Martins Creek Quarry – Heavy Vehicle Route and Market Assessment

Summary

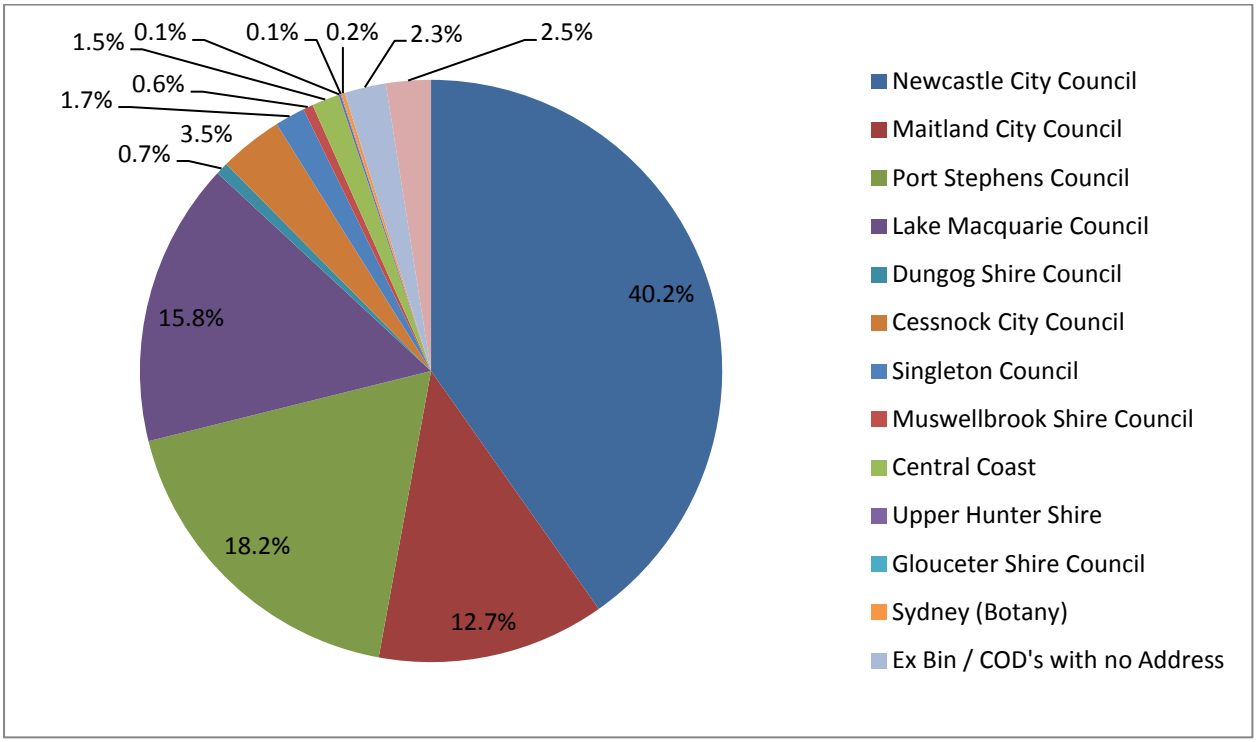
Daracon has been requested to complete an assessment of the areas that are most impacted by heavy vehicle traffic travelling to and from Martins Creek Quarry located at Station Street, Martins Creek. The assessment includes a review of volumes supplied over a 12 month period, including peak demands, the Local Government areas in which they were delivered and traffic routes that are most frequently used. Further a review has been completed of areas of major aggravation due to impacts by heavy vehicles, anticipated future market growth and factors relating to delivery restrictions for various materials.

Volume by Local Government Area

The 12 month period assessed was November 2013 – October 2014. The approximate volume for the period totalled 1.1 million tonnes, a distribution of percentages to each LGA are included in the table below. Consideration should be given to the "major" projects that Daracon supplied over this period, which generated short term increased volumes and indicates a larger market than would normally be expected. Major projects during this period included;

1. Hexham Rail upgrades – Newcastle
2. Nelson Bay Road Upgrade – Port Stephens
3. Inner City Bypass – Newcastle

Market By Local Government Area	% of total volume
Newcastle City Council	40.2%
Maitland City Council	12.7%
Port Stephens Council	18.2%
Lake Macquarie Council	15.8%
Dungog Shire Council	0.7%
Cessnock City Council	3.5%
Singleton Council	1.7%
Muswellbrook Shire Council	0.6%
Central Coast	1.5%
Upper Hunter Shire	0.1%
Glouceter Shire Council	0.1%
Sydney (Botany)	0.2%
Other	
Ex Bin / COD's with no Address	2.3%
Ballast Trains	2.5%



Ex-bin (Pick-up from quarry) volumes are not allocated to a specific council area as the material is sold on an "ex-bin" basis, Daracon systems do not track the location of these deliveries. Volume recorded against ballast trains is delivered by rail, future strategic plan includes increased volume and diversification of materials delivered using this method. Due to constraints with unloading materials from trains and rail access being unavailable at most sites, this method of delivering quarry materials will continue to be limited. This mechanism will require ongoing development to ensure Daracon optimises this option where possible.

Peak Demands

During 2014 Daracon Quarries were successful in securing large volume projects to be supplied from Martins Creek Quarry that increased short term supply demand, the increase in supply peaked at daily volumes in excess of 9000t per day. There were 3 days in the period March 14 - May 14 that daily volumes exceeded 9000t, resulting in excessive truck movements per day (viz.>560). The increased demand was primarily created by the Hexham Relief Roads Project which required a significant volume of rock fill in a short period of time, this type of project occurs on a very infrequent occasion.

Delivery Routes

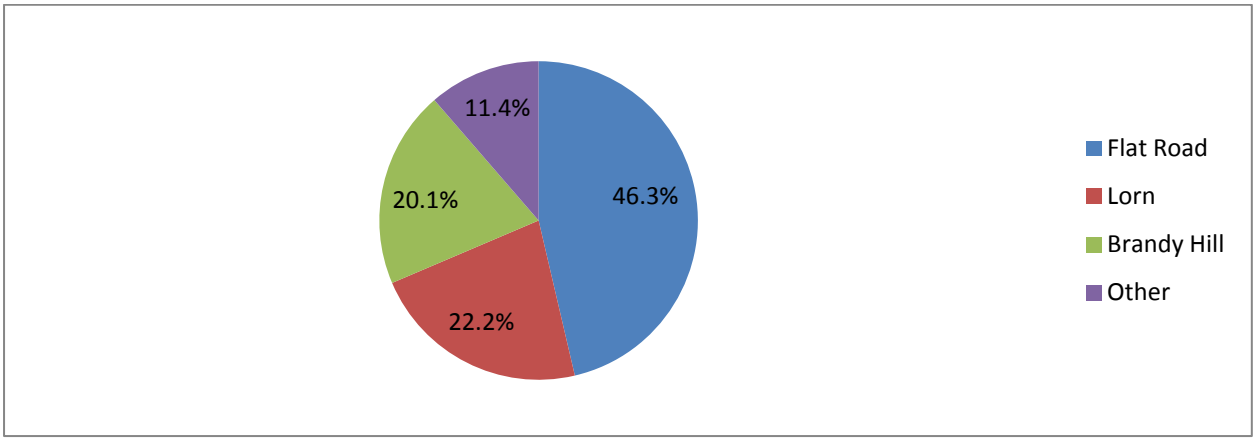
Daracon own a fleet of 19 truck and dogs that transport materials from Martins Creek Quarry. Further, Daracon engage external transport companies, on a subcontract basis, to supplement the company fleet on an "as needs" basis. There are 3 major transport routes that are used by heavy vehicles travelling to and from Martins Creek Quarry, other transport routes are considered to be used infrequently. Major transport routes are listed below;

1. Martins Creek Quarry – Grace Avenue – Dungog Road – Gresford Road – Tocal Road – Paterson Road – Flat Road
2. Martins Creek Quarry – Grace Avenue – Dungog Road – Gresford Road – Tocal Road – Paterson Road – Belmore Road
3. Martins Creek Quarry – Grace Avenue – Dungog Road – Gresford Road – Butterwick Road – Clarence Town Road – Brandy Hill Drive – Seaham Road

Maps for each delivery route are attached in appendix A.

