City of Dover

Pavement Management Plan

June 10, 2019

Final Report

Adopted by Dover City Council June 13, 2019

PROFESSIONAL ENGINEER
REGISTERED
11806
6-10-19
STATE OF IDAHO
A. JAY HASSELL

J·U·B ENGINEERS, INC.

7825 Meadowlark Way
Coeur d'Alene, ID 83815
www.jub.com
208.762.8787

Contents

Contents 3

Introduction 3

Background 4

Strategies 5

Routine Maintenance 7
Preventative Maintenance 7
Minor Rehabilitation 8
Structural Overlay 8
Reconstruction 8
Corrective Maintenance 8
Catastrophic Maintenance 9

Analysis 10

Scenario 1: No Reinvestment 11
Scenario 2: $30,000 Annual Pavement Management Strategy 12
Scenario 3: $40,000 Annual Pavement Management Strategy 14
Scenario 4: $50,000 Annual Pavement Management Strategy 16

Results 18

Conclusions 18

Tables

Table 1 – Typical Benefits of Pavement Improvement Strategies 5
Table 2 – Paved Road Network Value for Various Scenarios 18
Table 3 – 5-Year Total Budget Distribution Plan 19

Figures

Figure 1 – Distribution of Initial Paved Road Conditions (2018 Data) 4
Figure 2 – Pavement Preservation Strategies (FHWA) 6
Figure 3 – Pavement Condition versus Cost per Mile 7
Figure 4 – Typical Pavement Deterioration Curve and Value of Preventative Maintenance 9
Figure 5 – Network Remaining Service Life Distribution w/o Reinvestment after 5 Years 11
Figure 6 – Projected Remaining Service Life Using $30k Annual Budget Pavement Management Strategy 12
Figure 7 – $30k Pavement Management Strategy Budget Distribution 13
Figure 8 – Projected Service Life Distribution with $40,000 Annual Budget 14
Figure 9 – $40k Pavement Management Strategy Budget Distribution 15
Figure 10 – Projected Service Life Distribution with $50,000 Annual Budget 16
Figure 11 – $50k Pavement Management Strategy Budget Distribution 17

Appendices

Appendix A – Dover Pavement Data 23
Appendix B – Dover Paved Road RSL Map 25
Appendix C – Dover Capital Improvement Plan Map 27
Appendix D – Dover Paved and Unpaved Road Map 29

Introduction

The primary goal of this pavement evaluation report is to develop a strategic maintenance plan that minimizes the long-term cost to the City of Dover while improving the overall service life of the asphalt-paved road network. This report offers pavement repair strategies. The pavement repair strategies and Remaining Service Life (RSL) will provide a better understanding and give a systematic approach to maintaining paved roadways. The key to this effort is maximizing the maintenance of roads through preventative maintenance rather than reactive solutions that will add significant reconstruction costs in the future and create a loss of value to the City's assets.

The City of Dover is responsible for maintaining approximately 3.32 miles of public paved roads and 3.38 miles of public gravel roads. This pavement management plan exclusively takes into consideration the asphalt-paved roads, but if any of Dover's gravel or otherwise unpaved public roads are paved in the future, they would also be incorporated in this analysis. J-U-B inspected Dover's paved road conditions in the spring of 2017 and again in the summer of 2018. An updated inventory of the paved road network's condition was prepared using the IWORQ program. This inventory of current conditions allows the city to plan for future road improvements, maintenance projects, and expected changes in remaining service life as a result of aging, weathering, and traffic loading. The entire inventory of paved and unpaved road conditions is available in **Appendix A**.

According to the updated data collected , the IWORQ paved road condition report, and engineering judgement, different maintenance and reconstruction strategies can be used to maintain or improve the pavement condition. Pavement maintenance strategies vary depending on the condition and remaining service life of each specific road segment. Some of these strategies include routine maintenance, preventative maintenance, and reconstruction. These strategies are compared (costs versus benefits) and explained in detail in the "Strategies" section of this report.

Extending the overall service life and improving the value of the paved road network can be achieved by strategically allocating funds. The following four budget analyses were performed on the Dover road system to find the best alternative for preserving pavement in the city:

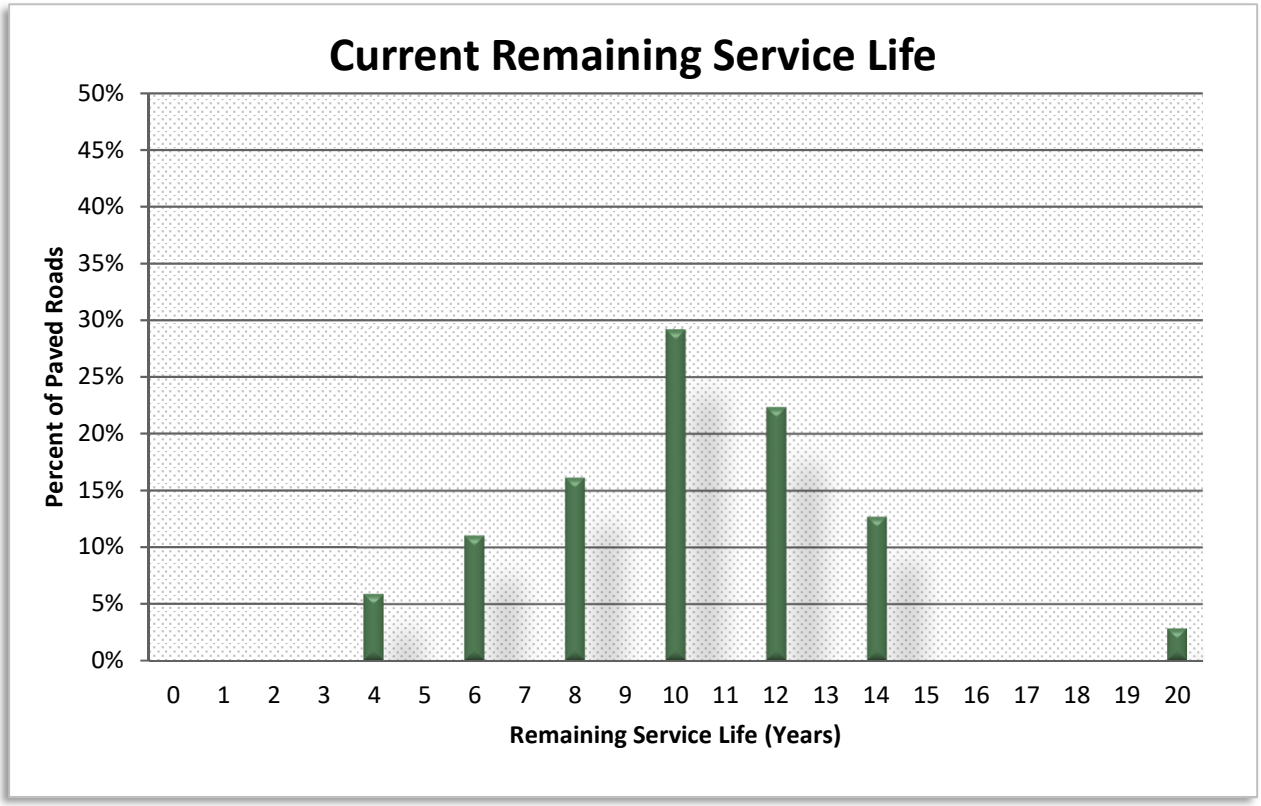
- A five-year, zero-dollar budget was analyzed to evaluate the paved road network if no investments, maintenance actions, or improvements are made, and
- five-year annual pavement maintenance budgets in the amounts of $30,000, $40,000, and $50,000 were analyzed to evaluate a conservative, moderate, and liberal budget's effect on Dover's paved road network condition and value.

The results of these studies can help the city to budget the appropriate funds for pavement maintenance while still considering other city budget obligations.

Background

An inspection of current paved road conditions was performed and the IWORQ program was updated with the results. The IWORQ program is used to store road condition information for each segment of paved roadway and help estimate its remaining service life compared to its design life. For example, since a paved road is assumed to be designed for a 20-year life, and if it has existed for eight years having no maintenance done to it, the assumed remaining service life is 12 years. **Figure 1** shows the current distribution of remaining service life for the paved road network within Dover's city limits. The average service life for the 3.32 miles of paved roads is approximately 11 years. All the paved road's segments and their RSL can be seen in **Appendix B.**

Figure 1 – Distribution of Initial Paved Road Conditions (2018 Data)



Currently, the City of Dover does not set an annual budget to be invested in road maintenance. A road maintenance budget is typically used to perform preventative and routine maintenance, road reconstruction, and any other unforeseen or catastrophic maintenance. It excludes staff costs and the engineering fees associated with maintenance. Engineering fees may range from 10% to 15% of project costs depending on the type of maintenance performed, which could range from about $3,000 and up per year, depending on what construction budget and projects are completed each year.

This evaluation was conducted to provide five-year plans for preventative and routine maintenance. Proper execution of this Pavement Management Plan can allow Dover to invest money in paved roads using a preventative strategy instead of making short-term budget decisions. Over several years, the plan's goal is to better preserve the road network value, but do so with the most cost-effective long-term budget.

