In the Environment Court of New Zealand
Auckland Registry

I Mua I Te Kōti Taiao O Aotearoa
Ki Tāmaki Makaurau

ENV-2023-AKL-160

Under	the Resource Management Act 1991
In the matter of	An application for a direct referral to the Environment Court under section 87G of the Act for an order granting the applicant's resource consent applications to construct and operate a new asphalt plant at 54 Aerodrome Road, Mt Maunganui, together with an application for consent to authorise the continued operation of the existing asphalt plant on the site pending construction of the new plant
Between	**Allied Asphalt Limited**
	Applicant
And	**Bay of Plenty Regional Council and Tauranga City Council**
	Consent Authorities

Statement of Evidence of Jonathan Michael Garton on behalf of Fulton Hogan Limited

Dated: 29 February 2024

Counsel acting:
Stephen Christensen
Project Barrister
421 Highgate, Dunedin 9010
p 027 448 2325
stephen@projectbarrister.nz

Qualifications and experience

1 My full name is Jonathan Michael Garton and I am the Industries Divisional Manager for Fulton Hogan Limited (**Fulton Hogan**) in the Auckland Region. In that role I am responsible for financial and operational management of the Manufacturing businesses related to bituminous products, as well as the Auckland Laboratory business. The manufacturing business includes Asphalt Plants, a Polymer and Bitumen plant and an Asphalt recycling plant.

2 I have been employed by Fulton Hogan as the Auckland Industries Divisional Manager since 2019. I have worked for Fulton Hogan since 2005 in other roles but all involving Asphalt Manufacturing. Prior to moving to New Zealand I completed a Production Engineering Diploma in South Africa and worked for a couple of Chemical manufacturing businesses, producing Zeolite for the petroleum industry and Phosphoric acid for fertilizer applications. I am authorised by Fulton Hogan to provide this statement of evidence.

3 During my 18 years of service at Fulton Hogan I have been directly involved in asphalt manufacturing and operations in multiple roles responsible for activities including:

(a) Plant operation, planning and supervision.

(b) Plant maintenance, upgrades, operational design and full plant replacement.

(c) Product development and design.

(d) Sub-contractor management.

(e) Site safety and environmental compliance.

(f) Quality control of process and projects.

(g) Financial management for various departments including pricing, tendering and securing work.

4 In that time, I have worked with various asphalt plant suppliers including Astec, Ammann, Marini and Benninghoven, as well as personally inspecting various Asphalt plants in New Zealand, Australia, Italy and the United States. This experience has afforded me an extensive knowledge of Asphalt plants, including their operation and capability.

5 My previous work experience includes the position of Operations Manager in the Auckland Industries division between 2017 and 2019 managing operational activities of both Asphalt plants, the Polymer and Emulsion plant and the Asphalt recycling business. Previous to those roles I was the Department Manager for the Auckland Asphalt plant in Reliable Way since 2012 and asphalt plant operation since 2005. During this time, I also attended the Astec asphalt customer school in Tennessee as well as the Astec training school in Australia.

6 In my management roles at Fulton Hogan, I have been involved in a number of consents including the renewal of the air discharge consent for the Reliable Way asphalt plant, renewal of the air discharge, land use, stormwater and industrial trade waste for Silverdale Asphalt and also the full consent process for the new Drury Asphalt Plant (Marini Top Tower 2500 that is intended for Mount Maunganui).

7 My role in relation to Allied Asphalt Limited's (**Allied**) application for resource consents for a new asphalt plant and the continued operation of an existing plant pending construction of the new plant at 54 Aerodrome Road, Mt Maunganui (**Application**) has been to provide advice in relation to asphalt plant selection.

8 In preparing this statement of evidence I have considered the following documents:

(a) the AEE accompanying the Application.

(b) Various asphalt plant supplier offers, including multiple models with various options.

9 I am giving this evidence as an employee of Fulton Hogan and therefore I am not an independent expert as identified in the Environment Court Code of Conduct for expert witnesses. I have however prepared this evidence using my skill and experience described above.

