INNOVATIVE COMMUNITY DESIGN FOR PRESERVING CULTURE ON CANADIAN AND CARIBBEAN ISLANDS

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UNIVERSITY OF WATERLOO
CONCORDIA CUM VERITATE

THE PROBLEM STATEMENT

Global climate change

Natural & anthropogenic stressor pose risks to SIDS

- Sea-level rise
- Elevated sea surface temperature
  - Ocean acidification
  - Coral bleaching
- Extreme weather events
  - Hurricanes/tropical cyclones
  - Changing rainfall patterns
- Pollution

Key actors in climate change

- Climatologists, engin… and natural scient… e chan… rs

Hinder the **involvement of local actors**

…ntific …egrated data, …dels that often …y **end-users** such as policy- …general audiences

- The global and national focus

Research questions

I. How can we integrate the **key players** into the process of climate change adaptation planning at the local level?

II. How can we integrate **physical planning and design** in climate change adaptation policies and strategies?

III. How can we incorporate the **knowledge of vulnerable local communities** in the formulation and implementation of adaptation policies and strategies?

THE DEDUCTIVE THEMES

Risks lead to climate change vulnerability

A system becomes vulnerable when

- It is **negatively impacted** by climate change
- It is **incapable of coping & adapting** to climate change

Mitigation & Adaptation

Mitigation

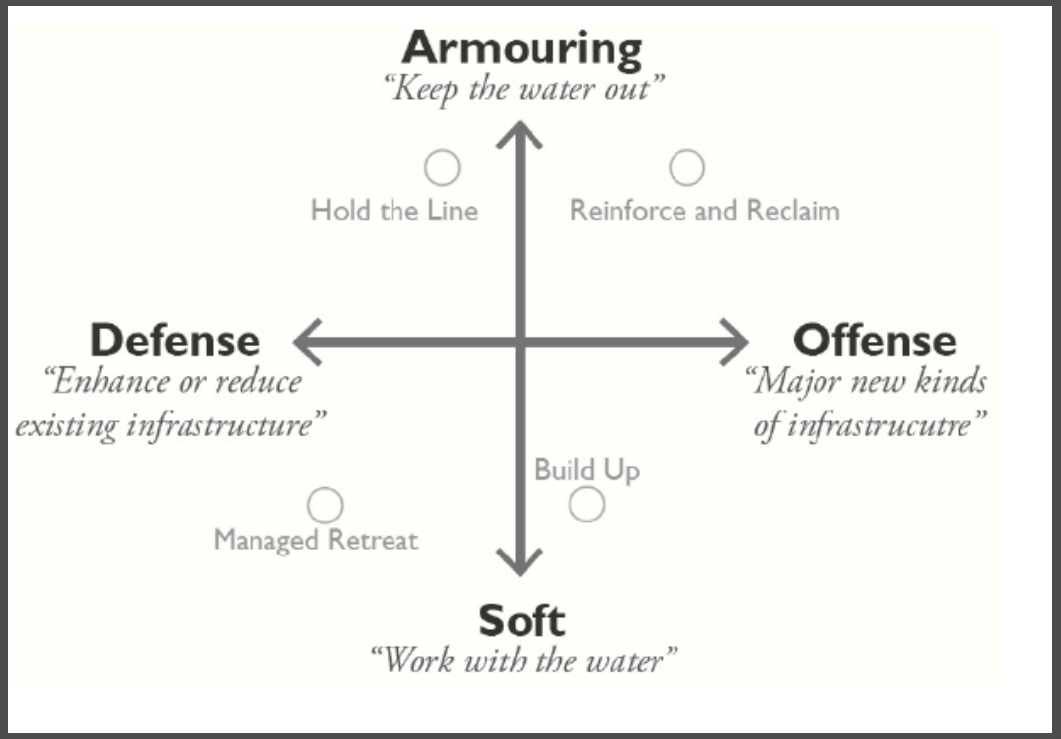
Any anthropogenic intervention (policy or design) to reduce the sources or enhance the sinks of greenhouse gases (GHG)

Adaptation

Any adjustments in natural or human systems, in response to actual or expected climatic stimuli or their effects, that seek to **moderate** harm or **exploit** beneficial opportunities

IPCC, 2001a

Adaptation choices



Barron et al., 2012
Mycoo & Chadwick, 2012

Resilience

- "The ability of **a social or ecological system** to **absorb disturbance** while retaining the same basic structure and ways of functioning, the capacity for self organization and the capacity to adapt to stress and change"

  (IPCC, 2007, p. 880)

- May range from merely **enduring** the impacts to **recuperating** from them

- Objectives may range from a minimum of **avoiding a system's failure** to an optimal of achieving this system's **prosperity**

