

Crescent Beach Community Meeting Series

MEETING 3

Moving Forward: Crescent Beach and the Coastal Flood Adaptation Strategy

Wednesday, September 14, 2016

6:00 – 8:00 pm



ACT
Adaptation to
Climate Change
Team



ideaspace
Think Big

Community Meeting Series

Meeting 1: May 24
Sea Level Rise and the Challenges for
Crescent Beach

Meeting 2: June 4
Community Dialogue on Adaptation
Responses

**Meeting 3: Moving Forward: Crescent
Beach and the
Coastal Flood Adaptation Strategy**



Meeting Agenda

6:00	Welcome, Introduction, Overview
6:15	Presentation: Recap of Meetings 1 and 2
7:00	Group Discussion
7:30	Presentation: Developing the Coastal Flood Adaptation Strategy
7:50	Group Discussion
8:00	Meeting Adjourns



ELGIN
HALL

1250



The Team
Love, which
is love.

and my love
for the beach
is the love
of my life.



GA
WILSON
WHOLE ISLAND L&L
Crescent Beach Swimming Club
Beach, Eureka, August 2011

Tell Me What You LOVE about
**CRESCENT
BEACH**





Wetlands of the Pacific Northwest
The Pacific Northwest region is home to a diverse array of wetlands, including coastal salt marshes, freshwater wetlands, and riparian wetlands. These wetlands play a critical role in supporting biodiversity, providing habitat for numerous species of plants and animals, and filtering pollutants from water. Wetlands also provide important ecosystem services, such as flood control and carbon sequestration.



Boundary Bay to Strait of Georgia















BAS CS
THE ASSOCIATION FOR
SUSTAINABLE COMMUNITIES
PROJECT NUMBER 11

Responses

- existing sand bars could be raised to reduce wave impact
- combination: artificial islands + beach nourish











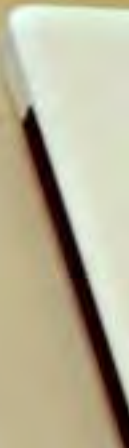
Soft shore
reclaim
of tidal
area

Soft shore
reclaim
of tidal
area

Soft shore
reclaim
of tidal
area

Random
access to
constraint
enclave

Aggressive
not narrow
people
drive to
B.





Washburn
Highway

Washburn
Highway

Washburn
Highway

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Highway



Meeting Agenda

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Discussion Guidelines

- Hold questions until after each presentation
- Respect each other and different points of view
- Please turn phones to silent and take any calls outside



Presentation: Recap Meetings 1 and 2

Diana Bulley, President, Ideaspace

Deborah Harford, Executive Director, SFU's Adaptation to Climate Change Team

Matt Osler, Senior Project Engineer, City of Surrey

Deborah Carlson, Staff Counsel, West Coast Environmental Law



Crescent Beach

The Climate Change Challenge



The world is committed to significant changes in climate regardless of future emissions of greenhouse gases.

While **emissions reduction is important** to avoid catastrophic changes in climate, this means that **adaptation to the effects of global warming is necessary to reduce vulnerability and enhance resilience.**

Projected Climate Change Impacts



Sea level rise – locked in

Province estimates 1m by 2100:

- Increased storminess and storm surge
- Erosion
- Infrastructure impacts
- Loss of beaches and coastal ecosystems
- Soil salinization
- River influence – e.g. levels, salt wedging
- Groundwater pooling

New Challenges



Result of climate changes plus additional influences:

- Traditional approaches need updating on an ongoing basis, including engineering and building standards
- Ability to project conditions based on experience not reliable
- Extreme weather of magnitudes we cannot foresee
- Levels of damage beyond our experience

Dutch Courage In the Face of Climate Change

Dutch govt set aside up to €1 bn a year up to 2100 for coastal reinforcement & ecological engineering. (*avoid/*retreat)



Miami Beach Sea Level Rise Action

Miami Beach has launched a \$400 million project to install 80 pump stations, plus roads on the island's low-lying western edge will be rebuilt higher. (*accommodate)



Vancouver Considers Infrastructure Responses

Former City of Vancouver Chief Engineer Peter Judd discussed flood-control gates (*protect), “sacrificial” first floors (*accommodate), and more for a 200-year future “where it's being conservatively estimated the ocean may rise at least two metres.” Much of Vancouver will need reinforcement.



Adaptation: Approaches

Need to:

- Collaborate and think regionally, e.g., on coastlines/watersheds/forests.



And...
Work together
to develop solutions.

FBC, 2016

Key Adaptation Actions Needed

1. **Engage** stakeholders from community and business to ensure they understand the challenges and participate in developing solutions.

2. **Plan** coastal response options:

- **Accommodate – raise buildings and services**
- **Protect – build protection around buildings and services or adapt ecosystem components**
- **Retreat – move out of the way**
- Or a **combination...**

3. **Innovate**: Resist, recover, *creative transformation?*

Climate-related Changes: Resident Comments

- Water restrictions now, stage 3 - stressful on the gardens
- The wetlands dried up for the first time last year
- Used to go outdoor skating as a kid - now can't remember when was the last time this was possible
- More snails; a problem because can't go swimming here anymore
 - More swimmer's itch
- Presence of king tides; this past March event was a big deal, was a new thing for most people
- As a kid, at low tide the sandbars were more visible and you could walk out for longer; now less defined bars, water level seems higher
- Less drainage
- Flowers flowering earlier
 - Some flowers which were blooming in late July 3 years ago, this year are blooming right now (May)

Sea Level Rise Impacts

City of Surrey is looking at projections of challenges and requirements for responses.



What Makes Crescent Beach So Special?

- Ever changing, dynamic environment and conditions
- Draws in mass amounts of biodiversity



Courtesy of Surrey Archives



Tides – Highs to Lows

Sand Shoreline



28

Mud Flat \ Estuary



30

Current Weather Effects in Crescent Beach



Working Together on Sea Level Rise

- No legal prescription for how exactly to respond to sea level rise in neighbourhoods like Crescent Beach.
- No perfect, one-size-fits-all technical responses.
- Need to work through possible responses with communities.
- Need input from community, stakeholders and experts to develop appropriate strategies.

