# Study of Options for Organic Waste Processing in Newfoundland

April 2014

# Overview of Presentation

- Project Guiding Principles
- Background on Newfoundland
- Organic Material Forecast
- Organics Processing Technologies
- Candidate Management Scenarios
- Scenario Analysis Results
- Next Steps

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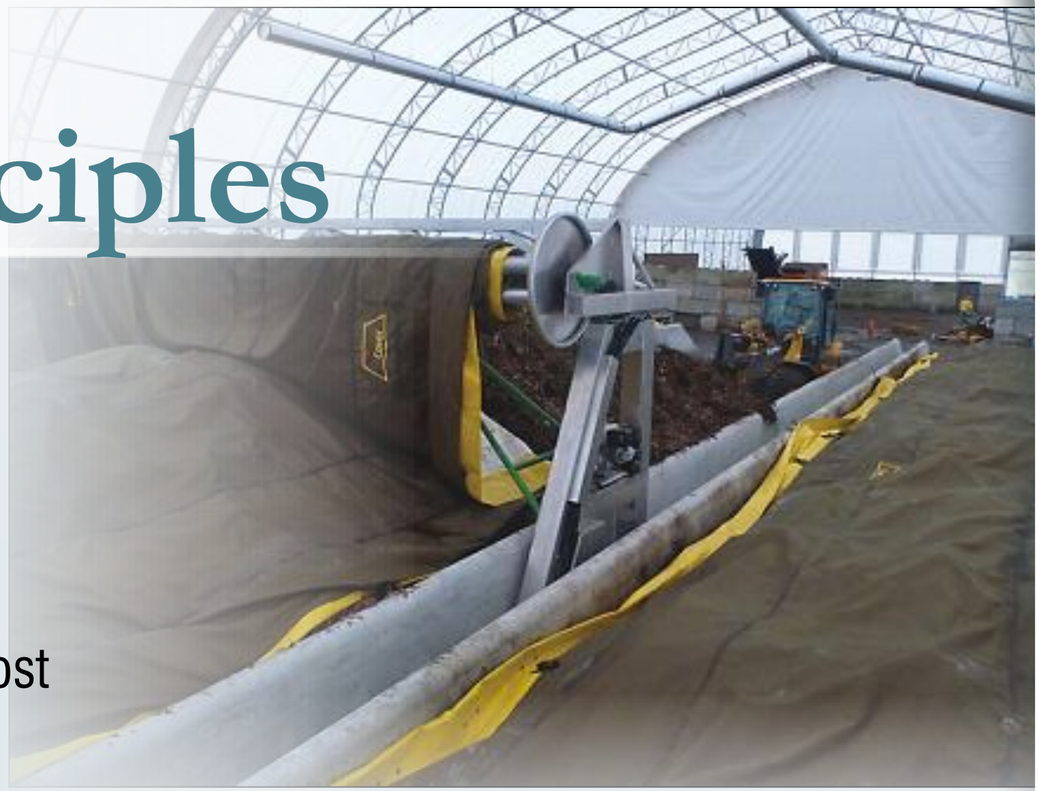
# Project Guiding Principles

- **Study Area Scope**
  - Eight defined management regions in Newfoundland
- **Achieving 50% Diversion**
  - To be considered at the Provincial level
- **Program Focus and Feedstocks**
  - "Traditional" MSW organics from residential and ICI generators
  - Opportunities for agricultural/fisheries/forestry sector organic residuals a secondary consideration
- **Organics Program Consistency**
  - Can be variable throughout the province and regions

# Project Guiding Principles



- **Proven Technologies**
  - >5 years of continuous, reliable operation
  - Similar tonnage throughput
  - Ability to control odour/leachate
  - Similar climate to Newfoundland
  - Minimum end product of Class/Category “B” compost
- **Waste Stream Forecasting**
  - 30-year planning period (2013-2043)
  - Population data from Stats Can and NL Dept of Finance
  - Current tonnage and waste stream data from MMSB, Regions and other available sources

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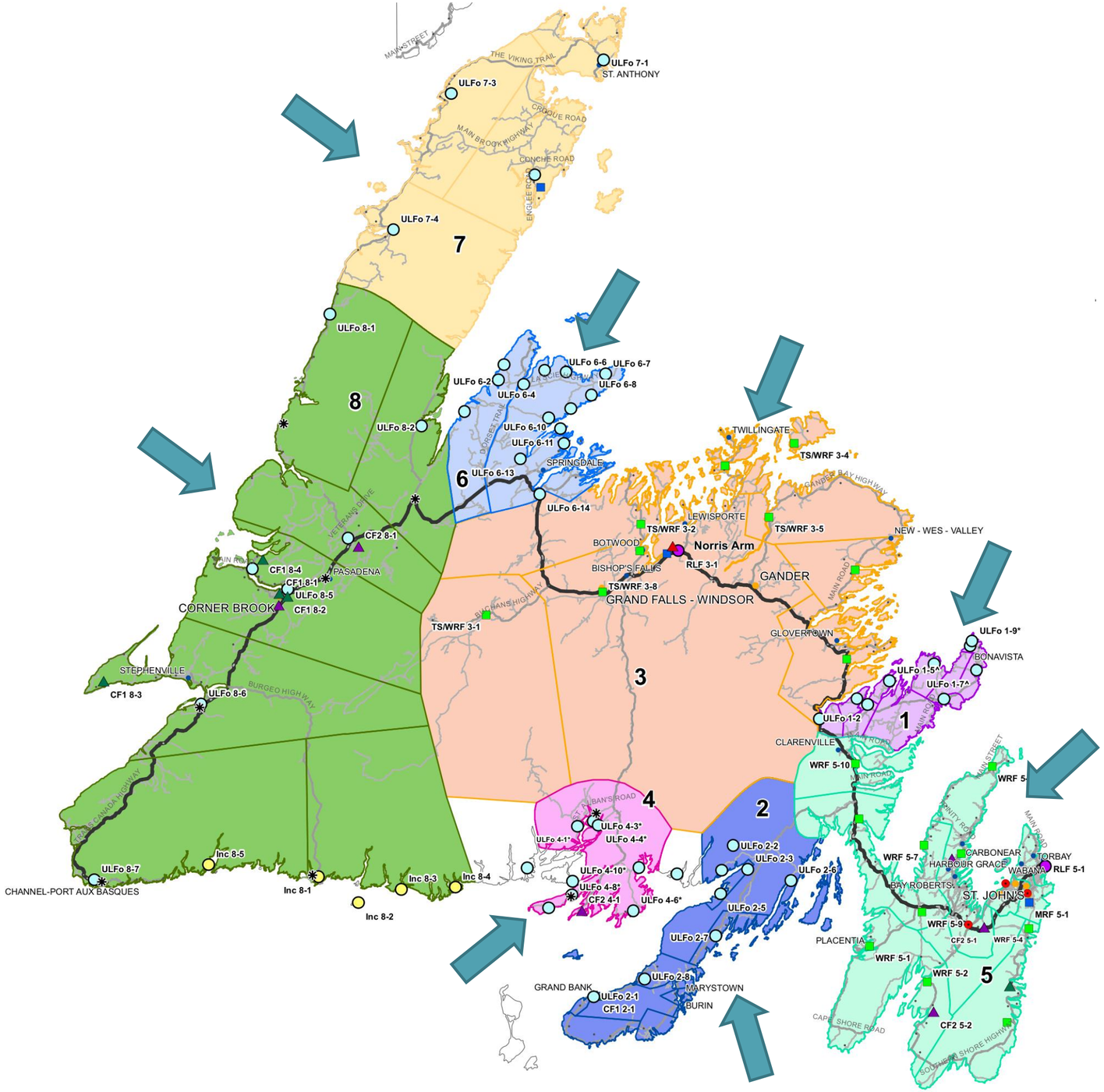
# Background on Newfoundland