Theoretical framework

Design charrette as

1. Participatory design tool
2. Knowledge exchange mechanism
3. Data collection tactic

Design Charrettes

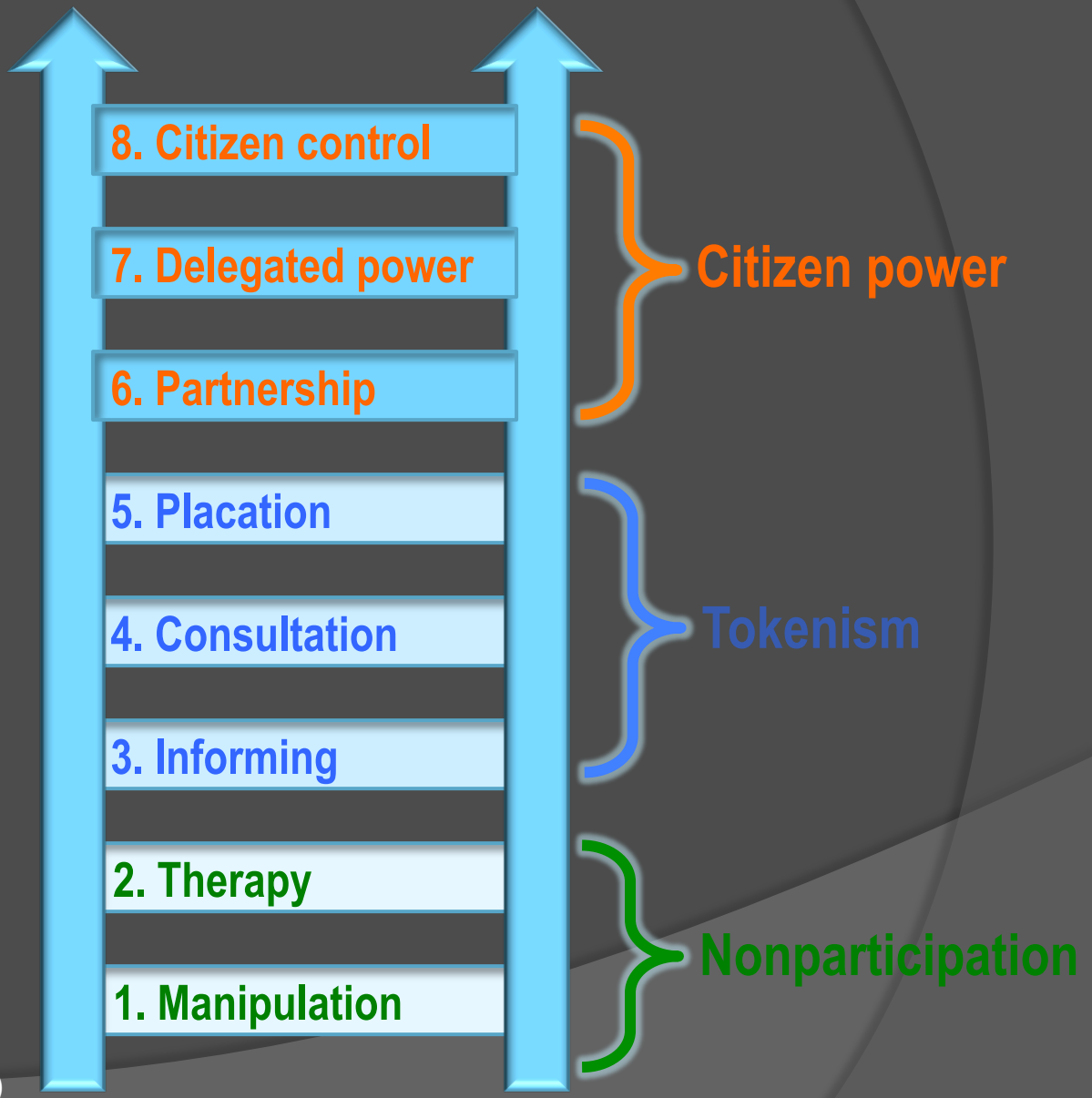
Involve key actors

- **Educational** charrettes: students & instructors
- **Leadership forums**: citizen activists, elected officials, representatives of NGOs
- **Problem-solving** charrettes: citizens
- **Interdisciplinary team** charrettes: professionals from various disciplines

- Not mutually exclusive
- A combination of expertise and backgrounds within each team of the charrette contributes to a stronger participatory approach, particularly for charrettes that deal with **environmental sustainability**

Design Charrettes

Participatory design empowers vulnerable local communities



S. Arnstein (1969)

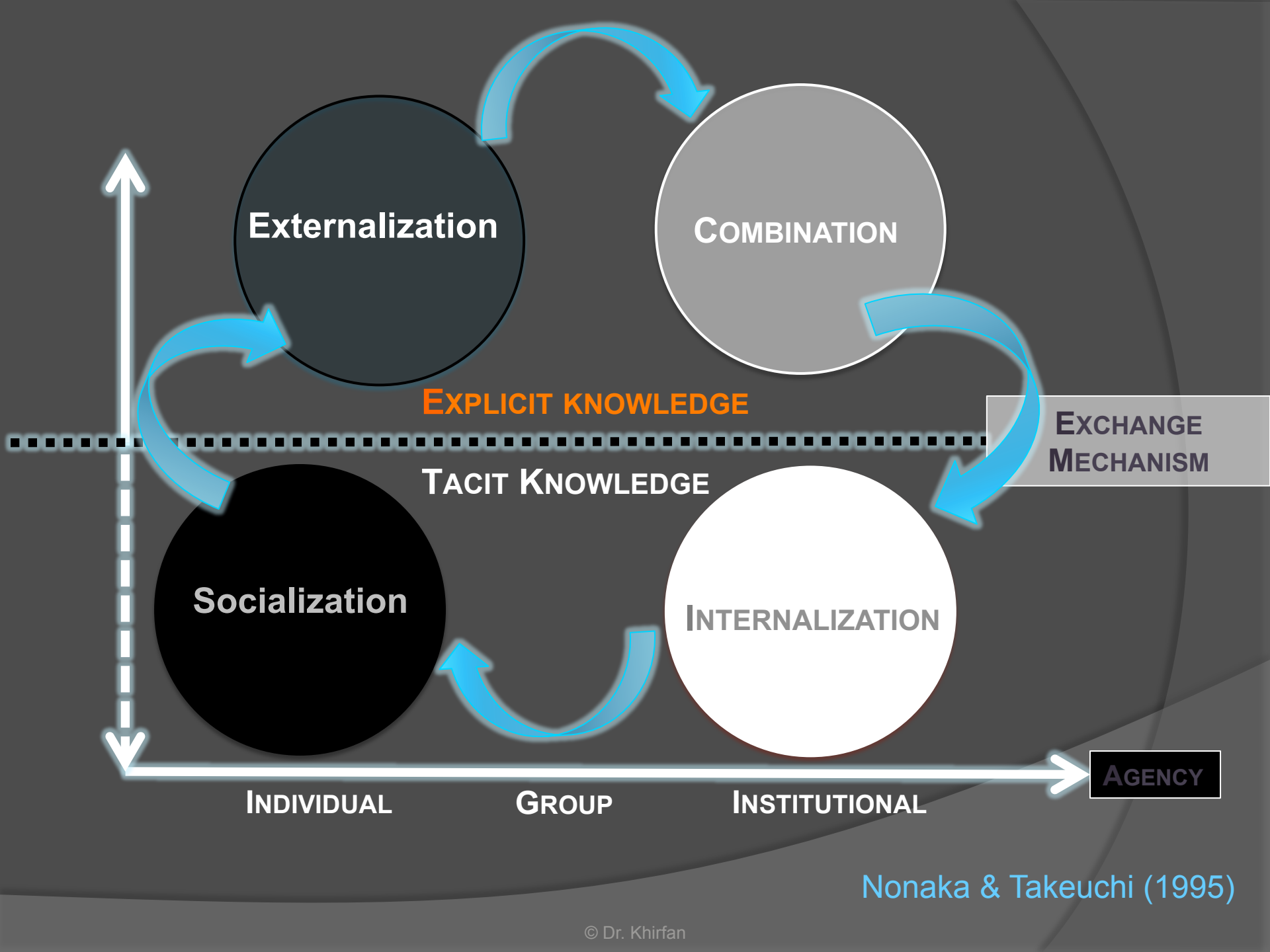
Design Charrettes

Provide a venue for knowledge exchange with local key actors

Transactive planning model

- Practical knowledge is the accumulation of person-centered interactions
- **Tacit knowledge** as the nuanced intuitive grasp that individuals (citizens & planners) acquire through their lived experiences within their local context

J. Friedmann (1973): 177-178



Nonaka & Takeuchi (1995)

