Parking in Wickford, RI with Green Infrastructure

URI Junior Landscape Architecture Studio
Professor Richard Sheridan

Date: March 17th, 2016
Time: 2:30 p.m. - 5p.m.
Location: North Kingstown Free Library

In association with RI Green and Resilient Infrastructure Project (GRIP), and funded by U.S. Department of the Interior and Rhode Island Sea grant.
TOWN HAS MAINTAINED THE INTEGRITY OF THE EXISTING HISTORICAL ARCHITECTURE THROUGHOUT THE YEARS BUT PARKING LOTS LACK THE SAME CHARACTER. THE LOTS ACT AS A TRANSITION ZONE FROM VEHICULAR TO PEDESTRIAN MOVEMENT AND SERVE AS “ENTRANCES” TO THE TOWN.

VISUAL CONNECTIVITY

COLONIAL INFLUENCE
- SMALL-TOWN FEEL, HUMAN-SCALE TRADITIONAL NEW ENGLAND LOOK, “PICTURESQUE WATERFRONT STREETS”
- CLASSICALLY STYLED TRIM AND LOTS OF BRICK ELEMENTS AND FLAGSTONE
- SYMMETRY WITH FEATURES ON HOUSE, CENTRAL CHIMNEY

NAUTICAL/MARITIME INFLUENCE
- WOODEN POSTS, ROPES, RIVERSTONES, AND DECKING
- MARITIME THEMED ELEMENTS ON BOTH LAND AND SEA (ANCHOR STATUE, MOONSTONE, BOATS, AND BENCHES)
SITE CONNECTIVITY

Local companies utilize the northern lot for their businesses, creating a working waterfront where clammers and other professionals that obtain seafare for profit can operate. Local restaurants rely on this waterfront because this is where most, if not all of their seafood comes from.

The main parking lot located in the heart of the Wickford Cove contains docks along the perimeter of the lot. These boat slips are generally used by the Wickford Boat Company where locals can rent boats, kayaks and other water sport products for the day. This is a great operation because it draws people into the town. The lot itself is composed of 125 parking spaces that has potential to be redesigned to accommodate more locals.

The new expansion lot is in the process of being designed and built. This lot has potential to accommodate more locals for parking and should reduce the congestion on Main Street.

When designing, flood proofing and proper space placement are factors that need to be accommodated for. It is important to ensure that any proposed design accommodates and or improves the key elements of these parking lots that were stated.
WICKFORD EVENTS

THE EVENTS ARE TO BRING THE COMMUNITY TOGETHER AND ACTS AS A FUNCTIONING WATERFRONT FOR THE COMMUNITY.

EVENTS UTILIZES MAIN STREET, WICKFORD, THE WATERFRONT AND PARKING LOTS REGARDING TO THE SITE.

- **“HORRIBLES” PARADE** *(WEEKEND OF HALLOWEEN)*
  - ANNUAL FUN, FESTIVE COSTUME PARADE FOR CHILDREN, ENDING WITH ENTERTAINMENTS AND FOUR-LEGGED FURRY FRIENDS
  - STARTS AT ST. PAUL’S CHURCH (55 MAIN STREET, WICKFORD) AND CONCLUDES AT THE MUNICIPAL PARKING LOT BY THE TOWN DOCK

- **ANNUAL FESTIVAL OF LIGHTS** *(EARLY DECEMBER)*
  - CONCERTS AND HAYRIDES
  - SANTA ESCORTED BY KAYAKS

- **WICKFORD ANNUAL ART FESTIVALS** *(SUMMER - JULY)*
  - 80,000 -100,000 ATTENDS WITHIN A 48-HOUR PERIOD

- **WICKFORD FARMER’S MARKET** *(JUNE - OCTOBER)*
  - LOCATION: TOWN PARKING LOT (63 BROWN STREET)
PARKING LOT ANALYSIS

LOT SIZE: 44,300 SQFT
PARKING SPOTS: 50
TOWN OWN
WORK - RECREATION

LOT SIZE: 20,750 SQFT
PARKING SPOTS: N/A
PRIVATE LOT

LOT SIZE: 58,806 SQFT
PARKING SPOTS: 125
TOWN OWN / PRIVATE
MULTI-USE
THE 25MPH SPEED LIMIT IS OFTEN IGNORED, CAUSING DANGEROUS CONDITIONS FOR PEDESTRIANS (LACK OF POLICE PRESENCE, AND SPEED BUMPS).

RIGHTS OF WAY AT EITHER END OF BROWN STREET CAN BE CONFUSING TO BOTH PEDESTRIANS THAT MAY BE CROSSING AND DRIVERS WHO ARE NOT FAMILIAR WITH THE AREA.

CROSSWALKS ALONE MAY NOT BE SUFFICIENT FOR HEAVY PEDESTRIAN TRAFFIC IN SUMMER (NO TRAFFIC LIGHTS).

GOOD CONNECTION BETWEEN PEDESTRIAN WALKWAYS, VEHICULAR ROADWAYS AND PUBLIC AND PRIVATE BOAT DOCKS.

WICKFORD CURRENTLY HAS NO BICYCLE LANES.
Sea Level Rise

-This picture to the left is of the Northernmost parking lot.

-This picture to the left is of the central parking lot as well as Narragansett Electric Company parking lot.

-The tides in this picture are from Hurricane Sandy, resulting in about 5 ft above MHHW.

-The tides in this picture are 2 ft above MHHW Spring 2015.

Images from ARCGIS.
According to the EPA, 20 year storm events are expected to occur 2-5 times more often in the next century. This map of Wickford shows the flood level for a 100 year storm, which will see a similar increase in frequency.
NOTE:
AS YOU HEAD FARTHER SOUTH TOWARDS SHAYNA'S PLACE THE THRESHOLD OF THE WATERTABLE GETS CLOSER TO THE GROUND SURFACE.

- BEHIND THE TOWN HALL ANNEX THE WATER TABLE IS 24" BELOW
- BEHIND SHAYNA'S PLACE THE WATER TABLE IS 12" BELOW
NOTE:
AS YOU HEAD FARTHER SOUTH TOWARDS SHAYNA’S PLACE THE THRESHOLD OF THE WATERTABLE GETS CLOSER TO THE GROUND SURFACE.

