FRY CONSULTING LTD
Property Management
Roofing and Waterproofing Solutions for Buildings

12 August 2011

To whom it May Concern.

EXPERT OPINION: NURAPLY 3PT, 3PTM AND 3PG AS EXTERNAL TANKING MEMBRANES

Nuraply 3PT, 3PTM and 3PG are 3-4mm thick, tough, flexible, non-woven polyester reinforced bituminous waterproofing membrane systems.

The Nuraply systems are installed against external walls and underslabs by heat welding the underside of the membrane to Nuraflux primed surfaces. All joints are heat-welded to seal the membranes together.

Nuraply 3PT, 3PTM and 3PG are recommended in situations where moderate hydrostatic pressure is likely and particularly if underslab tanking is required. The entire systems are positive waterproofing that is watertight immediately upon installation.

Once applied under floor slabs and foundations and to the exterior face of basement retaining walls they prevent water vapour penetrating to the interior face in spaces where moisture may cause damage

Having reviewed Nuralite's literature and test reports, in my opinion, Nuraply 3PT, Nuraply 3PTM and Nuraply 3PG if designed, used, installed and maintained in conjunction with Nuralite's literature, will meet the following provisions of the NZBC:

Clause B2 DURABILITY:

Performance B2.3.1 (a) not less than 50 years product performance expectancy

Clause E2 EXTERNAL MOISTURE:

Performance E2.3.3. Roofs and Walls shall prevent the penetration of water

Clause F2 HAZARDOUS BUILDING MATERIALS:

Performance Substrate Design F2-3·1. Does not pose a hazard to humans

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Comparison to existing Compliance Documents

During the E2/AS1 transition period the relevant comparison is with 12.2.2 DPM materials.

The following are acceptable damp-proof membrane materials acceptable solutions:

a) Mastic asphalt complying with BS 6925, and which is applied in at least two layers to give a membrane thickness of no less than 30 mm under floor slabs and 20 mm on walls,

b) Modified bituminous sheet comprising modified bitumen on a polyethylene backing, with or without layers of fabric reinforcement,

c) Synthetic rubber sheet,

d) Polyethylene sheet having minimum thickness of 0.25 mm, and

e) Liquid coatings, such as bitumen or tar emulsions, and those based on epoxies or urethanes.

Nuraply 3PT, 3PTM and 3PG compare very favorably against clauses c) and d) but are most closely aligned to clause b).

The main difference is that Nuraply 3PT, 3PTM and 3PG lack a polyethylene backing. The backing is not part of the waterproofing, rather it provides some robustness from penetration of foreign materials. The Nuraply membranes are sufficiently robust not to require a backing because:

- They are a minimum of 3mm thick whereas most membranes which qualify under clause b) are between 1 and 1.5mm thick
- They are reinforced with 180g/m2 of non-woven polyester whereas most membranes which qualify under clause b) are not reinforced at all.

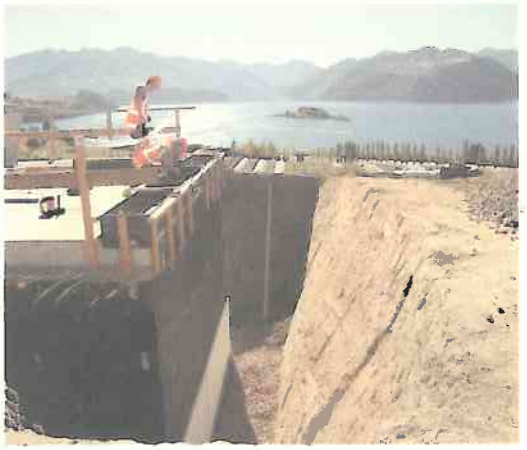
In my opinion, Nuraply 3PT, Nuraply 3PTM and Nuraply 3PG are very similar to current Acceptable Solutions. The slight differences serve to improve the performance of the Nuraply 3PT, Nuraply 3PTM and Nuraply 3PG systems above The Code requirements and alternative waterproofings.

History of Use

Nuraply 3PT, Nuraply 3PTM and Nuraply 3PG have been used in buried situations throughout New Zealand for over a decade now.

