



Administrative Report

To: Warden MacDonald and Members of Essex County Council

From: Karyn Templin, P.Eng.
Manager, Design and Construction

Date: Wednesday, November 6, 2024

Subject: 2025 State of Good Repair Program Report

Report #: 2024-1106-IPS-R27-KT

Purpose

The purpose of this report is to provide County Council with information and recommendations pertaining to the development and implementation of the 2025 State of Good Repair Program.

Background

The County's Infrastructure and Planning Services Department (IPS) is responsible for a number of construction initiatives including Capacity Expansion, Rehabilitation, Drainage, Engineering, and CWATS, which together provide major improvements to the roads, bridges, railway crossings, active transportation and drainage infrastructure that make up the Essex County Highway Network. The Construction Program, subject to the approval of the 2025 budget, consists of numerous components that are undertaken on an annual basis, including:

- Roadway Expansion;
- Rehabilitation;
- Traffic Operations;
- Engineering, Planning and Design; and
- Bridges and Culverts.

Continuing in 2025, IPS staff evaluate various strategies to optimize the use of capital funding for these programs while considering the complexity of project scope, delivery strategy and coordination of work with Local Municipal Partners.

Focusing on the rehabilitation component of the Construction Program, IPS prepares and delivers the annual State of Good Repair Program (SOGR). The SOGR concentrates on maintaining and improving the condition of the assets in the County of Essex Road Network and is the focus of this report. Included in the program are road pavements, bridge and culverts structures, drainage structures, intersections and guiderails. It utilizes a three-tiered approach of reconstruction, rehabilitation and preventative maintenance to improve our infrastructure and extend the life of our assets.

Much like the Roadway Expansion Program, the influx of development in the area has a direct impact on the level of service values for our roads and structures. As traffic volumes increase, the County's assets see more wear and tear and consequently the rate of deterioration accelerates. The SOGR strives each year to meet these demands and maintain the objectives of the County's Asset Management Plan.

Discussion

Rehabilitation Program Development

In order to develop the SOGR, IPS annually inspects and evaluates the roads, bridges and culverts that make up the County's infrastructure network. Pavement condition is evaluated based on factors including but not limited to: rideability, surface and base conditions, rutting, drainage and friction. Bridge and culvert structures are inspected on an element-by-element basis, including but not limited to: decks, abutments, expansion joints and barrier walls. Similar to the pavement evaluations, structural inspections consider rideability, superstructure and substructure conditions, concrete and steel deterioration and roadside safety. In conjunction with these technical evaluations, IPS evaluates assets based on factors such as remaining service life, traffic volumes including truck traffic, history of maintenance and rehabilitation, cost-benefit analysis, rate of deterioration and the knowledge and experience of our team.

In developing the rehabilitation program, there are external considerations to be made as well. Operational improvements such as intersection and/or road widening, other roadway components such as drainage, underground utilities, environmental impacts, alignment with municipal works and local development initiatives all play a key role.

Closely tied to the development of the SOGR is the County's Asset Management Plan (AMP). The AMP is updated regularly to address changes resulting from updated asset condition ratings, scope of work adjustments and market forces. The AMP supports the County's corporate goals which rely upon adequate infrastructure and a defined level of service that the

County is committed to providing. The objectives of the process are to establish the value of funds needed to maintain quality infrastructure and identify the means by which this infrastructure is maintained. The quality of this planning process has a significant impact on the condition of the County's infrastructure network and the life cycle cost of maintaining it.

The intent of the SOGR is to ensure a safe and reliable road network while providing for value-added and cost-effective maintenance. The SOGR supports the County of Essex Strategic Goal of "Building a Regional Powerhouse: the County will help create the conditions to make the region a powerhouse in public and private investment attraction" by providing reliable infrastructure for partners.

Performance prediction is a critical requirement for the identification of future structure preservation needs. There are various types of preservation techniques that the County utilizes to maximize service life and minimize costs. IPS continues to consider environmental concerns and sustainability principles when evaluating rehabilitation alternatives.

Roads

The County of Essex Road Network is made up of almost 1,500 lane kilometres of roads with various classes and composition. The pavement infrastructure has been constructed, maintained and enhanced over many years. As identified in the County's 2024 Asset Management Plan, the total replacement value of the Road Network is over \$568,000,000.

The most cost-effective way to maintain the road network is to provide timely, preventative treatments to the pavement. The benefits of this approach are realized in the form of lower overall costs, longer serviceability and less disruption to the travelling public. If pavements are allowed to deteriorate too far, the consequences can be compounding. The rate of deterioration typically accelerates as the end of service life is approached and rehabilitation efforts often become unpredictable and sporadic. The result is a pavement that has been cut and repaired in many different locations and methods. In the end, preservation options are no longer applicable and full pavement reconstruction, which is both costly and time consuming, become necessary.

