PSMC DOCUMENT	
ITEM:	10
REV:	1
STATUS:	FINAL

TRANSIT NEW ZEALAND

Auckland Harbour Bridge
Resource Consents for Discharge of Abrasive Blast Products

Annual Report

July 1996

Prepared		29 / 7 / 96
Checked		/ /
Approved		/ /

WORKS Consultancy Services

Works Consultancy Services Limited

CONTENTS

Appendices

1 INTRODUCTION

The following report has been prepared for the Auckland Regional Council in accordance with the special conditions of consent as set out in the Resource Consent. This is the second Annual Report.

The Resource Consents have been granted to Transit New Zealand for the discharge of abrasive blasting products from abrasive blasting of the Auckland Harbour Bridge under the following Discharge Permits.

- Discharge Permit No. 938557 for discharge to air
- Discharge Permit No. 938508 for discharge to water
- Discharge Permit No. 938862 for discharge to ground

All conditions of these discharge permits are being complied with. In accordance with the special conditions of consent the following details are discussed:

- The location and extent of blasting for the period 31 July 1995 to 31 July 1996.
- The estimated quantity (in kilograms) of abrasive blasting products generated and likely contaminants contained within the removed paint and the abrasive used.
- Confirmation of the quantity of abrasive blasting products recovered and disposed of.
- The quantity and type of corrosion inhibitors used during wet blasting.
- Details of the measures undertaken to avoid, remedy or mitigate any adverse environmental effect.
- Investigations into new paint technologies and other developments which will reduce the need for dry abrasive blasting.
- Results of a public survey taken to assess the effectiveness of the permit conditions.

2 EXTENT OF BLASTING

During the period August 1995 to July 1996 abrasive blasting operations have been carried out on the following areas of the bridge (see fig. 1).

Span 1 — Abrasive blasting was carried out in this span between December 1995 - July 1996. The blast cleaning operation has been predominantly carried out south of Pier 1. 84% of the blasting carried out in this area was south of Pier 1. The remaining 16% completed north of Pier 1 was carried out on areas above the water. No blasting was carried out on areas above land.

The prevailing wind direction was north-easterly during December and January and south-westerly from February to July. During blasting north of Pier 1 the wind direction was predominantly from the north-east

Blasting consisted primarily of spot blasting areas of paint breakdown back to the zinc coating followed by sweep blasting. The total quantity of blasting abrasive spent on Span 1 was 21.5 tonnes of which 3.5 tonnes was spent north of Pier 1.

Span 2 — Abrasive blasting was carried out in this span during August 1995. Blasting was confined to the eastern side of the overarch and consisted of spot blasting areas of paint breakdown followed by sweep blasting. Blasting was carried out on 13 days with the total quantity of abrasive spent being approximately 1.75 tonnes.

Span 3 — Abrasive blasting was carried out in this span between August 1995 and May 1996. The total quantity of abrasive spent in this area was approximately 15.9 tonnes.

Span 4 — No abrasive blasting was carried out in this span between August 1995 and July 1996.

Span 5 — Abrasive blasting was carried out in this span between August 1995 and March 1996. The total quantity of blasting abrasive spent in this area was approximately 15.8 tonnes.

Span 6 — Blasting was carried out in this span during April 1996. The wind direction during this period was from the north-east and south west. The total quantity of blasting abrasive spent in this area was 3.6 tonnes over a period of 10 days.

Span 7 — Blasting was carried out in span 7 during May 1996. The prevailing wind direction during this period was from the south-west. The total quantity of abrasive used in this area was 3.1 tonnes over a period of 10 days.

East Extension

During the period between 26 December 1995 and 10 January 1996 resurfacing of the steel deck on the east extension was carried out. Preparation for resurfacing the deck included abrasive blast cleaning to bare steel prior to application of a polyurethane membrane and surfacing material.

The total quantity of abrasive used was approximately 32 tonnes. The total surface area of deck cleaned was approximately 5,000 m^2.

The Contractor's operations have included the following measures to minimise any adverse environmental effects.

- signs and notices to inform the public of abrasive blasting schedules
- compressed air sweeping of the structure to remove debris
- covering of cesspits in the area of abrasive blasting
- repair of any damage caused to property.
- deployment of screens to reduce the spread of debris
- collection and environmentally safe disposal of debris from sealed public areas. No abrasive blasting debris has been found in these areas in the past year.
- limitation on abrasive blasting according to wind conditions. No blasting is undertaken in winds over 7m/s.

In summary the total quantity of abrasive used during the period August 1995 to July 1996 was as follows.

• North of Pier 1	3.5 tonnes over 19 days
• South of Pier 5	6.7 tonnes over 20 days
• Between Pier 1 and Pier 5	55 tonnes over 48 days

All blasting took place between the hours of 7.30 am and 4.30 pm. Refer Appendix A for further detailed breakdown of data.

The blasting abrasive being used for the blast cleaning of the structure is crushed basalt produced by MINTECH (NZ) LIMITED at their Waitakere Plant. This type of abrasive has been in use since the issuing of the Resource Consent in August 1994. The products used have SAE designations "Fineblast" and "Minblast". The abrasive contains no free silica.

The blasting abrasive used on the extension deck preparation consisted mostly of garnet (22 tonnes approx.). A smaller quantity of MINBLAST crushed basalt abrasive (8 tonnes) and steel shot (2 tonnes) was also used in this area.

The areas that have been abrasive blast cleaned were coated with the original paint system. This 5 coat system included three coats of zinc chromate primer over coated with 2 coats of micaceous iron oxide.

Since the type of blasting abrasive and the type of coatings being removed have remained unchanged since the resource consent was issued it is assumed that the composition of the blasting debris and likely concentration of contaminants will also remain unchanged.

Abrasive blast cleaning debris test results are detailed in the Central Laboratories Report 93-24731.

