.00	13.58	1.05	3.31	89.37	0.000	31.24
9*	31.52	31.43	0.728	0.62	2.00	23.16	6.14	19.30	92.06	0.000	31.37
10*	31.43	31.43	0.021	0.26	2.00	13.58	1.05	3.31	89.62	0.000	31.24
11*	31.05	30.96	0.728	0.61	2.00	23.57	6.14	19.30	94.45	0.000	31.15
12*	30.96	30.96	0.021	0.26	2.00	14.03	1.05	3.31	94.45	0.000	31.19
13*	30.40	30.31	0.728	0.65	2.00	21.74	6.14	19.30	84.04	0.000	29.7
14*	30.32	30.31	0.057	0.31	2.00	17.69	1.73	5.42	105.73	0.000	29.73
15*	29.52	29.45	0.607	0.54	2.00	26.01	5.61	17.62	112.08	0.000	29.7
16*	29.46	29.45	0.057	0.30	2.00	18.36	1.73	5.42	112.08	0.000	29.73
17*	28.35	28.35	0.037	0.26	2.00	17.97	1.39	4.38	118.21	0.000	29.41
18*	28.40	28.35	0.439	0.53	2.00	22.37	4.77	15.00	96.79	0.000	29.48
19*	27.14	27.05	0.021	0.23	2.00	16.33	1.05	3.31	117.20	0.000	29.36
20*	27.10	27.05	0.439	0.54	2.00	22.14	4.77	15.00	95.62	0.000	29.44
21*	27.08	25.56	0.728	0.54	2.00	28.35	6.14	19.30	122.19	0.000	29.12
22*	26.90	25.56	0.439	0.47	2.00	26.36	4.77	15.00	122.19	0.000	29.07
23*	26.33	24.39	0.728	0.58	1.50	25.83	7.64	19.30	106.80	0.000	29.12
24*	26.21	24.39	0.439	0.51	1.50	23.96	5.93	15.00	106.80	0.000	33.69
25*	24.92	22.99	0.072	0.35	0.35	16.50	16.50	6.06	91.33	0.000	33.59
26	32.76	32.67	0.017	3.00	4.00	1.86	1.50	18.81	20.32	0.000	33.34
27	32.67	32.38	0.059	2.75	4.00	3.80	2.79	35.00	43.10	0.000	31.42
28	32.38	31.75	0.125	4.00	4.00	4.04	4.04	50.82	38.01	0.000	31.42
29	31.75	31.43	0.064	3.75	5.00	4.17	3.35	65.83	68.92	0.000	31.29
30	31.43	30.96	0.095	5.00	5.00	4.08	4.08	80.10	63.80	0.000	31.19
31	30.96	30.31	0.129	5.00	5.00	4.77	4.77	93.62	63.80	0.000	29.83
32*	30.31	29.45	0.173	2.81	5.00	9.51	5.51	108.20	176.67	0.000	29.83
33	29.45	28.35	0.221	5.00	5.00	6.23	6.23	122.33	63.80	0.000	29.56
34	28.35	27.05	0.259	5.00	5.00	6.76	6.76	132.67	26.05	0.000	29.52
35	27.05	25.56	0.298	5.00	5.00	7.24	7.24	142.23	45.12	0.000	29.21
36	25.56	24.39	0.234	5.50	5.50	6.83	6.83	162.37	75.10	0.000	29.21
37	24.39	22.43	0.293	5.50	5.50	7.65	7.65	181.85	86.14	0.000	29.07
39*	25.26	24.74	0.109	0.64	0.64	8.54	8.54	7.46	33.31	0.000	29.21
40*	25.28	24.81	0.286	0.71	0.71	12.11	12.11	12.09	44.79	0.000	29.07
41*	22.43	21.41	0.298	2.80	5.50	15.07	7.72	183.44	355.34	0.000	29.21
42	21.41	18.77	0.333	5.50	5.50	8.16	8.16	193.93	78.44	0.000	29.10
43*	18.20	15.33	0.333	3.33	3.33	12.89	12.89	193.93	284.49	0.000	29.05

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : Melody Lane
 JOB NUMBER : 2006129-04
 PROJECT DESCRIPTION : Melody Lane East
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.55	4.82	34.17	34.17	4.19	0.000	11.095
A-2	0.55	0.48	16.83	16.83	6.22	0.000	1.649
A-3	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-4	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-5	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-6	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-7	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-8	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-9	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-10	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-11	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-12	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-13	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-14	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-15	0.55	4.19	25.00	25.00	5.03	0.000	11.584
A-16	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-17	0.55	0.92	19.63	19.63	5.74	0.000	2.905
A-18	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-19	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-20	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-21	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-22	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-23	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-24	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-25	0.55	4.63	26.00	26.00	4.92	0.000	12.518
A-26	0.55	1.21	17.67	17.67	6.07	0.000	4.038
A-27	0.55	1.53	18.67	18.67	5.90	0.000	4.962
A-28	0.55	2.66	21.50	21.50	5.47	0.000	7.998
B-1	0.55	60.60	66.00	66.00	2.75	0.000	91.782

On Grade Inlet Configuration Data

Inlet ID	Inlet Type	Inlet Length (ft)	Slopes		Gutter		Grate		Pond Width Allowed (ft)	Critic Elev. (ft)
			Long (%)	Trans (%)	n	Depr. (ft)	width (ft)	Type		
A-11	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.80
A-12	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.80
A-13	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.08
A-14	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-15	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-16	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-17	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-18	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.00
A-19	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-20	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.00
A-21	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.00
A-22	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.00

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A-23	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.00
A-24	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	30.00
A-26	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	29.07
A-1	Curb	20.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	33.00
A-2	Curb	20.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	33.00
A-3	Curb	20.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	32.00
A-4	Curb	20.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-5	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-6	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-7	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00
A-8	Curb	10.00	0.50	2.00	0.014	0.33	n/a	n/a	12.00	31.00

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-11	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-12	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-13	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-14	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-15	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-16	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-17	Curb	0.550	0.92	19.63	5.74	0.000	0.00	2.905
A-18	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-19	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-20	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-21	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-22	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-23	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-24	Curb	0.550	3.44	23.33	5.23	0.000	0.00	9.887
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-2	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-3	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-4	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-5	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-6	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-7	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-8	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-9	CircMh	0.550	4.36	23.34	5.22	0.000	0.00	12.528
N-10	CircMh	0.550	8.49	30.06	4.52	0.000	0.00	21.096
N-11	CircMh	0.550	16.52	31.76	4.37	0.000	0.00	39.731
N-12	CircMh	0.550	24.55	34.45	4.16	0.000	0.00	56.235
N-13	CircMh	0.550	25.76	36.11	4.05	0.000	0.00	57.340
A-26	Curb	0.550	1.21	17.67	6.07	0.000	0.00	4.038
A-27	Grate	0.550	1.53	18.67	5.90	0.000	0.00	4.962
A-1	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-2	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-3	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-4	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-5	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-6	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-7	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-8	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-9	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-10	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-28	Grate	0.550	29.95	37.40	3.96	0.000	0.00	65.245
A-29	CircMh	0.550	29.95	37.40	3.96	0.000	0.00	65.245
A-30	CircMh	0.550	29.95	37.40	3.96	0.000	0.00	65.245
A-31	CircMh	0.550	29.95	37.40	3.96	0.000	0.00	65.245
OUT	outlt	0.550	29.95	37.40	3.96	0.000	0.00	65.245

Conveyance Configuration Data

Melody Lane_Prop_east_100_t..txt

Run#	Node US	I.D. DS	Flowline US (ft)	Elev. DS (ft)	Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
17	A-17	N-9	26.50	23.34	Circ 1	0.00	2.00	12.00	27.30	0.013
18	A-18	N-9	25.50	23.34	Circ 1	0.00	2.00	12.00	18.30	0.013
19	A-19	N-10	26.50	23.39	Circ 1	0.00	2.00	12.00	26.83	0.013
20	A-20	N-10	25.50	23.39	Circ 1	0.00	2.00	12.00	17.86	0.013
21	A-21	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
22	A-22	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
23	A-23	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013
24	A-24	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013
25	A-26	N-13	24.57	22.64	Circ 1	0.00	2.00	12.00	16.30	0.013
34	N-9	N-10	23.34	23.29	Circ 1	0.00	4.00	500.00	0.01	0.013
35	N-10	N-11	23.39	22.14	Circ 1	0.00	4.00	500.00	0.25	0.013
36	N-11	N-12	22.14	21.89	Circ 1	0.00	4.50	500.00	0.05	0.013
37	N-12	N-13	22.89	22.64	Circ 1	0.00	4.50	380.00	0.07	0.013
38	N-13	A-28	22.64	22.57	Circ 1	0.00	4.50	280.00	0.03	0.013
39	A-27	A-28	24.62	24.57	Circ 1	0.00	2.00	24.00	0.21	0.013
40	A-28	A-29	24.57	16.95	Circ 1	0.00	4.50	87.50	8.74	0.013
41	A-29	A-30	16.95	16.45	Circ 1	0.00	4.50	187.50	0.27	0.013
42	A-30	A-31	16.45	14.23	Circ 1	0.00	4.50	200.00	1.11	0.013
43	A-31	OUT	14.23	10.98	Circ 1	0.00	4.50	20.00	16.47	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
17*	27.80	27.80	0.016	0.22	2.00	15.89	0.92	2.91	118.21	0.000	29.7
18*	27.82	27.80	0.191	0.43	2.00	19.76	3.15	9.89	96.79	0.000	29.73
19*	27.76	27.76	0.009	0.19	2.00	14.44	0.70	2.20	117.20	0.000	29.41
20*	27.78	27.76	0.191	0.43	2.00	19.64	3.15	9.89	95.62	0.000	29.48
21*	27.69	27.65	0.315	0.43	2.00	25.20	4.04	12.69	122.19	0.000	29.36
22*	27.68	27.65	0.191	0.38	2.00	23.37	3.15	9.89	122.19	0.000	29.44
23*	27.49	27.45	0.315	0.47	2.00	22.84	4.04	12.69	106.80	0.000	29.12
24*	27.47	27.45	0.191	0.41	2.00	21.25	3.15	9.89	106.80	0.000	29.07
25*	27.14	27.14	0.032	0.29	2.00	14.64	1.29	4.04	91.33	0.000	29.12
34	27.80	27.76	0.008	3.00	4.00	1.24	1.00	12.53	14.37	0.000	29.83
35	27.76	27.65	0.022	1.50	4.00	4.90	1.68	21.10	71.83	0.000	29.56
36	27.65	27.45	0.041	3.38	4.50	3.11	2.50	39.73	43.98	0.000	29.52
37	27.45	27.14	0.082	3.94	4.50	3.81	3.54	56.23	50.45	0.000	29.21
38	27.14	25.70	0.085	4.50	4.50	3.61	3.61	57.34	31.10	0.000	29.83
39	25.73	25.70	0.048	0.97	1.13	3.29	2.71	4.96	10.33	0.000	29.21
40*	25.70	19.55	0.110	1.02	2.60	24.18	6.85	65.24	581.50	0.000	29.07
41	19.55	18.80	0.110	2.60	2.60	6.85	6.85	65.24	101.56	0.000	29.21
42*	18.18	15.96	0.110	1.73	1.73	11.57	11.57	65.24	207.22	0.000	29.10
43*	15.10	11.85	0.110	0.87	0.87	30.24	30.24	65.24	798.15	0.000	29.05

