





*EZ Street* has a number of standard benefits that are independent to any paving project: Firstly, there is no tack coat or mixing required prior to application of *EZ Street* Asphalt — *EZ Street* is ready to use.

#### Weather Conditions

EZ Street Asphalt works in water and all weather conditions.

#### **Elimination of Cold Joints**

As EZ Street is a cold product and curing is not based on temperature, any cold joints / paver joints merge together to form one clean smooth mat from curb to curb. Cold Joints are recognized as an inbuilt weak point in any pavement surface. Except for any sub base / subsurface failures, the cold joint will inevitably be the first area of the pavement where failures will occur. The elimination of the cold joints through the use of EZ Street will reduce future road maintenance costs as well as potentially extending the usable life of the pavement itself.

#### **Cracking Resistance**

The EZ Street mat / surface will always remain slightly flexible through the life of the pavement. The product itself will remain slightly active through its life which will enable it to move fractionally with the movement of the traffic and the road structure itself. This movement does not lead to rutting or permanent deformation in the material but does result in the pavement being able to resist some reflective cracking and will also self-heal for any cracks that do appear.

#### No Material Wastage

Just as EZ Street Asphalt can be stored on site prior to the paving operation, there will be no wasted material when paving with it. With regular hot asphalt, any material not used through the paver is traditionally dumped as it gets cold and turns hard. As EZ Street Asphalt is not a temperature based material and will not go off, cure or turn hard like regular asphalt, any unused EZ Street product can be returned to the stockpile for reuse at a later date giving a 100% material usage. There are no longer concerns with under or over ordering of product or the potential for product loss due to on site delays or machinery breakdown.

## More square meters paved with the same tonnage

Any paving project will use 10% less EZ Street Asphalt per tonne than regular asphalt. For instance a paving job using 1,000mt of asphalt will use only 900mt of EZ Street. EZ Street Asphalt is approximately 10% lighter per tonne than regular asphalt. The specific weight of the product is around 2.2 tonnes/m3 versus asphalt at around 2.4 tonnes/m3. This allows for approximately 10% extra square meters paved per tonne than can be completed with regular asphalt.

#### **Significant Sound Reduction**

Paving with EZ Street Cold Asphalt dramatically reduces traffic noise produced by regular pavement and asphalt. The polymer within the EZ Street mix and the open grading of the cold asphalt combined absorb a significant amount of tire and road noise producing measurable sound reduction in the pavement. This is an ideal product for noise sensitive areas such as roads around hospitals and schools, etc. EZ Street Asphalt can also be used to pave quiet roads within residential neighborhoods generating significant cost savings by reducing the amount of sound barrier fencing on new or existing highways and project sites.

#### **Programming and Planning**

EZ Street is a polymer modified cold asphalt that can be used in virtually any weather condition. The benefit that this brings to a paving operation is that planning and programming can be made well in advance with no considerations having to be made for inclement weather on the day of installation. Rain snow or shine, the paving can still take place. EZ Street Asphalt can be utilized in sub-zero temperatures thus another benefit is the ability to extend the paving season further into the winter throughout the province. The shelf life of EZ Street enables the product to be stockpiled and stored on site in advance of the paving operation taking place. Product will not have to be picked up from the asphalt plant and taken to the project site on the day of paving. This in itself can be a significant saving as it can reduce the number of trucks required to deliver from the asphalt plant to the on-site stockpile. In the event that there is no space on site for storage, EZ Street can be taken directly from the depot stockpile (in urban areas) and delivered to the site eliminating any reliance on an asphalt plant co-ordination and one less activity to manage when performing a paving operation.

#### Age of Product

EZ Street Asphalt has a long shelf life. The product is always made in advance of the installation. Whether this is a week in advance or four months in advance, there is never a situation where the asphalt production and the paving are required to work in conjunction. The logistical relief this provides is extremely beneficial for any paving project.

#### **Paving Crew Minimization**

Paving with EZ Street Asphalt is an easier operation than paving with regular asphalt. Firstly, the paving equipment is cold as it is paving a cold product - plenty of time is available between the paving and the rolling to hand level and rake. This operation can even wait until the paving is completely finished before starting to rake, a process that can only lead to problems when working with hot asphalt. Secondly, the crew numbers required for the paving operation can be reduced as there is no longer the need for large crews to work in the time constraints required when paving with hot asphalt.