3 RECOVERY OF ABRASIVE BLAST DEBRIS

The Special Conditions of Consent require that "as much as practicable of the products from abrasive blasting used in the areas south of pier 5 and north of pier 1 is recovered". To minimise dispersion and drift and aid recovery the measures detailed in the previous annual report continue to be employed.

No debris has been deposited in these areas over the last year.

Abrasive blast cleaning in these areas is only carried out when wind conditions are suitable, ie. when the wind speed is below 7 m/s and the wind direction is away from the built up areas. Blasting in the areas north of Pier 1 and south of Pier 5 have been generally located away from any land spans and has not resulted in the deposition of blasting products on sealed public areas.

The use of garnet abrasive south of Pier 5 has also been effective in reducing problems of dust dispersion into public areas.

Where blasting products are deposited on sealed public areas the material is removed by suction sweeper and disposed of at the Northern Disposal Systems Special Waste Landfill at Greenmount.

Over the period August 1995 - July 1996 no corrosion inhibitors have been used during wet blasting. (Refer Appendix B for a statement from the Contractor).

4 ADDITIONAL MEASURES UNDERTAKEN TO AVOID, REMEDY OR MITIGATE ANY ADVERSE ENVIRONMENTAL EFFECTS

In addition to complying with the Conditions of Consent, Transit New Zealand and Works Consultancy Services Ltd have continued to explore options to

further minimise the adverse environmental effects of abrasive blasting on the areas surrounding the Auckland Harbour Bridge. These include:

- introduction of longer life coatings
- introduction of more "environmentally friendly" paint systems.
- the investigation of more environmentally friendly methods of paint removal.

4.1 ALTERNATIVE PAINT SYSTEMS

The current paint system being applied on the Auckland Harbour Bridge (AHB) is a four coat system consisting of two coats of high build zinc phosphate alkyd primer and two micaceous iron oxide topcoats. This system was introduced in August 1994. This coating system, together with numerous other generic types, are still under observation as part of our on-going paint trials.

The current philosophy with respect to coating application on the bridge is to spot blast areas of paint breakdown and leave sound paint intact, sweepblast the entire member and apply the new paint system over the old system. The change to the present system was prompted by the slow-drying characteristics of the oil based primers, concerns about occupational health (chromate inhibitors) and environmental safety, and the development of a more cost-effective system. The toxicity levels of the original system are as detailed in the 1995 Resource Consent Annual Report. The new system does not contain any toxic materials such as lead or chromates.

The paint trials (detailed in the 1995 Annual Report) continue to be monitored, however it is still to early to draw any firm conclusions as to which paint systems provide the best long term corrosion protection. Initial assessment of the systems indicates that alkyd systems are particularly suitable for painting of complex steelwork due to its good wetting characteristics resulting in reduced paint breakdown around sharp edges. A reduction in the amount of paint breakdown in these areas will have a corresponding reduction in the extent of blasting required. The use of high build coatings and high volume solid paints will reduce the number of coats, increase coating life and therefore reduce the frequency of recoating. In particular the chlorinated rubber system appears to exhibit these characteristics.

A new paint system is to be trialed on the bridge in Span 6. This is a polysiloxane epoxy that has a high volume of solids and excellent adhesion properties. It is expected that this system would reduce the frequency of recoating.

4.2 ALTERNATIVE PAINT REMOVAL TECHNIQUES

High Pressure Waterblasting

As a result of the successful waterblasting trial (discussed in the 1995 Annual Report), this method has since been used to remove excessive paint builds from the top of the bottom chords in spans 1 and 6.

Waterblasting has been very effective in the removal of brittle, high build films and will continue to be used on Span 1. However, there is still a requirement to carry out minimal abrasive blasting in these areas to provide the required surface profile for coating application. The quantity of blasting abrasive required with this method is substantially reduced in comparison to the current practice of full abrasive blasting.

Alternative Blasting Abrasive

We are currently trialing alternative blasting abrasive types in particular for use in the areas north of Pier 1 and south of Pier 5. These trials are still in the very early stages. The types of abrasive being considered are garnet and a low dust crushed basalt aggregate.

The garnet appears to be very successful in that it virtually eliminates the problem of dust containment and is more efficient for paint removal due to its greater hardness and angularity. This reduces the quantity of abrasive required to clean a painted surface to a particular standard and profile.

The chemical and mineralogical composition for the garnet abrasive is given below and a copy of the product data sheet is attached in the appendices.

Garnet	97% minimum
Quartz	Less than 0.5%
Limenite	Less than 2.5%
Monozite	Less than 0.25%
Magnetite	Nil
Gauranteed minimum purity	96%
Sodium Chloride content	Less than 50 ppm as soluble chloride

The cost of the garnet makes it prohibitive for use on the entire structure but may be a viable option for those areas where dust causes problems.

Crushed basalt is the type of abrasive currently being used but this new product is claimed to have a lower dust content.

5 PUBLIC SURVEY RESULTS

As required under the Special Conditions of Consent survey forms were sent out

to neighbouring property owners. The survey requested comments on the following:

- effectiveness of the screens
- the availability of information about the Contractor's programme
- the adequacy of the sweeping of the surrounding sealed areas
- the sufficiency of signage warning of possible hazards
- the effect of night blasting in the south anchorage area to reduce the nuisance caused to neighbours.

A total of 20 survey forms were distributed to neighbouring properties and businesses around Northcote Point and Westhaven. Of these only one form was returned. The comments made were generally of a positive nature. A copy of the original and returned survey form is attached in Appendix C.

The resource consent also requires that the Contractor advises residents and neighbours within 200 metre of their intention to carry out painting operations. A copy of this is attached in Appendix C.

