CROWN CAPITAL ENTERPRISE LIMITED

WANCHAI, HONG KONG

Demonstration of RJSeal™
Hong Qi Lu, QinHuangDao, Hebei, Peoples Republic of China

October 2003

TS^2 Consulting Inc.
Lamma, Hong Kong

TS² CONSULTING INC.

(British Virgin Islands Incorporated) website: http://ts2.stormloader.com

Hong Kong
2/F 81 Po Wah Yuen.
Lamma Island, Hong Kong
Phone (85-2)-2982-4131
Fax: (85-2)-2390-5465
Cellular: (85-2)-9157-6693
Email: speed_cny@yahoo.co.uk

Canada (Liaison Office)
1016 Cannock Road S.W.
Calgary, Alberta
Canada, T2W IM5
Phone: (403)-281-3043
Fax: (403)-281-3043
Email: speed_cny@yahoo.co.uk

December 29, 2003

Crown Capital Enterprise Limited
B5, Centre Point Building
181 – 185 Gloucestor Road,
Wanchai, Hong Kong.
Attn: Charence Chiang
General Manager

Dear Charence

Re: Demonstration of RJSeal™ on the Hong Qi Lu, QinHuangDao, HeBei.

This is the final report on the demonstration of RJSeal™ on the Hong Qi Lu, in the city of QinHuangDao, HeBei Province. This demonstration was undertaken on October 15 and 16 and encompassed the entire 6 lane street as well as bicycle paths on each side of the street. The principal interest of the city's road maintenance department was restoration of the asphalt pavement's ductility, as well as an improvement of the resistance to water penetration. Initial indications are that these requirements have been readily met.

Yours Sincerely

Anthony G. Speed, P.Eng. (Ontario, Canada)

Crown Capital Enterprise Limited.
RejuvaSeal Demo
Hong QiLu, QinHuangDao, hebeio
Date of Work October 15-16
Prepared by A.G. Speed
Updated by A.G. Speed
Updated 7-Feb-04

Weather Conditions

Temperature	21 Celsius
Humidity	40%
Cloud Cover	Cloudy

Assumptions

Date	Length	Width	Area
15-Oct-03	812	15.0	12180
16-Oct-03	812	15.0	12180
	1624	30	24360

Conversion Factors

US Gallon=	3.78	Litres	
Sq Metre=	10.76	Sq Feet	
Sq Metre=	1.20	Sq Yds	
One Litre	1.10	kgs	
One Full Drum	208	Litres	
One Full`Drum	55	US Gallon	
90% full drum	50	US Gallon	

Crew Consist	No
Desco Op	1
Desco Help	2
Labourers	15
Truck Driver	2
Supervisor	3
Total	23

Work Schedule	Work Time	Work Time	Test Length (m)	Total Area m^2	Total Area yd^2	RejuvaSeal Applied			Application Rate				23 Man Crew	
am/pm						US gals	litres	kilograms	USGal /yd^2	Litres/m^2	m^2 /Litre	m^2/Kg	m^2 /man hr	yd^2 /man hr
15-Oct-03	08.00-23.30	15.5	812.0	12,180	14,560	750	2,836	3,120	**0.052**	**0.23**	**4.29**	**3.90**	34.2	40.8
16-Oct-03	05.30-11.00	5.5	812.0	12,180	14,560	750	2,836	3,120	**0.052**	**0.23**	**4.29**	**3.90**	96.3	115.1
16-Oct-03	15.00-22.00	7.0	812.0	12,180	14,560	350	1,324	1,456	**0.024**	**0.11**	**9.20**	**8.37**	75.7	90.4
Totals		28.0	1,624.0	24,360.0	29,119.4	1,850.9	6,996.4	7,696.0	**0.064**	**0.29**	**3.48**	**3.17**	37.8	45.2
							bbls	37						

Note 1 On Day Two: vehicular traffic was allowed to travel over the treated area and it had to be re-done with 6 barrels
Note 2 Drying time 3 hours

FlowMeter Readings **Time (sec)** **Location**
Time **Location**

CROWN CAPITAL ENTERPRISE LIMITED

Demonstration of RJSeal
Hong Qi Lu, QinHuangDao, Hebei,
Peoples Republic of China