Adaptation: Local Benefits



Benefits:

- Less stress
- Safer
- Cheaper in the long run
- Lower insurance
- Creation of recreation and/or natural beauty benefits through responses featuring new nature-based areas
- Robust property values

Adaptation: Local Benefits



Incentives:

- Increased attractiveness for investors/homeowners in resilient cities as concern over sea level rise grows.
- Opportunity to stand out with innovative ecosystem-based infrastructure responses.

Crescent Beach: Dynamic, Beautiful, Changing



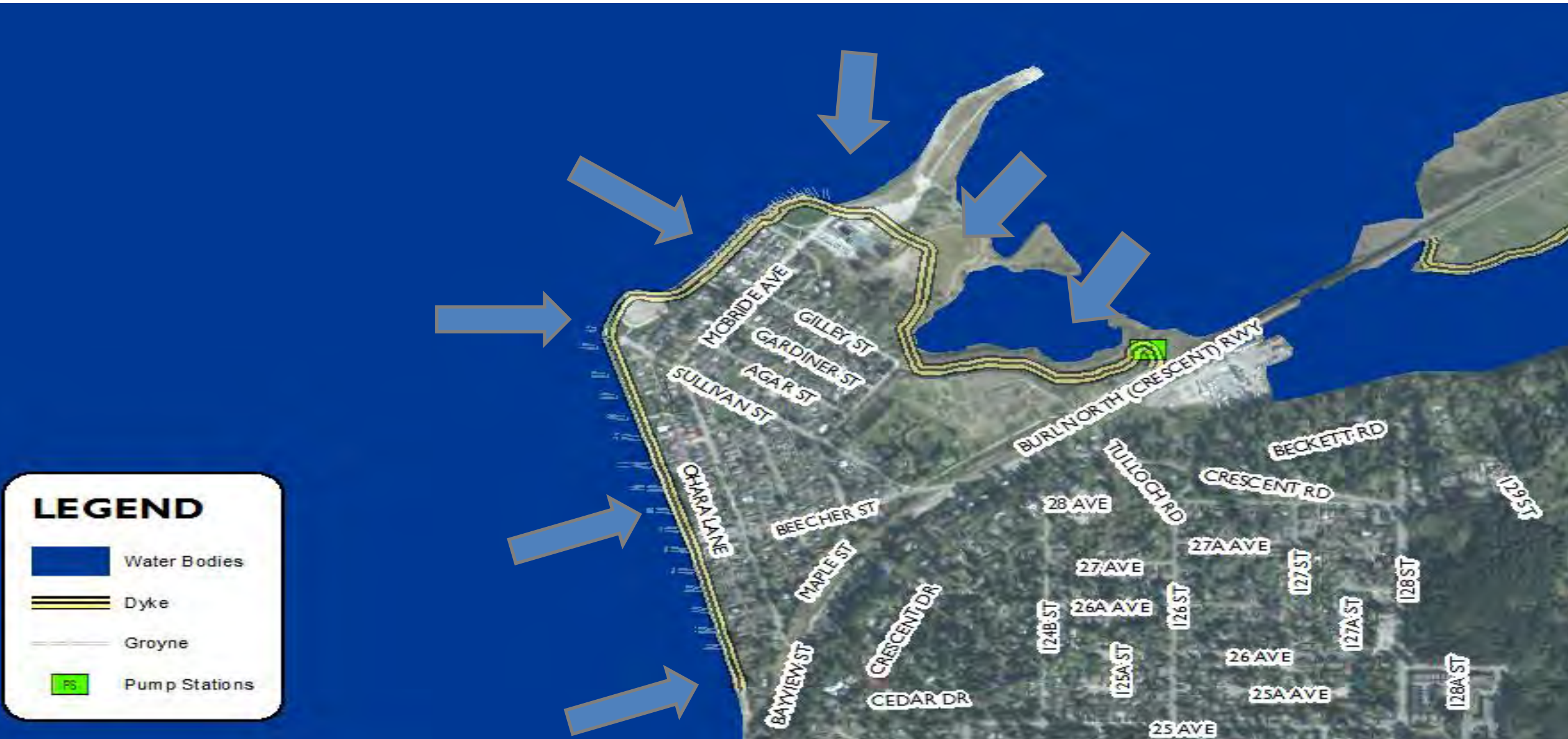
Crescent Beach Coastal Flood Potential



Sept 14, 2016

Matt Osler, Sr Project Engineer

Ocean Exposure



Surface ponding: Rainfall & Tidal Influence



Surface ponding: Rainfall & Tidal Influence



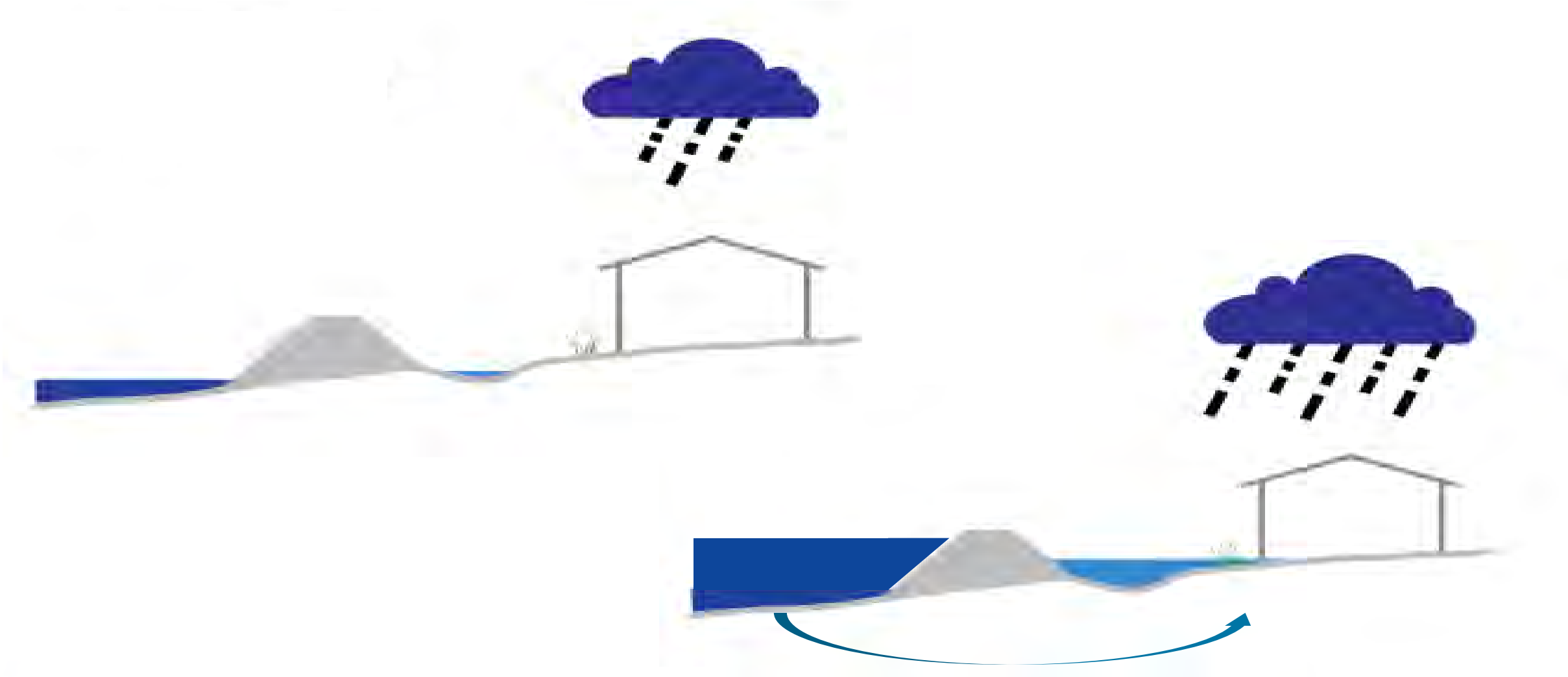
Surface ponding: Rainfall & Tidal Influence