Appendix A

Location/Time/Quantity of Abrasive Blast Media Used

ABRASIVE BLASTING DATA MA 1357 Auckland Harbour Bridge 1995/96

		Work Hours		Wind Speed (m/s)			Abrasive					
DATE	Span	From	To	0830 hrs	1400 hrs	Dir	Used			Total	Recovered	Controls
01-Jul-95	Weekend											
02-Jul-95	Weekend											
03-Jul-95	7	12:30	15:30	1.3	1.7	SW	175			175	0	screens
04-Jul-95	3,7	08:15	14:30	1.1	0.5	SE	450			450	0	screens
05-Jul-95	Humidity outside specifications											
06-Jul-95	3	08:30	16:15	3.6	4.1	SW	375			375	0	-
07-Jul-95	2,3	08:30	16:15	4.3	5.1	SW	275	300		575	0	screens
08-Jul-95	Weekend											
09-Jul-95	Weekend											
10-Jul-95										0		
11-Jul-95										0		
12-Jul-95										0		
13-Jul-95										0		
14-Jul-95										0		
15-Jul-95	Weekend											
16-Jul-95	Weekend											
17-Jul-95	3,5	08:15	16:00	3.1	3.9	SW	300	350		650	0	screens
18-Jul-95	3,5	08:15	14:00	0.4	0	NE	150	200		350	0	screens
19-Jul-95	Washdown											
20-Jul-95	3,5	08:15	16:00	2.7	2.4	SW	225	200		425	0	screens
21-Jul-95	2,3,5	08:15	15:00	2.3	0	SW	225	175	150	550	0	screens
22-Jul-95	Weekend											
23-Jul-95	Weekend											
24-Jul-95	Humidity outside specifications											
25-Jul-95	2	08:15	13:30	2.3	4.2	NW	175			175	0	screens
26-Jul-95	2	08:15	15:00	1.2	4.3	SW	150			150	0	screens
27-Jul-95	2,3	08:30	14:45	4.6	4.3	SW	150	125		275	0	screens
28-Jul-95	2,3,5	09:00	15:00	0.4	0	NE	125	100	125	350	0	screens
29-Jul-95	Weekend											
30-Jul-95	Weekend											
31-Jul-95	2,3,5	08:30	16:00	3.6	4.2	NE	125	225	200	550	0	screens
01-Aug-95	3	08:30	16:30	2.2	2.1	NE	300			300	0	screens
02-Aug-95	3,5	08:15	15:30	2.6	4.7	NE	200	250		450	0	screens
04-Aug-95	2,3,5	08:15	16:15	1.1	2.6	NE	175	225	275	675	0	screens
05-Aug-95	Weekend											
06-Aug-95	Weekend											
08-Aug-95	Washdown											
09-Aug-95	Washdown											
12-Aug-95	Weekend											
13-Aug-95	Weekend											
14-Aug-95	2	08:30	14:00	2.2	3.1	SW	150			150	0	-
15-Aug-95	2,3	08:15	14:00	0.5	3.5	SW	200	225		425	0	screens
16-Aug-95	2,3	08:15	16:00	2.7	4.2	SW	125	150		275	0	screens
17-Aug-95	2,5	08:15	16:30	3.6	4.5	SW	200	200		400	0	screens
18-Aug-95	2,5	08:15	16:00	4.8	3.7	SW	200	275		475	0	screens
19-Aug-95	Weekend											
20-Aug-95	Weekend											
21-Aug-95	2,5	08:30	14:00	2.2	4.6	NW	125	350		475	0	screens
22-Aug-95	2,3,5	08:30	16:15	1.6	1.9	NE	125	300	225	650	0	screens
23-Aug-95	3,5	08:30	14:00	0	2.2	NE	225	300		525	0	screens
24-Aug-95	2,3,5	08:30	14:30	2.4	1.9	NW	100	175	200	475	0	screens
25-Aug-95	5	08:30	14:30	3.6	3.5	NW	225			225	0	screens
26-Aug-95	Weekend											
27-Aug-95	Weekend											
28-Aug-95	2,5	08:30	14:00	3.8	4.7	SW	100	300		400	0	screens
29-Aug-95	5	08:15	13:30	1.7	1.9	SW	325			325	0	screens
30-Aug-95	5	09:00	15:00	2.3	2.2	SW	275			275	0	screens
31-Aug-95	2,5	09:30	15:00	3.1	4.8	SW	425			425	0	screens
02-Sep-95	Weekend											
03-Sep-95	Weekend											
04-Sep-95	3,5	09:30	16:15	1.6	2.9	SW	400	100		500	0	screens
05-Sep-95	Washdown											
06-Sep-95	Washdown											
07-Sep-95	3,5	08:30	14:30	4.8	5.2	SW	225	125		350	0	screens
08-Sep-95	3,5	09:00	13:30	1.7	2.3	SW	200	125		325	0	screens
09-Sep-95	Weekend											
10-Sep-95	Weekend											
11-Sep-95	3,5	08:15	15:00	2.3	2.7	NE	275	225		500	0	screens