#### **Remote Location**

EZ Street Asphalt can be used in any geographical location totally independent of the location of an asphalt plant. Regular asphalt is limited in the distance it can realistically be transported from the plant due to the "window" the temperature of the product allows.



ainroad Lower Mainland Contracting is responsible for the maintenance of Highway 99. This Ministry of Transportation & Infrastructure Provincial Highway is one of the major highways heading south from the Lower Mainland / Vancouver area towards the U.S. Border. With a traffic count of over 50,000 vehicles per day, Highway 99 is considered a Class A category road for maintenance work.

As a late season addition to the maintenance contract, a section of Highway 99's south bound, slow lane south of the George Massey Tunnel required surface repairs to maintain a safe and trafficable condition heading into winter. Significant sections of the slow lane were showing signs of considerable surface cracking and general deterioration. The usual repair method in these circumstances is a "grind and pave" repair where the pavement is ground / milled out to a depth of 50mm and re-paved. Due to the late season, the use of regular asphalt for this repair was avoided as the temperatures and weather conditions are notoriously cold and wet at this time of year in Vancouver. EZ Street Asphalt was recommended for this work as the material is not affected by the cold or wet weather and can still be installed in the same manner as regular asphalt.

The project took place on the overnight shift on Friday, December 7th, 2012. The weather was dry overnight even though it had rained significantly during the day. The temperature was stable at about 1° C through most of the shift.

The south bound lane of Highway 99 has an average daily traffic count of around 30,000 vehicles. The repairs were all in the slow lane with the full lane width being removed to a depth of 50mm. Three large patches were repaired with two of these being around 100m in length each while the third was approximately 1km long. The third and longest repair also ran underneath the three newly constructed overpasses for the new South Fraser Perimeter Road which is currently under construction.

During the grinding operation, some investigation work was performed on the areas to be resurfaced. It was found that on all three patches, the surface cracks continued down through the top 50mm layer being repaired into the base of the asphalt pavement. While the grind and pave was creating a new surface it was not eliminating or removing the damage to the pavement. In addition, a significant amount of water and dampness was found under the 50mm surface removal and in the base level test hole. The flexibility and crack resistant properties of EZ Street Asphalt is ideal for this situation. EZ Street will help to minimize the reflective cracking over the damaged base and the self healing properties will preserve the surface integrity should any cracks make their way through the new surface. Also, as EZ Street is not effected by the water, the moisture under the surface should have no impact on the new surface.

Approximately 5,700m2 of pavement was performed overnight in the "grind and pave" operation with 625mt of EZ Street Asphalt being utilized. As EZ Street Asphalt is lighter than regular asphalt with a weight of around 2.2mt/m3 instead of the normal 2.4mt/m3, the project used around 55mt less material than it would if it had been regular asphalt. As with previous EZ Street paving projects, the installation / paving was performed almost identically as with regular asphalt. The same equipment and crew installed the cold EZ Street the same as they would have installed the hot asphalt.

The EZ Street Asphalt product was produced a few days in advance of this project and was made with a kinimatic viscosity a lot higher than with a normal maintenance mix. With the 625mt being installed on a high traffic volume highway, we wanted to provide a material that would set up faster than our usual maintenance material which is designed to have a much longer shelflife.

Overall the project went well. EZ Street Asphalt was installed by an experienced paving crew and the end result is a smooth and very quiet surface. In addition, the new EZ Street surface has been observed to be significantly dryer than the surrounding existing asphalt surface during wet weather. The open graded surface as well as EZ Street's water shedding properties have very obvious and visual benefits for the new surface.





he roads around the University of British Columbia (UBC) pose maintenance challenges. Many are very old and in poor condition due to shallow pavement structures, poor subgrades, and tree root infestations. In addition to high commuter traffic, University Boulevard handles over 300 transit buses per day and is one of

the main entry points to the UBC campus. Typically, full depth pavement repairs have been performed in summer months to repair failed sections of the highway. In this case, given the time of year was December, the maintenance contractor decided to use EZ Street cold asphalt to provide a temporary patch until permanent repairs could be made. The repairs involved milling the surface to a depth of 50mm and 75mm. EZ Street asphalt was then laid over the area. Weather during the repair was cold (2° C) with drizzle and rain throughout the day.

