



**Capital Regional District
Core Area and West Shore Sewage
Treatment
Decision Information Report**

Technical and Community Advisory Committee

April 5, 2007



Agenda

- Global technology search
- The five wastewater management options
- Triple Bottom Line analysis
- The Conclusions

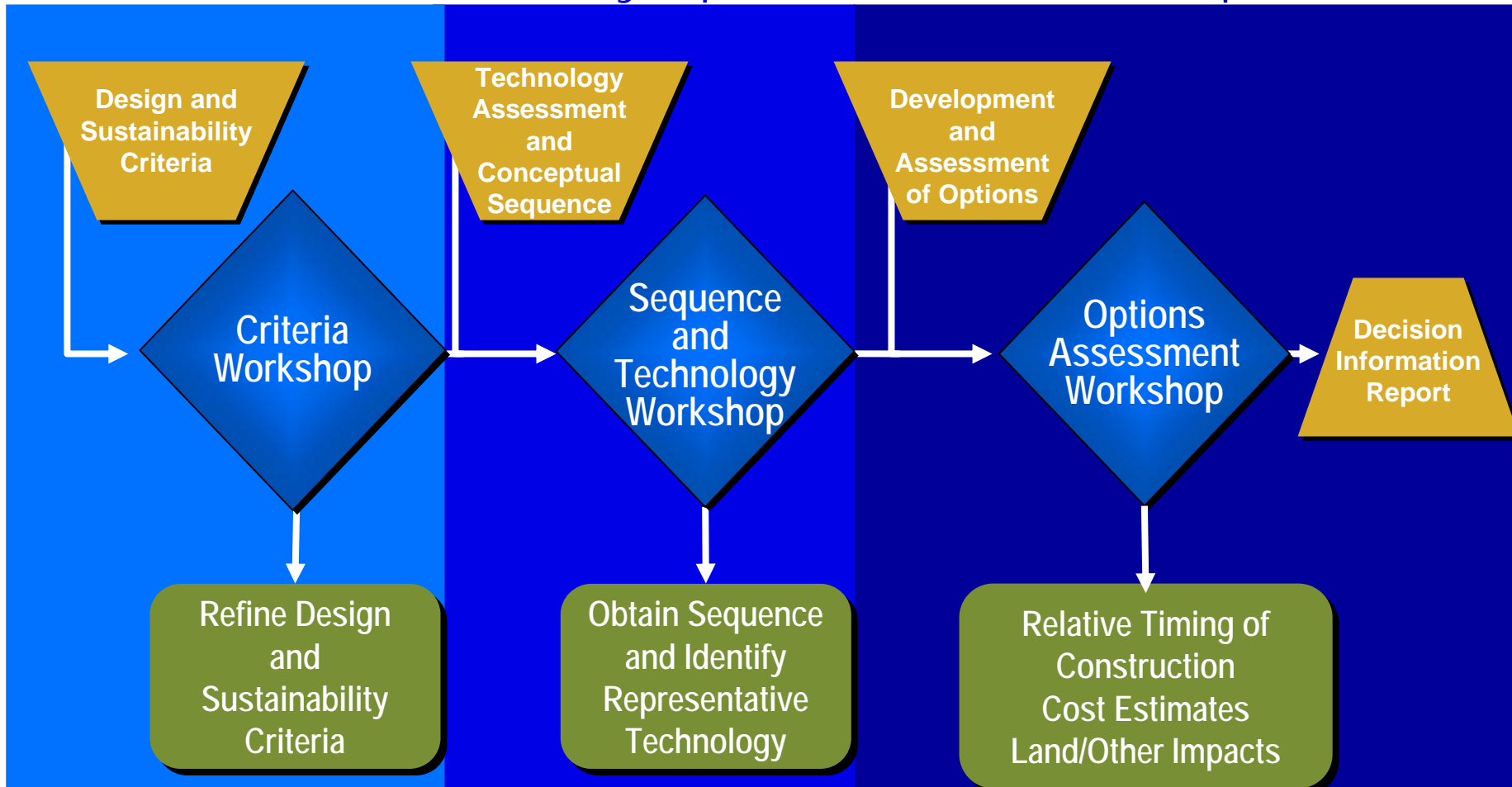


The Decision Information Process

Define Criteria

Identify Options

Assess Options



The Schedule

- Steering Committee Update – April 11
- Steering Committee Review of Draft Supporting Report – April 25
- TCAC Review of Draft Supporting Report – April 26
- CRD Board Submission – May 23
- Submission to Minister – June 29

**Request for
Expressions
of Interest –
Innovative
Technology**



REI Innovative Technology

The Results

- 24 submissions presenting 36 technologies
- 13 of the technologies had been previously reviewed by the consultant team
- The remaining 23 were scored using the same rating system; 11 passed and 12 failed.
- Many of the 11 passing technologies are specific equipment within previously scored technology categories

REI Innovative Technology Technologies Scoring High or Very High

Vendor	Technology	Application	Scoring
H2O Logics	Ponding Mixing	Wetlands	Very High
Veolia Water	Media Filters	Reuse	High
Veolia Water	Gravity Filters	Reuse	High
Siemens Water	Media Filters	Reuse	High

REI Innovative Technology Conclusions

*Does the results of the Innovative
Technology search change the selection of
the Representative Technology for
wastewater management option
development?*