ABRASIVE BLASTING DATA MA 1357 Auckland Harbour Bridge 1995/96

		Work Hours		Wind Speed (m/s)			Abrasive					
DATE	Span	From	To	0830 hrs	1400 hrs	Dir	Used			Total	Recovered	Controls
12-Sep-95	3,5	08:30	15:15	0	1.6	NE	325	200		525	0	screens
13-Sep-95	3	08:15	04:20	0	0.7	NE	175			175	0	screens
16-Sep-95	Weekend											
17-Sep-95	Weekend											
19-Sep-95	Washdown											
20-Sep-95	3,5	10:30	13:50	1.1	0.9	NE	225	150		375	0	screens
21-Sep-95	3,5	08:30	16:00	1.6	2.3	NE	300	325		625	0	screens
22-Sep-95	5	09:30	03:50	3.7	3	NE	175			175	0	screens
23-Sep-95	Weekend											
24-Sep-95	Weekend											
25-Sep-95	2,3	08:30	16:00	0.6	-	NE	650			650	0	-
26-Sep-95	3	08:15	16:15	3.1	2.7	NE	525			525	0	-
28-Sep-95	3	08:15	16:30	2.2	2.4	NE	525			525	0	-
29-Sep-95	3	08:15	13:00	1.6	1.8	NE	325			325	0	-
30-Sep-95	Weekend			Weekend			Weekend					Weekend
01-Oct-95	Weekend			Weekend			Weekend					Weekend
02-Oct-95	2,3	09:00	14:30	2.2	2.6	SW	350			350	0	screens
03-Oct-95	3,5	08:30	13:00	0.8	1.7	SW	275			275	0	screens
04-Oct-95	3	08:15	14:00	1.9	2.6	SW	225			225	0	screens
06-Oct-95	2	08:30	16:00	2.2	3.7	NE	275			275	0	-
07-Oct-95	Weekend											
08-Oct-95	Weekend											
09-Oct-95	Humidity outside specifiactions											
10-Oct-95	3	08:30	14:00	3.7	4.3	SW	275			275	0	screens
11-Oct-95	2	08:00	16:30	4.7	5.1	SW	175			175	0	screens
12-Oct-95	5	08:15	14:15	4.8	3.7	SW	175			175	0	screens
13-Oct-95	5	08:30	15:00	1.6	2.2	NE	125			125	0	screens
14-Oct-95	Weekend											
15-Oct-95	Weekend											
16-Oct-95	Humidity outside specifications											
17-Oct-95	Humidity outside specifications											
19-Oct-95	Humidity outside specifications											
20-Oct-95	1	09:00	15:15	1.7	1.4	SW	125			125	0	-
21-Oct-95	Weekend											
22-Oct-95	Weekend											
23-Oct-95	Public Holiday											
24-Oct-95	5	08:15	14:30	0.7	1.1	SW	275			275	0	-
25-Oct-95	Humidity outside specifications											
26-Oct-95	5	08:00	14:00	2.1	1.7	NE	200			200	0	-
27-Oct-95	5	08:50	16:00	2.6	3.1	NE	275			275	0	-
28-Oct-95	Weekend											
29-Oct-95	Weekend											
30-Oct-95	Humidity outside specifications											
31-Oct-95	5	09:00	13:30	3.8	4.1	NE	300			300	0	-
01-Nov-95	3,5	09:30	13:30	1.8	2.2	SW	325	300		625	0	-
02-Nov-95	3,5	08:15	14:00	3.1	2.9	SW	200	300		500	0	-
03-Nov-95	3,5	08:30	13:00	0.8	2.6	SW	350	275		625	0	-
04-Nov-95	Weekend											
05-Nov-95	Weekend											
06-Nov-95	3	08:15	16:00	2.7	1.6	SW	400			400	0	-
07-Nov-95	5	08:30	16:15	2.6	2.1	NE	375			375	0	-
08-Nov-95	1,3,5	08:30	16:15	0.7	1.6	SW	300	400	200	900	0	-
09-Nov-95	Humidity outside specifications											
10-Nov-95	3	08:15	16:15	2.1	1.8	SW	475			475	0	-
11-Nov-95	Weekend											
12-Nov-95	Weekend											
13-Nov-95	1	08:30	13:00	2.1	1.6	SW,NE	100			100	0	-
14-Nov-95	Washdown											
15-Nov-95	3	08:15	14:00	1.1	1.7	S	375			375	0	-
17-Nov-95	3	08:30	16:00	1.7	0.8	SW	325			325	0	-
18-Nov-95	Weekend											
19-Nov-95	Weekend											
20-Nov-95	Humidity outside specifications											
21-Nov-95	3	08:30	14:15	2.7	3.1	SW	300			300	0	-
22-Nov-95	3	08:30	14:00	2.9	3.1	NE	275			275	0	-
23-Nov-95	3	08:30	16:00	4.3	3.8	NE	350			350	0	-

ABRASIVE BLASTING DATA MA 1357 Auckland Harbour Bridge 1995/96

		Work Hours		Wind Speed (m/s)			Abrasive					
DATE	Span	From	To	0830 hrs	1400 hrs	Dir	Used			Total	Recovered	Controls
24-Nov-95	Humidity outside specifications											
25-Nov-95	Weekend											
26-Nov-95	Weekend											
27-Nov-95	Humidity outside specifications											
28-Nov-95	Humidity outside specifications											
29-Nov-95	5,1	08:30	16:15	0.5	1.1	NE,NW	350	150		500	0	-
30-Nov-95	5	08:30	16:15	0	1.7	SW	350			350	0	-
01-Dec-95	5	08:30	14:00	2.3	1.1	SW	400			400	0	-
02-Dec-95	Weekend											
03-Dec-95	Weekend											
04-Dec-95	1,5	08:15	16:15	2.7	0.7	NE	125	300		425	0	-
05-Dec-95	1,5	08:15	14:00	0	1.1	NE	125	325		450	0	-
06-Dec-95	5,1	08:15	14:00	1.8	1.4	SW	275	75		350	0	-
07-Dec-95	1,5	13:00	15:30	0.5	0.5	SW	725	125		850	0	-
08-Dec-95	5,1	10:00	15:00	2.6	3.7	SW	425	850		1275	0	-
09-Dec-95	Weekend											
10-Dec-95	Weekend											
11-Dec-95	1,5	08:30	16:15	4.1	5	NE	325	425		750	0	-
12-Dec-95	1,5	08:30	16:15	4.5	4.7	NE	350	75		425	0	-
13-Dec-95	1	08:30	16:15	4.8	4.3	NE	425			425	0	-
14-Dec-95	1	08:30	16:15	1.6	2.1	NE	100			100	0	-
15-Dec-95	1	08:30	16:15	1.6	2.1	NE	475			475	0	-
16-Dec-95	Weekend											
17-Dec-95	Weekend											
18-Dec-95	1	08:30	16:15	4.1	5	NE	125			125	0	-
19-Dec-95	1	08:30	16:15	2.3	5.3	NE	250			250	0	-
20-Dec-95	1	10:15	15:00	1	4.7	NE	250			250	0	-
21-Dec-95	Humidity outside specifications											
22-Dec-95	Humidity outside specifications											
23-Dec-95	Weekend											
24-Dec-95	Weekend											
25-Dec-95	Public Holiday											
26-Dec-95	Public Holiday											
27-Dec-95	1,3	09:00	15:30	3.7	3.3	SW	250	425		675	0	-
28-Dec-95	1,3	08:35	15:15	3.4	3.8	SW	150	******		1325	0	-
29-Dec-95	1,3	07:30	14:50	3.6	4.3	SW	475	325		800	0	-
30-Dec-95	Weekend											
31-Dec-95	Weekend											
01-Jan-96	Public Holiday											
02-Jan-96	Public Holiday											
03-Jan-96	3	08:20	14:35	0	0.8	NE	450			450	0	-
06-Jan-96	Weekend											
07-Jan-96	Weekend											
09-Jan-96	-	-	-	-	-	-	-	-	-	-	-	-
13-Jan-96	Weekend											
14-Jan-96	Weekend											
15-Jan-96	1	09:30	15:00	0.8	0.8	NE	250			250	0	-
16-Jan-96	1	09:30	14:30	0.6	0	NE	300			300	0	-
17-Jan-96	1	09:45	14:30	1.8	1.2	SW	300			300	0	-
18-Jan-96	1	08:00	14:50	0.5	0	E	300			300	0	
19-Jan-96	1	08:45	14:30	1.1	-	SW	100			100	0	
20-Jan-96	Weekend											
21-Jan-96	Weekend											
22-Jan-96	1	08:05	14:35	2.7	3.1	E/NE	325			325	0	
23-Jan-96	1	09:30	15:00	1.5	1.5	NE	175			175	0	
24-Jan-96	1, 5	09:35	14:45	1.6	2.1	SW	150	325		475	0	
25-Jan-96	1, 5	08:10	15:40	2.8	2.8	SE	125	275		400	0	
26-Jan-96	5	08:20	14:35	2.2	1.7	SE/SW	350			350	0	
27-Jan-96	Weekend											
28-Jan-96	Weekend											
29-Jan-96	Public Holiday											
30-Jan-96	5	08:45	15:40	1.1	1.6	SW	175			175	0	
31-Jan-96	1	09:30	16:25	1.1	1.1	NE	125			125	0	
01-Feb-96	1	08:00	16:00	0.9	0.8	NE	175			175	0	
02-Feb-96	1/ Gas line	08:10	15:10	0.5	2.5	NE	325	175		500	0	
03-Feb-96	Weekend											
04-Feb-96	Weekend											

