WILDWOOD CREST

Flood Mitigation and Storm Sewer Master Plan

March 2019

DeBlasio & Associates

CONSULTING ENGINEERS AND PLANNERS

Borough of Wildwood Crest
Cape May County, New Jersey

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The Borough of Wildwood Crest is located on the Atlantic Ocean coastline and back bay intercoastal waterway in Cape May County, New Jersey. The Borough is comprised of approximately 1.31 square miles of barrier beach island and is geographically surrounded by the bay and ocean waters. Each year the Borough is presented with a constant threat to this community from sea level rise, coastal flooding, Nor'easters and tropical-borne storm activity, introducing severe wave and flood impacts.

The Borough of Wildwood Crest has been historically subject to flooding, beach erosion and many other associated problems that require an aggressive approach to successfully manage infrastructure maintenance and flood damage mitigation. The Borough has developed a varied approach to protect and maintain its infrastructure, natural areas, public safety, welfare, and property of its residents, and continues to improve annually with the implementation of improvements, new technologies and with assistance from outside public and private agencies. The Borough will continue to pursue and improve upon methods to educate its residents, protect its coastline, manage its infrastructure and natural areas, and mitigate the efforts from flood damage and natural disasters. This Flood Mitigation and Storm Sewer Master Plan (FMSSMP) demonstrates the Borough's continued commitment to these goals.

The implementation of the FMSSMP has been an ongoing activity and components of the plan include storm sewer infrastructure improvements, participation in the Community Rating System (CRS), Repetitive Loss Reduction Plan, Beach Maintenance Plan and other specific Borough projects.

This FMSSMP was developed for the purpose of:

- Educating the Borough, public and private property owners of the existing flooding challenges facing the Borough;
- Establishing recommendations to mitigate the adverse impact of flooding and other coastal hazards that affect the Borough.
- Providing flood mitigation infrastructure options to guide the Borough when considering capital improvements;
- Complying with the Federal Emergency Management Agency (FEMA) Community Rating System (CRS) Program with the potential of enhancing that status.
- Participate and coordinate flood mitigation efforts with Federal, State, County and local entities.

The Borough of Wildwood Crest is located on "Wildwood Island" in the southern portion of Cape May County and is surrounded by the Atlantic Ocean to the east; Lower Township to the south; the intra-coastal waterway, salt marshes, and Lower Township to the west; and City of Wildwood to the north.

Wildwood Crest was incorporated as a Borough by an act of the New Jersey Legislature on April 6, 1910, from portions of Lower Township. The area of the Borough was first developed by Philip Baker in the 1910s as a southern extension to the resort of Wildwood. The Borough's name comes from Wildwood, which in turn was named for the area's wild flowers.

According to the United States Census Bureau, the Borough had a total area of 1.309 square miles (3.390 km^2), including 1.134 square miles (2.937 km^2) of land and 0.175 square miles (0.454 km^2) of water (13.38%). As of the 2010 United States Census, there were 3,270 people, 1,532 households, and 917.7 families residing in the Borough. The population density was 2,884.0 per square mile (1,113.5/km^2). There were 5,569 housing units at an average density of 4,911.6 per square mile (1,896.4/km^2).

The Borough is largely developed and is being redeveloped in all existing residential and commercial zones through demolitions and reconstruction. There is an element of the redevelopment that consists of infill and demolition of dwellings located on more than one lot, or conversions of single family units or commercial properties to two-family dwellings. However, no significant development or increase in impervious surface is expected to occur within the Borough.

Wildwood Crest, New Jersey

Borough

Borough of Wildwood Crest

Wildwood Crest arch

Wildwood Crest Borough highlighted in Cape May County. Inset map: Cape May County highlighted in the State of New Jersey.

Census Bureau map of Wildwood Crest, New Jersey
Coordinates: 38.97°N 74.83°W[1][2]

Country	United States
State	New Jersey
County	Cape May
Incorporated	April 6, 1910
Government[6]	
• Type	Walsh Act
• Body	Board of Commissioners
• Mayor	Donald Cabrera (term ends December 31, 2021)[3][4]
• Municipal clerk	Patricia A. Feketic[5]
Area[1]	
• Total	1.309 sq mi (3.390 km^2)
• Land	1.134 sq mi (2.937 km^2)
• Water	0.175 sq mi (0.454 km^2) 13.38%
Area rank	470th of 566 in state 13th of 16 in county[1]
Elevation[7]	3 ft (0.9 m)
Population (2010 Census)[8][9][10]	
• Total	3,270
• Estimate (2016)[11]	3,167
• Rank	442nd of 566 in state 9th of 16 in county[12]
• Density	2,884.0/sq mi (1,113.5/km^2)
• Density rank	221st of 566 in state 2nd of 16 in county[12]

The Borough of Wildwood Crest has made significant progress over the last decade to mitigate flooding including instituting several development ordinances, constructing storm sewer infrastructure improvements, maintaining natural assets and participating in regulatory initiatives. As such, our recommendations are categorized in the following manner:

A. Preventative
B. Capital Infrastructure Projects
C. Natural Resources and Regulatory Agencies

A. <u>Preventative Actions: Mitigate Susceptibility to Flooding</u>

1. Adopt a new bulkhead ordinance that requires new bulkheads to be constructed at elevation 8.0 (NAVD 1988), including a timeline requirement to retrofit existing bulkheads to elevation 8.0 (NAVD 1988).

2. Adopt a new lot grading and drainage ordinance that requires private property owners to elevate their properties to reduce flooding with particular emphasis on tidal nuisance flood events.

3. Continue to participate in the FEMA Community Rating System (CRS).

4. Inform and improve communication to property owners of flooding events through advance warning systems, forecasting and emergency planning. Coordinate with the Borough's Office of Emergency Management to install advanced flood warning signs.

5. Encourage elevating or floodproofing new and existing buildings through local zoning codes, building requirements and development policies.

B. <u>Capital Infrastructure Projects: Mitigate Flooding by Developing Projects that Control Floodwater.</u>

1. Construct bayside tide control improvements to reduce tidal ("nuisance") flooding from entering Borough streets through the existing storm sewer system.

2. Elevate Borough roadways in cooperation with private property owners to reduce flooding with particular emphasis on tidal "nuisance" flooding events.

3. Replace or retrofit Borough bulkheads and land berms to increase heights to elevation 8.0 (NAVD 1988). On an interim basis, eliminate "gutter scuppers," above grade penetration and breaches in Borough bulkhead and land berm structures.

4. Implement the use of groundwater recharge design techniques (where feasible) to reduce three stormwater runoff, peak flow discharges and improve water quality. The areas of the Borough that have been preliminarily identified for these improvements include:

    - Pacific Avenue – Jefferson Avenue to Lotus Road
    - Beach block street ends
    - Areas along Atlantic and Ocean Avenue

5. Construct storm sewer pump stations along the bayside at strategic locations to increase the hydraulic capacity of the storm sewer system and to control tidal flooding.

6. Increase the hydraulic capacity of the existing storm sewer system when completing capital infrastructure projects thru retrofitting, replacement and supplementation of storm sewer inlets and piping.

7. Implement Green Infrastructure improvements to reduce stormwater runoff, peak flows and improve water quality.

C. Preservation and Restoration of Natural Resources and Participation with Regulatory Agencies: Mitigate Flooding by Maintaining Natural Environments and Through Cooperative Partnerships

1. Evaluate and enact local zoning ordinances, policies and design requirements that are consistent with New Jersey Department of Environmental Protection and U.S. Army Corps of Engineers' regulations.

2. Participate in Federal and State beach nourishment and dune building programs.

3. Continue to monitor and survey the beaches, back bays and dunes.

4. In conjunction with Federal and State agencies, participate in opportunities to restore degraded tidal marsh areas in back bay areas utilizing dredge materials.

5. Consider land acquisition, purchasing repetitive loss properties and open space preservation in flood prone areas.

6. Participate in the New Jersey Coastal Coalition.

The natural hazards impacting the flooding in the Borough of Wildwood Crest are well-known and have been documented. The following hazards have been identified in the State of New Jersey 2014 Hazard Mitigation Plan:

1. Coastal Erosion and Sea Level Rise
2. Flooding
3. Hurricanes and Tropical Storms
4. Nor'Easters
5. Severe Weather
6. Severe Winter Weather
7. Wildfire

Flooding resulting from nor'easters, hurricanes, and tropical storms presents the single most significant threat to the life, safety, health, and property in the Borough. These coastal storms are described below and create strong storm surge that impact the Borough. Storm surge is a dome of elevated sea water caused by wind and low pressure accompanied by waves. When accompanied with waves, high winds, and heavy rain, storm surge can have potentially catastrophic damage. Nine (9) of the twelve (12) Presidential Disaster Declarations in Cape May County since 1984 were declared for these coastal storm events.

The power of storm surge can be clearly seen during Superstorm Sandy in 2012. The highest water level measured in New Jersey was 8.57 feet at the northern end of Sandy Hook. The storm was the costliest natural disaster in the State of New Jersey according to the State of New Jersey 2014 Hazard Mitigation Plan causing $30 billion in damage, destroying or significantly damaging 30,000 homes.

1. <u>Coastal Erosion and Sea Level Rise</u>

Strong coastal storms described above cause the coastline to erode and change shape. The coastline changes constantly due to wind, waves, tides, sea-level change, climate variation, human altercation, and other factors. As these factors morph the coastline, humans have developed methods to slow this process down. However, in some cases these methods make the problems worse. For example, sea wall structures can worsen the erosion in front of the structure, prevents sediment growth behind the structure, or cause down-drift beaches to erode. These structures are mostly used to protect properties behind them but have these negative impacts. As of 2014 in Cape May County alone there are 1 breakwater, 94 groins, 8 jetties, 4 revetments, and 3 seawalls. An alternative to the hard structures, shore communities have moved more towards beach nourishment and dune restoration. There are also altercations that can be made to existing structures to reestablish flow and decrease the negative impacts.

2. <u>Flooding</u>

New Jersey contains eight counties and 126 municipalities along the coastline that are vulnerable to coastal flooding. These areas are located in the Coastal Area Facility Review Act (CAFRA) area. Strong storms often cause storm surge that contributes to coastal flooding.

Flooding is common in the Borough of Wildwood Crest along the ocean and bay. These floods occur when the land along the ocean coast and bay are submerged due to above normal tide action. Hurricanes and tropical storms, severe storms, and Nor'Easters can cause coastal flooding. This type of flooding can cause beach erosion, loss of wetlands and coastal ecosystems, saltwater intrusion, high water tables, loss of coastal

recreation areas, beaches, sands dunes, parks, and coastal structures. Sea walls, piers, bulkheads, bridges, and buildings are considered coastal structures.

There are several forces that occur during an event that causes coastal flooding:

1. Hydrostatic forces from standing or slowly moving water causes the most flood damage.
2. Hydrodynamic forces from flood water moving at high velocity can destroy solid walls and buildings and carry large amounts of sediment and debris.
3. Waves affect coastal buildings and cause severe damage often 10 times higher than the force of high winds.
4. Flood-borne debris produced during a flood event includes all objects picked up by the floodwater and can destroy light construction.

Stormwater flooding is another type of flooding that can occur and it is caused by local drainage issues and high groundwater levels and is common in the Borough of Wildwood Crest. Heavy precipitation produces flooding in areas with little or poor drainage infrastructure. Water can accumulate and cause flooding problems. The Borough of Wildwood Crest is made of a flat gradient and faces a general increase in urbanization. A drainage system is in place to remove surface water as quickly as possible to prevent localized flooding. Without proper design of these drainage systems, stormwater flooding can occur.

As a result of meteorological conditions needed to cause flooding, it allows officials to issue warnings for impending floods. Warning times are usually between 24 and 48 hours. The time period provided allows preparation and planning to occur that can decrease the negative impacts of the flooding. However, there are some conditions that cannot be changed even when communities are given warning. When the soils are already wet from previous rain, this can create a condition that will increase the impact of the storm.

Many organizations look to provide projections of future climate change. According to the Office of New Jersey State Climatologist, New Jersey has become wetter over the last century. Southern New Jersey, for example, has become 5% wetter in the late 20th century and is predicted to increase by another 5% by the 2020s. As the state becomes wetter, the soils are required to hold more water and are saturated more often. When a flood event occurs on pre-saturated soils, it can lead to more severe conditions.

3. Hurricanes and Tropical Storms

Tropical cyclones are warm-core storms that develop over tropical or sub-tropical waters marked by circulating winds around a well-defined center, or eye. Both tropical storms and hurricanes are tropical cyclones. Tropical storms produce sustained surface winds between 39 and 73 mph, while hurricanes produce sustained surface winds of 74 mph or greater. The National Hurricane Center developed the Saffir-Simpson Hurricane Wind Scale to categorize hurricanes as follows:

Category	Wind Speeds
Five	>157 mph
Four	130-156 mph
Three	111-129 mph
Two	96-110 mph
One	74-95 mph

The high sustained winds, storm surge and large waves accompanying hurricanes can inflict catastrophic damage on barrier island communities. Although typically of shorter duration than large nor'easters, hurricanes can produce very high surges that can inundate a community. Large waves can also cause extensive coastal erosion and damage to infrastructure.

4. Nor'Easters

Nor'Easters are a cyclic storm that moves along the east coast of North America. Capable of producing strong wind, heavy rain, and severe storm surge, nor'easters can continue over several tide cycles, compounding damage from flooding and coastal erosion. The storm surge is typically accompanied by large waves generated from the high winds blowing continuously over the Atlantic Ocean.

Storm surge from nor'easters can exceed those from hurricanes, inundating large portions of developed areas of the Borough and causing extensive property damage. The onshore, wind-driven ocean waters and low pressure accompanying these storms can result in the persistence of flood waters throughout the storm, even during the low tide cycles.

5. Severe Weather

In addition to coastal storms, high winds associated with severe weather including derechos and tornadoes can impact shore communities. The extreme winds can inflict severe damage to structures. Cape May County is vulnerable to the 50-year wind event, where wind speeds can exceed 100 miles per hour.

Derechos are straight lines wind storms that cover wide areas and can extend for extended periods. They arise from clusters of thunderstorms that form a bowed shape, known as "bow echoes." Condition are developed that have winds of 57 to 100 mph. Derechos typical occur in warm seasons and pose a threat to the vacation communities. Unlike most coastal storms, they can be difficult to forecast and form quickly.

Tornadoes are the most violent atmospheric storm and consist of violent rotating column of air extending from the base of a thunderstorm to the ground. They can cause devastating localized damage due to the extreme winds that can exceed 200 mph. Mid-Atlantic states, including New Jersey, can occasionally be susceptible to these storms and cause significant damage.

6. Severe Winter Weather

The State's 2014 Hazard Mitigation Plan defines severe winter weather to include heavy snow, blizzards, and ice storms, all of which apply to Cape May County. In southern New Jersey, heavy snow is defined as four-inches or more in a 12-hour period or six inches or more in a 24-hour period. A blizzard is a winter

storm characterized by heavy snow accompanied by sustained winds or frequent gusts exceeding 35 mph that reduce visibility to below a quarter mile for at least three hours. Ice storms are characterized by freezing rain that results in dangerous ice accumulations.

7. Wildfire

The New Jersey 2014 Hazard Mitigation Plan includes wildfires as a hazard of concern that poses a threat to Cape May County. Although barrier islands are not a significant risk for wildfire, there is a concern for wildfires to occur in the tidal marshes of the back bay or the Borough's beach dunes.

Existing topographical maps have been developed to analyze the water flow paths throughout the Borough of Wildwood Crest. A topographic map is characterized by a detailed representation of the elevations of an area. This is generally created using contour lines that connect places of equal elevation. The closer together the contour lines, the steeper the terrain.

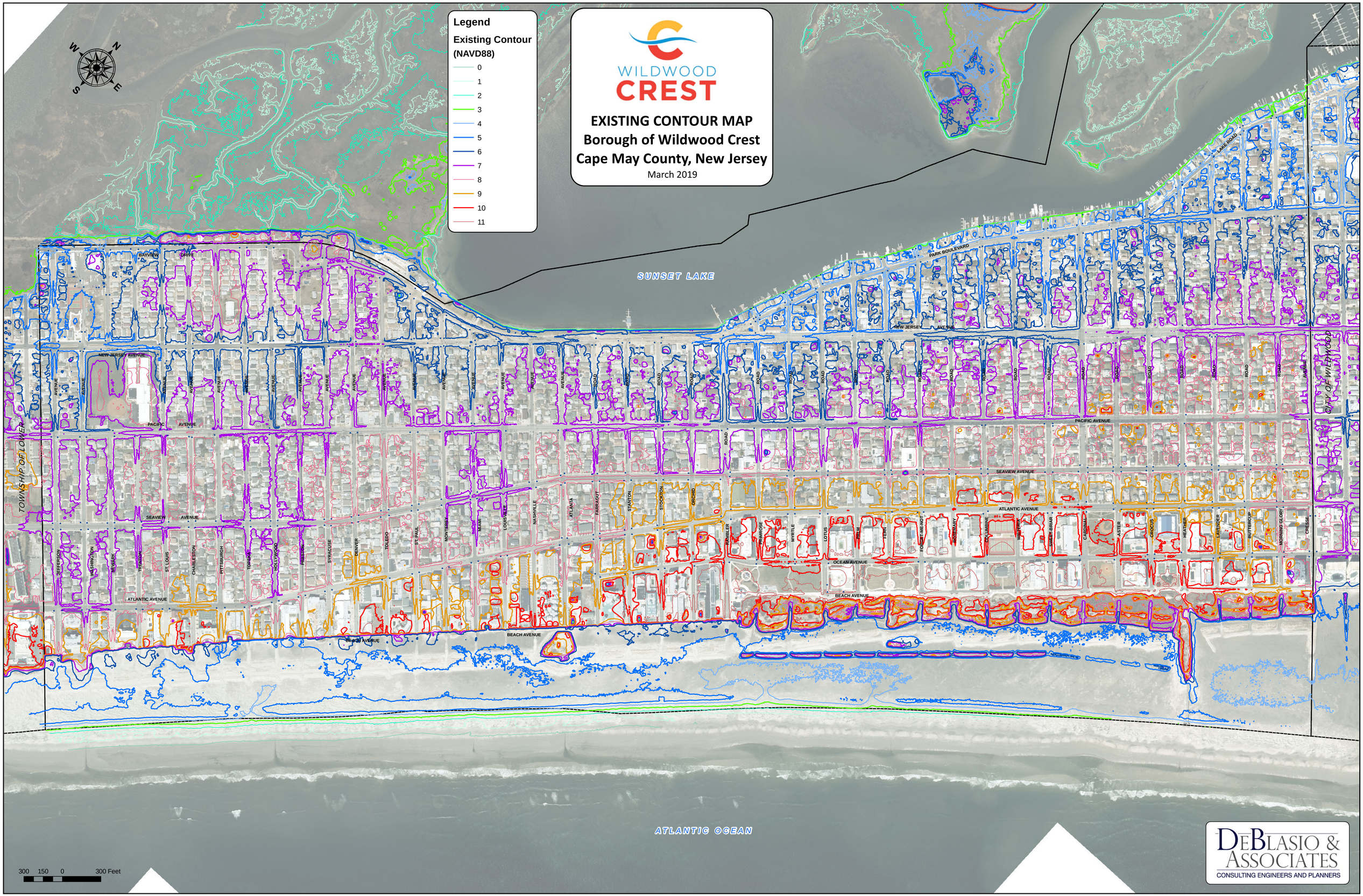
Maps for Borough of Wildwood Crest were developed through multiple sources. A main source for the topographic maps comes from the South New Jersey County LiDAR project. The project was created to provide LiDAR and elevation data for USGS and the New Jersey Department of Environmental Protection (NJDEP). Light Detection and Ranging (LiDAR) is used to create surface models and is a surveying method that can measure the distance to the surface by emitting a pulsed laser light and measuring the reflected pulses with a sensor. High accuracy data has been produced in ArcGrid format to cover approximately 874 square miles of South New Jersey. The area includes Cape May, Cumberland, and part of Salem county.

As seen on the Existing Contour Map, areas along the bayfront are lower than the properties along the ocean front. The stormwater generally travels from the oceanfront towards the bayfront until it reaches a natural or manmade barrier. Along the bay side, elevations generally range from four (4) to seven (7) feet and along the ocean side elevations generally range from eight (8) to eleven (11) feet in the NAVD 1988 datum. The highest area of the Borough is located along the ocean side between Rambler Road and Cresse Avenue, and the lowest areas of the Borough include the bay side between Trenton Avenue and Jefferson Avenue and the bay side between Rambler Road and Cresse Avenue along Park Boulevard.

The existing Contour Map was transected at Jefferson Avenue, Stockton Road and Buttercup Road to create the Existing Profile Map. The Existing Profile Map “slices” the Borough at the three (3) locations and relates the tidal elevation and inundation frequency across the profile.

Once these maps were developed, it created a way to determine stormwater flow patterns along the surface of the Borough. Low areas can be clearly seen and prioritized in storm water management programs.

The flow path of stormwater becomes important when developing drainage areas and stormwater management infrastructure. The topographical maps clearly show the boundaries of the existing drainage areas and can be used to track where the water flows. After the drainage areas are developed it aids designers in stormwater management infrastructure. The size of drainage areas will determine the size and location of the infrastructure.


WILDWOOD CREST
EXISTING CONTOUR MAP
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
Legend
Existing Contour (NAVD88)
0
1
2
3
4
5
6
7
8
9
10
11
N
S
E
W
SUNSET LAKE
ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
OCEAN AVENUE
BEACH AVENUE
PARK BOULEVARD
LAKE ROAD
JEFFERSON
WASHINGTON
NEWARK
TRENTON
ST. LOUIS
CHARLESTON
PITTSBURGH
TOPEKA
HOLLYWOOD
PRESTON
SYRACUSE
DENVER
TOLEDO
ST. PAUL
MONTEREY
MIAMI
LOUISVILLE
NASHVILLE
ATLANTA
PARKACOT
STANTON
STOCKTON
ORCHID
CRAMER
PRIMROSE
MYRTLE
LOTUS
PALM
FERN
FOREST-ARE-NOT
ROSEMARY
COLUMBINE
HIBISCUS
SUNFLOWER
CARDINAL
ASTER
CROCUS
HEATHER
LAVENDER
BUTTERCUP
MORNING GLORY
CRESSE
300 150 0 300 Feet
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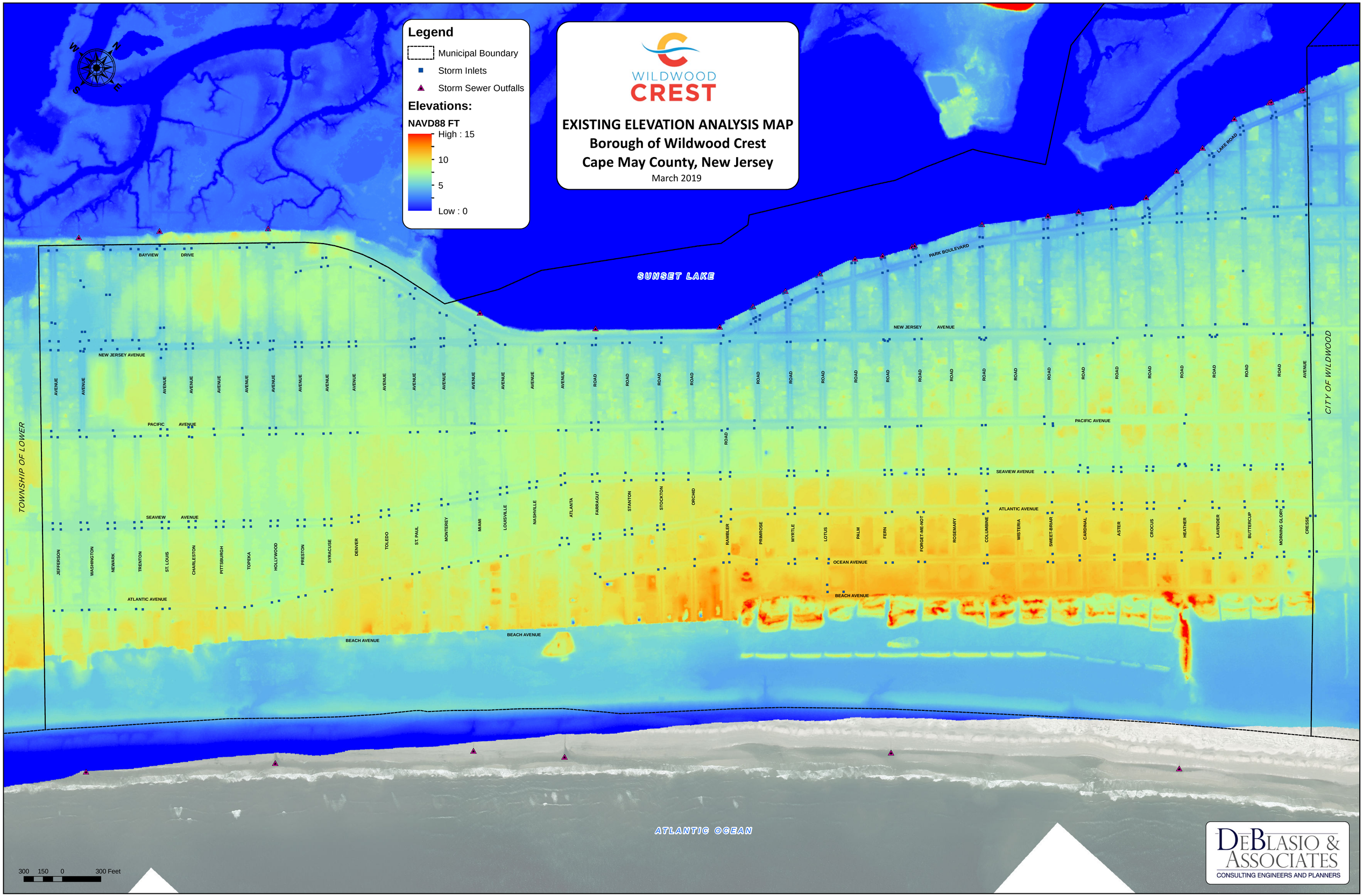
WILDWOOD CREST
EXISTING ELEVATION ANALYSIS MAP
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
Legend
Municipal Boundary
Storm Inlets
Storm Sewer Outfalls
Elevations:
NAVD88 FT
High : 15
10
5
Low : 0
N
E
S
W
SUNSET LAKE
ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
BEACH AVENUE
OCEAN AVENUE
PARK BOULEVARD
LAKE ROAD
JEFFERSON
WASHINGTON
NEWARK
TRENTON
ST. LOUIS
CHARLESTON
PITTSBURGH
TOPEKA
HOLLYWOOD
PRESTON
SYRACUSE
DENVER
TOLEDO
ST. PAUL
MONTEREY
MIAMI
LOUISVILLE
NASHVILLE
ATLANTA
FARRAGUT
STANTON
STOCKTON
ORCHID
RAMBLER
PRIMROSE
MYRTLE
LOTUS
PALM
FERN
FORGET-ME-NOT
ROSEMARY
COLUMBINE
WISTERIA
SWEET-BRIAR
CARDINAL
ASTER
CROCUS
HEATHER
LAVENDER
BUTTERCUP
MORNING GLORY
CRESSE
300 150 0 300 Feet
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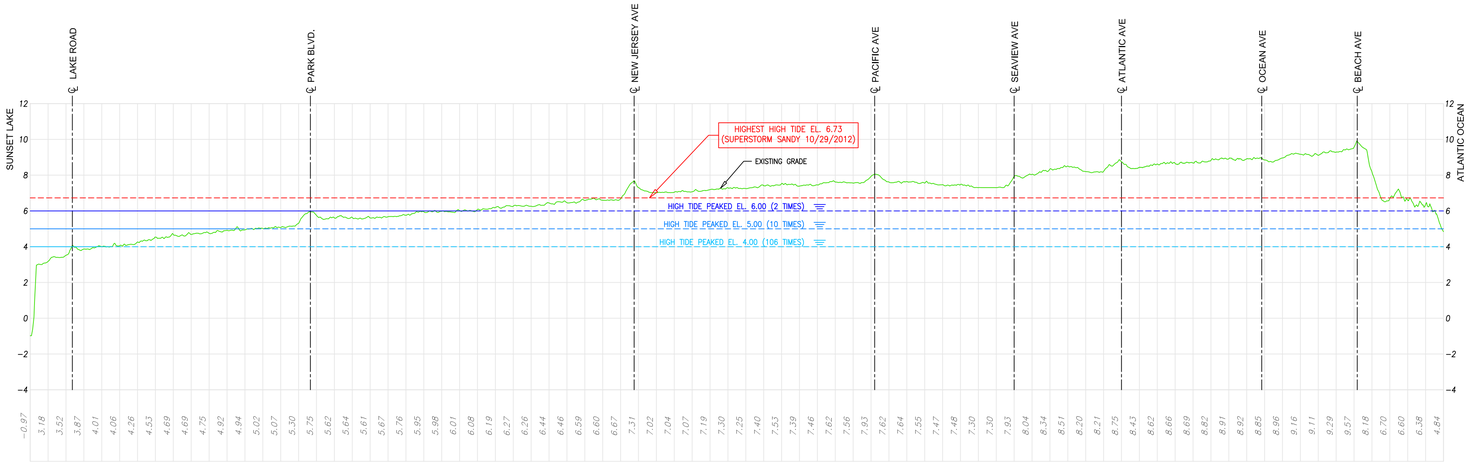
WILDWOOD CREST

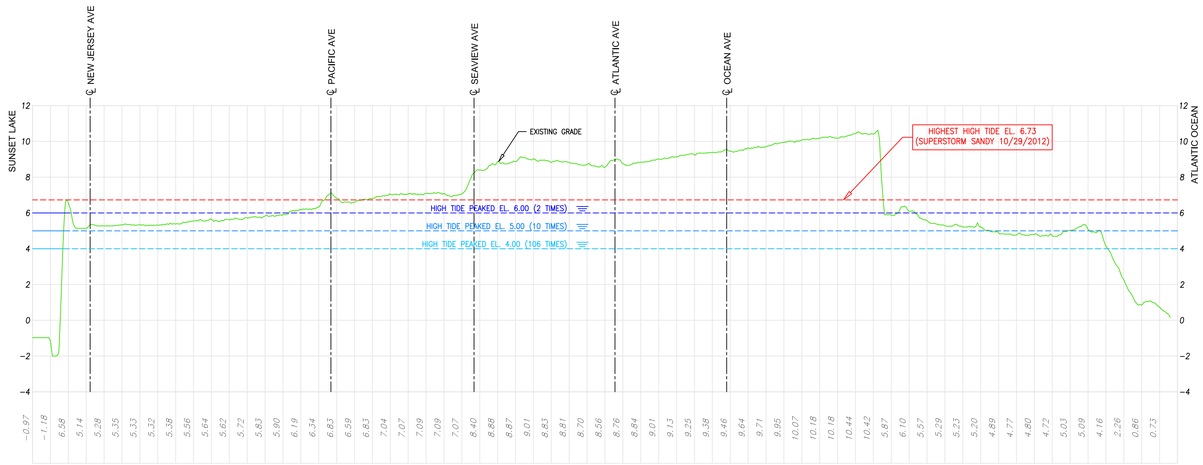
EXISTING PROFILES

Borough of Wildwood Crest
Cape May County, New Jersey
March 2019



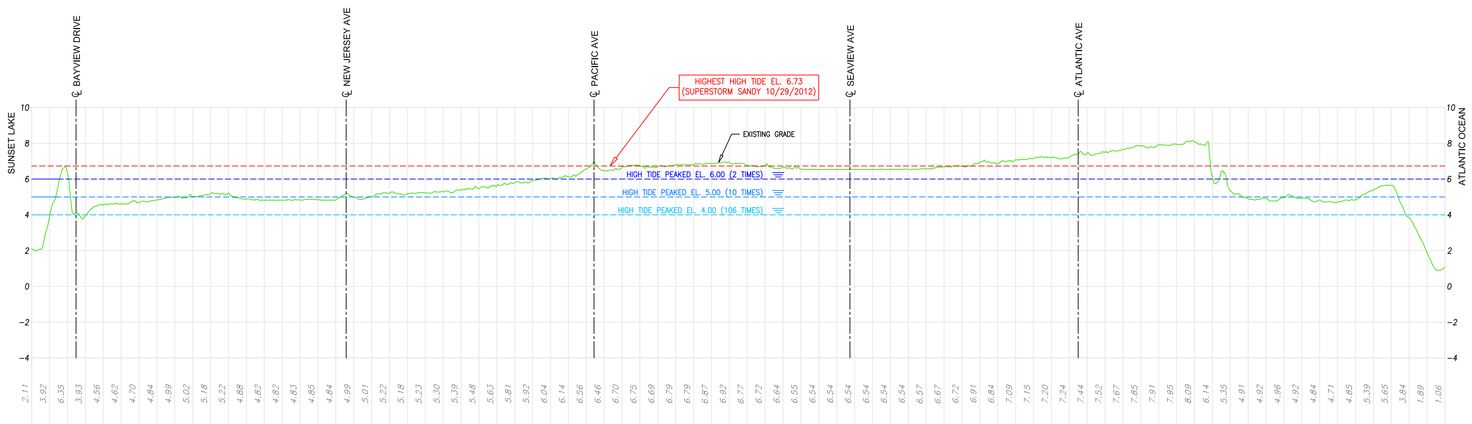
PROFILE - BUTTERCUP ROAD

NOT TO SCALE



PROFILE - STOCKTON ROAD

NOT TO SCALE



PROFILE - JEFFERSON AVENUE

NOT TO SCALE

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The Borough of Wildwood Crest storm sewer infrastructure is designed to remove excess rain water from impervious surfaces such as paved streets, parking lots, sidewalks, and roofs. The subcomponents of the system vary in size and complexity and are solely gravity sewers that carry excess water untreated to surrounding bodies of water.

An Existing Storm Sewer Infrastructure Map of the Borough of Wildwood Crest was generated and included in this report. Through GPS locators, extensive field work, and cooperation from the Borough of Wildwood Crest Department of Public Works, the map includes all storm sewer inlets, manholes, and outfalls. The Borough's storm sewer infrastructure includes approximately 634 inlets, 126 manholes, and 31 outfalls. The outfalls include 6 ocean outfalls and 25 bay outfalls. Attached are photographs of various beach outfalls. Pipes often become clogged with sand and do not function properly.

Storm sewer inlets throughout the Borough remove stormwater from the surface through a variety of grated drains and manholes allow access to the underground infrastructure. The internal network of piping contains different sizes and material to transport water to discharge outfalls. Outfalls allow collected stormwater to be removed and released into the bay or ocean.

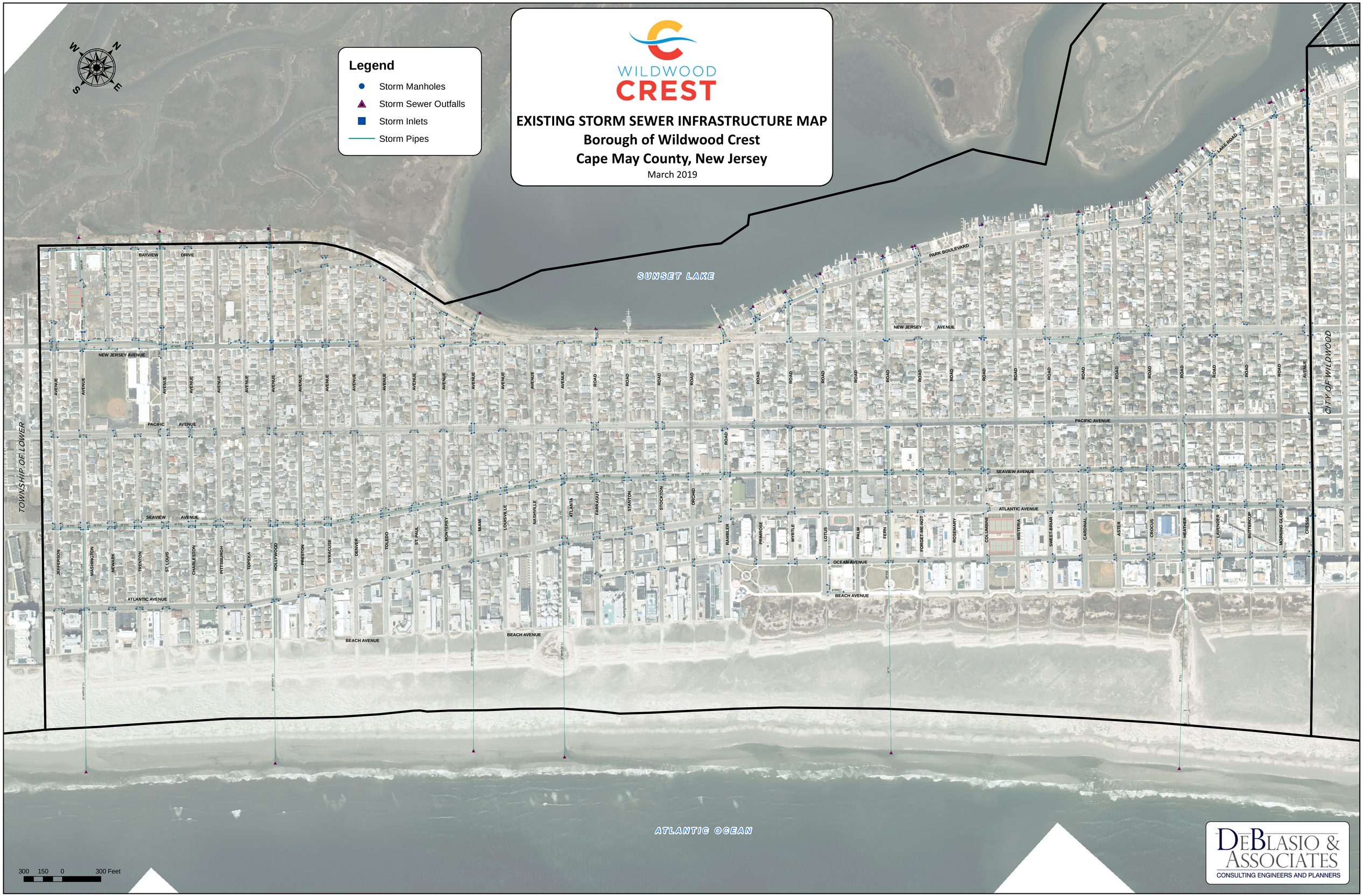
The Borough's storm sewer infrastructure is solely of gravity system and includes the following components:

1. Existing roadway gutters to transport water above ground from one intersection to another until an inlet is reached and then transported to an outfall.
2. "Bubbler" systems that utilize inlets to temporarily hold storm water until the water "bubbles up" from the lower inlet and is transported along the surface to the lower side of the intersection and eventually to an outfall.
3. Inlets with connecting storm sewer pipes that hold and transport water to existing outfalls.
4. All current storm sewer systems are gravity driven and utilize hydraulic gradients to transport water from the surface to existing outfalls.

The existing system contain some deficiencies that are often undersized and cannot support the amount of stormwater. Without the capacity to handle the stormwater, it can prolong surface flooding.

As tide levels increase, bay water begins to surcharge through the storm inlets and create nuisance flooding at low points. Some of the bayside outfalls lack valves or are not provided with proper valves to control tidewater. When high tide coincides with rain events, major flooding can occur.

Beach Outfalls:


WILDWOOD CREST
EXISTING STORM SEWER INFRASTRUCTURE MAP
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
Legend
Storm Manholes
Storm Sewer Outfalls
Storm Inlets
Storm Pipes
N
E
S
W
SUNSET LAKE
ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
BEACH AVENUE
OCEAN AVENUE
PARK BOULEVARD
LAKE ROAD
JEFFERSON
WASHINGTON
NEWARK
TRENTON
ST. LOUIS
CHARLESTON
PITTSBURGH
TOPEKA
HOLLYWOOD
PRESTON
SYRACUSE
DENVER
TOLEDO
ST. PAUL
MONTEREY
MIAMI
LOUISVILLE
NASHVILLE
ATLANTA
FAIRFAX
STANTON
STOCKTON
ORCHID
RAMBLER
PRIMROSE
MYRTLE
LOTUS
PALM
FERN
FORGET-ME-NOT
ROSEMARY
COLUMBINE
WISTERIA
SWEET-BRIAR
CARDINAL
ASTER
CROCUS
HEATHER
LAVENDER
BUTTERCUP
MORNING GLORY
CRESSE
300 150 0 300 Feet
DeBlasio & Associates
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The Borough of Wildwood Crest utilizes bay and ocean outfall pipes to drain the area of storm water. The area is delineated into 29 (twenty-nine) distinct drainage areas. These areas can be seen on the Existing Drainage Area Map. The Borough is generally divided along the midblock between Pacific Avenue and Seaview Avenue. The stormwater from the east side of the divide flows out the beach outfalls. The stormwater from the west side of the divide flows out the bay outfalls. Each drainage area was analyzed using HydroCAD to calculate the predicted flow during a 2-year flood, 10-year flood, and 25-year flood based on the assumption of a 38% impervious surface. A 2-year flood event, for example, can be described as a fifty-percent annual chance flood. This flood has a fifty percent chance to occur every year.

1. A1: Washington Avenue Bay Outfall Area is bounded on the North by Trenton Avenue, the South by the border of the Township of Lower, the East by the midblock between Seaview Avenue and Pacific Avenue, and the West by Shell Thorofare with a total drainage area of 1,520,836 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	**5-year Storm**	**10-year Storm**	**25-year Storm**
Predicted Flow (cfs)	6.58	11.14	15.55	22.53

2. A2: St. Louis Avenue Bay Outfall Area is bounded on the North by Pittsburgh Avenue, the South by Trenton Avenue, the East by the midblock between Seaview Avenue and Pacific Avenue, and the West by Shell Thorofare with a total drainage area of 1,184,997 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	**5-year Storm**	**10-year Storm**	**25-year Storm**
Predicted Flow (cfs)	5.13	8.68	12.11	17.55

3. B: Hollywood Avenue Bay Outfall Area is bounded on the North by Toledo Avenue, the South by Pittsburgh Avenue, the East by the midblock between Seaview Avenue and Pacific Avenue, and the West by Shell Thorofare with a total drainage area of 2,201,987 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	**5-year Storm**	**10-year Storm**	**25-year Storm**
Predicted Flow (cfs)	9.53	16.13	22.51	32.62

4. C: Miami Avenue Bay Outfall Area is bounded on the North by Nashville Avenue, the South by Toledo Avenue, the East by the midblock between Seaview Avenue and Pacific Avenue, and the West by Sunset Lake with a total drainage area of 1,516,999 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	6.57	11.11	15.51	22.48

5. D: Farragut Road Bay Outfall Area is bounded on the North by Orchid Road, the South by Nashville Avenue, the East by Seaview Avenue, and the West by Sunset Lake with a total drainage area of 1,263,280 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	5.47	9.25	12.91	18.71

6. E: Rambler Road Bay Outfall Area is bounded on the North by Primrose Road, the South by Orchid Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 424,380 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	1.84	3.11	4.34	6.29

7. F: Primrose Road Bay Outfall Area is bounded on the North by the midblock between Myrtle Road and Primrose Road, the South by the midblock between Primrose Road and Rambler Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 53,272 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	0.23	0.39	0.54	0.79

8. G: Myrtle Road Bay Outfall Area is bounded on the North by Palm Road, the South by Primrose Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 639,216 square feet.

According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	2.83	4.79	6.69	9.69

9. H: Lotus Road Bay Outfall Area is bounded on the North by Palm Road, the South by Lotus Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 123,081 square feet.

   According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	0.53	0.90	1.26	1.83

10. I: Palm Road Bay Outfall Area is bounded on the North by Palm Road right-of-way, the South by Palm Road right-of-way, the East by Park Boulevard, and the Sunset Lake with a total drainage area of 9,849 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	0.04	0.07	0.10	0.15

11. J: Fern Road Bay Outfall Area is bounded on the North by Rosemary Road and the midblock between Forget-Me-Not Road and Fern Road, the South by Palm Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 735,721 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	3.18	5.39	7.52	10.90

12. K: Forget-Me-Not Road South Bay Outfall Area is bounded on the North by Forget-Me-Not Road, the South by the midblock between Forget-Me-Not Road and Fern Road Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 73,466 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	0.32	0.54	0.75	1.09

13. L: Forget-Me-Not Road North Bay Outfall Area is bounded on the North by Rosemary Road, the South by Forget-Me-Not Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 177,026 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	0.77	1.30	1.81	2.62

14. M: Columbine Road Bay Outfall Area is bounded on the North by Wisteria Road, the South by Rosemary Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 749,123 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	3.24	5.49	7.66	11.10

15. N: Sweet-Briar Road Bay Outfall Area is bounded on the North by the midblock between Cardinal Road and Sweet-Briar Road, the South by Wisteria Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 317,153 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	1.37	2.32	3.24	4.70

16. O: Cardinal Road Bay Outfall Area is bounded on the North by the midblock between Heather Road and Crocus Road and the midblock between Aster Road and Cardinal Road, the South by Wisteria Road and the midblock between Sweet-Briar Road and Cardinal Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 1,154,184 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	5.00	8.46	11.80	17.10

17. P: Aster Road Bay Outfall Area is bounded on the North by the midblock between Crocus Road and Aster Road, the South by the midblock between Cardinal Road and Aster Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 252,526 square feet.

According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	1.09	1.85	2.58	3.74

18. Q: Crocus Road Bay Outfall Area is bounded on the North by the midblock between Heather Road and Crocus Road, the South by the midblock between Crocus Road and Aster Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 238,930 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	1.04	1.75	2.44	3.54

19. R: Heather Road Bay Outfall Area is bounded on the North by the midblock between Lavender Road and Heather Road, the South by the midblock between Crocus Road and Heather Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 489,327 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	2.12	3.58	5.00	7.25

20. S: Lavender Road Bay Outfall Area is bounded on the North by the midblock between Buttercup Road and Lavender Road, the South by the midblock between Heather Road and Lavender Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 615,864 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	2.67	4.51	6.30	9.12

21. T: Buttercup Road Bay Outfall Area is bounded on the North by the midblock between Morning-Glory Road and Buttercup Road, the South by Lavender Road and Buttercup Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 406,872 square feet.

According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	1.76	2.98	4.16	6.03

22. U: Morning-Glory Road Bay Outfall Area is bounded on the North by the midblock between Cresse Avenue and Morning-Glory Road, the South by the midblock between Buttercup Road and Morning-Glory Road, the East by New Jersey Avenue, and the West by Sunset Lake with a total drainage area of 425,953 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	1.84	3.12	4.36	6.31

23. V: Cresse Avenue Bay Outfall Area is bounded on the North by Cresse Avenue, the South by the midblock between Morning-Glory and Cresse Avenue Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 543,133 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	2.35	3.98	5.55	8.05

24. W: Washington Avenue Beach Outfall Area is bounded on the North by the midblock between Topeka Avenue and Hollywood Avenue, the South by the border of the Township of Lower, the East by the Atlantic Ocean, and the West by the midblock between Pacific Avenue and Seaview Avenue with a total drainage area of 2,283,150 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	9.88	16.72	23.34	33.82
Allowable Flow (cfs)	22.68			
Predicted vs Allowable	OK			

25. X1: Hollywood Beach Outfall Area is bounded on the North by the midblock between Toledo Avenue and Denver Avenue, the South by the midblock between Hollywood Avenue and Topeka Avenue, the East by the Atlantic Ocean, and the West by the midblock between Pacific Avenue and Seaview Avenue with a total drainage area of 1,222,207 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	5.29	8.95	12.50	18.11
Allowable Flow (cfs)	22.68			
Predicted vs Allowable	OK			

26. X2: Miami Beach Outfall Area is bounded on the North by the midblock between Nashville Avenue and Louisville Avenue, the South by the midblock between Toledo Avenue and Denver Avenue, the East by the Atlantic Ocean, and the West by the midblock between Pacific Avenue and Seaview Avenue with a total drainage area of 1,511,861 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	6.55	11.07	15.46	22.40
Allowable Flow (cfs)	22.68			
Predicted vs Allowable	OK			

27. X3: Atlanta Beach Outfall Area is bounded on the North by Rambler Road, the South by the midblock between Nashville Avenue and Louisville Avenue, the East by the Atlantic Ocean, and the West by Seaview Avenue with a total drainage area of 2,121,604 square feet.

    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	9.19	15.54	21.69	31.43
Allowable Flow (cfs)	22.68			
Predicted vs Allowable	OK			

28. X4: Fern Beach Outfall Area is bounded on the North by Wisteria Road, the South by Rambler Road, the East by the Atlantic Ocean, and the West by Pacific Avenue with a total drainage area of 3,040,326 square feet.

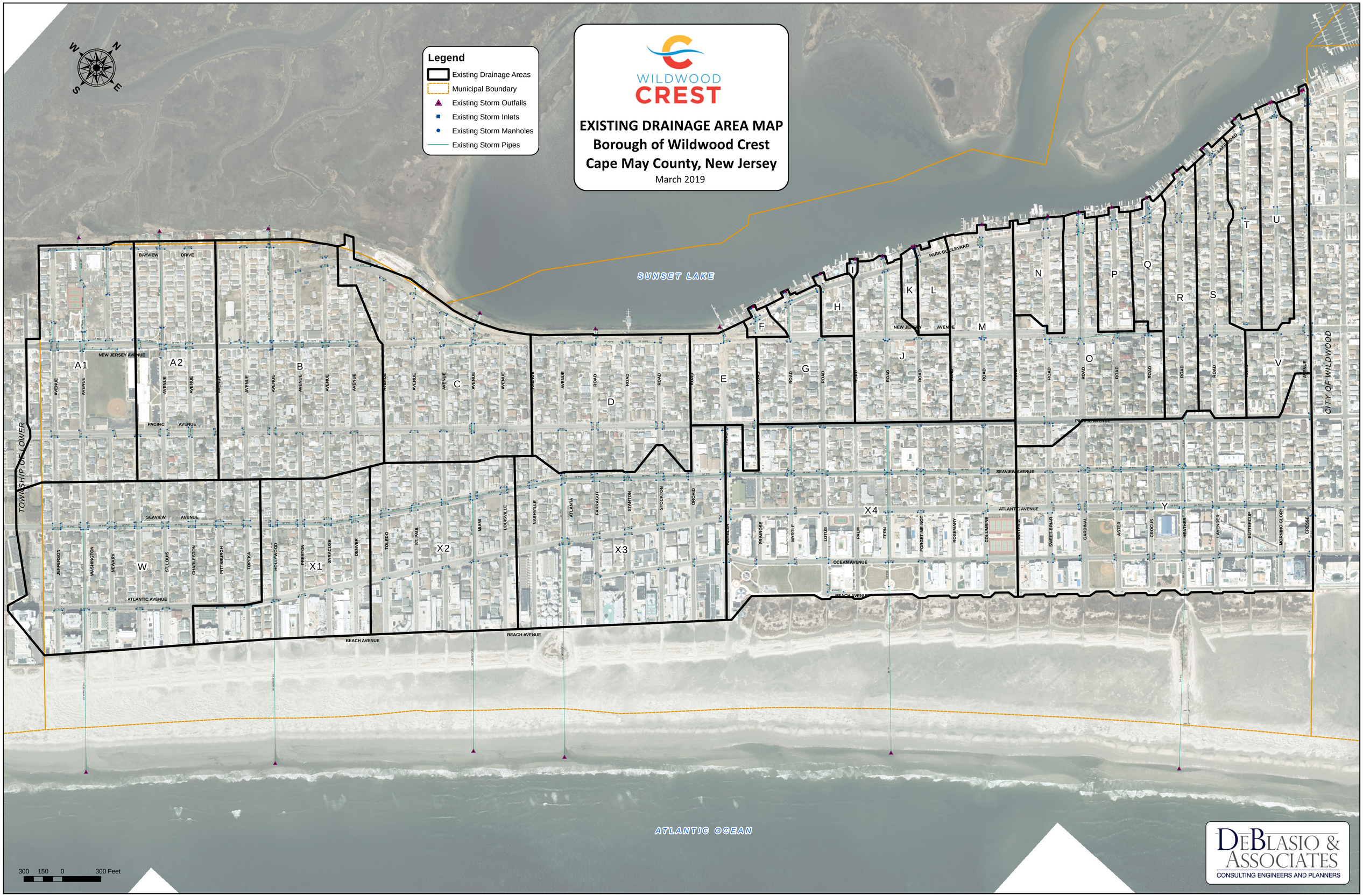
    According to HydroCAD the existing flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	13.16	22.27	31.08	45.04
Allowable Flow (cfs)	22.68			
Predicted vs Allowable	OK			

29. Y: Heather Road Beach Outfall Area is bounded on the North by Cresse Avenue, the South by Wisteria Road, the East by the Atlantic Ocean, and the West by Pacific Avenue with a total drainage area of 3,127,017 square feet.

According to HydroCAD the existing flow through the outfall:

	2-year Storm	**5-year Storm**	**10-year Storm**	**25-year Storm**
Predicted Flow (cfs)	13.54	22.91	31.97	46.33
Allowable Flow (cfs)	22.68			
Predicted vs Allowable	OK			


WILDWOOD CREST
EXISTING DRAINAGE AREA MAP
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
Legend
Existing Drainage Areas
Municipal Boundary
Existing Storm Outfalls
Existing Storm Inlets
Existing Storm Manholes
Existing Storm Pipes
N
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SUNSET LAKE
ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
BEACH AVENUE
OCEAN AVENUE
PARK BOULEVARD
LAKE ROAD
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WASHINGTON
NEWARK
ST LOUIS
CHARLESTON
PITTSBURGH
TOPEKA
HOLLYWOOD
PRESTON
SYRACUSE
DENVER
TOLEDO
ST PAUL
MIAMI
LOUISVILLE
NASHVILLE
ATLANTA
FARRAGUT
STANTON
STOCKTON
ORCHID
CANNA
PRIMROSE
MYRTLE
LOTUS
PALM
FERN
FORGET-ME-NOT
ROSEMARY
COLUMBINE
HYACINTH
SWEET-BRIAR
CARDINAL
ASTER
CROCUS
HEATHER
LAVENDER
BUTTERCUP
MORNING GLORY
CRESSE
300 150 0 300 Feet
DeBlasio & Associates
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The Borough of Wildwood Crest experiences semi-diural tides, two high tides and two low tides per lunar day with one high tide typically higher than the other. The United State Geological Survey (USGS) is responsible for tidal data collection in the back bays of New Jersey. After looking at the Tide Gage Station locations, the closest back bay station to the Borough of Wildwood Crest can be found on Stone Harbor Boulevard in Stone Harbor and the closest intercoastal U.S. Coast Guard Station in Cape May and shown on the attached map. The datum for the gages is at 0.00 feet based on NAVD of 1988 and the data was collected and reviewed from early 2000 to late 2018 for a total of 6,619 observations. Here is a table of the number of days with tides above elevations:

Stone Harbor Boulevard Station	Total # of Occurrences	Average # of Occurrences/Year
Above 2 feet	4760	265
Above 3 feet	1036	58
Above 4 feet	106	5.9
Above 5 feet	10	0.6
Above 6 feet	2	0.2
Above 7 feet	0	0

Cape May Station	Total # of Occurrences	Average # of Occurrences/Year
Above 2 feet	4391	244
Above 3 feet	1020	57
Above 4 feet	64	3.6
Above 5 feet	4	0.3
Above 6 feet	1	0.1
Above 7 feet	0	0

The maximum tide during this time period for the gage on Stone Harbor Boulevard was 6.73 feet on October 29, 2012 during Hurricane Sandy and the maximum for the gage at the U.S. Coast Guard Station was 6.47 feet on January 23, 2016 during Winter Storm Jonas. Below is a table of the top six tide elevations for the two stations.

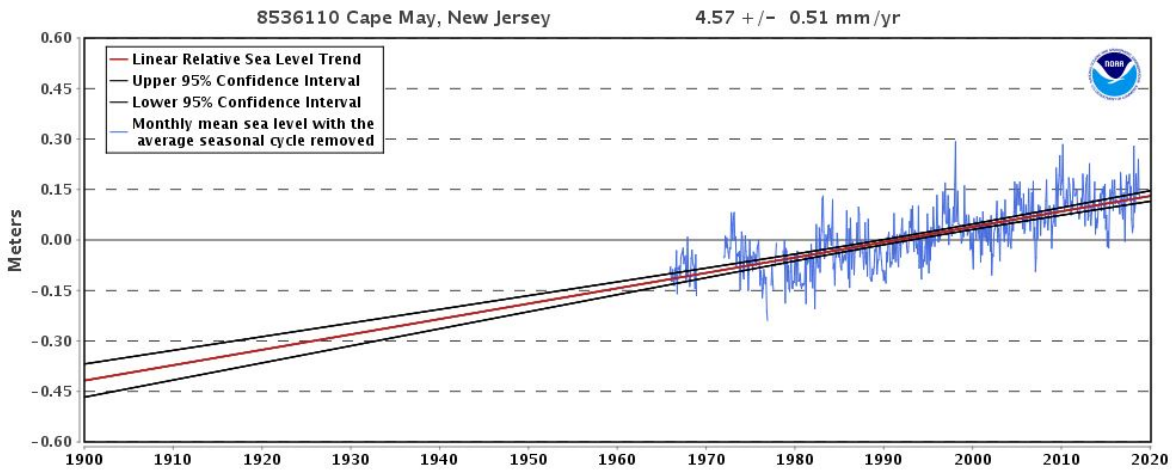
Date	Storm Name	Stone Harbor Station	Cape May Station
10/27/2018	Nor'easter	5.27	5.01
1/23/2016	Winter Storm Jonas	6.22	6.47
10/29/2012	Superstorm Sandy	6.73	5.90
8/27/2011	Hurricane Irene	5.30	5.15
11/13/2009	Hurricane Ida	5.44	4.74
2/17/2003	Presidents' Day Storm II	5.37	4.48

N
STONE HARBOR
CAPE MAY STATION
US COAST GUARD STATION
Lizard Tail Swamp Preserve
Frye
Great Sound
Avalon
Cape May Court House
Cape May Wetlands
Jenkins Sound
Villas
Rio Grande
Cape May County Airport
Cape Island
Garden State Pkwy
North Wildwood
Wildwood
Wildwood Crest
Javier Sound
Cape May Canal
Higbee Beach
10 ft.
US Coast Guard Station Center
West Cape May
Cape May Point
Cape May
Atlantic Ocean

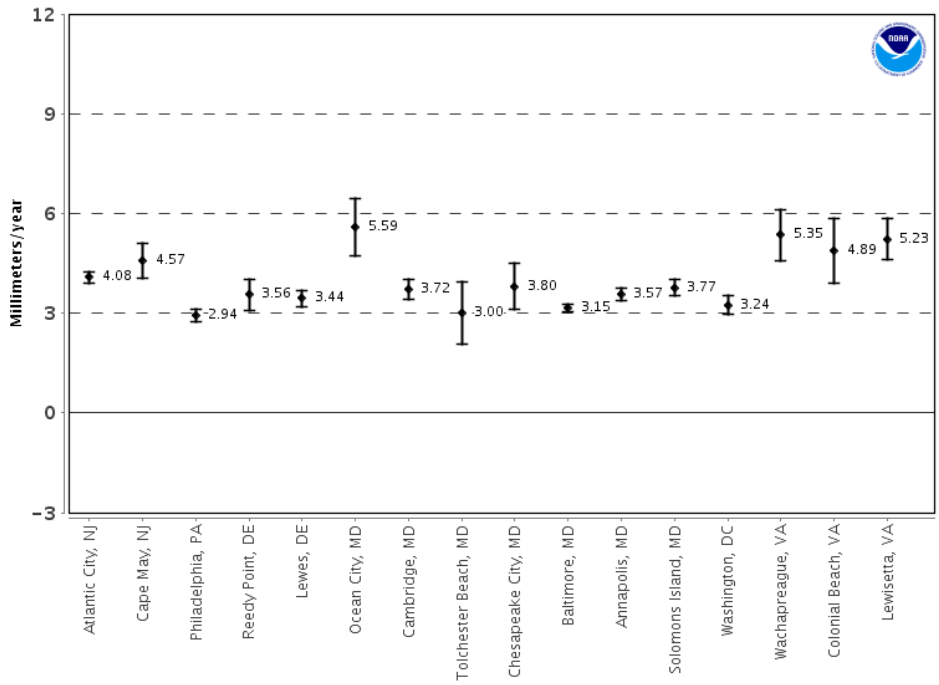
Providing projections of future climate change can be challenging. The further the projection, the more dynamic it becomes. A short term projection is based on recent trends and can be more accurate. The New Jersey Climate Adaptation Alliance is a network or organizations that work together in preparing New Jersey for climate change. Rutgers University, the facilitator of this program, indicates that sea levels along the New Jersey coast is rising faster than the global average. Sea level rise can cause more frequent severe storms.

The National Oceanic and Atmospheric Administration (NOAA) is a governmental agency that observes a network of more than 200 permanent water level stations. NOAA was able to look at tidal trends beginning in 1900 and predict tidal levels to 2020. This long-term linear trend is on a 95% confidence interval.

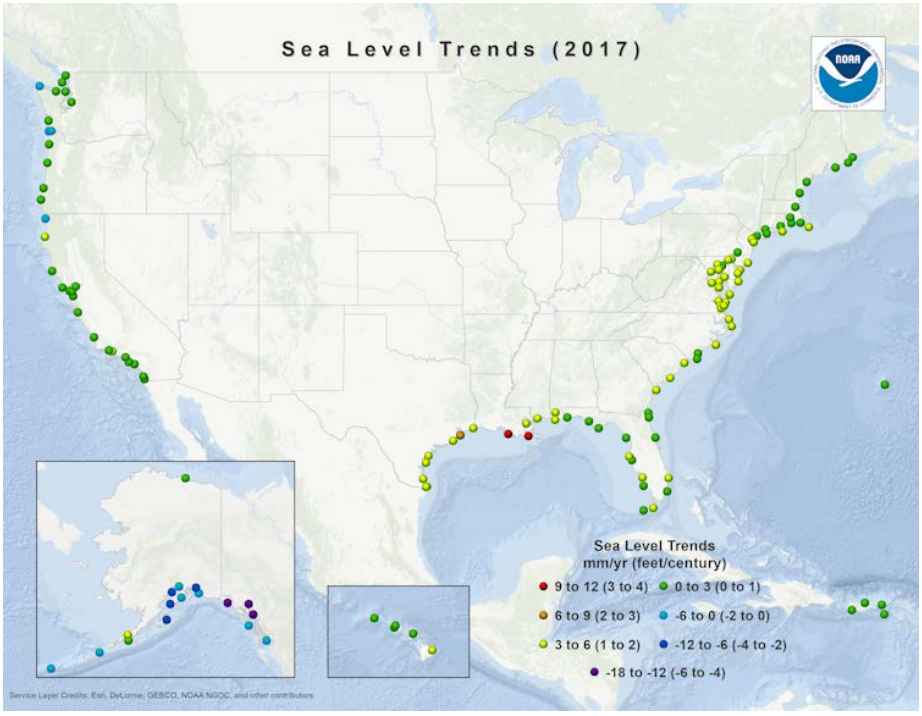
According to this trend, between 1965 and 2017 at the station Cape May the sea level trend is 4.57 +/- 0.51 mm/yr (0.18 in/yr) which is equivalent to a change of 1.50 feet in 100 years.



The sea level rise trend is not exclusive to New Jersey. Positive trends can be seen across the north east. The graphs below compare the 95% confidence intervals of relative sea level trends. The trends with the widest confidence intervals are based on only 30-40 years of tide data.



The map below can be used as an overview of the variations in the rates of rise across the country. The tide stations have a minimum of 30 years of data to determine long-term sea level variations and reduce error. The large variation in trends reflects the rates of vertical land motion as well. The average global sea level rise rate is 1.7-1.8 mm/yr. Areas with a high rate reflect lowering or shrinking of local land.



As sea level continues to rise, flooding through the Borough becomes more frequent and severe. On April 16, 2018 photographs were taken along Cresse Avenue. The west side of Cresse Avenue has an elevation 3 near the bayfront. On April 16, 2018 the high tide reached 3.75 feet in addition to 1.58 inches of rainfall. Below displays the combination of stormwater flooding and tidal flooding on Cresse Avenue:

On March 4, 2019 photographs were taken along Lake Road. The elevation along Lake Road is between 3 and 4 feet NAVD88. On this date, the high tide reached 3.44 feet with rainfall the previous day. Below displays the flooding that occurred:

Utilizing the existing topography map, flood inundation maps were generated for elevation 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, and 7.0 in the NAVD88.

WILDWOOD CREST
MAP OF AREAS BELOW ELEV. 4.0 FT
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
LEGEND
Municipal Boundary
Elevations:
NAVD88 Datum
< 0'
0' - 4.0'
> 4.0'
N
S
E
W
SUNSET LAKE
ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
BEACH AVENUE
OCEAN AVENUE
PARK BOULEVARD
LAKE ROAD
JEFFERSON AVENUE
WASHINGTON AVENUE
NEWARK AVENUE
TRENTON AVENUE
ST. LOUIS AVENUE
CHARLESTON AVENUE
PITTSBURGH AVENUE
TOPEKA AVENUE
HOLLYWOOD AVENUE
PRESTON AVENUE
SYRACUSE AVENUE
DENVER AVENUE
TOLEDO AVENUE
ST. PAUL AVENUE
MONTEREY AVENUE
MIAMI AVENUE
LOUISVILLE AVENUE
NASHVILLE AVENUE
ATLANTA AVENUE
FAIRAGUT AVENUE
STANTON AVENUE
STOCKTON AVENUE
ORCHID ROAD
RAMBLER ROAD
PRIMROSE ROAD
MYRTLE ROAD
LOTUS ROAD
PALM ROAD
FERN ROAD
FORGET-ME-NOT ROAD
ROSEMARY ROAD
COLUMBINE ROAD
WISTERIA ROAD
SWEET-BRIAR ROAD
CARDINAL ROAD
ASTER ROAD
CROCUS ROAD
HEATHER ROAD
LAVENDER ROAD
BUTTERCUP ROAD
MORNING GLORY ROAD
CRESSE AVENUE
300 150 0 300 Feet
DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

WILDWOOD CREST
MAP OF AREAS BELOW ELEV. 4.5 FT
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
LEGEND
Municipal Boundary
Elevations:
NAVD88 Datum
< 0'
0' - 4.5'
> 4.5'
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W
SUNSET LAKE
ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
BEACH AVENUE
OCEAN AVENUE
PARK BOULEVARD
LAKE ROAD
JEFFERSON
WASHINGTON
NEWARK
TRENTON
ST. LOUIS
CHARLESTON
PITTSBURGH
TOPEKA
HOLLYWOOD
PRESTON
SYRACUSE
DENVER
TOLEDO
ST. PAUL
MONTEREY
MIAMI
LOUISVILLE
NASHVILLE
ATLANTA
FAIRFAX
STANTON
STOCKTON
ORCHID
RAMBLER
PRIMROSE
MYRTLE
LOTUS
PALM
FERN
FORGET-ME-NOT
ROSEMARY
COLUMBINE
WISTERIA
SWEET-BRIAR
CARDINAL
ASTER
CROCUS
HEATHER
LAVENDER
BUTTERCUP
MORNING GLORY
CRESSE
300 150 0 300 Feet
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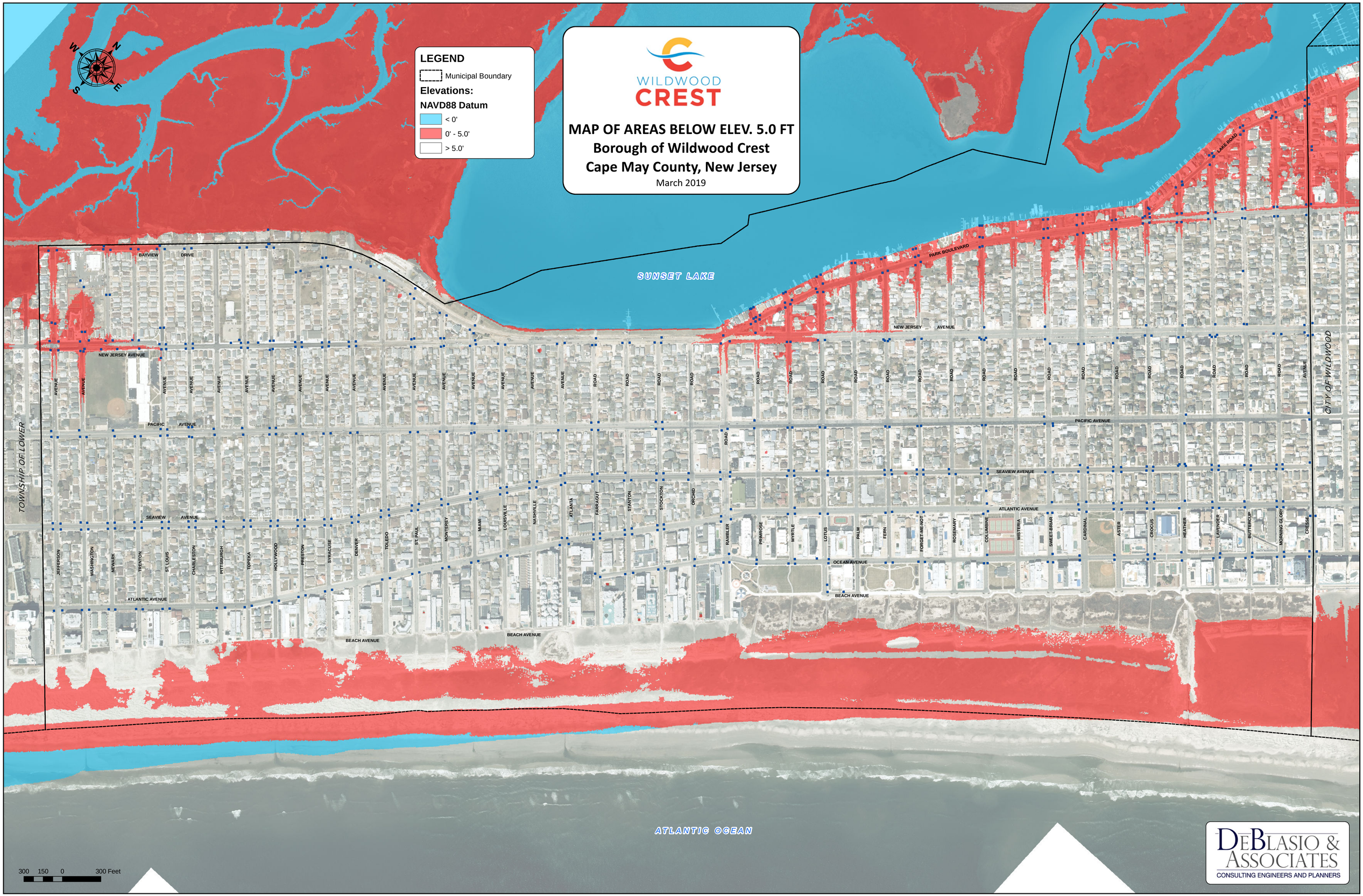
WILDWOOD CREST
MAP OF AREAS BELOW ELEV. 5.0 FT
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
LEGEND
Municipal Boundary
Elevations:
NAVD88 Datum
< 0'
0' - 5.0'
> 5.0'
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ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
BEACH AVENUE
OCEAN AVENUE
PARK BOULEVARD
LAKE ROAD
JEFFERSON AVENUE
WASHINGTON AVENUE
NEWARK AVENUE
TRENTON AVENUE
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PRESTON AVENUE
SYRACUSE AVENUE
DENVER AVENUE
TOLEDO AVENUE
ST. PAUL AVENUE
MONTEREY AVENUE
MIAMI AVENUE
LOUISVILLE AVENUE
NASHVILLE AVENUE
ATLANTA AVENUE
FAIRFAX AVENUE
STANTON AVENUE
STOCKTON AVENUE
ORCHID ROAD
RAMBLER ROAD
PRIMROSE ROAD
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FORGET-ME-NOT ROAD
ROSEMARY ROAD
COLUMBINE ROAD
WISTERIA ROAD
SWEET-BRIAR ROAD
CARDINAL ROAD
ASTER ROAD
CROCUS ROAD
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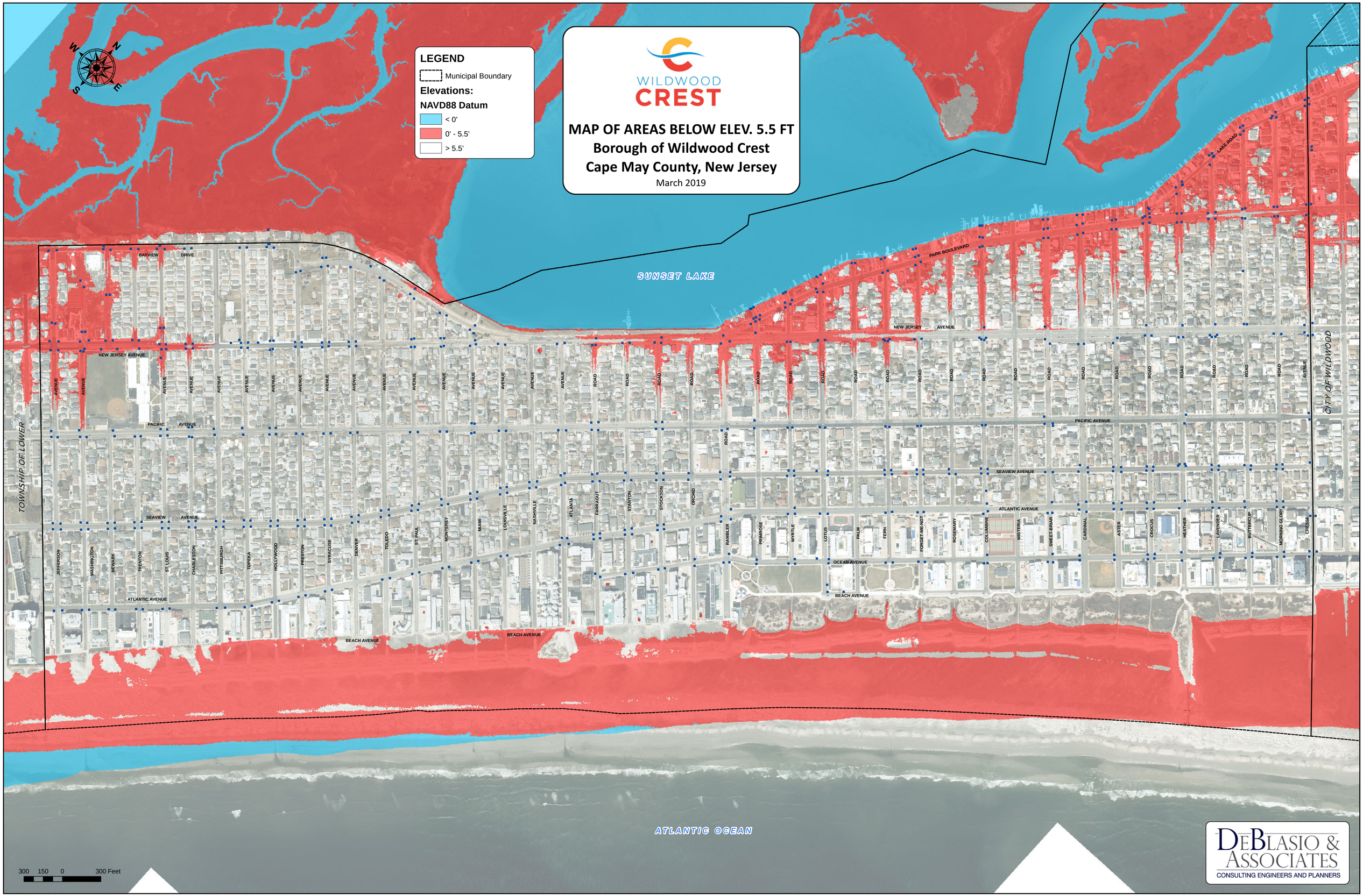
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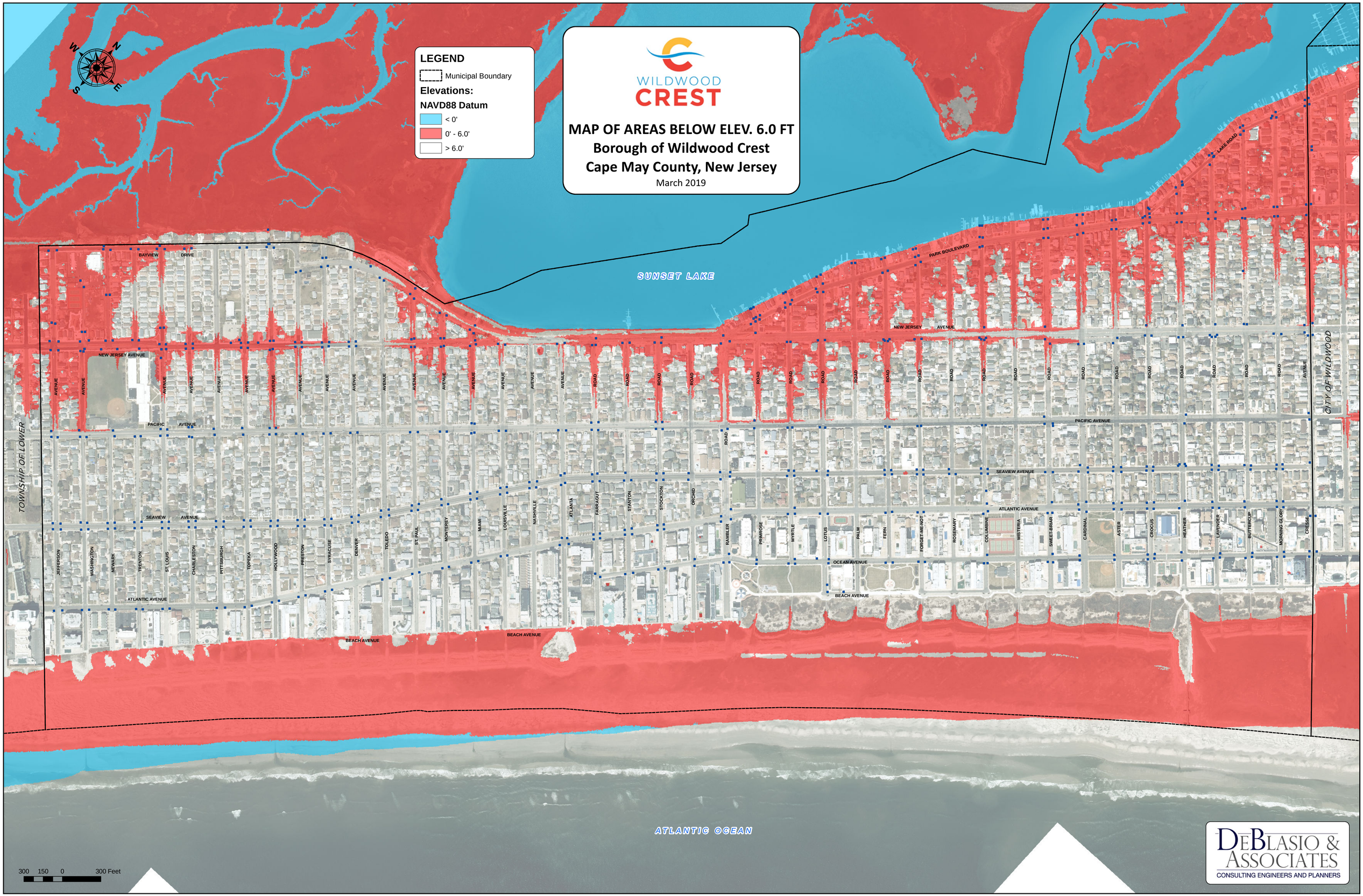
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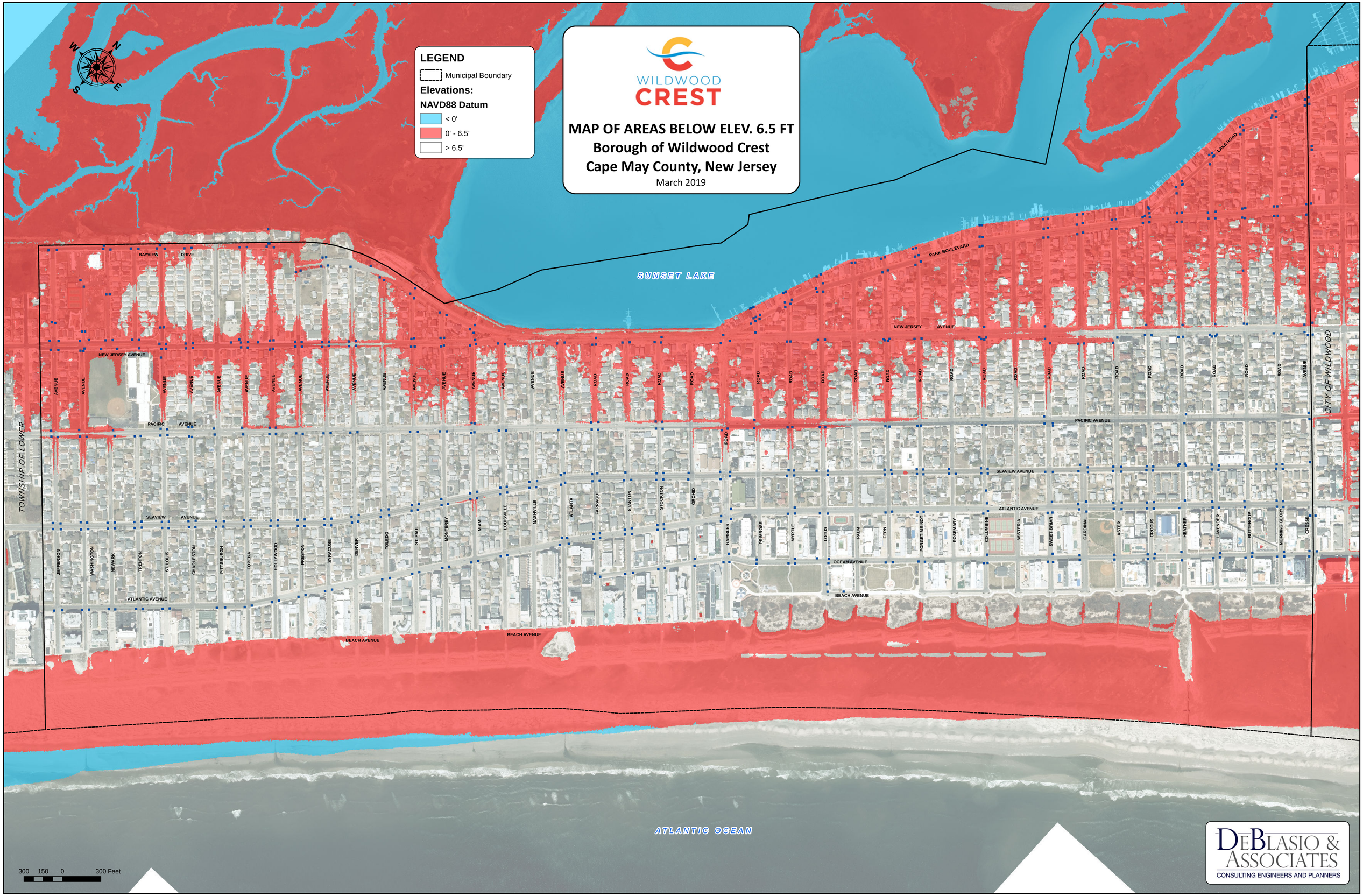
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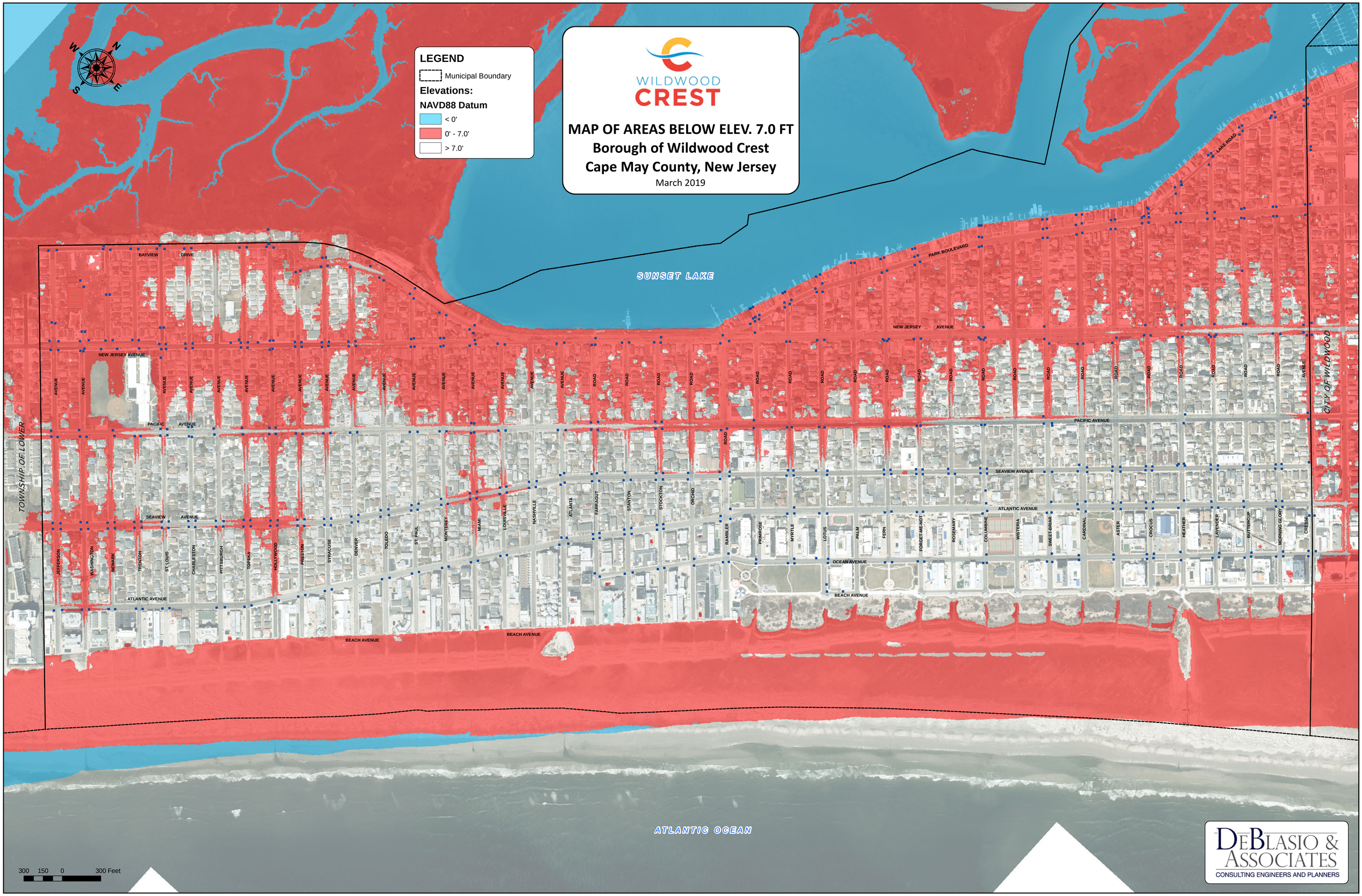
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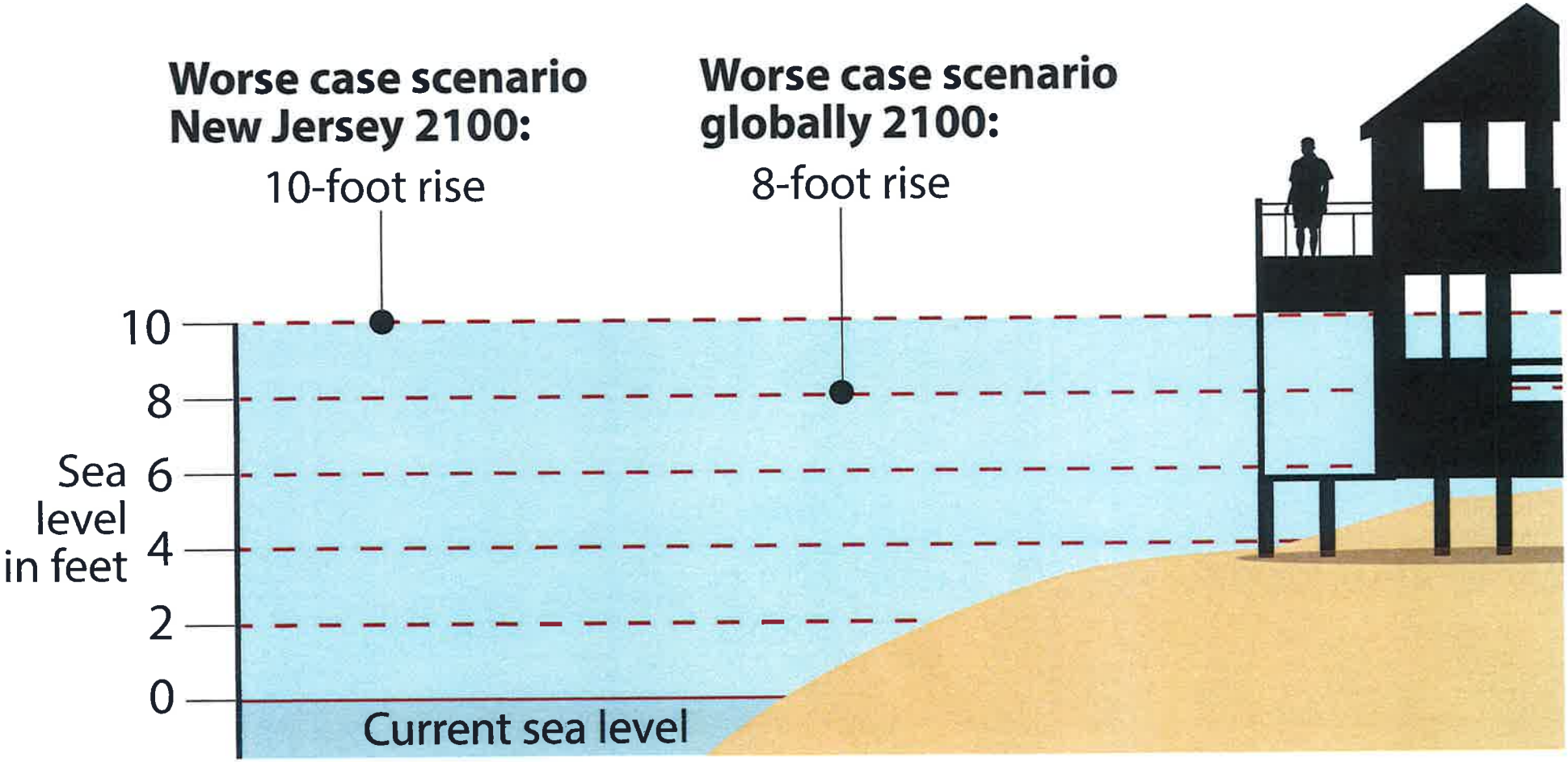
PROJECTED RANGE OF SEA LEVEL RISE



Source: Rutgers University

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NOAA Technical Report NOS CO-OPS 073

Sea Level Rise and Nuisance Flood Frequency Changes around the United States

City Dock in Annapolis, Maryland. Photo Credit: Amy McGovern.

Silver Spring, Maryland

June 2014

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U.S. DEPARTMENT OF COMMERCE
National Ocean Service
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NOAA Technical Report NOS CO-OPS 073

Sea Level Rise and Nuisance Flood Frequency Changes around the United States

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June 2014

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Penny Pritzker, Secretary

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EXECUTIVE SUMMARY

The National Oceanic and Atmospheric Administration (NOAA) water level (tide) gauges have been measuring water levels around the U.S. for over a century, providing clear evidence of sea level rise relative to land (SLR_{rel}) around most of the continental United States and Hawaii. As SLR_{rel} increases mean sea level (MSL), there is naturally an increase in tidal datum elevations, which are typically used to delineate inundation thresholds. Direct consequences of rising sea level against fixed elevations such as *today's* built infrastructure also include increased inundation during extreme events both spatially and temporally. Not only are extreme flooding events reaching higher grounds and covering larger areas due to SLR_{rel}, the frequency and duration of these extreme flood events are increasing.

Another consequence of SLR_{rel} is the increase in *lesser extremes* such as occasional minor coastal flooding experienced during high tide. These events are becoming more noticeable and widespread along many U.S. coastal regions and are *today* becoming more of a *nuisance*. As sea levels continue to rise and with an anticipated acceleration in the rate of rise from ocean warming and land-ice melt, concern exists as to when more substantive impacts from tidal flooding of greater frequency and duration will regularly occur. Information quantifying these occurrences to inform mitigation and adaptation efforts and decision makers is not widely available.

In this report, we show that water level exceedances above the elevation threshold for "minor" coastal flooding (nuisance level) impacts established locally by the National Weather Service (NWS) have been increasing in time. More importantly, we document that event frequencies are accelerating at many U.S. East and Gulf Coast gauges, and many other locations will soon follow regardless of whether there is an acceleration of SLR_{rel}. Lastly, we show a regional pattern of increasingly greater event-rate acceleration as the height between MSL and a location's nuisance flood threshold elevation decreases.

Impacts from recurrent coastal flooding include overwhelmed stormwater drainage capacity, frequent road closures, and general deterioration and corrosion of infrastructure not designed to withstand frequent inundation or salt-water exposure. From this, we conclude that there is a time horizon, largely dependent upon the local rate of SLR_{rel}, when critical elevation thresholds for various public/private/commercial serving systems will become increasingly compromised by tidal flooding. This concept of a non-linear impact trajectory needs to recognized, as it is critical for coastal planning to prevent degradation to society-serving systems at risk from $SLR_{rel.}$ The goal of this report is to heighten awareness of a growing problem of more frequent nuisance coastal flooding respective to a community's living memory and to encourage resiliency efforts in response to impacts from SLR_{rel}.

INTRODUCTION

Thermal expansion of the world's oceans and melting of glaciers and ice sheets from climate warming has contributed to global sea level rise (SLR) of approximately 1.7 mm/yr over the last century (Church and White, 2011) and even higher rates (3.2 mm/yr; Merrifield et al., 2013) over the last several decades. Superimposed upon this trend are ocean-atmosphere circulation dynamics producing significant regional interannual mean sea level (MSL) variability. This variability can be expressed as low-frequency multi-month MSL anomalies, as well as higher-frequency *storminess* changes in storm surge event frequency along the coast (Sweet and Zervas, 2011; Thompson et al., 2013) from altered seasonal storm track tendencies (Hirsch et al., 2001). Regional variability is often coherent with climate forcings such as El Niño Southern Oscillation (ENSO) and the multi-decadal Pacific Decadal Oscillation (PDO) that, dependent upon their state, can also exacerbate (Merrifield et al., 2012) or suppress (Bromirski et al., 2011) long-term regional SLR rates. Vertical land motion also contributes to regional-to-local relative changes in long-term SLR_{rel} rates respective to land (Zervas et al., 2013). The net effect for most of the United States is a SLR_{rel} readily tracked by the U.S. National Oceanic and Atmospheric Administration (NOAA) National Water Level Observation Network (NWLON). NWLON is a nationwide monitoring program whose water level gauges have supported essential commerce-related activities for over a century, such as providing tide predictions and chart datums for safe navigation as well as boundary delineations for private property and federal and state economic zones. NWLON also provides potentially life-saving information in near real-time about extreme tropical and extratropical storm surges, tsunami warnings, and enhances coastal intelligence by establishing coastal-flood probabilities.

One consequence of SLR_{rel} (http://tidesandcurrents.noaa.gov/sltrends) is an increase in tidal datum elevations (CO-OPS, 2001), such as Mean Higher High Water (MHHW), that define perennial inundation levels. A more societal-important consequence of SLR_{rel} is the exacerbation of extreme flood event magnitudes and their frequencies from a perspective of fixed elevations (Hunter, 2010; Park et al., 2011; Tebaldi et al., 2012), such as those associated with private property and critical public-serving infrastructure and systems (e.g., transportation, energy generation and transmission, wastewater treatment, etc.). The increased probability occurs as a result of a lowered "freeboard" or gap between MSL and specific threshold flood elevations from $SLR_{rel.}$ This results in smaller storm surge magnitudes increasingly impacting similar levels as time progresses. This reality was recently highlighted by Superstorm Sandy's impacts in October 2012 along the U.S. Mid-Atlantic (Sweet et al., 2013). However, neither changes in tidal datum elevations nor rare-event probabilities are readily apparent to the casual observer. The former is generally too gradual for noticeable impacts, or incurs successional changes over generational time scales (CO-OPS, 2001), whereas the latter is obscured by the infrequency of the extremely rare event (e.g., direct hurricane strike).

In this report, we describe a more tangible impact of SLR_{rel} as an increased frequency of minor (nuisance) tidal-related flooding, further refining the unbiased climate-change SLR indicator of Parker (1992). The increased frequency of nuisance tidal flooding along U.S. coastal regions is a growing problem with societal impacts (http://www.csc.noaa.gov/tidalfloodingvis/). We provide insight into patterns and trends associated with a nuisance-flood proxy derived from empirically calibrated levels at NWLON gauges, specifically the "minor" threshold elevation established by local Weather Forecasting Offices (WFO) of NOAA's National Weather Service (NWS).

Henceforth, we will refer to the NWS "minor" thresholds as a location's *nuisance flood level*, which have been historically associated with minor coastal flooding impacts. We note that not every exceedance above the nuisance flood level implies that noticeable or widespread flooding has occurred or will occur; though, when concurrent with localized rainfall or a wind-forced storm surge, impacts can become quite severe and more similar to the higher NWS-defined levels (i.e., moderate and major) recently analyzed by Kriebel and Geiman (2013). Rather, the nuisance flood level provides a measure of localized propensity for community-specific minor impacts based upon documented observations. Nuisance flood level thresholds and the land elevations susceptible to event inundation are displayed in the "Flood Frequency" tab of the NOAA Sea Level Viewer (http://csc.noaa.gov/slr/viewer/) with supporting discussion in Marcy et al. (2011).

Three main questions are addressed in this report:

1. How has historical SLR_{rel} changed the:
    - frequency and duration of nuisance flood events?
    - probability of a nuisance flood event?
2. What climatic patterns are associated with year-to-year differences?
3. During what season do nuisance floods typically occur and why?

DATA AND METHODS

Hourly water levels, available from the Center for Operational Oceanographic Products and Services (CO-OPS) (http://tidesandcurrents.noaa.gov/), are utilized in this report to describe nuisance-related impacts. The hourly data and nuisance flood levels are relative to the latest National Tidal Datum Epoch (NTDE) which, in all but one instance (Galveston, Texas is a 1997-2001 epoch), references the 1983-2001 period. The water level observations were further decomposed into an astronomical tide (prediction) and a nontidal residual (NTR) component, with the latter forming in response to ocean and atmospheric forcing.

Though NOAA NWLON has 210 water level gauges in its network, with 52 gauges in the Great Lakes and 158 along the open coast, only about 75 of the open coast gauges have a minor coastal flooding elevation threshold (nuisance flood level) assigned to them by local NOAA NWS WFOs. Of these approximately 75 gauges, the majority are along the East and Gulf Coasts since these areas have the potential for larger storm surges than the West Coast, where wave impacts are more prevalent and whose effects are not generally captured (by design) by coastal water level gauges (Ruggiero, 2013). A total of 45 gauges are used in this report including Honolulu, Hawaii, whose nuisance flood level is defined and displayed ("high sea level forecasts" tab) by the Pacific Integrated Ocean Observing System (PacIOOS; http://oos.soest.hawaii.edu/pacioos) rather than the local NWS WFO. Inclusion criterion is based upon: 1) 30 years of verified hourly data and 2) sufficient exceedances above the nuisance flood level to produce discernable trends or patterns. Figure 1 shows the location and nuisance flood levels for the NOAA gauges used in the study. Table 1 provides the gauge name, position, range of data utilized, SLR_{rel} trend for study period, and NWS minor (nuisance) coastal flood threshold elevations.

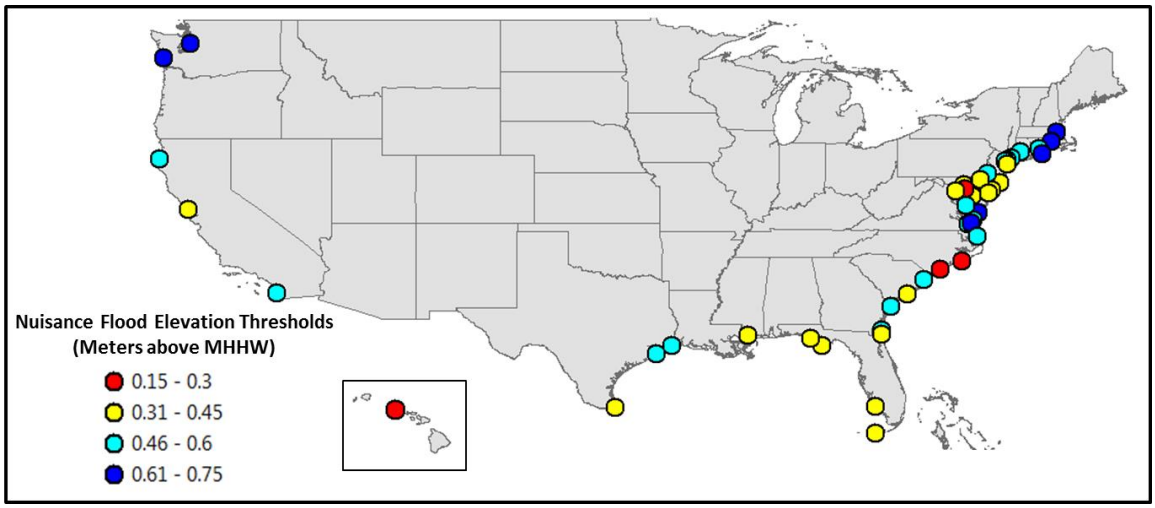

Figure 1. *NOAA water level gauges used in this study and corresponding nuisance flood level.*

Since water level record lengths vary by gauge (Table 1), an arbitrary start date of January 1, 1920 was chosen for the subsequent analysis. The 1920 start date truncates a few gauge records but ensures the majority of the other gauge record lengths are incorporated. The end date was 2013. Multiple analyses were performed and are described below. In "Findings" section, regionally representative gauge results will be highlighted to better illustrate the methods.

Cumulative Hours and Days with Nuisance Flooding

Hourly water level exceedances above the nuisance flood level are used to quantify both duration and frequency of historical impacts experienced locally. Two measures are shown in this report: 1) cumulative hours above the nuisance flood level elevation threshold during a year, and 2) number of days affected by nuisance level flooding (e.g., one day could represent one hour or an entire 24-hour period above the nuisance flood level) during a year. Henceforth, these two measures will be referred to as nuisance flood "hours" and "days," whereas when the term "event" is used, both measures are collectively being referenced, though one "day" would more closely approximate one "event." It should be noted that all exceedances above the nuisance flood level are accounted for, even the most extreme whose impacts would be considered *severe*, not *nuisance*. The daily definition as compared to the hourly summation reduces the relative contribution of severe storms exceeding the threshold for numerous hours. In semi-diurnal tidal regions (i.e., two high and two low tides a day) where two separate exceedances may occur in a day, the event is not counted twice. In both cases, results are shown only when 80% of a year's hourly data are available. In this presentation, a year is defined as a meteorological year as to not split the winter season, which tends to be the dominant storm season for much of the Northern Hemisphere in terms of atmospheric activity (e.g., Hirsch et al., 2001) and related storm surges (Sweet et al., 2011; Thompson et al., 2013). We define the meteorological year from May to April, e.g., May 2012–April 2013 is reported as year 2012. NOAA provides an inundation analysis tool allowing further frequency and duration investigation in context to this report's procedures and findings (http://tidesandcurrents.noaa.gov/inundation).

Table 1. *NOAA water level gauges, location, start of* ***analysis****, MSL trend, and nuisance flood level (m)*

	NOAA Tide Gauge	St. ID	Longitude	Latitude	Analysis Start (years)	MSL Trend (mm/yr)	Nuisance Flood Level (above MHHW)
1	Boston, MA	8443970	-71.052	42.355	1921	2.8	0.68
2	Providence, RI	8454000	-71.402	41.807	1938	2.26	0.66
3	New London, CT	8461490	-72.087	41.355	1938	2.57	0.60
4	Bridgeport, CT	8467150	-73.182	41.173	1970	2.87	0.48
5	Montauk, NY	8510560	-71.960	41.048	1947	3.2	0.60
6	Kings Point, NY	8516945	-73.765	40.810	1931	2.52	0.52
7	Battery, NY	8518750	-74.015	40.700	1920	3.15	0.50
8	Bergen Point, NY	8519483	-74.147	40.640	1981	4.93	0.52
9	Sandy Hook, NJ	8531680	-74.010	40.467	1922	4.08	0.45
10	Atlantic City, NJ	8534720	-74.418	39.355	1920	4.19	0.43
11	Cape May, NJ	8536110	-74.940	38.968	1965	4.61	0.38
12	Philadelphia, PA	8545240	-75.142	39.933	1920	3.09	0.49
13	Reedy Point, DE	8551910	-75.573	39.558	1979	3.67	0.42
14	Lewes, DE	8557380	-75.120	38.782	1920	3.46	0.41
15	Cambridge, MD	8571892	-76.068	38.573	1979	3.71	0.45
16	Baltimore, MD	8574680	-76.579	39.267	1920	3.25	0.41
17	Annapolis, MD	8575512	-76.482	38.983	1928	3.51	0.29
18	Washington D.C.	8594900	-77.022	38.873	1924	3.21	0.31
19	Wachapreague, VA	8631044	-75.687	37.607	1978	5.52	0.61
20	Kiptopeke, VA	8632200	-75.988	37.165	1976	3.57	0.48
21	Lewisetta, VA	8635750	-76.464	37.996	1970	5.59	0.46
22	Sewell Point, VA	8638610	-76.330	36.947	1927	4.58	0.53
23	Chesapeake Bay Bridge, VA	8638863	-76.113	36.967	1975	6.04	0.64
24	Duck, NC	8651370	-75.747	36.183	1978	4.58	0.55
25	Beaufort, NC	8656483	-76.670	34.720	1973	2.72	0.29
26	Wilmington, NC	8658120	-77.953	34.227	1935	2.02	0.25
27	Springmaid Pier, SC	8661070	-78.918	33.655	1977	3.62	0.58
28	Charleston, SC	8665530	-79.925	32.782	1921	3.11	0.38
29	Fort Pulaski, GA	8670870	-80.902	32.037	1935	3.01	0.46
30	Fernandina Beach, FL	8720030	-81.465	30.672	1920	2.21	0.59
31	Mayport, FL	8720218	-81.430	30.397	1928	2.43	0.44
32	Key West, FL	8724580	-81.808	24.553	1920	2.38	0.33
33	Naples, FL	8725110	-81.807	26.130	1965	2.34	0.35
34	Apalachicola, FL	8728690	-84.982	29.727	1976	1.77	0.42
35	Panama City, FL	8729108	-85.667	30.152	1973	1.57	0.35
36	Bay Waveland, MS	8747437	-89.325	30.325	1978	3.96	0.45
37	Sabine Pass, TX	8770570	-93.870	29.730	1981	5.49	0.58
38	Galveston, TX	8771510	-94.788	29.285	1957	6.61	0.60
39	Port Isabel, TX	8779770	-97.215	26.060	1944	3.79	0.34
40	La Jolla, CA	9410230	-117.257	32.867	1924	2.01	0.51
41	San Francisco, CA	9414290	-122.466	37.806	1920	2.00	0.35
42	Humboldt Bay, CA	9418767	-124.217	40.767	1977	3.93	0.56
43	Toke Point, WA	9440910	-123.967	46.707	1972	0.42	0.63
44	Seattle, WA	9447130	-122.339	47.603	1920	2.24	0.65
45	Honolulu, HI	1612340	-157.867	21.307	1920	1.24	0.22

To provide a physical basis for the trends in nuisance flood days, annual MSL values and their long-term trends are also shown. A yearly MSL value, which is an average of hourly water levels

over a year, is not reported if the gauge's hourly water level record is less than 80% for any particular year (as to synchronize with the yearly nuisance event statistics, Table 1). The annual MSL values are relative to the gauge's current MSL datum such that the values range from negative to positive with the "zero" near the current epoch's midpoint. Plotting relative to another tidal datum or epoch would have no effect on the magnitude of the SLR_{rel} trend apparent in each gauge's MSL values. The long-term SLR_{rel} trends for each gauge are listed in Table 1 and closely match those computed by Zervas (2009) and updated through 2012 at http://tidesandcurrents.noaa.gov/sltrends.

Current and 1950 Average Recurrence Interval of Daily Nuisance Flood Events

To quantify *extreme* events, extreme value statistics are employed to characterize the upper tail of a water level distribution. A common derived measure is the average recurrence interval, often termed return period, which is the inverse of the probability of exceeding a particular elevation threshold. A simple and effective method to quantify probabilities is the Annual Maximum Method (AMM), which fits a series of annual maximum water level with a Generalized Extreme Value (GEV) distribution. Zervas (2013) uses a GEV fit of annual maximum to quantify extreme characteristics at NOAA NWLON gauges (http://tidesandcurrents.noaa.gov/est). The main weakness of the AMM/GEV is that only one event per year is used, which ignores other significant events that occur during the same year and often leads to less robust results for gauges with shorter record lengths and higher frequency (<1 year) estimates of lesser extreme events.

In this report we use a Peak Over Threshold (POT)/Point Process approach, which utilizes multiple events per year to estimate the return periods for each gauge's nuisance flood level (Coles, 2001). We use the 97th percentile (%) of daily maximum water levels as the high threshold (not the nuisance level threshold) to study statistical exceedance properties. Consecutive events are filtered by a three-day window to ensure independence resulting in approximately eight events per year on average. Similar criteria were used by Mendez et al. (2006) for wave data and for water level extremes throughout the Pacific region (http://www.pacificstormsclimatology.org) as discussed in Kruk et al. (2013). It is assumed that the distribution of the number of exceedances per year follows a Poisson distribution and that the threshold excesses (y) are modeled using a Generalized Pareto Distribution (GPD) given by

$$(1) \qquad H(y,\sigma,\xi) = 1 - (1 + \xi y/\sigma)^{-1/\xi} \qquad \xi \neq 0$$
$$H(y,\sigma,\xi) = 1 - \exp(-y/\sigma) \qquad \xi = 0$$

where $\sigma > 0$ is the GPD scale parameter and ξ is the shape parameter. The combination of the Poisson and GPD models are related to GEV parameters by $\sigma = \sigma^* + \xi(u-\mu)$ with μ the GEV location parameter, u the high threshold and σ^* the GEV scale parameter and the event rate, $\sqrt{} = [(1 + \xi(u-\mu)/\sigma^*]^{-1/\xi}$. The return level, y_N, is given by Mendez et al. (2006) as

$$(2) \qquad y_N = \mu - \sigma^*/\xi\,[1-(-\log(1-q)]^{-\xi} \qquad \xi \neq 0$$
$$y_N = \mu - \sigma^* \log(-\log(1-q)] \qquad \xi = 0$$

where 1/q is the return period (years) with $0 < q < 1$. The GEV location parameter represents the median, the scale parameter (both GEV and GPD) represents the spread, and the shape parameter represents the skew of the distribution. Parameters are estimated by the maximum likelihood method, and the 95% confidence intervals are estimated via the delta method (Rice, 1994).

For the extreme value analysis, the water level data series are detrended by their local MSL trend (Table 1). Detrending normalizes the data respective to the current NTDE in order to compare events in time. To estimate current (2012) probabilities, the return level interval curves, which are valid for the mid-point (e.g., 1992) of the current epoch (e.g., 1983-2001), are raised to 2012 MSL elevations (MSL trend multiplied by 20 years). For 1950 probabilities, a gauge's return level interval curves are lowered to 1950 MSL (i.e., a height equal to its MSL trend × 42 years). Bottom left plots in Appendix 2 show the GPD Poisson model results for 2012 and 1950 and their elevation differences described here. Similar time-adjustment procedures and further method description is given by Sweet et al. (2013). The method is a quasi-nonstationary method that accounts for long-term SLR_{rel} effects, but no other time-varying considerations (e.g., Menendez and Woodworth, 2010).

Monthly Distribution of Nuisance Floods and Related Physical Forcing Processes

The monthly mean distributions of the nuisance flood hours and days are shown for a recent 30-year period (1980-2009). No attempt is made to discern whether or not seasonal-scale variability has been changing in time. In order to identify processes contributing to high water conditions, we decomposed the maximum daily water level into three components:

- A low-frequency seasonal MSL cycle component, which is similar to the amplitudes and phases of the annual (Sa) and semi-annual (Ssa) harmonic constituents and the 12-month MSL cycle derived by Zervas (2009)
- The predicted tide without the Sa and Ssa harmonic constituents included using T_tide analysis routines (Pawlowicz et al., 2002)
- The remaining NTR after the above components are removed

The maximum water level and its components are identified over the same 30-year period (e.g., 1980-2009) and for each calendar day of the year (e.g., Jan 1, 2…Dec 31). For the maximum water level and its predicted tide and NTR components, a 30-day running mean filter (smoothed) has also been applied in order to highlight patterns rather than individual event influences (e.g., Figure 3-8 in Marra et al., 2012). Subsequently, component summation is not precisely additive due to the smoothing process. But, shown with respect to the nuisance flood level, the components provide a sense of process significance during high-water formation typical for nuisance flooding events.

FINDINGS

Historical SLR_{rel} and Changing Frequencies of Nuisance Flood Events

A large spatial variability in the frequency of nuisance level flooding exists across the U.S. Figure 2a shows the average number of nuisance flood days for a recent three-year period of 2007-2009 (meteorological years: May 2007–April 2010), which corresponds to statistics shown on the NOAA Sea Level Viewer for a similar time period. It should be stressed that the elevation thresholds for minor nuisance flooding are location-specific elevations and derived empirically by NOAA National Weather Service (NWS) Weather Forecasting Offices (WFOs) for NOAA coastal water level gauges from local knowledge of impacts over time. Nuisance flood levels represent susceptibility to flooding inherent to the natural topography and hydrological conditions, as well as reflect any mitigation efforts of the human-altered environment (e.g., flood-defense and storm-water measures). Areas with higher values of nuisance flood days (>20 days) are located along the Mid-Atlantic and in the Chesapeake Bay, the coasts of North and South Carolina, and southern Texas. Not surprisingly, a strong negative correlation ($p<0.01$) exists between a gauge's number of nuisance flood days (2007-2009 mean) and its flood level elevation threshold, as shown in Figure 2b for the Northeast and Southeast regions ($R^2=0.73$). The variance accounted for by the linear regression model is smaller ($R^2=0.50$) when all gauges are included, which is a result of smaller tidal ranges (along the Gulf Coast) and lessened storm surge potential (along the West Coast) compared to the U.S. East Coast, which lessen a location's annual occurrences of exceeding its nuisance flood level.

***Figure 2**. (a) Average number of nuisance flood days between years 2007-2009 (meteorological years) that are correlated in (b) with the nuisance flood level elevation threshold by linear regression for the U.S. East Coast (NE and SE regions) gauges.*

The values shown in Figure 2 are not consistent in time. Rather, nuisance flooding has been increasing at NOAA gauges across the U.S. over the last century from increases in local MSL. Long-term changes in nuisance flood frequency occur because local SLR_{rel} raises MSL and the entire distribution of both high- and low-water events affecting higher and higher elevations in time, as illustrated at Sewells Point, Virginia (Figure 3). Trends derived from linear regression on the annual number of nuisance flood days are statistically significant at the 90% level at 41 of

the 45 gauges analyzed (Appendix 1). At the majority of the gauges analyzed (28 of 45 gauges), the rate of change of nuisance flood days has been accelerating (significant at the 90% level) over the last half-century, whereas SLR_{rel} rates have not necessarily been accelerating. Several stations not showing significant acceleration have shorter record lengths (start in 1970s) and thus may be unable to distinguish an accelerating rate of change largely initiating in the 1970s-1980s and observed at the other nearby gauges (e.g., Duck, North Carolina). The response becomes nonlinear as the water level distribution increasingly exceeds the nuisance flooding level elevation resulting in an accelerating increase of the annual number of event per year (increases in MSL result in an increasingly larger "area under the curve" that surpasses the threshold in Figure 3). In this regard, the acceleration observed (e.g., in Figures 4a, 5a, 6a) occurs in response to SLR_{rel} and not from an increasing *storminess* trend, which has been relatively unchanged within the Mid-Atlantic region over the 20th century (Zhang et al., 2000). Results of linear and quadratic regression on the number of days with nuisance flooding from 1950-2012 (or when the data record starts) are listed in Appendix 1.

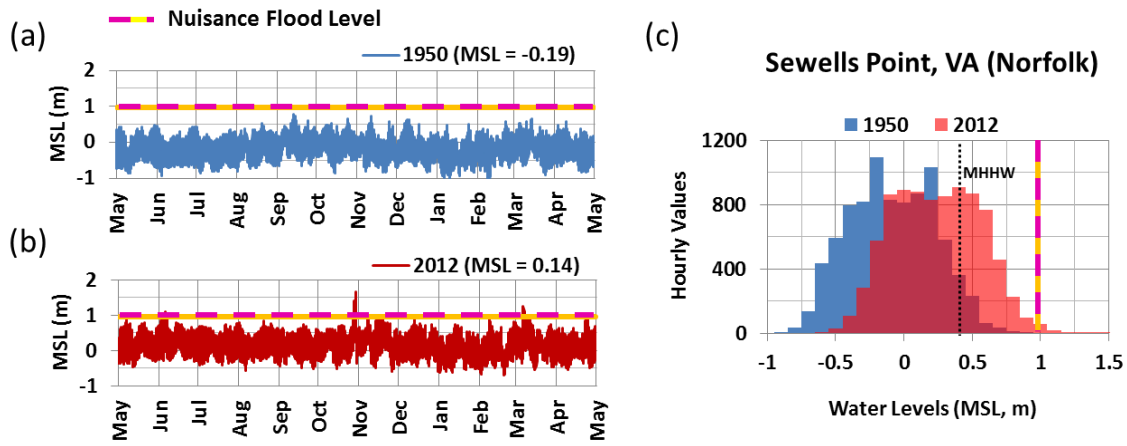

Figure 3. *Hourly water level observations at the NOAA gauge at Sewells Point (Norfolk), Virginia for (a) 1950 and (b) 2012 and their (c) yearly water level distribution plotted with the nuisance flood level elevation threshold. All figures are plotted relative to 1980-2001 MSL datum and reveal in (a) and (b) a monthly spring-tide influence and a few discrete storm events. Readily apparent in c) is the increase in MSL (change of distribution center relative to "0," which is the 1983-2001 epoch MSL datum elevation) between 1950 and 2012.*

There are regional rate-of-change patterns around the U.S. The following sections provide regional views of historical nuisance flood patterns, the low-lying areas within the region potentially susceptible to nuisance level flooding, and representative gauges for closer result inspection. Gauge-specific results are listed in Appendix 2.

U.S. Northeast (NE) Coast. There has been a significant increase of nuisance flooding occurrences along the U.S. NE Atlantic Coast (Figure 4b) largely in response to high regional SLR_{rel} rates (approximately 3-5 mm/yr) from vertical land subsidence (Boon et al., 2010; Zervas et al., 2013) most notable in the Mid-Atlantic region and lower Chesapeake Bay. In the last several decades, there has been a rate increase of nuisance flood days (Ezer, 2014) with 19 of the 23 NOAA gauges experiencing an accelerating response (Appendix 1). This nuisance flood frequency rate increase may reflect multi-decadal rate increases in regional SLR trends (Ezer and

Corlett, 2012; Boon 2012) associated with Gulf Stream system dynamics (Sallenger et al., 2012; Knop, 2013), though it is unclear if this regional SLR is from a direct transport slowdown or interaction with Mid-Atlantic Bight Slope Current (Ezer et al., 2013; Rossby et al., 2014). The New England gauges are an exception, with a lower event frequency, likely due to higher nuisance flood level threshold elevations (Figure 1), supportive of recent analysis by Kriebel and Geiman (2013). Figure 4a indicates (in red) the topography at or below nuisance flood level elevations.

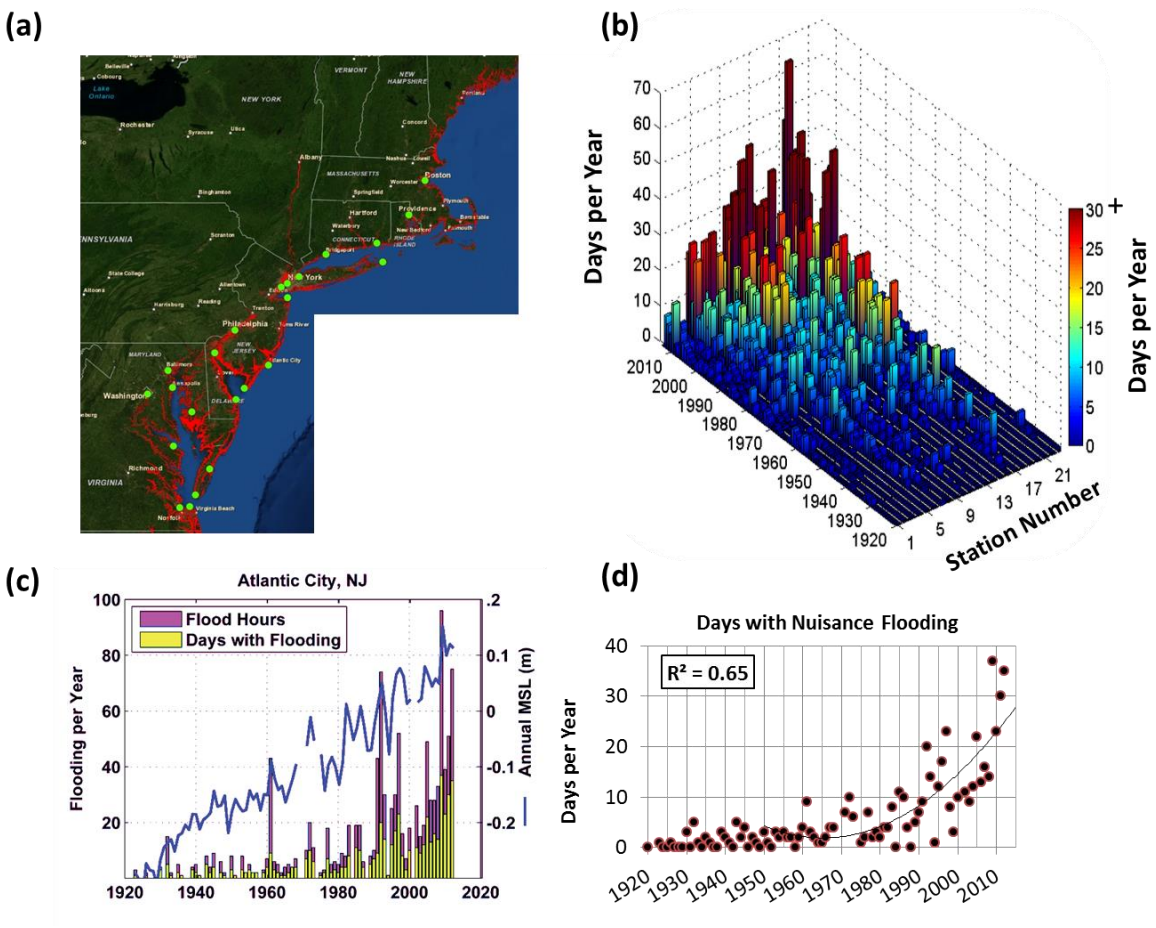

Figure 4. *(a) Northeast U.S. coastal topography at or below nuisance flood level elevations (image from "Flood Frequency" tab of NOAA Sea Level Viewer with NOAA gauges (green) used in this study). Shown in (b) are days per year (color bar not the same scale as "Days per Year" axis) with nuisance flooding at 23 gauges from Massachusetts to Virginia and (c) specifically at Atlantic City, New Jersey (gauge 10) plotted with annual average MSL. In (d) is a scatter plot of nuisance flood days at Atlantic City, New Jersey fitted with a quadratic curve starting in year 1950.*

Data from the NOAA gauge (number 10) at Atlantic City, New Jersey is provided as a regionally representative gauge. In Figure 4c, nuisance flood hours and days at Atlantic City, NJ are shown plotted with the annual average MSL. A high SLR_{rel} trend exists at this location (4.19 mm/yr, Table 1) with noticeable interannual MSL and nuisance-event variability (discussed below in "…year-to-year differences…" section). Nuisance flood days per year, which are shown as a

scatter plot in Figure 4d, can be seen to accelerate since the 1980s when fitted (R^2=0.65) with a quadratic curve for the 1950-2012 period.

U.S. Southeast (SE) Atlantic Coast. Large regions of the U.S. Southeast Atlantic Coast are susceptible to nuisance level flooding (Figure 5a), occurrences of which have been readily increasing since the 1980s (Figure 5b). In fact, five of the eight NOAA gauges are now on an accelerating nuisance flood frequency trajectory (Appendix 1). Local rates of $SLR_{rel,}$ which largely reflect differences in vertical land subsidence rates, are variable (approximately 2-3 mm/yr; Zervas et al., 2013) with locally higher rates at Springmaid Pier, South Carolina (possibly related to a datum shift and/or questionable monthly MSL records) and Duck, North Carolina (possibly related to its short data record length). The large increases in nuisance flood events found in Charleston, South Carolina and Fort Pulaski, Georgia reflect higher SLR_{rel} rates, whereas at Beaufort and Wilmington, North Carolina, lower nuisance flood level thresholds themselves are a factor. In this region, sea levels are affected by the Gulf Stream system (e.g., Florida Current), whose seasonal variability influences the MSL cycle and short-term perturbations contribute to nuisance flood event formation (Sweet et al., 2009). However, there is no known evidence of SLR_{rel} trends increasing in this region over the last several decades. Data from the NOAA gauge at Charleston, South Carolina (Figure 5c), however, clearly shows the acceleration in nuisance flood days since the 1980s (Figure 5d).

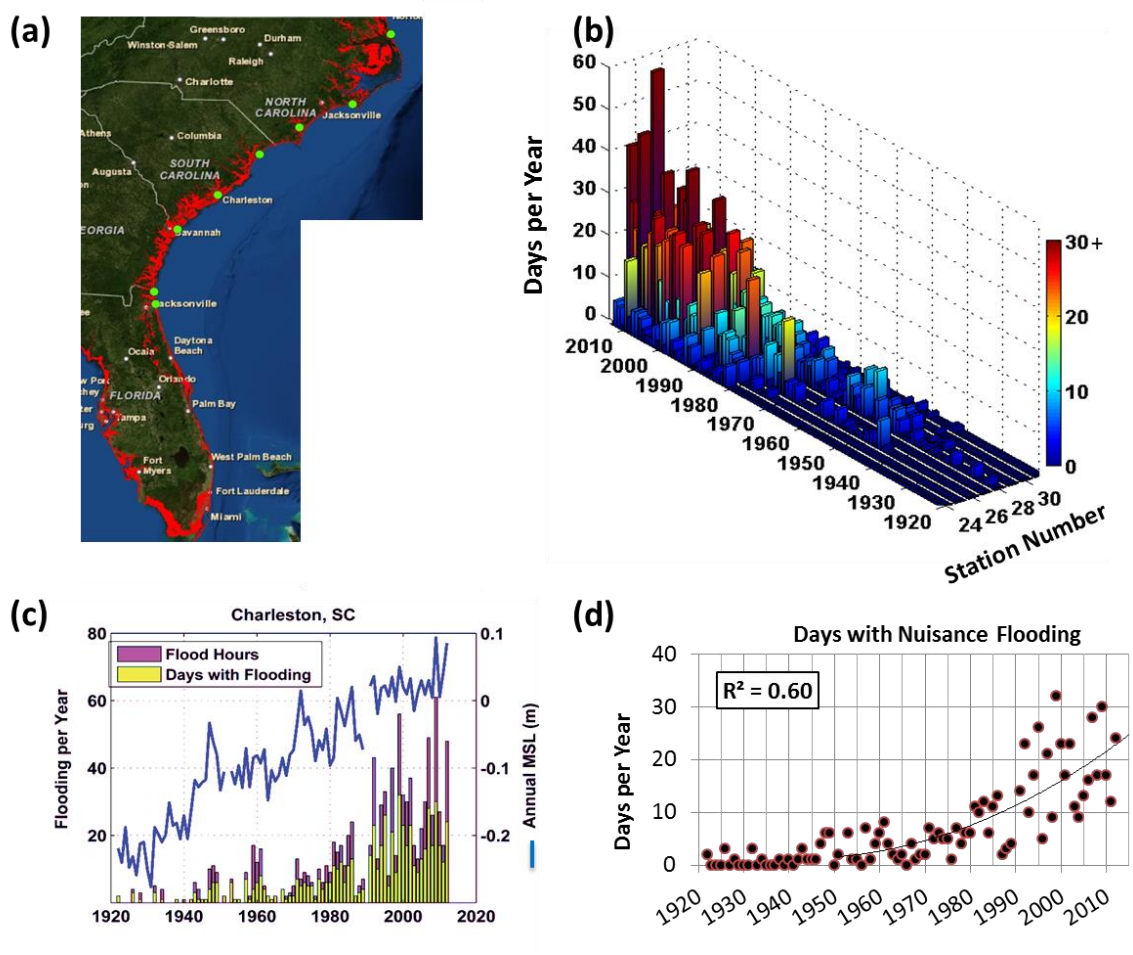

Figure 5. *As in Figure 4, but for the Southeast U.S. coastline that includes 8 NOAA gauges (24-31) between North Carolina and the Atlantic coast of Florida. Nuisance flood events are shown for Charleston, South Carolina* (gauge 28) *in (c) and (d).*

U.S. Gulf Coast. Along Texas and Louisiana, SLR_{rel} rates are often very high (approximately 5-10 mm/yr) due to land subsidence, which is highest regionally along the Mississippi River Delta and in areas affected by human-induced factors such as subsurface freshwater and oil withdrawal (Holzer and Galloway, 2005). The number of days with nuisance level flooding has also been increasing (Figure 6b), with four of the eight NOAA gauges undergoing response acceleration (Appendix 1), affecting highly developed as well as less-developed regions (Figure 5a). The gauges with highest SLR_{rel} (Galveston and Sabine Pass, Texas) do not, however, correspond to the gauges with the current highest number of nuisance events (Figure 2), since their nuisance flood level elevations are higher (Figure 1). It is possible that the higher levels reflect current flood defense mitigation measures. The NOAA gauge at Naples, Florida shows recent multi-decadal increases in nuisance flood hours and days (Figure 6c) similar to the Atlantic regions, though with large interannual variability (Figure 6d).

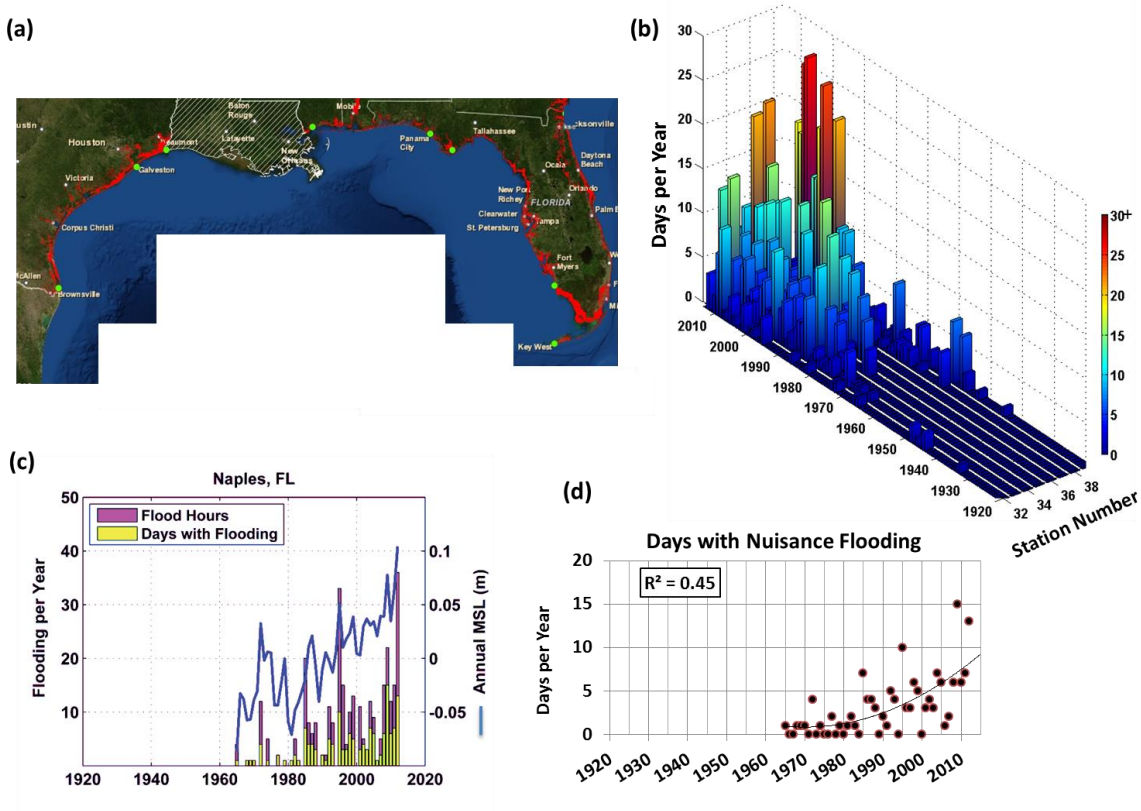

Figure 6. *As in Figure 4, but for Gulf Coast that includes 8 NOAA gauges (32-39) between Florida and Texas. Nuisance flood events are shown for Naples, Florida (gauge 33) in (c) and (d). Note, Louisiana has not yet been mapped by the NOAA Sea Level Viewer and is shown with cross-hashes.*

U.S. West Coast. Along the U.S. West Coast, long-term SLR_{rel} rates are generally less than along the Gulf and East Coasts (Table 1). Here, vertical land subsidence is not a significant contributor and there has also been a small apparent decrease in SLR rates over the last several decades (NRC, 2012). This slowdown is attributed to a wind-forced response associated with the negative phase of the PDO (Bromirski et al., 2011), also involved in recent SLR rate increases within the tropical western Pacific basin (Merrifield et al., 2012). Another important factor is that ENSO drives large year-to-year MSL variability, such as the MSL rise during the last strong El Niño event in 1997 (discussed below in "…year-to-year differences…" section). As such, the trend in nuisance flood days has been more gradual since the 1980s as compared to other regions (Figure 7b). The West Coast is unlike the Gulf and East Coasts with its narrow continental shelf that prohibits large wind-driven storm surge setups and has steeper inland topography, which limits the amount of land exposed to potential coastal flooding (Figure 7a). However, this region does have a significant wave climate and is susceptible to wave impacts (Ruggiero, 2013), whose effects are generally not measured by gauges and not necessarily associated with *tidal nuisance flooding*. The high values in Figure 7b occur at NOAA gauge 45 in Honolulu, Hawaii, which is in the middle of the North Pacific Ocean, and reflect its lower nuisance flood elevation threshold (Table 1). In Figure 7c, nuisance flood hours and days at La Jolla, California are shown. The MSL plot (blue line in Figure 7c) reveals the timing and extent of the apparent SLR slow-down starting in the 1980s. Large year-to-year variability can be observed in both MSL and nuisance

event frequency and reflects ENSO-forcing. The scatter plot shown in Figure 7d reveals a linear increase over time, but is quite noisy (lower R^2 values) due to the interannual variability.

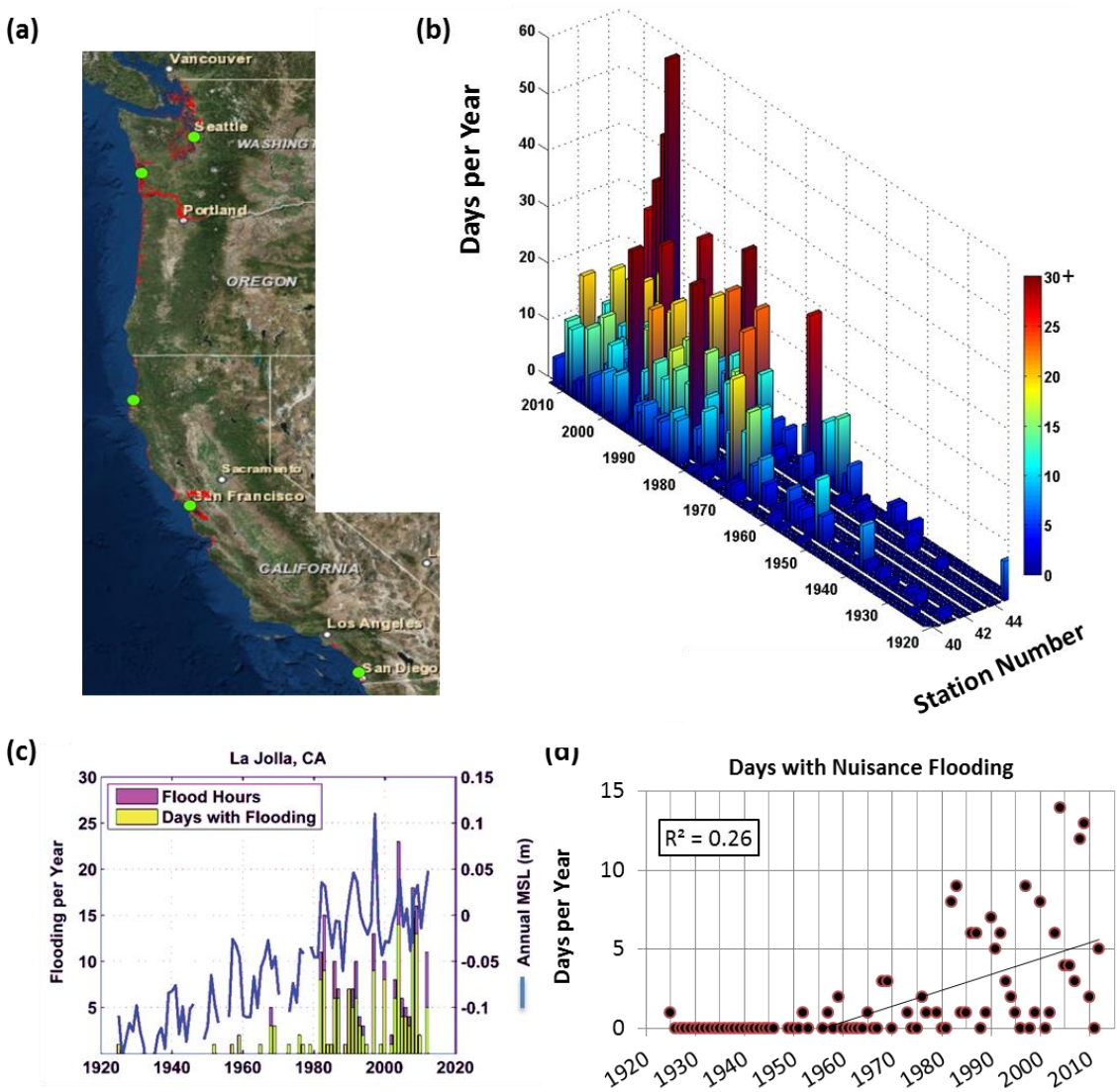

Figure 7. *As in Figure 4, but for U.S. Pacific coastline that includes 5 NOAA gauges (40-44) between California and Washington and gauge 45 at Honolulu, Hawaii (not shown in (a)). Nuisance flood events are shown for La Jolla, California (gauge 40) in (c) where the number of days per year with nuisance flooding is best fit by linear regression.*

Historical SLR_{rel} and Changing Nuisance Flood Event Probabilities

Here we examine how nuisance level events have changed over time in terms of their probability of recurrence (bottom left plots in Appendix 2), since this type of estimate is useful for risk-exposure planning (Marbaix and Nicholls, 2007). In the mid-20th century (e.g., the year 1950) when MSL was lower, a more extreme event would have been required to drive water levels to the nuisance flood level elevation. In 1950, events causing nuisance flooding generally had

return periods between approximately 1-5 years (black dash and yellow-magenta dash line intersections in Appendix 2 plots; Figure 8b). Since then, SLR_{rel} has increased the reach of high tides (i.e. MHHW tidal datum elevation) and lesser-magnitude storms can more readily cause observable impacts. By 2012 (Figure 8a), the probabilities of a nuisance flood event have increased throughout much of the U.S., with return periods typically <0.25 year (3 months) at most NOAA gauges.

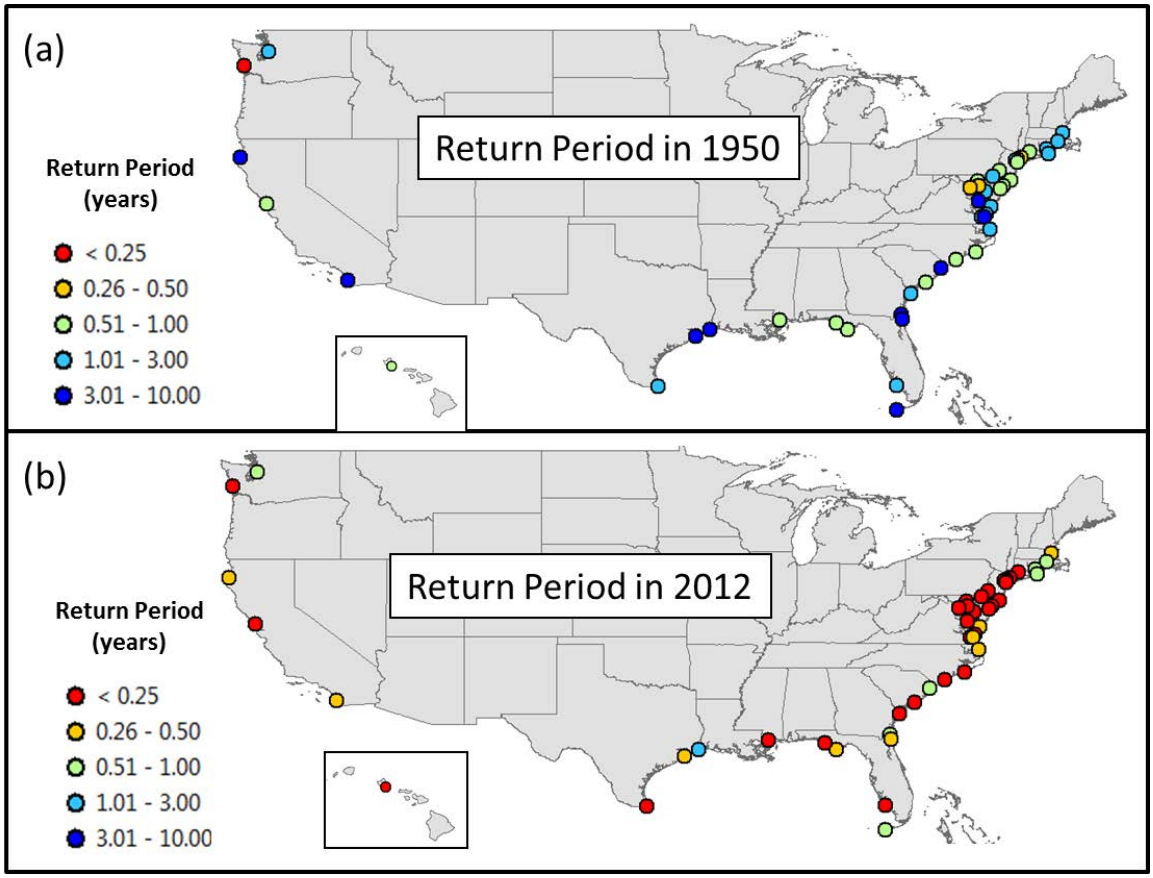

Figure 8. *Return Periods of nuisance level flood events in (a) 1950 and (b) 2012 at NOAA gauges.*

Patterns Associated with Year-to-Year Differences in Nuisance Flood Frequency

Superimposed upon the long-term changes in nuisance flood frequencies are noticeable year-to-year variability present across the regions. Year-to-year variability occurs in response to prolonged regional-scale MSL changes and/or differences in typical storm-track patterns (i.e., *storminess*). Diagnosing physical drivers of each gauge's response is beyond the scope of this report. However, there are some broad and recognizable patterns in both MSL and nuisance flood event frequency (Figures 4-7; Appendix 2) related to ENSO. We use the Oceanic Niño Index (ONI) since it is operationally tracked and updated by NOAA (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears).

Along the U.S. West Coast, NOAA gauges' MSL vary coherently (Chelton and Davis 1982) with high (low) MSL and number of days with nuisance flooding corresponding to ENSO warm

El Niño (cool La Niña) like conditions (e.g., Figure 7b). Recent pronounced El Niño events occurred during the years (meteorological) of 1972, 1982, 1986/87, 1991, 1997, 2004 and 2009 (Figure 9a). El Niño is characterized by a deepened thermocline along the eastern Pacific boundary off of the U.S. West Coast from poleward-propagating Kelvin waves and wind-forced shelf processes resulting in an elevated sea level anomaly for months at a time (Enfield and Allen, 1980; Chelton and Davis, 1982; Miller et al., 1997). During a pronounced El Niño, nuisance flooding often occurs during periods of elevated perigean-spring (aka "King") tides. Conditions during notable La Niña, such as 1984, 1988, 1998-2000, 2007 and 2010/11 are characterized by lower MSL and less nuisance flooding. Figure 9a illustrates the U.S. West Coast MSL-ENSO relationship with data from the NOAA gauge in San Francisco, CA. It can be seen that MSL, which has been detrended by its long-term SLR_{rel} rate and smoothed by a 5-month running mean filter, changes according to ENSO phase by 10-20 cm in magnitude. Close inspection of Figure 7c (and other West Coast gauges in Appendix 2) shows a similar pattern of elevated (lower) MSL and number of days with nuisance level flooding during warm or El Niño (cool or La Niña) conditions. The ENSO relationship is slightly obscured by the effect of the SLR_{rel} trend itself, which gradually elevates MSL, thereby increasing the likelihood of more days above the nuisance flood level in time.

Although ENSO does not have a direct oceanic impact along the U.S Northeast Coast as it does along the West Coast, a global *teleconnection* (e.g., atmospheric-to-oceanic) impact is felt. ENSO has been shown to affect year-to-year differences in frequency of winter extratropical storms (Hirsch et al., 2001; Eichler and Higgins, 2006). Storms tend to have an increased (decreased) likelihood to track northeastward along the U.S. East Coast during the warm (cool) ENSO phase, more heavily impacting the coastal regions north of Cape Hatteras, NC (Eichler and Higgins, 2006; Thompson et al., 2013). Sweet and Zervas (2011) showed that during cool months (October–April) of stronger El Niños since 1960, there was a much higher incidence of days with average NTR (approximate storm surge) values >0.3 m (approximately1 foot) and higher MSL along the Mid-Atlantic Coast than during neutral or cool La Niña-like conditions. This occurred in response to changes in regional sea level pressure fields over Eastern Canada and the Gulf of Mexico, which steered a more zonal jet stream and extratropical storm track along the East Coast and strengthened the northerly component of the prevailing wind fields off the U.S. Northeast Coast. An annual (meteorological) count of daily mean NTR values >0.3 m is shown at Sewells Point, Virginia (Figure 9b) to illustrate the relationship found by Sweet and Zervas (2011). Similar NTR results exist at other Mid-Atlantic locations, and this pattern increases the likelihood for nuisance level flood events independent of spring high-tide synergy. At Atlantic City, New Jersey (Figure 4c) and elsewhere along the mid-Atlantic Coast (Appendix 2), years of stronger El Niños (listed above) are associated with elevated MSL and progressively higher incidences (i.e., also affected by SLR_{rel} trend) of nuisance flood events.

Along the Southeast Atlantic Coast, the annual MSL and nuisance level event response to ENSO are less defined, and they are largely unrecognizable along the Gulf of Mexico Coast. However, during the last strong El Niño in 2009, many gauges showed a similar response (i.e., elevated MSL and/or nuisance flood events) though not necessarily from the same underlying processes. In these regions as well as the Northeast Coast, MSL and nuisance flood frequencies have remained elevated since the 2009 El Niño. Within the Northwest Atlantic Ocean (region offshore U.S. Northeast Coast), significant sea surface warming has occurred since 2000 and has been exceptionally warm since 2012. This ocean warming is associated with the mostly concurrent

negative phase of the North Atlantic Oscillation (NAO) (Xue et al., 2013) coupled with an observed northward shift in the jet stream and reduced evaporative cooling (Chen et al., 2014) whose net effect has deepened the thermocline and raised sea surface heights. The East Coast warming may also be linked to the multi-decadal rate increases in regional mean SLR trends (Ezer and Corlett, 2012; Boon 2012) and Gulf Stream system dynamics (Sallenger et al., 2012; Knop, 2013).

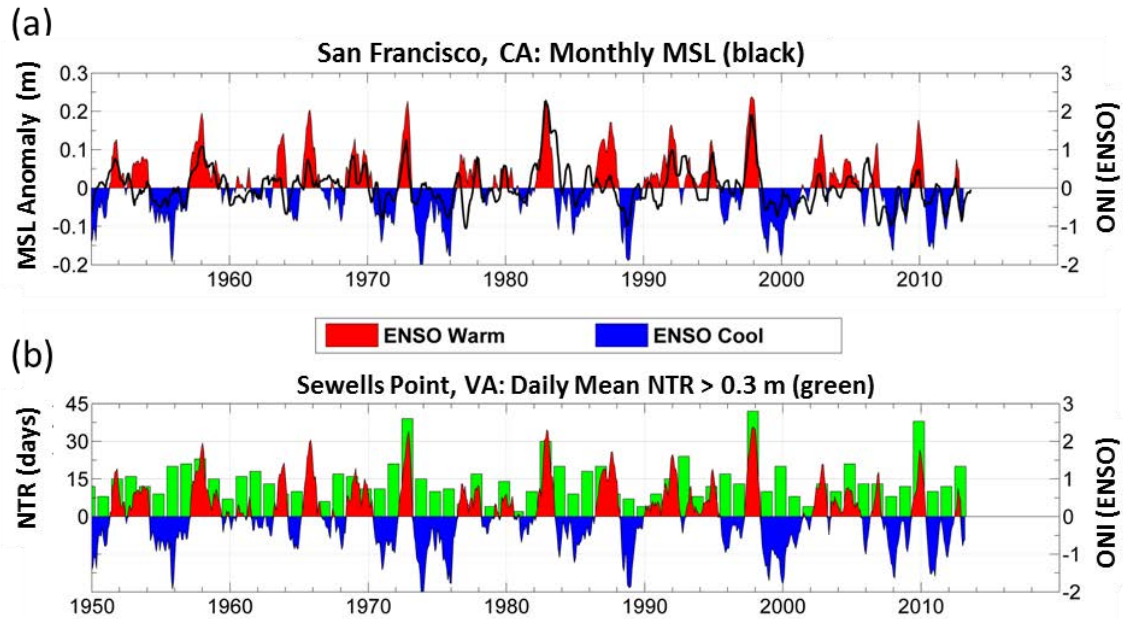

Figure 9. *The Oceanic Niño Index (ONI) plotted with (a) monthly MSL (black line) from San Francisco, California that has been detrended and smoothed by a 5-month running filter and (b) annual counts of daily average nontidal residual (NTR; green bars) > 0.3 m at Sewells Point, Virginia.*

Seasonal Pattern of Nuisance Flood Events and Underlying Processes

In the preceding sections, we show nuisance flood event frequencies increasing in time from SLR_{rel} with large year-to-year variability from MSL and/or storminess changes often related to ENSO. Here, we provide mean climatology patterns for 1980-2009 that describe typical timing of nuisance events during a year. We make no attempt to assess if intra-annual changes are occurring in terms of seasonal MSL changes within the Gulf of Mexico (Wahl et al., 2014). Figure 10 shows the season with the most occurrences of nuisance flood days. Regional differences include a winter-time maximum along the Northeast and Pacific Coasts and a fall-time maximum along the Mid-Atlantic, Southern, and Gulf Coasts. Regionally representative gauges are examined in Figure 11 to assess how the phasing (timing) of low and high-frequency NTR and tidal processes contribute to high-water formation and lead to nuisance flooding. Figures for all gauges are shown in Appendix 2.

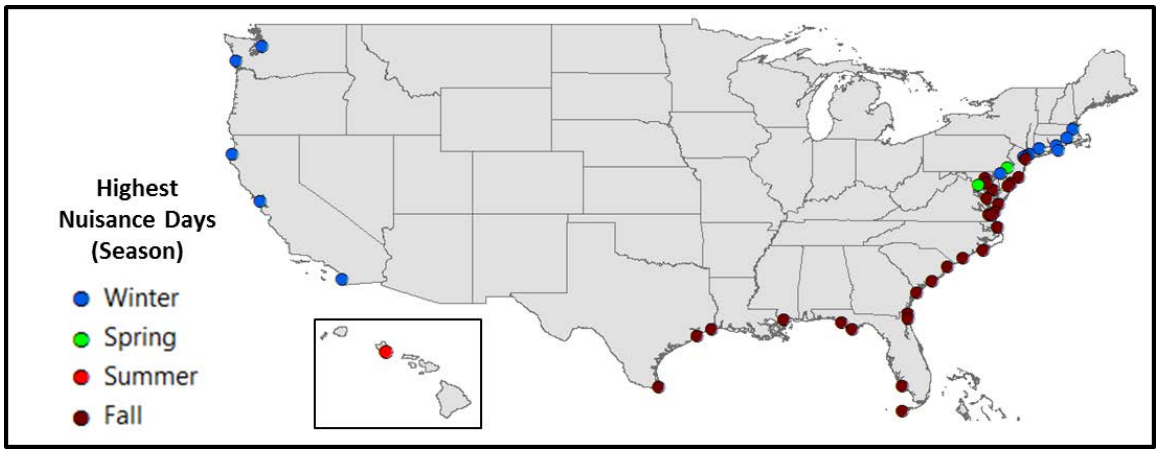

Figure 10. *Season with highest frequency of nuisance flood days over the 1980-2009 period as shown for each NOAA gauge in Appendix 2.*

The season with highest nuisance event frequency reflects upon one or more regionally significant processes. Along the Northeast Atlantic Coast, the winter-time maximum occurs in response to northeasterly wind storm event (nor'easters) forcing, which is highest between late fall and early spring (Hirsch et al., 2001). As such, NTR frequency and magnitude are enhanced, as is the frequency of nuisance flood events along much of the mid-Atlantic. This pattern is highlighted at the Battery, New York, where a >30 cm changing NTR cycle (green line, Figure 11a) outweighs the approximately 15-cm MSL cycle (blue dash), which is out of phase to the NTR cycle and forms in response to seasonal heating (e.g., coldest in winter, warmest by late summer). The tide component shows little seasonal variability in its tide range (blue line is fairly flat). Two NOAA gauges (Washington D.C. and Philadelphia, Pennsylvania), whose levels are influenced by riverine discharge, reveal spring-time maxima (Figure 10, green dots) associated with increased river flows.

Along the Southeast Atlantic Coast, nor'easters as well as the infrequent hurricane strike can elevate sea level; however, typically their NTR signal is less frequent or short-lived, and the net contribution (e.g., after 30-day filter smoothing) is less pronounced than in the Northeast. The transition to a fall-time maximum southward along the East Coast (Figure 10) occurs largely in response to changing strength and phasing of the MSL cycle. The MSL cycle has a prominent peak in mid-fall, which is ≥0.25 m higher than in mid-winter (blue dash, Figure 11b). The fall-time maximum in the MSL cycle enables modest storm surges to more readily produce nuisance level events. Similar to the Northeast, the spring tide range has little seasonal variability.

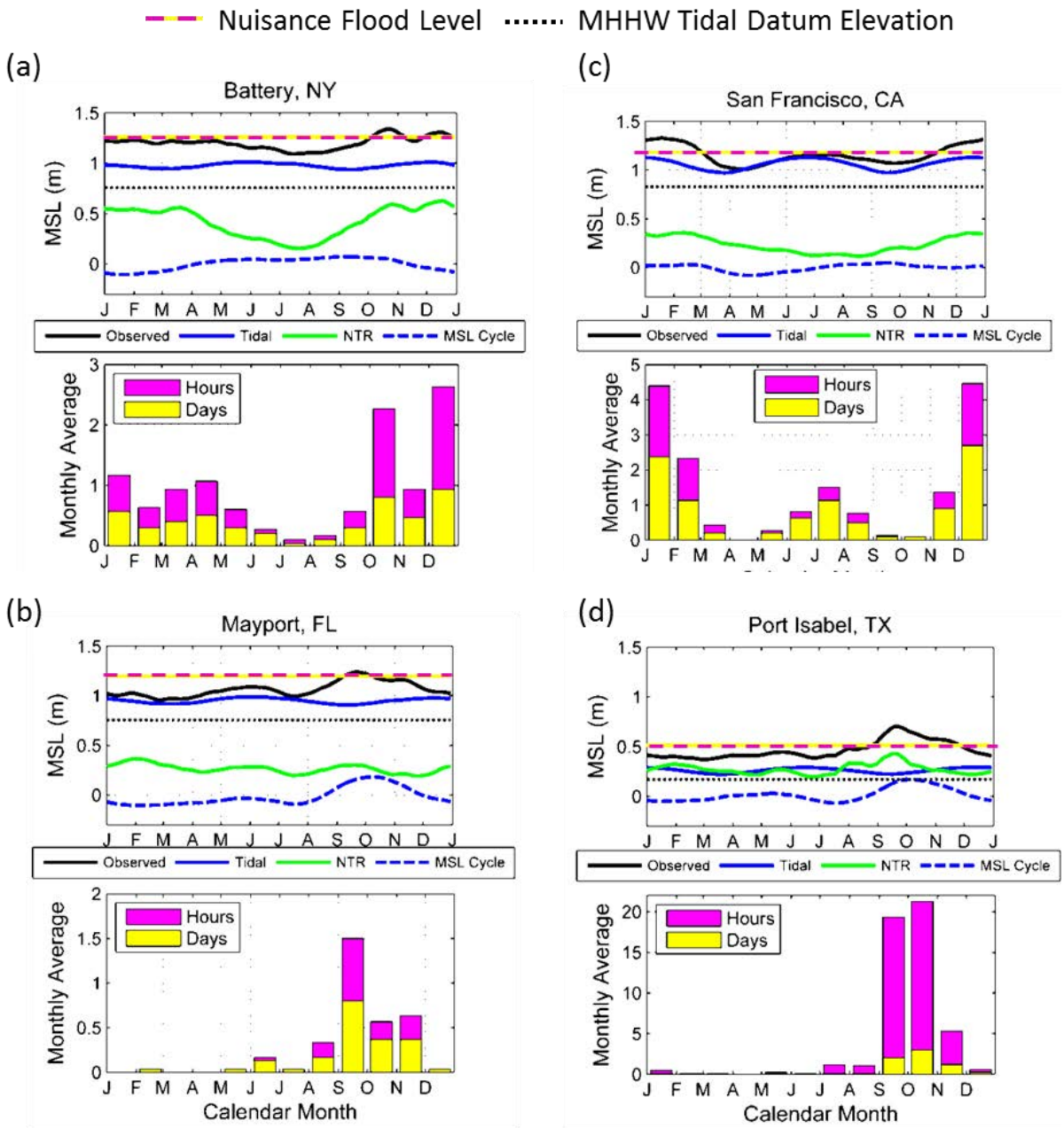

Figure 11. *Maximum observed water levels per calendar day over the 1980-2009 period decomposed into a low-frequency MSL cycle, predicted tide (without the annual and semi-annual harmonic fits) and remaining nontidal residual (NTR) all smoothed by a 30-day running filter shown for (a) the Battery, New York, (b) Mayport, Florida, (c) San Francisco, California and (d) Port Isabel, Texas. All series are relative to their station MSL datum and plotted with the nuisance flood level (yellow-magenta line) and MHHW datum elevation (black dot-dash). In the bottom plots, the number of nuisance flood hours and days (shared y-axis) are averaged by calendar month between 1980 and 2009.*

Along the Gulf Coast, the NTR is a more significant high water contributor, similar in magnitude to the rather small tide range. Similar to the Southeast Atlantic Coast, the NTR reveals little seasonal variability, except for the infrequent fall-time NTR spike associated with tropical storms (see Appendix 2 for gauges with much higher nuisance hours than impacted days). Also,

the MSL cycle is quite pronounced and similar in magnitude to the NTR. Collectively, the MSL cycle and NTR patterns create the observed water level maxima (black line) in the fall, exacerbating hurricane impacts and the frequency of nuisance flood events. Similar to the Southeast and Mid-Atlantic Coasts, where seasonal changes of the Gulf Stream System drive concurrent geostrophic-related MSL changes along the Mid-Atlantic (Sweet et al., 2009; Ezer et al., 2013), the annual cycles of MSL in the Gulf and Loop Current System also co-vary. Figure 12a shows an inverse relationship between seasonal cycles of MSL at Mayport, Florida and Port Isabel, Texas (some apparent lag) and volume transport (in Sverdrup, Sv = 10^6 m^3/sec) of the Florida and Yucatan Currents (data: www.aoml.noaa.gov/phod/altimetry/cvar), which feed the Gulf Stream and Loop Current, respectively. MSL and volume transport are computed using data from 2000-2009 and are shown relative to their mean value over this period.

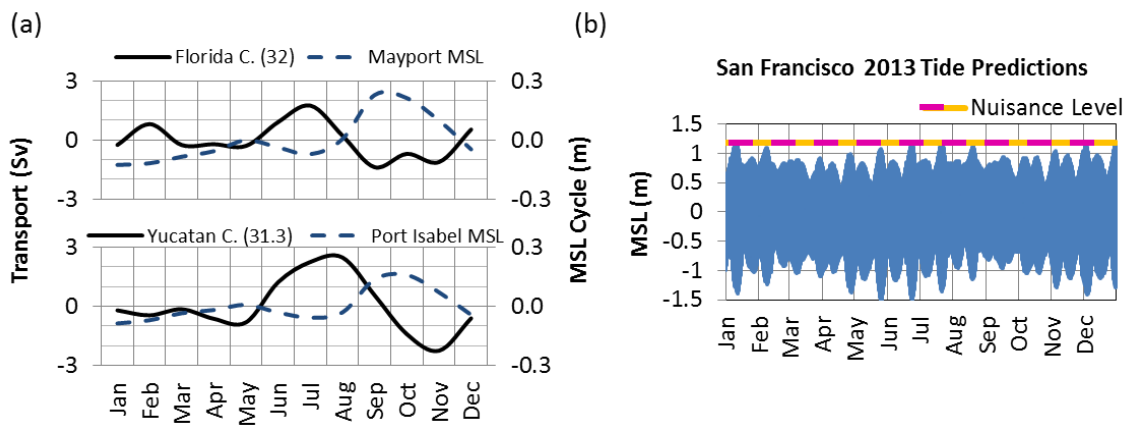

Figure 12. *(a) Monthly mean volume transport of the Florida and Yucatan Currents over the 2000-2009 with their means in parenthesis that reveal a geostrophic-related inverse relationship to MSL cycle at Mayport, Florida and Port Isabel, Texas, respectively. In (b) are hourly astronomic tide predictions for San Francisco, California showing semi-annual spring tide strengthening during the winter and summer solstice time frames, which reach the nuisance flood level.*

Along the West Coast, the spring-tide range is a more substantial component than along the East or Gulf Coasts. The tide cycle has a larger (15 cm at San Francisco in Figure 11c) semi-annual strengthening near the times of perigean spring tides during the winter and summer solstices (Figure 12b), which is typical for much of the Northern Pacific Ocean (Merrifield et al., 2007). Regionally, the MSL annual cycle has a spring-time low from wind-driven upwelling. The NTR component is elevated during the fall-spring stormy season, and more so along the Pacific Northwest Coast (Allan and Komar, 2006), where winter storms track east from the Aleutian Low atmospheric center of action. But, compared to the other regions, the NTR is generally of less significance than the tide contribution due to the narrow continental shelf along the West Coast that inhibits the wind-driven component of storm-surge buildup. Large wave events typically cause most impacts along the West Coast and Pacific Islands (Ruggiero, 2013; Hoeke et al., 2013). In response, nuisance flood events are more frequent at times of highest "king tides" along the West Coast and Pacific, and more so in the winter, due to the addition of the higher NTR contribution.

A ratio comparing the mean of the NTR contribution (green line) and the maximum water level observation (black line in top plot of Figure 11) is helpful in assessing the significance of

individual components of high-water and nuisance flooding. A low ratio, as described by Marra et al. (2012) and Merrifield et al. (2013), helps identify regions where the tide range is a much larger contributor than the NTR magnitude (Figure 13a). These regions include the West Coast (and Honolulu) where the NTR component is small (narrow continental shelf), as well as sections of the Southeast and Northeast Atlantic Coast, where the tide range is large. Mid-Atlantic gauges have larger NTR components and mid-range valued ratios (e.g., due to nor'easter storm surges along a wide continental shelf). The Chesapeake Bay and the Gulf of Mexico Coasts have large ratios, higher relative importance of the NTR compared to the tidal range.

The ratio in Figure 13a can also be used to help predict when a nuisance flood might form; regions where the ratio is small, higher tides tend to be the event driver, whose timing is readily predicted by NOAA (e.g., http://tidesandcurrents.noaa.gov/tide_predictions). In other regions, higher NTR contributions generally occur concurrently. A "NTR of concern" (Figure 13b) provides an estimate for the 1980-2009 period of the height of the nuisance flood level (yellow-magenta line) above the mean tide height (blue line) during maximum water level (smoothed, black line), as shown in Figure 11 and in Appendix 2. A smaller value in Figure 13b is of more concern because less *freeboard* exists.

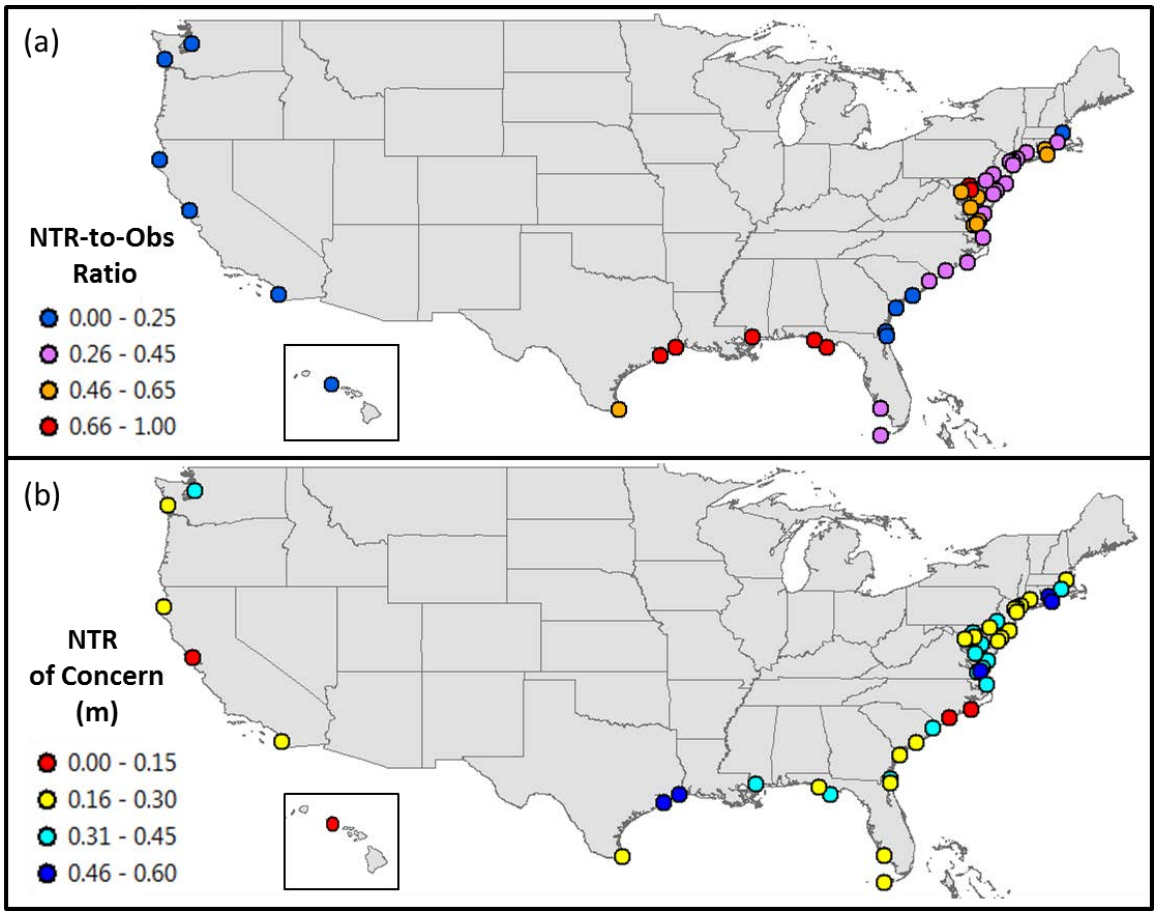

Figure 13. *Calendar-day maxima over 1980-2009 (i.e., as shown in top plots of Figure 11a-d) are averaged to estimate (a) a ratio between the average of the NTR during (divided by) maximum water level and (b) the distance between the NOAA gauge's nuisance flood level and the average tidal contribution during maximum water level.*

CONCLUDING REMARKS

NOAA water level gauges have been measuring water levels around the U.S. for over a century. Their observations clearly show that much of the U.S. is experiencing long-term SLR_{rel} (http://tidesandcurrents.noaa.gov/sltrends), which has been steadily increasing the effects of extreme events through time and exacerbating their frequency relative to fixed elevations. What is becoming more noticeable and widespread are the high-tide flood events that many coastal regions are now perennially experiencing. These impacts *today* are generally minor, localized and a *nuisance* to the communities in which they occur. These events are typically recognized as repetitive flooding of coastal roadways and private and commercial properties during certain times of the year. When concurrent with localized rainfall or a wind-forced storm surge, impacts are worse, overwhelm storm water drainage systems and further stress other vulnerable public works (http://csc.noaa.gov/tidalfloodingvis). The extent and frequency of nuisance tidal flooding is of growing concern due to on-going SLR_{rel} and likely future rate acceleration from ocean heating and land-ice melt (Church et al., 2013; Parris et al., 2012).

In this report we show that the duration and frequency of nuisance-tidal flooding is intensifying around the U.S. We use the NOAA NWS WFO "minor" threshold elevation for coastal flooding impacts as our *nuisance flood level*, which have been empirically calibrated to specific water level gauge elevations based upon local historical impact monitoring. Moderate and major impact thresholds are also assigned by NOAA NWS WFOs (http://water.weather.gov/ahps). There are approximately 75 NOAA gauges around the U.S. with empirically defined flood level thresholds, and of those, we analyze 45 gauge records (including one gauge in Honolulu whose level is defined locally by PacIOOS researchers). The coastal regions potentially exposed to flooding at these elevations are shown under the "Flood Frequency" tab of the NOAA Sea Level Viewer (http://csc.noaa.gov/slr/viewer/).

We derive two measures—cumulative duration (hours) and number of days exceeding the nuisance flood level threshold per year—to provide estimates of *today's* impact rate and how this rate has grown in time. We note several regionally consistent relationships (below).

Relationships of societal importance

1. *The lower the threshold, the higher the yearly frequency of nuisance flooding events.* The annual number of days currently (2007-2009 average) impacted by nuisance level flooding is highly (negative) correlated to the height of the flood threshold elevation (Figure 2b).

2. *The frequency of nuisance flooding events is increasing and accelerating in many locations.* The annual number of days impacted by nuisance flooding is increasing at an accelerated rate along much of the U.S. East and Gulf Coasts.

3. *The rate of (above) acceleration is higher as the gap lessens between the local flood threshold elevation and MHHW.* Acceleration (quadratic) constants characterizing how nuisance flood days change over time (Appendix 1) versus the nuisance flood levels reveals a strong negative correlation ($p<0.01$) for East Coast gauges (Figure 14).

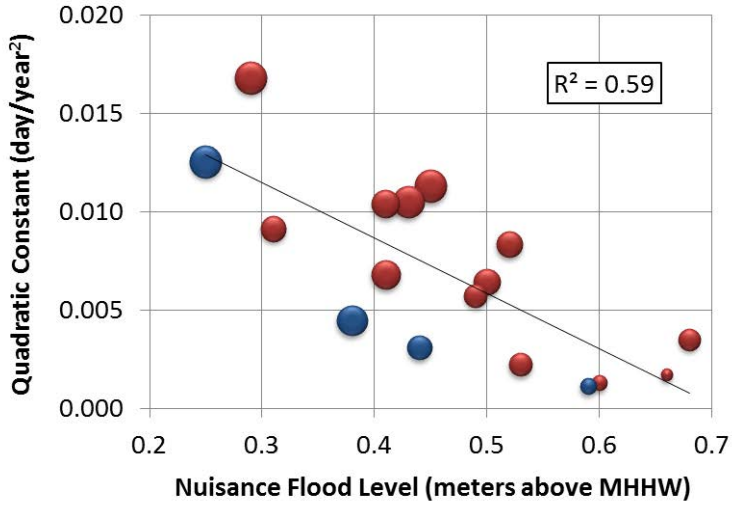

Figure 14. *Bubble plot of nuisance flood level (x-axis) versus quadratic constant (b_2; y-axis) from fit of annual number of nuisance flood days listed in Appendix 1 for East Coast (NE region in red and SE region in blue) gauges. Bubble size represents the goodness-of-fit (R^2) of each quadratic model fit. Only gauges with significant quadratic fits and hourly data starting prior to 1960 (Appendix 1) are included to minimize quadratic curve-fitting discrepancies due to gauge record length.*

Relationship (3) occurs as SLR_{rel} increases the rate of annual-event exceedances above the elevation thresholds characterized by exponential growth in the water level distribution (e.g., elevations between the nuisance flood level and MHHW in Figure 3). Relationship (2) depends upon the extent of annual variability in local MSL respective to a gauge's SLR_{rel} trend. The West Coast is different than the Gulf and East Coasts due to direct forcing of ENSO, which creates prolonged changes in MSL with large year-to-year variability. Strong El Niños like the 1982 and 1997 events (meteorological years) drive 0.2-0.3 m MSL anomalies for months (e.g., Figure 9, though MSL has been smoothed) and a spike in days with nuisance level flooding (e.g., Figure 7c). Moreover, since the last strong 1997 El Niño, MSL along the West Coast has remained relatively stationary due in part to PDO-related factors (Bromirski et al., 2011) and changes in nuisance flood event frequency, which is best characterized as a linear increase with higher signal variance (lower R^2). Along the U.S. East Coast, strong El Niños increase storm-surge frequency (Sweet and Zervas, 2011; Thompson et al., 2013), but MSL is less affected, typically though the preponderance of storm surges. But, East Coast MSLs have been steadily increasing over the last several decades (e.g., Figure 3c), and the event rate of nuisance flood events is accelerating and well characterized by a quadratic relationship (Appendix 1, Figure 14). Year-to-year differences in storm surge frequency are presumed of lesser importance, since this process has a more stationary behavior than MSL, which is rising (e.g., Zhang et al., 2000). Interannual storm surge variability might be a factor in some regions like the Gulf Coast where the tide range is small and nuisance flood level elevations can be relatively high. All of these considerations may help explain why not all approximately 75 NOAA gauges with NWS-defined nuisance flood levels show discernable time-dependent trends.

In terms of event probabilities, nuisance flood events have clearly changed over time, for instance since the 1950s, when many coastal regions were developing. In 1950, such events would have the probability of recurring every couple of years (Figure 8), whereas today, they

occur so frequently due to decades of SLR_{rel} that they are no longer classified as an *extreme* event. To better plan for these recurring impacts, we have quantified the season that typically has the highest occurrences of nuisance flooding during the year (Figure 10) and highlighted the related physical forcing processes (Figure 11). In regions like the West Coast, where storm surge magnitudes are bathymetrically constrained by the narrow continental shelf, nuisance flooding is more tidally controlled (Figure 13a) and readily predictable using NOAA Tide Predictions (http://tidesandcurrents.noaa.gov/tide_predictions). In regions like the Gulf Coast and Chesapeake Bay, nuisance flooding typically happens at higher tide levels, but a substantial NTR contribution is also needed, either from a local storm or a longer-term regional event contributing to a *quiet* sea level (NTR) anomaly (e.g., Sweet et al., 2009). We have quantified a typical NTR contribution required during periods of higher tidal range (spring tides) to cause local nuisance level flooding (Figure 13b).

Together, the *relationships of societal importance* might be further refined to more broadly assess potential impacts from tidal-related coastal flooding over a range of elevations. Such a refinement might permit flood frequency and duration estimates at particular thresholds for locations lacking a nearby water level gauge but having a local tide datum as provided by the NOAA Vertical Datum Transformation Tool (vdatum.noaa.gov). These relationships are not intended to explicitly determine where and for how long minor flooding will occur, since local baseline hydrologic conditions vary with the weather and by topo-bathymetric and land-cover response characteristics. The relationships do establish a degree of susceptibility for large regions of the U.S. Coast to coastal flooding at various elevations above *today's* high tide.

In closing, it is important to stress that SLR_{rel} exacerbates impacts over a range of elevation thresholds relative to *today's fixed reference frame* (e.g., Figure 3c). At very high thresholds, such as those of the 100-year event experienced during rare hurricane strikes (not observable in Figure 3c), SLR_{rel} has and will continue to nonlinearly compress recurrence probabilities in the future because smaller (with higher probability) storm surges will be able to impact similar elevations. The same is true for impacts from lesser extremes or nuisance-like tides, which we describe here in terms of average annual frequency and duration. We find that with lower threshold elevations, nuisance-level events are more commonplace and their event frequencies change in time at increasingly higher rates (Figure 14) simply from linear SLR_{rel}. Any acceleration in SLR_{rel} will only further intensify inundation impacts over time, and will further reduce the time between flood events. It is therefore apparent that a time horizon exists, largely dependent upon the local rate of SLR_{rel}, when critical elevation thresholds for various public/private/commercial serving systems will become increasingly compromised by tidal flooding in the future. We stress that in many areas*, the frequency of nuisance flooding is already on an accelerating trajectory, and many other locations will soon follow even with a continuation of linear SLR_{rel} rates*. This fact needs to be recognized, as it is critical for coastal planning entities to prevent critical-system degradation from SLR impacts and to promote resiliency efforts in general.

RECOMMENDATIONS

Continued research of trends and patterns associated with nuisance coastal flooding should help identify regionally important processes (e.g., tide variations, ENSO influences, ocean current circulation, etc.) involved in event occurrence to facilitate near-term predictions and seasonal outlooks of their potential impacts. Systematic score-keeping of locally important (e.g., sector-specific) threshold exceedances at NOAA gauges by communities would permit monitoring for important frequency changes in tidal-related flooding. Coupled with new, innovative, crowd-source-like technologies (e.g., various "King Tide websites"), this effort would help spatially delineate vulnerabilities, allowing for better local (street-level) calibration/validation of model-based decision tools. In short, tracking sensible indicators of SLR_{rel} like nuisance tidal flooding and recognizing their impacts will heighten awareness, bridge today's perceptions with a community's living memory, and facilitate planning and resiliency efforts.