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.55	4.82	34.17	34.17	6.45	0.000	17.100
A-2	0.55	0.48	16.83	16.83	9.32	0.000	2.470
A-3	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-4	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-5	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-6	0.55	0.69	19.33	19.33	8.72	0.000	3.308

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A-7	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-8	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-9	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-10	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-11	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-12	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-13	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-14	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-15	0.55	4.19	25.00	25.00	7.65	0.000	17.621
A-16	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-17	0.55	0.92	19.63	19.63	8.65	0.000	4.377
A-18	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-19	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-20	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-21	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-22	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-23	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-24	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-25	0.55	4.63	26.00	26.00	7.49	0.000	19.073
A-26	0.55	1.21	17.67	17.67	9.10	0.000	6.059
A-27	0.55	1.53	18.67	18.67	8.87	0.000	7.461
A-28	0.55	2.66	21.50	21.50	8.27	0.000	12.093
B-1	0.55	60.60	66.00	66.00	4.37	0.000	145.645

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-11	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-12	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-13	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-14	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-15	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-16	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-17	Curb	0.550	0.92	19.63	8.65	0.000	0.00	4.377
A-18	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-19	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-20	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-21	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-22	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-23	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-24	Curb	0.550	3.44	23.33	7.93	0.000	0.00	14.998
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-2	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-3	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-4	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-5	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-6	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-7	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-8	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-9	CircMh	0.550	4.36	23.34	7.93	0.000	0.00	19.006
N-10	CircMh	0.550	8.49	28.45	7.14	0.000	0.00	33.324
N-11	CircMh	0.550	16.52	29.93	6.94	0.000	0.00	63.079
N-12	CircMh	0.550	24.55	32.03	6.69	0.000	0.00	90.300
N-13	CircMh	0.550	25.76	33.15	6.56	0.000	0.00	92.962
A-26	Curb	0.550	1.21	17.67	9.10	0.000	0.00	6.059
A-27	Grate	0.550	1.53	18.67	8.87	0.000	0.00	7.461
A-1	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-2	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-3	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-4	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-5	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-6	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-7	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000

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A-8	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-9	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-10	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-28	Grate	0.550	29.95	33.94	6.47	0.000	0.00	106.652
A-29	CircMh	0.550	29.95	33.94	6.47	0.000	0.00	106.652
A-30	CircMh	0.550	29.95	33.94	6.47	0.000	0.00	106.652
A-31	CircMh	0.550	29.95	33.94	6.47	0.000	0.00	106.652
OUT	Outlt	0.550	29.95	33.94	6.47	0.000	0.00	106.652

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
17	A-17	N-9	26.50	23.34	Circ 1	0.00	2.00	12.00	27.30	0.013
18	A-18	N-9	25.50	23.34	Circ 1	0.00	2.00	12.00	18.30	0.013
19	A-19	N-10	26.50	23.39	Circ 1	0.00	2.00	12.00	26.83	0.013
20	A-20	N-10	25.50	23.39	Circ 1	0.00	2.00	12.00	17.86	0.013
21	A-21	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
22	A-22	N-11	25.50	22.14	Circ 1	0.00	2.00	12.00	29.17	0.013
23	A-23	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013
24	A-24	N-12	25.50	22.89	Circ 1	0.00	2.00	12.00	22.28	0.013
25	A-26	N-13	24.57	22.64	Circ 1	0.00	2.00	12.00	16.30	0.013
34	N-9	N-10	23.34	23.29	Circ 1	0.00	4.00	500.00	0.01	0.013
35	N-10	N-11	23.39	22.14	Circ 1	0.00	4.00	500.00	0.25	0.013
36	N-11	N-12	22.14	21.89	Circ 1	0.00	4.50	500.00	0.05	0.013
37	N-12	N-13	22.89	22.64	Circ 1	0.00	4.50	380.00	0.07	0.013
38	N-13	A-28	22.64	22.57	Circ 1	0.00	4.50	280.00	0.03	0.013
39	A-27	A-28	24.62	24.57	Circ 1	0.00	2.00	24.00	0.21	0.013
40	A-28	A-29	24.57	16.95	Circ 1	0.00	4.50	87.50	8.74	0.013
41	A-29	A-30	16.95	16.45	Circ 1	0.00	4.50	187.50	0.27	0.013
42	A-30	A-31	16.45	14.23	Circ 1	0.00	4.50	200.00	1.11	0.013
43	A-31	OUT	14.23	10.98	Circ 1	0.00	4.50	20.00	16.47	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr.Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
17*	28.82	28.81	0.037	0.26	2.00	17.97	1.39	4.38	118.21	0.000	29.7
18*	28.86	28.81	0.439	0.53	2.00	22.37	4.77	15.00	96.79	0.000	29.73
19*	28.73	28.72	0.021	0.23	2.00	16.33	1.05	3.31	117.20	0.000	29.41
20*	28.78	28.72	0.439	0.54	2.00	22.14	4.77	15.00	95.62	0.000	29.48
21*	28.54	28.46	0.728	0.54	2.00	28.35	6.14	19.30	122.19	0.000	29.36
22*	28.51	28.46	0.439	0.47	2.00	26.36	4.77	15.00	122.19	0.000	29.44
23*	28.03	27.94	0.728	0.58	2.00	25.83	6.14	19.30	106.80	0.000	29.12
24*	27.99	27.94	0.439	0.51	2.00	23.96	4.77	15.00	106.80	0.000	29.07
25*	27.15	27.14	0.072	0.35	2.00	16.50	1.93	6.06	91.33	0.000	29.12
34	28.81	28.72	0.018	3.50	4.00	1.63	1.51	19.01	14.37	0.000	29.83
35	28.72	28.46	0.054	1.91	4.00	5.64	2.65	33.32	71.83	0.000	29.56
36	28.46	27.94	0.103	4.50	4.50	3.97	3.97	63.08	43.98	0.000	29.52
37	27.94	27.14	0.211	4.50	4.50	5.68	5.68	90.30	50.45	0.000	29.21
38	27.14	26.10	0.223	4.50	4.50	5.85	5.85	92.96	31.10	0.000	29.83
39	26.13	26.10	0.109	1.25	1.53	3.61	2.89	7.46	10.33	0.000	29.21
40*	26.10	20.89	0.294	1.31	3.94	27.85	7.23	106.65	581.50	0.000	29.07
41	20.89	19.49	0.294	3.94	3.94	7.23	7.23	106.65	101.56	0.000	29.21
42*	18.74	16.52	0.294	2.29	2.29	13.15	13.15	106.65	207.22	0.000	29.10
43*	15.34	12.09	0.294	1.11	1.11	34.90	34.90	106.65	798.15	0.000	29.05

END

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : Melody Lane
 JOB NUMBER : 2006129-04
 PROJECT DESCRIPTION : Melody Lane West
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-16	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-17	0.55	0.92	19.63	19.63	5.74	0.000	2.905
A-18	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-19	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-20	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-21	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-22	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-23	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-24	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-25	0.55	4.63	26.00	26.00	4.92	0.000	12.518
A-26	0.55	1.21	17.67	17.67	6.07	0.000	4.038
A-27	0.55	1.53	18.67	18.67	5.90	0.000	4.962
A-28	0.55	2.66	21.50	21.50	5.47	0.000	7.998
B-1	0.55	60.60	66.00	66.00	2.75	0.000	91.782
A-1	0.55	4.82	34.17	34.17	4.19	0.000	11.095
A-2	0.55	0.48	16.83	16.83	6.22	0.000	1.649
A-3	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-4	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-5	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-6	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-7	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-8	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-9	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-10	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-11	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-12	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-13	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-14	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-15	0.55	4.19	25.00	25.00	5.03	0.000	11.584

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-6	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-7	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-8	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-9	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-10	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-11	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-12	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-13	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-14	Curb	0.550	1.15	20.00	5.68	0.000	0.00	3.596
A-15	Curb	0.550	4.19	25.00	5.03	0.000	0.00	11.584
A-16	Curb	0.550	1.15	20.00	5.68	0.000	0.00	3.596

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A-17	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-18	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-19	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-20	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-21	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-22	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-23	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-24	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.550	5.30	34.18	4.18	0.000	0.00	12.203
N-2	CircMh	0.550	10.58	38.47	3.89	0.000	0.00	22.658
N-3	CircMh	0.550	15.86	40.93	3.75	0.000	0.00	32.682
N-4	CircMh	0.550	21.14	43.28	3.62	0.000	0.00	42.065
N-5	CircMh	0.550	26.42	45.59	3.50	0.000	0.00	50.874
N-6	CircMh	0.550	31.70	48.01	3.39	0.000	0.00	59.068
N-7	CircMh	0.550	37.44	50.25	3.29	0.000	0.00	67.752
N-8	CircMh	0.550	42.78	52.21	3.21	0.000	0.00	75.536
N-9	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-10	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-11	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-12	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-26	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-27	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-1	Curb	0.550	4.82	34.17	4.19	0.000	0.00	11.095
A-2	Curb	0.550	0.48	16.83	6.22	0.000	0.00	1.649
A-3	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-4	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-5	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-28	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-29	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-30	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-31	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-14	CircMh	0.550	42.78	52.21	3.21	0.000	0.00	75.536
OUT	outlt	0.550	42.78	52.21	3.21	0.000	0.00	75.536

