VERNON
Regional Airport
MASTER PLAN

Appendix E

Pavement Facility Study Vernon Airport

SNC·LAVALIN

PAVEMENT FACILITY STUDY
VERNON AIRPORT

Final Report

Vernon Regional Airport Supervisor- Vernon Airport

TRANSPORTAION

19 | 11 | 2013

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November 19, 2013

Mr. Ian Adkins
Vernon Regional Airport Supervisor
Vernon Airport
6300 Tronson Rd
Vernon BC
V1H 1N5

Re: Vernon Airport Pavement Facility Study

Please find attached our Pavement Facility Study Report based on the inspection carried out on October 24 and 25, 2013.

Thank you for the opportunity to perform this work. We look forward to continuing assisting the City of Vernon in the development and rehabilitation of the Vernon airport.

Sincerely,

Martin Samson, P.Eng.
Director of Engineering
Airports & Aviation Group
SNC-Lavalin Inc.
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1 EXECUTIVE SUMMARY

The City of Vernon mandated SNC-Lavalin to undertake an assessment of existing airfield pavement facilities at the Vernon Airport to determine the remaining service life and to provide recommendations regarding rehabilitation alternatives.

The infrastructure assessment included the following:

a. Review background information;

b. Airfield pavement facilities assessment/visual inspection of the airfield pavements in accordance with Transport Canada guidance documents (ERD-121).

c. Determine PLR/PCN ratings using the background information provided

Following the completion of the Infrastructure Assessment, all the collected information and data was compiled in order to firstly identify the sections which required rehabilitation. Based on the visual inspection and background review, SNC-Lavalin determined that only the runway, Taxiway Alpha and the oldest portion of Apron #1 would require immediate rehabilitation. The pavements are considered to have reached their terminal serviceability. A delay in rehabilitating these pavements increases the risk of FODs. Other airfield pavements are in good enough condition for their current use and a life expectancy of about 25 years can be expected under the current operating conditions.

For the Runway and Taxiway Alpha, SNC-Lavalin examined different options that could be considered by the City of Vernon for their rehabilitation. These options include:

a. Asphalt Overlay, with our without milling of the existing pavement;

b. Replacement of the Asphalt layer;

c. Hot in-place recycling of existing asphalt pavement followed by a thin overlay.

Full depth reconstruction was not considered due to the good performance of the pavement over the last 27 years. The pavement did not suffer from frost heave and no load induced distresses where observed.

However, for the old portion of Apron #1, none of the above solutions would provide satisfactory results and it is recommended to fully reconstruct this area.

The current Pavement Loading Ratio (PLR) of the Runway is estimated at 7,4 based on available data on pavement structure composition and SNC-Lavalin's assessment of the structural integrity of the asphalt pavement. The taxiways and aprons which have the same Equivalent Granular Thickness also have a PLR of 7,4. Due to the limited asphalt thickness and base course thickness, **the tire pressure restriction of 0,5 MPa should be maintained** as a general rule. However, there are no defects which could be attributed to loads even though aircrafts such as the Citation and King Air have regularly landed at the airport over the last 15 years. Therefore, these aircrafts at the current volume of operation can be tolerated until the pavements are rehabilitated and reinforced. If traffic was to increase significantly, then the tire pressure restriction should be reconsidered.

Based on the findings of this pavement assessment study, SNC-Lavalin recommends the following strategy:

- Concentrate rehabilitation money on the Runway and Taxiway Alpha and possibly the old portion of Apron #1 if deemed necessary;

- Overlay the remaining portion of Apron 1 to fit the grades with Taxiway Alpha and its extension into Apron 1;
- Continue the crack filling program on all the other airfield pavement surfaces;

For the rehabilitation of the runway and Taxiway Alpha, SNC-Lavalin recommends using Hot In-Place Recycling which would restore the existing materials at a lesser cost, and within a reduced schedule. This would maintain the PLR at 7,4 and increase the tire pressure restriction to 1,0 MPa.

2 INTRODUCTION

The Vernon Airport entered into service in 1948 with a single grass runway and a small shed that served as a terminal building. The airport operated with very few modifications until the late 1960s when the runway was paved for the first time and a first taxiway was built to access the private hangars built along the road. However, it is in 1986 that the current runway was built to replace the old runway. The new runway was built to a length of 1070 m (feet) and a width of 23 m (feet). A taxiway (now known as Taxiway Alpha) was also built to reach the existing apron.

Later works included:

- Construction of Taxiway Bravo and repaving of the old taxiway in 1996;
- Construction of Taxiway Charlie in 1998;
- Extension of the service road to reach Taxiway Charlie in 1998;
- Construction of Taxiway Delta and Apron #2 in 2006;
- Extension of Apron #1 in 2010.

Apart from these works, the City of Vernon has initiated a maintenance program in the recent years that mainly consists of crack sealing. The current pavement assessment study has two objectives:

1. to determine the remaining service life of the airfield pavements; and
2. to provide recommendations regarding rehabilitation alternatives.

The mandate which was awarded to SNC-Lavalin inc. through a tender process included the following activities that are described in the following sections:

a. Review background information;
b. Airfield pavement facilities assessment/visual inspection in accordance with applicable Transport Canada guidance documents.
c. Determine PLR/PCN ratings where possible using the background information provided
d. Recommendations for rehabilitation/replacement of the facilities including an assessment of up to two (2) alternatives for each facility;
e. Preliminary cost estimates for each rehabilitation option considered.

3 REVIEW OF BACKGROUND INFORMATION

For the preparation of this report, the background information listed in table 3-1 was consulted. These documents and additional information obtained from former City employees or local contractors allowed for the reconstitution of the construction history of the airport as presented in Introduction.

Other pertinent information for this study included a number of plans gathered by the airport manager over the years. It is difficult however to determine if they represent what was actually built since none are labelled as as-built and some appear to be preliminary. Nevertheless, they provide valuable information and we will assume that they are accurate for the purpose of this study.

Based on these plans and other reports listed in table 3-1, the most probable pavement structures for the various facilities were established as indicated in Table 3-2. These pavement structures were then used to assess the Pavement Load Ratings (PLR) as described in section 5.

Table 3:1 - Reference Documentation consulted.

Title	Date
12831 - Vernon - IFC - 24x36 -	Sept 13-06
ACAD-408-DD	
ACAD-408-DD_ST	
Airport Overview Map	March 2011
Fletcher Associates Engineering ***Runway Extension – Vernon Regional Airport***	May 19, 1998
Fletcher Associates Engineering ***Geotechnical Investigations and Recommendations related to Water Main Installation and Taxiway Construction*** ***Taxiway Delta (Code B), Vernon Airport, B.C.***	April 26, 2001
Fletcher Paine Associates LTD ***Geotechnical Investigations and Recommendations Related to Pavement Structure Design in Relation to Phases I,II and III. City of Vernon Airport Apron Works***	May 14,2002
Fletcher Paine Associate LTD ***Statement of Qualifications and General Conditions***	2006
Horizon Geotechnical LTD ***Sieve, proctor, CBR Results of sand subgrade at 95% modified***	May 25.,2006
Trow Geotech Report ***Geotechnical Exploration & Pavement Report - Airfield Expansion Rehabilitation Projects Vernon Regional Airport, Vernon, BC***	June 2, 2006

Table 3:2 - Pavement structure of airfield pavements[1].

Facility	Asphalt thickness	Base granular material thickness	Subbase granular material thickness	Natural subgrade
Runway Threshold 05 Stopway	100 mm	200 mm	300 mm	Silty Clay
Runway Central portion	76 mm	140 mm (25 mm minus crushed granular base)	445 mm (gravel)	Silty Clay
Runway Threshold 23 Stopway	75 mm	230 mm (25 mm minus crushed granular base)	450 mm (75 mm minus granular material)	Silty Clay
Taxiway Alpha	N/D	N/D	N/D	N/D
Taxiway Bravo	N/D	N/D	N/D	N/D
Taxiway Charlie	49 - 54 mm	200 mm (25 mm minus crushed granular base)	375 mm (75 mm minus granular material)	Clay
Taxiway Delta	50 mm	150 mm (25 mm minus crushed granular base)	450 mm (150 mm minus granular material)	Clay
Apron 1	N/D	N/D	N/D	N/D
Apron 2	N/D	N/D	N/D	N/D
Service road	N/D	N/D	N/D	N/D

Information on the pavement structure of the Taxiways and Aprons is scarce. Actual construction details were found for Taxiways Charlie and Delta but nothing for Taxiway Alpha and Bravo and the two Aprons. Nevertheless, based on the information provided by airport manager, we will presume that:

- taxiway Bravo has the same pavement structure as Taxiway Charlie because they were built at two years interval;

[1] The pavement structure presented in Table 3-2 is based on an interpretation of documents that were not necessarily intended at describing the existing pavement structure. Therefore, SNC-Lavalin cannot take any liability toward the exactness of this information.