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APPENDIX 1

Gauge name, analysis start date, model coefficients from linear and quadratic fits of days per year impacted by nuisance flooding and goodness of fit (R^2). Both models use data starting in 1950 (e.g., $t_{(1950)}$= 1) or when data becomes available and ends in year (meteorological) 2012. Trend (b_1) and acceleration coefficients (b_2) are **bold** *when significant at the 90% level.*

			Linear Model $y=b_1*t + b$			Quadratic: $y=b_2*t^2 + b_1*t + b$			
	Station Name	Start (year)	b_1	b	R^2	b_2	b_1	b	R^2
1	Boston, MA	1921	**0.047**	0.7	0.12	**0.0035**	-0.18	3.2	0.30
2	Providence, RI	1938	0.007	1.1	0.01	**0.0017**	-0.11	2.9	0.09
3	New London, CT	1938	0.012	0.9	0.03	0.0009	-0.04	1.4	0.07
4	Bridgeport, CT	1970	**0.281**	-5.2	0.33	**0.0240**	-1.74	33.5	0.63
5	Montauk, NY	1947	**0.023**	0.4	0.08	**0.0013**	-0.06	1.3	0.15
6	Kings Point, NY	1931	**0.158**	1.9	0.26	**0.0083**	-0.37	7.5	0.44
7	Battery, NY	1920	**0.146**	0.2	0.29	**0.0064**	-0.27	4.7	0.44
8	Bergen Point, NY	1981	**0.301**	-8.9	0.38	**0.0230**	-1.92	42.8	0.51
9	Sandy Hook, NJ	1922	**0.334**	-2.6	0.52	**0.0113**	-0.39	5.2	0.67
h	Atlantic City, NJ	1920	**0.327**	-2.4	0.51	**0.0105**	-0.34	4.6	0.65
11	Cape May, NJ	1965	**0.652**	-14.1	0.54	**0.0320**	-1.96	33.5	0.74
12	Philadelphia, PA	1920	**0.145**	0.0	0.23	**0.0057**	-0.22	4.1	0.33
13	Reedy Point, DE	1979	**0.338**	-10.8	0.35	**0.0207**	-1.62	33.9	0.43
14	Lewes, DE	1920	**0.251**	0.4	0.35	**0.0104**	-0.43	8.4	0.50
15	Cambridge, MD	1979	**0.253**	-8.5	0.46	**0.0185**	-1.46	29.6	0.65
16	Baltimore, MD	1920	**0.165**	-0.6	0.38	**0.0068**	-0.27	4.1	0.55
17	Annapolis, MD	1928	**0.567**	-3.8	0.53	**0.0168**	-0.51	7.7	0.66
18	Washington D.C.	1924	**0.384**	1.3	0.37	**0.0091**	-0.20	7.5	0.42
19	Wachapreague, VA	1978	**0.090**	-1.9	0.11	0.0009	0.01	-0.1	0.12
20	Kiptopeke, VA	1976	**0.208**	-5.2	0.28	0.0036	-0.12	1.8	0.29
21	Lewisetta, VA	1970	**0.257**	-8.0	0.45	**0.0111**	-0.72	12.0	0.56
22	Sewell Point, VA	1927	**0.097**	-0.1	0.30	**0.0022**	-0.05	1.4	0.34
23	Ches. Bay Bridge, VA	1975	**0.105**	-2.7	0.21	0.0008	0.03	-1.3	0.22
24	Duck, NC	1978	**0.159**	-3.9	0.25	0.0016	0.01	-0.7	0.25
25	Beaufort, NC	1973	**0.894**	-26.2	0.69	**0.0206**	-0.95	12.4	0.73
26	Wilmington, NC	1935	**0.542**	-6.6	0.57	**0.0125**	-0.26	2.2	0.66
27	Springmaid Pier, SC	1977	**0.060**	-1.0	0.08	0.0049	-0.39	8.6	0.13
28	Charleston, SC	1921	**0.347**	-1.8	0.57	**0.0045**	0.06	1.4	0.60
29	Fort Pulaski, GA	1935	**0.194**	0.4	0.37	0.0018	0.08	1.7	0.38
30	Fernandina Beach, FL	1920	**0.026**	0.1	0.11	**0.0011**	-0.05	0.9	0.17
31	Mayport, FL	1928	**0.068**	-0.9	0.24	**0.0031**	-0.13	1.2	0.38
32	Key West, FL	1920	**0.043**	-0.7	0.20	**0.0020**	-0.09	0.8	0.31
33	Naples, FL	1965	**0.153**	-3.0	0.40	**0.0042**	-0.18	2.7	0.45
34	Apalachicola, FL	1976	**0.096**	-1.4	0.12	0.0007	0.03	0.1	0.12
35	Panama City, FL	1973	**0.155**	-2.4	0.14	**0.0118**	-0.91	20.0	0.24
36	Bay Waveland, MS	1978	**0.259**	-4.5	0.27	0.0093	-0.60	14.1	0.30
37	Sabine Pass, TX	1981	0.026	-0.4	0.02	-0.0042	0.44	-10.4	0.05
38	Galveston, TX	1957	**0.029**	0.0	0.14	0.0010	-0.04	1.0	0.17
39	Port Isabel, TX	1944	**0.218**	-2.6	0.34	**0.0069**	-0.22	2.1	0.42
40	La Jolla, CA	1924	**0.100**	-0.7	0.26	0.0006	0.06	-0.2	0.27
41	San Francisco, CA	1920	**0.130**	3.0	0.12	-0.0026	0.30	1.2	0.13
42	Humboldt Bay, CA	1977	**0.146**	-3.2	0.17	-0.0045	0.57	-12.4	0.18
43	Toke Point, WA	1972	0.088	7.0	0.03	-0.0062	0.63	-3.9	0.04
44	Seattle, WA	1920	**0.026**	0.6	0.05	0.0007	-0.02	1.1	0.06
45	Honolulu, HI	1920	**0.278**	-0.3	0.19	0.0000	0.28	-0.3	0.19

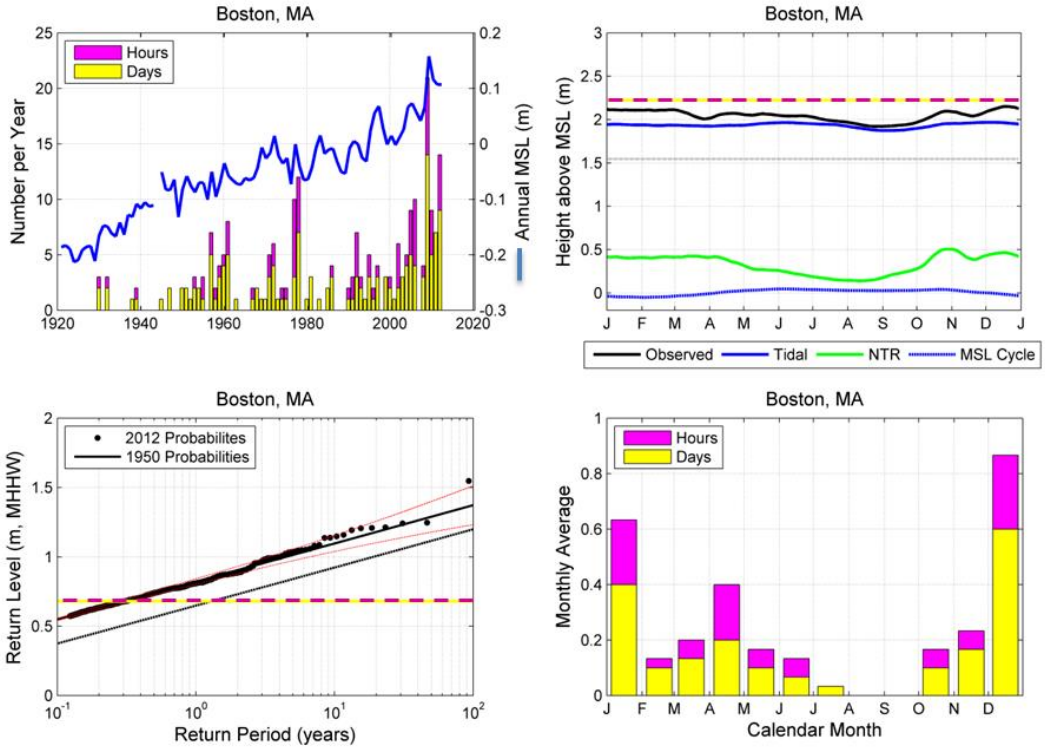
APPENDIX 2

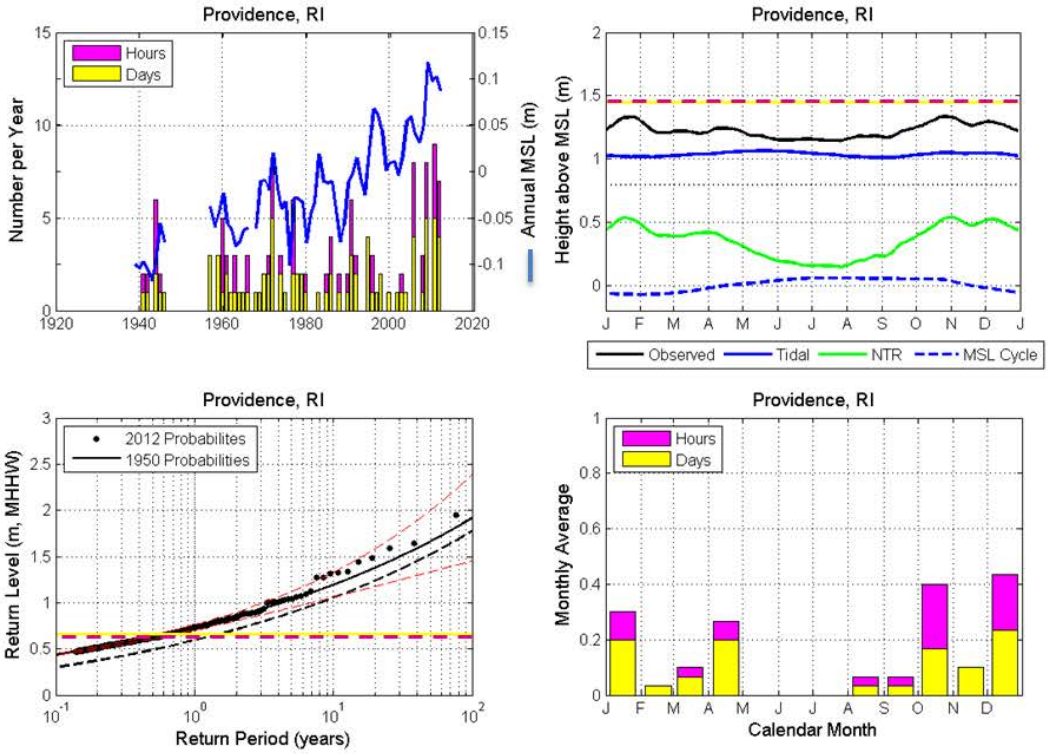
- *(top left) show nuisance flood events (cumulative hours and impacted days) per meteorological year with annual MSL through 2012 (i.e., May 2012 – April 2013). Note: if the number of hours and days are numerically equivalent, only the top values (days in yellow) appear.*

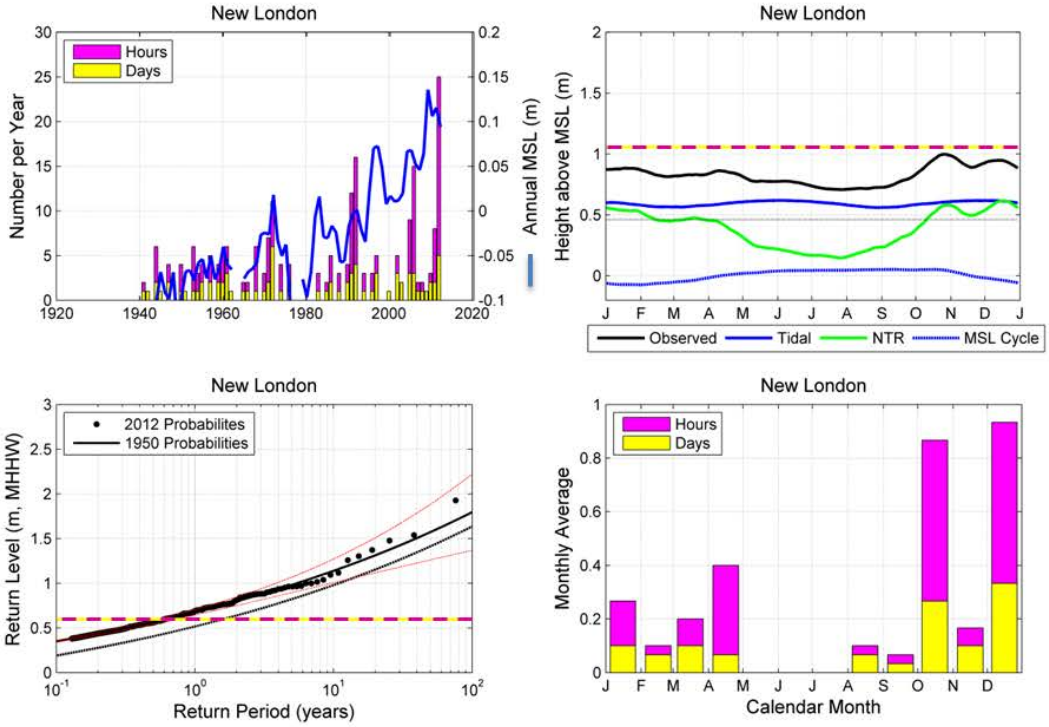
- *(bottom left) show return level interval curves from a Peak Over Threshold (POT) / Point Process approach fit to a Generalized Pareto Distribution (GPD). The 2012 modeled values (black line), their 95% confidence intervals (red dash) and POT picks (dots) are shown respective to the nuisance flood level (yellow-magenta line). 1950 values (black dash) are the 2012 values lowered by a distance equal to the local relative sea level rise (SLR_{rel}) trend (mm/yr) shown in Table 1 for a 62-year period.*

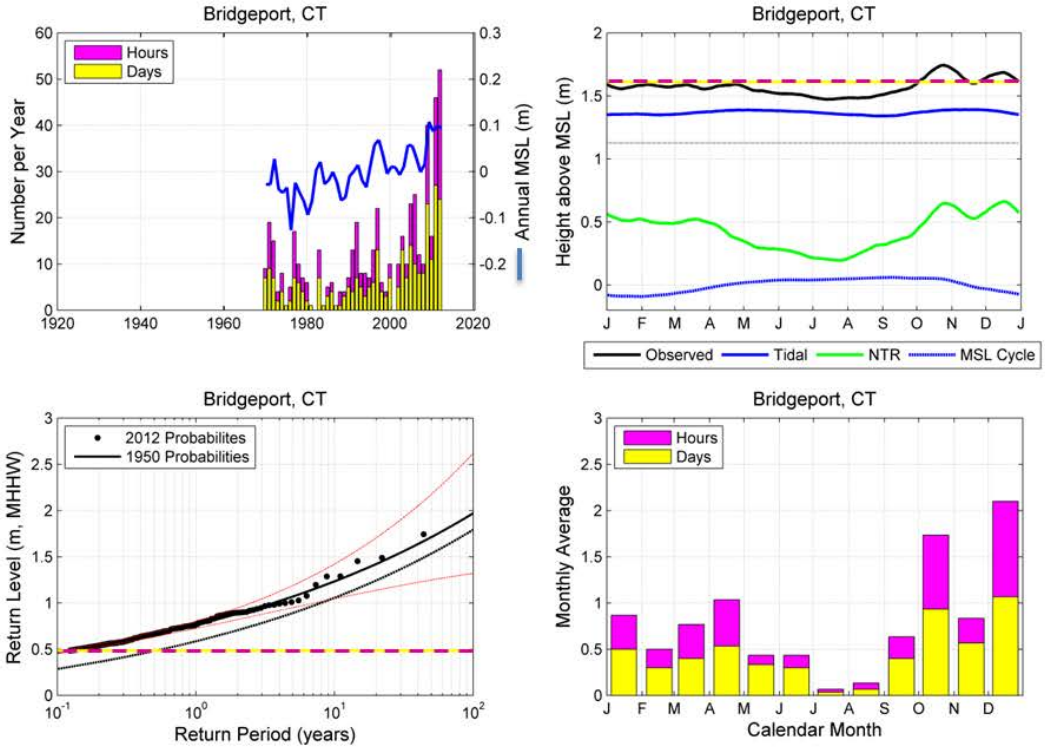
- *(top right) show maximum water levels (black) per calendar day over the 1980-2009 period decomposed into a low-frequency MSL cycle (blue dot), predicted tide (blue; no S_a and S_{sa} harmonic fits) and nontidal residual (NTR; green). All series are smoothed by a 30-day running filter and plotted relative to each gauge's MSL tidal datum shown with the nuisance flood level (yellow-magenta) and MHHW tidal datum (black dot).*

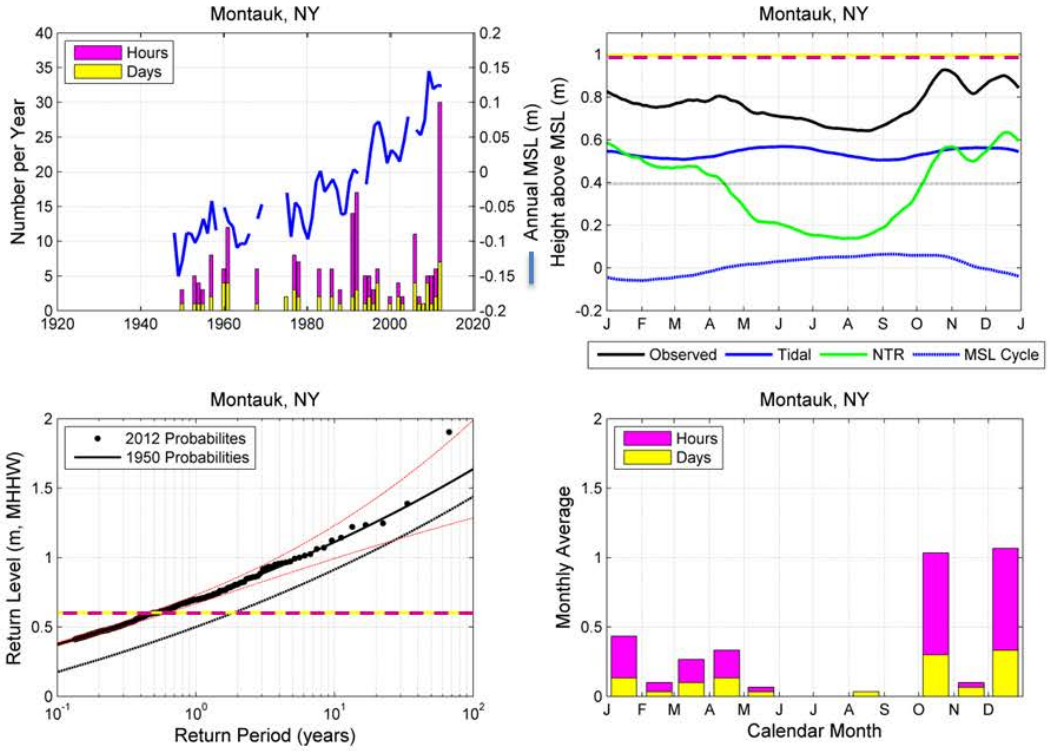
- *(bottom right) show average nuisance flood events (shared y-axis) by calendar month over 1980-2009. Note: if the number of hours and days are numerically equivalent, only the top values (days in yellow) appear.*

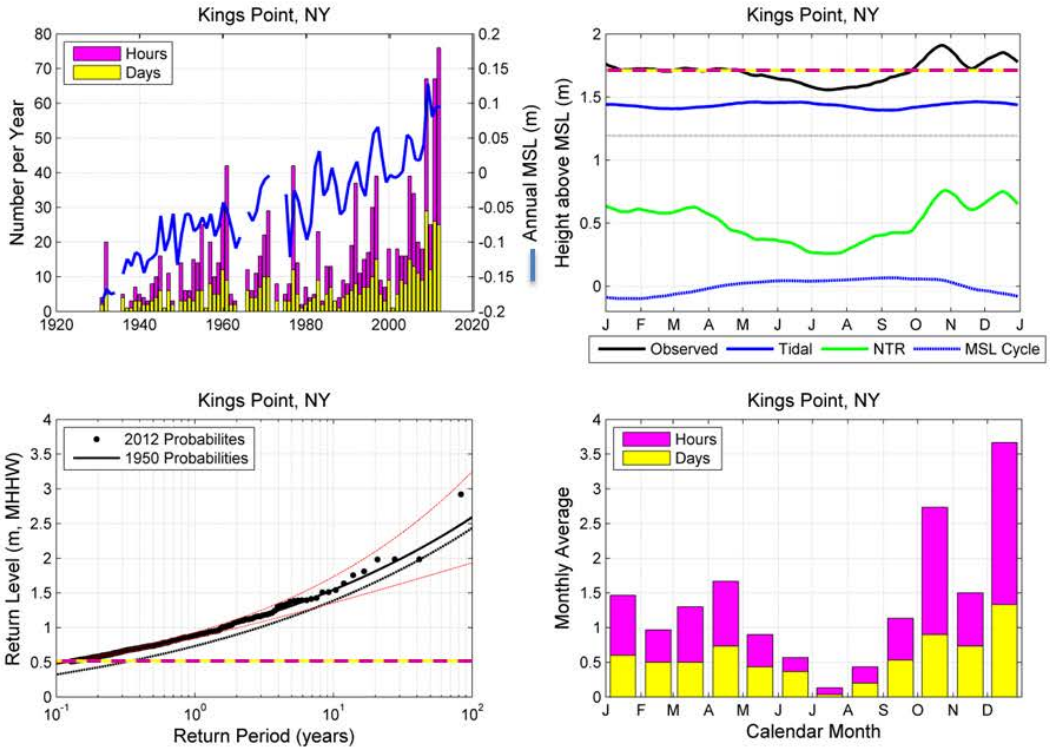


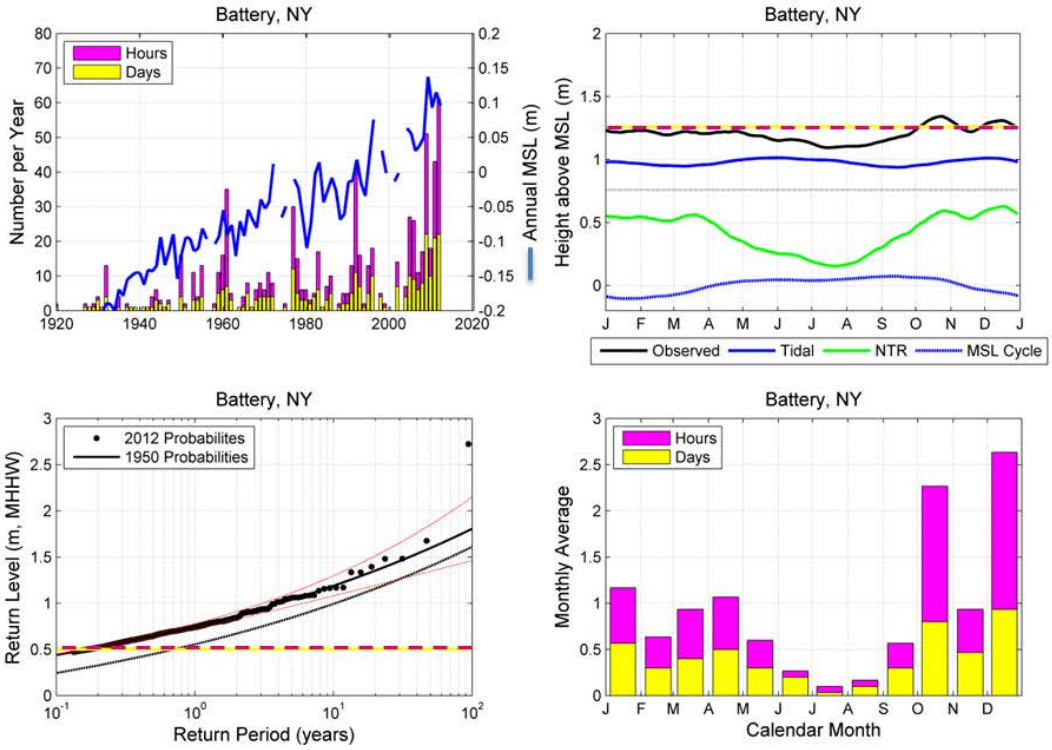

Providence, RI
Hours
Days
Number per Year
Annual MSL (m)
Providence, RI
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
Providence, RI
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Providence, RI
Hours
Days
Monthly Average
J F M A M J J A S O N D
Calendar Month

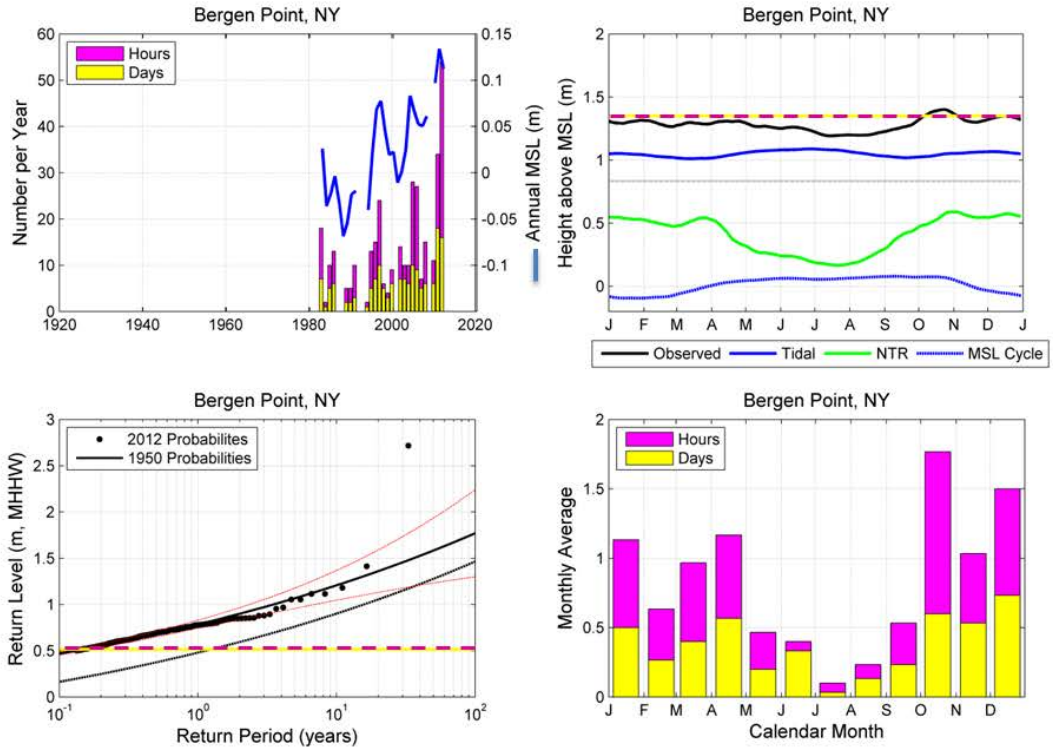

New London
Hours
Days
Number per Year
Annual MSL (m)
New London
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
New London
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
New London
Hours
Days
Monthly Average
J F M A M J J A S O N D
Calendar Month

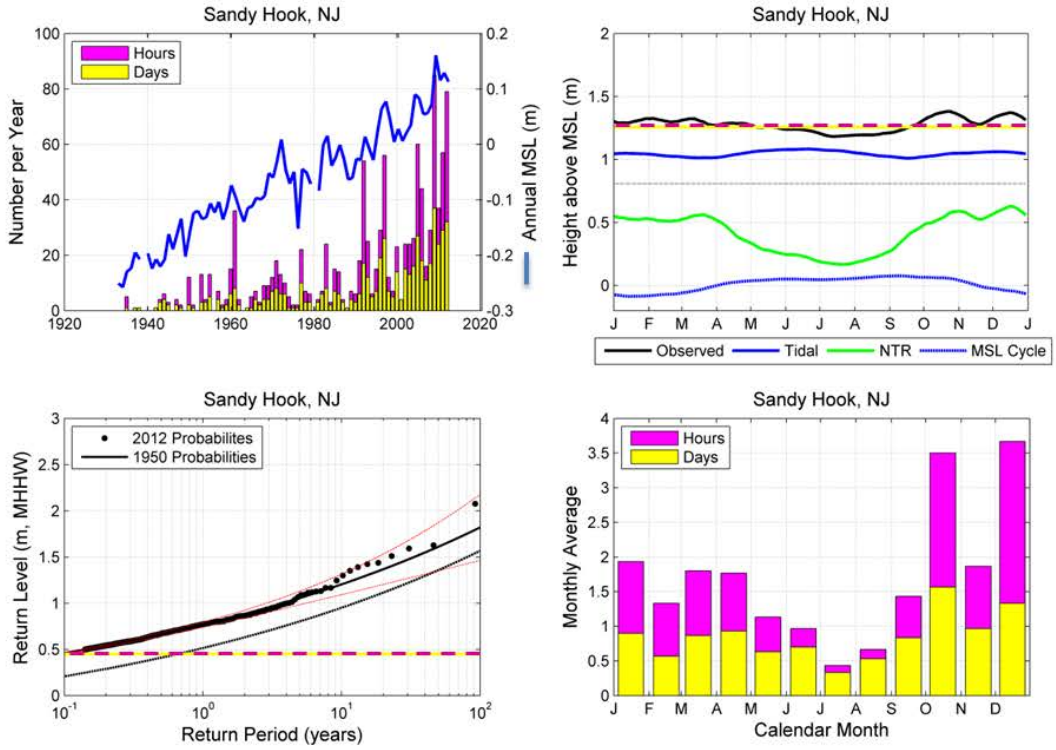

Bridgeport, CT
Hours
Days
Number per Year
Annual MSL (m)
Bridgeport, CT
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Bridgeport, CT
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Bridgeport, CT
Hours
Days
Monthly Average
Calendar Month

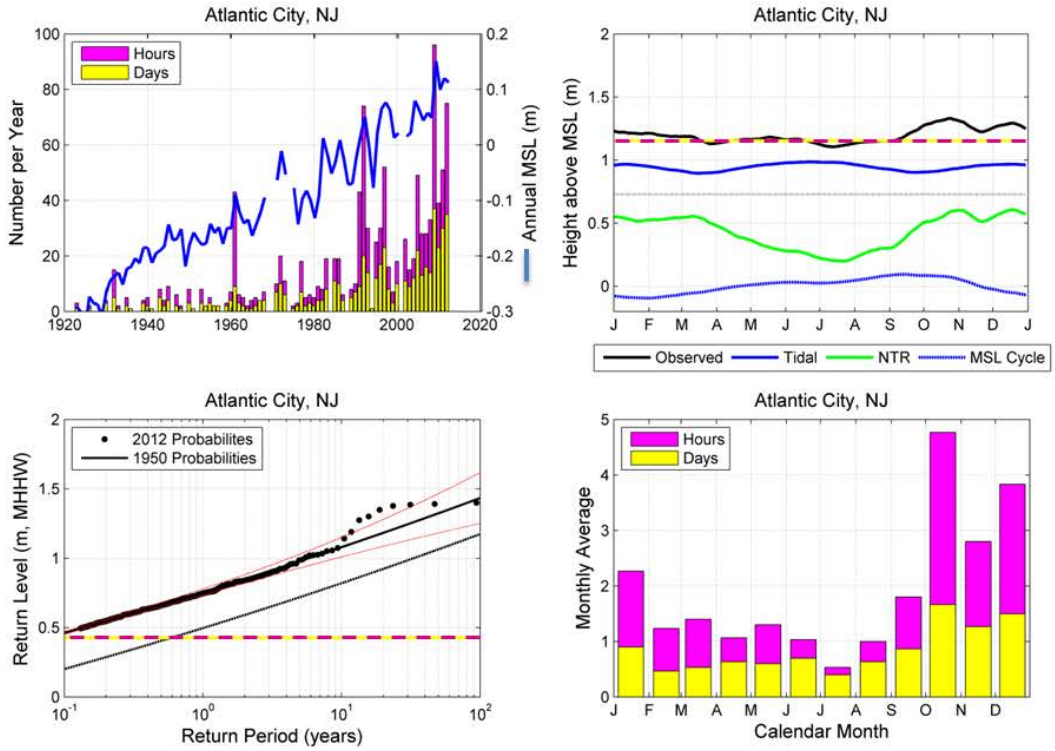

Montauk, NY
Hours
Days
Number per Year
Annual MSL (m)
Montauk, NY
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Montauk, NY
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Montauk, NY
Hours
Days
Monthly Average
Calendar Month

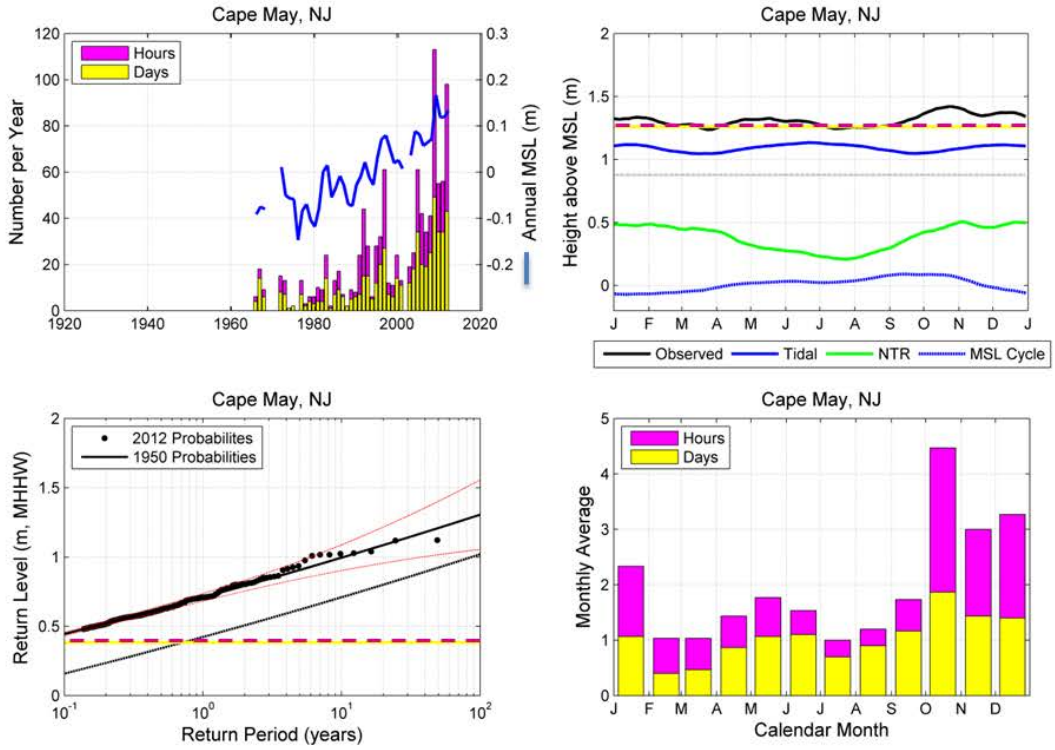

Kings Point, NY
Hours
Days
Number per Year
Annual MSL (m)
Kings Point, NY
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Kings Point, NY
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Kings Point, NY
Hours
Days
Monthly Average
Calendar Month

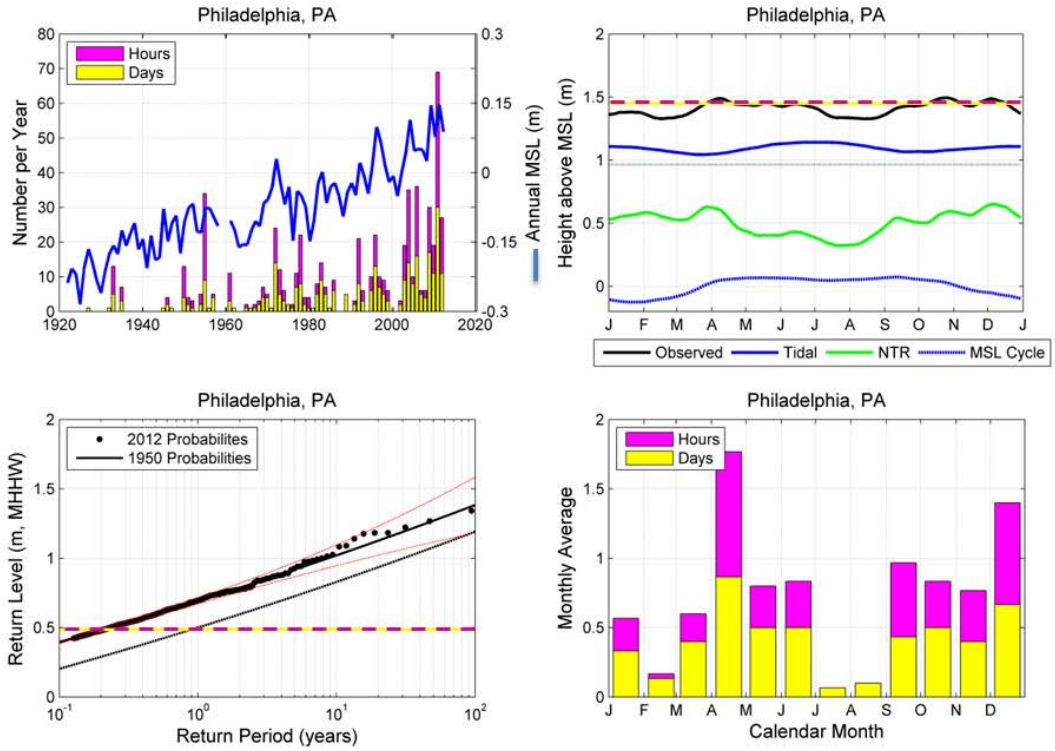

Battery, NY
Hours
Days
Number per Year
Annual MSL (m)
Battery, NY
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Battery, NY
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Battery, NY
Hours
Days
Monthly Average
Calendar Month

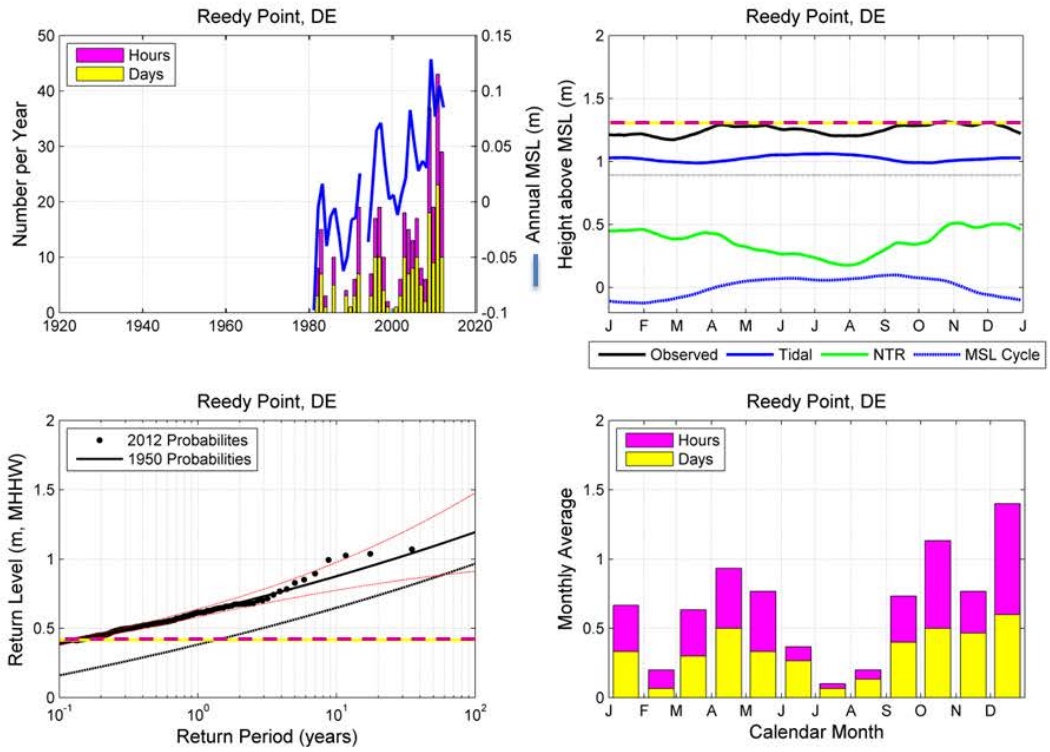

Bergen Point, NY
Hours
Days
Number per Year
Annual MSL (m)
Bergen Point, NY
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
Bergen Point, NY
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Bergen Point, NY
Hours
Days
Monthly Average
Calendar Month

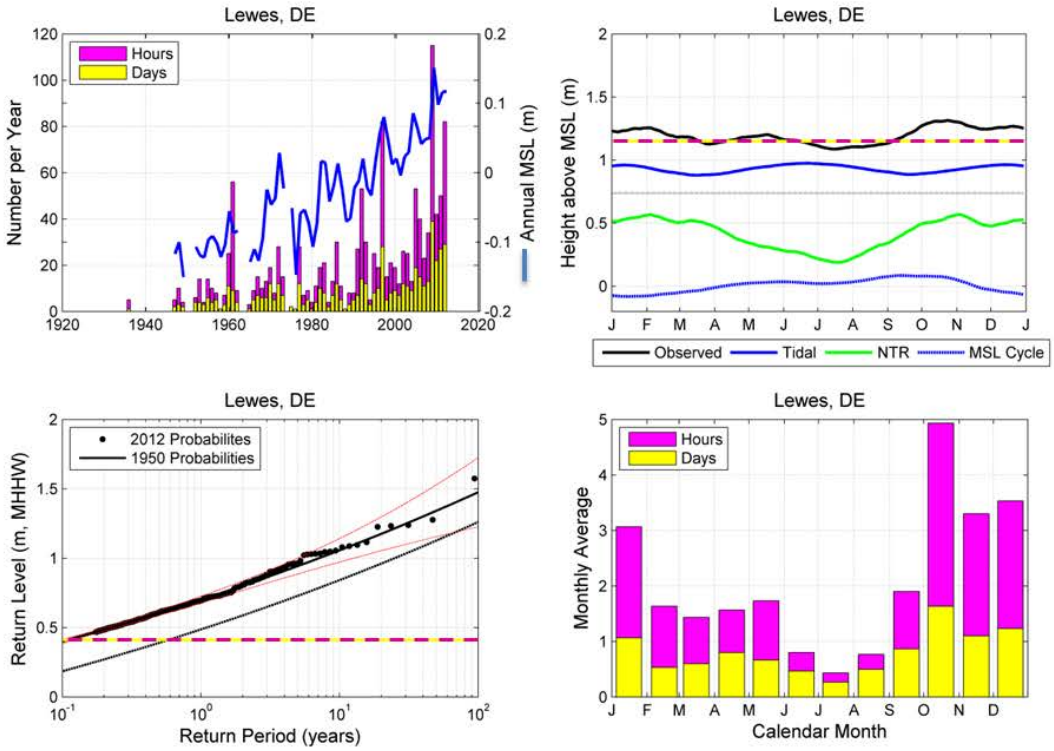

Sandy Hook, NJ
Hours
Days
Number per Year
Annual MSL (m)
Sandy Hook, NJ
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
Sandy Hook, NJ
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Sandy Hook, NJ
Hours
Days
Monthly Average
Calendar Month

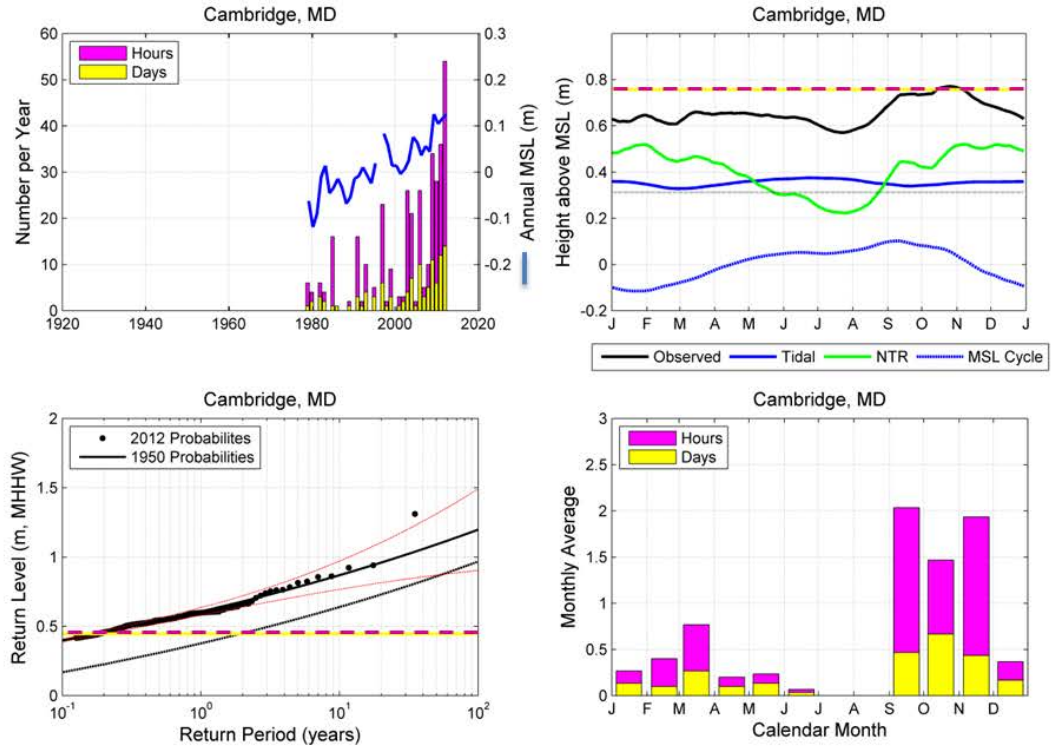

Atlantic City, NJ
Hours
Days
Number per Year
Annual MSL (m)
Atlantic City, NJ
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Atlantic City, NJ
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Atlantic City, NJ
Hours
Days
Monthly Average
Calendar Month

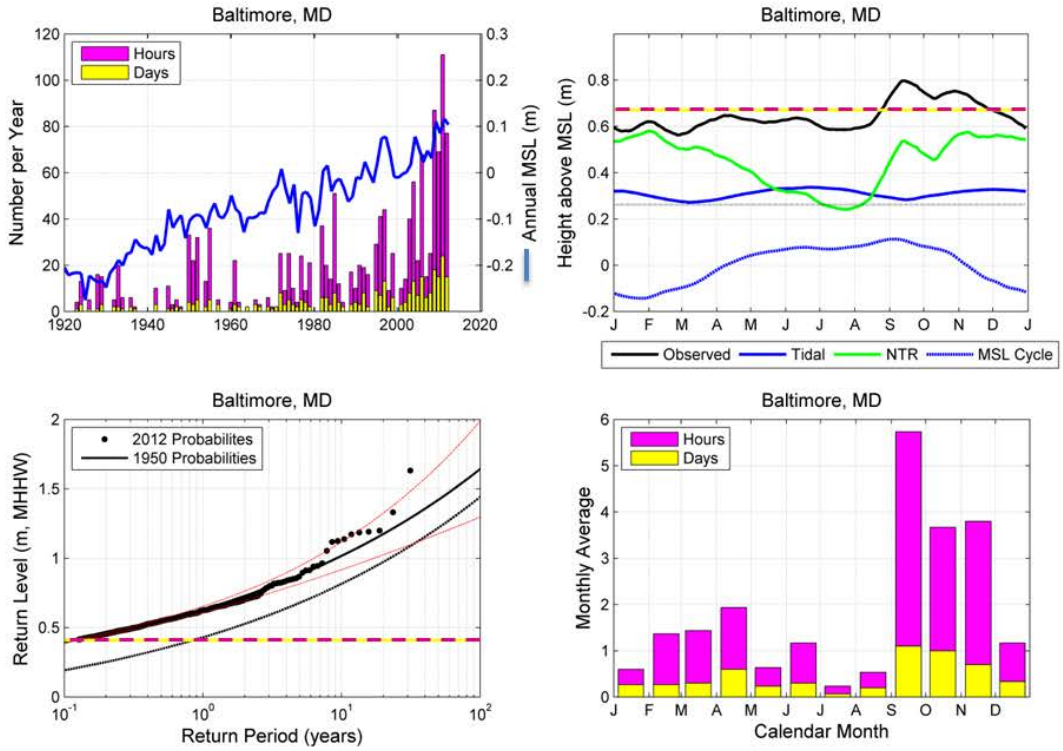

Cape May, NJ
Hours
Days
Number per Year
Annual MSL (m)
Cape May, NJ
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Cape May, NJ
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Cape May, NJ
Hours
Days
Monthly Average
Calendar Month


Philadelphia, PA
Hours
Days
Number per Year
Annual MSL (m)
Philadelphia, PA
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Philadelphia, PA
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Philadelphia, PA
Hours
Days
Monthly Average
Calendar Month


Reedy Point, DE
Hours
Days
Number per Year
Annual MSL (m)
Reedy Point, DE
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Reedy Point, DE
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Reedy Point, DE
Hours
Days
Monthly Average
Calendar Month


Lewes, DE
Hours
Days
Number per Year
Annual MSL (m)
Lewes, DE
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
Lewes, DE
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Lewes, DE
Hours
Days
Monthly Average
Calendar Month


Cambridge, MD
Hours
Days
Number per Year
Annual MSL (m)
Cambridge, MD
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
Cambridge, MD
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Cambridge, MD
Hours
Days
Monthly Average
Calendar Month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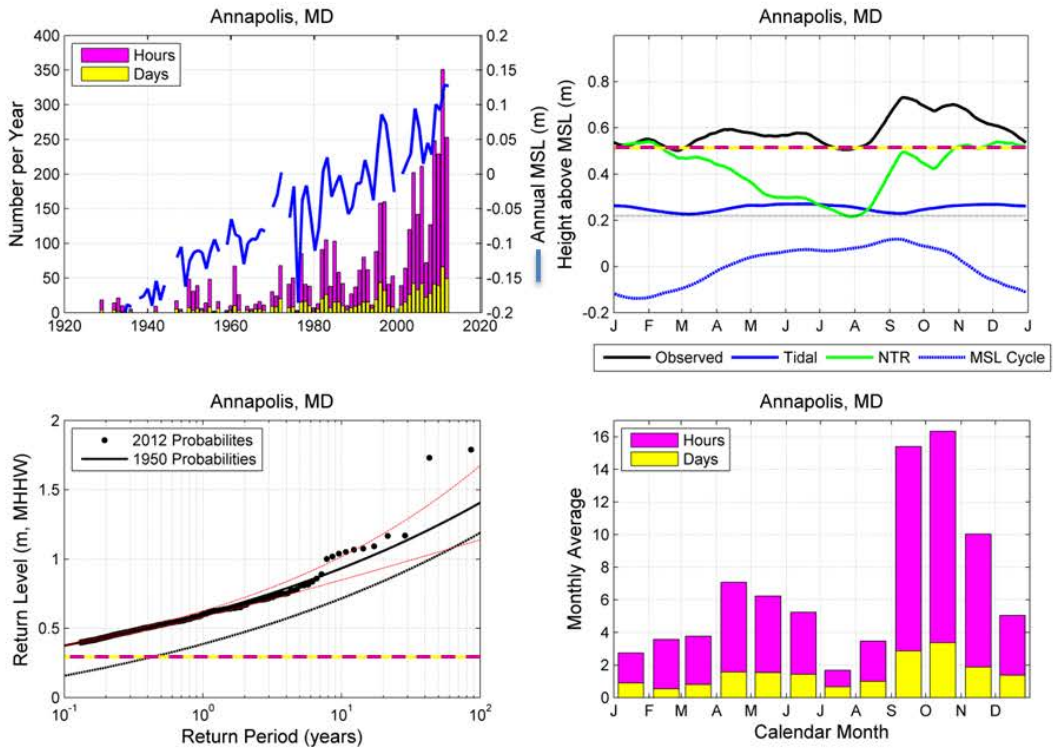
Hours
Days
Number per Year
Annual MSL (m)
Baltimore, MD
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Baltimore, MD
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Baltimore, MD
Hours
Days
Monthly Average
Calendar Month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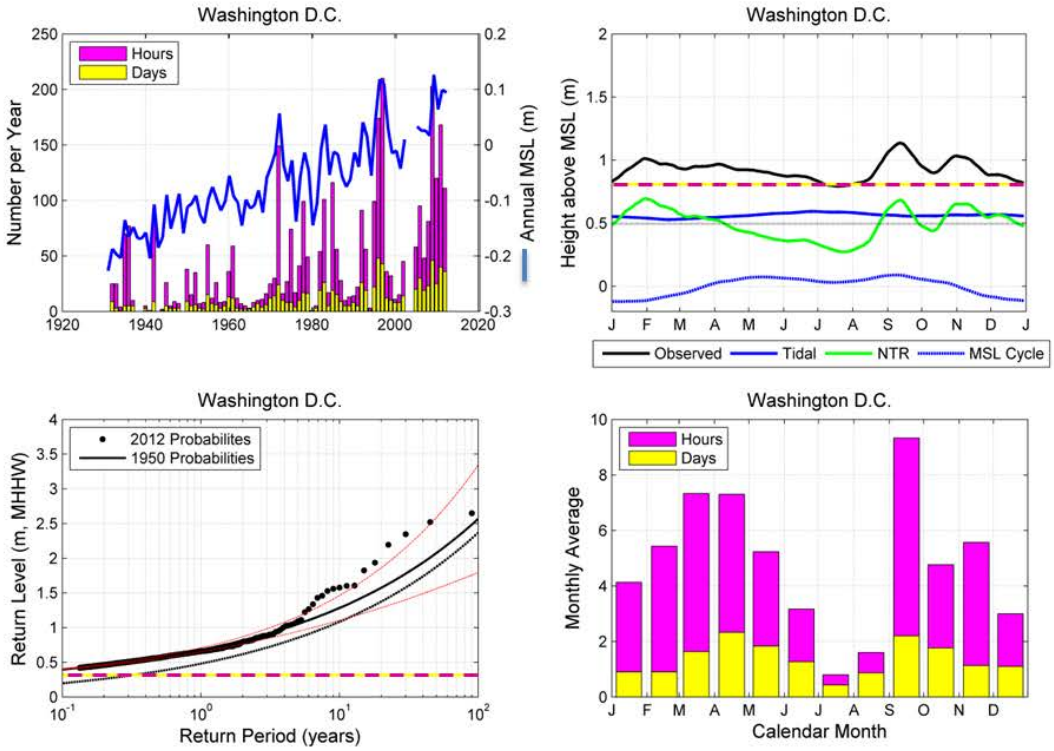
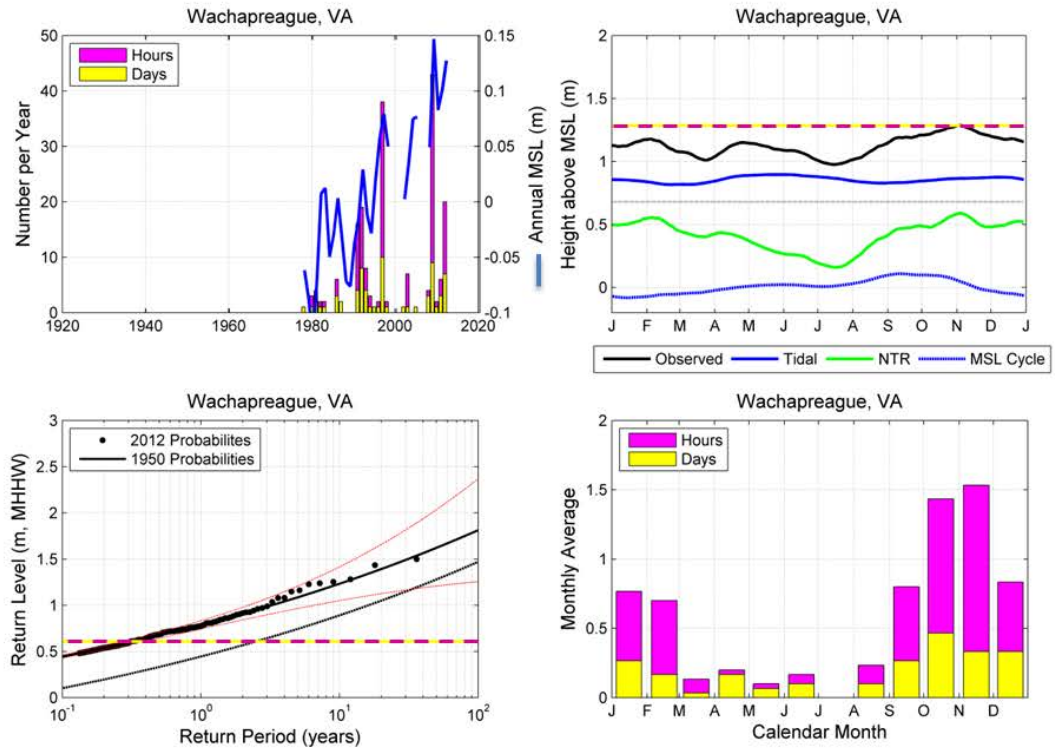
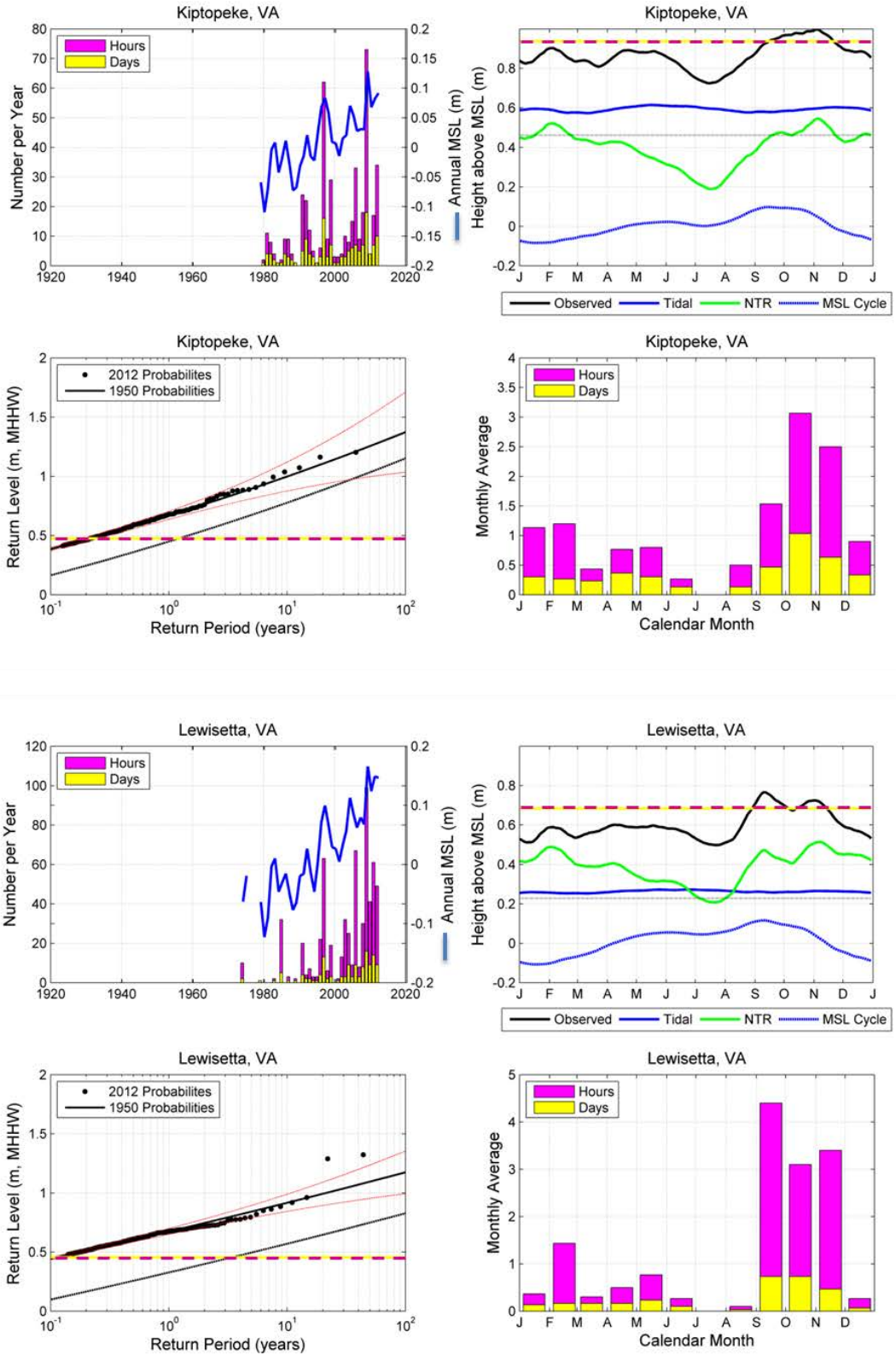
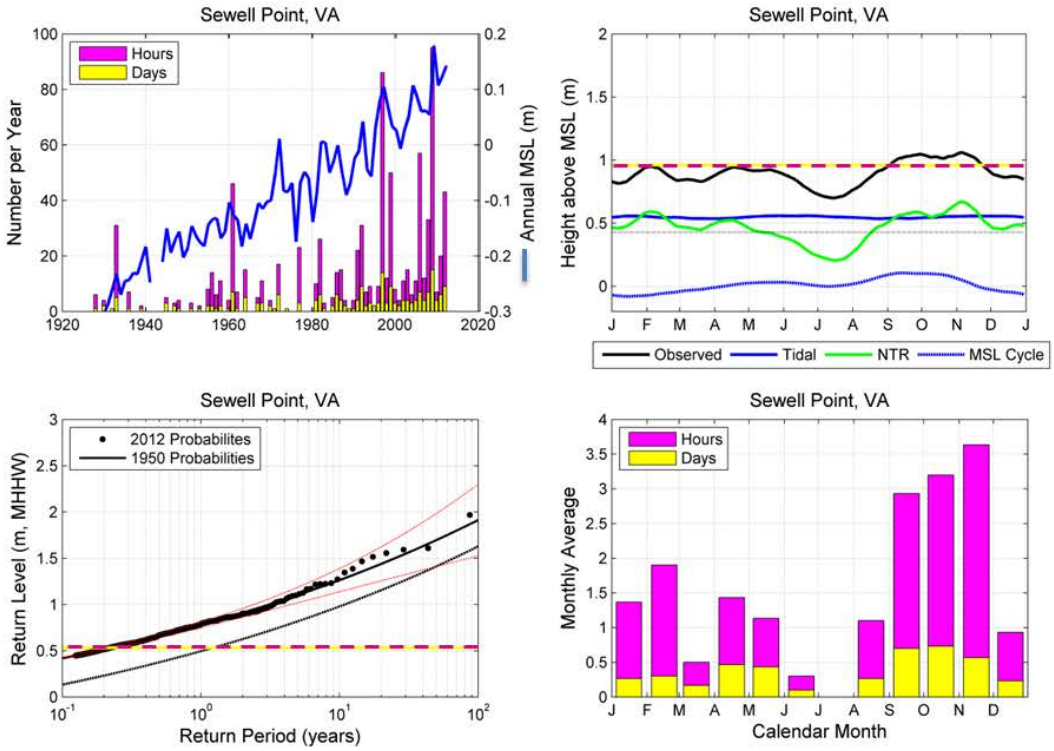
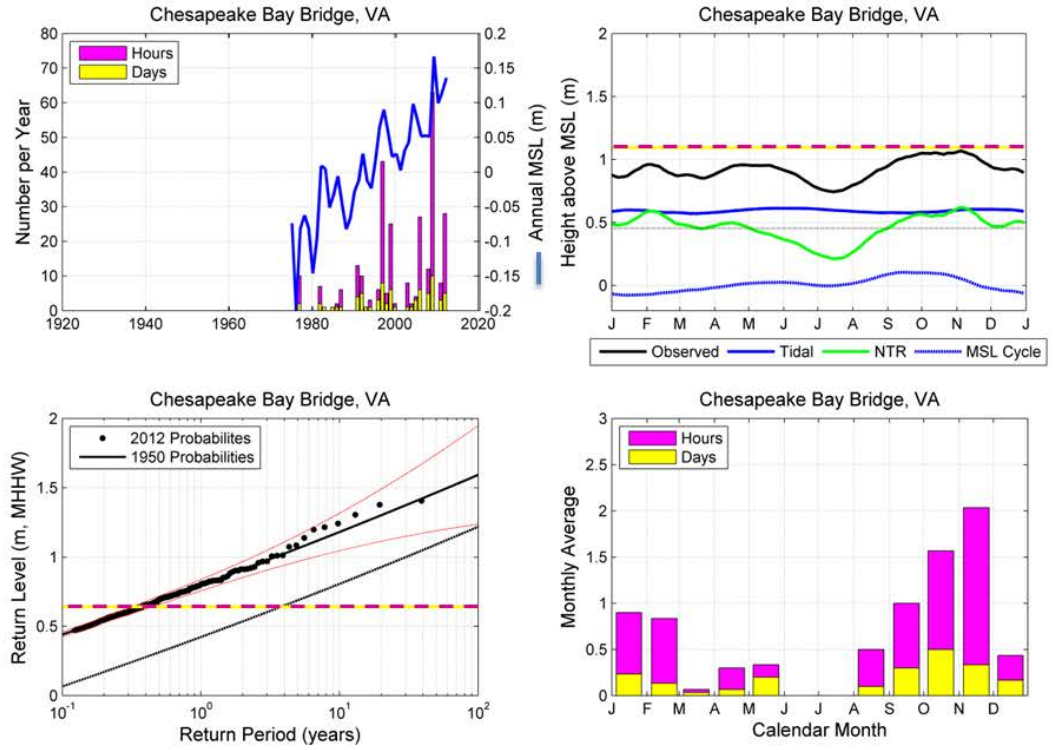
Hours
Days
Number per Year
Annual MSL (m)
Annapolis, MD
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Annapolis, MD
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Annapolis, MD
Hours
Days
Monthly Average
Calendar Month

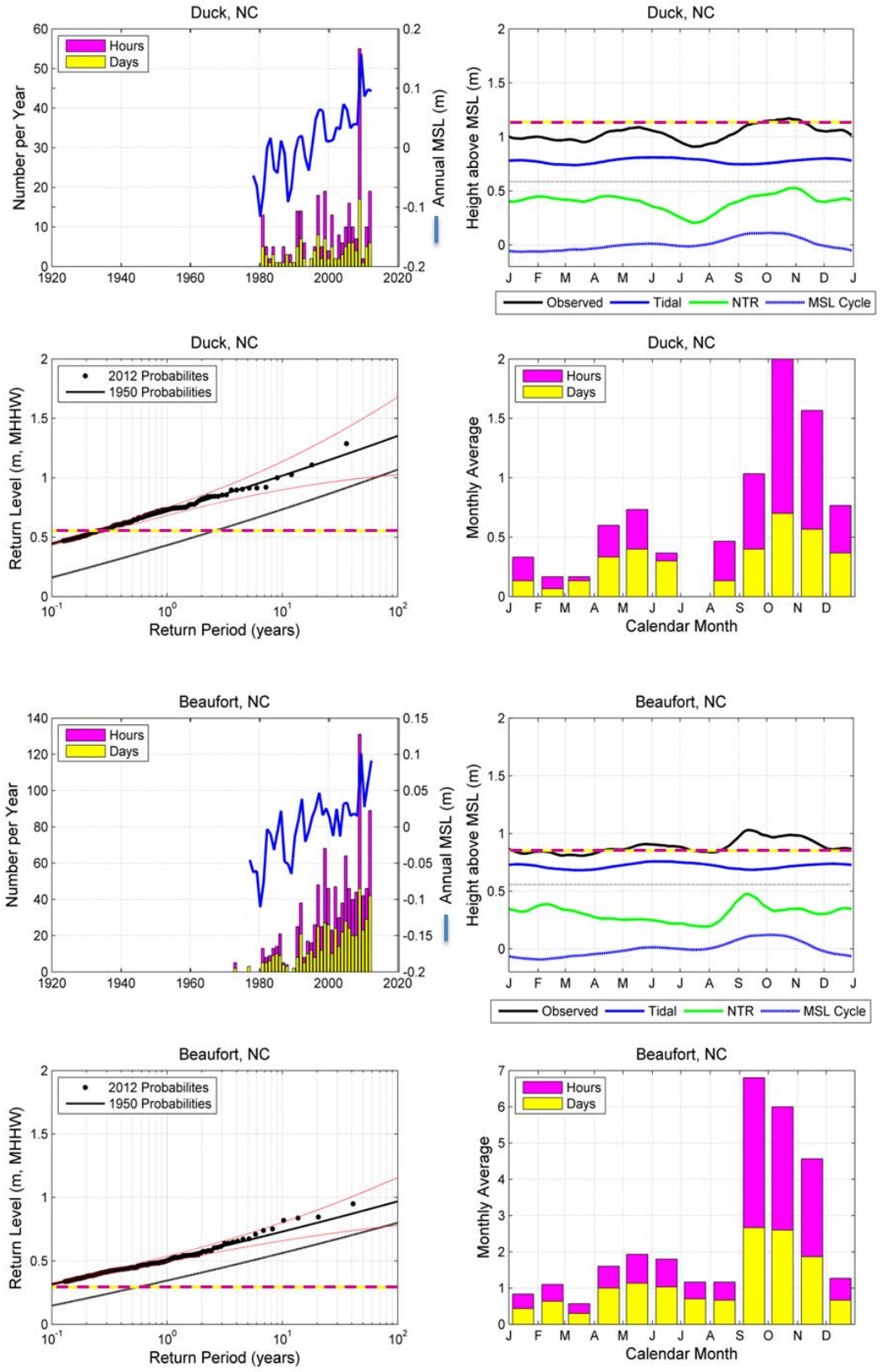

Washington D.C.
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month


Wachapreague, VA
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month


Kiptopeke, VA
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
Lewisetta, VA


Sewell Point, VA
Hours
Days
Number per Year
Annual MSL (m)
Sewell Point, VA
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Sewell Point, VA
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Sewell Point, VA
Hours
Days
Monthly Average
Calendar Month


Chesapeake Bay Bridge, VA
Hours
Days
Number per Year
Annual MSL (m)
Chesapeake Bay Bridge, VA
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Chesapeake Bay Bridge, VA
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Chesapeake Bay Bridge, VA
Hours
Days
Monthly Average
Calendar Month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Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
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MSL Cycle
2012 Probabilites
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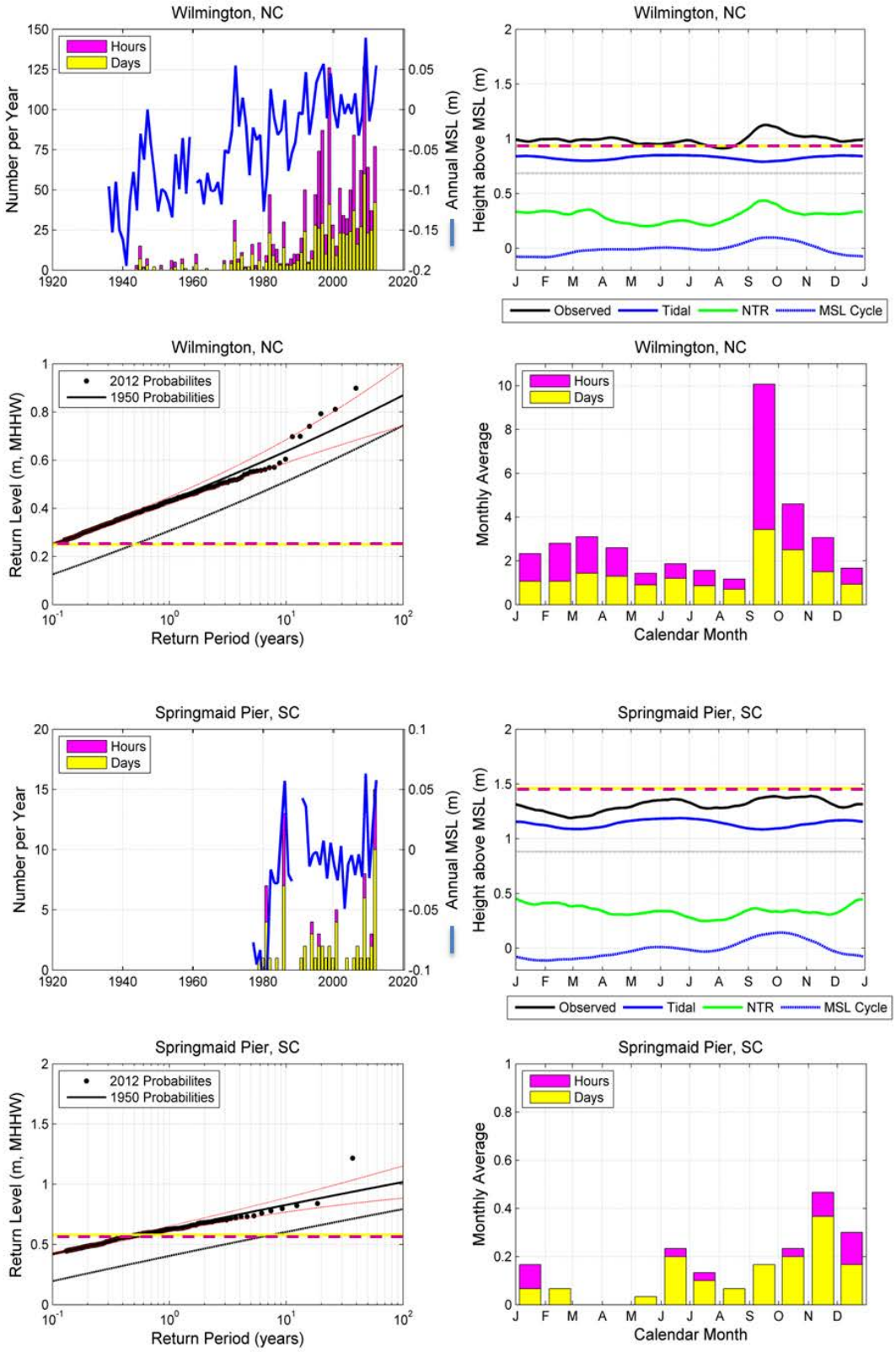
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
Beaufort, NC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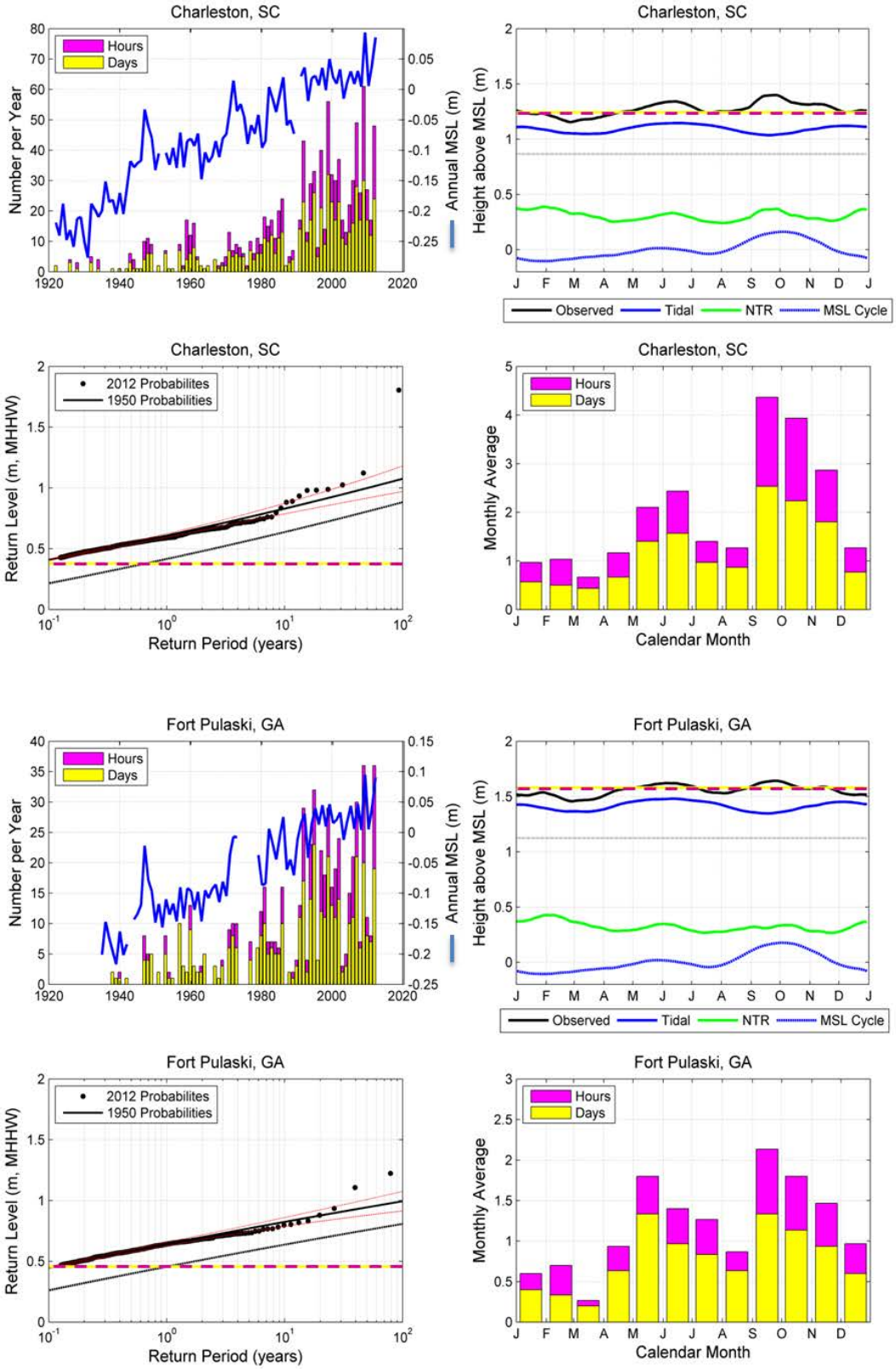
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
Springmaid Pier, SC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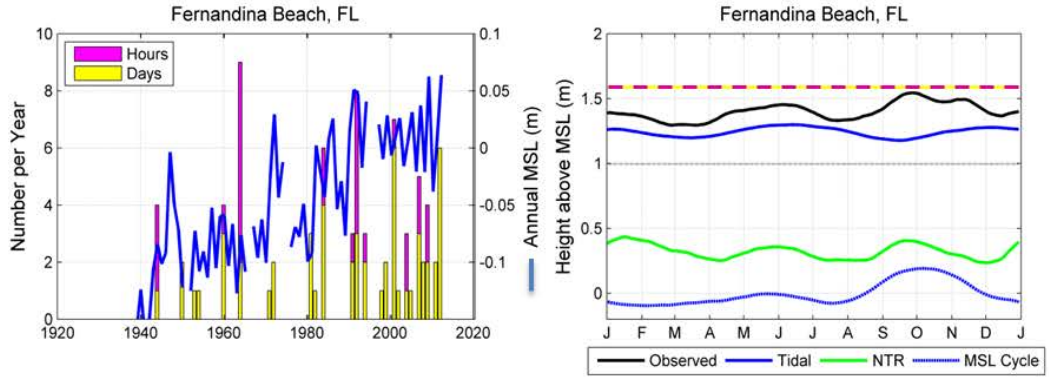
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
Fort Pulaski, GA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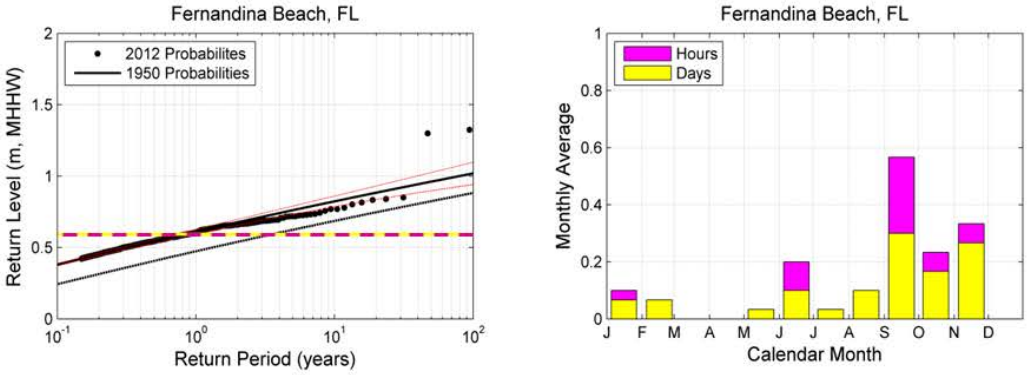
Hours
Days
Number per Year
Annual MSL (m)
Fernandina Beach, FL
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle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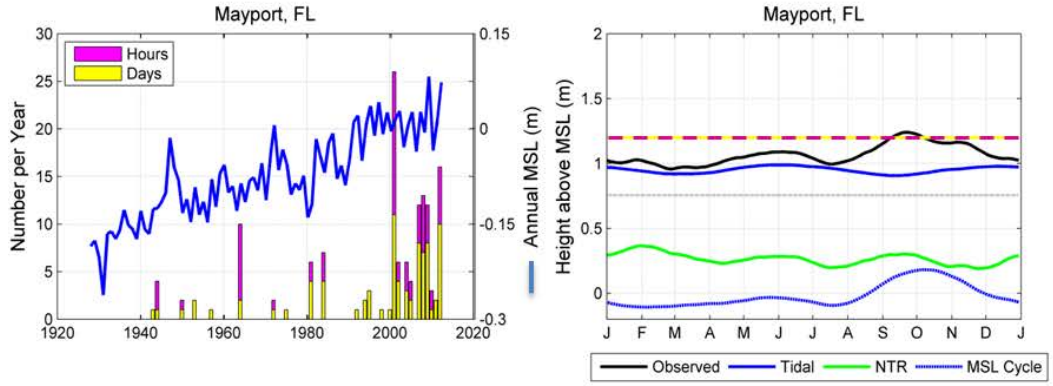
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Fernandina Beach, FL
Hours
Days
Monthly Average
J F M A M J J A S O N D
Calendar Month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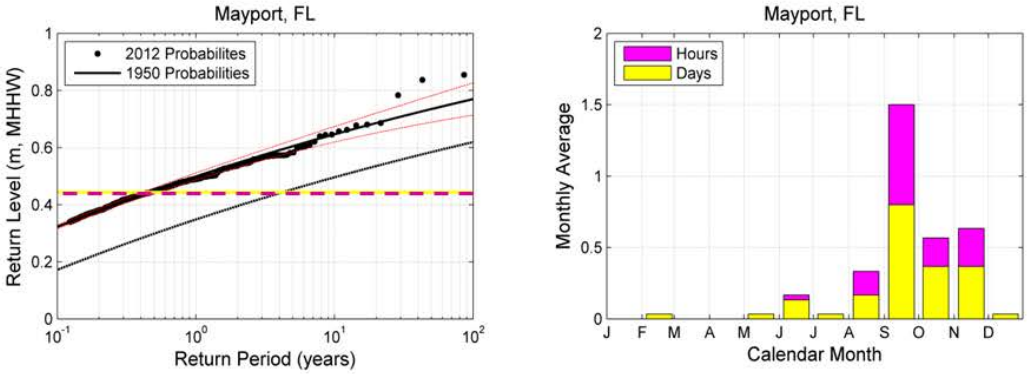
Hours
Days
Number per Year
Annual MSL (m)
Mayport, FL
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle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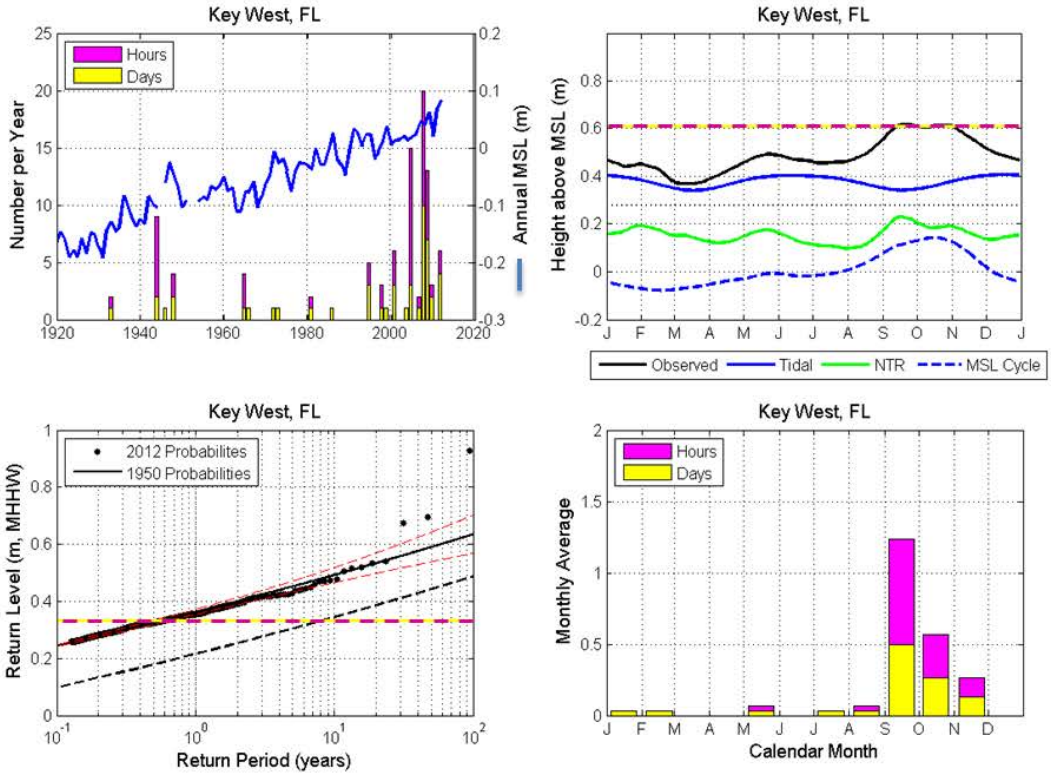
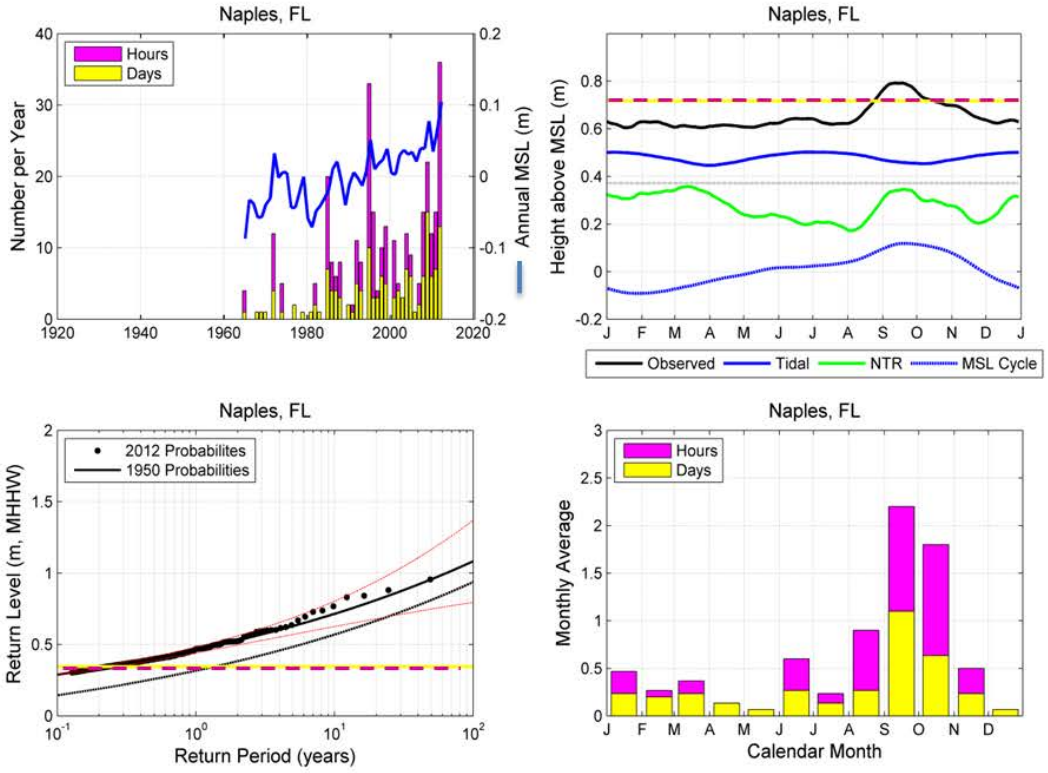
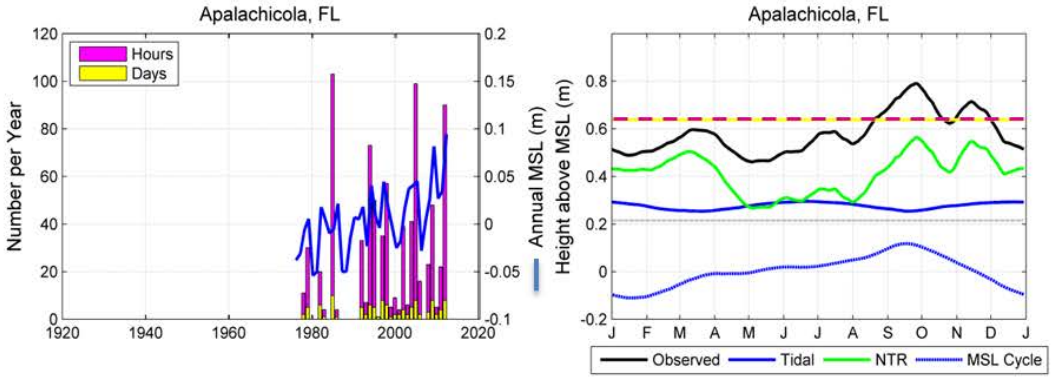
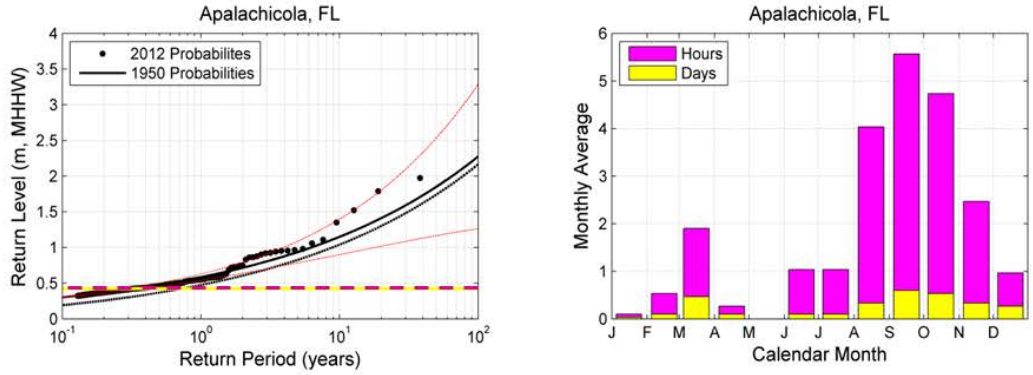
Return Period (years)
Mayport, FL
Hours
Days
Monthly Average
J F M A M J J A S O N D
Calendar Month


Key West, FL
Hours
Days
Number per Year
Annual MSL (m)
Key West, FL
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
Key West, FL
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Key West, FL
Hours
Days
Monthly Average
Calendar Month


Naples, FL
Hours
Days
Number per Year
Annual MSL (m)
Naples, FL
Height above MSL (m)
J F M A M J J A S O N D J
Observed
Tidal
NTR
MSL Cycle
Naples, FL
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Naples, FL
Hours
Days
Monthly Average
Calendar Month


Apalachicola, FL
Hours
Days
Number per Year
Annual MSL (m)
Apalachicola, FL
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle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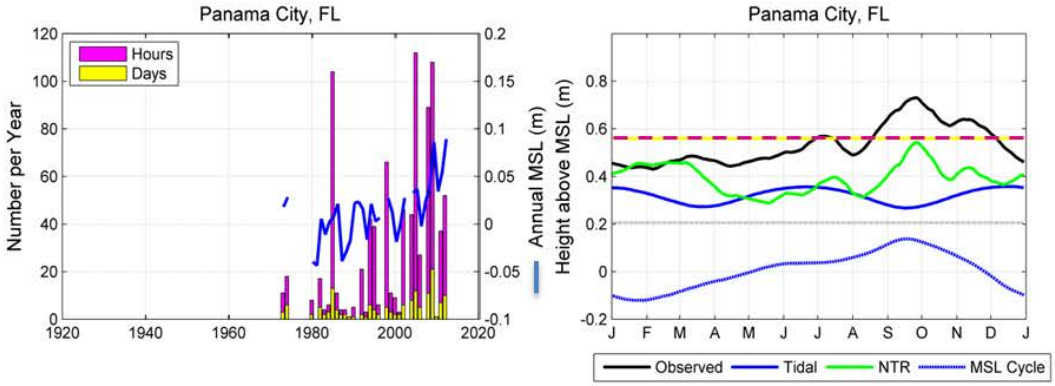
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Apalachicola, FL
Hours
Days
Monthly Average
Calendar Month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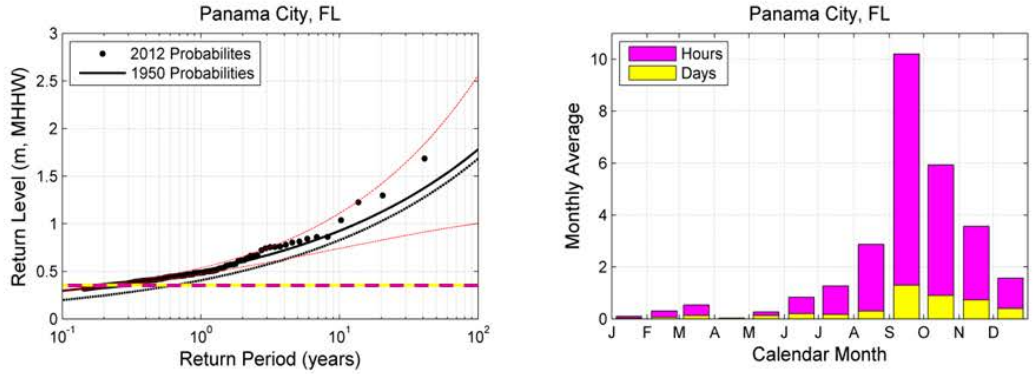
Hours
Days
Number per Year
Annual MSL (m)
Panama City, FL
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle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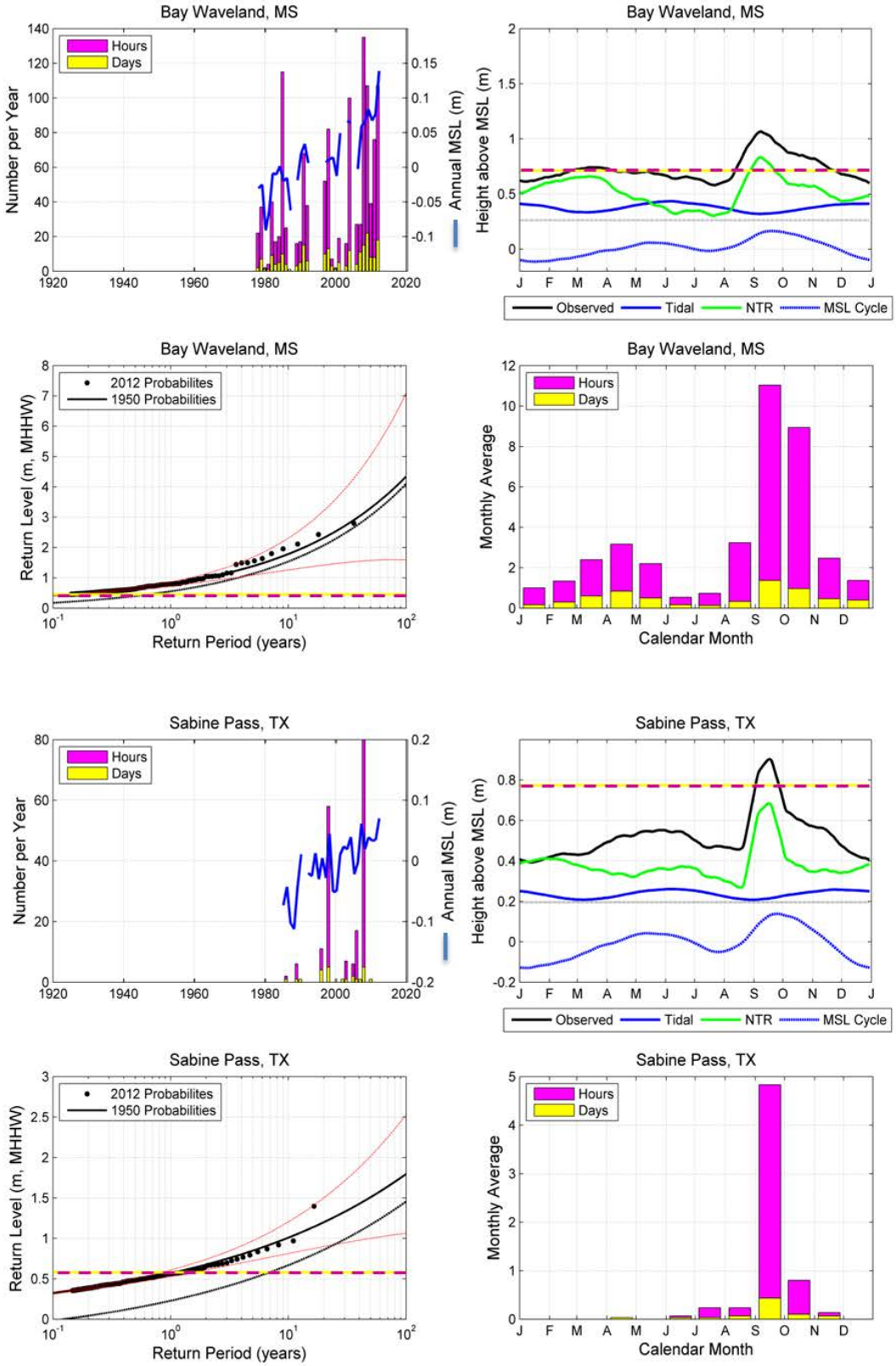
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Panama City, FL
Hours
Days
Monthly Average
Calendar Month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Hours
Days
Number per Year
Annual MSL (m)
Bay Waveland, MS
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Bay Waveland, MS
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Bay Waveland, MS
Hours
Days
Monthly Average
Calendar Month
Sabine Pass, TX
Hours
Days
Number per Year
Annual MSL (m)
Sabine Pass, TX
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
Sabine Pass, TX
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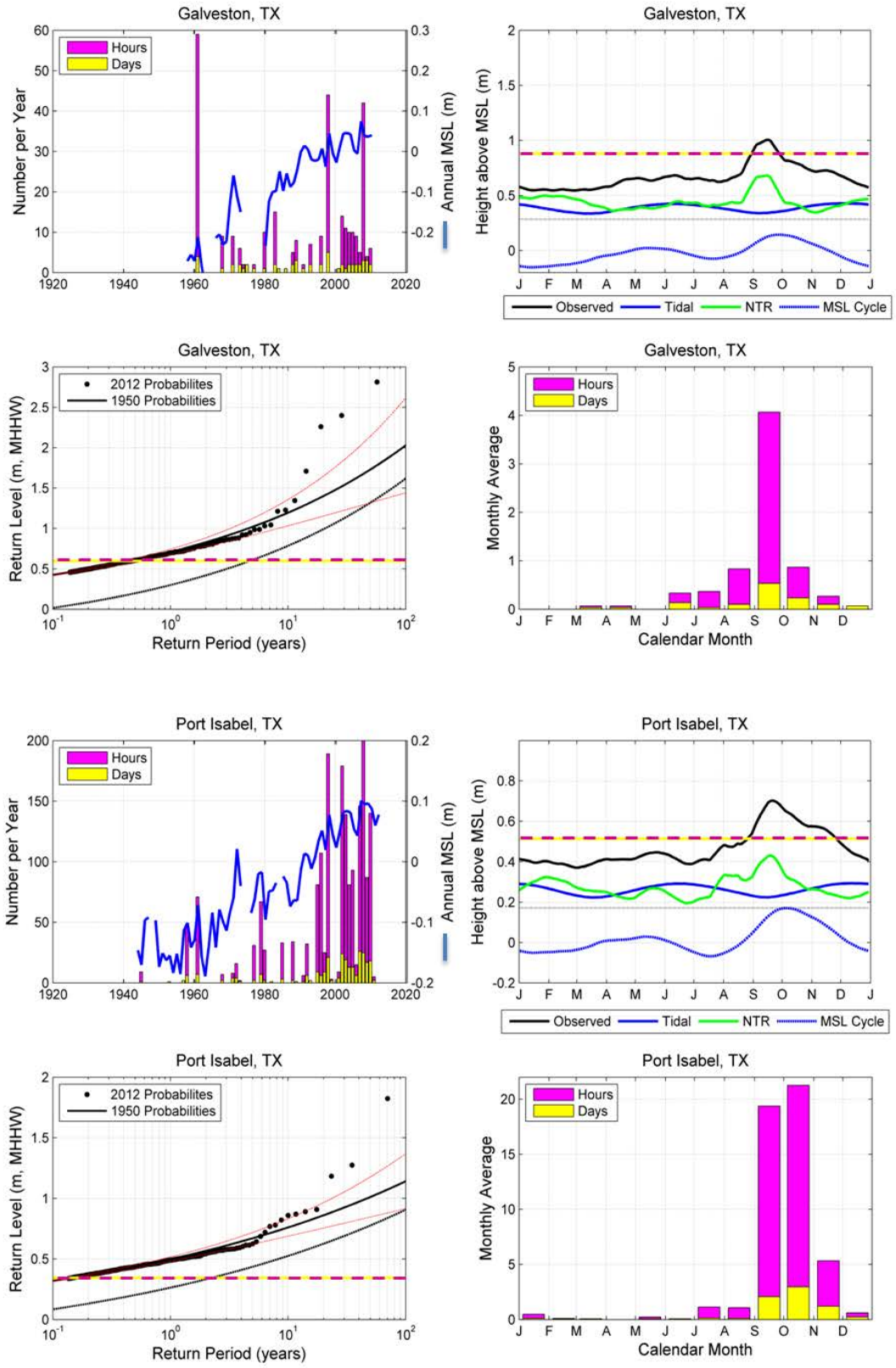
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Sabine Pass, TX
Hours
Days
Monthly Average
Calendar Month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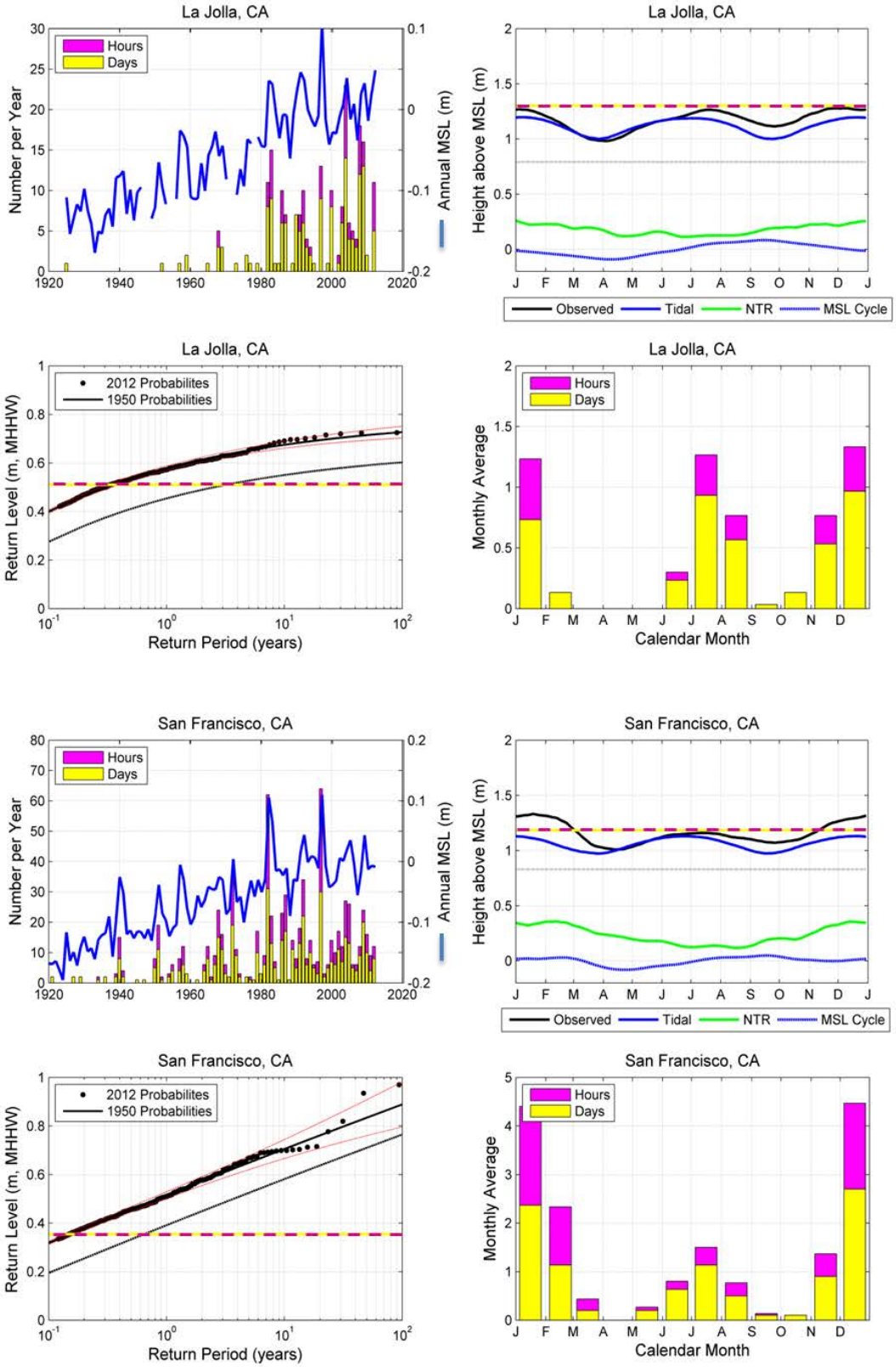
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
Port Isabel, TX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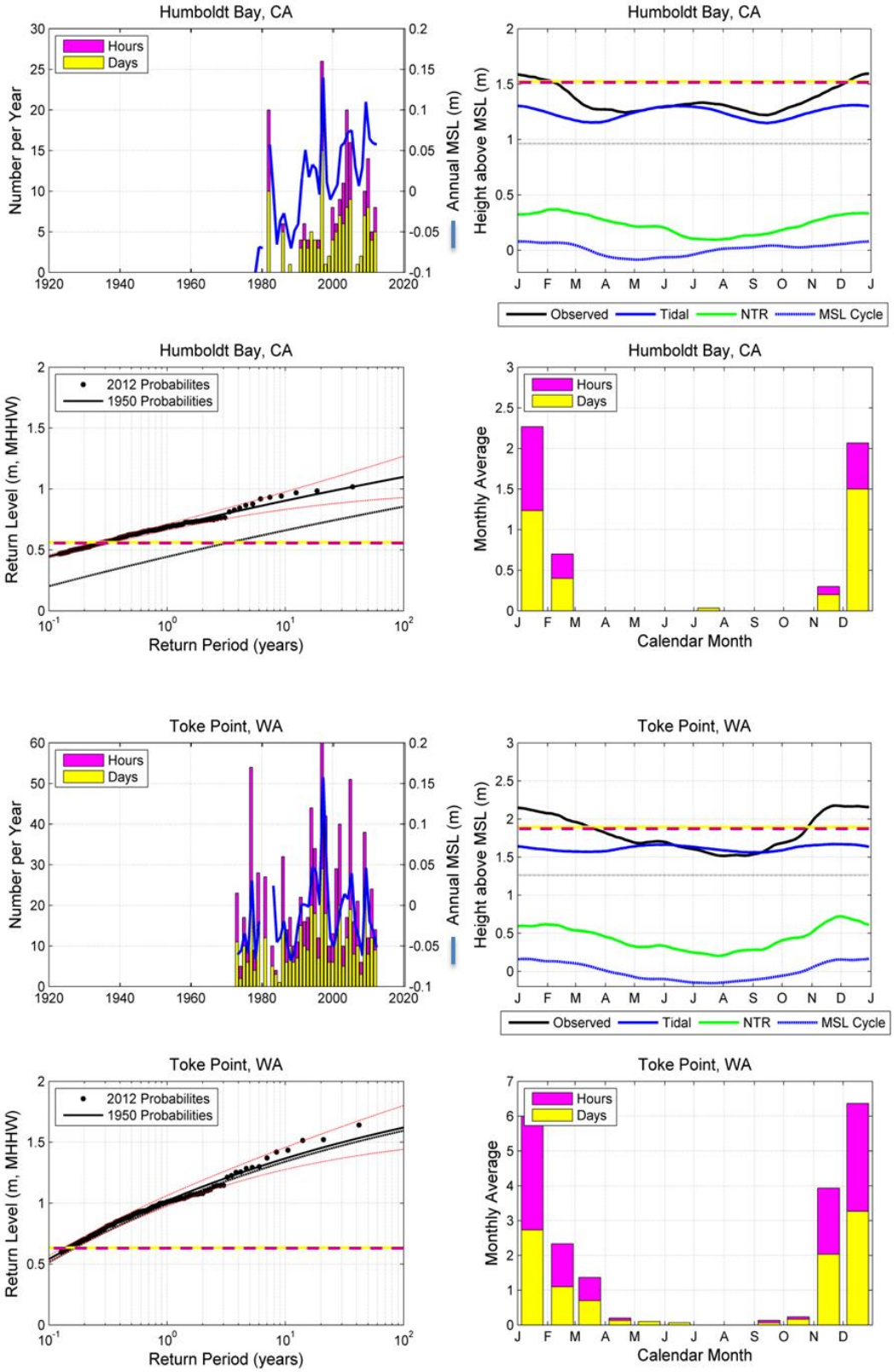
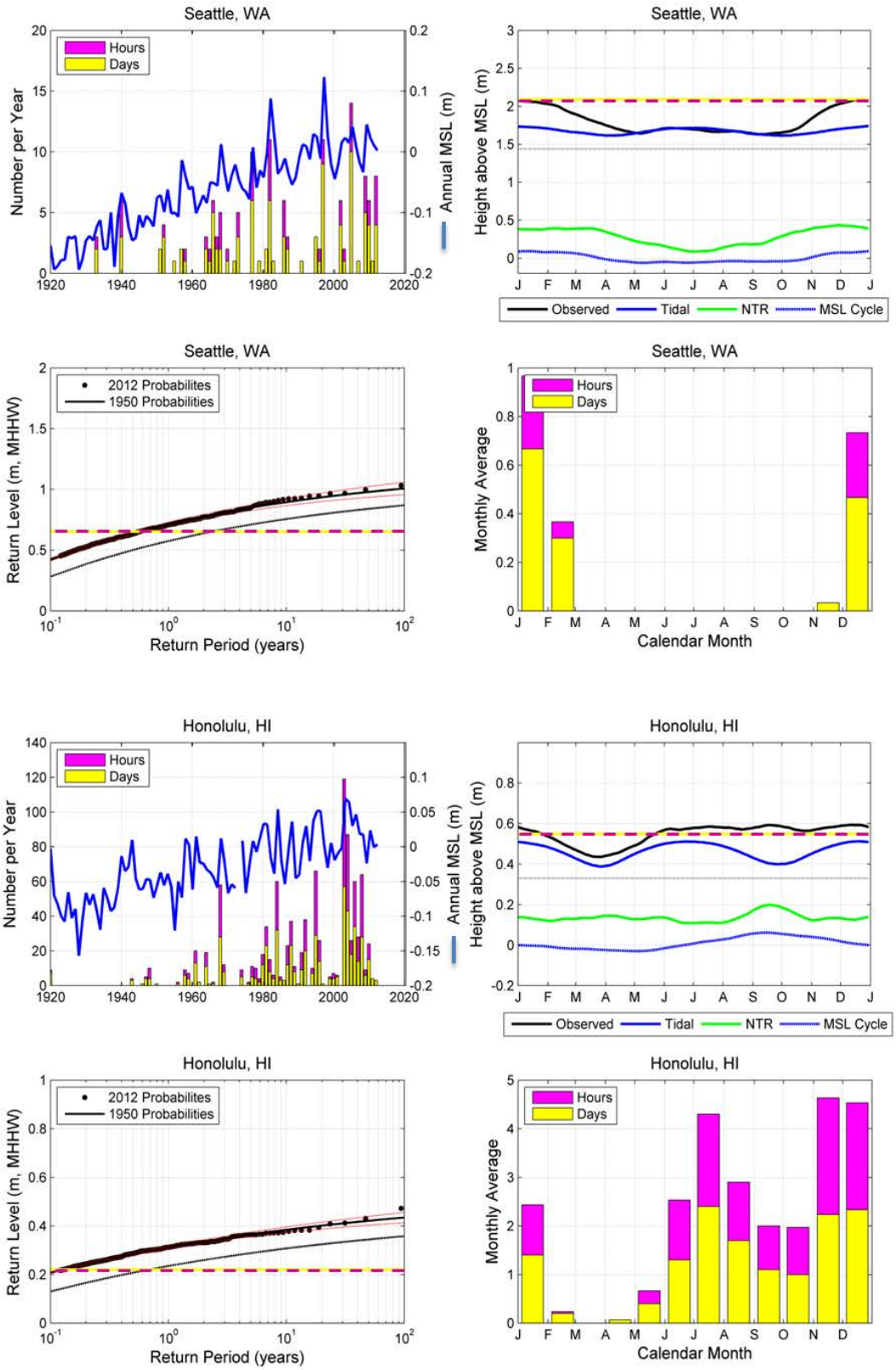
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
San Francisco, CA


Humboldt Bay, CA
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
Toke Point, WA


Seattle, WA
Hours
Days
Number per Year
Annual MSL (m)
Height above MSL (m)
Observed
Tidal
NTR
MSL Cycle
2012 Probabilites
1950 Probabilities
Return Level (m, MHHW)
Return Period (years)
Monthly Average
Calendar Month
Honolulu, HI

ACRONYMS

AMM	Annual Maximum Method
CO-OPS	Center for Operational Oceanographic Products and Services
ENSO	El Niño Southern Oscillation
GEV	Generalized Extreme Value
GPD	Generalized Pareto Distribution
MHHW	Mean Higher High Water
MSL	Mean Sea Level
NAO	North Atlantic Oscillation
NOAA	National Oceanic and Atmospheric Administration
NTDE	National Tidal Datum Epoch
NTR	Nontidal Residual
NWLON	National Water Level Observation Network
NWS	National Weather Service
ONI	Oceanic Niño Index
PacIOOS	Pacific Integrated Ocean Observing System
PDO	Pacific Decadal Oscillation
POT	Peak Over Threshold
SLR	Sea Level Rise
WFO	Weather Forecasting Offices

A bulkhead and land berm system is the main barrier between the mainland and the bay. In order to determine the height along the barrier, a survey of bayfront properties was conducted on January 15th and completed January 31, 2019. The GPS receiver was placed on each property's barrier top surface and that elevation was recorded in the North American Vertical Datum of 1988. The values in feet are listed in the Excel spreadsheet of positions and lot & block data. The Borough data was obtained from the most recent NJ State Lot/Block records.

The current bulkhead ordinance for the Borough of Wildwood Crest Chapter 17 Bulkheads requires the top elevation of constructed bulkheads to be set to a minimum elevation of 8.0 msl Datum 1929. The required height can be converted to NAVD 1988 by subtracting 1.3' for a required minimum elevation of 6.7 msl NAVD 1988.

Below is a list of all bulkhead points that are located on Borough owned property:

Lowest Elevation Point (NAVD 1988)	Location	Approximate Length (ft)	Comply with Current Ordinance (Y/N)
4.35	Sweet Briar Road	60	NO
4.40	Cardinal Road	70	NO
4.48	Wisteria Road	50	NO
4.61	Cresse Avenue	55	NO
4.73	Myrtle Road	50	NO
4.83	Buttercup Road	50	NO
4.89	Primrose Road	50	NO
4.94	Columbine Road	50	NO
4.99	Forget Me Not Road	50	NO
5.00	Fern Road	50	NO
5.16	Lotus Road	60	NO
5.16	Palm Road	50	NO
5.57	Morning Glory Road	50	NO
6.42	Heather Road	60	NO
6.47	Lavender Road	50	NO
6.50	Rosemary Road	55	NO
6.94	Crocus Avenue	50	YES
7.00	Aster Road	60	YES

Bulkhead Statistical Analysis

The data was collected from north to south with the Point ID number starting at 1 and increasing as the survey travelled south. The actual point count total was 448 points surveyed and added to define the horizontal extent of individual bulkheads and land berms. 134 of the 448 points recorded were on land berms located between Monterey Avenue and Jefferson Avenue. These land berms provide protection to the Borough of Wildwood Crest but are located in the Township of Lower. During the survey, anywhere adjoining bulkheads were of differing elevations, both were surveyed at least once where they met.

Many properties have decks and walkways overhanging or directly on top of the bulkhead making it challenging to determine where the bulkhead stops, and the accessory structures begin.

The data set consists of 448 individual points with each property having at least one position. Many have two minimum, with one at each end of the bulkhead structure.

LOWEST ELEVATION	**2.11 FT.**	**NAVD 1988**
HIGHEST ELEVATION	**8.35 FT.**	**NAVD 1988**
MEAN ELEVATION	**5.49 FT.**	**NAVD 1988**
MEDIAN ELEVATION	**5.33 FT.**	**NAVD 1988**
STANDARD DEVIATION	**1.04 FT.**	

ONE STD. DEVIATION = 68% of DATA	**THE RANGE IS BETWEEN 4.45 & 6.53 FT.**
TWO STD. DEVIATIONS = 95% of DATA	**THE RANGE IS BETWEEN 3.41 & 7.57 FT.**

The statistics above detail the range in elevations recorded, show a mean above 5 feet NAVD 1988 with a standard deviation in the data of just over 1.0 feet. The normal data distribution used for analysis (Gaussian Distribution) shows that 95% of all bulkheads are at least just over 3.0 feet in elevation and up to just below 8.0 feet. The median represents the 50th percentile bulkhead (the elevation of the 224th bulkhead if ranked in order of elevation numbers).

There were 95 bulkhead data points documented to lie between 4.5 and 5.0-foot elevations with another 79 data points found to lie between 5.0 and 5.5-foot elevations. This pair of data bins represents 39% of all values found. The data is a bit bi-modal as well with a secondary peak bin value of 75 elevation locations between 6.5 to 7.0 feet. These likely represent the suite of newer timber bulkheads put in place as the properties develop. There are 44 and 22 locations a half foot lower and a half foot higher than this secondary mode in the data. This three-bin cluster represents 141 bulkhead locations in the Borough of Wildwood Crest.

The graph below best shows the distribution of bulkhead and land berm elevations with the actual number of data points shown above each red bar. The Gaussian Distribution yields the standard deviation and the mean (average elevation) and the median (50th percentile value of all data).

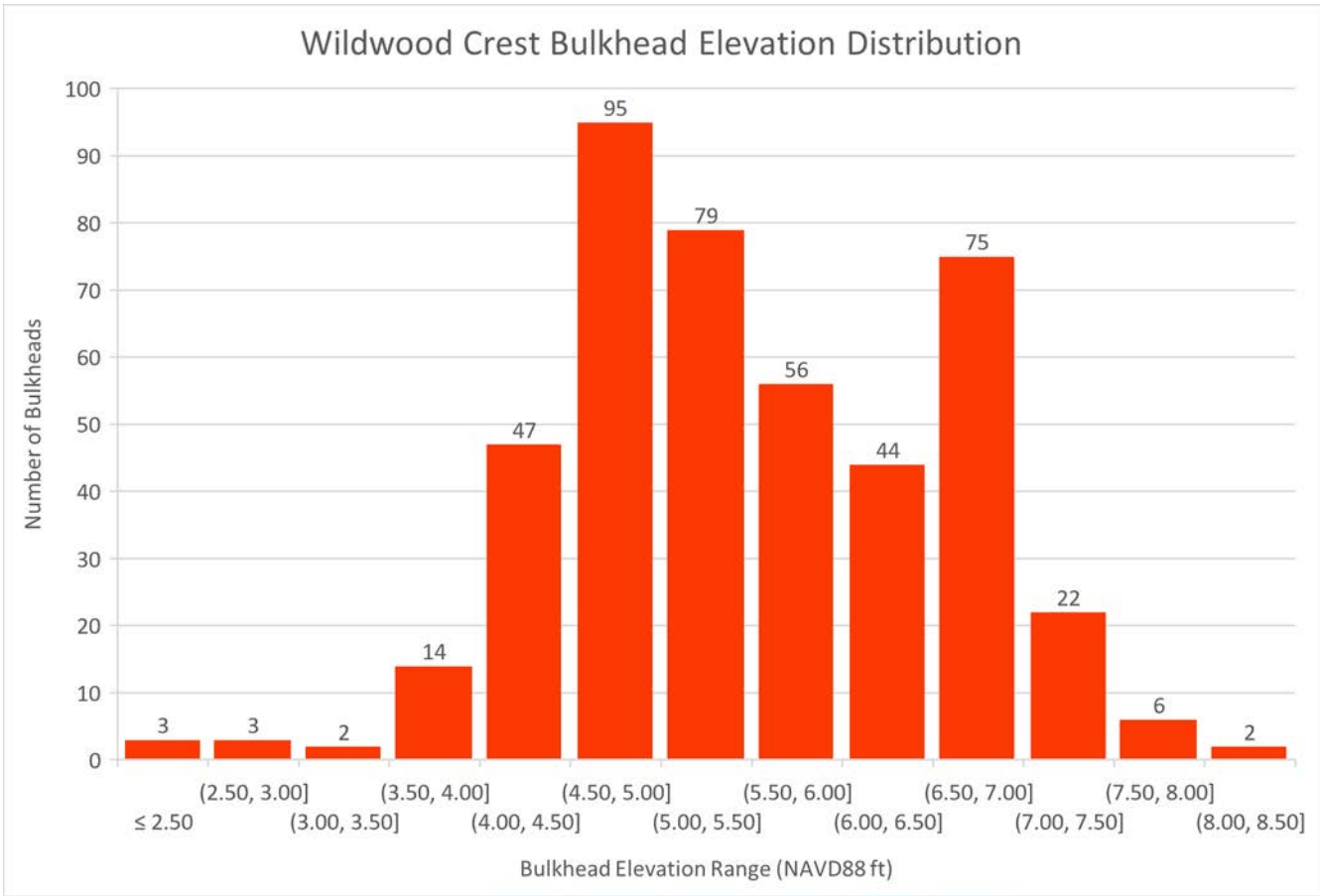


Figure 1. Statistical results for the bulkhead and land berm elevations found in Wildwood Crest in NAVD 1988 datum numbers. The data was separated into half-foot bins starting at elevation <2.5, ranging up to elevation 8.5 feet. There were 13 bins with two medial bins containing 39% of all values. 95% of all values fell 3.41 and 7.57 feet.

The statistical analysis represents a normal evaluation using Gaussian Distributions (also called the "normal bell curve" which represents a vast number of size differences; height, length or weight ranges of entities or species found in nature).

The bayfront survey contained 134 points recorded in the Township of Lower and 314 points recorded in the Borough of Wildwood Crest. Coordination with the Township of Lower is required to address low points along the land berm between Monterey Avenue and Jefferson Avenue.

BAYSIDE BULKHEAD ELEVATION MAP
(Page Index)

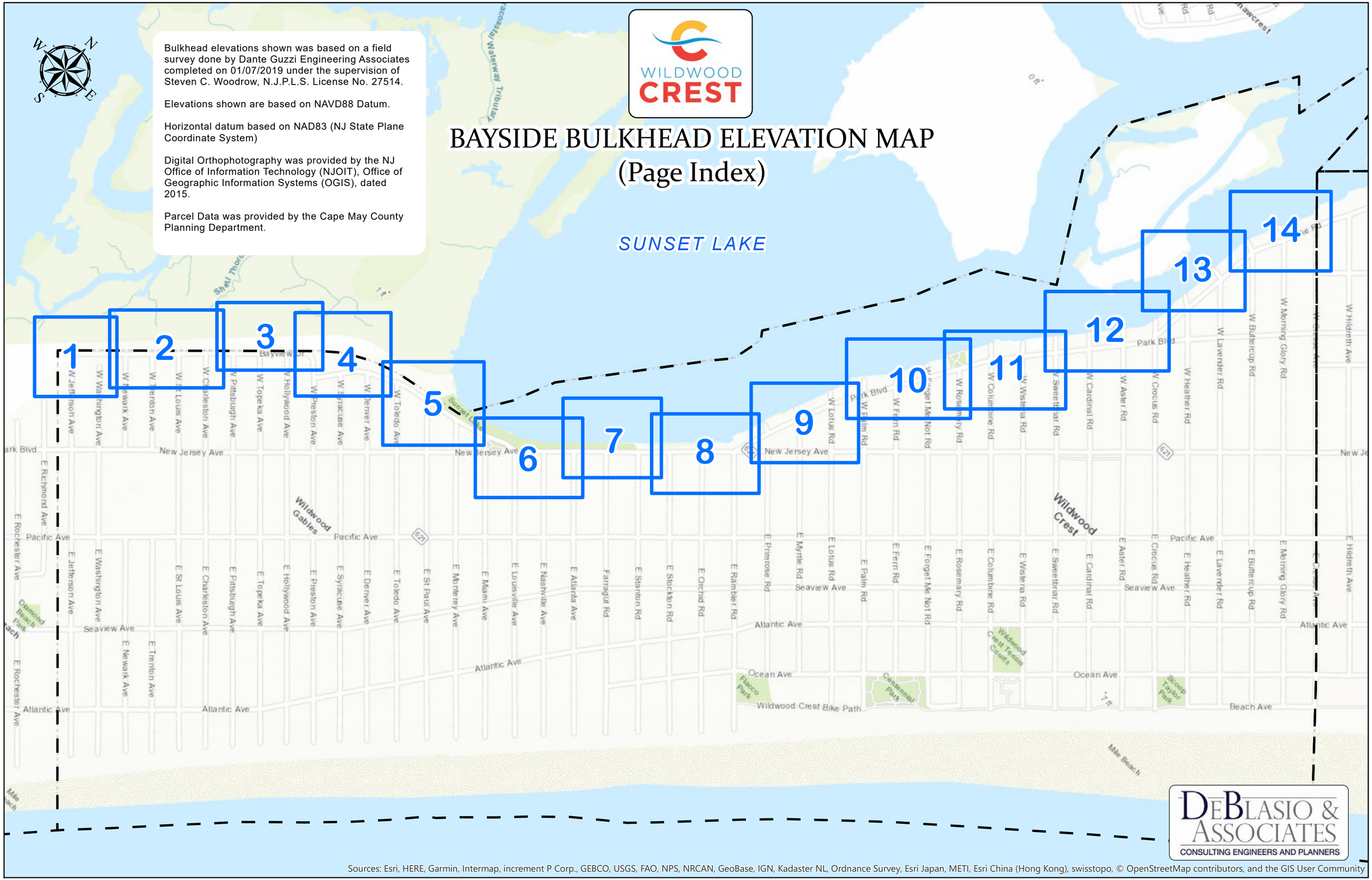
Bulkhead elevations shown was based on a field survey done by Dante Guzzi Engineering Associates completed on 01/07/2019 under the supervision of Steven C. Woodrow, N.J.P.L.S. License No. 27514.

Elevations shown are based on NAVD88 Datum.

Horizontal datum based on NAD83 (NJ State Plane Coordinate System)

Digital Orthophotography was provided by the NJ Office of Information Technology (NJOIT), Office of Geographic Information Systems (OGIS), dated 2015.

Parcel Data was provided by the Cape May County Planning Department.



DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

BAYSIDE BULKHEAD ELEVATION MAP
(Page 1)

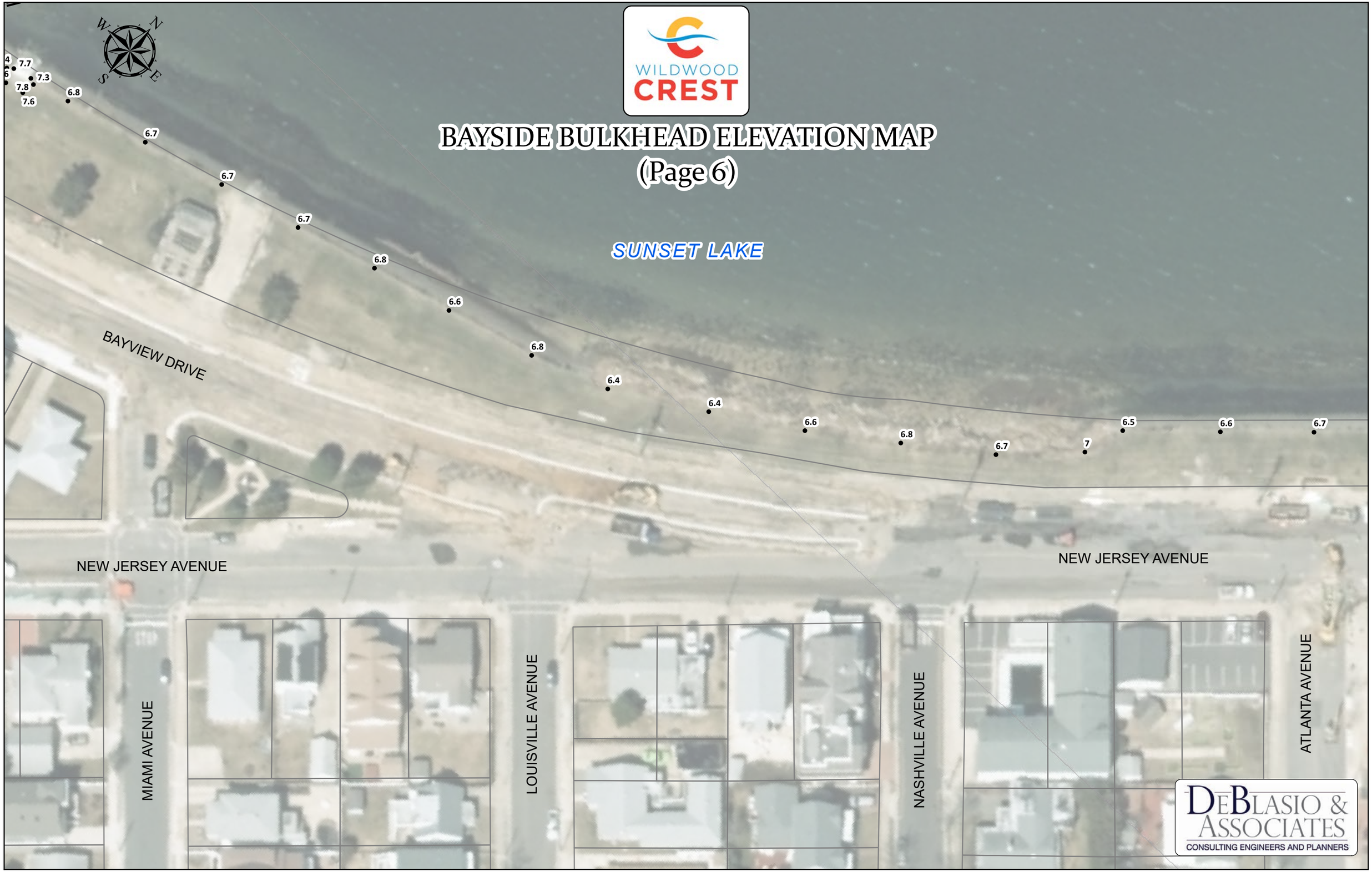
BAYSIDE BULKHEAD ELEVATION MAP
(Page 2)

BAYSIDE BULKHEAD ELEVATION MAP
(Page 3)

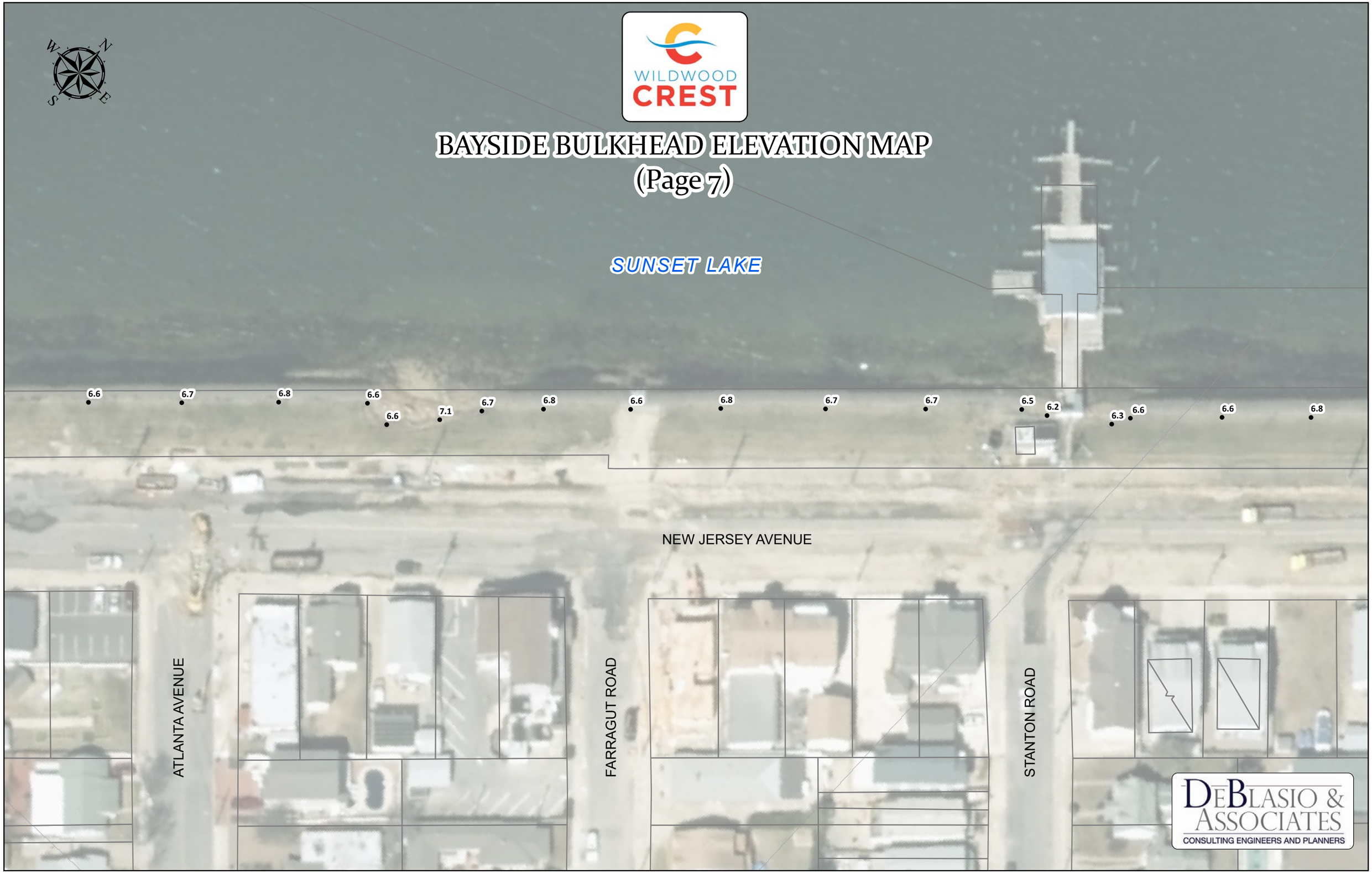
BAYSIDE BULKHEAD ELEVATION MAP
(Page 4)

BAYSIDE BULKHEAD ELEVATION MAP
(Page 5)

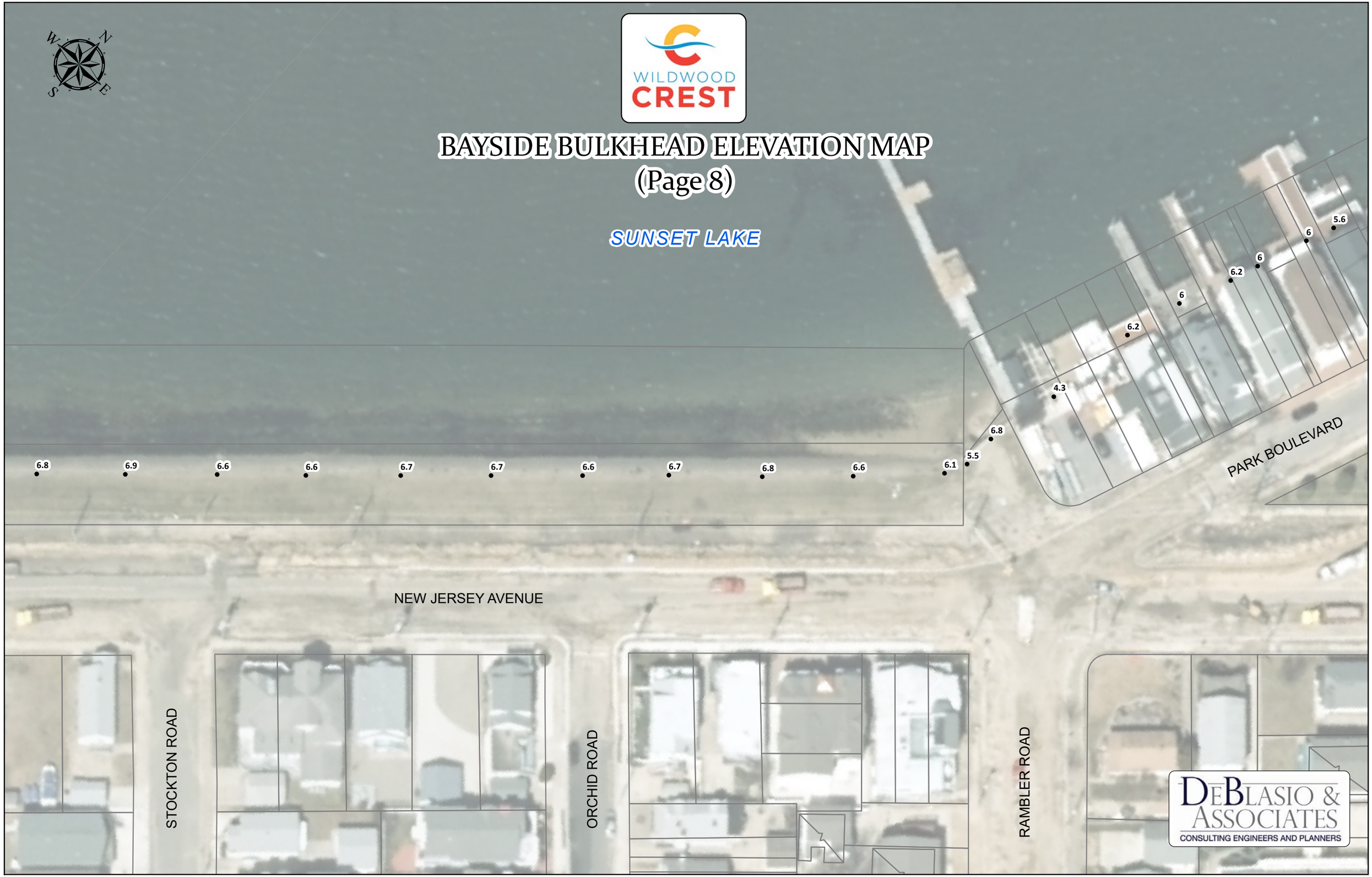
BAYSIDE BULKHEAD ELEVATION MAP
(Page 6)



BAYSIDE BULKHEAD ELEVATION MAP
(Page 7)



BAYSIDE BULKHEAD ELEVATION MAP
(Page 8)



BAYSIDE BULKHEAD ELEVATION MAP
(Page 9)

BAYSIDE BULKHEAD ELEVATION MAP
(Page 10)

BAYSIDE BULKHEAD ELEVATION MAP
(Page 11)

WILDWOOD CREST

BAYSIDE BULKHEAD ELEVATION MAP
(Page 12)

SUNSET LAKE

BAYSIDE BULKHEAD ELEVATION MAP
(Page 13)

WILDWOOD CREST

BAYSIDE BULKHEAD ELEVATION MAP
(Page 14)

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CONSULTING ENGINEERS AND PLANNERS

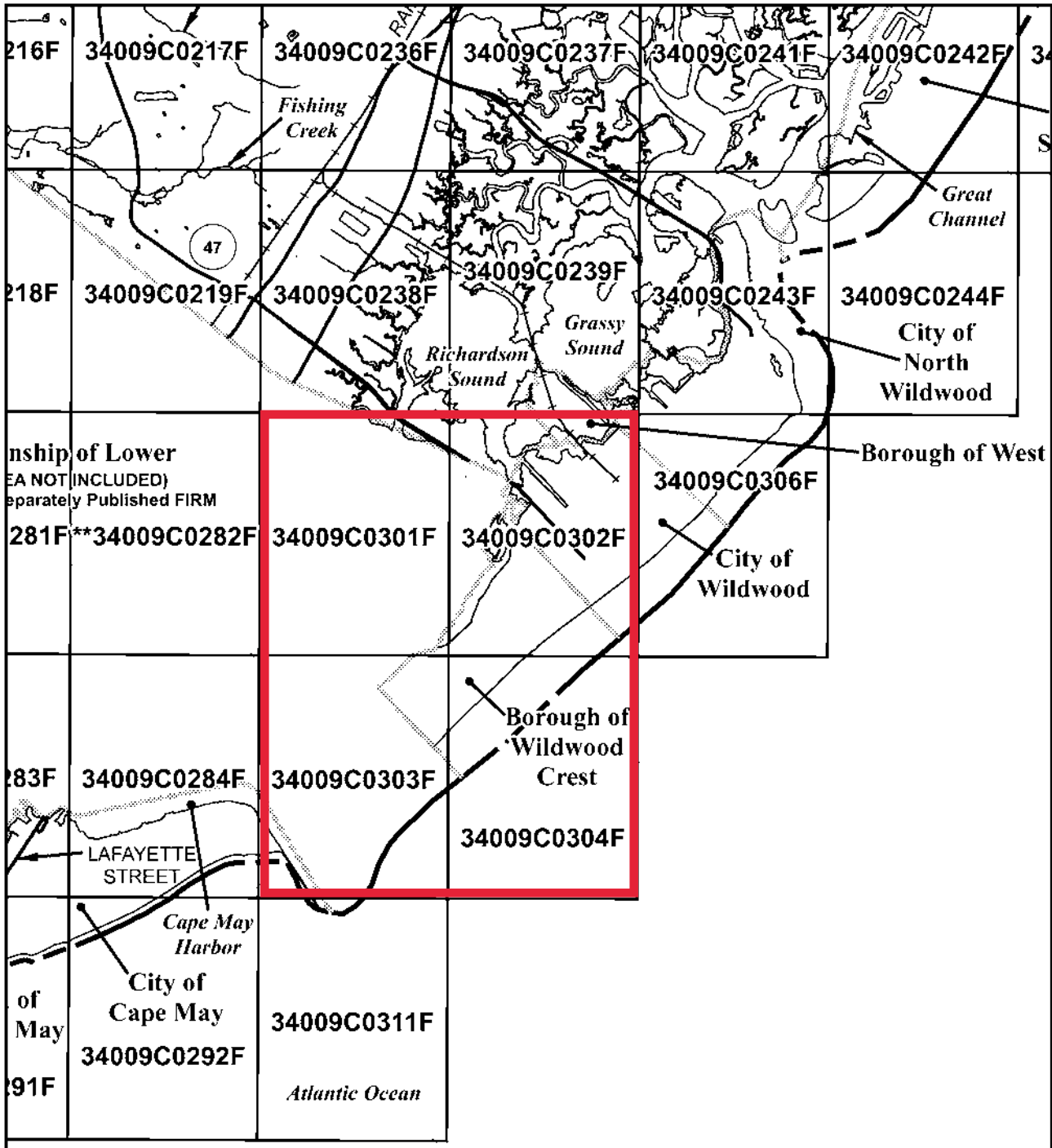
The FEMA Flood Map Service Center (MSC) is a public source for flood hazard information produced to support the National Flood Insurance Program (NFIP). By utilizing the MSC officials can find flood maps, access flood hazard products, and better understand flood risk. These maps are continually updated and can be downloaded or printed from the FEMA site. The maps are often interactive, and users can enter an address or location of interest.

Flood hazard mapping has become an important part of the NFIP and the maps help to assess flood risks and develop flood insurance rates. These rates can be found through FEMA on the Flood Insurance Rate Maps (FIRMS). The maps include information such as data for river flow, storm tides, hydrologic/hydraulic analyses, and rainfall and topographic surveys.

The map included in this report delineates the special hazard area and rick premium zones applicable to Borough of Wildwood Crest. The 1% annual flood (100-year flood) is a flood that has a 1% chance of occurring in any given year. The Special Flood Hazard Area is the area that is subject to flooding by the 1% annual chance flood. These areas include Zone A, AE, AH, AO, AR, A99, V, AND VE. These zones can be seen on the included map.

VE or V zones are properties that have a 1 percent chance of flooding in any year and also face hazards associated with coastal storm waves. High risk areas are called Special Flood Hazard Areas. These areas are required to obtain flood insurance. Elevations shown on the map are based on North American Vertical Datum of 1988 (NAVD 88). Continually updated maps give the best technical data and help to outline the community's flood risk areas.

The FIRM map for the Borough of Wildwood Crest include map number 34009C0301F-34009C0304F with effective date of October 5, 2017 and does not reflect changes which have been made after the date. Visit the FEMA Flood Map Store at www.msc.fema.gov for more information.



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM

FLOOD INSURANCE RATE MAP

CAPE MAY COUNTY,
NEW JERSEY
(ALL JURISDICTIONS)

MAP INDEX

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MAP NUMBER
34009CIND0A

EFFECTIVE DATE
OCTOBER 5, 2017

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

NOTES TO USERS

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

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The **projection** used in the preparation of this map was New Jersey State Plane (FIPS 2900) zone. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was developed from high-resolution orthophotography provided by the State of New Jersey. This information was derived from digital orthophotos produced at a scale of 1:2400 with a 1-foot pixel resolution from photography dated 2012.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

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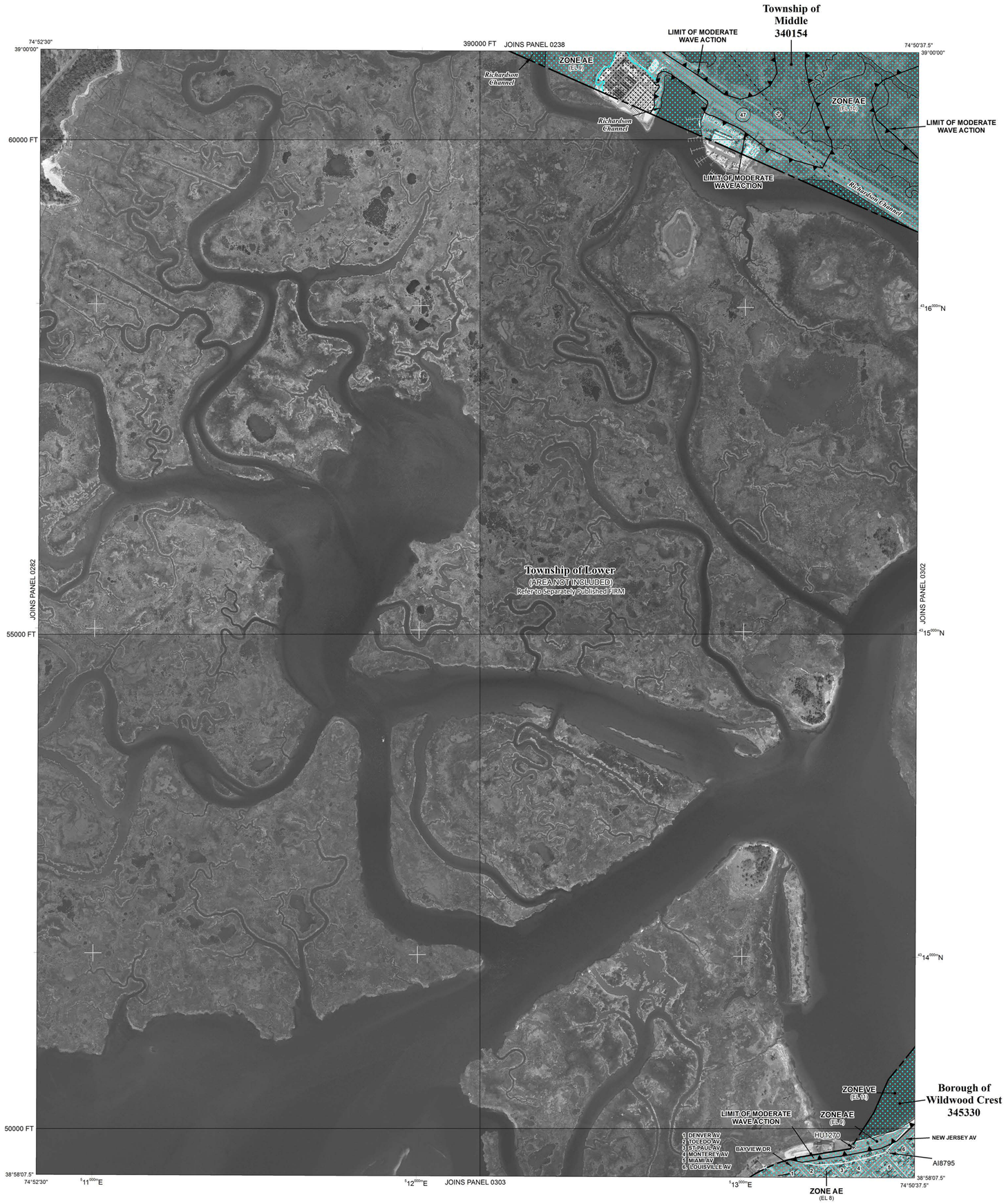

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Limit of Moderate Wave Action

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - 23	Transect line
	Culvert, Flume, Penstock or Aqueduct
	Road or Railroad Bridge
	Footbridge
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276 000m N	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid values: New Jersey State Plane coordinate system (FIPSZONE 2900), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
October 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0301F

FIRM

FLOOD INSURANCE RATE MAP

CAPE MAY COUNTY, NEW JERSEY

(ALL JURISDICTIONS)

PANEL 301 OF 311

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MIDDLE, TOWNSHIP OF	340154	0301	F
WILDWOOD CREST, BOROUGH OF	345330	0301	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
34009C0301F

EFFECTIVE DATE
OCTOBER 5, 2017

Federal Emergency Management Agency

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LEGEND

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ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Limit of Moderate Wave Action

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Culvert, Flume, Penstock or Aqueduct

Road or Railroad Bridge

Footbridge

87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

2476000mN — 1000-meter Universal Transverse Mercator grid values, zone 18

600000 FT — 5000-foot grid values: New Jersey State Plane coordinate system (FIPSZONE 2900), Transverse Mercator projection

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

● M1.5 — River Mile

MAP REPOSITORY
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
October 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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N

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0302F

FIRM

FLOOD INSURANCE RATE MAP

CAPE MAY COUNTY, NEW JERSEY
(ALL JURISDICTIONS)

PANEL 302 OF 311
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MIDDLE, TOWNSHIP OF	340154	0302	F
NORTH WILDWOOD, CITY OF	345308	0302	F
WEST WILDWOOD, BOROUGH OF	345328	0302	F
WILDWOOD CREST, BOROUGH OF	345330	0302	F
WILDWOOD, CITY OF	345329	0302	F

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MAP NUMBER
34009C0302F

EFFECTIVE DATE
OCTOBER 5, 2017

Federal Emergency Management Agency

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LEGEND

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ZONE A	No Base Flood Elevations determined.
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ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

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MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
October 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0303F

FIRM

FLOOD INSURANCE RATE MAP

CAPE MAY COUNTY, NEW JERSEY
(ALL JURISDICTIONS)

PANEL 303 OF 311

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CAPE MAY, CITY OF	345288	0303	F
WILDWOOD CREST, BOROUGH OF	345330	0303	F

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MAP NUMBER
34009C0303F

EFFECTIVE DATE
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Federal Emergency Management Agency

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was New Jersey State Plane (FIPS 2900) zone. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was developed from high-resolution orthophotography provided by the State of New Jersey. This information was derived from digital orthophotos produced at a scale of 1:2400 with a 1-foot pixel resolution from photography dated 2012.

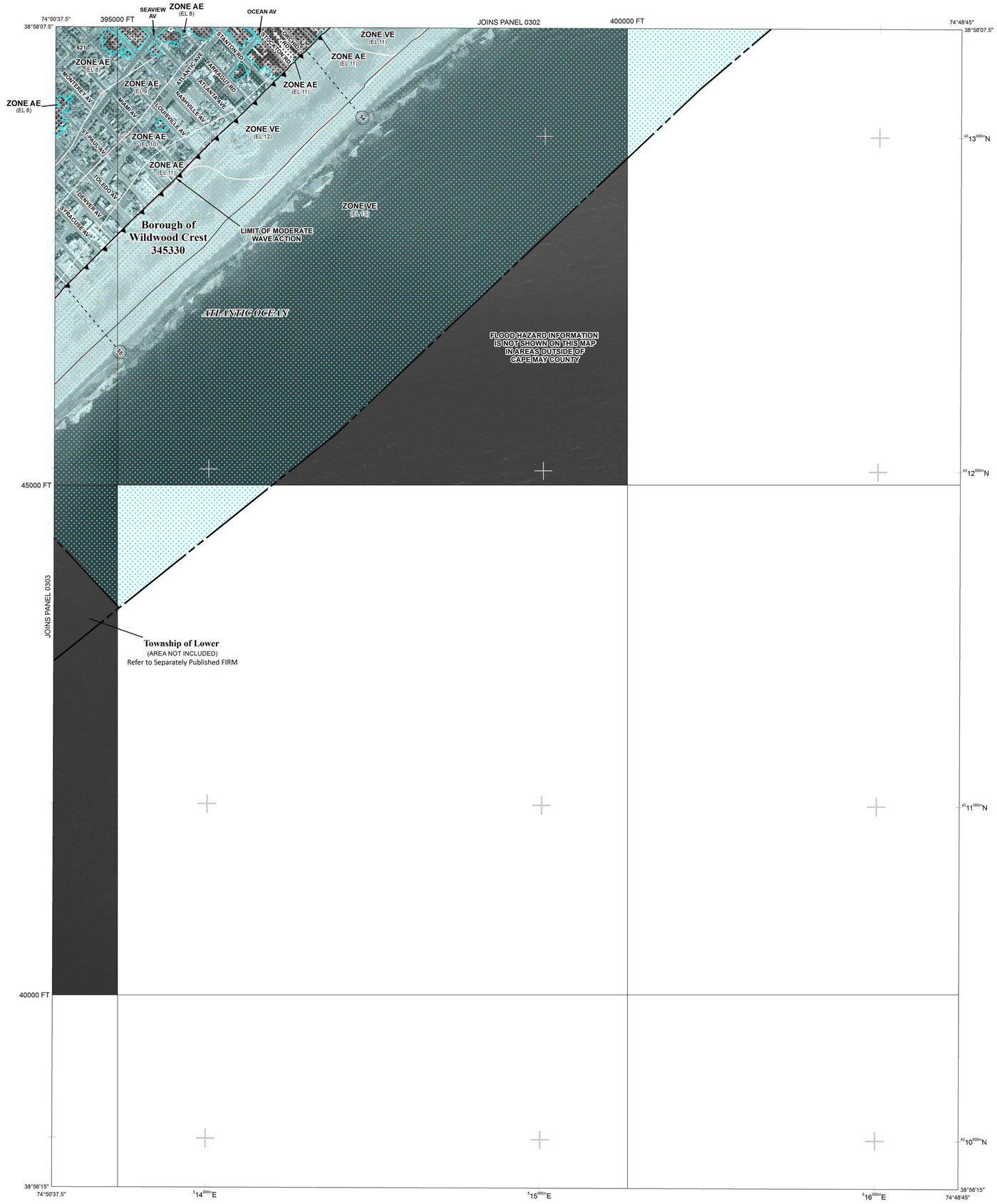
Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/national-flood-insurance-program.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

Limit of Moderate Wave Action

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

Culvert, Flume, Penstock or Aqueduct

Road or Railroad Bridge

Footbridge

87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

$^{24}76^{000m}$N — 1000-meter Universal Transverse Mercator grid values, zone 18

600000 FT — 5000-foot grid values: New Jersey State Plane coordinate system (FIPSZONE 2900), Transverse Mercator projection

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

● M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
October 5, 2017

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0304F

FIRM

FLOOD INSURANCE RATE MAP

CAPE MAY COUNTY, NEW JERSEY
(ALL JURISDICTIONS)

PANEL 304 OF 311
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WILDWOOD CREST, BOROUGH OF	345330	0304	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
34009C0304F

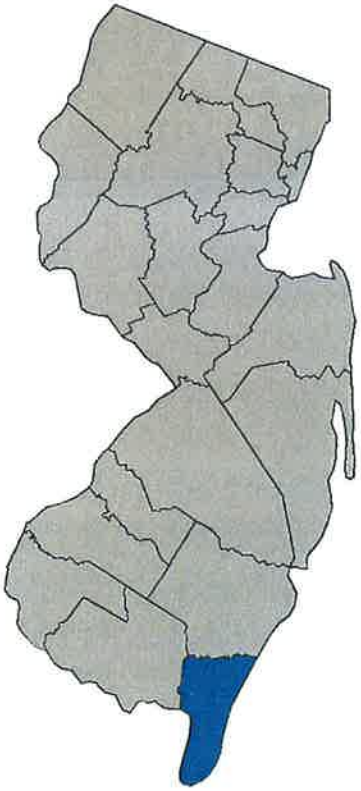
EFFECTIVE DATE
OCTOBER 5, 2017

Federal Emergency Management Agency

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 1



CAPE MAY COUNTY, NEW JERSEY

(ALL JURISDICTIONS)

COMMUNITY NAME	COMMUNITY NUMBER
AVALON, BOROUGH OF	345279
CAPE MAY, CITY OF	345288
CAPE MAY POINT, BOROUGH OF	345289
DENNIS, TOWNSHIP OF	340552
MIDDLE, TOWNSHIP OF	340154
NORTH WILDWOOD, CITY OF	345308
OCEAN CITY, CITY OF	345310
SEA ISLE CITY, CITY OF	345318
STONE HARBOR, BOROUGH OF	345323
UPPER, TOWNSHIP OF	340159
WEST CAPE MAY, BOROUGH OF	340160
WEST WILDWOOD, BOROUGH OF	345328
WILDWOOD, CITY OF	345329
WILDWOOD CREST, BOROUGH OF	345330
WOODBINE, BOROUGH OF	340164

FEMA

Effective:

OCTOBER 5, 2017

FLOOD INSURANCE STUDY NUMBER

34009CV000A

Version Number 2.1.3.0

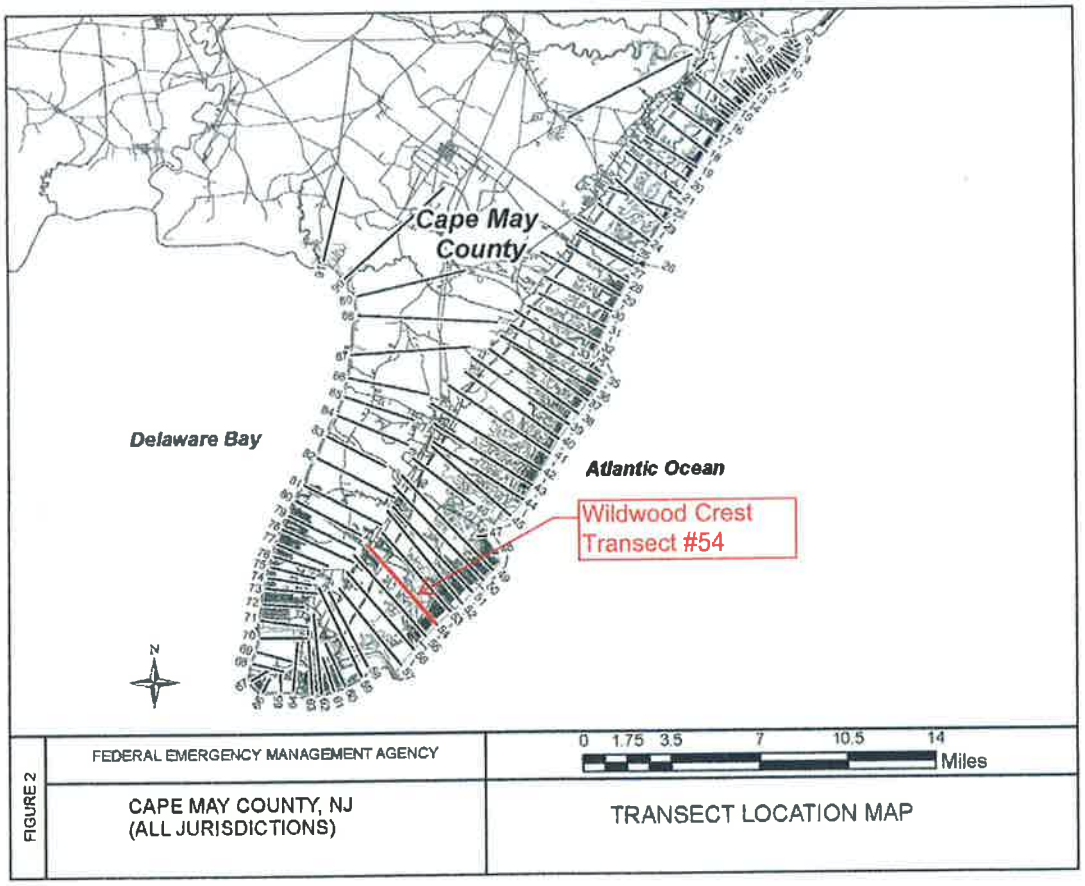


FIGURE 2 – TRANSECT LOCATION MAP

TABLE 2 – TRANSECT DATA - continued

Flood Source	Transect		Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations[1] (ft. NAVD88) Range of Stillwater Elevations[2] (ft. NAVD88)			
	Number	Coordinates	Significant Wave Height	Peak Wave Period	10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	50	N 38.991221 W 74.798163	9.30	13.30	6.3 5.8 - 7.3	8.1 7.7 - 8.9	8.9 8.3 - 9.8	11.8 9.8 - 12.4
Atlantic Ocean	51	N 38.984349 W 74.806213	11.81	13.35	6.2 5.8 - 7.2	8.1 7.8 - 9.2	8.9 8.4 - 10.2	11.7 9.8 - 12.9
Atlantic Ocean	52	N 38.978315 W 74.814347	11.65	13.27	6.1 5.0 - 8.1	7.9 7.7 – 9.0	8.6 8.3 - 9.9	11.5 9.8 - 12.4
Atlantic Ocean	53	N 38.973435 W 74.822708	11.82	13.37	6.2 10-YEAR	7.9 50-YEAR	8.6 100-YEAR	11.5 500-YEAR
Atlantic Ocean	54	N 38.966463 W 74.833312	12.15	12.67	6.2 5.5 - 6.9	8.0 6.8 - 9.1	8.7 7.7 - 10.2	11.6 9.3 - 12.9
Atlantic Ocean	55	N 38.960130 W 74.841650	12.37	12.41	6.2 5.4 - 6.7	8.0 6.8 - 9.1	8.7 7.7 - 10.1	11.6 9.2 - 12.8
Atlantic Ocean	56	*	*	*	*	*	*	*
Atlantic Ocean	57	*	*	*	*	*	*	*
Atlantic Ocean	58	N 38.941412 W 74.883776	9.98	13.28	6.1 5.8 - 6.2	7.8 7.0- 7.8.0	8.5 7.8 - 8.5	11.3 9.2 - 11.3
Atlantic Ocean	59	N 38.938349 W 74.889912	10.10	12.92	6.0 5.8 - 7.2	7.7 6.9 - 7.7	8.4 7.7 - 8.4	11.1 9.0 - 11.1
Atlantic Ocean	60	N 38.933080 W 74.902288	10.78	12.71	5.8 3.7 - 6.3	7.7 7.2 - 7.8	8.5 8.0 - 8.5	11.0 9.6 - 11.1
Atlantic Ocean	61	N 38.930518 W 74.910757	9.65	13.18	6.0 5.9 - 6.3	7.6 7.2 - 7.7	8.3 8.0 - 8.4	10.7 9.7 - 10.8
Atlantic Ocean	62	N 38.929185 W 74.919659	10.58	12.66	6.0 5.2 - 6.3	7.6 7.3 - 7.6	8.3 8.0 - 8.3	10.5 9.5 - 10.5
Atlantic Ocean	63	N 38.929183 W 74.926473	9.76	12.70	6.0 2.1 - 6.4	7.5 6.8 - 7.6	8.2 7.4 - 8.3	10.4 8.8 - 10.5
Atlantic Ocean	64	N 38.931336 W 74.940576	8.24	13.10	5.9 1.4 - 6.3	7.5 6.7 - 7.7	8.1 7.2 - 8.4	10.2 8.1 - 10.6
Atlantic Ocean	65	N 38.931264 W 74.949562	7.31	12.51	5.9 2.2 - 6.3	7.5 6.7 - 7.5	8.1 7.2 - 8.1	10.0 8.1 - 10.1

[1]Stillwater elevations include the contribution from wave setup.

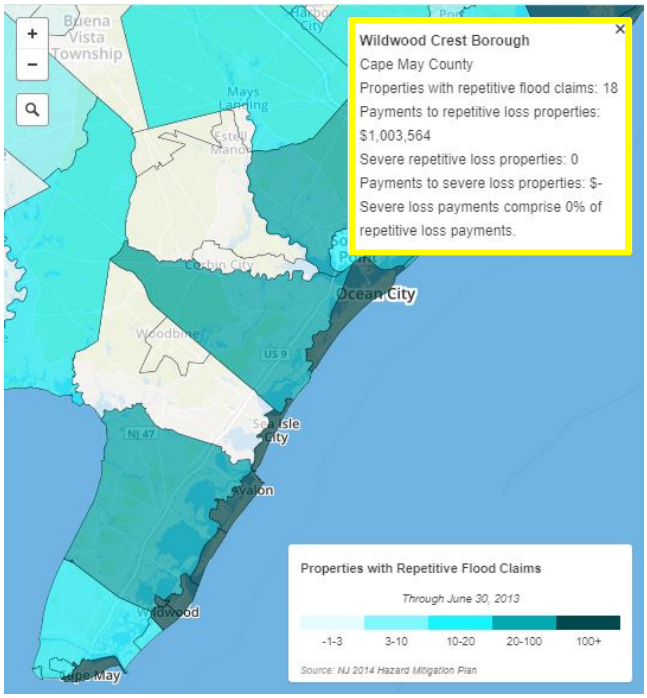
[2]For transects with a constant stillwater elevation, only one number is provided to represent both the starting value and the range.

*Data not included (transect is located within the Township of Lower)

Flooding has become the most costly and most common natural disaster in the United States. A useful indicator to assess where damaging flood occurs can be found in the National Flood Insurance Program (NFIP) data. The NFIP keeps track of repetitive loss properties in the country. The number of repetitive loss properties has been increasing each year. A property is considered a repetitive loss where is has two or more losses reported which were paid more than $1,000 for each loss. These losses must be within 10 years of each other and be at least 10 days apart. These properties go back to January 1, 1978. Also, a property can be considered a severe loss property:

- Has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.
- For both of the above, at least two of the referenced claims must have occurred within any 10- year period, and must be greater than 10 days apart.

When looking at New Jersey, Cape May County historically has the highest number of repetitive loss claims. FEMA is especially concerned with RL and SRL properties as they repetitively strain the resources of the NFIP. The map below shows the distribution of properties with repetitive flood claims:



Source: New Jersey Spotlight, Interactive Map, 2014. https://www.njspotlight.com/stories/14/04/10/repetitive-losses/

Ratable Loss

Reoccurring flood damage can have a devastating impact on property value. This impact can be seen by looking at assessed property values before and after Superstorm Sandy. The analysis below is based on parcel data from 2012 and 2013. The New Jersey Department of Treasury indicated a loss of $2 billion in property value, County-wide:

Table 8: Ratable Loss

Municipality	2012 Equalized Assessed Property Value *(in billions)*	2013 Equalized Assessed Property Value *(in billions)*	Loss in Equalized Assessed Property Value *(in billions)*	Percent Loss
Avalon Borough	$7.771	$7.638	$0.133	2%
Cape May City	$2.885	$2.799	$0.087	3%
Cape May Point Borough	$0.519	$0.509	$0.010	2%
Dennis Township	$0.923	$0.880	$0.043	5%
Lower Township	$4.018	$3.785	$0.233	6%
Middle Township	$2.954	$2.823	$0.132	4%
North Wildwood City	$2.824	$2.737	$0.087	3%
Ocean City	$12.238	$11.637	$0.601	5%
Sea Isle City	$4.472	$4.352	$0.120	3%
Stone Harbor Borough	$4.438	$4.196	$0.242	5%
Upper Township	$2.142	$2.027	$0.115	5%
West Cape May Borough	$0.492	$0.454	$0.037	8%
West Wildwood Borough	$0.254	$0.241	$0.013	5%
Wildwood City	$1.594	$1.501	$0.094	6%
Wildwood Crest Borough	$2.251	$2.201	$0.050	2%
Woodbine Borough	$0.194	$0.189	$0.005	3%
Total	**$49.968**	**$47.967**	**$2.001**	4%

Source: NJ Department of the Treasury, Table of Equalized Valuations, 2012 & 2013. http://www.state.nj.us/treasury/taxation/lpt/lptvalue.shtml

An article in the Philadelphia Inquirer by Frank Kummer "Sea Level Rise's Impact on Property Values Will Be Greatest in N.J. Shore Towns, Study Says" was released February 27, 2019. This article speaks to the impact of sea level rise on shore communities. New Jersey faces the second highest losses among states at $4.5 billion. Homes along the shore that are affected by tidal flooding appreciate at a significantly lower rate than homes unaffected by tidal flooding. The article also states that New Jersey is not only facing rising sea levels, but also land that is sinking due to its geology.

The National Flood Insurance Program (NFIP) offers flood insurance to all properties in communities that comply with minimum standards for floodplain management. The NFIP created a system to credit communities that go beyond the minimum standard. This program is known as the Community Rating System (CRS) and communities can strive to create a high standard for floodplain management. As communities meet certain criteria, they are awarded points. These points are used to rank communities and provide discounts on flood insurance premiums.

Communities can gain credits by following the CRS Coordinator's Manual and verifying their efforts. Based on the amount of credit points the community earns, the CRS assigns a rate class. The rate class is used to determine the discount on insurance premiums. Below displays the points and how they relate to the corresponding discount.

NFIP Discount Classes

Class	Credit Points	Floodplain Discount	Non-Floodplain Discount
1	4,500	45%	10%
2	4,000	40%	10%
3	3,500	35%	10%
4	3,000	30%	10%
5	2,500	25%	10%
6	2,000	20%	10%
7	1,500	15%	5%
8	1,000	10%	5%
9	500	5%	5%
10	< 500	0	0

Communities throughout Cape May County participate in the CRS and vary in current class. The table below displays Cape May County communities and current class as of October 1, 2018:

Community Number	Community Name	CRS Entry Date	Current Class
345279	Borough of Avalon	10/1/1996	5
345288	City of Cape May	10/1/1994	6
345289	Borough of Cape May Point	10/1/1993	6
340153	Township of Lower	10/1/2018	7
345308	City of North Wildwood	10/1/2000	6
345310	City of Ocean City	10/1/1992	5
345318	City of Sea Isle	10/1/1992	3
345323	Borough of Stone Harbor	10/1/1994	5
340159	Township of Upper	10/1/2011	5
345328	Borough of West Wildwood	10/1/1993	10
345329	City of Wildwood	05/1/2016	5
345330	Borough of Wildwood Crest	10/1/1993	6

The CRS provides credits for 19 different activities from four series. These activities are attached and can be found in the CRS Coordinator's Manual for the latest information.

As seen in the survey completed in January 2019, there is a wide range of bulkhead heights along bayfront properties. The height of the bulkhead varies from 2.326 ft to 9.425 ft with an average of 6.06 ft North American Vertical Datum of 1988 (NAVD88). With inconsistent bulkhead heights along the bay, some areas are more prone to localized flooding than others. As coastal flooding becomes more prevalent, coastal communities have started introducing new bulkhead ordinances with higher finished elevation requirements. Listed below are Atlantic and Cape May County coastal communities and their corresponding bulkhead ordinance height requirements. As of December, 2018 the mean required elevation is 7.58 ft NAVD 88 for bayfront bulkheads.

TOWN	1929 DATUM	1988 DATUM
ATLANTIC CITY		
AVALON	9.3	8
CAPE MAY		
LONGPORT	11.05 - 11.55	9.75 - 10.25
LOWER TOWNSHIP		
MARGATE	9.3 Bay, 14.3 Ocean	8.0 Bay, 13.0 Ocean
MIDDLE TOWNSHIP	8	6.7
NORTH WILDWOOD	8	6.7
OCEAN CITY	8.3 Bay, 12.3 Ocean	7.0 Bay, 11.0 Ocean
SEA ISLE CITY	7.5	6.2
SOMERS POINT	8.3-15.3	7.0-14.0
STONE HARBOR	9.3	8
UPPER TOWNSHIP	9.3	8
VENTNOR	9.3 Bay, 11.8 Ocean	8.0 Bay, 10.5 Ocean
WEST WILDWOOD	9.8	8.5
WILDWOOD	conform to height of contiguous bulkhead	
WILDWOOD CREST	8	6.7

**to convert to 1929 Datum to 1988 Datum subtract 1.30'*

The Borough of Wildwood Crest should adopt a new bulkhead ordinance to establish a new, minimum bulkhead height elevation. The bayfront bulkheads are the primary barrier between the residents and tidal water flooding. Once the tide reaches the lowest bulkhead elevation, residents are susceptible to localized flooding. Based on FEMA's anticipated sea level rise in 2050, the new ordinance should specify a minimum height of 8.0 feet NAVD 88 for all existing, constructed, reconstructed, and/or repaired bulkheads. The entire bulkhead should be watertight above grade to provide a strong flood barrier. The recommended bulkhead ordinance is provided as a draft and is attached in the appendix.

The Borough of Wildwood Crest is becoming more developed as the community progresses. Impervious surfaces increase peak flow during rain events and do not retain water. The rapid progression to impervious surfaces on residential properties throughout the community increase pressure on the stormwater sewer infrastructure. During a rain event, water reaches the impervious surfaces and immediately runs to areas of lower elevation, usually the roadway. If properties continue to move away from grass and stone lawns, it will increase this issue and flood the roadway more often.

a. Lot Grading Ordinance

The Borough of Wildwood Crest should adopt a new lot grading ordinance to establish lot grading minimums and increase underground storage. The proposed ordinance would require all lot grading applications to be reviewed by the Borough's engineer. The engineer must determine how the proposed grading plan will affect the adjacent properties and storm sewer system. Properties should slope towards the road and retain as much water underground as possible.

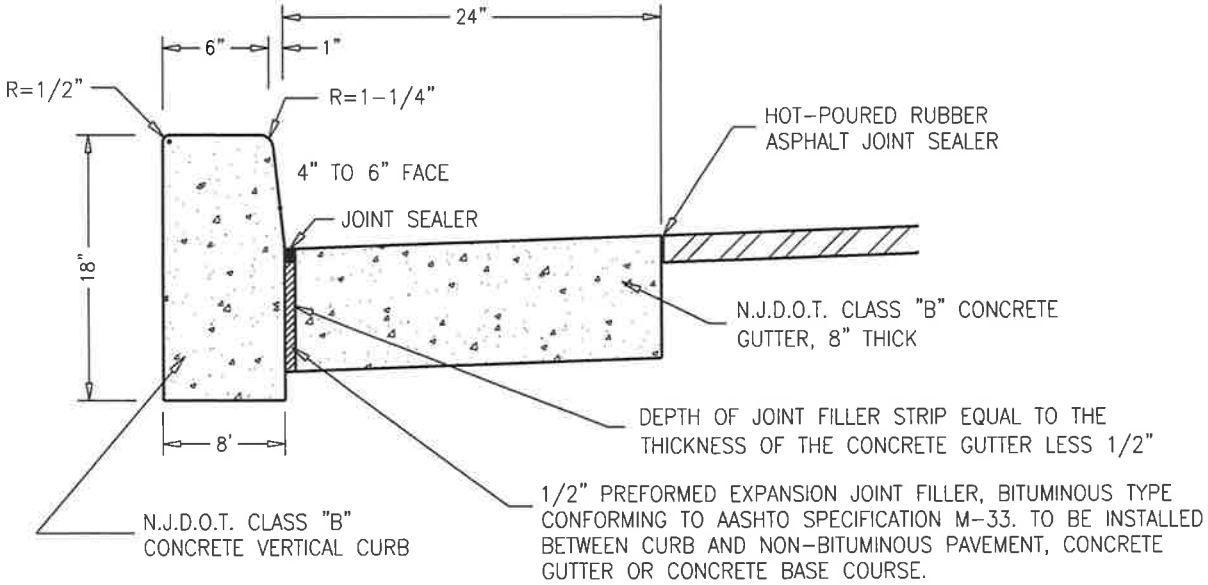
The ordinance states that all grading plans shall be submitted with all zoning permits for new construction, any alterations which increase impervious coverage by 5% or more of the total lot area, installation of impervious improvements four feet from an adjacent property, any change in grade, or the construction of a retention wall. The minimum slope for lawns shall be 1 ½% and 4/10 of 1% for hard finished surfaces. The use of retaining walls shall be designed by a New Jersey Licensed professional engineer. The grading plan will be reviewed and approved by the Borough's engineer.

A beneficial system is developed in the ordinance for underground stormwater storage. The ordinance creates a minimum requirement to install an underground storm water recharge system that will limit the amount of runoff generated by the construction. It also provides a predesigned system to retain the water and will be approved by the Borough's engineer. The applicant shall install five linear feet of underground stormwater storage (Detail S-1) for every five hundred square feet of impervious coverage.

After construction is completed, the applicant will also be required to verify the height of the completed property and structure. A New Jersey Professional Land Surveyor shall provide verification of the lot grading plan. The recommended lot grading ordinance is provided as a draft and is attached in the appendix.

b. Topography Adjustments

As roadways receive stormwater from adjacent properties, they need to be graded correctly to flow water to the proper place. Asphalt is often not installed with the proper elevations and it can create a ponding affect as seen in the attached photograph. A solution to this problem is to utilize a concrete gutter. Concrete can be placed more precisely than asphalt and can drain nearly flat roadways. The minimum grade for a roadway with a curbed section without a sloped gutter is 0.3 percent according to the 2015 N.J.D.O.T. Roadway Design Manual. A concrete sloped gutter must be installed if the grade rate is less than 0.3 percent. It is recommended that all proposed roadways be installed with the use of concrete gutters. The asphalt is placed to drain towards the concrete curb and gutter, thus allowing water to flow properly. The detail for a concrete vertical curb and concrete gutter is attached.



NOTES:

1. TRANSVERSE JOINTS 1/2" WIDE SHALL BE INSTALLED IN THE CURB 20'-0" APART AND SHALL BE FILLED WITH PREFORMED, BITUMINOUS-IMPREGNATED FIBER JOINT FILLER, COMPLYING WITH THE REQUIREMENTS OF AASHTO M-213, RECESSED 1/4" FROM THE FRONT FACE AND TOP OF CURB.

2. DUMMY JOINTS (FORMED) SHALL BE INSTALLED MIDWAY BETWEEN EXPANSION JOINTS.

CONCRETE VERTICAL CURB AND CONCRETE GUTTER DETAIL

N.T.S.

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
BOROUGH OF WILDWOOD CREST
CAPE MAY COUNTY, NEW JERSEY

DEBLASIO & ASSOCIATES
CONSULTING ENGINEERS AND PLANNERS
4701 NEW JERSEY AVENUE
WILDWOOD, NJ 08260
PHONE: (609) 854-3311
FAX: (609) 854-4323

The Borough of Wildwood Crest's participation in the FEMA Community Rating System has resulted in significant savings for its residents. Currently residents receive up to 20% discount on their flood insurance. With continued participation in the program, the Borough will provide their residents with financial benefits. The benefits greatly outweigh the costs, which include the wages, salaries, and professional fees required to implement the program.

There are 18 floodplain management activities and the Borough should strive to participate in as many activities as possible. The CRS offers some non-financial benefits as well. The community receives recognition from a national evaluation program, technical assistance in designing and implementing activities, and monitoring of the community's floodplain management program.

The CRS should be reviewed and updated annually to maintain an effective program. By reviewing the program, it will ensure the Borough continues to participate in as many activities as possible. As more points are gained, residents will receive higher discounts on their flood insurance. Activities can also be implemented with the assistance from a state or regional agency. Continued cooperation with other agencies can alleviate local expense.

A main component of the CRS includes informing residents about the flood hazard, flood insurance, and ways to reduce flood damage. The community's emergency manager should have a plan in place for flood events and should communicate this plan with the residents. Flood hazard management should continue to include preparation and prevention. The Borough should continue their concerted effort to lower flood hazards by participating in CRS related activities.

Table 2.

What You Can Do to Get Credit

The CRS grants credit for 19 different activities that fall into four series:

Series 300	Public Information	Maximum Points*	Average Points *
	This series credits programs that advise people about the flood hazard, flood insurance, and ways to reduce flood damage. The activities also provide data insurance agents need for accurate flood insurance rating.		
310	**Elevation Certificates** • Maintain FEMA elevation certificates for new construction in the floodplain. (At a minimum, a community must maintain certificates for buildings built after the date of its CRS application.)	116	38
320	**Map Information Service** • Provide Flood Insurance Rate Map information to those who inquire, and publicize this service.	90	73
330	**Outreach Projects** • Distribute outreach projects with messages about flood hazards, flood insurance, flood protection measures, and/or the natural and beneficial functions of floodplains.	350	87
340	**Hazard Disclosure** • Real estate agents advise potential purchasers of flood-prone property about the flood hazard. • Regulations require notice of the hazard.	80	14
350	**Flood Protection Information** • The public library and/or community's website maintains references on flood insurance and flood protection.	125	38
360	**Flood Protection Assistance** • Give inquiring property owners technical advice on how to protect their buildings from flooding, and publicize this service.	110	55
370	**Flood Insurance Promotion** • Assess flood insurance coverage within the community and implement a plan to promote flood insurance.	110	39
	Series 300 Total	981	3448

*Maximum and average points are subject to change. See the current *CRS Coordinator's Manual* for the latest information.

Series 400	Mapping & Regulations	Maximum Points*	Average Points *
	This series credits programs that limit floodplain development or provide increased protection to new and existing development.		
410	**Floodplain Mapping** • Develop new flood elevations, floodway delineations, wave heights, or other regulatory flood hazard data for an area not mapped in detail by the flood insurance study. • Have a more restrictive mapping standard.	802	60
420	**Open Space Preservation** • Guarantee that currently open public or private floodplain parcels will be kept free from development. • Zone the floodplain for minimum lot sizes of 5 acres or larger.	2,020	509
430	**Higher Regulatory Standards** • Limit new buildings and/or fill in the floodplain. • Require freeboard. • Require soil tests or engineered foundations. • Require compensatory storage. • Require coastal construction standards in AE Zones. • Have regulations tailored to protect critical facilities or areas subject to special flood hazards (for example, alluvial fans, ice jams, subsidence, or coastal erosion).	2,042	270
440	**Flood Data Maintenance** • Keep flood and property data on computer records. • Use better base maps. • Maintain elevation reference marks.	222	115
450	**Stormwater Management** • Regulate new development throughout the watershed to ensure that post-development runoff is no greater than pre-development runoff. • Regulate new construction to minimize soil erosion and protect or improve water quality.	755	132
	Series 400 Total	5,841	1,086

Series 500	Flood Damage Reduction	Maximum Points*	Average Points *
	This series credits programs that reduce the flood risk to existing development.		
510	**Floodplain Management Planning** • Prepare, adopt, implement, and update a comprehensive flood hazard mitigation plan using a standard planning process. • Prepare an analysis of the repetitive flood loss areas within the community. *Note: category C repetitive loss communities must receive credit for either the floodplain management plan or the repetitive loss area analysis, above.* • Prepare, adopt, implement, and update a plan to protect natural functions within the community's floodplain.	622	175
520	**Acquisition and Relocation** • Acquire and/or relocate floodprone buildings so that they are out of the floodplain.	2,250	195
530	**Flood Protection** • Protect existing floodplain development by floodproofing, elevation, or minor flood control projects.	1,600	73
540	**Drainage System Maintenance** • Have a program for and conduct annual inspections of all channels and detention basins; remove debris as needed.	570	218
	Series 500 Total	5,042	661

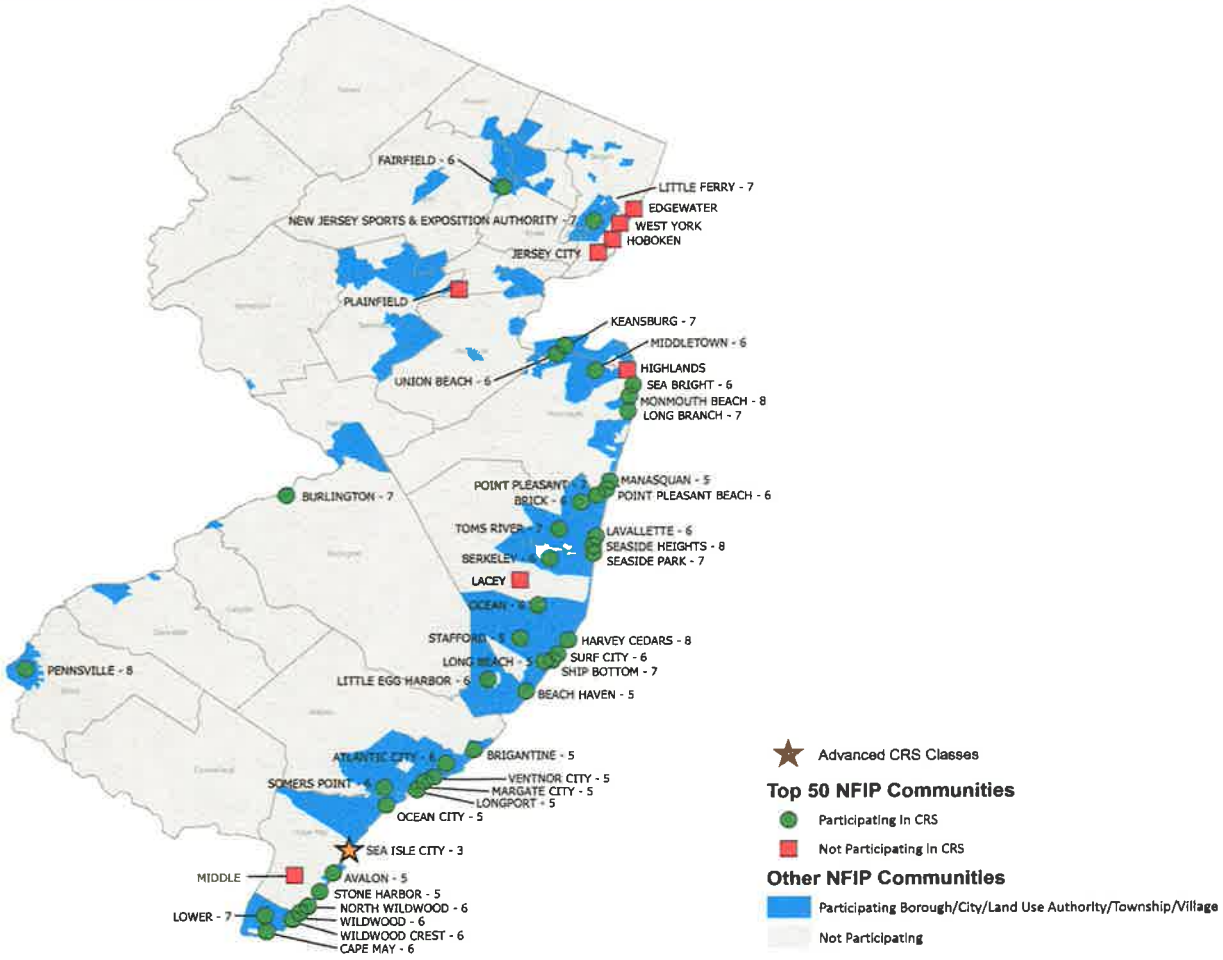
Series 600	Flood Preparedness	Maximum Points*	Average Points *
	This series credits flood warning, levee safety, and dam safety projects.		
610	**Flood Warning and Response** • Provide early flood warnings to the public, and have a detailed flood response plan keyed to flood crest predictions.	395	254
620	**Levees** • Annually inspect and maintain existing levees; have a system for recognizing the threat of levee failure and/or overtopping, disseminating warnings, and providing emergency response; and coordinate with operators of critical facilities.	235	157
630	**Dams** • Have a high-hazard-potential dam that could affect the community; have a system for recognizing the threat of dam failure, disseminating warnings, planning and practicing emergency responses; and coordinating with operators of critical facilities.	160	35
	Series 600 Total	790	446
	All Series Total	12,654	2,537

New Jersey

Top 50 National Flood Insurance Program (NFIP) Policy Count Communities* and Community Rating System (CRS) Participation

*Ranked by the total number of NFIP insurance policies-in-force

Rank	CID	Community Name	Policies	Class
1	345310	Ocean City	16,865	5
2	340222	Hoboken	9,657	--
3	345293	Toms River	8,959	7
4	340223	Jersey City	7,080	--
5	345278	Atlantic City	7,055	6
6	345286	Brigantine	6,948	5
7	345301	Long Beach	6,582	5
8	345318	Sea Isle City	6,531	3
9	345308	North Wildwood	6,257	6
10	345304	Margate City	5,486	5
11	345279	Avalon	5,076	5
12	345326	Ventnor City	4,677	5
13	345330	Wildwood Crest	4,344	6
14	345285	Brick	4,160	6
15	345329	Wildwood	3,717	5
16	340393	Stafford	3,313	5
17	340570	New Jersey Meadowlands	3,084	7
18	340376	Lacey	2,803	--
19	340313	Middletown	2,675	6
20	345323	Stone Harbor	2,671	5
21	345288	Cape May	2,626	6
22	340369	Berkeley	2,618	6
23	340153	Lower	2,610	7
24	340380	Little Egg Harbor	2,473	6
25	340029	Edgewater	2,135	--
26	345282	Beach Haven	2,135	5
27	340379	Lavallette	2,110	6
28	340307	Long Branch	2,008	7
29	345313	Point Pleasant	1,848	7
30	340388	Point Pleasant Beach	1,805	6
31	340315	Monmouth Beach	1,746	8
32	340303	Keansburg	1,697	7
33	345320	Ship Bottom	1,522	7
34	345324	Surf City	1,516	6
35	345303	Manasquan	1,494	5
36	345302	Longport	1,408	5
37	340389	Seaside Heights	1,374	8
38	345319	Seaside Park	1,317	7
39	340229	West New York	1,283	--
40	340331	Union Beach	1,141	6
41	340154	Middle	1,104	--
42	345317	Sea Bright	1,098	6
43	345312	Plainfield	1,095	--
44	345297	Highlands	1,056	--
45	345295	Fairfield	1,011	6
46	340512	Pennsville	979	8
47	345287	Burlington	974	7
48	345296	Harvey Cedars	963	8
49	340017	Somers Point	934	6
50	340518	Ocean	932	6



CRS Class Data: October 1, 2018 / Policy Data: August 31, 2018

For a full list of all CRS Communities as of October 1, 2018, visit http://bit.ly/CRS_FIM_Oct_2018.

NOTES:

As of October 2018, 552 communities in New Jersey participate in the National Flood Insurance Program (NFIP).

Of these communities, 95 (or 17%) participate in the Community Rating System (CRS).

Of the top 50 New Jersey communities (in terms of flood insurance policies-in-force), 42 participate in the CRS.

The remaining 8 communities present an outreach opportunity for encouraging participation in the CRS.

FEMA

NFIP/CRS

Benefits of Joining the CRS

* *Activities credited by the CRS provide direct benefits to the community, including enhanced public safety, reduction in flood damage and environmental protection.*
* *Residents are reminded that the community is working to protect them from flood losses.*
* *Public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.*
* *Money stays in the community instead of being spent on insurance premiums.*

As discussed throughout the report, flooding has become an increasing problem for the Borough of Wildwood Crest. In addition to property damage, flooding creates inaccessible and dangerous roadways. Motorists are often unaware of flooded roadways and can be susceptible to dangers created by slippery surfaces. Multiple companies have developed flood warning signs to notify motorists when roads ahead can be flooded.

It is recommended that the Borough investigate installing flood warning signs in flood prone areas. Flood warning signs can include manufacturers that produce traffic products and warning systems with sensors that detect wet and slippery roads and forewarn motorists. These systems utilize non-corrosive sensors that can operate in salt/sea, brackish, fresh, and icy slush. When the sensor gets wet, it activates the warning system. It will cause the beacon to flash or send a signal to a transmitter. The transmitter sends a signal to a receiver that causes the beacon on the pole to flash if desired. If the sensor is wet, the beacon will continue to flash. When the flooding recedes, the beacon will stop flashing. These systems can be AC or DC powered. The sensor is embedded in the pavement on a roadway that experiences flooding and is flush with the surface. A wire connects the sensor to the flasher. Flood warning signs can be equipped with sensors to capture the flood event. Some signs can also be equipped with cameras that when the sensor detects flood water, the camera takes 15 pictures and sends them to the Borough. The pictures are then analyzed, and residents can be notified through text message, email, or recorded message.

It is also recommended that the Borough investigate installing high water level sirens which can be utilized to warn residents of impending floods. High power speaker arrays project clear voice reproductions over a 360° area. These systems alert residents through a prerecorded message or broadcast live. Manufacturers provide guidance to an area that requires warning sirens. The location and number of sirens is determined to ensure all areas of interest are covered. The Engineer's Opinion of Probable Cost for this recommended improvement can be found in Section 7 of this report.

Embedded
Wet Road Detector

HIGH WATER
DO NOT
ENTER WHEN
FLASHING

The Borough of Wildwood Crest utilizes bay and ocean outfall pipes to drain the area of storm water. The proposed area is delineated into 6 (six) distinct drainage areas. These areas can be seen on the Proposed Drainage Area Map. Each drainage area was analyzed using HydroCAD to calculate the predicted flow during a 2-year flood, 5-year flood, 10-year flood, and 25-year flood based on future development resulting in a 70 percent impervious surface. A 2-year flood event, for example, can be described as a fifty percent annual chance flood. This flood has a fifty percent chance to occur every year.

1. A-B: is bounded generally on the North by Toledo Avenue, the South by the border of the Township of Lower, the East by the Atlantic Ocean, and the West by Shell Thorofare with a total drainage area of 8,413,527 square feet.

   According to HydroCAD the flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	113.47	162.58	206.01	270.96

2. C: Miami Avenue Bay Outfall Area is bounded generally on the North by Nashville Avenue, the South by Toledo Avenue, the East by the midblock between Seaview Avenue and Pacific Avenue, and the West by Sunset Lake with a total drainage area of 1,516,999 square feet.

   According to HydroCAD the flow through the outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	17.04	24.46	31.05	40.90

3. D: Farragut Road Bay Outfall Area is bounded generally on the North by Orchid Road, the South by Nashville Avenue, the East by Seaview Avenue, and the West by Sunset Lake with a total drainage area of 1,263,280 square feet.

   According to HydroCAD the flow through the Outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	14.19	20.37	25.85	34.06

4. E-M: is bounded generally on the North by Wisteria Road, the South by Orchid Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 2,983,368 square feet.

   According to HydroCAD the flow through the Outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	33.50	48.10	61.06	80.43

5. N-V: is bounded generally on the North by the border of the City of Wildwood, the South by Wisteria Road, the East by Pacific Avenue, and the West by Sunset Lake with a total drainage area of 4,444,022 square feet.

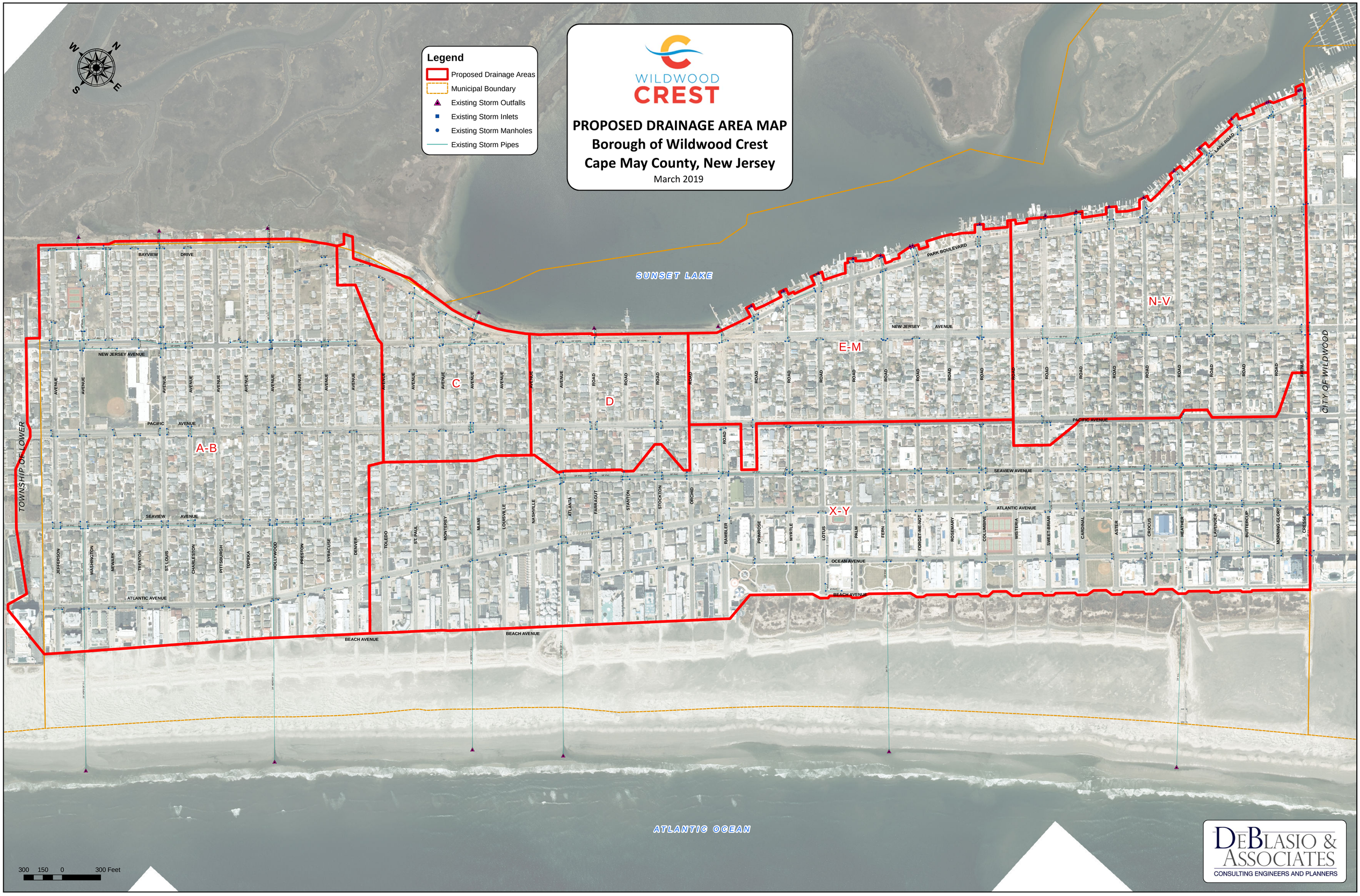
   According to HydroCAD the flow through the Outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	49.90	71.65	90.95	119.81

6. X-Y: is bounded generally on the North by Cresse Avenue, the South by the midblock between Toledo Avenue and Denver Avenue, the East by the Atlantic Ocean, and the West by Pacific Avenue with a total drainage area of 9,800,808 square feet.

   According to HydroCAD the flow through the 24” outfall:

	2-year Storm	5-year Storm	10-year Storm	25-year Storm
Predicted Flow (cfs)	110.16	158.17	200.75	264.46


WILDWOOD CREST
PROPOSED DRAINAGE AREA MAP
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
Legend
Proposed Drainage Areas
Municipal Boundary
Existing Storm Outfalls
Existing Storm Inlets
Existing Storm Manholes
Existing Storm Pipes
N
S
E
W
SUNSET LAKE
ATLANTIC OCEAN
TOWNSHIP OF LOWER
CITY OF WILDWOOD
A-B
C
D
E-M
N-V
X-Y
BAYVIEW DRIVE
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
OCEAN AVENUE
BEACH AVENUE
PARK BOULEVARD
LAKE ROAD
JEFFERSON
WASHINGTON
NEWARK
TRENTON
ST. LOUIS
CHARLESTON
PITTSBURGH
TOPEKA
HOLLYWOOD
PRESTON
SYRACUSE
DENVER
TOLEDO
ST. PAUL
MONTEREY
MIAMI
LOUISVILLE
NASHVILLE
ATLANTA
FARRAGUT
STANTON
STOCKTON
ORCHID
RAMBLER
PRIMROSE
MYRTLE
LOTUS
PALM
FERN
FORGET-ME-NOT
ROSEMARY
COLUMBINE
WISTERIA
SWEET-BRIAR
CARDINAL
ASTER
CROCUS
HEATHER
LAVENDER
BUTTERCUP
MORNING GLORY
CRESSE
300 150 0 300 Feet
DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

As sea level continues to rise, the elevation of the Borough of Wildwood Crest will need to increase. Land berms and bulkheads provide protection to bay side properties by blocking out tidal water. If the Borough chooses to adopt a new bulkhead and land berm ordinance requiring the finished height of newly constructed bulkheads and land berms to be 8.00 msl NAVD 88, all Borough owned bulkheads will be below this height. Borough owned bulkheads range in height from 4.35 to 7.00 feet. As residents begin to raise the height of their newly constructed bulkheads, the Borough owned bulkheads will need to be elevated as well.

The Borough is responsible for all street end bulkheads that are found in the roadway right-of-way. From Cresse Avenue to Rambler Road there are 18 street ends with Borough constructed bulkheads. These street end bulkheads range in elevation from 4.35 to 7.00 feet. As the Borough continues its efforts to decrease tidal flooding, bulkheads with the lowest finished elevations should be a priority. The tidal water will enter through the lowest access point along the bay side of the barrier island.

Bulkheads along the bay would require a N.J.D.E.P. Waterfront Development Permit. All activity conducted in tidal waters at or below the mean high water line require this permit. Below is a list of Borough owned bulkheads sorted by finished elevation in descending order:

Lowest Elevation Point	Location	Approximate Length (ft)	Comply with Proposed Ordinance (Y/N)
4.35	Sweet Briar Road	60	NO
4.40	Cardinal Road	70	NO
4.48	Wisteria Road	50	NO
4.61	Cresse Avenue	55	NO
4.73	Myrtle Road	50	NO
4.83	Buttercup Road	50	NO
4.89	Primrose Road	50	NO
4.94	Columbine Road	50	NO
4.99	Forget Me Not Road	50	NO
5.00	Fern Road	50	NO
5.16	Lotus Road	60	NO
5.16	Palm Road	50	NO
5.57	Morning Glory Road	50	NO
6.42	Heather Road	60	NO
6.47	Lavender Road	50	NO
6.50	Rosemary Road	55	NO
6.94	Crocus Avenue	50	NO
7.00	Aster Road	60	NO

The Engineer's Opinion of Probable Cost for this recommended improvement is contained in Section 7 of this report.

a. Increase Hydraulic Capacity

The existing stormwater infrastructure in the Borough has been analyzed using HydroCAD to determine the predicted flows through the beach outfall pipes. As the community continues to develop, houses are generally becoming larger with a larger area of impervious surface. As impervious surface percentage increases, stormwater infrastructure pipes need to be upgraded to increase their hydraulic capacity. After analysis, it is determined that the Washington Avenue, Atlanta Avenue, Fern Road, and Heather Road beach outfalls should be upgraded to increase hydraulic capacity if existing drainage areas remain. The pipes are undersized and should be upgraded to 30" pipe diameter. The larger diameter pipe is designed for a 2-year storm after considerable development of the Borough. Below is a table with the allowable flow through stormwater pipes:

Pipe Size	24"	30"	36"	42"
Allowable Flow (cfs)	22.68	41.13	66.88	100.88

b. Outfall Elimination and Pump Stations

Another option is to eliminate the outfalls on the beach and install pump stations. Currently, all stormwater management is accomplished using gravity. The water flows by gravity from the ocean side of the island to the ocean discharge outfalls. A pump station is proposed at the tennis courts between Columbine Road and Wisteria Road. The pump station would collect stormwater from existing drainage area X2, X3, X4, and Y and utilize a force main out Palm Road to discharge the water. Miami Avenue, Atlanta Avenue, Fern Road, and Heather Road beach outfalls would be eliminated and replaced with one beach outfall at Palm Road.

Existing drainage area W and X1 would be piped to the proposed pump station at the Borough of Wildwood Crest Department of Public Work's building between Washington Avenue and Jefferson Avenue. The pipe system would gather all stormwater from existing drainage area W and X1 and pipe it in a closed system down Pittsburgh Avenue to the pump station. The pump station and pipe network would allow the Washington Avenue and Hollywood Avenue beach outfalls to be removed.

The proposed pump stations would be placed on Borough owned property. Pump Stations can elevate stormwater flooding even during a high tidal event. As the frequency of tidal elevations that exceed the stormwater collection points increase, gravity stormwater management becomes less effective.

The Engineer's Opinion of Probable Cost for these recommended improvements are contained in Section 7 of this report.

DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

Project Name Wildwood Crest Stormwater Management Plan
Location Borough of Wildwood Crest, Cape May County

Job No.
Calc. By CEE **Date** 2/26/2019
Check **Date**

Connection Pt		Pipe Information										Proposed Flow					
Upstream Point	Downstream Point	Number of Pipes	Pipe Diameter (ft)	Flow Area, A (sq. ft.)	Hyrdaulic Radius (ft)	Upstream Invert	Downstream Invert	Hydraulic Length (ft)	Slope (ft/ft)	Manning's n	Max. Flow (cfs)	Drainage Area	Contributing Flow (cfs)	Total Flow to Connection Pt (cfs)	Velocity (fps)	Total vs. Max. Flow	Comment
Area W - Washington Street Outfall																	
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	X-W	25.64	25.64	7.22	NG	Existing Flow
		1	**2.50**	4.91	0.63	110.00	100.00	1000	0.0100	0.013	41.13	P-W	25.64	25.64	8.38	OK	Proposed Flow
Area X1 - Hollywood Avenue Outfall																	
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	X-X1	13.73	13.73	7.22	OK	Existing Flow
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	P-X1	13.73	13.73	7.22	OK	Proposed Flow
Area X2 - Miami Avenue Outfall																	
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	X-X2	16.98	16.98	7.22	OK	Existing Flow
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	P-X2	16.98	16.98	7.22	OK	Proposed Flow
Area X3 - Atlanta Avenue Outfall																	
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	X-X3	23.83	23.83	7.22	NG	Existing Flow
		1	**2.50**	4.91	0.63	110.00	100.00	1000	0.0100	0.013	41.13	P-X3	23.83	23.83	8.38	OK	Proposed Flow
Area X4 - Fern Avenue Outfall																	
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	X-X4	34.14	34.14	7.22	NG	Existing Flow
		1	**2.50**	4.91	0.63	110.00	100.00	1000	0.0100	0.013	41.13	P-X4	34.14	34.14	8.38	OK	Proposed Flow
Area Y - Heather Avenue Outfall																	
		1	2.00	3.14	0.50	110.00	100.00	1000	0.0100	0.013	22.68	X-Y	35.12	35.12	7.22	NG	Existing Flow
		1	**2.50**	4.91	0.63	110.00	100.00	1000	0.0100	0.013	41.13	P-Y	35.12	35.12	8.38	OK	Proposed Flow

Pacific Avenue has become an area of concern as stormwater flooding is a common occurrence. The storm sewer inlets along Pacific Avenue ("bubblers") are not connected by pipes. The existing roadway gutters are used to transport water above ground to New Jersey Avenue and then to discharge outfalls. However, roads are often poorly graded, and ponding can occur along the roadway and at handicap ramps creating a hazardous environment. The handicap ramps are often at a lower elevation than the adjacent roadway and hold water for long periods of time after a rain event.

Stormwater flooding has become an increasing area of concern on Pacific Avenue from Rambler Road to Jefferson Avenue as it is a main road utilized by the Borough of Wildwood Crest residents. The extent of flooding during a rain event can be seen in the pictures attached. The roadway often experiences flooding long after the rain has ended. The extended period of water retention has a damaging effect on the pavement. Roadways begin to crack and deteriorate quicker when flooding occurs for an extended time period.

A project is in place to increase stormwater recharge and positive discharge to bay side outfalls. The project will include a redesign of handicap ramps to deter water from ponding and allow clear access to the ramps. Pacific Avenue from Rambler Road to Jefferson Avenue is Cape May County Road 621. All work along Pacific Avenue would be funded by the County and alleviate the financial burden from the Borough of Wildwood Crest. The funding is in place from the County to move forward with this project. It would include storm sewer infrastructure improvements along Pacific Avenue from Lotus Road to Jefferson Avenue.

The Overall Proposed Storm Drainage Improvements map of the Borough of Wildwood Crest displays the extent of the project. Stormwater pipes will carry water from the surface of Pacific Avenue to bay side outfalls through positive discharge. The higher elevation of Pacific Avenue allows gravity driven pipes to carry stormwater to bay side outfalls.

The Cape May County Engineer has indicated that they will receive federal money for the project with construction likely in the fall of 2021. The Borough of Wildwood Crest plans to fund necessary stormwater improvements along several side streets to connect all drainage improvements. The Engineer's Opinion of Probable Cost for the multiple side street infrastructure improvements is contained in Section 7 of this report.

Flooding Observations

Flooding Observations

Roadway Damage

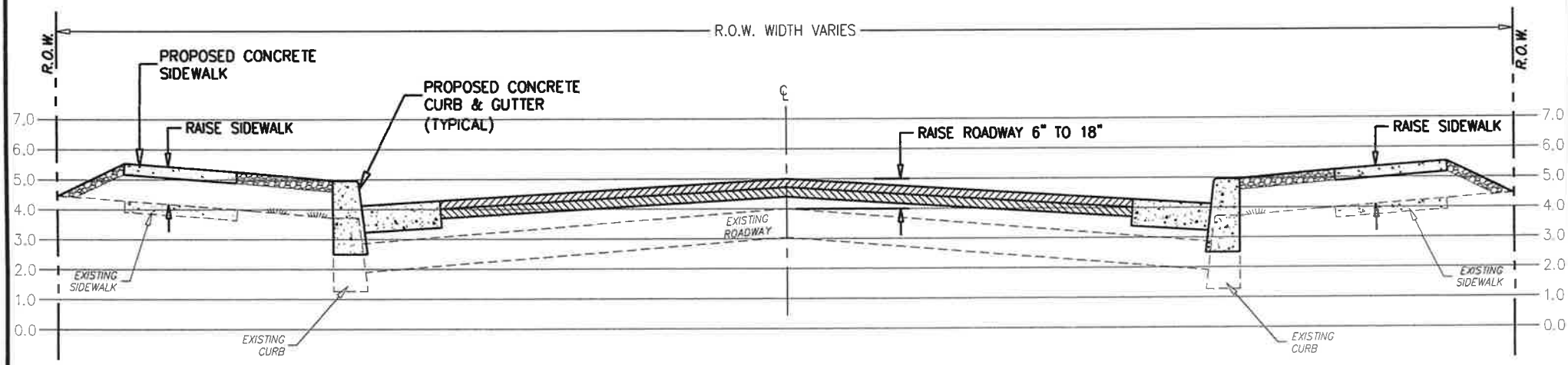
As flooded roads become more of a problem for coastal communities, raising the street elevation is a possible solution. The Borough of Wildwood Crest contains roadways with elevations as low as three feet. When the tide rises above this point, the roadway will flood and make it difficult for residents to pass through. According to the USGS tidal gauge located on Stone Harbor Boulevard, the high tide is above three feet in elevation 58 times a year. That means that for 58 days out of the year, some roadways in the Borough experience tidal flooding.