**Legend**

- Future TS/WRF
- Future Composting Site
- Candidate Composting Facility Location
- Composting Facility
- Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Municipality (Population >10,000)
- Municipality (Population 2,000 - 9,999)
- Municipality (Population < 1,999)
- Arterial
- Collector
- Local
- 1- Discovery Regional Service Board
- 2 - Burin Peninsula Regional Service Board
- 3 - Central Regional Service Board
- 4 - Coast of Bays Waste Management Corporation
- 5 - Eastern Regional Service Board
- 6 - Baie Verte - Green Bay Region
- 7 - Northern Peninsula Regional Service Board
- 8 - Western Regional Service Board

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# Organic Material Forecast

- **Waste stream characterization**
  - ➢ "As-generated" (versus "As-disposed")
    - Disposed *and* diverted materials
  - ➢ Developed waste stream composition for:
    - Urban – Residential
    - Urban – ICI
    - Rural – Residential
    - Rural - ICI

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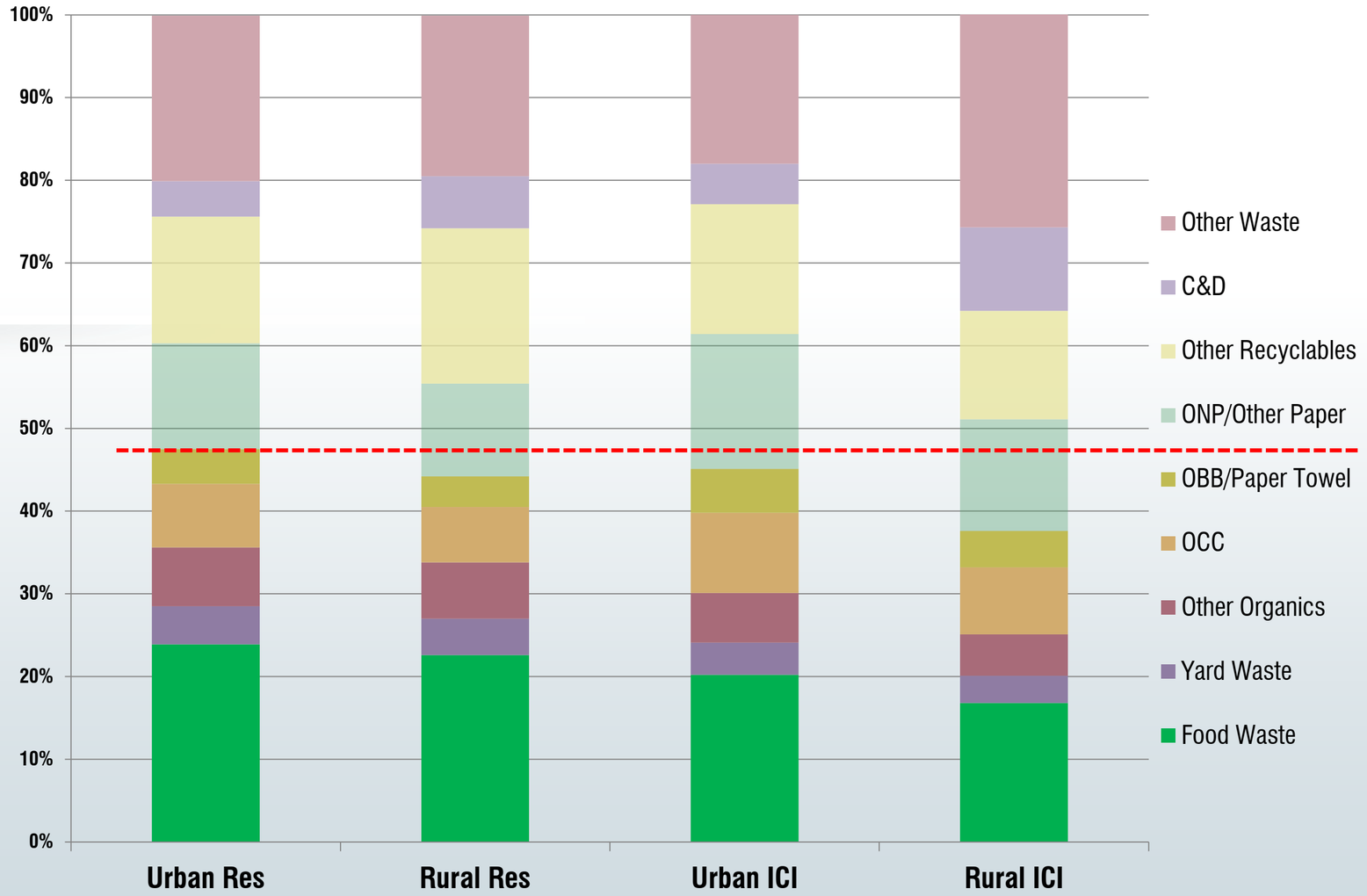
# Organic Material Forecast