No

Wastewater Management Options



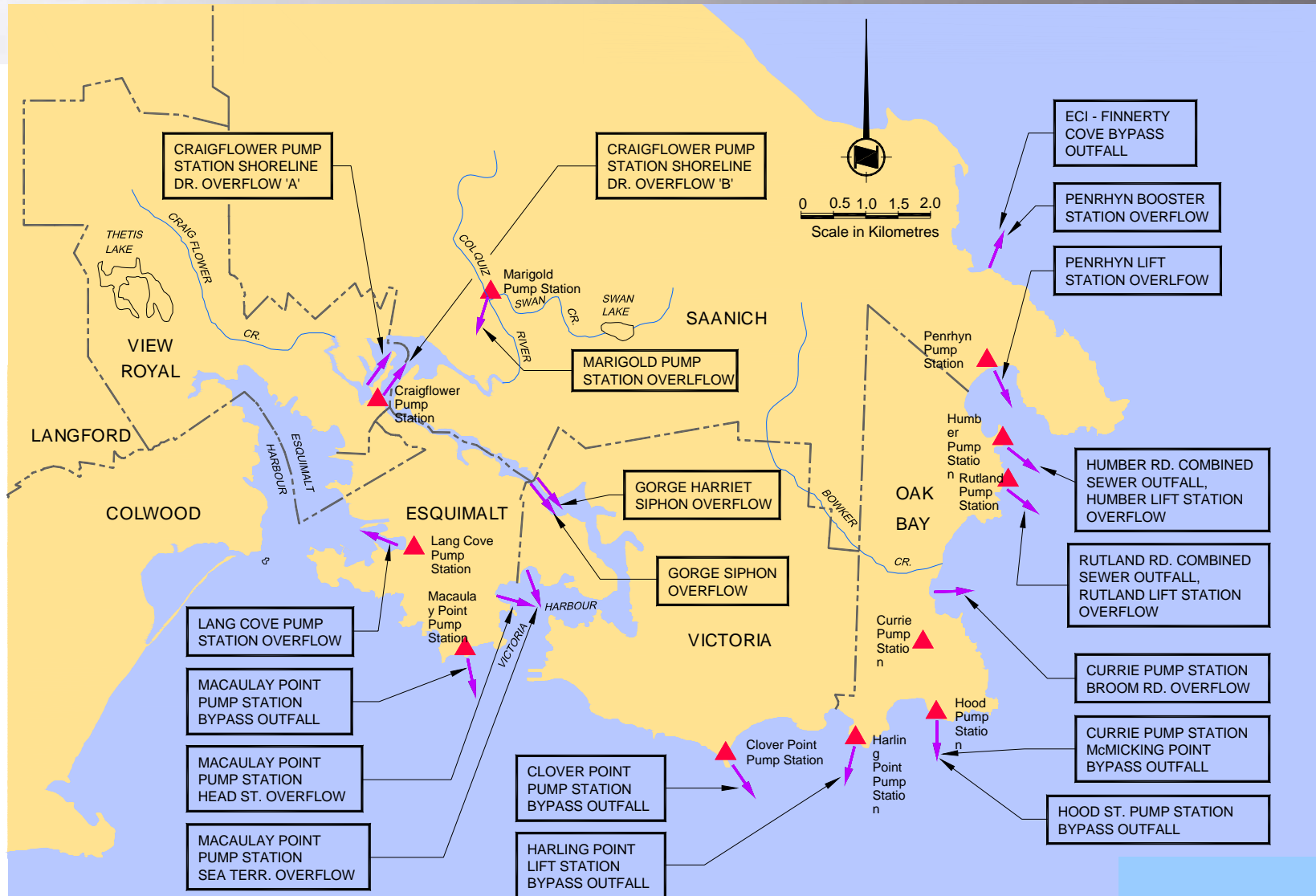
Wastewater Management Options

Centralized versus Decentralized Treatment

- Centralized Approach – Series One
Convey wastewater to a downstream plant
- Integrated Approach – Series Two
Sharing wastewater management functions
- Decentralized Approach – Series Three
Utilize “local” plants