The roadways along the bay are lowest in elevation. The lowest area is bounded on the North by Cresse Avenue, the south by Rambler Road, the East by New Jersey Avenue, and the West by Sunset Lake. The roadways in this area range from three feet to six feet. As discussed before, the roadways that are at elevation three will flood 58 days of the year. If the roadways are raised to four feet in elevation, the flooding decreases to 6 times a year. If the roadways are raised to five feet in elevation, the flooding decreases to 0.5 days a year. The benefit from elevating roadways becomes clear.

Although the benefit of elevating roadways is clear, there are high costs and difficulties associated with it. The challenges associated with this improvement include coordination with the City of Wildwood and Lower Township, connecting the roadway to adjacent properties and widening the travel way.

In the Borough of Wildwood Crest, a major difficulty would be cooperation with the private property owners. As the roadways increase in height, property owners would be required to raise their properties to meet and match the roadway. This would require an outreach program to work with the property owners to explain the advantage of elevated roadways to decrease tidal flooding in the Borough. Raising the roads keeps as much water as possible from coming up the stormwater inlets and flooding the surface.

The associated costs to elevate the lowest area of the Borough is attached. The linear foot cost includes raising the pavement elevation, concrete curb, concrete gutter, concrete sidewalk, and storm sewer system upgrades. The Engineer's Opinion of Probable Cost for this recommended improvement is contained in Section 7 of this report.



TYPICAL SECTION VIEW

ELEVATE EXISTING ROADWAYS - BAY SIDE

N.T.S.

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
BOROUGH OF WILDWOOD CREST
CAPE MAY COUNTY, NEW JERSEY

DEBLASIO & ASSOCIATES
CONSULTING ENGINEERS AND PLANNERS
4701 NEW JERSEY AVENUE
WILDWOOD, NJ 08260
PHONE: (609) 854-3311
FAX: (609) 854-4323

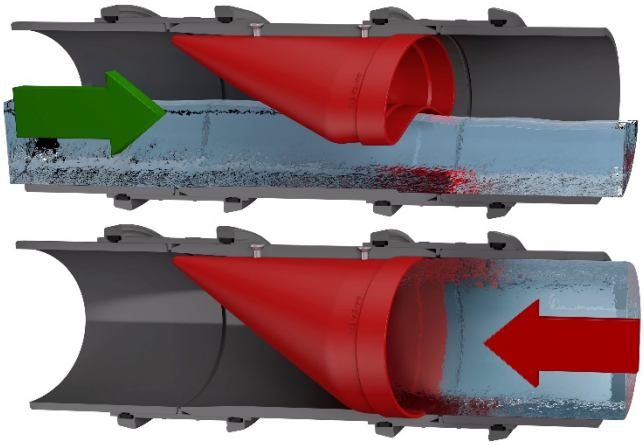
The Borough has several locations along the bay where there are non-functioning valves on the discharge outfalls. As the tide water rises above the outfall, it travels through the storm sewer pipe system and up the storm sewer inlets. As the water rises out of the inlets it causes nuisance flooding. The Borough in the past has utilized check valves on the end of the outfall pipe that are not functioning properly. Barnacle growth and debris block the valve from keep tidal water from entering the pipe. There are four options to solve this issue, each with different benefits and costs:

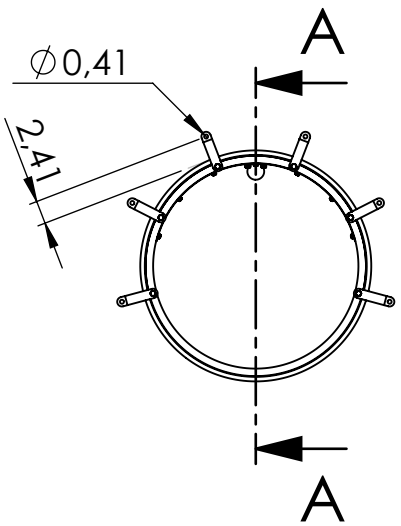
a. Passive Control Valves
b. Manually Operated Control Valves
c. SCADA Operated Control Valves
d. Storm Sewer Pump Stations

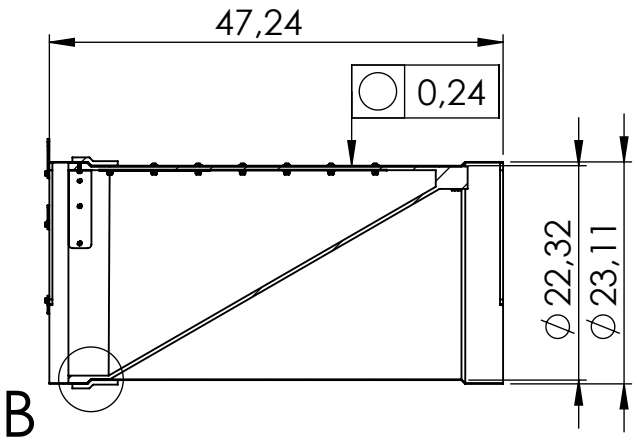
a. Passive Control Valves

The first option is for a valve that is located inside the pipe or "in-line." The inline check valve allows stormwater to exit the discharge outfalls but does not allow tidal water to enter. Valves are manufactured for a variety of pipe sizes and materials to provide a tight seal. These valves have been used throughout the world to protect against tidal flooding including use in New Zealand, Florida, and England. By utilizing a reliable inline check valve, it significantly decreases flooding and ponding during storms.

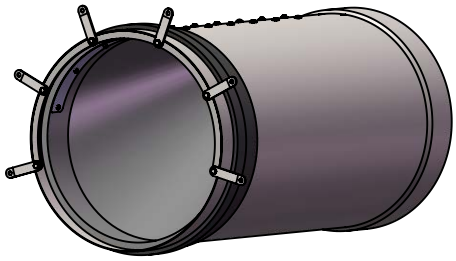
Inline check valves are resistant to barnacle growth and can be protected inside the storm sewer pipe. Using debris collectors before the valve and grates over the end of the pipe, debris should not block the valve from functioning properly. Inline check valves have low head loss and are built for easy installation. These valves would need to be installed on all existing bayside outfalls. The valve can be seen below and the Engineer's Opinion of Probable Coast for this recommended improvement can be found in Section 7 of this report.

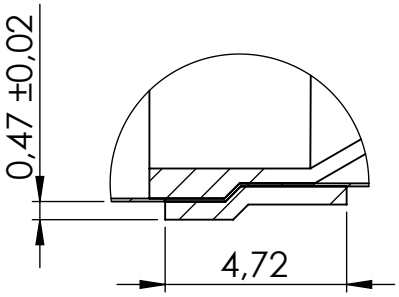






SECTION A-A





DETAIL B

Designed By	Approved By	Created Date	Units	General Tolerance	Scale
RB	RB	2017-09-18	[inch]	SS-ISO 2768-1 m	1:20

Material	Comments	Project Number
AISI 304 / AISI 316		

Weight [Lbs]	Box Volume [ft³]	Description
117	14.8	WaStop NPS 24"

Article Number	Rev	Sheet
WS590-S	2017-10-19	1 (1)

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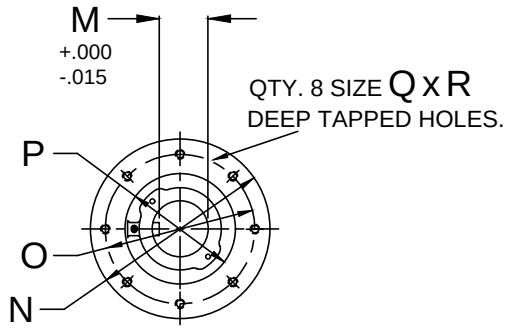
b. Manually Operated Control Valves

Passive control valves such as the inline check valves often have inconsistent results. Although inline valves preform more efficiently than others, they can still malfunction. Manually controlled mechanical valves would provide a higher degree of confidence and rarely malfunction. The valves will be manually closed when higher than normal tides are expected and opened when the tide recedes.

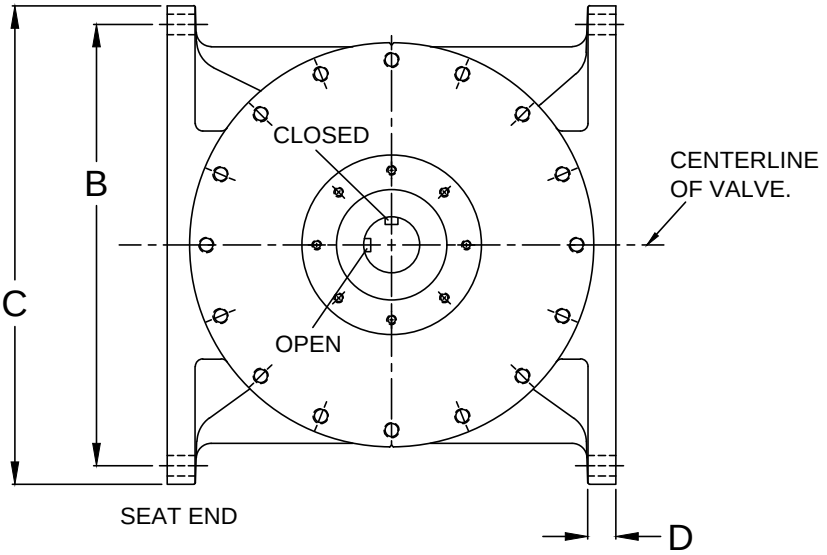
A recommended mechanical valve is the Val-Matic Plug Valve. The plug valve is a ¼ turn valve with a cost-effective, low torque actuation for shut-off. The plug valve features a shaft sealing system for low maintenance. The highlighting features are listed below:

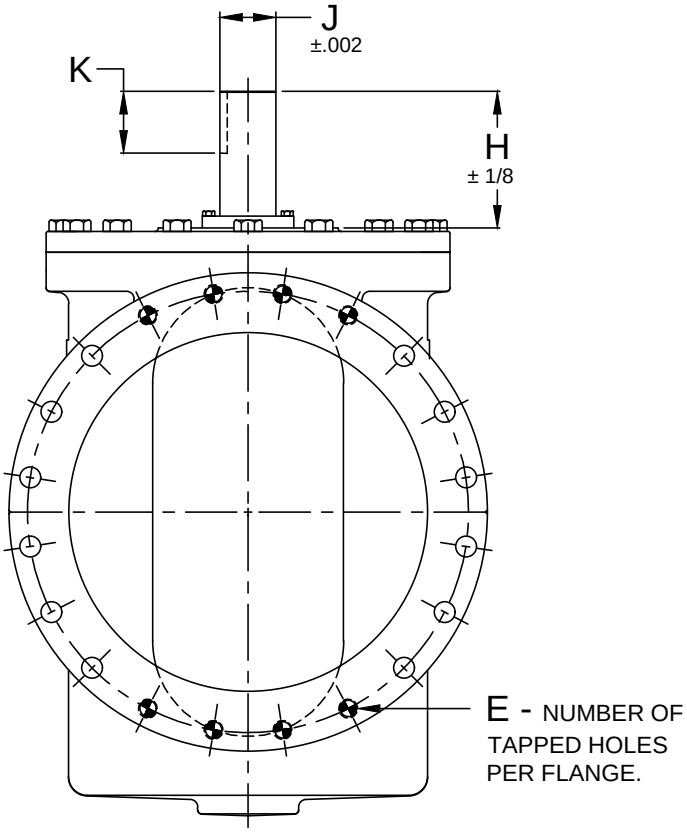
1. Non-Clog design: The flow area and smooth streamline allows large solids to pass through without clogging
2. Eccentric Action: Positive shut-off in both directions with wear resistant action and low torque
3. Full Top Access Cover: Allows valve inspection without the removal of the valve from the line
4. Radial Bearings: Heavy duty, stainless steel, permanently lubricated
5. Seat: Welded 95 nickel raised seat is corrosion and wear resistant
6. Plug: Fully rubber encapsulated molded plug eliminates exposed surfaces for resistance to corrosion and wear

The plug valve would be closed and opened using a mounted actuator with a handwheel. Closure of the valve would be operated and regulated through the Borough of Wildwood Crest Department of Public Works. These valves would need to be installed on all bayside outfalls. The Engineer's Opinion of Probable Coast for this recommended improvement can be found in Section 7 of this report.

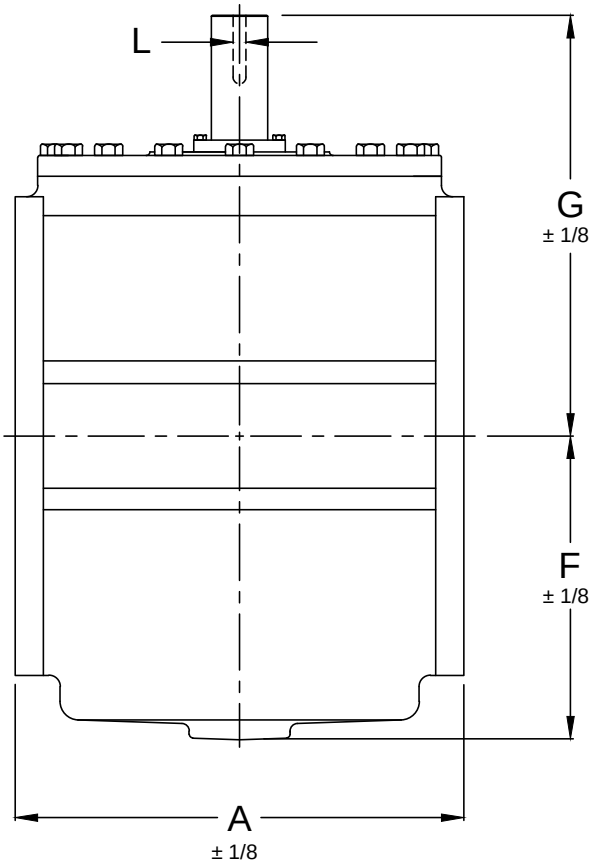


ACTUATOR MOUNTING DIMENSIONS





COLD WORKING PRESSURE
150 P.S.I.
HYDRO TEST PRESSURE
225 P.S.I.



SEE DRAWING N0. VM-5804RN-M FOR MATERIALS OF CONSTRUCTION.

END FLANGE DRILLING CONFORMS TO ANSI B16.1

DIMENSIONS, INCHES

VALVE SIZE	A	B	C	D	E QTY.	E TAP	E DEEP	F	G	H	J	K	L	M	N	O	P	Q	R	BOLT SIZE	NO. OF BOLTS	% OF STD. WT. PIPE
24	30.00	29.50	32.00	1.88	8	1 1/4–7	1.88	20.25	28.18	9.12	3.745	4.12	.875	3.261	12.00	10.00	7.38	5/8–11	1.12	1 1/4	20	83

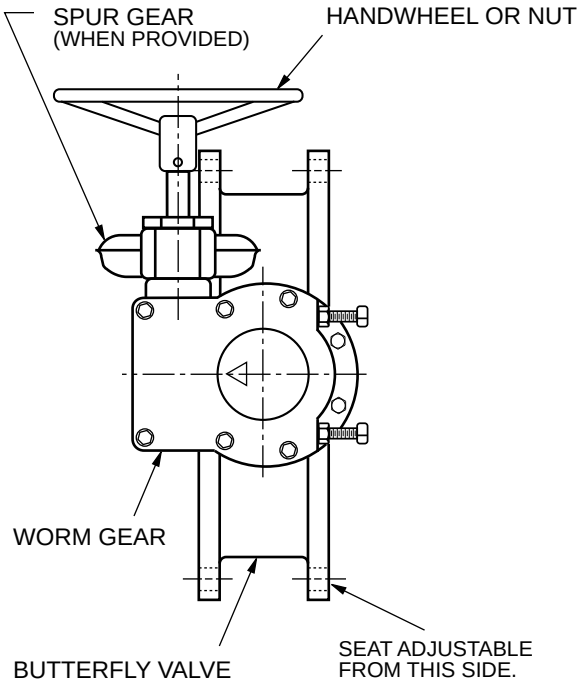
Revised 6-21-18

ANSI CLASS 125 FLANGED CAM-CENTRIC® RECTANGULAR PLUG VALVE WITH BARE STEM

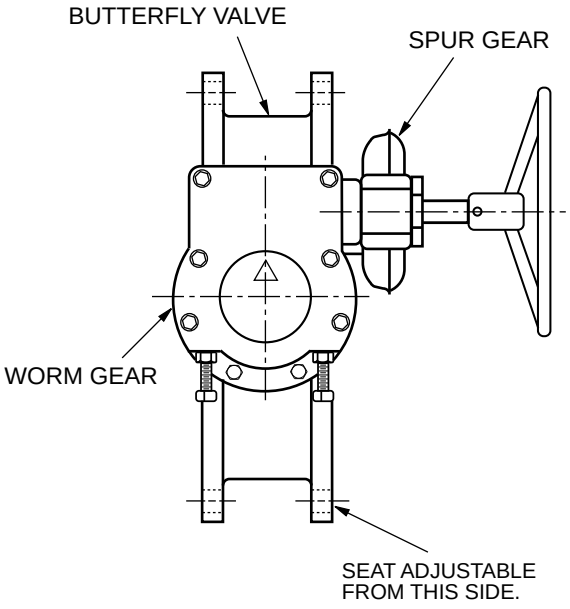
DATE 5-19-09

VAL-MATIC® VALVE AND MANUFACTURING CORP.

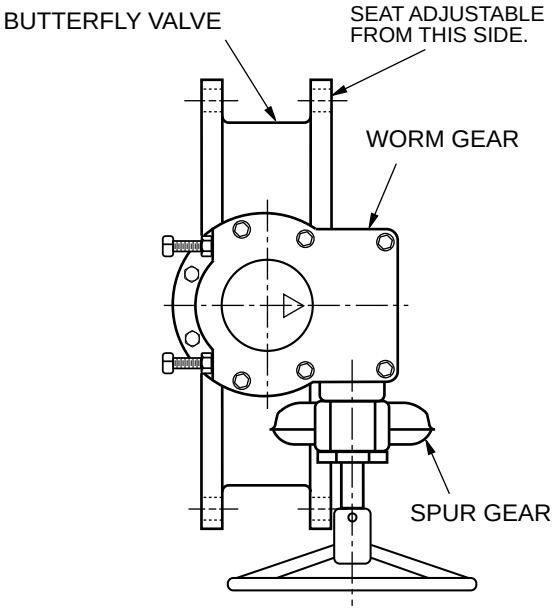
DRWG. NO. VMC-5824R/BS



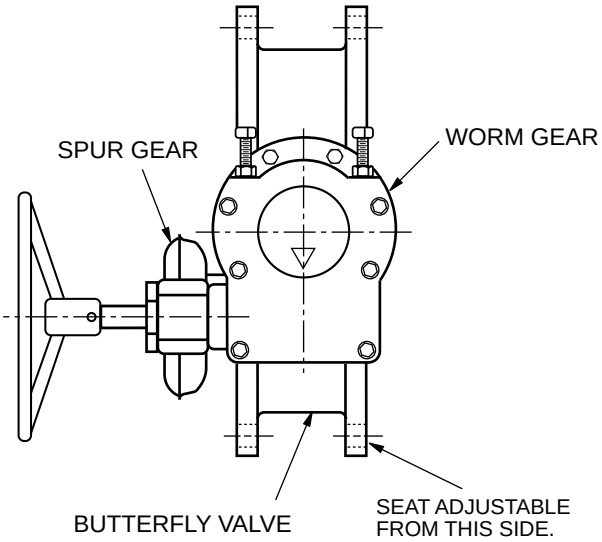
STANDARD POSITION



90º POSITION



180º POSITION



270º POSITION

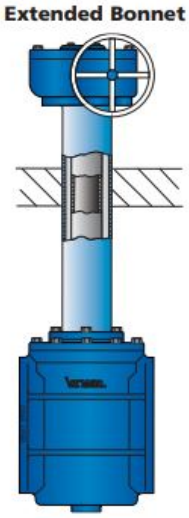
BUTTERFLY VALVE WORM GEAR ACTUATOR MOUNTING POSITIONS	DATE 5-23-02
VAL-MATIC® VALVE AND MANUFACTURING CORP.	DRWG. NO. VM-2000/WGA

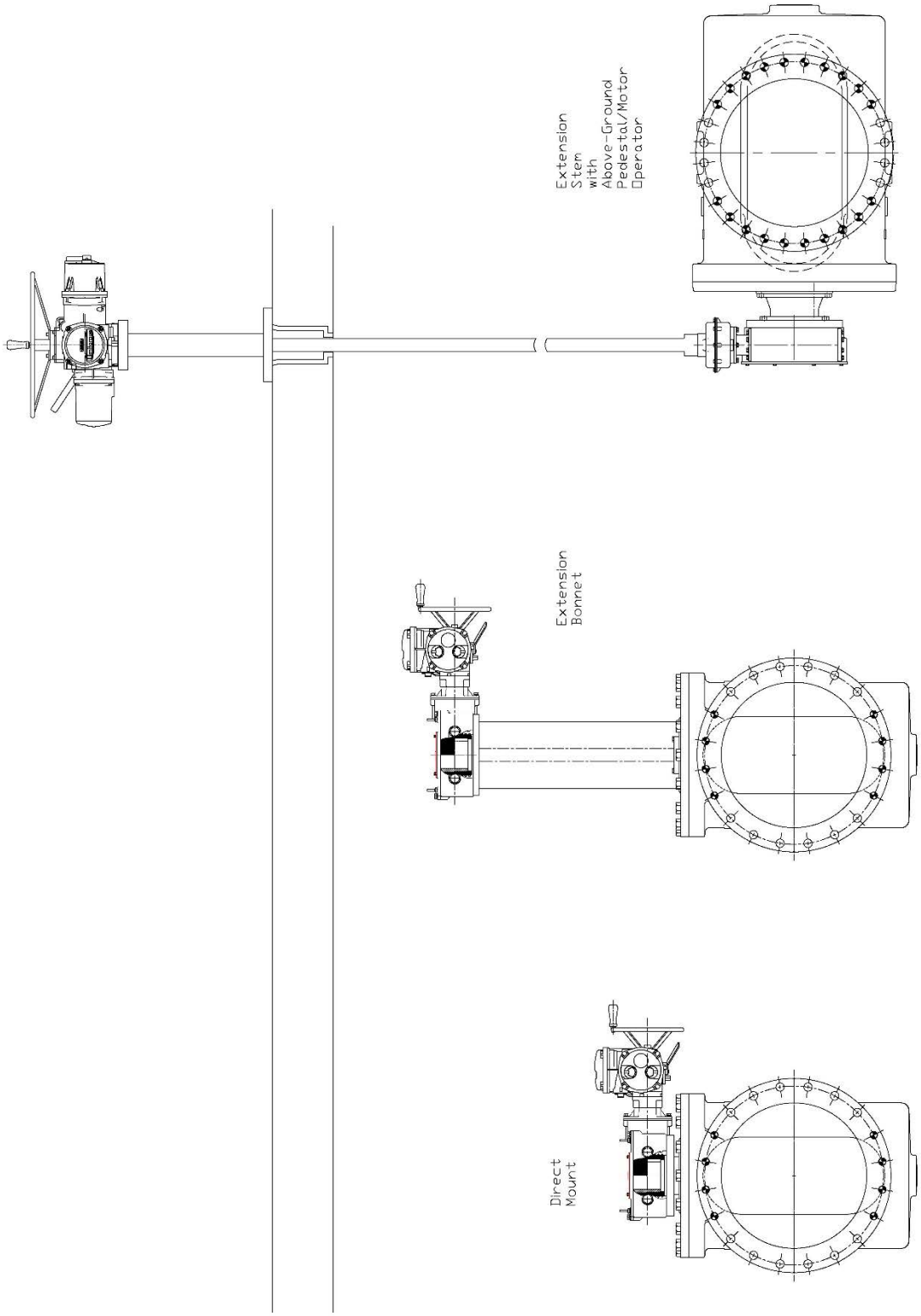
c. SCADA Operated Control Values

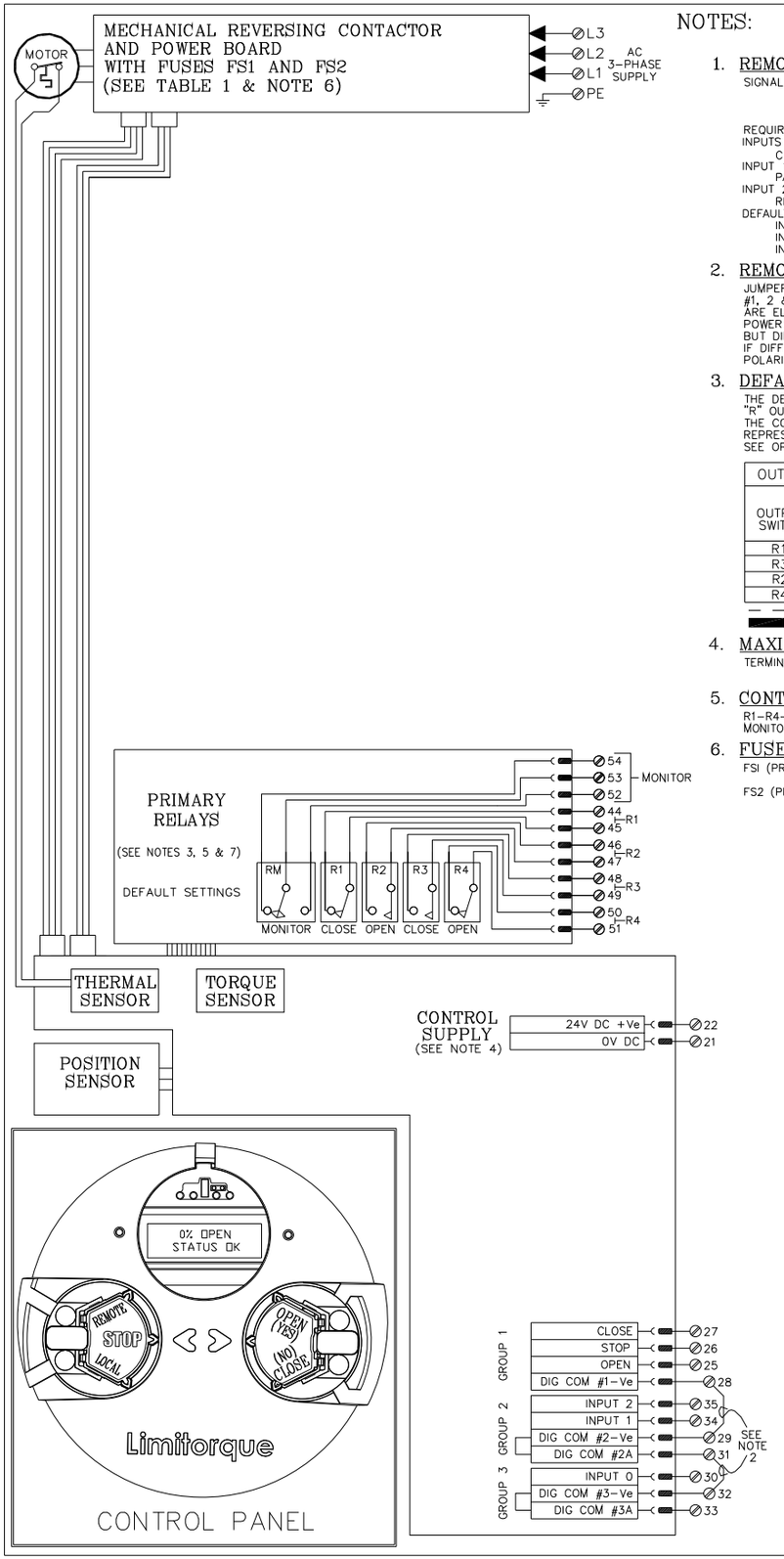
Another option for bayside tide control is remotely controlled mechanical valves. The valves would be the same as the manually operated control valves. The valve would be closed during higher than normal tides and closed when the water recedes. However, the operation of the valve would not be by a manual handwheel. The Plug Valve would be equipped with an electric actuator. The actuator would receive power from an electric power source and be controlled from a remote location. By utilizing an electric actuator, it will be possible to close all bayside outfalls quickly and effectively.

The valves would be controlled by a Supervisory Control and Data Acquisition (SCADA) system. The SCADA system would be a network of wireless controlled actuators with the ability to open and close the plug valves when needed. This would provide the Borough of Wildwood Crest Department of Public Works high-level control with a programmable logic controller. Unlike the inline valves and manually controlled valves, the SCADA operated control valves would be reliable and be low labor intensive. The SCADA system can receive data from sensors placed in the water that measure water level. When the water level reaches a set level, the valves can be programmed to close. In the event of a power outage, the actuators are equipped with a manual override handwheel to open and close the plug valve. The plug valve would provide a full seal to prevent tidal water from entering the drainage areas with the ability to open and close the valve remotely.

The plug valve and electric actuator can be assembled in three different layouts. The first layout would mount the actuator directly on the plug valve. The second would mount the actuator on an extension bonnet. This would keep the actuator at a higher elevation, and it would not be saturated as often. The third option would mount the actuator on an extension stem above the surface. This would allow the manual override handwheel to above grade for easy access. The three options are shown as well as the typical wiring layout for the electric actuator. The Engineer's Opinion of Probable Cost for this recommended improvement can be found in Section 7 of this report.




Extension
Stem
with
Above-Ground
Pedestal/Motor
Operator
Extension
Bonnet
Direct
Mount



NOTES: (SEE INSTALLATION & OPERATION MANUAL LMENIM 2306 FOR DETAILS)

CIRCUIT SHOWN WITH VALVE IN FULLY CLOSED POSITION AND WITH POWER OFF.

1. REMOTE INPUTS

SIGNAL THRESHOLD – MINIMUM "ON" 19.2V AC/DC
MAXIMUM "OFF" 5.0V AC/DC
MAX LOAD – 10 mA / 110V AC
2 mA / 24V DC

REQUIRED CONTROL SIGNAL DURATION = 350ms MIN.
INPUTS 0,1,2 ARE FIELD CONFIGURABLE FOR CLOSE/OPEN INHIBIT, USER INPUT, OR ESD.
INPUT 1 MAY ALSO BE CONFIGURED FOR PARTIAL STROKE TEST.
INPUT 2 MAY ALSO BE CONFIGURED FOR CSE REMOTE SELECTION INDICATION.
DEFAULT INPUT CONFIGURATION
INPUT 0 – ESD,
INPUT 1 – OPEN INHIBIT,
INPUT 2 – CLOSE INHIBIT.

2. REMOTE INPUT JUMPERS

JUMPERS CAN BE USER WIRED TO CONNECT DIG COMMONS #1, 2 & 3 (AS NEEDED). THE 3 REMOTE WIRING GROUPS ARE ELECTRICALLY ISOLATED, INTERNALLY. ONLY A SINGLE POWER SOURCE MAY BE USED TO POWER ANY ONE GROUP BUT DIFFERENT SOURCES MAY POWER DIFFERENT GROUPS. IF DIFFERENT SOURCES ARE USED, ENSURE THAT THE POLARITIES ARE CORRECT.

3. DEFAULT [R] SETTINGS

THE DEFAULT OPERATING CONFIGURATION FOR THE "R" OUTPUTS ARE SHOWN IN THE TABLE BELOW.
THE CONTACT STATES SHOWN IN THE SCHEMATIC REPRESENT A FULLY CLOSED VALVE.
SEE OPERATION MANUAL FOR ALTERNATE CONFIGURATIONS.

OUTPUT SWITCH CONTACT DEVELOPMENT

OUTPUT SWITCH	VALVE POSITION: FULL CLOSE	VALVE POSITION: FULL OPEN	FUNCTION
R1	■ — — — — —	— — — — —	CLOSE LIMIT
R3	— ■ ■ ■ ■ ■	■ ■ ■ ■ ■	CLOSE LIMIT
R2	— — — — — —	— ■ ■ ■ ■ ■	OPEN LIMIT
R4	■ ■ ■ ■ ■ ■	■ — — — — —	OPEN LIMIT

— — OPEN CONTACT
■ CLOSED CONTACT

4. MAXIMUM EXTERNAL LOAD

TERMINALS 21 AND 22 (24 VDC)
– 5W MAX. EXT. LOAD

5. CONTACT RATINGS

R1–R4– 5 AMPS @ 250 VAC OR 30 VDC (RESISTIVE)
MONITOR– 5 AMPS @ 250 VAC OR 30 VDC (RESISTIVE)

6. FUSES

FS1 (PRIMARY)
FS2 (PRIMARY)
600V AC, 1A, 100kA Int RATING, FAST ACTING 10.3 x 38.1mm TUBE. UL LISTED, CSA CERTIFIED

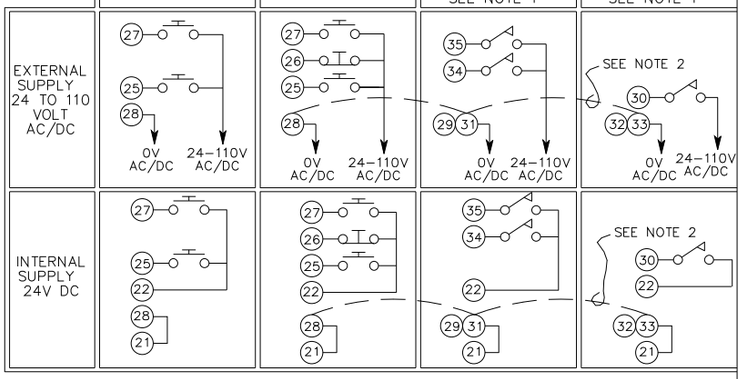
7. RELAY BOARDS

SET JUMPER J1 TO POSITION 1–2 ON THE RELAY BOARD.
CONNECT 12–PIN CONNECTOR WITH YELLOW WIRES TO ADAPTER HARNESS (64–825–0066–3) THEN TO J3 ON THE RELAY BOARD.

TABLE 1: TRANSFORMER TAPPING OPTIONS

TYPE	TAPS	APPL. VOLTAGES
1	106V	110V
	115V	115V, 120V
	200V	208V
	212V	220V
2	226V	226V,230V,240V
	366V	380V
	392V	400V,415V
	450V	440V,460V,480V
3	212V	220V
	505V	525V
	530V	550V
	572V	575V,600V

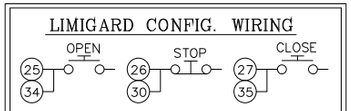
(–) NEGATIVE COMMON



REMOTE WIRING CONNECTIONS

TERMINAL POINT FUNCTION					
CLOSE (27)	+24V DC (22)	0V DC (21)	OPEN INHIBIT (34)	DIG COM #1 (28)
STOP (26)	+24V DC (22)	0V DC (21)	CLOSE INHIBIT (35)	DIG COM #2(A) (29)(31)
OPEN (25)	EXTERNAL SUPPLY ↓		ESD (30)	DIG COM #3(A) (32)(33)

LIMIGARD CONFIG. WIRING

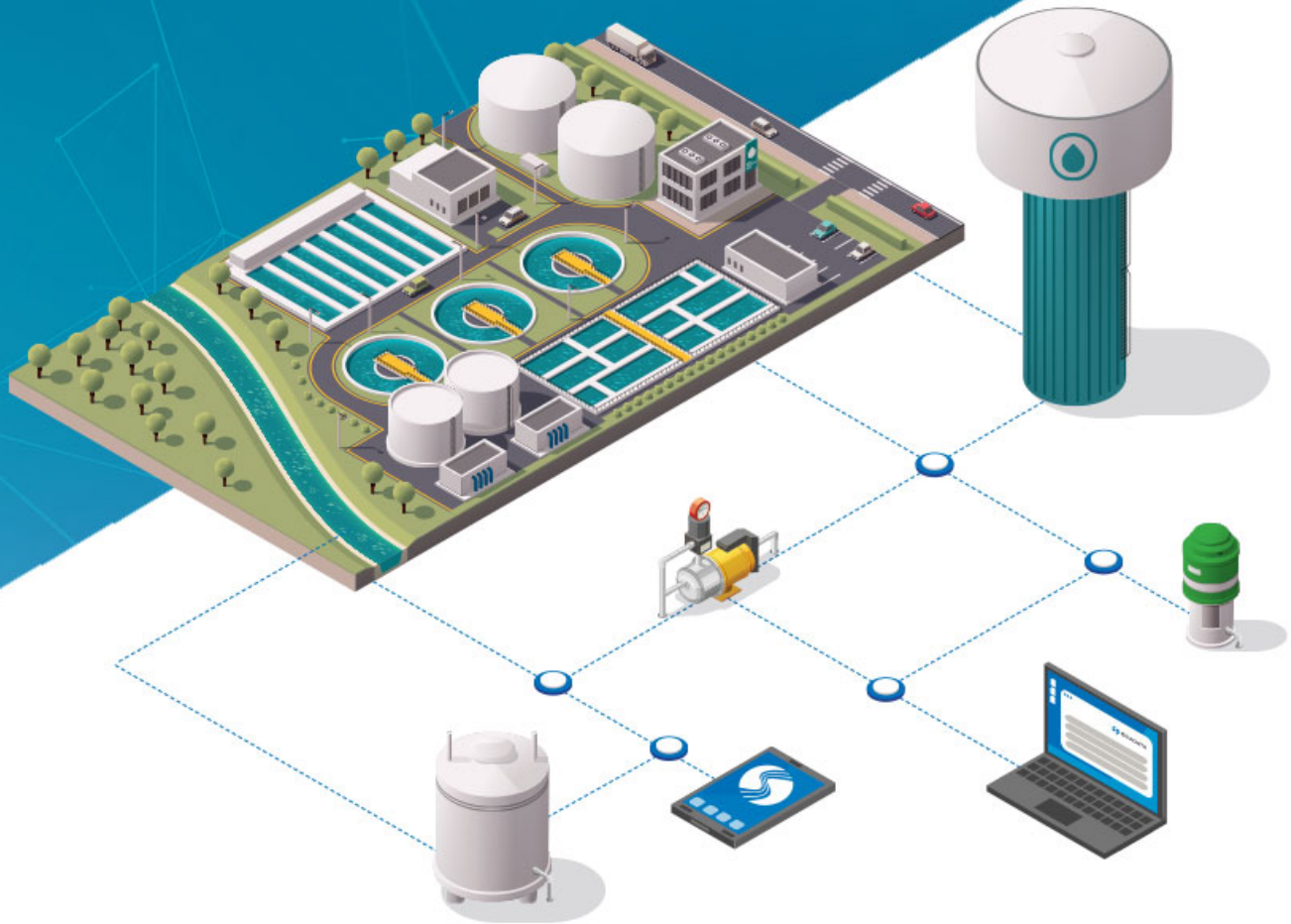


24 VDC TO 120 VAC

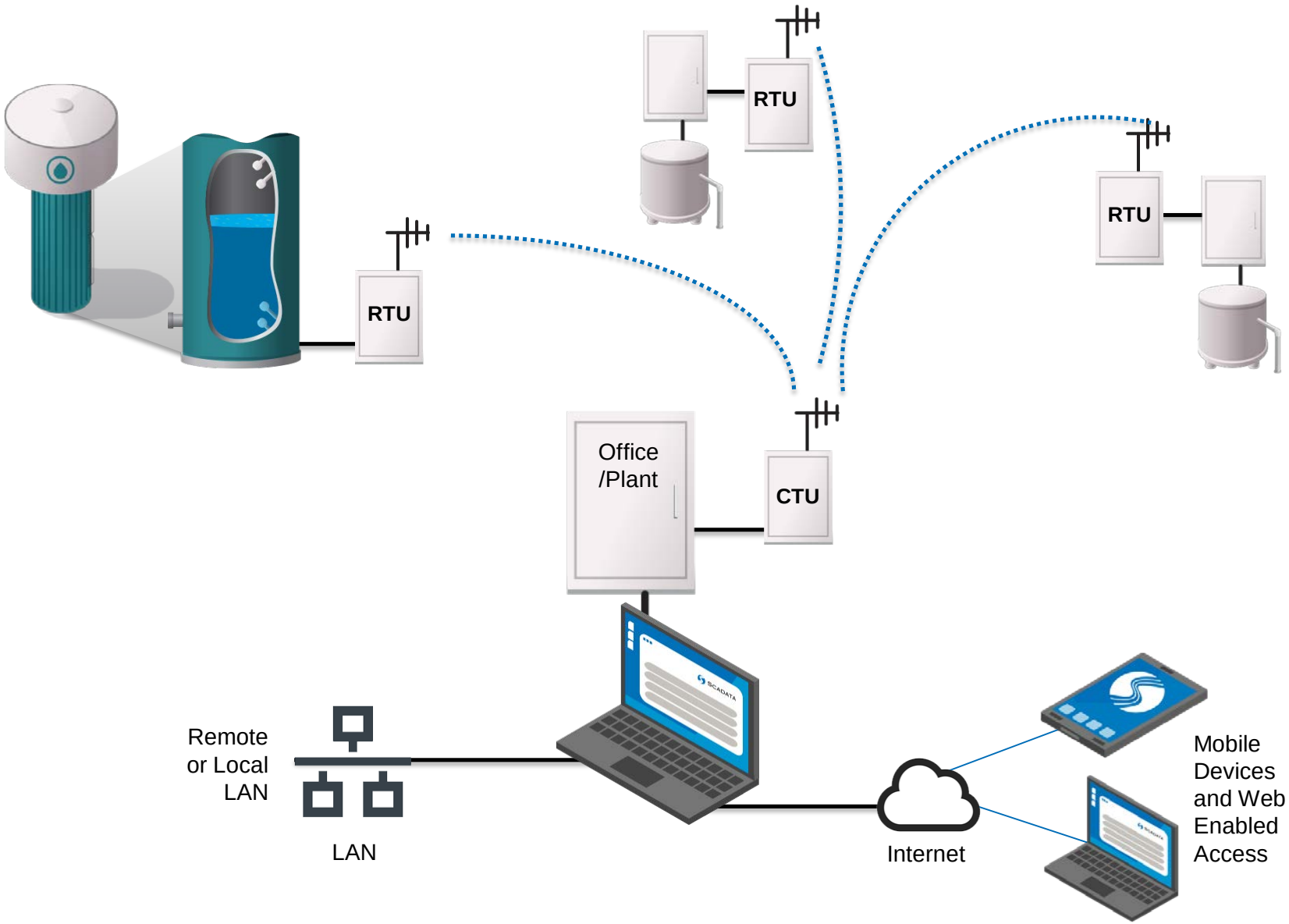
DRAWN	DATE	FLOWSERVE Limitorque Actuation Systems, 5114 WOODALL ROAD, LYNCHBURG, VIRGINIA 24506-1318			
RLP	10/30/12	TITLE MXa WIRING DIAGRAM Standard No Analog Mechanical Contactor 0A, (4) 5A, (1) 5A monitor relay 3Wire/4Wire			
CHECKED	DATE				
ZKC	11/01/12				
APPROVED	DATE	UNIT TYPE MXa	DWG NO WD-MXa-010000-0000	REV 00F	SHEET 1 OF 1
ZKC	11/01/12				

SCADATA

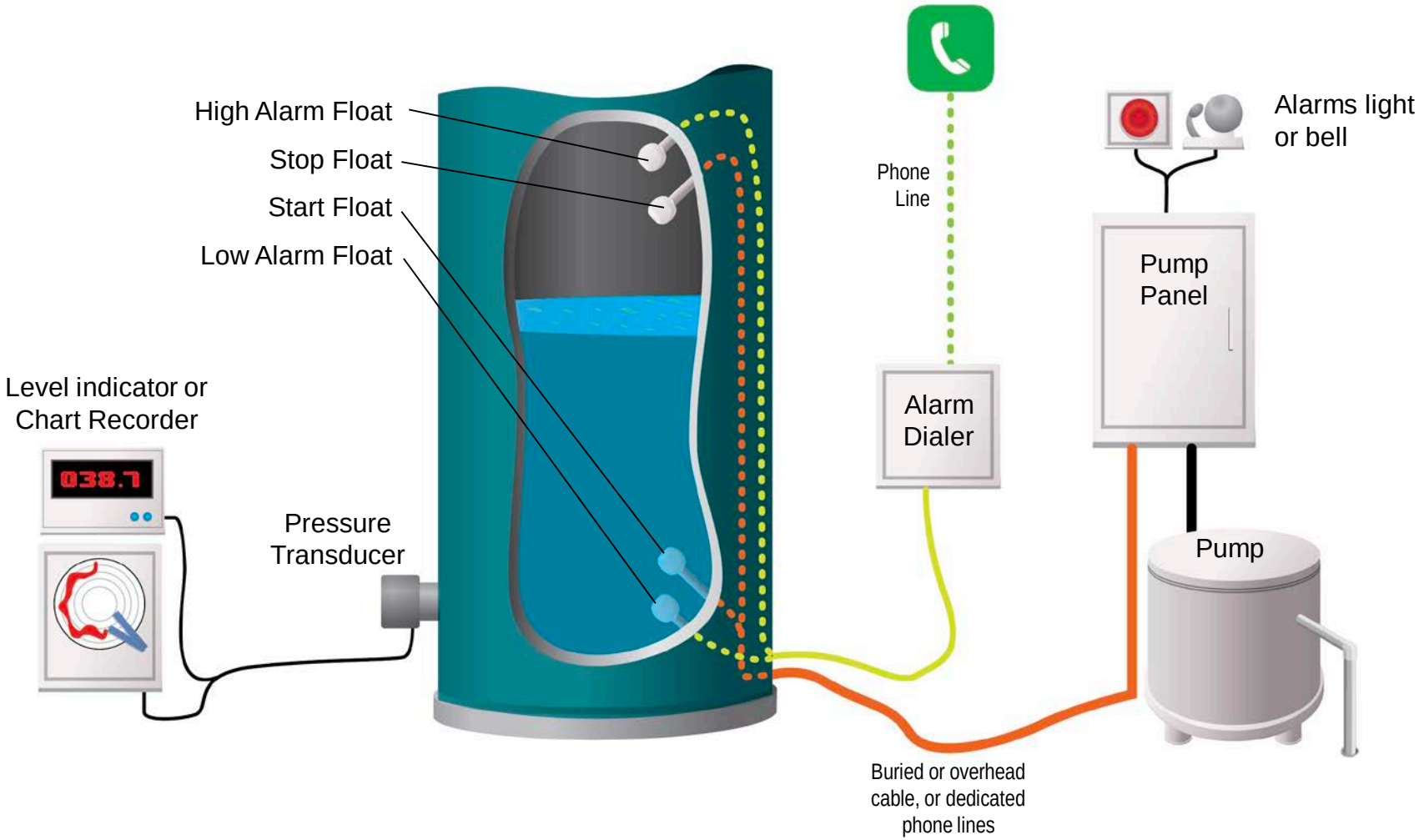
SIMPLY SENSIBLE SCADA



What is a SCADATA System?

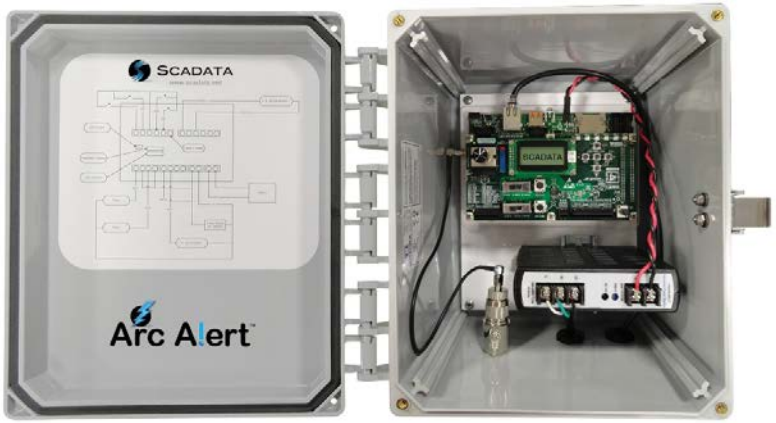


Remote Site



SCADATA

SCADATA Hardware



SCADATA

RT4422 Point-to-Multipoint RTU

Features

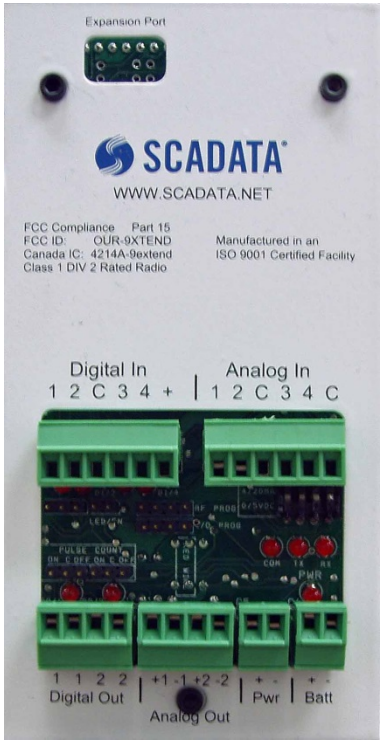
- Integrates with SCADATA Software Suite
- Onboard run-time logging and pulse counting capable
- Radio, Cellular and Ethernet interface
- Communicates wirelessly and remotely
- Real-time monitoring
- Expandable interface

Benefits

- Comprehensive I/O capabilities - Monitor & Control Capable
- Allows for reporting, trending and totalizing
- Flexible communication method
- Seamless integration with industry devices

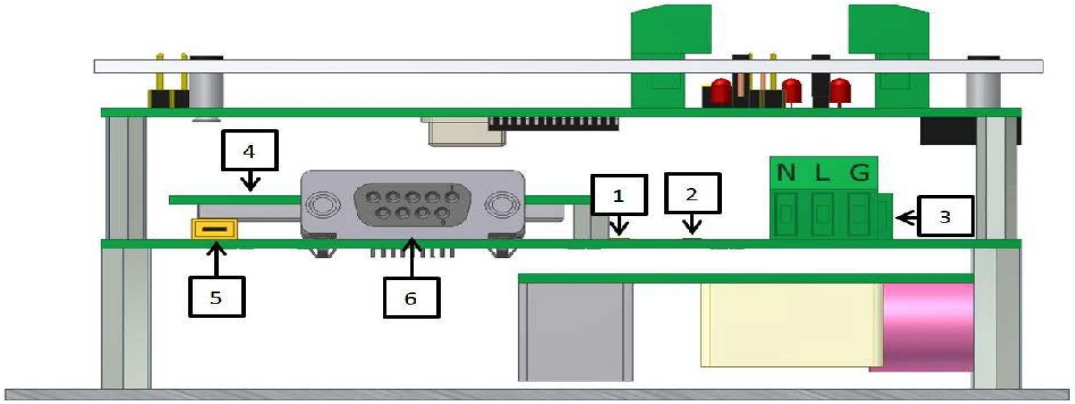
Specifications for RT4422

- 4 digital inputs
  - pulse inputs on 1-3
- 4 analog inputs
  - (Can be converted to digital)
- 2 digital outputs
- 2 analog outputs
- Built-In
  - Power Fail
  - Low Battery
  - Communications Failure

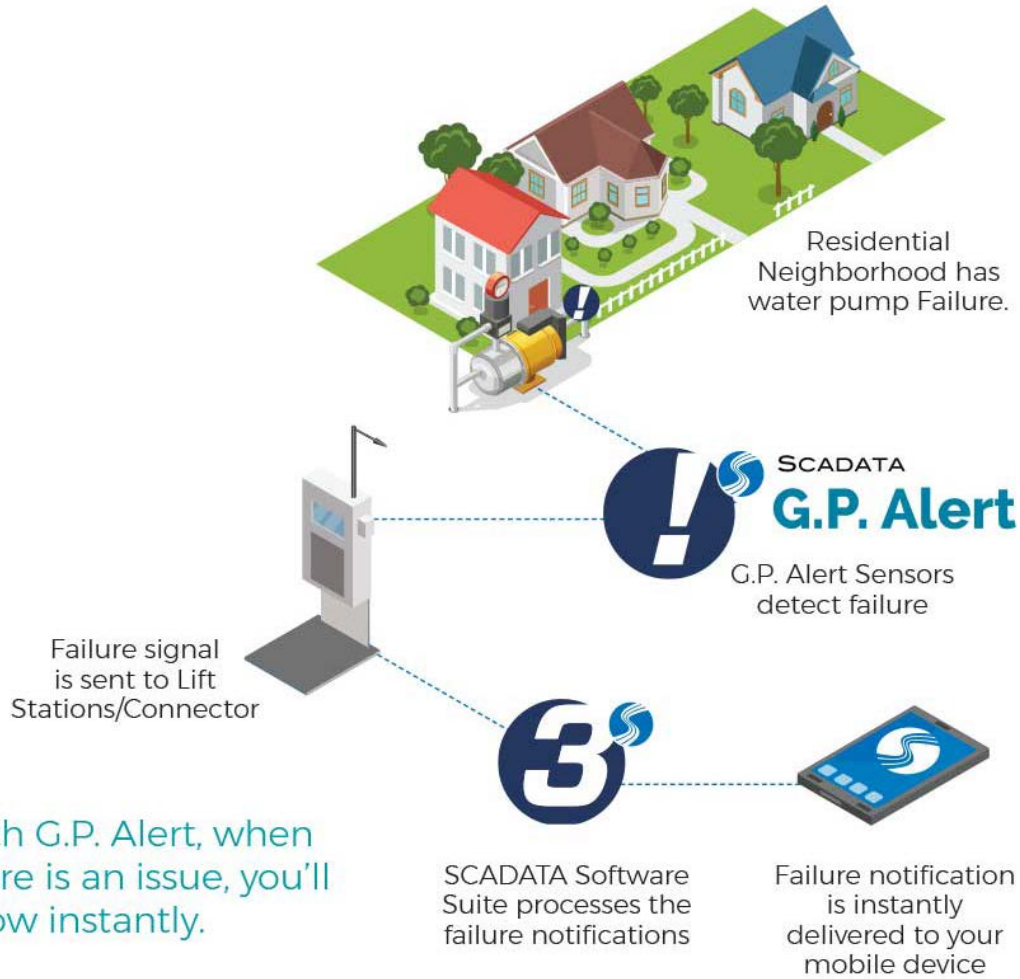


RTU with 900 MHz Radio

- RT4422-MM2T
  - 1. Output Indicator (D6): Yellow LED indicates 12 VDC is flowing from the I/O board.
  - 2. Input Indicator (D2): Green LED indicates the transceiver is plugged in to power source and110 VAC is flowing into the I/O board.
  - 3. AC receiving port
  - 4. Radio module
  - 5. Diagnostic port
  - 6. Serial port



GP Alert



With G.P. Alert, when there is an issue, you'll know instantly.

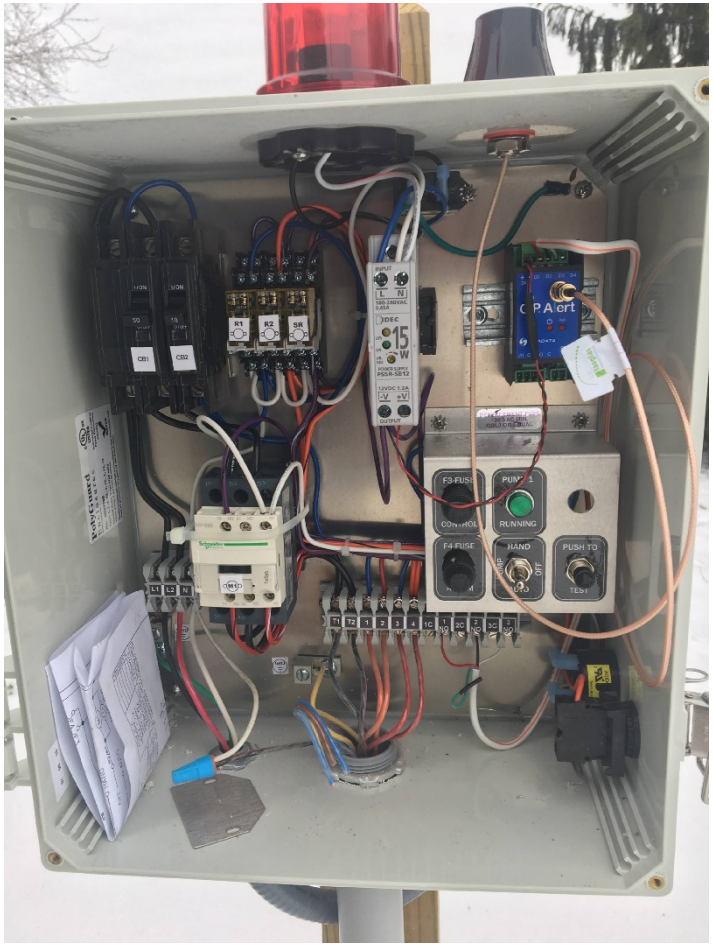
GP Alert

Features

- Uniquely designed for small systems
- Cost-effective
- Real-time monitoring
- Alerts and notifications via text and email
- Communicates wirelessly and remotely

Benefits

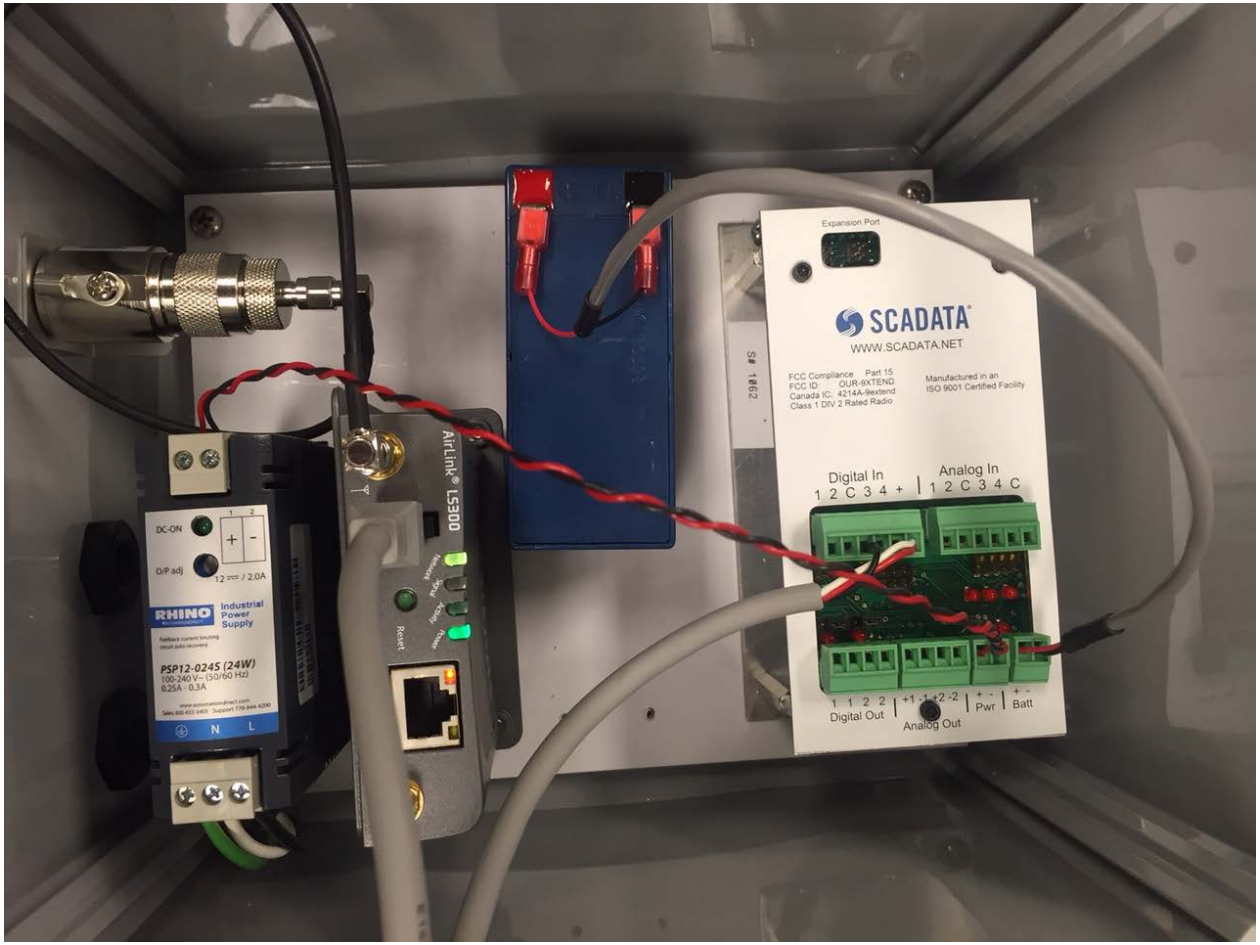
- Continuously monitors remote locations
- Reduces costs and manpower
- Improves ability to offer high-quality service to your customers efficiently
- Seamless integration
- Quick deployment system



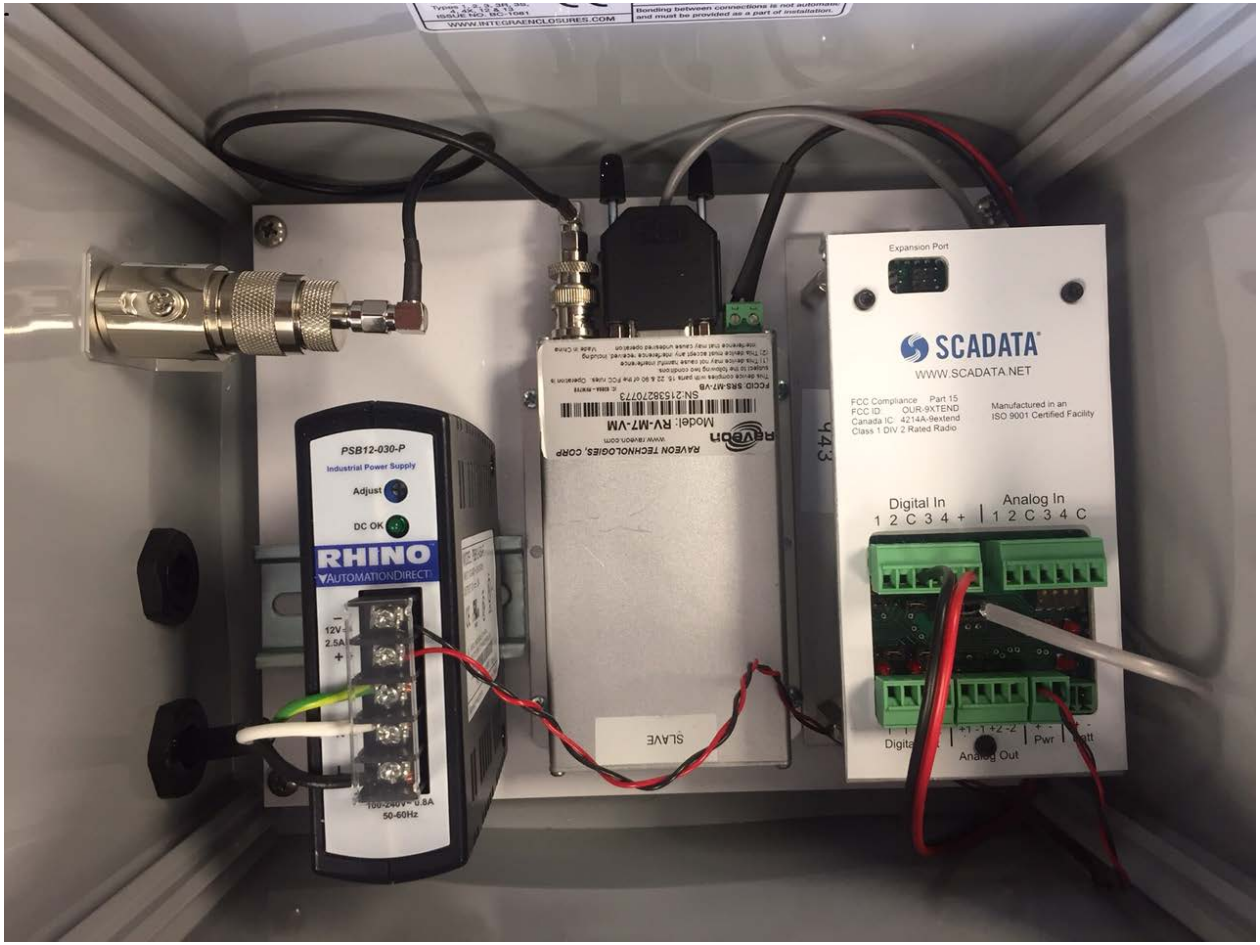
Our Communication Options

- We provides free radio path analysis using latitude and longitude coordinates
- 900 MHz unlicensed radios – most common
- Cellular modems
- VHF: 150-170 MHz (Licensed)
- UHF: 450-470 MHz (Licensed)
- Ethernet/Fiber
- Wi-Fi

SCADATA RT4422 w/ Cell Modem



SCADATA RT4422 w/ VHF Radio



What Communication method is right for your system?

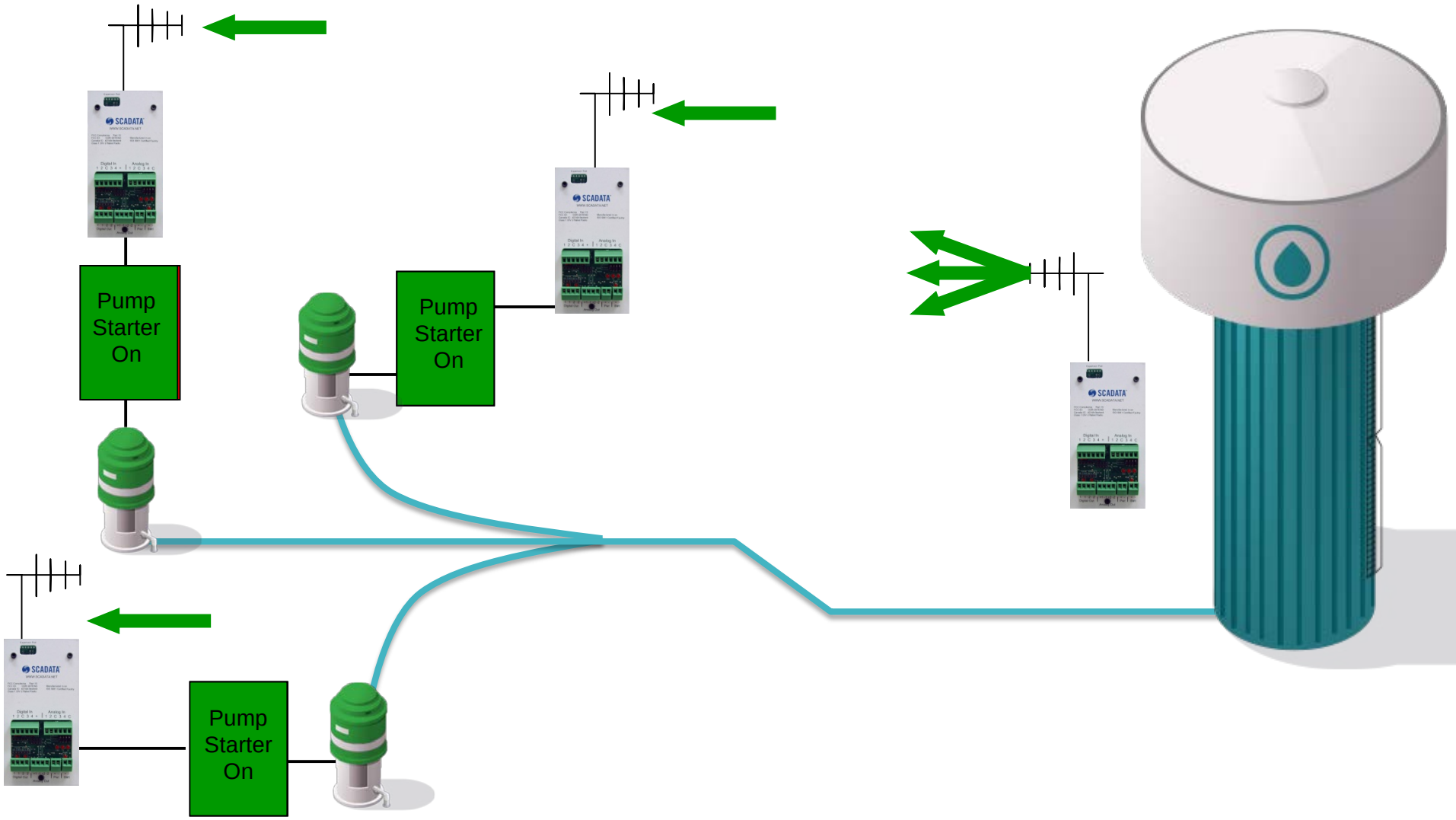
- When looking at a new system all communication options are on the table.
- At each site we look to find the best option while keeping cost down for the customer long term.
- Radio commonly being the best long term savings and Cellular being the most versatile.
- Before every project we conduct digital path studies and guarantee communication.

We strive to make the most out of our customers radio systems.

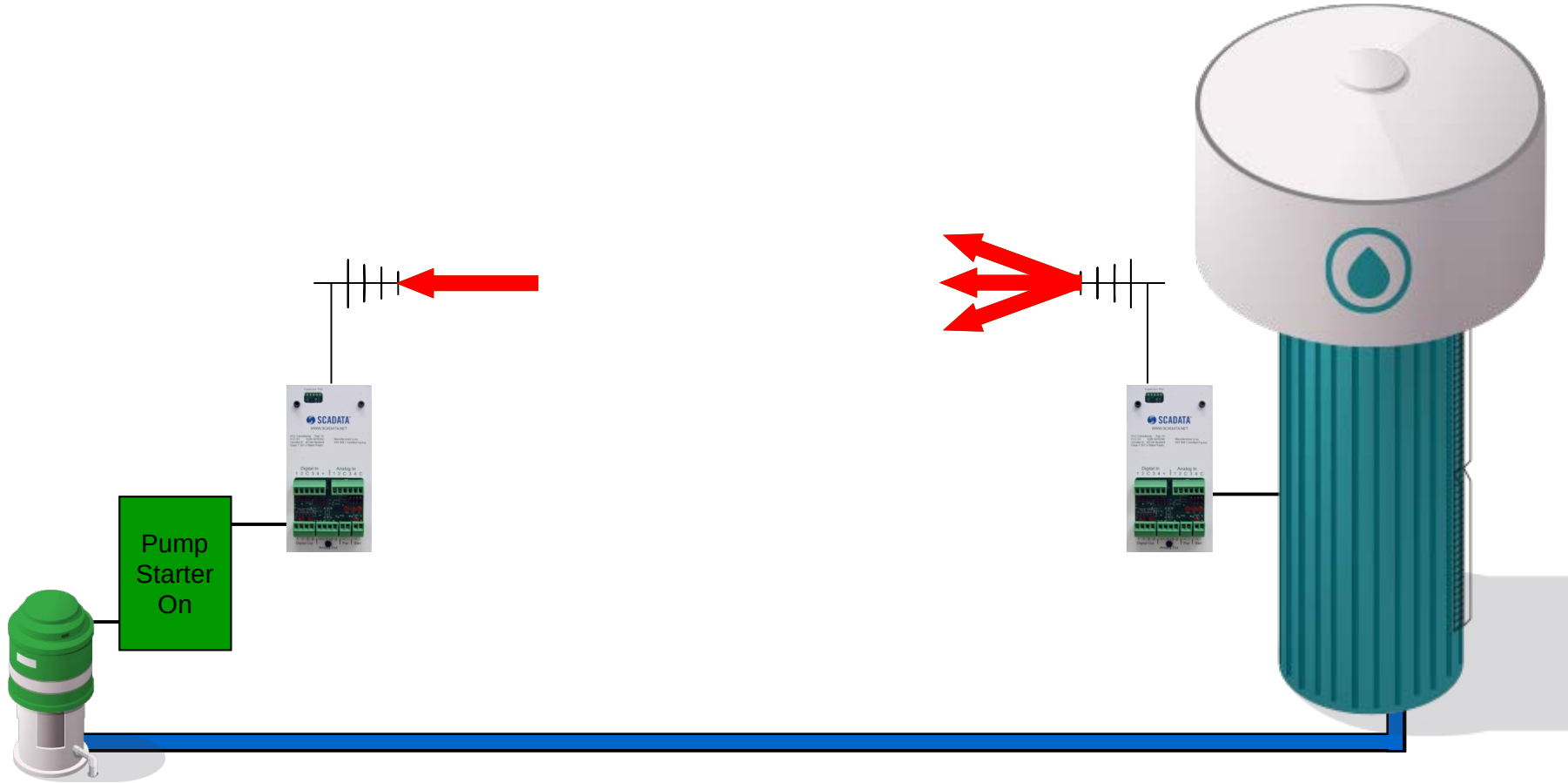
- In-depth radio path studies
- Repeater site capability
- Radio signal boosting and diagnostics
- Spectrum analysis

All to ensure strong connections keep long term cost down.

Multiple RTUs using Radios



SCADATA Wireless Wires



Constant Speed Application

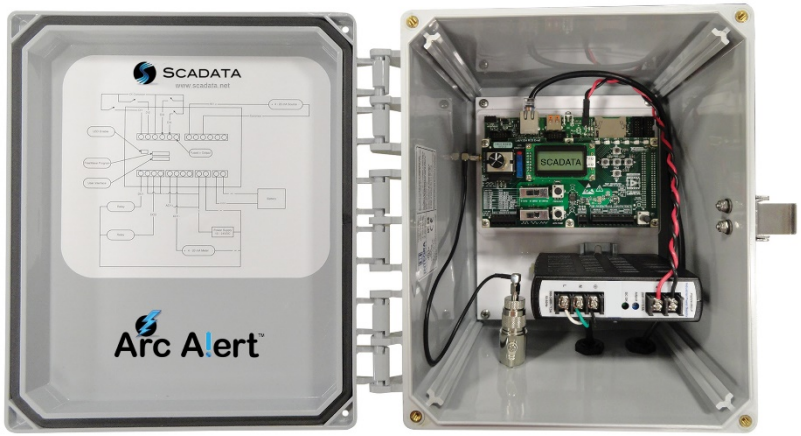
SCADATA Arc Alert

ARC Monitoring Solution

Real- time continuous detection of corona, tracking, arc, and partial discharge conditions

- Uses ultrasound technology to detect potentially harmful arc conditions
- Alarms notify you before dangerous situations occur
- Real-time and historical data monitoring
- Increased facility safety and efficiency
- Reduced labor costs

ARC Monitoring System



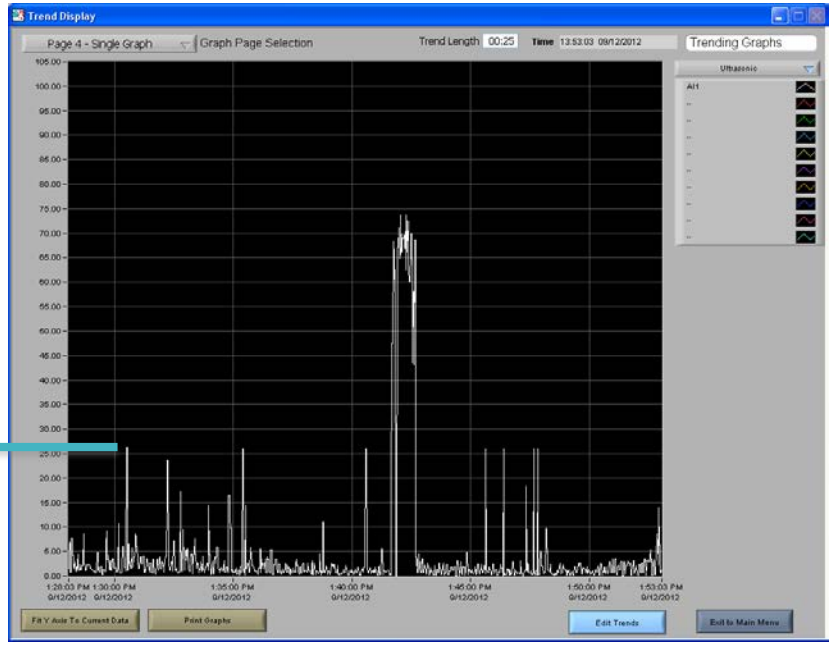
Sensing Device

Interface Wireless or Ethernet

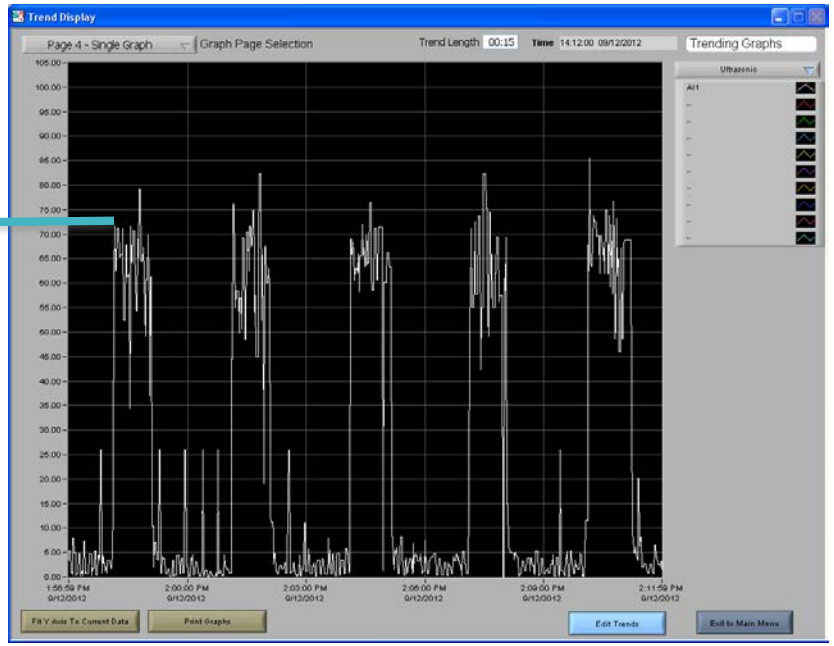
Real-Time Notification

SCADATA – ARC Testing

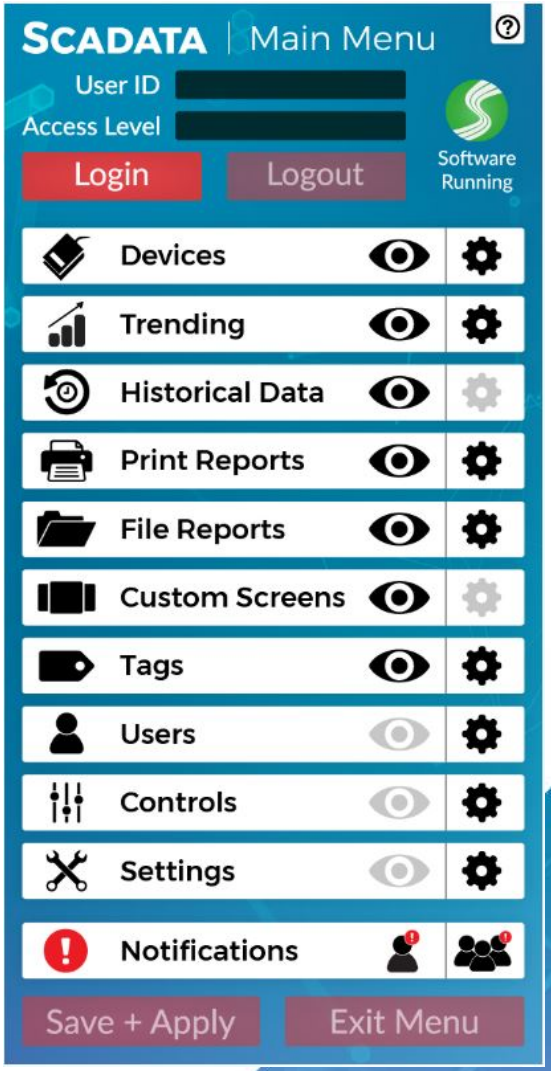
Partial Discharge



ARC Event



SCADATA Software Suite



SCADATA Software Suite

- Our data acquisition and management software is written using LabView Software
- Interfaces with all industry devices
- User-friendly navigation and setup
- Simple reporting options

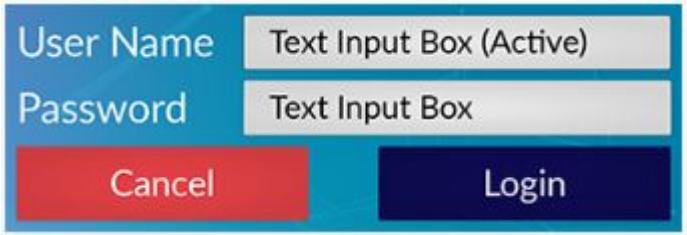
SCADATA Software Suite

Hosted and Non-hosted

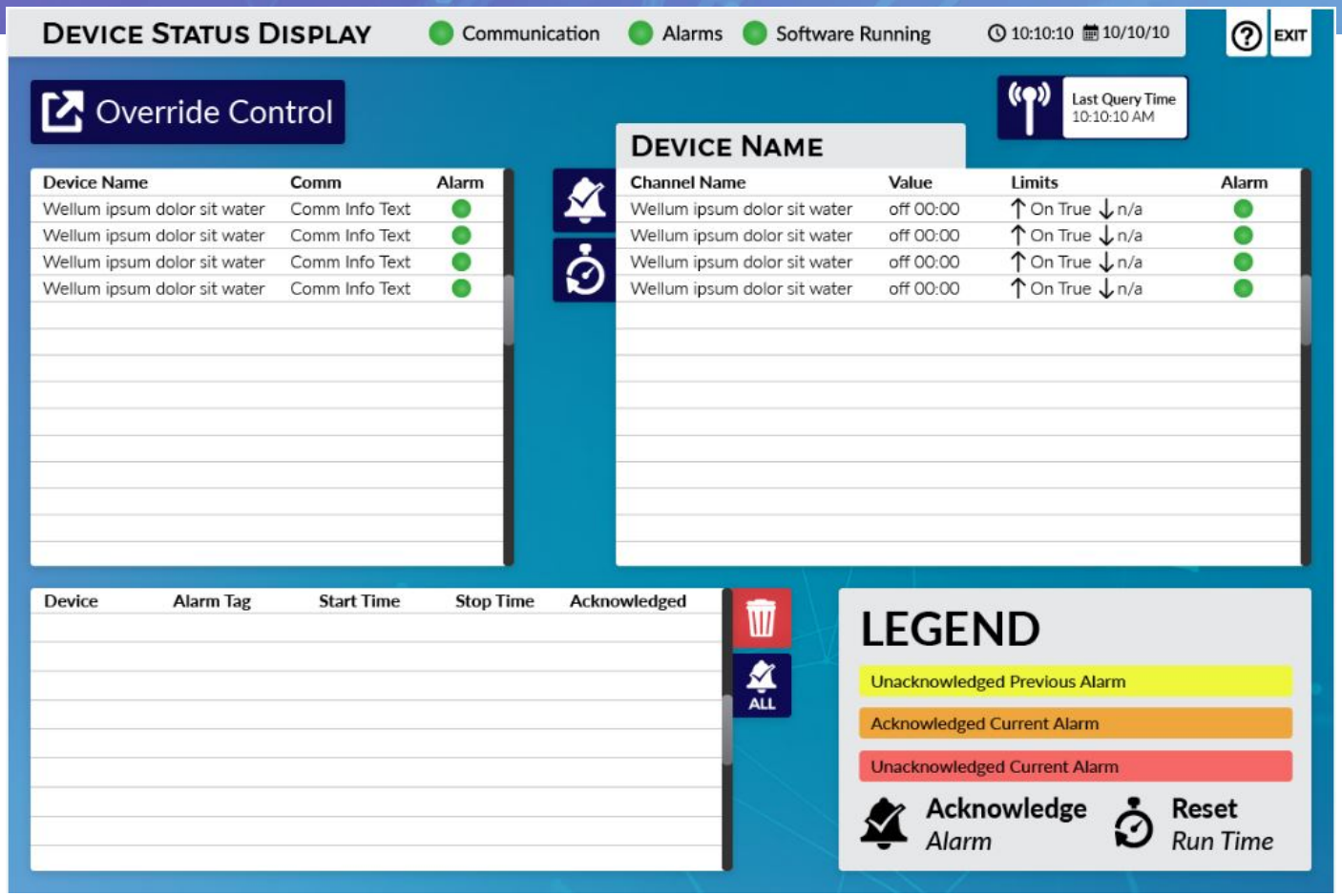
- Scadata can offer direct software licenses or hosted server.
- Direct software License would reside on a customer computer.
- Hosted server option is accessed through internet remote access from any computer.
- Scadata also offers a phone application for both software offerings.

Secure Software

- Account Management
  - User access management
- Activity Log
  - Activity description
  - Time stamp activity



- Data Integrity Validation
  - Electronic records with data storage
  - RSA encryption



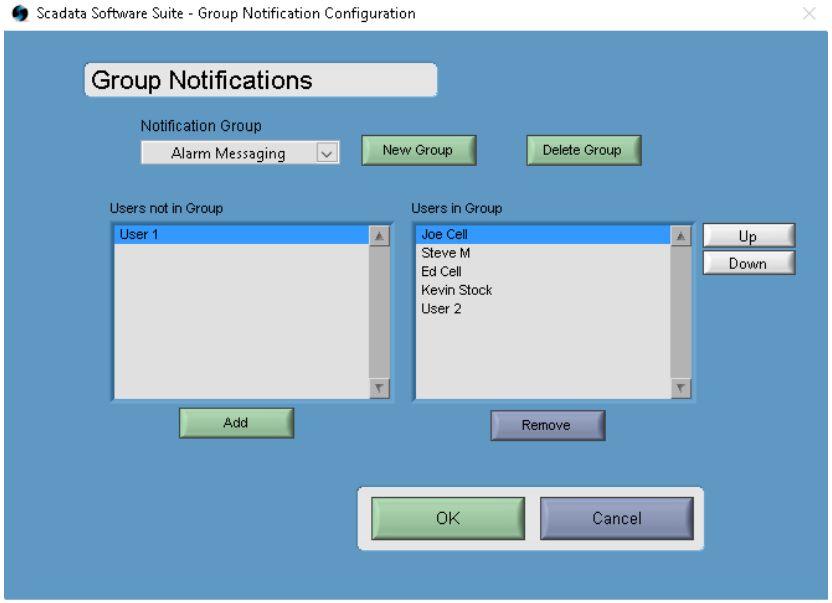
- View all RTUs and I/O status on single screen
- Manage alarms
- Reset run times
- Communications status

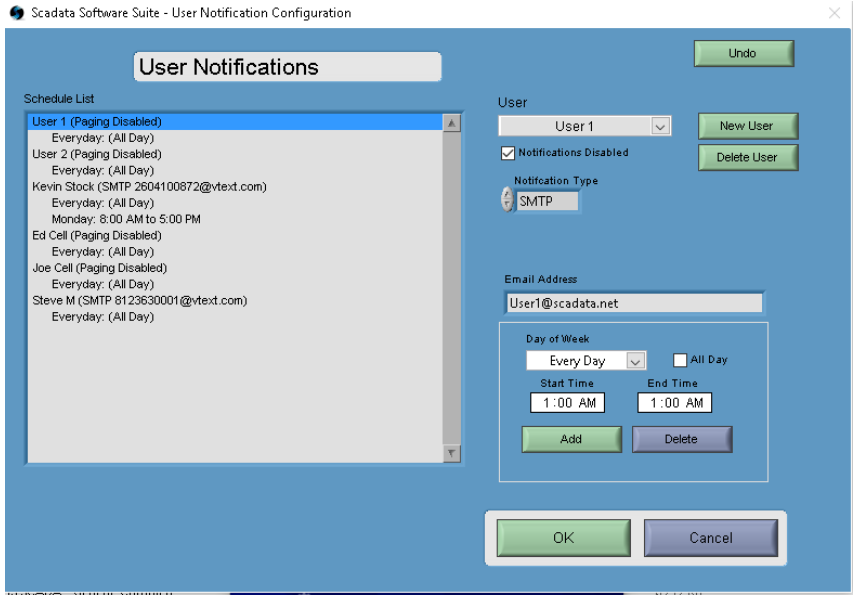
Real Time Trend Graphs

Alarms User Notifications

Email

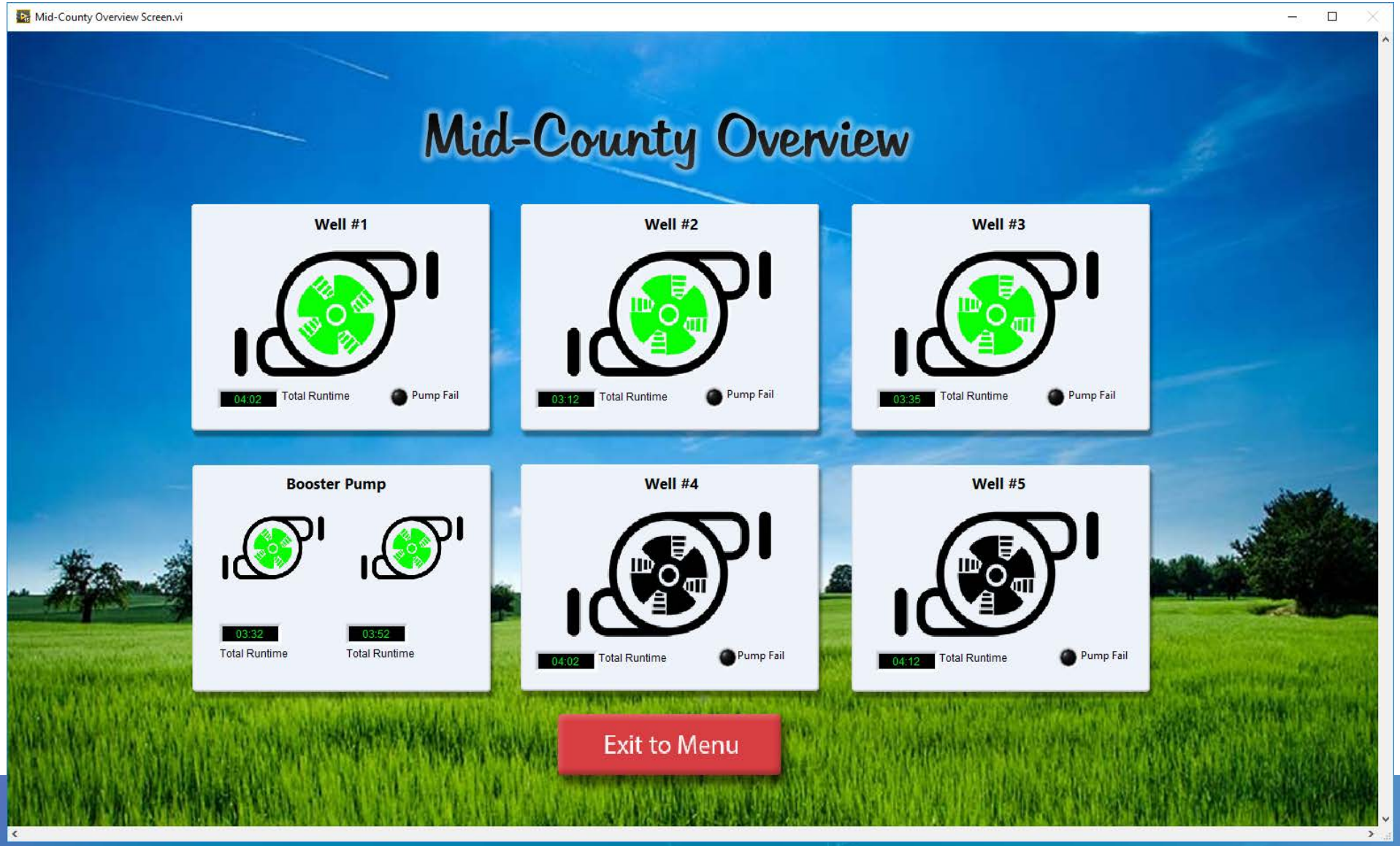
Text



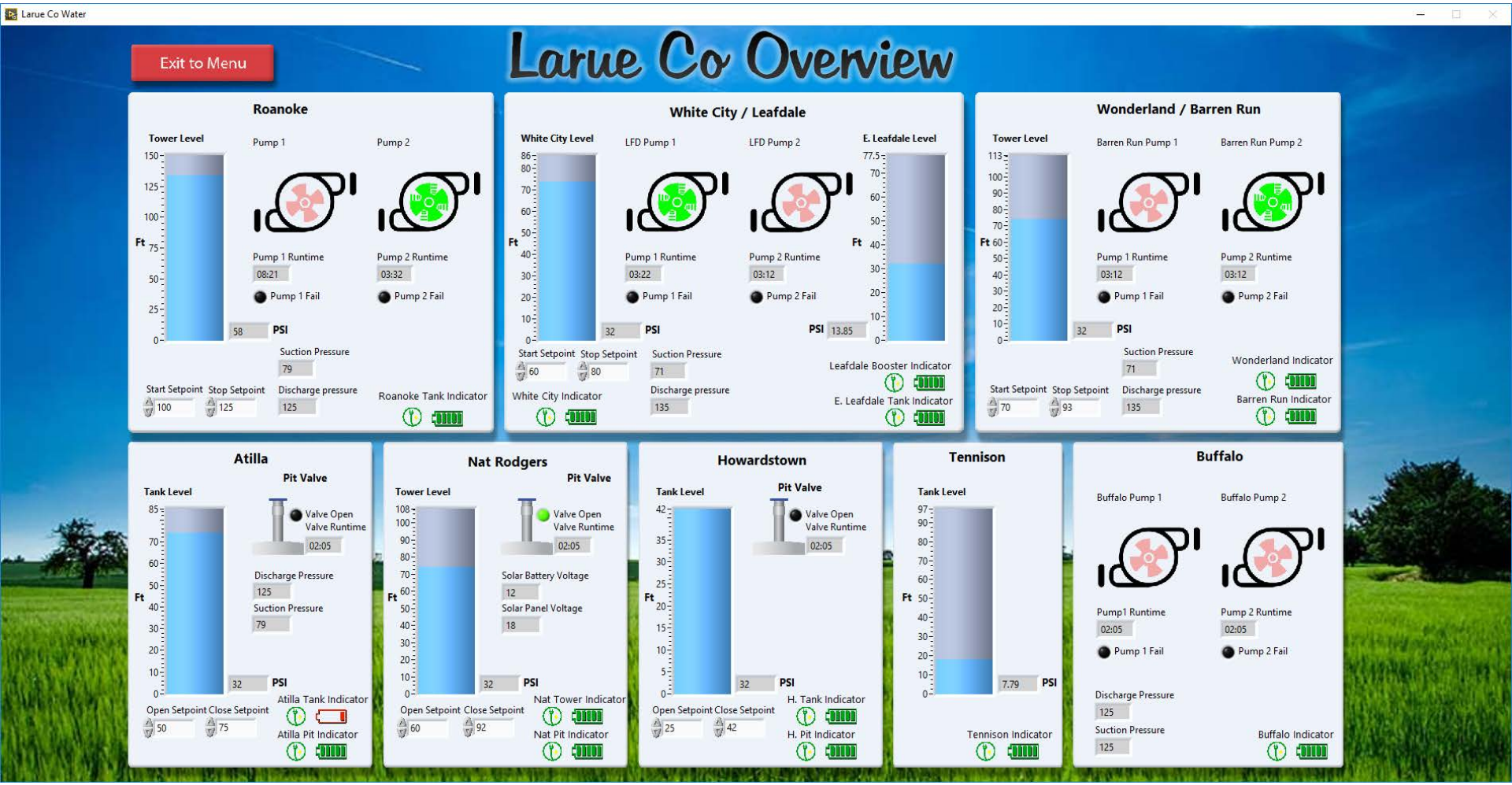


Custom Screen Example

Custom Screen Example



Custom Screen Example



d. Storm Sewer Pump Stations

Bayside tidal control is an essential aspect of flood mitigation in the Borough of Wildwood Crest. Techniques described that utilize passive, manual, or SCADA controlled valves will mitigate tidal flooding from increasing tidal elevation, but it will not be able to control stormwater flooding. When the tidal elevation is above the bay discharge outfalls, stormwater will not drain from the island. During a severe rain event with high tidal elevation, flooding will have damaging effects.

Currently all stormwater management in the Borough utilizes gravity. When the tidal elevations are high these systems do not work. Pump stations are required to mitigate tidal and stormwater flooding. Stations would be designed to evacuate stormwater runoff from rain events. It is recommended that the Borough install three bayside pump stations. Stormwater would discharge through force mains through existing bayside bulkheads.

The first pump station would be located along the bayfront between Wisteria Road and Orchid Road. The pump station would receive stormwater from existing drainage areas E, F, G, H, I, J, K, L, and M. The drainage area for the proposed pump station would be 2,985,134 square feet.

The second pump station would be located along the bayfront on Rosemary Road. The pump station would receive stormwater from existing drainage areas N, O, P, Q, R, S, T, U, and V. The drainage area for the proposed pump station would be 4,443,942 square feet.

The third pump station would be located at the Department of Public Works building between Washington Avenue and Jefferson Avenue. The pump station would receive stormwater from existing drainage areas A1, A2, B, W, and X1. The drainage area for the proposed pump station would be 8,413,177 square feet. The pump station is designed to receive stormwater from existing stormwater drainage areas W and X1. The Engineer's Opinion of Probable Cost for this recommended pump station can be found in Section 7 of this report under Beach Outfall Elimination and Pump Stations.

The pump stations would require new pipe systems to carry stormwater to their location. The proposed pipe system and potential pump station locations can be seen on the Overall Proposed Storm Drainage Improvements map. The Engineer's Opinion of Probable Cost for the first and second recommended pump stations can be found in Section 7 of this report.

MPC-T59131-030519.pdf

Lineshaft Pumps

Axial Flow Pumps

Pump Features:

- Flanged Drive Coupling
- Removable Stuffing Box & Bearing Housing
- Removable Bearing Retainer
- Stainless Steel Line Shaft
- Stainless Steel High-Efficiency Propeller
- Durable Nitrile Rubber Marine Bearings
- Close Tolerance Parallel Machined Flanges
- Stainless Steel Bowl Wear Ring
- Optional Ceramic Coating

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www.morrisonpump.com

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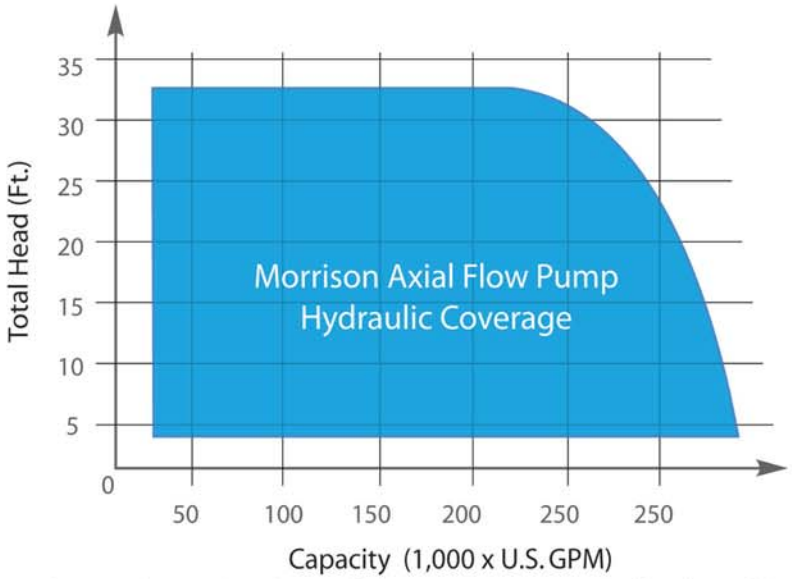
Lineshaft Pumps- Axial Flow

The High Efficiency Morrison Pump Axial Flow Lineshaft Pump has been engineered and manufactured for severe duty applications and continuous operation.

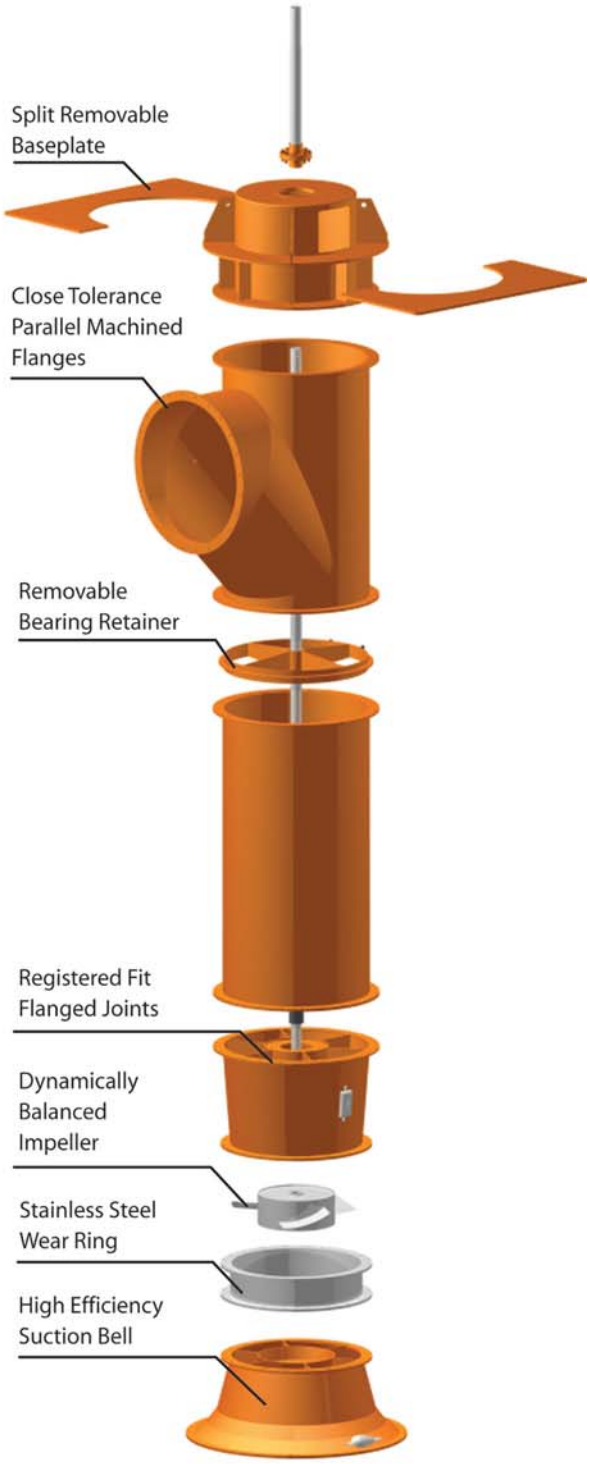
Some of the standard features that distinguish Morrison Lineshaft Pumps include our jointed (segmented) pump construction, dynamic balancing of impellers, stainless steel rotating elements and wear rings, flanged drive couplings, electrical isolation of dissimilar metals, removable bearing retainers, and standard marine nitrile rubber radial bearings. Furthermore, all Axial Flow Pumps are provided with certified pump performance curves.

Morrison High-Efficiency Axial Flow Lineshaft Pumps can be in vertical, horizontal, or slant (angle) configurations, and may be oil, water, or product lubricated (no seals, no oil). Various material options include marine steel, austenitic stainless steel (AISI 316L), duplex stainless steels, and titanium.



Please consult Morrison Pump Company for larger pump sizes. Morrison Mixed Flow also available.

PUMP PART	PART DESCRIPTION
Pump Body	Segmented, A36 Carbon Steel
Propeller	Stainless Steel 304L / 316L
Wear Ring	Flanged, Isolated, Stainless Steel 304L / 316L
Lineshaft	Stainless Steel 304L / 316L
Bearings - Product Lube	Marine Nitrile Rubber
Bearings - Oil Lube	Bronze SAE 64
Bearing Retainers	Removable, A36 Carbon Steel
Support Baseplate	Split & Removable, A36 Carbon Steel
Mounting Hardware	Stainless Steel 304 / 316



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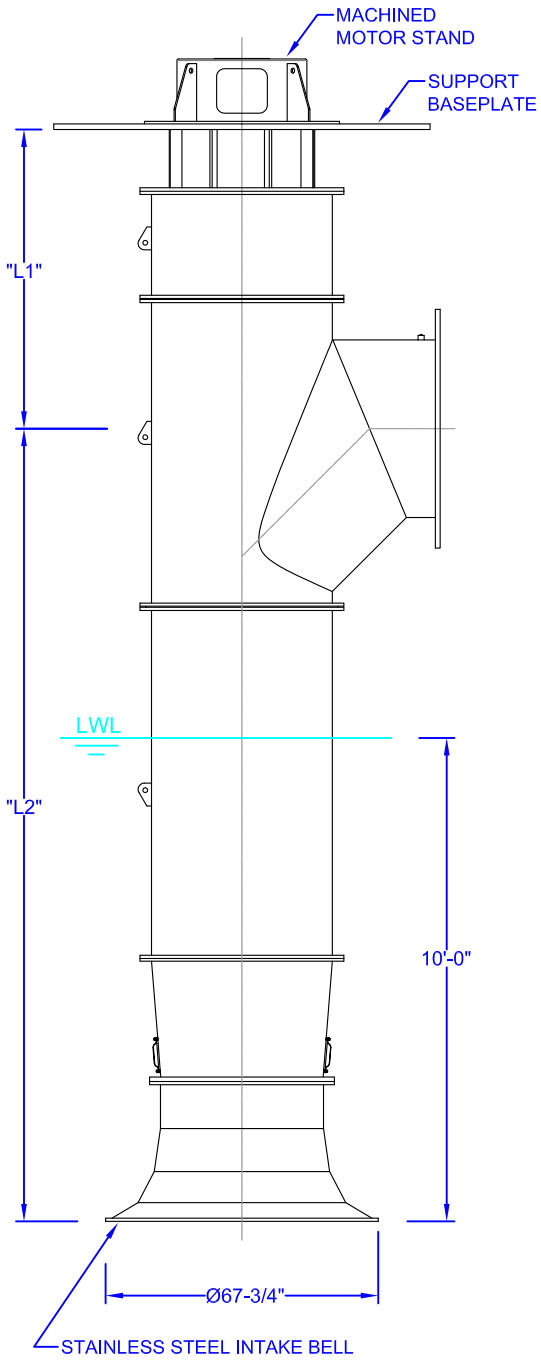
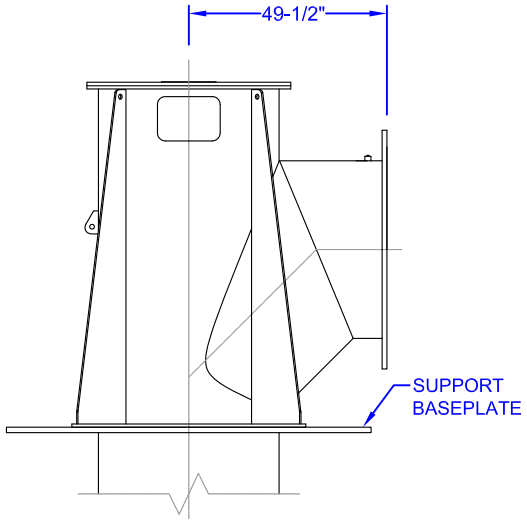
MORRISON MODEL VPS-44-40
GENERAL DIMENSIONS

BELOW GRADE DISCHARGE



ABOVE GRADE DISCHARGE



PUMP PERFORMANCE:

MORRISON PUMP MODEL	:	VPS-44-40
BOWL MODEL	:	MP-40-03-LH
DESIGN CAPACITY	:	54,000 GPM
DESIGN HEAD	:	15.0 FT. TDH
DESIGN SPEED	:	450 RPM
BOWL EFFICIENCY	:	87.2% @ RATED CONDITION
NPSHR	:	29.8 FT. @ RATED CONDITION
POWER	:	235 BHP @ RATED CONDITION

PUMP CONSTRUCTION:

PUMP TYPE	:	AXIAL FLOW IMPELLER LINESHAFT
CONFIGURATION	:	VERTICAL LINESHAFT PUMP
DISCHARGE	:	Ø44 OR Ø48 INCHES
LUBRICATION	:	PRODUCT LUBRICATION
IMPELLER	:	FORGED 304L STAINLESS STEEL, DYNAMICALLY BALANCED
SHAFT	:	DUPLEX STAINLESS STEEL, S31803
RADIAL BEARINGS	:	NITRILE RUBBER OR THORDON SXL
BOWL	:	STAINLESS STEEL & CARBON STEEL
COLUMN & ELBOW	:	A36 CARBON STEEL
FLANGES	:	MACHINED WITH REGISTERS
COATING	:	12 MILS 2-PART EPOXY
MISC.	:	REMOVABLE SPIDERS, NO SUCTION BELL BEARING, NO OIL/NO GREASE

NOTES:

1. DRAWING IS FOR GENERAL REFERENCE ONLY.
2. VERTICAL ELECTRIC MOTOR NOT SHOWN.
3. LWL = LOW WATER LEVEL INDICATING MINIMUM SUBMERGENCE PER ANSI/HI 9.8-2018 INTAKE DESIGN STANDARDS

MORRISON PUMP COMPANY
A BUSINESS UNIT OF PATTERSON

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DWG. TITLE: MORRISON PUMP MODEL VPS-44-40 GENERAL DIMENSIONS

PROJECT: MPC 59131A - REINER PUMP / STORMWATER PUMP STATION

DATE: 05-MARCH-2019

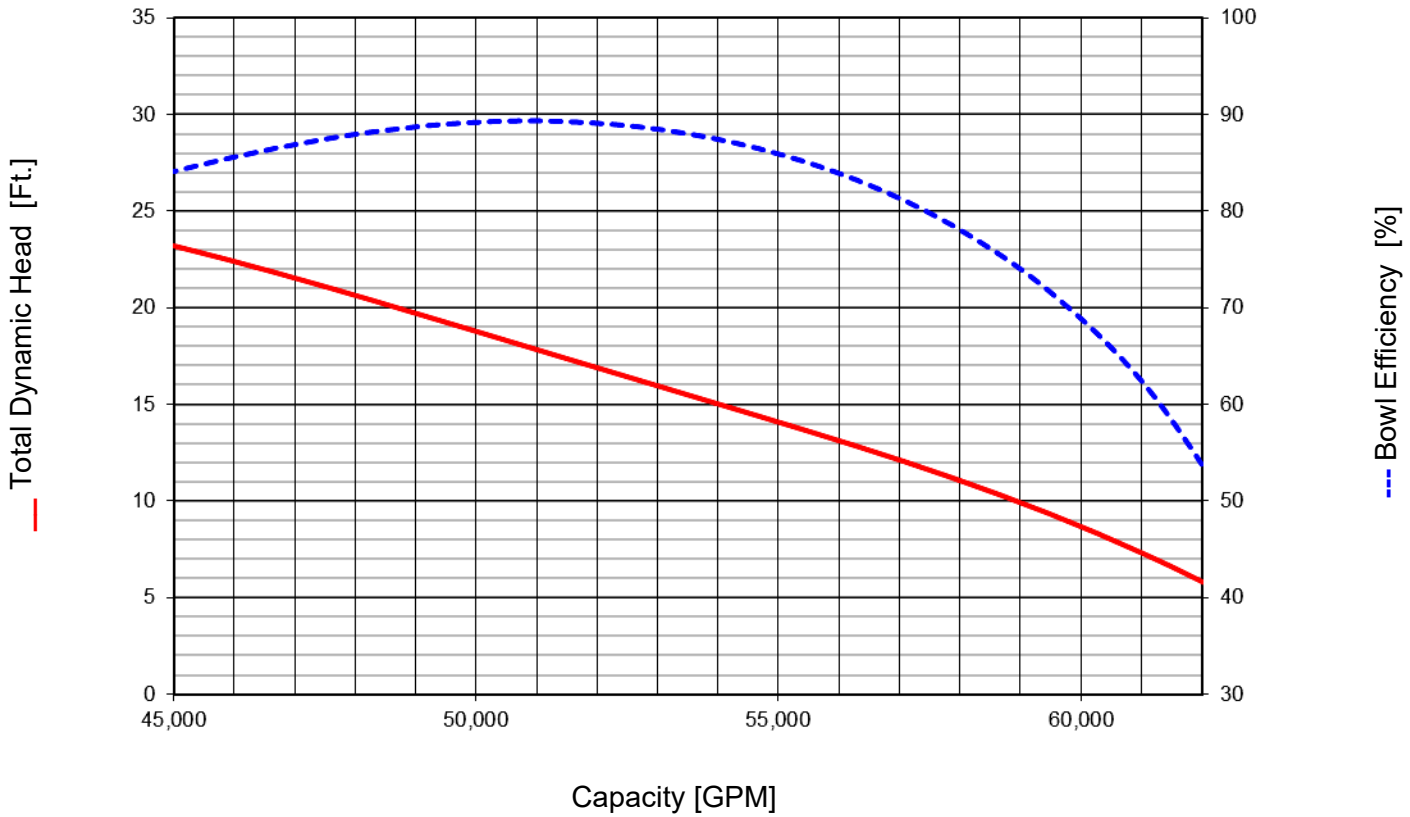
FILE: DWG-59131-VPS-44

Pump Performance

Axial Flow Impeller, One-Stage, High-Efficiency

Project No.: MPC 59131A
Project Name: Reiner Pump – DeBlasio & Associates, Stormwater Pump Station
Date: 05-March-2019

MORRISON PUMP MODEL VPS-44-40
Design Condition = 54,000 GPM @ 15.0 Ft. TDH



Morrison Pump Bowl No.:	MP-40-03-LH
Impeller Diameter:	39.4 inches
Shaft Speed:	450 RPM

MORRISON PUMP COMPANY
A BUSINESS UNIT OF PATTERSON

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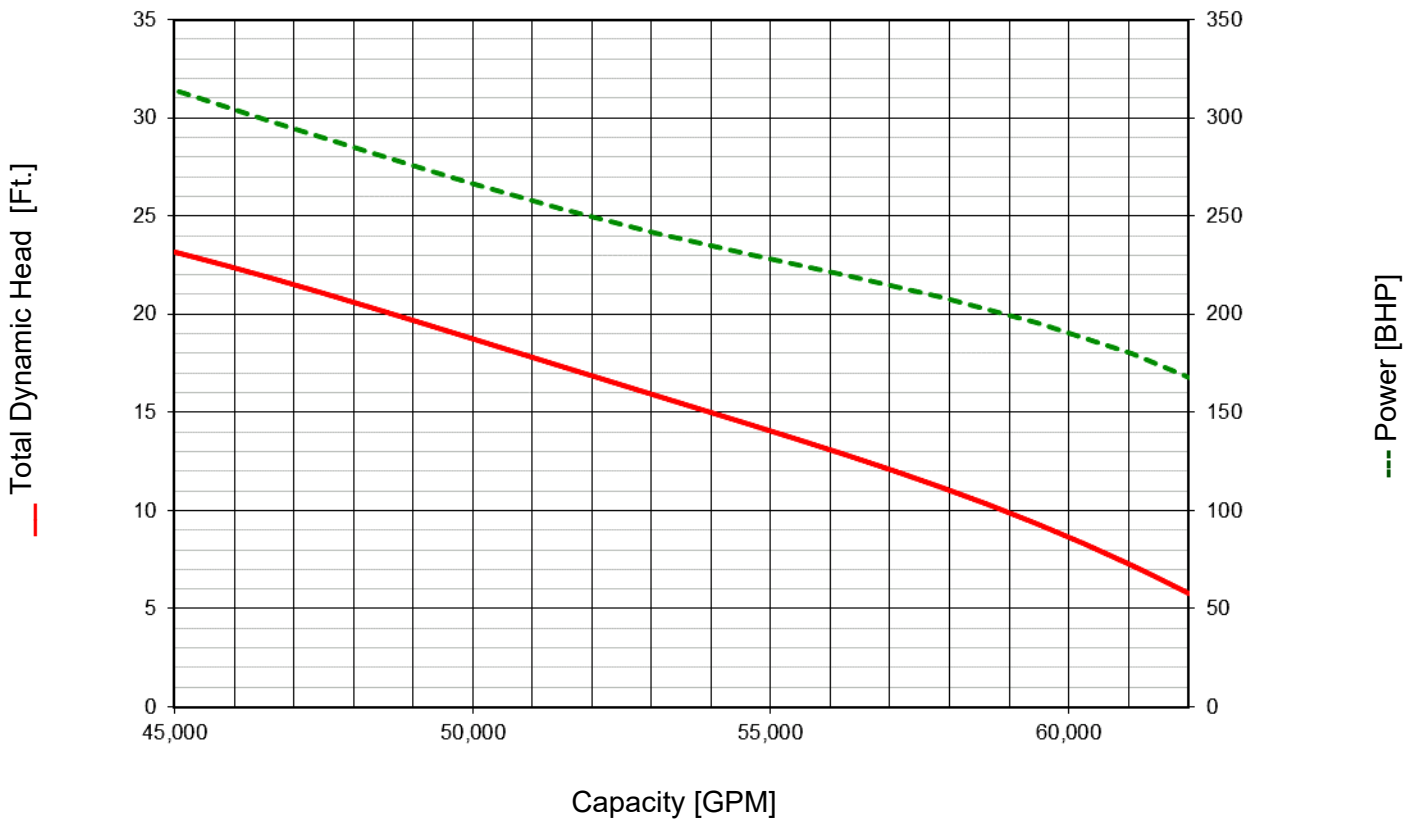
Pump Performance

Axial Flow Impeller, One-Stage, High-Efficiency

Project No.: MPC 59131A
Project Name: Reiner Pump – DeBlasio & Associates, Stormwater Pump Station
Date: 05-March-2019

MORRISON PUMP MODEL VPS-44-40
Design Condition = 54,000 GPM @ 15.0 Ft. TDH



Morrison Pump Bowl No.:	MP-40-03-LH
Impeller Diameter:	39.4 inches
Shaft Speed:	450 RPM

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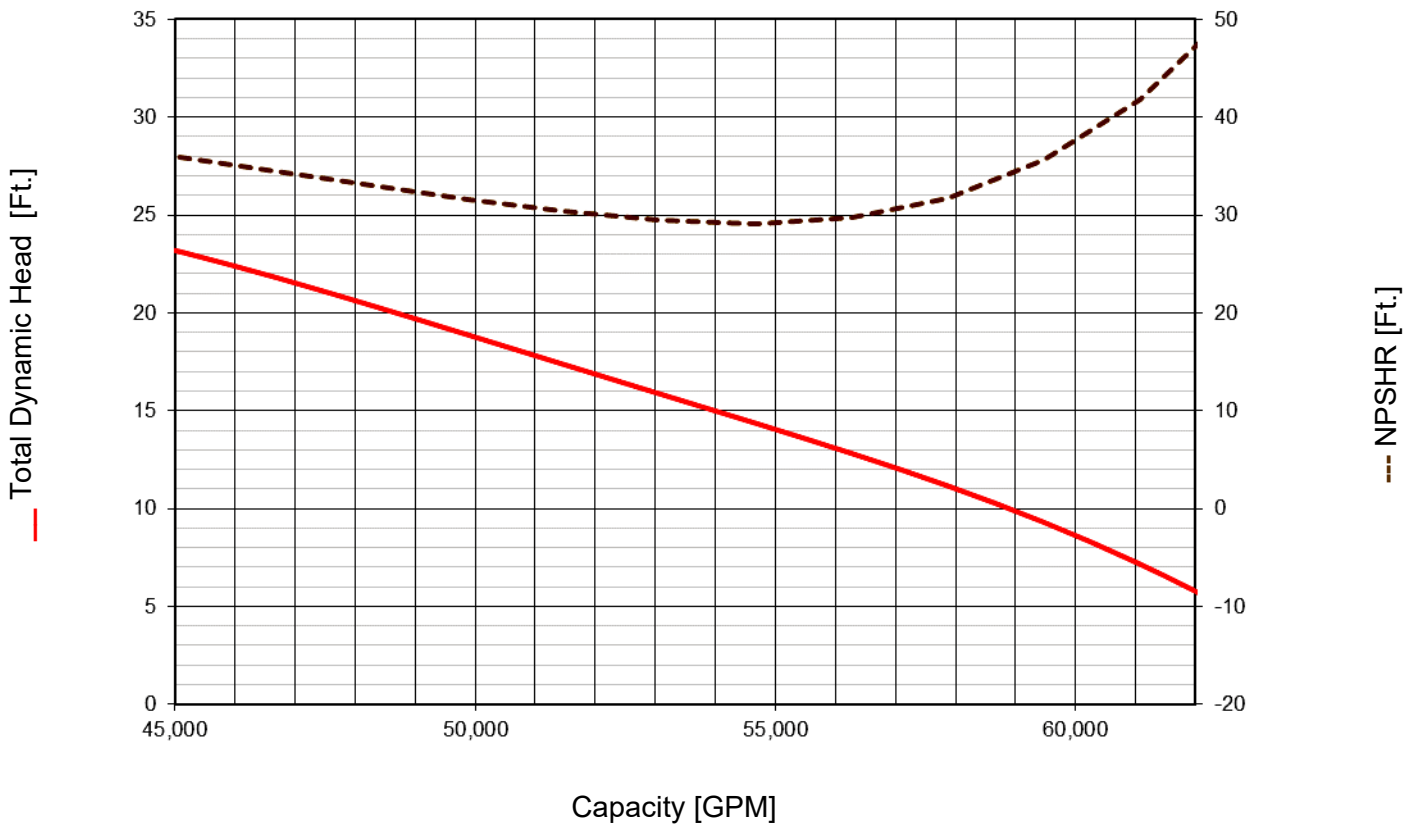
Pump Performance

Axial Flow Impeller, One-Stage, High-Efficiency

Project No.: MPC 59131A
Project Name: Reiner Pump – DeBlasio & Associates, Stormwater Pump Station
Date: 05-March-2019

MORRISON PUMP MODEL VPS-44-40
Design Condition = 54,000 GPM @ 15.0 Ft. TDH



Morrison Pump Bowl No.:	MP-40-03-LH
Impeller Diameter:	39.4 inches
Shaft Speed:	450 RPM

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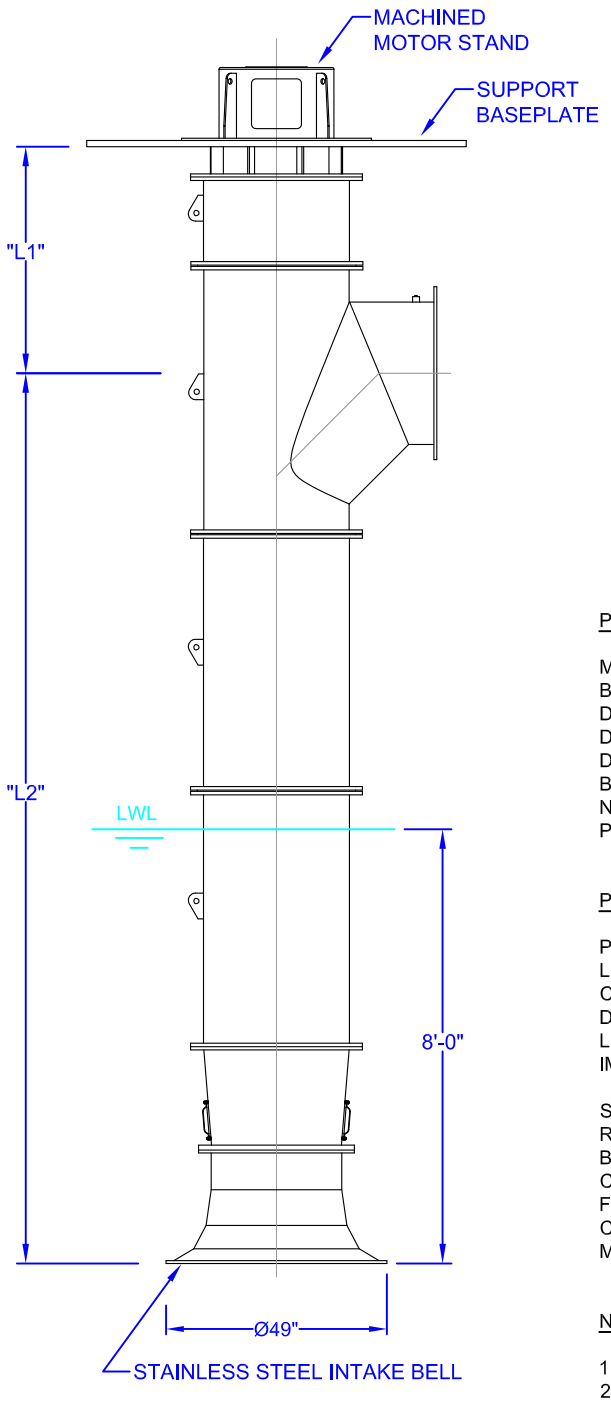
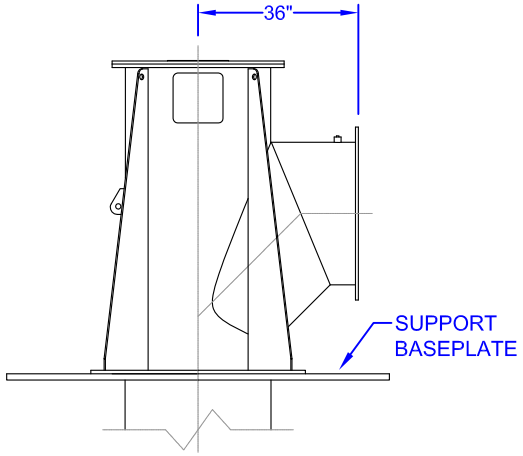
MORRISON MODEL VPS-32-28
GENERAL DIMENSIONS

BELOW GRADE DISCHARGE



ABOVE GRADE DISCHARGE



PUMP PERFORMANCE:

MORRISON PUMP MODEL	:	VPS-32-28
BOWL MODEL	:	MP-28-03-MH
DESIGN CAPACITY	:	27,000 GPM
DESIGN HEAD	:	15.0 FT. TDH
DESIGN SPEED	:	450 RPM
BOWL EFFICIENCY	:	88.4% @ RATED CONDITION
NPSHR	:	28.8 FT. @ RATED CONDITION
POWER	:	116 BHP @ RATED CONDITION

PUMP CONSTRUCTION:

PUMP TYPE	:	AXIAL FLOW IMPELLER
LINESHAFT CONFIGURATION	:	VERTICAL LINESHAFT PUMP
DISCHARGE	:	Ø32 OR Ø36 INCHES
LUBRICATION	:	PRODUCT LUBRICATION
IMPELLER	:	FORGED 304L STAINLESS STEEL, DYNAMICALLY BALANCED
SHAFT	:	DUPLEX STAINLESS STEEL, S31803
RADIAL BEARINGS	:	NITRILE RUBBER OR THORDON SXL
BOWL	:	STAINLESS STEEL & CARBON STEEL
COLUMN & ELBOW	:	A36 CARBON STEEL
FLANGES	:	MACHINED WITH REGISTERS
COATING	:	12 MILS 2-PART EPOXY
MISC.	:	REMOVABLE SPIDERS, NO SUCTION BELL BEARING, NO OIL/NO GREASE

NOTES:

1. DRAWING IS FOR GENERAL REFERENCE ONLY.
2. VERTICAL ELECTRIC MOTOR NOT SHOWN.
3. LWL = LOW WATER LEVEL INDICATING MINIMUM SUBMERGENCE PER ANSI/HI 9.8-2018 INTAKE DESIGN STANDARDS

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DWG. TITLE: MORRISON PUMP MODEL VPS-32-28 GENERAL DIMENSIONS

PROJECT: MPC 59131B - REINER PUMP / STORMWATER PUMP STATION

DATE: 05-MARCH-2019

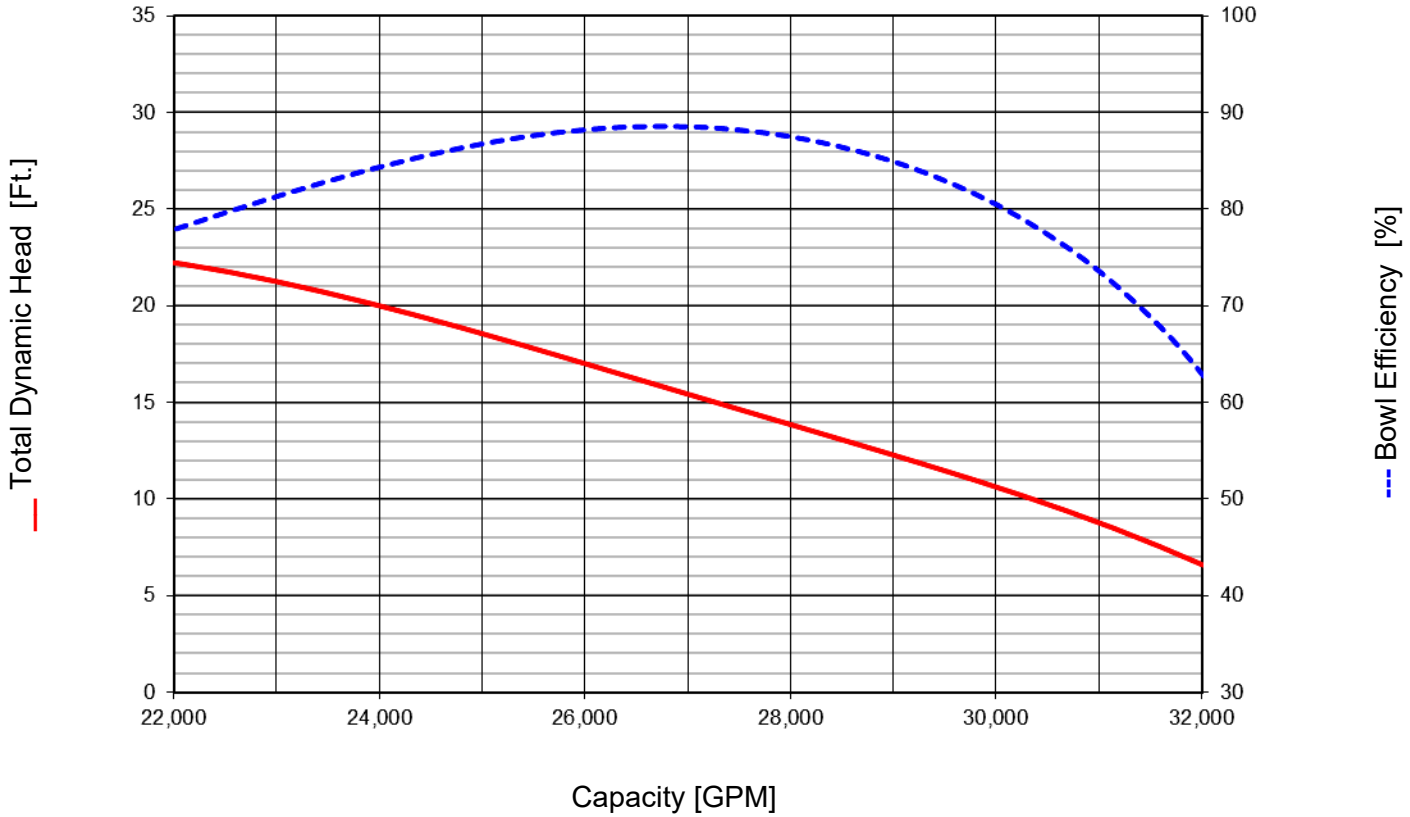
FILE: DWG-59131-VPS-32

Pump Performance

Axial Flow Impeller, One-Stage, High-Efficiency

Project No.: MPC 59131B
Project Name: Reiner Pump – DeBlasio & Associates, Stormwater Pump Station
Date: 05-March-2019

MORRISON PUMP MODEL VPS-32-28
Design Condition = 27,000 GPM @ 15.0 Ft. TDH



Morrison Pump Bowl No.:	MP-28-03-MH
Impeller Diameter:	28.0 inches
Shaft Speed:	595 RPM

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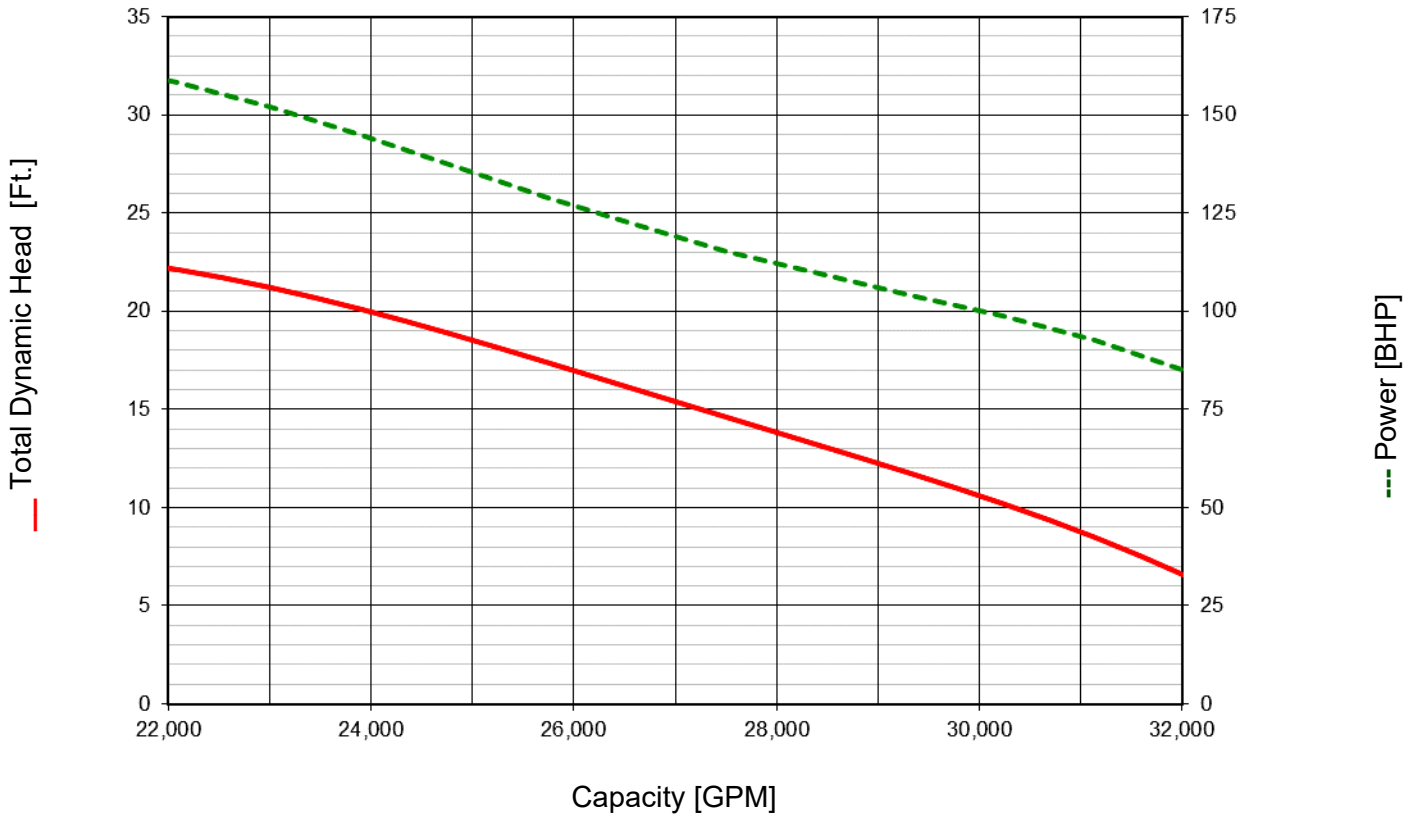
Pump Performance

Axial Flow Impeller, One-Stage, High-Efficiency

Project No.: MPC 59131B
Project Name: Reiner Pump – DeBlasio & Associates, Stormwater Pump Station
Date: 05-March-2019

MORRISON PUMP MODEL VPS-32-28
Design Condition = 27,000 GPM @ 15.0 Ft. TDH



Morrison Pump Bowl No.:	MP-28-03-MH
Impeller Diameter:	28.0 inches
Shaft Speed:	595 RPM

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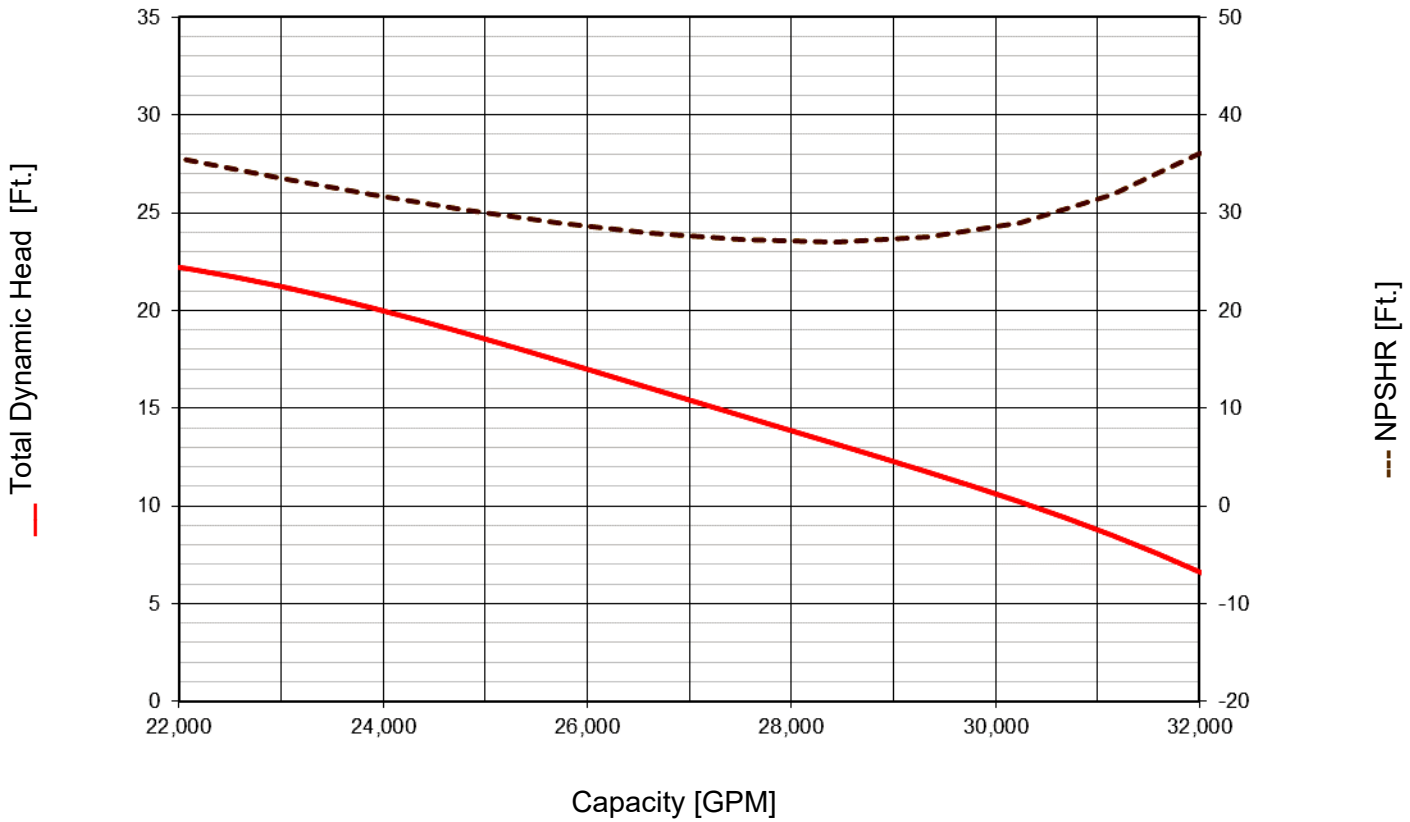
Pump Performance

Axial Flow Impeller, One-Stage, High-Efficiency

Project No.: MPC 59131B
Project Name: Reiner Pump – DeBlasio & Associates, Stormwater Pump Station
Date: 05-March-2019

MORRISON PUMP MODEL VPS-32-28
Design Condition = 27,000 GPM @ 15.0 Ft. TDH



Morrison Pump Bowl No.:	MP-28-03-MH
Impeller Diameter:	28.0 inches
Shaft Speed:	595 RPM

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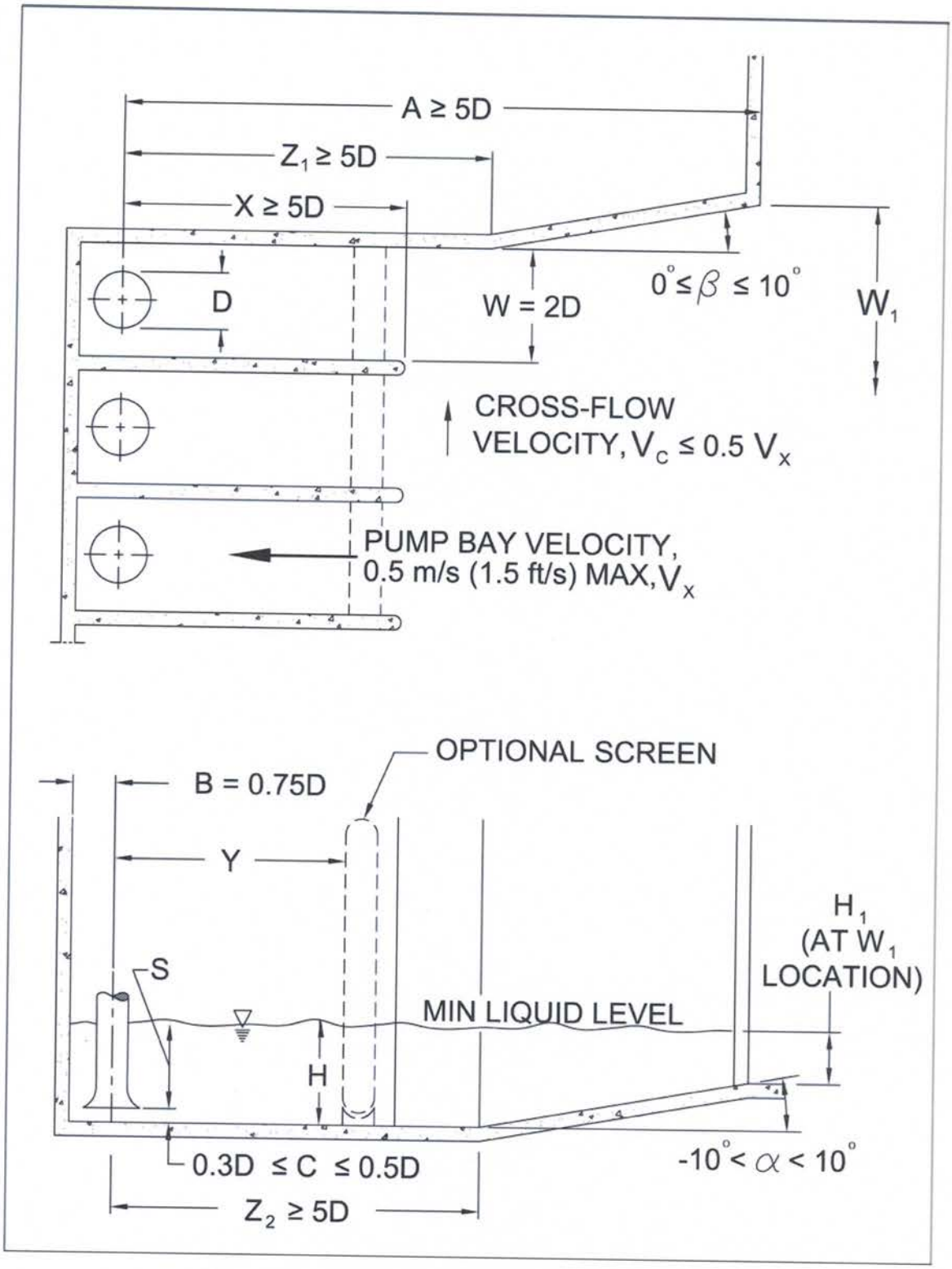

Figure 9.8.3.1.4a Rectangular intake structure layout

Table 9.8.3.1.4b provides a sequence of steps to follow in determining the general layout and internal geometry of a rectangular intake structure.

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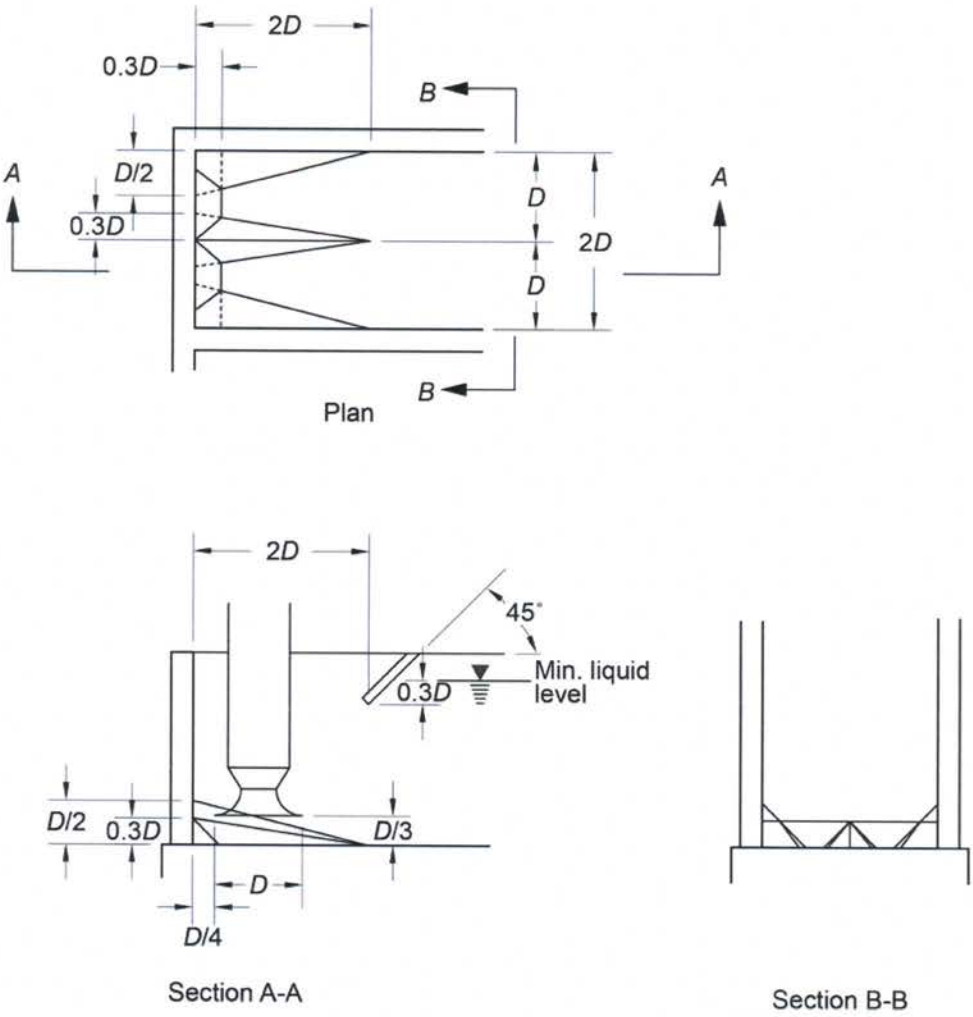
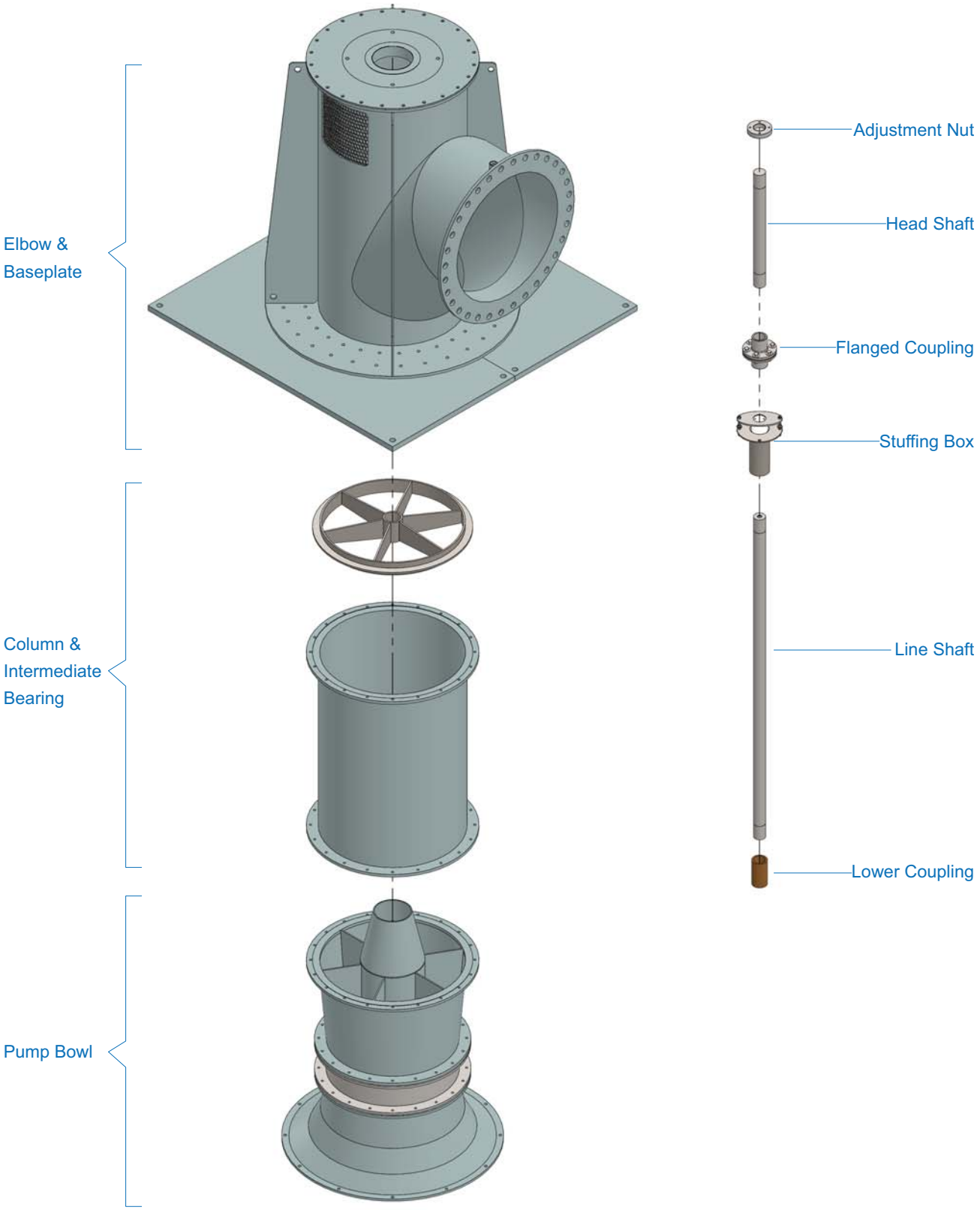


Figure J.2 Pump bay details near the pump bells for rectangular intakes with a shallow liquid source

MORRISON PUMP STANDARD PUMP DETAIL



See Sub-Assembly Drawings for Detail.

Standard Pump Components & Detail - Morrison Pump VPS - Model

File: PartsDetail-Overview-VPS Above Ground Discharge

MORRISON PUMP COMPANY

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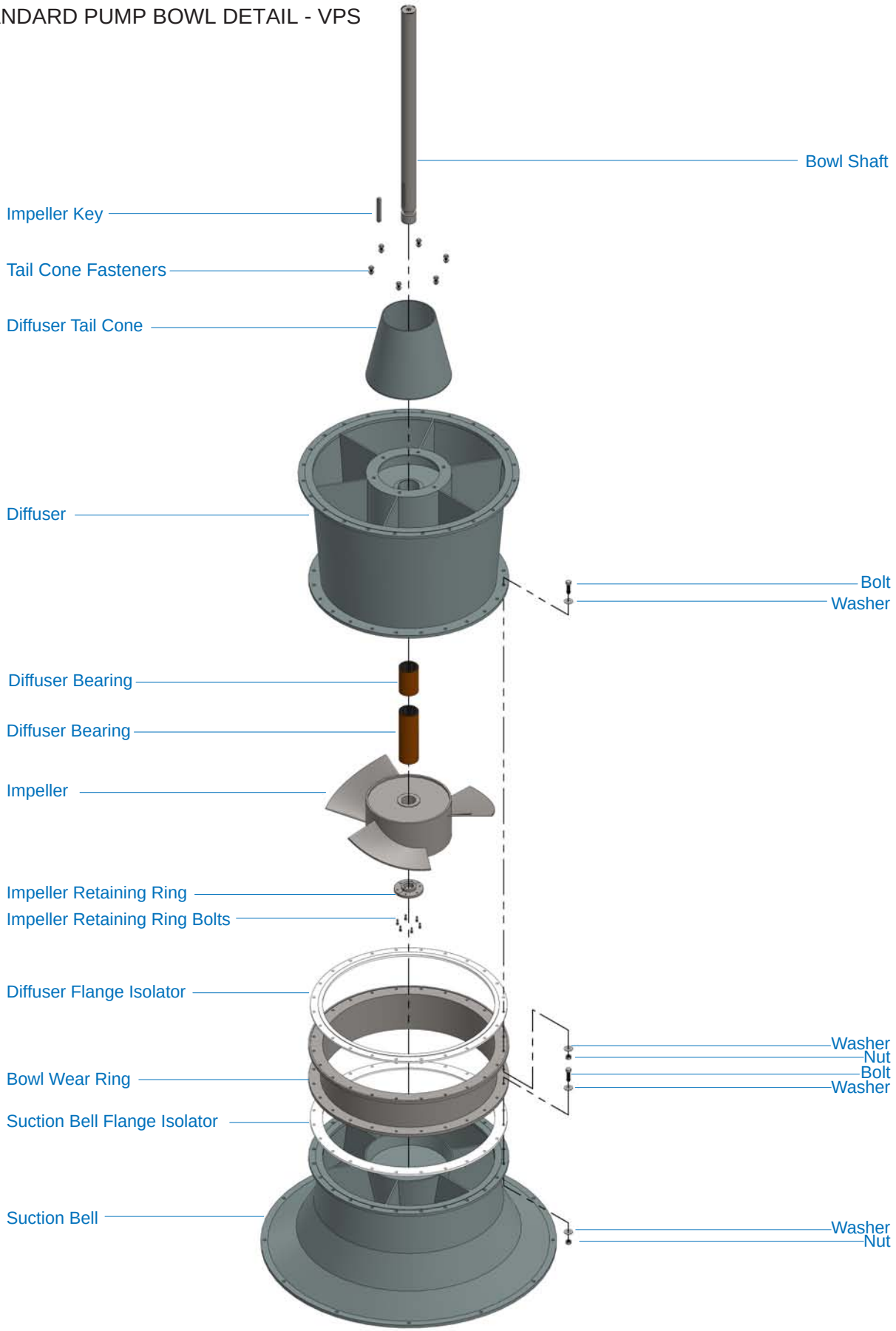
STANDARD PUMP BOWL DETAIL - VPS



Standard Pump Bowl Detail - Morrison Pump Model VPS

File: PartsDetail-PumpBowl-VPS

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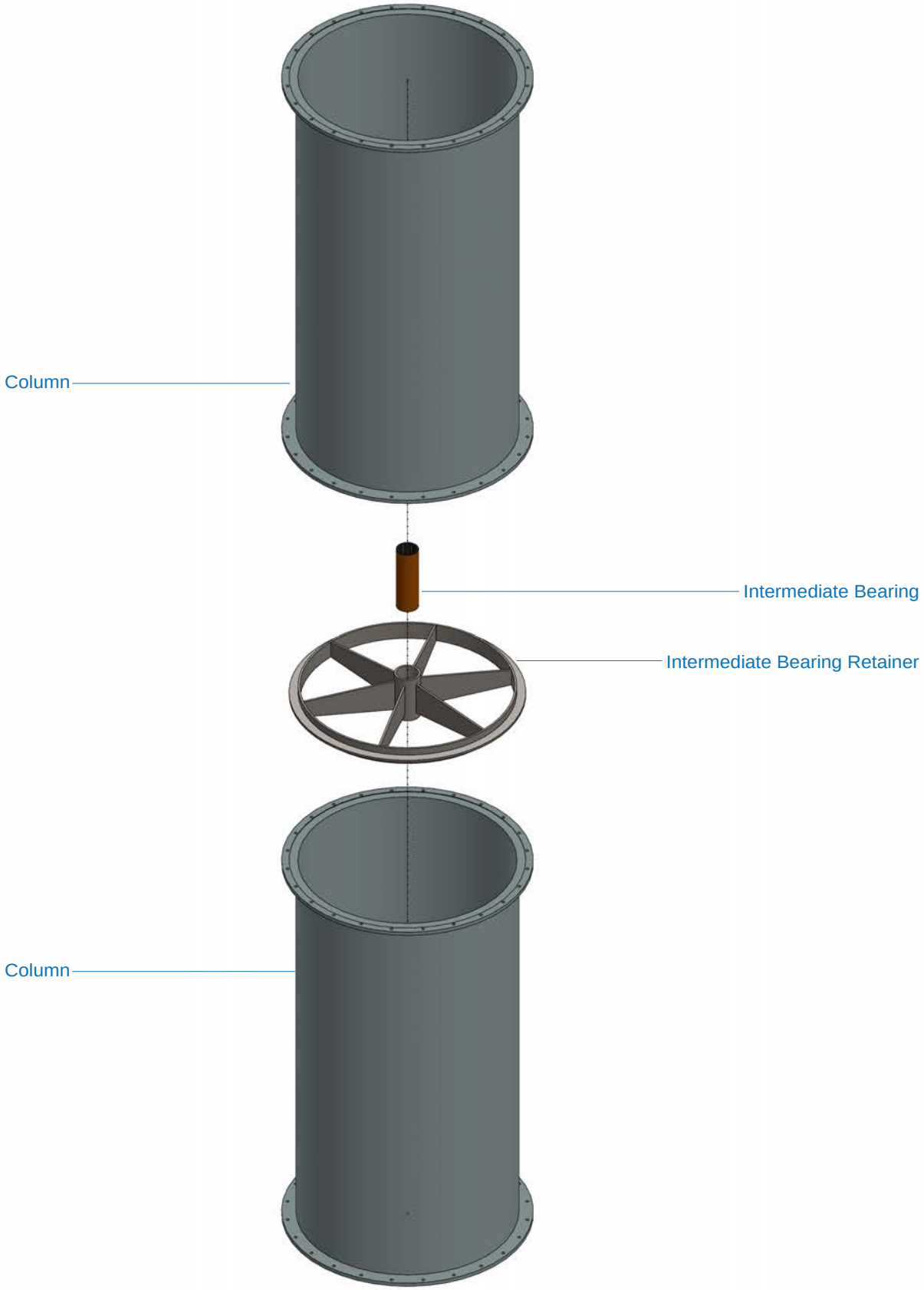
STANDARD PUMP COLUMN DETAIL



Center Column & Intermediate Bearing Retainer

File: PartsDetail-ColumnBearing

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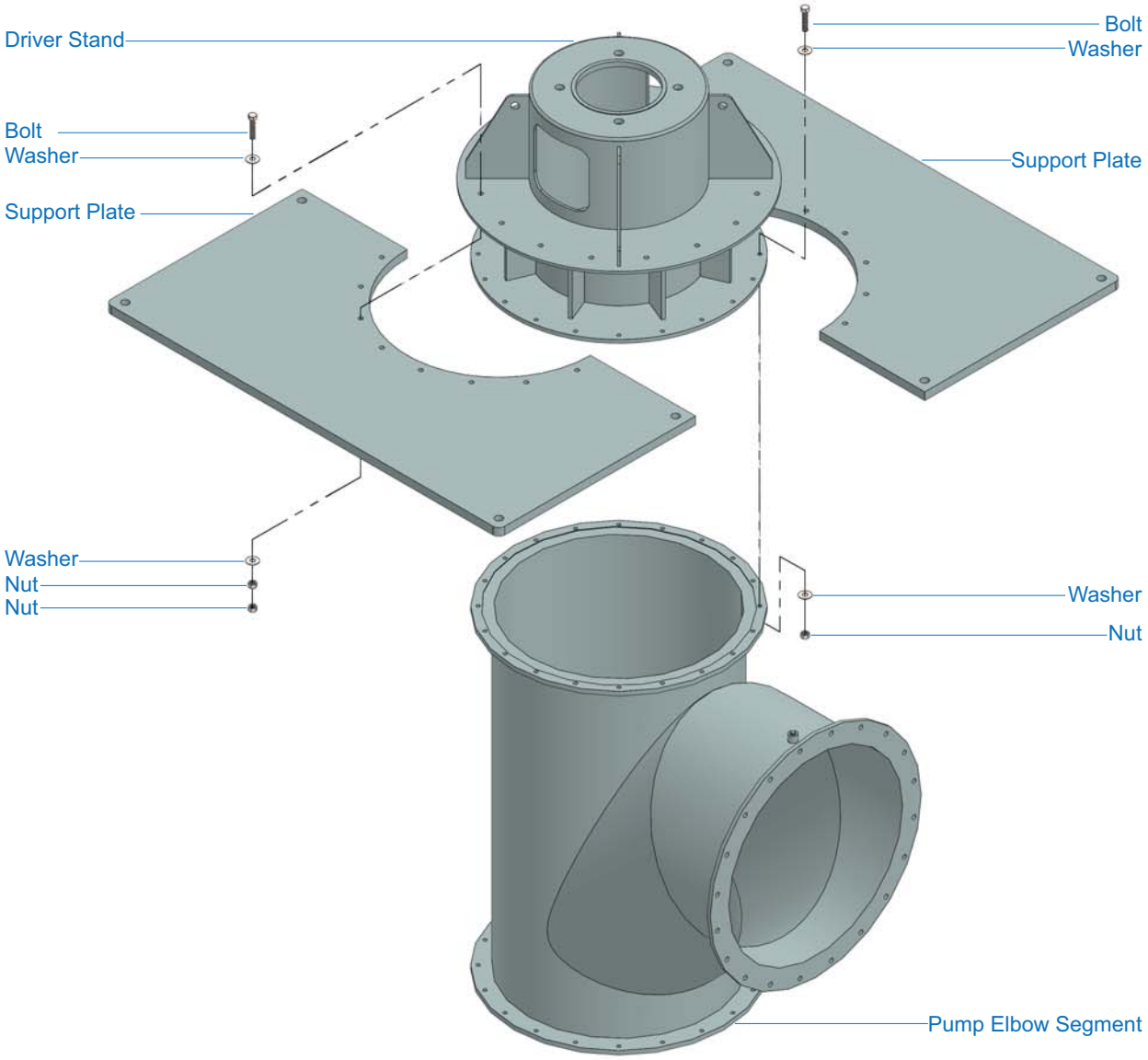
STANDARD PUMP ELBOW & BASEPLATE DETAIL



Standard Split Baseplate Detail

File: Parts Detail - Split Baseplate Discharge Elbow

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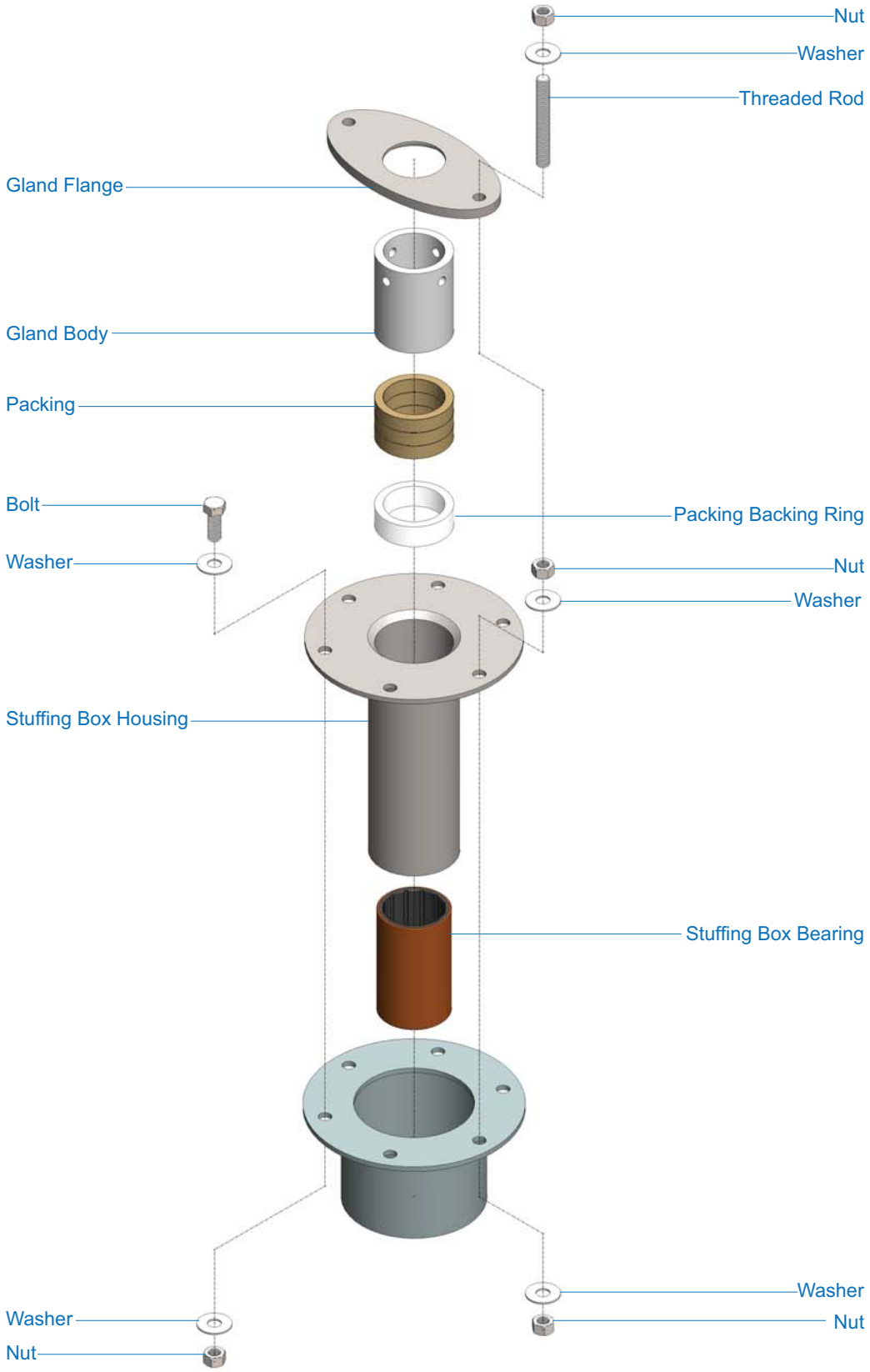
STANDARD STUFFING BOX DETAIL



Standard Pump Detail - Stuffing Box - Morrison Pump Models VPS

File: PartsDetail-Stuffing Box

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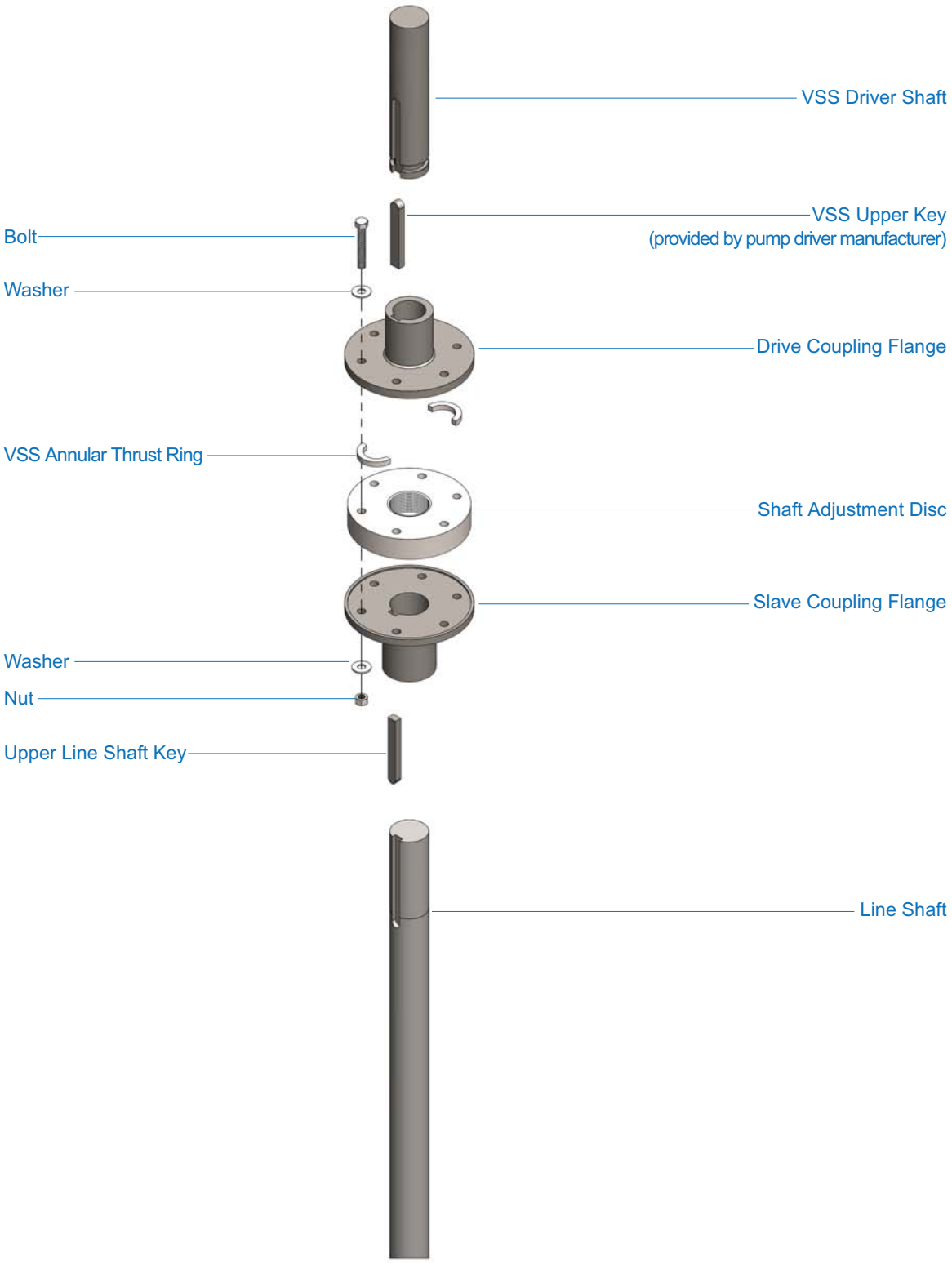
HEAD SHAFT AND UPPER COUPLING DETAIL
THREADED & FLANGED COUPLING - VSS



Head Shaft & Threaded Flanged Coupling VSS

File: PartsDetail-HeadShaft-ThreadedFlangedCoupling VSS

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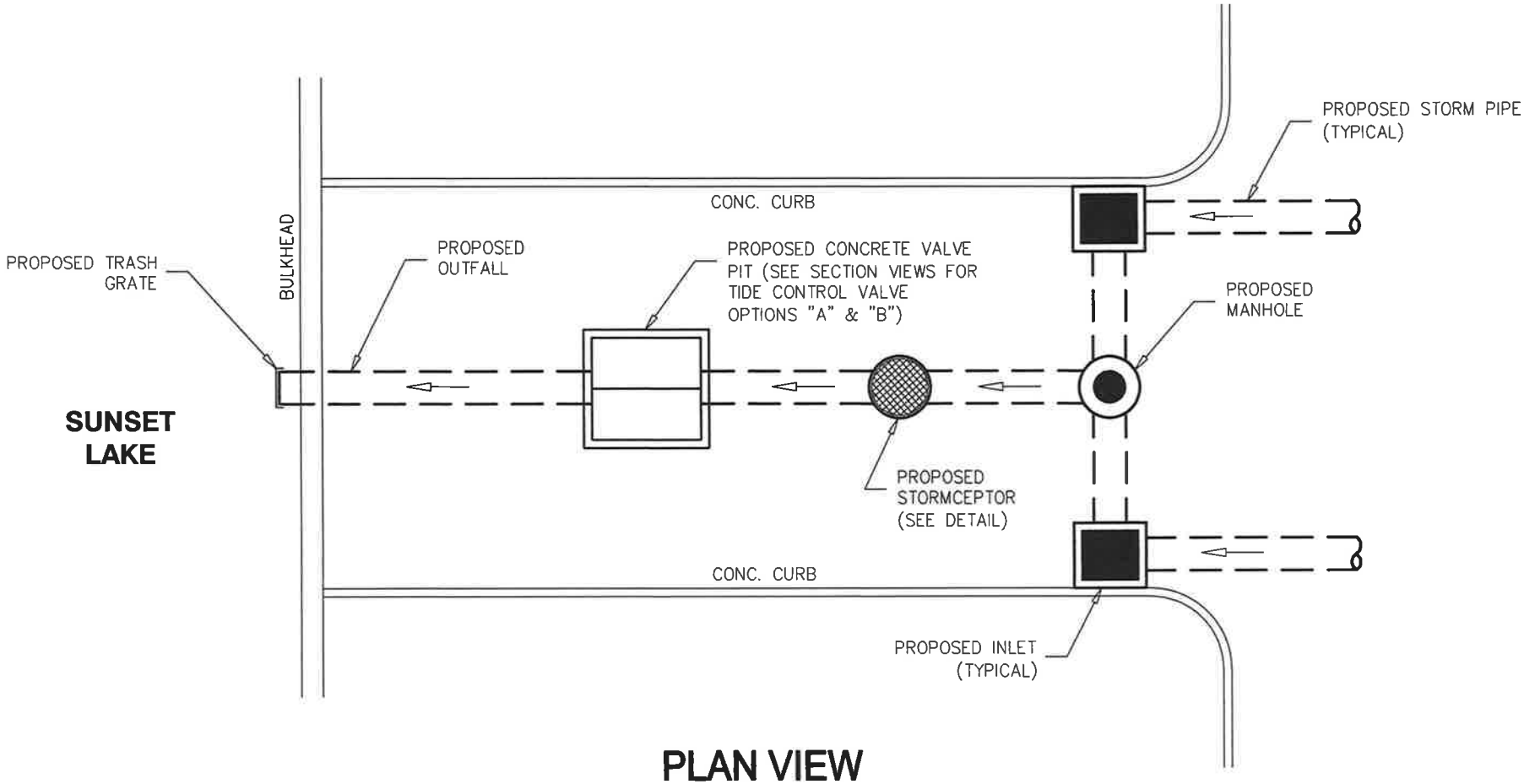


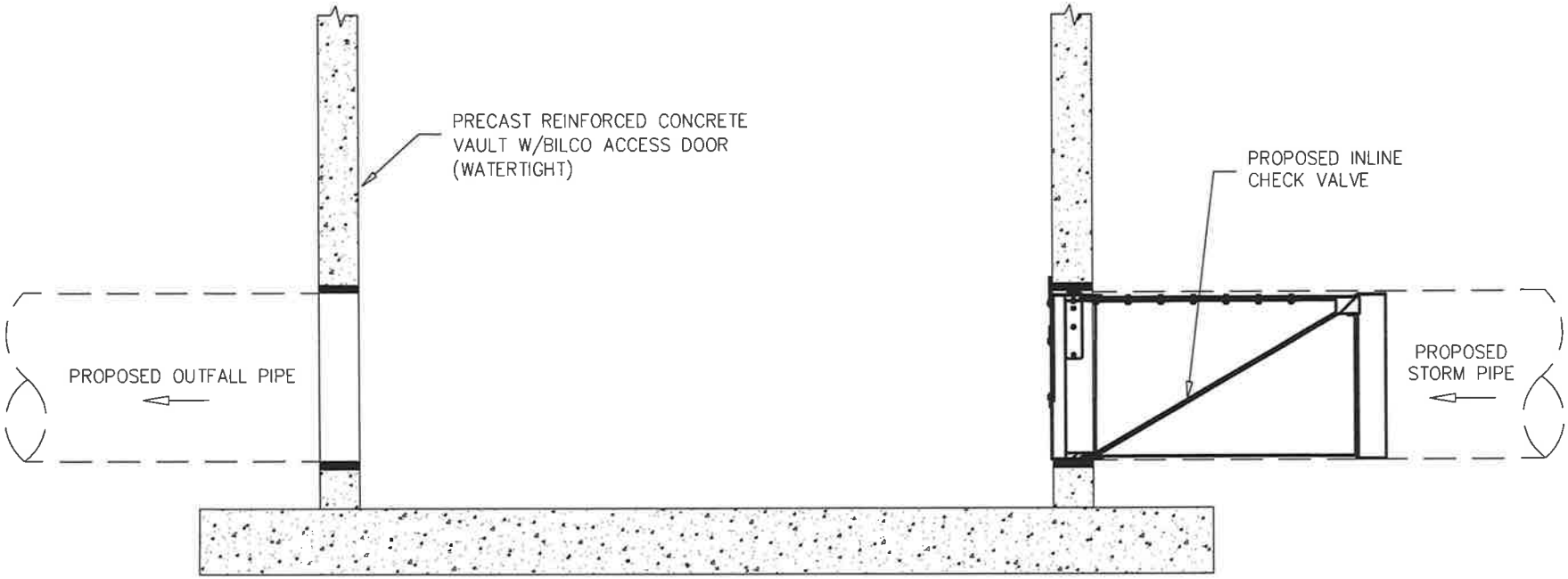
PLAN VIEW

TYPICAL BAY SIDE STREET END DETAIL
(OPTION "A" & "B")

N.T.S.

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
BOROUGH OF WILDWOOD CREST
CAPE MAY COUNTY, NEW JERSEY

DEBLASIO & ASSOCIATES
CONSULTING ENGINEERS AND PLANNERS
4701 NEW JERSEY AVENUE
WILDWOOD, NJ 08260
PHONE: (609) 854-3311
FAX: (609) 854-4323



SECTION VIEW

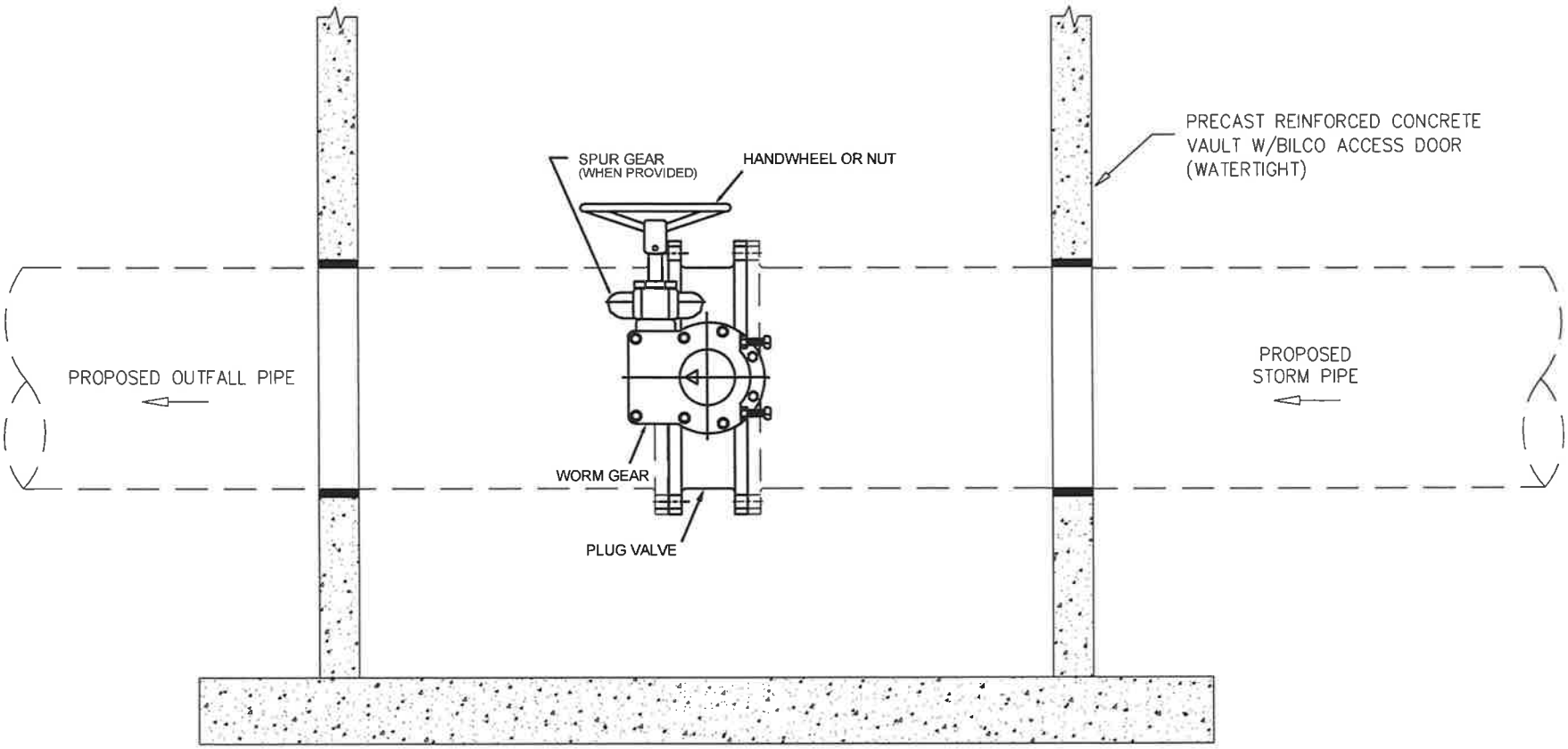
BAY SIDE TIDE CONTROL VALVE - OPTION "A"

(PASSIVE CONTROL VALVE)

N.T.S.

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
BOROUGH OF WILDWOOD CREST
CAPE MAY COUNTY, NEW JERSEY

DEBLASIO & ASSOCIATES
CONSULTING ENGINEERS AND PLANNERS
4701 NEW JERSEY AVENUE
WILDWOOD, NJ 08260
PHONE: (609) 854-3311
FAX: (609) 854-4323



SECTION VIEW

BAY SIDE TIDE CONTROL VALVE - OPTION "B"

(MANUALLY OPERATED)

N.T.S.

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
BOROUGH OF WILDWOOD CREST
CAPE MAY COUNTY, NEW JERSEY

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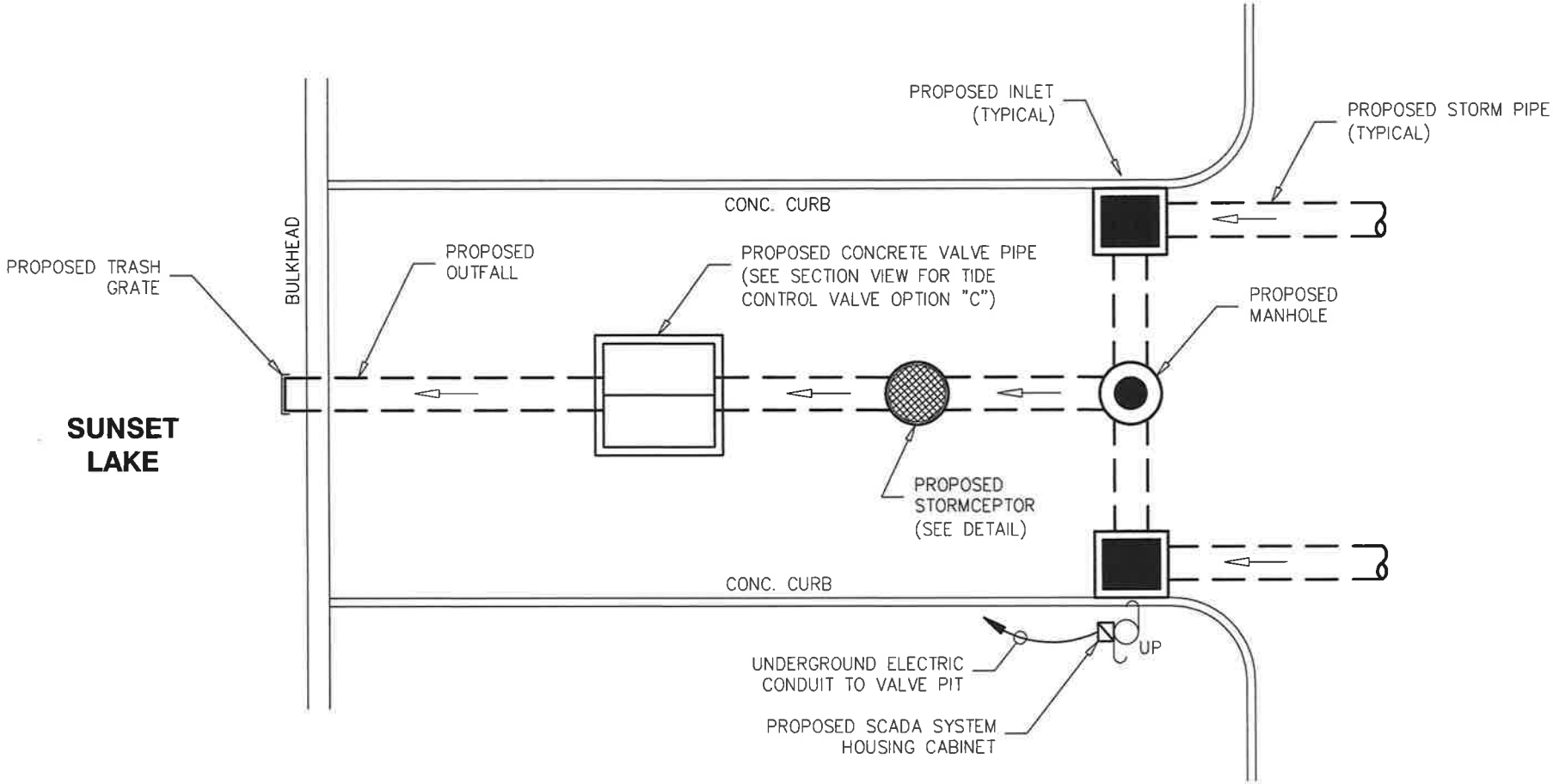

PLAN VIEW

TYPICAL BAY SIDE STREET END DETAIL
(OPTION "C")

N.T.S.

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
BOROUGH OF WILDWOOD CREST
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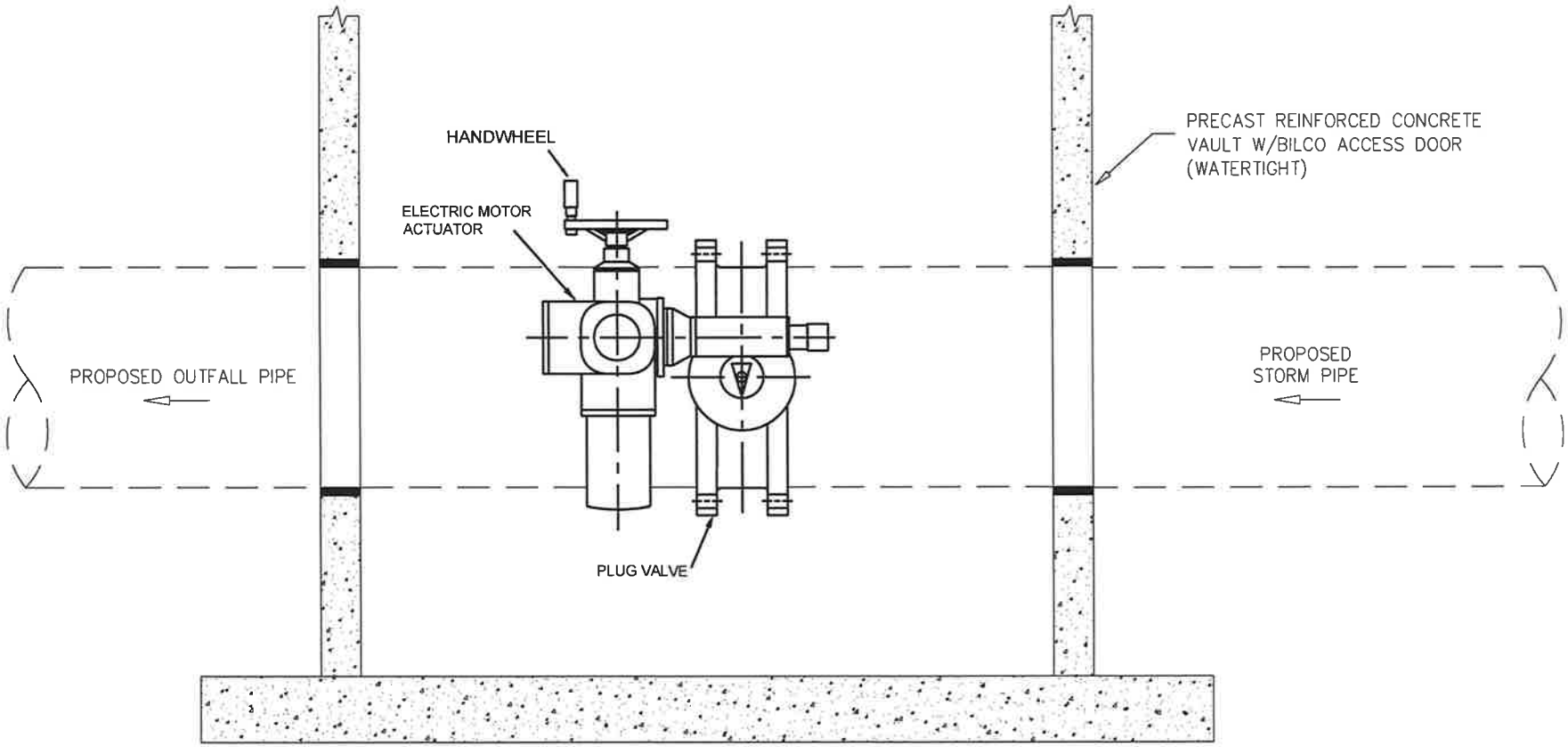

SECTION VIEW

BAY SIDE TIDE CONTROL VALVE - OPTION "C"

(SCADA OPERATED)

N.T.S.

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
BOROUGH OF WILDWOOD CREST
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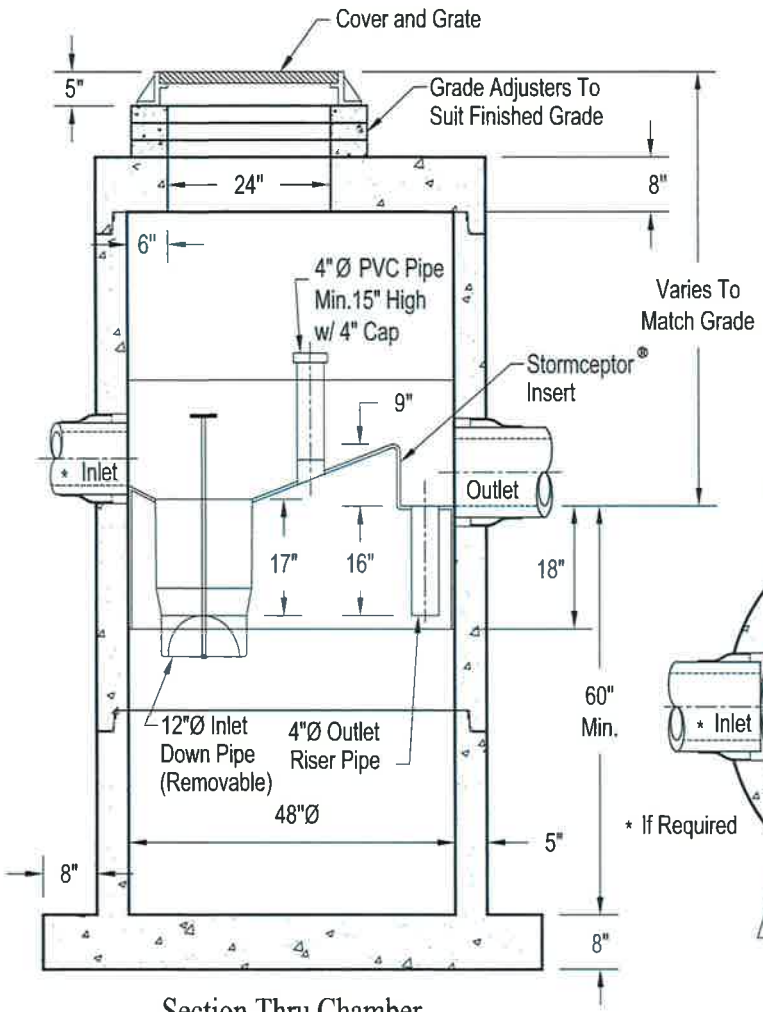
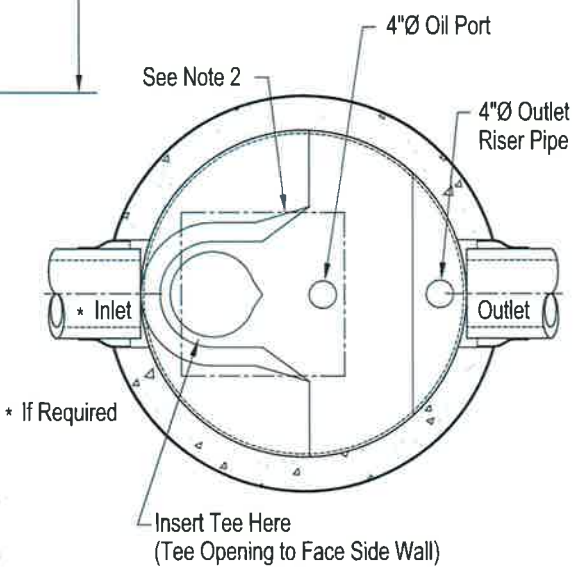
STC 450i Precast Concrete Stormceptor®
(450 U.S. Gallon Capacity)



Section Thru Chamber



Plan View

FLOOD MITIGATION AND STORM SEWER MASTER PLAN
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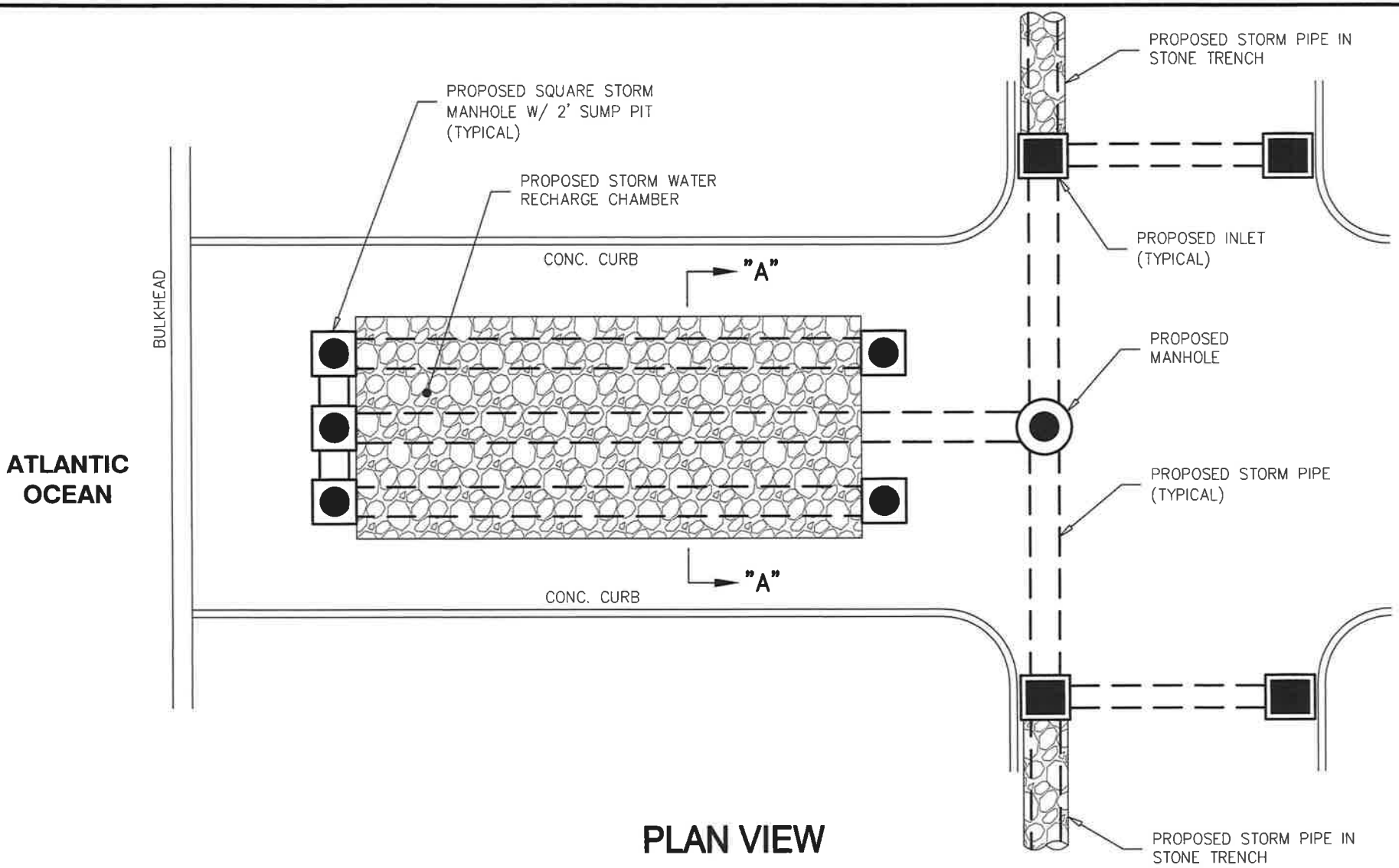
It is recommended that the storm sewer system be upgraded when the existing infrastructure is deteriorated, undersized or absent in areas to increase the hydraulic capacity. Hydraulic capacity is the amount of water that can pass through a structure or watercourse and is an essential measurement for sewer and watersheds. Exceeding the hydraulic capacity of a storm sewer system can result in inconveniences, damage or flooding. As the storm sewer pipe system is increased in size and magnitude it will be able to retain more storm water underground. The more water contained underground, the less flooding on the surface.