- **Residential & ICI Waste Composition**

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# Organic Material Forecast

- **Population Data**

| | Discovery | Burin Peninsula | Central | Coast of Bays | Eastern | Green Bay – Baie Verte | Northern | Western |
|---|---|---|---|---|---|---|---|---|
| % Population Change / Year | -0.56% | -1.27% | -0.48% | -0.57% | 0.41% | -0.98% | -0.75% | -0.18% |

*Data from: The Estimated Rural Secretariat Region Population Projection Data from 1986 to 2026*

- **Future Waste Stream Forecast**
  - ➢ Correlation between GNP and per capita waste generation
  - ➢ Consistent with growth in Canadian GNP over 25 years, projected Newfoundland GNP and trends within North America

***Annual waste generation rate = 2.2%***

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# Organics Processing Technologies

- **Development of Long-List of Organics Processing Technologies**

| Aerobic (Passive) |
| --- |
| • Static Pile |
| • Bunker |
| • Windrow |
| • Turned Mass Bed |
| • Passively Aerated Windrow |

| Aerobic (Active) |
| --- |
| • Aerated Static Pile |
| • Enclosed Aerated Static Pile |
| • Static Container |
| • Agitated Container |
| • Enclosed Channel |
| • Agitated Bed |
| • Rotating Drum |

| Anaerobic |
| --- |
| • High-Solids (Stackable) |
| • High-Solids (Slurry) |
| • Wet (low-solids) |
| • Co-digestion in WWTP |

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# Organics Processing Technologies

**Development of three levels of facility sizes:**

- **Level I – Regional, Centralized Facilities**
  - Processing greater than 2,500 tonnes per year
  - Further separated into Level Ia (>10,000 tonnes per year) and Level Ib (2,500 to 9,999 tonnes per year)
- **Level II – Sub-Regional Facilities**
  - Processing between 1,000 and 2,499 tonnes per year
- **Level III – Small-Scale Facilities**
  - Processing less than 1,000 tonnes per year

# Organics Processing Technologies

- **Evaluation Criteria**
  - **Modularity of Technology** – allowance for facility to be developed in stages over time
  - **Technology Flexibility (Feedstock Quality)** – ability to manage varying qualities of organic feedstock
  - **Environmental Nuisance Control** – ability to manage environmental nuisances (e.g., odour, dust, vectors)
  - **Capital Costs** – compare capital cost intensiveness of the technological options
  - **Operational & Maintenance Costs** – compare on the basis of facility operating and maintenance costs

# Organics Processing Technologies

- **Preferred Facilities (in no particular order….)**

| Level I (>2,500 tpy) | Level II (1,000 – 2,499 tpy) | Level III (< 1,000 tpy) |
|---|---|---|
| • Aerated Static Pile | • Static Pile | • Static Pile |
| • Enclosed Aerated Static Pile | • Windrow* | • Windrow* |
| • Static Container | • Passively Aerated Windrow | • Passively Aerated Windrow |
| • Enclosed Channel | • Aerated Static Pile (Covered) | • Aerated Static Pile (Covered) |

** weather-protected*

- **Reference Facilities for Costing**

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# Candidate Management Scenarios

- **5 Main Assumption Categories**
  - Capture Rate
  - Reference Facilities for Costing
  - Determination of Transfer/Haulage Costs
  - Presentation of Residential Curbside Collection Costs
  - Calculation of Annual and Net Present Value

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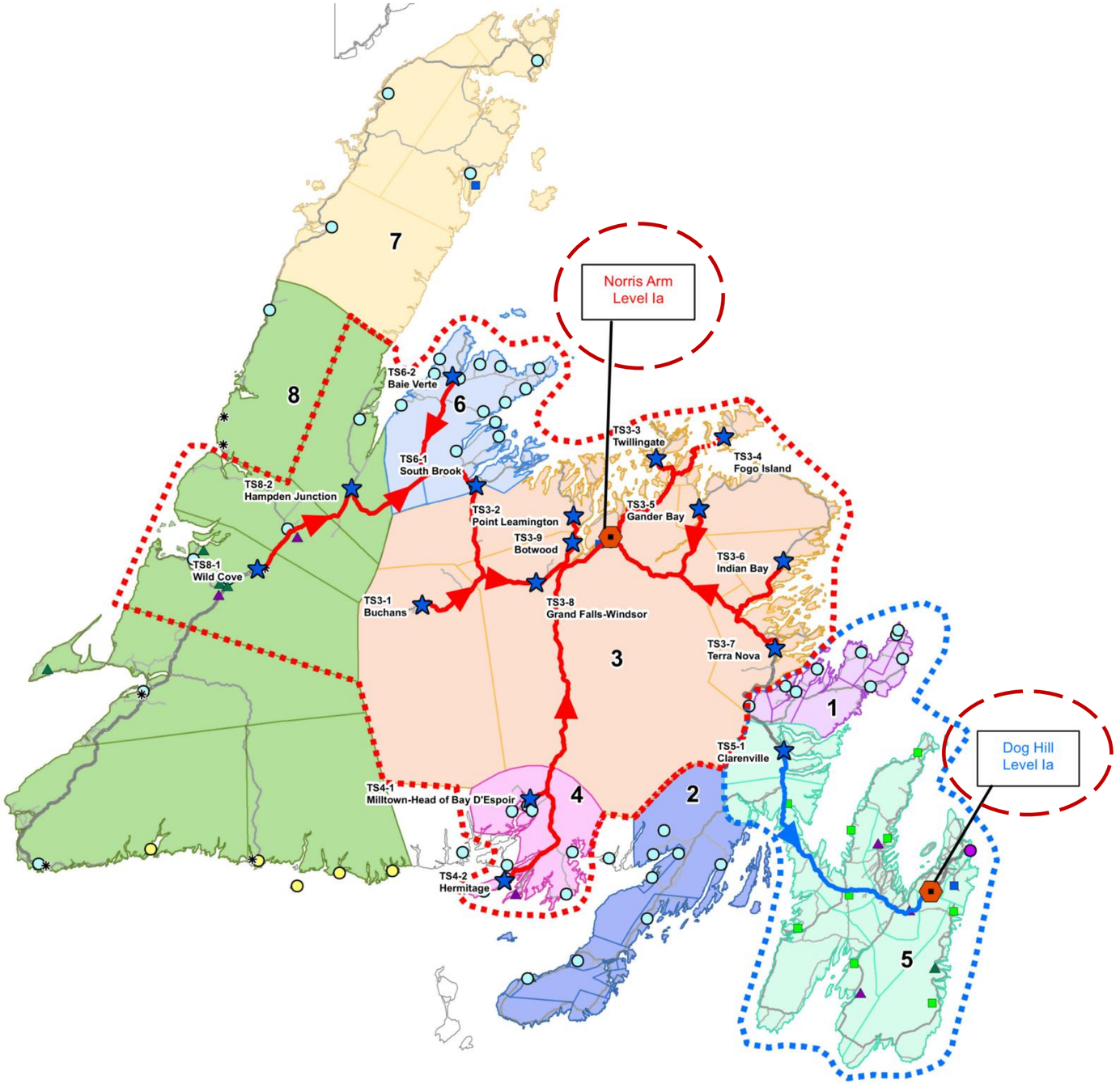
# Scenario 1