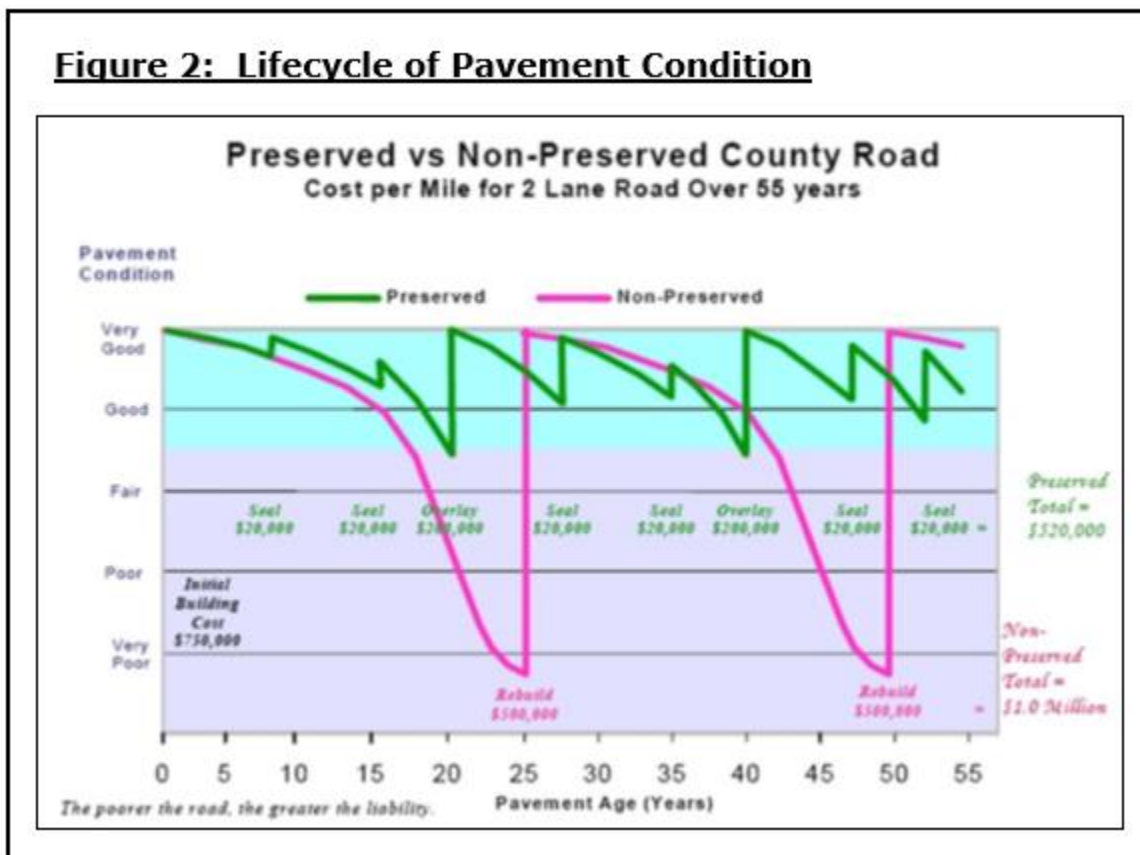
IPS is always looking into new and innovative ways to address pavement deterioration. The objective is to utilize more frequent minor rehabilitation methodologies to allow more kilometers of road to be maintained for the same budgetary values.

In order to optimize the County's position in the development of this rehabilitation program, pavement evaluations are conducted biannually to

determine the functional and structural condition of each road segment for the purpose of either routine maintenance or planned corrective action. Pavement Condition Surveys are completed in accordance with the Ministry of Transportation of Ontario standards in order to determine the Pavement Condition Index (PCI), which then translates into the categories of Very Good, Good, Fair and Poor that are identified in the County's Asset Management Plan. Examples of these conditions can be seen in Figure 1. Road segments found to be in the Poor and Fair categories are then brought forward as potential candidate projects for the Rehabilitation Program. Further review of candidate projects is undertaken to evaluate potential conflicts with other planned construction efforts.



