Memorandum

To	Nick Bowmar Meridian Energy
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From	Leonard Wiles
Office	Wellington
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Subject	Mt Munro Aggregate Supply Assessment Memo Report

1 Purpose

The purpose of this memo report is to provide an assessment of the available aggregates for concrete production, paving and backfill material for internal cabling required for the construction of Mt Munro windfarm located in Eketāhuna.

2 Approximate Volume of Construction Materials (Aggregates)

2.1 Assumptions

This section describes the assumptions for assessing the materials comprising the turbine foundations, paving and backfill material for internal cabling – noting that the following documents formed the basis of our assumptions:

- WSP Updated Proof of Concept Foundation Design (136m rotor diameter)
- Meridian (Tonkin Taylor) Construction Footprints, Pavement depths etc.
- Meridian Update (Cable trench distances)

Turbine Foundation Assumptions

The quantities of sand, aggregate and cement estimated for the turbine foundations are based on a 'proof of concept design' of a standard reinforced concrete gravity pad (octangular) for a total of 20 wind turbines with a 136m rotor diameter. Details on the foundation design dimensions of this 'proof of concept design' of these foundations are provided in Appendix B. The 'proof of concept design' assumes that all the turbine sites are expected to be underlain by greywacke rock. This provides a conservative estimate of the resource inputs to foundation construction.

Roading Pavement Assumptions

The internal roads are made up of main roads and spine roads with a total as-built road footprint of approximately 93, 000m^2. We have assumed the main road component is approximately 70,000 m^2 and the spine road component is approximately 23,000m^2.

The make-up of the roading pavement depends on the roading type (main road or spine road) and geological subgrade. 3 geological subgrades have been assumed for this site. These are listed below along with the corresponding proportion of the total as-built road footprint assumed for each.

- Greywacke (70%)

- Tertiary Deposits (5%)
- Overlying Soils (25%)

Tables 1 and 2 below summarise the assumed pavement make-up for main and spine roads respectively for each subgrade.

Table 1– Main Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	150	n/a
Tertiary Deposits	200	300
Overlying Soils	200	500

Table 2 – Spine Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a
Tertiary Deposits	100	150
Overlying Soils	100	300

Refer to Appendix A for further details on pavement design assumptions.

Hardstand Pavement Assumptions

A total as-built hardstand footprint of approximately 80, 000m^2.has been assumed based on each footprint being approximately 4,000 m^2 for 20 turbines.

The same assumptions for the make-up of the main road pavement have been made for the hardstand pavements. Table 3 below summarises the make-up has been assumed pavement make-up for the hardstands each underlying subgrade.

Table 3 – Hardstand Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	150	n/a
Tertiary Deposits	200	300
Overlying Soils	200	500

Construction Village Pavement Assumptions

We have assumed that the total as-built construction village footprint is approximately 14,000m^2. The construction village is located near the site entrance close to the Makakahi River where the geological subgrade is identified as overlying soils. The same assumptions for the make-up of the spine road pavement have been made for the construction village pavement. This is summarised in Table 4 below.

Table 4 – Construction Village Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Overlying Soils	100	300

Refer to Appendix A for further details on pavement design assumptions.

On-site and Off-site Substation Pavement Assumptions

We have assumed that the as-built construction footprint of the on-site and off-site substations are approximately 7,500m^2 and 12,000m^2 respectively. The geological subgrade for the on-site substation and off-site substation is assumed to be greywacke and overlying soils respectively. The same assumptions for the make-up of the spine road pavement have been made for the on-site and off-site substation pavement This is summarised in Tables 5 and Table 6 below.

Table 5 – On-site Substation Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a

Table 6 – Off-site Substation Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Overlying Soils	100	300

Refer to Appendix A for further details on pavement design assumptions.

Concrete Batching Plant Assumptions

We have assumed that the as-built construction footprint of the concrete batching plant is approximately 6,000m^2. The geological subgrade is assumed to be greywacke and the same assumptions for the make-up of the spine road pavement have been made for concrete batching plant pavement This is summarised in Table 7 below.

Table 7 – Concrete Batching Plant Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a

Refer to Appendix A for further details on pavement design assumptions.

Miscellaneous Facilities Assumptions

We have assumed that the as-built construction footprint of miscellaneous facilities is approximately 10,000m^2. The geological subgrade is assumed to be greywacke and the same assumptions for the make-up of the spine road pavement have been made for miscellaneous facilities pavement This is summarised in Table 8 below.

