Atlantic County

Flood Control Study

Flood Hazard Mitigation Presentation of Findings

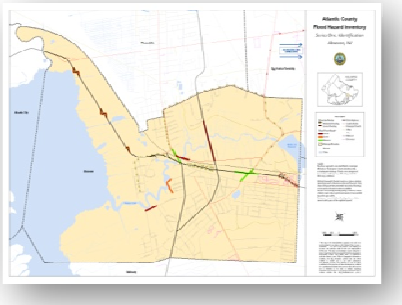
October 5, 2007

Table of Contents

Flood Hazard Mitigation & Diversion Route Inventory Program

MAP SERIES LIST & BRIEF DESCRIPTION

TITLE: *Atlantic County, Flood Hazard Inventory, Series One: Identification, Mun NJ*



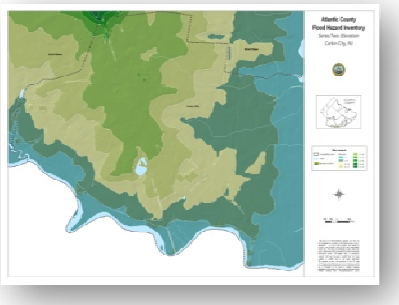
SERIES 1 - IDENTIFICATION: <u>Reoccurring flooded roadway inventory</u> including: flooded sections of roadway, flood extent rating & diversion routes.

*Note: flood extent rating describes the flooded section in relation to traffic flow see page 4 for detailed information.

TITLE: *Atlantic County, Flood Hazard Inventory, Series One: Supplemental, Mun NJ*

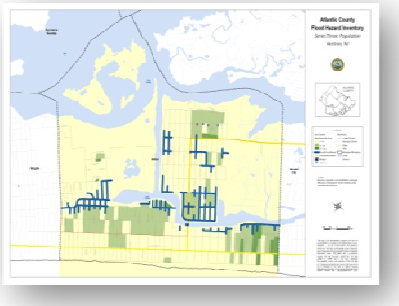
SERIES 1 SUPPLEMENTAL-<u>Same as previous</u>, with additional data & information supplied by municipal officials.

TITLE: *Atlantic County, Flood Hazard Inventory, Series Two: Elevation, Mun NJ*



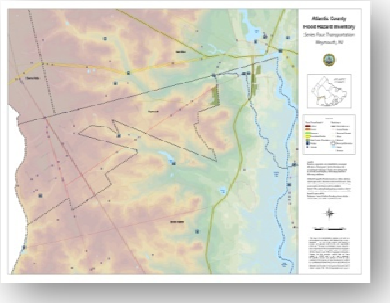
SERIES 2-ELEVATION: <u>Elevation model</u> including; Surrounding area elevation shading, flood prone sections of roadway, water & contours.

TITLE: *Atlantic County, Flood Hazard Inventory, Series Two: Elevation, Mun NJ*



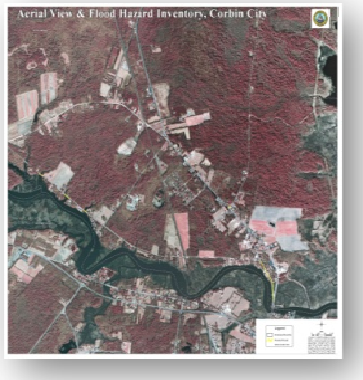
SERIES 3- POPULATION: <u>Surrounding demographics</u> including: emergency response, population centers, and flooded sections of roadway.

TITLE: *Atlantic County, Flood Hazard Inventory, Series Four: Transportation Mun, NJ*



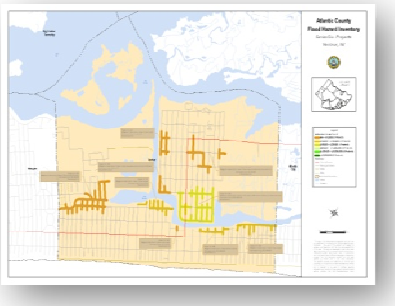
SERIES 4- TRANSPORTATION: <u>Transportation structures,</u> including: Bridges, culverts, evacuation routes, diversion routes, elevation model & high density population centers.

TITLE: *2002 Aerial View & Flood Hazard Inventory Mun NJ*



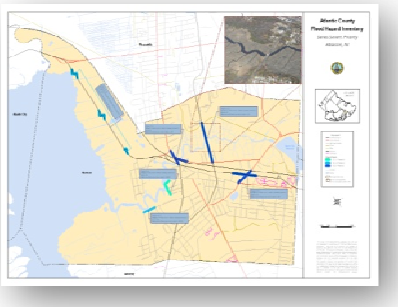
SERIES 5- <u>2002 Aerial view of the municipality</u> including: all roads labeled and an overlay of flooded sections displayed with a transparency level set.

TITLE: *Atlantic County, Flood Hazard Inventory, Series Six: Feasibility Mun, NJ*



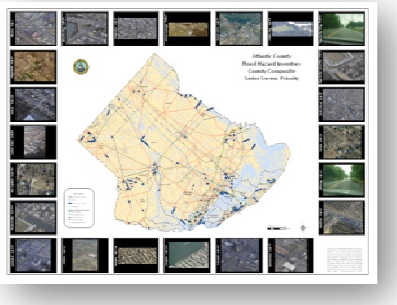
SERIES 6-<u>PROJECTS</u>: Flood prone sections grouped together by potential solution and symbolized by estimated dollar amount. Text labels show project ID, mitigation solution, estimated dollar amount, and attachment reference.

TITLE: *Atlantic County, Flood Hazard Inventory, Series Seven: Priority Mun, NJ*



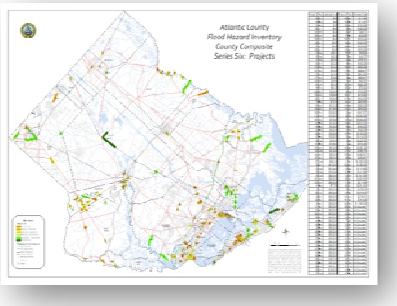
SERIES 7-<u>PRIORITY</u>: Each project assigned a score based on all developed data. Flood prone sections of roadway, and text labels show project ID, score and trip cost.

TITLE: *Atlantic County, Flood Hazard Inventory County Composite, Series Seven: Priority*



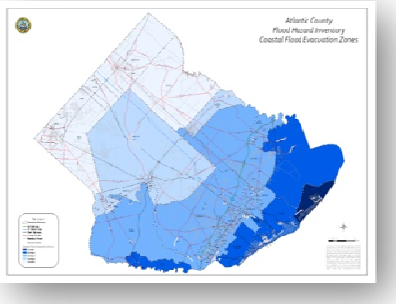
COUNTY COMPOSITE SERIES 7- <u>PRIORITY</u>: County wide flood prone sections of roadway. The extent of flood prone roadways within Atlantic County, as well as, photos of the highest ranking projects in each of the 23 municipalities.

TITLE: *Atlantic County, Flood Hazard Inventory County Composite, Series Six: Projects*



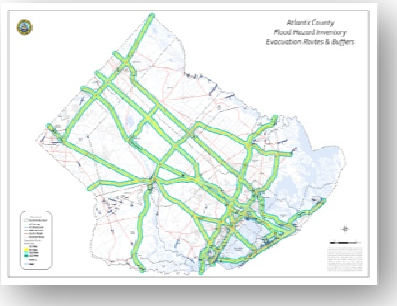
COUNTY COMPOSITE SERIES 6-<u>PROJECTS</u>: County wide flood prone sections grouped together by potential solution and symbolized by estimated dollar amount.

TITLE: *Atlantic County, Flood Hazard Inventory, Coastal Flood Evacuation Zones*



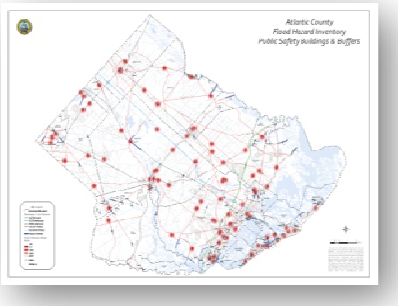
COASTAL FLOOD EVACUATION ZONES: County wide Coastal Flood Evacuation Zones with flood prone sections of roadway.

TITLE: *Atlantic County, Flood Hazard Inventory, Evacuation Routes & Buffers*



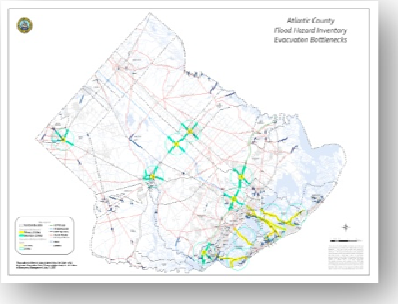
EVACUATION ROUTES & BUFFERS: County wide Evacuation Routes and Evacuation Route Buffers with flood prone sections of roadway.

TITLE: *Atlantic County, Flood Hazard Inventory, Public Safety Buildings & Buffers*



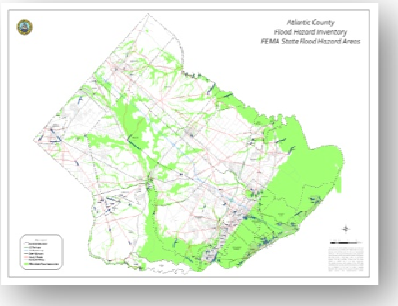
PUBLIC SAFETY BUILDINGS & BUFFERS: County wide Public Safety Buildings and Public Safety Building Buffers with flood prone sections of roadway.

TITLE: *Atlantic County, Flood Hazard Inventory, Evacuation Bottlenecks*



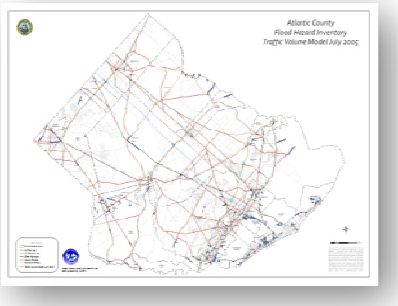
EVACUATION BOTTLENECKS: County wide Evacuation Bottlenecks and Evacuation Bottleneck Buffers with flood prone sections of roadway.

TITLE: *Atlantic County, Flood Hazard Inventory, FEMA State Flood Hazard Areas*



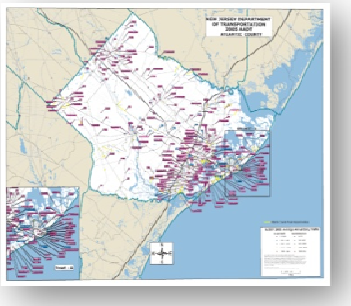
FEMA STATE FLOOD HAZARD AREAS: County wide FEMA State Flood Hazard Areas with flood prone sections of roadway.

TITLE: *Atlantic County, Flood Hazard Inventory, Traffic Volume Model July 2005*



TRAFFIC VOLUME MODEL JULY 2005: NJDOT Projected Traffic Volume for July 2005 with flood prone sections of roadway.

TITLE: *New Jersey Department of Transportation, 2005 AADT, Atlantic County*



2005 AADT: NJDOT Average Annual Daily Traffic Counts

Georeferenced image overlaid with flood prone sections of roadway.

FLOOD EXTENT RATING **(Traffic flow & pass ability in relation to the flooded section of roadway): Roadway segments were identified by municipal officials as "flood prone" due to elevation, tide, or inadequate drainage. Roads were categorized by severity and frequency of flooding under the following conditions:**

- **Critical- Frequently flooded roadways where vehicles cannot pass and a diversion route must be used. Also, where infrequent but potentially hazardous flooding occurs and no diversion route is available.**
- **Severe- Reoccurring flooding along a roadway where vehicles must reduce speed and maneuver around the hazard to pass safely.**
- **Nuisance – Area of shallow flooding where vehicles cannot safely pass at the regulated speed.**

FLOODING SOURCE CATEGORY AND DESCRIPTION:

- **Elevation- Roadway too low. Drainage structures would not help to relieve flooding on the identified section of roadway.**
- **Tidal- Flooding occurs with tidal influence.**
- **Maintenance - Existing drainage system is obstructed, repair or cleaning needed. Scheduled roadway improvements.**
- **Structural- Inadequate transportation drainage system. Additional system components are needed to reduce or resolve flooding on the identified section of roadway.**
- **Weather- Heavy rain and other weather events.**

CATEGORY RESOLUTION COST ESTIMATES & CALCULATION:

- **Elevation: Raise roadway. Assumptions: 50 ft Right Of Way; 1 linear mile, 6" rise in pavement elevation; approximately 11,300 tons of paving; 10,500 ft of curbing; 16 inlets & 3600 ft of pipe. For further details see *Attachment A Preliminary Engineer's Cost Estimates***
- **Tidal: Install one of two check valve options: A-$155,500; B-$3,750. For further details see *Attachment B Check Valve Cost Estimates***
- **Maintenance: Clean or repair existing drainage structures. One vehicle, two people, one storm drain, ~$75.00. Assuming four drains per intersection. Drainage resolutions included with scheduled roadway improvements.**
- **Structural: Install additional structures as needed. Concrete gutters, addition inlets, retro fit existing drainage systems. Approximately $600.00 /ft, for further details see *Attachment C Preliminary Engineer's Cost Estimates***
- **Weather: Sporadic and unusual weather events (Rain Event August 1997). Not enough data for estimated resolution.**

Municipal Abbreviations- municipality names were abbreviated in the project score table in the following manner.