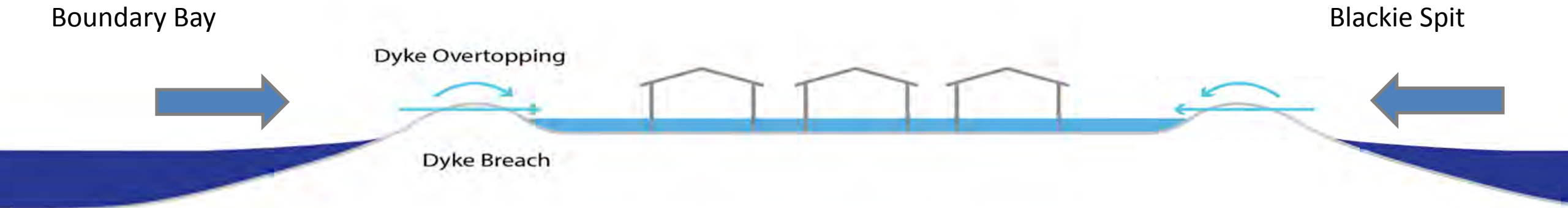
Surface ponding: Rainfall & Tidal Influence



Surface ponding: Rainfall & Tidal Influence

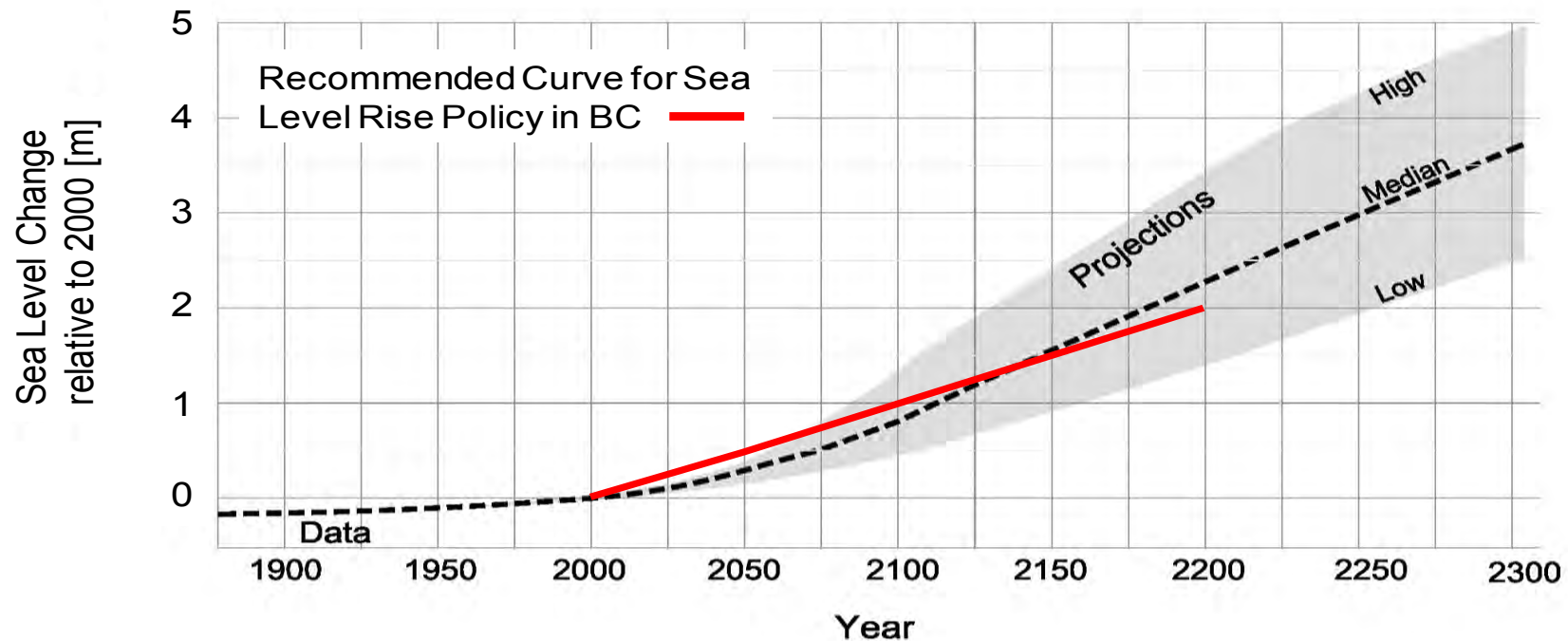


Potential Cause of Coastal Flooding in Crescent Beach



4 Drivers of Coastal Flooding

- 1) High Tide
- 2) Storm Surge
- 3) Wind and Waves
- 4) Sea Level Rise



ADAPTING TO CLIMATE CHANGE

Coastal Flood Management:



LANARC

From You Tube Channel: <http://youtube.com/provinceofbc>
Complete BC Adapts Playlist: <http://ow.ly/JaoK300TLRX>



https://youtu.be/oMXFn_2MKOw?t=1m44s

Excerpt from BC Adapts: Coastal Flood Management 4

Potential flood Impacts in Crescent Beach

- Simulations based on dyke overtopping in an extreme event resulting in washing out dyke completely

Home Example (Gardiner Street)



No Flood

Home Example (Gardiner Street)



Potential Flood Scenario 2020

Home Example (Gardiner Street)



Potential Flood Scenario 2040

Home Example (Gardiner Street)



Potential Flood Scenario 2070

Home Example (Gardiner Street)

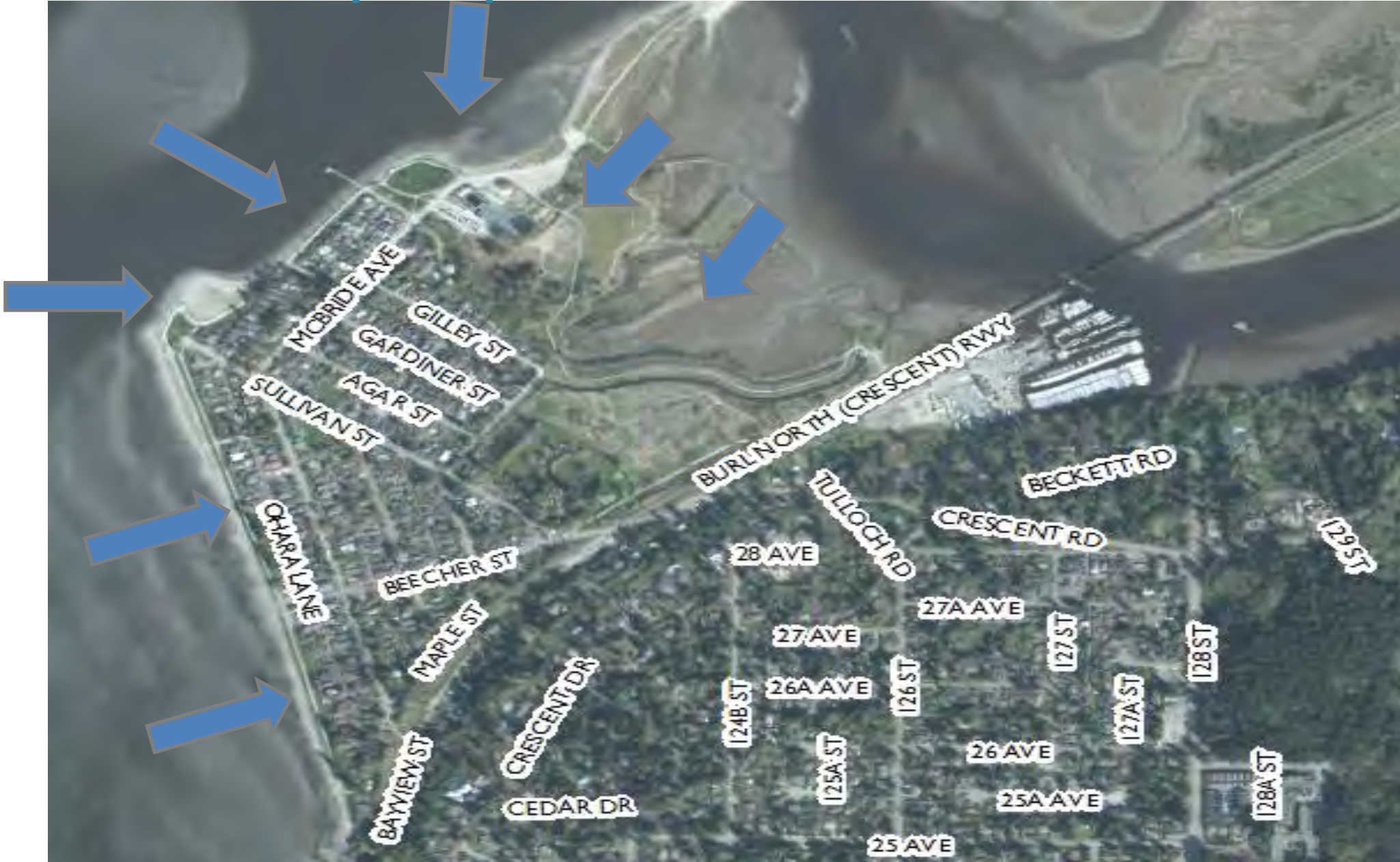


Potential Flood Scenario 2100

Potential Community Impact: Flood Scenarios

- Flood waters shown on following maps have same depth as shown on in the time lapse photos from Gardner Road house
- Elevations are the estimated flood construction levels with sea level rise estimates into the future and correspond to extreme conditions
- Water will flow to low areas from dyke overtopping
- Flood Scenarios shown would trigger community evacuation
- Emergency Services have response plans

Potential Community Impact: Flood Scenarios



Potential Community Impact - 2020

Legend

Flood Depth (metres)

White	Dry
Lightest Blue	0.01 - 0.25
Light Blue	0.26 - 0.5
Medium-Light Blue	0.51 - 0.75
Medium Blue	0.76 - 1
Dark Blue	1.1 - 1.3
Very Dark Blue	1.4 - 1.5
Dark Blue	1.6 - 1.8
Very Dark Blue	1.9 - 2
Black	2.1 - 2.3