Scope of evidence

10 I have prepared evidence in relation to:

(a) The asphalt plant selection process including:

(i) Plant type – continuous mixing versus batch plants and mobile versus stationary

(ii) Manufacturer selection

(iii) Plant size

(iv) Plant capability and specification

(v) Plant layout and footprint

The proposed new asphalt plant selection

11 The selection process for the Tauranga site was able to build on work completed for the Fulton Hogan Hamilton and Fulton Hogan Drury asphalt plant sites[1]. The process provided significant weighting toward environmental performance requirements whilst also considering operational, safety, commercial and building compliance requirements.

12 The process included establishing a working group from across the business including experts in mechanical engineering; environmental and sustainability management; asset and financial management; and asphalt operations. The group met weekly over a 12-month period to identify, investigate and ultimately select the best practical option for the asphalt production sites. Thereafter the group continued to collaborate on project delivery and coordination.

13 The decisions reached by the working group were peer reviewed by an experienced expert in asphalt plant installation from Fulton Hogan Australia.

Plant Type - Mobile versus Stationary

14 Asphalt plants manufacturers provide options of either mobile or stationary asphalt plants.

15 There are examples of both currently in New Zealand with selection between the two options considered for each site, including Tauranga.

16 A mobile asphalt plant is portable and can be moved from one location to another, which makes it suitable for temporary projects or remote areas where transportation of materials is challenging.

17 In order to maintain mobility, the design of mobile asphalt plants applies a strong focus on weight reduction and quick plant erection. This is intended

[1] The Fulton Hogan Hamilton site is in Frankton and is surrounded by a range of land uses including houses and a large church, as well as other industrial activities. The Drury site in South Auckland is in an area adjacent to a large existing quarry with relatively few sensitive neighbours.

to allow for periodic relocation with limited equipment, such as cranes, and also quick setup to begin production at the new location.

18 Mobile asphalt plants produce a quality product with most of the same technology employed on stationary asphalt plants. This includes emission controls such as baghouses and cyclones. The mobile nature of the plant does however limit options for blue smoke treatment on silos and at the loadout.[2]

19 Mobile asphalt plants also typically have a shorter stack height due to the limited foundations and structural support required for a tall stack. A low stack height impacts air dispersion and limits site suitability.

20 Stationary asphalt plants are designed with limited mobility and typically would not be moved except in situations where the property is no longer suitable, or they are being replaced. Depending on the manufacturer and plant model they can be supplied in containerised components or as a combination that also includes large modular sections. Containerised plants are much easier to transport when shipping from overseas.

21 Stationary asphalt plants are intended for long term operation on a site with consistent demand, ongoing infrastructure development in urban areas or large-scale construction projects.

22 They are generally more durable, offered in a number of different models by manufacturers and, depending on the model, have additional options for increased emissions control systems. Stationary asphalt plants can also accommodate taller stack heights with examples as high as 36m tall in operation currently.

Plant Type - Continuous Mixing versus Batch Plants

23 There are two main asphalt manufacturing plant types globally accepted and employed based on a number of production factors. The first and most commonly used in New Zealand, however not globally, is the “continuous mixing” or “drum mixing” plant”. The second is the “batch plant” which is the type of plant proposed for the Allied Asphalt site in Tauranga.

24 Batch plants have recently been consented and are in the course of construction at Fulton Hogan sites in Hamilton and Drury. Fulton Hogan has also recently applied for consents to construct another new batch plant in Wellington. It is likely that the same or very similar batch plants will be

[2] Bluesmoke is the term used to describe semi-volatile organic compounds that re gases at stack temperature but condense when they cool to ambient temperatures

selected as Fulton Hogan and related entities consider replacement options for existing asphalt plants in other parts of the country as they reach retirement over the next decade or longer.

25 “The continuous mixing plant” or “drum mixing plant” involves uninterrupted production, where mixing occurs either within the same drying drum or in an after-mixer (pugmill) before being conveyed to hot asphalt storage silos. The type of mixing, although relatively simplistic, requires accurate metering systems on the aggregate feeders and is well known for high production wastage.

26 In drum mixing plants, options include counterflow and parallel flow configurations. Counterflow plants feature the heating and mixing process occurring in separate zones, allowing for efficient heat transfer and control over the production process. Parallel flow plants, on the other hand, have heating and mixing in the same direction of material flow, offering a more simplistic design but with reduced efficiency.

27 The existing drum mix asphalt plant in Mt Maunganui is a parallel flow plant, as illustrated in Figure 4.1 of Appendix 04 Existing plant description.