I have reviewed Nuralite's remedial issues file and can confirm that none of these jobs have presented any problems since installation.

Rotorua Hospital



Rippon Vineyard, Wanaka

Bleakhouse Road, Howick

Mace Residence, Bay of Islands

Barley Station, Queenstown

Khandallah Road, Wellington

Waiheke Island Garage

Orakei, Auckland

Having reviewed the test reports, compared the Nuraply systems to Acceptable Solutions and having reviewed historic use of the systems, I have formed the opinion that Nuraply 3PT, Nuraply 3PTM and Nuraply 3PG are suitable solutions to prevent moisture ingress for both walls, foundations and underneath slabs.

Yours sincerely

Philip E. Fry

Managing Director.

Appendices: 1

Appendix: 1.

About Fry Consulting Limited

Fry Consulting Limited is a specialized consultancy focused on providing professional advice to the waterproofing industry or those suffering from waterproofing issues at their property.

The principal, Phil Fry, has over 40 years of experience within the waterproofing industry. He is recognized for his knowledge of membrane waterproofing acquired through decades of involvement in many of the leading waterproofing projects in New Zealand and throughout the Pacific and Asia.

The first waterproofing project Mr. Fry was involved in was Auckland Central Police Station in 1963. Since then some examples of projects where he had a leading technical role are:

- Vector Arena, Auckland.
- The Beehive and Parliament Buildings, Wellington.
- Te Papa, Wellington.
- Starship Children's Hospital, Auckland.
- Whampoa Gardens – Hong Kong
- Samoan Parliament Buildings, Apia.

CONFIDENTIAL REPORT

PURPOSE: Application to Auckland Council for assessment – New product

PRODUCT TYPE: Damp proof membrane - Tanking

PRODUCT TRADE NAMES : Nuraply 3PT and Nuraply 3PTM

PRODUCT DESCRIPTION:

- Nuraply 3PT: Thick and tough reinforced bituminous waterproofing membrane of great strength and durability. The membrane is 3mm thick of APP bitumen with a heavy reinforcing layer of non-woven polyester inside. The 10m x 1m rolls of Nuraply 3PT are laid by heat welding the underside of the membrane to a Nuraflux primed surface.

- Nuraply 3PTM: As for Nuraply 3PT with mineral chip aggregate rolled into its surface, making it ideally suited for waterproofing underslabs where the mineral chips key into the poured concrete slab.

USE SITUATION: Tanking - Combining Nuraply 3PT on the walls with Nuraply 3PTM under the slab ensures the entire building is encapsulated with a tough positive waterproofing system. Both Systems have been developed for positive long-term low maintenance waterproofing of construction features such as:

- Foundations
- Basements
- Lift shafts, pits
- Underslab

APPLICANT: Nuralite Waterproofing Ltd
Contact: John Simmons-Managing Director
53A Victoria Street
Onehunga
Auckland 1061
Tel: (09) 579 2046 or 0800 Nuralite (0800 687254)
Fax: (09) 579 5136

AUTHOR: Chris Dane **SIGNED:** 24 August 2011
(Grayson Wagner Co Ltd, Consultant Chemists)

TABLE OF CONTENTS

A. INTRODUCTION:

The definition of a Damp Proof Membrane (DPM) is a sheet material coating or vapour barrier having a low water vapour transmission and used to prevent water and water vapour movement through concrete in contact with the ground. Also known as a concrete underlay.

The Nuraply 3PT and Nuraply 3PTM system provides a robust watertight solution (DPM) for areas where water is likely. The system can tolerate some hydrostatic pressure but specific design is required for areas of high hydrostatic pressure such as large building sites by the sea.

The system should not be used where tree roots are prevalent, where the tanking may be damaged mechanically and where there is insuffient room for an applicator to work on the substrate in a safe manner.

The purpose of this application is to provide evidence that the Nuraply 3PT and Nuraply 3PTM system provides a durable bituminous waterproofing membrane for tanking purposes.

When applying Nuraply 3PT the surface should be primed thoroughly with Nuraflux Primer and allowed to dry, the Nuraply 3PT is then adhered to the substrate by heat fusing.