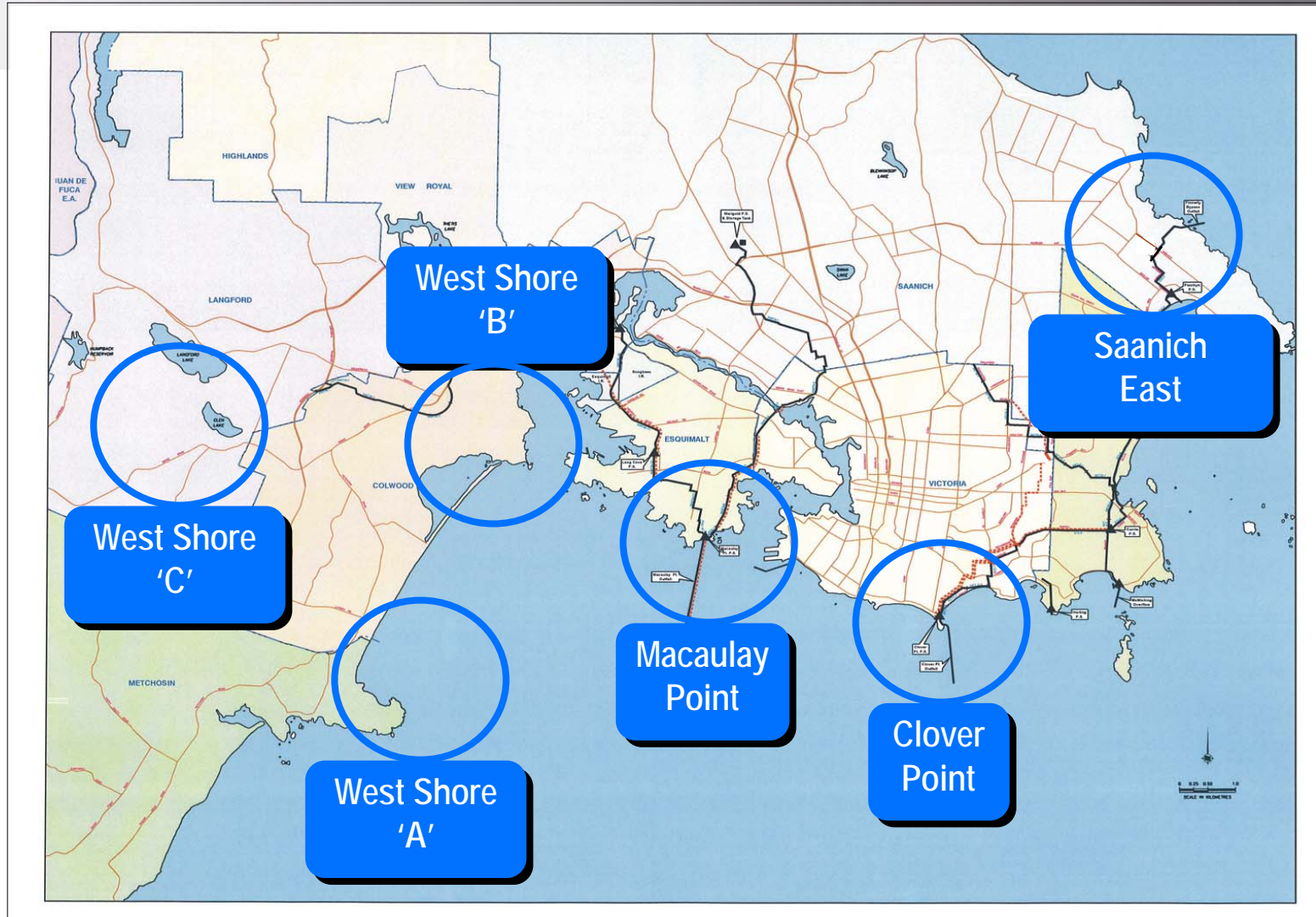
Wastewater Management Options

Wet Weather Flow Management



Wastewater Management Options

Potential Wastewater Treatment Plant Sites



Wastewater Management Options

Biosolids Management

- Base assumption for all options – remote Biosolids Management Facility
- Requires truck haul of dewatered sludge to the Facility
- 2 ha site area required, likely at or near Hartland Road Landfill
- Some options may allow on-site biosolids management to be considered – eliminating the need for the remote Facility

Wastewater Management Options

Biosolids Management

Representative Technologies

- Sludge rewatering and conditioning
- Two stage thermophillic anaerobic digestion
- Biosolids dewatering
- Cogeneration biogas utilization

Wastewater Management Options

Odour Control and Appearance

Assumptions

- All options will meet stringent odour control targets
- Plant layouts will be integrated into neighborhoods – buried or low profile
- Opportunities to integrate learning or recreational facilities – these costs are not included

Oceanside WWTP, San Francisco, CA



San Diego WWTP, San Diego, CA



Marine Park WWTP, Vancouver, WA



Wastewater Management Options

Primary versus Secondary Treatment

- Options include a mix of treatment levels
- All options include secondary treatment of flows up to 2 times the ADWF by the end of Stage 1 (10 years)
- The inclusion or capacity of secondary treatment works at some plants can be phased over a longer period

Wastewater Management Options

Capital and Life Cycle Costing

- Plant layouts (year 2065) were developed using representative technologies on assumed sites
- Conveyance and wet weather flow strategies were developed for each option
- Phasing of each option was developed based on three stages
- Life cycle costing was carried out based on a real discount rate range of 2 to 6 % from the present day to 2065

Wastewater Management Options

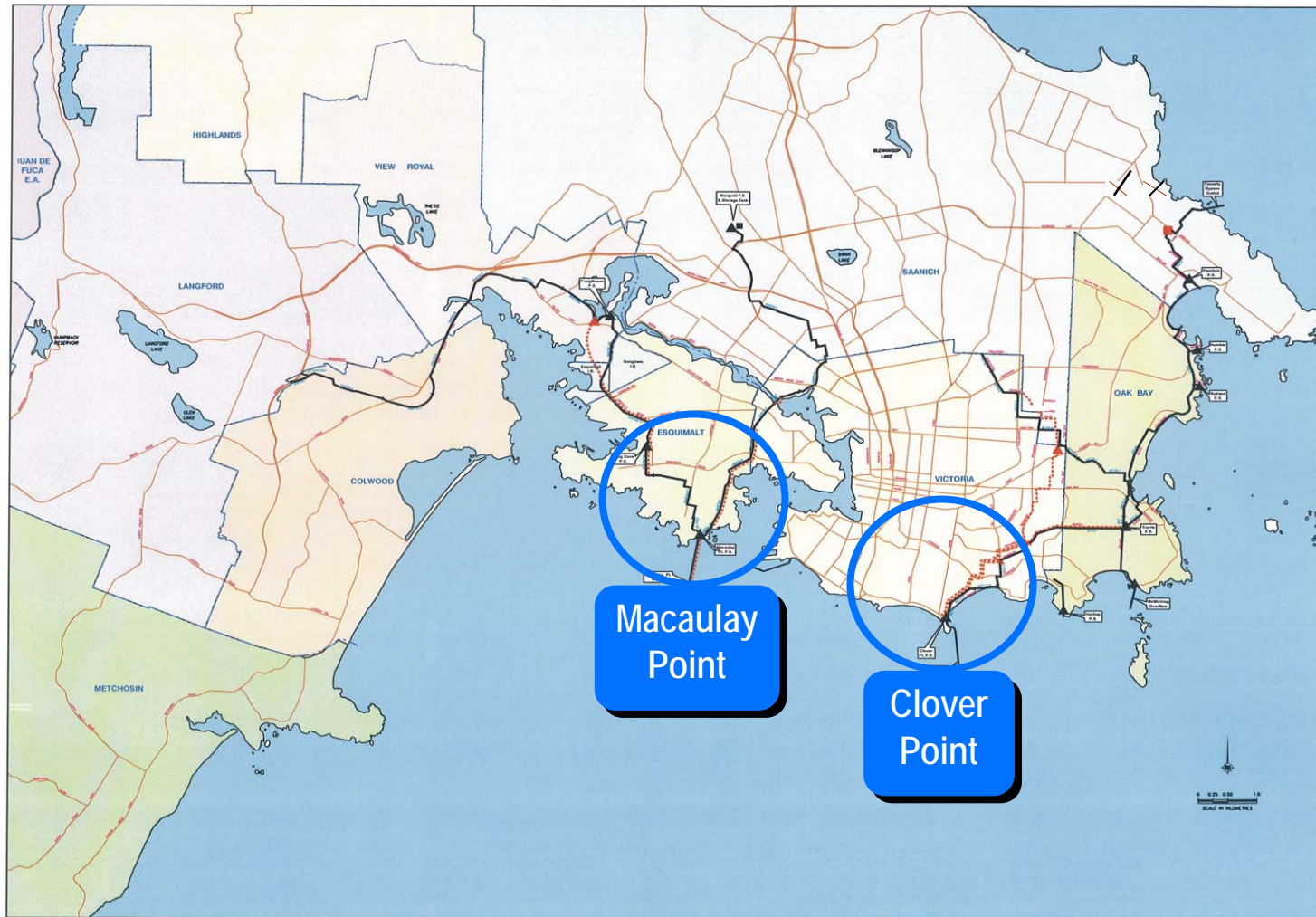
Cost Factors

Base Construction Cost (2007 dollars) plus:

