Public Presentation on the Findings of the Environmental Impact Assessment for the Proposed Residential Development at Coral Springs, Trelawny

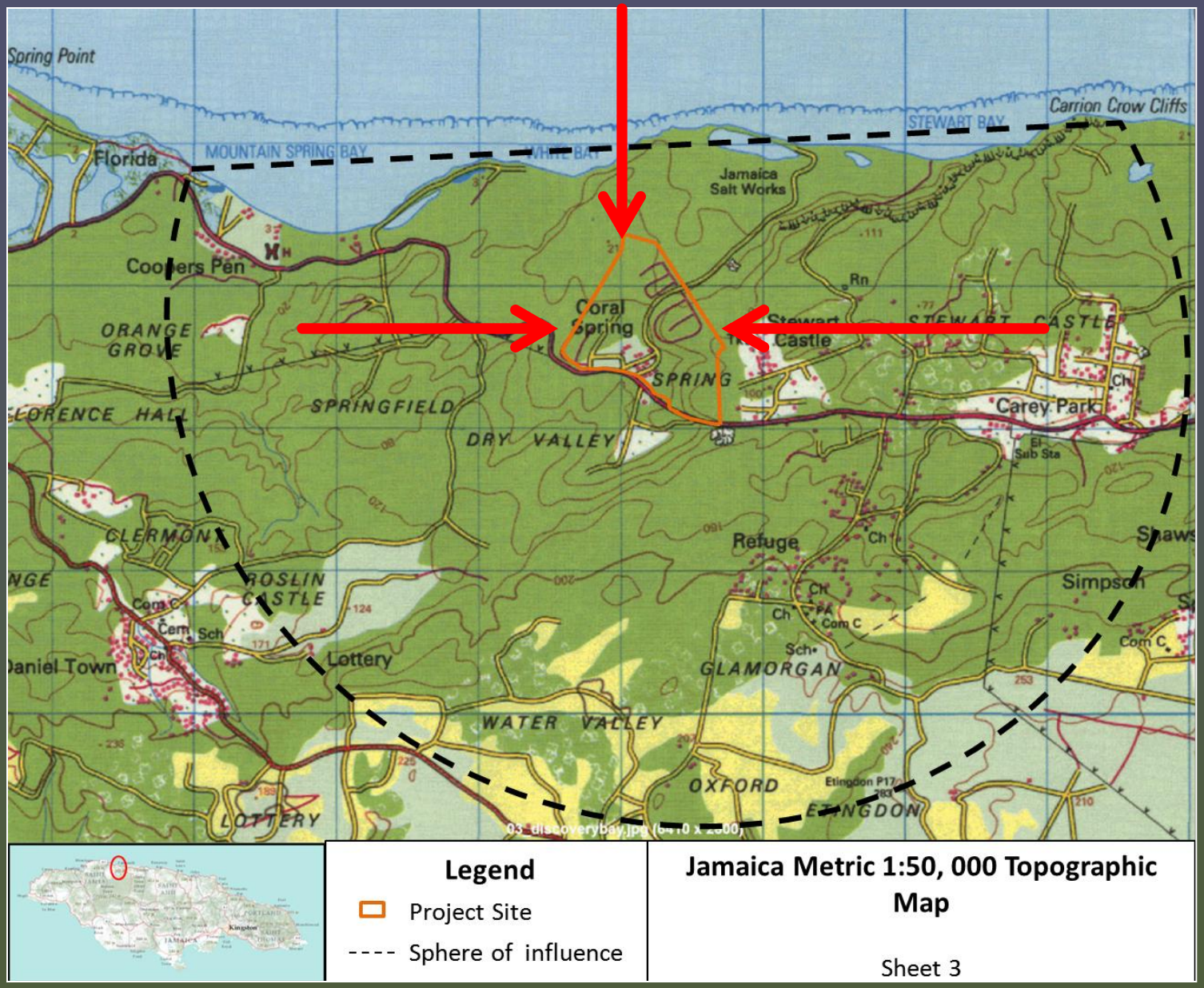
Presented by
Environmental Solutions Limited
On behalf of
Gore Developments Limited

September 18, 2012 at the Kettering Baptist Church, Duncans - Trelawny

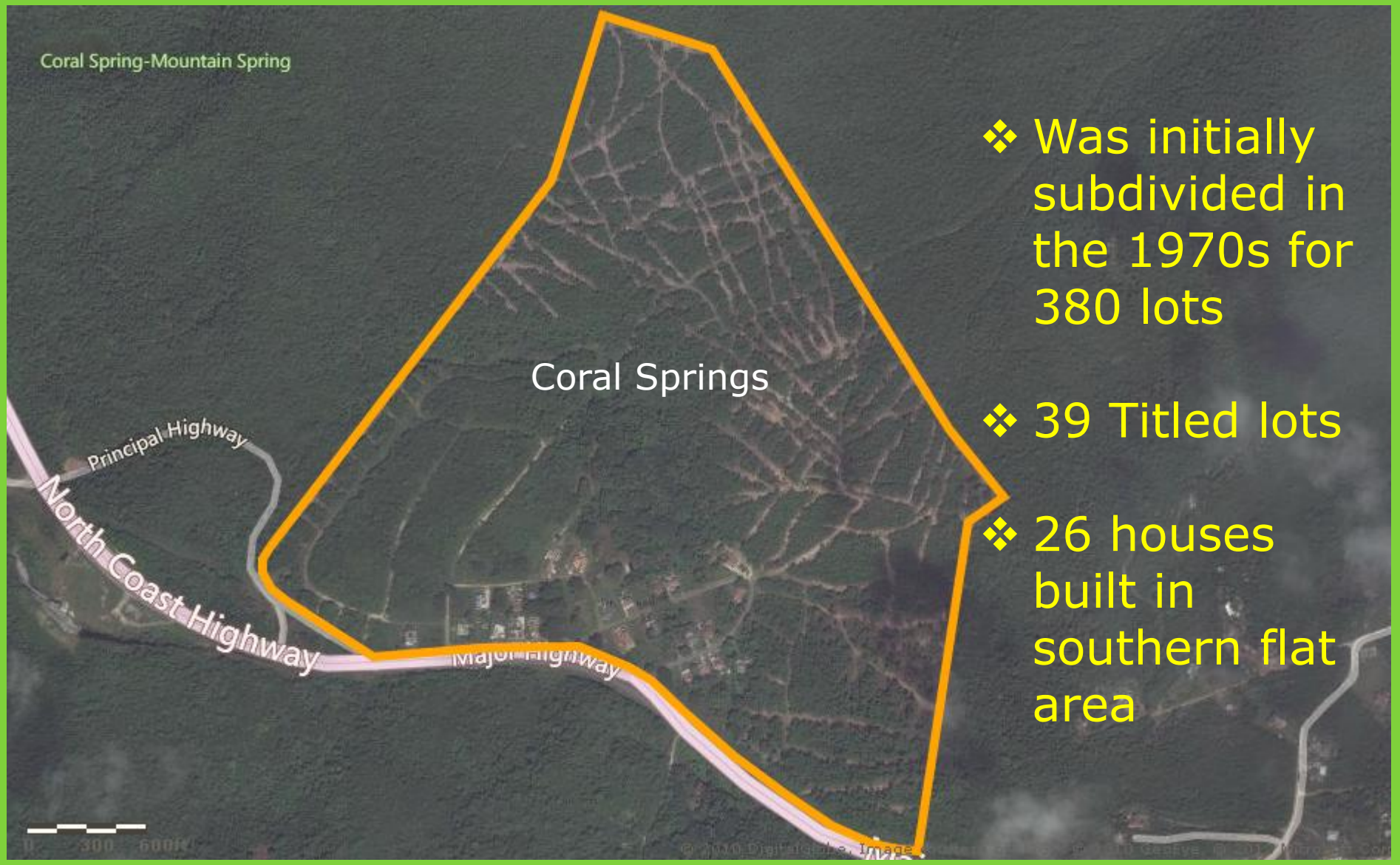
Presentation Outline

- **Description of the Project**
  - Location
  - Design of the Development
  - Amenities
- **The EIA Process**
  - Purpose of the EIA
  - Methodology
  - TORs
  - Role of the Consultants
  - The EIA Team
  - Work Plan
- **The Existing Environment**
  - Physical
  - Biological
  - Socio-economic
- **Potential Environmental Impacts**
  - Air quality
  - Noise
  - Slopes
  - Water resources
    - Hydrology, drainage and run-off
    - Sewage
  - Geology
  - Ecology
  - Socio-economic
  - Hazardous materials
  - Solid waste
- **Mitigation Measures**
  - Construction phase
  - Operation phase
- **Cumulative Impacts**
- **Consideration of Alternatives**

Project Site Location



Satellite Imagery of Site



- Was initially subdivided in the 1970s for 380 lots
- 39 Titled lots
- 26 houses built in southern flat area