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WATER TABLE ANALYSIS

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STORMWATER RUNOFF

3 MAIN POLLUTANTS
STORMWATER RUNOFF
FAILING SEPTIC SYSTEMS
EROSION

- PATHOGENS FROM FAILING ONSITE TREATMENT (WATER BORN VIRUSES, BACTERIA)
- TOO MANY NUTRIENTS FROM SEDIMENT, SALT, CALCIUM, METALS AND PESTICIDES
- BOAT DISCHARGE, SURFACE RUNOFF, PET WASTE
- 23% OF WATERS ARE CLOSED FOR SHELLFISHING
- 10% OF WATERS ARE CLOSED FOR RECREATION

WICKFORD WATERSHEDS
- 4500 ACRES
- HIGH WATER TABLE
- LARGE NETWORK OF UNDERGROUND WATER SYSTEMS

THE MAIN GOAL OF THE TOWN OF WICKFORD IS TO PROTECT THE EXISTING QUALITY OF THE WATERSHEDS AND TO RESTORE THEM TO THE BALANCED AND HEALTHY ECOSYSTEM OF BEFORE

Weatherspark.com
"Wickford Harbor Watershed Assessment” The University of Rhode Island
WAYS TO COLLECT OR TREAT STORMWATER AND FIRST FLUSH

- DETENTION PONDS
- WETLANDS, BIOSWALES, RAIN GARDENS
- VEGETATION
- PERMEABLE PAVEMENTS
- STORM DRAINS
- DECREASE IMPERVIOUS SURFACES
- LOW IMPACT DEVELOPMENT
GREEN INFRASTRUCTURE // LOW IMPACT DEVELOPMENT

“DEVELOPMENT WHICH THOUGH ITS LOW NEGATIVE ENVIRONMENTAL IMPACT EITHER ENHANCES OR DOES NOT SIGNIFICANTLY DIMINISH ENVIRONMENTAL QUALITY.”

APPLICATIONS:
- SWALES
- BIORETENTION AREAS
- GREEN ROOFS

WICKFORD LID GOALS
1. 1. ADHERENCE TO URBAN DESIGN AESTHETICS THAT SHOWCASE VIEWS OF NARRAGANSETT BAY
2. 2. USE OF DIVERSE MIX OF SUSTAINABLE, LOW MAINTENANCE VEGETATION THROUGHOUT EACH DEVELOPMENT SITE.
   a. ALLOW AESTHETIC APPEAL.
   b. NATURAL VEGETATIVE BUFFER BENEFITS WATER QUALITY.
   c. PROTECT HABITAT VALUE FOR WILDLIFE.
3. 3. AN INFILTRATION APPROACH TO STORMWATER MANAGEMENT THROUGH THE USE OF LOW IMPACT DEVELOPMENT TECHNIQUES.
HABITAT & VEGETATION

NATIVE TREES
- SCARLET OAK
- SWAMP WHITE OAK
- NORWAY MAPLE
- RED MAPLE
- BLACK MAPLE
- THORNLESS Honey Locust
- ZELKOVA
- CRABAPPLE
- COMMON REED
- SALT HAY GRASS
- SALT MARSH ASTER
- BLACK NEEDLE RUSH
- THREE-LEAF BULLRUSH
- SALTMEADOW CORDGRASS
- SALT-MARSH CORDGRASS
- SMOOTH CORDGRASS
- SALT GRASS
- SEA LAVENDER
- EEL GRASS
- BLUE ALGAE
- GLASSWORTS

ORNAMENTAL TREES
- HIGH MARSH
- LOW MARSH
- MUDFLAT ZONE

BIRDS
- CANADA GOOSE
- CROW
- EGRET
- BLACK-BACKED GULLS
- PIGEONS
- SWAN
- TERN
- HERRING GULLS

MAMMALS
- WOODCHUCK
- RACOON
- RACOON
- DEER
- SQUIRREL
- SKUNK
- RABBIT
- FOX
- RABBIT
- RACOON
- SQUIRREL
- RABBIT
- FOX

SHELLFISH
- CLAM
- QUAHOG
- LITTLENECKS
- OYSTERS
- SNAILS
- BAY SCALLOPS
- STARFISH
- MUSSELS
- ANCHovies

CRUSTACEANS
- LOBSTER
- BLUE CRAB
- HERMIT CRAB
- SPIDER CRAB
- HORSESHOE CRAB
- ASIAN SHORE CRAB

SEASONAL VISITORS
- LOBSTER
- BLUE CRAB
- HERMIT CRAB
- SPIDER CRAB
- HORSESHOE CRAB
- ASIAN SHORE CRAB

FISH
- TAUTOG
- FLOUNDER
- SEA BASS
- BLUE FISH
- STRIPED BASS
- SCUP
- STRIPED BASS
WATER USE

ZONEs:
1- CONSERVATION AREAS
2- LOW INTENSITY USE
3- HIGH INTENSITY BOATING
5- RECREATION & COMMERCIAL USE

Each one of these zones involves our site. This becomes important when understanding what these waters currently do for the public.

This also helps to show where pollutants could be coming from.
FOR SOME IT'S WORK AND PLAY...

MAIN STREET LOT

PHILLIPS STREET LOT

BROWN STREET LOT

MAIN STREET LOT
Student Site Designs

Parking in Wickford, RI with Green Infrastructure

URI Junior Landscape Architecture Studio
Professor Richard Sheridan

In association with RI Green and Resilient Infrastructure Project (GRIP), and funded by U.S. Department of the Interior and Rhode Island Sea grant.
NEW DOCK IN PLACE WILL ORGANIZE BOATS MORE EFFECTIVELY THAN THE PREVIOUS PILLERS.

20' STREET LAMPS WILL BE SIMPLY PLACED AROUND THE PARKING LOT.

SOLAR TRASH BINS AROUND THE SITE WILL HELP ELIMINATE WASTE FROM VISITORS.

FISHERMAN'S CLEANING AREA

WATERVIEW WALKWAYS WILL ENTICE THE PEOPLE OF THE COMMUNITY.

DRAINAGE DRAFDENT ALONG THE SIDESWALK WILL CATCH STORM-WATER RUN OFF FROM THE PARKING LOT.