Strategies

Various strategies are used to maintain and preserve paved roads. These strategies range from simple routine maintenance and pavement preservation to paved road reconstruction. The type of treatment necessary depends on the current condition of a paved road. For example, if a paved road is fairly new, it may only need minor preventative repair such as a chip seal, while an older paved road that has not been maintained may require an overlay or reconstruction to provide acceptable conditions for drivers.

This section compares and discusses the pavement repair strategies that can be used within Dover. The benefits and costs of each strategy are discussed and compared to provide an explanation of paved road repair and the benefits of preventative maintenance.

The three categories of paved road repair are full reconstruction, preventative preservation, and reactive repair. **Table 1** shows the benefits of the strategies that are widely used.

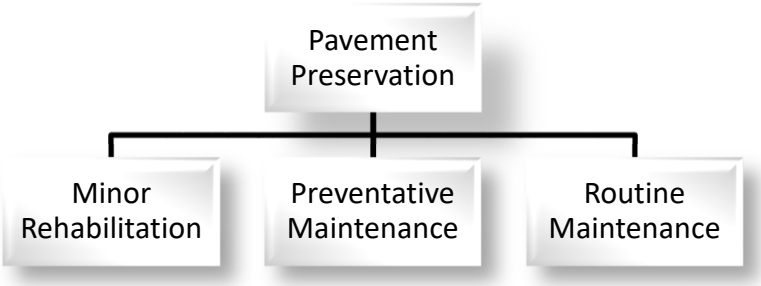
Table 1 – Typical Benefits of Pavement Improvement Strategies

	Strategy	Increase Capacity	Increase Strength	Reduce Aging	Restore Serviceability
Full Reconstruction	New Construction	X	X	X	X
	Reconstruction	X	X	X	X
	Major Rehabilitation		X	X	X
	Structural Overlay		X	X	X
Preventative Preservation	Minor Rehabilitation			X	X
	Preventative Maintenance			X	X
	Routine Maintenance				X
Reactive Repair	Corrective Maintenance				X
	Catastrophic Maintenance				X

Reactive repair is performed when a major event occurs that requires immediate repair. This is typically something that cannot be planned for, but it may restore the serviceability of a roadway if it becomes unusable or unsafe.

Preventative preservation can restore serviceability and reduce the aging of a roadway. It can enhance pavement performance, extend pavement life, reduce user delays, and provide improved safety and mobility. Cost-effectiveness can also be enhanced. Scheduled maintenance of this kind will typically lower the long-term cost of repairing a paved road to an acceptable level of service rather than allowing the paved road to deteriorate significantly or completely fail and require reconstruction. **The three main types of pavement preservation outlined by the Federal Highway Administration (FHWA) are minor rehabilitation, preventative maintenance, and routine maintenance**, as shown in **Figure 2**.

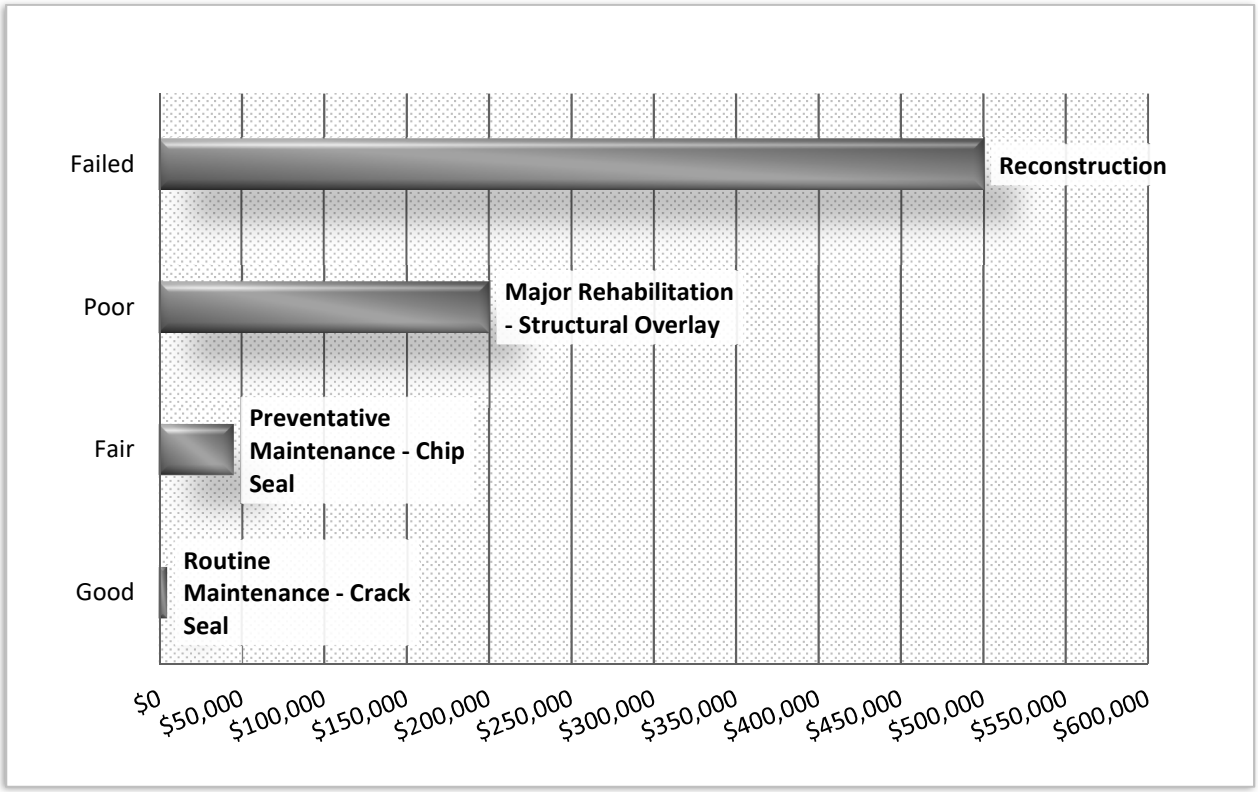
Figure 2 – Pavement Preservation Strategies (FHWA)



The final strategy is reconstruction and rehabilitation. Reconstruction is typically a reactive measure used to repair failing or functionally obsolete paved roads (roads that no longer meet current needs). When the serviceability becomes so low that travel is considered unsafe on a roadway, a structural overlay, major rehabilitation, or reconstruction is typically used to restore the roadway. These strategies can provide increased capacity and strength, reduce roadway aging, and restore the serviceability of a roadway. Reconstruction provides the greatest benefit of the pavement strategies, but it is also the most expensive option in the long term.

Figure 3 shows the pavement strategy that is typically used on each specific road condition. This figure also shows an approximate cost per mile to perform each pavement repair or preservation strategy. These costs can vary depending on each road condition, location, or other roadside features that may impact costs.

Figure 3 – Pavement Condition versus Cost per Mile



Each strategy mentioned in this comparison is described in detail in the following sections and includes the benefits, costs, appropriate condition of pavement each strategy should be used on, and what the method entails.

Routine Maintenance

Routine maintenance is generally one of the lowest-cost strategies ($3,000 to $5,000 per mile). It can reduce aging and restore serviceability of a roadway. Routine maintenance typically "consists of work that is planned and performed on a routine basis to maintain and preserve the condition… to specific conditions," (AASHTO Highway Subcommittee on Maintenance). Examples of routine maintenance include crack repair and sealing, fixing potholes, maintaining pavement markings, etc. Independent Highway District supports the City with some of these services on an as-needed basis.

Preventative Maintenance

Preventative maintenance is "a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, delays future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity)" (AASHTO Standing Committee on Highways, 1997). Preventative maintenance techniques include chip sealing and fog sealing. These treatments

are typically performed between three and twelve years after initial construction of the roadway and on a repeating cycle, depending on the condition of the paved road. Preventative maintenance typically costs anywhere from $25,000 to $45,000 per mile of repair and can restore the service life of the paved road by three to five years.

Minor Rehabilitation

Minor rehabilitation is typically a non-structural repair or enhancement used when top down cracking develops due to environmental exposure. This technique helps reduce age-related deterioration and is generally a thin overlay, such as a bituminous surface treatment (BST). These methods vary in cost from $80,000 to $150,000 per mile and are used on roadways that have a remaining service life of six to seven years. BST typically adds four to six years to the remaining service life of a paved road.

Structural Overlay

A structural overlay (2-3 inches for typical Dover traffic) is a pavement repair strategy typically used on road sections with a high level of deterioration that require increased structural capacity but do not need full reconstruction. This is a lower cost alternative for roads that have not completely failed but are on the verge of failing. Structural overlays typically cost between $180,000 and $220,000 per mile, depending on the thickness, and are typically performed on roads that have a remaining service life between four and seven years. Benefits of a structural overlay include increasing the road capacity, reducing the aging of the road, and restoring serviceability of the road. This overlay typically restores the service life of the road by seven to nine years. Additional options and treatments available with a structural overlay are typically evaluated on a case-by-case basis.