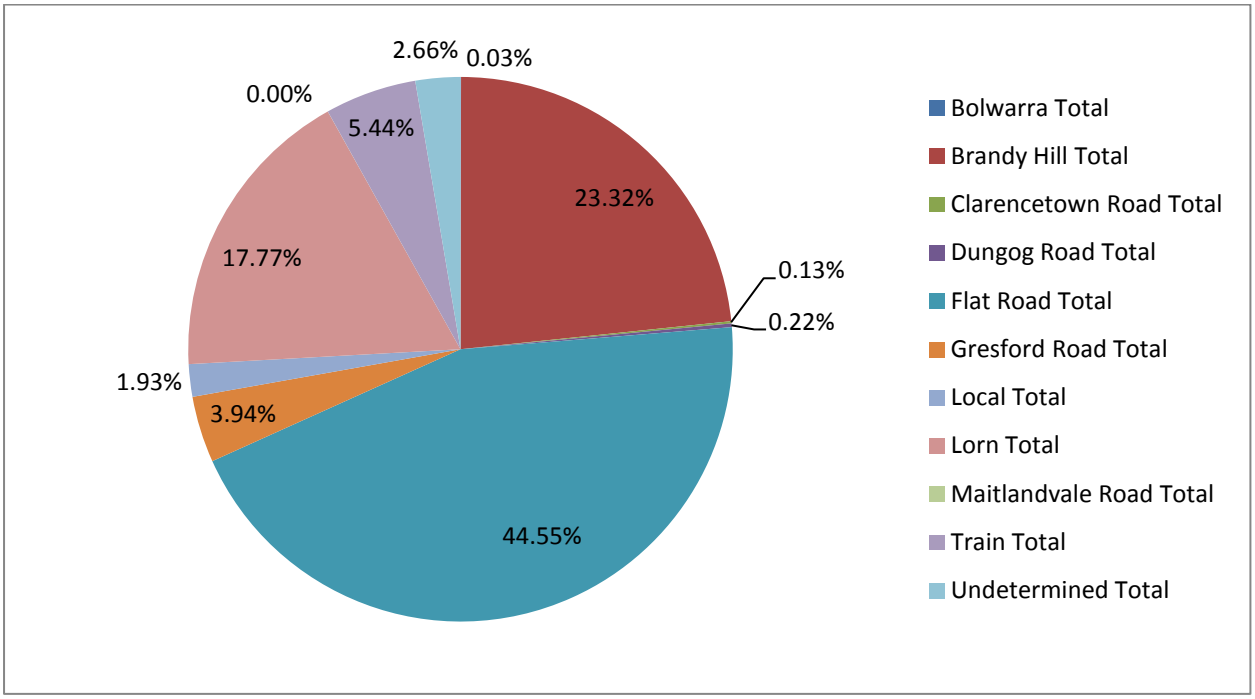
Daracon conducted a survey on heavy vehicles leaving the quarry for a period of 88 days from August 2014. Data collected and recorded was based on the 3 major routes identified above, vehicles not using these routes are identified as other. The following data is a summary of the survey;

Month	Flat Road	Lorn	Brandy Hill	Other
Aug-14	36.9%	16.9%	28.6%	17.6%
Sep-14	46.9%	17.5%	25.8%	9.7%
Oct-14	52.0%	19.1%	21.5%	7.4%
Nov-14	38.2%	29.8%	13.7%	18.3%
Dec-14	55.5%	28.3%	10.4%	5.8%
Totals	46.3%	22.2%	20.1%	11.4%



NB: Data for August and December is based on part month only. Short term detour occurred due to Gostwyck Bridge closure, detour via Vacy was implemented by RMS. Approximately 6.4% of the total traffic used the detour during the survey period, with all traffic ending up on the 3 major routes identified.

Subsequent to the above information being reviewed and discussions with Dungog Council, the % of traffic recorded as "other" (viz. average 11.4%, with peak of 18.3%) was requested to be further assessed to quantify associated routes, refer graph below;



Additional Information Relevant to Above Graph:

Bolwarra – Material was supplied to Bolwarra area, delivery via Patterson, Tocal etc

Local – Materials supplied to the local area e.g. Martins Creek, Paterson etc

Trains – Train loaded material

Undetermined – Job locations not available, materials were picked up from quarry by customer and job location not known

Major Aggravation Areas

Major Aggravation areas due to heavy vehicle traffic are considered to include;

- Martins Creek
- Paterson
- Bolwarra
- Lorn
- Brandy Hill

Alternate Traffic Route Assessment

Alternate traffic routes have been considered where possible, unfortunately due to the limited routes available whilst ensuring efficient transport operations the majority of these areas are unavoidable when sourcing materials from Martins Creek Quarry. Lorn is considered to be an area that can be avoided if required, heavy vehicles going to Maitland, Cessnock, Rutherford etc would travel along traffic route (1) identified above, with the utilisation of flat road to East Maitland and then travel via the New England Highway to access the abovementioned areas.

Product and Market Assessment

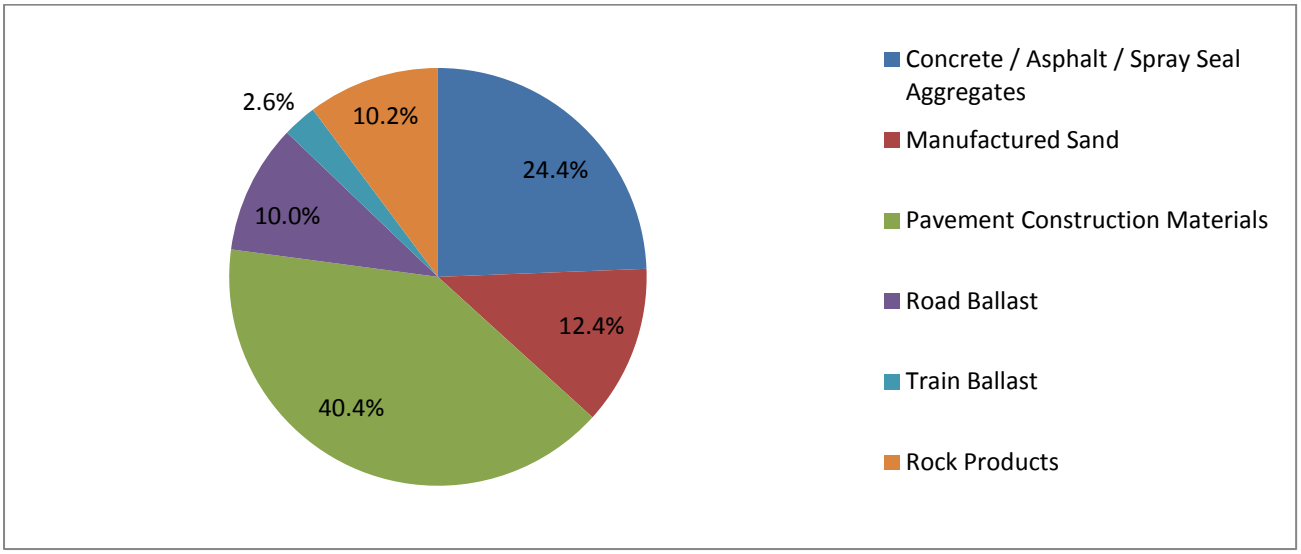
Hard rock extractive resources are limited in NSW, particularly those that are suitable for high strength concrete and asphalt applications. This situation is no different in the Lower Hunter Region. The Lower Hunter Region is supplied by

five hard rock quarries considered to have the capacity to service the demand placed by the construction industry with high strength aggregates for the production of concrete / asphalt and high quality base and subbase materials for RMS applications;

- Daracon, Martins Creek
- Boral Quarry, Seaham
- Hanson Quarry, Brandy Hill
- Hunter Quarry, Karuah
- Quarry Products Newcastle, Allandale