These patches were expected to hold through the wet Vancouver winter, eliminating the need for pothole repairs until May, when permanent repairs could be completed. To date, the EZ cold asphalt Street patches are 100% intact, with the expectation that they will now be left as permanent repairs. Further EZ Street cold asphalt paving is now being planned as a permanent solution at more UBC locations.



Before



After

#### Progress Update (August, 2012)

Paving was completed in early December, 2010 and included milling and paving of various patches and sections to treat some significantly damaged areas of the road. The pavement that was treated varied in condition from areas with a reasonable amount of damage due to tree roots, surface and pavement age, through to sections with significantly poor and damaged sub-base and subgrade. To provide a permanent repair for these badly damaged areas there will need to be a full excavation and reconstruction of the pavement before a new surface is installed.

The pavement repairs were conducted to (temporarily) extend the life of the pavement through the wet winter period when potholes appear in quick succession whenever it rains. The expected life was approximately four to five months until full depth repairs could be performed in the late spring / early summer. Success would be measured on the reduction in the number of potholes to be repaired over the winter and for the life of the temporary repairs.

## Twenty months later, the temporary pavement repairs are still in place.

No full depth reconstruction has taken place along University Boulevard. Rehabilitation programs and fund allocations have been prioritized elsewhere.

## Sections with moderate subgrade and basecourse damage

These sections have held up well. The pavement has remained intact and the repairs



One month post project installation – Note that existing pavement showing wear is not encroaching into new EZ Street paved surface.

are performing as well today as the day they were installed. The tracks of the tree roots are still visible in a couple of locations but this is to be expected as the roots were never removed. No potholes have appeared in any of the repairs performed in the moderately damaged sections.

# Sections with severe subgrade, sub-base and basecourse damage

These sections have well exceeded the initial expectations and term of the EZ Street repairs. These repairs have been performed over sections of the road that have significant deep pavement damage that regular asphalt resurfacing has previously not been able to repair. These sections require a full depth reconstruction of approximately 500mm in depth.

The EZ Street Asphalt has survived reasonably well with cracking now visible and surface damage re-appearing. The sections of pre-existing pavement not treated with EZ Street Asphalt have significant failures and potholes. There is still a visible demarcation between the pre-existing regular pavement and the EZ Street sections.

The most important thing to note with these repairs is that no potholes have appeared or required repairing on the EZ Street sections. This has been a significant success for the twenty months of extra relief for the maintenance contractor.

#### Conclusion

The EZ Street repairs have been successful and have exceeded the initial expected life and performance expectations over both the pavement sections with moderate damage and those with significant damage. It has provided extra life to a pavement that should be reconstructed and has provided relief for the maintenance contractor.

In normal situations EZ Street Asphalt surfacing would not be used for repairing sections of road in the condition that University Boulevard was in. This project has demonstrated that even in extreme situations EZ Street Asphalt provides a superior surface treatment than regular asphalt can provide.



he paving was part of a timber bridge rehabilitation project performed by Mainroad South Island Contracting's Bridge Crew as part of the British Columbia Ministry of Transportation & Infrastructure Service Area 01 Highway Maintenance Contract. Part of the rehabilitation project was to remove and replace the existing and badly deteriorated asphalt surface. After reviewing the project, the location and the timber surface, the decision was made to trial EZ Street Asphalt for the resurfacing material. The bridge deck is approximately 185m long and 6m wide.

Port Renfrew is approximately two to two and a half hours driving distance away from either Victoria or Duncan on Vancouver Island. In turn, it is also approximately two to two and a half hours driving distance from the nearest asphalt plant. The bridge is a single lane timber bridge with a timber bridge deck. The bridge is part of the main ring road around this area of Vancouver Island and must remain open to traffic at all times. The project had the ability to close the bridge to trucks and heavy traffic for one day only and this had to be planned and advertised to the public well in advance. The bridge takes a reasonable amount of logging trucks and other heavy traffic.

The paving crew utilized a small paver approximately 3m wide. The project required the ability to keep controlled, one way light vehicle traffic crossing the bridge throughout the day. This called for the bridge to be paved in 2 x 3m wide paver runs.

The EZ Street Asphalt being used on this project had been produced three weeks in advance of the paving and was delivered to Mainroad's Duncan yard the day prior to the scheduled paving. This particular batch of EZ Street Asphalt was made using bio-fuel produced from waste vegetable oil. This is the first bio-fuel production of EZ Street in Canada.

