CITY OF
BAINBRIDGE ISLAND

CITY COUNCIL STUDY SESSION
TUESDAY, MARCH 15, 2022

REMOTE MEETING ON ZOOM

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AGENDA

1. **CALL TO ORDER / ROLL CALL - 6:00 PM**

2. **APPROVAL OF AGENDA / CONFLICT OF INTEREST DISCLOSURE - 6:05 PM**

3. **REGULAR BUSINESS**

3.A **(6:10 PM) Review Current and Recommended Practices for Funding and Maintaining City Facilities and Streets - Public Works,** 45 Minutes
Streets_Facilities Funding Memo 031122.docx
Facilities Streets Memo Appendix A - Facilities Condition Assessment.pdf
Facilities and Streets Memo Appendix B - Establishing City Facilities Maintenance and Capital Replacement Policy_DRAFT.docx
Facilities_Streets Memo Appendix C - Pavement Condition Report.pdf
Facilities_Streets Memo Appendix D - Streets Staffing Analysis.pdf
Facilities_Streets Presentation.pptx

3.B **(6:55 PM) Overview of Real Estate Excise Tax - Finance,** 20 Minutes
Real Estate Excise Tax Presentation.pptx
2022 REET Uses Staff Memorandum.docx

4. **COMMITTEE REPORTS - 7:15 PM**

5. **ADJOURNMENT - 7:25 PM**

GUIDING PRINCIPLES

Guiding Principle #1 - Preserve the special character of the Island, which includes downtown Winslow's small town atmosphere and function, historic buildings, extensive forested areas, meadows, farms, marine views and access, and scenic and winding roads supporting all forms of transportation.

Guiding Principle #2 - Manage the water resources of the Island to protect, restore and maintain their ecological and hydrological functions and to ensure clean and sufficient groundwater for future generations.

Guiding Principle #3 - Foster diversity with a holistic approach to meeting the needs of the Island and the human needs of its residents consistent with the stewardship of our finite environmental resources.

Guiding Principle #4 - Consider the costs and benefits to Island residents and property owners in making land use decisions.

Guiding Principle #5 - The use of land on the Island should be based on the principle that the Island's environmental resources are finite and must be maintained at a sustainable level.

Guiding Principle #6 - Nurture Bainbridge Island as a sustainable community by meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Guiding Principle #7 - Reduce greenhouse gas emissions and increase the Island's climate resilience.

Guiding Principle #8 - Support the Island's Guiding Principles and Policies through the City's organizational and operating budget decisions.

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CITY OF BAINBRIDGE ISLAND

City Council Study Session Agenda Bill

MEETING DATE: March 15, 2022 **ESTIMATED TIME:** 45 Minutes

AGENDA ITEM: (6:10 PM) Review Current and Recommended Practices for Funding and Maintaining City Facilities and Streets - Public Works,

SUMMARY: The City Manager and City staff will present an overview of the City's current practices regarding funding and implementing the maintenance of City facilities and streets, and make recommendations for the City Council's consideration as part of the 2023-24 biennial budget process.

No specific action is requested from the City Council other than a commitment to the principle of maintenance. Specifically, preventative maintenance. Maintenance is an essential activity. Preventive maintenance aims to minimize unplanned downtime and repair costs. It is generally understood that preventive maintenance can save money over reactive maintenance.

AGENDA CATEGORY: Discussion **PROPOSED BY:** Public Works

RECOMMENDED MOTION: Discussion.

STRATEGIC PRIORITY:

FISCAL IMPACT:	
Amount:	N/A
Ongoing Cost:	N/A
One-Time Cost:	N/A
Included in Current Budget?	No

BACKGROUND: See the attached staff memo and related appendices for more information regarding current practices for funding and implementing the maintenance of City facilities and streets, including recommendations for the City Council's consideration as part of the 2023-24 biennial budget process.

ATTACHMENTS:

Streets_Facilities_Funding Memo 031122.docx

Facilities Streets Memo Appendix A - Facilities Condition Assessment.pdf

Facilities and Streets Memo Appendix B - Establishing City Facilities Maintenance and Capital Replacement Policy DRAFT.docx

Facilities Streets Memo Appendix C - Pavement Condition Report.pdf

Facilities Streets Memo Appendix D - Streets Staffing Analysis.pdf

Facilities Streets Presentation.pptx

FISCAL DETAILS: N/A

Fund Name(s):

Coding: N/A

CITY OF
BAINBRIDGE ISLAND

Department of Public Works Memorandum

Date: March 11, 2022

To: City Manager

From: Christopher Wierzbicki, Public Works Director

Subject: Facility and Pavement/Streets Maintenance Needs Overview

Attachments: Appendix A, Facilities Condition Assessment; Appendix B, Draft City Facilities Capital and Maintenance Fund Policy; Appendix C, Pavement Management Report; Appendix D, Municipal Streets Maintenance Comparison.

Executive Summary

The following memo provides background and support for the following recommendations related to the City's facility, pavement management and streets maintenance programs:

- Create an annual set-aside of $1 million for facility maintenance, potentially through the establishment of a City Facilities Capital and Maintenance Fund;
- Add 1 new full-time employee (FTE) dedicated to facility maintenance (total = 2), and 1 new full-time project manager dedicated to facility maintenance contract work (total = 3);
- Fund an update to the facility condition assessment in the 2023-24 biennial budget;
- Increase annual pavement management budget to $1 million plus inflation (approximately $500K average annual increase); and,
- Increase streets maintenance staffing to expand crew availability.

Purpose

This memo was prepared at the City Manager's request for the purpose of clarifying the City's current funding and approach for maintaining facilities, asphalt-paved streets, and general street maintenance. The memo also presents informed recommendations for funding and performing this work in the future and serves as a supplement to the proposed City Facilities Maintenance and Capital Replacement Policy, which is proposed for a discussion with the City Council on March 15, 2022.

Facility Maintenance

Summary of Existing and Future Facilities and Needs

The City maintains approximately 90,000 square feet of facilities, with an additional 18,000 square feet expected to come online in late 2023 when the new Police and Municipal Court Building is completed at 8804 Madison Avenue. Additionally, the City also provides grounds maintenance services for the City dock, approximately 70 acres of park land, and another 9 acres of building-related grounds, including the new Police/Court building.

The City last performed a Facilities Condition Assessment in 2018 (see Appendix A.) That assessment was broken out into detailed assessments of the City's four largest facilities (City Hall, the Public Works Shop, the Public Works Truck Storage Building, and the Senior Center/Commons), and a summary of observational deficiencies for the remaining smaller facilities.

The assessment identified that in 2018, there were approximately $4M of "predicted renewal" costs over 20 years for the four facilities that were closely studied, and an additional $700K of observed deficiencies noted for the remaining facilities.

Current Facility Maintenance Approach and Recent Work

The City's Public Works Operations and Maintenance Division provides a majority of the maintenance for the City's facilities both through direct staff attention, and through contracts for service. The work is planned and funded as part of the biennial budget process, and scheduled according to funding availability, risk prioritization, and staff availability. The type of work performed by the City and its contractors spans a wide variety of complexity and cost, from door knob repairs, to roof and exterior siding replacement. In the last 5 years, the City has spent an annual average of approximately $200K on routine facility maintenance, excluding a large repair/replacement project at City Hall that was approximately $400K.

With regards to grounds maintenance, the City performs a majority of this work with staff resources. The work includes not only building grounds maintenance but also road-end, farms, trail and sprinkler system maintenance. City staff do not perform janitorial work, which is provided through a contract for service.

The Streets and Facilities work group, which consists of 9 FTEs total, are available to perform grounds maintenance, but this work must be prioritized along with street maintenance needs. Temporary, seasonal employees are also available to perform this work. One FTE from the group is specifically assigned to facility maintenance, and one is assigned to downtown Winslow (new position, not yet filled.)

Currently, the Division estimates that only 60% of the desired level of service for routine maintenance work is being performed, a majority of which is reactive. The lack of capacity in this area is visible to building occupants and the public, for example, through damaged walls and building hardware that are unable to be addressed in a timely manner.

Facility Maintenance Recommendations

Based on the Facilities Condition Assessment, the City should be setting aside at least $1M annually for facility repair and maintenance, potentially through the establishment of a City Facility Maintenance and Capital Replacement Fund (see an example policy and more detail in Appendix B). The $1M annual contribution was developed based on recommendations from the Facility Condition Assessment, which identified a need for at least $200K per year, and an estimate of the cost of asset depreciation, which is currently calculated at approximately $800K per year once the new Police and Court facility is completed.

An update to the Facilities Condition Assessment that includes the new Police and Municipal Court Facility, and that provides a more detailed investigation of the City's other facilities, should be funded in the next biennium to confirm and/or update the recommended annual fund contribution.

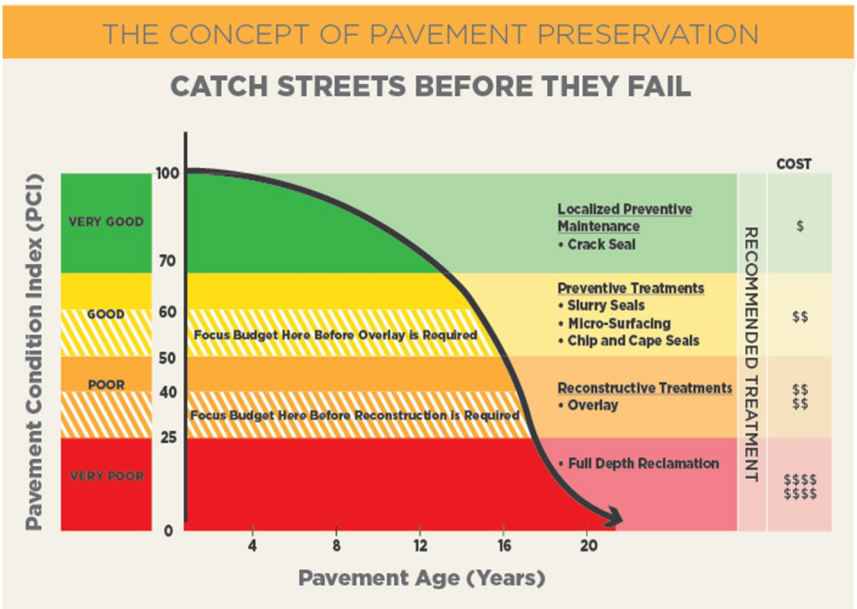
Additionally, following industry standards that state the median number of FTEs for building maintenance is 1 per 50,000 SF, and to provide the Division's level of service goals, ideally the City would have 2 FTEs dedicated to facility maintenance (excluding grounds). Lastly, an additional 1FTE project manager is recommended to ensure that projects are able to be effectively planned and delivered.

Pavement Preservation and Street Maintenance

Summary of Pavement Conditions and Current Maintenance Approach

The City currently maintains approximately 270 lane miles of paved roads and an additional 5 miles of gravel roads, a list which grows slightly each year due to the acceptance of privately built, public facilities associated with land development actions.

The City's last Pavement Management Report was completed in 2020 (see Appendix C). The report identified that the City's replacement cost for the roadway system was approximately $115M, with the Pavement Condition Index (PCI) rated at 70. The PCI score is a ranking assessment on the overall health of a pavement segment on a scale of 0 to 100, with the network average being a global indicator of the network's overall health.



Investment in pavement preservation is a key piece of minimizing the costs of road maintenance. As shown on the left, maintaining a PCI score between 60 and 70 through preventative treatments like crack sealing, chip sealing and square-cut patching prevents the need for costlier reconstruction or reclamation. Note also that conditions more rapidly deteriorate below a PCI score of 70.

The City performs a majority of the pavement preservation work through an annual contract for services, the budget for which has averaged approximately $500K per year. At that rate of investment, the Pavement Management Reports predicts that the average PCI score will lower from 70 to 64 over 5 years (which indicates that the current PCI score is now 68), and the backlog portion of the network that will need more expensive reconstruction in lieu of maintenance will increase from 7.5% to 11%. The Report recommends an investment of approximately $1M per year to maintain a PCI of 68 and reduce the backlog to 6%.

Current Street Maintenance Approach and Recent Work

In addition to pavement management, the City also performs a host of maintenance and safety-related tasks associated with the roadway system. The work - which includes sweeping, vegetation management, sign maintenance, shoulder maintenance, etc. – is performed almost entirely by City staff. There are 8 FTEs in the Streets and Facilities work group that perform this work, one of which is dedicated primarily to signs and markings, and one of which is dedicated to downtown Winslow. These same staff are responsible for grounds maintenance identified in the previous section of this memo.

Currently, the Division estimates that only about 70% of the desired level of service for streets maintenance work is being performed – with less than 50% of key tasks such as shoulder maintenance and minor pavement maintenance being performed. The City has not performed any asphalt crack sealing work in recent years. Additionally, the City is preparing to expand the bike facility network, which will create an additional need for maintenance resources. The lack of capacity in these areas of work is experienced by the public when shoulder conditions impact biking and walking safety, and when concentrated areas of potholes are addressed only with temporary measures. A lack of roadside maintenance also results in areas of ponding and poor drainage which exacerbate pavement deterioration in the travel lanes.

Pavement/Streets Maintenance Recommendations

In following the recommendations from the Pavement Management Report, ideally the City would invest a minimum of $1 million annually in pavement preservation in order to maintain a PCI index of 68 or higher. This would be an average increase of $500K per year from current spending levels. An inflation factor of between 2.5-5% should be added for future years.

To provide the Division's level of service goals, ideally the City would have additional staffing dedicated to street maintenance. A proposed increase in staffing, combined with some strategic equipment purchase, would also aid in supplementing the pavement management work through the crew's ability to perform hot asphalt pavement repairs. Currently, the City's need for hot asphalt repairs, which are a critical component of pavement management, are too large for the current crew size, and too small to interest contractor support. There are portions of this work that can be performed through the annual pavement contract, but the City pays a premium for the work, and it absorbs funding that is intended to address more comprehensive and complete preventative treatments.

Lastly, for the development of this memo, City staff contacted the Municipal Research Service Center and individual City Public Works Departments in Washington State for information on how other municipal governments with similar roadway and geographic conditions staff their streets maintenance work groups. A comparative analysis can be found in Appendix D.

Appendix A

City of Bainbridge Island

2018 Facility Condition Assessment

Final Report

Prepared By:

MENG ANALYSIS

October 2, 2018

Contents

Database Reports Continued

Introduction

The City's assets are the foundation of the valuable services the City provides to residents and represent a significant investment. Effective asset management is required to maintain service levels and for long-term fiscal sustainability. Effective asset management is also a good investment in itself, as proper management and stewardship can slow the deterioration of assets, resulting in life-cycle cost savings.

Effective asset management is comprised of a number of components, including:

- Assets need to be continually assessed so there is up to date information on their status.
- The information is used to determine needed maintenance and to mitigate issues.
- Each asset should have a plan that addresses its needs for its entire life, including its replacement, inspections, and maintenance.
- And there should be a system in place to prioritize asset care and the allocation of limited resources.

To support the City of Bainbridge Island in asset management, capital planning, & budgeting efforts, MENG Analysis was contracted to complete a Facility Condition Assessment (FCA) of a number of City-owned facilities and sites. The MENG Analysis team reviewed existing operation and maintenance information, conducted field investigations to identify Observed Deficiencies (ODs), developed cost estimates for documented issues, and used customized cost models to predict future capital costs over a 20-year horizon (Predicted Renewals or PRs).

This assessment was broken into two levels of detail, "Detailed FCA" and "Observed Deficiencies Only," as noted in the list of facilities surveyed for this project on the following page.

Facility	Address	Square Feet	Level
City Hall	280 Madison Ave N	24,107	Detailed FCA
Public Works Shop	7305 Hidden Cove	8,728	Detailed FCA
PW Truck Storage Building	7305 Hidden Cove	12,000	Detailed FCA
Senior Center/Commons	370/402 Brien Dr SE	2,500/4,088	Detailed FCA
Commodore Well Building	1755 Lewis Place NW	240	ODs Only
Court	10255 Valley Road NE	3,000	ODs Only
Decant Facility	6400 Don Palmer Lane	15,600	ODs Only
Fletcher Bay Booster Station	5579 N.E. Foster Road	520	ODs Only
HOB Booster Station	7290 Wyatt Way	600	ODs Only
HOB Well 1 Building	7290 Wyatt Way	80	ODs Only
HOB Well 2 Building	7290 Wyatt Way	90	ODs Only
Morales Farm house	8862 NE Lovgreen Road E	1,122	ODs Only
Police Station	625 Winslow Way East	7,000	ODs Only
PW Admin Trailer	7305 Hidden Cove	1,770	ODs Only
PW SSWM Trailer	7306 Hidden Cove	270	ODs Only
PW Storage Shop	7305 Hidden Cove	1,700	ODs Only
PW Training Trailer	7307 Hidden Cove	400	ODs Only
PW Well Building	7305 Hidden Cove	100	ODs Only
Rockaway Treatment Building	1100 Old Creosote Road	100	ODs Only
Sands Booster Station	8499 Sands Avenue NE	390	ODs Only
Suyematsu Farm house	9929 NE Day Road E	1,372	ODs Only
Taylor Well Building	6300 Taylor Avenue	114	ODs Only
Waterfront Park Bathroom	301 Shannon Drive	330	ODs Only
WWTP Biosolids Building	1220 Donald Place	2,092	ODs Only
WWTP Blower Building	1220 Donald Place	2,240	ODs Only
WWTP Contact Chamber Building	1220 Donald Place	567	ODs Only
WWTP Control Building	1220 Donald Place	2,016	ODs Only
WWTP Effluent Pump Building	1220 Donald Place	90	ODs Only
WWTP RAS Building	1220 Donald Place	266	ODs Only

This introduction presents a general overview of the findings and trends across the City's facility portfolio. More detailed assessment data are included in each of the individual facility group reports.

FCA Methodology

Facility Survey Methodology

The methodology for the City of Bainbridge Island FCA started with an initial review of previous records and drawings. An operations and maintenance questionnaire was completed by city staff. Additional anecdotal was gathered during the O&M workshop.

This preparation stage was followed by eight weeks of on-site field surveys of architectural, site/civil, mechanical, plumbing, and electrical systems for each facility building and site infrastructure. The facility surveys were facilitated by an FCA Team Leader to maintain consistency in evaluation and on-going training with survey forms, condition ratings and system categorization. Following each facility walk-through, the FCA Team completed condition survey and observed deficiency forms.

Each team member used survey forms to document the apparent facility conditions including:

i. Describing the nature of facility systems per Uniformat
ii. Determining the overall condition score
iii. Identifying major maintenance deficiencies greater than $5,000 (direct cost) that are likely to be required for immediate major maintenance repairs (2018), plus the next 5-year period (2019-2023)
iv. Documenting specific deficiencies of systems with narrative as well as budgetary level cost estimates to repair or replace deficiencies
v. The survey team also documented specific opportunities for upgrades that will increase facility performance. These items are not required.

Cost Models

Customized cost models were developed for the City of Bainbridge Island are based on general specific facility use types unique to these facilities. Therefore, the application of the cost model's facility use types to other new types of facilities is not recommended.

Estimating Methodology

The MENG Analysis team uses the Uniformat II system to organize cost estimates. Depending upon the condition and type of system, cost estimates are based upon square foot area (SF), linear feet (LF), lump-sum (LS), and each (EA) quantity factors.

For the cost estimating of Observed Deficiencies of building systems, the FCA survey team estimated costs for system repairs or replacements.

A proprietary custom cost model was used that drives the Predicted Renewal (PR) costs of building systems. Unit costs in the models are updated on a yearly basis and adjusted to our specific northwest region. The models also provide an overall building cost per square foot ($/SF) for various building types. Specific analysis of similar projects that have been estimated and managed by the team were also referenced against the modeled costs for additional verification of recent costs.

Condition Survey Form Development

Survey forms were developed for the facility condition assessments based on the Uniformat Level 3. All Level 3 subsystems are described with evaluation criteria. The evaluation criteria descriptions clearly explain what elements were included and excluded from each Level 3 subsystem.

Each survey form is accompanied by a deficiency report form that is completed when Observed Deficiencies (ODs) are noted. This Observed Deficiency form notes the problem and the recommended action to correct the deficiency. Raw construction costs (i.e., labor and materials) for facility component replacements or repairs are estimated.

Sample Condition Scoring Criteria

The following section provides six examples of the condition scoring definitions that were used during the condition surveys.

Roof Construction **B1020**	Roof structural frame, structural interior walls supporting roof, roof decks, slabs and sheathing, canopies. Excludes insulation and roofing. **1- Excellent:** New; Structure is sound and stable; no evidence of cracking, deflection or separation of framing members. Preventative inspection. **2 - Good:** Structure is sound and stable; no evidence of cracking, deflection or separation of framing members. Minor preventative maintenance: rust proofing and / or sealants and tightening of connections. **3 - Fair:** Minor surface cracking or separation of framing members. Preventative maintenance and minor restorative repairs of isolated items. **4 - Poor:** Structural damage evident; Twisting, cracking, or separation of structural members affecting surrounding finishes or moisture intrusion. Restorative repairs. **5 - Unsatisfactory:** Structurally deficient or damaged beyond repair; major damage to surrounding finishes; jeopardizing occupancy. Replacement.

Exterior Windows **B2020**	Screens, storm windows, exterior louvers, frame, trim, sills, caulking, flashing. Excludes window shades and treatments. **1 -Excellent:** New; doors operating smoothly; no finish degradation. Preventative inspection. **2 - Good:** Functioning smoothly; no finish degradation. Secure hardware and emergency exiting. Minor preventative maintenance. **3 - Fair:** Worn but functional; requires paint or resealing; glass or hardware damage only in isolated doors. Preventative maintenance and minor restorative repairs of isolated items. **4 - Poor**: Damaged or deficient hardware, glass, trim or seals; water intrusion. Restorative repairs. **5 - Unsatisfactory:** Extensive damage, deficient beyond repair; Hardware not operating, moisture intrusion. Replacement.

Exterior Wall Finishes **B2040**	Exterior wall - exterior applied finishes **1 - Excellent:** New; no finish degradation. Preventative inspection. **2 - Good:** no cracking or moisture intrusion. Minor finish degradation. Minor preventative maintenance. Cleaning. **3 - Fair:** Minor undamaged but requires sealing. Preventative maintenance and minor restorative repairs of isolated items. **4 - Poor:** Restorative repairs. **5 - Unsatisfactory:** Damaged beyond repair, Replacement.

Plumbing Fixtures **D2010**	Water closets, urinals, lavatories, sink, showers, bathtubs, drinking fountains. Excludes hot water heaters. **1 – Excellent:** New; All fixtures operating well. Preventative inspection. **2 – Good:** system components operational, free of defect, and of adequate utility service and capacity for intended use. Includes water saving features. Minor preventative maintenance. **3 – Fair:** Some components worn, fixtures stained. Preventative maintenance and minor restorative repairs of isolated items. **4 – Poor:** Many components damaged; limited parts; leaking valves, rust and corrosion. Operating parts > 30 years old. Restoration repairs. **5 – Unsatisfactory:** Many fixtures not operational. Rust, corrosion, and mineral deposits. Leaks causing damage to other finishes and components. Replacement.

Heat Generating Systems **D3020**	Boilers, piping and fittings adjacent to boilers, primary pumps, auxiliary equipment, equipment and piping insulation. **1 - Excellent:** New. Preventative inspection. **2 - Good:** System is fully operational, suitable capacity, efficient utility utilization, integrated energy management controls. Minor preventative maintenance. **3 - Fair:** Equipment worn but reliable, older energy controls; Preventative maintenance and minor restorative repairs of isolated items. **4 - Poor:** Equipment marginal/hard to obtain parts, insulated ext. ductwork, no energy controls. > 40 years old. Restorative repairs. **5 - Unsatisfactory:** System non-functional or seriously deficient, not delivering supply to required spaces. Replacement.

Distribution Systems **D3040**	Supply & return air systems, ventilation & exhaust systems, steam, hot water & chilled water distribution, terminal devices, heat recovery equipment, auxiliary equipment such as secondary pumps, and heat exchangers, piping, duct & equipment insulation. **1 - Excellent**: New. Preventative inspection. **2 - Good:** System is fully operational, suitable capacity, efficient utility utilization, integrated energy management controls. Good insulation. Minor preventative maintenance. **3 - Fair:** Equipment worn but reliable, older energy controls; Insulation. Some joints/ sealants loose. Preventative maintenance and minor restorative repairs of isolated items. **4 - Poor:** Equipment marginal/hard to obtain parts, no energy controls; Many grilles missing or loose. Air leaks and unbalance. Restorative repair **5 - Unsatisfactory:** Non-functional or seriously deficient. Grilles corroded, missing. Replacement.

Terminology and Abbreviations

Facility Condition Assessment (FCA): A structured process to document the conditions of site infrastructure and building systems. FCAs are typically performed by a multi-disciplinary team of architects, engineers, construction, and cost specialists. Facility information and condition data should be maintained in a database for ease of updating and reporting. The data should be renewed over time.

Facility Condition Index (FCI): A benchmark used to compare relative condition of facilities within a portfolio of assets; derived by the following formula:

$$FCI = \frac{\text{Backlog of Maintenance and Repair (BMAR)}}{\text{Current Replacement Value (CRV)}}$$

There are a number of different methods used by various organizations to calculate that backlog. For this reason, using FCIs to compare the City's facilities to other organizations is not always appropriate.

This study uses a parametric method that calculates BMAR based on the assessed condition scores. The statistical basis is a study conducted by NASA on over 10,000 surveyed facilities that evaluated the backlog of repair items relative to qualitative condition scores 1 through 5. The parametric backlog for each system is calculated based on a statistical theoretical percentage of that system that would need repair or replacement for each of the qualitative condition scores. The costs of those systems are the facility use cost models customized for the City of Bainbridge Island.

Life Cycle Renewal Model: A theoretical forecast of when building systems will exceed their typical lifespan and funding will be required for renewals.

Parametric Costs: Parametric cost estimating is a technique that uses statistical relationships between historical cost data and other program variables such as system condition or age. Historical cost data is typically used at a high level (e.g., cost per square foot) and often represent conceptual, order-of-magnitude costs for initial planning or discussion purposes.

Remaining Useful Life: An estimate of the years that a facility system may remain serviceable or in operation before failure; which would then require system renewal or replacement.

Subsystem: The term subsystem in this report refers to a Uniformat Level 3 building systems category (e.g., B3010 - Roof Coverings; or B3020 – Roof Opening; or B3030 – Projections).

System: The term system in this report refers to a Uniformat Level 2 building system category (e.g., B3000 – Roofing)

The following terms are used in the MENG Analysis FCA Database:

(See also the database user's manual for more specific definitions.)

Last Major System Renewal: The year in which a system was last renewed (substantially repaired or replaced).

Original System Date: The year a system was originally constructed/installed.

Subsystem Assessed Condition Score: The field surveyors' assessment of condition assigned to each facility subsystem. The rating uses a scale of 1 through 5, where 1=excellent, 2=good, 3=fair, 4=poor, 5=unacceptable. Different subsystem % of CRV's are included in the database for each of the different facility use types (e.g. maintenance shops vs. police station vs. office building, etc.)

BMAR (backlog of maintenance and repair): This is an estimated amount that would need to be spent to bring the facility up to good condition. Does not guarantee code compliance.

BMAR is generally defined as the amount of work required to safely maintain facilities and related infrastructure for the current use that should have been accomplished, but for a variety of reasons has not. It includes minor seismic, ADA, and fire protection items necessary to maintain current operations, but it does not include major work in those areas that would normally be accomplished in major building renovation for full code compliance.

The MENG Analysis methodology for calculating BMAR is based on the condition scores (1-5, excellent to unsatisfactory) for each system, with each condition bracket having a BMAR defined as the percentage of that system's replacement value needing repair. Those percentages were derived from a statistical industry study that compared specific system maintenance and repair costs for tens of thousands of buildings relative to the condition scores. Within our FCA process, we calculate condition scores for each subsystem, which are then rolled up to the systems level, and a bracketed lookup table used associate those scores with a percentage of replacement value. Those are totaled for the entire facility, and then divided by the replacement value of the entire facility to get the actual FCI index.

Subsystem Normal Life: Industry standard expected subsystem life between renewals or replacement cycles.

System Coverage: The amount of area in a facility containing a specific system, expressed as percent of building or site area.

Certain FCA terms are also expressed as formulas in the MENG Analysis FCA Database, as follows:

List of Commonly Used Abbreviations

AC = Asphalt concrete

ACT = Acoustic ceiling tile

A/V = Audio/video

AHU = Air handling unit

ASHRAE = American Society of Heating, Refrigeration, & Air Conditioning Engineers

BUR = Built-up roofing

CCTV = Closed circuit television

CFH = Cubic feet per hour (of natural gas)

CFL = Compact fluorescent

CI = Cast iron

CMU = Concrete masonry unit

CO2 = Carbon dioxide

CU = Condensing unit

C = Commissioning

DDC = Direct digital control

DHW = Domestic hot water

Ds = Direct expansion

EA = Each (measurable unit)

EF = Exhaust fan

EFIS = Exterior insulation finishing system

FRP = Fiber reinforced plastic

GI = Grease interceptor

GSHP = Ground-source heat pump

HID = High intensity discharge (lamps)

HM = Hollow metal

HVAC = Heating, ventilating, and air conditioning

IT = Information technology

LF = Linear feet (measurable unit)

LED = Light emitting diode

LS = Lump sum (measurable unit)

MDF = Main distribution frame

OWS = Oil/water separator

PA = Public address

P-lam = Plastic laminate

PRV = Pressure regulating valve

PTAC = Packaged Terminal Air Conditioning

Spig = Pounds per square inch (pressure)

SS Shelving = Stainless Steel Shelving

PVC = Polyvinyl chloride

RTU = Roof top unit

RPBP = Reduced pressure backflow preventer

SF = Square feet (measurable unit)

UPS = Uninterruptible power supply

VAV = Variable air volume

VCT = Vinyl composite tile

VWC = Vinyl wall covering

VOIP = Voice over internet protocol

WAP = Wireless access point

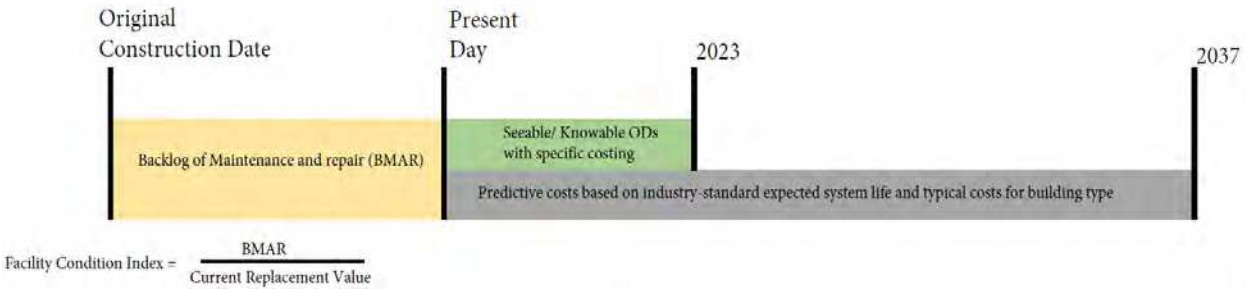
WD = Wood

Cost Overview

Estimated costs are calculated for short-term Observed Deficiencies (ODs) and modeled for long-term Predicted Renewals (PRs). The costs in the detailed reports show direct costs plus typical construction markups as well as project development markups (design, management, etc.).

Observed Deficiencies & Predicted Renewals

It is important to clarify that 2018 – 2023 ODs should not be added to 2018 – 2023 PRs. ODs are based on known conditions that are witnessed by or disclosed directly to the field surveyors. Alternatively, PRs are based on predictive models that use industry-standard expected life data, combined with original construction or remodel dates and system scores from surveyors to estimate when a system will require renewal. Often the 2018-2023 ODs and PRs align somewhat; however, PRs may indicate a system needs renewal that is not evident from visual survey. Conversely, a model might indicate that a renewal is due based on timing, but survey conditions estimate a longer life. Therefore, ODs are generally the best short-term planning tool, while PRs are best used for long-term rough order of magnitude budgeting.



Facility Condition Index & Weighted Average Condition Scores

The surveyor team included knowledgeable technical experts who reviewed civil, structural, architectural, mechanical, electrical, plumbing, and site infrastructure systems to a Uniformat level 3 detail[1]. These individual system descriptions and scores can be found in the individual Facility Summaries in each Facility Grouping report. These scores are weighted and aggregated into two key indicators of condition:

1) Weighted Average Condition Score (WACS)
2) Facility Condition Index (FCI)

Weighted Average Condition Scores (WACS)

The condition assessment process rates each building subsystem with a qualitative score of 1 (New/Excellent) through 5 (Unacceptable/Failed). Subsystem scores are then combined and weighted by the cost of that subsystem relative to the total current replacement value of the facility (CRV).

Facility Condition Index (FCI)

A Facility Condition Index (FCI) is an industry standard used for benchmarking and evaluating a portfolio of facility assets over time[2]. The FCI is the ratio between a facility's Backlog of Maintenance and Repair (BMAR) and the Current Replacement Value (CRV) of the facility. Please see the list of FCA terminology in the Appendix for further explanation of FCI. The lower the FCI, the lower the cost of maintenance backlog in relation to the cost of a full building replacement.

Common industry practice is to create a scale for interpreting the FCI as a way to prioritize facility needs. Most organizations adjust their classifications of FCI to relate to their own unique criteria. For the City of Bainbridge Island, we would suggest the following FCI breakdown to support decision making.

- Excellent = 0.00 – 0.05 (5%)
- Good = 0.06 – 0.10 (6% – 10%)
- Fair = 0.11 – 0.20 (11% – 20%)
- Poor = 0.21 – 0.25 (21% – 25%)
- Critical = 0.26 (26% or greater)

The WACS is more subjective based on surveyor expertise, whereas the FCI is based on cost data. Usually as the FCI increases, the WACS also increases. However, they are not always directly correlated. For example, the "floor coverings" category includes all floor coverings in a facility. If there is a mixture wood, vinyl, and carpet floors, they could be overall judged as "fair" condition, but if a section of the carpet is worn or stained, that cost could influence the FCI cost calculation at a greater proportion than the floor covering score is weighted in the WACS calculation.