October 2003

TABLE OF CONTENTS

FIGURES

TABLES

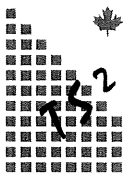
CROWN CAPITAL ENTERPRISE LIMITED

Demonstration of RJSeal
Hong Qi Lu, QinHuangDao, Hebei,
Peoples Republic of China

October 2003

APPENDICES

No.	Description
A	RJSeal Descriptive Literature
B	Desco D200 Sprayer - Specifications



TS^2 Consulting Inc.
Lamma, Hong Kong

CROWN CAPITAL ENTERPRISE LIMITED

Demonstration of RJSeal™
Hong Qi Lu, QinHuangDao, Hebei
Peoples Republic of China

October 2003

1.0 INTRODUCTION

Crown Capital Enterprise Limited of Hong Kong entered into a contract with the Road Maintenance Department of the City of QinHuangDao, Hebei Province, China in September 2003. This arrangement calls for the analysis of the performance of RJSeal™, a sealer/rejuvenator for asphalt pavement on Hong Qi Lu, as a precursor to further work in 2004.

Hebei Province is situated to the north of the Yellow River (HuangHe) at its confluence with the Sea of Bohai. Henan, Shanxi, Shandong and Liaoning Provinces as well as Mongolia border Hebei. Furthermore, Beijing and TianJin and their independently administered Municipalities are hosted by Hebei Province. Hebei has seen a major growth in the highway system, in recent years, due to a government drive to build national highways linking Beijing and TianJin with major cities in the adjoining provinces and the massive increase in the world export trade. QinHuangDao, lies some 450 kilometres east of Beijing and some 350 kms northeast of TianJin. The capital city of Hebei Province is Shijiazhuang with a population of approximately 3 million. See figure 1.0 for a map showing the location of QinHuangDao and Hebei Province. The majority of the area lies at 10 to 20 metres in elevation, on the extensive coastal plain that borders the Sea of Bohai. The regions' latitude (38 degrees north), mean that there are four seasons, with temperatures ranging from 45 Celsius in the long, hot summer to minus 5 Celsius in the short winter. Their is no rainy season per-se, just thunderstorms and these occur primarily in June thru August, but can extend into September.

In the immediate QinHuangDao area, there are small hills, with exposures of weakly cemented fine-grained sandstone. However to the south, on the vast plain that lies astraddle the Yellow River, there are no opportunities to see the bedrock. A significant unconsolidated sedimentary sequence predominates and this is due to the site adjoining the delta of the Yellow River. The silt from the flooding that has occurred over several millennium and now obscures all outcrops. Drainage channels feeding into the Yellow River also afford no opportunities to see the bedrock. The asphalt in the area is manufactured from imported materials, which is comprised of crushed and screened sandstone and diorites hauled in from quarries elsewhere in Hebei Province, as well as washed gravels from the various rivers. The bitumen binder for the asphalt is sourced from various locations. Since Hebei Province borders the Sea of Bohai, the possibility of bitumen being sourced from offshore is a distinct possibility so refineries in Singapore and the like should not be forgotten.

LAST UPDATE: 02/08/20 8:11am CAD FILE NAME: 800001.dwg

DESIGNED BY	TS2	02/08/20	SCALE: As Shown	
DRAWN BY	Bb	02/08/20	PROJECT NO. B023G	

TS2 Consulting Inc.
Lamma, Hong Kong

REJUVASEAL DEMO

CROWN CAPITAL ENTERPRISE LIMITED
HEBEI PROVINCE

GENERAL LOCATION MAP

DRAWING NO. FIGURE 1.0

REV. A

2.0 CO-OPERATIVE PROGRAM

The intent of the arrangement with the City of QinHaungDao is to demonstrate RJSeal™ and subsequently allow analysis of the performance of RJSeal™ on a variety of asphalt surfaces. A demonstration was undertaken on Hong Qi Lu, in the central core of the city of QinHuangDao, on October 15 and 16, 2003. The portion of the street that was treated was composed of asphalt pavement of 1996 vintage. No details are known about the subgrade, but inspection of the shoulders show a sandy-silty material. Knowing construction techniques in streets in China in general, minimal gravel would be used for an immediate coarse base, beneath the asphalt pavement. This asphalt pavement is only one year old and the gray colour indicates premature aging of the bitumen and keen interest was expressed in having the life extended.