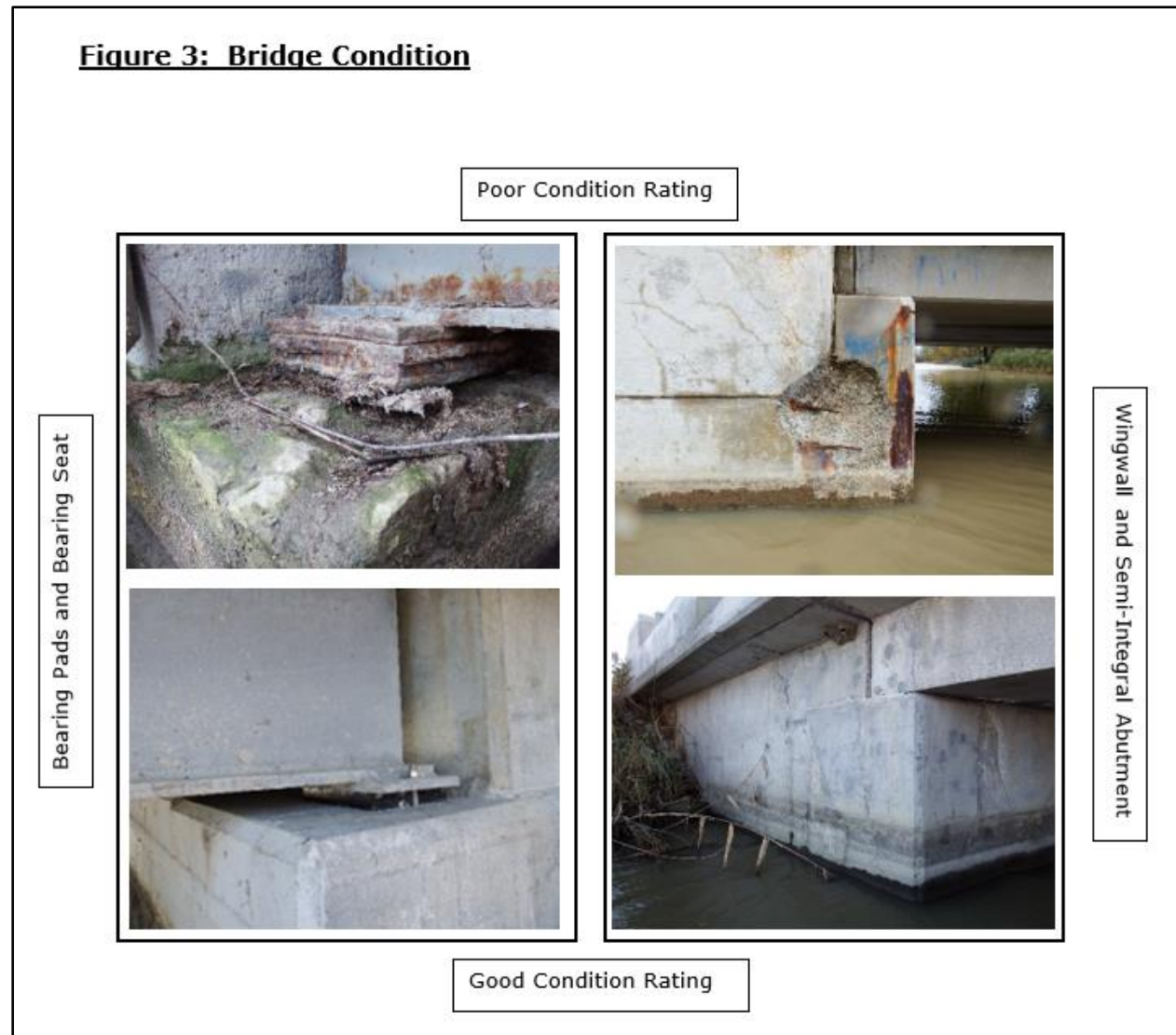
Figure 2 represents sample costs to maintain a road over a set service life through a preserved or non-preserved maintenance strategy. It shows a typical methodology, very similar to what the County employs, that demonstrates how, with the timely application of preservation works, the full life cycle costing can be reduced by up to half of the overall cost throughout a 55-year life cycle for each kilometer of 2-lane road. Procedures and methodologies such as this one, are reviewed annually by IPS for each road segment in the long-term rehabilitation plan and from this review, the differences between competing pavement design alternatives and subsequent rehabilitation strategies are evaluated.



Bridges

The County's Bridge Inventory currently includes 84 structures that range in age from new to approximately 90 years with an average age of 52 years. The full replacement value of all the County's bridge structures is in the order of \$200,000,000.