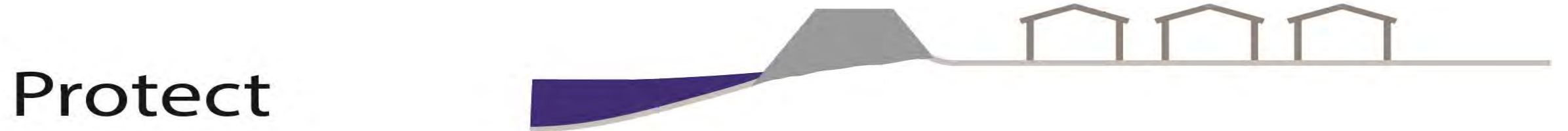
Possible Flood Scenario – 2020



Possible Flood Scenario – 2070

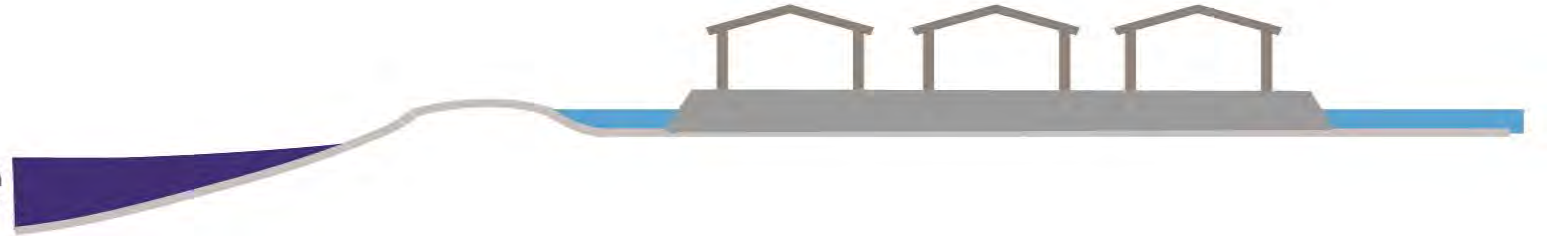


Adaptation Pathways



Early Structures raised on Piles

Accommodate



Crescent Oyster Co circa 1905 in Crescent Beach



Later Settlers responded with Protect

Protect



1948: Stone and mortar wall existed in Crescent Beach



1953: Timber Wall



<http://www.surreyhistory.ca/cresbeach.html>

Introduction to examples of Protect Adaptation

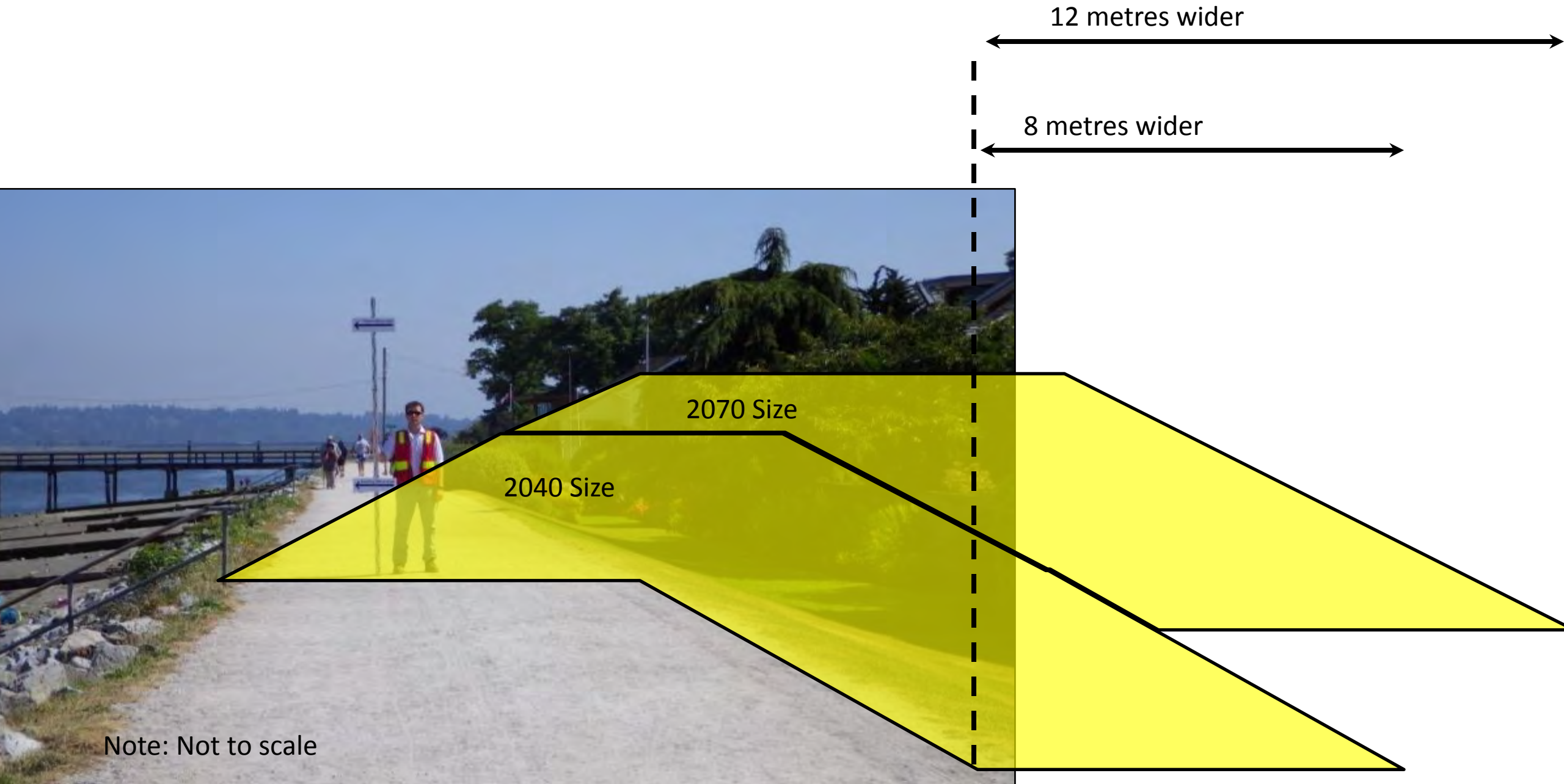
Response 1: Upgrade the existing dyke to meet Provincial Standards

Response 2: Build a wall

Response 3: Build Soft Shore and modified dyke

Response 4: Build Offshore islands/features

Considerations for Response 1



Note: Not to scale

Considerations for Response 2



November - 2014

Light Damage

Source: SNC Lavalin Presentation November 25, 2015

Response 3 Examples

Campbell River (Dick Murphy Park)