B. SPECIFICATIONS:

Item	**Nuraply 3PT**	**Nuraply 3PTM**
Description	Waterproofing membrane consisting of straight run bitumen heavily modified with polymers (APP = Atactic Polypropylene) and reinforced with non woven polyester	Waterproofing membrane consisting of straight run bitumen heavily modified with polymers (APP = Atactic Polypropylene) and reinforced with non woven polyester
Finishing	• Topsurfaced with white calibrated sand • Underside finished with a smooth thermofusible film	• Topsurface finished with dense mechanically rolled aggregate chip • Underside finished with a smooth thermofusible film
Composition	• Reinforcement: Non-woven polyester 180g/m2 • Coating mass: Plastomer bitumen consisting of ± 70% bitumen and ± 30% atactic polypropylene (APP)	• Reinforcement: Non-woven polyester 180g/m2 • Coating mass: Plastomer bitumen consisting of ± 70% bitumen and ± 30% atactic polypropylene (APP)

Technical Specifications (average values)	• Tensile strength (U.E.A.t.c.) L: 600 N T T: 550 N • Elongation at break (U.E.A.t.c.) L: 40% D: 40%	• Tensile strength (U.E.A.t.c.) L: 650 N T T: 500 N • Elongation at break (U.E.A.t.c.) L: 45% D: 45%
Dimensions	• Thickness 3 mm • Length: 10 m • Width: 1 m • Surface: 10 m^2 • Av weight: 41 kg	• Thickness 3 mm • Length: 10 m • Width: 1 m • Surface: 10 m^2 • Av weight: 36 kg

Note: Nuraply 3PT and Nuraply 3PTM are non hazardous products.
Nuraflux primer is Class III Dangerous Goods and is flammable. Care is required in use.

Refer to NURALITE TANKING Systems Brochure in Attachment 3. Pg 28.

C. CODE CLAUSE - E2 (EXTERNAL MOISTURE):

Moisture in basements (Tanking): Water or water vapour shall be prevented from penetrating to the interior face of basement retaining walls in spaces where moisture may cause damage. This includes concrete slab-on-ground where every concrete floor slab cast on the ground shall have a damp proof membrane.

Damp-proof membrane (DPM) requirements.

Based on E2/AS1 10.3 Concrete slab-on-ground the DPM shall:

a) Have a vapour flow resistance of no less than 90 MN s/g (mega-newton seconds per gram)
b) Be sufficiently durable to resist damage from installation and normal worksite operations
c) Continue to function satisfactorily as a DPM for a minimum of 50 years
d) Be continuous over the whole slab area except where the DPM is used under a concrete floor topping
e) Extend under the foundation walls.
f) Be laid on a surface which is unlikely to damage the DPM.
g) Have penetrations by services, reinforcing or other objects that are sealed by taping
h) Be manufactured out of acceptable material – 0.25 mm thick minimum virgin polyethylene film or any other material that can be shown to meet the above requirements.

Based on E2 AS1 12.0 Basements the DPM material shall:

a) Have a vapour flow resistance of no less than 90 MN s/g
b) Have all joints and penetrations sealed.
c) Be adequately protected against damage during backfilling.
d) If polyethylene sheet vapour barrier, be protected where granular surface is likely to cause intrusion into the vapour barrier by surface blinding with sand to nominal minimum thickness of 25mm or heavy-weight building paper
e) That it be manufactured out of acceptable material:
   - Mastic asphalt
   - Modified bituminous sheet
   - Synthetic rubber sheet
   - Polyethylene sheet of minimum 0.25 mm thickness.
   - Liquid coatings (bitumen, tar emulsions and others based on epoxies or Urethanes)

Based on these requirements, the Nuraply 3PT and Nuraply 3PTM system damp-proof membrane material specifically requires:

1. A vapour flow resistance of no less than 90 MN s/g
2. That all joints and penetrations are sealed.
3. That it be adequately protected against damage during backfilling.
4. That it continue to function satisfactorily as a DPM for a minimum of 50 years
5. That it be manufactured out of acceptable material - Modified bituminous sheet comprising modified bitumen on a polyethylene backing with or without layers of fabric reinforcement. Minimum thickness of 0.25 mm

1. <u>A vapour flow resistance of no less than 90 MN s/g</u>

Due to the confusion arising between the use of ASTM E96M-05 where results are in Permeance units and the units used in most of E2 which are MNs/g (Vapour transmission resistance) a readily comprehensible, cheap and quick method which also reflects the requirements of B2/VM1 is used as an alternative (% weight gain after immersion in water by ASTM D471 etc). Refer to Grayson Wagner's paper to the NZIA dated June 2011 (Refer to Attachment 1. Pg 13.).