Proposed Development Layout

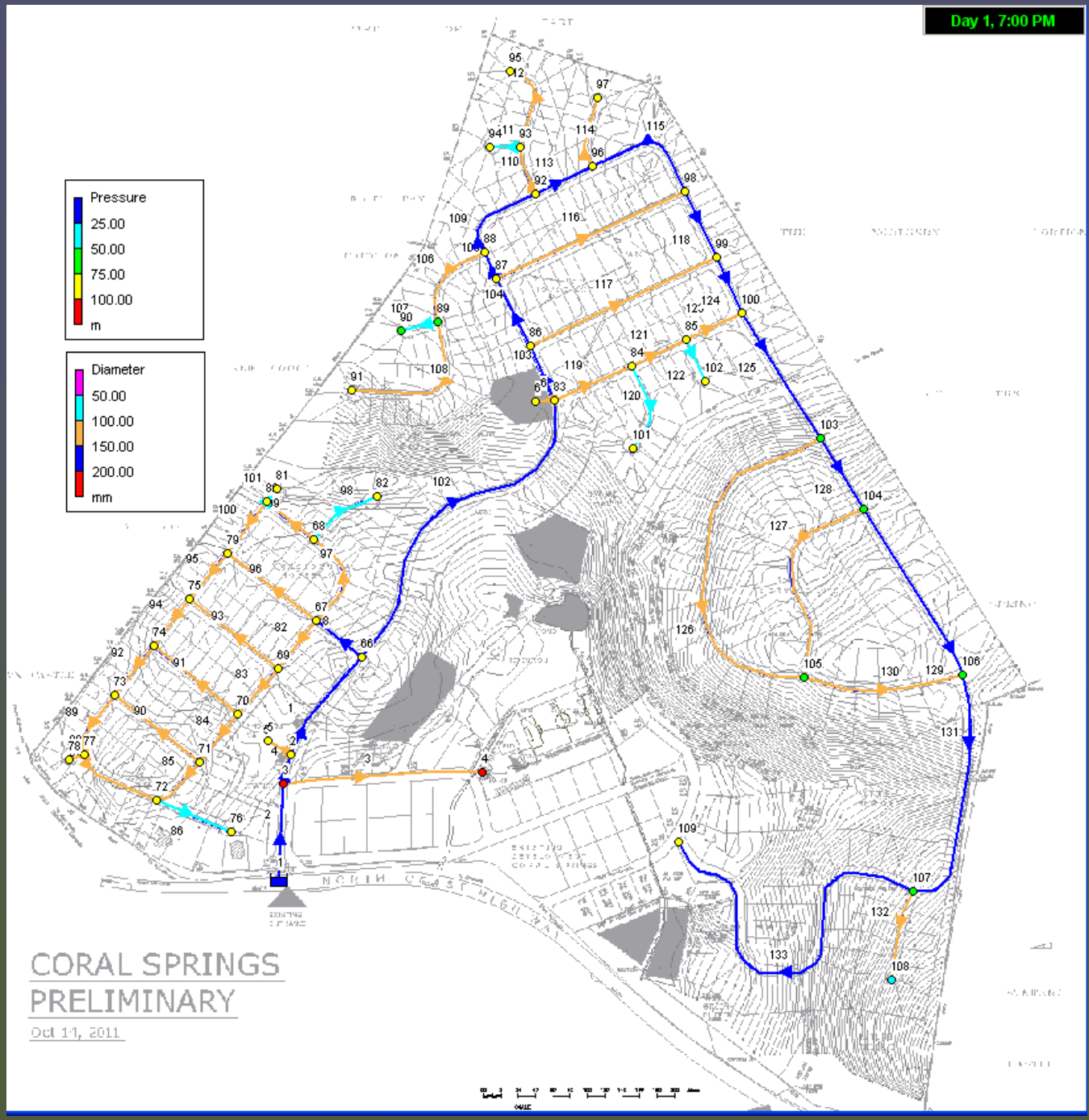
- **169 acres (68 Ha) of land**
- **401 two-bedroom houses with lot size of 420.5 m²**
- **Total of 503 lots**
- **102 larger service lots**

Typical GDL House

Amenities

- Green spaces (17.6 Ha)
- Electricity
- Water supply
- Sewage treatment
- Drainage
- Commercial area including Gas Station
- Basic School allocation

Water Supply



The EIA Process

Purpose

- Describe project area and environmental conditions, identify potential impacts & determine mitigation measures

Data

- Make use of available data where appropriate and collate new data as necessary

Reporting

- Conduct assessment and prepare report
- Conduct public hearing for citizens' response

Methodology

Multi-disciplinary team used charette style method for data gathering, analysis and presentation

Data gathering:

- Review of reports and background documents
- Field studies
- Intrusive tests
- Analysis of maps, plans, aerial photos
- Structured interviews
- Laboratory analyses

Team meetings:

Iterative interaction with developer, architects and engineers

Terms of Reference

Approved by NEPA (June 19, 2012)

- Internationally accepted TOR components for Human Habitation Projects
- Developed between NEPA, ESL and GDL
- Included in EIA final report for reference

Role of the Consultants

- **Collect and analyze all relevant data, information and viewpoints**
- **Systematically identify and examine possible consequences of proposed development, and potential impacts on the environment**
- **Determine appropriate means to avoid or reduce (mitigate) impacts to acceptable levels**
- **Utilize objectivity and professional integrity in analyzing and reporting all findings**
- **Serve as a liaison between developer and regulatory agency**
- **The consultants do not serve as proponents of the project**

The EIA Professional Team

- **Barry Wade, PhD - Team Leader; Environmental Scientist**
- **George Campbell, MSc – Economist**
- **Kimberly Bryan, MSc – Environmental Scientist**
- **Marlon Beale, PhD Candidate – Avifaunal Specialist**
- **Simone Lee, MSc – Terrestrial Ecologist**
- **Roderick Ebanks, MPhil - Archaeologist**

GDL Specialist Consultants

Architects	Civil and Structural Engineers	Hydrologist	Geotechnical Engineers	Surveyors
Portico Ltd	FCS Consultants Ltd	Brian Richardson	NHL Engineers Ltd	Masters and Johnson

Work Plan November 2011 to September 2012

- Client meetings
- Review of documents
- Review of legislation
- Site investigations
- Community surveys
- Water and Air analyses
- Vegetation surveys
- Faunal surveys
- Hydrological/flood evaluation study

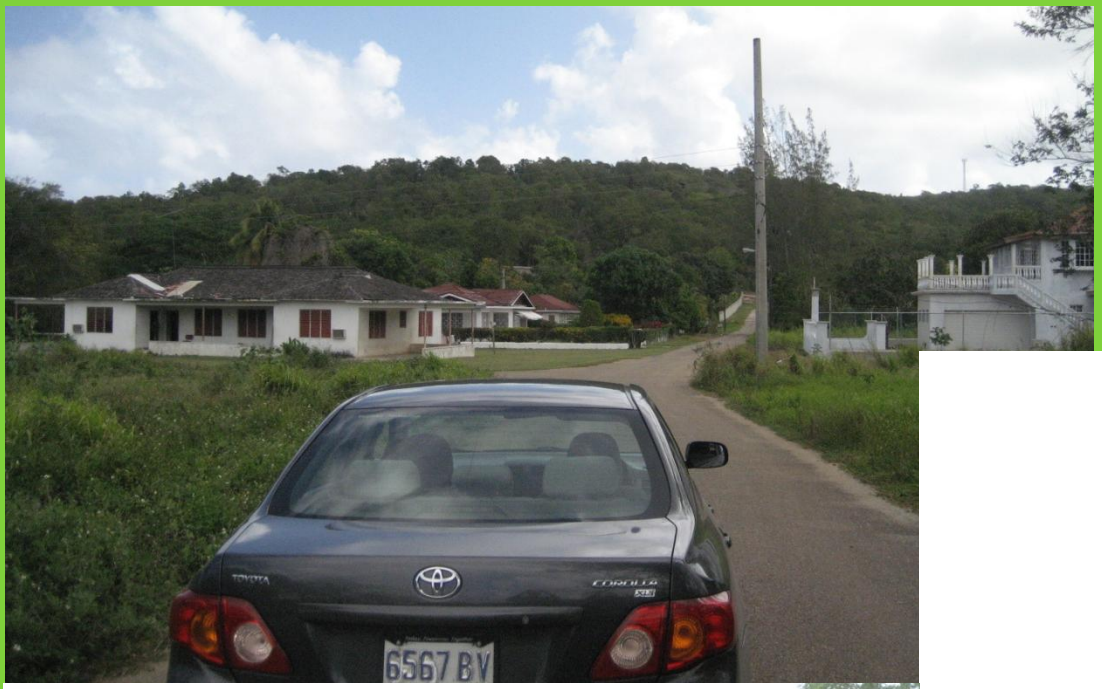
- Data review and analysis
- Analysis of impacts
- Draft report
- Client review
- Final report to NEPA
- Public notices
- Public presentation of findings