28 Continuous mixing plants are ideal for producing large quantities of asphalt mixes for various paving projects requiring consistent supply.

Figure 1 - Marini Batch Plant Fulton Hogan Hamilton

29 Batch plant production operates as titled, in 'batches', allowing much greater operational flexibility. Aggregates are dried and heated in a drying drum and conveyed to a multi-deck screen where they are screened into specifically sized fractions. The aggregates, bitumen binder and other raw materials such as reclaimed aggregate pavement (RAP) are mixed in discrete batches before being discharged into storage before loadout.

30 Assessment of the infrastructure market and the receiving environment was considered in order to make a decision between the two plant types. The New Zealand Transport Agency issues specifications defining asphalt performance requirements and undertook a review of these with the industry that was updated in 2020. Revision to the specifications has increased the need for greater process control to achieve quality standards. The new plant is intended to accommodate the technical aspects and environmental/ sustainability aspects of what future specification revisions are likely to include. Additionally, Fulton Hogan's directive for the new plants was to be more energy efficient, have improved environmental performance, and to reduce wastage contributed to the decision.

Option Selection

31 The best option for Mount Maunganui was determined to be a stationary batch plant. Primary contributing factors were:

(a) A mobile asphalt plant still required foundations to meet New Zealand seismic conditions and installation on multiple sites was not feasible.

(b) Regular and consistent asphalt production requirements, supporting regional infrastructure and infrastructure projects was better suited to a stationary plant.

(c) A stationary asphalt plant offered additional environmental performance options including blue smoke treatment for the silos and loadout area.

(d) Requirement for short production runs of various different asphalt products while still reducing production wastage is better suited to a batch plant.

(e) A batch plant provides the best environmental performance, achieved through consistent product quality, plant performance and improved energy efficiency, contributing towards lower environmental impact through better utilization of natural resources.

(f) Increased production versatility to meet the needs of the market.

(g) Energy efficiency of components and overall plant

Plant Size

32 The production rate options for batch plants range from as low as 80 tonnes per hour (t/h) up to rates well over 400 t/h.

33 Each manufacturer has a number of different models of batch plant on offer with varying capabilities and a range of production rates per model. Modifications or upgrades can affect the production rate. Higher RAP contents, aggregate moisture contents or height above sea level can all reduce the production rate.

34 Assessment of the production rate was undertaken considering market requirements, as well as product requirements such as RAP content and emission controls. The assessment included peak periods tonnage requirements over time and not simply the total tonnage per month/annum.

35 It was assessed that in order to meet the anticipated demand for Allied's Mount Maunganui site, a batch plant rated between 180 t/h and 200 t/h was required.

(a) The maximum specified plant rate is specific to a number of factors including altitude, total moisture content, aggregate temperature, aggregate density, RAP content and even particle size distribution.

(b) The production rate was based on historical production values and future production requirements, including both tonnages produced over time, and also the opportunity to produce asphalt in larger batches more quickly, meaning that compared to the existing plant, the same amount of product can be produced in a shorter operating time.

Manufacturer selection

36 The selection process focussed on four asphalt plant manufacturers globally accepted for supplying some of the best asphalt plants are:

(a) Ammann

(i) Established in 1869 in Italy

(ii) Over 200 outlets in more than 100 countries in the world

(iii) Well known in New Zealand and Australia with various current plants in operation across both countries.

(b) Benninghoven

(i) Founded in 1909 in Germany

(ii) Recently joined the Wirtgen group with headquarters in Germany.

(iii) Batch plants operational in Australia

(c) Astec

(i) Founded in 1972 in Chattanooga Tennessee

(ii) Developed the Astec Double barrel® for continuous manufacturing plants.

(iii) Currently three Asphalt plants in operation in Auckland and many others in Australia.

(d) Marini

(i) Established in 1899 in Alfonsine Italy.

(ii) Sold over 3000 Asphalt plants globally.

(iii) A number of plants in operation across New Zealand and Australia.

37 Fulton Hogan has previously purchased asphalt plants from each manufacturer and currently operates various types and models of each across New Zealand and Australia.

38 Each company was approached and given the opportunity to provide their best offer to meet the required plant specifications.