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape	#	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)							
1	A-1	N-1	29.00	25.69	Circ	1	0.00	2.00	12.00	28.70	0.013
2	A-2	N-1	29.00	25.69	Circ	1	0.00	2.00	12.00	28.70	0.013
3	A-3	N-2	28.00	25.79	Circ	1	0.00	2.00	12.00	18.74	0.013
4	A-4	N-2	28.00	25.79	Circ	1	0.00	2.00	12.00	18.74	0.013
5	A-5	N-3	27.50	25.24	Circ	1	0.00	2.00	12.00	19.18	0.013
6	A-6	N-3	27.50	25.24	Circ	1	0.00	3.00	500.00	0.45	0.013
7	A-7	N-4	25.39	24.89	Circ	1	0.00	2.00	12.00	4.17	0.013
8	A-8	N-4	26.74	24.89	Circ	1	0.00	2.00	12.00	15.60	0.013
9	A-9	N-5	26.50	24.54	Circ	1	0.00	2.00	12.00	16.56	0.013
10	A-10	N-5	26.40	24.54	Circ	1	0.00	2.00	12.00	15.69	0.013
11	A-11	N-6	26.30	24.24	Circ	1	0.00	2.00	12.00	17.43	0.013
12	A-12	N-6	26.30	24.24	Circ	1	0.00	2.00	12.00	17.43	0.013
13	A-13	N-7	25.58	23.94	Circ	1	0.00	2.00	12.00	13.80	0.013
14	A-14	N-7	26.50	23.94	Circ	1	0.00	2.00	12.00	21.84	0.013
15	A-15	N-8	26.50	23.64	Circ	1	0.00	2.00	12.00	24.54	0.013
16	A-16	N-8	26.50	23.64	Circ	1	0.00	2.00	12.00	24.54	0.013
26	N-1	N-2	25.79	25.69	Circ	1	0.00	4.00	500.00	0.02	0.013
24	N-8	N-14	23.64	6.00	Circ	1	0.00	4.50	950.00	1.86	0.013
25	N-14	OUT	6.00	4.00	Circ	1	0.00	4.50	50.00	4.00	0.013
27	N-2	N-3	25.69	25.24	Circ	1	0.00	4.50	500.00	0.09	0.013
28	N-3	N-4	25.24	24.89	Circ	1	0.00	4.50	500.00	0.07	0.013
29	N-4	N-5	24.89	24.54	Circ	1	0.00	4.50	500.00	0.07	0.013
30	N-5	N-6	24.54	24.24	Circ	1	0.00	4.50	500.00	0.06	0.013
31	N-6	N-7	24.24	23.94	Circ	1	0.00	4.50	500.00	0.06	0.013
32	N-7	N-8	23.94	23.64	Circ	1	0.00	4.50	500.00	0.06	0.013

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Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr. Slope (%)	Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	30.19	29.66	0.240	0.41	2.00	24.01	3.53	11.10	121.20	0.000	33.65
2*	29.67	29.66	0.005	0.16	2.00	13.62	0.52	1.65	121.20	0.000	33.5
3*	29.67	29.63	0.315	0.49	2.00	21.55	4.04	12.69	97.94	0.000	33.65
4*	29.63	29.63	0.009	0.21	2.00	12.86	0.70	2.20	97.94	0.000	33.5
5*	29.62	29.58	0.315	0.48	2.00	21.67	4.04	12.69	99.08	0.000	33.12
6*	29.59	29.58	0.001	0.45	3.00	3.29	0.31	2.20	44.85	0.000	33.33
7*	29.49	29.45	0.315	0.72	2.00	12.54	4.04	12.69	46.20	0.000	31.37
8*	29.45	29.45	0.009	0.22	2.00	12.02	0.70	2.20	89.37	0.000	31.24
9*	29.26	29.23	0.315	0.50	2.00	20.60	4.04	12.69	92.06	0.000	31.37
10*	29.23	29.23	0.009	0.22	2.00	12.02	0.70	2.20	89.62	0.000	31.24
11*	28.93	28.89	0.315	0.50	2.00	20.95	4.04	12.69	94.45	0.000	31.15
12*	28.89	28.89	0.009	0.21	2.00	12.51	0.70	2.20	94.45	0.000	31.19
13*	28.48	28.44	0.315	0.53	2.00	19.27	4.04	12.69	84.04	0.000	31.15
14*	28.44	28.44	0.025	0.25	2.00	15.60	1.14	3.60	105.73	0.000	31.19
15*	27.09	25.27	0.262	0.43	1.63	23.01	4.21	11.58	112.08	0.000	29.7
16*	26.80	25.27	0.025	0.25	1.63	16.33	1.31	3.60	112.08	0.000	29.73
26	29.66	29.63	0.007	2.00	3.94	1.94	0.97	12.20	20.32	0.000	33.69
24*	25.27	7.63	0.148	1.63	1.63	14.47	14.47	75.54	268.02	0.000	29.07
25*	7.34	5.34	0.148	1.34	1.34	19.10	19.10	75.54	393.51	0.000	29.12
27	29.63	29.58	0.013	1.97	4.34	3.39	1.44	22.66	59.00	0.000	33.59
28	29.58	29.45	0.028	2.53	4.50	3.55	2.05	32.68	52.04	0.000	33.34
29	29.45	29.23	0.046	3.09	4.50	3.61	2.64	42.06	52.04	0.000	31.42
30	29.23	28.89	0.067	3.94	4.50	3.45	3.20	50.87	48.18	0.000	31.42
31	28.89	28.44	0.090	4.50	4.50	3.71	3.71	59.07	48.18	0.000	31.29
32	28.44	26.04	0.119	4.50	4.50	4.26	4.26	67.75	48.18	0.000	31.19

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency:

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-16	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-17	0.55	0.92	19.63	19.63	8.65	0.000	4.377
A-18	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-19	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-20	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-21	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-22	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-23	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-24	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-25	0.55	4.63	26.00	26.00	7.49	0.000	19.073
A-26	0.55	1.21	17.67	17.67	9.10	0.000	6.059
A-27	0.55	1.53	18.67	18.67	8.87	0.000	7.461
A-28	0.55	2.66	21.50	21.50	8.27	0.000	12.093
B-1	0.55	60.60	66.00	66.00	4.37	0.000	145.645
A-1	0.55	4.82	34.17	34.17	6.45	0.000	17.100
A-2	0.55	0.48	16.83	16.83	9.32	0.000	2.470
A-3	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-4	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-5	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-6	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-7	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-8	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-9	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-10	0.55	0.69	19.33	19.33	8.72	0.000	3.308

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A-11	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-12	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-13	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-14	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-15	0.55	4.19	25.00	25.00	7.65	0.000	17.621

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-6	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-7	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-8	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-9	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-10	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-11	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-12	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-13	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-14	Curb	0.550	1.15	20.00	8.57	0.000	0.00	5.421
A-15	Curb	0.550	4.19	25.00	7.65	0.000	0.00	17.621
A-16	Curb	0.550	1.15	20.00	8.57	0.000	0.00	5.421
A-17	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-18	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-19	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-20	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-21	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-22	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-23	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-24	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.550	5.30	34.18	6.45	0.000	0.00	18.808
N-2	CircMh	0.550	10.58	38.66	6.01	0.000	0.00	35.001
N-3	CircMh	0.550	15.86	40.85	5.83	0.000	0.00	50.822
N-4	CircMh	0.550	21.14	43.27	5.63	0.000	0.00	65.508
N-5	CircMh	0.550	26.42	45.29	5.48	0.000	0.00	79.702
N-6	CircMh	0.550	31.70	46.96	5.37	0.000	0.00	93.616
N-7	CircMh	0.550	37.44	48.37	5.28	0.000	0.00	108.635
N-8	CircMh	0.550	42.78	49.59	5.20	0.000	0.00	122.302
N-9	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-10	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-11	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-12	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-26	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-27	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-1	Curb	0.550	4.82	34.17	6.45	0.000	0.00	17.100
A-2	Curb	0.550	0.48	16.83	9.32	0.000	0.00	2.470
A-3	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-4	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-5	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-28	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-29	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-30	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-31	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-14	CircMh	0.550	42.78	49.59	5.20	0.000	0.00	122.302
OUT	Outlt	0.550	42.78	49.59	5.20	0.000	0.00	122.302

Conveyance Configuration Data

Run#	Node I.D.	Flowline Elev.	Shape #	Span	Rise	Length	Slope	n_value
	US DS	US DS (ft) (ft)		(ft)	(ft)	(ft)	(%)	
1	A-1 N-1	29.00 25.69	circ 1	0.00	2.00	12.00	28.70	0.013

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2	A-2	N-1	29.00	25.69	Circ 1	0.00	2.00	12.00	28.70	0.013
3	A-3	N-2	28.00	25.79	Circ 1	0.00	2.00	12.00	18.74	0.013
4	A-4	N-2	28.00	25.79	Circ 1	0.00	2.00	12.00	18.74	0.013
5	A-5	N-3	27.50	25.24	Circ 1	0.00	2.00	12.00	19.18	0.013
6	A-6	N-3	27.50	25.24	Circ 1	0.00	3.00	500.00	0.45	0.013
7	A-7	N-4	25.39	24.89	Circ 1	0.00	2.00	12.00	4.17	0.013
8	A-8	N-4	26.74	24.89	Circ 1	0.00	2.00	12.00	15.60	0.013
9	A-9	N-5	26.50	24.54	Circ 1	0.00	2.00	12.00	16.56	0.013
10	A-10	N-5	26.40	24.54	Circ 1	0.00	2.00	12.00	15.69	0.013
11	A-11	N-6	26.30	24.24	Circ 1	0.00	2.00	12.00	17.43	0.013
12	A-12	N-6	26.30	24.24	Circ 1	0.00	2.00	12.00	17.43	0.013
13	A-13	N-7	25.58	23.94	Circ 1	0.00	2.00	12.00	13.80	0.013
14	A-14	N-7	26.50	23.94	Circ 1	0.00	2.00	12.00	21.84	0.013
15	A-15	N-8	26.50	23.64	Circ 1	0.00	2.00	12.00	24.54	0.013
16	A-16	N-8	26.50	23.64	Circ 1	0.00	2.00	12.00	24.54	0.013
26	N-1	N-2	25.79	25.69	Circ 1	0.00	4.00	500.00	0.02	0.013
24	N-8	N-14	23.64	6.00	Circ 1	0.00	4.50	950.00	1.86	0.013
25	N-14	OUT	6.00	4.00	Circ 1	0.00	4.50	50.00	4.00	0.013
27	N-2	N-3	25.69	25.24	Circ 1	0.00	4.50	500.00	0.09	0.013
28	N-3	N-4	25.24	24.89	Circ 1	0.00	4.50	500.00	0.07	0.013
29	N-4	N-5	24.89	24.54	Circ 1	0.00	4.50	500.00	0.07	0.013
30	N-5	N-6	24.54	24.24	Circ 1	0.00	4.50	500.00	0.06	0.013
31	N-6	N-7	24.24	23.94	Circ 1	0.00	4.50	500.00	0.06	0.013
32	N-7	N-8	23.94	23.64	Circ 1	0.00	4.50	500.00	0.06	0.013