The water absorption characteristics of Nuraply 3PT and Nuraply 3PTM were analysed by Grayson Wagner Company Limited Chris Williams under the direction of Bill Grayson (For qualifications: Refer to Attachment 2. Pg 27.), as follows:

Supplied Samples:
The two samples of waterproofing membranes supplied to Grayson Wagner Co Ltd for testing were as follows:

- Nuraply 3PTM - Bituminous torch on membrane used for tanking under slab

- Nuraply 3PT - Bituminous torch on membrane used for tanking and as a base sheet.

Standard Test Methods:

- **ASTM Standard Test Method D5147** is equivalent to that of **ASTM Test Method D471** apart from the difference in size and replicate number of samples.
- **ASTM Standard Test Method D5147** was used to analyse the supplied waterproofing membranes' water absorption at 23°C for 1, 4 and 7 days for compliance to **AS/NZS4858-2004.**
- **ASTM Standard Test Method D5147** was used to analyse the supplied waterproofing membranes' water absorption at 50°C for 1, 4 and 7 days for compliance to **ASTM Specifications D6222-08/D6223M-09.**
- Replicates of 5 for each sample of membrane measuring 100cm² were tested at both 23°C and 50°C. Reported results are averages of the 5 replicates for each sample of membrane supplied and ranges of values are also given.

Variation from test method:

- **ASTM Standard Test Method D5147** requires test specimens be dipped in acetone for 1-2 seconds after being removed from the immersion vessel. This step has been omitted from the test method as acetone affects the membranes by slightly dissolving the bitumen.

Maximum Water Absorption

- **AS/NZS4858-2004** states that a membrane must not have a water absorption value greater than 10% w/w when immersed at 23°C for 1 day - tested to **ASTM Standard Test Method D5147.**
- **ASTM Specifications D6222-08/D6223M-09** state that a membrane must not have a water absorption value greater than 3.2% w/w when immersed at 50°C for 4 days - tested to **ASTM Standard Test Method D5147.**
- Grayson Wagner's paper to the NZIA states that a membrane tested to **ASTM Standard Test Method D5147** at 50°C for 7 days, must not have a water absorption value greater than 10% w/w.

Results for membranes tested to ASTM D5147 at 23°C and 50°C for 1, 4 and 7 days are as follows:

Nuraply 3PT				
Days	**Average Water Absorption @ 23°C (%w/w)**	**Range in Water Absorption @ 23°C (%w/w)**	**Average Water Absorption @ 50°C (%w/w)**	**Range in Water Absorption @ 50°C (%w/w)**
0	0	0	0	0
1	0.3	0.2-0.3	0.3	0.2-0.5
4	0.2	0.2-0.3	0.2	0.1-0.3
7	0.1	0.0-0.2	0.1	0.0-0.3

Nuraply 3PT:

- **Note:** Membranes lost small amounts of surface granules
- The samples of Nuraply 3PT tested to **ASTM D5147** at 23°C in this analysis comply with **AS/NZS4858-2004**.
- The samples of Nuraply 3PT tested to **ASTM D5147** at 50°C in this analysis comply with **ASTM D6222-08/D6223M-09.**
- The samples of Nuraply 3PT tested to **ASTM D5147** at 50°C in this analysis comply with requirements set out in Grayson Wagner's paper to the NZIA dated June 2011 (Refer to Attachment 1. Pg 13.).