Reconstruction

Reconstruction is an extreme measure that is often used on paved roads that have deteriorated to a point where the paved road is unsafe, unusable, or irreparable. This is the costliest strategy and is usually not planned, whereas preventative maintenance is planned. Reconstruction does provide more short-term benefits, but it is generally not cost-effective to let a paved road deteriorate to the point of reconstruction (allowing total failure is not typically planned). Full reconstruction of a paved road typically ranges between $400,000 to $600,000 per mile, depending on the terrain, location, and available materials. Reconstruction is typically performed on failing paved roads with a remaining service life ranging from zero to three years and restores the service life of the paved road to 20 years.

Corrective Maintenance

Corrective maintenance is performed as a reactive measure when deficiencies develop that “negatively impact the safe, efficient operations of the facility and future integrity of the

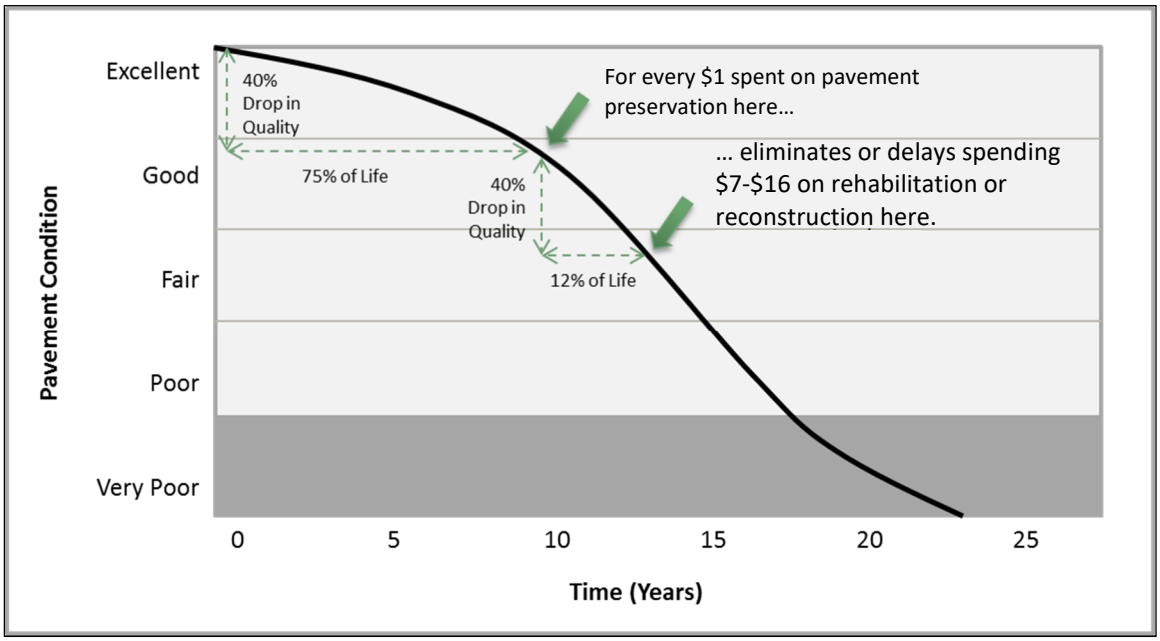
pavement section" (FHWA). These measures are generally used when unforeseen issues occur such as repairing potholes, edge failures, and localized deterioration.

Catastrophic Maintenance

Catastrophic maintenance typically describes work that is necessary to return a roadway to a minimum level of service after an unforeseen catastrophic event such a spring thaw failure or washout. This is typically a temporary fix, while permanent restoration is designed and scheduled.

Figure 4 illustrates the relationship between pavement strategies and preservation versus the cost of improvements. This figure shows how cost-effective pavement preservation strategies can be in the long run.

Figure 4 – Typical Pavement Deterioration Curve and Value of Preventative Maintenance



** National Center for Pavement Preservation, values adjusted for inflation*

Analysis

This analysis was performed based on the information collected for the City of Dover by J-U-B and the costs/benefits of pavement preservation strategies. The Pavement Management Plan can be executed in order to better preserve the current 3.32 miles of paved roads located within the City of Dover and increase the value of investment in paved road repair. The current value of the public paved network in Dover is estimated to be approximately $1,484,000. If all roads were new, the total value would be approximately $1,650,000 (but an agency having all new roads is not typical and thus the total value is only provided as a reference point).

The value of a paved road was estimated using the following method. One mile of paved road with a remaining service life of 20 years was estimated to have a net value of $500,000. To estimate the value of a paved road (per mile) with a remaining service life of less than 20 years, the cost to restore the road to a remaining service life of 20 years was subtracted from the value of a mile of paved road with a remaining service life of 20 years.

For example, if a mile of paved road required a $200,000 structural overlay to restore the paved road to 20 years of remaining service life, the net value of the paved road would be calculated as:

$500,000 – $200,000 = $300,000

Where:

$500,000 represents the value of a paved road with a remaining service life of 20 years

$200,000 represents a given value for repairing a paved road to a remaining service life of 20 years

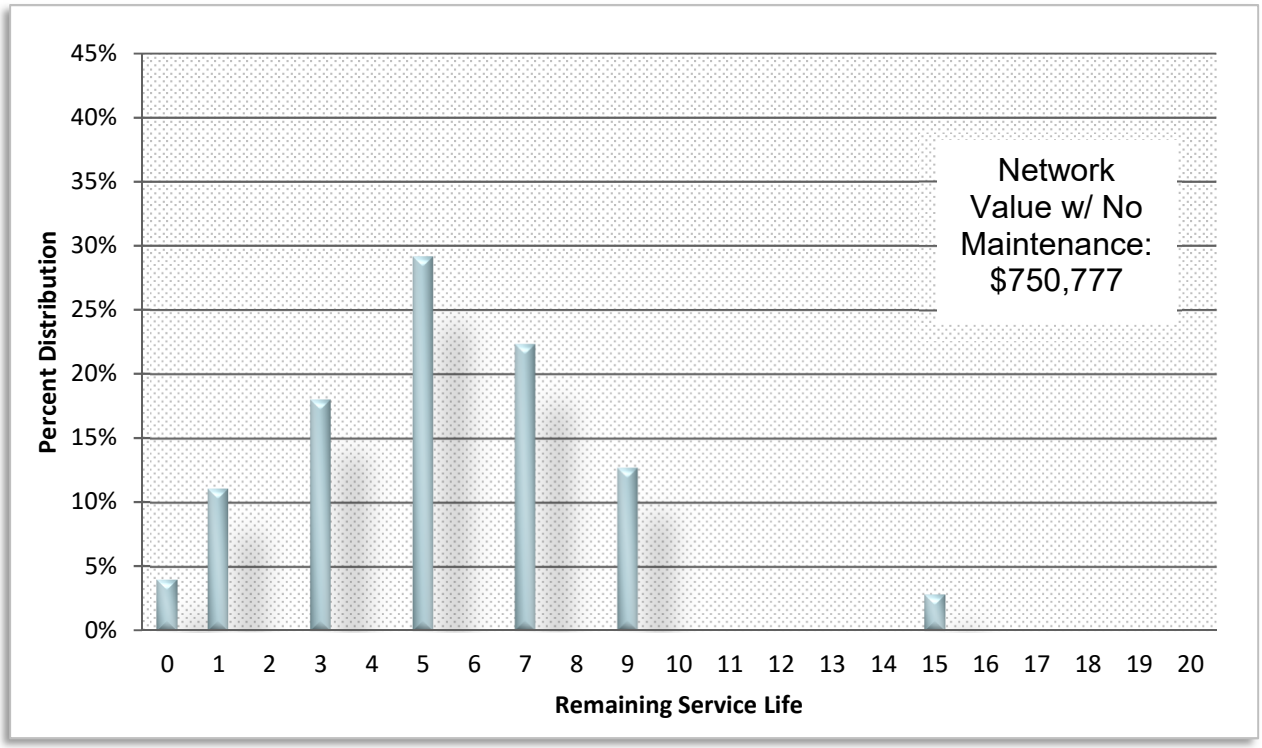
$300,000 represents the current value of a paved road that needs a $200,000 maintenance improvement to restore the road to a remaining service life of 20 years

Based on the existing road conditions, different five-year budget scenarios were considered, such as not investing in the roadway, investing $30,000 annually, investing $40,000 annually, and investing $50,000 annually. Each scenario is discussed in detail in the following sections.

Scenario 1: No Reinvestment

The first analysis estimated the network value after five years if no maintenance is performed. This information was used to establish a baseline value to show how the total value of the paved road network would decrease over the five-year period due to pavement deterioration. **Figure 6** shows the remaining service life distribution after five years with no repairs and continuous deterioration. The total value of the network was estimated to be $750,777 for a total decrease in value of approximately $733,305 over the five years.

Figure 5 – Network Remaining Service Life Distribution w/o Reinvestment after 5 Years



Scenario 2: $30,000 Annual Pavement Management Strategy

An analysis was completed to determine the $30,000 annual pavement management strategy and estimate its effect on remaining service life for network roads if Dover adopted a similar budget. **Figure 6** shows the projected service life distribution after five years as well as the projected total value of the paved network. The future value of the network was estimated to be $1,377,105. This shows a total increase in value of $626,328 over the no reinvestment strategy, which is a return in investment of +417.55% over five years. Even still, this is an overall decrease in network value of $106,977 (-7.21%) over the five years compared to the current network value.