- Design contingency – 10%
- Construction contingency – 15%
- Engineering – 15%
- Administration – 3%
- Miscellaneous – 2%
- Interim financing – 4%

Total cost factor multiplier is 1.56

Option 1-1 Macaulay Point / Clover Point WWTPs



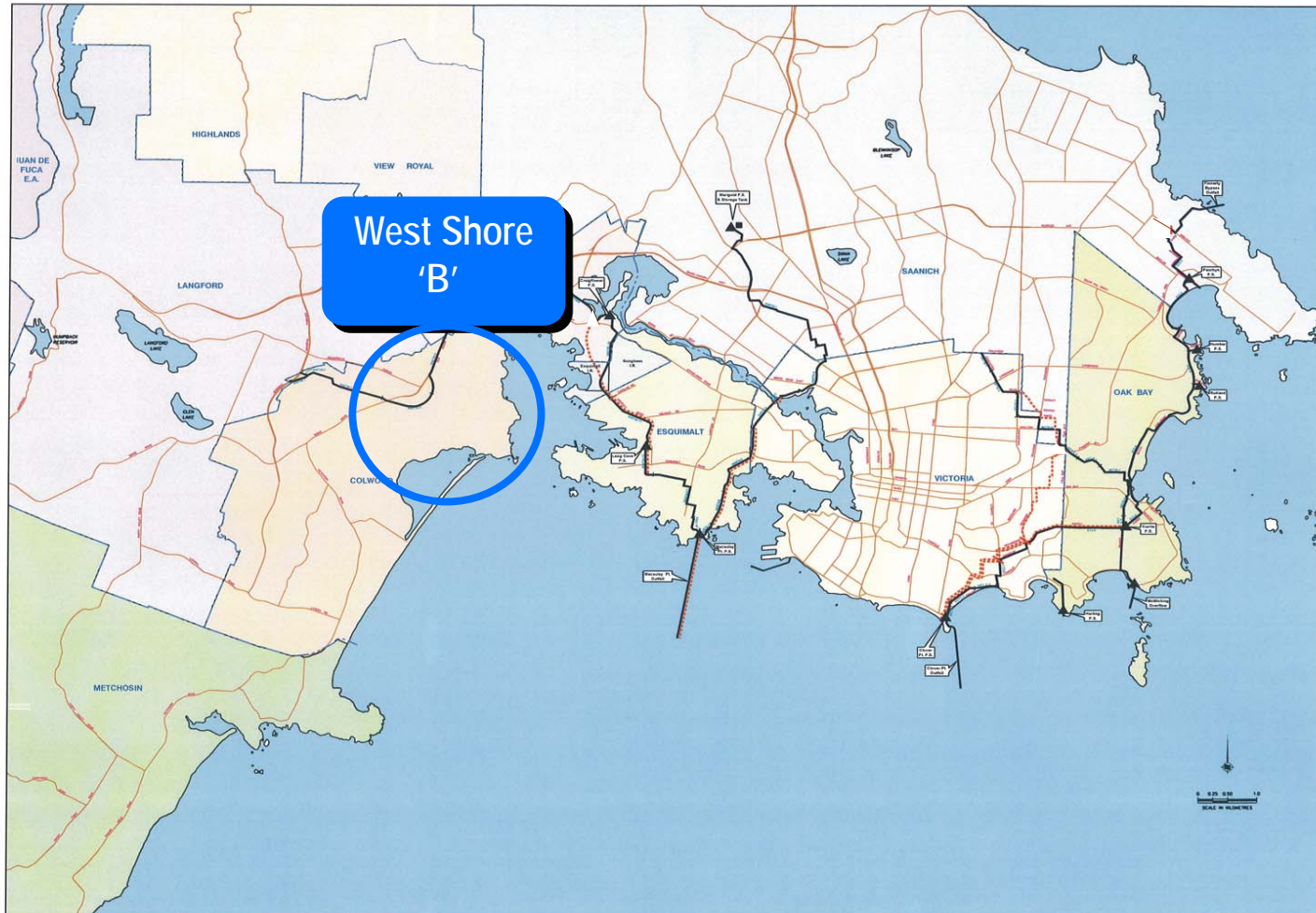
Option 1-1

Macaulay Point / Clover Point WWTPs

Key Considerations

- This the current LWMP strategy
- The acceptance of a secondary plant at Clover Point by the public is the key risk factor
- Requires upgrading of the conveyance system to direct wet weather flows to the two plants
- Life cycle cost is 4 highest out of 5 options