Abs	Absecon
Atc	Atlantic City
Brg	Brigantine
Bub	Buena Borough
Buv	Buena Vista Township
Cor	Corbin City
Ehc	Egg Harbor City
Eht	Egg Harbor Township
Est	Estell Manor
Fol	Folsom
Gal	Galloway Township
Hal	Hamilton Township
Ham	Hammonton
Lin	Linwood
Lon	Longport
Mar	Margate
Mul	Mullica Township
Nor	Northfield
Plv	Pleasantville
Por	Port Republic
Som	Somers Point
Ven	Ventnor
Wey	Weymouth

FLOOD HAZARD MITIGATION
PROJECT SCORE POINTS GUIDE

EMERGENCY TRAVEL FACTORS:

(45 TOTAL POSSIBLE POINTS)

EVACUATION ZONES: Zone 1= 25pts, Zone 2=20pts, Zone 3=15pts, Zone 4=10pts, Zone 5=5pts

PROXIMITY TO ROUTES, INTENSITY OF FLOODING:

(20 TOTAL POSSIBLE POINTS, 5 POINT MAX PER SUBCATEGORY)

EVACUATION ROUTE: 5pts = On route, 4pts = connects to route within 100ft
DIVERSION ROUTE: 3pts = 500ft, 2pts = 1000ft, 1pt = 1500ft

EMERGENCY RESPONSE: Public safety institutions; 5pts within 100ft, 4pts-500, 3pts-1000, 2pts-1500, 1pt-2000

FLOOD EXTENT RATING: Critical=5pts, Severe=3pts, Nuisance=1pt

DAILY TRAVEL FACTORS:

(20 TOTAL POSSIBLE POINTS)

BRIDGES & CULVERTS: Bridge or dam project = 5pts, Culvert project = 4pts

BOTTLENECKS: Primary = 5pts, Secondary = 3pts

POPULATION: 5pts = Very High, 4pts = High, 3pts = Medium, 2pts = Low

TRAFFIC COUNTS:
5pts=> 30,001
4pts=20,001 - 30,000
3pts=10,001 - 20,000
2pts=2,501 - 10,000; 1pt=500 - 2,500

COST EFFECTIVENESS FEASIBILITY:
(35 TOTAL POSSIBLE POINTS)

Q3 (Elevation): Q3 (Elevation): 5pts for projects outside of the Flood Hazard Area

PROJECT FACTOR: $\text{TRIP COST} = \frac{\text{ESTIMATED COST}}{\text{TRAFFIC VOLUME}}$

PROJECT FACTOR
$0.01 - $10 = 30pts
$10.01 - $100 = 24pts
$100.01 - $1,000 = 18pts
$1000.01 - $10,000 = 12pts
> $10,000.00 = 6pts

Supporting Information Contributors:

- **Army Corps of Engineers**
- **Federal Emergency Management Agency**
- **New Jersey Department of Environmental Protection (NJDEP)**
- **NJDEP Bureau of Dam Safety & Flood Control**
- **New Jersey Department of Transportation**
- **New Jersey State Police, Office of Emergency Management**
- **South Jersey Transportation Planning Organization**
- **Atlantic County Department of Public Safety Office of Emergency Management**
- **Atlantic County Division of Engineering**
- **Penoni Associates Inc.**
- **Dixon Associates**

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Atlantic County Office of GIS

Map Viewer (ArcReader) Tutorial
Flood Inventory Verification

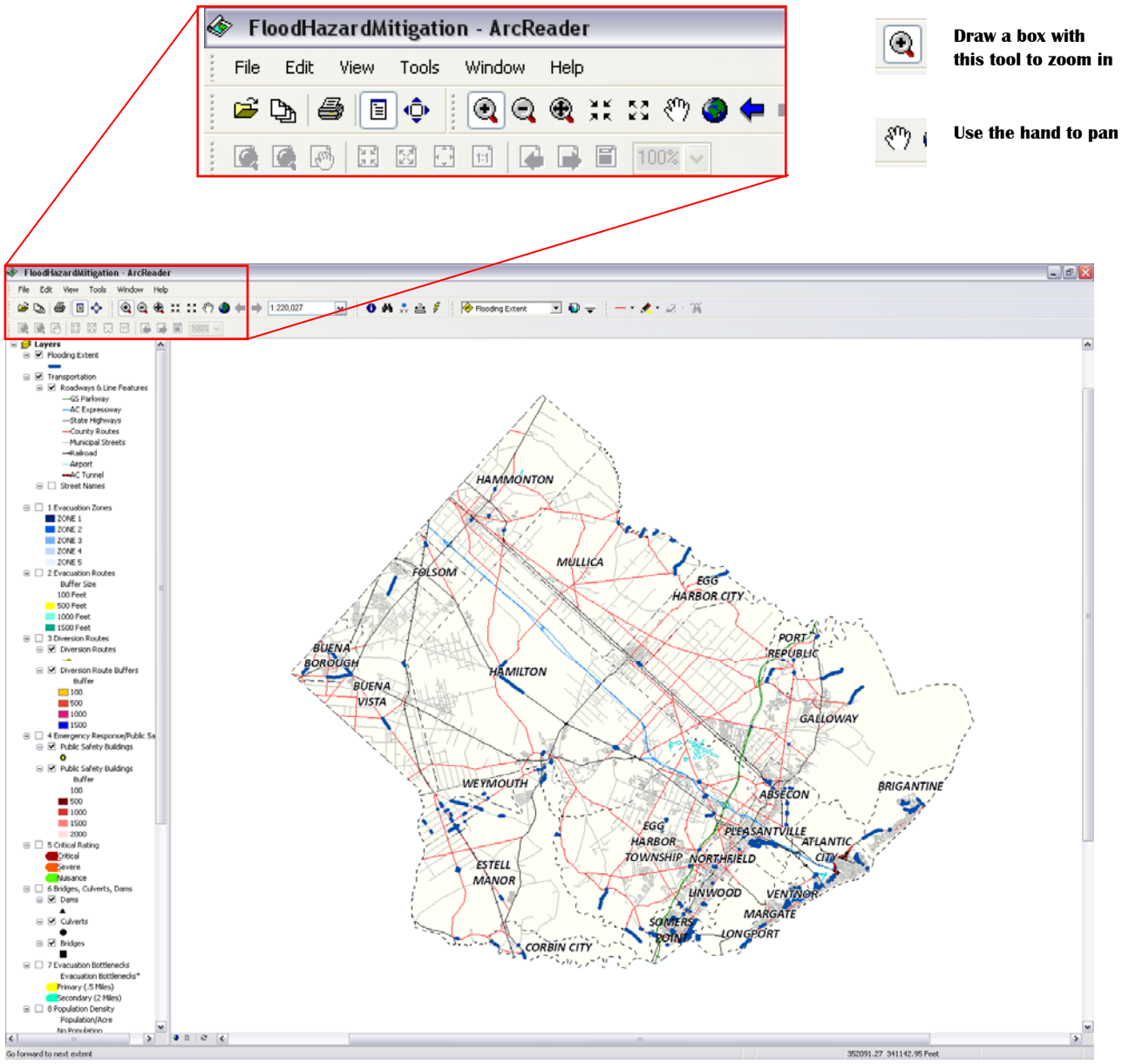
The Atlantic County flood control inventory & analysis can be explored using the map viewer included on the DVD. ArcReader makes it easy to turn layers on and off, take measurements on screen, and access stored database information. Once installed, ArcReader will open a custom made Published Map File (PMF). This file contains the flood inventory in relation to factors used in the scoring of each project. These factors (or layers) include; Evacuation zones, evacuation routes, public safety buildings, bridges, culverts, evacuation bottlenecks, population density, traffic volume, Q3 FEMA identified state flood hazard areas, and project photos. To use ArcReader, begin by installing the included software and opening the custom published map file following the directions below:

1) Install ArcReader (Windows operating systems only)
   - Insert the Flood Hazard Mitigation DVD
   - In My Computer, DVD drive, Right click & Copy the FloodMitigationFindings folder
   - Paste to a new location on the computer
   - In the FloodMitigationFindings folder, just copied to your computer, browse to ArcReader92
   - Within the folder ArcReader92, Double click setup.exe
   - Follow the guided install of ArcReader

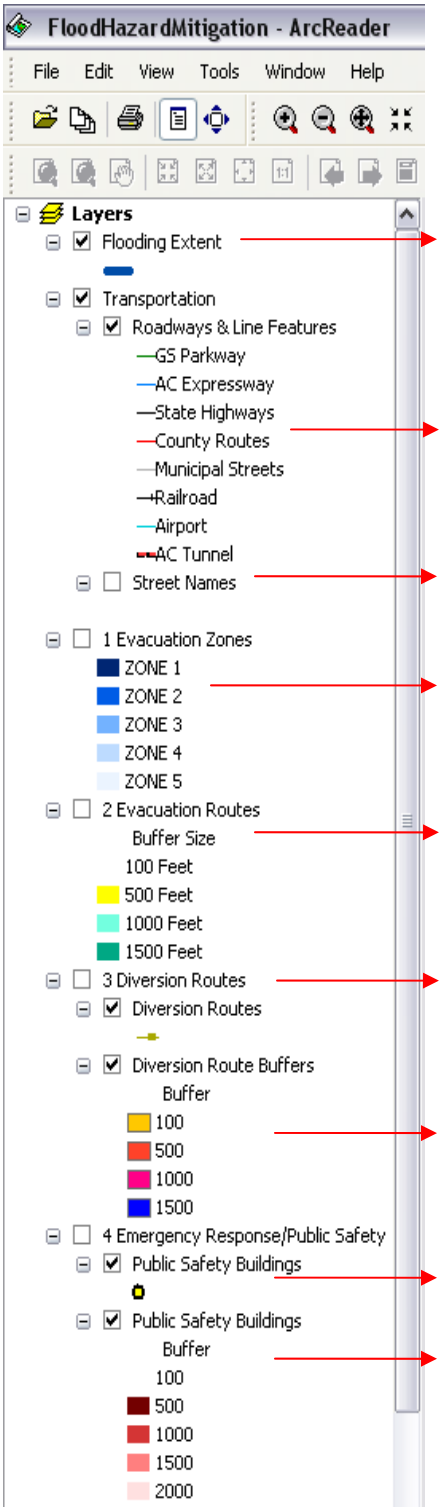
2) Open the Flood Mitigation Document
   - Open ArcReader
   - On the top menu bar click “file”, then “open”
   - Browse to the folder that was copied to your computer, and follow the path as shown below: .../FloodMitigationFindings/InteractiveMap/pmf/floodhazardmitigation.pmf, click “open”. (This will take a few moments to load.)

Once loaded, the PMF will look like the image below.

Use the zoom and pan tools to navigate to a specific municipality & project.



Data layers can be turned on and off by checking the box next to the layer name in the table of contents. For those layers grouped together, both the group and the individual layer must be checked on for the layer to be viewed. The following layers can be viewed in this project:



Flooding Extent– The length roadway experiencing flooding along the transportation network

Transportation- Roads and transportation features within Atlantic County

Street Names- Turn on this layer to see road labels

Evacuation Zones- Areas to be evacuated in the event of a coastal flooding. Higher priority was assigned to projects in zones that have greater chance for coastal flooding disaster

Evacuation Routes & Buffers- Routes to be used in the case of evacuation. Higher priority was assigned to projects on an evacuation route or within the buffers

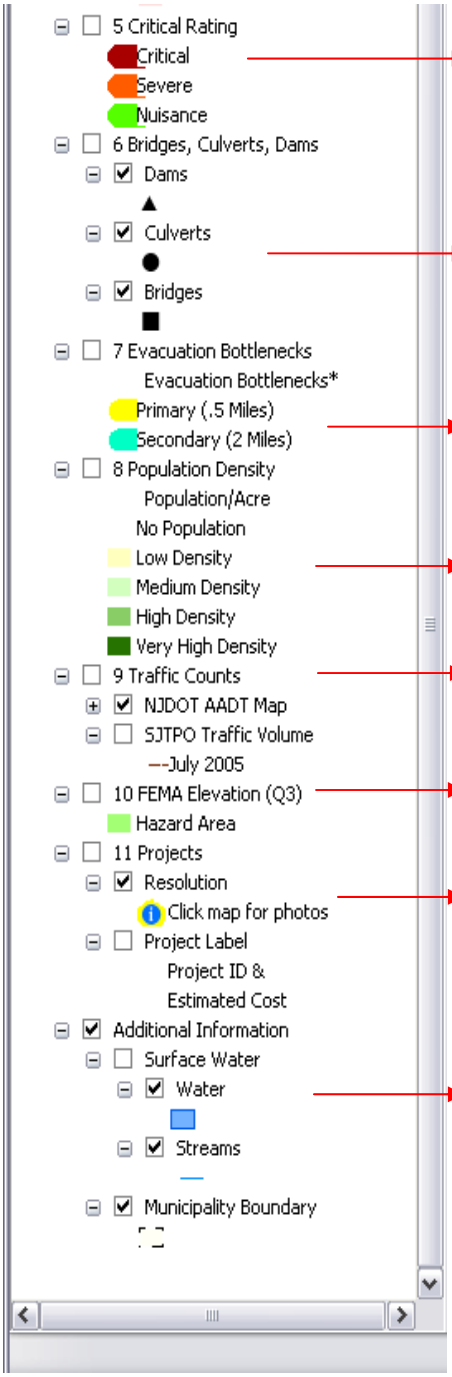
Diversion Routes- Defined routes used in the case of an impassable flooded section of roadway

Diversion Route Buffers- Higher priority was assigned to projects on a diversion route or within the buffers

Public Safety Buildings- Rescue, fire and police buildings

Public Safety Buildings Buffer- Higher priority was assigned to projects within the buffer of a public safety building.