3.0 RJSEAL™

RJSeal™ is a proprietary product that is supplied by Crown Capital Enterprise Limited of Wanchai, Hong Kong. RJSeal™ has been proven in numerous applications in North and South America to rejuvenate asphalt pavement at various stages of its life and economically extend the life of the pavement. RJSeal™ is a three component, asphalt sealer rejuvenator that is comprised of Coal Tar, Coal Tar Oils and Petroleum Solvents.

3.1 PRIOR EXPERIENCE

Refer to Appendix A for a copy of the brochure that outlines the experience with RJSeal™ at various locations in North America and South America. Further information is available from Crown Capital Enterprise Limited. RJSeal™ has been used at numerous airports in North and South America, as well as highways in Alberta, Canada; Cearo State, Brazil and North Dakota and Texas, as well as other locations in the U.S.A. Since 2000, RJSeal™ has been demonstrated successfully at over thirty one (31) locations in China and eleven (11) commercial-scale applications have taken place at various locations, including Shanghai, DaQing and Kunming.

4.0 TEST PROGRAM

Since Hebei Province is located in a semi-tropical climate (Latitude: 38 North) at a low altitude (10 to 20 metres), it's a demanding setting for asphalt, given the year round warm climate (extremes of 45 Celsius in summer and minus 5 Celsius in the winter) and intense exposure to ultraviolet radiation, all which contribute to the oxidation and breakdown of the asphalt binder.

Hebei has the second greatest concentration of highways in China (after ShangDong), with some 10,000 kms of National and Provincial highway. The City of QinHuangDao is responsible for 1000 kilometres of National Highway, and 800 kilometres of Provincial Highway, within it's jurisdiction (distances as of year-end 2000) and approximately 1000 kms of streets in QinHuangDao and other neighboring communities

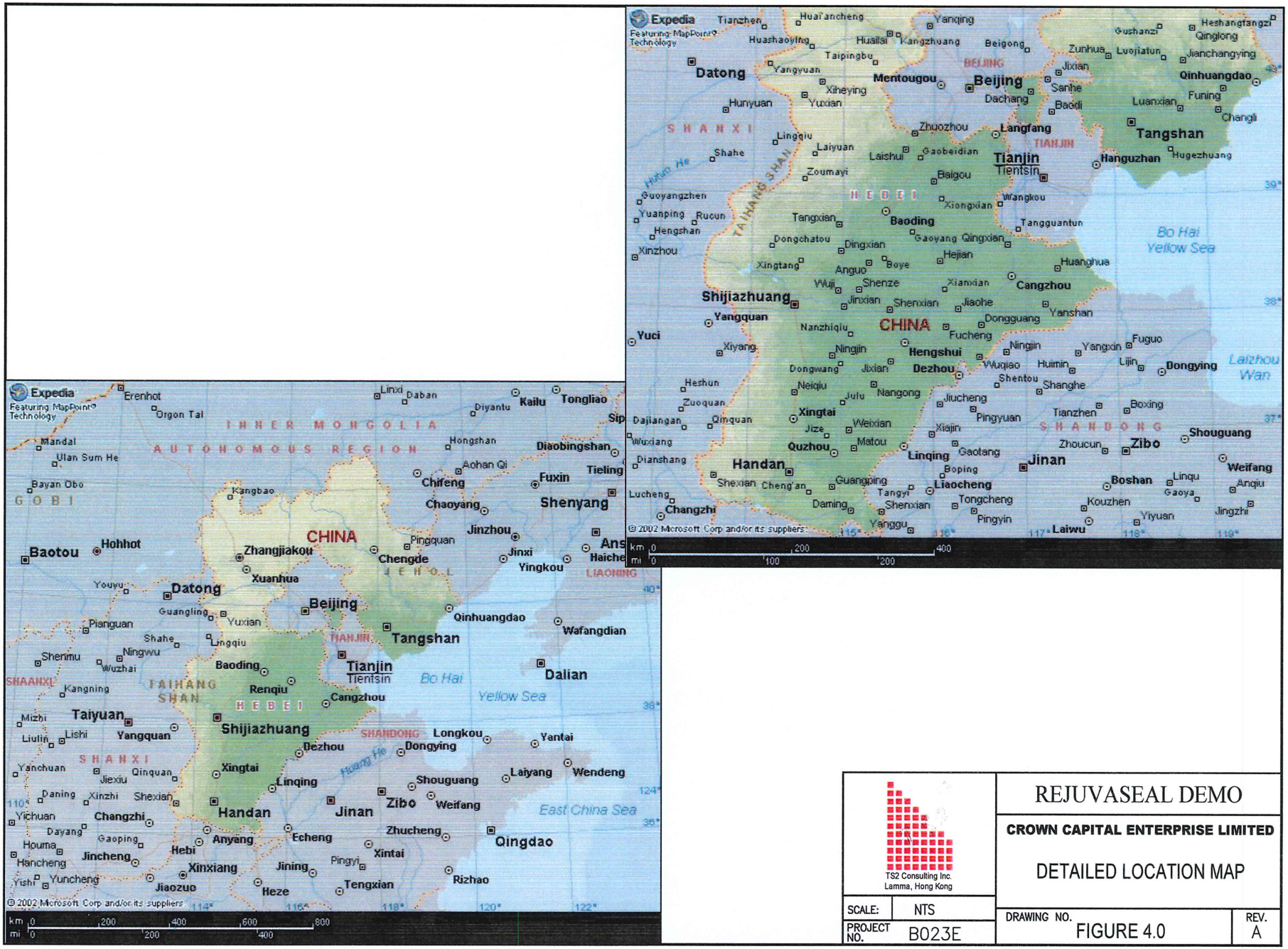
QinHuangDao is definitely interested in determining how to economically extend the life of the asphalt road surface. To this end, QinHaungDao has contracted to try RJSeal™ on Hong Qi Lu, adjacent to the city centre of QinHuangDao.. See Figure 4.0, showing the location of this street with respect to QinHuangDao and Hebei