Plant Capability and Specification

39 Determination of plant capability was undertaken via as a consultative process with each manufacturer. Each plant manufacturer offers similar base plant capabilities and specifications but achieves them in different ways. For example, additional hot asphalt storage on certain models required side-by-side weighbridges instead of a single weighbridge. The plant and configuration for the various types, models and manufacturers selected needed to fit in the space available on the existing Allied site.

40 The consultative process with the manufacturers was utilised to identify and compare an extensive list of features between the different plants, as

described in Appendix 1 to my evidence. These features were listed to allow side-by-side comparison of the different plant options and identify the best option for the site. The full spreadsheet can be viewed in appendix 5 of the AEE.

Plant layout and footprint

41 Each manufacturing plant has limitations in the layout of the various plant equipment. The drying drum position relative to the mixing tower, and the position of aggregate feeders relative to the drying drum all determine how the plant can be positioned.

42 A number of iterations per plant were considered in different combinations for the Allied site at Aerodrome Road to determine the most appropriate layout for the plant options.

43 The design of each manufacturing plant also differed in total footprint. For example, the Ammann Unibatch 180 is designed with the baghouse on ground level whereas the Marini Top Tower 2500 is designed with the baghouse above the drying drum. This combination difference results in a reduced footprint, which increases the concrete foundation requirements beneath the drying drum of the Marini plant but ultimately reduces the total concrete required.

Outcome of selection process

44 The plant selection and assessment process clearly identified a short list of key plant requirements:

(a) The selected plant needed to include a high level of environmental control for particulate and odour and an option for installing a blue smoke treatment system, because:

(i) The selection process considered the site requirements of a number of locations including Drury, Hamilton and Tauranga (Mount Maunganui). The polluted status of the Mount Maunganui airshed was given priority.

(ii) A technologically advanced plant was required, allowing for capture and treatment options for odour, particulate and blue smoke from both the production areas and the loadout area of the plant.

(iii) Options needed to include extraction and treatment solutions for the hot aggregate storage bins, steam evacuation from the mixer, the shuttle room and the loadout area. Additional ability to enclose the loadout area in the future if necessary was also considered.

(b) The plant needed to be at least 30% RAP capable.

(i) RAP is one of the most recycled materials globally and according to the National Asphalt Pavement Association is the most recycled product in the United States.

(ii) RAP provides a number of environmental benefits including:

(A) A reduction in the need for imported bitumen, since less virgin bitumen is required in asphalt when utilizing RAP.

(B) Asphalt production requires fewer virgin aggregates when using RAP and is proportional to the quantity recycled. This reduces the amount of quarried aggregate extracted, processed and delivered.

(C) RAP is a resource that can also be recycled over and over again making it an important inclusion in asphalt production and sustainability goals.

(c) The plant needed to be compliant with New Zealand seismic and wind engineering requirements in order to be buildable / obtain building consent.

(d) Include noise reduction and dust containment features.

(e) Manufacturer support for both commissioning, operational staff training and ongoing operational troubleshooting.

(f) The batch plant needed to either have, or be able to be upgraded to have, at least 4 hot asphalt storage silos.

(i) Asphalt is produced in various designs specific to the application intended, such as footpaths, arterial roads or motorways to name a few.

(ii) Different products can be stored in separate silos temporarily, allowing supply to multiple customers over the same time period.

(iii) Silo storage important for reducing total trucking requirements by providing “surge” capacity between the plant and the site.

(g) The batch plant needed to include energy reduction principles in its design.

(i) Including insulation features.

(ii) Ability to include technology advances (ie additives and fuels) with manufacturer support.

(iii) Integral computer monitoring systems for quality and plant control optimization.

(iv) Energy efficiency of the components and the overall plant

45 This resulted in three plant options being short listed:

(a) Ammann – Unibatch 180

(b) Marini – Top Tower 2500

(c) Astec – BG1800

46 The Astec BG1800 option was removed from consideration primarily due to it being a very new plant to the market and insufficient operational data is available to verify its capabilities. It was also smaller than the other two plants with limited storage capacity.

47 The initial decision was made to progress with a detailed design and assessment for installation of the Ammann Unibatch 180. Although different to the Marini Top Tower in a number of ways, the two plants both achieved the initial list of requirements.

48 During the detailed design process a suitable solution to seismic compliance and blue smoke capture/treatment at the loadout area could not be agreed.