**Legend** **Scenario 1**

- Scenario 1 Transfer Facilities
- Scenario 1 Composting Facilities
- Existing Composting Facility
- Existing Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Proposed Haul Route
- Scenario 1 Service Area Boundaries
- 1- Discovery Regional Service Board
- 2 - Burin Peninsula Regional Service Board
- 3 - Central Regional Service Board
- 4 - Coast of Bays Waste Management Corporation
- 5 - Eastern Regional Service Board
- 6 - Green Bay Waste Authority Inc.
- 7 - Northern Peninsula Regional Service Board
- 8 - Western Regional Service Board

**Facility Capacity Levels**
Level Ia - >10,000 tonnes/year
Level Ib - 2,500 - 9,999 tonnes/year
Level II - 1,000 - 2,499 tonnes/year
Level III - < 1,000 tonnes/year

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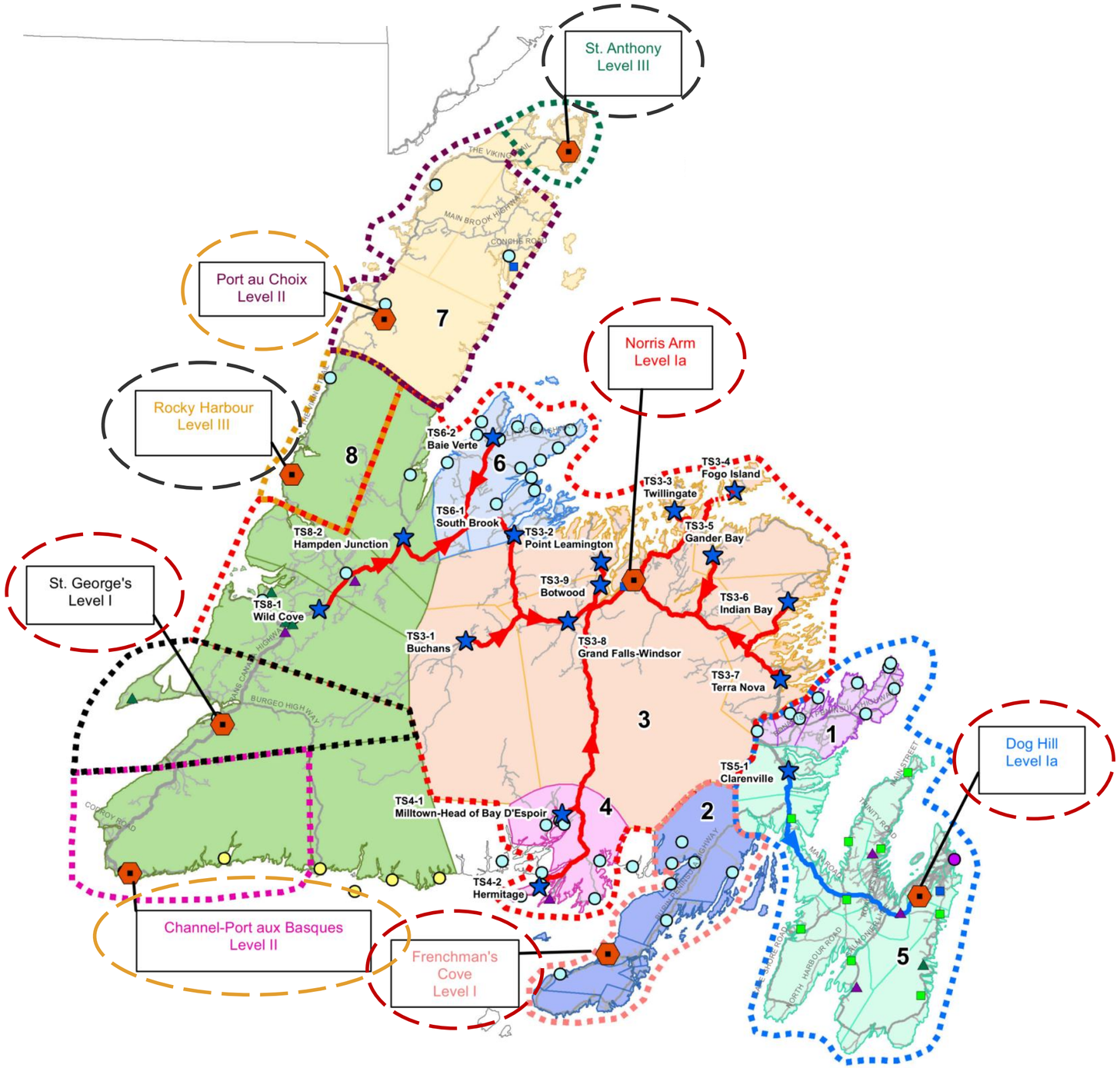
# Scenario 2