On October 15, a test strip in the southbound lane of Hong Qi Lu (six-lane street with bicycles path on each side, was sprayed with RJSeal™. The test strip was at the following geographic location:

Table 4.1	**Geographic Location of Test Patch Site**	
System	**Northing**	**Easting**
Geographic (deg, min)	39^0 58.446'	119^0 32.170'
Universal Transverse Mercator Grid (50S) (metres)	4427978	0716581

See Figure No 4.1 for a photo showing the test strip as implemented. Inspection of the test strip on October 15, indicated that the application rate of 3.9 m^2/kilogram was appropriate for the asphalt pavement at this location and could be used as a guide for other locations with similar physical characteristics.

The application of RJSeal on Hong Qi Lu is located in the centre of the City of QinHuangDao. This strip is entirely asphalt pavement. See figure 4.0, which follows, for a location of the general locale. The location of the test patch with respect to the demonstration portion of the street is graphically shown in figure 4.1, which follows.



TS2 Consulting Inc.
Lamma, Hong Kong

SCALE:	NTS
PROJECT NO.	B023E

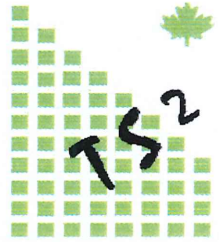
REJUVASEAL DEMO

CROWN CAPITAL ENTERPRISE LIMITED

DETAILED LOCATION MAP

DRAWING NO.	REV.
FIGURE 4.0	A

Figure 4.1 Test Strip, Hong Qing Lu.



The application section, on Hong Qi Lu was selected by the QinHuangDao City Street Management and is geographically located as follows:

Table 4.3	**Location of Demo Site**	
System	**Northing**	**Easting**
Geographic (deg, min)	39^0 58.446'	119^0 32.170'
Universal Transverse Mercator Grid (metres) 50S	4427978	0716581

This is at the same location as the test strip. Refer to Figure 4.0 for the location. Work commenced on the demonstration section at 8:00 am on October 15, on an overcast day, where the mid-day temperature reached 27 Celsius. A strip, 812 metres long, on the southbound lane of this six-lane street was treated. The application section is located on a straight section. There is a slight camber to the road, which causes water to run off toward the shoulder, rather than puddle on the road. The asphalt surface on the section treated, was reputedly one (1) years old (2002 vintage). No significant oil spills were observed, just the occasional drop of transmission oil, crankcase oil or hydraulic fluid. The asphalt pavement surface was not appreciably worn with no rutting due to traffic wear. There was aging and oxidation of the bitumen, which extended to a depth of several millimetres. There were no visible longitudinal cracks or lateral cracks. The entire portion of the treated street section was on a compacted silty-clay, sub-grade

On October 15, the southbound lanes were treated with RJSeal. Then on October 16, the Northbound lanes were treated with RJSeal. The application was undertaken with a Desco D200 Sprayer. See Appendix B for the specifications for this machine.