As a roadway is being designed, the storm sewer system needs to be analyzed. The design should include the storm sewer system capacity, acceptable pipe slopes, acceptable depths of flow within pipes, minimum and maximum velocity of flow, and minimum pipe size. The benefits of upgrading the Borough's storm sewer system generally exceed the cost. The typical proposed storm pipe upgrades can be seen on the Overall Proposed Storm Drainage Improvements map. Storm sewer inlets are often not connected and are simply used to store water. As these inlets are connected, it creates a much more efficient underground system.

It is also recommended to install systems that encourage groundwater recharge. Groundwater recharge is the hydraulic process where water moves from the surface to groundwater. Land development activities in the Borough that cover permeable soils with impervious surfaces reduce the rate of ground water recharge. Most of the precipitation never seeps into the soil, but instead leaves the system as surface runoff.

A typical storm water recharge chamber is contained in this report and displays a possible method to increase recharge. The system includes three perforated H.D.P.E. pipes surrounded by pervious backfill. Storm water enters the system and after being stored in the pipes, it begins to drain into the ground. This system is recommended from Pacific Avenue to the ocean side of the Borough. These chambers provide initial storage for storm water and decrease the peak flow during a storm.



PLAN VIEW

TYPICAL OCEAN SIDE STREET END DETAIL

N.T.S.

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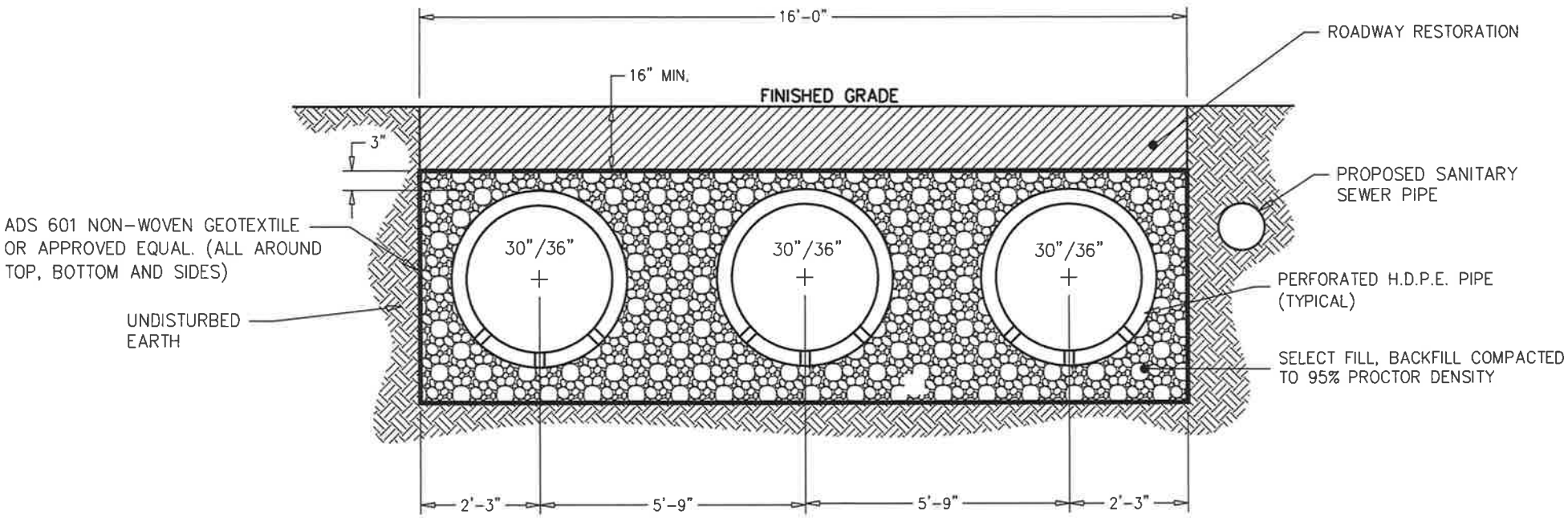

SECTION VIEW "A"

TYPICAL STORM WATER RECHARGE CHAMBER

N.T.S.

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New Jersey Stormwater Best Management Practices Manual

April 2004

C H A P T E R 6

Groundwater Recharge

This chapter presents the standards, data, and procedures necessary to meet the groundwater recharge requirements of the NJDEP Stormwater Management Rules at N.J.A.C. 7:8. According to these Rules, a "major development" project, which is one that disturbs at least 1 acre of land or creates at least 0.25 acres of new or additional impervious surface, must include nonstructural and/or structural stormwater management measures that prevent the loss of groundwater recharge at the project site. This requirement is included in the Rules because the loss of groundwater recharge can adversely impact the health of streams and wetlands and the yield of water supply wells. Urban redevelopment and certain linear development projects are exempt from the groundwater recharge requirements, while waivers may obtained under certain conditions for public roadway, railroad, and pedestrian walkway enlargements. Complete details can be found in Subchapter 5 of the Stormwater Management Rules.

Specifically, the Stormwater Management Rules require that a proposed major land development comply with one of the following two groundwater recharge requirements:

Requirement 1: That 100 percent of the site's average annual pre-developed groundwater recharge volume be maintained after development; or

Requirement 2: That 100 percent of the difference between the site's pre- and post-development 2-Year runoff volumes be infiltrated.

The Stormwater Management Rules allow the site designer to select which requirement to follow. The Rules also state that compliance with either of the above alternative requirements must be demonstrated through hydrologic and hydraulic analysis. Regardless of which alternative requirement is selected, such an analysis will generally begin with a computation of the existing (or pre-developed) hydrologic conditions at the proposed development site. In the case of Requirement 1, these conditions will focus on the annual amount of groundwater recharge that occurs at the site under pre-developed conditions while, for Requirement 2, the focus will instead be on the pre-developed volume of 2-Year site runoff.

These computations will then be followed by similar ones for the proposed (or post-developed) conditions at the site. A comparison of the results of either of these pre- and post-development computations will then yield the annual volume of groundwater that must be recharged (Requirement 1) or 2-Year storm runoff volume that must be infiltrated (Requirement 2) through one or more structural recharge or infiltration BMPs. Ideally, the planning and design of the proposed site will have incorporated nonstructural measures to such an extent that the need for structural facilities is reduced to a practical minimum.

Finally, once the analysis of pre- and post-development conditions has established the need for structural recharge (Requirement 1) or infiltration (Requirement 2) BMPs, the hydrologic and hydraulic analysis would next focus on the actual design of such facilities. This process would include answering such questions such as:

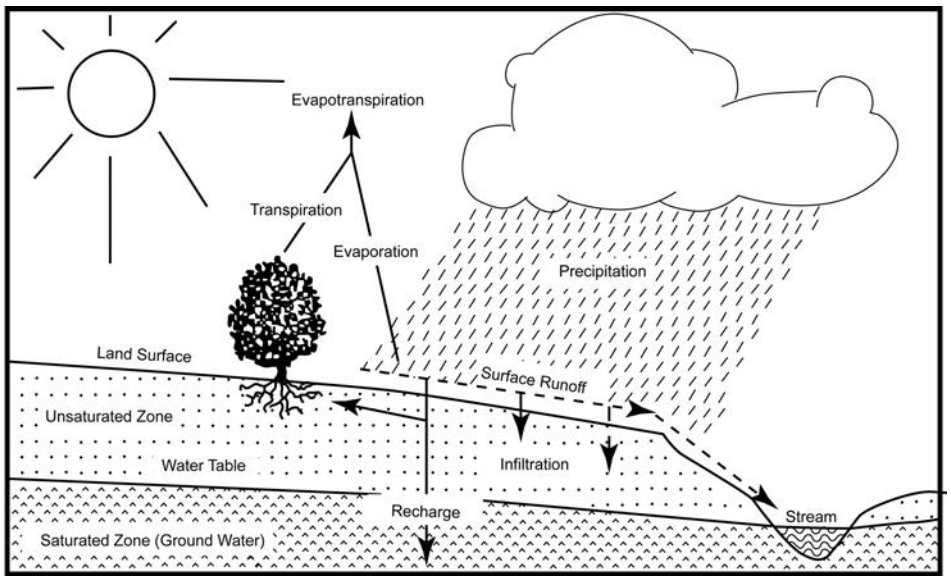
- Should the required recharge or infiltration be achieved at a single facility or several located throughout the development site?
- Should the facilities be located above or below ground?
- Which portions of the development site should be utilized to generate runoff to the facilities?
- What facility dimensions are required?
- Where should the facilities be located on the site relative to buildings, septic systems, property lines, and other sensitive areas?

This chapter presents the groundwater recharge information necessary to perform the hydrologic and hydraulic analysis required for Requirement 1 (maintaining pre-developed annual recharge volumes). Information necessary for the analysis required for Requirement 2 (infiltrating the increased 2-Year runoff volume) is presented in *Chapter 5: Computing Stormwater Runoff Rates and Volumes*. Design information regarding structural recharge and infiltration BMPs can be found in this chapter and *Chapter 9: Structural Stormwater Management Measures*.

Fundamentals

In both the NJDEP Stormwater Management Rules and this manual, groundwater recharge is defined as precipitation that infiltrates into the soil and is not evapotranspired. Instead, the infiltrated precipitation moves downward to a depth below the root zone of the surface vegetation, where it cannot be removed by that vegetation through uptake and evapotranspiration. At such a depth, it is considered available to enter the soil's saturated zone and become groundwater. The role of groundwater recharge in the overall hydrologic cycle is illustrated in Figure 6-1 below.

Figure 6-1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

According to the New Jersey Geological Survey (NJGS):

> *The potential for natural groundwater recharge begins with precipitation (rain, snow, hail, sleet). Some of the precipitation never seeps into the soil, but instead leaves the system as surface runoff. The water that seeps into the soil is infiltration. Part of the water that does infiltrate is returned to the atmosphere through evapotranspiration. Evapotranspiration refers to water that is returned to the atmosphere from vegetated areas by evaporation from the soil and plant surfaces and soil water that is taken up by plant roots and transpired through plant leaves or needles. Infiltrated water that is not returned to the atmosphere by evapotranspiration moves vertically downward and, upon reaching the saturated zone, becomes ground water. This ground water could be in a geologic material that is either an aquifer or nonaquifer, depending on whether it can yield satisfactory quantities to wells.* (NJGS GSR-32)

In addition to supplying water to wells, groundwater can also provide base flow to streams, wetlands, and other water bodies, directly affecting the ecology and geomorphology of these resources.

The potentially adverse impacts of land development on groundwater recharge have long been recognized. From the description presented above, it can be seen that land development activities that either cover permeable soils with impervious surfaces or reduce the soils' permeability through disturbance and compaction will reduce the rate of groundwater recharge that occurs under pre-developed site conditions. As noted above, such reductions in groundwater recharge can adversely impact streams, wetlands, and other water bodies by reducing the volume and rate of base flow to them. Reductions in groundwater recharge to aquifers can also adversely impact the yield of water supply wells. As a result, the New Jersey Stormwater Management Rules require that pre-developed groundwater recharge rates be maintained at land development sites under post-development conditions.

Computing Groundwater Recharge

Overview

As described above, the groundwater recharge requirements of the NJDEP Stormwater Management Rules can be met by demonstrating that the average volume of precipitation that is annually recharged to the groundwater at a major land development site under pre-developed conditions will be maintained following site development. As described in detail below, this can be achieved through a combination of natural recharge over the developed site's pervious surfaces and artificial recharge through groundwater recharge BMPs constructed at the site. The BMP volume is based on an average annual distribution of runoff-producing precipitation events at the site, the impervious drainage area to the BMP, and the losses that may occur to the infiltrated runoff before it can travel below the root zone of surrounding vegetation and become groundwater.

The data and analytic procedures necessary to meet these requirements have been developed by the New Jersey Department of Environmental Protection (NJDEP) with assistance from the New Jersey Geologic Survey (NJGS), the U.S. Geologic Survey (USGS), and professional consultants, and have been compiled into the New Jersey Groundwater Recharge Spreadsheet (NJGRS), a Microsoft Excel-based computer spreadsheet program. The NJGRS is intended for use by site planners, designers, engineers, and reviewers to determine average annual groundwater recharge amounts under both pre- and post-development site conditions and to design the groundwater recharge BMPs necessary to maintain 100 percent of the pre-developed site's annual groundwater recharge rate. Information regarding the NJGRS, including a detailed User's Guide, an example problem, and instructions on how to download the NJGRS from the NJDEP stormwater management website, is presented below. Details of the program's theoretical basis, equations, and supporting databases are also summarized.

In general, the analytic procedures utilized by the NJGRS to achieve compliance with the groundwater recharge requirements of the Stormwater Management Rules (described as Requirement 1 above) can be summarized by the following computational steps:

1. Compute the average amount of annual groundwater recharge occurring over the land development site under pre-developed site conditions.
2. Compute the average amount of annual groundwater recharge occurring over the land development site under post-developed conditions. Such site conditions should reflect the use, to the maximum extent practicable, of nonstructural stormwater management measures at the post-developed site in accordance with the Stormwater Management Rules. Details of such nonstructural measures are presented in *Chapter 2: Low Impact Development Techniques*.
3. Compute any resulting annual groundwater recharge deficit by subtracting the post-developed annual recharge amount in Step 2 from the pre-developed annual amount in Step 1. This deficit represents the average annual amount of groundwater recharge that must be achieved at the development site through structural groundwater recharge BMPs.
4. Determine the storage volume and related dimensions of the structural groundwater recharge BMP that will be required to satisfy the average annual groundwater recharge deficit computed in Step 3 above. In doing so, the BMP volume must be based on the average annual distribution of runoff-producing precipitation events at the development site, the size of the drainage area over which these events will occur (and from which runoff will be collected or captured for recharge), and the infiltration, evapotranspiration, and other losses that may occur to the recharged runoff in the BMP before it can actually enter the groundwater.

Theoretical Basis of Computations

Computation of the average annual groundwater recharge at a land development site under either pre- or post-developed conditions (as described above in Steps 1 and 2) can be performed with the New Jersey Groundwater Recharge Spreadsheet (NJGRS). This Microsoft Excel-based spreadsheet is based on the data and computational procedures contained in the 1993 *Geological Survey Report GSR-32: A Method for Evaluating Ground Water Recharge Areas in New Jersey* developed by the NJGS. As described in the report, GSR-32 utilizes precipitation, soil, land cover, and climate data, and rainfall-runoff and mass balance computations to estimate average annual groundwater recharge amounts at sites within any New Jersey municipality under a variety of surface and development conditions. All pertinent GSR-32 databases and computational algorithms have been incorporated into the NJGRS. As such, use of the NJGRS is governed, in part, by the assumptions and limitations of GSR-32.

Design of the required recharge BMP (as described in Step 4 above) to compensate for the developed site's groundwater recharge deficit (as described in Step 3 above) can also be performed with the NJGRS. The design computations in the NJGRS are based on a number of analytic techniques and databases. Conceptually, a groundwater recharge BMP will recharge the runoff it receives from its drainage area for all storms up to a particular precipitation depth, which can be referred to as the BMP's groundwater recharge design storm. While the recharge BMP will also receive runoff from larger storms, it will only recharge that portion of the runoff that equals the Recharge Design Storm runoff. The remaining runoff from these larger storms will overflow or otherwise bypass the BMP. It is important to note that the range of precipitation depths typically involved in the design of a groundwater recharge BMP are relatively small when compared to depths associated with runoff quality or quantity control. As a result, the NJGRS requires that the entire drainage area to a recharge BMP be impervious, since pervious surfaces would typically not be able to produce a sufficient amount of rechargeable runoff from such small precipitation depths.

Assuming that all of the precipitation falling in a recharge BMP's impervious drainage area can be collected and recharged (i.e., no runoff, infiltration, or recharge losses), computation of the BMP's Recharge Design Storm depth can be conceptually illustrated with the following conversion equation:

$$\text{Total Average Annual Recharge Deficit} = \text{Annual Sum of Recharge Design and Smaller Storm Depths} + \left[\text{Recharge Design Storm Depth} \times \text{Number of Larger Storms}\right]$$

The above equation shows that, with appropriate precipitation data and ignoring all losses, the total annual recharge deficit at a land development site can be converted to the sum of two precipitation amounts, both of which are based on a single groundwater recharge design storm. The first amount is the sum of all storm depths up to and including the Recharge Design Storm that would occur at the site in an average year. The second amount is the product of the Recharge Design Storm depth times the number of larger storms that would also occur at the site in that same average year.

Unfortunately, most of the ease and simplicity of the conversion equation shown above is gained through its two assumptions: that appropriate precipitation data is available, and that all of the precipitation falling on the BMP's impervious drainage area can be recharged without loss. In reality, compiling such precipitation data for a specific land development site requires considerable effort and resources and must be repeated for each new development site. In addition, precipitation losses will occur and must be taken into consideration in the design of a recharge BMP. As noted above, these losses, which will vary with the total precipitation depth, include those occurring in the conversion of precipitation to runoff, including surface storage, evaporation, and infiltration through cracks, joints, and seams in the drainage area's impervious surface. Further losses will occur once the runoff is delivered to the recharge BMP, primarily in

the form of evapotranspiration by the vegetation above, beneath, and/or adjacent to the BMP. Further complications arise when one attempts to estimate these variable losses. While equations exist to predict such losses for individual storm events, there are none readily available that can do so for an annual precipitation depth.

The NJGRS addresses these problems in several ways. Regarding the need for appropriate precipitation data for all possible development site locations in New Jersey, the NJGRS developers compiled and analyzed 52 years of daily precipitation data collected at 92 precipitation stations throughout New Jersey between 1948 and 1999. To ensure a proper database, only precipitation depths greater than 0.04 inches were considered, since this depth was considered the minimum amount necessary to produce runoff from impervious surfaces. All daily values at each station were sorted for each year and then averaged over the 52 year period of record. Next, all values with the same rank were averaged across all 92 stations to produce an average annual series of 79 precipitation events for the state. Finally, this series was normalized by dividing each event value by 46.32 inches, which was the average annual precipitation for the 92 stations. This produced an average annual series of 79 precipitation events, expressed as a percentage of total annual precipitation, that are analyzed individually by the NJGRS to compute the runoff, infiltration, and recharge losses and the resulting annual groundwater recharge achieved by a recharge BMP at a land development site in any New Jersey municipality.

This average annual series of precipitation events for New Jersey is shown below in Figures 6-2 and 6-3. Figure 6-2 depicts the precipitation depth, expressed as a percentage of total average annual rainfall, of each event in the series in ascending order, while Figure 6-3 depicts, also in ascending order, the events' cumulative percentage of the average annual rainfall. More detailed information about each specific event in the average annual series is contained in the NJGRS' databases. The average annual precipitation series shown in Figure 6-2 is used by NJGRS to produce a site-specific, year-long series of design storms by multiplying each event value in the series by the average annual precipitation in the municipality where the recharge BMP is located. Since the NJGRS also contains average annual precipitation values for each New Jersey municipality, the NJGRS user can generate this site-specific average annual design series simply by specifying the municipality and county in which the development site is located.

Figure 6-2: Average Annual Precipitation Series in NJGRS

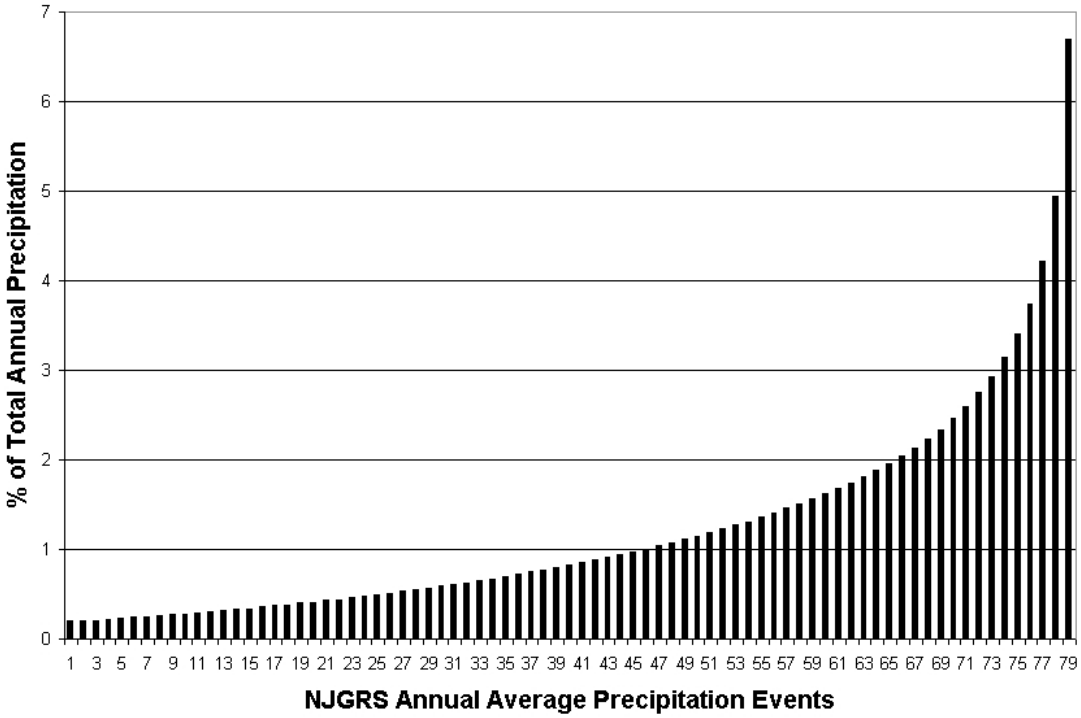
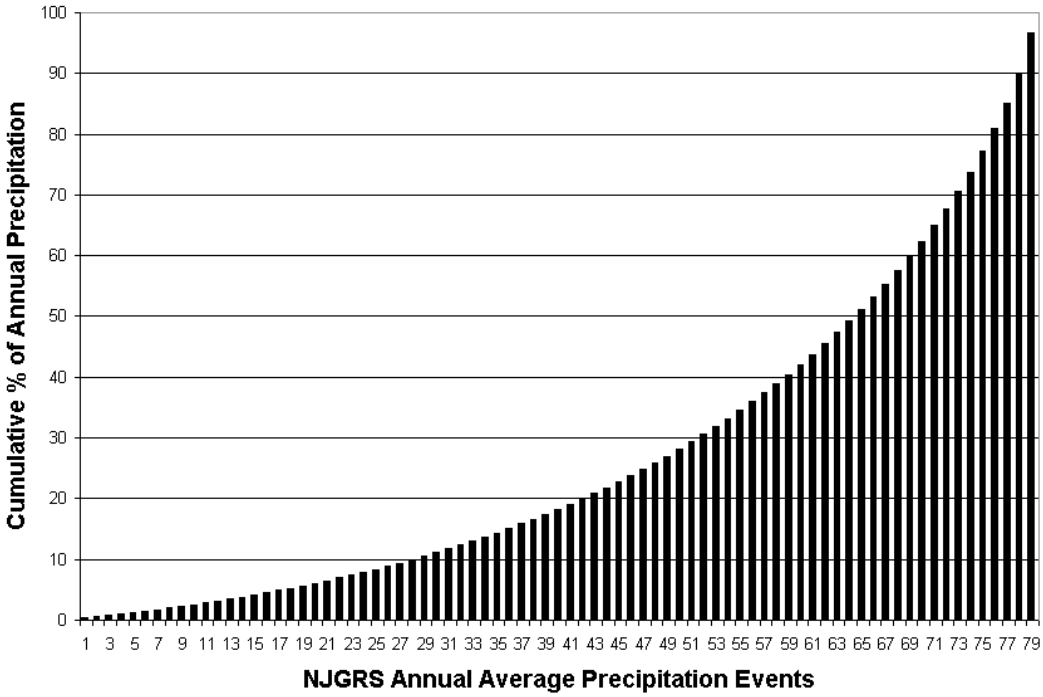


Figure 6-3: Cumulative Total of Average Annual Precipitation Series in NJGRS



Once an average annual design series is computed for the specific recharge BMP site, the NJGRS next addresses the problem of precipitation losses. As noted above, all of the possible losses that will occur, from the time the precipitation falls on the BMP's impervious drainage area to when the recharged water moves below the root zone of the vegetation in or adjacent to the BMP, must be accounted for in order to accurately compute the actual volume that will be recharged. Such losses can include infiltration and surface storage losses on the drainage area surface as the precipitation is converted into runoff, as well as evapotranspiration and infiltration losses as the runoff is converted to recharge within the BMP itself. To compute runoff losses, the NJGRS uses one of three equations depending upon the total depth of the event. These equations are applied to each event in the average annual design series to compute the resultant runoff for each one. This resultant runoff is then used in additional equations that estimate the losses that will occur for each design event once the runoff enters the recharge BMP.

When computing runoff losses for design event depths less than 0.0408 inches, the NJGRS assumes that the entire precipitation depth is consumed by surface storage, infiltration, and other losses and no runoff is produced.

For design event depths between 0.04 and 1.25 inches, the NJGRS uses the following equation to compute runoff:

$$Q = 0.95\ (P - 0.0408)\ 0.90$$

where:

Q = Runoff Depth in Inches
P = Precipitation Depth in Inches

For design event depths greater than 1.25 inches, the NJGRS uses the NRCS Runoff Equation with a Runoff Curve Number (CN) of 98:

$$Q = \frac{(P - 0.04)^2}{(P + 0.16)}$$

where:

Q = Runoff Depth in Inches
P = Precipitation Depth in Inches

As noted above, the resultant runoff depth for each design event is then applied to specialized equations developed specifically for the NJGRS to estimate the losses that will occur to the runoff after it is stored in the recharge BMP. These losses will depend upon a number of factors, including the climate at the development site, the specific vegetation and soil conditions at the recharge BMP location, and the depth of the BMP relative to the vegetation's root zone. A complete description of the loss equations used in the NJGRS is presented in the program's User's Guide. By subtracting these losses from the stored runoff, the amount of runoff that is actually recharged for each design event is computed. The NJGRS then adds up the recharge amounts from each design event to obtain a total annual recharge amount, which is then compared with the average annual recharge deficit created by the development to determine whether the recharge BMP's performance is adequate. Similar to the computation of the average annual design series described above, the NJGRS' loss computations are performed automatically each time the user provides new development site or recharge BMP data and then requests a BMP design update. The NJGRS will then either evaluate the performance of the proposed recharge BMP or, if requested, compute the effective BMP storage depth or surface area necessary to offset the development's annual recharge deficit.

New Jersey Groundwater Recharge Spreadsheet (NJGRS)

General Instructions

As described above, the New Jersey Groundwater Recharge Spreadsheet (NJGRS) is a Microsoft Excel-based computer spreadsheet program. It is typically used in a two step procedure, utilizing first the Annual Recharge worksheet and then the BMP Calculations worksheet in the program. During the first step, the average annual groundwater recharge amounts at the site under pre- and post-developed conditions are estimated based upon site data provided by the user. From these estimates, the program computes the average annual groundwater recharge deficit caused by the site development that must be offset by a groundwater recharge BMP. During the second step, this recharge BMP is sized based upon user-specified information regarding both the BMP and its location at the development site. General information regarding each step is provided below. Specific information about the program's use and computation methods are provided in the NJGRS User's Guide, which is presented at the end of this chapter.

It should be noted that, as a spreadsheet, certain cells of the program are reserved for user input while others provide intermediate and final results. All user input cells are shaded with a tan color while spreadsheet output cells are shaded with gray. Only the tan, user-input cells should be changed. In addition, the spreadsheet contains several combinations of commands known as macros. While these macros are essential to the spreadsheet's operations, they are unsigned and, as such, their presence may conflict with the Excel program's security settings in the user's computer. These conflicts would be identified to the user through an error or warning message immediately after opening the NJGRS. If such conflicts are encountered, they can usually be addressed by setting the Excel macro security level to Medium. *The user should determine whether this level of security is acceptable for their own system.* The user would then be prompted to enable the NJGRS macros each time the spreadsheet is opened.

Finally, upon completing use of the NJGRS for a specific project, the user will be asked whether the changes made during use should be saved. While such decisions are at the discretion of each user, it may be helpful for training purposes to retain the spreadsheet original settings, which match those in the NJGRS User's Guide. In this case, a copy of the revised NJGRS with project specific data entered can be saved with a project-specific name using the *Save As* command under *File* on the Excel command line.

Annual Recharge Worksheet

Annual groundwater recharge at a land development site under both pre- and post-developed (or existing and proposed) site conditions can be estimated using the Annual Recharge worksheet in the NJGRS. As discussed above, these estimates are based on the methodology contained in *Geological Survey Report GSR-32: A Method for Evaluating Ground Water Recharge Areas in New Jersey* (GSR-32) developed by the New Jersey Geological Survey. In general, use of this worksheet requires the following user input:

1. Name of municipality and county in which the project site is located (Cell C3). Upon input of this data through use of a drop-down list, the NJGRS will immediately display the average annual precipitation and climate factor for the site's municipality from the GSR-32 databases in the NJGRS. The user can also specify a project name, description, and date in the lines provided (Cells K1, K2, and K3).
2. Land use and land cover (LULC) data for the site under both pre- and post-developed conditions. This data will consist of the area (in acres), LULC characteristics, and soil series name for up to 15 land segments of the pre- and post-developed site. The NJGRS will issue a warning message if the total area specified under pre-developed conditions is different than post-developed. The LULC data and soil series names are listed in a drop-down list next to the respective input cells. It is

important to note that the LULC categories in the drop-down list are based on those contained in Table 2-2 of the NRCS *Technical Release 55 – Urban Hydrology for Small Watersheds*. For a correlation between these LULC categories and those in GSR-32, upon which the NJGRS is based, see Table 6-1 below.

Table 6-1: NJGRS/TR-55 and GSR-32 LULC Descriptions

NJGRS/TR-55 LULC Descriptions	GSR-32 LULC Descriptions
Brush	Brush
Gravel, Dirt	Unvegetated
Impervious Areas	Unlandscaped Developed
Meadow, Pasture, Grassland or Range	Agricultural – Pasture
Open Space	Landscape Open Space
Residential 1 to 2 Acre	1 - 2 Acre Lots
Residential 1/2 to 1 Acre	1/2 - 1 Acre Lots
Residential 1/3 to 1/4 Acre	1/8 - 1/2 Acre Lots
Residential 1/8 Acre or Less	1/8 Acre Lots
Row Crop	Agricultural – General
Small Grain or Legumes	Agricultural – Cropland, Legume
Urban Districts	Landscaped Developed
Woods	Woods
Woods – Grass Combination	Wooded – General

As noted in the NJGRS User's Guide, it is important to specify a site's LULC characteristics as accurately as possible. Therefore, while a 1/4 acre residential site could be specified in the NJGRS by the "Residential 1/3 to 1/4 Acre" LULC description in Table 6-1, it is generally more accurate to divide the site into impervious and pervious areas and specify each as a separate land segment in the NJGRS. For example, at a 1/4 acre residential site with a total area of 10 acres consisting of 40 percent connected impervious and 60 percent grassed surfaces and a single soil series, it would be more appropriate to specify the site's LULC characteristics in the program as a separate 4 acre impervious area land segment and a 6 acre open space land segment. This separation of connected impervious and pervious areas is similar to the technique for computing runoff volume using the NRCS methodology in Chapter 5. It should be noted that the total impervious area for post-developed conditions displayed in Cell M23 of the Annual Recharge worksheet will be based only on those post-developed land segments specified as impervious.

When using the above technique, it should be noted that if any impervious areas at a development site are unconnected (see Chapters 2 and 5 for complete details and requirements), the area used in the impervious surface designations described above for these unconnected areas should be one half of the actual area. For example, if a site has 3 acres of directly connected impervious surface, but 2 acres of unconnected impervious area, the total impervious area specified in the NJGRS can be 3 + (0.5)(2) or 4

acres. This 50 percent reduction in the size of unconnected impervious areas accounts for the runoff re-infiltration that can occur downstream of such areas and is consistent with the runoff computations for such areas contained in TR-55. To keep the total site area correct, the user should remember to specify the "remainder" of the unconnected impervious area as a pervious one with the appropriate soil series and LULC based upon the actual pervious area downstream of the unconnected impervious area.

It should also be noted that if a proposed recharge BMP will have a specific location within a land development site with similarly specific LULC and soil characteristics, that portion of the site should be specified as a separate land segment on the Annual Recharge worksheet. This is true even if that segment will be covered with an impervious surface. Doing this will allow the NJGRS to more accurately compute the losses and resultant recharge at the BMP. More details are presented below in the NJGRS User's Guide, including the need to specify this segment on the BMP Calculation worksheet.

From the above, it can be seen that the more generalized Residential and Urban District LULC descriptions in Table 6-1 above should be used only for general planning studies of groundwater recharge requirements, particularly at sites with multiple lots of similar size and impervious coverage where each lot will have a separate groundwater recharge BMP. Since the soil series in which each BMP will be located may vary from lot to lot, the general LULC descriptions can be used to compute typical or general groundwater recharge requirements and BMP dimensions for the entire site. These general values can then be refined on a lot by lot basis during later, more detailed project phases with specific lot and BMP information.

Finally, in accordance with NJGS Report GSR-32, which is the basis of the NJGRS, zero recharge volume will be computed for any land segment specified for either pre- or post-development conditions that contain soils that are hydric. See Report GSR-32 for more details.

BMP Calculations Worksheet

The dimensions of a groundwater recharge BMP can be either determined or tested using the BMP Calculations worksheet in the NJGRS. This worksheet can be used to calculate the effective depth required at a recharge BMP if the impervious drainage area and BMP area are specified. Conversely, the worksheet can also be used to calculate the required area of the BMP if the drainage area and effective BMP depth are specified. Finally, the BMP Calculations worksheet can be used to analyze a specific recharge BMP with a certain area and effective depth to see what amount of annual groundwater recharge it can provide.

As explained in the NJGRS User's Guide, it is critical that the surface area of a recharge BMP (variable ABMP) be specified in the program as accurately as possible. This is because the program uses the ratio of the BMP's drainage area and surface area to determine the resultant depth of runoff in the BMP for each storm event analyzed. In addition, a recharge BMP's effective depth (variable dBMP) represents the maximum equivalent water depth that can be achieved in the BMP before overflow begins. Therefore, if the proposed recharge BMP will consist, for example, of a subsurface, vertical-walled chamber, dBMP will simply be the maximum achievable depth before the chamber is full and overflow occurs. However, if the proposed BMP will be filled with broken stone or other suitable material, dBMP will be the product of the BMP's actual or physical depth and the void ratio of the fill material.

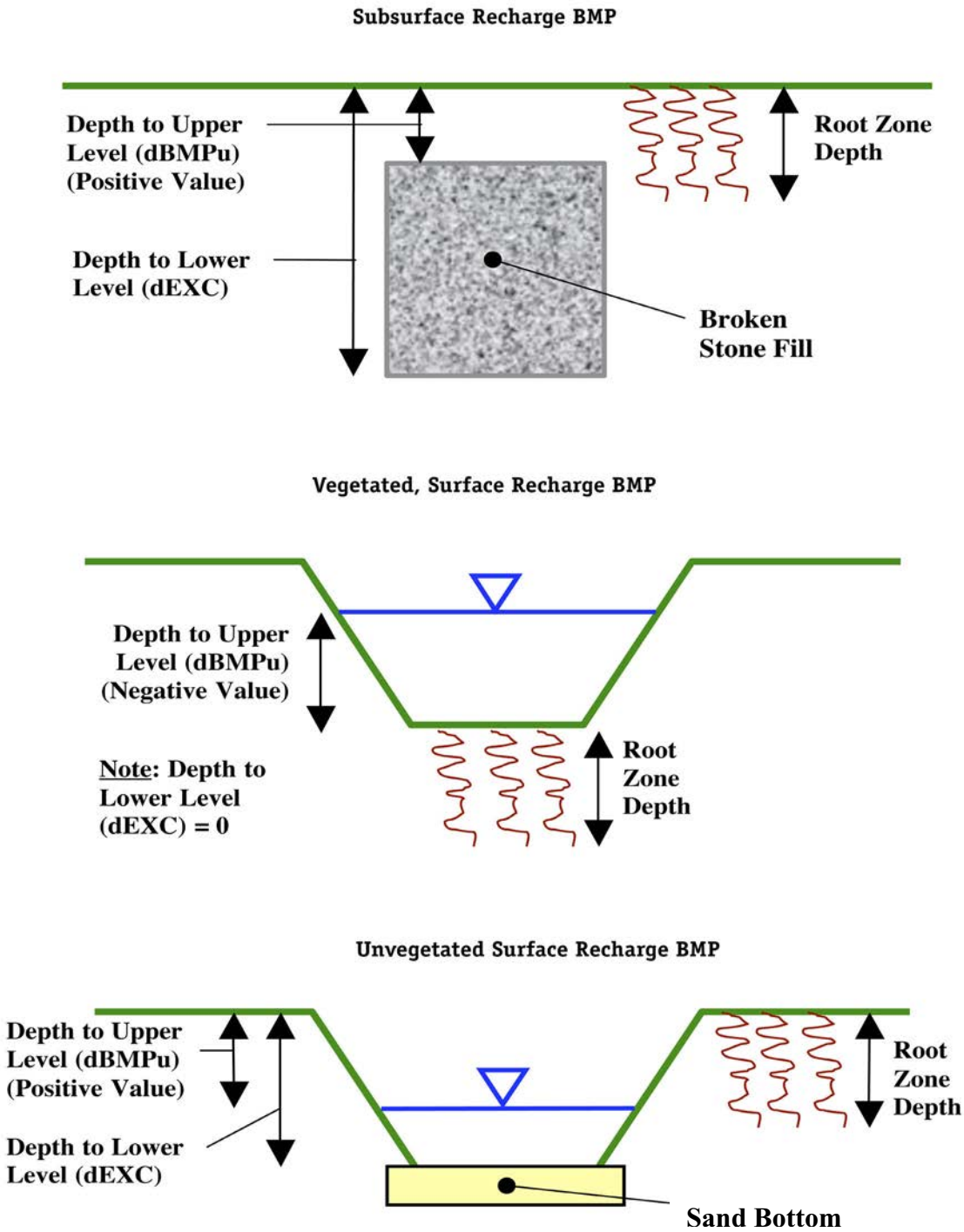
For recharge BMPs that consist of a combination of filled and open areas (e.g., a perforated pipe within a stone filled trench) or for irregular-shaped BMPs with nonvertical sides, dBMP can be computed by dividing the BMP's total storage volume by its surface area (ABMP). For BMPs with varying surface areas (e.g., a trapezoidal infiltration basin with sloping sides or a perforated elliptical pipe), the user should exercise discretion in selecting the correct surface area to use. In most cases, the average surface area would be appropriate. In all cases, the user should always verify that the product of the specified surface area (ABMP) and effective depth (dBMP) equals the BMP's total storage volume (variable VBMP in Cell G12). More information and recommendations can be found in the NJGRS User's Guide.

In addition to the above, it is important to note that the BMP Calculations Worksheet assumes that all runoff stored in the recharge BMP at depths at or below dBMP (i.e., the maximum storage depth in the BMP) will be infiltrated into the soils below the BMP and that any greater runoff amounts will overflow the BMP. As such, the BMP Calculations Worksheet cannot directly model a recharge BMP that will infiltrate some of its runoff while it is simultaneously discharging some through an overflow or other outlet. Examples of such a recharge BMP would include an extended detention basin where stored runoff is simultaneously infiltrated through the basin bottom and out its outlet structure. For such BMPs, alternative BMP calculation techniques will be required.

With regards to BMP location, if a recharge BMP will be located within a particular post-developed land segment specified on the Annual Recharge worksheet, it should be specified in Cell C9 (variable C9) of the BMP Calculations worksheet. As described earlier, doing so will allow the NJGRS to more accurately compute the losses and resultant recharge at the BMP. If this land segment is not specified on the BMP Calculations worksheet, the NJGRS will, by default, use average soil and loss factors based on all of the post-developed land segments specified on the Annual Groundwater Recharge worksheet.

The BMP Calculations worksheet can analyze a recharge BMP located either on grade or constructed below grade through excavation. An excavated BMP can be either a surface or subsurface BMP. The specific type of BMP is described in the BMP Calculations worksheet through its effective depth (dBMP) and two additional vertical distances. The first is the vertical distance from the vegetated ground surface to the maximum water surface level in the BMP (variable dBMPu in Cell C7). This value is positive if the maximum level is below the vegetated ground surface and negative if above the vegetated ground surface. The second is the vertical distance from the vegetated ground surface to the bottom of the BMP (variable dEXC in Cell C8). For example, if the top of a 36-inch deep stone-filled infiltration trench is located 24 inches below ground level, dBMPu would be 24 inches and dEXC would be 60 inches (i.e., dBMPu plus the 36-inch actual depth of the trench). It should be noted, however, that since the trench is filled with gravel with a certain void ratio, the BMP's effective depth (dBMP) would be 36 inches times that void ratio. Using the dBMPu and dEXC variables, virtually all types of recharge BMPs can be specified, including "above the surface," "semi-buried," and "completely buried" BMPs. See Figure 6-4 below and the NJGRS User's Guide for more information.

Figure 6-4: Examples of Depths to Upper (dBMPu) and Lower (dEXC) Levels of Recharge BMP



In using the BMP Calculations worksheet, it is important to note that, by default, the NJGRS takes the values from the Annual Recharge worksheet for the Post-Development Recharge Deficit Volume (Cell K24) and the Total Impervious Area (Cell M23) and specifies them as initial values on the BMP Calculations worksheet for the Post-Development Deficit Recharge (variable Vdef in Cell C14) and Post-Development Impervious Area (variable Aimp in Cell C15). This allows solution of the site's total recharge deficit by a single groundwater recharge BMP that will receive runoff from a developed site's entire impervious area (if specified as impervious land segments). However, in many instances, the single groundwater recharge BMP will receive runoff from only a portion of the site's impervious area (e.g., only roof runoff). In such cases, the user must specify the exact size of Aimp (impervious area to the BMP) in Cell C15. Failure to do this for such BMPs will result in an overestimation of the amount of runoff captured by the BMP and erroneous BMP dimensions and/or recharge amounts.

At other sites, it may be necessary or desirable to utilize more than one groundwater recharge BMP to meet the site's recharge requirements. In such cases, each BMP will not only receive runoff from a portion of the site's impervious surface, but each will also seek to provide only a portion of the site's total recharge deficit. In such cases, the user must specify both the exact Aimp and Vdef (Post-Development Deficit) for each BMP in Cells C14 and 15 of the BMP Calculations worksheet. *In such cases, the user must also use a separate NJGRS spreadsheet for each BMP. Using multiple copies of the BMP Calculations worksheet within a single spreadsheet can yield erroneous results.*

In addition, computational problems can occur if, in designing a recharge BMP, the user selects either an initial BMP surface area (ABMP) or effective depth (dBMP) that is drastically different than the actual value needed to meet the required recharge deficit. If this occurs, the NJGRS may not be able to compute the correct value and will, instead, display excessive large answers or divide by zero messages. If this occurs, the user should adjust the initial value to one that more closely approximates the final answer and rerun the worksheet.

The BMP Calculations worksheet will also present various characteristics of the recharge BMP, including its effectiveness in converting runoff to infiltrated water and then recharged groundwater. See the NJGRS User's Guide presented at the end of this chapter for more information.

BMP Calculation Messages

The BMP Calculations worksheet provides three important messages to check the validity of the computed results. The Volume Balance message (Cell J11) is a check of the Annual BMP Recharge Volume in Cell G14 against the Post-Development Deficit Recharge (variable Vdef in Cell C14). If these values are equal, the problem is solved successfully and the message in this section will read "OK." However, if the BMP's annual recharge volume does not equal Vdef, the message instructs the user to continue to solve the problem. This may also occur if the user changes any of the BMP design parameters and forgets to solve the problem by clicking on any of the two solve buttons.

The dBMP Check message (Cell J12) checks the validity of the value inputted for the dBMP, the BMP's effective depth in Cell C6. If this value is greater than the difference between the depths to the BMP's upper and lower surfaces (variables dBMPu and dEXC in Cells C7 and C8, a warning message is issued telling the user to adjust dBMP. dEXC Check (Cell J13) is the third message. It checks the validity of dEXC to ensure it is larger than dBMPu. If it is not, a message will appear instructing the user to make dEXC larger than dBMPu.

Below these messages is a report on the location of the BMP as specified by the user in Cell C9 (variable segBMP). If the user has entered a valid segment number for segBMP, the message will read "OK." If the user enters a zero for segBMP, the message will read "Location is selected as distributed or undetermined." However, if the user enters a land segment number that was not previously defined in the Annual Recharge

worksheet under Post-Developed Conditions, the message will say: "Land Segment Number Selected for BMP is not Defined." The user should then make appropriate corrections to segBMP.

See the NJGRS User's Guide for more information regarding calculation check messages and warnings.

Additional Information

In addition to the above, the following important features and characteristics of the NJGRS should be noted:

1. The NJGRS gives the user the opportunity to specify what percentage of a development site's annual groundwater recharge deficit must be retained (Cell K23 of the Annual Recharge worksheet). However, it should be noted that the program's default value is 100 percent which, as noted above, is the amount required by the NJDEP Stormwater Management Rules.
2. The pre- and post-development average annual recharge at a development site is a function, in part, of the municipality in which the site is located. Therefore, changing the name of the municipality in Cell C3 of the Annual Recharge worksheet will change both the pre- and post-development recharge volumes. Similarly, if the user wishes to analyze a site in a different municipality, the new municipality's name must be entered through the drop-down list in Cell C3 in order to accurately compute pre-and post-development recharge amounts.
3. In Cell K6 of the BMP Calculations worksheet, the NJGRS will display the "Inches of Rainfall to Capture." This value is also displayed graphically in Chart 1 of the NJGRS along with other pertinent BMP performance information. This value specifies the minimum depth of rainfall over the BMP's impervious drainage area that must be collected to meet the development site's average annual recharge deficit. It is also the maximum event rainfall that the BMP can store without overflowing and, as such, it is equal to the BMP's Recharge Design Storm depth described previously in "Theoretical Basis of Calculations." This design storm depth is important, as it can be used to estimate the resultant groundwater recharge design storm runoff from a development site with groundwater recharge BMPs. See Examples 4, 5 and 6 in Chapter 5 for more details on this procedure.
4. At the time of the NJGRS' development, all soil series mapped in New Jersey were included in its databases. Nevertheless, instances may arise where a soil series identified at a land development site has not been included. In such instances, the user should select a similar soil series from the program's database. In doing so, the following criteria should be utilized, generally in the order presented:
    - Select a NJGRS soil series within the same Hydrologic Soil Group (HSG) as the site soil.
    - Within the same HSG, select an NJGRS soil series with similar textural characteristics and classification as the soil.
    - If the site soil includes a fragipan, bedrock, or other restrictive layer below its surface, select an NJGRS soil series with a similar restrictive depth.
    - If more than one choice of NJGRS soil series appears reasonable, the user may then analyze and compare the annual groundwater recharge amounts for each using the NJGRS program to help make a final selection.

Recharge BMP Design Guidelines

In general, the design of a groundwater recharge BMP to offset a development site's groundwater recharge deficit should follow the standards and guidelines for dry wells, infiltration basins, and pervious paving systems with storage beds presented in Chapter 9. This includes utilizing soil permeability data obtained from tests such as those contained in Standards for Individual Subsurface Sewage Disposal Systems at N.J.A.C. 7:9A at the site of the proposed recharge BMP. In addition, the recharge BMP design must be based on the following guidelines:

1. Computation of the pre- and post-development annual groundwater recharge rate and the annual recharge deficit should be based upon the New Jersey Geological Survey Report GSR-32 A Method For Evaluating Ground-Water-Recharge Areas in New Jersey, which is incorporated into the NJGRS.
2. Only the directly connected impervious portions of a recharge BMP's drainage area can be used to compute runoff to the BMP. In the NJGRS, the input parameter Aimp, which is the size of the recharge BMP's drainage area, must represent only directly connected impervious surfaces. This is particularly relevant for infiltration basins and pervious paving systems used for groundwater recharge that may also have pervious and unconnected impervious areas draining to them.
3. Runoff collected from roofs and other above-grade surfaces can be directly conveyed to a recharge BMP. However, roof gutter guards and/or sumps or traps equipped with clean-outs should be included upstream of the recharge BMP wherever possible to minimize the amount of sediment or other solids that can enter the BMP.
4. Runoff collected from parking lots, driveway, roads, and other on-grade impervious surfaces and conveyed to a subsurface recharge BMP must be pretreated to remove 80 percent of TSS in order to prevent the loss of storage volume and/or recharge capacity due to sedimentation and clogging. Exceptions may be possible for patios, tennis courts, and similar on-grade impervious surfaces with minimal TSS loadings on case-by-case basis. Such treatment can also be used to meet the site's overall TSS removal requirements. In addition, all on-grade drainage areas to a subsurface recharge BMP should consist only of impervious surfaces. Exceptions to this requirement may include roadway right-of-ways, vegetated parking lot medians, planting and landscape beds, and other pervious surfaces provided that they comprise only a small percentage of the total drainage area and will not generate an excessive amount of TSS or other material that might adversely impact the subsurface recharge BMP. As noted above, if such areas are part of the actual drainage area, they must not be included in the drainage area size (variable Aimp) used in the NJGRS' BMP Calculations worksheet to design the recharge BMP.

   In addition, it should be noted that, since the BMP Calculations Worksheet assumes that all runoff from a recharge BMP's impervious drainage area will be delivered to the BMP, it cannot directly account for runoff losses incurred at a pretreatment measure located between the drainage area and the recharge BMP. If such losses will occur due to the selected pretreatment measure, appropriate compensating adjustments may be attempted in the BMP Calculations Worksheet input data or alternative BMP calculation techniques utilized.
5. In general, County Soil Surveys prepared by the U.S. Department of Agriculture and the State Soil Conservation Committee can be used to obtain the soil series data required for the determination of annual land development site recharge rates and deficits and the dimensions of recharge BMPs using the NJGRS program. However, site soil tests will be required at the actual location of a proposed recharge BMP in order to confirm the BMP's ability to function properly without failure. Such tests should include a determination of the textural classification and permeability of the soil

at the bottom of the proposed recharge BMP. As noted above, permeability testing can be conducted in accordance with Standards for Individual Subsurface Sewage Disposal Systems at N.J.A.C. 7:9A.

Depending upon the type, location, use, and maximum design storm of the selected recharge BMP, minimum design soil permeability rates will vary from 0.2 to 0.5 inches per hour and that a factor of safety of 2 must be applied when converting a tested permeability rate to a design rate. In addition, the soil permeability rate must allow the recharge BMP to fully drain its maximum design storm runoff volume within 72 hours. Recharge BMP locations that fail to meet these two requirements should be rejected and alternative onsite locations selected. A groundwater recharge waiver may be sought from the applicable reviewing agencies if suitable permeability rates cannot be found at any recharge BMP locations on the development site.

See Chapter 9 for details on structural best management practices that can be used as recharge BMPs, including minimum design permeability rates. Such BMPs include dry wells (Chapter 9.3), infiltration basins (Chapter 9.5), and certain types of pervious paving systems (Chapter 9.7).

6. The results of the BMP site soil testing should be compared with the County Soil Survey data used in the NJGRS' annual recharge and BMP design computations to ensure reasonable data consistency. If significant differences exist between the BMP site soil test results and the County Soil Survey data, additional development site soil tests are recommended to determine and evaluate the extent of the data inconsistency and the need for revised annual recharge and BMP design computations based upon the site soil test results. All significant inconsistencies should be discussed with the local Soil Conservation District prior to proceeding with such redesign to help ensure that the site soil data is accurate. It should also be noted that significant inconsistencies between development site soil tests and the County Soil Survey may warrant revisions to the site's stormwater quality and quantity storm computations.
7. The development site areas that extensive site soil testing determine to have permeability rates less than 0.2 inches per hour may be considered to belong to Hydrologic Soil Group D in the NJGRS program. For such areas, the user may use any HSG D soil in the NJGRS soil series database to define such site areas in the NJGRS' Annual Recharge worksheet. In accordance with the assumptions of both the NJGRS program and N.J. Geological Survey's Geological Survey Report GSR-32: A Method for Evaluating Ground Water Recharge Areas in New Jersey, such areas will not produce any groundwater recharge. Once again, the assignment of HSG D to any development site areas should be discussed with the local Soil Conservation District prior to proceeding to help ensure that the site soil data is accurate.

The New Jersey Groundwater Recharge Spreadsheet (NJGRS)

User's Guide

Version 2.0 – November 2003

There are two computational worksheets in the NJGRS spreadsheet:

- **Annual Recharge:** This worksheet, which resides on the first page of the spreadsheet, is used to estimate the annual groundwater recharge volumes that occur naturally under the Pre-Developed and Post-Developed Conditions. Based on the value of *"percent of Pre-Developed Annual Recharge to Preserve"* that the user provides (NJDEP currently requires 100 percent for this parameter), the worksheet calculates the *"Post-Development Annual Recharge Deficit"* in cubic feet. This is the annual recharge volume that must be provided by one or more groundwater recharge BMPs.
- **BMP Calculations:** This worksheet, which resides on the second page of the spreadsheet, is used to design the required size and configuration of one or more groundwater recharge BMPs to satisfy the *"Post-Development Annual Recharge Deficit"* calculated in the Annual Recharge worksheet.

NOTE: Only the above worksheets in the NJ Groundwater Recharge Spreadsheet are for user input. Charts 1 through 3 can be viewed for visual inspection of the results. Other worksheets in the spreadsheet are either for internal calculations or contain the databases used by calculations. The user should refrain from changing anything in these worksheets.

Part 1: Using the Annual Recharge Worksheet

Figure 1: Screen Capture Showing the Annual Recharge Worksheet

New Jersey Groundwater Recharge Spreadsheet Version 2.0 November 2003

Annual Groundwater Recharge Analysis (based on GSR-32)

Select Township ↓	Average Annual P (in)	Climatic Factor
MIDDLESEX CO., PERTH AMBOY CITY	47.8	1.53

Project Name:	Sample Project
Description:	This is a test application
Analysis Date:	09/01/03

Pre-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	1.4	Open space	Woodstown	12.9	65,498
2	0.3	Gravel, dirt	Woodstown	6.9	7,536
3	3.5	Woods-grass combination	Woodstown	13.5	171,255
4	1.4	Open space	Keyport	13.4	68,146
5	0.5	Gravel, dirt	Keyport	7.5	13,657
6	3.3	Woods-grass combination	Keyport	13.9	165,963
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	10.4			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)
				13.0	492,054

Post-Developed Conditions

Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	1.5	Impervious areas	Keyport	0.0	-
2	1.6	Gravel, dirt	Woodstown	6.9	40,191
3	3.65	Open space	Keyport	13.4	177,667
4	3.65	Open space	Woodstown	12.9	170,762
5	0				
6	0				
7	0				
8	0				
9	0				
10	0				
11	0				
12	0				
13	0				
14	0				
15	0				
Total =	10.4			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				10.3	388,620

Annual Recharge Requirements Calculation ↓

% of Pre-Developed Annual Recharge to Preserve =	100%	Total Impervious Area (sq.ft)	65,340
Post-Development Annual Recharge Deficit=	*103,435*	(cubic feet)	

Recharge Efficiency Parameters Calculations (area averages)

RWC=	3.94	(in)	DRWC=	3.94	(in)
ERWC =	0.93	(in)	EDRWC=	0.93	(in)

Procedure to fill the Pre-Development and Post-Development Conditions Tables

For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table and proceed downward. Don't leave blank rows (with A=0) in between your segment entries. Rows with A=0 will not be displayed or used in calculations. For impervious areas outside of standard lots select "Impervious Areas" as the Land Cover. Soil type for impervious areas are only required if an infiltration facility will be built within these areas.

- Figure 1 is a screen capture from an example application of the Annual Recharge Worksheet. All user-input cells are tan colored. All gray colored cells are used to show calculation results or internal validity checks and must *not* be changed by the user. The three cells at the upper right corner of the sheet are where the user can input project information. These inputs are optional, but they can help in identifying the project and the alternative being analyzed.
- As the first step, the user must select the project's municipality. Click once on the municipality cell (Cell C3) and select the project's county and municipality from the drop-down list of all New Jersey municipalities, which is arranged by county in alphabetical order. Once the user has selected a municipality, the values of average annual precipitation and the climate factor are set for that municipality in the two cells to the immediate right of the municipality's name (Cells D3 and E3).
- The next step is to provide information about pre-developed site conditions. The first column is the land segment number (Cells A6 to A20). Up to 15 different land segments can be inputted in this table.

  NOTE: If you have more than 15 different land segments, try to combine similar segments together or subdivide your area into smaller areas not consisting of more than 15 land segments.

- For each land segment, first enter the area in acres. Then select an appropriate TR-55 land cover description from the drop-down list of standard NRCS land cover descriptions. Finally, select the segments soil series from the drop-down list. Note that, as soon as the area for a segment is entered, the entries for other columns become visible and selectable. Start from the top of table and proceed downward. Do not leave blank rows (with zero area) between land segment entries; rows with zero areas will not be displayed or used in calculations.

  NOTE: Once you click on any of these cells a pop-up help message will appear to briefly tell you about the required input for that cell.

- As can be seen from the list of available TR-55 land cover descriptions in the drop-down list, there may be more than one way to describe the pre-developed land cover at a project site, particularly when that cover is a mixture of pervious and impervious surfaces such as a single family residential development. For assistance, see the guidelines in the New Jersey Groundwater Recharge Spreadsheet (NJGRS) section of Chapter 6 for selecting segment limits and land cover descriptions. Finally, it should be noted that, under the Pre-Developed Conditions section, it is not necessary to specify the soil series for site segments with impervious land cover, since the natural recharge in these segments is set at zero.

  NOTE: If the soil you select for a land segment is hydric, recharge will be set to zero for that segment.

- Once the user has completed inputting all land covers in the table for the Pre-Developed Conditions, check the total area in acres (Cell B21) to ensure that the total project area is correct. The last two columns of this table show the naturally occurring average annual recharge amount as a depth (in inches over the segment area) and a volume (in cubic feet) for each land segment. At the bottom of these columns (Cells E22 and F22), the average recharge depth (in inches) and the total annual recharge volume (in cubic feet) over the total area under Pre-Developed Conditions is given. This number is later used in the calculation of any post-development recharge deficit.
- The above procedure can also be used to enter the required data for the post-developed site conditions. In doing so, please note the following additional requirements:
  1. To correctly compute the performance and/or required size of a proposed groundwater recharge BMP, the area in which the BMP will be located must be entered as a separate site

segment with its associated soil series. The number of this segment must also be specified on the BMP Calculations spreadsheet (see below).

2. As noted above, it is normally not necessary to specify the soil series within an impervious site segment. However, the soil series of the impervious segment must be specified if a proposed groundwater recharge BMP will be located within or below it (e.g., a stone-filled infiltration trench below a parking lot). As noted in 1 above, the soil series is necessary in order to accurately compute the performance and/or required size of the proposed BMP.

- Finally, as noted above, see the guidelines in the New Jersey Groundwater Recharge Spreadsheet (NJGRS) section of Chapter 6 for further assistance in selecting appropriate segment limits and TR-55 land cover descriptions for post-developed site conditions.

  NOTE: Soil series selected for the impervious areas in the Post-Developed Conditions table are automatically displayed in orange, signifying that they have no effect on the site's natural annual recharge calculation (i.e., recharge set to zero for all land segments classified as "Impervious areas" regardless of the soil type), but that they can affect the artificial annual recharge volume of any groundwater recharge BMP set below them.

- Once the user has completed inputting all land segment information in the table for the Post-Developed Conditions, once again check the total project area (Cell I21) to ensure that the total post-development project area is correct.

  NOTE: If the total area in the Post-Developed Conditions is different from the total area in the Pre-Developed Conditions, a warning message will appear to the right of the total Post-Developed project area (Cell J21).

- As an additional check, the total impervious area (in square feet) under Post-Developed conditions will be shown at the bottom right of this table (Cell M23). Please note that this value reflects only those impervious areas specified as separate project segments and does not include any impervious areas within those segments specified by the standard TR-55 residential or urban land descriptions. The last two columns of this table show the naturally occurring average annual recharge depth (in inches) and volume (in cubic feet) for each land segment. At the bottom of these columns (Cells L22 and M22), the average recharge depth (in inches) and the total annual recharge volume (in cubic feet) over the total area under Post-Developed Conditions is given. This number is also used later in the calculation of any Post-Development recharge deficit.
- Immediately below the Post-Developed Conditions table is the Annual Recharge Requirements Calculation section. The user needs to input the "percent of Pre-Developed Annual Recharge to Preserve" (Cell K23) to set the percentage of the recharge under Pre-Developed Conditions that must be maintained under the Post-Developed Conditions. The NJDEP Stormwater Management Rules at N.J.A.C. 7:8 currently requires this value to be 100 percent, which is the spreadsheet's default value. The spreadsheet then computes the difference between the total annual recharge volumes for Pre- and Post-Developed Conditions and multiplies it by the "percent of Pre-Developed Annual Recharge to Preserve." The resulting value is shown as the "Post-Development Annual Recharge Deficit" in the worksheet (Cell K24). This amount is 103,435 cubic feet in the case of the example in Figure 1. This is the volume of groundwater recharge that must be artificially recharged under Post-Developed Conditions annually through groundwater recharge BMPs.
- The "Recharge Efficiency Parameter Calculations" table shown below the "Post-Development Annual Recharge Deficit" show the parameters calculated by this worksheet that are later used in the BMP Calculations worksheet.

  NOTE: The Appendix to this guide provides the basic equations and defines the variables used in Recharge Efficiency Parameter Calculations.

Part 2: Using the BMP Calculations Worksheet

This worksheet allows the proper sizing of groundwater recharge BMPs to provide the desired or required volume of annual groundwater recharge. Alternatively, it can be used to evaluate the performance of a user-specified recharge BMP. As described in Chapter 2, groundwater recharge BMPs can also be referred to as Low Impact Development BMPs (or LID-BMPs), depending on their size and location in the project site.

Figure 2: Screen Capture from the BMP Calculations Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Project Name		Description			Analysis Date		BMP or LID Type						
2	Sample Project		This is a test application			09/01/03								
3	Infiltration BMP Input Parameters				Root Zone Water capacity Calculated Parameters				Recharge Design Parameters					
4	Parameter	Symbol	Value	Unit	Parameter	Symbol	Value	Unit	Parameter	Symbol	Value	Unit		
5	BMP Area	ABMP	6656.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.93	in	Inches of Runoff to capture	Qdesign	0.54	in		
6	BMP Effective Depth, this is the design variable	dBMP	5.2	in	ERWC Modified to consider dEXC	EDRWC	0.93	in	Inches of Rainfall to capture	Pdesign	0.67	in		
7	Upper level of the BMP surface (negative if above ground)	dBMPu	-5.2	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.74	in	Recharge Provided Avg. over Imp. Area		19.0	in		
8	Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in					Runoff Captured Avg. over imp. Area		24.8	in		
9	Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless										
10	Solve for ABMP to provide Vdef	Solve for dBMP to provide Vdef		Default Vdef & Aimp	BMP Calculated Size Parameters				CALCULATION CHECK MESSAGES					
11					ABMP/Aimp	Aratio	0.10	unitless	Volume Balance->	OK				
12					BMP Volume	VBMP	2,873	cu.ft	dBMP Check--->	OK				
13	Parameters from Annual Recharge Worksheet				System Performance Calculated Parameters				dEXC Check--->	OK				
14	Post-D Deficit Recharge (or desired recharge volume)	Vdef	103,435	cu.ft	Annual BMP Recharge Volume		103,435	cu.ft	BMP Location--->	Location is selected as distributed or undetermined				
15	Post-D Impervious Area (or target Impervious Area)	Aimp	65,340	sq.ft	Avg BMP Recharge Efficiency		76.7%	Represents % Infiltration Recharged	OTHER NOTES					
16	Root Zone Water Capacity	RWC	3.94	in	%Rainfall became Runoff		78.3%	%	Pdesign is accurate only after BMP dimensions are updated to make rech volume= deficit volume. The portion					
17	RWC Modified to consider dEXC	DRWC	3.94	in	%Runoff Infiltrated		66.2%	%	of BMP infiltration prior to filling and the area occupied by BMP are ignored in these calculations. Results are					
18	Climatic Factor	C-factor	1.53	no units	%Runoff Recharged		50.8%	%	sensetive to dBMP, make sure dBMP selected is small enough for BMP to empty in less than 3 days. For land					
19	Average Annual P	Pavg	47.8	in	%Rainfall Recharged		39.7%	%	Segment Location of BMP if you select "impervious areas" RWC will be minimal but not zero as determined by					
20	Recharge Requirement over Imp. Area	dr	19.0	in					the soil type and a shallow root zone for this Land Cover allowing consideration of lateral flow and other losses.					
21	How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP. To solve for a smaller BMP or a LID-IMP to recharge only part of the recharge requirement, set Vdef to your target value and Aimp to impervious area directly connected to your infiltration facility and then solve for ABMP or dBMP. To go back to the default configuration clik the "Default Vdef & Aimp" button.														

- Figure 2 is a screen capture from a portion of the BMP Calculations worksheet. While most of the calculations in this worksheet are performed in a separate worksheet, the portion shown in Figure 2 can be studied to understand the worksheet usage. There are several sections and solve buttons in this part of the worksheet, as explained below.

  NOTE: The three entries for Project Name, Description and Analysis Date are automatically copied from the Annual Recharge Sheet to the top of this sheet. The user can optionally input information regarding Groundwater Recharge BMP type.

Recharge BMP Input Parameters

- The user may start by inputting an initial value for the BMP surface area in square feet (variable ABMP) in Cell C5. In the NJGRS program, the variable ABMP is used in conjunction with the size of the recharge BMP's drainage area to determine the depth of stored runoff in the BMP resulting from a specific rain event. If a specific recharge BMP is being analyzed, ABMP will be based on the

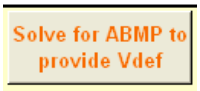
actual area of the BMP. If the spreadsheet is being used to determine the required recharge BMP dimensions, this value should be an initial estimate of the required surface area to satisfy the Post-Developed Recharge Deficit volume. This deficit volume (variable Vdef) is shown in Cell C14 and is either user-specified or, by default, taken from the Post-Development Annual Recharge Defici computed on the Annual Recharge worksheet (Cell K24).

- Next, a value for the recharge BMP's effective storage depth (variable dBMP) must be specified in inches in Cell C6. In the NJGRS program, dBMP represents the maximum equivalent water depth that can be achieved in the BMP before overflow begins. Therefore, if the proposed recharge BMP will, for example, be a subsurface, vertical-walled chamber, dBMP will simply be the maximum achievable depth before the chamber is full and overflow occurs. However, if the proposed BMP will be filled with broken stone or other suitable material, dBMP will be the product of the BMP's actual or physical depth and the void ratio of the fill. For recharge BMPs that consist of a combination of filled and open areas (e.g., a perforated pipe within a stone filled trench) or for irregular, nonrectangular BMP shapes (e.g., a perforated elliptical pipe or an infiltration basin with sloping sides), dBMP can be computed by dividing the BMP's total storage volume by its surface area.
- Just like the BMP surface area variable ABMP, the dBMP value entered for effective storage depth can be either a given value for a specific recharge BMP or an initial guess for a BMP to be sized by the spreadsheet. If this second option is selected, the user should remember that the resultant dBMP computed by the program may or may not be its actual or physical depth, depending on whether the BMP uses broken stone or other media in which to store runoff.
- In addition to dBMP, the user must also provide two additional recharge BMP depths. In Cell C7, the variable dBMPu is the vertical distance from the vegetated ground surface to the maximum water level of the BMP. This value should be positive if the maximum level is below the ground surface and negative if above the vegetated ground surface. In Cell C8, the variable dEXC is the vertical distance from the vegetated ground surface to the bottom of the BMP. For example, if the top of a 36-inch deep stone-filled infiltration trench (void ratio = 0.33) is located 24 inches below ground level, dBMPu would be 24 inches and dEXC would be 60 inches (i.e., dBMPu plus the 36-inch actual or physical depth of the trench). Remember, however, that since the trench is filled with gravel, the effective BMP depth (dBMP) would be 12 inches (i.e., 36 inches times 0.33). Using the dBMPu and dEXC variables, virtually all types of recharge BMPs can be specified, including "above the surface," "semi-buried," and "completely buried" BMPs. See Figure 6-4 for additional examples of dBMPu and dEXC.
- The next input cell on the BMP Calculations worksheet is the variable segBMP (Cell C9). This variable represents the post-developed site segment (as specified on the Annual Recharge worksheet) in which the proposed recharge BMP will be located. For example, if the recharge BMP is proposed to be built in Land Segment 3 in the Post-Developed Conditions table shown in Figure 1, then enter 3 for segBMP on the BMP Calculations worksheet.

  NOTE: Input zero for segBMP if the location of the BMP is still undetermined or a series of identical BMPs will be distributed over multiple site segments.

- The last input cell on the BMP Calculations worksheet is the variable Aimp (Cell C15). Similar to the variable Vdef in Cell C14, Aimp is either user-specified or, by default, taken from the Total Impervious Area computed on the Annual Recharge worksheet (Cell M23).

- Once values and/or initial guesses are entered in the input cells, either of two solve buttons can be used to solve the design problem. These buttons are described below.



NOTE: Click this button to automatically evaluate the value of ABMP that provides Vdef given all other input values.

NOTE: Click this button to automatically evaluate the value of dBMP that provides Vdef given all other input values.

If the initial guess values you enter for ABMP or dBMP are drastically off from what is needed to satisfy Vdef (i.e., too small or too big, too shallow or too deep), the program may not be able to find the right answer. You can tell the answers are not acceptable because negative values or division by zero signs will show up. If this happens just change your ABMP and/or dBMP values to more realistic numbers and solve the problem again.

- It is important to remember that, by default, the spreadsheet takes the values computed on the Annual Recharge worksheet for the Post-Development Recharge Deficit Volume (Cell K24) and the Total Impervious Area (Cell M23) and specifies them as initial values on the BMP Calculations worksheet for the Post-Development Deficit Recharge (variable Vdef in Cell C14) and Post-Development Impervious Area (variable Aimp in Cell C15). This allows solution of the site's total recharge deficit by a single groundwater recharge BMP that will receive runoff from the site's entire impervious area. However, in many instances, the single groundwater recharge BMP will receive runoff from only a portion of the site's impervious area (e.g., only roof runoff). In such cases, the user must specify the exact size of Aimp (impervious area to the BMP) in Cell C15. Failure to do this for such BMPs will result in an overestimation of the amount of runoff captured by the BMP and erroneous BMP dimensions and/or recharge amounts.
- At other sites, it may be necessary or desirable to utilize more than one groundwater recharge BMP to meet the site's recharge requirements. In such cases, each BMP will not only receive runoff from a portion of the site's impervious surface, but each will also seek to provide only a portion of the site's total recharge deficit. In such cases, the user must specify both the exact Aimp and Vdef (Post-Development Deficit) for each BMP in Cells C14 and 15 of the BMP Calculations worksheet. *IMPORTANT: In such cases, the user* must *also use a separate NJGRS spreadsheet for each BMP. Using multiple copies of the BMP Calculations worksheet within a single spreadsheet can yield erroneous results.*

NOTE: These procedures area also summarized in a note at the bottom of the BMP Calculations worksheet.

NOTE: Click this button to retrieve the initial, default values of Vdef and Aimp from the Annual Recharge worksheet.

- Similar to the Annual Recharge worksheet, the user-input cells in the BMP Calculations worksheet are tan colored. This includes the cells for Vdef and Aimp so that they can be altered from their default values by the user. As described above, these cells are initially assigned default values from the Annual Recharge worksheet so the user does not have to input values for certain sites and BMPs. All gray colored cells are used to show calculation results or internal validity checks and must *not* be changed by the user.

NOTE: Remember that the default configuration assumes that the runoff from the site's entire impervious area (set by specifying one or more land segments to "Impervious Areas" on the Annual Recharge worksheet) will drain to the BMP. If only a portion of this impervious area will do so, the correct impervious area must be specified for Aimp (Cell C15) on the BMP Recharge worksheet.

- The values shown in Figure 2 above are the final results obtained by solving for ABMP (with a constant dBMP of 5.2 inches) to satisfy the entire annual recharge deficit of 103,435 cubic feet (which is the default Vdef value from the Annual Recharge worksheet). The user can tell the results are correct by comparing the calculated Annual BMP Recharge Volume amount in Cell G14 (under the "System Performance Calculated Parameters" heading) with the Vdef amount in Cell C14. In addition, the user can see that the volume balance is shown to be "OK" (Cell J11) in the "Calculation Check Messages" section.

Parameters from Annual Recharge Worksheet

- This section of the BMP Calculations worksheet contains various parameters initially computed in and then transferred from the Annual Recharge worksheet. As noted above, the initial values for Vdef (Cell C14) and Aimp (Cell C15) are taken from the Post-Development Recharge Deficit Volume (Cell K24) and the Total Impervious Area (Cell M23) on the Annual Recharge worksheet. A complete description of when the user must specify other values for these parameters is presented above. The values for Root Zone Water Capacity (variable RWM in Cell C16) and RWC Modified to Consider dEXC (variable DRWC in Cell C17) are automatically adjusted to reflect the user's choice for the excavation depth (variable dEXC) of the BMP. The values for Climatic Factor (variable C-Factor in Cell C18) and Average Annual P (variable Pavg in Cell C19) are constant values for the municipality selected in Cell C3 of the Annual Recharge worksheet. It is important to note that if the user wishes to analyze a site in a different municipality, the user must go back to the Annual Recharge worksheet and change the municipality's name in order to obtain the correct C-Factor and Pavg values on the BMP Calculations worksheet.

  WARNING: By changing the municipality, you also change the site's annual recharge deficit.

- The final value shown in this section of the BMP Calculations worksheet is the Recharge Requirement over Impervious Area (variable dr in Cell C20). This value is the average depth of annual recharge in inches over the impervious area (Aimp) specified (either by default or the user) in Cell C15. The value of dr is calculated by dividing Vdef by Aimp.

Root Zone Water Capacity Calculated Parameters

- This section of the BMP Calculations worksheet contains the calculated results for three root zone water capacity parameters. These values are needed for estimating the recharge efficiency of the groundwater recharge BMP under consideration. These parameters enable the NJGRS spreadsheet to estimate what portion of the infiltrated water from the BMP will travel downward below the root zone of the surrounding vegetation. As described above, this degree of water movement is the technical definition of groundwater recharge. The values of these three root zone water capacity parameters are automatically adjusted for the municipality and LULC segment in which the BMP is to be located. If the variable segBMP (Cell C9) is set to zero, weighted averages of these three parameters are utilized based on all the land segments specified on the Annual Recharge worksheet.

  NOTE: See the Appendix to this guide for more information about these three root zone water capacity parameters.

BMP Calculated Size Parameters

- This section of the BMP Calculations worksheet contains values for two recharge BMP design parameters. The parameter Aratio (Cell G11) is computed by dividing the area (ABMP) of the BMP by the impervious area (Aimp) draining to it. The parameter VBMP (Cell G12) is the maximum storage volume in the BMP. It is computed by multiplying the BMP area (ABMP) by its effective depth (dBMP). These values can be checked by the user to help ensure that the ABMP, Aimp, and dBMP values have been inputted and used correctly by the NJGRS spreadsheet.

System Performance Calculated Parameters

- This section of the BMP Calculations worksheet contains various calculated BMP performance values. Of these, the Annual BMP Recharge Volume value (Cell G14) is the most important, since it must match the Post-Development Deficit Recharge value (variable Vdef in Cell C14) for the BMP to completely satisfy the site's annual recharge deficit or target recharge volume (as described above).
- The next parameter, Average BMP Recharge Efficiency (Cell G15), specifies the percentage of infiltrated water that is recharged (i.e., travels below the root zone) over an average year. This efficiency depends on many factors, including the project location, land cover, soil types, BMP dimensions, and depth of BMP. For the example shown in Figure 2 above, the recharge efficiency of the selected BMP is 76.7 percent.
- The remaining performance values in this section (Cells G16 to G19) are self-explanatory.

Recharge Design Parameters

- Inches of Runoff to Capture (variable Qdesign in Cell K5) is the first value in this section of the BMP Calculations worksheet. This value is the minimum depth of runoff over the BMP's tributary impervious area that must be captured and directed to the BMP to allow it to meet the site's groundwater recharge deficit. Similarly, Inches of Rainfall to Capture (variable Pdesign in Cell K6) specifies the minimum depth of rainfall over the BMP's impervious area that must be similarly controlled by the BMP to meet the site's recharge deficit. This value is also the maximum event rainfall the BMP can store without overflowing and, therefore, is the design rainfall for the BMP as described above.
- The next parameter in this section, Recharge Provided Average over Impervious Area (Cell K7) is the total annual depth of groundwater recharge provided by the BMP. For a site's recharge deficit to be met, this value must equal the Recharge Requirement over Impervious Area (variable dr in Cell C20). Runoff Captured Average over Impervious Area (Cell K8) is the last parameter in this section. It is the total annual depth of runoff over the impervious area tributary to the BMP that infiltrates into the ground. As such, it does not contain that part of the impervious area runoff to the BMP that overflows from the BMP during rainfall events greater than the BMP's design rainfall (Pdesign).

Calculation Check Messages

- This section the BMP Calculations worksheet provides three important messages to check the validity of the computed results. The Volume Balance message (Cell J11) is a check of the Annual BMP Recharge Volume in Cell G14 against the Post-Development Deficit Recharge (variable Vdef in Cell C14). If these values are equal, the problem is solved successfully and the message in this section should read "OK." However, if the BMP's annual recharge volume does not equal Vdef, the message instructs the user to continue to solve the problem. This may also occur if the user changes any of the BMP design parameters and forgets to solve the problem by clicking on any of the two solve buttons described above.
- The dBMP Check message (Cell J12) checks the validity of the value inputted for the dBMP, the BMP's effective depth in Cell C6. If this value is greater than the difference between the depths to the BMP's upper and lower surfaces (variables dBMPu and dEXC in Cells C7 and C8, a warning message is issued telling the user to adjust dBMP. dEXC Check (Cell J13) is the third message. It checks the validity of dEXC to make sure it is larger than dBMPu. If it is not, a message will appear instructing the user to make dEXC larger than dBMPu.
- Below these messages is a report on the location of the BMP as specified by the user in Cell C9 (variable segBMP). If the user has entered a valid segment number for segBMP, the message will read "OK." If the user enters a zero for segBMP, the message will read "Location is selected as distributed or undetermined." However, if the user enters a land segment number that was not previously defined in the Annual Recharge worksheet under Post-Developed Conditions, the message will say "Land Segment Number Selected for BMP is not Defined." The user should then make appropriate corrections to segBMP.

Other Notes

- This section of the BMP Calculations worksheet contains notes regarding the assumptions and limitations of the calculations in this worksheet. In the current version of the spreadsheet, these notes refer to the following aspects of spreadsheet use:
    1. The variable Pdesign (Cell K6) is accurate only after the BMP's annual recharge volume (Cell G14) is equal to the site's recharge deficit (variable Vdef in Cell C14). In addition, Pdesign is computed from the results of the BMP's performance. It is not used to compute that performance.
    2. A recharge BMP results are sensitive to its effective depth (dBMP in Cell C6). The user must ensure that the selected dBMP is small enough for the BMP to empty in less than 72 hours.
    3. If a BMP is located within an impervious Post-Development land segment, the Root Zone Water Capacity (variable RWC in Cell C16) at the BMP will be minimal, but not zero. This allows consideration for lateral flow and other losses at the BMP.

A P P E N D I X

Basic Equations and Variables Used in Recharge Efficiency Parameters Calculations

Basic Equations for Soil Water Capacity

A. Equation from GSR-32:

RWC = Root Depth x AWC (1)

RWC: Root Zone Water Capacity, (inch)

AWC: Available Water Capacity, (inch/ft)

B. New Equation:

ERWC = (1-0.5 x C-Factor) x RWC (2)

ERWC: Empty Root Zone Water Capacity under natural recharge, (inch)

C-Factor: Climate Factor = Ratio of precipitation to potential ET, (unitless)

Range of Values in NJ: RWC: (0.3, 14.35), C-Factor: (1.18-1.83)

ERWC: (0.02, 5.88)

Infiltration and Artificial Recharge under BMP or LID-IMP

$$\text{Average Annual Total Infiltration Depth} = \sum_{i=1}^{n} \text{Minimum}\,(Qi/\text{Aratio}, \text{dBMP}) \quad (3)$$

n = total number of runoff producing precipitation events in an average year

Aratio = Ratio of surface area of BMP (ABMP) to the impervious surface area served by the BMP (Aimp), unitless.

Find Average Empty RWC under Infiltration Facility

A. Modification to account for the buried depth of the facility

We know that dBMPb = dEXC- Max(0,dBMPu);

We can define the following relationship:

DRWC = Max {0, Root Depth- 0.5 dBMPb - (dEXC- dBMPb)} AWC

which can be simplified to:

DRWC = Max (0, Root Depth- dEXC+ 0.5 dBMPb) AWC (4)

DRWC = Root zone water capacity under BMP modified for the buried portion of the BMP and calculated over all land segments, (inch)

B. Define the empty portion of EDRWC

EDRWC = (1- 0.5 x C-Factor) x DRWC (5)

EDRWC = Empty Portion of DRWC, (inch)

C. Account for the effect of moisture supplied by infiltration facility in reduction of empty portion of root zone

$$REavg = (1/n) \sum_{i=1}^{n} \text{Maximum } (EDRWC - infi) \quad (6)$$

REavg = DRWC modified to account for infiltration under BMP, (inch)

infi = Infiltration depth in BMP during "i"th event (inch)

$$RERWC = (n/365) \times REavg + [(365-n)/n] \times EDRWC \quad (7)$$

RERWC = Average empty root zone water capacity under BMP operation calculated for the average RWC of all land segments (inch)

$$RBMP = \sum_{i=1}^{n} \text{Maximum } (infi - RERWC, 0) \quad (8)$$

RBMP = Total infiltration depth under BMP during an average year, (inch)

$$\text{BMP Recharge Efficiency} = \frac{RBMP}{\sum_{i=1}^{n} infi} \quad (9)$$

In equations (8) and (9), results are very sensitive to C-Factor. As C-Factor increases, natural recharge increases and recharge deficit due to development increases. The NJGRS equations imply that if a development is constructed in an area of high natural recharge, the recharge efficiency of a BMP at the site would also be high. Therefore, the size of required recharge BMP should not be unduly large in areas with a large C-Factor.

The above parameters are calculated in the spreadsheet for each land segment as well as for the entire area (area weighted average) under Post-Developed Conditions. If the user specifies the location of the recharge BMP, the relevant parameters of the same land segment will be used. If the user does not specify the location, the average soil and loss factors based on all of the post-developed land segments specified on the Annual Groundwater recharge worksheet will be used.

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As part of managing stormwater runoff in the Borough, the Borough should investigate and implement development techniques and infrastructure and development requirements for public and private development that reduce stormwater runoff volume and increase stormwater runoff quality. Green Infrastructure (GI) is a broad term that describes efforts to capture, treat, and infiltrate stormwater runoff in urban areas. Stormwater practices include green roofs, permeable pavers, rainwater harvesting, rain gardens and planter boxes, bioswales, an urban tree canopy and constructed wetlands.

The New Jersey Department of Environmental Protection describes Green Infrastructure as follows: Green Infrastructure refers to methods of stormwater management that reduce wet weather/stormwater volume, flow, or changes the characteristics of the flow into combined or separate sanitary or storm sewers, or surface waters, by allowing the stormwater to infiltrate, to be treated by vegetation or by soils; or to be stored for reuse. Green Infrastructure (GI) methods are management practices that address stormwater runoff through soils, or reuse. GI practices include, but are not limited to, pervious paving, bioretention basins, vegetated swales, and cisterns. The use of green infrastructure encourages the idea that stormwater is a resource that can be reused, instead of being treated as a nuisance that needs to be removed as quickly as possible.

A well-developed Green Infrastructure Plan would help the Borough to address water quality concerns and reduce stormwater runoff volumes. Green Infrastructure can have a significant impact on the volume and rate of stormwater runoff in the types of normal, frequent rainfall events that occur in the Borough regularly. When considering the future condition of the Borough, where nearly all stormwater will need to be pumped off the island, a reduction in runoff rates and volumes from frequent small storm events would also equate to a savings in pumpage related costs.

POLICY IMPLEMENTATION

Policy Implementation to support the Borough's Green Infrastructure will require new or improved stormwater ordinances requiring the use of green infrastructure practices to meet quantitative management standards. Revising or creating local stormwater regulation that encourages or mandates green infrastructure should be a standard step in the process of setting up a comprehensive Green Infrastructure Program. The stormwater/green infrastructure codes shall have definitive language supporting or requiring the use of practices that infiltrate, reuse and/or evapotranspire surface runoff.

It is recommended that revisions be made to the Code of the Borough of Wildwood Crest to include requirements to implement "green infrastructure" in private development. Chapter 85: Land Development Procedures and Chapter 66: Stormwater Management should be revised to include "green infrastructure" requirements.

The Borough should consider establishing specific “green infrastructure” guidelines for use in the design of all public improvement projects including but not limited to parks, streets, sidewalks, parking lots, buildings, etc. Stormwater Manufactured Treatment Devices, as certified by NJDEP, and underground pipe recharge systems should be incorporated into the design of all proposed Borough stormwater drainage system projects.

Green Stormwater Practices

- Rain Gardens/ Bioretention Basins
- Cisterns
- Grass Swales
- Green Roofs
- Pervious Pavement
- Street Tree Trench
- Rain Barrels
- Riparian Buffers
- Subsurface Gravel Wetlands

Financial Assistance

News and Events	Date
Conference: CSOs, Green Infrastructure and Stormwater	4-29-2013

How Development Affects a Watershed

Development can impact a watershed in many ways. For instance, the change in land use from a forested area to a suburb can result in an increase in pollutants that are deposited on surfaces, such as particulates from automobile tailpipes, nutrient-rich fertilizer residues that remain on lawns and improperly discarded pet waste. In a developed watershed, all of these pollutants are picked up by rainwater and ultimately washed into our rivers and streams.

Pervious Concrete Sidewalk - West Windsor, Mercer County

Development not only removes beneficial vegetation, but it tends to replace it with hard surfaces, like roofs, roads and parking lots. This minimizes the areas where water can infiltrate into the soil; this is important because the water that infiltrates into the soil is the same water that replenishes aquifers and provides base flow for many streams. Another result of all this "hardscaping" is the dramatic increase in the volume of runoff. This volume increase can lead to flooding and overburdened water infrastructure systems. In areas of the State where the storm sewer system is combined with the sanitary sewer system, this increased volume can lead to discharges of untreated sewage into our waterways.

What Can Be Done?

Traditional, or gray infrastructure, generally focuses on collecting rainwater and sending it downstream to ultimately be discharged into a waterway. Green infrastructure (GI), on the other hand, mimics natural processes utilizing soils and vegetation to manage rainwater where it falls.

GI can be applied on different scales. For instance, on a regional scale, GI can focus on an interconnected network of waterways, wetlands and forested areas. In this way, municipalities can incorporate stormwater management goals into their open space plans and greenways plan. Information on the Garden State Greenways program is available at http://www.gardenstategreenways.org/.

Municipalities can also incorporate GI on a neighborhood scale. Tree plantings and downspout disconnection can be utilized in areas where there is an existing flooding problem. GI can also be used in downtown areas, green street planning can help promote walkability while at the same time managing stormwater. Schools and community groups can also incorporate GI strategies such tree planting and community gardens the neighborhood scale. These practices can go a long way to creating a neighborhood.

GI can also be applied on a site-specific scale. Business owners can retrofit parking lots with pervious pavement and larger bioretention systems that can be placed in the islands. Some businesses may be able to collect rainwater in a cistern for non-potable uses. Many school campuses are large enough to incorporate rain gardens and tree plantings, as well as installing pervious pavement on parking lots and basketball/tennis courts. Homeowners can also incorporate GI into their existing landscape. GI strategies, like rain gardens and rain barrels, are easily implemented into yards.

Low Impact Development (also known as nonstructural strategies) is the concept of designing a site to reduce the impacts. Design techniques include:

- preserving stream buffer areas
- minimizing the number of trees cut down during construction
- minimizing the areas on site where heavy equipment is used
- using the soils and vegetation that are beneficial on site, and
- using GI practices that treat stormwater runoff through soil and vegetation

Additional information on nonstructural strategies is available in
Chapter 2 of the BMP Manual - Low Impact Development Techniques.

Green Infrastructure Design

Green infrastructure practices to be incorporated into site design should be selected based on an evaluation of individual site characteristics and needs. Informational fact sheets on common GI practices, including rain gardens/bioretention basins, grass swales, constructed gravel wetlands, and rain barrels, can be found on the left hand side of this page. GI practices are generally considered as part of development design, but most GI practices can also be used as a retrofit option once a site has already been developed depending on the site conditions. Finally, despite the name, "green" infrastructure doesn't have to be vegetated; GI can include designs incorporating pervious pavement and sand filters that use the soils to reduce runoff and treat pollutants, and rain barrels and cisterns that store rainwater for later reuse.

How it works

GI manages stormwater in two ways: by reducing the volume of runoff and by treating runoff. GI strategies reduce runoff volume by allowing rainfall to infiltrate into the soil where it can be used by plants or where it can recharge aquifers and stream baseflow. Another way to reduce volume is to capture the rainfall in man-made structures like rain barrels or cisterns where it is stored until it can be reused; however, the use of this stored water is limited to non-potable uses, such as irrigation.

Return to Green Infrastructure Home Page

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Last Updated: December 20, 2018

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: RAIN GARDEN/BIORETENTION BASIN

Rain gardens are landscaped, shallow depressions that capture rainwater and allow it to percolate slowly into the ground. Large rain gardens are called bioretention basins.

HOW IT WORKS:

Stormwater flows into the rain garden where it is temporarily stored. The plants in the rain garden take up some of this rainwater, and the rest infiltrates the soil. Rain gardens are generally planted with more deeply rooted grasses and flowers than a traditional lawn, so water is able to drain more deeply into the soil, maximizing infiltration and groundwater recharge. Also, because runoff is collected in the rain garden instead of flowing directly into a storm drain, it has a chance to interact with the plants and soil, where pollutants can be broken down and filtered.

CONSIDERATIONS:

Rain gardens are best placed between two impervious surfaces, like between a downspout draining a roof and a sidewalk, so it can slow down and intercept runoff. Because infiltration of rainwater into the soil is one of the major purposes of rain gardens, it is important to make sure the soil in your rain garden is sandy enough. If it is not, it is important to add coarse sand to the soil to increase the amount of water that can be penetrated into the soil. Finally, it is best to choose native plants; native plants are accustomed to New Jersey's climate, so they are less likely to need fertilizer to thrive.

Additional information regarding the rain garden/bioretention design is available at **www.njstormwater.org/bmp_manual2.htm**.

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: CISTERNS

Cisterns store rooftop runoff in a storage tank placed either above or below ground. Cisterns are used for larger rooftops and can capture and store between 100 and 10,000 gallons of runoff. (Rain Barrels are used for smaller roofs and can only hold about 55 gallons.) The stored water can then be used in non-potable manners such as landscape irrigation, rinsing gardening tools and washing the car. Cisterns can also be rerouted for indoor uses such as toilet water.

HOW IT WORKS:

Cisterns capture runoff from rooftop downspouts and gutters. Cisterns can store water which reduces runoff to streams and storm sewers, particularly for small storms. A filter is used to remove any debris and pollutants from the runoff that goes through the gutter before entering the cistern. A gutter guard can also be used to reduce any leaves, dust and debris that may enter the cistern.

CONSIDERATIONS:

Consideration should be taken to ensure a stable and appropriate path of water in for overflows since cisterns are not typically designed for large storm events. Underground cisterns may need special permits and the location for overflows may also need approvals. Check with your local municipality.

Cistern

Irrigation from cistern

photos courtesy of Rutgers Cooperative Extension

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: GRASS SWALE

Grass swales are vegetated channels used to convey stormwater to a downstream structure, like a basin or a storm drain.

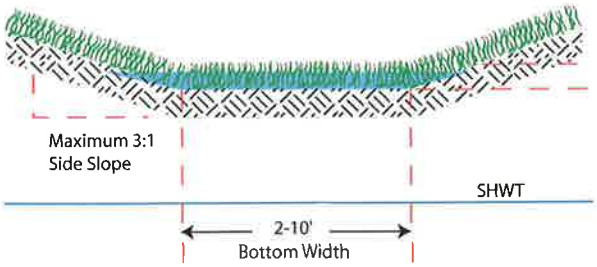
HOW IT WORKS:

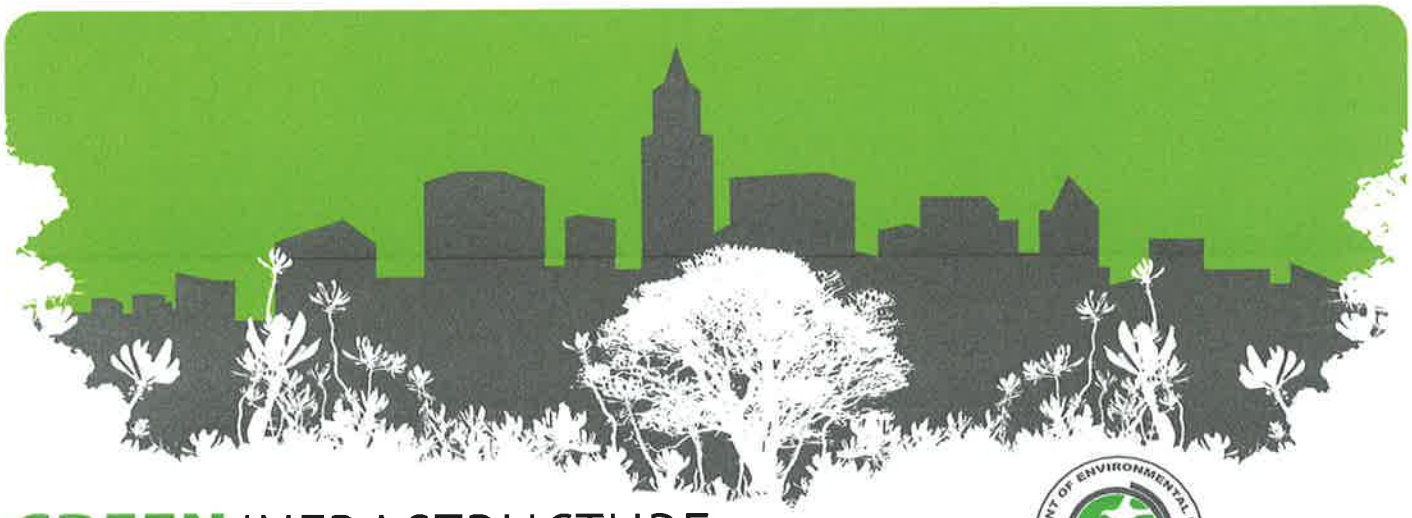
Stormwater flows into a grass swale where it is conveyed more slowly to a downstream basin or storm drain. Grass within a grass swale is maintained between three and six inches; at this height, the grass slows the runoff allowing it to drop any debris or sediment. This results in cleaner water entering the basin or storm drain, which ultimately discharges into a stream.

CONSIDERATIONS:

Grass swales are best suited to capture runoff from small areas. They are typically installed on the sides of roadways, in median strips and in parking lot islands. They are also used to drain the runoff from yards, which provides some pollutant treatment before it enters the storm sewer system. Grass swales are not intended to be used to infiltrate stormwater into the soil.

If you are interested in infiltration within a swale, a bioretention swale, which is a combination of a grass swale and a rain garden, can be constructed. Additional information for bioretention swales is available on the Rain Garden fact sheet and at **www.njstormwater.org/bmp_manual/NJ_SWBMP_9.1%20print.pdf**. Additional information regarding grass swale design is available at **www.njstormwater.org/pdf/Grass%20Swale%20after%Public%20Comment%208_19_10.pdf**.





GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: GREEN ROOFS

Green roofs are roofing surfaces that are partly or completely covered with vegetation. Green roofs provide stormwater management by slowing down rainfall and by allowing a portion of the precipitation to be returned to the atmosphere through evapotranspiration. There are two main types of green roofs: extensive and intensive.

HOW IT WORKS:

Precipitation that falls on the green roof is either taken up by the plants, which return it to the atmosphere, or slowly drain through to the planting media into the storage bed and drainage system below. Some of the water that passes through the planting or growing media remains in the soil. The portion that makes it to the storage slowly drains off the roof through a structure. Green roofs have been shown to hold a significant amount of the rainfall that reaches their surface in the summer, but the amount of rainfall which can be taken up by the plants are reduced in the winter.[1] Green roofs decrease stress on storm sewer systems by retaining and delaying the release of stormwater. Non-stormwater related benefits of green roofs include insulation and shading of the building, mitigation of the "urban heat island" effect - a phenomenon that causes cities to be a few degrees warmer than surrounding areas, and reduced air pollution and greenhouse gas emissions.

The major components of a green roof are a waterproof membrane, root barrier, drainage system, planting media and vegetation. An **extensive** green roof is lightweight, includes shallow-rooted drought-resistant plants, typically Sedum species, and requires minimal maintenance. An **intensive** green roof has a thicker layer of growing medium, so it can contain a variety of vegetation, including grasses, ornamentals, flowers and small trees. This type of green roof requires a greater weight bearing capacity and more frequent maintenance. Extensive roofs are the more typical for stormwater management purposes.

CONSIDERATIONS:

Rooftops must be evaluated for suitability in terms of roof load and accessibility for maintenance in advance of installation. Other factors to take into account are the height and the pitch of the roof, as well as construction and maintenance budgets. The best time to install a green roof is either during building construction or when a roof requires replacement.

GREEN INFRASTRUCTURE PRACTICE: GREEN ROOFS

Green Roof - Hopewell Township, Mercer County

[1] www.greenroofs.org/index.php/about/greenroofbenefits

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: PERVIOUS PAVEMENT

Pervious pavement systems are paved surfaces that allow rainwater to infiltrate into underlying soils. There are three types of pervious pavement systems: pervious concrete, porous asphalt and interlocking concrete pavers.

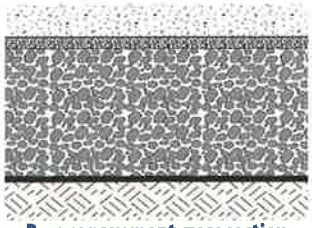
HOW IT WORKS:

Rain that falls on these systems enters an underground storage bed through either pores in the paved surface, as in porous asphalt or pervious concrete, or through gaps between pavers, as in interlocking concrete pavers. Water is held temporarily in the storage area while it slowly percolates into the soil beneath the pervious paving system. Because rainwater is able to flow through this type of pavement, the runoff is treated for pollutants as it passes through the soils; from there it is available to replenish groundwater. In addition, the soils below pervious pavement tend to be wetter than soils underneath traditional pavement. The water in the soil traps heat, so pervious pavement does not freeze as quickly as standard pavement; this can reduce the amount of salt needed for de-icing in the winter.

CONSIDERATIONS:

Because pervious pavement relies on the underlying soils to treat pollutants and to recharge groundwater, these soils must be sandy enough to allow the rainwater to flow through it. Also, because these types of systems ultimately do flow into the groundwater, they should not be used where chemicals that could contaminate groundwater supplies are present.

Additional information regarding the design of pervious pavement is available at **www.njstormwater.org/bmp_manual2.htm**.



Porous pavement cross section

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: STREET TREE TRENCH

A street tree trench is a linear stormwater management feature, typically placed near sidewalks, that combines trees with an underground stormwater management system. On the surface, they look like regular trees with a drain, but an underground stormwater system manages and reduces runoff to provide additional stormwater management.

HOW IT WORKS:

A street tree trench is a combination of tree pits and a subsurface stormwater management system designed to treat runoff entering the tree pit. Most tree trenches incorporate several standard stormwater management BMPs into their design: filtration through a soil media such as in a bioretention basin, subsurface detention, or subsurface infiltration. Stormwater runoff is diverted to the trench by a curb cut, storm drain or permeable concrete sidewalk pavers. The soils typically provide treatment for the runoff before it enters a storage area, where the water is available to the tree roots for uptake. This system reduces pressure on the remainder of the stormwater infrastructure by capturing, filtering and reducing runoff from adjacent impervious areas in underground storage before releasing it or infiltrating it into the soils, if local soils are suitable. If necessary, larger storms can bypass the tree trench.

Aside from capturing stormwater runoff, tree trenches help large canopy trees thrive, which improves air quality, provides additional green space, and helps to mitigate the "urban heat island" effect, which causes cities to be warmer than their surrounding areas.

Information regarding bioretention basin, detention basin and infiltration basin design criteria are available at **www.njstormwater.org/bmp_manual2.htm.**

CONSIDERATIONS:

Street tree trenches should be considered when sidewalks are being replaced or repaired. Sidewalk load bearing requirements must be taken into account during the design process. Sidewalk width should also be considered to ensure that the trench does not encroach on pedestrian traffic. Tree trenches are also an appropriate stormwater management feature for parking lots.

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: RAIN BARREL

Rain Barrels are generally 55-gallon barrels that are placed under a gutter's downspout, which are used to collect rainwater from roofs.

HOW IT WORKS:

Rainwater that falls on a roof flows into gutters, and then enters the rain barrel through the downspout where it is stored for later use. Approximately 500 gallons of that rainwater can come off of an 800-square-foot roof in a one-inch rain storm, so every gallon of that rainwater that can be captured in rain barrels is a gallon of rainwater that does not flow into a storm drain or a stream. This can make a difference in the long-term maintenance of storm sewer systems; it can also make a difference in the amount of runoff that enters nearby streams. In addition, because water captured in rain barrels can be used to irrigate gardens and lawns, it can add up to significant savings on water bills.

CONSIDERATIONS:

A number of pollutants can be deposited on roofs through air deposition, bird droppings and chemicals used to treat roof tiles; therefore, it is important to never consume water collected in rain barrels or use it to wash anything that will later be consumed. Water collected in rain barrels is perfect, however, for water gardens and lawns and for rinsing garden tools. Finally, because mosquitoes need standing water to breed, it is important to always keep your rain barrel covered.

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: RIPARIAN BUFFERS

Riparian buffers are vegetated areas along streams; the vegetation is typically native and is generally a combination of trees, shrubs and grasses.

HOW IT WORKS:

Stormwater runoff flows into the riparian buffer where it slows down and drops its litter and coarser debris; some of this runoff is then either taken up by the plants or is infiltrated into the soils, where chemical and biological reactions occur that treat the pollutants in the runoff. This results in less runoff entering the stream, and the portion of the runoff that does enter the stream is cleaner. It is also moving more slowly; this is important because the slower the water moves, the less likely it is to cause erosion. Slower moving runoff also has a chance to cool down as it goes through the vegetated buffer; this can be important if there are temperature-sensitive species present.

CONSIDERATIONS:

When restoring a riparian buffer, it is important to make sure that the amount of water and the slope into the stream will not cause the buffer to erode. It is also important, when choosing plants for a stream buffer, to select as many native plants as possible. Native plants are less likely to need fertilizer to thrive, and fertilizer should not be applied this close to a waterbody because of the potential for the nutrients to enter the stream where they can act as pollutants.

Additional information regarding the design of riparian buffers for the treatment of stormwater runoff (also known as vegetative filter strips) is available at **www.njstormwater.org/bmp_manual2.htm**.

GREEN INFRASTRUCTURE in New Jersey

PRACTICES

GREEN INFRASTRUCTURE PRACTICE: SUBSURFACE GRAVEL WETLAND

Subsurface gravel wetlands are wetland systems designed to maximize the removal of pollutants, particularly nitrogen, from stormwater runoff through settling, uptake and chemical transformation.

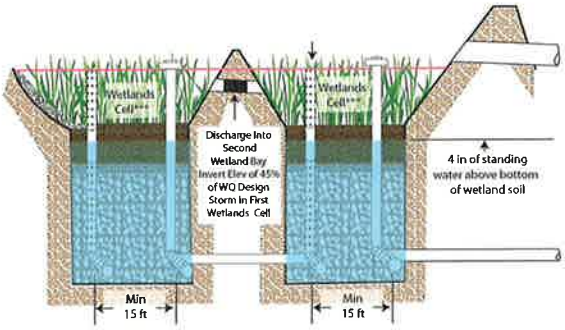
HOW IT WORKS:

These systems consist of two distinct components: the above ground wetland cells and the below ground gravel cell. Stormwater flows into the wetland cell where pollutants are treated through settling and uptake by the wetland plants. Stormwater then slowly enters the underground gravel beds that stores runoff between events. A special type of bacteria grows on the saturated gravel, which breaks down the nitrogen compounds dissolved in the water.

CONSIDERATIONS:

Gravel wetlands are fully lined so they can be constructed in areas with high water tables where other systems would fail. Water should remain in the systems about 24 hours for the best pollutant removal; however, they must be designed so that the runoff drains from the surface wetland cells within 72 hours to prevent mosquito breeding and odor problems.

Additional information regarding the design of subsurface gravel wetlands for the treatment of stormwater runoff is available at **www.njstormwater.org/pdf/gravel_wetlands_barnegat_bay.pdf**.



WILDWOOD CREST
OVERALL PROPOSED STORM DRAINAGE IMPROVEMENTS
Borough of Wildwood Crest
Cape May County, New Jersey
March 2019
Legend
Ex. Storm Manholes
Ex. Storm Sewer Outfalls
Ex. Storm Inlets
Ex. Storm Pipes
Proposed Storm Pipes
Proposed Recharge Storm Pipes
Proposed Manhole
Proposed Inlet
Outfall Elimination
Elevate Roadway Areas
N
S
E
W
PROPOSED FORCE MAIN
NEW CONTROL VALVE
PS
BAYVIEW DRIVE
SUNSET LAKE
PARK BOULEVARD
LAKE ROAD
NEW JERSEY AVENUE
PACIFIC AVENUE
SEAVIEW AVENUE
ATLANTIC AVENUE
OCEAN AVENUE
BEACH AVENUE
PROPOSED STORM PIPE TO PUMP STATION
PROPOSED STORM WATER RECHARGE CHAMBER (TYPICAL)
TOWNSHIP OF LOWER
CITY OF WILDWOOD
JEFFERSON
WASHINGTON
NEWARK
TRENTON
ST. LOUIS
CHARLESTON
PITTSBURGH
TOPEKA
HOLLYWOOD
PRESTON
SYRACUSE
DENVER
TOLEDO
ST. PAUL
MONTEREY
MIAMI
LOUISVILLE
NASHVILLE
ATLANTA
FARRAGUT
STANTON
STOCKTON
ORCHID
RAMBLER
PRIMROSE
MYRTLE
LOTUS
PALM
FERN
FORGET-ME-NOT
ROSEMARY
CYCLAMEN
WISTERIA
SWEET-BRIAR
CARDINAL
ASTER
CROCUS
HEATHER
LAVENDER
BUTTERCUP
MORNING GLORY
CRESSE
ATLANTIC OCEAN
300 150 0 300 Feet
DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

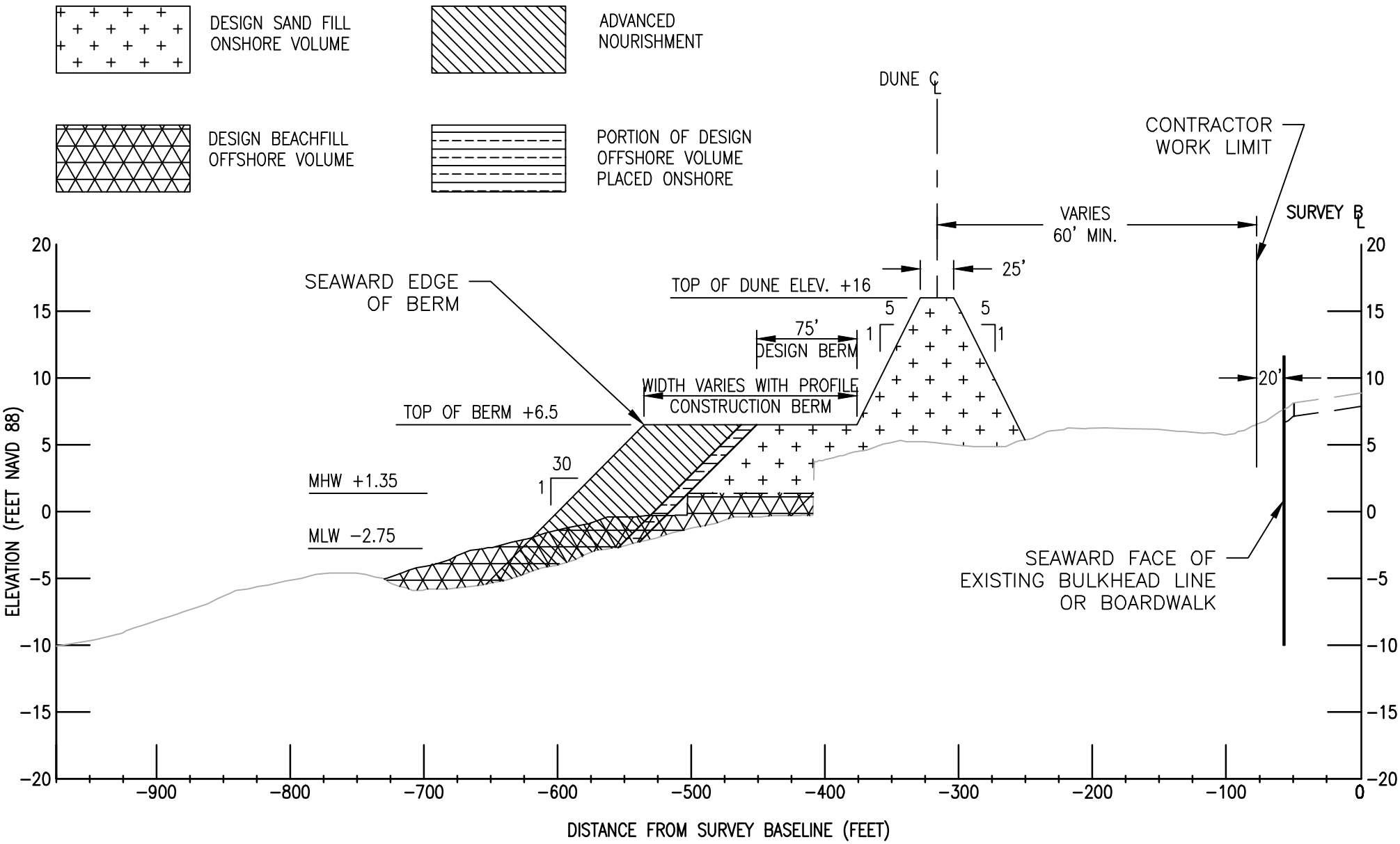
The U.S. Army Corps of Engineers has conducted an Environmental Assessment of the beach and dune system from Hereford Inlet to Cape May Inlet. A plan has been developed that includes backpassing sand from the beaches of Wildwood, Wildwood Crest, and Lower Township to construct a berm and dune to reduce storm damage. Sand from these areas will be utilized to construct a continuous dune and berm along North Wildwood, Wildwood, Wildwood Crest, and Lower Township. The dune will be constructed to an elevation of +16 NAVD88 with a crest width of 25' and a 75' wide berm. The slope for the dune will be 1V:5H and 1:30 for the seaward slope of the berm. The proposed beach dune will replenish the beaches from coastal erosion as well as provide protection to coastal communities.

Through coordinated efforts with coastal communities, the Army Corps has developed a plan that includes approximately 64 acres of dune grass, 28,000 linear feet of sand fence, 44 extended crossovers, 7 new pedestrian crossovers, 6 new handicap crossovers, 8 existing vehicle crossover extensions and 5 new vehicle crossovers. The plan also includes nourishment every four years. The project will include an initial 1,527,250 cubic yards of sand from the borrow zone. After the initial construction, the periodic nourishment would include approximately 391,000 cubic yards of material.

According to the Army Corps' feasibility study, the selected plan has a primary benefit based on hurricane and storm surge reduction. The plan provides an average annual benefit of $3,565,000 with a benefit to cost ratio of 2.3. The area from the Hereford Inlet to Cape May Inlet has two distinct problems. The problems include erosion at the northern portion of the island and the accumulation of sand at the southern portion of the island. As the northern portion erodes, the properties become exposed to storm damage. As the southern portion accumulates sand, municipal outfalls clog and flood interior portions of the island.

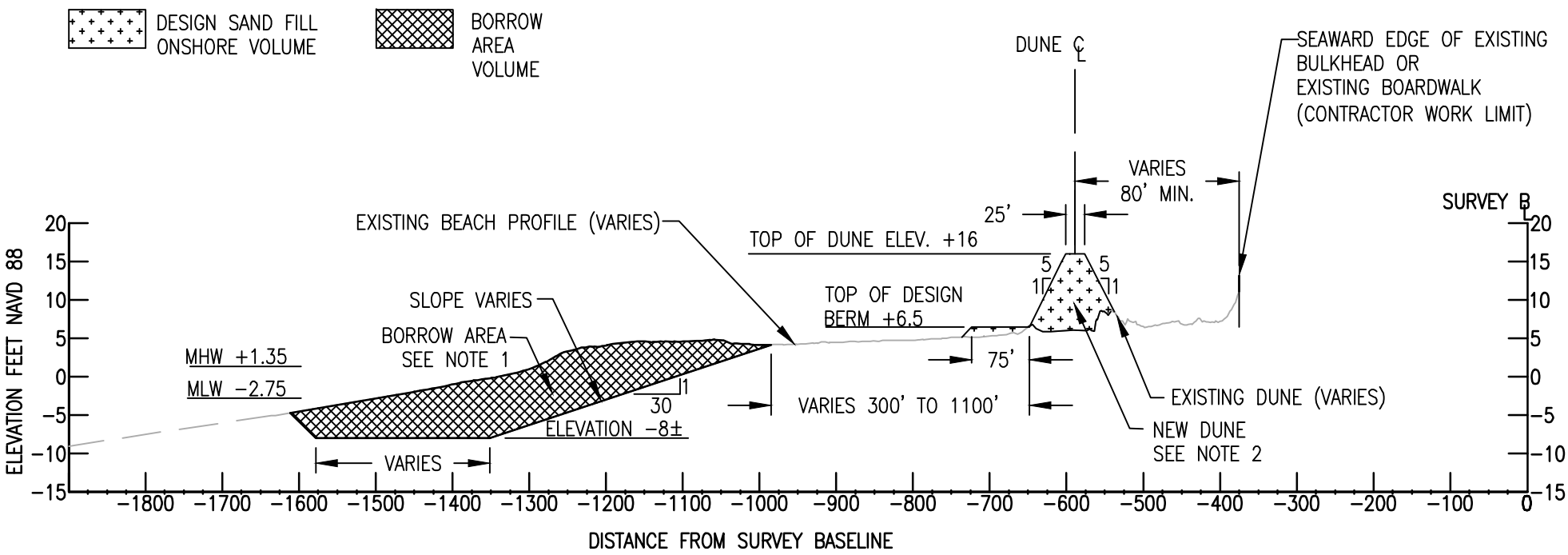
The Borough of Wildwood Crest will see immediate benefits from this project. The plan will provide the Borough with increased protection from storm surge as well as provide residents with added access to the beach. The continued cooperation with the Army Corps is needed to ensure a successful project.

Attached is the typical beachfill design and construction cross section. This includes a typical design from station 0+00 to 85+00, station 85+00 to 240+00, and station 240+00 to 314+03.



HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY

TYPICAL BEACHFILL DESIGN AND CONSTRUCTION CROSS SECTION
STATION 0+00 TO 85+00
ELEVATION +6.5 BERM +16' DUNE ELEVATION
SCALE AS SHOWN IN FEET

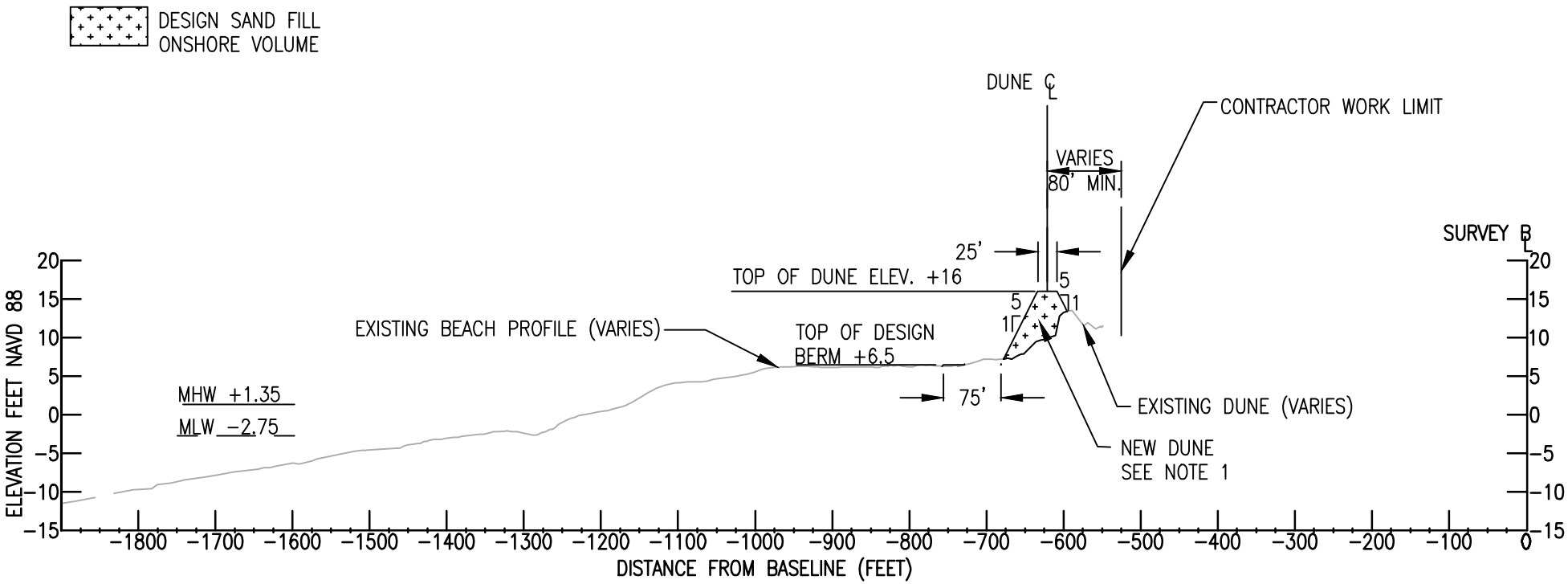


NOTES:
1. EXACT LIMITS OF BORROW AREA MAY VARY FROM THAT SHOWN HERE, BASED ON EXISTING BEACH CONDITIONS AND DREDGING EQUIPMENT SELECTED AT TIME OF CONSTRUCTION.
2. CENTERLINE OF NEW DUNE IS LOCATED ALONG THE SEAWARD EDGE OF THE EXISTING DUNES IN ORDER TO MINIMIZE SAND VOLUME REQUIRED
3. NEW DUNE VEGETATION IS NOT SHOWN.

HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY

TYPICAL DESIGN CROSS SECTION STATION 85+00 TO 240+00
BEACH BORROW AREA WITH ELEVATION +16 DUNE

SCALE AS SHOWN IN FEET



NOTES:
1. CENTERLINE OF NEW DUNE IS LOCATED ALONG THE SEAWARD EDGE OF THE EXISTING DUNES IN ORDER TO MINIMIZE SAND VOLUME REQUIRED.
2. NEW DUNE VEGETATION IS NOT SHOWN.

HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY
TYPICAL DESIGN CROSS SECTION
STATION 240+00 TO 314+03
ELEVATION +16 DUNE
SCALE AS SHOWN IN FEET

MATCHLINE RE: SHEET 2

PLAN NORTH

SURF AVE

SURF AVE

SURF AVE

13TH AVE

12TH AVE

11TH AVE

10TH AVE

9TH AVE

8TH AVE

7TH AVE

6TH AVE

5TH AVE

4TH AVE

3RD AVE

2ND AVE

OCEAN AVE

OCEAN AVE

CONTRACTOR LIMIT OF WORK

LANDWARD LIMIT OF DUNE

30+00

25+00

20+00

15+00

10+00

5+00

0+00

JOHN F. KENNEDY (BEACH DR)

Point #1
E 10,433.29
N 61,453.90

STONE GROIN

PI: 14+23.84

PI: 9+52.56

SEAWARD TOE OF DUNE

CENTERLINE OF DUNE

PROPOSED MLW

OUTFALL

SEAWARD EDGE OF BERM

TOE OF FILL

PROPOSED MHW

MHW 2012

MLW 2012

CELL 1

MATCHLINE RE: SHEET 2

BORROW AREA

NOTES:

1. ALL EXISTING DUNE CROSSOVERS AND BEACH ACCESS POINTS WILL BE EXTENDED OVER THE PROPOSED DUNE. SPREAD SHEET AVAILABLE OF LOCATIONS AND CROSSING TYPE.
2. SAND WILL BE PLACED ON THE SEAWARD SIDE OF ESTABLISHED DUNES. IN ORDER TO REACH PROPOSED HEIGHT.

GRAPHIC SCALE

300 0 150 300 600 900

(IN FEET)

1 inch = 300 ft.

HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY

PLAN – BEACH FILL AND BORROW AREA

PHILADELPHIA DISTRICT, CORPS OF ENGINEERS

SHEET 1 OF 6

MATCHLINE RE: SHEET 3

MAPLE AVE
ENWOOD AVE
OCEAN AVE
POPLAR AVE
MAGNOLIA AVE
JUNIPER AVE
26TH AVE
25TH AVE
24TH AVE
23RD AVE
22ND AVE
21ST AVE
20TH AVE
19TH AVE
18TH AVE
17TH AVE
16TH AVE
15TH AVE
14TH AVE
SURF AVE
SURF AVE
OCEAN AVE

PLAN NORTH

CONTRACTOR LIMIT OF WORK
SEAWARD EDGE OF BERM
TOE OF FILL
POTENTIAL CONTRACTOR LAY DOWN AREA
LANDWARD LIMIT OF DUNE
CONTRACTOR LIMIT OF WORK
PI: 60+04.47
PI: 43+50.87
CENTERLINE OF DUNE
SEAWARD TOE OF DUNE
N: 55905.56
E: 405870.30
OUTFALL
PROPOSED MHW
SEAWARD EDGE OF BERM
TOE OF FILL
CELL 2
OUTFALL
MHW 2012
MLW 2012
N: 55406.10
E: 406355.88

MATCHLINE RE: SHEET 1

BORROW AREA

NOTES:
1. ALL EXISTING DUNE CROSSOVERS AND BEACH ACCESS POINTS WILL BE EXTENDED OVER THE PROPOSED DUNE. SPREAD SHEET AVAILABLE OF LOCATIONS AND CROSSING TYPE.
2. SAND WILL BE PLACED ON THE SEAWARD SIDE OF ESTABLISHED DUNES. IN ORDER TO REACH PROPOSED HEIGHT.

GRAPHIC SCALE
300 0 150 300 600 900
(IN FEET)
1 inch = 300 ft.

HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY

PLAN – BEACH FILL AND BORROW AREA

PHILADELPHIA DISTRICT, CORPS OF ENGINEERS

SHEET 2 OF 6

MATCHLINE RE: SHEET 4

OCEAN AVE

PROPOSED TUNNEL ACCESS

CONTRACTOR LIMIT OF WORK

CENTERLINE OF DUNE

MONSTER TRUCK ACCESS

OCEAN AVE

BEACH PATROL AREA

EXISTING TUNNEL ACCESS

LANDWARD LIMIT OF DUNE

TIE INTO FRONT FACE OF EXISTING DUNES

PROPOSED RV PARKING

POTENTIAL CONTRACTOR LAY DOWN AREA

SEAWARD TOE OF DUNE

POTENTIAL CONTRACTOR LAY DOWN AREA

POTENTIAL CONTRACTOR LAY DOWN AREA

BORROW AREA LIMIT

SEAWARD EDGE OF BERM

TOE OF FILL

LIMIT OF EXCAVATION

OUTFALL

N: 53840.03
E: 403086.59

OUTFALL

LIMIT OF EXCAVATION

TOE OF CUT SLOPE ELEV. -8

PROPOSED MHW

MHW 2012

MLW 2012

PROPOSED MLW

REACH LIMIT OF EXCAVATOR BASED ON 2012 SURVEY DATA

LIMIT OF DISTURBANCE

MLW 2012

BORROW AREA LIMIT

N: 53082.39
E: 403877.58

MATCHLINE RE: SHEET 4

MATCHLINE RE: SHEET 2

RE: SHEET 2

PLAN NORTH

BORROW AREA

NOTES:

1. ALL EXISTING DUNE CROSSOVERS AND BEACH ACCESS POINTS WILL BE EXTENDED OVER THE PROPOSED DUNE. SPREAD SHEET AVAILABLE OF LOCATIONS AND CROSSING TYPE.
2. SAND WILL BE PLACED ON THE SEAWARD SIDE OF ESTABLISHED DUNES. IN ORDER TO REACH PROPOSED HEIGHT.

GRAPHIC SCALE

300 0 150 300 600 900

(IN FEET)

1 inch = 300 ft.

HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY

PLAN – BEACH FILL AND BORROW AREA

PHILADELPHIA DISTRICT, CORPS OF ENGINEERS

SHEET 3 OF 6

MATCHLINE RE: SHEET 5

OCEAN AVE

CONTRACTOR LIMIT OF WORK

TIE INTO FRONT FACE OF EXISTING DUNES

PROPOSED TUNNEL ACCESS

LANDWARD LIMIT OF DUNE

BORROW AREA LIMIT

SEAWARD EDGE OF BERM

TOE OF FILL

CENTERLINE OF DUNE

SEAWARD TOE OF DUNE

PROPOSED RV PARKING AREA

N: 52561.92
E: 400949.11

OUTFALL

TOE OF CUT SLOPE ELEV. -8

PROPOSED MHW

MHW 2012

OUTFALL

PROPOSED MLW

MLW 2012

LIMIT OF DISTURBANCE

REACH LIMIT OF EXCAVATOR
BASED ON 2012 SURVEY DATA

CELL 4

MATCHLINE RE: SHEET 3

PLAN NORTH

BORROW AREA

NOTES:

1. ALL EXISTING DUNE CROSSOVERS AND BEACH ACCESS POINTS WILL BE EXTENDED OVER THE PROPOSED DUNE. SPREAD SHEET AVAILABLE OF LOCATIONS AND CROSSING TYPE.
2. SAND WILL BE PLACED ON THE SEAWARD SIDE OF ESTABLISHED DUNES. IN ORDER TO REACH PROPOSED HEIGHT.

GRAPHIC SCALE

300 0 150 300 600 900

(IN FEET)
1 inch = 300 ft.

HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY

PLAN – BEACH FILL AND BORROW AREA

PHILADELPHIA DISTRICT, CORPS OF ENGINEERS

SHEET 4 OF 6

MATCHLINE RE: SHEET 6

ATLANTIC AVE

SYRACUSE AVE
DENVER AVE
TOLEDO AVE
ST PAUL AVE
MONTEREY AVE
MIAMI AVE
LOUISVILLE AVE
NASHVILLE AVE
ATLANTA AVE
FARRAGUT RD
STANTON RD
STOCKTON RD
ORCHID RD
RAMBLER RD
PRIMROSE RD
MYRTLE RD
LOTUS RD
PALM RD
FERN RD

OCEAN AVE

PLAN NORTH

MATCHLINE RE: SHEET 4

LANDWARD LIMIT OF DUNE
CONTRACTOR LIMIT OF WORK

CENTERLINE OF DUNE

SEAWARD EDGE OF BERM
TOE OF FILL

N: 48176.82
E: 396500.54

BORROW AREA LIMIT, LIMIT OF EXCAVATION

N: 49059.59
E: 397441.63

N: 49401.03
E: 397617.00

SEAWARD TOE OF DUNE

LIMIT OF EXCAVATION

PROPOSED MHW
MHW 2012
OUTFALL
OUTFALL
MHW 2012
OUTFALL
PROPOSED MLW
MLW 2012
MLW 2012

N: 48448.70
E: 398252.06

CELL 5

MATCHLINE RE: SHEET 6

MATCHLINE RE: SHEET 4

BORROW AREA

NOTES:
1. ALL EXISTING DUNE CROSSOVERS AND BEACH ACCESS POINTS WILL BE EXTENDED OVER THE PROPOSED DUNE. SPREAD SHEET AVAILABLE OF LOCATIONS AND CROSSING TYPE.
2. SAND WILL BE PLACED ON THE SEAWARD SIDE OF ESTABLISHED DUNES. IN ORDER TO REACH PROPOSED HEIGHT.

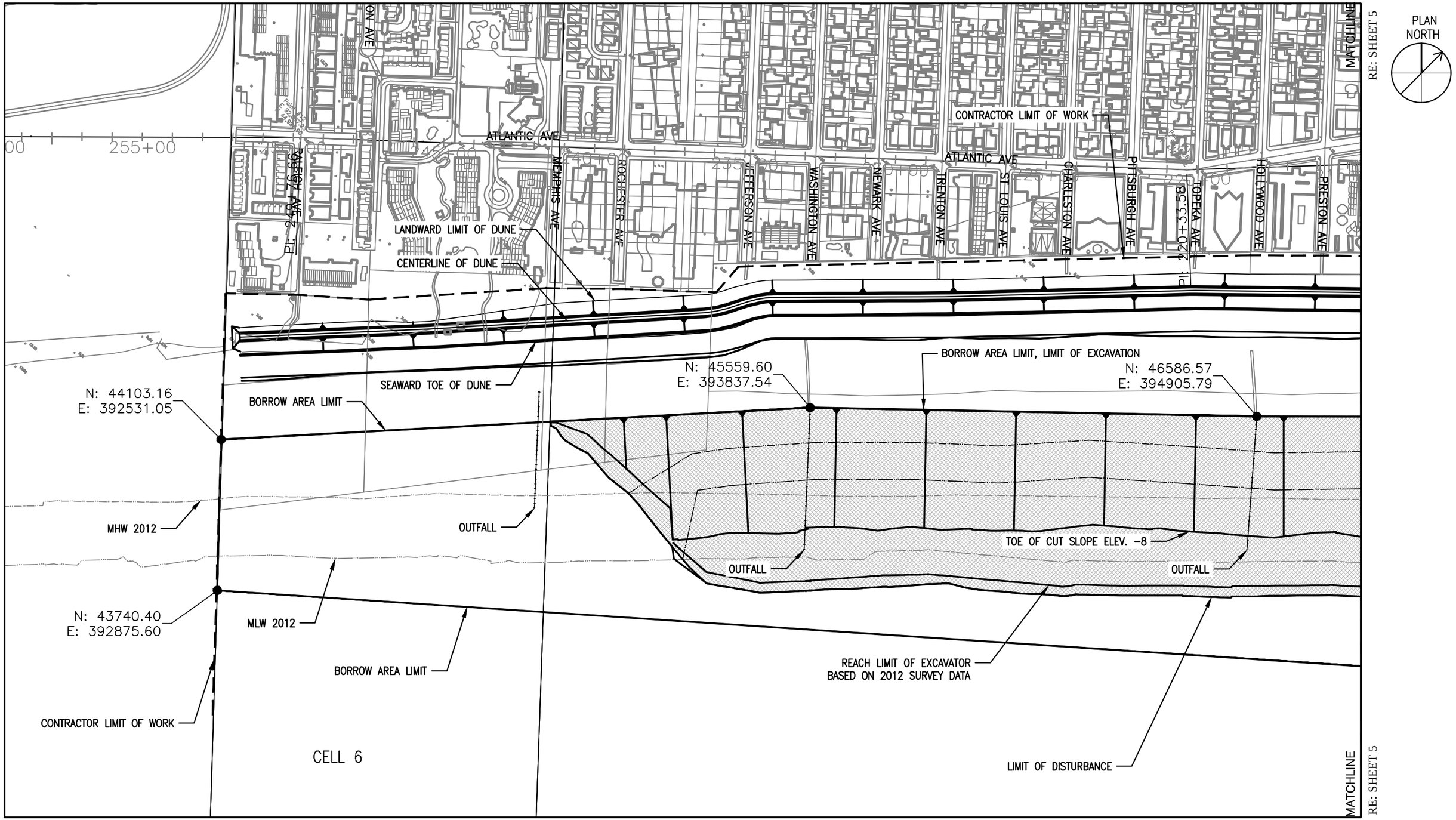
GRAPHIC SCALE
300 0 150 300 600 900
(IN FEET)
1 inch = 300 ft.

HEREFORD INLET TO CAPE MAY INLET FEASIBILITY STUDY

PLAN – BEACH FILL AND BORROW AREA

PHILADELPHIA DISTRICT, CORPS OF ENGINEERS

SHEET 5 OF 6



BORROW AREA

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PLAN – BEACH FILL AND BORROW AREA

PHILADELPHIA DISTRICT, CORPS OF ENGINEERS

SHEET 6 OF 6

The Department of Environmental Protection and the U.S. Army Corps of Engineers are working together to develop and create a comprehensive flood-mitigation strategy for New Jersey's back bay areas. The Army Corps released the "New Jersey Back Bays Coastal Storm Risk Management Interim Report" on February 28, 2019. This report informs coastal communities on strategies to protect communities and ecosystems through structural, non-structural and ecological solutions. "New Jersey is particularly vulnerable to the impacts of sea-level rise caused by climate change," DEP Commissioner Catherine R. McCabe said. "The DEP and the Army Corps are committed to ongoing public dialogue on solutions needed to make our economically vital and environmentally fragile coastline more resilient."

The cooperation of the Borough of Wildwood Crest and these agencies is essential to developing the most effective solutions moving forward. The report developed by the Army Corps provides locations where structures such as barriers, flood walls or levees could be effective but notes that the structures have visual impacts and are costly. Relocation of these structures can often have long-term ecosystem and storm-surge protection benefits.

Another solution outlined in the report includes ecosystem-based solutions such as marsh restoration to restore marshes degraded by sea-level rise. Also, living shorelines can sometimes be utilized as alternatives to hard structures. A living shoreline is an area planted with native plants and shellfish that provides a natural flood buffer.

The report focuses on risk management and damage reduction from coastal storms as well as the engineering, economic, social, and environmental analysis. The most severe storms in New Jersey's history have severely impacted the back bays of coastal communities. The study found in the report gives in-depth analysis of Monmouth, Ocean, Burlington, Atlantic, and Cape May Counties including their interconnected waterways. For more information and detailed analysis, the report can be found online on the U.S. Army Corps of Engineers' website.

NEW JERSEY BACK BAYS COASTAL STORM RISK MANAGEMENT FEASIBILITY STUDY

PUBLIC INFORMATION MEETING
VENTNOR CITY, NJ
SEPTEMBER 12, 2018

NJBB
NEW JERSEY BACK BAYS STUDY

"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."

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Public Information Meeting Purpose

NJBB Study purpose, technical products, and progress

Public and Stakeholder input

- Study analyses and products
- Study process and schedule
- Management measures
- Other pertinent information relevant to study

Public and Shareholder collaboration towards community coastal resilience in a regional, systems context

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State of New Jersey
Shore Protection Program

State of New Jersey
Philip Murphy, Governor

Department of Environmental Protection
Catherine McCabe, Commissioner

Engineering & Construction
David Rosenblatt, Assistant Commissioner

Division of Coastal Engineering
William Dixon, Director

US Army Corps of Engineers.

Division of Coastal Engineering

Purpose

To administer beach nourishment and coastal storm risk management projects throughout the State to:

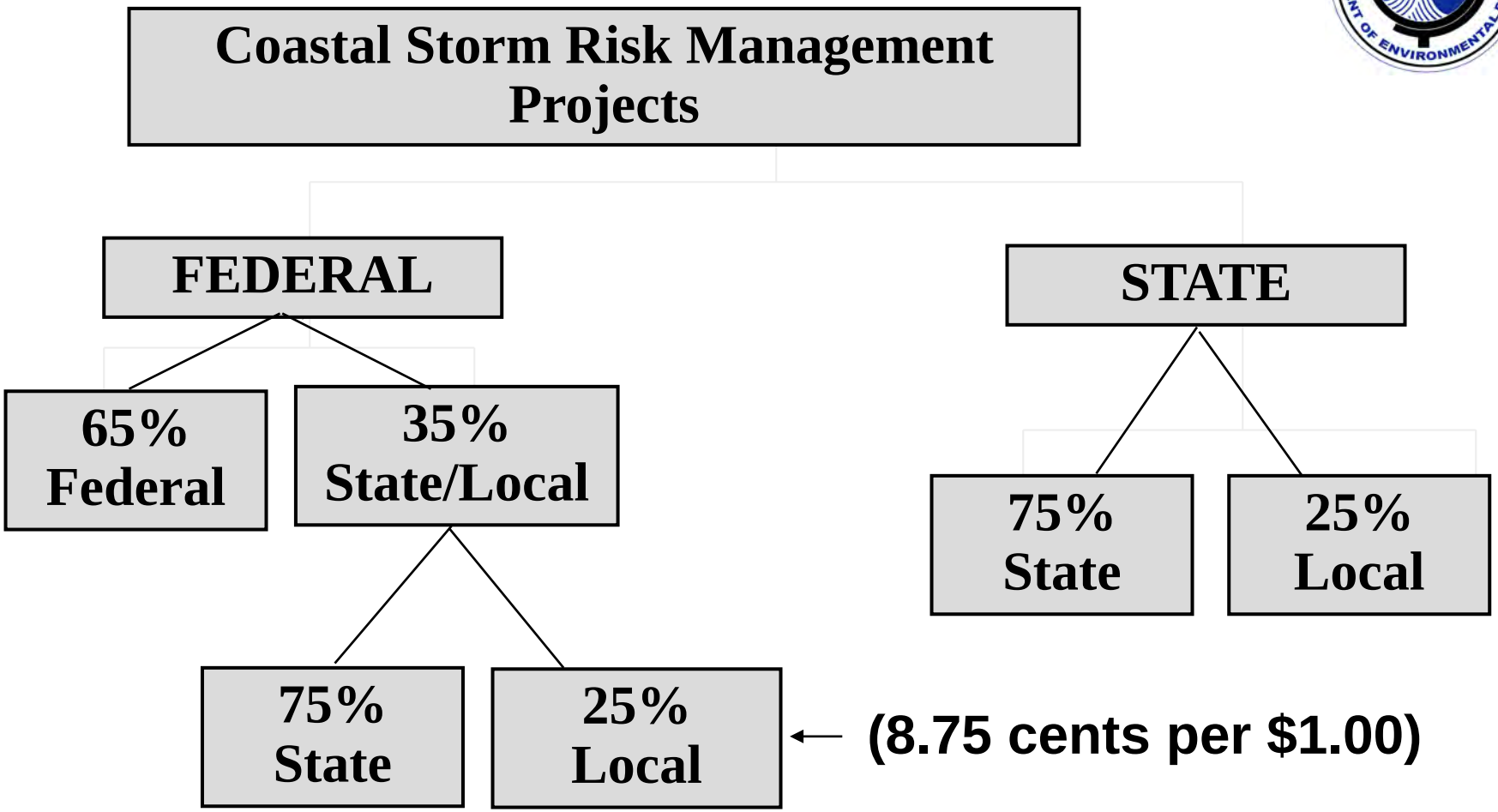
…Provide for protection of life and property along the coast
…Preserve New Jersey's vital coastal resources
…Maintain safe and navigable waterways

Shore Protection Fund is Dedicated…

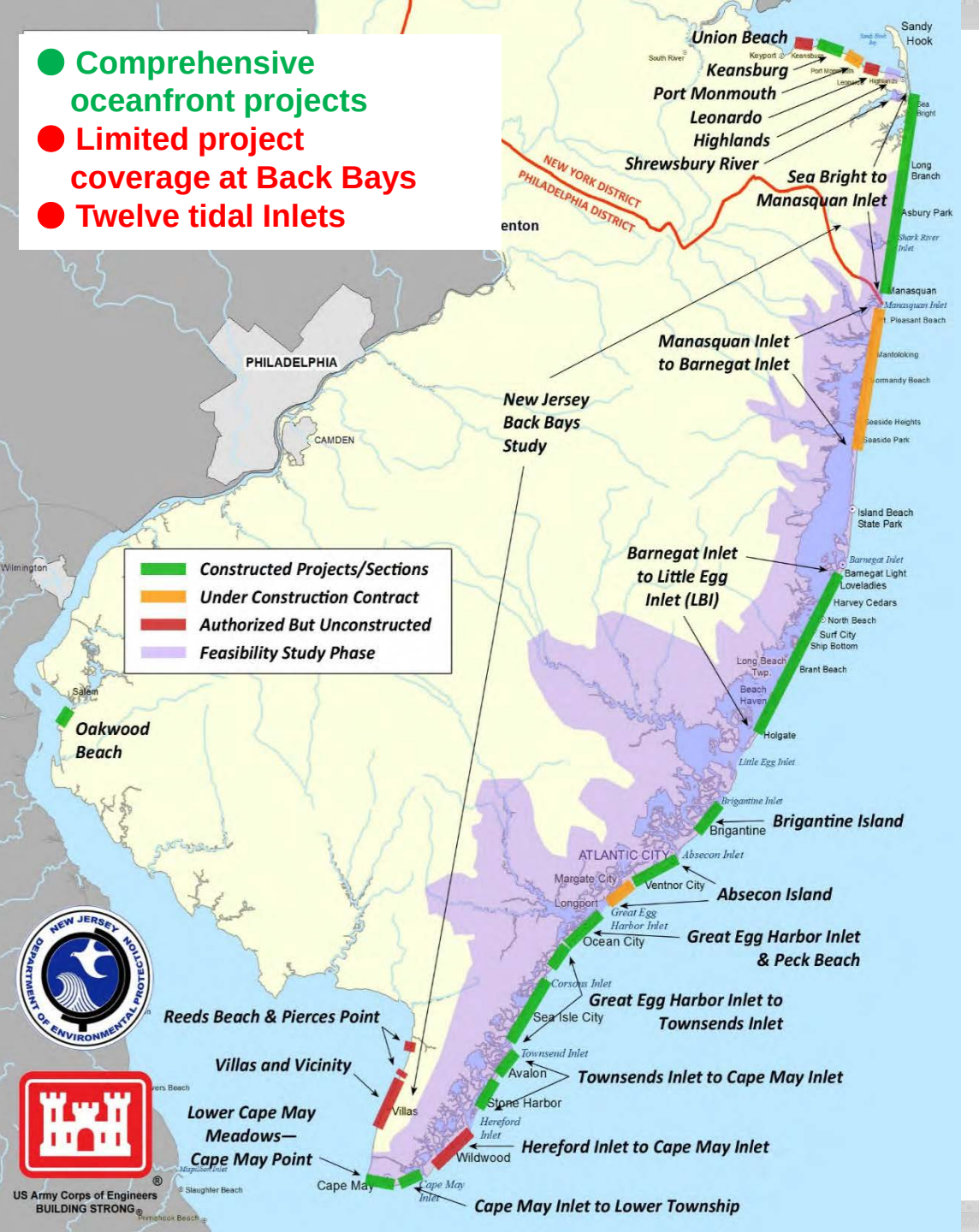
"To protect existing development and infrastructure from storm surges, sea-level rise, and shoreline migration, through dune creation and maintenance, beach nourishment projects and construction and repair of shore protection structures."

$25 million dedicated annually
Realty Transfer Tax (N.J.S.A. C. 13:19-16.1)

Typical Cost Share Breakdown



← (8.75 cents per $1.00)



Study Goals

- Coastal flooding and sea level rise risk management
- Reduce damages that affect population, property and infrastructure, and ecosystems
- Implement system-wide structural, nonstructural, natural and nature-based solutions
- Scaled and incrementally implementable construction opportunities

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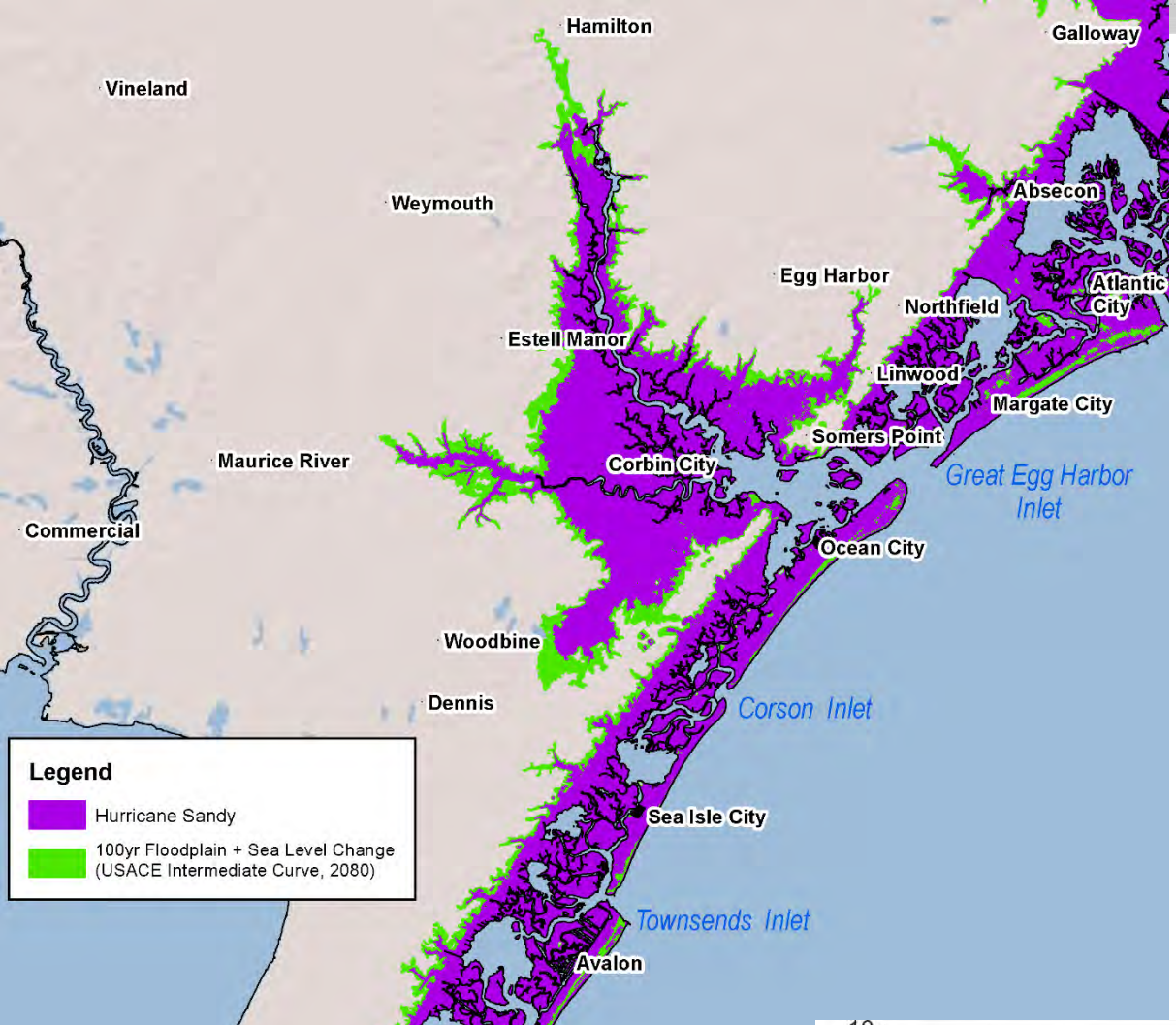
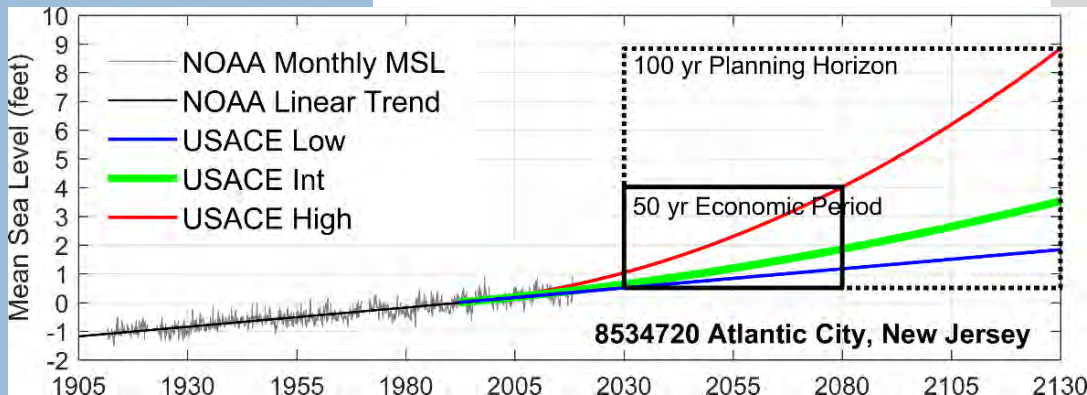
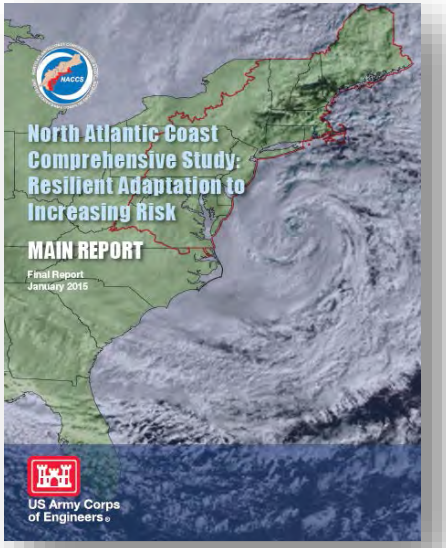
- Hurricane Sandy (October 2012) Mantoloking, NJ
- USACE North Atlantic Coast Comprehensive Study
- Focus Area Studies

Southern Study Area Inundation Map with Sea Level Rise





Challenge: Tough Choices



"Addressing these problems requires a paradigm shift in how we work, live, travel, and play in a sustainable manner as the extent of the area at very high risk of coastal storm damage expands."

Preface

TOUGH CHOICES

The North Atlantic Coast is a dynamic environment that supports densely populated areas encompassing trillions of dollars of largely fixed public, private, and commercial investment. Hurricane Sandy made us acutely aware of our vulnerability to coastal storms and the potential for future, more devastating events due to changing sea levels and climate change. Changing sea levels represent an inexorable process causing numerous, significant water resource problems such as: increased, wide-spread flooding along the coast; changes in salinity gradients in estuarine areas that impact ecosystems; increased inundation at high tide; decreased capacity for stormwater drainage; and declining reliability of critical infrastructure services such as transportation, power, and communications. Addressing these problems requires a paradigm shift in how we work, live, travel, and play in a sustainable manner as the extent of the area at very high risk of coastal storm damage expands.

Resilience

The Army Corps of Engineers applies **resilience thinking** through **four principles** that spring from the following definition of resilience:

*"the ability to anticipate, **prepare** for, and **adapt** to changing conditions and **withstand, respond to**, and **recover** rapidly from disruptions."*

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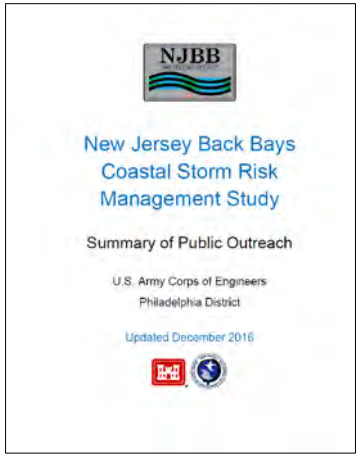
Study Accomplishments

- Public, Stakeholder and agency meeting input incorporation
- Technical analyses
  - Management measure and alternative plan screening/formulation
  - Economic modeling and benefit calculations
  - Storm surge barrier hydrodynamic modeling
  - Natural and Nature Based Features incorporation
  - Sea Level change and risk informed decision making
- Environmental impact/NEPA compliance path forward
- Robust review process framework commenced
- Garnered Congressional, Army Corps & State of NJ Support
- Study funding stream authorized and appropriated

Public Outreach Summary


NJBB

New Jersey Back Bays
Coastal Storm Risk
Management Study

Summary of Public Outreach

U.S. Army Corps of Engineers
Philadelphia District

Updated December 2016

US Army Corps of Engineers.

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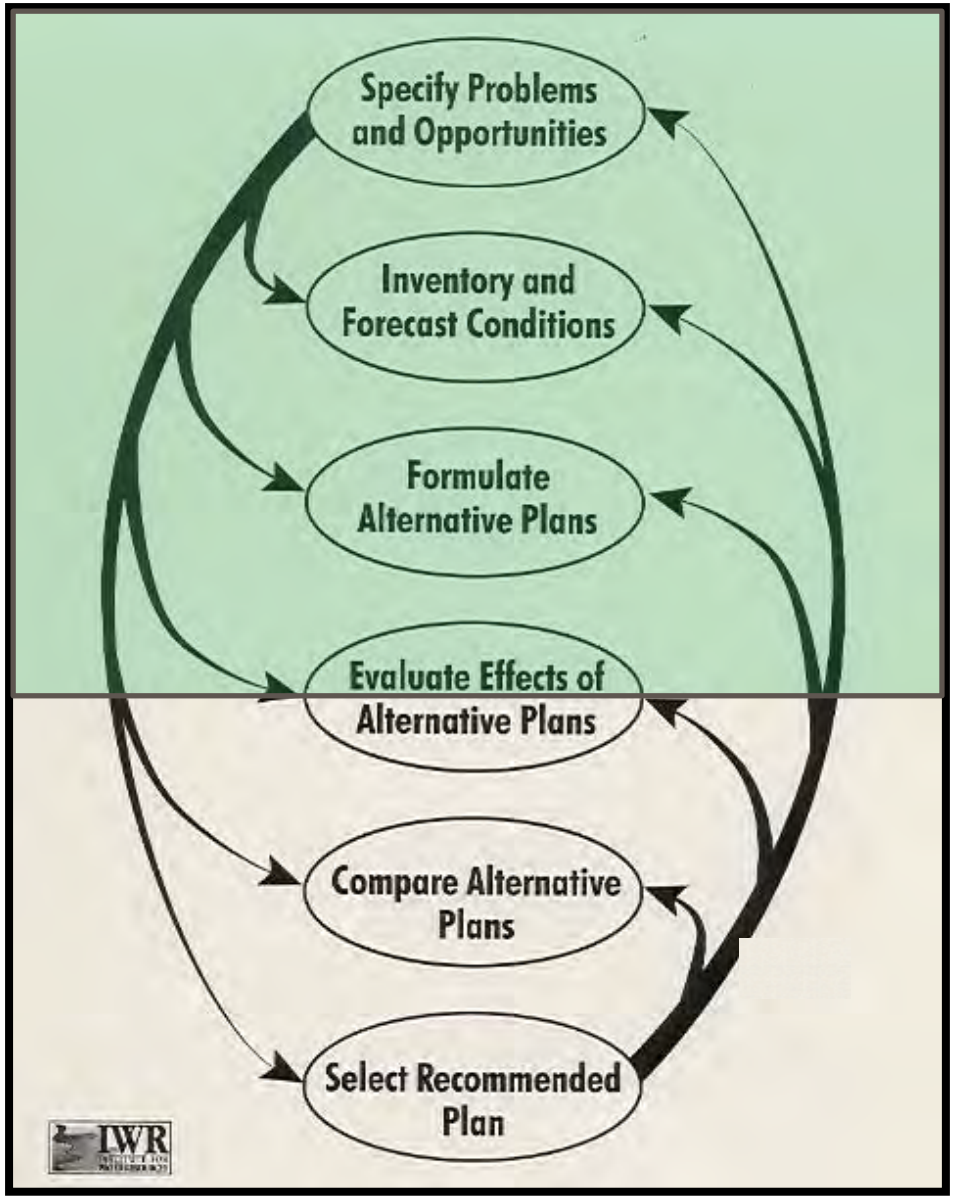
Six Step Planning Process



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Overall Study Strategy

Management measure screening process complete

Storm Surge Barrier hydrodynamic modeling

Floodwalls/Levees

Nonstructural

Natural and Nature Based Features (NNBF) inclusion

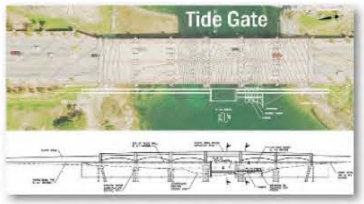
Hybrid Plan Development

- Economics
- Construction costs
- Hydrodynamic modeling
- Design
- Risk and uncertainty analyses
- Environmental Analyses
  - NEPA Compliance/impacts
  - Assess mitigation needs
  - Agency coordination

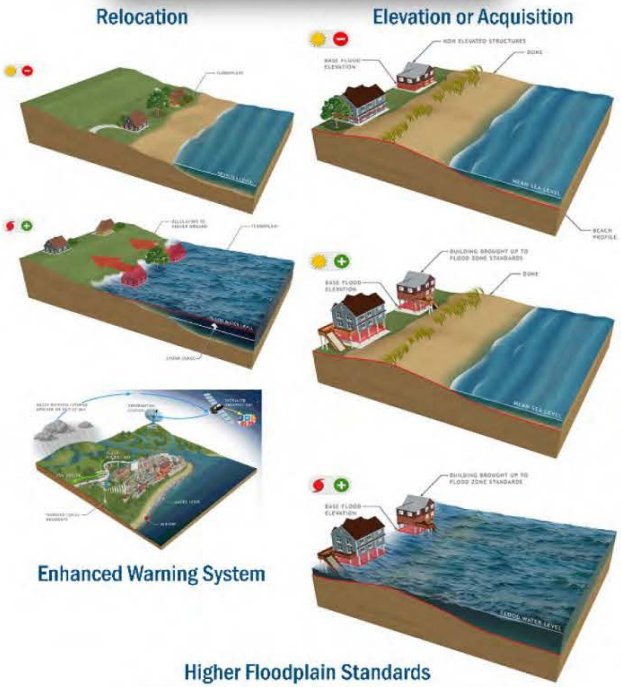
Final selected plan will address high risk areas

MANAGEMENT MEASURES FOR CONSIDERATION

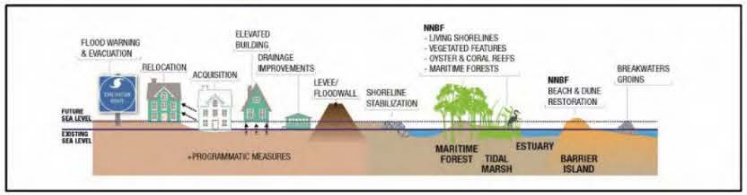
Structural



Non-structural



Natural and Nature-based



U.S. Army Corps of Engineers Philadelphia District

NJBB

NJDEP

Preliminary Component Attribute Comparison

	Storm Surge Barriers	Floodwalls & levees	Non structural	Natural and nature based features
Coastal storm risk management	High	High	Medium	Low
Residual risk reduction	Medium	High	Low	Medium
Environmental/water quality impacts	Medium	Medium	Low	Low
Local construction/aesthetic impacts	Low	High	Medium	Low

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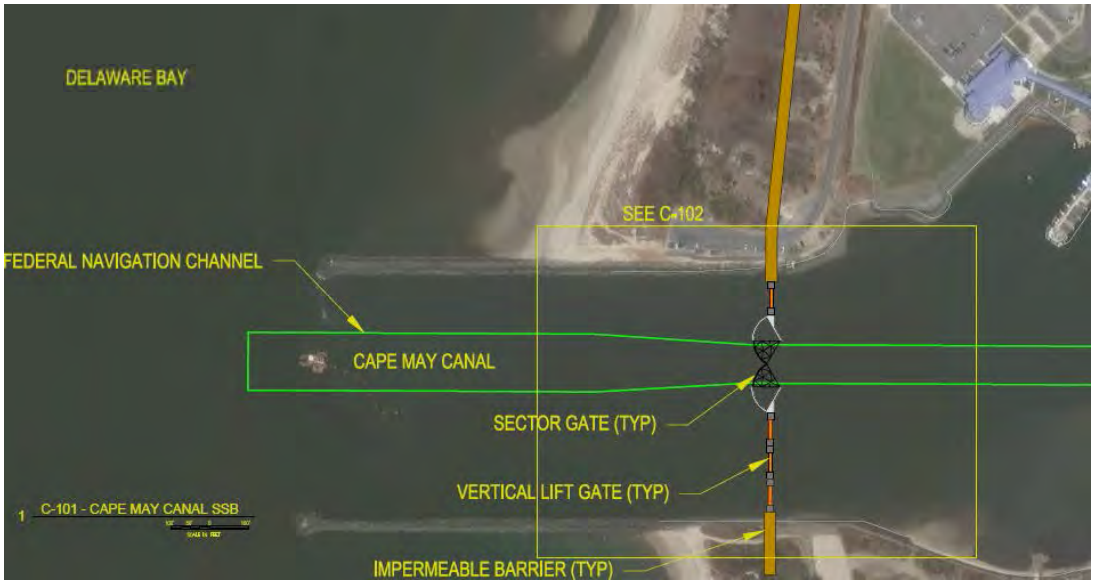
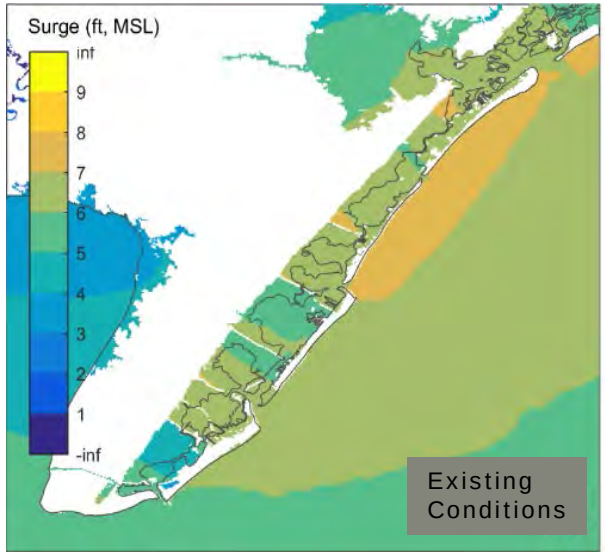
Structural Measure – Storm Surge Barriers

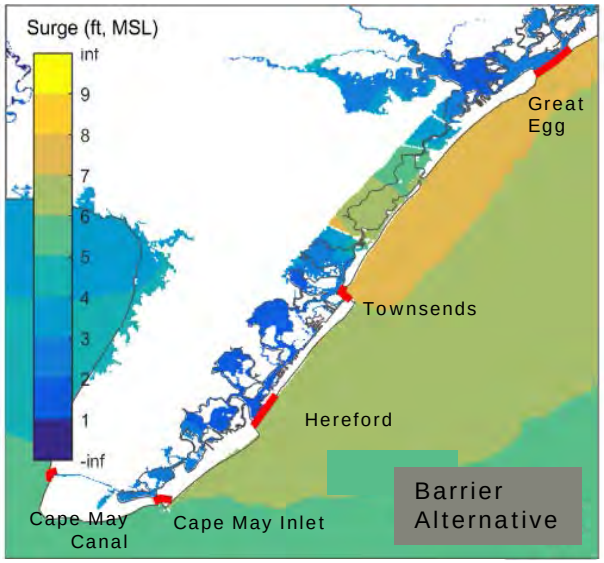
Seabrook - New Orleans, LA

Example at Cape May Canal, NJ

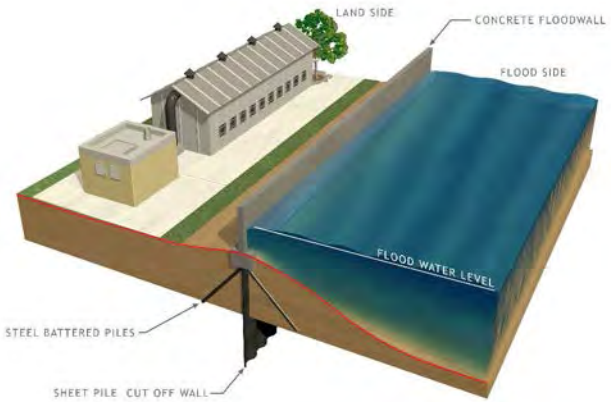


Modeling

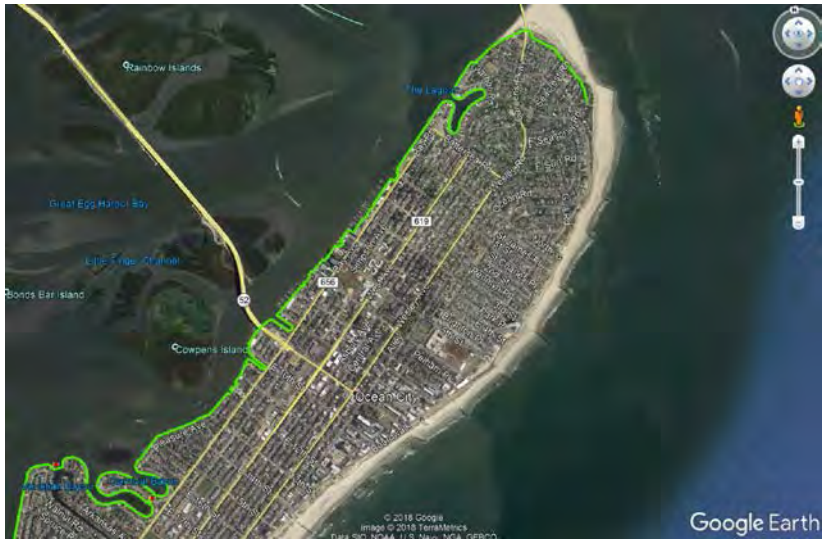




Structural Measure – Floodwalls & Levees

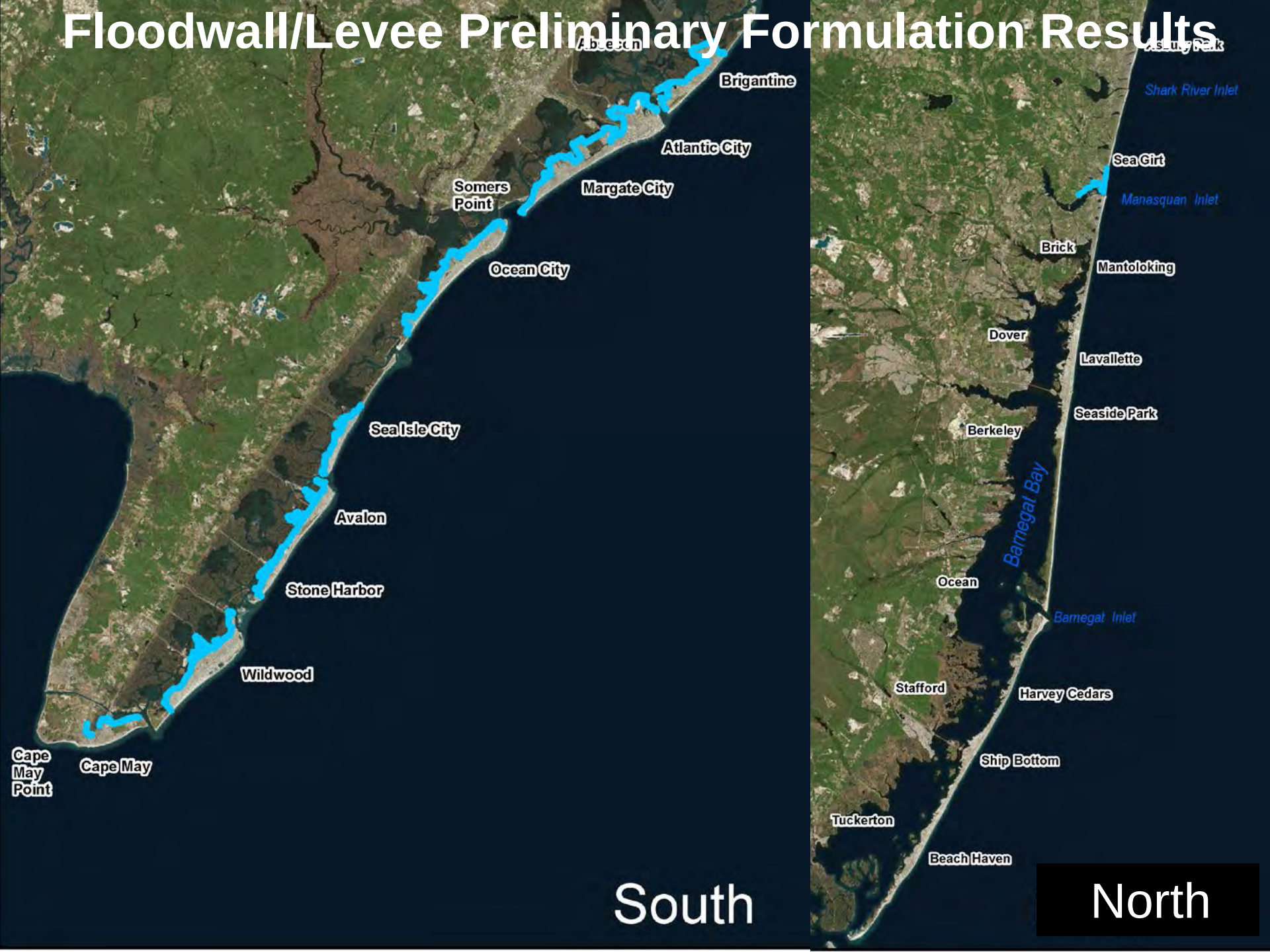


Floodwall & Levee Example at Ocean City, NJ



Visual Impacts

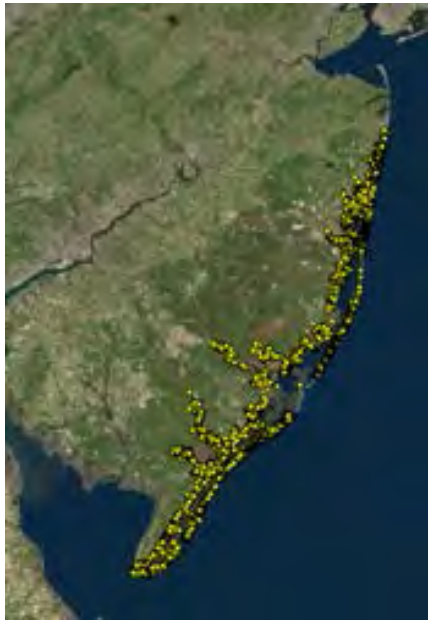
Floodwall/Levee Preliminary Formulation Results



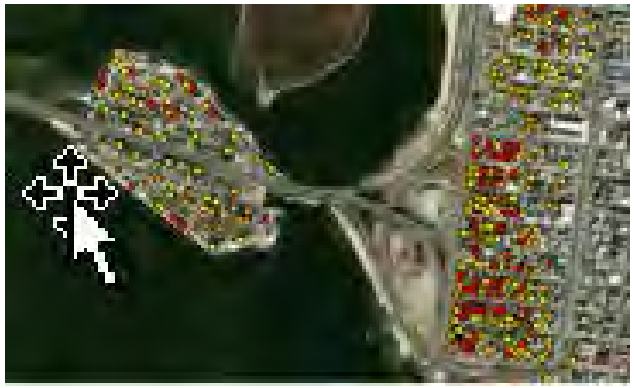
Nonstructural Analyses

- **Primary Nonstructural measures**
  - **Building retrofit (elevation, floodproofing, ring walls)**
  - **Acquisition and relocation**
- **Formulation process**
  - **Develop structure inventory**
  - **Identify Design Flood Elevation (DFE) = FEMA BFE + 3 feet**
  - **Isolate residential structures by floodplain**
  - **Discount previously elevated structures**
- **Recommended in combination with structural measures to formulate economically justified hybrid plans**

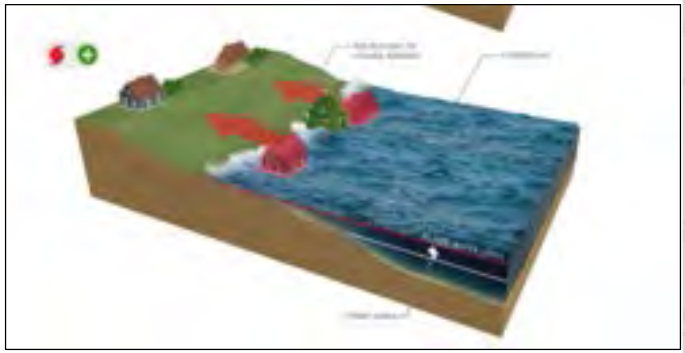
Building Retrofit



Develop structure inventory



Isolate structures by floodplain



Acquisition/Relocation

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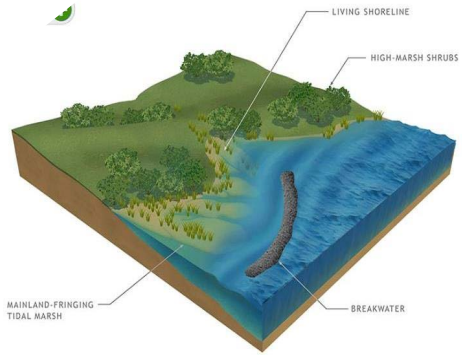
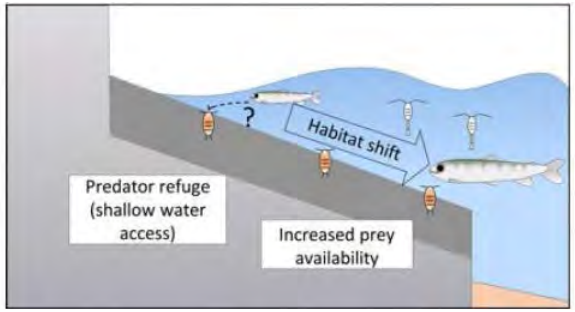
Natural and Nature Based Features (NNBF)

- **Primary NNBF measure under consideration is living shorelines. Current criteria for this measure include:**
  - **Unarmored shorelines adjacent to infrastructure**
  - **Complementary to structural measures such as floodwalls and levees**
- **NJBB study is also considering modifications that can be made to structural measures that can increase their habitat value:**
  - **Habitat benches to restore more natural slope along shorelines**
  - **Textured concrete to support colonization of algae and invertebrates**



Construction of living shoreline in Camp Pecometh, MD



Conceptual diagram of habitat bench

Textured concrete

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System of Economic Accounts

National Economic Development (NED)	• The National Economic Development criteria examines the return per dollar spent and optimizes the balance between construction and implementation cost and coastal storm damages reduced. (See figure to right)
Regional Economic Development (RED)	• Regional Economic Development considers the changes in regional economic activity that result from each alternative plan. • Regional income and regional employment are two factors that are included in regional economic development
Environmental Quality (EQ)	• Environmental Quality criteria includes both beneficial and adverse changes in the ecological, aesthetic, and cultural attributes of natural and cultural resources
Other Social Effects	• Other social effects include urban and community impacts; life, heath, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation. • Other criteria can be added to this category based on feedback from stakeholders.

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USACE Economic Analysis

- **Analyze proposed project effectiveness:**
  - **Estimate coastal storm damages over next 50 years if no action taken**
  - **Estimate coastal storm damages with proposed project in place**
  - **Compare damages reduced with project cost to measure justifiability**

- **Maximize National Economic Development (NED) Benefits**

Net Average Annual NED Benefits =

Avg. Ann. NED Benefits – Avg. Ann. NED Costs

Benefit-Cost Ratio =

Avg. Ann. NED Benefits / Avg. Ann. NED Costs

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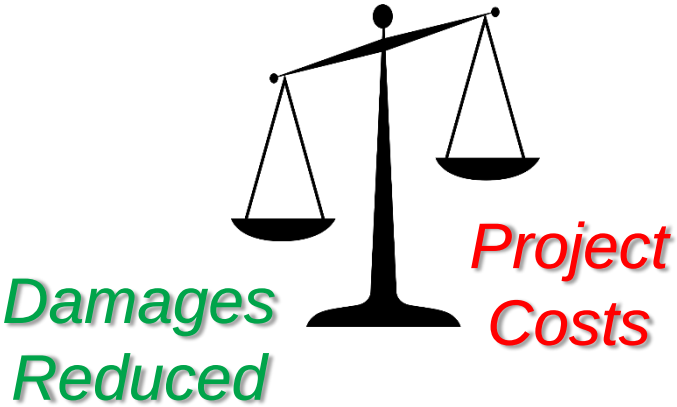
Balancing Economic Benefits and Construction Costs

NED Benefits (Damage Reduction)

- Structure Damages
- Content Damages
- Infrastructure Damages
- Vehicle Damages
- Land Value Losses
- Income Losses
- Emergency Costs
- Transportation Delays
- Recreation Losses
- Benefits During Construction

NED Costs

- Construction
- Real Estate
- Environmental Mitigation
- Operation and Maintenance
- Interest During Construction
- Additional Miscellaneous Costs



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Stakeholder/Public Coordination and Collaboration

2016

JUNE
Stakeholder Workshops

NOVEMBER
NEPA Scoping Letter

DECEMBER
Public Meeting

2017

DECEMBER
Federal Register Notice of Letter of Intent for Environmental Impact Statement

2018

MARCH
Cooperating Agency Letters

MAY – JUNE
Local Elected Officials Meetings

MAY – OCTOBER
Environmental Agency Coordination Meetings

SEPTEMBER
Stakeholder / Public Meetings

Feasibility Study Process

SCOPING 3-6 Months → **ALTERNATIVE FORMULATION & ANALYSIS** → **FEASIBILITY-LEVEL ANALYSIS** → **CHIEF'S REPORT**

1

APRIL 2016

Scoping

Executed Cost-Sharing Agreement

Identify study objectives

Define Problems & Opportunities

NEPA Scoping

Inventory & Initial Forecast

Formulate Alternative Plans

Evaluate alternatives and identify preliminary array

Develop Project Mgt Plan and Review Plan

2

DECEMBER 2016

Alternative Milestone

Army Corps concurrence on preliminary array of alternatives

3

DECEMBER 2018

TSP Milestone

Army Corps concurrence on Tentatively Selected Plan (TSP)

4

SPRING 2019

Release Draft Report for Concurrent review

Study Exemption Submittal

5

2021

Final Integrated Feasibility Report & Environmental Impact Statement

Completes the Feasibility Phase

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Design & Construction Process

POST CHIEF'S REPORT

6

2022

WRDA Bill Authorization & Congressional Approval

7

2022

Construction Funds Appropriation

8

2023

Preconstruction Engineering & Design Initiation

9

2026

Incremental Construction Commencement

10

2027

Monitor & Adapt

* Dates tentative pending funding

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NEPA Environmental Compliance Process

Completed

Begin National Environmental Policy Act (NEPA) Scoping

Public, Agency and Stakeholder Involvement

Identify:
- Problems & Needs
- Affected Environment
- Alternatives

Evaluate and Compare Alternatives

Public Meeting
SEPTEMBER 2018

Next Steps

Tentatively Selected Plan (TSP)

Preliminary Impact Evaluation

Prepare Draft Interim Report and Environmental Scoping Document for Public and Agency Review

3x3x3
Exemption Approval
SPRING 2019

Post Exemption

Evaluate Public and Agency Comments on Environmental Scoping Document

Revise TSP
(if necessary)

Continue Detailed Env. Investigations and Modeling

Prepare Draft Env. Impact Statement (EIS)

Public and Agency Review of EIS

Evaluate Draft EIS Comments

Verify Compliance w/ Env. Statutes

Prepare Final Integrated Feasibility Report and EIS / Draft Record of Decision
2021

Agency Coordination and Compliance

National Environmental Policy Act (NEPA)

Environmental Impact Statement

Cooperating Agencies:
USACE/USEPA/USFWS/NMFS

Endangered Species Act
USFWS/NMFS

Clean Water Act
Sections 401, 402 & 404
USACE/USEPA/NJDEP

Rivers and Harbors Act
USACE

Clean Air Act
USEPA/NJDEP

CERCLA
USEPA/NJDEP

National Historic Preservation Act
NPS/ACHP/ SHPO

Executive Orders
11988 Floodplains
11990 Wetlands
12989 Env. Justice

Wild and Scenic Rivers Act
USDOI-NPS

Coastal Barrier Resources Act
USFWS

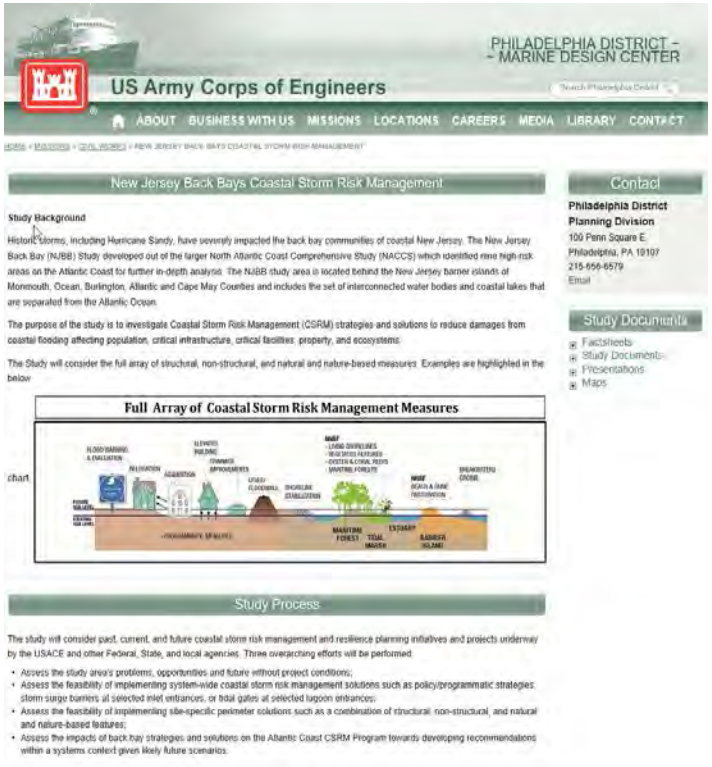
Coastal Zone Management Act
NOAA/NJDEP

Magnuson-Stevens Act
(Essential Fish Habitat)
NMFS

Fish and Wildlife Coordination Act
USFWS/NMFS

Comments & Questions

- **Video of meetings, presentation and background material posted on New Jersey Back Bays Webpage next week**
- **Detailed comments can be submitted by comment form, email or in writing**
  - **PDPA-NAP@usace.army.mil**
  - **U.S. Army Corps of Engineers, Planning Division, 100 Penn Square East, Philadelphia, PA 19107**
- **Please limit individual questions and comments to two minutes during Discussions**
- **http://www.nap.usace.army.mil/ (NJBB link under "Current Issues")**



USACE NJBB Webpage

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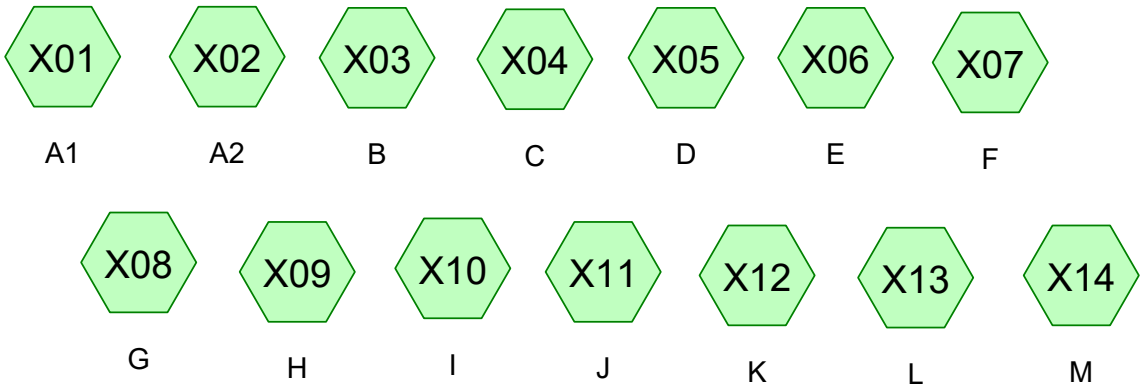
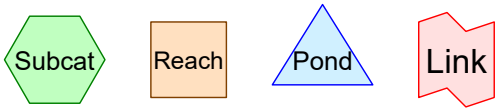
The New Jersey Coastal Coalition is a non-profit organization, incorporated in the State of New Jersey. Their mission is to build a more resilient community at the Jersey Shore through policies and practices that anticipate future concerns. The policies and practices developed and discussed are shared by all participants. The organization recognizes the damaging effect of coastal storm events. The organization was formed after the 2012 Superstorm Sandy and have met regularly since January 2013.

The meetings are usually help on the first Thursday of the month at various locations. The meetings include elected officials, County and Municipal staff as well as selected professionals. Participants include coastal communities throughout New Jersey. Ideas are discussed and shared between communities.

The Borough of Wildwood Crest should continue their participation in this organization. It is beneficial for the communities to work together to develop the best possible policies and practices.