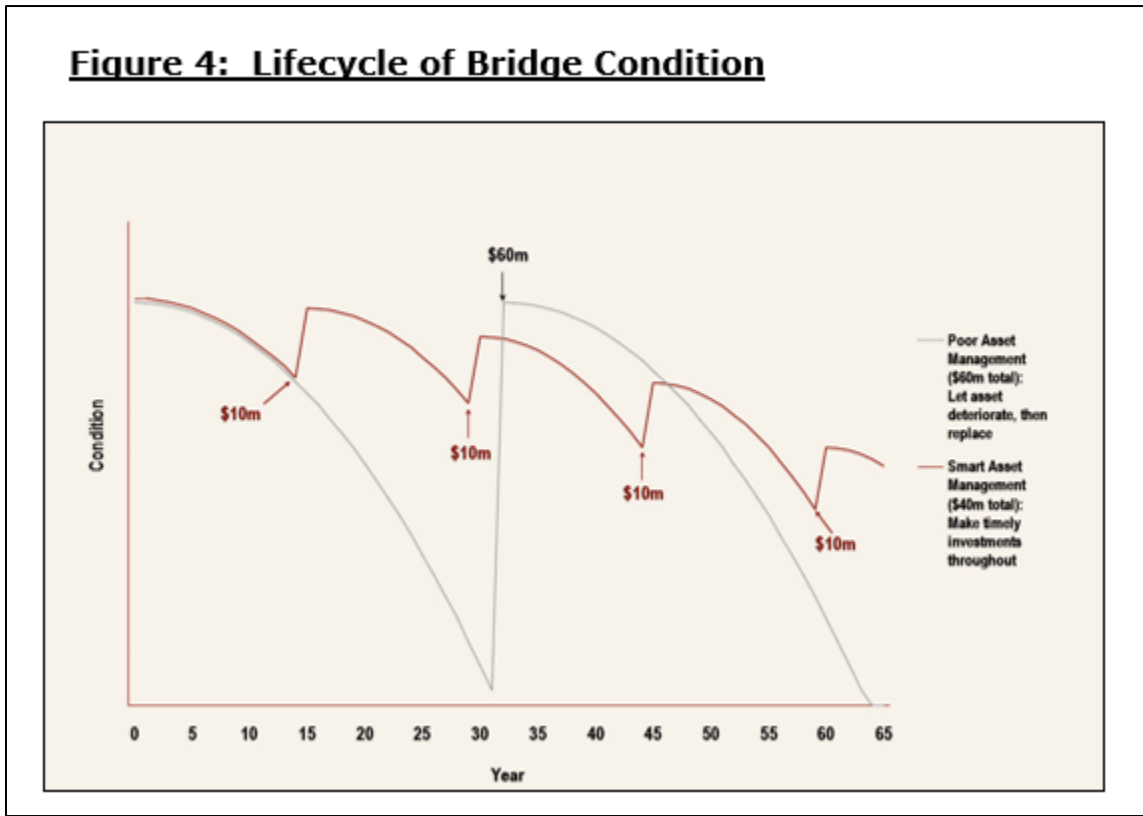
Under the *Public Transportation and Highway Improvement Act, 1990*, *Ontario Regulation 104/97* and *Ontario Regulation 472/10 Standards for Bridges*, municipalities are required to inspect bridges every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM) procedure established by the Ministry on Transportation of Ontario. Structures are evaluated on an element by element basis and required rehabilitation efforts are categorized as Excellent, Good, Fair and Poor. The individual element ratings are weighted in order to determine a Bridge Condition Index for each structure which is then translated into Now, 1-5 Year and 6-10 Year timeframes. Examples of Good and Poor structural elements can be found in Figure 3.



Based on the OSIM inspections, IPS developed a maintenance and rehabilitation program both for a five-year time frame and for a 30-year time frame. These documents are updated with each new inspection to ensure the programs remain current and reflect the rate of deterioration for the County's inventory. The information included in these rehabilitation programs is based primarily on overall structure conditions, otherwise known as "condition-based management", with secondary consideration given to "age-based management".

Similar to the lifecycle of pavements, bridges also require regular preventative maintenance initiatives to avoid expensive full replacement projects and extend the service life of the structure (Figure 4).