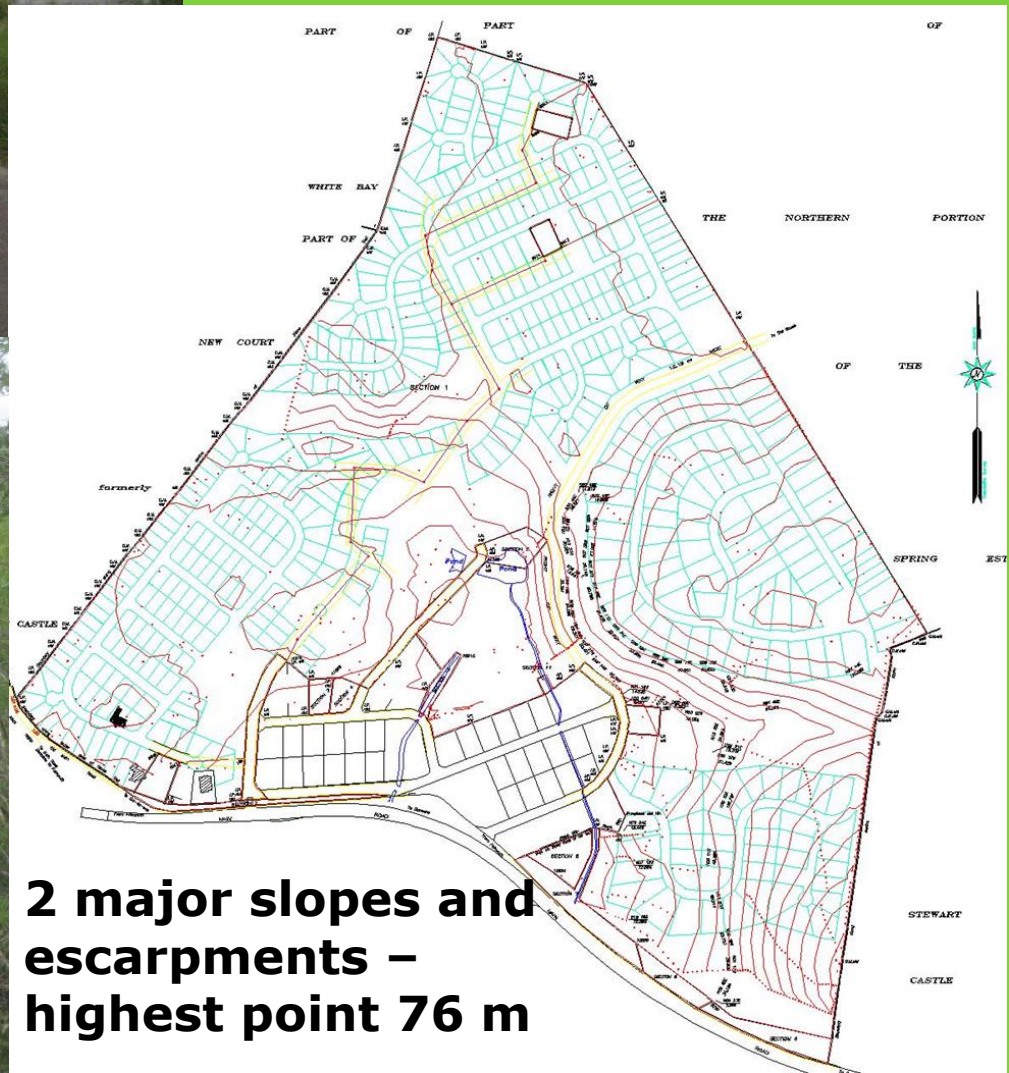

The Existing Environment


Physical Environment

Topography

More than 50% of site is low lying – lowest point 7 m

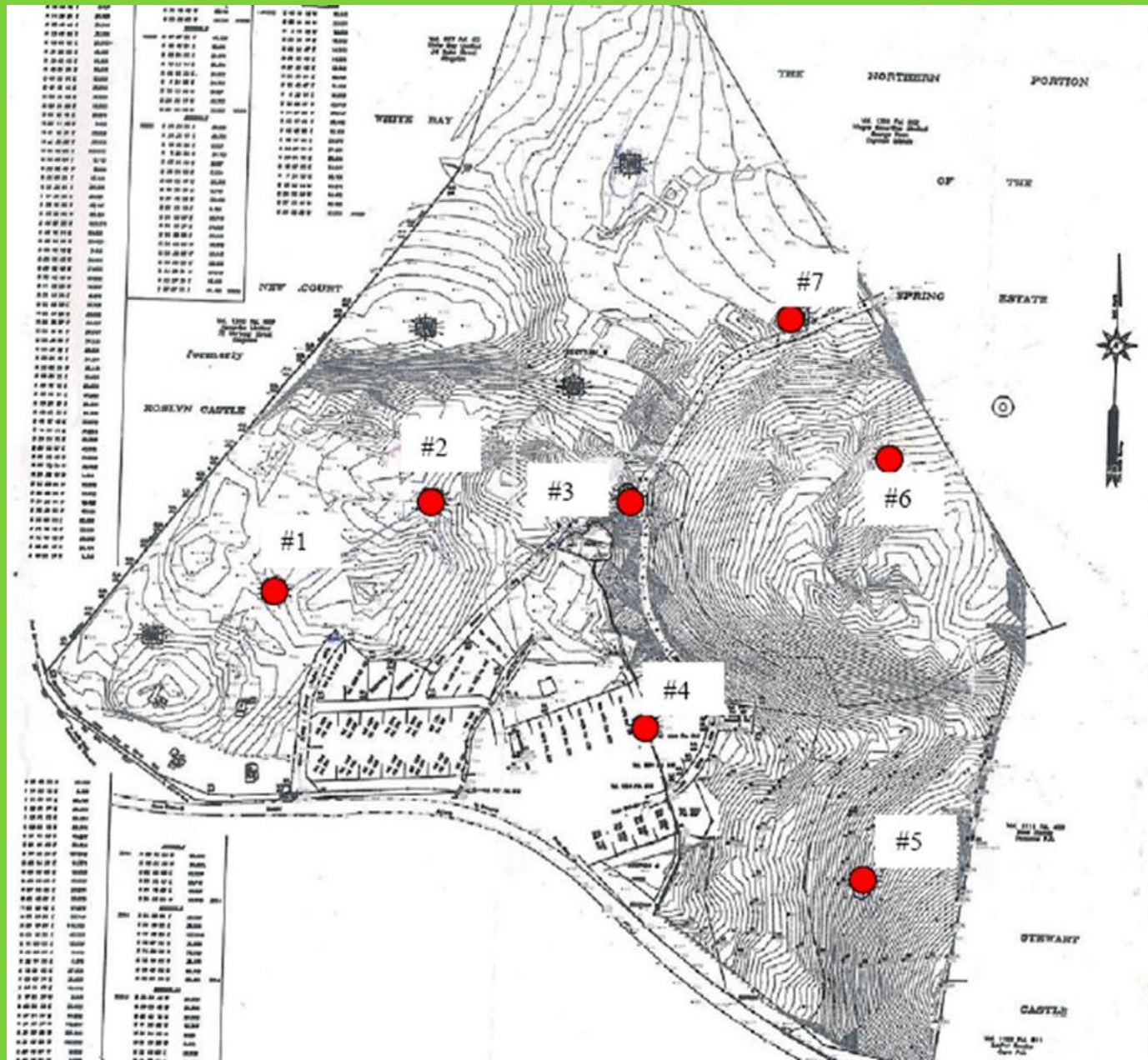




2 major slopes and escarpments – highest point 76 m

Soils

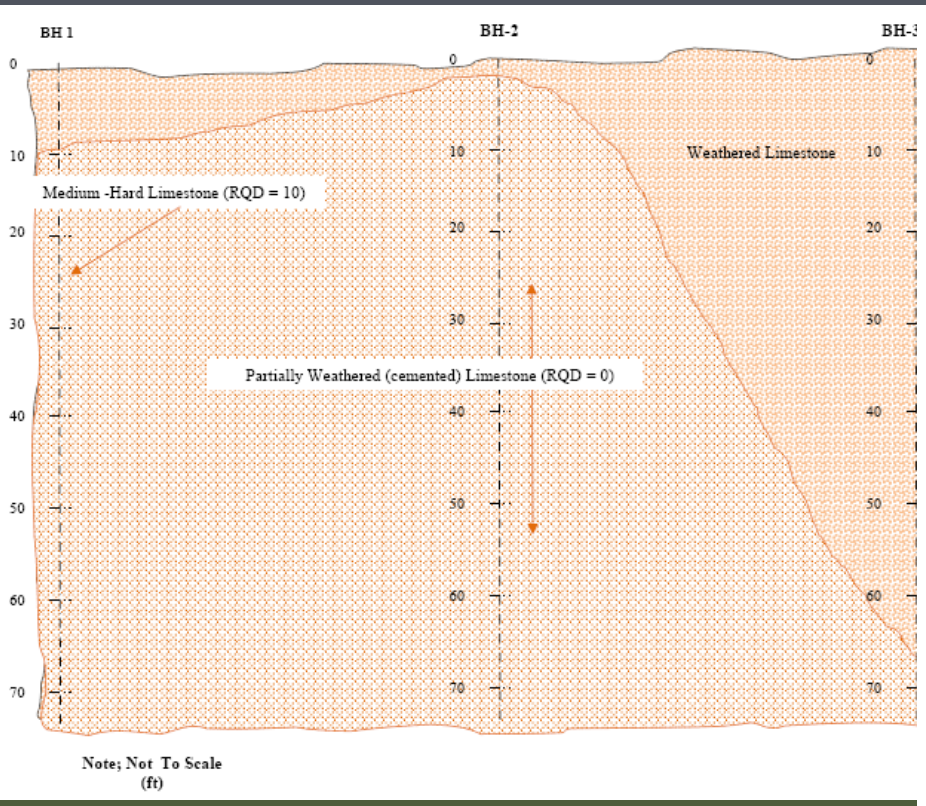
- 6 of 7 boreholes dug
- BH #6 was abandoned
- Soil profiles were created

