Stormwater Master Plan – Progress Update

City of Rockland, Maine

June 2022

Ryan Wingard, PE
Steve Guerrette, PE

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Agenda

- Introductions
- Overview of Phase 1
- Council Questions from Phase 1
- Summary of Proposed Phase 2 Work
- Schedule Moving Forward
- Thank You

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2

Introduction

Ryan Wingard, PE
Stormwater Lead

Steve Guerrette, PE
Lead Project Engineer

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Overview of Phase 1 – Preliminary Stormwater Master Plan

Phase 1 Master Plan Tasks

- Review of existing data
- Review projects already proposed
- Field Inspection
- Hydraulic Modeling
- Analyze potential for green infrastructure
- Prioritize Improvements
- Develop Draft Master Plan
- Develop Final Master Plan

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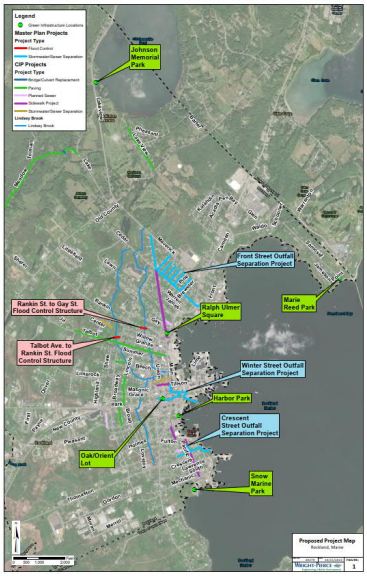
Overview of Phase 1 – Preliminary Stormwater Master Plan



Preliminary Stormwater Master Plan Recommendations

- Separation Projects
- Green Infrastructure Projects
- Storage Projects

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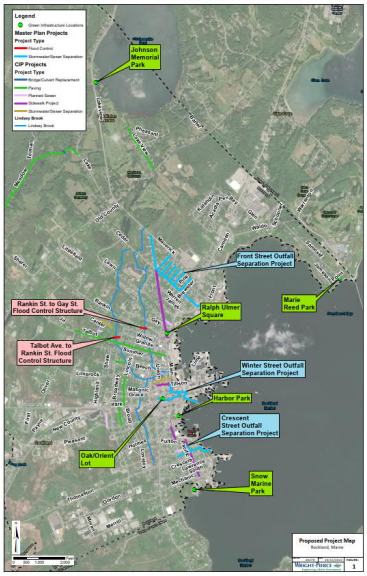
Overview of Phase 1 – Preliminary Stormwater Master Plan



Separation Projects (not in Lindsey Brook)

- Crescent Street Outfall Separation
- Front Street Outfall Separation
- Winter Street Outfall Separation

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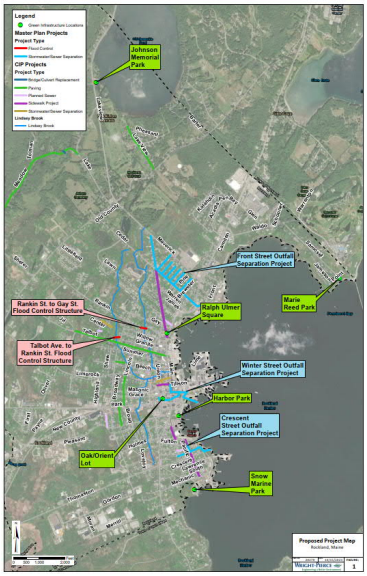
Overview of Phase 1 – Preliminary Stormwater Master Plan



Green Infrastructure Projects

- Harbor Park – Treatment Device
- Snow Marine Park – Vegetated Bio-retention
- Samoset Road/Marie Reed Park – Vegetated Bio-retention
- Oak/Orient Parking Lot – Porous Pavement/Tree Box Filter
- Johnson Memorial Park – Vegetated Bio-retention
- Ralph Ulmer Square – Vegetated Bio-retention