Figure 6 – Projected Remaining Service Life Using $30k Annual Budget Pavement Management Strategy

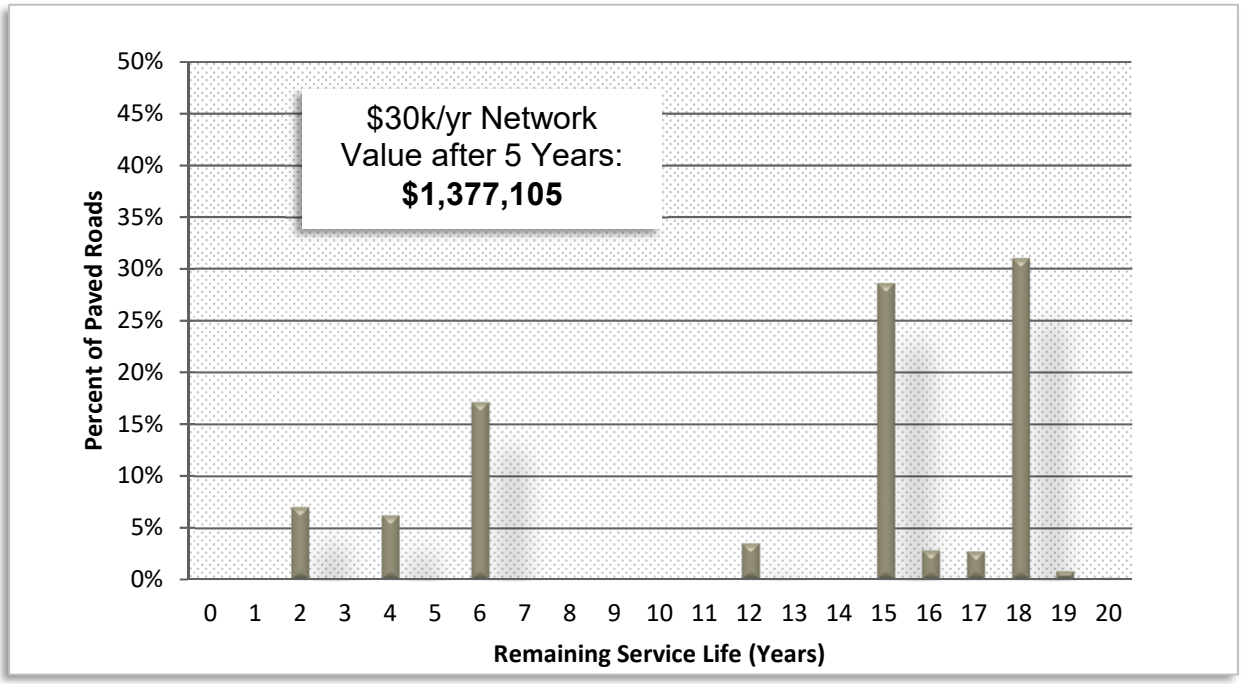
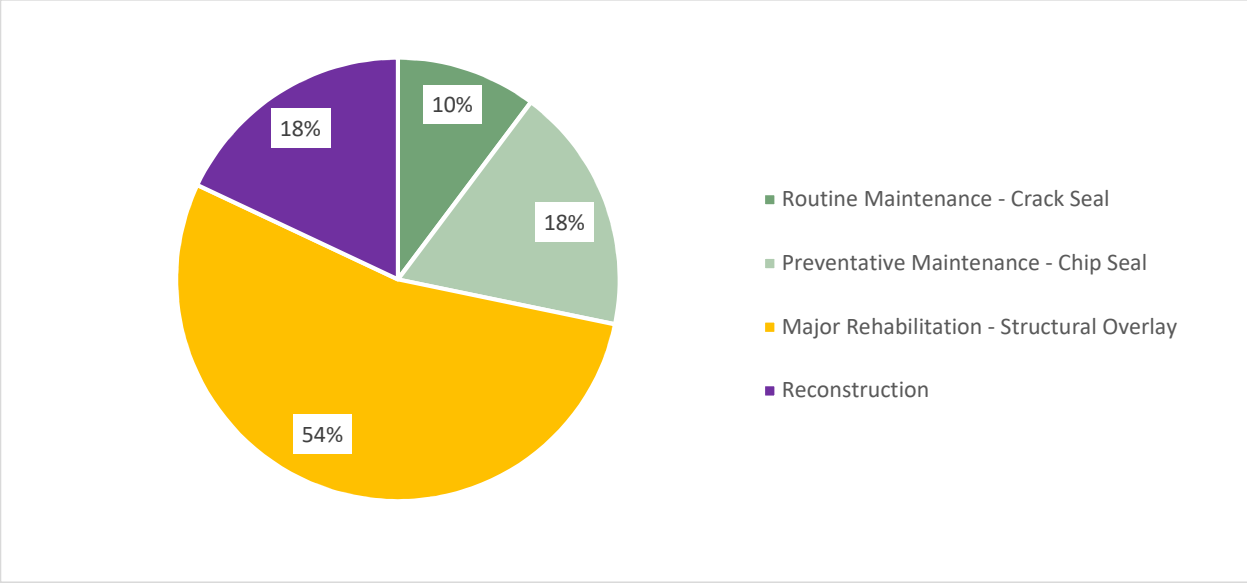


Figure 7 shows the proposed distribution for the $30,000 annual budget strategy. Due to Dover's current roadway condition, the majority of the budget is allocated towards major rehabilitation or structural overlay, but the spread of investment is otherwise balanced between all the categories. With this said, this distribution is the most practical approach to rehabilitate the low-value roads while preserving the "better" roads from further deterioration so that the overall RSL and value of the roadway network is improved the most.

Figure 7 – $30k Pavement Management Strategy Budget Distribution



Scenario 3: $40,000 Annual Pavement Management Strategy

An analysis was also performed for a $40,000 annual budget over the five-year period to show how the total value of the paved road network would respond. **Figure 8** shows an estimate for the projected service life distribution after five-years with a $40,000 annual budget. The estimated value of the network after five years is $1,527,077.

This scenario shows a total increase in value of $776,300 over the no reinvestment strategy, which is a return of investment of +388.15% over the five years. There is also an increase of $149,972 in the paved road network value in comparison to Scenario 2. A slight increase in overall network value of $42,995 (+2.90%) over the 5 years is achieved compared to the current network value.

Figure 8 – Projected Service Life Distribution with $40,000 Annual Budget

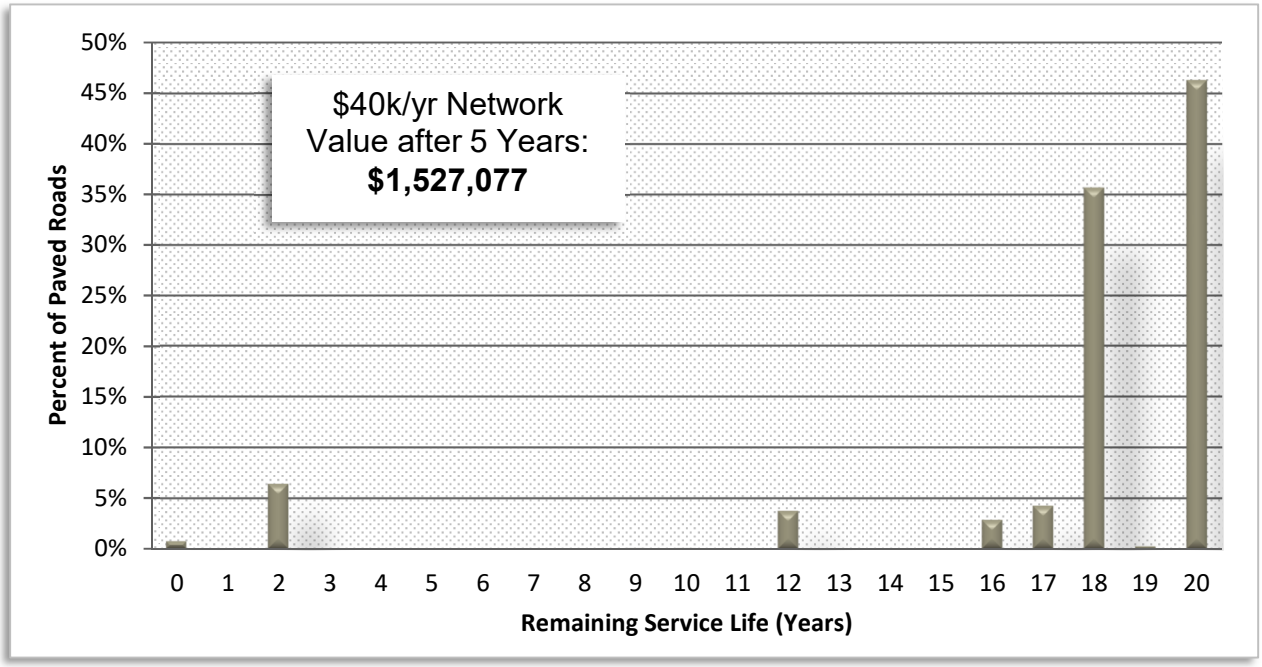
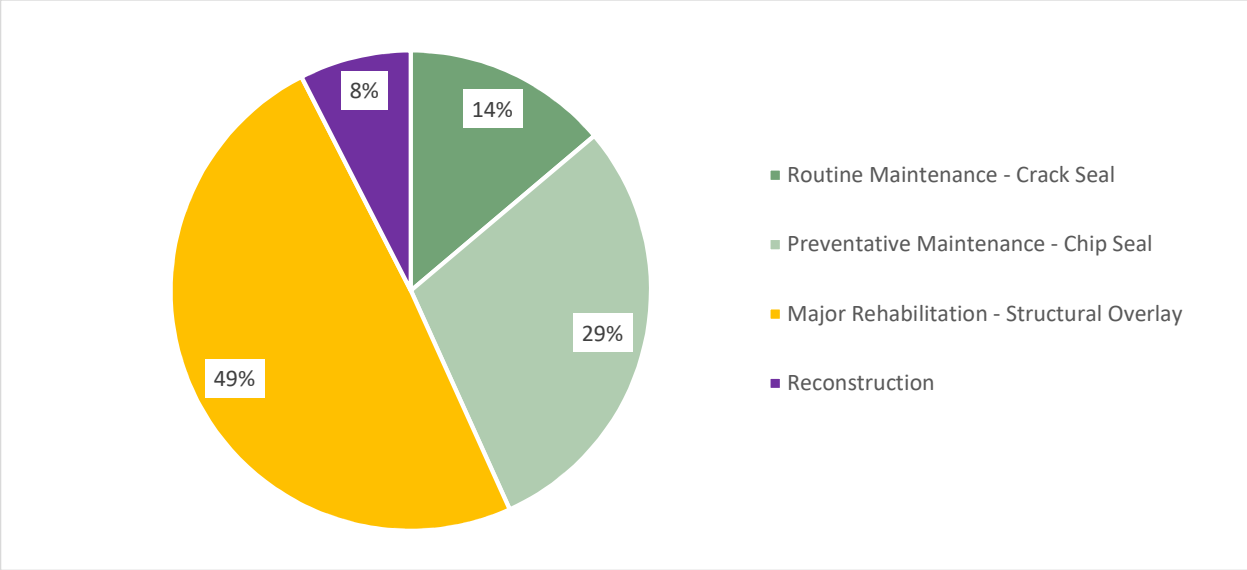