EXISTING DRAINAGE AREA CALCULATIONS





Routing Diagram for 19-0221_Existing_A-M
Prepared by {enter your company name here}, Printed 2/27/2019
HydroCAD® 10.00-24 s/n 07298 © 2018 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentX01: A1 Runoff Area=34.910 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.58 cfs 2.488 af

SubcatchmentX02: A2 Runoff Area=27.200 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.13 cfs 1.938 af

SubcatchmentX03: B Runoff Area=50.550 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=9.53 cfs 3.602 af

SubcatchmentX04: C Runoff Area=34.830 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.57 cfs 2.482 af

SubcatchmentX05: D Runoff Area=29.000 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.47 cfs 2.066 af

SubcatchmentX06: E Runoff Area=9.740 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.84 cfs 0.694 af

SubcatchmentX07: F Runoff Area=1.220 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.23 cfs 0.087 af

SubcatchmentX08: G Runoff Area=15.020 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.83 cfs 1.070 af

SubcatchmentX09: H Runoff Area=2.830 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.53 cfs 0.202 af

SubcatchmentX10: I Runoff Area=0.230 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.04 cfs 0.016 af

SubcatchmentX11: J Runoff Area=16.890 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.18 cfs 1.204 af

SubcatchmentX12: K Runoff Area=1.690 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.32 cfs 0.120 af

SubcatchmentX13: L Runoff Area=4.060 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.77 cfs 0.289 af

SubcatchmentX14: M Runoff Area=17.200 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.24 cfs 1.226 af

Total Runoff Area = 245.370 ac Runoff Volume = 17.484 af Average Runoff Depth = 0.86"
62.00% Pervious = 152.129 ac 38.00% Impervious = 93.241 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentX01: A1 Runoff Area=34.910 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=11.14 cfs 4.154 af

SubcatchmentX02: A2 Runoff Area=27.200 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=8.68 cfs 3.237 af

SubcatchmentX03: B Runoff Area=50.550 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=16.13 cfs 6.015 af

SubcatchmentX04: C Runoff Area=34.830 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=11.11 cfs 4.145 af

SubcatchmentX05: D Runoff Area=29.000 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=9.25 cfs 3.451 af

SubcatchmentX06: E Runoff Area=9.740 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.11 cfs 1.159 af

SubcatchmentX07: F Runoff Area=1.220 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.39 cfs 0.145 af

SubcatchmentX08: G Runoff Area=15.020 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=4.79 cfs 1.787 af

SubcatchmentX09: H Runoff Area=2.830 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.90 cfs 0.337 af

SubcatchmentX10: I Runoff Area=0.230 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.07 cfs 0.027 af

SubcatchmentX11: J Runoff Area=16.890 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.39 cfs 2.010 af

SubcatchmentX12: K Runoff Area=1.690 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.54 cfs 0.201 af

SubcatchmentX13: L Runoff Area=4.060 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.30 cfs 0.483 af

SubcatchmentX14: M Runoff Area=17.200 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.49 cfs 2.047 af

Total Runoff Area = 245.370 ac Runoff Volume = 29.198 af Average Runoff Depth = 1.43"
62.00% Pervious = 152.129 ac 38.00% Impervious = 93.241 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentX01: A1 Runoff Area=34.910 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=15.55 cfs 5.766 af

SubcatchmentX02: A2 Runoff Area=27.200 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=12.11 cfs 4.492 af

SubcatchmentX03: B Runoff Area=50.550 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=22.51 cfs 8.349 af

SubcatchmentX04: C Runoff Area=34.830 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=15.51 cfs 5.753 af

SubcatchmentX05: D Runoff Area=29.000 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=12.91 cfs 4.790 af

SubcatchmentX06: E Runoff Area=9.740 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=4.34 cfs 1.609 af

SubcatchmentX07: F Runoff Area=1.220 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.54 cfs 0.201 af

SubcatchmentX08: G Runoff Area=15.020 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.69 cfs 2.481 af

SubcatchmentX09: H Runoff Area=2.830 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.26 cfs 0.467 af

SubcatchmentX10: I Runoff Area=0.230 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.10 cfs 0.038 af

SubcatchmentX11: J Runoff Area=16.890 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=7.52 cfs 2.790 af

SubcatchmentX12: K Runoff Area=1.690 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.75 cfs 0.279 af

SubcatchmentX13: L Runoff Area=4.060 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.81 cfs 0.671 af

SubcatchmentX14: M Runoff Area=17.200 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=7.66 cfs 2.841 af

Total Runoff Area = 245.370 ac Runoff Volume = 40.525 af Average Runoff Depth = 1.98"
62.00% Pervious = 152.129 ac 38.00% Impervious = 93.241 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment X01: A1 Runoff Area=34.910 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=22.53 cfs 8.350 af

Subcatchment X02: A2 Runoff Area=27.200 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=17.55 cfs 6.506 af

Subcatchment X03: B Runoff Area=50.550 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=32.62 cfs 12.091 af

Subcatchment X04: C Runoff Area=34.830 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=22.48 cfs 8.331 af

Subcatchment X05: D Runoff Area=29.000 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=18.71 cfs 6.937 af

Subcatchment X06: E Runoff Area=9.740 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.29 cfs 2.330 af

Subcatchment X07: F Runoff Area=1.220 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.79 cfs 0.292 af

Subcatchment X08: G Runoff Area=15.020 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=9.69 cfs 3.593 af

Subcatchment X09: H Runoff Area=2.830 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.83 cfs 0.677 af

Subcatchment X10: I Runoff Area=0.230 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=0.15 cfs 0.055 af

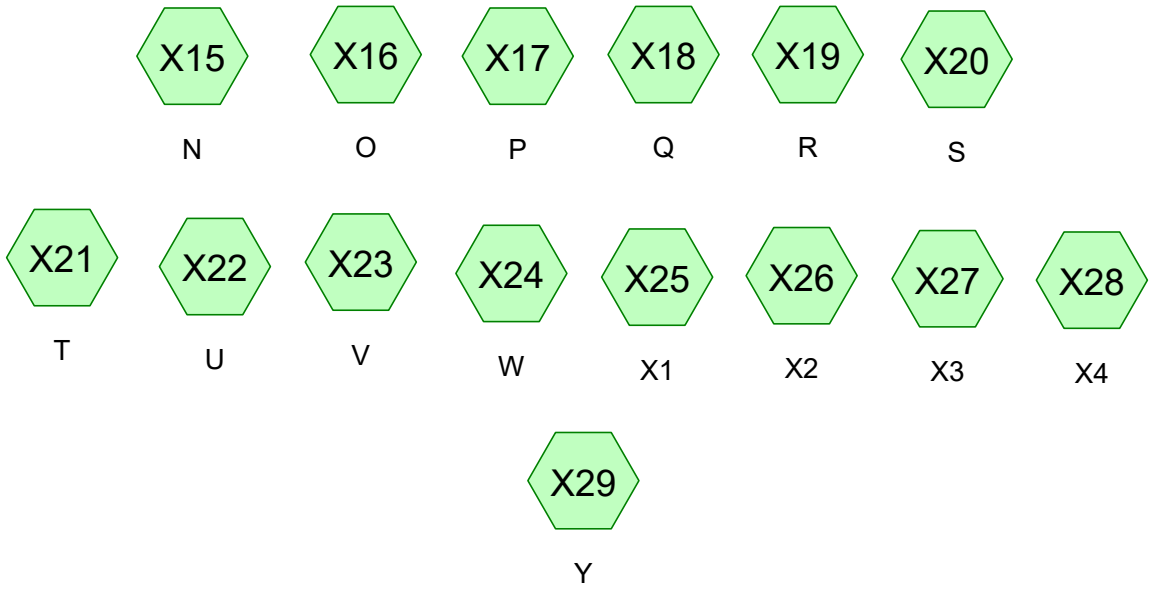
Subcatchment X11: J Runoff Area=16.890 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=10.90 cfs 4.040 af

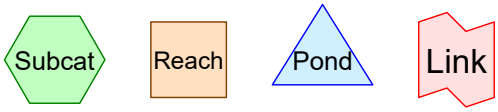
Subcatchment X12: K Runoff Area=1.690 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.09 cfs 0.404 af

Subcatchment X13: L Runoff Area=4.060 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.62 cfs 0.971 af

Subcatchment X14: M Runoff Area=17.200 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=11.10 cfs 4.114 af

Total Runoff Area = 245.370 ac Runoff Volume = 58.691 af Average Runoff Depth = 2.87"
62.00% Pervious = 152.129 ac 38.00% Impervious = 93.241 ac





Routing Diagram for 19-0221_Existing_N-Y
Prepared by {enter your company name here}, Printed 2/27/2019
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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentX15: N Runoff Area=7.280 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.37 cfs 0.519 af

SubcatchmentX16: O Runoff Area=26.500 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.00 cfs 1.888 af

SubcatchmentX17: P Runoff Area=5.800 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.09 cfs 0.413 af

SubcatchmentX18: Q Runoff Area=5.490 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.04 cfs 0.391 af

SubcatchmentX19: R Runoff Area=11.230 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.12 cfs 0.800 af

SubcatchmentX20: S Runoff Area=14.140 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.67 cfs 1.008 af

SubcatchmentX21: T Runoff Area=9.340 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.76 cfs 0.666 af

SubcatchmentX22: U Runoff Area=9.780 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.84 cfs 0.697 af

SubcatchmentX23: V Runoff Area=12.470 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.35 cfs 0.889 af

SubcatchmentX24: W Runoff Area=52.410 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=9.88 cfs 3.735 af

SubcatchmentX25: X1 Runoff Area=28.060 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.29 cfs 1.999 af

SubcatchmentX26: X2 Runoff Area=34.710 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.55 cfs 2.473 af

SubcatchmentX27: X3 Runoff Area=48.710 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=9.19 cfs 3.471 af

SubcatchmentX28: X4 Runoff Area=69.800 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=13.16 cfs 4.974 af

SubcatchmentX29: Y Runoff Area=71.790 ac 38.00% Impervious Runoff Depth>0.86"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=13.54 cfs 5.116 af

Total Runoff Area = 407.510 ac Runoff Volume = 29.038 af Average Runoff Depth = 0.86"
62.00% Pervious = 252.656 ac 38.00% Impervious = 154.854 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentX15: N Runoff Area=7.280 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.32 cfs 0.866 af

SubcatchmentX16: O Runoff Area=26.500 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=8.46 cfs 3.153 af

SubcatchmentX17: P Runoff Area=5.800 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.85 cfs 0.690 af

SubcatchmentX18: Q Runoff Area=5.490 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=1.75 cfs 0.653 af

SubcatchmentX19: R Runoff Area=11.230 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.58 cfs 1.336 af

SubcatchmentX20: S Runoff Area=14.140 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=4.51 cfs 1.683 af

SubcatchmentX21: T Runoff Area=9.340 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.98 cfs 1.111 af

SubcatchmentX22: U Runoff Area=9.780 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.12 cfs 1.164 af

SubcatchmentX23: V Runoff Area=12.470 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.98 cfs 1.484 af

SubcatchmentX24: W Runoff Area=52.410 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=16.72 cfs 6.237 af

SubcatchmentX25: X1 Runoff Area=28.060 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=8.95 cfs 3.339 af

SubcatchmentX26: X2 Runoff Area=34.710 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=11.07 cfs 4.130 af

SubcatchmentX27: X3 Runoff Area=48.710 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=15.54 cfs 5.796 af

SubcatchmentX28: X4 Runoff Area=69.800 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=22.27 cfs 8.306 af

SubcatchmentX29: Y Runoff Area=71.790 ac 38.00% Impervious Runoff Depth>1.43"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=22.91 cfs 8.543 af

Total Runoff Area = 407.510 ac Runoff Volume = 48.492 af Average Runoff Depth = 1.43"
62.00% Pervious = 252.656 ac 38.00% Impervious = 154.854 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentX15: N Runoff Area=7.280 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.24 cfs 1.202 af

SubcatchmentX16: O Runoff Area=26.500 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=11.80 cfs 4.377 af

SubcatchmentX17: P Runoff Area=5.800 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.58 cfs 0.958 af

SubcatchmentX18: Q Runoff Area=5.490 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=2.44 cfs 0.907 af

SubcatchmentX19: R Runoff Area=11.230 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.00 cfs 1.855 af

SubcatchmentX20: S Runoff Area=14.140 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.30 cfs 2.335 af

SubcatchmentX21: T Runoff Area=9.340 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=4.16 cfs 1.543 af

SubcatchmentX22: U Runoff Area=9.780 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=4.36 cfs 1.615 af

SubcatchmentX23: V Runoff Area=12.470 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=5.55 cfs 2.060 af

SubcatchmentX24: W Runoff Area=52.410 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=23.34 cfs 8.656 af

SubcatchmentX25: X1 Runoff Area=28.060 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=12.50 cfs 4.634 af

SubcatchmentX26: X2 Runoff Area=34.710 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=15.46 cfs 5.733 af

SubcatchmentX27: X3 Runoff Area=48.710 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=21.69 cfs 8.045 af

SubcatchmentX28: X4 Runoff Area=69.800 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=31.08 cfs 11.528 af

SubcatchmentX29: Y Runoff Area=71.790 ac 38.00% Impervious Runoff Depth>1.98"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=31.97 cfs 11.857 af

Total Runoff Area = 407.510 ac Runoff Volume = 67.304 af Average Runoff Depth = 1.98"
62.00% Pervious = 252.656 ac 38.00% Impervious = 154.854 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentX15: N Runoff Area=7.280 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=4.70 cfs 1.741 af

SubcatchmentX16: O Runoff Area=26.500 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=17.10 cfs 6.339 af

SubcatchmentX17: P Runoff Area=5.800 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.74 cfs 1.387 af

SubcatchmentX18: Q Runoff Area=5.490 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=3.54 cfs 1.313 af

SubcatchmentX19: R Runoff Area=11.230 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=7.25 cfs 2.686 af

SubcatchmentX20: S Runoff Area=14.140 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=9.12 cfs 3.382 af

SubcatchmentX21: T Runoff Area=9.340 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.03 cfs 2.234 af

SubcatchmentX22: U Runoff Area=9.780 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=6.31 cfs 2.339 af

SubcatchmentX23: V Runoff Area=12.470 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=8.05 cfs 2.983 af

SubcatchmentX24: W Runoff Area=52.410 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=33.82 cfs 12.536 af

SubcatchmentX25: X1 Runoff Area=28.060 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=18.11 cfs 6.712 af

SubcatchmentX26: X2 Runoff Area=34.710 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=22.40 cfs 8.302 af

SubcatchmentX27: X3 Runoff Area=48.710 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=31.43 cfs 11.651 af

SubcatchmentX28: X4 Runoff Area=69.800 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=45.04 cfs 16.696 af

SubcatchmentX29: Y Runoff Area=71.790 ac 38.00% Impervious Runoff Depth>2.87"
Flow Length=5,000' Slope=0.0030 '/' Tc=244.1 min CN=75 Runoff=46.33 cfs 17.172 af

Total Runoff Area = 407.510 ac Runoff Volume = 97.474 af Average Runoff Depth = 2.87"
62.00% Pervious = 252.656 ac 38.00% Impervious = 154.854 ac

TIDE GAUGE DATA

DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

TIDE DATA

Elevations NAVD88
Location: Lat 39°03'25", long 74°45'54" Stone Harbor Borough Stone Harbor Blvd Western Edge of Stone Harbor USGS
Maximum 6.73 ft Oct 29, 2012
To determine elevations to NGVD of 1929, add 1.31 ft
Average High Tide: 2.366

Total Observations	6619
# of occurances > Elev 2	4760
# of occurances > Elev 3	1036
# of occurances > Elev 4	106
# of occurances > Elev 5	10
# of occurances > Elev 6	2
# of occurances > Elev 7	0

Date	Mean Tide Elev.	High Tide Elev	Low Tide Elev.
Column3	Column4	Column6	Column8
3/4/2000	-0.46	1.96	-2.82
3/5/2000	-0.28	2.26	-2.79
3/6/2000	-0.5	2.04	-2.91
3/7/2000	-0.51	2.03	-3.08
3/8/2000	-0.45	2.16	-3.06
3/9/2000	-0.08	2.31	-2.51
3/10/2000	-0.59	2.16	-2.97
3/11/2000	0.14	2.13	-2.16
3/12/2000	-0.22	2.83	-2.97
3/13/2000	-0.94	1.43	-3.13
3/14/2000		1.32	-2.71
3/15/2000			
3/16/2000		1.58	-3.14
3/17/2000	-0.29	2.07	-3.03
3/18/2000	0.14	2.66	-2.6
3/19/2000	0.32	2.72	-2.55
3/20/2000	0.76	3.08	-2.26
3/21/2000	1.31	3.81	-1.32
3/22/2000	1.16	3.22	-1.27
3/23/2000	0	2.03	-2.42
3/24/2000	-0.64	1.65	-2.63
3/25/2000	-0.64	1.49	-2.43
3/26/2000	-0.59	1.36	-2.36
3/27/2000	-0.18	1.47	-1.9
3/28/2000	0.12	2.35	-1.45
3/29/2000	-0.59	1.35	-2.14
3/30/2000	-0.53	1.21	-2.18
3/31/2000	-0.37	1.54	-2.33
4/1/2000	-0.6	1.55	-2.58
4/2/2000	-0.91	1.35	-3.18
4/3/2000	-0.76	1.82	-3.35
4/4/2000	-0.58	2.05	-3.22
4/5/2000	-1.04	1.75	-4.15
4/6/2000	-1	1.98	-3.81
4/7/2000	-0.64	2.56	-3.33
4/8/2000	-0.35	1.51	-2.67
4/9/2000	-1.29	2.18	-3.91
4/10/2000	-1.84	0.59	-4.27
4/11/2000	-0.56	1.58	-2.79
4/12/2000	-0.45	2.3	-2.79
4/13/2000	-0.65	1.75	-2.97

4/14/2000	-0.73	1.48	-3.09
4/15/2000	-0.52	1.88	-3.03
4/16/2000	-0.4	1.99	-3.03
4/17/2000	0.38	3.27	-2.92
4/18/2000		4.03	-0.93
4/19/2000		3.22	-1.25
4/20/2000	0.41	2.84	-1.92
4/21/2000	0.56	3.14	-1.88
4/22/2000	0.71	2.27	-1.22
4/23/2000	0.16	2.69	-1.68
4/24/2000	-0.38	2.12	-2.02
4/25/2000	0.43	1.69	-1.62
4/26/2000	1.25	3.09	-0.29
4/27/2000	0.53	2.41	-1.15
4/28/2000	-0.18	1.74	-1.9
4/29/2000	0.17	1.9	-1.65
4/30/2000	0.06	1.9	-2.16
5/1/2000	-0.04	2.14	-2.42
5/2/2000	-0.33	2.15	-2.84
5/3/2000	-0.4	2.38	-3.05
5/4/2000	-0.52	2.5	-3.24
5/5/2000	-0.7	2.52	-3.47
5/6/2000	-0.61	2.69	-3.3
5/7/2000	-0.32	1.7	-2.9
5/8/2000	-0.41	2.61	-2.88
5/9/2000	-0.38	2.44	-2.63
5/10/2000		2.33	
5/11/2000			-2.05
5/12/2000	0.19	2.23	-2.09
5/13/2000	0.48	2.41	-1.85
5/14/2000	0.18	2.41	-2.24
5/15/2000	-0.12	2.13	-2.42
5/16/2000	-0.25	2.23	-2.54
5/17/2000	-0.36	2.27	-2.72
5/18/2000	-0.61	1.66	-2.76
5/19/2000	-0.41	3.1	-3.18
5/20/2000	0.34	2.76	-1.88
5/21/2000	0.2	2.35	-1.64
5/22/2000	0.02	1.43	-2.01
5/23/2000	0.17	2.46	-1.5
5/24/2000	0.22	2.25	-1.46
5/25/2000	-0.01	2.23	-1.79
5/26/2000	-0.26	1.81	-1.92
5/27/2000	-0.31	1.56	-2.05
5/28/2000	-0.01	1.79	-2.11
5/29/2000	0.82	2.77	-1.17
5/30/2000	0.87	2.89	-1.45
5/31/2000	0.14	2.59	-2.59
6/1/2000	-0.18	2.67	-2.98
6/2/2000	-0.17	3	-2.98
6/3/2000	-0.22	2.97	-3.03
6/4/2000	-0.24	3.11	-3.09
6/5/2000	0.21	2.11	-2.55
6/6/2000	0.65	3.5	-1.92
6/7/2000	0.45	3.21	-1.91
6/8/2000	-0.33	2.23	-2.67
6/9/2000	-0.58	1.69	-2.86
6/10/2000	-0.6	1.45	-2.91
6/11/2000	-0.49	1.7	-2.74
6/12/2000	0.06	2.39	-2.16
6/13/2000	0.42	2.61	-1.81
6/14/2000	0.23	2.64	-1.86
6/15/2000	0.05	2.46	-2.06

6/16/2000	-0.33	2.18	-2.51
6/17/2000	-0.63	1.9	-2.64
6/18/2000	-0.5	2.16	-2.59
6/19/2000	-0.31	2.25	-2.26
6/20/2000	-0.43	1.98	-2.33
6/21/2000			-2.02
6/22/2000	-0.47	1.71	-2.45
6/23/2000	-0.36	1.72	-2.33
6/24/2000	-0.29	1.72	-2.18
6/25/2000	-0.31	1.62	-2.27
6/26/2000	-0.44	1.43	-2.55
6/27/2000	-0.54	1.71	-2.89
6/28/2000	-0.1	2.45	-2.58
6/29/2000	0.3	3.08	-2.29
6/30/2000	0.13	3.05	-2.7
7/1/2000	-0.02	3.16	-2.97
7/2/2000	-0.13	3.12	-2.98
7/3/2000	-0.28	2.87	-2.99
7/4/2000	-0.27	2.86	-3.08
7/5/2000	-0.1	1.96	-2.71
7/6/2000	0.12	2.69	-2.46
7/7/2000	0.05	2.49	-2.41
7/8/2000	-0.08	2	-2.19
7/9/2000	-0.33	1.72	-2.52
7/10/2000	-0.32	1.83	-2.45
7/11/2000	0.03	2.2	-1.87
7/12/2000	-0.05	2.23	-2.04
7/13/2000	-0.22	2.24	-2.27
7/14/2000	-0.01	2.5	-2.1
7/15/2000	0.17	2.82	-1.88
7/16/2000	0.21	2.6	-1.81
7/17/2000	0.09	2.54	-1.94
7/18/2000	-0.15	2.2	-2.14
7/19/2000	-0.08	2.59	-2.32
7/20/2000	0.29	2.46	-1.89
7/21/2000	-0.01	1.58	-1.9
7/22/2000	-0.21	1.94	-2.22
7/23/2000	-0.19	1.82	-2.15
7/24/2000	-0.01	1.98	-2.12
7/25/2000	0.46	2.52	-1.78
7/26/2000	0.45	2.53	-1.77
7/27/2000	0.35	2.79	-2.14
7/28/2000	0.42	3.22	-2.2
7/29/2000	0.34	3.28	-2.44
7/30/2000	0.19	3.28	-2.76
7/31/2000	0.25	3.45	-2.67
8/1/2000	0.24	3.09	-2.64
8/2/2000	-0.05	2.7	-2.72
8/3/2000	-0.24	2	-2.74
8/4/2000	-0.27	2.28	-2.79
8/5/2000	-0.03	2.27	-2.28
8/6/2000	-0.16	1.93	-2.27
8/7/2000	-0.46	1.64	-2.52
8/8/2000	-0.42	1.61	-2.4
8/9/2000	-0.24	1.86	-2.04
8/10/2000	-0.22	2.12	-2.2
8/11/2000	-0.03	2.28	-2
8/12/2000	0.51	3.12	-1.71
8/13/2000	1.41	3.73	-0.73
8/14/2000	1.03	2.91	-1.06
8/15/2000	0.33	2.72	-1.77
8/16/2000	0.05	2.38	-2.23
8/17/2000	-0.11	2.29	-2.3

8/18/2000	-0.02	2.3	-2.16
8/19/2000	0.08	2.09	-1.99
8/20/2000	-0.01	2.19	-2.13
8/21/2000	-0.26	1.92	-2.37
8/22/2000	-0.44	1.77	-2.59
8/23/2000	-0.35	1.94	-2.44
8/24/2000	-0.26	2.22	-2.56
8/25/2000	0.1	2.63	-2.31
8/26/2000	0.12	2.82	-2.53
8/27/2000	-0.03	2.93	-2.88
8/28/2000	0.05	3.16	-2.81
8/29/2000	0.59	3.48	-2.22
8/30/2000	0.33	3.03	-2.59
8/31/2000	0.16	2.49	-2.51
9/1/2000	0.02	2.37	-2.47
9/2/2000	-0.05	2.3	-2.31
9/3/2000	0.19	2.46	-2.03
9/4/2000	0.26	2.32	-1.67
9/5/2000	1.09	2.99	-0.62
9/6/2000	0.69	2.26	-0.95
9/7/2000	0.06	1.78	-1.68
9/8/2000	-0.41	1.49	-2.01
9/9/2000	-0.45	1.83	-2.32
9/10/2000	-0.06	2.36	-2.09
9/11/2000	0.08	2.43	-1.95
9/12/2000	-0.09	2.27	-2.23
9/13/2000	-0.14	2.43	-2.45
9/14/2000	0.2	2.74	-2.2
9/15/2000	0.28	2.45	-2.14
9/16/2000	0.06	2.43	-2.22
9/17/2000	-0.44	2.08	-2.78
9/18/2000	-0.89	1.57	-3.26
9/19/2000	-0.19	3.93	-2.42
9/20/2000	-0.52	2.03	-2.59
9/21/2000	-0.48	2.01	-2.63
9/22/2000	-0.39	2.12	-2.52
9/23/2000	-0.07	2.49	-2.3
9/24/2000	0.04	2.7	-2.48
9/25/2000	0.54	3.5	-2.6
9/26/2000		4.39	-0.46
9/27/2000	0.71	3.03	-2.27
9/28/2000	0.14	2.61	-2.6
9/29/2000	0.33	2.87	-2.18
9/30/2000	0.08	2.62	-2.3
10/1/2000	0.01	2.44	-2.26
10/2/2000	0.32	2.6	-1.74
10/3/2000	0.1	2.2	-1.67
10/4/2000	0.04	2.12	-1.52
10/5/2000	0.15	2.15	-1.41
10/6/2000	0.18	1.99	-1.66
10/7/2000	0.1	1.83	-1.95
10/8/2000	-0.2	1.69	-1.72
10/9/2000	0.13	2.15	-2.01
10/10/2000	-0.13	1.8	-2.02
10/11/2000	-1.31	1.02	-4.08
10/12/2000	-0.63	1.91	-3.27
10/13/2000	-0.54	1.85	-2.93
10/14/2000	-0.59	1.94	-3.22
10/15/2000	-0.47	2.23	-2.91
10/16/2000	0.08	2.75	-2.77
10/17/2000	0.63	3.14	-1.65
10/18/2000	0.35	2.77	-1.8
10/19/2000	-0.07	2.42	-2.15

10/20/2000	-0.26	2.16	-2.62
10/21/2000	-0.55	1.87	-2.69
10/22/2000	-0.04	2.47	-2.33
10/23/2000	-0.15	2.27	-2.45
10/24/2000	-0.24	1.99	-2.7
10/25/2000	-0.39	2.16	-3.07
10/26/2000	0.08	2.46	-2.8
10/27/2000	0.59	2.79	-2.53
10/28/2000	0.36	2.91	-2.17
10/29/2000	0.29	2.71	-2.11
10/30/2000	0.2	2.66	-1.85
10/31/2000	0.48	2.78	-1.56
11/1/2000	0.69	2.61	-1.01
11/2/2000	0.81	2.7	-0.84
11/3/2000	0.69	2.54	-0.91
11/4/2000	0.38	2.19	-1.16
11/5/2000	0.23	1.94	-1.58
11/6/2000	0.18	1.78	-1.69
11/7/2000	0.27	2.03	-1.63
11/8/2000	0.57	2.48	-1.24
11/9/2000	0.52	2.61	-1.95
11/10/2000	0.64	3.2	-1.74
11/11/2000	0.49	2.75	-2.46
11/12/2000	0.76	3.55	-1.83
11/13/2000	0.33	3.24	-2.3
11/14/2000	0.21	3.3	-2.38
11/15/2000	-0.45	2.72	-2.97
11/16/2000	-0.86	2.06	-3.14
11/17/2000	-0.99	1.88	-3.21
11/18/2000	-0.91	1.59	-3.03
11/19/2000	-0.65	1.63	-2.81
11/20/2000	-0.36	2	-3.39
11/21/2000	-0.92	1.3	-3.98
11/22/2000	-1.5	0.63	-3.81
11/23/2000	-1.11	1.35	-4.35
11/24/2000	-0.48	2.18	-3.05
11/25/2000	-0.28	2.18	-3.15
11/26/2000	0.71	3.54	-1.7
11/27/2000	-0.3	2.54	-2.84
11/28/2000	-0.81	1.92	-2.91
11/29/2000	-0.61	1.89	-2.92
11/30/2000	-0.73	1.34	-2.29
12/1/2000	-0.43	1.47	-2.07
12/2/2000	-0.24	1.55	-1.81
12/3/2000	-0.28	1.27	-1.91
12/4/2000	-0.36	1.29	-2.25
12/5/2000	-0.55	1.09	-2.79
12/6/2000	-1.02	0.73	-3.03
12/7/2000	-0.95	1.31	-3.1
12/8/2000	-0.42	1.83	-2.5
12/9/2000	-0.3	2.16	-2.68
12/10/2000	-0.25	2.55	-3.13
12/11/2000	-0.18	2.75	-3.12
12/12/2000	-0.73	3.12	-4.44
12/13/2000	-1.2	1.9	-4.52
12/14/2000	-0.24	2.67	-3.01
12/15/2000	-0.82	2.04	-3.55
12/16/2000	-0.06	2.61	-2.72
12/17/2000	-0.08	2.57	-3.97
12/18/2000	-2.09	-0.11	-4.32
12/19/2000	-0.98	1.29	-2.97
12/20/2000	-0.94	1.58	-3.85
12/21/2000	-1.23	0.89	-3.34

12/22/2000	-1.07	1.42	-2.8
12/23/2000			-3.86
12/24/2000			
12/25/2000			
12/26/2000		1.19	-3.94
12/27/2000		0.78	
12/28/2000		1.47	-3.33
12/29/2000		2.25	
12/30/2000		2.42	-1.68
12/31/2000		0.05	
1/1/2001		0.28	
1/2/2001		1.11	
1/3/2001		1.03	
1/4/2001		1.1	-2.83
1/5/2001		1.36	-2.63
1/6/2001	-0.33	2.26	-3.19
1/7/2001	-0.41	2.13	-2.79
1/8/2001	-0.1	2.84	-2.89
1/9/2001	-0.1	3.28	-3.13
1/10/2001	-1.02	2.02	-4.11
1/11/2001	-0.68	2.66	-3.69
1/12/2001	-0.63	2.56	-3.67
1/13/2001	-0.26	2.76	-2.85
1/14/2001	-0.65	1.98	-3.03
1/15/2001	-0.39	1.86	-2.63
1/16/2001	-0.44	2.13	-2.9
1/17/2001	-0.95	1.2	-3.18
1/18/2001		1.02	-2.27
1/19/2001	0.06	2.19	-1.93
1/20/2001	0.7	2.56	-1.56
1/21/2001	0.06	2.86	-1.93
1/22/2001	-0.7	1.5	-3.18
1/23/2001	-0.54	1.96	-2.73
1/24/2001	-0.2	2.4	-2.35
1/25/2001	-0.15	2.39	-2.27
1/26/2001	-0.16	2.21	-2.35
1/27/2001	-0.52	2.18	-2.91
1/28/2001	-0.99	1.4	-3.05
1/29/2001	-0.44	1.78	-2.31
1/30/2001	-0.27	1.97	-2.15
1/31/2001	-0.48	1.61	-2.46
2/1/2001	-0.67	1.38	-2.33
2/2/2001	-0.36	1.62	-2.71
2/3/2001	-1.13	1.2	-3.52
2/4/2001	-0.61	1.5	-2.66
2/5/2001	0.22	2.61	-1.65
2/6/2001	-0.96	2.25	-4.08
2/7/2001	-1.19	2	-4.48
2/8/2001	-0.96	2.37	-4.63
2/9/2001	-0.53	2.7	-4.03
2/10/2001	-1.36	1.63	-4.52
2/11/2001	-1.91	0.93	-4.82
2/12/2001	-1.58	0.77	-4.5
2/13/2001	-0.6	1.78	-2.68
2/14/2001	-0.61	1.44	-2.53
2/15/2001	-0.5	1.71	-2.26
2/16/2001	-0.34	1.58	-2.07
2/17/2001	-0.32	2.3	-2.91
2/18/2001	-1.07	0.9	-2.85
2/19/2001	-0.98	1.25	-2.52
2/20/2001	-0.91	1.12	-3.18
2/21/2001	-0.79	1.64	-2.84
2/22/2001	-0.27	2.03	-2.84

2/23/2001	-0.22	2.48	-2.55
2/24/2001	-0.86	1.56	-3.42
2/25/2001	-0.4	2.05	-2.59
2/26/2001	-0.69	1.7	-2.73
2/27/2001	-0.82	1.39	-2.98
2/28/2001	-0.56	1.57	-2.51
3/1/2001	-0.67	1.01	-2.5
3/2/2001	-0.33	1.51	-2.17
3/3/2001	-0.16	1.97	-2
3/4/2001	0.94	2.28	-1.01
3/5/2001	1.24	3.89	-1.85
3/6/2001	0.42	2.52	-1.92
3/7/2001	1.57	4.07	-0.93
3/8/2001	0.96	3.75	-1.92
3/9/2001	0.23	3.19	-2.76
3/10/2001	-0.66	2.18	-3.75
3/11/2001	-0.94	2.08	-3.82
3/12/2001	-1.02	2.14	-4.01
3/13/2001	-0.08	2.49	-2.53
3/14/2001	-0.79	0.63	-2.95
3/15/2001	-0.87	1.65	-2.8
3/16/2001	-0.45	1.75	-2.16
3/17/2001	-0.23	1.68	-1.8
3/18/2001	-0.74	1.05	-2.37
3/19/2001	-0.69	1.19	-2.34
3/20/2001	-0.42	1.41	-2.2
3/21/2001	1.16	2.97	-0.5
3/22/2001	0.71	3.08	-1.27
3/23/2001	-0.29	1.96	-2.36
3/24/2001	-0.66	1.85	-2.84
3/25/2001	-0.71	1.72	-3.42
3/26/2001	-0.57	1.79	-2.94
3/27/2001	-0.82	1.42	-3.24
3/28/2001	-1.02	1.39	-3.17
3/29/2001	-0.84	2.4	-3.35
3/30/2001	0.17	1.86	-2.1
3/31/2001	-0.31	2.31	-2.2
4/1/2001	0.4	2.3	-1.59
4/2/2001	0.1	2.6	-2.36
4/3/2001	-0.26	2.04	-2.53
4/4/2001	-0.15	2.15	-2.51
4/5/2001	-0.43	2.05	-3.06
4/6/2001	-0.54	2.09	-3.33
4/7/2001	-0.09	2.8	-3.42
4/8/2001	0.06	2.68	-2.84
4/9/2001	-0.18	2.55	-2.89
4/10/2001	-0.18	2.45	-2.74
4/11/2001	-0.22	2.43	-2.49
4/12/2001	-0.17	1.43	-2.28
4/13/2001	-0.31	2.24	-2.25
4/14/2001	-0.39	1.95	-2.02
4/15/2001	-0.2	1.47	-2.04
4/16/2001	0.44	2.34	-1.31
4/17/2001	-0.18	1.63	-1.74
4/18/2001	-0.13	1.74	-1.94
4/19/2001	-0.62	1.63	-2.52
4/20/2001	-0.82	1.31	-3.1
4/21/2001	-0.67	1.46	-2.87
4/22/2001	-1.14	1.06	-3.58
4/23/2001	-0.91	1.94	-3.62
4/24/2001	-0.72	2.01	-3.09
4/25/2001	-0.54	2.39	-3.11
4/26/2001	-0.16	2.84	-2.76

4/27/2001	-0.04	1.7	-2.27
4/28/2001	-0.28	2.67	-2.43
4/29/2001	-0.69	1.99	-2.75
4/30/2001	-1.02	1.57	-3.07
5/1/2001	-0.85	1.24	-2.95
5/2/2001	-0.38	1.95	-2.79
5/3/2001	-0.46	1.76	-2.93
5/4/2001	-0.55	1.89	-3.22
5/5/2001	-0.29	2.59	-3.21
5/6/2001			-2.8
5/7/2001	0.01	2.46	-2.68
5/8/2001	-0.57	2.29	-3.08
5/9/2001	-0.46	2.39	-2.85
5/10/2001	-0.3	2.34	-2.58
5/11/2001	-0.37	1.1	-2.46
5/12/2001	-0.34	2.04	-2.27
5/13/2001	-0.22	2.04	-1.92
5/14/2001	-0.29	1.75	-1.88
5/15/2001	-0.28	1.45	-1.97
5/16/2001	0.5	1.82	-1.04
5/17/2001	0.35	2.22	-1.54
5/18/2001	-0.08	1.63	-2.02
5/19/2001	-0.04	1.91	-2.19
5/20/2001	0.29	2.5	-2
5/21/2001	0.34	2.75	-1.93
5/22/2001	0.23	2.93	-2.32
5/23/2001	0.35	3.15	-2.21
5/24/2001	0.15	2.97	-2.45
5/25/2001	0.17	2.92	-2.23
5/26/2001	-0.01	1.67	-2.33
5/27/2001	0.08	3.01	-2.19
5/28/2001	-0.02	2.79	-2.43
5/29/2001	0	2.54	-2.29
5/30/2001	-0.12	2.36	-2.34
5/31/2001	-0.36	1.9	-2.78
6/1/2001	-0.12	2.25	-2.69
6/2/2001	0.23	2.7	-2.43
6/3/2001	0.04	2.45	-2.59
6/4/2001	-0.31	2.36	-2.8
6/5/2001	-0.36	2.44	-2.79
6/6/2001	-0.37	2.54	-2.74
6/7/2001	-0.23	2.52	-2.49
6/8/2001	-0.24	2.36	-2.4
6/9/2001	-0.23	2.25	-2.4
6/10/2001	-0.22	1.06	-2.21
6/11/2001	-0.33	2.03	-2.2
6/12/2001		1.79	-1.4
6/13/2001	-0.16	1.88	-2.02
6/14/2001	-0.19	1.65	-2.01
6/15/2001	-0.16	1.45	-2.06
6/16/2001	0		-1.98
6/17/2001	0.2	2.36	-2.22
6/18/2001	-0.29	2	-2.63
6/19/2001	-0.47	2.25	-2.89
6/20/2001	-0.54	2.4	-2.96
6/21/2001	-0.49	2.78	-3.13
6/22/2001	-0.08	3.13	-2.67
6/23/2001	-0.08	2.87	-2.68
6/24/2001	-0.3	1.61	-2.83
6/25/2001	-0.32	2.72	-2.78
6/26/2001	-0.45	2.43	-2.89
6/27/2001	-0.52	2.1	-2.99
6/28/2001	-0.45	1.73	-2.9

6/29/2001	0.05	2.37	-2.33
6/30/2001	-0.11	2.1	-2.47
7/1/2001	-0.42	2.04	-2.7
7/2/2001	-0.29	2.37	-2.59
7/3/2001	-0.43	2.25	-2.66
7/4/2001	-0.28	2.56	-2.65
7/5/2001	-0.13	2.44	-2.31
7/6/2001	-0.27	2.36	-2.5
7/7/2001	-0.36	2.17	-2.44
7/8/2001	-0.37	2.39	-2.41
7/9/2001	-0.02	1.4	-1.94
7/10/2001	-0.04	2.28	-1.97
7/11/2001	-0.03	2.06	-1.95
7/12/2001	-0.17	2.01	-1.91
7/13/2001	-0.2	1.52	-1.99
7/14/2001	-0.21	1.54	-2.09
7/15/2001	-0.1	1.88	-2.04
7/16/2001	-0.08	2.11	-2.21
7/17/2001	-0.13	2.33	-2.36
7/18/2001	-0.02	2.77	-2.38
7/19/2001	0.75	3.71	-2
7/20/2001	0.56	3.45	-2.15
7/21/2001	0.07	3.16	-2.66
7/22/2001	-0.03	3.02	-2.78
7/23/2001	-0.17	2.64	-2.86
7/24/2001	-0.45	1.78	-2.95
7/25/2001	-0.75	2.1	-3.31
7/26/2001	-0.37	1.66	-3.09
7/27/2001	0.45	2.62	-1.78
7/28/2001	-0.22	1.96	-2.5
7/29/2001	-0.07	2.14	-2.21
7/30/2001	0.51	2.72	-1.52
7/31/2001	0.35	2.54	-1.68
8/1/2001	-0.25	2.17	-2.29
8/2/2001	-0.31	2.18	-2.36
8/3/2001	-0.66	2	-2.74
8/4/2001	-0.41	2.31	-2.67
8/5/2001	-0.14	2.26	-2.15
8/6/2001	-0.35	2	-2.37
8/7/2001	-0.54	1.81	-2.43
8/8/2001	-0.46	1.21	-2.5
8/9/2001	-0.2	1.89	-2.03
8/10/2001	-0.52	1.71	-2.25
8/11/2001	-0.48	1.32	-2.35
8/12/2001	-0.22	1.73	-2
8/13/2001	-0.39	1.68	-2.37
8/14/2001	-0.07	2.24	-2.17
8/15/2001	0.32	2.77	-1.91
8/16/2001	0.18	2.8	-2.39
8/17/2001	-0.23	2.65	-2.96
8/18/2001	-0.21	3.05	-2.99
8/19/2001	-0.02	3.09	-2.97
8/20/2001	-0.04	2.94	-2.91
8/21/2001	-0.12	2.55	-2.86
8/22/2001	-0.26	2.26	-2.97
8/23/2001	-0.39	2.19	-2.92
8/24/2001	0	2.4	-2.52
8/25/2001	0.45	2.72	-1.85
8/26/2001	0.29	2.3	-1.76
8/27/2001	-0.08	2.04	-1.99
8/28/2001	-0.03	2.31	-1.89
8/29/2001	0.1	2.38	-1.74
8/30/2001	0.08	2.41	-1.87

8/31/2001	0.13	2.54	-1.84
9/1/2001	-0.03	2.48	-2.09
9/2/2001	0.29	2.61	-2.05
9/3/2001	0.12	2.47	-2
9/4/2001	0.03	2.19	-2.02
9/5/2001	0.02	2.1	-2.11
9/6/2001	-0.1	1.93	-2.09
9/7/2001	-0.26	1.77	-2.16
9/8/2001	-0.38	1.68	-2.23
9/9/2001	-0.4	1.75	-2.3
9/10/2001	-0.29	1.87	-2.09
9/11/2001	-0.16	2.16	-2.04
9/12/2001	0.24	2.54	-1.67
9/13/2001	0.16	2.51	-1.97
9/14/2001	0.45	3.57	-2.33
9/15/2001	0.93	3.52	-1.74
9/16/2001	0.53	3.31	-2.37
9/17/2001	0.37	3.04	-2.62
9/18/2001	0.24	2.86	-2.62
9/19/2001	0.24	2.82	-2.6
9/20/2001		2.42	-2.08
9/21/2001	0.17	2.61	-2.18
9/22/2001	0.07	2.47	-2.17
9/23/2001	0.02	2.33	-1.95
9/24/2001	0.2	2.3	-1.57
9/25/2001	0.18	2.17	-1.76
9/26/2001	-0.15	1.79	-2.21
9/27/2001	-0.32	1.75	-1.92
9/28/2001	-0.09	2.11	-1.91
9/29/2001	0.98	3.66	-1.73
9/30/2001	2.29	4.14	0.49
10/1/2001	1.83	3.59	-0.18
10/2/2001	0.48	2.4	-1.74
10/3/2001	-0.01	2.14	-2.22
10/4/2001	-0.17	2.06	-2.27
10/5/2001	-0.28	2.09	-2.34
10/6/2001	-0.64	1.75	-2.59
10/7/2001	-0.59	1.72	-2.56
10/8/2001	-0.77	1.52	-2.71
10/9/2001	-0.49	1.85	-2.36
10/10/2001	-0.84	1.34	-2.8
10/11/2001	-0.66	1.82	-2.63
10/12/2001		2.36	
10/13/2001		2.87	-2.53
10/14/2001	0.66	3.49	-2.42
10/15/2001	0.12	2.61	-3.11
10/16/2001	0.01	3.03	-3.3
10/17/2001	-0.68	2.77	-4.11
10/18/2001	-1.35	1.83	-4.69
10/19/2001	-0.74	2.3	-3.49
10/20/2001	-0.71	2.13	-3.18
10/21/2001	-0.55	2.14	-2.76
10/22/2001	-0.69	1.71	-2.66
10/23/2001	-0.15	2.1	-2.01
10/24/2001	0	1.97	-1.94
10/25/2001	-0.2	1.46	-2.14
10/26/2001	-0.74	1.05	-3.24
10/27/2001	-0.88	1.48	-2.59
10/28/2001	-0.19	1.98	-2.27
10/29/2001	-0.41	1.7	-2.54
10/30/2001	-0.44	1.88	-3.01
10/31/2001	-0.21	2.3	-2.54
11/1/2001	-0.55	2.08	-2.96

11/2/2001	-0.62	2.13	-3.08
11/3/2001	-0.76	2.03	-3.23
11/4/2001	-0.34	2.58	-2.82
11/5/2001	-0.47	2.37	-2.83
11/6/2001	-0.36	2.51	-2.65
11/7/2001	-0.69	1.88	-2.7
11/8/2001	-0.38	2.23	-2.33
11/9/2001	-0.47	2.18	-3.07
11/10/2001	-0.61	1.84	-3.17
11/11/2001	-0.68	2.11	-3.29
11/12/2001	-0.48	2.16	-3.14
11/13/2001	-0.66	2.23	-3.61
11/14/2001	-1.01	2.03	-3.98
11/15/2001	-0.75	2.35	-3.92
11/16/2001	-0.64	2.5	-3.47
11/17/2001	-0.03	3.17	-3.14
11/18/2001	-0.38	2.6	-2.88
11/19/2001	-0.82	1.87	-2.91
11/20/2001	-0.87	1.43	-2.71
11/21/2001	-0.5	1.75	-2.12
11/22/2001	-0.58	1.43	-2.41
11/23/2001	-0.41	1.5	-2
11/24/2001	-0.16	1.51	-1.98
11/25/2001	-0.12	1.57	-2.08
11/26/2001	-0.32	1.52	-2.43
11/27/2001	-0.18	1.94	-2.08
11/28/2001	-0.32	2.08	-2.57
11/29/2001	0.2	2.6	-2.56
11/30/2001	-0.15	2.65	-2.63
12/1/2001	-0.66	2.31	-3.25
12/2/2001	-0.51	2.71	-3.3
12/3/2001	-0.52	2.65	-3.1
12/4/2001	-0.91	2.12	-3.33
12/5/2001	-0.84	2.07	-3.19
12/6/2001	-0.83	1.96	-3.25
12/7/2001	-0.79	1.76	-3.08
12/8/2001	-0.07	2.24	-2.18
12/9/2001	0.2	2.4	-2.14
12/10/2001	-0.06	2.33	-2.69
12/11/2001	-0.07	2.41	-2.25
12/12/2001		2.42	-2.7
12/13/2001	0.21	3.22	-2.42
12/14/2001	-0.18	2.71	-2.98
12/15/2001	-0.79	1.94	-3.38
12/16/2001	-0.2	2.74	-2.68
12/17/2001	-0.06	2.8	-2.45
12/18/2001		2.07	-2.03
12/19/2001	-0.32	1.79	-2.32
12/20/2001	-0.56	1.34	-2.46
12/21/2001	-1.35	0.4	-3.27
12/22/2001	-0.29	1.45	-2.05
12/23/2001	-0.25	1.26	-1.99
12/24/2001	-0.16	1.51	-1.97
12/25/2001	-0.41	1.36	-2.19
12/26/2001	0.08	1.98	-2.01
12/27/2001	-0.2	2.28	-2.08
12/28/2001	-0.78	1.85	-2.91
12/29/2001	-0.69	2.27	-3.58
12/30/2001	-0.91	2.24	-3.37
12/31/2001	-1.37	1.8	-4.2
1/1/2002	-0.96	2.19	-3.85
1/2/2002	-1.14	1.86	-3.67
1/3/2002	-0.78	2	-3.47

1/4/2002	-0.37	2.28	-2.71
1/5/2002	-0.94	1.41	-3.18
1/6/2002	-0.5	1.59	-2.74
1/7/2002	-0.36	1.69	-2.8
1/8/2002	-0.52	1.71	-2.87
1/9/2002	-1.05	1.54	-3.7
1/10/2002	-1.01	1.38	-3.08
1/11/2002	-0.47	2.28	-2.97
1/12/2002	-0.94	1.72	-3.37
1/13/2002	-0.74	2.68	-3
1/14/2002	-1.94	0.57	-4.56
1/15/2002	-0.8	1.92	-3.66
1/16/2002	-1.1	1.25	-3.19
1/17/2002	-0.75	1.82	-2.82
1/18/2002	-0.94	1.49	-2.99
1/19/2002	-0.57	1.16	-2.47
1/20/2002	-0.11	1.84	-2.16
1/21/2002	-0.5	1.05	-2.38
1/22/2002	-1.86	0.34	-3.54
1/23/2002	-1.23	0.4	-2.68
1/24/2002	-0.56	1.72	-2.67
1/25/2002	-0.46	1.78	-2.93
1/26/2002	-1.09	1.44	-3.2
1/27/2002	-0.85	1.7	-3.78
1/28/2002	-0.26	2.6	-3.08
1/29/2002	-0.07	2.99	-2.94
1/30/2002	-0.16	2.87	-3.07
1/31/2002	0.47	3.48	-2.43
2/1/2002	0.03	3.04	-2.76
2/2/2002	-1.05	1.74	-3.62
2/3/2002	-0.62	1.59	-3.02
2/4/2002	-0.19	2.08	-2.56
2/5/2002	-0.26	1.89	-2.35
2/6/2002	-0.69	1.48	-2.83
2/7/2002	-0.24	1.81	-1.98
2/8/2002	-0.1	2.25	-2
2/9/2002	-0.22	1.9	-2.54
2/10/2002	-0.2	2.21	-2.37
2/11/2002	-0.71	2.07	-3.65
2/12/2002	-0.41	2.38	-2.66
2/13/2002	-0.87	1.84	-3.25
2/14/2002	-0.83	1.66	-2.91
2/15/2002	-1.06	1.14	-3.04
2/16/2002	-0.56	1.56	-2.72
2/17/2002	-0.34	1.66	-2.22
2/18/2002	-0.12	1.63	-1.88
2/19/2002	0.06	1.8	-1.55
2/20/2002	-0.14	1.78	-1.63
2/21/2002	-0.24	1.46	-1.66
2/22/2002	-0.34	1.88	-2.4
2/23/2002	-0.45	1.72	-2.54
2/24/2002	-0.12	2.18	-2.11
2/25/2002	-0.13	2.48	-2.59
2/26/2002	0	2.79	-3.06
2/27/2002	-0.18	3.14	-3.14
2/28/2002	-1.54	1.32	-4.61
3/1/2002	-1.31	1.64	-4.52
3/2/2002	-0.87	2.59	-4.08
3/3/2002	-0.17	1.94	-2.72
3/4/2002	-1.34	1.85	-3.75
3/5/2002	-1.5	0.9	-3.52
3/6/2002	-1.79	0.71	-3.74
3/7/2002	-1.52	0.28	-3.39

3/8/2002	-0.73	1.36	-2.36
3/9/2002	-0.65	1.45	-2.61
3/10/2002	-1.5	1.07	-3.54
3/11/2002	-1.87	0.07	-4.16
3/12/2002	-1.03	1.28	-3.59
3/13/2002	-0.25	2	-2.9
3/14/2002	-0.48	1.84	-2.81
3/15/2002	-0.73	1.51	-2.8
3/16/2002	-0.78	1.45	-2.95
3/17/2002	0.14	2.28	-1.98
3/18/2002	0.27	2.2	-1.61
3/19/2002	-0.12	1.97	-1.8
3/20/2002	0.16	1.88	-1.52
3/21/2002	-0.25	1.66	-1.87
3/22/2002	-1.05	1.1	-3.12
3/23/2002	-1.68	0.3	-3.77
3/24/2002	-1.56	0.22	-3.49
3/25/2002	-0.1	1.8	-2.14
3/26/2002	0.39	2.71	-2.11
3/27/2002	-0.05	2.71	-2.81
3/28/2002	-0.27	2.56	-3.31
3/29/2002	-0.51	2.54	-3.74
3/30/2002	-0.41	2.48	-3.37
3/31/2002	-0.41	1.85	-3.14
4/1/2002	-0.4	2.4	-2.99
4/2/2002	-0.87	0.81	-3.11
4/3/2002	-0.97	1.7	-2.94
4/4/2002	-0.88	1.43	-2.6
4/5/2002	-0.64	1.44	-2.26
4/6/2002	-0.68	1.25	-2.42
4/7/2002	-0.44	1.36	-2.14
4/8/2002	-0.86	1.04	-2.75
4/9/2002	-0.89	1.18	-2.82
4/10/2002	-0.95	1.1	-3.02
4/11/2002	-0.66	1.85	-3.17
4/12/2002	-0.44	1.64	-2.62
4/13/2002	-0.78	1.49	-2.95
4/14/2002	-0.87	1.79	-3.13
4/15/2002	-0.75	1.88	-2.92
4/16/2002	-0.7	1.8	-2.7
4/17/2002	-0.69	0.74	-2.61
4/18/2002	-0.57	1.83	-2.46
4/19/2002	-0.35	2.11	-2.04
4/20/2002	-0.37	1.85	-2.23
4/21/2002	-0.14	2	-1.99
4/22/2002	0.17	2.28	-2.05
4/23/2002	0.22	2.54	-2
4/24/2002	0.03	2.31	-2.62
4/25/2002	0.1	2.43	-2.67
4/26/2002	-0.27	2.43	-3.43
4/27/2002	-0.47	2.46	-3.57
4/28/2002	-0.32	3.1	-3.29
4/29/2002	-0.21	2.67	-2.89
4/30/2002	-0.34	1.6	-2.77
5/1/2002	-0.45	2.09	-2.72
5/2/2002	0.04	2.26	-1.76
5/3/2002	-0.49	2.14	-2.48
5/4/2002	-0.86	1.31	-2.57
5/5/2002	-0.66	1.07	-2.32
5/6/2002	-0.47	1.33	-2.23
5/7/2002	-0.53	1.24	-2.58
5/8/2002	-0.18	1.85	-2.25
5/9/2002	0.01	1.97	-2.01

5/10/2002	-0.5	1.45	-2.69
5/11/2002	-0.89	1.39	-3.04
5/12/2002	-0.78	1.94	-3.27
5/13/2002	-0.19	2.7	-2.46
5/14/2002	-0.51	1.6	-2.84
5/15/2002	-1.26	1.54	-3.43
5/16/2002	-0.94	0.65	-3.1
5/17/2002	-1	1.66	-3.14
5/18/2002	0.15	2.19	-1.68
5/19/2002	-0.17	2.6	-2.31
5/20/2002	-0.27	1.94	-2.43
5/21/2002	-0.49	1.81	-2.78
5/22/2002	-0.47	1.77	-2.97
5/23/2002	-0.43	2.16	-3.17
5/24/2002	-0.34	2.51	-3.11
5/25/2002	-0.15	2.91	-3.01
5/26/2002	-0.12	2.82	-2.84
5/27/2002	-0.38	2.57	-2.94
5/28/2002	-0.49	2.49	-3
5/29/2002	-0.38	1.19	-2.73
5/30/2002	-0.26	2.52	-2.4
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6/1/2002	-0.31	1.92	-2.2
6/2/2002	-0.35	1.66	-2.18
6/3/2002	-0.16	1.8	-1.87
6/4/2002	-0.38	1.24	-2.29
6/5/2002	-0.41	1.25	-2.28
6/6/2002	-0.5	1.7	-2.42
6/7/2002	0.8	3.21	-1.78
6/8/2002	0.53	2.6	-1.67
6/9/2002	-0.34	2.04	-2.54
6/10/2002	-0.37	2.5	-2.7
6/11/2002	-0.29	2.34	-2.47
6/12/2002	-0.36	2.68	-2.69
6/13/2002	0.46	3.3	-1.94
6/14/2002	0.54	2.13	-1.73
6/15/2002	0.83	3.34	-1.38
6/16/2002	0.28	2.9	-1.96
6/17/2002	0.08	2.55	-2.17
6/18/2002	-0.11	2.14	-2.45
6/19/2002	-0.23	1.94	-2.73
6/20/2002	-0.31	2.09	-2.9
6/21/2002	-0.38	2.25	-3.01
6/22/2002	-0.62	2.26	-3.3
6/23/2002	-0.61	2.45	-3.35
6/24/2002	-0.59	2.5	-3.17
6/25/2002	-0.36	2.69	-2.86
6/26/2002	-0.35	2.32	-2.56
6/27/2002	-0.71	1.91	-2.98
6/28/2002	-0.7	0.9	-2.83
6/29/2002	-0.43	1.92	-2.52
6/30/2002	-0.45	1.92	-2.34
7/1/2002	-0.69	1.54	-2.6
7/2/2002	-0.78	1.03	-2.61
7/3/2002	-0.54	1.21	-2.35
7/4/2002	-0.29	1.43	-2.12
7/5/2002	-0.33	1.59	-2.2
7/6/2002	-0.23	1.89	-2.12
7/7/2002	-0.44	1.97	-2.57
7/8/2002	-0.45	2.25	-2.61
7/9/2002	-0.58	2.33	-2.96
7/10/2002	-0.3	2.84	-2.8
7/11/2002	0.13	2.77	-2.47

7/12/2002	-0.36	2.59	-2.86
7/13/2002	-0.34	1.6	-2.9
7/14/2002	-0.14	2.66	-2.71
7/15/2002	-0.1	2.65	-2.45
7/16/2002	-0.04	2.24	-2.61
7/17/2002	0.22	2.41	-2.1
7/18/2002	0.06	2.35	-2.28
7/19/2002	0.14	2.57	-2.24
7/20/2002	0.28	2.83	-2.18
7/21/2002	0.1	2.7	-2.37
7/22/2002	-0.29	2.46	-2.69
7/23/2002	-0.75	2.02	-3.01
7/24/2002	-0.25	3.01	-3.17
7/25/2002	0.3	2.96	-1.97
7/26/2002	0.24	2.64	-1.91
7/27/2002	0.04	2.33	-2.03
7/28/2002	-0.01	1.59	-1.93
7/29/2002	0.04	2.2	-1.9
7/30/2002	0.1	2.05	-1.73
7/31/2002	0.1	1.78	-1.65
8/1/2002	0.06	1.76	-1.67
8/2/2002	0.14	1.95	-1.58
8/3/2002	0.03	1.81	-1.79
8/4/2002	-0.12	2.01	-2.08
8/5/2002	-0.27	2.2	-2.3
8/6/2002	0.07	3.12	-2.43
8/7/2002	0.21	2.94	-2.18
8/8/2002	-0.01	2.96	-2.54
8/9/2002	-0.05	2.97	-2.73
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8/13/2002	-0.35	2.19	-2.92
8/14/2002	-0.39	2.15	-2.83
8/15/2002		1.9	
8/16/2002	-0.54	1.9	-2.75
8/17/2002	-0.36	2.16	-2.61
8/18/2002	-0.09	2.44	-2.18
8/19/2002	0.02	2.67	-2.26
8/20/2002	0.1	2.87	-2.2
8/21/2002	0.09	2.67	-2.18
8/22/2002	-0.18	2.35	-2.41
8/23/2002	-0.21	2.78	-2.77
8/24/2002	0.33	2.72	-1.87
8/25/2002	0.18	2.32	-1.93
8/26/2002	-0.02	1.98	-1.98
8/27/2002	-0.08	1.92	-1.93
8/28/2002	0.72	2.65	-1.58
8/29/2002	0.61	2.6	-1.26
8/30/2002	0.03	1.86	-1.58
8/31/2002	0.6	2.44	-1.47
9/1/2002	1.45	3.19	-0.18
9/2/2002	0.67	2.67	-1.12
9/3/2002	0.45	2.64	-1.62
9/4/2002	0.23	2.84	-2.14
9/5/2002	0.25	3.01	-2.38
9/6/2002	0.27	3.03	-2.42
9/7/2002	-0.02	2.87	-3
9/8/2002	-0.08	2.7	-2.97
9/9/2002	-0.01	2.67	-2.85
9/10/2002	0.39	3.08	-2.53
9/11/2002	0.39	2.93	-2.27
9/12/2002	-0.04	2.5	-2.41

9/13/2002	-0.21	1.99	-2.33
9/14/2002	-0.4	1.79	-2.29
9/15/2002	-0.22	1.8	-2.21
9/16/2002	-0.28	1.97	-2.22
9/17/2002	0.14	2.57	-2.06
9/18/2002	0.26	2.69	-1.88
9/19/2002	0.16	2.65	-2.04
9/20/2002	0.01	2.36	-2.25
9/21/2002	-0.04	2.19	-2.23
9/22/2002	-0.01	2.34	-2.36
9/23/2002	0.3	2.39	-1.85
9/24/2002	0.31	2.4	-1.77
9/25/2002	0.3	2.31	-1.9
9/26/2002	1.1	3.03	-0.79
9/27/2002	0.75	2.6	-0.84
9/28/2002	-0.04	2.15	-1.97
9/29/2002	0.27	2.35	-1.42
9/30/2002	0.1	2.05	-1.79
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10/3/2002	-0.09	2.64	-2.51
10/4/2002	0.93	3.46	-1.95
10/5/2002	0.19	2.72	-2.91
10/6/2002	0.38	3.13	-3.05
10/7/2002	0.5	3.57	-2.52
10/8/2002	0.43	3.48	-2.39
10/9/2002	0.29	3.23	-2.46
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10/11/2002	0.74	3.22	-1.48
10/12/2002	1.21	3.42	-1.03
10/13/2002	1.25	3.03	-1.1
10/14/2002	0.45	2.44	-1.58
10/15/2002	0.85	2.83	-0.81
10/16/2002	1.91	3.39	1.41
10/17/2002	0.46	2.29	-1.6
10/18/2002	0.27	2.26	-1.71
10/19/2002	-0.2	1.87	-2.17
10/20/2002	-0.4	1.8	-2.83
10/21/2002	0.04	2.32	-2.41
10/22/2002	0.09	2.4	-2.13
10/23/2002	-0.29	2.15	-2.36
10/24/2002	-0.22	2.14	-2.11
10/25/2002	0.07	2.33	-1.94
10/26/2002	0.63	2.8	-1.07
10/27/2002	-0.12	1.89	-1.92
10/28/2002	-0.21	1.91	-2.1
10/29/2002		2.4	-1.43
10/30/2002		2.73	
10/31/2002	0.64	2.6	-2
11/1/2002	-0.27	1.93	-3.61
11/2/2002	-0.74	1.71	-3.32
11/3/2002	-0.38	2.23	-3.69
11/4/2002	-0.01	3.02	-3.09
11/5/2002	0.18	3.19	-3.16
11/6/2002	0.57	3.81	-2.19
11/7/2002	-0.16	2.7	-2.76
11/8/2002	-0.4	2.5	-3.04
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11/10/2002	-0.29	2.2	-2.31
11/11/2002	-0.34	1.77	-2.33
11/12/2002	-0.01	2.01	-1.63
11/13/2002	0.35	2.32	-1.78
11/14/2002	-0.02	1.67	-2.25

11/15/2002	-0.66	1.2	-2.7
11/16/2002	0.35	2.67	-1.71
11/17/2002	1.51	3.44	-0.58
11/18/2002	-0.91	1.65	-3.24
11/19/2002	-1.35	0.84	-4.02
11/20/2002	-0.41	2.11	-2.99
11/21/2002	0.06	2.54	-2.2
11/22/2002	0.44	3.14	-1.65
11/23/2002	-1.48	0.83	-3.89
11/24/2002	-1.77	0.7	-3.84
11/25/2002	-1.28	1.15	-3.38
11/26/2002	-0.22	2.29	-2.21
11/27/2002	-0.05	2.18	-1.96
11/28/2002	-0.43	1.76	-2.86
11/29/2002	-0.87	1.42	-3.59
11/30/2002	-0.85	1.67	-2.92
12/1/2002	-1.27	1.44	-4.23
12/2/2002	-1.35	1.55	-4.25
12/3/2002	-0.9	1.99	-4.41
12/4/2002	-0.8	2.48	-3.82
12/5/2002	0.25	3.28	-3.73
12/6/2002	0.25	3.19	-2.51
12/7/2002	-0.63	2.32	-3.11
12/8/2002	-1.3	1.55	-3.37
12/9/2002	-1.02	1.61	-3.03
12/10/2002	-0.54	1.57	-2.37
12/11/2002	0.43	2.31	-1.45
12/12/2002	0.08	1.96	-2.34
12/13/2002	0.2	2	-1.52
12/14/2002	0.31	2.59	-2.41
12/15/2002	-0.7	1.21	-2.55
12/16/2002	-0.52	1.81	-2.89
12/17/2002	0.2	2.39	-2.04
12/18/2002	0.14	2.63	-2.12
12/19/2002	-0.2	2.35	-2.5
12/20/2002	-0.01	2.74	-2.38
12/21/2002	-0.57	2.45	-3.23
12/22/2002	-0.89	2.11	-3.66
12/23/2002	-0.84	2.01	-3.02
12/24/2002	-0.72	2	-3.31
12/25/2002	0.61	4.41	-2.53
12/26/2002	-0.9	1.23	-3.4
12/27/2002	-0.48	1.72	-2.82
12/28/2002	-0.46	1.75	-2.82
12/29/2002	-0.38	2.11	-3.03
12/30/2002	-0.28	2.23	-2.68
12/31/2002	0.03	2.8	-2.54
1/1/2003	0.21	2.75	-2.84
1/2/2003	1.06	4.13	-1.65
1/3/2003	1.68	4.55	-1.4
1/4/2003	0.68	3.75	-2.1
1/5/2003	0.04	2.87	-2.56
1/6/2003	0.11	2.76	-2.11
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1/10/2003	-0.03	1.73	-1.45
1/11/2003	-1.1	0.82	-2.91
1/12/2003	-1.58	-0.19	-3.11
1/13/2003	-1.37	0.78	-3.48
1/14/2003	-1.27	0.55	-2.82
1/15/2003	-0.72	1.73	-2.44
1/16/2003	-0.97	1.36	-3.22

1/17/2003	-0.45	2.3	-3.2
1/18/2003	-0.18	2.45	-2.74
1/19/2003	-0.38	2.83	-3.05
1/20/2003	-1.52	1.59	-4.48
1/21/2003	-1.32	1.63	-4.05
1/22/2003	-1.81	0.97	-4.57
1/23/2003		0.72	-4.27
1/24/2003		1.31	
1/25/2003		1.68	
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1/27/2003		1.75	
1/28/2003			
1/29/2003		1.84	
1/30/2003		2.26	-2.7
1/31/2003	0.02	2.61	-2.72
2/1/2003	0.25	3.03	-2.21
2/2/2003	-0.63	2.4	-3.37
2/3/2003	-1.25	1.44	-3.97
2/4/2003	-0.72	2.32	-3.07
2/5/2003	-1.94	0.19	-4.39
2/6/2003	-1.59	0.69	-3.59
2/7/2003	-0.74	1.27	-2.34
2/8/2003	-1.19	0.91	-2.87
2/9/2003	-1.65	0.31	-3.28
2/10/2003	-1.15	0.34	-2.66
2/11/2003	-1.06	0.76	-2.5
2/12/2003	-1.42	1.04	-3.59
2/13/2003	-1.95	0.1	-3.98
2/14/2003		1.07	
2/15/2003	-0.73		
2/16/2003			-3.16
2/17/2003		5.37	
2/18/2003	0.61	3.58	-2.59
2/19/2003	-0.5	2.4	-3.3
2/20/2003	-0.94	1.74	-3.72
2/21/2003	-0.86	1.53	-3.38
2/22/2003	-0.19	2.07	-2.78
2/23/2003	-0.37	2.88	-3.76
2/24/2003	-1.77	0.55	-3.97
2/25/2003	-1.41	1	-3.51
2/26/2003	-0.59	1.56	-2.42
2/27/2003	0.02	2.39	-2.09
2/28/2003	0.54	2.93	-1.61
3/1/2003	-0.13	2.37	-2.6
3/2/2003	0.12	2.72	-2.58
3/3/2003			-2.68
3/4/2003		1.68	-3.23
3/5/2003	-0.63	1.94	-3.17
3/6/2003	0.04	2.34	-2.57
3/7/2003	-0.01	1.99	-2.07
3/8/2003	-0.59	1.35	-2.46
3/9/2003	-0.88	0.37	-2.47
3/10/2003	-0.83	1.09	-2.48
3/11/2003	-0.96	0.88	-2.3
3/12/2003	-1.02	0.96	-2.56
3/13/2003	-0.62	0.85	-2.37
3/14/2003	0	2.32	-2.38
3/15/2003	-0.63	1.75	-2.9
3/16/2003	-0.37	2.15	-2.9
3/17/2003	0.23	2.89	-2.82
3/18/2003	0.46	3.13	-2.79
3/19/2003	0.72	3.39	-2.4
3/20/2003	0.43	3.17	-2.54

3/21/2003	-0.14	2.65	-2.9
3/22/2003	-0.4	1.68	-3.01
3/23/2003	-0.44	2.46	-2.76
3/24/2003	-0.34	2.2	-2.33
3/25/2003	-0.34	2.14	-2.14
3/26/2003	-0.4	1.95	-2.47
3/27/2003	-0.41	2	-2.49
3/28/2003	-0.3	1.88	-2.36
3/29/2003		2.06	-2.46
3/30/2003		2.26	
3/31/2003	-0.6	1.82	-3.07
4/1/2003	-0.89	1.44	-3.83
4/2/2003	-0.53	1.89	-3.05
4/3/2003	-0.05	2.36	-2.57
4/4/2003	0.25	2.91	-2.15
4/5/2003	0.61	2.48	-1.29
4/6/2003	-0.49	0.88	-2.32
4/7/2003	0.08	1.47	-2.38
4/8/2003	0.96	2.67	-0.55
4/9/2003	0.9	2.58	-0.6
4/10/2003	1.15	2.68	-0.28
4/11/2003	1.49	3.29	-0.34
4/12/2003	0.78	2.93	-1.32
4/13/2003	-0.06	2.12	-2.38
4/14/2003	-0.44	1.95	-3.03
4/15/2003	-0.83	1.83	-3.81
4/16/2003	-1.16	2.19	-4.25
4/17/2003	0.71	4.31	-3.06
4/18/2003	0.85	3	-2.19
4/19/2003	0.15	3.37	-2.46
4/20/2003	0.13	3.13	-2.44
4/21/2003	0	2.87	-2.38
4/22/2003	0.21	2.78	-1.85
4/23/2003	-0.12	2.24	-2.1
4/24/2003	-0.5	1.72	-2.72
4/25/2003	-0.14	1.71	-2.05
4/26/2003	0.46	2.34	-1.79
4/27/2003	0.19	2.46	-1.97
4/28/2003	-0.31	1.75	-2.38
4/29/2003	-0.47	1.84	-2.6
4/30/2003	-0.35	2.25	-2.56
5/1/2003	-0.14	2.18	-2.24
5/2/2003	-0.24	2.49	-2.52
5/3/2003	0.06	2.51	-2.11
5/4/2003	0.04	1.56	-1.89
5/5/2003	-0.18	2.29	-2.09
5/6/2003	-0.11	2.22	-1.82
5/7/2003	-0.21	2.19	-1.9
5/8/2003	-0.01	2.09	-1.75
5/9/2003	-0.08	2.19	-1.93
5/10/2003	-0.18	1.89	-2.16
5/11/2003	-0.01	1.88	-2.23
5/12/2003	0.26	2.38	-2.02
5/13/2003	-0.27	2.12	-3.02
5/14/2003	-0.17	2.7	-3.05
5/15/2003	-0.12	3.09	-3.08
5/16/2003	0.64	4.12	-2.64
5/17/2003	0.72	3.28	-2.05
5/18/2003	-0.19	2.8	-2.78
5/19/2003	-0.42	1.3	-2.77
5/20/2003	-0.48	2.48	-2.73
5/21/2003	-0.49	2.13	-2.63
5/22/2003	-0.13	2.09	-2.15

5/23/2003	0.08	2.05	-1.86
5/24/2003	0.39	2.1	-1.51
5/25/2003	0.14	1.88	-1.76
5/26/2003	0.38	2.26	-1.44
5/27/2003	0.18	2.03	-1.91
5/28/2003	0.07	2.21	-1.9
5/29/2003	-0.05	2.4	-2.06
5/30/2003	0.08	2.6	-2.01
5/31/2003	0.2	2.91	-1.94
6/1/2003	0.33	2.65	-1.67
6/2/2003	-0.44	2.19	-2.58
6/3/2003	-0.57	2.23	-2.47
6/4/2003	-0.02	1.14	-1.89
6/5/2003	-0.03	2.56	-1.87
6/6/2003	-0.37	2.21	-2.21
6/7/2003	-0.28	1.81	-2.35
6/8/2003	0.1	2.12	-1.95
6/9/2003	0.37	2.46	-1.95
6/10/2003	-0.08	2.26	-2.75
6/11/2003	-0.06	2.58	-2.79
6/12/2003	-0.09	2.92	-2.94
6/13/2003	0.11	3.37	-2.77
6/14/2003	0.12	3.25	-2.74
6/15/2003	0.04	3.23	-2.67
6/16/2003	0.27	3.24	-2.66
6/17/2003	-0.03	1.66	-2.43
6/18/2003	-0.07	2.65	-2.35
6/19/2003	0.16	2.57	-1.99
6/20/2003	0.34	2.53	-1.8
6/21/2003	0.51	2.42	-1.51
6/22/2003	0.41	2.32	-1.51
6/23/2003	0.28	2	-1.57
6/24/2003	0.26	2.08	-1.56
6/25/2003	0.18	2.2	-1.73
6/26/2003	0.16	2.38	-1.81
6/27/2003	0.19	2.53	-1.79
6/28/2003	0.08	2.54	-1.96
6/29/2003	-0.14	2.52	-2.27
6/30/2003	-0.28	2.38	-2.4
7/1/2003	-0.25	2.48	-2.35
7/2/2003	-0.25	2.52	-2.31
7/3/2003	0.04	1.52	-2.06
7/4/2003	-0.06	2.71	-2.17
7/5/2003	-0.37	2.19	-2.51
7/6/2003	-0.3	1.97	-2.47
7/7/2003	-0.09	1.99	-2.48
7/8/2003	-0.02	2.27	-2.38
7/9/2003		2.55	-2.5
7/10/2003		3.27	-2.18
7/11/2003		3.21	-2.33
7/12/2003	0.12	3.06	-2.53
7/13/2003	-0.09	2.93	-2.66
7/14/2003	-0.13	2.91	-2.7
7/15/2003	-0.08	2.82	-2.53
7/16/2003	-0.26	2.37	-2.55
7/17/2003	-0.26	1.71	-2.63
7/18/2003	-0.28	2.18	-2.44
7/19/2003	-0.08	2.09	-2.02
7/20/2003	-0.17	1.83	-2.11
7/21/2003	-0.2	1.47	-2.01
7/22/2003	-0.26	1.56	-1.99
7/23/2003	-0.28	1.63	-1.96
7/24/2003	-0.48	1.51	-2.22

7/25/2003	-0.52	1.75	-2.39
7/26/2003	-0.61	1.85	-2.55
7/27/2003	-0.71	2.02	-2.76
7/28/2003	-0.49	2.46	-2.74
7/29/2003	0.06	2.76	-2.12
7/30/2003	-0.15	2.61	-2.43
7/31/2003	0	1.79	-2.21
8/1/2003	-0.12	2.41	-2.41
8/2/2003	-0.29	1.77	-2.5
8/3/2003	-0.4	2.06	-2.69
8/4/2003	-0.24	2.06	-2.42
8/5/2003	-0.22	2.24	-2.46
8/6/2003	-0.13	2.28	-2.34
8/7/2003	0.01	2.49	-2.34
8/8/2003	-0.1	2.56	-2.57
8/9/2003	-0.07	2.72	-2.53
8/10/2003	-0.22	2.68	-2.73
8/11/2003	-0.21	2.76	-2.68
8/12/2003	-0.27	2.56	-2.79
8/13/2003	-0.35	2.35	-2.77
8/14/2003	-0.46	2.16	-2.79
8/15/2003	-0.23	2.27	-2.58
8/16/2003	-0.05	1.99	-2.17
8/17/2003	-0.01	2.09	-2.01
8/18/2003	0.22	2.11	-1.61
8/19/2003	-0.04	1.7	-1.62
8/20/2003	-0.46	1.34	-2.04
8/21/2003	-0.41	1.58	-2.11
8/22/2003	-0.27	1.74	-2
8/23/2003	-0.09	2.09	-1.83
8/24/2003	-0.04	2.11	-1.85
8/25/2003	-0.37	2.13	-2.53
8/26/2003	-0.2	2.64	-2.49
8/27/2003	-0.07	2.64	-2.62
8/28/2003	-0.15	2.71	-2.75
8/29/2003	-0.1	2.51	-2.61
8/30/2003	-0.27	2.2	-2.74
8/31/2003	0.08	2.69	-2.42
9/1/2003	-0.06	2.38	-2.4
9/2/2003	0.23	2.55	-2.35
9/3/2003	0.61	2.92	-1.67
9/4/2003	0.28	2.55	-1.91
9/5/2003	0.35	2.82	-1.79
9/6/2003	0.4	2.85	-1.76
9/7/2003	0.18	2.72	-2.05
9/8/2003	0.24	3.1	-2.19
9/9/2003	0.97	3.57	-1.42
9/10/2003	0.72	2.78	-1.58
9/11/2003	0.08	2.6	-2.27
9/12/2003	1.08	3.29	-1.47
9/13/2003	0.71	2.59	-1.53
9/14/2003	0.18	2.27	-1.84
9/15/2003	0.27	2.27	-1.48
9/16/2003	0.19	2.14	-1.46
9/17/2003	0.43	2.32	-1.28
9/18/2003	1.94	3.67	-0.02
9/19/2003	1.01	2.89	-1.25
9/20/2003	0.16	2.05	-1.33
9/21/2003	0.36	2.42	-1.28
9/22/2003	0.47	2.66	-1.42
9/23/2003	0.39	2.62	-2.09
9/24/2003	0.14	2.65	-2.34
9/25/2003	0.21	2.78	-2.41

9/26/2003	0.31	2.82	-2.39
9/27/2003	0.5	3.06	-2.28
9/28/2003	0.66	3.4	-2.2
9/29/2003	0.46	3.27	-2.18
9/30/2003	-0.21	2.56	-2.5
10/1/2003	-0.05	2.48	-2.2
10/2/2003	-0.09	2.4	-2.39
10/3/2003	-0.16	2.14	-1.99
10/4/2003	-0.23	1.91	-1.92
10/5/2003	-0.36	1.73	-2.51
10/6/2003	-0.07	2.29	-2.32
10/7/2003	-0.03	2.39	-2.28
10/8/2003	-0.42	2.01	-2.61
10/9/2003	-0.51	1.8	-2.77
10/10/2003	0.24	2.81	-2.49
10/11/2003	1.39	3.31	-0.78
10/12/2003	1.11	3.21	-1.11
10/13/2003	0.13	2.26	-1.79
10/14/2003	0.4	2.57	-1.64
10/15/2003	-0.56	2.5	-2.89
10/16/2003	-1.2	0.67	-2.94
10/17/2003	-0.42	1.52	-2.16
10/18/2003	0.22	2.01	-1.36
10/19/2003	-0.04	1.58	-1.6
10/20/2003	0.04	1.8	-1.93
10/21/2003	-0.54	1.45	-2.52
10/22/2003	0.36	2.82	-2.44
10/23/2003	0.38	2.58	-2.07
10/24/2003	-0.36	2.12	-3.1
10/25/2003	-0.26	2.55	-3.14
10/26/2003	-0.4	2.64	-3.24
10/27/2003	-0.03	3.22	-2.95
10/28/2003	0.12	3.2	-2.71
10/29/2003	0.41	3.52	-2.25
10/30/2003	-0.64	2	-2.87
10/31/2003	-0.46	2.13	-2.44
11/1/2003	-0.39	1.99	-2.4
11/2/2003	-0.22	2.08	-2.14
11/3/2003	-0.2	1.97	-2.18
11/4/2003	0.07	2.32	-1.99
11/5/2003	0.47	2.42	-1.49
11/6/2003	0.25	2.25	-2.03
11/7/2003	0.21	2.42	-1.94
11/8/2003	-0.2	2.18	-2.3
11/9/2003	-0.39	2.25	-2.5
11/10/2003	-0.63	1.78	-2.78
11/11/2003	-0.23	2.27	-2.21
11/12/2003	0.04	2.43	-1.87
11/13/2003	-1.33	1.16	-4.03
11/14/2003	-2.6	-0.51	-4.59
11/15/2003	-1.61	0.59	-3.8
11/16/2003	-0.47	1.61	-2.03
11/17/2003	-0.15	1.61	-1.8
11/18/2003	0.19	2.05	-1.73
11/19/2003	0.54	2.67	-1.83
11/20/2003	0.19	2.18	-2.67
11/21/2003	-0.19	2.23	-2.7
11/22/2003	0.36	3.03	-2.73
11/23/2003	0.48	3.37	-2.51
11/24/2003	0.64	3.74	-2.42
11/25/2003	0.08	3.41	-3.07
11/26/2003	-0.03	3.15	-2.79
11/27/2003	-0.05	2.91	-2.5

11/28/2003	0.18	2.85	-2.23
11/29/2003	-1.76	0.28	-4.53
11/30/2003	-2.05	0.03	-4
12/1/2003	-1.32	0.46	-3.55
12/2/2003	-1.58	0.51	-3.46
12/3/2003	-0.84	0.97	-2.65
12/4/2003	-0.79	1.31	-2.81
12/5/2003	1.14	3.78	-0.72
12/6/2003	1.94	4.45	-0.28
12/7/2003	0.26	2.73	-1.9
12/8/2003	0.26	2.54	-1.88
12/9/2003	0.25	2.68	-1.85
12/10/2003	0.5	2.64	-1.83
12/11/2003	0.73	3.95	-1.65
12/12/2003	-1.07	1.41	-3.1
12/13/2003	-0.86	1.62	-2.74
12/14/2003	1.02	3.51	-1.69
12/15/2003	-0.52	1.62	-2.88
12/16/2003	-1.49	0.51	-3.51
12/17/2003	-0.24	1.87	-2.13
12/18/2003	-1.11	1.57	-3.75
12/19/2003	-0.73	1.37	-2.9
12/20/2003	-0.01	2.67	-2.95
12/21/2003	-0.45	2.62	-2.9
12/22/2003	-1.26	1.59	-4.06
12/23/2003	-0.44	2.76	-3.76
12/24/2003	0.07	3.48	-3.05
12/25/2003	-0.45	3.12	-3.28
12/26/2003	-1.58	1.57	-4.26
12/27/2003	-0.96	1.96	-3.95
12/28/2003	-0.11	2.28	-2.19
12/29/2003	-0.54	1.46	-2.45
12/30/2003	-0.91	1.1	-3.18
12/31/2003	-1.26	0.37	-3.08
1/1/2004	-1.36	0.18	-2.91
1/2/2004	-0.52	1.31	-2.23
1/3/2004	-0.2	2.05	-2.16
1/4/2004	-0.14	1.96	-1.83
1/5/2004	0.31	2.52	-1.55
1/6/2004	-0.57	2.13	-2.55
1/7/2004	-1.43	1.36	-3.48
1/8/2004	-1.72	0.83	-4.2
1/9/2004	-0.59	1.98	-3.46
1/10/2004	-0.23	2.41	-2.28
1/11/2004	-0.65	2.01	-2.63
1/12/2004	-1.22	0.99	-3.31
1/13/2004	-0.68	1.78	-2.8
1/14/2004	-0.78	1.25	-2.75
1/15/2004	-0.23	1.88	-2.49
1/16/2004	-2.1	0.34	-4.17
1/17/2004	-1.17	0.95	-3.47
1/18/2004	-0.38	1.76	-2.56
1/19/2004	-0.51	2.52	-2.87
1/20/2004	-1.31	1.95	-4
1/21/2004	-1.14	1.71	-4.41
1/22/2004	-0.5	2.6	-3.13
1/23/2004		2.3	-3.92
1/24/2004		2.29	
1/25/2004			
1/26/2004		2.34	
1/27/2004		2.43	-0.98
1/28/2004			
1/29/2004			

1/30/2004		0.25	
1/31/2004			
2/1/2004			
2/2/2004			-1.98
2/3/2004	0.01	1.97	-1.6
2/4/2004	-0.82	1.63	-2.79
2/5/2004	-1.19	1.41	-3.37
2/6/2004	-0.61	2.04	-3.56
2/7/2004	-0.31	2.54	-2.69
2/8/2004	-1.21	1.5	-3.57
2/9/2004	-1.76	0.72	-4.13
2/10/2004	-0.99	1.54	-3.52
2/11/2004	-0.97	1	-3.07
2/12/2004	-0.96	1.32	-3.03
2/13/2004	-1.03	1.66	-3.12
2/14/2004	-1.22	1.36	-3.17
2/15/2004	-0.39	1.64	-2.31
2/16/2004	-0.21	2.36	-2.83
2/17/2004	-0.51	1.87	-2.7
2/18/2004	0.39	2.77	-2.54
2/19/2004	0.12	3	-2.68
2/20/2004	0.21	3.04	-2.57
2/21/2004	0.07	2.87	-2.51
2/22/2004	-0.56	1.96	-3.02
2/23/2004	-0.3	2.16	-2.83
2/24/2004	-0.38	1.91	-2.5
2/25/2004	-0.36	1.74	-2.17
2/26/2004	-0.32	1.12	-1.88
2/27/2004	-0.3	1.54	-1.76
2/28/2004	-0.69	1.14	-2.08
2/29/2004	-0.66	1.02	-2.03
3/1/2004	-0.59	1.17	-1.95
3/2/2004	-0.68	1.41	-2.63
3/3/2004	-0.92	1.22	-2.71
3/4/2004	-0.59	1.63	-2.47
3/5/2004	-0.27	2.08	-2.58
3/6/2004	-0.41	2.3	-2.7
3/7/2004	-0.73	1.94	-3.64
3/8/2004	0.13	2.86	-3.09
3/9/2004	0.3	2.65	-2.22
3/10/2004	0.73	3.7	-2.09
3/11/2004	0.99	2.71	-1.36
3/12/2004	-0.23	3.16	-2.75
3/13/2004	-1.68	1.49	-3.72
3/14/2004	-1.06	1.14	-2.98
3/15/2004	-0.86	1.74	-2.97
3/16/2004	0.37	2.2	-1.52
3/17/2004	0.94	3.25	-1.23
3/18/2004	0.49	2.9	-2.03
3/19/2004	0.75	3.04	-1.89
3/20/2004	0.14	2.49	-2.32
3/21/2004	-0.21	2.21	-2.66
3/22/2004	-0.67	1.65	-3.01
3/23/2004	-0.88	1.27	-2.96
3/24/2004	-1.45	1.32	-3.66
3/25/2004	-1.12	1.11	-2.94
3/26/2004	-1.16	0.93	-2.69
3/27/2004	-1.06	-0.04	-2.58
3/28/2004	0	1.22	-1.7
3/29/2004	0.52	2.4	-0.73
3/30/2004	0.15	1.72	-1.21
3/31/2004	0.09	1.67	-1.37
4/1/2004	0.4	2.42	-1.54

4/2/2004	0.47	2.42	-1.52
4/3/2004	0.44	2.61	-1.73
4/4/2004	-0.2	2.47	-2.69
4/5/2004	-0.67	1.85	-3.3
4/6/2004	-0.89	2.16	-3.62
4/7/2004	-0.47	2.7	-3.31
4/8/2004	-0.22	1.77	-2.69
4/9/2004	-0.18	2.85	-2.52
4/10/2004	-0.58	2.36	-2.64
4/11/2004	-0.49	1.91	-2.69
4/12/2004	0.14	2.09	-1.98
4/13/2004	0.45	2.75	-1.81
4/14/2004	-0.13	1.84	-2.21
4/15/2004	0.08	2.17	-2.26
4/16/2004	-0.19	1.89	-2.41
4/17/2004	-0.57	1.83	-2.83
4/18/2004	-0.91	1.71	-3.43
4/19/2004	-0.76	1.48	-2.99
4/20/2004	-1.04	1.72	-3.44
4/21/2004	-0.52	2.2	-2.95
4/22/2004	-0.7	1.55	-2.71
4/23/2004	-0.71	1.99	-2.68
4/24/2004	-0.55	0.58	-2.24
4/25/2004	-0.5	1.44	-2.28
4/26/2004	-0.58	1.54	-2.01
4/27/2004	-0.37	1.66	-1.85
4/28/2004	-0.73	1.21	-2.32
4/29/2004	-0.81	0.99	-2.51
4/30/2004	-0.94	0.86	-2.87
5/1/2004	-0.69	1.4	-2.79
5/2/2004	-0.27	2.16	-2.72
5/3/2004	-0.32	2.54	-2.82
5/4/2004	-0.44	2.29	-3.22
5/5/2004	-0.57	2.64	-3.41
5/6/2004	-0.44	2.73	-3.07
5/7/2004	-0.68	2.4	-3.31
5/8/2004	-0.37	1.63	-3
5/9/2004	-0.58	2.59	-2.8
5/10/2004	-0.54	2.07	-2.67
5/11/2004	-0.53	1.99	-2.61
5/12/2004	-0.64	1.57	-2.76
5/13/2004	-0.59	1.46	-2.74
5/14/2004	-0.35	1.67	-2.55
5/15/2004	-0.64	1.54	-2.8
5/16/2004	-0.89	1.48	-3.05
5/17/2004	-0.54	2.09	-2.86
5/18/2004	-0.68	1.65	-2.76
5/19/2004	-0.83	1.99	-3.13
5/20/2004	-0.53	2.15	-2.54
5/21/2004	-0.55	2	-2.34
5/22/2004	-0.43	2.02	-2.21
5/23/2004	-0.2	1.98	-1.84
5/24/2004	-0.16	0.97	-1.73
5/25/2004	0.01	2	-1.77
5/26/2004	0.41	2.2	-1.38
5/27/2004	0.3	2.36	-1.57
5/28/2004	0.3	2.06	-1.64
5/29/2004	0.14	2.05	-1.94
5/30/2004	-0.06	2.08	-2.33
5/31/2004	0.2	2.89	-2.36
6/1/2004	0.63	3.4	-2
6/2/2004	0.22	3.25	-2.61
6/3/2004	-0.07	3.18	-2.88

6/4/2004	-0.14	3.17	-2.82
6/5/2004	0.26	3.5	-2.41
6/6/2004	0.36	2.04	-1.98
6/7/2004	-0.18	3.08	-2.52
6/8/2004	-0.47	2.27	-2.71
6/9/2004	-0.54	1.88	-2.75
6/10/2004	-0.26	1.69	-2.47
6/11/2004	0.33	2.16	-1.72
6/12/2004	0.03	1.98	-1.94
6/13/2004	-0.13	2.02	-2.16
6/14/2004	-0.35	1.77	-2.34
6/15/2004	-0.58	1.94	-2.52
6/16/2004	-0.58	2.07	-2.54
6/17/2004	-0.3	2.32	-2.23
6/18/2004	-0.23	2.37	-2.18
6/19/2004	-0.01	2.4	-1.84
6/20/2004	-0.15	2.15	-2.17
6/21/2004	-0.53	0.7	-2.29
6/22/2004	-0.48	1.81	-2.21
6/23/2004	-0.2	1.94	-1.96
6/24/2004	-0.18	2.03	-2.01
6/25/2004	-0.22	1.88	-2.11
6/26/2004	-0.11	1.8	-2.04
6/27/2004	-0.3	1.78	-2.42
6/28/2004	-0.32	2.19	-2.67
6/29/2004	-0.13	2.59	-2.72
6/30/2004	-0.32	2.72	-2.97
7/1/2004	-0.33	2.99	-3.07
7/2/2004	-0.29	2.96	-3.02
7/3/2004	-0.16	3.15	-2.85
7/4/2004	-0.16	3.01	-2.79
7/5/2004	-0.13	1.74	-2.53
7/6/2004	-0.24	2.71	-2.66
7/7/2004	-0.14	2.38	-2.53
7/8/2004	-0.16	2.15	-2.4
7/9/2004	-0.34	1.7	-2.45
7/10/2004	-0.38	1.52	-2.33
7/11/2004	-0.3	1.75	-2.22
7/12/2004	-0.09	1.98	-1.96
7/13/2004	0.21	2.54	-1.65
7/14/2004	0.35	2.72	-1.51
7/15/2004	0.27	2.56	-1.78
7/16/2004	0.01	2.51	-1.97
7/17/2004	-0.02	2.5	-1.99
7/18/2004	0.11	2.78	-1.94
7/19/2004	0.21	2.42	-1.86
7/20/2004	-0.16	2.27	-2.1
7/21/2004	-0.18	1.45	-2.19
7/22/2004	-0.12	2.2	-2.15
7/23/2004	-0.17	2.07	-2.09
7/24/2004	-0.11	1.86	-2.3
7/25/2004	0.39	2.37	-1.65
7/26/2004	0.37	2.49	-1.79
7/27/2004	0.3	2.64	-1.98
7/28/2004	0.19	2.9	-2.26
7/29/2004	0.08	2.98	-2.49
7/30/2004	0	3.09	-2.75
7/31/2004	-0.13	3.02	-2.89
8/1/2004	-0.16	2.94	-2.94
8/2/2004	-0.11	2.94	-2.69
8/3/2004	0.13	2.25	-2.44
8/4/2004	0.3	2.96	-2.13
8/5/2004	0.4	2.56	-2.17

8/6/2004	0.62	2.58	-1.6
8/7/2004	0.29	2.23	-1.51
8/8/2004	-0.31	1.55	-2.04
8/9/2004	-0.43	1.58	-2.15
8/10/2004	-0.22	1.85	-1.84
8/11/2004	-0.24	1.9	-1.84
8/12/2004	-0.05	2.33	-1.83
8/13/2004	0.02	2.37	-1.93
8/14/2004	-0.21	2.31	-2.23
8/15/2004	-0.07	2.43	-2.2
8/16/2004	-0.07	2.57	-2.28
8/17/2004	-0.07	2.48	-2.2
8/18/2004	-0.13	2.17	-2.24
8/19/2004	-0.35	1.86	-2.48
8/20/2004	-0.34	1.94	-2.54
8/21/2004	-0.5	1.84	-2.53
8/22/2004	-0.02	2.35	-1.99
8/23/2004	-0.11	2.25	-2.1
8/24/2004	-0.1	2.41	-2.38
8/25/2004	0.1	2.51	-2.08
8/26/2004	0.02	2.65	-2.24
8/27/2004	-0.1	2.69	-2.59
8/28/2004	-0.3	2.73	-2.96
8/29/2004	-0.21	2.88	-2.92
8/30/2004	0.13	3.14	-2.59
8/31/2004	0.24	2.73	-2.52
9/1/2004	-0.12	2.22	-2.69
9/2/2004	-0.01	2.45	-2.58
9/3/2004	0.08	2.23	-1.95
9/4/2004	-0.2	1.96	-2.22
9/5/2004	0.64	2.74	-1.66
9/6/2004	0.75	2.31	-0.91
9/7/2004	0.27	2	-1.12
9/8/2004	0.24	2	-1.31
9/9/2004	0.26	1.69	-0.96
9/10/2004	-0.34	1.83	-2.07
9/11/2004	0.02	2.31	-2
9/12/2004	0.17	2.52	-1.95
9/13/2004	-0.16	2.23	-2.41
9/14/2004	0.27	2.81	-2.34
9/15/2004	0.35	2.52	-2.04
9/16/2004	-0.04	2.22	-2.49
9/17/2004	0.12	2.53	-2.45
9/18/2004	0.68	2.85	-1.39
9/19/2004	1.17	3.34	-1.15
9/20/2004	0.64	2.91	-1.39
9/21/2004	0.22	2.62	-1.97
9/22/2004	0.37	2.67	-1.65
9/23/2004	0.37	2.63	-1.74
9/24/2004	0.48	2.89	-1.54
9/25/2004	0.25	2.63	-2.06
9/26/2004	-0.05	2.67	-2.62
9/27/2004	0.25	2.93	-2.39
9/28/2004	0.49	3.02	-2.13
9/29/2004	1.14	3.4	-1.85
9/30/2004	0.82	3.18	-1.55
10/1/2004	0.37	2.76	-1.78
10/2/2004	0.22	2.63	-1.84
10/3/2004	0.4	2.63	-1.6
10/4/2004	0.31	2.31	-1.2
10/5/2004	0.23	2.26	-1.51
10/6/2004	0	1.82	-1.57
10/7/2004	-0.33	1.42	-1.72

10/8/2004	-0.18	1.7	-1.68
10/9/2004	-0.14	1.91	-1.76
10/10/2004	0.06	2.36	-1.84
10/11/2004	0.49	2.58	-1.74
10/12/2004	0.52	2.72	-1.81
10/13/2004	0.57	2.94	-1.92
10/14/2004	0.7	3.2	-1.99
10/15/2004	0.83	3.58	-1.71
10/16/2004	-0.14	3.05	-2.63
10/17/2004	-0.84	2.29	-3.22
10/18/2004	-0.44	2.4	-2.7
10/19/2004	0.51	2.98	-1.82
10/20/2004	1.62	3.75	-0.31
10/21/2004	1.18	3.15	-0.85
10/22/2004	1.28	3.2	-0.57
10/23/2004	1.67	3.57	-0.21
10/24/2004	1.78	3.78	-0.44
10/25/2004	1.41	3.46	-0.87
10/26/2004	0.78	2.96	-1.48
10/27/2004	0.63	3.01	-1.86
10/28/2004	0.56	2.99	-1.84
10/29/2004	0.28	2.78	-2.04
10/30/2004	0.2	2.7	-1.96
10/31/2004	0.12	2.65	-1.8
11/1/2004	-0.26	2	-1.98
11/2/2004	0.28	2.43	-1.48
11/3/2004	0.09	1.72	-1.44
11/4/2004	0.34	2.34	-1.23
11/5/2004	-0.74	1.41	-2.59
11/6/2004	-1.39	0.51	-3.13
11/7/2004	-0.69	1.52	-2.2
11/8/2004	-0.17	1.73	-2.25
11/9/2004	-0.26	1.79	-2.33
11/10/2004	-0.19	2.12	-2.5
11/11/2004	-0.43	2.32	-2.93
11/12/2004	0.36	2.89	-3.09
11/13/2004	1.04	4.11	-1.63
11/14/2004	0.25	3.31	-2.34
11/15/2004	-0.08	2.96	-2.59
11/16/2004	0.14	3.07	-2.18
11/17/2004	0.17	2.91	-1.97
11/18/2004	0.01	2.41	-2.17
11/19/2004	-0.02	2.3	-2.08
11/20/2004	0.13	2.26	-1.98
11/21/2004	0.15	2.13	-1.98
11/22/2004	0.07	2.18	-2.19
11/23/2004	0.13	2.32	-2.01
11/24/2004	0.57	2.74	-1.97
11/25/2004	-0.05	2.91	-2.09
11/26/2004	-0.87	1.96	-3.09
11/27/2004	-0.13	2.39	-2.86
11/28/2004	0.75	3.54	-1.21
11/29/2004	-0.11	2.35	-2.02
11/30/2004	-0.06	2.38	-1.87
12/1/2004	-0.55	2.62	-3.36
12/2/2004	-1.26	0.67	-2.92
12/3/2004	-0.67	1.28	-2.13
12/4/2004	-0.32	1.4	-1.86
12/5/2004	-0.87	0.78	-2.6
12/6/2004	-0.18	1.51	-1.84
12/7/2004	0.49	2.19	-1.72
12/8/2004	-0.14	2.18	-2.84
12/9/2004	-0.25	2.07	-2.49

12/10/2004	1.1	3.38	-2.01
12/11/2004	0.66	3.75	-2.02
12/12/2004	-0.13	3	-3.01
12/13/2004	-0.47	2.95	-3.25
12/14/2004	-0.65	2.58	-3.59
12/15/2004	-0.42	2.57	-2.88
12/16/2004	-0.45	2.4	-2.85
12/17/2004	-1.23	1.14	-3.41
12/18/2004	-0.35	1.99	-2.48
12/19/2004	0.41	2.34	-1.73
12/20/2004	-0.31	1.7	-2.67
12/21/2004	-0.7	1.66	-2.87
12/22/2004	-0.64	1.5	-2.54
12/23/2004	-0.05	2.18	-1.74
12/24/2004	-0.33	2.06	-2.81
12/25/2004	-0.05	2.37	-2.37
12/26/2004	0.52	2.62	-2.09
12/27/2004	0.63	2.88	-1.45
12/28/2004	-0.39	2.37	-2.73
12/29/2004	-1.41	0.8	-3.57
12/30/2004	-0.58	1.79	-2.76
12/31/2004	-0.51	1.7	-2.29
1/1/2005	-1.03	1.09	-2.69
1/2/2005	-0.51	1.41	-2.09
1/3/2005	-0.49	1.2	-2.35
1/4/2005	-0.58	0.97	-2.2
1/5/2005	0.07	1.66	-1.53
1/6/2005	0.55	2.55	-1.65
1/7/2005	-0.35	2.52	-3.06
1/8/2005	-0.26	2.54	-2.18
1/9/2005	-0.04	3	-3.04
1/10/2005	-0.08	3.3	-2.96
1/11/2005	-0.26	2.9	-3.3
1/12/2005	0.37	3.51	-2.78
1/13/2005	0.17	3.16	-2.5
1/14/2005	-0.29	2.3	-2.87
1/15/2005	-0.3	1.94	-2.51
1/16/2005	0.53	2.42	-1.51
1/17/2005	0.44	2.65	-1.82
1/18/2005	-0.74	1.73	-2.87
1/19/2005	-0.39	1.41	-2.32
1/20/2005	-0.38	1.48	-1.92
1/21/2005	-0.13	1.98	-2.02
1/22/2005	0.3	2.03	-1.3
1/23/2005	0.84	2.82	-1.1
1/24/2005	0.59	2.74	-1.53
1/25/2005	-0.41	1.83	-2.46
1/26/2005	0.26	2.66	-2.03
1/27/2005	0.57	2.94	-1.46
1/28/2005	0.21	2.42	-1.87
1/29/2005	-0.15	2.06	-2.1
1/30/2005	0.14	2.16	-1.9
1/31/2005		2.5	
2/1/2005			-1.63
2/2/2005	-0.09	1.84	-1.72
2/3/2005	0.62	2.48	-1.21
2/4/2005	0.99	2.77	-0.85
2/5/2005	0.61	3.2	-2.12
2/6/2005	0.34	2.82	-1.88
2/7/2005	0.43	3.12	-2.06
2/8/2005	0.17	3.18	-2.52
2/9/2005	0.27	3.27	-2.84
2/10/2005	0.19	3.31	-2.73

2/11/2005	-0.56	2.21	-3.07
2/12/2005	-0.85	1.73	-3.38
2/13/2005	-0.66	1.35	-2.9
2/14/2005	-0.12	1.81	-2.23
2/15/2005	-0.51	2.05	-2.2
2/16/2005	-0.49	1.18	-2.01
2/17/2005	-0.44	1.64	-2.21
2/18/2005	-0.8	1.35	-2.64
2/19/2005	-0.72	1.25	-2.28
2/20/2005	-0.76	1.14	-2.42
2/21/2005	0.11	2.12	-1.75
2/22/2005	0.35	2.56	-1.6
2/23/2005	0.05	2.42	-1.9
2/24/2005	0.39	2.72	-2.39
2/25/2005	0.74	3.11	-1.61
2/26/2005	-0.04	2.36	-2.32
2/27/2005	-0.76	1.46	-2.87
2/28/2005	0.19	1.71	-2.86
3/1/2005	0.98	4.01	-1.55
3/2/2005	-1.49	-0.02	-3.41
3/3/2005	-1.32	0.52	-3.16
3/4/2005	-0.8	1.01	-2.39
3/5/2005	-0.51	1.76	-2.41
3/6/2005	-0.53	1.9	-2.75
3/7/2005	-0.22	2.19	-2.43
3/8/2005	-0.24	2.88	-2.82
3/9/2005	-1.89	1.15	-5
3/10/2005	-0.93	2.08	-4.63
3/11/2005	0.07	2.69	-2.84
3/12/2005	-0.07	2.34	-2.54
3/13/2005	0.16	2.8	-2.54
3/14/2005	-0.32	1.69	-2.64
3/15/2005	-0.81	0.78	-2.73
3/16/2005	-0.42	1.63	-1.99
3/17/2005	-0.14	1.56	-1.51
3/18/2005	-0.18	1.57	-1.48
3/19/2005	-0.22	1.47	-1.6
3/20/2005	-0.09	1.47	-1.44
3/21/2005	-0.12	1.8	-1.83
3/22/2005	-0.1	1.96	-1.88
3/23/2005	0.79	3.15	-2.15
3/24/2005	1.23	3.2	-0.84
3/25/2005	0.44	2.55	-1.79
3/26/2005	0.19	2.62	-2.25
3/27/2005	0.26	2.78	-2.08
3/28/2005	0.83	3.4	-1.52
3/29/2005	0.72	2.84	-1.36
3/30/2005	0.18	1.76	-1.82
3/31/2005	0.2	2.67	-1.67
4/1/2005	0.38	2.75	-1.55
4/2/2005	1.34	3.07	-0.44
4/3/2005	0.57	2.97	-2.08
4/4/2005	-0.15	2.24	-2.49
4/5/2005	-0.17	2.31	-2.6
4/6/2005	-0.11	2.43	-2.64
4/7/2005	-0.17	2.4	-2.74
4/8/2005	-0.11	2.77	-2.96
4/9/2005	0.2	3	-2.57
4/10/2005	0.12	2.62	-2.3
4/11/2005	0.19	2.61	-2.39
4/12/2005	0	1.72	-2.06
4/13/2005	0.03	2.17	-2.14
4/14/2005	-0.05	2.34	-1.82

4/15/2005	1.15	2.23	-0.09
4/16/2005	0.51	2.46	-0.97
4/17/2005	-0.2	1.59	-1.65
4/18/2005	-0.29	1.25	-1.74
4/19/2005	-0.17	1.54	-1.78
4/20/2005	-0.22	1.6	-2.02
4/21/2005	-0.07	2.09	-2.15
4/22/2005	0.32	2.54	-1.89
4/23/2005	0.44	2.9	-1.86
4/24/2005	0.42	3.02	-1.9
4/25/2005	-0.02	2.8	-2.63
4/26/2005	-0.08	2.89	-2.53
4/27/2005	0.33	2.11	-1.92
4/28/2005	0.14	3.21	-2.17
4/29/2005	0.14	2.87	-1.89
4/30/2005	0.08	2.69	-1.92
5/1/2005	-0.11	2.34	-2.13
5/2/2005	-0.13	2.02	-2.3
5/3/2005	-0.12	2.18	-2.4
5/4/2005	-0.23	1.97	-2.68
5/5/2005	-0.3	2.14	-2.85
5/6/2005	0.37	3.39	-2.62
5/7/2005	1.4	3.6	-1.02
5/8/2005	0.57	3.34	-1.8
5/9/2005	0.6	3.16	-1.81
5/10/2005	0.37	2.63	-1.81
5/11/2005	-0.08	2.29	-1.99
5/12/2005	-0.19	1.1	-2.03
5/13/2005	-0.2	2.05	-1.97
5/14/2005	-0.46	1.71	-2.04
5/15/2005	0.04	1.75	-1.49
5/16/2005	0.25	2.1	-1.31
5/17/2005	0.08	1.79	-1.7
5/18/2005	0.07	1.56	-1.71
5/19/2005	0.17	1.97	-1.79
5/20/2005	1.03	3.24	-1.53
5/21/2005	0.95	3.24	-1.25
5/22/2005	0.58	3.18	-1.94
5/23/2005	0.64	3.62	-1.85
5/24/2005	1.04	4.46	-1.61
5/25/2005	1.64	4.56	-0.7
5/26/2005	1.29	3	-1.21
5/27/2005	0.43	3.5	-1.89
5/28/2005	0.24	2.93	-1.99
5/29/2005	0.16	2.82	-2.11
5/30/2005	0.26	2.55	-2.02
5/31/2005	0.2	2.34	-2.14
6/1/2005	0.22	2.15	-2.03
6/2/2005	0.1	2.22	-2.26
6/3/2005	0.29	2.74	-2
6/4/2005	0.29	2.73	-1.98
6/5/2005	0.14	2.76	-2.05
6/6/2005	0.16	2.79	-1.99
6/7/2005	-0.02	2.54	-2.05
6/8/2005	-0.17	2.48	-2.17
6/9/2005	-0.07	2.39	-1.96
6/10/2005	-0.2	1.98	-1.93
6/11/2005	-0.42	0.66	-2.2
6/12/2005	-0.29	1.88	-2.07
6/13/2005	-0.17	1.84	-1.9
6/14/2005	0.2	1.81	-1.63
6/15/2005	0.76	2.28	-1.14
6/16/2005	0.88	2.5	-1.07

6/17/2005	0.56	2.42	-1.46
6/18/2005	0.33	2.52	-1.86
6/19/2005	0.55	3.2	-1.77
6/20/2005	0.41	3.09	-1.84
6/21/2005	0	2.99	-2.49
6/22/2005	-0.08	3.32	-2.68
6/23/2005	0.19	3.32	-2.39
6/24/2005	-0.1	2.88	-2.58
6/25/2005	-0.32	1.49	-2.7
6/26/2005	-0.24	2.56	-2.73
6/27/2005	0.18	2.58	-2.2
6/28/2005	0.02	2.36	-2.32
6/29/2005	-0.2	1.82	-2.44
6/30/2005	0	2.2	-2.37
7/1/2005	0.46	2.62	-1.71
7/2/2005	0.3	2.58	-1.8
7/3/2005	0.3	2.71	-1.7
7/4/2005	0.21	2.62	-1.81
7/5/2005	0.04	2.56	-1.95
7/6/2005	0.14	2.79	-1.86
7/7/2005	0.53	3.07	-1.54
7/8/2005	0.87	2.88	-1.15
7/9/2005	0.23	2.1	-1.8
7/10/2005	-0.2	1.13	-1.98
7/11/2005	-0.01	2.18	-1.73
7/12/2005	0.34	2.06	-1.61
7/13/2005	0.35	2.27	-1.44
7/14/2005	0.22	1.96	-1.59
7/15/2005	0.09	1.74	-1.72
7/16/2005	0.18	2.27	-1.76
7/17/2005	0.29	2.62	-1.89
7/18/2005	0.18	2.83	-2.14
7/19/2005	0.15	3.08	-2.34
7/20/2005	0.2	3.34	-2.35
7/21/2005	0.17	3.44	-2.53
7/22/2005	0.32	3.51	-2.4
7/23/2005	0.33	3.34	-2.38
7/24/2005	0.22	2.4	-2.43
7/25/2005	-0.18	2.81	-2.68
7/26/2005	0.01	2.31	-2.53
7/27/2005	0.02	2.27	-2.23
7/28/2005	0.29	2.44	-1.64
7/29/2005	0.07	2.03	-1.88
7/30/2005	-0.09	1.99	-1.92
7/31/2005	0.03	2.25	-1.76
8/1/2005	0.09	2.32	-1.83
8/2/2005	-0.13	2.38	-2.19
8/3/2005	0.04	2.56	-1.94
8/4/2005	-0.01	2.53	-1.98
8/5/2005	-0.13	2.3	-2.14
8/6/2005	-0.14	2.38	-2.23
8/7/2005	0.01	2.35	-2
8/8/2005	0.02	2.19	-1.9
8/9/2005	-0.04	1.7	-1.93
8/10/2005	0.19	2.21	-1.73
8/11/2005	-0.05	1.89	-1.86
8/12/2005	-0.06	2.04	-1.89
8/13/2005	-0.21	1.96	-2.07
8/14/2005	-0.15	2.22	-2.11
8/15/2005	0.18	2.74	-2.04
8/16/2005	0.68	3.28	-1.65
8/17/2005	0.38	3.17	-2.23
8/18/2005	0.35	3.54	-2.28

8/19/2005	0.47	3.68	-2.37
8/20/2005	0.44	3.39	-2.42
8/21/2005	0.28	3.01	-2.53
8/22/2005	0.22	2.69	-2.44
8/23/2005	0.29	2.75	-2.25
8/24/2005	0.26	2.6	-2.13
8/25/2005	0.18	2.44	-2.02
8/26/2005	0.06	2.19	-1.82
8/27/2005	0.21	2.21	-1.44
8/28/2005	0.28	2.24	-1.35
8/29/2005	0.19	2.29	-1.52
8/30/2005	0.29	2.44	-1.4
8/31/2005	0.19	2.24	-1.6
9/1/2005	-0.03	2.34	-2.19
9/2/2005	0.01	2.37	-1.99
9/3/2005	-0.01	2.33	-2.08
9/4/2005	0.05	2.32	-2.05
9/5/2005	0.21	2.35	-2.03
9/6/2005	0.32	2.36	-1.69
9/7/2005	0.05	2.09	-1.87
9/8/2005	-0.05	2.17	-2.04
9/9/2005	0.04	2.31	-2.06
9/10/2005	0.15	2.32	-1.7
9/11/2005	0.01	2.21	-1.75
9/12/2005	-0.43	1.86	-2.54
9/13/2005	-0.28	2.51	-2.5
9/14/2005	0.62	3.1	-1.54
9/15/2005	0.44	3.29	-2.06
9/16/2005	0.63	3.54	-2.09
9/17/2005	0.66	3.33	-2.24
9/18/2005	0.44	2.97	-2.38
9/19/2005	0.08	2.69	-2.7
9/20/2005	-0.15	2.6	-2.84
9/21/2005	-0.18	2.65	-2.78
9/22/2005	-0.09	2.55	-2.31
9/23/2005	-0.27	2.11	-2.35
9/24/2005	0.78	2.97	-0.86
9/25/2005	0.11	1.91	-1.53
9/26/2005	-0.09	1.83	-1.75
9/27/2005	-0.35	1.92	-1.99
9/28/2005	0.36	2.32	-1
9/29/2005	0.04	1.63	-1.43
9/30/2005	0.01	2.07	-2.12
10/1/2005	-0.09	2.23	-2.19
10/2/2005	-0.29	1.88	-2.42
10/3/2005	-0.25	1.93	-2.41
10/4/2005	-0.11	2.26	-2.3
10/5/2005	-0.18	2.31	-2.31
10/6/2005	-0.13	2.33	-2.25
10/7/2005	0.14	2.69	-1.93
10/8/2005	0.25	2.71	-1.63
10/9/2005	0.07	2.53	-2.06
10/10/2005	0.77	3.16	-1.03
10/11/2005	0.82	2.92	-1.02
10/12/2005	2.05	4.31	0.07
10/13/2005	2.44	4.44	0.24
10/14/2005	2.03	3.89	-0.35
10/15/2005	1.17	3.5	-1.28
10/16/2005	-0.24	2.49	-3.2
10/17/2005	-0.85	1.87	-3.83
10/18/2005	-0.17	2.81	-2.9
10/19/2005	-0.17	2.78	-2.73
10/20/2005	-0.04	2.7	-2.56

10/21/2005	0.22	2.81	-1.92
10/22/2005	0.86	3.24	-1.03
10/23/2005	-0.1	1.87	-1.88
10/24/2005	0.96	2.89	-1.26
10/25/2005	3.14	4.37	0.96
10/26/2005	0.59	2.4	-1.74
10/27/2005	-0.27	1.61	-1.89
10/28/2005	0.33	2.2	-1.26
10/29/2005	0.42	2.16	-1.3
10/30/2005	-0.06	1.95	-1.88
10/31/2005	0.01	2.35	-2.13
11/1/2005	-0.17	2.32	-2.53
11/2/2005	-0.11	2.52	-2.63
11/3/2005	-0.46	2.63	-2.75
11/4/2005	-0.68	2.35	-3.31
11/5/2005	0.1	2.94	-2.43
11/6/2005	0.08	2.65	-1.85
11/7/2005	-0.26	2.28	-2.29
11/8/2005	-0.47	1.99	-2.41
11/9/2005	0.24	2.61	-1.56
11/10/2005	0.01	2.35	-2.58
11/11/2005	-0.25	1.99	-2.53
11/12/2005	-0.17	2.05	-2.77
11/13/2005	-0.34	2.09	-2.76
11/14/2005	-0.45	2.23	-3.05
11/15/2005	0.13	2.95	-2.76
11/16/2005	-0.09	2.79	-2.56
11/17/2005	-0.48	2.52	-2.92
11/18/2005	-0.48	2.34	-2.83
11/19/2005	-0.3	2.4	-2.25
11/20/2005	-0.7	1.79	-2.48
11/21/2005	-0.3	1.74	-2.28
11/22/2005	0.85	2.85	-1.23
11/23/2005	-0.59	1.11	-2.23
11/24/2005	-0.37	1.4	-2.55
11/25/2005	-0.99	0.59	-2.3
11/26/2005	-0.47	1.05	-2.14
11/27/2005	-0.22	1.71	-1.9
11/28/2005	0.06	2.06	-2.02
11/29/2005	0.37	2.54	-1.58
11/30/2005	0.12	2.72	-2.13
12/1/2005	0.52	3.36	-2.3
12/2/2005	-0.68	2.72	-3.49
12/3/2005	-1.4	1.82	-4.37
12/4/2005	-0.33	2.81	-2.82
12/5/2005	-0.15	2.55	-2.49
12/6/2005	-0.12	2.62	-2.59
12/7/2005	-1.24	1.21	-3.74
12/8/2005	-1.18	1.18	-3.25
12/9/2005	-0.52	2.08	-3.25
12/10/2005	-0.89	1	-3.12
12/11/2005	-0.12	2.05	-2.27
12/12/2005	-0.37	1.92	-2.6
12/13/2005	-0.06	2.5	-2.3
12/14/2005	0.17	2.91	-2.15
12/15/2005	0.28	2.73	-2.16
12/16/2005	0.45	2.86	-2.17
12/17/2005	-0.75	1.96	-2.98
12/18/2005	-0.61	2	-2.56
12/19/2005	-0.74	1.9	-2.76
12/20/2005	-1.03	1.3	-2.72
12/21/2005	-0.8	1.38	-2.45
12/22/2005	-0.78	1.19	-2.5

12/23/2005	-1.18	0.4	-2.73
12/24/2005	-0.68	0.84	-2.16
12/25/2005	0.28	1.66	-1.18
12/26/2005	-0.03	2.22	-2.51
12/27/2005	-0.68	1.32	-2.51
12/28/2005	0.02	2.34	-1.95
12/29/2005	0.52	3.15	-1.65
12/30/2005	-0.11	2.76	-2.74
12/31/2005	0.14	3.32	-2.67
1/1/2006	0.11	3.29	-2.68
1/2/2006	0.11	3.15	-2.77
1/3/2006	1.52	4.21	-1.56
1/4/2006	1.39	3.74	-1.25
1/5/2006	0.56	2.98	-1.92
1/6/2006	0.26	2.35	-1.97
1/7/2006	-0.15	2.22	-2.44
1/8/2006	-0.59	1.68	-2.55
1/9/2006	-0.55	2.1	-2.71
1/10/2006	-0.75	1.74	-2.99
1/11/2006	-0.57	1.75	-2.47
1/12/2006	-0.71	1.84	-2.8
1/13/2006	-0.35	2.31	-2.79
1/14/2006	0.49	3.2	-1.93
1/15/2006	-0.03	2.37	-2.06
1/16/2006	-0.33	2.41	-2.4
1/17/2006	-0.4	2.03	-2.94
1/18/2006	-0.16	2.38	-2.92
1/19/2006	-1.88	-0.05	-3.73
1/20/2006	-1.45	0.17	-3.31
1/21/2006	-0.99	0.87	-2.73
1/22/2006	-1.03	0.45	-2.62
1/23/2006	-0.35	1.28	-2.02
1/24/2006	0.01	1.95	-1.65
1/25/2006	-0.51	2.28	-3.12
1/26/2006	-0.58	1.5	-2.43
1/27/2006	-0.03	2.67	-2.11
1/28/2006	-0.89	2.14	-3.59
1/29/2006	-0.23	2.78	-3.66
1/30/2006	0.32	3.43	-2.94
1/31/2006	1.24	4.43	-1.84
2/1/2006	0.88	3.43	-1.85
2/2/2006	0.8	3.21	-1.79
2/3/2006	0.63	2.97	-1.94
2/4/2006	0.75	2.72	-1.51
2/5/2006	0.23	3.05	-2.2
2/6/2006	-1.46	1.13	-3.53
2/7/2006	-1.37	0.16	-3.08
2/8/2006	-0.43	1.61	-2.1
2/9/2006	-0.35	1.98	-2.15
2/10/2006	-0.64	1.79	-2.52
2/11/2006	0	2.05	-2.72
2/12/2006	2.01	4.62	-0.27
2/13/2006	-0.27	2.17	-2.7
2/14/2006	-1.38	0.69	-3.46
2/15/2006	-0.86	1.32	-3.2
2/16/2006	-0.7	1.58	-2.7
2/17/2006	-1.14	1.06	-3.7
2/18/2006	-1.55	0.35	-3.64
2/19/2006	-1.46	0.52	-3.23
2/20/2006	-1.02	0.76	-2.65
2/21/2006	-0.72	1.36	-2.19
2/22/2006	-0.44	1.58	-2
2/23/2006	-0.03	2.23	-1.98

2/24/2006	-0.78	2.21	-3.27
2/25/2006	-0.45	1.97	-2.61
2/26/2006	-0.21	2.72	-2.98
2/27/2006	-0.54	2.62	-3.54
2/28/2006	-0.49	2.46	-3.68
3/1/2006	-0.44	2.44	-3.52
3/2/2006	0.15	2.89	-3.02
3/3/2006	-0.23	2.29	-3.01
3/4/2006	-1.09	0.64	-3.36
3/5/2006	-0.57	1.65	-2.57
3/6/2006	-0.39	1.91	-2.06
3/7/2006	-0.12	1.96	-1.68
3/8/2006	-0.29	1.66	-1.91
3/9/2006	-0.13	1.74	-1.69
3/10/2006	-0.42	1.95	-2.55
3/11/2006	-0.65	1.58	-2.48
3/12/2006	-0.51	1.77	-2.68
3/13/2006	-0.32	1.96	-2.53
3/14/2006	-0.44	2.09	-2.55
3/15/2006	-1.3	0.74	-3.72
3/16/2006	-1.19	1.49	-3.67
3/17/2006	-0.32	1.89	-2.56
3/18/2006	-0.47	1.65	-2.73
3/19/2006	-0.68	1.77	-2.7
3/20/2006	-0.58	0.94	-2.42
3/21/2006	-0.47	1.86	-2.21
3/22/2006	-0.42	1.74	-1.92
3/23/2006	-0.58	1.66	-2.22
3/24/2006	-0.1	1.76	-1.75
3/25/2006	0.58	2.61	-1.45
3/26/2006	0.47	2.96	-1.93
3/27/2006	0.28	2.8	-2.36
3/28/2006	0.16	2.82	-2.84
3/29/2006	-0.02	2.69	-3.03
3/30/2006	-0.34	2.49	-3.26
3/31/2006	-0.51	2.47	-3.34
4/1/2006	-0.65	2.26	-3.2
4/2/2006	-0.69	1.08	-2.88
4/3/2006	-0.17	2.22	-2.38
4/4/2006	-0.37	2.4	-2.28
4/5/2006	-0.25	1.94	-1.9
4/6/2006	-0.41	1.78	-2.08
4/7/2006	-0.24	1.64	-1.93
4/8/2006	0.1	1.68	-1.67
4/9/2006	0.39	2.28	-1.36
4/10/2006	-0.26	1.67	-2.13
4/11/2006	-0.56	1.45	-2.56
4/12/2006	-0.73	1.58	-2.88
4/13/2006	-0.77	1.68	-3.02
4/14/2006	-0.53	2.26	-2.91
4/15/2006	-0.15	2.6	-2.48
4/16/2006	-0.1	2.45	-2.2
4/17/2006	0.05	2.46	-2.09
4/18/2006	-0.18	1.19	-2.12
4/19/2006	-0.05	2.32	-1.76
4/20/2006	-0.09	2.24	-1.96
4/21/2006	0.32	2.27	-1.72
4/22/2006	0.82	2.77	-1.21
4/23/2006	0.39	2.62	-1.99
4/24/2006	0.33	2.59	-2.11
4/25/2006	0.01	2.57	-2.65
4/26/2006	0.15	2.81	-2.89
4/27/2006	-0.12	2.79	-2.94

4/28/2006	0.1	3.16	-2.93
4/29/2006	-0.09	2.98	-2.77
4/30/2006	0.28	3.12	-2.22
5/1/2006	0.82	2.31	-1.53
5/2/2006	0.79	3.46	-1.11
5/3/2006	0.1	2.4	-1.78
5/4/2006	0.26	2.35	-1.4
5/5/2006	0.11	2.02	-1.43
5/6/2006	0.1	1.87	-1.49
5/7/2006	0.12	1.71	-1.51
5/8/2006	0.33	2.01	-1.4
5/9/2006	0.6	2.4	-1.43
5/10/2006	0.52	2.42	-1.59
5/11/2006	0.52	3	-1.78
5/12/2006	0.59	3.07	-1.67
5/13/2006	0.51	3.14	-1.7
5/14/2006	0.72	3.24	-1.43
5/15/2006	0.57	3	-1.85
5/16/2006	0.17	2.72	-2.09
5/17/2006	-0.03	1.26	-2.22
5/18/2006	0.2	2.78	-1.87
5/19/2006	0.3	2.85	-1.8
5/20/2006	0.07	2.41	-2.17
5/21/2006	0.14	2.44	-2.25
5/22/2006	-0.13	2.06	-2.69
5/23/2006	-0.14	2.23	-2.74
5/24/2006	-0.12	2.5	-2.81
5/25/2006	0.02	3	-2.7
5/26/2006	0.13	3.16	-2.46
5/27/2006	0.05	3	-2.43
5/28/2006	-0.12	2.72	-2.48
5/29/2006	-0.25	2.49	-2.46
5/30/2006	-0.38	2.35	-2.6
5/31/2006	-0.27	1.19	-2.22
6/1/2006	-0.41	2.1	-2.29
6/2/2006	-0.28	1.7	-2.02
6/3/2006	0.06	1.98	-1.53
6/4/2006	0.15	1.8	-1.49
6/5/2006	0.05	1.58	-1.69
6/6/2006	0.27	2.07	-1.59
6/7/2006	1.04	2.76	-0.6
6/8/2006	0.6	2.62	-1.36
6/9/2006	0.35	2.72	-1.82
6/10/2006	0	2.57	-2.31
6/11/2006	-0.37	2.66	-2.79
6/12/2006	-0.11	2.86	-2.42
6/13/2006	-0.17	2.83	-2.5
6/14/2006	-0.19	3.1	-2.55
6/15/2006	-0.07	1.41	-2.44
6/16/2006	-0.14	2.75	-2.34
6/17/2006	-0.32	2.28	-2.76
6/18/2006	-0.44	2.07	-2.86
6/19/2006	-0.42	1.74	-2.87
6/20/2006	-0.26	2.14	-2.65
6/21/2006	-0.1	2.32	-2.57
6/22/2006	-0.12	2.38	-2.45
6/23/2006	-0.27	2.56	-2.79
6/24/2006	-0.29	2.64	-2.63
6/25/2006	-0.13	2.75	-2.43
6/26/2006	-0.12	2.66	-2.3
6/27/2006	-0.15	2.61	-2.27
6/28/2006	-0.09	2.53	-2.24
6/29/2006	-0.2	1.05	-2.14

6/30/2006	-0.23	2.18	-2.16
7/1/2006	-0.4	1.84	-2.2
7/2/2006	-0.63	1.42	-2.34
7/3/2006	-0.56	1.02	-2.48
7/4/2006	-0.23	1.55	-2.06
7/5/2006	-0.2	1.61	-1.93
7/6/2006	0.07	2.17	-1.7
7/7/2006	-0.11	2.27	-1.94
7/8/2006	-0.26	2.42	-2.38
7/9/2006	-0.27	2.43	-2.54
7/10/2006	-0.59	2.57	-3.03
7/11/2006	-0.51	2.59	-2.99
7/12/2006	-0.55	2.62	-3.06
7/13/2006	-0.45	2.76	-3.06
7/14/2006	-0.07	2.09	-2.57
7/15/2006	-0.04	2.74	-2.59
7/16/2006	0.05	2.53	-2.46
7/17/2006	0.07	2.36	-2.37
7/18/2006	-0.05	2.22	-2.37
7/19/2006	0	2.31	-2.39
7/20/2006	0.62	3.08	-1.52
7/21/2006	0.12	2.28	-1.96
7/22/2006	-0.07	2.43	-2.33
7/23/2006	-0.14	2.67	-2.51
7/24/2006	-0.06	2.52	-2.3
7/25/2006	-0.16	2.48	-2.34
7/26/2006	-0.02	2.53	-2.15
7/27/2006	-0.12	2.19	-2.12
7/28/2006	-0.31	1.91	-2.22
7/29/2006	-0.4	1.36	-2.36
7/30/2006	-0.09	1.84	-2.04
7/31/2006	0.19	1.94	-1.62
8/1/2006	-0.01	1.75	-1.67
8/2/2006	-0.09	1.79	-1.75
8/3/2006	-0.07	1.84	-1.81
8/4/2006	0.28	2.34	-1.48
8/5/2006	0.35	2.54	-1.49
8/6/2006	0.24	2.78	-1.89
8/7/2006	0.04	2.82	-2.39
8/8/2006	-0.06	3.08	-2.64
8/9/2006	0.16	3.24	-2.6
8/10/2006	0.08	3.07	-2.76
8/11/2006	0.4	3.26	-2.74
8/12/2006	0.3	2.75	-2.5
8/13/2006	-0.01	2.63	-2.66
8/14/2006	-0.31	2.26	-2.82
8/15/2006	-0.64	1.79	-3.14
8/16/2006	-0.16	2.2	-2.29
8/17/2006	-0.08	2.21	-2.1
8/18/2006	-0.07	2.14	-1.92
8/19/2006	-0.09	2.29	-2.1
8/20/2006	-0.26	2.23	-2.38
8/21/2006	-0.09	2.45	-2.17
8/22/2006	-0.17	2.39	-2.26
8/23/2006	-0.13	2.43	-2.34
8/24/2006	0.06	2.46	-2.07
8/25/2006	0.04	2.16	-2.13
8/26/2006	0.51	2.73	-1.52
8/27/2006	0.42	2.25	-1.58
8/28/2006	0.08	1.83	-1.69
8/29/2006	0.53	2.53	-1.35
8/30/2006	0.97	2.95	-0.71
8/31/2006	0.86	2.73	-0.76

9/1/2006	1.9	3.78	-0.23
9/2/2006	2.43	4.03	-0.2
9/3/2006	0.97	2.82	-1.47
9/4/2006	0.25	2.73	-1.93
9/5/2006	0.49	3.48	-1.99
9/6/2006	0.59	3.28	-2.12
9/7/2006	0.28	3.24	-2.66
9/8/2006	0.26	2.98	-2.67
9/9/2006	0.14	2.81	-2.7
9/10/2006	0.36	3.04	-2.68
9/11/2006	1.14	3.69	-1.57
9/12/2006	1.18	3.56	-1.15
9/13/2006	0.75	3.05	-1.29
9/14/2006	0.52	2.67	-1.46
9/15/2006	0.69	2.82	-1.31
9/16/2006	0.85	2.52	-1.17
9/17/2006	0.54	2.6	-1.18
9/18/2006	0.4	2.54	-1.45
9/19/2006	0.33	2.55	-1.64
9/20/2006	0.31	2.2	-1.62
9/21/2006	-0.03	2.13	-2.2
9/22/2006	0.01	2.18	-2.16
9/23/2006	-0.29	1.95	-2.54
9/24/2006	-0.41	1.82	-2.49
9/25/2006	-0.14	2.17	-2.19
9/26/2006	-0.11	2.11	-2.03
9/27/2006	0.13	2.36	-1.68
9/28/2006	0.42	2.48	-1.29
9/29/2006	0.15	2.23	-1.49
9/30/2006	0.11	2.26	-1.63
10/1/2006	0.17	2.35	-1.59
10/2/2006	0.02	2.23	-1.89
10/3/2006	-0.07	2.29	-2.25
10/4/2006	-0.15	2.71	-2.73
10/5/2006	0.28	3.25	-2.63
10/6/2006	1.68	4.62	-1.97
10/7/2006	2.1	4.92	-0.62
10/8/2006	0.63	3.51	-2.35
10/9/2006	0.16	3.12	-2.54
10/10/2006	0.22	3.09	-2.39
10/11/2006	1.01	3.69	-1.43
10/12/2006	0.89	3.14	-0.99
10/13/2006	0.4	2.8	-1.44
10/14/2006	0.2	2.37	-1.71
10/15/2006	-0.03	1.7	-1.77
10/16/2006	0.05	1.85	-1.64
10/17/2006	0.43	2.29	-1.13
10/18/2006	0.32	2.25	-1.5
10/19/2006	0.35	2.34	-1.78
10/20/2006	0.28	2.59	-1.55
10/21/2006	-0.61	1.77	-2.91
10/22/2006	-0.3	2.16	-2.65
10/23/2006	0.03	2.47	-2.05
10/24/2006	-0.19	2.36	-2.25
10/25/2006	-0.41	2.06	-2.46
10/26/2006	-0.21	2.32	-2.1
10/27/2006	0.27	2.57	-1.51
10/28/2006	0.59	2.74	-2.26
10/29/2006	-1.8	0.04	-3.7
10/30/2006	-1.85	0.38	-3.69
10/31/2006	-0.5	2.02	-2.46
11/1/2006	0.05	2.48	-2.35
11/2/2006	0.29	2.67	-2.15

11/3/2006	-0.01	2.52	-2.6
11/4/2006	-0.17	2.64	-3.19
11/5/2006	-0.18	2.84	-3.14
11/6/2006	-0.23	2.96	-3.02
11/7/2006	-0.05	2.96	-2.94
11/8/2006	0.85	3.79	-1.98
11/9/2006	0.76	3.46	-1.34
11/10/2006	0.1	2.61	-1.84
11/11/2006	0.06	2.37	-1.87
11/12/2006	0.44	2.47	-1.3
11/13/2006	1.29	2.99	-0.36
11/14/2006	0.8	2.31	-1.24
11/15/2006	0.33	1.96	-1.52
11/16/2006	0.57	2.19	-1.54
11/17/2006	-0.05	2.06	-1.84
11/18/2006	-0.04	2.12	-2.47
11/19/2006	0.2	2.52	-1.96
11/20/2006	-0.01	2.63	-2.16
11/21/2006	0.13	2.53	-2.39
11/22/2006	2.06	4.1	-0.75
11/23/2006	2.14	4.51	-0.03
11/24/2006	0.87	3.32	-1.36
11/25/2006	0.58	3.04	-1.38
11/26/2006	-0.01	2.42	-2.12
11/27/2006	-0.45	2.04	-2.4
11/28/2006	-0.17	2.13	-2
11/29/2006	0.2	2.24	-2.19
11/30/2006	-0.22	1.94	-2.68
12/1/2006	-0.45	1.93	-3.76
12/2/2006	-1.24	1.46	-3.61
12/3/2006	-0.4	2.48	-3.74
12/4/2006	-0.16	2.97	-2.79
12/5/2006	-0.29	2.78	-2.91
12/6/2006	-0.22	2.96	-2.82
12/7/2006	-0.51	2.52	-2.93
12/8/2006	-1.32	0.94	-3.42
12/9/2006	-1.47	0.79	-3.38
12/10/2006	-1.58	0.56	-3.34
12/11/2006	-1.03	1.1	-2.99
12/12/2006	-0.13	1.54	-1.69
12/13/2006	-0.03	1.63	-1.78
12/14/2006	-0.35	1.29	-2
12/15/2006	-0.08	1.61	-1.62
12/16/2006	-0.35	1.78	-2.29
12/17/2006	-0.46	1.95	-2.13
12/18/2006	-0.53	1.93	-2.74
12/19/2006	-0.22	2.57	-2.54
12/20/2006	-0.18	2.73	-2.51
12/21/2006	-0.95	2	-3.58
12/22/2006	-0.43	2.38	-3.34
12/23/2006	0.36	3.14	-1.94
12/24/2006	-0.61	2.1	-3.1
12/25/2006	-0.32	1.97	-2.88
12/26/2006	0.29	2.75	-2.12
12/27/2006	-0.5	1.61	-2.75
12/28/2006	-0.72	1.43	-2.97
12/29/2006	-0.55	1.65	-2.55
12/30/2006	-0.27	2.41	-2.98
12/31/2006	-0.28	2.22	-2.35
1/1/2007	0.28	3.11	-2.19
1/2/2007	-0.47	2.37	-2.96
1/3/2007	-0.94	2.12	-3.5
1/4/2007	-0.84	2.18	-3.58

1/5/2007	-0.29	2.61	-2.91
1/6/2007	-0.45	2.37	-2.6
1/7/2007	-0.56	1.9	-2.73
1/8/2007	-0.08	2.17	-1.88
1/9/2007	-1.04	0.9	-2.76
1/10/2007	-1.03	0.65	-2.72
1/11/2007	-0.9	0.66	-2.53
1/12/2007	-1.36	0.83	-3.09
1/13/2007	-0.96	0.78	-2.28
1/14/2007	-0.06	1.75	-1.56
1/15/2007	0.01	2.29	-2.1
1/16/2007	-0.38	2.06	-2.52
1/17/2007	-0.47	2.13	-2.71
1/18/2007	-0.21	2.53	-2.9
1/19/2007	-0.31	3	-3.1
1/20/2007	-1.53	1.62	-4.28
1/21/2007	-0.97	1.89	-4.01
1/22/2007	0.03	2.76	-2.54
1/23/2007	0.01	2.5	-2.42
1/24/2007	-0.1	2.13	-2.3
1/25/2007	-0.02	2.4	-2.2
1/26/2007		1.84	
1/27/2007	-0.26	1.68	-2.04
1/28/2007	0.01	2.47	-2.11
1/29/2007	-0.05	2.27	-2.26
1/30/2007	-0.3	2.13	-2.32
1/31/2007	-0.54	1.73	-3.27
2/1/2007	-0.26	2.37	-2.84
2/2/2007	0.35	2.91	-2.43
2/3/2007	-0.74	2.04	-3.26
2/4/2007	-1.81	0.8	-4.23
2/5/2007			
2/6/2007			
2/7/2007			
2/8/2007			
2/9/2007			
2/10/2007			
2/11/2007			
2/12/2007			
2/13/2007			
2/14/2007			-2.86
2/15/2007	-1.64	1.27	-3.91
2/16/2007	-2.18	0.84	-4.62
2/17/2007		0.94	-5.04
2/18/2007	-0.79	2.36	-4.06
2/19/2007	-1.25	1.67	-4.2
2/20/2007	-0.99	2.25	-3.96
2/21/2007	-0.41	2.5	-3.05
2/22/2007	-0.08	2.16	-2.4
2/23/2007	-0.41	2.29	-2.48
2/24/2007	-0.56	1.98	-2.47
2/25/2007	-0.08	1.97	-1.71
2/26/2007	0.48	2.58	-1.33
2/27/2007	0.18	2.49	-2.04
2/28/2007	-0.16	2.16	-2.15
3/1/2007	-0.08	2.13	-2.36
3/2/2007	0.53	3.17	-2.22
3/3/2007	0.34	2.66	-1.97
3/4/2007	-0.63	1.94	-3.16
3/5/2007	-1.43	1.1	-3.74
3/6/2007	-1.87	0.36	-4.2
3/7/2007	-0.87	1.68	-3.35
3/8/2007	-0.99	0.93	-3.03

3/9/2007	-0.84	1.4	-2.47
3/10/2007	-0.96	-0.03	-2.46
3/11/2007	-1	1.13	-2.46
3/12/2007	-0.83	1.15	-2.1
3/13/2007	-0.74	1.04	-2.2
3/14/2007	-0.76	1.38	-2.72
3/15/2007	-0.72	1.55	-2.65
3/16/2007	1.36	3.53	-0.52
3/17/2007	0.75	3.45	-1.94
3/18/2007	-1.02	1.84	-4.1
3/19/2007	-1.13	1.83	-4.32
3/20/2007	-1.26	1.94	-4.24
3/21/2007	-1	2.17	-3.91
3/22/2007	-0.97	1.33	-3.41
3/23/2007	-1.35	1.58	-3.8
3/24/2007	-0.78	1.82	-3.14
3/25/2007	-0.23	2.2	-2.14
3/26/2007	-0.7	1.57	-2.41
3/27/2007	-0.58	1.41	-2.28
3/28/2007	-0.36	1.71	-2.46
3/29/2007	-0.48	1.47	-2.33
3/30/2007	-0.37	1.84	-2.35
3/31/2007	-0.35	1.78	-2.58
4/1/2007	-0.22	2.06	-2.44
4/2/2007	0.12	2.42	-2.15
4/3/2007	0.1	2.58	-2.08
4/4/2007	0.78	2.9	-1.42
4/5/2007	-0.13	1.6	-2.44
4/6/2007	-0.68	2.03	-2.81
4/7/2007	-0.06	1.16	-1.85
4/8/2007	-0.95	1.96	-2.78
4/9/2007	-1.69	0.81	-3.27
4/10/2007	-0.9	0.62	-2.4
4/11/2007	-0.44	1.49	-1.93
4/12/2007	0.34	2.07	-1.56
4/13/2007	-0.55	2.25	-3.16
4/14/2007	-0.61	1.74	-3.13
4/15/2007	0.96	3.86	-2.89
4/16/2007	0.26	2.82	-3.08
4/17/2007	0.65	3.78	-2.75
4/18/2007	1.07	4.16	-2.12
4/19/2007	1.06	3.71	-1.61
4/20/2007	0.43	3.1	-2.06
4/21/2007	-0.12	1.53	-2.46
4/22/2007	-0.29	2.37	-2.44
4/23/2007	-0.4	2.34	-2.32
4/24/2007	-0.9	1.28	-2.84
4/25/2007	-0.17	1.51	-2.08
4/26/2007	0.09	2.25	-1.85
4/27/2007	0.05	1.78	-1.85
4/28/2007	0.1	2.07	-1.88
4/29/2007	-0.03	2.04	-2.05
4/30/2007	0	2.2	-2.09
5/1/2007	-0.15	2.28	-2.27
5/2/2007	-0.06	2.49	-2.18
5/3/2007	-0.34	2.09	-2.36
5/4/2007	-0.59	1.99	-2.7
5/5/2007	-0.59	2.09	-2.61
5/6/2007	0.4	2.55	-1.88
5/7/2007	0.12	1.24	-1.76
5/8/2007	-0.45	2.06	-2.08
5/9/2007	-0.5	1.74	-2.21
5/10/2007	-0.29	1.76	-2.13

5/11/2007	-0.07	1.98	-2.11
5/12/2007	0.14	2.21	-2.32
5/13/2007	0.24	2.43	-2.26
5/14/2007	-0.08	2.42	-2.72
5/15/2007	-0.76	2.1	-3.57
5/16/2007	-0.83	2.56	-3.73
5/17/2007	-0.11	3.4	-3.12
5/18/2007	0.9	3.62	-1.71
5/19/2007	0.04	2.7	-2.5
5/20/2007	-0.34	1.15	-2.72
5/21/2007	-0.23	2.52	-2.5
5/22/2007	-0.41	2.19	-2.41
5/23/2007	-0.5	1.72	-2.38
5/24/2007	-0.66	1.39	-2.51
5/25/2007	-0.74	0.94	-2.59
5/26/2007	-0.37	1.55	-2.24
5/27/2007	-0.22	1.76	-2.12
5/28/2007	-0.26	1.91	-2.19
5/29/2007	-0.29	2.1	-2.16
5/30/2007	-0.38	2.21	-2.35
5/31/2007	-0.4	2.24	-2.37
6/1/2007	-0.33	2.24	-2.35
6/2/2007	-0.48	2.28	-2.56
6/3/2007	0.11	3.45	-2.36
6/4/2007	0.98	3.3	-1.03
6/5/2007	0.29	1.44	-1.73
6/6/2007	0.1	2.75	-1.92
6/7/2007	-0.04	2.35	-2.1
6/8/2007	0.04	2.18	-2.13
6/9/2007	0.42	2.51	-2.05
6/10/2007	0.54	2.71	-2.02
6/11/2007	0.26	2.67	-2.41
6/12/2007	0.44	3.21	-2.24
6/13/2007	0.96	4.15	-1.94
6/14/2007	1.12	3.59	-1.51
6/15/2007	0.67	3.43	-1.79
6/16/2007	0.2	2.96	-2.25
6/17/2007	-0.06	2.84	-2.45
6/18/2007	0.03	1.57	-2.25
6/19/2007	0.03	2.65	-2.1
6/20/2007	0.09	2.4	-2.05
6/21/2007	0.05	2.24	-1.84
6/22/2007	-0.04	1.66	-2.06
6/23/2007	0.09	1.71	-1.62
6/24/2007	-0.01	1.83	-1.79
6/25/2007	-0.27	1.7	-2.08
6/26/2007	-0.35	1.85	-2.19
6/27/2007	-0.49	1.9	-2.36
6/28/2007	-0.5	2.16	-2.52
6/29/2007	-0.16	2.58	-2.28
6/30/2007	0.04	2.72	-2.09
7/1/2007	0	2.78	-2.16
7/2/2007	-0.06	2.53	-2.34
7/3/2007	-0.32	2.46	-2.62
7/4/2007	-0.32	1.46	-2.61
7/5/2007	-0.64	2.12	-2.99
7/6/2007	-0.32	2.02	-2.7
7/7/2007	-0.12	1.99	-2.5
7/8/2007	-0.04	2.16	-2.31
7/9/2007	0.05	2.47	-2.3
7/10/2007	0.05	2.59	-2.37
7/11/2007	0.24	2.98	-2.21
7/12/2007	0.2	2.88	-2.16

7/13/2007	-0.06	2.89	-2.58
7/14/2007	-0.08	2.89	-2.52
7/15/2007	-0.11	2.66	-2.5
7/16/2007	-0.08	2.75	-2.45
7/17/2007	0.07	2.56	-2.16
7/18/2007	0.07	1.84	-1.99
7/19/2007	0.08	2.29	-1.87
7/20/2007	-0.1	1.98	-1.99
7/21/2007	0.01	1.86	-1.66
7/22/2007	0.16	1.96	-1.56
7/23/2007	0.6	2.23	-1.22
7/24/2007	-0.06	1.78	-1.67
7/25/2007	-0.06	2.03	-1.81
7/26/2007	-0.05	2.25	-1.83
7/27/2007	0.03	2.64	-1.97
7/28/2007	0.17	2.81	-1.9
7/29/2007	0.1	2.9	-2.3
7/30/2007	0.16	2.93	-2.27
7/31/2007	0.18	2.94	-2.24
8/1/2007	0.15	2.78	-2.26
8/2/2007	0	2.16	-2.4
8/3/2007	-0.23	2.27	-2.66
8/4/2007	-0.24	2.1	-2.64
8/5/2007	0.21	2.63	-2.25
8/6/2007	0.08	2.3	-2.02
8/7/2007	0.19	2.54	-1.96
8/8/2007	0.19	2.6	-2.07
8/9/2007	0.43	3.09	-1.92
8/10/2007	0.56	3.36	-2.03
8/11/2007	1.06	3.15	-1.43
8/12/2007	0.19	2.76	-2.22
8/13/2007	0.14	2.84	-2.23
8/14/2007	0.37	2.76	-1.96
8/15/2007	0.14	2.1	-1.99
8/16/2007	-0.09	2.04	-2.19
8/17/2007	-0.08	1.96	-2.1
8/18/2007	-0.11	2.05	-1.92
8/19/2007	-0.24	1.8	-1.88
8/20/2007	0.2	2.04	-1.49
8/21/2007	0.88	2.46	-0.45
8/22/2007	0.65	2.34	-0.97
8/23/2007	0.35	2.19	-1.26
8/24/2007	0.23	2.38	-1.48
8/25/2007	0.11	2.6	-1.84
8/26/2007	0.11	2.8	-2.13
8/27/2007	0.29	3.03	-2.19
8/28/2007	0.35	3.1	-2.21
8/29/2007	0.3	2.96	-2.35
8/30/2007	0.29	2.82	-2.4
8/31/2007	0.45	2.96	-2.18
9/1/2007	0.4	3.05	-2.26
9/2/2007	0.16	2.76	-2.27
9/3/2007	-0.05	2.43	-2.18
9/4/2007	-0.28	2.17	-2.47
9/5/2007	0.13	2.53	-1.94
9/6/2007	0.16	2.42	-1.85
9/7/2007	-0.07	2.34	-2.2
9/8/2007	-0.4	2.24	-2.6
9/9/2007	0.03	2.71	-2.42
9/10/2007	0.34	2.82	-2
9/11/2007	0.41	2.63	-1.91
9/12/2007	-0.14	2.02	-2.41
9/13/2007	-0.09	2.14	-2.31

9/14/2007	0.1	2.33	-1.95
9/15/2007	0.17	2.43	-1.66
9/16/2007	-0.06	2.06	-1.88
9/17/2007	0.16	2.06	-1.62
9/18/2007	0.53	2.27	-0.93
9/19/2007	0.2	1.88	-1.3
9/20/2007	-0.1	1.7	-1.66
9/21/2007	-0.04	2	-1.56
9/22/2007	0.11	2.32	-1.62
9/23/2007	0.02	2.43	-2.03
9/24/2007	0.02	2.65	-2.38
9/25/2007	-0.28	2.42	-2.89
9/26/2007	-0.21	2.47	-2.92
9/27/2007	0.05	2.71	-2.97
9/28/2007	0.26	3.17	-2.55
9/29/2007	0.07	3.05	-2.8
9/30/2007	0.13	3.08	-2.6
10/1/2007	0.28	2.95	-2.02
10/2/2007	0.3	2.82	-1.9
10/3/2007	0.2	2.48	-1.75
10/4/2007	0.16	2.3	-1.81
10/5/2007	0.03	2.12	-1.86
10/6/2007	0.04	2.22	-1.9
10/7/2007	0.26	2.82	-2.02
10/8/2007	0.46	2.41	-1.77
10/9/2007	0.75	3.34	-1.97
10/10/2007	1.14	3.19	-1.05
10/11/2007	1.06	3.42	-1.16
10/12/2007	0.26	2.23	-1.9
10/13/2007	0.29	2.57	-1.79
10/14/2007	-0.04	2.32	-1.91
10/15/2007	-0.01	2.28	-1.7
10/16/2007	-0.05	2.11	-1.75
10/17/2007	0.04	2.12	-1.52
10/18/2007	0.1	2.19	-1.52
10/19/2007	0.38	2.45	-1.2
10/20/2007	0.17	2.28	-1.9
10/21/2007	-0.32	1.84	-2.39
10/22/2007	-0.17	2.33	-2.19
10/23/2007	0.07	2.59	-2.49
10/24/2007	0.07	2.82	-2.74
10/25/2007	1.37	3.76	-2.09
10/26/2007	1.32	4.1	-1.54
10/27/2007	0.49	3.71	-2.52
10/28/2007	-0.21	2.87	-2.89
10/29/2007	-0.02	3.05	-2.47
10/30/2007	-0.36	2.45	-2.62
10/31/2007	-0.25	2.38	-2.36
11/1/2007	-0.24	2.11	-2.18
11/2/2007	0.77	2.82	-1.21
11/3/2007	2.15	3.82	-0.4
11/4/2007	0.19	2.14	-2.24
11/5/2007	-0.18	1.74	-2.23
11/6/2007	-0.06	2.5	-2.32
11/7/2007	-0.48	1.56	-2.6
11/8/2007	0	2.27	-2.31
11/9/2007	0.22	2.53	-2
11/10/2007	0.7	3.01	-1.67
11/11/2007	0.58	3	-1.4
11/12/2007	-0.18	2.39	-2.3
11/13/2007	-0.15	2.36	-2.03
11/14/2007	0.06	2.41	-1.77
11/15/2007	-0.1	2.17	-1.63

11/16/2007	-0.85	1.35	-2.68
11/17/2007	-0.9	1.34	-2.57
11/18/2007	0	2.14	-1.73
11/19/2007	0.63	2.39	-1.36
11/20/2007	0.27	2.38	-2.26
11/21/2007	0.28	2.47	-2.24
11/22/2007	0.29	3.01	-2.04
11/23/2007	-0.06	2.95	-3.17
11/24/2007	-0.15	3.01	-2.9
11/25/2007	-0.38	2.8	-3.18
11/26/2007	-0.23	2.76	-3.06
11/27/2007	-0.77	2.31	-3.26
11/28/2007	-0.98	1.98	-3.8
11/29/2007	-0.48	2.19	-2.58
11/30/2007	-0.79	1.79	-2.65
12/1/2007	-1.27	0.63	-3.3
12/2/2007	-0.29	1.53	-1.86
12/3/2007	-0.65	1.72	-3.27
12/4/2007	-1.61	0.2	-3.31
12/5/2007	-0.49	1.34	-2.1
12/6/2007	-0.06	2.14	-1.7
12/7/2007	-0.38	2.01	-2.27
12/8/2007	-0.66	1.9	-2.66
12/9/2007	-0.58	2.08	-2.8
12/10/2007	-0.19	2.44	-2.41
12/11/2007	-0.11	2.5	-2.25
12/12/2007	-0.69	1.95	-2.86
12/13/2007	-0.04	2.66	-2.33
12/14/2007	0.09	2.47	-1.92
12/15/2007	0.06	2.22	-2.1
12/16/2007	1.29	3.71	-1.66
12/17/2007	-1.91	0.64	-3.82
12/18/2007	-1.21	0.78	-3.12
12/19/2007	-0.31	1.76	-2.52
12/20/2007	-0.06	2.42	-2.55
12/21/2007	0.9	2.94	-1.37
12/22/2007	0.85	3.7	-1.72
12/23/2007	0.61	3.49	-2.08
12/24/2007	-0.31	3.09	-2.98
12/25/2007	-0.86	2.34	-3.73
12/26/2007	0.23	2.93	-3.1
12/27/2007	1.01	3.57	-1.37
12/28/2007	-0.01	2.28	-2.12
12/29/2007	0.09	2.25	-2
12/30/2007	-0.06	1.63	-2.02
12/31/2007	-0.07	2.54	-2.1
1/1/2008	-0.44	1.34	-2.44
1/2/2008	-0.95	1.02	-2.54
1/3/2008	-0.58	1.53	-2.25
1/4/2008	-0.84	1.69	-3.18
1/5/2008	-1.22	0.77	-2.93
1/6/2008	-0.58	1.55	-2.86
1/7/2008	-0.25	2.33	-2.31
1/8/2008	-0.43	2.3	-2.59
1/9/2008	-0.59	2.35	-3.05
1/10/2008	-0.53	2.2	-2.84
1/11/2008	-0.02	2.63	-2.42
1/12/2008	-0.06	2.42	-2.21
1/13/2008	0.37	2.68	-1.76
1/14/2008	0.82	2.85	-1.52
1/15/2008	-0.22	2.15	-2.67
1/16/2008	-0.76	1.33	-2.95
1/17/2008	0.19	1.96	-1.55

1/18/2008	0.21	3.29	-2.52
1/19/2008	-0.41	2.02	-2.55
1/20/2008	-0.51	2.44	-2.79
1/21/2008	-1.03	1.74	-3.66
1/22/2008	-0.79	2.31	-3.48
1/23/2008	-0.65	2.35	-3.35
1/24/2008	-0.23	2.61	-3.21
1/25/2008	-0.53	2.23	-3.03
1/26/2008	-0.42	2.06	-2.67
1/27/2008	0.39	2.3	-1.6
1/28/2008	0.97	2.6	-0.84
1/29/2008	0.44	2.35	-1.26
1/30/2008	-0.58	1.92	-2.38
1/31/2008	-0.95	0.49	-2.35
2/1/2008	0.36	1.62	-1.49
2/2/2008	-1.06	1.31	-2.89
2/3/2008	-0.94	1.05	-2.67
2/4/2008	-0.32	1.78	-1.92
2/5/2008	-0.06	2.33	-2.32
2/6/2008	-0.08	2.62	-2.54
2/7/2008	0.07	2.6	-2.42
2/8/2008	0.4	3.16	-2.24
2/9/2008	0.13	2.75	-2.52
2/10/2008	-0.45	2.56	-3.06
2/11/2008	-1.92	0.22	-4.36
2/12/2008		0.62	
2/13/2008	0.13	2.37	-1.94
2/14/2008	-0.13	2.57	-2.44
2/15/2008	-0.79	1.9	-3.06
2/16/2008	-0.6	1.84	-2.75
2/17/2008	-0.06	2.37	-2.24
2/18/2008	-0.01	2.64	-2.26
2/19/2008	-0.6	2.34	-3.03
2/20/2008	-0.96	1.83	-3.82
2/21/2008	-0.71	1.92	-3.41
2/22/2008	-0.04	2.38	-3
2/23/2008	0.2	2.54	-2.25
2/24/2008	-0.09	2.02	-2.23
2/25/2008	-0.51	1.67	-2.5
2/26/2008	-0.04	1.6	-2.16
2/27/2008	-0.16	2.28	-1.96
2/28/2008	-1.09	1.08	-2.78
2/29/2008	-0.58	0.74	-1.88
3/1/2008	-0.6	1.15	-2
3/2/2008	-1.09	0.69	-2.5
3/3/2008	-0.71	1.18	-2.38
3/4/2008	-0.56	1.56	-2.31
3/5/2008	-0.15	2.16	-2.4
3/6/2008	-0.16	2.41	-2.65
3/7/2008	0.38	2.97	-2.74
3/8/2008	0.18	2.73	-2.35
3/9/2008	-2.2	0.48	-4.76
3/10/2008	-1.28	1.73	-4.42
3/11/2008	-0.57	1.7	-3.24
3/12/2008	-0.23	2.59	-2.58
3/13/2008	-0.27	2.07	-2.5
3/14/2008	0.23	2.6	-1.76
3/15/2008	0.63	2.84	-1.53
3/16/2008	1.04	3.33	-1.46
3/17/2008	0.2	2.08	-1.74
3/18/2008	0.66	2.62	-1.85
3/19/2008	1	3.19	-1.46
3/20/2008	0.22	2.37	-2.42

3/21/2008	-1.05	1.14	-3.68
3/22/2008	-0.82	2.01	-3.66
3/23/2008	-0.38	2	-2.82
3/24/2008	-0.42	1.96	-2.51
3/25/2008	-0.19	2.06	-2.3
3/26/2008	-0.76	0.31	-2.57
3/27/2008	-0.37	1.57	-2.07
3/28/2008	-0.16	1.91	-1.72
3/29/2008	-0.33	1.75	-1.76
3/30/2008	-0.35	1.33	-1.64
3/31/2008	-0.38	1.3	-1.81
4/1/2008	-0.66	1.47	-2.77
4/2/2008	-0.97	0.86	-2.79
4/3/2008	-0.71	1.51	-3
4/4/2008	-0.25	2.33	-2.88
4/5/2008	0.04	2.77	-2.77
4/6/2008	0.88	4.23	-2.58
4/7/2008	1.32	4.1	-1.48
4/8/2008	0.99	3.29	-1.76
4/9/2008	0.15	1.9	-2.34
4/10/2008	-0.1	2.98	-2.35
4/11/2008	-0.03	2.54	-2.19
4/12/2008	0.17	2.72	-1.79
4/13/2008	0.16	2.41	-1.84
4/14/2008	0.22	2.35	-2.04
4/15/2008	-0.05	1.83	-1.9
4/16/2008	-0.19	1.82	-2.38
4/17/2008	0.13	2.32	-2.18
4/18/2008	0.29	2.41	-1.92
4/19/2008	0.09	2.5	-2.14
4/20/2008	0.27	2.87	-2.08
4/21/2008	0.66	2.86	-1.47
4/22/2008	0.28	2.48	-1.63
4/23/2008	-0.08	2.27	-1.92
4/24/2008	-0.28	2.17	-2.06
4/25/2008	-0.03	1.09	-1.83
4/26/2008	0.5	2.25	-1.46
4/27/2008	0.75	2.62	-0.83
4/28/2008	0.73	2.5	-0.82
4/29/2008	0.41	2.47	-1.32
4/30/2008	0.22	2.19	-1.68
5/1/2008	0.19	1.99	-1.98
5/2/2008	0.35	2.61	-2.21
5/3/2008	0.94	3.51	-1.7
5/4/2008	0.72	3.33	-2.16
5/5/2008	0.29	3.31	-2.48
5/6/2008	0.12	3.27	-2.68
5/7/2008	0.11	3.35	-2.56
5/8/2008	-0.13	1.56	-2.74
5/9/2008	0.52	2.92	-2.32
5/10/2008	1.08	3.97	-1.38
5/11/2008	1.1	2.92	-1.46
5/12/2008	3.56	5.21	1.47
5/13/2008	1.7	3.8	-0.65
5/14/2008	0.76	2.5	-1.41
5/15/2008	0.63	2.56	-1.47
5/16/2008	0.71	2.91	-1.47
5/17/2008	0.63	2.53	-1.38
5/18/2008	0.42	2.86	-2
5/19/2008	0.15	2.43	-2.02
5/20/2008	0.2	2.83	-2.06
5/21/2008	0.35	2.76	-1.67
5/22/2008	0.02	2.42	-1.87

5/23/2008	-0.2	2.36	-2.12
5/24/2008	0.04	1.2	-1.87
5/25/2008	-0.04	2.38	-1.81
5/26/2008	-0.26	2.12	-2.02
5/27/2008	-0.56	1.48	-2.51
5/28/2008	-0.09	1.68	-1.85
5/29/2008	-0.35	1.5	-2.36
5/30/2008	-0.42	1.83	-2.73
5/31/2008	-0.12	2.21	-2.51
6/1/2008	-0.03	2.86	-2.66
6/2/2008	0.06	3.04	-2.64
6/3/2008	-0.01	3.23	-2.79
6/4/2008	-0.04	3.38	-2.88
6/5/2008	0.1	3.23	-2.5
6/6/2008	0.01	2.98	-2.54
6/7/2008	-0.17	1.65	-2.54
6/8/2008	-0.21	2.53	-2.52
6/9/2008	-0.02	2.35	-2.29
6/10/2008	0.1	2.12	-2.11
6/11/2008	0.06	1.95	-2.03
6/12/2008	-0.15	1.78	-2.19
6/13/2008	-0.19	1.83	-2.15
6/14/2008	-0.08	2.22	-2.01
6/15/2008	0.3	2.62	-1.75
6/16/2008	0.37	2.57	-1.52
6/17/2008	0.23	2.69	-1.78
6/18/2008	0.29	2.73	-1.66
6/19/2008	0.2	2.73	-1.68
6/20/2008	0.03	2.5	-1.89
6/21/2008	-0.09	2.36	-2.01
6/22/2008	-0.09	1.3	-2.04
6/23/2008	0.04	2.43	-1.85
6/24/2008	-0.21	2.32	-2.1
6/25/2008	-0.32	1.91	-2.33
6/26/2008	-0.15	1.8	-2.29
6/27/2008	0.15	2.21	-2
6/28/2008	0.27	2.51	-1.96
6/29/2008	0.26	2.74	-2.12
6/30/2008	0.15	3.05	-2.48
7/1/2008	0.14	3.15	-2.54
7/2/2008	-0.04	3.03	-2.79
7/3/2008	-0.25	2.81	-2.9
7/4/2008	-0.24	3.19	-3
7/5/2008	0.07	2.91	-2.42
7/6/2008	0.06	1.99	-2.32
7/7/2008	-0.07	2.64	-2.3
7/8/2008	-0.27	2.1	-2.4
7/9/2008	-0.34	1.57	-2.4
7/10/2008	-0.11	1.96	-2.07
7/11/2008	0.03	2.03	-1.84
7/12/2008	0.02	1.93	-1.72
7/13/2008	0.14	2.28	-1.6
7/14/2008	0.12	2.28	-1.72
7/15/2008	0.06	2.4	-1.8
7/16/2008	0.04	2.52	-1.83
7/17/2008	-0.03	2.5	-2.05
7/18/2008	-0.16	2.41	-2.16
7/19/2008	-0.28	2.32	-2.3
7/20/2008	-0.28	2.37	-2.4
7/21/2008	-0.02	2.52	-2.22
7/22/2008	0.03	1.84	-2.09
7/23/2008	0.05	2.32	-2.14
7/24/2008	-0.12	1.92	-2.23

7/25/2008	-0.15	2.05	-2.24
7/26/2008	-0.14	2.18	-2.39
7/27/2008	0.04	2.61	-2.21
7/28/2008	0.25	2.74	-2.13
7/29/2008	0.07	2.79	-2.51
7/30/2008	0.15	3.19	-2.49
7/31/2008	0.3	3.37	-2.4
8/1/2008	0.32	3.29	-2.42
8/2/2008	0.3	3.12	-2.3
8/3/2008	0.21	2.69	-2.33
8/4/2008	0.01	2.37	-2.39
8/5/2008	0.12	2.28	-2.28
8/6/2008	0.26	2.29	-1.8
8/7/2008	0.39	2.41	-1.59
8/8/2008	0.3	2.3	-1.53
8/9/2008	0.2	2.11	-1.53
8/10/2008	0.26	2.25	-1.45
8/11/2008	0.25	2.17	-1.4
8/12/2008	0.17	2.26	-1.54
8/13/2008	0.12	2.55	-1.71
8/14/2008	0.25	2.65	-1.75
8/15/2008	0.28	2.74	-1.82
8/16/2008	0.08	2.56	-2.12
8/17/2008	-0.05	2.61	-2.28
8/18/2008	-0.16	2.45	-2.46
8/19/2008	-0.15	2.29	-2.51
8/20/2008	0.16	2.53	-2.1
8/21/2008	-0.19	2.12	-2.45
8/22/2008	-0.17	2.26	-2.46
8/23/2008	-0.1	2.36	-2.3
8/24/2008	0	2.39	-2.13
8/25/2008	-0.02	2.47	-2.12
8/26/2008	0.39	2.84	-1.48
8/27/2008	0.38	3.04	-1.96
8/28/2008	0.5	3.18	-2.02
8/29/2008	0.61	3.25	-1.96
8/30/2008	0.34	2.74	-2.33
8/31/2008	0.16	2.62	-2.39
9/1/2008	0.1	2.42	-2.33
9/2/2008	0.19	2.46	-2.33
9/3/2008	0.57	2.86	-1.55
9/4/2008	0.13	2.28	-1.74
9/5/2008	-0.05	2.05	-1.89
9/6/2008	0.52	2.89	-1.62
9/7/2008	-0.27	1.92	-1.83
9/8/2008	-0.18	1.87	-1.61
9/9/2008	0.04	1.91	-1.49
9/10/2008	0.28	2.34	-1.07
9/11/2008	0.17	2.19	-1.47
9/12/2008	0.09	2.36	-1.8
9/13/2008	0.07	2.54	-2.02
9/14/2008	0.34	2.77	-2.04
9/15/2008	0.01	2.45	-2.5
9/16/2008	0.19	2.67	-2.41
9/17/2008	0.3	2.79	-2.24
9/18/2008	0.31	2.78	-2.25
9/19/2008	1.02	3.52	-1.41
9/20/2008	0.75	3.11	-1.44
9/21/2008	0.19	2.6	-1.82
9/22/2008	0.3	2.66	-1.97
9/23/2008	1.04	3.13	-0.95
9/24/2008	1.21	3.35	-0.67
9/25/2008	2	4.32	-0.57

9/26/2008	1.57	3.31	-0.84
9/27/2008	0.8	3.05	-1.72
9/28/2008	0.83	2.94	-1.6
9/29/2008	0.65	2.95	-1.77
9/30/2008	0.54	2.84	-1.97
10/1/2008	0.72	3.09	-1.55
10/2/2008	0.15	2.54	-1.93
10/3/2008	-0.32	2.1	-2.2
10/4/2008	-0.29	1.91	-2.03
10/5/2008	-0.42	1.44	-2.07
10/6/2008	0.06	1.94	-1.39
10/7/2008	0.04	1.82	-1.44
10/8/2008	-0.1	1.72	-1.56
10/9/2008	-0.25	1.58	-2
10/10/2008	-0.14	1.97	-1.77
10/11/2008	0.1	2.4	-2.01
10/12/2008	0.07	2.3	-2.06
10/13/2008	-0.05	2.23	-2.54
10/14/2008	0.43	2.97	-2.18
10/15/2008	0.35	3	-2.31
10/16/2008	0.4	3.33	-2.28
10/17/2008	0.61	3.6	-2.09
10/18/2008	1.03	3.88	-1.67
10/19/2008	1.7	4.3	-0.73
10/20/2008	1.55	3.81	-0.64
10/21/2008	0.62	2.89	-1.99
10/22/2008	0.11	2.38	-2.11
10/23/2008	1.07	3.03	-1.11
10/24/2008	0.6	2.42	-1.41
10/25/2008	0.87	2.95	-1.67
10/26/2008	0.59	2.68	-1.9
10/27/2008	0.43	2.66	-2.05
10/28/2008	-0.28	2.92	-3.08
10/29/2008	-1.55	1.1	-3.81
10/30/2008	-0.52	2.19	-2.92
10/31/2008	-0.38	2.31	-2.47
11/1/2008	-0.63	1.82	-2.74
11/2/2008	0.35	2.62	-1.54
11/3/2008	-0.03	2.04	-1.62
11/4/2008	-0.16	1.9	-1.66
11/5/2008	0.76	2.4	-1.16
11/6/2008	1.51	2.95	-0.57
11/7/2008	0.62	2.31	-1.25
11/8/2008	0.47	2.21	-1.6
11/9/2008	0.21	2.16	-2.23
11/10/2008	-0.1	2.21	-2.16
11/11/2008	-0.19	2.23	-2.74
11/12/2008	-0.05	2.72	-2.68
11/13/2008	0.41	3.25	-2.73
11/14/2008	0.58	3.64	-2.13
11/15/2008	0.65	3.98	-2.16
11/16/2008	-0.58	2.59	-3.36
11/17/2008	-0.84	2.02	-3.5
11/18/2008	0.13	2.75	-2.18
11/19/2008	0.57	2.86	-1.47
11/20/2008	0.36	2.35	-2.04
11/21/2008	0.12	2.12	-1.9
11/22/2008	-0.58	1.75	-2.71
11/23/2008	-0.97	1.13	-3
11/24/2008	-0.44	1.78	-2.3
11/25/2008	0.04	2.22	-2.28
11/26/2008	-0.24	2.01	-2.33
11/27/2008	0.13	2.62	-2.01

11/28/2008	0	2.6	-2.29
11/29/2008	-0.02	2.5	-2.09
11/30/2008	0.88	3.15	-1.57
12/1/2008	0.32	2.61	-1.81
12/2/2008	-0.96	1.23	-2.76
12/3/2008	-0.73	1.52	-2.29
12/4/2008	-1.03	0.95	-2.79
12/5/2008	-0.66	1.37	-2.21
12/6/2008	-0.15	1.65	-1.92
12/7/2008	-0.62	1.73	-3.41
12/8/2008	-1.14	0.85	-3.08
12/9/2008	-0.69	1.79	-2.9
12/10/2008	-0.57	2.3	-2.87
12/11/2008	0.32	2.84	-3.24
12/12/2008	0.35	3.68	-2.46
12/13/2008	-0.5	2.62	-3.29
12/14/2008	-0.42	2.86	-3.25
12/15/2008	-0.69	2.54	-3.18
12/16/2008	-0.82	2.02	-3.52
12/17/2008	-0.04	2.64	-2.4
12/18/2008	-0.38	1.86	-2.44
12/19/2008	0.07	2.04	-1.98
12/20/2008	0.96	2.7	-0.92
12/21/2008	1.05	3.14	-1.54
12/22/2008		0.45	
12/23/2008		-0.01	
12/24/2008	-0.7	1.62	-2.27
12/25/2008	-1.52	0.56	-3.44
12/26/2008	-0.71	1.52	-3.38
12/27/2008	-0.26	2.31	-2.26
12/28/2008	-0.69	2.13	-2.77
12/29/2008	-0.75	1.85	-3.14
12/30/2008	-0.89	1.28	-2.85
12/31/2008	-0.35	2.19	-2.9
1/1/2009		1.37	
1/2/2009		1.06	-2.86
1/3/2009	-1.16	0.73	-3.09
1/4/2009	-1.17	0.68	-2.96
1/5/2009	-0.49	1.37	-2.38
1/6/2009	-0.08	1.84	-1.82
1/7/2009	0.6	2.75	-1.13
1/8/2009	-1.36	2.05	-3.9
1/9/2009	-1.47	1.37	-4.47
1/10/2009	-0.37	2.47	-3.9
1/11/2009	0.18	3.28	-2.76
1/12/2009	0.06	3.01	-2.96
1/13/2009	0.12	3.04	-2.75
1/14/2009	-0.34	2.52	-2.94
1/15/2009	-0.56	1.72	-2.79
1/16/2009		1.65	
1/17/2009			
1/18/2009			
1/19/2009		1.96	-1.37
1/20/2009		2.17	
1/21/2009		2.18	
1/22/2009			
1/23/2009			
1/24/2009	-0.28	2.15	-2.22
1/25/2009		2.06	
1/26/2009		2.02	
1/27/2009		2.24	
1/28/2009		2.7	
1/29/2009	-0.86	1.63	-3.05

1/30/2009		1.87	-2.58
1/31/2009		1.45	
2/1/2009		1.34	-2.92
2/2/2009	-0.23	1.46	-2.12
2/3/2009	0.96	2.52	-0.75
2/4/2009	0.74	3.2	-1.9
2/5/2009		2.26	
2/6/2009		2.37	
2/7/2009	-0.12	2.53	-2.69
2/8/2009	-0.46	2.44	-3.23
2/9/2009	-0.6	2.36	-3.54
2/10/2009	-0.09	2.82	-3.36
2/11/2009	0.16	2.93	-2.69
2/12/2009	-0.54	2.08	-3.32
2/13/2009	-1.2	2.14	-3.74
2/14/2009	-0.07	2.01	-2.17
2/15/2009	-0.49	1.77	-2.58
2/16/2009	0.15	2.14	-1.54
2/17/2009	0.1	1.88	-1.32
2/18/2009	0.24	1.89	-1.08
2/19/2009	0.45	2.4	-2.48
2/20/2009	-1.14	1.37	-3.42
2/21/2009	-1.39	0.44	-3.11
2/22/2009	-0.49	1.77	-2.9
2/23/2009	-1.46	1.22	-3.66
2/24/2009	-1.28	0.98	-3.92
2/25/2009	-0.53	1.92	-3.18
2/26/2009	-0.54	1.85	-2.89
2/27/2009	-0.38	2.02	-2.76
2/28/2009	-0.37	2.54	-2.89
3/1/2009	1.02	3.64	-1.27
3/2/2009	1.28	2.76	-1.19
3/3/2009		2.52	
3/4/2009			
3/5/2009			-2.76
3/6/2009	-0.92	1.53	-3.02
3/7/2009	-0.61	1.91	-2.92
3/8/2009	-0.3	2.15	-2.73
3/9/2009	0.34	2.91	-2.58
3/10/2009	0.42	3.08	-2.42
3/11/2009	0.02	2.69	-2.63
3/12/2009	-0.71	1.77	-3.26
3/13/2009	-0.59	2.14	-3.21
3/14/2009	-0.49	1.99	-2.69
3/15/2009	-0.44	1.29	-2.44
3/16/2009	-0.35	1.9	-2.23
3/17/2009	0.26	2.31	-1.26
3/18/2009	-0.31	1.72	-1.67
3/19/2009	-0.48	1.13	-1.84
3/20/2009	0.02	1.5	-1.66
3/21/2009	0.09	1.77	-1.59
3/22/2009	-0.39	1.62	-2.17
3/23/2009	-0.26	1.64	-2.26
3/24/2009	0.11	2.22	-2.14
3/25/2009	0.49	2.9	-2.04
3/26/2009	0.7	2.99	-1.73
3/27/2009	0.3	2.84	-2.23
3/28/2009	0.53	3.12	-2.1
3/29/2009	0.56	3.03	-1.79
3/30/2009	-0.45	0.96	-2.93
3/31/2009	-0.35	2.33	-2.68
4/1/2009	0.25	2.67	-1.76
4/2/2009	0.01	2.64	-1.98

4/3/2009	0.67	2.71	-1.56
4/4/2009	-0.35	2.47	-2.78
4/5/2009	-0.5	1.72	-3.01
4/6/2009	0.54	2.98	-2.52
4/7/2009	0.04	2.44	-2.6
4/8/2009	-0.49	2.2	-3.08
4/9/2009	-0.25	2.57	-3.07
4/10/2009	-0.23	2.67	-2.84
4/11/2009	0.31	3.16	-2.52
4/12/2009	-0.04	2.43	-2.43
4/13/2009	-0.56	0.96	-2.66
4/14/2009	-0.18	1.61	-2.44
4/15/2009	1.39	2.71	-0.52
4/16/2009	0.56	2.86	-0.98
4/17/2009	-0.21	1.81	-1.78
4/18/2009	-0.55	1.14	-2.03
4/19/2009	0.23	1.58	-1.36
4/20/2009	0.89	2.5	-0.84
4/21/2009	0.72	2.52	-1.39
4/22/2009	0.29	2.55	-1.92
4/23/2009	-0.55	1.93	-3.17
4/24/2009	-0.6	2.3	-3.16
4/25/2009	-0.39	2.67	-2.96
4/26/2009	-0.41	2.69	-3.04
4/27/2009	-0.45	2.7	-2.94
4/28/2009	-0.66	2.12	-3.09
4/29/2009	-0.41	1.47	-3.06
4/30/2009	-0.2	2.46	-2.29
5/1/2009	-0.43	2.27	-2.46
5/2/2009	-0.45	1.85	-2.72
5/3/2009	0.06	1.99	-2.23
5/4/2009	0.41	2.46	-1.77
5/5/2009	0.34	2.41	-1.98
5/6/2009	0.23	2.65	-2.31
5/7/2009	-0.11	2.51	-2.69
5/8/2009	0.06	2.9	-2.37
5/9/2009	0.17	2.89	-2.12
5/10/2009	-0.38	2.28	-2.52
5/11/2009	-0.42	2.32	-2.56
5/12/2009	-0.16	2.29	-2.15
5/13/2009	-0.31	0.94	-2.18
5/14/2009	-0.45	2.02	-2.11
5/15/2009	-0.54	1.68	-2.3
5/16/2009	-0.31	1.68	-2
5/17/2009	-0.09	1.61	-1.91
5/18/2009	0.09	1.68	-1.55
5/19/2009	-0.25	1.44	-2.16
5/20/2009	-0.54	1.52	-2.67
5/21/2009	-0.56	1.84	-2.86
5/22/2009	-0.57	2.18	-2.98
5/23/2009	-0.35	2.9	-3
5/24/2009	-0.12	2.87	-2.78
5/25/2009	-0.23	3.19	-2.9
5/26/2009	0.63	3.64	-2.49
5/27/2009	0.35	2.11	-2.18
5/28/2009	0.44	3.26	-2.08
5/29/2009	0.74	3.47	-1.49
5/30/2009	0.44	3.05	-1.86
5/31/2009	0.35	2.47	-1.91
6/1/2009	0.14	2.1	-2.02
6/2/2009	-0.07	2.14	-2.4
6/3/2009	0.23	2.58	-2.03
6/4/2009	0.56	2.92	-1.68

6/5/2009	0.81	3.46	-1.55
6/6/2009	0.74	2.88	-1.56
6/7/2009	0.2	2.81	-1.9
6/8/2009	0.18	2.98	-2.03
6/9/2009	0.44	2.94	-1.62
6/10/2009	0.56	3.04	-1.54
6/11/2009	0.72	2.01	-1.25
6/12/2009	0.55	2.97	-1.32
6/13/2009	0.53	2.6	-1.32
6/14/2009	0.65	2.57	-1.26
6/15/2009	0.68	2.52	-1.19
6/16/2009	0.61	2.34	-1.28
6/17/2009	0.55	2.38	-1.33
6/18/2009	0.62	2.59	-1.33
6/19/2009	0.66	3.08	-1.66
6/20/2009	0.73	3.71	-1.82
6/21/2009	0.97	4.14	-1.72
6/22/2009	1.07	4.15	-1.69
6/23/2009	0.91	3.88	-1.86
6/24/2009	0.53	3.65	-2.25
6/25/2009	0.5	3.36	-2.08
6/26/2009	0.44	2.46	-2.15
6/27/2009	0.6	3.22	-1.94
6/28/2009	0.82	2.99	-1.74
6/29/2009	0.83	2.82	-1.5
6/30/2009	0.82	2.87	-1.36
7/1/2009	0.93	3.02	-1.21
7/2/2009	0.91	3	-1.21
7/3/2009	0.55	2.78	-1.52
7/4/2009	0.37	2.76	-1.66
7/5/2009	0.36	2.81	-1.62
7/6/2009	0.33	2.94	-1.73
7/7/2009	0.38	2.85	-1.59
7/8/2009	0.48	2.9	-1.62
7/9/2009	0.57	3.11	-1.69
7/10/2009	0.5	2.6	-1.48
7/11/2009	0.13	1.7	-1.77
7/12/2009	0.08	2.23	-2.23
7/13/2009	0.35	2.33	-1.63
7/14/2009	0.23	2.2	-1.66
7/15/2009	-0.05	2.11	-2.1
7/16/2009	0.06	2.22	-1.91
7/17/2009	0.53	2.78	-1.71
7/18/2009	0.57	3.06	-1.82
7/19/2009	0.26	3.07	-2.26
7/20/2009	0.31	3.41	-2.38
7/21/2009	0.54	3.5	-2.34
7/22/2009	0.26	3.38	-2.64
7/23/2009	0.6	4.21	-2.45
7/24/2009	0.89	3.11	-2.04
7/25/2009	0.39	2.73	-2.42
7/26/2009	0.26	2.8	-2.21
7/27/2009	0.03	2.36	-2.48
7/28/2009	-0.01	2.34	-2.19
7/29/2009	0.01	2.1	-1.85
7/30/2009	0	2.21	-1.97
7/31/2009	-0.06	2.1	-1.95
8/1/2009	-0.05	2.19	-1.75
8/2/2009	0.19	2.36	-1.72
8/3/2009	0.14	2.55	-1.87
8/4/2009	0.06	2.46	-1.91
8/5/2009	0	2.5	-2.07
8/6/2009	0.16	2.68	-2.15

8/7/2009	0.07	2.31	-1.98
8/8/2009	0.02	2.38	-2.17
8/9/2009	0.05	2.31	-2.11
8/10/2009	0.13	2.2	-1.9
8/11/2009	0.14	2.23	-1.91
8/12/2009	0.38	2.46	-1.82
8/13/2009	0.74	2.76	-1.38
8/14/2009	0.26	2.38	-1.68
8/15/2009	0.08	2.44	-2.01
8/16/2009	0.07	2.6	-2.27
8/17/2009	0.05	2.78	-2.44
8/18/2009	0	2.94	-2.67
8/19/2009	0.04	3.2	-2.81
8/20/2009	0.29	3.26	-2.52
8/21/2009	0.27	2.98	-2.48
8/22/2009	0.51	3.15	-2.32
8/23/2009	0.65	3.2	-1.86
8/24/2009	0.08	2.62	-2.33
8/25/2009	0.1	2.56	-2.21
8/26/2009	-0.15	2.06	-2.25
8/27/2009	0.14	2.41	-1.96
8/28/2009		2.36	-1.38
8/29/2009		2.75	
8/30/2009	0.46	2.57	-1.36
8/31/2009	0.21	2.26	-1.48
9/1/2009	0.64	2.81	-1.5
9/2/2009	0.59	2.69	-1.3
9/3/2009	0.66	2.96	-1.55
9/4/2009	0.74	2.72	-1.31
9/5/2009	0.31	2.45	-1.96
9/6/2009	0.52	2.92	-1.96
9/7/2009	0.82	2.85	-1.31
9/8/2009	0.64	2.85	-1.47
9/9/2009	0.87	3.06	-1.48
9/10/2009	2.12	4.05	0.01
9/11/2009	2.16	4.29	-0.82
9/12/2009	0.52	2.83	-1.54
9/13/2009	0.76	3.09	-1.28
9/14/2009	0.82	3.17	-1.41
9/15/2009	0.67	3.32	-1.8
9/16/2009	1.08	4.06	-1.77
9/17/2009	1.69	3.81	-0.89
9/18/2009	0.58	3.05	-2.31
9/19/2009	0.31	2.87	-2.6
9/20/2009	0.28	2.94	-2.46
9/21/2009	0.16	2.81	-2.28
9/22/2009	0.16	2.72	-2.15
9/23/2009	0	2.4	-2.04
9/24/2009	-0.27	2	-2.21
9/25/2009	0.4	2.52	-1.58
9/26/2009	0.84	2.57	-0.65
9/27/2009	0.62	2.37	-1.16
9/28/2009	0.12	2.01	-1.7
9/29/2009	0.09	1.75	-1.3
9/30/2009	0	2.19	-2.19
10/1/2009	0.08	2.28	-2.02
10/2/2009	0.26	2.5	-1.96
10/3/2009	0.31	2.44	-1.91
10/4/2009	0.16	2.52	-2.12
10/5/2009	-0.11	2.41	-2.46
10/6/2009	0.02	2.61	-2.53
10/7/2009	-0.35	2.52	-3.1
10/8/2009	-0.69	2.08	-3.07

10/9/2009	0.12	2.87	-2.04
10/10/2009	0.02	2.5	-2.04
10/11/2009	0.15	2.55	-2.08
10/12/2009	0.05	2.43	-1.95
10/13/2009	0.05	2.32	-2.28
10/14/2009	0.44	2.66	-1.93
10/15/2009	1.41	4.25	-1.61
10/16/2009	2.59	4.75	0.15
10/17/2009	2.4	4.78	-0.01
10/18/2009	2.22	4.66	-0.05
10/19/2009	1.17	3.73	-1.59
10/20/2009	0.19	2.85	-2.36
10/21/2009	0.13	2.78	-2
10/22/2009	0.12	2.61	-1.74
10/23/2009	0.38	2.56	-1.81
10/24/2009	0.87	2.78	-0.72
10/25/2009	-0.01	2.02	-1.67
10/26/2009	0.2	1.97	-1.27
10/27/2009	0.75	2.41	-0.7
10/28/2009	1.23	2.56	-0.65
10/29/2009	1.71	3.17	0.4
10/30/2009	0.93	2.68	-1.08
10/31/2009	0.52	2.66	-1.56
11/1/2009	0.12	2.52	-2.14
11/2/2009	1.28	3.56	-1.8
11/3/2009	1.09	3.91	-1.41
11/4/2009	0.33	3.28	-2.2
11/5/2009	0.37	3.37	-2.21
11/6/2009	0.2	3	-2.44
11/7/2009	0.39	3.24	-1.71
11/8/2009	-0.38	2.27	-2.59
11/9/2009	-0.26	2.34	-2.31
11/10/2009	-0.35	1.98	-2.39
11/11/2009	1.25	3.53	-0.86
11/12/2009	3.13	5.14	1.43
11/13/2009	3.23	5.44	1.51
11/14/2009		4.77	
11/15/2009	0.74	3.49	-1.8
11/16/2009	0.23	2.89	-2.23
11/17/2009	0.48	3.26	-2.19
11/18/2009	0.61	3.21	-1.63
11/19/2009	0.36	2.94	-1.9
11/20/2009	0.12	2.52	-1.8
11/21/2009	-0.04	2.28	-1.89
11/22/2009	0.48	2.39	-1.3
11/23/2009	1.45	3.11	0.02
11/24/2009	1.25	2.73	-0.72
11/25/2009	0.79	2.35	-0.86
11/26/2009	0.79	2.27	-0.94
11/27/2009	0.61	2.69	-2.07
11/28/2009	-1.3	1.09	-3.4
11/29/2009	-0.37	1.71	-2.31
11/30/2009	-0.1	2.44	-2.36
12/1/2009	0.01	2.75	-2.42
12/2/2009	0.09	3.02	-2.76
12/3/2009	0.03	2.88	-2.79
12/4/2009	-0.26	2.65	-3.26
12/5/2009	0.55	3.64	-2.46
12/6/2009	0.07	2.76	-2.39
12/7/2009	-0.07	2.55	-2.4
12/8/2009	-0.44	1.91	-2.73
12/9/2009	1.29	3.06	-1.2
12/10/2009	-0.32	2.75	-3.43

12/11/2009	-2.06	0.76	-4.44
12/12/2009	-1.85	0.34	-4.11
12/13/2009	-0.47	1.89	-2.26
12/14/2009	-0.07	2.45	-3.19
12/15/2009	0.37	3.18	-2.08
12/16/2009	-0.36	2.52	-2.68
12/17/2009	-0.67	2.1	-2.99
12/18/2009	0.06	2.72	-2.64
12/19/2009	1.9	4.31	-1.19
12/20/2009	1.35	3.46	-1.08
12/21/2009	-0.17	2.01	-2.17
12/22/2009	-0.68	1.4	-2.36
12/23/2009	-0.43	1.5	-2.25
12/24/2009	-0.05	1.62	-1.66
12/25/2009	0.81	2.36	-0.63
12/26/2009	1.63	2.96	-0.48
12/27/2009	0.7	3.08	-1.77
12/28/2009	-0.24	2.49	-2.92
12/29/2009	-1.5	1.42	-3.86
12/30/2009	-0.93	1.74	-3.96
12/31/2009	0.06	3.03	-3.23
1/1/2010	0.43	3.6	-2.62
1/2/2010	0.07	3.45	-2.77
1/3/2010	-1.34	1.45	-4.51
1/4/2010	-0.26	2.76	-3.04
1/5/2010	-0.13	2.46	-2.76
1/6/2010	-0.43	1.99	-2.81
1/7/2010	-0.49	1.82	-2.55
1/8/2010	-0.46	1.94	-2.77
1/9/2010	-0.3	1.98	-2.29
1/10/2010	-0.17	2.24	-2.34
1/11/2010	-0.41	2.03	-2.54
1/12/2010	-0.62	2.01	-2.67
1/13/2010	-0.49	1.99	-2.84
1/14/2010	-0.15	2.37	-2.44
1/15/2010	-0.36	2.39	-2.62
1/16/2010	-0.65	1.95	-2.93
1/17/2010	0.4	2.92	-2.45
1/18/2010	1.1	3.31	-0.92
1/19/2010	0.92	3.05	-1.15
1/20/2010	0.28	2.08	-1.74
1/21/2010	0.25	1.99	-1.44
1/22/2010	0.93	2.41	-0.61
1/23/2010	0.9	2.78	-1.04
1/24/2010	0.26	2.42	-1.61
1/25/2010	0.65	2.63	-1.94
1/26/2010	0.1	2.82	-2.78
1/27/2010	-0.42	2.13	-2.97
1/28/2010	-0.16	2.69	-2.4
1/29/2010	-0.98	2.34	-3.84
1/30/2010	-0.89	2.09	-4.5
1/31/2010	0.23	3.36	-2.84
2/1/2010	-0.68	2.48	-3.61
2/2/2010	-0.58	2.42	-3.66
2/3/2010	-0.07	2.44	-2.57
2/4/2010	-0.48	2.18	-2.82
2/5/2010	-0.38	1.88	-2.47
2/6/2010	2.25	3.94	0.25
2/7/2010		3.33	
2/8/2010			
2/9/2010			-2.12
2/10/2010	0.93	3.23	-0.41
2/11/2010	0.85	3.06	-1.19

2/12/2010	0.57	2.99	-1.52
2/13/2010	0.29	2.75	-1.92
2/14/2010	-0.55	1.8	-2.74
2/15/2010	-0.62	1.71	-3.13
2/16/2010	-0.29	2.29	-2.52
2/17/2010	-0.46	1.77	-2.64
2/18/2010	-0.55	1.51	-2.67
2/19/2010	-1.05	0.61	-3.24
2/20/2010	-0.67	1.07	-2.57
2/21/2010	-0.69	1.56	-2.5
2/22/2010	-0.04	1.66	-1.62
2/23/2010	1.15	2.82	-0.7
2/24/2010	1	3.22	-1.31
2/25/2010	0.72	3.24	-1.28
2/26/2010	-0.47	1.96	-3.46
2/27/2010	0.48	3.18	-2.47
2/28/2010	0.58	3.39	-2.53
3/1/2010	-0.17	2.72	-3.52
3/2/2010	0.61	3.33	-2.49
3/3/2010	1.66	4.25	-1.46
3/4/2010	1.09	3.35	-1.51
3/5/2010	0.85	2.48	-1.43
3/6/2010	0.55	3.1	-1.42
3/7/2010	-0.12	2.3	-1.82
3/8/2010	-0.08	1.94	-1.72
3/9/2010	-0.11	1.84	-1.74
3/10/2010	0.03	1.92	-1.61
3/11/2010	0.1	2.13	-1.75
3/12/2010	0.8	2.47	-1.21
3/13/2010	2.68	4.39	-0.27
3/14/2010	1.94	4.02	-0.26
3/15/2010	1.44	3.4	-0.77
3/16/2010	1.56	3.47	-0.7
3/17/2010	0.63	2.59	-1.87
3/18/2010	-0.07	2.46	-2.39
3/19/2010	0.02	2.54	-2.13
3/20/2010	-0.03	1.61	-2.08
3/21/2010	-0.24	2.3	-2.14
3/22/2010	0.16	2.26	-1.66
3/23/2010	0.33	2.64	-1.7
3/24/2010	-0.4	1.98	-2.39
3/25/2010	0.05	2.32	-2.4
3/26/2010	0.67	2.93	-1.83
3/27/2010	1.16	3.42	-1.37
3/28/2010	0.77	3.34	-2.12
3/29/2010	0.72	3.46	-2.3
3/30/2010	0.69	3.31	-2.36
3/31/2010	0.49	3.38	-2.48
4/1/2010	0.34	3.15	-2.32
4/2/2010	0.26	2.14	-2.17
4/3/2010	0.05	2.79	-2.13
4/4/2010	-0.17	2.46	-2.09
4/5/2010	-0.14	2.12	-2.01
4/6/2010	0.01	2.02	-1.55
4/7/2010	-0.01	1.86	-1.56
4/8/2010	0.02	1.78	-1.66
4/9/2010	0.18	1.97	-1.46
4/10/2010	-0.37	1.68	-2.46
4/11/2010	-0.68	1.33	-2.81
4/12/2010	-0.34	1.96	-2.83
4/13/2010	-0.19	2.21	-2.5
4/14/2010	-0.44	2.08	-2.7
4/15/2010	-0.59	2.4	-3.09

4/16/2010	0.32	3.25	-2.24
4/17/2010	0.5	2.89	-1.77
4/18/2010	0.14	2.54	-2.04
4/19/2010	-0.03	1.63	-2.13
4/20/2010	-0.11	2.48	-2.12
4/21/2010	0.05	2.46	-1.98
4/22/2010	0.28	2.5	-1.82
4/23/2010	0.17	2.42	-2.15
4/24/2010	0.31	2.41	-2.12
4/25/2010	0.77	3.2	-2.16
4/26/2010	1.37	4.04	-1.44
4/27/2010	1.2	3.67	-1.43
4/28/2010	0.29	2.93	-2.8
4/29/2010	-0.28	2.76	-2.93
4/30/2010	0.01	2.92	-2.69
5/1/2010	0.07	2.98	-2.49
5/2/2010	0.08	1.5	-2.03
5/3/2010	-0.2	2.57	-2.12
5/4/2010	-0.08	2.18	-1.99
5/5/2010	-0.03	2.17	-1.78
5/6/2010	-0.13	1.85	-1.7
5/7/2010	-0.14	1.68	-1.82
5/8/2010	-0.16	1.6	-1.91
5/9/2010	-0.76	1.02	-2.8
5/10/2010	-0.51	1.63	-2.57
5/11/2010	-0.16	2.1	-2.3
5/12/2010	0.11	2.68	-2.23
5/13/2010	-0.03	2.5	-2.64
5/14/2010	-0.49	2.74	-2.97
5/15/2010	-0.25	2.75	-2.7
5/16/2010	-0.12	2.8	-2.58
5/17/2010	-0.23	1.48	-2.58
5/18/2010	0.8	2.76	-1.5
5/19/2010	0.56	3.43	-1.95
5/20/2010	0.06	2.51	-2.22
5/21/2010	-0.08	2.28	-2.48
5/22/2010	0.2	2.31	-2.2
5/23/2010	0.35	2.59	-2.14
5/24/2010	0.19	2.6	-2.48
5/25/2010	0.07	2.81	-2.51
5/26/2010	0.19	3.02	-2.35
5/27/2010	0.73	3.92	-2.26
5/28/2010	0.41	3.14	-2.04
5/29/2010	0.2	2.88	-2.12
5/30/2010	0.06	2.76	-2.16
5/31/2010	0.09	1.55	-2.13
6/1/2010	-0.06	2.6	-1.95
6/2/2010	0.08	2.17	-1.94
6/3/2010	0.36	2.46	-1.31
6/4/2010	0.23	2.11	-1.56
6/5/2010	0.28	2.05	-1.47
6/6/2010	0.23	1.84	-1.63
6/7/2010	0.21	2.05	-1.69
6/8/2010	0.05	2.17	-1.88
6/9/2010	0.16	2.52	-2.05
6/10/2010	0.44	3.15	-1.91
6/11/2010	0.31	3.2	-2.1
6/12/2010	0.18	3.05	-2.37
6/13/2010	0.23	3.45	-2.39
6/14/2010	0.46	3.36	-2.08
6/15/2010	0.3	2.23	-2.27
6/16/2010	0.07	3.07	-2.4
6/17/2010	0.12	2.82	-2.5

6/18/2010	0.28	2.63	-2.26
6/19/2010	0.09	2.37	-2.43
6/20/2010	0.09	2.4	-2.35
6/21/2010	0.12	2.53	-2.31
6/22/2010	0.27	2.84	-2.14
6/23/2010	0.12	2.77	-2.35
6/24/2010	0.09	2.81	-2.23
6/25/2010	0.01	2.92	-2.23
6/26/2010	0.07	2.88	-2.23
6/27/2010	0.19	2.9	-2.01
6/28/2010	0.09	2.61	-2.08
6/29/2010	0.01	2.44	-2.12
6/30/2010	0.06	1.75	-2.07
7/1/2010	-0.19	2.15	-2.1
7/2/2010	-0.18	1.74	-2.05
7/3/2010	-0.22	1.66	-2.14
7/4/2010	-0.24	1.68	-2.21
7/5/2010	-0.13	1.91	-2.12
7/6/2010	0.15	2.19	-1.75
7/7/2010	0.18	2.42	-1.9
7/8/2010	0.27	2.74	-1.97
7/9/2010	0.34	3.06	-2.1
7/10/2010	0.37	3.37	-2.25
7/11/2010	0.4	3.43	-2.31
7/12/2010	0.27	3.4	-2.48
7/13/2010	0.26	3.23	-2.58
7/14/2010	0.25	3.07	-2.53
7/15/2010	0.53	2.88	-2.25
7/16/2010	0.36	3.13	-2.24
7/17/2010	0.17	2.54	-2.5
7/18/2010	0.1	2.46	-2.47
7/19/2010	0.24	2.53	-2.05
7/20/2010	0.19	2.54	-2.06
7/21/2010	0.24	2.63	-2.03
7/22/2010	0.03	2.52	-2.19
7/23/2010	0.04	2.65	-2.19
7/24/2010	0.01	2.78	-2.22
7/25/2010	0.15	2.67	-2.01
7/26/2010	0.02	2.38	-2.2
7/27/2010	-0.21	2.32	-2.39
7/28/2010	-0.2	2.13	-2.31
7/29/2010	-0.32	2.14	-2.38
7/30/2010	0.19	2.24	-1.94
7/31/2010	0.1	2.12	-1.86
8/1/2010	0.12	2.02	-1.86
8/2/2010	0.1	2.03	-1.75
8/3/2010	-0.04	1.94	-1.88
8/4/2010	-0.14	1.96	-2.08
8/5/2010	0.02	2.36	-2.04
8/6/2010	0.09	2.68	-2.23
8/7/2010	0.36	3	-2.14
8/8/2010	0.25	3.12	-2.6
8/9/2010	0.17	3.25	-2.78
8/10/2010	0.17	3.36	-2.76
8/11/2010	0.43	3.47	-2.56
8/12/2010	0.78	3.74	-2.16
8/13/2010	1.09	3.54	-1.66
8/14/2010	0.66	3.22	-1.91
8/15/2010	0.36	2.75	-2.12
8/16/2010	0.22	2.54	-1.93
8/17/2010	0.04	2.35	-2.11
8/18/2010	0.27	2.63	-1.75
8/19/2010	0.37	2.64	-1.58