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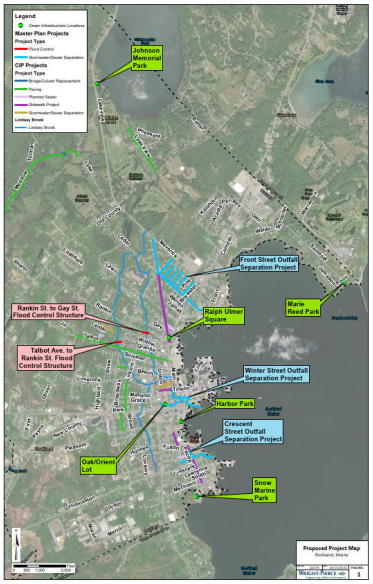
Overview of Phase 1 – Preliminary Stormwater Master Plan

Storage Infrastructure Projects

- Talbot Avenue to Rankin Street Flood Control Structure
- Rankin Street to Gay Street Flood Control Structure



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Overview of Phase 1 – Preliminary Stormwater Master Plan

Project Prioritization – Recommended List

Priority	Project Name	Type	Cost
1	Crescent Street Outfall Separation Project	Sewer Separation	$1,379,000
2	Front Street Outfall Separation Project	Sewer Separation	$6,490,000
3	Winter Street Outfall Separation Project	Sewer Separation	$1,786,000
4	Oak Street / Orient Street Parking Lot Green Infrastructure Project	Green Infrastructure	$753,000
5	Ralph Ulmer Square Green Infrastructure Project	Green Infrastructure	$147,000
6	Harbor Park Green Infrastructure Project	Green Infrastructure	$132,000
7	Winter Street Outfall Redirection Project	Sewer Separation	$957,500
8	Talbot to Rankin Flood Control Structure	In-stream Flood Control	$1,540,000
9	Johnson Memorial Park Green Infrastructure	Green Infrastructure	$216,500
10	Rankin Street to Gay Street Flood Control Structure	In-stream Flood Control	$1,392,000
11	Snow Marine Park Green Infrastructure	Green Infrastructure	$225,000
12	Samoset Road/Marie Reed Park Green Infrastructure Project	Green Infrastructure	$127,000
TOTAL PROJECT COSTS			$13,753,000

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Questions from Phase 1

- Will the proposed retention ponds have some form of silt reservoir, or a kind of sump that can be cleaned out every couple of years to protect Lermond's Cove? Or as part of the project should we be looking at a silt reservoir at the terminus of the Brook, say as it enters the harbor?
- On a practical level, how much could the proposed Talbot / Rankin / Gay flood control structures reduce flooding, and in what areas?
- In the prioritization chart, how were benefits determined or quantified?
- Could conveyance improvements plausibly reduce downstream Lindsey Brook flooding? At what (approximate) cost?Impacted by infiltration/inflow?
- Some community members have advocated daylighting Lindsey Brook. Any thoughts on the feasibility or expense of this?

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Project Prioritization – Scoring Matrix

Table 4-1 Stormwater Project Scoring Matrix

Score	Cost/Benefit	Funding Probability	PCF Flow Reduction	CIP Overlap
5	Very Low	Extremely High	Extremely High	Significant
4	Low	Very High	Very High	Substantial
3	Moderate	High	High	Moderate
2	High	Moderate	Moderate	Little
1	Very High	Low	Little	Very Little
0	Extremely High	Very Low	Low	None

- Potential to modify this for Phase 2 work.