Figure 9 shows the proposed distribution for the $40,000 annual budget strategy. Much of the budget is allocated towards major rehabilitation or structural overlay, yet the spread of investment is otherwise balanced between all the categories. This distribution is the most practical approach is to rehabilitate the current number of low-value roads in the city of Dover while preserving the "better" roads from further deterioration so that the overall RSL and value of the roadway network is improved the most.

Figure 9 – $40k Pavement Management Strategy Budget Distribution



Scenario 4: $50,000 Annual Pavement Management Strategy

A final analysis was performed for a $50,000 annual budget over the five-year period to show how the total value of the paved road network would respond. **Figure 10** shows an estimate for the projected service life distribution after five-years with a $50,000 annual budget. The estimated value of the network after five years is $1,629,975.

This scenario shows a total increase in value of $879,198 over the no reinvestment strategy, which is a return of investment of +351.68% over the five years. There is also an increase of $102,898 in the paved road network value in comparison to Scenario 3. An increase in overall network value of $145,893 (+9.83%) over the 5 years is achieved compared to the current network value.

Figure 10 – Projected Service Life Distribution with $50,000 Annual Budget

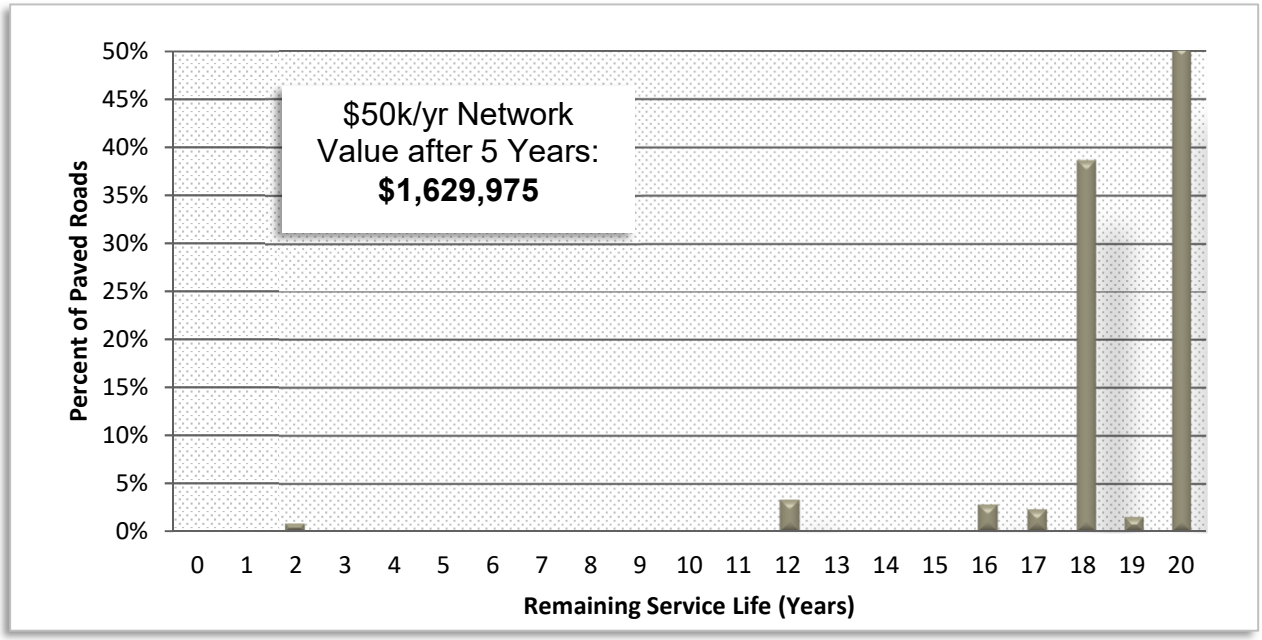
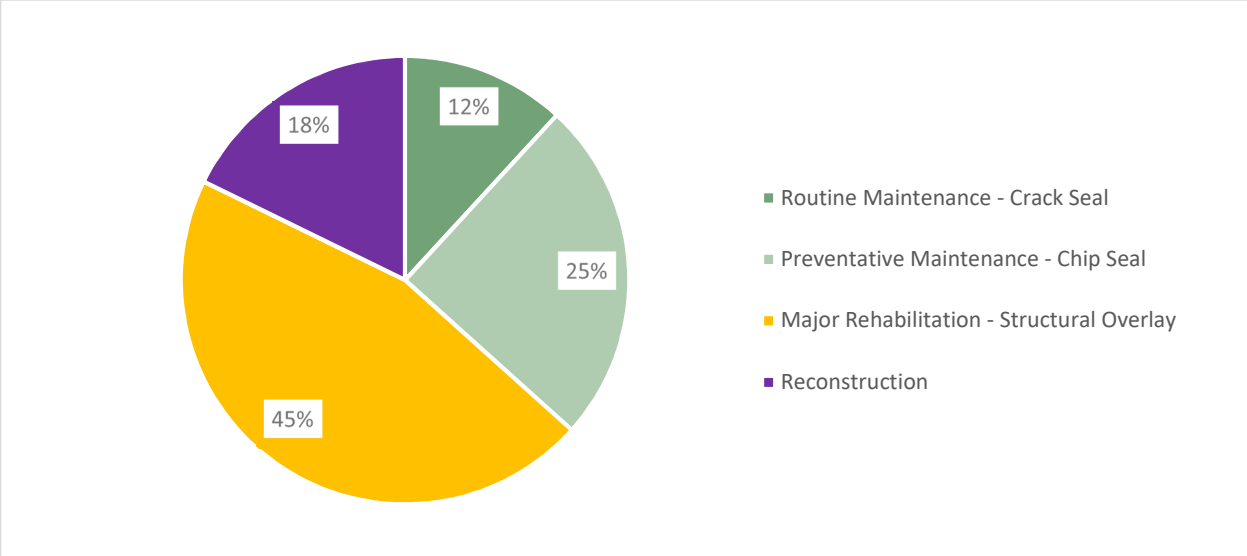


Figure 11 shows the proposed distribution for the $50,000 annual budget strategy. Much of the budget is allocated towards major rehabilitation or structural overlay, yet the spread of investment is otherwise balanced between all the categories. This distribution is the most practical approach is to rehabilitate the current number of low-value roads in the city of Dover while preserving the "better" roads from further deterioration so that the overall RSL and value of the roadway network is improved the most.

Figure 11 – $50k Pavement Management Strategy Budget Distribution



Results

The value of performing the three budget strategies versus a no reinvestment strategy is shown in **Table 2**. This table summarizes the total value of the paved road network under the various conditions discussed previously.