Table 8 – Miscellaneous Facilities Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a

Transmission Road Assumptions

We have assumed that the as-built construction footprint of the transmission road is approximately 15,000m^2. The geological subgrade is assumed to be Tertiary Deposits and the and the same assumptions for the make-up of the spine road pavement has been made for the transmission road. This is summarised in Table 9 below.

Table 9 – Transmission Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Tertiary Deposits	100	150

Old Coach Road (Public Road) Assumptions

We have assumed that the as-built construction footprint of the upgraded Old Coach Road is approximately 12,800m^2. The geological subgrade is assumed to be Tertiary Deposits and the and the same assumptions for the make-up of the spine road pavement has been made for this road. This is summarised in Table 10 below.

Table 10 – Old Coach Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Tertiary Deposits	100	150

Internal Cabling Materials Assumptions

We have made the following assumptions with respect to internal cabling

- Cable trenches will be buried under internal roads
- With 4-6 turbines per string, and 2 sets of cables per string, between 2 and 6 trenches will be required depending on location
- Standard trench dimensions between 350mm-500mm wide, 500mm deep and 1m between trenches
- Area of each trench is approximately 0.25m^2
- Approximately 11km of cable trenching will be required

2.2 Summary of Aggregate Quantities

Table 11 on the following page provides a detailed summary of the quantities of aggregates based on the assumptions above. This table also indicates the expected period in the programme the aggregates will be required,

Table 11 – Summary of Aggregate Quantities

Item	Description	Vol(m3)/turbine	No. of Turbines	Total Quantity (m3)		Programme Month of 26 Month Programme
1	**TURBINE FOUNDATIONS**					
1.1	Total sand (dry) (m3)	445	20	9,000		
1.2	Total aggregates (dry) (m3)	890	20	18,000		20-26
1.3	Total cement (dry) (m3)	297	20	6,000		
2	**ROADING PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
2.1	GAP40 - Basecourse					
	Main Roads - On Rock	150	49,000	7,000	10,000	
	Main Roads - On Soil	200	17,500	4,000	6,000	
	Main Roads - On Tertiary Deposits	200	3,500	1,000	1,000	
		Subtotal	**70,000**	**12,000**	**17,000**	17-23
	Spine Roads - On Rock	100	16,100	2,000	3,000	
	Spine Roads - On Soil	100	5,750	1,000	1,000	
	Spine Roads - On Tertiary Deposits	100	1,150	-	-	
		Subtotal	**23,000**	**3,000**	**4,000**	
2.2	AP65 - Subbase					
	Main Roads - On Rock	-	49,000	-	-	
	Main Roads - On Soil	500	17,500	8,750	12,000	
	Main Roads - On Tertiary Deposits	300	3,500	1,050	1,000	10-15
		Subtotal	**70,000**	**10,000**	**13,000**	
	Spine Roads - On Rock	-	16,100	-	-	
	Spine Roads - On Soil	300	5,750	2,000	3,000	
	Spine Roads - On Tertiary Deposits	150	1,150	-	-	13-15
		Subtotal	**23,000**	**2,000**	**3,000**	
3	**HARDSTAND PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
3.1	GAP40 - Basecourse					
	On Rock	150	56,000	8,000	11,000	
	On Soil	200	20,000	4,000	6,000	
	On Tertiary Deposits	200	4,000	1,000	1,000	
		Subtotal	**80,000**	**13,000**	**18,000**	17-23
3.2	AP65 - Subbase					
	On Rock	-	-	-	-	
	On Soil	500	20,000	10,000	14,000	
	On Tertiary Deposits	300	4,000	1,200	2,000	
		Subtotal	**24,000**	**11,000**	**16,000**	
4	**CONSTRUCTION VILLAGE PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
4.1	GAP40 - Basecourse					
	On Soil	100	14,000	1,400	2,000	
		Subtotal	**14,000**	**1,400**	**2,000**	10-12
4.2	AP65 - Subbase					
	On Soil	300	14,000	4,200	6,000	
		Subtotal	**14,000**	**4,200**	**6,000**	
5	**OFFSITE SUBSTATION PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
5.1	GAP40 - Basecourse					
	On Soil	100	12,000	1,000	1,000	
		Subtotal	**12,000**	**1,000**	**1,000**	17-23
5.2	AP65 - Subbase					
	On Soil	300	12,000	4,000	6,000	
		Subtotal	**12,000**	**4,000**	**6,000**	
6	**ONSITE SUBSTATION PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
6.1	GAP40 - Basecourse					
	On Rock	100	7,500	1,000	1,000	17-23
		Subtotal	**8,000**	**1,000**	**1,000**	
7	**CONCRETE BATCHING PLANT PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
7.1	GAP40 - Basecourse					
	On Rock	100	5,000	1,000	1,000	17-23
		Subtotal	**5,000**	**1,000**	**1,000**	
8	**MISCELLANEOUS PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
8.1	GAP40 - Basecourse					
	On Rock	100	10,000	1,000	1,000	17-23
		Subtotal	**10,000**	**1,000**	**1,000**	
9	**TRANSMISSION ROAD PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
9.1	GAP40 - Basecourse					
	On Tertiary Deposits	100	15,000	2,000	3,000	
		Subtotal	**15,000**	**2,000**	**3,000**	13-15
9.2	AP65 - Subbase					
	On Tertiary Deposits	150	15,000	2,000	3,000	
		Subtotal	**15,000**	**2,000**	**3,000**	
10	**OLD COACH ROAD PAVEMENTS**	**Depth (mm)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
10.1	GAP40 - Basecourse					
	On Tertiary Deposits	100	12,800	1,000	1,000	
		Subtotal	**13,000**	**1,000**	**1,000**	1-9
10.2	AP65 - Subbase					
	On Tertiary Deposits	150	12,800	2,000	3,000	
		Subtotal	**13,000**	**2,000**	**3,000**	
11	**INTERNAL CABLING MATERIALS**	**Length (m)**	**Area (m2)**	**Quantity In-place (m3)**	**Quantity Loose (m3)**	
11.1	Backfill material (crusher dust)					
	Backfill material (crusher dust)	11,000	0.25	3,000	4,000	16-21
	Subtotal	11,000	0.25	3,000	4,000	
	SUMMARY					
	TURBINE FOUNDATIONS	**QUANTITY DRY (m3)**				
	Total sand (dry) (m3)	**9,000**				
	Total aggregates (dry) (m3)	**18,000**				
	Total cement (dry) (m3)	**6,000**				
	PAVEMENTS	**QUANTITY IN-PLACE (m3)**		**QUANTITY LOOSE (m3)**		
	GAP40 - Basecourse	**36,400**		**49,000**		
	AP65 - Subbase	**35,200**		**50,000**		
	Backfill material (crusher dust)	**3,000**		**4,000**		