PUBLIC RESTROOMS

BIOSWALE AT THE EDGE OF THE PARK WILL CATCH ANY STORM AND RAIN WATER BEFORE GETTING TO THE PARKING LOT PENINSULA WILL BE PITCHED TO LEAD WATER TO AN OVERFLOW SWALE ALONG THE RIGHT SIDE OF THE SIDESWALK.
BROWN STREET LOT

WICKFORD, RI

PROJECT BY: BRYNN ARMSTRONG
PREPARED FOR: RICHARD SHERIDAN
LAR 344 - SPRING 2016

NOTES:
- TREES THAT ARE NATIVE TO RHODE ISLAND WILL BE PLANTED AROUND THE SITE AND WILL HELP ENHANCE THE AESTHETICS OF WICKFORD VILLAGE. SOME NAMIES INCLUDE:
  - Eastern Red Cedar (Juniperus virginiana)
  - Red Maple (Acer rubrum)
  - Tilia cordata (Sycamore Maple)
  - Nyssa sylvatica (Black Tupelo)
- ONE WAY EXIT AND ENTRANCE WILL HELP CONTROL THE CONGESTION OF OUTGOING AND INCOMING OF TRAFFIC.
- SOLAR TRANSITIONS AROUND THE SITE WILL HELP ELIMINATE WASTE FROM VISITORS.
- 20 STREET LAMPS WILL BE SPARSELY PLACED AROUND THE PARKING LOT.

WATERFRONT WALKWAYS WILL ENTOPE THE PEOPLE OF THE COMMUNITY.

AREA FOR DUMPSTERS, DUMP TRUCK WILL TURN TO FOLLOW THE WAY OF THE ROAD AND THEN CAN BACK UP AND COLLECT TRASH FROM THE DUMPSTERS.

PARK AREA WITH BENCHES OVERLOOKING THE HARBOR AS WELL AS PICNIC TABLES. NEW PARK CAN BE USED BY EMPLOYEES OF THE SURROUNDING BUSINESSES FOR LUNCH BREAKS AS WELL AS THE REST OF THE COMMUNITY.

BENCHES FACING THE EAST WILL ATTRACT PEOPLE TO SIT AND LOOK OUT ONTO THE HARBOR AS WELL AS THE SUN RISING.

HANDICAP PARKING SPOTS AVAILABLE NEAR THE PUBLIC RESTROOMS AND LIBRARY PARK, AS WELL AS THE NEW WATERFRONT PARK.

NEW DECK CAN SERVE AS A STAGE FOR OUTDOOR MUSIC AND RECREATIONAL EVENTS.
PHILLIPS STREET LOT

WICKFORD, RI

PROJECT BY: BRYNN ARMSTRONG
PREPARED FOR: RICHARD SHERIDAN
LAR 344 - SPRING 2016

CROSS SECTION NTS

50' VEGETATIVE BUFFER BETWEEN PARKING LOT AND CONSERVATION ZONE

12 NEW PARKING SPOTS FOR OVERFLOW PARKING

LOT WILL BE PITCHED TO LEAD STORM AND RAIN WATER TO THE BIOSHAPE IN THE CENTER OF THE LOT

TELEPHONE POLE

NOTES:
- "TREES THAT ARE NATIVE TO RHODE ISLAND WILL BE PLANTED AROUND THE SITE AND WILL HELP ENHANCE THE AESTHETICS OF WICKFORD VILLAGE. SOME NATIVES INCLUDE:
  - Eastern Red Cedar, Juniperus virginiana
  - Red Maple, Acer rubrum
  - White Oak, Quercus alba
  - Honey Locust, Gleditsia triacanthos"
- "ONE-WAY EXIT AND ENTRANCE WILL HELP CONTROL THE CONGESTION OF OUTGOING AND INCOMING TRAFFIC"
- "SOLAR TRASH RING AROUND THE SITE WILL HELP ELIMINATE WASTE FROM VISITORS"
- "30' STREET LAMPS WILL BE SPARSELY PLACED AROUND THE PARKING LOT."
BROWN STREET LOT
WICKFORD, RI


PLANT LIST FOR WICKFORD PARKING:
- SPARGO RICOLOR
- PINUS Rigida
- LIQUIDAMBAR STyrACIFlua
- PRUNUS Maritima
- SYMPHORICARPUS ALBUS
- PANICUM VIRGATUM
- CAREX STRICTA

VIEWS FROM PEDESTRIAN WALKWAY
INSPIRATION FOR DRY SWALE GRID, WOOD PILING IN SWALES ALIGN WITH PILING IN COVE

PROJECT BY: EMILY CONDON
PREPARED FOR: PROF. RICHARD SHERIDAN
LAR 344

BUILT UP (GRANITE SEA WALL, 9 FT AND LOOSE GRAVEL PEDESTRIAN WALKWAY INCREASES DRAINAGE AND PROTECTS AGAINST FLOODING
POROUS ASPHALT PAVEMENT, \( \frac{3}{6} \) DEEP, HELPS WITH DRAINAGE
ONE WAY VEHICULAR MOVEMENT, SIMPLIFIES CIRCULATION THRU SITE (94 PARKING SPOTS)
PERCOLATION IN PAVING WITH UNDERGROUND CATCHMENT TREATS STORMWATER AND RELEASES IT INTO GROUNDWATER OVER TIME
IMPREGNATED AGGREGATE CONCRETE SIDEWALK
PRICE SCULPTURE MOVED TO CENTER OF BRICK PLAZA, FORMAL ENTRANCE TO PARK
DRY SWALE WITH RIVER ROCKS AND SALT TOLERANT PLANTING, WOOD PILES IN GRID, EDGED WITH GRANITE
WEED LAWNS GRADED APPROX. 3 FT ABOVE LOT, PITCHING TOWARDS SWALE SYSTEM AND CATCHMENTS
HUNSTEONE GARDEN WITH NATIVE GRASSES, SHRUBS, AND SHADING RELATING TO WICKFORD HISTORY
PUBLIC DOORS FOR VISITORS WITH BOATS
WOODEN PILE AND ROPE BARRIER, SPFT TALL