8/20/2010	0.32	2.63	-1.64
8/21/2010	0.51	2.89	-1.6
8/22/2010	0.52	2.94	-1.67
8/23/2010	1.23	3.84	-1.3
8/24/2010	1.78	3.72	-0.25
8/25/2010	1.05	2.86	-1.16
8/26/2010	0.45	2.52	-1.69
8/27/2010	0.26	2.31	-1.88
8/28/2010	0.22	2.25	-1.92
8/29/2010	0.07	2.12	-1.88
8/30/2010	0.11	2.3	-1.78
8/31/2010	0.2	2.33	-1.75
9/1/2010	0.23	2.31	-1.59
9/2/2010	0.22	2.35	-1.57
9/3/2010	1.04	3.52	-1.25
9/4/2010	0.69	2.55	-1.46
9/5/2010	-0.13	2.61	-2.52
9/6/2010	0.36	3.4	-2.66
9/7/2010	0.09	2.91	-2.86
9/8/2010	-0.08	3.09	-3.26
9/9/2010	0.31	2.98	-2.78
9/10/2010	0.44	3.19	-2.48
9/11/2010	0.52	3.3	-2.21
9/12/2010	0.56	3.27	-2.03
9/13/2010	0.69	3.14	-1.6
9/14/2010	0.43	2.78	-1.62
9/15/2010	0.29	2.49	-1.69
9/16/2010	0.36	2.4	-1.52
9/17/2010	-0.11	2.17	-2.17
9/18/2010	0.53	2.63	-1.15
9/19/2010	0.46	2.54	-1.48
9/20/2010	0.78	3.14	-1.51
9/21/2010	0.73	2.72	-1.36
9/22/2010	-0.2	1.91	-2.36
9/23/2010	-0.01	2.58	-2.75
9/24/2010	0.35	2.56	-1.9
9/25/2010	-0.12	2.32	-2.34
9/26/2010	0.48	2.93	-2.1
9/27/2010	0.94	3.22	-1.08
9/28/2010	0.52	2.76	-1.36
9/29/2010	0.32	2.57	-1.55
9/30/2010	0.77	2.91	-0.98
10/1/2010	0.65	2.61	-1.44
10/2/2010	0.5	2.54	-1.63
10/3/2010	1.43	3.84	-0.89
10/4/2010	2.23	4.07	0.19
10/5/2010	0.94	3.13	-1.81
10/6/2010	0.58	3.08	-2.33
10/7/2010	0.19	2.98	-2.82
10/8/2010	0.02	3.06	-3.11
10/9/2010	0.13	3.11	-3.09
10/10/2010	0.65	3.63	-2.01
10/11/2010	0.2	2.94	-2.39
10/12/2010	0.56	3.17	-1.61
10/13/2010	0.71	3.02	-1.28
10/14/2010	0.68	2.71	-1.11
10/15/2010	0.22	2.16	-2.53
10/16/2010	-0.57	1.78	-2.44
10/17/2010	0.28	2.15	-1.6
10/18/2010	0.2	1.99	-1.71
10/19/2010	0.3	2.15	-1.69
10/20/2010	0.39	2.36	-1.69
10/21/2010	0.24	2.47	-1.99

10/22/2010	-0.17	2.16	-2.49
10/23/2010	-0.93	1.67	-3.52
10/24/2010	-0.24	2.38	-3.06
10/25/2010	0.1	2.7	-2.14
10/26/2010	-0.04	2.7	-2.41
10/27/2010		2.4	-2.14
10/28/2010		2.45	
10/29/2010	-0.21	2.44	-2.14
10/30/2010	-0.34	2.09	-2.44
10/31/2010	-0.88	1.52	-3.07
11/1/2010	0.08	2.28	-2.43
11/2/2010	0.13	2.25	-2.16
11/3/2010	0.25	2.6	-2.53
11/4/2010	1.12	3.6	-2.34
11/5/2010	0.8	3.93	-2.1
11/6/2010	0.21	3.31	-2.77
11/7/2010	0.16	3.31	-2.52
11/8/2010	-0.11	2.71	-2.89
11/9/2010	0.64	3.29	-1.76
11/10/2010	1.06	3.36	-1.33
11/11/2010	2.06	4.28	0.27
11/12/2010	1.94	3.73	0.04
11/13/2010	1.18	2.76	-0.65
11/14/2010	0.74	2.32	-0.95
11/15/2010	0.82	2.31	-1.02
11/16/2010	0.59	2.08	-0.92
11/17/2010	0.01	2.38	-2.9
11/18/2010	-0.96	1	-2.94
11/19/2010	-0.26	1.89	-2.05
11/20/2010	-0.44	2.29	-2.87
11/21/2010	-0.23	2.28	-3.14
11/22/2010	0.25	2.97	-2.02
11/23/2010	-0.02	2.76	-2.49
11/24/2010	-0.24	2.62	-2.64
11/25/2010	0.13	2.79	-2.61
11/26/2010	0.51	3.06	-1.99
11/27/2010	-0.31	2.08	-2.58
11/28/2010	-0.33	2.04	-2.5
11/29/2010	-0.2	1.92	-2.38
11/30/2010	0.2	2.22	-1.85
12/1/2010	0.49	2.88	-2.67
12/2/2010	-0.04	2.49	-2.67
12/3/2010	0.35	2.94	-1.96
12/4/2010	0.28	3.13	-2.35
12/5/2010	0.27	3.26	-2.44
12/6/2010	-0.63	2.55	-3.37
12/7/2010	-1.14	1.77	-3.73
12/8/2010	-0.64	2.26	-3.16
12/9/2010	-0.74	1.98	-2.94
12/10/2010	-0.41	1.98	-2.4
12/11/2010	-0.24	1.85	-1.98
12/12/2010	0.59	2.29	-1.13
12/13/2010	0.3	2.42	-2.09
12/14/2010	-0.43	1.39	-2.34
12/15/2010	-0.75	1.11	-2.7
12/16/2010	-0.42	1.15	-1.97
12/17/2010	-0.1	2.16	-2.42
12/18/2010	-0.13	2.12	-2.12
12/19/2010	0.27	2.65	-1.93
12/20/2010	0.55	3.16	-1.62
12/21/2010	0.61	3.19	-2.15
12/22/2010	0.79	3.72	-1.9
12/23/2010	0.17	2.89	-2.55

12/24/2010	0.76	3.57	-1.88
12/25/2010	0.47	3.14	-2.2
12/26/2010	0.94	3.25	-1.82
12/27/2010	0.01	3.49	-3.41
12/28/2010		0.88	-3.41
12/29/2010	-0.71	1.16	-2.75
12/30/2010	-0.15	2.39	-2.6
12/31/2010	-0.61	2.14	-3.09
1/1/2011	-0.28	2.28	-2.55
1/2/2011	-0.14	2.52	-2.76
1/3/2011	-0.37	2.61	-2.9
1/4/2011	-0.48	2.59	-2.97
1/5/2011	-0.59	2.15	-3.27
1/6/2011	0.27	2.89	-2.27
1/7/2011	0.72	3.26	-1.47
1/8/2011	0.68	3.06	-1.35
1/9/2011	-0.72	1.14	-2.73
1/10/2011	-1.13	0.72	-2.98
1/11/2011	-0.27	1.3	-2.08
1/12/2011	-0.79	1.87	-3.28
1/13/2011		-0.13	
1/14/2011		1.48	-2.16
1/15/2011	-0.42	1.78	-2.57
1/16/2011	-0.65	1.7	-2.86
1/17/2011	-0.19	2.15	-2.02
1/18/2011	0.44	3.15	-2.18
1/19/2011	0	2.97	-2.79
1/20/2011	-0.17	2.86	-3.1
1/21/2011	-0.1	2.76	-3.06
1/22/2011	-0.4	2.5	-3.53
1/23/2011		2.14	
1/24/2011			
1/25/2011		1.38	-3.16
1/26/2011	0.71	2.45	-2.02
1/27/2011	0.62	3.51	-2.3
1/28/2011	-0.18	2.08	-2.24
1/29/2011	-0.06	2.26	-2.26
1/30/2011	-0.1	2.36	-2.14
1/31/2011	-0.19	2.3	-2.42
2/1/2011	0.28	2.69	-2.17
2/2/2011	0.39	3.36	-1.96
2/3/2011	-0.63	1.92	-2.99
2/4/2011	-0.34	2.41	-2.74
2/5/2011	-0.43	1.9	-3.01
2/6/2011	-1.02	1.19	-3.47
2/7/2011	-0.39	2.25	-2.71
2/8/2011	-0.4	1.72	-2.94
2/9/2011	-1.55	0.32	-3.28
2/10/2011	-0.87	0.74	-2.36
2/11/2011	-0.48	1.36	-2.05
2/12/2011	-0.84	1.6	-2.76
2/13/2011	-0.99	1.05	-2.89
2/14/2011	-0.94	1.4	-3.6
2/15/2011	-0.8	1.52	-2.91
2/16/2011	-0.39	2.36	-2.93
2/17/2011	-0.42	2.3	-3.45
2/18/2011	-0.11	2.82	-3.24
2/19/2011	-0.78	2.44	-4.05
2/20/2011	-0.39	2.78	-3.55
2/21/2011	0.62	3.79	-2.27
2/22/2011	0.44	2.49	-2.49
2/23/2011	-0.13	2.77	-2.46
2/24/2011	-0.07	2.4	-2.22

2/25/2011	-0.26	2.62	-4.24
2/26/2011	-0.7	1.74	-2.56
2/27/2011	0.04	2.43	-2.11
2/28/2011	0.52	2.93	-1.68
3/1/2011	-0.01	2.37	-1.94
3/2/2011	-0.39	2.12	-2.58
3/3/2011	-0.42	1.99	-3.04
3/4/2011	-0.27	2.12	-2.65
3/5/2011	-0.14	2.18	-2.48
3/6/2011	0.06	2.42	-2.33
3/7/2011	-0.58	1.85	-3.1
3/8/2011	-0.3	2.19	-2.36
3/9/2011	0.33	2.86	-1.9
3/10/2011	1.11	3.39	-0.65
3/11/2011	0.65	1.82	-1.25
3/12/2011	-0.35	2.16	-2.04
3/13/2011	-0.47	1.45	-2.1
3/14/2011	-0.54	1.45	-2.29
3/15/2011	-0.15	1.86	-2.08
3/16/2011	0	2.57	-2.44
3/17/2011	-0.36	2.12	-3.14
3/18/2011	-0.3	2.4	-3.26
3/19/2011	-0.31	2.6	-3.44
3/20/2011	-0.12	2.81	-3.41
3/21/2011	-0.15	3.14	-3.25
3/22/2011	-0.06	2.17	-2.96
3/23/2011	0.72	3.1	-2.29
3/24/2011	1.08	3.97	-1.46
3/25/2011	0.28	2.79	-1.84
3/26/2011	-0.19	2.13	-2.04
3/27/2011	-0.33	1.9	-2.34
3/28/2011	-0.8	1.29	-2.74
3/29/2011	-0.5	1.38	-2.11
3/30/2011	-0.38	1.42	-2.38
3/31/2011	0.79	2.87	-1.84
4/1/2011	1.03	3.24	-1.23
4/2/2011	-0.34	1.84	-2.6
4/3/2011	-0.74	1.8	-3.24
4/4/2011	-0.01	2.48	-2.62
4/5/2011	-0.5	2.26	-3.5
4/6/2011	-0.95	1.61	-3.19
4/7/2011	-0.12	2.48	-2.45
4/8/2011	0.04	1.38	-1.86
4/9/2011	0.18	2.42	-1.6
4/10/2011	-0.09	2.37	-1.79
4/11/2011	-0.24	2.06	-2.1
4/12/2011	-0.29	1.42	-2.32
4/13/2011	0.6	2.52	-1.67
4/14/2011	0.25	2.51	-2.25
4/15/2011	0.23	2.71	-2.52
4/16/2011	1.24	4.22	-2.09
4/17/2011	0.54	3.12	-2.86
4/18/2011	-0.21	3.24	-3.46
4/19/2011	-0.15	3.33	-3.23
4/20/2011	0.14	3.11	-2.56
4/21/2011	-0.23	1.61	-2.75
4/22/2011	-0.25	2.54	-2.49
4/23/2011	-0.03	2.47	-1.97
4/24/2011	-0.48	1.97	-2.5
4/25/2011	-0.17	1.69	-1.94
4/26/2011	-0.03	1.95	-1.93
4/27/2011	-0.12	1.62	-1.9
4/28/2011	-0.23	1.64	-1.9

4/29/2011	-0.1	1.95	-2.22
4/30/2011	-0.08	2.19	-2.27
5/1/2011	-0.05	2.37	-2.23
5/2/2011	0.03	2.47	-2.22
5/3/2011	0.25	2.84	-2.17
5/4/2011	0.01	2.61	-2.18
5/5/2011	-0.36	2.39	-2.54
5/6/2011	-0.2	2.49	-2.4
5/7/2011	-0.1	1.37	-2.18
5/8/2011	0.1	2.54	-1.96
5/9/2011	0.26	2.64	-1.73
5/10/2011	0.96	2.71	-1.16
5/11/2011	1.05	2.98	-1.18
5/12/2011	1.15	3.27	-1.18
5/13/2011	0.77	2.94	-1.83
5/14/2011	0.77	3.37	-2.07
5/15/2011	0.81	3.64	-2.05
5/16/2011	0.74	3.79	-2.12
5/17/2011	0.9	4.12	-2.04
5/18/2011	0.88	3.7	-1.9
5/19/2011	0.47	3.29	-2.14
5/20/2011	0.21	2.02	-2.32
5/21/2011	0.32	3.03	-2.08
5/22/2011	0.51	2.78	-1.84
5/23/2011	0.67	2.94	-1.25
5/24/2011	0.1	2.08	-2
5/25/2011	0.36	2.09	-1.59
5/26/2011	0.43	2.1	-1.46
5/27/2011	0.17	1.91	-1.7
5/28/2011	0.06	2.14	-1.96
5/29/2011	0.02	2.23	-2.02
5/30/2011	-0.18	2.34	-2.36
5/31/2011	-0.03	2.64	-2.24
6/1/2011	-0.07	2.53	-2.23
6/2/2011	-0.37	2.42	-2.76
6/3/2011	-0.26	2.68	-2.53
6/4/2011	0.08	2.72	-2.2
6/5/2011	0.2	1.97	-1.99
6/6/2011	0.12	2.75	-2.12
6/7/2011	0.14	2.7	-2.12
6/8/2011	0.09	2.37	-2.41
6/9/2011	0.28	2.39	-2.22
6/10/2011	0.31	2.51	-2.25
6/11/2011	0.6	3.02	-1.98
6/12/2011	0.79	3.32	-1.88
6/13/2011	0.77	3.67	-1.83
6/14/2011	0.74	3.78	-1.99
6/15/2011	0.66	3.63	-2.06
6/16/2011	0.55	3.37	-2.01
6/17/2011	0.3	3.3	-2.21
6/18/2011	0.42	3.04	-2.01
6/19/2011	0.59	2.32	-1.85
6/20/2011	0.43	3.05	-1.7
6/21/2011	0.21	2.56	-1.92
6/22/2011	0.28	2.1	-1.76
6/23/2011	0.46	2.05	-1.39
6/24/2011	0.69	2.38	-0.96
6/25/2011	0.76	2.61	-0.98
6/26/2011	0.52	2.45	-1.22
6/27/2011	0.4	2.52	-1.46
6/28/2011	0.48	2.72	-1.6
6/29/2011	0.37	2.89	-1.85
6/30/2011	0.29	2.91	-1.98

7/1/2011	0.24	3.08	-2.12
7/2/2011	0.22	3.1	-2.25
7/3/2011	0.23	3.08	-2.31
7/4/2011	0.23	2.17	-2.35
7/5/2011	0.24	2.96	-2.28
7/6/2011	0.12	2.66	-2.34
7/7/2011	0.03	2.33	-2.43
7/8/2011	0.28	2.64	-2.27
7/9/2011	0.41	2.84	-1.94
7/10/2011	0.34	2.84	-2.04
7/11/2011	0.21	2.92	-2.41
7/12/2011	0.14	3.12	-2.43
7/13/2011	0.28	3.14	-2.31
7/14/2011	0.7	3.53	-2.11
7/15/2011	0.45	3.02	-2.02
7/16/2011	0.17	2.68	-2.21
7/17/2011	-0.17	2.34	-2.56
7/18/2011	-0.42	1.92	-2.71
7/19/2011	-0.13	1.86	-2.6
7/20/2011	0.35	2.43	-1.66
7/21/2011	0.06	2.14	-1.76
7/22/2011	-0.27	1.59	-2.21
7/23/2011	0.01	1.87	-1.87
7/24/2011	0.22	2.03	-1.66
7/25/2011	0.53	2.48	-1.32
7/26/2011	0.58	2.69	-1.44
7/27/2011	0.44	2.74	-1.54
7/28/2011	0.35	2.88	-1.88
7/29/2011	0.36	3.19	-2.21
7/30/2011	0.28	3.12	-2.43
7/31/2011	0.26	3.15	-2.44
8/1/2011	0.12	2.87	-2.63
8/2/2011	0.16	2.95	-2.54
8/3/2011	0.48	2.87	-2.39
8/4/2011	0.85	3.31	-1.84
8/5/2011	0.42	2.84	-2.13
8/6/2011	0.27	2.67	-2.15
8/7/2011	0.29	2.76	-2.08
8/8/2011	0.62	2.98	-1.77
8/9/2011	0.87	3.37	-1.32
8/10/2011	0.62	3.03	-1.73
8/11/2011	0.56	3.18	-1.76
8/12/2011	0.31	2.83	-2.11
8/13/2011	0.1	2.69	-2.28
8/14/2011	0.23	2.86	-2.24
8/15/2011	0.62	2.91	-1.76
8/16/2011	0.5	2.63	-1.67
8/17/2011	0.16	2.11	-1.89
8/18/2011	0	1.96	-2.02
8/19/2011	0.05	2.05	-2.04
8/20/2011	0.18	2.12	-1.67
8/21/2011	0.09	1.99	-1.58
8/22/2011	0.09	2.14	-1.53
8/23/2011	0.15	2.23	-1.5
8/24/2011	-0.02	2.18	-1.91
8/25/2011	-0.07	2.25	-2
8/26/2011	0.01	2.71	-2.37
8/27/2011	1.13	5.3	-2.1
8/28/2011	0.92	3.06	-3.44
8/29/2011	-0.22	3.06	-3.32
8/30/2011	0.26	2.8	-2.57
8/31/2011	0.2	2.95	-2.66
9/1/2011	0.32	2.99	-2.45

9/2/2011	0.61	3.33	-2.2
9/3/2011	0.37	2.91	-2.01
9/4/2011	0.11	2.58	-2.16
9/5/2011	0.16	2.58	-2.02
9/6/2011	0.53	2.99	-1.86
9/7/2011	0.88	2.97	-1.18
9/8/2011	0.86	3.14	-1.41
9/9/2011	0.83	2.88	-1.37
9/10/2011	0.57	2.92	-1.83
9/11/2011	0.83	2.98	-1.68
9/12/2011	0.59	2.66	-1.73
9/13/2011	0.36	2.51	-1.95
9/14/2011	0.34	2.54	-1.88
9/15/2011	0.24	2.48	-1.8
9/16/2011	0.43	2.64	-1.67
9/17/2011	0.29	2.28	-1.58
9/18/2011	0.97	2.95	-0.71
9/19/2011	0.97	2.69	-0.72
9/20/2011	0.36	2.27	-1.29
9/21/2011	0.28	2.24	-1.44
9/22/2011	0.3	2.37	-1.68
9/23/2011	0.33	2.57	-1.69
9/24/2011	0.25	2.63	-2.19
9/25/2011	0.28	2.87	-2.39
9/26/2011	0.45	3.09	-2.42
9/27/2011	0.57	3.15	-2.56
9/28/2011	0.88	3.66	-2.22
9/29/2011	0.84	3.93	-2.03
9/30/2011	0.47	3.43	-2.38
10/1/2011	0.71	3.56	-1.79
10/2/2011	0.41	3.04	-1.93
10/3/2011	0.3	2.75	-1.91
10/4/2011	0.32	2.56	-1.87
10/5/2011	0.41	2.56	-1.52
10/6/2011	0.55	2.53	-2.07
10/7/2011	0.37	2.57	-1.53
10/8/2011	0.02	2.06	-2.01
10/9/2011	-0.3	1.89	-2.61
10/10/2011	0.24	2.36	-2.24
10/11/2011	0.61	2.78	-1.88
10/12/2011	1.41	3.45	-1.05
10/13/2011	1.43	3.71	-0.77
10/14/2011	1.07	3.37	-0.97
10/15/2011	-0.29	2.13	-2.36
10/16/2011	-0.62	1.8	-2.56
10/17/2011	-0.17	2.31	-2.3
10/18/2011	0.33	2.54	-1.67
10/19/2011	1.28	3.48	-0.74
10/20/2011	0.14	2.33	-2.6
10/21/2011	-0.7	1.57	-2.69
10/22/2011	-0.04	2.27	-2.2
10/23/2011	0.33	2.64	-1.99
10/24/2011	0.45	2.72	-2.29
10/25/2011	0.11	2.85	-2.77
10/26/2011	0.03	2.96	-3.27
10/27/2011	0.57	3.71	-2.49
10/28/2011	0.78	4.05	-2.11
10/29/2011	1.64	4.92	-1.55
10/30/2011	0.61	3.44	-2.68
10/31/2011	0.17	3.02	-2.17
11/1/2011	0.83	3.34	-1.36
11/2/2011	0.81	2.83	-1.33
11/3/2011	0.16	2.02	-1.86

11/4/2011	0.45	2.41	-1.63
11/5/2011	1.06	2.6	-1.04
11/6/2011	0.18	2.25	-2.18
11/7/2011	-0.51	1.69	-2.52
11/8/2011	-0.15	1.85	-2.72
11/9/2011	0.26	2.45	-1.9
11/10/2011	0.61	2.99	-1.63
11/11/2011	-0.17	2.42	-2.38
11/12/2011	-1.04	1.79	-3.24
11/13/2011	-0.84	1.82	-3.28
11/14/2011	-0.48	2.09	-2.57
11/15/2011	-0.57	1.88	-2.52
11/16/2011	0.06	2.51	-1.94
11/17/2011	0.09	2.42	-1.82
11/18/2011	-0.68	1.68	-2.66
11/19/2011	-0.89	1.15	-3.14
11/20/2011	-1.03	1.02	-3.33
11/21/2011	-0.34	1.97	-2.62
11/22/2011	0.74	3.09	-1.76
11/23/2011	0.46	3.27	-2.52
11/24/2011	0.62	3.66	-2.34
11/25/2011	0.12	3.36	-2.84
11/26/2011	-0.28	2.85	-3.24
11/27/2011	0.01	3.07	-2.81
11/28/2011	-0.02	2.89	-2.53
11/29/2011	0.16	2.85	-2.19
11/30/2011	-0.12	2.46	-2.44
12/1/2011	-0.2	2.18	-2.06
12/2/2011	-0.05	1.9	-2.23
12/3/2011	-0.03	1.6	-1.82
12/4/2011	-0.08	1.76	-1.88
12/5/2011	-0.2	1.78	-2.09
12/6/2011	-0.13	1.98	-2.03
12/7/2011	0.02	2.13	-1.91
12/8/2011	-0.85	1.44	-3.54
12/9/2011	-0.45	2.02	-3.03
12/10/2011	-0.16	2.65	-2.68
12/11/2011	-0.1	2.58	-2.6
12/12/2011	-0.33	2.35	-2.78
12/13/2011	-0.34	2.41	-2.6
12/14/2011	0.18	2.78	-2.04
12/15/2011	0.09	2.63	-2.01
12/16/2011	-0.85	1.24	-2.8
12/17/2011	-0.31	2.17	-2.47
12/18/2011	0.08	2.15	-2.09
12/19/2011	-0.05	2.56	-3.13
12/20/2011	-0.73	1.49	-2.97
12/21/2011	0.13	2.8	-2.92
12/22/2011	-0.41	2.44	-3.08
12/23/2011	0.3	3.14	-2.78
12/24/2011	0.11	3.26	-2.81
12/25/2011	0.05	3.24	-2.78
12/26/2011	-0.36	2.65	-3.38
12/27/2011	0.33	3.1	-2.47
12/28/2011	-0.66	2.52	-3.36
12/29/2011	-1.08	1.4	-3.56
12/30/2011	-0.89	1.2	-2.81
12/31/2011	-0.26	1.68	-2.06
1/1/2012	-0.11	1.63	-1.97
1/2/2012	-0.89	1.18	-2.65
1/3/2012	-0.63	1.11	-2.23
1/4/2012	-0.25	1.86	-2.1
1/5/2012	-0.48	1.64	-2.32

1/6/2012	-0.54	1.83	-2.55
1/7/2012	-0.22	2.37	-2.56
1/8/2012	-0.34	2.32	-2.79
1/9/2012	-0.28	2.51	-2.83
1/10/2012	-0.38	2.54	-3.04
1/11/2012	-0.08	2.57	-2.98
1/12/2012	1.02	3.57	-1.49
1/13/2012	-0.5	1.53	-3.54
1/14/2012	-1.86	0.29	-4.12
1/15/2012	-1.1	1	-3.42
1/16/2012	-0.48	1.88	-2.75
1/17/2012	-1.32	1.08	-3.36
1/18/2012	-0.87	1.53	-3.21
1/19/2012	0.1	2.46	-2.26
1/20/2012	-0.31	2.27	-2.77
1/21/2012	0.42	2.97	-3
1/22/2012	0.73	3.44	-1.9
1/23/2012	0.49	3.26	-2.23
1/24/2012	-0.14	2.73	-2.81
1/25/2012	-0.55	2.32	-3.18
1/26/2012	-0.29	2.26	-2.96
1/27/2012	-0.12	2.47	-2.59
1/28/2012	-0.7	1.33	-2.57
1/29/2012	-1.25	0.43	-3
1/30/2012	-1.52	0.71	-3.31
1/31/2012	-0.95	0.89	-2.52
2/1/2012	-0.61	0.81	-2.01
2/2/2012	-0.13	1.38	-1.86
2/3/2012	0.02	2.08	-1.98
2/4/2012	-0.2	2.08	-2.23
2/5/2012	0.44	2.73	-1.42
2/6/2012	-0.26	2.5	-2.73
2/7/2012	-0.69	1.77	-3.51
2/8/2012	0.35	3	-2.73
2/9/2012	0.02	2.74	-2.8
2/10/2012	-0.25	2.48	-3.04
2/11/2012	0.24	2.96	-2.7
2/12/2012	-0.32	2.14	-2.95
2/13/2012	-1.18	1.82	-3.63
2/14/2012	-0.83	1.48	-3.06
2/15/2012	-0.16	2.39	-2.38
2/16/2012	-0.23	2.12	-2.38
2/17/2012	-0.14	2.44	-2.55
2/18/2012	-0.33	2.28	-2.59
2/19/2012	-0.13	2.3	-3.1
2/20/2012	0.31	2.95	-2.29
2/21/2012	0.05	2.63	-2.64
2/22/2012	-0.05	2.41	-2.7
2/23/2012	-0.06	2.32	-2.67
2/24/2012	0.75	2.88	-1.93
2/25/2012	-1.68	0.62	-4.48
2/26/2012	-2.12	0.62	-4.61
2/27/2012	-0.93	0.98	-2.76
2/28/2012	-0.97	1.05	-2.82
2/29/2012	-0.27	1.22	-1.92
3/1/2012	0.63	2.17	-0.8
3/2/2012	0.84	2.31	-0.66
3/3/2012	0.81	3.04	-1.48
3/4/2012	0.04	2.11	-2.16
3/5/2012	-0.33	1.89	-2.47
3/6/2012	-0.43	2.09	-3.08
3/7/2012	-0.96	1.65	-3.69
3/8/2012	-0.99	1.9	-3.91

3/9/2012	-1.01	2.32	-4.32
3/10/2012	-0.68	2.44	-3.95
3/11/2012	-0.86	1.88	-3.56
3/12/2012	-1.06	1.85	-3.77
3/13/2012	-0.68	2.03	-3.13
3/14/2012	-0.38	2.09	-2.65
3/15/2012	0.22	2.31	-1.84
3/16/2012	0.31	2.61	-1.88
3/17/2012	-0.15	2.27	-2.35
3/18/2012	-0.27	2.04	-2.53
3/19/2012	-0.48	1.94	-2.86
3/20/2012	-0.2	2.09	-2.83
3/21/2012	-0.51	1.92	-3.06
3/22/2012	-0.5	2.08	-3.14
3/23/2012	-0.46	2.24	-2.9
3/24/2012	0.17	2.81	-2.29
3/25/2012	0.77	3.04	-1.32
3/26/2012	0.34	2.28	-1.88
3/27/2012	0.14	1.54	-1.6
3/28/2012	-0.03	2.28	-1.8
3/29/2012	0.3	2.31	-1.37
3/30/2012	0.38	2.41	-1.4
3/31/2012	0.76	2.16	-0.84
4/1/2012	0.67	2.76	-1.35
4/2/2012	0.66	2.45	-1.33
4/3/2012	0.4	2.44	-1.94
4/4/2012	0.73	3.05	-2.05
4/5/2012	0.73	3.13	-2.09
4/6/2012	0.49	3.32	-2.56
4/7/2012	0.26	3.3	-2.78
4/8/2012	0.24	3.37	-2.78
4/9/2012	-0.36	1.76	-3.45
4/10/2012	-0.09	2.72	-2.89
4/11/2012	0.17	3	-2.32
4/12/2012	0.18	2.67	-2.12
4/13/2012	-0.03	2.46	-2.12
4/14/2012	-0.45	1.87	-2.62
4/15/2012	-0.33	1.64	-2.53
4/16/2012	-0.1	1.92	-2.32
4/17/2012	-0.21	1.89	-2.44
4/18/2012	-0.04	2.23	-2.39
4/19/2012	-0.02	2.21	-2.29
4/20/2012	0.04	2.47	-2.39
4/21/2012	0.11	2.59	-2.18
4/22/2012	0.47	3.2	-2.14
4/23/2012	0.37	2.42	-1.65
4/24/2012	-0.23	2.25	-2.35
4/25/2012	-0.04	1.53	-2.01
4/26/2012	0.11	2.3	-1.83
4/27/2012	-0.44	2.57	-2.56
4/28/2012	-0.89	1.44	-2.61
4/29/2012	-0.81	1.23	-2.82
4/30/2012	-0.31	1.42	-2.05
5/1/2012	-0.27	1.8	-2.52
5/2/2012	0.32	2.48	-2.16
5/3/2012	0.18	2.66	-2.66
5/4/2012	0.12	3.04	-2.77
5/5/2012	0.33	3.47	-2.74
5/6/2012	0.3	3.49	-2.64
5/7/2012	0.08	3.31	-2.88
5/8/2012	0.02	3.15	-2.77
5/9/2012	0.03	1.99	-2.71
5/10/2012	0.14	3.12	-2.32

5/11/2012	-0.29	2.53	-2.78
5/12/2012	-0.38	2.07	-2.59
5/13/2012	-0.44	1.72	-2.59
5/14/2012	-0.28	1.54	-2.42
5/15/2012	0.06	1.9	-1.96
5/16/2012	0.11	2.17	-1.98
5/17/2012	0.14	2.43	-2
5/18/2012	0.18	2.64	-2.11
5/19/2012	0.41	2.72	-1.59
5/20/2012	0.37	2.75	-1.78
5/21/2012	0.32	2.82	-1.83
5/22/2012	0.31	2.73	-1.75
5/23/2012	0.17	2.65	-1.85
5/24/2012	0.05	2.54	-1.94
5/25/2012	0.09	1.58	-1.83
5/26/2012	-0.24	2.4	-2.12
5/27/2012	-0.25	1.98	-2.26
5/28/2012	-0.1	2.01	-2.17
5/29/2012	-0.01	1.99	-2.18
5/30/2012	0.23	2.53	-2.18
5/31/2012	0.52	2.85	-2.1
6/1/2012	0.76	3.66	-2.07
6/2/2012	0.84	3.7	-2.21
6/3/2012	0.59	3.59	-2.39
6/4/2012	0.97	4.72	-2.4
6/5/2012	1.55	4.14	-1.26
6/6/2012	0.72	3.43	-1.98
6/7/2012	0.29	2.25	-2.42
6/8/2012	0.24	2.99	-2.37
6/9/2012	0.22	2.72	-2.24
6/10/2012	0.29	2.51	-1.96
6/11/2012	0.42	2.26	-1.79
6/12/2012	0.34	2.12	-1.76
6/13/2012	0.57	2.49	-1.68
6/14/2012	0.76	2.54	-1.26
6/15/2012	0.54	2.54	-1.48
6/16/2012	0.56	2.75	-1.4
6/17/2012	0.8	2.95	-1.06
6/18/2012	0.41	2.81	-1.62
6/19/2012	0.2	2.68	-1.92
6/20/2012	0	2.59	-2.16
6/21/2012	0.05	2.87	-2.21
6/22/2012	0.34	2.97	-1.93
6/23/2012	0.31	1.86	-1.89
6/24/2012	0.22	2.69	-1.99
6/25/2012	0.18	2.53	-2.01
6/26/2012	0.35	2.44	-1.9
6/27/2012	0.19	2.23	-2.15
6/28/2012	0.22	2.55	-2.24
6/29/2012	0.28	2.8	-2.21
6/30/2012	0.27	2.99	-2.46
7/1/2012	0.24	3.15	-2.62
7/2/2012	0.19	3.3	-2.61
7/3/2012	0.21	3.4	-2.64
7/4/2012	0.24	3.38	-2.63
7/5/2012	0.25	3.3	-2.64
7/6/2012	0.36	2.37	-2.33
7/7/2012	0.17	3.01	-2.43
7/8/2012	0.25	2.74	-2.15
7/9/2012	0.42	2.48	-1.84
7/10/2012	0.17	2.13	-1.98
7/11/2012	0.1	1.89	-1.84
7/12/2012	0.13	2.01	-1.68

7/13/2012	-0.03	1.93	-1.85
7/14/2012	-0.13	2.04	-2.07
7/15/2012	-0.14	2.17	-2.08
7/16/2012	0.09	2.52	-1.94
7/17/2012	0.19	2.78	-1.95
7/18/2012	-0.02	2.63	-2.27
7/19/2012	0.2	3.08	-2.1
7/20/2012	0.94	3.87	-1.56
7/21/2012	1	3.07	-1.55
7/22/2012	0.25	2.51	-2.04
7/23/2012	-0.03	2.12	-2.45
7/24/2012	0.04	2.28	-2.32
7/25/2012	0.43	2.82	-1.77
7/26/2012	0.03	2.42	-2.15
7/27/2012	0.2	2.59	-2.1
7/28/2012	0.39	2.96	-2.19
7/29/2012	0.54	3.11	-2.1
7/30/2012	0.56	3.43	-2.14
7/31/2012	0.66	3.56	-2.04
8/1/2012	0.45	3.23	-2.47
8/2/2012	0.41	3.06	-2.34
8/3/2012	0.13	2.81	-2.52
8/4/2012	-0.03	2.51	-2.56
8/5/2012	-0.3	1.91	-2.61
8/6/2012	-0.34	1.87	-2.82
8/7/2012	0.06	2.11	-2.2
8/8/2012	0.17	2.1	-1.74
8/9/2012	0.14	2.04	-1.74
8/10/2012	0.13	1.89	-1.54
8/11/2012	0.04	2	-1.59
8/12/2012	0.12	2.22	-1.6
8/13/2012	0.17	2.32	-1.57
8/14/2012	0.18	2.59	-1.82
8/15/2012	0.35	2.83	-1.9
8/16/2012	0.36	2.84	-2
8/17/2012	0.17	2.73	-2.3
8/18/2012	0.34	3.17	-2.42
8/19/2012	0.47	2.92	-2.14
8/20/2012	0.53	2.93	-2.08
8/21/2012	0.31	2.72	-2.18
8/22/2012	0.24	2.78	-2.29
8/23/2012	0.23	2.71	-2.19
8/24/2012	0.21	2.67	-2.12
8/25/2012	0.48	2.92	-1.86
8/26/2012	0.67	2.94	-1.73
8/27/2012	0.27	2.71	-2.19
8/28/2012	0	2.74	-2.73
8/29/2012	0.47	3.3	-2.35
8/30/2012	0.32	2.88	-2.36
8/31/2012	-0.16	2.31	-2.84
9/1/2012	-0.15	2.69	-2.95
9/2/2012	0.52	2.74	-2.01
9/3/2012	0.49	2.72	-1.85
9/4/2012	0.32	2.46	-1.71
9/5/2012	-0.14	1.97	-1.97
9/6/2012	0.18	2.27	-1.74
9/7/2012	0.17	2.09	-1.53
9/8/2012	0.11	2.05	-1.69
9/9/2012	0.3	2.17	-1.21
9/10/2012	0.35	2.33	-1.28
9/11/2012	0.26	2.08	-1.42
9/12/2012	0.02	2.12	-1.99
9/13/2012	-0.17	2.31	-2.42

9/14/2012	-0.05	2.48	-2.53
9/15/2012	0.08	2.69	-2.5
9/16/2012	0.2	2.7	-2.55
9/17/2012	0.06	2.67	-2.68
9/18/2012	0.18	3.04	-2.42
9/19/2012	0.03	3.08	-3.22
9/20/2012	0.3	3.12	-2.59
9/21/2012	0.5	2.96	-1.78
9/22/2012	0.31	2.76	-1.99
9/23/2012	0.05	2.74	-2.46
9/24/2012	0.09	2.42	-2.12
9/25/2012	-0.16	2.11	-2.39
9/26/2012	-0.52	2.02	-2.92
9/27/2012	-0.3	2.35	-2.99
9/28/2012	0.24	2.59	-2.41
9/29/2012	0.18	2.47	-2.33
9/30/2012	0.29	2.72	-2.29
10/1/2012	-0.2	2.32	-2.56
10/2/2012		2.49	-2.6
10/3/2012	0.11	2.55	-1.96
10/4/2012	0.1	2.4	-1.82
10/5/2012	0.26	2.4	-1.48
10/6/2012	0.12	2.24	-1.65
10/7/2012	0.32	2.28	-1.11
10/8/2012	0.32	2	-1.24
10/9/2012	0.94	2.71	-0.64
10/10/2012	0.91	2.46	-1.51
10/11/2012	-0.12	1.9	-1.95
10/12/2012	-0.39	1.69	-2.74
10/13/2012	0.04	2.4	-2.55
10/14/2012	-0.44	2.1	-3.23
10/15/2012	-0.29	2.44	-3.4
10/16/2012	0.1	3.01	-2.89
10/17/2012	0.2	3.34	-2.76
10/18/2012	0.28	3.25	-2.52
10/19/2012	0.65	3.42	-1.77
10/20/2012	0.41	3.06	-2.07
10/21/2012	-0.08	2.43	-2.49
10/22/2012	-0.35	2.1	-2.63
10/23/2012	-0.03	2.32	-2.17
10/24/2012	0.29	2.48	-1.78
10/25/2012	0.44	2.4	-1.81
10/26/2012	0.52	2.49	-1.8
10/27/2012	1.12	3.07	-1.73
10/28/2012	2.79	5.09	-0.29
10/29/2012	4.9	6.73	2.41
10/30/2012	1.63	3.77	-1.53
10/31/2012	0.87	3.34	-1.5
11/1/2012	0.57	2.93	-1.64
11/2/2012	0.19	2.52	-1.75
11/3/2012	0.04	2.49	-1.82
11/4/2012	0.23	2.32	-1.66
11/5/2012	0.28	2.35	-1.4
11/6/2012	0.59	2.47	-1.05
11/7/2012	2.06	3.59	0.62
11/8/2012	1.66	4.16	-2.03
11/9/2012	-0.36	1.64	-2.46
11/10/2012	0.15	2.46	-2.54
11/11/2012	-0.18	2.47	-2.68
11/12/2012	-0.16	2.53	-3.08
11/13/2012	0	3.01	-3.01
11/14/2012	0.38	3.37	-2.88
11/15/2012	0.69	3.72	-2.31

11/16/2012	0.56	3.62	-2.17
11/17/2012	0.38	3.25	-2.27
11/18/2012	0.47	3.02	-1.92
11/19/2012	0.87	3.11	-1.15
11/20/2012	0.74	2.67	-1.47
11/21/2012	0.79	2.56	-1.15
11/22/2012	0.97	2.78	-1.43
11/23/2012	0.47	2.44	-1.76
11/24/2012	-0.19	1.79	-2.71
11/25/2012	-0.73	1.54	-2.74
11/26/2012	-0.88	1.6	-3.13
11/27/2012	0	2.37	-2.81
11/28/2012	0.38	2.91	-1.78
11/29/2012	-0.19	2.46	-2.43
11/30/2012	-0.56	1.92	-2.82
12/1/2012	0.29	2.71	-1.98
12/2/2012	0.19	2.66	-1.88
12/3/2012	-0.4	1.91	-2.25
12/4/2012	-0.11	2.16	-1.97
12/5/2012	-0.35	1.73	-2.2
12/6/2012	-0.26	1.6	-2
12/7/2012	0.03	1.81	-1.99
12/8/2012	0.19	2.34	-2.02
12/9/2012	0.29	2.41	-1.98
12/10/2012	0.5	3.14	-2.57
12/11/2012	0.07	2.98	-2.61
12/12/2012	0.05	3.13	-3.22
12/13/2012	0.33	3.49	-2.96
12/14/2012	-0.06	3.27	-3.28
12/15/2012	-0.06	3.15	-3.3
12/16/2012	0.56	3.47	-2.38
12/17/2012	1.08	3.68	-1.4
12/18/2012	0.81	3.18	-1.79
12/19/2012	-0.01	2.18	-2.57
12/20/2012	0.95	2.85	-1.06
12/21/2012	1.26	4.46	-2
12/22/2012	-0.73	1.46	-2.61
12/23/2012	-0.55	1.59	-2.53
12/24/2012	-0.12	1.93	-1.91
12/25/2012	0	2.05	-1.91
12/26/2012	1.24	4.16	-2.02
12/27/2012	0.86	3.58	-1.98
12/28/2012	-0.16	2.26	-2.61
12/29/2012	0.4	2.93	-1.93
12/30/2012	-0.61	2.33	-3.26
12/31/2012	-1.27	1.41	-3.65
1/1/2013	-1.24	1.25	-3.71
1/2/2013	-0.39	2.04	-2.49
1/3/2013	-0.91	1.44	-3.02
1/4/2013	-1.11	1.12	-3.22
1/5/2013	-1.34	0.52	-3.42
1/6/2013	-0.51	1.63	-2.66
1/7/2013	-0.49	1.89	-2.79
1/8/2013	-0.42	2.45	-3.44
1/9/2013		2.23	
1/10/2013			-3.75
1/11/2013			
1/12/2013	0.49	3.56	-2.86
1/13/2013	0.48	3.54	-2.49
1/14/2013	0.15	3	-2.56
1/15/2013	0.22	2.68	-2.32
1/16/2013	0.54	2.96	-1.88
1/17/2013	-0.07	2.43	-2.29

1/18/2013	-0.1	2.28	-2.09
1/19/2013	-0.85	1.7	-3.04
1/20/2013	-1.31	0.39	-2.8
1/21/2013	-0.27	1.3	-1.84
1/22/2013	-0.63	2.09	-2.87
1/23/2013	-0.5	1.45	-2.17
1/24/2013	-0.59	1.91	-2.47
1/25/2013	-0.96	1.16	-3.27
1/26/2013	-0.51	2.14	-2.7
1/27/2013	-0.6	2.14	-3.07
1/28/2013	-0.57	2.26	-3.05
1/29/2013	-0.16	2.42	-2.89
1/30/2013	0.17	2.75	-2.2
1/31/2013	-1.12	0.87	-3.78
2/1/2013	-1.97	0.08	-4.18
2/2/2013	-0.95	1.18	-3.05
2/3/2013	-0.29	1.85	-2.51
2/4/2013	-0.8	1.91	-3.15
2/5/2013	-0.6	1.7	-2.8
2/6/2013	-0.23	2.49	-2.99
2/7/2013	-0.06	2.4	-2.64
2/8/2013	1.42	4.07	-2.52
2/9/2013	0.66	3.74	-2.58
2/10/2013	0.27	3.25	-2.83
2/11/2013	-0.07	2.97	-3.06
2/12/2013	-0.47	2.36	-3.36
2/13/2013	-0.28	2.45	-3.16
2/14/2013	0.13	2.33	-2.29
2/15/2013	-0.27	1.55	-2.27
2/16/2013	0	1.94	-1.91
2/17/2013	-0.34	2.41	-2.78
2/18/2013	-2.18	-0.09	-3.89
2/19/2013	-1.67	-0.35	-3.42
2/20/2013	-1.21	1.14	-3.62
2/21/2013	-1.41	0.58	-3.16
2/22/2013	-0.2	1.77	-1.94
2/23/2013	0.55	2.54	-1.45
2/24/2013	0.45	3.02	-1.86
2/25/2013	0.23	2.51	-2.62
2/26/2013	0.72	3.41	-2.08
2/27/2013	1.38	3.7	-1.47
2/28/2013	0.8	3.03	-1.92
3/1/2013	0.37	2.92	-2.12
3/2/2013	0.38	2.52	-1.96
3/3/2013	-0.05	2.64	-2.23
3/4/2013	-0.41	2.43	-2.67
3/5/2013	-0.14	1.78	-2.23
3/6/2013	2.67	4.7	0.82
3/7/2013	2.47	4.78	-0.46
3/8/2013	1.8	3.96	-0.89
3/9/2013	2.13	4.36	-0.55
3/10/2013	1.28	3.81	-1.48
3/11/2013	0.51	3	-2.28
3/12/2013	0.27	2.79	-2.5
3/13/2013	-0.1	2.53	-2.82
3/14/2013	-0.88	1.42	-3.41
3/15/2013	-1.01	1.52	-3.32
3/16/2013	-0.3	1.65	-2.63
3/17/2013	0.01	2.41	-1.9
3/18/2013	0.18	1.84	-1.54
3/19/2013	0.62	2.42	-0.8
3/20/2013	-0.38	1.93	-1.86
3/21/2013	-0.16	1.27	-1.89

3/22/2013	-0.23	1.66	-2.15
3/23/2013	-0.71	1.22	-2.72
3/24/2013	-0.3	2.01	-2.83
3/25/2013	1.41	3.71	-1.84
3/26/2013		3.32	-1.77
3/27/2013	-0.1	2.44	-2.82
3/28/2013	-0.29	2.85	-3.34
3/29/2013	-0.07	2.7	-2.82
3/30/2013	-0.31	1.91	-2.95
3/31/2013	-0.1	2.6	-2.82
4/1/2013	0.02	2.92	-2.44
4/2/2013	-0.41	2.39	-2.9
4/3/2013	-1.01	1.89	-3.46
4/4/2013	-0.84	1.42	-3.1
4/5/2013	-0.05	2.19	-2.49
4/6/2013	-0.14	2.13	-2.43
4/7/2013	-0.42	1.89	-3
4/8/2013	-0.45	2.24	-3.07
4/9/2013	-0.25	2.39	-2.83
4/10/2013	-0.05	2.79	-2.87
4/11/2013	0.19	3.04	-2.51
4/12/2013	0.8	3.38	-1.63
4/13/2013	0.42	2.43	-2.03
4/14/2013	0.04	1.71	-2.06
4/15/2013	-0.05	2.22	-1.86
4/16/2013	-0.1	2.13	-1.78
4/17/2013	-0.39	1.94	-1.98
4/18/2013	-0.2	1.45	-1.78
4/19/2013	0.12	1.93	-1.52
4/20/2013	-0.66	1.31	-2.73
4/21/2013	-0.39	1.59	-2.06
4/22/2013	0.59	2.79	-2.11
4/23/2013	1.32	3.21	-0.99
4/24/2013	0.41	2.59	-2.4
4/25/2013	-0.27	2.89	-3.13
4/26/2013	-0.23	2.83	-3.09
4/27/2013	-0.31	2.85	-3.13
4/28/2013	-0.28	1.86	-2.99
4/29/2013	-0.18	2.98	-2.71
4/30/2013	0.06	2.8	-2.57
5/1/2013	0.22	2.8	-2.19
5/2/2013	-0.09	2.41	-2.46
5/3/2013	0.39	2.3	-1.81
5/4/2013	0.68	2.58	-1.61
5/5/2013	0.72	2.6	-1.51
5/6/2013	0.39	2.58	-1.9
5/7/2013	0.38	2.76	-1.91
5/8/2013			
5/9/2013			
5/10/2013			
5/11/2013			
5/12/2013			
5/13/2013			
5/14/2013			
5/15/2013			
5/16/2013			
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5/24/2013			
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5/26/2013			
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6/30/2013			
7/1/2013			
7/2/2013			
7/3/2013			
7/4/2013			
7/5/2013			
7/6/2013			
7/7/2013			
7/8/2013			
7/9/2013			
7/10/2013			
7/11/2013		2.5	
7/12/2013	0.39	2.04	-1.84
7/13/2013	0.24	2.68	-1.72
7/14/2013	-0.14	1.99	-2.13
7/15/2013	-0.27	1.7	-2.42
7/16/2013	0.04	2.19	-2.14
7/17/2013	0.27	2.54	-2.04
7/18/2013	0.28	2.63	-2.14
7/19/2013	0.15	2.87	-2.44
7/20/2013	0.07	3.02	-2.82
7/21/2013	0.2	3.48	-2.77
7/22/2013	0.56	3.74	-2.48
7/23/2013	0.52	3.5	-2.5
7/24/2013	0.48	3.4	-2.4
7/25/2013	0.95	3.25	-2.17

7/26/2013	0.85	3.79	-1.81
7/27/2013	0.08	2.61	-2.58
7/28/2013	0.22	2.43	-2.14
7/29/2013	0.21	2.37	-1.89
7/30/2013	0.14	2.16	-1.83
7/31/2013	0.22	2.26	-1.62
8/1/2013	0.39	2.27	-1.36
8/2/2013	0.41	2.51	-1.44
8/3/2013	0.25	2.58	-1.75
8/4/2013	0.37	2.73	-1.7
8/5/2013	0.41	2.77	-1.7
8/6/2013	0.31	2.7	-1.94
8/7/2013	0.27	2.76	-2.06
8/8/2013	0.21	2.5	-2.06
8/9/2013	0.13	2.34	-2.08
8/10/2013	-0.03	2.15	-2.35
8/11/2013	-0.03	2.18	-2.31
8/12/2013	0.11	2.38	-2.09
8/13/2013	0.3	2.6	-1.94
8/14/2013	0.29	2.58	-2
8/15/2013	0.15	2.48	-2.03
8/16/2013	0.18	2.69	-2.23
8/17/2013	0.35	2.95	-2.25
8/18/2013	0.49	3.29	-2.2
8/19/2013	0.33	3.11	-2.62
8/20/2013	0.03	3.07	-3.04
8/21/2013	0.21	3.09	-2.68
8/22/2013	0.04	2.71	-2.87
8/23/2013	0.18	2.75	-2.72
8/24/2013	0.41	2.8	-2.34
8/25/2013	0.24	2.52	-1.97
8/26/2013	-0.31	2.03	-2.46
8/27/2013	-0.1	2.13	-2.43
8/28/2013	0.46	2.45	-1.41
8/29/2013	0.86	2.73	-0.81
8/30/2013	0.73	2.49	-1.26
8/31/2013	0	1.92	-1.69
9/1/2013	0.32	2.51	-1.49
9/2/2013	0.49	2.7	-1.46
9/3/2013			
9/4/2013		2.3	-2.13
9/5/2013	-0.02	2.46	-2.37
9/6/2013	0.48	2.66	-2.01
9/7/2013	0.18	2.42	-2.22
9/8/2013	-0.05	2.36	-2.52
9/9/2013	0.44	2.94	-1.87
9/10/2013	-0.08	2.4	-2.32
9/11/2013	-0.23	2.32	-2.59
9/12/2013	-0.09	2.34	-2.35
9/13/2013	0.3	2.73	-1.85
9/14/2013	0.38	2.7	-2.18
9/15/2013	0.11	2.62	-2.4
9/16/2013	-0.04	2.83	-2.82
9/17/2013	0.64	3.19	-2.52
9/18/2013	0.44	2.86	-2.51
9/19/2013	0.04	2.57	-2.82
9/20/2013	0.1	2.62	-2.85
9/21/2013	0.35	2.89	-2.43
9/22/2013	0.37	2.86	-2.12
9/23/2013	0.34	2.76	-1.86
9/24/2013	0.21	2.52	-1.82
9/25/2013	0.28	2.45	-1.58
9/26/2013	0.44	2.4	-1.26

9/27/2013	0.64	2.36	-0.92
9/28/2013	0.75	2.35	-0.82
9/29/2013	0.74	2.42	-0.95
9/30/2013	0.73	2.62	-0.98
10/1/2013	0.53	2.5	-1.47
10/2/2013	0.39	2.48	-1.82
10/3/2013	0.27	2.46	-2.05
10/4/2013	0.31	2.57	-2.21
10/5/2013	0.38	2.79	-2.3
10/6/2013	0.68	3.26	-1.98
10/7/2013	0.63	3.45	-1.99
10/8/2013	0.55	3.34	-2.12
10/9/2013	1.59	4.04	-0.9
10/10/2013	2.02	4.19	-0.12
10/11/2013	1.87	3.83	-0.21
10/12/2013	1.88	3.73	-0.17
10/13/2013	1.97	3.55	-0.75
10/14/2013	0.97	2.93	-1.3
10/15/2013	0.8	3.02	-1.73
10/16/2013	0.93	3.13	-1.66
10/17/2013	0.77	3.08	-1.91
10/18/2013	0.11	2.47	-2.55
10/19/2013	0.3	2.94	-2.64
10/20/2013	0.08	2.73	-2.41
10/21/2013	0	2.58	-2.41
10/22/2013	0.04	2.56	-2.06
10/23/2013	0.62	2.9	-1.46
10/24/2013	0.01	2.24	-2.14
10/25/2013	-0.56	1.54	-2.14
10/26/2013	-0.5	1.46	-2.22
10/27/2013	-0.78	1.26	-2.46
10/28/2013	-0.13	1.56	-1.98
10/29/2013	0.19	2.01	-1.58
10/30/2013	0.19	1.94	-1.62
10/31/2013	0.12	2.1	-2.14
11/1/2013	-0.07	2.24	-2.53
11/2/2013	0.23	2.73	-2.63
11/3/2013	0.36	3.08	-2.25
11/4/2013	0.69	3.5	-2.09
11/5/2013	0.34	3.29	-2.45
11/6/2013	0.18	3.12	-2.49
11/7/2013	0.07	3	-2.61
11/8/2013	-0.4	2.31	-3.1
11/9/2013	-0.49	2.17	-2.66
11/10/2013	-0.66	1.87	-3.34
11/11/2013	-0.67	1.7	-3.03
11/12/2013	-0.43	2.06	-2.67
11/13/2013	-0.03	2.23	-2.68
11/14/2013	-0.78	1.93	-3.2
11/15/2013	-0.72	1.68	-3.8
11/16/2013	-0.02	2.48	-2.68
11/17/2013	0.29	2.78	-2.37
11/18/2013	0.15	2.6	-2.29
11/19/2013	-0.37	2.22	-2.88
11/20/2013	0.1	2.68	-2.14
11/21/2013	-0.11	2.25	-2.14
11/22/2013	-0.23	2.08	-2.14
11/23/2013	-0.28	2.07	-2.04
11/24/2013	-1.27	0.62	-2.88
11/25/2013	-1.12	0.74	-2.63
11/26/2013	-0.69	1.03	-2.44
11/27/2013	0.36	2.55	-2.03
11/28/2013	-1.34	1.18	-3.49

11/29/2013	-0.88	1.19	-3.02
11/30/2013	-0.33	2.06	-2.57
12/1/2013	0	2.73	-2.68
12/2/2013	0.17	3	-3.02
12/3/2013	0.54	3.66	-2.43
12/4/2013	0.3	3.48	-2.68
12/5/2013	-0.03	3.11	-2.96
12/6/2013	0.06	3.1	-2.74
12/7/2013	0	2.93	-2.74
12/8/2013	-0.2	2.35	-2.57
12/9/2013	0.26	2.47	-2.34
12/10/2013	-0.27	1.99	-2.74
12/11/2013	-0.96	1.39	-3.25
12/12/2013	-0.78	1.46	-3.13
12/13/2013	-1.14	1.48	-3.5
12/14/2013	-0.18	2.05	-2.42
12/15/2013	0.46	3.12	-1.9
12/16/2013	-0.94	1.5	-3.18
12/17/2013	-0.36	2.25	-2.94
12/18/2013	-0.14	2.5	-2.48
12/19/2013	-0.81	2.07	-3.36
12/20/2013	-0.78	1.84	-3.18
12/21/2013	-0.41	2.02	-2.52
12/22/2013	-0.79	1.25	-2.72
12/23/2013	-0.36	1.7	-2.21
12/24/2013		2.06	
12/25/2013			
12/26/2013			
12/27/2013			-2.91
12/28/2013	-0.85	1.54	-3.22
12/29/2013	-0.39	1.99	-3.44
12/30/2013	-0.34	2.6	-2.86
12/31/2013	-0.12	3.2	-3.08
1/1/2014	-0.52	2.68	-3.78
1/2/2014	0.58	3.55	-3.3
1/3/2014	1.18	4.14	-1.86
1/4/2014	0.43	3.44	-2.61
1/5/2014	-0.39	2.34	-3.21
1/6/2014	0.16	2.71	-2.27
1/7/2014	-2.02	1.14	-4.47
1/8/2014	-1.85	0.06	-3.91
1/9/2014	-1.25	0.8	-3.29
1/10/2014	-0.43	1.66	-2.39
1/11/2014	-0.01	2.12	-1.93
1/12/2014	-0.62	1.95	-2.65
1/13/2014	-0.48	1.6	-3.12
1/14/2014	0.14	2.56	-2.15
1/15/2014	-0.03	2.44	-2.28
1/16/2014	0.22	2.77	-2.21
1/17/2014	0.12	2.8	-2.27
1/18/2014	-0.14	2.64	-2.54
1/19/2014	-0.65	2.01	-3.03
1/20/2014	-1.05	1.19	-3.36
1/21/2014	0.6	2.55	-2.02
1/22/2014	0.88	3	-1.36
1/23/2014		2.49	
1/24/2014			
1/25/2014			
1/26/2014			
1/27/2014		1.67	-3.3
1/28/2014		2.24	
1/29/2014		2.77	
1/30/2014			

1/31/2014		1.94	
2/1/2014		2.56	
2/2/2014	-0.32	2.72	-3.3
2/3/2014	0.05	2.81	-3.03
2/4/2014	-0.08	2.19	-2.63
2/5/2014	0.33	2.48	-1.98
2/6/2014	-0.17	1.9	-1.98
2/7/2014	-0.37	1.97	-2.52
2/8/2014	-0.82	1.08	-2.43
2/9/2014	-0.32	1.56	-2.18
2/10/2014	-0.44	1.58	-2.68
2/11/2014		1.74	-2.43
2/12/2014		1.85	
2/13/2014		3.94	
2/14/2014	-0.47	2.11	-3.14
2/15/2014	-0.56	1.84	-3.75
2/16/2014	-0.5	2.24	-2.95
2/17/2014	-1.03	1.5	-3.46
2/18/2014	-0.5	1.89	-3.14
2/19/2014	-0.39	1.84	-2.47
2/20/2014	-0.94	0.74	-3.04
2/21/2014	-0.45	1.86	-2.8
2/22/2014	-0.64	1.82	-2.68
2/23/2014	-0.74	1.39	-2.65
2/24/2014	-0.79	1.78	-3.44
2/25/2014	-0.98	1.7	-3.62
2/26/2014	-0.46	2.23	-3.04
2/27/2014	-0.06	2.95	-2.97
2/28/2014	-0.69	2.33	-3.82
3/1/2014	-0.42	2.61	-3.8
3/2/2014	-0.42	2.52	-3.65
3/3/2014	-0.1	2.65	-3.04
3/4/2014	-0.08	2.5	-2.64
3/5/2014	-0.25	2.26	-2.63
3/6/2014	0.22	1.84	-1.71
3/7/2014	0.54	2.59	-1.45
3/8/2014	0.22	2.78	-1.9
3/9/2014	-0.1	1.76	-1.71
3/10/2014	-0.11	1.81	-1.67
3/11/2014	0.19	1.86	-1.52
3/12/2014	0.57	2.24	-1.08
3/13/2014	-0.89	1.17	-2.7
3/14/2014	-0.87	1.28	-3.13
3/15/2014	-0.56	1.92	-3.12
3/16/2014	-0.33	2.15	-2.87
3/17/2014	0.63	2.86	-1.99
3/18/2014	0.64	2.83	-1.71
3/19/2014	0.38	2.86	-2.05
3/20/2014	-0.08	1.98	-2.48
3/21/2014	-0.77	2.15	-3.05
3/22/2014	-0.6	1.92	-2.59
3/23/2014	-0.38	2.19	-2.43
3/24/2014	-0.24	1.93	-2.19
3/25/2014	0	2.14	-2.2
3/26/2014	0.3	2.81	-2.78
3/27/2014	0.04	2.55	-2.21
3/28/2014	-1.01	1.63	-3.86
3/29/2014	-0.4	2.74	-3.87
3/30/2014	0.54	3.08	-2.5
3/31/2014	0.5	3.01	-2.29
4/1/2014	0.31	3.12	-2.51
4/2/2014	0.34	2.82	-2.18
4/3/2014	0.09	2.58	-2.2

4/4/2014	0.55	2.23	-1.57
4/5/2014	0.25	2.85	-1.85
4/6/2014	-0.47	1.6	-2.16
4/7/2014	-0.26	1.24	-2.07
4/8/2014	0.26	2.19	-1.59
4/9/2014	-0.08	1.84	-1.96
4/10/2014	-0.38	1.26	-2.23
4/11/2014	-0.63	1.21	-2.83
4/12/2014	-0.56	1.48	-2.69
4/13/2014	-0.37	1.99	-2.76
4/14/2014	-0.48	2.05	-2.87
4/15/2014	-0.46	1.98	-2.86
4/16/2014	-0.43	2.44	-3.1
4/17/2014	0.14	3.14	-2.66
4/18/2014	0.22	2.74	-2.22
4/19/2014	-0.26	1.62	-2.64
4/20/2014	-0.13	2.29	-2.64
4/21/2014	0.02	2.56	-2.07
4/22/2014	0.14	2.44	-2.07
4/23/2014	0.1	2.55	-2.34
4/24/2014	-0.17	2.37	-2.79
4/25/2014	0.58	2.99	-2.02
4/26/2014	0.73	3.05	-2.25
4/27/2014	0.51	2.93	-2.22
4/28/2014	0.1	2.89	-2.67
4/29/2014	1.15	4.4	-2.42
4/30/2014	1.52	3.57	-0.97
5/1/2014	0.32	2.64	-2.21
5/2/2014	-0.04	2.57	-2.44
5/3/2014	0.08	1.7	-2.04
5/4/2014	-0.09	2.48	-2.03
5/5/2014	-0.33	1.93	-2.3
5/6/2014	0.14	2.07	-1.58
5/7/2014	0.05	1.78	-1.64
5/8/2014	0.11	1.85	-1.72
5/9/2014	0.21	1.89	-1.76
5/10/2014	0.19	2.02	-1.94
5/11/2014	-0.25	2.02	-2.49
5/12/2014	-0.15	2.44	-2.49
5/13/2014	0.33	3.42	-2.51
5/14/2014	0.45	3.03	-2.28
5/15/2014	0.06	3.04	-2.56
5/16/2014	0.21	3.12	-2.41
5/17/2014	-0.01	2.84	-2.64
5/18/2014	-0.2	1.78	-2.86
5/19/2014	-0.22	2.64	-2.75
5/20/2014	-0.12	2.44	-2.63
5/21/2014	0.19	2.43	-2.31
5/22/2014	0.45	2.6	-2.14
5/23/2014	0.44	2.58	-2.16
5/24/2014	0.48	2.8	-2.06
5/25/2014	0.26	2.66	-2.42
5/26/2014	0	2.59	-2.54
5/27/2014	-0.07	2.91	-2.73
5/28/2014	0.68	3.74	-2.18
5/29/2014	0.97	3.03	-1.57
5/30/2014	0.2	2.67	-2.05
5/31/2014	0.17	2.67	-2.22
6/1/2014	0.1	1.65	-1.86
6/2/2014	-0.03	2.37	-1.9
6/3/2014	0	2.01	-2.04
6/4/2014	0.38	2.28	-1.48
6/5/2014	0.46	2.27	-1.19

6/6/2014	0.17	2.13	-1.69
6/7/2014	-0.07	1.81	-2.11
6/8/2014	0.06	2.14	-2.03
6/9/2014	0.15	2.43	-2.16
6/10/2014	0.2	2.71	-2.34
6/11/2014	0.59	3.52	-2.1
6/12/2014	0.72	3.53	-2.05
6/13/2014	0.69	3.6	-2.05
6/14/2014	0.33	3.31	-2.5
6/15/2014	0.13	3.15	-2.67
6/16/2014	0.14	2.21	-2.62
6/17/2014	0.16	3.1	-2.45
6/18/2014	0.09	2.74	-2.58
6/19/2014	0.28	2.59	-2.33
6/20/2014	0.28	2.56	-2.5
6/21/2014	0.45	2.68	-2.01
6/22/2014	0.55	2.83	-1.84
6/23/2014	0.36	2.68	-2.06
6/24/2014	0.19	2.65	-2.17
6/25/2014	0.03	2.64	-2.21
6/26/2014	0.11	2.71	-2.16
6/27/2014	0.47	2.86	-1.93
6/28/2014	0.16	2.66	-2.01
6/29/2014	0.02	2.44	-2.08
6/30/2014	-0.05	2.32	-2.08
7/1/2014	-0.1	1.49	-2.12
7/2/2014	-0.06	2.11	-2
7/3/2014	0	2.02	-1.81
7/4/2014	0.37	1.8	-1.7
7/5/2014	-0.17	1.97	-2.04
7/6/2014	-0.53	1.42	-2.46
7/7/2014	-0.38	1.96	-2.46
7/8/2014	-0.18	2.33	-2.56
7/9/2014	-0.06	2.61	-2.55
7/10/2014	-0.01	2.98	-2.69
7/11/2014	0.06	3.09	-2.87
7/12/2014	-0.04	3.2	-3.02
7/13/2014	-0.09	3.02	-3.02
7/14/2014	-0.13	3.07	-3.16
7/15/2014	0.04	2.43	-2.86
7/16/2014	0.18	3.05	-2.63
7/17/2014	0.12	2.76	-2.55
7/18/2014	-0.03	2.3	-2.58
7/19/2014	0.1	2.34	-2.41
7/20/2014	0.76	2.98	-1.56
7/21/2014	0.44	2.52	-1.85
7/22/2014	0.12	2.41	-2.04
7/23/2014	0.06	2.5	-2.16
7/24/2014	0.17	2.7	-2.12
7/25/2014	0.29	2.7	-1.84
7/26/2014	0.08	2.65	-2.07
7/27/2014	0.11	2.65	-2.03
7/28/2014	0.28	2.58	-1.96
7/29/2014	0.1	2.37	-2.09
7/30/2014	0.05	2.21	-1.95
7/31/2014	-0.11	1.7	-2.07
8/1/2014	-0.21	1.9	-2.32
8/2/2014	0.35	2.33	-1.83
8/3/2014	0.42	2.27	-1.46
8/4/2014	0.23	2.18	-1.73
8/5/2014	0.32	2.56	-1.84
8/6/2014	0.47	2.84	-1.79
8/7/2014	0.52	3.16	-2

8/8/2014	0.38	3.1	-2.4
8/9/2014	0.21	3.35	-2.79
8/10/2014	0.33	3.45	-2.73
8/11/2014	0.4	3.47	-2.69
8/12/2014	0.62	3.86	-2.46
8/13/2014	0.79	3.19	-2.05
8/14/2014	0.37	2.9	-2.49
8/15/2014	0.22	2.74	-2.43
8/16/2014	0.23	2.52	-2.11
8/17/2014	0.17	2.34	-2
8/18/2014	0.28	2.41	-1.68
8/19/2014	0.38	2.39	-1.5
8/20/2014	0.41	2.48	-1.61
8/21/2014	0.39	2.61	-1.7
8/22/2014	0.57	2.87	-1.51
8/23/2014	0.96	3.08	-1.27
8/24/2014	0.94	2.96	-1.08
8/25/2014	0.59	2.63	-1.51
8/26/2014	0.36	2.51	-1.88
8/27/2014	0.26	2.42	-1.92
8/28/2014	0.22	2.3	-1.93
8/29/2014	0.41	2.53	-1.79
8/30/2014	0.3	2.43	-1.76
8/31/2014	-0.05	2.1	-1.98
9/1/2014	-0.14	2.19	-2.29
9/2/2014	0.21	2.48	-1.79
9/3/2014	0.1	2.45	-1.9
9/4/2014	0.1	2.55	-2.12
9/5/2014	0.17	2.76	-2.3
9/6/2014	0.04	2.86	-2.72
9/7/2014	0.29	3.36	-2.88
9/8/2014	0.79	3.87	-2.54
9/9/2014	1.3	3.89	-1.62
9/10/2014	1.14	3.67	-1.94
9/11/2014	0.57	3.22	-2.33
9/12/2014	0.44	3.16	-2.46
9/13/2014	0.78	3.37	-1.64
9/14/2014	0.69	2.96	-1.42
9/15/2014	0.43	2.57	-1.51
9/16/2014	0.6	2.56	-1.08
9/17/2014	0.76	2.64	-0.96
9/18/2014	0.57	2.39	-1.35
9/19/2014	0.82	2.84	-0.72
9/20/2014	0.7	2.57	-1.16
9/21/2014	0.6	2.83	-1.57
9/22/2014	0.14	2.19	-2.04
9/23/2014	-0.1	2.11	-2.45
9/24/2014	0.59	2.69	-2.04
9/25/2014	1.45	3.63	-0.69
9/26/2014	0.87	2.99	-1.3
9/27/2014	0.32	2.62	-1.93
9/28/2014	0.1	2.45	-2.07
9/29/2014	0.12	2.51	-1.94
9/30/2014	0.59	2.9	-1.75
10/1/2014	1.04	3.1	-0.98
10/2/2014	1.39	3.5	-0.58
10/3/2014	1.5	3.54	-0.74
10/4/2014	1.42	3.44	-0.8
10/5/2014	0.62	3.04	-2.09
10/6/2014	0.56	3.02	-2.26
10/7/2014	0.3	2.93	-2.74
10/8/2014	0.11	2.76	-2.88
10/9/2014	-0.01	2.86	-3.1

10/10/2014	-0.08	2.83	-3.35
10/11/2014	0.62	3.26	-2
10/12/2014	0.44	2.84	-1.87
10/13/2014	0.05	2.47	-2.09
10/14/2014	-0.03	2.23	-1.96
10/15/2014	0.26	2.34	-1.48
10/16/2014	0.41	2.3	-1.36
10/17/2014	0.39	2.1	-1.61
10/18/2014	0.18	2.02	-1.93
10/19/2014	0.2	2.04	-1.59
10/20/2014	0.23	2.15	-1.66
10/21/2014	0.15	2.4	-2.32
10/22/2014	1.25	3.23	-1.65
10/23/2014	1.32	3.73	-1.17
10/24/2014	0.86	3.36	-1.55
10/25/2014	0.46	3.19	-1.88
10/26/2014	-0.06	2.49	-2.4
10/27/2014	-0.14	2.51	-2.38
10/28/2014	-0.19	2.42	-2.36
10/29/2014	0.01	2.57	-2.16
10/30/2014	0.07	2.49	-2.22
10/31/2014	0.49	2.76	-1.74
11/1/2014	2.03	4.03	-0.02
11/2/2014	1.42	3.89	-2.12
11/3/2014	-0.29	2.33	-3.64
11/4/2014	-0.63	2.18	-3.44
11/5/2014	-0.1	2.47	-2.93
11/6/2014	0.27	3.14	-3
11/7/2014	-0.09	3.08	-2.9
11/8/2014	-0.26	2.69	-2.93
11/9/2014	-0.47	2.23	-3.05
11/10/2014	0.07	2.64	-2.24
11/11/2014	0.24	2.61	-1.77
11/12/2014	0.34	2.6	-1.57
11/13/2014	0.42	2.45	-1.26
11/14/2014	0.18	1.97	-1.65
11/15/2014	-0.1	1.56	-1.89
11/16/2014	-0.08	1.47	-1.79
11/17/2014	0.28	2.36	-2.49
11/18/2014	-0.91	1.48	-3.88
11/19/2014	-1.37	0.75	-3.3
11/20/2014	-0.93	1.29	-3.41
11/21/2014	-0.82	1.64	-3.43
11/22/2014	-0.76	2.23	-3.25
11/23/2014	-1.22	1.64	-4.11
11/24/2014	0.23	3.11	-2.67
11/25/2014	-0.21	2.64	-2.91
11/26/2014	0.66	3.48	-2.63
11/27/2014	0.37	2.93	-2.58
11/28/2014	-0.32	2.18	-2.71
11/29/2014	0.11	2.53	-2.24
11/30/2014	-0.28	1.88	-2.9
12/1/2014	-0.41	1.83	-2.81
12/2/2014	0.6	2.77	-1.45
12/3/2014	0.44	3.22	-3.38
12/4/2014	-0.53	2.22	-3.18
12/5/2014	0.11	2.72	-3.06
12/6/2014	0.45	3.21	-2.12
12/7/2014	1.07	3.55	-2.22
12/8/2014	1.82	4.28	-0.61
12/9/2014	2.23	4.77	0
12/10/2014	0.59	2.83	-1.77
12/11/2014	-0.54	1.87	-2.66

12/12/2014	-0.35	1.91	-2.18
12/13/2014	-0.24	1.7	-1.94
12/14/2014	-0.01	1.73	-1.64
12/15/2014	0.2	1.77	-1.67
12/16/2014	0.2	1.8	-1.53
12/17/2014	-0.06	2.06	-2.58
12/18/2014	-0.74	1.38	-3.16
12/19/2014	-0.52	1.72	-2.59
12/20/2014	-0.06	2.54	-2.8
12/21/2014	0.06	2.9	-2.67
12/22/2014	0.22	3.12	-2.87
12/23/2014	0.86	3.85	-2.11
12/24/2014	0.71	3.73	-2.06
12/25/2014	-0.23	2.86	-3.28
12/26/2014	-0.98	1.88	-3.64
12/27/2014	-0.64	2.02	-3.13
12/28/2014	-0.49	1.75	-2.87
12/29/2014	-0.34	1.77	-2.52
12/30/2014	-0.04	2.28	-2.56
12/31/2014	-0.39	2.18	-2.83
1/1/2015	-0.91	1.6	-3.58
1/2/2015	-1.22	1.12	-3.54
1/3/2015	-0.27	2.13	-3.46
1/4/2015	0.04	2.82	-2.36
1/5/2015	-1.45	1.58	-4.05
1/6/2015	-1.23	1.44	-4.14
1/7/2015	-1.08	1.92	-3.66
1/8/2015	-1.21	1.19	-3.57
1/9/2015	-1.79	-0.08	-3.71
1/10/2015	-1.65	0.36	-3.76
1/11/2015	-1.28	0.68	-3.01
1/12/2015	-0.96	0.93	-2.82
1/13/2015	-0.32	1.25	-1.77
1/14/2015	0.4	1.97	-1.37
1/15/2015	0.03	2.28	-2.32
1/16/2015	-0.8	1.68	-2.92
1/17/2015	-0.62	1.89	-2.81
1/18/2015	-0.04	2.5	-2.52
1/19/2015	-0.36	2.66	-3.43
1/20/2015	-0.66	2.49	-3.7
1/21/2015	-0.21	2.91	-3.85
1/22/2015	-0.09	3.04	-3.16
1/23/2015	-0.16	2.83	-3.05
1/24/2015	0.53	3.5	-2.04
1/25/2015	-0.63	2.38	-3.36
1/26/2015	0.85	3.02	-1.82
1/27/2015	1.83	4.05	-0.91
1/28/2015	0.35	2.94	-2.32
1/29/2015	-0.07	2.25	-2.09
1/30/2015	-0.15	2.36	-2.85
1/31/2015	-0.92	1.23	-3.08
2/1/2015	-0.65	1.75	-2.93
2/2/2015	-0.1	2.58	-2.6
2/3/2015	-0.47	2.16	-2.82
2/4/2015	-0.83	1.86	-3.2
2/5/2015	-0.56	2.03	-3.08
2/6/2015	-0.65	1.96	-3.02
2/7/2015	-0.64	1.75	-2.84
2/8/2015	-0.09	2.33	-2.27
2/9/2015	1.01	2.67	-0.79
2/10/2015	1.53	2.97	-0.05
2/11/2015	1.63	3.27	-0.23
2/12/2015	0.71	2.8	-1.36

2/13/2015		1.69	-2.15
2/14/2015		2.12	-2.29
2/15/2015		0.97	
2/16/2015			
2/17/2015		2.33	
2/18/2015			
2/19/2015			
2/20/2015			
2/21/2015			
2/22/2015		1.98	
2/23/2015			
2/24/2015			
2/25/2015			
2/26/2015			
2/27/2015			
2/28/2015			
3/1/2015			
3/2/2015		1.61	
3/3/2015		1.17	
3/4/2015		1.51	
3/5/2015	-0.4	1.9	-3.02
3/6/2015	-0.55	1.78	-2.94
3/7/2015	-0.99	1.4	-3.28
3/8/2015	-1.24	1.54	-3.7
3/9/2015	-0.64	1.52	-2.73
3/10/2015	-0.64	1.24	-2.67
3/11/2015	-0.54	1.82	-2.35
3/12/2015	-1.02	1.41	-2.76
3/13/2015	-0.6	1.18	-2.23
3/14/2015	-0.28	1.65	-2.31
3/15/2015	-0.55	1.85	-2.91
3/16/2015	-0.06	2.14	-2.3
3/17/2015	0.42	2.92	-2.02
3/18/2015	-0.58	2.08	-3.85
3/19/2015	-0.68	2.28	-3.87
3/20/2015	0	3.43	-3.77
3/21/2015	0.42	3.08	-2.89
3/22/2015	-0.35	2.5	-3.41
3/23/2015	-0.9	1.68	-3.87
3/24/2015	-0.98	1.37	-3.75
3/25/2015	-0.6	1.97	-2.85
3/26/2015	-0.51	1.84	-2.48
3/27/2015	-0.32	1.5	-2.12
3/28/2015	-0.07	1.8	-2.01
3/29/2015	0.05	1.89	-1.71
3/30/2015	-0.51	1.32	-2.66
3/31/2015	-0.23	1.73	-2.3
4/1/2015	-0.14	1.96	-2.15
4/2/2015	-0.5	1.73	-2.54
4/3/2015	-0.96	1.5	-3.29
4/4/2015	-0.82	1.82	-3.04
4/5/2015	-0.99	1.23	-3.36
4/6/2015	-0.94	2.08	-3.8
4/7/2015	-0.61	2.47	-3.01
4/8/2015	0.53	2.13	-1.68
4/9/2015	0.6	3.09	-1.32
4/10/2015	0.2	2.64	-1.88
4/11/2015	-0.63	1.9	-2.61
4/12/2015	-0.9	1.47	-2.94
4/13/2015	-0.64	1.58	-2.75
4/14/2015	-0.52	1.84	-2.98
4/15/2015	-0.33	2.12	-3.04
4/16/2015	-0.35	2.35	-3.31

4/17/2015	-0.18	2.62	-3.21
4/18/2015	-0.33	2.72	-3.54
4/19/2015	0.08	3.3	-3.35
4/20/2015	0.73	3.55	-2.13
4/21/2015	0.3	2.97	-2.57
4/22/2015	0.06	2.14	-2.45
4/23/2015	-0.33	2.63	-2.64
4/24/2015	-0.36	1.87	-2.72
4/25/2015	-0.05	2.21	-1.9
4/26/2015	0.33	2.07	-1.49
4/27/2015	0.23	2.06	-1.54
4/28/2015	0.25	1.97	-1.59
4/29/2015	0.24	2.11	-1.68
4/30/2015	0.61	2.5	-1.69
5/1/2015	0.83	2.91	-1.23
5/2/2015	0.56	2.78	-1.59
5/3/2015	0.12	2.5	-2.22
5/4/2015	-0.28	2.26	-2.61
5/5/2015	-0.68	2.08	-3.01
5/6/2015	-0.48	2.61	-3.1
5/7/2015	-0.3	2.45	-2.6
5/8/2015	-0.31	1.37	-2.47
5/9/2015	-0.1	2.47	-2.3
5/10/2015	-0.33	2.35	-2.58
5/11/2015	-0.36	2.01	-2.71
5/12/2015	-0.06	2.15	-2.41
5/13/2015	-0.39	1.81	-2.92
5/14/2015	-0.11	2.3	-2.71
5/15/2015	-0.31	2.42	-3.37
5/16/2015	-0.31	2.64	-3.32
5/17/2015	-0.24	2.81	-3.23
5/18/2015	0	3.31	-3.06
5/19/2015	0.12	2.98	-2.64
5/20/2015	-0.19	2.57	-2.77
5/21/2015	-0.15	1.74	-2.62
5/22/2015	-0.17	2.75	-2.44
5/23/2015	-0.59	2.03	-2.65
5/24/2015	-1.01	1.35	-2.91
5/25/2015	-0.9	0.96	-2.87
5/26/2015	-0.84	1.01	-2.72
5/27/2015	-0.81	0.89	-2.72
5/28/2015	-0.82	1.1	-2.86
5/29/2015	-0.56	1.59	-2.65
5/30/2015	-0.37	1.99	-2.55
5/31/2015	-0.46	2.07	-2.83
6/1/2015	-0.07	2.83	-2.59
6/2/2015	0.71	3.38	-1.86
6/3/2015	0.72	3.21	-1.69
6/4/2015	0.61	3.36	-1.85
6/5/2015	0.49	3.09	-1.91
6/6/2015	0.08	1.82	-2.33
6/7/2015	-0.06	2.74	-2.52
6/8/2015	-0.2	2.51	-2.54
6/9/2015	-0.23	2.12	-2.76
6/10/2015	-0.03	2.17	-2.55
6/11/2015	-0.07	2.18	-2.66
6/12/2015	-0.12	2.44	-2.84
6/13/2015	-0.11	2.62	-2.92
6/14/2015	0.01	2.76	-2.72
6/15/2015	0.11	3.05	-2.63
6/16/2015	0.24	3	-2.29
6/17/2015	0.13	3.05	-2.5
6/18/2015	0.24	2.86	-2.17

6/19/2015	0.07	2.65	-2.19
6/20/2015	0.21	1.85	-2.02
6/21/2015	0.22	2.75	-1.68
6/22/2015	-0.05	2.26	-2.12
6/23/2015	-0.08	1.96	-1.86
6/24/2015	0.04	1.98	-1.79
6/25/2015	0.11	1.97	-1.76
6/26/2015	0.31	2.11	-1.52
6/27/2015	0.73	3.05	-1.25
6/28/2015	0.78	2.8	-1.45
6/29/2015	-0.02	2.6	-2.43
6/30/2015	0.13	2.94	-2.39
7/1/2015	0.17	3.02	-2.35
7/2/2015	0.25	3.4	-2.44
7/3/2015	0.32	3.26	-2.41
7/4/2015	0.42	3.33	-2.3
7/5/2015	0.23	2.27	-2.4
7/6/2015	0.15	2.9	-2.55
7/7/2015	0.2	2.78	-2.44
7/8/2015	0.06	2.4	-2.54
7/9/2015	0.31	2.61	-2.34
7/10/2015	0.39	2.87	-2.38
7/11/2015	0.39	2.82	-2.2
7/12/2015	0.28	2.78	-2.37
7/13/2015	0.34	3.02	-2.2
7/14/2015	0.5	3.18	-2.07
7/15/2015	0.62	3.26	-1.86
7/16/2015	0.86	3.2	-1.81
7/17/2015	0.33	2.76	-2.03
7/18/2015	0.13	2.54	-2.03
7/19/2015	0.19	2.47	-2.04
7/20/2015	0.24	1.98	-1.88
7/21/2015	0.48	2.39	-1.46
7/22/2015	0.47	2.45	-1.23
7/23/2015	0.28	2.12	-1.53
7/24/2015	0.18	2.11	-1.69
7/25/2015	0.21	2.11	-1.67
7/26/2015	0.05	2.06	-1.86
7/27/2015	0.02	2.36	-2.16
7/28/2015	0.06	2.56	-2.32
7/29/2015	0.06	2.78	-2.59
7/30/2015	-0.15	2.8	-2.92
7/31/2015	-0.01	3.08	-2.78
8/1/2015	-0.1	2.98	-2.96
8/2/2015	0	2.98	-2.9
8/3/2015	-0.04	2.37	-2.78
8/4/2015	-0.29	2.47	-3.19
8/5/2015	-0.11	2.41	-2.69
8/6/2015	0.06	2.51	-2.55
8/7/2015	0.52	2.76	-1.75
8/8/2015	0.81	2.95	-1.52
8/9/2015	0.85	3.11	-1.53
8/10/2015	0.69	2.83	-1.56
8/11/2015	0.17	2.48	-2.28
8/12/2015	0.3	2.7	-2.13
8/13/2015	0.19	2.6	-2.13
8/14/2015	-0.09	2.42	-2.41
8/15/2015	-0.19	2.3	-2.48
8/16/2015	-0.27	2.15	-2.54
8/17/2015	-0.34	1.83	-2.49
8/18/2015	-0.21	1.9	-2.33
8/19/2015	-0.11	1.82	-2.03
8/20/2015	0.18	2.09	-1.72

8/21/2015	0.22	1.98	-1.66
8/22/2015	0.28	2.3	-1.59
8/23/2015	0.35	2.4	-1.57
8/24/2015	0.36	2.39	-1.56
8/25/2015	0.39	2.61	-1.68
8/26/2015	0.32	2.77	-1.85
8/27/2015	0.19	2.91	-2.4
8/28/2015	0.12	3.02	-2.76
8/29/2015	0.02	3.02	-3.07
8/30/2015	-0.07	2.8	-3.16
8/31/2015	-0.26	2.62	-3.32
9/1/2015	-0.04	2.78	-3.23
9/2/2015	0.32	2.92	-2.54
9/3/2015	0.35	2.87	-2.25
9/4/2015	0.58	2.89	-2.11
9/5/2015	1.04	3.08	-1.28
9/6/2015	0.37	2.44	-1.76
9/7/2015	0.17	2.33	-1.99
9/8/2015	-0.18	1.95	-2.26
9/9/2015	0.15	2.65	-2.25
9/10/2015	0.34	2.69	-1.94
9/11/2015	0.59	2.98	-1.8
9/12/2015	0.59	2.82	-1.75
9/13/2015	0.43	2.53	-1.89
9/14/2015	-0.3	1.88	-2.71
9/15/2015	-0.33	1.89	-2.62
9/16/2015	-0.2	2	-2.3
9/17/2015	-0.05	2.16	-2.13
9/18/2015	-0.04	2.12	-1.9
9/19/2015	0.03	2.16	-1.87
9/20/2015	0.23	2.16	-1.65
9/21/2015	1.06	2.97	-0.63
9/22/2015	1.14	2.97	-0.87
9/23/2015	0.83	2.74	-1.44
9/24/2015	0.59	2.86	-1.68
9/25/2015	1.09	3.55	-1.5
9/26/2015	1.29	3.81	-1.35
9/27/2015	0.94	3.31	-2.04
9/28/2015	0.3	2.99	-2.93
9/29/2015	0.29	3.11	-2.94
9/30/2015	0.52	3.28	-2.53
10/1/2015	1.5	4.12	-1.52
10/2/2015	2.85	4.98	0.6
10/3/2015	3.02	4.77	1.15
10/4/2015	2.67	4.31	0.88
10/5/2015	1.87	3.53	-0.19
10/6/2015	1.05	2.78	-1.06
10/7/2015	0.72	2.62	-1.37
10/8/2015	0.52	2.51	-1.53
10/9/2015	0.26	2.14	-1.64
10/10/2015	0.42	2.54	-2.22
10/11/2015			
10/12/2015	0.15	2.31	-2.2
10/13/2015			
10/14/2015	0.13	2.56	-2.1
10/15/2015	0.11	2.47	-2.15
10/16/2015	-0.21	2.04	-2.28
10/17/2015	-0.23	2.24	-2.2
10/18/2015			
10/19/2015	-0.05	2.18	-1.85
10/20/2015	-1.09	1.04	-3.25
10/21/2015	-0.87	1.56	-2.78
10/22/2015	-0.17	2.13	-2.54

10/23/2015	0.04	2.51	-2.25
10/24/2015	0.49	2.9	-2.18
10/25/2015	0.33	2.88	-2.6
10/26/2015	0.34	3.05	-3.02
10/27/2015	0.55	3.28	-2.76
10/28/2015	1.11	4.06	-2.2
10/29/2015			
10/30/2015	-0.38	2.52	-3.09
10/31/2015	-0.16	2.64	-2.72
11/1/2015	-0.22	2.35	-2.38
11/2/2015	-0.18	2.17	-2.17
11/3/2015	-0.11	1.88	-1.85
11/4/2015	-0.01	1.78	-1.74
11/5/2015	-0.04	1.64	-1.91
11/6/2015			
11/7/2015	-0.35	1.5	-2.46
11/8/2015	-0.26	1.58	-2.03
11/9/2015	-0.25	1.86	-2.49
11/10/2015	0.9	3.02	-2.19
11/11/2015	0.88	3.15	-1.38
11/12/2015	1.15	3.44	-1.43
11/13/2015	-0.3	2.38	-2.8
11/14/2015	-1.15	1.36	-3.52
11/15/2015	-0.67	2.06	-2.82
11/16/2015	-0.62	1.99	-2.97
11/17/2015	0.34	2.86	-1.61
11/18/2015			
11/19/2015	0.23	2.42	-1.7
11/20/2015	0.02	2.23	-2.25
11/21/2015	0.44	2.63	-1.76
11/22/2015	0.33	2.74	-2.57
11/23/2015	0.09	2.78	-2.42
11/24/2015	-0.23	2.77	-3.22
11/25/2015	-0.34	2.64	-3.53
11/26/2015	-0.28	2.81	-3.2
11/27/2015	-0.39	2.72	-3.27
11/28/2015			
11/29/2015			
11/30/2015			
12/1/2015	0.61	2.8	-1.29
12/2/2015	0.09	2.01	-1.82
12/3/2015	-0.68	1.34	-2.83
12/4/2015	-1.01	0.6	-2.56
12/5/2015	-0.41	1.18	-2.14
12/6/2015	-0.62	1.36	-2.38
12/7/2015	-0.43	1.7	-2.51
12/8/2015	0.02	1.98	-1.95
12/9/2015	0.55	2.89	-1.6
12/10/2015	0.33	2.76	-1.94
12/11/2015	0.22	2.85	-2.1
12/12/2015	-0.08	2.67	-2.55
12/13/2015	-0.05	2.67	-2.54
12/14/2015	0.17	2.86	-2.25
12/15/2015	-0.19	2.56	-2.63
12/16/2015	0.11	2.7	-2.29
12/17/2015	0.84	3.23	-1.61
12/18/2015	0.2	2.39	-2.4
12/19/2015	-0.95	1.7	-3.85
12/20/2015	-1.33	0.74	-3.56
12/21/2015	-0.9	1.66	-3.56
12/22/2015	-0.45	2.17	-3.32
12/23/2015	0.1	2.62	-3.32
12/24/2015	-0.17	2.92	-3.06

12/25/2015	-0.17	2.75	-3.26
12/26/2015	0.3	3.04	-2.84
12/27/2015	0.03	2.99	-2.7
12/28/2015	0.17	3.06	-3.12
12/29/2015	1.2	3.37	-1.5
12/30/2015	0.27	2.29	-1.76
12/31/2015	0.17	2.39	-1.97
1/1/2016	-0.32	1.57	-2.12
1/2/2016	-0.43	1.12	-2.22
1/3/2016	-0.4	1.28	-2.34
1/4/2016	0.03	1.68	-1.48
1/5/2016	0.6	2.27	-1.51
1/6/2016	-0.15	2.27	-2.58
1/7/2016	-0.33	1.85	-2.36
1/8/2016	0.63	2.73	-2.17
1/9/2016	1.18	3.68	-1.29
1/10/2016	1.17	4.3	-1.4
1/11/2016	-0.55	2.43	-3.57
1/12/2016	-0.41	2.79	-3.03
1/13/2016	-1.33	1.54	-4.03
1/14/2016	-1.01	1.61	-3.5
1/15/2016	-0.36	2.06	-3.1
1/16/2016			
1/17/2016			
1/18/2016			
1/19/2016			
1/20/2016	-1.44	0.71	-3.69
1/21/2016	-0.47	2.15	-2.74
1/22/2016	-0.18	2.22	-3.03
1/23/2016	3.6	6.22	-0.84
1/24/2016	2.02	4.65	-0.8
1/25/2016	0.63	3.3	-2.06
1/26/2016			
1/27/2016	-0.6	1.78	-2.84
1/28/2016	-0.02	2.34	-2.35
1/29/2016	0.05	2.2	-2.31
1/30/2016	-0.35	1.53	-2
1/31/2016	-0.52	1.09	-1.96
2/1/2016	-0.4	1.28	-1.93
2/2/2016	-0.19	1.51	-1.83
2/3/2016	0.05	1.92	-1.98
2/4/2016	-0.23	1.98	-2.3
2/5/2016	0	2.35	-2.35
2/6/2016	-0.31	2.26	-2.81
2/7/2016	-0.16	2.26	-3.1
2/8/2016	2.11	4.78	-1.67
2/9/2016	2.04	4.74	-0.62
2/10/2016	0.5	3.32	-2.79
2/11/2016	-0.93	2.04	-4
2/12/2016	-0.99	2.2	-4.01
2/13/2016	-1.02	1.36	-3.99
2/14/2016	-1.25	1.14	-3.68
2/15/2016	-0.49	1.76	-2.6
2/16/2016	-0.12	2.07	-2.89
2/17/2016	-0.43	2.02	-2.88
2/18/2016	-0.68	1.78	-2.79
2/19/2016	-0.18	2.22	-2.42
2/20/2016	-0.35	2.28	-2.85
2/21/2016	-0.32	1.98	-3.11
2/22/2016	0.16	2.72	-2.51
2/23/2016	0.61	2.86	-2.49
2/24/2016	1.02	3.17	-1.5
2/25/2016	-0.25	2.3	-2.79

2/26/2016	-1.66	0.9	-4
2/27/2016	-0.82	1.3	-2.85
2/28/2016	-1.18	0.44	-2.9
2/29/2016	-1.08	0.98	-2.69
3/1/2016	-0.65	1.25	-2.33
3/2/2016	-0.56	1.86	-2.43
3/3/2016	-0.74	0.75	-2.26
3/4/2016	0.23	1.77	-1.65
3/5/2016	0.67	2.58	-1.42
3/6/2016			
3/7/2016	-0.42	2.42	-3.01
3/8/2016	-0.2	2.44	-3.7
3/9/2016	-0.15	2.63	-3.23
3/10/2016	-0.45	2.37	-3.66
3/11/2016	-0.39	2.52	-3.57
3/12/2016	-0.27	2.41	-3.15
3/13/2016	-0.46	1.76	-3.07
3/14/2016	0.68	2.57	-1.67
3/15/2016	0.94	3.42	-1.37
3/16/2016	0.25	2.58	-1.88
3/17/2016	0.45	2.54	-1.68
3/18/2016	0.07	2.32	-2.04
3/19/2016	0.24	2.19	-1.75
3/20/2016	1.04	2.97	-1.75
3/21/2016	0.67	3.05	-1.68
3/22/2016			
3/23/2016	-1.1	1.48	-3.54
3/24/2016	-0.15	2.49	-2.81
3/25/2016	-0.07	2.07	-2.4
3/26/2016	-0.02	2.29	-2.39
3/27/2016	0.16	2.48	-1.94
3/28/2016	0.3	2.06	-1.56
3/29/2016	-1.25	-0.01	-3.19
3/30/2016	-0.74	0.96	-2.31
3/31/2016	-0.57	1.53	-2.19
4/1/2016	-0.82	1.12	-2.61
4/2/2016	-0.14	1.8	-1.94
4/3/2016	-1.39	0.55	-4.14
4/4/2016	-0.52	1.94	-3.2
4/5/2016	0.47	2.82	-2.35
4/6/2016	0.27	2.84	-2.86
4/7/2016	0.22	3.04	-2.92
4/8/2016	-0.1	2.8	-3.53
4/9/2016	0.11	3.2	-3.16
4/10/2016	-0.2	2.49	-3.15
4/11/2016	-0.7	2.15	-3.18
4/12/2016	-0.67	1.2	-3.05
4/13/2016	-0.28	2.03	-2.4
4/14/2016	-0.15	2.13	-2.18
4/15/2016	0.15	2.13	-1.83
4/16/2016	0.61	2.4	-1.53
4/17/2016	0.87	2.73	-1.44
4/18/2016	0.24	2.2	-2
4/19/2016	0.24	2.37	-2.01
4/20/2016	0.06	2.2	-2.23
4/21/2016	-0.05	2.11	-2.4
4/22/2016			
4/23/2016	0.34	2.71	-2.1
4/24/2016	0.36	2.54	-1.88
4/25/2016	0.04	2.41	-2.06
4/26/2016			
4/27/2016	0.76	2.94	-1.27
4/28/2016	0.21	1.57	-1.88

4/29/2016	0.5	2.37	-1.51
4/30/2016	0.21	2.6	-1.92
5/1/2016	0.07	2.07	-1.91
5/2/2016	0.33	2.49	-2.05
5/3/2016	0.55	2.72	-2.15
5/4/2016	1.1	3.53	-1.92
5/5/2016	1.52	4.2	-1.51
5/6/2016	1.43	3.95	-1.56
5/7/2016	0.76	3.61	-2.44
5/8/2016	0.4	3.35	-2.76
5/9/2016	-0.13	2.71	-2.96
5/10/2016	-0.27	2.48	-2.84
5/11/2016	-0.33	1.49	-2.8
5/12/2016	-0.13	2.44	-2.32
5/13/2016	0.06	2.34	-2.05
5/14/2016	0.11	2.17	-2
5/15/2016	-0.41	1.73	-2.32
5/16/2016	-1.01	1.03	-3.17
5/17/2016	-0.81	1.5	-2.96
5/18/2016	-0.17	2.15	-2.38
5/19/2016			
5/20/2016	-0.34	2.09	-2.54
5/21/2016	-0.01	2.86	-2.61
5/22/2016	0.53	2.97	-1.64
5/23/2016			
5/24/2016	0.1	2.52	-2.04
5/25/2016	-0.12	2.36	-2.22
5/26/2016	-0.34	2.2	-2.48
5/27/2016	-0.34	1.26	-2.45
5/28/2016	-0.52	1.98	-2.58
5/29/2016	-0.39	1.8	-2.68
5/30/2016	-0.1	2.19	-2.36
5/31/2016	-0.21	1.97	-2.67
6/1/2016	-0.08	2.43	-2.86
6/2/2016	0.44	3.2	-2.53
6/3/2016	0.41	3.22	-2.7
6/4/2016	0.22	3.27	-2.83
6/5/2016	0.36	3.41	-2.65
6/6/2016	0.2	3.16	-2.69
6/7/2016	0.26	3.28	-2.6
6/8/2016	-0.09	2.51	-3.11
6/9/2016	-0.46	2.29	-2.87
6/10/2016	-0.28	2.29	-2.5
6/11/2016	-0.17	2.05	-2.16
6/12/2016	-0.04	1.79	-2
6/13/2016	0.15	1.97	-1.91
6/14/2016	0.04	1.87	-1.88
6/15/2016	-0.06	1.88	-2.02
6/16/2016	0.4	2.44	-1.58
6/17/2016	0.41	2.67	-1.83
6/18/2016	-0.04	2.29	-2.26
6/19/2016	-0.16	2.4	-2.34
6/20/2016	-0.26	2.46	-2.51
6/21/2016	-0.16	2.73	-2.51
6/22/2016	-0.16	2.66	-2.44
6/23/2016			
6/24/2016	0.17	2.76	-2.22
6/25/2016	0.18	1.96	-2.12
6/26/2016	-0.06	2.48	-2.4
6/27/2016	-0.12	2.2	-2.47
6/28/2016	-0.08	2.09	-2.51
6/29/2016	0.05	2.39	-2.46
6/30/2016	0.01	2.48	-2.59

7/1/2016	0.02	2.76	-2.92
7/2/2016	-0.08	2.77	-3.03
7/3/2016	-0.17	2.77	-3.11
7/4/2016	-0.33	2.8	-3.28
7/5/2016	-0.11	2.99	-2.91
7/6/2016	-0.01	2.84	-2.6
7/7/2016	0.08	2.72	-2.39
7/8/2016	0.33	3.01	-2.14
7/9/2016	0.76	3.01	-1.38
7/10/2016	0.43	2.72	-1.62
7/11/2016	0.28	2.12	-1.68
7/12/2016	0.02	1.78	-1.8
7/13/2016	-0.1	1.79	-1.93
7/14/2016	0	1.96	-1.79
7/15/2016	-0.23	1.87	-2.16
7/16/2016	-0.15	2.1	-2.26
7/17/2016	-0.12	2.32	-2.3
7/18/2016	-0.33	2.29	-2.62
7/19/2016	-0.36	2.6	-2.77
7/20/2016	-0.06	2.75	-2.63
7/21/2016	-0.2	2.57	-2.76
7/22/2016	-0.36	2.32	-2.87
7/23/2016			
7/24/2016	0.06	2.56	-2.58
7/25/2016	0.07	2.29	-2.45
7/26/2016	0.07	2.36	-2.48
7/27/2016	0.19	2.57	-2.31
7/28/2016	0.31	2.7	-2.23
7/29/2016	0.56	3.08	-2.07
7/30/2016	0.35	2.95	-2.43
7/31/2016	0.29	2.99	-2.47
8/1/2016	0.47	3.35	-2.27
8/2/2016	0.61	3.48	-2.07
8/3/2016	0.53	3.12	-2.04
8/4/2016	0.31	2.8	-2.2
8/5/2016	0.11	2.44	-2.25
8/6/2016	-0.08	2.31	-2.34
8/7/2016	0.11	2.12	-2.05
8/8/2016	0.09	1.96	-1.87
8/9/2016	-0.12	1.81	-1.85
8/10/2016	-0.38	1.59	-2.02
8/11/2016	-0.58	1.41	-2.28
8/12/2016	-0.53	1.57	-2.26
8/13/2016	-0.35	1.93	-2.27
8/14/2016			
8/15/2016	-0.17	2.38	-2.36
8/16/2016	-0.07	2.57	-2.41
8/17/2016	-0.37	2.57	-3
8/18/2016	0.02	3.01	-2.94
8/19/2016	0.27	3.11	-2.49
8/20/2016	0.37	3.18	-2.43
8/21/2016	0.5	2.86	-2.12
8/22/2016	0.06	2.65	-2.69
8/23/2016	-0.03	2.49	-2.43
8/24/2016			
8/25/2016	-0.3	2.26	-2.74
8/26/2016	-0.31	2.14	-2.66
8/27/2016	0.17	2.6	-2.15
8/28/2016	0.26	2.74	-2.26
8/29/2016	0.15	2.67	-2.4
8/30/2016	0.19	2.74	-2.49
8/31/2016	0.29	2.88	-2.35
9/1/2016	0.35	2.95	-2.24

9/2/2016	0.53	2.94	-2.13
9/3/2016	1.47	3.48	-1.31
9/4/2016	1.43	3.21	-0.76
9/5/2016	1.39	3.24	-0.69
9/6/2016	1.55	3.76	-0.6
9/7/2016	0.8	2.62	-0.93
9/8/2016	0.42	2.26	-1.18
9/9/2016			
9/10/2016	0.1	1.95	-1.46
9/11/2016	-0.05	1.92	-1.72
9/12/2016	0.26	2.41	-1.64
9/13/2016	0.09	2.44	-2.12
9/14/2016	0.02	2.62	-2.44
9/15/2016	0.57	3.14	-2.45
9/16/2016	0.57	3.06	-2.34
9/17/2016	0.31	2.9	-2.69
9/18/2016	0.1	2.67	-2.87
9/19/2016	0.35	3.04	-2.65
9/20/2016	0.26	2.96	-2.46
9/21/2016	0.21	2.83	-2.36
9/22/2016	0.29	2.86	-2.22
9/23/2016	0.35	2.71	-1.82
9/24/2016	0.71	3.14	-1.46
9/25/2016			
9/26/2016	0.37	2.64	-1.88
9/27/2016	0.3	2.7	-2.18
9/28/2016	0.94	3.63	-1.99
9/29/2016	2.41	4.35	-0.1
9/30/2016	2.38	4.19	0.14
10/1/2016	1.47	3.55	-0.98
10/2/2016	0.81	2.94	-1.54
10/3/2016	0.67	2.83	-1.49
10/4/2016	0.96	2.95	-1.5
10/5/2016	1.2	3.12	-0.78
10/6/2016	0.48	2.5	-1.38
10/7/2016	0.29	2.25	-1.22
10/8/2016	0.5	2.31	-1.13
10/9/2016	1.22	3.01	-0.51
10/10/2016	0.93	2.62	-1.03
10/11/2016	0.44	2.3	-1.84
10/12/2016	0.55	2.8	-1.87
10/13/2016	0.42	2.79	-1.98
10/14/2016	0.49	2.95	-2.3
10/15/2016	0.55	3	-2.39
10/16/2016	0.39	3.16	-2.75
10/17/2016	0.22	3.17	-2.91
10/18/2016	0.39	3.39	-2.68
10/19/2016	0.23	3.1	-2.54
10/20/2016	0.42	3.15	-2.23
10/21/2016	0.83	3.27	-1.49
10/22/2016	0.2	2.48	-2.41
10/23/2016	-1.24	0.91	-3.26
10/24/2016	-0.72	1.71	-3.05
10/25/2016			
10/26/2016	-0.13	1.94	-2.25
10/27/2016	0.22	2.28	-1.82
10/28/2016	-0.12	1.98	-2.25
10/29/2016	-0.03	2.17	-2.5
10/30/2016	0.01	2.24	-2.46
10/31/2016	0.53	2.93	-1.84
11/1/2016	0.36	2.79	-1.81
11/2/2016			
11/3/2016	0	2.35	-1.88

11/4/2016	0.39	2.63	-1.38
11/5/2016	0.14	2.32	-1.78
11/6/2016			
11/7/2016	0.66	2.59	-1.01
11/8/2016	0.69	2.57	-1.48
11/9/2016	0.45	2.58	-1.81
11/10/2016	0.52	2.53	-2.26
11/11/2016	-0.36	1.98	-3.16
11/12/2016	-0.05	2.47	-2.78
11/13/2016	-0.54	2.37	-3.68
11/14/2016	-0.43	2.49	-4.06
11/15/2016	0.44	3.48	-3.11
11/16/2016	0.11	3.35	-2.94
11/17/2016	0	3.06	-3.03
11/18/2016	0.24	3.03	-2.31
11/19/2016	0.71	3.51	-1.36
11/20/2016	-1.07	1.66	-3.89
11/21/2016	-1.97	0.16	-4.31
11/22/2016	-1.39	0.51	-3.23
11/23/2016	-0.61	1.24	-2.5
11/24/2016	-0.19	1.67	-2.22
11/25/2016	0.07	2.12	-2.04
11/26/2016			
11/27/2016	-0.01	2.26	-2.14
11/28/2016	-0.12	2.5	-2.42
11/29/2016	-0.3	2.2	-2.8
11/30/2016	0.06	2.54	-2.59
12/1/2016	0.11	2.68	-2.14
12/2/2016	-0.71	1.96	-2.82
12/3/2016	-1.06	1.25	-3.32
12/4/2016	0.06	2.43	-1.9
12/5/2016	0.22	2.4	-1.74
12/6/2016	0.56	2.48	-1.54
12/7/2016	1.11	3.35	-1.5
12/8/2016	0.09	2.21	-2.69
12/9/2016	-0.86	1.38	-3.56
12/10/2016	-0.65	1.68	-3.47
12/11/2016	-0.29	2.26	-2.94
12/12/2016	-0.06	2.96	-3.23
12/13/2016	-0.13	2.76	-3.5
12/14/2016	0.22	3.39	-2.94
12/15/2016	-0.86	2.47	-4.07
12/16/2016	-1.43	1.82	-4.77
12/17/2016	-0.48	2.74	-3.36
12/18/2016	-0.68	2.03	-3.08
12/19/2016	-0.66	1.65	-2.86
12/20/2016	-0.19	1.8	-2.04
12/21/2016	-0.43	1.49	-2.27
12/22/2016			
12/23/2016	-0.6	1.43	-2.56
12/24/2016	-0.55	1.77	-2.56
12/25/2016	-0.63	1.66	-2.64
12/26/2016	-0.1	2	-1.95
12/27/2016	-0.55	2.11	-3.02
12/28/2016			
12/29/2016	0.32	2.89	-2.2
12/30/2016	-0.79	1.97	-3.46
12/31/2016	-1.03	1.72	-3.34
1/1/2017	-0.82	1.92	-3.34
1/2/2017	0.08	2.62	-2.61
1/3/2017	0.94	3.3	-1.21
1/4/2017	0.13	2.5	-2.34
1/5/2017	-1.01	1.03	-3.16

1/6/2017	-0.46	1.69	-2.65
1/7/2017			
1/8/2017	-0.11	2.64	-3.25
1/9/2017	-0.71	2.14	-3.57
1/10/2017	-0.46	2.3	-3.15
1/11/2017			
1/12/2017	-0.64	2.55	-3.73
1/13/2017	-0.77	2.51	-3.94
1/14/2017	-0.51	2.52	-3.63
1/15/2017			
1/16/2017	-0.6	2.09	-2.91
1/17/2017	-0.76	1.54	-2.83
1/18/2017	0.04	2.01	-2.02
1/19/2017			
1/20/2017	0.02	1.7	-1.58
1/21/2017	0.06	1.82	-1.72
1/22/2017	0.38	1.99	-1.15
1/23/2017			
1/24/2017			
1/25/2017	0.25	2.61	-1.81
1/26/2017	0.05	2.58	-2.26
1/27/2017			
1/28/2017	-1.39	1.41	-4.16
1/29/2017	-0.69	2.09	-3.58
1/30/2017	-0.26	2.54	-2.69
1/31/2017	-0.27	2.52	-2.92
2/1/2017	-0.37	2.16	-2.99
2/2/2017	-0.61	1.82	-2.82
2/3/2017	-0.65	1.54	-2.82
2/4/2017	-0.88	1.48	-3.28
2/5/2017	-0.88	1.4	-3.19
2/6/2017	-0.88	1.64	-3.18
2/7/2017	-0.27	2.07	-2.6
2/8/2017	0.11	2.46	-2.58
2/9/2017	0.35	3.75	-2.47
2/10/2017	-0.75	2.26	-3.75
2/11/2017	-0.52	2.12	-3.55
2/12/2017	0.5	3.17	-2.79
2/13/2017	-0.87	1.56	-3.98
2/14/2017	0.25	2.9	-2.92
2/15/2017	0.56	2.65	-1.6
2/16/2017	-0.53	2	-2.58
2/17/2017	-0.7	1.53	-2.66
2/18/2017	-0.56	0.92	-2.24
2/19/2017	-0.36	1.51	-1.88
2/20/2017	-0.21	1.49	-1.7
2/21/2017	0.02	2.07	-1.76
2/22/2017	-0.01	2.11	-1.97
2/23/2017			
2/24/2017	-0.01	2.33	-2.3
2/25/2017	0.27	2.59	-2.4
2/26/2017	-0.39	2.42	-3.12
2/27/2017	-0.91	1.97	-3.72
2/28/2017	-0.7	2.14	-3.68
3/1/2017	-0.45	2.48	-3.12
3/2/2017	-1.58	1.02	-4.36
3/3/2017	-1.62	0.81	-4.2
3/4/2017	-1.51	0.93	-3.82
3/5/2017	-1.13	1.02	-3.34
3/6/2017	-0.51	1.86	-2.5
3/7/2017	-0.25		
3/8/2017	-0.6		
3/9/2017	-0.93		

3/10/2017	0.16		
3/11/2017	-1.03		
3/12/2017	-1.33		
3/13/2017	-0.95		
3/14/2017	0.9		
3/15/2017	-1.57		
3/16/2017	-1.98		
3/17/2017	-1.28		
3/18/2017	-0.31		
3/19/2017	0.87		
3/20/2017	0.38	2.09	-1.17
3/21/2017	0.08	2	-1.46
3/22/2017	-0.56	1.67	-2.46
3/23/2017	-0.86	1.22	-2.84
3/24/2017	-1.01	1.07	-3.08
3/25/2017	-0.74	1.51	-3.16
3/26/2017			
3/27/2017	0.04	2.57	-2.8
3/28/2017	0.16	2.91	-3.01
3/29/2017	0.23	2.79	-2.7
3/30/2017	-0.02	2.81	-2.9
3/31/2017	0.44	3.52	-2.51
4/1/2017	0.92	2.9	-1.57
4/2/2017	0.31	3.27	-2.03
4/3/2017	0.15	2.62	-2.08
4/4/2017	0.69	2.9	-1.6
4/5/2017	0.72	3.06	-1.49
4/6/2017	1.34	3.25	-1.36
4/7/2017	0.24	2.82	-2.88
4/8/2017	-0.43	1.94	-3.04
4/9/2017	-0.17	2.18	-2.76
4/10/2017			
4/11/2017	-0.63	1.87	-3.06
4/12/2017			
4/13/2017			
4/14/2017	-0.45	2.03	-2.63
4/15/2017	-0.38	1.86	-2.28
4/16/2017	-0.63	1.43	-2.35
4/17/2017	-0.45	0.85	-2.27
4/18/2017	-0.11	1.83	-1.74
4/19/2017	0.04	1.98	-1.42
4/20/2017	-0.14	1.86	-1.79
4/21/2017	0.44	2.11	-1.48
4/22/2017	0.57	2.64	-1.78
4/23/2017	0.35	2.42	-2.22
4/24/2017	0.46	2.85	-2.28
4/25/2017	1.08	3.73	-1.86
4/26/2017	0.94	3.45	-2.11
4/27/2017	0.28	3.13	-2.85
4/28/2017	-0.12	2.91	-3.22
4/29/2017	-0.44	2.68	-3.24
4/30/2017	-0.19	3.01	-3.04
5/1/2017	0.03	1.78	-2.24
5/2/2017	-0.28	2.43	-2.66
5/3/2017	-0.33	2.33	-2.55
5/4/2017	-0.05	2.01	-2.23
5/5/2017	0.78	2.47	-1.12
5/6/2017	0.56	2.63	-1.88
5/7/2017	0.13	2.32	-2.43
5/8/2017	-0.05	2.29	-2.53
5/9/2017			
5/10/2017	0.25	2.73	-2.21
5/11/2017	0.3	2.9	-2.16

5/12/2017	0.52	2.96	-1.8
5/13/2017	1.19	3.24	-1.23
5/14/2017	0.88	2.59	-1.35
5/15/2017	0.02	2.6	-2.09
5/16/2017	0.11	1.46	-1.74
5/17/2017	-0.17	2.1	-1.95
5/18/2017	-0.3	1.84	-2.18
5/19/2017	-0.35	1.71	-2.36
5/20/2017	0.37	2.19	-1.65
5/21/2017	0.05	2.09	-2.17
5/22/2017	0.23	2.56	-2.41
5/23/2017	0.54	3.02	-2.33
5/24/2017	0.94	3.71	-2.07
5/25/2017	1.28	4.16	-1.82
5/26/2017	0.56	3.57	-2.66
5/27/2017	0.43	3.63	-2.53
5/28/2017	0.65	3.94	-2.22
5/29/2017	0.99	3.6	-1.6
5/30/2017			
5/31/2017	0.38	2.95	-1.9
6/1/2017	0.16	2.51	-2.06
6/2/2017	0.15	2.15	-1.98
6/3/2017	0.07	2	-1.95
6/4/2017	0.09	2.25	-2.09
6/5/2017	0.35	2.62	-1.88
6/6/2017	0.94	3.18	-1.42
6/7/2017	1.05	3.03	-1.04
6/8/2017	0.54	3	-1.61
6/9/2017	0.39	2.57	-1.75
6/10/2017	-0.2	2.17	-2.26
6/11/2017	-0.33	2.36	-2.66
6/12/2017	-0.39	2.21	-2.49
6/13/2017	-0.2	2.38	-2.3
6/14/2017	0.12	2.58	-2.09
6/15/2017	0.32	1.77	-1.71
6/16/2017	0.49	2.62	-1.49
6/17/2017	0.35	2.49	-1.69
6/18/2017	0.06	2.11	-2.12
6/19/2017	-0.29	1.98	-2.68
6/20/2017	-0.16	2.34	-2.72
6/21/2017	-0.16	2.6	-3.08
6/22/2017	0.09	3.24	-3.04
6/23/2017	0.17	3.25	-2.87
6/24/2017	-0.12	3.24	-3.38
6/25/2017	0.01	3.27	-2.93
6/26/2017	0	2.92	-2.8
6/27/2017	0.05	2.83	-2.74
6/28/2017			
6/29/2017	-0.32	2.27	-2.65
6/30/2017	-0.46	1.73	-2.71
7/1/2017	-0.23	1.77	-2.4
7/2/2017	-0.01	1.94	-2.1
7/3/2017	-0.03	1.99	-2.05
7/4/2017	0.04	2.29	-2.07
7/5/2017	0.17	2.46	-2
7/6/2017	0.29	2.68	-1.94
7/7/2017	0.38	2.82	-1.84
7/8/2017	0.27	2.72	-1.91
7/9/2017	0.14	2.63	-1.98
7/10/2017	0.01	2.61	-2.21
7/11/2017	-0.06	2.45	-2.15
7/12/2017	-0.11	2.37	-2.34
7/13/2017	-0.11	2.31	-2.28

7/14/2017	0.3	2.1	-1.99
7/15/2017	0.26	2.74	-2.04
7/16/2017			
7/17/2017	0.06	2.2	-2.18
7/18/2017	0	2.38	-2.31
7/19/2017	0	2.56	-2.51
7/20/2017	0	2.79	-2.78
7/21/2017	0.12	3.11	-2.87
7/22/2017	0.29	3.4	-2.78
7/23/2017	0.48	3.76	-2.5
7/24/2017	0.86	3.9	-2
7/25/2017	0.76	3.47	-2.04
7/26/2017	0.62	3.01	-1.91
7/27/2017	0.3	2.55	-2.14
7/28/2017	0.45	2.43	-1.94
7/29/2017	1.6	3.39	-0.72
7/30/2017	1.19	3.34	-0.74
7/31/2017	0.44	2.3	-1.39
8/1/2017	0.27	2.19	-1.62
8/2/2017	0.26	2.33	-1.58
8/3/2017			
8/4/2017	0.36	2.66	-1.74
8/5/2017	0.34	2.64	-1.99
8/6/2017	0.08	2.47	-2.23
8/7/2017	0.19	2.84	-2.33
8/8/2017	0.35	2.82	-2.05
8/9/2017	0.06	2.66	-2.33
8/10/2017	-0.04	2.55	-2.4
8/11/2017	0.05	2.55	-2.42
8/12/2017	0.2	2.49	-2.24
8/13/2017	0.17	2.36	-2.12
8/14/2017	0.08	2.35	-2.3
8/15/2017	0.34	2.56	-2.09
8/16/2017	0.34	2.74	-2.14
8/17/2017	0.37	2.91	-2.19
8/18/2017	0.25	2.89	-2.41
8/19/2017	0.4	3.34	-2.61
8/20/2017	0.25	3.15	-2.63
8/21/2017	0.08	2.92	-2.9
8/22/2017	0.06	2.74	-2.76
8/23/2017	0.14	2.86	-2.84
8/24/2017	0.3	2.71	-2.27
8/25/2017	0.27	2.49	-2.03
8/26/2017	0.19	2.34	-2.1
8/27/2017	0.35	2.36	-1.88
8/28/2017	0.77	2.6	-1.06
8/29/2017	1.39	3.07	-0.68
8/30/2017	1.4	2.95	-0.62
8/31/2017	0.43	2.14	-1.26
9/1/2017	0.66	2.6	-1.38
9/2/2017	0.58	2.82	-1.41
9/3/2017	0.68	2.88	-1.28
9/4/2017	0.11	2.52	-2.26
9/5/2017	-0.08	2.42	-2.54
9/6/2017	0.21	2.72	-2.36
9/7/2017	0.22	2.47	-2.55
9/8/2017	-0.2	2.31	-2.81
9/9/2017	0.06	2.52	-2.63
9/10/2017	0.18	2.65	-2.25
9/11/2017	0.09	2.56	-2.23
9/12/2017	0.24	2.69	-2.17
9/13/2017	0.47	2.87	-1.66
9/14/2017	0.47	2.92	-1.75

9/15/2017	0.42	2.86	-1.91
9/16/2017	0.48	2.93	-2.05
9/17/2017	0.63	3.21	-2.1
9/18/2017	1.05	3.73	-1.92
9/19/2017	2.09	4.57	-1.13
9/20/2017	1.71	3.95	-1.03
9/21/2017	1.04	3.29	-1.64
9/22/2017	1.4	3.71	-1.2
9/23/2017	0.84	3.14	-1.46
9/24/2017	0.46	2.57	-1.64
9/25/2017	0.59	2.63	-1.25
9/26/2017	0.6	2.43	-1.13
9/27/2017	0.91	2.72	-0.74
9/28/2017	0.86	2.58	-0.94
9/29/2017	0.65	2.39	-1.1
9/30/2017	0.34	2	-1.48
10/1/2017	0.82	2.54	-1.56
10/2/2017	0.25	2.41	-1.93
10/3/2017	0.53	2.87	-1.93
10/4/2017	0.11	2.33	-2.41
10/5/2017	-0.46	2	-3.22
10/6/2017	0.02	2.58	-3.06
10/7/2017	0.35	3.01	-2.42
10/8/2017	0.09	2.92	-2.74
10/9/2017	-0.06	2.89	-2.64
10/10/2017	-0.07	2.76	-2.62
10/11/2017	0.27	2.82	-2.18
10/12/2017	1.76	4.12	-0.18
10/13/2017	1.24	3.18	-1.27
10/14/2017	0.57	2.62	-1.87
10/15/2017	0.23	2.42	-2.34
10/16/2017	0	2.45	-2.19
10/17/2017	0.48	2.7	-2.18
10/18/2017	0.06	2.44	-2.59
10/19/2017	-0.24	2.27	-2.75
10/20/2017	-0.23	2.32	-2.73
10/21/2017	-0.02	2.51	-2.53
10/22/2017	0	2.45	-2.2
10/23/2017	0.32	2.6	-1.85
10/24/2017	0.54	2.85	-1.33
10/25/2017	0.59	2.68	-1.16
10/26/2017	0.32	2.35	-1.29
10/27/2017	-0.22	1.48	-1.76
10/28/2017	0.07	1.91	-1.48
10/29/2017	0.99	2.8	-0.82
10/30/2017	-0.02	2.15	-2.94
10/31/2017	-0.86	1.74	-2.98
11/1/2017	0.29	2.6	-1.76
11/2/2017	0.37	2.61	-2.21
11/3/2017	0.36	2.9	-2.4
11/4/2017	0.72	3.5	-2.69
11/5/2017	1.02	3.95	-1.95
11/6/2017	0.48	3.44	-2.53
11/7/2017	0.66	3.46	-2.25
11/8/2017	1.46	4.04	-0.99
11/9/2017	1.11	3.45	-1.36
11/10/2017	0.16	2.39	-2.05
11/11/2017	-0.04	2.22	-2.34
11/12/2017	-0.01	2.14	-2.29
11/13/2017	0.33	2.4	-1.81
11/14/2017	0.66	2.63	-1.58
11/15/2017	1.12	3.04	-1.07
11/16/2017	0.67	3.18	-1.7

11/17/2017	-0.3	2.24	-2.68
11/18/2017	0.05	2.67	-2.33
11/19/2017	-0.71	1.97	-3.02
11/20/2017	-0.98	1.53	-3.23
11/21/2017	-0.92	1.55	-3.1
11/22/2017	-0.18	2.37	-2.21
11/23/2017	0.06	2.22	-1.78
11/24/2017	-0.15	1.78	-1.88
11/25/2017	0.21	2.22	-1.65
11/26/2017	-0.15	1.77	-2.11
11/27/2017	-0.65	1.17	-2.6
11/28/2017	-0.1	1.86	-2.04
11/29/2017	-0.41	1.72	-2.86
11/30/2017	0.1	2.17	-2.08
12/1/2017	0.36	2.84	-2.19
12/2/2017	0.36	2.97	-2.6
12/3/2017	0.4	3.38	-2.64
12/4/2017	0.34	3.45	-2.78
12/5/2017	0.45	3.67	-2.54
12/6/2017	-0.09	2.91	-2.95
12/7/2017	-0.34	2.71	-3.13
12/8/2017	-0.29	2.58	-2.95
12/9/2017	0.57	2.74	-1.82
12/10/2017	0.12	2.68	-2.57
12/11/2017	-0.71	1.05	-2.69
12/12/2017			
12/13/2017	-1	1.55	-3.37
12/14/2017	-1.08	0.96	-3.8
12/15/2017	-0.36	1.86	-2.62
12/16/2017	-1.18	1.43	-3.43
12/17/2017	-0.65	1.81	-3.86
12/18/2017	-0.21	2.33	-2.61
12/19/2017	-0.38	2.31	-2.79
12/20/2017	-0.73	1.8	-2.88
12/21/2017	-0.3	2.23	-2.47
12/22/2017	-0.15	2.36	-2.17
12/23/2017	-0.01	2.54	-1.96
12/24/2017	-0.03	2.31	-2.09
12/25/2017	-0.87	1.93	-3.61
12/26/2017			
12/27/2017	-1.22	0.77	-3.26
12/28/2017	-1.46	0.92	-4
12/29/2017	-0.99	1.12	-3.01
12/30/2017	-0.31	2.48	-2.84
12/31/2017	-0.47	2.4	-3.61
1/1/2018	-0.56	2.67	-3.67
1/2/2018	-0.94	2.29	-4.16
1/3/2018	-0.57	2.65	-4.24
1/4/2018	0.56	3.94	-2.52
1/5/2018	-1.8	1.31	-4.99
1/6/2018	-3.11	-0.84	-5.51
1/7/2018	-1.76	0.51	-4.06
1/8/2018	-1.64	0.55	-3.98
1/9/2018	-1.48	0.29	-3.32
1/10/2018	-0.65	1.1	-2.62
1/11/2018	-0.65	1.52	-2.44
1/12/2018	-0.22	1.81	-2.01
1/13/2018	-0.64	2.04	-3.24
1/14/2018	-0.56	1.62	-2.69
1/15/2018	0.38	2.5	-2.35
1/16/2018	0.43	2.77	-1.76
1/17/2018			
1/18/2018	-0.09	2.6	-2.4

1/19/2018	-0.31	2.27	-2.68
1/20/2018	-0.53	2.14	-2.76
1/21/2018	-0.72	1.64	-2.87
1/22/2018	-0.24	1.96	-2.16
1/23/2018	0.04	2.32	-1.94
1/24/2018	-0.74	1.87	-2.96
1/25/2018	-0.83	1.27	-2.77
1/26/2018	-0.99	1.37	-3.18
1/27/2018	-0.75	1.74	-3.44
1/28/2018	-0.85	1.75	-3.43
1/29/2018	0.42	2.7	-2.18
1/30/2018	1.16	4.25	-1.6
1/31/2018	0.22	3.39	-2.93
2/1/2018	-0.76	2.29	-3.89
2/2/2018	-0.6	2.83	-3.69
2/3/2018	-1.07	2.03	-3.88
2/4/2018	-0.69	2.25	-3.71
2/5/2018	-0.75	1	-2.96
2/6/2018	-0.88	1.36	-2.97
2/7/2018	-0.26	1.67	-2.24
2/8/2018	-0.73	1.11	-2.63
2/9/2018	-0.8	0.73	-2.23
2/10/2018	-0.48	1.54	-2.21
2/11/2018	-0.42	1.85	-2.59
2/12/2018	-0.78	1.29	-2.93
2/13/2018	-0.54	1.71	-2.07
2/14/2018	-0.63	1.94	-2.71
2/15/2018	-0.5	2.09	-3.12
2/16/2018	-0.06	2.43	-2.63
2/17/2018		2.39	-2.64
2/18/2018		1.98	-3.16
2/19/2018		2.17	-2.85
2/20/2018		1.3	-3.14
2/21/2018		0.96	-3.17
2/22/2018		1.37	-2.68
2/23/2018		2.44	-2.21
2/24/2018		2	-2.79
2/25/2018		2.16	-1.83
2/26/2018		2.82	-2.73
2/27/2018		2.51	-2.94
2/28/2018		2.44	-3.36
3/1/2018		2.92	-3.28
3/2/2018		3.41	-3.06
3/3/2018		4.31	-1.36
3/4/2018		4.42	-0.36
3/5/2018		4.13	-0.84
3/6/2018		3.64	-0.28
3/7/2018		4.09	-0.44
3/8/2018		3.46	-1.37
3/9/2018		2.11	-1.96
3/10/2018		1.03	-2.34
3/11/2018		1.22	-2.23
3/12/2018		2.19	-1.2
3/13/2018		3.22	-1.08
3/14/2018		2.03	-2.49
3/15/2018		0.65	-3.81
3/16/2018		1.67	-3.08
3/17/2018		1.83	-3.54
3/18/2018		2.48	-3.35
3/19/2018		2.6	-2.76
3/20/2018		3.85	-2.54
3/21/2018		4.15	-0.16
3/22/2018		2.72	-1.53

3/23/2018	2.96	-2.3
3/24/2018	1.95	-2.38
3/25/2018	2.32	-1.74
3/26/2018	3.02	-1.52
3/27/2018	2.79	-1.98
3/28/2018	2.93	-1.9
3/29/2018	2.8	-2.51
3/30/2018	2.48	-2.97
3/31/2018	2.32	-3.22
4/1/2018	2.18	-3.42
4/2/2018	2.62	-3.01
4/3/2018	2.72	-2.4
4/4/2018	1.8	-2.73
4/5/2018	0.52	-3.11
4/6/2018	1.38	-2.57
4/7/2018	1.4	-2.31
4/8/2018	1.82	-1.15
4/9/2018	1.74	-1.69
4/10/2018	1.34	-2.11
4/11/2018	1.77	-1.86
4/12/2018	1.84	-2.4
4/13/2018	1.44	-3.1
4/14/2018	2	-3.22
4/15/2018	4.05	-2.45
4/16/2018	3.75	-1.55
4/17/2018	2.47	-2.9
4/18/2018	2.63	-3.28
4/19/2018	2.36	-2.53
4/20/2018	2.24	-3
4/21/2018	1.17	-2.82
4/22/2018	1.94	-2.88
4/23/2018	1.87	-2.66
4/24/2018	2.08	-2.44
4/25/2018	2.71	-1.76
4/26/2018		
4/27/2018	2.66	-2.55
4/28/2018	2.76	-2.42
4/29/2018	2.38	-2.8
4/30/2018	2.41	-3.1
5/1/2018	2.34	-2.68
5/2/2018	2.18	-2.84
5/3/2018	1.81	-2.92
5/4/2018	1.84	-2.65
5/5/2018	1.75	-2.57
5/6/2018	1.75	-2.05
5/7/2018	2.18	-1.58
5/8/2018	1.8	-1.63
5/9/2018	1.6	-1.68
5/10/2018	1.75	-1.86
5/11/2018	1.91	-2.31
5/12/2018	2.24	-2.43
5/13/2018	2.71	-2.18
5/14/2018	2.81	-2.46
5/15/2018	2.94	-2.82
5/16/2018	3.34	-2.9
5/17/2018	3.24	-2.5
5/18/2018	3.87	-2.57
5/19/2018	2.95	-2.02
5/20/2018	1.41	-2.59
5/21/2018	2.44	-2.62
5/22/2018	2.5	-2.16
5/23/2018	2.46	-2.14
5/24/2018	2.22	-2.34

5/25/2018	2.16	-2.71
5/26/2018	2.22	-2.98
5/27/2018	3.21	-2.52
5/28/2018	2.86	-1.93
5/29/2018	2.73	-2.23
5/30/2018	2.87	-2.22
5/31/2018	2.8	-1.82
6/1/2018	2.75	-1.84
6/2/2018	2.72	-1.66
6/3/2018	3.51	-0.89
6/4/2018	2.34	-0.7
6/5/2018	2.84	-1.08
6/6/2018	2.58	-0.83
6/7/2018	2.5	-1.34
6/8/2018	2	-1.89
6/9/2018	2.12	-2.19
6/10/2018	2.69	-2.26
6/11/2018	3.23	-1.76
6/12/2018	3.1	-2.6
6/13/2018	3.06	-2.97
6/14/2018	3.28	-3.1
6/15/2018	3.58	-2.56
6/16/2018	3.11	-2.76
6/17/2018	2.89	-2.79
6/18/2018	2	-2.62
6/19/2018	2.46	-2.84
6/20/2018	2.35	-2.38
6/21/2018	2.46	-1.96
6/22/2018	2.76	-1.38
6/23/2018	2.88	-1.5
6/24/2018	2.72	-1.92
6/25/2018	2.74	-2.03
6/26/2018	2.64	-2
6/27/2018	2.8	-2.07
6/28/2018	2.87	-2.01
6/29/2018	2.63	-1.95
6/30/2018	2.58	-2.01
7/1/2018	2.47	-1.96
7/2/2018	2.38	-1.89
7/3/2018	2.1	-1.96
7/4/2018	1.23	-2.04
7/5/2018	1.84	-2.16
7/6/2018	1.61	-2.41
7/7/2018	2.19	-1.44
7/8/2018	2.25	-2.05
7/9/2018	2.35	-2.4
7/10/2018	2.76	-2.69
7/11/2018		
7/12/2018	3.47	-2.65
7/13/2018	3.32	-2.82
7/14/2018	3.1	-2.96
7/15/2018	3.11	-2.9
7/16/2018	2.86	-2.54
7/17/2018	2.2	-2.64
7/18/2018	2.75	-2.23
7/19/2018	2.4	-2.07
7/20/2018	2.23	-2.03
7/21/2018	3.23	-1.51
7/22/2018	2.77	-1.57
7/23/2018	2.5	-1.67
7/24/2018	2.62	-1.87
7/25/2018		
7/26/2018	2.57	-2.07

7/27/2018	2.57	-2.06
7/28/2018	2.7	-1.9
7/29/2018	2.48	-1.95
7/30/2018	2.4	-2.17
7/31/2018	2.52	-1.87
8/1/2018	2.01	-1.78
8/2/2018	1.82	-2.35
8/3/2018	1.7	-2.21
8/4/2018	1.75	-2.21
8/5/2018	2.15	-2.13
8/6/2018		
8/7/2018	2.46	-2.36
8/8/2018	3.02	-2.35
8/9/2018	3.36	-2.58
8/10/2018	3.6	-2.65
8/11/2018	3.59	-2.7
8/12/2018	3.44	-2.69
8/13/2018	3.22	-2.42
8/14/2018	2.65	-2.5
8/15/2018	2.38	-2.71
8/16/2018	2.23	-2.48
8/17/2018	2.19	-2.28
8/18/2018	2.21	-1.94
8/19/2018	2.89	-1.3
8/20/2018	2.82	-1.05
8/21/2018	2.77	-1.02
8/22/2018	2.56	-1.26
8/23/2018	2.69	-1.58
8/24/2018	2.65	-1.77
8/25/2018	2.6	-1.97
8/26/2018	2.44	-2.05
8/27/2018	2.47	-2.45
8/28/2018	2.29	-2.22
8/29/2018	2.2	-2.23
8/30/2018	2.34	-2.26
8/31/2018	2.84	-1.91
9/1/2018	2.77	-1.3
9/2/2018	2.45	-1.61
9/3/2018	3.17	-1.9
9/4/2018	2.35	-2.12
9/5/2018	2.73	-2.01
9/6/2018	2.88	-2.44
9/7/2018	3.35	-2.47
9/8/2018	4.19	-1.93
9/9/2018	5.04	-1.11
9/10/2018	4.39	-0.46
9/11/2018	3.51	-1.86
9/12/2018	3.03	-2
9/13/2018		
9/14/2018	3.22	-1.13
9/15/2018	2.8	-1.14
9/16/2018	2.42	-1.42
9/17/2018	2.45	-1.16
9/18/2018	2.18	-1.36
9/19/2018	2.96	-0.91
9/20/2018	3.06	-0.71
9/21/2018	2.71	-1
9/22/2018	2.74	-1.73
9/23/2018	3.03	-1.67
9/24/2018	3.55	-1.16
9/25/2018	3.52	-1.12
9/26/2018	2.88	-1.7
9/27/2018	2.86	-2.1

9/28/2018	2.88	-1.58
9/29/2018	2.59	-1.89
9/30/2018	2.73	-1.73
10/1/2018	2.5	-1.81
10/2/2018	2.61	-1.85
10/3/2018	2.75	-1.68
10/4/2018		
10/5/2018	3.55	-1.34
10/6/2018	3.19	-1.62
10/7/2018	2.94	-2.39
10/8/2018	3.32	-2.47
10/9/2018	3.12	-2.32
10/10/2018	2.92	-2.52
10/11/2018	3.28	-2.21
10/12/2018	3.78	-1.23
10/13/2018	3.2	-1.56
10/14/2018	2.66	-1.61
10/15/2018	2.06	-1.62
10/16/2018	2.03	-2.11
10/17/2018	1.3	-2.41
10/18/2018	1.08	-2.44
10/19/2018	1.35	-2.69
10/20/2018	2	-2.38
10/21/2018	2.18	-2
10/22/2018	2.23	-2.24
10/23/2018	2.23	-2.69
10/24/2018	2.24	-2.62
10/25/2018	2.76	-2.57
10/26/2018	2.83	-2.43
10/27/2018	5.27	-0.51
10/28/2018	2.86	-2.18
10/29/2018	2.11	-2.6
10/30/2018	2.28	-2.44
10/31/2018	2.63	-2.12
11/1/2018	2.37	-2.31
11/2/2018	2.30	-2.06
11/3/2018		
11/4/2018	1.80	-3.40
11/5/2018	3.16	-1.61
11/6/2018	3.33	-1.94
11/7/2018	2.73	-2.80
11/8/2018	2.62	-3.04
11/9/2018	3.38	-2.24
11/10/2018	2.70	-3.00
11/11/2018	1.93	-3.16
11/12/2018	1.98	-2.27
11/13/2018	1.72	-1.82
11/14/2018	1.00	-2.54
11/15/2018	1.81	-1.90
11/16/2018	3.36	-1.64
11/17/2018	1.44	-2.28
11/18/2018	1.98	-1.94
11/19/2018	2.26	-1.66
11/20/2018	2.66	-2.05
11/21/2018	2.63	-2.53
11/22/2018	2.44	-2.97
11/23/2018	2.97	-2.80
11/24/2018	3.79	-2.35
11/25/2018	3.91	-2.41
11/26/2018	4.06	-1.92
11/27/2018	3.12	-2.27
11/28/2018	2.08	-2.87
11/29/2018	2.17	-2.79

11/30/2018	2.70	-1.75
12/1/2018	2.63	-1.50
12/2/2018	2.95	-1.65
12/3/2018	2.83	-2.52
12/4/2018	2.32	-2.38
12/5/2018	3.19	-2.31
12/6/2018	2.99	-2.66
12/7/2018	2.24	-3.15
12/8/2018	2.69	-2.65
12/9/2018	2.64	-2.43
12/10/2018		
12/11/2018		
12/12/2018		
12/13/2018		
12/14/2018		
12/15/2018	1.69	-1.35
12/16/2018	3.17	-0.48
12/17/2018	2.74	-2.19
12/18/2018	1.72	-2.64
12/19/2018	2.03	-2.46
12/20/2018	2.43	-2.26
12/21/2018	3.55	-1.70
12/22/2018	3.09	-3.32
12/23/2018	2.50	-3.87
12/24/2018	3.28	-3.02
12/25/2018	2.95	-3.24
12/26/2018		
12/27/2018	2.39	-2.89
12/28/2018	2.57	-2.52
12/29/2018	1.96	-3.07
12/30/2018	1.88	-2.19
12/31/2018	2.46	-1.83

DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

TIDE DATA

Elevations NAVD88
Location: Lat 38°56'54", long 74°53'20" Cape May City U.S. Coast Guard Station USGS
Maximum 6.47 ft Jan 23, 2016
To determine elevations to NGVD of 1929, add 1.31 ft
Average High Tide: 2.370

Total Observations	6024
# of occurances > Elev 2	4391
# of occurances > Elev 3	1020
# of occurances > Elev 4	64
# of occurances > Elev 5	4
# of occurances > Elev 6	1
# of occurances > Elev 7	0

Date	Mean Tide Elev.	High Tide Elev	Low Tide Elev.
Column3	Column4	Column6	Column8
5/29/2000	-0.46	2.74	-1.27
5/30/2000	-0.28	2.86	-2.23
5/31/2000	-0.5	2.67	-2.99
6/1/2000	-0.51	2.87	-3.52
6/2/2000	-0.45	3.2	-3.42
6/3/2000	-0.08	3.18	-3.44
6/4/2000	-0.59	3.29	-3.6
6/5/2000	0.14	3.6	-3.06
6/6/2000	-0.22	3.3	-2.27
6/7/2000	-0.94	2.34	-2.2
6/8/2000		2.33	-3.01
6/9/2000		1.79	-3.13
6/10/2000		1.54	-3.26
6/11/2000	-0.29	1.77	-2.98
6/12/2000	0.14	2.49	-2.3
6/13/2000	0.32	2.7	-2
6/14/2000	0.76	2.73	-2.2
6/15/2000	1.31	2.64	-2.34
6/16/2000	1.16	2.28	-2.85
6/17/2000	0	1.99	-2.94
6/18/2000	-0.64	2.25	-3.02
6/19/2000	-0.64	2.36	-2.66
6/20/2000	-0.59	2.06	-2.49
6/21/2000	-0.18	1.82	-2.44
6/22/2000	0.12	1.04	-2.61
6/23/2000	-0.59	1.85	-2.49
6/24/2000	-0.53	1.75	-2.37
6/25/2000	-0.37	1.69	-2.46
6/26/2000	-0.6	1.53	-2.81
6/27/2000	-0.91	1.78	-3.15
6/28/2000	-0.76	2.57	-2.85
6/29/2000	-0.58	3.31	-2.61
6/30/2000	-1.04	3.28	-3.18
7/1/2000	-1	3.41	-3.46
7/2/2000	-0.64	3.41	-3.5
7/3/2000	-0.35	3.15	-3.61
7/4/2000	-1.29	3.07	-3.73
7/5/2000	-1.84	2.87	-3.17
7/6/2000	-0.56	2.28	-2.96
7/7/2000	-0.45	2.65	-2.75
7/8/2000	-0.65	2.04	-2.47
7/9/2000	-0.73	1.84	-2.72
7/10/2000	-0.52	1.92	-2.62
7/11/2000	-0.4	2.28	-2.02
7/12/2000	0.38	2.36	-2.27

7/13/2000		2.39	-2.45
7/14/2000		2.69	-2.31
7/15/2000	0.41	2.94	-2.12
7/16/2000	0.56	2.75	-2.03
7/17/2000	0.71	2.69	-2.3
7/18/2000	0.16	2.27	-2.36
7/19/2000	-0.38	2.78	-2.55
7/20/2000	0.43	2.53	-2.28
7/21/2000	1.25	1.98	-2.13
7/22/2000	0.53	1.61	-2.45
7/23/2000	-0.18	1.86	-2.42
7/24/2000	0.17	2.05	-2.32
7/25/2000	0.06	2.59	-2.08
7/26/2000	-0.04	2.6	-2.21
7/27/2000	-0.33	2.91	-2.38
7/28/2000	-0.4	3.41	-2.45
7/29/2000	-0.52	3.52	-2.85
7/30/2000	-0.7	3.48	-3.21
7/31/2000	-0.61	3.69	-3.17
8/1/2000	-0.32	3.3	-3.17
8/2/2000	-0.41	2.87	-3.29
8/3/2000	-0.38	2.42	-3.16
8/4/2000		2.39	-3.21
8/5/2000		2.2	-2.56
8/6/2000	0.19	2.06	-2.49
8/7/2000	0.48	1.68	-2.77
8/8/2000	0.18	1.64	-2.6
8/9/2000	-0.12	1.91	-2.17
8/10/2000	-0.25	2.15	-2.45
8/11/2000	-0.36	2.37	-2.19
8/12/2000	-0.61	3.22	-1.71
8/13/2000	-0.41	3.71	-1.09
8/14/2000	0.34	3.07	-1.27
8/15/2000	0.2	2.87	-2.02
8/16/2000	0.02	2.47	-2.38
8/17/2000	0.17	2.39	-2.43
8/18/2000	0.22	2.42	-2.56
8/19/2000	-0.01	2.26	-2.21
8/20/2000	-0.26	2.1	-2.23
8/21/2000	-0.31	1.98	-2.59
8/22/2000	-0.01	1.81	-2.75
8/23/2000	0.82	2.05	-2.59
8/24/2000	0.87	2.33	-2.74
8/25/2000	0.14	2.73	-2.56
8/26/2000	-0.18	2.99	-2.83
8/27/2000	-0.17	3.14	-3.36
8/28/2000	-0.22	3.37	-3.35
8/29/2000	-0.24	3.53	-2.81
8/30/2000	0.21	3.16	-3.13
8/31/2000	0.65	2.71	-2.99
9/1/2000	0.45	2.42	-2.86
9/2/2000	-0.33	2.39	-2.54
9/3/2000	-0.58	2.58	-2.19
9/4/2000	-0.6	2.38	-1.97
9/5/2000	-0.49	2.91	-0.83
9/6/2000	0.06	2.22	-1.09
9/7/2000	0.42	1.79	-1.78
9/8/2000	0.23	1.56	-2.46
9/9/2000	0.05	1.9	-2.29
9/10/2000	-0.33	2.48	-2.18
9/11/2000	-0.63	2.55	-2.16
9/12/2000	-0.5	2.4	-2.4
9/13/2000	-0.31	2.53	-2.72
9/14/2000	-0.43	2.89	-2.52
9/15/2000		2.55	-2.31
9/16/2000	-0.47	2.6	-2.46

9/17/2000	-0.36	2.25	-2.95
9/18/2000	-0.29	1.68	-3.42
9/19/2000	-0.31	2.51	-2.63
9/20/2000	-0.44	2.15	-2.8
9/21/2000	-0.54	2.14	-2.86
9/22/2000	-0.1	2.26	-2.76
9/23/2000	0.3	2.61	-2.56
9/24/2000	0.13	2.82	-3.01
9/25/2000	-0.02	3.59	-2.5
9/26/2000	-0.13	4.97	-0.34
9/27/2000	-0.28	3.18	-2.72
9/28/2000	-0.27	2.75	-3.13
9/29/2000	-0.1	2.98	-2.61
9/30/2000	0.12	2.71	-2.68
10/1/2000	0.05	2.52	-2.45
10/2/2000	-0.08	2.6	-1.97
10/3/2000	-0.33	2.28	-1.85
10/4/2000	-0.32	2.21	-1.64
10/5/2000	0.03	2.13	-1.56
10/6/2000	-0.05	2.02	-1.78
10/7/2000	-0.22	1.85	-2.04
10/8/2000	-0.01	1.78	-2.1
10/9/2000	0.17	2.16	-2.02
10/10/2000	0.21	1.94	-2.23
10/11/2000	0.09	1.14	-4.25
10/12/2000	-0.15	1.99	-3.5
10/13/2000	-0.08	1.94	-3.2
10/14/2000	0.29	2.05	-3.49
10/15/2000	-0.01	2.36	-3.28
10/16/2000	-0.21	2.85	-3.12
10/17/2000	-0.19	3.18	-2.06
10/18/2000	-0.01	2.86	-2.06
10/19/2000	0.46	2.47	-2.32
10/20/2000	0.45	2.28	-2.81
10/21/2000	0.35	1.95	-2.87
10/22/2000	0.42	2.54	-2.56
10/23/2000	0.34	2.33	-2.81
10/24/2000	0.19	2.08	-2.95
10/25/2000	0.25	2.2	-3.38
10/26/2000	0.24	2.54	-3.17
10/27/2000	-0.05	2.91	-2.93
10/28/2000	-0.24	3	-2.73
10/29/2000	-0.27	2.78	-2.42
10/30/2000	-0.03	2.83	-2.06
10/31/2000	-0.16	2.87	-1.63
11/1/2000	-0.46	2.67	-1.11
11/2/2000	-0.42	2.76	-0.95
11/3/2000	-0.24	2.55	-0.97
11/4/2000	-0.22	2.16	-1.28
11/5/2000	-0.03	1.95	-1.6
11/6/2000	0.51	1.9	-1.79
11/7/2000	1.41	2.07	-1.78
11/8/2000	1.03	2.58	-2.07
11/9/2000	0.33	2.73	-1.89
11/10/2000	0.05	3.47	-2
11/11/2000	-0.11	2.83	-2.83
11/12/2000	-0.02	3.73	-2.29
11/13/2000	0.08	3.39	-2.83
11/14/2000	-0.01	3.48	-2.89
11/15/2000	-0.26	2.92	-3.15
11/16/2000	-0.44	2.16	-3.36
11/17/2000	-0.35	1.96	-3.5
11/18/2000	-0.26	1.66	-3.27
11/19/2000	0.1	1.72	-3.05
11/20/2000	0.12	2.11	-3.97
11/21/2000	-0.03	1.36	-4.13

11/22/2000	0.05	0.82	-4.62
11/23/2000	0.59	1.46	-3.46
11/24/2000	0.33	2.31	-3.27
11/25/2000	0.16	2.33	-3.45
11/26/2000	0.02	3.45	-2.2
11/27/2000	-0.05	2.62	-3.12
11/28/2000	0.19	1.97	-3.18
11/29/2000	0.26	1.96	-3.15
11/30/2000	1.09	1.35	-2.42
12/1/2000	0.69	1.58	-2.09
12/2/2000	0.06	1.57	-1.89
12/3/2000	-0.41	1.35	-2.08
12/4/2000	-0.45	1.29	-2.32
12/5/2000	-0.06	1.15	-2.87
12/6/2000	0.08	0.83	-3.22
12/7/2000	-0.09	1.38	-3.22
12/8/2000	-0.14	1.94	-2.84
12/9/2000	0.2	2.24	-2.64
12/10/2000	0.28	2.69	-3.4
12/11/2000	0.06	2.9	-3.52
12/12/2000	-0.44	3.27	-4.59
12/13/2000	-0.89	2.03	-4.63
12/14/2000	-0.19	2.67	-3.47
12/15/2000	-0.52	2.09	-3.78
12/16/2000	-0.48	2.7	-2.98
12/17/2000	-0.39	2.52	-4.38
12/18/2000	-0.07	0.05	-4.37
12/19/2000	0.04	1.18	-3.19
12/20/2000	0.54	1.46	-3.83
12/21/2000		1.01	-3.51
12/22/2000	0.71	1.44	-3.97
12/23/2000	0.14	1.24	
12/24/2000	0.33		
12/25/2000	0.08		
12/26/2000	0.01	1.41	-0.87
12/27/2000	0.32	1	0.74A
12/28/2000	0.1	1.61	-3.41
12/29/2000	0.04	2.43	-1.84
12/30/2000	0.15	2.52	-1.78
12/31/2000	0.18	0.29	-4.17
1/1/2001	0.1	0.34	-3.52
1/2/2001	-0.2	1.14	-2.63
1/3/2001	0.13	1.08	-1.55
1/4/2001	-0.13	1.17	-2.93
1/5/2001	-1.31	1.5	-2.81
1/6/2001	-0.63	2.38	-3.43
1/7/2001	-0.54	2.33	-3.14
1/8/2001	-0.59	3.05	-3.2
1/9/2001	-0.47	3.43	-3.6
1/10/2001	0.08	2.25	-4.44
1/11/2001	0.63	2.92	-4.16
1/12/2001	0.35	2.82	-4.13
1/13/2001	-0.07	2.96	-3.19
1/14/2001	-0.26	2.1	-3.24
1/15/2001	-0.55	1.87	-2.91
1/16/2001	-0.04	2.18	-2.97
1/17/2001	-0.15	1.25	-3.37
1/18/2001	-0.24	1.51	-2.33
1/19/2001	-0.39	2.25	-2.03
1/20/2001	0.08	1.95	-0.61
1/21/2001	0.59	2.72	-2.02
1/22/2001	0.36	1.1	-3.23
1/23/2001	0.29	2.01	-2.87
1/24/2001	0.2	2.47	-2.52
1/25/2001	0.48	2.43	-2.51
1/26/2001	0.69	2.25	-2.54

1/27/2001	0.81	2.21	-3.1
1/28/2001	0.69	1.52	-3.2
1/29/2001	0.38	1.81	-2.37
1/30/2001	0.23	2.05	-2.36
1/31/2001	0.18	1.58	-2.54
2/1/2001	0.27	1.42	-2.41
2/2/2001	0.57	1.61	-2.84
2/3/2001	0.52	1.26	-3.72
2/4/2001	0.64	1.56	-2.84
2/5/2001	0.49	2.71	-2.93
2/6/2001	0.76	2.51	-4.63
2/7/2001	0.33	2.08	-4.63
2/8/2001	0.21	2.45	-4.62
2/9/2001	-0.45	2.82	-4.52
2/10/2001	-0.86	1.79	-4.61
2/11/2001	-0.99	1.12	-4.64
2/12/2001	-0.91	1.82	-4.64
2/13/2001	-0.65	1.54	-2.88
2/14/2001	-0.36	1.53	-2.71
2/15/2001	-0.92	1.75	-2.36
2/16/2001	-1.5	1.63	-2.17
2/17/2001	-1.11	2.32	-3.03
2/18/2001	-0.48	0.98	-2.88
2/19/2001	-0.28	1.32	-3.32
2/20/2001	0.71	1.17	-2.96
2/21/2001	-0.3	1.67	-2.93
2/22/2001	-0.81	2	-3
2/23/2001	-0.61	2.42	-2.67
2/24/2001	-0.73	1.58	-3.69
2/25/2001	-0.43	2.11	-2.82
2/26/2001	-0.24	1.75	-3.03
2/27/2001	-0.28	1.47	-3.21
2/28/2001	-0.36	1.67	-2.64
3/1/2001	-0.55	1.09	-2.52
3/2/2001	-1.02	1.6	-2.29
3/3/2001	-0.95	1.99	-2.13
3/4/2001	-0.42	2.38	-1.26
3/5/2001	-0.3	3.63	-2.09
3/6/2001	-0.25	2.62	-2.18
3/7/2001	-0.18	4.1	-1.39
3/8/2001	-0.73	3.86	-2.43
3/9/2001	-1.2	3.34	-3.32
3/10/2001	-0.24	2.34	-4.09
3/11/2001	-0.82	2.24	-4.36
3/12/2001	-0.06	1.69	-4.35
3/13/2001	-0.08	2.57	
3/14/2001	-2.09	1.74	-2.83
3/15/2001	-0.98	1.74	-2.89
3/16/2001	-0.94	1.78	-2.31
3/17/2001	-1.23	1.68	-1.91
3/18/2001	-1.07	0.75	-2.27
3/19/2001		1.29	-2.39
3/20/2001		0.48	-1.88
3/21/2001		2.48	-0.9
3/22/2001		2.92	-1.56
3/23/2001		2.07	-2.56
3/24/2001		1.93	-3.09
3/25/2001		1.67	-3.74
3/26/2001		1.83	-3.17
3/27/2001		1.54	-3.44
3/28/2001		1.57	-3.36
3/29/2001		2.48	-3.48
3/30/2001		1.81	-2.36
3/31/2001		2.34	-2.4
4/1/2001		2.32	-1.78
4/2/2001	-0.33	2.61	-2.56

4/3/2001	-0.41	2.14	-2.7
4/4/2001	-0.1	2.23	-3.01
4/5/2001	-0.1	2.17	-3.68
4/6/2001	-1.02	2.2	-3.62
4/7/2001	-0.68	2.92	-3.88
4/8/2001	-0.63	2.83	-3.53
4/9/2001	-0.26	2.7	-3.41
4/10/2001	-0.65	2.59	-3.18
4/11/2001	-0.39	2.52	-2.86
4/12/2001	-0.44	2.22	-2.53
4/13/2001	-0.95	0.96	-2.44
4/14/2001		1.93	-2.13
4/15/2001	0.06	1.54	-2.18
4/16/2001	0.7	2.51	-1.41
4/17/2001	0.06	1.77	-1.89
4/18/2001	-0.7	1.8	-2.05
4/19/2001	-0.54	1.69	-3.19
4/20/2001	-0.2	1.4	-2.97
4/21/2001	-0.15	1.57	-3.1
4/22/2001	-0.16	1.15	-3.88
4/23/2001	-0.52	2.06	-3.86
4/24/2001	-0.99	2.13	-3.49
4/25/2001	-0.44	2.54	-3.44
4/26/2001	-0.27	2.96	-3.04
4/27/2001	-0.48	2.82	-2.59
4/28/2001	-0.67	2.09	-2.61
4/29/2001	-0.36	0.93	-3
4/30/2001	-1.13	1.66	-3.17
5/1/2001	-0.61	1.37	-3.1
5/2/2001	0.22	2.03	-3.1
5/3/2001	-0.96	1.83	-3.19
5/4/2001	-1.19	2.01	-3.58
5/5/2001	-0.96	2.78	-3.23
5/6/2001	-0.53	2.42	-3.25
5/7/2001	-1.36	2.59	-2.99
5/8/2001	-1.91	2.38	-3.56
5/9/2001	-1.58	2.46	-3.2
5/10/2001	-0.6	2.41	-2.92
5/11/2001	-0.61	2.13	-2.66
5/12/2001	-0.5	2.06	-2.35
5/13/2001	-0.34	1.1	-2.06
5/14/2001	-0.32	1.8	-1.91
5/15/2001	-1.07	1.49	-2.07
5/16/2001	-0.98	1.85	-1.14
5/17/2001	-0.91	2.24	-1.62
5/18/2001	-0.79	1.71	-2.15
5/19/2001	-0.27		-2.27
5/20/2001	-0.22	2.6	-1.91
5/21/2001	-0.86	2.88	-2.1
5/22/2001	-0.4	3.09	-2.64
5/23/2001	-0.69	3.27	-2.57
5/24/2001	-0.82	3.11	-2.8
5/25/2001	-0.56	2.99	-2.64
5/26/2001	-0.67	3.11	-2.66
5/27/2001	-0.33	2.95	-2.61
5/28/2001	-0.16	1.57	-2.69
5/29/2001	0.94	2.64	-2.44
5/30/2001	1.24	2.48	-2.51
5/31/2001	0.42	2.01	-2.91
6/1/2001	1.57	2.4	-2.88
6/2/2001	0.96	2.83	-2.72
6/3/2001	0.23	2.66	-2.91
6/4/2001	-0.66	2.58	-3.14
6/5/2001	-0.94	2.7	-3.05
6/6/2001	-1.02	2.7	-3.05
6/7/2001	-0.08	2.7	-2.82

6/8/2001	-0.79	2.52	-2.59
6/9/2001	-0.87	2.4	-2.53
6/10/2001	-0.45	2.15	-2.34
6/11/2001	-0.23	1.91	-2.26
6/12/2001	-0.74	1.09	-2.31
6/13/2001	-0.69	1.92	-2.14
6/14/2001	-0.42	1.7	-2.08
6/15/2001	1.16	1.52	-2.11
6/16/2001	0.71	1.91	-2.09
6/17/2001	-0.29	2.41	-2.61
6/18/2001	-0.66	2.11	-2.83
6/19/2001	-0.71	2.42	-3.16
6/20/2001	-0.57	2.64	-3.27
6/21/2001	-0.82	3	-3.45
6/22/2001	-1.02	3.36	-3.02
6/23/2001	-0.84	3.06	-3.19
6/24/2001	0.17	2.97	-3.22
6/25/2001	-0.31	2.6	-3.19
6/26/2001	0.4	1.53	-3.32
6/27/2001	0.1	2.2	-3.28
6/28/2001	-0.26	1.83	-3.17
6/29/2001	-0.15	2.45	-2.59
6/30/2001	-0.43	2.22	-2.75
7/1/2001	-0.54	2.19	-3.08
7/2/2001	-0.09	2.39	-2.92
7/3/2001	0.06	2.46	-2.8
7/4/2001	-0.18	2.72	-2.95
7/5/2001	-0.18	2.63	-2.66
7/6/2001	-0.22	2.5	-2.72
7/7/2001	-0.17	2.31	-2.76
7/8/2001	-0.31	2.53	-2.65
7/9/2001	-0.39	2.35	-2.19
7/10/2001	-0.2	2.11	-2.15
7/11/2001	0.44	1.5	-2.06
7/12/2001	-0.18	2.06	-2
7/13/2001	-0.13	1.56	-2.16
7/14/2001	-0.62	1.59	-2.25
7/15/2001	-0.82	1.88	-2.19
7/16/2001	-0.67	2.19	-2.39
7/17/2001	-1.14	2.46	-2.69
7/18/2001	-0.91	2.89	-2.61
7/19/2001	-0.72	3.85	-2.41
7/20/2001	-0.54	3.71	-2.6
7/21/2001	-0.16	3.38	-3.22
7/22/2001	-0.04	3.23	-3.33
7/23/2001	-0.28	2.88	-3.33
7/24/2001	-0.69	2.24	-3.39
7/25/2001	-1.02	1.54	-3.69
7/26/2001	-0.85	1.71	-3.48
7/27/2001	-0.38	2.57	-2.03
7/28/2001	-0.46	2	-2.76
7/29/2001	-0.55	2.23	-2.42
7/30/2001	-0.29	2.72	-1.78
7/31/2001		2.62	-2.22
8/1/2001	0.01	2.27	-2.57
8/2/2001	-0.57	2.33	-2.58
8/3/2001	-0.46	2.12	-3.01
8/4/2001	-0.3	2.46	-2.91
8/5/2001	-0.37	2.43	-2.37
8/6/2001	-0.34	2.08	-2.61
8/7/2001	-0.22	1.89	-2.64
8/8/2001	-0.29	1.98	-2.64
8/9/2001	-0.28	1.78	-2.2
8/10/2001	0.5	1.37	-2.46
8/11/2001	0.35	1.42	-2.52
8/12/2001	-0.08	1.77	-2.24

8/13/2001	-0.04	1.69	-2.68
8/14/2001	0.29	2.3	-2.28
8/15/2001	0.34	2.91	-2.14
8/16/2001	0.23	2.98	-2.74
8/17/2001	0.35	2.8	-3.4
8/18/2001	0.15	3.28	-3.52
8/19/2001	0.17	3.3	-3.46
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8/21/2001	0.08	2.7	-3.42
8/22/2001	-0.02	2.37	-3.38
8/23/2001	0	2.23	-3.28
8/24/2001	-0.12	2.53	-2.76
8/25/2001	-0.36	2.85	-2.12
8/26/2001	-0.12	2.34	-1.94
8/27/2001	0.23	2.13	-2.08
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8/30/2001	-0.36	2.56	-2.04
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9/3/2001	-0.23	2.61	-2.25
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9/8/2001	-0.19	1.8	-2.35
9/9/2001	-0.16	1.82	-2.44
9/10/2001	0	1.99	-2.24
9/11/2001	0.2	2.23	-2.26
9/12/2001	-0.29	2.65	-1.83
9/13/2001	-0.47	2.67	-2.58
9/14/2001	-0.54	3.6	-2.51
9/15/2001	-0.49	3.68	-2.17
9/16/2001	-0.08	3.5	-2.85
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9/21/2001	-0.52	2.74	-2.47
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9/24/2001	-0.11	2.39	-1.73
9/25/2001	-0.42	2.22	-1.85
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9/28/2001	-0.28	2.16	-2.08
9/29/2001	-0.13	3.65	-1.09
9/30/2001	-0.27	3.98	0.21A
10/1/2001	-0.36	3.43	-0.42
10/2/2001	-0.37	2.5	-1.95
10/3/2001	-0.02	2.28	-2.47
10/4/2001	-0.04	2.18	-2.52
10/5/2001	-0.03	2.24	-2.58
10/6/2001	-0.17	1.88	-2.86
10/7/2001	-0.2	1.79	-2.65
10/8/2001	-0.21	1.6	-2.74
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10/21/2001	0.45	2.25	-2.64
10/22/2001	-0.22	1.82	-2.52
10/23/2001	-0.07	2.18	-1.9
10/24/2001	0.51	2.09	-1.83
10/25/2001	0.35	1.63	-1.87
10/26/2001	-0.25	1.3	-2.92
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10/28/2001	-0.66	2.08	-1.99
10/29/2001	-0.41	1.85	-2.32
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10/31/2001	-0.35	2.35	-2.47
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11/7/2001	-0.39	-0.8	-2.44
11/8/2001	-0.07	2.39	-2.14
11/9/2001	0.32	2.21	-3.09
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11/11/2001	-0.23	2.17	-3.18
11/12/2001	-0.21	2.29	-3.58
11/13/2001	-0.02	2.38	-3.43
11/14/2001	-0.04	2.23	-3.99
11/15/2001	-0.12	2.5	-3.98
11/16/2001	-0.26	2.68	-3.49
11/17/2001	-0.39	3.2	-3.18
11/18/2001	0	2.7	-2.78
11/19/2001	0.45	1.98	-2.82
11/20/2001	0.29	1.46	-2.56
11/21/2001	-0.08	1.86	-1.94
11/22/2001	-0.03	1.56	-2.19
11/23/2001	0.1	1.64	-1.84
11/24/2001	0.08	1.58	-1.91
11/25/2001	0.13	1.65	-2
11/26/2001	-0.03	1.56	-2.36
11/27/2001	0.29	1.92	-2.59
11/28/2001	0.12	2.09	-2.47
11/29/2001	0.03	2.63	-2.5
11/30/2001	0.02	2.73	-2.65
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12/7/2001	0.24	1.82	-2.91
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12/9/2001	0.45	2.35	-2.16
12/10/2001	0.93	2.44	-2.69
12/11/2001	0.53	2.51	-2.73
12/12/2001	0.37	2.78	-2.4
12/13/2001	0.24	3.28	-2.63
12/14/2001	0.24	2.81	-3.04
12/15/2001		2.06	-3.33
12/16/2001	0.17	2.81	-2.6
12/17/2001	0.07	2.85	-2.47
12/18/2001	0.02	2.02	-2.19
12/19/2001	0.2	1.98	-2.45
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12/23/2001	-0.09	1.41	-2
12/24/2001	0.98	1.62	-2.08
12/25/2001	2.29	1.4	-2.24
12/26/2001	1.83	2.08	-2.13
12/27/2001	0.48	2.4	-3.04
12/28/2001	-0.01	2.03	-2.96
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12/30/2001	-0.28	2.38	-3.59
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1/5/2002	-0.66	1.57	-3.44
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1/7/2002		1.83	-3.05
1/8/2002	0.66	1.6	-3.1
1/9/2002	0.12	1.6	-3.95
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1/13/2002	-0.74	2.82	-3.16
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1/23/2002	-0.41	0.42	-2.96
1/24/2002	-0.44	1.73	-2.95
1/25/2002	-0.21	1.84	-3.09
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1/29/2002	-0.34	3.21	-3.39
1/30/2002	-0.47	3.05	-3.52
1/31/2002	-0.36		-2.89
2/1/2002	-0.69		
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2/4/2002	-0.61	1.97	-2.91
2/5/2002	-0.68	1.81	-2.48
2/6/2002	-0.48	1.48	-2.97
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2/9/2002	-0.75	2.04	-2.07
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2/11/2002	-0.03	2	-4.11
2/12/2002	-0.38	2.55	-3.08
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2/14/2002	-0.87	1.74	-3.12
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2/16/2002	-0.58	1.65	-2.86
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3/28/2002	-0.96	2.69	-3.86
3/29/2002	-1.14	2.75	-4.44
3/30/2002	-0.78	2.64	-4.02
3/31/2002	-0.37	2.97	-3.67
4/1/2002	-0.94	2.08	-3.24
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4/3/2002	-0.36	1.85	-3.23
4/4/2002	-0.52	1.49	-2.78
4/5/2002	-1.05	1.52	-2.34
4/6/2002	-1.01	1.32	-2.5
4/7/2002	-0.47	1.41	-2.54
4/8/2002	-0.94	1.11	-2.91
4/9/2002	-0.74	1.25	-3.11
4/10/2002	-1.94	1.22	-3.28
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4/12/2002	-1.1	1.63	-2.94
4/13/2002	-0.75	1.56	-3.19
4/14/2002	-0.94	1.87	-3.43
4/15/2002	-0.57	1.91	-3.3
4/16/2002	-0.11	1.92	-2.93
4/17/2002	-0.5	1.91	-2.8
4/18/2002	-1.86	0.68	-2.64
4/19/2002	-1.23	2.17	-2.17
4/20/2002	-0.56	2.01	-2.29
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4/22/2002	-1.09	2.37	-2.38
4/23/2002	-0.85	2.55	-2.79
4/24/2002	-0.26	2.44	-3.06
4/25/2002	-0.07	2.54	-2.91
4/26/2002	-0.16	2.5	-3.87
4/27/2002	0.47	2.71	-4.18
4/28/2002	0.03	3.25	-4
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4/30/2002	-0.62	2.21	-3.05
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5/2/2002	-0.26	1.23	-2.08
5/3/2002	-0.69	2.12	-2.81

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5/6/2002	-0.22	1.37	-2.33
5/7/2002	-0.2	1.28	-2.82
5/8/2002	-0.71	1.88	-2.48
5/9/2002	-0.41	1.98	-2.31
5/10/2002	-0.87	1.49	-2.92
5/11/2002	-0.83	1.47	-3.31
5/12/2002	-1.06	1.96	-3.6
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5/22/2002	-0.13	1.82	-3.33
5/23/2002	0	2.28	-3.45
5/24/2002	-0.18	2.68	-3.56
5/25/2002	-1.54	3.09	-3.51
5/26/2002	-1.31	3.03	-3.33
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5/28/2002	-0.17	2.61	-3.44
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6/8/2002	-0.48	2.68	-1.92
6/9/2002	-0.73	2.16	-2.79
6/10/2002	-0.78	2.61	-2.98
6/11/2002	0.14	2.5	-2.78
6/12/2002	0.27	2.85	-3
6/13/2002	-0.12	3.44	-2.4
6/14/2002	0.16	3.48	-2.07
6/15/2002	-0.25	3.04	-1.67
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6/20/2002	0.39	2.14	-3.16
6/21/2002	-0.05	2.33	-3.42
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6/23/2002	-0.51	2.67	-3.8
6/24/2002	-0.41	2.71	-3.56
6/25/2002	-0.41	2.84	-3.25
6/26/2002	-0.4	2.48	-2.87
6/27/2002	-0.87	2.01	-3.28
6/28/2002	-0.97	1.96	-3.11
6/29/2002	-0.88	1.99	-2.71
6/30/2002	-0.64	0.99	-2.5
7/1/2002	-0.68	1.6	-2.7
7/2/2002	-0.44	1.09	-2.72
7/3/2002	-0.86	1.25	-2.46
7/4/2002	-0.89	1.42	-2.2
7/5/2002	-0.95	1.55	-2.28
7/6/2002	-0.66	1.93	-2.5
7/7/2002	-0.44	2.06	-2.78
7/8/2002	-0.78	2.39	-2.81

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7/10/2002	-0.75	2.98	-3.16
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7/12/2002	-0.69	2.77	-3.27
7/13/2002	-0.57	2.8	-3.25
7/14/2002	-0.35	2.77	-3.14
7/15/2002	-0.37	2.1	-2.79
7/16/2002	-0.14	2.26	-2.89
7/17/2002	0.17	2.52	-2.35
7/18/2002	0.22	2.46	-2.52
7/19/2002	0.03	2.69	-2.5
7/20/2002	0.1	2.94	-2.38
7/21/2002	-0.27	2.87	-2.62
7/22/2002	-0.47	2.64	-2.98
7/23/2002	-0.32	2.13	-3.33
7/24/2002	-0.21	3.1	-3.48
7/25/2002	-0.34	3.03	-2.33
7/26/2002	-0.45	2.72	-2.26
7/27/2002	0.04	2.36	-2.23
7/28/2002	-0.49	2.25	-2.17
7/29/2002	-0.86	2.08	-2.05
7/30/2002	-0.66	1.71	-1.85
7/31/2002	-0.47	1.82	-1.77
8/1/2002	-0.53	1.8	-1.81
8/2/2002	-0.18	2.03	-1.71
8/3/2002	0.01	1.87	-2.05
8/4/2002	-0.5	2.06	-2.16
8/5/2002	-0.89	2.26	-2.53
8/6/2002	-0.78	3.34	-2.35
8/7/2002	-0.19	3.11	-2.48
8/8/2002	-0.51	3.12	-2.93
8/9/2002	-1.26	3.15	-3.07
8/10/2002	-0.94	2.91	-3.34
8/11/2002	-1	2.63	-3.46
8/12/2002	0.15	2.28	-3.36
8/13/2002	-0.17	2.24	-3.23
8/14/2002	-0.27	2.27	-3.13
8/15/2002	-0.49	2	-3.21
8/16/2002	-0.47	1.95	-2.97
8/17/2002	-0.43	2.18	-2.76
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8/22/2002	-0.49	2.5	-2.69
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8/24/2002	-0.26	2.83	-2.19
8/25/2002		2.42	-2.13
8/26/2002	-0.31	2.02	-2.22
8/27/2002	-0.35	1.96	-2.06
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9/3/2002	-0.34	2.75	-1.99
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2/14/2003	-0.41	1.2	-3.95
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3/25/2003	-0.38	2.22	-2.27
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3/28/2003	0.21	1.96	-2.52
3/29/2003	1.06	2.1	-2.64

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4/12/2003	-0.97	2.94	-2.14
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4/27/2003	0.02	2.47	-2.17
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5/24/2003	0.02	2.09	-1.63
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7/17/2003	0.21	2.28	-2.88
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7/21/2003	0.46	1.58	-2.18
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8/16/2003	-0.13	2.26	-2.37
8/17/2003	0.08	1.99	-2.22
8/18/2003	0.39	1.84	-1.81
8/19/2003	0.14	1.74	-1.72
8/20/2003	0.38	1.39	-2.16
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8/22/2003	0.07	1.77	-2.21
8/23/2003	-0.05	2.18	-1.96
8/24/2003	0.08	2.22	-2.33
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8/28/2003	-0.57	2.87	-3.03
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9/6/2003	-0.09	2.92	-2.1
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9/8/2003	0.12	3.19	-2.48
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9/12/2003	-0.07	3.22	-1.87
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9/14/2003	0.34	2.32	-2.16
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9/17/2003	0.28	2.29	-1.42
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9/20/2003	0.16	2.06	-1.43
9/21/2003	0.19	2.49	-1.36
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10/3/2003		2.25	-2.15
10/4/2003		1.99	-2.67
10/5/2003		1.79	-2.6
10/6/2003	0.12	2.37	-2.57
10/7/2003	-0.09	2.51	-2.53
10/8/2003	-0.13	2.13	-2.97
10/9/2003	-0.08	0.64	-3.05
10/10/2003	-0.26		
10/11/2003	-0.26		
10/12/2003	-0.28		
10/13/2003	-0.08		

10/14/2003	-0.17		
10/15/2003	-0.2		
10/16/2003	-0.26		
10/17/2003	-0.28		
10/18/2003	-0.48		
10/19/2003	-0.52		
10/20/2003	-0.61		
10/21/2003	-0.71		
10/22/2003	-0.49		
10/23/2003	0.06		
10/24/2003	-0.15	2.04	-3.64
10/25/2003	0	2.74	-3.63
10/26/2003	-0.12	2.84	-3.87
10/27/2003	-0.29	3.39	-3.49
10/28/2003	-0.4	3.47	-2.99
10/29/2003	-0.24	3.77	-2.49
10/30/2003	-0.22	2.13	-3.12
10/31/2003	-0.13	2.24	-2.71
11/1/2003	0.01	2.09	-2.64
11/2/2003	-0.1	2.11	-2.34
11/3/2003	-0.07	2.06	-2.44
11/4/2003	-0.22	2.35	-2.2
11/5/2003	-0.21	2.49	-2.34
11/6/2003	-0.27	2.26	-2.13
11/7/2003	-0.35	2.54	-2.21
11/8/2003	-0.46	2.19	-2.47
11/9/2003	-0.23	2.29	-2.69
11/10/2003	-0.05	1.89	-2.99
11/11/2003	-0.01	2.41	-2.4
11/12/2003	0.22	2.49	-2.01
11/13/2003	-0.04	1.19	-4.12
11/14/2003	-0.46	-0.3	-4.6
11/15/2003	-0.41	0.65	-3.83
11/16/2003	-0.27	1.67	-2.07
11/17/2003	-0.09	1.72	-1.84
11/18/2003	-0.04	2.19	-1.89
11/19/2003	-0.37	2.8	-2.47
11/20/2003	-0.2	2.34	-3.05
11/21/2003	-0.07	2.4	-3.14
11/22/2003	-0.15	3.26	-2.56
11/23/2003	-0.1	3.59	-2.97
11/24/2003	-0.27	3.98	-2.92
11/25/2003	0.08	3.66	-4.18
11/26/2003	-0.06	3.37	-3.29
11/27/2003	0.23	3.12	-2.85
11/28/2003	0.61	3.01	-2.55
11/29/2003	0.28	0.63	-4.63
11/30/2003	0.35	0.05	-4.17
12/1/2003	0.4	0.57	-3.83
12/2/2003	0.18	0.51	-3.57
12/3/2003	0.24	0.96	-2.71
12/4/2003	0.97	1.44	-2.89
12/5/2003	0.72	3.14	-1.11
12/6/2003	0.08	3.94	-0.76
12/7/2003	1.08	2.76	-2.11
12/8/2003	0.71	2.65	-2.01
12/9/2003	0.18	2.85	-2.04
12/10/2003	0.27	2.86	-2.06
12/11/2003	0.19	3.88	-2.12
12/12/2003	0.43	1.54	-3.26
12/13/2003	1.94	1.73	-2.92
12/14/2003	1.01	3.28	-1.9
12/15/2003	0.16	1.61	-2.82
12/16/2003	0.36	0.64	-3.67
12/17/2003	0.47	1.88	-2.5
12/18/2003	0.39	1.77	-3.89

12/19/2003	0.14	1.46	-3.2
12/20/2003	0.21	2.83	-3.26
12/21/2003	0.31	2.85	-4.59
12/22/2003	0.5	1.83	-4.46
12/23/2003	0.66	2.97	-4.3
12/24/2003	0.46	3.78	-3.49
12/25/2003	-0.21	3.23	-3.71
12/26/2003	-0.05	1.82	-4.5
12/27/2003	-0.09	2.04	-4.21
12/28/2003	-0.16	2.4	-2.45
12/29/2003	-0.23	1.54	-2.58
12/30/2003	-0.36	1.17	-3.25
12/31/2003	-0.07	0.57	-3.26
1/1/2004	-0.03	0.29	-2.99
1/2/2004	-0.42	1.42	-2.33
1/3/2004	-0.51	2.11	-2.25
1/4/2004	0.24	2	-2
1/5/2004	1.39	2.62	-1.83
1/6/2004	1.11	2.13	-2.61
1/7/2004	0.13	1.41	-3.56
1/8/2004	0.4	1.07	-4.34
1/9/2004	-0.56	2.09	-3.69
1/10/2004	-1.2	2.56	-2.38
1/11/2004	-0.42	2.14	-2.71
1/12/2004	0.22	1.07	-3.48
1/13/2004	-0.04	1.86	-2.91
1/14/2004	0.04	1.41	-2.88
1/15/2004	-0.54	2.05	-2.6
1/16/2004	0.36	0.47	-3.9
1/17/2004	0.38	1.08	-0.86
1/18/2004	-0.36	2.04	-2.9
1/19/2004	-0.26	2.69	-4.25
1/20/2004	-0.4	2.08	-4.04
1/21/2004	-0.03	1.92	-4.66
1/22/2004	0.12	2.91	-3.5
1/23/2004	0.41	2.53	-4.4
1/24/2004	-0.64		
1/25/2004	-0.46		
1/26/2004	-0.39		1.08A
1/27/2004	-0.22	2.42	-1.26
1/28/2004	-0.2	1.03	-2.84
1/29/2004	0.07	0.78	-3.1
1/30/2004	0.47	0.41	
1/31/2004	0.25	0.2	
2/1/2004	0.21	0.04	-1.34
2/2/2004	-0.2	0.52	-1.7
2/3/2004	-0.39	2.08	-1.74
2/4/2004	-0.63	1.75	-2.97
2/5/2004	-0.23	1.5	-3.58
2/6/2004	0.04	2.13	-3.73
2/7/2004	-1.33	2.69	-2.97
2/8/2004	-2.6	1.5	-3.82
2/9/2004	-1.61	0.88	-4.56
2/10/2004	-0.47	1.75	-3.85
2/11/2004	-0.15	1.51	-3.42
2/12/2004	0.19	0.93	-3.21
2/13/2004	0.54	1.75	-3.35
2/14/2004	0.19	1.46	-3.36
2/15/2004	-0.19	1.75	-2.55
2/16/2004	0.36	2.48	-3.16
2/17/2004	0.48	1.97	-3.06
2/18/2004	0.64	2.88	-2.09
2/19/2004	0.08	3.17	-3
2/20/2004	-0.03	3.23	-3.02
2/21/2004	-0.05	3	-3.06
2/22/2004	0.18	2	-3.45

2/23/2004	-1.76	2.29	-3.24
2/24/2004	-2.05	1.99	-2.75
2/25/2004	-1.32	1.77	-2.26
2/26/2004	-1.58	1.21	-2.06
2/27/2004	-0.84	1.63	-1.84
2/28/2004	-0.79	1.13	-2.11
2/29/2004	1.14	1.01	-2.12
3/1/2004	1.94	1.22	-2.04
3/2/2004	0.26	1.45	-2.83
3/3/2004	0.26	1.24	-2.81
3/4/2004	0.25	1.7	-2.62
3/5/2004	0.5	2.14	-2.77
3/6/2004	0.73	2.41	-2.98
3/7/2004	-1.07	2.07	-4.22
3/8/2004	-0.86	3	-3.67
3/9/2004	1.02	2.76	-2.69
3/10/2004	-0.52	3.65	-2.52
3/11/2004	-1.49	3.3	-1.68
3/12/2004	-0.24	1.38	-2.79
3/13/2004	-1.11	1.73	-3.85
3/14/2004	-0.73	1.22	-3.1
3/15/2004	-0.01	1.84	-3.11
3/16/2004	-0.45	2.08	-2.01
3/17/2004	-1.26	3.19	-1.89
3/18/2004	-0.44	3.02	-2.38
3/19/2004	0.07	3.15	-2.41
3/20/2004	-0.45	2.58	-2.75
3/21/2004	-1.58	2.31	-3.04
3/22/2004	-0.96	1.77	-3.38
3/23/2004	-0.11	1.33	-3.23
3/24/2004	-0.54	1.45	-3.87
3/25/2004	-0.91	1.21	-3.14
3/26/2004	-1.26	1.07	-2.88
3/27/2004	-1.36	0	-2.68
3/28/2004	-0.52	1.28	-1.82
3/29/2004	-0.2	2.38	-0.88
3/30/2004	-0.14	1.73	-1.34
3/31/2004	0.31	1.72	-1.58
4/1/2004	-0.57	2.47	-1.81
4/2/2004	-1.43	2.47	-1.75
4/3/2004	-1.72	2.66	-2
4/4/2004	-0.59	2.62	-3.06
4/5/2004	-0.23	2	-3.64
4/6/2004	-0.65	2.4	-4.31
4/7/2004	-1.22	2.94	-3.8
4/8/2004	-0.68	3.04	-3.11
4/9/2004	-0.78	2.54	-2.84
4/10/2004	-0.23	0.98	-2.97
4/11/2004	-2.1	2.13	-2.91
4/12/2004	-1.17	2.24	-2.29
4/13/2004	-0.38	2.76	-2.16
4/14/2004	-0.51	1.96	-2.71
4/15/2004	-1.31	2.14	-2.75
4/16/2004	-1.14	1.86	-2.53
4/17/2004	-0.5		
4/18/2004			
4/19/2004			
4/20/2004			
4/21/2004			
4/22/2004			
4/23/2004			
4/24/2004			
4/25/2004			
4/26/2004			
4/27/2004			
4/28/2004			

4/29/2004	0.01		
4/30/2004	-0.82		
5/1/2004	-1.19		
5/2/2004	-0.61		
5/3/2004	-0.31		
5/4/2004	-1.21		
5/5/2004	-1.76	1.94	-3.67
5/6/2004	-0.99	3.04	-3.49
5/7/2004	-0.97	2.63	-3.77
5/8/2004	-0.96	2.78	-3.46
5/9/2004	-1.03	0.92	-3.07
5/10/2004	-1.22	2.16	-2.99
5/11/2004	-0.39	2.05	-2.85
5/12/2004	-0.21	1.62	-3.02
5/13/2004	-0.51	1.53	-2.94
5/14/2004	0.39	1.74	-2.8
5/15/2004	0.12	1.66	-3.09
5/16/2004	0.21	1.58	-3.3
5/17/2004	0.07	2.19	-3.23
5/18/2004	-0.56	1.8	-2.97
5/19/2004	-0.3	2.15	-3.52
5/20/2004	-0.38	2.21	-2.8
5/21/2004	-0.36	2.06	-2.59
5/22/2004	-0.32	2.08	-2.36
5/23/2004	-0.3	2.06	-2
5/24/2004	-0.69	0.94	-2.02
5/25/2004	-0.66	2.08	-1.94
5/26/2004	-0.59	2.24	-1.64
5/27/2004	-0.68	2.46	-1.8
5/28/2004	-0.92	2.16	-1.85
5/29/2004	-0.59	2.09	-2.16
5/30/2004	-0.27	2.21	-2.58
5/31/2004	-0.41	3.07	-2.52
6/1/2004	-0.73	3.61	-2.37
6/2/2004	0.13	3.53	-2.99
6/3/2004	0.3	3.44	-3.32
6/4/2004	0.73	3.41	-3.51
6/5/2004	0.99	3.54	-2.93
6/6/2004	-0.23	3.22	-2.52
6/7/2004	-1.68	2.43	-2.87
6/8/2004	-1.06	1.28	-3.05
6/9/2004	-0.86	1.98	-3.04
6/10/2004	0.37	1.75	-2.74
6/11/2004	0.94	2.2	-1.85
6/12/2004	0.49	2.06	-2.14
6/13/2004	0.75	2.15	-2.34
6/14/2004	0.14	1.91	-2.63
6/15/2004	-0.21	2.03	-2.8
6/16/2004	-0.67	2.17	-2.86
6/17/2004	-0.88	2.39	-2.45
6/18/2004	-1.45	2.54	-2.34
6/19/2004	-1.12	2.54	-2.1
6/20/2004	-1.16	2.31	-2.34
6/21/2004	-1.06	1.94	-2.49
6/22/2004	0	2.05	-2.35
6/23/2004	0.52	2.06	-2.16
6/24/2004	0.15	2.06	-2.15
6/25/2004	0.09	1.96	-2.25
6/26/2004	0.4	1.89	-2.26
6/27/2004	0.47	1.89	-2.75
6/28/2004	0.44	2.36	-2.85
6/29/2004	-0.2	2.82	-3.05
6/30/2004	-0.67	3.03	-3.31
7/1/2004	-0.89	3.26	-3.48
7/2/2004	-0.47	3.22	-3.51
7/3/2004	-0.22	3.39	-3.45

7/4/2004	-0.18	3.25	-3.38
7/5/2004	-0.58	2.92	-3.05
7/6/2004	-0.49	2.54	-3
7/7/2004	0.14	1.86	-2.83
7/8/2004	0.45	2.3	-2.91
7/9/2004	-0.13	1.78	-2.63
7/10/2004	0.08	1.59	-2.54
7/11/2004	-0.19	1.79	-2.35
7/12/2004	-0.57	2.07	-2.1
7/13/2004	-0.91	2.61	-1.93
7/14/2004	-0.76	2.97	-1.69
7/15/2004	-1.04	2.71	-1.94
7/16/2004	-0.52	2.59	-2.18
7/17/2004	-0.7	2.62	-2.24
7/18/2004	-0.71	2.92	-2.19
7/19/2004	-0.55	2.59	-2.2
7/20/2004	-0.5	2.36	-2.39
7/21/2004	-0.58	2.27	-2.45
7/22/2004	-0.37	2.14	-2.4
7/23/2004	-0.73	1.73	-2.28
7/24/2004	-0.81	1.92	-2.46
7/25/2004	-0.94	2.37	-1.97
7/26/2004	-0.69	2.54	-2.06
7/27/2004	-0.27	2.8	-2.34
7/28/2004	-0.32	3.01	-2.58
7/29/2004	-0.44	3.18	-2.93
7/30/2004	-0.57	3.35	-3.18
7/31/2004	-0.44	3.24	-3.39
8/1/2004	-0.68	3.18	-3.53
8/2/2004	-0.37	3.16	-3.31
8/3/2004	-0.58	3.12	-2.96
8/4/2004	-0.54	2.68	-2.51
8/5/2004	-0.53	2.74	-2.46
8/6/2004	-0.64	2.74	-1.83
8/7/2004	-0.59	2.26	-1.63
8/8/2004	-0.35	1.62	-2.11
8/9/2004	-0.64	1.62	-2.28
8/10/2004	-0.89	1.94	-1.96
8/11/2004	-0.54	1.97	-2.04
8/12/2004	-0.68	2.43	-2.02
8/13/2004	-0.83	2.42	-2.15
8/14/2004	-0.53	2.37	-2.54
8/15/2004	-0.55	2.54	-2.42
8/16/2004	-0.43	2.7	-2.52
8/17/2004	-0.2	2.6	-2.47
8/18/2004	-0.16	2.27	-2.59
8/19/2004	0.01	1.92	-2.83
8/20/2004	0.41	1.99	-2.81
8/21/2004	0.3	1.93	-2.8
8/22/2004	0.3	2.46	-2.2
8/23/2004	0.14	2.34	-2.28
8/24/2004	-0.06	2.48	-2.61
8/25/2004	0.2	2.63	-2.3
8/26/2004	0.63	2.8	-2.61
8/27/2004	0.22	2.89	-2.87
8/28/2004	-0.07	2.94	-3.35
8/29/2004	-0.14	3.07	-3.4
8/30/2004	0.26	3.31	-3.14
8/31/2004	0.36	2.87	-3.02
9/1/2004	-0.18	2.32	-3.23
9/2/2004	-0.47	2.54	-2.93
9/3/2004	-0.54	2.29	-2.2
9/4/2004	-0.26	2.01	-2.49
9/5/2004	0.33	2.65	-1.88
9/6/2004	0.03	2.27	-1.06
9/7/2004	-0.13	2.01	-1.28

9/8/2004	-0.35	2.01	-1.5
9/9/2004	-0.58	1.8	-2.02
9/10/2004	-0.58	1.85	-2.22
9/11/2004	-0.3	2.35	-2.01
9/12/2004	-0.23	2.64	-2.17
9/13/2004	-0.01	2.35	-2.74
9/14/2004	-0.15	2.86	-2.63
9/15/2004	-0.53	2.6	-2.48
9/16/2004	-0.48	2.3	-2.87
9/17/2004	-0.2	2.65	-2.81
9/18/2004	-0.18	2.98	-2.05
9/19/2004	-0.22	3.39	-1.44
9/20/2004	-0.11	2.97	-1.6
9/21/2004	-0.3	2.7	-2.17
9/22/2004	-0.32	2.66	-1.91
9/23/2004	-0.13	2.72	-2.03
9/24/2004	-0.32	2.98	-2.03
9/25/2004	-0.33	2.76	-2.82
9/26/2004	-0.29	2.81	-2.96
9/27/2004	-0.16	3.08	-2.77
9/28/2004	-0.16	3.07	-2.58
9/29/2004	-0.13	3.36	-2.42
9/30/2004	-0.24	3.28	-1.92
10/1/2004	-0.14	2.92	-2.12
10/2/2004	-0.16	2.85	-2.11
10/3/2004	-0.34	2.71	-1.8
10/4/2004	-0.38	2.42	-1.34
10/5/2004	-0.3		0.28A
10/6/2004	-0.09	1.87	-1.63
10/7/2004	0.21	1.48	-1.78
10/8/2004	0.35	1.78	-1.79
10/9/2004	0.27	1.97	-1.94
10/10/2004	0.01	2.37	-2.09
10/11/2004	-0.02	2.63	-1.61
10/12/2004	0.11	2.83	-1.99
10/13/2004	0.21	3.11	-2.08
10/14/2004	-0.16	3.38	-2.38
10/15/2004	-0.18	3.76	-2.21
10/16/2004	-0.12	3.33	-3.07
10/17/2004	-0.17	2.44	-3.69
10/18/2004	-0.11	2.57	-2.96
10/19/2004	0.39	3.02	-2.24
10/20/2004	0.37		1.00A
10/21/2004	0.3	3.17	-1.08
10/22/2004	0.19	3.2	-0.91
10/23/2004	0.08	3.56	-0.83
10/24/2004	0	3.78	-0.68
10/25/2004	-0.13		
10/26/2004	-0.16	3.07	-1.89
10/27/2004	-0.11	3.1	-2.25
10/28/2004	0.13	3.07	-2.22
10/29/2004	0.3	2.91	-2.32
10/30/2004	0.4	2.84	-2.18
10/31/2004	0.62	2.75	-2.02
11/1/2004	0.29	2.06	-2.16
11/2/2004	-0.31	2.52	-1.62
11/3/2004	-0.43	1.75	-1.48
11/4/2004	-0.22	2.4	-1.39
11/5/2004	-0.24	1.57	-2.6
11/6/2004	-0.05	0.58	-3.28
11/7/2004	0.02	1.54	-2.3
11/8/2004	-0.21	1.81	-2.29
11/9/2004	-0.07	1.87	-2.52
11/10/2004	-0.07	2.26	-2.8
11/11/2004	-0.07	2.47	-3.29
11/12/2004	-0.13	2.98	-3.49

11/13/2004	-0.35	4.12	-2.11
11/14/2004	-0.34	3.39	-2.79
11/15/2004	-0.5	3.14	-2.97
11/16/2004	-0.02	3.25	-2.46
11/17/2004	-0.11	3.06	-2.3
11/18/2004	-0.1	2.54	-2.43
11/19/2004	0.1	2.39	-2.31
11/20/2004	0.02	2.34	-2.25
11/21/2004	-0.1	2.15	-2.18
11/22/2004	-0.3	2.25	-2.44
11/23/2004	-0.21	2.42	-2.33
11/24/2004	0.13	2.84	-1.9
11/25/2004	0.24	3.03	-2.33
11/26/2004	-0.12	2.04	-3.51
11/27/2004	-0.01	2.44	-3.15
11/28/2004	0.08	3.4	-1.61
11/29/2004	-0.2	2.42	-2.14
11/30/2004	0.64	2.45	-2.12
12/1/2004	0.75	2.6	-3.62
12/2/2004	0.27	0.79	-3.02
12/3/2004	0.24	1.31	-2.24
12/4/2004	0.26	1.47	-1.99
12/5/2004	-0.34	0.89	-2.65
12/6/2004	0.02	1.62	-1.96
12/7/2004	0.17	2.27	-2.01
12/8/2004	-0.16	2.17	-3.07
12/9/2004	0.27	2.17	-2.8
12/10/2004	0.35	3.37	-1.64
12/11/2004	-0.04	3.94	-2.53
12/12/2004	0.12	3.23	-3.52
12/13/2004	0.68	3.21	-3.98
12/14/2004	1.17	2.78	-3.93
12/15/2004	0.64	2.62	-3.22
12/16/2004	0.22	2.55	-3.22
12/17/2004	0.37	1.39	-3.65
12/18/2004	0.37	2.07	-2.73
12/19/2004	0.48	2.36	-2.02
12/20/2004	0.25	1.63	-2.86
12/21/2004	-0.05	1.75	-3.09
12/22/2004	0.25	1.6	-2.84
12/23/2004	0.49	2.34	-3.47
12/24/2004	1.14	2.05	-2.33
12/25/2004	0.82	2.41	-2.59
12/26/2004	0.37	2.68	-2.24
12/27/2004	0.22	2.65	-1.73
12/28/2004	0.4	2.51	-2.94
12/29/2004	0.31	0.83	-3.88
12/30/2004	0.23	1.81	-3.02
12/31/2004	0	1.72	-2.47
1/1/2005	-0.33	1.16	-2.87
1/2/2005	-0.18	1.39	-2.37
1/3/2005	-0.14	1.17	-2.56
1/4/2005	0.06	1	-2.47
1/5/2005	0.49	1.73	-1.78
1/6/2005	0.52	2.62	-1.94
1/7/2005	0.57	2.59	-3.39
1/8/2005	0.7	2.68	-3.52
1/9/2005	0.83	3.12	-3.07
1/10/2005	-0.14	3.49	-3.5
1/11/2005	-0.84	3.07	-3.78
1/12/2005	-0.44	3.57	-3.43
1/13/2005	0.51	3.27	-3.08
1/14/2005	1.62	2.35	-3.32
1/15/2005	1.18	1.8	-2.87
1/16/2005	1.28	2.27	-1.8
1/17/2005	1.67	2.61	-1.98