Nuraply 3PTM				
Days	**Average Water Absorption @ 23°C (%w/w)**	**Range in Water Absorption @ 23°C (%w/w)**	**Average Water Absorption @ 50°C (%w/w)**	**Range in Water Absorption @ 50°C (%w/w)**
0	0	0	0	0
1	0.2	0.1-0.2	0.4	0.3-0.5
4	0.1	0.1-0.2	0.5	0.4-0.5
7	0.2	0.1-0.2	0.7	0.6-0.8

Nuraply 3PTM:

- The samples of Nuraply 3PTM tested to **ASTM D5147** at 23°C in this analysis comply with **AS/NZS4858-2004**.
- The samples of Nuraply 3PTM tested to **ASTM D5147** at 50°C in this analysis comply with **ASTM D6222-08/D6223M-09.**
- The samples of Nuraply 3PTM tested to **ASTM D5147** at 50°C in this analysis comply with requirements set out in Grayson Wagner's paper to the NZIA dated June 2011(Refer to Attachment 1. Pg 13.).

Conclusions:

- All waterproofing membranes tested in this analysis comply with **AS/NZS4858-2004** and **ASTM D6222-08/D6223M-09**.
- All membranes tested in this analysis fall within the requirements set out in the Grayson Wagner NZIA paper dated June 2011 (Refer to Attachment 1. Pg 13.).

2. **<u>That all joints and penetrations are sealed.</u>**

   This is ensured provided the general application methods for Nuraply 3PT and 3PTM are followed. Refer to the general application methods under point E.

   Refer to NURALITE TANKING Systems Brochure in Attachment 3. Pg 28.

3. **<u>Be continuous over the whole slab area</u>**

   All lap joints are welded as a separate process. Refer to the general application method for Nuraply 3PT and 3PTM

Refer to NURALITE TANKING Systems Brochure in Attachment 3. Pg 28.

4. **<u>That it be adequately protected against damage during backfilling.</u>**

   Use instructions indicate that care should be taken once the membrane is installed to ensure it is not damaged. Careful supervision of the placement of protection boards and backfilling is recommended.

   Refer to NURALITE TANKING Systems Brochure in Attachment 3. Pg 28.

5. **<u>That it continue to function satisfactorily as a DPM for a minimum of 50 years</u>**

   Refer to B2 (Durability)

6. **<u>That it be manufactured out of acceptable material</u> - Modified bituminous sheet comprising modified bitumen on a polyethylene backing with or without layers of fabric reinforcement. Minimum thickness of 0.25 mm.**

   Nuraply 3PT and 3PTM are waterproofing membranes consisting of straight run bitumen heavily modified with polymers (APP = Atactic Polypropylene) and reinforced with non woven polyester. The thickness is 3mm. Refer to the specifications.

   Refer to NURALITE TANKING Systems Brochure in Attachment 3. Pg 28.

D. CODE CLAUSE - B2 (DURABILITY):

The verification method B2/VM1 1.0 indicates that the durability of a building element will be by proof of performance and shall take into account the expected in-service exposure conditions by one or more of the following:

a) In-service history
b) Laboratory testing
c) Comparable performance of similar building elements.

Verification of durability for Nuraply 3PT and Nuraply 3PTM is based on laboratory testing with conclusions based on use for tanking, ingredients, method of application and product specifications.

<u>Laboratory testing</u>

Based on Entropy and the Second Law of Thermodynamics (Physics for Students of Science and Engineering Combined Edition - Halliday and Resnick): The water content of a membrane over time will come to a constant.

This constant will be a point of equilibrium where no further water absorption will take place. This state will remain for the life of the structure which in this case is a damp proof membrane and serves as an indicator of durability.

Grayson Wagner's paper to the NZIA dated June 2011 (Refer to Attachment 1. Pg 13.).

Grayson Wagner Co Ltd carried out a complete review of applicable standards for membranes which indicate that the most comprehensive are the ASTM standards.

The applicable ASTM standards test a variety of membrane types in different ways and with different specifications.

To determine whether a particular membrane will waterproof a structure, a number of membranes were tested using ASTM methods using water immersion at 23^{o}C and 50^{o}C until they reached equilibrium (stopped absorbing water)

Included on the list of membranes tested is Nuraply 3PV which is similar to the Nuraply 3PT and 3PTM. Nuraply 3PV (labeled 10) is listed as a torch on sheeting of APP modified Bitumen with non-woven Polyester reinforcing. It is a tough 4mm thick membrane with a built in vapour diffusion layer.