THE CASE STUDIES

TOBAGO

NEGRIL

CHARLOTTETOWN

DATA COLLECTION & ANALYSIS

a) Transect walks





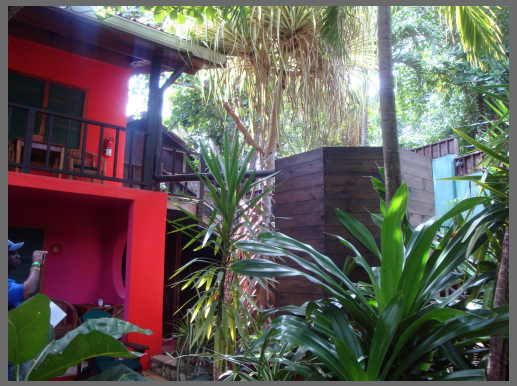






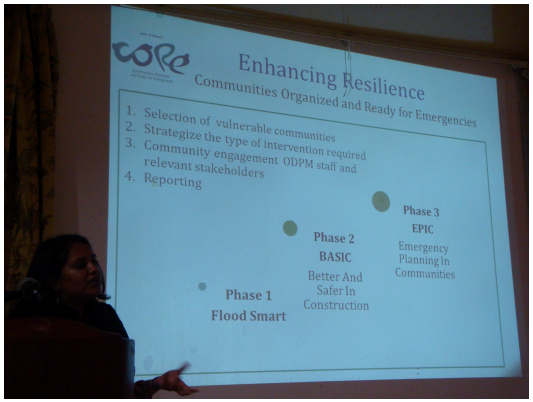
- **Visual Analyses**
  - Architectural & infrastructural typologies

b) Guided tours with local experts



Local conditions & interventions

c) Lectures from local experts



- **Local planning**
  - Planning regulations & culture
  - On-going research

d) Design charrettes



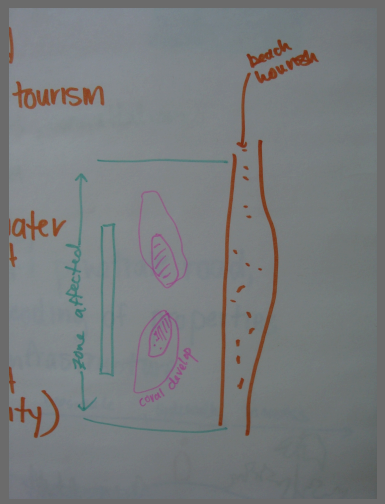


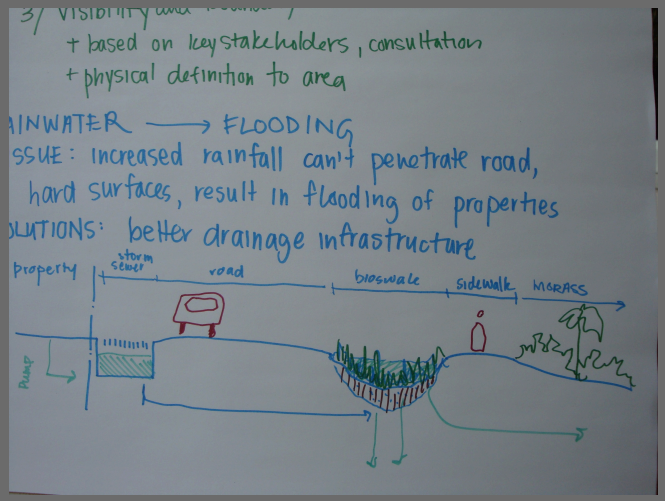


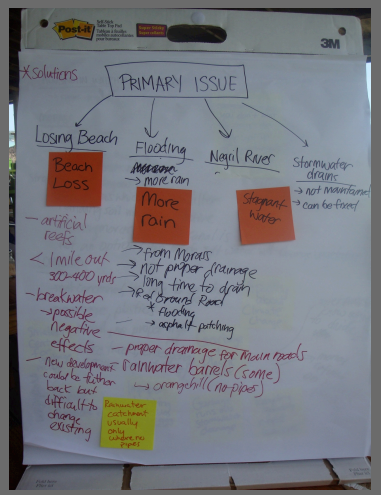

d) Design charrettes -outputs



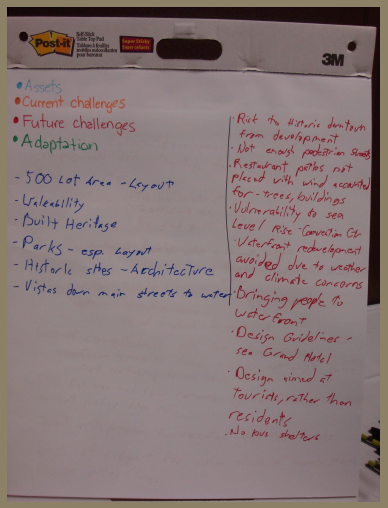






d) Design charrettes – outputs



- Assets
- Vulnerabilities
- Adaptation options

e) Survey questionnaire (Negril)

RETREAT

PROTECTION: 1

ACCOMODATION: 1

PROTECTION: 2

ACCOMODATION: 2

Surveyor name/team: **Date:**

Location (e.g., long bay beach, at hotel, at design charrette 1):

Respondent information	Adaptation Preferences and ranking	Notes (the reason of why he/she prefers their chosen option)
Respondent #: 1. Age: 2. Are you a tourist or a local? 3. What is your occupation: **For tourists:** 4. What is your country of origin? 5. How many previous visits (apart from this one) have you made to Negril? 6. How long is your current stay in Negril?	**1. Retreat:** Yes / No **2. Accommodation:** Hard / Soft **3. Protection:** Hard / Soft **Ranking** (where 1 is the most preferred choice and 5 is the least preferred choice) 1 2 3 4 5	
Respondent #: 1. Age: 2. Are you a tourist or a local? 3. What is your occupation: **For tourists:** 4. What is your country of origin? 5. How many previous visits (apart from this one) have you made to Negril? 6. How long is your current stay in Negril?	**1. Retreat:** Yes / No **2. Accommodation:** Hard / Soft **3. Protection:** Hard / Soft **Ranking** (where 1 is the most preferred choice and 5 is the least preferred choice) 1 2 3 4 5	