3 Aggregate Supply Programme

Figures 1 below shows the assumed 26 month aggregate supply programme between Oct 2024 and Nov 2026 based on Table 11 above.

Mt Munro Wind Farm - Aggregrate Supply Programme

Activity	Year	2024			2025												2026											
	Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	Month No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Paving Aggregates																												
- Old Coach Road (Public Road)																												
- Main Laydown/Accommodation																												
- Internal Roads																												
- Transmission Road																												
- Hardstands																												
- Offsite Substation																												
- Onsite Substation																												
- Concrete Batching Plant																												
- Miscellaneous																												
Concrete Aggregates																												
-Turbine Foundations																												
Cable Trenching Aggregates																												
- Internal Roads																												

Figure 1 – Assumed Aggregate Supply Programme

4 Investigating Aggregate Sources

Assuming that no significant volumes can be won on-site this task involved investigating the volumes of aggregates that can be won from local quarries, the wider Wairarapa region and beyond.

At total of 9 Contractors/Quarries were contacted as shown in Table 12 below.

Table 12 – Contractors/Quarries Contacted

Contractors/Quarries	Location	Email
Haults Contractors	Palmerston North	dave@houltcontractors.co.nz
Blackley (Byfords)	Ashhurst	richard@byfords.co.nz
Hirock	Pahiatua	enquiries@hirock.co.nz
Pratts Quarry	Palmerston North	prattharvestingltd@xtra.co.nz
Stringfellows (Troup Rd)	Dvk	simon@stringfellows.co.nz
Prenters	Pahiatua	office@prenters.co.nz
Longburn Shingle	Longburn	sales@longburnshingle.co.nz
Winstone Aggregates	Lower Hutt	ben.hawkins@winstoneaggregates.co.nz
Kieran Oliver	Masterton	contact@kieranoliver.co.nz

Figure 2 shows the location of the Contractors/Quarries in relation to the Mt Munro project site.