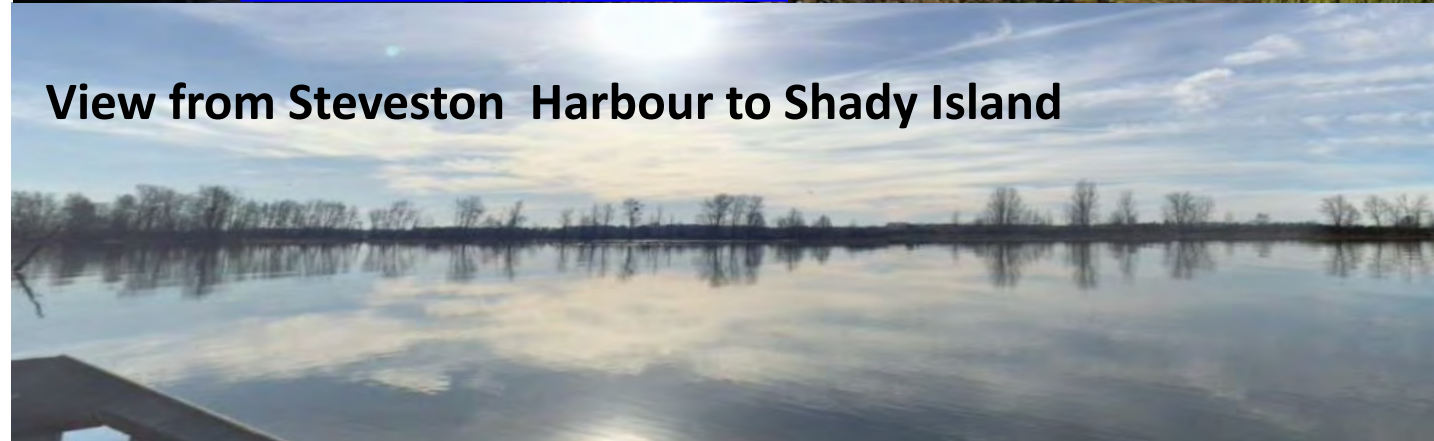


Source: http://stewardshipcentrebc.ca/PDF_docs/greenshores/projects/GS_Case_Study_DickMurphy.pdf

Response 3: Modified Dyke with Soft Shore Stabilization



Response 4 Example: Shady Island, Richmond



Response 4 Example: Ogden Pt, Victoria Harbour



Response 4 Example: Drayton Harbour, Blaine



Community values in Crescent Beach



Connections to the shoreline

- Walking/running along the beach
- Spending time on Blackie Spit
- Bird watching
- Fishing from the pier
- Sunsets
- “Grandchildren love the beach”



Connections to the sea



- Kayaking, sailing, canoeing
- Swimming, paddleboarding
- Salmon/crab fishing
- Rich biodiversity



Neighbours & neighbourhoods

- Knowing your neighbours
- Backyard/street parties, sharing music
- Neighbours helping neighbours: rides for seniors, helping with gardening
- Being part of a caring community



Connections across the community

- Camp Alexander
- Dunsmuir community garden
- The marina
- Restaurants!
- Swim club, sailing club
- Volunteering
- “Amazing community involvement”
- “It’s my whole life”



A unique place

- Distinctive, seaside atmosphere
- Peaceful
- Natural beauty
- Heritage homes
- So many trees!
- Can bike anywhere



Security/stability



- Long term residents
- Many local services
- Privacy of homes and backyards
- Limited size, can't expand

Staying involved!

- “The meeting was informative and motivated us to be involved”
- “Public engagement is a must”
- “Knowledge is essential”
- “Hopefully the Surrey team will be listeners as well as leaders”