The results clearly show that the percentage water absorption of this membrane in tap water at 50^{o}C over 30 days was in equilibrium below 10% water absorption.

Grayson Wagner Co Ltd concluded that any membrane that serves a waterproofing function should not absorb more than 10% at equilibrium

Laboratory Analysis conducted by Chris Williams of Grayson Wagner Co Ltd.

The tests as shown under point C. CODE CLAUSE E2 (EXTERNAL MOISTURE) clearly shows that the percentage water absorption for the Nuralite membranes Nuraply 3PT and Nuraply 3PTM immersed in water at 23^{o}C and 50^{o} C reach equilibrium below 10% absorption over 7 days.

Readings subsequently conducted at 31 days verify the state of equilibrium as illustrated in the following tables.

Nuraply 3PT				
Days	**Average Water Absorption @ 23°C (%w/w)**	**Range in Water Absorption @ 23°C (%w/w)**	**Average Water Absorption @ 50°C (%w/w)**	**Range in Water Absorption @ 50°C (%w/w)**
0	0	0	0	0
1	0.3	0.2-0.3	0.3	0.2-0.5
4	0.2	0.2-0.3	0.2	0.1-0.3
7	0.1	0.0-0.2	0.1	0.0-0.3
31	0.0	0.0-0.0	0.3	0.1-0.6

Nuraply 3PTM				
Days	**Average Water Absorption @ 23°C (%w/w)**	**Range in Water Absorption @ 23°C (%w/w)**	**Average Water Absorption @ 50°C (%w/w)**	**Range in Water Absorption @ 50°C (%w/w)**
0	0	0	0	0
1	0.2	0.1-0.2	0.4	0.3-0.5
4	0.1	0.1-0.2	0.5	0.4-0.5
7	0.2	0.1-0.2	0.7	0.6-0.8
31	0.3	0.2-0.4	1.2	1.2-1.3

Conclusion on the durability of Nuraply 3PT and Nuraply 3PTM.

A durability period of not less than 50 years can be expected for Nuraply 3PT and Nuraply 3PTM based on the following assumptions:

- A state of equilibrium for water absorption at below 10% after 31 days indicates that it is unlikely that water will be absorbed thus providing waterproofing for the life of the membranes.
- The membranes are > 0.25mm in thickness.
- The membranes are used underground (tanking) eliminating any potential ULV degradation.
- Application onto the required surface is optimal and permanent. Nuraply 3PT is applied to the substrate by heat fusion and Nuraply 3PTM has mineral chip aggregate rolled into its surface which keys into the poured concrete slab.
- Bitumen is a black, oily, viscous material that is a naturally occurring organic byproduct of decomposed organic materials which means that bitumen does not rot, there is no microbiological degredation.

Reference: The Belgian manufacturer ATAB NV (atab Polygum) have provided a letter to whom it may concern anticipating that the membrane will continue to perform its function for in excess of 50 years. Refer to Attachment 4. Pg 32.

E. GENERAL APPLICATION METHODS

Nuraply 3PT

The surface to be waterproofed should be dry, smooth, free from dust, dirt, protrusions and cavities.

a) The surface should be primed thoroughly with Nuraflux Primer and allowed to dry. The drying time depends on the porosity of the substrate and the environmental conditions (± 0.5-3 hours).
b) Nuraply 3PT is adhered to the substrate by heat fusingthe base of the sheet as it is rolled up the substrate.
c) All lap joints are welded as a separate process. As this step is vital, a three pass method is used so that the quality of the weld is checked during the process.
d) Top edges overflashed or secured to ensure there are no loose or uncovered edges above or below ground level

Nuraply 3PTM

a) The surface must be compacted and free of protrusions
b) Roll out the Nuraply 3PTM with the chip side facing up
c) Weld the lap joints in the traditional way, ensure a large bitumen bleed is evident along the joint
d) Ensure there is sufficient material to fold up the footing
e) Pour the slab directly onto the membrane

Refer to NURALITE TANKING Systems Brochure in Attachment 3. Pg 28.