**Legend** **Scenario 2**

- Scenario 2 Transfer Facilities
- Scenario 2 Composting Facilities
- Existing Composting Facility
- Existing Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Proposed Haul Route
- Scenario 2 Service Area Boundaries
- 1- Discovery Regional Service Board
- 2 - Burin Peninsula Regional Service Board
- 3 - Central Regional Service Board
- 4 - Coast of Bays Waste Management Corporation
- 5 - Eastern Regional Service Board
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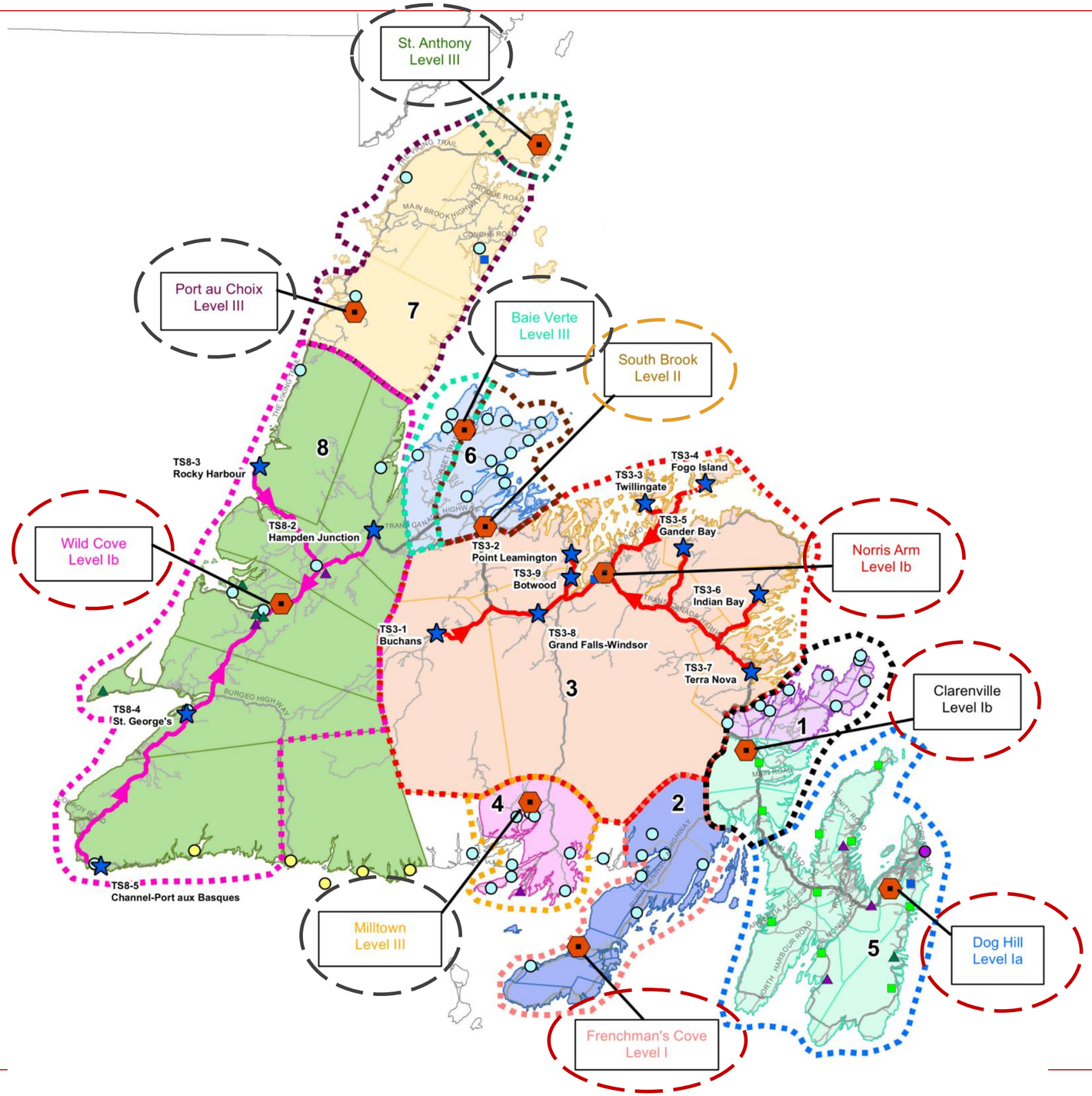
# Scenario 3