LOT PITCHES TO DRAIN INFRASTRUCTURE

SECTION A-A1
N15
PHILLIPS STREET LOT

WICKFORD, RI

BECAUSE THIS LOT IS CURRENTLY UNDEVELOPED AND
ADJACENT TO CONSERVATIONAL WATER, THIS PLAN
AIMS TO PRESERVE ITS NATURALISTIC CHARACTER
WHILE ALSO ADDING GREEN INFRASTRUCTURE FOR
VEHICULAR CIRCULATION AND STORMWATER
MANAGEMENT. BY USING STRUCTURED FESCUE
MIX GRASS AND GRAVEL RUNOFF RATHER THAN
CONVENTIONAL PAVING, THE SITE RETAINS ITS
UNTOLLED APPEARANCE AND
ASSISTS WITH STORMWATER RUNOFF. SALT TOLERANT
WETLAND GRASSES AND NATIVE SHRUBS RESPECT THE 50-FT
BUFFER, BUT A RURAL FLAGSTONE PATH LEADING DOWN TO A
RAISED OUTLOOK INVITES VISITORS TO ENJOY THE SCENIC
WATERFRONT. THE WETLAND GRASSES SURROUNDING THE
OUTLOOK WILL TRAP PHYSICAL POLLUTION AND TREAT RUNOFF.
BIRDHOUSES PLACED IN THE SITE WILL ATTRACT MORE
WILDLIFE TO THE AREA. AN INTERACTIVE SCULPTURE GARDEN
REPRESENTING QUAHOG CLAMSHELLS TIE THE LOT INTO THE
MARINE CULTURE OF HISTORIC WICKFORD AND MAKE THE SITE
A POINT OF INTEREST FOR TOURISTS AND RESIDENTS. THE
BRONZE SHELLS AND NATIVE FLOWERING SHRUBS CONCEAL
UTILITY POLES AND CONNECT PEDESTRIAN MOVEMENT FROM
PHILLIPS ST. TO THE WATERFRONT.

SKETCHES OF SCULPTURE GARDEN
BRONZE QUAHOG CLAMSHELLS WITH NATIVE FLOWERING SHRUBS
NTS

PROJECT BY: EMILY CONDON
PREPARED FOR: PROF. RICHARD SHERIDAN
LAR 344

CONSERVATION WATER
50 FT BUFFER OF NATIVE GRASSES AND WETLANDS, WITH BIRDHOUSES ON
WOOD PLING TO ATTRACT MORE WILDLIFE
RAISED OUTLOOK WITH VIEWS OF THE WATER
SIGNAGE RELATING TO CONSERVATION AND NATIVE PLANT AND WILDLIFE
SCREENING FOR RESIDENTS, TALL S-PLUGS AND OAK TREE
INTERACTIVE SCULPTURE GARDEN, QUAHOG CLAMSHELLS EMERGING
FROM THE GROUND WITH NATIVE SHRUBS
UTILITY POLES
FLAGSTONE PATH LEADING DOWN TO WATERFRONT OUTLOOK
ONE WAY VEHICULAR CIRCULATION THRU SITE (15 PARKING SPOTS)
STRUCTURED FESCUE-MIX GRASS WITH GRAVEL RUNNERS ON DRIVEWAY
FOR VEHICLES
MAIN STREET
WICKFORD, RI

A GREEN ROOF is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane.

Green roofs serve several purposes for a building, such as:
- Absorbing rainfall, providing insulation, creating habitat for wildlife, increasing biodiversity and decreasing stress of the people around the roof by providing a more aesthetically pleasing landscape, and lowering urban air temperatures & pollution.

Green roofs ENSURE the natural functions of plants to filter water and heat air in urban and suburban landscapes.

The two TYPES of greenroofs:

1. INTENSIVE: roofs are thicker, have a minimum depth of 5.0 inches (+/-), and can support a wider variety of plants but are heavier & require more maintenance.
2. EXTENSIVE: roofs are shallower, ranging in depth below 5.0 inches (+/-), 2.5 to 3.0 inches (+/-), with a lighter material load, have minimal plants, and require minimal maintenance.

BROWN ROOFS, or BIO-DIVERSE ROOFS, are designed for industrial brownfield sites, supporting rare species of plants, animals, and invertebrates.

Currently, these habitats are UNDER THREAT increasingly in demand for re-development.

Green roofs are ideal for urban areas by closing the water cycle, reducing runoff, with a layer of bio-diverse materials.

BROWN ROOFS are similar to GREEN ROOFS, with the major difference being the choice of biologically diverse soil.
- BROWN ROOF MATERIALS:
  - BARK: 1 part
  - GRASS: 2 parts
  - SOIL: 3 parts

BROWN ROOF is allowed to self-colonise after construction, via seeders & insects, providing a feeding site for invertebrates.

BROWN ROOF:
- 13 ft. above the lot
- material sourced from Brown street site

THE PRINCIPLE of LOW IMPACT DEVELOPMENT is to USE NATURE AS A MODEL AND MIRROR RAINFOAL AT THE SOURCE, ACCOMPLISHED THROUGH SEQUENCED IMPLEMENTATION OF RUNOFF PREVENTION STRATEGIES, RUNOFF MITIGATION STRATEGIES, AND FINALLY, TREATMENT CONTROLS TO REMOVE POLLUTANTS.

LOW IMPACT DEVELOPMENT TECHNIQUES ARE MORE THAN JUST PRACTICE AND PRODUCTS, IT IS A STRATEGIC DESIGN PROCESS TO CREATE A SUSTAINABLE SITE THAT EMULATES THE UNDERDEVELOPED HYDROLOGIC PROPERTIES OF THE SITE. IT REQUIRES A PREScriptive APPROACH THAT IS APPROPRIATE FOR THE PROPOSED USE.

THE PROCESS used to MANAGE STORMWATER INCLUDES:

1. PRE-TREATMENT
2. FILTRATION
3. INFILTRATION
4. STORAGE & REUSE

CORE REQUIREMENTS for designing LOW IMPACT DEVELOPMENT:

1. CONSERVE NATURAL AREAS WHEREVER POSSIBLE.
2. MANAGE THE DEVELOPMENT IMPACT ON HYDROLOGY.
3. MAINTAIN RUNOFF RATE & DURATION FOR THE SITE.
4. INTEGRATED MANAGEMENT PRACTICES SCATTERED THROUGH SITE.
5. IMPLEMENT POLLUTION PREVENTION, PROPER MAINTENANCE AND PUBLIC EDUCATION PROGRAMS.

PROJECT BY: BENJAMIN CONGDON
PREPARED FOR: PROF. RICHARD SHERIDAN
Design Goals:

a. Use of diverse mix of sustainable, low maintenance vegetation in site development.
b. An infiltration approach to storm water management with low impact development techniques.
c. All parking development must enhance or at least not significantly degrade environmental quality.
d. Street design policy of preserve, protect, and where possible, restore native coastal features of the site.
e. Any environmental alteration of coastal resources will be measured, judged, and regulated against preservation and restoration.