Quarry operations are usually not the core business of major industry players. Often, major quarries are part of a vertically integrated operation to provide aggregates to their company core business activity, primarily being concrete and asphalt manufacturing. However, Daracon Construction Materials group (consisting of 4 quarries (1 not operational), 2 conglomerate and 2 hardrock) consider quarries as an independent core business activity with a primary focus on supplying the various external civil, rail and general construction market. Daracons external customer base includes but is not limited to government and major industry players including RMS, ARTC, Local Government, Sydney Trains, Lend Lease, Thiess, Leighton, Boral, Hanson, Holcim, Fulton Hogan and Metromix. Supply to these customers occurs for various reasons but mainly due to the quality and availability of aggregates and road pavement materials produced at Martins Creek Quarry that readily meet the rigorous requirements of State Government and associated geotechnical specifications. Whilst Martins Creek Quarry primarily produces aggregates, Daracon also focus on the design and manufacture of high quality road pavement materials, in particular Stabilbase (RMS Dense Graded Base) and Stabilstone (RMS Heavily Bound Base). For the past 15 years (approximately) Stabilstone has been one of only two products that met RMS heavily bound specification RN73, Heavily Bound Base is critical to road infrastructure for state and local government roads subjected to increased traffic volume and heavy loading. Recent changes to RMS specifications has seen a small increase of suppliers in the Heavily Bound Base (HBB) market, however due to some specific site requirements they do not always comply. Due to extensive experience of Daracon staff and a history of 15 years designing these materials, Stabilstone readily meets all site and specification requirements. Both Stabilstone and Stabilbase produced at Martins Creek Quarry incorporate a percentage of flyash. Flyash is a by-product (waste) of the combustion of pulverised coal in thermal power plants, Martins Creek Quarry uses approximately 10-15kt per annum of flyash.

General material categories and sales percentage distribution is provided below for the period November 2013 – October 2014.



A full list of products and examples of their use to the construction industry is attached in appendix B.

The Lower Hunter Regional Strategy represents an agreed NSW government position on the future of the Lower Hunter, the current strategy applies to the period 2006 – 2031. The primary purpose of the regional strategy is to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing and employment needs of the Region's population over the 25 year period. The strategy aims to provide for up to an additional 115 000 new dwellings ensuring that housing can accommodate the projected 160 000 additional people that is forecasted to populate the Region over the period. In 2011, the Government established the HIIF to promote economic growth and enhance the livability of the Hunter region. The Government initially committed $350 million to the HIIF over four years. Of this amount $332 million has now been allocated to projects, including $60 million towards the revitalisation of the Newcastle CBD.

NSW State Government has committed $60 billion to rebuilding state infrastructure in the 2014-2015 budget. The budget has an allowance of $43 million allocated to road infrastructure upgrades in the Hunter Region consisting of;

Hunter Roads – Major Projects ▪ Cormorant Road, Industrial Drive to Stockton Bridge (planning) ▪ Nelson Bay Road, Bobs Farm to Anna Bay (Stage 3) ▪ Newcastle Inner City Bypass, Rankin Park to Jesmond (planning) ▪ New England Highway, Belford to Golden Highway duplication (planning) ▪ New England Highway, Gowrie Gates, widen Rail Underpass (planning) ▪ New England Highway, Singleton Bypass (planning) ▪ New England Highway, Scone Bypass and Rail Level Crossing removal (planning) ▪ New England Highway, Upgrade of Maitland roundabouts ▪ Pacific Motorway (M1) Extension to Raymond Terrace (planning)	$43 million (2014–15 financial year)	Planning and investment for works to address localised impact of mining related activity and population growth. A corridor study on Hillsborough Road, Warners Bay will commence in 2014–15. Some projects include Commonwealth Government funding contributions.

This forecasted growth within the Hunter, and government commitment to upgrading infrastructure, will increase market need for hard rock quarry products in the region such as Martins Creek, to service the demand for building and construction materials.

Whilst Martins Creek Quarry is critical to the ongoing development and growth of the Hunter area, it is anticipated that it will have a significant place in the state market due to the rail siding and limited hard rock quarries in NSW locations that are forecast to have major road and rail infrastructure upgrades completed. In particular it is anticipated that the Pacific Highway Upgrade in Northern NSW will require quarry materials in excess of volume and quality available locally to meet project demands. There have been early suggestions that material may be sourced from distant locations using rail freight for transport. In addition to the Pacific Highway Upgrade the State's infrastructure program has a particular focus on

transport projects designed to reduce the costs of Sydney's road congestion, which costs the State economy an estimated $5.1 billion each year. Due to the close proximity to Sydney, and the advantage of the rail siding, Daracon are currently assessing locations that are suitable to unload trains into the Sydney area that can be used as a transfer point where re-loading onto trucks for delivery to projects is achievable.

NSW Trade and Investment Royalties Branch, provided information based on extractive returns for NSW. Data provided indicates that the NSW extractive industries consists of various quarry operations that produced approximately 27Mt in the 2013 / 2014 period, Martins Creek Quarry supplied approx 4% of the total volume for NSW in this period. Further, Hunter quarry operations extracted approx 3.8Mt of which Martins Creek Quarry supplied approx 30%. Of the 3.8Mt in the Hunter area approximately 2.1Mt is considered material of competing strength and quality suitable for use in high strength applications as Martins Creek Materials are used, based on the data, Martins Creek contributes approximately 55% of the total volume of high quality materials to the local area.

Quarry Product Materials, The Industry Uses and Delivery Requirements:

Delivery Restrictions

Martins Creek materials are supplied to various sectors of the manufacturing and construction market, end use of Martins Creek material is diverse and in most cases deliveries are required to be made at an increased rate early in the day to meet customer demand and supply requirements. In particular, civil construction sites, including local and state government, rail, and mining, rely on product deliveries from early morning. Depending on the location of the delivery point, travel times generally range from 45 min – 2 hours. The construction industry commences work early each day and relies on material supply as early as possible to ensure works can commence without delay, preventing inefficient work practices and impact on schedules and completion dates. It is imperative that Martins Creek Quarry has the capability to service the market as early as possible each day to avoid unnecessary delays to the end user.

To provide further clarity around the importance for Martins Creek Quarry to maintain the capability to service the industry at times dictated by the end user, products have been split into product categories and information provided relating to demand on supply times;

Concrete / Asphalt / Spray Seal Aggregates

This segment of the market relating to the supply of aggregates for concrete and asphalt plants is dominated by quarries providing materials for the batch plants and asphalt plants that are vertically integrated business units held under the same ownership. Therefore the predominant use and destination is to the batch plants and asphalt plants.

Martins Creek Quarry being an independent quarry provides material to diversified industry base which is characterised by a lot of smaller consumers.

This category includes aggregates that are supplied to asphalt and concrete manufacturing plants. Asphalt and concrete plants generally provide an anticipated material demand schedule each month. This schedule is routinely changed significantly due to variations in client and customer requirements (viz. project scope changes, weather, budget variations, geotechnical issues etc). Generally, customer and client materials are delivered to storage bins that have limited capacities. Optimum capacity is typically limited by site size, space and environmental considerations. Sufficient space to store materials to keep up with the inherent fluctuations in market demand is impractical as it would require extensive increases in site storage capacities to meet the peaks in demand for the various asphalt and concrete manufacturing

facilities. However, forward planning and the storage space that is typically available, does allow some consistency in deliveries to manage average requirements of these production facilities throughout each day. Product distribution is further complicated where customers that have their own trucks and pick materials up from the quarry, early morning peaks will be evident to assist in truck utilisation. Typically trucks will be sent to the quarry for a load of aggregate to utilise trucks in the early stages of the day, whilst sites are prepared for asphalt to be laid. After the first load of aggregate being delivered to the plant, trucks are then utilised carting asphalt for the remainder of the day.

Spray seal aggregates are mostly delivered to stockpile prior to incorporation into road sealing works, materials are usually supplied in the days leading up to the work being completed and can be made consistently throughout the day.