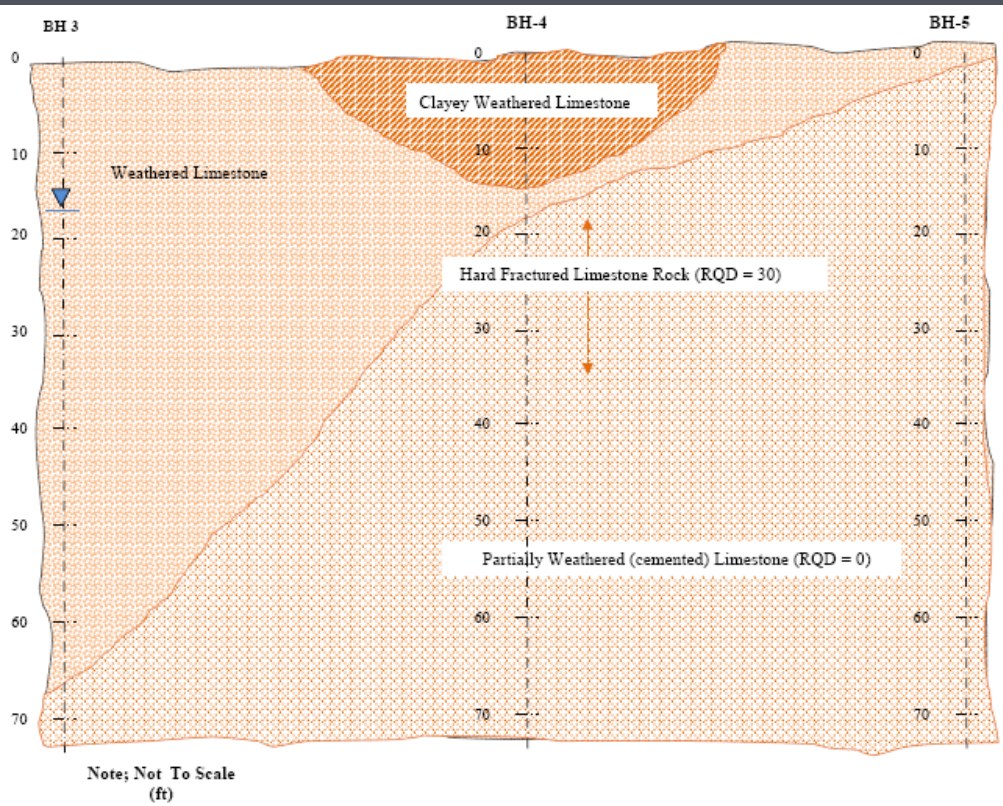


Soil Profiles

18 samples were tested - average Compressive Strength of 1640 psi

Compact to v. dense Gravelly Sands (weathered limestone) + Clays





Geology

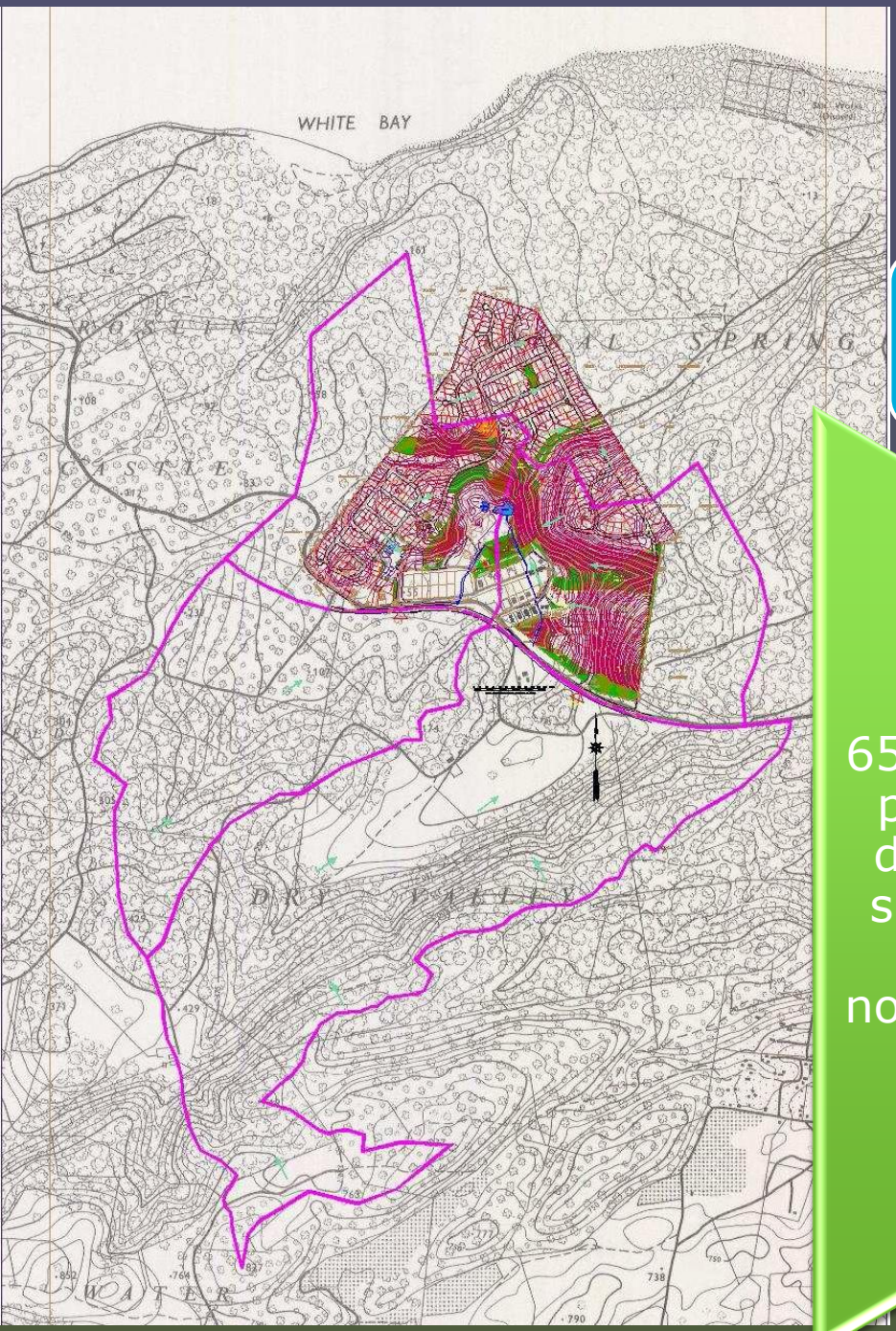
- **Mm – Montpelier Limestone Formation**
- **Solid red lines show geological faults**
- **Rocks classified as Medium hard limestone**

Hydrology and Drainage

- Site drainage controlled by central sinkhole/pond
- Sinkhole lip is clearly demarked at the 15 m (50 ft.) contour
- All drainage lines discharge into the sinkhole

Drainage Basin and Sinkhole

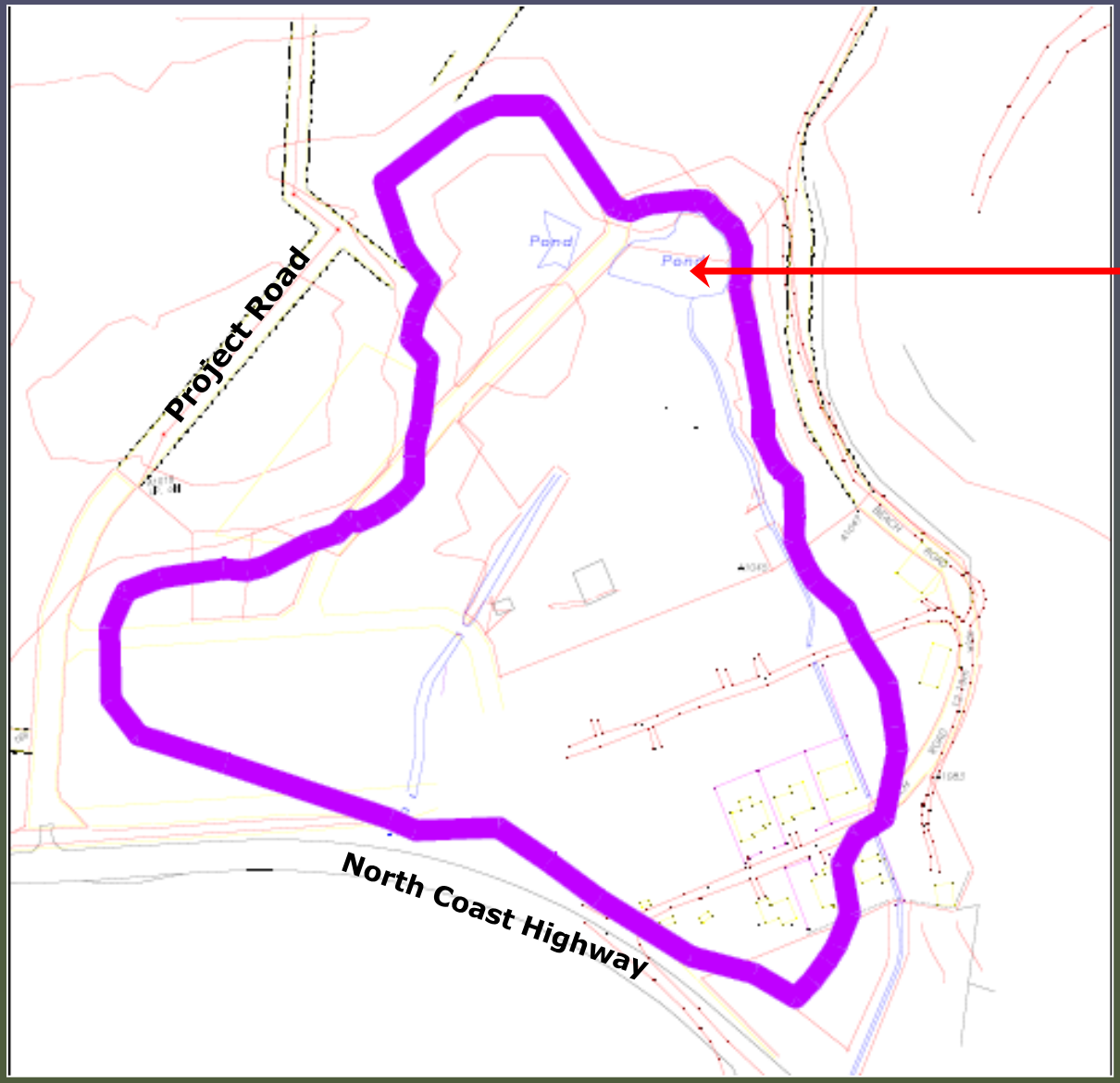
Natural Drainage Features



Sinkhole drains an area of approximately 315 hectares

- 65% of the property drains to sinkhole; 35% northwards
- North Coast Highway separates the southern catchment (the Dry Valley side) from the Coral Springs sinkhole
- Flows from south are channeled via a culvert beneath the highway to the sinkhole

100 Year Flood Plain (17.48 m)



Water Quality

Drain leading to sinkhole monitored from southern Dry Valley property

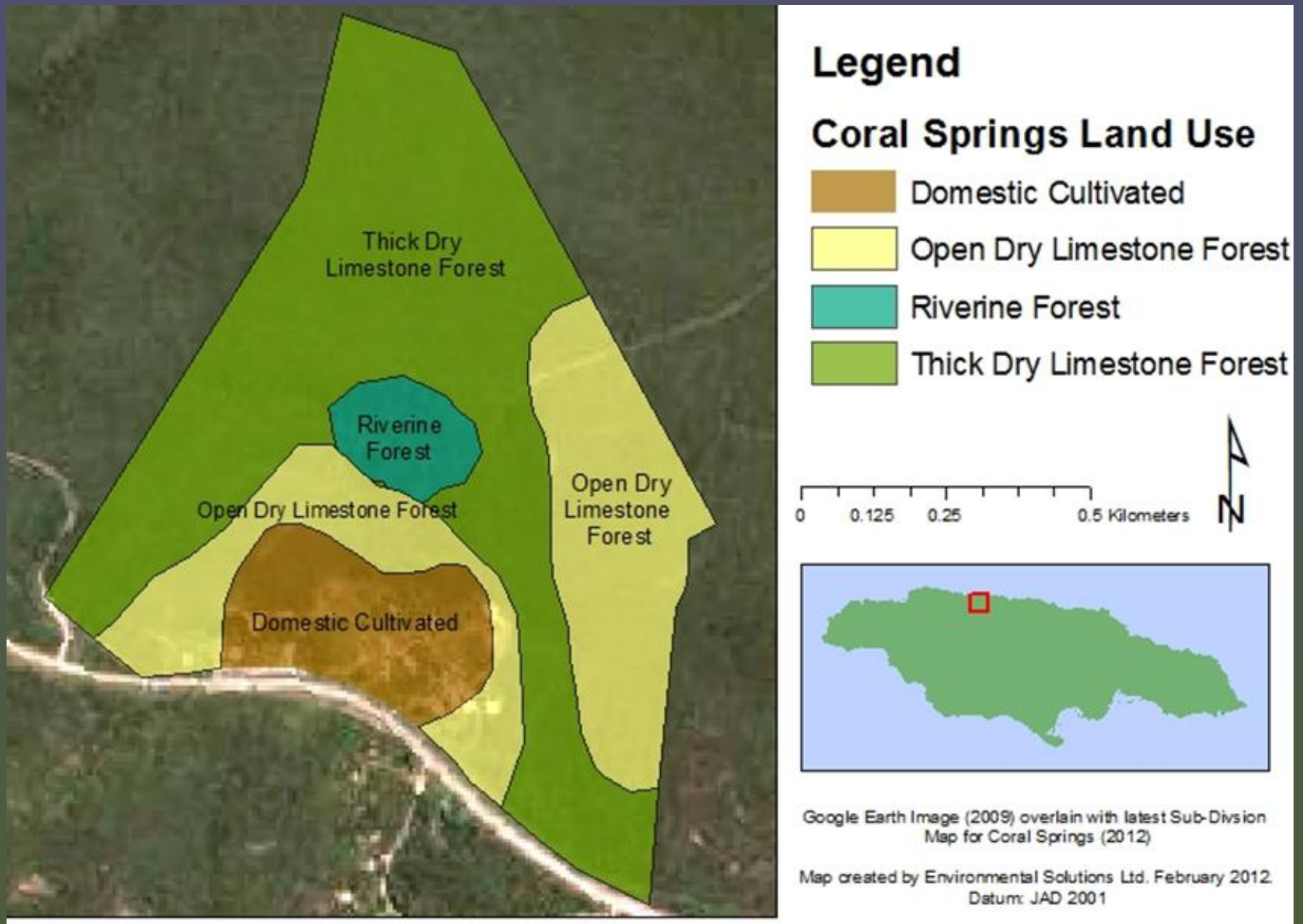
High BOD and iron values in the drain after passing existing houses