1/18/2005	1.78	1.7	-2.96
1/19/2005	1.41		
1/20/2005	0.78		-1.5
1/21/2005	0.63	2.08	-2.13
1/22/2005	0.56		
1/23/2005	0.28		
1/24/2005	0.2		
1/25/2005	0.12		
1/26/2005	-0.26		
1/27/2005	0.28		
1/28/2005	0.09		
1/29/2005	0.34		
1/30/2005	-0.74	2.49	
1/31/2005	-1.39	2.49	-1.07
2/1/2005	-0.69	2.45	-1.85
2/2/2005	-0.17	1.91	-1.97
2/3/2005	-0.26	2.48	-1.55
2/4/2005	-0.19	2.77	-1.18
2/5/2005	-0.43	3.21	-2.54
2/6/2005	0.36	2.86	-2.39
2/7/2005	1.04	3.19	-2.53
2/8/2005	0.25	3.29	-3.03
2/9/2005	-0.08	3.39	-3.47
2/10/2005	0.14	3.53	-3.47
2/11/2005	0.17	2.24	-3.52
2/12/2005	0.01	1.83	-3.81
2/13/2005	-0.02	1.92	-3.21
2/14/2005	0.13	1.67	-2.67
2/15/2005	0.15	2.11	-2.44
2/16/2005	0.07	1.25	-2.33
2/17/2005	0.13	1.75	-2.48
2/18/2005	0.57	1.41	-2.75
2/19/2005	-0.05	1.33	-2.42
2/20/2005	-0.87	1.26	-2.52
2/21/2005	-0.13	2.19	-2
2/22/2005	0.75	2.7	-1.88
2/23/2005	-0.11	2.57	-2.15
2/24/2005	-0.06	2.66	-2.73
2/25/2005	-0.55	3.08	-2.01
2/26/2005	-1.26	2.43	-2.67
2/27/2005	-0.67	1.56	-3.31
2/28/2005	-0.32	3.62	-3.18
3/1/2005	-0.87	2.54	-1.79
3/2/2005	-0.18	0.02	-3.74
3/3/2005	0.49	0.69	-3.43
3/4/2005	-0.14	1.1	-2.55
3/5/2005	-0.25	1.87	-2.65
3/6/2005	1.1	2	-3.12
3/7/2005	0.66	2.31	-3.1
3/8/2005	-0.13	2.95	-4.19
3/9/2005	-0.47		
3/10/2005	-0.65	-1.4	
3/11/2005	-0.42	2.89	-3.06
3/12/2005	-0.45	2.56	-3.21
3/13/2005	-1.23	2.89	-3.11
3/14/2005	-0.35	1.8	-3.02
3/15/2005	0.41	0.75	-2.95
3/16/2005	-0.31	1.68	-2.19
3/17/2005	-0.7	1.64	-1.7
3/18/2005	-0.64	1.61	-1.65
3/19/2005	-0.05	1.55	-1.78
3/20/2005	-0.33	1.53	-1.63
3/21/2005	-0.05	1.79	-2.1
3/22/2005	0.52	1.98	-2.05
3/23/2005	0.63	2.93	-2.41
3/24/2005	-0.39	3.05	-1.34

3/25/2005	-1.41	2.62	-2.22
3/26/2005	-0.58	2.69	-2.72
3/27/2005	-0.51	2.88	-2.47
3/28/2005	-1.03	3.53	-2.1
3/29/2005	-0.51	2.88	-1.83
3/30/2005	-0.49	2.73	-2.19
3/31/2005	-0.58	1.58	-1.98
4/1/2005	0.07	2.9	-1.88
4/2/2005	0.55	3.1	-0.84
4/3/2005	-0.35		-1.43
4/4/2005	-0.26	2.32	-2.81
4/5/2005	-0.04	2.39	-3.06
4/6/2005	-0.08	2.52	-3.07
4/7/2005	-0.26	2.53	-3.3
4/8/2005	0.37	2.92	-3.6
4/9/2005	0.17	3.08	-3.17
4/10/2005	-0.29	2.76	-2.85
4/11/2005	-0.3	2.72	-2.86
4/12/2005	0.53	2.3	-2.51
4/13/2005	0.44	2.46	-2.44
4/14/2005	-0.74	0.81	-2.05
4/15/2005	-0.39	2.15	-0.61
4/16/2005	-0.38	2.3	-1.3
4/17/2005	-0.13	1.44	-1.96
4/18/2005	0.3	1.21	-1.95
4/19/2005	0.84	1.54	-2.13
4/20/2005	0.59	1.62	-2.42
4/21/2005	-0.41	2.14	-2.57
4/22/2005	0.26	2.66	-2.24
4/23/2005	0.57	3.14	-2.26
4/24/2005	0.21	3.14	-2.48
4/25/2005	-0.15	3	-3
4/26/2005	0.14	3.15	-3.14
4/27/2005		3.39	-2.42
4/28/2005		3.01	-2.62
4/29/2005	-0.09	1.61	-2.25
4/30/2005	0.62	2.88	-2.29
5/1/2005	0.99	2.41	-2.53
5/2/2005	0.61	2.09	-2.68
5/3/2005	0.34	2.27	-2.78
5/4/2005	0.43	2.07	-3.12
5/5/2005	0.17		-3.1
5/6/2005	0.27	3.37	-2.7
5/7/2005	0.19	3.71	-1.5
5/8/2005	-0.56	3.48	-2.28
5/9/2005	-0.85	3.34	-2.29
5/10/2005	-0.66	2.8	-2.19
5/11/2005	-0.12	2.37	-2.27
5/12/2005	-0.51	2.12	-2.3
5/13/2005	-0.49	1.82	-2.24
5/14/2005	-0.44	0.48	-2.27
5/15/2005	-0.8	1.78	-1.66
5/16/2005	-0.72	2.17	-1.55
5/17/2005	-0.76	1.85	-1.84
5/18/2005	0.11	1.64	-1.93
5/19/2005	0.35	2.03	-1.99
5/20/2005	0.05	2.9	-1.25
5/21/2005	0.39	3.38	-1.59
5/22/2005	0.74	3.33	-2.31
5/23/2005	-0.04	3.82	-2.28
5/24/2005	-0.76	4.46	-2.03
5/25/2005	0.19	4.62	-1.25
5/26/2005	0.98	3.73	-1.76
5/27/2005	-1.49	3.11	-2.47
5/28/2005	-1.32	1.89	-2.35
5/29/2005	-0.8	2.94	-2.41

5/30/2005	-0.51	2.66	-2.4
5/31/2005	-0.53	2.4	-2.44
6/1/2005	-0.22	2.2	-2.33
6/2/2005	-0.24	2.29	-2.65
6/3/2005	-1.89	2.74	-2.39
6/4/2005	-0.93	2.81	-2.42
6/5/2005	0.07	2.88	-2.45
6/6/2005	-0.07	2.95	-2.35
6/7/2005	0.16		
6/8/2005	-0.32	1.71	
6/9/2005	-0.81	2.51	-2.24
6/10/2005	-0.42	2.11	-2.16
6/11/2005	-0.14		
6/12/2005	-0.18		
6/13/2005	-0.22	1.1	-2.08
6/14/2005	-0.09		0.99A
6/15/2005	-0.12	2.32	-1.34
6/16/2005	-0.1	2.62	-1.21
6/17/2005	0.79	2.51	-1.68
6/18/2005	1.23	2.65	-2.1
6/19/2005	0.44	3.33	-2.09
6/20/2005	0.19	3.25	-2.35
6/21/2005	0.26	3.25	-2.98
6/22/2005	0.83	3.57	-3.24
6/23/2005	0.72	3.5	-2.86
6/24/2005	0.18	3.12	-3.07
6/25/2005	0.2		
6/26/2005	0.38		
6/27/2005	1.34	2.17	-2.67
6/28/2005	0.57		0.05A
6/29/2005	-0.15	1.93	-2.84
6/30/2005	-0.17	2.22	-2.74
7/1/2005	-0.11	2.74	-1.95
7/2/2005	-0.17	2.69	-2.06
7/3/2005	-0.11	2.81	-1.98
7/4/2005	0.2	2.78	-2.08
7/5/2005	0.12	2.71	-2.31
7/6/2005	0.19	2.89	-2.13
7/7/2005	0	3.21	-1.87
7/8/2005	0.03	2.97	-1.72
7/9/2005	-0.05	2.17	-2.11
7/10/2005	1.15	2.21	-2.19
7/11/2005	0.51	2.03	-1.95
7/12/2005	-0.2		
7/13/2005	-0.29	2.33	-1.85
7/14/2005	-0.17	1.99	-1.74
7/15/2005	-0.22	2.04	-1.87
7/16/2005	-0.07	2.36	-1.96
7/17/2005	0.32	2.75	-2.06
7/18/2005	0.44	2.97	-2.51
7/19/2005	0.42	3.24	-2.74
7/20/2005	-0.02	-0.3	
7/21/2005	-0.08	3.64	-3.06
7/22/2005	0.33	3.7	-3.05
7/23/2005	0.14	3.52	-3.09
7/24/2005	0.14	2.99	-3.07
7/25/2005	0.08	2.38	-3.27
7/26/2005	-0.11	2.51	-2.97
7/27/2005	-0.13	2.31	-2.6
7/28/2005	-0.12	2.56	-1.96
7/29/2005	-0.23	2.1	-2.21
7/30/2005	-0.3	2.04	-2.11
7/31/2005	0.37	2.3	-1.99
8/1/2005	1.4	2.39	-2.1
8/2/2005	0.57	2.46	-2.48
8/3/2005	0.6	2.65	-2.2

8/4/2005	0.37	2.62	-2.3
8/5/2005	-0.08	2.39	-2.44
8/6/2005	-0.19	2.42	-2.5
8/7/2005	-0.2	2.41	-2.26
8/8/2005	-0.46	2.2	-2.13
8/9/2005	0.04	2.24	-2.18
8/10/2005	0.25	2.04	-1.89
8/11/2005	0.08		
8/12/2005	0.07	2.07	-2.04
8/13/2005	0.17	2.01	-2.26
8/14/2005	1.03	2.22	-2.39
8/15/2005	0.95	2.78	-2.38
8/16/2005	0.58	3.38	-1.98
8/17/2005	0.64	3.28	-2.67
8/18/2005	1.04	3.72	-2.72
8/19/2005	1.64	3.76	-2.94
8/20/2005	1.29	3.58	-2.97
8/21/2005	0.43	3.15	-3.15
8/22/2005	0.24	2.78	-3.02
8/23/2005	0.16	2.88	-2.69
8/24/2005	0.26	2.71	-2.49
8/25/2005	0.2		
8/26/2005	0.22		
8/27/2005	0.1		
8/28/2005	0.29		
8/29/2005	0.29		
8/30/2005	0.14		-1.4
8/31/2005	0.16	2.24	-1.9
9/1/2005	-0.02	2.39	-2.52
9/2/2005	-0.17	2.41	-2.27
9/3/2005	-0.07		
9/4/2005	-0.2		
9/5/2005	-0.42		
9/6/2005	-0.29		
9/7/2005	-0.17		
9/8/2005	0.2		
9/9/2005	0.76		
9/10/2005	0.88		
9/11/2005	0.56		
9/12/2005	0.33		-1.98
9/13/2005	0.55	2.51	-2.75
9/14/2005	0.41	3.24	-2.31
9/15/2005	0	3.46	-2.36
9/16/2005	-0.08	3.66	-2.6
9/17/2005	0.19	3.45	-2.95
9/18/2005	-0.1	3.09	-3.12
9/19/2005	-0.32		
9/20/2005	-0.24	1.48	
9/21/2005	0.18	2.8	-3.3
9/22/2005	0.02	2.65	-2.62
9/23/2005	-0.2	2.18	-2.59
9/24/2005	0	2.94	-1.1
9/25/2005	0.46	1.93	-1.68
9/26/2005	0.3	1.84	-1.9
9/27/2005	0.3	1.93	-2.11
9/28/2005	0.21	2.35	-1.54
9/29/2005	0.04	1.69	-2.23
9/30/2005	0.14	2.13	-1.98
10/1/2005	0.53	2.29	-2.48
10/2/2005	0.87	1.93	-2.68
10/3/2005	0.23	2	-2.72
10/4/2005	-0.2	2.3	-2.64
10/5/2005	-0.01	2.37	-2.62
10/6/2005	0.34	2.37	-2.57
10/7/2005	0.35	2.74	-2.2
10/8/2005	0.22	2.8	-1.94

10/9/2005	0.09	2.57	-2.26
10/10/2005	0.18	3.13	-1.37
10/11/2005	0.29	2.95	-1.24
10/12/2005	0.18	4.02	-0.28
10/13/2005	0.15	4.32	-0.21
10/14/2005	0.2	3.69	-1.81
10/15/2005	0.17	3.57	-1.74
10/16/2005	0.32	2.7	-3.68
10/17/2005	0.33	1.95	-4.43
10/18/2005	0.22	2.93	-3.46
10/19/2005	-0.18	2.93	-3.19
10/20/2005	0.01	2.81	-2.99
10/21/2005	0.02	2.84	-2.18
10/22/2005	0.29	3.1	-1.31
10/23/2005	0.07	2.03	-2
10/24/2005	-0.09	2.88	-1.45
10/25/2005	0.03	3.93	0.52A
10/26/2005	0.09	2.22	-1.86
10/27/2005	-0.13	1.62	-2.01
10/28/2005	0.04	2.18	-1.53
10/29/2005	-0.01	2.17	-2
10/30/2005	-0.13	1.96	-2.22
10/31/2005	-0.14	2.4	-2.41
11/1/2005	0.01	2.36	-2.85
11/2/2005	0.02	2.63	-3.07
11/3/2005	-0.04	2.75	-3.23
11/4/2005	0.19	2.4	-3.74
11/5/2005	-0.05	2.96	-2.85
11/6/2005	-0.06	2.73	-2.09
11/7/2005	-0.21	2.37	-2.44
11/8/2005	-0.15		
11/9/2005	0.18		0.40A
11/10/2005	0.68	2.36	-2.96
11/11/2005	0.38	2	-2.87
11/12/2005	0.35	2.14	-3.19
11/13/2005	0.47	2.18	-3.42
11/14/2005	0.44	2.31	-3.61
11/15/2005	0.28	3.01	-3.28
11/16/2005	0.22	2.85	-3.12
11/17/2005	0.29	2.63	-3.74
11/18/2005	0.26	2.39	-3.23
11/19/2005	0.18	2.43	-2.61
11/20/2005	0.06	1.84	-2.73
11/21/2005	0.21	1.76	-2.56
11/22/2005	0.28	2.51	-1.33
11/23/2005	0.19	1.1	-2.51
11/24/2005	0.29	1.49	-2.98
11/25/2005	0.19	0.59	-2.49
11/26/2005	-0.03	1.1	-2.42
11/27/2005	0.01	1.76	-2.18
11/28/2005	-0.01	2.08	-2.34
11/29/2005	0.05	2.6	-2
11/30/2005	0.21	2.75	-2.67
12/1/2005	0.32	3.38	-2.68
12/2/2005	0.05	2.84	-4.08
12/3/2005	-0.05	1.88	-4.47
12/4/2005	0.04	2.95	-3.36
12/5/2005	0.15	2.67	-2.89
12/6/2005	0.01	2.6	-2.9
12/7/2005	-0.43	1.27	-4.1
12/8/2005	-0.28	1.17	-3.61
12/9/2005	0.62	2.09	-3.71
12/10/2005	0.44	1.14	-3.43
12/11/2005	0.63	2.1	-2.58
12/12/2005	0.66	1.98	-2.98
12/13/2005	0.44	2.59	-2.55

12/14/2005	0.08	2.96	-2.59
12/15/2005	-0.15	2.79	-2.58
12/16/2005	-0.18	2.72	-2.79
12/17/2005	-0.09	1.95	-3.3
12/18/2005	-0.27	1.97	-2.96
12/19/2005	0.78	1.89	-3.04
12/20/2005	0.11	1.34	-2.88
12/21/2005	-0.09	1.37	-2.64
12/22/2005	-0.35	1.22	-2.65
12/23/2005	0.36	0.43	-2.95
12/24/2005	0.04	0.84	-2.45
12/25/2005	0.01	1.71	-1.41
12/26/2005	-0.09	2.24	-2.72
12/27/2005	-0.29	1.23	-2.78
12/28/2005	-0.25	2.38	-2.25
12/29/2005	-0.11	3.31	-2.11
12/30/2005	-0.18	2.84	-3.23
12/31/2005	-0.13	3.41	-3.16
1/1/2006	0.14	3.36	-3.16
1/2/2006	0.25	3.23	-3.3
1/3/2006	0.07	4	-2.21
1/4/2006	0.77	3.7	-1.74
1/5/2006	0.82	3	-2.29
1/6/2006	2.05	2.37	-2.29
1/7/2006	2.44	2.17	-2.68
1/8/2006	2.03	1.76	-2.8
1/9/2006	1.17	2.05	-2.96
1/10/2006	-0.24	1.74	-3.25
1/11/2006	-0.85	1.75	-3.13
1/12/2006	-0.17	1.85	-2.99
1/13/2006	-0.17	2.34	-3.21
1/14/2006	-0.04	3.33	-2.29
1/15/2006	0.22	2.1	-2.62
1/16/2006	0.86	2.45	-2.8
1/17/2006	-0.1	2.05	-3.29
1/18/2006	0.96	2.32	-3.41
1/19/2006	3.14	0.14	-4.04
1/20/2006	0.59	0.21	-3.65
1/21/2006	-0.27	0.85	-2.91
1/22/2006	0.33	0.39	-2.91
1/23/2006	0.42	1.22	-2.3
1/24/2006	-0.06	1.94	-1.79
1/25/2006	0.01	2.41	-3.52
1/26/2006	-0.17	1.43	-2.71
1/27/2006	-0.11	2.75	-3.49
1/28/2006	-0.46	2.28	-4.11
1/29/2006	-0.68	2.93	-4.24
1/30/2006	0.1	0.19	
1/31/2006	0.08	4.47	-2.55
2/1/2006	-0.26	3.46	-2.59
2/2/2006	-0.47	3.29	-2.27
2/3/2006	0.24	2.7	-2.45
2/4/2006	0.01	2.83	-1.98
2/5/2006	-0.25	3.15	-2.5
2/6/2006	-0.17	1.17	-3.72
2/7/2006	-0.34	0.18	-3.32
2/8/2006	-0.45	1.66	-2.41
2/9/2006	0.13		
2/10/2006	-0.09		
2/11/2006	-0.48		
2/12/2006	-0.48		
2/13/2006	-0.3	-1.6	
2/14/2006	-0.7	0.79	-3.76
2/15/2006	-0.3	1.32	-3.61
2/16/2006	0.85	1.61	-2.99
2/17/2006	-0.59	1.11	-4.19

2/18/2006	-0.37	0.64	-4.18
2/19/2006	-0.99	0.09	-3.37
2/20/2006	-0.47	0.77	-2.91
2/21/2006	-0.22	1.42	-2.43
2/22/2006	0.06	1.65	-2.2
2/23/2006	0.37	2.27	-2.27
2/24/2006	0.12	2.27	-3.6
2/25/2006	0.52	2.08	-3.62
2/26/2006	-0.68	2.82	-2.84
2/27/2006	-1.4	2.76	-4.11
2/28/2006	-0.33	2.59	-4.37
3/1/2006	-0.15	2.58	-4.21
3/2/2006	-0.12	2.95	-3.75
3/3/2006	-1.24	2.3	-3.43
3/4/2006	-1.18	1.62	-3.73
3/5/2006	-0.52	1	-2.83
3/6/2006	-0.89	1.99	-2.28
3/7/2006	-0.12	1.99	-1.93
3/8/2006	-0.37	1.72	-2.06
3/9/2006	-0.06	1.78	-1.94
3/10/2006	0.17	1.92	-2.8
3/11/2006	0.28	1.66	-2.92
3/12/2006	0.45	1.8	-2.65
3/13/2006	-0.75	1.99	-2.78
3/14/2006	-0.61	2.14	-2.85
3/15/2006	-0.74	0.87	-3.85
3/16/2006	-1.03	1.58	-3.94
3/17/2006	-0.8	1.96	-2.87
3/18/2006	-0.78	1.7	-2.89
3/19/2006	-1.18	1.82	-3.04
3/20/2006	-0.68	0.98	-2.56
3/21/2006	0.28	1.97	-2.33
3/22/2006	-0.03	1.82	-2.06
3/23/2006	-0.68	1.68	-2.33
3/24/2006	0.02	1.78	-1.87
3/25/2006	0.52	2.72	-1.79
3/26/2006	-0.11	2.99	-2.8
3/27/2006	0.14	2.85	-2.87
3/28/2006	0.11	2.88	-3.37
3/29/2006	0.11	2.82	-3.6
3/30/2006	1.52	2.62	-3.89
3/31/2006	1.39	2.66	-3.91
4/1/2006	0.56	2.28	-3.68
4/2/2006	0.26	2.27	-3.21
4/3/2006	-0.15	1.31	-2.56
4/4/2006	-0.59	2.34	-2.57
4/5/2006	-0.55	2.01	-2.14
4/6/2006	-0.75	1.78	-2.1
4/7/2006	-0.57	1.74	-2.24
4/8/2006	-0.71	1.68	-1.83
4/9/2006	-0.35	2.22	-2.13
4/10/2006	0.49	1.61	-2.3
4/11/2006	-0.03	1.49	-2.84
4/12/2006	-0.33	1.64	-3.18
4/13/2006	-0.4	1.69	-3.33
4/14/2006	-0.16	2.31	-3.16
4/15/2006	-1.88	2.66	-2.75
4/16/2006	-1.45	2.53	-2.51
4/17/2006	-0.99	2.58	-2.38
4/18/2006	-1.03	2.37	-2.33
4/19/2006	-0.35	1.31	-1.93
4/20/2006	0.01	2.25	-2.11
4/21/2006	-0.51	2.32	-1.9
4/22/2006	-0.58	2.72	-1.53
4/23/2006	-0.03	2.67	-2.37
4/24/2006	-0.89	2.62	-3.03

4/25/2006	-0.23	2.72	-3.06
4/26/2006	0.32	2.98	-3.36
4/27/2006	1.24	2.99	-3.35
4/28/2006	0.88	3.27	-3.45
4/29/2006	0.8	3.03	-3.4
4/30/2006	0.63	3.09	-2.78
5/1/2006	0.75	3.44	-1.91
5/2/2006	0.23	2.53	-1.32
5/3/2006	-1.46	1.16	-1.92
5/4/2006	-1.37	2.36	-1.53
5/5/2006	-0.43	2.05	-1.53
5/6/2006	-0.35	1.83	-1.66
5/7/2006	-0.64	1.73	-1.66
5/8/2006	0	1.85	-1.67
5/9/2006	2.01	2.41	-1.66
5/10/2006	-0.27	2.53	-1.8
5/11/2006	-1.38	3.13	-2.04
5/12/2006	-0.86	3.17	-1.96
5/13/2006	-0.7	3.23	-1.97
5/14/2006	-1.14	3.24	-1.77
5/15/2006	-1.55	3.1	-2.24
5/16/2006	-1.46	2.82	-2.41
5/17/2006	-1.02	2.88	-2.49
5/18/2006	-0.72	1.6	-2.08
5/19/2006	-0.44	2.97	-1.97
5/20/2006	-0.03	2.52	-2.45
5/21/2006	-0.78	2.53	-2.53
5/22/2006	-0.45	2.06	-3
5/23/2006	-0.21	2.38	-2.98
5/24/2006	-0.54	2.62	-3.08
5/25/2006	-0.49	3.21	-2.94
5/26/2006	-0.44	3.35	-2.88
5/27/2006	0.15	3.1	-2.84
5/28/2006	-0.23	2.84	-2.91
5/29/2006	-1.09	2.57	-2.75
5/30/2006	-0.57		
5/31/2006	-0.39		
6/1/2006	-0.12		
6/2/2006	-0.29	1.05	-2.08
6/3/2006	-0.13	1.96	-1.65
6/4/2006	-0.42	1.82	-1.55
6/5/2006	-0.65	1.59	-1.84
6/6/2006	-0.51	2.06	-1.73
6/7/2006	-0.32	2.82	-1.17
6/8/2006	-0.44	2.71	-1.59
6/9/2006	-1.3	2.86	-2.02
6/10/2006	-1.19	2.69	-2.56
6/11/2006	-0.32	2.75	-3.03
6/12/2006	-0.47	2.97	-2.78
6/13/2006	-0.68	2.97	-2.86
6/14/2006	-0.58	3.32	-2.86
6/15/2006	-0.47	2.89	-2.75
6/16/2006	-0.42	2.36	-2.67
6/17/2006	-0.58	2.36	-3.08
6/18/2006	-0.1	2.11	-3.23
6/19/2006	0.58	1.78	-3.24
6/20/2006	0.47	2.22	-3
6/21/2006	0.28	2.39	-2.85
6/22/2006	0.16	2.49	-2.89
6/23/2006	-0.02	2.7	-3.19
6/24/2006	-0.34	2.78	-2.99
6/25/2006	-0.51	2.88	-2.77
6/26/2006	-0.65	2.78	-2.64
6/27/2006	-0.69	2.69	-2.61
6/28/2006	-0.17		
6/29/2006	-0.37	2.24	

6/30/2006	-0.25	1.84	-2.38
7/1/2006	-0.41	1	-2.38
7/2/2006	-0.24	1.45	-2.51
7/3/2006	0.1	1.01	-2.66
7/4/2006	0.39	1.56	-2.16
7/5/2006	-0.26	1.66	-2.18
7/6/2006	-0.56	2.2	-1.93
7/7/2006	-0.73	2.34	-2.48
7/8/2006	-0.77	2.56	-2.66
7/9/2006	-0.53	2.52	-2.86
7/10/2006	-0.15	2.71	-3.43
7/11/2006	-0.1	2.72	-3.47
7/12/2006	0.05	2.7	-3.56
7/13/2006	-0.18	2.89	-3.5
7/14/2006	-0.05	2.92	-3.03
7/15/2006	-0.09	2.63	-3
7/16/2006	0.32	2.24	-2.86
7/17/2006	0.82	2.39	-2.74
7/18/2006	0.39	2.24	-2.7
7/19/2006	0.33	2.36	-2.77
7/20/2006	0.01	3.05	-1.95
7/21/2006	0.15	2.32	-2.7
7/22/2006	-0.12	2.51	-2.34
7/23/2006	0.1	2.79	-2.87
7/24/2006	-0.09	2.59	-2.57
7/25/2006	0.28	2.55	-2.69
7/26/2006	0.82	2.65	-2.51
7/27/2006	0.79	2.28	-2.43
7/28/2006	0.1	2.13	-2.4
7/29/2006	0.26	1.86	-2.63
7/30/2006	0.11	1.93	-2.16
7/31/2006	0.1	1.93	-1.75
8/1/2006	0.12	1.77	-1.9
8/2/2006	0.33	1.8	-1.9
8/3/2006	0.6	1.83	-1.94
8/4/2006	0.52	2.34	-1.63
8/5/2006	0.52	2.61	-1.89
8/6/2006	0.59	2.92	-2.21
8/7/2006	0.51	2.93	-2.74
8/8/2006	0.72	3.21	-3.12
8/9/2006	0.57	3.41	-3.03
8/10/2006	0.17	3.24	-3.33
8/11/2006	-0.03	3.43	-3.38
8/12/2006	0.2	2.85	-3.14
8/13/2006	0.3	2.6	-3.15
8/14/2006	0.07	2.32	-3.21
8/15/2006	0.14	1.8	-3.51
8/16/2006	-0.13	2.26	-2.5
8/17/2006	-0.14		-1.41
8/18/2006	-0.12	2.18	-2.27
8/19/2006	0.02	2.39	-2.31
8/20/2006	0.13	2.33	-2.58
8/21/2006	0.05	2.56	-2.31
8/22/2006	-0.12	2.49	-2.43
8/23/2006	-0.25	2.52	-2.62
8/24/2006	-0.38	2.48	-2.3
8/25/2006	-0.27	2.18	-2.45
8/26/2006	-0.41	2.68	-1.84
8/27/2006	-0.28	2.18	-1.95
8/28/2006	0.06	1.87	-1.96
8/29/2006	0.15	2.56	-1.5
8/30/2006	0.05	2.92	-0.95
8/31/2006	0.27	2.72	-0.93
9/1/2006	1.04	3.6	-0.56
9/2/2006	0.6	3.45	-0.51
9/3/2006	0.35	2.9	-1.68

9/4/2006	0	2.83	-2.21
9/5/2006	-0.37	3.53	-2.26
9/6/2006	-0.11	3.45	-2.52
9/7/2006	-0.17	3.41	-3.14
9/8/2006	-0.19	3.15	-3.24
9/9/2006	-0.07	3	-3.33
9/10/2006	-0.14	3.17	-3.22
9/11/2006	-0.32	3.62	-2.05
9/12/2006	-0.44	3.59	-1.51
9/13/2006	-0.42	3.12	-1.55
9/14/2006	-0.26	2.78	-1.76
9/15/2006	-0.1	2.81	-1.57
9/16/2006	-0.12	2.54	-1.35
9/17/2006	-0.27	2.66	-1.5
9/18/2006	-0.29	2.66	-1.77
9/19/2006	-0.13	2.62	-1.74
9/20/2006	-0.12	2.23	-1.84
9/21/2006	-0.15	2.16	-2.41
9/22/2006	-0.09	2.18	-2.43
9/23/2006	-0.2	1.99	-2.91
9/24/2006	-0.23	1.78	-2.82
9/25/2006	-0.4	2.2	-2.42
9/26/2006	-0.63	2.2	-2.16
9/27/2006	-0.56	2.46	-1.85
9/28/2006	-0.23	2.6	-1.42
9/29/2006	-0.2	2.25	-1.63
9/30/2006	0.07	2.34	-1.77
10/1/2006	-0.11	2.46	-1.9
10/2/2006	-0.26	2.27	-2.15
10/3/2006	-0.27	2.42	-2.99
10/4/2006	-0.59	2.87	-3.03
10/5/2006	-0.51	3.43	-2.68
10/6/2006	-0.55	4.4	-2.47
10/7/2006	-0.45	4.77	-1.42
10/8/2006	-0.07	3.62	-3.01
10/9/2006	-0.04	3.3	-3.03
10/10/2006	0.05	3.24	-2.76
10/11/2006	0.07	3.76	-1.73
10/12/2006	-0.05	3.24	-1.18
10/13/2006	0	2.92	-1.45
10/14/2006	0.62	2.46	-1.76
10/15/2006	0.12	1.77	-1.87
10/16/2006	-0.07	1.86	-1.7
10/17/2006	-0.14	2.28	-1.63
10/18/2006	-0.06	2.32	-1.93
10/19/2006	-0.16	2.42	-1.79
10/20/2006	-0.02	2.72	-1.81
10/21/2006	-0.12	1.92	-3.14
10/22/2006	-0.31	2.29	-2.95
10/23/2006	-0.4	2.6	-2.28
10/24/2006	-0.09	2.53	-2.49
10/25/2006	0.19	2.14	-2.57
10/26/2006	-0.01	2.46	-2.22
10/27/2006	-0.09	2.73	-1.59
10/28/2006	-0.07	2.72	-2.33
10/29/2006	0.28	0.25	-3.82
10/30/2006	0.35	0.51	-3.72
10/31/2006	0.24	2.04	-2.62
11/1/2006	0.04	2.55	-2.66
11/2/2006	-0.06	2.73	-3.04
11/3/2006	0.16	2.61	-3.66
11/4/2006	0.08	2.78	-3.26
11/5/2006	0.4	2.99	-3.6
11/6/2006	0.3	3.17	-3.6
11/7/2006	-0.01	3.19	-3.37
11/8/2006	-0.31	3.94	-2.41

11/9/2006	-0.64	3.47	-1.67
11/10/2006	-0.16	2.65	-2.12
11/11/2006	-0.08	2.37	-2.09
11/12/2006	-0.07	2.52	-1.44
11/13/2006	-0.09	2.87	-0.5
11/14/2006	-0.26	2.24	-1.36
11/15/2006	-0.09	1.96	-1.67
11/16/2006	-0.17	2.21	-1.95
11/17/2006	-0.13	2.05	-2.72
11/18/2006	0.06	2.15	-2.22
11/19/2006	0.04	2.58	-2.22
11/20/2006	0.51	2.68	-2.4
11/21/2006	0.42	2.51	-2.65
11/22/2006	0.08	3.84	-1.22
11/23/2006	0.53	4.21	-0.53
11/24/2006	0.97	3.32	-1.7
11/25/2006	0.86	3.08	-1.69
11/26/2006	1.9	2.49	-2.37
11/27/2006	2.43	2.02	-2.65
11/28/2006	0.97	2.16	-2.34
11/29/2006	0.25	2.29	-2.52
11/30/2006	0.49	1.99	-2.98
12/1/2006	0.59	2.01	-4.39
12/2/2006	0.28	1.4	-4.31
12/3/2006	0.26	2.49	-3.24
12/4/2006	0.14	3.05	-3.33
12/5/2006	0.36	2.89	-3.33
12/6/2006	1.14	3.11	-3.2
12/7/2006	1.18	2.64	-3.43
12/8/2006	0.75	0.98	-3.8
12/9/2006	0.52	0.83	-3.65
12/10/2006	0.69	0.6	-3.5
12/11/2006	0.85	1.02	-3.22
12/12/2006	0.54	1.5	-1.9
12/13/2006	0.4	1.61	-1.97
12/14/2006	0.33	1.28	-2.19
12/15/2006	0.31	1.57	-1.79
12/16/2006	-0.03	1.83	-2.53
12/17/2006	0.01	1.93	-2.98
12/18/2006	-0.29	1.93	-2.83
12/19/2006	-0.41	2.63	-2.91
12/20/2006	-0.14	2.84	-2.8
12/21/2006	-0.11	2.08	-4
12/22/2006	0.13	2.48	-3.73
12/23/2006	0.42	3.2	-2.41
12/24/2006	0.15	2.14	-3.48
12/25/2006	0.11	2.45	-3.2
12/26/2006	0.17	2.57	-2.48
12/27/2006	0.02	1.51	-3.01
12/28/2006	-0.07	1.45	-3.25
12/29/2006	-0.15	1.62	-2.85
12/30/2006	0.28	2.49	-3.32
12/31/2006	1.68	2.28	-2.78
1/1/2007	2.1	3.19	-2.95
1/2/2007	0.63	2.4	-3.3
1/3/2007	0.16	2.13	-3.87
1/4/2007	0.22	2.17	-4
1/5/2007	1.01	2.66	-3.4
1/6/2007	0.89	2.36	-3.06
1/7/2007	0.4	1.8	-3.09
1/8/2007	0.2		
1/9/2007	-0.03	0.93	-3.01
1/10/2007	0.05	0.6	-2.89
1/11/2007	0.43	0.69	-2.74
1/12/2007	0.32	0.87	-3.3
1/13/2007	0.35	0.73	-2.48

1/14/2007	0.28	1.71	-1.73
1/15/2007	-0.61	2.28	-2.43
1/16/2007	-0.3	1.98	-2.98
1/17/2007	0.03	2.15	-2.63
1/18/2007	-0.19	2.56	-3.37
1/19/2007	-0.41	3.04	-3.8
1/20/2007	-0.21	1.76	-4.64
1/21/2007	0.27	1.92	-4.54
1/22/2007	0.59	2.89	-3.22
1/23/2007	-1.8	2.48	-2.82
1/24/2007	-1.85	2.15	-2.64
1/25/2007	-0.5	2.37	-2.64
1/26/2007	0.05	1.67	-3.46
1/27/2007	0.29	1.69	-2.4
1/28/2007	-0.01	2.46	-2.4
1/29/2007	-0.17	2.09	-2.52
1/30/2007	-0.18	2.18	-2.53
1/31/2007	-0.23	1.68	-3.59
2/1/2007	-0.05	2.43	-3.26
2/2/2007	0.85	3.11	-2.79
2/3/2007	0.76	2.12	-3.71
2/4/2007	0.1	0.84	-4.92
2/5/2007	0.06	-0.4	-5.22
2/6/2007	0.44		
2/7/2007	1.29		
2/8/2007	0.8		
2/9/2007	0.33		
2/10/2007	0.57	0.56	-2.37
2/11/2007	-0.05		-0.57
2/12/2007	-0.04	0.63	-3.21
2/13/2007	0.2	0.99	-2.11
2/14/2007	-0.01		
2/15/2007	0.13		-4.92
2/16/2007	2.06	0.93	-4.92
2/17/2007	2.14	0.99	-5.39
2/18/2007	0.87	2.39	-4.82
2/19/2007	0.58	-0.5	
2/20/2007	-0.01	2.33	-4.77
2/21/2007	-0.45	2.61	-3.63
2/22/2007	-0.17	2.17	-2.66
2/23/2007	0.2	2.32	-2.92
2/24/2007	-0.22	1.93	-2.8
2/25/2007	-0.45	1.92	-1.84
2/26/2007	-1.24	2.59	-1.58
2/27/2007	-0.4	2.5	-2.28
2/28/2007	-0.16	2.17	-2.64
3/1/2007	-0.29	2.15	-2.56
3/2/2007	-0.22	3.22	-2.86
3/3/2007	-0.51	2.71	-2.4
3/4/2007	-1.32	1.92	-3.44
3/5/2007	-1.47	1.17	-3.94
3/6/2007	-1.58	0.46	-4.66
3/7/2007	-1.03	1.68	-3.69
3/8/2007	-0.13	0.9	-3.27
3/9/2007	-0.03	1.38	-2.65
3/10/2007	-0.35	0	-2.64
3/11/2007	-0.08	1.09	-2.64
3/12/2007	-0.35	1.09	-2.25
3/13/2007	-0.46	1	-2.37
3/14/2007	-0.53	1.39	-2.99
3/15/2007	-0.22	1.5	-2.91
3/16/2007	-0.18	3.03	-1.37
3/17/2007	-0.95	3.35	-2.52
3/18/2007	-0.43	1.84	-4.57
3/19/2007	0.36	1.91	-4.95
3/20/2007	-0.61	1.99	-5.28

3/21/2007	-0.32	2.19	-4.64
3/22/2007	0.29	1.6	-4.01
3/23/2007	-0.5	1.88	-4.22
3/24/2007	-0.72	0.52	-3.44
3/25/2007	-0.55	2.18	-2.51
3/26/2007	-0.27	1.55	-2.7
3/27/2007	-0.28	1.32	-2.54
3/28/2007	0.28	1.64	-2.77
3/29/2007	-0.47	1.36	-2.67
3/30/2007	-0.94	1.76	-2.57
3/31/2007	-0.84	1.73	-2.87
4/1/2007	-0.29	2.06	-2.75
4/2/2007	-0.45	2.4	-2.52
4/3/2007	-0.56	2.61	-2.42
4/4/2007	-0.08	2.93	-1.81
4/5/2007	-1.04	1.52	-2.68
4/6/2007	-1.03	2.1	-3.11
4/7/2007	-0.9	1.96	-2.09
4/8/2007	-1.36	0.83	-2.93
4/9/2007	-0.96	-0.6	-3.32
4/10/2007	-0.06	0.59	-2.62
4/11/2007	0.01	1.49	-2.1
4/12/2007	-0.38	2.1	-1.86
4/13/2007	-0.47	2.23	-3.51
4/14/2007	-0.21	1.76	-3.59
4/15/2007	-0.31	3.9	-2.27
4/16/2007	-1.53	2.87	-3.64
4/17/2007	-0.97	3.88	-3.56
4/18/2007	0.03	4.33	-2.77
4/19/2007	0.01	3.83	-2.25
4/20/2007	-0.1	3.22	-2.65
4/21/2007	-0.02	2.42	-2.91
4/22/2007		1.13	-2.79
4/23/2007	-0.26	2.34	-2.61
4/24/2007	0.01	1.28	-3.05
4/25/2007	-0.05	1.49	-2.24
4/26/2007	-0.3	2.25	-2.02
4/27/2007	-0.54	1.75	-2.1
4/28/2007	-0.26	2.07	-2.13
4/29/2007	0.35	2.07	-2.34
4/30/2007	-0.74	2.25	-2.41
5/1/2007	-1.81	2.43	-2.55
5/2/2007		2.58	-2.63
5/3/2007		2.12	-2.65
5/4/2007		2.05	-3
5/5/2007		2.1	-2.87
5/6/2007		2.58	-2.34
5/7/2007		1.96	-2.09
5/8/2007		0.5	-2.42
5/9/2007		1.66	-2.52
5/10/2007		1.72	-2.39
5/11/2007		1.97	-2.33
5/12/2007	-1.64	2.17	-2.59
5/13/2007	-2.18	2.52	-2.91
5/14/2007		2.53	-3.62
5/15/2007	-0.79	2.2	-4.2
5/16/2007	-1.25	2.67	-4.38
5/17/2007	-0.99	3.57	-3.72
5/18/2007	-0.41	3.77	-2.46
5/19/2007	-0.08	2.8	-2.99
5/20/2007	-0.41	2.6	-3.19
5/21/2007	-0.56	1.22	-2.91
5/22/2007	-0.08	2.22	-2.66
5/23/2007	0.48	1.74	-2.55
5/24/2007	0.18	1.45	-2.72
5/25/2007	-0.16	0.95	-2.72

5/26/2007	-0.08	1.55	-2.4
5/27/2007	0.53	1.79	-2.35
5/28/2007	0.34	1.89	-2.41
5/29/2007	-0.63	2.13	-2.37
5/30/2007	-1.43	2.29	-2.65
5/31/2007	-1.87	2.27	-2.64
6/1/2007	-0.87	2.32	-2.68
6/2/2007	-0.99	2.34	-2.85
6/3/2007	-0.84	3.42	-2.7
6/4/2007	-0.96	3.37	-1.36
6/5/2007	-1	2.83	-2.25
6/6/2007	-0.83	2.4	-2.38
6/7/2007	-0.74	1.53	-2.32
6/8/2007	-0.76	2.22	-2.49
6/9/2007	-0.72	2.47	-2.38
6/10/2007	1.36	2.76	-2.41
6/11/2007	0.75	2.79	-2.8
6/12/2007	-1.02	3.32	-2.56
6/13/2007	-1.13	4.24	-2.4
6/14/2007	-1.26	3.73	-2.06
6/15/2007	-1	3.6	-2.23
6/16/2007	-0.97	3.18	-2.73
6/17/2007	-1.35	2.94	-2.89
6/18/2007	-0.78	2.79	-2.66
6/19/2007	-0.23	2.51	-2.38
6/20/2007	-0.7	1.62	-2.29
6/21/2007	-0.58	2.32	-2.08
6/22/2007	-0.36	1.72	-2.26
6/23/2007	-0.48	1.76	-1.81
6/24/2007	-0.37	1.82	-1.91
6/25/2007	-0.35	1.77	-2.2
6/26/2007	-0.22	1.9	-2.37
6/27/2007	0.12	1.97	-2.5
6/28/2007	0.1	2.18	-2.85
6/29/2007	0.78	2.59	-3.03
6/30/2007	-0.13	2.86	-2.48
7/1/2007	-0.68	2.94	-2.49
7/2/2007	-0.06	2.62	-2.75
7/3/2007	-0.95	2.59	-2.97
7/4/2007	-1.69	2.19	-3
7/5/2007	-0.9	2.04	-3.45
7/6/2007	-0.44	1.72	-3.14
7/7/2007	0.34	2.01	-2.92
7/8/2007	-0.55	2.26	-2.64
7/9/2007	-0.61	2.57	-2.64
7/10/2007	0.96	2.72	-2.77
7/11/2007	0.26	3.15	-2.54
7/12/2007	0.65	3.09	-2.57
7/13/2007	1.07	3.01	-3.01
7/14/2007	1.06	3.03	-3
7/15/2007	0.43	2.81	-3.03
7/16/2007	-0.12	2.86	-2.96
7/17/2007	-0.29	2.65	-2.57
7/18/2007	-0.4	2.31	-2.28
7/19/2007	-0.9	2	-2.11
7/20/2007	-0.17	2	-2.18
7/21/2007	0.09	1.83	-1.89
7/22/2007	0.05	1.95	-1.82
7/23/2007	0.1	2.21	-1.39
7/24/2007	-0.03	1.79	-1.85
7/25/2007	0	2.04	-2.01
7/26/2007	-0.15	2.26	-2.09
7/27/2007	-0.06	2.75	-2.21
7/28/2007	-0.34	2.89	-2.24
7/29/2007	-0.59	2.95	-2.67
7/30/2007	-0.59	3.02	-2.61

7/31/2007	0.4	3.06	-2.68
8/1/2007	0.12	2.9	-2.81
8/2/2007	-0.45	2.33	-2.85
8/3/2007	-0.5	2.13	-3.12
8/4/2007	-0.29	2.12	-2.98
8/5/2007	-0.07	2.67	-2.63
8/6/2007	0.14	2.29	-2.54
8/7/2007	0.24	2.56	-2.27
8/8/2007	-0.08	2.68	-2.41
8/9/2007	-0.76	3.17	-2.24
8/10/2007	-0.83	3.49	-2.49
8/11/2007	-0.11	3.27	-1.83
8/12/2007	0.9	2.93	-2.63
8/13/2007	0.04	2.93	-2.67
8/14/2007	-0.34	2.86	-2.41
8/15/2007	-0.23	2.19	-2.41
8/16/2007	-0.41	2.07	-2.47
8/17/2007	-0.5	1.89	-2.56
8/18/2007	-0.66	2.03	-2.44
8/19/2007	-0.74	1.76	-2.09
8/20/2007	-0.37	1.95	-1.69
8/21/2007	-0.22	2.33	-0.98
8/22/2007	-0.26	2.18	-1.24
8/23/2007	-0.29	2.1	-1.46
8/24/2007	-0.38	2.41	-1.83
8/25/2007	-0.4	2.66	-2.08
8/26/2007	-0.33	2.86	-2.45
8/27/2007	-0.48	3.13	-2.62
8/28/2007	0.11	3.22	-2.58
8/29/2007	0.98	3.09	-2.91
8/30/2007	0.29	2.92	-2.98
8/31/2007	0.1	3.07	-2.72
9/1/2007	-0.04	3.14	-2.76
9/2/2007	0.04	2.87	-2.68
9/3/2007	0.42	2.52	-2.47
9/4/2007	0.54	2.17	-2.79
9/5/2007	0.26	2.52	-2.21
9/6/2007	0.44	2.47	-2.17
9/7/2007	0.96	2.45	-2.63
9/8/2007	1.12	2.32	-2.96
9/9/2007	0.67	2.82	-2.73
9/10/2007	0.2	2.9	-2.41
9/11/2007	-0.06	2.78	-2.42
9/12/2007	0.03	2.01	-2.71
9/13/2007	0.03	2.2	-2.61
9/14/2007	0.09	2.37	-2.2
9/15/2007	0.05	2.48	-2.08
9/16/2007	-0.04	2.04	-2.09
9/17/2007	0.09	1.98	-1.78
9/18/2007	-0.01	2.17	-1.11
9/19/2007	-0.27	1.82	-1.53
9/20/2007	-0.35	1.66	-1.78
9/21/2007	-0.49	1.97	-1.69
9/22/2007	-0.5	2.33	-2.1
9/23/2007	-0.16	2.48	-2.64
9/24/2007	0.04	2.73	-2.97
9/25/2007	0	2.5	-3.42
9/26/2007	-0.06	2.49	-3.46
9/27/2007	-0.32	2.88	-3.67
9/28/2007	-0.32	3.24	-3.19
9/29/2007	-0.64	3.13	-3.34
9/30/2007	-0.32	3.09	-3.09
10/1/2007	-0.12	2.94	-2.4
10/2/2007	-0.04	2.76	-2.14
10/3/2007	0.05	2.38	-2.13
10/4/2007	0.05	2.29	-2.03

10/5/2007	0.24	2.1	-2.1
10/6/2007	0.2	2.21	-2.17
10/7/2007	-0.06	2.7	-2.32
10/8/2007	-0.08	2.45	-2.1
10/9/2007	-0.11	3.36	-2.18
10/10/2007	-0.08	3.2	-1.39
10/11/2007	0.07	3.49	-1.64
10/12/2007	0.07	2.21	-2.19
10/13/2007	0.08	2.69	-2.06
10/14/2007	-0.1	2.41	-2.18
10/15/2007	0.01	2.33	-1.87
10/16/2007	0.16	2.09	-1.86
10/17/2007	0.6	2.12	-1.71
10/18/2007	-0.06	2.21	-1.66
10/19/2007	-0.06	2.46	-1.37
10/20/2007	-0.05	2.32	-2.15
10/21/2007	0.03	1.81	-2.73
10/22/2007	0.17	2.21	-2.94
10/23/2007	0.1	2.51	-3.19
10/24/2007	0.16	2.67	-3.3
10/25/2007	0.18	3.67	-2.77
10/26/2007	0.15	4.06	-2.29
10/27/2007	0	3.92	-3.32
10/28/2007	-0.23	3	-3.43
10/29/2007	-0.24	3.16	-3.03
10/30/2007	0.21	2.53	-3.02
10/31/2007	0.08	2.44	-2.69
11/1/2007	0.19	2.13	-2.46
11/2/2007	0.19	2.67	-1.58
11/3/2007	0.43	3.56	-0.6
11/4/2007	0.56	2.16	-2.51
11/5/2007	1.06	1.73	-2.41
11/6/2007	0.19	2.52	-2.94
11/7/2007	0.14	1.63	-2.72
11/8/2007	0.37	2.32	-2.53
11/9/2007	0.14	2.6	-2.24
11/10/2007	-0.09	2.95	-1.94
11/11/2007	-0.08	2.87	-1.68
11/12/2007	-0.11	2.32	-2.61
11/13/2007	-0.24	2.34	-2.22
11/14/2007	0.2	2.39	-2.05
11/15/2007	0.88	2.06	-1.92
11/16/2007	0.65	1.36	-2.79
11/17/2007	0.35	1.26	-2.79
11/18/2007	0.23	1.99	-1.98
11/19/2007	0.11	2.13	-1.82
11/20/2007	0.11	2.26	-2.65
11/21/2007	0.29	2.55	-2.75
11/22/2007	0.35	3.09	-3.94
11/23/2007	0.3	2.98	-3.28
11/24/2007	0.29	3.14	-3.51
11/25/2007	0.45	2.98	-3.86
11/26/2007	0.4	2.9	-3.7
11/27/2007	0.16	2.39	-3.82
11/28/2007	-0.05	1.96	-4.33
11/29/2007	-0.28	2.22	-3.07
11/30/2007	0.13	1.8	-2.94
12/1/2007	0.16	0.64	-3.68
12/2/2007	-0.07	1.49	-2.26
12/3/2007	-0.4	1.64	-3.5
12/4/2007	0.03	0.22	-3.54
12/5/2007	0.34	1.36	-2.37
12/6/2007	0.41	2.11	-2.44
12/7/2007	-0.14	2.06	-2.63
12/8/2007	-0.09	1.9	-2.89
12/9/2007	0.1	2.06	-3.09

12/10/2007	0.17	2.44	-2.82
12/11/2007	-0.06	2.57	-2.62
12/12/2007	0.16	1.92	-3.17
12/13/2007	0.53	2.62	-2.63
12/14/2007	0.2	2.51	-2.16
12/15/2007	-0.1	2.21	-2.33
12/16/2007	-0.04	3.51	-1.77
12/17/2007	0.11	0.57	-4.09
12/18/2007	0.02	0.74	-3.49
12/19/2007	0.02	1.73	-2.88
12/20/2007	-0.28	2.45	-3.02
12/21/2007	-0.21	2.95	-1.82
12/22/2007	0.05	3.71	-2.28
12/23/2007	0.26	3.53	-2.63
12/24/2007	0.07	3.11	-3.7
12/25/2007	0.13	2.35	-4.52
12/26/2007	0.28	2.94	-3.77
12/27/2007	0.3	3.49	-1.83
12/28/2007	0.2	2.31	-2.52
12/29/2007	0.16	2.17	-2.36
12/30/2007	0.03	1.57	-2.3
12/31/2007	0.04	2.51	-2.37
1/1/2008	0.26	1.33	-2.7
1/2/2008	0.46	0.96	-2.93
1/3/2008	0.75	1.46	-2.43
1/4/2008	1.14	1.63	-3.46
1/5/2008	1.06	0.75	-3.22
1/6/2008	0.26	1.49	-2.66
1/7/2008	0.29	2.31	-2.63
1/8/2008	-0.04	2.29	-2.96
1/9/2008	-0.01	2.34	-3.6
1/10/2008	-0.05	2.24	-3.34
1/11/2008	0.04	2.62	-2.99
1/12/2008	0.1	2.42	-2.79
1/13/2008	0.38	2.67	-2.1
1/14/2008	0.17	2.75	-1.85
1/15/2008	-0.32	2.16	-2.94
1/16/2008	-0.17	1.28	-3.3
1/17/2008	0.07	1.89	-1.77
1/18/2008	0.07	3.11	-2.85
1/19/2008	1.37	2.02	-2.99
1/20/2008	1.32	2.5	-4.27
1/21/2008	0.49	1.72	-3.97
1/22/2008	-0.21	2.41	-4.09
1/23/2008	-0.02	2.4	-4.08
1/24/2008	-0.36	2.64	-3.88
1/25/2008	-0.25	2.17	-3.54
1/26/2008	-0.24	2.06	-3.07
1/27/2008	0.77	2.31	-1.9
1/28/2008	2.15	2.52	-1.03
1/29/2008	0.19	2.34	-1.43
1/30/2008	-0.18	1.91	-2.49
1/31/2008	-0.06	0.47	-2.64
2/1/2008	-0.48	1.69	-1.98
2/2/2008	0	1.37	-3.1
2/3/2008	0.22	1	-2.99
2/4/2008	0.7	1.72	-2.6
2/5/2008	0.58	2.32	-2.6
2/6/2008	-0.18	2.62	-3.12
2/7/2008	-0.15	2.48	-3
2/8/2008	0.06	3.17	-2.77
2/9/2008	-0.1	2.83	-3.08
2/10/2008	-0.85	2.68	-3.19
2/11/2008	-0.9	0.36	
2/12/2008	0	0.71	-3.95
2/13/2008	0.63	2.28	-2.75

2/14/2008	0.27	2.38	-2.79
2/15/2008	0.28	1.85	-3.39
2/16/2008	0.29	1.77	-3.19
2/17/2008	-0.06	2.36	-2.77
2/18/2008	-0.15	2.62	-3.35
2/19/2008	-0.38	2.36	-3.56
2/20/2008	-0.23	1.85	-4.65
2/21/2008	-0.77	1.88	-4.01
2/22/2008	-0.98	2.31	-3.74
2/23/2008	-0.48	2.43	-2.82
2/24/2008	-0.79	2.06	-2.65
2/25/2008	-1.27	1.68	-2.79
2/26/2008	-0.29	1.56	-2.41
2/27/2008	-0.65	2.2	-2.21
2/28/2008	-1.61	0.98	-2.96
2/29/2008	-0.49	0.65	-2.05
3/1/2008	-0.06	1.27	-2.16
3/2/2008	-0.38	0.68	-2.71
3/3/2008	-0.66	1.19	-2.72
3/4/2008	-0.58	1.55	-2.69
3/5/2008	-0.19	2.15	-3.6
3/6/2008	-0.11	2.37	-3.19
3/7/2008	-0.69	2.99	-3.36
3/8/2008	-0.04	2.7	-3.21
3/9/2008	0.09		
3/10/2008	0.06	1.52	
3/11/2008	1.29	2.72	-3.77
3/12/2008	-1.91	2.09	-2.82
3/13/2008	-1.21	1.21	-2.87
3/14/2008	-0.31	2.65	-2.11
3/15/2008	-0.06	2.85	-1.93
3/16/2008	0.9	3.36	-1.77
3/17/2008	0.85	1.98	-2.23
3/18/2008	0.61	2.5	-1.81
3/19/2008	-0.31	3.12	-2.06
3/20/2008	-0.86	2.32	-2.83
3/21/2008	0.23	1.23	-4.04
3/22/2008	1.01	2.1	-4.2
3/23/2008	-0.01	2.04	-3.3
3/24/2008	0.09	1.99	-2.88
3/25/2008	-0.06	2.08	-2.75
3/26/2008	-0.07	1.56	-2.91
3/27/2008	-0.44	0.77	-2.42
3/28/2008	-0.95	1.79	-2.05
3/29/2008	-0.58	1.62	-2.01
3/30/2008	-0.84	1.24	-1.94
3/31/2008	-1.22	1.23	-2.1
4/1/2008	-0.58	1.44	-3.15
4/2/2008	-0.25	0.84	-3.31
4/3/2008	-0.43	1.49	-3.36
4/4/2008	-0.59	2.16	-3.25
4/5/2008	-0.53	2.76	-3.42
4/6/2008	-0.02	4.1	-3.27
4/7/2008	-0.06	3.97	-2.2
4/8/2008	0.37	3.27	-2.43
4/9/2008	0.82	3.01	-2.92
4/10/2008	-0.22	2.58	-2.83
4/11/2008	-0.76	1.33	-2.56
4/12/2008	0.19	2.77	-2.22
4/13/2008	0.21	2.29	-2.15
4/14/2008	-0.41	2.36	-2.35
4/15/2008	-0.51	1.74	-2.54
4/16/2008	-1.03	1.73	-2.72
4/17/2008	-0.79	2.24	-2.4
4/18/2008	-0.65	2.4	-2.45
4/19/2008	-0.23	2.54	-2.63

4/20/2008	-0.53	2.9	-2.53
4/21/2008	-0.42	2.77	-1.99
4/22/2008	0.39	2.39	-2.13
4/23/2008	0.97	2.18	-2.33
4/24/2008	0.44	2.12	-2.36
4/25/2008	-0.58	2.26	-2.08
4/26/2008	-0.95	1.48	-1.65
4/27/2008	0.36	2.56	-1.15
4/28/2008	-1.06	2.39	-1.11
4/29/2008	-0.94	2.46	-1.66
4/30/2008	-0.32	2.13	-1.99
5/1/2008	-0.06	2.02	-2.31
5/2/2008	-0.08	2.65	-2.63
5/3/2008	0.07	3.6	-2.15
5/4/2008	0.4	3.46	-2.87
5/5/2008	0.13	3.44	-3.17
5/6/2008	-0.45	3.43	-3.29
5/7/2008	-1.92	3.53	-3.26
5/8/2008		3.05	-3.38
5/9/2008	0.13	3.95	-2.79
5/10/2008	-0.13	2.39	-1.76
5/11/2008	-0.79	3	-1.82
5/12/2008	-0.6	4.79	0.62A
5/13/2008	-0.06	3.58	-1.05
5/14/2008	-0.01	2.48	-1.71
5/15/2008	-0.6	2.59	-1.82
5/16/2008	-0.96	2.96	-1.61
5/17/2008	-0.71	2.62	-1.7
5/18/2008	-0.04	2.86	-2.38
5/19/2008	0.2	2.5	-2.3
5/20/2008	-0.09	2.9	-2.35
5/21/2008	-0.51	2.89	-1.93
5/22/2008	-0.04	2.47	-2.12
5/23/2008	-0.16	2.42	-2.32
5/24/2008	-1.09	2.38	-2.14
5/25/2008	-0.58	2.15	-2.03
5/26/2008	-0.6	0.89	-2.25
5/27/2008	-1.09	1.47	-2.81
5/28/2008	-0.71	1.65	-2.21
5/29/2008	-0.56	1.49	-2.66
5/30/2008	-0.15	1.86	-3.07
5/31/2008	-0.16	2.19	-3
6/1/2008	0.38	2.94	-3.23
6/2/2008	0.18	3.16	-3.28
6/3/2008	-2.2	3.43	-3.33
6/4/2008	-1.28	3.54	-3.72
6/5/2008	-0.57	3.31	-3.23
6/6/2008	-0.23	3.12	-3.29
6/7/2008	-0.27	2.55	-3.11
6/8/2008	0.23	1.49	-3.01
6/9/2008	0.63	2.3	-2.78
6/10/2008	1.04	2.06	-2.43
6/11/2008	0.2	1.89	-2.41
6/12/2008	0.66	1.71	-2.43
6/13/2008	1	1.81	-2.47
6/14/2008	0.22	2.23	-2.22
6/15/2008	-1.05	2.65	-1.86
6/16/2008	-0.82	2.66	-1.79
6/17/2008	-0.38	2.75	-1.99
6/18/2008	-0.42	2.85	-2.04
6/19/2008	-0.19	2.82	-1.97
6/20/2008	-0.76	2.55	-2.23
6/21/2008	-0.37	2.37	-2.36
6/22/2008	-0.16	2.42	-2.39
6/23/2008	-0.33	2.27	-2.17
6/24/2008	-0.35	1.31	-2.43

6/25/2008	-0.38	1.85	-2.7
6/26/2008	-0.66		
6/27/2008	-0.97		
6/28/2008	-0.71		
6/29/2008	-0.25		
6/30/2008	0.04		
7/1/2008	0.88		
7/2/2008	1.32		
7/3/2008	0.99		
7/4/2008	0.15		
7/5/2008	-0.1		
7/6/2008	-0.03		
7/7/2008	0.17		
7/8/2008	0.16		
7/9/2008	0.22		
7/10/2008	-0.05		
7/11/2008	-0.19		
7/12/2008	0.13		
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7/15/2008	0.27		
7/16/2008	0.66		
7/17/2008	0.28		
7/18/2008	-0.08		
7/19/2008	-0.28		
7/20/2008	-0.03		
7/21/2008	0.5		
7/22/2008	0.75		
7/23/2008	0.73		
7/24/2008	0.41		
7/25/2008	0.22		
7/26/2008	0.19		
7/27/2008	0.35		
7/28/2008	0.94		
7/29/2008	0.72		
7/30/2008	0.29		
7/31/2008	0.12		
8/1/2008	0.11		
8/2/2008	-0.13		
8/3/2008	0.52		
8/4/2008	1.08		
8/5/2008	1.1		
8/6/2008	3.56		
8/7/2008	1.7		
8/8/2008	0.76		
8/9/2008	0.63		
8/10/2008	0.71		
8/11/2008	0.63		
8/12/2008	0.42		
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8/14/2008	0.2		
8/15/2008	0.35		
8/16/2008	0.02		
8/17/2008	-0.2		
8/18/2008	0.04		
8/19/2008	-0.04		
8/20/2008	-0.26		
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8/22/2008	-0.09		
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8/27/2008	0.06		
8/28/2008	-0.01		
8/29/2008	-0.04		

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9/1/2008	-0.17
9/2/2008	-0.21
9/3/2008	-0.02
9/4/2008	0.1
9/5/2008	0.06
9/6/2008	-0.15
9/7/2008	-0.19
9/8/2008	-0.08
9/9/2008	0.3
9/10/2008	0.37
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9/13/2008	0.2
9/14/2008	0.03
9/15/2008	-0.09
9/16/2008	-0.09
9/17/2008	0.04
9/18/2008	-0.21
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9/20/2008	-0.15
9/21/2008	0.15
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9/24/2008	0.15
9/25/2008	0.14
9/26/2008	-0.04
9/27/2008	-0.25
9/28/2008	-0.24
9/29/2008	0.07
9/30/2008	0.06
10/1/2008	-0.07
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10/6/2008	0.02
10/7/2008	0.14
10/8/2008	0.12
10/9/2008	0.06
10/10/2008	0.04
10/11/2008	-0.03
10/12/2008	-0.16
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10/14/2008	-0.28
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10/16/2008	0.03
10/17/2008	0.05
10/18/2008	-0.12
10/19/2008	-0.15
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10/21/2008	0.04
10/22/2008	0.25
10/23/2008	0.07
10/24/2008	0.15
10/25/2008	0.3
10/26/2008	0.32
10/27/2008	0.3
10/28/2008	0.21
10/29/2008	0.01
10/30/2008	0.12
10/31/2008	0.26
11/1/2008	0.39
11/2/2008	0.3
11/3/2008	0.2

11/4/2008	0.26
11/5/2008	0.25
11/6/2008	0.17
11/7/2008	0.12
11/8/2008	0.25
11/9/2008	0.28
11/10/2008	0.08
11/11/2008	-0.05
11/12/2008	-0.16
11/13/2008	-0.15
11/14/2008	0.16
11/15/2008	-0.19
11/16/2008	-0.17
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11/18/2008	0
11/19/2008	-0.02
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11/21/2008	0.38
11/22/2008	0.5
11/23/2008	0.61
11/24/2008	0.34
11/25/2008	0.16
11/26/2008	0.1
11/27/2008	0.19
11/28/2008	0.57
11/29/2008	0.13
11/30/2008	-0.05
12/1/2008	0.52
12/2/2008	-0.27
12/3/2008	-0.18
12/4/2008	0.04
12/5/2008	0.28
12/6/2008	0.17
12/7/2008	0.09
12/8/2008	0.07
12/9/2008	0.34
12/10/2008	0.01
12/11/2008	0.19
12/12/2008	0.3
12/13/2008	0.31
12/14/2008	1.02
12/15/2008	0.75
12/16/2008	0.19
12/17/2008	0.3
12/18/2008	1.04
12/19/2008	1.21
12/20/2008	2
12/21/2008	1.57
12/22/2008	0.8
12/23/2008	0.83
12/24/2008	0.65
12/25/2008	0.54
12/26/2008	0.72
12/27/2008	0.15
12/28/2008	-0.32
12/29/2008	-0.29
12/30/2008	-0.42
12/31/2008	0.06
1/1/2009	0.04
1/2/2009	-0.1
1/3/2009	-0.25
1/4/2009	-0.14
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1/6/2009	0.07
1/7/2009	-0.05
1/8/2009	0.43

1/9/2009	0.35
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1/12/2009	1.03
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1/26/2009	-0.63
1/27/2009	0.35
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1/30/2009	0.76
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2/1/2009	0.62
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2/3/2009	0.21
2/4/2009	-0.1
2/5/2009	-0.19
2/6/2009	-0.05
2/7/2009	0.41
2/8/2009	0.58
2/9/2009	0.65
2/10/2009	-0.58
2/11/2009	-0.84
2/12/2009	0.13
2/13/2009	0.57
2/14/2009	0.36
2/15/2009	0.12
2/16/2009	-0.58
2/17/2009	-0.97
2/18/2009	-0.44
2/19/2009	0.04
2/20/2009	-0.24
2/21/2009	0.13
2/22/2009	0
2/23/2009	-0.02
2/24/2009	0.88
2/25/2009	0.32
2/26/2009	-0.96
2/27/2009	-0.73
2/28/2009	-1.03
3/1/2009	-0.66
3/2/2009	-0.15
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3/4/2009	-1.14
3/5/2009	-0.69
3/6/2009	-0.57
3/7/2009	0.32
3/8/2009	0.35
3/9/2009	-0.5
3/10/2009	-0.42
3/11/2009	-0.69
3/12/2009	-0.82
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3/15/2009	0.07

3/16/2009	0.96
3/17/2009	1.05
3/18/2009	
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3/22/2009	-0.71
3/23/2009	-0.26
3/24/2009	-0.69
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3/26/2009	-0.89
3/27/2009	-0.35
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3/30/2009	-1.16
3/31/2009	-1.17
4/1/2009	-0.49
4/2/2009	-0.08
4/3/2009	0.6
4/4/2009	-1.36
4/5/2009	-1.47
4/6/2009	-0.37
4/7/2009	0.18
4/8/2009	0.06
4/9/2009	0.12
4/10/2009	-0.34
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4/20/2009	-0.28
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4/28/2009	
4/29/2009	-0.23
4/30/2009	0.96
5/1/2009	0.74
5/2/2009	
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5/5/2009	-0.46
5/6/2009	-0.6
5/7/2009	-0.09
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5/15/2009	0.24
5/16/2009	0.45
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5/18/2009	-1.39
5/19/2009	-0.49
5/20/2009	-1.46

5/21/2009	-1.28		
5/22/2009	-0.53		
5/23/2009	-0.54		
5/24/2009	-0.38		
5/25/2009	-0.37		
5/26/2009	1.02		
5/27/2009	1.28		
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5/30/2009			
5/31/2009	-0.92		
6/1/2009	-0.61		
6/2/2009	-0.3		
6/3/2009	0.34		
6/4/2009	0.42		
6/5/2009	0.02	3.2	-2.06
6/6/2009	-0.71	2.76	-2.14
6/7/2009	-0.59	2.74	-2.45
6/8/2009	-0.49	2.84	-2.56
6/9/2009	-0.44	2.81	-2.08
6/10/2009	-0.35	2.86	-2.07
6/11/2009	0.26	2.8	-1.76
6/12/2009	-0.31	2.42	-1.75
6/13/2009	-0.48	1.59	-1.73
6/14/2009	0.02	2.37	-1.67
6/15/2009	0.09	2.3	-1.56
6/16/2009	-0.39	2.12	-1.68
6/17/2009	-0.26	2.21	-1.8
6/18/2009	0.11	2.42	-1.92
6/19/2009	0.49	3	-2.22
6/20/2009	0.7	3.6	-2.36
6/21/2009	0.3	3.96	-2.35
6/22/2009	0.53	4.11	-2.35
6/23/2009	0.56	3.82	-2.7
6/24/2009	-0.45	3.58	-3.13
6/25/2009	-0.35	3.33	-2.96
6/26/2009	0.25	3.1	-3.02
6/27/2009	0.01	2.37	-2.71
6/28/2009	0.67	2.84	-2.31
6/29/2009	-0.35	2.68	-2.07
6/30/2009	-0.5	2.76	-1.79
7/1/2009	0.54	2.89	-1.72
7/2/2009	0.04	2.84	-1.64
7/3/2009	-0.49	2.69	-1.9
7/4/2009	-0.25	2.67	-2.07
7/5/2009	-0.23	2.71	-2.12
7/6/2009	0.31	2.79	-2.24
7/7/2009	-0.04	2.74	-2.04
7/8/2009	-0.56	2.76	-2.17
7/9/2009	-0.18	2.95	-2.2
7/10/2009	1.39	2.46	-1.94
7/11/2009	0.56	2.09	-2.21
7/12/2009	-0.21	2.09	-2.88
7/13/2009	-0.55	2.03	-2.11
7/14/2009	0.23	2.01	-2.04
7/15/2009	0.89	1.9	-2.54
7/16/2009	0.72	2.05	-2.48
7/17/2009	0.29	2.62	-2.14
7/18/2009	-0.55	2.94	-2.42
7/19/2009	-0.6	2.99	-2.81
7/20/2009	-0.39		
7/21/2009	-0.41		
7/22/2009	-0.45		
7/23/2009	-0.66		
7/24/2009	-0.41		
7/25/2009	-0.2		

7/26/2009	-0.43		
7/27/2009	-0.45		
7/28/2009	0.06		
7/29/2009	0.41		
7/30/2009	0.34		
7/31/2009	0.23	1.86	-2.56
8/1/2009	-0.11	2	-2.18
8/2/2009	0.06	2.14	-2.04
8/3/2009	0.17	2.35	-2.32
8/4/2009	-0.38	2.33	-2.36
8/5/2009	-0.42	2.31	-2.54
8/6/2009	-0.16	2.46	-2.91
8/7/2009	-0.31	2.14	-2.46
8/8/2009	-0.45	2.2	-2.71
8/9/2009	-0.54	2.12	-2.73
8/10/2009	-0.31	2.02	-2.51
8/11/2009	-0.09	2.01	-2.41
8/12/2009	0.09	2.24	-2.3
8/13/2009	-0.25	2.56	-1.8
8/14/2009	-0.54	2.16	-2.16
8/15/2009	-0.56	2.26	-2.46
8/16/2009	-0.57	2.44	-2.72
8/17/2009	-0.35	2.66	-2.96
8/18/2009	-0.12	2.89	-3.29
8/19/2009	-0.23	3.14	-3.63
8/20/2009	0.63	3.17	-3.45
8/21/2009	0.35	2.83	-3.5
8/22/2009	0.44	2.86	-3.2
8/23/2009	0.74	3.03	-2.66
8/24/2009	0.44	2.43	-2.94
8/25/2009	0.35	2.34	-2.8
8/26/2009	0.14	1.83	-2.7
8/27/2009	-0.07	2.15	-2.38
8/28/2009	0.23	2.1	-1.94
8/29/2009	0.56	2.58	-1.44
8/30/2009	0.81	2.35	-1.84
8/31/2009	0.74	2.02	-1.88
9/1/2009	0.2	2.62	-1.46
9/2/2009	0.18	2.42	-1.71
9/3/2009	0.44	2.7	-2.06
9/4/2009	0.56	2.48	-1.82
9/5/2009	0.72	2.21	-2.44
9/6/2009	0.55	2.6	-2.55
9/7/2009	0.53	2.58	-1.94
9/8/2009	0.65	2.58	-2.04
9/9/2009	0.68	2.86	-2.03
9/10/2009	0.61	3.62	-0.63
9/11/2009	0.55	3.58	-1.26
9/12/2009	0.62	2.62	-2
9/13/2009	0.66	2.84	-1.7
9/14/2009	0.73	3.02	-1.96
9/15/2009	0.97	3.2	-2.33
9/16/2009	1.07	-0.3	
9/17/2009	0.91	3.52	-1.65
9/18/2009	0.53	2.89	-3.16
9/19/2009	0.5	2.69	-3.4
9/20/2009	0.44	2.8	-3.24
9/21/2009	0.6	2.68	-2.95
9/22/2009	0.82	2.53	-2.67
9/23/2009	0.83	2.31	-2.52
9/24/2009	0.82	1.87	-2.47
9/25/2009	0.93	2.4	-1.85
9/26/2009	0.91	2.45	-1.02
9/27/2009	0.55	2.2	-1.42
9/28/2009	0.37	1.86	-1.95
9/29/2009	0.36	1.7	-2.45

9/30/2009	0.33	2.1	-1.97
10/1/2009	0.38	2.21	-2.34
10/2/2009	0.48	-1	
10/3/2009	0.57	2.36	-2.39
10/4/2009	0.5	2.47	-2.55
10/5/2009	0.13	2.37	-2.88
10/6/2009	0.08	2.65	-2.91
10/7/2009	0.35	2.54	-3.6
10/8/2009	0.23	2.05	-3.32
10/9/2009	-0.05	2.88	-2.4
10/10/2009	0.06	2.46	-2.42
10/11/2009	0.53	2.44	-2.31
10/12/2009	0.57	2.36	-2.28
10/13/2009	0.26	2.2	-2.64
10/14/2009	0.31	2.56	-2.29
10/15/2009	0.54	3.85	-1.88
10/16/2009	0.26	4.43	-0.7
10/17/2009	0.6	4.58	-0.92
10/18/2009	0.89	4.4	-0.72
10/19/2009	0.39	3.72	-2.23
10/20/2009	0.26	2.91	-2.82
10/21/2009	0.03	2.8	-2.34
10/22/2009	-0.01	2.58	-2.04
10/23/2009	0.01	2.4	-2.09
10/24/2009	0	2.7	-1.05
10/25/2009	-0.06	1.8	-1.92
10/26/2009	-0.05	1.77	-1.56
10/27/2009	0.19	2.16	-1.08
10/28/2009	0.14	2.4	-1.12
10/29/2009	0.06	2.96	-0.88
10/30/2009	0	2.54	-1.68
10/31/2009	0.16	2.58	-1.94
11/1/2009	0.07	2.48	-2.75
11/2/2009	0.02	3.44	-2.18
11/3/2009	0.05	3.84	-1.92
11/4/2009	0.13	3.29	-2.72
11/5/2009	0.14	3.33	-2.69
11/6/2009	0.38	2.89	-2.87
11/7/2009	0.74	3.19	-2.12
11/8/2009	0.26		
11/9/2009	0.08	2.2	-2.75
11/10/2009	0.07	1.8	-2.78
11/11/2009	0.05	3.21	-1.44
11/12/2009	0	4.38	0.41A
11/13/2009	0.04	4.74	0.34A
11/14/2009	0.29	4.48	-0.81
11/15/2009	0.27	3.34	-2.46
11/16/2009	0.51	2.79	-2.81
11/17/2009	0.65	3.12	-2.7
11/18/2009	0.08	3.01	-2.2
11/19/2009	0.1	2.8	-2.39
11/20/2009	-0.15	2.33	-2.2
11/21/2009	0.14	2.17	-2.18
11/22/2009		2.19	-1.62
11/23/2009		2.81	-0.48
11/24/2009	0.46	2.48	-1.08
11/25/2009	0.21	2.1	-1.22
11/26/2009	0.64	2.07	-1.29
11/27/2009	0.59	2.52	-2.43
11/28/2009	0.66	1.03	-3.74
11/29/2009	0.74	1.61	-2.72
11/30/2009	0.31	2.38	-2.91
12/1/2009	0.52	2.66	-2.86
12/2/2009	0.82	3.02	-3.24
12/3/2009	0.64	2.89	-3.48
12/4/2009	0.87	2.59	-3.85

12/5/2009	2.12	3.51	-2.98
12/6/2009	2.16	2.98	-2.88
12/7/2009	0.52	2.5	-2.71
12/8/2009	0.76	1.83	-3.17
12/9/2009	0.82	2.87	-1.77
12/10/2009	0.67	2.58	-3.74
12/11/2009	1.08	0.69	-5.03
12/12/2009	1.69	0.37	-4.42
12/13/2009	0.58	1.72	-2.71
12/14/2009	0.31	2.25	-3.51
12/15/2009	0.28	3.02	-2.6
12/16/2009	0.16	2.36	-3.16
12/17/2009	0.16		
12/18/2009	0		
12/19/2009	-0.27		
12/20/2009	0.4		
12/21/2009	0.84		
12/22/2009	0.62	1.24	-2.61
12/23/2009	0.12	1.29	-2.49
12/24/2009	0.09	1.54	-1.89
12/25/2009	0	2.1	-0.95
12/26/2009	0.08	2.69	-1.05
12/27/2009	0.26	2.8	-2.21
12/28/2009	0.31	2.33	-2.76
12/29/2009	0.16		
12/30/2009	-0.11		
12/31/2009	0.02	2.97	-3.82
1/1/2010	-0.35	3.52	-3.23
1/2/2010	-0.69	3.35	-3.51
1/3/2010	0.12	1.48	-5.49
1/4/2010	0.02	2.09	
1/5/2010	0.15	2.37	-3.19
1/6/2010	0.05	1.83	-3.15
1/7/2010	0.05	1.63	-2.97
1/8/2010	0.44	1.82	-3.26
1/9/2010	1.41	1.77	-2.68
1/10/2010	2.59		
1/11/2010	2.4		
1/12/2010	2.22		
1/13/2010	1.17		
1/14/2010	0.19	2.21	-2.78
1/15/2010	0.13	2.3	-2.94
1/16/2010	0.12	1.86	-3.31
1/17/2010	0.38	2.61	-2.9
1/18/2010	0.87	3.01	-1.6
1/19/2010	-0.01	2.86	-1.53
1/20/2010	0.2	1.92	-2.02
1/21/2010	0.75	1.8	-1.77
1/22/2010	1.23		
1/23/2010	1.71	2.53	-1.44
1/24/2010	0.93	2.19	-1.98
1/25/2010	0.52	2.45	-2.73
1/26/2010	0.12	2.66	-3.18
1/27/2010	1.28	1.9	-3.42
1/28/2010	1.09	2.6	-2.87
1/29/2010	0.33	2.26	-4.76
1/30/2010	0.37		
1/31/2010	0.2	0.16	
2/1/2010	0.39	2.42	-4.43
2/2/2010	-0.38	2.31	-4.24
2/3/2010	-0.26	2.27	-3.17
2/4/2010	-0.35	2.01	-3.15
2/5/2010	1.25	1.72	-2.84
2/6/2010	3.13	3.18	-0.4
2/7/2010	3.23	3.04	-2.14
2/8/2010		1.71	-3.26

2/9/2010	0.74	0.91	-2.7
2/10/2010	0.23	3.15	-1.18
2/11/2010	0.48	2.79	-1.54
2/12/2010	0.61	2.88	-1.94
2/13/2010	0.36	2.65	-2.17
2/14/2010	0.12	1.74	-2.97
2/15/2010	-0.04	1.64	-3.4
2/16/2010	0.48	2.09	-2.91
2/17/2010	1.45	1.6	-3.04
2/18/2010	1.25	1.36	-3.05
2/19/2010	0.79	0.82	-3.58
2/20/2010	0.79	0.78	-2.9
2/21/2010	0.61	1.42	-2.78
2/22/2010	-1.3	1.51	-1.87
2/23/2010	-0.37	2.67	-1.24
2/24/2010	-0.1	3	-1.69
2/25/2010	0.01	3.1	-3.08
2/26/2010	0.09	1.91	-4.03
2/27/2010	0.03	3.13	-3.05
2/28/2010	-0.26	3.37	-3.21
3/1/2010	0.55	0.18	
3/2/2010	0.07	3.43	-3.17
3/3/2010	-0.07	4.15	-2.15
3/4/2010	-0.44	3.35	-1.92
3/5/2010	1.29	2.35	-1.75
3/6/2010	-0.32	3.05	-1.58
3/7/2010	-2.06	2.29	-1.98
3/8/2010	-1.85	1.88	-1.81
3/9/2010	-0.47	1.8	-1.82
3/10/2010	-0.07	1.88	-1.78
3/11/2010	0.37	2.09	-1.93
3/12/2010	-0.36	2.42	-1.49
3/13/2010	-0.67	4.2	-0.73
3/14/2010	0.06	3.82	-0.71
3/15/2010	1.9	3.26	-1.21
3/16/2010	1.35	3.32	-1.1
3/17/2010	-0.17	2.56	-2.21
3/18/2010	-0.68	2.53	-2.7
3/19/2010	-0.43	2.6	-2.42
3/20/2010	-0.05	2.32	-2.28
3/21/2010	0.81	1.2	-2.27
3/22/2010	1.63	2.25	-1.87
3/23/2010	0.7	2.69	-2.01
3/24/2010	-0.24	1.99	-2.7
3/25/2010	-1.5	2.32	-2.7
3/26/2010	-0.93	3.04	-2.25
3/27/2010	0.06	3.33	-1.8
3/28/2010	0.43	3.46	-2.61
3/29/2010	0.07	3.64	-2.86
3/30/2010	-1.34	3.26	-2.75
3/31/2010	-0.26	3.39	-3.3
4/1/2010	-0.13	3.18	-2.8
4/2/2010	-0.43	2.81	-2.49
4/3/2010	-0.49	2.5	-2.48
4/4/2010	-0.46	1.13	-2.36
4/5/2010	-0.3	2.06	-2.23
4/6/2010	-0.17	1.93	-1.72
4/7/2010	-0.41	1.79	-1.74
4/8/2010	-0.62	1.7	-1.77
4/9/2010	-0.49	1.86	-2.38
4/10/2010	-0.15	1.59	-2.8
4/11/2010	-0.36	1.36	-3.01
4/12/2010	-0.65	1.98	-3.07
4/13/2010	0.4	2.29	-2.82
4/14/2010	1.1	2.18	-3
4/15/2010	0.92	2.45	-3.39

4/16/2010	0.28	3.3	-2.59
4/17/2010	0.25	2.87	-2.1
4/18/2010	0.93	2.56	-2.23
4/19/2010	0.9	1.54	-2.45
4/20/2010	0.26	2.47	-2.28
4/21/2010	0.65	2.48	-2.14
4/22/2010	0.1	2.55	-2.09
4/23/2010	-0.42	2.39	-2.49
4/24/2010	-0.16	2.41	-2.5
4/25/2010	-0.98	3.21	-2.37
4/26/2010	-0.89	4.05	-1.98
4/27/2010	0.23	3.66	-1.98
4/28/2010	-0.68	3.04	-3.32
4/29/2010	-0.58	2.86	-3.44
4/30/2010	-0.07	3.05	-3.18
5/1/2010	-0.48	3.09	-2.86
5/2/2010	-0.38	2.64	-2.33
5/3/2010	2.25	1.04	-2.35
5/4/2010		2.16	-2.17
5/5/2010		2.11	-2.03
5/6/2010		1.82	-1.83
5/7/2010	0.93	1.63	-1.82
5/8/2010	0.85	1.5	-2.04
5/9/2010	0.57	1.04	-2.89
5/10/2010	0.29	1.69	-2.69
5/11/2010	-0.55	2.1	-2.49
5/12/2010	-0.62	2.82	-2.45
5/13/2010	-0.29	2.59	-2.9
5/14/2010	-0.46	2.84	-3.22
5/15/2010	-0.55	2.86	-2.99
5/16/2010	-1.05	2.92	-2.9
5/17/2010	-0.67	2.91	-2.89
5/18/2010	-0.69	3.39	-1.93
5/19/2010	-0.04	2.21	-2.3
5/20/2010	1.15	2.56	-2.5
5/21/2010	1	2.27	-2.71
5/22/2010	0.72	2.3	-2.4
5/23/2010	-0.47	2.6	-2.42
5/24/2010	0.48	2.58	-2.8
5/25/2010	0.58	2.72	-2.82
5/26/2010	-0.17	3.07	-2.8
5/27/2010	0.61	4	-2.71
5/28/2010	1.66	3.24	-2.39
5/29/2010	1.09	2.92	-2.51
5/30/2010	0.85	2.8	-2.5
5/31/2010	0.55	2.65	-2.41
6/1/2010	-0.12	2.17	-2.19
6/2/2010	-0.08	1.39	-2.12
6/3/2010	-0.11	2.43	-1.41
6/4/2010	0.03	2.02	-1.67
6/5/2010	0.1	2.03	-1.54
6/6/2010	0.8	1.83	-1.73
6/7/2010	2.68	1.99	-1.88
6/8/2010	1.94	2.17	-2.02
6/9/2010	1.44	2.63	-2.22
6/10/2010	1.56	3.25	-2.13
6/11/2010	0.63	3.33	-2.33
6/12/2010	-0.07	3.26	-2.71
6/13/2010	0.02	3.57	-2.86
6/14/2010	-0.03	3.5	-2.46
6/15/2010	-0.24	3.19	-2.66
6/16/2010	0.16	2.93	-2.81
6/17/2010	0.33	2.12	-2.89
6/18/2010	-0.4	2.65	-2.51
6/19/2010	0.05	2.35	-2.73
6/20/2010	0.67	2.47	-2.67

6/21/2010	1.16	2.62	-2.49
6/22/2010	0.77	2.99	-2.51
6/23/2010	0.72	2.83	-2.57
6/24/2010	0.69	2.99	-2.47
6/25/2010	0.49	2.99	-2.58
6/26/2010	0.34	2.96	-2.6
6/27/2010	0.26	2.96	-2.34
6/28/2010	0.05	2.6	-2.4
6/29/2010	-0.17	2.42	-2.39
6/30/2010	-0.14	2.18	-2.36
7/1/2010	0.01	1.7	-2.3
7/2/2010	-0.01	1.58	-2.22
7/3/2010	0.02		0.35A
7/4/2010	0.18	1.63	-2.36
7/5/2010	-0.37	1.86	-2.29
7/6/2010	-0.68	2.18	-1.87
7/7/2010	-0.34	2.44	-2.03
7/8/2010	-0.19	2.82	-2.2
7/9/2010	-0.44	3.16	-2.34
7/10/2010	-0.59	3.47	-2.63
7/11/2010	0.32	3.58	-2.78
7/12/2010	0.5	3.58	-2.96
7/13/2010	0.14	3.32	-3.13
7/14/2010	-0.03	3.1	-3.01
7/15/2010	-0.11	3.2	-2.73
7/16/2010	0.05	2.71	-2.74
7/17/2010	0.28	2.56	-2.82
7/18/2010	0.17	2.47	-2.71
7/19/2010	0.31	2.53	-2.33
7/20/2010	0.77	2.59	-2.35
7/21/2010	1.37	2.66	-2.21
7/22/2010	1.2	2.58	-2.35
7/23/2010	0.29	2.58	-2.4
7/24/2010	-0.28	2.8	-2.59
7/25/2010	0.01	2.7	-2.26
7/26/2010	0.07	2.39	-2.53
7/27/2010	0.08	2.31	-2.7
7/28/2010	-0.2	2.11	-2.59
7/29/2010	-0.08	2.06	-2.62
7/30/2010	-0.03	2.23	-2.13
7/31/2010	-0.13	1.91	-2.03
8/1/2010	-0.14	1.98	-2.03
8/2/2010	-0.16	2	-1.92
8/3/2010	-0.76	1.92	-2.02
8/4/2010	-0.51	1.95	-2.22
8/5/2010	-0.16	2.35	-2.3
8/6/2010	0.11	2.71	-2.57
8/7/2010	-0.03	3.05	-2.28
8/8/2010	-0.49	3.28	-2.94
8/9/2010	-0.25	3.42	-3.27
8/10/2010	-0.12	3.48	-3.28
8/11/2010	-0.23	3.61	-3.19
8/12/2010	0.8	3.92	-2.76
8/13/2010	0.56	3.58	-2.24
8/14/2010	0.06	3.09	-2.43
8/15/2010	-0.08	2.79	-2.41
8/16/2010	0.2	2.57	-2.19
8/17/2010	0.35	2.35	-2.32
8/18/2010	0.19	2.66	-2.06
8/19/2010	0.07	2.66	-1.73
8/20/2010	0.19	2.66	-1.74
8/21/2010	0.73	2.96	-1.74
8/22/2010	0.41	2.94	-1.94
8/23/2010	0.2	3.69	-1.49
8/24/2010	0.06	3.69	-0.55
8/25/2010	0.09	2.86	-1.46

8/26/2010	-0.06	2.51	-1.96
8/27/2010	0.08	2.33	-2.02
8/28/2010	0.36	2.26	-2.13
8/29/2010	0.23	2.09	-2.06
8/30/2010	0.28	2.3	-1.93
8/31/2010	0.23	2.3	-1.89
9/1/2010	0.21	2.3	-1.74
9/2/2010	0.05	2.51	-1.76
9/3/2010	0.16	3.46	-1.29
9/4/2010	0.44	2.8	-2.43
9/5/2010	0.31	2.83	-2.86
9/6/2010	0.18	3.62	-2.5
9/7/2010	0.23	3.13	-3.24
9/8/2010	0.46	3.27	-3.69
9/9/2010	0.3	3.11	-3.54
9/10/2010	0.07	3.37	-3
9/11/2010	0.12	3.49	-2.52
9/12/2010	0.28	3.39	-2.22
9/13/2010	0.09	3.23	-1.75
9/14/2010	0.09	2.87	-1.74
9/15/2010	0.12	2.56	-1.68
9/16/2010	0.27	2.46	-1.62
9/17/2010	0.12	2.21	-2.4
9/18/2010	0.09	2.66	-1.64
9/19/2010	0.01	2.58	-1.74
9/20/2010	0.07	3.08	-1.2
9/21/2010	0.19	2.86	-1.55
9/22/2010	0.09	1.94	-2.5
9/23/2010	0.01	2.6	-3.17
9/24/2010	0.06	2.63	-2.04
9/25/2010	-0.19	2.36	-2.65
9/26/2010	-0.18	2.96	-2.39
9/27/2010	-0.22	3.27	-1.24
9/28/2010	-0.24	2.83	-1.64
9/29/2010	-0.13	2.57	-1.77
9/30/2010	0.15	2.94	-1.19
10/1/2010	0.18	2.56	-1.92
10/2/2010	0.27	2.57	-1.79
10/3/2010	0.34	3.67	-1.2
10/4/2010	0.37	3.79	-1.3
10/5/2010	0.4	3.23	-2.24
10/6/2010	0.27	3.06	-2.74
10/7/2010	0.26	3.13	-3.14
10/8/2010	0.25	3.25	-3.62
10/9/2010	0.53	3.23	-3.64
10/10/2010	0.36	3.76	-2.43
10/11/2010	0.17	3.03	-2.67
10/12/2010	0.1	3.34	-1.85
10/13/2010	0.24	3.13	-1.38
10/14/2010	0.19	2.76	-1.25
10/15/2010	0.24	2.21	-2.61
10/16/2010	0.03	1.67	-2.57
10/17/2010	0.04	2.22	-1.74
10/18/2010	0.01	2.04	-1.74
10/19/2010	0.15	2.2	-1.52
10/20/2010	0.02	2.42	-1.76
10/21/2010	-0.21	2.57	-2.14
10/22/2010	-0.2	2.21	-2.68
10/23/2010	-0.32	1.8	-3.73
10/24/2010	0.19	2.38	-3.32
10/25/2010	0.1	2.78	-2.42
10/26/2010	0.12	2.78	-2.62
10/27/2010	0.1	2.42	-2.44
10/28/2010	-0.04	2.46	-2.5
10/29/2010	-0.14	2.36	-2.34
10/30/2010	0.02	2.12	-2.63

10/31/2010	0.09	1.54	-3.26
11/1/2010	0.36	2.23	-2.68
11/2/2010	0.25	2.25	-2.88
11/3/2010	0.17	2.62	-2.69
11/4/2010	0.17	3.65	-1.96
11/5/2010	0.43	3.95	-2.74
11/6/2010	0.78	3.3	-3.28
11/7/2010	1.09	3.32	-2.97
11/8/2010	0.66	2.72	-3.26
11/9/2010	0.36	3.32	-2.04
11/10/2010	0.22	3.3	-1.48
11/11/2010	0.04	4.1	-0.06
11/12/2010	0.27	3.62	-0.14
11/13/2010	0.37	2.73	-0.82
11/14/2010	0.32	2.31	-1.06
11/15/2010	0.51	2.27	-1.14
11/16/2010	0.52	2.03	-1.07
11/17/2010	1.23	2.37	-3.05
11/18/2010	1.78	1.06	-3.06
11/19/2010	1.05	1.84	-2.26
11/20/2010	0.45	2.34	-3.03
11/21/2010	0.26	2.28	-3.41
11/22/2010	0.22	3.04	-2.34
11/23/2010	0.07	2.9	-2.72
11/24/2010	0.11	2.65	-2.88
11/25/2010	0.2	2.8	-2.89
11/26/2010	0.23	3.08	-2.29
11/27/2010	0.22	2.06	-2.85
11/28/2010	1.04	1.99	-2.7
11/29/2010	0.69	1.88	-2.52
11/30/2010	-0.13	2.23	-2.19
12/1/2010	0.36	2.88	-3.07
12/2/2010	0.09	2.43	-2.95
12/3/2010	-0.08	2.97	-2.26
12/4/2010	0.31	3.18	-2.65
12/5/2010	0.44	3.26	-2.82
12/6/2010	0.52	2.66	-3.67
12/7/2010	0.56	1.82	-3.99
12/8/2010	0.69	2.28	-3.42
12/9/2010	0.43	2	-3.09
12/10/2010	0.29	2.02	-2.55
12/11/2010	0.36	1.96	-2.03
12/12/2010	-0.11	2.23	-1.38
12/13/2010	0.53	2.35	-2.16
12/14/2010	0.46	1.27	-2.54
12/15/2010	0.78	0.98	-2.74
12/16/2010	0.73	1.19	-2.14
12/17/2010	-0.2	2.19	-2.53
12/18/2010	-0.01	2.17	-2.22
12/19/2010	0.35	2.8	-2.03
12/20/2010	-0.12	3.23	-1.88
12/21/2010	0.48	3.2	-2.35
12/22/2010	0.94	3.9	-2.26
12/23/2010	0.52	2.9	-2.8
12/24/2010	0.32	3.58	-2.17
12/25/2010	0.77	3.27	-2.48
12/26/2010	0.65	3.35	-2.07
12/27/2010	0.5	3.25	-3.54
12/28/2010	1.43		-0.68
12/29/2010	2.23	1.16	-2.92
12/30/2010	0.94	2.46	-2.76
12/31/2010	0.58	2.2	-3.3
1/1/2011	0.19	2.33	-2.95
1/2/2011	0.02	2.59	-2.83
1/3/2011	0.13	2.62	-3.12
1/4/2011	0.65	2.68	-3.22

1/5/2011	0.2	2.16	-3.58
1/6/2011	0.56	3.01	-2.48
1/7/2011	0.71	3.37	-1.74
1/8/2011	0.68	3.14	-1.46
1/9/2011	0.22	1.18	-2.82
1/10/2011	-0.57	0.78	-2.97
1/11/2011	0.28	1.4	-2.27
1/12/2011	0.2	1.73	-3.35
1/13/2011	0.3	-0.1	-3.24
1/14/2011	0.39	1.5	-2.28
1/15/2011	0.24	1.84	-2.79
1/16/2011	-0.17	1.68	-3.05
1/17/2011	-0.93	2.16	-2.49
1/18/2011	-0.24	3.35	-1.73
1/19/2011	0.1	3.37	-2.75
1/20/2011	-0.04	2.95	-3.52
1/21/2011		2.76	-3.29
1/22/2011			
1/23/2011	-0.21		
1/24/2011	-0.34		
1/25/2011	-0.88		
1/26/2011	0.08	2.43	-2.28
1/27/2011	0.13	3.03	-2.44
1/28/2011	0.25	2.13	-2.46
1/29/2011	1.12	2.28	-2.46
1/30/2011	0.8	2.38	-2.59
1/31/2011	0.21	2.31	-2.56
2/1/2011	0.16	2.68	-2.39
2/2/2011	-0.11	3.36	-2.46
2/3/2011	0.64	1.88	-3.22
2/4/2011	1.06	2.4	-3.01
2/5/2011	2.06	1.89	-3.24
2/6/2011	1.94	1.21	-3.62
2/7/2011	1.18	2.28	-2.92
2/8/2011	0.74	1.52	-3.15
2/9/2011	0.82	0.26	-3.39
2/10/2011	0.59	0.67	-2.54
2/11/2011	0.01	1.33	-2.14
2/12/2011	-0.96	1.59	-2.81
2/13/2011	-0.26	1.03	-3.14
2/14/2011	-0.44	1.4	-3.89
2/15/2011	-0.23	1.41	-3.15
2/16/2011	0.25	2.39	-3.18
2/17/2011	-0.02	2.32	-3.8
2/18/2011	-0.24	2.92	-3.63
2/19/2011	0.13	2.44	-4.57
2/20/2011	0.51	2.86	-3.97
2/21/2011	-0.31	3.99	-2.66
2/22/2011	-0.33	2.51	-2.77
2/23/2011	-0.2	2.73	-2.72
2/24/2011	0.2	2.43	-2.42
2/25/2011	0.49	2.64	-5
2/26/2011	-0.04	1.68	-2.65
2/27/2011	0.35	2.4	-2.2
2/28/2011	0.28	3.04	-1.86
3/1/2011	0.27	2.29	-1.95
3/2/2011	-0.63	2.08	-2.74
3/3/2011	-1.14	1.92	-3.33
3/4/2011	-0.64	2.1	-2.76
3/5/2011	-0.74	2.14	-2.79
3/6/2011	-0.41	2.5	-2.63
3/7/2011	-0.24	1.8	-3.6
3/8/2011	0.59	2.12	-2.57
3/9/2011	0.3	2.76	-2.12
3/10/2011	-0.43	3.34	-0.89
3/11/2011	-0.75	1.72	-1.41

3/12/2011	-0.42	2.1	-2.21
3/13/2011	-0.1	1.38	-2.25
3/14/2011	-0.13	1.38	-2.47
3/15/2011	0.27	1.8	-2.29
3/16/2011	0.55	2.66	-3
3/17/2011	0.61	2.08	-3.46
3/18/2011	0.79	2.4	-3.69
3/19/2011	0.17	2.67	-3.97
3/20/2011	0.76	2.9	-4.16
3/21/2011	0.47	3.19	-4.01
3/22/2011	0.94	3.16	-3.46
3/23/2011	0.01	3.83	-2.74
3/24/2011		2.69	-1.88
3/25/2011	-0.71	2.73	-1.95
3/26/2011	-0.15	2.07	-2.26
3/27/2011	-0.61	1.8	-2.52
3/28/2011	-0.28	1.26	-3.03
3/29/2011	-0.14	1.27	-2.59
3/30/2011	-0.37	1.39	-2.43
3/31/2011	-0.48	2.72	-1.47
4/1/2011	-0.59	3.1	-1.47
4/2/2011	0.27	1.95	-2.77
4/3/2011	0.72	1.83	-3.62
4/4/2011	0.68	2.52	-2.97
4/5/2011	-0.72	2.22	-4.18
4/6/2011	-1.13	1.56	-3.47
4/7/2011	-0.27	2.5	-2.77
4/8/2011	-0.79	2.47	-2.04
4/9/2011		1.28	-1.88
4/10/2011		2.36	-1.95
4/11/2011	-0.42	2.01	-2.33
4/12/2011	-0.65	1.34	-2.49
4/13/2011	-0.19	2.34	-1.92
4/14/2011	0.44	2.53	-2.76
4/15/2011	0	2.64	-2.96
4/16/2011	-0.17	4.3	-2.6
4/17/2011	-0.1	3.35	-3.38
4/18/2011	-0.4	3.45	-4.18
4/19/2011		3.48	-3.88
4/20/2011		3.14	-3.17
4/21/2011		2.59	-3.2
4/22/2011	0.71	1.54	-2.87
4/23/2011	0.62	2.52	-2.16
4/24/2011	-0.18	1.97	-2.73
4/25/2011	-0.06	1.58	-2.3
4/26/2011	-0.1	1.94	-2
4/27/2011	-0.19	1.59	-2.17
4/28/2011	0.28	1.71	-2.02
4/29/2011	0.39	2.02	-2.49
4/30/2011	-0.63	2.14	-2.3
5/1/2011	-0.34	2.41	-2.48
5/2/2011	-0.43	2.53	-2.39
5/3/2011	-1.02	2.94	-2.39
5/4/2011	-0.39	2.68	-2.37
5/5/2011	-0.4	2.43	-2.82
5/6/2011	-1.55	2.58	-2.67
5/7/2011	-0.87	2.63	-2.29
5/8/2011	-0.48	1.56	-2.12
5/9/2011	-0.84	2.68	-1.85
5/10/2011	-0.99	2.76	-1.34
5/11/2011	-0.94	3.06	-1.35
5/12/2011	-0.8	3.31	-1.42
5/13/2011	-0.39	3.05	-2.2
5/14/2011	-0.42	3.51	-2.39
5/15/2011	-0.11	3.88	-2.43
5/16/2011	-0.78	3.98	-2.68

5/17/2011	-0.39	4.24	-2.68
5/18/2011	0.62	3.82	-2.43
5/19/2011	0.44	3.41	-2.59
5/20/2011	-0.13	3.11	-2.77
5/21/2011	-0.07	2	-2.46
5/22/2011	-0.26	2.85	-2.08
5/23/2011	-0.7	2.96	-1.43
5/24/2011	0.04	2.13	-2.19
5/25/2011	0.52	2.06	-1.77
5/26/2011	-0.01	2.15	-1.57
5/27/2011	-0.39	1.99	-1.8
5/28/2011	-0.42	2.16	-2.07
5/29/2011	-0.27	2.31	-2.21
5/30/2011	-0.14	2.36	-2.55
5/31/2011	0.06	2.72	-2.48
6/1/2011	-0.58	2.65	-2.47
6/2/2011	-0.3	2.47	-2.91
6/3/2011	0.33	2.74	-2.82
6/4/2011	1.11	2.84	-2.44
6/5/2011	0.65	2.89	-2.24
6/6/2011	-0.35	2.8	-2.36
6/7/2011	-0.47	2.02	-2.4
6/8/2011	-0.54	2.42	-2.63
6/9/2011	-0.15	2.45	-2.45
6/10/2011	0	2.6	-2.5
6/11/2011	-0.36	3.14	-2.28
6/12/2011	-0.3	3.49	-2.23
6/13/2011	-0.31	3.84	-2.16
6/14/2011	-0.12	3.97	-2.41
6/15/2011	-0.15	3.83	-2.43
6/16/2011	-0.06	3.6	-2.36
6/17/2011	0.72	3.44	-2.69
6/18/2011	1.08	3.22	-2.36
6/19/2011	0.28	3.21	-2.18
6/20/2011	-0.19	2.67	-1.92
6/21/2011	-0.33	1.94	-2.12
6/22/2011	-0.8	2.14	-1.91
6/23/2011	-0.5	2.04	-1.52
6/24/2011	-0.38	2.4	-1.07
6/25/2011	0.79	2.66	-1.1
6/26/2011	1.03	2.53	-1.34
6/27/2011	-0.34	2.57	-1.64
6/28/2011	-0.74	2.76	-1.78
6/29/2011	-0.01	3.02	-2.28
6/30/2011	-0.5	3.06	-2.17
7/1/2011	-0.95	3.21	-2.39
7/2/2011	-0.12	3.24	-2.55
7/3/2011	0.04	3.24	-2.7
7/4/2011	0.18	3.11	-2.65
7/5/2011	-0.09	2.78	-2.56
7/6/2011	-0.24	2.36	-2.64
7/7/2011	-0.29	2.39	-2.7
7/8/2011	0.6	2.71	-2.54
7/9/2011	0.25	2.9	-2.14
7/10/2011	0.23	2.98	-2.19
7/11/2011	1.24	3.05	-2.68
7/12/2011	0.54	3.25	-2.71
7/13/2011	-0.21	3.28	-2.57
7/14/2011	-0.15	3.75	-2.52
7/15/2011	0.14	3.18	-2.33
7/16/2011	-0.23	2.84	-2.44
7/17/2011	-0.25	2.41	-2.78
7/18/2011	-0.03	1.96	-2.93
7/19/2011	-0.48	2.46	-2.79
7/20/2011	-0.17	2.2	-1.71
7/21/2011	-0.03	2.16	-1.92

7/22/2011	-0.12	1.63	-2.34
7/23/2011	-0.23	1.81	-1.97
7/24/2011	-0.1	2.07	-1.71
7/25/2011	-0.08	2.53	-1.41
7/26/2011	-0.05	2.78	-1.5
7/27/2011	0.03	2.85	-1.67
7/28/2011	0.25	3.01	-2.04
7/29/2011	0.01	3.34	-2.48
7/30/2011	-0.36	3.27	-2.71
7/31/2011	-0.2	3.3	-2.77
8/1/2011	-0.1	2.98	-3.07
8/2/2011	0.1	3.05	-3.02
8/3/2011	0.26	3.2	-2.86
8/4/2011	0.96	3.42	-2.35
8/5/2011	1.05	2.93	-2.49
8/6/2011	1.15	2.77	-2.39
8/7/2011	0.77	2.88	-2.36
8/8/2011	0.77	3.05	-1.98
8/9/2011	0.81	3.55	-1.62
8/10/2011	0.74	3.15	-1.86
8/11/2011	0.9	3.34	-1.91
8/12/2011	0.88	2.98	-2.36
8/13/2011	0.47	2.82	-2.54
8/14/2011	0.21	2.94	-2.52
8/15/2011	0.32	2.96	-1.94
8/16/2011	0.51	2.69	-1.92
8/17/2011	0.67	2.15	-2.06
8/18/2011	0.1	2.01	-2.12
8/19/2011	0.36	2.14	-2.25
8/20/2011	0.43	2.13	-1.78
8/21/2011	0.17	2.05	-1.66
8/22/2011	0.06	2.13	-1.68
8/23/2011	0.02	2.25	-1.52
8/24/2011	-0.18	2.2	-2
8/25/2011	-0.03	2.3	-2.37
8/26/2011	-0.07	2.79	-2.6
8/27/2011	-0.37	5.15	-2.32
8/28/2011	-0.26		
8/29/2011	0.08	3.09	-3.81
8/30/2011	0.2	2.91	-3.08
8/31/2011	0.12	3.14	-3.24
9/1/2011	0.14	3.15	-2.91
9/2/2011	0.09	3.44	-2.6
9/3/2011	0.28	3.04	-2.3
9/4/2011	0.31	2.72	-2.29
9/5/2011	0.6	2.7	-2.2
9/6/2011	0.79	2.96	-2.12
9/7/2011	0.77	3.01	-1.62
9/8/2011	0.74	3.08	-1.69
9/9/2011	0.66	2.91	-1.64
9/10/2011	0.55	3.01	-2.09
9/11/2011	0.3	3.1	-2.03
9/12/2011	0.42	2.73	-1.96
9/13/2011	0.59	2.6	-2.23
9/14/2011	0.43	2.65	-2.1
9/15/2011	0.21	2.62	-2
9/16/2011	0.28	2.68	-1.85
9/17/2011	0.46	2.29	-1.77
9/18/2011	0.69	2.86	-1
9/19/2011	0.76	2.7	-0.86
9/20/2011	0.52	2.3	-1.39
9/21/2011	0.4	2.31	-1.54
9/22/2011	0.48	2.44	-1.81
9/23/2011	0.37	2.66	-2.04
9/24/2011	0.29	2.75	-2.5
9/25/2011	0.24	3.09	-2.72

9/26/2011	0.22	3.21	-2.96
9/27/2011	0.23	3.3	-3.13
9/28/2011	0.23	3.83	-2.87
9/29/2011	0.24	4.14	-2.7
9/30/2011	0.12	3.64	-2.9
10/1/2011	0.03	3.6	-2.3
10/2/2011	0.28	3.11	-2.28
10/3/2011	0.41	2.87	-2.14
10/4/2011	0.34	2.58	-1.96
10/5/2011	0.21	2.62	-1.67
10/6/2011	0.14	2.5	-2.24
10/7/2011	0.28	2.65	-1.86
10/8/2011	0.7	2.12	-2.1
10/9/2011	0.45	1.96	-2.79
10/10/2011	0.17	2.37	-2.44
10/11/2011	-0.17	2.79	-2.05
10/12/2011	-0.42	3.47	-1.22
10/13/2011	-0.13	3.76	-1.09
10/14/2011	0.35		
10/15/2011	0.06	2.18	-2.44
10/16/2011	-0.27	1.91	-2.72
10/17/2011	0.01	2.33	-2.49
10/18/2011	0.22	2.67	-1.76
10/19/2011	0.53	3.55	-0.86
10/20/2011	0.58	2.48	-2.75
10/21/2011	0.44	1.63	-2.84
10/22/2011	0.35	2.35	-2.32
10/23/2011	0.36	2.79	-2.54
10/24/2011	0.28	2.89	-2.87
10/25/2011	0.26	2.99	-3.24
10/26/2011	0.12	3.21	-3.76
10/27/2011	0.16	3.93	-3.08
10/28/2011	0.48	4.22	-2.9
10/29/2011	0.85	3.07	
10/30/2011	0.42	3.6	-3.03
10/31/2011	0.27	3.16	-2.44
11/1/2011	0.29	3.29	-1.73
11/2/2011	0.62	2.81	-1.55
11/3/2011	0.87	2.01	-1.98
11/4/2011	0.62	2.28	-1.83
11/5/2011	0.56	2.52	-1.18
11/6/2011	0.31	2.24	-2.34
11/7/2011	0.1	1.7	-2.94
11/8/2011	0.23	1.81	-2.33
11/9/2011	0.62	2.46	-2.15
11/10/2011	0.5	3.02	-1.9
11/11/2011	0.16	2.4	-2.5
11/12/2011	0	1.93	-3.45
11/13/2011	0.05	1.88	-3.61
11/14/2011	0.18	2.09	-2.79
11/15/2011	0.09	1.86	-2.66
11/16/2011	0.09	2.52	-2.11
11/17/2011	0.15	2.52	-1.92
11/18/2011	-0.02	1.71	-2.69
11/19/2011	-0.07		-1.17
11/20/2011	0.01	1.04	-3.54
11/21/2011	1.13	1.95	-2.89
11/22/2011	0.92	3.14	-2.49
11/23/2011	-0.22	3.4	-2.86
11/24/2011	0.26	3.82	-2.84
11/25/2011	0.2	-1.6	
11/26/2011	0.32	3.03	-3.64
11/27/2011	0.61	3.2	-3.27
11/28/2011	0.37	3.02	-2.9
11/29/2011	0.11	3	-2.5
11/30/2011	0.16	2.42	-2.66

12/1/2011	0.53	2.13	-2.25
12/2/2011	0.88	1.89	-2.29
12/3/2011	0.86	1.53	-1.94
12/4/2011	0.83	1.75	-2.04
12/5/2011	0.57	1.75	-2.22
12/6/2011	0.83	1.94	-2.2
12/7/2011	0.59	2.13	-1.97
12/8/2011	0.36	1.52	-3.75
12/9/2011	0.34	2	-3.18
12/10/2011	0.24	2.63	-2.88
12/11/2011	0.43	2.61	-2.89
12/12/2011	0.29	2.45	-3.04
12/13/2011	0.97	2.42	-2.88
12/14/2011	0.97	2.76	-2.2
12/15/2011	0.36	2.68	-2.32
12/16/2011	0.28	1.09	-3.11
12/17/2011	0.3	2.05	-2.79
12/18/2011	0.33	2.06	-2.32
12/19/2011	0.25	2.56	-3.44
12/20/2011	0.28	1.51	-3.21
12/21/2011	0.45	2.86	-3.33
12/22/2011	0.57	2.45	-3.41
12/23/2011	0.88	3.17	-3.27
12/24/2011	0.84	-1.7	
12/25/2011	0.47	3.37	-3.3
12/26/2011	0.71	2.72	-3.86
12/27/2011	0.41	3.25	-2.92
12/28/2011	0.3	2.5	-3.68
12/29/2011	0.32	1.36	-3.77
12/30/2011	0.41	1.26	-3
12/31/2011	0.55	1.65	-2.31
1/1/2012	0.37	1.6	-2.09
1/2/2012	0.02	1.15	-2.79
1/3/2012	-0.3	1.09	-2.3
1/4/2012	0.24	1.83	-2.23
1/5/2012	0.61	1.67	-2.4
1/6/2012	1.41	1.89	-2.76
1/7/2012	1.43	2.44	-2.3
1/8/2012	1.07	2.34	-3.04
1/9/2012	-0.29	2.6	-3.12
1/10/2012	-0.62	2.66	-3.26
1/11/2012	-0.17	2.68	-3.22
1/12/2012	0.33	3.54	-1.74
1/13/2012	1.28	1.59	-3.83
1/14/2012	0.14	0.34	-4.45
1/15/2012	-0.7	1.01	-3.63
1/16/2012	-0.04	1.82	-2.94
1/17/2012	0.33	1.08	-3.74
1/18/2012	0.45	1.47	-3.58
1/19/2012	0.11	2.51	-2.57
1/20/2012	0.03	2.23	-3.34
1/21/2012	0.57	3.1	-2.32
1/22/2012	0.78	3.5	-2.28
1/23/2012	1.64	3.32	-2.66
1/24/2012	0.61	2.78	-3.14
1/25/2012	0.17	2.27	-3.56
1/26/2012	0.83	2.29	-3.25
1/27/2012	0.81	2.48	-2.86
1/28/2012	0.16	1.36	-2.78
1/29/2012	0.45	0.94	-3.06
1/30/2012	1.06	0.67	-3.56
1/31/2012	0.18	0.89	-2.64
2/1/2012	-0.51	0.75	-2.12
2/2/2012	-0.15	1.37	-2.12
2/3/2012	0.26	2.07	-2.09
2/4/2012	0.61	2.07	-2.45

2/5/2012	-0.17	2.74	-2.35
2/6/2012	-1.04	2.52	-2.88
2/7/2012	-0.84	1.74	-3.77
2/8/2012	-0.48	3.05	-3.13
2/9/2012	-0.57	2.8	-3.12
2/10/2012	0.06	2.56	-3.56
2/11/2012	0.09	3.01	-3.17
2/12/2012	-0.68	2.11	-3.32
2/13/2012	-0.89	1.8	-3.9
2/14/2012	-1.03	1.55	-3.22
2/15/2012	-0.34	2.39	-2.5
2/16/2012	0.74	2.15	-2.52
2/17/2012	0.46	2.5	-2.76
2/18/2012	0.62	2.33	-3.28
2/19/2012	0.12	2.29	-2.77
2/20/2012	-0.28	2.97	-2.69
2/21/2012	0.01	2.63	-3.01
2/22/2012	-0.02	2.4	-3.03
2/23/2012	0.16	2.32	-3.06
2/24/2012	-0.12	2.76	-2.23
2/25/2012	-0.2	0.9	-4.72
2/26/2012	-0.05	0.64	-4.89
2/27/2012	-0.03	0.97	-2.95
2/28/2012	-0.08	0.98	-3.12
2/29/2012	-0.2	1.22	-2.07
3/1/2012	-0.13	2.33	-0.87
3/2/2012	0.02	2.24	-0.77
3/3/2012	-0.85	2.99	-1.74
3/4/2012	-0.45	2.12	-2.44
3/5/2012	-0.16	1.91	-3.44
3/6/2012	-0.1	2.02	-3.1
3/7/2012	-0.33	1.66	-4
3/8/2012	-0.34	1.95	-4.38
3/9/2012	0.18	2.45	-4.96
3/10/2012	0.09	2.48	-4.61
3/11/2012	-0.85	1.91	-3.95
3/12/2012	-0.31	2.03	-4.11
3/13/2012	0.08	2.03	-3.43
3/14/2012	-0.05	2.08	-2.9
3/15/2012	-0.73	2.3	-2.06
3/16/2012	0.13	2.58	-2.1
3/17/2012	-0.41	2.22	-2.52
3/18/2012	0.3	2.02	-2.87
3/19/2012	0.11	1.92	-2.99
3/20/2012	0.05	2.07	-3.09
3/21/2012	-0.36	1.88	-3.23
3/22/2012	0.33	2.07	-3.44
3/23/2012	-0.66	2.21	-3.22
3/24/2012	-1.08	2.84	-2.56
3/25/2012	-0.89	3.06	-1.67
3/26/2012	-0.26	2.27	-1.93
3/27/2012	-0.11	2.28	-1.8
3/28/2012	-0.89	1.16	-2.01
3/29/2012	-0.63	2.32	-1.56
3/30/2012	-0.25	2.4	-1.43
3/31/2012	-0.48	2.13	-0.99
4/1/2012	-0.54	2.74	-1.39
4/2/2012	-0.22	2.38	-1.64
4/3/2012	-0.34	2.43	-2.19
4/4/2012	-0.28		
4/5/2012	-0.38		
4/6/2012	-0.08		
4/7/2012	1.02		
4/8/2012	-0.5	2.92	
4/9/2012	-1.86	2.84	-3.69
4/10/2012	-1.1	3.07	-3.22

4/11/2012	-0.48	2.05	-2.53
4/12/2012	-1.32	2.66	-2.32
4/13/2012	-0.87	2.5	-2.27
4/14/2012	0.1	1.87	-2.74
4/15/2012	-0.31	1.64	-2.6
4/16/2012	0.42	1.9	-2.54
4/17/2012	0.73	1.92	-2.6
4/18/2012	0.49	2.22	-2.42
4/19/2012	-0.14	2.25	-2.42
4/20/2012	-0.55	2.54	-2.65
4/21/2012	-0.29	2.68	-2.44
4/22/2012	-0.12		
4/23/2012	-0.7	1.84	
4/24/2012	-1.25	2.24	-2.6
4/25/2012	-1.52	2.34	-2.22
4/26/2012	-0.95	2.6	-1.96
4/27/2012	-0.61	0.83	-2.63
4/28/2012	-0.13	1.43	-2.66
4/29/2012	0.02	1.24	-2.87
4/30/2012	-0.2	1.33	-2.19
5/1/2012	0.44	1.83	-2.66
5/2/2012	-0.26	2.48	-2.35
5/3/2012	-0.69	2.71	-2.88
5/4/2012	0.35	3.14	-3.04
5/5/2012	0.02		
5/6/2012	-0.25		
5/7/2012	0.24		
5/8/2012	-0.32		
5/9/2012	-1.18	3.26	
5/10/2012	-0.83	1.99	-2.72
5/11/2012	-0.16	2.57	-3.09
5/12/2012	-0.23	2.07	-2.79
5/13/2012	-0.14	1.71	-2.8
5/14/2012	-0.33	1.59	-2.55
5/15/2012	-0.13	1.87	-2.1
5/16/2012	0.31	2.22	-2.07
5/17/2012	0.05	2.49	-2.08
5/18/2012	-0.05	2.71	-2.23
5/19/2012	-0.06	2.78	-1.9
5/20/2012	0.75	2.74	-2.02
5/21/2012	-1.68	2.85	-2.03
5/22/2012	-2.12	2.71	-2
5/23/2012	-0.93	2.67	-2.03
5/24/2012	-0.97	2.56	-2.09
5/25/2012	-0.27	2.43	-1.97
5/26/2012	0.63	2	-2.35
5/27/2012	0.84	1.27	-2.38
5/28/2012	0.81	2.07	-2.38
5/29/2012	0.04	1.98	-2.28
5/30/2012	-0.33	2.6	-2.39
5/31/2012	-0.43	2.94	-2.38
6/1/2012	-0.96		
6/2/2012	-0.99		
6/3/2012	-1.01		
6/4/2012	-0.68		
6/5/2012	-0.86		
6/6/2012	-1.06		
6/7/2012	-0.68	3.12	
6/8/2012	-0.38	2.82	-2.81
6/9/2012	0.22	2.1	-2.44
6/10/2012	0.31	2.51	-2.18
6/11/2012	-0.15	2.25	-1.99
6/12/2012	-0.27	2.14	-1.89
6/13/2012	-0.48	2.5	-1.86
6/14/2012	-0.2	2.53	-1.5
6/15/2012	-0.51	2.53	-1.67

6/16/2012	-0.5	2.76	-1.59
6/17/2012	-0.46	3.02	-1.22
6/18/2012	0.17	2.91	-1.81
6/19/2012	0.77	2.78	-2.11
6/20/2012	0.34	2.69	-2.3
6/21/2012	0.14	2.95	-2.38
6/22/2012	-0.03	2.91	
6/23/2012	0.3	2.78	-2.06
6/24/2012	0.38	2.65	-2.16
6/25/2012	0.76	2.23	-2.08
6/26/2012	0.67	2.42	-1.99
6/27/2012	0.66	2.34	-2.25
6/28/2012	0.4	2.64	-2.3
6/29/2012	0.73	2.91	-2.6
6/30/2012	0.73	3.21	-2.64
7/1/2012	0.49	3.32	-2.83
7/2/2012	0.26		
7/3/2012	0.24		
7/4/2012	-0.36	2.3	
7/5/2012	-0.09	3.44	-3.08
7/6/2012	0.17	3.16	-2.7
7/7/2012	0.18	2.75	-2.77
7/8/2012	-0.03	2.55	-2.47
7/9/2012	-0.45	2.55	-2.11
7/10/2012	-0.33	2.17	-2.04
7/11/2012	-0.1	1.94	-1.98
7/12/2012	-0.21	2.03	-1.82
7/13/2012	-0.04	1.95	-1.98
7/14/2012	-0.02	2.1	-2.12
7/15/2012	0.04	2.24	-2.15
7/16/2012	0.11	2.62	-2.04
7/17/2012	0.47	2.9	-2.1
7/18/2012	0.37	2.68	-2.42
7/19/2012	-0.23	3.17	-2.3
7/20/2012	-0.04	3.68	-2
7/21/2012	0.11	3.18	-1.9
7/22/2012	-0.44	2.62	-2.35
7/23/2012	-0.89	2.4	-2.68
7/24/2012	-0.81	2.36	-2.59
7/25/2012	-0.31	2.95	-1.95
7/26/2012	-0.27	2.51	-2.32
7/27/2012	0.32	2.7	-2.38
7/28/2012	0.18	3.09	-2.34
7/29/2012	0.12	3.24	-2.34
7/30/2012	0.33	-1.4	
7/31/2012	0.3	3.74	-2.36
8/1/2012	0.08	3.42	-2.83
8/2/2012	0.02	3.26	-2.68
8/3/2012	0.03	3	-2.96
8/4/2012	0.14	2.6	-2.89
8/5/2012	-0.29	1.99	-2.82
8/6/2012	-0.38	2.11	-3.08
8/7/2012	-0.44	2.16	-2.33
8/8/2012	-0.28	2.15	-1.8
8/9/2012	0.06	2.06	-1.79
8/10/2012	0.11	1.84	-1.65
8/11/2012	0.14	1.94	-1.67
8/12/2012	0.18	2.24	-1.72
8/13/2012	0.41	2.37	-1.8
8/14/2012	0.37	2.67	-1.92
8/15/2012	0.32	2.9	-2.1
8/16/2012	0.31	2.94	-2.2
8/17/2012	0.17	2.85	-2.59
8/18/2012	0.05	3.28	-2.76
8/19/2012	0.09	3.07	-2.5
8/20/2012	-0.24	2.83	

8/21/2012	-0.25	2.83	-2.47
8/22/2012	-0.1	2.84	-2.5
8/23/2012	-0.01	2.82	-2.42
8/24/2012	0.23	2.78	-2.33
8/25/2012	0.52	3	-2.06
8/26/2012	0.76		-1.7
8/27/2012	0.84	2.81	-2.42
8/28/2012	0.59	2.83	-2.97
8/29/2012	0.97	-0.7	
8/30/2012	1.55	3.03	-2.61
8/31/2012	0.72	2.41	-3.02
9/1/2012	0.29	2.75	-3.29
9/2/2012	0.24	2.82	-2.28
9/3/2012	0.22	2.81	-2.13
9/4/2012	0.29	2.51	-2
9/5/2012	0.42	1.97	-2.19
9/6/2012	0.34	2.26	-1.94
9/7/2012	0.57	2.11	-1.64
9/8/2012	0.76	2.13	-1.82
9/9/2012	0.54	2.14	-1.4
9/10/2012	0.56	2.29	-1.33
9/11/2012	0.8	2.1	-1.74
9/12/2012	0.41	2.2	-2.08
9/13/2012	0.2	2.4	-2.55
9/14/2012	0	2.59	-2.79
9/15/2012	0.05	2.79	-2.76
9/16/2012	0.34	2.77	-2.94
9/17/2012	0.31	2.8	-3.08
9/18/2012	0.22		
9/19/2012	0.18	3.21	-3.67
9/20/2012	0.35	3.17	-2.94
9/21/2012	0.19	3.06	-1.97
9/22/2012	0.22	2.89	-2.23
9/23/2012	0.28	2.78	-2.63
9/24/2012	0.27	2.45	-2.29
9/25/2012	0.24	2.2	-2.85
9/26/2012	0.19	2.02	-3.29
9/27/2012	0.21	2.4	-2.92
9/28/2012	0.24	2.68	-2.73
9/29/2012	0.25	2.58	-2.67
9/30/2012	0.36	2.77	-2.52
10/1/2012	0.17	2.37	-2.72
10/2/2012	0.25	2.55	-2.83
10/3/2012	0.42	2.58	-2.15
10/4/2012	0.17	2.38	-1.99
10/5/2012	0.1	2.41	-1.6
10/6/2012	0.13	2.33	-1.68
10/7/2012	-0.03	2.25	-1.21
10/8/2012	-0.13	1.99	-1.43
10/9/2012	-0.14	2.6	-0.79
10/10/2012	0.09	2.46	-1.55
10/11/2012	0.19	1.95	-2.66
10/12/2012	-0.02	1.69	-2.87
10/13/2012	0.2	2.42	-2.74
10/14/2012	0.94	2.18	-3.63
10/15/2012	1	2.52	-3.84
10/16/2012	0.25	3.13	-3.48
10/17/2012	-0.03	3.38	-3.28
10/18/2012	0.04		
10/19/2012	0.43		
10/20/2012	0.03		1.09A
10/21/2012	0.2	2.46	-2.64
10/22/2012	0.39	2.11	-2.78
10/23/2012	0.54	2.35	-2.32
10/24/2012	0.56	2.55	-1.93
10/25/2012	0.66	2.46	-1.94

10/26/2012	0.45	2.54	-1.97
10/27/2012	0.41	3.12	-1.24
10/28/2012	0.13	3.32	
10/29/2012	-0.03	5.9	2.60A
10/30/2012	-0.3		
10/31/2012	-0.34		
11/1/2012	0.06	3.07	-1.83
11/2/2012	0.17	2.55	-1.82
11/3/2012	0.14	2.49	-1.93
11/4/2012	0.13	2.41	-1.72
11/5/2012	0.04	2.42	-1.48
11/6/2012	0.12	2.49	-1.2
11/7/2012	0.17	3.32	0.33A
11/8/2012	0.18		-1.14
11/9/2012	0.35	1.66	-2.56
11/10/2012	0.36	2.53	-2.74
11/11/2012	0.17	2.58	-3.41
11/12/2012	0.34	2.65	-3.3
11/13/2012	0.47	3.05	-3.43
11/14/2012	0.53		
11/15/2012	0.31		
11/16/2012	0.24		
11/17/2012	0.23	2.11	
11/18/2012	0.21	3.06	-2.24
11/19/2012	0.48	3.05	-1.51
11/20/2012	0.67	2.67	-1.69
11/21/2012	0.27	2.52	-1.35
11/22/2012	0	2.74	-1.7
11/23/2012	0.47	2.45	-2
11/24/2012	0.32	1.7	-2.8
11/25/2012	-0.16	1.59	-3.28
11/26/2012	-0.15	1.61	-3.1
11/27/2012	0.52	2.43	-3.05
11/28/2012	0.49	-1.1	
11/29/2012	0.32	2.53	-2.49
11/30/2012	-0.14	1.97	-2.94
12/1/2012	0.18	2.76	-2.23
12/2/2012	0.17	2.68	-2.11
12/3/2012	0.11	1.89	-2.45
12/4/2012	0.3	2.18	-2.15
12/5/2012	0.35	1.65	-2.28
12/6/2012	0.26	1.61	-2.12
12/7/2012	0.02	1.74	-2.19
12/8/2012	-0.17	2.31	-2.23
12/9/2012	-0.05	2.42	-2.22
12/10/2012	0.08	3.17	-2.97
12/11/2012	0.2	2.99	-2.97
12/12/2012	0.06	3.16	-3.66
12/13/2012	0.18		
12/14/2012	0.03	-0.5	
12/15/2012	0.3	3.27	-3.78
12/16/2012	0.5	3.55	-2.76
12/17/2012	0.31		
12/18/2012	0.05	3.21	-2.06
12/19/2012	0.09	2.2	-2.8
12/20/2012	-0.16	2.79	-1.25
12/21/2012	-0.52		-0.55
12/22/2012	-0.3	1.5	-2.74
12/23/2012	0.24	1.61	-2.73
12/24/2012	0.18	1.9	-1.96
12/25/2012	0.29	2.05	-2.16
12/26/2012	-0.2	3.83	-2.16
12/27/2012		3.34	-2.12
12/28/2012	0.11	2.22	-2.74
12/29/2012	0.1	3.06	-2.26
12/30/2012	0.26	2.24	-3.32

12/31/2012	0.12	1.53	-3.79
1/1/2013	0.32	1.25	-3.79
1/2/2013	0.32	2.1	-2.57
1/3/2013	0.94	1.18	-3.14
1/4/2013	0.91	1.11	-3.32
1/5/2013	-0.12	0.52	-3.68
1/6/2013	-0.39	1.64	-2.74
1/7/2013	0.04	1.93	-2.94
1/8/2013	-0.44	2.55	-3.71
1/9/2013	-0.29	2.29	-3.47
1/10/2013	0.1	2.35	-4.17
1/11/2013	0.2	2.99	-4.34
1/12/2013	0.28		
1/13/2013	0.65	1.06	
1/14/2013	0.41	3.08	-3.25
1/15/2013	-0.08	2.68	-2.7
1/16/2013	-0.35	2.99	-2.23
1/17/2013	-0.03	2.4	-2.51
1/18/2013	0.29	2.24	-2.24
1/19/2013	0.44	1.67	-3.26
1/20/2013	0.52	0.42	-2.97
1/21/2013	1.12	1.33	-1.95
1/22/2013	2.79	2.08	-2.98
1/23/2013	4.9	1.33	-2.23
1/24/2013	1.63	1.94	-2.52
1/25/2013	0.87	1.25	-3.27
1/26/2013	0.57	2.07	-2.87
1/27/2013	0.19	2.18	-3.14
1/28/2013	0.04	2.28	-3.3
1/29/2013	0.23	2.47	-3.2
1/30/2013	0.28	2.77	-2.46
1/31/2013	0.59	0.95	-3.99
2/1/2013	2.06	0.11	-4.34
2/2/2013	1.66	1.18	-3.28
2/3/2013	-0.36	1.8	-2.62
2/4/2013	0.15	1.89	-3.25
2/5/2013	-0.18	1.72	-2.93
2/6/2013	-0.16	2.5	-3.22
2/7/2013	0	2.4	-2.91
2/8/2013	0.38		
2/9/2013	0.69	-2.1	
2/10/2013	0.56	3.32	-3.24
2/11/2013	0.38	3.06	-3.66
2/12/2013	0.47	2.38	-3.76
2/13/2013	0.87	2.45	-3.47
2/14/2013	0.74	2.28	-2.57
2/15/2013	0.79	1.57	-2.42
2/16/2013	0.97	1.91	-2.07
2/17/2013	0.47	2.31	-2.95
2/18/2013	-0.19	-0.1	-3.94
2/19/2013	-0.73	-0.2	-3.51
2/20/2013	-0.88	1.01	-3.78
2/21/2013	0	0.58	-3.26
2/22/2013	0.38	1.77	-2.07
2/23/2013	-0.19	2.61	-1.52
2/24/2013	-0.56	3.01	-2.08
2/25/2013	0.29	2.49	-2.82
2/26/2013	0.19		
2/27/2013	-0.4	2.09	
2/28/2013	-0.11	3.04	-2.25
3/1/2013	-0.35	2.96	-2.42
3/2/2013	-0.26	2.48	-2.15
3/3/2013	0.03	2.67	-2.45
3/4/2013	0.19	2.42	-2.8
3/5/2013	0.29	1.75	-2.4
3/6/2013	0.5		

3/7/2013	0.07		
3/8/2013	0.05		
3/9/2013	0.33		
3/10/2013	-0.06		
3/11/2013	-0.06	3.07	-2.82
3/12/2013	0.56	2.83	-3.04
3/13/2013	1.08	2.59	-3.23
3/14/2013	0.81	1.46	-3.8
3/15/2013	-0.01	1.56	-3.49
3/16/2013	0.95	2.37	-2.88
3/17/2013	1.26	1.48	-2
3/18/2013	-0.73	1.79	-1.71
3/19/2013	-0.55	2.25	-0.98
3/20/2013	-0.12	1.84	-1.99
3/21/2013	0	1.32	-2.08
3/22/2013	1.24	1.54	-2.31
3/23/2013	0.86	1.19	-3
3/24/2013	-0.16	2.06	-2.62
3/25/2013	0.4	0.38	
3/26/2013	-0.61	3.21	-2.19
3/27/2013	-1.27	2.5	-3.13
3/28/2013	-1.24	2.86	-3.74
3/29/2013	-0.39	2.8	-3.34
3/30/2013	-0.91	2.68	-3.36
3/31/2013	-1.11	2.92	-3.16
4/1/2013	-1.34	2.92	-2.75
4/2/2013	-0.51	2.35	-3.04
4/3/2013	-0.49	1.9	-3.69
4/4/2013	-0.42	1.43	-3.3
4/5/2013		2.17	-2.8
4/6/2013		2.08	-3.12
4/7/2013		2.03	-3.2
4/8/2013	0.49	2.26	-3.43
4/9/2013	0.48	2.44	-3.15
4/10/2013	0.15	2.87	-3.21
4/11/2013	0.22	3.02	-3.06
4/12/2013	0.54	3.37	-2.04
4/13/2013	-0.07	2.47	-2.28
4/14/2013	-0.1	2.24	-2.21
4/15/2013	-0.85	2.1	-2
4/16/2013	-1.31	1.04	-1.91
4/17/2013	-0.27	1.92	-2.04
4/18/2013	-0.63	1.42	-1.84
4/19/2013	-0.5	1.83	-1.76
4/20/2013	-0.59	1.15	-2.9
4/21/2013	-0.96	1.55	-2.32
4/22/2013	-0.51	2.58	-1.9
4/23/2013	-0.6	-0.7	
4/24/2013	-0.57	2.75	-2.75
4/25/2013	-0.16	3.02	-3.61
4/26/2013	0.17	2.93	-3.59
4/27/2013	-1.12	2.93	-3.65
4/28/2013	-1.97	3.04	-3.52
4/29/2013	-0.95	3.05	-3.16
4/30/2013	-0.29	1.9	-2.71
5/1/2013	-0.8	2.76	-2.56
5/2/2013	-0.6	2.4	-2.74
5/3/2013	-0.23	2.17	-2.04
5/4/2013	-0.06	2.49	-1.8
5/5/2013	1.42	2.58	-1.94
5/6/2013	0.66	2.52	-2.25
5/7/2013	0.27	2.81	-2.23
5/8/2013	-0.07	2.61	-2.52
5/9/2013	-0.47	2.76	-2.37
5/10/2013	-0.28	2.65	-2.54
5/11/2013	0.13	2.56	-2.55

5/12/2013	-0.27	2.27	-2.37
5/13/2013	0	2.03	-2.69
5/14/2013	-0.34	2	-2.31
5/15/2013	-2.18	1.79	-2.36
5/16/2013	-1.67	1.79	-2.09
5/17/2013	-1.21	1.7	-2.2
5/18/2013	-1.41	1.63	-2.17
5/19/2013	-0.2	1.57	-2.14
5/20/2013	0.55	1.8	-2.51
5/21/2013	0.45	2.32	-2.72
5/22/2013	0.23	2.79	-2.92
5/23/2013	0.72	2.9	-3.38
5/24/2013	1.38	2.94	-3.62
5/25/2013	0.8	1.44	
5/26/2013	0.37	2.69	-4.41
5/27/2013	0.38	2.7	-4.04
5/28/2013	-0.05	2.68	-3.88
5/29/2013	-0.41	1.58	-3.58
5/30/2013	-0.14	2.45	-3.49
5/31/2013	2.67	1.85	-3.28
6/1/2013	2.47	1.73	-2.99
6/2/2013	1.8	1.73	-2.88
6/3/2013	2.13	1.91	-2.79
6/4/2013	1.28	2.03	-2.68
6/5/2013	0.51	2.27	-2.51
6/6/2013	0.27	2.64	-2.47
6/7/2013	-0.1	0.78	
6/8/2013	-0.88	2.32	-2.75
6/9/2013	-1.01	2.27	-2.95
6/10/2013	-0.3	2.79	-2.52
6/11/2013	0.01	2.34	-2.5
6/12/2013	0.18	2.44	-2.23
6/13/2013	0.62	2.89	-1.85
6/14/2013	-0.38	2.71	-1.33
6/15/2013	-0.16	2.42	-1.86
6/16/2013	-0.23	2.02	-1.89
6/17/2013	-0.71	2.04	-2.04
6/18/2013	-0.3	2.62	-2.04
6/19/2013	1.41	2.89	-2.21
6/20/2013		2.8	-2.86
6/21/2013	-0.1	2.97	-3.24
6/22/2013	-0.29	3.28	-3.57
6/23/2013	-0.07	3.35	-3.49
6/24/2013	-0.31		
6/25/2013	-0.1		
6/26/2013	0.02		
6/27/2013	-0.41		
6/28/2013	-1.01	2.99	-2.72
6/29/2013	-0.84	2.68	-2.55
6/30/2013	-0.05	2.24	-2.38
7/1/2013	-0.14	2.17	-2.35
7/2/2013	-0.42	1.94	-2.69
7/3/2013	-0.45	2.11	-2.34
7/4/2013	-0.25	1.93	-2.58
7/5/2013	-0.05	-1.5	
7/6/2013	0.19	2.22	-2.54
7/7/2013	0.8	2.48	-2.51
7/8/2013	0.42	2.51	-2.32
7/9/2013	0.04	2.65	-2.42
7/10/2013	-0.05	2.41	-2.22
7/11/2013	-0.1	2.52	-2.27
7/12/2013	-0.39	2.68	-2.06
7/13/2013	-0.2	1.95	-1.92
7/14/2013	0.12	1.7	-2.27
7/15/2013	-0.66	1.66	-2.62
7/16/2013	-0.39	2.14	-2.34

7/17/2013	0.59	2.55	-2.2
7/18/2013	1.32	2.72	-2.46
7/19/2013	0.41	2.98	-2.7
7/20/2013	-0.27	3.14	-3.18
7/21/2013	-0.23		
7/22/2013	-0.31		
7/23/2013	-0.28		
7/24/2013	-0.18		
7/25/2013	0.06		
7/26/2013	0.22	2.68	
7/27/2013	-0.09	2.25	-2.97
7/28/2013	0.39	2.44	-2.42
7/29/2013	0.68	2.33	-2.11
7/30/2013	0.72	2.17	-2.02
7/31/2013	0.39	2.22	-1.78
8/1/2013	0.38	2.3	-1.53
8/2/2013		2.55	-1.69
8/3/2013		2.62	-1.88
8/4/2013		2.77	-1.98
8/5/2013		2.84	-1.89
8/6/2013		2.8	-2.18
8/7/2013		2.87	-2.42
8/8/2013		2.6	-2.28
8/9/2013		2.32	-2.37
8/10/2013		2.17	-2.79
8/11/2013		2.21	-2.54
8/12/2013		2.4	-2.23
8/13/2013		2.7	-2.18
8/14/2013		2.59	-2.22
8/15/2013		2.52	-2.19
8/16/2013		2.81	-2.3
8/17/2013			
8/18/2013			
8/19/2013		3.26	-3.04
8/20/2013			
8/21/2013		1.52	
8/22/2013		2.83	-3.37
8/23/2013		2.82	-3.12
8/24/2013		2.87	-2.79
8/25/2013		2.6	-2.26
8/26/2013		2.03	-2.69
8/27/2013		2.12	-2.58
8/28/2013		2.43	-1.52
8/29/2013		2.72	-0.94
8/30/2013		2.54	-1.25
8/31/2013		1.96	-1.7
9/1/2013			
9/2/2013		2.74	-1.63
9/3/2013		2.79	-1.94
9/4/2013		2.36	-2.26
9/5/2013		2.5	-2.62
9/6/2013		2.72	-2.26
9/7/2013		2.52	-2.51
9/8/2013		2.36	-2.81
9/9/2013		3.03	-2.15
9/10/2013		2.49	-2.5
9/11/2013		2.37	-2.87
9/12/2013		2.47	-2.63
9/13/2013		2.74	-2.09
9/14/2013		2.72	-2.41
9/15/2013		2.72	-2.77
9/16/2013		2.91	-3.19
9/17/2013		-1.2	
9/18/2013		2.99	-2.86
9/19/2013		2.66	-3.28
9/20/2013		2.7	-3.32

9/21/2013		2.98	-2.8
9/22/2013		2.97	-2.57
9/23/2013		2.84	-2.04
9/24/2013		2.53	-1.83
9/25/2013		2.51	-1.79
9/26/2013		2.47	-1.39
9/27/2013		2.36	-1.08
9/28/2013		2.36	-0.9
9/29/2013		2.42	-1.06
9/30/2013		2.62	-1.32
10/1/2013		2.55	-1.73
10/2/2013		2.56	-1.94
10/3/2013		2.54	-2.16
10/4/2013		2.68	-2.42
10/5/2013		2.9	-2.58
10/6/2013	0.39		
10/7/2013	0.24		
10/8/2013	-0.14	2.53	
10/9/2013	-0.27	3.92	-1.29
10/10/2013	0.04		2.17A
10/11/2013	0.27	3.74	-0.59
10/12/2013	0.28		
10/13/2013	0.15		-0.88
10/14/2013	0.07	2.97	-2.02
10/15/2013	0.2	3.07	-1.83
10/16/2013	0.56	-1.2	
10/17/2013	0.52	3.18	-2.25
10/18/2013	0.48	2.53	-2.82
10/19/2013	0.95	3.05	-2.92
10/20/2013	0.85	2.81	-2.82
10/21/2013	0.08	2.7	-2.67
10/22/2013	0.22	2.68	-2.23
10/23/2013	0.21	2.95	-1.6
10/24/2013	0.14	2.28	-2.17
10/25/2013	0.22	1.52	-2.23
10/26/2013	0.39	1.55	-2.24
10/27/2013	0.41	1.21	-2.64
10/28/2013	0.25	1.64	-2.09
10/29/2013	0.37	2.01	-1.67
10/30/2013	0.41	1.99	-2.22
10/31/2013	0.31		
11/1/2013	0.27	-2	
11/2/2013	0.21	2.69	-3.01
11/3/2013	0.13	3.17	-2.57
11/4/2013	-0.03		
11/5/2013	-0.03	0.66	
11/6/2013	0.11	3.24	-2.84
11/7/2013	0.3	3.13	-2.9
11/8/2013	0.29	2.38	-3.32
11/9/2013	0.15	2.22	-2.84
11/10/2013	0.18	1.93	-3.54
11/11/2013	0.35	1.77	-3.26
11/12/2013	0.49	1.94	-2.94
11/13/2013	0.33	2.13	-2.8
11/14/2013	0.03	1.99	-4.12
11/15/2013	0.21	1.59	-3.36
11/16/2013	0.04	2.55	-2.88
11/17/2013	0.18	2.84	-2.63
11/18/2013	0.41	2.69	-2.53
11/19/2013	0.24	2.19	-3.13
11/20/2013	-0.31	2.7	-2.33
11/21/2013	-0.1	2.26	-2.28
11/22/2013	0.46	2.09	-2.25
11/23/2013	0.86	2	-2.26
11/24/2013	0.73	0.5	-3.02
11/25/2013	0	0.76	-2.76

11/26/2013	0.32	1.03	-2.51
11/27/2013	0.49	2.59	-2.27
11/28/2013		1.2	-3.6
11/29/2013		1.18	-3.19
11/30/2013	-0.02	2.03	-2.92
12/1/2013	0.48	2.77	-2.75
12/2/2013	0.18	3.1	-3.32
12/3/2013	-0.05		
12/4/2013	0.44		
12/5/2013	-0.08	1.31	
12/6/2013	-0.23	3.24	-3.27
12/7/2013	-0.09	2.89	-3.16
12/8/2013	0.3	2.28	-2.85
12/9/2013	0.38	2.28	-2.64
12/10/2013	0.11	1.98	-2.84
12/11/2013	-0.04	1.34	-3.47
12/12/2013	0.64	1.4	-3.3
12/13/2013	0.44	1.49	-3.71
12/14/2013	0.04	1.93	-2.62
12/15/2013	0.1		
12/16/2013	0.35	1.5	-3.42
12/17/2013	0.37	2.22	-3.05
12/18/2013	0.34	2.5	-2.75
12/19/2013	0.21	2.06	-3.51
12/20/2013	0.28	1.79	-3.4
12/21/2013	0.44	1.96	-2.75
12/22/2013	0.64	1.16	-2.95
12/23/2013	0.75	1.56	-2.36
12/24/2013	0.74	2.1	-2.24
12/25/2013	0.73	1.46	-2.28
12/26/2013	0.53	1.58	-2.31
12/27/2013	0.39	1.54	-2.98
12/28/2013	0.27	1.51	-3.47
12/29/2013	0.31	1.98	-3.97
12/30/2013	0.38	2.66	-3.19
12/31/2013	0.68		
1/1/2014	0.63	2.78	-4.14
1/2/2014	0.55		
1/3/2014	1.59		
1/4/2014	2.02	1.6	
1/5/2014	1.87	2.41	-3.52
1/6/2014	1.88	2.67	-2.59
1/7/2014	1.97	1.1	-4.65
1/8/2014	0.97		-1.03
1/9/2014	0.8	0.79	-3.41
1/10/2014	0.93	1.61	-2.5
1/11/2014	0.77	2.1	-2.25
1/12/2014	0.11	1.97	-3.36
1/13/2014	0.3		
1/14/2014	0.08	2.58	-2.04
1/15/2014	0	2.4	-2.51
1/16/2014	0.04	2.75	-2.54
1/17/2014	0.62	2.87	-2.49
1/18/2014	0.01	2.52	-2.59
1/19/2014	-0.56	2.06	-3.1
1/20/2014	-0.5	1.15	-3.47
1/21/2014	-0.78	2.46	-2.14
1/22/2014	-0.13	2.8	-1.5
1/23/2014	0.19	2.35	-2.89
1/24/2014	0.19		
1/25/2014	0.12		
1/26/2014	-0.07		-2.44
1/27/2014	0.23	1.64	-3.67
1/28/2014	0.36		
1/29/2014	0.69		
1/30/2014	0.34		

1/31/2014	0.18	-1.1	
2/1/2014	0.07	2.59	-4.51
2/2/2014	-0.4	2.77	-3.88
2/3/2014	-0.49	2.77	-3.44
2/4/2014	-0.66	2.12	-2.9
2/5/2014	-0.67	2.4	-2.24
2/6/2014	-0.43	1.87	-2.2
2/7/2014	-0.03	1.88	-2.66
2/8/2014	-0.78	1.05	-2.53
2/9/2014	-0.72	1.47	-2.33
2/10/2014	-0.02	1.48	-2.8
2/11/2014	0.29		
2/12/2014	0.15		
2/13/2014	-0.37	0	
2/14/2014	0.1	1.99	-3.34
2/15/2014	-0.11	1.59	-4.03
2/16/2014	-0.23	2.18	-3.06
2/17/2014	-0.28	1.45	-3.71
2/18/2014	-1.27	1.88	-3.36
2/19/2014	-1.12	1.84	-2.69
2/20/2014	-0.69	0.75	-3.32
2/21/2014	0.36	1.77	-3.23
2/22/2014	-1.34	1.71	-2.78
2/23/2014	-0.88	1.34	-2.8
2/24/2014	-0.33	1.68	-3.64
2/25/2014	0	1.66	-3.84
2/26/2014	0.17	2.23	-3.32
2/27/2014	0.54	3.01	-3.66
2/28/2014	0.3	-2.8	
3/1/2014	-0.03	2.59	-4.28
3/2/2014	0.06	2.51	-4.26
3/3/2014	0		
3/4/2014	-0.2	2.16	
3/5/2014	0.26	2.24	-2.97
3/6/2014	-0.27	1.65	-2.08
3/7/2014	-0.96	2.51	-1.63
3/8/2014	-0.78	2.65	-2.08
3/9/2014	-1.14	1.67	-1.81
3/10/2014	-0.18	1.78	-1.73
3/11/2014	0.46	1.77	-1.59
3/12/2014	-0.94	2.21	-1.18
3/13/2014	-0.36	1.06	-3.03
3/14/2014	-0.14	1.2	-3.26
3/15/2014	-0.81	1.92	-3.37
3/16/2014	-0.78	2.15	-3.1
3/17/2014	-0.41	2.76	-2.3
3/18/2014	-0.79	2.82	-2.1
3/19/2014	-0.36	2.84	-2.43
3/20/2014		2.16	-2.8
3/21/2014		1.03	-3.27
3/22/2014		1.93	-2.84
3/23/2014		2.16	-2.5
3/24/2014	-0.85	1.88	-2.4
3/25/2014	-0.39	2.12	-2.29
3/26/2014	-0.34	2.69	-3.16
3/27/2014	-0.12	2.5	-3.73
3/28/2014	-0.52	1.72	-4.3
3/29/2014	0.58	2.75	-4.27
3/30/2014	1.18	2.94	-3.02
3/31/2014	0.43	3.04	-2.8
4/1/2014	-0.39	3.22	-2.93
4/2/2014	0.16	2.9	-2.45
4/3/2014	-2.02	2.61	-2.47
4/4/2014	-1.85	2.01	-1.78
4/5/2014	-1.25	2.81	-1.98
4/6/2014	-0.43	1.55	-2.25

4/7/2014	-0.01	1.2	-2.1
4/8/2014	-0.62	2.04	-1.71
4/9/2014	-0.48	1.8	-2.13
4/10/2014	0.14	1.24	-2.29
4/11/2014	-0.03	1.18	-2.96
4/12/2014	0.22	1.54	-2.85
4/13/2014	0.12	2.06	-3.02
4/14/2014	-0.14	2.18	-3.1
4/15/2014	-0.65	1.88	-3.15
4/16/2014	-1.05	2.47	-3.29
4/17/2014	0.6	3.14	-3.06
4/18/2014	0.88	2.78	-2.51
4/19/2014		2.33	-2.82
4/20/2014		1.54	-3.08
4/21/2014		2.52	-2.32
4/22/2014		2.42	-2.24
4/23/2014		2.58	-2.6
4/24/2014		2.45	-3.05
4/25/2014			
4/26/2014		-1.6	
4/27/2014		3.02	-2.62
4/28/2014		3.02	-2.99
4/29/2014	-0.32		
4/30/2014	0.05	2.67	
5/1/2014	-0.08	2.73	-2.56
5/2/2014	0.33	2.58	-2.88
5/3/2014	-0.17	2.52	-2.22
5/4/2014	-0.37	1.39	-2.16
5/5/2014	-0.82	1.92	-2.48
5/6/2014	-0.32	2.04	-1.73
5/7/2014	-0.44	1.79	-1.74
5/8/2014		1.9	-1.78
5/9/2014		1.82	-1.89
5/10/2014		2.02	-2.69
5/11/2014	-0.47	2.07	-2.67
5/12/2014	-0.56	2.55	-2.59
5/13/2014	-0.5	0.4	
5/14/2014	-1.03	3.14	-2.53
5/15/2014	-0.5		
5/16/2014	-0.39	2.82	
5/17/2014	-0.94	2.93	-2.96
5/18/2014	-0.45	2.75	-3.15
5/19/2014	-0.64	1.72	-3.06
5/20/2014	-0.74	2.51	-2.91
5/21/2014	-0.79	2.47	-2.52
5/22/2014	-0.98	2.65	-2.22
5/23/2014	-0.46	2.6	-2.39
5/24/2014	-0.06	2.87	-2.34
5/25/2014	-0.69	2.77	-2.68
5/26/2014	-0.42	2.68	-2.77
5/27/2014	-0.42	2.97	-3.04
5/28/2014	-0.1		
5/29/2014	-0.08	1.96	
5/30/2014	-0.25	2.76	-2.28
5/31/2014	0.22	2.77	-2.52
6/1/2014	0.54	2.38	-2.09
6/2/2014	0.22	2	-2.05
6/3/2014	-0.1	1.45	-2.14
6/4/2014	-0.11	2.28	-1.56
6/5/2014	0.19	2.31	-1.35
6/6/2014	0.57	2.1	-1.89
6/7/2014	-0.89	1.82	-2.23
6/8/2014	-0.87	2.18	-2.16
6/9/2014	-0.56	2.55	-2.27
6/10/2014	-0.33	2.82	-2.55
6/11/2014	0.63		

6/12/2014	0.64		
6/13/2014	0.38		
6/14/2014	-0.08		
6/15/2014	-0.77		
6/16/2014	-0.6		
6/17/2014	-0.38		
6/18/2014	-0.24	2.88	-2.94
6/19/2014	0	2.65	-2.71
6/20/2014	0.3	2.61	-2.72
6/21/2014	0.04	2.78	-2.21
6/22/2014	-1.01	2.94	-1.97
6/23/2014	-0.4	2.81	-2.24
6/24/2014	0.54	2.8	-2.34
6/25/2014	0.5	2.84	-2.41
6/26/2014	0.31	2.82	-2.37
6/27/2014	0.34	2.99	-2.14
6/28/2014	0.09	2.77	-2.3
6/29/2014	0.55	2.52	-2.27
6/30/2014	0.25	2.43	-2.22
7/1/2014	-0.47	2.15	-2.23
7/2/2014	-0.26	2.09	-2.11
7/3/2014	0.26	1.68	-2.05
7/4/2014	-0.08	1.84	-1.76
7/5/2014	-0.38	1.98	-2.07
7/6/2014	-0.63	1.5	-2.56
7/7/2014	-0.56	1.98	-2.58
7/8/2014	-0.37	2.36	-2.74
7/9/2014	-0.48	2.7	-2.79
7/10/2014	-0.46	3.13	-3.03
7/11/2014	-0.43	3.26	-3.07
7/12/2014	0.14	1.23	
7/13/2014	0.22	3.23	-3.52
7/14/2014	-0.26	3.23	-3.67
7/15/2014	-0.13	3.15	-3.38
7/16/2014	0.02	2.47	-3.08
7/17/2014	0.14	2.83	-2.92
7/18/2014	0.1	2.34	-2.84
7/19/2014	-0.17	2.38	-2.6
7/20/2014	0.58	3	-1.8
7/21/2014	0.73	2.57	-1.94
7/22/2014	0.51	2.47	-2.2
7/23/2014	0.1	2.6	-2.28
7/24/2014	1.15	2.79	-2.34
7/25/2014	1.52	2.76	-2.01
7/26/2014	0.32	2.78	-2.26
7/27/2014	-0.04	2.75	-2.25
7/28/2014	0.08	2.67	-2.13
7/29/2014	-0.09	2.4	-2.25
7/30/2014	-0.33	2.25	-2.1
7/31/2014	0.14	1.91	-2.21
8/1/2014	0.05	1.7	-2.45
8/2/2014	0.11	2.31	-1.98
8/3/2014	0.21	2.29	-1.55
8/4/2014	0.19	2.19	-1.87
8/5/2014	-0.25	2.62	-1.92
8/6/2014	-0.15	2.89	-1.92
8/7/2014	0.33	3.23	-2.17
8/8/2014	0.45	3.26	-2.62
8/9/2014	0.06	3.54	-3.09
8/10/2014	0.21	3.64	-3.14
8/11/2014	-0.01	2.45	
8/12/2014	-0.2	3.9	-3.08
8/13/2014	-0.22	3.3	-2.8
8/14/2014	-0.12	3.03	-2.85
8/15/2014	0.19	2.83	-2.72
8/16/2014	0.45	2.61	-2.26

8/17/2014	0.44	2.4	-2.17
8/18/2014	0.48	2.47	-1.76
8/19/2014	0.26	2.46	-1.63
8/20/2014	0	2.55	-1.64
8/21/2014	-0.07	2.68	-1.79
8/22/2014	0.68	2.94	-1.6
8/23/2014	0.97	3.15	-1.44
8/24/2014	0.2	3.01	-1.29
8/25/2014	0.17	2.72	-1.65
8/26/2014	0.1	2.54	-2.06
8/27/2014	-0.03	2.49	-2.16
8/28/2014	0	2.3	-2.13
8/29/2014	0.38	2.54	-1.99
8/30/2014	0.46	2.46	-1.89
8/31/2014	0.17	2.13	-2.07
9/1/2014	-0.07	2.2	-2.42
9/2/2014	0.06	2.52	-1.98
9/3/2014	0.15	2.55	-2.03
9/4/2014	0.2	2.65	-2.26
9/5/2014	0.59	2.89	-2.7
9/6/2014	0.72	3.03	-2.94
9/7/2014	0.69	-1.1	
9/8/2014	0.33	3.96	-2.97
9/9/2014	0.13		
9/10/2014	0.14	2.8	
9/11/2014	0.16	3.4	-2.86
9/12/2014	0.09	3.28	-2.7
9/13/2014	0.28	3.46	-1.83
9/14/2014	0.28	3.05	-1.55
9/15/2014	0.45	2.65	-1.53
9/16/2014	0.55	2.54	-1.21
9/17/2014	0.36	2.65	-1.09
9/18/2014	0.19	2.43	-1.36
9/19/2014	0.03	2.84	-0.9
9/20/2014	0.11	2.65	-1.34
9/21/2014	0.47	2.88	-1.73
9/22/2014	0.16	2.17	-2.15
9/23/2014	0.02	2.08	-2.62
9/24/2014	-0.05	2.67	-2.21
9/25/2014	-0.1	3.36	-1.12
9/26/2014	-0.06	3.05	-1.56
9/27/2014	0	2.68	-2.12
9/28/2014	0.37	2.52	-2.24
9/29/2014	-0.17	2.6	-2.02
9/30/2014	-0.53	2.97	-1.86
10/1/2014	-0.38	3.2	-1.08
10/2/2014	-0.18	3.56	-0.74
10/3/2014	-0.06		
10/4/2014	-0.01		-2.1
10/5/2014	0.06	3.21	-2.32
10/6/2014	-0.04	-1.7	
10/7/2014	-0.09	3.11	-3.14
10/8/2014	-0.13	2.86	-3.27
10/9/2014	0.04	3.02	-3.49
10/10/2014	0.18	2.95	-3.67
10/11/2014	0.12	3.32	-2.33
10/12/2014	-0.03	2.91	-2.08
10/13/2014	0.1	2.51	-2.2
10/14/2014	0.76	2.29	-2.09
10/15/2014	0.44	2.31	-1.59
10/16/2014	0.12	2.27	-1.48
10/17/2014	0.06	2.16	-1.65
10/18/2014	0.17	2.05	-2.06
10/19/2014	0.29	2.02	-1.73
10/20/2014	0.08	2.13	-2.39
10/21/2014	0.11	2.45	-2.39

10/22/2014	0.28	3.17	-1.98
10/23/2014	0.1		
10/24/2014	0.05		
10/25/2014	-0.11	1.16	
10/26/2014	-0.21	2.56	-2.57
10/27/2014	0.35	2.61	-2.57
10/28/2014	0.42	2.52	-2.5
10/29/2014	0.23	2.64	-2.31
10/30/2014	0.32	2.5	-2.27
10/31/2014	0.47	2.84	-1.84
11/1/2014	0.52		
11/2/2014	0.38		
11/3/2014	0.21		
11/4/2014	0.33		
11/5/2014	0.4	2.56	-3.31
11/6/2014	0.62	-1.6	
11/7/2014	0.79	3.17	-3.2
11/8/2014	0.37	2.85	-3.25
11/9/2014	0.22	2.33	-3.29
11/10/2014	0.23	2.7	-2.36
11/11/2014	0.17	2.74	-1.92
11/12/2014	0.28	2.67	-1.69
11/13/2014	0.38	2.48	-1.34
11/14/2014	0.41	1.94	-1.7
11/15/2014	0.39	1.48	-1.91
11/16/2014	0.57	1.48	-1.85
11/17/2014	0.96	2.3	-1.37
11/18/2014	0.94		
11/19/2014	0.59		
11/20/2014	0.36	1.28	-3.48
11/21/2014	0.26		
11/22/2014	0.22	2.28	-3.37
11/23/2014	0.41	-0.8	
11/24/2014	0.3	3.16	-2.87
11/25/2014	-0.05	2.69	-3.19
11/26/2014	-0.14	2.77	
11/27/2014	0.21	3.04	-2.71
11/28/2014	0.1	2.11	-2.74
11/29/2014	0.1	2.6	-2.34
11/30/2014	0.17	1.87	-3.05
12/1/2014	0.04	1.78	-2.91
12/2/2014	0.29	2.66	-1.76
12/3/2014	0.79		-3.58
12/4/2014	1.3	2.22	-3.58
12/5/2014	1.14	2.78	-3.29
12/6/2014	0.57	3.29	-2.41
12/7/2014	0.44		
12/8/2014	0.78		
12/9/2014	0.69	2.52	
12/10/2014	0.43	2.84	-1.93
12/11/2014	0.6	1.87	-2.69
12/12/2014	0.76	1.88	-2.28
12/13/2014	0.57	1.64	-1.93
12/14/2014	0.82	1.74	-1.69
12/15/2014	0.7	1.8	-1.63
12/16/2014	0.6	1.83	-1.66
12/17/2014	0.14	2.11	-2.65
12/18/2014	-0.1	1.46	-3.35
12/19/2014	0.59	1.73	-2.79
12/20/2014	1.45	2.58	-2.96
12/21/2014	0.87	2.98	-2.92
12/22/2014	0.32	3.22	-3.09
12/23/2014	0.1		
12/24/2014	0.12	1.77	
12/25/2014	0.59	2.91	-3.67
12/26/2014	1.04	1.86	-3.91

12/27/2014	1.39	1.99	-3.35
12/28/2014	1.5	1.72	-3.15
12/29/2014	1.42	1.74	-2.66
12/30/2014	0.62	2.26	-2.74
12/31/2014	0.56	2.16	-2.92
1/1/2015	0.3	1.55	-3.75
1/2/2015	0.11	1.09	-3.74
1/3/2015	-0.01	2.11	-2.69
1/4/2015	-0.08	2.81	-2.67
1/5/2015	0.62	1.46	-4.28
1/6/2015	0.44	1.4	-4.31
1/7/2015	0.05	1.94	-4.02
1/8/2015	-0.03	0.25	
1/9/2015	0.26	0.25	-3.71
1/10/2015	0.41	0.26	-3.95
1/11/2015	0.39		
1/12/2015	0.18	0.9	-2.89
1/13/2015	0.2	1.2	-1.91
1/14/2015	0.23	1.87	-1.56
1/15/2015	0.15	2.17	-2.45
1/16/2015	1.25	1.69	-3
1/17/2015	1.32	1.86	-2.97
1/18/2015	0.86	2.53	-3.3
1/19/2015	0.46	2.76	-3.73
1/20/2015	-0.06	2.56	-4.02
1/21/2015	-0.14	3.03	-4.25
1/22/2015	-0.19	3.08	-3.65
1/23/2015	0.01	2.87	-3.51
1/24/2015	0.07	2.34	
1/25/2015	0.49	2.34	-3.54
1/26/2015	2.03	2.86	-2.33
1/27/2015	1.42		1.19A
1/28/2015	-0.29	2.87	-2.47
1/29/2015	-0.63	2.24	-2.28
1/30/2015	-0.1	2.34	-3.06
1/31/2015	0.27	1.13	-3.22
2/1/2015	-0.09	1.81	-3.03
2/2/2015	-0.26	2.63	-2.77
2/3/2015	-0.47	2.09	-2.97
2/4/2015	0.07	1.93	-3.39
2/5/2015	0.24	1.96	-3.33
2/6/2015	0.34	0.06	
2/7/2015	0.42	1.77	-3.03
2/8/2015	0.18	2.25	-2.44
2/9/2015	-0.1	2.55	-1.07
2/10/2015	-0.08	2.83	-0.28
2/11/2015	0.28	3.11	-0.52
2/12/2015	-0.91	2.72	-1.57
2/13/2015	-1.37	1.49	-2.28
2/14/2015	-0.93	2.15	-1.76
2/15/2015	-0.82	0.82	-3.58
2/16/2015	-0.76		
2/17/2015	-1.22		
2/18/2015	0.23		
2/19/2015	-0.21		
2/20/2015	0.66		
2/21/2015	0.37		
2/22/2015	-0.32		
2/23/2015	0.11		
2/24/2015	-0.28		
2/25/2015	-0.41		
2/26/2015	0.6	1.98	-2.38
2/27/2015	0.44	1.6	-2.51
2/28/2015	-0.53		-2.63
3/1/2015	0.11	1.03	-3.24
3/2/2015	0.45	1.54	-3.08

3/3/2015	1.07	1.11	-3.79
3/4/2015	1.82	1.38	-3.15
3/5/2015	2.23	1.87	-3.25
3/6/2015	0.59	1.65	-3.16
3/7/2015	-0.54	1.39	-3.39
3/8/2015	-0.35	1.45	-3.86
3/9/2015	-0.24	1.43	-2.9
3/10/2015	-0.01	1.75	-2.81
3/11/2015	0.2	1.06	-2.51
3/12/2015	0.2	1.31	-2.87
3/13/2015	-0.06	1.1	-2.46
3/14/2015	-0.74	1.58	-2.51
3/15/2015	-0.52	1.82	-3.12
3/16/2015	-0.06	2.03	-2.38
3/17/2015	0.06	2.91	-2.89
3/18/2015	0.22	2.03	-4.06
3/19/2015	0.86	2.24	-4.16
3/20/2015	0.71	3.21	-4.17
3/21/2015	-0.23	3.02	-3.46
3/22/2015	-0.98	2.56	-3.96
3/23/2015	-0.64	1.67	-4.13
3/24/2015	-0.49	1.87	-4.06
3/25/2015	-0.34	1.15	-3.07
3/26/2015	-0.04	1.78	-2.73
3/27/2015	-0.39	1.31	-2.38
3/28/2015	-0.91	1.74	-2.23
3/29/2015	-1.22	1.69	-1.77
3/30/2015	-0.27	1.38	-2.8
3/31/2015	0.04	1.73	-2.44
4/1/2015	-1.45	1.86	-2.3
4/2/2015	-1.23	1.64	-2.78
4/3/2015	-1.08	1.44	-3.5
4/4/2015	-1.21	1.8	-3.38
4/5/2015	-1.79	1.26	-3.63
4/6/2015	-1.65	2.1	-3.99
4/7/2015	-1.28	2.4	-3.32
4/8/2015	-0.96	3	-2.08
4/9/2015	-0.32	1.89	-1.6
4/10/2015	0.4	2.56	-2.06
4/11/2015	0.03	1.87	-2.65
4/12/2015	-0.8	1.42	-3.1
4/13/2015	-0.62	1.52	-2.89
4/14/2015	-0.04	1.8	-3.11
4/15/2015	-0.36	2.11	-3.53
4/16/2015	-0.66	2.29	-3.6
4/17/2015	-0.21	2.66	-3.68
4/18/2015	-0.09	2.75	-3.94
4/19/2015	-0.16		
4/20/2015	0.53		
4/21/2015	-0.63	2.99	
4/22/2015	0.85	2.61	-2.82
4/23/2015	1.83	2.61	-2.74
4/24/2015	0.35	1.83	-2.99
4/25/2015	-0.07	2.17	-2.01
4/26/2015	-0.15	2.03	-1.65
4/27/2015	-0.92	2.03	-1.69
4/28/2015	-0.65	1.89	-1.76
4/29/2015	-0.1	2.02	-1.93
4/30/2015	-0.47	2.51	-1.54
5/1/2015	-0.83	2.84	-1.58
5/2/2015	-0.56	2.78	-1.82
5/3/2015	-0.65	2.5	-2.48
5/4/2015	-0.64	2.28	-2.88
5/5/2015	-0.09	2.05	-3.24
5/6/2015	1.01	2.58	-3.32
5/7/2015	1.53	2.45	-2.79

5/8/2015	1.63	2.44	-2.69
5/9/2015	0.71	1.46	-2.54
5/10/2015		2.29	-2.8
5/11/2015		1.99	-2.9
5/12/2015		2.05	-2.66
5/13/2015		1.73	-3.15
5/14/2015		2.27	-3.07
5/15/2015		2.47	-3.6
5/16/2015		2.68	-3.67
5/17/2015		2.91	-3.67
5/18/2015		1.73	
5/19/2015		3.07	-3
5/20/2015		2.61	-3.11
5/21/2015		2.81	-2.84
5/22/2015		2	-2.65
5/23/2015		1.08	-2.74
5/24/2015		1.34	-2.98
5/25/2015		0.96	-2.98
5/26/2015		1	-2.81
5/27/2015		0.89	-2.82
5/28/2015		1.05	-2.95
5/29/2015		1.52	-2.71
5/30/2015	-0.4	1.97	-2.72
5/31/2015	-0.55	2.06	-3.07
6/1/2015	-0.99	2.85	-2.85
6/2/2015	-1.24		
6/3/2015	-0.64		
6/4/2015	-0.64		
6/5/2015	-0.54		
6/6/2015	-1.02	2.79	
6/7/2015	-0.6	1.73	-2.89
6/8/2015	-0.28	2.49	-2.77
6/9/2015	-0.55	2.11	-3.04
6/10/2015	-0.06	2.1	-2.81
6/11/2015	0.42	2.2	-2.85
6/12/2015	-0.58	2.48	-3.06
6/13/2015	-0.68	2.68	-3.22
6/14/2015	0	2.86	-3
6/15/2015	0.42	0.07	
6/16/2015	-0.35	3.11	-2.7
6/17/2015	-0.9	2.06	
6/18/2015	-0.98	2.94	-2.56
6/19/2015	-0.6	2.69	-2.46
6/20/2015	-0.51	2.8	-2.17
6/21/2015	-0.32	2.27	-1.99
6/22/2015	-0.07	2.27	-2.26
6/23/2015	0.05	1.88	-1.99
6/24/2015	-0.51	1.97	-1.85
6/25/2015	-0.23	1.93	-1.91
6/26/2015	-0.14	2.22	-1.66
6/27/2015	-0.5	2.99	-1.47
6/28/2015	-0.96	2.87	-1.98
6/29/2015	-0.82	2.63	-2.59
6/30/2015	-0.99	3.06	-2.62
7/1/2015	-0.94	3.08	-2.58
7/2/2015	-0.61		
7/3/2015	0.53		
7/4/2015	0.6		
7/5/2015	0.2	2.98	
7/6/2015	-0.63	2.46	-2.9
7/7/2015	-0.9		1.31A
7/8/2015	-0.64	2.32	-2.75
7/9/2015	-0.52	2.61	-2.62
7/10/2015	-0.33	2.86	-2.61
7/11/2015	-0.35	2.88	-2.4
7/12/2015	-0.18	2.83	-2.51

7/13/2015	-0.33	3.1	-2.42
7/14/2015	0.08		
7/15/2015	0.73		
7/16/2015	0.3	1.95	
7/17/2015	0.06	2.86	-2.28
7/18/2015	-0.33	2.6	-2.16
7/19/2015	-0.36	2.5	-2.16
7/20/2015	-0.05	2.43	-2.05
7/21/2015	0.33	2.19	-1.57
7/22/2015	0.23	2.44	-1.32
7/23/2015	0.25	2.07	-1.61
7/24/2015	0.24	2.06	-1.78
7/25/2015	0.61	2.27	-1.69
7/26/2015	0.83	2.26	-1.8
7/27/2015	0.56	2.57	-2.15
7/28/2015	0.12	2.83	-2.35
7/29/2015	-0.28	3.02	-2.64
7/30/2015	-0.68	3.02	-3.08
7/31/2015	-0.48	1.21	
8/1/2015	-0.3	3.16	-3.27
8/2/2015	-0.31		
8/3/2015	-0.1	2.69	
8/4/2015	-0.33	2.46	-3.45
8/5/2015	-0.36	2.57	-2.93
8/6/2015	-0.06	2.69	-2.59
8/7/2015	-0.39	3.01	-1.85
8/8/2015	-0.11	3.11	-1.68
8/9/2015	-0.31		-1.23
8/10/2015	-0.31	3.02	-1.65
8/11/2015	-0.24	2.62	-2.4
8/12/2015	0	2.91	-2.12
8/13/2015	0.12	2.8	-2.26
8/14/2015	-0.19	2.63	-2.46
8/15/2015	-0.15	2.5	-2.5
8/16/2015	-0.17	2.31	-2.59
8/17/2015	-0.59	2	-2.45
8/18/2015	-1.01	1.96	-2.39
8/19/2015	-0.9		
8/20/2015	-0.84	2.19	-1.74
8/21/2015	-0.81	2.05	-1.66
8/22/2015	-0.82	2.43	-1.58
8/23/2015	-0.56	2.49	-1.56
8/24/2015	-0.37	2.49	-1.69
8/25/2015	-0.46	2.73	-1.8
8/26/2015	-0.07	2.94	-2.27
8/27/2015	0.71	3.07	-2.55
8/28/2015	0.72	3.23	-3
8/29/2015	0.61	3.24	-3.41
8/30/2015	0.49	2.98	-3.55
8/31/2015	0.08	2.77	-3.76
9/1/2015	-0.06	2.9	-3.69
9/2/2015	-0.2	3.09	-2.87
9/3/2015	-0.23	3.11	-2.43
9/4/2015	-0.03	3.04	-2.17
9/5/2015	-0.07	3.13	-1.36
9/6/2015	-0.12	2.55	-1.81
9/7/2015	-0.11	2.48	-1.96
9/8/2015	0.01	2.12	-2.31
9/9/2015	0.11	2.79	-2.06
9/10/2015	0.24	2.79	-2.13
9/11/2015	0.13	3.11	-1.87
9/12/2015	0.24	2.95	-1.84
9/13/2015	0.07	2.61	-1.97
9/14/2015	0.21	1.94	-2.7
9/15/2015	0.22	1.89	-2.71
9/16/2015	-0.05	2.08	-2.39

9/17/2015	-0.08	2.25	-2.16
9/18/2015	0.04	2.24	-1.88
9/19/2015	0.11	2.25	-1.87
9/20/2015	0.31	2.25	-1.67
9/21/2015	0.73	2.95	-0.8
9/22/2015	0.78	2.96	-0.97
9/23/2015	-0.02	2.79	-1.53
9/24/2015	0.13	2.93	-1.83
9/25/2015	0.17		
9/26/2015	0.25		
9/27/2015	0.32		
9/28/2015	0.42	0.72	
9/29/2015	0.23	3.26	-3.46
9/30/2015	0.15		
10/1/2015	0.2		
10/2/2015	0.06		
10/3/2015	0.31		
10/4/2015	0.39		
10/5/2015	0.39		
10/6/2015	0.28		
10/7/2015	0.34		
10/8/2015	0.5		
10/9/2015	0.62		
10/10/2015	0.86		
10/11/2015	0.33		
10/12/2015	0.13		
10/13/2015	0.19		
10/14/2015	0.24		
10/15/2015	0.48		
10/16/2015	0.47		
10/17/2015	0.28		
10/18/2015	0.18		
10/19/2015	0.21		
10/20/2015	0.05		
10/21/2015	0.02		
10/22/2015	0.06		
10/23/2015	0.06		
10/24/2015	-0.15		
10/25/2015	-0.01		
10/26/2015	-0.1		
10/27/2015	0		
10/28/2015	-0.04		
10/29/2015	-0.29		
10/30/2015	-0.11		
10/31/2015	0.06		
11/1/2015	0.52		
11/2/2015	0.81		
11/3/2015	0.85	1.98	-1.96
11/4/2015	0.69	1.87	-1.81
11/5/2015	0.17	1.7	-1.98
11/6/2015	0.3	1.76	-2.29
11/7/2015	0.19	1.53	-2.49
11/8/2015	-0.09	1.66	-2.12
11/9/2015	-0.19	1.93	-2.59
11/10/2015	-0.27	3.08	-2.26
11/11/2015	-0.34	3.16	-1.48
11/12/2015	-0.21	3.59	-1.6
11/13/2015	-0.11	2.51	-2.9
11/14/2015	0.18	1.48	-3.54
11/15/2015	0.22	2.12	-2.91
11/16/2015	0.28	2.04	-3.09
11/17/2015	0.35	2.91	-1.76
11/18/2015	0.36	2.35	-2.25
11/19/2015	0.39	2.47	-1.84
11/20/2015	0.32	2.24	-2.41
11/21/2015	0.19	2.66	-1.89

11/22/2015	0.12	2.87	-2.79
11/23/2015	0.02	2.78	-3.3
11/24/2015	-0.07	2.87	-3.53
11/25/2015	-0.26	2.78	-3.86
11/26/2015	-0.04		
11/27/2015	0.32		
11/28/2015	0.35		
11/29/2015	0.58	2.97	-2.6
11/30/2015	1.04	2.87	-1.62
12/1/2015	0.37		-1.53
12/2/2015	0.17	2.13	-1.82
12/3/2015	-0.18	1.3	-2.77
12/4/2015	0.15	0.63	-2.58
12/5/2015	0.34	1.16	-2.21
12/6/2015	0.59	1.44	-2.39
12/7/2015	0.59	1.72	-2.55
12/8/2015	0.43	2	-2.01
12/9/2015	-0.3	2.96	-1.65
12/10/2015	-0.33	2.85	-2.1
12/11/2015	-0.2	3.01	-2.26
12/12/2015	-0.05	2.78	-2.69
12/13/2015	-0.04	2.77	-2.76
12/14/2015	0.03	3.02	-2.42
12/15/2015	0.23	2.59	-2.7
12/16/2015	1.06	2.8	-2.44
12/17/2015	1.14	3.41	-1.77
12/18/2015	0.83	2.36	-2.55
12/19/2015	0.59	1.67	-3.86
12/20/2015	1.09	0.77	-3.65
12/21/2015	1.29	1.77	-3.67
12/22/2015	0.94	2.24	-3.65
12/23/2015	0.3	2.72	-2.83
12/24/2015	0.29	3.06	-3.26
12/25/2015	0.52		
12/26/2015	1.5	EqpP	EqpP
12/27/2015	2.85	EqpP	EqpP
12/28/2015	3.02	EqpP	EqpP
12/29/2015	2.67	EqpP	EqpP
12/30/2015	1.87	2.42	-1.86
12/31/2015	1.05	2.14	-1.95
1/1/2016	0.72	1.58	-2.07
1/2/2016	0.52	1.1	-2.21
1/3/2016	0.26	1.29	-2.32
1/4/2016	0.42	1.72	-1.52
1/5/2016		2.31	-1.61
1/6/2016	0.15	2.29	-2.72
1/7/2016		1.92	-2.45
1/8/2016	0.13	2.77	-1.59
1/9/2016	0.11	3.75	-1.54
1/10/2016	-0.21	4.43	-1.77
1/11/2016	-0.23	2.55	-3.82
1/12/2016		2.95	-3.26
1/13/2016	-0.05	1.64	-4.23
1/14/2016	-1.09	1.7	-3.8
1/15/2016	-0.87	2.02	-3.25
1/16/2016	-0.17	3.03	-2.35
1/17/2016	0.04	2.47	-1.7
1/18/2016	0.49	2.86	-3.89
1/19/2016	0.33	0.73	-5.02
1/20/2016	0.34	0.78	-3.78
1/21/2016	0.55	2.18	-3.3
1/22/2016	1.11	2.35	-2.95
1/23/2016		6.47	1.34P
1/24/2016	-0.38	4.74	-1.31
1/25/2016	-0.16	3.42	-2.3
1/26/2016	-0.22	2.42	-2.94

1/27/2016	-0.18	1.7	-3.04
1/28/2016	-0.11	2.33	-2.54
1/29/2016	-0.01	2.25	-2.49
1/30/2016	-0.04	1.64	-2.03
1/31/2016		1.14	-1.96
2/1/2016	-0.35	1.33	-2.03
2/2/2016	-0.26	1.5	-1.86
2/3/2016	-0.25	1.94	-2.29
2/4/2016	0.9	2.08	-2.58
2/5/2016	0.88	2.31	-2.38
2/6/2016	1.15	2.34	-3.03
2/7/2016	-0.3	2.34	-3.26
2/8/2016	-1.15	4.52	-2.09
2/9/2016	-0.67	4.68	-1.27
2/10/2016	-0.62	3.48	-3.16
2/11/2016	0.34	2.16	-4.36
2/12/2016		2.23	-4.21
2/13/2016	0.23	1.38	-4.13
2/14/2016	0.02	1.19	-3.78
2/15/2016	0.44	1.79	-2.73
2/16/2016	0.33	2.07	-3.03
2/17/2016	0.09	1.9	-3.14
2/18/2016	-0.23	1.75	-2.97
2/19/2016	-0.34	2.19	-2.61
2/20/2016	-0.28	2.27	-3.07
2/21/2016	-0.39	1.99	-3.32
2/22/2016		2.82	-2.91
2/23/2016		2.77	-2.71
2/24/2016		3.2	-1.68
2/25/2016	0.61	2.31	-3
2/26/2016	0.09	0.87	-4.15
2/27/2016	-0.68	1.39	-2.95
2/28/2016	-1.01	1.03	-2.99
2/29/2016	-0.41	0.21	-2.77
3/1/2016	-0.62	1.24	-2.4
3/2/2016	-0.43	1.87	-2.46
3/3/2016	0.02	0.82	-2.34
3/4/2016	0.55	1.8	-1.8
3/5/2016	0.33	2.5	-1.68
3/6/2016	0.22	2.95	-2.94
3/7/2016	-0.08	2.46	-3.24
3/8/2016	-0.05	2.62	-3.97
3/9/2016	0.17	2.78	-3.6
3/10/2016	-0.19	2.48	-4.08
3/11/2016	0.11	2.59	-4.07
3/12/2016	0.84	2.53	-3.5
3/13/2016	0.2	2.71	-3.3
3/14/2016	-0.95	2.71	-2.03
3/15/2016	-1.33	3.36	-1.52
3/16/2016	-0.9	2.59	-2.06
3/17/2016	-0.45	2.52	-1.81
3/18/2016	0.1	2.34	-2.15
3/19/2016	-0.17	2.16	-1.97
3/20/2016	-0.17	2.87	-1.46
3/21/2016	0.3	2.97	-1.97
3/22/2016	0.03	1.96	-2.91
3/23/2016	0.17	1.48	-3.7
3/24/2016	1.2	2.58	-3.02
3/25/2016	0.27	2.07	-2.62
3/26/2016	0.17	2.35	-2.61
3/27/2016	-0.32	2.49	-2.16
3/28/2016	-0.43	2.04	-1.68
3/29/2016	-0.4	0.06	-3.25
3/30/2016	0.03	0.93	-2.38
3/31/2016	0.6	1.62	-2.18
4/1/2016	-0.15	1.14	-2.76

4/2/2016	-0.33	1.89	-2.19
4/3/2016	0.63	0.77	-4.59
4/4/2016	1.18	1.92	-3.58
4/5/2016	1.17	2.87	-2.67
4/6/2016	-0.55	3.15	-3.24
4/7/2016	-0.41	3.17	-3.39
4/8/2016	-1.33	2.96	-3.99
4/9/2016	-1.01	3.27	-3.9
4/10/2016	-0.36	2.78	-3.45
4/11/2016		2.29	-3.52
4/12/2016		1.2	-3.37
4/13/2016		2.06	-2.54
4/14/2016		2.16	-2.31
4/15/2016	-1.44	2.11	-2.02
4/16/2016	-0.47	2.31	-1.74
4/17/2016	-0.18	2.68	-1.65
4/18/2016	3.6	2.22	-2.2
4/19/2016	2.02	2.4	-2.23
4/20/2016	0.63	2.31	-2.38
4/21/2016		2.3	-2.56
4/22/2016	-0.6	2.4	-2.81
4/23/2016	-0.02	2.8	-2.36
4/24/2016	0.05	2.7	-2.1
4/25/2016	-0.35	2.55	-2.21
4/26/2016	-0.52	2.98	-2.01
4/27/2016	-0.4	2.64	-1.31
4/28/2016	-0.19	1.51	-1.89
4/29/2016	0.05	2.4	-1.7
4/30/2016	-0.23	2.55	-2.09
5/1/2016	0	2.08	-2.02
5/2/2016	-0.31	2.5	-2.11
5/3/2016	-0.16	2.81	-2.39
5/4/2016	2.11	3.63	-2.42
5/5/2016	2.04	4.4	-2.05
5/6/2016	0.5	4.16	-2.06
5/7/2016	-0.93	3.79	-2.92
5/8/2016	-0.99	3.61	-3.3
5/9/2016	-1.02	2.86	-3.3
5/10/2016	-1.25	2.58	-3.16
5/11/2016	-0.49	1.47	-3.07
5/12/2016	-0.12	2.48	-2.43
5/13/2016	-0.43	2.42	-2.09
5/14/2016	-0.68	2.2	-2.06
5/15/2016	-0.18	1.91	-2.41
5/16/2016	-0.35	1.08	-3.28
5/17/2016	-0.32	1.52	-3.12
5/18/2016	0.16	2.22	-2.53
5/19/2016	0.61	2.24	-2.58
5/20/2016	1.02	2.21	-2.73
5/21/2016	-0.25	2.83	-2.71
5/22/2016	-1.66	3.02	-1.91
5/23/2016	-0.82	2.84	-1.88
5/24/2016	-1.18	2.66	-2.18
5/25/2016	-1.08	2.42	-2.33
5/26/2016	-0.65	2.31	-2.58
5/27/2016	-0.56	2.1	-2.53
5/28/2016	-0.74	2.1	-2.63
5/29/2016	0.23	1.87	-2.79
5/30/2016	0.67	2.31	-2.46
5/31/2016		2.04	-2.85
6/1/2016	-0.42	2.56	-3.08
6/2/2016	-0.2	3.36	-2.9
6/3/2016	-0.15	3.43	-3.05
6/4/2016	-0.45	3.55	-3.23
6/5/2016	-0.39	3.71	-3.11
6/6/2016	-0.27	3.44	-3.01

6/7/2016	-0.46	3.5	-2.94
6/8/2016	0.68	2.69	-3.56
6/9/2016	0.94	2.37	-3.09
6/10/2016	0.25	1.55	-2.68
6/11/2016	0.45	2.08	-2.17
6/12/2016	0.07	1.87	-2.06
6/13/2016	0.24	2.01	-2.01
6/14/2016	1.04	1.93	-1.89
6/15/2016	0.67	1.98	-2.03
6/16/2016		2.62	-1.7
6/17/2016	-1.1	2.81	-1.96
6/18/2016	-0.15	2.42	-2.38
6/19/2016	-0.07	2.56	-2.49
6/20/2016	-0.02	2.64	-2.67
6/21/2016	0.16	2.94	-2.65
6/22/2016	0.3	2.85	-2.64
6/23/2016	-1.25	3.07	-2.47
6/24/2016	-0.74	2.89	-2.48
6/25/2016	-0.57	2.58	-2.29
6/26/2016	-0.82	1.92	-2.53
6/27/2016	-0.14	2.28	-2.53
6/28/2016	-1.39	2.23	-2.65
6/29/2016	-0.52	2.52	-2.67
6/30/2016	0.47	2.69	-2.76
7/1/2016	0.27	3.02	-3.09
7/2/2016	0.22	2.97	-3.32
7/3/2016	-0.1	2.98	-3.28
7/4/2016	0.11	2.93	-3.58
7/5/2016	-0.2	3.21	-3.24
7/6/2016	-0.7	3.03	-2.87
7/7/2016	-0.67	2.86	-2.65
7/8/2016	-0.28	3.14	-2.42
7/9/2016	-0.15	2.53	-1.64
7/10/2016	0.15	2.81	-1.73
7/11/2016	0.61	2.18	-1.78
7/12/2016	0.87	1.84	-1.87
7/13/2016	0.24	1.91	-1.92
7/14/2016	0.24	2.06	-1.85
7/15/2016	0.06	1.96	-2.24
7/16/2016	-0.05	2.2	-2.45
7/17/2016		2.47	-2.44
7/18/2016	0.34	2.21	-2.77
7/19/2016	0.36	2.75	-2.89
7/20/2016	0.04	2.92	-2.82
7/21/2016		2.82	-2.93
7/22/2016	0.76	2.5	-3.08
7/23/2016	0.21	2.69	-3.2
7/24/2016	0.5	2.68	-2.83
7/25/2016	0.21	2.48	-2.55
7/26/2016	0.07	2.47	-2.66
7/27/2016	0.33	2.78	-2.49
7/28/2016	0.55	2.88	-2.35
7/29/2016	1.1	3.26	-2.42
7/30/2016	1.52	3.18	-2.59
7/31/2016	1.43	3.23	-2.67
8/1/2016	0.76	3.51	-2.53
8/2/2016	0.4	3.66	-2.43
8/3/2016	-0.13	3.27	-2.32
8/4/2016	-0.27	2.92	-2.49
8/5/2016	-0.33	2.58	-2.43
8/6/2016	-0.13	2.35	-2.43
8/7/2016	0.06	2.2	-2.19
8/8/2016	0.11	2.06	-1.97
8/9/2016	-0.41	1.77	-1.88
8/10/2016	-1.01	1.68	-2.04
8/11/2016	-0.81	1.53	-2.25

8/12/2016	-0.17	1.66	-2.37
8/13/2016		2.06	-2.3
8/14/2016	-0.34	2.34	-2.24
8/15/2016	-0.01	2.53	-2.39
8/16/2016	0.53	2.8	-2.49
8/17/2016		2.72	-3.21
8/18/2016	0.1	3.18	-3.31
8/19/2016	-0.12	3.32	-2.82
8/20/2016	-0.34	3.35	-2.82
8/21/2016	-0.34	3.03	-2.5
8/22/2016	-0.52	2.75	-3.05
8/23/2016	-0.39	2.62	-2.69
8/24/2016	-0.1	2.21	-3
8/25/2016	-0.21	2.41	-2.88
8/26/2016	-0.08	2.25	-2.78
8/27/2016	0.44	2.74	-2.28
8/28/2016	0.41	2.88	-2.51
8/29/2016	0.22	2.81	-2.7
8/30/2016	0.36	2.84	-2.7
8/31/2016	0.2	3.09	-2.68
9/1/2016	0.26	3.08	-2.47
9/2/2016	-0.09	3.06	-2.46
9/3/2016	-0.46	3.36	-1.58
9/4/2016	-0.28	3.22	-1.07
9/5/2016	-0.17	3.26	-0.92
9/6/2016	-0.04	3.84	-0.59
9/7/2016	0.15	2.65	-1.05
9/8/2016	0.04	2.33	-1.18
9/9/2016	-0.06	2.02	-1.51
9/10/2016	0.4	2	-1.52
9/11/2016	0.41	1.88	-1.8
9/12/2016	-0.04	2.54	-1.7
9/13/2016	-0.16	2.65	-2.21
9/14/2016	-0.26	2.82	-2.62
9/15/2016	-0.16	3.25	-2.58
9/16/2016	-0.16	3.22	-2.74
9/17/2016		3.09	-3.12
9/18/2016	0.17	2.84	-3.33
9/19/2016	0.18	3.23	-3.04
9/20/2016	-0.06	3.08	-2.81
9/21/2016	-0.12	2.95	-2.57
9/22/2016	-0.08	2.97	-2.39
9/23/2016	0.05	2.84	-2
9/24/2016	0.01	3.23	-1.68
9/25/2016	0.02	2.77	-2.01
9/26/2016	-0.08	2.82	-1.99
9/27/2016	-0.17	2.77	-2.38
9/28/2016	-0.33	3.57	-1.83
9/29/2016	-0.11	4.23	-0.54
9/30/2016	-0.01	3.93	-0.52
10/1/2016	0.08	3.51	-1.4
10/2/2016	0.33	2.99	-1.74
10/3/2016	0.76	2.96	-1.69
10/4/2016	0.43	3.01	-1.64
10/5/2016	0.28	3.15	-0.9
10/6/2016	0.02	2.57	-1.49
10/7/2016	-0.1	2.24	-1.31
10/8/2016	0	2.31	-1.2
10/9/2016	-0.23	2.79	-0.81
10/10/2016	-0.15	2.64	-1.1
10/11/2016	-0.12	2.34	-1.96
10/12/2016	-0.33	2.89	-2.04
10/13/2016	-0.36	2.87	-2.62
10/14/2016	-0.06	3.07	-2.52
10/15/2016	-0.2	3.13	-2.8
10/16/2016	-0.36	3.35	-3.19