- Apron 2 has the same pavement structure as Taxiway Delta since they were built in the same year by same contractor;
- Taxiway Alpha and Apron 1 have the same pavement structure as the central portion of the runway because they were all built in 1986, except for the expansion of Apron 1 which was built in 2009.

The design aircraft for the Vernon Airport is a Beachcraft 1900D, although the most common aircrafts using the airport are as follows:

Table 3:3 - Aircraft Fleet at Vernon Airport

Aircraft	Empty Weight	Max Takeoff Weight	Other Variants	Use	Landings
Pilatus PC 12	5,867 lb (2,761 kg)	10,450 lb (4,740 kg)	N/A	Private/Charter	80-100 Annually
Beachcraft King Air 200	7,755 lb (3,520 kg)	12,500 lb (5,670 kg)	King Air 90, 100	Private/Charter/Medi-Vac	40-60 Annually
Cessna Citation V 560 Encore	9,395 lb (4,261 kg)	16,300 lb (7,394 kg)	Citation CJ1, CJ2, CJ3, CJ4	Private	Daily
Beachcraft 1900D	10,434 lb (4,732 kg)	17,120 lb (7,764 kg)	Beachcraft 1900, 1900C	Charter/Commercial	1 in 5 Yrs
Citation Sovereign	17,700 lb (8,029 kg)	30,300 lb (13,744 kg)	N/A	Private	Estimate Daily
de Havilland Canada DHC-5 Buffalo	25,160 lb (11,412 kg)	49,200 lb (22,316 kg)	N/A	Military	1-2 Annually

4 PAVEMENTS VISUAL INSPECTION

The background information on the existing pavements and in particular the construction history was used to define the pavement sections to be inspected and rated separately. Figure 1 shows the various sections that were established for this study.

The runway was separated in three (3) sections corresponding to the two runway extensions at both ends constructed in 1998 and 2006 and the central portion constructed in 1986. Similarly, Apron #1 was separated in multiple sections corresponding to the various stages of construction through the years. Table 1 summarizes the various sections identified for the inspection.

Table 4:1 - Pavement Sections for Visual Inspection

Section	Description	Area (sq.m.)
1	Runway Threshold 05 Stopway	3,478
2	Runway Central portion	20,677
3	Runway Threshold 23 Stopway	1,333
4	Apron 1	6,029
5	Taxiway Alpha	1,321
6	Taxiway Bravo	2,033
7	Taxiway Charlie	2,603
8	Taxiway Delta	3,658
9	Apron 2 – Old Taxiway	1,942
10	Apron 2 – Parking Area	1,847
11	Service road	2,234
TOTAL		**47,155**

Each of these sections was then carefully inspected to observe and record surface distresses, including type, extent and severity observations and to take photographs at locations representative of observed conditions, including typical conditions, and significant pavement surface distress anomalies.

4.1 METHODOLOGY FOR INSPECTION

During a pavement structural condition inspection, individual defects present in the surface are identified and rated in terms of their extent and severity on an inspection form as per **Transport Canada, ERD-121** procedure. An overall Structural Condition Rating (SCR) is assigned to each pavement section based on the extent and severity of the defects found in the section. Pavement Structural Condition Ratings are assigned using a numerical scale of 0 to 10 as shown below.

Table 4:2 - Structural Condition Rating

Structural Condition Rating (SCR)	
Numerical Rating	**Descriptive Rating**
0 - 2	Very Poor
2 - 4	Poor
4 - 6	Fair
6 - 8	Good
8 - 10	Very Good

A pavement structural condition rating reflects the suitability of a pavement structure to serve aircraft traffic as judged from surface defects that develop with age and traffic and that reflect deficiencies with respect to structural integrity and bearing strength attributes. A rating below 4 usually triggers rehabilitation.

4.2 GENERAL OBSERVATIONS

None of the distresses observed on the pavements at Vernon Airport are load related. All the distresses observed are either associated with construction (i.e. cold joints, raveling) or aging (i.e. block cracking, weathering).

However, due to the different times of construction, the condition of the pavements varies. As would be expected, there is a direct relationship between age of pavement and condition.

Generally speaking, only the main portion of the runway (between the two thresholds), Taxiway Alpha, the old section of Apron #1 and the service road are in a condition that would require rehabilitation. All the other pavement areas are in a good to very good condition and will not require rehabilitation in the near future if loading conditions remain as they are.

4.3 SPECIFIC OBSERVATIONS

Section 1 – Runway 05 Stopway

Constructed in 1998, this section is still in excellent condition. Very few distresses observed, only raveling (see picture No.2) of very low severity that may be attributed to a weak bonding between some of the larger aggregates and the bitumen. This section should be inspected regularly for loose particles (FOD) and broomed regularly.

Photo 4:1 - Section 1 overview

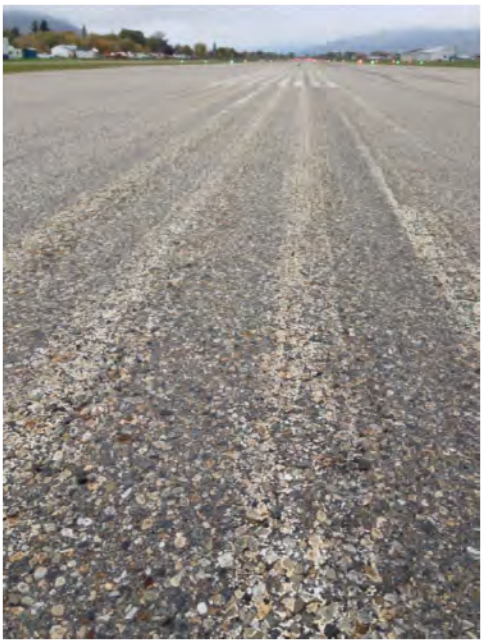

Photo 4:2 - Minor raveling in Section 1

Section 2 – Runway 05-23

The main Runway section, between the two thresholds, was constructed in 1986, but never rehabilitated since then. The City of Vernon has put in place an extensive crack sealing program which has proven successful and has allowed maintaining the runway in a relatively fair condition up to 27 years.

However, the extent of block cracking has now reached a high level which makes it unrealistic to properly maintain. The coverage of crack sealant in some areas reduces adherence and friction. Furthermore, the winter maintenance (snow plowing and brushing) tear the sealant and could generate FODs. It was observed that many cracks are opening faster than crack sealant can be reapplied, allowing water to penetrate under the asphalt layer and accelerating the degradation. This water which penetrates along cracks can cause serious damages in the winter when it freezes. Some of the cracks are severe and could also generate FODs.

Photo 4:3 - Section 5 overview from Threshold 23

Photo 4:4 - Extreme extent of block cracking

Photo 4:5 - Section 5 overview from Twy-D

Photo 4:6 - High severity cracking

Photo 4:7 - Extensive crack sealing

Photo 4:8 - Overview of threshold 05

Section 3 – Runway 23 Stopway

Constructed in 2006, this section is still in perfect condition; no distress observed in the entire section.

Photo 4:9 - Section 3 overview.

Section 4 – Apron #1

Apron #1 was originally paved in the 1960s and only a small area of this old pavement remains today. This sub-section 4A is in very bad condition; there is severe block cracking on 80% of the surface, the pavement is uneven with multiple depressions. This sub-section is prone to FODs and should be rehabilitated or condemned to aircraft traffic.

Photo 4:10 - Section 4A overview

Photo 4:11 - Extreme Map Cracking in Section 4A

The sub-section 4E which corresponds to the extension of Taxiway Alpha dates from 1986 and is exhibiting extensive block cracking. The good maintenance that was done to seal those numerous cracks has prevented their degradation but the extent of those cracks would justify rehabilitation.

Photo 4:12 - Section 4E overview

Photo 4:13 - High Severity Block Cracking in Section 4E

Other sub-sections are in relative good condition and would not require immediate rehabilitation but the current maintenance program should be continued.

Section 5 – Taxiway Alpha

As mentioned before, Taxiway Alpha was constructed in 1986 and was never overlaid. Extensive block cracking is observed on this section but due to effective crack sealing, the cracks have not degraded. However, the extent of these cracks would justify rehabilitation.

Photo 4:14 - Section 5 overview

Photo 4:15 - Low Severity Cracking in Section 5

Section 6 – Taxiway Bravo

Taxiway Bravo was constructed in 1996 and is still in good condition. There are a few longitudinal and transverse cracks that have been properly sealed and one edge crack with grass in it but generally speaking, these defects do not pose a problem to the operations. This taxiway would not require rehabilitation before 8 to 10 years.

Photo 4:16 - Section 6 overview

Photo 4:17 - Low Severity Cracking in Section 6

Section 7 – Taxiway Charlie

Taxiway Charlie was constructed in 1998 and has not been used much. Its condition is still excellent with very minor and scattered transverse cracks. The main distress that will require attention and maintenance is the center line crack that runs the entire length of the taxiway.