Further, there are circumstances that require increased delivery demand peaks beyond typical market requirements to allow for such things as unplanned changes, increased project and client supply demands i.e. end of financial year (EOFY) spend, changed project schedules, projects with changed schedules overlapping etc which results in increased and unplanned supply demand. The quarry industry experiences significant variations in the inherent market demand serviced. This is particularly the case, where the quarry supplies all the various market sectors as is the case with Martins Creek Quarry. It is not primarily linked to one sector or the other which can often be the case with specialist market sector quarries (ie. Sand) or vertically integrated companies supplying their own end user facilities.

Manufactured Sand

Manufactured Sand includes fill dust, stabilised manufactured sand and washed manufactured sand, these products are diversely used in the construction industry for many purposes. Manufactured sand is commonly used in the production of asphalt and concrete, therefore the same as the concrete / asphalt / spray seal aggregates apply to delivery times. However, a significant volume of manufactured sand is also used in pavement construction applications where deliveries are required to be made at an increased rate early in the day and decreasing towards the end of the day (viz. 3pm). It is important in pavement construction applications that supply is completed with enough time for placement and compaction to occur prior to the end of the shift.

Pavement Construction Materials

Pavement construction materials include bound and unbound road base, drainage aggregates and rail capping. These products must be delivered at a certain productivity level as dictated by the end user, the end user will have plant and equipment / personnel on site that are relying on supply at their desired production rate for various reasons;

- Works are tendered based on productivities that must be achieved in order to meet budget constraints
- Plant and equipment is arranged to facilitate efficient placement based on the hourly quantity that is to be supplied, if quantity is insufficient, budgeted productivities will not be achieved resulting in increased placement costs. If quantity exceeds the requested level, additional costs in transport will be evident as trucks will be waiting to tip which may also have site safety impacts with increased heavy vehicle congestion
- Deliveries must be completed allowing sufficient time for final placement and compaction prior to completion of the shift, in most cases sites stipulate at least 2-3 hours for this to occur. In the winter months site hours are further reduced, increasing the importance of deliveries being finalised earlier in the day.
- Pavement construction materials are required to be delivered directly, tipped off and immediately incorporated into construction works. These materials are not double handled to maximize efficiencies and avoid increased placement costs.

Stabilised products (i.e. road bases) are particularly important to be supplied at the desired rate of the end user due to the hydration process ("set-up") that occurs in the material, similar to lean mix concrete. In most cases these products are supplied in accordance with a specification that is specific with times that must be adhered to when placing, compacting and trimming the material. These products are required to be freshly batched using a pug mill to incorporate binder additive and deliveries sent to site immediately post batching. RMS specification R73 specifies that "Final trimming should be carried out within the Allowable Working Time". Typically material is to be delivered, placed, compacted and trimmed all within the same day. Often client requirements are that traffic is reinstated on the fresh placed material, additional impacts on time restrictions can be caused by traffic control time limitations imposed by local and state Government to minimise traffic interruptions during peak traffic periods.

Pavement construction materials are typically delivered at an increased rate between the hours of 6am – 1pm, with deliveries decreasing from 1pm until end of shift. It is critical that the Quarry retain the capability to service the market with pavement construction materials at a supply rate that allows effective and efficient on site placement and compaction. It is essential that all pavement construction materials can be delivered at increased volumes in the timeframe requested by the end user to ensure that construction deadlines are met. The competitive nature of the industry enforces the importance of this, ultimately hourly restrictions on deliveries will result in increased costs to the client and economy resulting in inefficient work practices. Please refer to the later section of this report production, Distribution and End User Demands.

Road Ballast

Road ballast is rail ballast that is delivered by road, not rail. Ballast is used in the construction and maintenance of railway track work. Ballast is generally delivered to stockpile prior to incorporation into track work, ballast deliveries are primarily managed at a consistent rate throughout the day. Some circumstances will see the need for increased deliveries at different times throughout the day to meet customer demands.

Train Ballast

Train Ballast is rail ballast delivered by train, road transport issues are not applicable.

Rock Products

Rock products include gabion, armor rock, large scour protection rock and rock fill materials. Rock products are both delivered direct into the works but also at times, delivered to stockpile locations for future incorporation in construction works. Rock deliveries are generally consistent throughout the day, avoiding peak deliveries in the early hours of the day. Whilst delivery of rock products can generally be made consistently throughout the day, there are some circumstances that require increased delivery demand to allow for unplanned changes, or increased project and client supply demands i.e. project acceleration.

Production, Distribution and End User Demands:

Hard rock is utilised in the various facets of the construction industry in many and various forms and for an equally wide array of end uses. The residential dwelling sector utilises concrete for housing slabs and driveways and aggregate is part of the concrete mixture. Road and civil construction utilise aggregates in the sealing of pavements on roads, or as ballast in rail lines.

As such there is a requirement that both the raw material and the processed product is to meet specifications as required by the end user. These specifications can be a standard set by the Australian or International standards, by government policy or engineer design.

For example, a concrete batch for a particular use, say, in the construction of a pre stressed concrete member for a beam to be used in a bridge will have an engineering specification for the concrete and it will require a concrete batch of a certain hardness with a determined amount of aggregate to be included in the batch.

Likewise where hard rock products are utilised at a point in the construction of a road, specified materials will be treated in a pug mill to a specified condition and then the treated material is delivered to the construction site.

An example of the Quarry Product and critical time constraints:

The use of the pug mill manufactured products are used in the construction of road pavements and require to be batched/ manufactured fresh just prior to use. These cannot be stockpiled due to the perishable nature based on timeframe and construction specification requirements. The construction specification for this type of material is R73 and Rn73, copies are annexed to this report. These specifications not only specify the manufacturing of the products but also the timing factors involved, the manner in which the material is worked and laid.

Implications of production and delivery constraints:

During the construction of dwellings and buildings.

With local DA determinations the following is an example of the standard restrictions for construction:

> *" work on the development shall be limited to the following hours to prevent unreasonable disturbance to the amenity of the area:-*
>
> *Monday to Friday- 7.00am to 5.00pm*
>
> *Saturday- 8.00am to 1.00 pm if audible on other residential premises, otherwise7.00am to 5.00 pm*
>
> *No work to be carried out on Sundays or Public Holidays."*

This often relates to the construction times of buildings and dwellings in a local government area. As an extension of this where concrete is utilised such as slab construction and footings, concrete delivery would be just prior to the pour. Most often slabs are poured at the beginning of the day, 7.00 am to allow the concrete to be poured and worked (spread, floated and finished) prior to the concrete starting to set. There are critical points of time in the process that has a great bearing on the slab passing construction standards and acceptance.

Aggregate is part of the concrete manufacturing process and it must be delivered to the concrete batch plant prior to the batching process. This is either done the evening before or before batching starts for the day with aggregate bins being supplied on demand of the batch plant throughout the day.

This explains that the delivery of the aggregate material has a peak in the morning and is consistent throughout the day until such time as the last delivery shift can be completed prior to the closing of the batch plant.

Local Road Works Construction:

In reviewing DA consents for road works within local council areas and on council roads the following condition of consent is representative of standard consent conditions:

> *"All work on site shall only occur between the following hours:*
>
> *Monday to Friday 7.00am to 6.00pm*
>
> *Saturday 8.00am to 4.00pm Sunday and public holidays No Work."*

Please note there are extended hours of operation. This would reflect that road construction on active roads causes disturbance to a larger sector of the community and the extended hours is an attempt to have the work completed more quickly thereby lessening the disturbance to the community and road infrastructure users.

However this not applicable in the case of Regional roads or those of a greater hierarchy in the transport network.

RMS Controlled Roads:

Where RMS road works are being undertaken a project may have conditions of consent that relate specifically to that construction project and those extend to the hours of operation. The conditions of consent can be as the example above but special dispensation may be granted where construction may be allowed at night time so as to limit the impact on traffic movement on high volume roads during day periods.

This means that where the construction timetable requires the delivery of stabilised pavement it may be in the night at 10.00pm. As stated before stabilised pavement is a perishable product and is required to be manufactured, delivered, placed and worked within the contract specifications and relevant standards inclusive of time constraints for working the material.