The weather conditions were not ideal for the utilization of regular asphalt but were ideal to demonstrate the benefits of EZ Street Asphalt for paving. The timber bridge deck was damp and wet in areas at the time of installation. No tack coat was used for the paving nor was it required for EZ Street Asphalt. The damp bridge deck would not have allowed the use of a tack coat.

There was a period of heavy rain during the paving. The rain was heavy enough that it

would not have allowed regular asphalt to be used. EZ Street Asphalt is hydrophobic so is not effected by water at all and the paving progress was not halted or impacted due to the weather conditions.

EZ Street Asphalt is a cold product and does not require the paving equipment to be hot for the installation. This proved beneficial as the product was able to be transported to the site, held in trucks for a period of the day before being emptied into the paver without any deterioration to the product or any waste material. During the installation, a large fully loaded truck and transporter needed to cross the bridge. At this period only about two thirds of one run of paving had been completed. To enable the truck to pass, the paver moved off the bridge and the truck straddled both the EZ Street Asphalt and the unpaved section to cross. At this point, the EZ Street Asphalt had only approximately four passes with a roller. The truck passed over the site leaving virtually no impression on the brand new and virtually uncompacted surface.

The paver broke down for a period of time (about 1 hour) during the installation. This situation combined with the remote location and distance from an asphalt plant can cause significant issues when using regular asphalt and the temperature would be continuing to drop the longer it had to wait for the paver to be back in operation. Due to the location of this project the asphalt would have had to travel two to two and a half hours before getting to the site. This proved not to be an issue for EZ Street Asphalt or the paving operation as EZ Street Asphalt is a cold product that can remain waiting on trucks for almost a limitless period of time. In the instance of this project, EZ Street Asphalt had been produced three weeks earlier and had been sitting in stock pile awaiting the project.







 his project was the culmination of a two year relationship with the City of Edmonton where they have been using EZ Street cold asphalt for

maintenance patching applications. The City determined a location to try EZ Street Asphalt as a paving alternative to their regular paving program.

The work was performed in early August, 2011. The chosen location is in the Lago Lindo suburb in Northern Edmonton. The whole of 168th Avenue NW / 95th Street NW intersection was being paved and the EZ Street asphalt section ran from the 174th Avenue intersection north for 300m, past 176 Avenue NW.

The site is a suburban road and is a designated bus route. The City paving program had a 2km section of the street planned for resurfacing, including a piece to trial the installation of EZ Street cold asphalt. The City paved approximately 1km of asphalt first, then 300m of EZ Street asphalt followed by asphalt to complete the job. The idea was to trial the EZ Street asphalt product for sound reduction and to provide a controlled area for the crews to learn to work with the EZ Street asphalt product. The site was pre-milled and the paving was performed in one, 50mm lift. The City of Edmonton has their own paving crews and utilized their modern paving equipment. They recently acquired a new Vogele paver and standard Cat rollers (both steel drum and PTR).

This EZ Street asphalt section has proven to be a success in a number of ways for the City. First, they have found a product that can provide a significantly quieter road surface that has applications anywhere there are noise sensitive areas, from general urban environments through to roads outside hospitals, etc. Secondly, the City was very impressed by the single mat surface (no cold seams / paver runs) and thirdly, and most importantly for the City of Edmonton, is that the currently limited paving season can potentially be expanded by twelve weeks. This alone will be an enormous benefit to the City and can apply to any city or municipality through Canada which has a limited season due to cold winters.

The crews found paving with EZ Street cold asphalt to be easier than paving with regular asphalt. Even though it was the first time the crews had worked with EZ Street

asphalt at this scale, they quickly adapted to the different material and found some shortcuts in the placement of the product compared to the hot-mix asphalt.

With no temperature constraints due to the hot asphalt, the roller drivers found they could work away from the paver and get long roller runs in instead of the usual procedure of being behind the paver the moment the asphalt is on the ground.