[1] http://www.uniformat.com/index.php/classification-of-building-elements

[2] Since 1999 GASB 34 has required government agencies to improve Basic Financial Statements, including periodic Condition Assessment of capital assets; subsequent protocols were developed by GSA, NASA, States, NCUBO and others with most sharing similar definitions of BMAR, CRV & FCI.

Detailed Analysis

This section contains more detailed data for each facility. Following our key findings is a set of charts that summarize the overall facility condition, Observed Deficiency cost by subsystem, and Predicted Renewal cost by system.

Key Findings

Overall, City of Bainbridge Island capital facilities are in fair to good condition, but a few are poor, needing attention, especially the farm houses. Work is already underway to correct the water intrusion damage at City Hall; the HVAC system should be more closely evaluated to be sure City Hall is operating under positive, not negative air pressure.

Several pump stations, especially HOB need attention, particularly the roofs; additionally, the heavy-duty electrical services and mission critical motors should be infrared inspected for both safety and reliability purposes. There is immediate structural integrity concern at the relative new Commodore Well Building on the Bainbridge High School site; the foundation appears to be failing and may cause damage to the well itself.

The Police Station is in need of replacement with a modern public safety building. Several of the original temporary trailers at the Public Works site are past their useful lives and should be replaced with permanent facilities. The Waste Water Treatment Plant (WWTP) is generally in good condition, excepting certain original small outbuildings/sheds that should be renewed or replaced. Several facilities are in good to excellent condition including the Senior Center/Commons and Court buildings.

While this Condition Assessment focuses on Observed Deficiencies for most the facilities, the Field Survey Team casually observed many opportunities for future improvement throughout the City's facilities portfolio including programmatic, energy efficiency, occupant comfort, and productivity enhancements. In several cases there are multiple utility meters to the same facility (e.g., Police Station) increasing monthly operating cost beyond its value; at others there is no sub-metering of multiple buildings on the same site (e.g., Public Works) so it is difficult to monitor utility efficiency.

Summary of Facilities

Facility	FCI	WACS	OD Total	PR Total
City Hall	0.09	2.3	$591,000	$3,174,000
Public Works Shop	0.07	2.2	$73,000	$747,000
PW Truck Storage Building	0.07	2.5	$136,000	$650,000
Senior Center / Commons	0.09	2.5	$87,000	$348,000
Commodore Well Building	0.03	4.0	$17,000	$2,000
Court			-	
Decant Facility			-	
Fletcher Bay Booster Station			-	
HOB Booster Station			$23,000	
HOB Well 1 Building			-	
HOB Well 2 Building			-	
Morales Farm house			$23,000	
Police Station			$189,000	
PW Admin Trailer			$34,000	
PW SSWM Trailer			$11,000	
PW Storage Shop			$11,000	
PW Training Trailer			$11,000	
PW Well Building			-	
Rockaway Treatment Building			$11,000	
Sands Booster Station			$23,000	
Suyematsu Farm House			$116,000	
Taylor Well Building			-	
Waterfront Park Bathroom			-	
WWTP Biosolids Building			$11,000	
WWTP Blower Building			$11,000	
WWTP Contact Chamber Building			-	
WWTP Control Building			$198,000	
WWTP Effluent Pump Building			$11,000	
WWTP RAS Building			$17,000	

Predicted Renewals over 20 Years (Full FCA)

Facility/System	Sum of Cost
City Hall	**$2,614,927**
D30 HVAC	$726,687
D50 Electrical	$690,659
C30 Interior Finishes	$532,099
B20 Exterior Enclosure	$402,457
B30 Roofing	$164,654
C10 Interior Construction	$30,522
E20 Furnishings	$28,087
D20 Plumbing	$19,503
C20 Stairs	$11,740
E10 Equipment	$4,023
D40 Fire Protection	$3,815
F10 Special Construction	$681
Public Works Shop	**$592,887**
D50 Electrical	$133,105
B30 Roofing	$112,784
D30 HVAC	$87,668
E10 Equipment	$82,441
C30 Interior Finishes	$78,588
B20 Exterior Enclosure	$44,729
E20 Furnishings	$32,799
D20 Plumbing	$17,179
C10 Interior Construction	$3,046
D40 Fire Protection	$548
Public Works Storage	**$587,939**
D30 HVAC	$229,282
D50 Electrical	$144,128
E10 Equipment	$88,142
B30 Roofing	$73,216
D20 Plumbing	$52,080
D40 Fire Protection	$1,091
Senior Center/Commons Bldg	**$282,737**
D50 Electrical	$123,865
C30 Interior Finishes	$58,792
D30 HVAC	$51,715
B30 Roofing	$22,152
D20 Plumbing	$10,283
E10 Equipment	$6,645
C10 Interior Construction	$5,976
E20 Furnishings	$2,284
D40 Fire Protection	$1,025
Grand Total	**$4,078,490**

Observed Deficiencies (Full FCA)

Facility/Subsystem	Sum of Cost
City Hall	**$800,023**
D3050 Terminal and Package Units	$256,223
C3020 Floor Finishes	$205,150
B2010 Exterior Walls	$176,309
D3060 Controls and Instrumentation	$129,692
B2020 Exterior Windows	$21,766
D3030 Cooling Generating Systems	$10,883
Public Works Shop	**$70,437**
D3060 Controls and Instrumentation	$37,995
D3020 Heat Generating Systems	$21,766
B2010 Exterior Walls	$10,676
Public Works Storage	**$130,599**
D5020 Lighting and Branch Wiring	$130,599
Senior Center/Commons Bldg	**$81,627**
D5037 Low Voltage Fire Alarm	$23,688
D3050 Terminal and Package Units	$21,352
D5039 Low Voltage Data	$14,067
B1010 Floor Construction	$11,310
E1010 Commercial Equipment	$11,210
Grand Total	**$1,082,686**

Observed Deficiencies

Facility/Subsystem	Sum of Cost
Commodore Well Bldg	**$16,325**
B2010 Exterior Walls	$16,325
HOB Booster Station	**$21,978**
B3010 Roof Coverings	$11,095
E1020 Institutional Equipment	$10,883
Morales Farm House	**$21,356**
B2010 Exterior Walls	$10,883
B3010 Roof Coverings	$10,473
Police Station	**$173,913**
D5010 Electrical Service and Distribution	$57,529
D4010 Fire Protection Sprinkler Systems	$57,448
B3010 Roof Coverings	$21,766
E1010 Commercial Equipment	$16,014
D3040 HVAC Distribution Systems	$10,883
D2020 Domestic Water Distribution	$10,273
Public Works Infrastructure	**$21,766**
G2020 Parking Lots	$10,883
G2010 Roadways	$10,883
PW Admin Trailer	**$32,244**
D3030 Cooling Generating Systems	$11,095
D3050 Terminal and Package Units	$10,676
B1010 Floor Construction	$10,473
PW SSWM Trailer	**$10,676**
D3050 Terminal and Package Units	$10,676
PW Storage Shop	**$11,095**
E1030 Vehicular Equipment	$11,095
PW Training Center	**$10,676**
D3050 Terminal and Package Units	$10,676
Rockaway Treatment Bldg	**$10,883**
B3010 Roof Coverings	$10,883
Sands Booster Station	**$21,766**
D3040 HVAC Distribution Systems	$10,883
B3010 Roof Coverings	$10,883
Suyematsu Farm House	**$111,072**
B2010 Exterior Walls	$43,533
B2020 Exterior Windows	$14,148
D2030 Sanitary Waste	$10,883
B1010 Floor Construction	$10,883
E1010 Commercial Equipment	$10,676
D2020 Domestic Water Distribution	$10,676
B1020 Roof Construction	$10,273
WWTP Biosolids Bldg	**$10,473**
B2010 Exterior Walls	$10,473
WWTP Blower Bldg	**$10,883**
D3030 Cooling Generating Systems	$10,883

Observed Deficiencies

Facility/Subsystem	Sum of Cost
WWTP Control Bldg	**$195,831**
D2020 Domestic Water Distribution	$169,650
B3010 Roof Coverings	$26,181
WWTP Effluent Pump Bldg	**$10,883**
B2030 Exterior Doors	$10,883
WWTP RAS Bldg	**$16,325**
B2030 Exterior Doors	$16,325
Grand Total	**$708,145**

Facility Summary

City of Bainbridge
City Hall
City Hall

280 Madison Ave N
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Facility Code	
Facility Size - Gross S.F.	24,107
Year Of Original Construction	2000
Facility Use Type	Admin - Low rise
Construction Type	Medium
# of Floors	2
Energy Source	Electric
Year Of Last Renovation	2000
Historic Register	No

			Total Project Cost	Total Project Cost - Present Value
Weighted Avg Condition Score	**2.3**			
Facility Condition Index (FCI)	0.09			
Current Replacement Value (CRV)	$8,195,000	**Predicted Renewal Budget (6 yrs)**	$838,000	$773,000
Beginning Budget Year	2018	**Predicted Renewal Budget (20 yrs)**	$3,174,000	$2,615,000
		Predicted Renewal Budget (ALL)	$3,174,000	$2,615,000
		Observed Deficiencies (6 yrs)	$591,000	$562,000
		Observed Deficiencies (ALL)	$591,000	$562,000
		Opportunity Total Project Cost		N/A

NOTE: (ALL) totals are calculated starting at Survey Year. All other totals are calculated starting at Beginning Budget Year

Facility Condition Summary

Modern two-story building with atrium public area, city council room, small data center, small EOC with radio antenna and standby generator, staff breakroom, locker room, and many open and private offices, plus map and conference rooms. Generally good condition with primary concerns being moisture-damaged board & batten exterior wall and aging heat pumps and associated controls near end of life. Unclear HVAC system economizer (free cooling) function interface with exhaust/relief fans may be negatively pressurizing building, drawing moisture into outside walls; infrared analysis is suggested to better characterize on-going moisture damage to exterior walls. Opportunities to improve energy performance if desired, such as through upgrades to LED lighting and high-efficiency heat pumps upon their replacement. City Hall appears to provide power and water to the seasonal Farmer's Market on the adjacent property which may complicate any attempt to determine City Hall energy and water efficiency. Recently installed large PV panel array include a PSE net-power meter which may further complicate energy monitoring.

Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
A Substructure			**2.0**			

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Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date		Comments
A Substructure			**2.0**				
Foundations							
A1010 Standard Foundations							
	2000	2000	2		MAL	05/01/18	Concrete footings and stem walls. No issues
A1030 Slab On Grade							
	2000	2000	2		MAL	05/01/18	Main level slab on grade. No issues.
B Shell			**2.3**				
Superstructure							
B1010 Floor Construction							
	2000	2000	2		MAL	05/01/18	Slab on grade on level one. Wood framing/top chord bearing open web trusses with 2 layers of plywood on level two. No issues.
B1020 Roof Construction							
	2000	2000	2		MAL	05/01/18	GLB trusses with purlins at clerestory with car decking, out bound insulation, and metal roofing. Top chord bearing open web trusses with plywood sheathing, out bound insulation, and metal roofing at second floor low slope roof. No issues.
Exterior Closure							
B2010 Exterior Walls							
	2000	2000	3		MAL	05/01/18	Wood framed walls with insulation, interior gypsum wall board, exterior sheathing, and combination of horizontal ship lap/board and batten siding. Board and batten siding failing in a number of areas.
B2020 Exterior Windows							
	2000	2000	3		MAL	05/01/18	Painted/stained exterior wood windows, double glazing, natural wood finish interior. Aluminum double glazed windows. Minor caulking repairs required on exterior. Interior side of windows showing signs of moisture behind casing and condensation damage at high windows (clerestory).
B2030 Exterior Doors							
	2000	2000	2		MAL	05/01/18	Solid wood doors with double glazed sidelights/transoms at main entries. Wood with glass barn doors at council chamber. Painted

Facility Components Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
B Shell			**2.3**			
Exterior Closure						
B2030 Exterior Doors						hollow metal doors and frames and exits and mechanical rooms. Wood doors and frames showing signs of wear.
Roofing						
B3010 Roof Coverings	2000	2000	2		MAL 05/01/18	Standing seam metal roof with metal gutters and downspouts. Gutters leaking at seams. PV system on majority of low slope roof at clerestory. No issues noted.
C Interiors			**2.0**			
Interior Construction						
C1010 Partitions	2000	2000	2		MAL 05/01/18	Wood framed walls with painted gypsum wallboard. Exposed concrete walls at council chambers. Composite toilet partitions. Standard office partition/furniture system. Minor cracking/scratches in wall finishes.
C1020 Interior Doors	2000	2000	2		MAL 05/01/18	Wood interior swing doors with wood frames and wood sidelights. Lever hardware. Wood roll up garage door with glazing at council chambers. No issues.
C1030 Fittings	2000	2000	2		MAL 05/01/18	Fabricated compartments and cubicles in common office area. No issues. Painted steel pipe rail at back stairwell. No issues Horizontal flat black iron with wood cap railing at main stairs and mezzanine. Solid wood panel railing at landings. No issues. Metal lockers and wood cubbies in employee restroom/showers. No issues. Stainless steel restroom accessories/grab bars. Plastic soap dispensers. Metal framed mirrors. No issues.
Staircases						
C2010 Stair Construction						

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Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
C Interiors			**2.0**			
Staircases						
C2010 Stair Construction	2000	2000	2		MAL 05/01/18	Steel stringers with wood treads at main staircase. No issues Wood framed stairs with carpet at second staircase. No issues
C2020 Stair Finishes	2000	2000	2		MAL 05/01/18	Finished wood treads. Carpet.
Interior Finishes						
C3010 Wall Finishes	2000	2000	2		MAL 05/01/18	Exposed concrete. Painted gypsum wall board. Tile/PLam in bathrooms. Fabric wall coverings in council chambers. No issues.
C3020 Floor Finishes	2000	2000	2		MAL 05/01/18	Stained/sealed concrete. Carpet. Tile. VCT. Sheet vinyl. Normal signs of wear. No issues
C3030 Ceiling Finishes	2000	2000	2		MAL 05/01/18	Painted gypsum. Small amount of painted open structure. ACT ceiling tile and grid. Some minor water stains.
D Services			**2.6**			
Vertical Transportation						
D1010 Elevators and Lifts	2000	2000	2		DCS 05/01/18	One Otis two-stop hydraulic elevator with 3,500 lb capacity and 30 hp motor; no issues reported; carpet still smells like new.
Plumbing						
D2010 Plumbing Fixtures	2000	2000	2		DCS 05/01/18	Porcelain water closets, urinals and lavatories; closets have manual and urinals automatic flush valves; faucets are metering, but non-ADA. Stainless steel sinks at kitchenettes, some with disposal and/or instahot. Composite floor sinks at custodial closet(s). Tested fixtures work well and no issues reported. Newer stainless steel

Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
D Services			**2.6**			
Plumbing						
D2010 Plumbing Fixtures						dual-height drinking fountains with bottle-fillers. One-piece showers in locker rooms.
D2020 Domestic Water Distribution	2000	2000	2		DCS 05/01/18	Copper piping throughout with 2.5-inch copper service main; one electric A.O. Smith DHW 80-gal heater in the main mechanical room with recirc pump; hose bibs in boxes at outside walls.
D2030 Sanitary Waste	2000	2000	2		DCS 05/01/18	Cast-iron DW&V piping with tested fixtures on both levels flushing and draining well; no back-ups or odors reported; floor drains in bathrooms with trap primers.
D2040 Rain Water Drainage	2000	2000	3		DCS 05/01/18	Metal gutter & downspout to storm; reported issue where south roof gutter connects to downspout - minor maintenance to correct.
HVAC						
D3020 Heat Generating Systems	2000	2000	2		DCS 05/01/18	One Precision-brand 150 kW electric boiler with immersion heaters recently (2017) replaced; two 7.5-hp condenser water constant-speed circulating pumps (opportunity for VFD to reduce energy use); one 1/3-hp boiler recirc pump; expansion tank, air-separator and recently added chemical feeder.
D3030 Cooling Generating Systems	2000	2000	3		DCS 05/01/18	BAC closed-loop fluid cooler (cooling tower) with open-cycle spray-cooling including water chemistry; the cooling tower air intake is all but blocked to the north by the enclosure wall - may be wasting 10% energy due to restricted air flow; the tower further includes a cooling air fan intake sound attenuator, which further increases energy use. The cooling tower coils are fouled. Reportedly the condenser water includes glycol for freeze protection, plus the system is run year-round. The tower sump includes a freeze-protection immersion heaters. The cooling sequence reportedly calls for spray-cooling first, then air cooling - opposite the traditional

Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
D Services			**2.6**			
HVAC						
D3030 Cooling Generating Systems						
						sequence; further investigation is suggested in conjunction with control system renewal in the near future. Dedicated Mitsubishi ductless split-Dx cooling recently (2017) installed for data room.
D3040 HVAC Distribution Systems						
	2000	2000	2		DCS 05/01/18	All-copper condenser water distribution piping from boiler room to distributed water-source heat pumps (WSHPs) and out to cooling tower (underground). Sheet metal and factory-insulated flex-duct air distribution including fully-ducted return to WSHPs. Approximately ten exhaust fans. Economizer but with unclear coordination with exhaust fans; fully assess economizer function with Control system renewal in near future. All overhead air distribution, except at Council Chamber with below floor supply air. Occupant comfort complaints appear mostly related to: 1) No vestibules at the two main entries, 2) Limited zoning (multiple private offices sharing a single temperature control zone, exacerbated by: 3) Differing thermal envelope exposures for private offices sharing one control zones (e.g., two outside walls at corner offices versus one wall for most offices).
D3050 Terminal and Package Units						
	2000	2000	3		DCS 05/01/18	Reportedly 21 WSHPs throughout, with five replaced since 2013, and the rest nearing end of life. Electric wall heaters, unit heaters and baseboard heaters in various areas in fair to good condition.
D3060 Controls and Instrumentation						
	2000	2000	4		DCS 05/01/18	Original Johnson Controls DDC - increasingly obsolete. Suspect incorrect operation of economizer (free-cooling) mode with warm water to cooling tower when outside air temperature is 50 deg F, suggested economizer mode is not working optimally; additionally exhaust/relief fans reportedly all run continuously during occupied hours regardless of economizer mode; Retro-Cx is suggested to fully investigate economizer and other HVAC performance-related issues prior to control system renewal.
D3090 Other HVAC Systems and Equipment						

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Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
D Services			**2.6**			
HVAC						
D3090 Other HVAC Systems and Equipment						
	2000	2000	3		DCS 05/01/18	Ceiling fans aging but functional.
Fire Protection						
D4010 Fire Protection Sprinkler Systems						
	2000	2000	2		DCS 05/01/18	Six-inch service to dedicated rise room with DDCV and 4-inch FDC from yard to one 4-inch dry and one 4-inch wet risers; riser base pressure at 55-psig, dry at 30-psig; current 2017 inspection. System includes fire department connections in recessed cabinets at each stairwell.
D4030 Fire Protection Specialties						
	2000	2000	2		DCS 05/01/18	Fire extinguishers, AED and first aid kits, all in wall-mounted cabinets.
D4090 Other Fire Protection Systems						
	2000	2000	3		DCS 05/01/18	Halon bottle reportedly installed for data room with unclear capacity and integration with HVAC system - further investigation suggested.
Electrical						
D5010 Electrical Service and Distribution						
	2000	2000	2		DCS 05/01/18	Service at 480V to Square D main switchboard with 1,200A capacity supplying panel 4P with 600A capacity for HVAC, 4L with 400A for lighting and pumps, and 4X for miscellaneous HVAC, lighting and some life/safety; two 480/208V transformers both Square D with 112.5 and 30 kVA capacities. Large 208V Panel 2P with 400A capacity supplies power to panels via feeders and to adjacent seasonal Farmer's Market area; panel 1A provides power to receptacles and walker-duct; panel 2X supplies receptacles and several special loads; all the forgoing in the first floor main electrical room; limited TVSS. Multiple 120/208V distribution panels throughout the building. No issues reported or observed, other than access to some panels blocked by furniture and/or stored materials.
D5020 Lighting and Branch Wiring						
	2000	2000	3		DCS 05/01/18	T8 fluorescent pendant direct/indirect and lay-in

Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
D Services			**2.6**			
Electrical						
D5020 Lighting and Branch Wiring						
						in office areas; CFL recessed can-lights; architectural pendant fixtures in atrium space. Mix of mostly manual and some occupancy-sensor lighting controls; plus special scene lighting for council chamber room. Wall receptacles, in-floor walker-duct in open office areas, plus powered-furniture in open office areas. No issues reported, but opportunity to upgrade to LED lighting with more automatic lighting control, especially dimming given the extensive day-lighting provided by the architectural design.
D5032 Low Voltage Communication						
	2000	2000	3		DCS 05/01/18	Modern VOIP phone system, duress system; special telecommunications for EOC function including free-standing radio tower outside EOC room. CATV system with original CRT TVs in some spaces.
D5037 Low Voltage Fire Alarm						
	2000	2000	3		DCS 05/01/18	Relatively modern EST-2 fire alarm system monitors fire sprinkler, pull-stations, duct smoke detectors and limited number of space smoke detectors; minimal coverage for this high-value building, but appears to meet code. FACP at first floor telecom closet with remote annunciator at rear entry.
D5038 Low Voltage Security						
	2000	2000	3		DCS 05/01/18	Radionics intrusion detection, plus card-key access system; no CCTV. Aging but functional with no issues reported.
D5039 Low Voltage Data						
	2000	2000	3		DCS 05/01/18	High-speed fiber-optic data service to MDF on upper floor with Cat 5 cable to distribution, minimal wireless (WiFi/WAP) service; excessive surplus and/or abandoned equipment and cabling in MDF (modest maintenance to clean-up). No issues reported, assume adequate for current and near-term needs.
D5090 Other Electrical Systems						
	2000	2000	3		DCS 05/01/18	Kohler 80 kW standby generator outside with ATS in main electrical room, plus connector

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Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
D Services			**2.6**			
Electrical						
D5090 Other Electrical Systems						
						outside sprinkler riser room for portable generator via 480V, 200A-rated connector and disconnect switch. Battery-backed egress bug-eye wall-packs and exit signs; all tested devices working.
E Equipment and Furnishings			**2.0**			
Equipment						
E1010 Commercial Equipment						
	2000	2000	3		DCS 05/01/18	Appliances aging but functional; some more worn than others with no issues reported.
E1020 Institutional Equipment						
	2000	2000	2		DCS 05/01/18	Heavy rolling file storage system. Broadcast equipment for council chamber room.
Furnishings						
E2010 Fixed Furnishings						
	2000	2000	2		DCS 05/01/18	Mostly in good condition; minor wear & tear in a few locations such as staff kitchen and public toilet rooms.
F Special Construction			**3.0**			
Special Construction						
F1050 Special Controls and Instrumentation						
	2000	2000	3		DCS 05/01/18	EOC systems including radio tower antenna arrays.

Facility Summary

City of Bainbridge
City Hall
City Hall Infrastructure

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Facility Condition Summary

Site infrastructure in good condition with few or no issues reported or observed, noting limited parking.

Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date	Comments
G Sitework						
Site Improvements						
G2020 Parking Lots	2000	2000	3		MAL 05/01/18	Asphalt paving with concrete curbs. Some cracking and alligatoring present. ADA Van Accessible spot does not appear to meet requirements. Space not 132" wide with 60" pathway or 96" wide with 96" pathway.
G2030 Pedestrian Paving	2000	2000	2		MAL 05/01/18	Concrete sidewalks, stairs, landings, and ADA ramp. No issues noted.
G2040 Site Development	2000	2000	2		MAL 05/01/18	Property shares parking and building access with an adjacent parcel. The parcel includes Bainbridge Island Performing Arts Center.
G2050 Landscaping	2000	2000	2		MAL 05/01/18	Mature trees, shrubs, hedges, and ground cover. Some landscaping in contact with building surface.
Site Civil / Mechanical Utilities						
G3010 Water Supply	2000	2000	2		DCS 05/01/18	City water with 2-inch domestic meter with no apparent back-flow prevention, 1.5-inch irrigation meter with RPBP and 6-inch fire service with 4-inch DDCV; modest pressure at 55 psig. Additionally 1.25-inch RPBP to Farmer's Market yard hydrants with no apparent sub-metering.
G3020 Sanitary Sewer	2000	2000	2		DCS 05/01/18	City sewer with no issues reported or observed.
G3030 Storm Sewer						

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Bainbridge Island, WA

Facility Components

Systems	Original System Date	Last Major System Renew.	Cond. Scores	Subsystem Remain.Useful Life - Yrs	Surveyor/ Survey Date		Comments
G Sitework							
Site Civil / Mechanical Utilities							
	2000	2000	2		DCS	05/01/18	Roof drains and catch basin piped to City storm at street; no issues reported or observed; system includes a vault filter to west prior to discharge to City connection.
G3050 Cooling Distribution							
	2000	2000	2		DCS	05/01/18	Apparent copper condenser water piping underground from building to cooling tower enclosure; no issues reported or observed.
Site Electrical utilities							
G4010 Electrical Distribution							
	2000	2000	2		DCS	05/01/18	Power underground to on-site PSE 500 kVA pad-mounted transformer, then underground to building at 480V, 3-phase with PSE meter #Z09501134 and no issue reported. Power is reported extended underground from City Hall to serve the Farmer's Market area to east.
G4020 Site Lighting							
	2000	2000	3		DCS	05/01/18	MH lamps in metal bollards at pedestrian pathways; MH in pole heads; in-ground and above-ground up-lights for signs and landscape features; several newer LED sconces; several other fixtures, some with CFL; all on timer and/or photocell control; all MH and CFL with opportunity to upgrade to LED. Some bollard and up-lights with minor damage.
G4030 Site Communications and Security							
	2000	2000	2		DCS	05/01/18	High-speed fiber-optic data to comm room; little or no site electronic security.
Other Site Construction							
G9090 Other Site Systems							
	2000	2000	2		DCS	05/01/18	Free-standing radio antennas supporting EOC and other public safety functions.

Deficiency Repair Cost Markups By System 2018 - 2023

City of Bainbridge

Site: City Hall

Facility	System	Direct Construction Cost	Contingency 30%	Contractor's OH & P 20%	Project Soft Cost 45%	Total Project Cost	Total Project Cost (Present Value)
City Hall	Exterior Closure	$91,000	$27,300	$23,660	$63,882	$205,842	$198,074
	Interior Finishes	$94,250	$28,275	$24,505	$66,163	$213,194	$205,150
	HVAC	$185,268	$55,580	$48,170	$130,058	$419,075	$396,798
	Facility Total	**$370,518**	**$111,155**	**$96,335**	**$260,103**	**$838,111**	**$800,022**
	Site Total	**$370,518**	**$111,155**	**$96,335**	**$260,103**	**$838,111**	**$800,022**

CITY OF
BAINBRIDGE ISLAND

City Municipal Facilities Maintenance and Replacement Policy
Department of Finance and Administrative Services

Prepared by Finance Director DeWayne Pitts
Initial Development: 3/15/2022

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Policy Statement

The City owns and operates a variety of municipal facility assets including City Hall, the Police and Court facility, the Senior Center and various storage, park, farm and other investments that must be properly maintained and replaced to ensure they remain safe, that financial and service level investments are maintained, and that they provide a welcoming and usable space to serve their intended purposes.

Purpose

This policy supports the City in asset management, facility replacement planning and budgeting efforts and is established to fund for the planned replacement and major maintenance cost of existing City-owned facilities. A separate fund is created and established by the City Council for the maintenance, replacement and operation of the fund. Adequate budget appropriation levels must be ensured to provide resources for needed projects.

Scope

This policy applies to the City's existing general government municipal facility assets. It includes all facility structures such as City Hall, the Police and Court Facility, the Senior Center Commons building and other structures that have an expected future replacement cost of at least $1 million and an estimated useful life of at least 25 years. It does not include the City's utility owned assets or new planned purchases, land or leased assets. It includes funding for facility replacement and major maintenance as defined under the City's capital asset policy.

Goals

Effective asset management is comprised of several components including:

- Assets need to be continually assessed so there is up-to-date information on their condition and status.
- The information is then used to determine maintenance, upgrades, replacement, and mitigation issues.
- Facilities assets should have a plan that addresses its needs for the entire life, including replacement, inspections, and maintenance
- There should be a system in place to prioritize asset care and the allocation of limited resources.

It is the intention of this policy to adequately fund major maintenance projects of City-owned facilities with an additional reserve amount for unforeseen losses or catastrophic events plus an additional amount to set aside for eventual replacement of City owned facilities.

Funding

The municipal facilities renewal and replacement policy may incorporate several available funding sources to pay for major maintenance. These sources vary in legal, grant and other restrictions. This policy will also incorporate and follow an existing financial policy that states when an expenditure is incurred, the City will first consider and target the more

restricted funding sources where possible. The following sources, at a minimum, may be considered for allocation to the City Facilities Capital and Maintenance fund:

- Real Estate Excise
- Grants
- General fund reserve transfers
- One-time revenue transfers
- General obligation bonds or other financing available as allowed by the City's debt policy
- Proceeds from the sale of existing City facilities and properties defined in this policy
- Other sources as appropriate

Authoritative Guidance

Government Finance Officers Association (GFOA)

The Government Finance Officers Association represents public finance officials throughout the United States and Canada. GFOA's mission is to advance excellence in public finance and includes best practices in governmental finance. The following link provides best practices for establishing capital asset renewal and replacement. Strategies for Establishing Capital Asset Renewal and Replacement Reserve Policies (gfoa.org)

City of Bainbridge Island – Capital Asset Policy

The capital asset policy provides guidance on acquisition, inventories, maintenance and the disposal of capital assets.

City of Bainbridge Island – 2018 Facility Condition Assessment

A facility condition assessment was performed in 2018 that will serve as a minimum target consideration to meet for funding major maintenance projects.

Roles and Responsibilities

Facility asset management is a shared function between the Public Works Department and Finance. Public Works is responsible for the asset life cycle process including acquisition, condition assessment, maintenance, cost estimates and the disposal of assets. Finance is responsible for the budgeting, recording, depreciation, physical inventory, and update of a physical asset list. Finance will also oversee the administration of the municipal facilities fund and calculate an estimated budget appropriation needed. The final appropriation of funds is the responsibility of the City Council.

Procedures

Condition Assessment of Existing Municipal Facilities

The City will conduct a systematic condition review of all facility assets no less every five years that includes scoring criteria, asset useful lives used for assessments, project justification and estimated cost to replace or repair. Major repairs may be capitalized following the City's Capital asset policy. Costs that are not capitalized will follow the procedures of this policy for determining appropriation into the fund. Costs estimates from the assessment will be used to determine an estimate for adequate funding needed to pay for needed asset improvements into this fund.

Budget appropriation funding

The budget appropriation for funding the Municipal Facilities Maintenance and Replacement fund each year shall be calculated using the following components:

- Six year planned Facilities Operating projects planned in the City operating budget plus;
- Depreciation of Existing Buildings which will eventually be used for the facility replacement over the estimated useful life

Note that any 6-year Facilities Capital Improvement Plan projects that meet City Capitalization thresholds will be funded separately in the Capital Construction Fund and identified in the 6-year Capital Improvement plan and will not directly affect this fund. If there is a purchase of a new City facility, it will be factored into future consideration using this fund once it has been placed into service.

Minimum fund balance

To maintain an appropriate minimum fund balance, the City will calculate yearly appropriation and fund a minimum target balance of at least $1 million. This is intended to provide a facility maintenance reserve buffer for unanticipated projects. At a minimum, the balance should cover at least the six-year major maintenance target.

Major Facility Replacement

The future replacement of major facilities will initially be funded using an amount equal to the annual depreciation expense of major facility buildings over their expected useful lives. Utilizing depreciation to fund major facility replacement should be considered a starting point but will not typically generate enough funds for capital replacement needs because the cost of replacing facility assets generally increases over time and far exceeds the original replacement costs. Periodic review and the facility condition assessment will be used to determine if additional replacement funds are needed. If replacement revenue received over the life of an asset is insufficient to cover the facility replacement, the funding decision for the incremental difference will be made on a case-by-case basis depending on the nature and extent of the difference and the short- and long-term impact on the fund balance, operating budget and future asset replacement schedules.