**Legend** **Scenario 3**

- Scenario 3 Transfer Facilities
- Scenario 3 Facilities
- Existing Composting Facility
- Existing Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Proposed Haul Route
- Scenario 3 Service Area Boundaries
- 1- Discovery Regional Service Board
- 2 - Burin Peninsula Regional Service Board
- 3 - Central Regional Service Board
- 4 - Coast of Bays Waste Management Corporation
- 5 - Eastern Regional Service Board
- 6 - Green Bay Waste Authority Inc.
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**Facility Capacity Levels**
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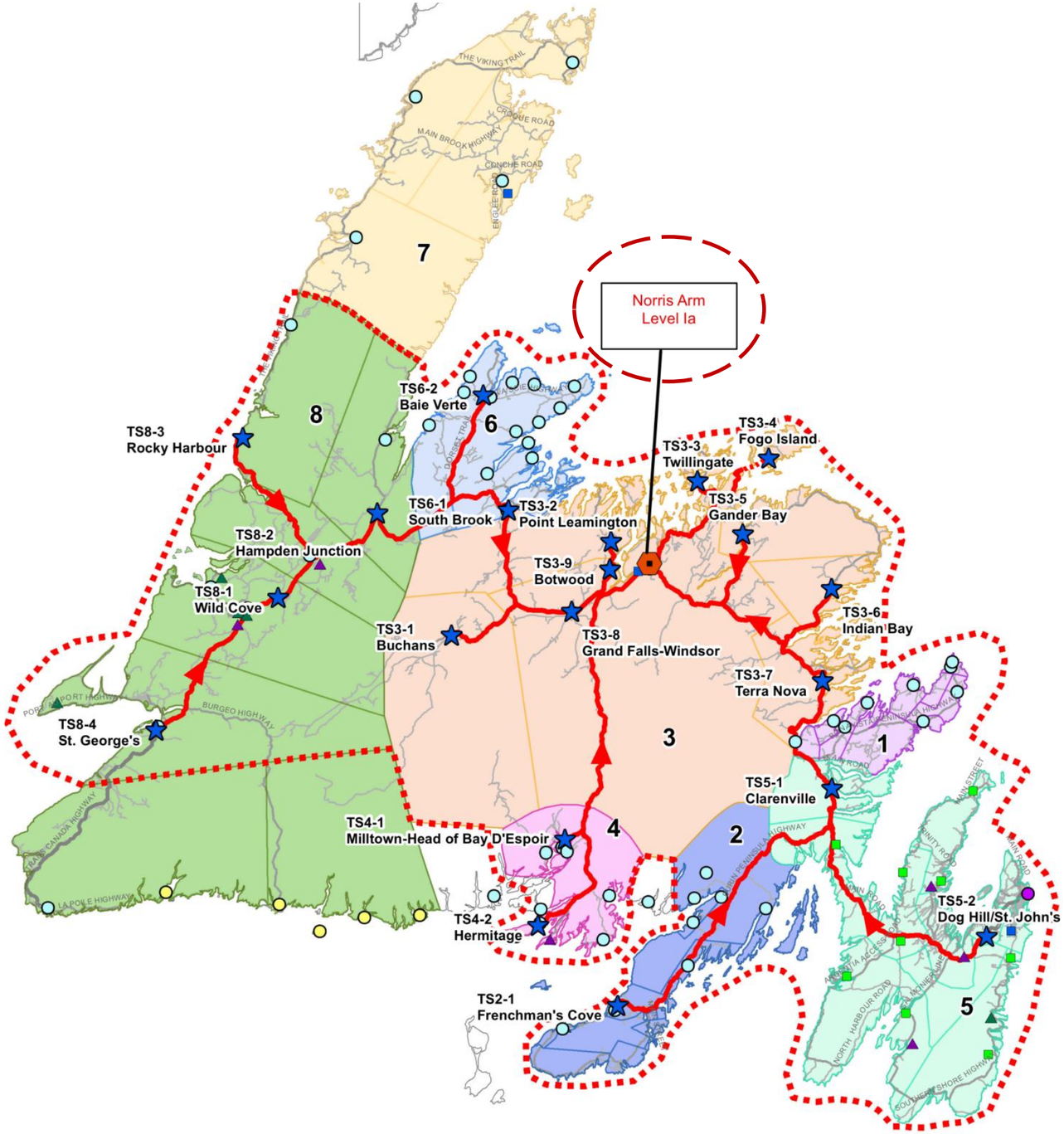
# Scenario 4




**Legend** **Scenario 4**

- Scenario 4 Transfer Facilities
- Scenario 4 Composting Facilities
- Existing Composting Facility
- Existing Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Proposed Haul Route
- Scenario 4 Service Area Boundaries
- 1- Discovery Regional Service Board
- 2 - Burin Peninsula Regional Service Board
- 3 - Central Regional Service Board
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**Facility Capacity Levels**
Level Ia - > 10,000 tonnes/year
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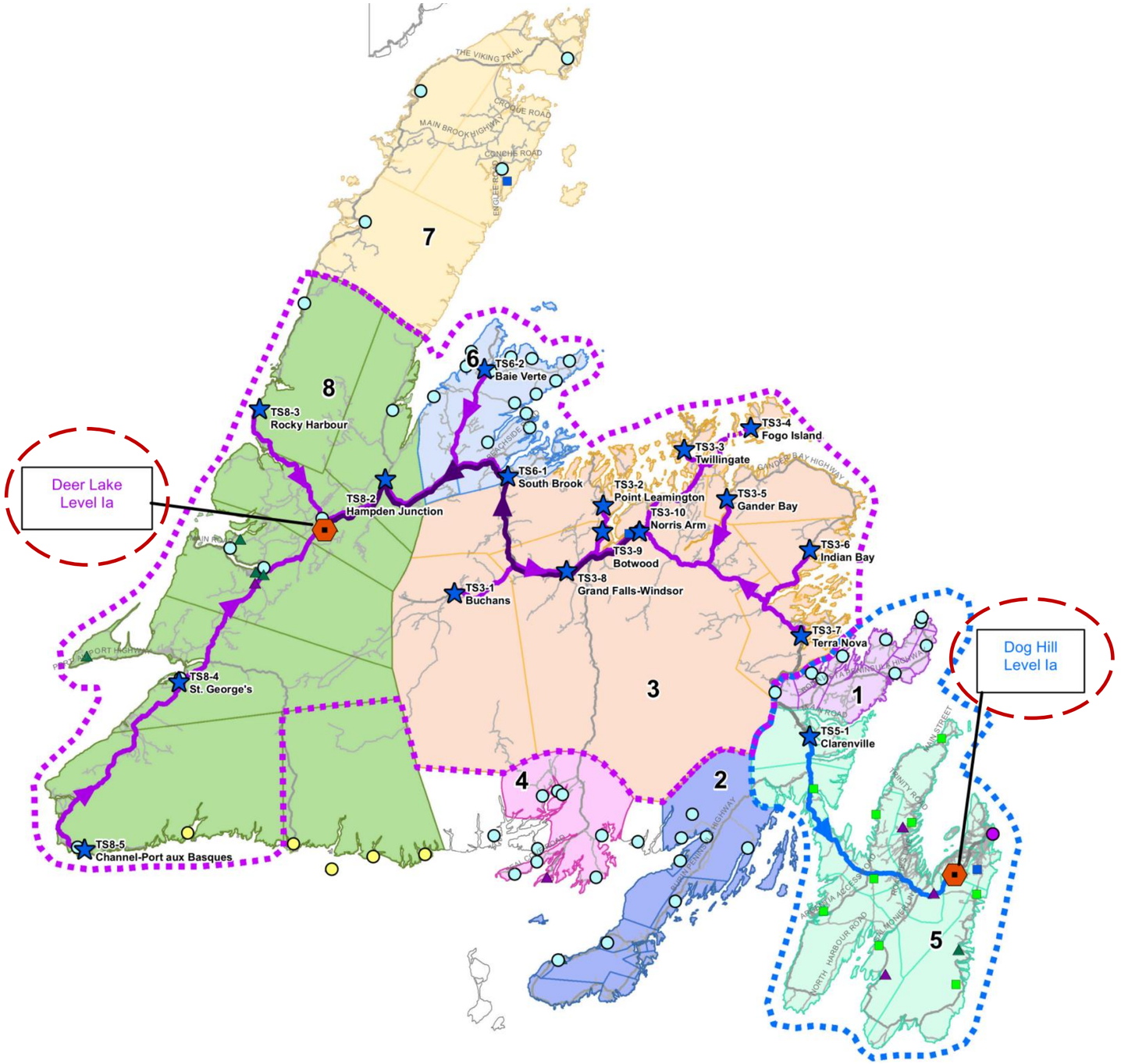
# Scenario 5