ABRASIVE BLASTING DATA MA 1357 Auckland Harbour Bridge 1995/96

DATE	Span	Work Hours From	Work Hours To	Wind Speed (m/s) 0830 hrs	Wind Speed (m/s) 1400 hrs	Wind Speed (m/s) Dir	Abrasive Used			Abrasive Total	Abrasive Recovered	Controls
06-Feb-96	Public Holiday											
07-Feb-96	1/Gas Pipe	07:55	14:20	0	2.9	NW	300	50		350	0	
08-Feb-96	Washdown	Pier 3 to South Anchorage										
09-Feb-96	Washdown	Extensions										
10-Feb-96	Weekend											
11-Feb-96	Weekend											
12-Feb-96	1	07:55	16:05	1.1	2.8	NE	275			275	0	
13-Feb-96	1	13:00	16:15	0	1.1	SW	175			175	0	
14-Feb-96	1	08:00	16:00	0	1.7	SW	350			350	0	
15-Feb-96	1	07:55	15:30	2.7	3.2	SW	200			200	0	
16-Feb-96	5	08:00	14:35	0.7	0	SW	325			325	0	
17-Feb-96	Weekend											
18-Feb-96	1			1.1	1.5	SW	575			575		
19-Feb-96	5			0	1.7	SW	350			350	0	
20-Feb-96	5			0.7	-	SW	325			325	0	
21-Feb-96	5	08:20	14:50	0.7	0.9	SW	275			275	0	
22-Feb-96	Washdown	Span 3 - 7 / North Viaduct										
23-Feb-96	5	08:15	16:05	0.5	1	SW	250			250	0	
24-Feb-96	Weekend											
25-Feb-96	1	14:40		6.2	5.1	NE	250			250		
26-Feb-96	2,3,5	08:00	15:30	2.7	2.5	E	100	175	275	550	0	
27-Feb-96	2,3,5	08:20	16:05	1.9	3.7	SW	75	175	275	525	0	
28-Feb-96	2,3	09:00	15:00	2.7	3.5	SW	100	175		275	0	
29-Feb-96	2,3	08:05	14:40	0	0.5	SW	175	125		300	0	
01-Mar-96	1,2	08:05	14:15	0	0.5	NE	150	175		325	0	
02-Mar-96	Weekend											
03-Mar-96	1	09:30	12:15	0	2.7	SW	225			225		
04-Mar-96	1, 3	08:00	14:50	0.5	1.1	SW	325	175		500	0	
05-Mar-96	1, 3	08:05	15:30	0	0.5	NE	450	125		575	0	
06-Mar-96	1, 3	08:05	14:55	1.7	5	SE	100	200		300	0	
07-Mar-96	1, 3	08:05	15:25	0.5	2.6	NE	300	150		450	0	
08-Mar-96	1	07:55	15:10	0.5	1.5	NE/SW	225			225	0	
09-Mar-96	Weekend											
10-Mar-96	Weekend											
11-Mar-96	1,3,5	08:10	15:05	2.7	4.8	NE/SE	275	150	375	800	0	
12-Mar-96	1,3,5	07:55	15:45	0.5	4.5	NE/SW	275	150	325	750	0	
13-Mar-96	3	08:30	16:10	1.7	-	SW	150			150	0	
14-Mar-96	1,3,5	09:00	14:45	-	0.5	NW	100	150	325	575	0	
15-Mar-96	1,5	08:05	15:15	0.5	3.5	SW	250	325		575	0	
16-Mar-96	Weekend											
17-Mar-96	Weekend											
18-Mar-96	1,3,5	08:10	15:25	0.5	3	SW	100	125	275	500	0	
20-Mar-96	Washdown											
21-Mar-96	3,5	09:45	16:10	0.8	1.3	NE	150	225		375	0	
22-Mar-96	1	09:50	16:00	0.5	-	NE	125			125	0	
23-Mar-96	Weekend											
25-Mar-96	3	10:00	14:35	0.5	1	SW	150			150	0	
26-Mar-96	1	08:00	15:30	0.5	0.5	SW	100			100	0	
27-Mar-96	Washdown											
28-Mar-96	1,3	07:45	16:00	0.5	0.5	NE	75	150		225	0	
29-Mar-96	1	07:55	16:00	1.5	1.5	NE	125			125	0	
30-Mar-96	Weekend											
31-Mar-96	Weekend											
01-Apr-96	Washdown											
02-Apr-96	1,3	08:15	15:15	2.5	3.8	NW/W	150	75		225	0	
03-Apr-96	1,3	08:00	15:00	1.2	2.8	NW	300	75		375	0	
04-Apr-96	1	11:30		2.78	3.8	W	300			300	0	
05-Apr-96	Public Holiday											
06-Apr-96	Weekend											
07-Apr-96	Weekend											
08-Apr-96	Public Holiday											
09-Apr-96	1	08:00		0	0	-	175			175	0	
10-Apr-96	6									0	0	Waterblasting
11-Apr-96	1,3,6			1.5	1.5	NE	175	125	325	625	0	
12-Apr-96	1,6			1	1	NE	150	825		975	0	
13-Apr-96	Weekend			Weekend			Weekend					Weekend
14-Apr-96	Weekend			Weekend			Weekend					Weekend
15-Apr-96	1,3,6	09:30	15:25	1.5	2.8	SW	275	175	450	900	0	
16-Apr-96	1, 3	08:30	15:00	0.5	0.5	NE	275	125		400	0	
17-Apr-96	1, 3, 6	10:15	15:15	0.5	1	SW/NE	275	125	500	900	0	