Sinkhole/pond acts as a sink for contaminants

Natural Hazards

Flooding	Hurricanes	Landslides	Earthquakes	Pollution
• Known to occur at the lowest elevations on site	• Like rest of Jamaica the site is prone to hurricane impacts and climate variability	• No historical evidence of landslides	• Fault line traverses site • Jamaica located in active zone	• No known incidences of pollution in a 5 Km zone

Biological Environment



Domestic Cultivated Zone

- Bougainvillea
- Mango
- Papaya
- Ackee
- Orange

Closed/Thick Dry Limestone Forests

Dense shrub and herb species in lower half of the forest:

- **Red Birch**
- **Burnwood**
- **Bullhoof**
- **Guango**
- **Logwood**

Open Dry Limestone Forests

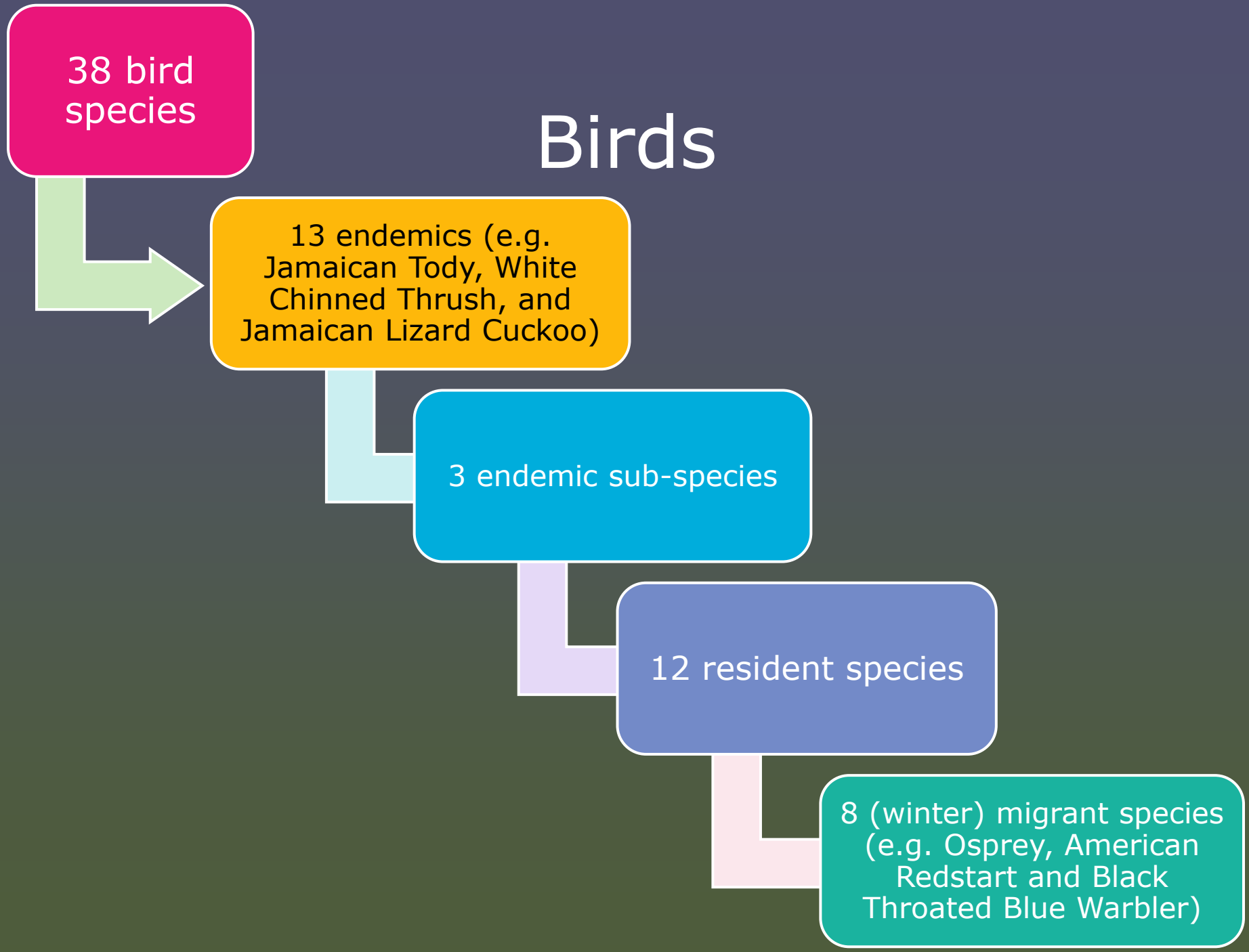
Less dense upper canopy and more lower scattered shrub presence:

- Red Birch
- Burnwood
- Bullhoof
- Guango
- Logwood

Riverine Vegetation

- **Bamboo**
- **Sweetsop**
- **Breadfruit**

Birds


38 bird species
13 endemics (e.g. Jamaican Tody, White Chinned Thrush, and Jamaican Lizard Cuckoo)
3 endemic sub-species
12 resident species
8 (winter) migrant species (e.g. Osprey, American Redstart and Black Throated Blue Warbler)

Other Fauna

- 14 butterfly species (two endemics)
- “Croaking lizard”
- Bats
- Termites
- Lampyrid Fireflies
- Jamaican Slider Turtle (observed in pond)

Socio-Economic Environment

- Tourism Developments
- Heritage Attractions
- Falmouth Deep Water Terminal
- Housing Developments
  - Florence Hall and Stone brook

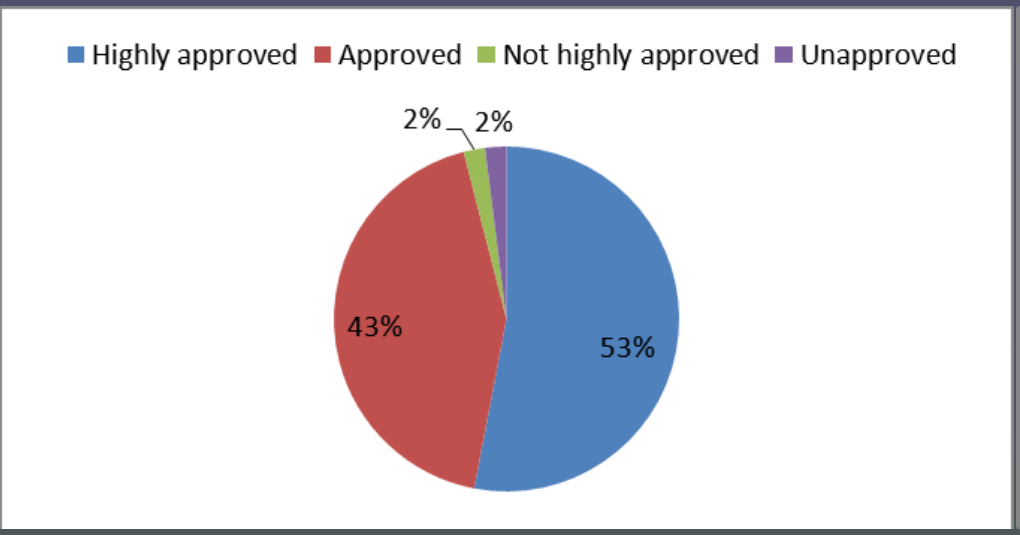
The Communities of Interest are:

Falmouth: Parish capital and main commercial centre; population 8,188

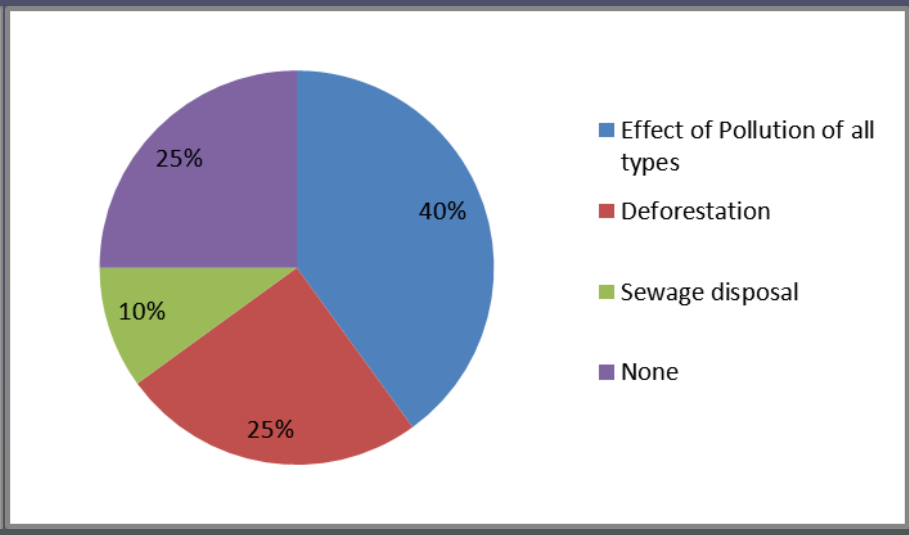
- Coral Springs – existing residential estate
- Duncans
- Stewart Castle
- Carey Park and Refuge
- Retreat Heights