Option 1-2 West Shore Regional WWTP



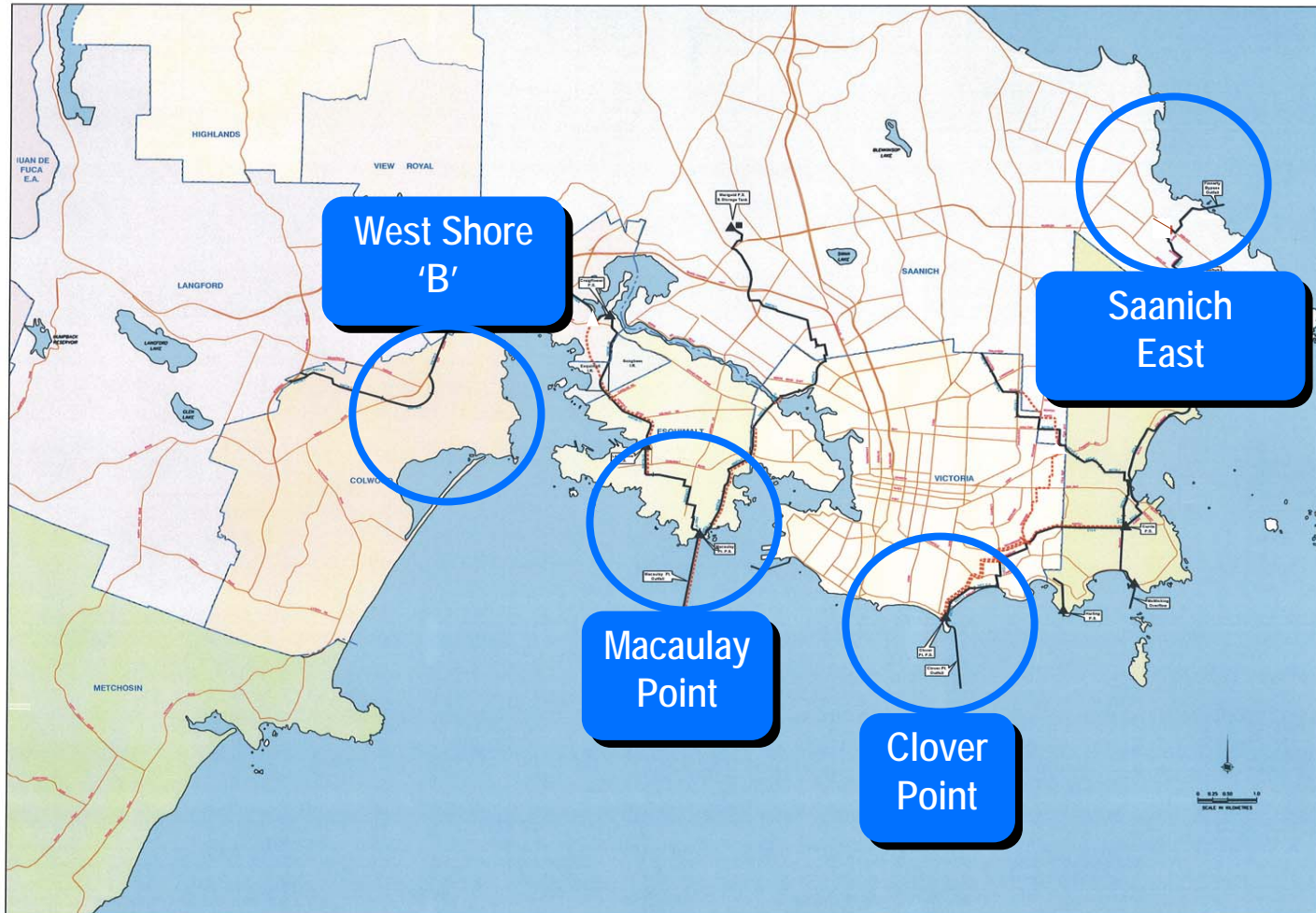
Option 1-2

West Shore Regional WWTP

Key Considerations

- Locating a suitably large site is the greatest risk factor
- Requires upgrading of the conveyance system to direct wet weather flows to the plant
- The cost savings due to the scale factor of the WWTP is lost due to the high conveyance cost
- Life cycle cost is the highest out of 5 options

Option 2-1 Clover Point / Macaulay Point / Saanich East / West Shore B WWTPs

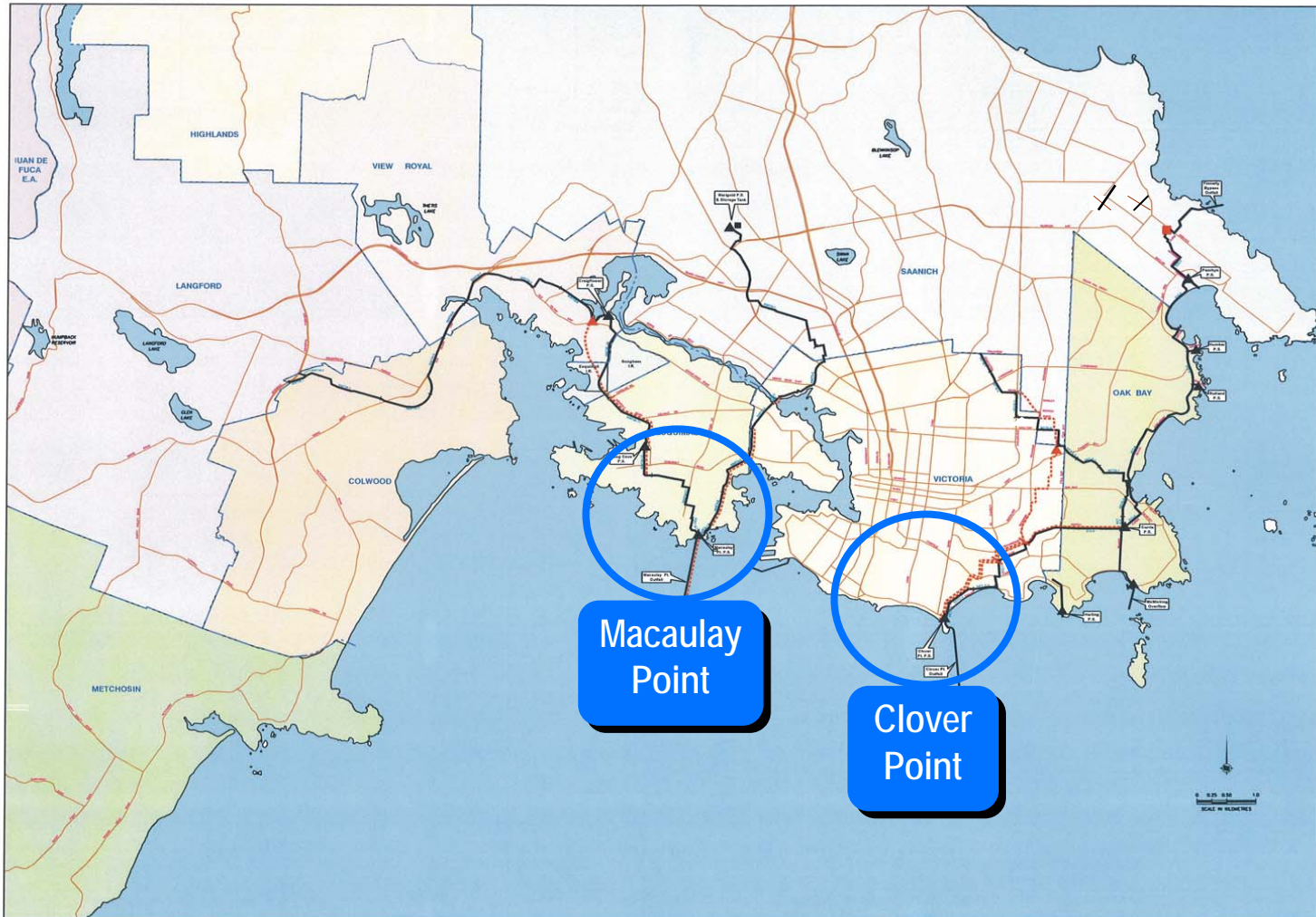


Option 2-1

Clover Point / Macaulay Point / Saanich East / West Shore B WWTPs - Key Considerations

