

2009 Road Capital Upgrade Program – Review, Update, and Discussion

Introduction

In the June 1, 2009 report to council, Acting Public Works Manager – Engineering indicated a need to increase the annual road capital expenditure to at least \$500,000 and to incorporate preventative maintenance, rehabilitation and reconstruction into the program.

This year the main focus of the road capital upgrade program was to improve the failing road base on Grafton Road, to reinstate two lanes of traffic to Dorman Road and to apply routine surface treatment to a number of local roads. Additionally, the replacement of a culvert on Terminal Creek, a major creek crossing on Grafton Rd was completed after a routine inspection program identified the pipe to be in extremely poor shape with a potential for collapse.

Other noteworthy accomplishments this year include the installation of a portion of roadside trail between the Fire Hall and Connelly Road, the repair of a base failure on Eaglecliff Road and the application of crack sealant on Millers Road, Eaglecliff Road, Grafton Road, Village Drive and Cates Hill Road.

Review

Typical road capital expenditures between 2005 and 2007 did not exceed \$180,000 or 36% of the 2009 budget amount for each of the years. Industry leaders have previously noted that each dollar spent on road maintenance now results in 5 dollars saved in rehabilitation in future years. It is clear that money previously not spent on road maintenance has resulted in increased rehabilitation costs now and in the future, creating fiscal pressure on the current road improvement program.

In an effort to develop a rehabilitation and preventative maintenance program, road capital works dramatically increased in magnitude over the past two years to include rehabilitation of most of Grafton Road and portions of Dorman Road, Taylor Road, and Channelview Road and routine resurfacing of all of Taylor Road, Channelview Road, Hummingbird Road, Seniors Lane, and portions of Grafton Road, Dorman Road and Adams Road. In future years it is expected that road rehabilitation will be a large component of the capital program although routine resurfacing will continue in other areas to arrest further road base degradation.

Grafton Rd

At the end of the 2008/2009 winter season, Grafton Rd was in extremely poor condition with excessive road ruts, potholes, alligator cracks and delaminated asphalt overlays. A number of freeze thaw cycles during the end of winter even forced the closure of heavy traffic for a number of weeks – a significant impact to local businesses and residents. It was clear to the Public Works Department that most of Grafton Road was substandard and would need to be repaired.

Given the poor condition of the asphalt surfaces on Grafton Road, significant repairs were necessary prior to undertaking any resurfacing. As a result, the existing asphalt was reclaimed to a depth of about

180 millimetres (7 inches) and an average lift of 120 mm (5 inches) of granular base material was added overtop to increase the total road base thickness on approximately 2.3 lane km of road.

This process involved grinding, grading and compacting the existing asphalt material then applying locally sourced material to the road surface. The unit cost for this method of base improvement is about \$15/m², which is much more affordable than the cost to excavate and repair severely damaged road sections, which has been estimated at about \$40/ m² based on previous budgets.

Upon review of the 2008 paving program and the 2009 budget for road improvement, it did not appear feasible to apply asphalt pavement on top of the new road base surface. To pave the freshly graded gravel surfaces would have cost in the order of \$300,000 – an amount that would have resulted in significant budgetary over-runs or removal of other work items from the program. Neither of these scenarios would be acceptable and the latter option would ultimately lead to increased road maintenance costs in the long term.

Sealcoating, an alternative road surfacing technique was applied to Grafton Road to seal the new road base and to provide a tough driving surface. This surface was applied in two coats overtop the gravel base, which was graded prior to the sealcoating to remove surficial deformations created by vehicular traffic.

As sealcoating does not have the ability to level minor irregularities in the road surface, the final product is bumpier than asphalt paving. However, at a cost in the order of \$65,000 to sealcoat about 2.3 lane kilometers of Grafton Road, it is much more affordable and will provide an adequate surface until such time that paving the remainder of Grafton Road becomes feasible given the condition of other roads and funding available.

It is expected the asphalt paving of the remaining 0.5 lane kilometers of gravel road, located west of Artisan Lane, will cost in the order of \$50,000. This particular section was not considered for sealcoating due to its steep gradient and heavy traffic load at the intersection with Artisan Square.

Dorman Road

Although it was initially considered too expensive to complete within the existing budgetary allowance, Dorman Road was successfully returned to two lane traffic well under previously estimated budgets. Observations conducted by the Acting Public Works Manager – Engineering during repair of two other slumping sections of Dorman Road found the road structure to be composed of loose, unconsolidated material with large rock material and some woody debris and noted that removal and replacement with appropriately sized, compacted granular material was sufficient to provide a suitable road base.