There are roll on cost implications with restricted times for material manufacture and delivery for infrastructure projects. Where stabilised material is delayed in delivery and thereby further delaying its incorporation into the road construction, this is compounded over time to increase construction timeframes thereby increasing the cost of infrastructure delivery.

Below is a schedule showing the cost implications of delaying the delivery and placement of stabilised materials based on the following parameters:

1. a quarry commencing production at 6.00am
2. stabilised materials to be manufactured in accordance with specifications of materials
3. An order of 950 m2 (or 500 tonnes) for 1 construction crew. (nb. On large infrastructure projects up to 2,000 tonnes may needed to be produced for a day with 2 crews constructing pavement).

4. Stabilised material manufacturing output of 285 tonnes per hour
5. 1 hour for delivery to the construction site in accordance with specifications of material.
6. 500 tonnes requires approximately 15 truck and dog combinations to deliver materials.

Implications of Delayed Production & Delivery - Bound Pavement for Road Works						
Duration	**Description**	**Qty**	**Unit**	**Rate**	**Margin**	**Total**
8 Weeks, 1 Base day	**Normal Production & Delivery Time Periods**	**10555**	**m3**	**$ 124.70**	**7.50%**	**$ 1,414,924.14**
10 weeks, 1 Base day	**Revised with Quarry delay allowing for both production & operational deficiency**	**10555**	**m3**	**$ 145.06**	**7.50%**	**$ 1,645,941.42**
Increased Costs in $ terms and % loss.						**$ 231,017.29 16.33%**
2 weeks Cost, 1 Base day	**Project Delay Costs- On site overhead costs ($14,000.00 per day)**	**11**	**day**	**$12,500.00**	**7.50%**	**$ 147,812.50**
Total additional Costs in $ terms and % loss. These costs are passed on to the client						**$ 378,829.79 26.77%**

This demonstrates that there is a loss of productivity of 26.80%.

There are further constraints as to the production of materials used for road works and these are requirements of Local Government Authorities and the RMS.

Both authorities have stringent requirements that the materials used in construction:

1. Be from a certified supply and is a single source of material for use in construction of pavement and,
2. One source for aggregates used in concrete supply and asphalt or seal.

The above is a summary of the requirements that are referenced from the various specifications that are required by Local Government Authorities and the RMS referenced in the aforementioned R73.

This means that during a road construction project, quarry materials cannot be sourced from other quarries and mixed to meet the quantity required on a project. Once a segment of construction is complete then a substitute material may be nominated but it has to meet specification and the same rigours as the provision and usage of material the previous source went through.

Consider an additional cost impost in this order across an infrastructure project such as the major highways and roads in Hunter region for example The Hunter Expressway is significant for the region's continued economic development to provide a more direct and efficient freight route between the Upper Hunter and the Port of Newcastle. Other road infrastructure includes:

- The M1 Pacific Motorway,
- Pacific Highway,
- Central Coast Highway,

- New England Highway and,
- Golden Highway,

All of which are major routes for interstate and intrastate travel.

In all there are 17,600 kilometres of State road network in the region. To appreciate the importance of the quarry to the operations to state and regional road projects below is a list of the road projects within the region, that have been completed, currently underway or pending that have a profound impact on the road work and wider implications for the Hunter community.

Within these main projects are sub projects of road construction that relate to the delivery of a wider road network that have greater social and economic implications for the region and NSW State.

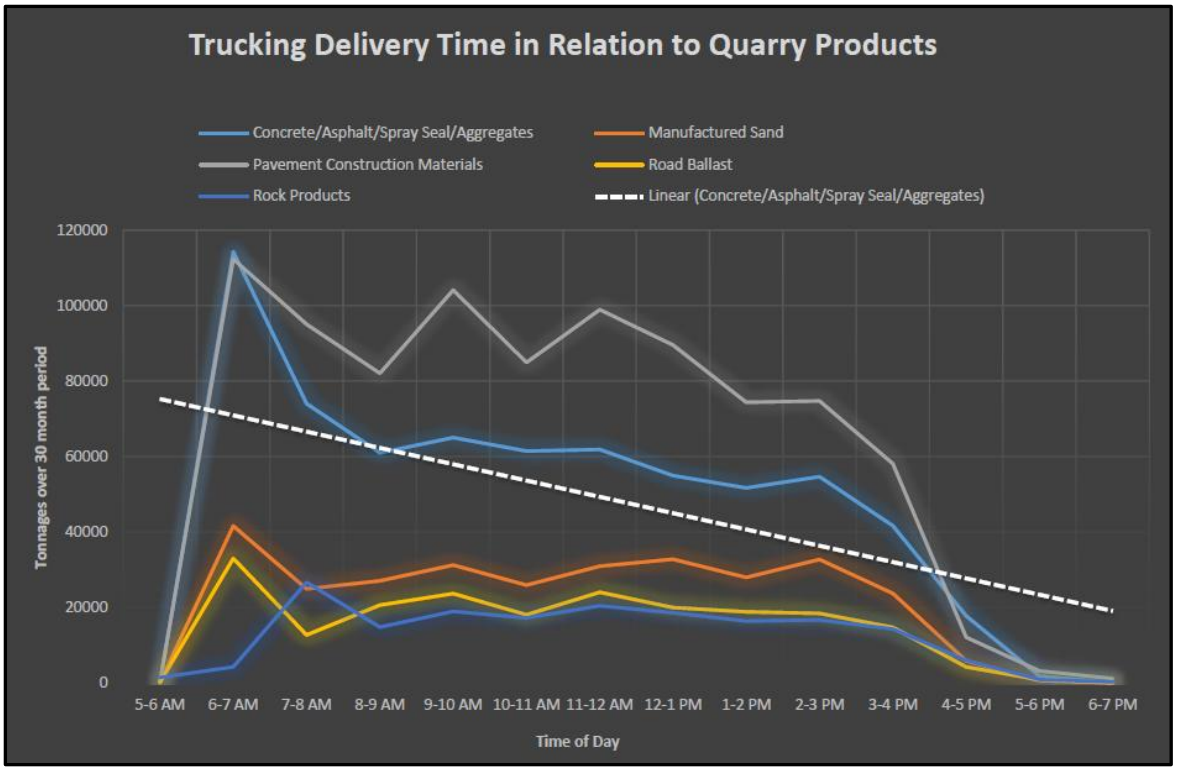
- Hunter
- Barrington Bridge
- Clarence Town - Brig O'Johnston Bridge
- Dunmore Bridge - completed
- Gostwyck & Vacy Bridges maintenance
- Hamilton - Griffiths & Chatham Roads
- Inner Newcastle Traffic Study
- Kooragang - Tourle Street & Cormorant Road
- Lambton - Newcastle Road upgrade
- Luskintyre Bridge maintenance
- M1 Pacific Motorway, Weakleys Drive & John Renshaw Drive intersection upgrade
- M1 Pacific Motorway extension to Raymond Terrace
- M1 Pacific Motorway to Newcastle - completed
- Middle Falbrook Bridge - Bridges for the Bush
- Nelson Bay Road upgrade
- Newcastle Inner City Bypass
- New England Highway
- Swansea Bridge maintenance program
- Taree - Martin Bridge
- The Hunter Expressway
- Toronto - Cary Street safety improvements
- Wallsend to Morisset
- Fennell Bay to Booragul
- Toronto to Fennell Bay
- Warners Bay intersection upgrade - completed
- Central Coast NSW