Community Opinion on Project

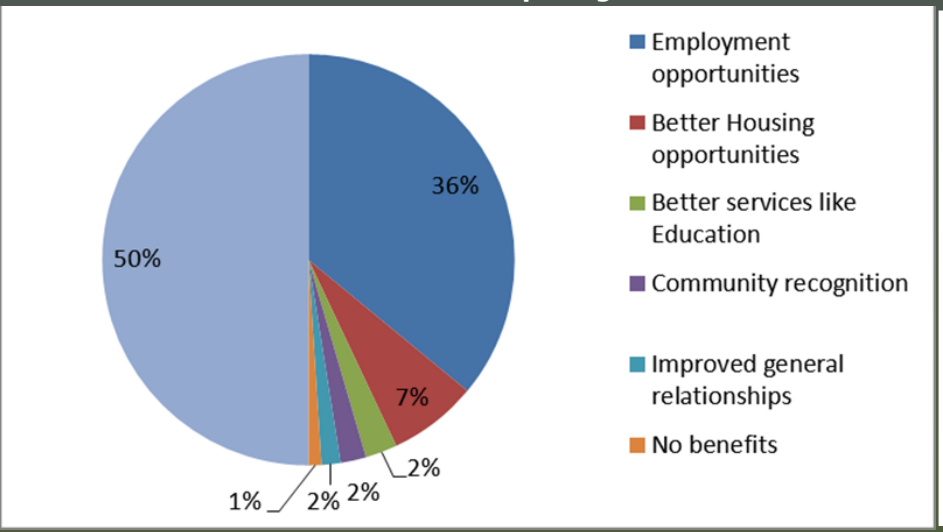
Approval rating for the project



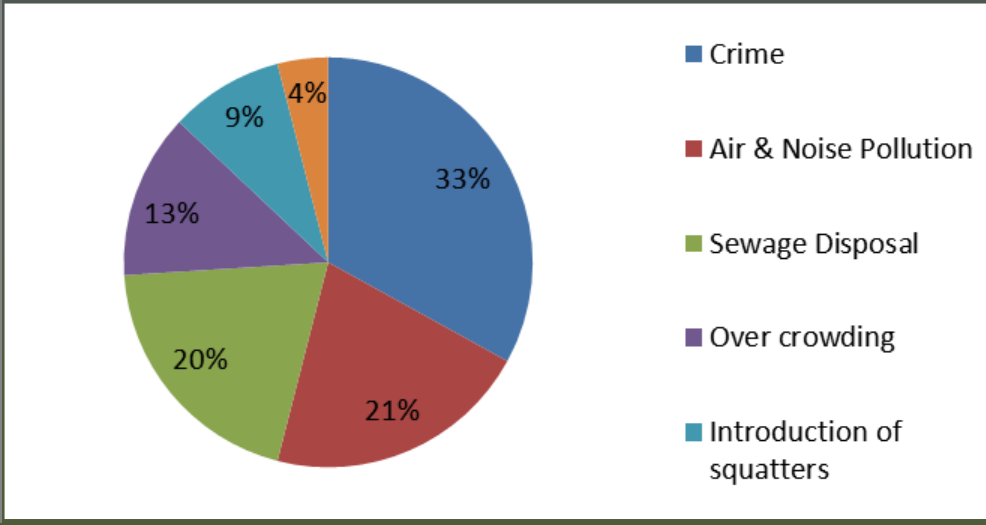
Environmental fears of the project?



Benefits of the project?



General concerns about the project?



Social Infrastructure

Mainly centred in Falmouth

Utilities: Water Electricity Telecommunications	**Public Health Facilities**	**Education:** William Knibb and Holland High	**Waste Management**	**Fire Brigade**	**Transportation**

Heritage

Possible storm water structure leading into the sinkhole/pond

Pack stone wall around the north western section of pond

Very few visible remnants above ground

Heritage

Concrete square wall structure: cattle watering facility?

Eastern (left) and western (right) pack stone boundary walls

Potential Environmental Impacts

Occurrence of impacts:

- **Construction Phase (Site Preparation and Construction)**
- **Operations**

Classification of Impacts:

- **Positive or negative**
- **Direct or indirect**
- **Short or long term**
- **Reversible or irreversible**
- **Cumulative**

Potential Impacts

Air quality:

- Increased dust during construction activities

Noise:

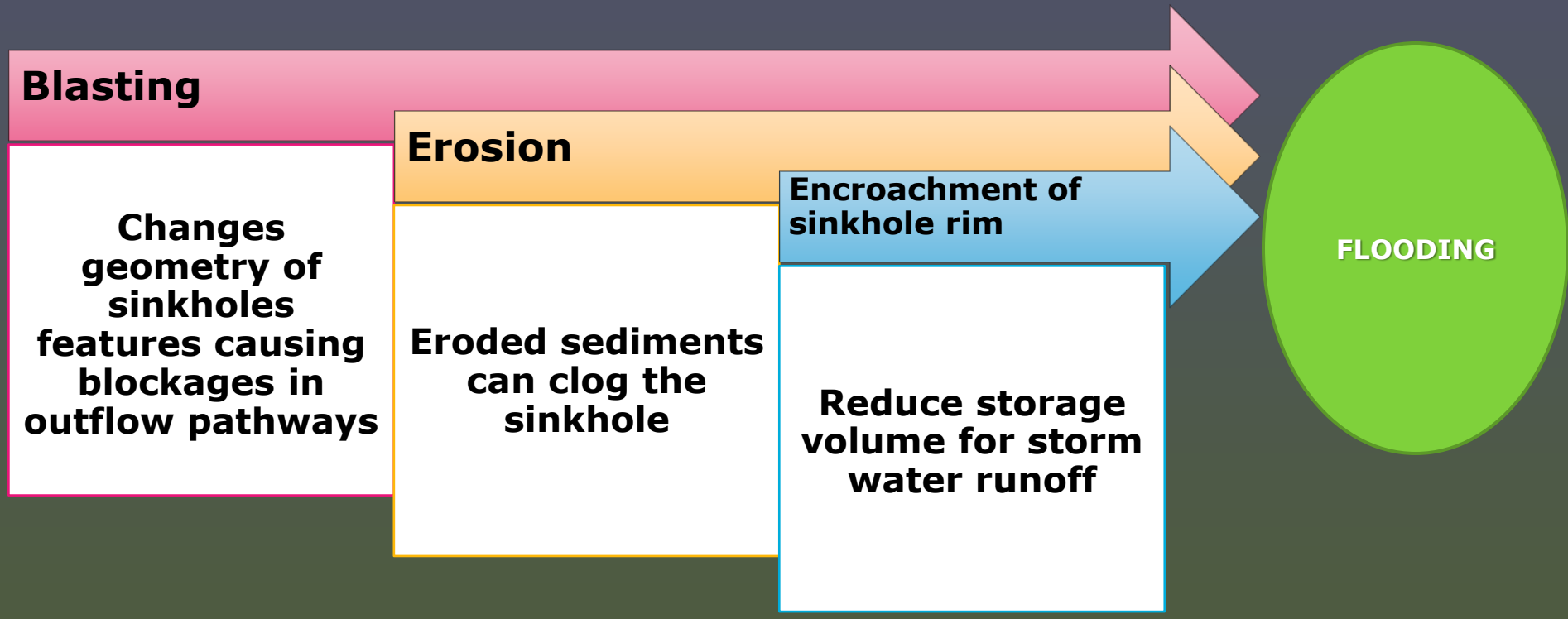
- Will be elevated during construction hours

Potential Impacts:

Slopes

- Clearance of vegetation on steep slopes
- Grading/cutting and filling of slopes

Potential Impacts: Drainage and Hydrology



Water Quality

Run off from site activities and stockpiles

Waste waters from washing of vehicles

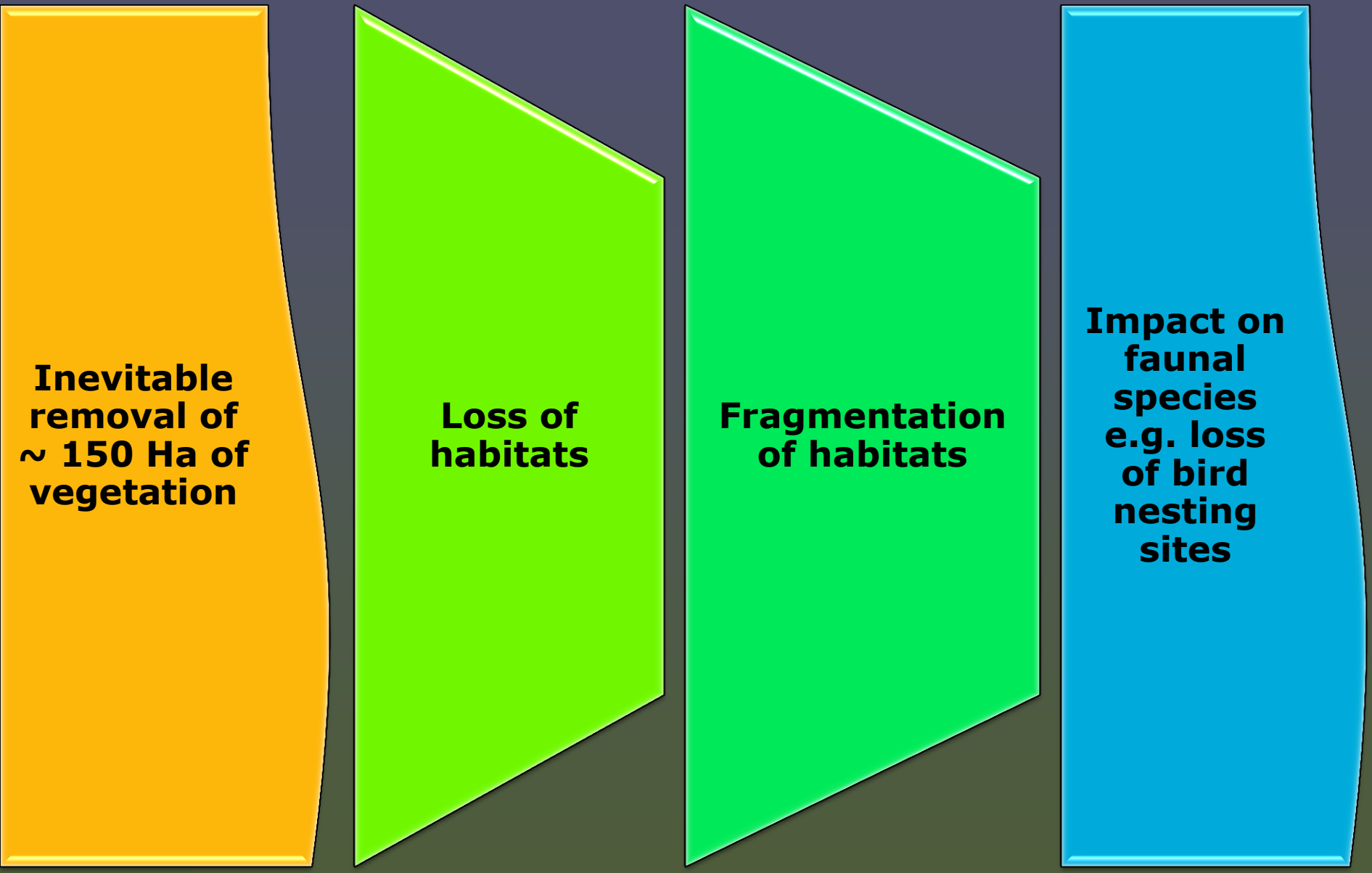
Wastewater from construction site sanitary facilities