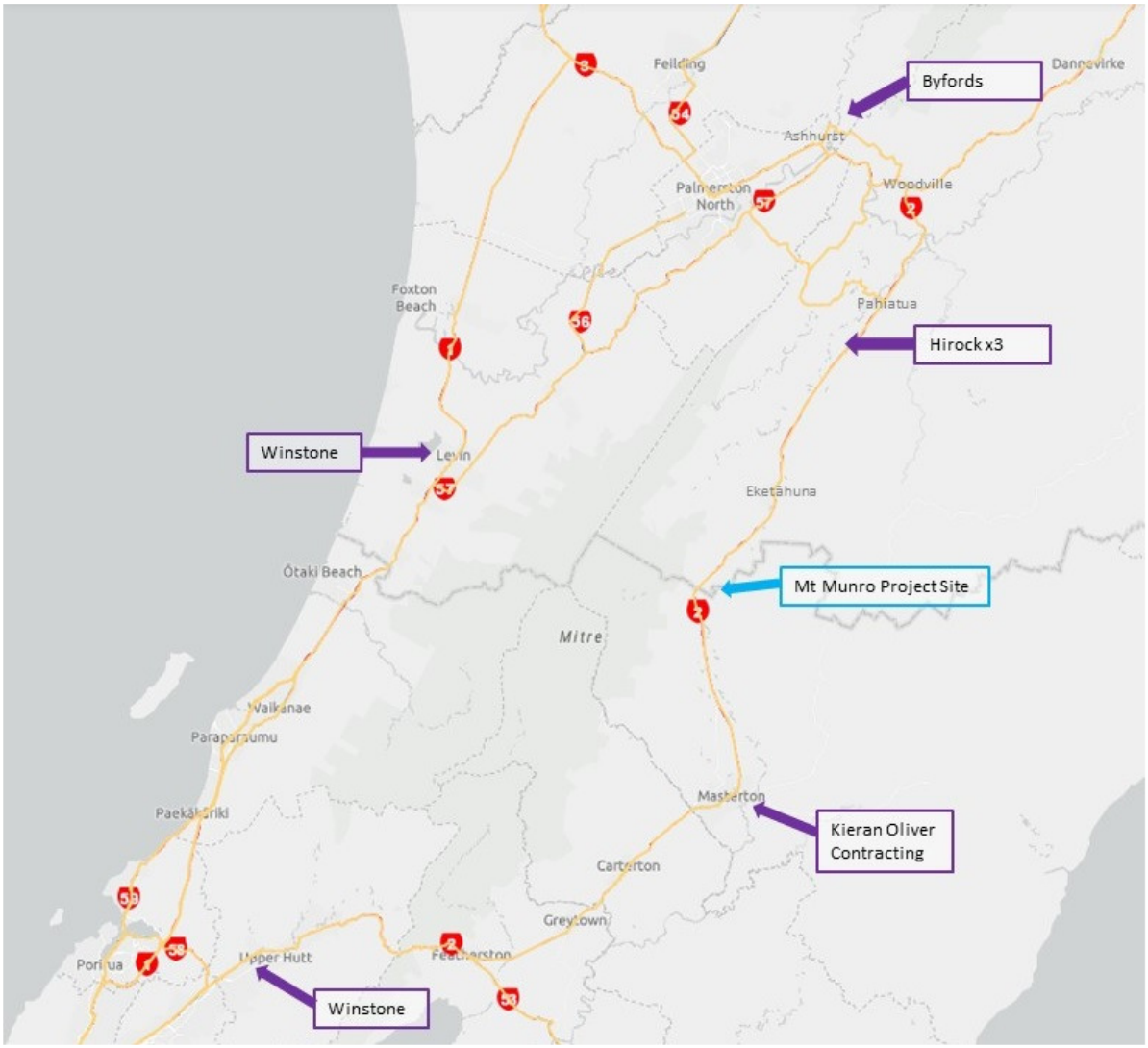

Figure 2 – Indicative Location of the Contractors/Quarries in relation to Mt Munro

6 Traffic Movement Assessment

This section provides an estimate of the truck movements to supply the aggregate materials over the construction period based on the following assumptions:

- the required material can be supplied as outlined in the previous section
- the supply rate is based on Table 9 in the first section of this memo
- Capacity of 6 wheel truck is 10 tonnes
- Capacity of truck and trailer is 25 tonnes

Figures 3 and 4 on the following pages show the monthly and daily traffic volumes generated from the supply of aggregates to the site over the assumed 26 month aggregate supply programme between Oct 2024 and Nov 2026.