- The current public use and views at Clover Point will not change
- Makes efficient use of the existing flow capacity in the conveyance system by using multiple wet weather discharge points
- Macaulay Point WWTP would be 30% smaller than Option 2-2 due to the use of decentralized plants.
- Wastewater sludges are processed at the Macaulay plant only. On-site sludge digestion could be considered.
- Life cycle cost is the lowest of 5 options

Option 2-2 Macaulay Point with Clover Point as Wet Weather Flow Only

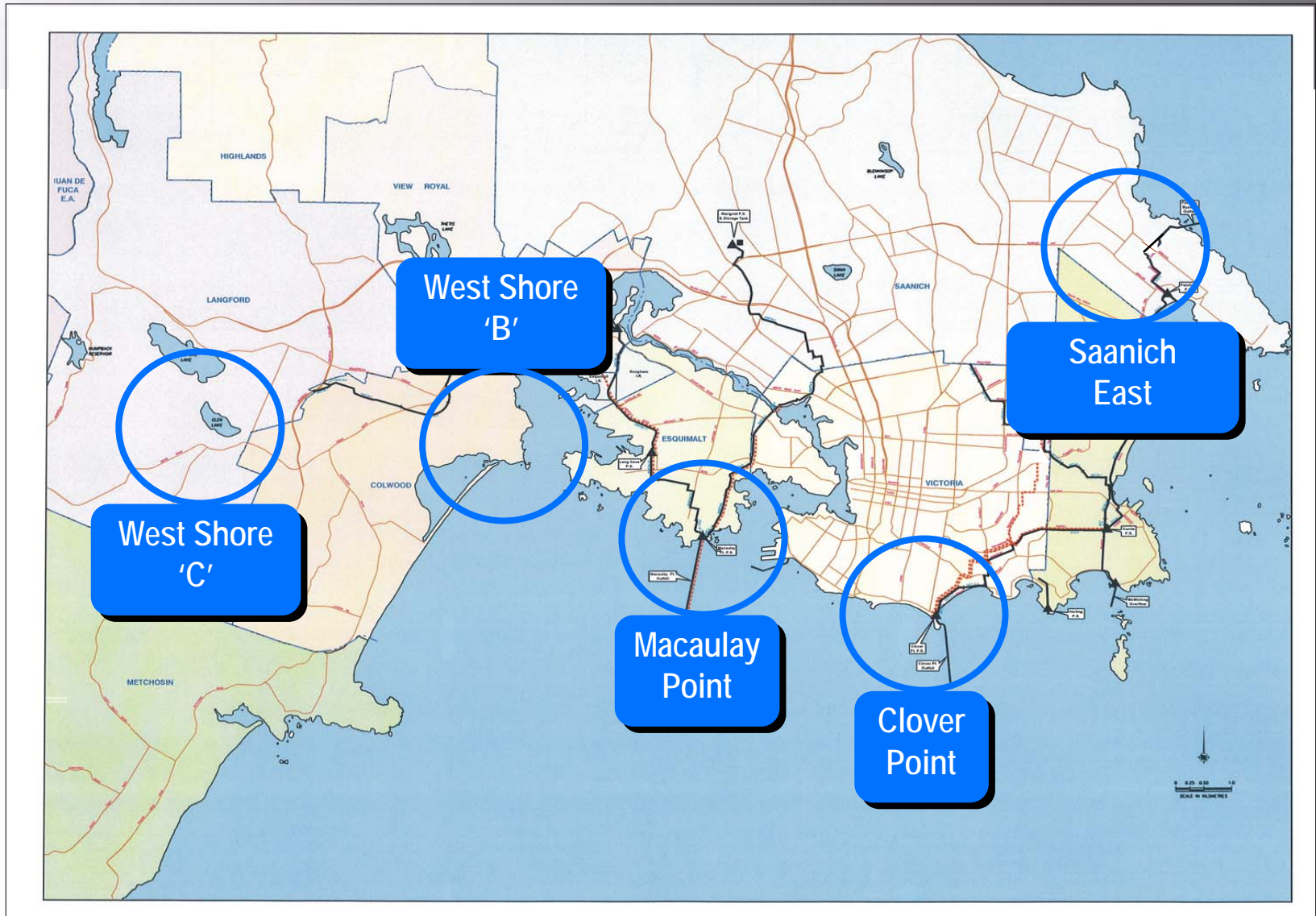


Option 2-2

Macaulay Point with Clover Point as Wet Weather Flow Only - Key Considerations

- The current public use and views at Clover Point will not change
- Macaulay Point WWTP would be 30% larger than the options that incorporate decentralized plants
- Trades off more dollars into conveyance and less dollars into wastewater treatment plants compared to the options using decentralized plants
- Life cycle cost is the second lowest of 5 options

Option 3-1 Five Plant Scenario



Option 3-1

Five Plant Scenario

Key Considerations

- Considerations similar to Option 2-1 – conveyance efficiency, no change in Clover Point site, smaller Macaulay plant.
- Demonstrates how advanced and soft technologies can be used in an inland, decentralized approach
- Increased number of plants starts to lose the economic advantage of the decentralized strategy
- Life cycle cost is the third highest of 5 options