Details of the application are summarized in the table that follows:

Table 4.4				**Details on RJSeal™ Demonstration Section on Hong Qi Lu**						
Work Schedule	Work Time (hrs)	(Test Length m)	Total Area m^2	Total Area yd^2	RJSeal™ Applied			Application Rate		
					US gals	litres	kgs	US Gal /yd^2	m^2/litre	m^2 /kg
Oct 15	15.5	812	12,180	14,560	750	2,836	3,120	0.052	4.29	3.90
Oct 16	5.5	812	12,180	14,560	750	2,836	3,120	0.052	4.29	3.90
Oct 16	7.0	812	12,180	14,560	350	1,324	1,456	0.024	9.20	8.37
Totals	28.0	15	465	1,674	1,850	6,996	7,696	0.064	3.48	3.17

Ambient temperatures at the time of the application were in the 24 to 27 degree Celsius range, with humidity in the 55% range. The application on October 15 on the southbound lanes finished at 23:30 and they remained

closed until 08:00 on October 16, when they were re-opened for traffic. The application on October 16 on the northbound lanes was completed by 11:00. Unfortunately traffic resumed prematurely on the newly treated surface and the northbound lanes had to sprayed again, commencing at 15:00 and working thru until 22:00. The northbound lanes then remained closed until 08:00 on October 17, when they were re-opened for traffic. Photos showing the test application of RJSeal™ follow in figures 4.2, 4.3 and 4.4. on the following pages.

The site was visited on October 17 around 08:30 and a difference was readily perceived between the RJSeal™ treated section and the adjoining untreated lanes. A screwdriver was used to dig two small holes in the asphalt pavement, to a depth of 3 centimetres, to determine the penetration of the RJSeal™. This was one day after the application of RJSeal™ and at these two locations the newly rejuvenated surface was evident, by the black resilient surface layer, which was now approximately 1 millimetre thick. Below that depth, the grey, oxidized layer of asphalt was evident.

Figure 4.2 Typical Application Procedure.

Original Street.

Figure 4.3 Finished Street.

Figure 4.4 Site visit - following application

4.1 RJSeal™ Testing

To date the comparison of the asphalt treated with RJSeal™ has been compared on a subjective basis over a very short period at the test site on Hong Qi Lu.

Testing equipment will be brought to the site for comparison on a more disciplined, objective basis in the future, and to this end, the following tests will be undertaken.

- Fuel Resistance Comparison
- Elasticity/Ductility Testing

.

4.2 Water Dissipation

An "Outflow Meter" manufactured in the U.S.A. by Humble Equipment Company of Ruston, Louisiana and sold under the trademark "Outflow Meter" (see figure 4.5) will be used to measure the asphalt pavement's capability to dissipate water. The Outflow Meter gives readings in seconds for the dissipation of a known quantity of water. It is suggested that any readings between 3 and 10 seconds are satisfactory results for an asphalt surface, if hydroplaning is to be minimized.

4.3 Fuel Resistance Comparison

Fuel Resistance Comparison will be undertaken on several sections of the untreated and RJSeal™ treated sections in close proximity to the Outflow meter tests in the near future. This comparison will consist of pouring about a cupful of diesel fuel onto the road surface and then later checking the penetration of the fuel. If the fuel readily penetrated the asphalt pavement surface, then resistance to this form of chemical attack was presumed to be lower than if the fuel pooled on the surface of the asphalt pavement and slowly evaporated.