Planning & Management Programs developed around the following standards & criteria:

a. Need & demand for various activities and their impact upon ecological systems.
b. Degree of compatibility of various activities.
c. Water quality standards set by the Director of Environmental Management.
d. Consideration of plans, studies, surveys, inventories from public & private sources.
e. Consideration for contiguous land uses & transportation facilities.
f. Marine resources development plan governs land use management responsibilities.
THE PRINCIPLE OF LOW IMPACT DEVELOPMENT is to use nature as a model and manage rainfall at the source, accomplished through sequenced implementation of runoff prevention strategies, runoff mitigation strategies, and finally, treatment controls to remove pollutants.

LOW IMPACT DEVELOPMENT TECHNIQUES are more than just practices and products. It is a strategic design process to create a sustainable site that makes the undeveloped hydrologic properties of the site. It requires a prescriptive approach that is appropriate for the proposed land use.

THE PROCESS used to manage stormwater includes:
1. PRETREATMENT
2. FILTRATION
3. INFILTRATION
4. STORAGE & RE-USE

CORE REQUIREMENTS designing for LOW IMPACT DEVELOPMENT include:
1. CONSERVE NATURAL AREAS WHEREVER POSSIBLE
2. MINIMIZE THE DEVELOPMENT IMPACT ON HYDROLOGY
3. MAINTAIN RUNOFF RATE & DURATION FOR THE SITE
4. INTEGRATED MANAGEMENT PRACICES SCATTERED THROUGHOUT SITE
5. IMPLEMENT POLLUTION PREVENTION, PROPER MAINTENANCE AND PUBLIC EDUCATION PROGRAMS.

PERMEABLE PAVING IS A RANGE OF SUSTAINABLE MATERIALS AND TECHNIQUES FOR PERMEABLE PAVEMENTS WITH A BASE AND SUBBASE THAT ALLOW THE MOVEMENT OF STORMWATER THROUGH THE SURFACE. IN ADDITION TO RUNOFF, THIS EFFECTIVELY TRAPS SUSPENDED SOLIDS & FILTERS POLLUTANTS FROM THE WATER.
WICKFORD PARKING  PHILLIPS STREET LOT

WICKFORD, RI

PROJECT BY: ROMEO D’ANDREA
PREPARED FOR: PROF. RICHARD SHERIDAN
LAR 344

NATIVE SALT TOLERANT PLANT BUFFER; REMOVE INVASIVES
PEDESTRIAN ACCESS TO SCENIC VIEW OF COVE
SMALL SWALES BETWEEN PARKING CAPTURE RUNOFF
VEGETATIVE BUFFER AND FENCE BETWEEN LOT AND ADJACENT RESIDENTIAL PROPERTY
STRUCTURED GRASS PARKING AREA (16 SPACES TOTAL)
ONE-WAY TRAFFIC PATTERN AND ANGLED PARKING MAXIMIZE THE AVAILABLE PARKING
LIGHTING FOR NIGHTTIME SAFETY

STRUCTURED GRASS

SCALE: 1" = 20'

NATIVE VEGETATION RECOMMENDATION
DEciduous:
ACER RUBRUM
AELLANDERI CANADENSIS
BETULA LUTEA
FRAXINUS AMERICANA
GLEDITSIA TRICANTHOS VAR. INERVIS
NYssa Sylvestris

CONIFER:
JUNIPERUS VIRGINIANA
PICEA GLAUCA

SHrubs:
CLETHRA ALPINOLIA
JUNIPERUS HORIZONTUS
RHODODENDRON MAXIMUM

GRASS:
PRUNUS VIRGATUM
SPOROBOLUS WIRCHII

SECTION A - A’

SCALE: 1" = 20’
WICKFORD PARKING  MAIN STREET LOT

WICKFORD, RI

PROJECT BY: ZACHARY DRIVER
PREPARED FOR: PROF. RICHARD SHERIDAN

PARKING LOT
- 54 spots total
- Super porous paver 
- Xeriscape
- Approximately 26,466 sqft
- Reduced by 30%
- Accumulates approx. 740 
- sqft rainwater
- One way traffic
- All pitches gradually 
- Towards bioswale

PORTABLE BATHROOMS
REPLACED MEMORIAL

VEGETATION
- Trees: Nyssa sylvatica, 
- Quercus palustris, 
- Gleditsia triacanthos v. 
- Enermis
- Shrubs: Ilex verticillata, 
- Rosa palustris, Rosa 
- Virginiana, Vaccinium 
- Corymbosum, Ilex glabra
- Grasses/groundcover: 
- Spartina alterniflora, 
- Spartina patens, Carex 
- Limos, Agropogon 
- Glomeratus

DOCK AND OPEN TRANSITIONAL 
SIDEWALK (CONCRETE) AREA FOR 
COMMERCIAL USE

PERMEABLE PARKING SURFACE, 
ONE WAY TRAFFIC

Bioswale: Bioretention cells, 
all pollutants are captured and 
held here.

Solar powered picnic shelter, 
will be sufficiently storm 
protected.
**PARKING LOT**

- 8 SPOTS TOTAL
- "SUPER PERVEROUS PAVE" XERIPIAVE
- APPROXIMATELY 8,185 sqft of SURFACE AREA
- ACCUMULATES APPROX. 228 sqft RAINWATER
- ONE WAY TRAFFIC
- ALL GRADUALLY PITCHES INTO ADJACENT BIOSWALES

**VEGETATION**

- TREES: NYSEA SYLVATICA, QUERCUS PALUSTRIS, GLEDITSIA TRIACANTHOS V. ENERIMIS
- SHRUBS: ILEX VERTICILLATA, ROSA PALUSTRIS, ROSA VIRGINIANA, VACCINUM CORYMBOSUM, ILEX GLabra
- GRASSES/GROUND COVER: SPARTINA ALTERNIFLORA, SPARTINA PATENS, CAREX LURIDA, ANDROPOGON GLOMERATUS