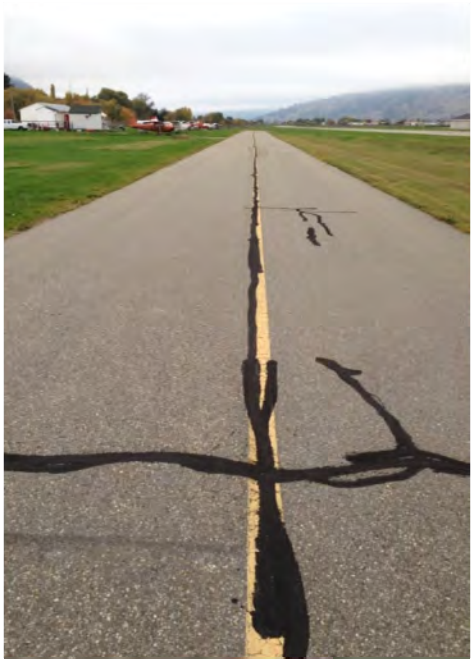

Photo 4:18 - Section 7 overview

Section 8 – Taxiway Delta

Taxiway Delta runs approximately where the old runway was located. However, in 2001, it was completely rebuilt under an ATAP grant. The only notable distress is a longitudinal crack that runs almost the entire length and is attributed to a cold joint during construction. The crack sealing will have to be maintained as is currently done to prevent degradation of the crack.

The intersection with Taxiway Bravo appears to have been problematic and there are old patches that may have been necessary to correct a water pounding problem. No action is necessary now but this problem should be addressed when the Taxiway is rehabilitated.

Photo 4:19 - Section 8 overview

Photo 4:20 - Patches at intersection with Taxiway D

Section 9 – Apron #2 (old taxiway)

The old Taxiway was repaved in 1996 but its current width is not sufficient to be considered a Taxiway and this is why it is considered as part of Apron #2. Its current condition is excellent with very few transverse cracks widely spaced. Those cracks were properly sealed and will have to be maintained as such.

Photo 4:21 - Section 9 overview

Photo 4:22 - Section 9 overview – cont'd

Section 10 – Apron #2 (parking area)

The main area of Apron #2 was built in 2005 to provide additional parking space for aircrafts. Its current condition is perfect with no visible defect.

Photo 4:23 - Section 10 overview

Photo 4:24 - Section 10 overview – cont'd

Apron #2 ties into Apron #1 near the fueling compound area. Several fuel spills have been observed on the pavement and it is noted that this could impair the durability of the asphalt binder. No visible degradation is observed at the moment but when rehabilitation will become necessary, building a concrete slab for the refueling area should be considered.

Photo 4:25 - Fuel spills near the fuel compound area in Apron #1

Section 11 – Service Road

The service road dates back to the original construction in 1976 and has now reached its terminal condition and should be rehabilitated. However, no aircraft uses this road and very limited traffic. Depending on the decision to extend Apron #1 or not, a portion of this road could be integrated into Apron #1. The rest of the road could be left as is.

Photo 4:26 - Section 11 overview

Photo 4:27 - Section 11 overview – cont'd

Table 4:3 - Pavement Condition Summary Rating.

Airport: Vernon Regional			Structural Condition Rating	Program Restoration	Maintenance required	**Pavement Surface Defects for Asphalt Surfaces**								
Inspector: Martin Samson														
Date: 24 October 2013														
Facility	**Section ID No.**	**Area (m²)**				Transverse Cracking	Longitudinal Cracking	Alligator Cracking	Map Cracking	Block Cracking	Raveling	Rutting	Patch	Depressions
Runway	1	3,478.4	7.0								4/L			
Runway	2	20,676.8	3.0	X		2/M	3/L			4/M				
Runway	3	1,333.2	7.0								4/L			
Apron #1	4A	1,015.5	2.0	X				2/M		4/H	4/L		1/L	2/L
Apron #1	4B	960.2	6.4		X		3/L				4/L			
Apron #1	4C	1,746.4	7.0		X						4/L			
Apron #1	4D	356.3	6.4		X		3/L				4/L			
Apron #1	4E	885.6	1.4	X						4/H				
Apron #1	4F	1,060.1	8.0											
Taxiway A	5	1,321.1	4.0	X		3/L	3/L			2/H				
Taxiway B	6	2,033.3	7.0		X	1/L	1/L				4/L			
Taxiway C	7	2,603.1	7.0		X		1/L							
Taxiway D	8	3,658.0	6.4		X		3/L							
Apron #2	9	1,941.7	9.5			1/L			1/L					
Apron #2	10	1,846.6	10											
Service Road	11	2,233.9	1.7	X				4/M				4/M		

Critical Aircraft: Beechcraft 1900 (B190)
Operation Weigth: 76 KN
Tire Pressure (MPA): 0.67
Aircraft Load Rating (ALR): 2.9

PAVEMENT DEFETCT RATINGS

1: Minor
2: Moderate
3: Major
4: Extreme

Extent of Defect

Severity of Defect

L: Low
M: Medium
H: High

STRUCTURAL CONDITION RATING

10 9 8 7 6 5 4 3 2 1 0

Very Good Good Fair Poor Very Poor

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5 AIRFIELD PAVEMENT LOAD RATING (PLR)

5.1 DEFINITION

PLR is a number expressing the bearing strength of a pavement for unrestricted operations. It is Transport Canada pavement strength reporting format. Under the PLR system, pavement bearing strengths are reported on a scale of 1-13, with 1 representing a weak pavement and 13 a very strong pavement. For flexible pavement systems (i.e. asphaltic concrete or gravel surfaces) a tire pressure restriction may also be published along with the PLR value.

The determination of airfield pavement bearing strength is usually based on the results of in-situ pavement strength tests combined with a knowledge of the thicknesses and strength properties of the various material layers comprising the pavement structure.

5.2 AVAILABLE DATA

Based on available data from previous geotechnical investigations, the existing pavement structure of some of the airfield pavements could be determined (see table 3-2) as well as the subgrade bearing strength. According to the results from a geotechnical investigation by Fletcher Paine in 2009, the subgrade bearing strength varies locally from 70 KN to 90 KN depending on the subgrade nature and condition. Lower values are recommended where the subgrade consists of silty clays, mid value for areas where the subgrade consists of compact silt and sand mixes and the higher value of 90 KN is recommended where the subgrade consists of compact sand.

Considering that the nature of the subgrade soils vary locally which makes it difficult to generalize for any of the taxiways or the runway and since a single taxiway or runway cannot be assigned multiple PLR, we will consider the most critical subgrade strength for the PLR determination of all the airfield pavements, which is 70 KN.

Using the Equivalent Granular Thickness determined below in tables 5-1 to 5-3 and a Subgrade Strength of 70 KN, a PLR value can be determined using Figure 5-1 – Flexible Pavement Design Curves for Standard Gear Loadings –from Transport Canada Advisory Circular 302-011 (2012).

Table 5:1 - Runway , Taxiway Alpha and Apron 1 Pavement Equivalent Granular Thickness.

Pavement Layers	Measured Thickness (1)		Equivalency Factor	Equivalent Granular Thickness (cm)
	Range	Average		
Asphalt pavement	2.6 – 3.15 in	3 in (7,5 cm) (2)	1,5(3)	11,25
Crushed gravel base	5-6 in	5½ in (14,0 cm)	1	14,0
Gravel subbase	17-18 in	17½ in (44,5 cm)	1	44,5
Total	**23-28 in**	**26 in (66,0 cm)**		**69,75**

(1) Ref.: Horizon Geotechnical Ltd, Report dated April 27, 2006.

(2) Asphalt thickness is 10,0 cm at Threshold 05 Stopway and in good condition. This increases the EGT to 78,5 cm.

(3) Equivalency Factor for asphalt pavement is reduced from 2 to 1,5 due to poor condition of pavement.

Table 5:2 - Taxiways Bravo and Charlie Pavement Equivalent Granular Thickness.