Improper and inadequate sewage disposal facilities

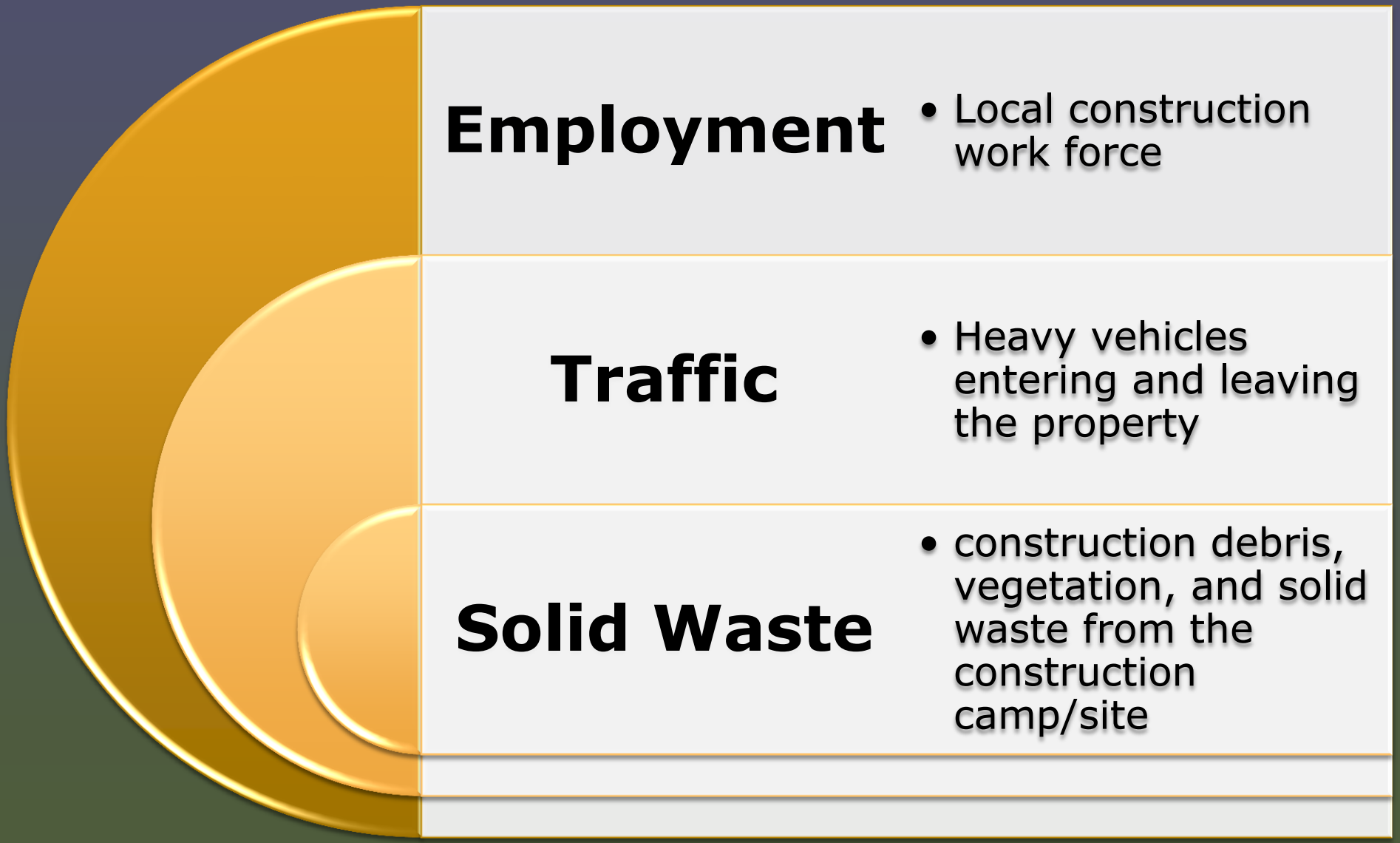
Fuel and chemical storage

Potential Impacts:

Potential Impacts: Ecology



Socio-economic Impacts:



Carrying Capacity

Water supply

- NWC able to supply projected 595 m^3/day of water without affecting the overall water supply

Solid waste

- Facilities already overwhelmed

Health care

- Facilities already severely overwhelmed

Mitigation Measures: Air Quality

Phased vegetation clearance

- To create buffers to filter out dust
- Minimize chances of erosion

Wetting exposed surfaces

- Especially during dry periods during construction

Safety gears

- Construction crews should be provided with appropriate gears for protection

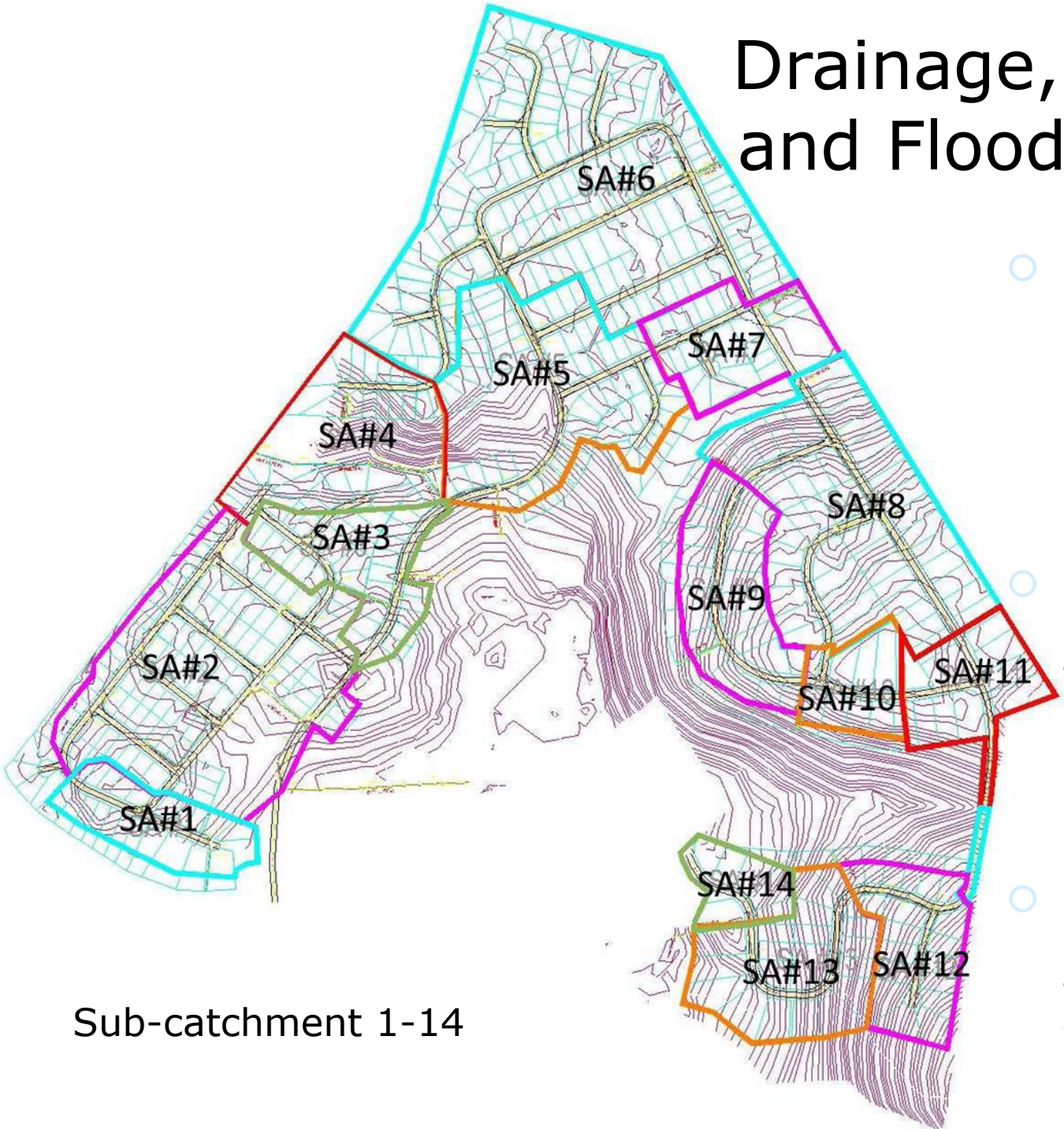
Mitigation Measures: Slopes

No removal of vegetation on escarpments

Roads and parking areas designed to minimize excessive erosion

Fills to be properly stabilized and cuts supported by retaining walls or other appropriate structures

Drainage, Hydrology and Flood Mitigation



Sub-catchment 1-14

- SA#1 to SA# 5 (54.3 ha) flows to the pond in a series of storm sewer and covered U drains
- SA#6 to SA# 8 (flow north from site) have three exit points to meet natural channels in wide open U drains
- SA#9 to SA# 14 (50.5 ha) flow into the existing channels via several drains

Drainage, Hydrology and Flood Mitigation

Storage capacity and infiltration potential of sinkhole to be increased

Hard brown clay to be removed and filled with compacted gravel and crushed limestone (13.5 m - 14.2 m contour)

Post development flood elevation will not exceed pre development flood elevation

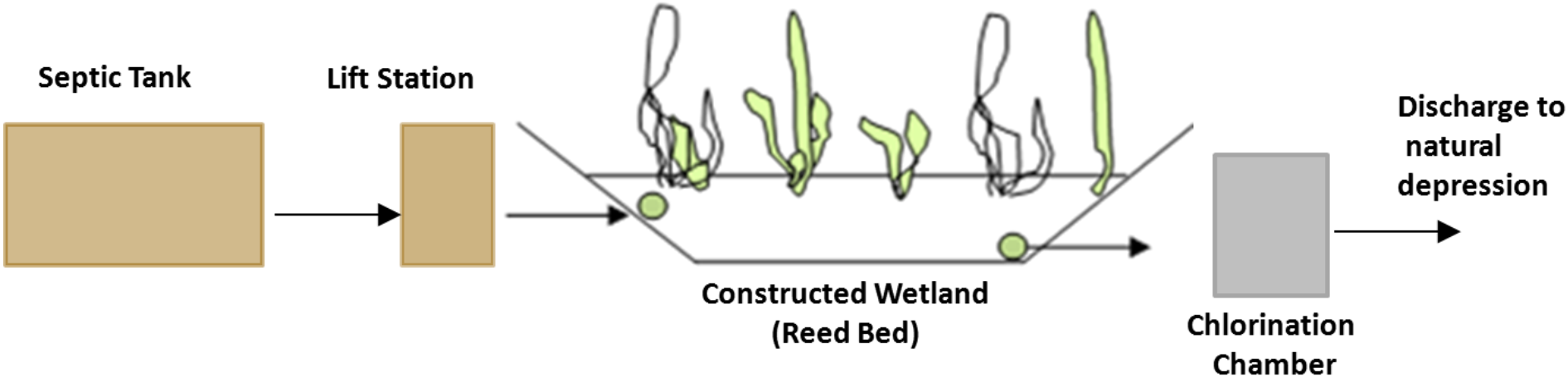
Designed to reduce flooding by 0.78 m for 100 year storm