Bainbridge Island, WA

Pavement Management Analysis Report

April, 2020

City of Bainbridge Island, WA
Attn.: Chris Munter, P.E., PMP, ENV SP
280 Madison Avenue
North Bainbridge Island, WA 98110

IMS Infrastructure Management Services
8380 S. Kyrene Rd., Suite 101, Tempe, AZ 85284
Phone: (480) 839-4347, Fax: (480) 839-4348
www.imsanalysis.com

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Pavement Condition Rating by Project Using Descriptive Terms
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Abbreviation or Acronym	Definition
$k	Dollars in thousands ($,000)
$M	Dollars in millions
%SP	Percent Spreadability - component of deflection analysis
AC	Asphalt Concrete - asphalt streets, flexible pavements, also know n as ACP
ACP	Asphalt Concrete Pavement - asphalt streets, flexible pavements, also know n as AC
ART	Arterial roadw ay functional classification
ASTM	American Society of Testing Methods
Avg	Average
BCI	Base Curvature Index - component of deflection analysis
Brk	Break
CAL	Coarse Aggregate Loss
CDV	Corrected Deduct Value - part of the ASTM D6433 PCI calculation
COL	Collector roadw ay functional classification
Crk	Crack
DeflCON	Deflection Condition - structural load analysis based on traffic loading and deflection
DMD	Dynamic Maximum Deflection - temperature corrected deflection
Dvdd Slab	Divided Slab
DynaCON	Dynamic Condition - structural layer analysis
ft or FT	Foot
ft2 or FT2	Square foot
FunCL	Functional Classification
FWD	Falling w eight deflectometer
GCI	Gravel Condition Index
GFP	Good - Fair - Poor
GIS	Geographic Information System
GISID	GIS segment identification number
H&V	Horizontal and Vertical
IRI	International Roughness Index
Jt	Joint
L&T	Longitudinal and Transverse
LAD	Load associated distress
LOC	Local roadw ay functional classification - same as RES
LOG	Lip of Gutter
m	Metre or meter
M	Moderate
m2	square metre or square meter
MART	Major arterial roadw ay functional classification
Max	Maximum
MaxDV	Maximum Deduct Value
MCOL	Major collector roadw ay functional classification
mi or Mi	Mile
Min	Minimum
MnART	Minor arterial roadw ay functional classification
MnCOL	Minor collector roadw ay functional classification
MOD	Moderate
NLAD	Non-load associated distress
OCI	Overall condition index, also know n as PCI
Olay	Overlay
PART	Primary arterial roadw ay functional classification
Pavetype	Pavement Type
PCC	Portland Cement Concrete - concrete streets
PCI	Pavement Condition Index - generic term for OCI
R&R	Remove and replace
RART	Rural arterial roadw ay functional classification
PWF	Priority Weighting Factor
Recon	Reconstruction
Rehab	Rehabilitation
RES	Local roadw ay functional classification - same as LOC
RI or RCI	Roughness Index
S	Strong
SART	Secondary arterial roadw ay functional classification
SCI	Surface Curvature Index - componenent of deflection analysis
SDI	Surface Distress Index
SI	Structural Index
STA	Station or chainage
Surf Trtmt	Surface Treatment
TDV	Total Deduct Value
W	Weak

1.0 EXECUTIVE SUMMARY & RECOMMENDATIONS

PROJECT SUMMARY

In 2019 IMS Infrastructure Management Services, LLC (IMS) was contracted by the City of Bainbridge Island to conduct a pavement condition assessment and analysis update on approximately 140 centerline miles of City maintained asphalt and concrete roadways alike.

IMS mobilized their Laser Road Surface Tester (RST) to conduct an objective assessment using industry standard pavement distress protocols such as those found in ASTM D6433-11. At that time, the City's network average Pavement Condition Index was found to be a 69 and the City's backlog (roads below a PCI of 40) was at 10%. *See section 4 for more information*

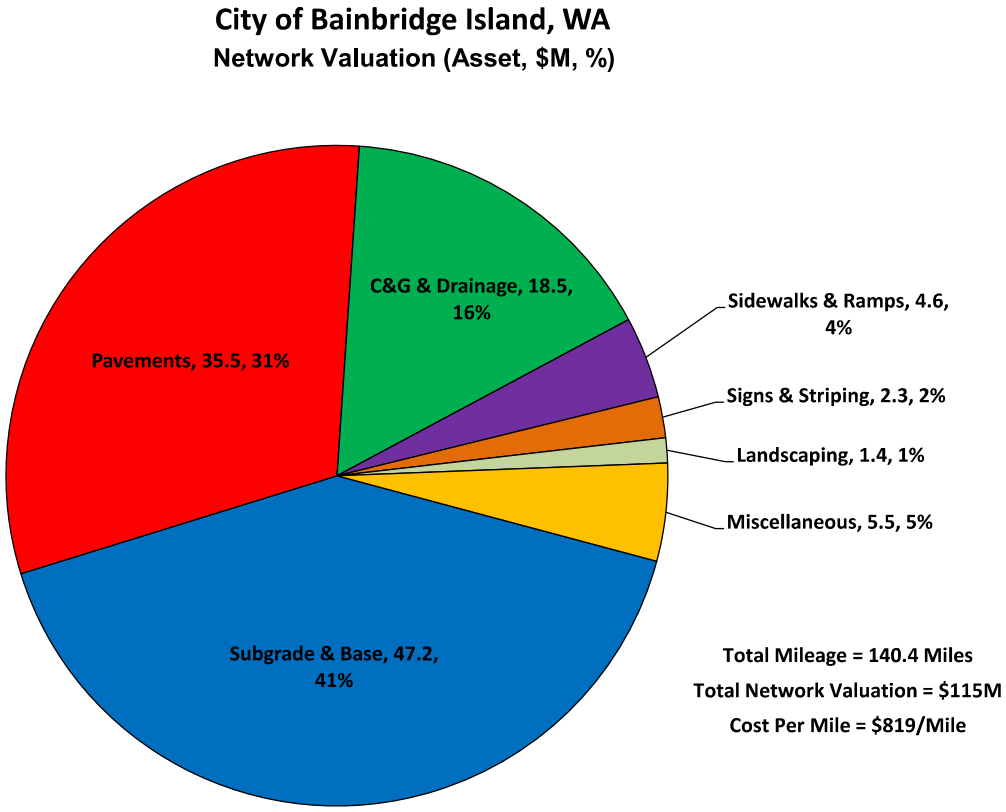


Figure 1- Replacement Value of Roadway Network

As seen in **Figure 1**, Bainbridge Island has just over 140 centerline miles of roadway, encompassing nearly 1.9M square yards of pavement surfacing, which is predominantly asphalt. At an average replacement cost for a typical roadway just over $800K per mile, not including the value of the land, the City has over $115M invested in its paved roadway network.

SUMMARY METRICS OF HEALTH

Pavement Condition Index (PCI) – The PCI score is a ranking assessment on the overall health of a pavement segment on a scale of 0 to 100. The network average PCI is a good global indicator of a network's overall health. *(Explained in section 4)*

Percent of Excellent Roads – Roads with a condition category of Excellent are those that score between a PCI of 85 to 100.

Backlog –Backlog is the Very Poor and Poor roads (between a PCI of 0 and 40) that represent a portion of the network in need of extensive rehabilitation such as full and partial reconstruction. Using sound pavement management and finance principles, a very healthy network will have a backlog of 10% or less.

Bainbridge Island met two out of three of the metrics for evaluating the quality of its roadway network.

- ✓ Bainbridge Island's network average pavement condition score is above the national average currently seen by IMS of 60 to 65, with the City's average scoring a 70.
- o The number of streets rated Excellent is below the minimum recommended target of 15% at 12.6%
- ✓ The backlog amount is below the average value of 12% at 7.5%.

BUDGET SCENARIOS

See section 5 for more information

The current annual budget for Bainbridge Island is $400K per year dedicated to pavement preservation and rehabilitation. This will increase the backlog to 11% while lowering the average PCI to a 64 over 5 years. Please note this number is an annual budget average across all 5 years of the analysis horizon.

The Recommended budget is $967K per year and will lower the network average PCI to a 68 while reducing the backlog to 6%.

EXECUTIVE SUMMARY CONCLUSION

The Bainbridge Island network has an average PCI of 70 and a backlog of 7.5%, with most of the network landing in the Very Good PCI range. With the City's existing budget, the network conditions will continue to degrade into the mid-60s PCI range and backlog will continue to increase slightly over time.

2.0 PRINCIPLES OF PAVEMENT MANAGEMENT

2.1 PAVEMENT PRESERVATION

Preservation of existing roads and street systems has become a major activity for all levels of government. Because municipalities must consistently optimize the spending of their budgets, funds that have been designated for pavement must be used as effectively as possible. The best method to obtain the maximum value of available funds is through the use of a pavement management system.

Pavement management is the process of planning, budgeting, designing, evaluating, and rehabilitating a pavement network to provide maximum benefit with available funds.

A pavement management system is a set of tools or methods that assist decision makers in finding optimal strategies for providing and maintaining pavements in a serviceable condition over a given time period. The intent is to identify the optimum level of long-term funding to sustain the network at a predetermined level of service while incorporating local conditions and constraints.

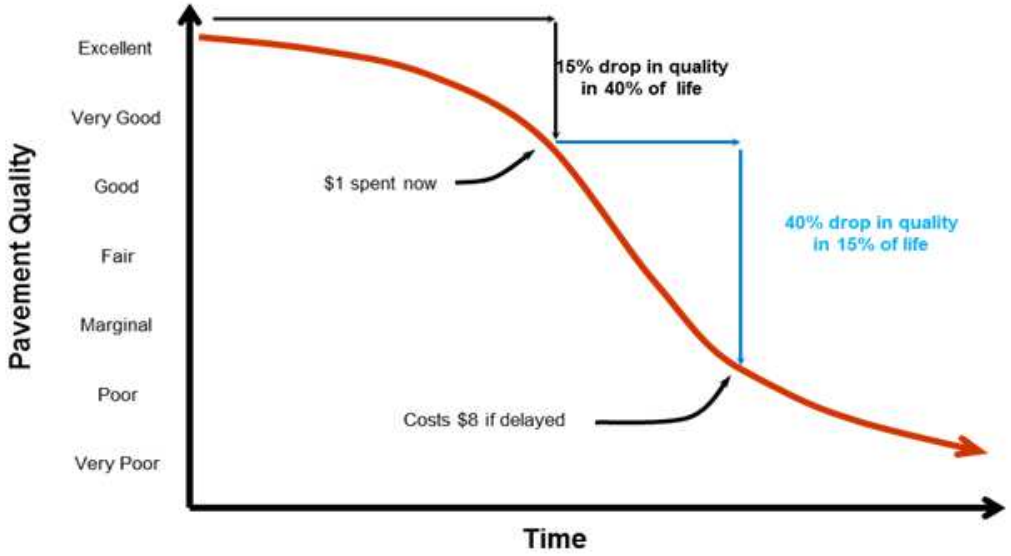


Figure 2 – Pavement Deterioration and Life Cycle Costs

As shown as **Figure 2**, the streets that are repaired while in good condition will cost less over their lifetime than those left to deteriorate to a poor condition. Without an adequate routine pavement maintenance program, streets require more frequent reconstruction, thereby costing millions of extra dollars.

The key to a successful pavement management program is to develop a reasonably accurate performance model of the roadway, and then identify the optimal timing and rehabilitation strategy. The resultant benefit of this exercise is realized by the long term cost savings and increase in pavement quality over time. As illustrated in **Figure 2,** pavements typically deteriorate rapidly once they hit a specific threshold. A $1 investment after 40% lifespan is much more effective than deferring maintenance until heavier overlays or possibly reconstruction are required just a few years later.

Once implemented, an effective pavement information management system can assist agencies in developing long-term rehabilitation programs and budgets. The key is to develop policies and practices that delay the inevitable total reconstruction for as long as practical yet still remain within the target zone for cost effective rehabilitation. That is, as each roadway approaches the steepest part of its deterioration curve, apply a remedy that extends the pavement life, at a minimum cost, thereby avoiding costly heavy overlays and reconstruction. **Figure 3** illustrates the concept of extending pavement life through the application of timely rehabilitations.

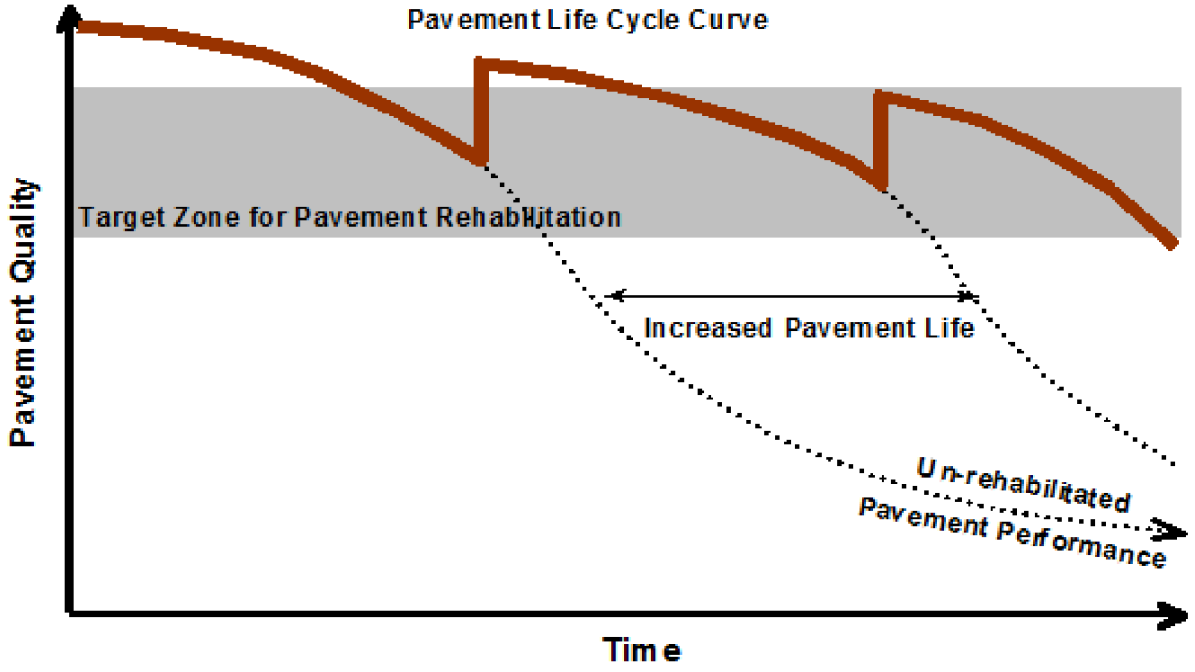


Figure 3 – Pavement Life Cycle Curve

Ideally, the lower limit of the target zone shown in **Figure 3** would have a minimum PCI value in the 60 to 70 range to keep as many streets as possible requiring a thin overlay or less. The upper limit would tend to fall close to the higher end of the Very Good category – that is a pavement condition score approaching 85. Other functions of a pavement management system include assessing the effectiveness of maintenance activities, new technologies, and storing historical data and images.

For Bainbridge Island, a prioritization methodology based on pavement condition, pavement materials, functional class, and strength rating was used to analyze the network condition and develop the proposed 5 year rehabilitation plan.

The analysis methodologies and data collection technologies were based on *ASTM D6433 Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys* (hereinafter ASTM D6433) for assessment of pavement surface condition and the International Roughness Index (IRI) for quantification of pavement roughness on all City streets. These measurements of pavement quality are combined to form an overall 0 to 100 Pavement Condition Index (PCI), with 100 being the best.

2.2 ECONOMIC IMPACTS OF MAINTENANCE & REHABILITATION

The role of the street network as a factor in the City's well-being cannot be overstated. In the simplest of terms, roadways form the economic backbone of a community. They provide the means for goods to be exchanged, commerce to flourish, and commercial enterprises to generate revenue. As such, they are an investment to be maintained.

The overall condition of an agency's infrastructure and transportation network is a key indicator of economic prosperity. Roadway networks, in general, are one of the most important and dynamic sectors in the global economy. They have a strong influence on not only the economic well-being of a community, but a strong impact on quality of life. Well-maintained road networks experience multiple socioeconomic benefits through greater labor market opportunities and decreasing income gap.

As a crucial link between producers and their markets, quality road networks ensure straightforward access to goods and drive global and local economies. Likewise, higher network quality has a strong correlation to improvements in household consumption and income. Roads also act as a key element to social cohesion by acting as a median for integration of bordering regions. This social integration promotes a decreased gap in income along with diversity and a greater sense of community that can play a large role in decreasing rates of poverty.

Conversely, deterioration of roads can have adverse effects on a community and may bring about important and unanticipated welfare effects that the governments should be aware of when cutting transportation budgets. Poor road conditions increase fuel and tire consumption while shortening intervals between vehicle repair and maintenance. In turn, these roads result in delayed or more expensive deliveries for businesses and consumers. Economic effects of poor road networks, such as time consuming and costly rehabilitation, can be reduced if a proactive maintenance approach is successfully implemented. To accomplish this, a pavement assessment and analysis should be completed every few years in an effort update the budget models and rehabilitation plans. The IMS Laser Road Surface Tester (featured in **Figure 4**) was mobilized to Bainbridge Island to conduct an objective survey.

Figure 4 – Laser Road Surface Tester (RST)

3.0 THE PAVEMENT MANAGEMENT PROCESS

3.1 FUNCTIONAL CLASS REVIEW

As part of the scope of this assignment, the functional classification designations currently used in the Bainbridge Island pavement management program were adopted for their use in the pavement analysis.

Although there is no uniform standard for classifying pavement into functional classes, The Federal Highway Administration (FHWA), American Public Works Association (APWA) and Institute of Transportation Engineers (ITE) offer some broad guidelines on how to assign classifications that were followed in this study.

The City's functional classification definitions used in the assessment are as follows:

1. **Arterial (ART)** – all cross City corridors consisting of 2 to 4 or more lanes, generally spaced at 1 mile intervals with daily traffic counts generally exceeding 10,000 vehicles per day. Major cross City corridors with a landscaped median were also assigned to Principal Arterials.
2. **Collector (COL)** – Continuous and discontinuous cross City and inter-district corridors that are 2 to 4 lanes across and generally have a centerline stripe or a designated bus route. The ADT generally falls in the 1,000 to 10,000 vehicle per day range. They are typically spaced on the ½ or ¼ mile section line and on occasion, may have a short non-landscaped median. Major collectors are also assigned to streets segments leading to, or adjacent to, a major traffic generator site such as a regional shopping complex. Collectors form the entrance to communities and may have a decorative landscaped median of short duration.
3. **Residential Urban/Suburban** – These are the majority of the street segments consisting of all residential roads not defined above or as industrial/commercial.

The paved roadway network consists of 4 functional classes, covering approximately 140 miles of pavement. The average pavement condition index (PCI) of the roadway network is a 69 and the network's primary pavement type is asphalt. The following table and **Figure 5** summarize the functional classification splits within the system.

City of Bainbridge Island, WA
Network Summary by Functional Class

	Pavetype	Network	Secondary Arterial	Collector	Residential Urban	Residential Suburban
Segment (Block) Count	All Streets	987	214	230	247	296
	Asphalt	974	208	230	240	296
	Concrete	13	6	0	7	0
Network Length (ft):	All Streets	741,279	171,600	235,325	117,931	216,423
	Asphalt	735,395	169,687	235,325	113,959	216,423
	Concrete	5,885	1,913	0	3,972	0
Network Length (mi):	All Streets	140.4	32.5	44.6	22.3	41.0
	Asphalt	139.3	32.1	44.6	21.6	41.0
	Concrete	1.1	0.4	0.0	0.8	0.0
Average Width (ft):	All Streets	22.9	25.7	22.5	23.2	20.8
	Asphalt	22.8	25.7	22.5	23.2	20.8
	Concrete	25.2	29.9	0.0	22.9	0.0
Network Area (yd2):	All Streets	1,883,174	490,466	587,493	304,428	500,787
	Asphalt	1,866,729	484,119	587,493	294,330	500,787
	Concrete	16,445	6,347	0	10,098	0
Current Pavement Condition Index (CPCI) 3/19/19	All Streets	70	79	71	65	62
	Asphalt	70	79	71	64	62
	Concrete	92	89	0	94	0
Pavement Condition Index (Surveyed PCI)	All Streets	70	79	71	65	62
	Asphalt	70	79	71	64	62
	Concrete	92	89	0	94	0
Current Backlog (%)	All Streets	8	Percentage of Network with a PCI < 40			
Current Network Index	All Streets	65	Managable Network Index			
Surface Distress Index (SDI) 3/19/19	All Streets	71	80	73	67	63
	Asphalt	71	80	73	66	63
	Concrete	95	93	0	97	0
Roughness Index (RI) 3/19/19	All Streets	67	78	66	61	60
	Asphalt	66	78	66	60	60
	Concrete	85	81	0	87	0

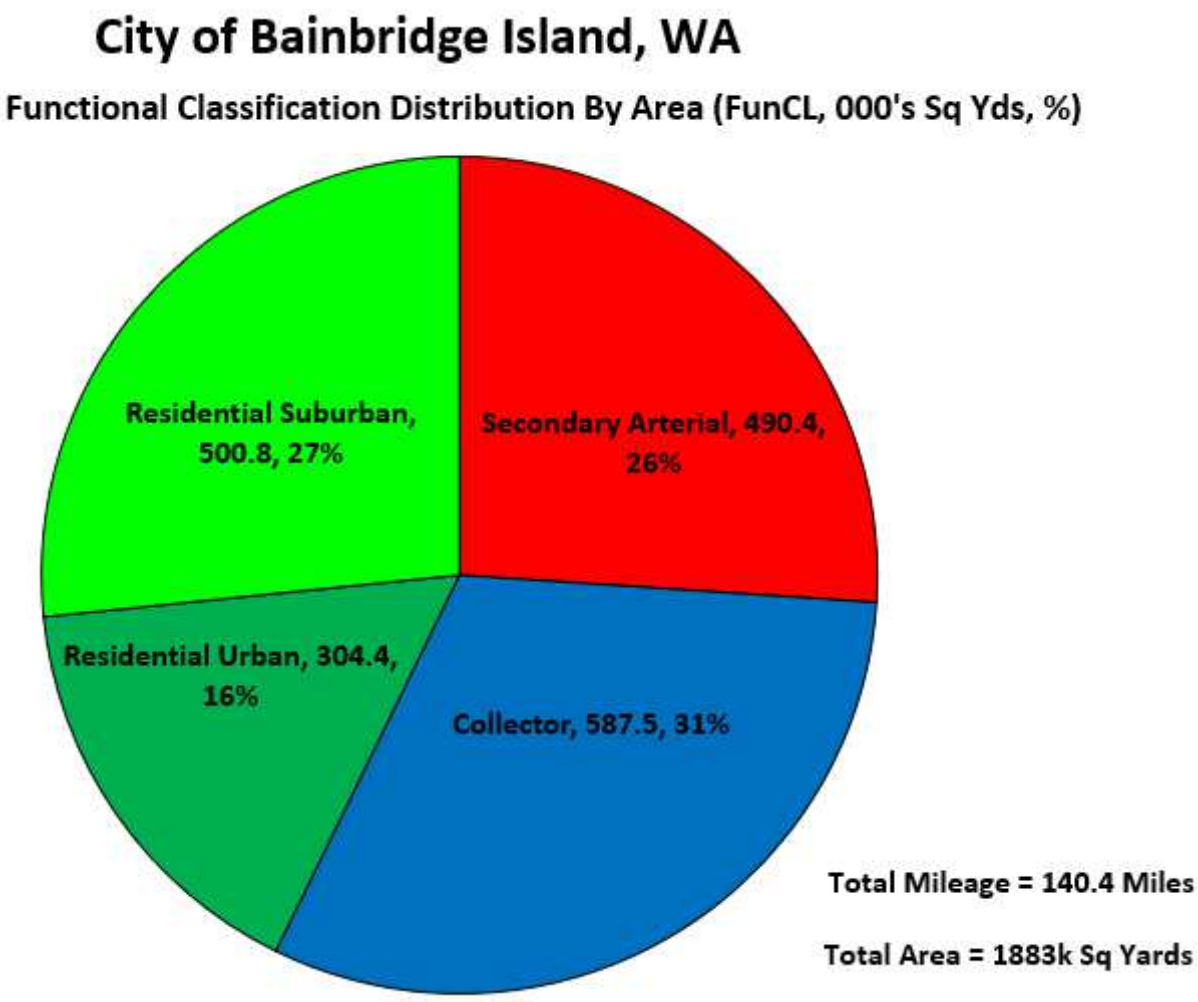


Figure 5 – Functional Class Distribution by Milage

The amount of streets classified as collectors falls slightly below the typical distribution of other networks recently surveyed by IMS. Typically, 12% to 18% of a network falls in the collector category with 62% to 75% of the segments being categorized as locals. In Bainbridge Island, the residential roads have been separated into Urban and Suburban categories. This will allow the pavement management system to select different priorities and rehabs for each category.

As discussed later in this report, the functional classifications also play a critical role in the rehabilitation candidate selection process as Arterials are generally given preference over other rehab candidates due to their higher traffic counts and steeper deterioration curves.

The following figure (**Figure 6**) highlights the functional classifications used for the Bainbridge Island roadway network. An electronic version of this map is appended to this report.

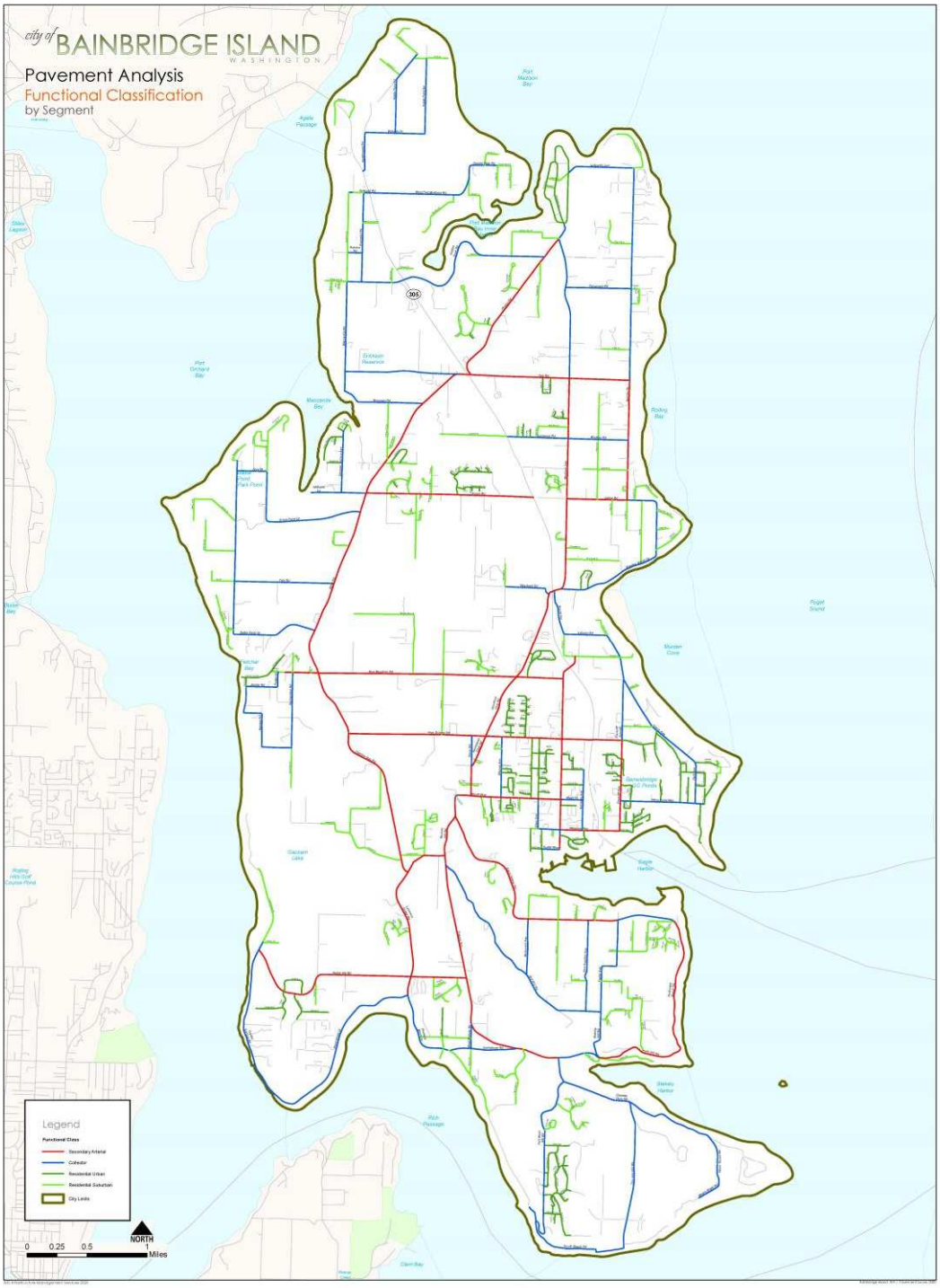


Figure 6 – Bainbridge Island Functional Classification Designation

3.2 ASSEMBLY OF DATA INTO PROJECTS

Bainbridge Island's Geographic Information System (GIS) was used as the basis for segmenting the roadway network on a block-by-block basis. Each segment was assigned a unique identifier referred to as a GISID, establishing a one-to-one relationship between the GIS and the street inventory. The segments form the basic building block of the pavement management system and are where all attribute and condition data are stored.

The centerline segments were aggregated together within the pavement management system to form logical projects that the analysis and rehabilitation program are developed against.

- Arterial projects run from major intersection to major intersection up to 1 mile in length.
- Similar to arterials, collector streets within a neighborhood were aggregated together to form a single project where practical.
- Local streets along a homogenous route were aggregated together along with adjacent side streets to form a small neighborhood based approach.

Segments were joined only when the pavement condition and functional classification were homogeneous in nature such that when joined they have a relatively uniform condition that may be rehabilitated using a single strategy.

The following figure (**Figure 7**) highlights the projects, used for the analysis. An electronic version of this map is appended to this report.

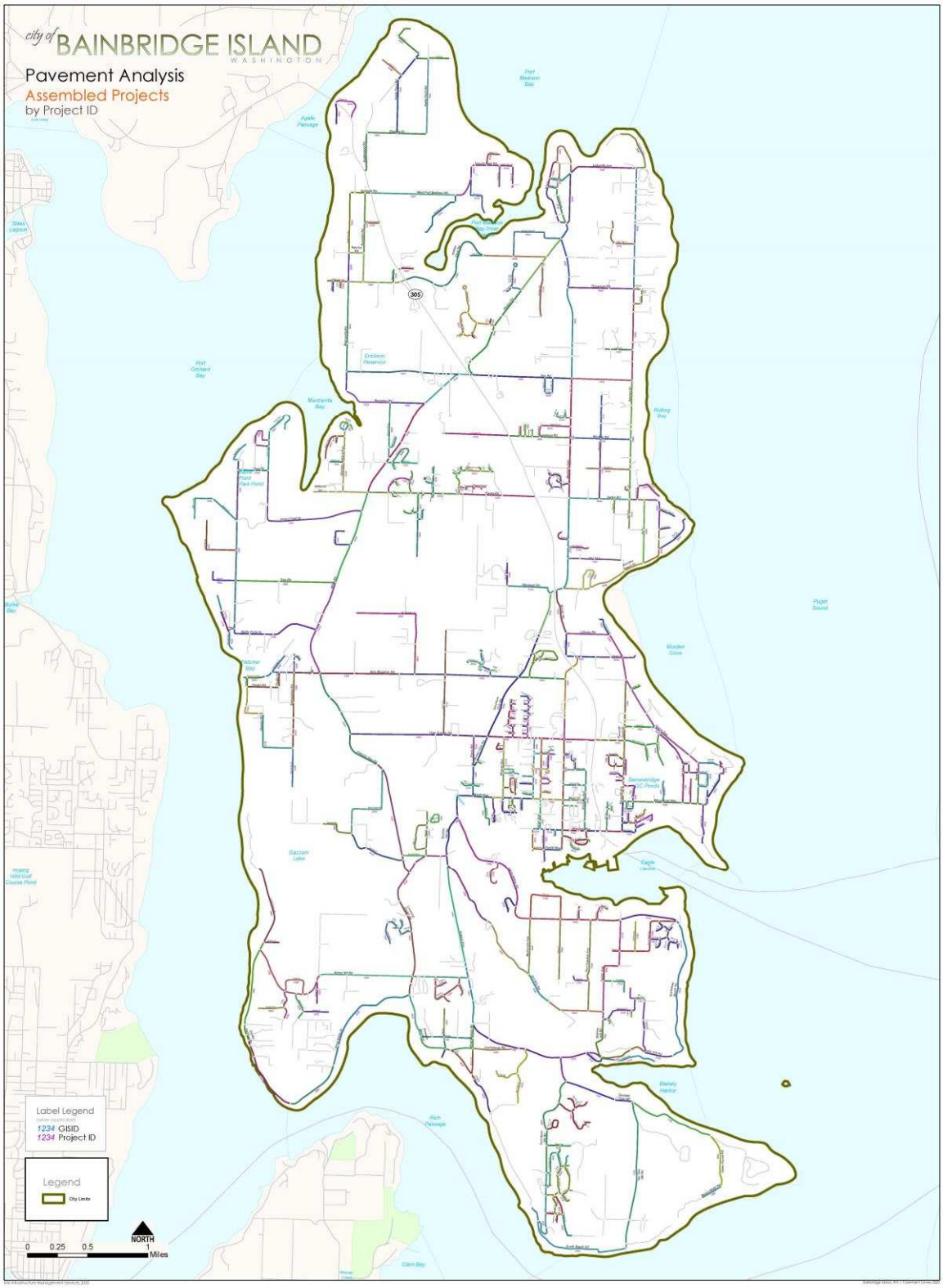


Figure 7 – Bainbridge Island Assembled Projects

3.3 FIELD SURVEY METHODOLOGY

Following a set of predefined assessment protocols matching the pavement management software (ASTM D6433), a specialized piece of survey equipment – referred to as a Laser Road Surface Tester (Laser RST, pictured on page 5) – is used to collect observations on the condition of the pavement surface, as well as collect high definition digital imagery and spatial coordinate information. The Laser RST surveys each local street from end to end in a single pass, while all other roadway classifications are completed in two passes.

Key pavement condition data elements collected by the Laser RST include:

Surface Distress Index – The Laser RST collects surface distress observations based on the extent and severity of distresses encountered along the length of the roadway following ASTM D6433 protocols for asphalt and concrete pavements. The surface distress condition (cracking, potholes, raveling, and the like) is considered by the traveling public to be the most important aspect in assessing the overall pavement condition.

Presented on a 0 to 100 scale, the Surface Distress Index (SDI) is an aggregation of the observed pavement defects. Within the SDI, not all distresses are weighted equally. Certain load associated distresses (caused by traffic loading), such as rutting or alligator cracking on asphalt streets, or divided slab on concrete streets, have a much higher impact on the surface distress index than non-load associated distresses such as raveling or patching. Even at low extents and moderate severity – less than 10% of the total area – load associated distresses can drop the SDI considerably. ASTM D6433 also has algorithms within it to correct for multiple or overlapping distresses within a segment.