Data layers continued:



Flood Extent Rating- Rating used to describe how flooding impedes traffic flow. Higher priority was assigned to projects that impeded traffic flow

Bridges, Culverts, Dams- Transportation structure locations. Higher priority was assigned to projects that involved a bridge, culvert or dam

Evacuation Bottlenecks- Locations of gridlock during an evacuation. Higher priority was assigned to projects within the first half mile or two miles of a gridlock intersection

Population Density- Population per acre based on 2000 census data. Higher priority was assigned to projects adjacent to very high density population centers

Traffic Counts- Traffic volume was used as a factor for scoring and to generate trip cost. Higher priority was given to projects with higher volume traffic flow

FEMA Elevation (Q3)- FEMA Q3 State flood hazard area. As a function of cost, higher priority was given to projects were outside of the FEMA hazard area

Resolution- This layer serves a special function which will be covered later on in this document. It displays information about the project resolution, estimated cost and contains links to project photos

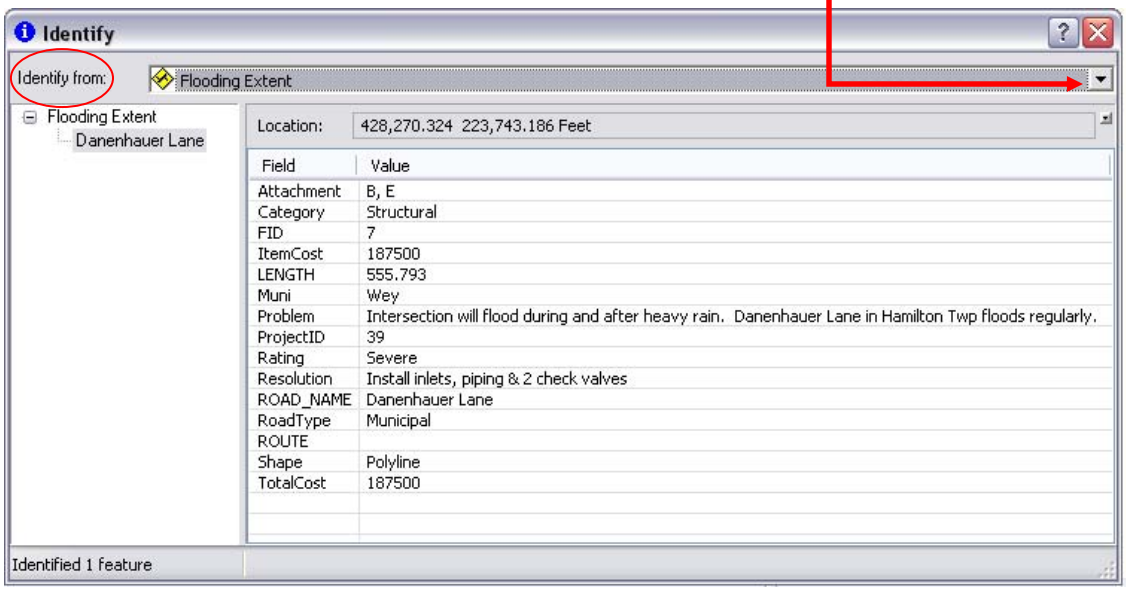
Additional Information- Additional layers useful for viewing along with the flood database. Water bodies, streams and municipal boundaries.

The identify tool will display information stored in the database on each feature present on the map.

To use the Identify feature, first Click the identify tool. This will Open the identify window.

Next, use the identify mouse cursor to Click on a feature for more information.

The identify window will display information about features from the <top most layer>. To identify from a different layer, expand the drop down menu and choose the layer you would like to identify from:

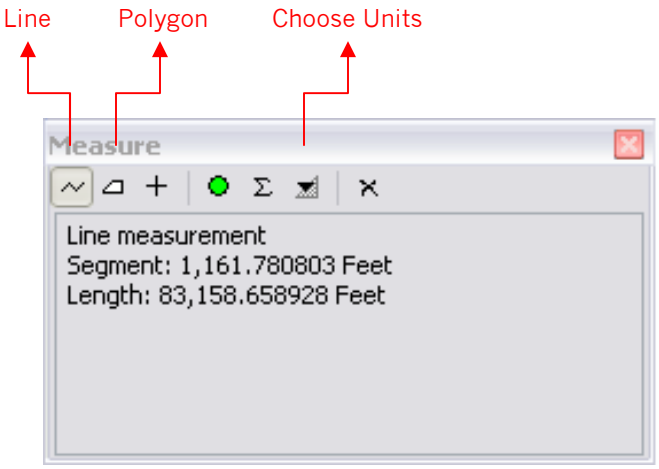


The identify window displays information about the feature that was clicked. Selecting the layer "Flooding Extent" will display the information seen in the above image.

<u>The measure tool</u> – To measure distance or area of any feature in the map, use the measure tool.

To use the measure tool, click the Measure tool button. This will open The measure window.

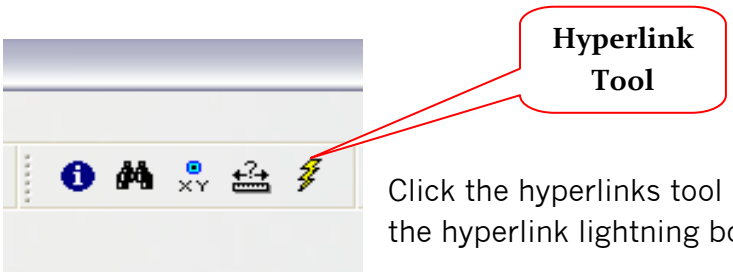
In the measure window, choose To measure a line or a polygon. Next choose the units.



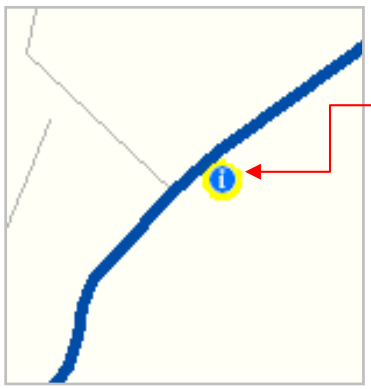
Now click to use the measure tool mouse cursor to draw a line or polygon, and double click when finished. The length or area of the drawn segment will be displayed in the measure window.

The hyperlink tool Use this tool to access photo's for each project in the database.

Important: In order to use this tool, The group layer named ***11 Projects***, and the Layer named ***Resolution*** must be checked on.

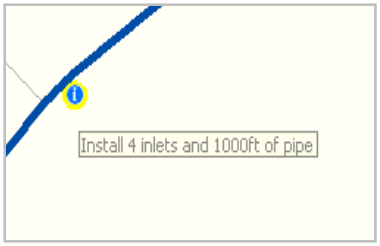


Click the hyperlinks tool and wait for the cursor to change to the hyperlink lightning bolt. This will take a few moments.



With the hyperlink cursor, click on the blue and yellow circle symbol

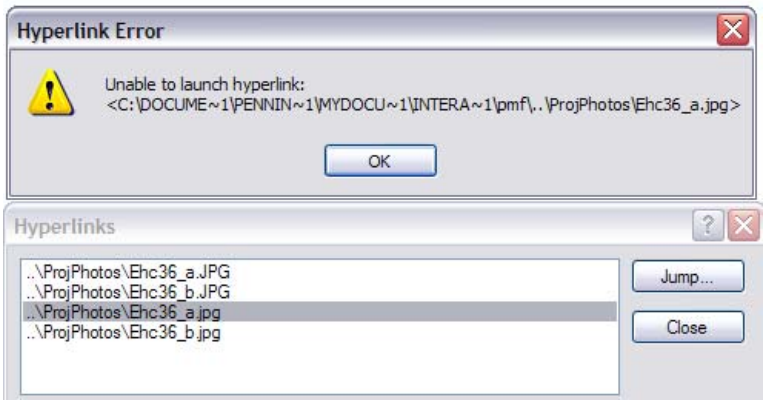
If there are several pictures to choose from, a new window will open. Choose one picture and click the Jump button. If there is only one picture available, it will display in windows picture and fax viewer. (If an error occurs while trying to view the project photos, see the hyperlink troubleshooting tip below.)



Map Tips

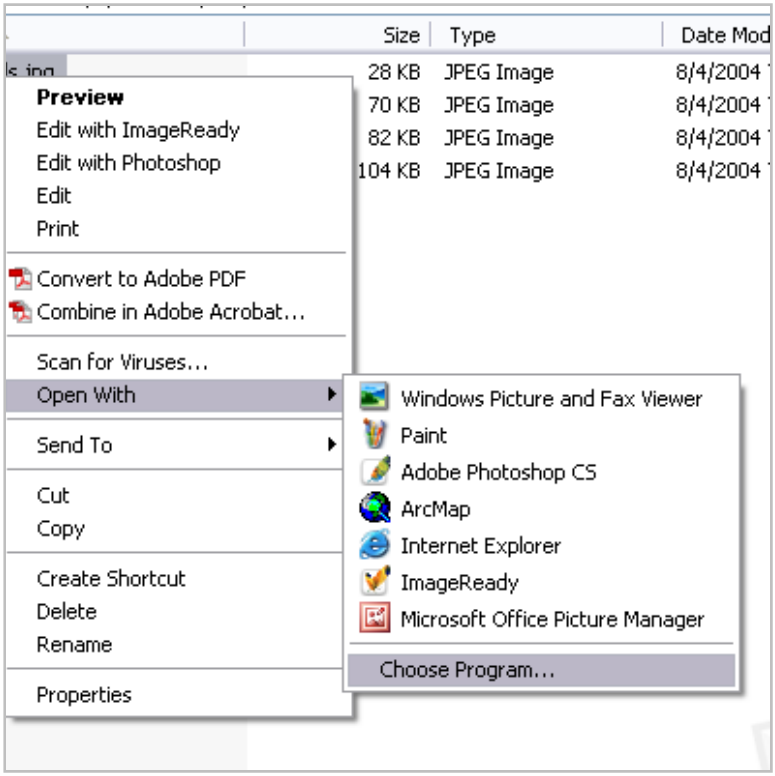
The same blue and yellow symbol will display the project resolutions when moused over (hover cursor over feature)

Hyperlink Troubleshooting

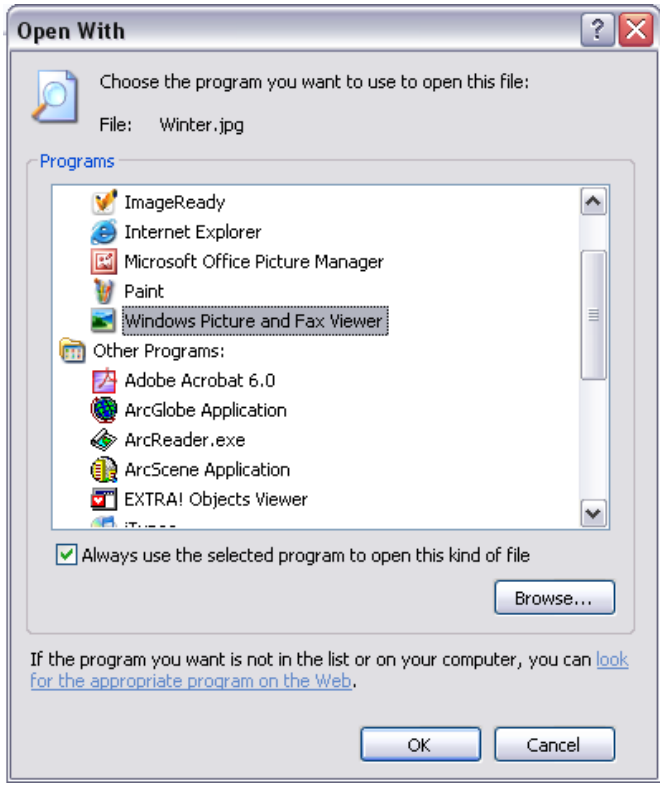


If this error message appears when trying to access project photos through the hyperlink tool, use the following steps to resolve the issue:

1) Browse to any jpg image on your computer, through windows explorer
2) Right click on the image file
3) From the drop down menu choose 'Open With'
4) Then click, 'Choose Program'



5) This will open a new window as shown below. Highlight 'Windows Picture and Fax Viewer' in the list of programs. Then check 'Always use the selected program to open this kind of file'. Next click 'OK' and return to ArcReader.