**CONSERVATIONAL WATERS**

**BIOSWALE**

- CONSISTS OF NATIVE TREES, SHRUBS, AND GRASSES
- ALSO HAS 4' MECK BRIDGE ACROSS THE DRAIN

**ELECTRICAL WIRING**

- BIO SWALE DIVERTS ALL POLLUTED STORMWATER RUNOFF DURING TIDAL FLUSH...
BROWN STREET PARKING LOT

PROJECT BY: GABRIELLA D'ANGELIS
PREPARED FOR PROF. RICHARD SHERIDAN
LAR 344

WICKFORD, RI

- Bioswale: Helps prevent flooding, Captures runoff, Cleanses Runoff

- Grass Parking: Collects & Cleanses Runoff, Collects contaminants, Assists with drainage

- Existing Drain

- Pervious Concrete Drive: Collects contaminants, Assists with drainage

- Rune Stone Area: Proposed additional drain underneath, Will capture runoff from upper street, Gives a more aesthetic look when water is underneath

1" = 20'

0 20 40 60 80 100 120 140 160
MAIN STREET LOT
WICKFORD, RI

PROJECT BY: OLIVIA FOW
PREPARED FOR: PROF. RICHARD SHERIDAN
LAR 344

THIS WORKING WATERFRONT WAS DESIGNED TO ACCOMMODATE THE MANY LOCAL FISHERMEN THAT USE THIS LOT WHILE ALSO RESPONDING TO THE NEEDS OF A SPACE THAT IS VULNERABLE TO SEA LEVEL RISE, STORM SURGE AND FLOODING. THE GOALS OF THE DESIGN WERE TO MOVE THE VEHICLES AWAY FROM THE WATER AND IMPLEMENT GREEN INFRASTRUCTURE TO DEAL WITH THE WATER ISSUES WHILE STILL ALLOWING EASY ACCESS AND USEFUL RECREATIONAL SPACE.

- Extended docks allow easy water access for fishermen and recreational use.
- Fisherman's memorial node.
- Thru-way traffic on porous pavement to allow stormwater to percolate through slowly while filtering out toxins.
- Native grass and tree buffer zones allowing fishermen to pull up to the docks and access the waterfront without having to cross the natural reef.
- Native grass and tree buffer zones are planted at grades level in order to actively catch runoff and pollution.
- Fescue shrub zones provide low maintenance and work to clean at the surface.
- Composting public restrooms.
- Boulder seating offers aesthetic connectivity to the sidewalk and Phillips street lot while blocking off irregular access to the recreational dock.
- 13’ dock keeps cars and pollutants away from pedestrian pathways and provides safe kayak storage for larger events such as kayak races or festivals.
- 2’ wide stairs down to water for recreational Use, restricted boat access to protect ecosystem.
BROWN STREET LOT

WICKFORD, RI

PROJECT BY: OLIVIA FOW
PREPARED FOR: PROF. RICHARD SHERIDAN
LAR 344

THIS CENTRAL LOT WAS DESIGNED TO ADDRESS FREQUENT STORM SURGE EVENTS, STORMWATER MANAGEMENT PROBLEMS, AND SEA LEVEL RISE USING GREEN INFRASTRUCTURE. THIS LOT IS FUNCTIONAL AND RECREATIONAL, OFFERING ZI, PARKING SPACES, AND PLenty OF GREEN SPACE FOR SEASONAL EVENTS, VISITORS, AND LOCALS TO ENJOY.

BIKE PARK
PORTABLE INFIRMITY FOR STORM WATER FILTRATION
STRUCTURED CAFÉ PARKS HELP PARKING LOT GREEN ALL YEAR, RETAIN STORMWATER RUNOFF AND CATCH POLLUTANTS

PEDESTRIAN CROSSING ZONE. BRICK PLANTERS CONTAIN THE "HISTORIC VILLAGE" FEEL TRANSITIONING INTO DOCKS AND DRAWING VISITORS INTO THE WATERFRONT PARK.

EXTENDED DOCKS FOR FUNCTIONAL BOATING AND WATERFRONT ACCESS WHILE ALLOWING SPACE FOR SEASONAL EVENTS AND PEDESTRIAN CIRCULATION AROUND THE NEW WATERFRONT GREEN SPACE.

BRICK AREA FOR OUTDOOR DINING AND UTILITY ACCESS

NATIVE GRASS AND PERENNIAL BEECH, SASKATCHEWAN CEDAR, STIPA, AND LAFOOOS HABERISTRUS, ACANTHUS INNOMINATA VARI, FUSCHIA, EURATOM PULMONARIUM PLANTED AT GRANULE LEVEL FOR MOST EFFECTIVE STORMWATER CREATIVATION AND TREATMENT

BRICK NODAL HOME TO ANCHOR SCULPTURE AND FUNCTIONAL FOR TOWN EVENTS

HARD-HELD LAWN, PERENNIAL, AND GRASS MEADOW COLLECTS RUNOFF FROM CITY STREETS

SEA WALL, ROCK SCULPTURE, AND SCAPING WALL OFFER SCREENED VIEWS OF PARKED CARS AND WATERFRONT, CREATING A LIMITS RHODE ISLAND ENSUE, PREVENTS STORM WATER FROM FLOWING INTO PARKING LOT IN STORM SURGE EVENTS.

LIBRARY PARK EXTENDED TO CREATE A TOWN SQUARE AND TO INCREASE PEDESTRIAN CIRCULATION TO ANCIENT HILTON STONE AND TO WATERFRONT PARK.
The goal of this plan was to create a working parking lot that provides as many spaces as possible for use during seasonal events while respecting the needs of a conservation site. This lot was intended to remain as natural as possible, responding to storm water surges and sea level rise, allowing for optional recreational use, and being a beautiful functional parking lot.

1. Repurpose buffer zone to protect conservation land on site

2. Integrating rock, swales, act as catchment and retention basins for storm water runoff and storm surge events, water (drainage) and trees - cedar, lindal, and poplar, glaucous, evergreen, cary, evergreen, holly, eliptica, quebec, halafalot - filter out toxins as the water percolates through the ground. The swale also provide visual definition for the optional grass pathway to the waterfront.

3. Small grass pathway of red, fire, grass for easy maintenance, optional walkway to the water for views of the cove

4. Structured grass pathways, catch pollutants from mixed cars, allow water to slowly percolate through and help the landscape and natural and green path is a conservation site.

5. Emerging from the ground is a wave like rock sculpture to hide views of utility lines and to add an interesting visual element connecting the lot visually to the sea wall in the brown street lot and the rock benches in the main street lot.