Further discussions and recommendations provided by a local geotechnical engineer led to the onset of an investigative and repair program for the closed portion of Dorman Road that followed this technique and used locally sourced material. After four days, the project was completed using the services of two local contracting companies, independent local truck operators, and a number of support staff at both Bowen Island rock sources.

Indeed, this was a locally derived solution that was executed by locally sourced equipment, operators and materials.

Dorman Road, Taylor Road, Channelview Road and a portion of Lower Adams Road

Although much of the 2009 road improvement program focuses on Grafton Road, ongoing maintenance and resurfacing of local roads was also an important part of the road capital improvement program to reduce the long term degradation of the road base and to minimize future repair costs.

A significant amount of time and effort was spent by the Public Works crew to repair Dorman Road, Taylor Road, Channelview Road and a portion of Lower Adams Road prior to this year's sealcoat resurfacing. Additionally, many operational tasks, including several weeks of rock scaling on Taylor Rd, were fast tracked to ensure that the road was ready for resurfacing.

In total, approximately 6.0 lane km of these roads were resurfaced with a sealcoat surface in an effort to slow the degradation of these road structures for a number of years.

Update

The contractor completed sweeping of the sealcoated roads during the week of September 28th, 2009 – material remaining on the road surface will be removed via traffic, weather and routine sweeping. Final grading and asphalt paving of the remaining section of Grafton Road, located west of Artisan Lane will occur on October 5th-6th, 2009. Lane marking will commence shortly afterwards, weather permitting

During this time, the Public Works crew graded and compacted the road shoulders to ensure adequate road drainage and to improve pedestrian movement along these sections. In the near future, excess gravel will be removed from the road edge and guard railing installation will commence at the newly replaced Terminal Creek crossing on Grafton Road. It is expected that the Public Works crew will be continuing to support various road improvement works until such time that they must focus on normal winter duties.

Discussion

A recent review of the results of the road reclamation, base improvement and sealcoat surfacing effort finds that the roads are generally in better condition than they were at the end of winter. As the Public Works department continues with its strong efforts to address the road conditions, a number of valuable lessons have been learned:

1. Sealcoating is a very inexpensive but practical method of surfacing an existing asphalt road or a gravel road. It costs only slightly less to pave the 0.5 lane km of Grafton Road, west of Artisan Lane as it does to sealcoat 2.3 lane km's of Grafton Road. Until additional funding is available, asphalt paving is not a feasible surfacing material for large areas.
2. Sealcoating requires far fewer truckloads of bituminous material than asphalt paving which ultimately reduces the number of trips on the ferry and minimizes hauling distances. Additionally, utilization of locally sourced gravel for the sealcoat surface reduced total

sealcoating costs, eliminated use of the ferry, reduced hauling distances, and increased local business activity.

3. No road is perfect or ever will be perfect. In the spring, crack sealing was applied on asphalt pavement that was applied only last year, after identifying crack formation which appeared over the winter season.

This is also true with sealcoating, where a few potholes were evident after application of the surface – most likely as a result of minor bumps in the granular base surface which weren't adequately smoothed prior to application of the sealcoat surface. Use of standard patching techniques and subsequent application of sealcoat bitumen and local gravel material is expected to satisfactorily seal the road surface in those areas.

4. Tight coordination of the various contractors is critical. Surface irregularities remaining on Grafton Road are not a result of a poor base surface but are a result of traffic damage to the upper portion of the gravel surface and the inability of the final grading process to perfectly smooth the gravel surface prior to application of the sealcoating surface.

In the future, improved staffing levels are expected to support the improvement in the timing of contracts to ensure work is conducted earlier in the season. Additional measures will also be taken to minimize the length of time between the reclamation work and the surfacing work to reduce issues with final grading. Although this will improve the overall smoothness of the ride, sealcoating will always be rougher than asphalt.

Conclusion

In general, the 2009 road capital program successfully achieved the goal of improving the base structure of Grafton Road, reinstating the full use of Dorman Road and providing rehabilitation, routine resurfacing, and sealing of a number of local roads.

Although it is expected that major rehabilitation will form a large part of road improvement programs over the next several years, routine maintenance and resurfacing will also continue to reduce future repair costs. Until additional funding is secured and the conditions have improved in other roads, sealcoating is likely going to form a key component of future road improvement programs.