For this project, extent and severity observations were collected, processed, and loaded into the pavement management software. Within the software, the following distresses, listed in order from greatest to lowest impact, are presented as a 0 to 10 rating for review and reporting:

- Alligator Cracking – Alligator cracking is quantified by the severity of the failure and number of square feet. Even at low extents, this can have a large impact on the condition score as this distress represents a failure of the underlying base materials.
- Wheel Path Rutting – Starting at a minimum depth of ¼ inch, wheel path ruts are quantified by their depth and the number of square feet encountered. Like alligator cracking, low densities of rutting can have a large impact on the final condition score.
- Longitudinal, Transverse, Block (Map), and Edge Cracks – These are quantified by their length and width. Longitudinal cracks that intertwine are the start of alligator cracking.
- Patching – Patching is quantified by the extent and quality of patches. When the majority of a roadway surface is covered by a patch, such as a large utility replacement, the rating of the patch is minimized. All potholes are rated as patches.
- Distortions – All uneven pavement surfaces, such as depressions, bumps, sags, swells, heaves, and corrugations, are included as distortions and are quantified by the severity and extent of the affected area.
- Raveling – Raveling is the loss of fine aggregate materials on the pavement surface and is measured by the severity and number of square feet affected.

- Bleeding – Bleeding is the presence of free asphalt on the roadway surface caused by too much asphalt in the pavement or insufficient voids in the matrix. The result is a pavement surface with low skid resistance and is measured by the amount and severity of the area.
- Similar distresses were collected for concrete streets including divided slab, corner breaks, joint spalling, faulting, polished aggregate, and scaling.

Roughness Index – Roughness is recorded following the industry standard "International Roughness Index" (IRI), a measure of the change in elevation over a distance expressed as a slope and reported in millimeters/meter. The IRI value is converted to a 0 to 100 score and reported as the Roughness Index (RI) as follows:

$$\mathbf{RI} = (11 - 3.5 \times \ln(IRI)) \times 10$$

ln(IRI) is the natural logarithm of IRI.

In common terms, a newer street would generally have a Roughness Index above 85, while one due for an overlay would be in the range 40 to 70. Failed streets typically have roughness values below 40.

Structural Index – The network of streets was not tested for structural adequacy, instead, the relationship between the final pavement condition score and amount of load associated distresses was analyzed and each pavement section assigned a Weak, Moderate or Strong strength rating. The assigned structural index (30, 60 or 80 for weak, moderate and strong respectively) was not used in determining the overall pavement condition score, but simply to classify the pavement strength and aid in selecting appropriate rehabilitation strategies.

Pavement Condition Index (PCI) – Following our field surveys, the condition data is assembled to create a single score representing the overall condition of the pavement. The Pavement Condition Index (PCI) is calculated as follows:

PCI = 33% Roughness Index + 67% Surface Distress Index

Development of the pavement management plan and budgets were completed using Bainbridge Island - specific rehabilitation strategies, unit rates, priorities, and pavement performance curves. The process was iterative in its attempt to obtain the greatest efficiency and cost benefit.

4.0 BAINBRIDGE ISLAND SURVEY PAVEMENT CONDITION

4.1 UNDERSTANDING THE PAVEMENT CONDITION INDEX

The following compares the Pavement Condition Index (PCI) to commonly used descriptive terms. Divisions between the terms are not fixed, but are meant to reflect common perceptions of condition.

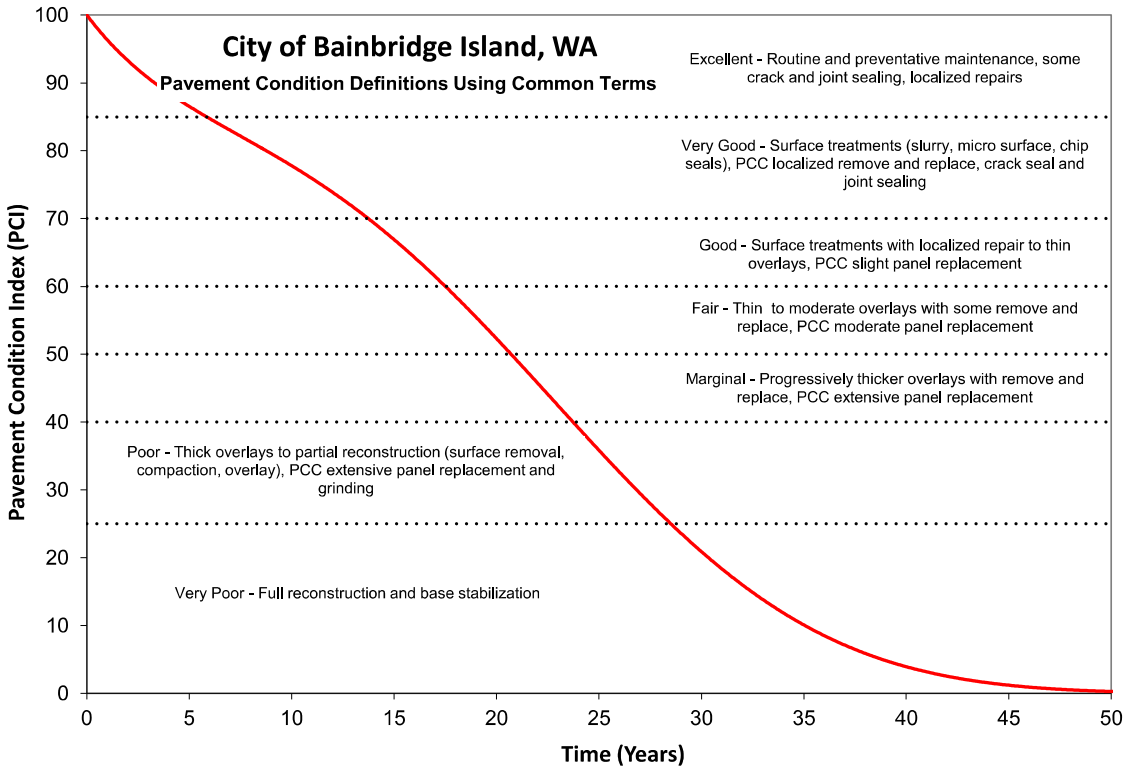


Figure 8 – Understanding the Pavement Condition Index (PCI) Score

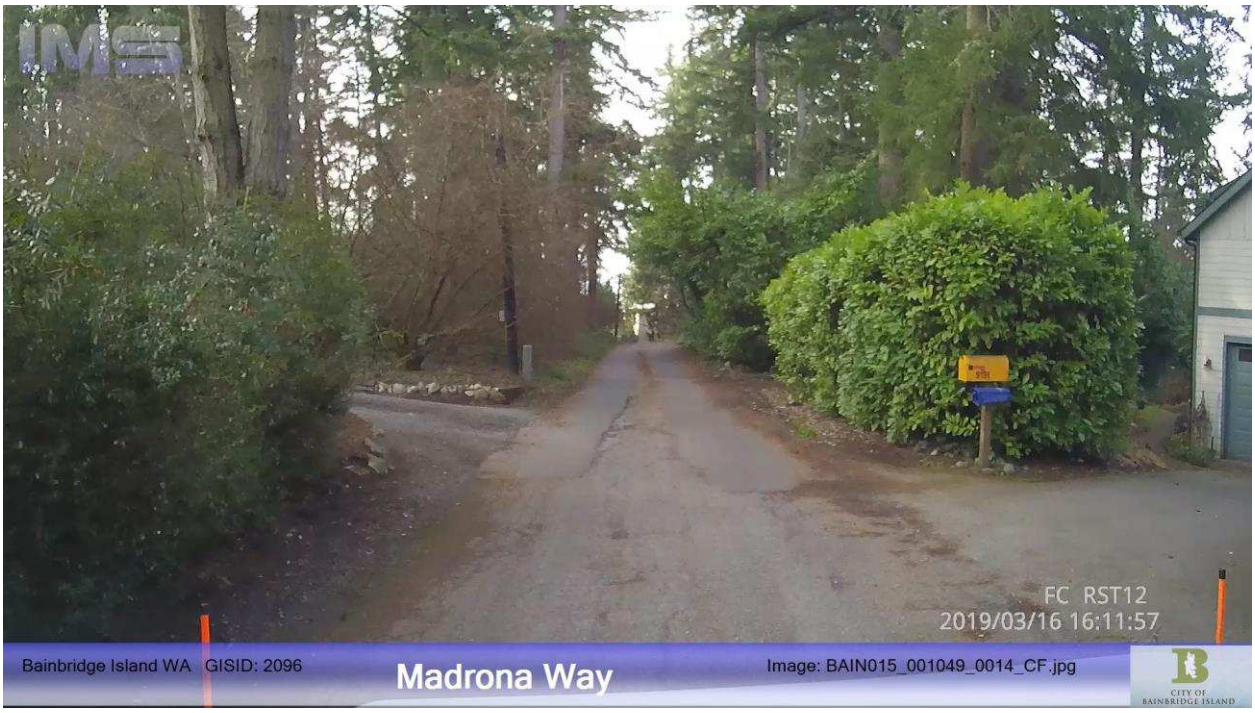
The following table details a general description for each of these condition levels with respect to remaining life and typical rehabilitation actions:

PCI Range	Description	Relative Remaining Life	Definition
85 – 100	Excellent	15 to 25 Years	Like new condition – little to no maintenance required when new; routine maintenance such as crack and joint sealing.
70 – 85	Very Good	12 to 20 Years	Routine maintenance such as patching and crack sealing with surface treatments such as seal coats or slurries.
60 – 70	Good	10 to 15 Years	Heavier surface treatments, chip seals and thin overlays. Localized panel replacements for concrete.
40 – 60	Marginal to Fair	7 to 12 Years	Heavy surface-based inlays or overlays with localized repairs. Moderate to extensive panel replacements.
25 – 40	Poor	5 to 10 Years	Sections will require very thick overlays, surface replacement, base reconstruction, and possible subgrade stabilization.
0 – 25	Very Poor	0 to 5 Years	High percentage of full reconstruction.

4.2 BAINBRIDGE ISLAND NETWORK CONDITION IMAGERY

The images presented below provide a sampling of the Bainbridge Island streets that fall into the various condition categories with a discussion of potential rehabilitation strategies.

Very Poor (PCI = 0 to 25) – Complete Reconstruction



Madrona Way from South End to Olympus Beach Way (GISID 2096, PCI = 23) – Rated as Very Poor, this street displays spreading base failure as evidenced by the severe alligator cracking and patching. A mill and overlay on this street would not be suitable as the base has failed and would not meet an extended service life of at least 15 years. This street requires a full reconstruction and should be carefully monitored.

Deferral of reconstruction of streets rated as Very Poor will not cause a substantial decrease in pavement quality as the streets have passed the opportunity for overlay-based strategies. Due to the high cost of reconstruction, Very Poor streets are often deferred until full funding is available in favor of completing more streets that can be rehabilitated at lower costs, resulting in a greater net benefit to the City. This strategy however must be sensitive to citizen complaints forcing the street to be selected earlier. In addition, this type of street can pose a safety hazard for motorists, since severe potholes and distortions may develop. It is important to consistently monitor these streets and check for potholes or other structural deficiencies until the street is eventually rebuilt.

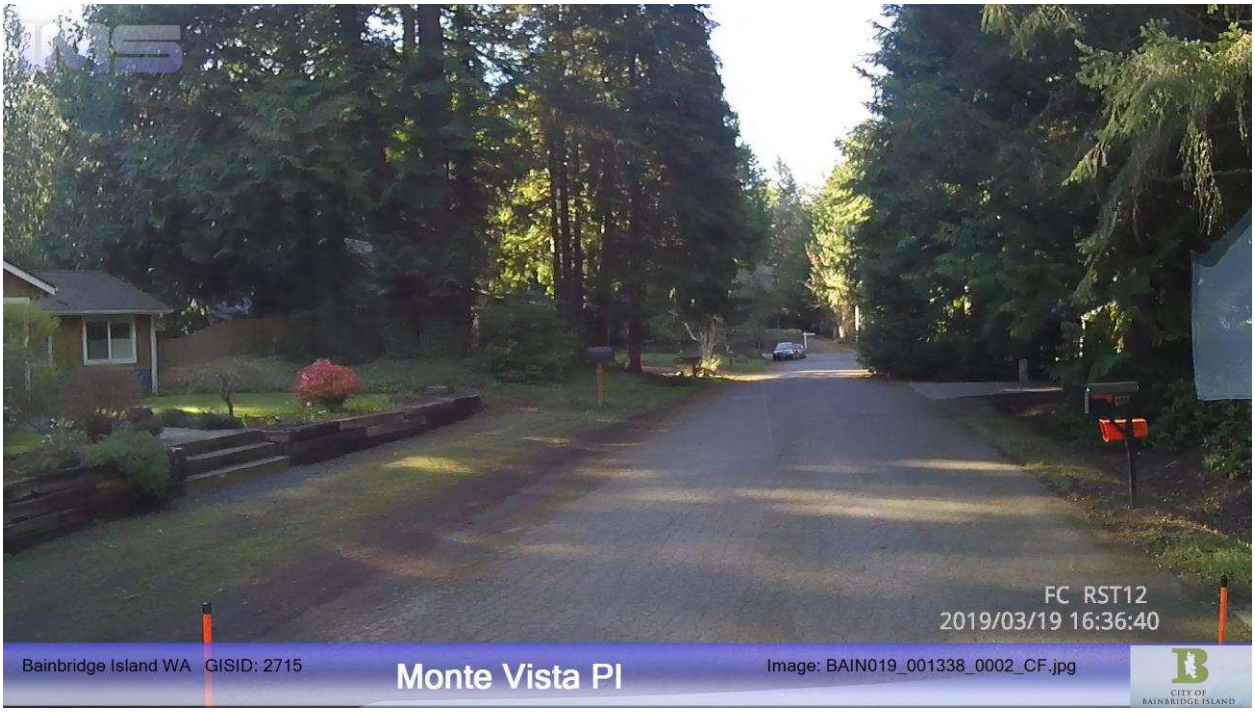
Poor (PCI = 25 to 40) – Last Opportunity for Surface Base Rehabilitation

Meadowmeer Circle from Chatham Place to Tyler Place (GISID 2060, PCI = 33) – Rated as Poor, this segment still has some remaining life before it becomes a critical reconstruction need. On this street, the base is showing signs of failure in areas exhibiting alligator/fatigue cracking. The severely cracked areas are isolated and do not persist throughout the entire segment length and cross section. These areas should be dug out and structurally patched to attain the maximum life from any potential rehabilitation efforts. If left untreated, within a short period of time, a full reconstruction would be required.

On arterial roadways, Poor streets often require partial to full reconstruction – that is removal of the pavement surface and base down to the subgrade and rebuilding from there. On local roadways, they require removal of the pavement surface through grinding or excavation, base repairs, restoration of the curb line and drainage, and then placement of a new surface.

In general, the service life of Poor streets is such that if deferred for too long, it would require a more costly reconstruction. Streets rated as Poor are typically selected first for rehabilitation as they provide the greatest cost/benefit to the City – that is the greatest increase in life per rehabilitation dollar spent.

Marginal (PCI = 40 to 50) – Progressively Thicker Overlays



Monte Vista Place from South End to Monte Vista Drive (GISID 2715, PCI = 41) – Rated as marginal with a PCI score at the lower range between Marginal and Poor streets. Marginal streets have distresses that tend to be localized and moderate in nature – that is they do not extend the full length of the segment and can be readily dug out and repaired. This street segment highlights this characteristic as the failed area does not quite extend the full length or width of the roadway and is still serviceable. However, it also highlights the relationship between base and pavement quality. Placing an overlay on this street without repairing the base would not achieve a full 15 year life as the failure would continue to occur over time. Structural patching of the failed areas along localized rehabs would permit a full width grind and inlay on this street segment and return it to full service.

Marginal streets that display high amounts of load associated distresses are selected as a priority for rehabilitation as they provide the greatest cost/benefit to the City. If left untreated, Marginal streets with high amounts of load associated distresses would deteriorate to become partial reconstruction candidates. Marginal streets that are failing due to materials issues or non-load associated failures may become suitable candidates for thick overlays if deferred, without a significant cost increase.

Fair (PCI = 50 to 60) – Thin to Moderate Overlays

Madrona Drive from South End to Olympus Beach Way (GISID 2426, PCI = 54) – Rated in the Fair category, these streets require thin to moderate overlays for asphalt when they enter their need year (generally within 2-3 points of the lower PCI in the defined range). Several distresses are present, but tend to be more localized and moderate in severity, and non-load related (primarily longitudinal and transverse cracking and raveling). On this segment of road, the signs of deterioration are evident in the left hand travel lane of the pavement and are moderate in severity indicating the base has not yet failed along the entire length of roadway.

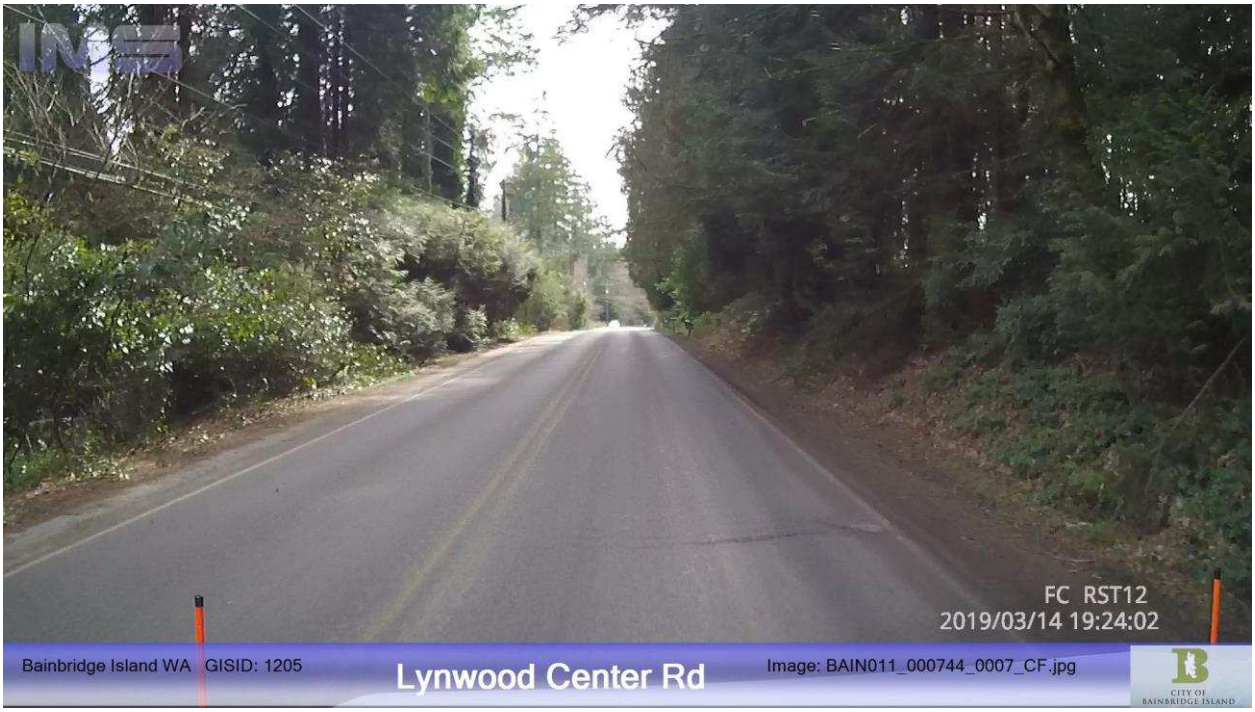
Asphalt streets rated as Fair tend to receive a lower priority when developing a rehabilitation program. If deferred, the rehabilitation cost would only increase by about $3 to $5/yd2, again depending on the functional classification, in about 5 to 10 years. This delay represents a 20% difference over the time stated. Thus, the cost of deferral is low when compared to deferring a thick overlay to a reconstruction with a two to threefold increase in cost.

Good (PCI = 60 to 70) – Surface Treatments to Thin Overlays

Lovell Avenue from Pierce Court to Annie Rose (GISID 2333, PCI = 60) – Rated as Good with the primary cause of deterioration the transverse and longitudinal cracking, as well as patching. It also displays small amounts of load associated distresses that can easily be removed to restore the visual appearance of the roadway. The existing cracks should be sealed and the pavement surface restored, with a heavier surface treatment such as microsurfacing or double slurry to fully waterproof the pavement and cover the crack sealant. The occasional dig out and replacement may be required to correct localized deficiencies. Alternatively, depending on the extent of the distressed areas, base strength and drainage, a thin overlay may be applied.

Asphalt streets rated as Good are ideal candidates for thinner surface-based rehabilitations and local repairs. Depending on the amount of localized failures, a thin edge mill and overlay, or possibly a surface treatment, would be a suitable rehabilitation strategy for streets rated as Good. Streets that fall in the high 60 - low 70 PCI range provide the greatest opportunity for extending pavement life at the lowest possible cost, thus applying the principles of the perpetual life cycle approach to pavement maintenance. The adjacent photo is a great example of a street segment (not a Bainbridge Island Road) that displayed low load associated distresses and thus, high structural characteristics, and once the distressed areas were replaced, a slurry seal was applied. The patching accounted for less than 5 to 10% of the total area and resulted in a good looking, watertight final surface at a much lower cost than an overlay with less disruption to the neighborhood and curb line. The patches were paver laid and roller compacted.

Very Good (PCI = 70 to 85) – Surface Treatments and Localized Rehabilitation



Lynwood Center Road from Jade Lane to Opal Ridge Lane (GISID 1205, PCI = 77) – Rated as Very Good, this road displays minor amounts of transverse cracking and patching. The surface is non-weathered, and the base is still strong. This street is an example of a candidate for preventative maintenance and light weight surface treatments to extend the life of a roadway.

Asphalt streets rated as Very Good generally need lightweight surface-based treatments such as surface seals, slurries, chip seals or microsurfacing. Routine maintenance such as crack sealing and localized repairs often precede surface treatments. The concept is to keep the cracks as waterproof as possible through crack sealing and the application of a surface treatment. By keeping water out of the base layers, the pavement life is extended without the need for thicker rehabilitations such as overlays or reconstruction. Surface treatments also tend to increase surface friction and visual appearance of the pavement surface but do not add structure or increase smoothness.

Surface treatments may include:

- *Double or single application of slurry seals (slurries are a sand and asphalt cement mix).*
- *Microsurfacing – asphalt cement and up to 3/8 sand aggregate.*
- *Chip seals and cape seals (Chip seal followed by a slurry).*

Additional cost benefits of early intervention include:

- *Less use of non-renewable resources through thinner rehabilitation strategies.*
- *Less intrusive rehabilitation and easier to maintain access during construction.*
- *Easier to maintain existing drainage patterns.*

Excellent (PCI = 85 to 100)

Knetchel Way from Wintersweet Road to Ericksen Avenue (GISID 1012, PCI = 94) – Rated as Excellent, displaying little to no surface distresses. The ride is smooth and the surface is non-weathered and the base is strong. In a couple of years, this street segment would be an ideal candidate for routine maintenance activities such as crack sealant rehabilitation.

In terms of pavement management efficiency, a program based on worst-first, that is starting at the lowest rated street and working up towards the highest, does not achieve optimal expenditure of money. Generally, under this scenario, agencies can not sufficiently fund pavement rehabilitation and lose ground despite injecting large amounts of capital into the network.

The preferred basis of rehabilitation candidate selection is to examine the cost of deferral of a street, against increased life expectancy.

4.3 EVALUATING THE PAVEMENT QUALITY AND BACKLOG

The concept of the Pavement Condition Index (PCI) score, backlog percentage and number of streets rated as Excellent must be fully understood in order to understand and develop an effective pavement management program. These three metrics should fall into certain ranges in order to measure the quality and long term viability of a network.

The PCI score indicates the overall pavement condition and represents the amount of equity in the system; it is the value most commonly considered when gauging the overall quality of a roadway network. It may also be used to define a desired level of service: that is, an agency may wish to develop a pavement management program such that in five years the overall network score meets a set minimum value. Obviously, the higher the PCI score the better off the overall network condition is. Agencies with an average PCI score above 80 (when considering surface distress, roughness and possibly strength) are rare and found only in a few select communities. Less than 1 in 20 communities surveyed by IMS have that high of a condition average. Averages between 65 and 80 are indicative of either newer networks, or ones that have an ongoing pavement rehabilitation program and tend to be fully funded. Scores between 60 and 65 are common and represent a reasonable average providing a satisfactory balance between levels of service and funding, and when taken with the other two metrics may represent a well-managed and funded network. A minimum score of 60 means that overall the network falls at the lower end of the range where light weight surface treatments and thin overlays are the standard rehabilitation practice. Below a 60 means an agency has to rely on more costly rehabilitations and reconstructions to address condition issues.

At the upper end of the condition scale, a minimum of 15% of the network should be rated as Excellent. Generally, at or above 15%, means that a noticeable percentage of the roadway network is in like new condition, requiring only routine maintenance. While higher percentages of streets rated as Excellent are certainly desirable, the annual cost to maintain rates at higher multiples is often cost prohibitive. Below 15% means the agency is struggling to effectively rehabilitate their network on an annual basis. The 15% marker represents a cost effective balance between annual investment and satisfactory level of service.

Backlog roadways are those that have dropped sufficiently in quality to the point where surface based rehabilitation efforts would no longer prove to be cost effective. These roadways are rated Poor or Very Poor and will require either partial or total reconstruction. Backlog is expressed as the percentage of roads requiring reconstruction as compared to the network totals.

It is the backlog, however, that defines the amount of legacy work an agency is facing and is willing to accept in the future. It is the combination of the three metrics that presents the true picture of the condition of a roadway network, and conversely defines improvement goals.

Generally, a backlog of 10% to 15% of the overall network is considered manageable from a funding point of view with 12% being a realistic target. Fifteen percent (15%) is used as a control limit to indicate the maximum amount of backlog that can be readily managed. Backlog rates below 10%, again are certainly desirable, but financially unachievable for a large percentage of agencies. Backlogs approaching 20% or more tend to become unmanageable, unless aggressively checked through larger rehabilitation programs, and will grow at an alarming rate. At 20% a tipping point has been met and the backlog tends to increase faster than an agency's ability to reconstruct their streets.

4.4 BAINBRIDGE ISLAND NETWORK CONDITION DISTRIBUTION

Figure 9 presented below shows the distribution of pavement condition for the roadway network in Bainbridge Island. The average PCI for the network is 70. While direct comparisons to other agencies are difficult due to variances in ratings systems, Bainbridge Island is above average when compared to other agencies recently surveyed by IMS, which typically fall in the 60 to 65 range.

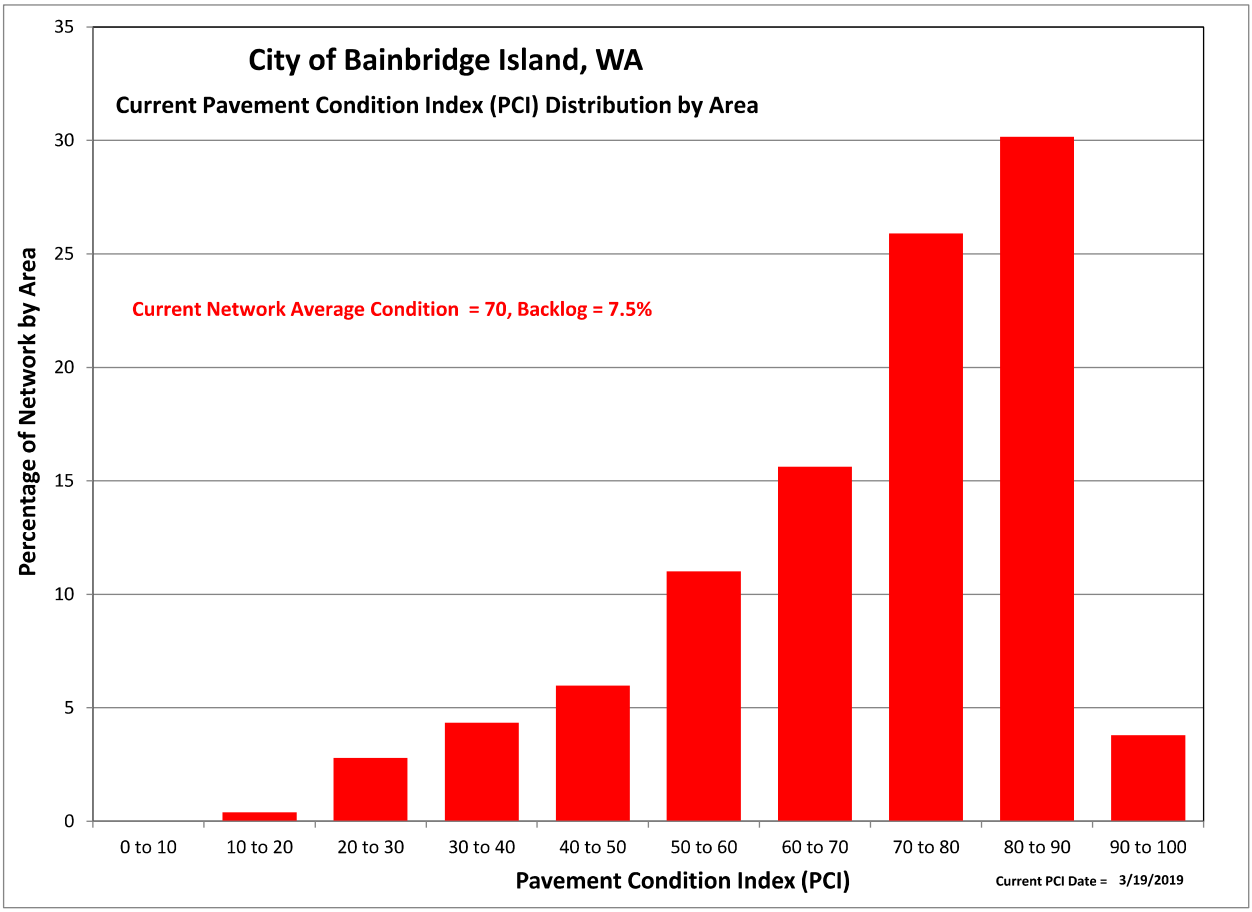


Figure 9 – Roadway Network Present Status

- This is reflective of a moderately aged network that has had some roadway renewal effort.
- Traditionally we expect to see a bell curve that is skewed to the right and centered between a PCI of 60 and 70. The Bainbridge Island network curve illustrated above is to the right of this norm and shows the positive impact of recent roadway renewal effort over the last several years.

The following graph **(Figure 10)** plots the same pavement condition information, but instead of using the actual Pavement Condition Index (PCI) value, descriptive terms are used to classify the roadways.

- Thirteen percent (13%) of the network can be considered in Excellent condition and require only routine maintenance.
- Forty-six percent (46%) of the network falls into the Very Good classification. These are roads that benefit most from preventative maintenance techniques such as microsurfacing, slurry seals and localized panel repairs.
- Sixteen percent (16%) of the streets are rated as Good and are candidates for lighter surface-based rehabilitations such as thin overlays or slight panel replacements.
- Seventeen percent (17%) of network can be considered Fair to Marginal condition representing candidates for progressively thicker overlay-based rehabilitation or panel replacements. If left untreated, they will decline rapidly into reconstruction candidates.
- The remaining eight percent (8%) of the network is rated as Poor or Very Poor, meaning these roadways have failed or are past their optimal due point for overlay or surface-based rehabilitation and may require progressively heavier or thicker forms of rehabilitation (such as extensive panel replacement, surface reconstruction or deep patch and paving) or total reconstruction.

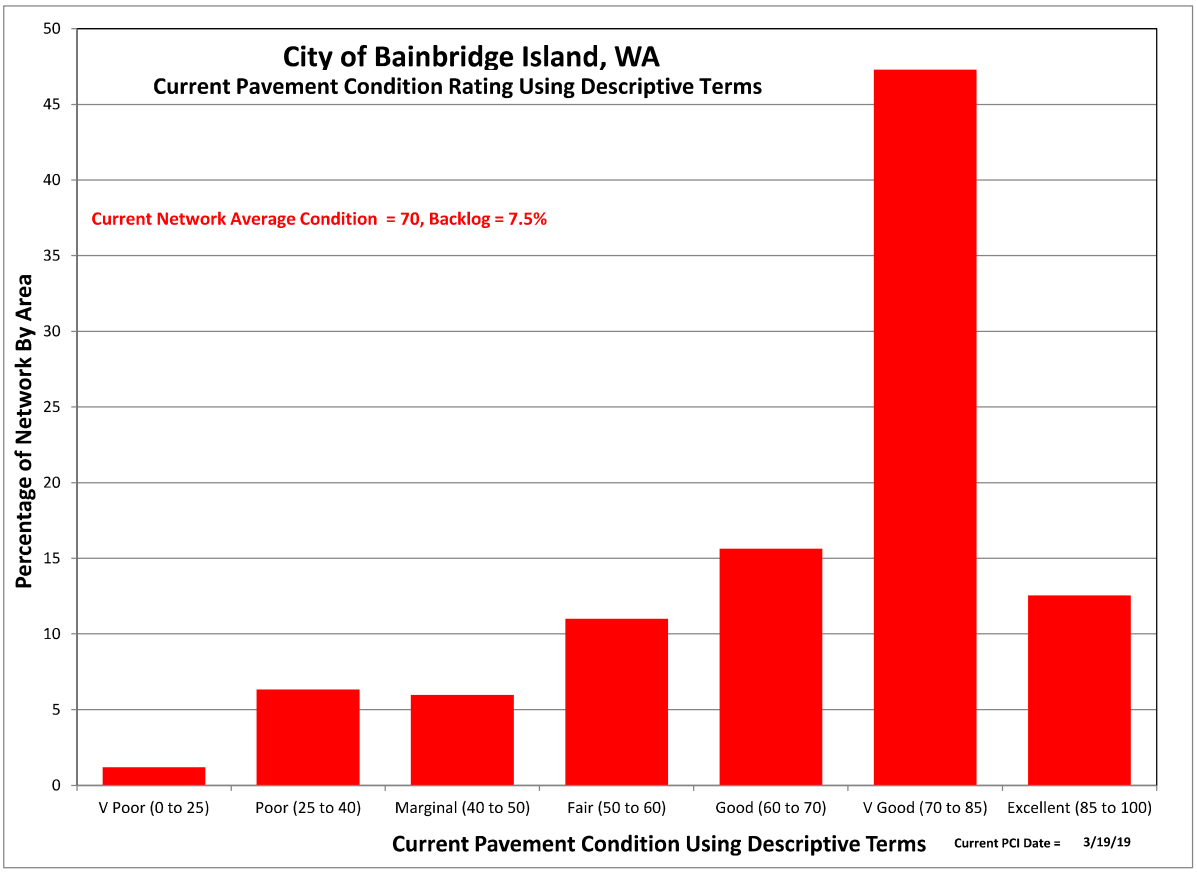


Figure 10 – Roadway Network Present Status Using Descriptive Terms

Figures 11 and 12 present the surveyed condition of the streets using PCI and Good-Fair-Poor descriptive terms, respectively. Electronic versions of these maps are appended to this report.