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline			Depth		Velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)	Fr. Slope (%)	Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	32.07	32.00	0.571	0.51	2.00	27.31	5.44	17.10	121.20	0.000	33.65
2*	32.00	32.00	0.012	0.20	2.00	15.30	0.79	2.47	121.20	0.000	33.5
3*	32.01	31.92	0.728	0.60	2.00	24.21	6.14	19.30	97.94	0.000	33.65
4*	31.92	31.92	0.021	0.25	2.00	14.51	1.05	3.31	97.94	0.000	33.5
5*	31.85	31.76	0.728	0.60	2.00	24.43	6.14	19.30	99.08	0.000	33.12
6*	31.77	31.76	0.002	0.55	3.00	3.72	0.47	3.31	44.85	0.000	33.33
7*	31.51	31.43	0.728	0.90	2.00	14.05	6.14	19.30	46.20	0.000	31.37
8*	31.43	31.43	0.021	0.26	2.00	13.58	1.05	3.31	89.37	0.000	31.24
9*	30.96	30.87	0.728	0.62	2.00	23.16	6.14	19.30	92.06	0.000	31.37
10*	30.88	30.87	0.021	0.26	2.00	13.58	1.05	3.31	89.62	0.000	31.24
11*	30.14	30.05	0.728	0.61	2.00	23.57	6.14	19.30	94.45	0.000	31.15
12*	30.05	30.05	0.021	0.26	2.00	14.03	1.05	3.31	94.45	0.000	31.19
13*	29.01	28.92	0.728	0.65	2.00	21.74	6.14	19.30	84.04	0.000	31.15
14*	28.93	28.92	0.057	0.31	2.00	17.69	1.73	5.42	105.73	0.000	31.19
15*	28.01	25.78	0.607	0.54	2.00	26.01	5.61	17.62	112.08	0.000	29.7
16*	27.32	25.78	0.057	0.30	2.00	18.36	1.73	5.42	112.08	0.000	29.73
26	32.00	31.92	0.017	3.00	4.00	1.86	1.50	18.81	20.32	0.000	33.69
24*	25.78	8.14	0.387	2.14	2.14	16.44	16.44	122.30	268.02	0.000	29.07
25*	7.72	5.72	0.387	1.72	1.72	21.84	21.84	122.30	393.51	0.000	29.12
27	31.92	31.76	0.032	2.53	4.50	3.80	2.20	35.00	59.00	0.000	33.59
28	31.76	31.43	0.067	3.94	4.50	3.44	3.20	50.82	52.04	0.000	33.34
29	31.43	30.87	0.111	4.50	4.50	4.12	4.12	65.51	52.04	0.000	31.42
30	30.87	30.05	0.164	4.50	4.50	5.01	5.01	79.70	48.18	0.000	31.42
31	30.05	28.92	0.227	4.50	4.50	5.89	5.89	93.62	48.18	0.000	31.29
32	28.92	26.71	0.305	4.50	4.50	6.83	6.83	108.64	48.18	0.000	31.19

=====END=====

* super critical flow.

NORMAL TERMINATION OF WINSTORM.

PROJECT NAME : Melody Lane
 JOB NUMBER : 2006129-04
 PROJECT DESCRIPTION : Melody Lane west with additional subdivision flow
 DESIGN FREQUENCY : 5 Years
 ANALYSIS FREQUENCY : 100 Years
 MEASUREMENT UNITS: ENGLISH

OUTPUT FOR DESIGN FREQUENCY of: 5 Years

Runoff Computation for Design Frequency.

ID	C Value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.55	4.82	34.17	34.17	4.19	0.000	11.095
A-2	0.55	0.48	16.83	16.83	6.22	0.000	1.649
A-3	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-4	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-5	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-6	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-7	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-8	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-9	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-10	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-11	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-12	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-13	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-14	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-15	0.55	4.19	25.00	25.00	5.03	0.000	11.584
A-16	0.55	1.15	20.00	20.00	5.68	0.000	3.596
A-17	0.55	0.92	19.63	19.63	5.74	0.000	2.905
A-18	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-19	0.55	0.69	19.33	19.33	5.79	0.000	2.197
A-20	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-21	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-22	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-23	0.55	4.59	25.00	25.00	5.03	0.000	12.690
A-24	0.55	3.44	23.33	23.33	5.23	0.000	9.887
A-25	0.55	4.63	26.00	26.00	4.92	0.000	12.518
A-26	0.55	1.21	17.67	17.67	6.07	0.000	4.038
A-27	0.55	1.53	18.67	18.67	5.90	0.000	4.962
A-28	0.55	2.66	21.50	21.50	5.47	0.000	7.998
B-1	0.55	60.60	66.00	66.00	2.75	0.000	91.782

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-Value	Cumulat. Dr. Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-1	Curb	0.550	4.82	34.17	4.19	0.000	0.00	11.095
A-2	Curb	0.550	0.48	16.83	6.22	0.000	0.00	1.649
A-3	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-4	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-5	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-6	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-7	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-8	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-9	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-10	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-11	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690
A-12	Curb	0.550	0.69	19.33	5.79	0.000	0.00	2.197
A-13	Curb	0.550	4.59	25.00	5.03	0.000	0.00	12.690

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A-14	Curb	0.550	1.15	20.00	5.68	0.000	0.00	3.596
A-15	Curb	0.550	4.19	25.00	5.03	0.000	0.00	11.584
A-16	Curb	0.550	1.15	20.00	5.68	0.000	0.00	3.596
A-17	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-18	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-19	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-20	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-21	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-22	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-23	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-24	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.550	5.30	34.18	4.18	0.000	0.00	12.203
N-2	CircMh	0.550	10.58	39.61	3.82	0.000	0.00	22.252
N-3	CircMh	0.550	76.46	76.62	2.49	0.000	0.00	104.826
N-4	CircMh	0.550	81.74	78.43	2.45	0.000	0.00	110.319
N-5	CircMh	0.550	87.02	80.41	2.41	0.000	0.00	115.485
N-6	CircMh	0.550	92.30	82.30	2.38	0.000	0.00	120.580
N-7	CircMh	0.550	98.04	84.26	2.34	0.000	0.00	126.060
N-8	CircMh	0.550	103.38	86.13	2.30	0.000	0.00	130.962
N-9	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-10	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-11	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-12	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-26	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-27	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-28	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-29	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-30	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-31	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-14	CircMh	0.550	103.38	86.13	2.30	0.000	0.00	130.962
B-1	Junct	0.550	60.60	66.00	2.75	0.000	0.00	91.782
OUT	Outlt	0.550	103.38	86.13	2.30	0.000	0.00	130.962

Conveyance Configuration Data

Run#	Node I.D.		Flowline Elev.		Shape #	Span (ft)	Rise (ft)	Length (ft)	Slope (%)	n_value
	US	DS	US (ft)	DS (ft)						
1	A-1	N-1	29.00	24.69	Circ 1	0.00	2.00	12.00	38.48	0.013
2	A-2	N-1	29.00	24.69	Circ 1	0.00	2.00	12.00	38.48	0.013
3	A-3	N-2	28.00	24.79	Circ 1	0.00	2.00	12.00	27.76	0.013
4	A-4	N-2	28.00	24.79	Circ 1	0.00	2.00	12.00	27.76	0.013
5	A-5	N-3	27.50	24.24	Circ 1	0.00	2.00	12.00	28.23	0.013
6	A-6	N-3	27.50	24.24	Circ 1	0.00	3.00	500.00	0.65	0.013
7	A-7	N-4	25.39	23.89	Circ 1	0.00	2.00	12.00	12.60	0.013
8	A-8	N-4	26.74	23.89	Circ 1	0.00	2.00	12.00	24.45	0.013
9	A-9	N-5	26.50	23.54	Circ 1	0.00	2.00	12.00	25.45	0.013
10	A-10	N-5	26.40	23.54	Circ 1	0.00	2.00	12.00	24.54	0.013
11	A-11	N-6	26.30	23.24	Circ 1	0.00	2.00	12.00	26.37	0.013
12	A-12	N-6	26.30	23.24	Circ 1	0.00	2.00	12.00	26.37	0.013
13	A-13	N-7	25.58	22.94	Circ 1	0.00	2.00	12.00	22.55	0.013
14	A-14	N-7	26.50	22.94	Circ 1	0.00	2.00	12.00	31.07	0.013
15	A-15	N-8	26.50	22.64	Circ 1	0.00	2.00	12.00	33.97	0.013
16	A-16	N-8	26.50	22.64	Circ 1	0.00	2.00	12.00	33.97	0.013
26	N-1	N-2	23.79	23.69	Circ 1	0.00	4.50	500.00	0.02	0.013
24	N-8	N-14	22.64	6.00	Circ 1	0.00	6.00	950.00	1.75	0.013
25	N-14	OUT	6.00	4.00	Circ 1	0.00	7.00	50.00	4.00	0.013
27	N-2	N-3	24.69	24.24	Circ 1	0.00	4.50	500.00	0.09	0.013
28	N-3	N-4	21.74	21.39	Circ 1	0.00	6.00	500.00	0.07	0.013
29	N-4	N-5	21.39	21.04	Circ 1	0.00	6.00	500.00	0.07	0.013
30	N-5	N-6	21.04	20.74	Circ 1	0.00	6.00	500.00	0.06	0.013
31	N-6	N-7	20.74	20.44	Circ 1	0.00	6.00	500.00	0.06	0.013
32	N-7	N-8	20.44	20.14	Circ 1	0.00	6.00	500.00	0.06	0.013
33	B-1	N-3	30.33	25.24	Ditch 1	10.00	3.00	1950.00	0.26	0.033