Flood Hazard Mitigation Project Scores

Project ID	1	2	3	4	5	6	135
Municipality	Abs	Abs	Abs	Abs	Abs	Abs	Atc
Road Name	Route 30 & Mill Road Intersection	Route 9	Shore Road & Ohio Avenue Intersection	Euclid Drive	Faunce Landing Road	Route 30 Jughandles	West End Avenue and Route 40/322
Score	67	66	64	37	41	53	81
Project Factor	24	24	24	12	12	24	24
Trip Cost	36.75	93.03	92.25	6699.42	5266.68	32.43	45.22
Traffic Volume	39609	15837	11353	91	91	39609	45734
Estimated Cost	$1,455,604.58	$1,473,394.94	$1,047,336.67	$609,646.84	$479,267.44	$1,284,635.88	$2,068,100.00
Q3 (FIRM)	5	0	0	0	0	0	0
Traffic Count	5	3	3	0	0	5	5
Population	3	3	3	5	3	2	5
Bottlenecks	0	0	0	0	0	0	5
Bridges/ Culverts	0	5	5	0	5	0	5
Critical Rating	1	5	5	3	5	3	5
Emergency Response	4	3	0	0	0	0	2
Diversion Route	5	3	5	1	1	0	5
Evacuation Route	5	5	4	1	0	4	5
Evacuation Zone	15	15	15	15	15	15	20

Project ID	136	137	138	140	141	143	144
Municipality	Atc	Atc	Atc	Atc	Atc	Atc	Atc
Road Name	Trenton Avenue	Fairmont Avenue	Kuehnle Avenue & Surrounding Streets	Oriental Avenue & Surrounding Streets	Connecticut Avenue South	Inside Thorofare Streets	East Riverside Drive & Surrounding
Score	44	51	47	51	49	43	47
Project Factor	12	18	18	24	18	12	18
Trip Cost	1089.90	130.61	845.86	53.37	560.22	7321.43	868.42
Traffic Volume	203	913	133	524	1941	203	133
Estimated Cost	$221,250.00	$119,250.00	$112,500.00	$27,967.79	$1,087,383.16	$1,486,250.00	$115,500.00
Q3 (FIRM)	0	0	0	0	0	0	0
Traffic Count	0	1	0	1	1	0	0
Population	5	5	5	5	5	5	5
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	0	0	0
Critical Rating	3	3	3	1	3	3	3
Emergency Response	2	2	0	0	0	1	0
Diversion Route	1	1	0	0	0	1	0
Evacuation Route	1	1	1	0	2	1	1
Evacuation Zone	20	20	20	20	20	20	20

Flood Hazard Mitigation Project Scores

Project ID	7	8	9	11	12	13	14
Municipality	Brg	Brg	Brg	Brg	Brg	Brg	Brg
Road Name	Bayshore Avenue	Twelfth Street North	Sheridan Avenue	Sarazan Drive	Hackney Place	Evans Boulevard East	Roosevelt Boulevard
Score	55	54	54	43	64	68	46
Project Factor	18	12	18	12	30	30	12
Trip Cost	428.16	2061.09	292.11	3779.53	3.62	1.31	1110.03
Traffic Volume	1027	580	1027	127	1037	1027	1027
Estimated Cost	$439,717.21	$1,195,430.88	$300,000.00	$480,000.00	$3,750.00	$1,350.00	$1,140,000.00
Q3 (FIRM)	0	0	0	0	0	0	0
Traffic Count	1	1	1	0	1	1	1
Population	5	5	5	5	5	5	4
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	4	0	0	0	0	0
Critical Rating	5	5	5	1	3	5	3
Emergency Response	0	0	0	0	0	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	1	2	0	0	0	2	1
Evacuation Zone	25	25	25	25	25	25	25

Project ID	15	145	16	17	18	19	20
Municipality	Brg	Brg	Bub	Bub	Bub	Bub	Bub
Road Name	Evans Boulevard West	Brigantine Boulevard	Route 40 - Summer Road to Wheat Road	Wheat Road	Route 40, Weymouth-Malaga	Central Avenue	Brewster Road
Score	47	75	47	54	49	42	39
Project Factor	12	18	18	18	24	24	18
Trip Cost	1051.61	920.12	198.19	917.11	15.93	12.81	466.85
Traffic Volume	1027	23910	9393	4046	8099	4792	4792
Estimated Cost	$1,080,000.00	$22,000,000.00	$1,861,637.27	$3,710,621.19	$129,054.26	$61,379.72	$2,237,156.08
Q3 (FIRM)	0	5	5	5	5	5	5
Traffic Count	1	5	2	2	2	2	2
Population	5	4	4	3	3	2	2
Bottlenecks	0	5	5	5	0	0	0
Bridges/ Culverts	0	5	0	4	0	0	4
Critical Rating	3	3	3	5	5	1	3
Emergency Response	0	0	0	3	0	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	1	5	5	4	5	3	0
Evacuation Zone	25	25	5	5	5	5	5

Flood Hazard Mitigation Project Scores

Project ID	129	21	22	23	84	85	86
Municipality	Bub	Buv	Buv	Buv	Cor	Cor	Cor
Road Name	Route 40 - Central Ave to Forest Grove	Tuckahoe Road	Main Avenue	Cains Mill Road	Aetna Drive	Griscom Mill Road	Main Street
Score	48	45	35	49	47	46	38
Project Factor	18	24	12	30	18	12	6
Trip Cost	185.16	22.50	3502.63	0.79	193.97	1343.28	15390.49
Traffic Volume	8099	7999	571	1311	58	134	58
Estimated Cost	$1,499,592.27	$180,000.00	$2,000,000.00	$1,032.00	$11,250.00	$180,000.00	$892,648.61
Q3 (FIRM)	5	5	5	5	0	5	0
Traffic Count	2	2	1	1	0	0	0
Population	3	2	2	2	2	2	3
Bottlenecks	3	0	0	0	0	0	0
Bridges/ Culverts	0	0	5	0	4	0	0
Critical Rating	3	3	5	3	3	3	5
Emergency Response	4	0	0	3	0	0	0
Diversion Route	0	4	0	0	0	0	0
Evacuation Route	5	0	0	0	0	4	4
Evacuation Zone	5	5	5	5	20	20	20

Project ID	36	71	72	73	74	75	80
Municipality	Ehc	Eht	Eht	Eht	Eht	Eht	Eht
Road Name	Route 30	Harbor Drive	Wharf Road	Morris Avenue (Jobs Point)	Somers Avenue	Zion Road	West Avenue
Score	57	33	26	26	38	52	65
Project Factor	24	12	6	6	18	24	30
Trip Cost	10.42	4801.62	24040.53	21287.36	614.54	11.66	4.57
Traffic Volume	19186	134	134	134	490	10294	10950
Estimated Cost	$200,000.00	$643,416.65	$3,221,430.57	$2,852,506.16	$301,126.79	$120,000.00	$50,000.00
Q3 (FIRM)	5	0	0	0	0	5	5
Traffic Count	3	0	0	0	0	3	3
Population	4	3	2	2	2	2	5
Bottlenecks	3	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	0	0	0
Critical Rating	3	3	3	3	3	1	5
Emergency Response	0	0	0	0	0	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	5	0	0	0	0	2	2
Evacuation Zone	10	15	15	15	15	15	15

Flood Hazard Mitigation Project Scores

Project ID	81	83	66	68	69	70	24
Municipality	Eht	Eht	Est	Est	Est	Est	Fol
Road Name	Delancy Avenue	Ocean Heights Avenue	Maple Avenue	Cape May Avenue & Fourth Avenue	Head of River Road	Tuckahoe Road	Mays Landing-Blue Anchor Rd &
Score	47	62	42	59	49	45	41
Project Factor	18	30	12	30	18	18	24
Trip Cost	146.58	0.20	5046.23	0.03	292.13	230.92	92.61
Traffic Volume	1228	18683	134	2568	1287	2568	5503
Estimated Cost	$180,000.00	$3,750.00	$676,195.43	$66.00	$375,968.44	$592,997.56	$509,641.58
Q3 (FIRM)	5	0	5	5	5	5	5
Traffic Count	1	3	0	2	1	2	2
Population	3	3	2	2	2	2	2
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	5	5	4	5	0	0
Critical Rating	1	1	3	1	3	3	3
Emergency Response	0	0	0	0	0	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	4	5	0	0	0	0	0
Evacuation Zone	15	15	15	15	15	15	5

Project ID	146	114	115	116	37	38	142
Municipality	Fol	Gal	Gal	Gal	Hal	Hal	Hal
Road Name	Mays Landing-Blue Anchor Rd &	Jimmie Leeds Road & Breaker Drive	Motts Creek Road	Oyster Creek Road	Route 322 & Cologne Avenue	Old Harding Highway & Mill	Route 322 & Weymouth-Elwood
Score	40	52	38	49	58	45	52
Project Factor	24	24	12	12	24	24	18
Trip Cost	62.34	42.59	6880.17	6090.27	40.48	48.83	414.50
Traffic Volume	5503	8217	525	525	36829	7741	17232
Estimated Cost	$343,035.00	$350,000.00	$3,612,090.00	$3,197,392.87	$1,490,774.55	$378,000.00	$7,142,630.59
Q3 (FIRM)	5	5	0	0	5	0	0
Traffic Count	2	2	1	1	5	2	3
Population	2	3	2	2	4	3	2
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	5	0	0	5
Critical Rating	1	3	3	5	5	3	5
Emergency Response	0	0	0	0	0	3	4
Diversion Route	1	0	0	0	0	0	0
Evacuation Route	0	0	0	4	5	0	5
Evacuation Zone	5	15	20	20	10	10	10

Flood Hazard Mitigation Project Scores

Project ID	25	26	27	28	95	96	97
Municipality	Ham	Ham	Ham	Ham	Lin	Lin	Lin
Road Name	Route 54 & West End Avenue	Route 206	Broadway	Lakeview Avenue	Frances Avenue & Brighton Avenue	Frances Avenue & Grammercy Avenue	Meadow View Avenue
Score	60	53	40	38	46	57	59
Project Factor	30	24	24	18	24	30	30
Trip Cost	7.76	14.40	51.72	944.88	46.27	0.77	0.27
Traffic Volume	15462	10417	4060	1143	389	389	1115
Estimated Cost	$120,000.00	$150,000.00	$210,000.00	$1,080,000.00	$18,000.00	$300.00	$300.00
Q3 (FIRM)	5	5	5	5	0	5	5
Traffic Count	3	3	2	1	0	0	1
Population	4	2	3	4	4	4	4
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	4	0	0	0	0	0
Critical Rating	5	5	1	1	1	1	1
Emergency Response	3	0	0	0	0	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	5	5	0	4	2	2	3
Evacuation Zone	5	5	5	5	15	15	15

Project ID	98	99	100	123	147	124	30
Municipality	Lin	Lin	Lin	Lon	Lon	Mar	Mul
Road Name	Hemlock Drive	Edgewood Avenue	Lincoln Avenue & Barr Avenue	Atlantic Avenue South	Atlantic Avenue North	Ventnor Avenue	Thurston Avenue
Score	48	57	61	43	55	62	27
Project Factor	18	30	30	12	18	18	18
Trip Cost	739.91	0.54	1.09	4223.18	694.24	123.34	636.04
Traffic Volume	1115	276	276	1354	1354	7297	283
Estimated Cost	$825,000.00	$150.00	$300.00	$5,718,182.00	$940,000.00	$900,000.00	$180,000.00
Q3 (FIRM)	5	5	5	0	0	0	0
Traffic Count	1	0	0	1	1	2	0
Population	4	3	5	2	5	5	3
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	0	0	0
Critical Rating	3	1	1	5	5	5	1
Emergency Response	0	1	2	0	3	4	0
Diversion Route	0	0	0	3	3	4	0
Evacuation Route	2	2	3	0	0	4	0
Evacuation Zone	15	15	15	20	20	20	5

Flood Hazard Mitigation Project Scores

Project ID	31	32	33	34	101	102	103
Municipality	Mul	Mul	Mul	Mul	Nor	Nor	Nor
Road Name	McCormick Avenue	Cedar Lane	River Drive	Green Bank Road	Helen Drive East & Cedar Bridge Road	Route 9 & Cedar Bridge Road	Pasadena Drive & Philmar Circle
Score	28	27	27	33	45	63	61
Project Factor	18	18	18	12	18	30	30
Trip Cost	636.04	636.04	636.04	5210.75	390.88	9.51	0.12
Traffic Volume	283	283	283	897	1228	15772	1228
Estimated Cost	$180,000.00	$180,000.00	$180,000.00	$4,674,044.25	$480,000.00	$150,000.00	$150.00
Q3 (FIRM)	0	0	0	0	5	5	5
Traffic Count	0	0	0	1	1	3	1
Population	3	3	3	3	3	4	5
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	5	0	0	0
Critical Rating	1	1	1	3	3	5	1
Emergency Response	1	0	0	4	0	0	2
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	0	0	0	0	0	1	2
Evacuation Zone	5	5	5	5	15	15	15