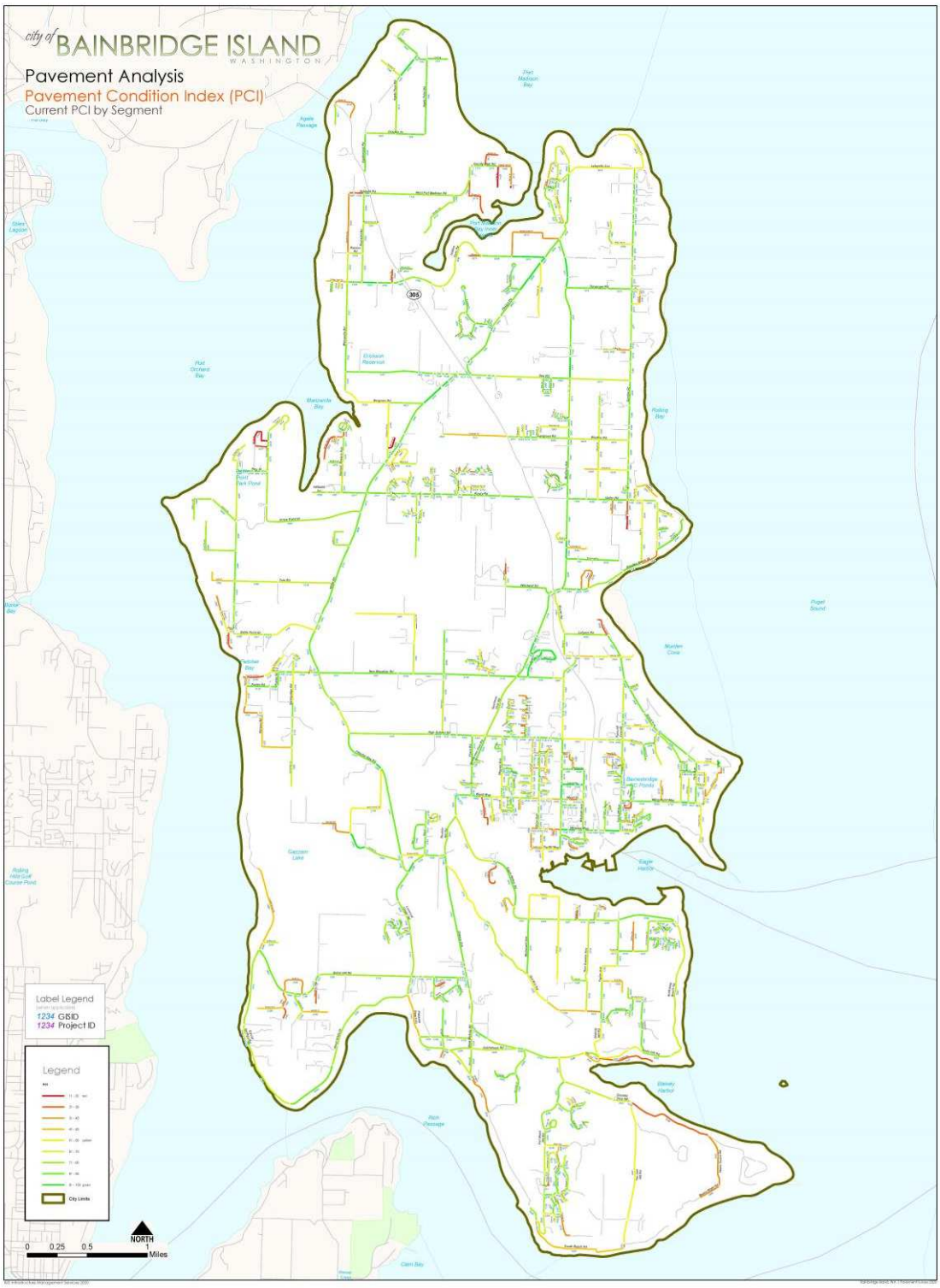


Figure 11 – Bainbridge Island by Segment Using Pavement Condition Index (PCI)

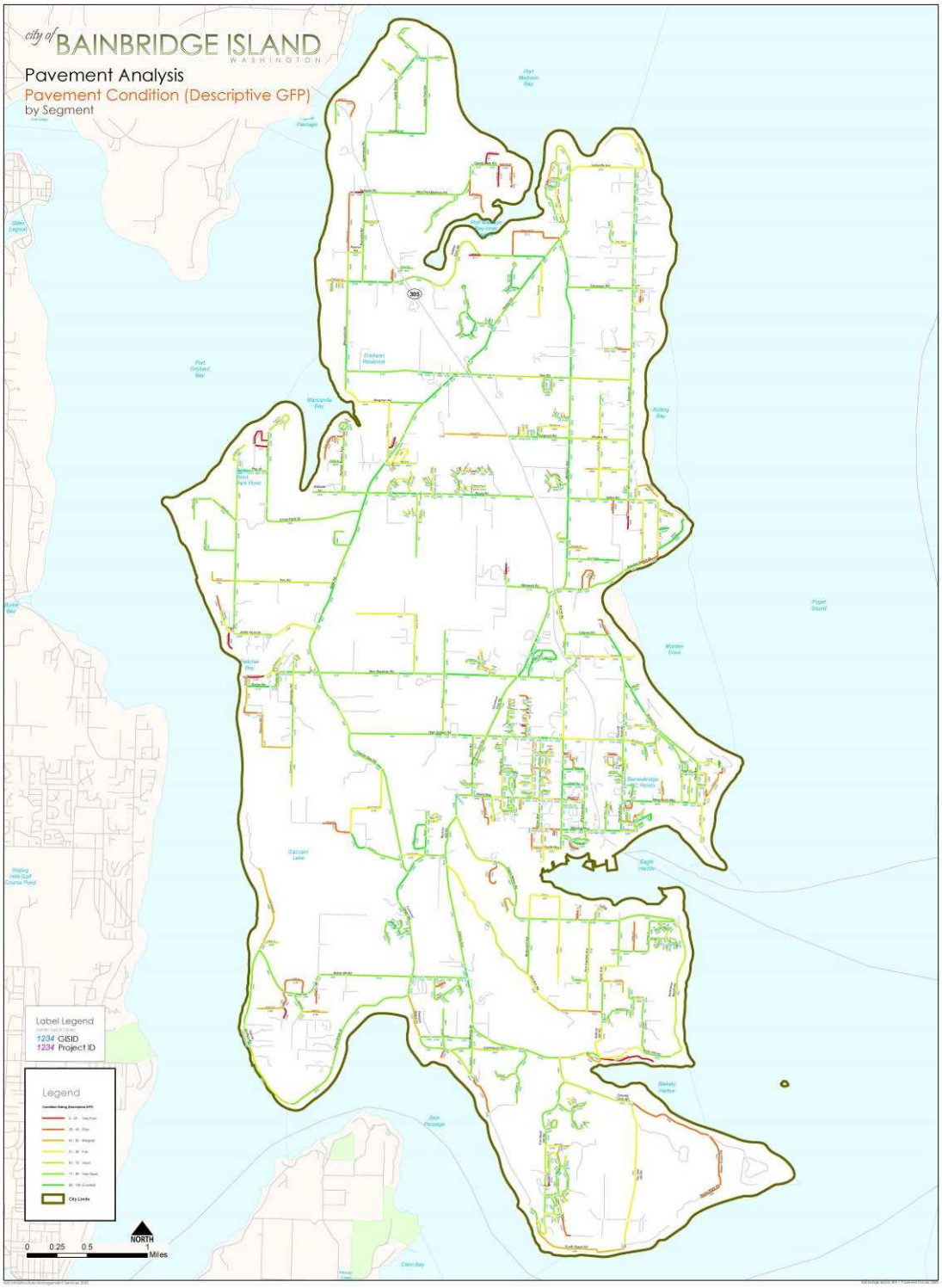


Figure 12 – Bainbridge Island Pavement Condition by Segment Using Descriptive Terms

4.5 CONDITION BY FUNCTIONAL CLASSIFICATION

Figure 13 highlights the pavement condition distribution for the arterial, collector, and local streets. Keep in mind that arterial roadways, the streets that have the majority of traffic use and link various parts of the city together, may be considered the thoroughfares of the city and during the budget development process, should receive the highest priority when selecting rehabilitation candidates.

- The **Arterial network** has an average PCI of **79**
- The **Collector network** has an average PCI of **71**
- The **Residential Urban network** has an average PCI of **65**
- The **Residential Suburban network** has an average PCI of **62**

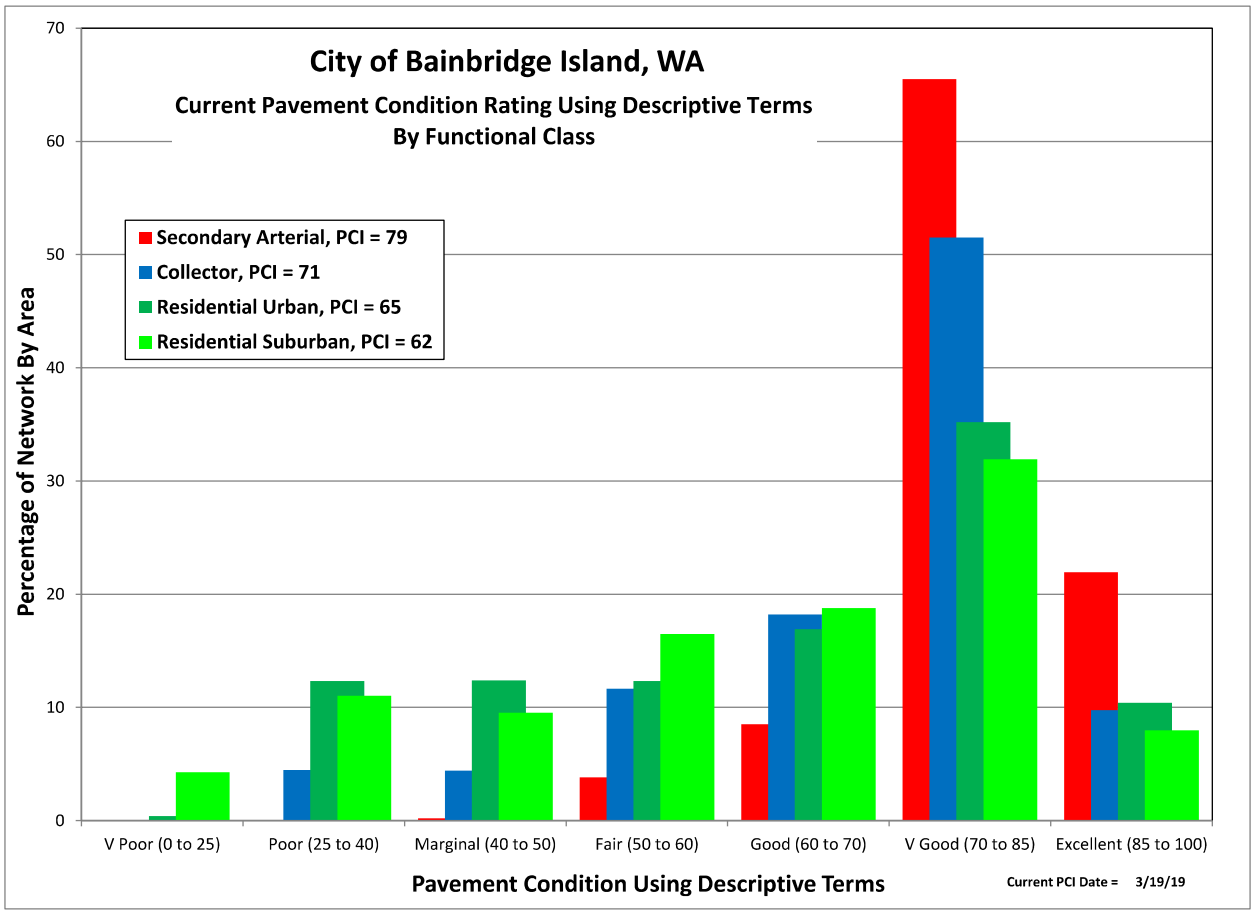


Figure 13 – Condition Rating by Functional Classification

4.6 STRUCTURAL AND LOAD ASSOCIATED DISTRESS ANALYSIS

Structural testing and analysis was not performed for the City of Bainbridge Island. Instead, analysis of the cause of pavement failure for these street segments was completed by examining the types of distresses that have caused the PCI score to drop.

Surface distresses may be categorized into two classifications – load associated distresses (LADD) and non-load associated distresses (NLAD). Load associated distresses are those that are directly related to traffic loading and structural capacity. Non-load associated distresses are those that result from materials or environmental issues including shrinkage (transverse) cracking, bleeding and raveling. Generally, load associated distresses affect the overall condition score more than non-load associated distresses – as is the case in Bainbridge Island. For asphalt streets, roadways were classified as Weak, Moderate, or Strong.

The purpose of the structural analysis is twofold:

- The structural analysis provides input into which performance curve each segment is to use – performance curves are used to predict pavement deterioration over time.
- Structural analysis assists in rehabilitation selection by constraining inadequate pavement sections from receiving too light of a rehabilitation and conversely, identifying segments suitable for lighter weight treatment.

Figure 14 plots the relationship of the load associated distresses (shown in red) against pavement condition. As can be seen from the plot, at higher PCI scores, most pavements fall into the moderate strength classification as the distresses have not yet begun to manifest themselves into severe failures. As the PCI score drops, the load associated distresses typically affect the PCI score to a higher degree with more segments being classified as weak. Conversely, segments that have a declining PCI score and low LADD, are classified as strong as they display few load associated failures. High PCI score (above 60) rehab selections should focus on pavement preservation activities such as surface treatments or thin overlays, possibly with some localized pavement repairs and crack sealing.

The sum of the Load-Associated Distress deducts (LADD) is also used to qualify the appropriate rehabilitation strategy selection in addition to the overall pavement condition score. For example, a street that has a good PCI score (that is between 60 and 70) and is displaying relatively low load associated distress deducts would be a suitable candidate for a surface treatment in place of a thin overlay in that the PCI score is more influenced by materials issues such as transverse cracking or raveling.

Overall, the low amounts of streets exhibiting weak performance can generally be attributed to poor subgrade conditions, insufficient pavement thickness and increased traffic loading – in particular heavy, side-loading garbage and recycling trucks (an unintended consequence of green initiatives) along with school buses and delivery vehicles. The average weight of these vehicles coupled with tire pressure and configuration today compared to those from a few decades ago has increased drastically.

- The upper black diagonal line identifies segments that have a high ratio of load associated distresses compared to their PCI score. These segments are classified as weak.
- The lower black diagonal line identifies segments that have a low ratio of load associated distresses compared to their PCI score and are classified as strong.
- Segments that fall between the two lines are assigned a moderate pavement strength.

The sum of the Load-Associated Distress deducts (LADD) is also used to qualify the appropriate rehabilitation strategy selection in addition to the overall pavement condition score.

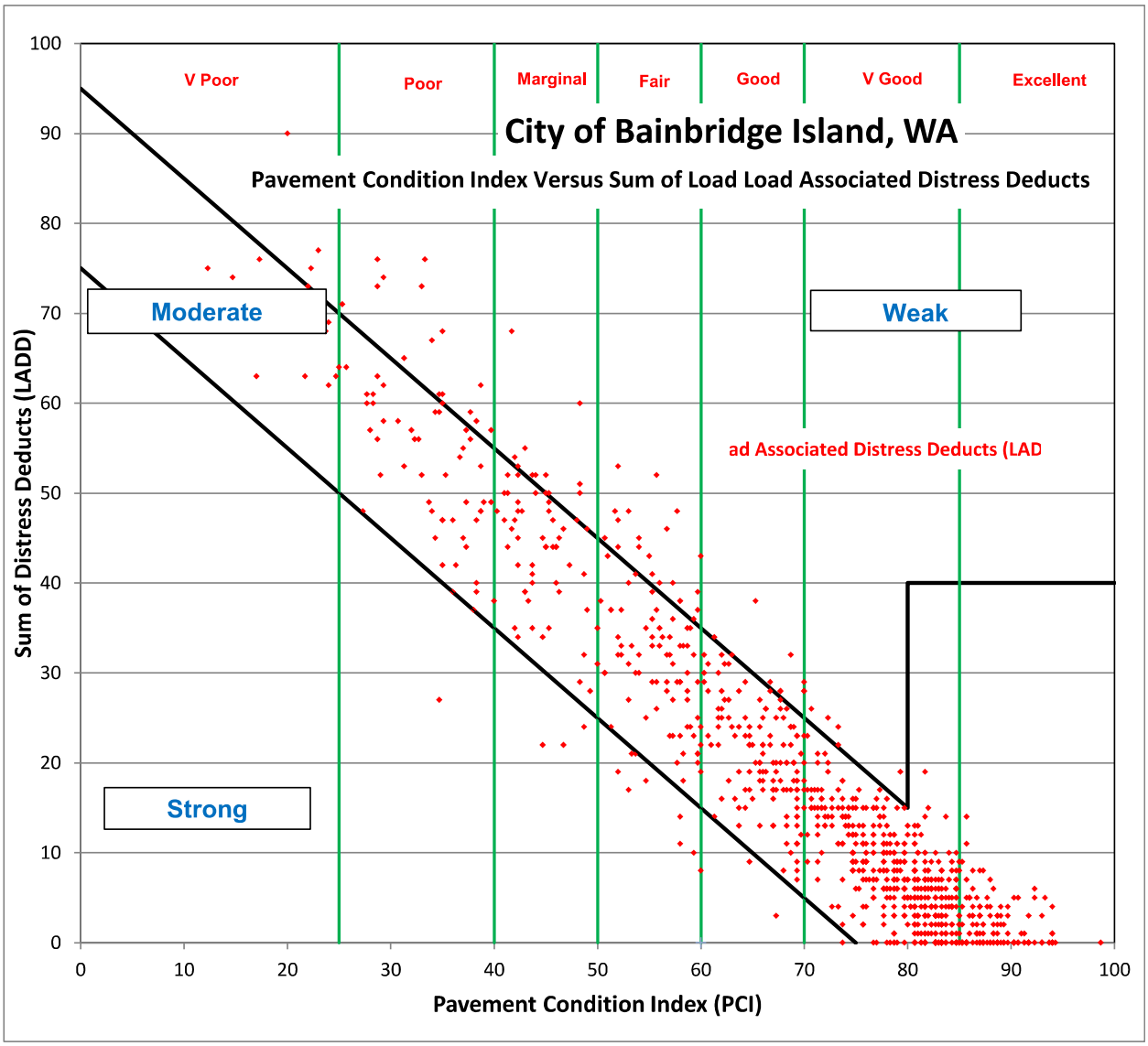


Figure 14 – Pavement Condition Index versus Sum of Distress Deducts

5.0 REHABILITATION PLAN AND BUDGET DEVELOPMENT

5.1 KEY ANALYSIS SET POINTS AND PAVEMENT PERFORMANCE CURVES

Pavement management analysis requires user inputs in order to complete its condition forecasting and prioritization. A series of operating parameters were developed in order to create an efficient program that is tailored to the City's needs.

Some of the highlights include:

- The pavement performance curves that are used to predict future pavement condition. Asphalt streets are classified as weak, moderate, or strong, and then assigned the appropriate pavement performance curve based on their functional classification to use in the analysis. The concept of load associated distresses does not apply to concrete streets.
- The shape of performance curves reflect the concept of deferred maintenance and salvage life. Instead of dropping to an absolute PCI value of 0 after 40 years of service, the curves are designed to become asymptotic to the age axis and have a whole life of approximately 50 to 60 years depending on pavement type. This indicates the notion that once a street deteriorates past a specific threshold – about a PCI of 20, age becomes less important in rehab selection.
- Priority ranking analysis uses prioritization for rehabilitation candidate selection. It is designed to capture as many segments in their need year based on the incremental cost of deferral. The higher the functional classification of a street, the higher priority a segment is given.

Rehabilitation Strategies and Unit Rates

The rehab strategies and unit rates used in the pavement analysis can be found on the following page. Some important parameters include:

- **Rehab Code and Activity** – The assigned identifier and name to each rehabilitation strategy. The relative terms of thin, moderate and thick are used to describe the overlay thickness. This is to facilitate consistency in the naming convention, but does not imply the same material thickness has to be used for each functional classification.

  The recommended rehab activities for any given PCI range may vary due to pavement strength and functional classification. For example, an arterial between a PCI of 50 to 60 may receive a thin to moderate overlay, while a local access road may only receive a chip seal or thin overlay.

- **Unit Rates** – The rehab costs are presented on a per square yard basis for each pavement type, functional class, and rehabilitation activity combination. The rates were developed using typical national averages for similar activities and adjusted for Bainbridge Island's location and unique conditions. An additional burden to all costs was also added to cover City overheads, design and engineering and inspection. Costs for peripheral concrete rehab (valley gutters, inlets, approaches, etc.) have not been included in the analysis.

The unit rates are reflected in the network value, final budgets, and average cost/mile for doing work in Bainbridge Island.

City of Bainbridge Island, WA
Rehabilitation Strategies and Unit Rates

Pavetype	Rehab Code	Rehab Activity	Rehab Group 1 Min PCI	Critical PCI (Need Year)	Max PCI	Secondary Arterial Unit Rate ($/yd2)	Collector Unit Rate ($/yd2)	Residential Urban Unit Rate ($/yd2)	Residential Suburban Unit Rate ($/yd2)	Construction Activities Burden Included in Unit Rates (%)	Agency Overheads Included in Unit Rates (%)	Reset PCI	Steady State Life Cycle (Yrs)	CBA Rehab Priority (Info Only)
All	5	Do Nothing	85	100	100	0.00	0.00	0.00	0.00	0	0		1	
Asphalt	10	Routine Maintanence	75	77	85	1.00	1.00	1.00	1.00	25	15	85	6	7
Asphalt	20	Surface Treatment	70	72	75	4.50	4.10	3.90	13.50	25	15	88	12	8
Asphalt	23	Surface Treatment + Strctrl Ptch	70	72	75	5.00	4.60	4.40	14.00	25	15	88	12	9
Asphalt	26	Surface Treatment + Strctrl Ptch	60	62	70	5.00	4.60	4.40	14.00	25	15	88	12	5
Asphalt	30	EM + Thin Overlay (1.5 - 2.0) / Chip Seal	60	62	70	23.00	22.00	21.00	14.50	25	15	92	21	14
Asphalt	33	EM + Thin Overlay (1.5 - 2.0) / Chip Seal + Strctrl Ptch	60	62	70	24.00	23.00	22.00	15.00	25	15	92	21	15
Asphalt	36	EM + Thin Overlay (1.5 - 2.0) / Chip Seal + Strctrl Ptch	50	53	60	24.00	23.00	22.00	15.00	25	15	92	21	6
Asphalt	40	EM/FWM + Mod Overlay (2.0 - 3.0) / Chip Seal	50	53	60	25.00	24.00	23.00	15.50	25	15	94	26	12
Asphalt	43	M/FWM + Mod Overlay (2.0 - 3.0) / Chip Seal + Strctrl Ptc	50	53	60	26.25	25.25	24.25	16.00	25	15	94	26	4
Asphalt	46	M/FWM + Mod Overlay (2.0 - 3.0) / Chip Seal + Strctrl Ptc	40	43	50	26.25	25.25	24.25	16.00	25	15	94	26	10
Asphalt	50	FWM + Thick Overlay (> 2.0 - 3.0)	40	43	50	27.00	26.00	25.00	24.00	25	15	96	31	11
Asphalt	53	FWM + Thick Overlay (> 2.0 - 3.0) + Strctrl Ptch	40	43	50	28.50	27.50	26.50	25.50	25	15	96	31	13
Asphalt	56	FWM + Thick Overlay (> 2.0 - 3.0) + Strctrl Ptch	25	28	40	28.50	27.50	26.50	25.50	25	15	96	31	1
Asphalt	60	Surf Recon + Base Rehab / FWM + Strctrl Ptch + Olay	25	28	40	36.75	37.00	28.75	28.75	25	15	98	39	3
Asphalt	70	ACP Full Depth Reconstruction	0	15	25	45.00	46.50	31.00	32.00	25	15	100	46	2
Concrete	510	PCC Jnt Rehab & Crk Seal	75	77	100	1.00	1.00	1.00	0.90	25	15	83	9	4
Concrete	520	PCC Localized Rehab	70	72	75	4.00	3.30	3.00	2.80	25	15	85	18	11
Concrete	523	PCC Localized Rehab + Grind	70	72	75	4.00	3.30	3.00	2.80	25	15	85	18	1
Concrete	530	PCC Slight Pnl Rplcmnt (<10%)	60	62	70	23.00	19.25	17.75	16.00	25	15	88	32	9
Concrete	533	PCC Slight Pnl Rplcmnt (<10%) + Grind	60	62	70	23.00	19.25	17.75	16.00	25	15	88	32	9
Concrete	540	PCC Moderate Pnl Rplcmnt (< 20%)	50	53	60	33.00	28.00	25.50	23.00	25	15	90	42	7
Concrete	543	PCC Moderate Pnl Rplcmnt (< 20%) + Grind	50	53	60	33.00	28.00	25.50	23.00	25	15	90	42	7
Concrete	550	PCC Extensive Pnl Rplcmnt (<33%)	40	43	50	43.00	36.50	33.00	30.00	25	15	94	54	2
Concrete	553	PCC Extensive Pnl Rplcmnt (<33%) + Grind	40	43	50	43.00	36.50	33.00	30.00	25	15	94	54	2
Concrete	560	PCC Partial Reconstruction	25	28	40	171.00	144.00	131.50	119.50	25	15	96	68	5
Concrete	570	PCC Full Depth Reconstruction	0	15	25	228.00	192.00	175.00	159.00	25	15	100	84	6

**Unit rates vary slightly between functional classes*

Min PCI, Critical PCI, and Max PCI – These define the Pavement Condition Index (PCI) range applicable to the rehab selection. The Critical PCI defines when a segment is in its need year and is deemed to be critical, otherwise if deferred, the street declines in PCI past the point which the rehabilitation is no longer appropriate. Generally the Critical PCI falls 2 to 4 points higher than the minimum PCI applicable for each rehab activity.

Figure 16 graphically presents the application of pavement rehabilitations for asphalt streets by PCI. The Rehab numbers are simply placeholders that separate each rehabilitation project identified on the chart above. For example, Rehab 43 is a Moderate Overlay + Structural Patch.

Unit rates increase slightly between functional classes to reflect increase costs in pavement thickness, traffic control, and striping.

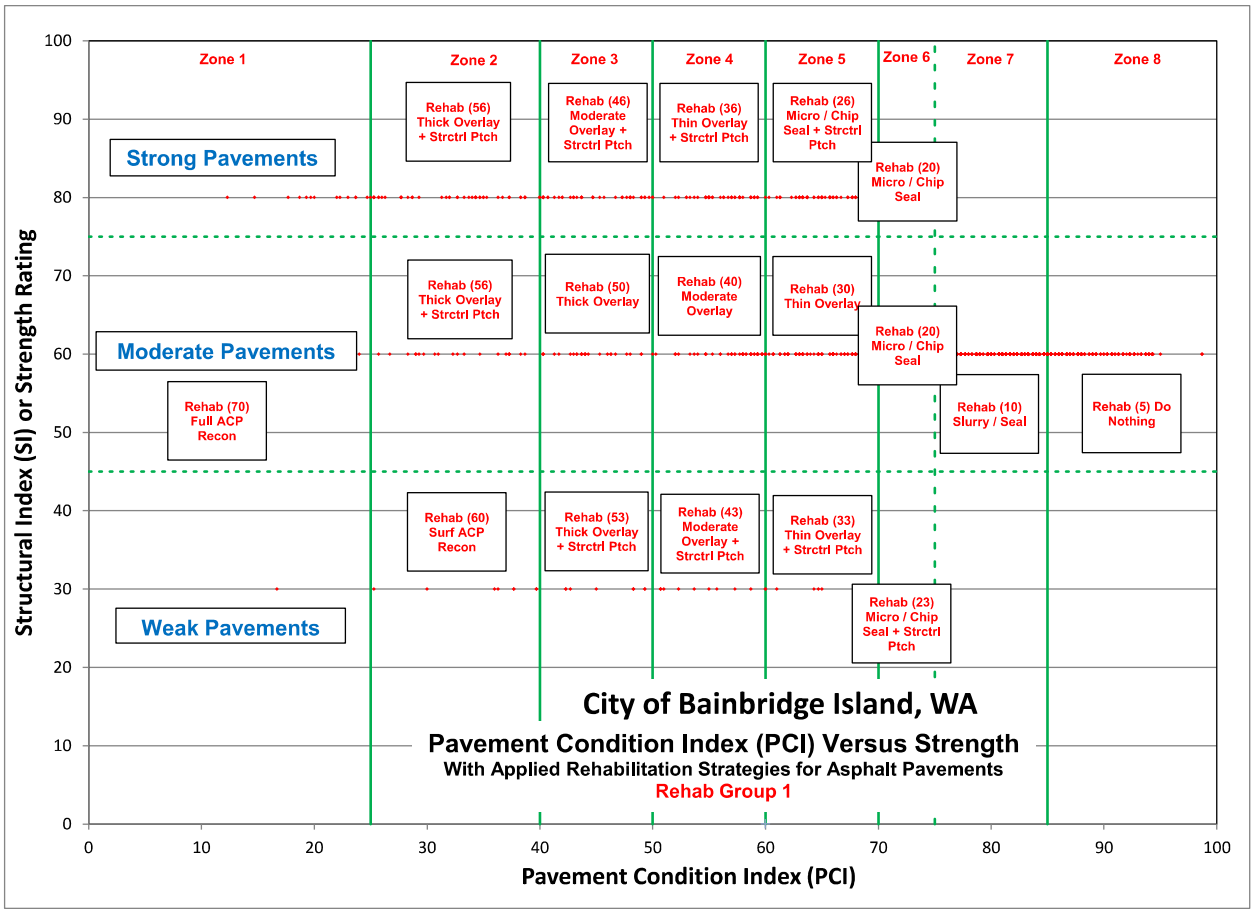


Figure 16 – Asphalt (ACP) Rehabilitation Strategies

Selection and Prioritization of Rehab Candidates

The City's pavement management program incorporates a series of user defined values to prioritize and select the street segments for rehabilitation. The rehab selection order is not worst first, but rather designed to capture as many segments in their need year based on the incremental cost of rehab deferral. A Street is considered to be in its need year when it has reached its maximum service life and any further deferral would require a heavier and more costly rehabilitation. The rehab program has been designed to maximize the increased service life for each rehabilitation dollar spent on a segment.

Other factors included in the prioritization process focus on:

- **Need Year** – streets are only selected when they have expended their service life and are optimal for rehab selection.
- **Functional Classification** – generally priority is given to higher functional classifications as they provide greater benefits to a larger group of users
- **Pavement Strength** – weaker streets are prioritized higher than stronger ones as they deteriorate faster.
- **Area** – a very slight increase in priority is given to larger projects over smaller ones.

The net result is a program that favors thick overlays, followed by partial reconstruction projects then full reconstruction projects (more for safety reasons than cost-benefit). These are then followed by surface treatments and lastly by moderate to thin overlays.

The programmed deterioration curves illustrated in **Figure 17** are designed to integrate the pavement condition distribution performance curves for the network, with the applied rehabilitation strategies and their expected life cycle. Different color performance curves are meant to represent the full suite of curves assigned to segments based upon their functional class, pavement type, and strength.

It is important to recognize that even though all streets fall into specific rating categories and their respective rehabilitation strategies, it is not until a street falls to within a few points of the lower end of the range that it will become a critical need selected for rehabilitation.

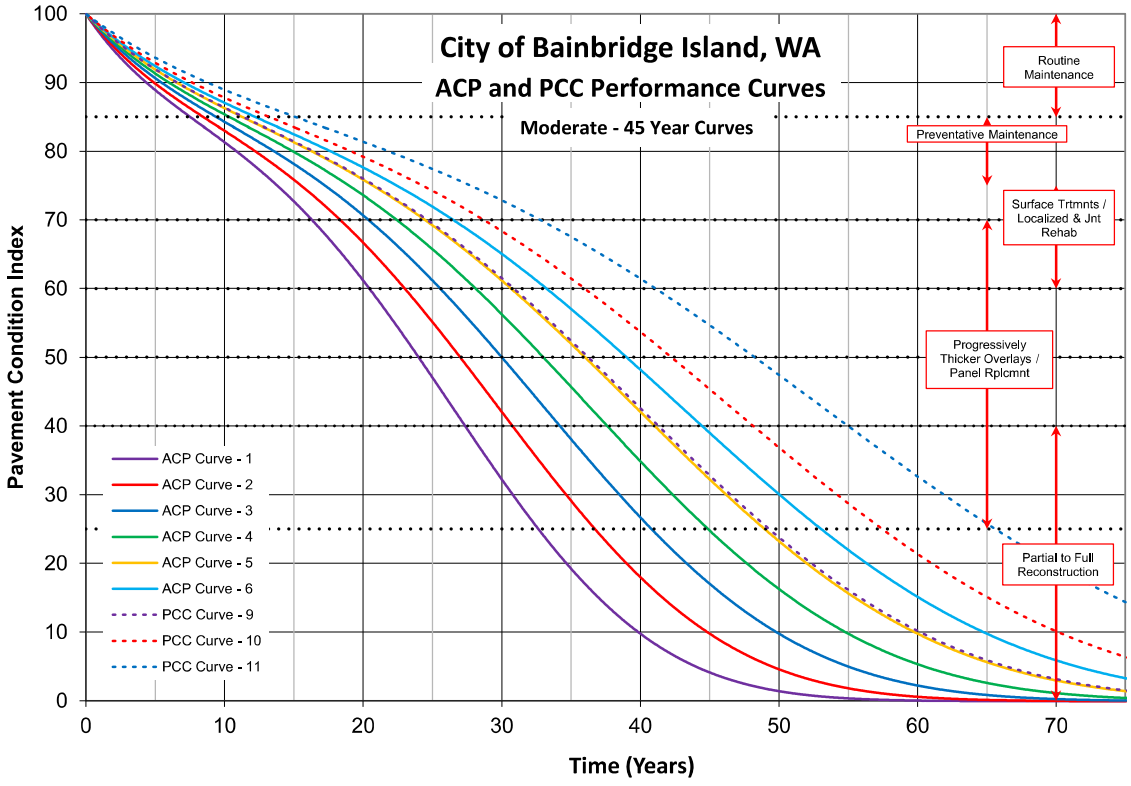


Figure 17 - Performance Curves

5.2 FIX ALL AND ANNUAL ESTIMATES

Three different approaches may be taken to identify and confirm the amount of funds the City needs to set aside each year to maintain the roadway network at its current condition. All three are completed externally to the pavement management system and are simply used to validate the final results.