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Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic Gradeline		Fr.Slope (%)	Depth		velocity		Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
	US Elev (ft)	DS Elev (ft)		Unif. (ft)	Actual (ft)	Unif. (f/s)	Actual (f/s)				
1*	30.19	27.94	0.240	0.38	2.00	26.71	3.53	11.10	140.36	0.000	33.65
2*	29.44	27.94	0.005	0.15	2.00	15.20	0.52	1.65	140.36	0.000	33.5
3*	29.28	27.93	0.315	0.44	2.00	24.73	4.04	12.69	119.21	0.000	33.65
4*	28.51	27.93	0.009	0.19	2.00	14.66	0.70	2.20	119.21	0.000	33.5
5*	28.78	27.86	0.315	0.44	2.00	24.89	4.04	12.69	120.21	0.000	33.12
6*	27.96	27.86	0.001	0.41	3.00	3.74	0.31	2.20	53.86	0.000	33.33
7*	27.59	27.56	0.315	0.54	2.00	18.63	4.04	12.69	80.31	0.000	31.37
8*	27.56	27.56	0.009	0.19	2.00	14.02	0.70	2.20	111.87	0.000	31.24
9*	27.78	27.22	0.315	0.45	2.00	23.97	4.04	12.69	114.15	0.000	31.37
10*	27.22	27.22	0.009	0.19	2.00	14.02	0.70	2.20	112.08	0.000	31.24
11*	27.58	26.85	0.315	0.45	2.00	24.27	4.04	12.69	116.19	0.000	31.15
12*	26.85	26.85	0.009	0.19	2.00	14.44	0.70	2.20	116.19	0.000	31.19
13*	26.86	26.44	0.315	0.46	2.00	22.97	4.04	12.69	107.45	0.000	31.15
14*	27.16	26.44	0.025	0.23	2.00	17.76	1.14	3.60	126.11	0.000	31.19
15*	27.05	24.61	0.262	0.40	1.97	25.77	3.70	11.58	131.87	0.000	29.7
16*	26.78	24.61	0.025	0.23	1.97	18.20	1.15	3.60	131.87	0.000	29.73
26	27.94	27.93	0.004	2.25	4.24	1.53	0.79	12.20	27.81	0.000	33.69
24*	24.61	7.97	0.096	1.97	1.97	16.15	16.15	130.96	560.62	0.000	29.07
25*	7.52	5.51	0.042	1.51	1.51	21.37	21.37	130.96	1278.35	0.000	29.12
27	27.93	27.86	0.013	1.97	3.62	3.33	1.62	22.25	59.00	0.000	33.59
28	27.86	27.56	0.061	4.50	6.00	4.61	3.71	104.83	112.06	0.000	33.34
29	27.56	27.22	0.068	5.25	6.00	4.21	3.90	110.32	112.06	0.000	31.42
30	27.22	26.85	0.074	5.25	6.00	4.40	4.08	115.48	103.75	0.000	31.42
31	26.85	26.44	0.081	6.00	6.00	4.26	4.26	120.58	103.75	0.000	31.29
32	26.44	24.61	0.089	6.00	6.00	4.46	4.46	126.06	103.75	0.000	31.19
33	32.44	27.86	0.069	2.11	2.62	3.06	2.30	91.78	178.20	0.000	29.83

OUTPUT FOR ANALYSIS FREQUENCY of: 100 Years

Runoff Computation for Analysis Frequency.

ID	C value	Area (acre)	Tc (min)	Tc Used (min)	Intensity (in/hr)	Supply Q (cfs)	Total Q (cfs)
A-1	0.55	4.82	34.17	34.17	6.45	0.000	17.100
A-2	0.55	0.48	16.83	16.83	9.32	0.000	2.470
A-3	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-4	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-5	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-6	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-7	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-8	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-9	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-10	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-11	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-12	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-13	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-14	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-15	0.55	4.19	25.00	25.00	7.65	0.000	17.621
A-16	0.55	1.15	20.00	20.00	8.57	0.000	5.421
A-17	0.55	0.92	19.63	19.63	8.65	0.000	4.377
A-18	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-19	0.55	0.69	19.33	19.33	8.72	0.000	3.308
A-20	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-21	0.55	4.59	25.00	25.00	7.65	0.000	19.304
A-22	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-23	0.55	4.59	25.00	25.00	7.65	0.000	19.304

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A-24	0.55	3.44	23.33	23.33	7.93	0.000	14.998
A-25	0.55	4.63	26.00	26.00	7.49	0.000	19.073
A-26	0.55	1.21	17.67	17.67	9.10	0.000	6.059
A-27	0.55	1.53	18.67	18.67	8.87	0.000	7.461
A-28	0.55	2.66	21.50	21.50	8.27	0.000	12.093
B-1	0.55	60.60	66.00	66.00	4.37	0.000	145.645

Cumulative Junction Discharge Computations

Node I.D.	Node Type	weighted C-value	Cumulat. Dr.Area (acres)	Cumulat. Tc (min)	Intens. (in/hr)	User Supply Q (cfs)	Additional Q in Node (cfs)	Total Disch. (cfs)
A-1	Curb	0.550	4.82	34.17	6.45	0.000	0.00	17.100
A-2	Curb	0.550	0.48	16.83	9.32	0.000	0.00	2.470
A-3	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-4	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-5	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-6	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-7	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-8	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-9	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-10	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-11	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-12	Curb	0.550	0.69	19.33	8.72	0.000	0.00	3.308
A-13	Curb	0.550	4.59	25.00	7.65	0.000	0.00	19.304
A-14	Curb	0.550	1.15	20.00	8.57	0.000	0.00	5.421
A-15	Curb	0.550	4.19	25.00	7.65	0.000	0.00	17.621
A-16	Curb	0.550	1.15	20.00	8.57	0.000	0.00	5.421
A-17	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-18	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-19	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-20	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-21	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-22	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-23	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-24	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-25	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-1	CircMh	0.550	5.30	34.18	6.45	0.000	0.00	18.808
N-2	CircMh	0.550	10.58	39.85	5.91	0.000	0.00	34.396
N-3	CircMh	0.550	76.46	75.37	4.02	0.000	0.00	169.226
N-4	CircMh	0.550	81.74	76.76	3.98	0.000	0.00	178.851
N-5	CircMh	0.550	87.02	78.08	3.94	0.000	0.00	188.383
N-6	CircMh	0.550	92.30	79.33	3.90	0.000	0.00	197.829
N-7	CircMh	0.550	98.04	80.52	3.86	0.000	0.00	208.172
N-8	CircMh	0.550	103.38	81.65	3.83	0.000	0.00	217.590
N-9	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-10	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-11	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-12	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-13	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-26	Curb	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-27	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-28	Grate	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-29	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-30	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
A-31	CircMh	0.000	0.00	0.00	0.00	0.000	0.00	0.000
N-14	CircMh	0.550	103.38	81.65	3.83	0.000	0.00	217.590
B-1	Junct	0.550	60.60	66.00	4.37	0.000	0.00	145.645
OUT	outlt	0.550	103.38	81.65	3.83	0.000	0.00	217.590

Conveyance Configuration Data

Run#	Node I.D.	Flowline Elev.	Shape #	Span	Rise	Length	Slope	n_value
	US DS	US DS (ft) (ft)		(ft)	(ft)	(ft)	(%)	

Melody Lane_Prop_west_a_100_t.txt

1	A-1	N-1	29.00	24.69	Circ 1	0.00	2.00	12.00	38.48	0.013
2	A-2	N-1	29.00	24.69	Circ 1	0.00	2.00	12.00	38.48	0.013
3	A-3	N-2	28.00	24.79	Circ 1	0.00	2.00	12.00	27.76	0.013
4	A-4	N-2	28.00	24.79	Circ 1	0.00	2.00	12.00	27.76	0.013
5	A-5	N-3	27.50	24.24	Circ 1	0.00	2.00	12.00	28.23	0.013
6	A-6	N-3	27.50	24.24	Circ 1	0.00	3.00	500.00	0.65	0.013
7	A-7	N-4	25.39	23.89	Circ 1	0.00	2.00	12.00	12.60	0.013
8	A-8	N-4	26.74	23.89	Circ 1	0.00	2.00	12.00	24.45	0.013
9	A-9	N-5	26.50	23.54	Circ 1	0.00	2.00	12.00	25.45	0.013
10	A-10	N-5	26.40	23.54	Circ 1	0.00	2.00	12.00	24.54	0.013
11	A-11	N-6	26.30	23.24	Circ 1	0.00	2.00	12.00	26.37	0.013
12	A-12	N-6	26.30	23.24	Circ 1	0.00	2.00	12.00	26.37	0.013
13	A-13	N-7	25.58	22.94	Circ 1	0.00	2.00	12.00	22.55	0.013
14	A-14	N-7	26.50	22.94	Circ 1	0.00	2.00	12.00	31.07	0.013
15	A-15	N-8	26.50	22.64	Circ 1	0.00	2.00	12.00	33.97	0.013
16	A-16	N-8	26.50	22.64	Circ 1	0.00	2.00	12.00	33.97	0.013
26	N-1	N-2	23.79	23.69	Circ 1	0.00	4.50	500.00	0.02	0.013
24	N-8	N-14	22.64	6.00	Circ 1	0.00	6.00	950.00	1.75	0.013
25	N-14	OUT	6.00	4.00	Circ 1	0.00	7.00	50.00	4.00	0.013
27	N-2	N-3	24.69	24.24	Circ 1	0.00	4.50	500.00	0.09	0.013
28	N-3	N-4	21.74	21.39	Circ 1	0.00	6.00	500.00	0.07	0.013
29	N-4	N-5	21.39	21.04	Circ 1	0.00	6.00	500.00	0.07	0.013
30	N-5	N-6	21.04	20.74	Circ 1	0.00	6.00	500.00	0.06	0.013
31	N-6	N-7	20.74	20.44	Circ 1	0.00	6.00	500.00	0.06	0.013
32	N-7	N-8	20.44	20.14	Circ 1	0.00	6.00	500.00	0.06	0.013
33	B-1	N-3	30.33	25.24	Ditch 1	10.00	3.00	1950.00	0.26	0.033