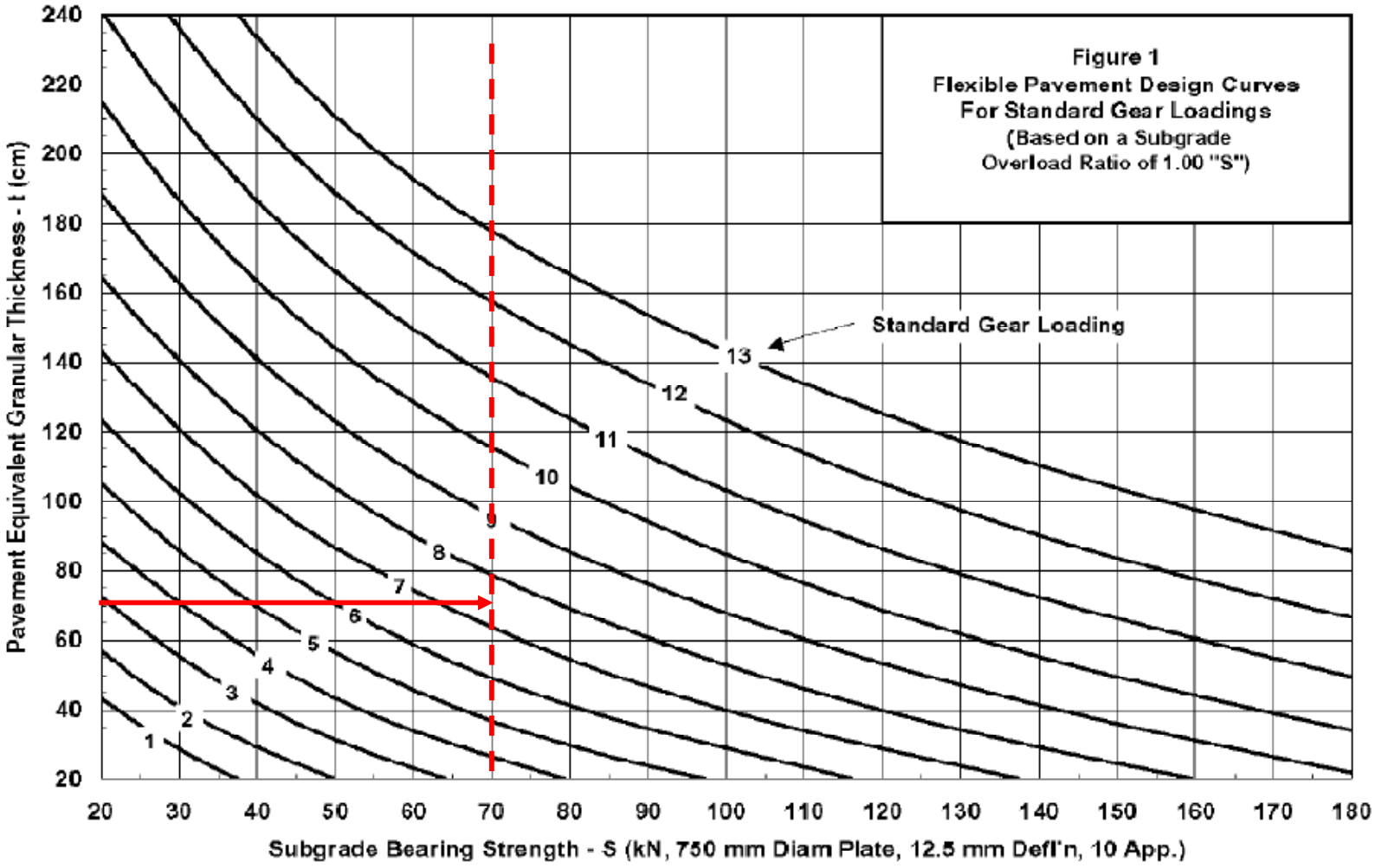
Pavement Layers	Measured Thickness [1] cm	Equivalency Factor	Equivalent Granular Thickness (cm)
Asphalt pavement	5,0	2,0	103,0
Crushed gravel base	20,0	1	20,0
Gravel subbase	37,5	1	37,5,5
Total			**67,5**

Table 5:3 - Taxiways Delta and Apron 2 Pavement Equivalent Granular Thickness.

Pavement Layers	Measured Thickness [1] cm	Equivalency Factor	Equivalent Granular Thickness (cm)
Asphalt pavement	5,0	2,0	10,0
Crushed gravel base	15,0	1	15,0
Gravel subbase	45,5	1	45,5,5
Total			**70,5**

Considering that all the airfield pavements have an Equivalent Granular Thickness of about 70 cm, the current estimated PLR for the Vernon airport pavements is 7,4. Due to the limited asphalt thickness and base course thickness, following general Transport Canada recommendations, **the tire pressure restriction of 0,5 MPa should be maintained**. However, as noted in the inspection, there are no defects which could be attributed to loads even though aircrafts with higher tire pressure such as the Citation and King Air have regularly landed at the airport over the last 15 years. Therefore, site specific experience shows that these aircrafts at the current volume of operation can be tolerated until the pavements are rehabilitated and reinforced. If traffic was to increase significantly, then the tire pressure restriction should be reconsidered.

Figure 5:1 - Flexible Pavement Design Curves for Standard Gear Loading



6 REHABILITATION OPTIONS

Once a pavement surface has begun to degrade through a combination of cracking, ravelling, weathering, stripping, longitudinal or transverse joint failure or other causes, the cost of ongoing maintenance and repairs increases and accelerates to a point where it is no longer cost effective, and rehabilitation must be considered. Runway 05-23 at Vernon Airport has reached this point and requires rehabilitation.

There are a limited number of rehabilitation methods that can be applied to restore the existing runway surface. It must be understood that pavement and pavement structure and sub-grade properties underlying the top 50 to 75 mm will remain unchanged, without complete reconstruction of the pavement. Cracks which have developed in the existing asphalt pavement will reflect through the new surface with time. The fact that this runway has never been subjected to heavy loadings since its original construction in 1986 has played a significant role in achieving an unusually long functional life of 27 years. The distresses that are observed today are all related to aging of the asphalt pavement.

A common goal for the rehabilitation of a deteriorated, existing asphalt pavement is to achieve a functional service life of between 10 and 18 years, or in the case of new construction 20 years, the typical flexible (asphalt) pavement design life.

6.1 OVERLAY

This rehabilitation method involves placing a layer of new Hot Mix Asphalt Concrete (HMAC) over the existing runway surface. Overlays are generally between 50 mm and 75 mm thick, though greater thickness may be considered if there is a requirement to re-profile the surface, to improve surface water run-off or to provide additional strength, none of which appear necessary in the case of runway 05-23.

The new overlay provides a protective “seal” to prevent water intrusion in the pavement and the sub-structure and restores contiguity of the asphalt/aggregate mixture, while providing a restored wearing surface.

A major limitation of a simple overlay is that it cannot be placed directly over a surface that has been treated with significant amounts of crack sealant. The highly elastic, hot-poured, rubberized asphalt joint sealing compound used for crack sealing provides an unstable, heat-sensitive base for the new hot mixed asphalt which would result in immediate cracking, shoving and tearing, since it softens when contacted by the hot mix asphalt overlay. The crack sealant can often penetrate up to 50 mm or deeper, depending on the width of the crack or joint opening when sealed. Localized depressions and bumps in the asphalt surface would appear immediately. It is therefore necessary to apply a pre-treatment to the existing pavement surface prior to the overlay, to address this problem. This typically involves the removal of a portion of the existing pavement surface by a mechanical method such as cold-milling, or by Hot In-place Recycling (HIR).

A 50 mm overlay would increase the PLR to 7,9 and would eliminate the restriction for tire pressure. However, it is not recommended as a standalone solution for the runway rehabilitation.

6.2 MILL/FILL

Mill/fill rehabilitation comprises removal of a portion of the existing pavement surface (depth can vary from 25 mm to 75 mm or more) followed by the application of the desired thickness of HMAC to reinstate the travelled surface. This method is generally employed where it is critical to match existing surface elevations. The cold-milling operation removes the majority of the existing crack sealant so that the overlay can be placed onto the prepared (but rough, and not suitable for aircraft traffic) surface, but reduces the strengthening of the pavement layer by the addition of new HMAC, since it is mainly “inlaid”. In the case of wide, full depth (bottom up) cracks, cracks remain below the milled depth, and will reflect through the overlay with time, which is the case at Vernon Airport.

The application is multi-faceted during construction as it requires cold-milling of the existing surface, removal and disposal (loading and hauling) of the cold-milled asphalt (RAP), sweeping, drying and clean-up of the prepared surface area, trimming of tie-in edges (preferably by saw-cutting), application of an asphalt tack coat, curing of the tack coat, and then repaving.

Without the benefit of an alternate, paved runway, this surface preparation method is considered high risk, as in the event of a break-down of any type, or unexpected inclement weather, there is potential for a delayed turn-over at shift-end, or unacceptable surface conditions for aircraft use following turn-over.

In addition, mill/fill presents several challenges during construction that must be carefully managed and coordinated by the contractor to avoid problems (such as delamination, ravelling of tie-in joints), in the future. If not completed for the full width of the runway each shift, cold joints result along each edge of each paver pass, which also must be well matched to avoid transverse joint irregularities. Compaction (density) is typically lower by 2 or 3 percentage points along the joints, resulting in a weakened / less durable zone at the outer edges of each paver lane.

Typically, the milling and repaving operation must be conducted in relatively short-length sections (100 to 200 lineal metres) due to the limited time available each shift, asphalt plant production and storage capacity limitations, and the complexity and logistics of the method. Each shift involves a transverse joint take-off from an existing pavement surface that is difficult to perfect. Slight bumps or dips often occur at take-off points which will impact the longitudinal smoothness / ride quality of the runway, particularly at high speed. This results in multiple, transverse cold-joints, or multiple longitudinal cold-joints, depending on the methodology adopted (single lane maximum length nightly, versus full width, shorter lengths nightly).

Milling 25 mm and repaving 50 mm would increase the PLR to 7,7 but the tire pressure restriction would remain at 0,5 MPa.