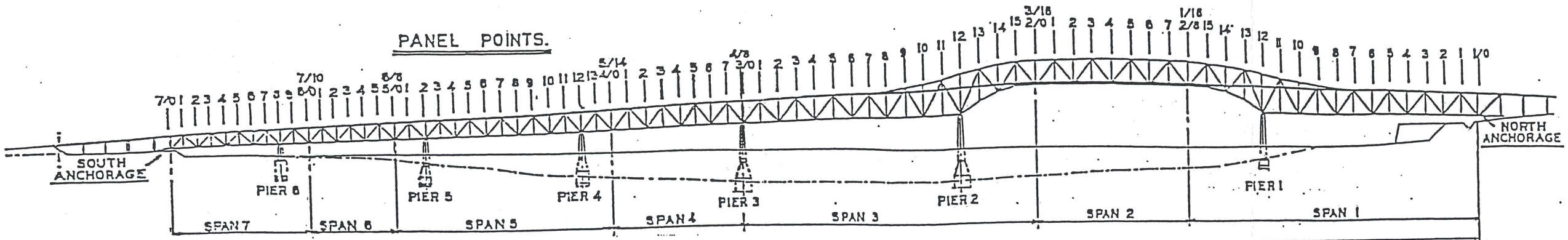
ABRASIVE BLASTING DATA MA 1357 Auckland Harbour Bridge 1995/96

		Work Hours		Wind Speed (m/s)			Abrasive					
DATE	Span	From	To	0830 hrs	1400 hrs	Dir	Used			Total	Recovered	Controls
18-Apr-96	1, 6	12:50	15:35	1	1	NE	175	125		300	0	
19-Apr-96	Washdown	East & West Extensions										
20-Apr-96	Weekend											
21-Apr-96	Weekend											
22-Apr-96	1, 3, 6	07:55	15:10	3.9	4.6	W/SW	225	175	125	525	0	
23-Apr-96	1, 6	07:55	15:25	0	2.5	SW	300	275		575	0	
24-Apr-96	1, 6	08:05	15:55	1.5	3.7	SW	225	600		825	0	
25-Apr-96	Public Holiday											
27-Apr-96	Weekend											
28-Apr-96	Weekend											
29-Apr-96	Washdown	East & West Extensions										
30-Apr-96	1	08:00	14:55	1.7	3.5	SW	275			275	0	
01-May-96	1	08:00	15:25	3.5	4.5	SW	300			300	0	
02-May-96	1, 3, 7	08:00	15:25	0.5	1.5	SW/SE	150	150	325	625	0	
03-May-96	1, 7	08:00	14:40	0	0.5	SW	325	275		600	0	
04-May-96	Weekend											
05-May-96	Weekend											
06-May-96	1, 3, 6	09:45	13:00	0.5	1.5	SW	300	150	400	850	0	
07-May-96	1, 3, 7	09:55	14:30	0.5	0.5	SW	175	150	300	625	0	
08-May-96	1, 3, 7	08:05	15:00	0.5	1	SW/W	375	150	400	925	0	
09-May-96	1, 7	08:15	15:00	0.5	2.5	SW	300	175		475	0	
10-May-96	1, 7	08:15	15:25	0.5	0.5	SW	375	275		650	0	
11-May-96	Weekend											
12-May-96	Weekend											
13-May-96	i, 3, 7	08:00	15:25	0.5	1.1	NE	75	75	225	375	0	
14-May-96	1, 7	08:00	15:30	1.7	3.5	NE/NW	75	400		475	0	
15-May-96	Washdown	Above Walkways Spans 1 - 7										
16-May-96	7	08:05	15:30	1.5	3.7	SW	425			425	0	
17-May-96	7	08:05	16:00	1.5	0	SW	275			275	0	
18-May-96	Weekend											
19-May-96	Weekend											
20-May-96	Washdown	Above Walkways Spans 1 - 7 / East & West Extensions										
21-May-96	Washdown	East & West Extensions										
22-May-96	Washdown	East & West Extensions										
23-May-96	5	08:00	15:15	3.5	5.1	SW	75			75	0	
24-May-96	5	11:45	15:05	4.5	3.5	SW	75			75	0	
25-May-96	Weekend											
26-May-96	Weekend											
28-May-96	5	16:05	16:20	0	0	-	50			50	0	
01-Jun-96	Weekend											
02-Jun-96	Weekend											
03-Jun-96	Public Holiday											
05-Jun-96	1	15:00		0	0	-	50			50	0	
06-Jun-96	Washdown											
07-Jun-96	1	15:00		1.5	1.5	SW	350			350	0	
08-Jun-96	Weekend											
09-Jun-96	Weekend											
10-Jun-96	1	10:30	15:05	1	3.5	NW/SW	300			300	0	
11-Jun-96	1	08:00	15:00	4.5	5.1	SW	50			50	0	
15-Jun-96	Weekend											
16-Jun-96	Weekend											
18-Jun-96	3	11:30	14:25	1.5	1.5	SW	75			75	0	
19-Jun-96	1	11:30	16:15	1.5	2	NE	400			400	0	
20-Jun-96	1	14:25		1.5	4.5	NE	375			375	0	
21-Jun-96	1	09:00	16:15	3.5	4.5	NE	575			575	0	
22-Jun-96	Weekend											
23-Jun-96	Weekend											
24-Jun-96										0	0	
25-Jun-96										0	0	
26-Jun-96										0	0	
27-Jun-96										0	0	
28-Jun-96										0	0	
29-Jun-96	Weekend											