Table 2 – Paved Road Network Value for Various Scenarios

Scenario	Network State	Network Value ($)	Change in Value
-	Current	**1,484,082**	-
1	5-year No Reinvestment	**750,777**	-49.41%
2	5-year $30,000 Annual Budget	**1,377,105**	-7.21%
3	5-year $40,000 Annual Budget	**1,527,077**	+2.90%
4	5-year $50,000 Annual Budget	**1,629,975**	+9.83%

Given that the current network value is $1,484,082, **Table 2** shows that over a five-year period, the network value would decrease to approximately $750,777 if no maintenance is performed, for a total loss of approximately $733,305. Scenario 2 causes a network value loss of approximately $107,000 over five years. Scenario 3 causes the network value to increase by approximately $43,000, and Scenario 4 causes the network value to increase by approximately $146,000. Inflation was not considered in this analysis.

Conclusions

Based on Scenario 1, if no money is invested in road maintenance and repair, the paved road network value will depreciate by approximately 49% over the next five years. However, if any of roadway budget scenarios 2, 3, or 4 are chosen, this depreciation can be slowed, stopped, or even reversed.

Scenario 2, the $30,000 annual budget strategy, is considered the minimum maintenance budget at this point and would work to slow the depreciation of its roadway network. Even so, it would still lead to accelerating network value decline in future years. The annual budget cannot keep up with the rate that the pavement network ages, and as roads age, the cost to repair the roadway to usable levels accelerates. This would lead to costs of more than the original $30,000 annually in future years to address roadways that would fall into disrepair and require costly reconstruction.

Scenario 3, the $40,000 annual budget, is considered the “break-even” option in order to keep the city’s road network value from decreasing significantly over time. The 2.9% average value increase could be leveraged to counteract the rate of inflation, but otherwise this option would likely hold the road network at a similar average remaining service life and network value. From the results of this analysis, it is hypothesized that in the long term (more than 10 years down

the road), this budget might bring the city's roads to levels at which only inexpensive routine and preventative maintenance could be enough to treat the roadway network. Unfortunately, this outcome is not guaranteed, especially because of the budget's slim margin of growth (that still does not account for engineer's fees or new project construction). It is likely that a $40,000 annual budget would continue in perpetuity.

Scenario 4, the $50,000 annual budget, is considered the "catch-up" strategy in order to not only increase the road network value, cover engineering, and save for new construction, but reach a more cost-effective goal in the span of five years. The analysis shows that this plan will bring the city's roads to conditions at which only inexpensive routine or preventative maintenance could be enough to treat most of the roadway network after five years. This is a goal for roadway-maintaining municipalities because it would mean that less money per year could be put into road maintenance because more inexpensive maintenance would keep the roads at a high remaining service life, for decades. After five years, future Dover could stay "on top" of pavement maintenance at a fraction of $50,000 annually if $50,000 per year is spent for the short term.

Given the discussed conclusions of the analyses, it is recommended that an annual pavement maintenance budget for the City of Dover of between $40,000 and $50,000 is implemented.

Table 3 shows budget breakdowns for pavement maintenance types using a relatively balanced, preventative approach. This table was developed based on scenarios 2, 3, and 4.

Table 3 – 5-Year Total Budget Distribution Plan

	Total Spent Per Budget Strategy		
Maintenance Type	**Scenario 2: $30k/yr**	**Scenario 3: $40k/yr**	**Scenario 4: $50k/yr**
Routine	$15,365	$27,700	$29,618
Preventative	$27,000	$58,796	$62,019
Structural Overlay	$80,635	$98,450	$113,962
Reconstruction	$27,000	$15,052	$44,400
Total	**$150,000**	**$200,000**	**$250,000**

This table should be used as a guide, not a standard. For instance, one year the city may decide not to spend any money on major rehabilitation, and the following year, invest a two-year budget on structural overlays. Conversely, the city may budget more each year than needed and carry over the remaining amount to save for a larger project. To maintain this preventative approach, it is important that at the end of the five-year period, the correct total proportion of

paved roads has received pavement upgrades. The anticipated Capital Improvement Plan and map can be seen in **Appendix C**.

Public roads that are gravel or otherwise unpaved in Dover did not come into consideration for analysis for this pavement management plan, but if any of the unpaved public roads in Dover are paved in the future, they will need to be incorporated in this management plan's analysis. Currently, some paved roads in the Dover Bay development are public right-of-way, and some are privately owned by the Home Owners Association. Some of the publicly owned roads in Dover Bay are currently privately maintained by the development. If the maintenance of any privately maintained public roads becomes the responsibility of the city in the future, those roads will likewise need to be incorporated into this pavement management plan's analysis.

A map showing all of the paved and unpaved roadways and their ownership can be seen in **Appendix D.**

Appendices

Appendix A – Dover Pavement Data
Appendix B – Dover Paved Road RSL Map
Appendix C – Dover Capital Improvement Plan Map
Appendix D – Dover Paved and Unpaved Road Map