- 151 respondents:
  - 97 locals
  - 54 tourists

THE INDUCTIVE THEMES (ANALYSIS) & THE INTEGRATED DESIGN APPROACH

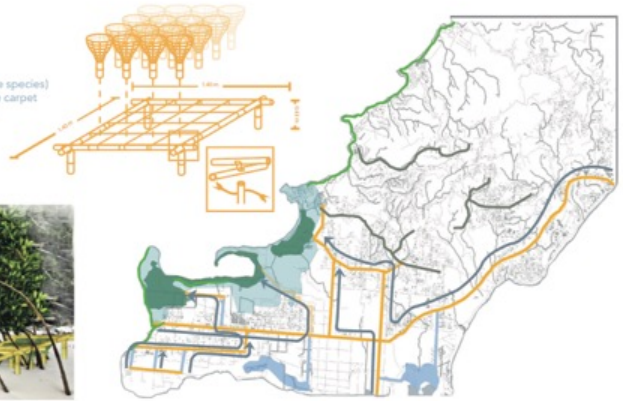
TOBAGO

LM2029

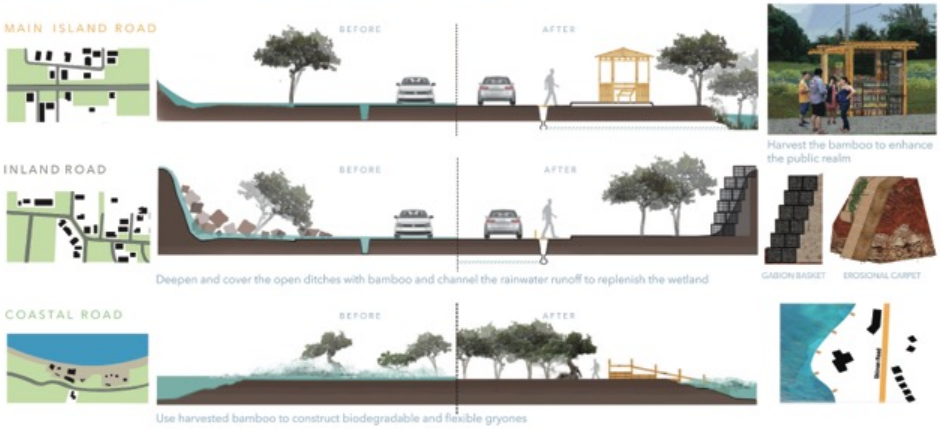
DESIGN PROPOSED FOR COMMUNITY-CLIMATE CHANGE ADAPTATION

LM2029

REGENERATE THE MANGROVE FOREST



ENHANCE EXISTING INFRASTRUCTURE TO REPLENISH THE WETLAND

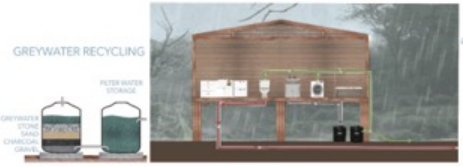


ENHANCE EXISTING VENACULAR ARCITECTURE

Capitalize on the stilts house typology to enhance household climate adaptive infrastructure

RAINWATER HARVESTING

GREYWATER RECYCLING



Raised bed gardens to support food security and beautify stilt construction by concealing infrastructure


Rainwater Harvesting
Greywater Recycling
Pervious Asphalt
Wetland and Mangrove Forest
White Mangrove, Black Mangrove and Red Mangrove
Raised Beds for Produce Garden
Ditches Channel Rainwater Runoff to Bioswale and Wetland
Bioswale
Bioswale Channels Rainwater Runoff to Wetland
Berm
Biodegradable Mangrove Carpet
Berm
Biodegradable And Reversible Gryones

NEGRIL

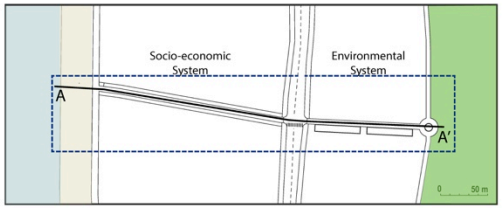
LEGEND

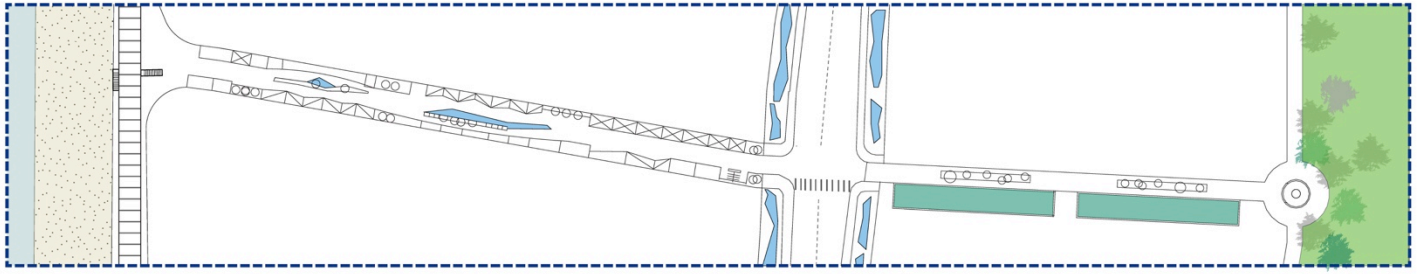
Existing Infrastructure

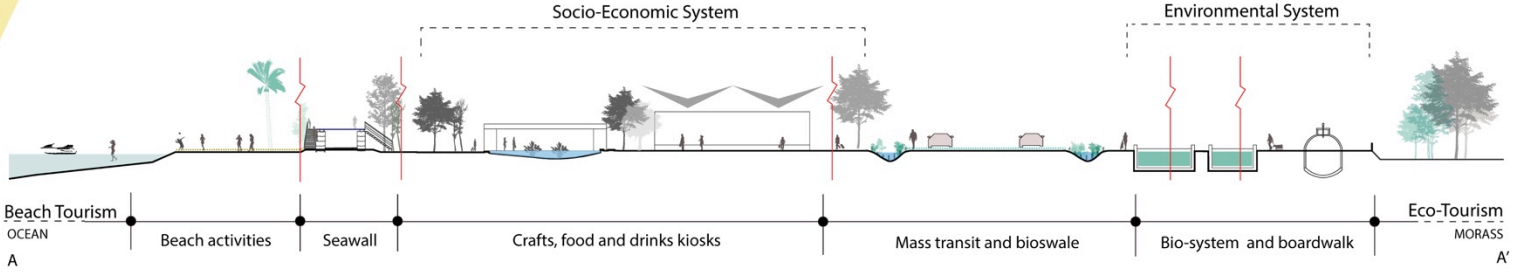
- Main Street
- Tranverse connections

Proposed Infrastructure

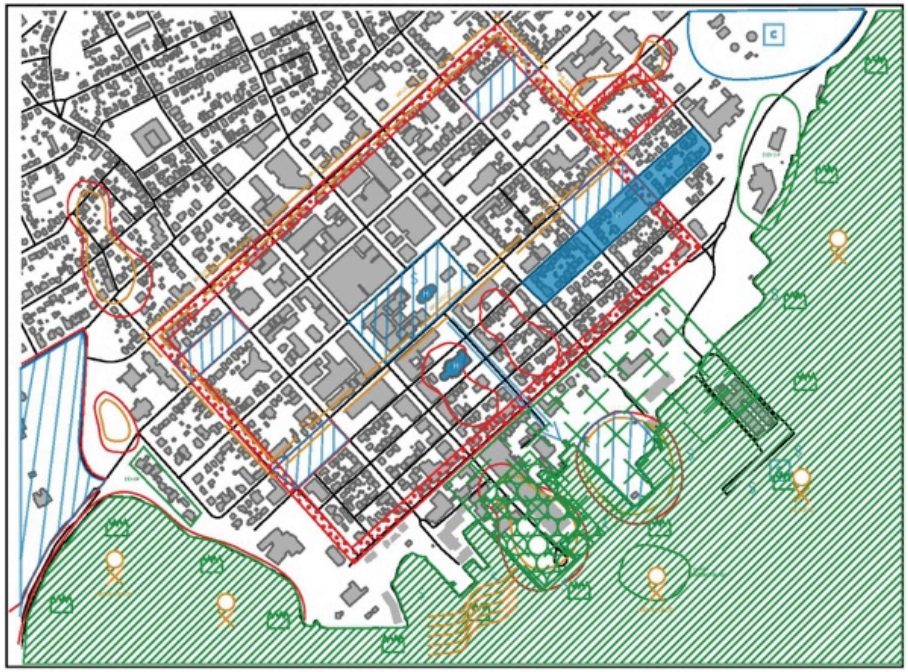
- Street Clusters
- beach front promenade (seawall)
- Boardwalk (along morass)
- Transverse connections