ABRASIVE BLASTING DATA

MA 1357 Auckland Harbour Bridge 1995/96

		Work Hours		Wind Speed (m/s)			Abrasive			
DATE	Span	From	To	0830 hrs	1400 hrs	Dir	Used	Total	Recovered	Controls
30-Jun-96	Weekend									
01-Jul-96								0	0	
02-Jul-96								0	0	
03-Jul-96								0	0	
04-Jul-96								0	0	
05-Jul-96								0	0	
06-Jul-96	Weekend									
07-Jul-96	Weekend									
08-Jul-96								0	0	
09-Jul-96								0	0	
10-Jul-96								0	0	
11-Jul-96								0	0	
12-Jul-96								0	0	
13-Jul-96	Weekend									
14-Jul-96	Weekend									
15-Jul-96								0	0	
16-Jul-96								0	0	
17-Jul-96								0	0	
18-Jul-96								0	0	
19-Jul-96								0	0	
20-Jul-96	Weekend									
21-Jul-96	Weekend									
		Av. Wind Speed		1.70	2.33		Total Quantity Us	69575	0	



	Span 7	Span 6	Span 5	SPAN 4	SPAN 3	SPAN 2	SPAN 1
Quantity of Abrasive Spent (Tonnes)	3.1	3.6	15.8	Nil	15.9	1.75	21.5 (3.5 North of Pier 1)
Work Period	May 1996	April 1996	August 1995 - March 1996	-	August 1995 - May 1996	August 1995	December 1995 - July 1996
Prevailing Wind Direction	NE/SW	NE/SW					SW/NE

FIGURE 1 : Location and Extent of Abrasive Blasting on the Auckland Harbour Bridge (July 1995 - July 1996)

INDUSTRIAL MINERALS (N.Z.) LTD
53 VICTORIA ST, ONEHUNGA
P.O. BOX 13481, ONEHUNGA
AUCKLAND, NEW ZEALAND
PHONE (09) 636 4785
FAX (09) 636 4792

GARNET

Garnet belongs to Almandite variety. Naturally occurring mineral in the beach sands.

Grade A	:	-12 to + 18 BSS Mesh (1.40mm to 0.85mm)
Grade B	:	-18 to + 36 BSS Mesh (0.85mm to 0.425mm)
Grade C	:	-36 to + 52 BSS Mesh (0.425mm to 0.30mm)
Grade D	:	-36 to + 72 BSS Mesh (0.425mm to 0.212mm)
Grade E	:	-72 to +100 BSS Mesh (0.212mm to 0.160mm)

Also available in any sieve combination (e.g. -12mm to +36mm, -18mm to +52mm etc.)

Note: We are also in a position to supply Garnet Sand finer than 150 B.S. Mesh from April 1992 onwards.

Physical Properties:

Hardness	:	6.5 to 7 in Moh's Scale of Hardness
Specific Gravity	:	4.5

Chemical and Mineralogical Composition:

Garnet	:	97% minimum
Quartz	:	Less than 0.5%
Limenite	:	Less than 2.5%
Monozite	:	Less than 0.25%
Magnetite	:	Nil
Guaranteed Minimum Purity	:	96% Garnet
Sodium Chloride Content	:	Less than 50 ppm as soluble chloride

Sieve Analysis:

Typically in all the grades 100% will pass through the upper mesh and minimum 75% retained on the lower mesh.

Quantity:

We can supply up to 500 MT per month in each grade except Grade A and E.

Packing:

Packing in HDPE/JUTE 25/50kg bags or once used one tonne Jumbo bags.

Appendix B

Confirmation That No Corrosion Inhibitors Are Used

SERCO

AUCKLAND HARBOUR BRIDGE
11 Princess St, Northcote.
PO Box 33908, Takapuna.
Phone (09) 418-1880, Fax (09) 419-0060

NOTICE TO ENGINEER

Consecutive No 85.

CLIENT: Transit NZ.

CONSULTANT: Works Consultancy Services - Auckland

CONTRACT: Auckland Harbour Bridge - Maintenance Contract

RESOURCE CONSENT

IN ACCORDANCE WITH NTC 178 I CAN CONFIRM THAT NO CORROSION INHIBITORS HAVE BEEN ON THE AUCKLAND HARBOUR BRIDGE

PLEASE FIND ENCLOSED COPIES OF:

- NOTICE TO NEIGHBOURS ADVISING OF OPERATIONS
- SURVEY FORM
- ONE ONLY SURVEY RETURNED TO THIS OFFICE.