- The final product outperformed expectations. The surface is holding strong, with even the bus stop area showing no sign of stress or deterioration.
- The crew found EZ Street cold asphalt a lot more forgiving to work with when patching and filling in hollows, etc. They could go back in a timeframe that hot asphalt will not usually allow to patch and fill the low areas with no visual deficiencies or delamination that will occur when patching over cooling asphalt.
- The crews noticed and discussed two other benefits of EZ Street cold asphalt that have quite a visual impact on their first application. These were firstly, that the EZ Street asphalt went much further than the regular asphalt (about 10% further) which became evident to the paver crew, as each truck and hopper load was taking them further down the road than they had been used to. Secondly, the single mat / no cold joint became very evident to everyone as the EZ Street asphalt was being paved. As soon as the roller went over the adjoining mats, the seam disappeared. At the end of the job, the paved area showed as a 300m long section with one 10m wide mat. All of the paver joints / cold joints of the conventional asphalt are very evident on this site but they end when they meet the EZ Street asphalt section.

#### Progress Update (August, 2012)

In August 2011, a 300m long section of 95th Street North of 174th Avenue NW was paved with EZ Street Asphalt to provide a comparison between the performances of EZ Street Asphalt to regular asphalt. This enabled us to directly compare the results on the first year of wear and tear (including an Edmonton winter) on the two pavement surfaces. Visual inspections and comparisons have been performed on the two sections with the following observations:

#### **Overall Performance**

Both the conventional City of Edmonton ACO mix with 150-200A asphalt binder and the EZ Street Asphalt mix have performed well over the winter.

#### **Macro-Texture**

The better macro-texture, the better skid resistance characteristics. The surface texture of the EZ Street Asphalt is very consistent and has a greater macro-texture than the regular asphalt.

#### Segregation | Surface Deterioration

The regular asphalt surface shows some signs of segregation in the surface which may be due to handling of the mix at the time of installation. (The cause of this is unknown and is not necessarily a reflection of all asphalt surfaces). These segregated areas tend to have a more open texture and have a risk of unravelling in the form of potholes and surface failures over time if they are not filled and treated by a maintenance crew. In this instance, numerous small holes have started to appear in the asphalt surface most likely caused by frost heave in segregated areas.

In comparison, no areas of segregation or surface deterioration are evident in the EZ Street Asphalt paved section.

#### **Surface Scraping**

Both the regular asphalt and EZ Street Asphalt show signs of surface scraping due to snow plows scraping the surface through the winter. It is unlikely that this will affect the long term performance of the surfaces.

#### Cracking

Some longitudinal and reflective cracking is visible within the asphalt surface as opposed to no visible cracking being apparent in the EZ Street Asphalt surface. As discussed in the installation case study, EZ Street Asphalt surfacing eliminates longitudinal paver joints which traditionally create a weak point for cracking and potholes. On the asphalt surface the paver joints are visible.



n October 22, 2009, EZ Street Polymer Modified Cold Asphalt was installed as a full-width surface on the NWT Highway system. This was a trial project approved by the NWT Minister of Transportation.

NWT Highway No. 3 is the most heavily trafficked NWT highway, including fully loaded trucks with supplies for Yellowknife and the mines north of Yellowknife. This highway suffers from extreme climatic conditions (freeze/thaw cycles, sub-minus 40° C conditions, concentrated heavy load traffic to ice roads/mine supply) and environmental challenges (permafrost, unstable subgrades, etc.).

80m of full width deteriorated chip seal highway surface (on a gravel sub-base) was removed with a grader and replaced w/ a 40mm depth surface of EZ Street Polymer Modified Cold Asphalt, installed with a paver and combination roller.

The material had been produced some 800km away utilizing standard asphalt production equipment, shipped to the staging area beside the test section and stockpiled for over four weeks before being installed, illustrating the unprecedented logistical flexibility and advantages of the technology. The material was installed in less than one day, in temperatures between minus 8° C and minus 10° C.

#### **Pavement Testing**

Marshall strength / stability tests were performed on the EZ Street material by EBA Engineering with results of 16,800N being achieved. The standard Marshall results for regular asphalt are expected to be between 6,000 to 8,000N.

In October 2012, (three years after installation) the test section was revisited to review the conditions of the surface and to review any deterioration that may have occurred.

The surface continues to perform without issue. The chip seal surface that was applied adjacent to the EZ Street test section in the same season has since had to be completely replaced.

#### Main Advantages and Benefits Demonstrated

This trial has shown that EZ Street Polymer Modified Cold Asphalt can be successfully installed under extreme conditions, at almost any time of year, with no detriment to performance. It has shown that this unique material can resist the stresses from constant freeze/thaw heaves and drops, common to Canadian roads. As demonstrated in many other applications, the unique polymer protection and composition of the material means that the mat remains slightly flexible and will absorb and resist some of the movement caused by constant freeze/thaw cycles. This will reduce the amount of cracking and deformation in that surface. Traditional hot mix asphalt is prone to extensive thermal cracking in the NWT due to the temperature extremes. There has been no thermal cracking in any of the NWT surfacing applications to date.