49 The final decision was weighted in favour of the Marini Top Tower 2500 due to clear beneficial design and capability differences including:

(a) A full emission control system for the batch tower as well as the loadout area. Incorporating a blue smoke filter, and with the ability to enclose the load out area further if required.

(b) Smaller footprint and more versatile layout reducing concrete foundation requirements.

(c) New Zealand seismic compliance, with commitment from Marini to supply a plant that would meet New Zealand requirements.

(d) A multi fuel burner capable of utilizing ULO, diesel or natural gas. Additionally, the burner can be setup to utilize other non-fossil fuels if these were to become available in the future.

(e) An energy reduction design that included placement of the baghouse over the drum for heat recovery, and reduced material travelling distances with shorter dust augers.

(f) More efficient energy capture during aggregate drying allowing for a smaller burner size but still allowing for higher production rate.

(g) Higher RAP percentage capability

(h) Larger filtration surface area and filter fabric density. This is an important consideration for achieving high levels of particulate control. Steam evacuation from the drying process requires moving a large volume of air. Aramid filter bags with a high thread count promote filtration but reduce airflow, hence a large surface area is required otherwise the asphalt production rate will be affected.

(i) Extended manufacturer warranty on critical high wear componentry.

Conclusion

50 The Marini Top Tower 2500 stood out as the best practical option due to its advanced features in achieving environmental performance while still producing quality asphalt products. It incorporated technologies like RAP recycling systems, multi-fuel burner capability and fume treatment, minimizing emissions and environmental impact. Selection of a stationary batch plant allowed for an optimized site layout, lower expected wastage and a high energy efficiency per tonne of asphalt produced. Overall, the plant offers a balance between efficiency and environmental responsibility making it an ideal choice for the various locations, particularly at Allied's site at 54 Aerodrome Road, Mt Maunganui

Jonathan Michael Garton

Dated this 29th of February 2024

Appendix 1

Plant features and specifications

(a) Dryer drum sizes with various RAP introduction systems

(b) Burner size and capabilities – Dual fuel for both liquid and gas options

(i) Ranged from 9MW to 14MW

(A) The burner needed to be capable of using various fuels depending on availability and site suitability. This included recycled fuel oil (ULO), diesel and/or natural gas. Additionally, it also needed to be capable of alternate non-fossil fuels.

(B) The burner control system needed to be certifiable in New Zealand and achieve emission values well below current standards.

(C) The plants did not come specified with ultra-low NOx burners. Ammann included the Oertli Induflame burner achieving Low Nox values and Marini include the CBS ASCB burner with low CO, VOC, Nox and CG4 values against current standards.The ability to upgrade the plant to an alternate burner in the future if required was noted as an option.

(ii) Baghouse filter

(A) Filter area

(B) Number of bags

(C) Filter fabric type including the fabric density.

(D) Forced pulse or reverse pulse (forced requires air and increases energy consumption)

(iii) Raw material storage

(A) Aggregate and RAP feeders

(B) Imported filler silo sizes (Important to ensure full truck deliveries due to delivery distances)

(C) Recovered fines silo sizes.

(iv) Hot product storage

(A) Hot aggregate quantities

(B) Hot asphalt quantities and silo configurations

(v) RAP percentage capability

(vi) Emission control systems

(A) Odour and blue smoke control during production

(1) Encompasses the mixer itself allowing for steam evacuation during RAP introduction and ducting fumes back to the burner for incineration.

(B) Blue smoke treatment system for loadout area

(1) The treatment system collects blue smoke directly from the loadout area and ducts it back to the Aerofilter.

(2) The system is designed for maximum capture of fume utilizing a fan rated for 51,000 m^3/hr airflow.

(c) Environmental emissions including noise and combustion gases.

(d) Total plant power and consumption requirements

(e) New Zealand seismic compliance

(i) NZ building compliance requires additional upgrades to meet requirements.

(f) Country of origin

(i) Sourcing from ethical and international standard supply options for both construction material and labour (i.e. both fabricated and constructed in Europe vs China)

(ii) Important for build standards towards NZ compliance

(iii) Requires build traceability including foundry certificates for building consents.

(iv) Protective coatings also different in various countries and NZ building consent requires a high durability (15 years plus) Europe use EN12944 for paint coatings as an example.