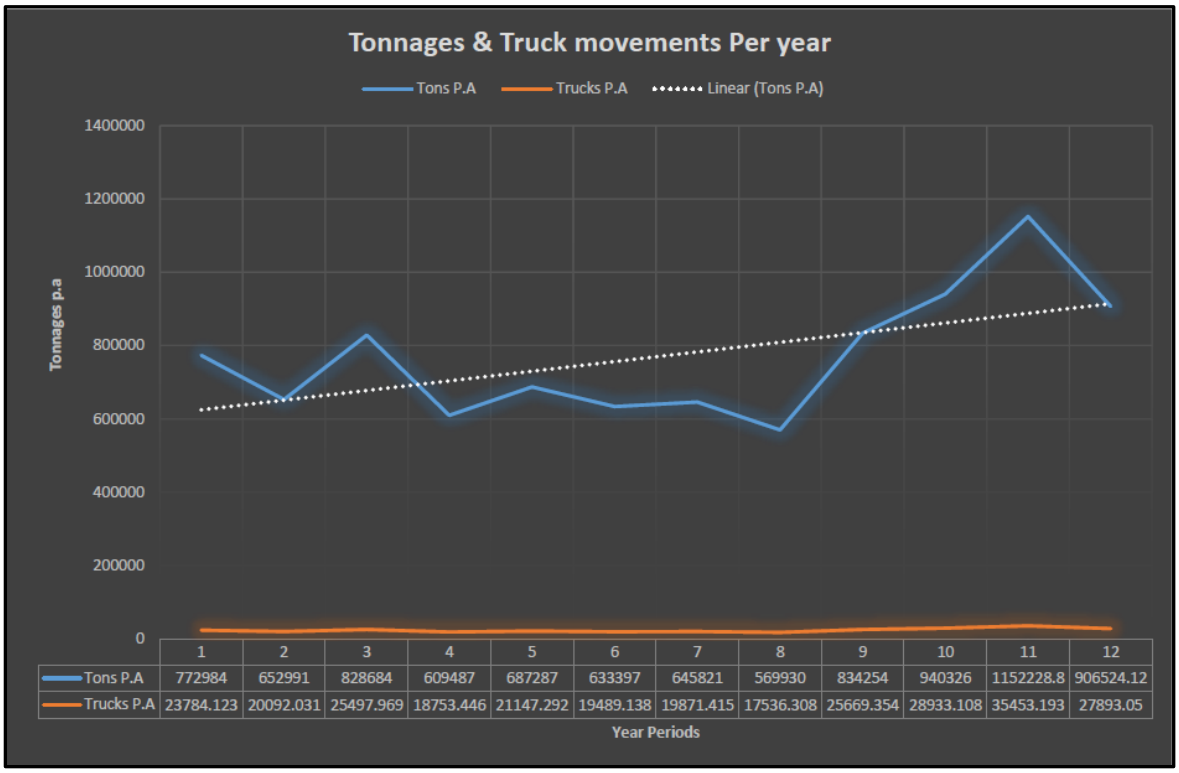
If we take just one example of a road project that has been completed, the Nelson Bay upgrade was opened in May 2015 and cost $45. Million. This road carries 7000 cars per day between Newcastle, Williamtown and Port Stephens and is an important tourism access for weekend and holidays that contributes to the economy of Port Stephens and the Hunter region. Martins Creek Quarry provided material for the construction of the upgrade.

Consider that materials, if not delivered in a timely manner, would lead to additional costs and timing delays and these additional costs, were they occur, are borne by the NSW State Government. Additional costs may have seen the project delayed in delivery.

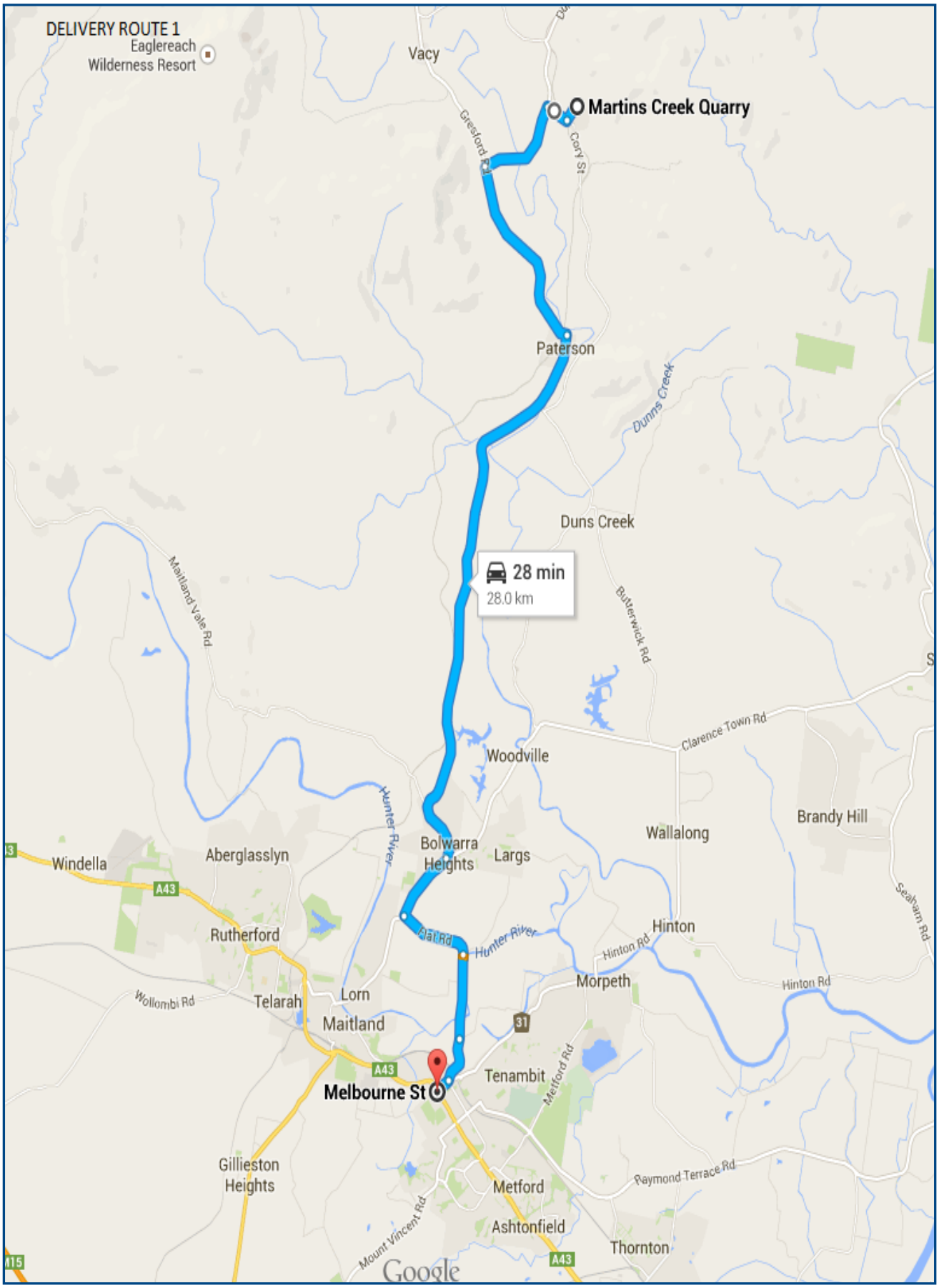
The above project relates to the Hunter and Central Coast and with the increasing scarcity of hard rock resources that meet government specifications, the Martins Creek Quarry is a necessary supply source for wider projects as other hard rock quarries elsewhere in the state become exhausted or too expensive to win material from. For example Bombo Quarry on the South Coast, Emu Plains in Western Sydney.