Figure 4: Lifecycle of Bridge Condition

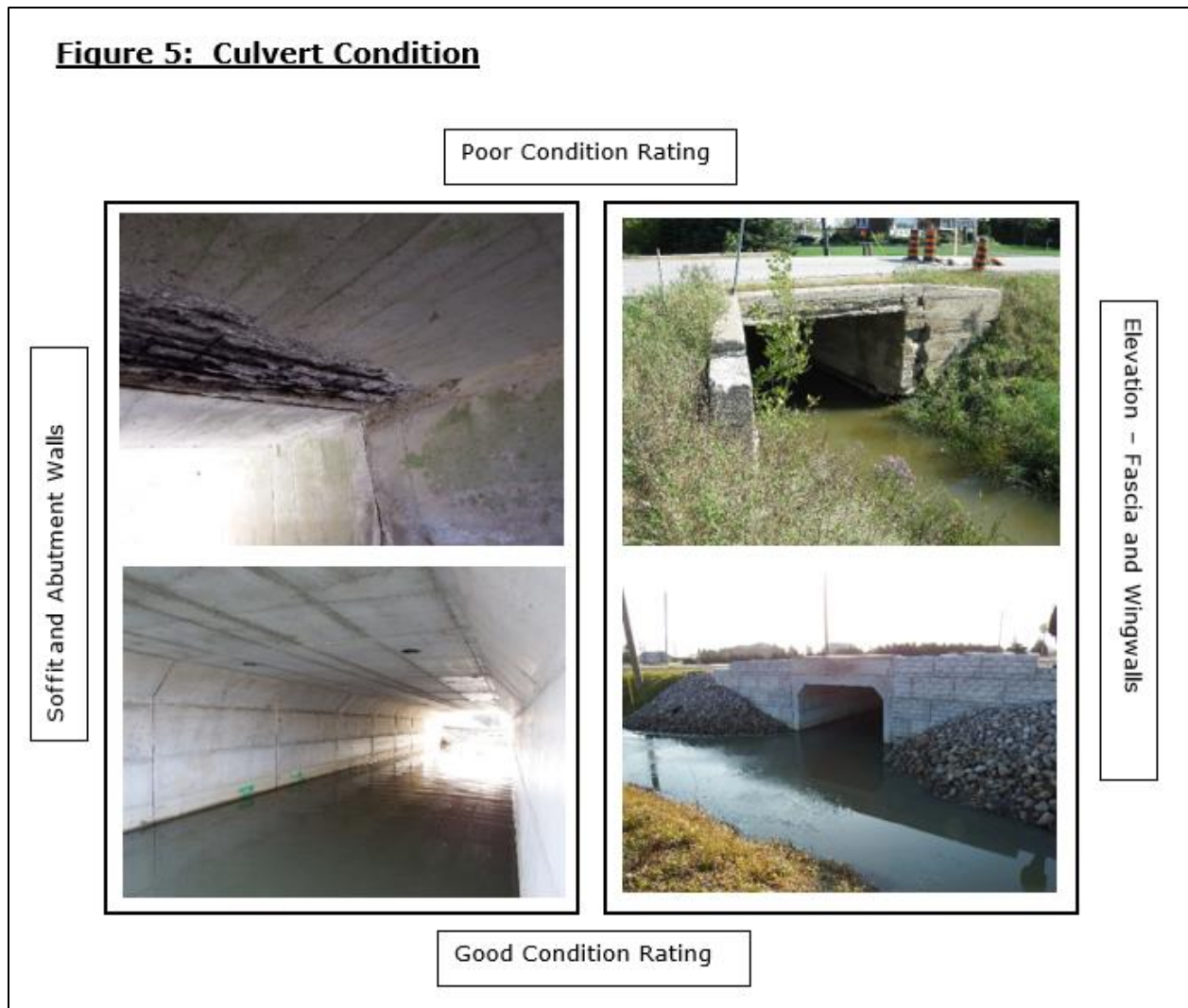


Culverts

The County’s Culvert Inventory currently includes 126 structures with spans greater than 3.0m. These structures range in age from new to approximately 90 years with an average age of 46 years. The full replacement value of the County’s culvert structures is in the order of \$65,000,000.

Although culverts are not included in the regulations for bridge inspections discussed previously, the County applies the same process for inspecting and evaluating culvert structures. OSIM procedures are followed and Culvert Condition Indices are calculated. Examples of both good and poor culvert conditions can be seen in Figure 5.

Figure 5: Culvert Condition



A 5 Year Rehabilitation program has been established for culvert structures and based on the number of culverts overall, a 35 Year Program was also created to cycle through the full inventory. The concept of preventative maintenance and lifecycle analysis is the same for culverts as it is for bridges. The objective is to address the deterioration of the structural elements before they reach the end of their service life in order to minimize costly replacement projects. However, because culverts tend to have less complex structural elements than bridges do and because the construction materials are more uniform throughout these elements, culverts are more often replaced at the end of their service life than rehabilitated intermittently.

In addition to the structures with spans greater than 3.0m, the County has in its jurisdiction numerous culverts with spans less than 3.0m. While some of these structures, with larger spans and more significant financial

implication, form part of the SOGR alongside those with spans greater than 3m, these smaller culverts are typically accounted for in conjunction with road work. Where possible, the cost to repair or replace these small culverts is incorporated into the overall cost for single-year or multi-year corridor improvements. As the overall age of the County's infrastructure increases, the rate at which these smaller span culverts become deficient also increases. As a result, the 5 Year Rehabilitation Program must be adjusted to account for these priority needs.

In recent years, IPS has established and successfully implemented a Culvert Preservation Program. This program was developed to address the numerous culverts that are in good to very good condition except for a singular element that is in very poor condition. By rehabilitating this singular element, the overall condition of the culvert is improved and the useful life of the asset is extended.