10/17/2016		3.42	-3.39
10/18/2016	0.06	3.57	-3.1
10/19/2016	0.07	3.3	-2.83
10/20/2016	0.07	3.3	-2.5
10/21/2016	0.19	3.44	-1.6
10/22/2016	0.31	2.5	-2.5
10/23/2016	0.56	1.01	-3.34
10/24/2016	0.35	1.72	-3.2
10/25/2016	0.29	1.66	-2.41
10/26/2016	0.47	2.04	-2.37
10/27/2016	0.61	2.38	-2.49
10/28/2016	0.53	1.96	-2.49
10/29/2016	0.31	2.2	-2.7
10/30/2016	0.11	2.33	-2.53
10/31/2016	-0.08	2.98	-1.99
11/1/2016	0.11	2.93	-1.99
11/2/2016	0.09	2.54	-2.16
11/3/2016	-0.12	2.45	-1.97
11/4/2016	-0.38	2.75	-1.47
11/5/2016	-0.58	2.37	-1.75
11/6/2016	-0.53	2.01	-1.97
11/7/2016	-0.35	2.57	-1.09
11/8/2016		2.64	-1.57
11/9/2016	-0.17	2.66	-2.03
11/10/2016	-0.07	2.63	-2.42
11/11/2016	-0.37	2.08	-3.53
11/12/2016	0.02	2.54	-3.4
11/13/2016	0.27	2.54	-4.02
11/14/2016	0.37	2.66	-4.46
11/15/2016	0.5	3.61	-3.46
11/16/2016	0.06	3.59	-3.51
11/17/2016	-0.03	3.17	-3.44
11/18/2016		3.15	-2.58
11/19/2016	-0.3	3.63	-1.59
11/20/2016	-0.31	1.53	-3.99
11/21/2016	0.17	0.19	-4.35
11/22/2016	0.26	0.45	-3.27
11/23/2016	0.15	1.26	-2.59
11/24/2016	0.19	1.66	-2.33
11/25/2016	0.29	2.15	-2.18
11/26/2016	0.35	2.43	-2.13
11/27/2016	0.53	2.34	-2.24
11/28/2016	1.47	2.62	-2.51
11/29/2016	1.43	2.3	-2.9
11/30/2016	1.39	2.59	-2.77
12/1/2016	1.55	2.73	-2.19
12/2/2016	0.8	2.06	-2.91
12/3/2016	0.42	1.17	-3.33
12/4/2016		2.53	-2.01
12/5/2016	0.1	2.47	-1.81
12/6/2016	-0.05	2.55	-1.55
12/7/2016	0.26	3.18	-1.7
12/8/2016	0.09	2.23	-2.87
12/9/2016	0.02	1.44	-3.79
12/10/2016	0.57	1.71	-3.69
12/11/2016	0.57	2.32	-3.18
12/12/2016	0.31	3.14	-3.59
12/13/2016	0.1	2.96	-3.98
12/14/2016	0.35	3.58	-3.28
12/15/2016	0.26	2.64	-4.15
12/16/2016	0.21	1.99	-5.22
12/17/2016	0.29	2.7	-3.69
12/18/2016	0.35	2.06	-3.4
12/19/2016	0.71	1.45	-3.07
12/20/2016		1.78	-2.12
12/21/2016	0.37	1.56	-2.32

12/22/2016	0.3	1.36	-2.87
12/23/2016	0.94	1.4	-2.67
12/24/2016	2.41	1.73	-2.66
12/25/2016	2.38	1.6	-2.79
12/26/2016	1.47	2.01	-2.15
12/27/2016	0.81	2.18	-3.16
12/28/2016	0.67	1.95	-3.2
12/29/2016	0.96	2.95	-2.27
12/30/2016	1.2	2.05	-3.68
12/31/2016	0.48	1.85	-3.41
1/1/2017	0.29	1.91	-3.58
1/2/2017	0.5	2.61	-2.76
1/3/2017	1.22	3.29	-1.51
1/4/2017	0.93	2.6	-2.48
1/5/2017	0.44	1.14	-3.23
1/6/2017	0.55	1.61	-2.84
1/7/2017	0.42	1.81	-2.27
1/8/2017	0.49	2.6	-3.43
1/9/2017	0.55	2.19	-3.84
1/10/2017	0.39	2.35	-3.45
1/11/2017	0.22	2.35	-3.91
1/12/2017	0.39	2.68	-4.11
1/13/2017	0.23	2.56	-4.3
1/14/2017	0.42	2.64	-3.97
1/15/2017	0.83	2.39	-3.2
1/16/2017	0.2	2.1	-3.12
1/17/2017	-1.24	1.56	-2.92
1/18/2017	-0.72	1.94	-2.21
1/19/2017		2.44	-1.74
1/20/2017	-0.13	1.68	-1.73
1/21/2017	0.22	1.79	-1.72
1/22/2017	-0.12	2.02	-1.24
1/23/2017	-0.03	3.81	1.13P
1/24/2017	0.01	4.22	-1.44
1/25/2017	0.53	2.7	-1.87
1/26/2017	0.36	2.71	-2.37
1/27/2017		1.74	-3.71
1/28/2017	0	1.5	-4.23
1/29/2017	0.39	2.16	-3.76
1/30/2017	0.14	2.57	-2.89
1/31/2017		2.74	-3.45
2/1/2017	0.66	2.26	-3.23
2/2/2017	0.69	1.85	-2.98
2/3/2017	0.45	1.55	-2.88
2/4/2017	0.52	1.46	-3.37
2/5/2017	-0.36	1.48	-3.3
2/6/2017	-0.05	1.69	-3.42
2/7/2017	-0.54	2.11	-2.88
2/8/2017	-0.43	2.56	-2.78
2/9/2017	0.44	3.91	-3.32
2/10/2017	0.11	2.42	-3.98
2/11/2017	0	2.23	-3.91
2/12/2017	0.24	3.27	-3.08
2/13/2017	0.71	1.5	-4.16
2/14/2017	-1.07	3.07	-3.13
2/15/2017	-1.97	2.79	-1.84
2/16/2017	-1.39	1.03	-2.71
2/17/2017	-0.61	1.47	-2.65
2/18/2017	-0.19	1.05	-2.24
2/19/2017	0.07	1.6	-1.93
2/20/2017		1.48	-1.72
2/21/2017	-0.01	2.15	-1.78
2/22/2017	-0.12	2.19	-2.03
2/23/2017	-0.3	2.27	-2.34
2/24/2017	0.06	2.42	-2.34
2/25/2017	0.11	2.69	-2.54

2/26/2017	-0.71	2.43	-3.26
2/27/2017	-1.06	2.03	-3.95
2/28/2017	0.06	2.29	-3.97
3/1/2017	0.22	2.54	-3.53
3/2/2017	0.56	1.07	-4.46
3/3/2017	1.11	0.87	-4.47
3/4/2017	0.09	0.6	-3.88
3/5/2017	-0.86	1.17	-3.44
3/6/2017	-0.65	1.91	-2.57
3/7/2017	-0.29	2.35	-2.77
3/8/2017	-0.06	2	-3.5
3/9/2017	-0.13	1.53	-3.65
3/10/2017	0.22	2.53	-2.19
3/11/2017	-0.86	1.67	-3.93
3/12/2017	-1.43	1.38	-4.35
3/13/2017	-0.48	2.25	-4.14
3/14/2017	-0.68	3.89	-2.48
3/15/2017	-0.66	0.87	-4.66
3/16/2017	-0.19	0.47	-4.18
3/17/2017	-0.43	1.14	-3.32
3/18/2017		1.26	-2.35
3/19/2017	-0.6	2.3	-0.6
3/20/2017	-0.55	1.93	-1.25
3/21/2017	-0.63	2.01	-1.49
3/22/2017	-0.1	1.75	-2.41
3/23/2017	-0.55	1.23	-2.8
3/24/2017		1.13	-3.3
3/25/2017	0.32	1.48	-3.29
3/26/2017	-0.79	2.5	-2.83
3/27/2017	-1.03	2.67	-3.06
3/28/2017	-0.82	3.04	-3.34
3/29/2017	0.08	2.91	-3.12
3/30/2017	0.94	2.99	-3.24
3/31/2017	0.13	3.56	-2.9
4/1/2017	-1.01	2.85	-1.94
4/2/2017	-0.46	3.37	-2.37
4/3/2017		2.77	-2.28
4/4/2017	-0.11	3.02	-1.77
4/5/2017	-0.71	3.17	-1.66
4/6/2017	-0.46	3.26	-1.51
4/7/2017		2.94	-3.16
4/8/2017	-0.64	2.01	-3.21
4/9/2017	-0.77	2.24	-3.04
4/10/2017	-0.51	2.06	-3.2
4/11/2017		1.97	-3.22
4/12/2017	-0.6	2.31	-3.32
4/13/2017	-0.76	2.12	-2.86
4/14/2017	0.04	2.12	-2.83
4/15/2017		1.92	-2.36
4/16/2017	0.02	1.5	-2.38
4/17/2017	0.06	0.84	-2.36
4/18/2017	0.38	1.88	-1.79
4/19/2017		2.05	-1.49
4/20/2017		1.94	-1.84
4/21/2017	0.25	2.15	-1.61
4/22/2017	0.05	2.69	-2
4/23/2017		2.55	-2.5
4/24/2017	-1.39	2.86	-2.62
4/25/2017	-0.69	3.76	-2.27
4/26/2017	-0.26	3.55	-2.64
4/27/2017	-0.27	3.36	-3.32
4/28/2017	-0.37	3.13	-3.64
4/29/2017	-0.61	2.85	-3.62
4/30/2017	-0.65	3.05	-3.47
5/1/2017	-0.88	1.85	-2.53
5/2/2017	-0.88	2.59	-2.84

5/3/2017	-0.88	2.44	-2.64
5/4/2017	-0.27	2.03	-2.33
5/5/2017	0.11	2.56	-1.3
5/6/2017	0.35	2.66	-2.07
5/7/2017	-0.75	2.39	-2.53
5/8/2017	-0.52	2.4	-2.65
5/9/2017	0.5	2.74	-2.61
5/10/2017	-0.87	2.92	-2.38
5/11/2017	0.25	3.03	-2.4
5/12/2017	0.56	3.14	-1.98
5/13/2017	-0.53	3.06	-1.5
5/14/2017	-0.7	2.69	-1.47
5/15/2017	-0.56	2.68	-2.24
5/16/2017	-0.36	2.19	-1.77
5/17/2017	-0.21	1.27	-2.02
5/18/2017	0.02	1.92	-2.16
5/19/2017	-0.01	1.79	-2.49
5/20/2017		2.1	-1.77
5/21/2017	-0.01	2.1	-2.33
5/22/2017	0.27	2.63	-2.57
5/23/2017	-0.39	3.18	-2.64
5/24/2017	-0.91	3.88	-2.42
5/25/2017	-0.7	4.64	-2.26
5/26/2017	-0.45	3.84	-3.09
5/27/2017	-1.58	3.87	-3.09
5/28/2017	-1.62	4.11	-2.76
5/29/2017	-1.51	3.75	-1.93
5/30/2017	-1.13	2.39	-2.24
5/31/2017	-0.51	3.07	-2.07
6/1/2017	-0.25	2.61	-2.24
6/2/2017	-0.6	2.19	-2.02
6/3/2017	-0.93	2.07	-2.04
6/4/2017	0.16	2.41	-2.09
6/5/2017	-1.03	2.72	-1.99
6/6/2017	-1.33	3.24	-1.51
6/7/2017	-0.95	3.19	-1.19
6/8/2017	0.9	3.16	-1.74
6/9/2017	-1.57	2.72	-1.87
6/10/2017	-1.98	2.31	-2.35
6/11/2017	-1.28	2.52	-2.81
6/12/2017	-0.31	2.29	-2.58
6/13/2017	0.87	2.51	-2.39
6/14/2017	0.38	2.71	-2.19
6/15/2017	0.08	1.82	-1.8
6/16/2017	-0.56	2.72	-1.67
6/17/2017	-0.86	2.57	-1.82
6/18/2017	-1.01	2.2	-2.28
6/19/2017	-0.74	2.16	-2.82
6/20/2017		2.51	-2.9
6/21/2017	0.04	2.76	-3.38
6/22/2017	0.16	3.46	-3.35
6/23/2017	0.23	3.56	-3.2
6/24/2017	-0.02	3.43	-3.7
6/25/2017	0.44	3.51	-3.47
6/26/2017	0.92	3.21	-3.3
6/27/2017	0.31	3	-3.09
6/28/2017	0.15	2.43	-2.86
6/29/2017	0.69	1.82	-2.79
6/30/2017	0.72	1.84	-2.74
7/1/2017	1.34	1.89	-2.49
7/2/2017	0.24	1.98	-2.2
7/3/2017	-0.43	2.1	-2.16
7/4/2017	-0.17	2.34	-2.09
7/5/2017		2.58	-2.09
7/6/2017	-0.63	2.81	-2.18
7/7/2017		2.94	-2

7/8/2017		2.84	-2.07
7/9/2017	-0.45	2.74	-2.14
7/10/2017	-0.38	2.76	-2.29
7/11/2017	-0.63	2.57	-2.23
7/12/2017	-0.45	2.44	-2.45
7/13/2017	-0.11	2.48	-2.42
7/14/2017	0.04	2.88	-2.44
7/15/2017	-0.14	2.16	-2.26
7/16/2017	0.44	2.3	-2.21
7/17/2017	0.57	2.32	-2.31
7/18/2017	0.35	2.47	-2.53
7/19/2017	0.46	2.71	-2.72
7/20/2017	1.08	2.95	-2.95
7/21/2017	0.94	3.32	-3.13
7/22/2017	0.28	3.64	-3.17
7/23/2017	-0.12	3.97	-2.9
7/24/2017	-0.44	4.02	-2.38
7/25/2017	-0.19	3.6	-2.31
7/26/2017	0.03	3.18	-2.27
7/27/2017	-0.28	2.7	-2.35
7/28/2017	-0.33	2.52	-2.26
7/29/2017	-0.05	3.26	-1.21
7/30/2017	0.78	3.37	-0.86
7/31/2017	0.56	2.39	-1.49
8/1/2017	0.13	2.27	-1.66
8/2/2017	-0.05	2.47	-1.66
8/3/2017		2.62	-1.55
8/4/2017	0.25	2.87	-1.8
8/5/2017	0.3	2.78	-2.2
8/6/2017	0.52	2.66	-2.37
8/7/2017	1.19	2.82	-2.35
8/8/2017	0.88	2.92	-2.34
8/9/2017	0.02	2.79	-2.54
8/10/2017	0.11	2.69	-2.57
8/11/2017	-0.17	2.7	-2.56
8/12/2017	-0.3	2.59	-2.4
8/13/2017	-0.35	2.45	-2.29
8/14/2017	0.37	2.4	-2.39
8/15/2017	0.05	2.7	-2.24
8/16/2017	0.23	2.85	-2.32
8/17/2017	0.54	3.08	-2.31
8/18/2017	0.94	3.15	-2.81
8/19/2017	1.28	3.57	-2.7
8/20/2017	0.56	3.31	-2.95
8/21/2017	0.43	3.14	-3.22
8/22/2017	0.65	3	-3.11
8/23/2017	0.99	3.01	-3.3
8/24/2017		2.82	-2.6
8/25/2017	0.38	2.62	-2.16
8/26/2017	0.16	2.41	-2.18
8/27/2017	0.15	2.41	-2
8/28/2017	0.07	2.62	-1.25
8/29/2017	0.09	3.01	-0.87
8/30/2017	0.35	2.83	-0.67
8/31/2017	0.94	2.24	-1.3
9/1/2017	1.05	2.71	-1.39
9/2/2017	0.54	2.77	-1.54
9/3/2017	0.39	2.96	-1.45
9/4/2017	-0.2	2.7	-2.38
9/5/2017	-0.33	2.57	-2.78
9/6/2017	-0.39	2.76	-2.59
9/7/2017	-0.2	2.59	-2.71
9/8/2017	0.12	2.38	-3.06
9/9/2017	0.32	2.55	-2.92
9/10/2017	0.49	2.71	-2.35
9/11/2017	0.35	2.63	-2.33

9/12/2017	0.06	2.72	-2.43
9/13/2017	-0.29	3.02	-1.81
9/14/2017	-0.16	3.08	-1.85
9/15/2017	-0.16	3.03	-2.1
9/16/2017	0.09	3.07	-2.24
9/17/2017	0.17	3.35	-2.27
9/18/2017	-0.12	3.8	-2.24
9/19/2017	0.01	4.52	-1.57
9/20/2017	0	3.99	-1.42
9/21/2017	0.05	3.38	-2.01
9/22/2017		3.78	-1.49
9/23/2017	-0.32	3.29	-1.65
9/24/2017	-0.46	2.64	-1.83
9/25/2017	-0.23	2.72	-1.36
9/26/2017	-0.01	2.44	-1.22
9/27/2017	-0.03	2.68	-0.92
9/28/2017	0.04	2.52	-1
9/29/2017	0.17	2.39	-1.11
9/30/2017	0.29	1.98	-1.57
10/1/2017	0.38	2.63	-1.69
10/2/2017	0.27	2.47	-2.03
10/3/2017	0.14	2.96	-1.96
10/4/2017	0.01	2.53	-2.61
10/5/2017	-0.06	2.05	-3.42
10/6/2017	-0.11	2.69	-3.36
10/7/2017	-0.11	3.18	-2.75
10/8/2017	0.3	3.15	-3.09
10/9/2017	0.26	3.11	-2.97
10/10/2017		2.89	-2.87
10/11/2017	0.06	2.97	-2.38
10/12/2017	0	4.05	-0.65
10/13/2017	0	3.17	-1.42
10/14/2017	0	2.69	-2.08
10/15/2017	0.12	2.52	-2.48
10/16/2017	0.29	2.39	-2.33
10/17/2017	0.48	2.75	-2.15
10/18/2017	0.86	2.56	-2.74
10/19/2017	0.76	2.35	-2.95
10/20/2017	0.62	2.37	-2.89
10/21/2017	0.3	2.6	-2.69
10/22/2017	0.45	2.54	-2.35
10/23/2017	1.6	2.74	-1.93
10/24/2017	1.19	3	-1.56
10/25/2017	0.44	2.68	-1.38
10/26/2017	0.27	2.33	-1.33
10/27/2017	0.26	1.57	-1.77
10/28/2017		2.02	-1.52
10/29/2017	0.36	2.88	-1.03
10/30/2017	0.34	2.02	-2.95
10/31/2017	0.08	1.73	-3.15
11/1/2017	0.19	2.71	-2.37
11/2/2017	0.35	2.74	-2.44
11/3/2017	0.06	3.01	-2.71
11/4/2017	-0.04	3.64	-3.07
11/5/2017	0.05	4.11	-2.45
11/6/2017	0.2	3.72	-2.99
11/7/2017	0.17	3.66	-2.53
11/8/2017	0.08	4.13	-1.32
11/9/2017	0.34	3.59	-1.5
11/10/2017	0.34	2.43	-2.1
11/11/2017	0.37	2.27	-2.41
11/12/2017	0.25	2.14	-2.34
11/13/2017	0.4	2.36	-2.05
11/14/2017	0.25	2.65	-1.78
11/15/2017	0.08	3.09	-1.28
11/16/2017	0.06	3.26	-1.86

11/17/2017	0.14	2.29	-2.87
11/18/2017	0.3	2.8	-2.55
11/19/2017	0.27	1.97	-3.15
11/20/2017	0.19	1.49	-3.37
11/21/2017	0.35	1.65	-3.19
11/22/2017	0.77	2.35	-2.26
11/23/2017	1.39	2.2	-1.81
11/24/2017	1.4	1.87	-1.93
11/25/2017	0.43	2.31	-1.67
11/26/2017	0.66	1.76	-2.11
11/27/2017	0.58	1.24	-2.61
11/28/2017	0.68	1.92	-2.09
11/29/2017	0.11	1.77	-2.88
11/30/2017	-0.08	2.24	-2.22
12/1/2017	0.21	2.96	-2.83
12/2/2017	0.22	3.15	-2.74
12/3/2017	-0.2	3.54	-2.93
12/4/2017	0.06	3.63	-3.17
12/5/2017	0.18	3.9	-2.98
12/6/2017	0.09	2.95	-3.25
12/7/2017	0.24	2.78	-3.42
12/8/2017	0.47	2.65	-3.13
12/9/2017	0.47	2.9	-1.74
12/10/2017	0.42	2.68	-2.61
12/11/2017	0.48	1.15	-2.69
12/12/2017	0.63	2.16	-2.64
12/13/2017	1.05	1.46	-3.29
12/14/2017	2.09	0.86	-4.11
12/15/2017	1.71	1.89	-2.72
12/16/2017	1.04	1.54	-3.43
12/17/2017	1.4	1.73	-3.86
12/18/2017	0.84	2.39	-2.74
12/19/2017	0.46	2.42	-2.89
12/20/2017	0.59	1.89	-3.01
12/21/2017	0.6	2.2	-2.6
12/22/2017	0.91	2.38	-2.23
12/23/2017	0.86	2.64	-2.16
12/24/2017	0.65	2.32	-2.15
12/25/2017	0.34	1.92	-3.51
12/26/2017	0.82	0	-3.7
12/27/2017	0.25	0.75	-3.26
12/28/2017	0.53	0.93	-4.05
12/29/2017	0.11	1.2	-3.09
12/30/2017	-0.46	2.59	-3.9
12/31/2017	0.02	2.44	-3.22
1/1/2018	0.35	2.77	-3.98
1/2/2018	0.09	2.41	-4.5
1/3/2018	-0.06	2.8	-4.6
1/4/2018	-0.07	3.55	-2.92
1/5/2018	0.27	1.63	-5.33
1/6/2018	1.76	-0.4	-5.79
1/7/2018	1.24	0.63	-4.43
1/8/2018	0.57	0.75	-4.2
1/9/2018	0.23	0.33	-3.41
1/10/2018	0	1.07	-2.55
1/11/2018	0.48	1.53	-2.55
1/12/2018	0.06	1.87	-2.2
1/13/2018	-0.24	2	-3.66
1/14/2018	-0.23	1.51	-2.66
1/15/2018	-0.02	2.44	-2.44
1/16/2018	0	2.77	-1.91
1/17/2018	0.32	2.45	-2.53
1/18/2018	0.54	EqpP	EqpP
1/19/2018	0.59	EqpP	EqpP
1/20/2018	0.32	2.17	-2.83
1/21/2018	-0.22	1.61	-2.95

1/22/2018	0.07	1.98	-2.21
1/23/2018	0.99	2.44	-2
1/24/2018	-0.02	1.81	-3.05
1/25/2018	-0.86	1.15	-2.77
1/26/2018	0.29	1.36	-3.26
1/27/2018	0.37	1.77	-3.62
1/28/2018	0.36	1.82	-3.56
1/29/2018	0.72	2.69	-2.5
1/30/2018	1.02	4.26	-2.15
1/31/2018	0.48	3.46	-3.27
2/1/2018	0.66	2.4	-4.28
2/2/2018	1.46	2.86	-4.08
2/3/2018	1.11	2.13	-4.07
2/4/2018	0.16	2.22	-3.79
2/5/2018	-0.04	0.85	-3
2/6/2018	-0.01	1.44	-3.11
2/7/2018	0.33	1.63	-2.29
2/8/2018	0.66	1.03	-2.65
2/9/2018	1.12	0.76	-2.27
2/10/2018	0.67	1.48	-2.24
2/11/2018	-0.3	1.8	-2.7
2/12/2018	0.05	1.24	-2.98
2/13/2018	-0.71	1.68	-2.98
2/14/2018	-0.98	1.95	-2.84
2/15/2018	-0.92	2.04	-3.23
2/16/2018	-0.18	2.46	-2.79
2/17/2018	0.06	2.43	-2.91
2/18/2018	-0.15	2.02	-3.29
2/19/2018	0.21	2.15	-2.98
2/20/2018	-0.15	1.39	-3.26
2/21/2018	-0.65	0.94	-3.23
2/22/2018	-0.1	1.36	-2.83
2/23/2018	-0.41	2.35	-2.32
2/24/2018	0.1	2.08	-2.86
2/25/2018	0.36	2.16	-1.98
2/26/2018	0.36	2.84	-2.98
2/27/2018	0.4	2.58	-3.5
2/28/2018	0.34	2.59	-3.49
3/1/2018	0.45	3.06	-3.53
3/2/2018	-0.09	3.18	-3.72
3/3/2018	-0.34	4.11	-1.8
3/4/2018	-0.29	4.32	-0.94
3/5/2018	0.57	4.14	-1.3
3/6/2018	0.12	3.8	-0.55
3/7/2018	-0.71	4.01	-0.73
3/8/2018		3.51	-1.37
3/9/2018	-1	2.13	-1.94
3/10/2018	-1.08	1.11	-2.32
3/11/2018	-0.36	1.32	-2.29
3/12/2018	-1.18	2.11	-1.26
3/13/2018	-0.65	3.13	-1.07
3/14/2018	-0.21	2.17	-2.55
3/15/2018	-0.38	0.7	-3.77
3/16/2018	-0.73	1.63	-3.24
3/17/2018	-0.3	1.91	-3.75
3/18/2018	-0.15	2.56	-3.62
3/19/2018	-0.01	2.75	-3.07
3/20/2018	-0.03	3.73	-2.73
3/21/2018	-0.87	3.81	-0.92
3/22/2018		3.06	-1.74
3/23/2018	-1.22	2.02	-2.37
3/24/2018	-1.46	1.99	-2.47
3/25/2018	-0.99	2.41	-1.78
3/26/2018	-0.31	2.97	-1.7
3/27/2018	-0.47	2.79	-2.19
3/28/2018	-0.56	2.98	-2.43

3/29/2018	-0.94	2.97	-2.81
3/30/2018	-0.57	2.63	-3.16
3/31/2018	0.56	2.4	-3.54
4/1/2018	-1.8	2.27	-3.55
4/2/2018	-3.11	2.79	-3.39
4/3/2018	-1.76	2.8	-2.79
4/4/2018	-1.64	1.87	-2.84
4/5/2018	-1.48	1.39	-3.08
4/6/2018	-0.65	1.39	-2.58
4/7/2018	-0.65	1.44	-2.45
4/8/2018	-0.22	1.84	-1.23
4/9/2018	-0.64	1.72	-1.68
4/10/2018	-0.56	1.38	-2.17
4/11/2018	0.38	1.72	-1.92
4/12/2018	0.43	EqpP	EqpP
4/13/2018			
4/14/2018	-0.09		
4/15/2018	-0.31		
4/16/2018	-0.53		
4/17/2018	-0.72	EqpP	EqpP
4/18/2018	-0.24	2.86	-3.65
4/19/2018	0.04	2.3	-2.87
4/20/2018	-0.74	2.37	-3.11
4/21/2018	-0.83	1.16	-2.92
4/22/2018	-0.99	2.02	-2.95
4/23/2018	-0.75	1.95	-2.75
4/24/2018	-0.85	2.19	-2.52
4/25/2018	0.42	2.79	-2.04
4/26/2018	1.16	2.59	-2.77
4/27/2018	0.22	2.72	-2.32
4/28/2018	-0.76	2.93	-2.65
4/29/2018	-0.6	2.48	-2.97
4/30/2018	-1.07	2.56	-3.17
5/1/2018	-0.69	2.47	-2.85
5/2/2018	-0.75	2.29	-2.98
5/3/2018	-0.88	1.86	-3.04
5/4/2018	-0.26	1.88	-2.78
5/5/2018	-0.73	1.78	-2.74
5/6/2018	-0.8	1.78	-2.12
5/7/2018	-0.48	2.16	-1.71
5/8/2018	-0.42	1.8	-1.73
5/9/2018	-0.78	1.59	-1.73
5/10/2018	-0.54	1.73	-1.97
5/11/2018	-0.63	1.93	-2.41
5/12/2018	-0.5	2.27	-2.59
5/13/2018	-0.06	2.79	-2.4
5/14/2018		3	-2.76
5/15/2018		3.03	-3.13
5/16/2018		3.49	-3.21
5/17/2018		3.36	-2.82
5/18/2018		3.87	-2.92
5/19/2018		3.14	-2.26
5/20/2018		1.41	-2.8
5/21/2018		2.53	-2.74
5/22/2018		2.57	-2.27
5/23/2018		2.48	-2.18
5/24/2018		2.28	-2.5
5/25/2018		2.34	-2.76
5/26/2018		2.31	-3.11
5/27/2018		3.27	-2.28
5/28/2018		3.01	-2.09
5/29/2018		2.84	-2.35
5/30/2018		2.93	-2.45
5/31/2018		2.93	-2.02
6/1/2018		2.84	-2
6/2/2018		2.79	-1.76

6/3/2018	3.35	-1.12
6/4/2018	2.26	-0.94
6/5/2018	2.87	-1.16
6/6/2018	2.54	-0.94
6/7/2018	2.54	-1.38
6/8/2018	2.01	-1.91
6/9/2018	2.18	-2.25
6/10/2018	2.76	-2.4
6/11/2018	3.32	-2.02
6/12/2018	3.22	-2.94
6/13/2018	3.26	-3.27
6/14/2018	3.45	-3.44
6/15/2018	3.78	-3.02
6/16/2018	3.36	-3.06
6/17/2018	3.09	-3.07
6/18/2018	2.02	-2.88
6/19/2018	2.58	-3.05
6/20/2018	2.46	-2.55
6/21/2018	2.53	-2.09
6/22/2018	2.81	-1.54
6/23/2018	2.92	-1.64
6/24/2018	2.82	-2.1
6/25/2018	2.77	-2.31
6/26/2018	2.78	-2.04
6/27/2018	3	-2.19
6/28/2018	2.97	-2.21
6/29/2018	2.68	-2.16
6/30/2018	2.64	-2.17
7/1/2018	2.53	-2.12
7/2/2018	2.48	-1.98
7/3/2018	2.1	-1.99
7/4/2018	1.24	-2.12
7/5/2018	1.83	-2.22
7/6/2018	1.64	-2.5
7/7/2018	2.2	-1.61
7/8/2018	2.27	-2.25
7/9/2018	2.5	-2.53
7/10/2018	2.94	-2.92
7/11/2018	3.64	-2.81
7/12/2018	3.7	-3.01
7/13/2018	3.53	-3.22
7/14/2018	3.32	-3.37
7/15/2018	3.33	-3.35
7/16/2018	3.09	-2.93
7/17/2018	2.9	-2.86
7/18/2018	2.9	-2.42
7/19/2018	2.47	-2.22
7/20/2018	2.34	-2.14
7/21/2018	3.32	-1.64
7/22/2018	2.92	-1.71
7/23/2018	2.6	-1.85
7/24/2018	2.73	-2.07
7/25/2018	2.87	-2.23
7/26/2018	2.66	-2.24
7/27/2018	2.66	-2.27
7/28/2018	2.79	-2.16
7/29/2018	2.58	-2.09
7/30/2018	2.52	-2.3
7/31/2018	2.61	-2.08
8/1/2018	2.05	-1.97
8/2/2018	1.85	-2.52
8/3/2018	1.79	-2.32
8/4/2018	1.75	-2.3
8/5/2018	2.15	-2.3
8/6/2018	2.45	-2.28
8/7/2018	2.62	-2.49

8/8/2018	3.17	-2.53
8/9/2018	3.51	-2.89
8/10/2018	3.81	-3
8/11/2018	3.77	-3.2
8/12/2018	3.57	-3.13
8/13/2018	3.36	-2.83
8/14/2018	2.72	-2.94
8/15/2018	2.42	-3.03
8/16/2018	2.25	-2.68
8/17/2018	2.23	-2.42
8/18/2018	2.23	-2.1
8/19/2018	2.88	-1.51
8/20/2018	2.79	-1.16
8/21/2018	2.88	-1.19
8/22/2018	2.64	-1.7
8/23/2018	2.7	-1.59
8/24/2018	2.74	-1.89
8/25/2018	2.68	-2.14
8/26/2018	2.53	-2.19
8/27/2018	2.54	-2.61
8/28/2018	2.39	-2.37
8/29/2018	2.27	-2.41
8/30/2018	2.35	-2.32
8/31/2018	2.88	-2.07
9/1/2018	2.81	-1.53
9/2/2018	2.52	-1.71
9/3/2018	2.43	-2.02
9/4/2018	2.43	-2.32
9/5/2018	2.85	-2.15
9/6/2018	3.08	-2.76
9/7/2018	3.48	-2.82
9/8/2018	4.24	-2.29
9/9/2018	4.89	-1.62
9/10/2018	4.18	-1.23
9/11/2018	3.65	-2.37
9/12/2018	3.13	-2.43
9/13/2018	3.08	-2.04
9/14/2018	3.15	-1.37
9/15/2018	2.81	-1.26
9/16/2018	2.47	-1.5
9/17/2018	2.5	-1.22
9/18/2018	2.22	-1.5
9/19/2018	2.99	-1.03
9/20/2018	3.11	-0.86
9/21/2018	2.86	-1.84
9/22/2018	2.83	-1.85
9/23/2018	3.05	-1.85
9/24/2018	3.4	-1.44
9/25/2018	3.51	-1.4
9/26/2018	2.94	-1.98
9/27/2018	2.88	-2.42
9/28/2018	2.9	-1.76
9/29/2018	2.68	-2.08
9/30/2018	2.76	-1.89
10/1/2018	2.61	-1.93
10/2/2018	2.76	-2
10/3/2018	2.77	-1.76
10/4/2018	2.99	-2.24
10/5/2018	3.6	-1.68
10/6/2018	3.35	-2.54
10/7/2018	3.07	-2.77
10/8/2018	3.38	-2.91
10/9/2018	3.26	-2.76
10/10/2018	3.07	-2.85
10/11/2018	3.48	-2.53
10/12/2018	3.64	-1.75

10/13/2018		3.27	-1.83
10/14/2018		2.75	-1.7
10/15/2018		2.11	-1.73
10/16/2018		2.12	-2.48
10/17/2018		1.35	-2.49
10/18/2018		1.17	-2.51
10/19/2018		1.46	-2.78
10/20/2018		2	-2.51
10/21/2018			
10/22/2018			
10/23/2018			
10/24/2018			
10/25/2018		2.05	
10/26/2018		3.02	-2.63
10/27/2018		5.01	-1.09
10/28/2018		3.01	-2.42
10/29/2018		2.23	-2.71
10/30/2018		2.43	-2.42
10/31/2018		2.8	-2.18
11/1/2018		2.55	-2.36
11/2/2018	0.04	2.45	-2.24
11/3/2018	-0.55	2.11	-3.8
11/4/2018	-0.81	1.86	-3.64
11/5/2018	0.51	2.99	-2.09
11/6/2018	0.58	3.52	-2.21
11/7/2018	-0.17	2.88	-3.01
11/8/2018	-0.22	2.76	-3.34
11/9/2018	0.55	3.56	-2.43
11/10/2018	-0.4	2.79	-3.02
11/11/2018	-0.79	2	-3.22
11/12/2018	-0.45	2.05	-2.34
11/13/2018	-0.13	1.82	-2.00
11/14/2018	-0.81	0.98	-2.56
11/15/2018	0.23	1.69	-1.89
11/16/2018	0.44	2.73	-1.73
11/17/2018	-0.54	1.45	-2.34
11/18/2018	-0.1	2.02	-2.01
11/19/2018	0.39	2.34	-1.65
11/20/2018	0.27	2.83	-2.23
11/21/2018	-0.13	2.86	-3.17
11/22/2018	-0.43	2.62	-3.06
11/23/2018	0.02	3.14	-2.95
11/24/2018	0.43	3.83	-2.62
11/25/2018	0.57	3.94	-3.28
11/26/2018	1.08	4.19	-2.26
11/27/2018	0.2	3.32	-2.38
11/28/2018	-0.64	2.1	-2.95
11/29/2018	-0.41	2.22	-2.77
11/30/2018	0.49	2.84	-1.89
12/1/2018	0.69	2.74	-1.58
12/2/2018	0.8	3.12	-1.74
12/3/2018	0.31	2.96	-2.76
12/4/2018	-0.04	2.41	-2.55
12/5/2018	0.45	3.33	-2.13
12/6/2018	-0.04	3.16	-2.87
12/7/2018	-0.52	2.33	-3.30
12/8/2018	-0.25	2.83	-2.80
12/9/2018	-0.05	2.78	-2.52
12/10/2018	0.35	2.99	-1.73
12/11/2018	0.19	2.55	-1.61
12/12/2018	-0.1	2.28	-1.86
12/13/2018	0.13	2.24	-1.60
12/14/2018	0.18	2.04	-1.58
12/15/2018	0.18	1.75	-1.39
12/16/2018	1.34	2.93	-0.68
12/17/2018	0.57	2.71	-2.27

12/18/2018	-0.44	1.79	-2.65
12/19/2018	-0.15	2.04	-2.51
12/20/2018	0.12	2.52	-2.39
12/21/2018	0.88	3.68	-1.95
12/22/2018	-0.17	3.14	-3.67
12/23/2018	-0.7	2.67	-4.17
12/24/2018	-0.25	3.48	-3.36
12/25/2018	-0.36	3.14	-3.54
12/26/2018	-0.4	2.96	-3.25
12/27/2018	-0.39	2.5	-3.08
12/28/2018	-0.04	2.68	-2.60
12/29/2018	-0.39	2	-3.08
12/30/2018	-0.18	1.93	-2.29
12/31/2018	0.3	2.54	-1.97

PROPOSED BULKHEAD ORDINANCE - *DRAFT*

BOROUGH OF WILDWOOD CREST
COUNTY OF CAPE MAY
STATE OF NEW JERSEY

ORDINANCE NO.

AN ORDINANCE OF THE BOROUGH OF WILDWOOD CREST, COUNTY OF CAPE MAY, NEW JERSEY ESTABLISHING UNIFORM REGULATIONS FOR CONSTRUCTION AND REPAIR OF BULKHEADS

BE IT ORDAINED BY THE BOROUGH COMMISSION OF THE BOROUGH OF WILDWOOD CREST, COUNTY OF CAPE MAY, STATE OF NEW JERSEY, AS FOLLOWS:

SECTION 1. Purpose.

It is the purpose and intent of this chapter to establish uniform regulations for the construction, reconstruction, renovation or repair of existing or new bulkheads within the BOROUGH OF WILDWOOD CREST.

Compliance.

All bulkheads that are newly constructed, reconstructed, replaced, renovated and repaired shall be done in accordance with the requirements of this Chapter.

Additionally, any property owner that demolishes an existing building or proposes to make a "substantial improvement" to an existing building, shall be required to bring the existing bulkhead into compliance with this Chapter. "Substantial improvement" means and reconstruction, rehabilitation, addition or other improvement to a structure, the total cost of which equals or exceeds 40 percent of the market value of the structure before the start of construction of the improvement.

Permits.

A. Permit required. No person or legal entity shall construct, reconstruct, renovate or repair any bulkhead within the BOROUGH OF WILDWOOD CREST without first obtaining and having in possession a valid permit to do such work that has been issued by the office of the Construction Code Official upon approval of the Borough Engineer.

B. Permit Application.

1. Applications for bulkhead permits shall be made on an application form obtained from the Construction Code Official. Completed applications shall be returned to the Construction Code Official with the required fee along with the following items in quadruplicate:

    a. Plans and specifications of the bulkhead that have been prepared, signed and sealed by a New Jersey licensed professional engineer.
    b. A property survey, prepared, signed and sealed by a New Jersey licensed professional land surveyor.

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c. Authorization for the New Jersey Department of Environmental Protection and any other state or federal agency having jurisdiction over the property affected by the proposed work.
d. Proof of notice of application to adjoining property owners.

2. The Borough Engineer may relax or waive any or all of the requirements that are set forth above within the application for a permit pertains to reconstruction, renovation or repair work for which the cost of completion is less than $5,000; however, in relaxing or waiving any such requirements, the Borough Engineer shall have the authority to require the submission of such plans, drawings and contract documents as the Engineer, in his sole and absolute discretion, determines will accurately depict the reconstruction, renovations or repair work to be performed.

3. The Borough Engineer shall review the application and plans and grant or deny the application within 20 business days upon receipt of a complete application.

C. Notice of application.

1. Notice of application for a bulkhead permit, the form of which is to be obtained from the Construction Code Official, shall be given by the applicant to the owners of all real property, as shown on the current tax duplicate, within 100 feet and whose property is adjacent to the same or similar tidal waters as is the applicant's property; provided that this requirement shall be deemed satisfied by notice to the condominium association, in the case of any unit owner whose unit has a unit above or below it; or horizontal property regime, in the case of any co-owner whose apartment has an apartment above or below it. Notice shall be given by mailing a copy thereof by regular, first class mail and by certified mail to the property owner at his address as shown on the said current tax duplicate. Notice to a partnership owner may be made by service upon any partner. Notice to a corporate owner may be made by service upon its president, a vice president, secretary or other person authorized by appointment or by law to accept service on behalf of the corporation. Notice to a condominium association, horizontal property regime, community trust or homeowners' association because of its ownership of common elements or areas located within 100 feet of the property which is the subject of the bulkhead application may be made in the same manner as to a corporation without further notice to unit owners, co-owners or homeowners on account of such common elements or areas.
2. Upon written request of an applicant, the Tax Assessor, within seven days, shall make and certify a list from said current tax duplicate of names and addresses of owners to whom the applicant is required to give notice pursuant to this section. A sum not to exceed $.25 per name or $10, whichever is greater, may be charged for preparation of such list. The Tax Assessor shall also verify the certified mailing costs.

D. Permit issuance. Upon receipt by the Construction Code Official of an application for a bulkhead permit, the Construction Code Official immediately shall transmit copies of the application and all accompanying documents to the Borough Engineer for review. No permit shall be issued by the Construction Code Official unless the permit is approved for issuance by the Borough Engineer. In the event that, upon review of the permit application, deficiencies are noted by the Borough Engineer, the Construction Code Official shall be informed of the nature of the deficiencies and the Construction Code Official shall provide written notice, by regular first class mail, of the

deficiencies to the applicant at the address set forth on the application and the applicant then shall be afforded the opportunity to correct any application deficiencies.

E. Permit fee. The permit fee shall be calculated in the following manner:
   1. For new construction: $100.00 for the first 50 feet of bulkhead to be constructed, and thereafter, $15.00 per foot or any portion thereof.
   2. For renovation, reconstruction and repairs: $100.00 for the first 50 feet of bulkhead to be constructed, and thereafter, $15.00 per foot or any portion thereof.

F. Inspection fee Escrow. The inspection fee shall be 5% of the estimated project cost (as determined by the Borough Engineer) or $500.00, whichever is greater. However, said inspection fee escrow shall not be charged if the bulkhead project is part of a Zoning or Planning Board approval for which an escrow is already required.

G. Appeal of permit denial. Any applicant aggrieved by the denial of a bulkhead permit may appeal the permit denial to Borough Commission by submitting to the Construction Code Official written correspondence appealing the permit denial. Such written appeal correspondence briefly shall describe the reason for the appeal. Such written appeal correspondence shall be submitted to the Construction Code Official within 20 days of the permit denial. Upon receipt of the appeal correspondence, the Construction Code Official shall transmit to Borough Commission copies of the permit application, all attachments thereto and any copies of any documents that have been generated by the Borough Engineer in connection with review of the permit application. Thereafter, the Construction Code Official shall schedule a date for the hearing of the appeal, and notice of the hearing date shall be provided to the permit applicant. In all instances the Construction Code Official shall endeavor to schedule the appeal hearing date not later than 30 days after receipt of the appeal correspondence. The hearing of the appeal shall be conducted by the Borough Commission at a public meeting. The applicant shall be permitted to produce evidence to Borough Commission in support of the permit application. Borough Commission may consider evidence presented to it by the Borough Engineer or any other individual that Borough Commission deems to have relevant information. The decision of Borough Commission to approve or deny the permit application shall be through adoption of a formal resolution.

Notification of commencement of construction; inspections.

A. The permittee shall provide to the Borough Engineer and to the Borough Zoning Officer notice of commencement of construction not less than two business days in advance of said commencement of construction. Not less than 14 days in advance of commencement of construction, the permittee shall provide notice of commencement of construction, on a form to be obtained from the Construction Code Official, to all property owners to whom the permittee would be required to provide notice of bulkhead permit application if the permittee were, at the time, making application for a bulkhead permit. Such notice shall be given in the same manner as is required for notices of permit application.

B. The Borough Engineer shall inspect the materials delivered to the job site and verify that they are in conformance with the permit issued for that work, in size, quantity and quality. If such materials do not conform to permit requirements, they shall be marked as “rejected” and

removed from the job site by the permittee and shall not be incorporated into the bulkhead construction.

C. The Borough Engineer shall make periodic visits to the job site to verify that the work is proceeding in accordance with permit requirements.

Final Inspection.

Prior to the backfilling of any bulkhead construction, reconstruction, renovation or repair, the Borough Engineer shall perform an inspection to ascertain that the bulkhead has been built pursuant to the plans that were submitted with the permit application. Written notice of project completion shall be given to the Borough Engineer and to the Borough Zoning Official within seven business days of substantial completion of the project, but prior to backfilling, and that written notification shall be accompanied by a certification from a licensed engineer or land surveyor of the elevations of the completed bulkhead height. If the Borough Engineer determines that the work that was performed pursuant to the bulkhead permit and the subject bulkhead fail to comply with the plans, drawings or documents that were submitted with the permit application or fail to comply with the provisions of this chapter, then written notice of final inspection failure shall be transmitted by the Borough Engineer by regular first class mail to the permittee at the address set forth on the permit application. The notice of final inspection failure shall detail the reasons for inspection failure. Permittees shall correct all deficiencies that resulted in final inspection failure within 20 days of the date of the written notice of final inspection failure. If, upon the expiration of those 20 days, the bulkhead is not approved upon inspection by the Borough Engineer then the permittee is deemed to be in violation of the duty to maintain and repair the subject bulkhead as established by this chapter.

Bulkhead Specification.

All bulkheads constructed, reconstructed renovated or repaired within the BOROUGH OF WILDWOOD CREST shall conform to the following minimum specifications:

A. All new bulkheads shall be designed by a New Jersey licensed professional engineer.
B. All piles shall have a butt diameter of not less than 12 inches and a tip diameter of eight inches.
C. All piles will be Douglas Fir or Southern Yellow Pine and shall be treated with an acceptable preservative for marine construction according to the latest American Wood Preservers' Association (A.W.P.A.) specifications.
D. Sheet piles shall be wood, steel or vinyl. Wales shall be Douglas Fir or Southern Yellow Pine. Wood sheet piles shall be a minimum of two inches thick. Wood sheet piles shall be constructed in two rows with staggered joints. All timber materials shall be treated with an acceptable preservative designed for use in a salt-water environment.
E. All components of the bulkhead system up to the minimum required elevation shall be constructed to be watertight. Watertight may include backfilling up against the landward side of the bulkhead, water stop sealants for steel and PVC sheet piles, continuous and solid landward capping and any other methods approved by the Borough Engineer.
F. All hardware shall be hot-dipped galvanized steel in accordance with latest standards for salt-water applications.
G. All outfall piping shall be fitted with a tide-control device that is approved by the Borough Engineer.

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H. The means and methods for outfall piping extensions that are required to accommodate the new bulkhead shall be approved by the Borough Engineer.
I. Bulkhead construction, reconstruction, renovation or repair shall not adversely affect adjoining property.
J. All existing utilities shall be protected from damage during any work performed pursuant to a bulkhead permit. The bulkhead permittee shall be responsible for obtaining current "utility markout" from all appropriate state and local agencies prior to commencement of work.
K. Deviations from construction materials set forth herein are allowed so long as all specifications and technical data concerning the proposed construction material are submitted to the Borough and are approved in writing by the Borough Engineer. The use of any construction material that is not specifically set forth above or approved by the Borough Engineer is strictly prohibited.
L. All design materials herein shall be subject to the requirements of the NJDEP and USACOE.

Height of Bulkheads.

The top elevation of any bulkhead to be constructed or reconstructed shall be set at a minimum elevation of 8.00 NAVD 1988.

Maintenance: duty to repair.

All bulkheads within the BOROUGH OF WILDWOOD CREST shall be maintained in such a condition so that they shall pose no danger to the health, safety or welfare of the residents of the BOROUGH OF WILDWOOD CREST or to public or private property within the BOROUGH OF WILDWOOD CREST. Bulkheads shall be kept in a state of repair so as to prevent erosion or damage to abutting, adjacent or adjoining properties. Whenever a bulkhead has deteriorated or suffered damage to such a degree that a danger to the property or adjoining properties is present, the Borough Engineer or Zoning Official or Code Enforcement Officer shall notify the property owner, in writing, by regular first class mail to the address that is set forth on the Borough's tax records, of the nature of the deterioration or damage and require the owner to make the necessary repairs. When notified by the Borough Engineer of a deteriorated bulkhead, a property owner shall submit a plan of corrective action to the Borough no later than 30 days from the receipt of this notice. Upon approval of the plan of corrective action by the Borough Engineer, the property owner shall complete all necessary repairs within 120 days. If permits are required from state or federal government agencies, such permits shall be immediately applied for upon receipt of Borough approval. Upon issuance of the bulkhead permit and approval of the plan of corrective action, the property owner immediately shall complete all necessary repairs. In the event that the property owner fails to submit a corrective action plan, fails to obtain a bulkhead permit to implement the corrective action plan or fails to implement the corrective action plan, the property owner shall be subject to the penalties set forth herein.

Existing non-conforming bulkheads.

Every bulkhead within the Borough of WILDWOOD CREST shall be constructed to a minimum elevation of 8.00 msl Datum 1988 no later than January 2050.

All existing nonconforming bulkheads will be required to be replaced or repaired per the duty to repair. An elevation survey was completed to determine bulkhead heights and will be used as a basis for bringing the nonconforming bulkheads into compliance. All bulkheads below elevation 5.5 feet NAVD 88 pose a significant threat to the flood frequency of the Borough and will be required to be structurally

extended to elevation 6.2 feet NAVD 88, where possible, or replaced in accordance with the standards set forth in this chapter. Bulkheads requiring replacement will be completed in accordance with the following timetable (all elevations are in NAVD 88):

Height (feet)	**Years**
4.0 and below	2
4.1 to 4.5	4
4.6 to 5.0	6
5.1 to 5.5	8

Violations and Penalties.

Any person violating any provision of this chapter, upon conviction thereof, shall be punished by a fine not exceeding $1,250.00 or by imprisonment for a term not exceeding 90 days, or both. A separate offense shall be deemed to be committed on each and every day during or on which a violation occurs or continues.

Section 2. All ordinances, or parts of ordinances, inconsistent herewith are hereby repealed to the extent of such inconsistency.

Section 3. This ordinance shall take effect after final adoption and publication as required by law.

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PROPOSED LOT GRADING ORDINANCE - *DRAFT*

BOROUGH OF WILDWOOD CREST
COUNTY OF CAPE MAY
STATE OF NEW JERSEY

ORDINANCE NO.

AN ORDINANCE OF THE BOROUGH OF WILDWOOD CREST, COUNTY OF CAPE MAY, NEW JERSEY ESTABLISHING UNIFORM REGULATIONS FOR THE GRADING OF BUILDING LOTS WITHIN THE BOROUGH OF WILDWOOD CREST

BE IT ORDAINED BY THE BOROUGH COMMISSION OF THE BOROUGH OF WILDWOOD CREST, COUNTY OF CAPE MAY, STATE OF NEW JERSEY, AS FOLLOWS:

Section 1a. Section XX-XX is amended as follows:

§ XX-XX **Zoning permits.**

No zoning permit shall be issued with respect to any property for which the payment of real estate taxes is in arrears. A zoning permit shall be required prior to the erection, construction or alteration of any building or structure or portion thereof. Application for permits shall be made in duplicate to the Zoning Officer in writing by the owner of the premises or his authorized agent. Included with the application shall be two complete sets of plans, drawn to scale, showing the proposed structure or alteration and all existing structures on the lot, their relation to each other and to bounding streets, and the use or intended use of all buildings and land. For applications which are subject to §XX-XX, two sets of grading plans prepared by a licensed engineer or surveyor, showing all existing and proposed grading within 50 feet of the subject site and conforming to the requirements of §XX-XX shall also be provided. All lots shall be surveyed and marked out on the ground prior to the erection or construction of any building. Permits shall be granted or refused within 10 days of the date of application. Zoning permits shall terminate on the occurrence of any of the following events:

A. If no building permit is issued in connection therewith within six months after issuance of the zoning permit.

B. Upon the expiration or other termination of a building permit issued in connection therewith.

C. Upon the enactment of any amendment to the Zoning Chapter which is inconsistent with the zoning permit in cases where no building permit has been issued in connection therewith.

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Section 1b. Section §XX-XX is added to the code as follows:

§ XX-XX **Lot Grading.**

This Section XX-XX shall not apply to any application for development which undergoes site plan review pursuant to Chapter XX.

All lots shall be graded to prevent the accumulation of storm water. Topsoil shall be provided and/or redistributed on the surface as cover and shall be stabilized with stones, seeding or planting. Grading plans shall be submitted with all zoning permit applications involving (i) new construction; (ii) any alterations which increase the total impervious coverage by five (5%) percent or more of the total lot area and result in total impervious coverage that is eighty (80%) percent or more of the maximum permitted impervious coverage; (iii) installation of any impervious improvements of within four (4') feet of a side or rear property line; (iv) any change in grade which alters the course of stormwater; or (v) construction of any retention wall; for review and approval by the Borough's engineer. The plan shall conform to the following requirements:

A. Wherever possible, the land shall be graded to maintain all existing drainage paths while directing storm water to the street. In the event directing stormwater to the street will interfere with existing drainage paths involving adjacent properties, stormwater shall be directed to an existing drainage path or interior yard collection system designed in accordance with this chapter. Storm water will not be permitted to run directly onto an adjacent property unless a pre-existing drainage path is present; provided that in no event shall any construction result in an increase in runoff to adjacent properties.

B. The minimum slope for lawns and disturbed areas shall be 1 ½% and for smooth, hard-finished surfaces shall be 4/10 of 1%.

C. The maximum grade for lawns and disturbed areas within five feet of a building shall be 10%, and for lawns and disturbed areas more than five feet from a building, 25%; except that, for the driveway the maximum grade shall be 15%.

D. Retaining walls installed in slope-controlled areas shall be constructed of reinforced concrete or other reinforced masonry, or of another construction acceptable to the Borough Engineer and shall be adequately designed by a New Jersey licensed professional engineer and detailed in the plan to carry all earth pressures, including any surcharges. The heights of retaining walls shall not exceed 1/3 of the horizontal distance from the foundation wall of any building to the face of the retaining wall.

E. All new construction and substantial improvements as defined in Chapter XX will be required to furnish and install an underground storm water recharge system to limit the amount of runoff generated by the construction. The system shall conform to the following requirements:

(1) The applicant shall install five linear feet of underground storage (Detail S-1) for every five-hundred square feet of impervious coverage or provide and install a system equivalent to the recommended design as approved by the borough's engineer.

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(2) The system shall be designed to collect storm water runoff from the roof leaders or an equivalent amount of runoff through inlets or yard drains.

(3) The system will be designed to convey the excess storm water to the street

Section 1c. Section XX-XX E. is amended as follows:

E. Proof of compliance with height restrictions required during construction. At specific intervals during the construction of all new construction and/or the renovation/alteration of any structure where such renovation/alteration may potentially change the height of the structure, a site survey prepared by a New Jersey Professional Land Surveyor shall be provided to the Zoning Officer for review and approval as follows:

(1) Upon completion of the foundation, a survey indicating the elevation to the top of the block, top of the freeboard and finished grade in relation to the top-of-curb height applicable to the property. In addition, all setbacks from property lines shall be indicated.

(2) Upon completion of the roof framing and sheathing, a survey of the elevation to the highest peak of the roof from the top of the block, top of the freeboard and finished grade in relation to the top-of-curb height applicable to the property. In addition, all setbacks from the property line shall be indicated. This shall include the height and location of any accessory structures on the lot. No framing inspection shall be performed on the property unless and until this provision is complied with.

(3) Upon application for the final certificate of occupancy, a survey showing the elevation to the highest roof peak from the top of the block, top of the freeboard and finished grade in relation to the top-of-curb height applicable to the property. In addition, the height and location of all structures on the lot, both in size and setbacks from the property lines. Where applicable, grade throughout the property shall also be shown to indicate conformance with the approved grading plan and shall indicate all impervious surfaces along with any underground storage provided in conformance with the code.

Section 2. All ordinances, or parts of ordinances, inconsistent herewith are hereby repealed to the extent of such inconsistency.

Section 3. This ordinance shall take effect after final adoption and publication as required by law.

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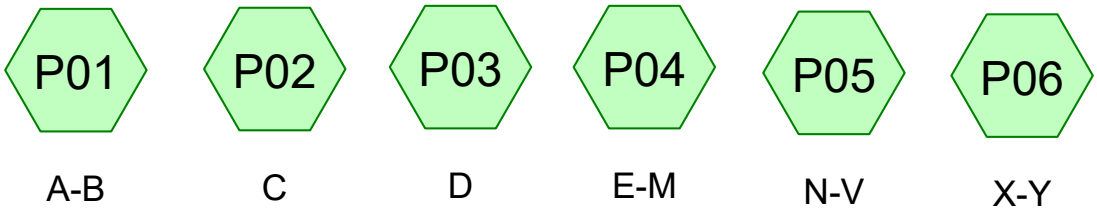
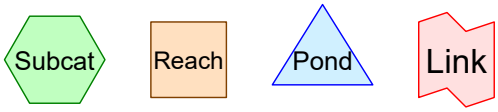
PROPOSED DRAINAGE AREA CALCULATIONS





Routing Diagram for 19-0221_Proposed_A-M
Prepared by {enter your company name here}, Printed 3/8/2019
HydroCAD® 10.00-24 s/n 07298 © 2018 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: A-B Runoff Area=193.140 ac 70.00% Impervious Runoff Depth>1.83"
Flow Length=5,000' Slope=0.0050 '/' Tc=123.7 min CN=88 Runoff=113.47 cfs 29.505 af

Subcatchment P02: C Runoff Area=34.830 ac 70.00% Impervious Runoff Depth>1.80"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=17.04 cfs 5.220 af

Subcatchment P03: D Runoff Area=29.000 ac 70.00% Impervious Runoff Depth>1.80"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=14.19 cfs 4.346 af

Subcatchment P04: E-M Runoff Area=68.490 ac 70.00% Impervious Runoff Depth>1.80"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=33.50 cfs 10.265 af

Subcatchment P05: N-V Runoff Area=102.020 ac 70.00% Impervious Runoff Depth>1.80"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=49.90 cfs 15.290 af

Subcatchment P06: X-Y Runoff Area=225.200 ac 70.03% Impervious Runoff Depth>1.80"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=110.16 cfs 33.752 af

Total Runoff Area = 652.680 ac Runoff Volume = 98.379 af Average Runoff Depth = 1.81"
29.99% Pervious = 195.750 ac 70.01% Impervious = 456.930 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: A-B Runoff Area=193.140 ac 70.00% Impervious Runoff Depth>2.65"
Flow Length=5,000' Slope=0.0050 '/' Tc=123.7 min CN=88 Runoff=162.58 cfs 42.687 af

Subcatchment P02: C Runoff Area=34.830 ac 70.00% Impervious Runoff Depth>2.61"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=24.46 cfs 7.561 af

Subcatchment P03: D Runoff Area=29.000 ac 70.00% Impervious Runoff Depth>2.61"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=20.37 cfs 6.296 af

Subcatchment P04: E-M Runoff Area=68.490 ac 70.00% Impervious Runoff Depth>2.61"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=48.10 cfs 14.869 af

Subcatchment P05: N-V Runoff Area=102.020 ac 70.00% Impervious Runoff Depth>2.61"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=71.65 cfs 22.148 af

Subcatchment P06: X-Y Runoff Area=225.200 ac 70.03% Impervious Runoff Depth>2.61"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=158.17 cfs 48.890 af

Total Runoff Area = 652.680 ac Runoff Volume = 142.451 af Average Runoff Depth = 2.62"
29.99% Pervious = 195.750 ac 70.01% Impervious = 456.930 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: A-B Runoff Area=193.140 ac 70.00% Impervious Runoff Depth>3.39"
Flow Length=5,000' Slope=0.0050 '/' Tc=123.7 min CN=88 Runoff=206.01 cfs 54.572 af

Subcatchment P02: C Runoff Area=34.830 ac 70.00% Impervious Runoff Depth>3.33"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=31.05 cfs 9.674 af

Subcatchment P03: D Runoff Area=29.000 ac 70.00% Impervious Runoff Depth>3.33"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=25.85 cfs 8.054 af

Subcatchment P04: E-M Runoff Area=68.490 ac 70.00% Impervious Runoff Depth>3.33"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=61.06 cfs 19.022 af

Subcatchment P05: N-V Runoff Area=102.020 ac 70.00% Impervious Runoff Depth>3.33"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=90.95 cfs 28.335 af

Subcatchment P06: X-Y Runoff Area=225.200 ac 70.03% Impervious Runoff Depth>3.33"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=200.75 cfs 62.547 af

Total Runoff Area = 652.680 ac Runoff Volume = 182.205 af Average Runoff Depth = 3.35"
29.99% Pervious = 195.750 ac 70.01% Impervious = 456.930 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P01: A-B Runoff Area=193.140 ac 70.00% Impervious Runoff Depth>4.52"
Flow Length=5,000' Slope=0.0050 '/' Tc=123.7 min CN=88 Runoff=270.96 cfs 72.672 af

Subcatchment P02: C Runoff Area=34.830 ac 70.00% Impervious Runoff Depth>4.44"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=40.90 cfs 12.892 af

Subcatchment P03: D Runoff Area=29.000 ac 70.00% Impervious Runoff Depth>4.44"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=34.06 cfs 10.734 af

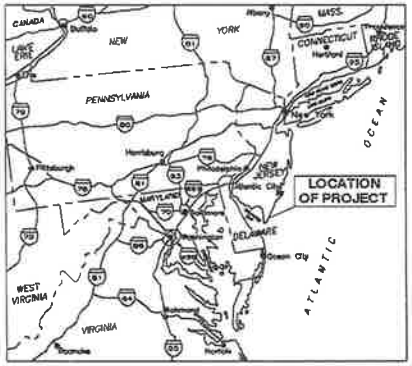
Subcatchment P04: E-M Runoff Area=68.490 ac 70.00% Impervious Runoff Depth>4.44"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=80.43 cfs 25.350 af

Subcatchment P05: N-V Runoff Area=102.020 ac 70.00% Impervious Runoff Depth>4.44"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=119.81 cfs 37.761 af

Subcatchment P06: X-Y Runoff Area=225.200 ac 70.03% Impervious Runoff Depth>4.44"
Flow Length=5,000' Slope=0.0030 '/' Tc=159.7 min CN=88 Runoff=264.46 cfs 83.354 af

Total Runoff Area = 652.680 ac Runoff Volume = 242.762 af Average Runoff Depth = 4.46"
29.99% Pervious = 195.750 ac 70.01% Impervious = 456.930 ac

U.S. ARMY CORPS OF ENGINEERS WILDWOOD BEACH FILL INITIAL CONSTRUCTION - PLANS



NORTH

VICINITY MAP

SCALE IN MILES

WILDWOODS BEACHFILL
INITIAL CONSTRUCTION

HEREFORD INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY

IFB W912BU-XX-B-00XX

NORTH

LOCATION MAP

SCALE IN MILES

DRAWING INDEX	
SHEET NUMBER	DESCRIPTION
GENERAL	
CS-101	COVER SHEET
CIVIL	
C-001	GENERAL INFORMATION SHEET
C-101	GENERAL PLAN
C-102	PLAN – STA -11+60 TO STA 30+35
C-103	PLAN – STA 30+35 TO STA 68+17
C-104	PLAN – STA 68+17 TO STA 105+68
C-105	PLAN – STA 105+68 TO STA 142+87
C-106	PLAN – STA 142+87 TO STA 179+96
C-107	PLAN – STA 179+96 TO STA 216+97
C-108	PLAN – STA 216+97 TO STA 253+99
C-301	TYPICAL SECTIONS – BEACHFILL (NORTH WILDWOOD)
C-302	TYPICAL SECTIONS – BEACHFILL (CITY OF WILDWOOD)
C-303	TYPICAL SECTIONS – BEACHFILL (WILDWOOD CREST & LOWER TOWNSHIP)
C-401	DUNE CROSSOVER SCHEDULE
C-402	PLAN – PEDESTRIAN CROSSOVER
C-403	PLAN – VEHICLE CROSSOVER
C-404	PLAN – ADA CROSSOVER
C-406	TYPICAL SECTION – PEDESTRIAN CROSSOVER
C-407	TYPICAL SECTION – VEHICLE CROSSOVER
C-408	TYPICAL SECTION – ADA CROSSOVER
C-501	DETAILS – FENCE
C-502	DETAILS – DUNE PLANTING AND SAND FENCE

THIS PROJECT WAS DESIGNED BY THE PHILADELPHIA DISTRICT OF THE U.S. ARMY CORPS OF ENGINEERS. THE INITIALS OR SIGNATURES AND REGISTRATION DESIGNATIONS OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY ER 1110-1-8152.

SUBMITTED:

ANDREW J. SCHRINGER, P.E.
CHIEF, ENGINEERING BRANCH

APPROVED:

PETER M. TRANCHIK, P.E.
CHIEF, ENGINEERING AND CONSTRUCTION DIVISION

HEREFORD INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY

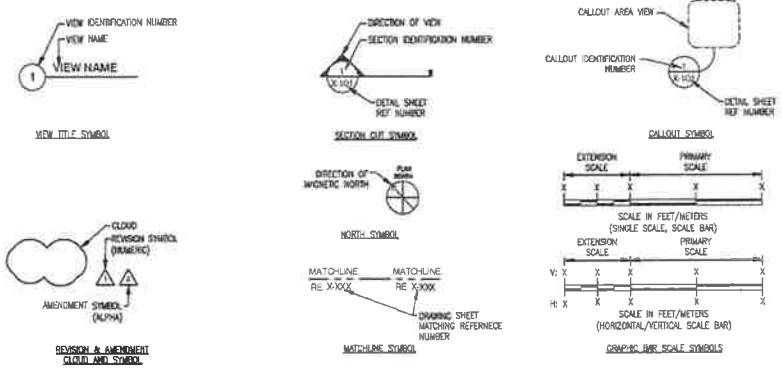
WILDWOODS BEACHFILL
INITIAL CONSTRUCTION

COVER SHEET

SHEET NUMBER
CS-101

SYMBOLS, ABBREVIATIONS AND GENERAL NOTES

DRAWING SHEET SYMBOLS



ABBREVIATIONS

ABBRV	DESCRIPTION	ABBRV	DESCRIPTION	ABBRV	DESCRIPTION
AD	AREA DRAIN	FF	FINISHED FLOOR	PSI	POUNDS PER SQUARE INCH
ADDL	ADDITIONAL	FIN	FINISH	PVI	POST INDICATOR VALVE
AFF	ABOVE FINISHED FLOOR	FL	FLOOR	RAD	RADIUS
BD	BOARD	FM	FORCE MAIN	REINF	REINFORCEMENT
BIT	BITUMINOUS	FT	FOOT, FEET	REM	REMOVABLE
BL	BASE LINE	FTG	FOOTING	ROW	RIGHT OF WAY
BLDG	BUILDING	G	GROUND	S	SOUTH
BM	BEAM	GOVT	GOVERNMENT	SCH	SCHEDULE
BMP	BEST MANAGEMENT PRACTICE	GR	GRADE	SECT	SECTION
BOT	BOTTOM	HORIZ	HORIZONTAL	SPEC	SPECIFICATION
BVCE	BEGINNING OF VERTICAL CURVE, ELEVATION	HS	HIGH STRENGTH	SPRT	SUPPORT
BVCS	BEGINNING OF VERTICAL CURVE, STATION	HT	HEIGHT	SQ	SQUARE
CMU	CONCRETE MASONRY UNIT	HVY	HEAVY	SST	STAINLESS STEEL
CO	CLEAN OUT	IN	INCH	STA	STATION
COL	COLUMN	INSUL	INSULATION, INSULATED	STD	STANDARD
CONC	CONCRETE	INT	INTERIOR	STRUCT	STRUCTURAL
CONSTR	CONSTRUCTION	INV	INVERT	SUSP	SUSPENDED
CONT	CONTINUOUS	LL	LIVE LOAD	SYS	SYSTEM
CTRL	CONTROL	LP	LOW POINT	TEMP	TEMPORARY
CWL	CONTRACTOR WORK LIMITS	LT	LIGHT	TD	TRENCH DRAIN
DET	DETAIL	LVC	LENGTH OF VERTICAL CURVE	TDO	TRENCH DRAIN OUTLET PIPE
DGA	DENSE GRADED AGGREGATE	JCT	JUNCTION	TELE	TELEPHONE
DIA	DIAMETER	MATL	MATERIAL	TOPO	TOPOGRAPHY
DIM	DIMENSION	MAX	MAXIMUM	TYP	TYPICAL
DL	DEAD LOAD	MIN	MINIMUM	UD	UNDERDRAIN
DWG	DRAWING	MISC	MISCELLANEOUS	UDO	UNDERDRAIN OUTLET PIPE
E	EAST	N	NORTH	UE	UNDERGROUND ELECTRIC
EA	EACH	NLT	NOT LESS THAN	UGND	UNDERGROUND
ECM	EROSION CONTROL MAT	NTS	NOT TO SCALE	UNO	UNLESS NOTED OTHERWISE
EJ	EXPANSION JOINT	OC	ORIGINAL CONSTRUCTION	UOP	UNDERDRAIN OUTLET PIPE
EL	ELEVATION	OD	OUTSIDE DIAMETER	UXO	UNEXPLODED ORDNANCE
ELEC	ELECTRIC	OH	OVERHEAD	VB	VINYL BASE
EOP	EDGE OF PAVEMENT	OPG	OPENING	VC	VERTICAL CURVE
EOS	EDGE OF SHOULDER	OPP	OPPOSITE	VCT	VINYL COMPOSITION TILE
EQ	EQUAL	PC	POINT OF CURVE	VOL	VOLUME
EQUIP	EQUIPMENT	PD	PAVEMENT DRAIN	VERT	VERTICAL
EXH	EXHAUST	PI	POINT OF INFLECTION	VTR	VENT THROUGH ROOF
EXIST		PI	POINT OF INFLECTION	W/	WITH
EXP	EXPANSION, EXPOSED	PIV	POINT OF VERTICAL INFLECTION	W	WEST
EXP JT	EXPANSION JOINT	POT	POINT OF TANGENT	WL	WATER LEVEL
EXT	EXTERIOR	PMP	PROBABLE MAXIMUM PRECIPITATION	WS	WATER SURFACE
FIG	FIGURE, SINGLE	PNL	PANEL	W/O	WITHOUT
FDTN	FOUNDATION	PSF	POUNDS PER SQUARE FOOT		

BEACHFILL SYMBOLS LEGEND

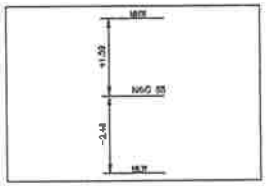
- EXISTING OUTFALL PIPE
- 40+00 — SURVEY BASELINE
- CONTRACTOR ACCESS
- CONTRACTOR STAGING/ STORAGE AREA
- BORROW AREA LIMIT
- BP — BEACH PATROL DUNE CROSSOVER
- XXX — CONTRACTOR WORK LIMIT POINT NUMBER/LOCATOR
- STATION OFFSET — SEAWARD EDGE OF BERM
- STATION OFFSET — DUNE CENTERLINE
- EXISTING STONE GROIN
- EXISTING VEGETATION
- EXISTING TIMBER GROIN
- FILL SLOPE AND BERM LINE
- HORIZONTAL AND VERTICAL CONTROL
- NJV-750 VIBRACORE BORING
- MVB-10 SOIL BORING
- LOCATION/IDENTIFICATION OF UNDER WATER CULTURAL ANTIQUITY W/ EXCLUSION ZONE
  - ±1578 MEDA
  - E 618576
  - N 442553
  - R=100'

LINE TYPE LEGEND

- CENTERLINE/SURVEY-CONSTRUCTION BASELINE (℄-℄)
- CHAIN LINK FENCE
- 20' — CONTOUR LINE
- CONTRACTOR WORK LIMIT
- HANDRAIL
- LOD — LIMIT OF DISTURBANCE
- MHW — MEAN HIGH WATER LINE (EXIST.)
- MLW — MEAN LOW WATER LINE (EXIST.)
- MTL — MEAN TIDE LINE
- METAL POST FENCE
- SAND FENCE, ZIG ZAG
- SAND FENCE, STRAIGHT
- STEEL SHEET PILE
- WOOD POST FENCE
- X — EXISTING FENCE

GENERAL NOTES:

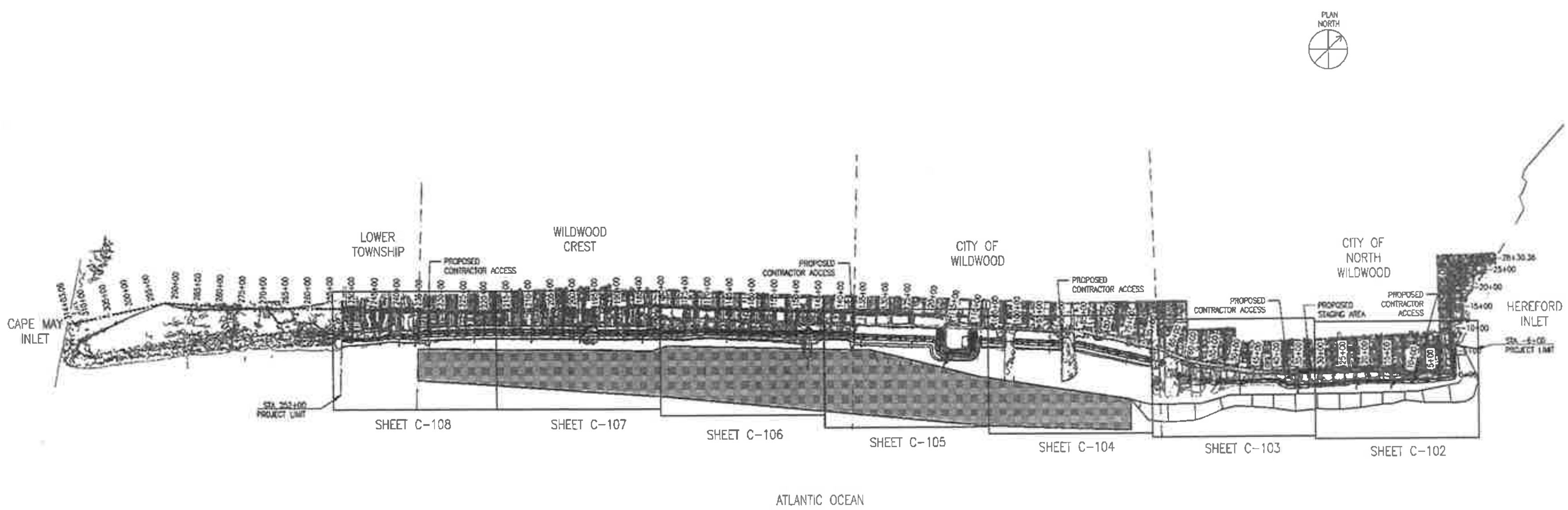
1. ELEVATIONS ARE EXPRESSED IN FEET AND TENTHS OF A FOOT AND REFER TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988.
2. HORIZONTAL CONTROL IS REFERENCED TO THE NEW JERSEY STATE PLANE COORDINATE SYSTEM (NAD 1983)
3. THE CONTRACTOR SHALL STAGE AND ACCESS THE SITE FROM THE LOCATIONS SHOWN ON THE PLANSHEETS.
4. THE SITE CONDITION SURVEYS ARE A RESULT OF LIDAR SURVEYS CONDUCTED IN 2016 AND BORROW AREA SURVEY JANUARY 2017 AND CAN ONLY BE CONSIDERED REPRESENTATIVE OF THE CONDITIONS OCCURRING AT THAT TIME.
5. THE CONTRACTOR MUST COORDINATE WITH ALL APPROPRIATE UTILITY COMPANIES, THE USACE RESIDENT OFFICE FOR MARK-OUT OF ONSITE UTILITIES PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.



TIDAL REFERENCE (LOCATION)

HEREFORD INLET TO LAKE WILDWOOD
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
GENERAL INFORMATION SHEET

SHEET NUMBER
C-001



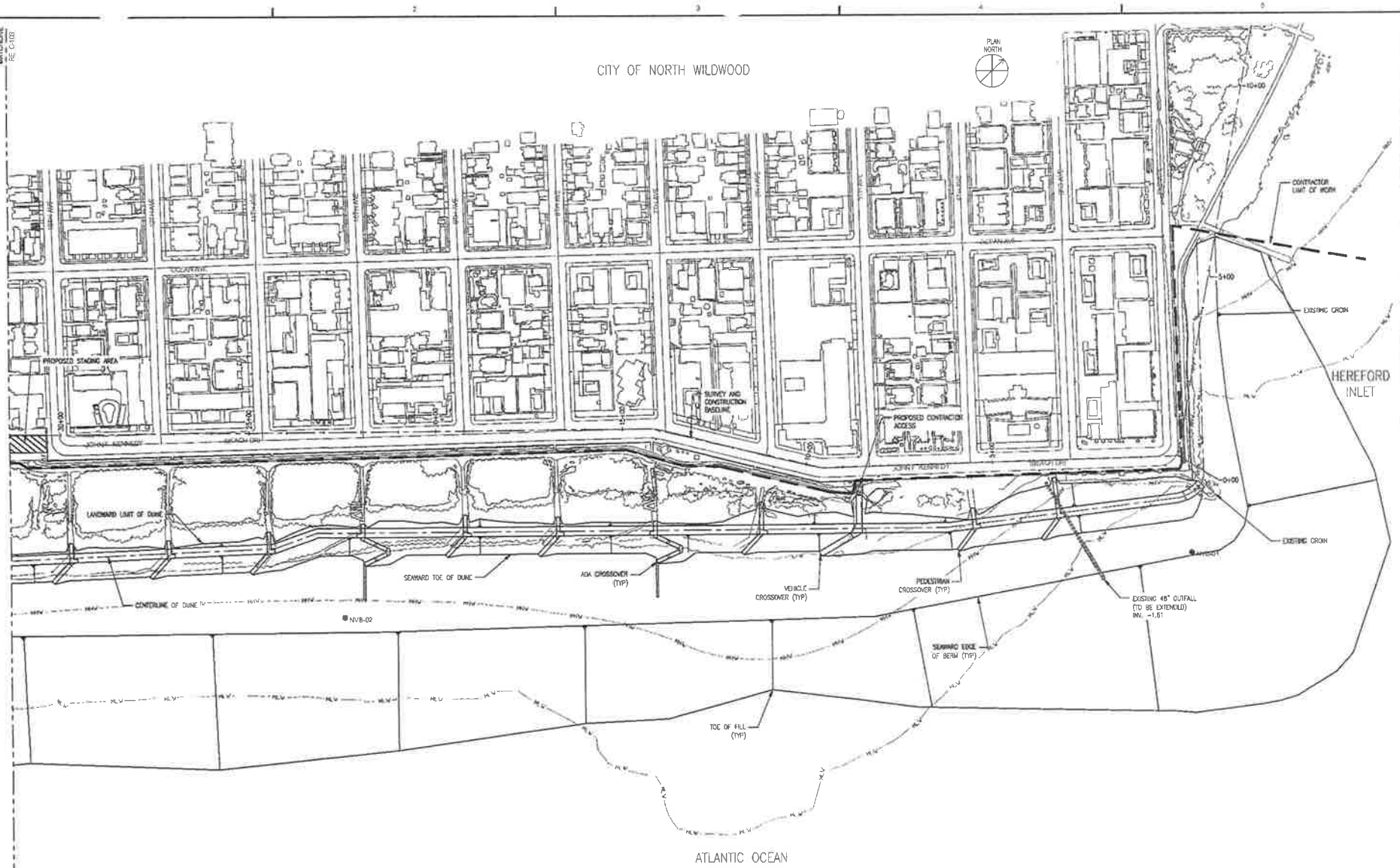
1 GENERAL PLAN
SCALE AS SHOWN

1000 0 1000 2000
SCALE IN FEET

NOTES:

1. FOR GENERAL INFORMATION AND LEGENDS, SEE SHEET C-001.
2. FOR TYPICAL SECTIONS, SEE SHEETS C-301 THROUGH C-303.
3. FOR DUNE CROSSOVER LOCATIONS AND DETAILS, SEE SHEETS C-401 THROUGH C-406.

SHEET NUMBER
C-101



1 PLAN: STA 11+00 TO STA 30+25
SCALE: 1"=100'

100 0 100 200
SCALE IN FEET

NOTES:

1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE SHEET C-301 FOR TYPICAL BEACHFILL SECTIONS.
3. SEE SHEET C-401 FOR DUNE CROSSOVER SCHEDULE.

US Army Corps of Engineers Philadelphia District

DATE | DESCRIPTION | BY | CHK | APP

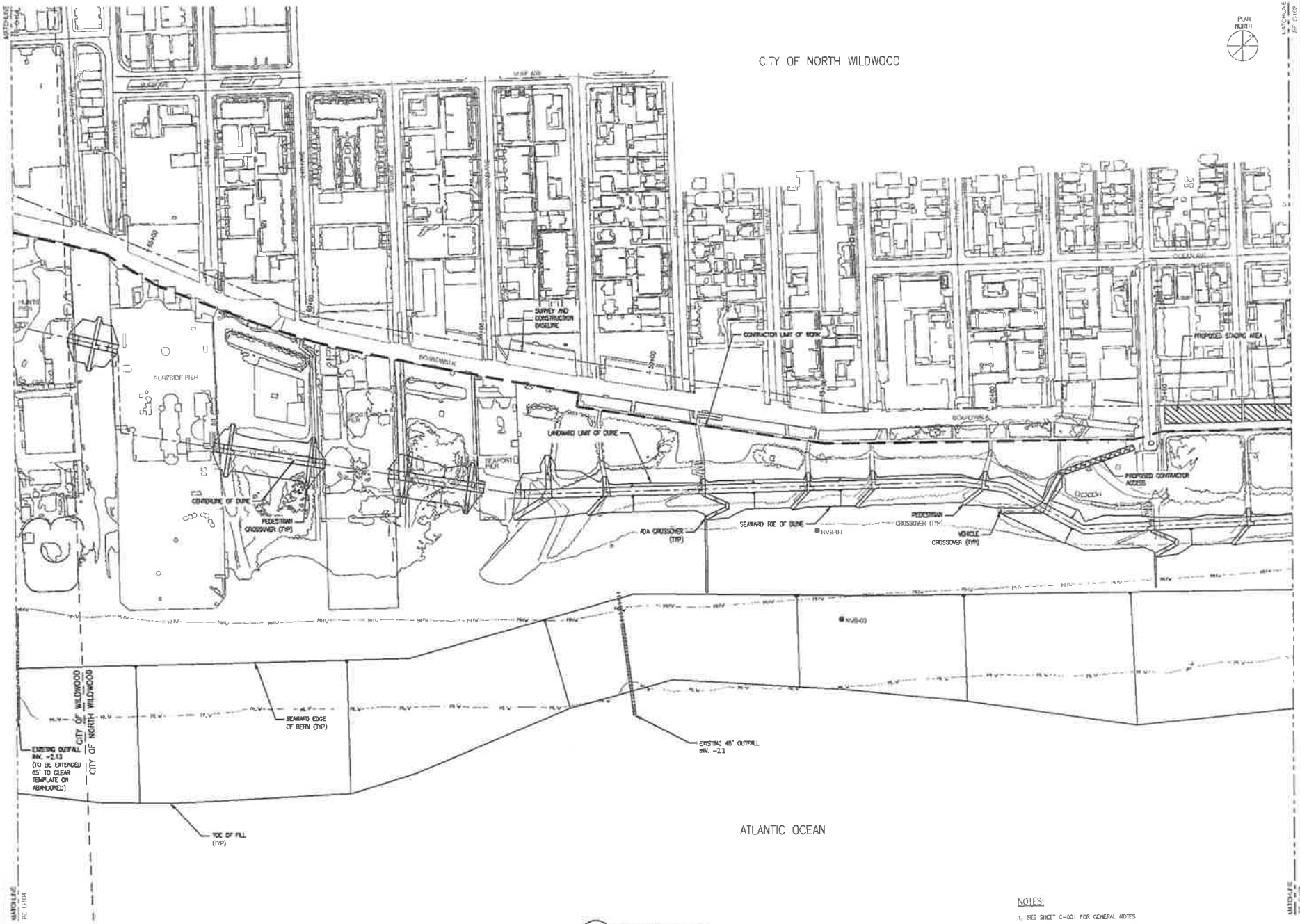
DATE | DESIGNED BY | DRAWN BY | CHECKED BY | APPROVED BY

DESIGN FILE | DATE | SCALE | PLOT DATE

U.S. ARMY CORPS OF ENGINEERS PHILADELPHIA DISTRICT

HEREFORD INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
PLAN: STA 11+00 TO STA 30+25

SHEET NUMBER
C-102



1 PLAN - STA 30+35 TO STA 38+17
SCALE AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. SEE SHEET C-001 FOR GENERAL NOTES
2. SEE SHEET C-301 FOR TYPICAL BEACHFILL SECTIONS
3. SEE SHEET C-401 FOR DUNE CROSSOVER SCHEDULE
4. THE CONTRACTOR SHALL HAND PLACE FILL MATERIAL FOR DUNE AND BERM AS REQUIRED UNDER THE EXISTING PIERS TO AN ELEVATION 2' BELOW THE PIER STRUCTURAL SUPPORTS

US Army Corps of Engineers Philadelphia District

CONTRACT NUMBER W912BP-17-B-0004
CAPE MAY COUNTY, NEW JERSEY
NAVESINK BEACHFILL
INITIAL CONSTRUCTION
PLAN - STA 30+35 TO STA 38+17

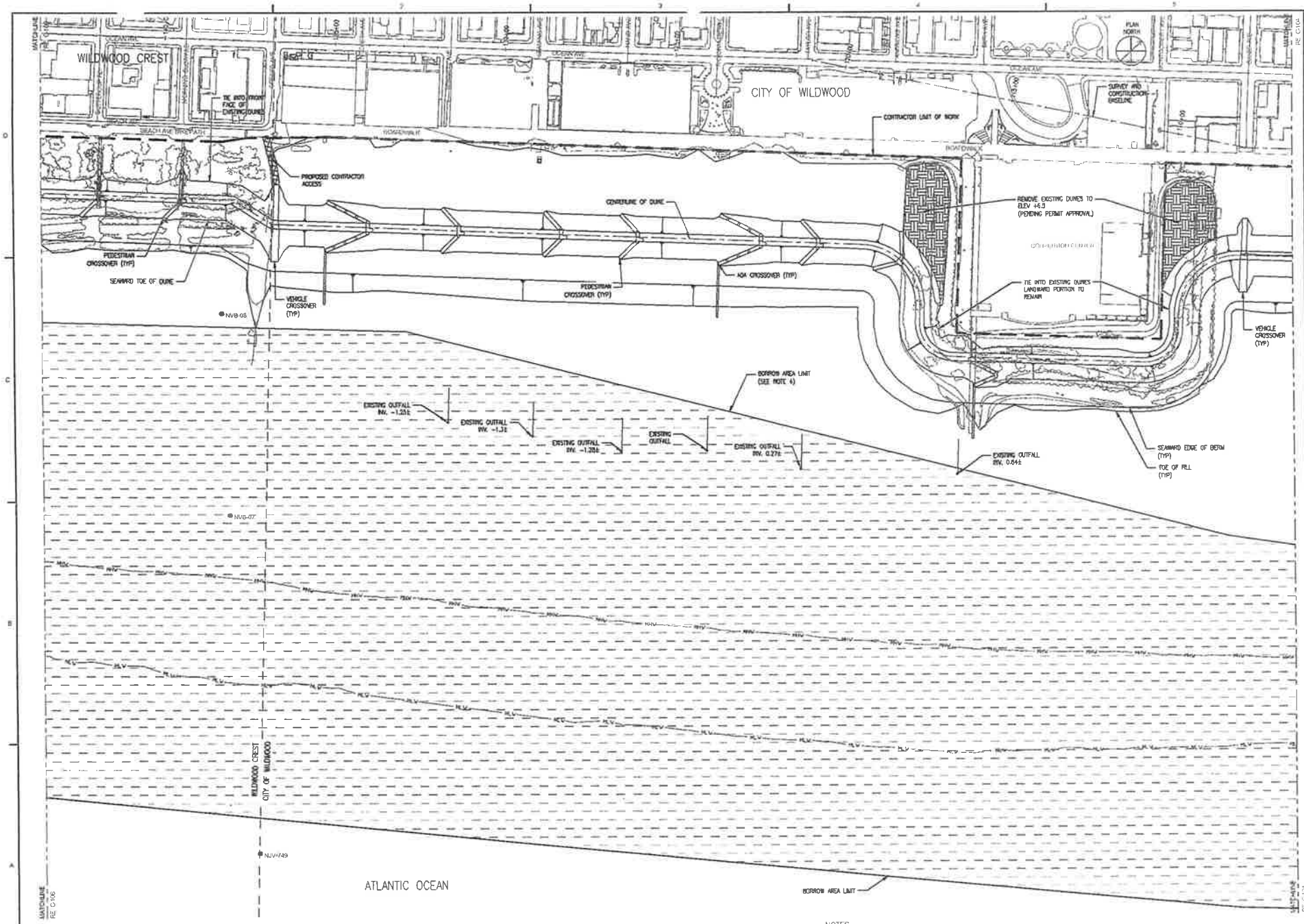
SHEET NUMBER
C-103

NOTES:

1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE SHEET C-302 FOR TYPICAL BEACHFILL SECTIONS.
3. SEE SHEET C-401 FOR DUNE CROSSOVER SCHEDULE.
4. BORROW AREA LIMITS SHOWN ARE FOR PERMITTING PURPOSES ONLY. THE ACTUAL LIMIT OF EXCAVATION WITHIN THE BORROW AREA IS DEPENDENT ON SEVERAL VARIABLES, SUCH AS GRAIN SIZE OF IN-SITU MATERIAL, METHOD OF DREDGING USED, AND QUANTITY OF BEACHFILL MATERIAL REQUIRED FOR THE FILL OPERATION. THE LIMITS OF EXCAVATION ARE CURRENTLY BEING EVALUATED USING THE ABOVE CRITERIA. THE BORROW AREA AND/OR LIMIT OF EXCAVATION WILL BE DEFINED ON THE 90% DRAWING SUBMITTAL.
5. THE CONTRACTOR SHALL HAND PLACE FILL MATERIAL FOR DUNE AND BERM AS REQUIRED UNDER THE EXISTING PIERS TO AN ELEVATION 2' BELOW THE PIER STRUCTURAL SUPPORTS.

HEREFORD INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOODS BEACHFILL
INITIAL CONSTRUCTION

SHEET NUMBER
C-104



1 PLAN - STA 106+00 TO STA 142+87
SCALE AS SHOWN

100 0 100 200
SCALE IN FEET

NOTES:

1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE SHEET C-302 AND C-303 FOR TYPICAL BEACHFILL SECTIONS.
3. SEE SHEET C-401 FOR DUNE CROSSOVER SCHEDULE.
4. BORROW AREA LIMITS SHOWN ARE FOR PERMITTING PURPOSES ONLY. THE ACTUAL LIMIT OF EXCAVATION WITHIN THE BORROW AREA IS DEPENDENT ON SEVERAL VARIABLES, SUCH AS GRAIN SIZE OF IN-SITU MATERIAL, METHOD OF DREDGING USED, AND QUANTITY OF BEACHFILL MATERIAL REQUIRED FOR THE FILL OPERATION. THE LIMITS OF EXCAVATION ARE CURRENTLY BEING EVALUATED USING THE ABOVE CRITERIA. THE BORROW AREA AND/OR LIMIT OF EXCAVATION WILL BE DEFINED ON THE 90% DRAWING SUBMITTAL.

U.S. Army Corps of Engineers Philadelphia District

REVISIONS			
NO.	DATE	DESCRIPTION	BY

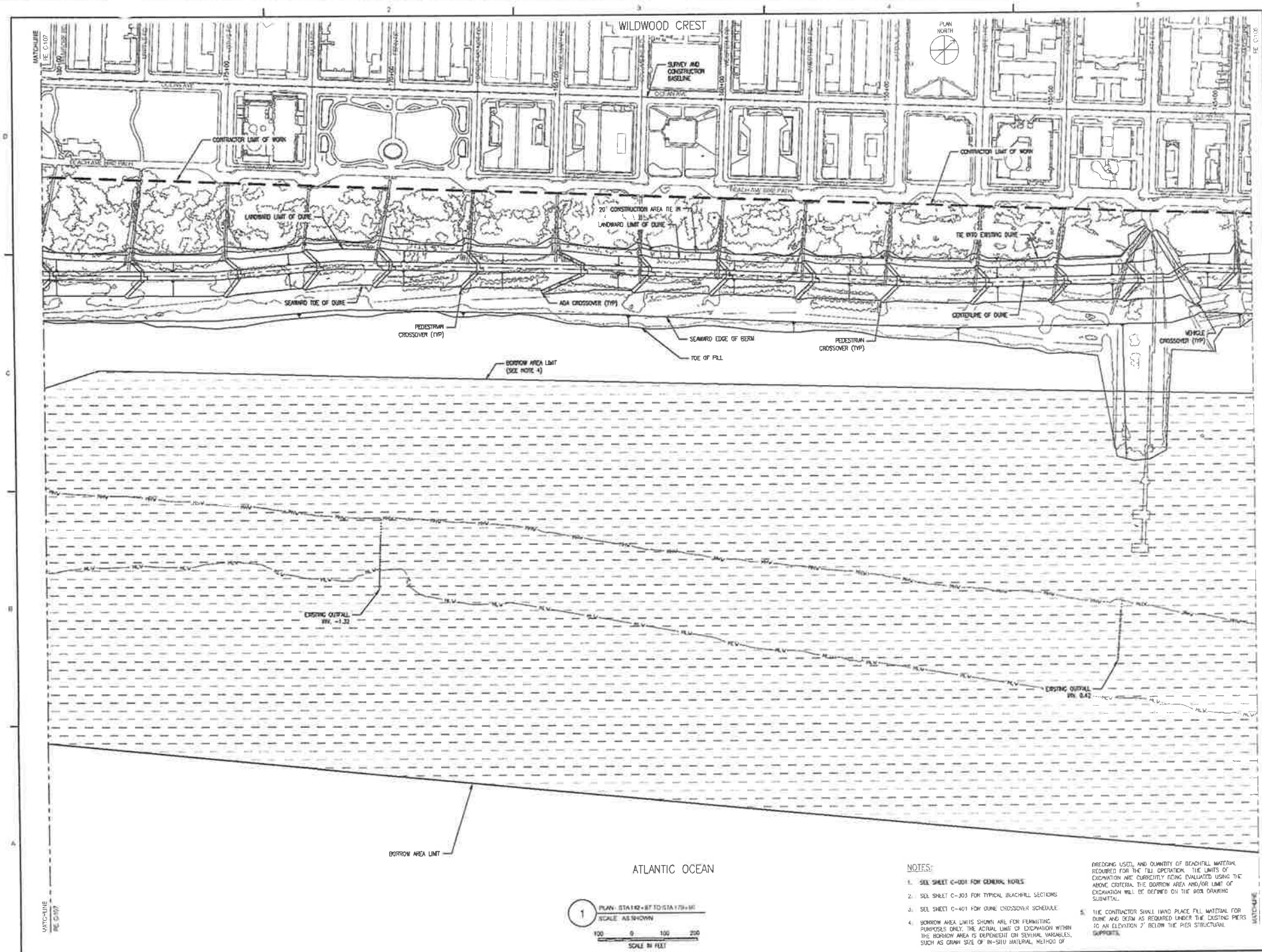
DESIGNED BY	DRAWN BY	CHECKED BY	REVIEWED BY
CAD	TB		

DATE: 08/2010
FILE: 08-C-105.DWG
SCALE: AS SHOWN

U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT

PROTECTED BEACH TO CREST UNIT NO. 1
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
P-A06-ETS-WW-08-BCFC-42487

SHEET NO. (of) C-105



1 PLAN - STA 112+87 TO STA 179+96
SCALE: AS SHOWN

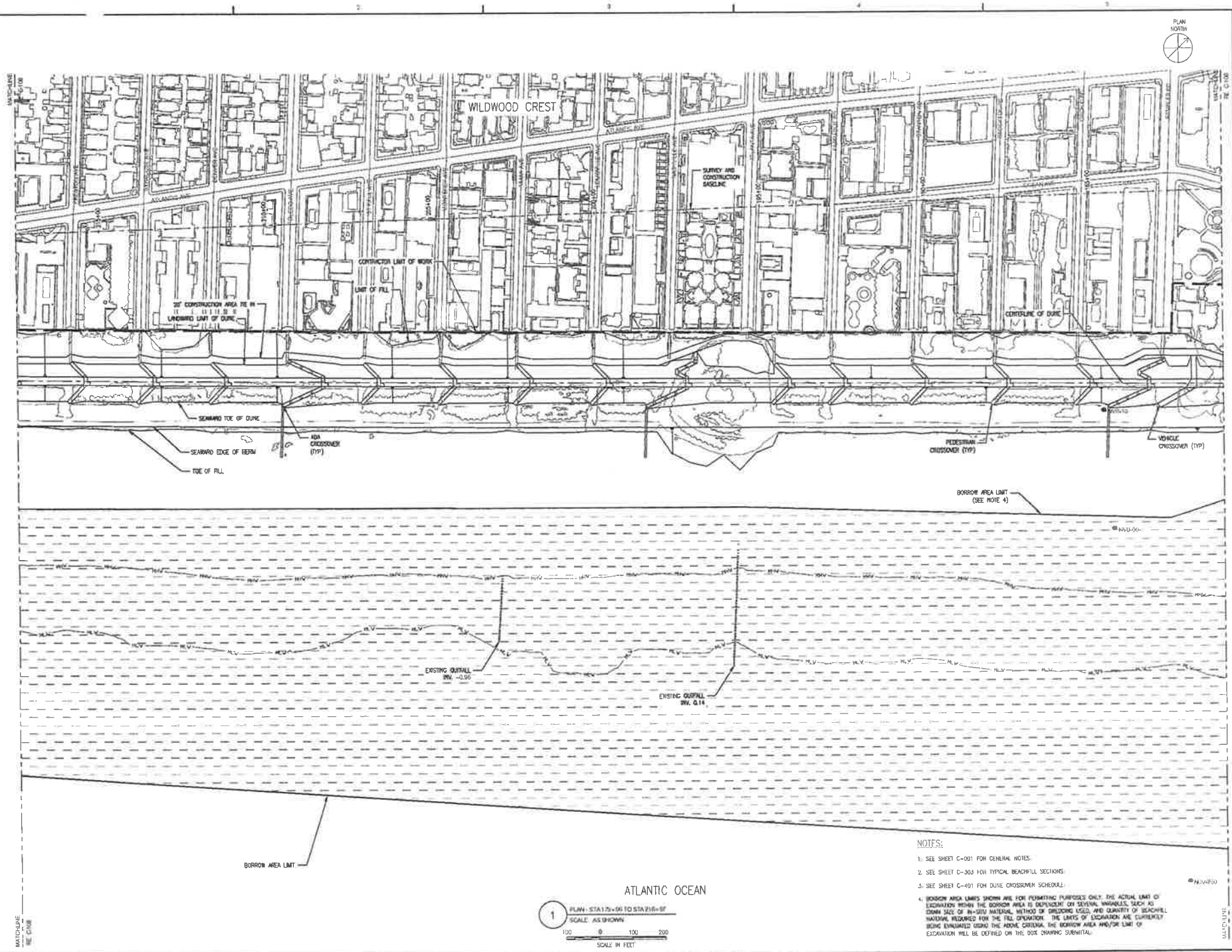
100 0 100 200
SCALE IN FEET

NOTES:

1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE SHEET C-303 FOR TYPICAL BEACHFILL SECTIONS
3. SEE SHEET C-401 FOR DUNE CROSSOVER SCHEDULE
4. BORROW AREA LIMITS SHOWN ARE FOR PERMITTING PURPOSES ONLY. THE ACTUAL LIMIT OF EXCAVATION WITHIN THE BORROW AREA IS DEPENDENT ON SEVERAL VARIABLES, SUCH AS GRAIN SIZE OF IN-SITU MATERIAL, METHOD OF DREDGING USED, AND QUANTITY OF BEACHFILL MATERIAL REQUIRED FOR THE FILL OPERATION. THE LIMITS OF EXCAVATION ARE CURRENTLY BEING EVALUATED USING THE ABOVE CRITERIA. THE BORROW AREA AND/OR LIMIT OF EXCAVATION WILL BE DEFINED ON THE BID DRAWING SUBMITTAL.
5. THE CONTRACTOR SHALL HAND PLACE FILL MATERIAL FOR DUNE AND BERM AS REQUIRED UNDER THE EXISTING PIERS TO AN ELEVATION 2' BELOW THE PIER STRUCTURAL SUPPORTS.

HYDROMAC TO OCEAN INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
P.N. 81A117-147 TO 311-796

SHEET NAVIGATOR
C-106



1 PLAN - STA 175+96 TO STA 216+97
SCALE: AS SHOWN

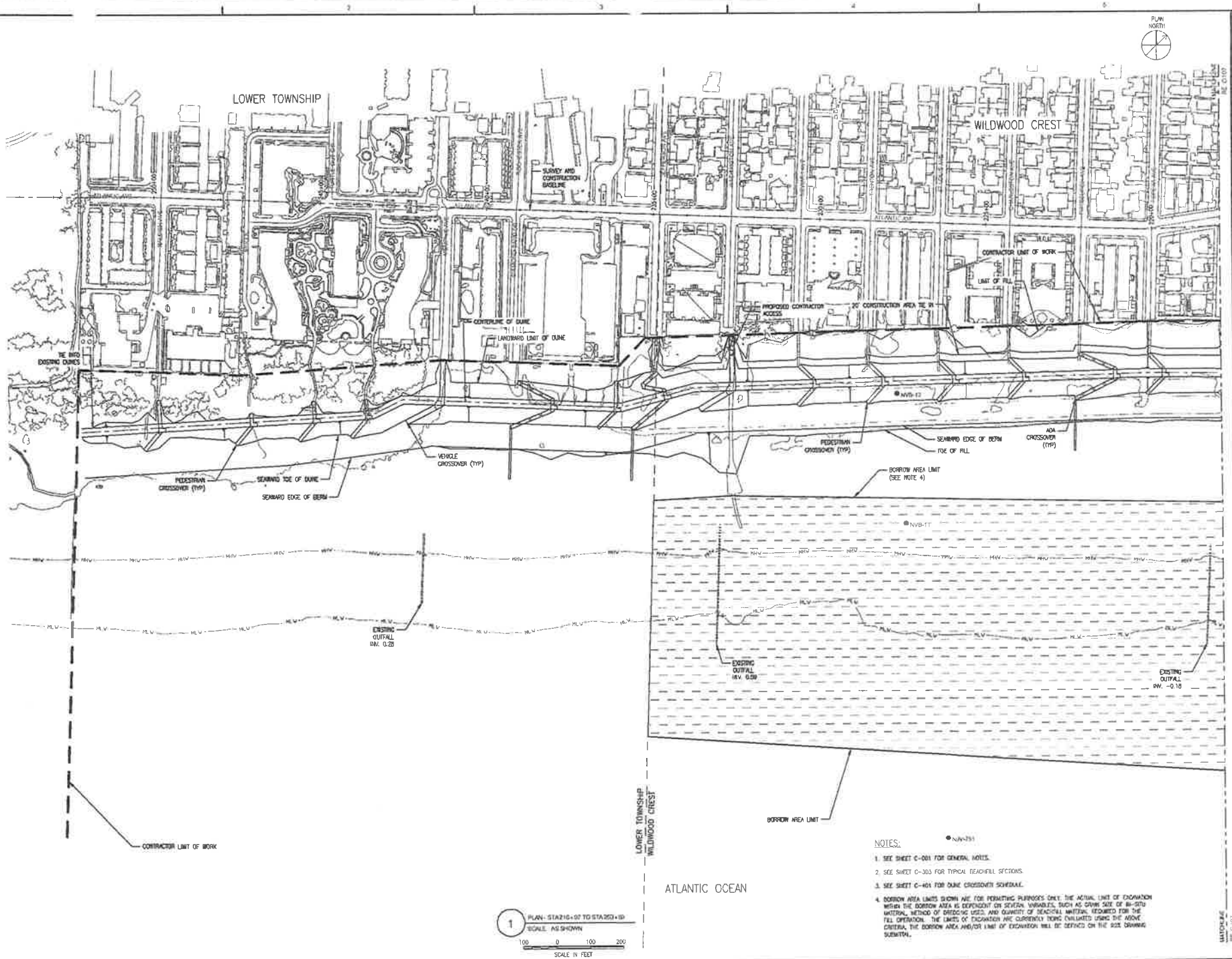
100 0 100 200
SCALE IN FEET

NOTES:

1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE SHEET C-303 FOR TYPICAL BEACHFILL SECTIONS.
3. SEE SHEET C-401 FOR DUNE CROSSOVER SCHEDULE.
4. BORROW AREA LIMITS SHOWN ARE FOR PERMITTING PURPOSES ONLY. THE ACTUAL LIMIT OF EXCAVATION WITHIN THE BORROW AREA IS DEPENDENT ON SEVERAL VARIABLES, SUCH AS GRAIN SIZE OF IN-SITU MATERIAL, METHOD OF DREDGING USED, AND QUANTITY OF BEACHFILL MATERIAL REQUIRED FOR THE FILL OPERATION. THE LIMITS OF EXCAVATION ARE CURRENTLY BEING EVALUATED USING THE ABOVE CRITERIA. THE BORROW AREA AND/OR LIMIT OF EXCAVATION WILL BE DEFINED ON THE BOX DRAWING SUBMITTAL.

RESTORATION OF CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
P-AN-STA 175+96 TO STA 216+97

SHEET NUMBER
C-107



NOTES:

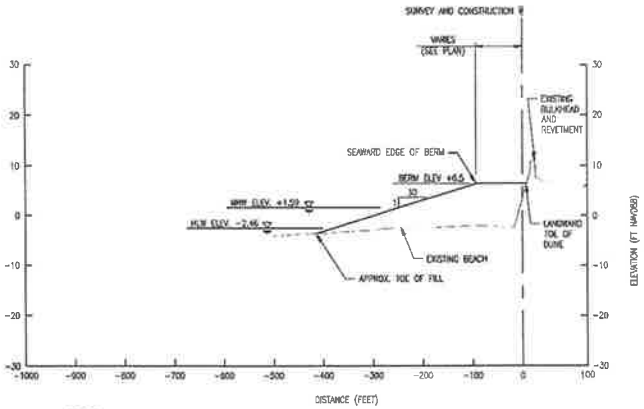
1. SEE SHEET C-001 FOR GENERAL NOTES.
2. SEE SHEET C-303 FOR TYPICAL BEACHFILL SECTIONS.
3. SEE SHEET C-401 FOR DUNE CROSSOVER SCHEDULE.
4. BORROW AREA LIMITS SHOWN ARE FOR PERMITTING PURPOSES ONLY. THE ACTUAL LIMIT OF EXCAVATION WITHIN THE BORROW AREA IS DEPENDENT ON SEVERAL VARIABLES, SUCH AS GRAIN SIZE OF IN-SITU MATERIAL, METHOD OF DREDGING USED, AND QUANTITY OF BEACHFILL MATERIAL REQUIRED FOR THE FILL OPERATION. THE LIMITS OF EXCAVATION ARE CURRENTLY BEING EVALUATED USING THE ABOVE CRITERIA. THE BORROW AREA AND/OR LIMIT OF EXCAVATION WILL BE DEFINED ON THE 95% DRAWING SUBMITTAL.

US Army Corps of Engineers Philadelphia District

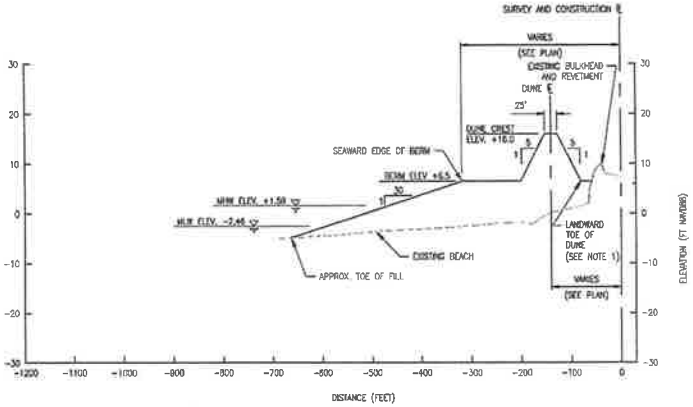
PROFESSIONAL ENGINEER SEAL

CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
F.A.P. - STA 210+97 TO STA 253+19

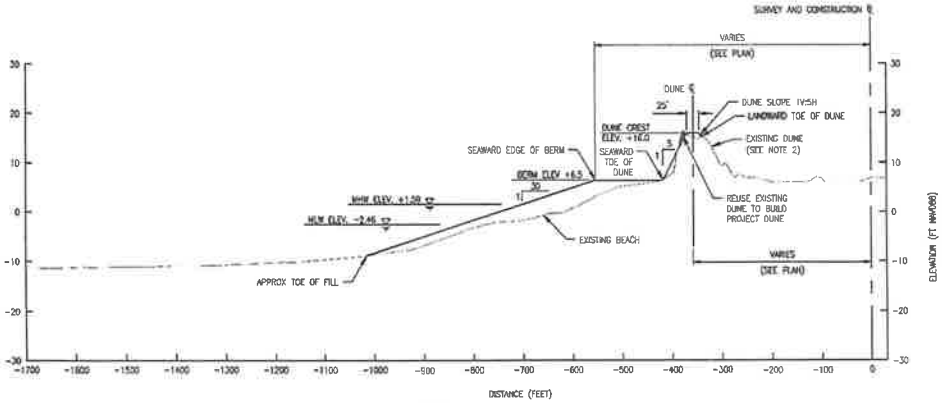
SHEET NUMBER
C-108



1 TYPICAL SECTION - STA -5+00 TO STA 0+00 (NORTH WILDWOOD)
SCALE: AS SHOWN



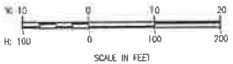
2 TYPICAL SECTION - STA. 0+00 TO STA. 5+00 (NORTH WILDWOOD)
SCALE: AS SHOWN



3 TYPICAL SECTION - STA 5+00 TO STA. 68+00 (NORTH WILDWOOD)
SCALE: AS SHOWN

NOTES:

1. PLACE FILL MATERIAL TO ELEVATION +6.5 BETWEEN EXISTING BULKHEAD/REVETMENT AND THE LANDWARD TOE OF DUNE.
2. MINIMIZE DISTURBANCE TO VEGETATION ON EXISTING DUNE.



US Army Corps of Engineers Philadelphia District

REVISIONS

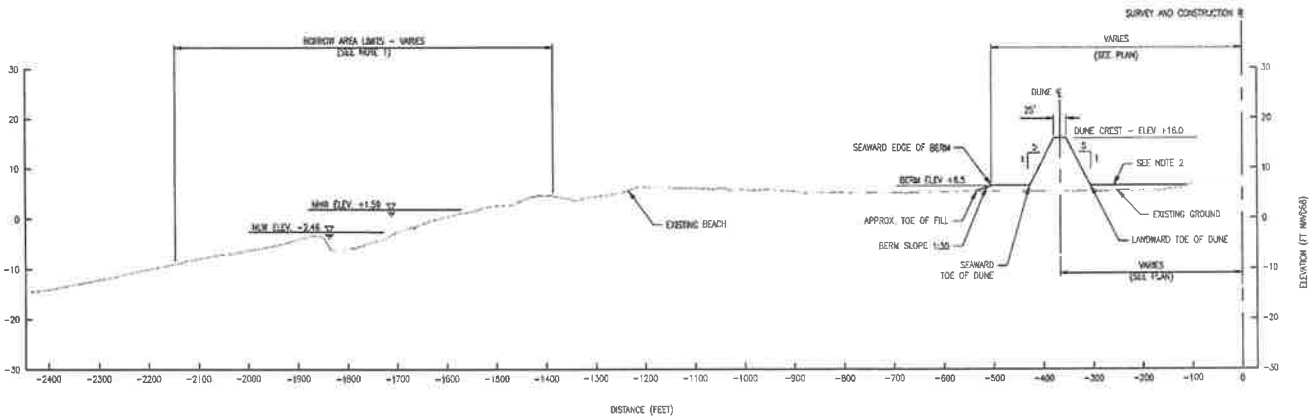
SYM	DESCRIPTION	DATE	APPR
A			
B			
C			
D			
E			

DESIGNED | DRAWN | CHECKED | SUPERVISED | APPROVED

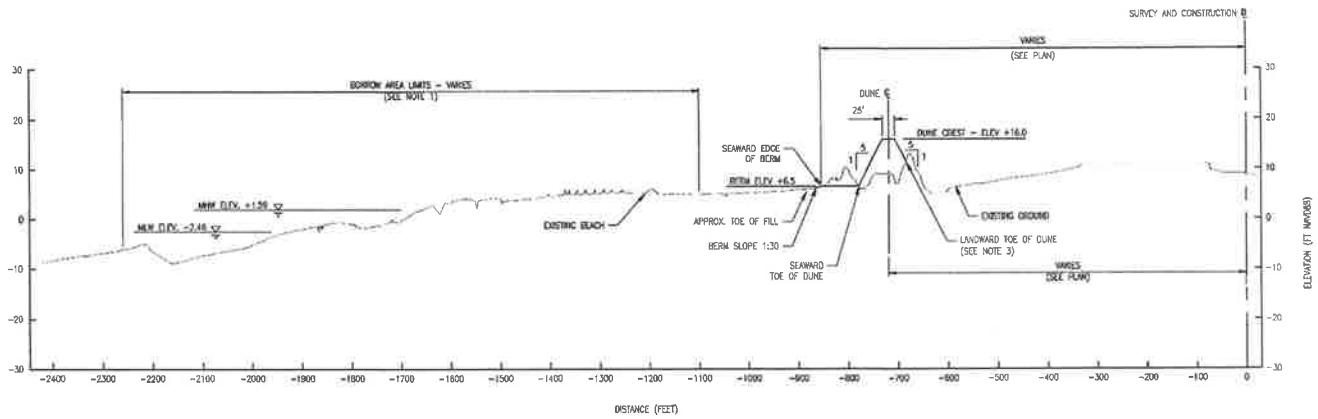
DATE | SCALE | DESIGN FILE NO. | CONTRACT NO.

ICW SECTION BULKHEAD TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACH FILL
INITIAL CONSTRUCTION
TYPICAL SECTIONS - BEACH FILL (NORTH WILDWOOD)

SHEET NUMBER
C-301



1 TYPICAL SECTION - STA 68+00 TO STA 108+00 AND STA 118+00 TO STA 136+75 (WILDWOOD)
SCALE AS SHOWN



2 TYPICAL SECTION - STA 108+00 TO STA 118+00 (WILDWOOD)
SCALE AS SHOWN

NOTES:

1. BORROW AREA LIMITS SHOWN ARE, FOR PERMITTING PURPOSES ONLY. THE ACTUAL LIMIT OF EXCAVATION WITHIN THE BORROW AREA IS DEPENDENT ON SEVERAL VARIABLES, SUCH AS GRAIN SIZE OF IN-SITU MATERIAL, METHOD OF DREDGING USED, AND QUANTITY OF BEACHFILL MATERIAL REQUIRED FOR THE FILL OPERATION. THE LIMITS OF EXCAVATION ARE CURRENTLY BEING EVALUATED USING THE ABOVE CRITERIA. THE BORROW AREA AND/OR LIMIT OF EXCAVATION WILL BE DEFINED ON THE 90% DRAWING SUBMITTAL.
2. GRADE FILL MATERIAL TO ELEV. +6.5 BETWEEN THE LANDWARD EDGE OF THE BOARDWALK AND THE LANDWARD TOE OF DUNE.
3. MINIMIZE DISTURBANCE TO EXISTING VEGETATION ON LANDWARD SIDE OF DUNE.

V: 10 0 10 20
H: 100 0 100 200
SCALE IN FEET

U.S. Army Corps of Engineers - Philadelphia District

NO.	DESCRIPTION	DATE	BY

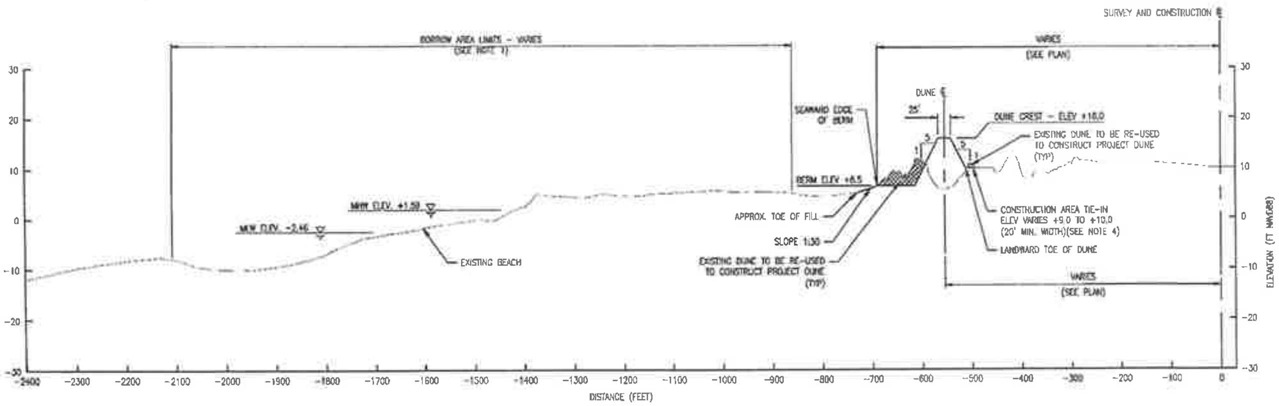
REVISIONS

DESIGNED BY: [illegible] | DRAWN BY: [illegible] | CHECKED BY: [illegible] | REVIEWED BY: [illegible] | DATE: [illegible] | SCALE: [illegible]

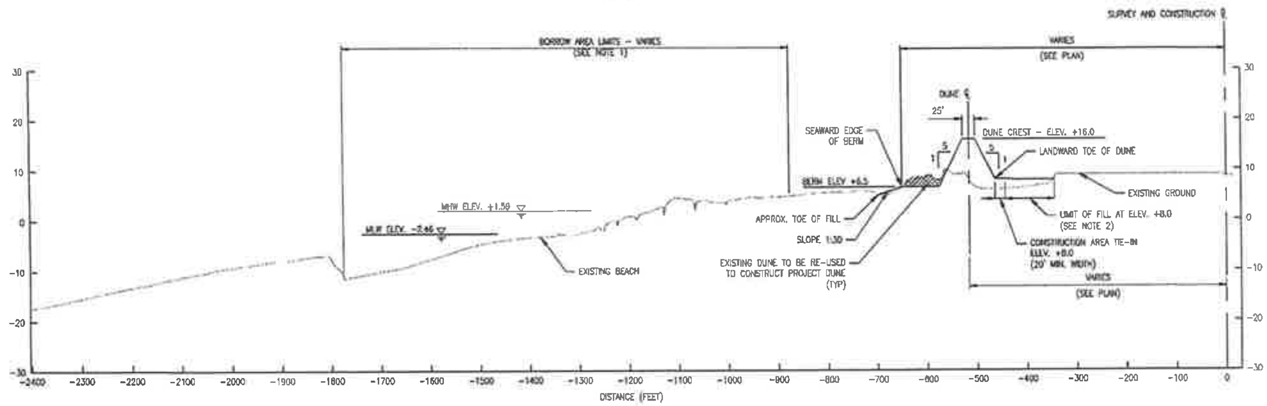
DESIGN FILE NAME: [illegible]
DATE: [illegible]

REGISTERED INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
TYPICAL SECTIONS - BEACHFILL (CITY OF WILDWOOD)

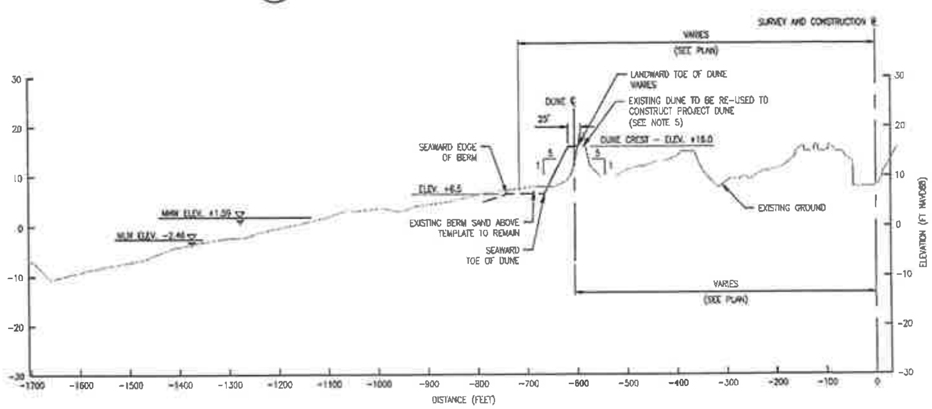
SHEET NUMBER
C-302



1 TYPICAL SECTION - STA 136+75 TO STA 182+00 (WILDWOOD CREST - NORTH OF RAMBLER AVE.)
SCALE: AS SHOWN



2 TYPICAL SECTION - STA 182+00 TO STA 205+00 (WILDWOOD CREST - SOUTH OF RAMBLER AVE.)
SCALE: AS SHOWN



3 TYPICAL SECTION - STA 205+00 TO STA 282+00 (LOWER TOWNSHIP)
SCALE: AS SHOWN

NOTES:

1. BORROW AREA LIMITS SHOWN ARE FOR PERMITTING PURPOSES ONLY. THE ACTUAL LIMIT OF EXCAVATION WITHIN THE BORROW AREA IS DEPENDENT ON SEVERAL VARIABLES, SUCH AS GRAIN SIZE OF IN-SITU MATERIAL, METHOD OF DREDGING USED, AND QUANTITY OF BEACHFILL MATERIAL REQUIRED FOR THE FILL OPERATION. THE LIMITS OF EXCAVATION ARE CURRENTLY BEING EVALUATED USING THE ABOVE CRITERIA. THE BORROW AREA AND/OR LIMIT OF EXCAVATION WILL BE DEFINED ON THE 80% DRAWING SUBMITTAL.
2. GRADE FILL MATERIAL AS SHOWN AT ELEV. +8.0 FROM LANDWARD TOE OF DUNE TO EXISTING BULKHEAD.
3. MINIMIZE DISTURBANCE TO EXISTING VEGETATION ON LANDWARD SIDE OF DUNE.
4. BETWEEN STA. 138+80 TO STA. 147+00 CONSTRUCTION AREA TIE-IN IS NOT TO BE BUILT.
5. EXISTING DUNES OR PORTIONS OF THE EXISTING DUNES WILL REMAIN IF POSSIBLE. CONSTRUCTIBILITY REQUIREMENTS FOR THE PROJECT DUNE MAY REQUIRE THAT SOME PARTS OF THE EXISTING DUNES WILL NEED TO BE INCORPORATED INTO THE PROJECT DUNE.

V: 10 0 10 20
H: 100 0 100 200
SCALE IN FEET

HEREFORD INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOODS BEACHFILL
INITIAL CONSTRUCTION

SHEET NUMBER
C-303

DUNE CROSSOVER SCHEDULE

MUNICIPALITY	LOCATION	SURVEY & CONSTR. BASELINE STATION	OFFSET (FT)	CROSSOVER TYPE	WIDTH (FT)	AREA (SF)	STABILIZATION MAT ON CROSSOVER (SF)	DERM STABILIZATION MAT (SF)	REMARKS
NORTH WILDOOD	3RD AVENUE	3+37	142.72 L	PEDESTRIAN	10				
	4TH AVENUE	5+54	163.74 L	PEDESTRIAN	10				
	5TH AVENUE	8+63	164.82 L	VEHICLE	15				
	6TH AVENUE	10+76	196.34 L	PEDESTRIAN	10				
	7TH AVENUE	13+54	262.02 L	ADA	10				
	8TH AVENUE	16+77	270.26 L	PEDESTRIAN	10				
	9TH AVENUE	19+26	288.50 L	PEDESTRIAN	10				
	10TH AVENUE	22+01	288.64 L	ADA	10				
	11TH AVENUE	24+33	307.99 L	PEDESTRIAN	10				
	12TH AVENUE	27+19	317.82 L	PEDESTRIAN	10				
	13TH AVENUE	29+78	327.42 L	PEDESTRIAN	10				
	14TH AVENUE	32+62	337.93 L	PEDESTRIAN	10				
	15TH AVENUE	35+41	348.27 L	ADA	10				
	16TH AVENUE	38+59	291.69 L	VEHICLE	15				
	17TH AVENUE	40+30	223.96 L	PEDESTRIAN	10				
	18TH AVENUE	43+50	218.00 L	PEDESTRIAN	10				
	19TH AVENUE	44+97	250.12 L	PEDESTRIAN	10				
	20TH AVENUE	47+95	307.50 L	ADA	10				
	21ST AVENUE	50+75	361.41 L	PEDESTRIAN	10				
	MID-BLOCK	52+33	391.83 L	VEHICLE	15				
	22ND AVENUE	54+64	406.19 L	PEDESTRIAN	10				STRAIGHT
	23RD AVENUE	56+44	411.24 L	PEDESTRIAN	10				STRAIGHT
	24TH AVENUE	59+30	414.46 L	PEDESTRIAN	10				STRAIGHT
	25TH AVENUE	60+70	442.60 L	PEDESTRIAN	10				STRAIGHT
	26TH/JUNIPER AVENUE	65+12	308.09 L	PEDESTRIAN	10				STRAIGHT
WILDWOOD CITY	POPLAR AVENUE	68+69	361.72 L	PEDESTRIAN	10				
	MAGNOLIA AVENUE	71+82	370.71 L	PEDESTRIAN	10				
	GLENWOOD AVENUE	72+70	368.96 L	ADA	10				
	MAPLE AVENUE	76+26	363.17 L	PEDESTRIAN	10				
	PINE AVENUE	78+46	359.80 L	PEDESTRIAN	10				
	WILDWOOD AVENUE	81+56	3664.57 L	PEDESTRIAN	10				
	OAK AVENUE	83+62	351.23 L	PEDESTRIAN	10				
	SCHELLENGER AVENUE	89+75	328.26 L	VEHICLE	15				STRAIGHT
	LINCOLN AVENUE	91+29	326.91 L	ADA	10				
	GARFIELD AVENUE	94+67	323.93 L	PEDESTRIAN	10				
	SPICER AVENUE	97+14	321.76 L	PEDESTRIAN	10				
	SPENCER AVENUE	99+55	319.64 L	PEDESTRIAN	10				
	ROBERTS AVENUE	104+95	314.66 L	PEDESTRIAN	10				
	BAKER AVENUE	107+97	312.24 L	VEHICLE	15				
	BURK AVENUE	114+61	756.15 L	ADA	10				
	ANDREWS AVENUE	117+34	518.33 L	PEDESTRIAN	10				SEAWARD SIDE ANGLE FROM CREST IS 59°58'
	TAYLOR AVENUE	119+66	518.01 L	PEDESTRIAN	10				
	RIO GRAND AVENUE	122+35	533.81 L	ADA	10				
	HAND AVENUE	125+99	533.57 L	PEDESTRIAN	10				
	LEAMING AVENUE	128+20	533.54 L	PEDESTRIAN	10				
	BONNETT AVENUE	131+21	533.51 L	PEDESTRIAN	10				
	HILDRETH AVENUE	133+89	533.48 L	ADA	10				
	CRESSE AVENUE	136+61	533.45 L	VEHICLE	15				

DUNE CROSSOVER SCHEDULE

MUNICIPALITY	LOCATION	SURVEY & CONSTR. BASELINE STATION	OFFSET (FT)	CROSSOVER TYPE	WIDTH (FT)	AREA (SF)	STABILIZATION MAT ON CROSSOVER (SF)	DERM STABILIZATION MAT (SF)	REMARKS
WILDWOOD CREST	MORNING GLORY ROAD	139+39	456.05 L	PEDESTRIAN					
	BUTTERCUP ROAD	141+50	465.92 L	PEDESTRIAN					
	LAVANDER ROAD	144+24	465.74 L	PEDESTRIAN					
	HEATHER ROAD	145+94	467.09 L	VEHICLE					
	HEATHER ROAD	147+16	503.46 L	PEDESTRIAN					
	CROCUS ROAD	149+38	514.74 L	PEDESTRIAN					
	ASTER ROAD	151+78	526.09 L	PEDESTRIAN					
	CARDINAL ROAD	154+47	531.32 L	PEDESTRIAN					
	SWEETBRIAR ROAD	157+04	528.77 L	PEDESTRIAN					
	WISTERIA ROAD	159+56	525.97 L	PEDESTRIAN					
	COLUMBINE ROAD	162+01	523.45 L	PEDESTRIAN					
	ROSEMARY ROAD	164+05	523.66 L	ADA					
	FORGET ME NOT ROAD	167+20	527.05 L	PEDESTRIAN					
	FERN ROAD	169+87	529.99 L	PEDESTRIAN					
	PALM ROAD	172+06	530.91 L	PEDESTRIAN					
	LOTUS ROAD	174+44	568.16 L	PEDESTRIAN					
	MYRTLE ROAD	177+56	564.68 L	PEDESTRIAN					
	PRIMROSE ROAD	180+50	580.11 L	VEHICLE					
	RAMBLER ROAD	183+63	583.72 L	ADA					
	RAMBLER ROAD	183+38	578.08 L	PEDESTRIAN					
	ORCHID ROAD	185+12	570.81 L	PEDESTRIAN					
	STOCKTON ROAD	187+65	560.28 L	PEDESTRIAN					
	STANTON ROAD	190+14	549.08 L	PEDESTRIAN					
	FARRAGUT ROAD	192+61	539.56 L	PEDESTRIAN					
	ATLANTA AVENUE	194+31	532.98 L	PEDESTRIAN					
	ATLANTA/NASHVILLE AVENUE	197+41	521.02 L	ADA					
	LOUISVILLE AVENUE	199+80	511.81 L	PEDESTRIAN					
	MIAMI AVENUE	202+11	503.50 L	PEDESTRIAN					
	MONTEREY AVENUE	204+42	493.95 L	PEDESTRIAN					
	ST PAUL AVENUE	206+73	484.72 L	PEDESTRIAN					
	TOLEDO AVENUE	208+42	477.81 L	ADA					
	DENVER AVENUE	211+36	465.81 L	PEDESTRIAN					
	SYRACUSE AVENUE	213+52	456.96 L	PEDESTRIAN					
	PRESTON AVENUE	215+59	448.49 L	PEDESTRIAN					
	HOLLYWOOD AVENUE	217+67	440.03 L	PEDESTRIAN					
	TOPEKA AVENUE	219+82	431.21 L	PEDESTRIAN					
	PITTSBURGH AVENUE	220+99	433.46 L	ADA					
	CHARLESTON AVENUE	223+72	450.67 L	PEDESTRIAN					
	ST LOUIS AVENUE	225+84	464.00 L	PEDESTRIAN					
	TRENTON AVENUE	227+97	477.42 L	PEDESTRIAN					
	NEWARK AVENUE	2230+04	495.46 L	ADA					
	WASHINGTON AVENUE	232+49	505.87 L	VEHICLE					
	JEFFERSON AVENUE	234+50	538.93 L	ADA					
LOWER TOWNSHIP	THE GRAND	235+99	579.19 L	PEDESTRIAN					
	DIAMOND SAND DRIVE	237+88	578.81 L	ADA					
	MEMPHIS AVENUE	241+19	577.57 L	VEHICLE					
	SEAPOINTE BLVD NORTH	243+44	626.62 L	PEDESTRIAN					
	SEAPOINTE BLVD SOUTH	245+00	641.51 L	PEDESTRIAN					
	BIRD LANE	246+89	658.06 L	PEDESTRIAN					
	RALEIGH AVENUE	249+63	686.64 L	PEDESTRIAN					

U.S. Army Corps of Engineers
Philadelphia District

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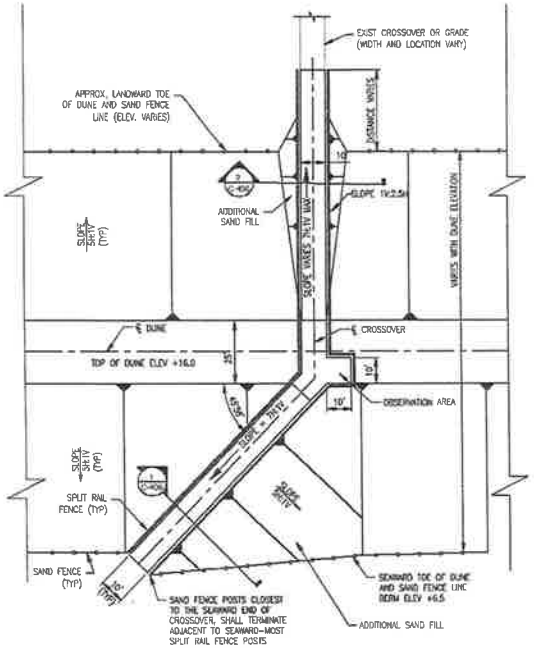
SHEET 1 OF 1
FILE NAME: [illegible]

U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
ENGINEERING DIVISION
[illegible]

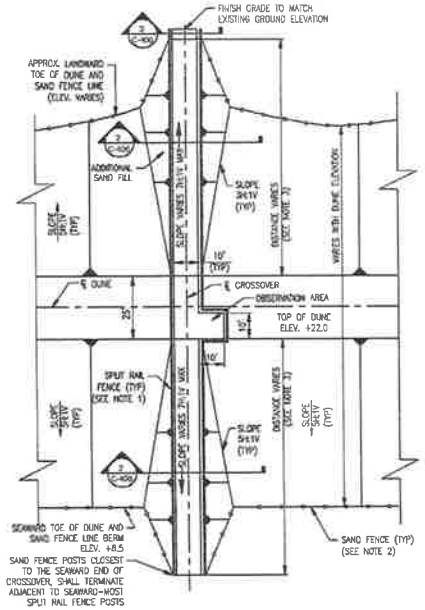
HOFFMAN INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD SEACOPELI
INITIAL CONSTRUCTION
DUNE CROSSOVER SCHEDULE

SHEET NUMBER:
C-401



1 PLAN - PEDESTRIAN CROSSOVER (NORTH WILDWOOD & WILDWOOD CREST & LOWER TOWNSHIP)
SCALE: AS SHOWN

20 0 20 40
SCALE IN FEET



2 PLAN - PEDESTRIAN CROSSOVER (NORTH WILDWOOD
SCALE: AS SHOWN

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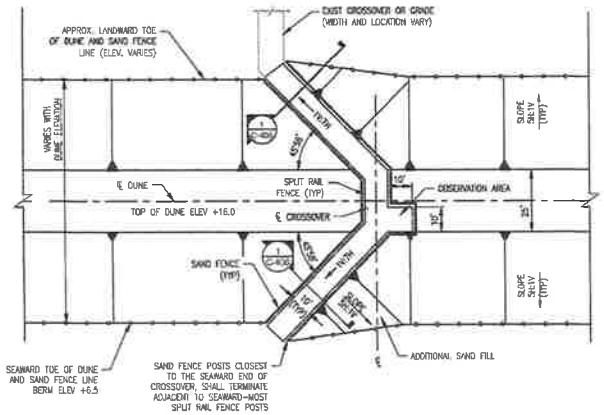
SCALE IN FEET



3 PLAN - PEDESTRIAN CROSSOVER (WILDWOOD CITY & WILDWOOD CREST)
SCALE: AS SHOWN

20 0 20 40
SCALE IN FEET

NOTES:

1. POST AND RAIL FENCE POSTS NOT SHOWN FOR CLARITY. FOR DETAILS OF POST AND RAIL FENCE, SEE SHEET C-501.
2. FOR SAND FENCE AND DUNE PLANTING DETAILS, SEE SHEET C-502.
3. THE LENGTH OF HANDICAP CROSSOVERS MAY VARY WITH LOCATION AND FINISHED GRADE OR EXISTING GROUND ELEVATIONS. THE RISE ON CROSSOVERS SHALL BE NO MORE THAN 2.5' OVER A RUN OF 30' (12H:1V). LANDING SHALL BE CONSTRUCTED AT A MAXIMUM SPACING OF 30' AND SHALL BE LEVEL FOR A MINIMUM LENGTH OF 5'.

US Army Corps of Engineers Philadelphia District

NO.	DATE	DESCRIPTION
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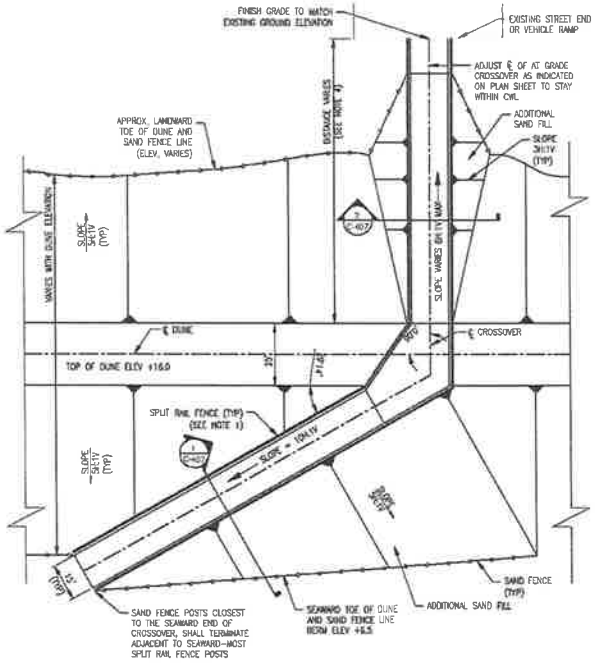
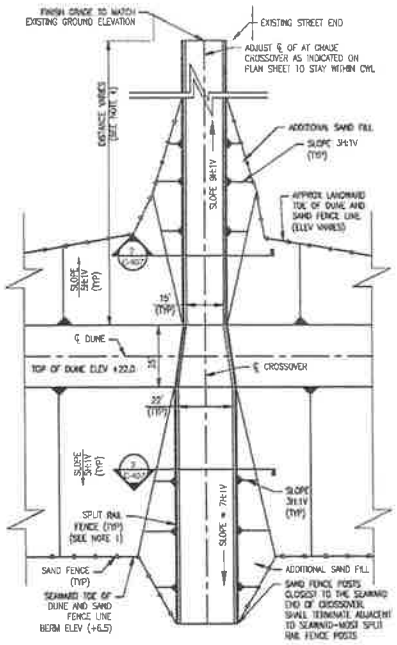
PERTAINING BACK TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACH FILL
INITIAL CONSTRUCTION
PLAN - PEDESTRIAN CROSSOVER

SHEET NUMBER
C-402



1 PLAN - TYPICAL VEHICLE CROSSOVER (NORTH WILDWOOD & WILDWOOD CREST & LOWER TOWNSHIP)
SCALE AS SHOWN

20 0 20 40
SCALE IN FEET



2 PLAN - VEHICLE CROSSOVER (WILDWOOD CITY)
SCALE AS SHOWN

20 0 20 40
SCALE IN FEET

NOTES:

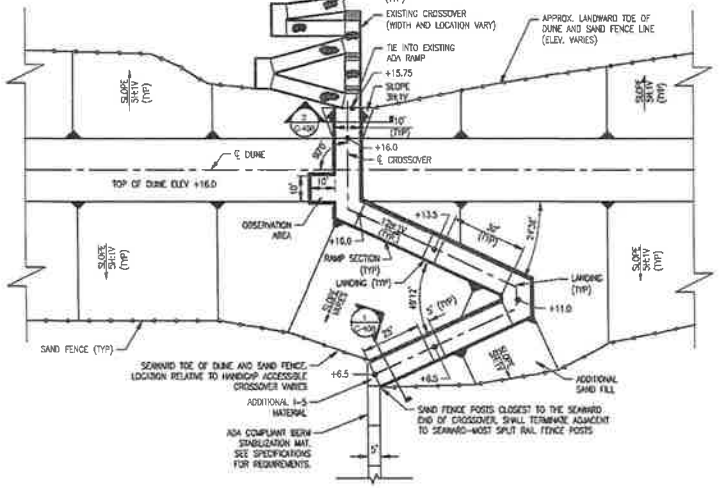
1. POST AND RAIL FENCE POSTS NOT SHOWN FOR CLARITY. FOR DETAILS OF POST AND RAIL FENCE, SEE SHEET C-501.
2. FOR SAND FENCE AND DUNE PLANTING DETAILS, SEE SHEET C-502.
3. THE LENGTH OF HANDICAP CROSSOVERS MAY VARY WITH LOCATION AND FINISHED GRADE OR EXISTING GROUND ELEVATIONS. THE RISE ON CROSSOVERS SHALL BE NO MORE THAN 2.5' OVER A RUN OF 30' (12H:1V). LANDING SHALL BE CONSTRUCTED AT A MAXIMUM SPACING OF 30' AND SHALL BE LEVEL FOR A MINIMUM LENGTH OF 5'.

U.S. Army Corps of Engineers Philadelphia District

NO.	DATE	DESCRIPTION	BY	CHK	APP
1	11/13/09	ADDED VEHICLE CROSSOVER			

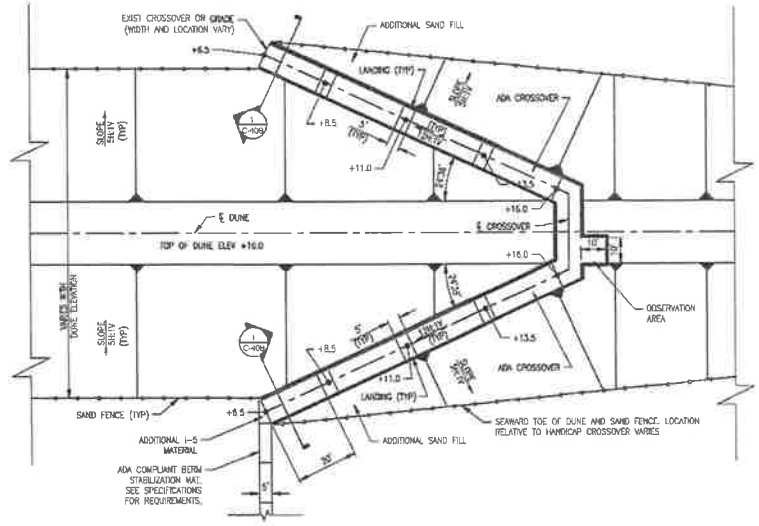
DIRECTIONAL BEACH FILL CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHES
INITIAL CONSTRUCTION
PLAN - VEHICLE CROSSOVER

SHEET NUMBER
C-403



1 PLAN - ADA CROSSOVER TYPICAL (NORTH WILDWOOD)
SCALE AS SHOWN

20 0 20 40
SCALE IN FEET



2 PLAN - ADA CROSSOVER (WILDWOOD CITY & WILDWOOD CREST & LOWER TOWNSHIP)
SCALE AS SHOWN

20 0 20 40
SCALE IN FEET

NOTES:

1. POST AND RAIL FENCE POSTS NOT SHOWN FOR CLARITY. FOR DETAILS OF POST AND RAIL FENCE, SEE SHEET C-501.
2. FOR SAND FENCE AND DUNE PLANTING DETAILS, SEE SHEET C-502.
3. THE LENGTH OF HANDICAP CROSSOVERS MAY VARY WITH LOCATION AND FINISHED GRADE OF EXISTING GROUND ELEVATIONS. THE RISE ON CROSSOVERS SHALL BE NO MORE THAN 2.5' OVER A RUN OF 30' (12:1±1V). LANDING SHALL BE CONSTRUCTED AT A MAXIMUM SPACING OF 30' AND SHALL BE LEVEL FOR A MINIMUM LENGTH OF 5'.

U.S. Army Corps of Engineers, Philadelphia District

NO.	DATE	REVISION
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DESIGNED BY: [illegible]
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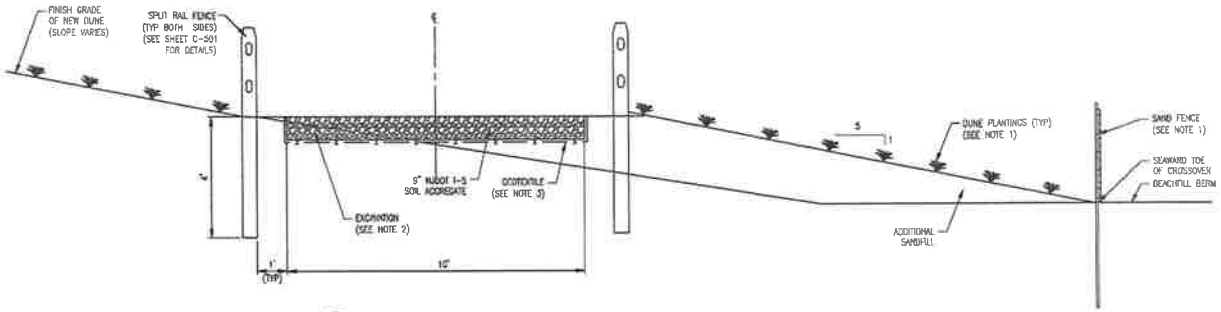
SUPERVISED BY: [illegible]
DATE: [illegible]
SCALE: AS NOTED
FILE NO. [illegible]
CONTRACT NO. [illegible]

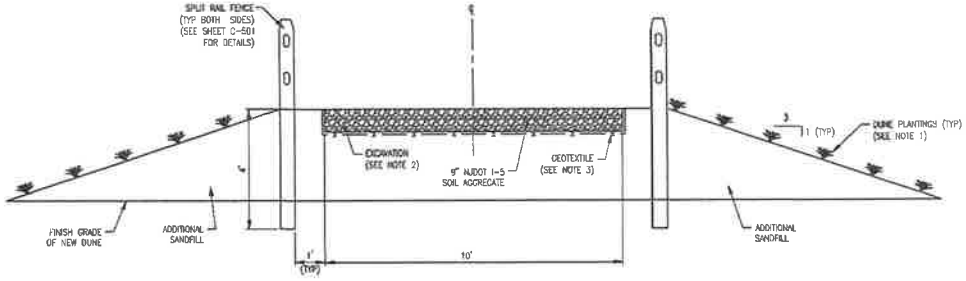
U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
P.O. BOX 19505
PHILADELPHIA, PA 19145-0505

HOFFMAN'S INLET TO CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
WILDWOODS BEACHFILL
INITIAL CONSTRUCTION
PLAN - ADA CROSSOVER

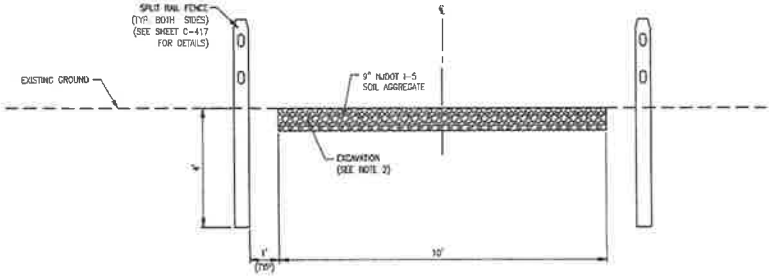
SHEET NUMBER
C-404



1 TYPICAL SECTION - PEDESTRIAN CROSSOVER
SCALE: NTS



2 TYPICAL SECTION - PEDESTRIAN CROSSOVER
SCALE: NTS



3 TYPICAL SECTION - PEDESTRIAN CROSSOVER
SCALE: NTS

NOTES:

1. FOR DUNE PLANTING AND SAND FENCE DETAILS, SEE SHEET C-502
2. EXCAVATED MATERIAL SHALL BE USED AS ADDITIONAL SAND FILL
3. THE CONTRACTOR SHALL PLACE GEOTEXTILE ⅔ OF THE WAY UP THE SURFACE OF THE I-5 MATERIAL.

US Army Corps of Engineers Philadelphia District

No.	Description	Date	By	Chkd

DATE	DESIGNED BY	DRAWN BY	CHECKED BY
2/13/07			
SCALE			
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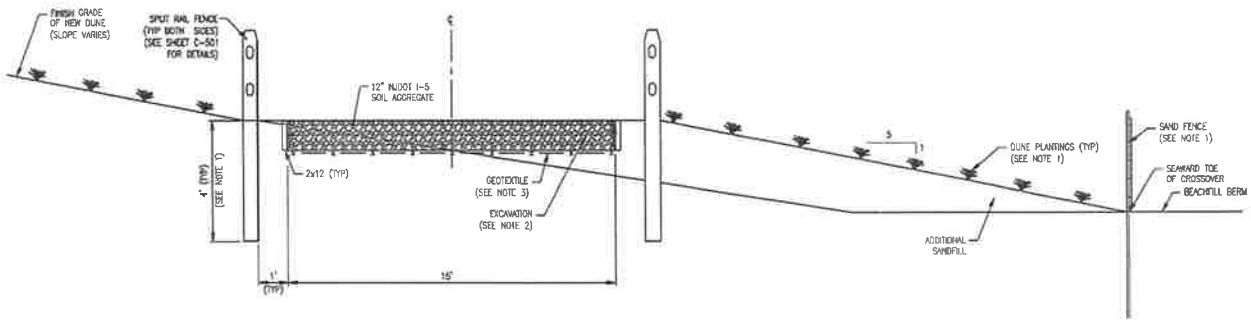
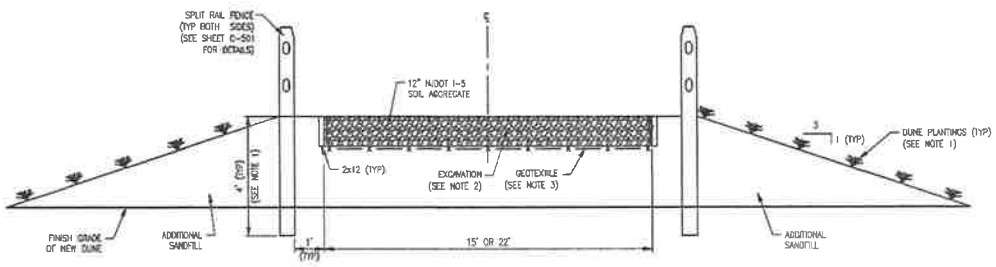
NJ DEPT. OF ENVIRONMENTAL PROTECTION
NJ DEPT. OF TRANSPORTATION
US ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT

SEDIMENT BALLT DISCAPE AND BEACH
CAPE MAY COUNTY, NEW JERSEY
BALDWIN'S BEACHFILL
INITIAL CONSTRUCTION
TYPICAL SECTION - PEDESTRIAN CROSSOVER

SHEET NUMBER
C-406



1 TYPICAL SECTION - VEHICLE CROSSOVER
SCALE NTS



2 TYPICAL SECTION - VEHICLE CROSSOVER
SCALE NTS

NOTES:

1. FOR DUNE PLANTING AND SAND FENCE DETAILS, SEE SHEET C-502.
2. EXCAVATED MATERIAL SHALL BE USED AS ADDITIONAL SAND FILL.
3. THE CONTRACTOR SHALL PLACE GEOTEXTILE ⅔ OF THE WAY UP THE SURFACE OF THE I-5 MATERIAL.

US Army Corps of Engineers Philadelphia District

REVISIONS

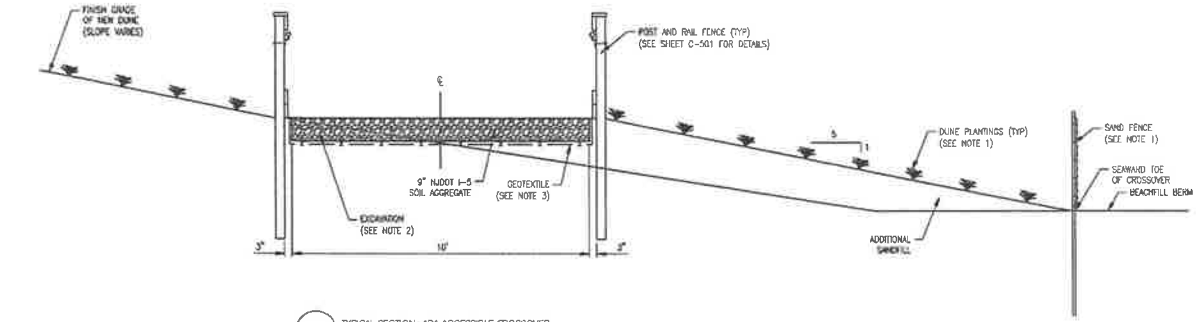
NO.	DATE	DESCRIPTION	BY	CHK	APP
1	12/17/2014	ADDED SHEET C-407	CAT	CAT	CAT

DATE 12/17/2014	DESIGNED BY CAT	DESIGNED BY CAT
DRAWN BY CAT	CHECKED BY CAT	CHECKED BY CAT
CAD FILE NAME		

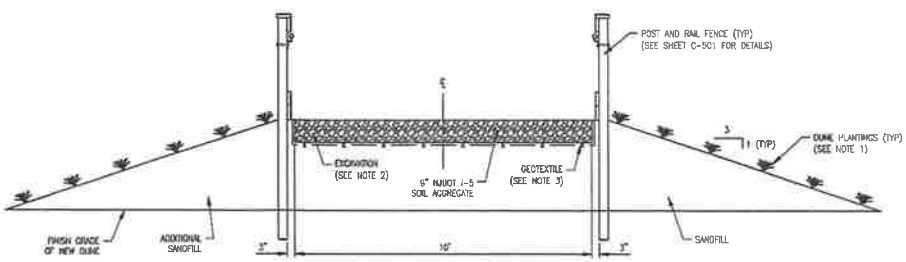
US ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
FRANKLIN AVENUE, NJ 08873

LOCATED BAYSIDE OF CAPE MAY INLET
CAPE MAY COUNTY, NEW JERSEY
HILDEBRANDS BEACHFILL
INITIAL CONSTRUCTION
TYPICAL SECTION - VEHICLE CROSSOVER

SHEET NUMBER
C-407



TYPICAL SECTION - ADA ACCESSIBLE CROSSOVER
SCALE NTS

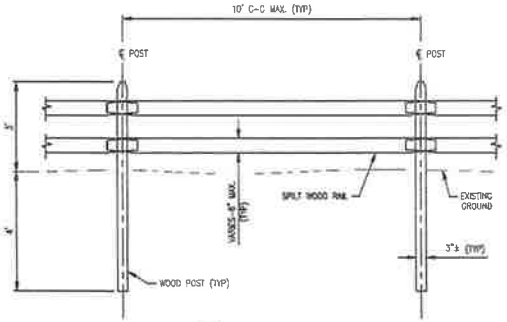


TYPICAL SECTION - ADA ACCESSIBLE CROSSOVER
SCALE NTS

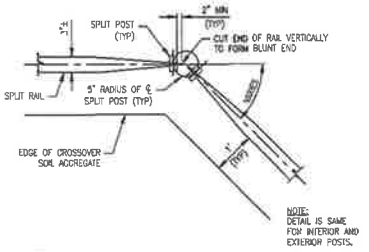
NOTES:

1. FOR DUNE PLANTING AND SAND FENCE DETAILS, SEE SHEET C-502.
2. SEE CONTRACTOR SPECIFICATIONS FOR REQUIREMENTS.

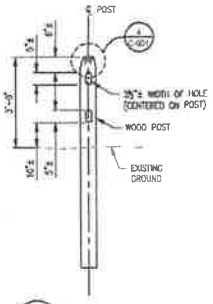
SHEET NUMBER
C-408



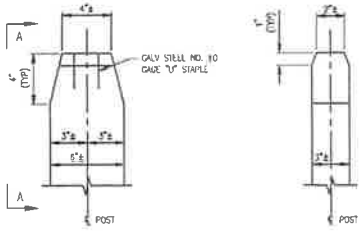
1 ELEVATION - SPLIT RAIL FENCE
SCALE: NTS



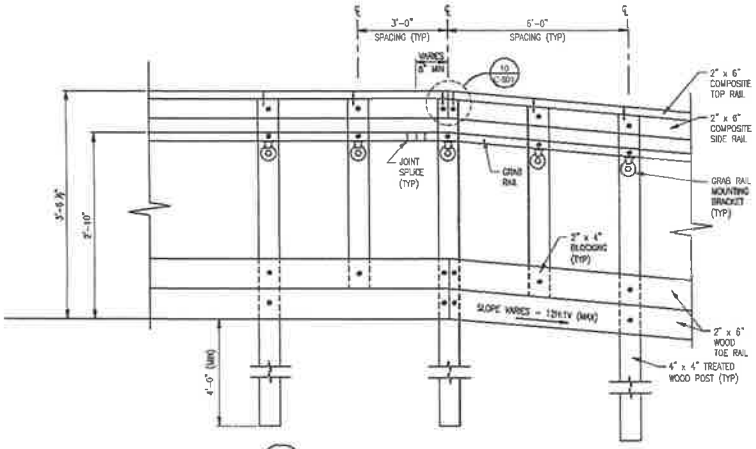
2 DETAIL - SPLIT RAIL FENCE POST LAYOUT AT HORIZONTAL ANGLE POINT
SCALE: NTS



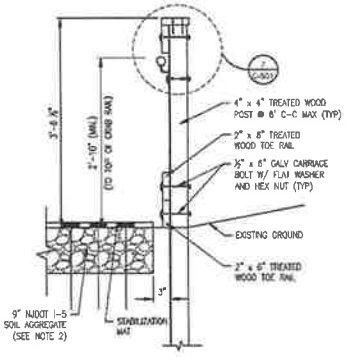
3 DETAIL - SPLIT RAIL FENCE
SCALE: NTS



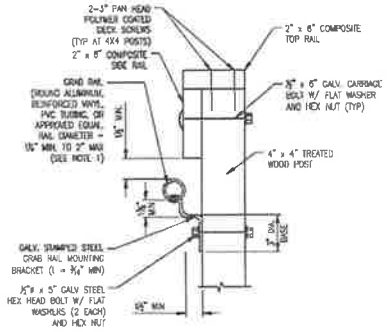
4 DETAIL - TOP OF SPLIT RAIL FENCE POST TAPER
SCALE: NTS



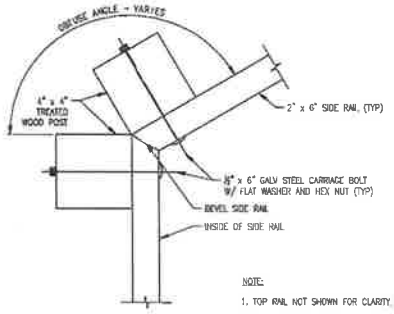
5 ELEVATION - POST AND RAIL FENCE
SCALE: NTS



6 DETAIL - POST AND RAIL FENCE
SCALE: NTS

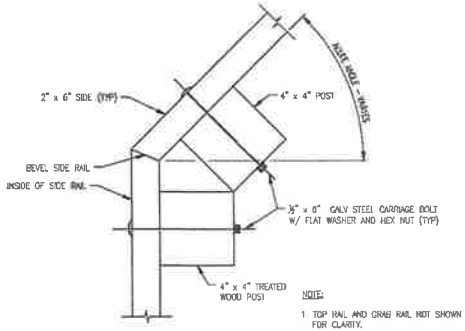


7 DETAIL - GRAB RAIL MOUNTING BRACKET TO POST
SCALE: NTS



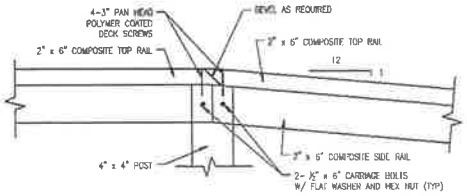
NOTE:
1. TOP RAIL NOT SHOWN FOR CLARITY.

8 DETAIL - POST AND RAIL FENCE RAILING WITH OBTUSE HOR. ANGLE ALIGNMENT
SCALE: NTS



NOTE:
1 TOP RAIL AND GRAB RAIL NOT SHOWN FOR CLARITY.

9 DETAIL - POST AND RAIL FENCE RAILING WITH ACUTE HOR. ANGLE ALIGNMENT
SCALE: NTS



10 DETAIL - POST AND RAIL FENCE RAIL SPLICE
SCALE: NTS

NOTES:

1. THE DIMENSION MAY VARY, BUT 1½" MINIMUM CLEAR IS REQUIRED BETWEEN THE O.D. OF THE GRAB RAIL AND FACE OF POST TO MEET ADA REQUIREMENTS.
2. CROSSOVER SURFACE MAY BE I-5 SOIL AGGREGATE OR STABILIZATION MAT. SEE CROSSOVER SCHEDULE ON SHEET C-601.

US Army Corps of Engineers Philadelphia District

SYM	DATE	DESCRIPTION	BY

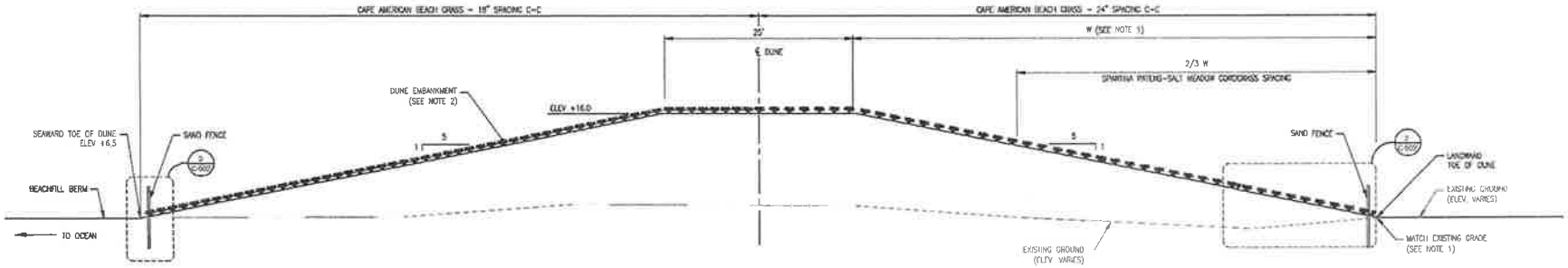
SCHEMATIC

DRAWN BY		DESIGNED BY	
CHECKED BY		APPROVED BY	
DATE		DATE	
SCALE			

U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
FT. DIX, NEW JERSEY 08640-5000

FORCEPOND PLANT TO DUTCH NECK RD.
CAPE MAY COURT HOUSE, NEW JERSEY
MISCELLANEOUS DETAILS
FENCING CONSTRUCTION
DC 7.4.3 - FENCE

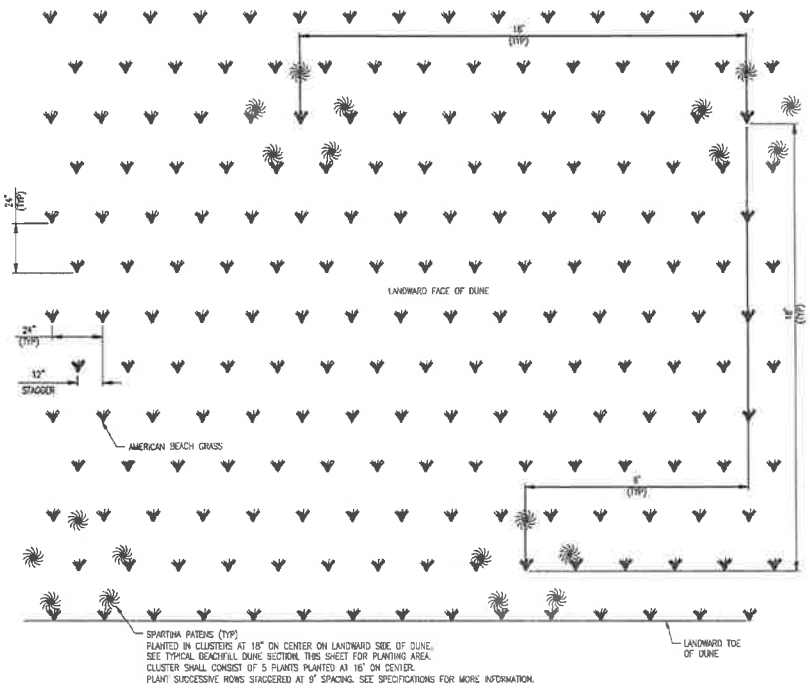
SHEET NUMBER
C-501



NOTE:

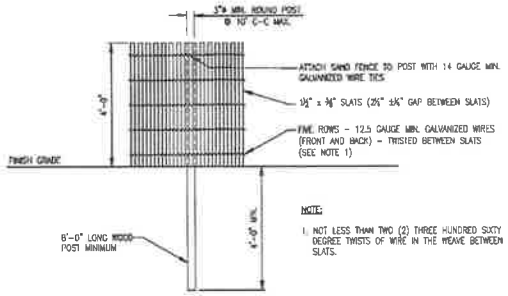
1. IN AREAS OF EXISTING DUNES, FULL DUNE CONSTRUCTION SHOWN HERE MAY NOT BE REQUIRED. SEE BEACHFILL CROSS SECTION SHEETS. PLANTING IS NOT REQUIRED ON EXISTING DUNES.
2. DUNE EMBANKMENT WIDTH VARIES TOE-TO-TOE.

1 DETAIL - DUNE PLANTING
SCALE NTS



2 DETAIL - LANDWARD FACE OF DUNE GRASS PLANTING LAYOUT
SCALE AS SHOWN

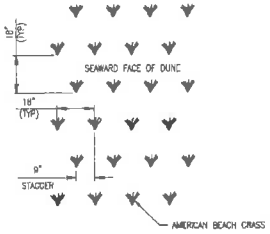
5 0 5 10
SCALE IN FEET



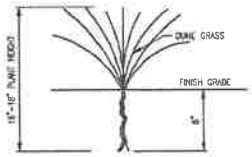
NOTE:

1. NOT LESS THAN TWO (2) THREE HUNDRED SIXTY DEGREE TWISTS OF WIRE IN THE WEAVE BETWEEN SLATS.

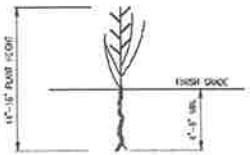
3 DETAIL - SAND FENCE WITH POST
SCALE NTS



4 DETAIL - SEAWARD FACE OF DUNE PLANTING LAYOUT
SCALE NTS



5 DETAIL - DUNE GRASS PLANTING (CAPE AMERICAN BEACH GRASS)
SCALE NTS



6 DETAIL - DUNE GRASS PLANTING (SPARTINA PATENS SALT MEADOW CORDGRASS)
SCALE NTS

CONTRACT NO. 2-CAP-2-MAT-1
CAPE MAY COUNTY, NEW JERSEY
WILDWOOD BEACHFILL
INITIAL CONSTRUCTION
DETAILS - DUNE PLANTING AND SAND FENCE

SHEET NUMBER
C-502

BULKHEAD AND LAND BERM SURVEY DATA

DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

CLIENT:
BOROUGH OF WILDWOOD CREST
PROJECT NAME:
STORM SEWER EVALUATION & FLOOD MITIGATION MASTER PLAN
D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
5	5.37	City of Wildwood			
6	4.64	Private	1	1.02	
7	4.66	Private	1	1.02	
8	4.66	Private	1	1.02	
9	4.65	Private	5.01	1.00	
10	4.61	Borough of Wildwood Crest			CRESSE AVENUE
11	5.53	Borough of Wildwood Crest			CRESSE AVENUE
12	5.48	Borough of Wildwood Crest			CRESSE AVENUE
13	5.47	Borough of Wildwood Crest			CRESSE AVENUE
14	4.91	Borough of Wildwood Crest			CRESSE AVENUE
15	4.73	Borough of Wildwood Crest			CRESSE AVENUE
16	4.16	Private	5	8.00	
17	4.18	Private	5	8.00	
18	4.16	Private	5	7.00	
19	5.77	Private	5	7.00	
20	5.94	Private	5	7.00	
22	5.72	Private	5	6.00	
23	5.81	Private	5	5.00	
26	5.84	Private	5	4.01	
28	5.80	Private	5	4.01	
29	5.78	Private	5	3.01	
30	5.82	Private	5	3.01	
31	5.84	Private	5	1.01	
32	5.80	Private	5	1.01	
35	5.78	Borough of Wildwood Crest			MORNING GLORY ROAD
36	5.60	Borough of Wildwood Crest			MORNING GLORY ROAD
37	5.59	Borough of Wildwood Crest			MORNING GLORY ROAD
38	5.57	Borough of Wildwood Crest			MORNING GLORY ROAD
39	4.43	Private	10	8.01	

DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

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BOROUGH OF WILDWOOD CREST
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STORM SEWER EVALUATION & FLOOD MITIGATION MASTER PLAN
D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
40	4.39	Private	10	8.01	
41	4.38	Private	10	8.01	
42	4.26	Private	10	7.01	
43	4.80	Private	10	6.01	
44	4.85	Private	10	6.01	
45	4.30	Private	10	7.01	
46	4.83	Private	10	6.01	
47	4.86	Private	10	5.01	
48	4.81	Private	10	5.01	
49	4.81	Private	10	4.01	
50	4.79	Private	10	3.01	
51	4.84	Private	10	3.01	
52	4.77	Private	10	2.01	
53	6.56	Private	10	2.01	
54	6.65	Private	10	2.01	
55	6.60	Private	10	2.01	
57	6.62	Private	10	1.01	
58	4.86	Borough of Wildwood Crest			BUTTERCUP ROAD
59	4.85	Borough of Wildwood Crest			BUTTERCUP ROAD
60	4.85	Borough of Wildwood Crest			BUTTERCUP ROAD
61	4.83	Borough of Wildwood Crest			BUTTERCUP ROAD
62	4.60	Private	15	8.12	
63	4.64	Private	15	8.12	
64	4.50	Private	15	8.12	
66	5.11	Private	15	8.12	
67	5.38	Private	15	8.12	
68	5.25	Private	15	8.12	
69	5.23	Private	15	7.01	
70	5.32	Private	15	7.01	

DeBlasio & Associates
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BOROUGH OF WILDWOOD CREST
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D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
71	5.17	Private	15	7.01	
72	5.21	Private	15	6.01	
73	5.26	Private	15	5.01	
74	6.58	Private	15	5.01	
76	6.56	Private	15	4.01	
78	6.52	Private	15	3.01	
79	5.59	Private	15	3.01	
82	5.56	Private	15	2.00	
83	5.53	Private	15	1.00	
84	4.45	Private	15	1.00	
85	4.60	Private	15	1.00	
86	4.50	Private	15	1.00	
87	6.51	Borough of Wildwood Crest			LAVENDER ROAD
88	6.47	Borough of Wildwood Crest			LAVENDER ROAD
89	6.47	Borough of Wildwood Crest			LAVENDER ROAD
90	6.59	Private	20.02	8.01	
91	6.53	Private	20.02	8.01	
92	6.57	Private	20.02	8.01	
93	6.62	Private	20.02	8.01	
94	6.42	Private	20.02	8.01	
95	6.27	Private	20.02	8.01	
96	6.30	Private	20.02	7.01	
97	6.36	Private	20.02	6.01	
98	6.51	Private	20.02	6.01	
99	4.24	Private	20.02	6.01	
100	4.19	Private	20.02	5.01	
101	6.45	Private	20.02	5.01	
102	6.28	Private	20.02	5.01	
103	6.36	Private	20.02	5.01	

DeBlasio & Associates
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D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
104	6.51	Private	20.02	5.01	
105	5.09	Private	20.02	5.01	
106	5.09	Private	20.02	4.01	
107	5.76	Private	20.02	4.01	
108	5.62	Private	20.02	3.01	
109	5.00	Private	20.02	3.01	
110	4.95	Private	20.02	3.01	
111	5.00	Private	20.02	3.01	
112	5.77	Private	20.02	3.01	
113	5.41	Private	20.02	3.01	
114	5.38	Private	20.02	2.01	
115	5.39	Private	20.02	1.01	
116	6.46	Borough of Wildwood Crest			HEATHER ROAD
117	6.42	Borough of Wildwood Crest			HEATHER ROAD
118	6.44	Borough of Wildwood Crest			HEATHER ROAD
120	4.26	Private	25	8.02	
121	4.06	Private	25	8.02	
122	4.07	Private	25	8.02	
123	4.48	Private	25	8.02	
124	4.47	Private	25	8.02	
125	4.67	Private	25	8.02	
126	4.61	Private	25	8.02	
127	4.46	Private	25	8.02	
128	4.49	Private	25	7.01	
129	4.65	Private	25	7.01	
131	4.53	Private	25	7.01	
132	4.57	Private	25	6.01	
133	4.53	Private	25	5.01	
134	4.56	Private	25	5.01	

DeBlasio & Associates
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BOROUGH OF WILDWOOD CREST
PROJECT NAME:
STORM SEWER EVALUATION & FLOOD MITIGATION MASTER PLAN
D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
135	5.56	Private	25	5.01	
136	5.51	Private	25	5.01	
137	5.52	Private	25	3.01	
138	5.57	Private	25	3.01	
140	5.21	Private	25	3.01	
141	5.16	Private	25	3.01	
142	5.21	Private	25	101.00	
143	5.20	Private	25	101.00	
144	7.33	Borough of Wildwood Crest			CROCUS ROAD
145	7.28	Borough of Wildwood Crest			CROCUS ROAD
146	6.94	Borough of Wildwood Crest			CROCUS ROAD
147	5.02	Private	29	7.01	
148	4.89	Private	29	7.01	
149	5.03	Private	29	7.01	
150	5.01	Private	29	6.01	
151	4.85	Private	29	6.01	
152	4.82	Private	29	6.00	
153	4.98	Private	29	6.00	
158	6.24	Private	29	6.00	
159	6.28	Private	29	3.00	
160	6.21	Private	29	3.00	
161	6.23	Private	29	3.01	
162	5.61	Private	29	3.01	
163	5.62	Private	29	3.01	
164	5.05	Private	29	3.01	
165	4.42	Private	29	3.01	
166	4.50	Private	29	1.01	
167	4.50	Private	29	1.01	
168	5.10	Private	29	1.01	

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STORM SEWER EVALUATION & FLOOD MITIGATION MASTER PLAN
D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
169	7.03	Borough of Wildwood Crest			ASTER ROAD
170	7.00	Borough of Wildwood Crest			ASTER ROAD
171	7.03	Borough of Wildwood Crest			ASTER ROAD
172	4.88	Private	33	7.01	
173	4.89	Private	33	7.01	
174	4.57	Private	33	7.01	
176	3.70	Private	33	7.01	
177	3.70	Private	33	7.01	
179	4.95	Private	33	7.01	
180	4.51	Private	33	7.01	
181	4.44	Private	33	7.01	
182	4.39	Private	33	5.01	
183	4.56	Private	33	4.00	
184	5.08	Private	33	4.00	
185	5.18	Private	33	4.00	
186	4.87	Private	33	2.00	
187	4.70	Private	33	1.01	
188	4.69	Private	33	1.01	
189	4.59	Private	33	1.01	
190	4.52	Private	33	1.01	
191	4.38	Private	33	1.01	
192	4.40	Borough of Wildwood Crest			CARDINAL ROAD
193	4.48	Borough of Wildwood Crest			CARDINAL ROAD
194	4.51	Borough of Wildwood Crest			CARDINAL ROAD
195	4.48	Borough of Wildwood Crest			CARDINAL ROAD
196	4.44	Private	37	7.01	
197	4.92	Private	37	7.01	
198	4.57	Private	37	7.01	
199	5.06	Private	37	7.01	

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BOROUGH OF WILDWOOD CREST
PROJECT NAME:
STORM SEWER EVALUATION & FLOOD MITIGATION MASTER PLAN
D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
200	5.05	Private	37	6.01	
201	5.10	Private	37	5.01	
202	4.81	Private	37	5.01	
203	4.99	Private	37	2.00	
204	5.14	Private	37	2.00	
205	5.56	Private	37	2.00	
206	5.14	Private	37	2.00	
207	4.97	Private	37	2.00	
208	5.52	Private	37	1.00	
209	4.54	Private	37	1.00	
210	4.40	Borough of Wildwood Crest			SWEET BRIAR ROAD
211	4.35	Borough of Wildwood Crest			SWEET BRIAR ROAD
214	4.57	Private	41	7.01	
215	4.44	Private	41	7.01	
216	4.80	Private	41	7.01	
217	5.68	Private	41	7.01	
218	6.63	Private	41	7.01	
219	6.61	Private	41	7.01	
220	6.54	Private	41	7.01	
221	5.12	Private	41	1.01	
222	5.98	Private	41	1.01	
223	4.69	Private	41	1.01	
224	4.54	Borough of Wildwood Crest			WISTERIA ROAD
225	4.49	Borough of Wildwood Crest			WISTERIA ROAD
226	4.48	Borough of Wildwood Crest			WISTERIA ROAD
1002	6.02	Private	45	7.01	
1025	5.01	Private		7.01	
1026	5.15	Private		5.01	
1027	6.02	Private		3.01	

DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

CLIENT:
BOROUGH OF WILDWOOD CREST
PROJECT NAME:
STORM SEWER EVALUATION & FLOOD MITIGATION MASTER PLAN
D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
1029	5.48	Private		1.01	
1030	5.28	Borough of Wildwood Crest			COLUMBINE ROAD
1031	4.94	Borough of Wildwood Crest			COLUMBINE ROAD
1032	4.92	Private	49	7.01	
1033	4.81	Private	49	6.01	
1034	4.98	Private	49	6.01	
1035	5.45	Private	49	5.01	
1036	5.53	Cape County MUA	49	1.01	
1037	6.52	Borough of Wildwood Crest			ROSEMARY ROAD
1038	6.50	Borough of Wildwood Crest			ROSEMARY ROAD
1039	5.82	Private	71	8.01	
1040	4.66	Private	71	8.01	
1041	4.63	Private	71	7.01	
1042	5.83	Private	71	7.01	
1043	5.30	Private	71	1.01	
1044	5.21	Private	71	1.01	
1045	4.99	Borough of Wildwood Crest			FORGET ME NOT ROAD
1046	5.17	Borough of Wildwood Crest			FORGET ME NOT ROAD
1047	5.90	Private	70	10.00	
1048	5.08	Private	70	7.01	
1049	6.03	Private	70	4.01	
1050	6.01	Private	70	1.01	
1053	5.02	Private	70	1.01	
1054	5.05	Borough of Wildwood Crest			FERN ROAD
1055	5.00	Borough of Wildwood Crest			FERN ROAD
1056	5.05	Private	67	8.01	
1057	5.33	Private	67	8.01	
1058	5.27	Private	67	6.01	
1059	5.44	Private	67	3.01	

DeBlasio & Associates
CONSULTING ENGINEERS AND PLANNERS

CLIENT:
BOROUGH OF WILDWOOD CREST
PROJECT NAME:
STORM SEWER EVALUATION & FLOOD MITIGATION MASTER PLAN
D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
1060	5.35	Borough of Wildwood Crest			PALM ROAD
1061	5.25	Borough of Wildwood Crest			PALM ROAD
1062	5.16	Borough of Wildwood Crest			PALM ROAD
1063	5.33	Private	64	7.01	
1064	4.85	Private	64	5.01	
1065	4.91	Private	64	3.01	
1066	4.98	Private	64	2.01	
1075	5.05	Private	64	1.01	
1076	5.18	Borough of Wildwood Crest			LOTUS ROAD
1077	5.16	Borough of Wildwood Crest			LOTUS ROAD
1078	6.93	Private	78	13.01	
1079	6.16	Private	78	12.01	
1080	6.73	Private	78	3.01	
1081	4.89	Borough of Wildwood Crest			MYRTLE ROAD
1082	4.73	Borough of Wildwood Crest			MYRTLE ROAD
1084	6.47	Private	77	10.01	
1086	6.47	Private	77	7.01	
1087	5.06	Private	77	5.01	
1088	5.26	Private	77	2.01	
1089	4.89	Borough of Wildwood Crest			PRIMROSE ROAD
1090	5.06	Borough of Wildwood Crest			PRIMROSE ROAD
1091	5.57	Private	76	11.01	
1092	5.99	Private	76	10.02	
1093	5.99	Private	76	8.02	
1094	6.16	Private	76	7.02	
1095	6.02	Private	76	6.01	
1096	6.20	Private	76	4.01	
1097	4.27	Private	76	1.00	
1098	6.80	Borough of Wildwood Crest			SUNSET LAKE

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CLIENT:
BOROUGH OF WILDWOOD CREST
PROJECT NAME:
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D&A PROJECT #:
WWC-G-008

Number	Elevation	Owner	Block	Lot	Street_Location
1107	5.55	Borough of Wildwood Crest			SUNSET LAKE
1108	6.14	Borough of Wildwood Crest			SUNSET LAKE
1109	6.61	Borough of Wildwood Crest			SUNSET LAKE
1110	6.79	Borough of Wildwood Crest			SUNSET LAKE
1111	6.72	Borough of Wildwood Crest			SUNSET LAKE
1112	6.65	Borough of Wildwood Crest			SUNSET LAKE
1113	6.67	Borough of Wildwood Crest			SUNSET LAKE
1114	6.73	Borough of Wildwood Crest			SUNSET LAKE
1115	6.56	Borough of Wildwood Crest			SUNSET LAKE
1116	6.60	Borough of Wildwood Crest			SUNSET LAKE
1117	6.87	Borough of Wildwood Crest			SUNSET LAKE
1118	6.84	Borough of Wildwood Crest			SUNSET LAKE
1119	6.62	Borough of Wildwood Crest			SUNSET LAKE
1120	6.58	Borough of Wildwood Crest			SUNSET LAKE
1121	6.35	Borough of Wildwood Crest			SUNSET LAKE
1122	6.25	Borough of Wildwood Crest			SUNSET LAKE
1123	6.53	Borough of Wildwood Crest			SUNSET LAKE
1124	6.67	Borough of Wildwood Crest			SUNSET LAKE
1125	6.67	Borough of Wildwood Crest			SUNSET LAKE
1126	6.76	Borough of Wildwood Crest			SUNSET LAKE
1127	6.63	Borough of Wildwood Crest			SUNSET LAKE
1130	6.83	Borough of Wildwood Crest			SUNSET LAKE
1131	6.66	Borough of Wildwood Crest			SUNSET LAKE
1132	7.14	Borough of Wildwood Crest			SUNSET LAKE
1133	6.64	Borough of Wildwood Crest			SUNSET LAKE
1134	6.59	Borough of Wildwood Crest			SUNSET LAKE
1135	6.76	Borough of Wildwood Crest			SUNSET LAKE
1136	6.67	Borough of Wildwood Crest			SUNSET LAKE
1137	6.65	Borough of Wildwood Crest			SUNSET LAKE

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Number	Elevation	Owner	Block	Lot	Street_Location
1138	6.47	Borough of Wildwood Crest			SUNSET LAKE
1139	7.00	Borough of Wildwood Crest			SUNSET LAKE
1140	6.69	Borough of Wildwood Crest			SUNSET LAKE
1141	6.85	Borough of Wildwood Crest			SUNSET LAKE
1142	6.55	Borough of Wildwood Crest			SUNSET LAKE
1143	6.45	Borough of Wildwood Crest			SUNSET LAKE
1144	6.43	Borough of Wildwood Crest			SUNSET LAKE
1145	6.84	Borough of Wildwood Crest			SUNSET LAKE
1146	6.58	Borough of Wildwood Crest			SUNSET LAKE
1147	6.81	Borough of Wildwood Crest			SUNSET LAKE
1148	6.73	Borough of Wildwood Crest			SUNSET LAKE
1149	6.72	Borough of Wildwood Crest			SUNSET LAKE
1150	6.73	Borough of Wildwood Crest			SUNSET LAKE
1151	6.82	Borough of Wildwood Crest			SUNSET LAKE
1152	7.32	Borough of Wildwood Crest			SUNSET LAKE
1153	7.65	Borough of Wildwood Crest			SUNSET LAKE
1154	7.81	Borough of Wildwood Crest			SUNSET LAKE
1155	7.73	Borough of Wildwood Crest			SUNSET LAKE
1156	7.58	Borough of Wildwood Crest			SUNSET LAKE
1157	7.44	Borough of Wildwood Crest			SUNSET LAKE
1158	6.90	Borough of Wildwood Crest			SUNSET LAKE
1159	6.17	Borough of Wildwood Crest			SUNSET LAKE
1160	5.62	Private	820	2.20	TOWNSHIP OF LOWER
1161	5.65	Private	820	2.20	TOWNSHIP OF LOWER
1162	5.61	Private	820	2.20	TOWNSHIP OF LOWER
1163	7.41	Private	820	2.20	TOWNSHIP OF LOWER
1164	7.41	Private	820	2.20	TOWNSHIP OF LOWER
1165	7.41	Private	820	2.20	TOWNSHIP OF LOWER
1166	7.36	Private	820	2.20	TOWNSHIP OF LOWER

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Number	Elevation	Owner	Block	Lot	Street_Location
1167	6.20	Private	820	2.20	TOWNSHIP OF LOWER
1168	6.08	Private	820	2.20	TOWNSHIP OF LOWER
1169	7.38	Private	820	2.20	TOWNSHIP OF LOWER
1170	7.43	Private	820	2.20	TOWNSHIP OF LOWER
1171	5.22	Private	820	2.20	TOWNSHIP OF LOWER
1172	5.35	Private	820	2.05	TOWNSHIP OF LOWER
1173	5.55	Private	820	2.05	TOWNSHIP OF LOWER
1176	5.03	Private	820	2.05	TOWNSHIP OF LOWER
1177	5.74	Private	820	2.05	TOWNSHIP OF LOWER
1178	5.22	Private	820	2.05	TOWNSHIP OF LOWER
1179	4.98	Private	820	2.05	TOWNSHIP OF LOWER
1181	5.03	Private	820	2.05	TOWNSHIP OF LOWER
1182	4.57	Private	820	2.05	TOWNSHIP OF LOWER
1183	4.96	Private	820	2.05	TOWNSHIP OF LOWER
1184	4.92	Private	820	2.05	TOWNSHIP OF LOWER
1185	4.04	Private	820	2.05	TOWNSHIP OF LOWER
1186	4.85	Private	820	2.05	TOWNSHIP OF LOWER
1187	4.00	Private	820	2.05	TOWNSHIP OF LOWER
1188	4.86	Private	820	2.05	TOWNSHIP OF LOWER
1189	6.57	Private	820	2.05	TOWNSHIP OF LOWER
1190	4.82	Private	820	2.05	TOWNSHIP OF LOWER
1191	4.17	Private	820	2.05	TOWNSHIP OF LOWER
1193	3.69	Private	820	2.05	TOWNSHIP OF LOWER
1194	6.39	Private	820	2.05	TOWNSHIP OF LOWER
1195	4.52	Private	820	2.05	TOWNSHIP OF LOWER
1196	4.02	Private	820	2.05	TOWNSHIP OF LOWER
1197	5.24	Private	820	2.05	TOWNSHIP OF LOWER
1198	4.80	Private	820	2.05	TOWNSHIP OF LOWER
1199	4.85	Private	820	2.05	TOWNSHIP OF LOWER

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Number	Elevation	Owner	Block	Lot	Street_Location
1200	6.03	Private	820	2.05	TOWNSHIP OF LOWER
1201	5.63	Private	820	2.05	TOWNSHIP OF LOWER
1202	4.87	Private	820	2.05	TOWNSHIP OF LOWER
1203	4.63	Private	820	2.05	TOWNSHIP OF LOWER
1206	4.14	Private	820	2.05	TOWNSHIP OF LOWER
1212	4.86	Private	820	2.05	TOWNSHIP OF LOWER
1213	5.26	Private	820	2.05	TOWNSHIP OF LOWER
1214	5.29	Private	820	2.05	TOWNSHIP OF LOWER
1215	5.48	Private	820	2.05	TOWNSHIP OF LOWER
1216	4.27	Private	820	2.05	TOWNSHIP OF LOWER
1217	4.83	Private	820	2.05	TOWNSHIP OF LOWER
1218	5.23	Private	820	2.05	TOWNSHIP OF LOWER
1219	5.68	Private	820	2.03	TOWNSHIP OF LOWER
1220	5.07	Private	820	2.03	TOWNSHIP OF LOWER
1221	4.59	Private	820	2.03	TOWNSHIP OF LOWER
1222	4.29	Private	820	2.03	TOWNSHIP OF LOWER
1223	5.49	Private	820	2.03	TOWNSHIP OF LOWER
1224	5.41	Private	820	2.03	TOWNSHIP OF LOWER
1225	4.72	Private	820	2.03	TOWNSHIP OF LOWER
1226	3.94	Private	820	2.03	TOWNSHIP OF LOWER
1227	4.29	Private	820	2.03	TOWNSHIP OF LOWER
1228	5.47	Private	820	2.03	TOWNSHIP OF LOWER
1229	6.03	Private	820	2.03	TOWNSHIP OF LOWER
1230	5.97	Private	820	2.03	TOWNSHIP OF LOWER
1231	6.20	Private	820	2.03	TOWNSHIP OF LOWER
1232	5.70	Private	820	2.03	TOWNSHIP OF LOWER
1233	3.81	Private	820	2.03	TOWNSHIP OF LOWER
1234	3.97	Private	820	2.03	TOWNSHIP OF LOWER
1235	4.17	Private	820	2.03	TOWNSHIP OF LOWER

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Number	Elevation	Owner	Block	Lot	Street_Location
1236	6.37	Private	820	2.03	TOWNSHIP OF LOWER
1237	6.58	Private	820	2.03	TOWNSHIP OF LOWER
1238	6.91	Private	820	2.03	TOWNSHIP OF LOWER
1239	7.85	Private	820	2.03	TOWNSHIP OF LOWER
1240	6.56	Private	820	2.03	TOWNSHIP OF LOWER
1246	7.07	Private	820	2.18	TOWNSHIP OF LOWER
1247	6.82	Private	820	2.17	TOWNSHIP OF LOWER
1248	6.73	Private	820	2.18	TOWNSHIP OF LOWER
1251	6.82	Private	820	2.17	TOWNSHIP OF LOWER
1252	6.94	Private	820	2.17	TOWNSHIP OF LOWER
1253	6.93	Private	820	2.16	TOWNSHIP OF LOWER
1255	5.98	Private	820	2.15	TOWNSHIP OF LOWER
1256	6.22	Private	820	2.15	TOWNSHIP OF LOWER
1257	5.83	Private	820	2.15	TOWNSHIP OF LOWER
1258	5.66	Private	820	2.15	TOWNSHIP OF LOWER
1264	6.60	Private	820	2.14	TOWNSHIP OF LOWER
1265	6.68	Private	820	2.14	TOWNSHIP OF LOWER
1266	6.76	Private	820	2.14	TOWNSHIP OF LOWER
1267	7.07	Private	820	2.14	TOWNSHIP OF LOWER
1268	7.20	Private	820	2.14	TOWNSHIP OF LOWER
1270	6.77	Private	820	2.13	TOWNSHIP OF LOWER
1274	7.01	Private	820	2.13	TOWNSHIP OF LOWER
1275	6.64	Private	820	2.13	TOWNSHIP OF LOWER
1278	7.06	Private	820	2.13	TOWNSHIP OF LOWER
1279	5.62	Private	820	2.13	TOWNSHIP OF LOWER
1280	7.16	Private	820	2.12	TOWNSHIP OF LOWER
1281	2.11	Private	820	2.12	TOWNSHIP OF LOWER
1283	5.19	Private	820	2.12	TOWNSHIP OF LOWER
1284	6.88	Private	820	2.12	TOWNSHIP OF LOWER

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Number	Elevation	Owner	Block	Lot	Street_Location
1285	8.35	Private	820	2.12	TOWNSHIP OF LOWER
1286	7.93	Private	820	2.12	TOWNSHIP OF LOWER
1288	4.32	Private	820	2.11	TOWNSHIP OF LOWER
1289	3.92	Private	820	2.11	TOWNSHIP OF LOWER
1290	4.09	Private	820	2.11	TOWNSHIP OF LOWER
1291	2.52	Private	820	2.11	TOWNSHIP OF LOWER
1292	2.38	Private	820	2.11	TOWNSHIP OF LOWER
1293	2.30	Private	820	2.10	TOWNSHIP OF LOWER
1294	6.84	Private	820	2.10	TOWNSHIP OF LOWER
1295	8.23	Private	820	2.10	TOWNSHIP OF LOWER
1296	5.98	Private	820	2.09	TOWNSHIP OF LOWER
1297	7.01	Private	820	2.09	TOWNSHIP OF LOWER
1298	7.02	Private	820	2.10	TOWNSHIP OF LOWER
1301	5.18	Private	820	2.09	TOWNSHIP OF LOWER
1302	4.37	Private	820	2.09	TOWNSHIP OF LOWER
1303	4.64	Private	820	2.09	TOWNSHIP OF LOWER
1304	4.55	Private	820	2.09	TOWNSHIP OF LOWER
1305	5.38	Private	820	2.09	TOWNSHIP OF LOWER
1306	3.49	Private	820	2.09	TOWNSHIP OF LOWER
1307	2.53	Private	820	2.09	TOWNSHIP OF LOWER
1308	2.67	Private	820	2.09	TOWNSHIP OF LOWER
1309	4.83	Township of Lower			TOWNSHIP OF LOWER
1310	4.62	Township of Lower			TOWNSHIP OF LOWER
1311	3.03	Private	820	2.08	TOWNSHIP OF LOWER
1312	3.85	Private	820	2.08	TOWNSHIP OF LOWER
1313	3.67	Township of Lower			TOWNSHIP OF LOWER
1314	3.81	Township of Lower			TOWNSHIP OF LOWER
1315	3.75	Private	820	2.07	TOWNSHIP OF LOWER
1316	4.12	Private	820	2.07	TOWNSHIP OF LOWER

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Number	Elevation	Owner	Block	Lot	Street_Location
1319	3.62	Private	820	2.07	TOWNSHIP OF LOWER
1320	3.71	Private	820	2.07	TOWNSHIP OF LOWER
1321	4.62	Private	820	2.06	TOWNSHIP OF LOWER
1322	4.95	Private	820	2.06	TOWNSHIP OF LOWER
1323	5.73	Private	820	2.06	TOWNSHIP OF LOWER
1324	6.13	Private	820	2.06	TOWNSHIP OF LOWER
1325	5.95	Private	820	2.01	TOWNSHIP OF LOWER
1326	6.20	Private	820	2.01	TOWNSHIP OF LOWER
1327	6.45	Private	820	2.01	TOWNSHIP OF LOWER
1328	5.39	Private	820	2.01	TOWNSHIP OF LOWER
1329	5.86	Private	820	2.01	TOWNSHIP OF LOWER
1330	5.01	Borough of Wildwood Crest			BOROUGH OF WILDWOOD CREST
1331	5.04	Borough of Wildwood Crest			BOROUGH OF WILDWOOD CREST

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LIST OF FULL SIZE 24” x 36” PLAN SHEETS ATTACHED:

- EXISTING CONTOUR MAP
- EXISTING ELEVATION ANALYSIS MAP
- EXISTING PROFILES
- EXISTING STORM SEWER INFRASTRUCTURE MAP
- EXISTING DRAINAGE AREA MAP
- MAP OF AREAS BELOW ELEV. 4.0 FT
- MAP OF AREAS BELOW ELEV. 4.5 FT
- MAP OF AREAS BELOW ELEV. 5.0 FT
- MAP OF AREAS BELOW ELEV. 5.5 FT
- MAP OF AREAS BELOW ELEV. 6.0 FT
- MAP OF AREAS BELOW ELEV. 6.5 FT
- MAP OF AREAS BELOW ELEV. 7.0 FT
- BAY SIDE BULKHEAD ELEVATION MAPS
- FEMA FIRM MAPS
- PROPOSED DRAINAGE AREA MAP
- OVERALL PROPOSED STORM DRAINAGE IMPROVEMENTS