Option 1 – Estimated Life Cycle Cost Based on Network Value

An approximate value for the annual street maintenance budget may be quickly determined by taking the total value of Bainbridge Island's roadway network, estimated at $114.97M, and dividing that by the ultimate life of a roadway – approximated to be 50 years for asphalt and 75 years for concrete. By this method, the annual budget is estimated at $2,286,000.

Please note, the 50 to 75 year lifespan of the roadway is the theoretical life of the roadway surface from construction, until the point at which there not usable surface remaining, it is not simply the lifespan of the pavement surface until the next overlay.

Rehabilitation Estimate Based on Network Valuation

Pavement Type	Network Valuation ($)	Ultimate Life Span (yrs)	Life Cycle Cost ($/Yr)
Asphalt Network	112,931,000	50	2,259,000
Concrete Network	2,037,000	75	27,000
City of Bainbridge Island, WA Network Totals:	**114,968,000**		**2,286,000**

Option 2 – Estimated Life Cycle Cost Based on Current Condition

A second method to validate the annual budget is to identify the average network PCI and associated rehabilitation requirements, and then estimate the number of miles required to be rehabilitated each year based on a typical life cycle for that rehabilitation activity. For Bainbridge Island, the average PCI for asphalt roads is 68, which places the Bainbridge Island asphalt network in the EM + Thin Overlay / Chip Seal range, at an average cost of $20.09/yd^2. Based on this estimate the City needs to spend approximately $1,820,075/year to maintain the current condition average.

Rehabilitation Estimate Based on Network Average Condition

Pavement Type	Pavement Condition Index (PCI)	Rehab Activity	Average Rehab Life Cycle (Yrs)	Miles to do Each Year	Blended Unit Rate ($/yd2)	Average Cost per Mile ($/)	Life Cycle Cost ($/Yr)
Asphalt Network	68	EM + Thin Overlay (1.5 - 2.0) / Chip Seal	21	6.6	20.09	274,500	1,820,075
Concrete Network	90	Do Nothing	1	1.1	0.00	0	0
City of Bainbridge Island, WA Network Totals:							**1,820,075**

Option 3 – Estimated Life Cycle Cost Based on Network Deficiency

The third methodology to confirm the required amount of annual funding is to identify the current network deficiency, that is the amount required to rehabilitate all streets in the network assuming unlimited funding, and then divide by the typical life cycle of each rehabilitation activity. This is referred to as the Fix All Estimate and Life Cycle Cost. The rehab strategies listed in the table are generic in nature and not necessarily the final set that was applied to Bainbridge Island. For Bainbridge Island, the Fix All Estimate for the network deficiency is approximately $23M and the Life Cycle Cost is $1.2M/year, broken down as follows:

City of Bainbridge Island, WA

Rehabilitation Estimate Based on Current Network Deficiency and Life Cycle Cost

Rehab Code	Rehab Activity	Network Total ($)	% of Total	Secondary Arterial	Collector	Residential Urban	Residential Suburban	Life Cycle (Yrs)	Life Cycle Cost ($/Yr)
10	Routine Maintanence	531,200	2.3	191,050	163,800	58,810	117,490	5	106,200
20	Surface Treatment	1,302,300	5.6	249,540	425,710	179,320	447,720	8	162,800
23	Surface Treatment + Strctrl Ptch	0	0.0	0	0	0	0	8	0
26	Surface Treatment + Strctrl Ptch	334,900	1.4	34,530	113,680	30,880	155,790	8	41,900
30	EM + Thin Overlay (1.5 - 2.0) / Chip Seal	12,038,000	52.0	3,298,080	3,668,600	2,150,570	2,920,710	21	573,200
33	EM + Thin Overlay (1.5 - 2.0) / Chip Seal + Strctrl Ptch	0	0.0	0	0	0	0	21	0
36	EM + Thin Overlay (1.5 - 2.0) / Chip Seal + Strctrl Ptch	2,845,100	12.3	531,150	1,189,060	497,920	626,970	21	135,500
40	EM/FWM + Mod Overlay (2.0 - 3.0) / Chip Seal	4,038,200	17.4	426,910	1,325,190	831,190	1,454,870	26	155,300
43	EM/FWM + Mod Overlay (2.0 - 3.0) / Chip Seal + Strctrl Ptc	0	0.0	0	0	0	0	26	0
46	EM/FWM + Mod Overlay (2.0 - 3.0) / Chip Seal + Strctrl Ptc	149,000	0.6	0	0	71,490	77,550	26	5,700
50	FWM + Thick Overlay (> 2.0 - 3.0)	852,600	3.7	34,860	90,190	295,770	431,770	31	27,500
53	FWM + Thick Overlay (> 2.0 - 3.0) + Strctrl Ptch	148,700	0.6	0	125,320	23,400	0	31	4,800
56	FWM + Thick Overlay (> 2.0 - 3.0) + Strctrl Ptch	923,900	4.0	0	217,500	242,000	464,430	31	29,800
	Total Asphalt and Composite Network:	**23,163,900**	**100.0**	**4,766,120**	**7,319,050**	**4,381,350**	**6,697,300**		**1,242,700**
	City of Bainbridge Island, WA Network Totals:	**23,163,900**		**4,766,120**	**7,319,050**	**4,381,350**	**6,697,300**		**1,242,700**

5.3 NETWORK BUDGET ANALYSIS MODELS

An analysis containing a total of 10 profile budget runs plus a Do Nothing options was prepared for Bainbridge Island.

The analysis results are summarized below:

- **Do Nothing** (illustrated in Figure 20) – This option identifies the effect of spending no capital for 5 years. After 5 years, this scenario results in a network average PCI drop from a 70 to a 60 and a dramatic increase in backlog to 16%.
- **Bainbridge Island Budget** (Green Line) – this represents the City's current annual budget of $400K annually dedicated to pavement preservation and rehabilitation. This level of funding will result in a network average PCI score of 64 and a backlog increase to 11%.
- **Steady State PCI** – this is simply the funds required to maintain the current network average PCI at a 70. The annual budget required to do so is on the order of $1.2M annually. This budget also reduces the backlog to 5%.
- **Backlog Control Budget** – A budget designed to maintain the City's backlog below a maximum of 10%.

The results of the analysis are summarized in **Figure 18** below. The X-axis highlights the annual budget, while the Y-axis plots the 5 Year Post Rehab Network Average PCI value. The diagonal blue line is the results of the pavement analysis (the Bainbridge Island model profile).

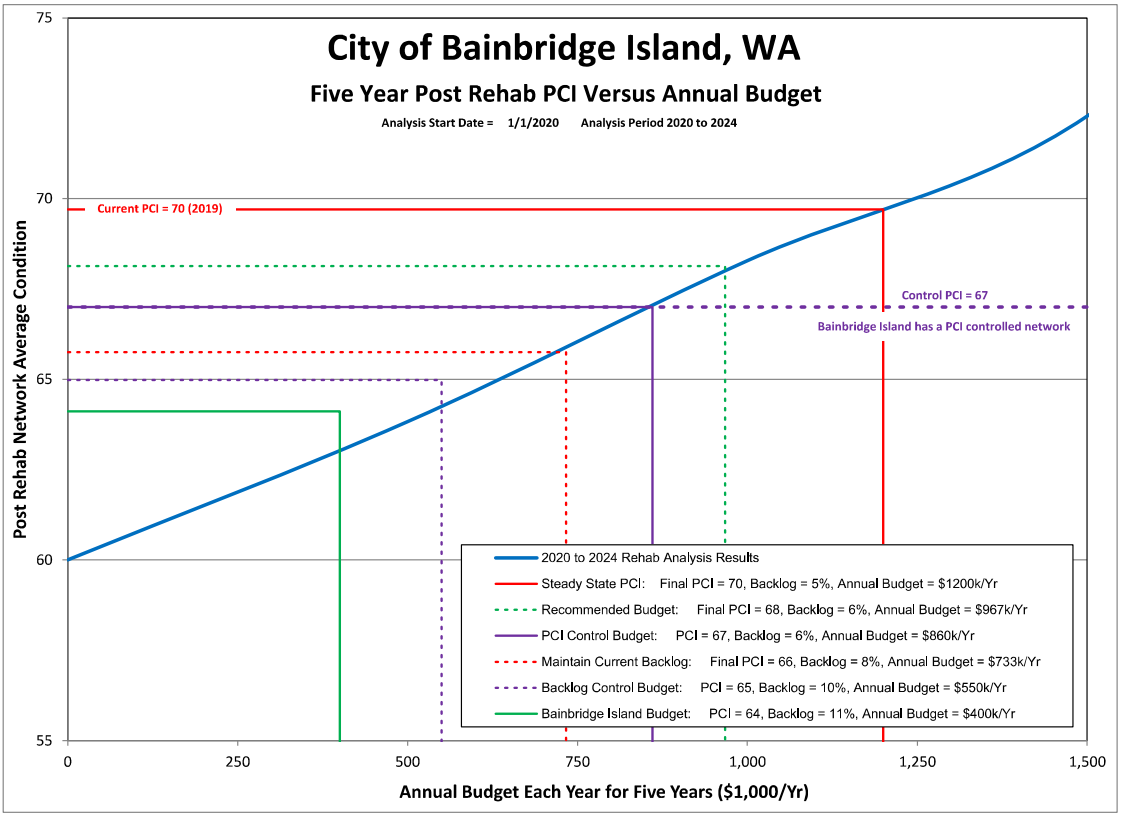


Figure 18 – 5 Year Post Rehab Network PCI Analysis Results

Figure 19 presents the resultant network backlog against annual budget. Similar to Figure 18, but instead of plotting the average PCI score, the blue diagonal line represents the total backlog after 5 years.

The lower the backlog the better, with a maximum of 12% recommended

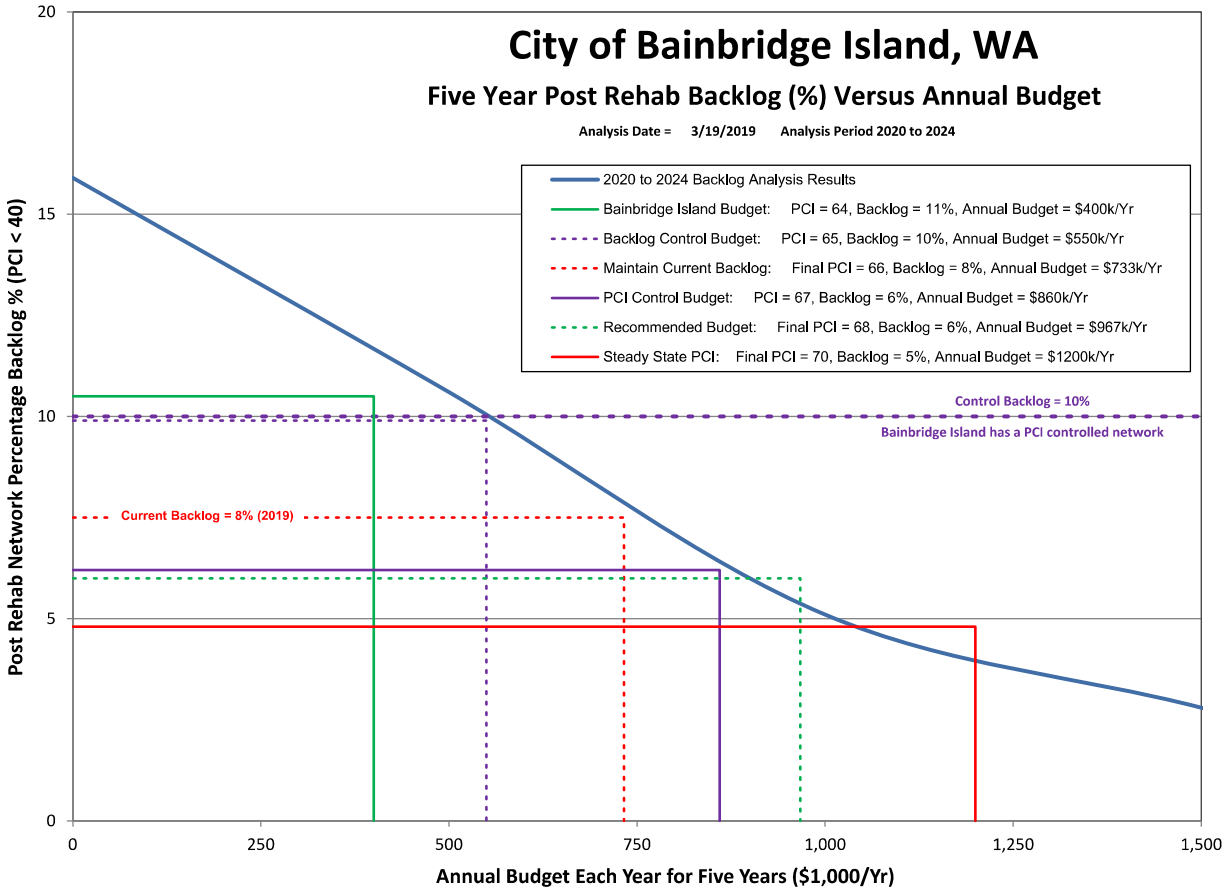


Figure 19 – 5 Year Post Rehab Network Backlog Results

Figure 20 presents the analysis results on an annual basis. This shows that if the budget falls below $1.2M/year (Steady State Budget), over time the overall condition of the roads will deteriorate as backlog continues to grow.

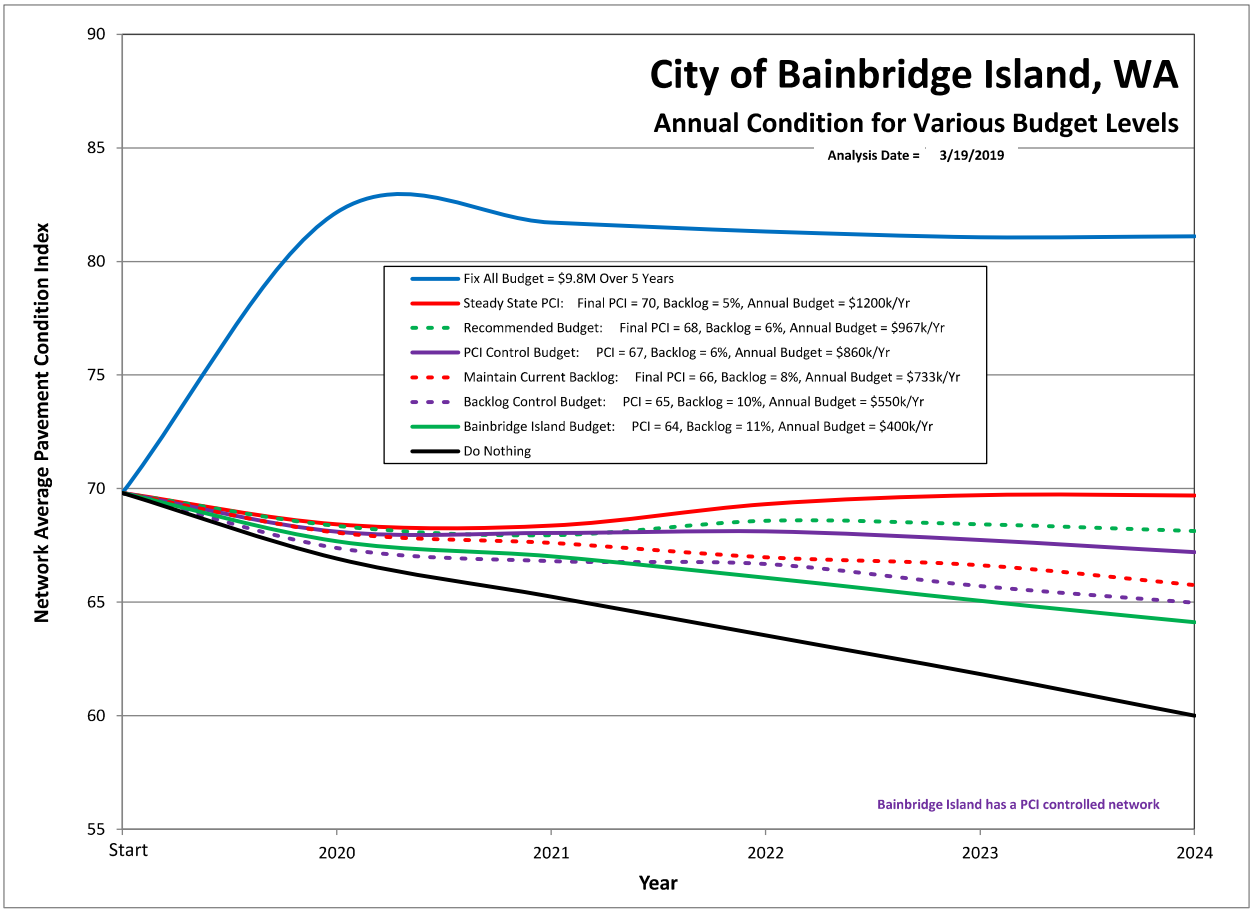


Figure 20– 5 Year Annual PCI

5.4 POST REHABILITATION CONDITION

The following figure (**Figure 21**) compares the current network condition distribution (red) against what the 5-year post rehabilitation distribution would be at with a budget of $400K/year (blue). As can be seen in the plot, the Bainbridge Island budget will reduce the overall network's PCI average amount of roads rated as excellent.

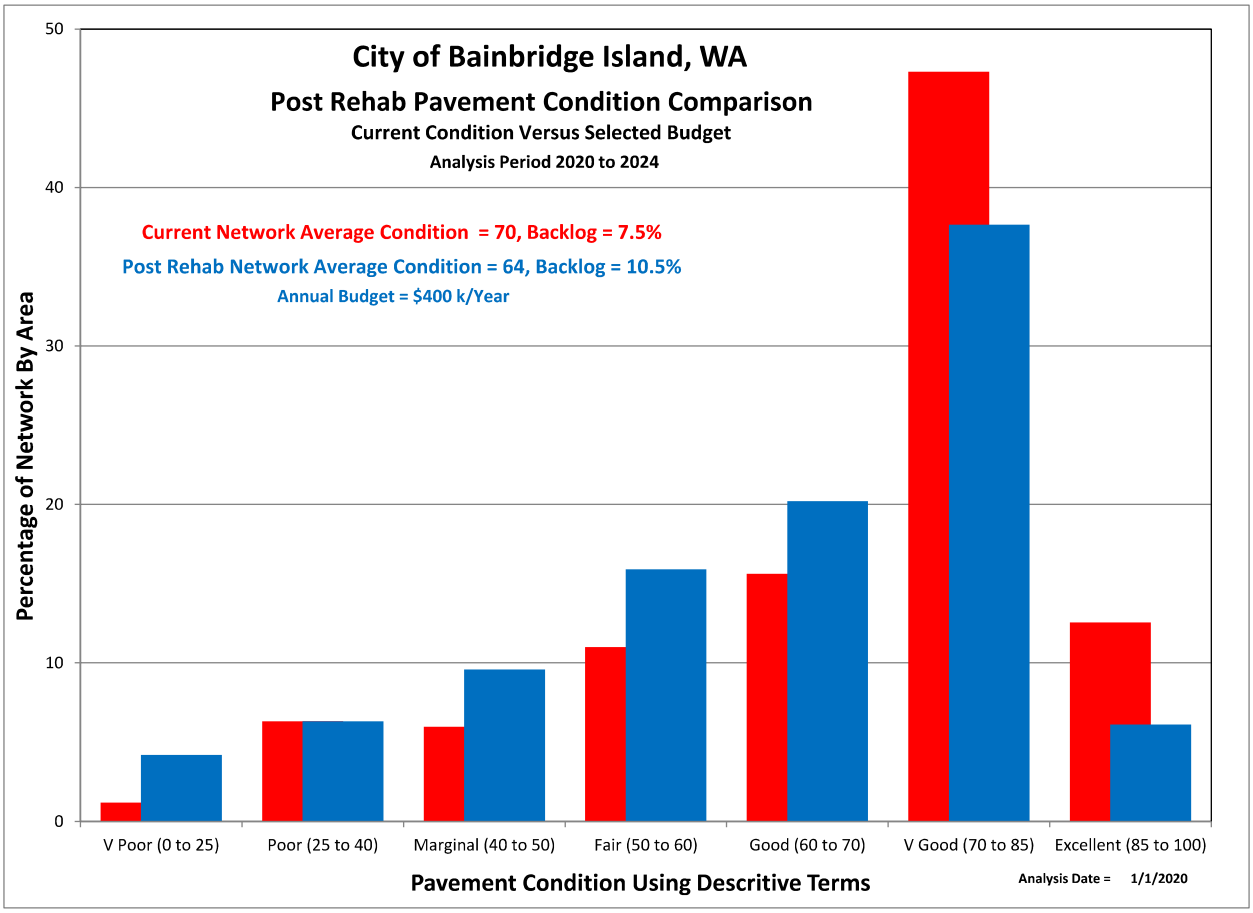


Figure 21 – Five-Year Post Rehabilitation Condition Distribution

Three metrics are used to evaluate the quality of a roadway network, they are:

Average Condition – should be between 60 and 65 at a minimum
Percentage of Backlog – target 12%, should be less than 15%, must be less than 20%
Percentage of Streets Rated as Excellent – should be greater than 15%

Figures 22 and 23 present the current Bainbridge Island recommended budget network rehabilitation plan by year and activity. Electronic versions of these maps are appended to this report.

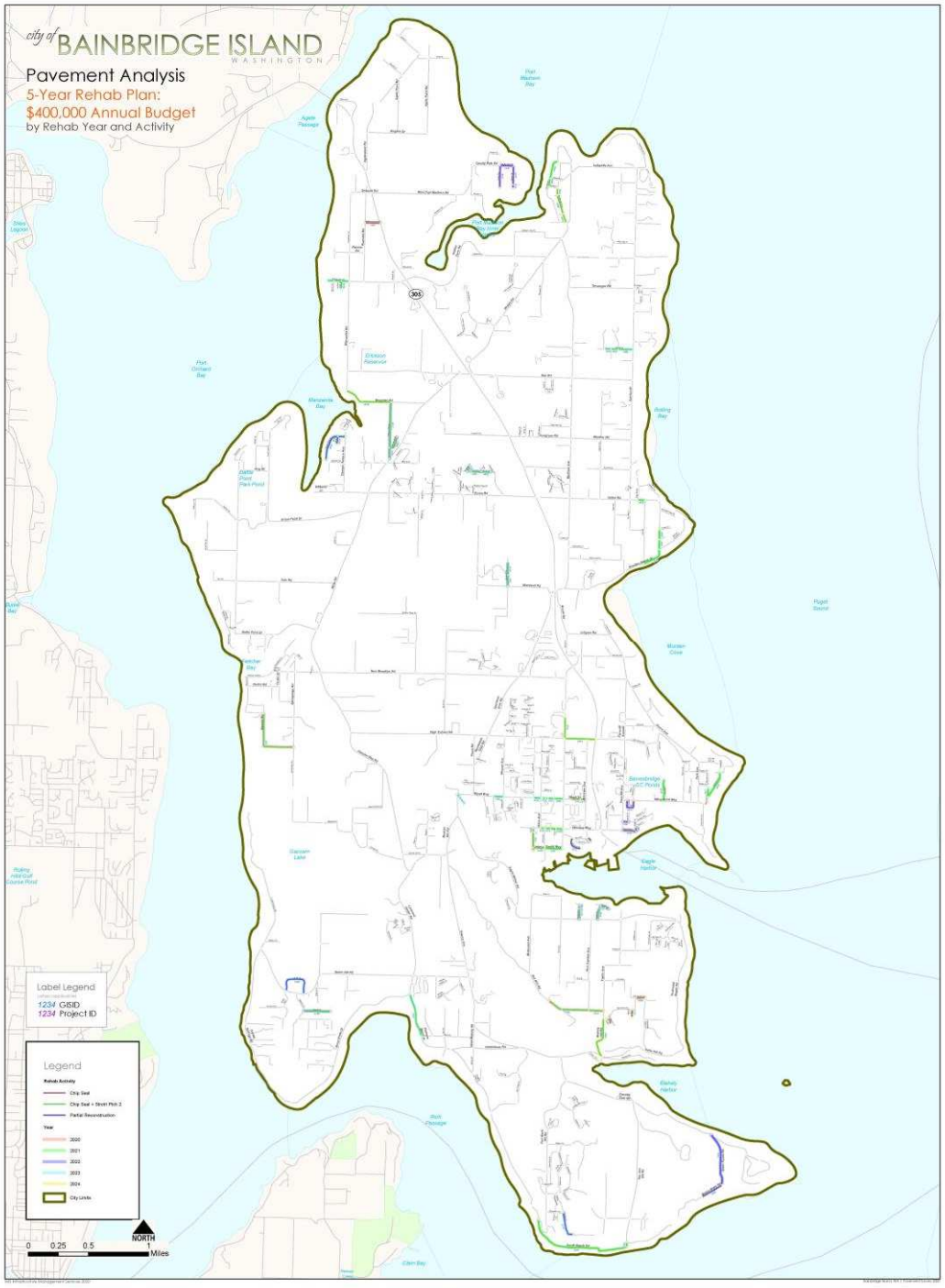


Figure 22 – $400K/Year Rehabilitation Plan by Activity and Year

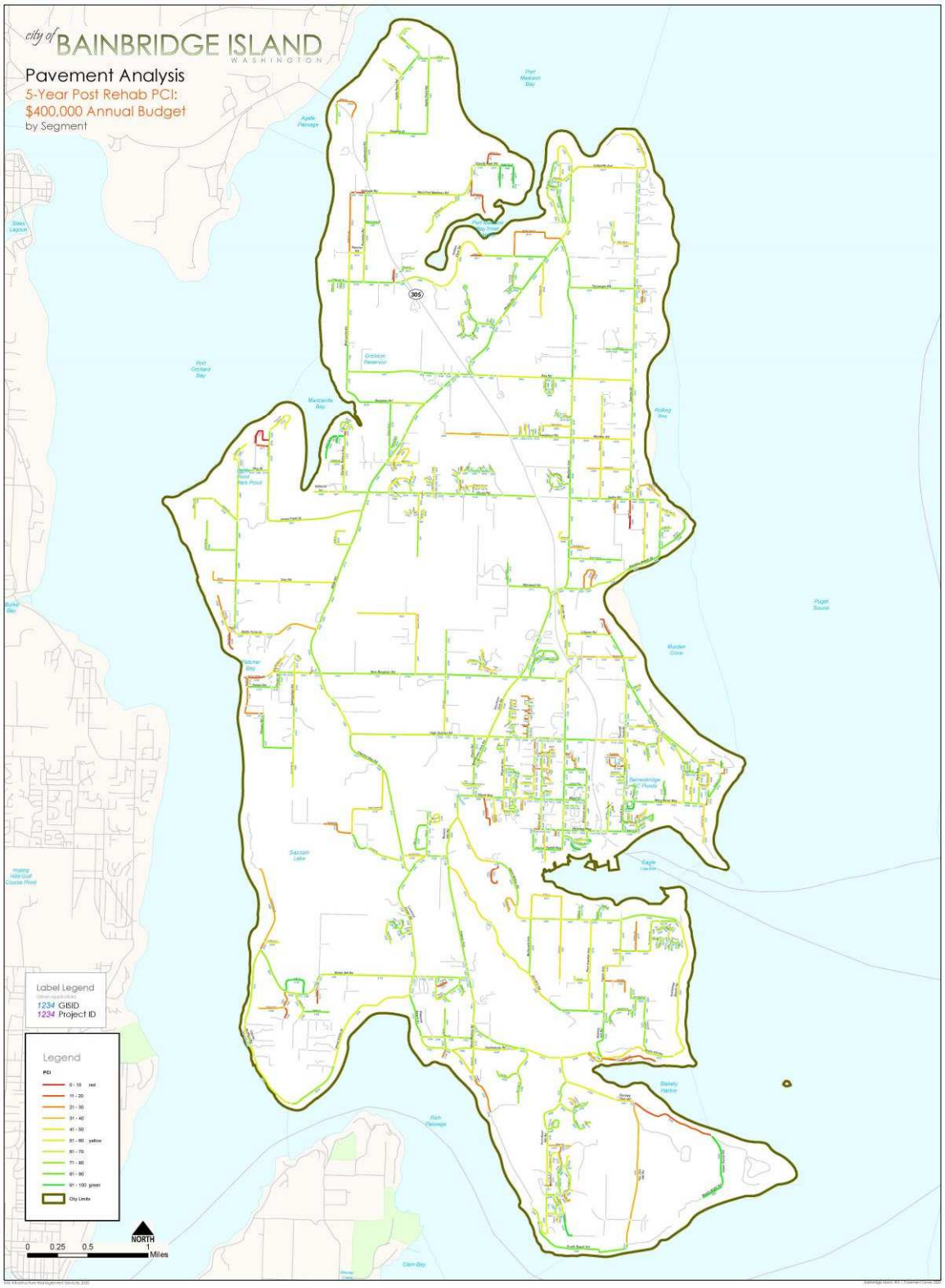


Figure 23 – $400K/Year Post Rehabilitation PCI by Segment

5.5 TRUE COST OF UNDERFUNDING OF A ROADWAY NETWORK

Funding of roadway rehabilitation is an exercise in identifying the balance between available funding and the desired level of service that is right for each agency. There are no hard rules for what is the definitive level of funding as this is a decision for local elected officials, based on their priorities and practices.

However, the true costs of over and underfunding must be presented in order to provide decision makers with all the information available to base the decisions upon. Bainbridge Island has a considerable investment in their paved roadway network with a combined replacement value (just for the streets, not right of way) exceeding $97M. Spreading this cost over a 50 to 75 year period (the expected ultimate life of a roadway) means that an annual investment on the order of $1.2M per year would be required – not including the cost of maintenance, deterioration ,repair curbing, drainage, tree roots, sidewalks or ADA ramps.

Government Accounting Standards Board Statement 34 requires that agencies who collect taxes (local, business, property or gas taxes) for the purpose of maintaining long term infrastructure assets (such as roads) be good stewards of those assets by either accounting for them financially on the City's balance sheet, or implement a methodology to manage and fund them to a locally defined level of service.

The condition of a roadway network may be equated to equity in a depreciating asset. Regular payments to that asset must be made in order to maintain the equity at a constant level. Should those payments fall short, the equity must eventually be replaced through a large influx of capital in order to make the investment whole again. Roadway networks are no different. Long term underfunding of rehabilitation and maintenance is the direct equivalent of removing equity from an asset – eventually it must be repaid through total reconstruction. The following table compares the real cost of the various budgets against the Do Nothing and Steady State options.

City of Bainbridge Island, WA
Equity Removal Summary

Starting PCI:	70			
Five Year Post Rehab Fix All PCI:	81			
Fix All PCI Increase:	11			
Five Year Fix All Total Cost ($):	9,785,000			
Cost Per PCI Point (Total Cost / PCI Increase, $/pt)	866,000			
Equity Removal Based On PCI Restoration				**For PCI Controlled Agencies**
Model:	**Do Nothing**	**$500k Annual**	**$1000k Annual**	**Steady State PCI**
Annual Budget ($k/Year):	0	500	1000	1200
Starting PCI	70	70	70	70
Final PCI	60	64	68	70
PCI Drop:	10	6	2	0
Cost to Replace Equity (PCI Drop X $/Pt, $):	8,489,000	5,180,000	1,320,000	0
5 Year Budget Expenditure ($):	0	2,500,000	5,000,000	6,000,000
Total 5 Year Cost ($):	8,489,000	7,680,000	6,320,000	6,000,000
Cost Over Steady State Budget ($):	2,489,000	1,680,000	320,000	0
Additional Annual Cost Over Steady State ($/year):	**497,800**	**336,000**	**64,000**	**0**

5.6 NETWORK RECOMMENDATIONS AND COMMENTS

The following recommendations are presented to Bainbridge Island as an output from the pavement analysis, and must be read in conjunction with the attached reports.

1. Bainbridge Island should adopt a policy statement to maintain PCI at or above a 65 while keeping backlog below 15%.

   An annual budget of $400K (dedicated to pavement rehabilitation) will achieve a network average PCI of 64 and backlog of 11%.

   The Recommended Budget of $967K will result in a PCI of 68 with a backlog of 6%.

2. The full suite of proposed rehabilitation strategies and unit rates should be reviewed annually as these can have considerable effects on the final program.

3. No allowance has been made for network growth. As the City expands or increases the amount of paved roads, increased budgets will be required.

4. No allowance has been made for routine maintenance activities such as asphalt crack sealing, pothole filling, sweeping, striping or patching within the budget runs and analysis. These costs are assumed to be outside the pavement management costs.