Table Exercises from Charrette 2 June 4

Explored for responses to adapt to sea level rise by 2040 and by 2070

Response 1: Upgrade the existing dyke to meet Provincial Standards

Response 2: Build a wall

Response 3: Build Soft Shore and modified dyke

Response 4: Build Offshore islands/features





See What **TABLE 1**
Did at Charrette #2

THE BEST PARTS OF CRESCENT BEACH



Community Gardens



Sailing



Restaurants



Family Time

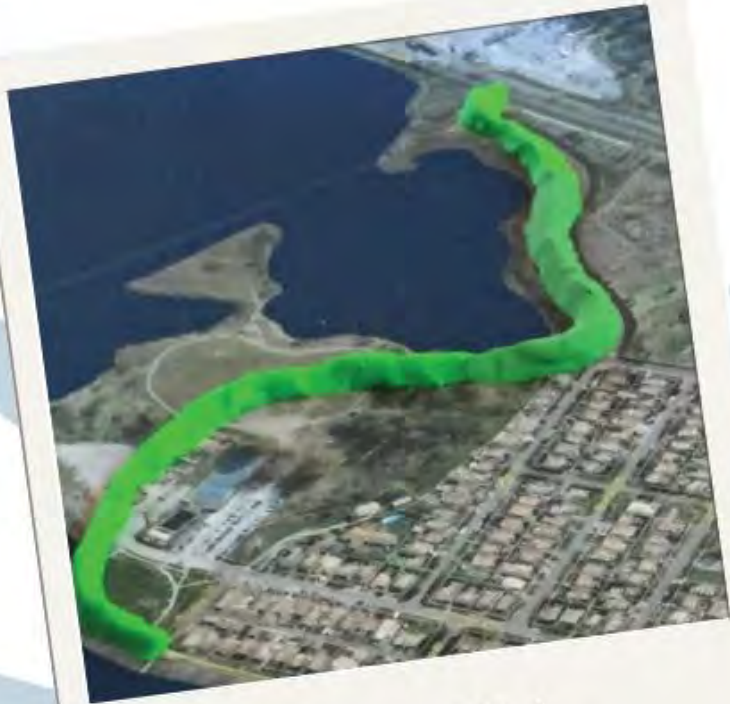


Car Show



Dog Walks

IDEAS FOR THE FUTURE



SEA WALL



ISLANDS WITH
RECREATION

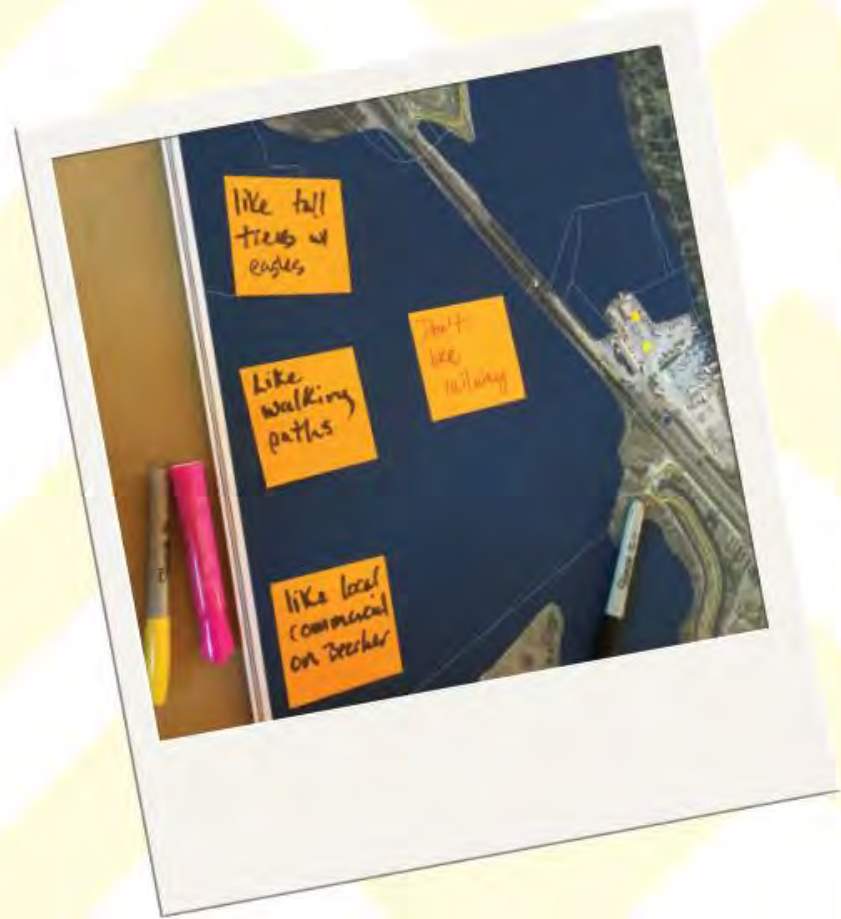


SOFT SHORE

See What **TABLE 2**
Did at Charrette #2



THE BEST PARTS OF CRESCENT BEACH



Blue Herons



Camp Alexandra



Eagles



Tall Trees

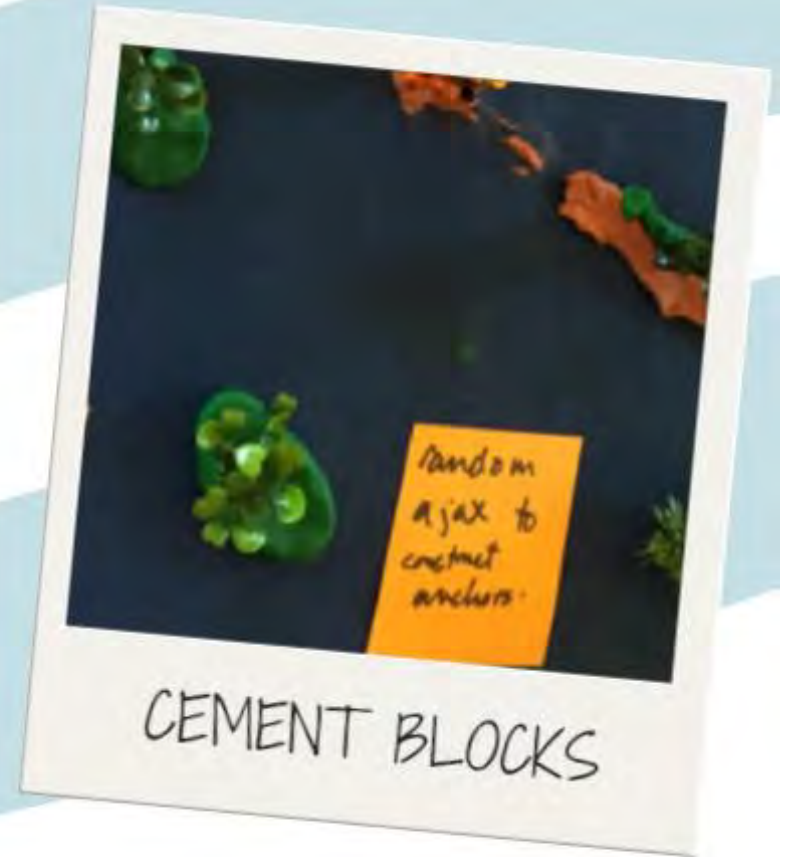


Beecher St.



Walking Paths

IDEAS FOR THE FUTURE





See What **TABLE 3**
Did at Charrette #2

THE BEST PARTS OF CRESCENT BEACH



Birds



Walks



Bike Rides



Pier



Kid Friendly



Blackie's Spit

IDEAS FOR THE FUTURE





See What **TABLE 4**
Did at Charrette #2

THE BEST PARTS OF CRESCENT BEACH



Kayaking



Character Homes



Sea



Pump House



Views



Green Space

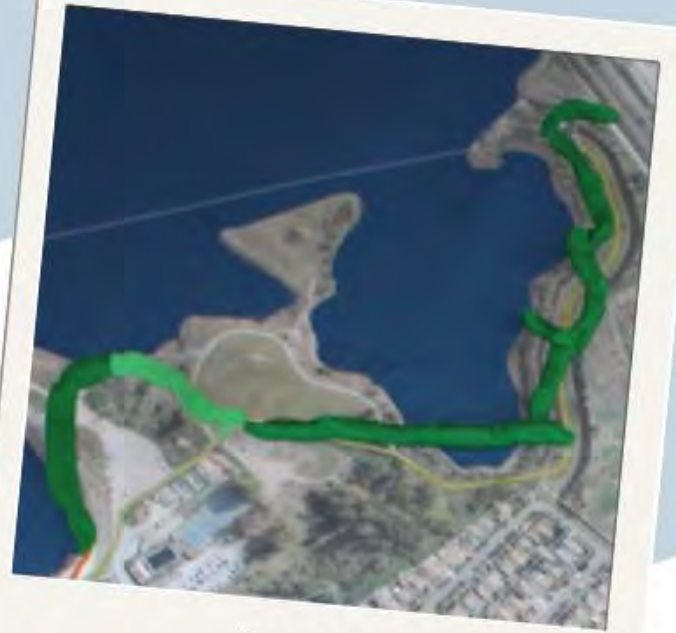
IDEAS FOR THE FUTURE



ISLANDS



SOFT SHORE



DYKE

See What **TABLE 5**
Did at Charrette #2



THE BEST PARTS OF CRESCENT BEACH



Garden Veggies



Coffee Shops



Flowers



Wild Berry Picking



Wildlife



Beach Walks

IDEAS FOR THE FUTURE





SURREY COASTAL FLOOD ADAPTATION STRATEGY (CFAS)