This trial also demonstrated the fact that this technology can be installed with a much smaller crew than required by traditional asphalt. The most experienced member of the install team (35+ years of asphalt experience) was able to engage in and supervise both the paving and compaction as completely separate events, as the EZ Street material can be optimally compacted at any time during the install, as opposed to traditional hot mix asphalt, that cannot be properly compacted once it begins to cool.

The quietness of the material is very dramatic, especially as a contrast to the high level of road noise emanating from the chip seal surface. This quietness is again a function of the unique polymer technology used to produce EZ Street Asphalt, allowing the material to absorb the kinetic vibrations that cause road noise.







n September 2011, an estimated 2km of EZ Street Polymer Modified Cold Asphalt Surface was installed for the community of N'dilo (located within the City of Yellowknife).

N'dilo had been waiting for over forty years for a paved surface for their community, and the EZ Street technology was chosen by the community over other alternatives for its logistical and performance advantages and the long term cost savings that its higher performance would provide over traditional hot mix asphalt surfacing.

The sub-base was prepared the week before surfacing, with the structural integrity and strength of the sub-base being then confirmed by the EZ Street Canada team through standard laboratory and field tests. The confirmation of adequate sub-base strength is conducted for all EZ Street Canada applications prior to installation.

The material had been produced some

2km away utilizing a standard asphalt plant and stockpiled at the production site for over a week before being installed, allowing for optimal planning and staging, with never any risk of any costly delays. The entire 2km of surface was installed over two full days, and temperatures were as low as minus 4° C during installation, with no detriment to the project or the material's performance.

The surface was installed using standard paving equipment, and compacted with a standard combination roller and a pneumatic tire roller.

#### **Pavement Testing**

Marshall strength/stability tests were performed on the EZ Street material by EBA Engineering with results of 14,600N being achieved. The standard Marshall results for regular hot mix asphalt installations are expected to be between 6,000 to 8,000N.



Optimal Compaction, with no heat/time limitations



In October 2012, (1 year after installation), the test section was revisited to review the conditions of the surface and to see if there was any deterioration.

The surface continues to perform without issue. There are no defects or cracks of any kind on any part of the surface. A similar sized section of traditional hot mix asphalt was installed in another section of Yellowknife close to the same time as this project. The hot mix asphalt section now shows more than fifty full width transverse thermal cracks (all requiring sealing less than six months after the section was installed). This amount of immediate thermal cracking is very common to hot mix asphalt installations in the Canadian North.

#### **Main Advantages Illustrated**

The EZ Street material was produced and stockpiled in advance of the paving and then installed a number of weeks later with no danger of delays, as the material is stored and installed at ambient temperatures. The material is also impervious to cold or wet conditions, and can be installed with a minimal crew. In this case the same experienced people that produced the EZ Street Asphalt also installed the material allowing the project to take full advantage of their production and installation skills. The EZ Street material was optimally compacted with no heat or time limitations, as opposed to traditional hot mix asphalt, that cannot be properly compacted once it begins to cool.

The complete lack of thermal cracking to date is an unprecedented benefit to the technology, as traditional asphalt installed in Yellowknife invariably develops full-width transverse thermal cracks within its first season.

EZ Street installs with no paver joints or seams as opposed to traditional hot mix asphalt that always comes with this unavoidable inbuilt problem. The seams and joints in traditional hot mix asphalt are weak areas that are likely to be the first point of failure and the beginning of end of the overall surface integrity. EZ Street Asphalt technology eliminates this problem completely. This aspect, combined with its superior strength and stability means a much longer potential life cycle and long-term savings on maintenance and replacement.



n April 2010, a small surface comparison project was performed to compare the performance of regular asphalt to EZ Street Asphalt over a section of concrete slab roadway.

Silver Dart Drive in the City of Mississauga was selected for this test comparison. Silver Dart Drive is a service road around the southern end of Toronto Pearson International Airport. This road has a reasonably high traffic volume and a high proportion of heavy vehicles (being a service entrance for the airport). The pavement on this road is constructed of concrete slabs with about a 25mm asphalt surface. The concrete slabs have a significant expansion joints and slab movement creating severe cracking in the asphalt surface. The current road / pavement condition would be considered very poor with severe deterioration to the asphalt surface at every joint.