Conveyance Hydraulic Computations. Tailwater = 0.000 (ft)

Run#	Hydraulic US Elev (ft)	Gradeline DS Elev (ft)	Fr. Slope (%)	Depth Unif. (ft)	Actual (ft)	Velocity Unif. (f/s)	Actual (f/s)	Q (cfs)	Cap (cfs)	Junc Loss (ft)	Crit Elev (ft)
1*	30.56	30.49	0.571	0.47	2.00	30.23	5.44	17.10	140.36	0.000	33.65
2*	30.49	30.49	0.012	0.18	2.00	17.00	0.79	2.47	140.36	0.000	33.5
3*	30.54	30.45	0.728	0.54	2.00	27.92	6.14	19.30	119.21	0.000	33.65
4*	30.45	30.45	0.021	0.23	2.00	16.54	1.05	3.31	119.21	0.000	33.5
5*	30.38	30.30	0.728	0.54	2.00	28.06	6.14	19.30	120.21	0.000	33.12
6*	30.31	30.30	0.002	0.50	3.00	4.22	0.47	3.31	53.86	0.000	33.33
7*	29.59	29.50	0.728	0.67	2.00	21.04	6.14	19.30	80.31	0.000	31.37
8*	29.50	29.50	0.021	0.24	2.00	15.94	1.05	3.31	111.87	0.000	31.24
9*	28.69	28.61	0.728	0.56	2.00	27.10	6.14	19.30	114.15	0.000	31.37
10*	28.61	28.61	0.021	0.24	2.00	15.94	1.05	3.31	112.08	0.000	31.24
11*	27.88	27.62	0.728	0.55	2.00	27.37	6.14	19.30	116.19	0.000	31.15
12*	27.62	27.62	0.021	0.23	2.00	16.33	1.05	3.31	116.19	0.000	31.19
13*	27.16	26.53	0.728	0.57	2.00	25.95	6.14	19.30	107.45	0.000	31.15
14*	27.32	26.53	0.057	0.28	2.00	20.05	1.73	5.42	126.11	0.000	31.19
15*	28.01	25.24	0.607	0.49	2.00	29.25	5.61	17.62	131.87	0.000	29.7
16*	27.32	25.24	0.057	0.28	2.00	20.67	1.73	5.42	131.87	0.000	29.73
26	30.49	30.45	0.009	3.38	4.50	1.47	1.18	18.81	27.81	0.000	33.69
24*	25.24	8.60	0.264	2.60	2.60	18.57	18.57	217.59	560.62	0.000	29.07
25*	7.96	5.96	0.116	1.96	1.96	24.75	24.75	217.59	1278.35	0.000	29.12
27	30.45	30.30	0.031	2.53	4.50	3.73	2.16	34.40	59.00	0.000	33.59
28	30.30	29.50	0.160	6.00	6.00	5.99	5.99	169.23	112.06	0.000	33.34
29	29.50	28.61	0.178	6.00	6.00	6.33	6.33	178.85	112.06	0.000	31.42
30	28.61	27.62	0.198	6.00	6.00	6.66	6.66	188.38	103.75	0.000	31.42
31	27.62	26.53	0.218	6.00	6.00	7.00	7.00	197.83	103.75	0.000	31.29
32	26.53	25.24	0.242	6.00	6.00	7.36	7.36	208.17	103.75	0.000	31.19
33	33.70	30.30	0.174	2.72	3.00	3.47	3.03	145.64	178.20	0.000	29.83

* Super critical flow.

NORMAL TERMINATION OF WINSTORM.

CITY OF FRIENDSWOOD
 DRAINAGE MASTER PLAN
 PHASE II
 FM518 WEST (WILLOWICK TO
 MARY'S CREEK)

ALTERNATE No. 1

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 54,000	1	\$ 54,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Flagmen	LS		0	\$ -
	Detention Facility Construction	CY	\$ 7	11600	\$ 81,200
	Trench Safety Systems for Trench Excavations	LF	\$ 15	5180	\$ 77,700
	Reinforced Filler Fence	LF	\$ 2	2970	\$ 5,940
	Reinforced Filler Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	3340	\$ 133,600
TOTAL - GENERAL ITEMS					\$ 472,440
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	11	\$ 33,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	690	\$ 3,450
	Remove Existing 24 Inch Storm Sewer, All Depths	LF	\$ 10	970	\$ 9,700
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	710	\$ 7,100
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	660	\$ 26,400
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Plug 24 Inch Storm Sewer	EA		0	\$ -
	24 Inch RCP Storm Sewer, All Depths	LF	\$ 60	760	\$ 45,600
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	390	\$ 39,000
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	0	\$ -
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	1160	\$ 162,400
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	0	\$ -
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	2870	\$ 574,000
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	16	\$ 32,000
TOTAL - STORM SEWER					\$ 932,650
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	5140	\$ 30,840
	Roadway Excavation	CY	\$ 5	6430	\$ 32,150
	Lime	TON	\$ 100	89.9	\$ 8,990
	Lime Stabilized Subgrade, 8-Inch	SY	\$ 5	5140	\$ 25,700
	Concrete Pavement	SY	\$ 60	5140	\$ 308,400
	6" Concrete Curb	LF	\$ 5	3640	\$ 18,200
	Concrete Driveway	SY	\$ 40	300	\$ 12,000
	4-1/2" Concrete Sidewalk	SY	\$ 3	910	\$ 2,730
	Wheel Chair Ramps	SY	\$ 5	80	\$ 400
TOTAL - STREET & BRIDGE ITEMS					\$ 439,410
TOTAL CONSTRUCTION ITEMS					\$ 1,844,500
CONTINGENCIES (30%)					\$ 553,350
CONSTRUCTION TOTAL					\$ 2,397,900
ENGINEERING SERVICES (15%)					\$ 360,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 2,757,900
	REAL ESTATE ACQUISITION	SF	\$ -	0	\$ -

Notes

- Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
- This alternative includes conveying flow to Mary's Creek In-line Detention Facility. Real estate within the proposed Mary's Creek In-line Detention Facility has been purchased and therefore has zero acquisition costs per City Staff.

CITY OF FRIENDSWOOD
DRAINAGE MASTER PLAN
PHASE II
FM518 WEST (WILLOWICK TO
MARY'S CREEK)

ALTERNATE No. 2

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 44,000	1	\$ 44,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Flagmen	LS		0	\$ -
	Detention Facility Construction	CY	\$ 7	19200	\$ 134,400
	Trench Safety Systems for Trench Excavations	LF	\$ 15	3410	\$ 51,150
	Reinforced Filter Fence	LF	\$ 2	2430	\$ 4,860
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	3340	\$ 133,600
TOTAL - GENERAL ITEMS					\$ 488,010
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	8	\$ 24,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	690	\$ 3,450
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	970	\$ 9,700
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	430	\$ 4,300
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	430	\$ 17,200
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	760	\$ 45,600
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	100	\$ 10,000
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	680	\$ 78,200
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	1870	\$ 261,800
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	0	\$ -
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	0	\$ -
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF		0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF		0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	21	\$ 42,000
TOTAL - STORM SEWER					\$ 498,250
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	5800	\$ 34,800
	Roadway Excavation	CY	\$ 5	7250	\$ 36,250
	Lime	TON	\$ 100	101.56	\$ 10,156
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	5800	\$ 29,000
	Concrete Pavement	SY	\$ 60	5800	\$ 348,000
	6" Concrete Curb	LF	\$ 5	4140	\$ 20,700
	Concrete Driveway	SY	\$ 40	300	\$ 12,000
	4-1/2" Concrete Sidewalk	SY	\$ 3	910	\$ 2,730
	Wheel Chair Ramps	SY	\$ 5	70	\$ 350
TOTAL - STREET & BRIDGE ITEMS					\$ 493,986
TOTAL CONSTRUCTION ITEMS					\$ 1,478,300
CONTINGENCIES (30%)					\$ 443,490
CONSTRUCTION TOTAL					\$ 1,921,800
ENGINEERING SERVICES (15%)					\$ 289,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 2,210,800
	REAL ESTATE ACQUISITION	SF	\$ 8	145000	\$ 1,160,000

Notes

Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
Real Estate Acquisition Data obtained from Galveston County CAD.

CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II
 FM518 WEST (WILLOWICK TO
 MARY'S CREEK)

ALTERNATE No. 3

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 40,000	1	\$ 40,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Detention Facility Construction	CY	\$ 7	11600	\$ 81,200
	Trench Safety Systems for Trench Excavations	LF	\$ 15	4550	\$ 68,250
	Reinforced Filler Fence	LF	\$ 2	2970	\$ 5,940
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	1460	\$ 58,400
TOTAL - GENERAL ITEMS					\$ 373,790
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	10	\$ 30,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	690	\$ 3,450
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	680	\$ 6,800
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	620	\$ 6,200
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	640	\$ 38,400
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	640	\$ 64,000
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	680	\$ 78,200
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	290	\$ 40,600
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	0	\$ -
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	2300	\$ 460,000
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	21	\$ 42,000
TOTAL - STORM SEWER					\$ 769,650
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	2470	\$ 14,820
	Roadway Excavation	CY	\$ 5	3090	\$ 15,450
	Lime	TON	\$ 100	43.23	\$ 4,323
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	2470	\$ 12,350
	Concrete Pavement	SY	\$ 60	2470	\$ 148,200
	6" Concrete Curb	LF	\$ 5	1640	\$ 8,200
	Concrete Driveway	SY	\$ 40	300	\$ 12,000
	4-1/2" Concrete Sidewalk	SY	\$ 3	910	\$ 2,730
	Wheel Chair Ramps	SY	\$ 5	50	\$ 250
TOTAL - STREET & BRIDGE ITEMS					\$ 218,323
TOTAL CONSTRUCTION ITEMS					\$ 1,361,800
CONTINGENCIES (30%)					\$ 408,540
CONSTRUCTION TOTAL					\$ 1,770,400
ENGINEERING SERVICES (15%)					\$ 266,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 2,036,400
	REAL ESTATE ACQUISITION	SF			\$ -

Notes

- Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
- This alternative includes conveying flow to Mary's Creek In-line Detention Facility. Real estate within the proposed Mary's Creek In-line Detention Facility has been purchased and therefore has zero acquisition costs per City Staff.

CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II
 FM518 WEST (WILLOWICK TO
 MARYS CREEK)

ALTERNATE No. 4

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 33,000	1	\$ 33,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Detention Facility Construction	CY	\$ 7	19200	\$ 134,400
	Trench Safety Systems for Trench Excavations	LF	\$ 15	3500	\$ 52,500
	Reinforced Filter Fence	LF	\$ 2	2430	\$ 4,860
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	1460	\$ 58,400
	TOTAL - GENERAL ITEMS				\$ 403,160
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	10	\$ 30,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	690	\$ 3,450
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	680	\$ 6,800
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	620	\$ 6,200
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	640	\$ 38,400
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	640	\$ 64,000
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	680	\$ 78,200
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	1540	\$ 215,600
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	0	\$ -
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	0	\$ -
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	21	\$ 42,000
	TOTAL - STORM SEWER				\$ 484,650
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	2470	\$ 14,820
	Roadway Excavation	CY	\$ 5	3090	\$ 15,450
	Lime	TON	\$ 100	43.23	\$ 4,323
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	2470	\$ 12,350
	Concrete Pavement	SY	\$ 60	2470	\$ 148,200
	6" Concrete Curb	LF	\$ 5	1640	\$ 8,200
	Concrete Driveway	SY	\$ 40	300	\$ 12,000
	4-1/2" Concrete Sidewalk	SY	\$ 3	910	\$ 2,730
	Wheel Chair Ramps	SY	\$ 5	50	\$ 250
	TOTAL - STREET & BRIDGE ITEMS				\$ 218,323
	TOTAL CONSTRUCTION ITEMS				\$ 1,106,200
	CONTINGENCIES (30%)				\$ 331,860
	CONSTRUCTION TOTAL				\$ 1,438,100
	ENGINEERING SERVICES (15%)				\$ 216,000
	TOTAL ENGINEERING AND CONSTRUCTION				\$ 1,654,100
	REAL ESTATE ACQUISITION	SF	\$ 8	145000	\$ 1,160,000

Notes

Contingencies Include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer 11a-ins.
 Real Estate Acquisition Data obtained from Galveston County CAD.

CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II
 FM 518 EAST (WILLOWICK TO
 COWARD'S CREEK)

ALTERNATE No. 1

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 104,000	1	\$ 104,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Flagmen	LS		0	\$ -
	Detention Facility Construction	CY	\$ 7	28900	\$ 202,300
	Trench Safety Systems for Trench Excavations	LF	\$ 15	7390	\$ 110,850
	Reinforced Filter Fence	LF	\$ 2	5120	\$ 10,240
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	7620	\$ 304,800
TOTAL - GENERAL ITEMS					\$ 852,190
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	11	\$ 33,000
	Remove Existing 15 Inch Storm Sewer, All Depths	LF	\$ 5		\$ -
	Remove Existing 18 Inch Storm Sewer, All Depths	LF	\$ 5	1260	\$ 6,300
	Remove Existing 24 Inch Storm Sewer, All Depths	LF	\$ 10	550	\$ 5,500
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10		
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	1030	\$ 20,600
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	1470	\$ 58,800
	Plug 24 inch Storm Sewer	EA			\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	810	\$ 48,600
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	120	\$ 9,600
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	0	\$ -
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	220	\$ 25,300
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	1490	\$ 208,600
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	0	\$ -
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	450	\$ 90,000
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	850	\$ 212,500
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	3450	\$ 1,035,000
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	24	\$ 48,000
TOTAL - STORM SEWER					\$ 1,801,800
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	10800	\$ 64,800
	Roadway Excavation	CY	\$ 5	13500	\$ 67,500
	Lime	TON	\$ 100	189	\$ 18,900
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	10800	\$ 54,000
	Concrete Pavement	SY	\$ 60	10800	\$ 648,000
	6" Concrete Curb	LF	\$ 5	5600	\$ 28,000
	Concrete Driveway	SY	\$ 40	670	\$ 26,800
	4-1/2" Concrete Sidewalk	SY	\$ 3	2280	\$ 6,840
	Wheel Chair Ramps	SY	\$ 5	150	\$ 750
TOTAL - STREET & BRIDGE ITEMS					\$ 915,590
TOTAL CONSTRUCTION ITEMS					\$ 3,569,600
CONTINGENCIES (30%)					\$ 1,070,880
CONSTRUCTION TOTAL					\$ 4,640,500
ENGINEERING SERVICES (15%)					\$ 697,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 5,337,500
	REAL ESTATE ACQUISITION	SF	\$ -	0	\$ -

Notes

- Contingencies Include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
- This alternative includes conveying flow to a TSARP buy-out property on Castlewood adjacent to Coward's Creek. This real estate has been purchased and therefore has zero acquisition costs per City Staff.

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 87,000	1	\$ 87,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Flagmen	LS		0	\$ -
	Detention Facility Construction	CY	\$ 7	12500	\$ 87,500
	Trench Safety Systems for Trench Excavations	LF	\$ 15	7210	\$ 108,150
	Reinforced Filter Fence	LF	\$ 2	5120	\$ 10,240
	Reinforced Filter Fabric Barrier	LF	\$ 5		\$ -
	Remove and Relocate Treas	EA		0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	7620	\$ 304,800
TOTAL - GENERAL ITEMS					\$ 717,690
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	15	\$ 45,000
	Remove Existing 15 inch Storm Sewer, All Depths	LF	\$ 5	0	\$ -
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	1260	\$ 6,300
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	550	\$ 5,500
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	1030	\$ 20,600
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	1220	\$ 48,800
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	810	\$ 48,600
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	120	\$ 9,600
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	390	\$ 39,000
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	1170	\$ 134,550
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	0	\$ -
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	850	\$ 144,500
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	3870	\$ 774,000
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	\$ 500	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF			
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	24	\$ 48,000
TOTAL - STORM SEWER					\$ 1,324,450
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	10800	\$ 64,800
	Roadway Excavation	CY	\$ 5	13500	\$ 67,500
	Lime	TON	\$ 100	189	\$ 18,900
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	10800	\$ 54,000
	Concrete Pavement	SY	\$ 60	10800	\$ 648,000
	6" Concrete Curb	LF	\$ 5	5600	\$ 28,000
	Concrete Driveway	SY	\$ 40	670	\$ 26,800
	4-1/2" Concrete Sidewalk	SY	\$ 3	2280	\$ 6,840
	Wheel Chair Ramps	SY	\$ 5	150	\$ 750
TOTAL - STREET & BRIDGE ITEMS					\$ 915,590
TOTAL CONSTRUCTION ITEMS					\$ 2,957,800
CONTINGENCIES (30%)					\$ 887,340
CONSTRUCTION TOTAL					\$ 3,845,200
ENGINEERING SERVICES (15%)					\$ 577,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 4,422,200
	REAL ESTATE ACQUISITION	SF	\$ 14	46000	\$ 644,000

Notes

Contingencies Include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
Real Estate Acquisition Data obtained from Galveston County CAD.

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 115,000	1	\$ 115,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Flagmen	LS		0	\$ -
	Detention Facility Construction	CY	\$ 7	28100	\$ 196,700
	Trench Safety Systems for Trench Excavations	LF	\$ 15	7020	\$ 105,300
	Reinforced Filter Fence	LF	\$ 2	5120	\$ 10,240
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	5180	\$ 207,200
TOTAL - GENERAL ITEMS					\$ 754,440
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	7	\$ 21,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	1260	\$ 6,300
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	550	\$ 5,500
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	1030	\$ 20,600
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	1030	\$ 41,200
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	2680	\$ 107,200
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	890	\$ 53,400
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	0	\$ -
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	50	\$ 5,750
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	730	\$ 102,200
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	320	\$ 54,400
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	850	\$ 170,000
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	320	\$ 80,000
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	1100	\$ 440,000
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	2760	\$ 1,380,000
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	24	\$ 48,000
TOTAL - STORM SEWER					\$ 2,535,550
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	7470	\$ 44,820
	Roadway Excavation	CY	\$ 5	9340	\$ 46,700
	Lime	TON	\$ 100	130.67	\$ 13,067
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	7470	\$ 37,350
	Concrete Pavement	SY	\$ 60	7470	\$ 448,200
	6" Concrete Curb	LF	\$ 5	5600	\$ 28,000
	Concrete Driveway	SY	\$ 40	670	\$ 26,800
	4-1/2" Concrete Sidewalk	SY	\$ 3	2280	\$ 6,840
	Wheel Chair Ramps	SY	\$ 5	130	\$ 650
TOTAL - STREET & BRIDGE ITEMS					\$ 652,427
TOTAL CONSTRUCTION ITEMS					\$ 3,942,500
CONTINGENCIES (30%)					\$ 1,182,750
CONSTRUCTION TOTAL					\$ 5,125,300
ENGINEERING SERVICES (15%)					\$ 769,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 5,894,300
	REAL ESTATE ACQUISITION	SF	\$ 6	55000	\$ 330,000

Notes

Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
Real Estate Acquisition Data obtained from Galveston County CAD.

CITY OF FRIENDSWOOD
 MASTER DRAINAGE PLAN
 PHASE II
 FM518 EAST (WILLOWICK TO
 COWARD'S CREEK)

ALTERNATE No. 4

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	\$ 75,000	1	\$ 75,000
	Traffic Control & Regulation	LS	\$ 120,000	1	\$ 120,000
	Detention Facility Construction	CY	\$ 7	28100	\$ 196,700
	Trench Safety Systems for Trench Excavations	LF	\$ 15	6600	\$ 99,000
	Reinforced Filter Fence	LF	\$ 2	0	\$ -
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	5180	\$ 207,200
TOTAL - GENERAL ITEMS					\$ 697,900
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	14	\$ 42,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	1260	\$ 6,300
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	820	\$ 49,200
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	0	\$ -
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	980	\$ 112,700
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	420	\$ 58,800
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	0	\$ -
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	4380	\$ 876,000
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	24	\$ 48,000
TOTAL - STORM SEWER					\$ 1,193,000
C. STREET & BRIDGE					
	Remove Existing Concrete Pavement w/ or w/o curb and w/ or w/o Asphalt, all thicknesses	SY	\$ 6	7470	\$ 44,820
	Roadway Excavation	CY	\$ 5	9340	\$ 46,700
	Lime	TON	\$ 100	130.67	\$ 13,067
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	7470	\$ 37,350
	Concrete Pavement	SY	\$ 60	7470	\$ 448,200
	6" Concrete Curb	LF	\$ 5	5600	\$ 28,000
	Concrete Driveway	SY	\$ 40	670	\$ 26,800
	4-1/2" Concrete Sidewalk	SY	\$ 3	2280	\$ 6,840
	Wheel Chair Ramps	SY	\$ 5	130	\$ 650
TOTAL - STREET & BRIDGE ITEMS					\$ 652,427
TOTAL CONSTRUCTION ITEMS					\$ 2,543,400
CONTINGENCIES (30%)					\$ 763,020
CONSTRUCTION TOTAL					\$ 3,306,500
ENGINEERING SERVICES (15%)					\$ 496,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 3,802,500
	REAL ESTATE ACQUISITION	SF	\$ 6	55000	\$ 330,000

Notes

Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
 Real Estate Acquisition Data obtained from Galveston County CAD.