**Legend** **Scenario 5**

- Scenario 5 Transfer Facilities
- Scenario 5 Composting Facilities
- Existing Composting Facility
- Existing Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Proposed Haul Route
- Scenario 5 Service Area Boundaries
- 1- Discovery Regional Service Board
- 2 - Burin Peninsula Regional Service Board
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**Facility Capacity Levels**
Level Ia - > 10,000 tonnes/year
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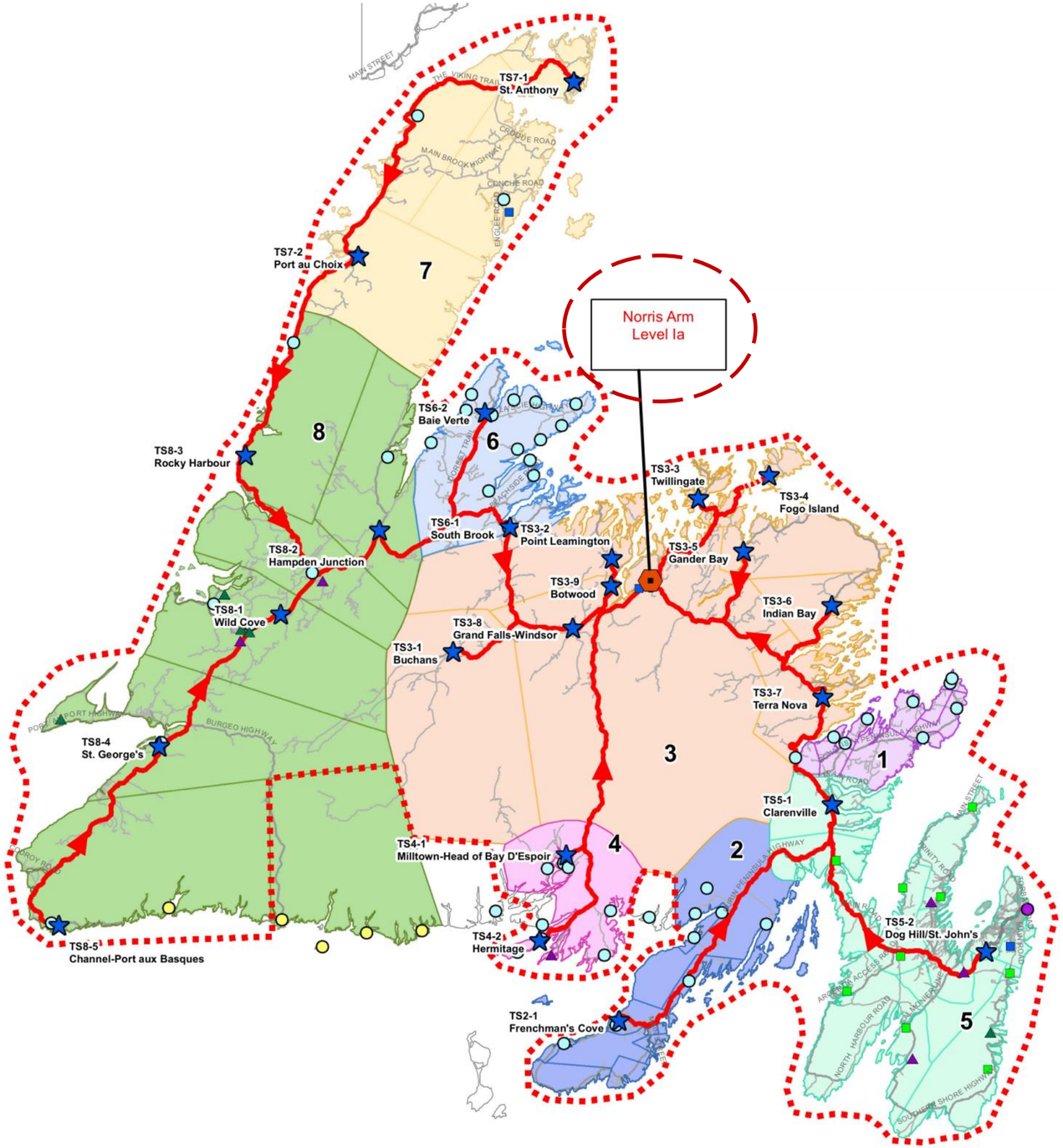
# Scenario 6