5. The City should resurvey their streets every few years to update the condition data and rehabilitation program.

Appendix A

Street Inventory and Condition Summary

Appendix D - Pavement/Streets Maintenance Staffing Comparisons

City staff contacted the Municipal Research Service Center and individual City Public Works Departments in Washington State for information on how other municipal governments with similar roadway and geographic conditions staff their streets maintenance work groups. The information below was collected from eleven different local Washington State cities with populations and city-maintained roadway networks similar in size to that of Bainbridge Island.

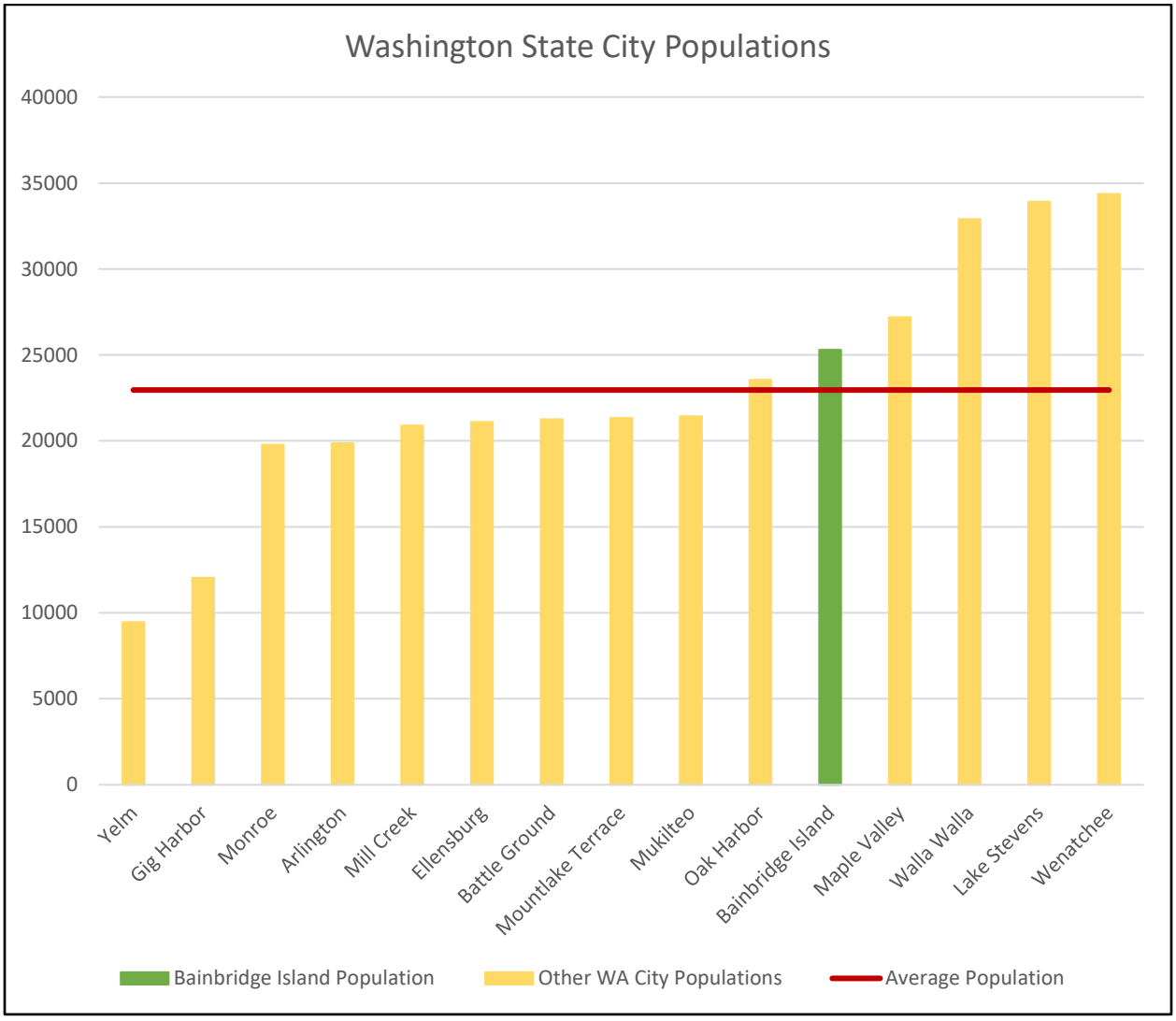


Figure 1: Current Populations of Bainbridge Island and Reference Cities

Figure 1 shows the current listed population of each city surveyed for this memo. The City of Bainbridge Island has a higher-than-average population size for this group.

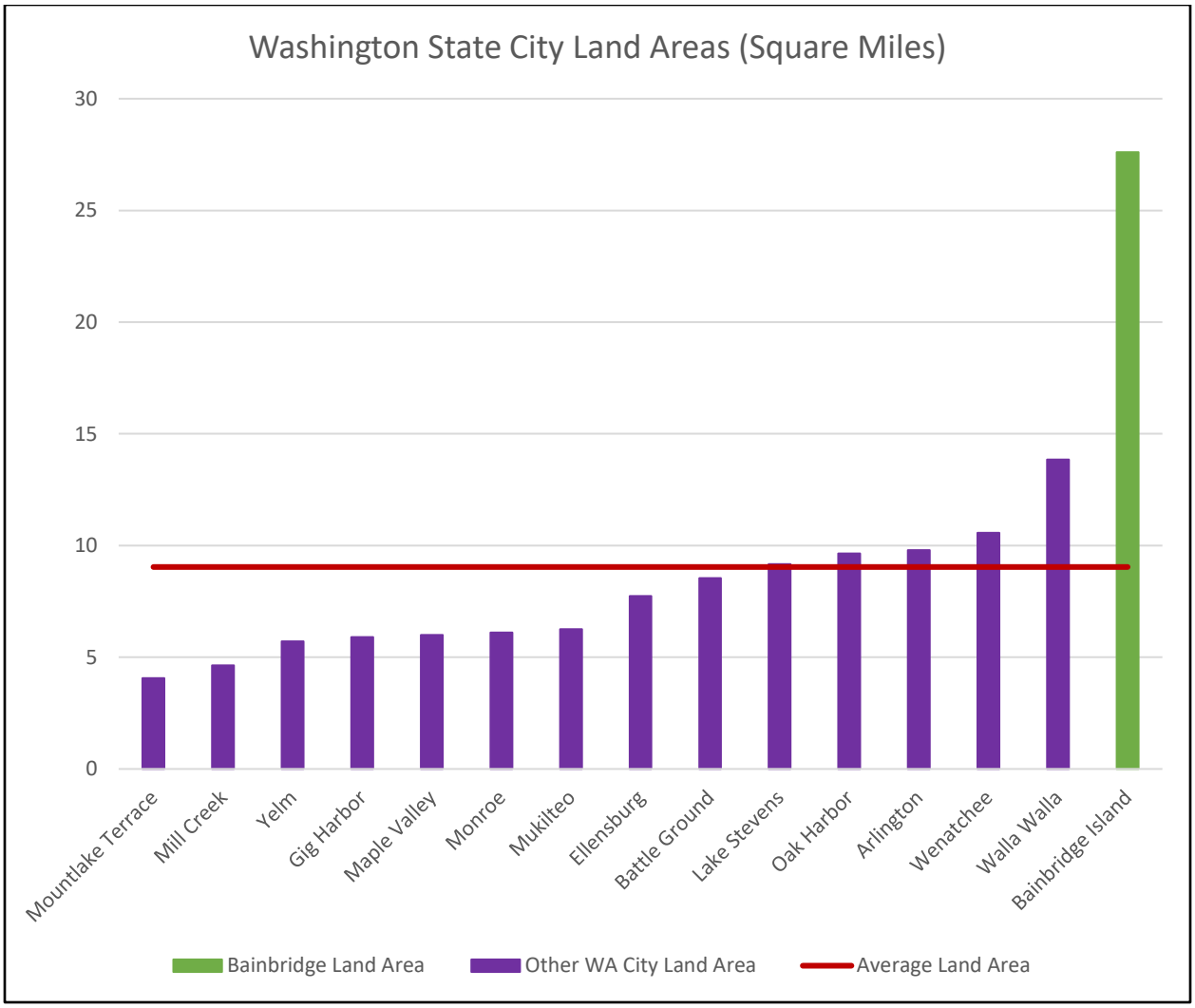


Figure 2: Land Areas in Square Miles

Figure 2 shows the land areas in square miles for each of the surveyed cities. The City of Bainbridge Island has a significantly higher-than-average land area, ranking highest among the cities surveyed for this memo.

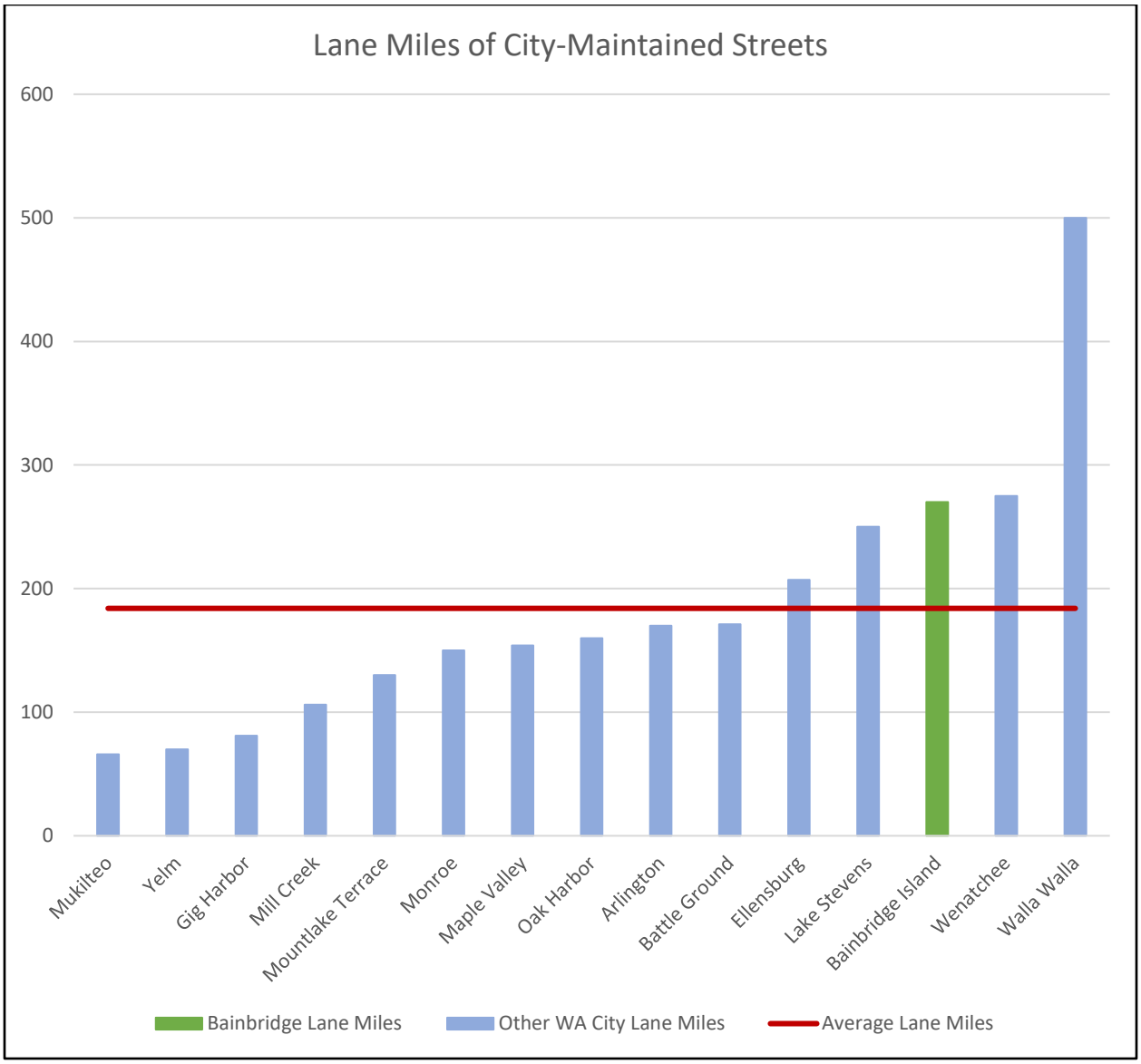


Figure 3: Number of Lane Miles of City-Maintained Streets

Figure 3 shows the number of *lane miles* of city-maintained roadway in each jurisdiction. Lane miles of roadway factor in the number of standard lanes in each segment of roadway and help to represent the amount of asphalt, pavement markings, and other traffic control facilities which must be maintained. Some lane mile quantities were estimated where necessary based on available city roadway data.

The City of Bainbridge Island is the third highest in number of lane miles of city-maintained roadway.

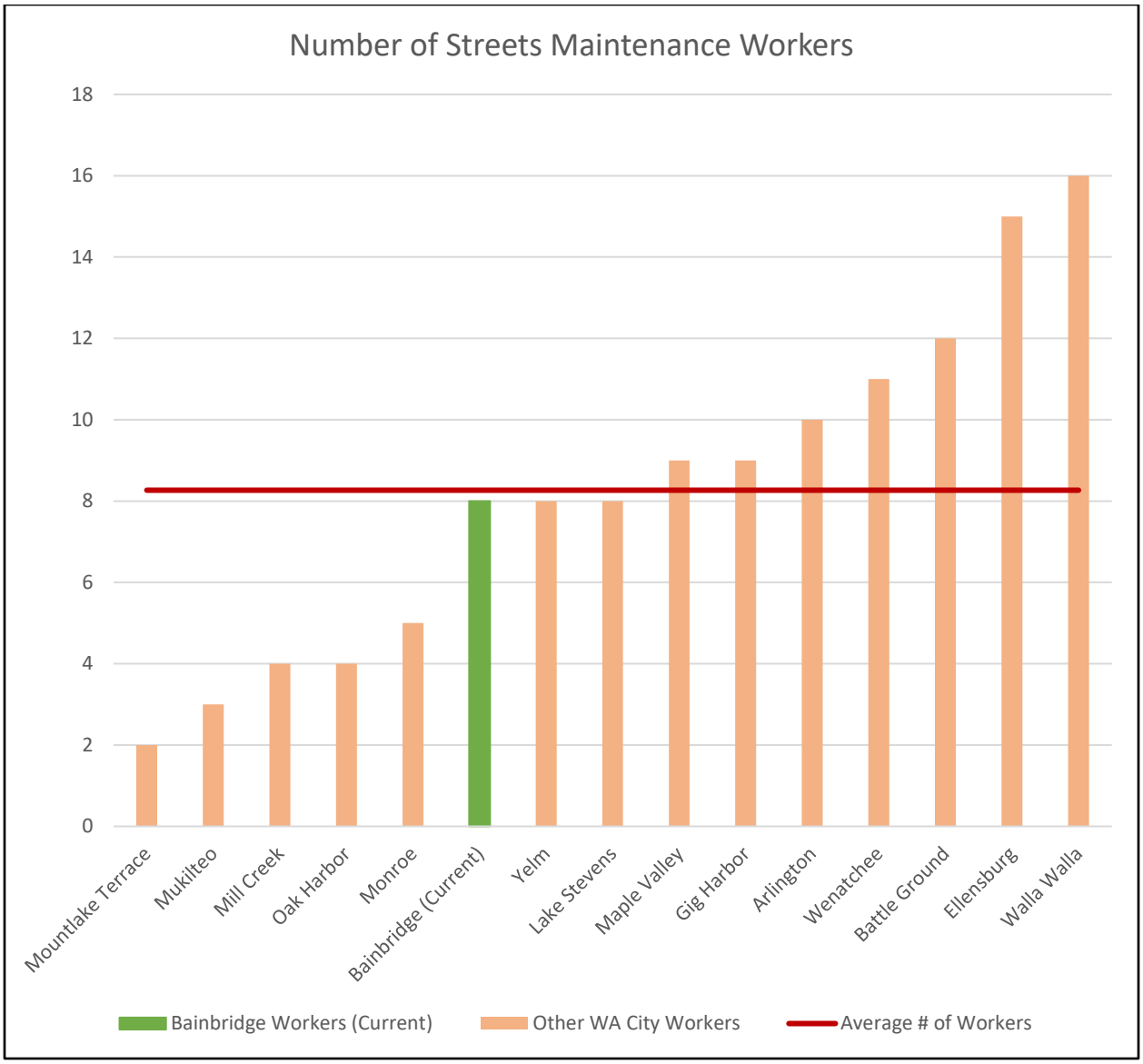


Figure 4: Number of Streets Maintenance Workers

Figure 4 shows the number of full-time and seasonal city maintenance workers who participate in streets related projects for each city. This number only includes maintenance worker positions, it does not include managers.

It should be noted that none of the cities contacted do any of their major paving work in-house except Wenatchee, which does about a third of its paving projects with its Streets Maintenance workers.

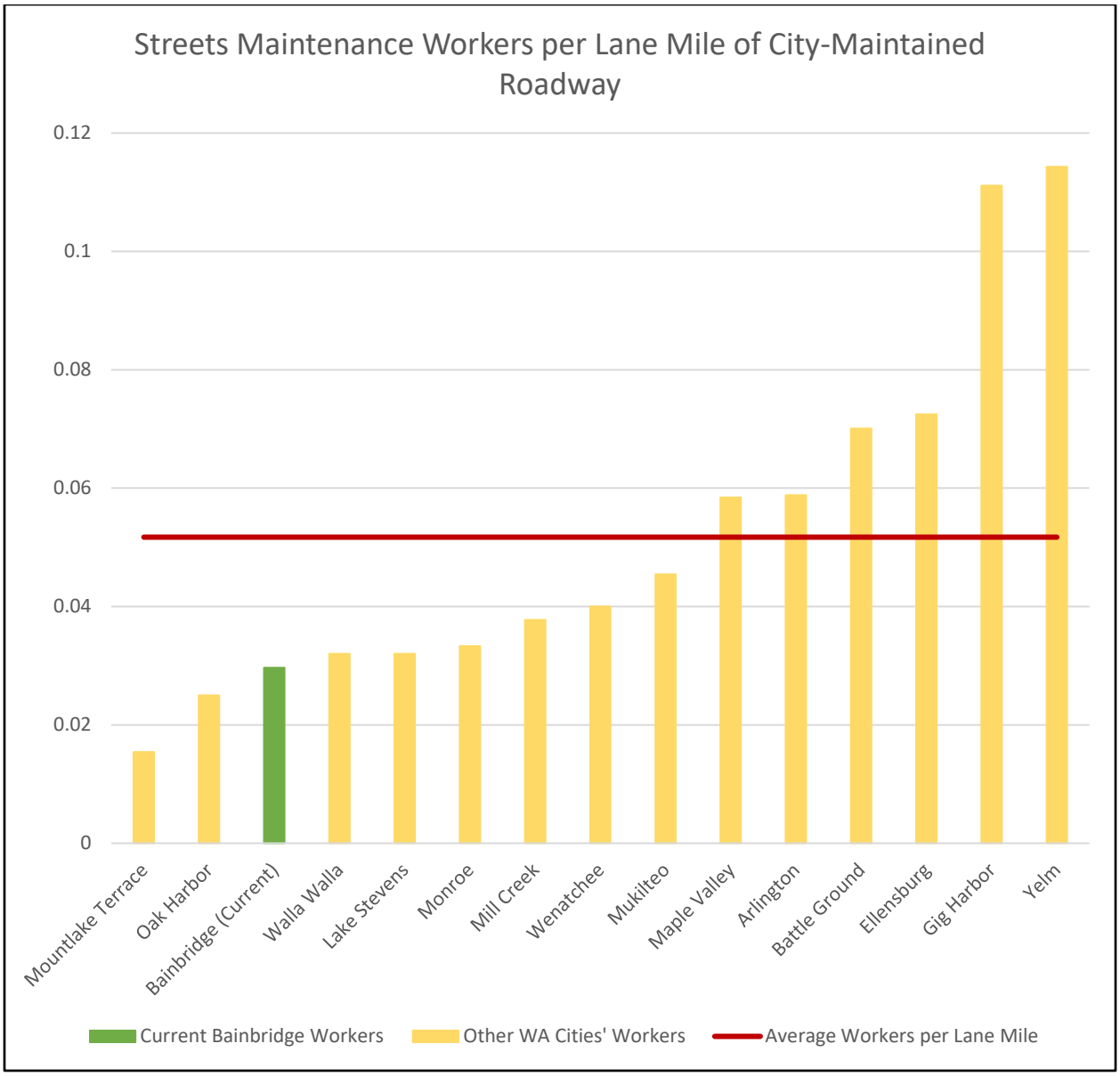


Figure 5: Streets Maintenance Workers per Lane Mile of City Maintained Streets

Figure 5 displays the ratio of full-time and seasonal Streets Maintenance workers compared to the number of lane miles of city-maintained roadway for each location. The number of current Bainbridge Island Streets Maintenance workers (Operation and Maintenance Division) per mile of city-maintained roadway is below average and the third lowest among those surveyed.

It should be noted that when contacted, the Public Works Directors of Mountlake Terrace and Oak Harbor (like many other cities in the survey) stated that their Streets Maintenance Divisions were understaffed and they were planning to hire more workers.

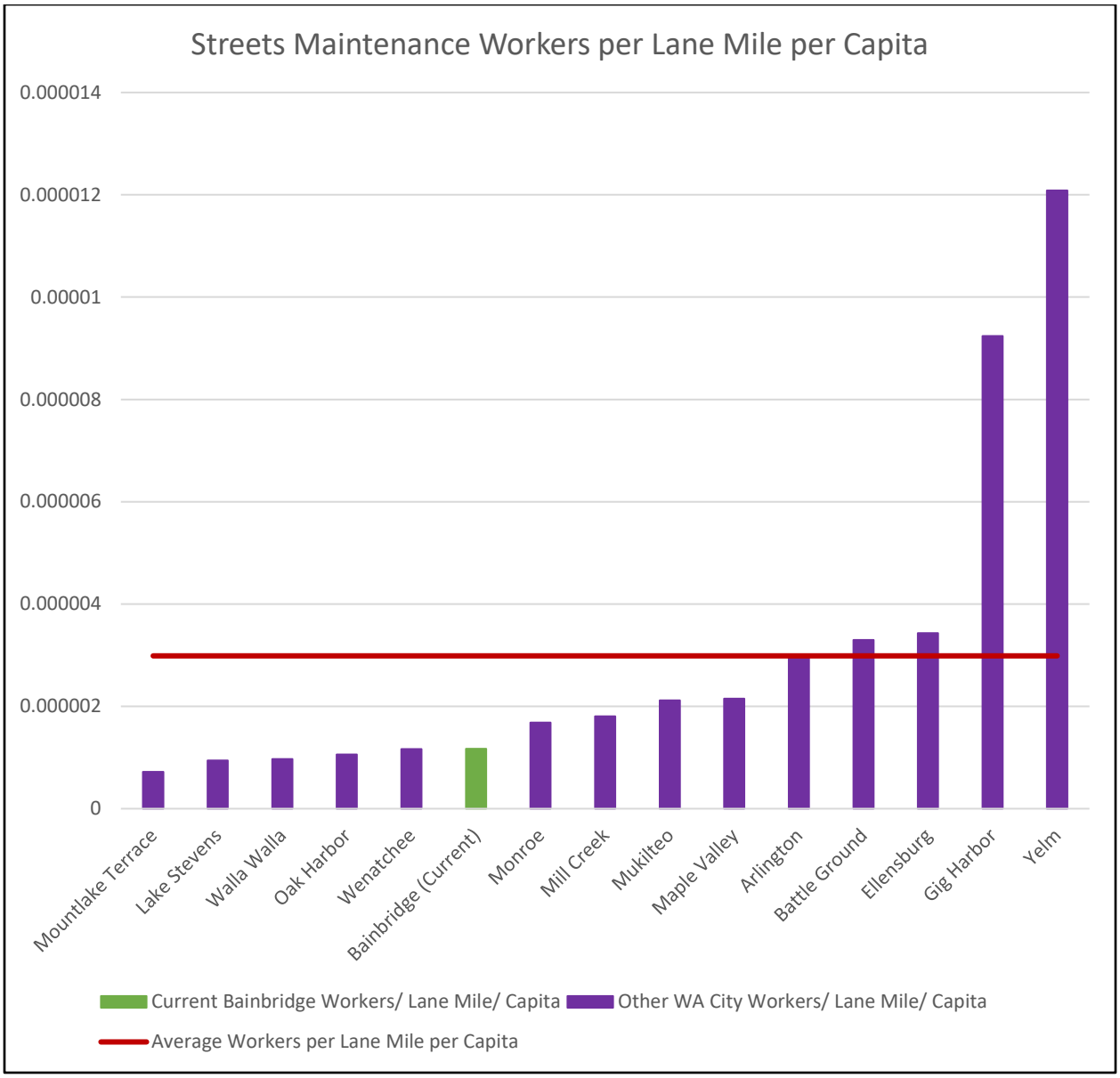


Figure 6: Streets Maintenance Workers per Lane Mile per Capita (City Population)

Figure 6 shows the number of Streets Maintenance workers per lane mile of city-maintained roadway (from **Figure 5**), then factored again by City population. Bainbridge Island (Current) which has one of the higher populations from the cities surveyed (**Figure 1**) is in the lower half in terms of maintenance staffing based on these two combined metrics (lane miles of roadway and city population.)

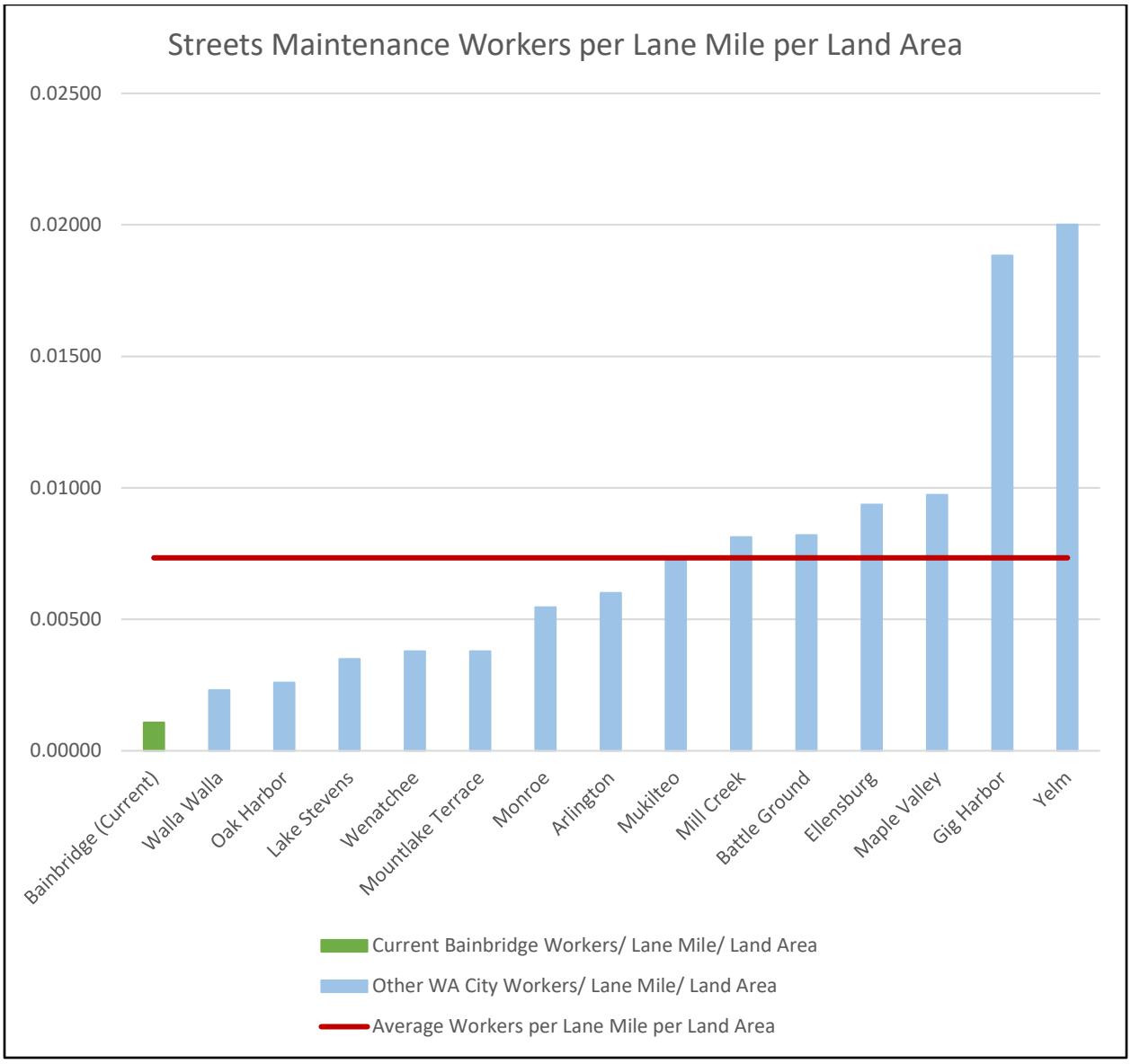


Figure 7: Streets Maintenance Workers per Lane Mile per Square Mile (City Land Area)

Figure 7 shows the number of Streets Maintenance workers per lane mile of city-maintained roadway (from **Figure 5**), then factored again by city land area in square miles. Bainbridge Island (Current) has the largest land area from the cities surveyed (**Figure 2**) and is the lowest in terms of maintenance staffing based on these two combined metrics (lane miles of roadway and city land area.)

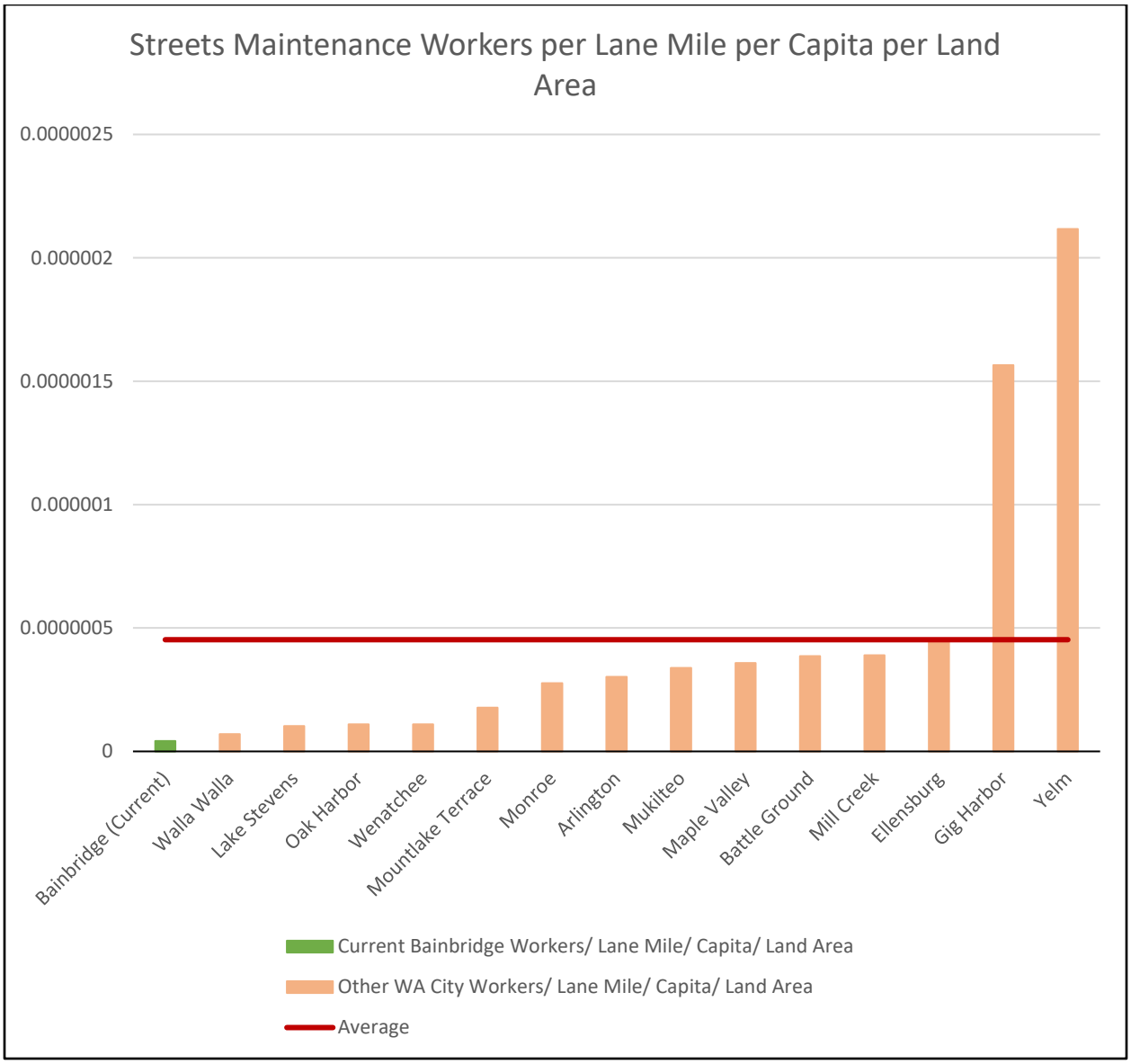


Figure 8: Streets Maintenance Workers per Lane Mile, per Capita, per Square Mile

Figure 8 shows the number of Streets Maintenance workers per lane mile of city-maintained roadway (from **Figure 5**), then factored by population, and factored again by city land area. Bainbridge Island is in the top half of population, city land area, and lane mile maintained from the cities surveyed (**Figures 1, 2, and 3**) and is the lowest in terms of maintenance staffing based on these three combined metrics (lane miles of roadway, population, and city land area.)