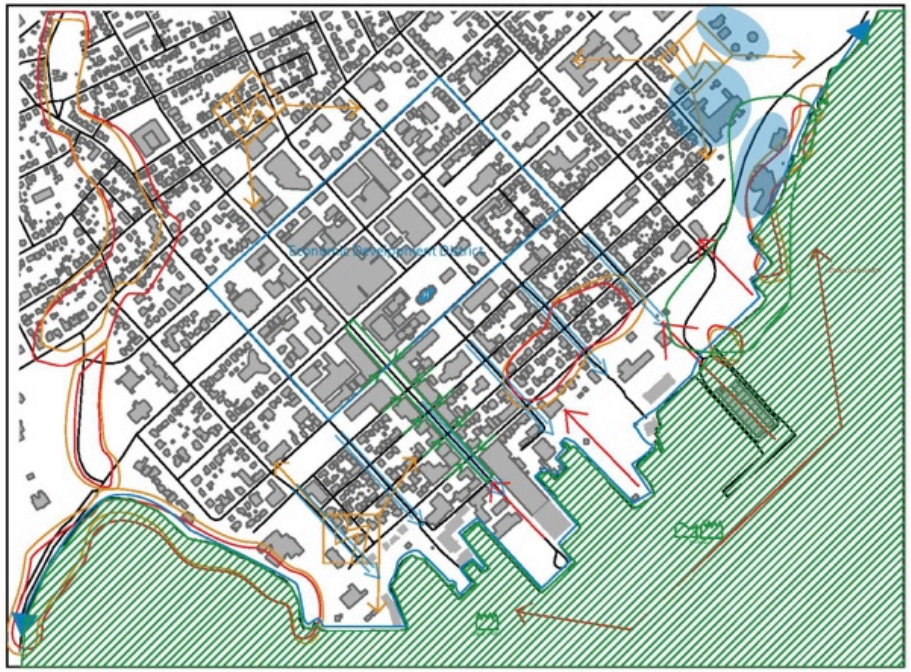






CHARLOTTETOWN





CHARLOTTETOWN

HISTORIC URBAN LANDSCAPE

ALEX CLARKE

HERITAGE ADAPTATION

TARGETED AT-RISK CHARACTER AREAS

LEGEND

Character Area 1

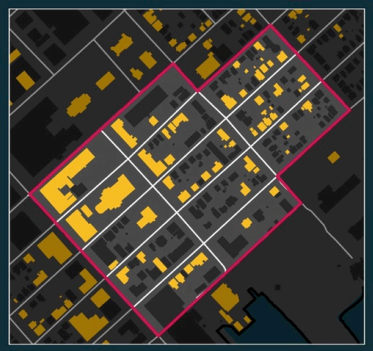
Character Area 2

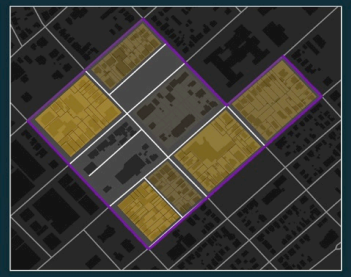
Character Area 3

Character Area 4

HERIT-

Ratio of Designated Heritage Buildings to Non-designated Buildings per block





HERITAGE ADAPTATION

STATUS QUO

LEGEND:

Designated Heritage Buildings

Heritage Preservation Area

Flooding from 4.93m Storm Surge

CONTEXTUAL ANALYSIS

LEGEND

Threat by Inland Flooding

Threat by Storm Surge

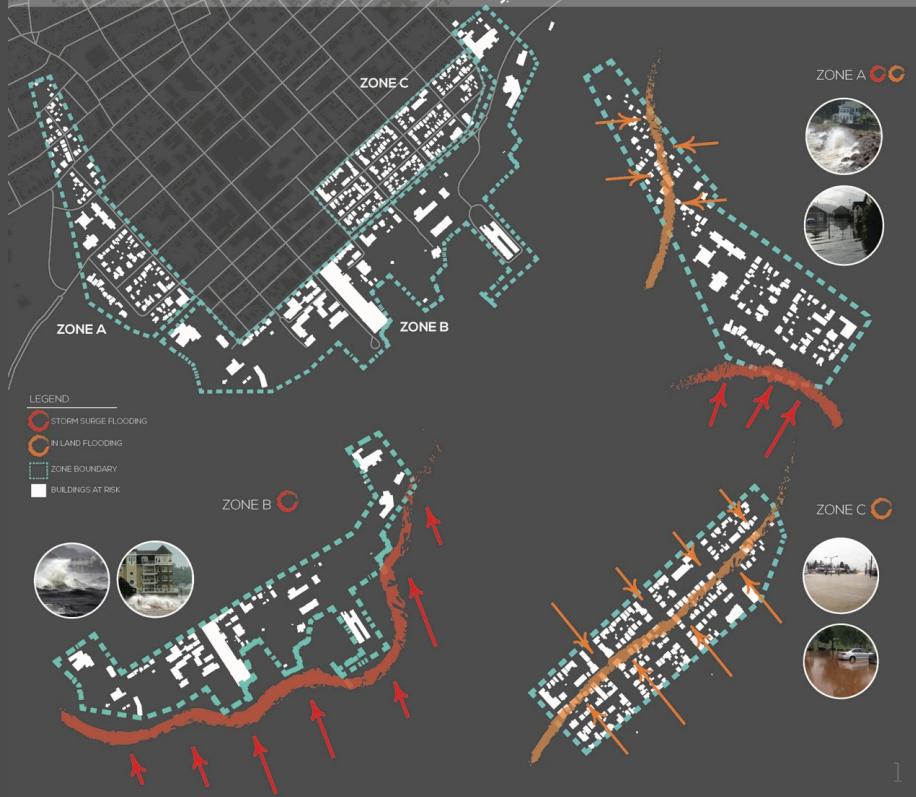
Identified Heritage Buildings

Identified Heritage Vistas and Sightlines

CHARLOTTETOWN
LAND USE, ZONING, BUILDING REGULATIONS

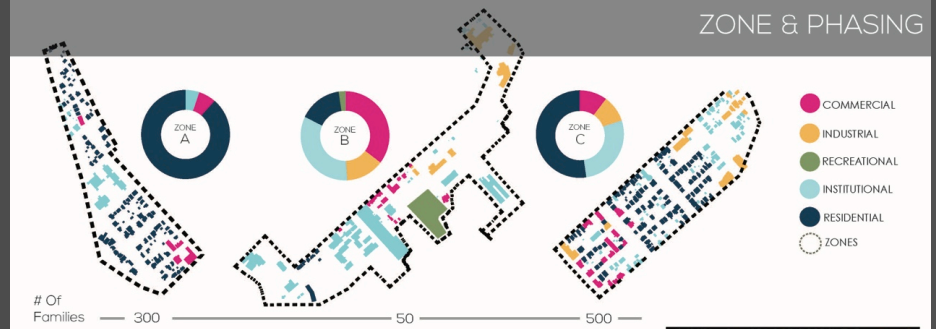
SABRINA SAMIN

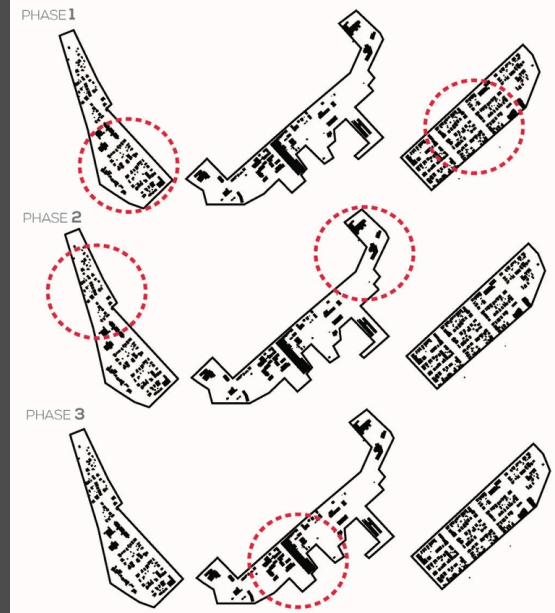
ZONING & BUILDING CODES

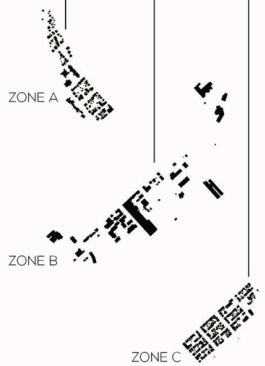


1

ZONE & PHASING







PROPOSAL

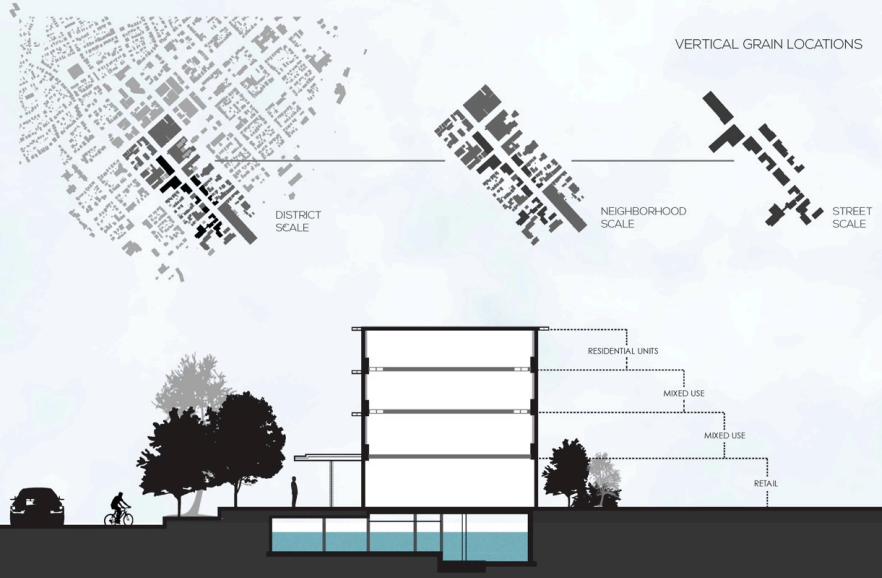
ZONING

BUILDING CODES

2

ZONING & LAND USE

MANAGED REALIGNMENT & VERTICAL GRAIN



BUILDING CODES

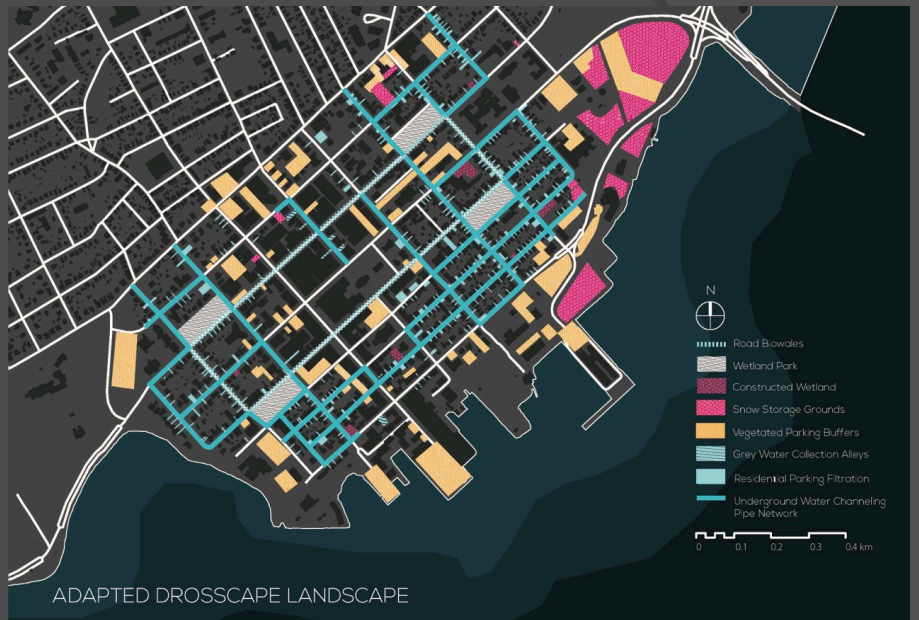
CHARLOTTETOWN

BUILDINGS & OPEN SPACE TYPOLOGIES

HADI EL-SHAYEB

DROSSCAPE TYPOLOGICAL ANALYSIS

	OPEN ALLEYWAYS	RESIDENTIAL PARKING	OPEN UNUSED SPACE	OPEN INDUSTRIAL LAND	PUBLIC PARKING	COMMERCIAL/ INDUSTRIAL PARKING
COUNT	15	351	6	14	7	88
TOTAL AREA (m^2)	2,775	13,583	2,910	37,800	5,215	71,280
SHAPE						
SCALE						
DROSSCAPE TYPOLOGIES						
LAND COVER						