Appendix A

Dover Pavement Data

Pavement General w/ Recommended Treatment

Paved Public Roads

Road Name	From Address	To Address	Length (ft)	Length (mi)	Width (ft)	Functional Class	Speed Limit	Paved or Unpaved	Ownership	Segment ID	Last Rating Date	RSL	Year of Service Life End	Calculated PCI	Recommended Treatment	Recommended Treatment Cost	Asset Value	Latest Comments	Fatigue	Transverse	Longitudinal	Patching	Edge	Block	Rutting	Roughness
3RD ST	JACKSON AVE	OLD HIGHWAY 2	960	0.18	20	Local Road	25	Paved	Public	2774	7/19/2018	10	2028	50	0 - No Maintenance	$0.00	$90,909.09	Early alligator, longitudinal cracking. RT, RSL changed.	1:LOW-LOW	0:NONE	3:LOW-HIGH	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
4TH ST	JACKSON AVE	WASHINGTON AVE	222	0.04	18	Local Road	25	Paved	Public	2752	7/19/2018	10	2028	50	2 - Chip Seal	$1,892.05	$19,130.68	Longitudinal and transverse cracking, early alligator cracking. RT, RSL changed.	2:LOW-MED	5:MED-MED	3:LOW-HIGH	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
4TH ST	RAILROAD AVE	JACKSON AVE	760	0.14	18	Local Road	25	Paved	Public	2767	7/19/2018	10	2028	50	2 - Chip Seal	$6,477.27	$65,492.42	Longitudinal and transverse cracking, early alligator cracking. RT, RSL changed.	2:LOW-MED	5:MED-MED	3:LOW-HIGH	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
4TH ST	OLD HIGHWAY 2	RAILROAD AVE	87	0.02	18	Local Road	25	Paved	Public	2770	7/19/2018	14	2032	70	0 - No Maintenance	$0.00	$8,238.64		0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
4TH ST	OLD HIGHWAY 2	LORETTA LN (END)	516	0.10	24	Local Road	25	Paved	Public	2783	7/19/2018	12	2030	60	1 - Crack Seal	$488.64	$48,375.00		1:LOW-LOW	1:LOW-LOW	1:LOW-LOW	0:NONE	0:NONE	0:NONE	1:LOW-LOW	0:NONE
CANOE COVE LN	ONTARIO ST	END	1536	0.29	30	Local Road	20	Paved	Public	2993	7/19/2018	8	2026	40	2 - Chip Seal	$13,090.91	$132,363.64		0:NONE	0:NONE	5:MED-MED	6:MED-HIGH	0:NONE	0:NONE	0:NONE	0:NONE
DOVER BAY BLVD	4TH ST	RAILROAD AVE	362	0.07	32	Local Road	25	Paved	Public	3310	7/19/2018	12	2030	60	1 - Crack Seal	$342.80	$33,937.50		1:LOW-LOW	1:LOW-LOW	1:LOW-LOW	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
JACKSON AVE	3RD ST	LAKESHORE AVE	194	0.04	18	Local Road	25	Paved	Public	2750	7/19/2018	8	2026	40	2 - Chip Seal	$1,653.41	$16,717.80		2:LOW-MED	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
JACKSON AVE	4TH ST	3RD ST	390	0.07	18	Local Road	25	Paved	Public	2753	7/19/2018	4	2022	20	4 - Reconstruction	$36,931.82	$0.00	Evidence of ice lensing.	9:HIGH-HIGH	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
LAKESHORE AVE	JACKSON AVE	WASHINGTON AVE	220	0.04	20	Local Road	25	Paved	Public	3309	7/19/2018	8	2026	40	2 - Chip Seal	$1,875.00	$18,958.33		2:LOW-MED	1:LOW-LOW	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
LAKESHORE AVE	LAKESHORE AVE/ JACKSON AVE	Estate On The Lake BnB	310	0.06	15	Local Road	25	Paved	Public	3304	7/19/2018	8	2026	40	2 - Chip Seal	$2,642.05	$26,714.02		2:LOW-MED	1:LOW-LOW	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
LAKESHORE AVE	Estate On The Lake BnB	End of straight East-West portion	640	0.12	15	Local Road	25	Paved	Public	3304	7/19/2018	4	2022	20	4 - Reconstruction	$60,606.06	$0.00	Alligator cracking, heave, patching, roughness. Ice lensing. RT, RSL changed.	6: MED-HIGH	5:MED-MED	0:NONE	5:MED-MED	8:HIGH-MED	0:NONE	1:LOW-LOW	3:LOW-HIGH
LAKESHORE AVE	End of straight East-West portion	END	380	0.07	15	Local Road	25	Paved	Public	3304	7/19/2018	8	2026	40	2 - Chip Seal	$3,238.64	$32,746.21		2:LOW-MED	1:LOW-LOW	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
LORETTA LN	4TH ST	END	144	0.03	22	Local Road	25	Paved	Public	3319	7/19/2018	20	2038	100	0 - No Maintenance	$0.00	$13,636.36	Slight ravelling.	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
LOWER SYRINGA RD	BEGINNING OF ASPHALT	ONTARIO ST	104	0.02	29	Local Road	25	Paved	Public	3315	7/19/2018	10	2028	50	2 - Chip Seal	$886.36	$8,962.12		0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
MCKINLEY AVE / BECKER LN	BECKER LN	4TH ST	186	0.04	20	Local Road	25	Paved	Public	3301	7/19/2018	8	2026	40	2 - Chip Seal	$1,585.23	$16,028.41	Longitudinal cracking and early alligator cracking.	2:LOW-MED	1:LOW-LOW	2:LOW-MED	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
MILL RD	RAILROAD AVE	END	943	0.18	18	Local Road	25	Paved	Public	2775	7/19/2018	14	2032	70	0 - No Maintenance	$0.00	$89,299.24	RT, RSL changed.	0:NONE	0:NONE	1:LOW-LOW	1:LOW-LOW	0:NONE	0:NONE	0:NONE	1:LOW-LOW
OLD HIGHWAY 2	HIGHWAY 2	4TH ST	1000	0.19	30	Local Road	25	Paved	Public	2801	7/19/2018	14	2032	70	0 - No Maintenance	$0.00	$94,696.97	RT, RSL changed.	0:NONE	0:NONE	1:LOW-LOW	1:LOW-LOW	0:NONE	0:NONE	0:NONE	1:LOW-LOW
ONTARIO ST	CANOE COVE	END OF CITY LIMIT	924	0.18	22	Major Collector	25	Paved	Public	2994	7/19/2018	6	2024	30	3 - Structural Overlay	$35,000.00	$52,500.00		7:HIGH-LOW	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
ONTARIO ST	BEGINNING OF OLD WASHOUT AREA	END OF OLD WASHOUT AREA	132	0.03	21	Major Collector	25	Paved	Public	2997	7/19/2018	20	2038	100	0 - No Maintenance	$0.00	$12,500.00	Just rebuilt. RT, RSL changed.	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
ONTARIO ST	LOWER SYRINGA RD	END OF CITY LIMIT	1063	0.20	21	Major Collector	25	Paved	Public	3000	7/19/2018	12	2030	60	1 - Crack Seal	$1,006.63	$99,656.25		3:LOW-HIGH	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
ONTARIO ST	LOWER SYRINGA RD	Canoe Cove Ln	575	0.11	21	Major Collector	25	Paved	Public	3000	7/19/2018	12	2030	60	1 - Crack Seal	$544.51	$53,906.25		2:LOW-MED	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
RAILROAD AVE	MILL RD	END OF PAVEMENT	1815	0.34	21	Local Road	25	Paved	Public	2776	7/19/2018	10	2028	50	0 - No Maintenance	$0.00	$171,827.65		0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW	2:LOW-MED
RAILROAD AVE	DOVER BAY BLVD	MILL RD	730	0.14	32	Local Road	25	Paved	Public	2777	7/19/2018	12	2030	60	1 - Crack Seal	$691.29	$68,437.50		3:LOW-HIGH	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
RAILROAD AVE	4th STREET	END	194	0.04	22	Local Road	25	Paved	Public	3311	7/19/2018	14	2032	70	0 - No Maintenance	$0.00	$18,371.21		0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
ROCKY POINT RD	HIGHWAY 2	END OF PAVEMENT	218	0.04	26	Local Road	25	Paved	Public	2851	7/19/2018	20	2038	100	0 - No Maintenance	$0.00	$20,643.94	Slight ravelling.	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
SYRINGA HEIGHTS RD	BEGINNING OF ASPHALT	HIGHWAY 2	419	0.08	30	Major Collector	25	Paved	Public	412	7/19/2018	10	2028	50	0 - No Maintenance	$0.00	$39,678.03		0:NONE	0:NONE	0:NONE	1:LOW-LOW	1:LOW-LOW	0:NONE	1:LOW-LOW	1:LOW-LOW
SYRINGA HEIGHTS RD	CEDAR RIDGE RD	PANORAMA RIDGE	1014	0.19	21	Major Collector	25	Paved	Public	2928	7/19/2018	6	2024	30	2 - Chip Seal	$8,642.05	$87,380.68		3:LOW-HIGH	1:LOW-LOW	2:LOW-MED	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW
W PINE ST	HIGHWAY 2	END OF PAVEMENT	668	0.13	21	Major Collector	25	Paved	Public	2832	7/19/2018	12	2030	60	1 - Crack Seal	$632.58	$62,625.00		0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE
WASHINGTON AVE	4TH ST	END	250	0.05	13	Local Road	25	Paved	Public	2746	7/19/2018	10	2028	50	1 - Crack Seal	$236.74	$23,437.50		3:LOW-HIGH	0:NONE	0:NONE	1:LOW-LOW	1:LOW-LOW	0:NONE	1:LOW-LOW	1:LOW-LOW
WASHINGTON AVE	4TH ST	LAKESHORE AVE	582	0.11	16	Local Road	25	Paved	Public	2751	7/19/2018	10	2028	50	0 - No Maintenance	$0.00	$55,113.64		2:LOW-MED	0:NONE	0:NONE	0:NONE	0:NONE	0:NONE	1:LOW-LOW	1:LOW-LOW