For the trial, the existing surface was removed over a length of about 20 to 30m and replaced with new material. One lane was replaced with a traditional asphalt surface and the opposite lane was replaced with EZ Street Asphalt.

#### **Pavement Testing**

Marshall strength / stability tests were performed on the EZ Street material with results of 19,800N being achieved. The standard Marshall results for regular asphalt is around 6,000 to 8,000N.

In June 2012, (two years after installation) Silver Dart Drive was revisited to review the conditions of the two surfaces and to review any deterioration that may have occurred.

As can be expected with the concrete slab road base and inbuilt movement, both surfaces show signs that joint movement has occurred. The traditional asphalt has cracks across all of the joints with some additional (new) cracking visible in the surface. The cracks were inspected close up (as per photo) and the cracks were found to penetrate all the way through the surface into the base. To keep this section of the pavement water proof, crack sealing will have to be performed through the length of the pavement life. This will be an



Cracks in the asphalt (full depth crack)

ongoing maintenance issue for regular asphalt through the life of this pavement.

EZ Street also shows some signs of cracking across the joints / expansion joints. Unlike the regular asphalt, when examined up close, the cracks show to be lines on the surface of the layer with no penetration through the mat. It visibly looks more like a scribe mark on the surface than a crack at all. Any cracks that had appeared in the pavement seem to have self-healed.

There are a number of reasons why the EZ Street is performing better than the regular asphalt for Silver Dart Road that will be the same for any surface with this pavement structure situation.

The EZ Street mat will remain slightly flexible and will absorb some of the movement in the concrete slabs and the pavement structure. This will reduce the amount of cracking that will appear in the surface. Regular asphalt turns very rigid when it has been installed and it goes cold. Once the pavement is rigid, it is extremely susceptible to any pavement movement and is prone to breaking resulting in the inevitable cracks appearing in the surface.

EZ Street has 'self-healing' properties. The product itself will remain "live" for a significant period of time. It will not move, deform or rut but will enable the material to reform to heal any cracks that appear. If cracks do appear due to higher than normal pavement movement such as the concrete slab joints in this trial then the cracks are able to re-join or heal leaving



Self-healed crack in the EZ Street (visible scribe mark only)

only a slightly visible mark on the surface but no crack at all. Asphalt on the other hand has an active life of about three hours from the asphalt plant and once it has gone cold and set it becomes very rigid. This rigid pavement becomes very susceptible to any movement from the pavement structure and will literally snap and break if the movement is too great. Once the asphalt mat has broken / cracked it can't be repaired. It will always be a weak point in the surface and will inevitable be a maintenance issue for the whole of the pavement life.

As EZ Street Asphalt is a cold material it will eliminate any paver joints / cold joints within the paved surface. As the EZ Street is installed, the paver joints will merge together to create one single mat the full width of the road. Paver joints / cold joints are an inbuilt structural weakness constructed into the pavement. Bearing any pavement weaknesses, the paver joint is the first area of the surface to start deteriorating and an area where failures will occur. Eliminating this joint will eliminate a weakness in the pavement.

The three points listed above provide for significant "whole of life savings" for the pavement and the surface. Not only will EZ Street potentially provide a surface that will greatly outlast traditional asphalt but it will also reduce maintenance costs through the life of the surface. The elimination of cracks and joint deterioration will reduce the amount of maintenance work that will be required.



n November 2010, an estimated 200m length of full width (two lane) EZ Street Polymer Modified Cold Asphalt surface was installed for the City of Mississauga on McLaughlin Road (northward from the Parkwood Place intersection). This is a particularly busy road in the midst of the city with steady and constant traffic every day. The existing asphalt surface was distressed with extensive full depth cracking. The City also wanted to investigate the quietness of the material (observed on previous installations). Due to the constant traffic on this section, local residential constituents had been complaining



Existing road milled (50mm)



Traffic ready immediately following installation

of the excessive road noise (70km speed limit). 50mm was milled from the old surface and 50mm of EZ Street Polymer Modified Cold Asphalt was installed.

The material was produced at an asphalt plant 25km away and stockpiled at the production site for three days before being shipped and installed, allowing for optimal planning and staging of the project. The entire 200m of surface was installed in less than one day, and temperatures were as low as minus 1° C during installation, with no detriment to the installation project or the material's performance.