Sinkhole Protection: No-Fill Zone

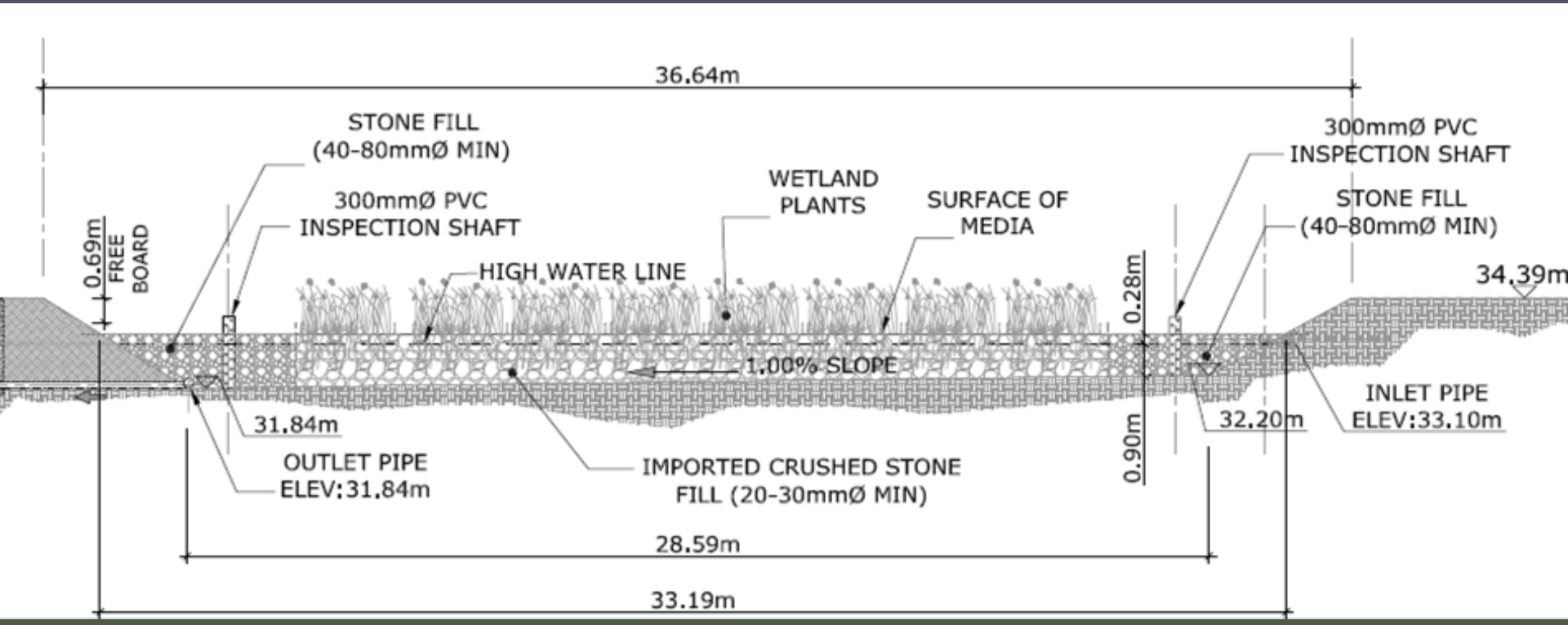
No construction, vegetation removal/modification, stockpiling or storage of any kind should be allowed in this (14 m contour line)

Water Quality: Sewage Treatment

- Septic tank on each lot
- Lift Stations
- Four "Reed Beds" (Constructed Wetland)
- Three Chlorination Chambers

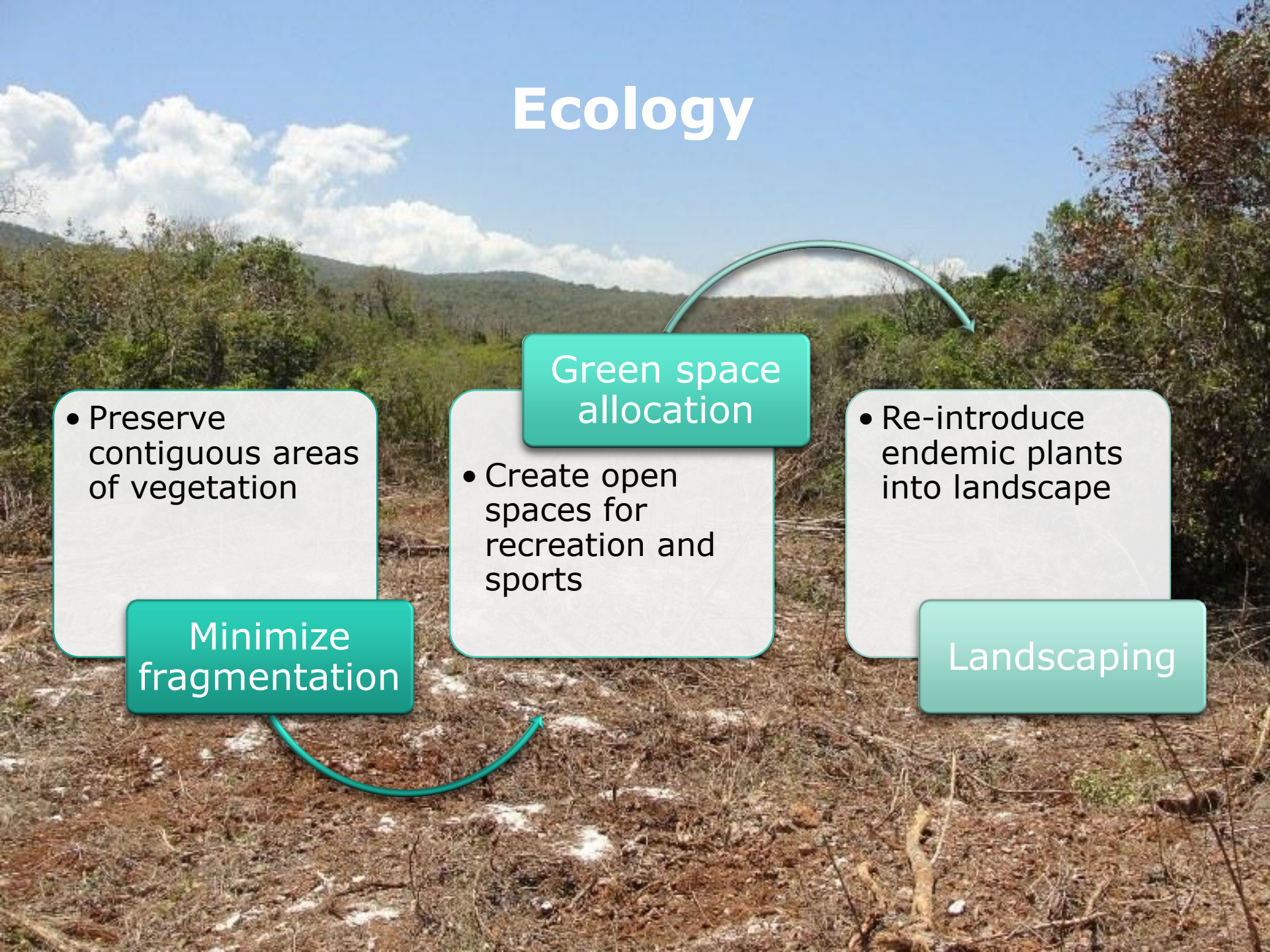


Reed Bed Cross Section



Example of Reed Beds – GDL Florence Hall Development

Ecology


Green space allocation
• Create open spaces for recreation and sports
• Re-introduce endemic plants into landscape
Landscaping
Minimize fragmentation
• Preserve contiguous areas of vegetation

Waste Management

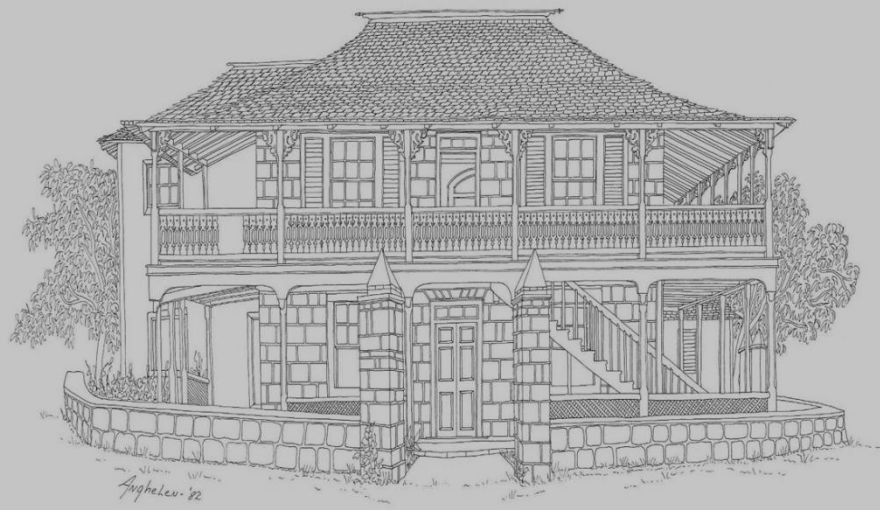
Heritage

Features such as the packed stone walls should be preserved and integrated into the development

During site clearance JNHT should be present to ensure that any sub-surface structures encountered are preserved

Restoration of the Florence Hall Great House

October 2007



Colonial era

August 2012

Cumulative Impacts

- **Increased urbanization of the Coral Springs area due to the housing development and open commercial area**
- **Increase in noise and dust during construction**
- **Increased traffic during construction and increased ingress/egress to highway during operation**
- **Improved housing stock – local residents and overseas investment (Diaspora)**
- **Increased use of drainage basin and sinkhole could minimize future development options**
- **Ecology – loss of natural habitat and impact on existing aesthetics**

ALTERNATIVES

Sewage Treatment

- The developer may consider allowing existing Coral Springs residents to connect to the central sewage system.

Private Forestry for slopes

- E.g. as a Forest Reserve) under the Forestry Division's Private Forestry Programme

No Build Alternative

- No additional houses to meet demand
- No drainage improvements


THANK YOU!
QUESTIONS AND ANSWERS