Figure 3 includes the following aggregate supply generating activities:

- Paving Aggregates
    - Old Coach Road (Public Road)
    - Main Laydown/Accommodation
    - Internal Roads
    - Transmission Road
    - Hardstands
    - Offsite Substation
    - Onsite Substation
    - Concrete Batching Plant
    - Miscellaneous
- Concrete Aggregates
    - Turbine Foundations
- Cable Trenching Aggregates
    - Internal Roads

Figure 4 includes all the above activities excluding paving aggregates for the transmission road and off site substation.

Mt Munro Wind Farm - Truck Movements Over Aggregate Supply Period

Activity	Year	**2024**			**2025**												**2026**											
	Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	Month No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Paving Aggregates																												
- Old Coach Road (Public Road)																												
- Main Laydown/Accommodation																												
- Internal Roads																												
- Transmission Road																												
- Hardstands																												
- Offsite Substation																												
- Onsite Substation																												
- Concrete Batching Plant																												
- Miscellaneous																												
Concrete Aggregates																												
-Turbine Foundations																												
Cable Trenching Aggregates																												
- Internal Roads																												
Material Type	**Volume (m3)**	**Supply Rate (m3/month)**																										
GAP40	48,000	222	222	222	222	222	222	222	222	222	667	667	667	667	667	667		6000	6000	6000	6000	6000	6000	6000				
AP65	50,000	333	333	333	333	333	333	333	333	333	2,000	2,000	2,000	1,000	1,000	1,000		5429	5429	5429	5429	5429	5429	5429				
Sand (dry)	9,000																				1286	1286	1286	1286	1286	1286	1286	
Aggregates (dry)	18,000																				2571	2571	2571	2571	2571	2571	2571	
Backfill Material (crusher dust)	4,000																667	667	667	667	667	667						
Cement	6,000																				857	857	857	857	857	857	857	
	Total volume per month	**556**	**556**	**556**	**556**	**556**	**556**	**556**	**556**	**556**	**2,667**	**2,667**	**2,667**	**1,667**	**1,667**	**1,667**	**667**	**12,095**	**12,095**	**12,095**	**16,810**	**16,810**	**16,143**	**16,143**	**4,714**	**4,714**	**4,714**	
		Truck return trips per month																										
	Truck (10 tonne)	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**360**	**360**	**360**	**225**	**225**	**225**	**103**	**1,646**	**1,646**	**1,646**	**2,325**	**2,325**	**2,222**	**2,222**	**679**	**679**	**679**	
	Truck and Trailer (25 tonne)	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**144**	**144**	**144**	**90**	**90**	**90**	**41**	**658**	**658**	**658**	**930**	**930**	**889**	**889**	**272**	**272**	**272**	
		Truck return trips per day																										
	Truck (10 tonne)	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**17**	**17**	**17**	**10**	**10**	**10**	**5**	**76**	**76**	**76**	**107**	**107**	**102**	**102**	**31**	**31**	**31**	
	Truck and Trailer (25 tonne)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**7**	**7**	**7**	**4**	**4**	**4**	**2**	**30**	**30**	**30**	**43**	**43**	**41**	**41**	**13**	**13**	**13**	