**Legend** **Scenario 6**

- Scenario 6 Transfer Facilities
- Scenario 6 Composting Facilities
- Existing Composting Facility
- Existing Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Proposed Haul Route
- Scenario 6 Service Area Boundaries
- 1- Discovery Regional Service Board
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**Facility Capacity Levels**
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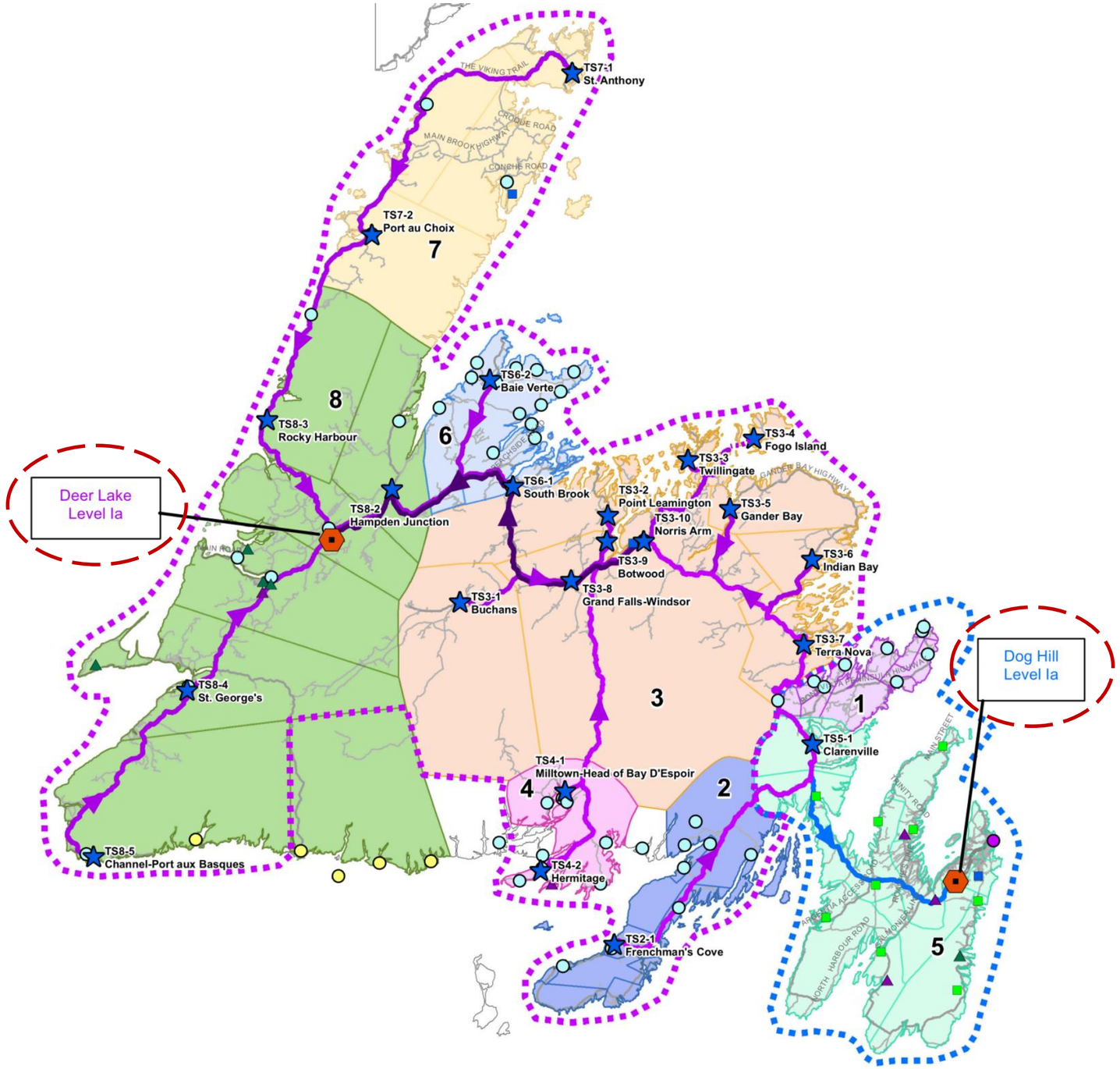
# Scenario 7




**Legend** **Scenario 7**

- Scenario 7 Transfer Facilities
- Scenario 7 Composting Facilities
- Existing Composting Facility
- Existing Composting Facility (Leaf and Yard Materials Only)
- Incinerator
- Unlined Landfill/Disposal Site (Operating)
- Regional Landfill (C/W Composite Liner)
- Materials Recycling Facility
- Transfer Station/Waste Recovery Facility
- Proposed Haul Route
- Scenario 7 Service Area Boundaries
- 1- Discovery Regional Service Board
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**Facility Capacity Levels**
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Level II - 1,000 - 2,499 tonnes/year
Level III - < 1,000 tonnes/year

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# Scenario Analysis Results

| Scenario | % Organics Diverted | | | | % of Population Served |
|---|---|---|---|---|---|
| | 2015 | 2025 | 2035 | 2045 | |
| Scenario 1 | 8 | 12 | 12 | 12 | 86.8 |
| Scenario 2 | 9 | 14 | 14 | 14 | 99.7 |
| Scenario 3 | 9 | 14 | 14 | 14 | 99.7 |
| Scenario 4 | 9 | 13 | 13 | 13 | 95.0 |
| Scenario 5 | 9 | 13 | 13 | 13 | 91.7 |
| Scenario 6 | 9 | 14 | 14 | 14 | 99.7 |
| Scenario 7 | 9 | 14 | 14 | 14 | 99.7 |

- Average organics diversion rate: ~11%
- MMSB 2011 waste diversion rate: 29%
- Additional ~10% needed to get to Provincial target

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# Next Steps

- **Final report submitted in March 2014**
- **Province/Regions to:**
  - identify a preferred course of action
  - set implementation priorities and timelines
  - commence implementation of preferred course of action

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# Thanks for your attention!

## CONTACT:

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