Triple Bottom Line Assessment



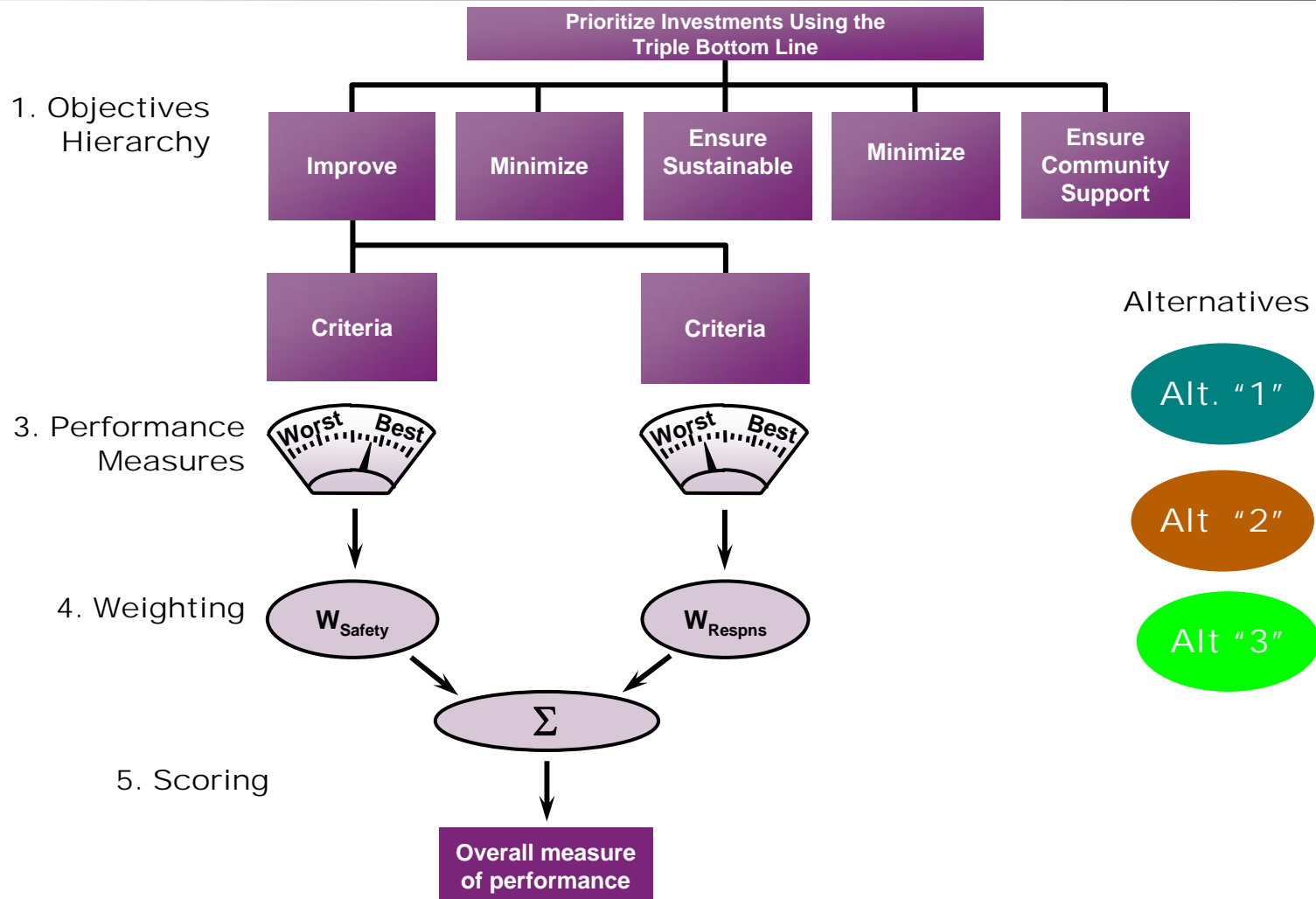
TBL Assessment

Using Multi-Criteria for Decision Making

- Ranking options based on how well the options rate against a chosen set of objectives and criteria
- Objectives and criteria are weighted by importance, and the overall “decision score” of an option is the weighted sum of its rating against each criterion