ADAPTED DROSSCAPE LANDSCAPE

NETWORK

RESIDENTIAL PARKING

UNDERGROUND WATER CHANNELING PIPE NETWORK

OPEN UNUSED SPACE

ROAD BIOSWALES & Wetland Park

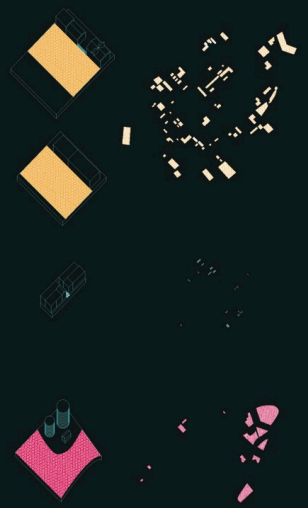
Refer to QUADRANT designs

INDEPENDENT SYSTEMS

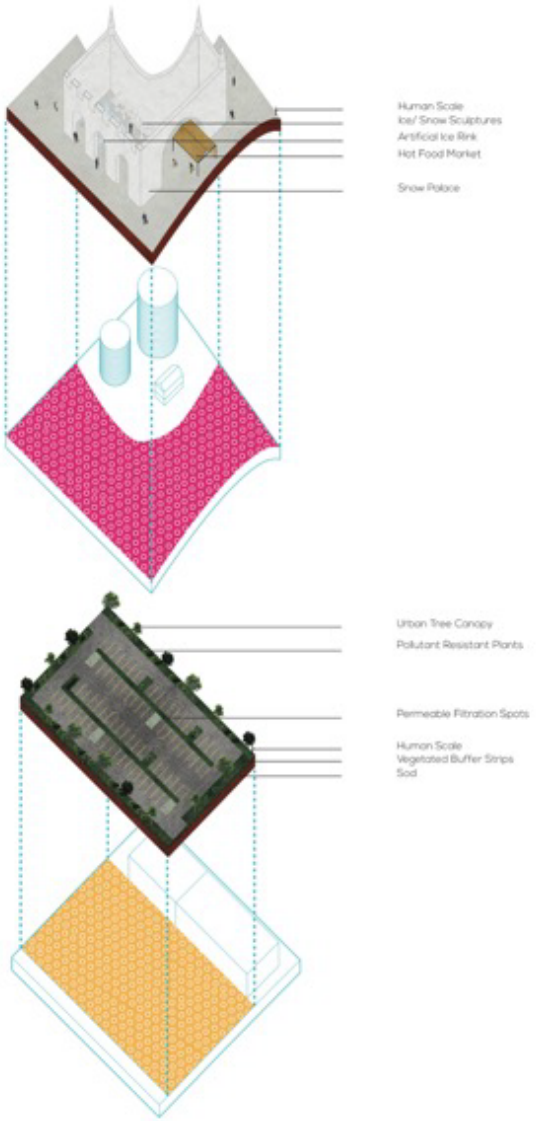
COMMERCIAL/ INDUSTRIAL/ PUBLIC PARKING

OPEN ALLEYWAYS

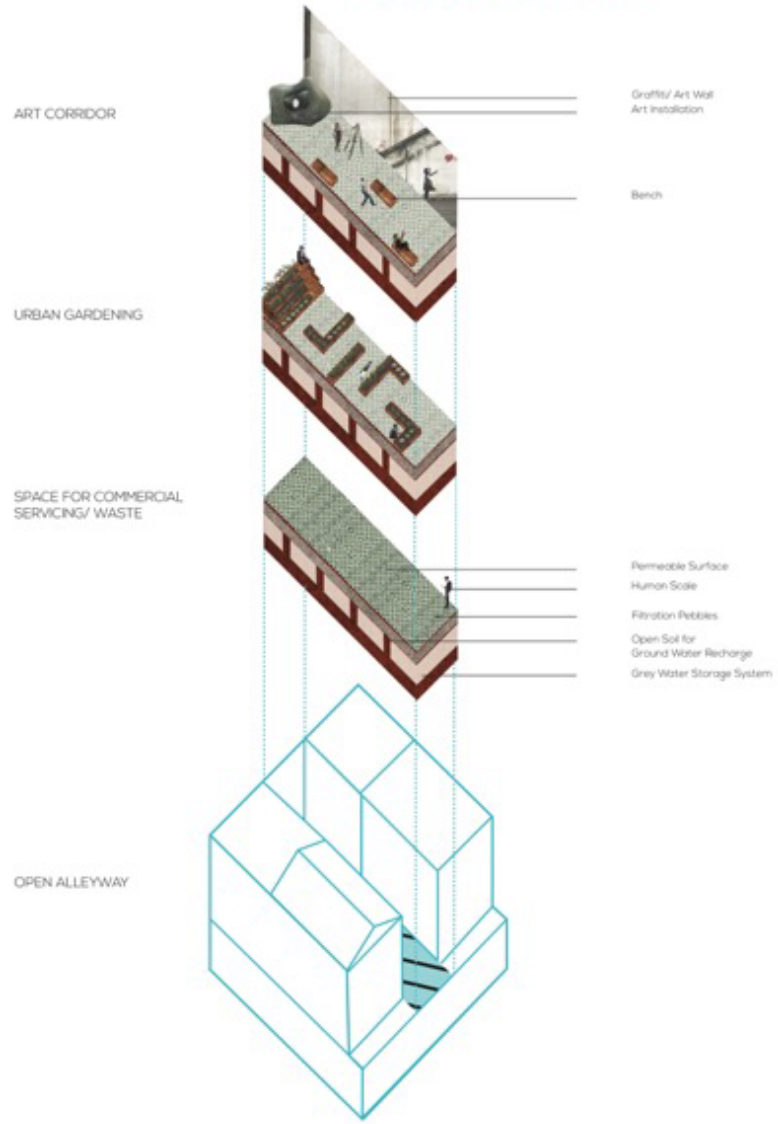
OPEN INDUSTRIAL LAND



DROSSCAPE INDEPENDENT SYSTEMS › SNOW STORAGE/ PARKING BUFFER



DROSSCAPE INDEPENDENT SYSTEMS › GREY WATER COLLECTION



CHARLOTTETOWN

ECOLOGICAL DESIGN – STORMWATER RUNOFF

OLIVER FRAYNE

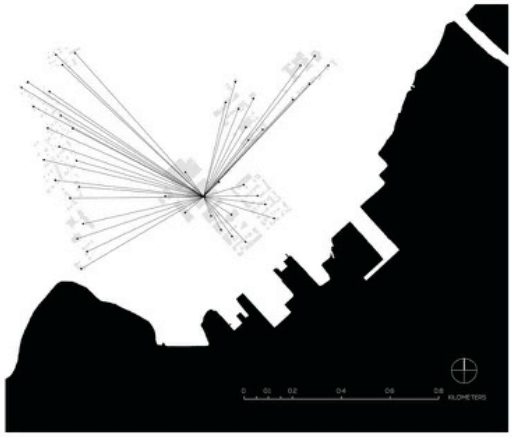
CONTEXT

1. Plan view of Charlottetown downtown core

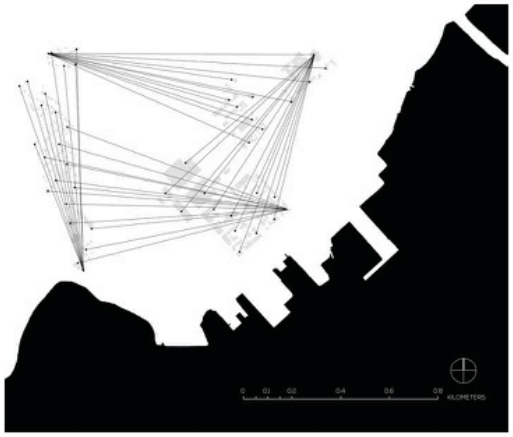
2. Inland flood areas as identified from design charrettes