6. Natural, grid utility lines

7. Tall wind grasses screen away of insurer laying next to the site

8. One way vehicular movement through the site. Paved parking is utilized to allow stormwater to percolate through and filter out first flush toxins

This circulation diagram breaks down the different spaces in the lot. Through the design process, the lot was intended to stay as green as possible to most effectively treat storm surges and respond to sea level rise, storms, lawns, paved, and vegetative space are the three spaces represented here.
MAIN STREET LOT
WICKFORD, RI

PROJECT BY: CASEY HARRINGTON
PREPARED FOR: PROF. RICHARD SHERIDAN
LAR 344

RECREATIONAL BOAT DOCK
PARK DESIGN
- DECKS AND SHADE
- FOR WORKERS
HANDICAP PARKING
LOAD/UNLOAD AREA
- 20 FOOT SPACES FOR WORKERS
WORKING DOCKS
BIO SWALE
- COLLECTING AND FILTRATING
- STORM WATER
PARKING LOT DESIGN
- ONE WAY CIRCULATION
- PERVIOUS PAVEMENT
- RESTROOM
- ADDITIONAL SPACES

DESIGN CONCEPT:
Parking lot design includes consideration of sea level rise, storm water issues, and non-point pollutants while improving parking for the village of Wickford. This is made up of pervious concrete composed of course aggregate to allow percolation. This design focuses on adding extra parking for the public, improving water drainage, while considering the "working" docks. The entire lot pitches towards two bio swales that will collect and infiltrate storm water as well as pollutant runoff. There is a 50' landscaped area running parallel to the docks to give room for commercial fishermen (trails). Overall, the lot provides 10 extra spaces for Wickford as well as permanent bathrooms. Previous design had 47 parking spaces, new design will have 59 spaces.

SCALE: 1" = 20' NORTH

- PERVERIOUS CONCRETE (4'-8")
- BASE/SUBBASE (6" MIN)
- FILTER FABRIC
- SUBGRADE
BROWN STREET LOT

WICKFORD, RI

PROJECT BY: CASEY HARRINGTON
PREPARED FOR: PROF. RICHARD SHERIDAN
LAR 344

HANDY-CAP PARKING

PARKING DESIGN
- ONE WAY CIRCULATION
- PERVIOUS PAVING
- 6 NEW PARALLEL SPACES

PED WALKING PATH

BIO SWALE
- COLLECTING AND FILTRATING
STORM WATER

PARK DESIGN
- PICNIC AREA
- BENCHES

SOLAR POWERED TRASH
DISPENSER

RECREATIONAL BOAT DOCK

LIGHTING THROUGHOUT LOT

DESIGN CONCEPT:
Parking lot design includes consideration of sea level rise, storm water issues, and non-point pollutants while improving parking for the village of Wickford. This is made up of pervious concrete composed of coarse aggregate to allow percolation. The entire lot pitches towards two main bio swales that will collect and infiltrate storm water and pollutants. Green space has been added to the existing picnic area to enjoy the beautiful recreational marine. 6 spaces were lost for this green area but necessary to create an attractive atmosphere (note: these spaces are moved to the new Phillip st. lot). Previous design had 122 parking spaces, new design will have 120 spaces.

SCALE: 1" = 20'-0"  NORTH
DESIGN CONCEPT:
Parking lot design includes consideration of sea level rise, storm water issues, and non point pollutants while improving parking for the Village of Wickford. This lot is made up of pervious concrete composed of course aggregate to allow percolation. The entire lot pitches towards a bio swale located in the center of the lot. This will collect and filtrate non point pollutants. This lot design provides the village with 19 extra parking spaces (parallel, 60 & 90 degree spaces). A 50 foot buffer is implemented for wildlife protection considering "Type 1" water.
GOALS: MAINTAIN FUNCTIONALITY OF WORKING DOCK, ADDRESS INDUSTRIAL RUNOFF AND STANDING WATER, CREATE A MORE COMFORTABLE AND AESTHETICALLY PLEASING ENVIRONMENT

MULTI-FUNCTIONAL LOT
- PAVED AREA REDUCED FROM APPROXIMATELY 30,000 SQ. FT. TO 26,500 SQ. FT. (30% REDUCTION)
- LOST ONLY TWO PARKING SPACES (50 TO 48)
- EASTERN SIDE OF LOT RESERVED FOR BOATS AND TRAILERS
- LAYOUT KEEPS TRAFFIC FLOW A SAFE DISTANCE FROM WORKING DOCK AND OUT OF THE WAY OF FISHERMEN

WATER MANAGEMENT
- PLANT BUFFERS BETWEEN ROWS OF PARKING AND ON NORTHERN EDGE OF LOT FILTER RUNOFF
- LOT PITCHES INTO BIOSWALE ON WEST SIDE - LOCATED WHERE STANDING WATER CURRENTLY COLLECTS
- TRENCH DRAIN CATCHES INDUSTRIAL RUNOFF OBSTRUCTING THE WORKING DOCK

AESTHETIC IMPROVEMENTS
- TREES BETWEEN ROWS OF PARKING CREATE A VISUAL BUFFER BETWEEN WORK AREA AND RECREATIONAL OVERFLOW AREA
- MICRO PARK INCLUDES RESTROOMS AND A PICNIC SHELTER WITH SCENIC VIEWS OF THE BAY
- SIDEWALK EXTENDS FROM MAIN ST. INTO PARK AREA AND PROVIDES A CONNECTION FOR PEDESTRIANS

SECTION A - A'
VERTICAL SCALE: 1" = 10'
GOALS: PREVENT FLOODING OF LOT AND NEARBY BUILDINGS, SIMPLIFY PARKING LAYOUT, CREATE A FOCAL POINT IN THE TOWN

FLOOD PREVENTION
- PAVED AREA RAISED 2 FEET AND PITCHED TOWARDS BIOSWALES LOCATED ON EITHER SIDE
- LOT SET BACK 20 FEET FROM WATER. BIOSWALE CATCH RUNOFF AND PROVIDE A BUFFER FROM STORM SURGES AND HIGH TIDES
- INNER SWALES CAPTURE RUNOFF AND PROTECT BUILDINGS ON SITE FROM FLOODING

PARKING
- PAVED AREA REDUCED FROM APPROXIMATELY 57,000 SQ. FT. TO 38,000 SQ. FT. (33% REDUCTION)
- PARKING SPACES REDUCED FROM 122 TO 108 (ONLY 12% REDUCTION)
- SIMPLE AND EFFICIENT ONE WAY PARKING LAYOUT