Issued by hand / ~~post~~ / ~~fax~~

G Osbaldiston. 2/7/96.

G Osbaldiston. Project Manager

Appendix C

Public Notices

Serco Operations I Auckland Harbour Bridge I 11 Princes Street I Northcote
PO Box 33-908 I Takapuna I Telephone 0-9-418-1880 I Fax 0-9-419-0060

24 June 1996

SERCO

Resource Consent Survey

Dear Neighbour,

In accordance with the Resource Consent granted to Transit NZ for Auckland Harbour Bridge Maintenance we are required to survey our neighbours to test the effectiveness of our work practices and to check on whether you have been inconvenienced by any of our operations.

To that end, we would appreciate your comments regarding any inconvenience that may have been caused by our maintenance activities.

Have you been effected by any sandblasting media drifting into your airspace?

Is sufficient information available to inform you of our painting programme?

Has any sandblasting debris caused a problem on the streets surrounding the bridge?

Is there sufficient signage in place to warn of possible hazards?

Any other comments?

Name: _____

Signature: _____

Address: _____

Date: _____

96RESOUR.WPD : 2 July 1996

Serco Operations I Auckland Harbour Bridge I 11 Princes Street I Northcote
PO Box 33-908 I Takapuna I Telephone 0-9-418-1880 I Fax 0-9-419-0060

24 June 1996

SERCO

Dear Neighbour,

AUCKLAND HARBOUR BRIDGE MAINTENANCE

In accordance with the conditions of the Resource Consent granted to Transit NZ for the above work, this letter is to inform you of our painting programme and our intentions over the coming months.

North: We are currently working at the South end of Span 1 underneath the bridge deck and as this work is completed will be moving North towards the North anchorage. All of span 1 is required to be repainted by August 1997.

South: We are currently working on a paint trial in Span 6 but this has been delayed while we wait for some plant to be repaired. In the meantime, and while the weather is unsuitable, we will be working inside the box extensions.

Concurrently we are continuing to work on the overarch area, mainly in span 3.

The other ongoing activity is the regular washing of the bridge with fresh water. This project continues on a year-round basis.

Like all programmes, ours is subject to change, mainly because of unsuitable weather conditions, but we will endeavour to keep you informed of our plans.

Please feel free to contact us at the above address should you have a problem with our maintenance operations or are inconvenienced in any way.

Yours faithfully,

Graham Osbaldiston
Project Manager

96RESOUR WPD · 2 July 1996

Appendix D

Public Survey Replies

s9(2)(a)

NORTHCOTE
26 JUNE 1996.

MR GRAHAM OSBALDISTON
SERCO
PO BOX 33-908
TAKAPUNA
AUCKLAND 9

RECEIVED
28 JUN 1996
HARBOUR BRIDGE

DEAR MR OSBALDISTON:

RE:- AUCKLAND HARBOUR BRIDGE
ENVIRONMENTAL COMPLIANCE

I RETURN YOUR RESOURCE CONSENT SURVEY ONLY COMPLETED.

THERE IS A MATTER STILL OUTSTANDING.

I ENCLOSE COPY OF LETTER DATED 28 JUNE 1995 FROM OUR CONSULTANTS METROPLANNING AND A LETTER DATED 6 SEPTEMBER 1995 IN RESPONSE TO METRO'S LETTER.

METRO'S LETTER CONTAINS A PARAGRAPH ABOUT NOXIOUS WEEDS AND DEBRIS ALONG OUR EASTERN FENCELINE. IF YOU REFER TO THE FINAL PARAGRAPH OF TRANSIT NEW ZEALAND'S LETTER, YOU WILL SEE THAT SERCO HAVE ADVISED TRANSIT NEW ZEALAND THAT THEY DO NOT OWN THE PROPERTY IN QUESTION BUT THAT IT IS OWNED BY NORTH SHORE CITY COUNCIL AND THEREFOR THEIR RESPONSIBILITY. THIS IS INCORRECT.

I ENCLOSE COPY OF ORIGINAL SURVEY PLAN s9(2)(a) TAKEN BY THE AUCKLAND HARBOUR BRIDGE AUTHORITY. LOT 33 IS CLEARLY MARKED AHBA. WOULD YOU PLEASE ADVISE TRANSIT NEW ZEALAND THAT THIS PROPERTY IS THEIR RESPONSIBILITY AND HAS BEEN NEGLECTED SINCE THEY ASSUMED OWNERSHIP.

I AWAIT YOUR REPLY

Yours sincerely

s9(2)(a)

Serco Operations I Auckland Harbour Bridge I 11 Princes Street I Northcote
PO Box 33-908 I Takapuna I Telephone 0-9-418-1880 I Fax 0-9-419-0060

24 June 1996

SERCO

Resource Consent Survey

Dear Neighbour,

In accordance with the Resource Consent granted to Transit NZ for Auckland Harbour Bridge Maintenance we are required to survey our neighbours to test the effectiveness of our work practices and to check on whether you have been inconvenienced by any of our operations.

To that end, we would appreciate your comments regarding any inconvenience that may have been caused by our maintenance activities.

Have you been ~~effected~~ affected by any sandblasting media drifting into your airspace? } Not applicable. You are working on the South side

Is sufficient information available to inform you of our painting programme? YES

Has any sandblasting debris caused a problem on the streets surrounding the bridge? NOT IN PRINCES STREET

Is there sufficient signage in place to warn of possible hazards? YES.

Any other comments? We are pleased that the graffiti has been removed from the bridge in Princes Street but it was allowed to remain for too long. Princes Street is a residential area and all of us who have our properties graffitied have an obligation to remove it as soon as possible. Leaving it only encourages more graffiti. Not related to resource consent but Princes Street is poorly lit under the bridge. I am sure it does not comply with lighting standards required by local authorities. Could we please have an improvement?

Name: s9(2)(a) [redacted]

Signat [redacted]

Addre [redacted]

Date: June 26, 1996.

96RESOUR.WPD : 25 June 1996