2024 Infrastructure Rehabilitation Highlights

The current construction year has been busy and challenging as the industry continues its acclimation to the unprecedented inflationary increases and supply and demand fluctuations of the recent past. New policies have been developed and implemented by consultants and contractors alike to ensure the safety of employees on job sites while maintaining schedules and deliverables. Continued shortages in both labour and construction materials impacted deadlines and held unit prices at higher than anticipated levels. There remains, within the construction industry, a strong element of unpredictability in workload and pricing.

Despite these challenges, the department was successful in the delivery of our rehabilitation program. Completed works include approximately 30km of road rehabilitation, concrete panel repairs, the rehabilitation of two bridges and the complete replacement of two culverts. Construction efforts on two additional culverts are underway with projected completion dates before the end of the calendar year. Multiple preservation projects were also completed including emergency road crossing culverts, pavement maintenance and structural repairs.

2025 Infrastructure Rehabilitation Program

The 2025 SOGR is made up of numerous road, bridge and culvert projects that, based on the comprehensive evaluation methodology discussed in this report, require some type of preservation effort. These preservation efforts are comprised of both major and minor rehabilitation works as well as full replacement projects. The full Program list can be found in Appendix 6 and includes:

- 2 Bridge Rehabilitation Projects;
- 2 Bridge Engineering Assignments;
- 3 Culvert Replacement Projects;
- 2 Culvert Engineering Assignments; and
- 13 Road Rehabilitation Projects.

Also included in the Program are allowances for preservation efforts related to concrete pavements, small and medium sized structures and roadworks.

While road rehabilitation projects are completed within the same year they are initiated, bridge and culvert projects are typically undertaken as multi-year endeavours due to the length of time required to complete the design phase of the project. Engineering design work, environmental approvals and utility relocations are completed in the first year and construction in the following year. As such, the success of the program is dependent upon a consistent delivery of bridge, culvert and road projects.

The total value of the Program is \$20,648,830. This value includes estimated amounts for both the Canada Community Building Fund (CCBF) and the Ontario Communities Infrastructure Fund (OCIF).

2025 Paved Shoulder Program

The County Wide Active Transportation System (CWATS) is developed with local partners to identify, construct and maintain active transportation facilities across the County. The program also supports numerous initiatives to promote and encourage active transportation.

CWATS is integrated into the SOGR as IPS strives to maximize the value of our construction efforts. Opportunities to incorporate active transportation facilities such as paved shoulders into scheduled road rehabilitation is a conscious and cooperative departmental initiative.

The construction of CWATS facilities in conjunction with the road rehabilitation program requires an additional annual budget to fully realize these opportunities. Funding to support this program is provided from the Infrastructure Expansion Reserve with an estimated 2025 construction value of \$2,800,000. The following table highlights the proposed 2025 Paved Shoulder Program. Also identified in the Table is the 2025 Shared CWATS Program, which includes the paved shoulder segments that are being completed this year with shared financial contributions between the County and Local Municipal Partners. A map of the Program can be found in Appendix 10.

Table 1: Paved Shoulder Projects

Project	CWATS ID	Road	Limits	Length	Estimate
CW0059	COE-4a	CR8	Cameron Sideroad - County Road 27	1.9km	\$545,000
CW0060	COE-12a	CR8	Walker Sideroad - County Road 15	2.5km	\$600,000
CW0063	Lake-2a	CR2	County Road 35 - County Road 37	2.3km	\$410,000
CW0064	Kings-3a	CR18	McCain Sideroad - County Road 29	3.3km	\$945,000
CW0066	Amh-2	CR50	7th Concession - County Road 41 Hydro Pole Relocation	-	\$300,000
Total 2025 Paved Shoulder Program					\$2,800,000
CW0061	Amh-7c	CR20	County Road 3 - River Canard Bridge	1.5km	\$250,000
CW0062	Lake-49	CR42	County Road 31 - Rochester Townline	3.0km	\$70,000
CW0067	Lake-53c	CR2	County Road 35 - County Road 37	1.4km	\$100,000
CW0065	Lake-44	CR31	County Road 42 - County Road 2	4.1km	\$390,000
Total 2025 Shared CWATS Program					\$810,000

Paved Shoulders are built in accordance with Ontario Provincial Standard Specifications (OPSS) and the Ontario Traffic Manual (OTM) Book 18 with desirable measurement of shoulder widths for rural bicycle routes at 1.5m-1.8m, as field conditions allow, on both sides of the road. Buffer separation is included where identified in the CWATS Master Plan and where possible.