6.3 HOT IN-PLACE RECYCLE

Hot In-place Recycling (HIR) involves the use of propane fuelled, infra-red or hot-air heaters to heat the asphalt surface in stages, warm/hot-milling to the desired depth, adding a proportion of new, hot mixed asphalt (typically ranging from 10 to 30%), adding an asphalt rejuvenating agent additive, re-mixing with an on-board pug-mill, re-laying the recycled asphalt mixture using conventional paving equipment, then compacting. The process is completed within a single train of equipment approximately 60 m in length and 3.6 m in width, followed by typical asphalt compaction equipment. The HIR train travels at speeds normally ranging between four and six lineal metres per minute, depending on the depth of the milling cut, the proportion and temperature of the admix being added, moisture, and ambient air and pavement surface temperature conditions.

The cost comparisons provided in Table 7-2, reflect a 40 mm HIR cut depth with the addition of the equivalent of approximately 10 mm (20%) of plant-produced, hot mix asphalt admix, along with the addition of an asphalt rejuvenating agent, resulting in a restoration depth of about 50 mm over the remaining approximate 35 mm of old asphalt. The ratio of 1.43 to 1 of new asphalt over old cracked asphalt would help delaying the reflection of existing cracks through the restored surface. Furthermore, the PLR would be increased to 7,9 and the tire pressure restriction could be raised to 1 MPa.

Hot In-place recycling can offer a number of advantages, including but not limited to:

- Lower capital cost.
- Shorter construction time frame. With suitable weather conditions and an adequate operating window, it should be possible to complete a full length pass of the runway each shift and to finish the rehabilitation of the required runway surface area in less than four weeks.
- Fewer (possibly none) transverse pavement joints (except at the tie-ins to the un-resurfaced pavement) yielding superior smoothness and ride quality of the finished pavement surface

(eliminates the intermittent starts and stops experienced with conventional paving). All longitudinal joints (between HIR passes) are hot joints, due to heating and processing overlaps extending into the adjacent lane.

- Higher stability asphalt mix due to a slightly stiffer asphalt binder, providing reduced risk of surface damage and tearing, and a lessened potential for rutting.
- Conservation of non-renewable resources by reusing existing asphalt and aggregate.
- Minimizes environmental impact due to asphalt plant emissions.
- Significantly reduces hauling, risk of damage to local roadways, and noise impacts on nearby residential areas.
- Minimizes problems with clean-up and drying of milled and adjacent surfaces, and eliminates the application and curing of asphalt tack coat.
- Longitudinal cold joints, and joint matching challenges (longitudinal and transverse) associated with a mill/fill operation are reduced or eliminated.
- Reduced difficulty in restoring runway to operations in the case of unexpected weather events, plant or equipment breakdowns, or interruption of asphalt supply.
- On-board heating and reduced removal/surface preparation/replacement/hauling time reduces exposure to ambient conditions allowing for a wider, net operating window.

Disadvantages may include:

- Lessened grade control on lay-down due to limited surge capacity in the recycling train. As the existing and proposed surface geometrics do not require significant adjustments to profile and cross-section, this concern is limited to achieving a precise match on longitudinal joints.
- Slightly less control of asphalt mixture properties, since the majority of the recycled asphalt mixture is a product of the existing asphalt pavement (the quality of which would have been well-controlled during the previous, Transport Canada-administered runway overlay in 1986). The on-board re-mixing of virgin, plant-produced asphalt admix and a liquid rejuvenating agent allows for some asphalt mixture modification and improvement.
- Limited ability to add an asphalt anti-stripping agent additive (

While HIR has, in most airfield applications, been utilized as a preparatory treatment for a HMAC overlay, there is no technical reason, based on past experience, why it should not be used as the primary resurfacing method.

A stand-alone HIR trial application was undertaken on Taxiway A at Penticton Airport in 1994 as part of a larger, airfield pavement rehabilitation project. On October 28, 2011 SNC Lavalin personnel inspected this trial section, which is now 17 years old. Our visual observations of Taxiway A were as follows:

- Some pre-existing cracks had reflected through the HIR surface and for the most part have been well maintained (cracks and joints sealed using over-bands) to prevent water intrusion – a key to good, long-term performance.
- Most pavement surface cracks were of low severity, narrow width, with little or no secondary cracking evident.
- Most longitudinal joints have endured well, with a limited amount of longitudinal joint sealing required to date.

- Based on ASTM D5340-10, Standard Test Method for Airport Pavement Condition Index Surveys, ravelling and weathering was classified as LOW severity.

6.4 FULL DEPTH RECLAMATION

Full depth reclamation remains an option for older pavements that have reached their terminal serviceability when there are concerns with the characteristics and properties or thicknesses of the existing pavement structure materials. This more expensive option can also be considered when either the traffic is expected to grow significantly or new heavier aircrafts are expected to visit the airport.

None of these conditions apply for the Vernon Airport. Nevertheless, as a basis for comparison, a full depth reclamation solution is defined for the Runway, Taxiway Alpha and Apron 1. The solution would involve:

- Full depth pulverization of the existing asphalt pavement together with a portion of the granular base;
- Addition of selected granular material to correct the gradation of the base material;
- Reshaping and recompacting the granular base;
- Laying new asphalt base course (50 mm);
- Applying a tack coat;
- Laying new asphalt surface course (40 mm).

This would increase the PLR to 7,9 and would eliminate the restriction for tire pressure.

See Section 7 for a summary of the rehabilitation options considered and for comparative estimates of probable costs.

7 COST COMPARISON

Most of the unit prices used in this cost comparison come from similar works executed in the recent years at Kelowna airport, YVR, Trail airport and others in British Columbia. They were adjusted to reflect local market and size of the project. However, the price for asphalt, laid and compacted, is the current applicable rate for the City of Vernon. These prices are indicative and for budgetary purposes only . They do not include indirect costs, contingency and taxes.

Table 7:1 - Unit Prices

Work	Cost	Unit
Milling - to 25 mm	$ 4.50	m²
Pulverize asphalt full depth	$ 6.00	m²
Excavation	$ 15.00	m³
Tack Coat	$ 0.60	m²
HMA - Patching	$ 188	t
HMA - Paving	$ 125	t
Granular shouldering	$ 25	t
Crushed Granular Base	$ 60	t
Full Depth Repair	$ 45.16	m²
HIR to 50 mm	$ 15.00	m²

Basic assumptions:

- HMA volumetric weight: 2,5 tons per cubic meter
- Granular materials volumetric weight: 2,0 tons per cubic meter

Table 7:2 - Comparison of Rehabilitation Options and Estimate of Probable Costs

Section	Airfield Pavement	Area (sq.m.)	Rehabilitation Options – Direct Costs			
			Overlay	Mill / Pave	Hot In-Place Recycling	Full Depth Reconstruction
Depth of intervention			50 mm	25 mm / 50 mm	65 mm	300 mm
1-2-3	Runway 05-23	25,488	$ 460,701	$ 677,150	$ 387,861	$ 943,943
4	Apron 1	6,029	$ 107,665	$ 131,734	$ 90,435	$ 220,661
5	Taxiway A	1,321	$ 24,031	$ 28,864	$ 19,815	$ 48,923
6	Taxiway B	2,033	$ 32,392	$ 31,715	$ 30,495	$ 75,763
7	Taxiway C	2,603	$ 41,474	$ 40,607	$ 39,045	$ 56,398
8	Taxiway D	3,658	$ 58,284	$ 57,065	$ 54,870	$ 79,257
9	Apron 2-Old Taxiway	1,942	$ 30,717	$ 30,295	$ 29,130	$ 40,782
10	Apron 2-Parking	1,847	$ 28,813	$ 28,813	$ 27,705	$ 38,787
11	Access Road	2,234	$ 37,084	$ 34,850	$ 33,510	$ 47,885
Life Expectancy[4]			**5 – 10 years**	**10 – 15 years**	**10 -15 years**	**> 25 years**

Notes:

1. Costs shown for 2014 are estimated probable costs, and are based on pavement rehabilitation approach concepts only.
2. Cost estimates are for comparison purposes only, and are provided to assist in assessing rehabilitation alternatives versus estimated functional service life.
3. For simplicity, E & C costs, indirect costs and HST have not been included in the table. E & C and other indirect costs could represent as much as 20-25% of the Direct Construction Costs. HST is also not included.
4. Life Expectancy is defined as the time lapse before the pavement return in its current poor condition (SCR<4).

8 RECOMMENDATIONS

The airfield pavements at Vernon airport are not subject to heavy loads and hence will slowly deteriorate as the bitumen is aging. With the exception of the old apron 1 area (sub-section 4A) which was built in the 60s and is now failed, the Runway and Taxiway A which were built in 1986 are the first more recent pavements to reach terminal serviceability (SCR < 4), after 27 years. The runway, between the two thresholds, would require a major rehabilitation to restore its functionality and reduce maintenance costs.

Considering the nature and extent of the defects observed, it is recommended to rehabilitate this portion of the runway using the Hot In-place Recycling (HIR) methodology, or alternatively by milling and repaving. In order to maintain the longitudinal profile, the two stopways should be overlaid to match the final rehabilitated surface. It should be noted that the simple overlay solution is not recommended because it will provide a limited life expectancy due to reflective cracking and the presence of a significant amount of joint sealant.