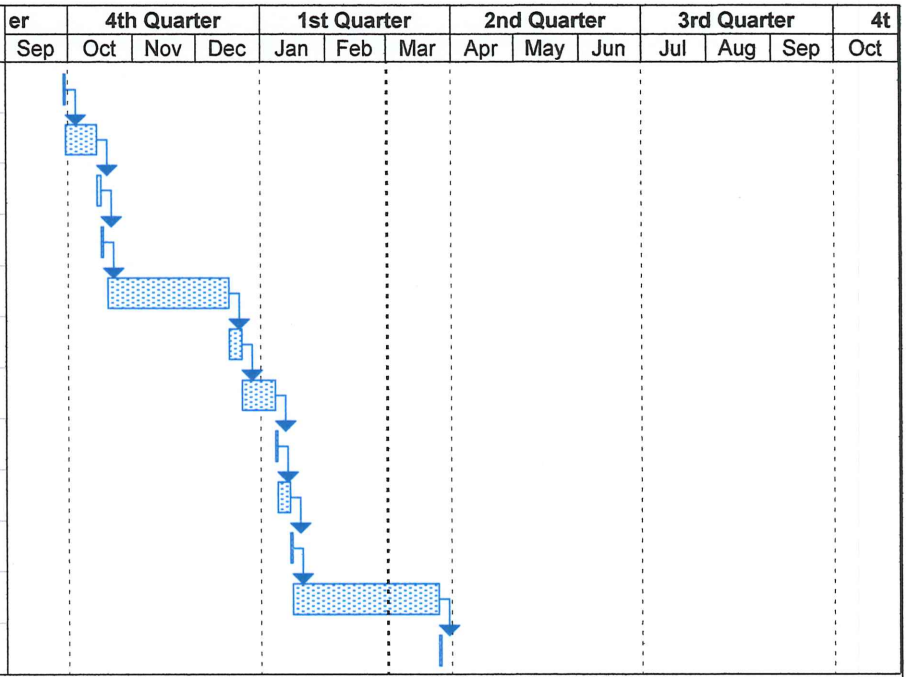
4.4 Elasticity/Ductility Testing

This aspect of the testing is beyond the capabilities of the field equipment available to both Crown Capital Enterprise Limited and RJSeal™ personnel and as such, external assistance has been sought from outside experts in the field of Asphalt Testing. To this end, Dr John Emery in Toronto, Canada has been contacted for advise on independent testing.

5.0 Test Completion Schedule

The team of technicians from the Hong Kong office will be dispatched to undertake further testing on the trial section in the near future. The projected completion of this testing is scheduled as shown in the following chart.

ID	Task Name	Duration	Start	Finish
1	Travel to QinHuangDao and inspect street	1d	Mon 9/29/03	Mon 9/29/03
2	Hiatus	11d	Tue 9/30/03	Tue 10/14/03
3	Application of RJSeal to Hong Qi Lu .	2d	Wed 10/15/03	Thu 10/16/03
4	Inspection of Demo Section	1d	Fri 10/17/03	Fri 10/17/03
5	Hiatus	42d	Mon 10/20/03	Tue 12/16/03
6	Prepare draft report on RJSeal Demo and Testing	4d	Wed 12/17/03	Mon 12/22/03
7	Hiatus	12d	Tue 12/23/03	Wed 1/7/04
8	Inspection of Demo Section	1d	Thu 1/8/04	Thu 1/8/04
9	Prepare final report	4d	Fri 1/9/04	Wed 1/14/04
10	Submit final report	1d	Thu 1/15/04	Thu 1/15/04
11	Hiatus	50d	Fri 1/16/04	Thu 3/25/04
12	Insitu Testing	1d	Fri 3/26/04	Fri 3/26/04



Project: QinHuangDaosched
Date: Mon 3/1/04

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

CROWN CAPITAL ENTERPRISE LIMITED

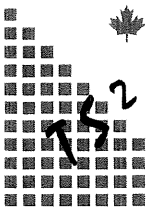
WANCHAI, HONG KONG

Demonstration of RJSeal™
Hong Qi Lu, QinHuangDao, Hebei, Peoples Republic of China

October 2003

APPENDICES

No.	Description
A	RJSeal™ Descriptive Literature
B	Desco D200 Sprayer - Specifications



TS² Consulting Inc.
Lamma, Hong Kong

CROWN CAPITAL ENTERPRISE LIMITED

WANCHAI, HONG KONG

Demonstration of RJSeal™
Hong Qi Lu, QinHuangDao, Hebei, Peoples Republic of China

October 2003

Appendix A

RJSeal™ Descriptive Literature

TS² Consulting Inc.
Lamma, Hong Kong

CROWN CAPITAL ENTERPRISE LIMITED

WANCHAI, HONG KONG

Demonstration of RJSeal™
Hong Qi Lu, QinHuangDao, Hebei, Peoples Republic of China

October 2003

Appendix B

Desco D200 Sprayer Specifications

TS^2 Consulting Inc.
Lamma, Hong Kong