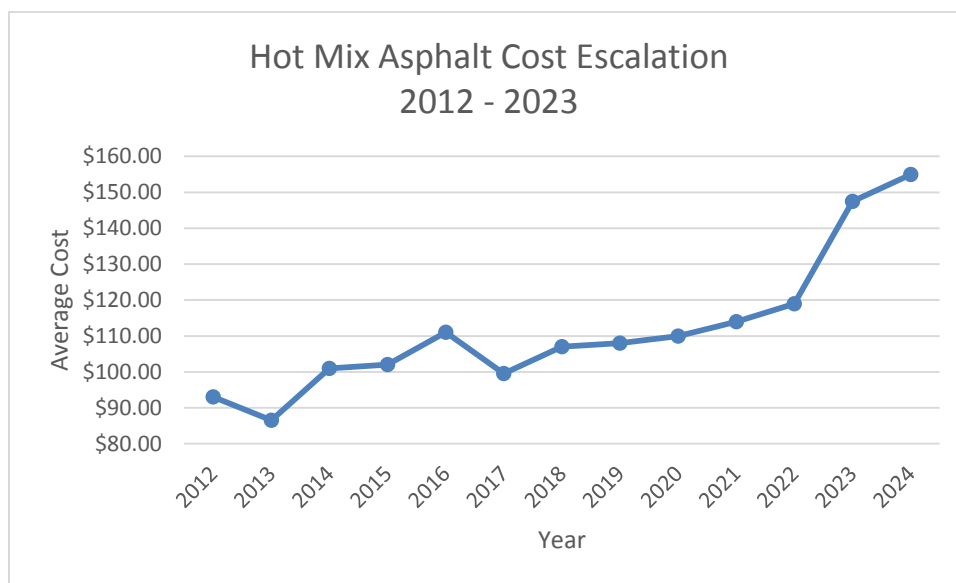
Cost Escalation

The overall condition of the network had been gradually improving due to increased annual funding and utilization of funding programs from senior levels of government. Utilization of the Federal Canada Community Building Fund (formerly the Federal Gas Tax Fund) had allowed the annual Rehabilitation Program to incrementally increase towards the targeted funding level. But with the recent reductions in these contributions, and the increases in construction costs, the Program is moving away from the target

and the funding gap identified in the County’s Asset Management Plan remains high. Without an increase in annual budget, this funding gap will continue to grow and the overall condition of the County’s assets will fall.

Cost escalations have been experienced across all types of construction activities from rehabilitation and preservation of road projects to large bridge projects. Labour, material and equipment costs have all been steadily increasing over the last decade. A good example of this escalation is the unit rate for hot mix asphalt (measured in tonnes). The data shown in Figure 6 illustrates the escalation experienced since 2012.

Figure 6: Asphalt Cost Escalation

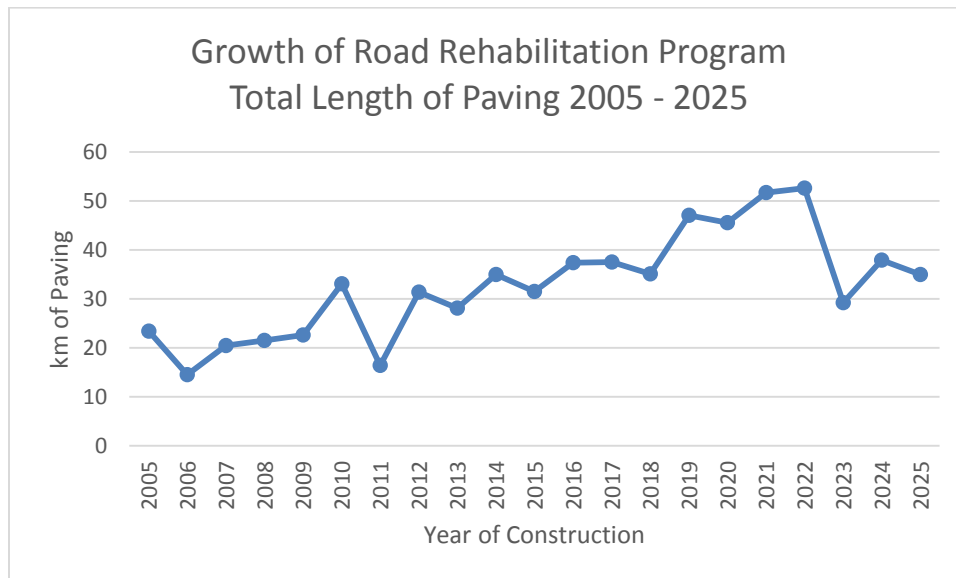


While the escalation of costs was reasonably steady and predictable over the last decade, 2022 brought unprecedented increases in unit rates for labour, materials and equipment. The rising costs of fuel, diesel and construction operations has created uncertainty in the industry that continues to be reflected in tender prices. Until the consistency and predictability experienced in previous years is reestablished, project estimates continue to incorporate this pricing trend.

Figure 7 illustrates that over the past 20 years, there has been a reasonably steady increase in total length of paving each year. At the time that the County’s Asset Management Plan was established, the SOGR included the paving of approximately 40-45km of roadway. During the inflationary spike in 2022, total paving dropped by approximately 25%. With unit costs remaining high, the total lane kilometers of paving have not returned to match that which is identified in the AMP, remaining at only 33km for 2025.