Project overview and introduction

What is it?



- A 3-year extension of the work started here
- Larger study area, more stakeholders and partners
- Led by broadly skilled consultant team

Goal: To help prepare Surrey for a changing climate and help support Surrey's coastal communities in becoming more resilient

Study area @ a glance



COMMUNITIES AND PEOPLE

1,500 residents
Approximately 20% of Surrey's land area
Over 30 km² of agricultural land in production
Alexandra Neighbourhood House
Heritage buildings and places



PARKS AND ENVIRONMENT

Regional and City parks,
beaches and recreation areas
Foreshore, coastal, riparian areas and species



LOCAL AND REGIONAL ECONOMY

700+ jobs
Over \$100M in annual farm gate revenue
Over \$1B in assessed property value
Almost \$25B annual truck and rail freight traffic



INFRASTRUCTURE

Over 10 km of Provincial Highways
Over 200,000 vehicle trips a day
Over 30km of railway (freight and passenger)

What is it?

Communities



**Crescent Beach
Charette Series**

May-Sept 2016

Surrey CFAS Process

Summer 2016 - Spring 2018

CFAS & Crescent Beach Charrette Series

Continuing the learning process
together

CFAS & Crescent Beach Charrette Series

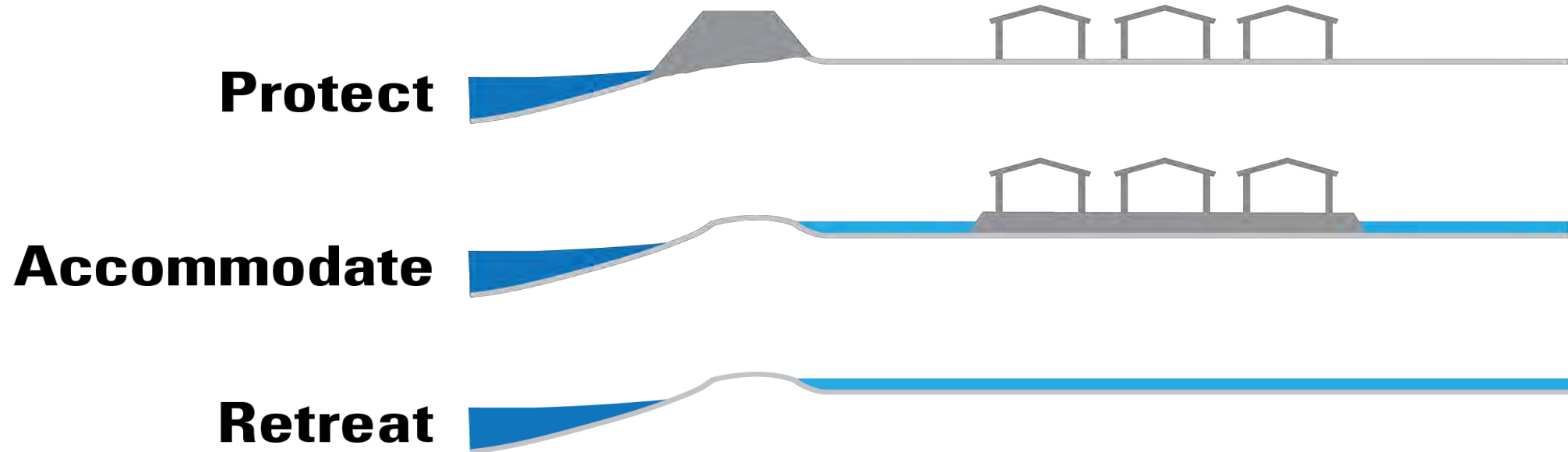


Continuing to explore values -- here and with other communities and groups

CFAS & Crescent Beach Charrette Series

A deeper dive into options, using values to guide the way

What is it?



What is it?

Combination



Surrey CFAS Process



Engagement – WHO?

You identified many other stakeholders to engage. *Are there any groups or people missing?*

- ✓ Other Surrey neighbourhoods & communities
- ✓ Neighbouring municipalities
- ✓ First Nations
- ✓ Provincial ministries & agencies
- ✓ Environmental groups (e.g., Friends of Semiahmoo Bay, Ducks Unlimited, etc.)
- ✓ Businesses & business groups
- ✓ Farmers & agriculture groups
- ✓ Transportation (BNSF Railway, Amtrack, TransLink, etc.)



Engagement – HOW?

Many expressed an interest in staying involved as the project goes forward. *What methods work best?*

- ✓ Project website
(www.surrey.ca/coastal)
- ✓ In-person meetings, workshops, focus groups, etc.
- ✓ Project newsletter (mail, drop-off, emailed)
- ✓ Community information posters at venues and businesses
- ✓ Email and text
- ✓ At community events and 'on-the-street'



What's next?

PHASE 1

*What matters most
and who is affected?*



FOCUS: *Education, awareness
building and community values*

SUMMER 2016 - SPRING 2017

More information





SURREY COASTAL FLOOD ADAPTATION STRATEGY (CFAS)

Thank you!





Crescent Beach: Dynamic, Beautiful, Ever Changing.

As the climate changes, coastal areas can expect more frequent and severe flooding from storm surges to sea level rise. To help protect our coastal communities, the City of Surrey is developing a Coastal Flood Adaptation Strategy.

Thank you for joining us

Before you go, please:

- Fill out a feedback form