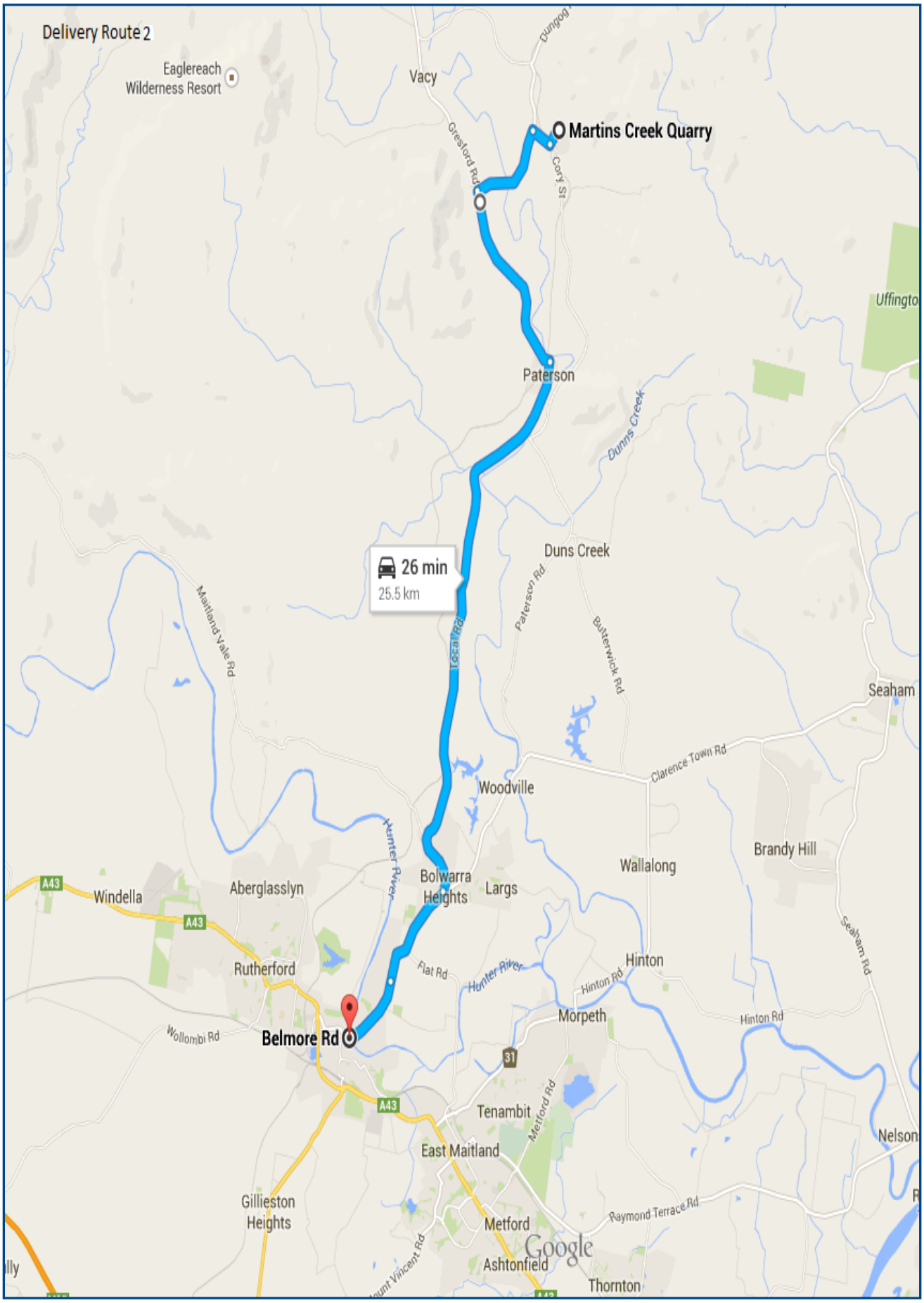
With the state government and federal funded infrastructure projects coming on line a certainty of a reliable quantity and quality of hard rock material is critical to delivery of the state and commonwealths infrastructure programmes.

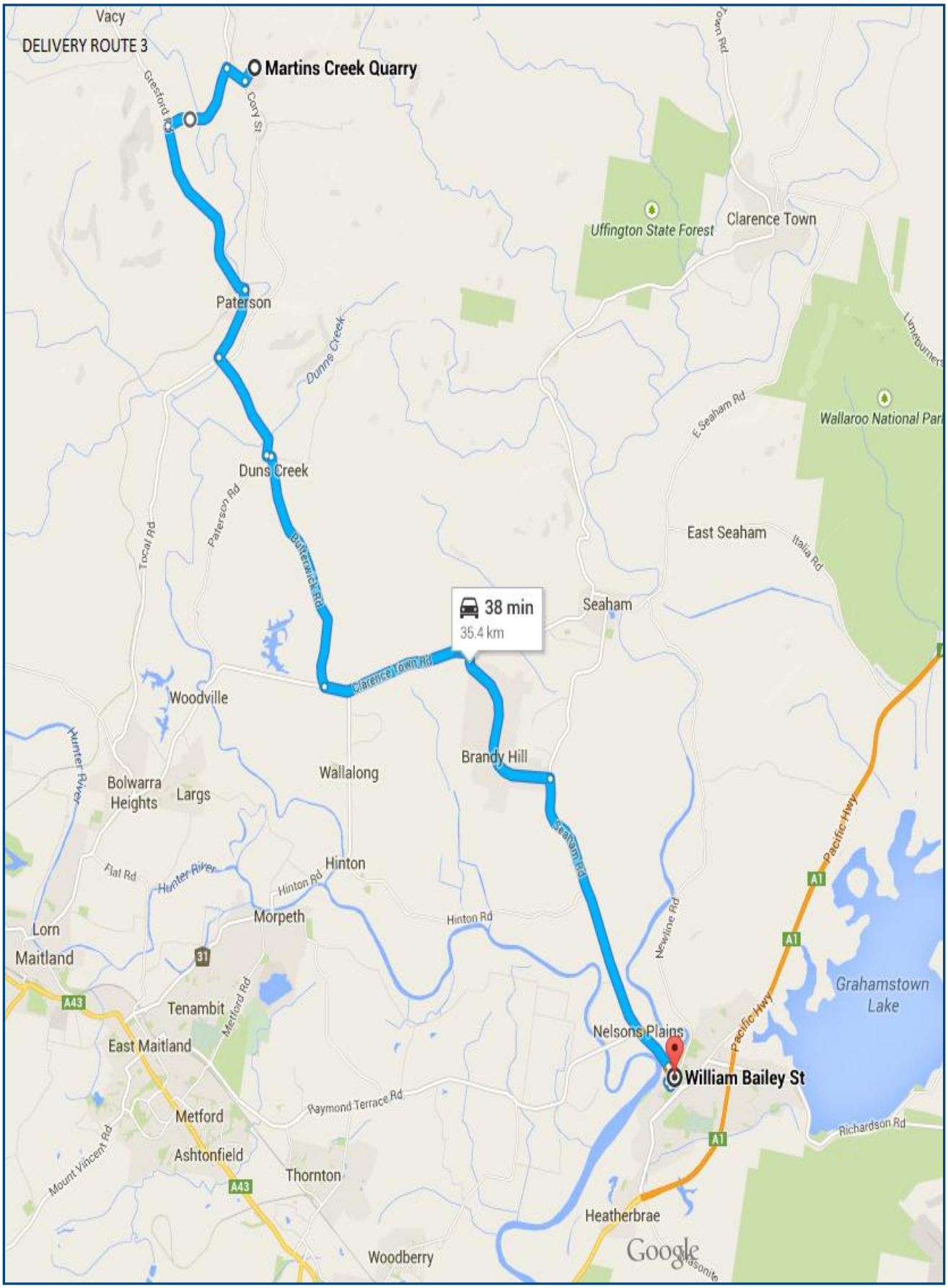




Appendix A – Delivery Maps


DELIVERY ROUTE 1
Eaglereach
Wilderness Resort
Vacy
Martins Creek Quarry
Paterson
Dunns Creek
Duns Creek
28 min
28.0 km
Maitland Vale Rd
Butterwick Rd
Clarence Town Rd
Woodville
Hunter River
Brandy Hill
Wallalong
Bolwarra Heights
Largs
Windella
Aberglasslyn
A43
Rutherford
Hinton
Morpeth
Hinton Rd
Seaham Rd
Wollombi Rd
Telarah
Lorn
Maitland
Melbourne St
Tenambit
Metford Rd
Gillieston Heights
Metford
Raymond Terrace Rd
Mount Vincent Rd
Ashtonfield
Thornton
Google