Project ID	104	105	106	108	109	110	111
Municipality	Nor	Nor	Ple	Ple	Ple	Ple	Ple
Road Name	Route 9 & Northfield Avenue	Broad Street & Davis Avenue Intersection	Ridgewood Avenue & Bikepath	Doughty Road & Bikepath	Streets Between Shore Rd, Bayview	Wright Street & Franklin Avenue	Tunis Avenue and Various
Score	58	57	59	60	60	54	64
Project Factor	24	30	30	30	30	24	30
Trip Cost	11.41	0.37	0.06	5.12	3.67	44.01	2.75
Traffic Volume	15772	406	2568	5858	4090	4090	4090
Estimated Cost	$180,000.00	$150.00	$150.00	$30,000.00	$15,000.00	$180,000.00	$11,250.00
Q3 (FIRM)	5	5	5	5	0	0	0
Traffic Count	3	0	2	2	2	2	2
Population	3	4	5	3	5	5	5
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	0	0	0
Critical Rating	5	1	1	3	5	3	1
Emergency Response	1	1	0	0	1	1	3
Diversion Route	0	0	0	0	2	3	5
Evacuation Route	2	1	1	2	0	1	3
Evacuation Zone	15	15	15	15	15	15	15

Flood Hazard Mitigation Project Scores

Project ID	117	118	119	120	121	122	87
Municipality	Por	Por	Por	Por	Por	Por	Som
Road Name	Cologne-Port Republic Road	Old New York Road	Pitney Road & Riverside Drive	Clarks Landing Road & Central Avenue	English Creek-Port Republic Road North	English Creek-Port Republic Road South	Mays Landing-Somers Point Road
Score	30	44	46	50	38	48	52
Project Factor	12	18	24	24	12	18	24
Trip Cost	6643.36	207.18	72.91	33.15	1589.40	663.51	12.92
Traffic Volume	65	905	2591	905	755	1266	9233
Estimated Cost	$431,818.18	$187,500.00	$188,920.45	$30,000.00	$1,200,000.00	$840,000.00	$119,250.00
Q3 (FIRM)	0	5	0	5	0	5	0
Traffic Count	0	1	2	1	1	1	2
Population	2	2	2	3	2	2	3
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	5	0	0
Critical Rating	1	3	3	1	3	3	5
Emergency Response	0	0	0	1	0	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	0	0	0	0	0	4	3
Evacuation Zone	15	15	15	15	15	15	15

Project ID	90	91	93	126	127	128	130
Municipality	Som	Som	Som	Ven	Ven	Ven	Ven
Road Name	Ambler Road	Groveland Avenue	Bay Avenue & Various	Monmouth Avenue & Surrounding	Harvard Avenue & Surrounding Streets	Fulton Avenue & Surrounding Streets	Harvard Avenue & Calvert Avenue
Score	35	35	64	60	55	81	58
Project Factor	12	12	24	30	24	30	24
Trip Cost	1346.94	1469.39	25.62	3.21	13.11	0.20	14.16
Traffic Volume	490	490	4391	1308	572	19051	572
Estimated Cost	$660,000.00	$720,000.00	$112,500.00	$4,200.00	$7,500.00	$3,750.00	$8,100.00
Q3 (FIRM)	0	0	0	0	0	0	0
Traffic Count	0	0	2	1	1	3	1
Population	5	5	5	5	5	5	5
Bottlenecks	0	0	5	0	0	5	0
Bridges/ Culverts	0	0	4	0	0	0	0
Critical Rating	3	3	5	1	1	5	3
Emergency Response	0	0	2	2	0	3	1
Diversion Route	0	0	0	0	2	5	2
Evacuation Route	0	0	2	1	2	5	2
Evacuation Zone	15	15	15	20	20	20	20

Flood Hazard Mitigation Project Scores

Project ID	131	132	133	134	148	39	40
Municipality	Ven	Ven	Ven	Ven	Ven	Wey	Wey
Road Name	Monmouth Avenue & Surrounding	Derby Avenue	Oxford Avenue & Various Surrounding	Winchester Avenue North	Winchester Avenue South	Danenhauer Lane & Morris Lane	Grant Avenue & Blake Drive
Score	57	65	77	54	55	31	35
Project Factor	24	30	30	24	24	12	18
Trip Cost	11.30	1.61	8.66	94.94	37.97	1399.25	447.76
Traffic Volume	2322	2322	19051	395	395	134	134
Estimated Cost	$26,250.00	$3,750.00	$165,000.00	$37,500.00	$15,000.00	$187,500.00	$60,000.00
Q3 (FIRM)	0	0	0	0	0	0	0
Traffic Count	1	1	3	0	0	0	0
Population	5	5	5	5	5	3	4
Bottlenecks	0	0	5	0	0	0	0
Bridges/ Culverts	0	0	0	0	0	0	0
Critical Rating	1	1	3	1	1	3	1
Emergency Response	2	2	1	0	1	1	0
Diversion Route	2	3	5	2	2	0	0
Evacuation Route	2	3	5	2	2	2	2
Evacuation Zone	20	20	20	20	20	10	10

Project ID	41	42	44	45	46	47	48
Municipality	Wey	Wey	Wey	Wey	Wey	Wey	Wey
Road Name	Loretto Avenue & Clement Intersection	Grant Ave & Intersections with	Tuckahoe Rd & Intersections with	Grant Street at Route 50	Grace Avenue & Hoover Avenue	Lafayette Street & Grace Avenue	Pennsylvania Avenue North
Score	38	34	47	45	29	36	37
Project Factor	18	12	24	18	12	12	18
Trip Cost	180.40	1326.57	70.09	335.82	1343.28	2251.49	335.82
Traffic Volume	134	134	2568	134	134	134	134
Estimated Cost	$24,173.18	$177,760.65	$180,000.00	$45,000.00	$180,000.00	$301,699.48	$45,000.00
Q3 (FIRM)	0	5	5	5	0	5	5
Traffic Count	0	0	2	0	0	0	0
Population	4	2	2	3	2	3	3
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	0	0	0
Critical Rating	1	1	3	3	1	1	1
Emergency Response	2	3	1	2	2	3	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	3	1	0	4	2	2	0
Evacuation Zone	10	10	10	10	10	10	10

Flood Hazard Mitigation Project Scores

Project ID	49	50	51	52	53	54	55
Municipality	Wey	Wey	Wey	Wey	Wey	Wey	Wey
Road Name	Smith Avenue & Grace Avenue	Twelfth Avenue	Eleventh Avenue & Burnett Avenue	Maple Avenue	Atlantic Avenue South	Ninth Avenue & South Jersey Avenue	Atlantic Avenue North
Score	46	30	46	24	30	36	30
Project Factor	30	12	24	6	12	18	12
Trip Cost	0.49	1890.97	34.58	18113.42	1703.86	526.81	1343.28
Traffic Volume	134	134	5205	134	134	134	134
Estimated Cost	$66.00	$253,389.83	$180,000.00	$2,427,198.71	$228,316.85	$70,592.56	$180,000.00
Q3 (FIRM)	0	5	5	5	0	5	5
Traffic Count	0	0	2	0	0	0	0
Population	2	2	2	2	2	2	2
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	5	0	0
Critical Rating	1	1	3	1	1	1	1
Emergency Response	0	0	0	0	0	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	3	0	0	0	0	0	0
Evacuation Zone	10	10	10	10	10	10	10

Project ID	56	57	58	59	61	62	63
Municipality	Wey	Wey	Wey	Wey	Wey	Wey	Wey
Road Name	Cape May Avenue	Eleventh Avenue	Estelle Avenue	Tuckahoe Road & Fourteenth Avenue	Pennsylvania Avenue South	Thirteenth Avenue & South Jersey Avenue	Tenth Avenue
Score	46	46	38	46	34	33	48
Project Factor	24	24	18	24	12	12	30
Trip Cost	70.09	36.85	313.43	33.96	1343.28	1343.28	0.49
Traffic Volume	2568	4885	134	5300	134	134	134
Estimated Cost	$180,000.00	$180,000.00	$42,000.00	$180,000.00	$180,000.00	$180,000.00	$66.00
Q3 (FIRM)	5	5	5	5	5	5	5
Traffic Count	2	2	0	2	0	0	0
Population	2	2	2	2	3	3	2
Bottlenecks	0	0	0	0	0	0	0
Bridges/ Culverts	0	0	0	0	0	0	0
Critical Rating	3	3	3	3	3	3	1
Emergency Response	0	0	0	0	1	0	0
Diversion Route	0	0	0	0	0	0	0
Evacuation Route	0	0	0	0	0	0	0
Evacuation Zone	10	10	10	10	10	10	10

Project ID	**64**	**65**
Municipality	Wey	Wey
Road Name	South Jersey Avenue	Tuckahoe Road
Score	34	46
Project Factor	12	24
Trip Cost	1343.28	33.96
Traffic Volume	134	5300
Estimated Cost	$180,000.00	$180,000.00
Q3 (FIRM)	5	5
Traffic Count	0	2
Population	2	2
Bottlenecks	0	0
Bridges/ Culverts	0	0
Critical Rating	1	3
Emergency Response	4	0
Diversion Route	0	0
Evacuation Route	0	0
Evacuation Zone	10	10

Flood Hazard Mitigation Project Resolution Table

ID	Mun	Problem	Resolution	Project Estimate	Attach-ment
1	Abs	Roadways too low. Flooding occurs when water 6ft above MLW.	Raise roadway elevation	$1,455,604.58	A
2	Abs	Roadways too low. Flooding occurs when water 6ft above MLW.	Raise roadway elevation	$1,473,394.94	A
3	Abs	Roadways too low. Flooding occurs when water 6ft above MLW.	Raise roadway elevation	$1,047,336.67	A
4	Abs	Roadways too low. Flooding occurs when water 6ft above MLW.	Raise roadway elevation	$609,646.84	A
5	Abs	Roadways too low. Flooding occurs when water 6ft above MLW.	Raise roadway elevation	$479,267.44	A
6	Abs	Roadways too low. Flooding occurs when water 6ft above MLW.	Raise roadway elevation	$1,284,635.88	A
135	Atc		Install bulkhead, check valves & pumping station. (1450ft new bulkhead, 2 check valves, 16 inlets, 2000ft of pipe, 1 pump station)	$2,068,100.00	K
136	Atc		2 Street end bulkheads, 3 check valves	$221,250.00	H
137	Atc		1 Vaulted and 1 outfall check valve	$119,250.00	B
138	Atc		Install 2 inlets, outfalls and check valves, 1000' of pipe. Reconnect inlet to outfall as per 1997 Citywide Storm Flooding Engineering Study, Pennoni	$112,500.00	B, E
139	Atc		Drainage resolutions included with scheduled roadway improvements and redevelopment of area near and around Carson & Massachusetts Avenues	$0.00	
140	Atc		Raise roadway elevation	$27,967.79	A
141	Atc		Fix underground drainage system	$1,087,383.16	D
143	Atc		Replace 1500 LF of bulkhead on both sides of bay and install 7 pipe end check valves.	$1,486,250.00	I
144	Atc		Install vaulted check valve. As per Citywide Storm Flooding Engineering Study.	$115,500.00	B
7	Brg	Elevation	Raise roadway elevation	$439,717.21	A
8	Brg	Elevation	Raise roadway elevation	$1,195,430.88	A
9	Brg	We need a pump (permanent) at Caverly Drive and Sheridan Blvd.	Drainage resolutions included with scheduled roadway improvements: permanent pump to be installed	$300,000.00	D
10	Brg	Elevation ---- 10 year storm	Unusual weather events not enough data for estimated resolution	$0.00	
11	Brg		(800ft * $600) Connect to pumped section along Sheridan Blvd.	$480,000.00	C
12	Brg		Install pipe end check valve	$3,750.00	B
13	Brg	Storm drain not adequate	Clean storm drains (assuming 18 storm drains)	$1,350.00	D
14	Brg		~1900L.F. to bay at 6th St South street end	$1,140,000.00	C
15	Brg	Storm drain not adequate	~1800L.F. to bay at 12th St North	$1,080,000.00	C
145	Brg	Critical in the case of catastrophic weather event	Unusual weather events not enough data for estimated resolution	$22,000,000.00	D
16	Bub		Raise roadway elevation	$1,861,637.27	A
17	Bub		Raise roadway elevation	$3,710,621.19	A