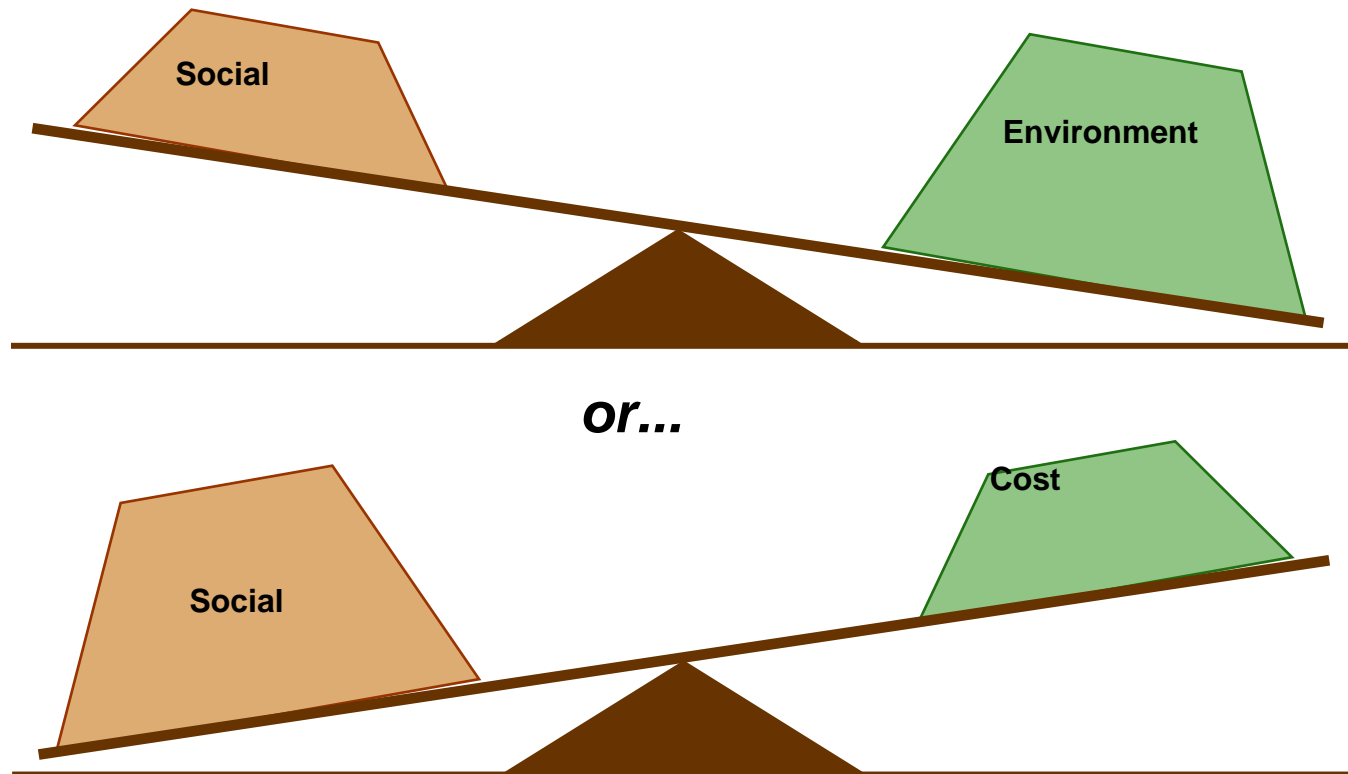
TBL Assessment

Basic Elements of Multi-Criteria Decision Analysis



TBL Assessment

Weighting Assigns the Trade-Offs Between Competing Objectives



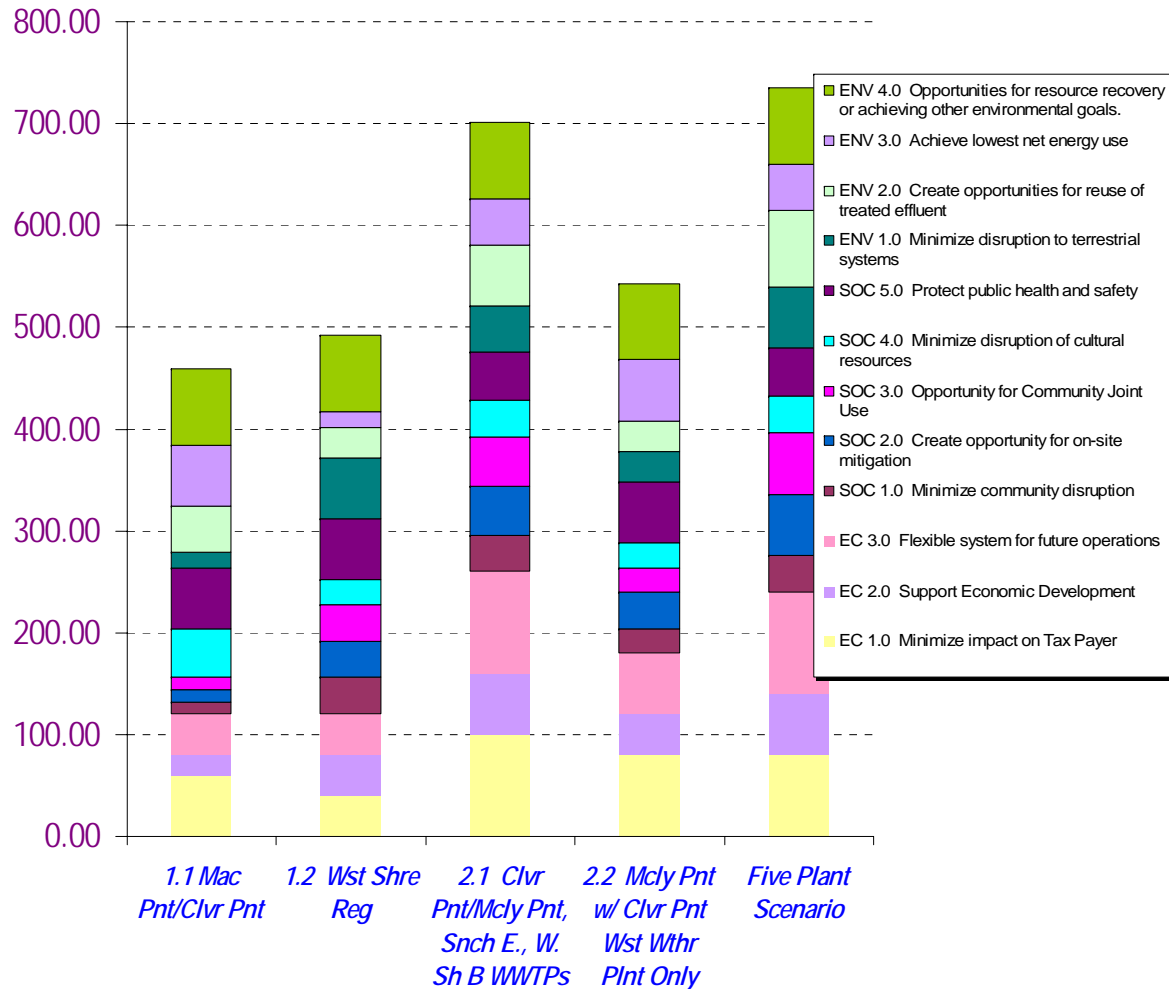
TBL Assessment

An Interactive Process

- Social, Economic and Environmental Categories – 12 goals
- 40 criteria under the 12 goals
- Starting point: equal weighting of goals – score from 1 to 5.
- Check sensitivity by changing the weighting
- TBL is a guide and tool to be creative
- TBL does not make the decision

The TBL Results

Triple Bottom Line Base Case – All TBL Elements Weighted Equal



The TBL Sensitivity

Social Objectives weighted 20% greater:

Little shift in relative positions. Option 2-2 declines relative to others.

Economic Objectives weighted 20% greater:

Relative position of preferred options (2-1 and 3-1) becomes closer.

Environmental Objectives weighted 20% greater:

Option 3-1 moves slightly higher than Option 2-1.

In all cases, relative ranking does not change.

The Conclusions



The Decision Information Process – Where are We At?

The five options are not definitive schemes, but rather possible strategies.

The selected strategy needs to be developed through further planning and public consultation.

The Major Conclusion

Development patterns, the coastal geography, the existing infrastructure with its wet weather flow issue and opportunities for future reuse all make a more decentralized approach attractive.

Wastewater Management Strategy

The Three Key Elements

- The Clover Point plant should be a wet weather facility only.
- A secondary plant at the Macaulay Point site is the most realistic option for a centralized plant.
- There should be two or more decentralized “liquid stream treatment only” plants. Decisions on conveyance and centralized treatment facilities need to be compatible with a distributed wastewater management strategy.

The CRD Core Area Wastewater Management Program

The first stage of the program will realistically extend over 10 years and cost \$1.2 billion.