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	141200	1	\$ 141,200
	Traffic Control & Regulation	LS	\$ 60,000	1	\$ 60,000
	Detention Facility Construction	CY	\$ 7	70510	\$ 493,570
	Trench Safety Systems for Trench Excavations	LF	\$ 15	7700	\$ 115,500
	Reinforced Filler Fence	LF	\$ 2	12820	\$ 25,640
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	6410	\$ 256,400
TOTAL - GENERAL ITEMS					\$ 1,092,310
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	15	\$ 45,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	0	\$ -
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	560	\$ 33,600
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	0	\$ -
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	0	\$ -
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	1500	\$ 210,000
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	0	\$ -
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	3500	\$ 700,000
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	2140	\$ 535,000
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	32	\$ 64,000
TOTAL - STORM SEWER					\$ 1,587,600
C. STREET & BRIDGE					
	Remove Existing Asphalt Pavement	SY	\$ 6	17800	\$ 106,800
	Roadway Excavation	CY	\$ 5	13000	\$ 65,000
	Lime	TON	\$ 100	544.25	\$ 54,425
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	31100	\$ 155,500
	Concrete Pavement	SY	\$ 60	28100	\$ 1,686,000
	6" Concrete Curb	LF	\$ 5	12820	\$ 64,100
	Concrete Driveway	SY	\$ 40	400	\$ 16,000
	4-1/2" Concrete Sidewalk	SY	\$ 3	5700	\$ 17,100
	Wheel Chair Ramps	SY	\$ 5	70	\$ 350
TOTAL - STREET & BRIDGE ITEMS					\$ 2,165,275
TOTAL CONSTRUCTION ITEMS					\$ 4,845,200
CONTINGENCIES (30%)					\$ 1,453,560
CONSTRUCTION TOTAL					\$ 6,298,800
ENGINEERING SERVICES (15%)					\$ 945,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 7,243,800

Notes

Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	119400	1	\$ 119,400
	Traffic Control & Regulation	LS	60,000	1	\$ 60,000
	Detention Facility Construction	CY	7	7510	\$ 52,570
	Trench Safety Systems for Trench Excavations	LF	15	7700	\$ 115,500
	Reinforced Filter Fence	LF	2	12820	\$ 25,640
	Reinforced Filter Fabric Barrier	LF	5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	40	6410	\$ 256,400
TOTAL - GENERAL ITEMS					\$ 629,510
B. STORM SEWER					
	Storm Sewer Manhole	EA	3,000	15	\$ 45,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	5	0	\$ -
	Remove Existing 24 inch Storm Sewer, All Depths	LF	10	0	\$ -
	Remove Existing 30 inch Storm Sewer, All Depths	LF	10	0	\$ -
	Remove Existing 36 inch Storm Sewer, All Depths	LF	20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	40	0	\$ -
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	60	540	\$ 32,400
	30 inch RCP Storm Sewer, All Depths	LF	80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	100	0	\$ -
	42 inch RCP Storm Sewer, All Depths	LF	115	0	\$ -
	48 inch RCP Storm Sewer, All Depths	LF	140	1500	\$ 210,000
	54 inch RCP Storm Sewer, All Depths	LF	170	5660	\$ 962,200
	60 inch RCP Storm Sewer, All Depths	LF	200	0	\$ -
	66 inch RCP Storm Sewer, All Depths	LF	250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	300	0	\$ -
	78 inch RCP Storm Sewer, All Depths	LF	400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	500	0	\$ -
	Type BB Inlet, Cast-in-Place or Precast	EA	2,000	26	\$ 52,000
TOTAL - STORM SEWER					\$ 1,301,600
C. STREET & BRIDGE					
	Remove Existing Asphalt Pavement	SY	6	17800	\$ 106,800
	Roadway Excavation	CY	5	13000	\$ 65,000
	Lime	TON	100	544.25	\$ 54,425
	Lime Stabilized Subgrade, 8-Inch	SY	5	31100	\$ 155,500
	Concrete Pavement	SY	60	28100	\$ 1,686,000
	6" Concrete Curb	LF	5	12820	\$ 64,100
	Concrete Driveway	SY	40	400	\$ 16,000
	4-1/2' Concrete Sidewalk	SY	3	5700	\$ 17,100
	Wheel Chair Ramps	SY	5	70	\$ 350
TOTAL - STREET & BRIDGE ITEMS					\$ 2,165,275
TOTAL CONSTRUCTION ITEMS					\$ 4,096,400
CONTINGENCIES (30%)					\$ 1,228,920
CONSTRUCTION TOTAL					\$ 5,325,400
ENGINEERING SERVICES (15%)					\$ 799,000
TOTAL ENGINEERING AND CONSTRUCTION					\$ 6,124,400
	REAL ESTATE ACQUISITION	SF	3	520000	\$ 1,560,000
	EASEMENT ACQUISITION	SF	3	20400	\$ 62,000
TOTAL REAL ESTATE AND EASEMENT ACQUISITION					\$ 1,622,000

Notes

Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
 Real Estate Acquisition Data obtained from Galveston County CAD.

Item	Description	Unit	Unit Cost	Sub Total Qty	Cost
A. GENERAL					
	Mobilization (3%)	LS	140800	1	\$ 140,800
	Traffic Control & Regulation	LS	\$ 60,000	1	\$ 60,000
	Detention Facility Construction	CY	\$ 7	41030	\$ 287,210
	Trench Safety Systems for Trench Excavations	LF	\$ 15	7650	\$ 114,750
	Reinforced Filter Fence	LF	\$ 2	12820	\$ 25,640
	Reinforced Filter Fabric Barrier	LF	\$ 5	0	\$ -
	Low Profile Concrete Traffic Barrier	LF	\$ 40	6410	\$ 256,400
	TOTAL - GENERAL ITEMS				\$ 884,800
B. STORM SEWER					
	Storm Sewer Manhole	EA	\$ 3,000	17	\$ 51,000
	Remove Existing 18 inch Storm Sewer, All Depths	LF	\$ 5	0	\$ -
	Remove Existing 24 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 30 inch Storm Sewer, All Depths	LF	\$ 10	0	\$ -
	Remove Existing 36 inch Storm Sewer, All Depths	LF	\$ 20	0	\$ -
	Remove Existing 42 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Remove Existing 48 inch Storm Sewer, All Depths	LF	\$ 40	0	\$ -
	Plug 24 inch Storm Sewer	EA		0	\$ -
	24 inch RCP Storm Sewer, All Depths	LF	\$ 60	540	\$ 32,400
	30 inch RCP Storm Sewer, All Depths	LF	\$ 80	0	\$ -
	36 inch RCP Storm Sewer, All Depths	LF	\$ 100	0	\$ -
	42 inch RCP Storm Sewer, All Depths	LF	\$ 115	0	\$ -
	48 inch RCP Storm Sewer, All Depths	LF	\$ 140	1500	\$ 210,000
	54 inch RCP Storm Sewer, All Depths	LF	\$ 170	2160	\$ 367,200
	60 inch RCP Storm Sewer, All Depths	LF	\$ 200	0	\$ -
	66 inch RCP Storm Sewer, All Depths	LF	\$ 250	0	\$ -
	72 inch RCP Storm Sewer, All Depths	LF	\$ 300	3450	\$ 1,035,000
	78 inch RCP Storm Sewer, All Depths	LF	\$ 400	0	\$ -
	84 inch RCP Storm Sewer, All Depths	LF	\$ 500	50	\$ 25,000
	Type BB Inlet, Cast-in-Place or Precast	EA	\$ 2,000	26	\$ 52,000
	Type E Inlet, Cast-in-Place or Precast	EA	\$ 3,000	1	\$ 3,000
	Ditch regrading	LF	\$ 5	1500	\$ 7,500
	TOTAL - STORM SEWER				\$ 1,783,100
C. STREET & BRIDGE					
	Remove Existing Asphalt Pavement	SY	\$ 6	17800	\$ 106,800
	Roadway Excavation	CY	\$ 5	13000	\$ 65,000
	Lime	TON	\$ 100	544.25	\$ 54,425
	Lime Stabilized Subgrade, 8-inch	SY	\$ 5	31100	\$ 155,500
	Concrete Pavement	SY	\$ 60	28100	\$ 1,686,000
	6" Concrete Curb	LF	\$ 5	12820	\$ 64,100
	Concrete Driveway	SY	\$ 40	400	\$ 16,000
	4-1/2" Concrete Sidewalk	SY	\$ 3	5700	\$ 17,100
	Wheel Chair Ramps	SY	\$ 5	70	\$ 350
	TOTAL - STREET & BRIDGE ITEMS				\$ 2,165,275
	TOTAL CONSTRUCTION ITEMS				\$ 4,833,200
	CONTINGENCIES (30%)				\$ 1,449,960
	CONSTRUCTION TOTAL				\$ 6,283,200
	ENGINEERING SERVICES (15%)				\$ 943,000
	TOTAL ENGINEERING AND CONSTRUCTION				\$ 7,226,200
	REAL ESTATE ACQUISITION	SF	\$ 3	520000	\$ 1,560,000
	EASEMENT ACQUISITION	SF	\$ 3	40500	\$ 122,000
	TOTAL REAL ESTATE AND EASEMENT ACQUISITION				\$ 1,682,000

Notes

Contingencies include: Public and private utility adjustments, SW3P, permits, outfall appurtenances, storm sewer tie-ins.
 Real Estate Acquisition Data obtained from Galveston County CAD.