City Facilities & Streets Maintenance Review and Recommendations

March 15, 2022

Agenda

Summary and recommendations on the following:

- Facility Maintenance
- Pavement Preservation
- Streets Maintenance

Discussion Goal

- Introductory discussion that will inform the preparation of the 2023-24 Biennial Budget

Facility Maintenance - Current

- The City owns and maintains:
  - 90,000 SF of general-purpose building facilities (including the new Police/Court Facility, but not including utility buildings)
  - 70 acres of parks; 9 acres of building grounds

Facility Maintenance - Current

- The City performs the following:
  - Average $200K per year in contract services
  - 1 full-time employee (FTE) for day-to-day maintenance
  - 9 FTEs perform grounds maintenance (staff shared with Streets)
  - Estimated 60% of required work being performed, majority reactive

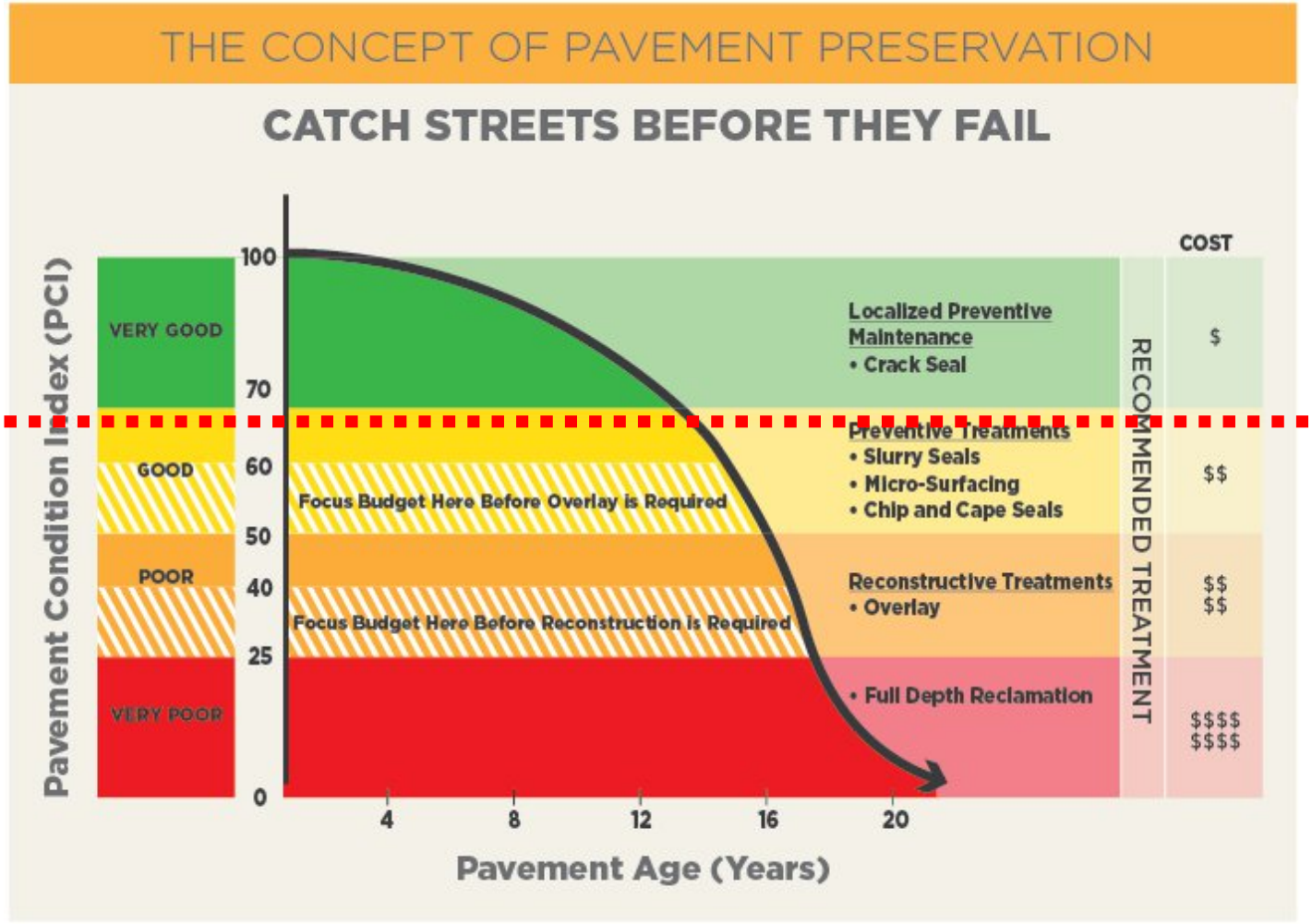
Facility Maintenance - Recommendations

- National standards indicate 1 FTE per 50,000 SF
  - Increase facilities maintenance staff by 1 FTE (total = 2)
- Facilities condition assessment + depreciation indicates need for $1M per year set aside
  - Create a City Facility Maintenance and Capital Replacement Fund
  - Set aside $1M per year in the Fund
  - Add facilities project manager (1 FTE)

Pavement Preservation- Current

- The City owns and maintains 270 lane miles of paved streets
- Current Pavement Condition Index (PCI) = 68/100
- Average annual pavement preservation budget is $500K

Pavement Preservation- Current



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Pavement Preservation- Recommendations

- 2019 Pavement Condition Report identifies a minimum annual investment of $1M to maintain current PCI score
- At $400-500K annually, expect to lower PCI by about 1 point/year
  - Increase pavement preservation program by $500K to $1M annually (can be implemented with existing staff)

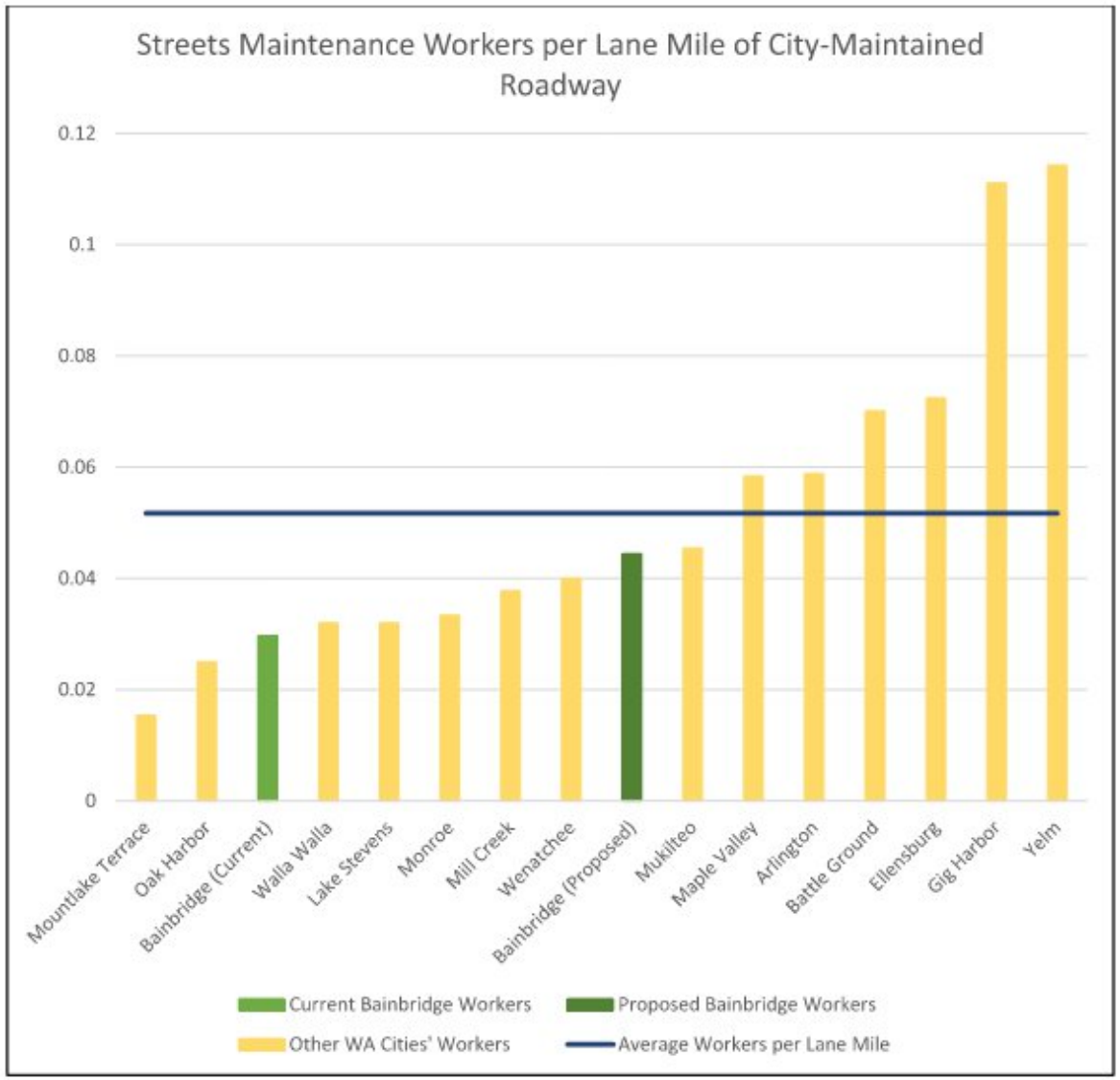
Streets Maintenance - Current

- Streets maintenance is performed by City Staff:
  - Vegetation removal
  - Shoulder grading
  - Crack sealing
  - Pothole filling
  - Sweeping
  - Sign/striping maintenance
  - Sidewalk repair
  - Plowing/emergency repairs
  - *This crew also performs grounds maintenance*

Streets Maintenance - Current

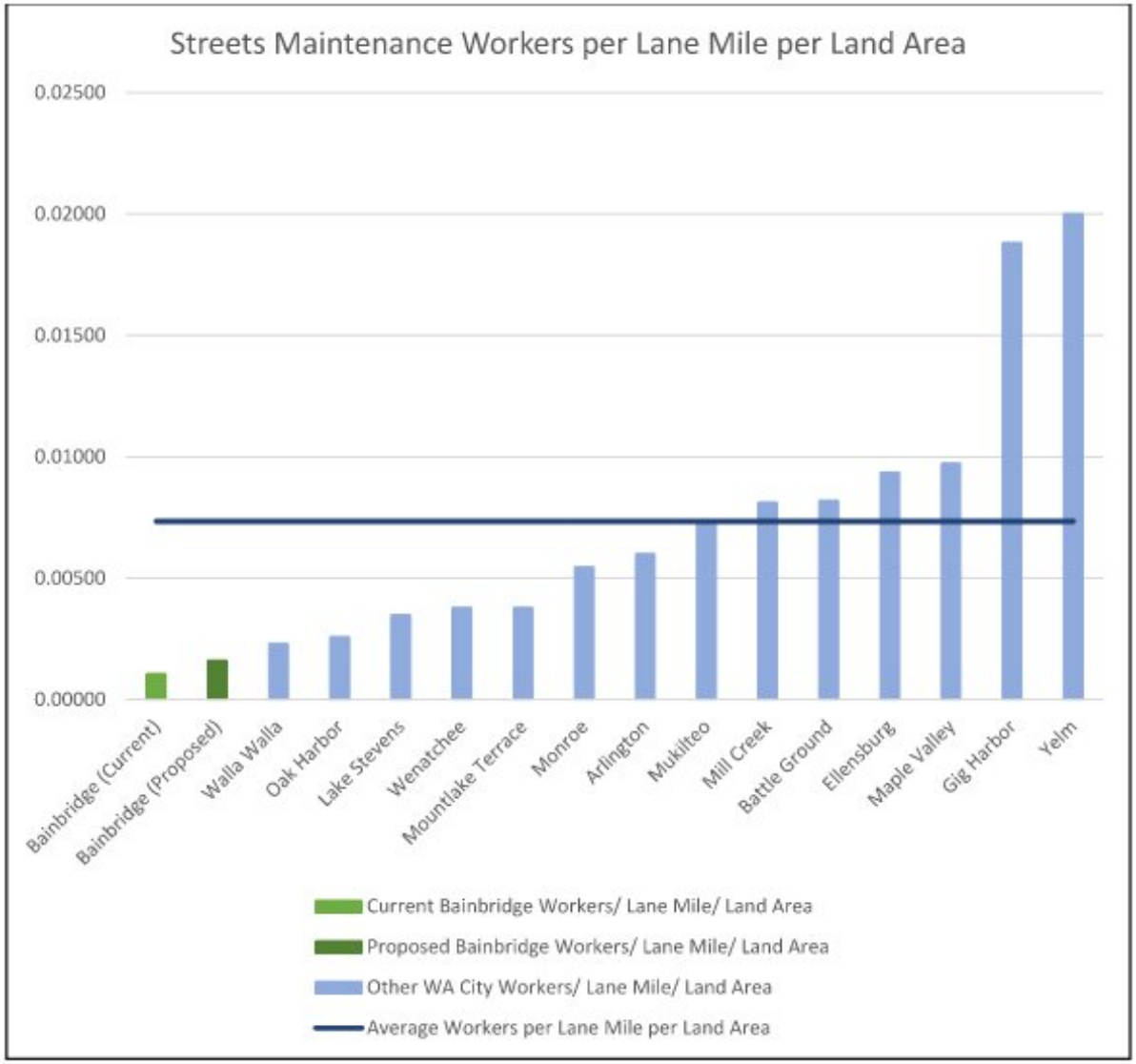
- City has 8 FTE dedicated to streets and facilities:
  - 1 dedicated to signs and markings
  - 1 dedicated to downtown Winslow (new)
  - 6 other maintenance techs
- Estimated 60% of required maintenance is being performed
- Lack of maintenance leads to more quickly deterioration roadways

Streets Maintenance - Current



Among comparable cities, Bainbridge has the lowest number of streets staff per lane mile of roadway

Streets Maintenance - Current



Among comparable cities, Bainbridge has the lowest number of streets staff per lane mile of roadway per land area

Pavement Preservation- Recommendations

- Increase streets maintenance staffing to increase level of service/safety and improve asset longevity.

City Facilities & Streets Maintenance Review and Recommendations Q&A

March 15, 2022

CITY OF BAINBRIDGE ISLAND

City Council Study Session Agenda Bill

MEETING DATE: March 15, 2022 **ESTIMATED TIME:** 20 Minutes

AGENDA ITEM: (6:55 PM) Overview of Real Estate Excise Tax - Finance,

SUMMARY: The City Manger and City staff will present an overview of Real Estate Excise Tax uses, legal and policy requirements, and planned uses from 2022-2026.

AGENDA CATEGORY: Discussion **PROPOSED BY:** Finance & Administrative Services

RECOMMENDED MOTION: Discussion.

STRATEGIC PRIORITY:

FISCAL IMPACT:

Amount:	
Ongoing Cost:	
One-Time Cost:	
Included in Current Budget?	

BACKGROUND: The City has received an average of $2.8 million in Real Estate Excise Tax ("REET") revenue over the past 10 years, ranging from a low of $1.3 million in 2013 to a high of $4.2 million in 2021. These revenues are broken out into "REET 1" and "REET 2" revenues and have different legal restrictions applicable to each revenue stream.

The City of Bainbridge Island collects the maximum allowable 0.25% of “REET 1” and an additional 0.25% of “REET 2” tax on the selling price of most real property sales. These revenues are legally restricted and collected in a separate special revenue fund which can only be used for eligible purposes. In general, the funds must be used for capital projects along with a limited amount allowed for maintenance. REET 2 projects are more restrictive than REET 1 and are directed more to infrastructure. REET 2 funds are not allowed for public facilities such as law enforcement, administration, and courts that were listed within the REET 1 statute. REET 2 funds may be used for affordable housing and homelessness through January 1, 2026. Debt service payments on projects financed with REET are also eligible for funding.

Current City financial policies state, in part: “Real Estate Excise Tax revenue shall be first applied to current capital debt service and then, to the extent available to other eligible expenses.” In addition, the policies state:

“As a general rule, when an expenditure is incurred for which both restricted and unrestricted fund balance is available, the City will consider the more restricted amounts to have been spent first."

ATTACHMENTS:

Real Estate Excise Tax Presentation.pptx

2022 REET Uses Staff Memorandum.docx

FISCAL DETAILS: City projected revenues for 2022 are $3.4 million. Ending 2021 REET fund balance is $2.5 million consisting of $2.1 million in REET 1 funds and $400,000 in REET 2 funds. Estimated 2023-2026 revenues are approximately $3.5 million per year. Estimated 2023-2026 uses are approximately $3.6 million per year.

Fund Name(s): Other

Coding:

CITY OF
BAINBRIDGE ISLAND

Real Estate Excise Tax (REET) Overview

March 15, 2022

DeWayne Pitts, CPA, CFE, Finance Director

Agenda

- REET Tax Overview
- Allowable REET Uses
- REET Policy Limitations
- Historical Uses of REET
- 2022 – 2026 Planned REET Uses

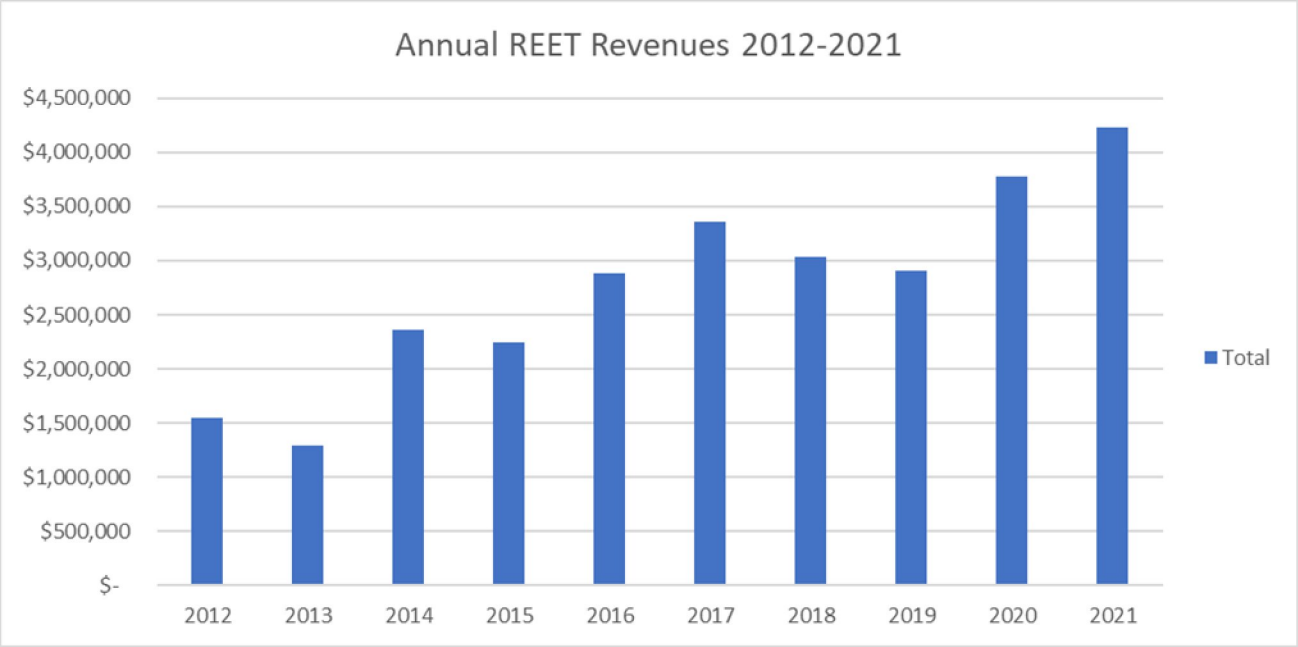
REET Tax Overview

- Tax collected upon gross sales price of most real estate sales
- Tax rate equal to 0.25% for “REET 1” and 0.25% for “REET 2”
- Funds legally restricted and uses may differ between REET 1 and REET 2
- Used mostly for Capital Projects, Debt Service and Maintenance

REET Tax Overview (Continued)

- REET 2 funds are generally more restrictive than REET 1
- Policy requires funds be first applied to current debt service and then to other eligible uses
- REET revenue can be volatile (see chart on next page)

REET Tax Overview (Continued)



REET Allowable Uses

Item	REET 1	REET 2
Tax Rate	0.25%	0.25%
Capital projects (roads, streets, utilities)	Eligible	Eligible
Capital projects (facilities)	Eligible	Not Eligible
Capital projects (Affordable Housing)	Not eligible	Until end of 2025, up to $1.0 million may be allowable
Maintenance	Eligible up to $1 million	Eligible up to $1 million
Debt Service	Eligible subject to Capital project limitations for REET 1	Eligible subject to Capital project limitations for REET 2
Estimated 2022 revenue	$1,700,000	$1,700,000
Current fund balance	$2,100,000	$400,000

REET Policy Limitations

"Real Estate Excise revenue shall be first applied to current capital debt service and then, to the extent available, to other eligible uses."

"As a general rule, when an expenditure is incurred for which both restricted and unrestricted fund balance is available, the City will consider the more restricted amounts to have been spent first."

2022 REET Historical Uses

5 Year Historical REET Spending						
Year	2017	2018	2019	2020	2021	Average
Debt Service	1,883,000	1,541,000	876,000	862,000	943,000	1,221,000
Streets Repair/Maintenance	624,000	785,000	1,094,000	836,000	1,851,000	1,038,000
Capital Projects	819,000	-	993,000	315,000	1,426,000	711,000
Total	3,326,000	2,326,000	2,963,000	2,012,000	4,219,000	-

Planned Use of Funds

2022 BEGINNING FUND BALANCE		2,500,000	2,179,000	1,983,000	1,844,000	1,759,000	
PLUS: ESTIMATED REVENUE[1]		3,400,000	3,450,000	3,500,000	3,550,000	3,700,000	
LESS: PLANNED EXPENSES 2022-2026							
CATEGORY	PROJECT	2022	2023	2024	2025	2026	TOTAL
Current Street Maintenance and Major Repair [2,4]		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	5,000,000
Targeted level increase for Street Maintenance [2,4]		-	500,000	500,000	500,000	500,000	2,000,000
		-	-	-	-	-	-
Debt Service	2007 Storm loan (2028 last year)	29,000	28,000	27,000	27,000	26,000	136,000
	Police/Court Facility Bonds (2039 last year)	508,000	510,000	511,000	507,000	507,000	2,543,000
	2019 Refunding Bonds(2028 last year)	406,000	397,000	389,000	390,000	376,000	1,959,000
Subtotal Debt Service		942,000	935,000	928,000	924,000	910,000	4,638,000
		-	-	-	-	-	-
CIP Capital Projects	Bainbridge Island Senior Center Renovations	276,000	-	-	-	-	276,000
	Country Club Bulkhead Reconstruction	-	525,000	-	-	-	525,000
	Eagle Harbor Drive Phase II	2,000	-	-	-	-	2,000
	Madison Ave Sidewalk Improvements	601,000	-	-	-	-	601,000
	Eagle Harbor Drive Phase I	257,000	5,000	20,000	-	-	282,000
	City Hall Parking Lot Retrofit	111,000	-	-	-	-	111,000
	Sportsman Club/New Brooklyn Intersection	532,000	-	-	-	-	532,000
	Average Support to CIP projects (2023-2026)[3]	-	181,000	691,000	711,000	711,000	2,294,000
Subtotal Capital Projects		1,779,000	711,000	711,000	711,000	711,000	4,623,000
		-	-	-	-	-	-
Plus: Targeted level in Facility Maintenance Contributions[4]		-	500,000	500,000	500,000	500,000	2,000,000
GRAND TOTAL - REET EXPENSES		$3,721,000	$3,646,000	$3,639,000	$3,635,000	$3,621,000	$18,261,000
ESTIMATED ENDING FUND BALANCE		2,179,000	1,983,000	1,844,000	1,759,000	1,839,000	-

Notes:

1 Revenue can be volatile - Assumed revenue increase of 2% per year

2 Current Streets spending includes maintenance and major road repairs

3 Average Capital Support for years 2017-2021 was $711,000 per year

4 Total maintenance limited to $2 million REET 1 and REEET 2; Remaining $500k per yr for new Facility maintenance fund will come from General fund

CITY OF BAINBRIDGE ISLAND

CITY OF
BAINBRIDGE ISLAND

Q&A

March 15, 2022

CITY OF
BAINBRIDGE ISLAND

Finance and Administrative Services Department

Memorandum

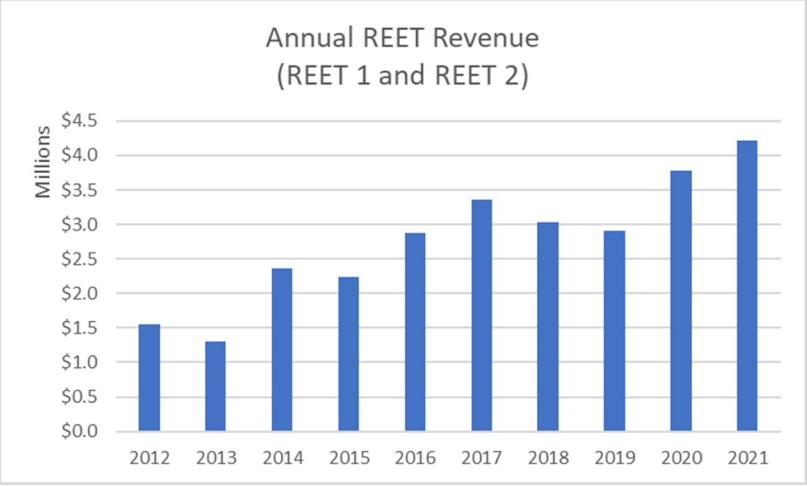
Date: March 11, 2022

To: City Council
Blair King, City Manager

From: DeWayne Pitts, Finance Director

Subject: Real Estate Excise Tax (REET) uses and policy requirements

Executive Summary:
This memo provides an introduction to a significant revenue source at the City of Bainbridge Island, the Real Estate Excise Tax (REET). The City has received an average of $2.8 million in REET revenue over the past 10 years, ranging from a low of $1.3 million in 2013 to a high of $4.2 million in 2021. The use of this revenue is restricted by state law to certain capital and maintenance purposes. Council has requested information about the use of REET funds.



5 Year Historical REET Spending						
Year	2017	2018	2019	2020	2021	Average
Debt Service	1,883,000	1,541,000	876,000	862,000	943,000	1,221,000
Streets Repair/Maintenance	624,000	785,000	1,094,000	836,000	1,851,000	1,038,000
Capital Projects	819,000	-	993,000	315,000	1,426,000	711,000
Total	3,326,000	2,326,000	2,963,000	2,012,000	4,219,000	-

Overview:

- The City of Bainbridge Island collects the maximum allowable 0.25% of "REET 1" and an additional 0.25% of "REET 2" tax on the selling price of most real property sales.
- These revenues are legally restricted and collected in a separate special revenue fund which can only be used for eligible purposes.
- In general, the funds must be used for capital projects along with a limited amount allowed for maintenance. Debt service payments on projects financed with REET are also eligible for funding.
- REET 2 projects are more restrictive than REET 1 and are directed more to infrastructure. REET 2 funds are not allowed for public facilities such as law enforcement, administration and courts that were listed within the REET 1 statute.
- New legislation passed in 2019 which sunsets January 1, 2026 allows the greater of $100,000 or 25% of available REET 2 funds not to exceed $1 million for affordable housing projects. REET 1 funds are not eligible for this use.
- REET revenues can be volatile since they depend on the volume and sales value of the properties sold.
- Current City financial policies state that *"Real Estate Excise Tax revenue shall be first applied to current capital debt service and then, to the extent available to other eligible expenses". In addition, the policies state that "As a general rule, when an expenditure is incurred for which both restricted and unrestricted fund balance is available, the City will consider the more restricted amounts to have been spent first".*
- City projected REET revenues for 2022 are $3.4 million. Ending 2021 REET fund balance is $2.5 million.

Real Estate Excise Tax (REET) 1 and 2

Item	REET 1	REET2
Tax rate	0.25%	0.25%
Capital projects (roads, streets, utilities)	Eligible	Eligible
Capital projects (facilities)	Eligible	Not eligible
Capital projects (Affordable Housing)	Not Eligible	Until end of 2025, up to $1.0 million may be allowable
Maintenance	Eligible up to $1 million	Eligible up to $1 million
Debt Service	Eligible up to Capital project limitations above	Eligible up to Capital project limitations above
Estimated 2022 revenue	$ 1,700,000	$ 1,700,000
Current fund balance	$ 2,100,000	$ 400,000

Background:

The State of Washington levies a real estate excise tax (REET) upon most sales of real estate under chapter 82.45 RCW based on a graduated tax scale determined by the selling price. In addition to the state real estate excise tax, cities and counties may impose local real estate excise taxes. The two REET options for cities and counties are:

- REET 1, or the "first quarter percent" – a 0.25% REET which may be imposed by any city, town, or county primarily for capital projects and limited maintenance.

- REET 2, or the "second quarter percent" – an additional 0.25% REET which may be imposed by any city, town, or county fully planning under the Growth Management Act, to be used primarily for capital projects, limited maintenance and certain affordable housing projects.

REET 1 – The "First Quarter Percent"

Summary

- Any city or town may impose a 0.25% excise tax upon most real estate sales
- The City of Bainbridge Island has imposed this tax
- Revenues are restricted and may only be used for certain capital purposes and housing relocation assistance
- May also be used for limited capital facility maintenance, with additional reporting requirements.
- In general, is less restrictive than REET 2 funds
- Does not require voter approval

Capital Use of Revenues: Cities such as Bainbridge with a population of more than 5,000 that are fully planning under the Growth management Act (GMA) must spend the REET 1 revenues on "capital projects" that are listed in the capital facilities plan (CFP). RCW 82.46.010(6) defines "capital project" as, in relevant part:

> *… those public works projects of a local government for planning, acquisition, construction, reconstruction, repair, replacement, rehabilitation, or improvement of streets; roads; highways; sidewalks; street and road lighting systems; traffic signals; bridges; domestic water systems; storm and sanitary sewer systems; parks; recreational facilities; law enforcement facilities; fire protection facilities; trails; libraries; administrative facilities; judicial facilities; river flood control projects; … and technology infrastructure that is integral to the capital project.*

Maintenance Use of Revenues: Cities may use up to $100,000 or 25% of its available REET 1 funds, whichever is greater but not to exceed $1 million per year, for the maintenance of capital projects. The definition of "maintenance" is defined within RCW 82.46.015(6):

> *For purposes of this section, "maintenance" means the use of fund for labor and materials that will preserve, prevent the decline of, or extend the useful life of a capital project. "Maintenance" does not include labor or material costs for routine operations of a capital project*.

There are additional reporting requirements the city must fulfill in the budget process in order to use the funds for maintenance.

Housing relocation Use of Revenues: REET 1 funds may be spent on housing relocation assistance as defined within RCW 59.18.440 and 59.18.450, which in summary provides assistance to low-income tenants under specific circumstances defined by statute and local ordinance.

REET 2 – The "Second Quarter Percent"

Summary

- Any city or town that is fully planning under the Growth Management Act may impose an additional 0.25% excise tax upon most real estate sales, in addition to the tax imposed under REET 1
- The City of Bainbridge Island has imposed this tax
- Revenues are restricted and may only be used for certain transportation, water/storm/sewer, and park capital purposes
- In general, REET 2 projects are more restrictive than REET 1 and are directed more to infrastructure

- REET 2 funds are not allowed for public facilities such as law enforcement, administration and courts that were listed within the REET 1 statute
- May also be used, with additional reporting requirements and spending limits for:
    - Capital facility maintenance
    - Affordable housing and homelessness through January 1, 2026
- Does not require voter approval

Capital Use of Revenues: REET 2 revenues are restricted and may only be used for financing "capital projects" specified in the capital facilities plan element of the city's comprehensive land use plan. RCW 82.46.035(5) defines "capital projects" as:

> (a) Planning, acquisition, construction, reconstruction, repair, replacement, rehabilitation, or improvement of streets, roads, highways, sidewalks, street and road lighting systems, traffic signals, bridges, domestic water systems, storm and sanitary sewer systems;
>
> (b) Planning, construction, reconstruction, repair, rehabilitation, or improvement of parks; and
>
> (c) Until January 1, 2026, planning, acquisition, construction, reconstruction, repair, replacement, rehabilitation, or improvement of facilities for those experiencing homelessness and affordable housing projects.

The definition of "capital projects" for REET 2 is more restrictive than it is in the REET 1 statute. REET 2 funds are more specifically directed to infrastructure. Also, REET 2 omits public facilities such as law enforcement, administration and courts that were listed within the REET 1 statute.

Maintenance Use of Revenues: Cities may use up to $100,000 or 25% of its available REET 2 funds – whichever is greater, not to exceed $1 million per year for the maintenance of REET 2 capital projects. RCW 82.46.037 allows REET 2 funds for the maintenance of REET 2 projects as described in that provision. As provided in RCW 82.46.037(4), in relevant part:

> "maintenance" means the use of funds for labor and materials that will preserve, prevent the decline of, or extend the useful life of a capital project. "Maintenance" does not include labor or material costs for routine operations of a capital project.

Affordable Housing Use of Revenues: Legislation passed in 2019 expanded the use of REET 2 revenues to include some expenses related to affordable housing. Until January 1, 2026 any city may now use the greater of $100,000 or 25% of its available REET 2 funds, not to exceed $1 million, for affordable housing projects and the planning, acquisition, construction, repair, replacement, rehabilitation, or improvement of facilities for those experiencing homelessness, as long as such projects are listed in the capital facilities plan.

Planned Use of Funds:

Below is a summary of the current planned use of REET funds from 2022-2026.

2022 BEGINNING FUND BALANCE		2,500,000	2,179,000	1,983,000	1,844,000	1,759,000	
PLUS: ESTIMATED REVENUE[1]		3,400,000	3,450,000	3,500,000	3,550,000	3,700,000	
LESS: PLANNED EXPENSES 2022-2026							
CATEGORY	PROJECT	2022	2023	2024	2025	2026	TOTAL
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		-	-	-	-	-	-
CIP Capital Projects	Bainbridge Island Senior Center Renovations	276,000	-	-	-	-	276,000
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Notes:

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