CREATE A FOCAL POINT
- WATERFRONT STAGE WITH A 360 DEGREE VIEW CAN HOST PERFORMANCES AND LOCAL EVENTS
- WIDENED FLOATING DOCK AND OPEN GREENSPACE PROVIDE ROOM FOR RECREATIONAL ACTIVITIES OR FOOD MARKETS
- BRICK PATH WITH ALLEE DRAWS PEDESTRIANS INTO THE SITE AND ESTABLISHES A WALKING CONNECTION TO SHOPS AND STORES ON BROWN STREET

SECTION A - A'
VERTICAL SCALE: 1" = 10'
PHILLIPS STREET LOT
WICKFORD, RI

GOALS: MAXIMIZE NUMBER OF PARKING SPACES WHILE MINIMIZING DISTURBANCE OF CONSERVATIONAL LAND AND ADJACENT RESIDENTIAL PROPERTY

PARKING
- 20 SPACES IN APPROXIMATELY 8,700 SQ. FT. OF PAVEMENT
- A 5 FOOT RETAINING WALL ENSURES THAT THE LOT WILL BE SAFE FROM STORM SURGES AND RISING SEA LEVELS
- LAYOUT WORKS AROUND EXISTING POWER LINES TO MAXIMIZE PARKING IN A SMALL AND CONFINED AREA

MINIMIZE DISTURBANCE
- LOT PITCHES INWARD TO CENTRAL BIOSWALE
- A 10 FOOT PLANT BUFFER GIVES PRIVACY TO THE RESIDENCE ON THE EAST SIDE
- 50 FOOT SETBACK FROM CONSERVATIONAL WATER - INTRODUCE NATIVE PLANTS TO HELP WITH FILTRATION OF POLLUTANTS
- A DECK EXTENDING INTO THE BUFFER ZONE PROVIDES EXCELLENT VIEWS OF SCENIC ACADEMY COVE

SECTION A - A' VERTICAL SCALE: 1" = 10'
WICKFORD PARKING  MAIN STREET LOT

WICKFORD, RI

SALT TOLERANT PLANTS THAT CAN BE USED:

**TREES**
- Thuja plicata
- Juniperus virginiana
- Nyssa sylvatica
- Gymnocladus dioica

**SHRUBS**
- Arctostaphylos uva-ursi
- Heteropygium
- Myrica pensylvanica
- Ribes alpinum
- Viburnum dentatum

**CONIFERS**
- Picea glauca
- Picea pungens var. glauca
- P. nigra var. nigra
- Larix sp.

**PERENNIALS**
- Amelanchier maritima
- Hemerocallis sp.
- Hosta sp.
- Pennisetum alopecuroides

LOT IS PITCHED AT A 2 PERCENT SLOPE TOWARDS THE MAIN BIOSWALE TO ENSURE THAT STORMWATER RUNOFF WON'T POOL UP IN THE ACTUAL LOT.
SALT TOLERANT PLANTS THAT CAN BE USED:

**TREES**
- Thuja plicata
- Pinus strobus
- Nymphaeas
- Carya ovata

**SHRUBS**
- Asterephylos sva-ursi
- Hydrangea
- Myrica pensylvanica
- Viburnum alnifolium
- Salix nigra

**CONIFERS**
- Picea glauca
- Picea pungens var. glauca
- Pinus nigra
- Liatris spicata

**PERENNIALS**
- Aster aquatiifolius
- Hypericum calycinum
- Hosta sp.
- Penstemon alopecuroides

LOT IS PITCHED TOWARDS THE CENTER OR MAIN BIO SWALE. AT A 2 PERCENT SLOPE SO AS NOT TO COLLECT STORMWATER RUNOFF CAN BE FILTRATED AND ABSORBED. ACCESS FLOODING SHOULDN'T BE AN ISSUE DUE TO THE LAYERS OF BIO SWALES THAT THE STORMWATER WILL HAVE TO GET THROUGH BEFORE REACHING THE MAIN SWALE.
WICKFORD PARKING  PHILLIPS STREET LOT

WICKFORD, RI

PROJECT BY: JOSEPH TRICARICO
PREPARED FOR: PROF. RICHARD SHERIDAN
CLASS: LAR344

ENTIRE LOT IS PITCHED AT A 2 PERCENT SLOPE TOWARDS THE WATER LEADING ALL RUNOFF WATER INTO THE MAIN BIOSWALE. ANY ACCESS WATER THAT DOES NOT GET ABSORBED WILL DRAIN BACK INTO THE OCEAN. THIS WILL ENSURE THAT NO FLOODING CAN OCCUR.

SALT TOLERANT PLANTS THAT CAN BE USED:

TREES
- TIUA PUICATA
- JUNIPERUS VIRGINIANA
- NYSSA SYLVATICA
- GYMNOSCLEROS DIOSCA

SHRUBS
- ARCTOSARXOS UVA-URSI
- HYDRANGEA
- MYRTICA PENSTROCE
- RIBES ALPINUM
- VIBURNUM DENTATUM

CONIFERS
- PICEA GLAUCA
- PICEA PUNGENS VAR. GLAUCA
- PINUS ARBOREUS
- ARBIX TUX

PERENNIALS
- ASTRAIUM MARITIMA
- HEMEROCALLIS SR
- HOSTA SP.
- PENSTEMON ALAPECUROIDES

MAIN BIOSWALE WHICH STRETCHES 30 FEET FROM THE WATER THAT WILL ABSORB AND FILTER RUNOFF WATER.
PATH THAT LEADS TO A LOOKOUT AREA SURROUNDED BY MAIN BIOSWALE THAT PEOPLE CAN ENJOY. THIS PATH WILL BE MADE FROM A MATERIAL CALLED "TREX DECK".
10 FOOT BUFFER FROM PROPERTY LINE. ACTING AS A VISUAL BUFFER.
EXISTING TELEPHONE POLE

CENTRAL BIOSWALE WHICH WILL CAPTURE FIRST FLUSH OF STORMWATER RUNOFF.

PARKING LOT IS COMPOSED OF 15 SPACES AND ARE POSITIONED AT A 45 DEGREE ANGLE. THE LOT WILL BE MADE OF ASPHALT.