18	Bub		Raise roadway elevation and/or construct drainage basin	$129,054.26	A
19	Bub		Raise roadway elevation	$61,379.72	A
20	Bub	A pond is located adjacent to Co. Rt 672, which causes flooding	Raise roadway elevation	$2,237,156.08	A
129	Bub		Raise roadway elevation	$1,499,592.27	A
21	Buv	Poor drainage on West Side. No drain pits.	Install 4 inlets and 1000ft of pipe	$180,000.00	E
22	Buv	Water spills over road during big storms. Removes board or two during storm.	Construct and implement a spillway structure and replace bridge. Field checked and no overflow during rain on 7/30/2007	$2,000,000.00	D
23	Buv	Road too low near lake & dam.	Clean drains & culverts (assume 12 drains & 2 culverts)	$1,032.00	D
84	Cor	Tidal/Rain events on Tuckahoe River	Install check valve at each area of flooding (3)	$11,250.00	B
85	Cor	Tidal/Rain events on Tuckahoe River	Install 4 inlets and 1000ft of pipe	$180,000.00	E
86	Cor	Tidal/Rain events on Tuckahoe River	Raise roadway elevation	$892,648.61	A
35	Ehc	Elevation--roadway is too low.	Unusual weather events not enough data for estimated resolution. Field checked and dry during rain storm on 7/30/07 (roadside phragmites)	$0.00	
36	Ehc	Poor drainage - State Road	Install 30in wide concrete gutter with 6in high curb plus asphalt patch. Maintain existing piping, clean culverts.	$200,000.00	F
71	Eht	Low elevation	Raise roadway elevation	$643,416.65	A
72	Eht	Low elevation	Raise roadway elevation	$3,221,430.57	A
73	Eht	Low elevation	Raise roadway elevation	$2,852,506.16	A
74	Eht	Low elevation	Raise roadway elevation	$301,126.79	A
75	Eht	County road and county needs to address. Basin can't handle the flow.	Clean or retrofit existing system (assume siphon system install, 500 LF @ $100 per LF)	$120,000.00	E
76	Eht	Low spot. Should be resolved during intersection improvement.	Drainage resolutions included with scheduled roadway improvements	$0.00	
77	Eht	Minor flooding after 3-4 inches downpour, not much can be done	Unusual weather events not enough data for estimated resolution	$0.00	
78	Eht	Minor flooding after 3-4 inches downpour, not much can be done	Unusual weather events not enough data for estimated resolution	$0.00	
79	Eht	Minor, no real issues	Unusual weather events not enough data for estimated resolution	$0.00	
80	Eht	Pump station needs to be replaced	Replace pump station	$50,000.00	D
81	Eht	Grade issues and need an inlet to existing basin	Install 4 inlets and 1000ft of pipe	$180,000.00	E
82	Eht	Should be fixed with intersection improvement	Drainage resolutions included with scheduled roadway improvements	$0.00	
83	Eht	High tide with heavy rain	Install check valve	$3,750.00	B
94	Eht	Low elevation	Sporadic and unusual weather events, not enough data for estimated resolution	$0.00	
112	Eht	Ongoing project should improve West Atlantic City	Drainage resolutions included with scheduled roadway improvements	$0.00	
66	Est	Roadway elevation is too low	Raise roadway elevation	$676,195.43	A
68	Est	Culverts and basins are in need of repair.	Begin by cleaning culverts, then observe severity of flooding in the future	$66.00	D
69	Est	Elevation of roadway is too low	Raise roadway elevation	$375,968.44	A
70	Est	Elevation of roadway is too low	Raise roadway elevation	$592,997.56	A

24	Fol	Southbound side low and no storm drain. North bound: water comes down roadway missing storm drain and into yard. Curb would solve problem.	Drainage basin at corner of 14th and conrail. Possible environmental constraints	$509,641.58	G
146	Fol	Southbound side low and no storm drain. North bound: water comes down roadway missing storm drain and into yard. Curb would solve problem.	Drainage basin at corner of 14th and conrail, assume 9450 sf = total road area. Possible environmental constraints	$343,035.00	G
113	Gal	Caused by construction project. Never flooded prior to clearing vegetation on the sides of the road.	Solution in progress. Correct & maintain current drainage system.	$0.00	
114	Gal		Drainage resolutions included with scheduled roadway improvements	$350,000.00	D
115	Gal	Roadways are too low and run through marshes. High tide makes the situation worse.	Raise roadway elevation	$3,612,090.00	A
116	Gal	Roadways are too low and run through marshes. High tide makes the situation worse.	Raise roadway elevation	$3,197,392.87	A
37	Hal	Runoff from adjacent areas and poor drainage on each jug handle	Raise roadway elevation	$1,490,774.55	A
38	Hal	Problem identified as inadequate sewers	Retro fit existing drainage ~630ft * $600.00/ft	$378,000.00	C
60	Hal	Lake Lenape dam	Drainage resolutions included with scheduled roadway improvements	$0.00	
142	Hal	Much of this area shut down and some were evacuated with large amount of rain 6/2007	Raise roadway elevation	$7,142,630.59	A
25	Ham	All of intersection, lack of drainage	Retrofit ~200ft @ $600/ft	$120,000.00	C
26	Ham	Private drive & culvert; pipe too small or requires additional pipe next to it	Retrofit ~250ft @ $600/ft	$150,000.00	C
27	Ham		Retrofit ~350ft @ $600/ft	$210,000.00	C
28	Ham	Wet ares to start then when it rains, water collects on lakeview and prevents traffic to/from 30.	Retrofit drainage structures back to Hammonton Lake ~1800ft @ $600/ft	$1,080,000.00	C
95	Lin	Some (in Linwood) due to elevation, others to undersized drainage lines	Install 2 inlets and 100ft of pipe. Assumption: connect to existing drainage system.	$18,000.00	E
96	Lin	Some (in Linwood) due to elevation, others to undersized drainage lines	Clean or repair 4 drains @ $75	$300.00	D
97	Lin	Some (in Linwood) due to elevation, others to undersized drainage lines	Clean or repair 4 drains @ $75	$300.00	D
98	Lin	Some (in Linwood) due to elevation, others to undersized drainage lines	Retrofit ~1375ft @ $600	$825,000.00	C
99	Lin	Some (in Linwood) due to elevation, others to undersized drainage lines	Clean or repair 2 drains @ $75	$150.00	D
100	Lin	Some (in Linwood) due to elevation, others to undersized drainage lines	Clean or repair 4 drains @ $75	$300.00	D
123	Lon	Wave action at the point. 11th Street causing ocean water to flow towards Atlantic Avenue, flooding 11th to 16th. Bay water goes over the roads at 16th to 22nd causing Atlantic to flood.	Dunes and beach fill (Beach lengths = Ven: 8800ft, Mar: 8700ft, Lon: 7400ft)	$5,718,182.00	D
147	Lon	Wave action at the point. 11th Street causing ocean water to flow towards Atlantic Avenue, flooding 11th to 16th. Bay water goes over the roads at 16th to 22nd causing Atlantic to flood.	Install seawall ~ 1550 LF	$940,000.00	J
124	Mar	Roadway is too low. But entire area also too low	5 blocks or ~1500ft @ 600/ft	$900,000.00	C
125	Mar	Sinking drainage manhole at NW corner of intersection	Drainage resolutions included with scheduled roadway improvements	$0.00	
29	Mul	Mullica river embankment. Installing bulkhead and drainage system.	Drainage resolutions included with scheduled roadway improvements	$0.00	

30	Mul		Install 4 inlets and 1000ft of pipe	$180,000.00	E
31	Mul		Install 4 inlets and 1000ft of pipe	$180,000.00	E
32	Mul	Proximity to the Mullica River	Install 4 inlets and 1000ft of pipe	$180,000.00	E
33	Mul		Install 4 inlets and 1000ft of pipe	$180,000.00	E
34	Mul	Elevation of roadway	Raise roadway elevation	$4,674,044.25	A
101	Nor	The intersections are too low, however, existing development limits the extent of changes to the intersection elevations. Most of the infrastructure does not have sufficient capacity to carry the volume of runoff associated with large rainfall even*	Install inlets & piping extending 800ft to US Rt 9's system (retrofit 800ft * $600/L.F.	$480,000.00	C
102	Nor	The intersections are too low, however, existing development limits the extent of changes to the intersection elevations. Most of the infrastructure does not have sufficient capacity to carry the volume of runoff associated with large rainfall even*	Retrofit 250ft @ $600/ft	$150,000.00	C
103	Nor	The intersections are too low, however, existing development limits the extent of changes to the intersection elevations. Most of the infrastructure does not have sufficient capacity to carry the volume of runoff associated with large rainfall even*	Clean 2 drains at $75 each	$150.00	D
104	Nor	The intersections are too low, however, existing development limits the extent of changes to the intersection elevations. Most of the infrastructure does not have sufficient capacity to carry the volume of runoff associated with large rainfall even*	Install inlets & piping	$180,000.00	E
105	Nor	The intersections are too low, however, existing development limits the extent of changes to the intersection elevations. Most of the infrastructure does not have sufficient capacity to carry the volume of runoff associated with large rainfall even*	Clean 2 drains at $75 each	$150.00	D
106	Ple	Inadequate Drainage	Clean 2 drains @ $75 each	$150.00	D
107	Ple	Inadequate drainage	Sporadic and unusual weather events, not enough data for estimated resolution	$0.00	
108	Ple	Inadequate Drainage	Install siphon system (~100ft cross drain)	$30,000.00	E
109	Ple	Inadequate Drainage	Install 4 check valves at street ends	$15,000.00	B
110	Ple	Inadequate Drainage	Install inlets & piping	$180,000.00	E
111	Ple	Inadequate Drainage	Install 3 check valves	$11,250.00	B
117	Por	Need engineering	Raise roadway elevation 800ft	$431,818.18	A
118	Por	Need basin/engineering. Old New York Rd. Mile # 19.-county fixed problem but just moved flooding northward	Install inlets, piping & flappers	$187,500.00	B, E
119	Por	High tide only; Roadway is too low.	Raise roadway elevation 350ft	$188,920.45	A
120	Por	Heavy rains come downhill on county road, ClarkÆs Landing and go down city rdùCentral Ave.__County is aware of this problem and iw working on plans to correct this.	Drainage resolutions included with scheduled roadway improvements (siphon system County labor & design)	$30,000.00	E
121	Por	Problems with the culvert. Either increase size of pipe or lower the pipe	Retrofit 2000ft @ $600/ft	$1,200,000.00	C
122	Por	Problems with the culvert. Either increase size of pipe or lower the pipe	Retrofit 1400ft @ $600/ft	$840,000.00	C

87	Som	Roadways, elevation, and poor drainage	Install each kind of check valve	$119,250.00	B
88	Som	Roadways, elevation, and poor drainage	Sporadic and unusual weather events. Not enough data for estimated resolution.	$0.00	
89	Som	Roadways, elevation, and poor drainage	Sporadic and unusual weather events. Not enough data for estimated resolution.	$0.00	
90	Som	Roadways, elevation, and poor drainage	Retrofit ~1100ft of roadway @ 600/ft	$660,000.00	C
91	Som	Roadways, elevation, and poor drainage	Retrofit ~1200ft of roadway	$720,000.00	C
92	Som	Roadways, elevation, and poor drainage	Sporadic and unusual weather events. Not enough data for estimated resolution.	$0.00	
93	Som	Roadways, elevation, and poor drainage	Install 30 check valves	$112,500.00	B
126	Ven		Clean 56 drains @ $75 each	$4,200.00	D
127	Ven		Install 2 check valves	$7,500.00	B
128	Ven	The bay goes over the County pipe end behind to old Bradlees. The water goes down the pipe and up through the grate at Dudley Avenue (lowest point). The water then runs on the surface of the streets shown	Install check valve at Victoria & Fulton Avenue	$3,750.00	B
130	Ven		Install 2 check valves & clean 8 drains at $75 each	$8,100.00	B, D
131	Ven		Install 7 check valves	$26,250.00	B
132	Ven		Install check valve	$3,750.00	B
133	Ven	Pipe size not big enough to allow for enough back pressure at Monmouth & Derby. Need to increase size of pipe under persons house and install check valve	Install check valve at Monmouth & Derby, increase pipe size	$165,000.00	L
134	Ven		Install check valves	$37,500.00	C
148	Ven		Install 4 check valves	$15,000.00	B
39	Wey	Intersection will flood during and after heavy rain. Danenhauer Lane in Hamilton Twp floods regularly.	Install inlets, piping & 2 check valves	$187,500.00	B, E
40	Wey	Intersection floods during heavy rains. Lots need catch basin/ storm drain.	Retrofit 100ft @ 600/ft	$60,000.00	C
41	Wey	Prone to flooding during extreme storms and tidal events, lot needs catch basin/ storm drain and roadway shoulder is too low.	Raise roadway elevation	$24,173.18	A
42	Wey	Prone to flooding during periodic combination of extreme storms and tidal events. Roadway is too low.	Raise roadway elevation	$177,760.65	A
43	Wey	Prone to flooding during periodic combination of extreme storms and tidal events. Road is low.	Unusual weather events not enough data for estimated resolution, surrounding projects may reduce reoccurance of flooding along this section	$0.00	
44	Wey	Block 33 Lot 6.01 roadway is too low, need catch basin/ storm drain and laterals.	Install inlets & piping	$180,000.00	E
45	Wey	Block 91 Lot 66 needs catch basin/ storm drain	Install 1 Inlet and piping	$45,000.00	D
46	Wey	Prone to flooding during extreme storms and tidal event. Needs catch basin/ storm drain.	Install inlets & piping	$180,000.00	E
47	Wey	Prone to flooding during extreme storms and tidal event. Roadway is too low.	Raise roadway elevation	$301,699.48	A
48	Wey	N/E corner of intersection holds water during rain. Roadway is too low.	Install 1 drain and piping	$45,000.00	D