Taxiway Alpha and its extension into Apron 1 could also be rehabilitated on the same occasion using the same technique. The rest of Apron 1 could be overlaid to match the grades, with the exception of the old Apron 1 area (sub-section 4A) which should be fully reconstructed.

Considering the current good condition of the other airfield pavements which were built or rehabilitated between 1996 and 2009, it is reasonable to expect equivalent life expectancy achieved for the runway (approx. 25 years). Therefore, their rehabilitation could be delayed at least 5 to 10 years depending on their year of construction, provided that the current operations remain unchanged as well as the maintenance operations.

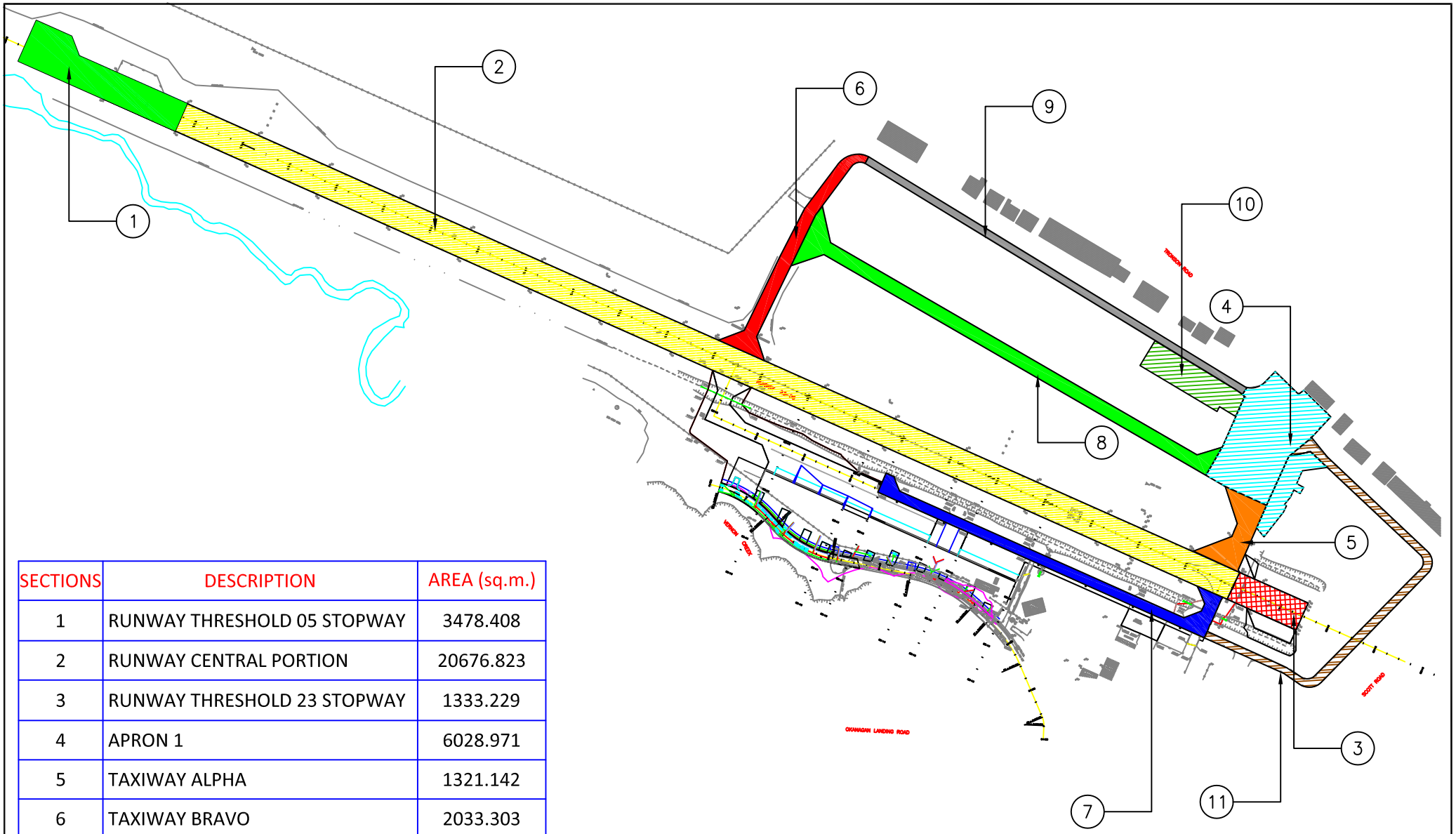
For the access road (section 11), its limited use and future Apron 1 expansion projects are good reasons to delay its rehabilitation. However, an overlay could provide satisfactory results until a decision is made on the expansion of Apron 1.

9 CLOSURE

Recognizing the complexity of managing such an infrastructure in the context of budget rationalization, we will be pleased to assist you with further assessment of the airfield and working together with you on selection of the most suitable rehabilitation strategy for the Vernon Airport. As presented in this report, there are many different options available which would provide different life expectancies and the right solution for the Vernon airport is the one that takes into consideration the available budget and the development objectives.

We trust that the information presented herein is sufficient for your current requirements. Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

APPENDIX A
LAYOUT SKETCHES



SECTIONS	DESCRIPTION	AREA (sq.m.)
1	RUNWAY THRESHOLD 05 STOPWAY	3478.408
2	RUNWAY CENTRAL PORTION	20676.823
3	RUNWAY THRESHOLD 23 STOPWAY	1333.229
4	APRON 1	6028.971
5	TAXIWAY ALPHA	1321.142
6	TAXIWAY BRAVO	2033.303
7	TAXIWAY CHARLIE	2603.064
8	TAXIWAY DELTA	3657.989
9	APRON 2 – OLD TAXIWAY	1941.677
10	APRON 2 – PARKING AREA	1846.562
11	SERVICE ROAD	2233.918
TOTAL		47155.086

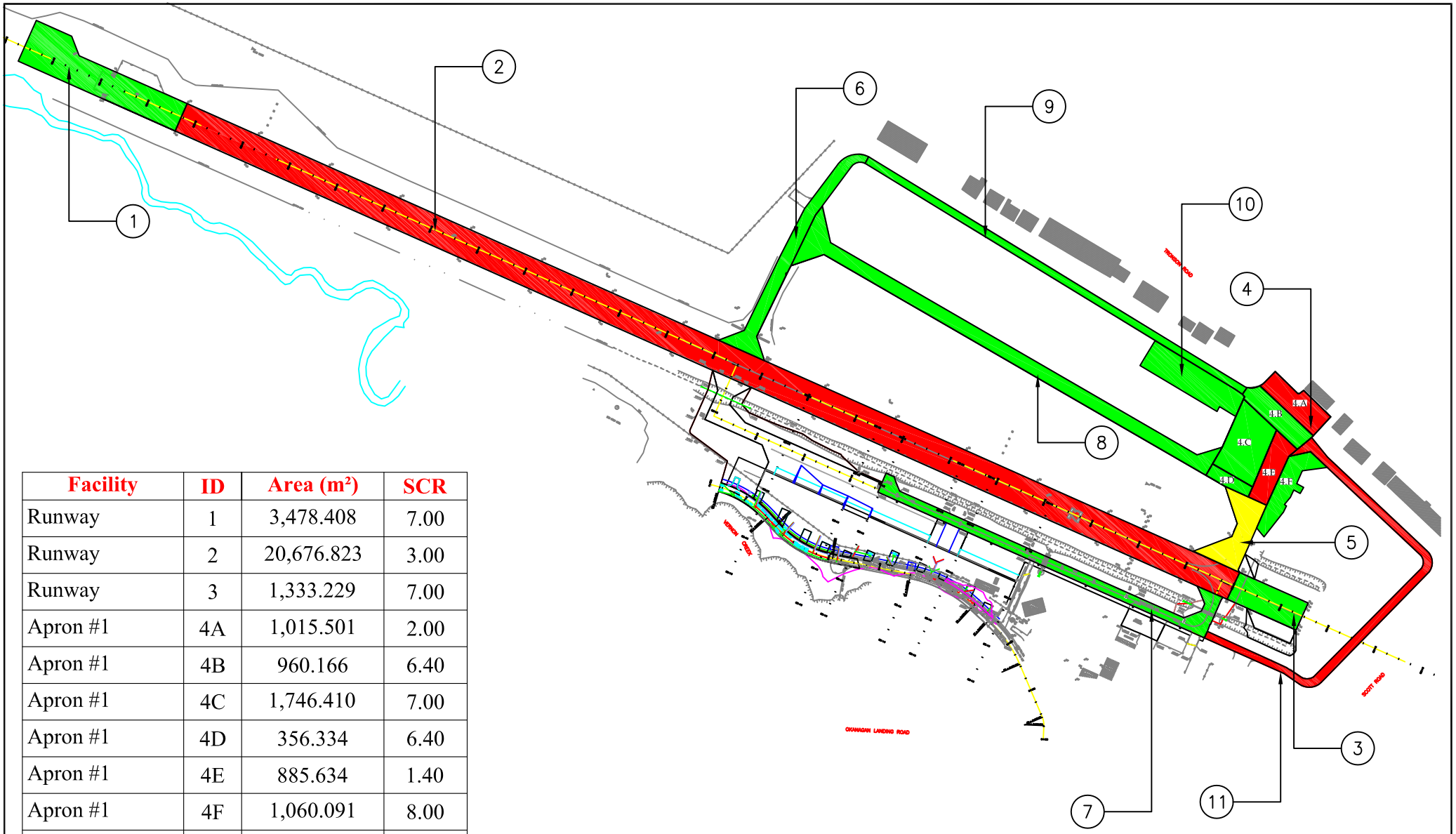
FIGURE A.1

LAYOUT OF SECTIONS

SNC·LAVALIN Montreal (Quebec) Canada H2Z 1Z3

DATE : 2012-11-11 FORMAT: 8.5 x 11

MADE	CHKD	APPD
S.T.		M.S.