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Project Prioritization – Scoring

Table 4-2 Stormwater Project Prioritization

Project Name	Cost/Benefit	Funding Probability	PCF Flow Reduction	CIP Overlap	Total
Winter Street Outfall Separation Project	1	5	3	0	9
Crescent Street Outfall Separation Project	3	5	4	5	17
Front Street Outfall Separation Project	4	2	5	0	11
Talbot to Rankin Flood Control Structure	3	0	0	0	3
Rankin Street to Gay Street Flood Control Structure	2	0	0	0	2
Snow Marine Park Green Infrastructure	2	0	0	0	2
Oak Street / Orient Street Parking Lot Green Infrastructure Project	1	5	3	0	9
Ralph Ulmer Square Green Infrastructure Project	4	0	0	5	9
Harbor Park Green Infrastructure Project	5	0	0	0	5
Johnson Memorial Park Green Infrastructure	3	0	0	0	3
Samoset Road/Marie Reed Park Green Infrastructure Project	2	0	0	0	2
Winter Street Outfall Redirection Project	1	1	2	0	4

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Why Sewer Separation Projects?

- Reduce flows at the Pollution Control Facility (PCF)
  - Reduce duration of sustained increased flows
  - Reduce costs of future upgrades at PCF
- Reduce Harbor Pollution from Stormwater
  - "1st flush" of runoff is the key
- Reduce Flows in Collection Systems
  - Reduce I/I and flow restrictions in sanitary collection system
  - Reduce operation and maintenance costs
  - Cost savings if done with planned street reconstruction
- Separation Projects can Fund Stormwater Improvements
  - Sewer improvements can drive stormwater funding
  - Separating stormwater responsibly

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Phase 2 Tasks

- Answer Phase 1 Council Questions
- Field Work based on 2021 rainfall
- Stormwater model updates
- Add and reprioritize stormwater projects
- Research funding opportunities
  - Applied for CWSRF funding (not successful)
  - Applied for MaineDOT funding
  - Discussing with internal funding expert
- Summary of Stormwater Utility Process
  - Will require significant public process
- Updated Stormwater Master Plan

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Phase 2 Tasks - Schedule

- Answer Phase 1 Council Questions – 6/29/22
- Field Work based on 2021 rainfall (90% complete) – 7/11/22
- Stormwater model updates (50% complete) – 8/1/22
- Add and reprioritize stormwater projects – 8/29/22
- Research funding opportunities (ongoing) – 9/26/22
  - Applied for CWSRF funding (not successful)
  - Applied for MaineDOT funding
  - Discussing with internal funding expert
- Summary of Stormwater Utility Process – 10/17/22
  - Will require significant public process
- Updated Stormwater Master Plan – 10/31/22

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Flooding Discussion - Causes

- What Causes Flooding
  - Insufficient conveyance
    - Existing piping/culverts capable of handling 5-year, 24-hour storm
    - Pipes/culverts need to be maintained
    - Existing open channel is overtopping (undersized)
  - Tidal influences
    - Tide fluctuates between -2.0' and 13.0' (MLLW)
    - October 2021 event high tide was at 9.1' (MLLW)
    - Lindsey Brook outfall elevation at 0.7' NAVD88 (5.9' MLLW)
    - Lindsey Brook upstream outfall elevation 9.1' NAVD88 (14.3' MLLW)
    - Appears there is at least 5' of hydraulic head to push flows out
  - Overwhelming and intense rain events
    - October 2021 event was 5.2 inches in 21 hours (4.5 inches in 6 hours)
    - Peak intensity was 1.35 inches/hour (2.76 inches/hour for 5-minute)
    - Similar to a 50-year, 6-hour design event

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Flooding Discussion – Standard Flooding Solutions

- Watershed storage
- Underground storage
- Increase conveyance
  - Increase pipe sizes
  - Relief piping
  - Additional outfalls
  - Increase open channel cross section
  - Convert closed piping to open channel (Lindsey Brook)
- Pumping against the tide (not for Rockland)
- Infiltration
- Flood proofing structures
  - Increasing finished floor elevation
  - Installing flood water barriers

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87 Limerock Street – October 2021 vs. June 2022

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101 Limerock Street – October 2021 vs. June 2022