49	Wey	Prone to flooding during periodic combination of extreme storms and tidal events. Roadway is low and culvert pipe is too small and exit path needs to be opened up.	Begin with culvert maintenance and observe future occurances of flooding	$66.00	D
50	Wey	Dirt road; will hold water during and after rains. Roadway is too low.	Raise roadway elevation	$253,389.83	A
51	Wey	W/B lane of 11th floods and the north side of Burnett floods during and after normal rain. Needs catch basin/ storm drain and laterals.	Install 4 inlets and piping	$180,000.00	E
52	Wey	Dirt road; roadway is too low	Raise roadway elevation	$2,427,198.71	A
53	Wey	Roadway is too low	Raise roadway elevation	$228,316.85	A
54	Wey	Intersection holds water during heavy rains heading east on 9th	Raise roadway elevation	$70,592.56	A
55	Wey	Needs catch basin	Install inlets & piping	$180,000.00	E
56	Wey	Needs catch basin / storm drain and roadway shoulder is too low.	Install inlets & piping	$180,000.00	E
57	Wey	Needs catch basin/ storm drain and laterals.	Install inlets and piping	$180,000.00	E
58	Wey	Needs catch basin/ storm drain and roadway shoulder is too low.	2 Inlets, 100ft of piping, 2 drainage pits	$42,000.00	E
59	Wey	Half of the S/B lane of roadway and all o the West side of intersection on 14th , floods during & after rain. Block 5 Lot 10 needs catch basin/ storm drain and laterals.	Install inlets & piping	$180,000.00	E
61	Wey	Entire roadway holds water during & after rain. Roadway is too low, need catch basin / storm drain and laterals.	Install inlets & piping	$180,000.00	E
62	Wey	Half of the S/B lane of roadway and all of the West side of intersection on 13th will flood during heavy rain. Needs larger catch basin/ storm drain and laterals.	Install inlets and piping	$180,000.00	E
63	Wey	Needs larger culvert pipe. Will flood during extreme storms.	Clean & clear culvert	$66.00	D
64	Wey	South Jersey Ave S/B lane holds water during heavy rains. Block 30 Lot 3 needs catch basin/ storm drain laterals installed.	Install siphon system with pits, 4 inlets & piping	$180,000.00	E
65	Wey	Half of the S/B lane of roadway floods during & after rain. Block 5 lots 7 & 8 need catch basin/ storm drain and laterals.	Install 4 inlets and piping	$180,000.00	E
67	Wey	Prone to flooding during periodic combination of extreme storms and tidal events.	Unusual weather events not enough data for estimated resolution	$0.00	

Attachment A

Approximate Project Cost to Raise a One(1) Mile Roadway of a Fifty Feet (50') width, Six Inches(6")

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL PRICE**
1	MAINTENANCE AND PROTECTION OF TRAFFIC	L.S.	1	$ 125,000.00	$ 125,000.00
2	CLEARING SITE	L.S.	1	$ 20,000.00	$ 20,000.00
3	ROADWAY EXCAVATION, UNCLASSIFIED	C.Y.	6000	$ 20.00	$ 120,000.00
4	BORROW EXCAVATION ZONE 3, (MODIFIED)	C.Y.	6000	$ 10.50	$ 63,000.00
5	TEST PIT EXCAVATION (IF AND WHERE DIRECTED)	UNIT	15	$ 250.00	$ 3,750.00
6	DENSE GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	29300	$ 16.00	$ 468,800.00
7	HOT MIX ASPHALT BASE COURSE, MIX I-2, 4" thick	TONS	7510	$ 65.00	$ 488,150.00
8	HOT MIX ASPHALT SURFACE COURSE, MIX I-4, 2" thick	TONS	3755	$ 70.00	$ 262,850.00
9	MILLING, VARIABLE DEPTH	S.Y.	29300	$ 8.00	$ 234,400.00
10	REINFORCED CONCRETE CULVERT PIPE, CLASS V	L.F.	3040	$ 100.00	$ 304,000.00
11	INLET TYPE B, BICYCLE SAFE GRATES	UNIT	16	$ 2,500.00	$ 40,000.00
12	9" x 18" CONCRETE VERTICAL CURB	L.F.	10560	$ 18.00	$ 190,080.00
13	CONCRETE SIDEWALK, 4" THICK	S.Y.	1380	$ 40.00	$ 55,200.00
14	HOT MIX ASPHALT DRIVEWAY, 6" THICK	S.Y.	500	$ 40.00	$ 20,000.00
15	CONCRETE DRIVEWAY, 6" THICK	S.Y.	100	$ 50.00	$ 5,000.00
16	TRAFFIC STRIPES LONG LIFE EPOXY RESIN	L.F.	21120	$ 0.75	$ 15,840.00
17	TOPSOILING, 4" THICK	S.Y.	4700	$ 1.50	$ 7,050.00
18	FERTILIZING AND SEEDING, TYPE A-3	S.Y.	4700	$ 0.50	$ 2,350.00
19	STRAW MULCHING	S.Y.	4700	$ 0.50	$ 2,350.00
20	PUBLIC SIDEWALK CURB RAMP DELINEATION	S.Y.	210	$ 10.00	$ 2,100.00
21	SILT FENCE	L.F.	10560	$ 2.50	$ 26,400.00
22	INLET FILTERS	UNIT	16	$ 60.00	$ 960.00
23	MANHOLE	UNIT	1	$ 3,000.00	$ 3,000.00
	SUBTOTAL				**$ 2,460,280.00**
	5% CONTINGENCIES				**$ 123,014.00**
	TOTAL CONSTRUCTION COST				**$ 2,583,294.00**
	10% Engineering and Contract Administration				**$ 258,329.40**
	TOTAL PROJECT COST				**$ 2,841,623.40**
				say	**$ 2,850,000.00**

Field Calculation Notes: Length In Miles Times Cost For One Mile
([Length] / 5280) * 2850000

Attachment B

Check Valves (2 kinds)
(Dependant on situation as to which kind is appropriate; will have to be evaluated on a case by case basis)

Vaulted Check Valve

$105,000 Construction (Materials and Labor)
$ 10,500 Engineering and Contract Administration
$115,500 Project Cost per Vaulted Check Valve

Outfall (Pipe End) Check Valve $2,700 (Materials, Labor, Engineering)

$ 2,250 Construction (Materials and Labor)
$ 1,200 Engineering and Contract Administration
$ 3,750 Project Cost per Outfall (Pipe End) Check Valve

For costs in AC be sure to increase prices, in 1997 Storm Water Report, by 27.37% which is the inflation rate from 1997 to 2007.
Also see me regarding the cost associated with the underground drainage canal on Baltic Ave(from Georgia to Rhode Island Avenues)

Attachment C

Approximate Project Cost to Retrofit Existing Drainage System at Old Harding Highway and Mill Street

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL PRICE**
1	MAINTENANCE AND PROTECTION OF TRAFFIC	L.S.	1	$ 30,000.00	$ 30,000.00
2	CLEARING SITE	L.S.	1	$ 10,000.00	$ 10,000.00
3	ROADWAY EXCAVATION, UNCLASSIFIED	C.Y.	260	$ 20.00	$ 5,200.00
4	BORROW EXCAVATION ZONE 3, (MODIFIED)	C.Y.	200	$ 10.50	$ 2,100.00
5	TEST PIT EXCAVATION (IF AND WHERE DIRECTED)	UNIT	3	$ 250.00	$ 750.00
6	DENSE GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	400	$ 16.00	$ 6,400.00
7	HOT MIX ASPHALT BASE COURSE, MIX I-2, 4" thick	TONS	520	$ 65.00	$ 33,800.00
8	HOT MIX ASPHALT SURFACE COURSE, MIX I-4, 2" thick	TONS	260	$ 70.00	$ 18,200.00
9	MILLING, VARIABLE DEPTH	S.Y.	2000	$ 8.00	$ 16,000.00
10	REINFORCED CONCRETE CULVERT PIPE, CLASS V	L.F.	650	$ 100.00	$ 65,000.00
11	INLET TYPE B, BICYCLE SAFE GRATES	UNIT	6	$ 2,500.00	$ 15,000.00
12	9" x 18" CONCRETE VERTICAL CURB	L.F.	820	$ 18.00	$ 14,760.00
13	CONCRETE SIDEWALK, 4" THICK	S.Y.	400	$ 40.00	$ 16,000.00
14	HOT MIX ASPHALT DRIVEWAY, 6" THICK	S.Y.	50	$ 40.00	$ 2,000.00
15	CONCRETE DRIVEWAY, 6" THICK	S.Y.	100	$ 50.00	$ 5,000.00
16	TRAFFIC STRIPES LONG LIFE EPOXY RESIN	L.F.	1000	$ 0.75	$ 750.00
17	TOPSOILING, 4" THICK	S.Y.	185	$ 1.50	$ 277.50
18	FERTILIZING AND SEEDING, TYPE A-3	S.Y.	185	$ 0.50	$ 92.50
19	STRAW MULCHING	S.Y.	185	$ 0.50	$ 92.50
20	PUBLIC SIDEWALK CURB RAMP DELINEATION	S.Y.	12	$ 10.00	$ 120.00
21	SILT FENCE	L.F.	820	$ 2.50	$ 2,050.00
22	INLET FILTERS	UNIT	6	$ 60.00	$ 360.00
23	MANHOLE	UNIT	4	$ 3,000.00	$ 12,000.00
	SUBTOTAL				**$ 255,952.50**
	5% CONTINGENCIES				**$ 12,797.63**
	TOTAL CONSTRUCTION COST				**$ 268,750.13**
	10% Engineering and Contract Administration				**$ 26,875.01**
	TOTAL PROJECT COST				**$ 295,625.14**
				say	**$ 300,000.00** **(For every 500 LF)**

Field Calculation: ~$600 per 1 Linear Foot

Attachment D

Various project cost estimate calculations

Underground Canal
Reconstruct Baltic Ave canal tide gates = $211,100.00 27.37% inflation rate from 1997 to 2007
Reconstruct Baltic Ave canal tide gates = $211,100.00
Sediment removal from the Baltic Ave canal = $431,520.00
Roof load tests
Hydrologic analyses for maximum runoff rates } Possible additional considerations
Internal gates
Pumps at either end

Permanent Pumping Station (using sewage pump estimates from RS Means)
New Install (Brig & Atc) $300,000.00
Replacement (EHT) $50,000.00

Dam & Spillway Structure
Pancoast Mill Dam (Buv): Spillway ~ $ 1,500,000.00
Bridge Replacement ~ $500,000.00

Clean existing drainage structures.
(Storm Drain: One vehicle, two people, one storm drain, ~$75.00. Assuming four drains per intersection.)
(Culvert: Setup, break down, one hour, one culvert ~$2.00/LF. Assumptions: Normal pipe normal conditions. Municipal Roads 33ft, County Roads 50ft State Roads measured on screen per instance.)

Approximate Project Costs to build up dunes, add beach fill (Lon):
derived from Absecon Island Shore Protection Brochure (Project Update: February 2004)
Ventnor FY'04 Project Cost = $6.2 Million => Projected FY'07 Cost (Inflation Rate =9.30%) ~ $6.8 Million
Longport Cost = Longport Beach Length x ($6.8 Million / Ventnor Beach Length)
$5,718,181.82 = 7400ft x ($6.8 Million / 8800ft)
Margate Cost = Margate Beach Length x ($6.8 Million / Ventnor Beach Length)
$6,722,727.72 = 8700ft x ($6.8 Million / 8800ft)

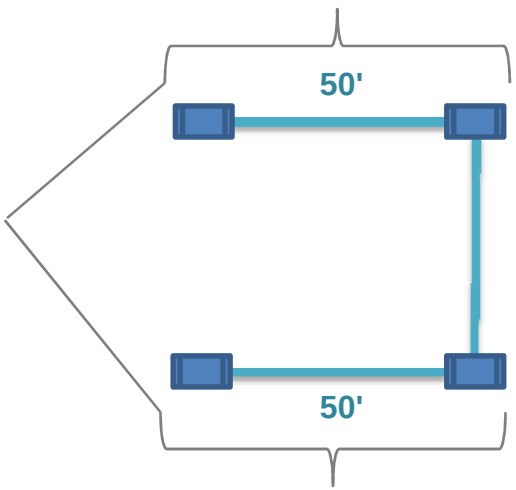
Regional Basin
(Concept design new leaf court, Gal ~$350,000. Jeff Ogborn Dixon Assoc.)