Facility	ID	Area (m²)	SCR
Runway	1	3,478.408	7.00
Runway	2	20,676.823	3.00
Runway	3	1,333.229	7.00
Apron #1	4A	1,015.501	2.00
Apron #1	4B	960.166	6.40
Apron #1	4C	1,746.410	7.00
Apron #1	4D	356.334	6.40
Apron #1	4E	885.634	1.40
Apron #1	4F	1,060.091	8.00
Taxiway A	5	1,321.142	4.00
Taxiway B	6	2,033.303	7.00
Taxiway C	7	2,603.064	7.00
Taxiway D	8	3,657.989	6.40
Apron #2	9	1,941.677	9.50
Apron #2	10	1,846.562	10.00
Service Road	11	2,233.918	1.70

FIGURE A.2

STRUCTURAL CONDITION RATING

SNC·LAVALIN Montreal (Quebec) Canada H2Z 1Z3

DATE : 2012-11-11 FORMAT: 8.5 x 11

MADE	CHKD	APPD
S.T.		M.S.

APPENDIX B
INSPECTION FORMS

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	RUNWAY
CHAINAGE From:		SECTION	1
To:		ID NO.	threshold 05
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS				
	% AT SEVERITY LEVEL			EXTENT
	HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	
Low	Single, clean cracks with no associated breakdown		
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement		SCR =

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing ≥ 2 m		
Medium	Cracking with chipped or ravelling edges, spacing ≥ 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing ≥ 1 m		SCR =

RAVELLING		% Area Affected	100
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth ≥ 3 mm	100	
Medium	Depth of surface loss not greater than maximum aggregate size	—	
High	Depth of surface loss greater than maximum aggregate size	—	SCR = 7.0

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

	% Wheelpath Length Affected	
Low		
Medium		
High		SCR =

	% Wheelpath Length Affected	
Low		
Medium		
High		SCR =

Comments Maintenance Requirements:
Excellent condition

Overall Structural Condition Rating: 7.0

Guidelines Controlling SCR = 7.0

Subjective Judgement SCR = ____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	RUNWAY
CHAINAGE From:		SECTION	2
To:		ID NO.	CENTER
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	15 / 3.5
Low	Single, clean cracks with no associated breakdown	/	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking	/	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/	from 0+175 to 0+215 SCR = 6.4

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	75
Low	Cracking with no associated breakdown, spacing > 2 m	20	5.0
Medium	Cracking with chipped or ravelling edges, spacing > 2 m	80	3.0
High	Cracking with asphalt fragments loose or spalled, spacing > 1 m	—	SCR = 3.0

start 0+130

RAVELLING		% Area Affected	—
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth > 3 mm		
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		SCR =

RUTTING		% Wheelpath Length Affected	—
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

Comments / Maintenance Requirements

Raveling that seems to be associated with line painting ??

Overall Structural Condition Rating: 3.0

Guidelines Controlling SCR = _____

Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	RUNWAY 3
CHAINAGE From:		SECTION	
To:		ID NO.	Threshold 23
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	
Low	Single, clean cracks with no associated breakdown		
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement		SCR =

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing ≥ 2 m		
Medium	Cracking with chipped or ravelling edges, spacing ≥ 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing ≥ 1 m		SCR =

RAVELLING		% Area Affected	100
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth ≥ 3 mm	100	more in middle portion
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		SCR = 7.0

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

Comments Maintenance Requirements

Very good condition

Overall Structural Condition Rating: 7.0

Guidelines Controlling SCR = _____

Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	VERNON	FACILITY	APRON #1
CHAINAGE From:	—	SECTION	4
To:	—	ID NO.	A
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)		/
Low	Single, clean cracks with no associated breakdown		/	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking	/		
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/		SCR =

ALLIGATOR CRACKING		% Wheelpath Length Affected		20
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		20	
Medium	Transverse cracking fully developed to complete alligator pattern	78		
High	Cracking with asphalt fragments loose or spalled	2		SCR = 3.5

MAP CRACKING		% Wheelpath Length Affected		
Low	Cracking with no associated breakdown			
Medium	Cracking with chipped or ravelling edges, or with secondary cracking			
High	Cracking with asphalt fragments loose or spalled			SCR =

BLOCK CRACKING		% Area Affected		100
Low	Cracking with no associated breakdown, spacing > 2 m		—	
Medium	Cracking with chipped or ravelling edges, spacing < 2 m	20	5.0	
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m	80	1.4	SCR = 1.4

RAVELLING		% Area Affected		100
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm		100	
Medium	Depth of surface loss not greater than maximum aggregate size	—		
High	Depth of surface loss greater than maximum aggregate size	—		SCR = 7.0

RUTTING		% Wheelpath Length Affected		
Low	Rut depth less than 20 mm			
Medium	Rut depth 20 to 40 mm			
High	Rut depth greater than 40 mm			SCR =

Patch		% Wheelpath Length Affected		< 1%
Low			100	
Medium				
High				SCR =

Depressions		% Wheelpath Length Affected		10
Low			—	
Medium		100		
High		—		SCR =

Comments / Maintenance Requirements

Very poor condition, uneven pavement, numerous depressions.

Overall Structural Condition Rating: 1.4

Guidelines Controlling SCR = ____

Subjective Judgement SCR = 2.0

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	APRON #1
CHAINAGE From:		SECTION	4
To:		ID NO.	B
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	/3.5
Low	Single, clean cracks with no associated breakdown	/3.5	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking	/	All sealed
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/	SCR = 6.4

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing > 2 m		
Medium	Cracking with chipped or ravelling edges, spacing < 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m		SCR =

RAVELLING		% Area Affected	100
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm	100	very low
Medium	Depth of surface loss not greater than maximum aggregate size	—	
High	Depth of surface loss greater than maximum aggregate size	—	SCR = 7.0

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

Comments / Maintenance Requirements	
	Overall Structural Condition Rating: 6.4
	Guidelines Controlling SCR = _____
	Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	APRON #1
CHAINAGE From:		SECTION	4
To:		ID NO.	C
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	
Low	Single, clean cracks with no associated breakdown	/	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking	/	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/	SCR =

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing > 2 m		
Medium	Cracking with chipped or ravelling edges, spacing < 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m		SCR =

RAVELLING		% Area Affected	100
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm	100	
Medium	Depth of surface loss not greater than maximum aggregate size	–	
High	Depth of surface loss greater than maximum aggregate size	–	SCR = 7.0

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

	% Wheelpath Length Affected	
Low		
Medium		
High		SCR =

	% Wheelpath Length Affected	
Low		
Medium		
High		SCR =

Comments / Maintenance Requirements

Very good condition

Overall Structural Condition Rating: 7.0

Guidelines Controlling SCR = _____

Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	APRON #1
CHAINAGE From:		SECTION	4
To:		ID NO.	D
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	— / 3.5
Low	Single, clean cracks with no associated breakdown	— / 3.5	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking	X	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	X	SCR = 6.4

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing > 2 m		
Medium	Cracking with chipped or ravelling edges, spacing < 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m		SCR =

RAVELLING		% Area Affected	100
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm	100	
Medium	Depth of surface loss not greater than maximum aggregate size	—	
High	Depth of surface loss greater than maximum aggregate size	—	SCR = 7.0

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

Paver Cold Sreed Tears		% Wheelpath Length Affected	100
Low		100	
Medium			
High			SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

Comments / Maintenance Requirements	
	Overall Structural Condition Rating: 6.4
	Guidelines Controlling SCR = _____
	Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	APRON #1
CHAINAGE From:		SECTION	4
To:		ID NO.	E
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)		
Low	Single, clean cracks with no associated breakdown		/	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		/	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/		SCR =

ALLIGATOR CRACKING		% Wheelpath Length Affected		
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath			
Medium	Transverse cracking fully developed to complete alligator pattern			
High	Cracking with asphalt fragments loose or spalled			SCR =