EZ Street installation



EZ Street surface

The surface was installed using standard paving equipment, and compacted with a standard combination roller and a pneumatic tire roller.

#### **Pavement Testing**

Marshall strength/stability tests were performed on the EZ Street material with results of 19,800N being achieved. The standard Marshall results for regular hot mix asphalt installations are expected to be between 6,000 to 8,000N.

In June 2012, (19 months after installation) the test section was revisited to review the conditions of the surface and to review any deterioration that may have occurred.

The surface continues to perform very well and remains very quiet. There is a dramatic decrease in the road noise levels on the EZ Street section compared to the adjacent traditional asphalt.

#### Benefits and Advantages Demonstrated

The EZ Street asphalt was produced in advance, stockpiled and shipped at a later set time, optimizing the staging and planning of the project and ensuring minimal disruption or delay. The day of installation all planned hot mix asphalt work in the City had been shut down due to the cold temperatures. EZ Street technology can be utilized in cold or wet conditions, with no such costly delays.

This project also demonstrated well the EZ Street Asphalt's resistance to reflective cracking and its self-healing capabilities, as the existing layer of asphalt beneath the installation was distressed with full depth cracks, and those defects have not reflected through the surface as they would with traditional hot mix asphalt.

The installation crew was impressed with the homogeneous surface that the EZ Street material provides, with no seams or joints, regardless of time or temperature. The installation crew was also appreciative of the increased worker safety provided in that with EZ Street Asphalt, there is no heat or fumes involved.



he District of North Vancouver uses EZ Street cold asphalt to provide service trench reinstatements for their Waterworks Department.

As trenches are not able to be left open overnight, traditionally, cold mix has been used as a temporary holding material until the full repair is complete. At that time, the cold mix is removed and the trench is fully asphalted. This has proven to be especially difficult during winter as firstly, the cold mix often does not stay in the trench for more than an hour or two under heavy traffic and secondly, the limited availability of asphalt in the winter months combined with the very limited number of rain-free days in the North Vancouver mountains (this area could be considered a rain forest) makes scheduling repairs near impossible.

The District of North Vancouver now uses EZ Street cold asphalt extensively to surface the service trenches in place of traditional cold mix.









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EDMONTON PAVING

## CASE STUDIES

DEERING BRIDGE RESURFACING ARCTIC SURFACING MISSISSAUGA SURFACING

POTHOLE REPAIR TORONTO AIRPORT

Deering Bridge Resurfacing - Port Renfrew, Vancouver Island

YELLOWKNIFE SURFACING

UBC PAVEMENT REPAIRS



The paving was part of a timber bridge rehabilitation project performed by Mainroad South Island Contracting's Bridge Crew as part of the British Columbia Ministry of Transportation & Infrastructure Service Area 01 Highway Maintenance Contract. Part of the rehabilitation project was to remove and replace the existing and badly deteriorated asphalt surface. After reviewing the project, the location and the timber surface, the decision was made to trial EZ Street Asphait for the resurfacing material. The bridge deck is approximately 185m long and 6m wide. Port Renfrew is approximately 2 to 2.5 hours driving distance away from either Victoria or Duncan on Vancouver Island. In turn, it is also approximately 2 to 2.5 hours driving distance from the nearest asphalt plant. The bridge is a single lane timber bridge with a timber bridge deck. The bridge is part of the main ring road around this area of Vancouver Island and must remain open to traffic at all times. The project had the ability to close the bridge to trucks and heavy traffic for one day only and this had to be planned and advertised to the public well in advance. The bridge takes a reasonable amount of logging trucks and other heavy traffic.

The paying crew utilized a small paver approximately 3m wide. The project required the ability to keep controlled, one way light vehicle traffic crossing the bridge throughout the day. This called for the bridge to be paved in 2 x 3m wide paver runs.

The EZ Street Asphalt being used on this project had been produced three weeks in advance of the paving and was delivered to Mainroad's Duncan yard the day prior to the scheduled paving. This particular batch of EZ Street Asphalt was made using bio-fuel produced from waste vegetable oil. This is the first bio-fuel production of EZ Street in Canada



GRANVILLE TRACK FILLING HIGHWAY 17 PATCH

VANCOUVER SERVICE TRENCH

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