Brigantine Bridge
Add two lanes to the Brigantine Bridge $20 - $25 Million, using $22,000,000.00

Attachment E

Siphon Systems (with & without seepage pits)

(without seepage pits)

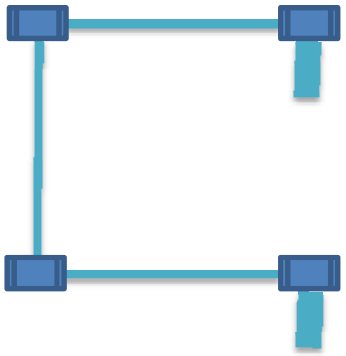


4 inlets with 2 50' cross drains ~$20,000

Inlet ~ $2500 per unit

x = ? @ ($100 / L.F.)

(with seepage pits)



New Install Of Inlets & Piping
Assumptions:
4 Inlets@2500ea($10,000)
4 pits@10,000ea($40,000)
1000 L.F. pipe @100ea($100,000)
estimated construction ($150,000)
contingencies 20% ($30,000)
Total: $180,000

Attachment E (Cont)

$180,000 for 4 drains. See Wey, Atc, Buv, Mul, Cor, Eht

New Install Of Inlets & Piping
Inlets & piping (4 Inlets@2500ea($10,000), 4 pits@10,000ea($40,000), 1000lf pipe @100ea($100,000)
est const ($150,000), 20% cont ($30,000), Total: 180000
(Is the above price and cost ok to use as a template that can be scaled up or down, ie $180,000 for 4 drains or $45,000 each?) See Wey, Atc, Buv, Mul, Cor, Eht 'Install 4 Inlets…')
(French drain, or seepage drain are these available for install?)

Attachment F

Approximate Project Cost to Increase Capacity of Gutter Flow of Route 30, Egg Harbor City

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL PRICE**
1	MAINTENANCE AND PROTECTION OF TRAFFIC	L.S.	1	$ 30,000.00	$ 30,000.00
2	CLEARING SITE	L.S.	1	$ 10,000.00	$ 10,000.00
3	ROADWAY EXCAVATION, UNCLASSIFIED	C.Y.	150	$ 20.00	$ 3,000.00
4	HOT MIX ASPHALT BASE COURSE, MIX I-2, 4" thick	TONS	70	$ 65.00	$ 4,550.00
5	HOT MIX ASPHALT SURFACE COURSE, MIX I-4, 2" thick	TONS	35	$ 70.00	$ 2,450.00
6	9" x 18" CONCRETE VERTICAL CURB	L.F.	2400	$ 18.00	$ 43,200.00
7	CONCRETE GUTTER, 8" THICK, 30" WIDE	L.F.	2400	$ 25.00	$ 60,000.00
8	HOT MIX ASPHALT DRIVEWAY, 6" THICK	S.Y.	50	$ 40.00	$ 2,000.00
9	TOPSOILING, 4" THICK	S.Y.	270	$ 1.50	$ 405.00
10	FERTILIZING AND SEEDING, TYPE A-3	S.Y.	270	$ 0.50	$ 135.00
11	STRAW MULCHING	S.Y.	270	$ 0.50	$ 135.00

SUBTOTAL		**$ 155,875.00**
15% CONTINGENCIES		**$ 23,381.25**
TOTAL CONSTRUCTION COST		**$ 179,256.25**
10% Engineering and Contract Administration		**$ 17,925.63**
TOTAL PROJECT COST		**$ 197,181.88**
	say	**$ 200,000.00**

Attachment G

ESTIMATE FOR BASIN SIZE, AND RELATED COSTS TO CONSTRUCT ON A S.F. BASIS.

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL PRICE**
1	CLEARING TREES	S.F.	1	$ 20.00	$ 20.00
2	PURCHASE PROPERTY	S.F.	1	$ 60.00	$ 60.00
3	BORROW EXCAVATION ZONE 3, (MODIFIED)	S.F.	1	$ 5.00	$ 5.00
4	TOPSOILING, 4" THICK	S.F.	1	$ 0.20	$ 0.20
5	FERTILIZING AND SEEDING, TYPE A-3	S.F.	1	$ 0.05	$ 0.05
6	STRAW MULCHING	S.F.	1	$ 0.05	$ 0.05
	SUBTOTAL				**$ 85.30**
	15% CONTINGENCIES (RELATED PIPES, CONTROL STRUCTURES, ETC.)				**$ 12.80**
	TOTAL CONSTRUCTION COST				**$ 98.10**
	10% Engineering and Contract Administration				**$ 9.81**
	TOTAL PROJECT COST				**$ 107.90**
				say	**$ 110.00** **(PER SF OF BASIN AREA)**

ESTIMATE BASIN AREA ~ 1/3 X TOTAL ROAD AREA

Attachment H

Approximate Project Cost to Retrofit 50 LF OF STREET END BULKHEAD (SEE ATTACHMENT E AND/OR B FOR ADDITIONAL COSTS)

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL PRICE**
1	CLEARING SITE	L.S.	1	$ 10,000.00	$ 10,000.00
2	MOBILIZATION OF PILE DRIVING SETUP, SMALL	UNIT	1	$ 12,500.00	$ 12,500.00
3	ROADWAY EXCAVATION, UNCLASSIFIED	C.Y.	40	$ 20.00	$ 800.00
4	BORROW EXCAVATION ZONE 3, (MODIFIED)	C.Y.	40	$ 10.50	$ 420.00
5	DENSE GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	110	$ 16.00	$ 1,760.00
6	HOT MIX ASPHALT BASE COURSE, MIX I-2, 4" thick	TONS	150	$ 65.00	$ 9,750.00
7	HOT MIX ASPHALT SURFACE COURSE, MIX I-4, 2" thick	TONS	75	$ 70.00	$ 5,250.00
8	STEEL SHEET PILING, WITH 4' X4' X 8" CONCRETE DEADMEN AT 10' O.C., BARGE DRIVEN, WITH CRUSHED STONE PLACED BEHIND	L.F.	50	$ 600.00	$ 30,000.00
9	9" x 18" GRANITE VERTICAL CURB	L.F.	40	$ 100.00	$ 4,000.00
10	CONCRETE SIDEWALK, 4" THICK	S.Y.	50	$ 40.00	$ 2,000.00
	SUBTOTAL				**$ 76,480.00**
	15% CONTINGENCIES				**$ 11,472.00**
	TOTAL CONSTRUCTION COST				**$ 87,952.00**
	15% Engineering and Contract Administration				**$ 13,192.80**
	TOTAL PROJECT COST				**$ 101,144.80**
				say	**$ 105,000.00**

Attachment I

Approximate Project Cost to Retrofit BULKHEAD PARALLEL TO STREET&SIDEWALK (SEE ATTACHMENT B FOR ADDITIONAL COSTS)

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	
1	CLEARING SITE	L.F.	1	$ 100.00	
2	ROADWAY EXCAVATION, UNCLASSIFIED	L.F.	1	$ 1.50	
3	BORROW EXCAVATION ZONE 3, (MODIFIED)	L.F.	1	$ 1.50	
4	STEEL SHEET PILING, WITH 4' X4' X 8" CONCRETE DEADMEN AT 10' O.C., BARGE DRIVEN, WITH CRUSHED STONE PLACED BEHIND	L.F.	1	$ 600.00	
5	CONCRETE SIDEWALK, 4" THICK	L.F.	1	$ 6.00	
	SUBTOTAL			**$ 709.00**	
	15% CONTINGENCIES			**$ 106.35**	
	SUBTOTAL CONSTRUCTION COST			**$ 815.35**	
	15% Engineering and Contract Administration			**$ 122.30**	
	SUBTOTAL PROJECT COST (NOT INCL. MOBILIZATION)			**$ 937.65**	
				$ 940.00	**PER L.F.**

6	MOBILIZATION FOR BARGE PILE DRIVING SETUP (LARGE)	UNIT	1	$ 50,000.00

TOTAL PROJECT COST = $50,000.00(MOBILIZATION) + ($940.00 X LENGTH OF BULKHEAD)

Attachment J

Approximate Project Cost to INSTALL SEA WALL PARALLEL TO STREET (SEE ATTACHMENT B FOR ADDITIONAL COSTS)

(i.e. LONGPORT-WESTERNMOST END OF BACKBAY)

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	
1	CLEARING SITE	L.F.	1	$ 100.00	
2	ROADWAY EXCAVATION, UNCLASSIFIED	L.F.	1	$ 5.50	
3	RESURFACE HALF OF ROADWAY, 12' WIDE, 6" THICK	L.F.	1	$ 31.00	
4	CONCRETE SEAWALL, INCLUDE FOOTING AND TIE-BACKS, UP TO 6' HIGH MINIMUM	L.F.	1	$ 315.00	
	SUBTOTAL			**$ 451.50**	
	15% CONTINGENCIES			**$ 67.73**	
	SUBTOTAL CONSTRUCTION COST			**$ 519.23**	
	15% Engineering and Contract Administration			**$ 77.88**	
	SUBTOTAL PROJECT COST (NOT INCL. MOBILIZATION)			**$ 597.11**	
				$ 600.00	**PER L.F.**

TOTAL PROJECT COST = $10,000.00(MOBILIZATION) + ($600.00 X LENGTH OF CONCRETE SEA WALL)

Attachment K

Approximate Project Cost to INSTALL BULKHEAD PARALLEL TO STREET (SEE ATTACHMENT B, E & DFOR ADDITIONAL COSTS)

(I.E. FOR CHELSEA HEIGHTS, ATLANTIC CITY, WEST END AVENUE)

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	
1	CLEARING SITE	L.F.	1	$ 100.00	
2	ROADWAY EXCAVATION, UNCLASSIFIED	L.F.	1	$ 5.50	
3	RESURFACE HALF OF ROADWAY, 18' WIDE, 6" THICK	L.F.	1	$ 47.00	
4	BORROW EXCAVATION ZONE 3, (MODIFIED)	L.F.	1	$ 1.50	
5	STEEL SHEET PILING, WITH 4' X4' X 8" CONCRETE DEADMEN AT 10' O.C., BARGE DRIVEN, WITH CRUSHED STONE PLACED BEHIND	L.F.	1	$ 600.00	
	SUBTOTAL			**$ 754.00**	
	15% CONTINGENCIES			**$ 113.10**	
	SUBTOTAL CONSTRUCTION COST			**$ 867.10**	
	15% Engineering and Contract Administration			**$ 130.07**	
	SUBTOTAL PROJECT COST (NOT INCL. MOBILIZATION)			**$ 997.17**	
				$ 1,000.00	**PER L.F.**

6	MOBILIZATION FOR PILE DRIVING SETUP (LARGE)	LS	1	$ 20,600.00
7	MAINTAINANCE AND PROTECTION OF TRAFFIC	LS	1	$ 50,000.00

TOTAL PROJECT COST = $20,600.00(MOBILIZATION)+$50,000.00(TRAFFIC CONTROL) + ($1,000.00 X LENGTH OF BULKHEAD)

Attachment L

Approximate Project Cost to Retrofit 90 LF OF PIPE UNDER STRUCTURE.

(I.E. MONMOUTH/DERBY, RETROFIT PIPE UNDER HOUSE)

PRELIMINARY ENGINEER'S COST ESTIMATES					
NO.	**ITEM NAME**	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL PRICE**
1	PREPARE JACKING PITS, INCL. MOBILIZATION & DEMOBILIZATINON, MAXIMUM	LS	1	$ 20,265.00	$ 20,265.00
2	WORK UNDER HOUSE (CONSIDER RAILROAD WORK PRICE)FOR A 36" DIAMETER PIPE	LF	90	$ 500.00	$ 45,000.00
3	GROUTING ABANDON PIPE (ASSUME 15" DIA., 90LF)	CF	110	$ 55.00	$ 6,050.00
4	BORROW EXCAVATION ZONE 3, (MODIFIED)	C.Y.	40	$ 10.50	$ 420.00
5	INSTALL NEW MANHOLE	UNIT	1	$ 5,000.00	$ 5,000.00
6	MISC. DRAINAGE PIPE REPLACEMENT	LF	150	$ 100.00	$ 15,000.00
7	DENSE GRADED AGGREGATE BASE COURSE, 6" THICK	S.Y.	600	$ 16.00	$ 9,600.00
8	HOT MIX ASPHALT BASE COURSE, MIX I-2, 4" thick	TONS	150	$ 65.00	$ 9,750.00
9	HOT MIX ASPHALT SURFACE COURSE, MIX I-4, 2" thick	TONS	75	$ 70.00	$ 5,250.00
10	CONCRETE VERTICAL CURB	L.F.	50	$ 20.00	$ 1,000.00
11	CONCRETE SIDEWALK, 4" THICK	S.Y.	50	$ 40.00	$ 2,000.00

SUBTOTAL		**$ 119,335.00**
20% CONTINGENCIES		**$ 23,867.00**
TOTAL CONSTRUCTION COST		**$ 143,202.00**
15% Engineering and Contract Administration		**$ 21,480.30**
TOTAL PROJECT COST		**$ 164,682.30**
	say	**$ 165,000.00**