Delivery Route 2
Eaglereach Wilderness Resort
Vacy
Martins Creek Quarry
Gresford Rd
Cory St
Paterson
Dunns Creek
Uffington
26 min
25.5 km
Local Rd
Paterson Rd
Duns Creek
Butterwick Rd
Maitland Vale Rd
Seaham
Clarence Town Rd
Woodville
Hunter River
Bolwarra Heights
Largs
Wallalong
Brandy Hill
A43
Windella
Aberglasslyn
Rutherford
Flat Rd
Hinton
Hinton Rd
Seaham Rd
Morpeth
Wollombi Rd
Belmore Rd
31
Tenambit
Metford Rd
East Maitland
Nelson
Gillieston Heights
Metford
Raymond Terrace Rd
Google
Ashtonfield
Thornton


DELIVERY ROUTE 3
Martins Creek Quarry
Vacy
Gresford
Cory St
Paterson
Dunns Creek
Duns Creek
Paterson Rd
Tocal Rd
Bulwarra Rd
Clarence Town Rd
38 min
35.4 km
Uffington State Forest
Clarence Town
Wallaroo National Park
E Seaham Rd
East Seaham
Italia Rd
Seaham
Woodville
Hunter River
Bolwarra Heights
Largs
Wallalong
Brandy Hill
Seaham Rd
Flat Rd
Hinton
Hinton Rd
Morpeth
Lorn
Maitland
A43
31
Tenambit
Metford Rd
East Maitland
Metford
Ashtonfield
Mount Vincent Rd
Thornton
Woodberry
Raymond Terrace Rd
Newline Rd
Nelsons Plains
William Bailey St
Pacific Hwy
A1
Grahamstown Lake
Richardson Rd
Heatherbrae
Google

Appendix B – Products Manufactured At Martins Creek Quarry and Examples of Their Use

Quarry Product	Industrial Use	Example Of Use	Specification Compliance	Examples of Recent Jobs
7mm, 10mm, 14mm and 20mm Aggregate	Asphalt Production	Road Construction, i.e. Road Upgrades, Carparks, Industrial Roadways, Main Road Construction, Rural Road Construction, Residential Road Construction etc	RMS 3152 Asphalt Aggregates	Hunter Expressway Upgrade, Nelson Bay Road Upgrade
	Drainage	Road Construction	RMS 3580 Aggregate Filter Materials for Subsurface Drainage	Hunter Expressway Upgrade, Nelson Bay Road Upgrade
		Residential Construction	NA	
	Road Sealing	Road Construction, i.e. Main Road Reseals, Rural Road Construction, Residential Road Construction	RMS 3151 Cover Aggregate for Sprayed Bituminous Surfacing	Hunter Expressway Upgrade, Nelson Bay Road Upgrade
30mm Aggregate	Drainage	Residential Construction	NA	Subdivisions at Maitland, Gillieston Heights and Cameron Park
	Stemming	Stem Blast Holes for Mining	Various dependent on independent Coal Mines	Mount Thorley Warkworth, Hunter Valley Operations, Bengalla
10/7mm & 20/14mm Aggregate	Concrete Production	Residential Construction, i.e. House Slabs, Footpaths, Driveways, Pool Construction, Kerb and Gutters etc	AS2758.1 Supply of Aggregates / AS1379 Supply and Producion of Concrete	Subdivisions at Maitland, Gillieston Heights and Cameron Park, Units at Bolte Street and Watt Street
		Commercial Construction, i.e. Slabs, Walkways, Driveways, Precast Concrete etc	AS2758.1 Supply of Aggregates / AS1379 Supply and Producion of Concrete	Midal Cables Tomago, CIA Precast, Carrington Warehouse, 2 x ALDI stores at Maryland and Blue Haven, City East Cable Tunnel, Bridge Beams Weakleys Drive, Tourle Street Bridge

Quarry Product	Industrial Use	Example Of Use	Specification Compliance	Examples of Recent Jobs
		Road Construction, i.e. Construction of carriageways etc	RMS R82 Lean Mix Sub Base / RMS R83 Jointed Concrete Base / RMS R84 Continuously Reinforced Cocnrete Base_Users Guide	
		Shotcrete, i.e. Drains, pools etc	CIA Z5 Shotcreting in Australia	20-30 pools per week
		Bridge Construction	RMS B80	
Manufactured Sand	Concrete Production	Residential Construction, i.e. House Slabs, Footpaths, Driveways, Pool Construction, Kerb and Gutters etc	AS2758.1 Aggregates and Rock for Engineering Purposes / AS1379 Specification and Supply of Concrete / AS3600 Concrete Structures / AS2876 Concrete Kerbs and Channels - Gutters - Manually or Machine Placed / AS3850 Tilt Up Construction	Subdivisions at Maitland, Gillieston Heights and Cameron Park, Units at Bolte Street and Watt Street
		Commercial Construction, i.e. Slabs, Walkways, Driveways, Precast Concrete etc	AS2758.1 Aggregates and Rock for Engineering Purposes / AS1379 Specification and Supply of Concrete / AS3600 Concrete Structures / AS2876 Concrete Kerbs and Channels - Gutters - Manually or Machine Placed / AS3850 Tilt Up Construction	Midal Cables Tomago, CIA Precast, Carrington Warehouse, 2 x ALDI stores at Maryland and Blue Haven
		Road Construction, i.e. Construction of carriageways etc	RMS R82 Lean Mix Sub Base / RMS R83 Jointed Concrete Base / RMS R84 Continuously Reinforced Cocnrete Base_Users Guide	
		Bridge Construction	RMS B80 Concrete for Bridges	
		Shotcrete, i.e. Drains, pools etc	CIA Z5 Shotcreting in Australia	20-30 pools per week

Quarry Product	Industrial Use	Example Of Use	Specification Compliance	Examples of Recent Jobs
	Drainage	Subdivision Construction, Major Project Drainage	RMS R11	The Sanctuary Fletcher, Northlakes Cameron Park, Waterford County Chisholm
	Asphalt Production	Road Construction, i.e. Road Upgrades, Carparks, Industrial Roadways, Main Road Construction, Rural Road Construction, Residential Road Construction etc	RMS 3152	Hunter Expressway Upgrade, Nelson Bay Road Upgrade, various subdivisions in the Hunter Area
Rail Ballast	Rail Construction	Placed on railway tracks to provide stability and drainage	ARTC ETA-04-01	ARTC Ballast Cleaning Works, Sydney Trains Track Maitenance, Hexham Relief Roads, Rebuilding of Main North Coast Rail Line post 2015 Floods
Rail Capping	Rail Construction	Placed on underside of Ballast to create an Impervious layer to ensure water drained through the Ballast "sheets off" and doesn't affect the structural integrity of the railway line	ARTC TDS-12	NCIG Flyover Works, Kooragang
Armour Rock	Revetment Walls	Riverbank protection	Job dependent	Hunter River Revetment Works
	Drainage	Scour Protection	Job dependent	Hunter Expressway Upgrade, Nelson Bay Road Upgrade
	Rail Construction	Embankment Stabilisation	NA	Rebuilding of Main North Coast Rail Line post 2015 Floods
	Residential	Wall Construction	NA	Various
Gabion Rock	Rail Construction	Embankment Stabilisation	NA	Rebuilding of Main North Coast Rail Line post 2015 Floods
	Gabion Basket / Mattress	Drainage and Erosion Control / Retaining Walls / Scour Protection	RMS R55	Hexham Relief Roads Upgrade

Quarry Product	Industrial Use	Example Of Use	Specification Compliance	Examples of Recent Jobs
Stabilbase (RMS DGB)	Unbound Base and Sub Base Material	Road Construction	RMS 3051	Hunter Expressway Upgrade, Nelson Bay Road Upgrade
Stabilstone	Heavily Bound Pavement Material	Road Construction	RMS R73 / RMS 3051	Hunter Expressway Upgrade, Nelson Bay Road Upgrade
FCR	General Fill	Road Construction	RMS R44	Maitland Fly-over
	Engineered Fill	Reinforced Earth Walls	RMS R57 / 58	

Appendix C – QA Specification R73 – Construction of Plant Mixed Heavily Bound Pavement Course

Appendix D – QA Specification RN73 – Bound Pavement Course (Slag or Ash Based)