F. WARRANTY:

Nuralite warrants both systems Nuraply 3PT and Nuraply 3PTM against materials defects for 20 years from the date of installation. The warranty must be applied for at the completion of the job.

The product installation is covered by a separate workmanship warranty issued by the applicator

Refer to NURALITE TANKING Systems Brochure in Attachment 3. Pg 28.

G. PRODUCT REFERENCES:

1. **Nuralite** – Producer Statement on the Nuraply 3PT Tanking System Membrane and an indication of recent uses which include:

- Rotorua Hospital
- The Rippon Vineyard

Refer to Attachment 5. Pg 33.

2. **Fry Consulting Ltd** – An Expert Opinion Report: Nuraply 3PT and 3PTM as external tanking membranes.

This report includes a comparison to existing compliance documents and a history of use which includes the following:

- Rotorua Hospital
- Rippon Vineyard Wanaka
- Bleakhouse Road Howick
- Mace Residence Bay of Islands
- Barley Station Queenstown
- Khandallah Road Wellington
- A Waiheke Island Garage
- Site at Orakei Auckland

Refer to Attachment 6. Pg 34.

3. **Protect Middle East L.L.C**.- Project reference list using Flexigum Membrane.

The product supplier has provided a list of tanking jobs that they have been involved with using an equivalent product in the Middle East (equivalent to Nuraply 3PT & Nuraply 3PTM).

Refer to Attachment 7. Pg 40.

H. ATTACHMENTS:

Antwerp, 11.08.11

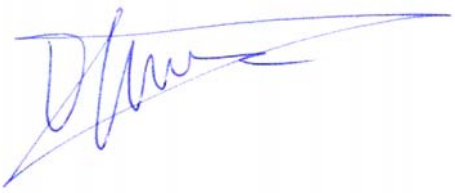
To Whom It May Concern:

We, ATAB NV, international expert in production and advice for flexible waterproofing systems, confirm following:

If the Nuraply 3 PG, root-resistant polymer modified bitumen membrane, or Nuraply 3PT or 3PTM are buried then, based on practical experience, ATAB anticipates that the membrane will continue to perform its function for in excess of 50 years.

Sincerely Yours,

Atab n.v.



Luc van Audenhaege
Polygum Roof Engineer

Auckland Council
Te Kaunihera o Tāmaki Makaurau

8 November 2011

Nuralite Waterproofing Co Ltd
53A Victoria Street
Onehunga
Auckland

Attention: John Simmons

Dear Sir

Re: Nuraply 3PT, 3PTM and 3PG Membrane Systems

Thank you for providing a report on the above products.

Based on the documents provided Auckland Council accepts Nuraply 3PT, 3PTM and 3PG Membrane Systems complies with the New Zealand Building Code in particular clauses B2, E2 and F2.

When applying for a building consent where these products are to be used, the specifier will need to clearly identify this on the working drawings of the Building Consent application. Relevant details for the product will need to be included as part of the Building Consent documentation. Can you please inform your applicators that if this product has not been approved as part of the issued Building Consent, an amendment to the Building Consent will need to be approved for its use, prior to work commencing. Furthermore the approval is given subject to the following conditions

> *At the completion of the works and prior to the issue of the Code Compliance Certificate, the applicant shall provide to Auckland City Environments the following documentation to assist Council in establishing compliance with the Building Code.*
>
> 1) *Copy of applicators approval certificate from Nuralite Waterproofing Co Ltd*
> 2) *Copy of Workmanship Statement from the applicator*
> 3) *Copy of manufacturer's warranty*

If any changes to this product occur, please inform Council prior to the changes being implemented. This will allow the Council to determine if it is satisfied the proposed changes will continue to meet the requirements of the Building Code.

Private Bag 92300, Auckland 1142 | aucklandcouncil.govt.nz | Ph 09 301 0101

Please be aware this approval may change/ be withdrawn as industry knowledge, Building Codes and Acts change. If you wish to re-produce this letter, please ensure it is reproduced in full.

Yours sincerely
Auckland Council

Ian Godfrey
Senior Technical Building Specialist