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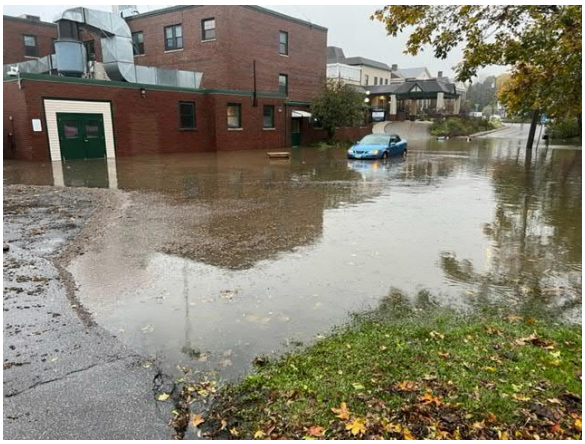
Knox Center (East) – October 2021 vs. June 2022



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Knox Center (West) – October 2021 vs. June 2022

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Potential Lindsey Brook Flood Mitigation Projects

- Talbot Avenue to Rankin Street Flood Control Structure
  - Flood control benefit
    - 17% reduction in flow for 25-year
    - 35% reduction in flow for 10-year
- Rankin Street to Gay Street Flood Control Structure
  - Flood control benefit
    - 7% reduction in flow for 25-year
    - 23% reduction in flow for 10-year
- Mitigation Projects Considered for Phase 2
  - Increasing culvert/piping sizes
  - Increasing open channel conveyance
  - Converting closed pipe network to open channel
  - Minor storage on Rankin (near Old County Road)

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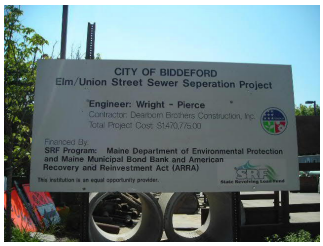
Potential Stormwater Funding



- Research funding opportunities (ongoing)
  - Applied for CWSRF funding (not successful)
  - Applied for MaineDOT funding (pending)
  - Discussed with internal funding expert
    - Community Resilience Partnership ($50k max – September 2022)
    - DOI, Bureau of Reclamation ($200k max – March 2023)
    - NOAA Habitat Restoration ($ varies – August 2022)
    - EPA SSO and Stormwater Municipal Grants ($ varies – timing varies)
    - DOT National Culvert Replacement Grant ($ varies – timing TBD)
    - Maine DEP CWSRF ($ varies – March 2023)
    - FEMA Flood Mitigation Grants ($ varies – September 2022)
    - FEMA Hazard Mitigation Grants ($ varies – June 2023)
    - FEMA BRIC Grants (December 2022)
    - NRCS Watershed and Flood Prevention ($ varies – January 2023)
    - NOAA/Maine Coastal Program Grant ($ varies – April 2023)

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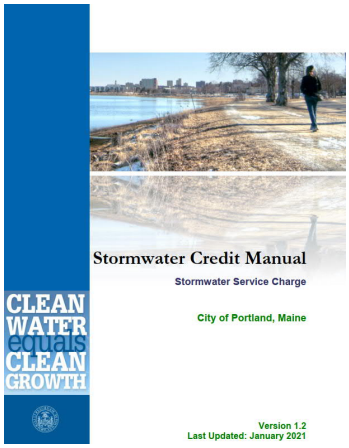
Potential Stormwater Funding



- Create Stormwater Utility
  - Generates funding through user fees based on impervious areas
  - Similar to dedicated municipal funds for public water and sewer
  - Benefits
    - Dedicated funding source
    - Sustainable revenue
    - Shared Cost
  - Does it make sense for Rockland?
    - Workshops required with stakeholders
    - Need to understand stormwater needs and future costs
    - "Compelling Case" needed to identify pros and cons
    - Education and outreach needed
    - Rate methodology needed to identify data gaps
    - Rate structure analysis needed
    - Billing methodology investigation

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THANK YOU

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