This decrease in average annual paving will lead to a further decrease in the overall Level of Services of the County Road Network and a larger gap in the asset management model.

Figure 7: Growth of Paving



Similarly, the structures in the State of Good Repair Program have been impacted by the current year's cost to funding ratio. Bridge projects remain consistent, but two culverts from the program are being deferred in 2025 for the second year in a row in order to meet the allocated budget.

Although we cautiously observe that costs appear to be stabilizing, they are doing so at notably higher than anticipated values. As a result, the County cannot meet the needs of the network at the current funding level.

Financial Implications

The Draft 2025 Budget includes the State of Good Repair (SOGR) Program with a total value of \$20,648,830, reflecting a 5% increase over the 2024 budget. This increase aims to maintain approximately 35 km of road rehabilitation, though it is expected to cover only 33 km due to rising costs, resulting in a slight reduction in the level of service. Despite an initial departmental request for a 9% budget increase to maintain the full 35 km, budget limitations prevented further funding. The 2025 program will be supported by a combination of grant funding including OCIF and CCBF (\$4,078,480) and the County Levy (\$16,570,350).

Since 2004, County Council has approved a pre-committed level of expenditure for the early development and release of tendered work associated with bridge, culvert and road projects. This approach has facilitated the completion of critical projects on an expedited schedule with competitive tender results. As we see the strain on the construction industry continue, securing contractual work in a timely fashion is critical to the successful delivery of an elaborate program such as this one. Furthermore, the projects proposed for the 2025 SOGR are complicated in nature and rely on precise scheduling in order to be successfully completed in the face of environmental constraints and restrictions.

The projects selected for pre-approval are included in Appendix 6.0 and total \$2,015,000. Early approval of these projects will provide the opportunity to take advantage of “off-season” prices, develop and coordinate work schedules with less conflict and undertake bridge construction outside of environmental restriction windows. Included in the selection of early release projects are 5 engineering assignments and a culvert project that was identified as an urgent rehabilitation need. With the approval and expenditure of budget dollars in advance, our consultants can begin work prior to the approval of the overall budget and achieve tendering dates early in 2025. It is the recommendation of Administration that Essex County Council advance the design function of the SOGR through the approval of the Early Release projects identified herein.

Consultations

This report was prepared in consultation with the following parties:

- Jerry Behl, Manager, Transportation Planning and Development
- Allan Botham, Director, Infrastructure & Planning Services
- Melissa Ryan, Director of Financial Services/Treasurer
- Heidi McLeod, Manager, Accounting – Administration/Deputy Treasurer
- Hoa Du, Financial Analyst

Strategic Plan Alignment

Working as Team Essex County	Growing as Leaders in Public Service Excellence	Building a Regional Powerhouse
<ul style="list-style-type: none"> <input type="checkbox"/> Scaling Sustainable Services through Innovation <input type="checkbox"/> Focusing “Team Essex County” for Results <input type="checkbox"/> Advocating for Essex County’s Fair Share 	<ul style="list-style-type: none"> <input type="checkbox"/> Being an Employer with Impact <input checked="" type="checkbox"/> A Government Working for the People <input checked="" type="checkbox"/> Promoting Transparency and Awareness 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Providing Reliable Infrastructure for Partners <input checked="" type="checkbox"/> Supporting Dynamic and Thriving Communities Across the County <input type="checkbox"/> Harmonizing Action for Growth <input type="checkbox"/> Advancing Truth and Reconciliation

Recommendation

That Essex County Council receive for information Report Number 2024-1106-IPS-R27-KT being the State of Good Repair Program Report, having an estimated value of \$20,648,830;

And that the projects recommended in Appendix 6.0, as the 2025 Early Release Program, having an estimated value of \$2,015,000, be pre-approved for the 2025 Budget, and advanced for early release.

Approvals

Respectfully Submitted,

Karyn Templin

Karyn Templin, P. Eng., Manager, Design and Construction

Concurred With,

Allan Botham

Allan Botham, P.Eng., Director, Infrastructure and Planning Services

Concurred With,

Sandra Zwiers

Sandra Zwiers, MAcc, CPA, CA, Chief Administrative Officer

Appendix	Title
1.0	2025 Rehabilitation Program Powerpoint
2.0	County Road Map
3.0	Bridge Location Map
4.0	Culvert (Span over 3m) Location Map
5.0	Pavement Condition Rating Map
6.0	2025 Rehabilitation Program Project Listing
7.0	2025 Rehabilitation Program Location Map
8.0	2025-2029 Rehabilitation Program
9.0	5-Year Rehabilitation Program Map
10.0	2025 Candidate Paved Shoulder Program