3. Four parks, identified as community assets during design charrettes

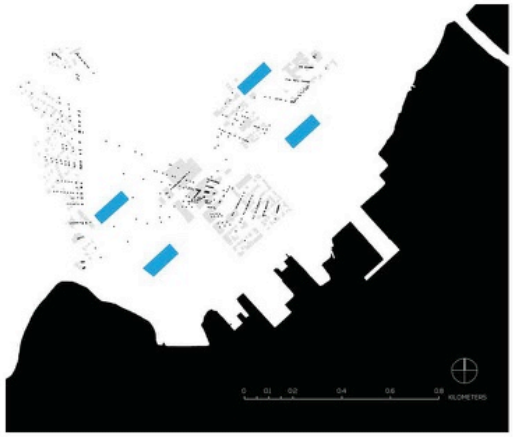
SPATIAL LINKS



4. Flood blocks linked to centre point

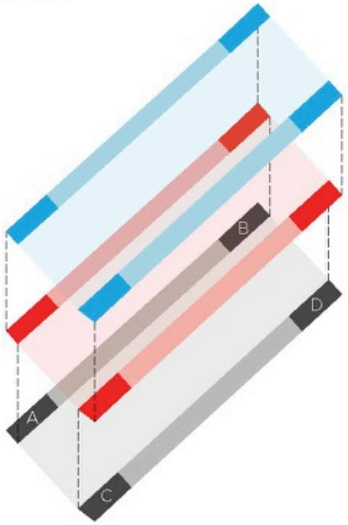


5. Outer point linked by adjacent cardinal directions



6. Intersection of diagrams 4 & 5, park corridor identified

FUNCTION LAYERS



WATER

Retain
Move

PEOPLE

Retain
Move

LOCATIONS

A Rochford
B King's
C Connaught
D Hillsborough

AB Kent St
CD Richmond St

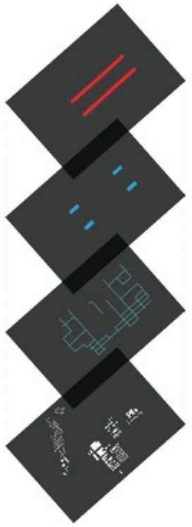
BIG SYSTEM

GREEN CHANNELS

FOUR SQUARES

MINOR CHANNEL NETWORK*

INLAND FLOOD AREAS

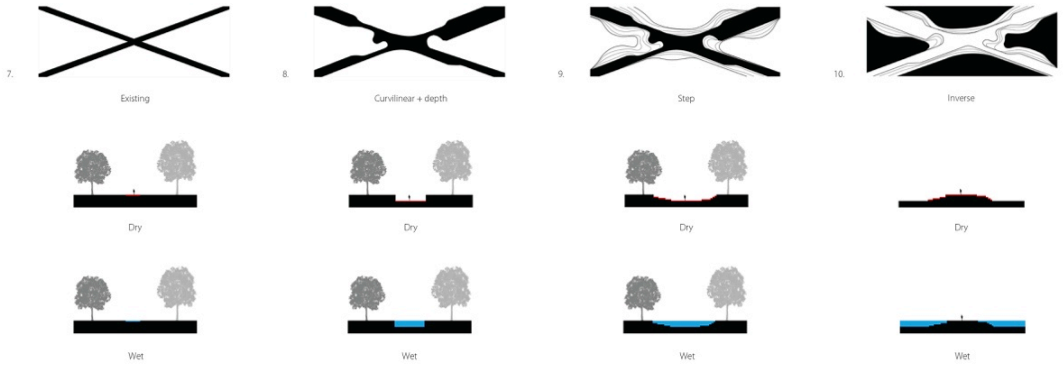


Moves flooding into quadrant
Create pedestrian street
Prioritize cyclists and pedestrians
Remove on-street parking

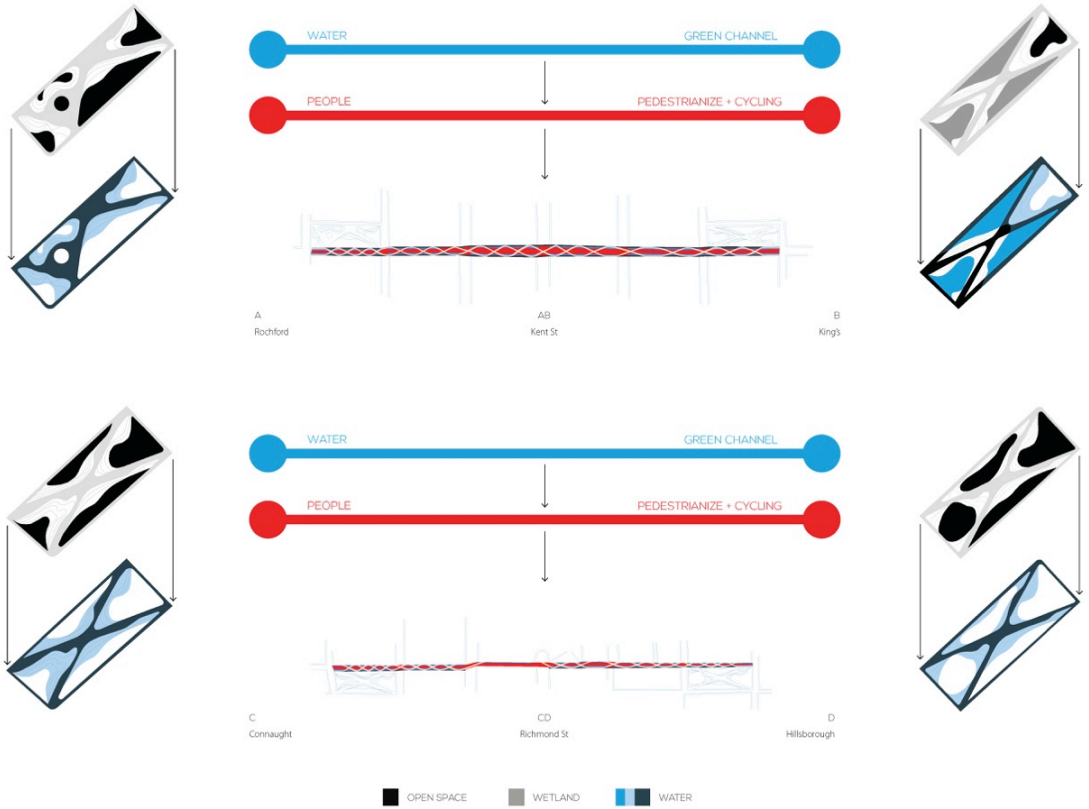
Preserve heritage squares
Reshape for maximum water storage capacity
Design for new social interaction
Complement linear and curved aesthetics

Remove flooding from distress areas

SQUARE CONCEPTS



INTERVENTION DESIGN



STREET PROGRAMMING

SPATIAL

ADAPTABILITY CALENDAR

TEMPORAL

IDEA EXPERIENCE

Thank you!