Appendix B

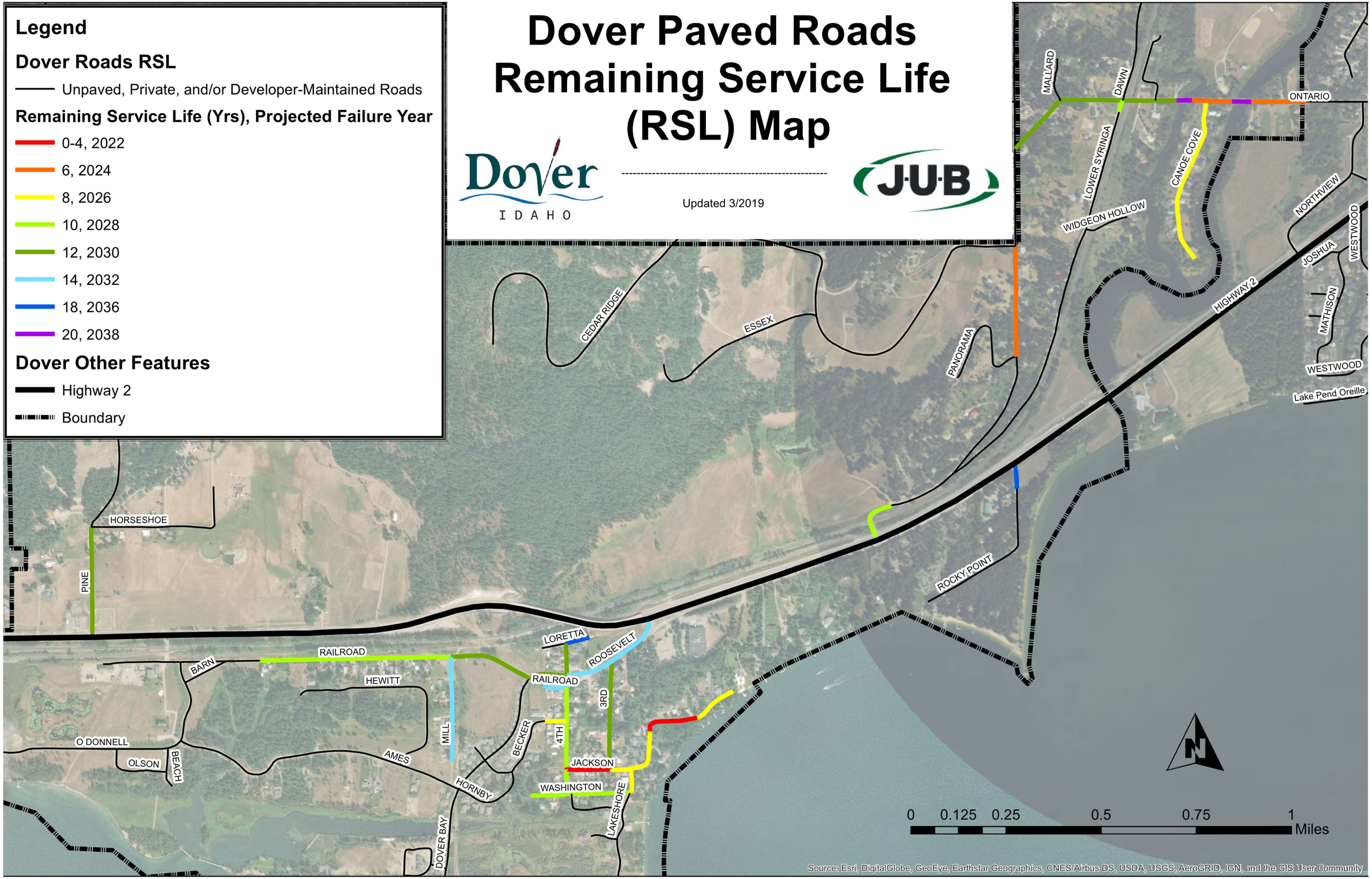
Dover Paved Road RSL Map

Dover Paved Roads Remaining Service Life (RSL) Map

Dover IDAHO

Updated 3/2019

J-U-B



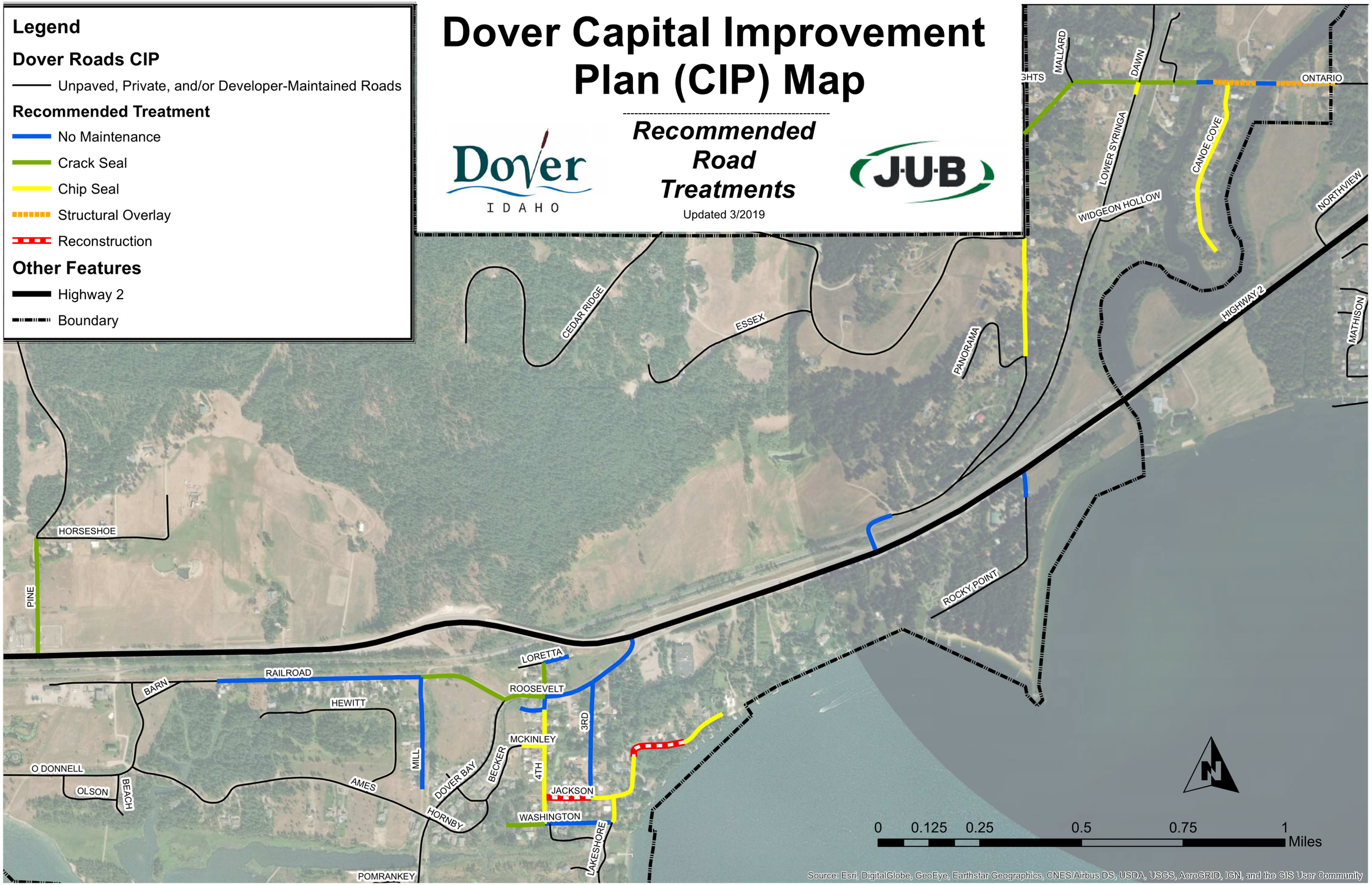
Appendix C

Dover Capital Improvement Plan Map

Dover Capital Improvement Plan (CIP) Map

Recommended Road Treatments

Updated 3/2019

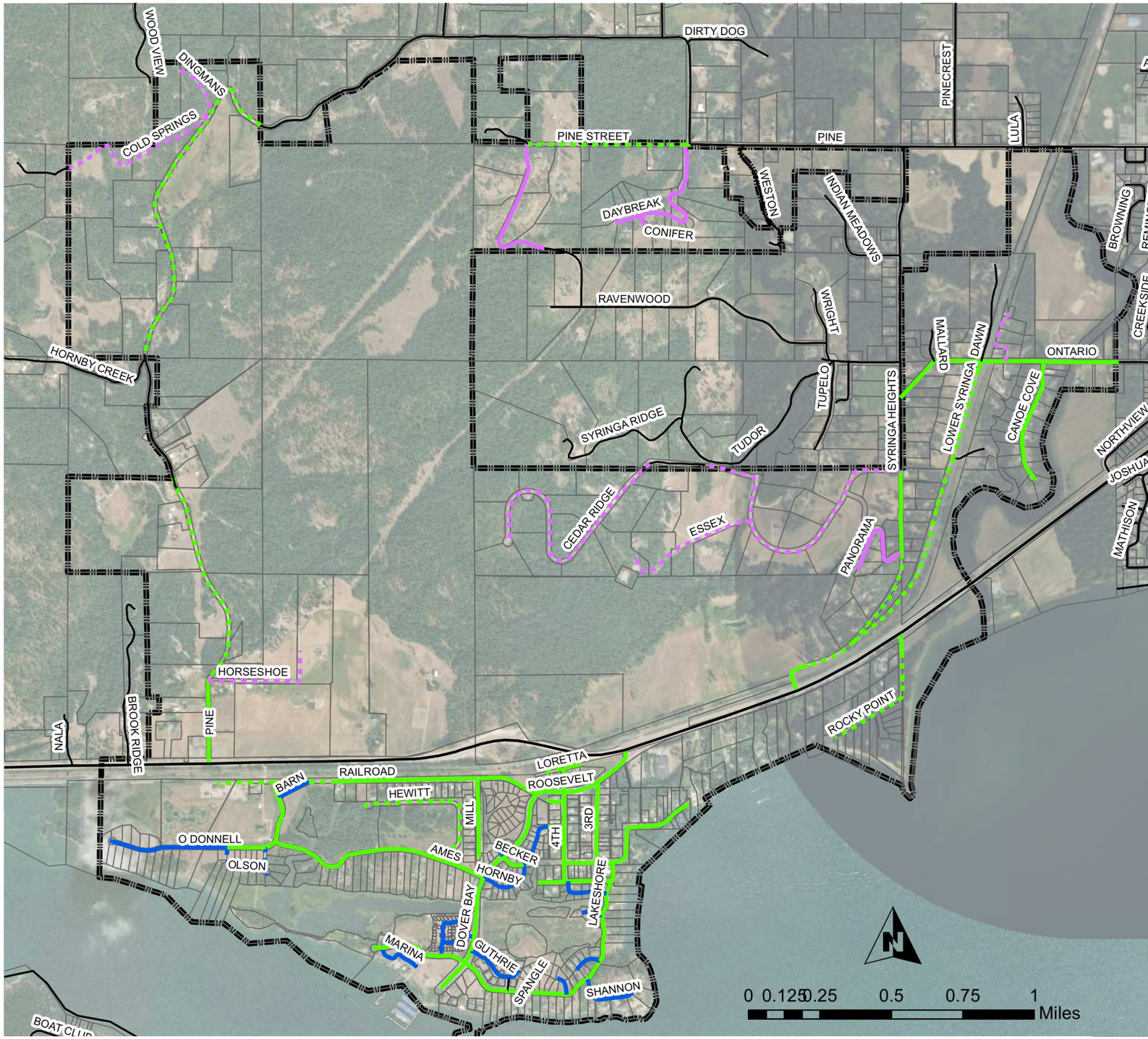


Appendix D

Dover Paved and Unpaved Road Map

Dover Paved and Unpaved Road Map

Updated 3/2019



Legend

Dover Roads - Ownership[1], Surface

- Bonner County Roads

Dover Roads - Ownership, Surface

- DOVER, PUBLIC, PAVED
- DOVER, PUBLIC, GRAVEL
- DOVER, DOVER BAY, PAVED
- DOVER, DOVER BAY, GRAVEL
- DOVER, PRIVATE, PAVED
- DOVER, PRIVATE, GRAVEL

Dover Other Features

- Highway 2
- Boundary

Parcels

- Parcels

(1) Dover Bay Development roads are under evaluation.