MAP CRACKING		% Wheelpath Length Affected		
Low	Cracking with no associated breakdown			
Medium	Cracking with chipped or ravelling edges, or with secondary cracking			
High	Cracking with asphalt fragments loose or spalled			SCR =

BLOCK CRACKING		% Area Affected			100
Low	Cracking with no associated breakdown, spacing > 2 m			10	7.6
Medium	Cracking with chipped or ravelling edges, spacing < 2 m		10	6.0	
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m	30	1.4	SCR =	1.4

RAVELLING		% Area Affected		
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm			
Medium	Depth of surface loss not greater than maximum aggregate size			
High	Depth of surface loss greater than maximum aggregate size			SCR =

RUTTING		% Wheelpath Length Affected		
Low	Rut depth less than 20 mm			
Medium	Rut depth 20 to 40 mm			
High	Rut depth greater than 40 mm			SCR =

		% Wheelpath Length Affected		
Low				
Medium				
High				SCR =

		% Wheelpath Length Affected		
Low				
Medium				
High				SCR =

Comments / Maintenance Requirements

Extrem block cracking but well sealed

Overall Structural Condition Rating: 1.4

Guidelines Controlling SCR = _____

Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	APRON #1
CHAINAGE From:		SECTION	4F
To:		ID NO.	
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	
Low	Single, clean cracks with no associated breakdown		
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement		SCR =

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing > 2 m		
Medium	Cracking with chipped or ravelling edges, spacing > 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing > 1 m		SCR =

RAVELLING		% Area Affected	
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth > 3 mm		
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		SCR =

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

Cold screed tears		% Wheelpath Length Affected	80
Low			
Medium			
High			SCR = 8.0

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

Comments Maintenance Requirements	Overall Structural Condition Rating:
	Guidelines Controlling SCR =
	Subjective Judgement SCR = 8,0

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	TAXIWAY A
CHAINAGE From:		SECTION	5
To:		ID NO.	—
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)		/
Low	Single, clean cracks with no associated breakdown		10 / 7	7.9 / 7.5
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		/	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/		
			SCR =	7.5

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		
			SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		
			SCR =

BLOCK CRACKING		% Area Affected	15
Low	Cracking with no associated breakdown, spacing > 2 m		—
Medium	Cracking with chipped or ravelling edges, spacing < 2 m		—
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m	100	
			SCR = 4.0

RAVELLING		% Area Affected	
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm		
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		
			SCR =

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		
			SCR =

	% Wheelpath Length Affected	
Low		
Medium		
High		
		SCR =

	% Wheelpath Length Affected	
Low		
Medium		
High		
		SCR =

Comments / Maintenance Requirements	Overall Structural Condition Rating: 4.0
	Guidelines Controlling SCR = _____
	Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	TAXIWAY B
CHAINAGE From:		SECTION	6
To:		ID NO.	
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)		
Low	Single, clean cracks with no associated breakdown		10 / 1	/ centre line crack
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		/	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/		SCR = 8,0

ALLIGATOR CRACKING		% Wheelpath Length Affected		
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath			
Medium	Transverse cracking fully developed to complete alligator pattern			
High	Cracking with asphalt fragments loose or spalled			SCR =

MAP CRACKING		% Wheelpath Length Affected		
Low	Cracking with no associated breakdown			
Medium	Cracking with chipped or ravelling edges, or with secondary cracking			
High	Cracking with asphalt fragments loose or spalled			SCR =

BLOCK CRACKING		% Area Affected		
Low	Cracking with no associated breakdown, spacing > 2 m			
Medium	Cracking with chipped or ravelling edges, spacing < 2 m			
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m			SCR =

RAVELLING		% Area Affected		100
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm		100	
Medium	Depth of surface loss not greater than maximum aggregate size		—	
High	Depth of surface loss greater than maximum aggregate size	—		SCR = 7,0

RUTTING		% Wheelpath Length Affected		
Low	Rut depth less than 20 mm			
Medium	Rut depth 20 to 40 mm			
High	Rut depth greater than 40 mm			SCR =

Edge cracking		% Wheelpath Length Affected		1 side, half length
Low				
Medium				
High				SCR =

		% Wheelpath Length Affected		
Low				
Medium				
High				SCR =

Comments / Maintenance Requirements	Overall Structural Condition Rating:
	Guidelines Controlling SCR = 7.0
	Subjective Judgement SCR =

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	TAXIWAY C
CHAINAGE From:		SECTION	7
To:		ID NO.	
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	— / 1m & full length
Low	Single, clean cracks with no associated breakdown	/	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking	/	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/	SCR = 7.0

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing > 2 m		
Medium	Cracking with chipped or ravelling edges, spacing < 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing < 1 m		SCR =

RAVELLING		% Area Affected	
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm		
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		SCR =

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

Comments / Maintenance Requirements

Very minor scattered transverse cracks.

Overall Structural Condition Rating: 7.0

Guidelines Controlling SCR = _____

Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	TAXIWAY D
CHAINAGE From		SECTION	9
To		ID NO.	
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS				
	% AT SEVERITY LEVEL			EXTENT
	HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)		— / 3.5 full length const. joint
Low	Single, clean cracks with no associated breakdown		— / 3.5	
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		/	
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	/		SCR = 6.4

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing ≥ 2 m		
Medium	Cracking with chipped or ravelling edges, spacing ≥ 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing ≥ 1 m		SCR =

RAVELLING		% Area Affected	
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth ≤ 3 mm		
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		SCR =

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

Patches		% Wheelpath Length Affected	
Low		100	
Medium			
High			SCR =

Tear cracks at intersection in		% Wheelpath Length Affected	
Low	to wheelpath		
Medium			
High			SCR =

Comments Maintenance Requirements

Patches at intersection of Tw B and D seem to be associated with poor drainage along joint

Overall Structural Condition Rating: 6.4

Guidelines Controlling SCR = _____

Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	APRON #2
CHAINAGE From:		SECTION	9
To:		ID NO.	—
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m) > 30 /—
Low	Single, clean cracks with no associated breakdown	>30/—
Medium	Cracks with chipped or ravelling edges, or with secondary cracking	+
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement	+

SCR = 9.5

ALLIGATOR CRACKING		% Wheelpath Length Affected	1
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath	100	In front of large hangar
Medium	Transverse cracking fully developed to complete alligator pattern	—	
High	Cracking with asphalt fragments loose or spalled	—	

SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		

SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing > 2 m		
Medium	Cracking with chipped or ravelling edges, spacing > 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing > 1 m		

SCR =

RAVELLING		% Area Affected	
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth < 3 mm		
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		

SCR =

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		

SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			

SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			

SCR =

Comments / Maintenance Requirements	Overall Structural Condition Rating:
	Guidelines Controlling SCR = 9.5
	Subjective Judgement SCR =

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.

SNC·LAVALIN

AIRPORT	Vernon	FACILITY	APRON #2
CHAINAGE From:		SECTION	10
To:		ID NO.	—
INSPECTOR	M.S.	DATE	24-10-2013

DEFECT RATINGS			
% AT SEVERITY LEVEL			EXTENT
HIGH	MEDIUM	LOW	

TRANSVERSE / LONGITUDINAL (DISCRETE) CRACKING		Average Spacing of Cracks (m)	
Low	Single, clean cracks with no associated breakdown		
Medium	Cracks with chipped or ravelling edges, or with secondary cracking		
High	Cracks with adjacent asphalt fragments loose or spalled, or with major settlement		SCR =

ALLIGATOR CRACKING		% Wheelpath Length Affected	
Low	Initial stages, closely spaced longitudinal hairline cracks in the wheelpath		
Medium	Transverse cracking fully developed to complete alligator pattern		
High	Cracking with asphalt fragments loose or spalled		SCR =

MAP CRACKING		% Wheelpath Length Affected	
Low	Cracking with no associated breakdown		
Medium	Cracking with chipped or ravelling edges, or with secondary cracking		
High	Cracking with asphalt fragments loose or spalled		SCR =

BLOCK CRACKING		% Area Affected	
Low	Cracking with no associated breakdown, spacing ≥ 2 m		
Medium	Cracking with chipped or ravelling edges, spacing ≥ 2 m		
High	Cracking with asphalt fragments loose or spalled, spacing ≥ 1 m		SCR =

RAVELLING		% Area Affected	
Low	Individual coarse aggregate pop-outs or fines matrix loss to depth ≤ 3 mm		
Medium	Depth of surface loss not greater than maximum aggregate size		
High	Depth of surface loss greater than maximum aggregate size		SCR =

RUTTING		% Wheelpath Length Affected	
Low	Rut depth less than 20 mm		
Medium	Rut depth 20 to 40 mm		
High	Rut depth greater than 40 mm		SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

		% Wheelpath Length Affected	
Low			
Medium			
High			SCR =

Comments Maintenance Requirements

Perfect condition

Overall Structural Condition Rating: 10

Guidelines Controlling SCR = _____

Subjective Judgement SCR = _____

Note: The "Guidelines Controlling SCR" is the lowest of the defect SCR's calculated above.


SNC·LAVALIN