Figure 3 – Estimated Truck Movements Over Aggregate Supply Period

Mt Munro Wind Farm - Truck Movements Over Aggregate Supply Period

Activity	Year	**2024**			**2025**												**2026**											
	Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	Month No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Paving Aggregates																												
- Old Coach Road (Public Road)																												
- Main Laydown/Accommodation																												
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- Miscellaneous																												
Concrete Aggregates																												
-Turbine Foundations																												
Cable Trenching Aggregates																												
- Internal Roads																												
Material Type	**Volume (m3)**	**Supply Rate (m3/month)**																										
GAP40	48,000	222	222	222	222	222	222	222	222	222	667	667	667					5714	5714	5714	5714	5714	5714	5714				
AP65	50,000	333	333	333	333	333	333	333	333	333	2,000	2,000	2,000					4714	4714	4714	4714	4714	4714	4714				
Sand (dry)	9,000																				1286	1286	1286	1286	1286	1286	1286	
Aggregates (dry)	18,000																				2571	2571	2571	2571	2571	2571	2571	
Backfill Material (crusher dust)	4,000																667	667	667	667	667	667						
Cement	6,000																				857	857	857	857	857	857	857	
	Total volume per month	**556**	**556**	**556**	**556**	**556**	**556**	**556**	**556**	**556**	**2,667**	**2,667**	**2,667**	**-**	**-**	**-**	**667**	**11,095**	**11,095**	**11,095**	**15,810**	**15,810**	**15,143**	**15,143**	**4,714**	**4,714**	**4,714**	
		Truck return trips per month																										
	Truck (10 tonne)	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**360**	**360**	**360**	**-**	**-**	**-**	**103**	**1,511**	**1,511**	**1,511**	**2,190**	**2,190**	**2,087**	**2,087**	**679**	**679**	**679**	
	Truck and Trailer (25 tonne)	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**30**	**144**	**144**	**144**	**-**	**-**	**-**	**41**	**604**	**604**	**604**	**876**	**876**	**835**	**835**	**272**	**272**	**272**	
		Truck return trips per day																										
	Truck (10 tonne)	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**17**	**17**	**17**	**-**	**-**	**-**	**5**	**70**	**70**	**70**	**101**	**101**	**96**	**96**	**31**	**31**	**31**	
	Truck and Trailer (25 tonne)	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**7**	**7**	**7**	**-**	**-**	**-**	**2**	**28**	**28**	**28**	**40**	**40**	**38**	**38**	**13**	**13**	**13**	

Figure 4 – Estimated Truck Movements Over Aggregate Supply Period (excluding paving aggregates for the transmission road and offsite substation)

Appendix A – Pavement Design Assumptions

Geological subgrade	**Likely California Bearing Ratio (CBR)**	**Main Roads**
Greywacke Sandstone and Siltstone	High >50	150mm Compacted GAP40 over Cut
Tertiary Mudstone or Siltstone (very limited section of road expected)	Assumed CBR>10	200mm Compacted GAP40 over 300mm Compacted AP65
Overlying Soils	Assumed CBR>5	Compacted 200mm GAP40 over 500mm Compacted AP65

Geological subgrade	**Likely California Bearing Ratio (CBR)**	**Spine Roads**
Greywacke Sandstone and Siltstone	High >50	100mm Compacted GAP40 over Cut
Tertiary Mudstone or Siltstone (very limited section of road expected)	Assumed CBR>10	100mm Compacted GAP40 over 150mm Compacted AP65
Overlying Soils	Assumed CBR>5	Compacted 100mm GAP40 over 300mm Compacted AP65

Appendix B – Mt Munro Wind Farm Civil Works Assessment Wind Turbine Foundations – 'Proof of Concept' Design Gravity Pad Foundation Dimensions

CALCULATION SHEET

Project/Task/File No:	5-C4317.00	Sheet No:	2	of
Project Description:	Mt Munro Wind Turbines	Office:	Wgtn	
	Gravity Pad Foundations	Computed	EB	12/11/2021
	Dimensions	Checked:		

Foundation Design

Conservatively assume bad ground conditions and high water level

Inputs	***Input Symbol***	**Input Value**		**References**
Foundation Dimensions				
Diameter of Steel Cylinder	d	6	m	
Embedment of Steel Cylinder in Pad		0	m	
Steel Cylinder Projection above Ground		0	m	
Thickness of concrete cover around shell		0	m	
Foundation Depth	h_1	2	m	
	h_2	0.5	m	
Depth of Soil above	h_3	1	m	
Water level below ground	h_4	N	m	"N" for no effect
Dimensions of octogonal pad	D	23	m	
	r	12.45	m	
	s	9.53	m	
Plan Area	A	438	m^2	
Average Foundation Depth	h_{avg}	2.25	m	
Area of Concrete Cylinder	A_{cyl}	28.3	m^2	
Total Volume of Concrete	V_{conc}	1021	m^3	
Equivalent diameter of circle	d	23.62	m	
Section Modulus	Z	1294	m^3